PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

TENNESSEE VALLEY AUTHORITY

1101 Market Street, Chattanooga, Tennessee 37402

NNP-25-003

April 28, 2025

10 CFR 50.30
10 CFR 2.101
10 CFR 2.390

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-001

Clinch River Project
NRC Docket No. 99902056

Subject: Submittal of the Environmental Report in Support of the Clinch River Nuclear Site Construction Permit Application

References

1. U.S. Nuclear Regulatory Commission, Tennessee Valley Authority – Clinch River Nuclear Site Ealy Site Permit (ESP-006), dated December 19, 2019 (ML19352D868)
2. U.S. Nuclear Regulatory Commission, Response to Tennessee Valley Authority Request for Exemption from Certain Requirements of Title 10 of the Code of Federal Regulations Section 2.101(a)(5), dated November 21, 2023 (ML23045A008)
3. U.S. Nuclear Regulatory Commission, Tennessee Valley Authority – Clinch River Nuclear Site Construction Permit Preapplication Readiness Assessment Report for the Draft Environmental Report (ML24218A168), dated August 5, 2024

The Tennessee Valley Authority (TVA) hereby submits the attached portions of its construction permit application (CPA) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," to construct a GE-Hitachi (GEH) BWRX-300 small modular reactor (SMR) at the Clinch River Nuclear Site (CRN Site) in Oak Ridge, Tennessee. The GEH BWRX-300 is an 870 megawatt-thermal (300 megawatt-electric) water-cooled natural circulation SMR that utilizes simple natural phenomena-driven safety systems.

PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

This CPA incorporates by reference the Clinch River Nuclear Site Early Site Permit (ESP-006), effective December 19, 2019 (Reference 1).

The requirements in 10 CFR 2.101(a)(5) for submitting a CPA state that an applicant may submit the information required in two parts. Further, Section (a)(5) specifies that the Preliminary Safety Analysis Report (PSAR) (required by 10 CFR 50.34(a)(1)) must be submitted with "whichever part is filed first." By letter dated November 21, 2023, (Reference 2), the NRC granted TVA an exemption that allows submittal of the PSAR with the second part of the CPA. Therefore, consistent with the exemption from 10 CFR 2.101(a)(5), this letter provides the CRN Site Environmental Report, and the additional information required to be submitted in this initial CPA submittal. Specifically, this submittal also includes the general information required by 10 CFR 50.33.

Enclosure 1 of this letter contains the public version of the CRN Site CPA, Enclosure 1, General and Administrative Information. Enclosure 2 of this letter contains the public version of the CRN Site CPA, Enclosure 5, Environmental Report.

Enclosures 3 and 4 of this letter (non-public versions of CPA Enclosures 1 and 5) contain proprietary or other sensitive information and, as such, it is requested that they be withheld from public disclosure in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." An affidavit certifying the basis for the request to withhold the identified information from public disclosure is included as Enclosure 5 of this letter. Proprietary or other sensitive information has been redacted from the documents provided in Enclosures 1 and 2 of this letter. Redacted information is identified in Enclosure 1 of this letter using [ ]$^{(a)(4)}$ and in Enclosure 2 of this letter using [ ]$^{(a)(3)}$.

TVA understands that a filing fee and fees for review of the CPA are based on the full costs of the review, in accordance with 10 CFR 50.30(e) and 10 CFR 170.21. TVA requests that the fees be invoiced for payment.

NRC completed a preapplication readiness assessment of TVA's draft Environmental Report in accordance with LIC-116, "Preapplication Readiness Assessment." NRC's observations provided TVA with the opportunity to resolve questions and ensure sufficient information is provided in the Environmental Report to foster an efficient NRC acceptance review and a predictable schedule for the staff's technical review. TVA dispositioned the NRC's general and specific observations from the Preapplication Readiness Assessment Report (Reference 3) during completion of the enclosed Environmental Report.

Based on the preapplication engagements, TVA requests a 24-month review schedule be considered for the Environmental Report.

PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

Activities that are subject to other licenses will be embedded in the 10 CFR Part 50 licensed facility, including the ability to receive, possess, produce, use, and transfer special nuclear material, source material, and byproduct material. Further information is provided in Enclosure 1 of the CPA and requests for additional licenses will be submitted to the NRC with a future application and request for an operating license under 10 CFR 50.34(b) or earlier, if needed, to support activities on the construction site.

As communicated previously, the TVA Board has not yet authorized the deployment of a SMR at the CRN Site. TVA's submittal of the CPA is an important step to de-risk the licensing aspect of a potential, future SMR deployment. Any decisions about deployment will be subject to support, risk sharing, required internal and external approvals, and completion of necessary environmental and permitting reviews.

The remaining portions of the CPA, in accordance with TVA's exemption from 10 CFR 2.101(a)(5), will be provided by June 2025.

Please address any questions regarding this application to Mr. Ray Schiele, Senior Manager Licensing, New Nuclear Program, at rjschiele@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 28th day of April 2025.

Sincerely,

Scott W. Hunnewell
Vice President, New Nuclear Program

Enclosures

cc: see page 4

PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

Enclosures:

1. Clinch River Nuclear Site Construction Permit Application Enclosure 1, General and Administrative Information (Public Version)
2. Clinch River Nuclear Site Construction Permit Application Enclosure 5, Environmental Report (Public Version)
3. Clinch River Nuclear Site Construction Permit Application Enclosure 1, General and Administrative Information (Non-Public Version)
4. Clinch River Nuclear Site Construction Permit Application Enclosure 5, Environmental Report (Non-Public Version)
5. TVA Affidavit and Request for Withholding from Public Disclosure (10 CFR 2.390(a)(3) and (4))

cc: (with Enclosures):

Mike King, Acting Director, Office of Nuclear Reactor Regulation (NRR)
Gregory T. Bowman, Deputy Office Director for New Reactors, NRR
Michele M. Sampson, Director, Division of New and Renewed Licenses
Chris M. Regan, Director, Division of Rulemaking, Environmental, and Financial Support
Samuel S. Lee, Deputy Director, Division of New and Renewed Licenses
John M. Moses, Deputy Director, Division of Rulemaking, Environmental, and Financial Support
Michele Hayes, Branch Chief, New Reactor Licensing Branch
Daniel Barnhurst, Branch Chief, Environmental Review New Reactors Branch
Allen H. Fetter, NRC Project Manager, Clinch River Nuclear Site
Madelyn Nagel, Project Manager, Environmental Review New Reactors Branch

PROPRIETARY AND SENSITIVE INFORMATION – WITHHOLD UNDER 10 CFR 2.390
This page is decontrolled when separated from Enclosures 3 and 4.

ENCLOSURE 1

Clinch River Nuclear Site Construction Permit Application
Enclosure 1, General and Administrative Information
(Public Version)

TENNESSEE VALLEY AUTHORITY

Clinch River Nuclear Site General and Administrative Information

Construction Permit Application – Enclosure 1

Revision 0

TABLE OF CONTENTS

ENCLOSURE 1 GENERAL AND ADMINISTRATIVE INFORMATION 1-1

1.0 Introduction 1-1

1.1 Applicant's Corporate Information 1-1

1.1.1 Name of Applicant 1-1

1.1.2 Description of Business or Occupation 1-1

1.1.3 Organization and Management 1-2

1.1.4 Requested Licenses and Authorized Uses 1-2

1.1.5 Construction Schedule 1-3

1.1.6 Listing of Regulatory Agencies Having Jurisdiction and News Publications 1-3

1.2 Financial Qualifications 1-4

1.2.1 Reasonable Assurance to Obtain Construction Funds 1-4

1.2.2 Sources of Available Funding 1-5

1.3 Foreign Ownership, Control, or Domination 1-5

1.4 Restricted Data or Other Defense Information 1-5

Appendix 1A Estimated Total Construction Costs for CRN-1 . . . . . 1A-1

Appendix 1B TVA 10K Financial Statement 1B-1

Appendix 1C TVA 10Q Financial Statement 1C-1

ENCLOSURE 1 GENERAL AND ADMINISTRATIVE INFORMATION

1.0 Introduction

This enclosure to the Construction Permit Application (CPA) for the Clinch River Nuclear (CRN) Site addresses the requirements of 10 CFR 50.33, “Content of applications; general information,” and provides details of the applicant’s corporate identity and location; applicant’s ownership organization; the types of licenses being applied for; the applicant’s financial qualifications; foreign ownership, control, or domination information; and agreement limiting access to classified information.

1.1 Applicant’s Corporate Information

1.1.1 Name of Applicant

The Tennessee Valley Authority (TVA) is the applicant for the Construction Permit for the CRN Site and will own and operate the proposed GE Hitachi Nuclear Energy (GEH) BWRX-300 small modular reactor technology at the CRN Site, hereafter referred to as CRN-1. The CRN Site and associated transmission corridors are owned by the United States of America and managed by the applicant as an agent of the Federal government. The applicant’s corporate headquarters is located at:

Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902
(865) 632-2101

1.1.2 Description of Business or Occupation

TVA, a wholly-owned corporate agency and instrumentality of the United States, was created in 1933 by the U.S. Congress by virtue of the Tennessee Valley Authority Act of 1933, as amended, 16 U.S.C. §§ 831-831 (as amended, the “TVA Act”). TVA was created to, among other things, improve navigation on the Tennessee River, reduce the damage from destructive flood waters within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers, further the economic development of TVA’s service area in the southeastern U.S., and sell the electricity generated at the facilities TVA operates. Today, TVA operates the nation’s largest public power system and supplies power to directly served customers, which include seven federal agency customers, and 153 local power company customers (“LPCs”) in most of Tennessee, northern Alabama, northeastern Mississippi, and southwestern Kentucky and in portions of northern Georgia, western North Carolina, and southwestern Virginia to a population of approximately 10 million people. TVA generates nearly all its revenues from the sale of electricity, and in 2024 revenues from the sale of electricity totaled 12.1 billion**.**

1.1.3 Organization and Management

The business and affairs of the TVA are managed under the direction of a nine-member Board of Directors. Board members are nominated by the President of the United States and confirmed by the Senate. Board members serve five-year terms and at least seven of the Board members must be residents of the TVA service territory. Board members elect the Chairman of the Board, and the Board has hiring authority over the Chief Executive Officer (CEO). The business address for the TVA Board and its executive officers is:

Tennessee Valley Authority Board of Directors
400 West Summit Hill Drive, WT 7B
Knoxville, TN 37902-1401

The TVA Board (as of April 1, 2025) consisted of the following four individuals, all of whom are citizens of the U.S.:

- William J. Renick (Chairman)
- Beth P. Geer
- Robert P. Klein
- Wade White

The President and CEO of TVA is a U.S. citizen, who is selected by the Board of Directors and is the senior executive responsible for TVA's day-to-day operations.

The names and titles of TVA's executive officers (as of April 1, 2025), all of whom are citizens of the U.S., are as follows:

- Donald A. Moul - President and Chief Executive Officer and Chief Operating Officer
- Tom Rice - Senior Vice President and Chief Financial Officer
- Timothy S. Rausch - Executive Vice President and Chief Nuclear Officer
- Rebecca Tolene - Acting Executive Vice President, General Counsel and Corporate Secretary
- William M. Trumm - Acting Vice President, Chief Human Resources Officer
- Jeannette Mills - Executive Vice President and Chief External Relations Officer
- Aaron Melda - Senior Vice President, Enterprise Strategy & External Affairs

1.1.4 Requested Licenses and Authorized Uses

This application is for a construction permit for a utilization facility under 10 CFR 50. TVA expects to apply for a future Class 103 operating license for a 40-year period pursuant to 10 CFR 50.22 (for commercial and industrial facilities), as well as future licenses for byproduct material under 10 CFR 30, for receipt, possession, and use of source material under 10 CFR 40, and for special nuclear material under 10 CFR 70. This application references the Early Site Permit (ESP) for the Clinch River Nuclear Site, as permitted by 10 CFR 50.32. The ESP application evaluated the suitability of the CRN Site for two or more units bounded by a plant parameter envelope (PPE).

The PPE was selected to bound the design characteristics of a number of reactor designs. This CPA incorporates information from the ESP Site Safety Analysis Report that addressed siting and environmental issues in the ESP proceeding, and provides the required information for comparing CRN-1 with the site characteristics and design parameters specified in the ESP.

CRN-1 will be used to demonstrate the feasibility to license, construct, and operate SMR technology at the CRN Site. The period of time for which the permit is requested shall begin upon the NRC's granting of the construction permit for CRN-1 and shall expire 20 years from the date upon which the NRC makes a finding that acceptance criteria are met under 10 CFR 50.35.

TVA acknowledges that a construction permit will constitute an authorization for TVA to proceed with construction but will not constitute Commission approval of the safety of any design feature or specification unless TVA specifically requests such approval, and such approval is incorporated in the permit. Also, the construction permit will be subject to the limitation that a license authorizing operation of the facility will not be issued by the Commission until (1) TVA has submitted to the Commission, by amendment to the application, the complete final safety analysis report, portions of which may be submitted and evaluated from time to time, and (2) the Commission has found that the final design provides reasonable assurance that the health and safety of the public will not be endangered by operation of the facility in accordance with the requirements of the license and the regulations of 10 CFR Part 50.

1.1.5 Construction Schedule

TVA is requesting NRC review and approval of the construction permit application by the 2nd quarter of government fiscal year (FY) 2027 to support construction of safety-related structures, systems, and components. The earliest projected date for completion of construction for CRN-1 is by the 3rd quarter of government fiscal year (FY) 2031, and the latest projected date for completion of CRN-1 is by the 3rd quarter of government fiscal year (FY) 2032.

1.1.6 Listing of Regulatory Agencies Having Jurisdiction and News Publications

With regard to the requirement of 10 CFR 50.33(i), under the TVA Act, the TVA Board has the sole authority to set the rates that TVA charges for electricity and is responsible for determining provisions to be included in TVA contracts relating to power service. This authority provides the TVA Board the flexibility to set rates at a level sufficient to generate adequate revenues to service TVA's financial obligations, properly operate and maintain its assets, and provide for reinvestment in its power program. Accordingly, these rates are not subject to review or approval by any state or federal regulatory body, and therefore, this part of 10 CFR 50.33(i) is not applicable to TVA.

A list of trade and news publications, which circulate in the area where the proposed activity will be conducted and which are considered appropriate to give reasonable notice of the application (e.g. municipalities, private utilities, public bodies, and cooperatives which might have a potential interest in the facility) are as follows:

Roane County News
1430 N. Gateway Ave.

Rockwood, TN 37854
865-376-3481

Knoxville News Sentinel
2332 News Sentinel Drive
Knoxville, TN 37921
1-844-900-7097

News-Herald
201 Simpson Road
Lenoir City, TN 37771
865-986-6581

Oak Ridger
575 Oak Ridge Turnpike, Suite 100
Oak Ridge, TN 37830
(865) 482-1021

Courier News
233 N Hicks St
Clinton, TN 37716
(865) 457-2515

1.2 Financial Qualifications

Pursuant to the requirements of 10 CFR 50.33(f)(1), an applicant for a construction permit is required to include information sufficient to demonstrate to the Commission that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. The information necessary to demonstrate TVA's financial qualifications to obtain construction funds and fuel cycle costs is provided in this subsection.

An estimate of CRN-1 construction costs is provided in Appendix 1A. The construction cost estimate is the total production plant costs with contingency, transmission costs (Substation only), and nuclear plant inventory first core costs.

1.2.1 Reasonable Assurance to Obtain Construction Funds

Pursuant to the requirements of 10 CFR 50.33(f), an applicant for a construction permit is required to include information sufficient to demonstrate the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. To satisfy this requirement, TVA's financial statements filed with the Securities and Exchange Commission (SEC) can be found at the following link: TVA - Financial Information - SEC Filings (q4ir.com)

The annual financial statement for TVA (SEC Form 10-K for the fiscal year ended September 30, 2024) is provided as Appendix 1B hereto and the quarterly financial statement (SEC Form 10-Q for the quarterly period ended December 31, 2024) is provided as Appendix 1C.

An examination of TVA's financial statements confirms the financial strength of TVA and supports the conclusion that TVA possesses, or has reasonable assurance of being able to obtain, funds sufficient for the construction of CRN-1.

1.2.2 Sources of Available Funding

TVA expects to have sufficient capabilities or access to sufficient third-party financing, to complete or direct the construction of the plant. TVA generally uses cash from operations, together with proceeds from power system financings, to fund its cash needs. TVA power system financings consist primarily of the sale of Bonds and secondarily of alternative forms of financing, such as lease arrangements. Additionally, TVA may work with partners to use third-party commercial financing if such arrangements can provide financial flexibility, optimization of the use of tax credits or related incentives, or other benefits. TVA plans to finance the cost to construct CRN-1 through TVA debt, tax credits available to TVA under the Inflation Reduction Act of 2022, and with any grants available to TVA, or through a combination of TVA debt and third-party financing, or through a third-party commercial financing arrangement. For third party arrangements, the form of financing may depend on the availability of certain federal subsidies such as grants or federal loan guarantees under the provisions of the Energy Policy Act of 2005. The roles of TVA in a commercial financing transaction may be influenced by requirements or restrictions, including restrictions that may affect the availability of tax credits, related to the uses of the various forms of funding, particularly considering TVA's status as a wholly owned federal government corporation.

1.3 Foreign Ownership, Control, or Domination

TVA, being a wholly-owned agency and instrumentality of the United States, is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government as set forth in 10 CFR 50.38.

1.4 Restricted Data or Other Defense Information

The construction permit application for CRN-1 does not contain any Restricted Data or other Classified National Security Information, nor does it result in any change in access to any Restricted Data or National Security Information. In addition, it is not expected that activities conducted in accordance with the proposed construction permit will involve such information. However, in the event that such information does become involved, and in accordance with 10 CFR 50.37, "Agreement limiting access to Classified Information," TVA will not permit any individual to have access to, or any facility to possess, Restricted Data or National Security Information until the individual and/or facility has been approved for such access under the provisions of 10 CFR Part 25, "Access Authorization for Licensee Personnel," and/or 10 CFR Part 95, "Facility Security Clearance and Safeguarding of National Security Information and Restricted Data".

Appendix 1A Estimated Total Construction Costs for CRN-1

Total nuclear production plant cost [ ](a)(4)

The estimated total construction cost for CRN-1 is considered proprietary information that is being withheld in accordance with 10 CFR 2.390(a)(4).

Appendix 1B TVA 10K Financial Statement

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(MARK ONE)

☒ ANNUAL REPORT PURSUANT TO

SECTION 13, 15(d), OR 37 OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended September 30, 2024

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____



Commission file number 000-52313

TENNESSEE VALLEY AUTHORITY
(Exact name of registrant as specified in its charter)

A corporate agency of the United States created by an act of Congress *(State or other jurisdiction of incorporation or organization)*	62-0474417 *(IRS Employer Identification No.)*
400 W. Summit Hill Drive Knoxville, Tennessee *(Address of principal executive offices)*	37902 *(Zip Code)*

(865) 632-2101
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
N/A	N/A	N/A

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes ☐ No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13, Section 15(d), or Section 37 of the Act.
Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13, 15(d), or 37 of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).
Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Emerging growth company ☐ Smaller reporting company ☐
Non-accelerated filer ☒ Accelerated filer ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).
Yes ☐ No ☒

Estimated aggregate market value of the common equity held by non-affiliates of TVA at March 31, 2024: N/A

Number of shares of common stock outstanding at November 13, 2024: N/A

Table of Contents

GLOSSARY OF COMMON ACRONYMS	4
FORWARD-LOOKING INFORMATION	6
GENERAL INFORMATION	8
PART I	
ITEM 1. BUSINESS	9
The Corporation	9
Service Area	10
Customers	11
Rates	12
Power Supply and Load Management Resources	12
Fuel Supply	21
Transmission	23
Weather and Seasonality	24
Competition	24
Research and Development	25
Flood Control Activities	26
Environmental Stewardship Activities	26
Economic Development Activities	28
Regulation	28
Taxation and Tax Equivalents	30
Environmental Matters	30
Human Capital Management	38
ITEM 1A. RISK FACTORS	41
ITEM 1B. UNRESOLVED STAFF COMMENTS	55
ITEM 1C. CYBERSECURITY	55
ITEM 2. PROPERTIES	56
Generating Properties	56
Transmission Properties	58
Natural Resource Stewardship Properties	58
Buildings	58
Disposal of Property	58
ITEM 3. LEGAL PROCEEDINGS	59
ITEM 4. MINE SAFETY DISCLOSURES	59
PART II	
ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES	60
ITEM 6. RESERVED	60
ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS	60
Business and Mission	60
Executive Overview	63
Results of Operations	65
Liquidity and Capital Resources	70
Key Initiatives and Challenges	75
Critical Accounting Estimates	83
New Accounting Standards and Interpretations	89
Legislative and Regulatory Matters	89
Environmental Matters	89
Legal Proceedings	89
Risk Management Activities	89
ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK	92
ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA	93
Consolidated Balance Sheets	94
Consolidated Statements of Operations	93
Consolidated Statements of Comprehensive Income (Loss)	96
Consolidated Statements of Cash Flows	97
Consolidated Statements of Changes in Proprietary Capital	98
Notes to Consolidated Financial Statements	99
Report of Independent Registered Public Accounting Firm (PCAOB ID 42)	160

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE	163
ITEM 9A. CONTROLS AND PROCEDURES	163
Disclosure Controls and Procedures	163
Internal Control over Financial Reporting	163
Report of Independent Registered Public Accounting Firm	164
ITEM 9B. OTHER INFORMATION	165
ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS	165
PART III	
ITEM 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE	166
Directors	166
Executive Officers	167
Disclosure and Financial Code of Ethics	168
Insider Trading Policy	168
Committees of the TVA Board	168
ITEM 11. EXECUTIVE COMPENSATION	170
Compensation Discussion and Analysis	170
CEO Pay Ratio Disclosure	196
Executive Compensation Tables and Narrative Disclosures	197
Director Compensation	208
Compensation Committee Interlocks and Insider Participation	210
Compensation Committee Report	210
ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS	211
ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE	211
Director Independence	211
Related Party Transactions	211
ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES	213
PART IV	
ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES	214
ITEM 16. FORM 10-K SUMMARY	217
SIGNATURES	218

GLOSSARY OF COMMON ACRONYMS

Following are definitions of some of the terms or acronyms that may be used in this Annual Report on Form 10-K for the fiscal year ended September 30, 2024 (the "Annual Report"):

Term or Acronym	Definition
ACPA	Anti-Cherrypicking Amendment
AI	Artificial intelligence
AOCI	Accumulated other comprehensive income (loss)
ARO	Asset retirement obligation
ART	Asset Retirement Trust
Bonds	Bonds, notes, or other evidences of indebtedness
Bull Run	Bull Run Fossil Plant
CAA	Clean Air Act
CCR	Coal combustion residuals
CCRMUs	CCR Management Units
CO_2	Carbon dioxide
COLA(s)	Cost-of-living adjustment(s)
CSAPR	Cross-State Air Pollution Rule
CTs	Combustion turbine unit(s)
Cumberland	Cumberland Fossil Plant
CVA	Credit valuation adjustment
CWA	Clean Water Act
CY	Calendar year
DBOT	Down-blend offering for tritium
DCP	Deferred Compensation Plan
DER	Distributed energy resources
DOE	Department of Energy
EIS	Environmental Impact Statement
ELGs	Effluent limitation guidelines
EO(s)	Executive order(s)
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ERC	Enterprise Risk Council
FASB	Financial Accounting Standards Board
FERC	Federal Energy Regulatory Commission
FHP	Financial Hedging Program
FIP	Federal Implementation Plan
FPA	Federal Power Act
GAAP	Accounting principles generally accepted in the United States of America
GAC	Grid access charge
GEH	GE Hitachi Nuclear Energy
GHG	Greenhouse gas
Holdco	John Sevier Holdco LLC
IRP	Integrated Resource Plan
IwD	Inclusion with Diversity
Jacobs	Jacobs Engineering Group, Inc.
JACTG	Johnsonville Aeroderivative Combustion Turbine Generation LLC
JHLLC	Johnsonville Holdco LLC.
JSCCG	John Sevier Combined Cycle Generation LLC
kWh	Kilowatt hours

Legacy CCR Rule	Legacy Coal Combustion Residuals Rule
Legacy SIs	Legacy CCR Surface Impoundments
LPCs	Local power company customers
MD&A	Management's Discussion and Analysis of Financial Condition and Results of Operations
MLGW	Memphis Light, Gas and Water Division
mmBtu	Million British thermal unit(s)
MtM	Mark-to-market
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NAV	Net asset value
NDT	Nuclear Decommissioning Trust
NEIL	Nuclear Electric Insurance Limited
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NES	Nashville Electric Service
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NYSE	New York Stock Exchange
PARRS	Putable Automatic Rate Reset Securities
PPAs	Power purchase agreements
QTE	Qualified technological equipment and software
RCRA	Resource Conservation and Recovery Act
RECs	Renewable energy certificates
RFP	Request for proposal
RP	Restoration Plan
SCCG	Southaven Combined Cycle Generation LLC
SCRs	Selective catalytic reduction systems
SEC	Securities and Exchange Commission
SERP	Supplemental Executive Retirement Plan
SHLLC	Southaven Holdco LLC
SIPs	State implementation plans
SMR	Small modular reactor(s)
SO_2	Sulfur dioxide
TDEC	Tennessee Department of Environment & Conservation
TIPS	Treasury Inflation-Protected Securities
TPBAR	Tritium-producing burnable absorber rods
TVA	Tennessee Valley Authority
TVA Act	Tennessee Valley Authority Act of 1933, as amended
TVA Board	TVA Board of Directors
TVARS	Tennessee Valley Authority Retirement System
U.S. Treasury	United States Department of the Treasury
USACE	U.S. Army Corps of Engineers
VIE(s)	Variable interest entity(ies)
XBRL	eXtensible Business Reporting Language

FORWARD-LOOKING INFORMATION

This Annual Report on Form 10-K for the fiscal year ended September 30, 2024 contains forward-looking statements relating to future events and future performance. All statements other than those that are purely historical may be forward-looking statements. In certain cases, forward-looking statements can be identified by the use of words such as "may," "will," "should," "expect," "anticipate," "believe," "intend," "project," "plan," "predict," "assume," "forecast," "estimate," "objective," "possible," "probably," "likely," "potential," "speculate," "aim," "aspiration," "goal," "seek," "strategy," "target," the negative of such words, or other similar expressions.

Although the Tennessee Valley Authority ("TVA") believes that the assumptions underlying any forward-looking statements are reasonable, TVA does not guarantee the accuracy of these statements. Numerous factors could cause actual results to differ materially from those in any forward-looking statements. These factors include, among other things:

- Significant additional costs for TVA to manage and operate its coal combustion residuals ("CCR") facilities;
- The cost of complying with known, anticipated, or new environmental requirements, some of which could render continued operation of many of TVA's aging coal-fired generation units not cost-effective or result in their removal from service, perhaps permanently;
- Federal legislation aimed specifically at curtailing TVA's activities, including legislation that may require the divestiture of TVA or the sale of certain of TVA's assets; restrict access to its U.S. Treasury account; eliminate its sole authority to set rates; restrict its authority to manage the Tennessee River system; lower the debt ceiling on bonds, notes, or other evidences of indebtedness (collectively, "Bonds") specified in the Tennessee Valley Authority Act of 1933, as amended ("TVA Act"); or limit its ability to pay its Chief Executive Officer or other employees competitive salaries;
- New, existing, or amended laws, regulations, executive orders ("EOs"), or administrative order or interpretations, including those related to climate change and other environmental matters, and the costs of complying with these laws, regulations, EOs, or administrative orders or interpretations;
- Loss of TVA's protected service territory if the Federal Energy Regulatory Commission ("FERC") were to limit the application of the anti-cherrypicking provision, or if Congress were to eliminate the anti-cherrypicking provision, without corresponding legislative modifications to the territorial limitations imposed by the fence;
- Additional federal reliability standards set forth by the North American Electric Reliability Corporation ("NERC") and approved by FERC and the costs of complying with these new standards;
- The failure of TVA's generation, transmission, navigation, flood control, and related assets and infrastructure, including CCR facilities, dams, and spent nuclear fuel storage facilities, to operate as anticipated, resulting in health, safety, or environmental problems, lost revenues, damages, or other costs that are not reflected in TVA's financial statements or projections, including due to aging, technological issues, or extreme weather conditions;
- Significant delays and additional costs, and/or inability to obtain necessary regulatory approvals, licenses, or permits, for major projects, including for assets that TVA needs to serve its existing and future load and to meet its carbon reduction aspirations;
- Risks associated with the operation of nuclear facilities or other generation and related facilities, including CCR facilities and dams;
- Events at a nuclear facility, whether or not operated by or licensed to TVA, which, among other things, could lead to increased regulation or restriction on the construction, ownership, operation, or decommissioning of nuclear facilities or on the storage of spent fuel, obligate TVA to pay retrospective insurance premiums, reduce the availability and affordability of insurance, increase the costs of operating TVA's existing nuclear units, or cause TVA to forego future construction at these or other facilities;
- The inaccuracy of certain assumptions about the future, including economic forecasts, anticipated energy and commodity prices, cost estimates, construction schedules, power demand forecasts, potential regulatory environments, and the appropriate generation mix to meet demand;
- Circumstances that cause TVA to change its determinations regarding the appropriate mix of generation assets;
- Inability to continue to operate certain assets, especially nuclear facilities, including due to the inability to obtain, or loss of, regulatory approval for the operation of assets;
- Physical attacks, threats, or other interference causing damage to TVA's facilities or interfering with TVA's operations;
- Other unforeseeable occurrences negatively impacting TVA assets or their supporting infrastructure;
- Events at TVA facilities, which, among other things, could result in loss of life, damage to the environment, damage to or loss of the facility, or damage to the property of others;
- Events that negatively impact TVA's reliability, including problems at other utilities or at TVA facilities or the increase in intermittent sources of power;
- Disruption of supplies of fuel, purchased power, or other critical items or services, which may result from, among other things, economic conditions, weather conditions, physical or cyber attacks, political developments, international trade restrictions or tariffs, legal actions, mine closures or reduced mine production, increases in fuel exports, environmental regulations affecting TVA's suppliers, transportation or delivery constraints, shortages of raw materials, supply chain difficulties, labor shortages, force majeure events, forced outages, intentional defaults, strikes, inflation, or similar events and which may, among other things, hinder TVA's ability to operate its assets, to complete projects on time and on budget, and meet its contractual obligations to deliver power;
- Global conflicts, terrorist activities, or military actions by the United States ("U.S.") government and its allies;

- Cyber attacks on TVA's assets or the assets of third parties upon which TVA relies, which may become more frequent and sophisticated due to advances in artificial intelligence ("AI");
- The failure of TVA's information technology systems;
- Lower future demand for electricity than TVA currently expects or is financially planning for, which would lead to unexpected revenue constraints that could negatively impact TVA's ability to meet financial obligations, including those associated with financing of projects to meet the anticipated demand;
- The need for significant future contributions associated with TVA's pension plans, other post-retirement benefit plans, or health care plans;
- Limitations on TVA's ability to borrow money, which may result from, among other things, TVA's approaching or substantially reaching the debt ceiling or TVA's losing access to the debt markets, and which may impact TVA's ability to make planned capital investments;
- Downgrades of TVA's credit ratings or the United States' sovereign credit ratings which may negatively impact TVA and the owners of TVA securities;
- Changes in technology, which, among other things, may affect relationships with customers and require TVA to change how it conducts its operations;
- Loss of competitive edge due to TVA's governmental status affecting TVA's ability to keep up with technological changes;
- Changes in the market price of commodities such as purchased power, coal, uranium, natural gas, fuel oil, crude oil, construction materials, reagents, or emission allowances;
- A limitation on the market for TVA Bonds, which may be influenced by the fact that the payment of principal and interest on TVA securities is not guaranteed by the U.S. government;
- Failure to attract or retain an appropriately qualified, diverse, and inclusive workforce;
- Changes in the membership of the TVA Board of Directors ("TVA Board") or TVA senior management, which may impact how TVA operates;
- Loss of quorum of the TVA Board, which may limit TVA's ability to adapt to meet changing business conditions;
- Weather conditions, including changing weather patterns, extreme weather conditions, and other events such as flooding, droughts, wildfires, heat waves, and snow or ice storms that may result from climate change, which may hamper TVA's ability to supply power, cause customers' demand for power to exceed TVA's then-present power supply, pose health, safety, or environmental risks, or otherwise negatively impact TVA's operations or financial condition;
- Events affecting the supply or quality of water from the Tennessee River system or Cumberland River system, or elsewhere, which could interfere with TVA's ability to generate power;
- Catastrophic events, such as fires, earthquakes, explosions, solar events, electromagnetic pulses, geomagnetic disturbances, droughts, floods, hurricanes, tornadoes, polar vortexes, icing events, pipeline explosions, or other casualty events, wars, national emergencies, terrorist activities, pandemics, widespread public health crises, geopolitical events, or other similar destructive or disruptive events;
- Ineffectiveness of TVA's financial control system to control issues and instances of fraud or to prevent or detect errors;
- Inability to use regulatory accounting for certain costs;
- Inability of TVA to implement its business strategy successfully, including due to the increased use in the public of distributed energy resources or energy-efficiency programs;
- Inability of TVA to achieve or maintain its cost reduction goals, which may require TVA to increase rates and/or issue more debt than planned;
- Failure of TVA's organizational structure to adequately support TVA's anticipated business needs or enable it to meet the needs of its current or potential customers;
- Inability of TVA to adapt its business model to changes in the utility industry and customer preferences and to remain cost competitive;
- Changes in commodity prices, investment prices, interest rates, currency exchange rates, or inflation rates;
- Reliability or creditworthiness of counterparties including but not limited to customers, suppliers, renewable resource providers, and financial institutions;
- Changes in the U.S. economy and volatility in financial markets;
- Ineffectiveness of TVA's disclosure controls and procedures or its internal control over financial reporting;
- Changes in customer preferences for energy produced from cleaner generation sources;
- Increases in TVA's financial liabilities for decommissioning its nuclear facilities and retiring other assets;
- The requirement or decision to make additional contributions to TVA's Nuclear Decommissioning Trust ("NDT") or Asset Retirement Trust ("ART");
- Events or changes involving transmission lines, dams, and other facilities not operated by TVA, including those that affect the reliability of the interstate transmission grid of which TVA's transmission system is a part and those that increase flows across TVA's transmission grid;
- Actions taken, or inaction, by the U.S. government relating to the national debt ceiling or automatic spending cuts in government programs;
- Inability to respond quickly enough to current or potential customer demands or needs or to act solely in the interest of ratepayers;
- Addition or loss of customers by TVA or TVA's local power company customers ("LPCs");
- Differences between estimates of revenues and expenses and actual revenues earned and expenses incurred;
- Changes in the market price of equity securities, debt securities, or other investments;

- An increase in TVA's cost of capital, which may result from, among other things, changes in the market for Bonds, disruptions in the banking system or financial markets, changes in the credit rating of TVA or the U.S. government, or, potentially, an increased reliance by TVA on alternative financing should TVA approach its debt limit;
- Costs or liabilities that are not anticipated in TVA's financial statements for third-party claims, natural resource damages, environmental cleanup activities, or fines or penalties associated with unexpected events such as failures of a facility or infrastructure;
- Adverse effects from regional health and other emergencies;
- Negative impacts on TVA's reputation; or
- Other unforeseeable events.

See also Part I, Item 1A, Risk Factors, and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations for a discussion of factors that could cause actual results to differ materially from those in any forward-looking statement. New factors emerge from time to time, and it is not possible for TVA to predict all such factors or to assess the extent to which any factor or combination of factors may impact TVA's business or cause results to differ materially from those contained in any forward-looking statement. TVA undertakes no obligation to update any forward-looking statement to reflect developments that occur after the statement is made, except as required by law.

GENERAL INFORMATION

Fiscal Year

References to years (2024, 2023, etc.) in this Annual Report on Form 10-K for the fiscal year ended September 30, 2024 are to TVA's fiscal years ending September 30 except for references to years in the biographical information about directors and executive officers in Part III, Item 10, Directors, Executive Officers, and Corporate Governance, as well as to years that are preceded by "CY," which references are to calendar years.

Notes

References to "Notes" are to the Notes to Consolidated Financial Statements contained in Part II, Item 8, Financial Statements and Supplementary Data in this Annual Report.

Property

TVA generally does not own real property or real property interests (collectively, "real property"). TVA typically acquires real property in the name of the United States ("U.S."), and legal title in such real property is entrusted to TVA as the agent of the U.S. to accomplish the purposes of the TVA Act. TVA acquires personal property in the name of TVA. Accordingly, unless the context indicates the reference is to TVA's personal property, any statement in this Annual Report referring to TVA property shall be read as referring to the real property of the U.S. that has been entrusted to TVA as its agent.

Available Information

TVA files annual, quarterly, and current reports with the Securities and Exchange Commission ("SEC") under Section 37 of the Securities Exchange Act of 1934 (the "Exchange Act"). TVA's SEC filings are available to the public at www.tva.com, free of charge, as soon as reasonably practicable after such reports are electronically filed with or furnished to the SEC. Information contained on or accessible through TVA's website shall not be deemed to be incorporated into, or to be a part of, this Annual Report or any other report or document that TVA files with the SEC. All TVA SEC reports are available to the public without charge from the website maintained by the SEC at https://www.sec.gov.

PART I

ITEM 1. BUSINESS

The Corporation

General

The Tennessee Valley Authority ("TVA") is a corporate agency and instrumentality of the United States ("U.S.") that was created in 1933 by federal legislation in response to a proposal by President Franklin D. Roosevelt. TVA was created to, among other things, improve navigation on the Tennessee River, reduce the damage from destructive flood waters within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers, further the economic development of TVA's service area in the southeastern U.S., and sell the electricity generated at the facilities TVA operates. Today, TVA operates the nation's largest public power system and supplies power to a population of approximately 10 million people.

TVA also manages the Tennessee River, its tributaries, and certain shorelines to provide, among other things, year-round navigation, flood damage reduction, and affordable and reliable electricity. Consistent with these primary purposes, TVA also manages the river system and public lands to provide recreational opportunities, adequate water supply, improved water quality, cultural and natural resource protection, and economic development. TVA performs these management duties in cooperation with other federal and state agencies that have jurisdiction and authority over certain aspects of the river system. In addition, the TVA Board of Directors ("TVA Board") has established two councils — the Regional Resource Stewardship Council and the Regional Energy Resource Council — to advise TVA on its stewardship activities in the Tennessee Valley and its energy resource activities.

Initially, all TVA operations were funded by federal appropriations. Direct appropriations for the TVA power program ended in 1959, and appropriations for TVA's stewardship, economic development, and multipurpose activities ended in 1999. Since 1999, TVA has funded all of its operations almost entirely from the sale of electricity and power system financings. TVA's power system financings consist primarily of the sale of bonds, notes, or other evidences of indebtedness (collectively, "Bonds") and secondarily of alternative forms of financing, such as lease arrangements. As a wholly-owned government corporation, TVA is not authorized to issue equity securities.

TVA's Mission of Service

TVA was built for the people, created by federal legislation, and charged with a unique mission - to improve the quality of life in a seven-state region through the integrated management of the region's resources. TVA's mission focuses on three key areas:

- Energy — Delivering reliable, low cost, clean energy;
- Environment — Caring for the region's natural resources; and
- Economic Development — Creating sustainable economic growth.

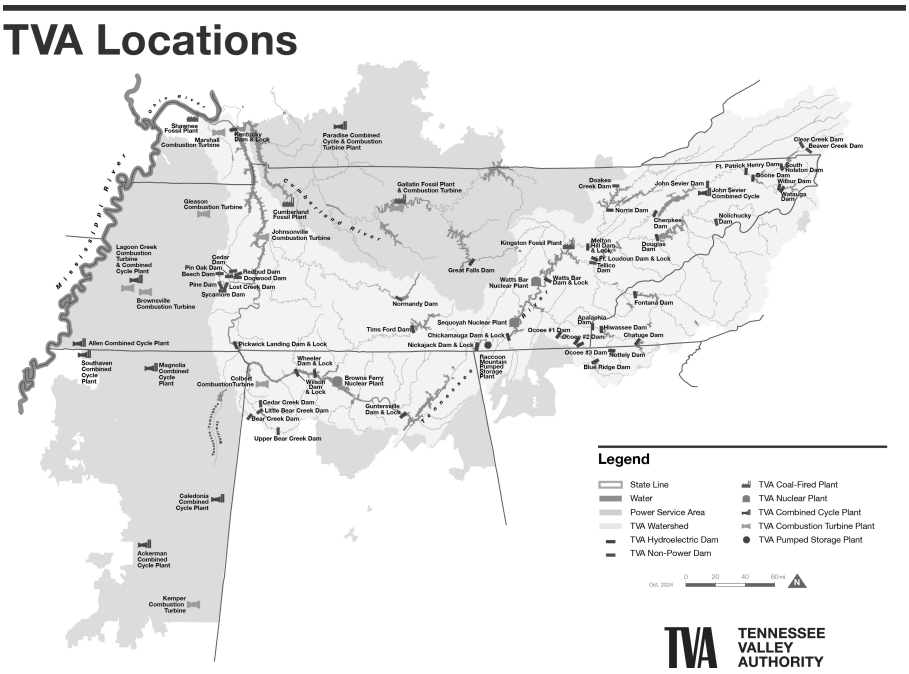
TVA's Strategic Priorities

While TVA's mission has not changed since it was established in 1933, the climate in which TVA operates continues to evolve. To continue to deliver its mission of service while evolving for future success, TVA must realize five strategic priorities:

- People Advantage — Amplifying the energy, passion, and creativity within each TVA employee;
- Operational Excellence — Building on TVA's best-in-class reputation for reliable service and competitively priced power;
- Financial Strength — Investing in the future, while keeping energy costs as low as possible;
- Powerful Partnerships — Promoting progress through the shared success of TVA's customers and stakeholders; and
- Igniting Innovation — Pursuing innovative solutions for TVA and its customers and communities.

Service Area

TVA's service area, the area in which it sells power, is defined by the Tennessee Valley Authority Act of 1933, as amended ("TVA Act"). TVA supplies power in most of Tennessee, northern Alabama, northeastern Mississippi, and southwestern Kentucky, and in portions of northern Georgia, western North Carolina, and southwestern Virginia. Under the TVA Act, subject to certain minor exceptions, TVA may not, without the enactment of authorizing federal legislation, enter into contracts that would have the effect of making it, or the wholesale customers that distribute TVA power ("local power company customers" or "LPCs"), a source of power supply outside the area for which TVA or its LPCs were the primary source of power supply on July 1, 1957. This provision is referred to as the "fence" because it bounds TVA's sales activities, essentially limiting TVA to power sales within a defined service area.



Note

(1) TVA Locations shown here are in service as of September 30, 2024.

(2) In addition to the locations above, TVA owns approximately one megawatt ("MW") of nameplate capacity among nine operating solar installations across the Tennessee Valley region with six installations in Tennessee, two in Alabama, and one in Mississippi. See *Power Supply and Load Management Resources* for a description of all of TVA's power supply resources.

In addition, the Federal Power Act ("FPA") includes a provision that helps protect TVA's ability to sell power within its service area. This provision, called the "anti-cherrypicking" provision, prevents the Federal Energy Regulatory Commission ("FERC") from ordering TVA to provide access to its transmission lines to others to deliver power to customers within TVA's defined service area. As a result, the anti-cherrypicking provision reduces TVA's exposure to loss of its customers. However, there have been some efforts to circumvent the anti-cherrypicking provision, and the protection of the provision could be limited and perhaps eliminated by federal legislation at some time in the future. See *Competition* and Item 1A, Risk Factors — *Regulatory, Legislative, and Legal Risks — TVA could lose its protected service territory.*

In 2024, the revenues generated from TVA's electricity sales were $12.1 billion and accounted for virtually all of TVA's revenues. See Note 17 — *Revenue* for details regarding revenues by state for each of the last three years.

Customers

TVA is primarily a wholesaler of power, selling power to LPCs that then resell power to their customers at retail rates. TVA's LPCs consist of (1) municipalities and other local government entities ("municipalities") and (2) customer-owned entities ("cooperatives"). These municipalities and cooperatives operate public power electric systems whose primary purpose is not to make a profit but to supply electricity to the general public or the cooperatives' members. TVA also sells power directly to certain end-use customers, primarily large commercial and industrial loads and federal agencies with loads larger than 5,000 kilowatts. Whether TVA or an LPC serves a new power customer is determined by the applicable TVA-LPC wholesale power contract. Each contract contains a formula that balances the size of the LPC and the amount of any TVA infrastructure investment to determine which party is entitled to serve the new customer. In addition, power in excess of the needs of the TVA system may, where consistent with the provisions of the TVA Act, be sold under exchange power arrangements with other specific electric systems. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Results of Operations — Financial Results — Operating Revenues* and Note 17 — *Revenue* for details regarding TVA's operating revenues.

Local Power Company Customers

Revenues from LPCs accounted for approximately 90 percent of TVA's total operating revenues for 2024. TVA had wholesale power contracts with 153 LPCs at September 30, 2024. Each of these contracts requires the LPC to purchase from TVA all of the electric power required for service to the LPC's customers; however, Power Supply Flexibility Agreements available to LPCs that have executed long-term Partnership Agreements with TVA allow LPCs to locally generate or purchase up to approximately five percent of their average total hourly energy sales over a certain time period in order to meet their individual customers' needs. Revised flexibility agreements were made available to LPCs in August 2023. These revised agreements permit projects to be located anywhere in TVA's service area, connected either to the LPC distribution system or to TVA's transmission system, and make it easier for LPCs to partner on projects. As of September 30, 2024, 102 LPCs had signed a Power Supply Flexibility Agreement. LPCs purchase power under contracts with terms of five or 20 years to terminate.

TVA's two largest LPCs — Memphis Light, Gas and Water Division ("MLGW") and Nashville Electric Service ("NES") — have contracts with a five-year and a 20-year termination notice period, respectively. Sales to MLGW and NES accounted for nine percent and eight percent, respectively, of TVA's total operating revenues for 2024.

TVA and LPCs continue to work together to meet the changing needs of consumers around the Tennessee Valley. TVA has a Partnership Agreement option that better aligns the length of LPC power contracts with TVA's long-term commitments. Under the partnership arrangement, the LPC power contracts automatically renew each year and have a 20-year termination notice. The partnership arrangements can be terminated under certain circumstances, including TVA's failure to limit rate increases to no more than 10 percent during any consecutive five-fiscal-year period, as more specifically described in the agreements. Participating LPCs receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term commitment, which enables TVA to recover its long-term financial commitments over a commensurate period. As of September 30, 2024, 148 LPCs had signed the Partnership Agreement with TVA.

The power contracts between TVA and LPCs provide for the purchase of power by LPCs at the wholesale rates established by the TVA Board. Under the TVA Act, the TVA Board is authorized to regulate LPCs to carry out the purposes of the TVA Act through contract terms and conditions as well as through rules and regulations. TVA regulates LPCs primarily through the provisions of TVA's wholesale power contracts. All of the power contracts between TVA and the LPCs require that power purchased from TVA be sold and distributed to the ultimate consumer without discrimination among consumers of the same class and prohibit direct or indirect discriminatory rates, rebates, or other special concessions. In addition, there are a number of wholesale power contract provisions through which TVA seeks to ensure that the electric system revenues of the LPCs are used only for electric system purposes. Furthermore, almost all of these contracts specify the resale rates and charges at which the LPC must resell TVA power to its customers. These rates are revised from time to time, subject to TVA approval, to reflect changes in costs, including changes in the wholesale cost of power.

TVA also regulates LPC policies for customer deposits, termination of service for non-payment, providing information to consumers, and billing through a service practice policy framework. TVA's regulatory framework provides for consistent regulatory policy for ratepayers across the Tennessee Valley, while recognizing local considerations. The regulatory provisions in TVA's wholesale power contracts are designed to carry out the objectives of the TVA Act, including the objective of providing for an adequate supply of power at the lowest feasible rates. See *Rates — Rate Methodology* below.

Other Customers

Revenues from directly served industrial customers accounted for approximately seven percent of TVA's total operating revenues in 2024. Contracts with these customers are subject to termination by the customer or TVA upon a minimum notice period that varies according to a number of factors, including the customer's contract demand and the period of time service has been provided. TVA also serves seven federal customers, including U.S. Department of Energy ("DOE") facilities and military installations, which accounted for approximately one percent of TVA's total operating revenues in 2024.

Other Revenue

Other revenue consists primarily of wheeling and network transmission charges, sales of excess steam that is a by-product of power production, delivery point charges for interconnection points between TVA and the customer, Renewable Energy Certificate ("REC") sales, and certain other ancillary goods or services. Other revenue accounted for approximately two percent of TVA's total operating revenues in 2024.

Rates

Rate Authority

The TVA Act gives the TVA Board sole responsibility for establishing the rates TVA charges for power. These rates are not subject to judicial review or to review or approval by any state or other federal regulatory body. Under the TVA Act, TVA is required to charge rates for power that will produce gross revenues sufficient to provide funds for:

- Operation, maintenance, and administration of its power system;
- Payments to states and counties in lieu of taxes ("tax equivalents");
- Debt service on outstanding indebtedness;
- Payments to the United States Department of the Treasury ("U.S. Treasury") in repayment of and as a return on the government's appropriation investment in TVA's power facilities (the "Power Program Appropriation Investment"); and
- Such additional margin as the TVA Board may consider desirable for investment in power system assets, retirement of outstanding Bonds in advance of their maturity, additional reduction of the Power Program Appropriation Investment, and other purposes connected with TVA's power business, having due regard for the primary objectives of the TVA Act, including the objective that power shall be sold at rates as low as are feasible. See Note 23 — *Related Parties*.

TVA fulfilled its requirement to repay $1.0 billion of the Power Program Appropriation Investment in 2014; therefore, the repayment of this amount is no longer a component of rate setting.

Rate Methodology

TVA uses a seasonal time of use wholesale rate structure comprised of base demand and energy rates, a fuel rate, and a grid access charge ("GAC"). In setting the base rates, TVA uses a debt-service coverage methodology to derive annual revenue requirements in a manner similar to that used by other public power entities that also use the debt-service coverage rate methodology. Under the debt-service coverage methodology, rates are calculated so that an entity will be able to cover its operating costs and to satisfy its obligations to pay principal and interest on debt, plus an additional margin. This ratemaking approach is particularly suitable for use by entities financed primarily, if not entirely, by debt, such as TVA, and helps ensure that TVA produces gross revenues sufficient to fund requirements specified in the TVA Act listed under *Rate Authority* above. TVA's rate structure includes a focus on TVA's long-term pricing by aligning rates with underlying cost drivers.

TVA recovers fuel costs and tax equivalent payments associated with fuel cost adjustments through a monthly rate reflecting the forecasted costs of fuel. Fuel costs are allocated to three groups of customers: (1) Standard Service (residential and small commercial customers), (2) large general service customers with contract demands greater than 5 MW, and (3) large manufacturing customers with contract demands greater than 5 MW. Fuel costs are allocated to these three classes of customers in relation to their hourly loads and TVA's hourly incremental dispatch cost. Total monthly fuel costs include costs for natural gas, fuel oil, coal, purchased power, emission allowances, nuclear fuel, and other fuel-related commodities as well as realized gains and losses on derivatives purchased to hedge the costs of such commodities.

Power Supply and Load Management Resources

General

TVA seeks to balance production capabilities with power supply requirements by promoting the conservation and efficient use of electricity and, when necessary, buying, building, or leasing assets or entering into power purchase agreements ("PPAs"). TVA also seeks to employ a diverse mix of energy generating sources and works toward obtaining greater amounts of its power supply from clean (low or zero carbon-emitting) resources. Currently, TVA is working with stakeholders and the public on the 2025 Integrated Resource Plan ("IRP"), a comprehensive plan that will help shape TVA's energy system through 2050. The IRP is expected to be TVA's compass for power generation decisions as well as for long-term operational and financial planning.

TVA is making investments in its generating portfolio and infrastructure to both help meet the growing demand for electricity and modernize the fleet while also allowing TVA to maintain competitive rates and high reliability and work toward an increasingly clean power system. As TVA continues to evaluate the impact of retiring its coal-fired fleet by 2035 and works to accelerate the growth of renewables, it also continues to evaluate adding flexible lower carbon-emitting gas plants as a strategy

to maintain reliability. Commercial operations began on Paradise Combustion Turbine Units ("CTs") 5-7 on December 29, 2023. TVA also has ongoing natural gas projects at its Johnsonville, Cumberland, and Kingston sites and is evaluating natural gas projects for the replacement generation for the second unit at Cumberland, a new Caledonia CT plant on TVA land, and an aeroderivative CT project at TVA's Allen site. TVA is committed to investing in the future of nuclear with the evaluation of emerging advanced nuclear technologies, such as small modular reactors ("SMRs"), while also investing in its existing nuclear assets and working to renew its nuclear generation fleet licenses. TVA has been implementing the Hydro Life Extension Program with a focus on improving the availability and flexibility of the hydroelectric fleet and exploring new hydroelectric pumped-storage power to support the grid. It is also investing in research and development for technology around hydrogen fuel and carbon capture, utilization, and storage. In addition, the Inflation Reduction Act of 2022 ("Inflation Reduction Act") makes certain tax-exempt entities, including TVA, eligible for a direct-pay option for certain tax credits that encourage investment in clean energy, in some circumstances. TVA is currently exploring funding opportunities of various types, including opportunities involving pumped-storage, solar, carbon capture, hydrogen, energy efficiency, and transmission, among others; however, this exploration does not guarantee that TVA or its partners will receive funds. See *Research and Development* below, Item 1A, Risk Factors — *Operational Risks*, and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio*.

Power generating facilities operated by TVA at September 30, 2024, included three nuclear sites, 18 natural gas and/or oil-fired sites, four coal-fired sites, 29 conventional hydroelectric sites, one pumped-storage hydroelectric site, one diesel generator site, and nine operating solar installations. See Item 2, Properties — *Generating Properties — Net Capability* for a discussion of the units at these facilities. TVA also acquires power under PPAs of varying durations, including short-term contracts of less than 24-hours in duration. See *Power Purchase and Other Agreements* below.

The following table shows TVA's generation and purchased power by generating source as a percentage of all electric power generated and purchased (based on kilowatt hours ("kWh")) for the periods indicated:

Total Power Supply by Generating Source
For the years ended September 30

Generation Resource[1]	2024	2023	2022
Nuclear	39%	42%	39%
Natural gas and/or oil-fired	23%	22%	22%
Coal-fired	13%	13%	13%
Hydroelectric	7%	8%	8%
Purchased power	18%	15%	18%

Note
(1) TVA's non-hydro renewable resources from TVA facilities are less than one percent for all periods shown, and therefore are not represented on the table above. Purchased power contains the majority of non-hydro renewable energy supply. TVA acquires RECs in connection with certain purchased power transactions and sells some of these RECs to customers. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements.*

While TVA continues down the path of lowering emissions, including GHG emissions, there will be fluctuations in usage due to electricity demands. Also, TVA continues to make operational decisions to keep the system reliable and to deliver low-cost energy.

Nuclear

At September 30, 2024, TVA had three nuclear sites consisting of seven units in operation. The units at Browns Ferry Nuclear Plant ("Browns Ferry") are boiling water reactor units, and the units at Sequoyah Nuclear Plant ("Sequoyah") and Watts Bar Nuclear Plant ("Watts Bar") are pressurized water reactor units. Operating information for each of these units is included in the table below.

TVA Nuclear Power
At September 30, 2024

Nuclear Unit	Summer Net Capability (MW)	Net Capacity Factor for 2024 (%)	Date of Expiration of Operating License
Browns Ferry Unit 1	1,227	85.8	2033
Browns Ferry Unit 2	1,208	97.8	2034
Browns Ferry Unit 3	1,227	85.2	2036
Sequoyah Unit 1	1,152	83.2	2040
Sequoyah Unit 2	1,140	78.5	2041
Watts Bar Unit 1	1,157	92.3	2035
Watts Bar Unit 2	1,121	92.1	2055

Nuclear Fleet License Extensions. TVA is seeking to renew all nuclear generation units' licenses for an additional 20 years. The first license renewal application was submitted to the Nuclear Regulatory Commission ("NRC") in January 2024 for the three units at Browns Ferry. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Nuclear Fleet License Extensions.*

Other Nuclear Initiatives. TVA has an Early Site Permit to potentially construct and operate SMRs at TVA's Clinch River Nuclear Site in Oak Ridge, Tennessee, and in 2022, the TVA Board approved a programmatic approach to exploring advanced nuclear technology (the "New Nuclear Program"). See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Small Modular Reactors*.

Other Nuclear Matters. Operating nuclear facilities subjects TVA to waste disposal, decommissioning, and insurance requirements, as well as litigation risks. See *Fuel Supply — Nuclear Fuel* below for a discussion of spent nuclear fuel and low-level radioactive waste and Note 22 — *Commitments and Contingencies — Contingencies* for a discussion of TVA's nuclear decommissioning liabilities and the related trust and nuclear insurance, which discussions are incorporated herein by reference. TVA's Sequoyah Unit 2 tripped on July 30, 2024, due to failure of the main generator. As a result, the project to restack and rewind the main generator was pulled forward in the Nuclear Life Extension ("NLE") plan. The unit will remain offline until project completion, which is expected in spring 2025. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Sequoyah Nuclear Plant Unit 2*.

Natural Gas and/or Oil-Fired

At September 30, 2024, TVA's natural gas and oil-fired fleet consisted of 85 combustion turbine power blocks (68 simple-cycle units, one cogeneration unit, and 14 combined-cycle power units, accounting for 12,656 MW of summer net capability, and two idled units at Allen Combustion Turbine Facility: Units 17 and 18). In 2024, Allen CTs 1-16 and Johnsonville CTs 11-16 were retired. Fifty-three of the simple-cycle units are currently capable of quick-start response allowing full generation capability in approximately 10 minutes. The economic dispatch of natural gas-fired plants depends on both the day-to-day price of natural gas and the price of other available intermediate resources such as coal-fired plants. TVA uses simple-cycle units to meet peaking or backup power needs. As TVA evaluates the retirement of its coal-fired fleet and works to accelerate the growth of renewables, it also continues to evaluate adding flexible lower carbon-emitting gas plants as a strategy to maintain reliability. The natural gas-fired fleet supports renewable expansion by providing reliability across all hours, as well as the flexibility to help manage ramping and intermittency. Commercial operations began on Paradise CTs 5-7 on December 29, 2023. TVA also has ongoing natural gas projects at its Johnsonville, Cumberland, and Kingston sites and is evaluating natural gas projects for the replacement generation for the second unit at Cumberland, a new Caledonia CT plant on TVA land, and an aeroderivative CT project at TVA's Allen site. TVA may decide to make further strategic investments in natural gas-fired facilities in the future by purchase, construction, or lease, to help support portfolio diversification and system reliability.

See Item 2, Properties — *Generating Properties,* Note 8 —*Leases,* and Note 14 — *Debt and Other Obligations* for a discussion of lease arrangements into which TVA has entered in connection with certain combined cycle facilities. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Natural Gas-Fired Units* for a discussion of ongoing projects at certain natural gas-fired facilities.

Coal-Fired

At September 30, 2024, TVA had four coal-fired plants consisting of 24 active units, accounting for 5,815 MW of summer net capability. TVA considers units to be in an active state when the unit is generating, available for service, or temporarily unavailable due to equipment failures, inspections, or repairs.

Coal-fired plants have been subject to increasingly stringent regulatory requirements over the last few decades, including those under the Clean Air Act ("CAA"), the Clean Water Act ("CWA"), and the Resource Conservation and Recovery Act ("RCRA"). TVA is pursuing a programmatic approach for the evaluation of its sites where coal combustion residuals ("CCR") are stored to meet all applicable state and federal regulations. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Coal Combustion Residuals — Coal Combustion Residuals Facilities.*

TVA continues to work toward a balanced generation plan with greater reliance on lower-cost and cleaner energy generation technologies. Since September 30, 2010, TVA has reduced its summer net capability of coal-fired units by 8,418 MW. TVA is evaluating the impact of retiring the balance of the coal-fired fleet by 2035, and that evaluation includes environmental review, public input, and TVA Board approval. In January 2023, TVA issued its Record of Decision to retire the two coal-fired units at Cumberland by the end of calendar year ("CY") 2026 and CY 2028. In April 2024, TVA issued its Record of Decision to retire the nine coal-fired units at Kingston by CY 2027. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio*.

Diesel Generators

At September 30, 2024, TVA had one diesel generator plant consisting of five units, and this facility accounted for nine MW of summer net capability. These units are not currently dispatched for generation to the transmission grid.

Hydroelectric Pumped-Storage

At September 30, 2024, TVA had four units at Raccoon Mountain Pumped-Storage Plant ("Raccoon Mountain") with a total net summer capability of 1,715 MW. These units are utilized to balance the transmission system as well as generate power. TVA uses electricity generated by its fleet during periods of low demand to operate pumps that fill the reservoir at Raccoon Mountain. Then, during periods of high or peak demand, the water is released and the pumps reverse to work as power generating turbines.

New hydroelectric pumped-storage is one of several technologies that TVA is exploring to ensure the reliability and resiliency of the grid, particularly as intermittent renewables like solar continue to be added to the generation mix. In 2023, TVA announced sites for a potential future pumped-storage facility. After completing an Environmental Impact Statement ("EIS"), TVA will select a site based on a wide range of environmental, social, and technical factors. Exploratory drilling is occurring.

Renewable Energy Resources

As more consumers and businesses are seeking cleaner energy, the utility industry is evolving to meet those needs. As TVA also evolves, it will see impacts to the way it does business through the pricing of products, transmission of energy, and development of new products and services for its customers in support of changing customer preferences. Many companies are focusing on sustainability and requiring more energy efficiency and renewable energy options. In addition, TVA seeks to obtain greater amounts of its power supply from clean resources to work towards carbon emission reductions. As a result, TVA is working to increase its renewable energy portfolio by investing in existing hydroelectric assets through the Hydro Life Extension Program, securing renewable PPAs, and exploring Self-Directed Solar projects. TVA also encourages renewable power and offers renewable resources through various current programs and offerings, including the Green Invest Program, which matches customer demand with renewable supply and is designed to meet the needs of customers at scale. See *Power Purchase and Other Agreements* for information on TVA's PPAs, including renewable agreements, and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements* for a discussion of TVA's RFPs.

Conventional Hydroelectric Dams. At September 30, 2024, TVA's hydroelectric fleet consisted of 29 conventional hydroelectric dams throughout the Tennessee River system with 109 conventional hydroelectric units (106 active units and three units in long-term outage and unavailable for service), that accounted for 3,757 MW of summer net capability. Wilbur Hydroelectric Facility Units 1-3 were in long-term outage and unavailable for service at September 30, 2024. The amount of electricity that TVA is able to generate from its hydroelectric plants depends on a number of factors, including the amount of precipitation and runoff, initial water levels, generating unit availability, and the need for water for competing water management objectives. When these factors are unfavorable, TVA must increase its reliance on higher cost generation plants and purchased power. In addition, TVA receives a portion of energy generated by eight of the U.S. Army Corps of Engineers ("USACE") dams on the Cumberland River system, and electric generation from the USACE dams is dependent on the same factors that affect generation from the TVA-owned dams. See *Dam Safety Assurance Program* and *Weather and Seasonality* below.

Hiwassee Hydro Unit 2 has a unique reversible turbine/generator that acts as a pump and a turbine enhancing TVA's ability to balance baseload generation. At September 30, 2024, Hiwassee Hydro Unit 2 accounted for 86 MW of the conventional hydroelectric summer net capability.

TVA has a Hydro Life Extension Program which focuses on recovering and preserving TVA's extensive hydroelectric fleet, improving efficiency and flexibility, and ensuring long-term reliability of this vital clean energy asset. As part of this program, TVA is working to add additional carbon free capacity to some of its existing hydroelectric units. In a separate effort, TVA is working to improve transmission system reliability by upgrading or adding synchronous condensing capability to several of the conventional hydro units in the fleet. Hydroelectric generation is an important part of TVA's energy mix in the future. It plays a vital role in carbon reduction initiatives, the ability to integrate other renewables into the power portfolio, and TVA's ability to meet changing customer preferences for cleaner energy sources.

In 2023, TVA signed a Memorandum of Understanding ("MOU") with the DOE to enhance collaboration on hydropower technology development. Joint efforts are focusing on evaluating and demonstrating different approaches for operating hydropower plants to meet the electricity grid's changing needs.

Dam Safety Assurance Program. TVA has an established dam safety program, which includes procedures based on the Federal Guidelines for Dam Safety, with the objective of reducing the risk of a dam safety event. The program analyzes, evaluates, and manages risks through a systematic and thorough process that facilitates decision-making for the safety of a structure, identifying necessary actions to reduce risk, including remediation projects, and prioritization of actions for TVA's river

dams. Prioritization is driven by reducing risk to the public and asset preservation. TVA also continues to provide routine care of the dams as part of the dam safety program through inspections, monitoring, and maintenance, among other activities.

Self-Directed Solar. During 2019, the TVA Board approved the opportunity for TVA to explore being directly involved in the development of a utility-scale solar project, contingent on the successful completion of environmental reviews under the National Environmental Policy Act ("NEPA") and other applicable laws. In 2021, TVA purchased land for this development, and in 2022, environmental reviews were completed. The challenges affecting the U.S. solar industry are also being seen in TVA's Self-Directed Solar project. The project has experienced delays and cost increases due to escalations from supply chain limitations. TVA has elected to pursue a competitive selection process with third parties for the development of the photovoltaic ("PV") solar facility to be located on the site. TVA plans to enter into a long-term PPA to purchase the energy generated by the facility. An RFP has been issued to this effect, and selection of the awardee is anticipated in early CY 2025.

In November 2022, the TVA Board approved the opportunity for TVA to explore the development of an additional utility-scale solar project, contingent on successfully completing environmental reviews under NEPA and other applicable laws and obtaining the necessary state permits. The project would utilize TVA land, deploying a solar cap system on the closed CCR facility at the TVA Shawnee Fossil Plant in Paducah, Kentucky. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Self-Directed Solar*.

Other Renewable Energy Resources. In addition to the hydroelectric units above, TVA owns nine operating solar installations that account for approximately one MW of nameplate capacity. Other renewable energy resources also include renewable energy purchases, a majority associated with TVA renewable programs. See *Power Purchase and Other Agreements* for information on renewable PPAs. TVA's current renewable programs and offerings include:

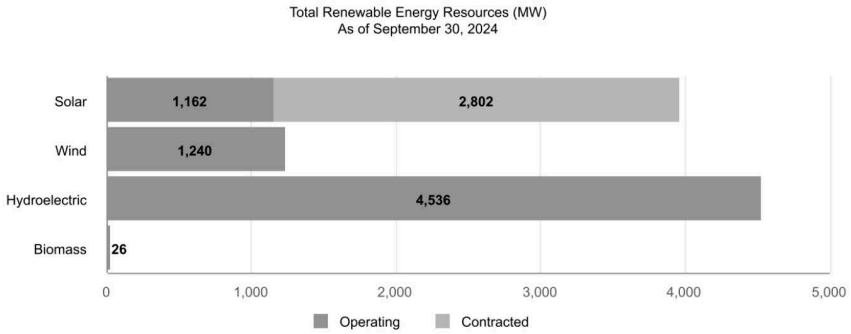
Small-scale Solutions. The Green Connect Program connects residential customers who are interested in on-site solar PV and/or battery storage systems with qualified solar and battery storage installers who agree to install to Green
Connect Program Standards. These qualified installers, who are members of TVA's Quality Contractor Network, are insured and
licensed and have also completed special training on TVA guidelines. Participants have access to objective information and the benefit of installation verifications with regard to whether their solar PV system has met the Green Connect Program Standards.

Utility-scale Solutions. The Green Invest Program matches customer demand with renewable supply through a Green Invest Agreement. The goal of the Green Invest Program is to meet the long-term sustainability needs of customers at scale. TVA procures the needed renewable supply through a diversified approach, which could include a competitive procurement process, strategic partnerships, or construction of renewable facilities to meet these needs. As of September 30, 2024, more than 1,950 MW of renewable PPAs have been matched to customers through the Green Invest Program. In addition, Generation Flexibility is a solution available to LPCs participating in TVA's Partnership Agreement and supports the deployment of up to 2,000 MW of distributed solar to provide clean, local generation. See Note 17 — *Revenue*.

Other Renewable Solutions. The Green Switch Program allows customers to support solar renewable resources through purchasing renewable solar energy generated in the Tennessee Valley. The product is sold in blocks of 200 kWh or matches 100 percent of a customer's electricity usage (available through select LPCs). During the year ended September 30, 2024, participants purchased 67,122 MWh through the Green Switch Program. The Green Flex Program gives commercial and industrial customers the ability to meet sustainability goals and to make renewable energy claims through RECs from wind generation located outside TVA's service area. During the year ended September 30, 2024, participants purchased approximately 694,000 RECs through the Green Flex Program.

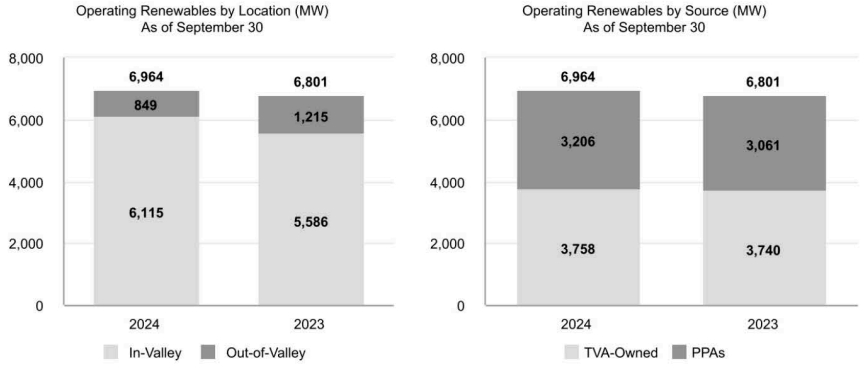
TVA tracks its renewable energy commitments and claims through the management of RECs. The RECs, which each represent one megawatt-hour ("MWh") of renewable energy generation, are principally associated with wind, solar, biomass, and low-impact hydroelectric. TVA continues to evaluate ways to adjust to customer preferences and requirements for cleaner and greener energy, including the acquisition of RECs from renewable purchased power that can be sold to customers to meet their needs. Overall, TVA will procure needed renewable supply through a diversified approach, which could include a competitive procurement process, strategic partnerships, or construction of renewable facilities to meet these needs.

Total Renewable Energy Resources. As of September 30, 2024, TVA's total renewable energy resources amounted to 9,766 MW. Of this amount, 6,964 MW are operating while 2,802 MW are contracted but not yet online. In addition, TVA has 299 MW from Self-Directed Solar projects currently under development, which are not represented in the table below.



Notes
(1) Contracted resources are executed PPAs expected to come online at a future date.
(2) Hydroelectric power consists of 3,757 MW from TVA-owned conventional hydroelectric facilities and 779 MW from renewable PPAs.
(3) TVA acquires RECs in connection with certain purchased power transactions and sells some of these RECs to customers. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements.*

TVA's operating renewables by location and by source are detailed below:



Notes
(1) In-Valley refers to the renewable energy that is sourced within TVA's service territory. Out-of-Valley refers to the renewable energy that is sourced outside of TVA's service territory and solely consists of wind power.
(2) See *Power Purchase and Other Agreements* below. PPAs also include capability from various historical renewable energy programs primarily with individuals and small businesses.
(3) TVA acquires RECs in connection with certain purchased power transactions and sells some of these RECs to customers. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements.*

Distributed Energy Resources

Consumer desire for energy choice, among other things, is driving the expectation for flexible options in the electric industry. TVA and LPCs are working together to leverage the strengths of the Tennessee Valley public power model to provide distributed energy solutions that are economical, sustainable, and flexible. TVA will focus on the safety and reliability impacts of these resources as they are interconnected to the grid and will aim to ensure that the pricing of electricity remains as low as feasible. Additional regulatory considerations and analysis may be required as the distributed energy resources ("DER") market, technologies, and programs evolve.

In 2017, the TVA Board authorized up to $300 million to be spent over the next 10 years, subject to annual budget availability and necessary environmental reviews, to build an enhanced fiber optic network that will better connect TVA's operational assets. Fiber is a vital part of TVA's modern communication infrastructure and is needed to help manage DER as they enter the market. The new fiber optic lines will also improve the reliability and resiliency of the generation and transmission system. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Fiber Optic Network.*

New energy management systems and energy storage technologies present opportunities for more sophisticated and integrated operation of the entire grid. The advent of electric vehicles and small-scale renewable generation has hastened the development of energy storage technologies that have the potential to mitigate the intermittent supply issues associated with many renewable generation options. Implementation of these technologies in conjunction with two-way communication to the site creates the potential for more efficient usage of other DER on the grid.

TVA is partnering with LPCs and others to support the electrification of transportation in the Tennessee Valley in a multi-year EV initiative. The initiative focuses on reducing or eliminating EV market barriers with EV policies, improving charging infrastructure availability, expanding EV availability and offerings, and spreading EV consumer awareness. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Electric Vehicles.*

On-site energy management technologies and the proliferation of companies interested in providing services to support and aggregate the impacts of such systems provide another DER opportunity. Such systems can afford the consumer benefits through reduced consumption, increased comfort, detailed energy use data, and savings from time-sensitive rate structures. TVA and LPCs must consider the impacts of integration from changes in energy usage patterns resulting from the operation of such systems.

Demand response systems that take advantage of the increasing sophistication in communication to homes, businesses, and distribution system assets also afford the opportunity for more granular control of system demand. Technologies can manage individual customer systems to shift usage from peak to off-peak periods and create significant reductions in the need for peak generation output or curtail usage for short periods to balance system demand. More sophisticated distribution control systems can also lower peak demand through control of excess voltage on the grid on either a dispatchable or continuous basis. Some large industrial customers also have the capacity to respond within a designated notice period and can augment operational flexibility by providing ancillary services. See *Community Energy Portfolio* below.

Community Energy Portfolio

TVA continues to make investments in its community energy portfolio, consisting of energy efficiency, demand response, renewable, and resiliency programs, as part of its commitment to meet the Tennessee Valley's growing energy needs and to support a decarbonized and more resilient grid. TVA is expanding its portfolio and plans to invest more than $1.5 billion in its energy efficiency and demand response programs from 2024 – 2028. Over this five-year period, TVA anticipates approximately 2,200 gigawatt hours of net incremental energy efficiency savings and expects to have over 2,200 MW of demand response portfolio capacity in 2028. These amounts are forward-looking and subject to various uncertainties. See *Forward-Looking Information* and Item 1A, Risk Factors. In 2024, TVA invested $173 million in its energy efficiency and demand response programs. As of September 30, 2024, TVA has 1,444 MW of demand response peak season portfolio capacity and effectively reduced 2024 energy needs by approximately 205 gigawatt hours of net incremental energy efficiency savings.

TVA's community energy portfolio consists of programs aimed at balancing system needs by lowering costs, shaping energy usage, increasing capacity, and decarbonizing the grid, all through the participation of end-use consumers. These programs help end-use consumers save on their bills and reduce some of the need for new generation in the future and are offered to both end-use residential customers and businesses and industries. TVA also has energy programming focused on expanding partnerships, improving program access, and catalyzing investment in communities where all individuals can benefit from TVA's resources. TVA's Community Energy Efficiency Programs, a component of the community energy portfolio, include (1) the Home Uplift Program, which completes home evaluations and makes high-impact home energy upgrades for qualifying homeowners at no cost to the homeowners, (2) the School Uplift Program, which assists schools with adopting strategic energy management practices, and (3) the Small Business Uplift Program, which assists small businesses located within underserved communities with energy evaluations and energy improvement investments provided by TVA at no cost to the small business.

TVA anticipates additional community energy programs to be developed over the coming years to grow the community energy portfolio. See *Distributed Energy Resources* above for further discussion on demand response systems.

Power Purchase and Other Agreements

TVA acquires power from a variety of power producers generally through long-term and short-term PPAs as well as through spot market purchases. During 2024, TVA acquired approximately 98 percent of the power that it purchased through the long-term PPAs described below, including agreements for long-term renewable generation resources, and approximately two percent on the spot market. During 2023, TVA acquired approximately 92 percent of the power that it purchased through long-term PPAs, approximately six percent through short-term PPAs, and approximately two percent on the spot market.

TVA's capability provided by PPAs is primarily provided under contracts that expire through 2044 and are described in the table below.

Power Purchase Agreements[1]
At September 30, 2024

Type of Facility	Location	Number of Contracts	Contract Capacity (MW)[2]	Contract Termination Date
Renewable PPAs				
Operating				
Solar	Tennessee	8	430	2032 - 2044
Solar	Alabama	2	302	2037 - 2041
Solar	Mississippi	1	150	2044
Total Operating Solar		11	882	
Wind	Tennessee	1	25	2025
Wind	Iowa	2	299	2030 - 2031
Wind	Kansas	2	366	2032 - 2033
Wind	Illinois	3	550	2032 - 2033
Total Operating Wind		8	1,240	
Hydroelectric	Tennessee, Kentucky, and North Carolina	2	779	2035 and upon three years' notice
Landfill Gas	Tennessee	1	5	2031
Subtotal Operating		22	2,906	
Contract Renewable Resources[3]			300	
Total Renewable Operating PPAs			3,206	
Contracted (not yet online)				
Solar[4]		21	2,802	
Total Renewable Contracted PPAs		21	2,802	
Nonrenewable PPAs				
Operating				
Diesel	Tennessee	4	59	2028 - 2032
Diesel	Alabama	1	10	2035
Diesel	Mississippi	2	46	2028
Total Operating Diesel		7	115	
Natural Gas[5]	Alabama	3	2,068	2024 - 2033
Natural Gas[5]	Georgia	3	646	2024-2025
Natural Gas	Illinois	1	479	2028
Natural Gas	Missouri	1	50	2025
Natural Gas	Pennsylvania	1	500	2028
Total Operating Natural Gas		9	3,743	
Coal	Georgia	1	250	2026
Coal	Mississippi	1	500	2026
Lignite	Mississippi	1	440	2032
Total Operating Coal		3	1,190	
Battery Storage	Mississippi	1	50	2044
Total Nonrenewable Operating PPAs		20	5,098	
Contracted (not yet online)				
Nuclear		1	14	
Battery Storage[4]		4	320	
Total Nonrenewable Contracted PPAs		5	334	

Notes
(1) TVA acquires RECs in connection with certain purchased power transactions and sells some of these RECs to customers. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements.*
(2) Represents capability specified in TVA's PPA contracts. The measurement for nonrenewable resources is contracted capacity, adjusted for any contractual summer output constraints. The measurement for renewable resources is contracted capacity of the renewable resources' nameplate capacity. Nameplate capacity does not account for real-time operating constraints, such as intermittency of renewable resources associated with weather, delivery mechanisms, or other factors.
(3) Contract Renewable Resources is capability from various historical renewable energy programs that consist of PPAs primarily with individuals and small businesses.
(4) See challenges associated with contracted PPAs not yet online in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Renewable Power Purchase Agreements*.
(5) Included in the table above is 500 MW of power delivery in Alabama and 250 MW of power delivery in Georgia that expired on September 30, 2024.

Under federal law, TVA is required to purchase energy from qualifying facilities (cogenerators and small power producers) at TVA's avoided cost of either generating this energy itself or purchasing this energy from another source. TVA fulfills this requirement through the Dispersed Power Production Program. At September 30, 2024, there were 1,197 generation sources, with a combined qualifying capacity of 279 MW, whose power TVA purchases under this program.

Fuel Supply

General

TVA's consumption of various types of fuel depends largely on the demand for electricity by TVA's customers, the availability of various generating units, and the availability and cost of fuel. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Results of Operations — Financial Results — Operating Expenses.*

Nuclear Fuel

Current Fuel Supply. Converting uranium to nuclear fuel generally involves four stages: the mining and milling of uranium ore to produce uranium concentrates; the conversion of uranium concentrates to uranium hexafluoride gas; the enrichment of uranium hexafluoride; and the fabrication of the enriched uranium hexafluoride into fuel assemblies. TVA plans to continue using contracts of various products, lengths, and terms as well as inventory to meet the projected nuclear fuel needs of its nuclear fleet. The net book value of TVA's nuclear fuel was $1.3 billion at both September 30, 2024 and 2023.

On May 13, 2024, President Biden signed the Prohibiting Russian Uranium Imports Act into law. Further restrictions on working with, and sanctions against, Russia or Russian entities may be forthcoming. TVA's currently contracted supply on nuclear fuel will not be impacted by the new law or future sanctions or restrictions related to Russia. TVA's nuclear fuel is supplied primarily by U.S., Canadian, Australian, and European Union sources, and TVA has existing physical inventories located in the United States and Canada sufficient to fuel its reactors for many years. Further, existing federal law already prohibited TVA from purchasing Russian or Chinese nuclear fuel. TVA is not contracted to purchase any Russian or Chinese origin nuclear fuel, and has no Russian or Chinese origin nuclear fuel in inventory for use in its reactors. TVA could be impacted by higher market prices as a result of general market impacts resulting from the new law and other potential trade restrictions; however, at this time TVA's nuclear fuel is obtained predominantly through long-term contracts.

TVA, the DOE, and certain nuclear fuel contractors have entered into agreements, referred to as the Down-blend Offering for Tritium ("DBOT"), that provide for the production, processing, and storage of low-enriched uranium that is to be made using surplus DOE highly enriched uranium and other uranium. Low-enriched uranium can be fabricated into fuel for use in a nuclear power plant. Production of the low-enriched uranium began in 2019 and is contracted to continue through September 2027. Contract activity after that date will consist of storage and flag management. Flag management ensures that the uranium is unencumbered by policy restrictions, so that it can be used in connection with the production of tritium. Under the terms of the interagency agreement between the DOE and TVA, the DOE will reimburse TVA for a portion of the costs of converting the highly enriched uranium to low-enriched uranium. See Note 1 — *Summary of Significant Accounting Policies — Down-blend Offering for Tritium* for a more detailed discussion of the DBOT project.

Low-Level Radioactive Waste. Certain materials and supplies used in the normal operation of nuclear electrical generating units are potentially exposed to low levels of radiation. TVA sends shipments of low-level radioactive waste to burial facilities in Clive, Utah, and Andrews, Texas. TVA is capable of storing some low-level radioactive waste at its own facilities for an extended period of time, if necessary.

Spent Nuclear Fuel. All three nuclear sites have dry cask storage facilities. Sequoyah will need additional capacity by 2029. Browns Ferry will need additional capacity by 2037. Watts Bar will need additional capacity by 2039. To recover the cost of providing long-term, on-site storage for spent nuclear fuel, TVA filed a breach of contract suit against the U.S. in the U.S. Court of Federal Claims in 2001. As a result of this lawsuit and related agreements, TVA has collected approximately $483 million through 2024.

Tritium-Related Services. TVA and the DOE are engaged in a long-term interagency agreement under which TVA will, at the DOE's request, irradiate tritium-producing burnable absorber rods ("TPBARs") to assist the DOE in producing tritium for

the Department of Defense ("DOD"). This agreement, which ends in 2040, requires the DOE to reimburse TVA for the costs that TVA incurs in connection with providing irradiation services and to pay TVA an irradiation services fee at a specified rate per TPBAR over the period when irradiation occurs.

In general, TPBARs are irradiated for one operating cycle, which lasts about 18 months. At the end of the cycle, TVA removes the irradiated rods and loads them into a shipping cask. The DOE then ships them to its tritium-extraction facility. TVA loads a fresh set of TPBARs into the reactor during each refueling outage. Irradiating the TPBARs does not affect TVA's ability to safely operate the reactors to produce electricity.

TVA has provided irradiation services using Watts Bar Unit 1 since 2003 and Watts Bar Unit 2 since 2021. TVA has increased its production to within currently licensed limits for Watts Bar Unit 1 and expects to be within licensed limits for Watts Bar Unit 2 in April 2025. The DOE notified TVA of future increased needs for tritium, and TVA submitted a License Amendment Request in 2023 to fulfill this request. This request was approved by the NRC in April 2024. The DOE's decision also allows for irradiation of TPBARs at Sequoyah in the future; however, TVA does not have plans to employ Sequoyah units for tritium production in the near term.

Natural Gas and Fuel Oil

During 2024, TVA purchased a significant amount of its natural gas requirements from a variety of suppliers under contracts with terms of up to five years and purchased substantially all of its fuel oil requirements on the spot market. The net book value of TVA's natural gas inventory was $23 million and $25 million at September 30, 2024 and 2023, respectively. The net book value of TVA's fuel oil inventory was $72 million and $84 million at September 30, 2024 and 2023, respectively. At September 30, 2024, 61 of the combustion turbine assets were dual-fuel capable, and TVA has fuel oil stored on each of these sites as a backup to natural gas.

TVA purchases natural gas from multiple suppliers on a daily, monthly, seasonal, and term basis. TVA uses contracts of various lengths and terms to meet the projected natural gas needs of its natural gas fleet. During 2024, TVA arranged for the transportation of natural gas on eight separate pipelines, with approximately 69 percent being transported on two pipelines. During 2024, TVA maintained a total of approximately 1,887,883 million British thermal unit(s) ("mmBtu") per day of firm transportation capacity on eight major pipelines, with approximately 63 percent of total firm transportation capacity being maintained on two pipelines.

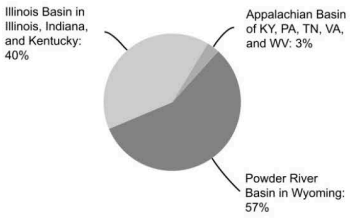
TVA utilizes natural gas storage services at eight facilities with a total capacity of 7.8 billion per cubic feet ("Bcf") of firm service and 7.3 Bcf of interruptible service to manage the daily balancing requirements of the eight pipelines used by TVA, with approximately 52 percent of the total storage capacity being maintained at two facilities. During 2024, storage levels were generally maintained at between 40 and 80 percent of the maximum contracted capacity at each facility. As TVA's natural gas requirements grow, it is anticipated that additional storage capacity may need to be acquired to meet the needs of the generating assets. In 2025, TVA expects to increase its storage portfolio by approximately three percent.

Coal

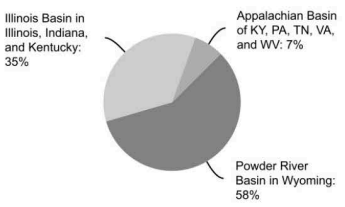
Coal consumption at TVA's coal-fired generating facilities during both 2024 and 2023 was approximately 12 million tons. At September 30, 2024 and 2023, TVA had 28 days and 21 days of system-wide coal supply at full burn rate, respectively, with net book values of $191 million and $204 million, respectively.

TVA utilizes both short-term and long-term coal contracts. During 2024, long-term contracts made up 94 percent of coal purchases, and short-term contracts accounted for the remaining six percent. TVA plans to continue using contracts of various lengths, terms, and coal quality to meet its expected consumption and inventory requirements. During 2024 and 2023, TVA purchased coal by basin as follows:

2024

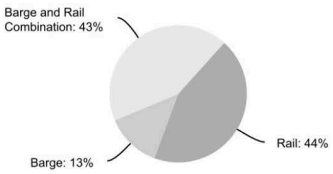


2023

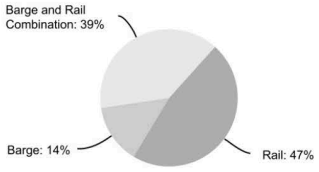


The following charts present the proportion of each delivery method TVA utilizes for its coal supply for the periods indicated:

2024



2023



Coal inventory decreased at September 30, 2024 as compared to September 30, 2023. Coal supply availability and transportation performance continued to improve in 2023 and 2024. Throughout 2024, TVA was able to meet burn and increase inventory stockpiles due to current market conditions reflecting an approximate balance between demand and available supply, weaker export markets, and stable natural gas prices. TVA also invested in additional multi-year coal supply contracts to help provide stability in coal supply availability. These investments are expected to support fuel resilience with TVA's overall coal supply.

Transmission

The TVA transmission system is one of the largest high-voltage transmission systems in North America. TVA's transmission system has 69 interconnections with 13 neighboring electric systems and delivered approximately 163 billion kWh of electricity to TVA customers in 2024. In carrying out its responsibility for transmission grid reliability in the TVA service area, the TVA transmission grid has operated with 99.999 percent reliability since 2000. See Item 2, Properties — *Transmission Properties*.

Pursuant to its Transmission Service Guidelines, TVA offers transmission services to eligible customers to transmit wholesale power in a manner that is comparable to TVA's own use of the transmission system. TVA has also adopted and operates in accordance with its published Transmission Standards of Conduct and separates its transmission function from its

power marketing function. As a Balancing Authority, Distribution Provider, Generator Owner, Generator Operator, Planning Coordinator, Reliability Coordinator, Resource Planner, Transmission Owner, Transmission Operator, Transmission Planner, and Transmission Service Provider, as those terms are defined for purposes of North American Electric Reliability Corporation ("NERC") regulations, TVA is also subject to federal reliability standards that are set forth by the NERC and approved by FERC. See *Regulation*.

Additional transmission upgrades may be required to maintain reliability. Upgrades may include enhancements to existing lines and substations or new installations as necessary to provide adequate power transmission capacity, maintain voltage support, and ensure generating plant and transmission system stability. In addition to upgrades to maintain reliability, TVA's Grid of Tomorrow initiative aims to increase grid flexibility to enable greater use of renewable resources such as solar, wind, and other forms of distributed generation and includes making data and communications upgrades as demonstrated by investments in the new system operations center, energy management system, and fiber optic network. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio.*

In recognition of the challenges of integrating intermittent and inverter-based resources to the power system, TVA established the Future Grid Performance initiative. The primary goal is to maintain a stable and reliable grid while fostering the evolution of the energy system of the future, one of TVA's strategic elements of Operational Excellence. Secondary goals include improving processes to facilitate an evolving resource mix with new technologies, optimizing approaches and tools to ensure system stability and performance in the future grid, and evaluating and adopting new grid technologies. This initiative seeks to address grid needs to keep the grid reliable and stable as TVA transitions to an energy system that has a greater share of intermittent and inverter-based resources, such as renewables and battery storage, connected to the transmission system.

In addition, TVA is working on various projects with universities, Electric Power Research Institute ("EPRI"), and others to help enable a dynamic and multi-directional grid. TVA is also working in partnership with LPCs to modernize their distribution systems by developing a shared vision and roadmap for transforming the Tennessee Valley's transmission and distribution systems into an integrated regional grid.

These initiatives support TVA's decarbonization efforts while helping ensure TVA continues to achieve its mission to deliver reliable power at the lowest feasible rate. Investments in a modernized grid will help enable enhanced monitoring and control of TVA's transmission and generation portfolio.

Weather and Seasonality

Weather affects both the demand for and the market prices of electricity. TVA's power system is generally a dual-peaking system in which the demand for electricity peaks during the summer and winter months to meet cooling and heating needs. TVA uses degree days to measure the impact of weather on its power operations. Degree days measure the extent to which the TVA system 23-station average temperatures vary from 65 degrees Fahrenheit. See Item 1, Business — *Flood Control Activities*, Item 1, Business — *Environmental Matters — Climate Change — Physical Impacts of Climate Change,* Item 1A, Risk Factors — *Risks Related to the Environment and Catastrophic Events,* and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Results of Operations — Sales of Electricity.*

Competition

TVA provides electricity in a service area that is largely free of competition from other electric power providers. This service area is defined primarily by provisions of law and long-term contracts. The region in which TVA or LPCs that distribute TVA power may provide power is limited and is often referred to as the "fence." Under the FPA, the Anti-Cherrypicking Amendment ("ACPA") limits the ability of others to use the TVA transmission system for the purpose of serving customers within TVA's service area. State service territory laws limit unregulated third parties' ability to sell electricity to consumers. All TVA wholesale power contracts are all requirements contracts; however, Power Supply Flexibility Agreements available to LPCs that have executed long-term Partnership Agreements with TVA allow LPCs to locally generate or purchase up to approximately five percent of their average total hourly energy sales over a certain time period in order to meet their individual customers' needs. Revised flexibility agreements were made available to LPCs in August 2023. These revised agreements permit projects to be located anywhere in TVA's service area, connected either to the LPC distribution system or to TVA's transmission system, and make it easier for LPCs to partner on projects. In addition, other utilities may use their own transmission lines to serve customers within TVA's service area, and third parties are able to avoid the restrictions on serving end-use customers by selling or leasing generating assets to a customer rather than selling electricity. These threats underscore the need for TVA to design rates and strategically price its products and services to be competitive. There have also been some efforts to erode the ACPA, and the protection of the provision could be limited and perhaps eliminated by federal legislation at some time in the future.

TVA also faces competition in the form of emerging technologies. Improvements in energy efficiency technologies, smart technologies, and energy storage technologies may reduce the demand for centrally provided power. The growing interest by customers in generating their own power through DER has the potential to lead to a reduction in the load served by TVA as well as cause TVA to re-evaluate how it operates the overall grid system to continue to provide highly reliable power at affordable

rates. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Fiber Optic Network*.

Finally, TVA and other utility companies are facing an evolving marketplace of increased competition driven by customer choice and behavior. As technology develops, consumers' demands for access to diverse products and services may increase, and customers could choose another utility to meet some or all of their power needs where available, pursue self-generation to meet some or all of their power needs, or move their operations outside of TVA's service territory.

Research and Development

Investments in TVA's research portfolio are supported through partnership and collaboration with LPCs, EPRI, the DOE, federal agencies, peer utilities, universities, and industry vendors and through participation in professional societies and other research consortiums.

Annual investments made in science and technological innovation help meet future business and operational challenges. Each year, TVA's annual research portfolio is updated based on a broad range of operational and industry drivers to assess key technology gaps, performance issues, or other significant issues, addressed through research and development. Core research activities directly support optimization of TVA's generation and transmission assets, air and water quality, energy utilization, and distributed/clean energy integration. TVA also provides research and development services on behalf of LPCs by helping optimize their distribution systems and helping minimize technology gaps in energy utilization and consumer technologies.

TVA places a high priority on providing innovation and research efforts to close gaps and develop the energy system of the future which are organized around its transformative innovation initiatives: advanced nuclear solutions, decarbonization options, storage integration, regional grid transformation, electric vehicles evolution, connected communities, and the newest - Future Grid Performance. TVA has placed an emphasis on research leading to the understanding and application of clean resources to support the reduction of carbon emissions from its power supply. This research supports both TVA and national strategic interests to reduce carbon emissions and is designed to both catalyze and support TVA's decarbonization initiative.

TVA is committed to investing in the future of nuclear and continues to evaluate the licensing and design of emerging nuclear technologies, such as advanced light water SMRs and advanced non-light water reactors, as part of technology innovation efforts aimed at developing the energy system of the future, one of TVA's strategic elements of Operational Excellence. In December 2019, TVA became the first utility in the nation to successfully obtain approval for an early site permit from the NRC to potentially construct and operate SMRs at its Clinch River Site. TVA has entered into memorandums of understanding and agreements that allow for mutual collaboration to explore advanced reactor designs as a next-generation nuclear technology while leveraging the expertise of federally funded research and development centers, utilities, vendors, and academic institutions. These contractual relationships are important steps in the early stages of evaluation as TVA considers the economic feasibility of advanced nuclear reactors. These contractual relationships are also intended to leverage innovations to improve advanced nuclear designs, streamline licensing pathways, find efficiencies in construction methods, and optimize operating expenses. For example, TVA has entered into a multi-party collaborative arrangement to advance the global development of the GE Hitachi Nuclear Energy BWRX-300 SMR. See Note 21 — *Collaborative Arrangement* for additional information on the multi-party collaboration arrangement. TVA currently believes that this advanced nuclear reactor technology is most readily available for deployment with the fewest risks; as such, TVA is evaluating this technology in greater detail, while still considering other advanced reactor technologies. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Small Modular Reactors* for additional discussion and total costs related to SMR work. TVA is also partnering on the exploration of fusion technology.

TVA is a founding member of the Low Carbon Resources Initiative ("LCRI"), which is a coalition of utilities and researchers led by EPRI and the Gas Technology Institute. The LCRI's purpose is to engage, inform, support, and accelerate global low-carbon solutions creating pathways to advance carbon reducing technologies for large scale utility deployment. The initial five-year initiative from 2020 to 2024 will extend into 2027 and includes foundational technical research and demonstration projects support creating resource options, such as alternative fuels (hydrogen, ammonia, and methanized derivatives), carbon capture, electrification, and utilization of clean DER as part of the overall low-carbon resource mix. TVA plans to continue involvement with LCRI to support demonstrations of technologies itself and gain knowledge from other demonstrations which can support pathways to decarbonization. TVA has made progress understanding regional geology and carbon capture technologies and is evaluating both with an emphasis on the potential for carbon capture in TVA's future. To support this initiative, in 2023 TVA entered into an MOU to study the development, construction, and operation of carbon capture, utilization, transportation, and sequestration infrastructure at or near TVA's Ackerman and Paradise Combined Cycle Plants.

At the forefront of the energy storage initiative is deploying grid-scale battery energy storage technology to optimize the existing TVA generation assets and improve the resiliency of the transmission system. In 2020, TVA launched its first TVA-owned, grid scale, lithium-ion demonstration battery project, and in 2023, TVA began construction near Vonore, Tennessee. The 20 MW battery system was installed in the first quarter of 2024, and the site is progressing toward construction completion with the expectation to begin testing and commissioning by the first quarter of 2025. TVA is also evaluating a battery energy storage system utilizing grid-forming inverters. Additionally, TVA is contracting for several battery energy storage systems to be deployed in the region by third-party developers who will make their systems available for TVA dispatch as described in Part II, Item 7,

Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Renewable Power Purchase Agreements.* The system integration lessons learned from these projects will guide future application of battery storage as part of the evolving bulk power system in the region. TVA is studying the optimal siting and design for another pumped-storage plant as described in *Power Supply and Load Management Resources — Hydroelectric Pumped-Storage*. TVA is also evaluating the potential of short duration battery alternatives to lithium-ion and long duration storage alternatives to pumped-storage.

TVA continues to develop potential electrification programs, in addition to the Fast Charge Network, that improve resource use and reduce environmental impacts in the transportation sector. TVA programs are based on previous assessments, which included a multi-stakeholder vision and roadmap effort aimed at identifying the path forward for electric vehicles in Tennessee. The approach provides for broad engagement from industry, government, and utilities that could be applied in other states in the TVA service territory. In addition, TVA is continuing its evaluation of potential electric vehicle adoption strategies through coordination of activities with EPRI and state and industry stakeholders related to operational fleet requirements. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Electric Vehicles.*

TVA has 23 Connected Communities pilot projects with many different stakeholders across four focus areas: Broadband and Digital Literacy, Economic Empowerment, Energy and Environmental Justice, and Enhanced Community Resiliency. Connected Communities pilot projects are aimed at addressing today’s challenges with community-driven information and technology solutions for a modernized energy system. Connected Communities has ten community partnerships to provide consulting services to test a framework for engaging communities to help set goals, scope projects, and apply for funding. Research will continue to identify best practices, better understand challenges in the Tennessee Valley, and scale up learnings from the projects to broader applications throughout the Tennessee Valley.

TVA and LPCs are engaged in several initiatives related to regional grid transformation. Research includes technologies and applications advancement in intelligent distribution systems. Smart meter technology has the potential to shift usage patterns away from peak demand times which could change costs significantly. Additionally, intelligent transmission systems would give TVA the ability to nearly instantaneously diagnose problems, make corrections, and engage transmission and generation resources quickly so that power would keep flowing. This could promote reduced emissions, lower energy costs, and add greater flexibility to accommodate the new consumer-generated sources under TVA's renewable energy programs. TVA also worked with LPC partners to execute a survey of LPC technology capabilities and plans, and the results are helping shape a realistic path toward TVA's long-term goals. See *Power Supply and Load Management Resources — Distributed Energy Resources* and *Transmission*.

Finally, in 2023, TVA began an initiative called Future Grid Performance. This initiative seeks to address grid needs to keep the grid reliable and stable as TVA transitions to an energy system that has a greater share of intermittent and inverter-based resources, such as renewables and battery storage, connected to the transmission system. See *Transmission* above for more information on this initiative.

Flood Control Activities

The Tennessee River watershed has one of the highest annual rainfall totals of any watershed in the U.S., averaging 51 inches per year. During 2024, approximately 52 inches of rain fell in the Tennessee Valley. TVA manages the Tennessee River system in an integrated manner, which includes managing minimum river flows and minimum depths for navigation, reducing flood damage, generating low-cost hydroelectric power, maintaining flows that support habitat for fish and other aquatic species, maintaining water supply, and providing recreational opportunities for the Tennessee Valley. In addition, having cool water available helps TVA to meet thermal compliance and support normal operation of TVA's nuclear and fossil-fueled plants, while oxygenating water helps fish species remain healthy. TVA spills or releases excess water through its dams in order to reduce flood damage to the Tennessee Valley. TVA typically spills only when all available hydroelectric generating turbines are operating at full capacity and additional water still needs to be moved downstream.

The Tennessee Valley experienced just above normal rainfall at 104 percent of normal and runoff at 81 percent of normal during 2024. Although runoff for 2024 was below normal due to fewer significant rain events, the winter and spring timing of above normal rainfall during the period supported TVA's objective to generate low-cost hydroelectric power while also meeting its river system commitments, including flood mitigation, which is estimated to have prevented damages across the Tennessee Valley of approximately $406 million in 2024 and $10.1 billion over TVA's recorded history.

Environmental Stewardship Activities

TVA's mission includes managing the Tennessee River, its tributaries, and federal lands along the shoreline to provide, among other things, year-round navigation, flood damage reduction, affordable and reliable electricity, recreational opportunities, adequate water supply, improved water quality, and natural resource protection. There are 49 dams that comprise TVA's integrated reservoir system. Each dam may also have ancillary structures used to support or assist the main dam's function. The reservoir system provides approximately 800 miles of commercially navigable waterways and also provides significant flood reduction benefits both within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers. The

reservoir system also provides a water supply for residential and industrial customers, as well as cooling water for TVA's coal-fired plants, combined cycle plants, and nuclear power plants. TVA's Environmental Policy provides objectives for an integrated approach related to providing reliable, affordable, and increasingly clean energy; engaging in proactive stewardship of the Tennessee River system and public lands; and supporting sustainable economic growth. The Environmental Policy also provides additional direction in several environmental stewardship areas related to reducing environmental impacts on the Tennessee Valley's natural resources, including reducing carbon intensity and air emissions; minimizing waste; and protecting water resources and cultural resources. TVA's Biodiversity Policy further builds on the TVA record of environmental stewardship by acknowledging the critical role of natural systems in achieving its mission of improving the quality of life in the region. The policy commits to seeking conservation opportunities within capital projects and improving current operational practices to help minimize impacts, reduce costs, and enhance biodiversity.

TVA serves the people of the TVA region through the integrated management of the Tennessee River system and public lands, which include approximately 11,000 miles of shoreline; 650,000 surface acres of reservoir water; and 293,000 acres of reservoir lands. TVA accomplishes this mission and supports the objectives of the TVA Environmental Policy through implementation of its natural resources stewardship strategy. Within this strategy, TVA confirms a desire to remain agile, balance competing demands, and be a catalyst for collaboration in order to protect and enhance biological, cultural, and water resources as well as create and sustain destinations for recreation and opportunities for learning and research. As part of the strategy, TVA intends to assist water-based community development with the issuance of permits, technical support, and land agreements using planning, clear regulations, meaningful guidelines, and consistent enforcement. Additional guidance for carrying out many of TVA's essential stewardship responsibilities is provided in TVA's Natural Resource Plan. The plan aligns TVA's mission with the stewardship strategy and includes ten focus areas that provide a comprehensive view of resource stewardship efforts.

Economic Development Activities

Economic development, along with energy production and environmental stewardship, is one of the primary statutory purposes of TVA. Economic development programs developed by TVA support all communities, including rural and economically distressed communities, across the Tennessee Valley. Through its economic development activities, TVA endeavors to recruit and retain companies in targeted business sectors, foster capital investment and job growth, and assist communities in the Tennessee Valley with economic growth opportunities.

TVA seeks to achieve these goals through a combination of initiatives and partnerships with LPCs, regional, state, and local agencies, and communities by providing financial incentives, technical services, industry expertise, and site-selection assistance to new and existing businesses in the Tennessee Valley. TVA's economic development incentive programs offer competitive incentives to new and existing power customers in certain business sectors that make multi-year commitments to invest in the Tennessee Valley. See Note 17 — *Revenue — Contract Balances — Economic Development Incentives* for total incentives recorded.

In 2024, TVA's economic development efforts and programs helped attract or expand 175 companies into the TVA service area. These companies announced the following economic performance measures:

Economic Performance Measure	At September 30, 2024[1]
Projected capital investments	$8.9 billion
Jobs expected to be created (#)[2]	10,368
Jobs expected to be retained (#)[3]	42,393

Notes
(1) These amounts are forward-looking and are subject to various uncertainties. Amounts may differ materially based upon a number of factors, including, but not limited to, economic downturns or recessions. See *Forward-Looking Information* and Item 1A, Risk Factors.
(2) "New jobs" in the TVA fiscal year are newly created, paid positions at a facility of a TVA customer. "Positions" are calculated by adding (1) the number of full-time, on-site employees and/or independent contractors at the facility, (2) the total number of full-time work-from-home employees and independent contractors who reside in the TVA service territory and who spend 100% of their work time on facility-related matters, and (3) the total hours worked on facility-related matters by (a) full-time and part-time on-site employees at the facility and (b) full-time and part-time work-from-home employees who reside in the TVA service territory and who spend less than 100% of their work time on facility-related matters, divided by the number of work hours of such employees based on a 40 hour work week. A "TVA customer" means an entity that purchases power from TVA or a distributor of TVA power. New jobs reported by TVA may include positions created during the current TVA fiscal year and certified projections of anticipated positions to be created within a five-year time frame. New job numbers reported by TVA are certified and provided to TVA by TVA customers.
(3) "Retained jobs" are paid positions at a facility of a TVA customer that were created prior to the current TVA fiscal year and that continue to be filled in the current TVA fiscal year. "Positions" are calculated by adding (1) the number of full-time, on-site employees and/or independent contractors at the facility, (2) the total number of full-time work-from-home employees and independent contractors who reside in the TVA service territory and who spend 100% of their work time on facility-related matters, and (3) the total hours worked on facility-related matters by (a) full-time and part-time on-site employees at the facility and (b) full-time and part-time work-from-home employees who reside in the TVA service territory and who spend less than 100% of their work time on facility-related matters, divided by the number of work hours of such employees based on a 40 hour work week. A "TVA customer" means an entity that purchases power from TVA or a distributor of TVA power. Retained job numbers reported by TVA are certified and provided to TVA by TVA customers.

Regulation

TVA is required to comply with comprehensive and complex laws, regulations, and orders. The costs of complying with these laws, regulations, and orders are expected to be substantial, and costs could be significantly more than TVA anticipates.

Congress

TVA exists pursuant to the TVA Act as enacted by Congress and carries on its operations in accordance with this legislation. Congress can enact legislation expanding or reducing TVA's activities, change TVA's structure, and even eliminate TVA. Congress can also enact legislation requiring the sale of some or all of the assets TVA operates or reduce the U.S.'s ownership in TVA. To allow TVA to operate more flexibly than a traditional government agency, Congress exempted TVA from all or parts of certain general federal laws that govern other agencies, such as federal labor relations laws and the laws related to the hiring of federal employees, the procurement of supplies and services, and the acquisition of land. Other federal laws enacted since the creation of TVA that are applicable to other agencies have been made applicable to TVA, including those related to paying employees overtime and protecting the environment, cultural resources, and civil rights.

Securities and Exchange Commission

Section 37 of the Securities Exchange Act of 1934 (the "Exchange Act") requires TVA to file with the Securities and Exchange Commission ("SEC") such periodic, current, and supplementary information, documents, and reports as would be required pursuant to Section 13 of the Exchange Act if TVA were an issuer of a security registered pursuant to Section 12 of the Exchange Act. Section 37 of the Exchange Act exempts TVA from complying with Section 10A(m)(3) of the Exchange Act, which requires each member of a listed issuer's audit committee to be an independent member of the board of directors of the issuer. Since TVA is an agency and instrumentality of the U.S., securities issued or guaranteed by TVA are "exempted securities" under the Securities Act of 1933, as amended (the "Securities Act"), and may be offered and sold without registration under the Securities Act. In addition, securities issued or guaranteed by TVA are "exempted securities" and "government

securities" under the Exchange Act. TVA is also exempt from Sections 14(a)-(d) and 14(f)-(h) of the Exchange Act (which address proxy solicitations) insofar as those sections relate to securities issued by TVA, and transactions in TVA securities are exempt from rules governing tender offers under Regulation 14E of the Exchange Act. Also, since TVA securities are exempted securities under the Securities Act, TVA is exempt from the Trust Indenture Act of 1939 insofar as it relates to securities issued by TVA, and no independent trustee is required for these securities.

Federal Energy Regulatory Commission

Under the FPA, TVA is not a "public utility," a term which primarily refers to investor-owned utilities. Therefore, TVA is not subject to the full jurisdiction that FERC exercises over public utilities under the FPA. TVA is, however, an "electric utility" and a "transmitting utility" as defined in the FPA and, thus, is directly subject to certain aspects of FERC's jurisdiction. Under the FPA, for example, TVA (1) must comply with certain standards designed to maintain transmission system reliability; (2) can be ordered to interconnect its transmission facilities with the electrical facilities of independent generators and of other electric utilities that meet certain requirements; (3) can be ordered to transmit wholesale power provided that the order (a) does not impair the reliability of the TVA or surrounding systems, (b) meets the applicable requirements concerning terms, conditions, and rates for service, and (c) does not implicate the ACPA; (4) could be subject to FERC review of the transmission rates and the terms and conditions of service that TVA provides; and (5) is prohibited from (a) reporting false information on the price of electricity sold at wholesale or the availability of transmission capacity to a federal agency with intent to fraudulently affect the data being compiled by the agency and (b) using manipulative or deceptive devices or contrivances in connection with the purchase or sale of power or transmission services subject to FERC's jurisdiction.

In addition, the FPA provides FERC with authority (1) to order refunds of excessive prices on short-term sales (transactions lasting 31 days or less) by all market participants, including TVA, in price gouging situations if such sales are through an independent system operator or regional transmission organization under a FERC-approved tariff; (2) to issue regulations requiring the reporting, on a timely basis, of information about the availability and prices of wholesale power and transmission service by all market participants, including TVA; (3) to investigate electric industry practices, including TVA's operations that are subject to FERC's jurisdiction; and (4) to impose civil penalties of up to $1 million per day for each violation of the provisions of the FPA discussed in the prior paragraph that are applicable to TVA. Criminal penalties may also result from such violations.

Furthermore, while not required to do so, TVA has elected to implement various FERC orders and regulations pertaining to public utilities on a voluntary basis to the extent that they are consistent with TVA's obligations under the TVA Act.

Finally, on July 28, 2023, FERC issued Order No. 2023. The order updates the procedures for interconnecting generating facilities and is intended to address interconnection queue backlogs, improve certainty in the interconnection process, and encourage the evaluation of alternative transmission technologies. TVA has revised its generation interconnection procedures and agreements to align with Order No. 2023, effective November 1, 2024.

NERC Compliance

TVA is subject to federal reliability standards that are set forth by NERC and approved by FERC. These standards are designed to maintain the reliability of the bulk electric system, including TVA's generation and transmission system, and include areas such as maintenance, training, operations, planning, modeling, critical infrastructure, physical and cyber security, vegetation management, and facility ratings. TVA recognizes that reliability standards and expectations continue to become more complex and stringent for transmission systems.

Nuclear Regulatory Commission

TVA operates its nuclear facilities in a highly regulated environment and is subject to the oversight of the NRC, an independent federal agency that sets the rules that users of radioactive materials must follow. The NRC has broad authority to impose requirements relating to the licensing, operation, and decommissioning of nuclear generating facilities. In addition, if TVA fails to comply with requirements promulgated by the NRC, the NRC has the authority to impose fines, shut down units, or modify, suspend, or revoke TVA's operating licenses. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Operational Challenges.*

Environmental Protection Agency

TVA is subject to regulation by the Environmental Protection Agency ("EPA") in a variety of areas, including air quality control, water quality control, management and disposal of solid and hazardous wastes, and greenhouse gas ("GHG") reductions to address climate change. See *Environmental Matters* below and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges.*

States

The Supremacy Clause of the U.S. Constitution prohibits states, without federal legislative consent, from regulating the manner in which the federal government conducts its activities. As a federal agency, TVA is exempt from regulation, control, and taxation by states except in certain areas where Congress has clearly made TVA subject to state regulation. See *Environmental Matters* below.

Other Federal Entities

TVA's activities and records are also subject to review to varying degrees by other federal entities, including the Government Accountability Office and the Office of Management and Budget ("OMB"). There is also an Office of the Inspector General which reviews TVA's activities and records.

Taxation and Tax Equivalents

TVA is not subject to federal income taxation. In addition, neither TVA nor its property, franchises, or income is subject to taxation by states or their subdivisions. The TVA Act, however, does require TVA to make tax equivalent payments to states and counties in which TVA conducts power operations or in which TVA has acquired properties previously subject to state and local taxation. The total amount of these payments is five percent of gross revenues from the sale of power during the preceding year excluding sales or deliveries to other federal agencies and off-system sales with other utilities, with a provision for minimum payments under certain circumstances. Except for certain direct payments TVA is required to make to counties, distribution of tax equivalent payments within a state is determined by individual state legislation.

Environmental Matters

TVA's activities, particularly its power generation activities, are subject to comprehensive regulation under environmental laws and regulations relating to air pollution, water pollution, and management and disposal of solid and hazardous wastes, among other matters. The environmental laws and regulations that have the largest impact on TVA's operations and financial condition are discussed below.

Clean Air Act Programs and Regulations

National Ambient Air Quality Standards. The CAA requires EPA to set National Ambient Air Quality Standards ("NAAQS") for certain air pollutants. EPA has set NAAQS for ozone, particulate matter, sulfur dioxide ("SO_2"), nitrogen oxides ("NO_x"), carbon monoxide, and lead. Over the years, EPA has made the NAAQS more stringent. Each state must develop a plan to be approved by EPA for achieving and maintaining NAAQS within its borders. These plans impose limits on emissions from pollution sources, which are applicable to certain TVA generating units, including fossil fuel-fired plants. Areas meeting a NAAQS are designated as attainment areas. Areas not meeting a NAAQS are designated as non-attainment areas, and more stringent requirements apply in those areas, including stricter controls on industrial facilities and more complicated and public permitting processes. TVA fossil fuel-fired plants can be impacted by these requirements. Currently, all TVA generating units are located in areas designated as attainment areas. On March 6, 2024, however, EPA finalized more stringent NAAQS for particulate matter that may increase the likelihood of certain areas in TVA's service territory being designated as non-attainment areas. TVA could incur significant costs associated with upgrades to facilities if such facilities are in areas that are redesignated as being in non-attainment. The more stringent NAAQS are currently subject to a legal challenge seeking to overturn the standards.

Revised Cross-State Air Pollution Rule. TVA power plants are subject to EPA's Cross-State Air Pollution Rule ("CSAPR"). CSAPR addresses air pollution from upwind states in the U.S. that affect air quality in downwind states and is focused on NO_x and SO_2. To comply with CSAPR, TVA power plants must obtain one NO_x allowance for every ton of NO_x emitted during the ozone season. Under a revised version of CSAPR (the "Revised CSAPR Update Rule"), the Shawnee Fossil Plant ("Shawnee") facility is subject to reduced ozone-season NO_x allowances and has been required to use most of its allowance inventory. In 2024, TVA monitored forecasted needs and utilized purchased allowances for the Shawnee facility. A longer-term compliance strategy for the facility is being developed that may include installing NO_x control upgrades, incorporating operational changes, and continuing to purchase allowances. When completed, this strategy will help TVA comply with both the Revised CSAPR Update Rule and the Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone NAAQS. TVA has obtained approval from the State of Kentucky for construction of seven selective catalytic reduction systems ("SCRs") at the Shawnee facility. In 2024, TVA constructed an SCR on Shawnee Unit 7 and is constructing SCRs at three additional Shawnee Units by the end of 2025. As of September 30, 2024, TVA had spent $189 million and expects to spend an additional $51 million. TVA is evaluating plans for the remaining units.

Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone NAAQS. On March 15, 2023, EPA issued final regulations known as the "Good Neighbor Plan" to reduce NO_x emissions from power plants and certain industrial facilities. With the Good Neighbor Plan, EPA issued its Federal Implementation Plan ("FIP") that covers 23 states, including Alabama, Kentucky, and Mississippi, to reduce the interstate transport of NO_x. Under the rule, beginning with the 2023 ozone season, power plants in 22 states, including Alabama, Kentucky, and Mississippi, are required to participate in a NO_x

trading program. Over time, the emission budgets will decline based on the level of reductions achievable through phased installation of emissions controls at power plants starting in 2024. The rule also establishes daily emission rates for coal steam electric generating units greater than or equal to 100 MW in the covered states beginning with the 2024 ozone season. To help comply with these regulations, TVA is developing a longer-term compliance strategy for its Shawnee facility that may include installing NO_x control upgrades, incorporating operational changes, and continuing to purchase allowances. See *Revised Cross-State Air Pollution Rule* above. During 2023, EPA issued interim rules to stay the effectiveness of the 2023 FIP requirements for emission sources in several states, including Kentucky, Mississippi, and Alabama. The Good Neighbor Plan itself has been challenged in the United States Court of Appeals for the District of Columbia Circuit ("D.C. Circuit"), and applications were filed with the U.S. Supreme Court to stay the plan while its merits are being litigated. On June 27, 2024, the U.S. Supreme Court stayed the Good Neighbor Plan. The stay prevents EPA from applying the Good Neighbor Plan in 23 affected states, including Alabama, Kentucky, and Mississippi, pending the disposition of the petition for review. TVA cannot predict the outcome of the litigation or how it may impact its operations.

Mercury and Air Toxics Standards for Electric Utility Units. On May 7, 2024, EPA published a final rule that strengthens and updates the Mercury and Air Toxics Standards (“MATS”) for electric generating units ("EGUs") to reflect recent developments in control technologies. The rule lowers the emission standard for filterable particulate matter ("PM") from 0.030 lbs/MMBtu to 0.010 lbs/MMBtu, with compliance to be demonstrated solely through the use of PM Continuous Emission Monitoring Systems. The rule is subject to legal challenges. If the challenges are not successful, the rule could require TVA to refurbish existing pollution control equipment at some of its coal-fired units, and the cost of such refurbishments could be substantial.

Environmental Agreements. In 2011, TVA entered into two substantively similar agreements, one with EPA and the other with Alabama, Kentucky, North Carolina, Tennessee, and three environmental advocacy groups (collectively, the "Environmental Agreements"). To resolve alleged New Source Review claims, TVA committed under the Environmental Agreements to, among other things, take now-completed actions regarding coal-fired units and invest $290 million in certain TVA environmental projects. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Environmental Agreements*, which discussion is incorporated herein by reference.

Acid Rain Program. EPA's Acid Rain Program is intended to help reduce emissions of SO_2 and NO_x, which are the primary pollutants implicated in the formation of acid rain. The program includes a cap-and-trade emission reduction program for SO_2 emissions from power plants. TVA continues to reduce SO_2 and NO_x emissions from its coal-fired plants, and the SO_2 allowances allocated to TVA under the Acid Rain Program are sufficient to cover the operation of its coal-fired plants. In the TVA service area, the limitations imposed on SO_2 and NO_x emissions by the CSAPR program are more stringent than the Acid Rain Program. Therefore, TVA does not anticipate that the Acid Rain Program will impose any additional material requirements on TVA.

Regional Haze Program. EPA issued the Clean Air Visibility Rule, which required certain older sources to install best available retrofit technology. No additional controls or lower operating limits are required for any TVA units to meet best available retrofit technology requirements. In 2017, EPA published the final rule that changed some of the requirements for Regional Haze State Implementation Plans ("SIPs"). Specific impacts on TVA cannot be determined until future Regional Haze SIPs are developed for the next decennial review under the visibility haze provisions of the CAA. States were required to submit their Regional Haze SIPs to EPA by July 31, 2021. In response to requests from state air pollution control agencies in Tennessee and Kentucky, TVA submitted regional haze analyses for its Cumberland and Shawnee facilities, respectively, to those state agencies. The reports evaluate SO_2 emission reduction options for these facilities and will be considered by these state agencies in preparing their Regional Haze SIPs. On August 25, 2022, EPA issued a final action stating that 15 states, including Kentucky, failed to submit a complete SIP, which triggered a two-year deadline for EPA to promulgate a FIP for the state unless Kentucky submits, and EPA approves, a SIP satisfying the visibility protection requirements of the CAA. TVA negotiated with Kentucky and agreed to accept a federal limit for SO_2 emissions starting January 1, 2028. In August 2023, TVA submitted a Title V permit application to the Kentucky Division of Air Quality that incorporates this limit. TVA anticipates that it could meet this limit by installing control technologies for the seven uncontrolled Shawnee units. On June 4, 2024, the Kentucky Division of Air Quality made Kentucky's Regional Haze SIP available for public comments and expects to submit the final SIP to EPA after consideration of those public comments. See *Revised Cross-State Air Pollution Rule* above for additional information regarding TVA's plans to control the Shawnee units.

Start Up, Shutdown, and Malfunctions. Opacity, or visible emissions, measures the denseness or color of power plant plumes and has traditionally been used by states as a means of monitoring good maintenance and operation of particulate control equipment. Under some conditions, retrofitting a unit with additional equipment to better control SO_2 and NO_x emissions can adversely affect opacity emissions, and TVA and other utilities have addressed this issue. The evaluation of utilities' compliance with opacity requirements is coming under increased scrutiny, especially during periods of startup, shutdown, and malfunction ("SSM"). Historically, SIPs developed under the CAA typically excluded periods of SSM, but in June 2015, EPA finalized a rule to eliminate such exclusions ("2015 Rule"). Environmental petitioners and several states filed petitions for judicial review of the 2015 Rule before the D.C. Circuit. On March 1, 2024, the D.C. Circuit determined that EPA exceeded its authority in removing the SSM exemptions from SIPs without showing the exemptions impede compliance with the CAA. TVA cannot predict the outcome of future SIP submittals in responding to the March 2024 decision of the D.C Circuit.

New York Petition to Address Impacts from Upwind High Emitting Sources. In 2018, the State of New York filed a petition with EPA under Section 126(b) of the CAA to address ozone impacts on New York from the NO_x emissions from sources emitting at least 400 tons of NO_x in CY 2017 from nine states including Kentucky. The New York petition requests that EPA require daily NO_x limits for several Kentucky utility units including the Shawnee units. Kentucky utility unit NO_x emissions are already limited under CSAPR and are declining, and current EPA modeling projects that no additional requirements to reduce Kentucky NO_x emissions are necessary. In 2019, EPA finalized its denial of New York's petition. The State of New York filed a petition in the D.C. Circuit for judicial review of EPA's denial of the petition, and in July 2020, the D.C. Circuit vacated EPA's denial of the petition and remanded the petition to EPA for reconsideration. Specific impacts to TVA cannot be determined until EPA takes further action on the petition.

GHG Emissions. On May 9, 2024, EPA published a final rule that (1) repeals the Affordable Clean Energy Rule addressing GHG emissions from existing fossil fuel-fired electric generation units ("EGUs"), (2) establishes guidelines for GHG emissions from existing fossil-fuel fired steam generating EGUs, (3) finalizes revisions to the New Source Performance Standards ("NSPS") for GHG emissions from new and reconstructed fossil fuel-fired stationary combustion turbine EGUs, and (4) finalizes revisions to the NSPS for GHG emissions from fossil fuel-fired steam generating EGUs that undertake a large modification. The degree of GHG emission reduction would depend on the EGU's retirement date, and the cost of such reductions would likely be substantial. TVA is still evaluating the potential impact of the rule on its new natural gas-fired EGUs, but the impact would also likely be substantial. Provisions of the rule addressing GHG emissions from base load natural gas-fired EGUs would apply to new combined cycle ("CC") gas plants at which construction commenced after May 23, 2023. Base load CC gas plants subject to the rule would be required by January 1, 2032, to control 90 percent of the GHG emissions, most likely through carbon capture and storage. EPA did not finalize guidelines for GHG emissions from existing fossil fuel-fired stationary combustion turbine EGUs in this rulemaking. The rule is subject to legal challenges. Under the new rule, TVA would be required to reduce GHG emissions from any coal-fired units that it continues to operate beyond January 1, 2032.

Climate Change

Emissions. Though many of TVA's facilities continue to emit air pollutants, emissions from all TVA-owned and operated units (including small CTs of less than 25 MW) have been reduced from historic peaks. Emissions of NO_x and SO_2 began being regulated in 1995 and 1977, respectively. Emissions of NO_x and SO_2 have been reduced by 97 percent and 99 percent, respectively, since their initial year of regulation.

Emissions and Intensity Rates [1]	CY 2023	CY 2022
Nitrogen Oxide (NO_x)[2]		
Total NO_x Emissions (MT)	13,221	15,270
Total NO_x Emissions Intensity (MT/Net MWh)	0.000098	0.000113
Sulfur Dioxide (SO_2)[2]		
Total SO_2 Emissions (MT)	17,736	22,331
Total SO_2 Emissions Intensity (MT/Net MWh)	0.000131	0.000165
Mercury (Hg)		
Total Hg Emissions (kg)	47.4	39.2
Total Hg Emissions Intensity (kg/Net MWh)	0.0000004	0.0000003

Notes
(1) Intensity rates are calculated based on generation from TVA's most recent fiscal year for years indicated and emissions data from the most recent CYs.
(2) Emissions data is consistent with Edison Electric Institute Environmental, Social, Governance, and Sustainability Report standards, which are based on metric tons ("MTs"), whereas overall CO_2 emission rates and baseline reductions from historical levels are based on short tons.

For CY 2023, TVA's emissions of carbon dioxide ("CO_2") from its owned and operated units, including purchased power and REC retirement adjustments which reduce the reportable CO_2 emissions, were 49 million tons, resulting in a TVA system average, as delivered, CO_2 emission rate of 625 lbs/MWh. This represents a 58 percent and 53 percent reduction in mass carbon emissions and TVA's carbon emission rate, respectively, from 2005 levels.

While TVA continues down the path of lowering emissions, including GHG emissions, there will be fluctuations in TVA's emission numbers as a result of various factors, including electricity usage in the Tennessee Valley and changes in the power supply mix, as TVA continues to make operational decisions to keep the system reliable and deliver low-cost energy. The achievement of TVA's carbon reduction efforts, and its ability to maintain system reliability during the transition to cleaner forms of energy, is subject to numerous risks. See *Forward-Looking Information*, and Item 1A, Risk Factors — *Operational Risks — TVA may not be able to meet its carbon reduction aspirations, which may result in additional capital expenditures or higher operating expense.*

Report on Climate-Related Risks. On December 30, 2022, the Government Accountability Office ("GAO") publicly released a report entitled *Tennessee Valley Authority: Additional Steps Are Needed to Better Manage Climate-Related Risks*. This report examines climate-related risks to TVA's operations and steps TVA has taken to manage climate-related risks as well

as additional steps needed. In the report, GAO made recommendations, including that TVA conduct an inventory of assets and operations vulnerable to climate change and develop a resilience plan that identifies and prioritizes resilience measures.

TVA provided a response to GAO in June 2023 outlining completed and planned TVA actions to address the recommendations. To strengthen TVA's climate resiliency, TVA has established new priority actions in TVA's Climate Adaptation Plan. Based on the information provided and the release of the 2024 Climate Adaptation Plan, GAO agreed to close all the recommendations on August 14, 2024.

Executive Actions. President Biden has taken several executive actions relating to climate change.

- On January 20, 2021, President Biden issued EO 13990, "Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis." EO 13990 directs federal agencies to review and revise regulations consistent with broad policy goals to improve public health and the environment, reduce GHG emissions, and prioritize environmental justice. In addition, EO 13990 re-established an Interagency Working Group and tasked it with identifying areas and other key decisions where agencies should consider the social cost of GHG, which is a modeled metric used to estimate damages that GHG causes across society. On September 21, 2023, President Biden announced that he approved recommendations from the Interagency Working Group on the expanded use of the social costs of GHG for budgeting, procurement, and other agency decisions, including reaffirming its use for environmental reviews where appropriate.

- On January 27, 2021, President Biden issued EO 14008, "Executive Order on Tackling the Climate Crisis at Home and Abroad." EO 14008 seeks to promote safe global temperatures, increase climate resilience, and support low greenhouse gas emissions and climate-resilient development by, among other things, (1) using federal procurement authorities to achieve or facilitate (a) a carbon pollution-free electricity sector no later than 2035 and (b) clean and zero-emission vehicles for federal, state, local, and tribal government fleets, (2) putting the U.S. on a path to achieve net-zero emissions, economy-wide, by no later than 2050, and (3) establishing the Justice40 Initiative, instructing federal agencies to direct 40 percent of the benefit from eligible projects toward disadvantaged communities.

- On May 20, 2021, President Biden issued EO 14030, "Climate-Related Financial Risk," which calls for a governmental-wide strategy on the disclosure of climate-related financial risk that includes, among other things, the measurement, assessment, mitigation, and disclosure of climate-related financial risk to federal government programs, assets, and liabilities in order to increase the long-term stability of federal operations.

- On December 8, 2021, President Biden issued EO 14057, "Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," which details the administration's policy to take a whole-of-government approach to lead by example to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050. Implementing Instructions for EO 14057 issued in August 2022 provided instructions to federal agencies regarding agency planning, reporting requirements, and accountability. Agencies must issue or revise existing agency policies, directives, and guidance, as appropriate, including employee training, to ensure alignment with the goals and requirements of EO 14057.

- On September 12, 2022, President Biden issued EO 14082, "Implementation of the Energy and Infrastructure Provisions of the Inflation Reduction Act of 2022." EO 14082 provides that in implementing the Inflation Reduction Act, federal agencies shall, as appropriate and to the extent consistent with law, prioritize, among other things, (1) driving progress to achieve the climate goals of the U.S. to reduce greenhouse gas emissions 50 to 52 percent below 2005 levels in 2030, achieve a carbon pollution-free electricity sector by 2035, and achieve net-zero emissions by no later than 2050, (2) advancing environmental and climate justice through an all-of-government approach, including through the Justice40 Initiative set forth in EO 14008, and (3) promoting construction of clean energy generation, storage, transmission, and enabling technologies through efficient, effective mechanisms that incorporate community engagement.

- On April 21, 2023, President Biden issued EO 14096, "Revitalizing Our Nation's Commitment to Environmental Justice for All." EO 14096, among other things, details the administration's policy to take a whole-of-government approach to environmental justice and to advance environmental justice by implementing and enforcing the nation's environmental and civil rights laws, preventing pollution, addressing climate change and its effects, and working to clean up legacy pollution that is harming human health and the environment. In addition, EO 14096 directs each federal agency to make achieving environmental justice part of its mission and to submit an environmental justice strategic plan to the Chair of the Council on Environmental Quality within 18 months of the date of the order and every four years thereafter.

TVA is voluntarily pursuing multiple policies and programs in the Tennessee Valley that support the goals and policies of these executive actions. See *Actions Taken by TVA to Reduce GHG Emissions* below. TVA must consider executive actions within the context of statutory requirements imposed by Congress when carrying out its mission such as the TVA Act, which requires power to be sold at rates as low as feasible, and the Energy Policy Act of 1992, which requires the use of least-cost resource planning. TVA performs long-term least-cost resource planning through its Integrated Resource Plan process.

Paris Agreement. The U.S. is currently part of the Paris Agreement. The Paris Agreement tracks emissions targets through nationally determined contributions ("NDCs"). Each nation that is a party to the Paris Agreement is asked to prepare five-year, successive NDCs that it plans to achieve. In April 2021, the Biden Administration announced its GHG NDCs for 2030 under the Paris Agreement, and these NDCs establish a new target for the U.S. to achieve a 50 to 52 percent reduction from 2005 levels in economy-wide net GHG pollution in 2030. TVA's own operations have achieved GHG reductions from 2005 levels that are in excess of 50 to 52 percent.

Litigation. Climate change issues have been the subject of a number of lawsuits, including lawsuits against TVA, and TVA may be subject to additional lawsuits in the future. See Note 22 — *Commitments and Contingencies — Legal Proceedings* for additional information.

Indirect Consequences of Regulation or Business Trends. Legal, technological, political, and scientific developments regarding climate change may create new opportunities and risks. The potential indirect consequences could include an increase or decrease in electricity demand, increased demand for clean generation from alternative energy sources, and subsequent impacts to business reputation and public opinion. See *Power Supply and Load Management Resources*.

Physical Impacts of Climate Change. Physical impacts of climate change may include, but not be limited to, changing weather patterns, extreme weather conditions, and other events such as flooding, droughts, wildfires, heat waves, and snow or ice storms, and these events can impact TVA's system in terms of system operability, customer demand, and the health of regional economies. TVA updated its Climate Adaptation Plan in 2024. The goal of the action planning process is to ensure TVA continues to achieve its mission and program goals and to operate in a secure, effective, and efficient manner in a changing climate by integrating climate change adaptation efforts in coordination with state and local partners, tribal governments, and private stakeholders. TVA manages the risks proposed by climate change on its mission, programs, and operations within its environmental management processes, though such risks cannot be completely eliminated.

Actions Taken by TVA to Reduce GHG Emissions. TVA has reduced GHG emissions from both its generation facilities and its other operations. TVA Board actions have focused on further reducing GHG emissions from its generation fleet by evaluating the potential retirement of its coal-fired fleet, increasing its nuclear capacity, modernizing its hydroelectric generation system, increasing natural gas-fired generation to enable greater integration of renewables on the grid, increasing its purchases of renewable energy, building solar facilities, and investing in energy efficiency initiatives to reduce energy use in the Tennessee Valley. Additionally, TVA continues to invest in energy efficiency in its operations and offer renewable energy programs. See *Power Supply and Load Management Resources — Renewable Energy Resources*. These changes support the broad electrification and carbon emission reduction efforts in other sectors of the economy. Also, TVA has partnered with the University of Tennessee Baker School for Public Policy and Public Affairs and with diverse stakeholders from across the Tennessee Valley to conduct a Valley Pathways Study, which is focused on building a competitive and clean economy for the Tennessee Valley. This study examines potential scenarios for all economic sectors across the Tennessee Valley that will support sustainable growth and a viable and preferred decarbonization pathway. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio*.

There are inherent challenges each year in both operations and asset changes. TVA will not sacrifice reliability at any time, which means that TVA must make certain operational decisions at times to keep the system reliable, possibly impacting annual performance on carbon emissions. Therefore, while TVA continues to strive to lower GHG emissions, there will be fluctuations in TVA's emission numbers resulting from changes in the power supply mix, weather impacts, economic conditions, and generating unit performance. As TVA evolves its generation portfolio, and after appropriate environmental review under NEPA, the TVA Board could make decisions about the timing, retirement, and replacement of aging fossil units or other expiring capacity, which may further TVA's CO_2 and other emissions reductions. The Environmental Policy also provides additional direction in several environmental stewardship areas related to reducing environmental impacts on the Tennessee Valley's natural resources, including reducing carbon intensity and air emissions. In addition, TVA's decarbonization initiative is aimed at understanding and applying clean resources to support the reduction of carbon emissions from its power supply, and TVA is exploring several technologies as part of these efforts. See *Research and Development* above.

Renewable/Clean Energy Standards

Thirty-five states and the District of Columbia have established enforceable or mandatory requirements for electric utilities to generate a certain amount of electricity from renewable sources or have established a renewable goal. In 18 of those states and the District of Columbia, the requirement is for a 100% clean electricity standard or goal by 2050 or earlier. One state within the TVA service area, North Carolina, has a mandatory renewable and clean energy goal that, while not applying directly to TVA, does apply to TVA's LPCs serving retail customers in that state. TVA's policy is to provide compliance assistance to any distributor of TVA power, and TVA is providing assistance to the covered LPCs that sell TVA power in North Carolina. In 2020, Virginia signed into law the Clean Economy Act. This act establishes a mandatory requirement for utilities to generate a certain amount of electricity from renewable sources. At this time, TVA is not impacted by the legislation due to the relatively small amount of electricity that TVA provides in Virginia compared to other utilities. Likewise, the Mississippi Public Service Commission adopted an energy efficiency rule applying to electric and natural gas providers in the state, and TVA is supplying information on participation in TVA's energy efficiency programs to support the covered Mississippi LPCs.

Water Quality Control Developments

Waters of the United States. On May 25, 2023, the Supreme Court in *Sackett v. EPA* narrowed the interpretation of the scope of “waters of the United States” under the CWA. Specifically, the Court ruled that CWA jurisdiction extends only to wetlands that have continuous surface connection with relatively permanent bodies of water connected to traditional interstate navigable waters. In reaching its decision, the Court rejected the “significant nexus” standard for determining the jurisdiction of the CWA that was articulated by Justice Kennedy in the Court’s *Rapanos* decision. The result of this decision is that fewer waters will be subject to CWA permitting or other restrictions. In response to the *Sackett v. EPA* decision, EPA and the Army Corps of Engineers (“ACE”) published a final rule in the Federal Register in September 2023 that reestablishes, for the third time, the definition of waters of the United States. The new definition encompasses fewer water bodies than the previous definition. As such, ACE permits will no longer be required for some streams and wetlands that would have been included based on the previous “significant nexus” standard.

Cooling Water Intake Structures. In 2014, EPA released a final rule under Section 316(b) of the CWA relating to cooling water intake structures ("CWIS") for existing power generating facilities. The rule requires changes in CWIS used to cool the vast majority of coal, gas, and nuclear steam-electric generating plants and a wide range of manufacturing and industrial facilities in the U.S. The final rule requires CWIS to reflect the best technology available ("BTA") for minimizing adverse environmental impacts, primarily by reducing the amount of fish and shellfish that are impinged or entrained at a CWIS. These new requirements will potentially affect a number of TVA's fossil-fueled and nuclear-fueled facilities and will likely require capital upgrades to ensure compliance. Most TVA facilities are projected to require retrofit of CWIS with "fish-friendly" screens and fish return systems to achieve compliance with the new rule. The rule is being implemented through permits issued under the National Pollutant Discharge Elimination System ("NPDES") in Section 402 of the CWA. State agencies administer the NPDES permit program in most states including those in which TVA's facilities are located. In addition, the responsible state agencies must provide all permit applications to the U.S. Fish and Wildlife Service for a 60-day review prior to public notice and an opportunity to comment during the public notice. As a result, the permit may include requirements for additional studies of threatened and endangered species arising from U.S. Fish and Wildlife Service comments and may require additional measures to be taken to protect threatened and endangered species and critical habitats directly or indirectly related to the plant cooling water intake. TVA's review of the final rule indicates that the rule offers adequate flexibility for cost-effective compliance. The required compliance timeframe is linked to plant-specific NPDES permit renewal cycles (i.e., technology retrofits), and compliance activities have begun and are expected to continue through the 2028 - 2030 timeframe. These compliance activities include the requirement to conduct and submit studies on entrainment mortality, and these studies will be submitted as part of the permit renewal process. Using these studies, the state permitting agency will determine if the existing technology exhibits best technology or if alternative technology is required to achieve BTA. To address impingement mortality, a facility has 180 days after its reissued NPDES permit becomes effective to select impingement compliance options and submit a compliance schedule for implementation. A waiver from having to implement its impingement compliance requirements can be obtained if the facility will be retiring in the next five-year permit cycle.

EPA has never previously applied the requirements under Section 316(b) to hydroelectric facilities. However, in September 2021, EPA Region 10, which covers an area outside TVA’s service area, issued NPDES permits to four hydroelectric plants that include Section 316(b) requirements. In determining the BTA to minimize adverse impacts on the environment using best professional judgment, Region 10 analyzed the existing controls that the hydroelectric facilities were already implementing and concluded that those controls constitute BTA. It is not clear whether this approach will be adopted nationwide or how the BTA standard would be applied to TVA's hydroelectric facilities; accordingly, the specific impacts to TVA from the Region 10 permits cannot be determined at this time.

Hydrothermal Discharges. EPA and many states continue to focus regulatory attention on potential effects of hydrothermal discharges. Many TVA plants have variances from thermal standards under Section 316(a) of the CWA that are subject to review as NPDES permits are renewed. Specific data requirements in the future will be determined based on negotiations between TVA and state regulators. If plant thermal limits are made more stringent, TVA may have to install cooling towers at some of its plants and operate installed cooling towers more often. This could result in a substantial cost to TVA.

Steam-Electric Effluent Guidelines. In October 2020, EPA issued final revised electric effluent limitations guidelines ("ELGs") for bottom ash transport water and FGD wastewater. The primary impact for TVA is on the operation of existing coal-fired generation facilities. The revision also includes a subcategory for which Cumberland would qualify that provides TVA greater flexibility in meeting the ELGs. The revision includes two additional subcategories for low utilization units and units that cease coal combustion by the end of CY 2028. In October 2021, TVA filed notices of planned participation preserving the option for TVA's Bull Run, Cumberland, and Kingston plants to participate in the subcategory for units that cease coal combustion by the end of CY 2028.

On May 9, 2024, EPA issued final steam ELGs. This rule is expected to significantly impact wastewater treatment options at coal combustion facilities with waste streams that operate past 2028. This rule establishes more stringent technology-based effluent limitations for four waste streams: flue gas desulfurization (“FGD”) wastewater, bottom ash transport water (“BATW”), combustion residual leachate (“CRL”), and legacy wastewater. The rule also establishes a new subcategory for CRL called unmanaged CRL, which includes discharges of CRL that the permitting authority determines are the functional equivalent

of direct discharges of CRL or groundwater that meets the definition of CRL that is pumped to the surface and discharged to the waters of the United States. The 2024 ELGs are based on performance of specific technologies applied to these wastewaters. The rule establishes a general applicability category and a 2034 retirement subcategory for existing coal generation and retains the 2028 retirement subcategory and voluntary incentives program from the 2020 rule. The 2024 rule is likely to affect TVA's operating fossil sites, including Kingston, Cumberland, Gallatin, and Shawnee, and imposes additional reporting requirements for Bull Run. Additionally, this rule could impact any sites with CRL that have repowered or in the future could repower with steam electric generation. TVA is evaluating the applicability of this rule on all facilities as appropriate. Currently, the rule is subject to legal challenges. If the challenges are not successful, TVA could incur substantial costs to comply with the rule.

In 2021, TVA submitted requests to state regulatory authorities to modify NPDES permits for Kingston, Cumberland, Bull Run, Shawnee, and Gallatin Fossil Plant ("Gallatin") to incorporate into the permits limitations in EPA's 2020 rule. The Tennessee Department of Environment and Conservation ("TDEC") issued a final permit for Cumberland in the first quarter of 2024. In addition, consistent with the 2024 rule, on August 6, 2024, TVA submitted requests to state regulatory authorities to modify NPDES permits for Kingston, Cumberland, Shawnee, and Gallatin to incorporate into the permits limitations in EPA's 2024 rule.

Other Water Quality Control Requirements. As is the case in other industrial sectors, TVA and other utilities are also facing more stringent requirements related to drinking water standards, including new limits and requirements for per- and polyfluoroalkyl substances, the protection of wetlands, reductions in storm water impacts from construction activities, new water quality criteria for nutrients and other pollutants, new wastewater analytical methods, and changes in regulation of pesticide application.

Cleanup of Solid and Hazardous Wastes

TVA Sites. Historical operations by TVA and other entities at certain facilities have resulted in releases of contaminants that TVA is addressing, including at TVA's Environmental Research Center at Muscle Shoals, Alabama. TVA has completed several removal, remedial, and characterization actions at the site, as required by a RCRA permit issued by the Alabama Department of Environmental Management ("ADEM"). On September 30, 2024, TVA's estimated liability for required cleanup and similar environmental work for those sites for which sufficient information was available to develop a cost estimate was approximately $15 million and was included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. ADEM issued a renewed permit to TVA in July 2023, with a 10-year term. The new permit will not have any adverse impacts on TVA. In addition, the Environmental Research Center has an active groundwater monitoring program as part of a permitted corrective action plan.

Non-TVA Sites. TVA is aware of alleged hazardous-substance releases at certain non-TVA areas for which it may have some liability. See Note 22 — *Commitments and Contingencies — Contingencies — Environmental Matters*.

Coal Combustion Residuals. EPA published its final rule governing CCR in 2015. The rule regulates CCR as nonhazardous waste under Subtitle D of RCRA and establishes standards for landfill and surface impoundment placement, design, operation, and closure; groundwater monitoring; corrective action; and post-closure care. The initial version of the rule provided for self-implementation by utilities and allowed enforcement through citizen suits in federal court. The Water Infrastructure Improvements for the Nation Act subsequently allowed state or federal-based permitting to implement EPA's CCR rule ("CCR Rule") instead of self-implementation. In 2020, EPA issued the final Part A revision to its CCR Rule. Among other things, the final Part A rule requires unlined CCR surface impoundments to stop receiving CCR and non-CCR wastestreams and to initiate closure or retrofit by no later than April 11, 2021. TVA ceased sending CCR and non-CCR wastestreams to, and initiated closure of, unlined CCR surface impoundments by the specified deadline. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Coal Combustion Residuals — Coal Combustion Residuals Facilities* for a discussion of the impact on TVA's operations, including the cost and timing estimates of related projects.

On May 8, 2024, EPA published its final legacy CCR Rule ("Legacy CCR Rule"), which expands the scope of the existing regulatory requirements of the 2015 CCR Rule to include two additional classes of CCR units: Legacy Surface Impoundments (“Legacy SIs”) and Coal Combustion Residual Management Units (“CCRMUs”). Legacy SIs include inactive surface impoundments at retired generating facilities that were exempt from the 2015 CCR Rule. CCRMUs are a newly defined category that includes previously unregulated areas at CCR facilities where CCR was beneficially reused in an unencapsulated manner, disposed, placed, or managed on land outside of CCR units regulated by the 2015 CCR Rule. TVA completed applicability reports for multiple Legacy SIs by the November 8, 2024 deadline and as authorized by regulation is still evaluating whether other CCR units might constitute Legacy SIs. For CCRMUs, TVA must complete the initial round of facility evaluation reports by February 8, 2026, and the subsequent round by February 8, 2027. During 2024, TVA recorded additional estimated AROs of $3.1 billion as a result of EPA's Legacy CCR Rule and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated. These amounts are forward-looking and are subject to various uncertainties, and actual amounts may differ materially based upon a number of factors, including, but not limited to, the outcome of legal challenges to the Legacy CCR Rule, ongoing evaluations of the number and scope of newly regulated units, and determinations on final closure requirements and performance standards. See *Forward-Looking Information* and Item 1A, Risk Factors for a discussion of additional factors. Revisions to the additional estimated non-

nuclear AROs from the Legacy CCR Rule will be made whenever factors indicate that the timing or amounts of estimated cash flows have changed. See also Note 13 — *Asset Retirement Obligations*. In addition, EPA has recently interpreted its CCR Rule in a way that could challenge TVA's predominant closure methodology for many units, thereby potentially creating significant additional costs with implementing closure.

In August 2015, TDEC issued an order that includes an iterative process through which TVA and TDEC will investigate, assess, and remediate any unacceptable risks resulting from CCR management and disposal at TVA CCR units in the State of Tennessee. As part of this process, TVA has submitted environmental assessment reports ("EARs") to TDEC, and after the EARs are approved, TVA will submit Corrective Action/Risk Assessment ("CARA") Plans that will identify the unacceptable risks and TVA's proposed remediation. TDEC will review the CARA Plans and provide comments, and TVA will make revisions to address TDEC's comments until TDEC approves a final CARA Plan for each site. The public also will have an opportunity to review and comment on each CARA Plan prior to TDEC's approval of the final plan. During 2024, TDEC approved EARs for John Sevier, Cumberland, Kingston, Allen, and Watts Bar, and TVA submitted initial drafts of the CARA Plans for John Sevier, Cumberland, Allen, Watts Bar, and Kingston. TVA also submitted an initial draft of the Gallatin Ash Pond Complex CARA Plan to TDEC in January 2024 pursuant to a consent order and agreement. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations – *Key Initiatives and Challenges – Coal Combustion Residuals – Coal Combustion Residual Facilities* for a discussion of the Gallatin Ash Pond Complex. As discussed above, revisions of these initial draft CARA Plans will continue through the iterative process until the final plans are approved.

In October 2019, TDEC released amendments to its regulations which govern solid waste disposal facilities, including TVA's active CCR facilities covered by a solid waste disposal permit and those which closed pursuant to a TDEC-approved closure plan. Such facilities are generally subject to a 30-year post-closure care period during which the owner or operator must undertake certain activities, including monitoring and maintaining the facility. The amendments, among other things, add an additional 50-year period after the end of the post-closure care period, require TVA to submit recommendations as to what activities must be performed during this 50-year period to protect human health and the environment, and require TVA to submit revised closure plans every 10 years.

Groundwater Impacts Associated with CCR Management Activities. There is increased attention among EPA, environmental groups, and state regulatory agencies on impacts to groundwater associated with CCR management activities. As a result, TVA may be required to change how it manages CCR at some of its plants, potentially resulting in higher costs. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Coal Combustion Residuals — Coal Combustion Residuals Facilities* and — *Allen Groundwater Investigation* and Note 13 — *Asset Retirement Obligations.*

Environmental Investments

From 1970 to 2024, TVA spent approximately $6.8 billion on controls to reduce emissions from its coal-fired power plants, including $28 million, $25 million, and $16 million in 2024, 2023, and 2022, respectively, on clean air controls. In addition, TVA has reduced emissions by idling or retiring coal-fired units and relying more on cleaner energy resources including natural gas and nuclear generation and renewable sources.

TVA currently anticipates spending significant amounts on environmental projects in the future, including investments in new clean energy generation including renewables to reduce TVA's overall environmental footprint. TVA environmental project expenditures could also result from coal-fired plant decommissioning and from effective ash management modernization. Based on TVA's decisions regarding certain coal-fired units, the amount and timing of expenditures could change. See *Power Supply and Load Management Resources — Coal-Fired* above and *Estimated Required Environmental Expenditures* below.

SO_2 Emissions and NO_x Emissions. To reduce SO_2 emissions, TVA operates scrubbers on 17 of its coal-fired units and switched to lower-sulfur coal at certain coal-fired units. To reduce NO_x emissions, TVA operates SCRs on 18 coal-fired units, operates low-NO_x burners or low-NO_x combustion systems on 20 units, optimized combustion on all 24 units, and operates NO_x control equipment year round when units are operating (except during start-up, shutdown, and maintenance periods). TVA has also retired 35 of 59 coal-fired units. In 2024, TVA constructed an SCR on Shawnee Unit 7 and is constructing SCRs at three additional Shawnee Units by the end of 2025. TVA is evaluating plans for the remaining units. Except for six units at Shawnee, the remaining coal-fired units in the TVA fleet have scrubbers and SCRs. See *Power Supply and Load Management Resources — Coal-Fired* above.

Particulate Emissions. To reduce particulate emissions of air pollutants, TVA has equipped all of its coal-fired units with scrubbers, mechanical collectors, electrostatic precipitators, and/or bag houses.

Greenhouse Gas Emissions. Various federal agencies, including EPA and the Department of Commerce, may issue regulations establishing more stringent air and waste requirements, as well as GHG accounting requirements, and these requirements could result in significant changes in the structure of the U.S. power industry, especially in the eastern half of the country. There could be additional material costs if further reductions of GHGs, including CO_2, are mandated by legislative, executive, regulatory, or judicial actions and if more stringent emission reduction requirements for conventional pollutants are established. These costs cannot reasonably be predicted at this time because of the uncertainty of these actions.

Estimated Required Environmental Expenditures

The following table contains information about TVA's current estimates on projects related to environmental laws and regulations.

Estimated Potential Environmental Expenditures[1][2]
As of September 30, 2024
(in millions)

	2025	2026	2027 - 2029[3]	Total
Coal Combustion Residual Program[4]	$ 342	$ 472	$ 1,575	$ 2,389
Clean Air Act control projects[5]	83	16	58	157
Clean Water Act requirements[6]	20	24	47	91

Notes
(1) These estimates are subject to change as additional information becomes available and as regulations change.
(2) These estimates include $111 million, $116 million, and $258 million for 2025, 2026, and 2027 - 2029, respectively, in capital environmental expenditures. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Liquidity and Capital Resources — Cash Requirements*.
(3) These estimates do not include expenditures expected to be incurred after 2029.
(4) Includes known costs necessary for both federal and state compliance with the CCR rule, including requirements for the closure of facilities, post-closure maintenance, monitoring, and inspections. TVA is continuing to evaluate the rules and their impact on its operations, including the cost and timing estimates of related projects. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Coal Combustion Residuals — Coal Combustion Residuals Facilities* and Note 13 — *Asset Retirement Obligations*.
(5) Includes air quality projects that TVA is currently performing to comply with existing air quality regulations, but does not include any projects that may be required to comply with potential GHG regulations or transmission upgrades.
(6) Includes projects that TVA is currently planning to comply with revised rules under the Clean Water Act regarding CWIS and ELGs for steam electric power plants.

Human Capital Management

People Strategy and TVA's Values

The employees of TVA continued to advance TVA's unique mission and business goals to create an environment that supports and responds to the changing needs of its workforce, using People Advantage and four other Strategic Priorities (Operational Excellence, Financial Strength, Powerful Partnerships, and Igniting Innovation) to help create a culture that lives up to its values.

Paramount to TVA's focus on human capital and its People Advantage priority are three specific pillars: (1) Inclusion with Diversity ("IwD"), (2) Talent, and (3) Engagement, all of which are briefly highlighted below. To help shape an inclusive work environment that values all voices, TVA has intensified its efforts over the past few years to integrate IwD into its culture and make its efforts and progress sustainable and a part of TVA's daily operations.

Inclusion with Diversity

TVA recognizes inclusion as a journey, not a destination, and has continued to make significant strides throughout 2024 by acknowledging that its people bring more to the workplace than simply skills. Looking ahead, TVA and its industry will face challenging new technologies, customer expectations, and environmental requirements.

TVA further illustrates its commitment to employees and communities by championing Employee Resource Groups and various diversity councils across TVA. Diversity Impact Awards also reflect the effectiveness of TVA's diversity efforts, which extend outside of TVA.

Talent

Attracting and Retaining Talent. The strength of TVA lies in the collective power from the diverse knowledge, experiences, and perspectives that its employees bring from a variety of backgrounds. TVA recruits talent primarily from across the Tennessee Valley region and utilizes a talent framework to deliver enterprise workforce needs supporting attraction, selection, development, engagement, and performance. TVA actively engages with key community and university partners to recruit talent in craft, engineering, information technology, and professional positions, and continues to improve employment opportunities and the talent pool within TVA's workforce through early career apprenticeships and internships. TVA's top majors for its intern population are engineering, computer science, data analytics, and business/finance.

Healthy Attrition. TVA's voluntary attrition rates continue to fall well below the national, utility, and government benchmarks, with the majority of TVA's attrition noted as "healthy" attrition (e.g., retirements). TVA believes this stability is critical to TVA's success in a complex and competitive work environment and among a highly skilled workforce.

Competitive Total Rewards. TVA's total rewards package is a significant factor in attracting and retaining top talent. TVA provides market-based and competitive compensation and benefits, which includes an annual incentive plan (extended to all eligible employees, including TVA's represented employee population). Additionally, in support of its cultural commitment to IwD,

TVA periodically reviews and monitors compensation pay practices to promote fairness and equity and continues to provide leaders with tools to assist in making equitable pay decisions.

Development and Training. As TVA continues to adapt to the evolving demands of the industry, it seeks to motivate people to do their best work by aligning employee development, skills, and capabilities with what TVA needs to succeed now and in the future. TVA provides individual and team training opportunities as well as development opportunities for all employee levels. In-person and online learning events are offered and encouraged, and TVA also provides tuition reimbursement opportunities for academic programs aligned with TVA's business and workforce development needs.

Leadership Development and Succession Planning. TVA encourages and motivates employees to seek development and leadership opportunities. With the assistance of TVA's talent review and succession planning program, 91 percent of director and executive level roles have at least one succession candidate identified and at least one ready-now succession candidate. A continuous focus on and support of leadership development has helped TVA meet or exceed established goals for female and people of color representation in leadership. TVA believes that its strength lies in the collective power from the diverse knowledge, experiences, and perspectives that its employees bring. To inspire the best from its people, TVA utilizes a talent management framework to deliver enterprise workforce needs supporting talent attraction, selection, development, engagement, and performance.

Engagement

Strong engagement levels impact all TVA strategic priorities. TVA's employee engagement survey is administered a minimum of annually to all employees and measures overall engagement and drivers of engagement. Results from the surveys are shared with employees and used by TVA leadership and business units to improve and monitor progress against People Advantage objectives.

Safety and Employee Health. Safety is one of TVA's core values. TVA's safety program is based on the fundamentals of a safety management system, which includes management commitment, employee engagement, hazard recognition and control, worksite analysis, contractor safety management, training, review, and continuous improvement. Further, management illustrates its commitment to human capital by including a safety metric in its incentive compensation metrics that tracks the serious injury incident rate and applies to all eligible participants in TVA's annual program. A keen focus on safety helps TVA maintain top quartile ranking in workforce engagement, top quartile serious injury performance, and a clear link to other key areas such as IwD.

Partnerships with Unions. TVA has a long-standing policy of acknowledging and working with recognized representatives of its employees, and that policy is reflected in long-term agreements to recognize the unions (or their successors) that represent TVA employees.

TVA's labor strategy is critical to the achievement of its strategic priorities as it prepares the workforce for the future. Its employees are represented by six collective bargaining agreements and nine labor unions. This reflects 57 percent of TVA's internal workforce, or approximately 6,000 employees. With the addition of collective bargaining agreements and labor unions for TVA's contractors, there are a total of nine collective bargaining agreements and 17 labor unions. TVA's partnerships with these unions go back more than 80 years and form the backbone of TVA and its ability to serve the people of the Tennessee Valley.

Ethics

Ethics and integrity have been highly valued and essential elements of TVA's culture since TVA's establishment in 1933. TVA's Ethics & Compliance ("E&C") office aims to help employees make the right decisions when the right decisions may not be clear. TVA requires all employees and certain contractors to take annual ethics training and attest to a code of conduct, which sets forth standards for adhering to core values and conducting its affairs with openness, honesty, and integrity every day. In response to these efforts and a review by Ethisphere®, TVA became the first federal agency to receive the Compliance Leader Verification™ ("CLV") certification, applicable for 2022-2023. In December 2023, TVA received its second consecutive certification from Ethisphere®, applicable for 2024-2025, and remains the only federal agency to have received the CLV certification at this time.

Key Metrics

TVA actively monitors internal metrics to remain aware of human capital trends and to strive to ensure that it is making measurable progress on its People Advantage objectives. Through monitoring sources such as data and performance dashboards, one-on-one engagements between leaders and employees, and engagement surveys, TVA obtains information that helps it understand its performance and make adjustments, as needed.

Key measures of success in TVA's People Advantage strategic priority are set forth below at or for the years ended September 30 (unless otherwise noted):

	Goal	Actual	
Performance Measures	**2025**	**2024**	**2023**
People of color representation in leadership (%) [1]	13.0 %	11.1 %	10.9 %
Female representation in leadership (%) [1]	22.0 %	19.4 %	19.7 %
Diverse external hires (%) [2]	42.0 %	39.2 %	41.4 %
Voluntary attrition (%) [3]	2.4 %	1.2 %	1.4 %
Engagement (100-point scale) [4]	Top Quartile (≥77)	82	81
Inclusion (100-point scale) [5]	Median (≥72)	74	75
Recordable injuries (#) [6]	0	25	32
Serious injury incident rate [7]	0.02	0.00	0.02
Serious injury incidents [7]	0	0	3
Ethics violations [8]	0	17	23

Notes
(1) Defined as first line supervisors and above.
(2) Defined as external hires who are female, persons of color, or persons with disabilities.
(3) Voluntary attrition measures and accounts for all employees who leave the business voluntarily during a fiscal year.
(4) Based on score from Employee Engagement Survey defined as degree to which employees invest their cognitive, emotional, and behavioral energies toward positive organizational outcomes, at November 2023. Benchmark data is provided by the third-party administrator of the survey, based on data collected from over 550 organizations. Benchmarks are updated at least annually using data from the previous 12-month period.
(5) Based on score from Employee Engagement Survey defined as the degree to which employees sense they belong at work, at November 2023. Benchmark data is provided by the third-party administrator of the survey, based on data collected from over 550 organizations. Benchmarks are updated at least annually using data from the previous 12-month period.
(6) Retroactive cases can affect annual recordable injury counts reported.
(7) Based on the Edison Electric Institute criteria developed by industry peers.
(8) Ethics violations are determined by performing a comprehensive assessment across TVA of substantiated ethics violations involving violation of ethical laws or TVA's Code of Conduct; refusal or failure to cooperate with investigations; violation of equal opportunity policies or remedial actions; mishandling of classified information, privacy information, or security incidents; misuse of government property or official time; theft or unauthorized possession of property; falsification of safety-related documents; falsification or failure to correct TVA documents; and associated disciplinary and/or corrective actions taken.

Workforce Demographics

Employee Demographics
At September 30

	2024	2023
Number of employees	11,312	10,901
Employees represented by collective bargaining unit	57% of employees represented, or approximately 6,000 employees	58% of employees represented, or approximately 6,000 employees
Trades and labor employees	3,357	3,293
Average tenure (years)	12	12
Average age	45.4	45.4

	All Employees		Leadership		New Hires	
	At September 30		At September 30		At September 30	
	2024	**2023**	**2024**	**2023**	**2024**	**2023**
Female	2,401	2,289	323	309	261	267
People of Color	1,428	1,363	184	171	161	206
Military, Veteran	1,910	1,883	352	336	115	148
Disabled	877	844	139	134	49	44

Note
All data is based upon self-reported information provided to TVA.

In addition to the employees above, TVA also had approximately 16,800 and 15,600 contractors on September 30, 2024 and 2023, respectively, providing intermittent or full-time services to achieve critical strategic objectives. The majority of these contractors are managed by TVA suppliers that are providing services to TVA and primarily provide construction, maintenance, and modification work on TVA property and facilities as well as supplemental staffing for projects in support of various business needs.

ITEM 1A. RISK FACTORS

The risk factors described below, as well as the other information included in this Annual Report on Form 10-K for the fiscal year ended September 30, 2024 (the "Annual Report"), should be carefully considered. Risks and uncertainties described in these risk factors could cause future results of TVA operations to differ materially from historical results as well as from the results anticipated in forward-looking statements. Although the risk factors described below are the ones that TVA considers material, additional risk factors that are not presently known to TVA or that TVA presently does not consider material may also impact TVA's business operations. See *Forward Looking Information* above for a description of some matters that could affect the below risks or generate new risks. The occurrence of any of the following could have a material adverse effect on TVA's cash flows, results of operations, or financial condition.

For ease of reference, the risk factors are presented in eight categories: (1) regulatory, legislative, and legal risks; (2) operational risks; (3) cybersecurity and information technology risks; (4) financial, economic, and market risks; (5) human capital and management risks; (6) risks related to the environment and catastrophic events; (7) accounting and financial reporting risks; and (8) general risk factors.

REGULATORY, LEGISLATIVE, AND LEGAL RISKS

TVA may become subject to additional environmental regulations or may be required to expend significant funds in the future to comply with current regulations.

Laws, regulations, orders, and their interpretation pose a threat of substantially increasing TVA's cost of operations, including through prompting the early retirement of generation facilities, requiring significant capital expenditures to reduce carbon emissions, or causing TVA to change its anticipated methodology for closing CCR facilities. Possible areas of future laws or regulations include, but are not limited to, CCR, GHGs, ELGs, water quality, air quality, renewable energy portfolio standards, and natural gas production and transmission. See Item 1, Business — *Environmental Matters — Clean Air Act Programs and Regulations* for a discussion of EPA's new greenhouse gas emission standards and guidelines and new Mercury and Air Toxics Standards, Item 1, Business — *Environmental Matters — Water Quality Control Developments* for a discussion of EPA's new effluent limitation guidelines, Item 1, Business — *Environmental Matters — Cleanup of Solid and Hazardous Wastes — Coal Combustion Residuals* for a discussion of recent revisions to EPA's CCR Rule, and Item 1, Business — *Environmental Matters — Climate Change — Executive Actions* for a discussion of recent executive actions regarding climate change. Litigation may affect the timing and requirements of new regulatory proposals or may indirectly affect TVA, potentially even when TVA is not involved. Failure to comply with environmental requirements can result in enforcement actions and litigation, which can lead to the imposition of significant civil liability, including fines and penalties, criminal sanctions, and/or temporary or permanent closure of non-compliant facilities.

New environmental laws, regulations, or orders may become applicable to TVA or the facilities it operates, and existing environmental laws or regulations may be revised, enforced, or reinterpreted in a way that adversely affects TVA. EPA's recent regulations relating to closure of CCR facilities and EPA's revised interpretation of CCR regulations are pertinent examples. These rules will likely require TVA to incur significant additional costs with implementing closure, subject to the completion of any required environmental investigations or studies and any required approval of appropriate state regulators. TVA expects that these costs will substantially increase constraints related to TVA's debt ceiling and increase risks related to, among other things, (1) maintaining TVA's desired mix of generation assets, (2) meeting TVA's carbon-reduction aspirations, and (3) operating TVA's assets or their supporting infrastructure in a manner TVA considers most efficient, each of which is discussed below in these Risk Factors.

Complicating these matters further, over the last several decades, U.S. Administrations have increasingly relied on regulations and executive orders to implement environmental policies and objectives in the absence of Congressional agreement regarding new legislation. This condition, which creates instability and unpredictability of environmental regulations, seems likely to persist and could increase due to apparent polarization between the two main political parties. As a result, TVA often must comply with and otherwise adapt to environmental regulations without assurance of their continued effect. TVA often does not have the ability to anticipate, or prepare in advance for, changes in regulatory approaches that may be implemented following a change in Administration.

The Supreme Court’s recent decision in *Loper Bright Enterprises v. Raimondo* overturned the Court’s longstanding deferral to the applicable agency’s interpretation of regulations. TVA is unable to predict whether, or to what extent, this decision will alter the outcome of judicial reviews of current or future regulations. TVA does not know whether risks related to current and future regulations affecting TVA will be significantly mitigated by the decision in *Loper Bright*.

New, existing, or amended laws, regulations, and administrative or executive orders, or congressional actions or inactions, create certain risks due to unique aspects of TVA’s structure and business.

TVA is subject to significant laws, regulations, and orders under federal law, including some that do not apply to private electric companies. The cost of complying with these laws, regulations, and orders is substantial, and costs could be

significantly more than TVA anticipates, especially concerning environmental and nuclear compliance. In addition, TVA is required to obtain numerous regulatory permits and approvals from governmental agencies, and a failure to timely obtain desired approvals or to comply with any law, regulation, or order may cause TVA to change how it operates certain assets or pay fines for continuing to operate the assets. Moreover, since states are sometimes authorized to implement environmental programs so long as they implement the minimum federal standards in compliance, performance, and enforcement, TVA is often required to work with state agencies and officials in numerous jurisdictions to ensure compliance. Amendments to existing laws or future additional laws, regulations, and administrative or executive orders present additional risks, the occurrence of which is likely increased due to the potential for stakeholder activism. Further, federal administrative or executive orders could induce TVA to change the way it conducts its business. See Item 1, Business — *Environmental Matters — Climate Change — Executive Actions* for a discussion of recent executive actions regarding climate change. Furthermore, Congress could act or fail to act on various issues that may impact TVA, including but not limited to action or inaction related to the national debt ceiling or automatic spending cuts in government programs.

In addition, Congress may pass laws in the future specifically applicable to TVA. These may include, but are not limited to, the following:

- A divestment or forced sale of TVA assets, which could trigger change of control provisions in certain material contracts, in addition to other costs and potential business disruptions;
- A revocation of the TVA Board's sole authority to set electricity rates under the TVA Act, which could result in material adverse impacts on TVA's ability to meet financial obligations;
- A restriction on TVA accessing or controlling its funds that are on deposit in its U.S. Treasury account;
- A lowering of TVA's debt ceiling from the $30.0 billion outstanding provided for in the TVA Act, which could inhibit TVA's ability to raise capital necessary for essential business functions or for investing in carbon free technologies;
- A restriction on TVA's authority to manage the Tennessee River system with power system operations, which could negatively impact TVA's operations of certain electric generation facilities; and
- A limitation on TVA's ability to pay its CEO or other employees competitive wages, which could negatively impact TVA's ability to hire and retain talent needed to effectively fulfill TVA's mission.

Although it is difficult to predict new laws, regulations, or administrative or executive orders, or congressional action or inaction, or how such laws, regulations, orders, actions, or inactions may impact TVA, any resulting change could require TVA to make substantial additional capital expenditures or abandon certain projects, which could negatively affect TVA's cash flows, results of operations, and financial condition.

TVA's governmental status may interfere with its ability to quickly respond to the needs of its current or potential customers or to act solely in the interest of its ratepayers.

As a governmental entity, TVA has certain legal requirements that prevent it from responding as quickly to potential changes in the market or requests from current or potential customers as might be desired or in comparison to other utilities. For example, TVA is required to comply with the National Environmental Policy Act ("NEPA"), which requires environmental reviews to be completed before TVA decides to pursue certain projects. The delay in responding to requests could damage relationships with current customers, deter potential customers from moving into TVA's service territory, or damage TVA's reputation.

TVA's nature as a governmental entity imposes additional pressures that most companies do not face, including most significantly the requirements to support economic development, simultaneously manage a river system for commerce, recreation, flood control, and power generation, and promote recreational opportunities within its service territory.

TVA funds these operations almost entirely from the sale of electricity. In addition, TVA must balance these obligations with the objective to provide power at the lowest feasible rates. If TVA does not adequately communicate how it fulfills its various missions and the value it provides, its reputation may be harmed, which may result in political pressure to change its nature or operations as well as in the loss of public support.

TVA is involved in various legal and administrative proceedings, the outcomes of which may affect TVA's finances and operations.

TVA is involved in a wide range of legal and administrative proceedings and is likely to become involved in future additional proceedings in the ordinary course of business or as a result of, among other things, catastrophic events or environmental conditions arising from TVA property or areas where TVA has disposed of materials or property. For a discussion of certain current material legal proceedings, see Note 22 — *Commitments and Contingencies — Legal Proceedings*. The additional proceedings could involve, among other things, challenges to TVA's CCR facilities, challenges to TVA's natural gas-fired plants and related pipelines, suits asserting nuisance claims under state law related to coal-fired plants, challenges to the anti-cherrypicking provision, challenges under NEPA, challenges under the Freedom of Information Act, and challenges to TVA's authority to set rates and enter into contracts. Although TVA cannot predict the outcome of the individual matters in which TVA is involved or will become involved, the resolution of

these matters could require TVA to make expenditures in excess of established reserves and in substantial amounts. Similarly, resolution of any such proceedings may require TVA to change its business practices or procedures, incur additional capital or operational expense, change how it operates its fossil-fueled units, cease construction of new natural gas-fired plants, reduce emissions to a greater extent or at a faster pace than TVA had planned, close existing CCR facilities sooner than planned, close existing CCR facilities using a different methodology than planned, build new CCR facilities sooner than planned, build new CCR facilities that were not planned, cease operation of some coal-fired units, adjust its rates, or terminate or modify contracts. These events individually or in the aggregate could have a material adverse effect on TVA's cash flows, results of operations, and financial condition.

TVA could lose its protected service territory.

TVA's service area is defined primarily by provisions of law and long-term contracts. The fence limits the region in which TVA or LPCs that distribute TVA power may provide power. The anti-cherrypicking provision precludes FERC from ordering TVA to transmit power for others if that power would be consumed within the TVA service area. State service territory laws limit unregulated third parties' ability to sell electricity to consumers. From time to time, there have been efforts to circumvent the protection of the anti-cherrypicking provision. In addition, the protections afforded by the anti-cherrypicking provision conceivably could be affected by future federal legislation. If FERC were to limit the application of the anti-cherrypicking provision or if federal legislation were to eliminate or limit the application of the anti-cherrypicking provision without corresponding legislative modifications to the territorial limitations imposed by the fence, TVA could face increased competition and may lose some of its customers.

TVA may become subject to additional NERC requirements.

TVA is subject to federal reliability standards set forth by NERC and approved by FERC. TVA recognizes that reliability standards and expectations continue to become more complex and stringent for transmission systems. If TVA fails to comply with the mandatory reliability standards, TVA could be subject to increased compliance obligations, sanctions or both. Complying with these or additional requirements set forth by NERC may require significant capital expenditures and may negatively affect TVA's cash flows, results of operations, and financial condition.

OPERATIONAL RISKS

TVA's management and operation of CCR facilities expose it to additional costs and risks.

TVA operates coal-fired units that produce CCR as byproducts of the power production process. TVA manages CCR in dedicated, protective facilities operated by TVA. TVA has closed some of these facilities and is in the process of closing others. Many of these facilities do not have liners, as they were constructed prior to the requirement that such facilities be built with liners. TVA has been ordered by TDEC to undertake investigations at all CCR facilities in Tennessee. TVA has also been involved in litigation related to certain CCR facilities, and to resolve one such lawsuit, TVA agreed to remove or beneficially reuse significant amounts of CCR material at Gallatin Fossil Plant ("Gallatin"). TVA could be subject to similar litigation or orders in the future and could be required to restrict or stop the use of some or all CCR facilities that were not required to be closed by the CCR Rule or relocate CCR material to lined facilities. Further, TVA has decided to move all CCR material at Allen Fossil Plant rather than closing the CCR facilities in place as originally planned, which subjects TVA to additional costs and transportation-related risks. Moreover, EPA's new CCR rule will likely require TVA to incur significant additional costs with implementing closure, and EPA has recently interpreted its CCR rule in a way that could challenge TVA's predominant closure methodology for many units, thereby potentially creating significant additional costs with implementing closure. The ultimate resolution of matters relating to CCR obligations could have a material adverse effect on TVA's cash flows, results of operation, and financial condition.

TVA relies on certain assumptions about the future that may prove inaccurate, including when determining the appropriate mix of generation assets.

TVA uses certain assumptions that are presently justifiable to develop its future plans. Such assumptions include economic forecasts, anticipated energy and commodity prices, cost estimates, construction schedules, power demand forecasts, potential regulatory environments, and the appropriate generation mix to meet demand. Should these assumptions be inaccurate, or be superseded by subsequent events, TVA's plans may not be effective in achieving the intended results. In determining TVA's power generation assets should consist of a mix of nuclear, coal-fired, natural gas-fired, and renewable power sources, including hydroelectric, TVA considered various factors, including the anticipated availability of its nuclear units, the availability of non-nuclear facilities, the forecasted cost of natural gas and coal, the forecasted demand for electricity, its carbon reduction aspirations, and environmental compliance including the expense of adding air pollution controls to its coal-fired units. If any of these assumptions materially change or are impacted by subsequent events, TVA's generation mix may not address its operational needs in the most efficient and cost-effective manner. Additionally, reallocating the mix of power generation assets from the planned mix may result in additional capital and operational expense. Furthermore, achieving TVA's carbon reduction aspirations may require TVA to make significant capital investments, including investments in new technologies, and take a long time. TVA may retire coal-fired and natural-gas fired generation facilities sooner than planned to meet carbon reduction aspirations, which also may require significant capital expenditures or additional power purchases, potentially causing an adverse

effect on TVA's cash flows, results of operations, and financial condition, as well as TVA's ability to meet electricity demand.

TVA may not be able to meet its carbon reduction aspirations, which may result in additional capital expenditures or higher operating expense.

The achievement of TVA's carbon reduction aspirations, and its ability to maintain system reliability during the transition to cleaner forms of energy, is subject to numerous risks beyond TVA's control that are difficult to predict and may prevent TVA from timely achieving such aspirations. New federal laws could impose carbon reduction aspirations that are more aggressive and time-sensitive than TVA's plans. Occurrences that may prevent TVA from achieving its carbon reduction aspirations in a timely manner include, but are not limited to, the following:

- Federal law or policy could restrict TVA's ability to use natural gas or nuclear power, which are each essential for TVA to reduce its carbon emissions.
- TVA may not receive timely approval from federal and state regulators for construction and operation of new natural gas assets and attendant infrastructure (e.g., pipelines).
- TVA may have difficulty obtaining resources or labor needed to complete projects on time and within budget.
- Legal challenges may slow or restrict TVA's ability to replace coal generation with cleaner forms of energy. These challenges may, for instance, come in the form of direct legal challenges to TVA projects or through challenges to TVA's environmental reviews or the attempts of TVA or third parties to obtain necessary licenses and permits.
- Potential delays in projects, along with now-anticipated load growth, may force TVA to rely on coal-fired generation more heavily, or longer, than it had previously projected.
- As to TVA's longer term carbon reduction aspirations, the development of new technologies necessary to meet these aspirations may not occur as quickly, feasibly, or cost-effectively as necessary.
- TVA's unique federal least-cost planning obligations may prevent TVA from moving forward with carbon-free generation as quickly as utilities that do not have the same requirements.

TVA may experience delays and incur additional costs in its major projects or may be unable to obtain necessary regulatory approval for them.

Among other projects, TVA is building new natural gas-fired generation facilities, seeking to improve the reliability and resiliency of its transmission system, undertaking repairs at certain hydroelectric facilities and dams, and closing some coal-fired plants and their supporting infrastructure. These activities involve risks of overruns in the cost of labor and materials, as well as potential delays, in beginning or completing these repairs, closures, or other projects. Further cancellation or delay of projects related to these activities may adversely affect TVA's cash flows, financial condition, and results of operations. Such cancellation or delays may result from, among other things, changes in market conditions, changes in laws or regulations, unanticipatedly high environmental remediation costs, lack of productivity, human error, supply chain challenges, regional health emergencies, the failure to schedule activities properly, TVA's inability to obtain the necessary regulatory approvals or licenses, TVA's decision to cancel construction of a facility or cancel another type of project, including due to delays, cost overruns, changes in customer preferences, or changes in requirements applicable to how TVA conducts construction, repair, or closure activities. Further, if projects are not completed according to specifications, TVA may suffer, among other things, delays in receiving licenses, reduced plant efficiency, reduced transmission system integrity and reliability, and higher operating costs.

TVA faces certain risks arising solely from its operation of nuclear units.

TVA has seven operating nuclear units. Unique risks associated with these units include the following:

Hazard Risks. Hazards exist with the use of radioactive material in energy production, including management, handling, storage, and disposal. Further, a nuclear incident at one of TVA's facilities could have significant consequences including loss of life, damage to the environment, damage to or loss of the facility, and damage to non-TVA property. Although TVA carries certain types of nuclear insurance, the amount that TVA is required to pay in connection with a nuclear incident could significantly exceed the amount of coverage provided by insurance. The licensee of each nuclear reactor has a contingent obligation to pay a retrospective premium, equal to its proportionate share of the loss in excess of the primary level, regardless of proximity to the incident of fault, up to a maximum of approximately $166 million per reactor, per incident. With TVA's seven reactors, the maximum total contingent obligation per incident is $1.2 billion. This retrospective premium is payable at a maximum rate currently set at approximately $25 million per year, per incident, per reactor. In addition, following an incident TVA may have to pay retrospective insurance premiums, and may experience a reduction in the availability of nuclear insurance, an increase in the cost of nuclear insurance, an increase in the costs of operating nuclear units, or increased regulation or restrictions on the construction, operation, and decommissioning of nuclear facilities. Moreover, federal legislation could impose revenue-raising measures on the nuclear industry to pay claims exceeding the limit for a single incident under the Price-Anderson Act. Further, the availability or price of insurance may be impacted by TVA's acts or omissions, such as a failure to properly maintain a facility, or events outside of TVA's control, such

as an equipment manufacturer's inability to meet a guideline, specification, or requirement.

Decommissioning Costs. TVA maintains a Nuclear Decommissioning Trust ("NDT") for the purpose of providing funds to decommission its nuclear facilities. The NDT is invested in securities generally designed to achieve a return in line with overall equity and debt market performance. TVA might have to make unplanned contributions to the NDT if, among other things:

- The value of the investments in the NDT declines significantly or the investments fail to achieve the assumed real rate of return;
- The decommissioning funding requirements are changed by law or regulation;
- The assumed real rate of return on plan assets, which is currently five percent, is lowered by the TVA Board or the actual real rate of return does not achieve the assumed rate;
- The actual costs of decommissioning are more than planned, including as a result of inflation;
- Changes in technology and experience related to decommissioning cause decommissioning cost estimates to increase significantly;
- TVA is required to decommission a nuclear plant sooner than it anticipates; or
- The NRC guidelines for calculating the minimum amount of funds necessary for decommissioning activities are materially changed.

If TVA were to have to make additional contributions to the NDT, the contributions may negatively affect TVA's cash flows, results of operations, and financial condition.

Regulatory Risks. The NRC has broad authority to adopt regulations related to the licensing, operating, and decommissioning of nuclear generation facilities and may adopt regulations as a result of events that occur at nuclear facilities in the U.S. or throughout the world. These regulations can result in significant restrictions or requirements on TVA. To comply with existing, new, or modified regulations, TVA may be required to make substantial capital expenditures at its nuclear plants or make substantial contributions to the NDT. In addition, if TVA were to fail to comply with requirements promulgated by the NRC, the NRC has the authority to impose fines, shut down units, or modify, suspend, or revoke TVA's operating licenses. Moreover, the NRC may not approve future requests from TVA to extend the operating licenses for its nuclear units.

Waste Disposal. TVA's nuclear operations produce various types of nuclear waste materials, including spent fuel. TVA has been storing the spent fuel in accordance with NRC regulations in anticipation that a final storage site for all such waste will be developed and put in operation by the U.S. government. If no such site is forthcoming or if no alternative disposal or reuse plan is developed, TVA might be required to arrange for the safe and permanent disposal of the spent fuel itself. Such a requirement would cause TVA to incur substantial expense, including substantial capital expenditures, and could cause TVA to change how it operates its nuclear plants.

Availability of Components. Nuclear facilities require specialized components and access to intellectual property for operation. As the number of reliable suppliers of such components decreases and access to intellectual property is reduced, the availability of the components and access to the intellectual property also will likely decrease. If TVA were unable to secure either the original components, intellectual property, or replacements approved for use by the NRC, TVA might have to change how it conducts its operations, which may result in substantial expense. Further, limitations on global trade resulting from future and past pandemics and global conflicts, or other limitations on global shipping, such as international trade restrictions or sanctions, could materially decrease the availability or increase the cost of necessary or desired equipment.

Cost of Nuclear Fuel. The relatively low cost of nuclear fuel per megawatt of production is a primary justification for the relatively high costs of developing and constructing nuclear facilities. Future constraints on the availability of nuclear fuel could cause the cost of operating these facilities to be materially higher than expected. Such constraints could arise from, among other things, increased demand from greater adoption of nuclear power by TVA and other domestic and global electric suppliers, global conflicts, and/or limitations on global trade and global shipping.

TVA may not be able to operate one or more of its nuclear power units.

If operating issues were to develop with TVA nuclear power units that were not correctable, TVA may choose to shut down one or more units or be ordered to do so by the NRC. Returning the unit(s) to operation could be a lengthy and expensive process, or might not be feasible depending on circumstances. In either case, TVA's cash flows, results of operations, financial condition, and reputation may be negatively affected. The inability to operate all of TVA's nuclear units may cause TVA to rely more on forms of generation that produce more carbon, thus making it more difficult for TVA to meet its carbon reduction aspirations or meet reliability goals.

Physical attacks, threats, or other interference could damage or interfere with TVA's facilities and operations.

TVA has an extensive generation and transmission system and supporting infrastructure that includes, among other things, TVA's generation facilities and transmission infrastructure such as substations, towers, and control centers. Some of TVA's hydroelectric facilities include navigation locks for commerce along the Tennessee River system. TVA also operates flood control dams and supporting infrastructure. Because of TVA's status as a government corporation and TVA's role as the primary power provider for its service territory, individuals, groups, or nation states may target TVA with physical attacks or threats of such attacks. Events such as war, armed conflicts, terrorist attacks, or similar disruptive events may increase the risks of these attacks targeting critical physical infrastructure in the U.S.

Although TVA's operations are protected by automated monitoring systems, TVA Police and Emergency Management, TVA employees, local law enforcement, or a combination thereof, it may not be possible to effectively deter or prevent such attacks. These attacks could pose health and safety risks, significantly disable or destroy TVA assets, interfere with TVA's operations, result in additional regulatory or security requirements or litigation, increase the costs of nuclear licensing or compliance, and otherwise negatively affect TVA's cash flows, results of operations, and financial condition. In addition, following a physical attack or threat, TVA may incur increased costs for added security measures, including additional physical plant security and security personnel, increased capability, or other necessary measures.

TVA's assets or their supporting infrastructure may not operate as planned.

Many of TVA's assets, including generation, transmission, navigation, and flood control assets, have been operating for several decades and have been in nearly constant service since they were completed. As such, they require regular maintenance, repair, and replacement in order to continue uninterrupted operation. Additionally, certain of TVA's newer assets utilize advanced technology that could experience technical or operating issues. The failure of TVA's assets or supporting infrastructure, including information technology systems, to perform as planned may cause health, safety, or environmental problems and may even result in events such as the failure of a dam, the inability to maintain a reservoir at the normal or expected level, or an incident at a coal-fired, gas-fired, or nuclear plant or a CCR facility. If these assets or their supporting infrastructure were to fail to operate as planned, if necessary repairs or upgrades were delayed or could not be completed as quickly as anticipated, or if necessary spare parts were unavailable, TVA:

- May have to invest a significant amount of resources to repair or replace the assets or the supporting infrastructure;
- May have to remediate collateral damage caused by a failure of the assets or the supporting infrastructure;
- May not be able to maintain the integrity or reliability of the generation or transmission system at normal levels;
- May have to operate less economical sources of power;
- May have to purchase replacement power on the open market at prices greater than its generation costs;
- May be required to invest substantially to meet more stringent reliability standards;
- May be unable to maintain insurance on affected facilities, may be required to pay higher premiums for coverage, or may have to make certain repairs or upgrades to maintain insurance or to avoid higher premiums;
- May be unable to operate the assets for a significant period of time or in the same manner as previously operated; and/or
- May not be able to meet its contractual obligations to deliver power.

Any of these potential outcomes, among other things, may negatively affect TVA's cash flows, results of operations, financial condition, and reputation.

TVA's operations present significant safety risks that are not able to be completely eliminated.

TVA's safety program, no matter how well designed and operated, may not completely prevent accidents. In addition to the potential human cost of accidents, which could include injury to employees or members of the public, significant accidents could impact TVA's ability to carry out operations, cause it to shut down facilities, subject it to additional regulatory scrutiny, expose it to litigation, damage its reputation, interfere with its ability to attract or retain a skilled workforce, or harm its financial condition. The aging of TVA's physical infrastructures and systems may increase the risk of accidents, especially if not properly maintained.

TVA's service reliability could be affected by problems at other utilities or at TVA facilities, or by the increase in intermittent sources of power.

TVA's transmission facilities are directly interconnected with the transmission facilities of neighboring utilities and are thus part of the larger interstate power transmission grid. Certain of TVA's generation and transmission assets are critical to maintaining reliability of the transmission system. Additionally, TVA uses assets that belong to third parties to transmit power and maintain reliability. Accordingly, problems at other utilities as well as at TVA's facilities, including disruptions or black-outs caused by an event such as a severe storm, generator or transmission facility outage on a neighboring system, or the actions of a neighboring utility, may cause interruptions in TVA's service to its customers,

increase congestion on the transmission grid, or reduce service reliability. The increasing installation of intermittent sources of power, such as wind and solar, as well as the retirement of coal-fired plants, may place additional strain on TVA's and neighboring systems, and additional transmission upgrades may be required to maintain reliability. Upgrades may include enhancements to existing lines and substations or new installations as necessary to provide adequate power transmission capacity, maintain voltage support, and ensure generating plant and transmission system stability.

TVA's supplies of fuel, purchased power, or other critical items may be disrupted or obtained at a higher cost than planned.

TVA purchases coal, uranium, natural gas, fuel oil, and electricity from a number of suppliers. TVA contracts for conversion of uranium into nuclear fuel and purchases other items, such as anhydrous ammonia, liquid oxygen, or replacement parts that are critical to the operation of certain generation assets. TVA also purchases power from other power producers when the purchase of such power is appropriate due to economic opportunities or operational concerns. TVA's reliance on purchased power may increase if the demand for power increases in TVA's service territory, and purchased power may become more costly, or perhaps be unavailable, if the demand for power also increases in surrounding service territories. Examples of circumstances that may disrupt, or materially increase the cost of, the future delivery of fuel, purchased power, contracted services, or other critical supplies include but are not limited to cyber attacks; war or physical attacks, including the wars in Ukraine and Israel; political developments, international trade restrictions or tariffs, or legal actions; mine closures or reduced mine production; increase in demand for power by other power systems which reduces the amount of power that is available for purchase by TVA; increases in fuel exports; environmental regulations affecting TVA's suppliers; transportation or delivery constraints; the failure of suppliers to timely deliver the services or supplies to TVA at budgeted costs due to force majeure events, forced outages not caused by force majeure events, opportunistic non-performance or intentional defaults by suppliers; shortages of raw materials; supply chain difficulties; increased cost of components and labor; strikes or work stoppages; inflation; availability of personnel being impacted by regional health emergencies; or similar events.

If one of TVA's suppliers were to fail to perform under the terms of its contract with TVA, TVA might have to purchase replacement fuel, power, or other critical supplies, perhaps at a significantly higher price than TVA is entitled to pay under the contract. TVA may not be able to recover this difference from the original supplier. In addition, any disruption of TVA's supplies could require TVA to operate higher cost generation assets, thereby negatively affecting TVA's cash flows, results of operations, and financial condition. Moreover, if TVA were unable to acquire enough replacement fuel, power, or supplies, or were to have insufficient reserves to offset the loss, TVA may not be able to operate certain assets in the manner TVA determines is in its best interests or provide enough power to meet demand or provide power on a basis TVA considers most reliable. As a result, power curtailments, brownouts, or even blackouts could occur.

Global conflicts, terrorist activities, or military actions could adversely affect TVA's business.

Global conflicts and terrorism, as well as any retaliatory military action by the United States and its allies, may have an adverse effect on TVA through increased political, economic, and financial market instability and volatility in the prices for natural gas and oil. Future acts of terrorism could be directed against companies operating in fuel and energy transportation and distribution, which may adversely affect TVA's ability to do business. TVA may experience increased costs to implement increased security, including additional plant security and security personnel. This situation could extend not only to fuel and minor components but could materially increase costs or decrease availability of large components needed for TVA's capital projects.

CYBERSECURITY AND INFORMATION TECHNOLOGY RISKS

TVA's facilities and information infrastructure may not operate as planned due to cyber threats to TVA's assets and operations.

TVA's operations are heavily computerized and include assets such as information technology and networking systems. As with all industries, the reliance on computerization and networking makes TVA a target for cyber attacks, and the risk of such attacks may increase as individual devices and equipment become accessible via the internet. TVA has been targeted by cyber attacks in the past and anticipates that it will be targeted in the future. These attacks may have been carried out, or in the future could be carried out, by individuals, groups, or nation states. TVA employs extensive cyber safeguards and works with industry specialists and relevant governmental authorities to deter, stop, or mitigate cyber attacks. Despite implementation of these security measures, TVA's facilities and information infrastructure may be subject to or vulnerable to disability, failures, or unauthorized access. Furthermore, as technology becomes more prevalent in energy infrastructure, TVA's infrastructure may be subject to increased cyber vulnerability in the future. Cyber attacks could come through one or more of a number of means, such as computer viruses, malicious or destructive code, phishing attacks, denial of service attacks, or ransomware. Cyber attacks may result in security breaches that may be detrimental to TVA's operations, including third parties' improperly accessing TVA's system and demanding ransom based on threats to expose sensitive data, including data from employees, customers, and financial parties, to gain operational control, or to expose security vulnerabilities specific to TVA's facilities. In such a case, a cyber attack could compromise sensitive data, significantly disrupt operations, require additional expenditures for

cybersecurity, negatively affect TVA's cash flows, results of operations, financial condition, and reputation, and pose health and safety risks to TVA personnel and the customers and communities that TVA serves.

Because the investigation of any cybersecurity breach is inherently unpredictable and would require substantial time to complete, TVA may not be able to quickly remediate the consequences of any breach, which may increase the costs and enhance the negative consequences associated with a breach. Additionally, the theft, damage, or improper disclosure of sensitive data may subject TVA to penalties and claims from third parties or increased governmental oversight.

Cyber attacks on third parties or the failure of their technology infrastructure could interfere with or harm TVA.

Many third parties on which TVA relies for services, including for transferring funds to non-TVA entities or receiving delivery of products in the ordinary course of business, are heavily computerized and use assets such as information technology and networking systems. These providers' systems are susceptible to cybersecurity and data breaches and outages from fire, floods, power loss, telecommunications failures, physical attack, and similar events. If any of these third parties were to experience interference from cyber attacks or significant system failures or outages, which events have occurred in the past and may occur again in the future, the services they provide TVA could be disrupted. This disruption could interfere with TVA's ability to perform its obligations to others, transfer funds, obtain fuel or critical parts, supplies, or services, or make payments, which in turn could negatively affect TVA's cash flows, results of operations, financial condition, and reputation. Additionally, the theft, damage, or improper disclosure of sensitive data held by these third parties may subject TVA to further harm. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Safeguarding Assets — Cybersecurity* for a discussion of recent cyber attacks on third parties.

The failure of TVA's information technology systems could have adverse consequences to TVA.

TVA's operations are dependent upon the proper functioning of its internal systems, including the information technology systems that support TVA's underlying business processes. Any significant failure or malfunction of such information technology systems may result in disruptions of TVA's operations. TVA relies on information technology systems, including the internet and cloud systems, to support a variety of business processes and activities and to store sensitive data. Some of TVA's information technology systems may be dependent upon cloud service providers. These providers' systems are susceptible to cybersecurity and data breaches and outages from fire, floods, power loss, telecommunications failures, security violations, and similar events. Failure to prevent or mitigate data loss from system failures or outages could materially affect the results of operations, financial condition, and cash flows of TVA.

The emergence of artificial intelligence technology could create challenges for TVA, and TVA may not be able to adopt the use of technology in step with private utilities.

TVA's sensitive information may be subject to improper disclosure or fabrication by artificial intelligence ("AI") and machine learning technologies on systems external to TVA, leading to compromises in cybersecurity. AI and machine learning technology may also be flawed, and data sets used in generative AI may be insufficient or contain biased, incorrect, or incomplete information. Additionally, inconsistent application of AI regulations and guidance in the industry may make the intellectual property ownership and license rights to certain information unclear. TVA could suffer reputational damage or face operational challenges because of any inconsistencies or flaws in the application of AI or machine learning technology. TVA could also face costs in complying with any new regulations concerning AI. The cost of implementing new AI regulations or the consequences of not complying with any future regulations could harm TVA's financial condition. Moreover, AI may be used to enhance malicious cyber attacks.

FINANCIAL, ECONOMIC, AND MARKET RISKS

Demand for electricity could be higher or lower in the future than TVA currently expects or is financially planning for.

TVA's current asset strategy and capital financing approach are based on assumptions drawn from recent trends suggesting increased demand for TVA electricity over the next several decades. This demand has arisen from, and seems likely to continue to arise from, among other things, increasing population in TVA's service territory, utilization of AI that uses significantly more power than traditional data processing, cryptocurrency mining, greater usage and adoption of electric vehicles, and economic development, including new or expanded data centers. Some factors that could unexpectedly lead to lower demand than TVA has planned for include one or more of the following: extended or severe economic downturns or recessions, loss of customer demand due to higher-than-expected adoption of TVA flexibility options that allow customers to produce a certain percent of their own power needs, unexpectedly high utilization of DER, increased energy efficiency and conservation, and loss of customers, including through loss of TVA's restricted service territory. Because TVA is investing heavily in developing its energy portfolio to meet increasing loads, lower-than-anticipated demand could lead to a reduction in planned revenue streams, which may constrain TVA's financial condition and results of operations.

If future demand were to be higher than TVA can address through execution of its current asset strategy, TVA may have to purchase additional generation or capacity at rates much higher than TVA can produce electricity itself. The higher that demand is at such time nationally, the more expensive such additional generation or capacity is likely to be. In addition, if capacity were not available elsewhere, TVA may have to take emergency measures to curtail load, including requiring rolling blackouts. On the programmatic side, TVA may be forced to raise rates or waitlist prospective industrial or commercial customers. These outcomes would likely have a material adverse effect on TVA's financial condition and results of operations, including through negative impacts to TVA's reputation.

TVA could have to make significant future contributions to fund its qualified pension plan, and the increasing costs of the plan and employee benefits could adversely affect TVA's results of operations, financial condition, or cash flows.

On September 30, 2024, TVA's qualified pension plan had assets of approximately $8.7 billion compared to liabilities of approximately $11.0 billion. The plan is mature with approximately 21,000 retirees and beneficiaries receiving benefits of approximately $750 million per year. The costs of providing benefits depend upon a number of factors, including, but not limited to, provisions of the plan; changing experience and assumptions related to terminations, retirements, and mortality; rates of increase in compensation levels; rates of return on plan assets; discount rates used in determining future benefit obligations and required funding levels; optional forms of benefit payments selected; future government regulation; and levels of contributions made to the plan.

The pension plan covers substantially all of TVA's full-time annual employees hired prior to July 1, 2014. Although the plan has been frozen to new participants since July 1, 2014, TVA's payment obligation under the pension plan is substantial, and changes in any one or more of these factors could cause TVA's benefit expenditures under the plan to increase and significantly exceed TVA's planned contributions. Unfavorable financial market conditions, including those arising from inflation and changes in interest rates, may cause lower-than-expected rates of return on plan assets, loss in value of the investments, and lower discount rates used in determining future benefit obligations. These changes would negatively impact the funded status of the plan and may require TVA to make contributions in excess of the amounts planned. In addition to the costs of the plan, the costs of providing health care benefits to TVA's employees and retirees have increased in recent years. Additional contributions to the plan and absorption of additional costs for the pension plan, health care plans, and other employee benefits would negatively affect TVA's cash flows, results of operations, and financial condition.

TVA's reliance on debt markets may make TVA more vulnerable to being unable to meet cash requirements than private utilities that can issue equity securities.

TVA uses cash provided by operations together with proceeds from power system financings to fund its current cash requirements. TVA's power system financings consist primarily of the sale of Bonds and secondarily of alternative forms of financing, such as lease arrangements. It is critical that TVA continue to have access to the debt markets to meet its cash requirements. The importance of having access to the debt markets is enhanced by the fact that TVA, unlike most utilities, relies almost entirely on debt capital, since as a governmental instrumentality, TVA cannot issue equity securities. TVA's access to the debt markets could be negatively impacted by market disruptions, including disruptions that result from systemic risks to the banking system and the financial markets. Moreover, rapid increases in interest rates beyond planning levels, especially as financing needs are increasing, or disruptions in the market due to rapid changes in interest rates, could impact TVA's cost of funds or ability to raise funds to meet cash needs.

TVA's debt ceiling may limit TVA's ability to carry out its business in the event that TVA were to approach or reach it.

Approaching or reaching the debt ceiling may negatively affect TVA's business by limiting TVA's ability to access capital markets and by increasing the amount of debt TVA must service without new debt capital. This occurrence may restrict TVA's ability to raise debt capital to acquire new power program assets or maintain existing ones, to carry out upgrades or improvements to existing assets or build new ones, to purchase power under long-term PPAs, or to meet regulatory requirements. A single generating facility could cost hundreds of millions of dollars or even billions depending on the fuel type, and TVA's ability to use new debt to fund strategic capital investments will decrease as TVA's debt increases and as the cost of projects increases. In addition, approaching or reaching the debt ceiling may lead to increased legislative or regulatory oversight of TVA's activities and could lead to negative rating actions by credit rating agencies. Operating at higher balances of Bonds subject to the $30.0 billion debt limit reduces TVA's financial flexibility for using financing to handle emergencies or other rapid cash funding needs and increases operational risks in management of the portfolio of Bonds subject to the debt limit.

TVA, together with owners of TVA securities, may be impacted by downgrades of TVA's credit ratings.

TVA's current credit ratings are not based solely on its underlying business or financial condition but are based to a large extent on TVA's status as a wholly-owned government corporation and the legislation that defines TVA's business structure. Key characteristics of TVA's business defined by legislation include (1) the TVA Board's ratemaking authority; (2) the current competitive environment, which is defined by the fence and the anti-cherrypicking provision; and (3) TVA's status as a corporate agency and instrumentality of the United States. If Congress takes any action that

effectively alters any of these characteristics, TVA's credit ratings could be downgraded. Although TVA Bonds are not obligations of the United States, TVA, as a corporate agency and instrumentality of the United States, may be impacted by a downgrade of the United States' sovereign credit ratings. Such a downgrade has and could again in the future, among other things, lead to a downgrade of TVA's credit rating. Additionally, future events that may negatively impact TVA's financial condition or reputation, including those discussed elsewhere in these Risk Factors, may lead to downgrades of TVA's credit ratings, and the criteria used by the credit rating agencies to assign ratings could be changed at any time, which could result in changes to TVA's ratings.

Downgrades of TVA's credit ratings, particularly downgrades related to TVA-specific factors, may have material adverse effects on TVA's cash flows, results of operations, and financial condition, as well as on investors in TVA securities. Among other things, a downgrade could increase TVA's interest expense by increasing the interest rates that TVA pays on new debt securities that it issues. Such an increase may reduce the amount of cash available for other purposes, which may require TVA to borrow more, to reduce other expenses or capital investments, or to increase power rates. A downgrade may also result in TVA's having to post collateral under certain physical and financial contracts that contain ratings triggers. A downgrade below a contractual threshold may specifically prevent TVA from borrowing under four credit facilities totaling $2.7 billion or posting letters of credit as collateral under these facilities. As of September 30, 2024, there were $566 million of letters of credit outstanding under these facilities. If TVA were no longer able to post letters of credit as collateral, TVA would likely have to post cash as collateral, which would negatively affect TVA's liquidity.

Further, a downgrade may lower the price of TVA securities in the secondary market, thereby negatively impacting investors who sell TVA securities after the downgrade and diminishing the attractiveness and marketability of TVA securities in the secondary market as well as new TVA debt securities.

Changes in technology could affect relationships with customers, require TVA to change how it conducts its operations, or impact TVA's financial condition.

TVA's primary business is to sell power it produces, for the most part, from large facilities such as nuclear power plants, hydroelectric facilities, natural gas-fired facilities, and coal-fired units. TVA sells power to LPCs and directly served customers. Research and development activities are ongoing to improve existing and alternative technologies to produce or store electricity, including large-scale energy storage, gas or wind turbines, fuel cells, microturbines, solar cells, and distributed energy or storage resources. Advances in these or other alternative technologies could reduce the costs of such production methods to a level that will enable these technologies to compete effectively with traditional power plants such as those used by TVA. These technologies could be more appealing to customers and could lead them to pressure TVA to modify power contracts to allow customers to generate some of their own power requirements or purchase power from other suppliers. Other customers might also cease purchasing power from TVA altogether. To the extent that sales to such customers are reduced or eliminated, TVA's cash flows, results of operations, and financial condition could be negatively affected. TVA could also be required to modify how it operates its traditional plants or further modify its generation mix to reduce reliance on these facilities. Additionally, demand could change in terms of amount or timing as more devices and equipment become connected to the internet, allowing for real-time adjustments in consumption of power. Such increased control over power consumption could, among other things, affect how TVA operates its facilities or dispatches power, or require TVA to change its pricing structure or rates.

TVA could lose its competitive edge if it fails to keep up with changes in technology.

TVA's competitive position could be impacted if TVA is unable to deploy new technology in a cost-effective and competitive manner. This process of enhancing or replacing TVA's technology infrastructure involves significant development and implementation costs to keep pace with changing technologies and customer demand. If TVA fails to successfully implement critical technology infrastructure, or if it does not provide the anticipated benefits or meet customer demands, such failure could negatively affect TVA's business strategy as well as impact its results of operations, financial position, and cash flows. Additionally, TVA may fail to fully capitalize on new technology, including AI, due to cybersecurity risk aversion or unique regulations applicable to TVA, leading to a loss in competitive edge or inability to efficiently solve future problems.

TVA is subject to a variety of market risks that may negatively affect TVA's cash flows, results of operations, and financial condition.

TVA is subject to a variety of market risks, including but not limited to the following:

Commodity Price Risk. TVA's rates may increase if prices of commodities critical to operations, including coal, uranium, natural gas, fuel oil, crude oil, construction materials, or emission allowances, were to increase. An increase in rates may reduce demand and negatively impact TVA's cash flows, results of operations, and financial condition.

Investment Price Risk. TVA is exposed to investment price risk in its NDT, Asset Retirement Trust ("ART"), pension plan, Supplemental Executive Retirement Plan ("SERP"), Deferred Compensation Plan ("DCP"), and Restoration Plan ("RP"). If the value of the investments held in the NDT or the pension fund were to either decrease or fail to increase in accordance with assumed rates of return, TVA may be required to make substantial contributions to these funds. In addition, although TVA is not required to make contributions to the ART, it may choose to do so, particularly if TVA's estimates of its non-nuclear asset retirement obligation liabilities were to increase. TVA may also choose to make contributions to the SERP, DCP, and RP from time to time.

Interest Rate Risk. Changes in interest rates may, variably, increase the amount of interest that TVA pays on new Bonds that it issues, decrease the return that TVA receives on short-term investments, decrease the value of the investments in the NDT, ART, pension fund, SERP, DCP, and RP, increase the amount of collateral that TVA is required to post in connection with certain of its derivative transactions, increase the losses on the mark-to-market valuation of certain derivative transactions into which TVA has entered, or some combination of these.

Counterparty Credit and Performance Risk. TVA is exposed to the risk that its counterparties will not be able to perform their contractual obligations. If TVA's counterparties were to fail to perform their obligations, TVA's cash flows, results of operations, and financial condition may be adversely affected. In addition, the failure of a counterparty to perform may make it difficult for TVA to perform its obligations, particularly if the counterparty were a supplier of electricity or fuel.

Currency Exchange Rate Risk. Over the next several years, TVA expects to spend a significant amount of capital on various projects. A portion of this amount may be spent on contracts that are denominated in one or more foreign currencies. TVA's two issues of Bonds denominated in British pounds sterling are hedged by currency swap agreements. The value of the U.S. dollar compared with other currencies has fluctuated widely in recent years, including as a result of changes in political and economic conditions. If not effectively managed, foreign currency exposure could negatively impact TVA's counterparty risk, cash flows, results of operations, and financial condition.

The market for TVA Bonds might be limited.

Although many TVA Bonds are listed on stock exchanges, there can be no assurances that any market will develop or continue to exist for any Bonds. Additionally, no assurances can be made as to the ability of the holders to sell their Bonds or as to the price at which holders will be able to sell their Bonds. Future trading prices of Bonds will depend on many factors, including prevailing interest rates, the then-current ratings assigned to the Bonds, the amount of Bonds outstanding, the time remaining until the maturity of the Bonds, the redemption features of the Bonds, the market for similar securities, and the level, direction, and volatility of interest rates generally, as well as the liquidity of the markets for those securities.

When a particular series of Bonds is offered through underwriters, those underwriters may attempt to make a market in the Bonds. Dealers other than underwriters may also make a market in TVA Bonds. However, the underwriters and dealers are not obligated to make a market in any TVA Bonds and may terminate any market-making activities at any time without notice.

Further, certain investors and underwriters use the environmental impact or sustainability of a company or industry as a criterion for deciding whether to invest in that company or industry. TVA's use of fossil fuels, among other things, could lead such investors or underwriters to not purchase TVA Bonds or reduce the attractiveness of TVA Bonds as compared to other investments, thereby limiting the market for TVA Bonds. Moreover, some investors may no longer be able to hold TVA securities after specified dates if TVA's performance on certain metrics fails to meet investor requirements on metrics such as the carbon intensity, carbon emissions, or operation of thermal coal-fired or natural gas-fired assets.

In addition, legal limitations may affect the ability of banks and others to invest in Bonds. For example, national banks may purchase TVA Bonds for their own accounts in an amount not to exceed 10 percent of unimpaired capital and surplus. Also, TVA Bonds are "obligations of a corporation which is an instrumentality of the United States" within the meaning of Section 7701(a)(19)(C)(ii) of the Internal Revenue Code for purposes of the 60 percent of assets limitation applicable to U.S. building and loan associations. These limitations on TVA Bond investors also may limit the market for TVA Bonds.

Payment of principal and interest on TVA securities is not guaranteed by the U.S government.

Although TVA Bonds are not obligations of the United States, TVA, as a corporate agency and instrumentality of the United States, may be impacted by a downgrade of the United States' sovereign credit ratings. Principal and interest on TVA securities are payable solely from TVA's net power proceeds. Net power proceeds are the remainder of TVA's gross power revenues after deducting the costs of operating, maintaining, and administering its power properties and payments to states and counties in lieu of taxes, but before deducting depreciation accruals or other charges representing the amortization of capital expenditures, plus the net proceeds from the sale or other disposition of any

power facility or interest therein. If TVA were to experience extreme financial difficulty and were unable to make payments of principal or interest on its Bonds, the federal government would not be legally obligated to prevent TVA from defaulting on its obligations. An inability to pay some or all of the principal or interest owed on a TVA security would likely have a negative impact on the market for TVA Bonds generally and TVA's financial condition, reputation, and relationship with the investment community, and could result in cross-defaults in other financial arrangements.

HUMAN CAPITAL AND MANAGEMENT RISKS

Failure to attract and retain an appropriately qualified, diverse, and inclusive workforce may negatively affect TVA's results of operations.

TVA's business depends on its ability to recruit and retain key executive officers as well as skilled professional and technical employees. Labor is subject to external factors that are beyond TVA's control, including the highly competitive market for skilled workers and leaders, inflation, regional health emergencies, and workforce participation rates. The inability to attract and retain an appropriately qualified, diverse, and inclusive workforce could adversely affect TVA's ability to, among other things, operate and maintain generation and transmission facilities, complete large construction projects, and successfully implement its continuous improvement initiatives.

Changes in the membership of the TVA Board and TVA senior management could impact how TVA operates.

The TVA Board is comprised of up to nine part-time members serving staggered, five-year terms. One to two Board members' terms typically expire each year. In addition, there is always the possibility that one or more members of TVA's senior management may retire or otherwise leave TVA. The individuals filling either the TVA Board or senior management positions may wish to change how TVA operates in whole or in part. If the changes were not successful or TVA were unable to adapt properly to such changes, TVA's financial condition, results of operations, reputation, and relationship with customers could be negatively affected.

Loss of a quorum of the TVA Board could limit TVA's ability to adapt to changing business conditions.

Under the TVA Act, a quorum of the TVA Board is five members. Becoming a member of the TVA Board requires confirmation by the U.S. Senate following appointment by the President. This process has been and could again in the future be subject to extended delays. The President may remove TVA Board members, and the TVA Board members may resign or otherwise leave office before a successor is commissioned. As a result, a delay in the appointment or confirmation of directors, or the removal of directors by the President, can threaten the TVA Board's quorum. The TVA Board is responsible for, among other things, establishing the rates TVA charges for power as well as TVA's long-term objectives, policies, and plans. Accordingly, the loss of a quorum for an extended period of time would impair TVA's ability to change rates and to modify these objectives, policies, and plans. Such an impairment would likely have a negative impact on TVA's ability to respond to significant changes in technology, the regulatory environment, or the industry overall and, in turn, negatively affect TVA's cash flows, results of operations, financial condition, and reputation. The TVA Board currently has eight members.

RISKS RELATED TO THE ENVIRONMENT AND CATASTROPHIC EVENTS

Weather conditions may hamper TVA's ability to supply power or negatively impact net revenue, and weather conditions may cause customers' demand for power to exceed TVA's then-present power supply capabilities.

Weather may have a material adverse effect on TVA's cash flows, results of operations, and financial condition, including through the following non-exclusive foreseeable scenarios:

- Extreme temperatures may increase the demand for power and require TVA to purchase power at high prices to meet customer demand, whereas unusually mild weather may result in decreased demand for power and lead to reduced electricity sales.
- Periods of either high or low levels of rainfall may impede river traffic, impacting barge deliveries of critical items such as coal and equipment for power facilities.
- High river water temperatures in the summer may limit TVA's ability to use water from the Tennessee or Cumberland River systems for cooling at certain of TVA's generating facilities, thereby limiting its ability to operate these generating facilities. This situation would be aggravated during periods of reduced rainfall or drought.
- Changes in the climate may make, or may be making, such shifts in weather more common or extreme. Climate change may cause catastrophic events like droughts, floods, wildfires, heat waves, and snow or ice storms to occur more frequently in the Tennessee Valley region. In response, TVA may be required to, among other things, change its generation mix or change how it conducts its operations.
- Extreme weather conditions or damage resulting from storms or other catastrophic events could stress TVA's transmission and distribution systems, communication systems, and technology, including information technology, resulting in increased restoration, maintenance, and capital costs and reduced reliability, and may

even result in events such as the failure of a dam or an incident at a coal-fired, gas-fired, or nuclear plant or a CCR facility.

Events that affect the supply or quality of water from the Tennessee River system and Cumberland River system, or elsewhere, may interfere with TVA's ability to generate power.

An inadequate supply of water in the Tennessee River system and Cumberland River system could negatively impact TVA's cash flows, results of operations, and financial condition, including potentially reducing generation at TVA's hydroelectric plants, which may require TVA to increase reliance on more expensive generation sources or purchase more energy in the market likely at higher costs; negatively affecting generation at coal-fired and nuclear plants, which depend on water from the river systems near which they are located for cooling and for use in boilers where water is converted into steam to drive turbines; or negatively affecting generation at TVA's gas-fired facilities not located near a river, which nonetheless require alternative sources of water, such as from wells or local utility companies.

Further, the water for these purposes must be of a particular quality for use in TVA's equipment. When the available water is not of sufficient quality for TVA's use, TVA must either treat the water or obtain alternate sources. An inadequate supply of quality water could result, among other things, from periods of low rainfall or drought, the withdrawal of water from the river systems by governmental entities or others, incidents affecting bodies of water not managed by TVA, supply issues that affect water providers, or intrusive aquatic plants and animals such as eel grass, algae, and mussels that block cooling water intake pipes or otherwise interfere with the operation of TVA's generation facilities. While TVA manages the Tennessee River and a large portion of its tributary system to provide much of the water necessary for the operation of its power plants, the USACE operates and manages other bodies of water upon which some of TVA's facilities rely. Events at these bodies of water or their associated hydroelectric facilities may interfere with the flow of water and may result in TVA's having insufficient water quality to meet the needs of some of its generating plants. If TVA were to have insufficient water supply of the quality necessary to meet the needs of its plants, TVA may be required to reduce generation at its affected facilities to levels compatible with the available supply of quality water, or take additional steps that change how TVA conducts its operations or that otherwise cause TVA to incur additional expense.

Catastrophic events are an ever present risk of financial loss and disruption to TVA's business.

TVA's cash flows, results of operations, and financial condition may be adversely affected, either directly or indirectly, by catastrophic events such as fires, earthquakes, explosions, solar events, electromagnetic pulses, geomagnetic disturbances, droughts, floods, hurricanes, tornadoes, polar vortexes, icing events, pipeline explosions, or other casualty events, wars, national emergencies, terrorist activities, pandemics or epidemics, widespread public health crises, geopolitical conflicts, or other similar destructive or disruptive events. These events, the frequency and severity of which are unpredictable, may, among other things, cause health, safety, or environmental problems; limit or disrupt TVA's ability to generate and transmit power; lead to legislative or regulatory changes that affect the construction, operation, and decommissioning of nuclear units and the storage of spent fuel; limit or disrupt TVA's ability to provide flood control and river management; reduce the demand for power; disrupt fuel or other supplies; require TVA to produce additional tritium; cause or exacerbate an economic downturn; require TVA to make substantial capital investments for repairs, improvements, or modifications; negatively affect the cost or availability of insurance; or cause or exacerbate instability in the financial markets. Additionally, some studies have predicted that climate change may cause catastrophic events, such as heat waves, droughts, and floods, to occur more frequently or with greater intensity in the Tennessee Valley region, which could adversely impact TVA.

These destructive or disruptive events may present special risks to TVA's nuclear plants. If public opposition to nuclear power were to make operating nuclear plants less feasible because of any of these events, TVA may be forced to shut down its nuclear plants. This would make it substantially more difficult for TVA to obtain greater amounts of its power supply from low or zero carbon emitting resources and to replace its generation capacity when faced with retiring or idling certain coal-fired units.

ACCOUNTING AND FINANCIAL REPORTING RISKS

TVA's financial control system cannot guarantee that all control issues and instances of fraud or errors will be prevented or detected.

No financial control system, no matter how well designed and operated, can provide absolute assurance that the objectives of the control system will be met, and no evaluation of financial controls can provide absolute assurance that all control issues and instances of fraud or errors can or will be prevented or detected. The design of any system of financial controls is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions, regardless of how remote.

TVA may be unable to use regulatory accounting for some or all costs.

TVA uses regulatory accounting to defer certain costs. To qualify for regulatory accounting, costs must meet certain accounting criteria and be approved for regulatory accounting treatment by the TVA Board in its capacity as TVA's regulator. When costs do not meet, or cease to meet, these criteria, or if the TVA Board were to disallow the treatment or were to cease to be TVA's sole regulator in such areas, TVA may not be able to defer those costs. Such an inability to defer costs would likely have a substantial impact on TVA's financial condition and results of operations and could impact the timing and amounts of TVA's rate recovery. For a discussion of regulatory accounting, see Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Critical Accounting Estimates*.

GENERAL RISK FACTORS

TVA may not be able to implement its business strategy successfully.

TVA's financial condition and results of operations are largely dependent on the extent to which it can implement its business strategy successfully. TVA's strategy includes maintaining low rates, aligning operations and maintenance costs with revenues, being responsible stewards, living within its means, meeting reliability expectations, and providing a balanced portfolio, in light of TVA's strategic priorities. The strategic priorities are Powerful Partnerships, People Advantage, Operational Excellence, Igniting Innovation, and Financial Strength. This strategy is subject to business, economic, and competitive uncertainties and contingencies, many of which are beyond TVA's control. Such uncertainties include customer energy-efficiency programs that are designed to reduce energy demand; energy-efficiency efforts by customers not related to TVA's energy-efficiency programs; increased customer use of DER, such as solar panels and other technologies, as well as the use of energy storage technologies; and macroeconomic factors impacting economic growth or contraction within TVA's service territory, which could affect energy demand. If TVA is unable to successfully implement its business strategy, TVA's financial condition and results of operations could be negatively affected. See Item 1, Business — *Environmental Matters* and *Human Capital Management*, Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges*, and Part III, Item 11, Executive Compensation — C*ompensation Discussion and Analysis* for additional information regarding TVA's strategic objectives.

TVA's cost reduction efforts may not be successful.

TVA is undertaking a cost optimization project to partially offset cost increases expected for the years 2024 through 2026, and achieving this goal may prove challenging, particularly if inflation rates remain high. The failure to achieve or maintain cost reduction targets could adversely affect TVA's rates, reputation, cash flows, results of operations, and financial condition. Moreover, if TVA fails to limit rate increases as provided in the long-term Partnership Agreements, participating LPCs have a right to renegotiate or terminate the Partnership Agreements.

TVA's organizational structure may not adequately support TVA's anticipated business needs or enable it to meet the needs of its current or potential customers.

TVA has been modifying its organizational structure to better adapt to the forecasted economic environment. If TVA's assumptions about either its forecasts or the proper internal structure of the company to meet the expected environment are inaccurate or if this structure does not adequately support TVA's needs, TVA could face operational or financial challenges that could adversely affect its cash flows, results of operations, and financial condition as well as TVA's ability to attract or retain a skilled workforce and to meet the needs of its current or potential customers.

TVA may have difficulty adapting its business model to changes in the utility industry and customer preferences.

The traditional business model for power production, selling power from centrally located plants, is facing pressure from a variety of sources, including the potential for self-generation by current or potential customers, new technologies such as energy storage, and increased energy efficiency. These pressures may reduce the demand for TVA power. If TVA does not or cannot adapt to this pressure by adequately changing its business model, TVA's financial condition and results of operations could be negatively affected.

TVA's reputation may be negatively impacted.

As with any company, TVA's reputation is a vital element of its ability to effectively conduct its business. TVA's reputation could be harmed by a variety of factors, including failure of a generating asset or supporting infrastructure; failure to effectively manage land and other natural resources entrusted to TVA; real or perceived violations of environmental regulations, including those related to climate change; real or perceived issues with TVA's safety culture or work environment; inability to meet its human capital management goals; inability to meet its carbon reduction

aspirations; inability to keep its electricity rates stable; involvement in a class-action or other high-profile lawsuit; significant delays in construction projects; occurrence of or responses to cyber attacks or security vulnerabilities; acts or omissions of TVA management or acts or omissions of a contractor or other third-party working with or for TVA, which actually or perceivably reflect negatively on TVA; measures taken to offset reductions in demand or to supply rising demand; or a significant dispute with one of TVA's customers.

Any deterioration in TVA's reputation may harm TVA's relationships with its customers and stakeholders, may increase its cost of doing business, may interfere with its ability to attract and retain a qualified, inclusive, and diverse workforce, may impact TVA's ability to raise debt capital, and may potentially lead to the enactment of new laws and regulations, or the modification of existing laws and regulations, that negatively affect the way TVA conducts its business.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 1C. CYBERSECURITY

Risk Management

TVA's cybersecurity risk management programs and processes exist under a written cybersecurity policy, which provides the foundation for TVA's information security programs. Under the policy, TVA engages assessors, consultants, auditors, and other third parties. All TVA employees, contractors, grantees, other federal agencies, state and local governments, industry partners, and others who possess TVA information or who operate, use, or have access to TVA's information systems are made responsible for complying with TVA's cybersecurity policy and information security-related communications, plans, practices, procedures, and standards issued as part of the information security programs.

TVA's cybersecurity risk management framework provides the structure for protecting against cybersecurity threats, including through promoting risk management efforts, situational awareness, and cyber risk modeling and simulations. Within this framework, TVA operates numerous programs under internal written policies and procedures, which are aimed at helping protect TVA's information resources. These include a vulnerability management program to help address cybersecurity threats to TVA digital assets; a patch and remediation management program to help computer systems remain current with software patches or software updates; an offensive threat management program to emulate threat actor activities; a cybersecurity training program to help educate employees and contractors, including by providing scenarios designed to train the workforce on responding to cybersecurity incidents; implementation of standard terms and conditions where appropriate in TVA's supply chain contracts to help mitigate TVA's cybersecurity risk, including through requiring timely notice of vendor cybersecurity incidents and data impacts and compliance with laws, regulations, and TVA's policies on cybersecurity; and a program to accomplish cybersecurity event detection alerting. These programs are based on principles from the National Institute of Standards and Technology and certain regulatory standards that are designed to protect against cybersecurity incidents, including the North American Electric Reliability Corporation Critical Infrastructure Protection Standards and Nuclear Regulatory Commission cybersecurity standards, and are periodically assessed by third-party experts.

In the last three fiscal years, TVA has not experienced any material cybersecurity incidents. TVA is not currently aware of any potential cybersecurity threats, including as a result of any previous cybersecurity incidents, that may have materially affected or are reasonably likely to materially affect TVA, including its business strategy, results of operations, or financial condition; however, TVA cannot provide assurance that it will not be materially affected in the future by cybersecurity risks or any future material risks. For more information on TVA's cybersecurity related risks, see Item 1A, Risk Factors – *Cybersecurity and Information Technology Risks* in this Annual Report.

Governance

The TVA Board is ultimately responsible for oversight of the identification, management, and mitigation of enterprise-wide risk, including cybersecurity risk, and receives reports from the Audit, Risk, and Cybersecurity Committee ("Audit Committee"). The Audit Committee is a standing committee of the TVA Board and advises the TVA Board on a variety of matters, including TVA's processes for identifying, monitoring, and mitigating enterprise risk and reviewing and overseeing strategies for addressing TVA's cybersecurity, data, and privacy policies and response protocols. The Audit Committee meets at least quarterly. Reporting to the Audit Committee and the TVA Board is the risk counsel comprised of TVA's top leaders and the Chief Risk Officer ("CRO"), which is responsible for the highest level of management oversight of risk at TVA. The risk committee's primary purpose is to oversee TVA's management of enterprise-wide risks with policy implications reported to the TVA Board or a designated TVA Board committee. The risk committee oversees a subordinate committee that provides comprehensive risk oversight of TVA's security, artificial intelligence, privacy, and technology risks consistent with TVA's mission, strategic imperatives, and approved financial and operational plans.

TVA's governance, oversight, execution, and support activities include quarterly Enterprise Risk and Assurance updates to the Audit Committee, an annual alignment with TVA's broader risk management framework and business planning initiatives, and tactical and intentional initiatives focused on reducing risk, increasing maturity, and helping ensure regulatory compliance and adherence. TVA engages in various audits in order to provide assurance of TVA's effective management of cybersecurity risk and risk as a whole and is also subject to required external audits to ensure compliance with certain regulatory standards that are designed to protect against cybersecurity incidents.

TVA's current VP, Cybersecurity serves as Chief Information Security Officer ("CISO"). The current CISO is also designated as the Chief Artificial Intelligence Officer and the agency's Federal Senior Intelligence Coordinator. Starting in operational technology as part of nuclear generation, the current CISO has spent his career in public power in various North American Electric Reliability Corporation regions and has been in the industry for over 25 years. He has led Cybersecurity for over 10 years in the sector. He was previously the CISO of the New York Power Authority, and he has experience supporting all verticals of electric operations, from the perspectives of security, resiliency, and recovery. He is a Certified Information Security Manager and has previously held Chair and Co-chair roles in the industry, such as with the Electric Subsector Coordinating Council's Cyber Mutual Aid Committee. He seeks to focus on information sharing and building partnerships to enable understanding of emerging threats. The current CISO remains active in various security organizations and the broader industry. He has a degree in Computer Science and a Master of Business Administration.

ITEM 2. PROPERTIES

TVA holds personal property in its own name but generally holds real property as agent for the U.S. TVA may acquire real property as an agent of the U.S. by negotiated purchase or by eminent domain.

Generating Properties

At September 30, 2024, TVA-operated generating assets consisted of seven nuclear units, 24 active coal-fired units, 70 simple-cycle gas units (68 active units and two idled units), one cogeneration unit, 14 combined-cycle gas power blocks, 109 conventional hydroelectric units (106 active units and three units in long-term outage and unavailable for service), four pumped-storage hydroelectric units, five diesel generator units, and nine operating solar installations. As of September 30, 2024, four of the combined-cycle power blocks were leased to special purpose entities ("SPEs") and leased back to TVA under long-term leases. See Note 11 — *Variable Interest Entities* and Note 14 — *Debt and Other Obligations — Lease/Leasebacks*. In addition, TVA is leasing the three Caledonia combined-cycle power blocks under a long-term lease. For a discussion of these assets, see Item 1, Business — *Power Supply and Load Management Resources*.

Net Capability

Net capability is defined as the ability of an electric system, generating unit, or other system component to carry or generate power for a specified time period. It does not include real-time bulk electrical system operating constraints such as transmission line loading limitations, fuel availability such as coal, gas, and seasonal river reservoir levels, fuel blend, severe weather events, environmental and/or other regulatory constraints, transmission system outages, generator outages, or generator derates. Summer net capability as presented in the table below reflects the expected output of individual resources at TVA's anticipated summer demand peak. The summation of those individual resources does not include the real-time bulk electrical system operating constraints previously noted. See also Item 1A, Risk Factors — *Operational Risks* and *Risks Related to the Environment and Catastrophic Events.*

In addition to the TVA-operated generating facilities presented in the table below, TVA also has 8,304 MWs of operating capacity available through PPAs. At September 30, 2024, these contracts were comprised of 3,206 MWs of renewable PPAs and 5,098 MWs of nonrenewable PPAs. The summation of TVA's PPAs under contract does not include real-time operating constraints, such as intermittency of renewable resources associated with weather or other factors. See Item 1, Business — *Power Supply and Load Management Resources — Power Purchase and Other Agreements* for information on TVA's renewable and nonrenewable power purchase contracts by resource type and location.

The following table summarizes TVA's summer net capability in MW at September 30, 2024:

SUMMER NET CAPABILITY
At September 30, 2024

Source of Capability	Location	Number of Units	Summer Net Capability (MW)	Date First Unit Placed in Service (CY)	Date Last Unit Placed in Service (CY)
TVA-Operated Generating Facilities					
Nuclear					
Browns Ferry	Alabama	3	3,662	1974	1977
Sequoyah	Tennessee	2	2,292	1981	1982
Watts Bar	Tennessee	2	2,278	1996	2016
Total Nuclear		7	8,232		
Coal-Fired					
Cumberland	Tennessee	2	2,470	1973	1973
Gallatin	Tennessee	4	976	1956	1959
Kingston	Tennessee	9	1,298	1954	1955
Shawnee	Kentucky	9	1,071	1953	1955
Total Coal-Fired		24	5,815		
Natural Gas and/or Oil-Fired[1][2]					
Simple-Cycle Combustion Turbine					
Allen[3]	Tennessee	4	92	1971	1972
Brownsville	Tennessee	4	425	1999	1999
Colbert	Alabama	11	1,041	1972	2023
Gallatin	Tennessee	8	534	1975	2000
Gleason	Tennessee	3	463	2000	2000
Johnsonville	Tennessee	13	708	1975	2000
Kemper	Mississippi	4	273	2002	2002
Lagoon Creek	Tennessee	12	844	2001	2002
Marshall County	Kentucky	8	571	2002	2002
Paradise	Kentucky	3	681	2023	2023
Subtotal Simple-Cycle Combustion Turbine		70	5,632		
Combined-Cycle Combustion Turbine					
Ackerman[4]	Mississippi	1	713	2007	2007
Allen[5]	Tennessee	1	1,106	2018	2018
Caledonia[6]	Mississippi	3	819	2003	2003
John Sevier[7]	Tennessee	1	871	2012	2012
Lagoon Creek[8]	Tennessee	1	596	2010	2010
Magnolia	Mississippi	3	951	2003	2003
Paradise[9]	Kentucky	1	1,100	2017	2017
Southaven	Mississippi	3	802	2003	2003
Subtotal Combined-Cycle Combustion Turbine		14	6,958		
Co-Generation					
Johnsonville	Tennessee	1	66	1975	2000
Total Natural Gas and/or Oil-Fired		85	12,656		
Hydroelectric					
Conventional Plants	Alabama	36	1,169	1925	1962
	Georgia	2	37	1931	1956
	Kentucky	5	225	1944	1948
	North Carolina	6	478	1940	1956
	Tennessee[3][10]	60	1,848	1912	1972
Pumped-Storage[11]	Tennessee	4	1,715	1978	1979
Total Hydroelectric		113	5,472		
Diesel Generator					
Meridian	Mississippi	5	9	1998	1998
TVA Non-hydro Renewable Resources[12]			1		
TVA Other Nonrenewable Resources[12]			5		
Total TVA-Operated Generating Facilities Summer Net Capability			32,190		

Notes
(1) See *Generating Properties* above for a discussion of TVA-operated natural gas and/or oil-fired facilities subject to leaseback and long-term lease arrangements.
(2) As of September 30, 2024, 92 MW of peak firing short-term capability of simple-cycle combustion turbine units was not operational and would require additional investment for dependable use; therefore, this short-term capability is not presented in the table above.
(3) As of September 30, 2024, TVA had two idled units at Allen CT Facility (Units 17 and 18) and three units that were in long-term outage and unavailable for service at Wilbur Hydroelectric Facility (Units 1-3). These units are included in their respective locations in the table above; however, the capability from these units is excluded.

(4) Ackerman Combined Cycle Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).
(5) Allen Combined Cycle Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).
(6) Caledonia Combined Cycle Plant ("Caledonia CC") is currently a leased facility operated by TVA.
(7) John Sevier Combined Cycle Facility ("John Sevier CCF") is a single steam cycle unit driven by three gas turbines (3x1 configuration).
(8) Lagoon Creek Combined Cycle Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).
(9) Paradise Combined Cycle Facility is a single steam cycle unit driven by three gas turbines (3x1 configuration).
(10) Includes 86 MW of summer net capability associated with Hiwassee Hydro Unit 2. See Item 1, Business — *Power Supply and Load Management Resources — Renewable Energy Resources — Conventional Hydroelectric Dams*.
(11) See Item 1, Business — *Power Supply and Load Management Resources — Hydroelectric Pumped-Storage* for a discussion of Raccoon Mountain Pumped-Storage Plant.
(12) TVA owns approximately one MW of renewable solar capability among nine operating solar installations, and Allen Combined Cycle Facility has five MW of nonrenewable biomass capability.

Transmission Properties

TVA's transmission system interconnects with systems of surrounding utilities and, at September 30, 2024, consisted primarily of approximately 2,500 circuit miles of 500 kilovolt, 12,000 circuit miles of 161 kilovolt, and 1,900 circuit miles of other voltage transmission lines; 5,196 miles of fiber optic lines; 583 transmission substations, power switchyards, and switching stations; and 1,351 customer connection points (customer, generation, and interconnection).

Natural Resource Stewardship Properties

TVA operates and maintains 49 dams and manages approximately 11,000 miles of reservoir shoreline, 293,000 acres of reservoir land, 650,000 surface acres of reservoir water, and approximately 148 public recreation areas throughout the Tennessee Valley, including campgrounds, day-use areas, and boat launching ramps.

Additionally, TVA manages over 153 agreements for commercial recreation (such as campgrounds and marinas). As part of its stewardship responsibilities, TVA approval is required to be obtained before any obstruction affecting navigation, flood control, or public lands can be constructed across, along, or in the Tennessee River and its tributaries. These public lands and waters managed by TVA provide both conservation and sustainable recreation.

Buildings

TVA has buildings and structures located throughout its service area to support TVA's mission of service. These buildings and structures include generation and transmission facilities, corporate offices, customer service centers, power service centers, warehouses, visitor centers, and crew quarters. Two significant buildings are its Knoxville Office Complex and the Chattanooga Office Complex in Tennessee. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Real Property Portfolio*.

Disposal of Property

TVA has broad authority to dispose of personal property but only limited authority to dispose of real property. TVA's primary, but not exclusive, authority to dispose of real property is as follows: TVA has authority to dispose of surplus real property at a public auction; TVA may dispose of real property for certain specified purposes, including providing replacement lands for certain entities whose lands were flooded or destroyed by dam or reservoir construction, providing real property for recreational use, and granting easements and rights-of-way upon which are located transmission or distribution lines; TVA can dispose of real property in connection with the construction of generating plants or other facilities under certain circumstances; and TVA has authority to grant easements for rights-of-way and other purposes.

The Basic Tennessee Valley Authority Power Bond Resolution adopted by the TVA Board on October 6, 1960, as amended on September 28, 1976, October 17, 1989, and March 25, 1992 (the "Basic Resolution") prohibits TVA (1) from mortgaging any part of its power properties and (2) from disposing of all or any substantial portion of these properties unless TVA provides for a continuance of the interest, principal, and sinking fund payments due and to become due on all outstanding Bonds, or for the retirement of such Bonds.

ITEM 3. LEGAL PROCEEDINGS

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting its activities. While the outcome of the Legal Proceedings to which TVA is a party cannot be predicted with certainty, any adverse outcome to a Legal Proceeding involving TVA may have a material adverse effect on TVA's financial condition, results of operations, and cash flows.

For a discussion of Legal Proceedings involving TVA, see Note 22 — *Commitments and Contingencies — Legal Proceedings,* which discussion is incorporated by reference into this Item 3.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Not applicable.

ITEM 6. RESERVED

Not applicable.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

(Dollars in millions except where noted)

The following Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") is intended to help the reader understand the Tennessee Valley Authority ("TVA"), its financial condition, results of operations, and cash flows, and its present business environment. The MD&A is provided as a supplement to, and should be read in conjunction with, TVA's consolidated financial statements and the accompanying notes thereto contained in Item 8, Financial Statements and Supplementary Data of this Annual Report on Form 10-K for the fiscal year ended September 30, 2024 (the "Annual Report"). See Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations in TVA's Annual Report on Form 10-K for the year ended September 30, 2023, filed with the Securities and Exchange Commission ("SEC") on November 14, 2023, for a discussion of variance drivers for the year ended September 30, 2023, as compared to the year ended September 30, 2022. The MD&A includes the following sections:

- Business and Mission — a general description of TVA's business, objectives, strategic priorities, and core capabilities;
- Executive Overview — a general overview of TVA's activities and results of operations for 2024;
- Results of Operations — an analysis of TVA's consolidated results of operations for 2023 and 2024;
- Liquidity and Capital Resources — an analysis of cash flows, a description of aggregate contractual obligations, and an overview of financial position;
- Key Initiatives and Challenges — an overview of current and future initiatives and challenges facing TVA;
- Critical Accounting Estimates — a summary of significant estimates, judgments, and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes;
- Legislative and Regulatory Matters — a summary of laws and regulations that may impact TVA; and
- Risk Management Activities — a description of TVA's risk governance and exposure to various market risks.

Business and Mission

Business

TVA operates the nation's largest public power system. At September 30, 2024, TVA had 61 directly served customers, which include seven federal agency customers, and 153 local power company customers ("LPCs") that serve approximately 10 million people in parts of seven southeastern states. TVA generates nearly all of its revenues from the sale of electricity, and in 2024 revenues from the sale of electricity totaled $12.1 billion. As a wholly-owned agency and instrumentality of the United States ("U.S."), however, TVA differs from other electric utilities in a number of ways:

- TVA is a government corporation.
- The area in which TVA sells power is limited by the Tennessee Valley Authority Act of 1933, as amended, (the "TVA Act"), under a provision known as the "fence"; however, another provision of federal law known as the Anti-Cherrypicking Amendment ("ACPA") generally protects TVA from being forced to provide access to its transmission lines to others for the purpose of delivering power to customers within substantially all of TVA's defined service area.
- The rates TVA charges for power are set solely by the TVA Board of Directors ("TVA Board") and are not set or reviewed by another entity, such as a public utility commission. In setting rates, however, the TVA Board is charged by the TVA Act to have due regard for the primary objectives of the TVA Act, including the objective that power be sold at rates as low as feasible.

- TVA is not authorized to raise capital by issuing equity securities. TVA relies primarily on cash from operations and proceeds from power program borrowings to fund its operations and is authorized by the TVA Act to issue bonds, notes, or other evidences of indebtedness (collectively, "Bonds") in an amount not to exceed $30.0 billion outstanding at any given time. Although TVA's operations were originally funded primarily with appropriations from Congress, TVA has not received any appropriations from Congress for any activities since 1999 and, as directed by Congress, has funded essential stewardship activities primarily with power revenues.

TVA's Mission of Service

TVA was built for the people, created by federal legislation, and charged with a unique mission - to improve the quality of life in a seven-state region through the integrated management of the region's resources. TVA's mission focuses on three key areas:



ENERGY **ENVIRONMENT** **ECONOMIC DEVELOPMENT**

- Energy — Delivering reliable, low cost, clean energy;
- Environment — Caring for the region's natural resources; and
- Economic Development — Creating sustainable economic growth.

While TVA's mission has not changed since it was established in 1933, the climate in which TVA operates continues to evolve. The business and economic environment has become more challenging due to economic conditions; tougher environmental standards; and the need to diversify its power supply and adapt to changing customer usage behaviors, new technologies, and emerging, non-traditional competition. To continue to deliver its mission of service while evolving for future success, TVA must realize five strategic priorities, which are comprised of several strategic elements each:



People Advantage	Operational Excellence	Financial Strength	Powerful Partnerships	Igniting Innovation
Foster a culture that embraces, adapts quickly to, and anticipates changes needed for TVA to excel in the future public power utility marketplace Support inclusion with diversity efforts to attract and retain the best talent for TVA Deliver an efficient and agile HR service model that enables enterprise effectiveness Develop the next generation of TVA leaders	Nation's top nuclear fleet by 2025 Achieve leading operational performance by managing the generation fleet based on the mission of each asset • Gas and hydro to top quartile • Coal fleet based on end of life Increase generation and transmission capacity while fostering excellence in project management and construction Advance TVA's grid capabilities to increase flexibility for future additions and to meet the reliability and resiliency needs of the future Accelerate the deployment of existing clean technologies including solar, storage, energy efficiency, and demand response	Maintain financial health while funding TVA's energy transition Ensure sufficient revenues to meet financial commitments (revenue requirements) Evolve the public power model while incorporating Valley Vision 2035	Build partnerships and community connections to enable solutions Champion the public power model through the region's energy expansion Align with TVA's customers and economic development agencies to target industries that are critical to the Valley's long-term success Responsibly foster excellence in natural resource management and environmental stewardship as TVA transitions to the energy system of the future	Advance energy transformation in the Valley through leveraging technology and innovation in all of TVA's work Refine innovation framework to align with TVA's strategic intent Support the development of new technologies to further accelerate decarbonization and prepare to deploy commercially viable technologies

TVA's mission sets the stage for its strategic planning process that includes strategic objectives, initiatives, and scorecards for performance designed to provide clear direction for improving TVA's core business.

Linking the Mission to Performance

TVA has formulated key performance measures to support its strategic priorities. The intent of these measures is to align employees to TVA's mission by focusing its collective efforts on operational excellence, fiscal responsibility, economic development, and environmental stewardship. The measures are designed to promote teamwork, encourage high performance behaviors, and motivate TVA employees to achieve goals aligned with TVA's mission and values. The 2024 corporate results compared with targets for these key measures are reflected in the chart below, and the subsequent chart reflects the 2025 approved corporate measures. See Part III, Item 11, Executive Compensation — *Compensation Discussion and Analysis* for information regarding how the 2024 measures are calculated.

2024 Corporate Measure	Weight	Actual	Threshold	Target	Stretch
TVA total spending ($ millions)	40%	$ 7,496	$ 8,049	$ 7,810	$ 7,570
Load not served (system minutes)	30%	2.3	4.5	4.1	3.2
Annualized nuclear online reliability loss factor (%)	15%	3.22 %	3.00 %	2.00 %	1.00 %
Combined cycle equivalent forced outage rate (%)	10%	1.2 %	6.4 %	5.5 %	4.0 %
Coal equivalent forced outage rate (%)	5%	4.8 %	18.2 %	15.2 %	8.6 %

2025 Corporate Measure	Weight	Threshold	Target	Stretch
Strategic Business Unit ("SBU") Controllable / Operating and Maintenance ("O&M") and Base Capital Spend	40%	$5,187	$5,061	$4,935
Transmission Performance Indicator	15%	50	100	200
Nuclear Performance Indicator	15%	2.77	2.00	1.23
Power Operations Performance Indicator	15%	50	100	200
Serious Injury Incident Rate	15%	0.04	0.02	0.00

Executive Overview

TVA's operating revenues were $12.3 billion and $12.1 billion for the years ended September 30, 2024 and 2023, respectively. Operating revenues increased for the year ended September 30, 2024 as compared to the prior year, primarily as a result of higher effective base rates and higher sales volume, partially offset by lower fuel rates. Effective base rates were higher primarily due to the TVA Board action to approve a 4.5 percent wholesale base rate increase beginning in 2024 and the pandemic credits ending on September 30, 2023. The higher sales volume was driven by a 20 percent increase in cooling degree days as compared to the same period of the prior year. Lower fuel rates were primarily due to lower coal, natural gas, and purchased power prices.

On January 17, 2024, TVA reached an all-time record high peak power demand of approximately 34,577 megawatts ("MW"). This peak was nearly 1,100 MW greater than TVA's previous all-time peak and over 1,100 MW greater than TVA's peak power demand during Winter Storm Elliott in December 2022. In addition, TVA reached a second highest peak power demand of approximately 34,284 MW on January 21, 2024.

Total operating expenses decreased $274 million for the year ended September 30, 2024, as compared to the prior year, primarily due to a decrease in fuel and purchased power expense. Fuel and purchased power expense decreased $432 million for the year ended September 30, 2024, as compared to the same period of the prior year, primarily due to lower coal, natural gas, and purchased power prices. Depreciation and amortization expense decreased $75 million for the year ended September 30, 2024, as compared to the prior year, primarily driven by a decrease in depreciation expense associated with the retirement of Bull Run Fossil Plant ("Bull Run"). These decreases were partially offset by a $269 million increase in Operating and maintenance expense primarily due to increases in payroll and benefit costs due to labor escalation for cost of living increases and additional headcount to support operational needs, outage expense driven by an increase in nuclear outage days, and contract labor costs primarily related to strategic project work and power operations performance improvement activities.

Commercial operations began on Paradise Combustion Turbine Units ("CTs") 5-7 on December 29, 2023. TVA also has ongoing natural gas projects at its Johnsonville, Cumberland, and Kingston sites and is evaluating natural gas projects for the replacement generation for the second unit at Cumberland, a new Caledonia CT plant on TVA land, and an aeroderivative CT project at TVA's Allen site. In addition, the first license renewal application was submitted to the Nuclear Regulatory Commission in January 2024 for the three units at Browns Ferry Nuclear Plant following the completion of a Supplemental Environmental Impact Statement ("EIS"). TVA documented its final decision related to the retirement of Kingston with the Record of Decision on April 2, 2024. TVA plans to retire the nine coal-fired units at Kingston by the end of calendar year ("CY") 2027 and replace the retired generation with an energy complex that includes natural gas, battery storage, and solar.

On May 8, 2024, the Environmental Protection Agency ("EPA") published its final legacy coal combustion residual ("CCR") rule ("Legacy CCR Rule"), which expands the scope of the existing regulatory requirements of EPA's 2015 CCR rule, as revised ("2015 CCR Rule"), to include two additional classes of CCR units: legacy CCR surface impoundments ("Legacy SIs") and CCR management units ("CCRMUs"). As a result of the enactment of the final rule, during 2024, TVA recorded additional estimated AROs of $3.1 billion and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated.

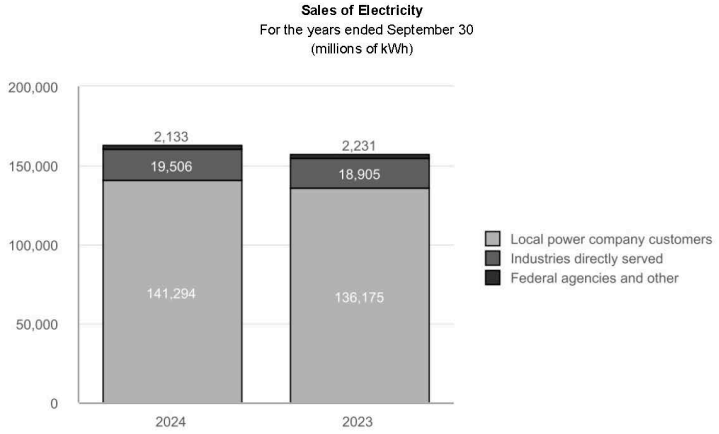
TVA's economic development efforts and programs continued to help attract or expand businesses and industries in the Tennessee Valley. These companies announced projected capital investments of $8.9 billion and are expected to create 10,368 jobs and retain 42,393 jobs. These amounts are forward-looking and are subject to various uncertainties. Amounts may differ materially based upon a number of factors, including, but not limited to, economic downturns or recessions. See *Forward-Looking Information* and Part I, Item 1A, Risk Factors for a discussion of additional factors, and see Part I, Item 1, Business — *Economic Development Activities* for definitions of "new jobs" and "retained jobs."

Results of Operations

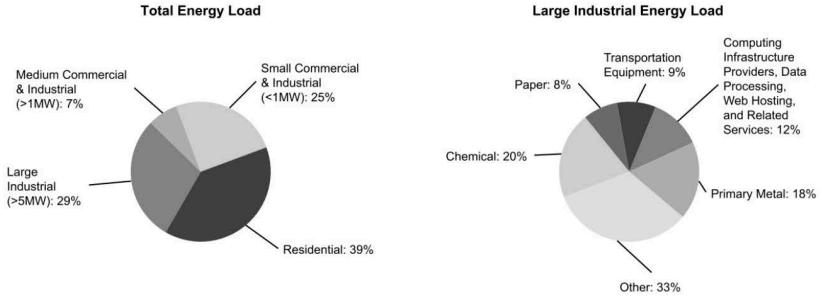
Sales of Electricity

Sales of electricity, which accounted for nearly all of TVA's operating revenues, were 162,933 million and 157,311 million kilowatt hours ("kWh") for 2024 and 2023, respectively. Total sales of electricity in 2024 includes 137 million kWh of pre-commercial generation at Paradise CTs 5-7, all of which was recognized in the three months ended December 31, 2023. Total sales of electricity in 2023 includes 99 million kWh of pre-commercial generation at Colbert CT Units 9-11. TVA sells power at wholesale rates to LPCs that then resell the power to their customers at retail rates. TVA also sells power to directly served customers, consisting primarily of federal agencies and customers with large or nonstandard loads. In addition, power exceeding TVA's system needs is sold under exchange power arrangements with certain other power systems.

The following chart compares TVA's sales of electricity by customer type for the years ended September 30, 2024 and 2023:



The following charts show a breakdown of TVA's energy load:



Note
Information included in the charts above was derived from energy usage of directly served customers and customers served by LPCs during CY 2023, and these graphs will continue to be updated on a CY basis.

Weather affects both the demand for TVA power and the price for that power. TVA uses degree days to measure the impact of weather on its power operations. Degree days measure the extent to which the TVA system 23-station average temperatures vary from 65 degrees Fahrenheit.

Degree Days							
	Variation from Normal						Change from Prior Period
	2024	Normal	Percent Variation	2023	Normal	Percent Variation	Percent Change
Heating Degree Days	2,801	3,152	(11.1)%	2,774	3,132	(11.4)%	1.0 %
Cooling Degree Days	1,954	1,824	7.1 %	1,634	1,824	(10.4)%	19.6 %

Sales of electricity increased approximately four percent for the year ended September 30, 2024, as compared to the same period of the prior year. The increased sales volume for LPCs was primarily driven by an increase in cooling degree days of 20 percent. For industries directly served, sales of electricity increased primarily within the data processing, hosting, and related services sector due to business-specific factors.

Financial Results

The following table compares operating results for 2024 and 2023:

Summary Consolidated Statements of Operations
For the years ended September 30
(in millions)

	2024	2023	Change	Percent Change
Operating revenues	$ 12,314	$ 12,054	$ 260	2.2 %
Operating expenses	10,086	10,360	(274)	(2.6)%
Operating income	2,228	1,694	534	31.5 %
Other income, net	71	61	10	16.4 %
Other net periodic benefit cost	98	199	(101)	(50.8)%
Interest expense	1,066	1,056	10	0.9 %
Net income	$ 1,135	$ 500	$ 635	127.0 %

Operating Revenues. Operating revenues for the years ended September 30, 2024 and 2023, were $12.3 billion and $12.1 billion, respectively. The following table compares TVA's operating revenues for the periods indicated:

Operating Revenues by Customer Type
For the years ended September 30
(in millions)

	2024	2023	Change	Percent Change
Operating revenues				
Local power companies	$ 11,138	$ 10,903	$ 235	2.2 %
Industries directly served	868	864	4	0.5 %
Federal agencies and other	125	135	(10)	(7.4)%
Revenue capitalized during pre-commercial plant operations[1]	(3)	(3)	—	— %
Other revenue	186	155	31	20.0 %
Total operating revenues	$ 12,314	$ 12,054	$ 260	2.2 %

Note
(1) Represents revenue capitalized during pre-commercial operations at Paradise CTs 5-7 in 2024 and Colbert CTs 9-11 in 2023.

TVA's two largest LPCs — Memphis Light, Gas and Water Division ("MLGW") and Nashville Electric Service ("NES") — have contracts with a five-year and a 20-year termination notice period, respectively. Sales to MLGW and NES accounted for nine percent and eight percent, respectively, of TVA's total operating revenues during both the years ended September 30, 2024 and 2023.

TVA's rate structure uses pricing signals to indicate seasons and hours of higher cost to serve its customers and to capture a portion of TVA's fixed costs in fixed charges. The structure includes three base revenue components: time of use demand charges, time of use energy charges, and a grid access charge ("GAC"). The demand charges are based upon the customer's peak monthly usage. The energy charges are based on time differentiated kWh used by the customer. Both of these components can be significantly impacted by weather. The GAC captures a portion of fixed costs and is offset by a corresponding reduction to the energy rates. The GAC also reduces the impact of weather variability to the overall rate structure.

TVA has a Partnership Agreement option that better aligns the length of LPC power contracts with TVA's long-term commitments. Under the partnership arrangement, the LPC power contracts automatically renew each year and have a 20-year termination notice. The partnership arrangements can be terminated under certain circumstances, including TVA's failure to limit rate increases to no more than 10 percent during any consecutive five-fiscal-year period, as more specifically described in the agreements. Participating LPCs receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term commitment, which enables TVA to recover its long-term financial commitments over a commensurate period. As of September 30, 2024, 148 LPCs had signed the 20-year Partnership Agreement with TVA.

In addition to base revenues, the rate structure includes a separate fuel rate that includes the costs of natural gas, fuel oil, purchased power, coal, emission allowances, nuclear fuel, and other fuel-related commodities; realized gains and losses on derivatives purchased to hedge the costs of such commodities; and payments to states and counties in lieu of taxes ("tax equivalents") associated with the fuel cost adjustments. See Part I, Item 1, Business — *Rates — Rate Methodology*.

In August 2024, the TVA Board approved a 5.25 percent wholesale base rate increase (excluding fuel) effective October 1, 2024. This adjustment is estimated to produce an additional $495 million of revenue during 2025.

The changes in revenue components are summarized below:

Changes in Revenue Components
For the years ended September 30
(in millions)

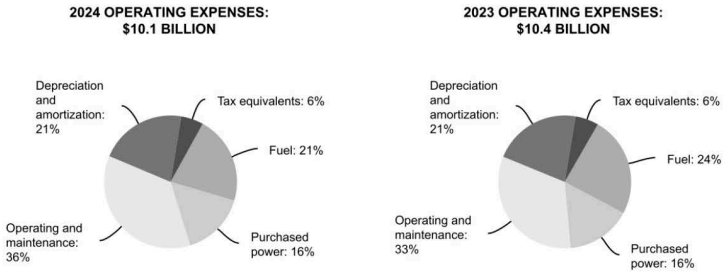
	2024	2023	Change	Percent Change
Base revenue				
Energy revenue	$ 5,065	$ 4,687	$ 378	8.1 %
Demand revenue	3,891	3,654	237	6.5 %
Grid access charge	622	589	33	5.6 %
Long-term partnership credits for LPCs	(215)	(199)	(16)	8.0 %
Pandemic relief credits[1]	—	(225)	225	(100.0)%
Other charges and credits[2]	(638)	(643)	5	(0.8)%
Total base revenue	8,725	7,863	862	11.0 %
Fuel cost recovery	3,398	4,025	(627)	(15.6)%
Off-system sales	8	14	(6)	(42.9)%
Pre-commercial operations[3]	(3)	(3)	—	— %
Revenue from sales of electricity	12,128	11,899	229	1.9 %
Other revenue	186	155	31	20.0 %
Total operating revenues	$ 12,314	$ 12,054	$ 260	2.2 %

Notes
(1) In 2022, the TVA Board approved a 2.5 percent monthly base rate credit, the Pandemic Recovery Credit, which was effective for 2023. The pandemic credits ended September 30, 2023.
(2) Includes economic development credits to promote growth in the Tennessee Valley, hydro preference credits for residential customers of LPCs, and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. See Note 17 — *Revenue*.
(3) Represents revenue capitalized during pre-commercial operations at Paradise CTs 5-7 in 2024 and Colbert CTs 9-11 in 2023.

Operating revenues increased $260 million for the year ended September 30, 2024, as compared to the prior year, primarily due to a $862 million increase in base revenue. The $862 million increase in base revenue was driven by a $637 million increase attributable to higher effective base rates and a $225 million increase attributable to higher sales volume. The increase in effective base rates was primarily due to the TVA Board action to approve a 4.5 percent wholesale base rate increase beginning in 2024 and the pandemic credits ending on September 30, 2023. The higher sales volume was primarily due to an increase in cooling degree days of 20 percent. Partially offsetting the increase in base revenue was a $627 million decrease in fuel cost recovery revenue. The $627 million decrease in fuel cost recovery revenue was driven by a $774 million decrease attributable to lower fuel rates partially offset by a $147 million increase attributable to higher sales volume. The lower fuel rates were primarily due to lower coal, natural gas, and purchased power prices.

See *Sales of Electricity* above for further discussion of the change in the volume of sales of electricity and *Operating Expenses* below for further discussion of the change in fuel expense.

Operating Expenses. Operating expense components as a percentage of total operating expenses for 2024 and 2023 consisted of the following:



Operating Expenses
For the years ended September 30
(in millions)

	2024	2023	Change	Percent Change
Operating expenses				
Fuel	$ 2,169	$ 2,549	$ (380)	(14.9)%
Purchased power	1,581	1,633	(52)	(3.2)%
Operating and maintenance	3,641	3,372	269	8.0 %
Depreciation and amortization	2,138	2,213	(75)	(3.4)%
Tax equivalents	557	593	(36)	(6.1)%
Total operating expenses	$ 10,086	$ 10,360	$ (274)	(2.6)%

The following table summarizes TVA's expenses for various fuels for the years indicated:

Fuel Expense for TVA-Operated Facilities[1]
For the years ended September 30
(in millions)

	Fuel Expense By Source		Cost per kWh[4]	
	2024	2023	2024	2023
Coal[2]	$ 770	$ 877	$ 3.53	$ 4.18
Natural gas and/or oil-fired[3]	1,062	1,293	2.76	3.74
Nuclear fuel	341	337	0.52	0.50
Total fuel	$ 2,173	$ 2,507	$ 1.73	$ 2.04

Notes
(1) Excludes effects of the fuel cost adjustment in the amounts of $(4) million and $42 million for the years ended September 30, 2024 and 2023, respectively.
(2) Fuel expense related to oil consumed for startup at coal-fired facilities was $23 million and $33 million for the years ended September 30, 2024 and 2023, respectively.
(3) Fuel expense related to oil consumed for generation at natural gas and/or oil-fired facilities was $8 million and $14 million for the years ended September 30, 2024 and 2023, respectively.
(4) Total cost per kWh is based on a weighted average.

Fuel expense decreased $380 million for the year ended September 30, 2024, as compared to the prior year. This decrease was primarily due to a decrease in effective fuel rates due to lower coal and natural gas prices, resulting in a $373 million decrease in fuel expense. Additionally, fuel expense decreased $46 million due to the deferral of unplanned coal costs during the summer of 2024 and the recovery of unplanned fuel costs in the prior year that were deferred in the summer of 2022. Partially offsetting these decreases was an increase of $39 million in fuel expense due to higher demand for energy.

Purchased power expense decreased $52 million for the year ended September 30, 2024, as compared to the prior year. This decrease was primarily due to lower purchased power market prices compared to the same period of the prior year, resulting in a decrease of $259 million. Additionally, purchased power expense decreased $43 million due to the deferral of unplanned purchased power costs from less availability of nuclear and hydro generation and the recovery of unplanned

purchased power costs in the prior year that were deferred in the summer of 2022. Partially offsetting these decreases was an increase of $250 million in purchased power expense due to higher demand for energy, and to a lesser extent, less availability of nuclear and hydro generation.

Operating and maintenance expense increased $269 million for the year ended September 30, 2024, as compared to the prior year. This increase was primarily due to $126 million of increased payroll and benefit costs primarily due to labor escalation for cost of living increases and additional headcount to support operational needs, a $39 million increase in outage expense primarily due to an increase in nuclear outage days, and $30 million of increased contract labor costs primarily related to strategic project work and power operations performance improvement activities. In addition, there was a $12 million increase in materials and supplies related to power operations performance improvement activities and other natural gas project work and a $9 million increase in expenditures related to TVA's New Nuclear Program.

Depreciation and amortization expense decreased $75 million for the year ended September 30, 2024, as compared to the prior year. The decrease was primarily driven by a decrease in depreciation expense of $206 million related to the decision to retire Bull Run, as Bull Run became fully depreciated in the fourth quarter of 2023. Partially offsetting this decrease was a $44 million increase in depreciation primarily related to TVA's decision to retire Cumberland and Kingston, a $38 million increase in amortization expense from amortization of finance leases and retirement of regulatory assets, and a $19 million increase due to Colbert CTs 9-11 and Paradise CTs 5-7 being placed into service in the fourth quarter of 2023 and the first quarter of 2024, respectively. The remainder of the partially offsetting increase was primarily due to depreciation of other additions to net completed plant. See Note 1 — *Summary of Significant Accounting Policies — Property, Plant, and Equipment, and Depreciation — Depreciation*.

Tax equivalents expense decreased $36 million for the year ended September 30, 2024, as compared to the prior year. This change was primarily driven by a decrease in the tax equivalents collected in the fuel cost recovery.

Generating Sources. The following tables show TVA's generation and purchased power by generating source as a percentage of all electrical power generated and purchased (based on kWh) for the periods indicated:

Total Power Supply by Generating Source
For the years ended September 30
(millions of kWh)

	2024		2023	
Nuclear	65,235	39 %	67,102	42 %
Natural gas and/or oil-fired[1]	38,390	23 %	34,467	22 %
Coal-fired	21,752	13 %	20,896	13 %
Hydroelectric	12,284	7 %	13,063	8 %
Total TVA-operated generation facilities[2][3]	137,661	82 %	135,528	85 %
Purchased power (natural gas and/or oil-fired)[4]	17,144	11 %	13,703	9 %
Purchased power (other renewables)[5]	5,930	4 %	6,247	4 %
Purchased power (coal-fired)	2,207	1 %	2,722	1 %
Purchased power (hydroelectric)	2,751	2 %	1,591	1 %
Total purchased power[3]	28,032	18 %	24,263	15 %
Total power supply	165,693	100 %	159,791	100 %

Notes
(1) The generation for 2023 includes 99 million kWh of pre-commercial generation at Colbert CTs 9-11. The generation for 2024 includes 137 million kWh of pre-commercial generation at Paradise CTs 5-7.
(2) Generation from TVA-owned renewable resources (non-hydroelectric) is less than one percent for all periods shown and therefore is not represented in the table above.
(3) Raccoon Mountain Pumped-Storage Plant net generation is allocated against each TVA-operated generation facility and purchased power type for both the year ended September 30, 2024, and the year ended September 30, 2023. See Part I, Item 1, Business — *Power Supply and Load Management Resources — Hydroelectric Pumped-Storage* for a discussion of Raccoon Mountain Pumped-Storage Plant.
(4) Purchased power (natural gas and/or oil-fired) includes generation from Caledonia CC, which is currently a leased facility operated by TVA. Generation from Caledonia Combined Cycle Plant (" Caledonia CC") was 4,798 million kWh and 4,030 million kWh for the years ended September 30, 2024 and 2023, respectively.
(5) Purchased power (other renewables) includes purchased power from the following renewable sources: solar, wind, biomass, and renewable cogeneration. TVA acquires Renewable Energy Certificates ("RECs") in connection with certain purchased power transactions and sells some of these RECs to customers.

In addition to power supply sources included here, TVA offers energy efficiency programs that effectively reduce energy needs. In 2024, TVA invested $71 million on its energy efficiency programs and effectively reduced 2024 energy needs by approximately 205 gigawatt hours of net incremental energy efficiency savings.

Interest Expense. Interest expense and interest rates for 2024 and 2023 were as follows:

Interest Expense and Rates
For the years ended September 30

	2024	2023	Percent Change
Interest expense[1]	$ 1,066	$ 1,056	0.9 %
Average blended debt balance[2]	$ 20,936	$ 20,613	1.6 %
Average blended interest rate[3]	4.90 %	4.92 %	(0.4)%

Notes
(1) Includes amortization of debt discounts, issuance, and reacquisition costs, net.
(2) Includes average balances of long-term power bonds, debt of VIEs, and discount notes.
(3) Includes interest on long-term power bonds, debt of VIEs, and discount notes.

Total interest expense increased $10 million for the year ended September 30, 2024, as compared to the prior year. This was primarily driven by a $23 million increase from higher average balances on long-term debt and an $8 million increase from higher average rates on short-term debt, partially offset by a $13 million decrease from lower average rates on long-term debt, a $5 million decrease from lower average balances on short-term debt, and a $3 million decrease due to lower interest expense related to finance leases.

Other Income, Net

Other income, net increased $10 million for the year ended September 30, 2024, as compared to the prior year. This increase was primarily driven by market gains on TVA's Investment funds and increases in interest income due to higher interest rates as compared to the prior year.

Other Net Periodic Benefit Cost

Other net periodic benefit cost decreased $101 million for the year ended September 30, 2024, as compared to the prior year. The decrease is primarily due to a decrease in the amount of deferred pension costs recognized. As a result of plan design changes, future contributions are expected to exceed the expense under U.S. GAAP. Accordingly, TVA discontinued this regulatory accounting practice as all such deferred costs were recovered as of September 30, 2023. In addition, Other net periodic benefit cost is subject to significant economic assumptions, such as changes in the discount rate used to measure the benefit plans, that can materially impact TVA. See Note 20 — *Benefit Plans*.

Liquidity and Capital Resources

Sources of Liquidity

TVA depends on various sources of liquidity to meet cash needs and contingencies. TVA's primary sources of liquidity are cash from operations and proceeds from the issuance of short-term debt in the form of discount notes, along with periodic issuances of long-term debt. TVA's balance of short-term debt typically changes frequently as TVA issues discount notes to meet short-term cash needs and pay scheduled maturities of discount notes and long-term debt. TVA's next significant power bond maturity is $1.0 billion in May 2025. The periodic amounts of short-term debt issued are determined by near-term expectations for cash receipts, cash expenditures, and funding needs, while seeking to maintain a target range of cash and cash equivalents on hand. TVA may hold higher cash balances from time to time in response to potential market volatility or other business conditions. In addition, cash balances may include collateral received from counterparties.

In addition to cash from operations and proceeds from the issuance of short-term and long-term debt, TVA's sources of liquidity include four long-term revolving credit facilities totaling $2.7 billion, a $150 million credit facility with the United States Department of the Treasury ("U.S. Treasury"), and proceeds from other financings. See Note 14 — *Debt and Other Obligations — Credit Facility Agreements.* The TVA Board authorized TVA to issue power bonds and enter into other financing arrangements in an aggregate amount not to exceed $4.0 billion during 2025. In the fourth quarter of 2024, TVA issued $1.0 billion of power bonds maturing in August 2034. Other financing arrangements may include, but are not limited to, lease financings, energy prepayments from customers, and other similar agreements. TVA may also engage in other alternative forms of financing such as sales of receivables, or loans, from time to time.

The TVA Act authorizes TVA to issue Bonds in an amount not to exceed $30.0 billion outstanding at any time. Bonds outstanding, excluding unamortized discounts and premiums and net exchange gains from foreign currency transactions, at September 30, 2024 and 2023, were $20.2 billion (including current maturities) and $19.5 billion (including current maturities), respectively. The balance of Bonds outstanding directly affects TVA's capacity to meet operational liquidity needs and to strategically use Bonds to fund certain capital investments as management and the TVA Board may deem desirable. Other options for financing not subject to the limit on Bonds, including lease financings (see *Lease Financings* below and Note 11 —

Variable Interest Entities), could provide supplementary funding if needed. Currently, TVA expects to utilize a combination of Bonds and additional power revenues through power rate increases to meet its ongoing operational liquidity needs while making planned capital investments through the decade. TVA may also utilize available funding through the Inflation Reduction Act of 2022 ("Inflation Reduction Act") and the Bipartisan Infrastructure Law ("BIL"), other federal funding opportunities, or other third-party financing arrangements. See *Lease Financing*s, *Key Initiatives and Challenges — Optimum Energy Portfolio — Decarbonization*, Note 11 — *Variable Interest Entities*, and Note 14 — *Debt and Other Obligations* for additional information.

TVA may from time to time seek to retire or purchase its outstanding debt through cash purchases and/or exchanges for securities, in open market purchases, privately negotiated transactions, or otherwise. Such repurchases or exchanges, if any, will depend on prevailing market conditions, TVA's liquidity requirements, contractual restrictions, and other factors. The amounts involved may be material.

Debt Securities. TVA's Bonds are not obligations of the U.S., and the U.S. does not guarantee the payments of principal or interest on Bonds. TVA's Bonds consist of power bonds and discount notes. Power bonds have maturities of between one and 50 years. At September 30, 2024, the average maturity of long-term power bonds was 13.96 years, and the weighted average interest rate was 4.69 percent. Discount notes have maturities of less than one year. Power bonds and discount notes have a first priority and equal claim of payment out of net power proceeds. Net power proceeds are defined as the remainder of TVA's gross power revenues after deducting the costs of operating, maintaining, and administering its power properties and tax equivalents, but before deducting depreciation accruals or other charges representing the amortization of capital expenditures, plus the net proceeds from the sale or other disposition of any power facility or interest therein. In addition to power bonds and discount notes, TVA had long-term debt associated with certain VIEs outstanding at September 30, 2024. See *Lease Financing* below, Note 11 — *Variable Interest Entities*, and Note 14 — *Debt and Other Obligations* for additional information.

Power bonds and discount notes are both issued pursuant to Section 15d of the TVA Act and pursuant to the Basic Tennessee Valley Authority Power Bond Resolution adopted by the TVA Board on October 6, 1960, as amended on September 28, 1976, October 17, 1989, and March 25, 1992 (the "Basic Resolution"). The TVA Act and the Basic Resolution each contain two bond tests: the rate test and the bondholder protection test.

Under the rate test, TVA must charge rates for power which will produce gross revenues sufficient to provide funds for operation, maintenance, and administration of its power system; tax equivalents; debt service on outstanding Bonds; payments to the U.S. Treasury in repayment of and as a return on the government's appropriation investment in TVA's power facilities (the "Power Program Appropriation Investment"); and such additional margin as the TVA Board may consider desirable for investment in power system assets, retirement of outstanding Bonds in advance of maturity, additional reduction of the Power Program Appropriation Investment, and other purposes connected with TVA's power business, having due regard for the primary objectives of the TVA Act, including the objective that power shall be sold at rates as low as are feasible. See Note 23 — *Related Parties*.

The rate test for the one-year period ended September 30, 2024, was calculated after the end of 2024, and TVA met the test's requirements.

Under the bondholder protection test, TVA must, in successive five-year periods, use an amount of net power proceeds at least equal to the sum of the depreciation accruals and other charges representing the amortization of capital expenditures and the net proceeds from any disposition of power facilities, for either the reduction of its capital obligations (including Bonds and the Power Program Appropriation Investment) or investment in power assets.

The bondholder protection test for the five-year period ended September 30, 2020, was calculated after the end of 2020, and TVA met the test's requirements. TVA must next meet the bondholder protection test for the five-year period ending September 30, 2025, and expects to meet the test.

TVA uses proceeds from the issuance of discount notes, in addition to other sources of liquidity, to fund short-term cash needs and scheduled maturities of long-term debt.

The following table provides additional information regarding TVA's short-term borrowings.

Short-Term Borrowings
(in millions)

	At September 30, 2024	For the year ended September 30, 2024	At September 30, 2023	For the year ended September 30, 2023
Gross Amount Outstanding (at End of Period) or Average Gross Amount Outstanding (During Period)				
Discount notes	$ 1,168	$ 787	$ 432	$ 890
Maximum Month-End Gross Amount Outstanding (During Period)				
Discount notes	N/A	$ 1,205	N/A	$ 1,864
Weighted Average Interest Rate				
Discount notes	4.76 %	5.37 %	5.29 %	4.34 %

TVA ended the year at September 30, 2024, with a higher balance of short-term debt as compared to September 30, 2023. The increase was primarily due to higher redemptions of long-term debt compared to the previous year, and the timing of cash flows.

TVA generally uses proceeds from the issuance of power bonds to refinance maturing power bonds or other financing obligations, as necessary, or for other power system purposes. The total balance of power bonds may decline in periods where redemptions of power bonds exceed issuance due to net positive cash flow from operating and investing activities. At this time, TVA anticipates the balance of Bonds and other financing obligations will increase in future years due to an expected increase in capital expenditures.

TVA issued $1.0 billion of power bonds during both 2024 and 2023. TVA redeemed $1.0 billion and $29 million of power bonds during 2024 and 2023, respectively. For additional information about TVA debt issuance activity and debt instruments issued and outstanding at September 30, 2024 and 2023, including rates, maturities, outstanding principal amounts, and redemption features, see Note 14 — *Debt and Other Obligations* — *Debt Securities Activity* and *Debt Outstanding*.

TVA Bonds are traded in the public bond markets and are listed on the New York Stock Exchange ("NYSE") except for TVA's discount notes, the 2009 Series B power bonds, and the power bonds issued under TVA's electronotes® program. TVA's Putable Automatic Rate Reset Securities ("PARRS") are traded on the NYSE under the exchange symbols "TVC" and "TVE." Other bonds listed on the NYSE are assigned various symbols by the exchange, which may be noted on the NYSE's website. TVA has also listed certain bonds on foreign exchanges from time to time, including the Luxembourg, Hong Kong, and Singapore Stock Exchanges. See Part I, Item 1A, Risk Factors — *Financial, Economic, and Market Risks* for additional information regarding the market for TVA's Bonds.

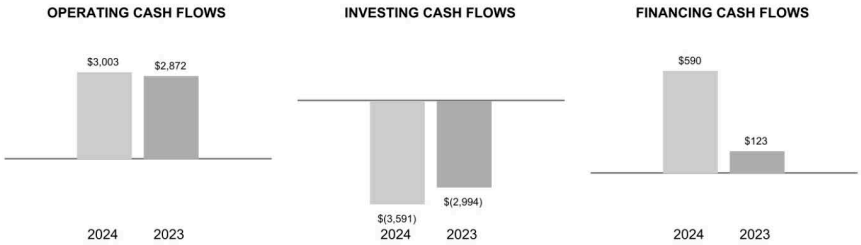
Although TVA Bonds are not obligations of the U.S., TVA, as a corporate agency and instrumentality of the U.S. government, may be impacted if the sovereign credit ratings of the U.S. are downgraded. According to statements made by the credit rating agencies, the U.S. credit rating may face additional downward pressure if policymakers are unable to respond to the country's growing fiscal challenges, if it appears deterioration in debt affordability or fiscal strength is likely to undermine U.S. economic strength or the role of the U.S. dollar or U.S. Treasury bond market, or if a weakening of governance were to occur. Additionally, TVA may be impacted by how the U.S. government addresses situations of approaching its debt limit. The outlook on the ratings of TVA is currently stable with S&P Global Ratings ("S&P") and Fitch Ratings, Inc. ("Fitch"); however, the outlook on TVA's ratings from Moody's Investors Service, Inc. ("Moody's") is negative due to Moody's change in the U.S. government rating outlook. TVA's rated senior unsecured Bonds are currently rated Aaa, AA+, and AA+, by Moody's, Fitch, and S&P, respectively. TVA's short-term discount notes are not rated. TVA is not able to predict the outcome of any rating changes on the U.S. government or any actions that may be taken on TVA because of actions on the government.

Lease Financings. TVA has entered into certain leasing transactions with special purpose entities ("SPEs") to obtain third-party financing for its facilities. These SPEs are sometimes identified as VIEs of which TVA is determined to be the primary beneficiary. TVA is required to account for these VIEs on a consolidated basis. See Note 11 — *Variable Interest Entities*. In addition, TVA previously entered into leasing transactions to obtain third-party financing for 24 peaking CTs as well as certain qualified technological equipment and software ("QTE"). See Note 1 — *Summary of Significant Accounting Policies* for information about reacquired rights associated with these lease financing activities.

Summary Cash Flows

A major source of TVA's liquidity is operating cash flows resulting from the generation and sale of electricity. Cash, cash equivalents, and restricted cash totaled $523 million and $521 million at September 30, 2024 and 2023, respectively. A summary of cash flow components for the years ended September 30 follows:

Cash provided by (used in):



Operating Activities. TVA's cash flows from operations are primarily driven by sales of electricity, fuel expense, and operating and maintenance expense. The timing and level of cash flows from operations can be affected by the weather, changes in working capital, commodity price fluctuations, outages, and other project expenses.

Net cash flows provided by operating activities increased $131 million for the year ended September 30, 2024, as compared to the same period of the prior year. The increase was primarily due to lower fuel prices and purchased power payments. This increase was partially offset by lower revenue collections and higher payroll and benefit related payments compared to the same period of the prior year. Revenue collections decreased primarily due to lower fuel and purchased power prices that were partially offset by the wholesale base rate increase that began in 2024, pandemic credits which ended in September 2023, and higher sales volume.

Investing Activities. The majority of TVA's investing cash flows are due to investments to acquire, upgrade, or maintain generating and transmission assets, including environmental projects and the purchase of nuclear fuel.

Net cash flows used in investing activities increased $597 million for the year ended September 30, 2024, as compared to the prior year, primarily driven by increased expenditures for capacity expansion projects partially offset by decreased expenditures for nuclear fuel during the period. Nuclear fuel expenditures vary depending on the number of outages and the prices and timing of purchases of uranium and enrichment services.

Financing Activities. TVA's cash flows provided by or used in financing activities are primarily driven by the timing and level of cash flows provided by operating activities, cash flows used in investing activities, and net issuance and redemption of debt instruments to maintain a strategic balance of cash on hand.

Net cash flows provided by financing activities increased $467 million for the year ended September 30, 2024, as compared to the prior year, primarily due to higher net short-term debt issuances for capacity expansion projects. Higher net cash flows provided by operating activities were offset by higher net cash used in investing activities which resulted in the need for net debt issuances to maintain targeted cash balance levels during the period. TVA anticipates a need to increase debt in the coming years as it continues to invest in power system assets, which may result in positive net cash flows provided by financing activities in future periods.

Cash Requirements

Actual capital expenditures and future planned capital expenditures for property, plant, and equipment additions, including environmental projects and new generation, and nuclear fuel are as follows:

Capital Expenditures
For the years ended September 30
(in millions)

	Actual	Estimated Capital Expenditures[1]				
	2024	2025	2026	2027	2028	2029
Capacity expansion expenditures	$ 2,020	$ 3,492	$ 2,643	$ 1,896	$ 1,425	$ 1,188
Environmental expenditures[2]	136	111	116	163	61	34
Nuclear fuel	281	265	216	231	526	528
Transmission expenditures	676	811	887	893	613	613
Other capital expenditures[3]	810	1,097	1,220	1,054	793	738
Total capital expenditures	$ 3,923 [4]	$ 5,776	$ 5,082	$ 4,237	$ 3,418	$ 3,101

Notes
(1) Currently, TVA expects to utilize a combination of Bonds and additional power revenues through power rate increases to meet its ongoing operational liquidity needs while making planned capital investments through the decade. TVA may also utilize available funding through the Inflation Reduction Act and the BIL, other federal funding opportunities, or other third-party financing arrangements. Estimated capital expenditures only include expenditures that are currently planned. Additional expenditures may be required, among other things, for TVA to meet growth in demand for power in its service area or to comply with new environmental laws, regulations, or orders.
(2) The table includes the capital portion of estimated environmental expenditures. See Part I, Item 1, Business — *Environmental Matters — Estimated Required Environmental Expenditures* for total estimates on projects related to environmental laws and regulations.
(3) Other capital expenditures are primarily associated with short lead time construction projects aimed at the continued safe and reliable operation of generating assets.
(4) The numbers above include the change in construction in progress and nuclear fuel expenditures included in Accounts payable and accrued liabilities of $348 million.

TVA continually reviews its capital expenditures and financing programs. The amounts shown in the table above are forward-looking amounts based on a number of assumptions and are subject to various uncertainties. Amounts may differ materially based upon a number of factors, including, but not limited to, changes in assumptions about system load growth, environmental regulation, rates of inflation, total cost of major projects, and availability and cost of external sources of capital. See *Forward-Looking Information* and Part I, Item 1A, Risk Factors.

TVA has certain obligations and commitments to make future payments, including contracts executed in connection with certain of the planned construction expenditures. TVA estimates total commitments and contingencies at September 30, 2024, are approximately $6.8 billion for the year ended September 30, 2025, and $47 billion for the years thereafter, of which $3.9 billion and $22.1 billion, respectively, are set forth in the table below. See Note 8 — *Leases*, Note 11 — *Variable Interest Entities*, Note 14 — *Debt and Other Obligations*, Note 20 — *Benefit Plans,* and Note 22 — *Commitments and Contingencies* for the obligations and commitments attributable to leases, VIEs and membership interests of VIEs subject to mandatory redemption, debt and leaseback obligations, the retirement plan, and unconditional purchase obligations, respectively, for remaining amounts.

Other Commitments and Contingencies
Payments due for the years ending September 30
(in millions)

	2025	2026	2027	2028	2029	Thereafter	Total
Interest payments relating to debt[1]	$ 1,008	$ 956	$ 895	$ 859	$ 834	$ 10,622	$ 15,174
Interest payments relating to debt of VIEs	44	42	40	39	36	247	448
Interest payments relating to membership interests of VIEs subject to mandatory redemption	1	1	1	1	1	2	7
Purchase obligations							
Power[2]	412	343	260	219	200	1,227	2,661
Fuel[3]	1,438	884	576	426	353	1,969	5,646
Other[4]	1,017	643	224	58	30	113	2,085
Total	$ 3,920	$ 2,869	$ 1,996	$ 1,602	$ 1,454	$ 14,180	$ 26,021

Notes
(1) Includes the effects of interest rate derivatives employed to manage interest rate risk.
(2) Includes commitments for energy and/or capacity under power purchase agreements ("PPAs") from hydroelectric, diesel, renewable, and gas-fired facilities, as well as transmission service agreements to support purchases of power from the market. Certain PPAs are accounted for as leases and have lease and non-lease components. For these contracts, the lease component is included in lease obligations (see Note 8 — *Leases*) and the non-lease component is included in power purchase obligations in the table above. For PPA contracts containing a lease component that have not commenced, the entire commitment amount is included in the table above.
(3) Includes commitments to purchase nuclear fuel, coal, and natural gas, as well as related transportation and storage services.

(4) Primarily includes long-term service contracts, contracts that contain minimum purchase levels for the purchase of limestone along with related storage and transportation, and contractual obligations related to TVA's load control program.

EnergyRight® Program. TVA purchases certain loans receivable from its LPCs in association with the EnergyRight® program. Depending on the nature of the energy-efficiency project, loans may have a maximum term of five years or 10 years. The loans receivable are then transferred to a third-party bank with which TVA has agreed to repay in full any loan receivable that has been in default for 180 days or more or that TVA has determined is uncollectible. At September 30, 2024, the total carrying amount of the loans receivable, net of discount, was $56 million. Such amounts are not reflected in the Other Commitments and Contingencies table above. The total carrying amount of the financing obligation was $66 million at September 30, 2024. See Note 9 — *Other Long-Term Assets* and Note 12 — *Other Long-Term Liabilities* for additional information.

Key Initiatives and Challenges

Optimum Energy Portfolio

TVA must continuously evaluate all generation and transmission assets to ensure an optimal energy portfolio that provides safe, clean, and reliable power while maintaining flexibility and fiscal responsibility to the people of the Tennessee Valley.

Additional load growth for the foreseeable future is expected to challenge capacity position. New capacity will be needed to support this load growth, replace retiring and expiring capacity, and enable further electrification of the economy. As discussed in *Liquidity and Capital Resources*, at this time, TVA anticipates the balance of Bonds and other financing obligations will increase in future years due to an expected increase in capital expenditures. In addition, TVA expects inflationary pressures to persist in 2025. See *Supply Chain and Inflation Pressures* below. To ensure TVA continues to provide affordable, reliable, and clean energy, it will need to be efficient in managing its operating costs and is undertaking a cost optimization project designed to reduce planned cost increases by approximately $950 million from 2024-2026 to address these pressures.

TVA is making investments in its generating portfolio and infrastructure to both help meet the growing demand for electricity and modernize the fleet while also allowing TVA to maintain competitive rates and high reliability and work toward an increasingly clean power system. As TVA continues to evaluate the impact of retiring its coal-fired fleet by 2035 and works to accelerate the growth of renewables, it also continues to evaluate adding flexible lower carbon-emitting gas plants as a strategy to maintain reliability. TVA is also evaluating other capacity expansion projects, and in the third quarter of 2024, TVA issued a request for proposal ("RFP") for capacity for terms through December 2029. TVA is currently evaluating proposals related to the RFP. In addition, TVA is committed to investing in the future of nuclear with the evaluation of emerging advanced nuclear technologies, such as small modular reactors ("SMRs"), and is increasing its renewable energy portfolio by securing PPAs and developing projects such as TVA's Self-Directed Solar. It is also investing in research and development for decarbonization technologies including battery storage, carbon capture, carbon sequestration and utilization, new hydroelectric pumped-storage, energy efficiency, demand response, electrification, commercial resiliency, and hydrogen.

TVA is working with stakeholders and the public on the 2025 Integrated Resource Plan ("IRP"), a comprehensive plan that will help shape TVA's energy system through 2050. TVA is also preparing an EIS to evaluate the impacts associated with the IRP in alignment with the National Environmental Policy Act ("NEPA"). The draft IRP and EIS were published on September 23, 2024. TVA will be holding in-person meetings across the region and public webinars to gather feedback during the public comment period, which runs through December 11, 2024. TVA will review and evaluate public input and conduct further analysis to appropriately incorporate feedback provided during the public comment period. Public comments on the draft IRP and EIS will be addressed in the final EIS. The final IRP, which is expected to be published in 2025, will include power supply mix ranges, recommendations for strategic portfolio direction through 2035, and information on factors that will influence portfolio direction from 2035 to 2050. The final IRP is expected to be presented to the TVA Board in 2025 for its consideration of the IRP recommendations.

TVA continues to evaluate and pursue funding opportunities under the Inflation Reduction Act and the BIL to help offset the cost of qualifying projects. In many cases, TVA is directly or indirectly eligible to seek BIL funded opportunities through agency-sponsored and implemented funding opportunities. The Inflation Reduction Act makes certain tax-exempt entities, including TVA, eligible for a direct-pay option for certain tax credits for clean energy generation projects. Projects eligible for funding under the Inflation Reduction Act or the BIL tend to be capital intensive. In addition, the funding legislation requires TVA to expend large sums of its own funds before becoming eligible to receive funding. For example, grant programs typically require at least a 50 percent cost share, and the Inflation Reduction Act credits may cover only about 30 percent to 40 percent of qualified basis of projects, generally received as a tax refund the year following when the project is placed in service. In addition, obtaining this funding often requires TVA to meet certain additional requirements, to submit information returns to the IRS, and to retain adequate books and records to support its filings. For TVA to receive direct pay under the Inflation Reduction Act for projects beginning construction on or after January 1, 2026, TVA will be required to meet domestic content requirements, unless a cost or availability exception applies. While meeting these requirements would automatically qualify the project for a 10 percent addition to the base credit, the cost of complying with these requirements may exceed this additional bonus.

TVA has established a Federal Funding Project Management Office (“FFPMO”) that governs and supports TVA's federal funding strategy to help position TVA and Tennessee Valley partners to leverage funding from the Inflation Reduction Act and the BIL. The FFPMO is responsible for overseeing opportunities, assessing TVA's BIL and Inflation Reduction Act eligibility,

prioritizing and coordinating proposal development, and seeking to capture funding opportunities for TVA. The FFPMO also acts as a conduit for LPCs and business partners to potentially access the Inflation Reduction Act and BIL funds. TVA is currently exploring funding opportunities of various types, including opportunities involving pumped-storage, solar, carbon capture, hydrogen, energy efficiency, and transmission, among others. This exploration does not guarantee that TVA or its partners will receive funds.

In October 2024, a TVA-led coalition that includes 10 LPCs was selected by the Department of Energy to enter negotiations for the Grid Resilience and Innovation Partnership grant. This $250 million grant would provide for more than 80 TVA and LPC transmission projects to increase grid capacity, mitigate extreme weather risks, and expedite development of clean energy projects. TVA is also currently pursuing efforts to claim Inflation Reduction Act credits.

Coal-Fired Fleet. TVA is evaluating the impact of retiring the balance of the coal-fired fleet by 2035. TVA will prepare environmental reviews pursuant to NEPA prior to making a decision on retiring or building any plant. TVA plans to retire the two coal-fired units at Cumberland, which at September 30, 2024, accounted for 2,470 MW of TVA's summer net capability. TVA plans to replace generation for one unit with a 1,450 MW combined cycle plant that is expected to be operational by the end of CY 2026 when the first unit is scheduled to be retired. The second unit is scheduled to be retired by the end of CY 2028, and in May 2023, TVA published the notice of intent to conduct an EIS to study potential environmental impacts associated with the proposed construction and operation of facilities to replace part of that generation. See *Natural Gas-Fired Units* below.

In 2023, TVA made available to the public a draft EIS to assess the impacts associated with the potential retirement of Kingston and the construction and operation of facilities to replace that generation. The final EIS was published in February 2024, and TVA documented its final decision with the Record of Decision on April 2, 2024. TVA plans to retire the nine coal-fired units at Kingston by the end of CY 2027 and replace the retired generation with an energy complex that includes 1,500 MW of natural gas, 100 MW of battery storage, and 3-4 MW of solar. See *Natural Gas-Fired Units* below. TVA expects to issue an RFP in the future for the battery storage and solar related to the energy complex.

Natural Gas-Fired Units. As TVA continues to evaluate the impact of retiring its coal-fired fleet by 2035 and works to accelerate the growth of renewables, it also continues to evaluate adding flexible lower carbon-emitting gas plants as a strategy to maintain reliability. During 2019, the TVA Board approved an expansion of peaking gas replacement capacity at the Paradise facility. Pre-commercial plant operations began on Paradise CTs 5-7 in the first quarter of 2024, and the units became operational on December 29, 2023, with a total summer net capability of 681 MW. As of September 30, 2024, TVA had spent $394 million on this expansion.

A 500 MW aeroderivative CT project at TVA's Johnsonville site has been approved for $619 million, contingent on the successful completion of environmental reviews under NEPA and other applicable laws. TVA completed the NEPA review and received the air permits for the Johnsonville facility, and as of September 30, 2024, TVA had spent $568 million on this project. TVA expects to spend an additional $51 million on this project and anticipates the project will enter commercial operations in the third quarter of 2025. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Case Involving Johnsonville Aeroderivative Combustion Turbine Project* for a discussion of a lawsuit involving this project. See Note 24 — *Subsequent Events* for financing related to this project.

As discussed in *Coal-Fired Fleet* above, TVA is replacing generation for one unit at Cumberland with a 1,450 MW combined cycle plant that is expected to be operational by the end of CY 2026. As of September 30, 2024, TVA had spent $945 million on this project, and expects to spend an additional $1.2 billion through CY 2026. In addition, as of September 30, 2024, TVA had spent $48 million on long lead time equipment in connection with the potential project to replace generation for the second unit at Cumberland. However, this equipment could be used at other TVA sites if the final project is not approved. TVA could spend up to an additional $1.4 billion on this potential project.

To operate the Cumberland Combined Cycle Plant, TVA has contracted for the transportation of gas from a gas pipeline that will need to be constructed. Numerous permits from various state and federal agencies are required for construction of the pipeline. Two cases are currently pending before the United States Court of Appeals for the Sixth Circuit ("Sixth Circuit"), one challenging the Tennessee Department of Environment and Conservation's order issuing a water quality certification under § 401 of the Clean Water Act ("CWA") for construction of the pipeline and one challenging the Army Corps of Engineers' issuance of a permit for construction pursuant to § 404 of the CWA. On October 11, 2024, the Sixth Circuit issued an order staying the permit in each respective case until the court can review the merits of these cases. The court is scheduled to review the merits on December 10, 2024. A case is also pending before the United States Court of Appeals for the District of Columbia Circuit challenging FERC's issuance of a certificate for the pipeline. While TVA is not a party in these cases, they could result in delays to commercial operation of the Cumberland facility or may lead to additional costs if the gas pipeline must be constructed in an alternate location than is currently planned. TVA is currently unable to predict the outcome of these cases. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Case Involving Cumberland Combined Cycle Plant* for a discussion of another lawsuit involving this project.

As discussed in *Coal-Fired Fleet* above, TVA is constructing a 1,500 MW combined cycle plant that is expected to be operational by the end of CY 2027. As of September 30, 2024, TVA had spent $662 million on this project and expects to spend

an additional $2.1 billion through CY 2027. To operate the Kingston combined cycle plant, TVA will contract for the transportation of gas from a gas pipeline that will need to be constructed.

TVA is continuing to explore a 500 MW New Caledonia simple cycle CT project on TVA land contingent on the successful completion of environmental reviews under NEPA and other applicable laws. The draft EIS for New Caledonia was made available for public comment in July 2024, and the final EIS is expected to be published in 2025. As of September 30, 2024, TVA had spent $121 million on the New Caledonia project and could spend up to an additional $427 million. TVA is also exploring a 200 MW aeroderivative CT project at TVA's Allen site. As of September 30, 2024, TVA had spent $190 million on the project at Allen and could spend up to an additional $163 million. Finally, TVA is exploring a potential project at Lagoon Creek.

Decarbonization. TVA's decarbonization initiative is aimed at understanding and applying clean resources to support the reduction of carbon emissions from its power supply. Related to its carbon reduction efforts, TVA has established six guiding principles which are as follows:

- Prioritize the needs of Tennessee Valley stakeholders as TVA works to achieve its goals by maintaining low rates and high reliability, and attracting new jobs in the Tennessee Valley.
- Use best-available science and support research and policies that further carbon-free dispatchable technologies.
- Partner with LPCs and other customers and communities to support economy-wide decarbonization efforts and the strategic electrification of other sectors, such as transportation.
- Maintain nuclear generation, hydro generation, and a strong transmission grid as key enabling assets.
- Be transparent with stakeholders in measuring and sharing TVA's progress, and listen and work effectively with all its stakeholders to understand their priorities and needs.
- Adapt to new technologies and changing policies, and be willing and open to changing TVA's plans and projects to achieve deep carbon reduction.

TVA has partnered with the University of Tennessee Baker School for Public Policy and Public Affairs and with diverse stakeholders from across the Tennessee Valley to conduct a Valley Pathways Study, which is focused on building a competitive and clean economy for the Tennessee Valley. This study examines potential scenarios for all economic sectors across the Tennessee Valley that will support sustainable growth and a viable and preferred decarbonization pathway. The preliminary findings from the Valley Pathways Study were released in February 2024.

As part of the decarbonization efforts, in 2022, the TVA Board approved a programmatic approach to exploring advanced nuclear technology, which is one of several technologies TVA is exploring. Other decarbonization technologies TVA is exploring in addition to advanced nuclear include battery storage, carbon capture, carbon sequestration and utilization, new hydroelectric pumped-storage, energy efficiency, demand response, electrification, commercial resiliency, and hydrogen. TVA also is increasing its renewable energy portfolio to work towards carbon emission reductions and meet customer preferences by investing in existing assets, encouraging renewable power through various current programs and offerings, and securing renewable PPAs through RFPs, among others. See below, Part I, Item 1, Business — *Power Supply and Load Management Resources — Renewable Energy Resources* and *Community Energy Portfolio*, and Part I, Item 1, Business — *Research and Development* for further discussion of TVA's decarbonization efforts. See also Part I, Item 1, Business — *Environmental Matters — Climate Change* for a discussion of the impact of executive actions and climate-related regulations on TVA.

Renewable Power Purchase Agreements. In recent years, TVA has issued RFPs in order to meet customer preferences and requirements for cleaner energy. TVA will procure the renewable energy and sell the resulting
RECs to specific customers, allowing TVA to increase renewable energy in the Tennessee Valley without additional costs to other TVA customers. These agreements help to align the core values of TVA and the public power model with the desire of TVA's customers for renewable energy. TVA issued a carbon-free RFP in 2022, and during 2024, TVA signed six power purchase agreements totaling 991 MW of solar generation and 220 MW of battery storage capacity from the carbon-free RFP that are expected to come online by the end of CY 2028.

TVA's existing solar PPA portfolio is not immune from the challenges affecting the U.S. solar industry. Similar to the experience of the rest of the industry, the majority of TVA's contracted PPAs from previous RFPs that are not yet online have been impacted by project delays and price increases.

Self-Directed Solar. During 2019, the TVA Board approved the opportunity for TVA to explore being directly involved in the development of a utility-scale solar project, contingent on the successful completion of environmental reviews under NEPA and other applicable laws. In 2021, TVA purchased land for this development, and in 2022, environmental reviews were completed. The challenges affecting TVA's RFPs are also being seen in TVA's Self-Directed Solar project. The project has experienced delays and cost increases due to escalations from supply chain limitations. As of September 30, 2024, TVA had spent $53 million on the 200 MW project. TVA has elected to pursue a competitive selection process with third parties for the

development of the photovoltaic solar facility to be located on the site. TVA plans to enter into a long-term PPA to purchase the energy generated by the facility. An RFP has been issued to this effect, and selection of the awardee is anticipated in early CY 2025.

In November 2022, the TVA Board approved the opportunity for TVA to explore the development of an additional utility-scale solar project, contingent on successfully completing environmental reviews under the NEPA and other applicable laws and obtaining the necessary state permits. The project would utilize TVA land, deploying a solar cap system on the closed CCR facility at the TVA Shawnee Fossil Plant in Paducah, Kentucky. As of September 30, 2024, TVA had spent $56 million on the 99 MW project and expects to spend an additional $206 million.

Small Modular Reactors. In December 2019, TVA became the first utility in the nation to successfully obtain approval for an early site permit from the Nuclear Regulatory Commission ("NRC") to potentially construct and operate SMRs at TVA's Clinch River Nuclear Site. The permit is valid through 2039 and therefore provides TVA a great deal of flexibility to make new nuclear decisions based on energy needs and economic factors. In 2021, TVA initiated a Programmatic EIS ("PEIS") that evaluated a variety of alternatives for a proposed advanced nuclear technology park at the Clinch River Nuclear Site and will provide additional flexibility for future decision making. The Record of Decision was signed in 2022.

The TVA Board has approved up to $350 million to explore advanced reactor technology options under the New Nuclear Program. Of this amount, TVA had spent $196 million as of September 30, 2024. The New Nuclear Program provides a systematic roadmap for TVA's exploration of advanced nuclear technology. Collaboration with other interested parties will be an important aspect of this program, and TVA has entered into several agreements with technology progressive organizations that allow for mutual collaboration to explore advanced reactor designs as a next-generation nuclear technology. In December 2022, TVA entered into a multi-party collaborative arrangement to advance the global deployment of the GE Hitachi Nuclear Energy ("GEH") BWRX-300 SMR. GEH is responsible for standard design development. See Note 21 — *Collaborative Arrangement* for additional information. One of the first tasks the New Nuclear Program is pursuing is a project to develop an NRC construction permit application at the Clinch River Nuclear Site. In addition, while evaluating alternatives for potential advanced nuclear at the Clinch River Nuclear Site, TVA is exploring the feasibility of applying a similar approach that could deploy additional SMRs at Clinch River and other TVA-owned properties.

The decision to potentially build SMRs continues to be part of the ongoing discussion as part of the asset strategy for TVA's future generation portfolio, and any future decision to construct any reactor, advanced or otherwise, would require approval by the TVA Board and the NRC. As of September 30, 2024, TVA had spent $287 million to date on work regarding SMRs, including work to complete the early site permit application for the Clinch River Nuclear Site and work associated with the New Nuclear Program above. Of these amounts, the U.S. Department of Energy ("DOE") had reimbursed TVA $29 million. Additional expenditures will be determined based on future project development.

Nuclear Fleet License Extensions. Subject to the completion of all appropriate environmental reviews, TVA is seeking to renew all nuclear generation units' licenses for an additional 20 years. The first license renewal application was submitted to the NRC in January 2024 for the three units at Browns Ferry following the completion of a Supplemental EIS prepared by TVA to assess the environmental impacts associated with renewing the Browns Ferry Nuclear Plant licenses. As of September 30, 2024, TVA had spent $32 million to support the subsequent license renewal ("SLR") of the three units at Browns Ferry and expects to spend up to an additional $10 million to complete the Browns Ferry SLR.

Fiber Optic Network. In 2017, the TVA Board authorized up to $300 million to be spent over the next 10 years, subject to annual budget availability and necessary environmental reviews, to build an enhanced fiber optic network that will better connect TVA's operational assets. Fiber is a vital part of TVA's modern communication infrastructure. The new fiber optic lines will improve the reliability and resiliency of the generation and transmission system while enabling the system to better accommodate distributed energy resources ("DER") as they enter the market. As of September 30, 2024, TVA had spent $266 million on installation of the fiber optic lines and expects to spend an additional $34 million through 2027.

System Operations Center. A new system operations center was approved by the TVA Board. The new secured facility is being built to accommodate a new energy management system and adapt to new regulatory requirements, and will improve reliability, have improved physical security from the previous center, and be flexible to help accommodate operational growth requirements, including future renewables. Construction of the facility is expected to be complete in CY 2024, and the facility is expected to be fully operational in CY 2026. As of September 30, 2024, TVA had spent $307 million on the project and expects to spend an additional $25 million.

Energy Management System. A new energy management system was approved by the TVA Board. As the current energy management system is nearing the end of its life cycle, this project will replace the existing analog system with a digital system. The new digital system will have higher capacity and speed for communications with the TVA grid and for inputs from monitoring equipment, will network the new control center with existing locations, and will enable better remote visibility and control to help mitigate reliability implications of climate change. The system is expected to be complete in CY 2027. As of September 30, 2024, TVA had spent $76 million on the project and expects to spend an additional $32 million.

Automated Energy Exchange Platform. In October 2021, an automated energy exchange, the Southeast Energy Exchange Market ("SEEM"), took effect. The exchange was created to facilitate more short-term power exchanges and will be an enhancement to the existing market. TVA completed the appropriate environmental reviews, and during the third quarter of 2022, the TVA Board approved the creation of a zero-cost, non-firm transmission service to allow TVA to participate in SEEM. In November 2022, the SEEM market began transacting.

In July 2023, the United States Court of Appeals for the District of Columbia Circuit ("D.C. Circuit") remanded the Federal Energy Regulatory Commission's ("FERC") approval of SEEM, sending the matter back to FERC for additional proceedings. On December 17, 2023, the petitioners filed another appeal on the theory that FERC's failure to act promptly after the D.C. Circuit's remand created a new appealable event. On June 14, 2024, in response to the D.C. Circuit's remand directives, FERC issued an order directing the parties to submit briefs to supplement the record on the issues of whether SEEM is a loose power pool and whether SEEM's geographic requirement violates the open access principles of FERC Order No. 888. The SEEM market is continuing to transact pending the disposition of the legal challenges.

Electric Vehicles

TVA is partnering with LPCs and others to support the electrification of transportation in the Tennessee Valley in a multi-year electric vehicle ("EV") initiative. The initiative focuses on reducing or eliminating EV market barriers by setting EV policies, improving charging infrastructure availability, expanding EV availability and offerings, and spreading EV consumer awareness. In 2021, the TVA Board approved new policies and an optional wholesale EV rate aimed at encouraging the development of charging infrastructure in the Tennessee Valley. The updated policies enable LPC investment in public charging infrastructure and allow for the conditional resale of electricity, for transportation purposes only, by any charging developer on a $/kWh basis. The optional wholesale rate was developed with high power EV charging in mind and provides a stable option for those developing charging infrastructure.

TVA is also working with LPCs, state agencies, and third-party charging developers to create the Fast Charge Network. This will be a foundational network of public fast charging stations at least every 50 miles along interstates and major highways across its seven-state service area. In 2021, TVA began a partnership with the State of Tennessee for the development and funding of Fast Charge Tennessee, the portion of the Fast Charge Network that covers Tennessee, and in 2022 TVA launched the Fast Charge Network. As of September 30, 2024, 39 sites were complete and operational with 39 additional sites under contract for development. TVA had spent $7 million on fast charging network charging stations as of September 30, 2024. TVA also plans to electrify 100 percent of its light-duty and 50 percent of its medium-duty vehicles in the TVA fleet. The adoption of EVs in the Tennessee Valley continues to grow, and TVA is working to ensure that the benefits of this rapid growth are secured, while also helping LPCs proactively avoid issues in their distribution systems. Also in 2021, TVA and five other major utilities formed the Electric Highway Coalition to develop a network of fast charging stations along all major highway routes within their service area. Since formation, the Electric Highway Coalition has gained significant interest from additional utilities and other EV collaboratives. In 2022, the Electric Highway Coalition merged with the Midwest Electric Vehicle Charging Infrastructure Collaboration to create the National Electric Highway Coalition with members committed to coordinate the development of EV charging infrastructure across the central U.S.

Sustainability and Social Responsibility

Sustainability has been and continues to be a focus in support of TVA's mission to deliver affordable and reliable energy, steward the environment, and create sustainable economic growth. TVA has a Chief Sustainability Officer (“CSO”) who oversees an enterprise-wide Sustainability Steering Council and a Sustainability Working Group, which together provide guidance and support for the development of TVA's Sustainability Program. The CSO is also a member of TVA's Risk Management Steering Committee.

TVA's sustainability work is categorized into five areas:

- Economic Impact — Affordable, reliable power supports residents and attracts businesses
- Environment — Protecting the region's air, land, water, and historic resources
- Social — Investing in communities and employees to uplift all
- Governance — Governance enables TVA to build a clean energy future
- Foundational — Values most fundamental to carrying out TVA's mission

Economic Impact	Environment	Social	Governance	Foundational
Clean energy	Air, water, and waste management	Community vitality and engagement	Corporate impact	Energy affordability and reliability
Flood and drought management	Biodiversity and stewardship	Customer engagement and partnerships	Cyber and physical security	Ethics and compliance
Innovation	Climate adaptation and resilience	Diversity, equity, and inclusion	Financial health	Health and safety
Supply chain	Cultural resource management	Environmental justice		
Valley economy		Workforce preparedness		

TVA issued its 2023 Sustainability Report on May 6, 2024. This comprehensive Sustainability Report aligns with global reporting standards and will serve as a baseline for annual corporate sustainability reporting. TVA also publishes two other sustainability-related documents: a Federal Sustainability Report and Implementation Plan, which addresses TVA's responsibilities related to federal sustainability performance, and an Environmental, Social, and Governance Sustainability Report, which uses a utility-focused and investor-driven reporting template developed by the Edison Electric Institute. TVA also issues other reports related to sustainability and social responsibility, including a Diversity, Equity, Inclusion and Accessibility Report, which highlights the actions TVA has taken in the Diversity, Equity, Inclusion, and Accessibility area, the results achieved, and the plans to continue to focus and improve, among other reports.

Extreme Flooding Preparedness

Updates to the TVA analytical hydrology model completed in 2009 indicated that under "probable maximum flood" conditions, some of TVA's dams might not have been capable of regulating the higher flood waters. A "probable maximum flood" is an extremely unlikely event; however, TVA has a responsibility to provide protection for its nuclear plants against such events. As a result, TVA installed a series of modifications at four dams.

Since 2009, TVA has performed further hydrology modeling of portions of the TVA watershed using updated modeling tools. Hydrology models were submitted for Sequoyah Nuclear Plant ("Sequoyah") Units 1 and 2 in 2012. However, concerns regarding TVA dam stability and revised hydrology analyses led to the submittal of a new hydrologic analysis for Sequoyah Units 1 and 2 in 2020. To resolve additional dam stability issues identified later in 2020, TVA submitted a revision to the Sequoyah model in April 2023. The new hydrologic analysis for Sequoyah Units 1 and 2 was approved by the NRC in March 2024. TVA submitted models for Watts Bar Nuclear Plant ("Watts Bar") Units 1 and 2 in December 2023 to incorporate a methodology approved by the NRC subsequent to its review of a previous hydrology submittal for Watts Bar. TVA will subsequently address conditions at Browns Ferry as needed. As of September 30, 2024, TVA had spent $158 million on the modifications and improvements related to extreme flooding preparedness. TVA has concluded that the revised hydraulic modeling and associated submittal of license amendment requests to update the Sequoyah and Watts Bar licensing bases have demonstrated appropriate design margins such that additional flood mitigating systems are no longer needed at these two sites. Therefore, TVA submitted a letter to the NRC in September 2024 to decommit from the commitment to implement an improved flood model mitigation system at these two sites.

Sequoyah Nuclear Plant Unit 2

Sequoyah Unit 2 tripped on July 30, 2024, due to failure of the main generator. As a result, the project to restack and rewind the main generator was pulled forward in the Nuclear Life Extension ("NLE") plan. The unit will remain offline until project completion, which is expected in spring 2025. As of September 30, 2024, TVA had spent $25 million related to this project and expects to spend an additional $57 million.

Hurricane Helene

In late September 2024, Hurricane Helene caused significant damage in communities in East Tennessee and Western North Carolina. Flood of record was approached or exceeded in many areas. TVA completed inspections at numerous dams, finding no substantial impacts. Shoreline erosion at Nolichucky Dam did not impact the dam's integrity and has subsequently been repaired. In addition, TVA stored a substantial amount of water in tributary reservoirs that has since been released downstream in a controlled manner to recover flood storage capacity. TVA is working on debris management at Douglas Reservoir to help mitigate potential downstream movement. TVA's efforts may also include aiding other agencies in their recovery efforts, including supporting major disaster declarations with the Federal Emergency Management Agency. TVA is evaluating the financial impact of the storm.

Coal Combustion Residuals

Coal Combustion Residuals Facilities. TVA is pursuing a programmatic approach to address environmental impacts related to the previous storage and disposal of its CCR in accordance with applicable law ("CCR Program"). Under the CCR Program, TVA performed stability remediation of all at-risk facilities, completed the conversion of all operational coal-fired plants to dry CCR storage, and ceased operation of wet CCR storage facilities.

Dry generation and dewatering projects. TVA has accomplished the conversion from wet to dry handling of CCR materials at all operating coal plants with the completion of dry generation and/or dewatering projects at Bull Run, Cumberland, Gallatin Fossil Plant ("Gallatin"), Kingston, and Shawnee Fossil Plant ("Shawnee").

Landfills. TVA has made strategic decisions to build and maintain lined and permitted dry storage facilities on TVA-owned property at some TVA locations, enabling these facilities to generate CCR beyond existing dry storage capacity. Lined and permitted landfills are operational at Bull Run, Gallatin, Kingston, and Shawnee. TVA received a State of Tennessee permit for the construction and operation of a new lined landfill at Gallatin, and construction started in 2022. TVA received a State of Tennessee permit for a new lined landfill at Cumberland in 2023, and TVA is currently evaluating the need for construction. Construction of additional lined and dry permitted storage facilities may occur to support future business requirements.

CCR facilities closures. TVA is working to close CCR facilities in accordance with federal and state requirements. Closure project schedules and costs are driven by the selected closure methodology (such as closure-in-place or closure-by-removal) and regulatory requirements. TVA's predominant closure methodology is currently closure-in-place, with exceptions at certain facilities, although EPA has recently interpreted its CCR Rule in a way that could challenge TVA's predominant closure methodology for many units, thereby potentially creating significant additional costs with implementing closure. TVA issued a PEIS in June 2016 that programmatically evaluated the closure of CCR impoundments at TVA's coal-fired plants. TVA issued its associated Record of Decision in July 2016. The PEIS assessed the potential environmental effects associated with various modes of impoundment closures and through subsequent NEPA documents specifically evaluated and addressed closure methods at 10 impoundments. TVA subsequently decided to close those impoundments. The method of final closure for each of these facilities will depend on various factors, including approval by appropriate state regulators and applicable closure requirements of state and federal regulations. Additional site-specific NEPA studies will be conducted, as warranted, as other facilities are considered for closure. See Note 13 — *Asset Retirement Obligations*.

Groundwater monitoring. Compliance with the Environmental Protection Agency's ("EPA's") CCR rule ("CCR Rule") requires implementation of a groundwater monitoring program and ongoing analysis. In compliance with the CCR Rule, TVA published the results of the 2023 groundwater testing at its CCR facilities during the second quarter of 2024. Similar to prior years, the tests identified certain CCR units with constituents at statistically significant levels above site-specific groundwater protection standards. TVA has completed an assessment of corrective measures ("ACM"), which analyzes the effectiveness of potential corrective actions, and has published ACM reports to its CCR Rule Compliance Data and Information website. Based on the results of the ACM, TVA is required to select a remedy as soon as feasible. TVA has selected remedies for two of its plants: a groundwater pump and treat system at the Allen East Ash Disposal Area and monitored natural attenuation at Shawnee. TVA continues to investigate and evaluate remedies for its other plants and will continue posting semi-annual progress reports on the status of remedy selection until the final remedy is selected. The cost of these final remedies cannot reasonably be predicted until investigations and evaluations are complete and remedial methods are selected.

The final Part A revision to the CCR Rule became effective September 28, 2020. Among other things, the final Part A rule requires unlined CCR surface impoundments to stop receiving CCR and non-CCR waste streams and to initiate closure or retrofit by no later than April 11, 2021. TVA ceased sending CCR and non-CCR waste streams to, and initiated closure of, unlined CCR surface impoundments by the specified deadline.

As of September 30, 2024, TVA had spent approximately $3.2 billion on its CCR Program. Through 2029, TVA expects to spend an additional $2.4 billion on the CCR Program. Estimates for these amounts and costs after 2029 may change depending on the final closure method selected for each facility. While the conversion portion of the CCR Program is completed, TVA will continue to undertake CCR closure and storage projects, including building new landfill cells under existing permits and closing existing cells once they reach capacity.

TVA was involved in two lawsuits concerning the CCR facilities at Gallatin. One of these cases was decided in TVA's favor by the Sixth Circuit, and the other case was resolved by the entry of a consent order and agreement in Davidson County Chancery Court that became effective July 24, 2019. Under the consent order, TVA agreed to close the existing ash facility by removal, either to an on-site landfill or to an offsite facility. TVA may also consider options for beneficial reuse of the CCR. TVA submitted the removal plan for approval to the Tennessee Department of Environment and Conservation ("TDEC") and other applicable parties pursuant to the consent order, which was approved on November 7, 2023. In addition, TVA submitted an Environmental Assessment Report ("EAR") to TDEC, and TDEC approved the EAR on June 6, 2023. TVA submitted the Gallatin Ash Pond Complex Corrective Action/Risk Assessment ("CARA") Plan to TDEC in January 2024. See Note 13 — *Asset Retirement Obligations*.

In October 2019, TDEC released amendments to its regulations which govern solid waste disposal facilities, including TVA's active CCR facilities covered by a solid waste disposal permit and those which closed pursuant to a TDEC approved closure plan. Such facilities are generally subject to a 30-year post-closure care period during which the owner or operator must undertake certain activities, including monitoring and maintaining the facility. The amendments, among other things, add an additional 50-year period after the end of the post-closure care period, require TVA to submit recommendations as to what activities must be performed during this 50-year period to protect human health and the environment, and require TVA to submit revised closure plans every 10 years.

On May 8, 2024, EPA published its Legacy CCR Rule, which expands the scope of the existing regulatory requirements of the 2015 CCR Rule to include two additional classes of units: Legacy SIs and CCRMUs. As a result of the enactment of the final rule, during 2024, TVA recorded additional estimated AROs of $3.1 billion and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated. These amounts are forward-looking and are subject to various uncertainties, and actual amounts may differ materially based upon a number of factors, including, but not limited to, the outcome of legal challenges to the Legacy CCR Rule, ongoing evaluations of the number and scope of newly regulated units, and determinations on final closure requirements and performance standards. See Part I, Item 1, Business — *Environmental Matters — Cleanup of Solid and Hazardous Wastes — Coal Combustion Residuals,* Part I, Item 1A, Risk Factors — *Regulatory, Legislative, and Legal Risks*, and Note 13 — *Asset Retirement Obligations.*

Allen Groundwater Investigation. The CCR Rule required TVA to implement a comprehensive groundwater monitoring program at units subject to the rule. As a result of this groundwater monitoring program, TVA reported to TDEC in 2017 elevated levels of arsenic, lead, and fluoride in groundwater samples collected from two shallow-aquifer groundwater monitoring wells around the Allen East Ash Disposal Area. TVA, under the oversight of TDEC, conducted a remedial investigation into the nature and extent of the contamination.

The remedial investigation confirmed that the high arsenic, fluoride, and lead concentrations are limited to the shallow alluvial aquifer in the north and south areas of the Allen East Ash Disposal Area. These areas are not adversely impacting the Memphis aquifer, which is the source of the public drinking water supply. All samples taken from the Memphis aquifer through TVA production wells were within the EPA drinking water standards. As the result of a pumping test conducted on TVA production wells at the nearby Allen Combined Cycle Plant ("Allen CC") by the United States Geological Survey and the University of Memphis, TVA has committed to not using these production wells until additional data is generated that supports safe use. TVA constructed water tanks on site and is purchasing cooling water from MLGW in lieu of utilizing the production wells. Purchasing cooling water in combination with the use of water tanks, rather than wells, could impose some operational limitations, such as limitations on capacity, on the Allen CC due to lower availability of cooling water.

Pursuant to a remedial action plan that has been approved by TDEC, TVA has installed a groundwater pump and treat system at the Allen East Ash Disposal Area. In addition, TVA is taking steps to close both the East Ash Disposal Area and the nearby West Ash Disposal Area at Allen. On November 29, 2021, after obtaining the necessary approvals from TDEC, TVA began removing CCR materials to an offsite, lined landfill, and removal and closure activities are expected to continue through 2030.

Real Property Portfolio

TVA engages in ongoing Tennessee Valley-wide real property portfolio evaluations of buildings, structures, and land as part of the strategic real estate program, which focuses on reducing cost, right-sizing the portfolio, and aligning real estate holdings with TVA's strategic direction. In addition, TVA continues to operate in a hybrid work environment for those who do not have to be physically present at a TVA facility. TVA is evaluating its use of the Chattanooga Office Complex and issued an RFP in August 2023 to determine availability for a new Chattanooga, Tennessee facility based on TVA's workplace needs. No final decisions have been made, and TVA is considering multiple options.

Supply Chain and Inflation Pressures

TVA continues to experience impacts due to inflation, supply chain material challenges, and labor availability. This has led to project delays, limited availability, and/or price increases for supplies and labor. TVA actively manages supply chain volatility with contracting, inventory strategies, and supplier engagement and support. TVA expects inflationary pressures to persist in 2025. TVA has been able to manage these challenges with limited business disruptions at this time; however, should pressures continue long term, TVA could experience more significant disruptions and pressure to further increase power rates.

Safeguarding Assets

Physical Security — Non-Nuclear Asset Protection. TVA utilizes a variety of security technologies, security awareness activities, and security personnel to prevent sabotage, vandalism, and thefts. Any of these activities could negatively impact the ability of TVA to generate, transmit, and deliver power to its customers. TVA's Police and Emergency Management personnel are active participants with numerous professional and peer physical security organizations in both the electric industry and law

enforcement communities.

TVA works with the North American Electric Reliability Corporation ("NERC"), the SERC Reliability Corporation, the North American Transmission Forum, and other utilities to implement industry approved recommendations and standards.

Nuclear Security. Nuclear security is carried out in accordance with federal regulations as set forth by the NRC. These regulations are designed for the protection of TVA's nuclear power plants, the public, and employees from the threat of radiological sabotage and other nuclear-related terrorist threats. TVA has security forces to guard against such threats.

Cybersecurity. TVA operates in a highly regulated environment with respect to cybersecurity. TVA's cybersecurity program aligns or complies with the Federal Information Security Modernization Act, the NERC Critical Infrastructure Protection requirements, and the NRC requirements for cybersecurity, as well as industry best practices. As part of the U.S. government, TVA coordinates with and works closely with the U.S. Department of Homeland Security's Cybersecurity and Infrastructure Security Agency ("CISA"). CISA serves as the agency assisting other federal entities in defending against threats and securing critical infrastructure. The U.S. Computer Emergency Readiness Team functions as a liaison between the U.S. Department of Homeland Security and the public and private sectors to coordinate responses to security threats.

The risk of cybersecurity events such as malicious code attacks, unauthorized access attempts, and social engineering attempts is intensifying across all industries, including the energy sector. TVA continues to see increases in malicious activity including phishing campaigns, malicious websites, distributed denial of service attacks, and activity related to business partner compromise, among others. These types of malicious activity have also been observed by TVA's external vendors, stakeholders, and partners, which has caused the need for heightened awareness and preparedness.

On May 12, 2021, President Biden signed EO 14028, "Improving the Nation's Cybersecurity." This EO is intended to improve the nation's cybersecurity posture and protect federal government networks by improving information-sharing between the U.S. government and the private sector on cyber issues and strengthening the United States' ability to respond to incidents when they occur. This EO is focused on specific goals and requirements including actions for zero trust architectures; cloud services; FedRAMP programs; supply chain and contracts; secure software development; endpoint detection and response, standardized vulnerability, and incident response operational plans; threat and vulnerability analysis; assessment and threat-hunting; event logging, monitoring, and retention; and information sharing. TVA continues to respond to the EO, associated Office of Management and Budget memorandums, and other emerging requirements in alignment with the order. TVA has submitted all reports as required, established response teams and an oversight structure, and initiated projects as necessary to address the required actions.

See Part I, Item 1C, Cybersecurity for a description of TVA's cybersecurity program and integrated risk management process. See also Part I, Item 1A, Risk Factors — *Cybersecurity and Information Technology Risks — TVA's facilities and information infrastructure may not operate as planned due to cyber threats to TVA's assets and operations*.

Critical Accounting Estimates

TVA's consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP"), which require management to make estimates, judgments, and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. Each of these estimates varies in regard to the level of judgment involved and its potential impact on TVA's financial results. Estimates are deemed critical either when a different estimate could have reasonably been used, or where changes in the estimate are reasonably likely to occur from period to period, and such use or change also would materially impact TVA's financial condition, results of operations, or cash flows. TVA's critical accounting policies are discussed in Note 1 — *Summary of Significant Accounting Policies* of the Notes to Consolidated Financial Statements.

TVA believes that its most critical accounting estimates relate to AROs, fair value measurements, and pension and other post-retirement benefits.

Management has discussed the development, selection, and disclosure of critical accounting estimates with the Audit, Risk, and Cybersecurity Committee of the TVA Board. While TVA's estimates and assumptions are based on its knowledge of current events and actions it may undertake in the future, actual results may ultimately differ from these estimates and assumptions.

Asset Retirement Obligations

TVA recognizes legal obligations associated with the future retirement of certain tangible long-lived assets. These obligations relate to TVA's generating facilities, including coal-fired, nuclear, hydroelectric, and natural gas and/or oil-fired. They also pertain to coal ash impoundments, transmission facilities, and other property-related assets. Activities involved with the retirement of these assets could include decontamination and demolition of structures, removal and disposal of wastes, and site restoration. TVA periodically reviews its estimated ARO liabilities. Revisions to the ARO estimates are made whenever factors indicate that the timing or amounts of estimated cash flows have changed. Any change to an ARO liability is recognized prospectively as an equivalent increase or decrease in the carrying value of the capitalized asset. Any accretion or depreciation expense related to these liabilities and assets is charged to a regulatory asset. See Note 10 — *Regulatory Assets and Liabilities — Nuclear Decommissioning Costs* and *Non-Nuclear Decommissioning Costs* and Note 13 — *Asset Retirement Obligations* for explanations of changes in estimates.

The initial obligation is measured at its estimated fair value using various judgments and assumptions. Fair value is developed using an expected present value technique that is based on assumptions of market participants and that considers estimated retirement costs in current period dollars that are inflated to the anticipated decommissioning date and then discounted back to the date the ARO was incurred. Changes in assumptions and estimates included within the calculations of the value of the AROs could result in different results than those identified and recorded in the financial statements, including amortization of the regulatory assets.

Nuclear Decommissioning. Decommissioning cost studies are updated for each of TVA's nuclear unit's long-lived assets at least every five years. At September 30, 2024, the estimated future nuclear decommissioning cost recognized in the financial statements was $3.8 billion and was included in AROs, and the unamortized regulatory asset related to nuclear decommissioning ARO costs of $362 million was included in Regulatory assets.

The following key assumptions can have a significant effect on estimates related to the nuclear decommissioning costs reported in TVA's nuclear ARO liability:

Timing and Method – In projecting decommissioning costs, two assumptions must be made to estimate the timing of plant decommissioning. First, the date of the plant's retirement must be estimated. At Browns Ferry and Sequoyah, the estimated retirement date is based on the unit with the longest license period remaining. At Watts Bar, the estimated retirement date is based on each unit's license period. Second, an assumption must be made on the timing of the decommissioning. TVA has ascribed probabilities to two different decommissioning methods related to its nuclear decommissioning obligation estimate: the DECON method and the SAFSTOR method. The DECON method requires that radioactive contamination be removed from a site and safely disposed of or decontaminated to a level that permits the site to be released for unrestricted use shortly after it ceases operation. The SAFSTOR method allows nuclear facilities to be placed and maintained in a condition that allows the facilities to be safely stored and subsequently decontaminated to levels that permit release for unrestricted use. TVA bases its nuclear decommissioning estimates on site-specific cost studies, which are updated for each of TVA's nuclear units at least every five years. Changes in probabilities ascribed to the assumptions or the timing of decommissioning can significantly change the present value of TVA's obligations.

Cost Estimates – There is limited experience with actual decommissioning of large nuclear facilities. Changes in technology and experience as well as changes in regulations regarding nuclear decommissioning could cause cost estimates to change significantly. TVA's cost studies assume current technology and regulations.

Cost Escalation Rate – TVA uses expected inflation rates over the remaining timeframe until the costs are expected to be incurred to estimate the amount of future cash flows required to satisfy TVA's decommissioning obligations.

Discount Rate – TVA uses its incremental borrowing rate over a period consistent with the remaining timeframe until the costs are expected to be incurred to calculate the present value of the weighted estimated cash flows required to satisfy TVA's decommissioning obligations.

The actual decommissioning costs may vary from the derived estimates because of changes in current assumptions, such as the assumed dates of decommissioning, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. A 10 percent change in TVA's forecasted costs for nuclear decommissioning activities at September 30, 2024, would have affected the liability by approximately $381 million.

Non-Nuclear Decommissioning. At September 30, 2024, the estimated future non-nuclear decommissioning cost recognized in the financial statements was $7.0 billion and was included in AROs, and the unamortized regulatory asset related to non-nuclear decommissioning ARO costs of $6.2 billion was included in Regulatory assets.

This decommissioning cost estimate involves estimating the amount and timing of future expenditures and making judgments concerning whether or not such costs are considered a legal obligation. Estimating the amount and timing of future expenditures includes, among other things, making projections of the timing and duration of the asset retirement process and predicting how costs will escalate with inflation. These costs are predominantly CCR closure, CCR post-closure care and

monitoring, and plant powerhouse asbestos removal. CCR closure estimates are primarily closure-in-place except for specific ponds located at Allen and Gallatin, which are closure-by-removal. CCR post-closure care and monitoring primarily includes costs for grounds maintenance, cover system and mechanical maintenance, inspections, and groundwater monitoring costs. Asbestos removal is based on cost per square foot to remove and dispose of asbestos-containing materials. TVA revises estimates of CCR closure on a project by project basis when updated cost information becomes available that causes management's expectation of cost to change materially.

The following key assumptions can have a significant effect on estimates related to the non-nuclear decommissioning costs:

Timing and Method – In projecting non-nuclear decommissioning costs, the date of the asset's retirement must be estimated. In instances where the retirement of a specific asset will precede the retirement of the generating plant, the anticipated retirement date of the specific asset is used. Additionally, TVA expects to incur certain ongoing costs subsequent to the initial asset retirement. TVA develops its cost estimates based on likelihood of decommissioning method where options exist in fulfilling legal obligations (e.g., closure-in-place or closure-by-removal for coal ash impoundments). The decommissioning method is determined based on several factors including available technologies, environmental studies, cost factors, resource availability, and timing requirements. As these factors are considered and decommissioning methods are determined, the detailed project schedules and estimates are adjusted. Non-nuclear decommissioning cost estimates, including CCR post-closure care and monitoring costs and asbestos removal, are studied for revision at least every five years, but revised more frequently if updated cost information becomes available that causes management's expectation of cost to change materially. See Note 10 — *Regulatory Assets and Liabilities — Non-Nuclear Decommissioning Costs*.

Technology and Regulation – Changes in technology and experience as well as changes in regulations regarding non-nuclear decommissioning could cause cost estimates to change significantly. TVA's cost estimates generally assume current technology and regulations. In April 2015, EPA published its final rule governing CCR, which regulates landfill and impoundment location, design, and operations; dictates certain pond-closure conditions; and establishes groundwater monitoring and closure and post-closure standards. On May 8, 2024, EPA published its Legacy CCR Rule, which expands the scope of the existing regulatory requirements of the 2015 CCR Rule to include two additional classes of units: Legacy SIs and CCRMUs. As a result of the enactment of the final rule, during 2024, TVA recorded additional estimated AROs of $3.1 billion and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated. TVA continues to evaluate the impact of the rule on its operations, including cost and timing estimates of related projects. As a result, further adjustments to its ARO liabilities may be required as estimates are refined.

Cost Escalation Rate – TVA uses expected inflation rates over the remaining timeframe until the costs are expected to be incurred to estimate the amount of future cash flows required to satisfy TVA's decommissioning obligations.

Discount Rate – TVA uses its incremental borrowing rate over a period consistent with the remaining timeframe until the costs are expected to be incurred to calculate the present value of the weighted estimated cash flows required to satisfy TVA's decommissioning obligations.

The actual decommissioning costs may vary from the derived estimates because of changes in current assumptions, such as the assumed dates of decommissioning, changes in the discount or escalation rates, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. A 10 percent change in TVA's forecasted costs for non-nuclear decommissioning activities at September 30, 2024, would have affected the liability by approximately $699 million.

Fair Value Measurements

Investments. Investment funds are comprised of equity securities and debt securities and are classified as trading. These securities are held in the Nuclear Decommissioning Trust ("NDT"), Asset Retirement Trust ("ART"), Supplemental Executive Retirement Plan ("SERP"), Deferred Compensation Plan ("DCP"), Restoration Plan ("RP"), and qualified benefit pension plan.

Investment Funds. The assets in the NDT, ART, SERP, DCP, and RP are generally measured at fair value based on quoted market prices or other observable market data such as interest rate indices. These investments are primarily U.S. and international equities, real estate investment trusts, fixed income investments, high-yield fixed income investments, U.S. Treasury Inflation-Protected Securities ("TIPS"), treasuries, currencies, derivative instruments, and other investments. TVA has classified all of these trading securities as either Level 1, Level 2, or Investments measured at net asset value ("NAV"). Private equity limited partnerships, private real asset investments, and private credit investments may include holdings of investments in private real estate, venture capital, buyout, mezzanine or subordinated debt, restructuring or distressed debt, and special situations through funds managed by third-party investment managers. These investments are valued at NAV as a practical expedient for fair value. There are no readily available quoted exchange prices for these investments. The fair value of these investments is based on information provided by the investment managers. These investments are valued on a quarterly basis. See Note 16 — *Fair Value Measurements — Valuation Techniques* for a discussion of valuation levels of the investments.

Plan Investments. TVA's qualified benefit pension plan is funded with qualified plan assets. These investments are primarily global public equities, private equities, fixed income securities, public real assets, and private real assets. See Note 20 — *Benefit Plans — Fair Value Measurements* for disclosure of fair value measurements for investments held by the TVA Retirement System ("TVARS") that support TVA's qualified defined benefit pension plan.

Pricing. Prices provided by third parties for the assets in investment funds and plan investments are subjected to automated tolerance checks by the investment portfolio trustee to identify and avoid, where possible, the use of inaccurate prices. Any such prices identified as outside the tolerance thresholds are reported to the vendor that provided the price. If the prices are validated, the primary pricing source is used. If not, a secondary source price that has passed the applicable tolerance check is used (or queried with the vendor if it is out of tolerance), resulting in either the use of a secondary price, where validated, or the last reported default price, as in the case of a missing price. For monthly valued accounts, where secondary price sources are available, an automated inter-source tolerance report identifies prices with an inter-vendor pricing variance of over two percent at an asset class level. For daily valued accounts, each security is assigned, where possible, an indicative major market index, against which daily price movements are automatically compared. Tolerance thresholds are established by asset class. Prices found to be outside of the applicable tolerance threshold are reported and queried with vendors as described above.

For investment funds, TVA additionally performs its own analytical testing on the change in fair value measurements each period to ensure the valuations are reasonable based on changes in general market assumptions. TVA also performs pricing tests on various portfolios comprised of securities classified in Levels 1 and 2 on a quarterly basis to confirm accuracy of the values received from the investment portfolio trustee. For plan investments, TVARS reviews the trustee's Service Organization Controls report and the pricing policies of the trustee's largest pricing vendor.

Derivatives. TVA has historically entered into various derivative transactions, including commodity option contracts, forward contracts, swaps, swaptions, futures, and options on futures, to manage various market risks. Other than certain derivative instruments included in investment funds, it is TVA's policy to enter into these derivative transactions solely for hedging purposes and not for speculative purposes. See Note 10 — *Regulatory Assets and Liabilities* and Note 15 — *Risk Management Activities and Derivative Transactions* for explanations of changes in estimates.

Currency and Interest Rate Derivatives. TVA has two currency swaps and two "fixed for floating" interest rate swaps. The currency swaps protect against changes in cash flows caused by volatility in exchange rates related to outstanding Bonds denominated in British pounds sterling. TVA uses interest rate swaps to fix variable short-term debt to a fixed rate. The currency and interest rate swaps are classified as Level 2 valuations as the rate curves and interest rates affecting the fair value of the contracts are based on observable data.

Commodity Derivatives. TVA enters into commodity contracts for natural gas that require physical delivery of the contracted quantity of the commodity. The natural gas derivative contracts are classified as Level 2 valuations based on market approaches which utilize short-term and mid-term market-quoted prices from an external industry brokerage firm.

TVA maintains policies and procedures to value commodity contracts using what is believed to be the best and most relevant data available. In addition, TVA's risk management group reviews valuations and pricing data.

Commodity Derivatives under the Financial Hedging Program ("FHP"). In 2022, the FHP was reinstated and hedging activity began. The TVA Board also approved the elimination of the Value at Risk aggregate transaction limit for the FHP and authorized the use of tolerances and measures that will be reviewed annually by the TVA Board. The commodity derivatives under the FHP are classified as Level 2 valuations based on market approaches which utilize short-term and mid-term market-quoted prices from an external industry brokerage firm.

Fair Value Considerations. In determining the fair value of its financial instruments, TVA considers the source of observable market data inputs, liquidity of the instrument, credit risk, and risk of nonperformance of itself or the counterparty to the contract. The conditions and criteria used to assess these factors are described below.

Sources of Market Assumptions. TVA derives its financial instrument market assumptions from market data sources (e.g., Chicago Mercantile Exchange and Moody's Investors Service, Inc. ("Moody's")). In some cases, where market data is not readily available, TVA uses comparable market sources and empirical evidence to derive market assumptions and determine a financial instrument's fair value.

Market Liquidity. Market liquidity is assessed by TVA based on criteria as to whether the financial instrument trades in an active or inactive market. A financial instrument is considered to be in an active market if the prices are fully transparent to the market participants, the prices can be measured by market bid and ask quotes, the market has a relatively high trading volume, and the market has a significant number of market participants that will allow the market to rapidly absorb the quantity of the assets traded without significantly affecting the market price. Other factors TVA considers when determining whether a market is active or inactive include the presence of government or regulatory control over pricing that could make it difficult to establish a market-based price upon entering into a transaction.

Nonperformance Risk. In determining the potential impact of nonperformance risk, which includes credit risk, TVA considers changes in current market conditions, readily available information on nonperformance risk, letters of credit, collateral, other arrangements available, and the nature of master netting arrangements. TVA is a counterparty to derivative instruments that subject TVA to nonperformance risk. Nonperformance risk on the majority of investments and certain exchange-traded instruments held by TVA is incorporated into the exit price that is derived from quoted market data that is used to value the investment.

Nonperformance risk for most of TVA's derivative instruments is an adjustment to the initial asset/liability fair value. TVA adjusts for nonperformance risk, both of TVA (for liabilities) and the counterparty (for assets), by applying a credit valuation
adjustment ("CVA"). TVA determines an appropriate CVA for each applicable financial instrument based on the term of the instrument and TVA's or the counterparty's credit rating as obtained from Moody's. For companies that do not have an observable credit rating, TVA uses internal analysis to assign a comparable rating to the company. TVA discounts each financial instrument using the historical default rate (as reported by Moody's for CY 1983 to CY 2023) for companies with a similar credit rating over a time period consistent with the remaining term of the contract.

All derivative instruments are analyzed individually and are subject to unique risk exposures. The application of CVAs resulted in a less than $1 million decrease in the fair value of assets and a $1 million decrease in the fair value of liabilities at September 30, 2024.

Collateral. TVA's interest rate swaps, currency swaps, and commodity derivatives under the FHP contain contract provisions that require a party to post collateral (in a form such as cash or a letter of credit) when the party's liability balance under the agreement exceeds a certain threshold. See Note 15 — *Risk Management Activities and Derivative Transactions — Other Derivative Instruments — Collateral* for a discussion of collateral related to TVA's derivative liabilities.

Pension and Other Post-Retirement Benefits

TVA sponsors a defined benefit pension plan that is qualified under section 401(a) of the Internal Revenue Code and covers substantially all of its full-time annual employees hired prior to July 1, 2014. TVARS, a separate legal entity governed by its own board of directors (the "TVARS Board"), administers the qualified defined benefit pension plan. TVA also provides a SERP to certain executives in critical positions, which provides supplemental pension benefits tied to compensation levels that exceed limits imposed by IRS rules applicable to the qualified defined benefit pension plan. Additionally, TVA provides post-retirement health care benefits for most of its full-time employees who reach retirement age while still working for TVA.

TVA's pension and other post-retirement benefits contain uncertainties because they require management to make certain assumptions related to TVA's cost to provide these benefits. Numerous factors are considered including the provisions of the plans, changing employee demographics, various actuarial calculations, assumptions, and accounting mechanisms.

Certain key actuarial assumptions critical to the pension and postretirement accounting estimates include expected long-term rate of return on plan assets, discount rates, projected health care cost trend rates, cost of living adjustments ("COLA"), and mortality rates. Every five years, a formal actuarial experience study that compares assumptions to the actual experience is conducted. Additional ad-hoc experience studies are performed as needed to review recent experience and validate recommended changes to the actuarial assumptions used based upon TVA's last experience study in 2023. See Note 20 — *Benefit Plans* for explanations of changes in assumptions and estimates.

Expected Return on Plan Assets. The qualified defined benefit pension plan is the only plan that is funded with qualified plan assets. In determining the expected long-term rate of return on pension plan assets, TVA uses a process that incorporates actual historical asset class returns and an assessment of expected future performance and takes into consideration external actuarial advice, the current outlook on capital markets, the asset allocation policy, and the anticipated impact of active management. In September 2023, the TVARS Board approved a new asset allocation policy, but had no changes in 2024 or 2023 to the 6.50 percent expected return on assets assumption adopted in 2022.

TVA recognizes the impact of asset performance on pension expense over a three-year phase-in period through a market-related value of assets ("MRVA") calculation. The MRVA recognizes investment gains and losses over a three-year period and is used in calculating the expected return on assets and the recognized net actuarial loss components of pension net periodic benefit cost.

A higher expected rate of return assumption decreases the net periodic pension benefit costs, whereas a lower expected rate of return assumption increases the net periodic pension benefit cost. The plan's actual rate of return for 2024 was 12.72 percent compared to the assumption of 6.50 percent. The difference between the expected and actual return on plan assets resulted in an actuarial gain of $510 million that is recognized as a decrease in the related regulatory asset and a decrease in the pension benefit obligation at September 30, 2024.

Discount Rate. TVA's discount rates are derived by identifying a theoretical settlement portfolio of high quality corporate bonds of Aa quality or higher sufficient to provide for the projected benefit payments. The model matches the present value of the projected benefit payments to the market value of the theoretical settlement bond portfolio with any resulting excess funds

presumed to be reinvested and used to meet successive year benefit payments. A single equivalent discount rate is determined to align the present value of the required cash flow with the value of the bond portfolio. The resulting discount rates are reflective of both the current interest rate and the distinct liability of the pension and post-retirement benefit plans.

The discount rate is somewhat volatile because it is determined based upon the prevailing rate of long-term corporate bonds as of the measurement date. A higher discount rate decreases the plan obligations and correspondingly decreases the net periodic pension and net post-retirement benefit costs for those plans where actuarial losses are being amortized. Alternatively, a lower discount rate increases net periodic pension and net periodic post-retirement benefit costs. The discount rates used to determine the pension and post-retirement benefit obligations were 4.95 percent and 5.00 percent, respectively, at September 30, 2024.

Health Care Cost Trends. In establishing health care cost trend rates for the post-retirement obligation, TVA reviews actual recent cost trends and projected future trends considering health care inflation, changes in health care utilization, and changes in plan benefits and premium experience. The pre-Medicare eligible per capita claims costs and per capita contributions trend rates are both 7.25 percent, declining 0.25 percent per year until it reaches the ultimate trend rate of 5.00 percent in 2034. The post-Medicare current health care cost trend rate is zero percent for years 2023 through 2025, reaching the ultimate rate of 4.00 percent in 2026. TVA recognized a $30 million actuarial gain as a result of updating the pre-Medicare health care cost trend rates to reflect observed and anticipated plan experience that is recognized as an increase in the related regulatory liability and a decrease in the post-retirement obligation at September 30, 2024.

Cost of Living Adjustments. Cost of living adjustments ("COLAs") are an increase in the benefits for eligible retirees to help maintain the purchasing power of benefits as consumer prices increase. This assumption is based on the long-term expected future rate of inflation, which is based on the capital market outlooks, economic forecasts, and the Federal Reserve policy. See Note 20 — *Benefit Plans — Plan Assumptions — Cost of Living Adjustment* for further discussion on the calculation of the COLA. The actual COLA for CY 2024 was 4.44 percent. The CY 2025 COLA is assumed to be 2.79 percent, and for years thereafter the COLA is assumed to be 2.00 percent. A higher COLA increases the pension benefit obligation whereas a lower COLA assumption decreases the obligation. The actual calendar year COLA and the long-term COLA assumption are used to determine the benefit obligation at September 30 and the net periodic benefit costs for the following fiscal year.

Mortality. TVA's mortality assumptions are based upon actuarial projections in combination with actuarial studies of the actual mortality experience of TVARS's pension and post-retirement benefit plan participants taking into consideration the Society of Actuaries ("SOA") mortality table and projection scales as of September 30, 2024. TVA continues to monitor the availability of updates to mortality tables, longevity improvement scales, and mortality reviews and experience studies to consider whether these updates should be reflected in the current year mortality assumption.

The following tables illustrate the estimated effects of changing certain of the critical actuarial assumptions discussed above, while holding all other assumptions constant and excluding any impact for unamortized actuarial gains and losses:

Sensitivity to Certain Changes in Pension Assumptions
(in millions)

Actuarial Assumption	Actual Assumption	Change in Assumption	Impact
Effect on 2024 pension expense:			
Discount rate	5.95 %	(0.25)%	$ 11
Expected return on assets	6.50 %	(0.25)%	19
COLA	2.00 %	0.25 %	22
Effect on benefit obligation at September 30, 2024:			
Discount rate	4.95 %	(0.25)%	$ 273
COLA	2.00 %	0.25 %	188

Sensitivity to Changes in Assumed Health Care Cost Trend Rates

	1% Increase	1% Decrease
Effect on total of service and interest cost components for 2024	$ 4	$ (4)
Effect on end-of-year accumulated post-retirement benefit obligation at September 30, 2024	48	(45)

New Accounting Standards and Interpretations

See Note 2 — *Impact of New Accounting Standards and Interpretations* for a discussion of recent accounting standards and pronouncements that were issued by the Financial Accounting Standards Board ("FASB"), became effective for TVA, or were adopted by TVA during the presented periods.

Legislative and Regulatory Matters

For additional discussion on legislative and regulatory matters, including a discussion of environmental legislation and regulation, see Part I, Item 1, Business — *Environmental Matters,* Part I, Item 1, Business — *Regulation,* and Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges.*

TVA does not engage, and does not control any entity that is engaged, in any activity listed under Section 13(r) of the Securities Exchange Act of 1934 (the "Exchange Act"), which requires certain issuers to disclose certain activities relating to Iran involving the issuer and its affiliates. Based on information supplied by each such person, none of TVA's directors and executive officers are involved in any such activities. While TVA is an agency and instrumentality of the U.S., TVA does not believe its disclosure obligations, if any, under Section 13(r) extend to the activities of any other departments, divisions, or agencies of the U.S.

Environmental Matters

See Part I, Item 1, Business — *Environmental Matters,* which discussion is incorporated by reference into this Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations.

Legal Proceedings

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting its activities. As of September 30, 2024, TVA had accrued approximately $10 million with respect to Legal Proceedings. No assurance can be given that TVA will not be subject to significant additional claims and liabilities. If actual liabilities significantly exceed the estimates made, TVA's results of operations, liquidity, and financial condition could be materially adversely affected.

For a discussion of certain current material Legal Proceedings, see Note 22 — *Commitments and Contingencies — Legal Proceedings*, which discussions are incorporated into this Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations.

Risk Management Activities

TVA is exposed to various market risks. These market risks include risks related to commodity prices, investment prices, interest rates, currency exchange rates, inflation, and counterparty credit and performance risk. To help manage certain of these risks, TVA has entered into various derivative transactions, including commodity option contracts, forward contracts, swaps, swaptions, futures, and options on futures. Other than certain derivative instruments in its trust investment funds, it is TVA's policy to enter into these derivative transactions solely for hedging purposes and not for speculative purposes. See Note 15 — *Risk Management Activities and Derivative Transactions*.

Risk Governance

The Enterprise Risk Council ("ERC") is responsible for the highest level of risk oversight at TVA and is also responsible for communicating enterprise-wide risks with policy implications to the TVA Board or a designated TVA Board committee. The ERC is comprised of the Senior Management Council and the Chief Risk Officer ("CRO") who acts as Chair. ERC members may invite additional attendees to meetings as non-voting participants. The ERC has also established subordinate committees, consisting of business unit leaders, to assist in the oversight of fuel and power procurement, DER programs and products, security, artificial intelligence, privacy, and technology risks, and general risk management.

TVA has a designated Enterprise Risk Management ("ERM") organization within its Financial Services organization responsible for (1) establishing enterprise risk management policies and guidelines, (2) developing an enterprise risk profile aligned with TVA's strategic objectives, (3) performing annual risk assessments across all TVA business units, (4) monitoring and reporting on identified enterprise risks and emerging risks, (5) facilitating enterprise risk discussions with the risk subject matter experts across the organization and at the ERC and TVA Board levels, and (6) developing and improving TVA's risk awareness culture. TVA has cataloged major short-term and long-term enterprise level risks across the organization. A discussion of significant risks is presented in Part I, Item 1A, Risk Factors.

Commodity Price Risk

TVA is exposed to effects of market fluctuations in the price of commodities that are critical to its operations, including

electricity, coal, and natural gas. The magnitude of exposure to these risks is influenced by many factors including contract terms and market liquidity. TVA's commodity price risk is substantially mitigated by its cost-based rates, including its total fuel cost adjustment, and long-term fixed price commodity contracts.

Commodity Derivatives. TVA manages risk with commodity contracts for natural gas that require physical delivery of the contracted quantity. An immediate 10 percent decline in the market price of natural gas on September 30, 2024 and 2023, would have resulted in decreases of less than $1 million and $1 million, respectively, in the fair value of TVA's natural gas derivative instruments at these dates.

Commodity Derivatives under the FHP. TVA manages risk with commodity derivatives under the FHP by hedging exposure to the price of natural gas. An immediate 10 percent decline in the market price of natural gas on September 30, 2024 and 2023, would have resulted in a decrease of approximately $72 million and $127 million, respectively, in the fair value of TVA's natural gas derivative instruments under the FHP.

Investment Price Risk

TVA's investment price risk relates primarily to investments in TVA's NDT, ART, pension fund, SERP, DCP, and RP.

Nuclear Decommissioning Trust. The NDT is generally designed to achieve a return in line with overall equity and debt market performance. The assets of the trust are invested in debt and equity securities, private partnerships, and certain derivative instruments including forwards, futures, options, and swaps, and through these investments the trust has exposure to U.S. equities, international equities, real estate investment trusts, natural resource equities, high-yield debt, domestic debt, U.S. TIPS, treasuries, private real assets, private equity, and private credit strategies. At September 30, 2024 and 2023, an immediate 10 percent decrease in the price of the investments in the trust would have reduced the value of the trust by $333 million and $279 million, respectively.

Asset Retirement Trust. The ART is presently invested to achieve a return in line with overall equity and debt market performance. The assets of the trust are invested in debt and equity securities, private partnerships, and certain derivative instruments including options, and through these investments the trust has exposure to U.S. equities, real estate investment trusts, natural resource equities, high-yield debt, domestic debt, TIPS, treasuries, private real assets, private equity, and private credit strategies. At September 30, 2024 and 2023, an immediate 10 percent decrease in the price of the investments in the trust would have reduced the value of the trust by $152 million and $124 million, respectively.

Qualified Pension Plan. In 2021, a new asset allocation policy was put in place to reduce risk and volatility in the TVARS investment portfolio. Furthermore, in September 2023, based on current market conditions and updated capital market assumptions, the asset allocation policy was modified to further progress towards these goals. TVARS investments will be reallocated in a prudent manner over time to move toward the new asset allocation targets. The TVARS asset allocation policy for qualified pension plan assets has targets of 17 percent growth assets, 30 percent defensive growth assets, 33 percent defensive assets, and 20 percent inflation-sensitive assets. Pursuant to the TVARS Rules and Regulations, any proposed changes in asset allocation that would change TVARS's assumed rate of investment return are subject to the review and veto of the TVA Board.

As set forth above, the qualified pension plan assets are invested across growth assets, defensive growth assets, defensive assets, and inflation-sensitive assets. The TVARS asset allocation policy includes permissible deviations from target allocations, and action can be taken, as appropriate, to rebalance the plan's assets consistent with the asset allocation policy. At September 30, 2024 and 2023, an immediate 10 percent decrease in the value of the net assets of the fund would have reduced the value of the fund by approximately $867 million and $813 million, respectively.

Supplemental Executive Retirement Plan. The SERP is a non-qualified defined benefit pension plan similar to those typically found in other companies in TVA's peer group and is provided to selected employees of TVA. TVA's SERP was created to recruit and retain key executives. The plan is designed to provide a competitive level of retirement benefits in excess of the limitations on contributions and benefits imposed by TVA's qualified defined benefit plan and Internal Revenue Code Section 415 limits on qualified retirement plans. The SERP currently targets an asset allocation policy for its plan assets of 64 percent equity securities, which includes U.S. and non-U.S. equities, and 36 percent fixed income securities. The SERP plan assets are presently invested to achieve a return in line with overall equity and debt market performance. At September 30, 2024 and 2023, an immediate 10 percent decrease in the value of the SERP investments would have reduced the value of the investments by $10 million and $8 million, respectively.

Deferred Compensation Plan. The DCP is designed to provide participants with the ability to defer compensation to future periods. The plan assists in the recruitment of top executive talent for TVA. As in other corporations, deferred compensation can be an integral part of a total compensation package. Assets currently include deferral balances. The default return on investment of the accounts is interest calculated based on the composite rate of all marketable U.S. Treasury issues. Executives may alternatively choose to have their balances adjusted based on the return of certain mutual funds. At both September 30, 2024 and 2023, an immediate 10 percent decrease in the value of the deferred compensation accounts would have reduced the value of the accounts by $2 million.

Restoration Plan. The RP is a non-qualified excess 401(k) plan designed to allow certain eligible employees whose contributions to the 401(k) plan are limited by IRS rules to save additional amounts for retirement and receive non-elective and matching employer contributions. The plan is designed to provide a competitive level of retirement benefits and assist in the recruitment of executive talent for TVA. The default return on investment of the accounts is interest calculated based on the composite rate of all marketable U.S. Treasury issues. Executives may alternatively choose to have their balances adjusted based on the return of certain mutual funds. At September 30, 2024 and 2023, an immediate 10 percent decrease in the value of the RP accounts would have reduced the value of the accounts by less than $1 million.

Interest Rate Risk

TVA's interest rate risk is related primarily to its short-term investments, short-term debt, long-term debt, and interest rate derivatives.

Investments. At September 30, 2024, TVA had $502 million of cash and cash equivalents, and the average balance of cash and cash equivalents for 2024 was $600 million. The average interest rate that TVA received on its short-term investments during 2024 was 5.39 percent. If the rates of interest that TVA received on its short-term investments during 2024 were 4.39 percent, TVA would have received $6 million less in interest from its short-term investments. At September 30, 2023, TVA had $501 million of cash and cash equivalents, and the average balance of cash and cash equivalents for 2023 was $544 million. The average interest rate that TVA received on its short-term investments during 2023 was 4.65 percent. If the rates that TVA received on its short-term investments during 2023 were 3.65 percent, TVA would have received approximately $5 million less in interest from its short-term investments. In addition to affecting the amount of interest that TVA receives from its short-term investments, changes in interest rates could affect the value of the investments in its NDT, ART, pension plan, SERP, DCP, and RP. See *Risk Management Activities — Investment Price Risk* above.

Short-Term Debt. At September 30, 2024, TVA's short-term borrowings were $1.2 billion, and the current maturities of power bonds and debt of variable interest entities were $1.1 billion. Based on TVA's interest rate exposure at September 30, 2024, an immediate one percentage point increase in interest rates would have resulted in an increase of $22 million in TVA's short-term interest expense. At September 30, 2023, TVA's short-term borrowings were $432 million, and the current maturities of long-term debt were $1.1 billion. Based on TVA's interest rate exposure at September 30, 2023, an immediate one percentage point increase in interest rates would have resulted in an increase of $15 million in TVA's short-term interest expense.

Long-Term Debt. At September 30, 2024 and 2023, the interest rates on all of TVA's outstanding long-term debt were fixed (or subject only to downward adjustment under certain conditions). Accordingly, an immediate one percentage point increase in interest rates would not have affected TVA's interest expense associated with its long-term debt. When TVA's long-term debt matures or is redeemed, however, TVA typically refinances debt in whole or in part by issuing additional debt. Accordingly, if interest rates are high when TVA issues this additional debt, TVA's cash flows, results of operations, and financial condition may be adversely affected. This risk is somewhat mitigated by the fact that TVA's debt portfolio is diversified in terms of maturities and has a long average life. At September 30, 2024 and 2023, the average life of TVA's debt portfolio was 13.96 years and 14.43 years, respectively. At September 30, 2024 and 2023, the average interest rate of TVA's debt portfolio was 4.69 percent and 4.61 percent, respectively. See Note 14 — *Debt and Other Obligations — Debt Outstanding* for a schedule of TVA's debt maturities.

Interest Rate Derivatives. Changes in interest rates also affect the mark-to-market ("MtM") valuation of TVA's interest rate derivatives. See Note 15 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Interest Rate Derivatives*. TVA had two interest rate swaps outstanding at both September 30, 2024 and 2023. Net unrealized gains and losses on the swaps are reflected on TVA's Consolidated Balance Sheets in a regulatory liability or asset account, and realized gains and losses are reflected in earnings. Based on TVA's interest rate exposure at September 30, 2024, an immediate one percentage point decrease in interest rates would have increased the interest rate swap liabilities by $293 million. Based on TVA's interest rate exposure at September 30, 2023, an immediate one percentage point decrease in interest rates would have increased the interest rate swap liabilities by $272 million.

Currency Exchange Rate Risk

Over the next several years, TVA plans to spend a significant amount of capital on clean air projects, capacity expansion, and other projects. A portion of this amount may be spent on contracts that are denominated in one or more foreign currencies. Additionally, TVA's two issues of Bonds denominated in British pounds sterling are hedged by currency swap agreements. If not effectively managed, foreign currency exposure could negatively impact TVA's counterparty risk, cash flows, results of operations, and financial condition.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Quantitative and qualitative disclosures about market risk are reported in Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Risk Management Activities*, which discussion is incorporated by reference into this Item 7A, Quantitative and Qualitative Disclosures About Market Risk.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF OPERATIONS
For the years ended September 30
(in millions)

	2024	2023	2022
Operating revenues			
Revenue from sales of electricity	$ 12,128	$ 11,899	$ 12,371
Other revenue	186	155	169
Total operating revenues	12,314	12,054	12,540
Operating expenses			
Fuel	2,169	2,549	2,567
Purchased power	1,581	1,633	1,921
Operating and maintenance	3,641	3,372	2,986
Depreciation and amortization	2,138	2,213	2,054
Tax equivalents	557	593	601
Total operating expenses	10,086	10,360	10,129
Operating income	2,228	1,694	2,411
Other income, net	71	61	7
Other net periodic benefit cost	98	199	258
Interest expense	1,066	1,056	1,052
Net income	$ 1,135	$ 500	$ 1,108

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED BALANCE SHEETS
At September 30
(in millions)

ASSETS

	2024	2023
Current assets		
Cash and cash equivalents	$ 502	$ 501
Accounts receivable, net	1,801	1,745
Inventories, net	1,155	1,108
Regulatory assets	191	178
Other current assets	120	134
Total current assets	3,769	3,666
Property, plant, and equipment		
Completed plant	70,989	68,199
Less accumulated depreciation	(38,793)	(35,871)
Net completed plant	32,196	32,328
Construction in progress	4,879	3,238
Nuclear fuel	1,261	1,344
Finance leases	729	572
Total property, plant, and equipment, net	39,065	37,482
Investment funds	4,968	4,123
Regulatory and other long-term assets		
Regulatory assets	9,408	5,566
Operating lease assets, net of amortization	149	177
Other long-term assets	344	330
Total regulatory and other long-term assets	9,901	6,073
Total assets	$ 57,703	$ 51,344

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED BALANCE SHEETS
At September 30
(in millions)

LIABILITIES AND PROPRIETARY CAPITAL

	2024	2023
Current liabilities		
Accounts payable and accrued liabilities	$ 2,910	$ 2,618
Accrued interest	280	272
Asset retirement obligations	283	272
Regulatory liabilities	174	222
Short-term debt, net	1,167	432
Current maturities of power bonds	1,022	1,022
Current maturities of long-term debt of variable interest entities	37	35
Total current liabilities	5,873	4,873
Other liabilities		
Post-retirement and post-employment benefit obligations	2,887	2,527
Asset retirement obligations	10,523	7,217
Finance lease liabilities	700	576
Other long-term liabilities	1,712	1,211
Regulatory liabilities	83	107
Total other liabilities	15,905	11,638
Long-term debt, net		
Long-term power bonds, net	17,867	17,844
Long-term debt of variable interest entities, net	897	933
Total long-term debt, net	18,764	18,777
Total liabilities	40,542	35,288
Commitments and contingencies (Note 22)		
Proprietary capital		
Power program appropriation investment	258	258
Power program retained earnings	16,437	15,302
Total power program proprietary capital	16,695	15,560
Nonpower programs appropriation investment, net	518	525
Accumulated other comprehensive loss	(52)	(29)
Total proprietary capital	17,161	16,056
Total liabilities and proprietary capital	$ 57,703	$ 51,344

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
For the years ended September 30
(in millions)

	2024	2023	2022
Net income	$ 1,135	$ 500	$ 1,108
Other comprehensive income (loss)			
Net unrealized gain (loss) on cash flow hedges	25	99	(157)
Net unrealized (gain) loss reclassified to earnings from cash flow hedges	(48)	(42)	93
Total other comprehensive income (loss)	(23)	57	(64)
Total comprehensive income	$ 1,112	$ 557	$ 1,044

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF CASH FLOWS
For the years ended September 30
(in millions)

	2024	2023	2022
Cash flows from operating activities			
Net income	$ 1,135	$ 500	$ 1,108
Adjustments to reconcile net income to net cash provided by operating activities			
Depreciation and amortization[1]	2,160	2,235	2,076
Amortization of nuclear fuel cost	364	371	347
Non-cash retirement benefit expense	138	241	328
Other regulatory amortization and deferrals	(71)	31	70
Changes in current assets and liabilities			
Accounts receivable, net	(16)	301	(412)
Inventories and other current assets, net	(70)	(83)	(163)
Accounts payable and accrued liabilities	44	(1)	282
Accrued interest	8	(1)	(7)
Pension contributions	(304)	(306)	(308)
Settlements of asset retirement obligations	(283)	(327)	(291)
Other, net	(102)	(89)	(82)
Net cash provided by operating activities	3,003	2,872	2,948
Cash flows from investing activities			
Construction expenditures	(3,281)	(2,526)	(2,361)
Nuclear fuel expenditures	(294)	(273)	(283)
Acquisition of leasehold interests in combustion turbine assets	—	(155)	—
Purchases of investments	(52)	(51)	(51)
Loans and other receivables			
Advances	(4)	(7)	(9)
Repayments	6	8	15
Other, net	34	10	26
Net cash used in investing activities	(3,591)	(2,994)	(2,663)
Cash flows from financing activities			
Long-term debt			
Issues of power bonds	991	992	484
Redemptions and repurchases of power bonds	(1,022)	(29)	(1,028)
Payments on debt of variable interest entities	(35)	(39)	(43)
Short-term debt issues (redemptions), net	734	(740)	392
Payments on leases and leasebacks	(76)	(56)	(85)
Financing costs, net	(5)	(4)	(3)
Other, net	3	(1)	—
Net cash provided by (used in) financing activities	590	123	(283)
Net change in cash, cash equivalents, and restricted cash	2	1	2
Cash, cash equivalents, and restricted cash at beginning of year	521	520	518
Cash, cash equivalents, and restricted cash at end of year	$ 523	$ 521	$ 520

Note
(1) Including amortization of debt issuance costs and premiums/discounts.

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF CHANGES IN PROPRIETARY CAPITAL
For the years ended September 30
(in millions)

	Power Program Appropriation Investment	Power Program Retained Earnings	Nonpower Programs Appropriation Investment, Net	Accumulated Other Comprehensive Loss	Total
Balance at September 30, 2021	$ 258	$ 13,689	$ 540	$ (22)	$ 14,465
Net income (loss)	—	1,115	(7)	—	1,108
Total other comprehensive income (loss)	—	—	—	(64)	(64)
Return on power program appropriation investment	—	(4)	—	—	(4)
Balance at September 30, 2022	$ 258	$ 14,800	$ 533	$ (86)	$ 15,505
Net income (loss)	—	508	(8)	—	500
Total other comprehensive income	—	—	—	57	57
Return on power program appropriation investment	—	(6)	—	—	(6)
Balance at September 30, 2023	$ 258	$ 15,302	$ 525	$ (29)	$ 16,056
Net income (loss)	—	1,142	(7)	—	1,135
Total other comprehensive income (loss)	—	—	—	(23)	(23)
Return on power program appropriation investment	—	(7)	—	—	(7)
Balance at September 30, 2024	$ 258	$ 16,437	$ 518	$ (52)	$ 17,161

The accompanying notes are an integral part of these consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(Dollars in millions except where noted)

Note		Page No.
1	Summary of Significant Accounting Policies	99
2	Impact of New Accounting Standards and Interpretations	105
3	Accounts Receivable, Net	106
4	Inventories, Net	106
5	Other Current Assets	107
6	Net Completed Plant	107
7	Plant Closures	108
8	Leases	109
9	Other Long-Term Assets	112
10	Regulatory Assets and Liabilities	114
11	Variable Interest Entities	116
12	Other Long-Term Liabilities	119
13	Asset Retirement Obligations	120
14	Debt and Other Obligations	122
15	Risk Management Activities and Derivative Transactions	126
16	Fair Value Measurements	132
17	Revenue	138
18	Other Income, Net	140
19	Supplemental Cash Flow Information	140
20	Benefit Plans	141
21	Collaborative Arrangement	154
22	Commitments and Contingencies	154
23	Related Parties	158
24	Subsequent Events	159

1. Summary of Significant Accounting Policies

General

The Tennessee Valley Authority ("TVA") is a corporate agency and instrumentality of the United States ("U.S.") that was created in 1933 by federal legislation in response to a proposal by President Franklin D. Roosevelt. TVA was created to, among other things, improve navigation on the Tennessee River, reduce the damage from destructive flood waters within the Tennessee River system and downstream on the lower Ohio and Mississippi Rivers, further the economic development of TVA's service area in the southeastern U.S., and sell the electricity generated at the facilities TVA operates. Today, TVA operates the nation's largest public power system and supplies power in most of Tennessee, northern Alabama, northeastern Mississippi, and southwestern Kentucky and in portions of northern Georgia, western North Carolina, and southwestern Virginia to a population of approximately 10 million people.

TVA also manages the Tennessee River, its tributaries, and certain shorelines to provide, among other things, year-round navigation, flood damage reduction, and affordable and reliable electricity. Consistent with these primary purposes, TVA also manages the river system and public lands to provide recreational opportunities, adequate water supply, improved water quality, cultural and natural resource protection, and economic development. TVA performs these management duties in cooperation with other federal and state agencies that have jurisdiction and authority over certain aspects of the river system. In addition, the TVA Board of Directors ("TVA Board") has established two councils — the Regional Resource Stewardship Council and the Regional Energy Resource Council — to advise TVA on its stewardship activities in the Tennessee Valley and its energy resource activities.

The power program has historically been separate and distinct from the stewardship programs. It is required to be self-supporting from power revenues and proceeds from power financings, such as proceeds from the issuance of bonds, notes, or other evidences of indebtedness (collectively, "Bonds"). Although TVA does not currently receive Congressional appropriations, it is required to make annual payments to the United States Department of the Treasury ("U.S. Treasury") as a return on the government's appropriation investment in TVA's power facilities (the "Power Program Appropriation Investment"). In the 1998 Energy and Water Development Appropriations Act, Congress directed TVA to fund essential stewardship activities related to its

management of the Tennessee River system and nonpower or stewardship properties with power revenues in the event that there were insufficient appropriations or other available funds to pay for such activities in any fiscal year. Congress has not provided any appropriations to TVA to fund such activities since 1999. Consequently, during 2000, TVA began paying for essential stewardship activities primarily with power revenues, with the remainder funded with user fees and other forms of revenues derived in connection with those activities. The activities related to stewardship properties do not meet the criteria of an operating segment under accounting principles generally accepted in the United States of America ("GAAP"). Accordingly, these assets and properties are included as part of the power program, TVA's only operating segment.

Power rates are established by the TVA Board as authorized by the Tennessee Valley Authority Act of 1933, as amended ("TVA Act"). The TVA Act requires TVA to charge rates for power that will produce gross revenues sufficient to provide funds for operation, maintenance, and administration of its power system; payments to states and counties in lieu of taxes ("tax equivalents"); debt service on outstanding indebtedness; payments to the U.S. Treasury in repayment of and as a return on the Power Program Appropriation Investment; and such additional margin as the TVA Board may consider desirable for investment in power system assets, retirement of outstanding Bonds in advance of maturity, additional reduction of the Power Program Appropriation Investment, and other purposes connected with TVA's power business. TVA fulfilled its requirement to repay $1.0 billion of the Power Program Appropriation Investment with the 2014 payment; therefore, this repayment obligation is no longer a component of rate setting. In setting TVA's rates, the TVA Board is charged by the TVA Act to have due regard for the primary objectives of the TVA Act, including the objective that power shall be sold at rates as low as are feasible. Rates set by the TVA Board are not subject to review or approval by any state or other federal regulatory body.

Fiscal Year

TVA's fiscal year ends September 30. Years (2024, 2023, etc.) refer to TVA's fiscal years unless they are preceded by "CY," in which case the references are to calendar years.

Cost-Based Regulation

Since the TVA Board is authorized by the TVA Act to set rates for power sold to its customers, TVA is self-regulated. Additionally, TVA's regulated rates are designed to recover its costs. Based on current projections, TVA believes that rates, set at levels that will recover TVA's costs, can be charged and collected. As a result of these factors, TVA records certain assets and liabilities that result from the regulated ratemaking process that would not be recorded under GAAP for non-regulated entities. Regulatory assets generally represent incurred costs that have been deferred because such costs are probable of future recovery in customer rates. Regulatory liabilities generally represent obligations to make refunds to customers for previous collections for costs that are not likely to be incurred or deferral of gains that will be credited to customers in future periods. TVA assesses whether the regulatory assets are probable of future recovery by considering factors such as applicable regulatory changes, potential legislation, and changes in technology. Based on these assessments, TVA believes the existing regulatory assets are probable of recovery. This determination reflects the current regulatory and political environment and is subject to change in the future. If future recovery of regulatory assets ceases to be probable, or TVA is no longer considered to be a regulated entity, then costs would be required to be written off. All regulatory asset write offs would be required to be recognized in earnings in the period in which future recovery ceases to be probable or in which TVA is no longer considered to be a regulated entity.

Basis of Presentation

The accompanying consolidated financial statements, which have been prepared in accordance with GAAP, include the accounts of TVA and variable interest entities ("VIEs") of which TVA is the primary beneficiary. See Note 11 — *Variable Interest Entities*. Intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements requires TVA to estimate the effects of various matters that are inherently uncertain as of the date of the consolidated financial statements. Although the consolidated financial statements are prepared in conformity with GAAP, TVA is required to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities, and the amounts of revenues and expenses reported during the reporting period. Each of these estimates varies in regard to the level of judgment involved and its potential impact on TVA's financial results. Estimates are considered critical either when a different estimate could have reasonably been used, or where changes in the estimate are reasonably likely to occur from period to period, and such use or change would materially impact TVA's financial condition, results of operations, or cash flows.

Cash, Cash Equivalents, and Restricted Cash

Cash includes cash on hand, non-interest bearing cash, and deposit accounts. All highly liquid investments with original maturities of three months or less are considered cash equivalents. Cash and cash equivalents that are restricted, as to withdrawal or use under the terms of certain contractual agreements, are recorded in Other long-term assets on the Consolidated Balance Sheets. Restricted cash and cash equivalents include cash held in trusts that are currently restricted for

TVA economic development loans and for certain TVA environmental programs in accordance with agreements related to compliance with certain environmental regulations. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Environmental Agreements*.

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported on the Consolidated Balance Sheets and Consolidated Statements of Cash Flows:

Cash, Cash Equivalents, and Restricted Cash
At September 30
(in millions)

	2024	2023
Cash and cash equivalents	$ 502	$ 501
Restricted cash and cash equivalents included in Other long-term assets	21	20
Total cash, cash equivalents, and restricted cash	$ 523	$ 521

Allowance for Uncollectible Accounts

TVA recognizes an allowance that reflects the current estimate for credit losses expected to be incurred over the life of the financial assets based on historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amounts. The appropriateness of the allowance is evaluated at the end of each reporting period.

To determine the allowance for trade receivables, TVA considers historical experience and other currently available information, including events such as customer bankruptcy and/or a customer failing to fulfill payment arrangements by the due date. TVA's corporate credit department also performs an assessment of the financial condition of customers and the credit quality of the receivables. In addition, TVA reviews other reasonable and supportable forecasts to determine if the allowance for uncollectible amounts should be further adjusted in accordance with the accounting guidance for Current Expected Credit Losses.

To determine the allowance for loans receivables, TVA aggregates loans into the appropriate pools based on the existence of similar risk characteristics such as collateral types and internal assessed credit risks. In situations where a loan exhibits unique risk characteristics and is no longer expected to experience similar risks to the rest of its pool, the loan will be evaluated separately. TVA derives an annual loss rate based on historical loss and then adjusts the rate to reflect TVA's consideration of available information on current conditions and reasonable and supportable future forecasts. This information may include economic and business conditions, default trends, and other internal and external factors. For periods beyond the reasonable and supportable forecast period, TVA uses the current calculated long-term average historical loss rate for the remaining life of the loan portfolio.

The allowance for uncollectible accounts was less than $1 million at both September 30, 2024 and 2023, for trade accounts receivable. Additionally, loans receivable of $105 million and $104 million at September 30, 2024 and 2023, respectively, are included in Accounts receivable, net and Other long-term assets for the current and long-term portions, respectively. Loans receivables are reported net of allowances for uncollectible accounts of $2 million and $3 million at September 30, 2024 and 2023, respectively.

Revenues

TVA recognizes revenue from contracts with customers to depict the transfer of goods or services to customers in an amount to which the entity expects to be entitled in exchange for those goods or services. For the generation and transmission of electricity, this is generally at the time the power is delivered to a metered customer delivery point for the customer's consumption or distribution. As a result, revenues from power sales are recorded as electricity is delivered to customers. In addition to power sales invoiced and recorded during the month, TVA accrues estimated unbilled revenues for power sales provided to five customers whose billing date occurs prior to the end of the month. Exchange power sales are presented in the accompanying Consolidated Statements of Operations as a component of sales of electricity. Exchange power sales are sales of excess power after meeting TVA native load and directly served requirements. Native load refers to the customers on whose behalf a company, by statute, franchise, regulatory requirement, or contract, has undertaken an obligation to serve. TVA engages in other arrangements in addition to power sales. Certain other revenue from activities related to TVA's overall mission is recorded in Other revenue. Revenues that are not related to the overall mission are recorded in Other income, net.

Inventories

Certain Fuel, Materials, and Supplies. Materials and supplies inventories are valued using an average unit cost method. A new average cost is computed after each inventory purchase transaction, and inventory issuances are priced at the latest moving weighted average unit cost. Coal, fuel oil, and natural gas inventories are valued using an average cost method. A new weighted average cost is computed monthly, and monthly issues are priced accordingly.

Renewable Energy Certificates. TVA accounts for Renewable Energy Certificates ("RECs") using the specific identification cost method. RECs that are acquired through power purchases are recorded as inventory and charged to purchased power expense when the RECs are subsequently used or sold. TVA assigns a value to the RECs at the inception of the power purchase arrangement using a relative standalone selling price approach. RECs created through TVA-owned asset generation are recorded at zero cost.

Emission Allowances. TVA accounts for emission allowances using the specific identification cost method. Allowances that are acquired through third party purchases are recorded as inventory at cost and charged to operating expense based on tons emitted during the respective compliance periods.

Allowance for Inventory Obsolescence. TVA reviews materials and supplies inventories by category and usage on a periodic basis. Each category is assigned a probability of becoming obsolete based on the type of material and historical usage data. TVA has a fleet-wide inventory management policy for each generation type. Based on the estimated value of the inventory, TVA adjusts its allowance for inventory obsolescence.

Pre-Commercial Plant Operations

As part of the process of completing the construction of a generating unit, the electricity produced is used to serve the demands of the electric system. TVA estimates revenues earned during pre-commercial operations at the fair value of the energy delivered based on TVA's hourly incremental dispatch cost. Pre-commercial plant operations began on Paradise CT Units 5-7 in the first quarter of 2024, and the units became operational on December 29, 2023. Estimated revenue of $3 million related to this project was capitalized to offset project costs for the year ended September 30, 2024. TVA also capitalized related fuel costs for this project of $3 million for the year ended September 30, 2024, all of which was recognized in the three months ended December 31, 2023.

Property, Plant, and Equipment, and Depreciation

Property, Plant, and Equipment. Additions to plant are recorded at cost, which includes direct and indirect costs. The cost of current repairs and minor replacements is charged to operating expense. When property, plant, and equipment is retired, accumulated depreciation is charged for the original cost of the assets. Gains or losses are only recognized upon the sale of land or an entire operating unit. TVA capitalizes certain costs incurred in connection with developing or obtaining internal-use software. Capitalized software costs are included in Property, plant, and equipment on the Consolidated Balance Sheets and are generally amortized over seven years.

Nuclear Fuel. Nuclear fuel, which is included in Property, plant, and equipment, is valued using the average cost method for raw materials and the specific identification method for nuclear fuel in a reactor. Amortization of nuclear fuel in a reactor is calculated on a units-of-production basis and is included in fuel expense.

TVA, the U.S. Department of Energy ("DOE"), and certain nuclear fuel contractors have entered into agreements, referred to as the Down-blend Offering for Tritium ("DBOT"), that provide for the production, processing, and storage of low-enriched uranium that is to be made using surplus DOE highly enriched uranium and other uranium. Low-enriched uranium can be fabricated into fuel for use in a nuclear power plant. Production of the low-enriched uranium began in 2019 and is contracted to continue through September 2027. Contract activity after that date will consist of storage and flag management. Flag management ensures that the uranium is unencumbered by policy restrictions, so that it can be used in connection with the production of tritium. Under the terms of the interagency agreement between the DOE and TVA, the DOE will reimburse TVA for a portion of the costs of converting the highly enriched uranium to low-enriched uranium. Since 2019, TVA has received $284 million in reimbursements from the DOE, which is recorded as a reduction in nuclear fuel inventory costs. At September 30, 2024, TVA recorded $13 million in Accounts receivable, net related to this agreement.

Depreciation. TVA accounts for depreciation of its properties using the composite depreciation convention of accounting. Under the composite method, assets with similar economic characteristics are grouped and depreciated as one asset. Depreciation is generally computed on a straight-line basis over the estimated service lives of the various classes of assets. The estimation of asset useful lives requires management judgment, supported by external depreciation studies of historical asset retirement experience. Depreciation rates are determined based on external depreciation studies that are updated approximately every five years, with the latest study implemented in 2022.

Depreciation expense for the years ended September 30, 2024, 2023, and 2022 was $1.8 billion, $1.9 billion, and $1.8 billion, respectively. Depreciation expense expressed as a percentage of the average annual depreciable completed plant was 2.92 percent for 2024, 3.14 percent for 2023, and 2.98 percent for 2022. Average depreciation rates by asset class are as follows:

Property, Plant, and Equipment Depreciation Rates
At September 30
(percent)

	2024	2023	2022
Asset Class			
Nuclear	2.71	2.73	2.72
Coal-fired[(1)]	4.13	4.98	4.27
Hydroelectric	1.83	1.82	1.85
Gas and oil-fired	3.31	3.17	3.38
Transmission	1.52	1.52	1.51
Other	4.98	4.43	3.64

Note
(1) The rates include the acceleration of depreciation related to retiring certain coal-fired units and potentially retiring the remainder of the coal-fired fleet by 2035. See Note 7 — *Plant Closures*.

Reacquired Rights. TVA previously entered into leasing transactions to obtain third-party financing for 24 peaking CTs as well as certain qualified technological equipment and software ("QTE"). All of the lease proceeds were accounted for as financing obligations due to TVA's continuing involvement with the combustion turbine facilities and the QTE during the leaseback term. These financial obligations were paid off, and TVA acquired the residual leasehold interests for all of this equipment and recorded the cash consideration as reacquired rights, which is an intangible asset included in property, plant, and equipment on the Consolidated Balance Sheet. As of September 30, 2024 and 2023, property, plant, and equipment includes intangible reacquired rights, net of amortization, of $312 million and $324 million, respectively. Reacquired rights are amortized over the estimated useful lives of the underlying CTs which range from 30 to 35 years. Amortization expense was $11 million, $10 million, and $6 million for the years ended September 30, 2024, 2023, and 2022, respectively, and accumulated amortization at September 30, 2024 and 2023 totaled $63 million and $52 million, respectively. At September 30, 2024, the estimated aggregate amortization expense for each of the next five years and thereafter is shown below:

	2025	2026	2027	2028	2029	Thereafter
Reacquired Rights	$ 12	$ 11	$ 12	$ 11	$ 11	$ 255

Impairment of Assets. TVA evaluates long-lived assets for impairment when events or changes in circumstances indicate that the carrying value of such assets may not be recoverable. For long-lived assets, TVA bases its evaluation on impairment indicators such as the nature of the assets, the future economic benefit of the assets, any historical or future profitability measurements, regulatory approval and ability to set rates at levels that allow for recoverability of the assets, and other external market conditions or factors that may be present. If such impairment indicators are present or other factors exist that indicate that the carrying amount of an asset may not be recoverable, TVA determines whether an impairment has occurred based on an estimate of undiscounted cash flows attributable to the asset as compared with the carrying value of the asset. If an impairment has occurred, the amount of the impairment recognized is measured as the excess of the asset's carrying value over its fair value. Additionally, TVA regularly evaluates construction projects. If the project is canceled or deemed to have no future economic benefit, the project is written off as an asset impairment or, upon TVA Board approval, reclassified as a regulatory asset and amortized over the Board-approved period. See Note 7 — *Plant Closures*.

Leases

TVA recognizes a lease asset and lease liability for leases with terms of greater than 12 months. Lease assets represent TVA's right to use an underlying asset for the lease term, and lease liabilities represent TVA's obligation to make lease payments arising from the lease, both of which are recognized based on the present value of the future minimum lease payments over the lease term at the commencement date. TVA has certain lease agreements that include variable lease payments that are based on energy production levels. These variable lease payments are not included in the measurement of the lease assets or lease liabilities but are recognized in the period in which the expenses are incurred.

While not specifically structured as leases, certain power purchase agreements ("PPAs") are deemed to contain a lease of the underlying generating units when the terms convey the right to control the use of the assets. Amounts recorded for these leases are generally based on the amount of the scheduled capacity payments due over the remaining terms of the PPAs, the terms of which vary. The total lease obligations included in Accounts payable and accrued liabilities, Other long-term liabilities, and Finance lease liabilities related to these agreements were $550 million and $121 million for finance and operating leases, respectively, at September 30, 2024. The total lease obligations included in Accounts payable and accrued liabilities, Other long-term liabilities, and Finance lease liabilities related to these agreements were $390 million and $135 million for finance and operating leases, respectively, at September 30, 2023.

TVA has agreements with lease and non-lease components and has elected to separate lease and non-lease components. Consideration is allocated to lease and non-lease components generally based on relative standalone price basis. Variable lease costs included in the agreements are allocated based on the determination of lease and non-lease components.

TVA has lease agreements which include options for renewal and early termination. The intent to renew a lease varies depending on the lease type and asset. Renewal options that are reasonably certain to be exercised are included in the lease measurements. The decision to terminate a lease early is dependent on various economic factors. No termination options have been included in TVA's lease measurements.

Leases with an initial term of 12 months or less, which do not include an option to extend the initial term of the lease to greater than 12 months that TVA is reasonably certain to exercise, are not recorded on the Consolidated Balance Sheets at September 30, 2024.

Operating leases are recognized on a straight-line basis over the term of the lease agreement. Rent expense associated with short-term leases and variable leases is recorded in Operating and maintenance expense, Fuel expense, or Purchased power expense on the Consolidated Statements of Operations. Expenses associated with finance leases result in the separate presentation of interest expense on the lease liability and amortization expense of the related lease asset on the Consolidated Statements of Operations.

Decommissioning Costs

TVA recognizes legal obligations associated with the future retirement of certain tangible long-lived assets. These obligations relate to fossil fuel-fired generating plants, nuclear generating plants, hydroelectric generating plants/dams, transmission structures, and other property-related assets. Activities involved with retiring these assets could include decontamination and demolition of structures, removal and disposal of wastes, and site restoration. Revisions to the forecasted costs of decommissioning activities are made whenever factors indicate that the timing or amounts of estimated cash flows have changed materially. Studies are updated for both nuclear and non-nuclear decommissioning costs at least every five years. Any accretion or depreciation expense related to these liabilities and assets is charged to a regulatory asset. See Note 10 — *Regulatory Assets and Liabilities — Nuclear Decommissioning Costs* and *Non-Nuclear Decommissioning Costs* and Note 13 — *Asset Retirement Obligations.*

Investment Funds

Investment funds consist primarily of trust funds designated to fund decommissioning requirements (see Note 22 — *Commitments and Contingencies — Contingencies — Decommissioning Costs*), the Supplemental Executive Retirement Plan ("SERP") (see Note 20 — *Benefit Plans — Overview of Plans and Benefits — Supplemental Executive Retirement Plan*), the Deferred Compensation Plan ("DCP"), and the Restoration Plan ("RP"). The Nuclear Decommissioning Trust ("NDT") holds funds primarily for the ultimate decommissioning of TVA's nuclear power plants. The Asset Retirement Trust ("ART") holds funds primarily for the costs related to the future closure and retirement of TVA's other long-lived assets. The NDT, ART, SERP, DCP, and RP funds are invested in portfolios of securities generally designed to achieve a return in line with overall equity and debt market performance. The NDT, ART, SERP, DCP, and RP funds are all classified as trading.

Research and Development Costs

Research and development costs are expensed when incurred. TVA's research programs include those related to power delivery technologies, emerging technologies (clean energy, renewables, distributed resources, and energy efficiency), technologies related to generation (fossil fuel, nuclear, and hydroelectric), and environmental technologies.

Tax Equivalents

TVA is not subject to federal income taxation. In addition, neither TVA nor its property, franchises, or income is subject to taxation by states or their subdivisions. The TVA Act requires TVA to make payments to states and counties in which TVA conducts its power operations and in which TVA has acquired power properties previously subject to state and local taxation. The total amount of these payments is five percent of gross revenues from sales of power during the preceding year, excluding sales or deliveries to other federal agencies and off-system sales with other utilities, with a provision for minimum payments under certain circumstances. TVA calculates tax equivalent expense by subtracting the prior year fuel cost-related tax equivalent

regulatory asset or liability from the payments made to the states and counties during the current year and adding back the current year fuel cost-related tax equivalent regulatory asset or liability. Fuel cost-related tax equivalent expense is recognized in the same accounting period in which the fuel cost-related revenue is recognized.

Maintenance Costs

TVA records maintenance costs and repairs related to its property, plant, and equipment on the Consolidated Statements of Operations as they are incurred except for the recording of certain regulatory assets for retirement and removal costs.

2. Impact of New Accounting Standards and Interpretations

The following are accounting standard updates issued by the Financial Accounting Standards Board that TVA adopted during 2024:

Accounting for Contract Assets and Contract Liabilities from Contracts with Customers	
Description	This guidance requires an entity (acquirer) to recognize and measure contract assets and contract liabilities acquired in a business combination in accordance with revenue with customers. It is expected that an acquirer will generally recognize and measure acquired contract assets and contract liabilities in a manner consistent with how the acquiree recognized and measured contract assets and contract liabilities in the acquiree's financial statements. The entity should apply the standard prospectively to business combinations occurring on or after the effective date of the standard.
Effective Date for TVA	TVA adopted the standard on October 1, 2023, on a prospective basis.
Effect on the Financial Statements or Other Significant Matters	Adoption of this standard did not have a material impact on TVA's financial condition, results of operations, or cash flows.

Troubled Debt Restructurings and Vintage Disclosures	
Description	This guidance eliminates the recognition and measurement guidance on troubled debt restructuring for creditors that have adopted Financial Instruments-Credit Losses and requires enhanced disclosures about loan modifications for borrowers experiencing financial difficulty. Additionally, the guidance requires public business entities to present current-period gross write-offs by year of origination in their vintage disclosures. The entity should apply the standard prospectively except for the transition method related to the recognition and measurement of troubled debt restructuring. For the transition method, an entity has the option to apply a modified retrospective transition method, resulting in a cumulative-effect adjustment to retained earnings in the period of adoption.
Effective Date for TVA	TVA adopted the standard on October 1, 2023, on a prospective basis.
Effect on the Financial Statements or Other Significant Matters	Adoption of this standard did not have a material impact on TVA's financial condition, results of operations, or cash flows.

The following accounting standards or rules have been issued but as of September 30, 2024, were not effective and had not been adopted by TVA:

Improvements to Reportable Segment Disclosures	
Description	This guidance improves reportable segment disclosure requirements, primarily through enhanced disclosures about significant segment expenses. The amendment requires a public entity to disclose, on an annual and interim basis, significant segment expenses that are regularly provided to the chief operating decision maker and included within each reported measure of segment profit and loss. It also requires a public entity that has a single reportable segment to provide all of the disclosures required by the amendment and all existing segment disclosures. The amendment is effective for public entities for fiscal years beginning after December 15, 2023, and interim periods in fiscal years beginning after December 15, 2024. Upon adoption, a public entity should apply the amendments retrospectively to all prior periods presented in the financial statements.
Effective Date for TVA	Fiscal years beginning October 1, 2024 and interim periods beginning October 1, 2025.
Effect on the Financial Statements or Other Significant Matters	The adoption of this standard will result in TVA including the additional required disclosures and will have no impact on TVA's financial condition, results of operations, or cash flows.

Enhancement and Standardization of Climate-Related Disclosures for Investors	
Description	In March 2024, the SEC adopted its climate-related final rule (SEC Release No. 34-99678, The Enhancement and Standardization of Climate-Related Disclosures for Investors), and in April 2024, the SEC voluntarily stayed the new rule as a result of pending legal challenges. The new rule, if implemented as adopted, will require registrants to provide certain climate-related information in their annual reports and registration statements and will also require the dollar impact of severe weather events and other natural conditions, as well as amounts related to carbon offsets and renewable energy credits or certificates, to be disclosed in the audited financial statements in certain circumstances. The disclosure requirements are currently expected to begin phasing in for fiscal years beginning on or after January 1, 2027 for non-accelerated filers.
Effective Date for TVA	Fiscal year beginning October 1, 2027.
Effect on the Financial Statements or Other Significant Matters	TVA is currently evaluating the impact of the rule on its disclosures.

3. Accounts Receivable, Net

Accounts receivable primarily consist of amounts due from customers for power sales. The table below summarizes the types and amounts of TVA's accounts receivable:

Accounts Receivable, Net
At September 30
(in millions)

	2024	2023
Power receivables	$ 1,683	$ 1,627
Other receivables	118	118
Accounts receivable, net[1]	$ 1,801	$ 1,745

Note
(1) Allowance for uncollectible accounts was less than $1 million at both September 30, 2024 and 2023, and therefore is not represented in the table above.

4. Inventories, Net

The table below summarizes the types and amounts of TVA's inventories:

Inventories, Net
At September 30
(in millions)

	2024	2023
Materials and supplies inventory	$ 931	$ 849
Fuel inventory	286	313
Renewable energy certificates/emissions allowance inventory, net	11	15
Allowance for inventory obsolescence	(73)	(69)
Inventories, net	$ 1,155	$ 1,108

5. Other Current Assets

Other current assets consisted of the following:

Other Current Assets
At September 30
(in millions)

	2024	2023[1]
Inventory work-in-progress	$ 41	$ 28
Prepaid software maintenance	22	18
Prepaid insurance	19	16
Prepaid cloud assets	13	7
Current portion of prepaid long-term service agreements	7	25
Commodity contract derivative assets	5	21
Other	13	19
Other current assets	$ 120	$ 134

Note
(1) At September 30, 2023, $7 million previously classified as Other (a component of Other current assets) has been reclassified to Prepaid cloud assets (a component of Other current assets) to conform to current year presentation.

Commodity Contract Derivative Assets. TVA enters into certain derivative contracts for natural gas that require physical delivery of the contracted quantity of the commodity as well as certain financial derivative contracts to hedge exposure to the price of natural gas. Commodity contract derivative assets classified as current include deliveries or settlements that will occur within 12 months or less. See Note 15 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

6. Net Completed Plant

Net completed plant consisted of the following:

Net Completed Plant
At September 30
(in millions)

	2024			2023		
	Cost	Accumulated Depreciation	Net	Cost	Accumulated Depreciation	Net
Nuclear	$ 26,800	$ 14,149	$ 12,651	$ 26,803	$ 13,557	$ 13,246
Coal-fired[1]	20,177	16,635	3,542	18,525	14,464	4,061
Gas and oil-fired	7,051	2,112	4,939	6,663	2,057	4,606
Transmission	9,964	3,450	6,514	9,375	3,359	6,016
Hydroelectric	4,307	1,288	3,019	4,109	1,241	2,868
Other electrical plant	1,763	737	1,026	1,798	780	1,018
Multipurpose dams	900	413	487	900	404	496
Other stewardship	27	9	18	26	9	17
Total	$ 70,989	$ 38,793	$ 32,196	$ 68,199	$ 35,871	$ 32,328

Note
(1) TVA recognized accelerated depreciation as a result of the decision to idle or retire certain units and the potential retirement of the remainder of the coal-fired fleet by 2035. See Note 7 — *Plant Closures*.

7. Plant Closures

Background

TVA must continuously evaluate all generating assets to ensure an optimal energy portfolio that provides safe, clean, and reliable power while maintaining flexibility and fiscal responsibility to the people of the Tennessee Valley. Based on results of assessments presented to the TVA Board in 2019, the retirement of Bull Run Fossil Plant ("Bull Run") by December 2023 was approved, and as of September 30, 2023, the facility was retired. In January 2023, TVA issued its Record of Decision to retire two coal-fired units at Cumberland Fossil Plant ("Cumberland") by the end of CY 2026 and CY 2028. In April 2024, TVA issued its Record of Decision to retire the nine coal-fired units at Kingston Fossil Plant ("Kingston") by CY 2027. In addition, TVA is evaluating the impact of retiring the balance of the coal-fired fleet by 2035, and that evaluation includes environmental reviews, public input, and TVA Board approval.

Financial Impact

TVA's policy is to adjust depreciation rates to reflect the most current assumptions, ensuring units will be fully depreciated by the applicable retirement dates. As a result of TVA's decision to accelerate the retirement of Bull Run, TVA has recognized a cumulative $659 million of accelerated depreciation since the second quarter of 2019 through September 30, 2023. Of this amount, $177 million and $140 million were recognized for the years ended September 30, 2023, and 2022, respectively. TVA's decision to retire the two units at Cumberland is estimated to result in approximately $16 million of additional depreciation quarterly, which does not include any potential impact from additions or retirements to net completed plant. The cumulative impact approximates $112 million of additional depreciation since January 2023, related to this decision. In addition, TVA's decision to retire the nine units at Kingston is estimated to result in approximately $9 million of additional depreciation quarterly, which does not include any potential impact from additions or retirements to net completed plant. The cumulative impact approximates $18 million of additional depreciation since April 2024, related to this decision.

TVA also recognized $15 million, $14 million, and $22 million in Operating and maintenance expense related to additional inventory reserves and project write-offs for the coal-fired fleet, including Kingston, Cumberland, and Bull Run, for the years ended September 30, 2024, 2023, and 2022, respectively.

8. Leases

The following table provides information regarding the presentation of leases on the Consolidated Balance Sheets:

Amounts Recognized on TVA's Consolidated Balance Sheets
At September 30
(in millions)

		2024	2023
Assets			
Operating	Operating lease assets, net of amortization	$ 149	$ 177
Finance	Finance leases	729	572
Total lease assets		$ 878	$ 749
Liabilities			
Current			
Operating	Accounts payable and accrued liabilities	$ 63	$ 71
Finance	Accounts payable and accrued liabilities	80	56
Non-current			
Operating	Other long-term liabilities	88	93
Finance	Finance lease liabilities	700	576
Total lease liabilities		$ 931	$ 796

TVA's leases consist primarily of railcars, equipment, real estate/land, power generating facilities, and gas pipelines. TVA's leases have various terms and expiration dates remaining from less than one year to 22 years. The components of lease costs were as follows:

Lease Costs
For the years ended September 30
(in millions)

	2024	2023	2022
Operating lease costs[1]	$ 77	$ 69	$ 56
Variable lease costs[1][5]	258	134	78
Short-term lease costs[1]	10	18	26
Finance lease costs			
Amortization of lease assets[2]	79	57	58
Interest on lease liabilities[3][4]	37	43	42
Total finance lease costs	116	100	100
Total lease costs	$ 461	$ 321	$ 260

Notes
(1) Costs are included in Operating and maintenance expense, Fuel expense, Purchased power expense, and Tax equivalents expense on the Consolidated Statements of Operations.
(2) Expense is included in Depreciation and amortization expense on the Consolidated Statements of Operations.
(3) Expense is included in Interest expense on the Consolidated Statements of Operations.
(4) Certain finance leases receive regulatory accounting treatment and are reclassified to Fuel expense and Purchased power expense.
(5) Variable lease costs include costs related to variable payments that are based on energy production levels, which are allocated to expense based on the determination of lease and non-lease components associated with the underlying agreements.

TVA's variable lease costs are primarily related to renewable energy purchase agreements that require TVA to purchase all output from the underlying facility. Payments under those agreements are solely based on the actual output over the lease term. Certain TVA lease agreements contain renewal options. Those renewal options that are reasonably certain to be exercised are included in the lease measurements.

The following table contains additional information with respect to cash and non-cash activities related to leases:

Amounts Recognized on TVA's Consolidated Statements of Cash Flows
For the years ended September 30
(in millions)

	2024	2023	2022
Operating cash flows for operating leases	$ 78	$ 77	$ 57
Operating cash flows for finance leases	37	43	42
Financing cash flows for finance leases	76	56	60
Lease assets obtained in exchange for lease obligations (non-cash)			
Operating leases	$ 115	$ 84	$ 43
Finance leases	230	3	—

TVA has certain finance leases under PPAs under which the present value of the minimum lease payments exceeds the fair value of the related lease asset at the date of measurement. This resulted in an interest rate that was higher than TVA's incremental borrowing rate. The weighted average remaining lease terms in years and the weighted average discount rate for TVA's operating and finance leases were as follows:

Weighted Averages
At September 30

	2024	2023
Weighted average remaining lease terms		
Operating leases	4 years	3 years
Finance leases[1]	9 years	10 years
Weighted average discount rate[2]		
Operating leases	4.3%	4.1%
Finance leases	17.6%	21.6%

Note
(1) One of TVA's finance leases includes an option period to extend, which TVA is reasonably certain to exercise.
(2) The discount rate is calculated using the rate implicit in a lease if it is readily determinable. If the rate used by the lessor is not readily determinable, TVA uses its incremental borrowing rate as permitted by accounting guidance. The incremental borrowing rate is influenced by TVA's credit rating and lease term and as such may differ for individual leases, embedded leases, or portfolios of leased assets.

.

The following table presents maturities of lease liabilities and a reconciliation of the undiscounted cash flows to lease liabilities at September 30, 2024:

Future Minimum Lease Payments Minimum payments outstanding at September 30, 2024 (in millions)		
Operating leases		
2025	$	68
2026		34
2027		31
2028		18
2029		4
Thereafter		8
Minimum annual payments		163
Less: present value discount		(12)
Operating present value of net minimum lease payments	$	151
Finance leases		
2025	$	140
2026		139
2027		137
2028		133
2029		132
Thereafter		452
Minimum annual payments		1,133
Less: amount representing interest		(353)
Finance present value of net minimum lease payments	$	780

TVA has entered into four PPAs with renewable resource providers for solar generation and rights to charge and discharge battery energy storage systems. The systems are considered a lease component in these agreements. These PPAs have terms of 15 - 20 years and are expected to commence between January 2025 and December 2028. Total capacity payments related to these batteries over the term of these PPAs are expected to total $991 million.

9. Other Long-Term Assets

The table below summarizes the types and amounts of TVA's other long-term assets:

Other Long-Term Assets
At September 30
(in millions)

	2024	2023[1]
Loans and other long-term receivables, net	$ 84	$ 97
Prepaid long-term service agreements	62	64
EnergyRight® receivables, net	44	47
Cloud assets	35	15
Prepaid capital assets	29	28
Commodity contract derivative assets	2	12
Other	88	67
Total other long-term assets	$ 344	$ 330

Note
(1) At September 30, 2023, $15 million previously classified as Other (a component of Other long-term assets) has been reclassified to Cloud assets (a component of Other long-term assets) to conform to current year presentation.

Loans and Other Long-Term Receivables. TVA's loans and other long-term receivables primarily consist of economic development loans for qualifying organizations and a receivable for reimbursements to recover the cost of providing long-term, on-site storage for spent nuclear fuel. The current and long-term portions of the loans receivable are reported in Accounts receivable, net and Other long-term assets, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024 and 2023, the carrying amount of the loans receivable, net of discount, reported in Accounts receivable, net was $21 million and $7 million, respectively.

EnergyRight® Receivables. In association with the EnergyRight® program, TVA's local power company customers ("LPCs") offer financing to end-use customers for the purchase of energy-efficient equipment. Depending on the nature of the energy-efficiency project, loans may have a maximum term of five years or 10 years. TVA purchases the resulting loans receivable from its LPCs. The loans receivable are then transferred to a third-party bank with which TVA has agreed to repay in full any loans receivable that have been in default for 180 days or more or that TVA has determined are uncollectible. Given this continuing involvement, TVA accounts for the transfer of the loans receivable as secured borrowings. The current and long-term portions of the loans receivable are reported in Accounts receivable, net and Other long-term assets, respectively, on TVA's Consolidated Balance Sheets. At both September 30, 2024 and 2023, the carrying amount of the loans receivable, net of discount, reported in Accounts receivable, was $12 million. See Note 12 — *Other Long-Term Liabilities* for information regarding the associated financing obligation.

Allowance for Loan Losses. The allowance for loan losses is an estimate of expected credit losses, measured over the estimated life of the loan receivables, that considers reasonable and supportable forecasts of future economic conditions in addition to information about historical experience and current conditions. See Note 1 — *Summary of Significant Accounting Policies — Allowance for Uncollectible Accounts*.

The allowance components, which consist of a collective allowance and specific loans allowance, are based on the risk characteristics of TVA's loans. Loans that share similar risk characteristics are evaluated on a collective basis in measuring credit losses, while loans that do not share similar risk characteristics with other loans are evaluated on an individual basis.

Allowance Components
At September 30
(in millions)

	2024	2023
EnergyRight® loan reserve	$ 1	$ 1
Economic development loan collective reserve	—	1
Economic development loan specific loan reserve	1	1
Total allowance for loan losses	$ 2	$ 3

Prepaid Long-Term Service Agreements. TVA has entered into various long-term service agreements for major maintenance activities at certain of its combined cycle plants. TVA uses the direct expense method of accounting for these arrangements. TVA accrues for parts when it takes ownership and for contractor services when they are rendered. Under

certain of these agreements, payments made exceed the value of parts received and services rendered. The current and long-term portions of the resulting prepayments are reported in Other current assets and Other long-term assets, respectively, on
TVA's Consolidated Balance Sheets. At September 30, 2024 and 2023, prepayments of $7 million and $25 million, respectively, were recorded in Other current assets.

Cloud Assets. TVA has capitalized the implementation costs of hosting arrangements that are considered service contracts as cloud assets. The cloud assets are amortized over the term of the associated hosting arrangements. The current and long-term portions of the cloud assets are reported in Other current assets and Other long-term assets, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024, and September 30, 2023, the carrying amount of the cloud assets reported in Other current assets was $13 million and $7 million, respectively.

Commodity Contract Derivative Assets. TVA enters into certain derivative contracts for natural gas that require physical delivery of the contracted quantity of the commodity as well as certain financial derivative contracts to hedge exposure to the price of natural gas. See Note 15 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

10. Regulatory Assets and Liabilities

TVA records certain assets and liabilities that result from the regulated ratemaking process that would not be recorded under GAAP for non-regulated entities. As such, certain items that would generally be reported in earnings or that would impact the Consolidated Statements of Operations are recorded as regulatory assets or regulatory liabilities. Regulatory assets generally represent incurred costs that have been deferred because such costs are probable of future recovery in customer rates. Regulatory liabilities generally represent obligations to make refunds to customers for previous collections for costs that are not likely to be incurred or deferral of gains that will be credited to customers in future periods. Components of regulatory assets and regulatory liabilities are summarized in the table below.

Regulatory Assets and Liabilities
At September 30
(in millions)

	2024	2023
Current regulatory assets		
Unrealized losses on commodity derivatives	$ 102	$ 136
Unrealized losses on interest rate derivatives	54	31
Fuel cost adjustment receivable	35	11
Total current regulatory assets	191	178
Non-current regulatory assets		
Non-nuclear decommissioning costs	6,187	2,922
Retirement benefit plans deferred costs	1,979	1,440
Unrealized losses on interest rate derivatives	447	272
Nuclear decommissioning costs	362	728
Environmental compliance and remediation costs	215	—
Unrealized losses on commodity derivatives	64	52
Other non-current regulatory assets	154	152
Total non-current regulatory assets	9,408	5,566
Total regulatory assets	$ 9,599	$ 5,744
Current regulatory liabilities		
Fuel cost adjustment tax equivalents	$ 169	$ 201
Unrealized gains on commodity derivatives	5	21
Total current regulatory liabilities	174	222
Non-current regulatory liabilities		
Retirement benefit plans deferred credits	81	95
Unrealized gains on commodity derivatives	2	12
Total non-current regulatory liabilities	83	107
Total regulatory liabilities	$ 257	$ 329

Retirement Benefit Plans Deferred Costs (Credits). TVA measures the funded status of its pension and post-retirement ("OPEB") benefit plans at each year-end balance sheet date. The funded status is measured as the difference between the fair value of plan assets and the benefit obligations at the measurement date for each plan. The changes in funded status are actuarial gains and losses that are recognized on TVA's Consolidated Balance Sheets by adjusting the recognized pension and OPEB liabilities, with the offset deferred as a regulatory asset or a regulatory liability. In an unregulated environment, these deferred costs (credits) would be recognized as an increase or decrease to accumulated other comprehensive income (loss) ("AOCI").

"Incurred cost" is a cost arising from cash paid out or an obligation to pay for an acquired asset or service, and a loss from any cause that has been sustained and for which payment has been or must be made. In the cases of pension and OPEB costs, the unfunded obligation represents a projected liability to the employee for services rendered, and thus it meets the definition of an incurred cost. Therefore, amounts that otherwise would be charged to AOCI for these costs are recorded as a regulatory asset or liability since TVA has historically recovered pension and OPEB expense in rates. Through historical and

current year expense included in ratemaking, the TVA Board has demonstrated the ability and intent to include pension and OPEB costs in allowable costs and in rates for ratemaking purposes. As a result, it is probable that future revenue will result from inclusion of the pension and OPEB regulatory assets or regulatory liability in allowable costs for ratemaking purposes.

The regulatory asset and liability are classified as long-term, which is consistent with the pension and OPEB liabilities, and are not amortized to the Consolidated Statements of Operations over a specified recovery period. They are adjusted either upward or downward each year in conjunction with the adjustments to the unfunded pension liability and OPEB liability, as calculated by the actuaries. Ultimately the regulatory asset and liability will be recognized in the Consolidated Statements of Operations in the form of pension and OPEB expense as the actuarial liabilities are eliminated in future periods. See Note 20 — *Benefit Plans — Obligations and Funded Status*.

Additionally on October 1, 2014, TVA began recognizing pension costs as a regulatory asset to the extent that the amount calculated under GAAP as pension expense differs from the amount TVA contributes to the pension plan. As a result of previous plan design changes, future contributions are expected to exceed the expense calculated under U.S. GAAP. Accordingly, TVA discontinued this regulatory accounting practice as all such deferred costs were recovered as of September 30, 2024.

Non-Nuclear Decommissioning Costs. Non-nuclear decommissioning costs include (1) certain deferred charges related to the future closure and decommissioning of TVA's non-nuclear long-lived assets, (2) recognition of changes in the liability, (3) recognition of changes in the value of TVA's ART, and (4) certain other deferred charges under the accounting rules for asset retirement obligations ("AROs"). TVA has established the ART to more effectively segregate, manage, and invest funds to help meet future non-nuclear AROs. The funds from the ART may be used, among other things, to pay the costs related to the future closure and retirement of non-nuclear long-lived assets under various legal requirements. These future costs can be funded through a combination of investment funds set aside in the ART, future earnings on those investment funds, and future cash contributions to the ART. In 2024 and 2023, TVA recovered in rates an amount determined by the average life of debt financed for non-nuclear decommissioning expenditures, assuming a 20-year debt service period, and contributions to the ART. Deferred charges will be recovered in rates based on an analysis of the expected expenditures, contributions, and investment earnings required to recover the decommissioning costs. Recovery of future decommissioning costs is dependent upon the future earnings of the ART, timing of decommissioning activities, and changes in decommissioning estimates. The regulatory asset is classified as long-term as amounts recovered are used to service debt or to contribute to the ART, which is restricted for future decommissioning costs.

During 2024, TVA recorded additional estimated AROs of $3.1 billion as a result of the Environmental Protection Agency's ("EPA's") final legacy coal combustion residual ("CCR") rule ("Legacy CCR Rule") and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated. See Note 13 — *Asset Retirement Obligations.*

Environmental Compliance and Remediation Costs. TVA uses regulatory accounting for certain amounts associated with compliance with an order, regulation, settlement, or lawsuit, or certain costs associated with environmental remediation activities, including but not limited to those involving environmental cleanup activities and groundwater activities. Costs will be recovered in rates based on the average life of debt financed to fund actual expenditures. See Note 22 — *Contingencies and Legal Proceedings — Contingencies — Environmental Matters.*

Unrealized Losses on Interest Rate Derivatives. TVA uses regulatory accounting treatment to defer the unrealized gains and losses on certain interest rate derivative contracts. When amounts in these contracts are realized, the resulting gains or losses are included in the ratemaking formula. The unrealized losses on these interest rate derivatives are recorded on TVA's Consolidated Balance Sheets as current and non-current regulatory assets, and the related realized gains or losses, if any, are recorded on TVA's Consolidated Statements of Operations when the contracts settle. A portion of certain unrealized gains and losses will be amortized into earnings over the remaining lives of the contracts. Gains and losses on interest rate derivatives that are expected to be realized within the next year are included as a current regulatory asset or liability on TVA's Consolidated Balance Sheets.

TVA does not recognize unrealized gains and losses from the investment portfolios and derivative instruments within earnings but rather defers all such gains and losses within a regulatory liability or asset in accordance with its accounting policy. See Note 15 — *Risk Management Activities and Derivative Transactions* and Note 16 — *Fair Value Measurements*.

Nuclear Decommissioning Costs. Nuclear decommissioning costs include (1) certain deferred charges related to the future closure and decommissioning of TVA's nuclear generating units under the Nuclear Regulatory Commission ("NRC") requirements, (2) recognition of changes in the liability, (3) recognition of changes in the value of TVA's NDT, and (4) certain other deferred charges under the accounting rules for AROs. These future costs can be funded through a combination of investment funds set aside in the NDT and ART and future earnings on those investment funds. Deferred charges will be recovered in rates based on the analysis of expected expenditures, contributions, and investment earnings required to recover the decommissioning costs. See Note 1 — *Summary of Significant Accounting Policies — Investment Funds*. Recovery of future decommissioning costs is dependent upon the future earnings of the NDT and ART, timing of decommissioning activities, and changes in decommissioning estimates. The regulatory asset is classified as long-term as amounts recovered are

contributed to the NDT or the ART, which are restricted for future decommissioning costs. See Note 13 — *Asset Retirement Obligations* and Note 16 — *Fair Value Measurements.*

Unrealized Gains (Losses) on Commodity Derivatives. TVA enters into certain derivative contracts for natural gas that require the physical delivery of the contracted quantity of the commodity. Unrealized gains (losses) on natural gas purchase contracts, included as part of unrealized gains (losses) on commodity derivatives, relate to the mark-to-market ("MtM") valuation of natural gas purchase contracts. The natural gas purchase contracts qualify as derivative contracts but do not qualify for cash flow hedge accounting treatment. As a result, TVA recognizes the changes in the market value of these derivative contracts as a regulatory liability or asset. This treatment reflects TVA's ability and intent to recover the cost of these commodity contracts on a settlement basis for ratemaking purposes through the fuel cost adjustment. TVA recognizes the actual cost of fuel received under these contracts in fuel and purchased power expense at the time the fuel is used to generate electricity. These contracts expire at various times through December 2028. Unrealized gains and losses on contracts with a maturity of less than one year are included as a current regulatory asset or liability on TVA's Consolidated Balance Sheets. See Note 15 — *Risk Management Activities and Derivative Transactions.*

Currently, TVA is hedging exposure to the price of natural gas under the Financial Hedging Program ("FHP"). Deferred gains and losses relating to TVA's FHP are included as part of unrealized gains and losses on commodity derivatives. TVA defers all MtM unrealized gains or losses as regulatory liabilities or assets, respectively, and records the realized gains or losses in fuel and purchased power expense as the contracts settle to match the delivery period of the underlying commodity. These contracts expire at various times through March 2028. This accounting treatment reflects TVA's ability and intent to include the realized gains or losses of these commodity contracts in future periods through the fuel cost adjustment. Net unrealized gains and losses for any settlements that occur within 12 months or less are classified as a current regulatory liability or asset on TVA's Consolidated Balance Sheets. See Note 15 — *Risk Management Activities and Derivative Transactions.*

Fuel Cost Adjustment Receivable. The fuel cost adjustment provides a mechanism to alter rates monthly to reflect changing fuel and purchased power costs. There is typically a lag between the occurrence of a change in fuel and purchased power costs and the reflection of the change in fuel rates. Balances in the fuel cost adjustment regulatory accounts represent over-collected or under-collected revenues that offset fuel and purchased power costs, and the fuel rate is designed to recover or refund the balance in less than one year.

Other Non-Current Regulatory Assets. Other non-current regulatory assets consist of the following:

Deferred Lease Asset and Other Financing Obligations. For certain leases, TVA recognized the initial finance lease and other financing asset and liability at inception of the lease or other obligation. However, the annual expense recognized in rates is equal to the annual payments, which differs from GAAP treatment for non-regulated entities. This practice results in TVA's asset balances being higher than they otherwise would have been under GAAP, with the difference representing a regulatory asset related to the lease or other financing obligation. These costs will be amortized over the respective lease or other financing obligation terms as payments are made. As the costs associated with this regulatory asset are not currently being considered in rates and the asset is expected to increase over the next year, the regulatory asset has been classified as long-term.

Debt Reacquisition Costs. Reacquisition expenses, call premiums, and other related costs, such as unamortized debt issue costs associated with redeemed Bond issues, are deferred and amortized (accreted) on a straight-line basis over the weighted average life of TVA's debt portfolio. Because timing of additional reacquisition expenses and changes to the weighted average life of the debt are uncertain, the regulatory asset is classified as long-term.

Retirement Removal Costs. Retirement removal costs, net of salvage, that are not legally required are recognized as a regulatory asset. Net removal costs are amortized over a one-year period subsequent to completion of the removal activities. TVA treats this regulatory asset as long-term in its entirety primarily because it relates to assets that are long-term in nature.

Fuel Cost Adjustment Tax Equivalents. The fuel cost adjustment includes a provision related to the current funding of the future payments TVA will make. As TVA records the fuel cost adjustment, five percent of the calculation that relates to a future asset or liability for tax equivalent payments is recorded as a current regulatory liability and paid or refunded in the following year.

11. Variable Interest Entities

A VIE is an entity that either (i) has insufficient equity to permit the entity to finance its activities without additional subordinated financial support or (ii) has equity investors who lack the characteristics of owning a controlling financial interest. When TVA determines that it has a variable interest in a VIE, a qualitative evaluation is performed to assess which interest holders have the power to direct the activities that most significantly impact the economic performance of the entity and have the obligation to absorb losses or receive benefits that could be significant to the entity. The evaluation considers the purpose and design of the business, the risks that the business was designed to create and pass along to other entities, the activities of the business that can be directed and which party can direct them, and the expected relative impact of those activities on the economic performance of the business through its life. TVA has the power to direct the activities of an entity when it has the

ability to make key operating and financing decisions, including, but not limited to, capital investment and the issuance of debt. Based on the evaluation of these criteria, TVA has determined it is the primary beneficiary of certain entities and as such is required to account for the VIEs on a consolidated basis.

John Sevier VIEs

In 2012, TVA entered into a $1.0 billion construction management agreement and lease financing arrangement with John Sevier Combined Cycle Generation LLC ("JSCCG") for the completion and lease by TVA of the John Sevier Combined Cycle Facility ("John Sevier CCF"). JSCCG is a special single-purpose limited liability company formed in January 2012 to finance the John Sevier CCF through a $900 million secured note issuance (the "JSCCG notes") and the issuance of $100 million of membership interests subject to mandatory redemption. The membership interests were purchased by John Sevier Holdco LLC ("Holdco"). Holdco is a special single-purpose entity, also formed in January 2012, established to acquire and hold the membership interests in JSCCG. A non-controlling interest in Holdco is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows are allocated.

The membership interests held by Holdco in JSCCG were purchased with proceeds from the issuance of $100 million of secured notes (the "Holdco notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each January 15 and July 15, with a final payment due in January 2042. The payment dates for the mandatorily redeemable membership interests are the same as those of the Holdco notes. The sale of the JSCCG notes, the membership interests in JSCCG, and the Holdco notes closed in January 2012. The JSCCG notes are secured by TVA's lease payments, and the Holdco notes are secured by Holdco's investment in, and amounts receivable from, JSCCG. TVA's lease payments to JSCCG are equal to and payable on the same dates as JSCCG's and Holdco's semi-annual debt service payments. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by JSCCG and Holdco. Certain agreements related to this transaction contain default and acceleration provisions.

Due to its participation in the design, business activity, and credit and financial support of JSCCG and Holdco, TVA has determined that it has a variable interest in each of these entities. Based on its analysis, TVA has concluded that it is the primary beneficiary of JSCCG and Holdco and, as such, is required to account for the VIEs on a consolidated basis. Holdco's membership interests in JSCCG are eliminated in consolidation.

Southaven VIE

In 2013, TVA entered into a $400 million lease financing arrangement with Southaven Combined Cycle Generation LLC ("SCCG") for the lease by TVA of the Southaven Combined Cycle Facility ("Southaven CCF"). SCCG is a special single-purpose limited liability company formed in June 2013 to finance the Southaven CCF through a $360 million secured notes issuance (the "SCCG notes") and the issuance of $40 million of membership interests subject to mandatory redemption. The membership interests were purchased by Southaven Holdco LLC ("SHLLC"). SHLLC is a special single-purpose entity, also formed in June 2013, established to acquire and hold the membership interests in SCCG. A non-controlling interest in SHLLC is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows of SHLLC are allocated.

The membership interests held by SHLLC were purchased with proceeds from the issuance of $40 million of secured notes (the "SHLLC notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each February 15 and August 15, with a final payment due on August 15, 2033. The payment dates for the mandatorily redeemable membership interests are the same as those of the SHLLC notes, and the payment amounts are sufficient to provide returns on, as well as returns of, capital until the investment has been repaid to SHLLC in full. The rate of return on investment to SHLLC is seven percent, which is reflected as interest expense in the Consolidated Statements of Operations. SHLLC is required to pay a pre-determined portion of the return on investment to Seven States Southaven, LLC ("SSSL") on each lease payment date as agreed in SHLLC's formation documents (the "Seven States Return"). The current and long-term portions of the Membership interests of VIE subject to mandatory redemption are included in Accounts payable and accrued liabilities and Other long-term liabilities, respectively.

The payment dates for the mandatorily redeemable membership interests are the same as those of the SHLLC notes. The SCCG notes are secured by TVA's lease payments, and the SHLLC notes are secured by SHLLC's investment in, and amounts receivable from, SCCG. TVA's lease payments to SCCG are payable on the same dates as SCCG's and SHLLC's semi-annual debt service payments and are equal to the sum of (i) the amount of SCCG's semi-annual debt service payments, (ii) the amount of SHLLC's semi-annual debt service payments, and (iii) the amount of the Seven States Return. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by SCCG and SHLLC. Certain agreements related to this transaction contain default and acceleration provisions.

In the event that TVA were to choose to exercise an early buy out feature of the Southaven facility lease, in part or in whole, TVA must pay to SCCG amounts sufficient for SCCG to repay or partially repay on a pro rata basis the membership interests held by SHLLC, including any outstanding investment amount plus accrued but unpaid return. TVA also has the right, at any time and without any early redemption of the other portions of the Southaven facility lease payments due to SCCG, to fully repay SHLLC's investment, upon which repayment SHLLC will transfer the membership interests to a designee of TVA.

TVA participated in the design, business activity, and financial support of SCCG and has determined that it has a direct variable interest in SCCG resulting from risk associated with the value of the Southaven CCF at the end of the lease term. Based on its analysis, TVA has determined that it is the primary beneficiary of SCCG and, as such, is required to account for the VIE on a consolidated basis.

Impact on Consolidated Financial Statements

The financial statement items attributable to carrying amounts and classifications of JSCCG, Holdco, and SCCG as of September 30, 2024 and 2023, as reflected on the Consolidated Balance Sheets, are as follows:

Summary of Impact of VIEs on Consolidated Balance Sheets
At September 30
(in millions)

	2024	2023
Current liabilities		
Accrued interest	$ 9	$ 9
Accounts payable and accrued liabilities	1	1
Current maturities of long-term debt of variable interest entities	37	35
Total current liabilities	47	45
Other liabilities		
Other long-term liabilities	16	17
Long-term debt, net		
Long-term debt of variable interest entities, net	897	933
Total liabilities	$ 960	$ 995

Interest expense of $46 million, $48 million, and $50 million related to debt of VIEs and membership interests of variable interest entity subject to mandatory redemption is included on the Consolidated Statements of Operations for the years ended September 30, 2024, 2023, and 2022, respectively.

At September 30, 2024, TVA had outstanding debt of VIEs of $934 million and outstanding membership interests subject to mandatory redemption (including current portion) of $17 million issued by one of its VIEs of which it is the primary beneficiary. The following table sets forth TVA's future payments at September 30, 2024:

Maturities Due in the Year Ending September 30
(in millions)

	2025	2026	2027	2028	2029	Thereafter
Long-term debt of VIEs including current maturities[(1)]	$ 37	$ 39	$ 40	$ 42	$ 44	$ 737
Membership interests of variable interest entity subject to mandatory redemption	1	1	1	1	2	11

Note
(1) Long-term debt of VIEs does not include non-cash item of unamortized debt issue costs of $5 million.

Creditors of the VIEs do not have any recourse to the general credit of TVA. TVA does not have any obligations to provide financial support to the VIEs other than as prescribed in the terms of the agreements related to these transactions.

12. Other Long-Term Liabilities

Other long-term liabilities consist primarily of liabilities related to certain derivative agreements as well as liabilities related to operating leases. The table below summarizes the types and amounts of Other long-term liabilities:

Other Long-Term Liabilities
At September 30
(in millions)

	2024	2023[1]
Interest rate swap liabilities	$ 792	$ 627
Environmental compliance and remediation costs	212	—
Long-term project cost accruals	140	10
Currency swap liabilities	109	131
Operating lease liabilities	88	93
Commodity contract derivative liabilities	64	52
Advances for construction	55	56
EnergyRight® financing obligation	52	55
Long-term deferred compensation	50	41
Long-term deferred revenue	48	45
Other	102	101
Total other long-term liabilities	$ 1,712	$ 1,211

(1) At September 30, 2023, $10 million previously classified as Other (a component of Other long-term liabilities) has been reclassified to Long-term project cost accruals (a component of Other long-term liabilities) to conform with current year presentation.

Interest Rate Swap Liabilities. TVA uses interest rate swaps to fix variable short-term debt to a fixed rate. The values of these derivatives are included in Other current assets, Accounts payable and accrued liabilities, Accrued interest, and Other long-term liabilities on the Consolidated Balance Sheets. See Note 15 — *Risk Management Activities and Derivative Transactions — Overview of Accounting Treatment* and *Derivatives Not Receiving Hedge Accounting Treatment — Interest Rate Derivative*s for information regarding the interest rate swap liabilities.

Operating Lease Liabilities. TVA's operating leases consist primarily of railcars, equipment, real estate/land, and power generating facilities. At September 30, 2024 and 2023, the current portion of TVA's operating leases reported in Accounts payable and accrued liabilities was $63 million and $71 million, respectively. See Note 8 — *Leases* for more information regarding leases.

Currency Swap Liabilities. To protect against exchange rate risk related to British pound sterling denominated Bond transactions, TVA entered into foreign currency hedges. The values of these derivatives are included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. See Note 15 — *Risk Management Activities and Derivative Transactions — Overview of Accounting Treatment* and *Cash Flow Hedging Strategy for Currency Swaps* for more information regarding the currency swap liabilities.

Commodity Contract Derivative Liabilities. TVA enters into certain derivative contracts for natural gas that require physical delivery of the contracted quantity of the commodity as well as certain financial derivative contracts to hedge exposure to the price of natural gas. See Note 15 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

EnergyRight® Financing Obligation. TVA purchases certain loans receivable from its LPCs in association with the EnergyRight® program. The current and long-term portions of the resulting financing obligation are reported in Accounts payable and accrued liabilities and Other long-term liabilities, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024 and 2023, the carrying amount of the financing obligation reported in Accounts payable and accrued liabilities was $13 million and $14 million respectively. See Note 9 — *Other Long-Term Assets* for information regarding the associated loans receivable.

Long-Term Deferred Compensation. TVA provides compensation arrangements to engage and retain certain employees, both executive and non-executive, which are designed to provide participants with the ability to defer compensation to future periods. The current and long-term portions are recorded in Accounts payable and accrued liabilities and Other long-term liabilities, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024 and 2023, the current amount of deferred compensation recorded in Accounts payable and accrued liabilities was $74 million and $65 million, respectively.

Advances for Construction. TVA receives refundable and non-refundable advances for construction that are generally intended to defray all or a portion of the costs of building or extending TVA's existing power assets. Amounts received are deferred as a liability with the long-term portion representing amounts that will not be recognized within the next 12 months. As projects meet milestones or other contractual obligations, the refundable portion is refunded to the customer and the non-refundable portion is recognized as contributions in aid of construction and offsets the cost of plant assets. At September 30, 2024 and 2023, the current amount of advances for construction recorded in Accounts payable and accrued liabilities was $60 million and $39 million, respectively.

Long-Term Deferred Revenue. Long-term deferred revenue represents payments received that exceed services rendered resulting in the deferral of revenue. This long-term portion represents amounts that will not be recognized within the next 12 months primarily related to fiber and transmission agreements. The current and long-term portions of the deferral are recorded in Accounts payable and accrued liabilities and Other long-term liabilities, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024 and 2023, the current amount of deferred revenue recorded in Accounts payable and accrued liabilities was $28 million and $21 million, respectively.

Environmental Compliance and Remediation Costs. Environmental compliance and remediation costs represent certain costs associated with environmental remediation activities, including but not limited to those involving environmental cleanup activities and groundwater activities. The current and long-term portions of environmental compliance and remediation costs are reported in Accounts payable and accrued liabilities and Other long-term liabilities, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024, the current amount of the environmental compliance and remediation costs reported in Accounts payable and accrued liabilities was $3 million. There were no current amounts at September 30, 2023.

Long-Term Project Cost Accruals. Long-term project cost accruals represent the unpaid liability associated with major construction projects and other project expenditures. TVA accrues these costs based on level of completion of the vendor's performance obligation, and the long-term portion represents amounts that will not be paid within the next 12 months. The current and long-term portions of Long-term project cost accruals are reported in Accounts payable and accrued liabilities and Other long-term liabilities, respectively, on TVA's Consolidated Balance Sheets. At September 30, 2024 and September 30, 2023, the current amount of the long-term project cost accruals reported in Accounts payable and accrued liabilities was $124 million and $14 million, respectively.

13. Asset Retirement Obligations

During the year ended September 30, 2024, TVA's total ARO liability increased $3.3 billion.

To estimate its decommissioning obligation related to its nuclear generating stations, TVA uses a probability-weighted, discounted cash flow model which, on a unit-by-unit basis, considers multiple outcome scenarios that include significant estimations and assumptions. Those assumptions include (1) estimates of the cost of decommissioning; (2) the method of decommissioning and the timing of the related cash flows; (3) the license period of the nuclear plant, considering the probability of license extensions; (4) cost escalation factors; and (5) the credit adjusted risk free rate to measure the obligation at the present value of the future estimated costs. TVA has ascribed probabilities to two different decommissioning methods related to its nuclear decommissioning obligation estimate: the DECON method and the SAFSTOR method. The DECON method requires radioactive contamination to be removed from a site and safely disposed of or decontaminated to a level that permits the site to be released for unrestricted use shortly after it ceases operation. The SAFSTOR method allows nuclear facilities to be placed and maintained in a condition that allows the facilities to be safely stored and subsequently decontaminated to levels that permit release for unrestricted use.

TVA also has decommissioning obligations related to its non-nuclear generating sites, ash impoundments, transmission substation and distribution assets, and certain general facilities. To estimate its decommissioning obligation related to these assets, TVA uses a probability-weighted, discounted cash flow model which, on a unit-by-unit basis, considers multiple outcome scenarios that include significant estimations and assumptions. Those assumptions include (1) estimates of the costs of decommissioning, (2) the method of decommissioning and the timing of the related cash flows, (3) the expected retirement date of each asset, (4) cost escalation factors, and (5) the credit adjusted risk free rate to measure the obligation at the present value of the future estimated costs. TVA bases its decommissioning estimates for each asset on its identified preferred closure method.

On May 8, 2024, EPA published its Legacy CCR Rule, which expands the scope of the existing regulatory requirements of EPA's 2015 CCR rule, as revised ("2015 CCR Rule"), to include two additional classes of CCR units: legacy CCR surface impoundments ("Legacy SIs") and CCR management units ("CCRMUs"). Legacy SIs include inactive surface impoundments at retired generating facilities that were exempt from the 2015 CCR Rule. CCRMUs are a newly defined category that includes previously unregulated areas at CCR facilities where CCR was beneficially reused in an unencapsulated manner, disposed, placed, or managed on land outside of CCR units regulated by the 2015 CCR Rule. TVA records the fair value of a liability for an ARO in the period in which it is incurred if a reasonable estimate of fair value can be made. As a result of the enactment of the final rule, during 2024, TVA recorded additional estimated AROs of $3.1 billion and recorded a corresponding regulatory asset of $3.1 billion due to these AROs being associated with closed sites and asset retirement costs having been fully depreciated. Key assumptions used to determine this estimate include the preliminary identification of Legacy SIs and CCRMUs at TVA facilities

impacted by the rule, the anticipated number of acres per newly regulated CCR unit, the expected closure method, a cost benchmark per acre based on sites currently being remediated, the potential duration of closure activities, and the escalation and discount factors. There are legal challenges to the Legacy CCR Rule that may impact the number and scope of newly regulated units and the determinations on final closure requirements and performance standards. Revisions to the additional estimated non-nuclear AROs from the Legacy CCR Rule will be made whenever factors indicate that the timing or amounts of estimated cash flows have changed. See also Note 22 — *Commitments and Contingencies — Environmental Matters*.

Revisions in non-nuclear estimates increased the liability balance by $292 million for the year ended September 30, 2024. The increase was primarily attributable to a change in closure liabilities of $231 million at Gallatin Fossil Plant based on scope changes, new vendor bids, and updated cost estimates for activities associated with final closure and $76 million at Cumberland based on scope changes to the interim closure plan and updated cost estimates for activities associated with final closure. Additionally, TVA completed a study of its CCR post-closure care obligations in September 2024, which resulted in an increase of $32 million as a result of expected cost increases. In September 2024, TVA decreased its liability for legacy CCR areas by $38 million as a result of revised acreage assumptions for areas covered by the Legacy CCR Rule.

Revisions in nuclear estimates decreased the liability balance by $160 million for the year ended September 30, 2024. The decrease was primarily attributable to an estimate revision of $164 million following the filing of a subsequent license renewal ("SLR") application with the Nuclear Regulatory Commission ("NRC") for Browns Ferry Nuclear Plant ("Browns Ferry"). If approved, the SLR will allow for an additional 20 years of operations for each of Browns Ferry's three units, resulting in a total operating life of 80 years.

For the year ended September 30, 2023, the revisions in non-nuclear estimates increased the liability balance by $362 million. During the year, CCR closure liabilities at Bull Run, Johnsonville, and Cumberland increased $458 million due to revised cost estimates for final closure activities based on TVA's current approved closure strategies at these sites. Partially offsetting these increases, expected reductions in CCR post-closure costs for long-term monitoring at Gallatin resulted in a decrease of $60 million. In addition, CCR closure liabilities at Cumberland decreased $15 million due to identified changes in the projected timing of certain asset retirement activities, and CCR closure liabilities at Paradise decreased $9 million based on refined project cost estimates.

Additionally, during the years ended September 30, 2024 and 2023, both the nuclear and non-nuclear liabilities were increased by periodic accretion, partially offset by settlements related to retirement projects that were conducted during the respective periods. The nuclear and non-nuclear accretion amounts were deferred as regulatory assets. During 2024, 2023, and 2022, $188 million, $188 million, and $137 million, respectively, of the related regulatory assets were amortized into expense as these amounts were collected in rates. See Note 10 — *Regulatory Assets and Liabilities*. TVA maintains investment trusts to help fund its decommissioning obligations. See Note 16 — *Fair Value Measurements — Investment Funds* and Note 22 — *Commitments and Contingencies — Contingencies — Decommissioning Costs* for a discussion of the trusts' objectives and the current balances of the trusts.

Asset Retirement Obligation Activity
(in millions)

	Nuclear	Non-Nuclear	Total
Balance at September 30, 2022	$ 3,643	$ 3,519	$ 7,162
Settlements	(8)	(271)	(279)
Revisions in estimate (non-cash)	7	362	369
Accretion (recorded as regulatory asset)	166	71	237
Balance at September 30, 2023	3,808	3,681	7,489 [1]
Settlements	(4)	(253)	(257)
Revisions in estimate (non-cash)	(160)	292	132
Additional obligations (non-cash)	—	3,136	3,136
Accretion (recorded as regulatory asset)	170	136	306
Balance at September 30, 2024	$ 3,814	$ 6,992	$ 10,806 [1]

Note
(1) Includes $283 million and $272 million at September 30, 2024 and 2023, respectively, in Current liabilities.

14. Debt and Other Obligations

General

The TVA Act authorizes TVA to issue Bonds in an amount not to exceed $30.0 billion at any time. At September 30, 2024, TVA had only two types of Bonds outstanding: power bonds and discount notes. Power bonds have maturities between one year and 50 years, and discount notes have maturities of less than one year. Power bonds and discount notes are both issued pursuant to Section 15d of the TVA Act and pursuant to the Basic Tennessee Valley Authority Power Bond Resolution adopted by the TVA Board on October 6, 1960, as amended on September 28, 1976, October 17, 1989, and March 25, 1992 (the "Basic Resolution"). Bonds are not obligations of the U.S., and the U.S. does not guarantee the payments of principal or interest on Bonds.

Power bonds and discount notes rank on parity and have first priority of payment from net power proceeds, which are defined as the remainder of TVA's gross power revenues after deducting the costs of operating, maintaining, and administering its power properties and tax equivalent payments, but before deducting depreciation accruals or other charges representing the amortization of capital expenditures, plus the net proceeds from the sale or other disposition of any power facility or interest therein.

TVA considers its scheduled payments under its lease financing arrangements involving John Sevier CCF and Southaven CCF as costs of operating, maintaining, and administering its power properties. Costs of operating, maintaining, and administering TVA's power properties have priority over TVA's payments on the Bonds. Once net power proceeds have been applied to payments on power bonds and discount notes as well as any other Bonds that TVA may issue in the future that rank on parity with or subordinate to power bonds and discount notes, Section 2.3 of the Basic Resolution provides that the remaining net power proceeds shall be used only for (1) minimum payments into the U.S. Treasury required by the TVA Act as repayment of, and as a return on, the Power Program Appropriation Investment; (2) investment in power system assets; (3) additional reductions of TVA's capital obligations; and (4) other lawful purposes related to TVA's power business.

The TVA Act and the Basic Resolution each contain two bond tests: the rate test and the bondholder protection test. Under the rate test, TVA must charge rates for power which will produce gross revenues sufficient to provide funds for, among other things, debt service on outstanding Bonds. As of September 30, 2024, TVA was in compliance with the rate test. Under the bondholder protection test, TVA must, in successive five-year periods, use an amount of net power proceeds at least equal to the sum of (1) the depreciation accruals and other charges representing the amortization of capital expenditures and (2) the net proceeds from any disposition of power facilities for either the reduction of its capital obligations (including Bonds and the Power Program Appropriation Investment) or investment in power assets. TVA met the bondholder protection test for the five-year period ended September 30, 2020, and must next meet the bondholder protection test for the five-year period ending September 30, 2025.

Secured Debt of VIEs

On August 9, 2013, SCCG issued secured notes totaling $360 million that bear interest at a rate of 3.846 percent. The SCCG notes require amortizing semi-annual payments on each February 15 and August 15, and mature on August 15, 2033. Also on August 9, 2013, SCCG issued $40 million of membership interests subject to mandatory redemption. The proceeds from the secured notes issuance and the issuance of the membership interests were paid to TVA in accordance with the terms of the Southaven head lease. See Note 11 — *Variable Interest Entities — Southaven VIE*. TVA used the proceeds from the transaction primarily to fund the acquisition of the Southaven CCF from SSSL.

On January 17, 2012, JSCCG issued secured notes totaling $900 million in aggregate principal amount that bear interest at a rate of 4.626 percent. Also on January 17, 2012, Holdco issued secured notes totaling $100 million that bear interest at a rate of 7.1 percent. The JSCCG notes and the Holdco notes require amortizing semi-annual payments on each January 15 and July 15, and mature on January 15, 2042. The Holdco notes require a $10 million balloon payment upon maturity. See Note 11 — *Variable Interest Entities — John Sevier VIEs*. TVA used the proceeds from the transaction to meet its requirements under the TVA Act.

Secured debt of VIEs, including current maturities, outstanding at September 30, 2024 and 2023 totaled $934 million and $968 million, respectively.

Short-Term Debt

The following table provides information regarding TVA's short-term borrowings:

Short-Term Borrowings
At September 30

	2024	2023
Gross amount outstanding - discount notes (in millions)	$ 1,168	$ 432
Weighted average interest rate - discount notes	4.76 %	5.29 %

Put Options

TVA has two issues of Putable Automatic Rate Reset Securities ("PARRS") outstanding. After a fixed-rate period of five years, the coupon rate on the PARRS may automatically be reset downward under certain market conditions on an annual basis. The coupon rate reset on the PARRS is based on a calculation. For both series of PARRS, the coupon rate will reset downward on the reset date if the rate calculated is below the then-current coupon rate on the Bond. The calculation dates, potential reset dates, and terms of the calculation are different for each series. The coupon rate on the 1998 Series D PARRS may be reset on June 1 (annually) if the sum of the five-day average of the 30-Year Constant Maturity Treasury ("CMT") rate for the week ending the last Friday in April, plus 94 basis points, is below the then-current coupon rate. The coupon rate on the 1999 Series A PARRS may be reset on May 1 (annually) if the sum of the five-day average of the 30-Year CMT rate for the week ending the last Friday in March, plus 84 basis points, is below the then-current coupon rate. The coupon rates may only be reset downward, but investors may request to redeem their Bonds at par value in conjunction with a coupon rate reset for a limited period of time prior to the reset dates under certain circumstances.

The coupon rate for the 1998 Series D PARRS, which mature in June 2028, has been reset eight times, from an initial rate of 6.750 percent to the current rate of 2.134 percent. In connection with these resets, $318 million of the Bonds have been redeemed; therefore, $256 million of the Bonds were outstanding at September 30, 2024. The coupon rate for the 1999 Series A PARRS, which mature in May 2029, has been reset seven times, from an initial rate of 6.50 percent to the current rate of 2.216 percent. In connection with these resets, $316 million of the Bonds have been redeemed; therefore, $208 million of the Bonds were outstanding at September 30, 2024.

Due to the contingent nature of the put option on the PARRS, TVA determines whether the PARRS should be classified as long-term debt or current maturities of long-term debt by calculating the expected reset rate for the Bonds on the calculation dates, described above. If the determination date for reset is before the balance sheet date of the reporting period and the expected reset rate is less than the then-current coupon rate on the PARRS, the PARRS are included in current maturities. Otherwise, the PARRS are included in long-term debt.

Debt Securities Activity

The table below summarizes the long-term debt securities activity for the years ended September 30, 2024 and 2023.

Debt Securities Activity
For the years ended September 30
(in millions)

	2024	2023
Issues		
2023 Series A[1]	$ —	$ 1,000
2024 Series A[2]	1,000	—
Discount on debt issues	(9)	(8)
Total	$ 991	$ 992
Redemptions/Maturities[3]		
2009 Series B	$ 22	$ 29
2014 Series A	1,000	—
Total redemptions/maturities of power bonds	1,022	29
Debt of variable interest entities	35	39
Total redemptions/maturities of debt	$ 1,057	$ 68

Notes
(1) The 2023 Series A Bonds were issued at 99.187 percent of par.
(2) The 2024 Series A Bonds were issued at 99.109 percent of par.

(3) All redemptions were at 100 percent of par.

Debt Outstanding

Total debt outstanding at September 30, 2024 and 2023, consisted of the following:

Short-Term Debt
At September 30
(in millions)

CUSIP or Other Identifier	Maturity	Coupon Rate	2024	2023
Short-term debt, net of discounts			$ 1,167	$ 432
Current maturities of long-term debt of VIEs issued at par			37	35
Current maturities of power bonds issued at par				
880591ER9	9/15/2024	2.875%	—	1,000
880591EF5	12/15/2024	3.770%	1	1
880591EW8	5/15/2025	0.750%	1,000	—
880591EF5	6/15/2025	3.770%	21	21
Total current maturities of power bonds issued at par			1,022	1,022
Total current debt outstanding, net			$ 2,226	$ 1,489

Long-Term Debt
At September 30
(in millions)

CUSIP or Other Identifier	Maturity	Coupon Rate	2024 Par	2023 Par	Stock Exchange Listings
880591EW8	5/15/2025	0.750%	$ —	$ 1,000	New York
880591CJ9	11/1/2025	6.750%	1,350	1,350	New York, Hong Kong, Luxembourg, Singapore
880591EU2	2/1/2027	2.875%	1,000	1,000	New York
880591EZ1	3/15/2028	3.875%	1,000	1,000	New York
880591300[1]	6/1/2028	2.134%	256	256	New York
880591409[1]	5/1/2029	2.216%	208	208	New York
880591DM1	5/1/2030	7.125%	1,000	1,000	New York, Luxembourg
880591EX6	9/15/2031	1.500%	500	500	New York
880591DP4	6/7/2032	6.587% [2]	335 [3]	305 [3]	New York, Luxembourg
880591DV1	7/15/2033	4.700%	472	472	New York, Luxembourg
880591EF5	6/15/2034	3.770%	116	139	None
880591FB3	8/1/2034	4.375%	1,000	—	New York
880591DX7	6/15/2035	4.650%	436	436	New York
880591CK6	4/1/2036	5.980%	121	121	New York
880591CS9	4/1/2036	5.880%	1,500	1,500	New York
880591CP5	1/15/2038	6.150%	1,000	1,000	New York
880591ED0	6/15/2038	5.500%	500	500	New York
880591EH1	9/15/2039	5.250%	2,000	2,000	New York
880591EP3	12/15/2042	3.500%	1,000	1,000	New York
880591DU3	6/7/2043	4.962% [2]	201 [3]	183 [3]	New York, Luxembourg
880591EB4	1/15/2048	4.875%	500	500	New York, Luxembourg
880591EY4	9/15/2052	4.250%	500	500	New York
880591DZ2	4/1/2056	5.375%	1,000	1,000	New York
880591EJ7	9/15/2060	4.625%	1,000	1,000	New York
880591ES7	9/15/2065	4.250%	1,000	1,000	New York
Subtotal			17,995	17,970	
Unamortized discounts, premiums, issue costs, and other			(128)	(126)	
Total long-term outstanding power bonds, net			17,867	17,844	
Long-term debt of VIEs, net			897	933	
Total long-term debt, net			$ 18,764	$ 18,777	

Notes
(1) TVA PARRS, CUSIP numbers 880591300 and 880591409, may be redeemed under certain conditions. See *Put Options* above.
(2) The coupon rate represents TVA's effective interest rate.
(3) CUSIP numbers 880591DP4 and 880591DU3 include total net exchange gain from currency transactions of $62 million and $109 million at September 30, 2024 and 2023, respectively.

Maturities Due in the Year Ending September 30
(in millions)

	2025	2026	2027	2028	2029	Thereafter	Total
Long-term power bonds including current maturities[1]	$ 1,022	$ 1,370	$ 1,020	$ 1,272	$ 220	$ 14,175	$ 19,079
Short-term debt net of discounts	1,167	—	—	—	—	—	1,167

Notes
(1) Long-term power bonds do not include non-cash items of foreign currency exchange gain of $62 million, unamortized debt issue costs of $41 million, or net discount on sale of Bonds of $87 million.

Credit Facility Agreements

TVA has funding available under four long-term revolving credit facilities totaling $2.7 billion. See the table below for additional information on the four long-term revolving credit facilities. The interest rate on any borrowing under these facilities varies based on market factors and the rating of TVA's senior unsecured, long-term, non-credit-enhanced debt. TVA is required to pay an unused facility fee on the portion of the total $2.7 billion that TVA has not borrowed or committed under letters of credit. This fee, along with letter of credit fees, may fluctuate depending on the rating of TVA's senior unsecured, long-term, non-credit-enhanced debt. At September 30, 2024 and 2023, there were $566 million and $535 million, respectively, of letters of credit outstanding under these facilities, and there were no borrowings outstanding. TVA's letters of credit are primarily posted as collateral under TVA's interest rate swaps. See Note 15 — *Risk Management Activities and Derivative Transactions — Other Derivative Instruments — Collateral*. TVA may also post collateral for TVA's currency swaps, for commodity derivatives under the FHP, or for certain transactions with third parties that require TVA to post letters of credit.

The following table provides additional information regarding TVA's funding available under the four long-term revolving credit facilities:

Summary of Long-Term Credit Facilities
At September 30, 2024
(in millions)

Maturity Date	Facility Limit	Letters of Credit Outstanding	Cash Borrowings	Availability
March 2026	$ 150	$ 38	$ —	$ 112
September 2026	1,000	134	—	866
March 2027	1,000	180	—	820
February 2028	500	214	—	286
Total	$ 2,650	$ 566	$ —	$ 2,084

TVA and the U.S. Treasury, pursuant to the TVA Act, have entered into a memorandum of understanding under which the U.S. Treasury provides TVA with a $150 million credit facility. This credit facility was renewed for 2025 with a maturity date of September 30, 2025. Access to this credit facility or other similar financing arrangements with the U.S. Treasury has been available to TVA since the 1960s. TVA can borrow under the U.S. Treasury credit facility only if it cannot issue Bonds in the market on reasonable terms, and TVA considers the U.S. Treasury credit facility a secondary source of liquidity. The interest rate on any borrowing under this facility is based on the average rate on outstanding marketable obligations of the U.S. with maturities from date of issue of 12 months or less. There were no outstanding borrowings under the facility at September 30, 2024. The availability of this credit facility may be impacted by how the U.S. government addresses the possibility of approaching its debt limit.

15. Risk Management Activities and Derivative Transactions

TVA is exposed to various risks related to commodity prices, investment prices, interest rates, currency exchange rates, and inflation as well as counterparty credit and performance risks. To help manage certain of these risks, TVA has historically entered into various derivative transactions, principally commodity option contracts, forward contracts, swaps, swaptions, futures, and options on futures.

Overview of Accounting Treatment

TVA recognizes certain of its derivative instruments as either assets or liabilities on its Consolidated Balance Sheets at fair value. The accounting for changes in the fair value of these instruments depends on (1) whether TVA uses regulatory accounting to defer the derivative gains and losses, (2) whether the derivative instrument has been designated and qualifies for hedge accounting treatment, and (3) if so, the type of hedge relationship (for example, cash flow hedge).

The following tables summarize the accounting treatment that certain of TVA's financial derivative transactions receive:

Summary of Derivative Instruments That Receive Hedge Accounting Treatment (part 1)
Amount of Mark-to-Market Gain (Loss) Recognized in Accumulated Other Comprehensive Income (Loss)
For the years ended September 30
(in millions)

Derivatives in Cash Flow Hedging Relationship	Objective of Hedge Transaction	Accounting for Derivative Hedging Instrument	2024	2023
Currency swaps	To protect against changes in cash flows caused by changes in foreign currency exchange rates (exchange rate risk)	Unrealized gains and losses are recorded in AOCI and reclassified to Interest expense to the extent they are offset by gains and losses on the hedged transaction	$ 25	$ 99

Summary of Derivative Instruments That Receive Hedge Accounting Treatment (part 2)[(1)]
Amount of Gain (Loss) Reclassified from Accumulated Other Comprehensive Income (Loss) to Interest Expense
For the years ended September 30
(in millions)

Derivatives in Cash Flow Hedging Relationship	2024	2023
Currency swaps	$ 48	$ 42

Note
(1) There were no amounts excluded from effectiveness testing for any of the periods presented. Based on forecasted foreign currency exchange rates, TVA expects to reclassify approximately $1 million of gains from AOCI to Interest expense within the next 12 months to offset amounts anticipated to be recorded in Interest expense related to the forecasted exchange loss on the debt.

Summary of Derivative Instruments That Do Not Receive Hedge Accounting Treatment
Amount of Gain (Loss) Recognized in Income on Derivatives[(1)]
For the years ended September 30
(in millions)

Derivative Type	Objective of Derivative	Accounting for Derivative Instrument	2024	2023
Interest rate swaps	To fix short-term debt variable rate to a fixed rate (interest rate risk)	Mark-to-market gains and losses are recorded as regulatory liabilities and assets, respectively Realized gains and losses are recognized in Interest expense when incurred during the settlement period and are presented in operating cash flow	$ (31)	$ (45)
Commodity derivatives under the FHP	To protect against fluctuations in market prices of purchased commodities (price risk)	Mark-to-market gains and losses are recorded as regulatory liabilities and assets, respectively Realized gains and losses are recognized in Fuel expense or Purchased power expense as the contracts settle to match the delivery period of the underlying commodity[(2)]	(295)	(348)

Notes
(1) All of TVA's derivative instruments that do not receive hedge accounting treatment have unrealized gains (losses) that would otherwise be recognized in income but instead are deferred as regulatory liabilities and assets. As such, there were no related gains (losses) recognized in income for these unrealized gains (losses) for the years ended September 30, 2024 and 2023.
(2) Of the amount recognized in 2024, $245 million and $50 million were reported in Fuel expense and Purchased power expense, respectively. Of the amount recognized in 2023, $301 million and $47 million were reported in Fuel expense and Purchased power expense, respectively.

Fair Values of TVA Derivatives
At September 30
(in millions)

	2024		2023	
Derivatives That Receive Hedge Accounting Treatment:				
	Balance	**Balance Sheet Presentation**	**Balance**	**Balance Sheet Presentation**
Currency swaps				
£250 million Sterling	$ (49)	Accounts payable and accrued liabilities $(4); Other long-term liabilities $(45)	$ (72)	Accounts payable and accrued liabilities $(6); Other long-term liabilities $(66)
£150 million Sterling	(67)	Accounts payable and accrued liabilities $(3); Other long-term liabilities $(64)	(69)	Accounts payable and accrued liabilities $(4); Other long-term liabilities $(65)
Derivatives That Do Not Receive Hedge Accounting Treatment:				
	Balance	**Balance Sheet Presentation**	**Balance**	**Balance Sheet Presentation**
Interest rate swaps				
$1.0 billion notional	$ (622)	Accounts payable and accrued liabilities $(10); Accrued interest $(26); Other long-term liabilities $(586)	$ (499)	Other current assets $1; Accrued interest $(27); Other long-term liabilities $(473)
$476 million notional	(218)	Accounts payable and accrued liabilities $(3); Accrued interest $(9); Other long-term liabilities $(206)	(159)	Other current assets $3; Accrued interest $(8); Other long-term liabilities $(154)
Commodity contract derivatives	2	Other current assets $5; Other long-term assets $2; Accounts payable and accrued liabilities $(3); Other long-term liabilities $(2)	31	Other current assets $21; Other long-term assets $12; Accounts payable and accrued liabilities $(1); Other long-term liabilities $(1)
Commodity derivatives under the FHP	(161)	Accounts payable and accrued liabilities $(99); Other long-term liabilities $(62)	(186)	Accounts payable and accrued liabilities $(135); Other long-term liabilities $(51)

Cash Flow Hedging Strategy for Currency Swaps

To protect against exchange rate risk related to British pound sterling denominated Bond transactions, TVA entered into foreign currency hedges at the time the Bond transactions occurred. TVA had the following currency swaps outstanding at September 30, 2024:

Currency Swaps Outstanding

Effective Date of Currency Swap Contract	Associated TVA Bond Issues Currency Exposure	Expiration Date of Swap	Overall Effective Cost to TVA
2001	£250 million	2032	6.587%
2003	£150 million	2043	4.962%

When the dollar strengthens against the British pound sterling, the exchange gain on the Bond liability and related accrued interest is offset by an equal amount of loss on the swap contract that is reclassified out of AOCI. Conversely, the exchange loss on the Bond liability and related accrued interest is offset by an equal amount of gain on the swap contract that is reclassified out of AOCI. All such exchange gains or losses on the Bond liability and related accrued interest are included in Long-term debt, net and Accrued interest, respectively. The offsetting exchange losses or gains on the swap contracts are recognized in AOCI. If any gain (loss) were to be incurred as a result of the early termination of the foreign currency swap contract, the resulting income (expense) would be amortized over the remaining life of the associated Bond as a component of Interest expense. The values of the currency swap liabilities are included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets.

Derivatives Not Receiving Hedge Accounting Treatment

Interest Rate Derivatives. Generally TVA uses interest rate swaps to fix variable short-term debt to a fixed rate, and TVA uses regulatory accounting treatment to defer the MtM gains and losses on its interest rate swaps. The net deferred unrealized gains and losses are classified as regulatory liabilities or assets on TVA's Consolidated Balance Sheets and are included in the ratemaking formula when gains or losses are realized. The values of these derivatives are included in Other current assets, Accounts payable and accrued liabilities, Accrued interest, and Other long-term liabilities on the Consolidated Balance Sheets, and realized gains and losses, if any, are included on TVA's Consolidated Statements of Operations. For the years ended September 30, 2024 and 2023, the changes in fair market value of the interest rate swaps resulted in the increase in unrealized losses of $182 million and the reduction in unrealized losses of $240 million, respectively. TVA may hold short-term debt balances lower than the notional amount of the interest rate swaps from time to time due to changes in business conditions and other factors. While actual balances vary, TVA generally plans to maintain average balances of short-term debt equal to or in excess of the combined notional amount of the interest rate swaps.

Commodity Derivatives. TVA enters into certain derivative contracts for natural gas that require physical delivery of the contracted quantity of the commodity. TVA may also enter into short-term PPAs with a term of less than one year that provide an option to financially settle contracted power deliveries. This option creates an embedded derivative in the hosting power purchase agreement. TVA marks to market these contracts and defers the unrealized gains (losses) as regulatory liabilities (assets). At September 30, 2024, TVA's natural gas contract derivatives had terms of up to four years.

Commodity Contract Derivatives
At September 30

	2024			2023		
	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)
Natural gas contract derivatives	45	321 million mmBtu	$ 2	54	318 million mmBtu	$ 31

Commodity Derivatives under the FHP. Currently, TVA is hedging exposure to the price of natural gas under the FHP. There is no Value at Risk aggregate transaction limit under the current FHP structure, but the TVA Board reviews and authorizes the use of tolerances and measures annually. TVA's FHP policy prohibits trading financial instruments under the FHP for speculative purposes. At September 30, 2024, TVA's natural gas swap contracts under the FHP had remaining terms of up to four years.

Commodity Derivatives under Financial Hedging Program[1]
At September 30

	2024			2023		
	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)
Natural gas swap contracts	126	230 million mmBtu	$ (161)	221	388 million mmBtu	$ (186)

Note
(1) Fair value amounts presented are based on the net commodity position with the counterparty. Notional amounts disclosed represent the net value of contractual amounts.

TVA defers all FHP unrealized gains (losses) as regulatory liabilities (assets) and records the realized gains or losses in Fuel expense and Purchased power expense to match the delivery period of the underlying commodity.

Offsetting of Derivative Assets and Liabilities

The amounts of TVA's derivative instruments as reported on the Consolidated Balance Sheets are shown in the table below:

Derivative Assets and Liabilities[1]
At September 30
(in millions)

	2024	2023
Assets		
Interest rate swaps	$ —	$ 4
Commodity contract derivatives	7	33
Commodity derivatives under the FHP[2]	—	—
Total derivatives subject to master netting or similar arrangement	$ 7	$ 37
Liabilities		
Currency swaps	$ 116	$ 141
Interest rate swaps[3]	840	662
Commodity contract derivatives	5	2
Commodity derivatives under the FHP[2]	161	186
Total derivatives subject to master netting or similar arrangement	$ 1,122	$ 991

Notes
(1) Offsetting amounts include counterparty netting of derivative contracts. Except as discussed below, there were no other material offsetting amounts on TVA's Consolidated Balance Sheets at either September 30, 2024 or 2023.
(2) At September 30, 2024, the gross derivative asset and gross derivative liability was $4 million and $165 million, respectively, with offsetting amounts for each totaling $4 million. At September 30, 2023, the gross derivative asset and gross derivative liability were $26 million and $212 million, respectively, with offsetting amounts for each totaling $26 million.
(3) Letters of credit of approximately $535 million and $509 million were posted as collateral at September 30, 2024 and 2023, respectively, to partially secure the liability positions of one of the interest rate swaps in accordance with the collateral requirements for this derivative.

Other Derivative Instruments

Investment Fund Derivatives. Investment funds consist primarily of funds held in the NDT, ART, SERP, DCP, and RP. See Note 16 — *Fair Value Measurements — Investment Funds* for a discussion of the trusts, plans, and types of investments. The NDT and ART may invest in derivative instruments which may include swaps, futures, options, forwards, and other instruments. At September 30, 2024 and 2023, the NDT held investments in forward contracts to purchase debt securities. The fair values of these derivatives were in net asset positions totaling $11 million at both September 30, 2024 and 2023.

Collateral. TVA's interest rate swaps, currency swaps, and commodity derivatives under the FHP contain contract provisions that require a party to post collateral (in a form such as cash or a letter of credit) when the party's liability balance under the agreement exceeds a certain threshold. At September 30, 2024, the aggregate fair value of all derivative instruments with credit-risk related contingent features that were in a liability position was $1.1 billion. TVA's collateral obligations at September 30, 2024, under these arrangements were $552 million, for which TVA had posted $535 million in letters of credit. These letters of credit reduce the available balance under the related credit facilities. TVA's assessment of the risk of its nonperformance includes a reduction in its exposure under the interest rate swap contracts as a result of this posted collateral.

For all of its derivative instruments with credit-risk related contingent features:

- If TVA remains a majority-owned U.S. government entity but S&P Global Ratings ("S&P") or Moody's Investors Service, Inc. ("Moody's") downgrades TVA's credit rating to AA or Aa2, respectively, TVA's collateral obligations would likely increase by $22 million, and
- If TVA ceases to be majority-owned by the U.S. government, TVA's credit rating would likely be downgraded and TVA would be required to post additional collateral.

Counterparty Risk

TVA may be exposed to certain risks when a counterparty has the potential to fail to meet its obligations in accordance with agreed terms. These risks may be related to credit, operational, or nonperformance matters. To mitigate certain counterparty risk, TVA analyzes the counterparty's financial condition prior to entering into an agreement, establishes credit limits, monitors the appropriateness of those limits, as well as any changes in the creditworthiness of the counterparty, on an ongoing basis, and when required, employs credit mitigation measures, such as collateral or prepayment arrangements and master purchase and sale agreements.

Customers. TVA is exposed to counterparty credit risk associated with trade accounts receivable from delivered power sales to LPCs, and from industries and federal agencies directly served, all located in the Tennessee Valley region. Of the $1.7 billion and $1.6 billion of receivables from power sales outstanding at September 30, 2024 and 2023, respectively, nearly all of the counterparties were rated investment grade. The majority of the obligations of these customers that are not investment grade are secured by collateral. TVA is also exposed to risk from exchange power arrangements with a small number of investor-owned regional utilities related to either delivered power or the replacement of open positions of longer-term purchased power or fuel agreements. TVA believes its policies and procedures for counterparty performance risk reviews have generally protected TVA against significant exposure related to market and economic conditions. See Note 1 — *Summary of Significant Accounting Policies — Allowance for Uncollectible Accounts,* Note 3 — *Accounts Receivable, Net*, and Note 9 — *Other Long-Term Assets.*

TVA had revenue from two LPCs that collectively accounted for 17 percent of total operating revenues for both the years ended September 30, 2024 and 2023.

Suppliers. TVA assesses potential supplier performance risks, including procurement of fuel, purchased power, parts, and services. If suppliers are unable to perform under TVA's existing contracts or if TVA is unable to obtain similar services or supplies from other vendors, TVA could experience delays, disruptions, additional costs, or other operational outcomes that may impact generation, maintenance, and capital programs. If certain fuel or purchased power suppliers fail to perform under the terms of their contract with TVA, TVA might lose the money that it paid to the supplier under the contract and have to purchase replacement fuel or power on the spot market, perhaps at a significantly higher price than TVA was entitled to pay under the contract. In addition, TVA might not be able to acquire replacement fuel or power in a timely manner and thus might be unable to satisfy its own obligations to deliver power. TVA continues evaluating potential supplier performance risks and supplier impact but cannot determine or predict the duration of such risks/impacts or the extent to which such risks/impacts could affect TVA's business, operations, and financial results or cause potential business disruptions.

TVA continues to experience impacts due to inflation, supply chain material challenges, and labor availability. This has led to project delays, limited availability, and/or price increases for supplies and labor. TVA has been able to manage these challenges with limited business disruptions at this time; however, should pressures continue long term, TVA could experience more significant disruptions and pressure to further increase power rates.

Natural Gas and Fuel Oil. TVA purchases a significant amount of its natural gas requirements through contracts with a variety of suppliers and purchases substantially all of its fuel oil requirements on the spot market. TVA delivers to its gas fleet under firm and non-firm transportation contracts on multiple interstate natural gas pipelines. TVA contracts for storage capacity that allows for operational flexibility and increased supply during peak gas demand scenarios or supply disruptions. TVA uses contracts of various lengths and terms to meet the projected natural gas needs of its natural gas fleet. TVA also maintains on-site, fuel oil backup to operate at the majority of the combustion turbine sites in the event of major supply disruptions. In the event a supplier experiences an incident that limits its ability to fulfill its firm contractual obligations to supply TVA with natural gas, TVA intends to leverage its storage and balancing services and/or replace the volume with a third party to ensure reliability of generation.

Coal. To help ensure a reliable supply of coal, TVA had coal contracts with multiple suppliers at September 30, 2024. The contracted supply of coal is sourced from several geographic regions of the U.S. and is delivered via barge and rail. As a result of emerging technologies, environmental regulations, industry trends, and natural gas market volatility over the past few years, coal suppliers are facing increased financial pressure, which has led to relatively poor credit ratings and bankruptcies, restructuring, mine closures, or other scenarios. A long-term continued decline in demand for coal could result in more consolidations, additional bankruptcies, restructuring, mine closures, or other scenarios.

Nuclear Fuel. Nuclear fuel is obtained predominantly through long-term uranium concentrate supply contracts, contracted conversion services, contracted enrichment services, or a combination thereof, and contracted fuel fabrication services. The supply markets for uranium concentrates and certain nuclear fuel services are subject to price fluctuations and availability restrictions. Supply market conditions may make procurement contracts subject to credit risk related to the potential nonperformance of counterparties. In the event of nonperformance by these or other suppliers, TVA believes that replacement uranium concentrate and nuclear fuel services can be obtained, although at prices that may be unfavorable when compared to the prices under the current supply agreements.

Purchased Power. TVA acquires power from a variety of power producers through long-term and short-term PPAs as well as through spot market purchases. Because of the reliability risk of purchased power, TVA requires that the PPAs contain certain counterparty performance assurance requirements to help insure counterparty performance during the term of the agreements.

Other Suppliers. Mounting solar supply chain constraints, commodity price increases, and the trade policy investigation into solar panel imports have created challenges for the U.S. solar industry. TVA's existing solar PPA portfolio is not immune from these challenges. Similar to the experience of the rest of the industry, the majority of TVA's contracted PPAs from previous requests for proposals ("RFPs") that are not yet online have been impacted by project delays and price increases.

Derivative Counterparties. TVA has entered into physical and financial contracts that are classified as derivatives for hedging purposes, and TVA's NDT, ART, and qualified defined benefit plan ("pension plan") have entered into derivative contracts for investment purposes. If a counterparty to one of the physical or financial derivative transactions defaults, TVA might incur costs in connection with entering into a replacement transaction. If a counterparty to the derivative contracts into which the NDT, the ART, or the pension plan have entered for investment purposes defaults, the value of the investment could decline significantly or perhaps become worthless. TVA has concentrations of credit risk from the banking, coal, and gas industries because multiple companies in these industries serve as counterparties to TVA in various derivative transactions. At September 30, 2024, all of TVA's commodity derivatives under the FHP, currency swaps, and interest rate swaps were with counterparties whose Moody's credit ratings were A2 or higher. TVA classifies forward natural gas contracts as derivatives. At September 30, 2024, the forward natural gas contracts were with counterparties whose ratings ranged from B1 to A1.

16. Fair Value Measurements

Fair value is determined based on the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the asset or liability's principal market, or in the absence of a principal market, the most advantageous market for the asset or liability in an orderly transaction between market participants. TVA uses market or observable inputs as the preferred source of values, followed by assumptions based on hypothetical transactions in the absence of market inputs.

Valuation Techniques

The measurement of fair value results in classification into a hierarchy by the inputs used to determine the fair value as follows:

Level 1	—	Unadjusted quoted prices in active markets accessible by the reporting entity for identical assets or liabilities. Active markets are those in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing.
Level 2	—	Pricing inputs other than quoted market prices included in Level 1 that are based on observable market data and that are directly or indirectly observable for substantially the full term of the asset or liability. These include quoted market prices for similar assets or liabilities, quoted market prices for identical or similar assets in markets that are not active, adjusted quoted market prices, inputs from observable data such as interest rate and yield curves, volatilities and default rates observable at commonly quoted intervals, and inputs derived from observable market data by correlation or other means.
Level 3	—	Pricing inputs that are unobservable, or less observable, from objective sources. Unobservable inputs are only to be used to the extent observable inputs are not available. These inputs maintain the concept of an exit price from the perspective of a market participant and should reflect assumptions of other market participants. An entity should consider all market participant assumptions that are available without unreasonable cost and effort. These are given the lowest priority and are generally used in internally developed methodologies to generate management's best estimate of the fair value when no observable market data is available.

A financial instrument's level within the fair value hierarchy (where Level 1 is the highest and Level 3 is the lowest) is based on the lowest level of input significant to the fair value measurement.

The following sections describe the valuation methodologies TVA uses to measure different financial instruments at fair value. Except for gains and losses on SERP, DCP, and RP assets, all changes in fair value of these assets and liabilities have been recorded as changes in regulatory assets, regulatory liabilities, or AOCI on TVA's Consolidated Balance Sheets and Consolidated Statements of Comprehensive Income (Loss). Except for gains and losses on SERP and DCP assets, there has been no impact to the Consolidated Statements of Operations or the Consolidated Statements of Cash Flows related to these fair value measurements.

Investment Funds

At September 30, 2024, Investment funds were comprised of $5.0 billion of equity securities and debt securities classified as trading measured at fair value. Equity and trading debt securities are held in the NDT, ART, SERP, DCP, and RP. The NDT holds funds for the ultimate decommissioning of TVA's nuclear power plants. The ART holds funds primarily for the costs related to the future closure and retirement of TVA's other long-lived assets. The balances in the NDT and ART were $3.3 billion and $1.5 billion, respectively, at September 30, 2024.

TVA established a SERP to provide benefits to selected employees of TVA which are comparable to those provided by competing organizations. The DCP is designed to provide participants with the ability to defer compensation to future periods. The RP is a non-qualified excess 401(k) plan designed to allow certain eligible employees whose contributions to the 401(k) plan are limited by Internal Revenue Service ("IRS") rules to save additional amounts for retirement and receive non-elective and matching employer contributions. The NDT, ART, SERP, DCP, and RP funds are invested in portfolios of securities generally designed to achieve a return in line with overall equity and debt market performance.

The NDT, ART, SERP, DCP, and RP are composed of multiple types of investments and are managed by external institutional investment managers. Most U.S. and international equities, U.S. Treasury inflation-protected securities ("TIPS"), and real estate investment trust securities, and certain derivative instruments are measured based on quoted exchange prices in active markets and are classified as Level 1 valuations. Fixed-income investments, high-yield fixed-income investments, currencies, and most derivative instruments are non-exchange traded and are classified as Level 2 valuations. These measurements are based on market and income approaches with observable market inputs. Cash equivalents and other short-term investments are highly liquid securities with maturities of less than three months and 12 months, respectively. These consist primarily of discount securities such as repurchase agreements and U.S. Treasury bills. These securities may be priced at cost, which approximates fair value due to the short-term nature of the instruments. These securities are classified as Level 2. Active market pricing may be utilized for U.S. Treasury bills, which are classified as Level 1.

Private equity limited partnerships, private real asset investments, and private credit investments may include holdings of investments in private real estate, venture capital, buyout, mezzanine or subordinated debt, restructuring or distressed debt, and special situations through funds managed by third-party investment managers. These investments generally involve a three-to-four-year period where the investor contributes capital, followed by a period of distribution, typically over several years. The investment period is generally, at a minimum, 10 years or longer. The NDT had unfunded commitments related to private equity limited partnerships of $382 million, private real assets of $120 million, and private credit of $87 million at September 30, 2024. The ART had unfunded commitments related to limited partnerships in private equity of $152 million, private real assets of $61 million, and private credit of $46 million at September 30, 2024. These investments have no redemption or limited redemption options and may also impose restrictions on the NDT's and ART's ability to liquidate their investments. There are no readily available quoted exchange prices for these investments. The fair value of these investments is based on information provided by the investment managers. These investments are valued on a quarterly basis. TVA's private equity limited partnerships, private real asset investments, and private credit investments are valued at net asset values ("NAV") as a practical expedient for fair value. TVA classifies its interest in these types of investments as investments measured at NAV in the fair value hierarchy.

Commingled funds represent investment funds comprising multiple individual financial instruments. The commingled funds held by the NDT, ART, SERP, DCP, and RP consist of either a single class of securities, such as equity, debt, or foreign currency securities, or multiple classes of securities. All underlying positions in these commingled funds are either exchange traded or measured using observable inputs for similar instruments. The fair value of commingled funds is based on NAV per fund share (the unit of account), derived from the prices of the underlying securities in the funds. These commingled funds can be redeemed at the measurement date NAV and are classified as Commingled funds measured at NAV in the fair value hierarchy.

Realized and unrealized gains and losses on equity and trading debt securities are recognized in current earnings and are based on average cost. The gains and losses of the NDT and ART are subsequently reclassified to a regulatory asset or liability account in accordance with TVA's regulatory accounting policy. See Note 1 — *Summary of Significant Accounting Policies — Cost-Based Regulation* and Note 10 — *Regulatory Assets and Liabilities*. TVA recorded unrealized gains and losses related to its equity and trading debt securities held during each period as follows:

Unrealized Investment Gains (Losses)[1]
For the years ended September 30
(in millions)

Fund	Financial Statement Presentation	2024	2023
NDT	Regulatory assets[2]	$ 324	$ 162
ART	Regulatory assets[3]	171	96
SERP	Other income (expense)	14	6
DCP	Other income (expense)	2	1

Notes
(1) The unrealized losses for the RP were less than $1 million for both the years ended September 30, 2024 and 2023 and therefore were not represented in the table above.
(2) Includes $93 million of unrealized gains and $27 million of unrealized gains related to NDT equity securities (excluding commingled funds) for the years ended September 30, 2024 and 2023, respectively.
(3) Includes $36 million of unrealized gains and $13 million of unrealized gains related to ART equity securities (excluding commingled funds) for the years ended September 30, 2024 and 2023, respectively.

Currency and Interest Rate Swap Derivatives

See Note 15 — *Risk Management Activities and Derivative Transactions — Cash Flow Hedging Strategy for Currency Swaps* and *Derivatives Not Receiving Hedge Accounting Treatment* for a discussion of the nature, purpose, and contingent features of TVA's currency swaps and interest rate swaps. These swaps are classified as Level 2 valuations and are valued based on income approaches using observable market inputs for similar instruments.

Commodity Contract Derivatives and Commodity Derivatives under the FHP

Commodity Contract Derivatives. Most of these derivative contracts are valued based on market approaches, which utilize short-term and mid-term market-quoted prices from an external industry brokerage service. These contracts are classified as Level 2 valuations.

Commodity Derivatives under the FHP. Swap contracts are valued using a pricing model based on New York Mercantile Exchange inputs and are subject to nonperformance risk outside of the exit price. These contracts are classified as Level 2 valuations.

See Note 15 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP*.

Nonperformance Risk

The assessment of nonperformance risk, which includes credit risk, considers changes in current market conditions, readily available information on nonperformance risk, letters of credit, collateral, other arrangements available, and the nature of master netting arrangements. TVA is a counterparty to currency swaps, interest rate swaps, commodity contracts, and other derivatives which subject TVA to nonperformance risk. Nonperformance risk on the majority of investments and certain exchange-traded instruments held by TVA is incorporated into the exit price that is derived from quoted market data that is used to mark the investment to market.

Nonperformance risk for most of TVA's derivative instruments is an adjustment to the initial asset/liability fair value. TVA adjusts for nonperformance risk, both of TVA (for liabilities) and the counterparty (for assets), by applying credit valuation adjustments ("CVAs"). TVA determines an appropriate CVA for each applicable financial instrument based on the term of the instrument and TVA's or the counterparty's credit rating as obtained from Moody's. For companies that do not have an observable credit rating, TVA uses internal analysis to assign a comparable rating to the counterparty. TVA discounts each financial instrument using the historical default rate (as reported by Moody's for CY 1983 to CY 2023) for companies with a similar credit rating over a time period consistent with the remaining term of the contract. The application of CVAs resulted in a less than $1 million decrease in the fair value of assets and a $1 million decrease in the fair value of liabilities at September 30, 2024.

Fair Value Measurements

The following tables set forth by level, within the fair value hierarchy, TVA's financial assets and liabilities that were measured at fair value on a recurring basis at September 30, 2024 and 2023. Financial assets and liabilities have been classified in their entirety based on the lowest level of input that is significant to the fair value measurement. TVA's assessment of the significance of a particular input to the fair value measurement requires judgment and may affect the determination of the fair value of the assets and liabilities and their classification in the fair value hierarchy levels.

	Fair Value Measurements At September 30, 2024 (in millions)			
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Assets				
Investments				
Equity securities	$ 770	$ —	$ —	$ 770
Government debt securities[1][2]	400	57	—	457
Corporate debt securities[4]	—	378	—	378
Mortgage and asset-backed securities	—	43	—	43
Institutional mutual funds	342	—	—	342
Forward debt securities contracts	—	11	—	11
Cash equivalents and other short-term investments[2][3]	95	183	—	278
Private equity funds measured at net asset value[5]	—	—	—	738
Private real asset funds measured at net asset value[5]	—	—	—	432
Private credit funds measured at net asset value[5]	—	—	—	219
Commingled funds measured at net asset value[5]	—	—	—	1,300
Total investments	1,607	672	—	4,968
Interest rate swaps	—	—	—	—
Commodity contract derivatives	—	7	—	7
Total	$ 1,607	$ 679	$ —	$ 4,975

	Quoted Prices in Active Markets for Identical Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Liabilities				
Currency swaps[6]	$ —	$ 116	$ —	$ 116
Interest rate swaps	—	840	—	840
Commodity contract derivatives	—	5	—	5
Commodity derivatives under the FHP	—	161	—	161
Total	$ —	$ 1,122	$ —	$ 1,122

Notes

(1) Includes obligations of government-sponsored entities.

(2) There are $400 million of U.S. Treasury securities in Level 1 Government debt securities and $95 million of U.S. Treasury securities in Level 1 Cash equivalents and other short-term investments for a total of $495 million of U.S. Treasury securities within Level 1 of the fair value hierarchy.

(3) Includes $78 million net payables (interest receivable, dividends receivable, receivables for investments sold, and payables for investments purchased), and $174 million of repurchase agreements in Level 2 Cash equivalents and other short-term investments.

(4) Includes both U.S. and foreign debt.

(5) Certain investments that are measured at fair value using the NAV or its equivalent (alternative investments) have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets.

(6) TVA records currency swaps net of cash collateral received from or paid to the counterparty, to the extent such amount is not recorded in Accounts payable and accrued liabilities. See Note 15 — *Risk Management Activities and Derivative Transactions — Offsetting of Derivative Assets and Liabilities*.

Fair Value Measurements
At September 30, 2023
(in millions)

	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Assets				
Investments				
Equity securities	$ 608	$ —	$ —	$ 608
Government debt securities[1][2]	287	60	—	347
Corporate debt securities[4]	—	300	—	300
Mortgage and asset-backed securities	—	36	—	36
Institutional mutual funds	288	—	—	288
Forward debt securities contracts	—	11	—	11
Cash equivalents and other short-term investments[2][3]	104	166	—	270
Private equity funds measured at net asset value[5]				583
Private real asset funds measured at net asset value[5]				387
Private credit funds measured at net asset value[5]				158
Commingled funds measured at net asset value[5]				1,135
Total investments	1,287	573	—	4,123
Interest rate swaps	—	4	—	4
Commodity contract derivatives	—	33	—	33
Total	$ 1,287	$ 610	$ —	$ 4,160

	Quoted Prices in Active Markets for Identical Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Liabilities				
Currency swaps[6]	$ —	$ 141	$ —	$ 141
Interest rate swaps	—	662	—	662
Commodity contract derivatives	—	2	—	2
Commodity derivatives under the FHP	—	186	—	186
Total	$ —	$ 991	$ —	$ 991

Notes
(1) Includes obligations of government-sponsored entities.
(2) There are $287 million of U.S. Treasury securities in Level 1 Government debt securities and $104 million of U.S. Treasury securities in Level 1 Cash equivalents and other short-term investments for a total of $391 million of U.S. Treasury securities within Level 1 of the fair value hierarchy.
(3) Includes $73 million net payables (interest receivable, dividends receivable, receivables for investments sold, and payables for investments purchased).
(4) Includes both U.S. and foreign debt.
(5) Certain investments that are measured at fair value using the NAV or its equivalent (alternative investments) have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets.
(6) TVA records currency swaps net of cash collateral received from or paid to the counterparty, to the extent such amount is not recorded in Accounts payable and accrued liabilities. See Note 15 — *Risk Management Activities and Derivative Transactions — Offsetting of Derivative Assets and Liabilities*.

Other Financial Instruments Not Recorded at Fair Value

TVA uses the methods and assumptions described below to estimate the fair value of each significant class of financial instruments. The fair value of the financial instruments held at September 30, 2024 and 2023, may not be representative of the actual gains or losses that will be recorded when these instruments mature or are called or presented for early redemption. The estimated values of TVA's financial instruments not recorded at fair value at September 30, 2024 and 2023, were as follows:

Estimated Values of Financial Instruments Not Recorded at Fair Value
(in millions)

		At September 30, 2024		At September 30, 2023	
	Valuation Classification	Carrying Amount	Fair Value	Carrying Amount	Fair Value
EnergyRight® receivables, net (including current portion)	Level 2	$ 56	$ 56	$ 59	$ 55
Loans and other long-term receivables, net (including current portion)	Level 2	105	99	104	96
EnergyRight® financing obligations (including current portion)	Level 2	66	74	69	81
Unfunded loan commitments	Level 2	—	—	—	1
Membership interests of VIEs subject to mandatory redemption (including current portion)	Level 2	17	19	18	19
Long-term outstanding power bonds, net (including current maturities)	Level 2	18,889	19,416	18,866	17,963
Long-term debt of VIEs, net (including current maturities)	Level 2	934	966	968	927

The carrying values of Cash and cash equivalents, Restricted cash and cash equivalents, Accounts receivable, net, and Short-term debt, net approximate their fair values.

The fair value for loans and other long-term receivables is estimated by determining the present value of future cash flows using a discount rate equal to lending rates for similar loans made to borrowers with similar credit ratings and for similar remaining maturities, where applicable. The fair value of long-term debt and membership interests of VIEs subject to mandatory redemption is estimated by determining the present value of future cash flows using current market rates for similar obligations, giving effect to credit ratings and remaining maturities.

17. Revenue

Revenue from Sales of Electricity

TVA's revenue from contracts with customers is primarily derived from the generation and sale of electricity to its customers and is included in Revenue from sales of electricity on the Consolidated Statements of Operations. Electricity is sold primarily to LPCs for distribution to their end-use customers. In addition, TVA sells electricity to directly served industrial companies, federal agencies, and others.

LPC sales	Approximately 92 percent of TVA's Revenue from sales of electricity for both the years ended September 30, 2024 and 2023, was from LPCs, which then distribute the power to their customers using their own distribution systems. Power is delivered to each LPC at delivery points within the LPC's service territory. TVA recognizes revenue when the customer takes possession of the power at the delivery point. For power sales, the performance obligation to deliver power is satisfied in a series over time because the sales of electricity over the term of the customer contract are a series of distinct goods that are substantially the same and have the same pattern of transfer to the customer. TVA has no continuing performance obligations subsequent to delivery. Using the output method for revenue recognition provides a faithful depiction of the transfer of electricity as customers obtain control of the power and benefit from its use at delivery. Additionally, TVA has an enforceable right to consideration for energy delivered at any discrete point in time and will recognize revenue at an amount that reflects the consideration to which TVA is entitled for the energy delivered. The amount of revenue is based on contractual prices approved by the TVA Board. Customers are invoiced monthly for power delivered as measured by meters located at the delivery points. The net transaction price is offset by certain credits available to customers that are known at the time of billing. Credits are designed to achieve objectives of the TVA Act and include items such as hydro preference credits for residential customers of LPCs, economic development credits to promote growth in the Tennessee Valley, wholesale bill credits to maintain long-term partnerships with LPCs, pandemic credits, and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. The pandemic credits ended September 30, 2023. Payments are typically due within approximately one month of invoice issuance.
Directly served customers	Directly served customers, including industrial customers, federal agencies, and other customers, take power for their own consumption. Similar to LPCs, power is delivered to a delivery point, at which time the customer takes possession and TVA recognizes revenue. For all power sales, the performance obligation to deliver power is satisfied in a series over time since the sales of electricity over the term of the customer contract are a series of distinct goods that are substantially the same and have the same pattern of transfer to the customer. TVA has no continuing performance obligations subsequent to delivery. Using the output method for revenue recognition provides a faithful depiction of the transfer of electricity as customers obtain control of the power and benefit from its use at delivery. Additionally, TVA has an enforceable right to consideration for energy delivered at any discrete point in time and will recognize revenue at an amount that reflects the consideration to which TVA is entitled for the energy delivered. The amount of revenue is based on contractual prices approved by the TVA Board. Customers are invoiced monthly for power delivered as measured by meters located at the delivery points. The net transaction price is offset by certain credits available to customers that are known at the time of billing. Examples of credits include items such as economic development credits to promote growth in the Tennessee Valley and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. Payments are typically due within approximately one month of invoice issuance.

Other Revenue

Other revenue consists primarily of wheeling and network transmission charges, sales of excess steam that is a by-product of power production, delivery point charges for interconnection points between TVA and the customer, REC sales, and certain other ancillary goods or services.

Disaggregated Revenues

During 2024, revenues generated from TVA's electricity sales were $12.1 billion and accounted for virtually all of TVA's revenues. TVA's operating revenues by state for each of the last three years are detailed in the table below:

Operating Revenues By State
For the years ended September 30
(in millions)

	2024	2023	2022
Alabama	$ 1,768	$ 1,731	$ 1,778
Georgia	295	284	299
Kentucky	776	773	821
Mississippi	1,150	1,146	1,182
North Carolina	89	89	87
Tennessee	7,998	7,819	8,137
Virginia	47	46	48
Subtotal	12,123	11,888	12,352
Off-system sales	8	14	19
Revenue capitalized during pre-commercial plant operations[1]	(3)	(3)	—
Revenue from sales of electricity	12,128	11,899	12,371
Other revenue	186	155	169
Total operating revenues	$ 12,314	$ 12,054	$ 12,540

Note
(1) Represents revenue capitalized during pre-commercial operations at Paradise CTs 5-7 in 2024 and Colbert CTs 9-11 in 2023.

TVA's operating revenues by customer type for each of the last three years are detailed in the table below:

Operating Revenues by Customer Type
For the years ended September 30
(in millions)

	2024	2023	2022
Revenue from sales of electricity			
Local power companies	$ 11,138	$ 10,903	$ 11,291
Industries directly served	868	864	926
Federal agencies and other	125	135	154
Revenue capitalized during pre-commercial plant operations[1]	(3)	(3)	—
Revenue from sales of electricity	12,128	11,899	12,371
Other revenue	186	155	169
Total operating revenues	$ 12,314	$ 12,054	$ 12,540

Note
(1) Represents revenue capitalized during pre-commercial operations at Paradise CTs 5-7 in 2024 and Colbert CTs 9-11 in 2023.

TVA and LPCs continue to work together to meet the changing needs of consumers around the Tennessee Valley. In 2019, the TVA Board approved a Partnership Agreement option that better aligns the length of LPC power contracts with TVA's long-term commitments. Under the partnership arrangement, the LPC power contracts automatically renew each year and have a 20-year termination notice. The partnership arrangements can be terminated under certain circumstances, including TVA's failure to limit rate increases to no more than 10 percent during any consecutive five-fiscal-year period, as more specifically described in the agreements. Participating LPCs receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term commitment, which enables TVA to recover its long-term financial commitments over a commensurate period. The total wholesale bill credits to LPCs participating in the Partnership Agreement were $215 million, $199 million, and $199 million, respectively, for the years ended September 30, 2024, 2023, and 2022. In 2020, TVA provided participating LPCs a flexibility option, named Generation Flexibility, that allows them to locally generate or purchase up to approximately five percent of their average total hourly energy sales over a certain time period in order to meet their individual customers' needs. Revised flexibility agreements were made available to LPCs in August 2023 which permit projects to be located anywhere in TVA's service area, either connected to the LPC distribution system or TVA's transmission system, and make it easier for LPCs to partner in projects. As of September 30, 2024, 148 LPCs had signed the Partnership Agreement with TVA, and 102 LPCs had signed a Power Supply Flexibility Agreement.

In previous years, the TVA Board approved pandemic credits, which were effective in both 2022 and 2023. These credits provided an annual 2.5 percent monthly base rate credit and applied to service provided to TVA's LPCs, their large commercial and industrial customers, and TVA directly served customers. For the years ended September 30, 2023 and 2022, pandemic credits totaled $225 million, and $228 million, respectively. The pandemic credits ended September 30, 2023.

The number of LPCs by contract arrangement, the revenues derived from such arrangements for 2024, and the percentage those revenues comprised of TVA's total operating revenues for 2024, are summarized in the table below:

TVA Local Power Company Contracts
At or for the year ended September 30, 2024

Contract Arrangements[1]	Number of LPCs	Revenue from Sales of Electricity to LPCs (in millions)	Percentage of Total Operating Revenues
20-year termination notice	148	$ 9,621	78.1 %
5-year termination notice	5	1,517	12.3 %
Total	153	$ 11,138	90.4 %

Note
(1) Ordinarily, the LPCs and TVA have the same termination notice period; however, in a contract with one of the LPCs with a five-year termination notice, TVA has a 10-year termination notice (which becomes a five-year termination notice if TVA loses its discretionary wholesale rate-setting authority). Certain LPCs have five-year termination notices or a shorter period if any act of Congress, court decision, or regulatory change requires or permits that election.

TVA's two largest LPCs — Memphis Light, Gas and Water Division ("MLGW") and Nashville Electric Service ("NES") — have contracts with a five-year and a 20-year termination notice period, respectively. Sales to MLGW and NES accounted for nine percent and eight percent, respectively, of TVA's total operating revenues in 2024, 2023, and 2022.

Contract Balances

Contract assets represent an entity's right to consideration in exchange for goods and services that the entity has transferred to customers. TVA did not have any material contract assets at September 30, 2024.

Contract liabilities represent an entity's obligations to transfer goods or services to customers for which the entity has received consideration (or an amount of consideration is due) from the customers. These contract liabilities are primarily related to upfront consideration received prior to the satisfaction of the performance obligation. See *Economic Development Incentives* below and Note 12 — *Other Long-Term Liabilities — Long-Term Deferred Revenue*.

Economic Development Incentives. Under certain economic development programs TVA offers incentives to existing and potential power customers in targeted business sectors that make multi-year commitments to invest in the Tennessee Valley. TVA records those incentives as reductions of revenue. Incentives recorded as a reduction to revenue were $318 million, $330 million, and $328 million for 2024, 2023, and 2022, respectively. Incentives that have been approved but have not been paid are recorded in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. At September 30, 2024 and 2023, the outstanding unpaid incentives were $187 million and $188 million, respectively. Incentives that have been paid out may be subject to claw back if the customer fails to meet certain program requirements.

18. Other Income, Net

Income and expenses not related to TVA's operating activities are summarized in the following table:

Other Income, Net
For the years ended September 30
(in millions)

	2024	2023	2022
Interest income	$ 42	$ 34	$ 15
External services	17	15	16
Gains (losses) on investments	23	13	(17)
Miscellaneous	(11)	(1)	(7)
Total other income, net	$ 71	$ 61	$ 7

19. Supplemental Cash Flow Information

Interest paid was $1.1 billion for each of 2024, 2023, and 2022. These amounts differ from interest expense in certain years due to the timing of payments. There was no interest capitalized in 2024, 2023, or 2022.

Construction in progress and nuclear fuel expenditures included in Accounts payable and accrued liabilities at September 30, 2024, 2023, and 2022 were $898 million, $559 million, and $510 million, respectively, and are excluded from the Consolidated Statements of Cash Flows for the years ended September 30, 2024, 2023, and 2022 as non-cash investing activities. ARO project accruals included in Accounts payable and accrued liabilities at September 30, 2024, 2023, and 2022 were $45 million, $71 million, and $119 million, respectively, and are excluded from the Consolidated Statements of Cash Flows for the years ended September 30, 2024, 2023, and 2022 as non-cash operating activities.

Excluded from the Consolidated Statements of Cash Flows for the year ended September 30, 2024, were non-cash investing and financing activities of $230 million primarily related to two finance leases. There was a $56 million lease asset and lease liability recorded as a result of a new finance lease entered into in May 2024. In addition, there was a $163 million lease liability and a $179 million lease asset recorded as a remeasurement of an existing lease due to change in lease term. There are no material finance leases that were entered into during the years ended September 30, 2023, and 2022. See Note 8 — *Leases* for further information regarding TVA's finance leases.

Cash flows from swap contracts that are accounted for as hedges are classified in the same category as the item being hedged or on a basis consistent with the nature of the instrument.

20. Benefit Plans

TVA sponsors a pension plan that covers most of its full-time employees hired prior to July 1, 2014, a qualified defined contribution plan ("401(k) plan") that covers most of its full-time employees, two unfunded post-retirement health care plans that provide for non-vested contributions toward the cost of eligible retirees' medical coverage, other post-employment benefits such as workers' compensation, the Restoration Plan, and the SERP. The pension plan and the 401(k) plan are administered by a separate legal entity, the TVA Retirement System ("TVARS"), which is governed by its own board of directors (the "TVARS Board").

Overview of Plans and Benefits

Retirement Plans. The participants in the pension plan receive either a traditional final average pay pension or a cash balance pension. The traditional pension benefit is based on the participant's creditable service, average monthly salary for the participant's highest three consecutive years of eligible compensation, and a pension factor based on the participant's age and years of service, less a Social Security offset. The cash balance pension benefit is based on pay and interest credits accumulated in the participant's account and the participant's age.

Participants in the pension plan are also eligible to receive 401(k) plan matching contributions, may be eligible to receive 401(k) plan non-elective contributions, and may be eligible to make after-tax contributions of up to $10,000 per year to the pension plan, which at the election of the participant are invested in either the fixed fund, which receives a fixed interest rate set forth in the plan, or the variable fund, which receives a rate of return based on an S&P 500 index fund. Participants in the pension plan may also become eligible for a supplemental pension benefit based on age and years of service at retirement, which is provided to help offset the cost of retiree medical insurance. Employees first hired on or after July 1, 2014, are participants in the 401(k) plan only and receive both non-elective and matching contributions to their accounts in the 401(k) plan.

401(k) Plan. Under the 401(k) plan, the non-elective and matching contributions TVA makes to participant accounts depends on the employee's hire date, years of service, and individual elections. Non-elective employer contributions for eligible participants range from three percent to six percent and matching employer contributions range from 1.5 percent to six percent. TVA recognized 401(k) contribution costs of $116 million, $105 million, and $97 million during 2024, 2023, and 2022, respectively.

Restoration Plan. TVA established the Restoration Plan, a nonqualified excess 401(k) plan, to allow certain eligible employees whose contributions to the 401(k) plan are limited by IRS rules to save additional amounts for retirement and receive non-elective and matching employer contributions. TVA recognized Restoration Plan benefit costs of $1 million in 2024 and less than $1 million in 2023.

Supplemental Executive Retirement Plan. TVA has established a SERP for certain executives in critical positions to provide supplemental pension benefits tied to compensation that exceeds limits imposed by IRS rules applicable to the qualified defined benefit pension plan.

Other Post-Retirement Benefits. TVA sponsors two unfunded post-retirement benefit plans that provide for non-vested contributions toward the cost of certain eligible retirees' medical coverage. The first plan covers only certain retirees and surviving dependents who do not qualify for TVARS benefits, including the supplemental pension benefit. The second plan is designed to place a limit on the out-of-pocket amount certain eligible retirees pay for medical coverage and provides a credit based on years of TVA service and monthly base pension amount, reduced by any TVARS supplemental pension benefits or any TVA contribution from the first plan, described above. In January 2017, TVA began providing all Medicare-eligible retirees and spouses Medicare supplement coverage through a private exchange. Transition to the exchange did not affect any TVARS supplemental benefits for eligible retirees, and the credit continues to be calculated in the same manner as before.

Other Post-Employment Benefits. TVA employees injured in work-related incidents are covered by the workers' compensation program for federal employees administered through the Department of Labor by the Office of Workers' Compensation Programs in accordance with the provisions of FECA. FECA provides compensation and medical benefits to federal employees for permanent and temporary disability due to employment-related injury or disease.

Accounting Mechanisms

Regulatory Accounting. TVA has classified all amounts related to unrecognized prior service costs/(credits), net actuarial gains or losses, and the funded status as regulatory assets or liabilities as such amounts are probable of collection in future rates. Additionally, TVA recognizes pension costs as regulatory assets or regulatory liabilities to the extent that the amount calculated under U.S. GAAP as pension expense differs from the amount TVA contributes to the pension plan as pension plan contributions. As a result of plan design changes, future contributions are expected to exceed the expense calculated under U.S. GAAP. Accordingly, TVA discontinued this regulatory accounting practice as all such deferred costs were recovered as of September 30, 2023.

Cost Method. TVA uses the projected unit credit cost method to determine the service cost and the projected benefit obligation for retirement, termination, and ancillary benefits. Under this method, a "projected accrued benefit" is calculated at the beginning of the year and at the end of the year for each benefit that may be payable in the future. The "projected accrued benefit" is based on the plan's accrual formula and upon service at the beginning or end of the year, but it uses final average compensation, social security benefits, and other relevant factors projected to the age at which the employee is assumed to leave active service. The projected benefit obligation is the actuarial present value of the "projected accrued benefits" at the beginning of the year for employed participants and is the actuarial present value of all benefits for other participants. The service cost is the actuarial present value of the difference between the "projected accrued benefits" at the beginning and end of the year.

Amortization of Net Gain or Loss. TVA utilizes the corridor approach for gain/loss amortization. Differences between actuarial assumptions and actual plan results are deferred and amortized into periodic cost only when the accumulated differences exceed 10 percent of the greater of the projected benefit obligation or the market-related value of plan assets. If necessary, the excess is amortized over the average future expected working lifetime of participants expected to receive benefits, which is approximately 11 years for the pension plan and 15 years for the post-retirement plans.

Amortization of Prior Service Cost/(Credit). Amortization of net prior service cost/(credit) resulting from a plan change is included as a component of period expense in the year first recognized and every year thereafter until it is fully amortized. The increase or decrease in the benefit obligation due to the plan change is amortized over the average remaining service period of participating employees expected to receive benefits under the plan. The pension and post-retirement plans currently have prior service costs/(credits) from plan changes made in 2016, 2018, and 2021 with remaining amortization periods ranging from one to five years. However, when a plan change reduces the benefit obligation, existing positive prior service costs are reduced or eliminated starting with the earliest established before a new prior service credit base is established.

Asset Method. TVA's asset method calculates a market-related value of assets ("MRVA") that recognizes realized and unrealized investment gains and losses over a three-year smoothing period to decrease the volatility of annual net periodic pension benefit costs. The MRVA is used to determine the expected return on plan assets, a component of net periodic pension benefit cost. The difference in the expected return on the MRVA and the actual return on the fair value on plan assets is recognized as an actuarial (gain)/loss in the pension benefit obligation at September 30. However, the MRVA has no impact on the fair value of plan assets measured at September 30.

Obligations and Funded Status

The changes in plan obligations, assets, and funded status for the years ended September 30, 2024 and 2023, were as follows:

Obligations and Funded Status
For the years ended September 30
(in millions)

	Pension Benefits		Other Post-Retirement Benefits	
	2024	2023	2024	2023
Change in benefit obligation				
Benefit obligation at beginning of year	$ 10,099	$ 10,536	$ 347	$ 388
Service cost	29	32	11	10
Interest cost	579	568	21	18
Plan participants' contributions	3	4	—	—
Collections[1]	—	—	12	13
Actuarial (gain) loss	1,059	(284)	(4)	(44)
Net transfers (to) from variable fund/401(k) plan	5	4	—	—
Expenses paid	(6)	(7)	—	—
Benefits paid	(766)	(754)	(34)	(38)
Benefit obligation at end of year	11,002	10,099	353	347
Change in plan assets				
Fair value of net plan assets at beginning of year	8,129	8,094	—	—
Actual return on plan assets	1,004	482	—	—
Plan participants' contributions	3	4	—	—
Collections[1]	—	—	12	13
Net transfers (to) from variable fund/401(k) plan	5	4	—	—
Employer contributions	304	306	22	25
Expenses paid	(6)	(7)	—	—
Benefits paid	(766)	(754)	(34)	(38)
Fair value of net plan assets at end of year	8,673	8,129	—	—
Funded status	$ (2,329)	$ (1,970)	$ (353)	$ (347)

Note
(1) Collections include retiree contributions as well as provider discounts and rebates.

For 2024, the $1.1 billion pension benefit obligation actuarial loss was primarily due to the decrease in the discount rate from 5.95 percent to 4.95 percent, which increased the liability by $981 million. In addition, TVA recognized a $46 million actuarial loss due to higher COLA and higher interest crediting rates than previously assumed for CY 2025, and a $37 million actuarial loss due to observed plan experience. These losses were offset by a $5 million actuarial gain due to mortality assumption changes.

For 2023, the $284 million pension benefit obligation actuarial gain was primarily due to the increase in the discount rate from 5.60 percent to 5.95 percent, which decreased the liability by $334 million. In addition, based on the results obtained from the 2023 experience study, TVA recognized actuarial gains of $23 million due to the revision in demographic and other experience related assumptions to reflect anticipated future plan experience. These gains were partially offset by a $61 million actuarial loss due to higher COLA and higher interest crediting rates than previously assumed for CY 2024, and a $12 million actuarial loss due to observed plan experience.

The other post-retirement actuarial gain for 2024 decreased the benefit obligation by $4 million. TVA recognized a $30 million actuarial gain as a result of updating the pre-Medicare health care cost trend rates to reflect observed and anticipated plan experience. Based upon results obtained from a study on post-retirement experience conducted in 2024, TVA recognized a $13 million actuarial gain due to the adoption of a retiree persistency assumption and a $2 million actuarial gain related to changes in the withdrawal assumption rates. In addition, TVA recognized a $2 million gain due to observed plan experience. These gains were partially offset by a $43 million actuarial loss from the decrease in the discount rate from 6.05 percent to 5.00 percent.

The other post-retirement actuarial gain for 2023 decreased the benefit obligation by $44 million. TVA recognized a $61 million actuarial gain primarily due to lower retirement rate assumptions than previously assumed and actuarial gains of $10 million due to the revision of demographic and other experience related assumptions to reflect anticipated future plan experience based on the results obtained from the 2023 experience study. In addition, TVA recognized a $17 million actuarial gain from the increase in the discount rate from 5.65 percent to 6.05 percent. These gains were partially offset by a $27 million actuarial loss to reflect observed and anticipated plan experience for contribution costs and pre-Medicare per capita claims costs and a $17 million actuarial loss due to changes in the pre-Medicare per capita claims cost trend rate assumptions.

Amounts related to these benefit plans recognized on TVA's Consolidated Balance Sheets consist of regulatory assets and liabilities that have not been recognized as components of net periodic benefit cost at September 30, 2024 and 2023, and the funded status of TVA's benefit plans, which are included in Accounts payable and accrued liabilities and Post-retirement and post-employment benefit obligations:

Amounts Recognized on TVA's Consolidated Balance Sheets
At September 30
(in millions)

	Pension Benefits		Other Post-Retirement Benefits	
	2024	2023	2024	2023
Regulatory assets (liabilities)	$ 1,979	$ 1,440	$ (81)	$ (95)
Accounts payable and accrued liabilities	(6)	(6)	(20)	(21)
Pension and post-retirement benefit obligations[1]	(2,323)	(1,964)	(333)	(326)

Note
(1) The table above excludes $230 million of post-employment benefit costs and $1 million of Restoration Plan costs at September 30, 2024, and $237 million of post-employment benefit costs at September 30, 2023 that are recorded in Post-retirement and post-employment benefit obligations on the Consolidated Balance Sheets.

Unrecognized amounts included in regulatory assets or liabilities yet to be recognized as components of accrued benefit cost at September 30, 2024 and 2023, consisted of the following:

Post-Retirement Benefit Costs Deferred as Regulatory Assets (Liabilities)
At September 30
(in millions)

	Pension Benefits		Other Post-Retirement Benefits	
	2024	2023	2024	2023
Unrecognized prior service credit	$ (247)	$ (336)	$ (42)	$ (59)
Unrecognized net loss (gain)	2,226	1,776	(39)	(36)
Total regulatory assets (liabilities)	$ 1,979	$ 1,440	$ (81)	$ (95)

Information for the pension projected benefit obligation ("PBO") in excess of plan assets and other post-retirement accumulated postretirement benefit obligation ("APBO") has been disclosed in the Obligations and Funded Status table above. The following table provides the pension plan accumulated benefit obligation ("ABO") in excess of plan assets. The other post-retirement plans are unfunded or have no plan assets.

Accumulated Benefit Obligations in Excess of Plan Assets
At September 30
(in millions)

	2024	2023
Accumulated benefit obligation	$ 10,971	$ 10,069
Fair value of net plan assets	8,673	8,129

The components of net periodic benefit cost for the years ended September 30, 2024, 2023, and 2022 were as follows:

Components of Net Periodic Benefit Cost [1]
For the years ended September 30
(in millions)

	Pension Benefits			Other Post-Retirement Benefits		
	2024	2023	2022	2024	2023	2022
Service cost	$ 29	$ 32	$ 53	$ 11	$ 10	$ 17
Interest cost	579	568	378	21	18	15
Expected return on plan assets	(494)	(492)	(435)	—	—	—
Amortization of prior service credit	(89)	(88)	(93)	(17)	(17)	(17)
Recognized net actuarial loss (gain)	99	135	392	(1)	(2)	5
Total net periodic benefit cost as actuarially determined	124	155	295	14	9	20
Amount expensed due to actions of regulator	—	77	13	—	—	—
Net periodic benefit cost	$ 124	$ 232	$ 308	$ 14	$ 9	$ 20

Note
(1) The components of net benefit cost other than the service cost component are included in Other net periodic benefit cost on the Consolidated Statements of Operations.

Plan Assumptions

Plan assumptions utilized to determine benefit obligations and net periodic benefit costs include discount rates, projected health care cost trend rates, COLAs, expected long-term rate of return on plan assets, rate of increase in future compensation levels, retirement rates, expected timing and form of payments, and mortality rates, of which certain key assumptions are noted below. Every five years, a formal actuarial experience study that compares assumptions to the actual experience is conducted. Additional ad-hoc experience studies are performed as needed to review recent experience and validate recommended changes to the actuarial assumptions used based upon TVA's latest experience study in 2023.

Actuarial Assumptions Utilized to Determine Benefit Obligations at September 30

	Pension Benefits		Other Post-Retirement Benefits	
	2024	2023	2024	2023
Discount rate	4.95%	5.95%	5.00%	6.05%
Average rate of compensation increase	4.01%	4.05%	N/A	N/A
Weighted average interest crediting rate	5.13%	5.13%	N/A	N/A
Cost of living adjustment (COLA)[1]	2.00%	2.00%	2.00%	2.00%
Pre-Medicare eligible per capita claim costs				
Current health care cost trend rate	N/A	N/A	7.25%	7.50%
Ultimate health care cost trend rate	N/A	N/A	5.00%	5.00%
Year ultimate trend rate is reached	N/A	N/A	2034	2034
Pre-Medicare eligible per capita contributions				
Current health care cost trend rate	N/A	N/A	7.25%	5.00%
Ultimate health care cost trend rate	N/A	N/A	5.00%	5.00%
Year ultimate trend rate is reached	N/A	N/A	2034	2022
Post-Medicare eligible				
Current health care cost trend rate	N/A	N/A	—%	—%
Ultimate health care cost trend rate	N/A	N/A	4.00%	4.00%
Year ultimate trend rate is reached	N/A	N/A	2026	2026

Note
(1) The COLA assumption rate is the ultimate long-term rate. The calendar year rate for 2025 is assumed to be 2.79 percent, and for years thereafter the ultimate rate is used.

Actuarial Assumptions Utilized to Determine Net Periodic Benefit Cost for the Years Ended September 30 [1]

	Pension Benefits			Other Post-Retirement Benefits		
	2024	2023	2022	2024	2023	2022
Discount rate	5.95%	5.60%	2.90%	6.05%	5.65%	3.05%
Expected return on plan assets[2]	6.50%	6.50%	5.75%	N/A	N/A	N/A
Weighted average interest crediting rate	5.13%	5.14%	5.14%	N/A	N/A	N/A
Cost of living adjustment (COLA)[3]	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Average rate of compensation increase	4.01%	3.28%	3.32%	N/A	N/A	N/A
Pre-Medicare eligible per capita claims costs						
Current health care cost trend rate	N/A	N/A	N/A	7.50%	7.00%	6.25%
Ultimate health care cost trend rate	N/A	N/A	N/A	5.00%	5.00%	5.00%
Year ultimate trend rate is reached	N/A	N/A	N/A	2034	2031	2027
Pre-Medicare eligible per capita contributions						
Current health care cost trend rate	N/A	N/A	N/A	5.00%	5.00%	8.51%
Ultimate health care cost trend rate	N/A	N/A	N/A	5.00%	5.00%	5.00%
Year ultimate trend rate is reached	N/A	N/A	N/A	2022	2022	2027
Post-Medicare eligible						
Current health care cost trend rate	N/A	N/A	N/A	—%	—%	—%
Ultimate health care cost trend rate	N/A	N/A	N/A	4.00%	4.00%	4.00%
Year ultimate trend rate is reached	N/A	N/A	N/A	2026	2026	2024

Notes
(1) The actuarial assumptions used to determine the benefit obligations at September 30 of each year are subsequently used to determine net periodic benefit cost for the following year except the rate of compensation increase assumption.
(2) The actual return on assets for 2024, 2023, and 2022 was 12.72 percent, 6.13 percent, and (6.64) percent, respectively.
(3) The COLA assumption rate is the ultimate rate. The actual calendar year rate is used in determining the expense, and for years thereafter the ultimate rate is used.

Discount Rate. In selecting the assumed discount rate, TVA reviews market yields on high-quality corporate debt and endeavors to match, through the use of a hypothetical bond portfolio, instrument maturities with the maturities of its pension obligations in accordance with the prevailing accounting standards. The selected bond portfolio is derived from a universe of high quality corporate bonds of Aa-rated quality or higher. After the bond portfolio is selected, a single interest rate is determined that equates the present value of the plan's projected benefit payments discounted at this rate with the market value of the bonds selected.

Expected Return on Plan Assets. The qualified defined benefit pension plan is the only plan that is funded with qualified plan assets. The expected rate of return is based on annual studies performed by third-party professional investment consultants. In determining the expected long-term rate of return on pension plan assets, TVA uses a process that incorporates actual historical asset class returns and an assessment of expected future performance and takes into consideration external actuarial advice, the current outlook on capital markets, the asset allocation policy, and the anticipated investment expenses and impact of active management. Asset allocations are periodically updated using the pension plan asset/liability studies and are part of the determination of the estimates of long-term rates of return. The TVARS asset allocation policy diversifies plan assets across multiple asset classes so as to minimize the risk of large losses. The asset allocation policy is designed to be responsive to changes in the funded status of TVARS. In September 2023, the TVARS Board approved a new asset allocation policy, but had no changes in 2023 and 2024 to the 6.50 percent expected return on assets assumption adopted in 2022.

Compensation Increases. Assumptions related to compensation increases are based upon the latest TVA compensation experience study performed in 2023. Future compensation is assumed to likely increase at rates between 3.00 percent and 5.50 percent per year, depending upon the employee's age, and is used to determine the benefit obligations and net periodic benefit cost. The average assumed compensation increase is based upon the current active participants.

Mortality. The mortality assumption is comprised of a base table that represents the current future life expectancy adjusted by an improvement scale to project future improvements in life expectancy. TVA's mortality assumptions are based upon actuarial projections in combination with studies of the actual mortality experience of TVA's pension and post-retirement benefit plan participants while taking into consideration the published Society of Actuaries ("SOA") mortality table and projection scale at September 30, 2024.

The following mortality assumptions were used to determine the benefit obligations for the pension and other post-retirement benefit plans at September 30, 2024, 2023, and 2022. Assumptions used to determine year-end benefit obligations are the assumptions used to determine the subsequent year's net periodic benefit costs.

Mortality Assumptions
At September 30

	2024	2023	2022
Mortality table	PRI-2012 Upper Quartile table (adjusted)	PRI-2012 Upper Quartile table (adjusted)	PRI-2012 Upper Quartile table (adjusted)
Improvement scale	MP-2021 (modified)	MP-2021 (modified)	MP-2021 (modified)

Health Care Cost Trends. The health care cost trend rates are assumptions about the annual rate of changes in the cost of health care benefits currently provided by the post-retirement benefit plan. In establishing health care cost trend rates, TVA reviews actual recent cost trends and projected future trends considering health care inflation, changes in health care utilization, and changes in plan benefits and premium experience.

Cost of Living Adjustment. COLAs are an increase in the benefits for eligible retirees to help maintain the purchasing power of benefits as consumer prices increase. Eligible retirees receive COLAs on pension and supplemental benefits in January based on a formula linked to the Consumer Price Index for All Urban Consumers ("CPI-U") following any year in which the calculation is at least one percent. Increases in COLA will be the percentage change in average CPI-U for the current 12-month period (November - October) compared to the average CPI-U for the previous 12-month period (November - October) for which a COLA was given, less 0.25 percent, with a 6.00 percent cap for any one year.

TVA's COLA assumption is derived from long-term expectations of the expected future rate of inflation, based upon capital market assumptions, economic forecasts, and the Federal Reserve policy. The actual calendar year COLA and the long- term COLA assumption are used to determine the benefit obligation at September 30 and the net periodic benefit costs for the following fiscal year. The actual calendar year COLAs for 2024, 2023, and 2022 were 4.44 percent, 6.00 percent, and 3.50 percent, respectively.

Sensitivity of Costs to Changes in Assumptions. The following chart reflects the sensitivity of pension cost to changes in certain actuarial assumptions:

Sensitivity to Certain Changes in Pension Assumptions

Actuarial Assumption	Change in Assumption	Impact on 2024 Pension Cost (in millions)	Impact on 2024 Projected Benefit Obligation (in millions)
Discount rate	(0.25)%	$ 11	$ 273
Rate of return on plan assets	(0.25)%	19	N/A
Cost of living adjustments	0.25 %	22	188

Each fluctuation above assumes that the other components of the calculation are held constant and excludes any impact for unamortized actuarial gains or losses.

Plan Investments

In September 2023, based on current market conditions and updated capital market assumptions, the asset allocation policy was modified to progress towards the goal of reducing risk and volatility in the TVARS investment portfolio. TVARS investments are being reallocated in a prudent manner over time to move toward the new asset allocation targets. Pursuant to the TVARS Rules and Regulations, any proposed changes in asset allocation that would change TVARS's assumed rate of investment return are subject to the review and veto of the TVA Board. The qualified pension plan assets are invested across growth, defensive-growth, defensive, and inflation-sensitive assets. The TVARS asset allocation policy includes permissible deviations from target allocations, and action can be taken, as appropriate, to rebalance the plan's assets consistent with the asset allocation policy. At September 30, 2024 and 2023, the asset holdings of TVARS included the following:

Asset Holdings of TVARS

		Plan Assets at September 30	
Asset Category	Target Allocation	2024	2023
Growth assets	17 %	21 %	22 %
Defensive growth assets	30 %	23 %	33 %
Defensive assets	33 %	34 %	17 %
Inflation-sensitive assets	20 %	22 %	28 %
Total	100 %	100 %	100 %

Fair Value Measurements

The following table provides the fair value measurement amounts for assets held by TVARS at September 30, 2024:

TVA Retirement System
At September 30, 2024
(in millions)

	Total[1][2]	Quoted Prices in Active Markets for Identical Assets/Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Equity securities	$ 670	$ 668	$ —	$ 2
Preferred securities	3	—	2	1
Debt securities				
Corporate debt securities	1,122	—	1,121	1
Mortgage and asset-backed securities	572	—	511	61
Debt securities issued by U.S. Treasury	543	543	—	—
Debt securities issued by foreign governments	19	—	19	—
Debt securities issued by state/local governments	23	—	23	—
Commingled funds measured at net asset value[3]				
Equity	245	—	—	—
Debt	1,236	—	—	—
Institutional mutual funds	180	180	—	—
Cash equivalents and other short-term investments	249	5	244	—
Private credit funds measured at net asset value[3]	1,126	—	—	—
Private equity funds measured at net asset value[3]	1,580	—	—	—
Private real asset funds measured at net asset value[3]	1,150	—	—	—
Securities lending collateral	235	—	235	—
Derivatives				
Swaps	6	—	6	—
Total assets	$ 8,959	$ 1,396	$ 2,161	$ 65
Liabilities				
Derivatives				
Futures	$ 1	$ 1	$ —	$ —
Swaps	3	—	3	—
Total liabilities	$ 4	$ 1	$ 3	$ —

Notes
(1) Excludes approximately $47 million in net payables associated with security purchases and sales and various other payables.
(2) Excludes a $235 million payable for collateral on loaned securities in connection with TVARS's participation in securities lending programs.
(3) Certain investments that are measured at fair value using the NAV or its equivalent ("alternative investments") have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets as the fair value of net plan assets.

The following table provides the fair value measurement amounts for assets held by TVARS at September 30, 2023:

TVA Retirement System
At September 30, 2023
(in millions)

	Total[1][2]	Quoted Prices in Active Markets for Identical Assets/Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Equity securities	$ 732	$ 731	$ —	$ 1
Preferred securities	4	—	4	—
Debt securities				
Corporate debt securities	1,109	—	1,107	2
Mortgage and asset-backed securities	616	—	561	55
Debt securities issued by U.S. Treasury	602	602	—	—
Debt securities issued by foreign governments	12	—	10	2
Debt securities issued by state/local governments	21	—	21	—
Commingled funds measured at net asset value[3]				
Equity	360	—	—	—
Debt	544	—	—	—
Blended	101	—	—	—
Institutional mutual funds	363	363	—	—
Cash equivalents and other short-term investments	315	51	264	—
Private credit funds measured at net asset value[3]	694	—	—	—
Private equity funds measured at net asset value[3]	1,769	—	—	—
Private real asset funds measured at net asset value[3]	1,162	—	—	—
Securities lending collateral	181	—	181	—
Derivatives				
Futures	1	1	—	—
Swaps	17	—	17	—
Foreign currency forward receivable	2	—	2	—
Total assets	$ 8,605	$ 1,748	$ 2,167	$ 60
Liabilities				
Derivatives				
Futures	$ 5	$ 5	$ —	$ —
Swaps	26	—	26	—
Options	1	1	—	—
Securities sold under agreements to repurchase	96	—	96	—
Total liabilities	$ 128	$ 6	$ 122	$ —

Notes
(1) Excludes approximately $167 million in net payables associated with security purchases and sales and various other payables.
(2) Excludes a $181 million payable for collateral on loaned securities in connection with TVARS's participation in securities lending programs.
(3) Certain investments that are measured at fair value using the NAV or its equivalent ("alternative investments") have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets as the fair value of net plan assets.

The following table provides a reconciliation of beginning and ending balances of pension plan assets measured at fair value on a recurring basis where the determination of fair value includes significant unobservable inputs (Level 3):

Fair Value Measurements Using Significant Unobservable Inputs
(in millions)

	Fair Value Measurements Using Significant Unobservable Inputs (Level 3)
Balance at September 30, 2022	$ 62
Net realized/unrealized gains (losses)	1
Purchases, sales, issuances, and settlements (net)	2
Transfers in and/or out of Level 3	(5)
Balance at September 30, 2023	60
Net realized/unrealized gains (losses)	2
Purchases, sales, issuances, and settlements (net)	10
Transfers in and/or out of Level 3	(7)
Balance at September 30, 2024	$ 65

The following descriptions of the valuation methods and assumptions used by the pension plan to estimate the fair value of investments apply to investments held directly by the pension plan. Third-party pricing vendors provide valuations for investments held by the pension plan in most instances, except for commingled, private credit, private equity, and private real asset funds which are priced at NAVs established by the investment managers. In instances where pricing is determined to be based on unobservable inputs, a Level 3 classification has been assigned. Certain securities priced by the investment manager using a proprietary fair value model with unobservable inputs have been classified as Level 3.

Equity and Preferred Securities. Investments listed on either a national or foreign securities exchange or traded in the over-the-counter National Market System are generally valued each business day at the official closing price (typically the last reported sale price) on the exchange on which the security is primarily traded and are classified as Level 1. Equity securities, including common stocks and preferred securities, classified as Level 2 may have been priced by dealer quote or using assumptions based on observable market data, such as yields on bonds from the same issuer or industry. Certain securities priced by the investment manager using unobservable inputs have been classified as Level 3.

Corporate Debt Securities. Corporate bonds are valued based upon recent bid prices or the average of recent bid and asked prices when available (Level 2 inputs) and, if not available, they are valued through matrix pricing models. Matrix pricing, which is a mathematical technique commonly used to price debt securities that are not actively traded, values debt securities without relying exclusively on quoted prices for the specific securities but rather by relying on the securities' relationship to other benchmark quoted securities (Level 2 inputs). Certain securities priced by the investment manager using broker pricing or unobservable inputs have been classified as Level 3.

Mortgage and Asset-Backed Securities. Residential mortgage-backed securities consist of collateralized mortgage obligations ("CMOs") and U.S. pass-through security pools related to government-sponsored enterprises. CMO pricing is typically based on either a volatility-driven, multidimensional, single-cash-flow stream model or an option-adjusted spread model. These models incorporate available market data such as trade information, dealer quotes, market color, spreads, bids, and offers. Pricing for government-sponsored enterprise securities, including the Federal Home Loan Mortgage Corporation, the Federal National Mortgage Association, and the Government National Mortgage Association, is typically based on quotes from the To Be Announced ("TBA") market, which is highly liquid with multiple electronic platforms that facilitate the execution of trading between investors and broker/dealers. Prices from the TBA market are then compared against other live data feeds as well as input obtained directly from the dealer community. Most residential mortgage-backed securities are considered to be priced using Level 2 inputs because of the nature of their market-data-based pricing models. Certain securities priced by vendors using a single broker quote or unobservable inputs have been classified as Level 3.

Commercial mortgage-backed and asset-backed securities are typically priced based on a single-cash-flow stream model, which incorporates available market data such as trade information, dealer quotes, market color, spreads, bids, and offers. Because of the market-data-based nature of such pricing models, these securities are typically classified as Level 2. Certain securities priced by investment managers using broker pricing or unobservable inputs have been classified as Level 3.

Debt Securities Issued by U.S. Treasury. For U.S. Treasury securities, fair values reflect the closing price reported in the active market in which the security is traded (Level 1 inputs).

Debt Securities Issued by Foreign Governments. Foreign government bonds and foreign government inflation-linked securities are typically priced based on proprietary discounted cash flow models, incorporating option-adjusted spread features

as appropriate. Debt securities issued by foreign governments are classified as Level 2 because of the nature of their market-data-based pricing models. Certain securities priced by the investment manager using broker quotes or unobservable input have been classified as Level 3.

Debt Securities Issued by State and Local Governments. Debt securities issued by state and local governments are typically priced using market-data-based pricing models, and are therefore classified as Level 2. These pricing models incorporate market data such as quotes, trading levels, spread relationships, and yield curves, as applicable.

Commingled Funds. The pension plan invests in commingled funds, which include collective trusts, unit investment trusts, and similar investment funds that predominantly hold debt and/or equity securities as underlying assets. The pension plan's ownership consists of a pro rata share and not a direct ownership of an underlying investment. These commingled funds are valued at their closing NAVs (or unit value) per share as reported by the managers of the commingled funds and as supported by the unit prices of actual purchases and sale transactions occurring as of or close to the financial statement date. These funds have not been classified in the fair value hierarchy in accordance with FASB guidance issued in May 2015.

The pension plan is invested in equity commingled funds, which can be categorized as either passively managed index funds or actively managed funds. The equity index funds seek to track the performance of a particular index by replicating its capitalization and characteristics. Passive fund benchmark indices include the Russell 1000 index and MSCI ACWI ex-U.S. index. The actively managed equity funds seek to outperform certain equity benchmarks through a combination of fundamental and technical analysis. Active funds select portfolio positions based upon their research.

The pension plan is invested in debt commingled funds, which can be categorized as either passively managed index funds or actively managed funds. The pension plan's debt index fund invests in a diversified portfolio of fixed-income securities and derivatives of varying maturities to replicate the characteristics of the Bloomberg Barclays Capital U.S. TIPS. The fund seeks to track the total return of the Bloomberg Barclays Capital U.S. TIPS index. The actively managed debt funds seek to outperform certain fixed-income benchmarks through fundamental research and analysis. The funds invest in a diversified portfolio of fixed income securities and derivatives of varying maturities. Varying by strategy, fund objectives include achieving a positive relative total return through active credit selection and providing risk management through desired strategic exposures.

The pension plan is invested in commingled funds, which invest across multiple asset classes that can be categorized as blended. These funds seek to outperform a passive benchmark through active security selection. The funds invest in securities across equity, fixed income, currency, and commodities. The portfolios employ fundamental, quantitative, and technical analysis.

The pension plan's investments in equity, debt, blended, and commodity commingled funds can generally be redeemed upon notification of the investment managers, with required notice periods varying from same-day to monthly. These investments do not have unfunded commitments.

Institutional Mutual Funds. Investments in institutional mutual funds are valued at prices based on their NAV. Institutional mutual funds have daily published market prices that represent their NAV (or unit value) per share and are classified as Level 1.

Cash Equivalents and Other Short-Term Investments and Certificates of Deposit. Cash equivalents and other short-term investments are highly liquid securities with maturities of less than three months and 12 months, respectively. These consist primarily of discount securities such as commercial paper, repurchase agreements, U.S. Treasury bills, and certain agency securities. These securities, as well as certificates of deposit, may be priced at cost, which approximates fair value due to the short-term nature of the instruments. Model based pricing which incorporates observable inputs may also be utilized. These securities are classified as Level 2. Active market pricing may be utilized for U.S. Treasury bills, which are classified as Level 1.

Private Credit Funds. Private credit limited partnerships are reported at NAVs provided by the fund managers. These funds have not been classified in the fair value hierarchy in accordance with FASB guidance issued in May 2015.

The private credit limited partnerships invest across direct lending, opportunistic credit, and distressed debt strategies. The limited partnerships generally make investments of senior secured first-lien loans, second-lien secured loans, asset-based loans, risk transfer loans, specialty finance loans, unitranche loans, and distressed debt opportunities to middle market private companies. The limited partnerships generally seek to obtain financial returns through high income potential and occasional equity upside. The limited partnerships generally have a term life of five to eight years and are diversified by sector and industry.

Private Equity Funds. Private equity limited partnerships are reported at NAVs provided by the fund managers. These funds have not been classified in the fair value hierarchy in accordance with FASB guidance issued in May 2015.

The private equity limited partnerships typically make longer-term investments in private companies and seek to obtain financial returns through long-term appreciation based on corporate stewardship, improved operating processes, and financial restructuring which may involve a merger or acquisition. Significant investment strategies include venture capital, buyout,

mezzanine or subordinated debt, restructuring or distressed debt, and special situations. Venture capital partnerships consist of two main groupings. Early-stage venture capital partnerships invest in businesses still in the conceptual stage where products may not be fully developed and where revenues and/or profits may be several years away. Later-stage venture capital partnerships invest in more mature companies in need of growth or expansion capital. Buyout partnerships provide the equity capital for acquisition transactions either from a private seller or the public, which may represent the purchase of the entire company or a refinancing or recapitalization transaction where equity is invested. Mezzanine or subordinated debt partnerships provide the intermediate capital between equity and senior debt in a buyout or refinancing transaction and typically own a security in the company that carries current interest payments as well as a potential equity interest in the company. Restructuring or distressed debt partnerships purchase opportunities generated by overleveraged or poorly managed companies. Special situation partnerships include organizations with a specific industry focus not covered by the other private equity subclasses or unique opportunities that fall outside the regular subclasses.

The private equity funds have no investment withdrawal provisions prior to the termination of the partnership. Partnerships generally continue 10 to 14 years after the inception of the fund. The partnerships are generally subject to two to three one-year extensions at the discretion of the General Partner. Partnerships can generally be dissolved by an 80 percent vote in interest by all limited partners, with some funds requiring the occurrence of a specific event.

Private Real Asset Investments. The pension plan's ownership in private real asset investments consists of a pro rata share and not a direct ownership of the underlying investments. The fair values of the pension plan's private real asset investments are estimated utilizing NAVs provided by the investment managers. These investments have not been classified in the fair value hierarchy in accordance with FASB guidance issued in May 2015. The investment strategies and methodologies utilized by the investment managers to calculate their NAVs are summarized as follows:

The pension plan is invested in limited partnerships that invest in real estate securities, real estate partnerships, and direct real estate properties. This includes investments in office, multifamily, industrial, and retail investment properties in the U.S. and international markets. The investment strategy focuses on distressed, opportunistic, and value-added opportunities. Partnership investments also include mortgage and/or real estate-related fixed-income instruments and related securities. Investments are diversified by property type and geographic location.

The pension plan is invested in a commingled fund that develops, renovates, and re-leases real estate properties to create value. Investments are predominantly in top tier real estate markets that offer deep liquidity. Property types include residential, office, industrial, hotel, retail, and land. Properties are diversified by geographic region within the U.S. domestic market. The plan is invested in a second commingled fund that invests primarily in core, well-leased, operating real estate properties with a focus on income generation. Investments are diversified by property type with a focus on office, industrial, apartment, and retail. Properties are diversified within the U.S. with an overweight to major market and coastal regions.

Fair value estimates of the underlying investments in these limited partnerships and commingled fund investments are primarily based upon property appraisal reports prepared by independent real estate appraisers within a reasonable amount of time following acquisition of the real estate and no less frequently than annually thereafter. The appraisals are based on one or a combination of three methodologies: cost of reproduction analysis, discounted cash flow analysis, and sales comparison analysis. Pricing for certain investments in mortgage-backed and asset-backed securities is typically based on models that incorporate observable inputs.

The pension plan is invested in energy infrastructure partnerships that acquire essential, long-lived real assets in three main groupings. Upstream assets include oil and gas exploration, drilling, and acquisition. Midstream assets include storage, pipelines, gathering, processing, and transportation of energy commodities. Downstream assets include generation, distribution, and transmission facilities. Additionally, the pension plan is invested in infrastructure partnerships that target mid-sized operating infrastructure companies and/or assets with limited development and construction risk primarily in the energy, transportation and logistics, environmental, telecommunications, and social industries. The partnerships use one or more valuation techniques (e.g., the market approach, the income approach, or the cost approach) for which sufficient and reliable data is available. The use of the market approach generally consists of using comparable market transactions, while the use of the income approach generally consists of the net present value of estimated future cash flows, adjusted as appropriate for liquidity, credit, market, and/or other risk factors.

The pension plan is invested in a private real asset investment trust formed to make direct or indirect investments in commercial timberland properties. Pricing for these types of investments is based on comprehensive appraisals that are conducted shortly after initial purchase of properties and at three-year intervals thereafter. All appraisals are conducted by third-party timberland appraisal firms. Appraisals are based on either a sales comparison analysis or a discounted cash flow analysis.

Securities Lending Collateral. Collateral held under securities lending arrangements is invested in highly liquid short-term securities, primarily repurchase agreements. The securities are often priced at cost, which approximates fair value due to the short-term nature of the instruments. These securities are classified as Level 2.

Derivatives. The pension plan invests in a variety of derivative instruments. The valuation methodologies for these instruments are as follows:

Futures. The pension plan enters into futures. The futures contracts are listed on either a national or foreign securities exchange and are generally valued each business day at the official closing price (typically the last reported sales price) on the exchange on which the security is primarily traded. The pricing is performed by third-party vendors. Since futures are priced by an exchange in an active market, they are classified as Level 1.

Options. The pension plan enters into purchased and written options. Options that are listed on either a national or foreign securities exchange are generally valued each business day at the official closing price (typically the last reported sales price) on the exchange on which the security is primarily traded. These options are classified as Level 1. Options traded over the counter and not on exchanges are priced by third-party vendors and are classified as Level 2.

Swaps. The pension plan enters into various types of swaps. Credit default swaps are priced at market using models that consider cash flows, credit curves, recovery rates, and other factors. The pricing is performed by third-party vendors, and in some cases by clearing exchanges. Interest rate swap contracts are priced at market using forward rates derived from the swap curve, and the pricing is also performed by third-party vendors, and in some cases by clearing exchanges. Other swaps such as equity index swaps and variance swaps are priced by third-party vendors using market inputs such as spot rates, yield curves, and volatility. The pension plan's swaps are generally classified as Level 2 based on the observable nature of their pricing inputs.

Foreign currency forwards. The pension plan enters into foreign currency forwards. All commitments are marked to market daily at the applicable translation rates, and any resulting unrealized gains or losses are recorded. Foreign currency forwards are priced by third-party vendors and are classified as Level 2.

Securities Sold Under Agreements to Repurchase. The pension plan enters into contracts to sell securities to a counterparty at a specified price with an agreement to purchase the same or substantially the same security from the same counterparty at a fixed or determinable price at a future date. Securities sold under agreements to repurchase are presented at their contract price which approximates fair value due to their short-term nature. These securities are classified as Level 2. In connection with sales of securities under agreements to repurchase, the counterparties require the pension plan to maintain collateral securities with a fair value that approximates or exceeds the contract amount of the repurchase agreement. These securities are held in government inflation-linked bonds and classified as government debt securities.

The valuation methods described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while the TVARS Board believes its valuation methods are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

Cash Flows

Estimated Future Benefit Payments. The following table sets forth the estimated future benefit payments under the benefit plans.

Estimated Future Benefits Payments
At September 30, 2024
(in millions)

	Pension Benefits[1]	Other Post-Retirement Benefits
2025	$ 820	$ 20
2026	821	19
2027	821	19
2028	819	19
2029	813	19
2030 - 2034	3,917	106

Note
(1) Participants are assumed to receive the Fixed Fund in a lump sum in lieu of available annuity options allowed for certain grandfathered participants resulting in higher estimated pension benefits payments.

Contributions. TVA made contributions to the pension plan of $300 million for 2024 and 2023. TVA has committed to make a minimum contribution of $300 million per year through 2036 or until the plan has reached and remained at 100 percent funded status under the actuarial rules applicable to TVARS. TVA made SERP contributions of $4 million and $6 million for 2024 and 2023, respectively. TVA made cash contributions to the other post-retirement benefit plans of $22 million (net of $5 million in rebates) and $25 million (net of $4 million in rebates) for 2024 and 2023, respectively. TVA expects to contribute $300 million to TVARS, $7 million to the SERP, and $20 million to the other post-retirement benefit plans in 2025.

Other Post-Employment Benefits

Post-employment benefit cost estimates are revised to properly reflect changes in actuarial assumptions made at the end of each year. TVA utilizes a discount rate determined by reference to the U.S. Treasury Constant Maturities corresponding to the calculated average durations of TVA's future estimated post-employment claims payments. The use of a 3.81 percent discount rate resulted in the recognition of $21 million in expenses in 2024 and an unpaid benefit obligation of $258 million at September 30, 2024. The use of a 4.59 percent discount rate resulted in the recognition of approximately $(3) million in expenses in 2023 and an unpaid benefit obligation of $266 million at September 30, 2023. The use of a 3.83 percent discount rate resulted in the recognition of approximately $(40) million in expenses in 2022 and an unpaid benefit obligation of $299 million at September 30, 2022. The U.S. Department of Labor ("DOL") administers TVA's worker compensation program and invoices TVA annually for claims processed.

The decrease in the unpaid obligation at September 30, 2024, compared to the prior year was due primarily to the decrease in overall claims experience offset by inflationary impacts on wage and medical costs and a decrease in the discount rate from 4.59 percent in 2023 to 3.81 percent in 2024. The DOL billed TVA $28 million for 2024 claims due in October 2024. TVA estimated claims for 2025 are $25 million.

The decrease in the unpaid obligation at September 30, 2023, compared to the prior year was due primarily to the increase in the discount rate from 3.83 percent in 2022 to 4.59 percent in 2023 and a decrease in claims. These decreases were partially offset by inflationary impacts on wage and medical costs and an increase in medical utilization previously delayed by the pandemic. TVA paid $29 million for 2023 claims to the DOL in October 2023.

The impact of inflation on wages, medical costs, and interest rates on the post-employment obligation depends on factors beyond TVA's knowledge or control, including the effects of supply chain disruptions and geographical tensions.

The current portion which represents unpaid losses and administrative fees due are in Accounts payable and accrued liabilities. The long-term portion is recognized in Post-retirement and post-employment benefit obligations.

Amounts Recognized on TVA's Consolidated Balance Sheets
At September 30
(in millions)

	2024	2023
Accounts payable and accrued liabilities	$ 28	$ 29
Post-retirement and post-employment benefit obligations	230	237

21. Collaborative Arrangement

In 2023, TVA, Ontario Power Generation, BWRX TCA sp. z.o.o., and GE Hitachi Nuclear Energy ("GEH") entered into a multi-party collaborative arrangement to advance the global deployment of the GEH BWRX-300 small modular reactor. GEH is responsible for standard design development. Under the agreement, TVA will contribute up to $88 million for design costs incurred by GEH through 2026. At the time feasibility is determined, TVA will have the right to use the design and may receive additional economic benefits.

Payments pursuant to the agreement are recorded as research and development expense, which is reflected as Operating and maintenance expense on TVA's Consolidated Statements of Operations in the period incurred. TVA recorded $41 million and $31 million of expenses related to this agreement for the years ended September 30, 2024 and 2023, respectively. TVA also had a $6 million letter of credit posted under this arrangement at September 30, 2024.

22. Commitments and Contingencies

Commitments

Power Purchase Obligations. TVA has contracted with various independent power producers and LPCs for additional capacity to be made available to TVA. Several of these agreements have contractual minimum payments and are accounted for as either finance or operating leases. In total, these agreements provide 4,487 megawatts ("MW") of summer net capability. The remaining terms of the agreements range up to 11 years. Additionally, TVA has contracted with regional transmission organizations to reserve 4,750 MW of transmission service to support purchases from the market and wind PPAs. The remaining terms of these agreements range up to five years. TVA has recorded $519 million, $355 million, and $366 million of expense under these power purchase and transmission service agreements during 2024, 2023, and 2022, respectively.

TVA has one power purchase agreement that was negotiated as part of arranging financing for the facility. At September 30, 2024, the non-lease portion of the commitment for each of the next five years and thereafter is shown below:

	2025	2026	2027	2028	2029	Thereafter
Unconditional purchase obligation	$ 166	$ 166	$ 166	$ 165	$ 166	$ 413

Under federal law, TVA is obligated to purchase power from qualifying facilities (cogenerators and small power producers). As of September 30, 2024, there was a combined qualifying facility capacity of 279 MW from 1,197 different generation sources, from which TVA purchased power under this law.

Unfunded Loan Commitments. At September 30, 2024, TVA had no commitments under unfunded loan commitments for 2025 through 2029.

Other Commitments. See Note 8 — *Leases*, Note 11 — *Variable Interest Entities*, Note 14 — *Debt and Other Obligations*, and Note 20 — *Benefit Plans* for the obligations and commitments attributable to leases, VIEs and membership interests of VIEs subject to mandatory redemption, leaseback obligations, and the retirement plan, respectively.

Contingencies

Nuclear Insurance. Section 170 of the Atomic Energy Act, commonly known as the Price-Anderson Act, provides a layered framework of financial protection to compensate for liability claims of members of the public for personal injury and property damages arising from a nuclear incident in the U.S. This financial protection consists of two layers of coverage. The primary level is private insurance underwritten by American Nuclear Insurers and provides public liability insurance coverage of $500 million for each nuclear power plant licensed to operate. If this amount is not sufficient to cover claims arising from a nuclear incident, the second level, Secondary Financial Protection, applies. Within the Secondary Financial Protection level, the licensee of each nuclear reactor has a contingent obligation to pay a retrospective premium, equal to its proportionate share of the loss in excess of the primary level, regardless of proximity to the incident of fault, up to a maximum of $166 million per reactor per incident. With TVA's seven reactors, the maximum total contingent obligation per incident is $1.2 billion. This retrospective premium is payable at a maximum rate currently set at $25 million per year per nuclear incident per reactor. Currently, 95 reactors are participating in the Secondary Financial Protection program.

In the event that a nuclear incident results in public liability claims, the primary level provided by American Nuclear Insurers combined with the Secondary Financial Protection should provide up to $16.3 billion in coverage.

Federal law requires that each NRC power reactor licensee obtain property insurance from private sources to cover the cost of stabilizing and decontaminating a reactor and its station site after an accident. TVA carries property, decommissioning liability, and decontamination liability insurance from Nuclear Electric Insurance Limited ("NEIL") and European Mutual Association for Nuclear Insurance. The limits available for a loss are up to $2.1 billion for two of TVA's nuclear sites and up to $2.8 billion for the remaining site. Some of this insurance may require the payment of retrospective premiums up to a maximum of $114 million.

TVA purchases accidental outage (business interruption) insurance for TVA's nuclear sites from NEIL. In the event that an accident covered by this policy takes a nuclear unit offline or keeps a nuclear unit offline, NEIL will pay TVA, after a waiting period, an indemnity (a set dollar amount per week) with a maximum indemnity of $490 million per unit. This insurance policy may require the payment of retrospective premiums up to a maximum of $44 million, but only to the extent the retrospective premium is deemed necessary by the NEIL Board of Directors to pay losses unable to be covered by NEIL's surplus.

Decommissioning Costs. TVA recognizes legal obligations associated with the future retirement of certain tangible long-lived assets related primarily to nuclear generating plants, coal-fired generating plants, hydroelectric generating plants/dams, transmission structures, and other property-related assets. See Note 13 — *Asset Retirement Obligations*.

Nuclear Decommissioning. Provision for decommissioning costs of nuclear generating units is based on options prescribed by the NRC procedures to dismantle and decontaminate the facilities to meet the NRC criteria for license termination. At September 30, 2024, $3.8 billion, representing the discounted value of future estimated nuclear decommissioning costs, was included in nuclear AROs. The actual decommissioning costs may vary from the derived estimates because of, among other things, changes in current assumptions, such as the assumed dates of decommissioning, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. Utilities that own and operate nuclear plants are required to use different procedures in calculating nuclear decommissioning costs under GAAP than those that are used in calculating nuclear decommissioning costs when reporting to the NRC. The two sets of procedures produce different estimates for the costs of decommissioning primarily because of differences in the underlying assumptions. TVA bases its nuclear decommissioning estimates on site-specific cost studies. The most recent study was approved and implemented in September 2022. Site-specific cost studies are updated for each of TVA's nuclear units at least every five years.

TVA maintains an NDT to provide funding for the ultimate decommissioning of its nuclear power plants. See Note 16 — *Fair Value Measurements — Investment Funds*. TVA monitors the value of its NDT and believes that, over the long term and before cessation of nuclear plant operations and commencement of decommissioning activities, adequate funds from investments and additional contributions, if necessary, will be available to support decommissioning. TVA's operating nuclear power units are licensed through various dates between 2033 - 2055, depending on the unit. It may be possible to extend the operating life of some of the units with approval from the NRC. See Note 10 — *Regulatory Assets and Liabilities — Nuclear Decommissioning Costs* and Note 13 — *Asset Retirement Obligations*.

Non-Nuclear Decommissioning. At September 30, 2024, $7.0 billion, representing the discounted value of future estimated non-nuclear decommissioning costs, was included in non-nuclear AROs. This decommissioning cost estimate involves estimating the amount and timing of future expenditures and making judgments concerning whether or not such costs are considered a legal obligation. Estimating the amount and timing of future expenditures includes, among other things, making projections of the timing and duration of the asset retirement process and how costs will escalate with inflation. The actual decommissioning costs may vary from the derived estimates because of changes in current assumptions, such as the assumed dates of decommissioning, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. TVA updates its underlying assumptions for non-nuclear decommissioning AROs at least every five years. However, material changes in underlying assumptions that impact the amount and timing of undiscounted cash flows are continuously monitored and incorporated into ARO balances in the period identified.

TVA maintains an ART to help fund the ultimate decommissioning of its non-nuclear power assets. See Note 16 — *Fair Value Measurements — Investment Funds*. Estimates involved in determining if additional funding will be made to the ART include inflation rate, rate of return projections on the fund investments, and the planned use of other sources to fund decommissioning costs. See Note 10 — *Regulatory Assets and Liabilities — Non-Nuclear Decommissioning Costs* and Note 13 — *Asset Retirement Obligations*.

Environmental Matters. TVA's generation activities, like those across the utility industry and in other industrial sectors, are subject to federal, state, and local environmental laws and regulations. Major areas of regulation affecting TVA's activities include air quality control, greenhouse gas ("GHG") emissions, water quality control, and management and disposal of solid and hazardous wastes. Regulations in these major areas continue to become more stringent and have, and will continue to have, a particular emphasis on climate change, renewable generation, and energy efficiency.

TVA has incurred, and expects to continue to incur, substantial capital and operating and maintenance costs to comply with evolving environmental requirements primarily associated with, but not limited to, the operation of TVA's coal-fired and natural gas-fired generating units in general and emissions of pollutants from those units. Environmental requirements placed on the operation of coal-fired and other generating units using fossil fuels such as oil and natural gas will likely continue to become more restrictive over time. Failure to comply with environmental and safety requirements can result in enforcement actions and litigation, which can lead to the imposition of significant civil liability, including fines and penalties, criminal sanctions, and/or temporary or permanent closure of non-compliant facilities. Historical non-compliance can also lead to difficulty in renewing existing permits, as well as difficulty in obtaining permits to bring new generation facilities online. Other obstacles to renewal or permitting of new facilities include a proliferation of non-government organizations seeking to use litigation tools to delay or stop altogether permitting of new fossil fuel facilities in favor of renewable energy projects.

Compliance with the 2015 CCR Rule required implementation of a groundwater monitoring program, additional engineering, evaluation of authorized closure methods, coordination with certain state authorities, and ongoing analysis at each TVA CCR unit. As further analyses are performed, including evaluation of monitoring results, there is the potential for additional costs for investigation and/or remediation. In addition, on May 8, 2024, EPA published its Legacy CCR Rule, which expands the scope of the existing regulatory requirements of the 2015 CCR Rule to include two additional classes of CCR units: Legacy SIs and CCRMUs. See Note 13 — *Asset Retirement Obligations*.

In May 2024, EPA also published (1) a final rule that establishes more stringent technology-based effluent limitations for four waste streams from coal-fired plants, (2) a rule that strengthens and updates the Mercury and Air Toxics Standards for electric generating units to reflect recent developments in control technologies, and (3) a rule that establishes GHG emission guidelines for existing coal-fired plants and GHG performance standards for new natural gas-fired power plants. These rules are all subject to legal challenges, and if the challenges are not successful, TVA would incur substantial costs to comply with the rules.

Liability for releases, natural resource damages, and required cleanup of hazardous substances is primarily regulated by the federal Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), the Resource Conservation and Recovery Act ("RCRA"), and other federal and parallel state statutes. In a manner similar to many other governmental entities, industries, and power systems, TVA has generated or used hazardous substances over the years. TVA operations at some facilities have resulted in releases of contaminants that TVA has addressed or is addressing consistent with state and federal requirements. At September 30, 2024 and 2023, TVA's estimated liability for required cleanup and similar environmental work for those sites for which sufficient information is available to develop a cost estimate was $15 million and $16 million, respectively, on a non-discounted basis, and was included in Accounts payable and accrued liabilities and Other long-

term liabilities on the Consolidated Balance Sheets. Additionally, the potential inclusion of new hazardous substances under CERCLA and RCRA jurisdiction could significantly affect TVA's future liability for remediating historical releases.

In August 2015, Tennessee Department of Environment and Conservation ("TDEC") issued an order that includes an iterative process through which TVA and TDEC will identify and evaluate any CCR contamination risks and, if necessary, respond to such risks. TVA is also following a similar process pursuant to a consent order. At September 30, 2024, TVA's estimated liability for costs associated with environmental remediation activities for the sites covered by these orders for which sufficient information is available to develop a cost estimate was approximately $215 million on a non-discounted basis and was included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. The current estimated time frame for work related to these remediation activities for which TVA has a cost estimate is through 2046.

Potential Liability Associated with Workers' Exposure to CCR Materials. In response to the 2008 ash spill at Kingston, TVA hired Jacobs Engineering Group, Inc. ("Jacobs") to oversee aspects of the cleanup. After the cleanup was completed, Jacobs was sued in the U.S. District Court for the Eastern District of Tennessee ("Eastern District") by employees of a contractor involved in the cleanup and family members of some of the employees. The plaintiffs alleged that Jacobs failed to take or provide proper health precautions and misled workers about the health risks associated with exposure to coal fly ash, which is a CCR material. The plaintiffs also alleged that exposure to the fly ash caused significant illnesses, including in some cases death. Other contractor employees and family members also filed lawsuits against Jacobs in the Eastern District. In the third quarter of 2023, Jacobs announced that it reached a global settlement that resolved all of these lawsuits. While TVA was not a party to any of these lawsuits, Jacobs claimed that TVA had an indemnity obligation to reimburse Jacobs under TVA's contract with Jacobs. In August 2024, TVA entered into a settlement arrangement with Jacobs and its insurers that releases TVA from all past, present, and future claims under the contract. The settlement arrangement did not have a material adverse impact on TVA's results of operations or financial condition.

Legal Proceedings

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting TVA's activities.

General. At September 30, 2024, TVA had accrued $10 million of probable losses with respect to Legal Proceedings. Of the accrued amount, $9 million is included in Other long-term liabilities and $1 million is included in Accounts payable and accrued liabilities. No assurance can be given that TVA will not be subject to significant additional claims and liabilities. If actual liabilities significantly exceed the estimates made, TVA's results of operations, liquidity, and financial condition could be materially adversely affected.

Environmental Agreements. On April 14, 2011, TVA entered into two substantively similar agreements, one with the EPA and the other with Alabama, Kentucky, North Carolina, Tennessee, and three environmental advocacy groups (collectively, the "Environmental Agreements"). To resolve alleged New Source Review claims, TVA committed under the Environmental Agreements to, among other things, take now-completed actions regarding coal units and invest $290 million in certain TVA environmental projects. Of this amount, TVA had spent approximately $284 million as of September 30, 2024. Additionally, TVA holds restricted cash in an interest earning trust to fund the remaining project commitments. Any interest earned through the trust must also be spent on agreed upon environmental projects. The total remaining committed costs, including interest earned through the trust, were approximately $7 million as of September 30, 2024.

The liabilities related to the Environmental Agreements are included in Accounts payable and accrued liabilities and Other long-term liabilities on the September 30, 2024, Consolidated Balance Sheets. In conjunction with the approval of the Environmental Agreements, the TVA Board determined that it was appropriate to record TVA's obligations under the Environmental Agreements as regulatory assets, and they are included as such on the September 30, 2024, Consolidated Balance Sheets and will be recovered in rates in future periods.

Case Involving Johnsonville Aeroderivative Combustion Turbine Project. On December 22, 2022, the Southern Environmental Law Center filed a lawsuit in the U.S. District Court for the Middle District of Tennessee on behalf of the Sierra Club, alleging that TVA violated the National Environmental Policy Act ("NEPA") in deciding to build a new aeroderivative combustion turbine project at its Johnsonville facility. The Sierra Club claims that TVA violated NEPA by failing to adequately analyze the climate consequences of the project, adequately address GHG mitigation in light of EOs to decarbonize the power sector, consider a reasonable range of alternatives to the project, and prepare an environmental impact statement ("EIS"). The Sierra Club requests the federal court to enter a declaratory judgment that TVA's environmental assessment ("EA") violates NEPA and that TVA's decision to issue a finding of no significant impact ("FONSI") was arbitrary, vacate the EA and FONSI, order TVA to prepare an EIS, and prohibit further construction and operation of the combustion turbines until TVA has complied with NEPA. Both parties moved for summary judgment, and on September 30, 2024, the court granted TVA's motion for summary judgment and dismissed the lawsuit. The Sierra Club has 60 days from the date of the decision to appeal.

Case Involving Cumberland Combined Cycle Plant. On June 14, 2023, Appalachian Voices, the Center for Biological Diversity, and the Sierra Club filed a lawsuit in the United States District Court for the Middle District of Tennessee alleging that TVA violated NEPA in deciding to build a 1,450 MW combined cycle plant at its Cumberland facility. The plaintiffs request the

court, among other things, to enter a declaratory judgment that the Cumberland EIS violated NEPA and TVA's decision to issue the Cumberland Record of Decision was arbitrary, capricious, and/or not in accordance with law; enter a declaratory judgment that TVA's failure to supplement the Cumberland EIS violated NEPA and was arbitrary, capricious, and/or not in accordance with law; vacate the Cumberland EIS and the Cumberland Record of Decision; order TVA to prepare a revised draft EIS or supplemental EIS subject to public comment that corrects the NEPA violations identified by the plaintiffs; and enjoin further construction and operation of the Cumberland combined cycle plant until TVA has complied with NEPA. TVA filed an amended answer on September 14, 2023. On February 13, 2024, the plaintiffs filed a motion to complete the administrative record that TVA submitted in support of the EIS for this project, alleging that the administrative record submitted by TVA is incomplete. The magistrate judge issued an order granting in part and denying in part the plaintiffs' motion to complete the administrative record. TVA subsequently filed a motion challenging the magistrate judge's ruling, and TVA's motion is pending before the court. In light of the outstanding issues related to the administrative record, the court suspended the parties' summary judgment deadlines. TVA cannot predict the outcome of this litigation.

Case Involving Kingston Gas-Fired Plant. On October 10, 2024, Appalachian Voices, the Center for Biological Diversity, and the Sierra Club filed a lawsuit in the United States District Court for the Eastern District of Tennessee alleging that TVA violated NEPA and TVA's least-cost planning obligations in deciding to build a gas plant at its Kingston facility. The plaintiffs requested that the court, among other things, enter a declaratory judgment that the Kingston EIS violated NEPA and that TVA's decision to issue the Kingston Record of Decision was arbitrary, capricious, and/or not in accordance with law; enter a declaratory judgment that TVA's least-cost-planning analysis was arbitrary, capricious, and/or not in accordance with law; vacate the Kingston Final EIS and the Kingston Record of Decision; order TVA to prepare a revised draft EIS or supplemental EIS that complies with NEPA and least-cost-planning requirements; and enjoin further construction and operation of the Kingston Gas Plant until TVA has complied with NEPA, least-cost-planning requirements, and the Administrative Procedure Act. TVA anticipates filing its response in December 2024. TVA cannot predict the outcome of this litigation.

23. Related Parties

TVA is a wholly-owned corporate agency of the federal government, and because of this relationship, TVA's revenues and expenses are included as part of the federal budget as a revolving fund. TVA's purpose and responsibilities as an agency are described under the "Other Agencies" section of the federal budget.

TVA's power program and stewardship (nonpower) programs were originally funded primarily by appropriations from Congress. In 1959, Congress passed an amendment to the TVA Act that required TVA's power program to be self-financing from power revenues and proceeds from power program financings. While TVA's power program did not directly receive appropriated funds after it became self-financing, TVA continued to receive appropriations for certain multipurpose and other nonpower mission-related activities as well as for its stewardship activities. TVA has not received any appropriations from Congress for any activities since 1999, and since that time, TVA has funded stewardship program activities primarily with power revenues.

The 1959 amendment to the TVA Act also required TVA, beginning in 1961, to make annual payments to the U.S. Treasury from net power proceeds as a repayment of and as a return on the Power Program Appropriation Investment until a total of $1.0 billion of the Power Program Appropriation Investment has been repaid in accordance with the 1959 amendment. TVA fulfilled its requirement to repay $1.0 billion of the Power Program Appropriation Investment in 2014. The TVA Act requires TVA to continue making payments to the U.S. Treasury as a return on the remaining $258 million of the Power Program Appropriation Investment.

TVA paid the U.S. Treasury $7 million, $6 million, and $4 million in 2024, 2023, and 2022, respectively, as a return on the Power Program Appropriation Investment. The amount of the return on the Power Program Appropriation Investment is based on the Power Program Appropriation Investment balance at the beginning of that year and the computed average interest rate payable by the U.S. Treasury on its total marketable public obligations at the same date. The interest rates payable by TVA on the Power Program Appropriation Investment were 3.02 percent, 1.99 percent, and 1.47 percent for 2024, 2023, and 2022, respectively.

TVA also has access to a financing arrangement with the U.S. Treasury pursuant to the TVA Act. TVA and the U.S. Treasury entered into a memorandum of understanding under which the U.S. Treasury provides TVA with a $150 million credit facility. This credit facility has a maturity date of September 30, 2025, and is typically renewed annually. Access to this credit facility or other similar financing arrangements has been available to TVA since the 1960s. See Note 14 — *Debt and Other Obligations — Credit Facility Agreements.*

In the normal course of business, TVA contracts with other federal agencies for sales of electricity and other services. Transactions with agencies of the federal government were as follows:

Related Party Transactions
At or for the years ended September 30
(in millions)

	2024	2023	2022
Revenue from sales of electricity	$ 118	$ 120	$ 134
Other income	273	282	296
Expenditures			
Operating expenses	241	234	228
Additions to property, plant, and equipment	12	8	11
Cash and cash equivalents	31	31	30
Accounts receivable, net	81	87	78
Investment funds	495	391	358
Long-term accounts receivable	35	38	43
Accounts payable and accrued liabilities	45	42	42
Long-term power bonds, net	3	1	1
Return on power program appropriation investment	7	6	4

24. Subsequent Events

In October 2024, TVA entered into an $800 million construction management agreement and lease financing arrangement with Johnsonville Aeroderivative Combustion Turbine Generation LLC ("JACTG") for the completion and lease by TVA of the Johnsonville Aeroderivative Combustion Turbine Facility ("Johnsonville Facility"). JACTG is a special single-purpose limited liability company formed in September 2024 to finance the Johnsonville Facility through a $720 million secured note issuance (the "JACTG notes") and the issuance of $80 million of membership interests subject to mandatory redemption. The membership interests were purchased by Johnsonville Holdco LLC ("JHLLC"). JHLLC is a special single-purpose entity, also formed in September 2024, established to acquire and hold the membership interests in JACTG. A non-controlling interest in JHLLC is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows are allocated.

The membership interests held by JHLLC in JACTG were purchased with proceeds from the issuance of $80 million of secured notes (the "JHLLC notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each April 1st and October 1st, with a final payment due in October 2054. The payment dates for the mandatorily redeemable membership interests are the same as those of the JHLLC notes. The sale of the JACTG notes, the membership interests in JACTG, and the JHLLC notes closed in October 2024. The JACTG notes are secured by TVA's lease payments, and the JHLLC notes are secured by JHLLC's investment in, and amounts receivable from, JACTG. TVA's lease payments to JACTG are equal to and payable on the same dates as JACTG's and JHLLC's semi-annual debt service payments. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by JACTG and JHLLC. Certain agreements related to this transaction contain default and acceleration provisions.

Due to its participation in the design, business activity, and credit and financial support of JACTG and JHLLC, TVA has determined that it has a variable interest in each of these entities. Based on its analysis, TVA has concluded that it is the primary beneficiary of JACTG and JHLLC and, as such, is required to account for the VIEs on a consolidated basis. JHLLC's membership interests in JACTG are eliminated in consolidation. As a result of the transaction, TVA recorded $791 million in long-term debt of variable interest entities and $9 million in current maturities of long-term debt of variable interest entities.

Report of Independent Registered Public Accounting Firm

To the Board of Directors of Tennessee Valley Authority

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Tennessee Valley Authority (the Company) as of September 30, 2024, and 2023, the related consolidated statements of operations, comprehensive income (loss), changes in proprietary capital and cash flows for each of the three years in the period ended September 30, 2024, and the related notes (collectively referred to as the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at September 30, 2024 and 2023, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 2024, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of September 30, 2024, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated November 13, 2024 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the Audit, Risk, and Cybersecurity Committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

	Valuation of Pension Benefit Obligation
Description of the Matter	At September 30, 2024, the Company’s pension benefit obligation was $11.0 billion. The Company utilizes certain actuarial assumptions to measure the pension benefit obligation at September 30, as more fully described in Note 20 to the consolidated financial statements. Auditing the pension benefit obligation was complex due to the judgmental nature of the assumptions used in the Company’s measurement process, including the discount rates, mortality rates, and cost of living adjustments. These assumptions have a significant effect on the projected pension benefit obligation.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the pension benefit obligation valuation process. For example, we tested controls over management’s review of the pension benefit obligation calculation, the relevant data inputs, and the significant actuarial assumptions described above.

To test the valuation of the pension benefit obligation, our audit procedures included, with the assistance of actuarial specialists, evaluating the methodologies used, the significant actuarial assumptions described above, and the underlying data used by the Company, among other procedures. We evaluated the Company's methodology for determining the discount rates that reflect the maturity and duration of the benefit payments and that are used to estimate the pension benefit obligation. To evaluate the mortality rates and cost of living adjustments, we assessed whether the information was consistent with publicly available information, and whether any market data adjusted for entity-specific adjustments was applied. We also tested the completeness and accuracy of the underlying data, including the participant data, used in the determination of the projected pension benefit obligation.

Valuation of Alternative Investments

Description of the Matter

At September 30, 2024, the Company had $5.0 billion in investment funds and $8.7 billion in plan investments related to the defined benefit pension plan. Approximately 54% and 62% of investment funds and plan investments, respectively, are invested in private equity funds, private real asset funds, private credit funds, and commingled funds. These types of investments are referred to as "alternative investments." These alternative investments are measured at fair value using the net asset value (or its equivalent) as more fully described in Note 16, for investment funds, and Note 20, for plan investments, to the consolidated financial statements.

Auditing the valuation of alternative investments was challenging because of the higher estimation uncertainty of the inputs to the fair value measurements, including the underlying net asset values, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. Additionally, certain information regarding the fair value of these alternative investments was based on unaudited information available to management at the time of valuation.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's alternative investments' valuation process. For example, we tested controls over management's review of the alternative investment valuation, which included a comparison of returns to benchmarks and monitoring of investment managers' valuation policies and procedures, as well as portfolio performance.

To test the valuation of the alternative investments, our audit procedures included, among others, comparing fund returns to selected relevant benchmarks and understanding variations as well as comparing fair values from the most recent audited financial statements to the Company's estimated fair values. We obtained an understanding of the changes to the investment portfolio and changes in investment strategies. We assessed the historical accuracy of management's estimates by comparing actual fair values to previous estimates. We evaluated for contrary evidence by confirming the fair values of the investments and ownership interest directly with the trustee and with a sample of investment managers.

Valuation of Non-Nuclear Asset Retirement Obligations

Description of the Matter

At September 30, 2024, the Company's non-nuclear asset retirement obligations (ARO) totaled $7.0 billion. As more fully described in Note 1 and Note 13 to the consolidated financial statements, the Company's initial obligation associated with the retirement of non-nuclear generating sites, ash impoundments, transmission substation and distribution assets, and certain general facilities is recognized at fair value at the time the obligation is incurred using various judgments and assumptions. Revisions to the obligation are made whenever factors indicate that the timing or amounts of estimated cash flows have changed materially.

Auditing the valuation of non-nuclear ARO was challenging because of the judgmental nature of the assumptions used in the Company's measurement process. In particular, the obligation's fair value is determined using a discounted cash flow technique which includes significant estimation and assumptions, including estimates of the costs of decommissioning, the method of decommissioning, and the timing of related cash flows.

How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's valuation of its non-nuclear ARO. For example, we tested controls over management's review of the significant estimations and assumptions described above and the relevant data inputs used in the calculations. To test the valuation of the non-nuclear ARO, our audit procedures included, among others, with the assistance of engineering specialists, evaluating the methodology used and testing the significant assumptions described above and the underlying data used by the Company in its estimate. To assess the estimates of the costs of decommissioning, the method of decommissioning, and the timing of related cash flows, we evaluated changes from the prior estimate if one existed, compared the consistency between timing of activities and closure date, evaluated the reasonableness of the selected method of decommissioning, assessed the estimated costs based on the method of decommissioning, and recalculated the Company's estimate.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2007
Chattanooga, Tennessee
November 13, 2024

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

TVA maintains disclosure controls and procedures designed to ensure that information required to be disclosed by TVA in reports that it files or submits under the Securities Exchange Act of 1934 (the "Exchange Act") is recorded, processed, summarized, and reported, within the time periods specified in the Securities and Exchange Commission's rules and forms, and is accumulated and communicated to TVA's management, as appropriate, to allow timely decisions regarding required disclosure. TVA's management, including the President and Chief Executive Officer, the Executive Vice President and Chief Financial and Strategy Officer, and members of the Disclosure Control Committee, including the Vice President and Controller (Principal Accounting Officer) (collectively "management"), evaluated the effectiveness of TVA's disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act) as of September 30, 2024. Based on this evaluation, management concluded that TVA's disclosure controls and procedures were effective as of September 30, 2024.

Internal Control over Financial Reporting

(a) **Management's Annual Report on Internal Control over Financial Reporting**

TVA's management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Exchange Act Rule 13a-15(f) and required by Section 404 of the Sarbanes-Oxley Act. TVA's internal control over financial reporting is designed to provide reasonable, but not absolute, assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with accounting principles generally accepted in the United States of America ("GAAP"). Because of the inherent limitations in all control systems, internal control over financial reporting and systems may not prevent or detect misstatements.

TVA's management, including the President and Chief Executive Officer, the Executive Vice President and Chief Financial and Strategy Officer, and members of the Disclosure Control Committee, including the Vice President and Controller (Principal Accounting Officer), evaluated the design and effectiveness of TVA's internal control over financial reporting as of September 30, 2024, based on the framework in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, TVA's management concluded that TVA's internal control over financial reporting was effective as of September 30, 2024.

Although the effectiveness of internal control over financial reporting was not required to be subject to attestation by TVA's independent registered public accounting firm, TVA has chosen to obtain such a report. Ernst & Young LLP, the independent registered public accounting firm that audited the financial statements included in this Annual Report, has issued an attestation report on TVA's internal control over financial reporting.

(b) **Changes in Internal Control over Financial Reporting**

During the quarter ended September 30, 2024, there were no changes in TVA's internal control over financial reporting that materially affected, or are reasonably likely to materially affect, TVA's internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Board of Directors of Tennessee Valley Authority

Opinion on Internal Control Over Financial Reporting

We have audited Tennessee Valley Authority's internal control over financial reporting as of September 30, 2024, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Tennessee Valley Authority (the Company) maintained, in all material respects, effective internal control over financial reporting as of September 30, 2024, based on the COSO criteria.
We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of September 30, 2024 and 2023, the related consolidated statements of operations, comprehensive income (loss), changes in proprietary capital and cash flows for each of the three years in the period ended September 30, 2024, and the related notes and our report dated November 13, 2024 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.
Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Chattanooga, Tennessee
November 13, 2024

ITEM 9B. OTHER INFORMATION

Insider Trading Arrangements and Policies

During the quarter ended September 30, 2024, no director or officer of TVA notified TVA of the adoption or termination of a "Rule 10b5-1 trading arrangement" or "non-Rule 10b5-1 trading arrangement," as each term is defined in Item 408(a) of Regulation S-K.

2024 CEO Compensation

On November 7, 2024, the TVA Board approved no adjustment to the salary of Chief Executive Officer ("CEO") Jeffrey J. Lyash for 2025.

The following sets forth the components of Mr. Lyash's 2025 target total direct compensation ("TDC"), effective October 1, 2024:

- Salary remained the same at $1,227,000.
- Long-term performance ("LTP") grant of $3,983,000, which will vest on September 30, 2027.
- Long-term retention ("LTR") grant of $1,707,000, which will vest in three equal increments on September 30, 2025, September 30, 2026, and September 30, 2027.

No adjustments were made to any other existing elements of compensation for Mr. Lyash for 2025.

Compensation Adjustments for Other NEOs

On November 7, 2024, CEO Jeffrey J. Lyash approved compensation adjustments for the following Named Executive Officers ("NEOs") for 2025. (Biographical information for each is set out in Item 10, Directors, Executive Officers, and Corporate Governance.) The following sets forth salary increases and incentive awards granted for 2025, effective October 1, 2024:

John M. Thomas, III
- Salary increased from $860,441 to $937,881.
- LTP grant of $1,472,000, which will vest on September 30, 2027.
- LTR grant of $700,000, which will vest in three equal increments on September 30, 2025, September 30, 2026, and September 30, 2027.

Donald A. Moul
- Salary increased from $819,468 to $844,052.
- LTP grant of $1,500,000, which will vest on September 30, 2027.
- LTR grant of $882,000, which will vest in three equal increments on September 30, 2025, September 30, 2026, and September 30, 2027.

David B. Fountain
- Salary increased from $648,696 to $687,618.
- LTP grant of $1,075,000, which will vest on September 30, 2027.
- LTR grant of $423,000, which will vest in three equal increments on September 30, 2025, September 30, 2026, and September 30, 2027.

Timothy S. Rausch
- Salary increased from $663,146 to $683,040.
- LTP grant of $775,000, which will vest on September 30, 2027.
- LTR grant of $402,000, which will vest in three equal increments on September 30, 2025, September 30, 2026, and September 30, 2027.

No adjustments were made to any other existing elements of compensation for these NEOs for 2025.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

Directors

The Tennessee Valley Authority Act of 1933, as amended (the "TVA Act") provides that the Tennessee Valley Authority ("TVA") will be administered by a board of nine part-time members appointed by the President of the United States ("U.S.") with the advice and consent of the U.S. Senate. The Chair of the TVA Board of Directors ("TVA Board") is selected by the members of the TVA Board. Under the TVA Act, to be eligible to be appointed as a member of the TVA Board, an individual (i) must be a U.S. citizen; (ii) must have management expertise relative to a large for-profit or nonprofit corporate, government, or academic structure; (iii) cannot be a TVA employee; (iv) must make a full disclosure to Congress of any investment or other financial interest that the individual holds in the energy industry; and (v) must affirm support for the objectives and missions of TVA, including being a national leader in technological innovation, low-cost power, and environmental stewardship. In addition, the President of the U.S., in appointing members of the TVA Board, must (i) consider recommendations from other public officials such as the Governors of the states in TVA's service area; individual citizens; business, industrial, labor, electric power distribution, environmental, civic, and service organizations; and the congressional delegations of the states in TVA's service area; and (ii) seek qualified members from among persons who reflect the diversity, including geographical diversity, and needs of TVA's service area. At least seven of the nine TVA Board members must be legal residents of the TVA service area. Currently, TVA has eight active TVA Board members.

TVA Board members serve five-year terms, and at least one member's term ends each year. After a member's term ends, the member is permitted under the TVA Act to remain in office until the earlier of the end of the then-current session of Congress or the date a successor takes office. The TVA Board, among other things, establishes broad goals, objectives, and policies for TVA; develops long-range plans to guide TVA in achieving these goals, objectives, and policies; approves annual budgets; and establishes a compensation plan for employees.

The TVA Board as of November 13, 2024, consisted of the following eight individuals with their ages and terms of office provided:

Directors	Age	Year Current Term Began	Year Term Expires
Joe H. Ritch[(1)]	74	2023	2025
Beth P. Geer	59	2023	2026
Beth H. Harwell	67	2021	2024
Robert P. Klein	73	2023	2026
L. Michelle Moore	52	2023	2026
Brian E. Noland	56	2020	2024
William J. Renick	71	2023	2027
A. Wade White	56	2023	2027

Notes
(1) Mr. Ritch assumed the Board Chair role on November 7, 2023.

Mr. Ritch of Huntsville, Alabama, joined the TVA Board in January 2023 and assumed the role of Board Chair in November 2023. He previously served on the TVA Board from January 2013 to January 2017 and as Board Chair from May 2014 to January 2017. He has been an attorney at Dentons Sirote, PC, a law firm in Huntsville, Alabama, and its predecessor firm, since June 1982. He has served as chair of the Redstone Regional Alliance since 1994, as a director of Axometrics, which provides polarization measurement solutions, since 2002, and as a member of the Alabama School of Cyber Technology and Engineering Foundation since 2018. He formerly served on various corporate boards primarily in the technology, aerospace, and defense industries, including Perkins Technical Services, Inc. and CAS Inc., as well as many non-profit boards, including
the Board of Trustees of the University of Alabama System, of which he is now a Trustee Emeritus, and the Huntsville/Madison County Chamber of Commerce. He has received numerous business and community awards and was inducted into the Alabama Business Hall of Fame in 2021.

Ms. Geer of Brentwood, Tennessee, joined the TVA Board in January 2023. She has served as the chief of staff to former Vice President Al Gore since May 2012 and has served on the Nashville Sustainability Advisory Committee since February 2020. She has extensive policy experience in climate change and environmental justice, having previously served in roles in the Clinton-Gore White House, U.S. Department of Labor, and the U.S. Senate.

Dr. Harwell of Nashville, Tennessee, joined the TVA Board in January 2021. She served as a distinguished visiting professor at Middle Tennessee State University from 2019 to 2022. She previously served as the speaker of the Tennessee House of Representatives, from 2011 until 2019, while serving as a state representative for the 56th District of Tennessee for

nearly 30 years. She has also chaired the Tennessee Republican Party and served as an assistant professor of political science at Belmont University, as well as in a variety of additional roles in both education and public service.

Mr. Klein of Chattanooga, Tennessee, joined the TVA Board in January 2023. He retired in November 2015 as former vice president of the International Brotherhood of Electrical Workers, a role he assumed after a decades-long career as a lineman and foreman for the Electric Power Board of Chattanooga. He also served as president of the Tennessee Valley Trades and Labor Council for 14 years, as well as on the TVA Labor-Management Committee, and served honorably in the Tennessee Army National Guard.

Ms. Moore of Midlothian, Virginia, joined the TVA Board in January 2023. Since June 2015, she has served as CEO of Groundswell, a nonprofit that builds community power to reduce energy burdens and expand economic opportunity. She is the author of *Rural Renaissance*, and from her roots in rural Georgia, she has worked to connect clean energy with affordability and quality of life for more than 25 years, including leading federal sustainability and infrastructure project delivery for the Obama White House.

Dr. Noland of Johnson City, Tennessee, joined the TVA Board in December 2020. Since January 2012, he has served as the ninth president of East Tennessee State University. He previously served as Chancellor of the West Virginia Higher Education System for six years. In addition, he serves on the NCAA Division I Board of Directors as well as the boards of Ballad Health and the Bank of Tennessee.

Mr. Renick of Ashland, Mississippi, joined the TVA Board in January 2023. He served as senior advisor for the Mississippi Office of Workforce Development from July 2021 to June 2022 and served as Workforce Division Director at Three Rivers Planning and Development District in Pontotoc, Mississippi, from June 2008 to June 2021. A longtime public servant, Mr. Renick has served in multiple local and state elected and appointed positions, as well as in the private sector.

Mr. White of Eddyville, Kentucky, joined the TVA Board in January 2023. He has served with Farmers Bank and Trust Company in Princeton, Kentucky, in business development and public relations, since January 2023. He previously served as a senior claims specialist with Progressive Insurance Company in Louisville, Kentucky, from January 2022 to December 2022, and as Lyon County Judge Executive from January 2011 to December 2022.

Executive Officers

TVA's executive officers as of November 13, 2024, their titles, their ages, and the date their employment with TVA commenced are as follows:

Executive Officers	Title	Age	Employment Commenced
Jeffrey J. Lyash	President and Chief Executive Officer	63	2019
John M. Thomas, III	Executive Vice President and Chief Financial and Strategy Officer	60	2005
Donald A. Moul	Executive Vice President and Chief Operating Officer	59	2021
David B. Fountain	Executive Vice President and General Counsel	57	2020
Timothy S. Rausch	Executive Vice President and Chief Nuclear Officer	60	2018
Jeannette Mills	Executive Vice President and Chief Administrative Officer	57	2020
Diane T. Wear	Vice President and Controller	56	2008

Mr. Lyash has served as TVA's President and CEO since April 2019. He previously served as the President and Chief Executive Officer of Ontario Power Generation Inc. ("OPG"), an electric utility, from August 2015 until April 2019. Prior to joining OPG, Mr. Lyash served as the President of the Power Business Unit of Chicago Bridge & Iron Company N.V., an engineering, procurement, and construction company, from July 2013 to August 2015, as Executive Vice President of Energy Supply for Duke Energy Corporation, an electric utility, from July 2012 to December 2012, and as Executive Vice President of Energy Supply for Progress Energy, Inc. ("Progress Energy"), an electric utility, from June 2010 to July 2012. Mr. Lyash joined Progress Energy (formerly Carolina Power & Light Company) in 1993 and held a number of other positions before assuming the role of Executive Vice President of Energy Supply, including Executive Vice President of Corporate Development from July 2009 to June 2010, President and Chief Executive Officer of Progress Energy Florida, Inc., from June 2006 to July 2009, Senior Vice President of Energy Delivery for Progress Energy Florida, Inc., from November 2003 to June 2006, and Vice President of Transmission for Progress Energy Carolinas, Inc., from January 2002 to October 2003. He also held a wide range of management and executive roles in Progress Energy's nuclear program, including Operations Manager, Engineering Manager, Plant Manager, and Director of Site Operations. Mr. Lyash began his career in the utility industry in 1981 and worked for Pennsylvania Power & Light before joining the U.S. Nuclear Regulatory Commission ("NRC"), where he worked from 1984 to 1993. While at the NRC, Mr. Lyash held a number of senior technical and management positions and also worked from June 1984 to May 1985 as an engineer at Browns Ferry Nuclear Plant while on loan to TVA.

Mr. Thomas was named Executive Vice President and Chief Financial and Strategy Officer ("CFSO") in June 2021. Mr. Thomas served as Executive Vice President and CFO from February 2012 to June 2021, as CFO from June 2010 to February 2012, as Executive Vice President of People and Performance from January 2010 to June 2010, as Senior Vice President, Corporate Governance and Compliance from July 2009 to January 2010, as Controller and Chief Accounting Officer from January 2008 to September 2009, and as the General Manager, Operations Business Services from November 2005 to January 2008. Prior to joining TVA, Mr. Thomas was CFO during 2005 for Benson Security Systems. He was also the Controller of Progress Fuels Corporation from 2003 to 2005 and Controller of Progress Ventures, Inc. from 2001 to 2002, both subsidiaries of Progress Energy.

Mr. Moul was named Executive Vice President and Chief Operating Officer in June 2021. Before joining TVA, Mr. Moul served as the Executive Vice President, Nuclear Division and Chief Nuclear Officer at NextEra Energy Inc. from January 2020 to May 2021 and as the Vice President and Chief Nuclear Officer of NextEra Energy Inc. from May 2019 to December 2019. He previously held various roles at several subsidiaries of FirstEnergy Corp. Mr. Moul served as Executive on Special Assignment of FirstEnergy Solutions Corp. from March 2019 to May 2019, President and Chief Nuclear Officer of FirstEnergy Generation Companies from March 2018 to March 2019, President of FirstEnergy Generation LLC from April 2017 to March 2018, and Senior Vice President, Fossil Operations and Environmental of FirstEnergy Solutions from August 2015 to April 2017.

Mr. Fountain was named Executive Vice President and General Counsel in March 2021. Mr. Fountain joined TVA in June 2020 as the Senior Vice President and Vice General Counsel. Prior to joining TVA, Mr. Fountain served in various leadership roles for more than 20 years with Duke Energy and predecessor companies Progress Energy and Carolina Power & Light. Most recently, Mr. Fountain served as Senior Vice President, Legal, Corporate Secretary, and Chief Ethics and Compliance Officer at Duke Energy from November 2018 to May 2020 and as President of Duke Energy North Carolina from August 2015 to November 2018.

Mr. Rausch was named Executive Vice President and Chief Nuclear Officer in November 2020. Mr. Rausch joined TVA in October 2018 as Senior Vice President and Chief Nuclear Officer. Before joining TVA, Mr. Rausch served as the Senior Vice President and Chief Nuclear Officer of Talen Energy Corporation from June 2015 until September 2018 and as the Senior Vice President and Chief Nuclear Officer of PPL Generation, LLC from July 2009 to June 2015. Mr. Rausch has 25 years of experience in virtually all the disciplines of the nuclear power industry, including roles as Site Vice President, Plant General Manager, and Director of Engineering.

Ms. Mills was named TVA's Executive Vice President and Chief Administrative Officer in August 2024. Ms. Mills joined TVA in February 2020 as the Executive Vice President and Chief External Relations Officer. Prior to joining TVA, Ms. Mills served as the Senior Vice President of Safety, Health, Environmental and Assurance for the U.S. region at National Grid Group, the United Kingdom's largest investor-owned utility, from March 2017 to February 2020. She also served as a Commissioner on the Maryland Public Service Commission, providing regulatory oversight of gas, electric, telephone, water, sewage disposal, and transportation companies, from June 2015 to March 2017. Ms. Mills spent 25 years of her career at Baltimore Gas and Electric, starting as an associate engineer and steadily progressing through positions of increasing responsibility to ultimately serve as Vice President, Customer Operations and Chief Customer Officer from 2008 to 2013.

Ms. Wear has served as TVA's Vice President and Controller since March 2012. Ms. Wear was the Assistant Controller from February 2010 to March 2012. Between April 2008, when she joined TVA, and February 2010, Ms. Wear was the General Manager, External Reporting/Accounting Policy and Research. Prior to joining TVA, Ms. Wear was a Managing Director at PricewaterhouseCoopers LLP. Ms. Wear joined a predecessor firm to PricewaterhouseCoopers LLP in January 1992.

Disclosure and Financial Code of Ethics

TVA has a Disclosure and Financial Ethics Code ("Financial Ethics Code") that applies to all executive officers (including the CEO, CFO, and Controller) and directors of TVA as well as to all employees who certify information contained in quarterly reports or annual reports or who have responsibility for internal control self-assessments. The Financial Ethics Code includes provisions covering conflicts of interest, ethical conduct, compliance with applicable laws, rules, and regulations, responsibility for full, fair, accurate, timely, and understandable disclosures, and accountability for adherence to the Financial Ethics Code. TVA will provide a current copy of the Financial Ethics Code to any person, without charge, upon request. Requests may be made by calling 888-882-4975 or by sending an e-mail to: investor@tva.com. Any waivers of or changes to provisions of the Financial Ethics Code that require disclosure pursuant to applicable Securities and Exchange Commission requirements will be promptly disclosed to the public, subject to limitations imposed by law, on TVA's website at: www.tva.com. Information contained on or accessible through TVA's website shall not be deemed to be incorporated into, or to be a part of, this Annual Report.

Insider Trading Policy

TVA has an Insider Trading Policy that provides guidelines with respect to transactions in TVA securities by insiders and the handling of confidential information about TVA and the companies with which TVA engages in transactions or does business. The policy promotes compliance with U.S. federal, state, and foreign securities laws that prohibit certain persons who are aware of material nonpublic information relating to TVA from (1) purchasing, selling, or otherwise engaging in transactions in TVA securities, or (2) providing material nonpublic information to other persons who may trade on the basis of that information. The prohibitions against insider trading apply to trading or otherwise transacting in TVA securities, tipping, and making recommendations to engage in transactions in TVA securities by virtually any person, including all persons associated with TVA, if the information involved is material and nonpublic. In addition, the prohibitions against insider trading extend to transactions in the securities of other companies with which TVA does business or has a business relationship if the transactions are based on material nonpublic information gained while working for TVA.

Committees of the TVA Board

The TVA Board has an Audit, Risk, and Cybersecurity Committee established in accordance with the TVA Act. This committee oversees TVA's financial reporting, risk management, cybersecurity, compliance, and ethics. It also reviews and considers input from the TVA Inspector General to ensure TVA investigates and reports transparently about its financial and legal obligations. Current members include L. Michelle Moore (Chair), Beth P. Geer, and William J. Renick. As discussed above, TVA directors are appointed by the President of the United States with the advice and consent of the U.S. Senate, and none of the current Board members meet the requirements of being an “audit committee financial expert” under applicable SEC rules.

TVA is exempted by Section 37 of the Exchange Act from complying with Section 10A(m)(3) of the Exchange Act, which requires each member of a listed issuer's audit committee to be an independent member of the board of directors of the issuer. The TVA Act contains certain provisions that are similar to the considerations for independence under Section 10A(m)(3) of the Exchange Act, including that to be eligible for appointment to the TVA Board, an individual shall not be an employee of TVA and shall make full disclosure to Congress of any investment or other financial interest that the individual holds in the energy industry.

Under Section 10A(m)(2) of the Exchange Act, which applies to TVA, the audit committee is directly responsible for the appointment, compensation, and oversight of the external auditor; however, the TVA Act assigns the responsibility for engaging the services of the external auditor to the TVA Board.

The TVA Board has also established four committees in addition to the Audit, Risk, and Cybersecurity Committee, as explained below:

The External Stakeholders and Regulation Committee oversees relationships with customers, members of the public, and key stakeholders. Involvement includes TVA's regulatory policy, natural resource management, economic development, government relations, federal advisory councils, and emerging social issues. Current members include Beth H. Harwell (Chair), Beth P. Greer, and William J. Renick.

The Operations and Nuclear Oversight Committee helps ensure the safety and effectiveness of TVA's power system generation and transmission assets by overseeing operational performance and planning. Additional oversight includes significant projects, major inspections and evaluations, long-term asset planning, and operational and regulatory compliance. Current members include Robert P. Klein (Chair), L. Michelle Moore, and A. Wade White.

The People and Governance Committee has a primary focus on people and the creation of a culture that lives up to TVA's values and seeks to ensure optimal performance and sustainability of the enterprise. The committee reviews key components of the people framework such as inclusion with diversity, talent, engagement, total rewards, and labor relations. Another key function of this committee is Board governance. Current members include Brian E. Noland (Chair), Beth H. Harwell, Robert P. Klein, and Joe H. Ritch.

The Finance, Rates, and Portfolio Committee oversees electricity rates, annual budget, major contracts, energy resource portfolio planning, commercial programs and products, technology, innovation, and research programs. This committee is charged with the responsibility of assisting the Board in fulfilling its responsibilities to manage financial health, strategic planning, wholesale and direct-served customer rates, and holistic asset strategy. Current members include A. Wade White (Chair), Brian E. Noland, William J. Renick, and Joe H. Ritch.

ITEM 11. EXECUTIVE COMPENSATION

Compensation Discussion and Analysis

This Compensation Discussion and Analysis ("CD&A") provides information on the objectives, goals, and structure of TVA's executive compensation program and the 2024 compensation awarded to TVA's CEO, CFSO, and the three other most highly compensated executive officers serving at the end of 2024. Collectively, these officers are TVA's 2024 Named Executive Officers ("NEOs"):

NEO	Title	Employment Date	Position Date
Jeffrey J. Lyash	President and Chief Executive Officer	2019	2019
John M. Thomas, III	Executive Vice President and Chief Financial and Strategy Officer	2005	2010
Donald A. Moul	Executive Vice President and Chief Operating Officer	2021	2021
David B. Fountain	Executive Vice President and General Counsel	2020	2021
Timothy S. Rausch	Executive Vice President and Chief Nuclear Officer	2018	2020

Note
Mr. Thomas was named Executive Vice President and Chief Financial and Strategy Officer ("CFSO") in June 2021 and has held the Chief Financial Officer position since June 2010.

TVA's Executive Compensation Philosophy

TVA has a public mission - one that is uniquely focused on serving the people of the Tennessee Valley and making those lives better. TVA aims to achieve its mission by attracting, retaining, and motivating highly qualified and committed executives to guide the organization's strategy, performance, and public power mission. Given the nature and scale of its operations, TVA competes with large investor-owned utilities ("IOUs") to attract and retain talent.

To effectively fulfill its public power mission, TVA must provide market-based, competitive compensation levels to drive superior performance and execution of ambitious multi-year objectives aligned with TVA's public power mission.

TVA's Compensation Plan as adopted by the TVA Board is designed to:

- Align compensation with **TVA performance and productivity improvement**.
- Set performance goals that are **aligned with TVA's strategic priorities** - See *2024 Performance Goals and Performance Achievements.*
- Provide **market-based, competitive compensation levels** so TVA can attract, retain, and motivate highly competent employees. Total direct compensation ("TDC"), which includes annual cash and short- and long-term incentives, generally is set by considering several factors, including reference to the median (50th percentile) of the relevant labor market, as well as factors such as individual performance, experience, and internal equity. Executives may be positioned above or below the median based on labor market conditions and other factors such as tenure in the role. See *Compensation Setting Process - Establishing Competitive Compensation - Use of Market Data and Benchmarking* for a discussion of benchmarking practices and competitive compensation decisions at TVA.
- **Motivate and reward short-term and long-term performance** by providing a mix of salary and performance-based short-term and long-term incentives, typically targeting a majority portion of long-term compensation in the form of at-risk, performance-based compensation.

The TVA Board follows the requirements of the TVA Act, which includes the approval of a compensation plan and other notable considerations:

- Compensation will be based on an annual survey of benchmark compensation for similar positions in private industry, including engineering and electric energy companies, publicly owned electric companies, and federal, state, and local governments; and
- Compensation will take into account education, experience, level of responsibility, geographic differences, and retention and recruitment needs.

Notable 2024 Actions

The following are key compensation actions and plan amendments for 2024:

TVA Executive Severance Plan

On January 26, 2024, TVA's Executive Severance Plan ("Severance Plan") was amended and restated to eliminate the additional severance benefits available to NEOs and other participants in connection with a change in control of TVA. Following a review by the People and Governance Committee (the "Committee") and the TVA Board, it was determined that TVA's Severance Plan did not need to include change in control provisions to remain competitive with its peers, based on factors unique to TVA's public power model.

Compensation Board Practice, TVA Compensation Plan, and Supplemental Plans

On May 9, 2024, the TVA Board adopted the *TVA Employee Compensation Board Practice* ("Board Practice") to clarify the roles and responsibilities of the TVA Board, the Committee, and management with respect to compensation matters. In addition, the TVA Board approved amended and restated versions of the TVA Compensation Plan and the following supplemental compensation plans to, among other things, reflect the principles set forth in the Board Practice: (1) Executive Annual Incentive Plan ("EAIP"), (2) Long-Term Incentive Plan ("LTIP"), (3) Severance Plan, (4) Supplemental Executive Retirement Plan, (5) Deferred Compensation Plan, and (6) Restoration Plan.

Three of the above supplemental plans (EAIP, LTIP, and Severance Plan) were amended and restated to reduce the amounts that TVA's CEO may receive under these plans.

- Under both incentive plans (EAIP and LTIP), the potential maximum earned payout achievement was reduced from 200 percent to 150 percent of the CEO's target opportunity.
- Under the Severance Plan, the CEO's cash severance was reduced as a result of a change in the cash severance formula from (1) 1.5 times the sum of the CEO's salary and target EAIP to (2) 1.0 times the CEO's salary.

The above changes are a cumulative result of specific recommendations presented to the Committee by the Executive Compensation Task Force ("ECTF"), which was created in December 2023 and consisted of a subset of members of the TVA Board. The ECTF focused its review and subsequent recommendations on Board governance and oversight with respect to executive compensation, CEO participation in TVA plans, and management's process for communicating compensation matters to the Committee and Board regarding CEO payouts under TVA plans. The Committee believes the above changes are appropriate in light of TVA's public service mission.

Amendment to Compensation Board Practice

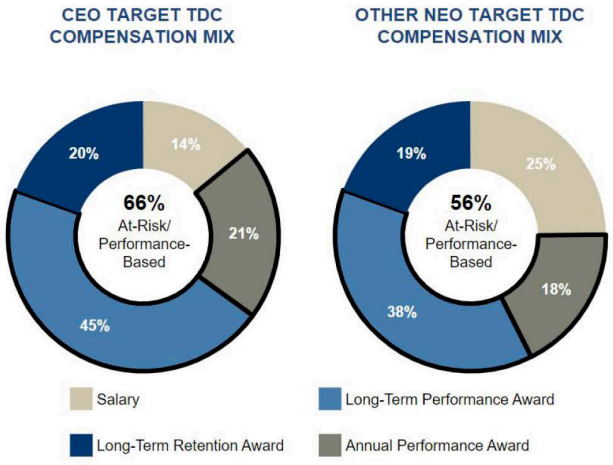
On August 22, 2024, the TVA Board approved amendments to the Board Practice adopted on May 9, 2024, to allow the CEO to approve compensation of his or her executive direct reports within ranges of total compensation that are approved annually by the Chair of the Committee. These amendments are designed to ensure that the TVA Board, through the Chair of the Committee, maintains appropriate oversight while allowing the CEO flexibility to implement his or her own compensation decisions.

TVA Board Actions Related to Compensation

On September 17, 2024, the TVA Board (1) established 2024 EAIP performance measures and goals for the CEO, (2) established 2025 corporate performance measures and goals for the Enterprise Scorecard for the Winning Performance Team Incentive Plan ("WPTIP") and EAIP, (3) established performance measures and goals for the 2024-2026 and 2025-2027 performance cycles under the LTIP, and (4) approved amendments to the WPTIP and EAIP that would eliminate the use of the corporate multiplier and would authorize the TVA Board to utilize a standard discretionary range to adjust the scorecard achievement by plus or minus 20 percent beginning with the 2025 performance cycle. This standard discretionary range allows the TVA Board to account for extraordinary events or significant occurrences that impact TVA's performance.

TVA's Executive Compensation Program Aligns Pay with Performance

Two-thirds of the CEO's target TDC is performance-based and at risk, based on achievement of performance goals that further advance TVA's mission and strategic objectives. More than half of the other NEOs' target TDC opportunity is performance-based and at risk. This alignment of compensation with performance also results in compensation being aligned with value delivered to TVA's stakeholders, including LPCs, businesses, and communities, and to the economy of the Tennessee Valley.



Compensation Setting Process

Establishing Compensation and Governance Practices

The TVA Board, under the authority of the TVA Act, has responsibility for establishing compensation for TVA employees, including the NEOs. The TVA Board is directed under Section 2 of the TVA Act to establish a plan that specifies all compensation (such as salary and any other pay, benefits, incentives, or other form of remuneration) for the CEO and TVA employees. The TVA Act also provides that the TVA Board will annually approve all compensation (such as salary and any other pay, benefits, incentives, or other forms of remuneration) for all managers and technical personnel who report directly to the CEO (including any adjustments to compensation).

Under the authority of the TVA Act, the TVA Board, its Committee, and individual TVA Board members are all involved in compensation matters. The TVA Board has taken the following actions to delegate authority with respect to compensation:

Delegation to Committee

- Oversee executive compensation pursuant to the Compensation Plan.
- Review this CD&A and recommend approval to the TVA Board.
- Review and make critical recommendations to the TVA Board, as reflected in *Compensation Setting Process - Compensation Setting - Annual Roles and Responsibility.*

Delegation to TVA Committee Chair

- Establish annual performance goals of the CEO, with concurrence of the TVA Board Chair and input from other members of the TVA Board, as appropriate.
- Determine the CEO's annual performance rating in accordance with the approved goals, with concurrence of the TVA Board Chair and input from other members of the TVA Board, as appropriate.

- Approve, with concurrence of the TVA Board Chair, the terms of any non-salary compensation benefits applicable to the CEO under supplemental compensation plans.
- Annually approve total compensation ranges for the CEO's executive direct reports following review by the Committee.

Delegation to CEO

- Following annual approval of total compensation ranges by the Committee Chair, set or adjust the total eligible compensation of the CEO's present or future executive direct reports within such ranges after informing the Committee's independent compensation consultant and the Committee Chair. The Committee Chair has discretion to reject any compensation actions proposed by the CEO pursuant to this section.
- Approve individual performance goals for the CEO's direct reports.
- Evaluate and rate the performance of the CEO's direct reports during the year against approved performance goals and adopt any individual multiplier, in consultation with the Committee. Review CEO direct reports' performance with the Committee, prior to finalizing end of year payout for the CEO's direct reports, and inform the Committee of any discretion under consideration. Determine final payouts under supplemental compensation plans after informing the Committee Chair and the Committee's independent compensation consultant.
- Approve, or delegate to others the authority to approve, the terms of supplemental compensation plans when the CEO is not a participant in the plan. The TVA Board retains the authority to amend or terminate supplemental compensation plans at its discretion.
- Approve, or delegate to others the authority to approve, the salaries of employees whose annual salaries would be in excess of Level IV of the Executive Schedule of the U.S. Government ($191,900 in 2024) for anyone except the CEO, the Inspector General, and the CEO direct reports (except to the extent described in the first bullet of this section), provided that the CEO provides the Committee a list of names and salaries of all such employees for its review at least once annually.
- Approve, or delegate to others the authority to approve, all compensation matters that are not specifically reserved to the TVA Board, a member of the TVA Board, or the Committee.

Role of Compensation Consultant

The Committee engaged the independent consulting firm Frederic W. Cook & Co., Inc. ("FW Cook") to help with evaluating TVA's 2024 competitive compensation decisions, peer group, and benchmarking processes. The Committee assessed certain independence factors and determined the firm's work raised no potential conflict of interest. In June 2024, the TVA Board engaged Meridian Compensation Partners (“Meridian”) to perform services previously provided by FW Cook, who ceased providing services to the TVA Board in June 2024.

Compensation Setting – Annual Roles and Responsibilities

The following chart sets forth the roles of the TVA Board, Board Chair, Committee, Committee Chair, and CEO, and typical timeframe, in setting compensation for the NEOs.

What	When	How
Compensation Governance	January	• Committee reviews and evaluates independent compensation consultant.
	April - September	• Committee reviews TVA Compensation Plan, peer group, and benchmarking process and recommends any changes to the TVA Board. • TVA Board reviews and approves any changes to compensation governance. • TVA Board reviews and approves any amendments or changes to supplemental compensation plans (e.g., short-term incentive ("STI") and long-term incentive ("LTI")) when the CEO is a participant. • CEO reviews and approves any changes to supplemental compensation plans when the CEO is not a participant. • TVA Board retains the authority to amend or terminate supplemental compensation plans at its discretion.
Executive Schedule ("ES") Level IV	January - February	• The TVA Board has delegated to the CEO the authority to approve, or delegate to others the authority to approve, the salaries of employees whose annual salaries would be in excess of ES Level IV ($191,900 for 2024) for anyone except the CEO, the Inspector General, and the CEO direct reports (except when approval for CEO direct reports has been delegated to the CEO). • The CEO provides the Committee a list of names and salaries for all such employees at least once annually for its review.
Incentive Plan Measures and Goals	January - October	• Committee monitors performance quarterly, including CEO compensation forecast.
	April	• Committee reviews proposed performance measures for next fiscal year ("FY").
	July - August	• CEO recommends STI enterprise and corporate multiplier measures and goals and LTI measures and goals for upcoming cycles. • Committee reviews and recommends to the TVA Board the STI enterprise and corporate multiplier measures and goals and LTIP performance measures and goals for upcoming cycles. • TVA Board approves STI enterprise and corporate multiplier measures and goals and LTIP performance measures and goals for upcoming cycles.
Short-Term Incentive Plans and Corporate Multiplier	October - November	• Committee qualitatively assesses performance compared to target and recommends final corporate multiplier between 0 and 1.1 and final STI payout for the past FY to the TVA Board. • TVA Board qualitatively assesses performance compared to target to determine final corporate multiplier between 0 and 1.1 and approves final STI payout for the past FY.
Long-Term Incentive Plan ("LTIP") – Long-Term Performance ("LTP") Component	October - November	• Committee qualitatively assesses performance compared to target and recommends final LTIP payout percentage for cycle ending in the past FY to the TVA Board. • TVA Board qualitatively assesses performance compared to target to determine final LTIP payout percentage for cycle ending in the past FY. • TVA Board has the discretionary authority to review the results of performance measures and goals and to approve any adjustments to payouts in appropriate circumstances.
CEO Performance Evaluation	September - November	• Individual TVA Board members complete and return CEO performance assessments to TVA's Compensation organization. • TVA's Compensation organization summarizes comments and information and presents assessment results to the Committee Chair. • Committee Chair, with concurrence of the TVA Board Chair and input from other TVA Board members, as appropriate, determines the CEO's annual performance rating in accordance with the approved goals. • Committee Chair informs EVP, Chief Administrative Officer, or VP, Chief Human Resources Officer, he/she has evaluated the CEO's performance and provides the final assessment results. • Committee Chair informs CEO of his/her performance evaluation.
CEO Compensation Adjustment	October - November	• Committee reviews the compensation consultant's benchmarking and market analysis report. • Committee decides whether to recommend compensation adjustments for the CEO for the next FY (recommends to the full TVA Board). • TVA Board reviews and approves at the November TVA Board meeting, if applicable, for the next FY. TVA Board establishes the CEO's salary and other compensation elements on an annual basis.
CEO Executive Annual Incentive Plan ("EAIP") Award	October - November	• Committee Chair obtains input from TVA Board Chair and other TVA Board members, as appropriate. • Committee recommends to the full TVA Board any payout, or adjustments to payout, to the CEO under the EAIP. • Committee Chair informs EVP, Chief Administrative Officer, or VP, Chief Human Resources Officer, via memo of the Board's decisions.
CEO Annual Performance Goals	October - November	• Committee Chair reviews and discusses with CEO performance goals for the next FY. • Committee Chair consults with and solicits input from the TVA Board Chair and other members of the TVA Board, as appropriate. • With concurrence of the TVA Board Chair, and input from other members of the TVA Board, Committee Chair establishes the annual performance goals for the CEO. • Committee Chair informs CEO of approved goals.

CEO Direct Report Compensation	October - November	• Committee Chair, following review by the Committee, annually approves total compensation ranges for the CEO's executive direct reports. • CEO, following annual approval by the Committee Chair, may set or adjust the total eligible compensation of the CEO's present or future executive direct reports within such ranges after informing the Committee's independent compensation consultant and the Committee Chair. Committee Chair has discretion to reject any compensation actions proposed by the CEO pursuant to this section. • CEO rates the performance of his or her direct reports and sets forth any individual multiplier (if applicable). • CEO reviews performance for CEO direct reports with the Committee and informs Committee of any discretion under consideration prior to finalizing end of year payouts for the CEO's direct reports. • CEO determines final payouts under supplemental compensation plans after informing the Committee Chair and the Committee's independent compensation consultant. • CEO establishes the next FY annual performance goals for his/her direct reports.
Compensation Discussion and Analysis ("CD&A")	October - November	• Committee reviews and recommends inclusion in TVA's Annual Report on Form 10-K.

Establishing Competitive Compensation

A fundamental goal of TVA's executive compensation program is to attract, retain, and motivate the highly competent talent necessary to manage TVA's complex operations and achieve superior performance. TVA competes for this talent with large IOUs, and thus TVA needs to offer compensation programs that are competitive with those peers.

Use of Market Data and Benchmarking

TVA generally determines target TDC for executives considering the median of the relevant labor market as well as other factors such as individual performance, experience, and internal equity.

After compiling market compensation for the positions at the beginning of 2024, the Committee, with assistance from FW Cook, used the information to:

- Assess target compensation level and incentive opportunity competitiveness; and
- Determine appropriate target compensation levels and incentive opportunities to maintain the desired degree of market competitiveness.

The relevant labor market for most of TVA's executives, including the NEOs, consists of both private and publicly-owned companies in the energy services industry that have similar revenue and scope as TVA. The process for gathering and analyzing information about executive compensation in the relevant labor market is as follows:

- Each year, the Committee's compensation consultant recommends a relevant labor market peer group for approval by the Committee. For 2024 compensation opportunities, TVA's market data was determined based on a review of executive compensation survey data and/or public proxy statement data for members of this peer group.
- For the survey-based analysis, TVA referenced a sample from the 2023 Willis Towers Watson ("WTW") Energy Services Executive Compensation Database consisting of (1) 33 IOUs with revenue greater than or equal to $3.0 billion plus (2) 11 additional government/non-profit entities with revenue greater than or equal to $1.0 billion. Data from this sample were further regressed to TVA's size based on revenue.
- The survey analysis was supplemented with public compensation data from a separate proxy peer group of IOUs. The Committee reviews the proxy peers annually to ensure continued appropriateness, including comparable business content and model, company size measured primarily by revenue and assets, and other refining factors such as generating capacity, number of employees, and number of customers.

List of Compensation Peer Companies

The following chart outlines the companies that constituted the survey sample and proxy peer group used to benchmark NEO compensation for 2024:

Company	Investor Owned Utilities with Revenue Greater Than or Equal to $3.0 Billion Which Participated in 2023 Willis Towers Watson Energy Services Survey	Government/Non-Profit Entities with Revenue Greater Than or Equal to $1.0 Billion Which Participated in 2023 Willis Towers Watson Energy Services Survey	Proxy Peer Group of Investor Owned Utilities
AES Corporation	■		■
Alliant Energy Corporation	■		
Ameren Corporation	■		■
American Electric Power Company, Inc.	■		■
Berkshire Hathaway Energy	■		
Calpine	■		
CenterPoint Energy, Inc.	■		■
CMS Energy Corporation	■		■
Colorado Springs Utilities		■	
Consolidated Edison, Inc.			■
Constellation Energy Corporation	■		■
CPS Energy		■	
Dominion Energy, Inc.	■		■
DTE Energy Company	■		■
Duke Energy Corporation	■		■
Edison International	■		■
Entergy Corporation	■		■
Evergy, Inc.	■		
Eversource Energy	■		■
Exelon Corporation	■		■
FirstEnergy Corp.	■		■
Great River Energy		■	
GE Renewable Energy	■		
JEA		■	
Lower Colorado River Authority		■	
Nebraska Public Power District		■	
New York Power Authority		■	
NextEra Energy, Inc.	■		■
NiSource, Inc.	■		■
NRG Energy, Inc.	■		■
Oak Ridge National Laboratory		■	
Oncor Electric Delivery Company LLC	■		
Omaha Public Power		■	
Pacific Gas and Electric Company	■		■
Pinnacle West Capital Corporation	■		
PPL Corporation	■		■
Public Service Enterprise Group, Inc.	■		■
Puget Sound Energy, Inc.	■		
Salt River Project		■	
Sempra Energy	■		■
Southern Company	■		■
Tri-State Generation and Transmission		■	

Vistra Corp.	■	■
WEC Energy Group, Inc.	■	
Xcel Energy, Inc.	■	■

Assessment of Risk

TVA's Enterprise Risk Management organization, in coordination with other members of TVA's management, including Human Resources, conducts an annual assessment of enterprise-level risks including risks arising from TVA's compensation policies and practices.

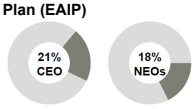
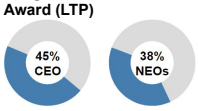
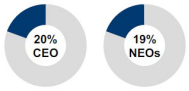
Based on the results of this assessment, no risks were identified with the compensation policies and practices that are reasonably likely to have a material adverse effect on the organization and its achievement of its strategic goals and objectives.

2024 Executive Compensation Program Components

Total Direct Compensation ("TDC")

In setting executive compensation each year, the Committee focuses on TDC, which includes those compensation elements that motivate future performance or reward past performance. TDC is comprised of annual salary, an annual incentive award under TVA's EAIP, and an LTI award provided under TVA's LTIP, which is delivered in two components, a Long-Term Performance ("LTP") award and a Long-Term Retention ("LTR") award.

Each year, two key compensation decisions are made with respect to NEO compensation: (1) the amount of the TDC *opportunity* to grant, which is forward-looking, incentivizes the NEO to perform, and is determined toward the beginning of the fiscal year, and (2) the amount of TDC *earned,* which rewards the NEO for demonstrated performance (other than salary or LTR award) and is determined at the end of the fiscal year. The TDC components and weightings for TDC opportunities granted to the NEOs in 2024 are summarized below and described in the sections that follow. Since TVA is a governmental entity that issues no equity, all direct compensation is denominated and paid out in cash.

Compensation Component* And % of Target TDC	Objective	Key Features
Annual Salary 	Provide fixed base compensation to encourage hiring and retention of qualified executives	• Annual salary is typically determined by considering, among other things, the median (50th percentile) for similar positions at other companies in TVA's peer group; above the median for positions affected by market scarcity, recruitment and retention issues, and other business reasons; or below median due to incumbent experience, position scope, or other business reasons.
Executive Annual Incentive Plan (EAIP) 	Incentivize performance by providing at-risk compensation tied to attainment of pre-established performance goals for the fiscal year	• Annual incentive payouts are based on the results of enterprise goals as determined from year to year by the TVA Board or the CEO, as applicable. Annual incentive payouts may be impacted by a corporate multiplier or adjusted by the TVA Board or CEO, as applicable, based on the evaluation of performance during the year. • Target annual incentive opportunities increase with position and responsibility and are based in part on the opportunities other companies in TVA's peer group provide to those in similar positions.
Long-Term Incentive Plan (LTIP)	Provide a targeted level of total long-term compensation comprised of at-risk and retention components	• Participation is limited to key positions that have the ability to significantly impact the long-term financial and/or operational objectives critical to TVA's overall success.
Long-Term Performance Award (LTP) 	Incentivize performance by providing at-risk compensation tied to attainment of pre-established performance goals over a three-year performance period	• LTP grants have a three-year performance cycle with variable at-risk opportunities based on achievement against performance goals established at the beginning of the performance cycle. • The Committee's policy is for a majority of each executive's total LTI opportunity to be in the form of performance-based grant, with the remaining percent to be retention oriented.
Long-Term Retention Award (LTR) 	Incentivize retention by providing "fixed" retention-based grants tied to a three-year vesting schedule	• LTR grants will vest and pay out in three equal increments annually over three years, subject to the participant being employed through such dates, but are payable upon death, disability, or retirement if earlier on a pro-rated basis. • Since TVA issues no equity, TVA offers retention grants to be competitive with the industry marketplace for talent, providing a retention incentive similar to restricted stock or restricted stock units. These grants are intended to encourage executives to remain with TVA and to provide, in combination with salary, EAIP, and LTP grants, a competitive level of TDC.

*typically reviewed annually

Setting Competitive Compensation Amounts and Opportunities Relevant to Labor Market

Salary

Annual salary is considered a "fixed" compensation component. Salary levels are typically reviewed annually to consider changes in benchmark salaries and/or individual performance.

NEO	2024[1]	2023	Percent Change
Mr. Lyash	$ 1,227,000	$ 1,227,000	— %
Mr. Thomas	860,441	835,380	3 %
Mr. Moul	819,468	795,600	3 %
Mr. Fountain	648,696	629,802	3 %
Mr. Rausch	663,146	637,640	4 %

Note
(1) All salaries were effective October 1, 2023.

The 2024 salaries for the NEOs are reported in the *Executive Compensation Tables and Narrative Disclosures - Summary Compensation Table*.

Incentive Opportunities

The short- and long-term incentive opportunities for the NEOs are set at levels that (1) are competitive with the relevant labor market, with target TDC generally determined by considering the 50th percentile of the relevant labor market, and (2) result in a majority of each executive's total LTI opportunity in the form of performance-based awards and the remaining percent of each executive's total LTI opportunity in the form of retention awards. More than half of TVA's NEO's target TDC opportunity is performance-based and at-risk as described above in *TVA's Executive Compensation Program Aligns Pay with Performance*.

LTI awards are intended to provide a similar pay component as equity-based compensation at peer IOUs. Since TVA does not issue equity, the compensation program cannot provide a component similar to equity awards that capture long-term value, and have the potential for significant gains or losses, based on market fluctuations. As a result, TVA's LTIs are not necessarily intended to match market pay levels.

Target incentive opportunities increase with position scope and responsibility to hold management accountable for delivery of results and are based in part on the opportunities other companies in TVA's peer group provide to those in similar positions. Incentive opportunities are typically reviewed annually to consider changes in benchmark short- and long-term incentives. The Committee reviews peer benchmark information by position for each component of pay as well as for overall TDC.

Non-Direct Compensation Elements

Other Compensation

To recruit high-quality talent, TVA may offer recruitment awards as well as relocation assistance and reimbursement. These types of deferred cash incentive awards are intended to compensate the individuals for amounts they may have forfeited from their previous employer in order to join TVA and/or provide substitute compensation when the individual is not eligible to receive certain incentive payments until a future date.

Executive Severance Plan

TVA has established a Severance Plan to provide additional benefits to certain executives if TVA terminates the employment of covered executives other than for Gross Misconduct or such executives terminate for Good Reason. See *Executive Compensation Tables and Narrative Disclosures - Executive Severance Plan* below for additional information regarding the benefits available to covered executives under the Severance Plan as well as definitions of Gross Misconduct and Good Reason. Material changes in the Severance Plan were approved for 2024, as reflected above in *Notable 2024 Actions*.

Retirement Benefits

TVA provides its NEOs with retirement benefits through its qualified plans as well as through a non-qualified supplemental executive retirement plan ("SERP") in order to provide compensation beginning with retirement or termination of employment (if vesting requirements are satisfied), with enhanced compensation for certain executives to provide an additional incentive for hiring and retention of qualified individuals.

TVA sponsors a qualified defined benefit plan ("pension plan") and a qualified defined contribution plan ("401(k) plan"), which are administered by the TVA Retirement System ("TVARS"). The availability of, and level of benefits provided by, these qualified plans are comparable to similar qualified plans provided by companies in TVA's peer group.

In addition to its qualified retirement plans, TVA has a SERP for selected executives who are critical to the ongoing success of the enterprise. TVA's SERP is a non-qualified plan that provides supplemental retirement benefits at compensation levels that are higher than the limits specified by Internal Revenue Service ("IRS") regulations for qualified retirement plans. The provision of such non-qualified plans to executives is a common practice among companies in TVA's peer group. The purpose of the SERP is to:

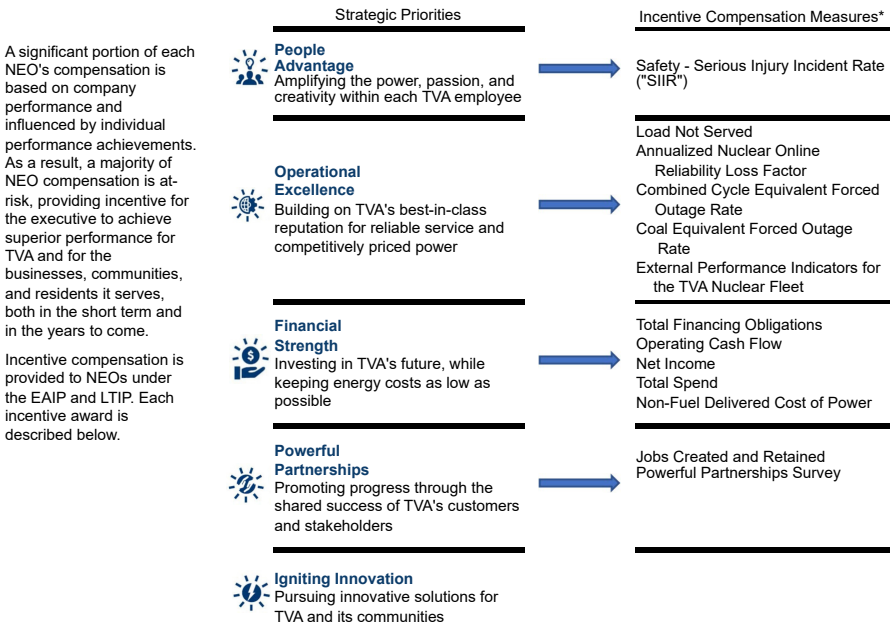
- Provide a competitive retirement benefit level that cannot be delivered solely through TVA's qualified retirement plans due to IRS limitations, and
- Provide a benefit level (as a percentage replacement of pre-retirement pay) that is more comparable to that of employees who are not subject to the IRS limitations.

More information regarding these retirement benefits is found following the Pension Benefits Table.

Health and Other Benefits

TVA offers a group of health and other benefits (medical, dental, vision, life and accidental death and disability insurance, and long-term disability insurance) that are available to a broad group of employees. The NEOs are eligible to participate in TVA's

health benefit plans and other non-retirement benefit plans on the same terms and at the same contribution rates as other TVA employees.



2024 Performance Goals and Performance Achievement

*Incentive compensation measures align with strategic priorities and are further described below in *Executive Annual Incentive Plan ("EAIP") - 2024 EAIP Performance Measures* and *Long-Term Incentive Plan ("LTIP")*.

Executive Annual Incentive Plan ("EAIP")

All TVA employees (including NEOs) participate in an annual, short-term incentive program (subject to eligibility requirements), since every employee contributes to the success of TVA and the execution of its public power mission. While the measures used for annual incentives are the same for all employees, they are provided under two plans: the WPTIP provides for annual incentive awards for eligible non-executives, and the EAIP provides for annual incentive awards for eligible executives, including the NEOs.

The EAIP is designed to encourage and reward executives for successfully achieving annual financial and operational goals. For 2024, the annual incentive payment for each NEO other than the CEO was calculated as follows:



The EAIP award for the CEO was calculated in the same manner as those awards for other NEOs except that the Scorecard Achievement range measured from 0 percent to 150 percent instead of 0 percent to 200 percent. See *Notable 2024 Actions* for additional information regarding this change.

Each component of this calculation is discussed below (except for annual salary, which is discussed above). The award for certain participants in the EAIP may be adjusted by the participant's supervisor based on an evaluation of the participant's individual achievements and performance during the year. In addition, pursuant to discretion granted under the TVA

Compensation Plan and EAIP, awards may be further adjusted by the TVA Board in its discretion. There is no guaranteed minimum payout under the EAIP, and the maximum payout for the EAIP cannot exceed 225 percent of the target award for all participants other than the CEO. For the CEO, the maximum payout cannot exceed 150 percent of the target award.

EAIP Target Incentive Opportunity

Following a review of benchmarking and individual performance, the TVA Board evaluated the appropriateness of the EAIP award opportunity for the CEO based on market data and other individual factors and made no changes for 2024. Similarly, the CEO evaluated the appropriateness of the EAIP award opportunities for the other NEOs based on market data and other individual factors, including internal parity, and made no changes for 2024. Accordingly, target EAIP award opportunities of the NEOs for 2024 were as follows:

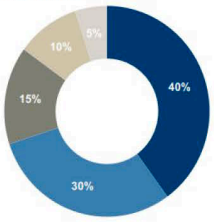
NEO	2024 EAIP Target Incentive Opportunity[1]
Mr. Lyash	150%
Mr. Thomas	80%
Mr. Moul	80%
Mr. Fountain	70%
Mr. Rausch	70%

Note
(1) Represents a percent of each NEO's salary.

2024 EAIP Performance Measures

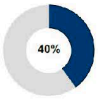
EAIP performance measures tie directly to key enterprise metrics used by senior management in TVA's annual budget and strategic planning process, which in turn link directly to the achievement of TVA's mission and strategic priorities. The 2024 EAIP performance measures and goals were provided in an organizational scorecard ("TVA Enterprise Scorecard"). The 2024 performance measures, along with the weighting ascribed to each, are shown below as a percentage of the total EAIP award opportunity at target-level performance.

2024 EAIP PERFORMANCE MEASURES



- TVA Total Spend
- Load Not Served
- Annualized Nuclear Online Reliability Loss Factor
- Combined Cycle Equivalent Forced Outage Rate
- Coal Equivalent Forced Outage Rate

The 2024 WPTIP/EAIP measures are described in detail below.



TVA Total Spend

What this measures: TVA's ability to keep costs low

Total Non-Fuel Operating and Maintenance, Capital, Non-Fuel Inventory, and Cloud Implementation expenses for corporate and operational Strategic Business Unit organizations (excludes TVA Board of Directors).

Why Is This Metric Used?

Supports the overall TVA goal of maintaining costs and managing rates based on spending levels approved by TVA management and the TVA Board.



Load Not Served

What this measures: Transmission system outages that affect TVA customers

Load Not Served ("LNS") is a measure of the magnitude and duration of transmission system outages that affect TVA customers expressed in system minutes. An automatic customer interruption with a duration of one minute or greater is tracked as an LNS event. LNS events caused by TVA on a distributor system will also count as a TVA event even if the TVA system remains energized. LNS events exclude interruptions due to declared major events, variances, verified tornadoes, gunfire, vandalism, ice formation, and foreign object/vehicle.

Why Is This Metric Used?

TVA manages this critical indicator to reduce the impact of customer outages.



Annualized Nuclear Online Reliability Loss Factor

What this measures: Nuclear plant availability

Annualized Nuclear Online Reliability Loss Factor is the 12-month ratio of all generation losses (minus refueling outage ("RFO") and exempt losses) to reference energy generation (minus RFO and exempt losses) in a normal fuel cycle period, per external standard nuclear industry guidelines.

Why Is This Metric Used?

Monitors performance between refueling outages to obtain high unit and energy production reliability.



Combined Cycle Equivalent Forced Outage Rate

What this measures: Combined cycle plant reliability

Combined Cycle Equivalent Forced Outage Rate ("EFOR") measures the generation lost due to forced events as a percentage of time the unit would have been scheduled to run for TVA-operated combined cycle generating assets, based on Generating Availability Data System ("GADS") event reporting guidelines for megawatt hour losses. Combined Cycle EFOR excludes GADS events classified as outside management control and variances.

Why Is This Metric Used?

Combined Cycle EFOR focuses on ensuring TVA combined cycle generating assets are available and reliable to meet system demand.



Coal Equivalent Forced Outage Rate

What this measures: Coal plant reliability

Coal EFOR measures the generation lost due to forced events as a percentage of time the unit would have been scheduled to run for TVA-operated coal generating assets, based on GADS event reporting guidelines for megawatt hour losses. Coal EFOR excludes GADS events classified as outside management control and variances.

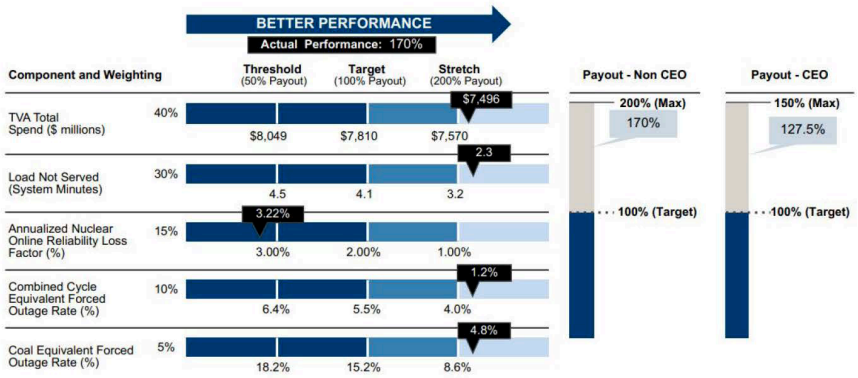
Why Is This Metric Used?

Coal EFOR focuses on ensuring TVA coal generating assets are available and reliable to meet system demand.

In setting the goal for each measure, consideration is given to TVA's historic performance, its strategic business plan priorities and strategic benchmarking goals, customer and stakeholder feedback, environmental and regulatory concerns and goals, and the competitive environment. Achievement of the target goal would result in a 100 percent payout with respect to that goal. A threshold goal is also set for each measure, so that no award payout would occur with respect to a measure when performance fails to achieve that threshold. Additionally, a stretch goal for each measure is set to incentivize and reward exceptional performance. Linear interpolation is used for results between threshold and stretch goals.

2024 Enterprise Scorecard and Corporate Multiplier Results

The performance results on the 2024 TVA Enterprise Scorecard are set forth below. TVA's Enterprise Scorecard is based on a scale of 0 percent to 200 percent for all participants other than the CEO and resulted in a **170 percent** of target opportunity payout. For the CEO, TVA's Enterprise Scorecard is based on a scale of 0 percent to 150 percent and resulted in a **127.5 percent** of target opportunity payout. TVA's Corporate Multiplier (described in the following section) has been used to determine final payout results.



ENTERPRISE SCORECARD PERFORMANCE[1]

Note
(1) The TVA Enterprise Scorecard sets forth performance goals of annual incentive plans applicable to both executive and non-executive employees.

Corporate Multiplier Approval

As in previous years, the TVA Board approved the use of a corporate multiplier for the 2024 EAIP. The corporate multiplier ranges between 0 and 1.1 and is based on a qualitative assessment of performance in 2024 against goals set in February 2024 for six organizational performance measures. Key highlights for this performance period were:

- Continued overall strong safety performance
  – 2024 SIIR is best achievable with zero serious injuries reported for the fiscal year
- Financial health and performance – continued strong financial performance with Total Financing Obligations ("TFO"), Net Income, and Operating Cash Flow substantially exceeding target
- Jobs created and jobs retained – 2024 efforts continued to help attract and encourage the expansion of business and industries
  – $8.9 billion in projected investments, and
  – Expected creation/retention of 52,761 jobs (10,368 jobs created and 42,393 jobs retained)
- **Overall performance – outstanding performance across a broad range of metrics**

Why does the TVA Board use a multiplier?

The multiplier allows the TVA Board to qualitatively assess the organization's performance, emphasizing the importance of safety, financial health, reputation, and economic development.

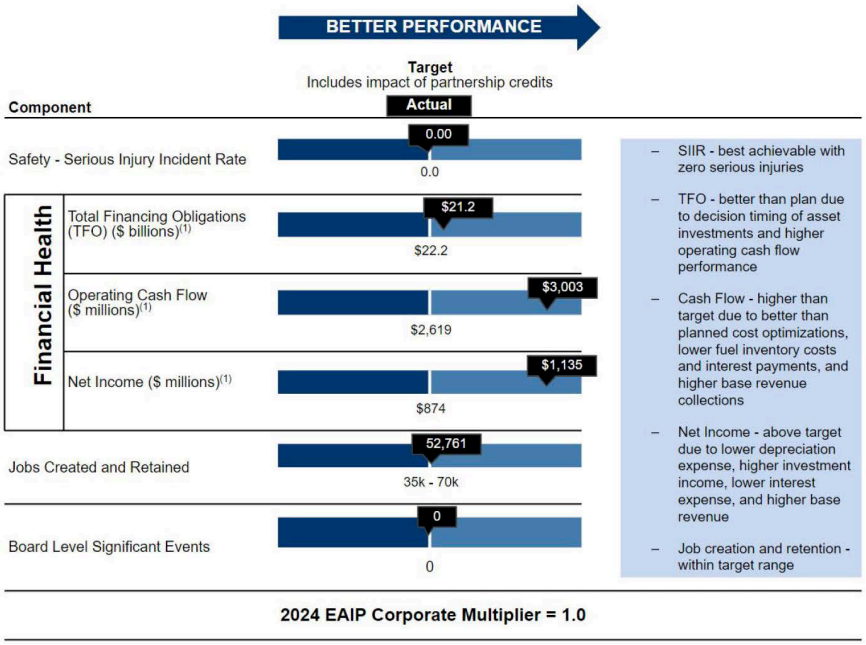
The TVA Board qualitatively assessed TVA's performance at the end of the 2024 performance period. Based on TVA's performance with respect to the 2024 corporate multiplier measures and the overall performance described above, the TVA Board determined to apply a **1.0 multiplier to the calculated EAIP payout**.

Corporate Multiplier Factors

	Measure	Definition	Why Is This Measure Used?
	Safety – Serious Injury Incident Rate ("SIIR")	A mathematical calculation used by Edison Electric Institute that quantifies the extent of injury for serious injuries and fatalities from events within the control of the employee and/or the employer.	TVA shares a professional and personal commitment to protect the safety of its employees, its contractors, its customers, and those in communities that TVA serves.
Financial Health	**Total Financing Obligations ("TFO")**	TFO includes all statutory debt and other financial obligations. TFO is calculated by subtracting unbudgeted contributions to unfunded liabilities from the sum of (1) long-term debt (including unamortized premiums/discounts), (2) short-term debt, (3) leaseback obligations, (4) energy prepayment obligations, and (5) variable interest entities.	TVA's TFOs are driven by its business plan and reflect the application of sound financial guiding principles. Focusing on this measure will improve TVA's fiscal performance and strengthen TVA's balance sheet.
	Operating Cash Flow	Amount of cash generated from power production and other mission-related activities and generally defined as operating revenues received less cash payments made for operating expenses. See Part II, Item 8, Financial Statements and Supplementary Data – *Consolidated Statements of Cash Flows* for additional information.	Operating Cash Flow is considered a key indicator of overall financial health as it measures TVA's ability to use cash received from customers to sufficiently fund outgoing cash expenditures.
	Net Income	Consists of the entity's net earnings derived by adjusting revenues for the cost of doing business, including the cost of sales, depreciation, interest, taxes, and other expenses. See Part II, Item 8, Financial Statements and Supplementary Data – *Consolidated Statements of Operations* for additional information.	Net income is a standard accounting measure that provides a view of TVA's financial performance and position.
	Jobs Created and Jobs Retained[(1)]	Measures the number of new or retained jobs in the Tennessee Valley for which TVA has played a role in the recruitment or retention of the economic development project.	Jobs Created and Retained is an industry standard measure that economic developers can speak to and easily understand, and provides an established tracking mechanism to measure TVA's economic development efforts.
	Board Level Significant Events	Includes items deemed significant by the TVA Board of Directors. These items may affect TVA's reputation with its customers and its stakeholders, the organizational health of the workforce, or its impact on the public at large. Both favorable and unfavorable events will be considered.	An incentive pay program, by design, cannot cover the entire scope of activities that could occur during a given cycle. This measure allows the TVA Board to deem certain reputational, environmental, or other items as significant impacts to TVA's business. Items that may be considered significant (either favorably or unfavorably) include customer survey results, stakeholder survey results, key indicators of organizational health, environmental events, or other major events not covered in other performance measures.

Note
(1) "Jobs created" in the TVA fiscal year are newly created, paid positions at a facility of a TVA customer, meaning any entity that purchases power from TVA or a distributor of TVA power. "Jobs retained" are paid positions at a facility of a TVA customer that were created prior to the current TVA fiscal year and that continue to be filled in the current TVA fiscal year. See Part I, Item 1, Business — *Economic Development Activities* for additional information.

2024 CORPORATE MULTIPLIER MEASURES (0.0 – 1.1 MULTIPLIER)



Note
(1) Includes impact of partnership credits. Partnership credits are wholesale bill credits provided to LPC customers who have signed long-term Partnership Agreements with TVA. For more information, see Part I, Item 1, Business — *Customers*.

Individual Performance Multiplier Reinforces Pay for Performance

Annually, individual goals for the NEOs are established at the beginning of each performance cycle. These goals tie to the achievement of TVA's mission and strategic priorities.

At the end of the performance period, the CEO assesses the performance of the other NEOs and determines any individual multiplier, in consultation with the Committee. The CEO reviews his or her direct reports' performance with the Committee prior to finalizing end of year payouts for the CEO's direct reports, informs the Committee of any discretion under consideration, and determines final payouts after informing the Committee Chair and the Committee's independent compensation consultant.

For the CEO individual performance multiplier, each TVA Board member assesses the CEO's performance at the end of a performance period (fiscal year-end). Results of the assessment are provided to the Committee Chair who, with concurrence of the TVA Board Chair and input from other TVA Board members, determines the CEO's annual performance rating. The Committee then recommends to the full TVA Board payouts to the CEO under the EAIP. For each NEO, the individual performance multiplier can range between 0 percent to 150 percent of the calculated payout and can be used to reduce (multiplier below 100 percent) or increase (multiplier above 100 percent) the amount of the award.

For 2024, the NEOs were evaluated on individual performance goals and the following leadership competencies:

LEADERSHIP COMPETENCIES



Award payouts under the 2024 EAIP are below and are reported in the "Non-Equity Incentive Plan Compensation" column in the *Executive Compensation Tables and Narrative Disclosures — Summary Compensation Table*. TVA's achievement against its Enterprise Scorecard, with approved corporate multiplier, is reflected below, as well as individual performance multipliers by NEO.

2024 EAIP Award Calculation

NEO	Salary	Target EAIP Incentive Opportunity (% of Salary)	Target EAIP Payout	Scorecard Results [1]	Corporate Multiplier	Individual Performance Multiplier ("IPM")	Actual EAIP Award Payout
Mr. Lyash[2]	$ 1,227,000	150%	$ 1,840,500	127.5%	1.0	100%	$ 2,346,638
Mr. Thomas[3]	$ 860,441	80%	$ 688,353	170.0%	1.0	108%	$ 1,263,816
Mr. Moul[4]	$ 819,468	80%	$ 655,574	170.0%	1.0	108%	$ 1,203,635
Mr. Fountain	$ 648,696	70%	$ 454,087	170.0%	1.0	100%	$ 771,948
Mr. Rausch	$ 663,146	70%	$ 464,202	170.0%	1.0	100%	$ 789,144

Notes
(1) This column reflects the percent of Enterprise Scorecard approved by the TVA Board. The EAIP Award for Mr. Lyash was calculated in the same manner as that of each NEO, except that his award was calibrated using a Scorecard Achievement range of 0 percent to 150 percent instead of 0 percent to 200 percent.
(2) The maximum EAIP payout for the CEO cannot exceed 150 percent of target. Mr. Lyash's individual performance multiplier of 100 percent was based on an evaluation of his performance during the fiscal year by the Committee and the TVA Board.
(3) The IPM for Mr. Thomas recognizes strong performance, with achievements at or near stretch for five key financial measures (TVA Total Spend, TFO, Operating Cash Flow, Net Income, and Non-Fuel Delivered Cost of Power). In addition, Financial Services exceeded the renewable and storage MW added metric, launched new interruptible products yielding 850 MW, and supported TVA efforts in bringing federal funding to the Valley and its stakeholders.
(4) The IPM for Mr. Moul recognizes operational performance above expectations, with achievements at stretch on three key operational measures. In addition, the Chief Operating Office maintained a zero SIIR for 2024 while also demonstrating year-over-year improvement in asset performance.

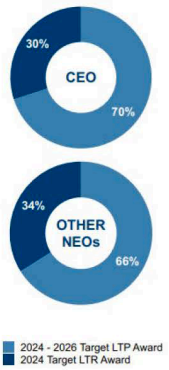
Long-Term Incentive Plan ("LTIP")

TVA executives, including the NEOs, participate in the company's LTIP. These individuals make decisions that significantly influence the development and execution of TVA's long-term strategic objectives. As such, awards under TVA's LTIP are designed to reward executives for sustainable success. Since long-term success is supported by a commitment to continued employment, the NEOs are incentivized to remain with the company through the vesting of the LTP awards and LTR awards, as discussed below.

LONG-TERM AWARDS REWARD LONG-TERM SUCCESS

- Enterprise-wide performance criteria that are directly aligned with TVA's mission
- "Cumulative" performance approach to measure performance achieved over a three-year period with a new three-year performance cycle beginning each year
- Potential payment range of 0 percent to 200 percent of target incentive opportunity to enable awards that are commensurate with performance achievements (0 percent to 150 percent for CEO)
- Award opportunities established for each performance cycle below or near median levels of competitiveness with TVA's peer group
- LTP awards vest upon the completion of the three-year performance period, contingent upon continued employment through vesting date and subject to achievement of performance goals
- LTR awards vest in one-third increments over three years, contingent upon continued employment through each vesting date

LONG-TERM INCENTIVE AWARDS



For 2024 compensation decisions, the TVA Board and Mr. Lyash evaluated the appropriateness of the LTI award opportunities for the CEO and other NEOs, respectively. As a result, the values of the Total LTI grants (LTP awards at target and the LTR awards) were increased from 2023 levels, near market median, following a review of benchmarking and individual performance and reflective of increased tenure and experience. Accordingly, target LTI award opportunities of the NEOs for 2024 were as follows:

	2024-2026 Granted LTI Values ($)			2024-2026 LTI - Increase vs 2023-2025 (%)		
NEO	LTP Target	LTR Award	TOTAL LTI	LTP Target	LTR Award	TOTAL LTI
Mr. Lyash	$ 3,983,000	$ 1,707,000	$ 5,690,000	—%	—%	—%
Mr. Thomas	1,425,000	700,000	2,125,000	—%	17%	5%
Mr. Moul	1,425,000	852,000	2,277,000	—%	9%	3%
Mr. Fountain	1,000,000	414,000	1,414,000	3%	6%	4%
Mr. Rausch	$ 725,000	$ 375,000	$ 1,100,000	—%	14%	4%

LTIP Grant and Vested Awards

TVA's executive compensation program provides for an annual LTP grant, which yields a vested award following a three-year performance period. During 2024, there were three overlapping LTP awards:

2022–2024 LTP Award	**Vested September 30, 2024**
2023–2025 LTP Award	**Vesting September 30, 2025**
2024–2026 LTP Award	**Vesting September 30, 2026**

The performance measures and threshold, target, and stretch goals for each measure are determined annually by the TVA Board. In setting the goal for each measure, the TVA Board considers budgeted amounts in the company's approved business plans, actual performance in recent years, and level of attainment. The TVA Board also considers TVA's strategic business plan priorities and strategic benchmarking goals, customer and stakeholder feedback, environmental and regulatory concerns and goals, and the competitive environment.

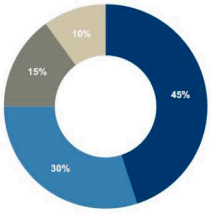
Following the TVA Board's approval of performance achievement at the end of each three-year performance period, awards are paid out in cash early in the subsequent fiscal year, or upon death, disability, or retirement, as described in TVA's LTIP. For the 2022-2024 LTP award cycle, target performance provides for a 100 percent payout opportunity, performance below threshold provides for no payout, performance at threshold provides for a 50 percent payout opportunity, and performance at stretch provides for a 200 percent payout opportunity (for all eligible participants, except the CEO).

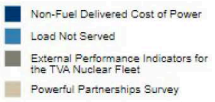
LTP Incentive awards for the CEO are calculated in the same manner except that the scorecard achievement ranges from 0 percent to 150 percent instead of 0 percent to 200 percent (see "*Notable 2024 Actions"* for additional information regarding change). Linear interpolation is used for results between threshold and stretch goals. The TVA Board may apply discretion, based on consideration of corporate factors and events that are significant during the Performance Cycle but not included or captured in the performance goals and performance measures, to reduce or increase the final LTP incentive awards for any or all participants as long as the final awards do not exceed the maximum amounts described above.



For the three-year performance period ended September 30, 2024, the TVA Board previously approved four overall TVA performance measures to be applied to all participants in the LTP. The 2022–2024 performance measures, along with the weighting ascribed to each, are shown below as a percentage of the total LTP award opportunity at target-level performance.

2022-2024 LTP PERFORMANCE MEASURES

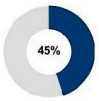




The 2022–2024 LTP measures are described in detail below.

Non-Fuel Delivered Cost of Power

What this measures: non-fuel expenses (cents/kWh)



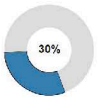
The Non-Fuel Delivered Cost of Power is a financial measure equal to the sum of (1) non-fuel operating and maintenance ("O&M") expense, (2) base capital cost, (3) interest expense, and (4) other expense divided by budgeted electric power sales.

Why Is This Measure Used?

This measure drives performance through activities that management can control. It aligns with TVA's strategic objective of maintaining low rates and focuses on aligning TVA's non-fuel costs associated with generation, transmission, statutory mission services, and additional customer services with revenue. Non-Fuel Delivered Cost of Power supports retail rate objectives and aligns to the business plan commitment.

Load Not Served

What this measures: transmission system outages that affect TVA customers



Load Not Served ("LNS") is a measure of the magnitude and duration of transmission system outages that affect TVA customers expressed in system minutes. An automatic customer interruption with a duration of one minute or greater is tracked as an LNS event. LNS events caused by TVA on a distributor system will also count as a TVA event even if the TVA system remains energized. LNS excludes interruptions due to declared major events, variances, gunfire, vandalism, and verified tornadoes.

Why Is This Measure Used?

TVA manages this critical indicator to reduce the impact of customer outages.

External Performance Indicators for the TVA Nuclear Fleet

What this measures: nuclear operations performance



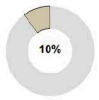
External Performance Indicators for the TVA Nuclear Fleet is calculated using a weighted combination of key performance indicators based on standard nuclear industry definitions for station performance, with the maximum obtainable being 100 points. TVA's fleet level index is a simple average of unit performance.

Why Is This Measure Used?

This measure is a recognized industry standard for nuclear operations performance based on safety and reliability.

Powerful Partnerships Survey

What this measures: external perception and reputational events



Powerful Partnerships Survey is conducted among customers, elected officials, business/economic development leaders, and the general public in the TVA service area to assess strength of various stakeholder relationships with TVA.

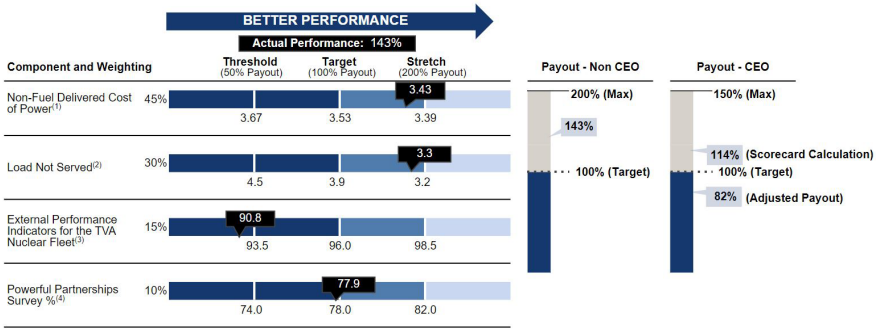
Why Is This Measure Used?

This measure supports the effective management of TVA's reputation and the ability to achieve desired outcomes and deliver on strategic priorities with stakeholders.

Consistent with its public power mission, TVA's LTP measures include the results of surveys that assess the external reputation and perception of TVA and TVA's effectiveness in carrying out its mission and strategic objectives. These measures reflect TVA's focus on meeting or exceeding customer expectations and identifying areas for continuous improvement.

2022–2024 LTP Award Performance Results

The performance results under the **2022-2024 TVA Long-Term Performance Scorecard** are set forth below. TVA's LTP Scorecard is based on a range of 0 percent to 200 percent for all participants other than the CEO and resulted in a payout of **143 percent** of target opportunity. For the CEO, TVA's LTP Scorecard is based on a scale of 0 percent to 150 percent, and resulted in an **adjusted payout of 82 percent** of target opportunity.



Notes

(1) Non-Fuel Delivered Cost of Power = (Non-Fuel Operating and Maintenance Expense + Base Capital Cost + Interest Expense + Other Expense) / Budgeted Electric Power Sales. For the 2022–2024 performance cycle, the Non-Fuel Delivered Cost of Power measure was calculated using an average of the 2022, 2023, and 2024 results.

(2) Load Not Served = (Percentage of Total Load Not Served) x (Number of Minutes in the Period). For the 2022–2024 performance cycle, the Load Not Served measure was calculated using an average of the 2022, 2023, and 2024 results.

(3) The External Performance Indicators for TVA Nuclear Fleet measure is calculated using a weighted combination of key performance indicators based on standard nuclear industry definitions for station performance, with the maximum obtainable being 100 points. For the 2022–2024 performance cycle, the External Performance Indicators for the TVA Nuclear Fleet measure was calculated using the 2024 results.

(4) The Powerful Partnerships Survey is conducted among customers, elected officials, business and economic development leaders, and the general public in the TVA service area to assess the strength of various stakeholder relationships with TVA. For the 2022–2024 performance cycle, the Powerful Partnerships Survey measure was calculated using an average of the 2022, 2023, and 2024 results.

In reviewing the 2022–2024 performance period, the TVA Board considered strong performance in two areas along with below threshold performance for External Performance Indicators for the TVA Nuclear Fleet and slightly below target performance for Powerful Partnerships Survey in 2024. Below are key highlights for this performance period:

- ✓ Strong transmission grid system reliability performance
- ✓ Financial performance
  - Debt continued to be consistent with long-term financial plan
  - Residential rates are lower than those paid by over 80% of customers of the top 100 U.S. utilities
  - Industrial rates are lower than those paid by over 90% of customers of the top 100 U.S. utilities
- ✓ Nuclear performance
  - Browns Ferry Unit 1 achieved 50 years of operation
  - Initiated the preservation of 8,232 MW of carbon free generation for a total of 80 years with approval of the Nuclear Life Extension Program
  - Partnerships for advancing new technologies
  - External Performance Indicators for TVA Nuclear Fleet performed below threshold for 2024
- ✓ Customer relationships
  - 97% of 153 LPCs have signed 20-year Partnership Agreements with TVA
  - Supporting federal funding opportunities
  - Powerful Partnerships Survey - performed just below target for 2024 as TVA continues to actively engage stakeholders across the Tennessee Valley
- ✓ Continued economic development efforts have been successful (2022-2024)
  - Companies have announced $28.3 billion in projected investments
  - Approximately 177,600 jobs (49,100 jobs expected to be created and 128,500 jobs expected to be retained)

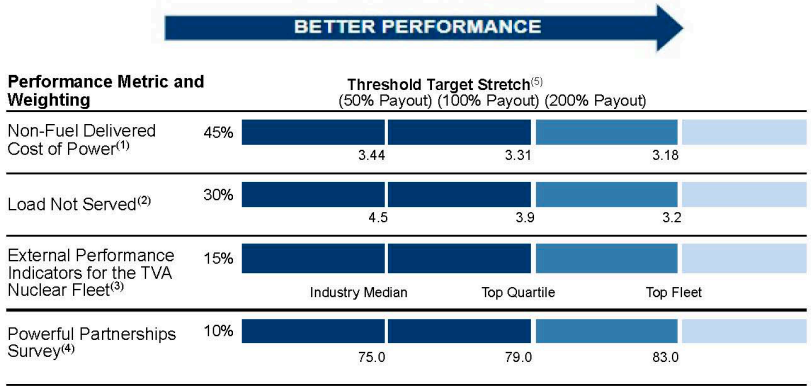
In light of operational performance challenges during the three-year performance cycle of the LTIP and concerns regarding TVA's ability to manage costs in light of future financial needs, the TVA Board exercised discretion to adjust the calculated 2022-2024 LTP Award **payout from 114 percent to 82 percent**, which is 72 percent of the calculated payout, for Mr. Lyash. For the remaining participants other than the CEO, the TVA Board determined that the calculated payout appropriately reflected executive performance in executing on TVA's long-term priorities and did not exercise its discretion to adjust the calculated payout. Award payouts for NEOs are reported below and in the *Executive Compensation Tables and Narrative Disclosures – Summary Compensation Table* under "Non-Equity Incentive Plan Compensation."

	2022-2024 LTP Award Calculation		
NEO	LTP Target	Scorecard Results Percent of Opportunity Achieved	LTP Award Payout
Mr. Lyash[1]	$ 3,556,000	82%	$ 2,915,920
Mr. Thomas	1,395,000	143%	1,994,850
Mr. Moul	1,175,000	143%	1,680,250
Mr. Fountain	770,000	143%	1,101,100
Mr. Rausch	596,000	143%	852,280

Note
(1) Mr. Lyash's LTP award was calculated in the same manner as that of each NEO, except that his award was calibrated using a Scorecard Achievement range of 0 percent to 150 percent instead of 0 percent to 200 percent. For the CEO, the maximum LTP award is 150 percent of the LTP incentive target.

2023–2025 Outstanding LTP Performance Cycle

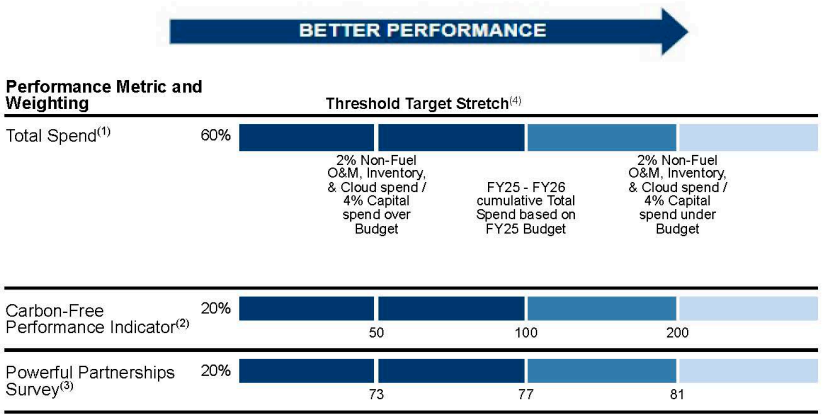
The TVA Board previously approved the following overall LTP measures of TVA performance for all participants for the three-year cycle ending September 30, 2025 (awards to be paid in November 2025):



Notes
(1) Non-Fuel Delivered Cost of Power measure has same definition as for the 2022-2024 LTP awards. For the 2023-2025 performance cycle, the Non-Fuel Delivered Cost of Power measure will be calculated using an average of the 2023, 2024, and 2025 results.
(2) Load Not Served measure has same definition as for the 2022-2024 LTP awards. For the 2023-2025 performance cycle, the Load Not Served measure will be calculated using an average of the 2023, 2024, and 2025 results.
(3) The External Performance Indicators for the TVA Nuclear Fleet measure has same definition as for the 2022-2024 LTP awards. For the 2023-2025 performance cycle, the External Performance Indicators for the TVA Nuclear Fleet measure will be calculated based on 2025 results.
(4) The Powerful Partnerships Survey measure is conducted among customers, elected officials, business and economic development leaders, and the general public in the TVA service area to assess the strength of various stakeholder relationships with TVA. For the 2023-2025 performance cycle, the Powerful Partnerships Survey measure will be calculated using an average of the 2023, 2024, and 2025 results.
(5) The Stretch Payout for the CEO is 150 percent.

2024–2026 Outstanding LTP Performance Cycle

In September 2024, the TVA Board approved the following overall LTP measures of TVA performance for all participants for the three-year cycle ending September 30, 2026 (awards to be paid in November 2026):



Notes

(1) Total Spend represents total Non-Fuel O&M, Capital, Non-Fuel Inventory, and Cloud Implementation expenses for corporate and operational SBU organizations (excludes TVA Board). This measure will support the overall TVA goal of maintaining costs and managing rates based on spending levels approved by TVA management and the TVA Board.

(2) Carbon-Free Performance Indicator measures renewable megawatts ("MW") added to the TVA system, energy program savings gigawatt hour ("GWh") and capacity MW provided by energy programs, and the ability to meet TVA's operational needs through demand response ("DR") event performance. This measure supports the evolution of TVA's reliability and clean energy supply into the energy system of the future as well as helps manage the impact of TVA's identified enterprise risk related to planning and execution of the power system.

(3) The Powerful Partnerships Survey is conducted among customers, elected officials, business/economic development leaders, and the general public in the TVA service area to assess the strength of various stakeholder relationships with TVA. This measure supports the effective management of TVA's reputation and ability to achieve desired outcomes and deliver on strategic priorities with stakeholders.

(4) The Stretch Payout for the CEO is 150 percent.

LTR Grant and Vested Awards

As a corporate agency of the U.S., TVA does not have equity securities that it can use to provide stock awards, options, or other equity-based awards as compensation for its employees. The purpose of the retention grants under the LTIP is to provide a "fixed" retention incentive similar to restricted stock or restricted stock units. These grants are intended to encourage executives to remain with TVA and to provide, in combination with salary, EAIP, and LTP grants, a competitive level of TDC. Grants are generally effective as of October 1 and will become one-third vested on each subsequent September 30 or upon death, disability, or retirement if earlier on a pro-rated basis. Each award will be paid in a lump sum within two months of vesting.

2024 LTR Grant

Following the market assessment conducted by FW Cook, effective October 1, 2023, TVA approved LTR grants to the NEOs. These grants vest in three equal tranches on September 30, 2024, September 30, 2025, and September 30, 2026, contingent upon continued employment on each vesting date. The amounts of these grants are set forth under *Long-Term Incentive Plan ("LTIP")* above.

2024 Vesting of Outstanding LTR Awards

LTR awards that vested in 2024 are described below and reported in the *Executive Compensation Tables and Narrative Disclosures — Summary Compensation Table* under "Non-Equity Incentive Plan Compensation."

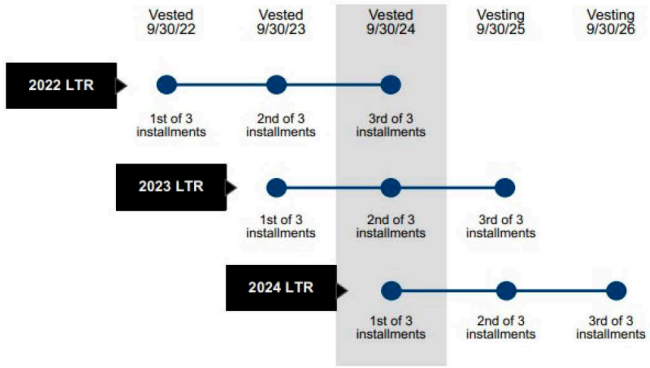
2024 LTR Vested Awards Payout

NEO	2022 LTR Award	2023 LTR Award	2024 LTR Award	2022 LTR Tranche Vested	2023 LTR Tranche Vested	2024 LTR Tranche Vested	2024 LTR Earned[1]
Mr. Lyash	$ 1,524,000	$ 1,707,000	$ 1,707,000	$ 508,000	$ 569,000	$ 569,000	$ 1,646,000
Mr. Thomas	585,000	600,000	700,000	195,000	200,000	233,333	628,333
Mr. Moul	785,000	785,000	852,000	262,000	261,667	284,000	807,667
Mr. Fountain	330,000	390,000	414,000	110,000	130,000	138,000	378,000
Mr. Rausch	330,000	330,000	375,000	110,000	110,000	125,000	345,000

Note
(1) Awards reflect vested tranches of 2022, 2023, and 2024 LTR program awards. LTR awards vest ratably over a three-year period, subject to continued employment on each vesting date.

The vesting schedule for the three LTR awards outstanding in 2024 is set forth below.

2024 VESTING OF OUTSTANDING LTR AWARDS



2024 CEO Pay Decisions - Overview and Analysis

CEO TDC EARNED IN 2024 - $8,135,558

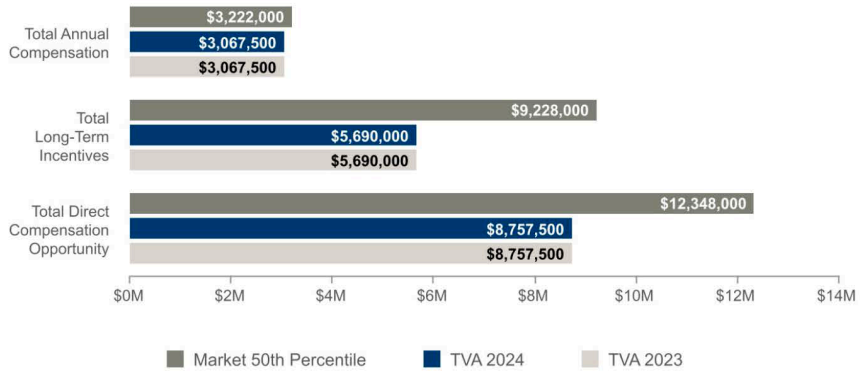
Base Salary	$ 1,227,000	2024 salary
EAIP	$ 2,346,638	127.5 percent of target EAIP award, followed by 1.0 Corporate Multiplier; 100 percent Individual Performance Multiplier then applied
LTIP (LTP component)	$ 2,915,920	82 percent of target LTP earned for the three-year performance cycle ended September 30, 2024
LTIP (LTR component)	$ 1,646,000	2024 tranche of 2022, 2023, and 2024 LTR awards

Each year, the Committee makes compensation decisions with respect to CEO compensation for two separate earning periods: the amount of TDC opportunity (which is forward-looking and incentivizes the CEO performance for the upcoming fiscal year), and the amount of TDC earned (which rewards CEO performance for the fiscal year period that just concluded).

2024 CEO Total Direct Compensation Analysis

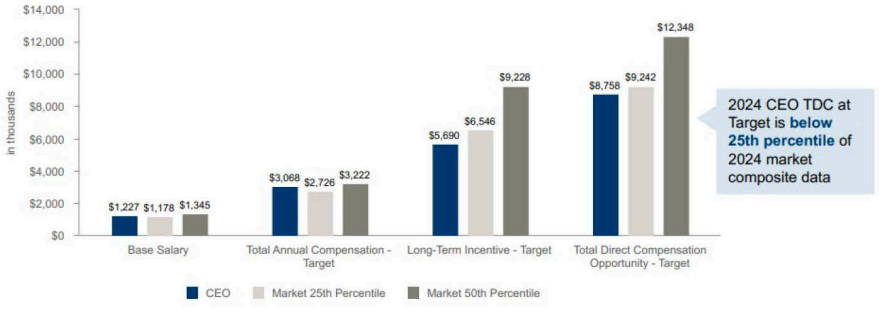
On November 9, 2023, the TVA Board approved no compensation adjustment for Mr. Lyash for 2024. The 2024 target TDC opportunity for Mr. Lyash, which remains equal to that of 2023, is illustrated below:

2024 CEO TARGET TDC OPPORTUNITY - YEAR OVER YEAR CHANGE RELATIVE TO MARKET[1][2][3][4]



Notes
(1) Target market assessment effective October 2023 and included market composite of WTW survey sample and proxy peer group. This composite group includes 44 investor-owned utilities and government/non-profit entities further described in Item 11, Executive Compensation — *Compensation Discussion and Analysis — Compensation Setting Process — Establishing Competitive Compensation — List of Compensation Peer Companies*. For 2024, CEO compensation reflects the same for "TVA 2023" and "TVA 2024" components.
(2) Market 50th Percentile amounts are benchmarks for each compensation component which are determined independently and do not sum together.
(3) Total Annual Compensation is calculated by adding Base Salary and EAIP. For 2024, Base Salary of $1,227,000 plus EAIP of $1,840,500 equals $3,067,500. For 2023, Base Salary of $1,227,000 plus EAIP of $1,840,500 equals $3,067,500.
(4) Total Long-Term Incentives are calculated by adding LTP and LTR. For 2024, LTP of $3,983,000 plus LTR of $1,707,000 equals $5,690,000. For 2023, LTP of $3,983,000 plus LTR of $1,707,000 equals $5,690,000.

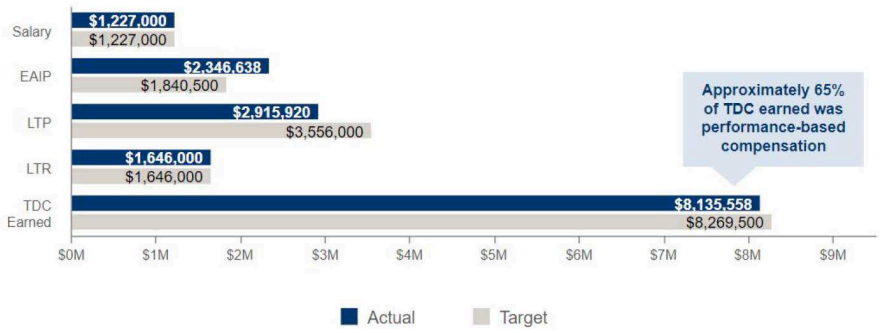
2024 CEO TARGET TDC OPPORTUNITY - RELATIVE TO MARKET PERCENTILE [1][2]



Note
(1) Target market assessment effective October 2023 and included market composite of WTW survey sample and proxy peer group. This composite group includes 44 investor-owned utilities and government/non-profit entities further described in Item 11, Executive Compensation — *Compensation Discussion and Analysis — Compensation Setting Process — Establishing Competitive Compensation — List of Compensation Peer Companies*.
(2) Market 25th and 50th Percentile amounts are benchmarks for each compensation component which are determined independently and do not sum together.

2024 CEO Total Direct Compensation - Target Versus Earned [1][2]

The TDC that Mr. Lyash earned for 2024 reflected individual and company performance that met and exceeded most targets and was approximately 65% performance-based compensation.



Notes
(1) 2022-2024 LTP award reflects a three-year performance cycle.
(2) LTR amount reflects the 2024 tranches of the 2022, 2023, and 2024 LTR awards.

CEO Pay Ratio Disclosure

As required by Section 953(b) of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 and Item 402(u) of Regulation S-K, TVA is providing the following information regarding the annual total compensation of TVA's CEO position and the annual total compensation of the median employee of the company:

- The total compensation for the CEO position for 2024 was $10,536,962.
- For 2024, the median employee's annual total compensation was $163,779.

Based on this information, the pay ratio of the total compensation for the CEO position to the median employee was approximately 64 to 1.

To identify the median employee and to determine the annual total compensation of the median employee, TVA took the following steps:

- TVA selected September 30, 2024, as the date on which to identify its median employee. On September 30, 2024, TVA's employee population that had earnings in 2024 (including full-time, part-time, and temporary employees) consisted of 11,267 individuals located in the U.S.
- In order to identify the median employee from its employee population, TVA compared the compensation that would be included in Box 5 (Medicare Wages and Tips) of Form W-2, which includes salary, overtime, and incentive compensation, for the period from October 1, 2023 to September 30, 2024. Box 5 compensation was used as it is representative of the compensation received by all employees and is readily available and objective.
- After identifying its median employee, TVA calculated that employee's compensation for 2024 as though that compensation was being calculated for purposes of the Summary Compensation Table, resulting in annual total compensation of $163,779.

TVA believes that the above pay ratio is a reasonable estimate calculated in a manner consistent with Item 402(u) of Regulation S-K. Because Item 402(u) provides companies with flexibility to select the methodology and assumptions used to identify the median employee and to calculate the pay ratio, the pay ratio reported by TVA may not be comparable to the pay ratios reported by other companies.

Executive Compensation Tables and Narrative Disclosures

Summary Compensation and Grants of Plan-Based Awards

The following table provides earned compensation information for each NEO in 2024 (and 2023 and 2022, as applicable).

SUMMARY COMPENSATION TABLE

Name and Principal Position	Year	Salary	Bonus[1]	Non-Equity Incentive Plan Compensation[2]	Change in Pension Value and Nonqualified Deferred Compensation Earnings[3]	All Other Compensation[4]	Total[5]
Jeffrey J. Lyash	2024	$ 1,227,000	$ —	$ 6,908,558	$ 2,371,704	$ 29,700	$ 10,536,962
President and Chief	2023	1,227,000	—	6,758,860	2,530,772	27,450	10,544,082
Executive Officer	2022	1,152,250	—	7,040,428	1,541,448	26,100	9,760,226
John M. Thomas, III	2024	$ 860,441	$ —	$ 3,886,999	$ 1,530,916	$ 24,750	$ 6,303,106
Executive Vice President	2023	835,380	—	2,743,221	950,898	22,875	4,552,374
and Chief Financial and Strategy Officer	2022	795,600	—	2,627,456	57,928	21,750	3,502,734
Donald A. Moul	2024	$ 819,468	$ —	$ 3,691,552	$ 479,688	$ 29,700	$ 5,020,408
Executive Vice President	2023	795,600	—	2,271,265	332,840	237,632	3,637,337
and Chief Operating Officer	2022	765,000	—	1,742,662	139,756	945,452	3,592,870
David B. Fountain	2024	$ 648,696	$ —	$ 2,251,048	$ 402,448	$ 29,700	$ 3,331,892
Executive Vice President	2023	629,802	—	1,630,441	221,672	27,450	2,509,365
and General Counsel	2022	577,800	—	1,239,436	185,739	76,100	2,079,075
Timothy S. Rausch	2024	$ 663,146	$ —	$ 1,986,424	$ 650,171	$ 29,700	$ 3,329,441
Executive Vice President	2023	637,640	—	1,817,165	322,682	27,450	2,804,937
and Chief Nuclear Officer	2022	569,321	—	1,607,805	219,325	26,100	2,422,551

Notes
(1) There were no bonus awards in 2024
(2) The 2024 data is outlined in the Non-Equity Incentive Plan Compensation table below.
(3) The 2024 data is outlined in the Change in Pension Value and Nonqualified Deferred Compensation Earnings table below.
(4) The 2024 data is outlined in the All Other Compensation table below.
(5) The total compensation amount reflected in this column, determined under applicable SEC rules, may differ substantially from compensation amounts actually earned within the fiscal year reflected. Change in Pension Value and Nonqualified Deferred Compensation Earnings can substantially impact this total, which are affected by external variables such as interest rates, assumptions about life expectancy, and changes in discount rate, which are functions of the economy and actuarial calculations not related to Company performance nor controlled or approved by the TVA Board or People Committee.

NON-EQUITY INCENTIVE PLAN COMPENSATION

	Jeffrey J. Lyash	John M. Thomas, III	Donald A. Moul	David B. Fountain	Timothy S. Rausch
EAIP	$ 2,346,638	$ 1,263,816	$ 1,203,635	$ 771,948	$ 789,144
LTP	2,915,920	1,994,850	1,680,250	1,101,100	852,280
LTR 2022-03[A]	508,000	195,000	262,000	110,000	110,000
LTR 2023-02[B]	569,000	200,000	261,667	130,000	110,000
LTR 2024-01[C]	569,000	233,333	284,000	138,000	125,000
Total	$ 6,908,558	$ 3,886,999	$ 3,691,552	$ 2,251,048	$ 1,986,424

tes
(A) LTR grant representing the third tranche of the 2022 LTR award effective October 1, 2021.
(B) LTR grant representing the second tranche of the 2023 LTR award effective October 1, 2022.
(C) LTR grant representing the first tranche of the 2024 LTR award effective October 1, 2023.

CHANGE IN PENSION VALUE AND NONQUALIFIED DEFERRED COMPENSATION EARNINGS

	Jeffrey J. Lyash	John M. Thomas, III	Donald A. Moul	David B. Fountain	Timothy S. Rausch
Increase under TVARS Plans[A]	$ —	$ 64,222	$ —	$ —	$ —
Increase under SERP	2,371,704	1,466,694	479,688	402,448	650,171
Total	$ 2,371,704	$ 1,530,916	$ 479,688	$ 402,448	$ 650,171

Notes
(A) The present value of the TVARS Plans and SERP are impacted by plan assumption changes and actual plan experience which may be different than previously assumed.

ALL OTHER COMPENSATION

	Jeffrey J. Lyash	John M. Thomas, III	Donald A. Moul	David B. Fountain	Timothy S. Rausch
401(k) Matching Contribution	$ 14,850	$ 14,850	$ 14,850	$ 14,850	$ 14,850
Non-Elective 401(k) Contribution	14,850	9,900	14,850	14,850	14,850
Deferred Cash Recruitment/Relocation Incentive	—	—	— [A]	—	—
Relocation Benefits	—	—	—	—	—
Total	$ 29,700	$ 24,750	$ 29,700	$ 29,700	$ 29,700

Notes
(A) Mr. Moul is required to repay to TVA a deferred cash recruitment and relocation incentive payment in the amount of $100,000 if, prior to June 21, 2025, he (1) voluntarily terminates employment unless the separation is for reasons beyond his control and acceptable to TVA, or (2) is terminated for cause.

The following table provides information on non-equity incentive plan opportunities and grants provided to NEOs and the possible range of payouts associated with the opportunities and grants. Awards under the EAIP, LTP, and LTR that vested as of September 30, 2024, will be paid in cash during the first quarter of 2025.

GRANTS OF PLAN-BASED AWARDS TABLE

as of September 30, 2024

			Estimated Possible Payouts Under Non-Equity Incentive Plan Awards[1]			Estimated Possible Future Payouts Under Non-Equity Incentive Plan Awards[1]			
			Current Year			Future Years			Performance
Name	Plan		Threshold[2]	Target[2]	Maximum[2]	Threshold[2]	Target[2]	Maximum[2]	Period End / Vesting Date
Jeffrey J. Lyash	EAIP	[3]	$ 920,250	$ 1,840,500	$ 2,760,750				9/30/2024
	LTP 2022	[4]	1,778,000	3,556,000	5,334,000				9/30/2024
	LTR 2022-03	[5]		508,000	508,000				9/30/2024
	LTR 2023-02	[5]		569,000	569,000				9/30/2024
	LTR 2024-01	[5]		569,000	569,000				9/30/2024
	LTP 2023	[6]				$ 1,991,500	$ 3,983,000	$ 5,974,500	9/30/2025
	LTR 2023-03	[5]					569,000	569,000	9/30/2025
	LTR 2024-02	[5]					569,000	569,000	9/30/2025
	LTP 2024	[6]				1,991,500	3,983,000	5,974,500	9/30/2026
	LTR 2024-03	[5]					569,000	569,000	9/30/2026
John M. Thomas, III	EAIP	[3]	$ 344,177	$ 688,353	$ 1,376,706				9/30/2024
	LTP 2022	[4]	697,500	1,395,000	2,790,000				9/30/2024
	LTR 2022-03	[5]		195,000	195,000				9/30/2024
	LTR 2023-02	[5]		200,000	200,000				9/30/2024
	LTR 2024-01	[5]		233,333	233,333				9/30/2024
	LTP 2023	[6]				$ 712,500	$ 1,425,000	$ 2,850,000	9/30/2025
	LTR 2023-03	[5]					200,000	200,000	9/30/2025
	LTR 2024-02	[5]					233,333	233,333	9/30/2025
	LTP 2024	[6]				712,500	1,425,000	2,850,000	9/30/2026
	LTR 2024-03	[5]					233,334	233,334	9/30/2026
Donald A. Moul	EAIP	[3]	$ 327,787	$ 655,574	$ 1,311,148				9/30/2024
	LTP 2022	[4]	587,500	1,175,000	2,350,000				9/30/2024
	LTR 2022-03	[5]		262,000	262,000				9/30/2024
	LTR 2023-02	[5]		261,667	261,667				9/30/2024
	LTR 2024-01	[5]		284,000	284,000				9/30/2024
	LTP 2023	[6]				$ 712,500	$ 1,425,000	$ 2,850,000	9/30/2025
	LTR 2023-03	[5]					261,667	261,667	9/30/2025
	LTR 2024-02	[5]					284,000	284,000	9/30/2025
	LTP 2024	[6]				712,500	1,425,000	2,850,000	9/30/2026
	LTR 2024-03	[5]					284,000	284,000	9/30/2026
David B. Fountain	EAIP	[3]	$ 227,044	$ 454,087	$ 908,174				9/30/2024
	LTP 2022	[4]	385,000	770,000	1,540,000				9/30/2024
	LTR 2022-03	[5]		110,000	110,000				9/30/2024
	LTR 2023-02	[5]		130,000	130,000				9/30/2024
	LTR 2024-01	[5]		138,000	138,000				9/30/2024
	LTP 2023	[6]				$ 485,000	$ 970,000	$ 1,940,000	9/30/2025
	LTR 2023-03	[5]					130,000	130,000	9/30/2025
	LTR 2024-02	[5]					138,000	138,000	9/30/2025
	LTP 2024	[6]				500,000	1,000,000	2,000,000	9/30/2026
	LTR 2024-03	[5]					138,000	138,000	9/30/2026
Timothy S. Rausch	EAIP	[3]	$ 232,101	$ 464,202	$ 928,404				9/30/2024
	LTP 2022	[4]	298,000	596,000	1,192,000				9/30/2024
	LTR 2022-03	[5]		110,000	110,000				9/30/2024
	LTR 2023-02	[5]		110,000	110,000				9/30/2024
	LTR 2024-01	[5]		125,000	125,000				9/30/2024
	LTP 2023	[6]				$ 362,500	$ 725,000	$ 1,450,000	9/30/2025
	LTR 2023-03	[5]					110,000	110,000	9/30/2025
	LTR 2024-02	[5]					125,000	125,000	9/30/2025
	LTP 2024	[6]				362,500	725,000	1,450,000	9/30/2026
	LTR 2024-03	[5]					125,000	125,000	9/30/2026

Notes

(1) TVA does not have any equity securities and therefore has no equity-based awards.

(2) Threshold, Target, and Maximum represent amounts that could be earned by an NEO based on performance during the applicable performance cycle. Threshold, Target, and Maximum targets for EAIP and LTIP were 50 percent, 100 percent, and 200 percent for 2024 (for all eligible participants, except the CEO). EAIP and LTIP Incentive awards for the CEO are calculated in the same manner except that the scorecard achievement ranges from 0 percent to 150 percent instead of 0 percent to 200 percent.

(3) Target incentive opportunities as a percentage of salaries were as follows: Mr. Lyash, 150 percent; Mr. Thomas, 80 percent; Mr. Moul, 80 percent; Mr. Fountain, 70 percent; and Mr. Rausch, 70 percent. Additionally, a corporate multiplier ranging between 0 and 1.1 may be applied which can reduce the award to $0. An individual performance multiplier of up to 150 percent may also be applied which may increase the award to 225 percent of target for all NEOs except for the CEO, whose maximum award is 150 percent of target. Actual EAIP awards earned for performance in 2024 are reported for each of the NEOs under the "Non-Equity Incentive Plan Compensation" column in the Summary Compensation Table.

(4) At the end of the performance period, TVA's LTIP Scorecard was applied to the grants in order to determine LTP award payouts. For 2024, the TVA Board exercised discretion to adjust the CEO's calculated LTP payout percentage from 114 percent to 82 percent. Award payouts are reported for each of the NEOs under the "Non-Equity Incentive Plan Compensation" column in the Summary Compensation Table.

(5) All LTR awards will be paid in a lump sum within two months of the September 30th vesting date except in the case of death, disability, or retirement. The awards will be paid in cash after deducting applicable federal, state, and local withholding taxes. In the case of death, the beneficiary will be paid as soon as administratively practicable but in no event later than the last day of the second full calendar month following the participant's death. Disability awards will be paid as soon as administratively practicable but in no event later than the last day of the second full calendar month following the participant's separation from service due to disability. Actual LTR awards earned in 2024 are reported for each of the NEOs under the "Non-Equity Incentive Plan Compensation" column in the Summary Compensation Table.

(6) At the end of the performance period, TVA's LTIP Scorecard will be applied to the grants in order to determine LTP award payouts. The final award may be adjusted by the TVA Board in its discretion in appropriate circumstances.

Retirement and Pension Plans

The table below provides the actuarial present value of the NEOs' accumulated benefits, including the number of years of credited service, under TVA's retirement and pension plans as of September 30, 2024, determined using a methodology and interest rate and mortality rate assumptions consistent with those used in the financial statements in this Annual Report, set forth in Note 20 — *Benefit Plans*.

PENSION BENEFITS TABLE

Name	Plan Name	Number of Years of Credited Service[1]	Present Value of Accumulated Benefit	Payments During Last Year
Jeffrey J. Lyash	TVARS	N/A	N/A [3]	$ —
	SERP Tier 1	15.417 [2]	$ 16,796,744	—
John M. Thomas, III	TVARS	18.833	473,770	—
	SERP Tier 1	18.833	7,880,284	—
Donald A. Moul	TVARS	N/A	N/A [3]	—
	SERP Tier 1	3.250	952,284	—
David B. Fountain	TVARS	N/A	N/A [3]	—
	SERP Tier 1	4.333	814,026	—
Timothy S. Rausch	TVARS	N/A	N/A [3]	—
	SERP Tier 1	5.917	1,609,285	—

Notes
(1) Limited to 24 years when determining supplemental benefits available under SERP Tier 1, described below.
(2) Mr. Lyash was granted ten years of credited service for calculating his SERP benefit: five years upon the commencement of his employment with TVA and an additional five years after five years of actual service. As of September 30, 2024, Mr. Lyash had 5.417 years of actual service and 15.417 years of credited service. The present value of the accumulated SERP benefit with 15.417 years of credited service is $16,796,744.
(3) Mr. Lyash, Mr. Moul, Mr. Fountain, and Mr. Rausch are not eligible to participate in the TVARS pension plan since they were hired after June 30, 2014.

Qualified Retirement Plans

The retirement benefits for which employees are eligible and receive under the TVARS pension plan and 401(k) plan depend on the employee's hire date, years of service, and individual elections, as follows:

- Employees who were first hired prior to January 1, 1996, receive (1) a traditional pension benefit calculated based on the employee's creditable service, the employee's average monthly salary for the highest three consecutive years of eligible compensation, and a pension factor based on the employee's age and years of service, less a Social Security offset, and (2) 401(k) plan matching contributions from TVA. The 401(k) plan matching contribution is $0.25 on every dollar contributed by the employee up to six percent of eligible compensation, for a maximum matching contribution of 1.5 percent of eligible compensation. None of the NEOs are in this group.

- Employees who were first hired prior to January 1, 1996, and who elected to switch pension structures from traditional to cash balance, receive (1) a cash balance pension benefit calculated based on (a) pay-based credits and interest that accrue over time in the employee's account and (b) the employee's age at the time of retirement, and (2) 401(k) plan matching contributions from TVA. The monthly pay credits are equal to six percent of eligible compensation, and monthly interest is credited at an annual interest rate equal to the change in the CPI-U plus three percent (with a minimum of six percent and maximum of 10 percent). The interest rate during 2024 was 7.69 percent. The 401(k) plan matching contribution is $0.75 on every dollar contributed by the employee up to six percent of eligible compensation, for a maximum matching contribution of 4.5 percent of eligible compensation. None of the NEOs are in this group.

- Employees who were first hired on or after January 1, 1996, and who had 10 or more years of service as of October 1, 2016, receive (1) a cash balance pension benefit calculated based on (a) pay-based credits and interest that accrue over time in the employee's account and (b) the employee's age at the time of retirement, and (2) 401(k) plan non-elective and matching contributions from TVA. The monthly pay credits are equal to three percent of eligible compensation, and monthly interest is credited at an annual interest rate equal to the change in the CPI-U plus two percent (with a minimum of 4.75 percent and a maximum of 6.25 percent). The interest rate during 2024 was 6.25 percent. The 401(k) plan automatic, non-elective contribution is equal to three percent of eligible compensation, and the matching contribution is $0.75 on every dollar contributed by the employee up to six percent of eligible compensation, for a maximum matching contribution of 4.5 percent of eligible compensation. Mr. Thomas is in this group.

- Employees who were first hired on or after January 1, 1996, and who had less than 10 years of service as of October 1, 2016, receive (1) a cash balance pension benefit calculated based on pay-based credits and interest that accrue over time

in the employee's account and the employee's age at the time of retirement, and (2) 401(k) plan non-elective and matching contributions from TVA. As of October 1, 2016, the cash balance accounts of these employees receive no additional pay-based credits; however, the accounts continue to receive monthly interest credits at an annual interest rate equal to the change in the CPI-U plus two percent (with a minimum of 4.75 percent and a maximum of 6.25 percent). The interest rate during 2024 was 6.25 percent. The 401(k) plan automatic, non-elective contribution is equal to six percent of eligible compensation, and the matching contribution is dollar-for-dollar on employee contributions up to six percent of eligible compensation, for a maximum matching contribution of six percent of eligible compensation. None of the NEOs are in this group.

- Employees who were hired prior to July 1, 2014, and who elected to waive their cash balance retirement benefit and transfer their cash balance account to the 401(k) plan effective October 1, 2018, receive a retirement benefit in the 401(k) plan only. The 401(k) plan is an automatic, non-elective contribution that is equal to six percent of eligible compensation, and the matching contribution is dollar-for-dollar on employee contributions up to six percent of the eligible compensation, for a maximum matching contribution of six percent of eligible compensation. None of the NEOs are in this group.

- Employees who were first hired on or after July 1, 2014 (or who were rehired and were either previously not vested in the pension plan or cashed out their pension benefit) receive a retirement benefit in the 401(k) plan only. The 401(k) plan automatic, non-elective contribution is equal to 4.5 percent of eligible compensation, and the matching contribution is $0.75 on every dollar contributed by the employee up to six percent of eligible compensation, for a maximum matching contribution of 4.5 percent of eligible compensation. Mr. Lyash, Mr. Moul, Mr. Fountain, and Mr. Rausch are in this group.

Cash Balance Pension. For NEOs who are eligible for retirement benefits under the pension plan, which includes Mr. Thomas, eligible compensation is defined as annual salary only for benefit calculation purposes and is shown under the column titled "Salary" in the Summary Compensation Table. The eligible compensation in 2024 could not exceed $330,000 pursuant to the IRS annual compensation limit applicable to qualified plans. Employees with cash balance benefits who have at least five years of cash balance service are eligible at retirement or termination of employment to receive an immediate benefit in the form of a monthly pension with survivor benefit options or in a lump-sum payment with cash out or rollover options. The pension plan does not provide for early retirement benefits to any NEO or any other employee eligible for cash balance benefits.

401(k) Plan. All employees eligible to participate in the 401(k) plan, including the NEOs, may elect to contribute to the 401(k) plan on a before-tax, Roth, and/or after-tax basis, and in-plan Roth rollovers by participant election are available. Contributions to a participant's 401(k) plan account by TVA and the participant during 2024 could not exceed $69,000 pursuant to the IRS annual contribution limit applicable to qualified plans. For purposes of matching and non-elective contributions from TVA to the 401(k) accounts of the NEOs, eligible compensation is defined as annual salary only for benefit calculation purposes and is shown under the column titled "Salary" in the Summary Compensation Table. The eligible compensation in 2024 could not exceed $330,000 pursuant to the IRS annual compensation limit applicable to qualified plans. Any participant in the 401(k) plan must have three years of TVA service to be vested in matching and non-elective contributions from TVA.

Supplemental Executive Retirement Plan

All NEOs are participants in the SERP. The SERP is a non-qualified defined benefit pension plan similar to those typically found in other companies in TVA's peer group and is provided to a limited number of executives, including the NEOs. TVA's SERP was created to recruit and retain key executives. The plan is designed to provide a competitive level of retirement benefits in excess of the limitations on contributions and benefits imposed by TVA's qualified defined benefit plan and Internal Revenue Code Section 415 limits on qualified retirement plans.

The SERP provides two distinct levels of participation, Tier 1 and Tier 2. Each participant is assigned to one of the two tiers at the time he or she is approved to participate in the SERP. The level of participation ("Tier") defines the level of retirement benefits under the SERP at the time of retirement.

Under the SERP, normal retirement eligibility is age 62 with five years of vesting service. No vested and accrued benefits are payable prior to age 55, and benefits are reduced for retirements prior to age 62. The level of reduction in benefits for retirements prior to age 62 depends on whether a participant's termination is "approved" or "unapproved." In the event of an approved termination of TVA employment, any vested and accrued benefits are reduced by 5/12 percent for each month that the date of benefit commencement precedes the participant's 62nd birthday, up to a maximum reduction of 35 percent. In the event of an unapproved termination of TVA employment, the participant's accrued benefits are first subject to a reduced percentage of vesting if the participant's years of service are between five and 10. At five years of vesting service, the vested percentage of retirement benefits is 50 percent and increases thereafter by 10 percent for each full additional year of service, reaching 100 percent vesting for 10 or more years of vesting service. Thereafter, any vested and accrued benefits are reduced by 10/12 percent for each month that the date of benefit commencement precedes the participant's 62nd birthday up to a maximum reduction of 70 percent.

For purposes of the SERP, an "approved" termination means termination of employment with TVA due to (1) retirement on or after the participant's 62nd birthday, (2) retirement on or after attainment of actual age 55, if such retirement has the approval of the TVA Board or its delegate, (3) death in service as an employee, (4) disability (as defined under the Rules and Regulations of

the TVARS) as determined by the Retirement Committee, or (5) any other circumstance approved by the TVA Board or its delegate. For purposes of the SERP, an "unapproved" termination means a termination of employment with TVA when such termination does not constitute an "approved" termination as defined in the preceding sentence.

SERP Tier 1. The Tier 1 structure is designed to replace 60 percent of the amount of a participant's compensation at the time the participant reaches age 62 and has accrued 24 years of TVA service. Tier 1 benefits are based on a participant's highest average compensation during three consecutive SERP years and a pension multiple of 2.5 percent for each year of credited service up to a maximum of 24 years. Compensation is defined as salary and EAIP for benefit calculation purposes. Tier 1 benefits are offset by Social Security benefits, benefits provided under TVA's qualified defined benefit pension plan, and prior employer pension benefits when applicable.

SERP Tier 2. The purpose of this restoration plan is to adjust qualified plan benefits to executives when benefits are lost due to IRS limits. Pension benefits are based on a participant's average compensation over three consecutive fiscal years and a pension multiplier of 1.3 percent for each year of service. For benefit calculation, pension includes salary and annual incentives.

Nonqualified Deferred Compensation

The following table provides information regarding deferred contributions, earnings, and balances for each of the NEOs. The amounts reported under this table do not represent compensation in addition to the compensation that was earned in 2024 and already reported in the Summary Compensation Table, but rather the amounts of compensation earned by the NEOs in 2024 or prior years that were or have been deferred.

NONQUALIFIED DEFERRED COMPENSATION TABLE

Name	Executive Contributions in 2024[1]	Registrant Contributions in 2024	Aggregate Earnings in 2024[2]	Aggregate Withdrawals/ Distributions	Aggregate Balance at September 30, 2024	
Jeffrey J. Lyash	$ —	$ —	$ —	$ —	$ —	
John M. Thomas, III	—	—	—	—	—	
Donald A. Moul	—	—	—	—	—	
David B. Fountain	36,396	—	9,343	—	45,739	[3]
Timothy S. Rausch	80,717	—	19,909	—	100,626	[4]

Notes
(1) Includes vested contributions. None of these amounts are included in the Summary Compensation Table as compensation for 2024.
(2) Includes vested earnings. Because none of the amounts are above market or preferential earnings under SEC rules, none of these amounts are included in the Summary Compensation Table.
(3) Includes vested contributions and earnings. $36,396 of this amount has been reported in the Summary Compensation Table as compensation for a prior fiscal year.
(4) Includes vested contributions and earnings. $80,717 of this amount has been reported in the Summary Compensation Table as compensation for a prior fiscal year.

TVA's compensation plans may allow participants to defer all or a portion of compensation earned under the plans as defined by plan terms and IRS regulations. All deferrals are credited to each participant in a deferred compensation account, and the deferral amounts are then funded into a rabbi trust. Each participant may elect one or more investment options made available by TVA or allow some or all funds to accrue interest at the rate established by the beginning of each fiscal year equal to the composite rate of all Treasury issues. Participants may elect to change from either one notional investment option or the TVA interest bearing option to another at any time. Generally, upon termination of employment, funds are distributed pursuant to elections made in accordance with applicable IRS regulations.

Executive Severance Plan

All NEOs are participants in the TVA Executive Severance Plan (the "Severance Plan"). The Severance Plan provides that if TVA terminates an NEO's employment other than for Gross Misconduct (as defined below) or such participant terminates employment for Good Reason (as defined below), such participant will be eligible to receive the following benefits in addition to his or her accrued compensation:

- For the CEO, a lump sum severance payment equal to the applicable multiplier times the employee's annual base salary, and continued healthcare benefits for a number of complete or partial years equal to such multiplier. The applicable multiplier is 1.0 for the CEO.
- For the other NEOs, a lump sum severance payment equal to the applicable multiplier times the sum of the employee's annual base salary and target annual incentive, and continued healthcare benefits for a number of complete or partial years equal to such multiplier. The applicable multiplier is 1.0 for the other NEOs.
- Any earned but unpaid incentive payments, and a prorated annual incentive payment for the year of termination based on actual achievement of performance goals.

In order to receive severance benefits under the Severance Plan, participants must timely execute (and not revoke) a release of claims in favor of TVA and comply with all applicable post-separation restrictive covenants. The terms of the Severance Plan will supersede rights and obligations with respect to severance under existing agreements to which Severance Plan participants are a party.

Under the Severance Plan, Good Reason shall mean the occurrence of any of the following:

- a material adverse change in the participant's authority, duties, or responsibilities (excluding during any period of participant's physical or mental incapacity) with respect to his or her employment with TVA without the participant's prior written consent;
- a material reduction in the participant's base salary without the participant's prior written consent (other than any reduction applicable to management employees generally);
- an actual change in the participant's principal work location by more than 50 miles and more than 50 miles from the participant's principal place of abode as of the date of such change in job location without the participant's prior written consent; or
- a material breach by TVA of any term or provision of the Severance Plan without the participant's prior written consent.

A participant may be considered to have Good Reason to terminate employment for purposes of the Severance Plan only if the participant provides written notice to TVA of termination within 30 days of the occurrence of the applicable event(s) or, if later, within 30 days of the date the participant has knowledge that such event(s) occurred. An event constituting Good Reason shall no longer constitute Good Reason if the circumstances described in the Good Reason notice are cured by TVA within 30 days following receipt of the Good Reason notice.

Under the Severance Plan, Gross Misconduct shall mean any of the following:

- misconduct involving dishonesty, fraud, or gross negligence that directly results in significant economic or reputational harm to TVA;
- insubordination, intentional neglect of duties, or refusal to cooperate with investigations of TVA's business practices;
- conviction of a crime amounting to a felony under the laws of the United States or any of the several states, or a crime of moral turpitude;
- a significant violation of TVA's Code of Ethics or Code of Conduct; or
- disclosure without authorization of proprietary or confidential information of TVA.

Potential Payments on Account of Resignation, Retirement, Termination without Cause, Termination with Cause, Death, or Disability

The tables below show certain potential payments that would have been made to each NEO if his or her employment had been terminated on September 30, 2024, under various scenarios: retirement, resignation, resignation for Good Reason, termination without Cause, termination with Cause, death, and Disability. The tables below also include payments from the following sources: Severance Plan, SERP, EAIP, deferred cash recruitment/relocation incentive, LTR, LTP, and deferred compensation.

The following provides background information on certain payments included in the termination tables:

- ***Resignation.*** The Resignation column covers resignations that do not qualify as resignations for Good Reason under TVA's Severance Plan. See *Executive Compensation Tables and Narrative Disclosures - Executive Severance Plan* for a definition of Good Reason.

- ***Retirement.*** The Retirement column covers situations where an employee separates from service after having met one of the following criteria: (1) the employee has reached the age of 55 with at least 10 years of full-time TVA service, (2) the employee has reached the age of 60 with at least five years of full-time TVA service, or (3) the employee is in the Civil Service Retirement System or Federal Employees Retirement System and is eligible for an immediate retirement benefit upon termination as outlined in the applicable plan.

- ***Severance Plan and Termination without Cause or Resignation for Good Reason.*** The Severance Plan provides that if TVA terminates an NEO's employment other than for Gross Misconduct or such participant terminates employment for Good Reason, such participant will be eligible to receive certain benefits in addition to his or her accrued compensation. See *Executive Compensation Tables and Narrative Disclosures - Executive Severance Plan* for definitions of Gross Misconduct and Good Reason, and for a discussion of the benefits provided to NEOs under the Severance Plan.

- ***SERP.*** The SERP payments in the tables represent the present value of the accumulated benefit unless otherwise noted.

- ***SERP Payment in Event of Death.*** In the event of a participant’s death while employed by TVA, the participant’s beneficiary will receive a lump sum payment equal to the actuarial equivalent of the benefit that would have been paid had the participant terminated employment on the date of death and elected a joint and 50 percent survivor benefit. The beneficiary will receive 50 percent of the reported value.

- ***LTR Payment in Event of Retirement.*** The LTIP provides that if a participant retires, the participant is entitled to any portion of a LTR award that had vested at the time of the separation from service but not been paid as well as a prorated portion of any LTR grant that had not vested at the time of the participant's separation from service, provided the amount of any such LTR award for each vesting period within the retention cycle is prorated based on the number of whole months the participant was employed by TVA during such vesting period.

- ***LTR Payment in Event of Death.*** The LTIP provides that in the event of the death of a participant, the participant's beneficiary is entitled to any portion of a LTR award that had vested at the time of the participant's death but not been paid as well as a prorated portion of any LTR grant that had not vested at the time of the participant's separation from service, provided that the LTR award for each vesting period will be prorated based on the number of whole months the participant was employed by TVA during the vesting period in which the participant separated from service as compared to (1) 12 months for the vesting period that includes the day that the participant separated from service, (2) 24 months for the vesting period that immediately follows the vesting period during which the participant separated from service, and (3) 36 months for the second vesting period that follows the vesting period during which the participant separated from service.

- ***LTR Payment in Event of Disability.*** The LTIP provides that if a participant separates from service due to a disability, the participant is entitled to any portion of a LTR award that had vested at the time of the separation from service but not been paid as well as a prorated portion of any LTR grant that had not vested at the time of the participant's separation from service, provided that the LTR award will be prorated based on the number of whole months the participant was employed by TVA during the vesting period in which the participant separated from service as compared to (1) 12 months for the vesting period that includes the day that the participant separated from service, (2) 24 months for the vesting period that immediately follows the vesting period during which the participant separated from service, and (3) 36 months for the second vesting period that follows the vesting period during which the participant separated from service.

- ***LTP Payment in the Event of Retirement.*** The LTIP provides that if a participant retires, the participant is entitled to (1) any LTP award that had vested at the time of the participant's separation from service but not been paid and (2) a prorated portion of any LTP awards that had not vested at the time of the participant's separation from service, provided that the amount of any such LTP award (a) is calculated using the actual percent of opportunity achieved and (b) is prorated based on the number of whole months the participant is employed by TVA during the applicable performance cycle. Jeff Lyash and John Thomas are the only NEOs who were eligible to retire as of September 30, 2024, and the LTP amounts included

in their Retirement columns assume that the percent of opportunity achieved will be 100 percent of target for the performance cycles ending on September 30, 2025 and September 30, 2026.

- ***LTP Payment in Event of Death.*** The LTIP provides that in the event of the death of a participant, the participant's beneficiary is entitled to (1) any LTP award that had vested at the time of the participant's death but not been paid and (2) any LTP awards that had not vested at the time of the participant's death and that covered a performance cycle for which the participant had received a LTP grant, provided that the amount of any such LTP award (a) will be calculated assuming that the percent of opportunity achieved is 100 percent of target and (b) will be prorated based on the number of whole months the participant was participating in the plan during the applicable performance cycle.

- ***LTP Payment in Event of Disability.*** The LTIP provides that if a participant separates from service due to a disability, the participant is entitled to (1) any LTP award that had vested at the time of the participant's separation from service but not been paid and (2) any LTP awards that had not vested at the time of the participant's separation from service and that covered a performance cycle for which the participant had received a LTP grant, provided that the amount of any such LTP award (a) will be calculated assuming that the percent of opportunity achieved is 100 percent of target and (b) will be prorated based on the number of whole months the participant was employed by TVA during the applicable performance cycle.

In addition to the amounts set forth in the termination tables, all NEOs would also be entitled to payments from plans generally available to TVA employees under the specific circumstances of termination of employment, including the health and welfare and pension plans and amounts in the 401(k) plan.

Jeffrey J. Lyash	Resignation	Retirement	Termination without Cause or Resignation for Good Reason	Termination with Cause	Death/Disability
Severance Plan	$ —	$ —	$ 1,227,000	$ —	$ —
SERP[1]	16,796,744	16,796,744	16,796,744	16,796,744	16,796,744
EAIP	2,346,638	2,346,638	2,346,638	2,346,638	2,346,638
Deferred Cash Recruitment/Relocation Incentive	—	—	—	—	—
LTR	1,646,000	1,646,000	1,646,000	1,646,000	2,404,667
LTP	2,915,920	6,898,920	6,898,920	2,915,920	6,898,920
Deferred Compensation	—	—	—	—	—
Total Value of Potential Payments	$ 23,705,302	$ 27,688,302	$ 28,915,302	$ 23,705,302	$ 28,446,969

Notes
(1) In February 2019, TVA entered into an arrangement with Mr. Lyash that provides that he will be granted five years of credited service for calculating his SERP benefit upon commencement of his employment with TVA and will be granted an additional five years of credited service after five years of actual service. As of September 30, 2024, Mr. Lyash had 5.417 years of actual service and 15.417 years of credited service.

John M. Thomas, III	Resignation	Retirement	Termination without Cause or Resignation for Good Reason	Termination with Cause	Death/Disability
Severance Plan	$ —	$ —	$ 1,548,794	$ —	$ —
SERP [1,2]	7,880,284	7,880,284	7,880,284	7,880,284	7,880,284
EAIP	1,263,816	1,263,816	1,263,816	1,263,816	1,263,816
Deferred Cash Recruitment/Relocation Incentive	—	—	—	—	—
LTR	628,333	628,333	628,333	628,333	922,778
LTP	1,994,850	3,419,850	3,419,850	1,994,850	3,419,850
Deferred Compensation	—	—	—	—	—
Total Value of Potential Payments	$ 11,767,283	$ 13,192,283	$ 14,741,077	$ 11,767,283	$ 13,486,728

Notes
(1) Actual benefit would be paid in five annual installments beginning upon separation from service.
(2) Assumes that the TVA Board or its delegate determines that the termination is an approved termination under SERP. See *Executive Compensation Tables and Narrative Disclosures — Retirement and Pension Plans — Supplemental Executive Retirement Plan* above for a discussion of approved and unapproved terminations under SERP.

Donald A. Moul	Resignation	Retirement	Termination without Cause or Resignation for Good Reason	Termination with Cause	Death/Disability
Severance Plan	$ —	$ —	$ 1,475,042	$ —	$ —
SERP	— [1]	— [1]	— [1]	— [1]	952,284
EAIP	1,203,635	1,203,635	1,203,635	1,203,635	1,203,635
Deferred Cash Recruitment/Relocation Incentive [2]	—	—	—	—	—
LTR	807,667	807,667	807,667	807,667	1,175,167
LTP	1,680,250	1,680,250 [3]	1,680,250	1,680,250	3,105,250
Deferred Compensation	—	—	—	—	—
Total Value of Potential Payments	$ 3,691,552	$ 3,691,552	$ 5,166,594	$ 3,691,552	$ 6,436,336

Notes
(1) The five-year vesting requirement has not been met.
(2) Under the terms of his offer letter, Mr. Moul is required to repay to TVA deferred cash recruitment and relocation incentive payment in the amount of $100,000 if, prior to June 21, 2025, he (1) voluntarily terminates employment unless the separation is for reasons beyond his control and acceptable to TVA, or (2) is terminated for cause.
(3) Is not eligible to retire based on definition in the LTIP plan.

David B. Fountain	Resignation	Retirement	Termination without Cause or Resignation for Good Reason	Termination with Cause	Death/Disability
Severance Plan	$ —	$ —	$ 1,102,783	$ —	$ —
SERP	— [1]	— [1]	— [1]	— [1]	814,026
EAIP	771,948	771,948	771,948	771,948	771,948
Deferred Cash Recruitment/Relocation Incentive	—	—	—	—	—
LTR	378,000	378,000	378,000	378,000	558,000
LTP	1,101,100	1,101,100 [2]	1,101,100	1,101,100	2,081,100
Deferred Compensation	45,739	45,739	45,739	45,739	45,739
Total Value of Potential Payments	$ 2,296,787	$ 2,296,787	$ 3,399,570	$ 2,296,787	$ 4,270,813

Notes
(1) The five-year vesting requirement has not been met.
(2) Is not eligible to retire based on definition in LTIP plan.

Timothy S. Rausch	Resignation	Retirement	Termination without Cause or Resignation for Good Reason	Termination with Cause	Death/Disability
Severance Plan	$ —	$ —	$ 1,127,348	$ —	$ —
SERP	1,609,285	1,609,285	1,609,285	1,609,285	1,609,285
EAIP	789,144	789,144	789,144	789,144	789,144
Deferred Cash Recruitment/Relocation Incentive	—	—	—	—	—
LTR	345,000	345,000	345,000	345,000	504,167
LTP	852,280	852,280 [1]	852,280	852,280	1,577,280
Deferred Compensation	100,626	100,626	100,626	100,626	100,626
Total Value of Potential Payments	$ 3,696,335	$ 3,696,335	$ 4,823,683	$ 3,696,335	$ 4,580,502

Notes
(1) Is not eligible to retire based on definition in LTIP plan.

Other Agreements

Except as described above and in the Compensation Discussion and Analysis, there are no other agreements between TVA and any of the NEOs.

Director Compensation

The TVA Act provides for up to nine directors on the TVA Board. As of November 13, 2024, the TVA Board consisted of eight members. Under the TVA Act, each director receives certain stipends that are increased annually by the same percentage increase applicable to adjustments under 5 U.S.C. § 5318, which adjusts the annual rates of pay of employees on the Executive Schedule of the U.S. Government. Effective January 1, 2024, the annual stipend for TVA directors was increased from $58,400 to $61,100 per year unless (1) the director chairs a TVA Board committee, in which case the stipend was increased from $59,500 to $62,300 per year, or (2) the director is the Chair of the TVA Board, in which case the stipend was increased from $65,000 to $68,100 per year. Directors are also reimbursed under federal law for travel, lodging, and related expenses while attending meetings and for other official TVA business.

The annual stipends provided by the TVA Act for each director and for the Chair of the TVA Board as of November 13, 2024, are listed below:

TVA BOARD ANNUAL STIPENDS

Name	Annual Stipend
Joe H. Ritch	$ 68,100
Beth P. Geer	61,100
Beth H. Harwell	62,300
Robert P. Klein	62,300
L. Michelle Moore	62,300
Brian E. Noland	62,300
William J. Renick	61,100
A. Wade White	62,300

The following table provides information on the compensation received by TVA's directors during 2024:

DIRECTOR COMPENSATION

Name	Fees Earned or Paid in Cash	Stock Awards	Option Awards	Non-Equity Incentive Plan Compensation	Change in Pension Value and Nonqualified Deferred Compensation Earnings[1]	All Other Compensation[2]	Total
Joe H. Ritch	$ 66,398	$ —	$ —	$ —	$ —	$ 3,320	$ 69,718
Beth P. Geer	60,373	—	—	—	—	604	60,977
Beth H. Harwell	61,546	—	—	—	—	3,077	64,623
Robert P. Klein	61,546	—	—	—	—	3,077	64,623
L. Michelle Moore	61,284	—	—	—	—	3,064	64,348
Brian E. Noland	61,546	—	—	—	—	3,077	64,623
William J. Renick	60,373	—	—	—	—	3,019	63,392
A. Wade White	61,320	—	—	—	—	3,064	64,384

Notes
(1) TVA directors do not participate in the TVARS Retirement Plans, TVA's SERP, or any non-qualified deferred compensation plan available to TVA employees. However, as appointed officers of the U.S. government, the directors are members of FERS. FERS is administered by the federal Office of Personnel Management, and information regarding the value of FERS pension benefits is not available to TVA.
(2) These amounts include TVA's non-elective and matching contributions to the Thrift Savings Plan.

The directors are not eligible to participate in any incentive programs available to TVA employees. The directors do not participate in the TVARS Retirement Plans and do not participate in TVA's SERP. However, as appointed officers of the U.S. government, the directors are members of the Federal Employees Retirement System ("FERS"). FERS is a tiered retirement plan that includes three components: (1) Social Security benefits, (2) the Basic Benefit Plan, and (3) the Thrift Savings Plan ("TSP"). As members of FERS, each director is required to make a mandatory percentage contribution of his or her stipend to the Basic Benefit Plan in the amount of 0.8 percent for those directors appointed prior to January 1, 2013, 3.1 percent for those directors appointed between January 1, 2013, and December 31, 2013, and 4.4 percent for those directors appointed on or after January 1, 2014.

The FERS Basic Benefit Plan is a qualified defined benefit plan that provides a retirement benefit based on a final average pay formula that includes age, highest average salary during any three consecutive years of service, and years of creditable service. A director must have at least five years of creditable service to be eligible to receive retirement benefits. Directors are eligible for immediate, unreduced retirement benefits once (1) they reach age 62 and have five years of FERS creditable service, (2) they reach age 60 and have 20 years of FERS creditable service, or (3) they attain the minimum retirement age and accumulate the specified years of service as set forth in the FERS regulations. Generally, benefits are calculated by multiplying 1.0 percent of the highest average salary during any three consecutive years of service by the number of years of creditable service. Directors who retire at age 62 or later with at least 20 years of FERS creditable service receive an enhanced benefit (a factor of 1.1 percent is used rather than 1.0 percent).

Each director is also eligible to participate in the TSP. The TSP is a tax-deferred retirement savings and investment plan that offers the same type of savings and tax benefits offered under 401(k) plans. Once a director becomes eligible, TVA contributes an amount equal to one percent of the director's stipend into a TSP account for the director. These contributions are made automatically every two weeks regardless of whether the director makes a contribution of his or her own money. Directors are eligible to contribute up to the TSP elective deferral limit. Directors receive matching contributions of 100 percent of each dollar for the first three percent of the director's stipend and 50 percent of each dollar for the next two percent of the director's stipend.

TVA offers a group of health and other benefits (medical, dental, vision, life and accidental death and disability insurance, and long-term disability insurance) that are available to a broad group of employees. Directors are eligible to participate in TVA's health benefit plans and other non-retirement benefit plans on the same terms and at the same contribution rates as other TVA employees.

Compensation Committee Interlocks and Insider Participation

The People and Governance Committee of the TVA Board currently consists of the following four directors: Brian E. Noland, Beth Harwell, Robert P. Klein, and Joe H. Ritch.

No member of this Committee was at any time during 2024 or at any other time an officer or employee of TVA, and no member of this committee had any relationship with TVA requiring disclosure under Item 404 of Regulation S-K. No executive officer of TVA has served on the board of directors or compensation committee of any other entity that has or has had one or more executive officers who served as a member of the People and Governance Committee during 2024.

Compensation Committee Report

The People and Governance Committee has reviewed and discussed the Compensation Discussion and Analysis with management, and based on the review and discussions, the Committee recommended to the TVA Board that the Compensation Discussion and Analysis be included in this Annual Report.

PEOPLE AND GOVERNANCE COMMITTEE

Brian E. Noland, Chair
Beth Harwell
Robert P. Klein
Joe H. Ritch

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Not applicable.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Director Independence

The composition of the TVA Board is governed by the TVA Act. The TVA Act contains certain provisions that are similar to the considerations for independence under section 10A(m)(3) of the Exchange Act, including that to be eligible for appointment to the TVA Board, an individual shall not be an employee of TVA and shall make full disclosure to Congress of any investment or other financial interest that the individual holds in the energy industry.

Related Party Transactions

Conflict of Interest Provisions

All TVA employees, including directors and executive officers, are subject to the conflict of interest laws and regulations applicable to employees of the federal government. Accordingly, the general federal conflict of interest statute (18 U.S.C. § 208) and the Standards of Ethical Conduct for Employees of the Executive Branch (5 C.F.R. part 2635) ("Standards of Ethical Conduct") form the basis of TVA's policies and procedures for the review, approval, or ratification of related party transactions. The general federal conflict of interest statute, subject to certain exceptions, prohibits each government employee, including TVA's directors and executive officers, from participating personally and substantially (by advice, decision, or otherwise) as a government employee in any contract, controversy, proceeding, request for determination, or other particular matter in which, to his or her knowledge, he or she (or his or her spouse, minor child, general partner, organization with which he or she serves as officer, director, employee, trustee, or general partner, or any person or organization with which he or she is negotiating, or has an arrangement, for future employment) has a financial interest. Exceptions to the statutory prohibition relevant to TVA employees are (1) financial interests which have been deemed by the U.S. Office of Government Ethics, in published regulations, to be too remote or inconsequential to affect the integrity of the employee's services, or (2) interests which are determined in writing, after full disclosure and on a case-by-case basis, to be not so substantial as to be deemed likely to affect the integrity of the employee's services for TVA. Any waiver determinations would be made in accordance with applicable federal law and regulation.

More broadly, Subpart E of the Standards of Ethical Conduct provides that where an employee (1) knows that a particular matter involving specific parties is likely to have a direct and predictable effect on the financial interests of a member of his or her household, or that a person with whom the employee has a "covered relationship" (which includes, but is not limited to, persons with whom the employee has a close family relationship and organizations in which the employee is an active participant) is or represents a party to the matter, and (2) determines that the circumstances would cause a reasonable person with knowledge of relevant facts to question his or her impartiality in the matter, the employee should not participate in the matter absent agency authorization. This authorization may be given by the employee's supervising officer, as agency designee, in consultation with the TVA Designated Agency Ethics Official, upon the determination that TVA's interest in the employee's participation in the matter outweighs the concern that a reasonable person may question the integrity of TVA's programs and operations.

The previously described restrictions are reflected in TVA's policies which require employees, including directors and executive officers, to comply with the guidelines outlined in the Standards of Ethical Conduct and which restate the standard of the conflict of interest statute.

Additionally, the TVA Board approved a written conflict of interest policy that applies to all TVA employees, including TVA's directors and executive officers. The conflict of interest policy reaffirms the requirement that all TVA employees must comply with applicable federal conflict of interest laws, regulations, and policies. It also establishes an additional policy that is applicable to TVA's directors and CEO. This additional policy provides that TVA's directors and CEO shall not hold a financial interest in (1) any distributor of TVA power; (2) any entity engaged primarily in the wholesale or retail generation, transmission, or sale of electricity, except where substantially all such business is conducted outside of North America; or (3) any entity that may reasonably be perceived as likely to be adversely affected by the success of TVA as a producer or transmitter of electric power. Any waiver of this additional policy may be made only by the TVA Board and will be disclosed promptly to the public, subject to the limitations on disclosure imposed by law.

TVA also has a protocol titled the "Obtaining Things of Value from TVA Protocol" (the "Protocol"). The Protocol describes what a TVA employee should do if a person covered by the Protocol asks for assistance in obtaining a specified thing of value from TVA. Similarly, the TVA Board Practice on External Inquiries describes what a member of the TVA Board should do if a person covered by the practice asks for assistance in obtaining a specified thing of value from TVA.

TVA relies on the policies, practices, laws, and regulations discussed above to regulate conflicts of interest involving employees, including directors and executive officers. TVA has no other written or unwritten policy for the approval or ratification of any transactions in which TVA was or is to be a participant and in which any director or executive officer of TVA (or any child, stepchild, parent, stepparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law of any director or executive officer of TVA) had or will have a direct or indirect material interest.

Other Relationships

TVA is engaged in a number of transactions with other agencies of the U.S. government, although such agencies do not fall within the definition of "related parties" for purposes of Item 404(a) of Regulation S-K. These include, among other things, supplying electricity to other federal agencies, purchasing electricity from the Southeastern Power Administration, and engaging in various arrangements involving nuclear materials with the Department of Energy. See Part I, Item 1, Business and Note 23 — *Related Parties*.

TVA also has access to a financing arrangement with the United States Department of the Treasury ("U.S. Treasury"). TVA and the U.S. Treasury have a memorandum of understanding under which the U.S. Treasury provides TVA with a $150 million credit facility. There were no outstanding borrowings under the facility at September 30, 2024. This credit facility has a maturity date of September 30, 2025, and is typically renewed annually. This arrangement is pursuant to the TVA Act. Access to this credit facility or other similar financing arrangements with the U.S. Treasury has been available to TVA since the 1960s. See Note 14 — *Debt and Other Obligations — Credit Facility Agreements*.

In addition, TVA is required by the 1959 amendment to the TVA Act to make annual payments to the U.S. Treasury from net power proceeds as a repayment of and as a return on the government's appropriation investment in TVA's power facilities (the "Power Program Appropriation Investment") until $1.0 billion of the Power Program Appropriation Investment has been repaid. With the 2014 payment, TVA fulfilled its requirement to repay $1.0 billion of the Power Program Appropriation Investment. The TVA Act requires TVA to continue to make payments to the U.S. Treasury indefinitely as a return on the remaining $258 million of the Power Program Appropriation Investment. See Note 23 — *Related Parties*.

The TVA Act requires the proceeds for each fiscal year derived from the sale of power or any other activities to be paid into the U.S. Treasury on March 31 of each year, except for the portion of such proceeds as in the opinion of the TVA Board shall be necessary for TVA in the operation of dams and reservoirs and in conducting its business in generating, transmitting, and distributing electric energy. For each fiscal year, the TVA Board adopts a resolution retaining for use in the operation of the TVA power system the entire margin of net power proceeds remaining at the conclusion of such fiscal year.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table shows the fees of Ernst & Young LLP for audit, audit-related, and other services for the years ended September 30, 2024 and 2023.

Principal Accountant Fees and Services
(in actual dollars)

Year	Principal Accountant	Audit Fees[1]	Audit-Related Fees[2]	Tax Fees	All Other Fees[3]	Total
2024	Ernst & Young LLP	$ 3,816,728	$ 131,389	$ —	$ 7,200	$ 3,955,317
2023	Ernst & Young LLP	3,581,554	—	—	255,040	3,836,594

Notes
(1) Audit fees consist of payments for professional services rendered in connection with the audit of TVA's annual financial statements, including the annual attestation on internal control over financial reporting; review of interim financial statements included in TVA's quarterly reports; audit of TVA's fuel cost adjustment; federal financial reporting responsibilities for the preparation and audit of the 2024 and 2023 federal consolidated financial statements of which TVA is a component; Bond offering and other financing comfort letters; and attestation on TVA's management report of eligible green expenditures.
(2) Audit-related fees primarily reflect pre-implementation assessments related to information technology system upgrades.
(3) All other fees reflect accounting and financial reporting research software license costs and advisory services related to the SEC climate-related rule.

The TVA Board has an Audit, Risk, and Cybersecurity Committee ("Audit Committee"). Under the TVA Act, the Audit Committee, in consultation with the Inspector General, recommends to the TVA Board the selection of an external auditor. TVA's Audit Committee, in consultation with the Inspector General, recommended that the TVA Board select Ernst & Young LLP as TVA's external auditor for the 2024 and 2023 audits and other related services, and the TVA Board approved these recommendations.

TVA has a policy (the "Policy") that requires all auditing services and permissible non-audit services provided by the external auditor to be pre-approved by the Audit Committee. The Policy also lists the following services as ones the external auditor is not permitted to perform:

- Bookkeeping or other services related to the accounting records or financial statements of TVA;
- Financial information system design and implementation;
- Appraisal or valuation services, fairness opinions, and contribution-in-kind reports;
- Actuarial services;
- Internal audit outsourcing services;
- Management functions or human resources;
- Broker or dealer, investment adviser, or investment banking services;
- Legal services and expert services unrelated to the audit; and
- Any other services that the Public Company Accounting Oversight Board determines, by regulation, are impermissible.

The Policy also delegates to the Chair of the Audit Committee the authority to pre-approve a permissible service so long as the amount of the service does not exceed $100,000 and the total amount of services pre-approved during the year by the Chair does not exceed $200,000. The Chair must report for informational purposes the services pre-approved under this provision at the Audit Committee's next meeting.

The Audit Committee pre-approved all audit services for 2024 and 2023.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents have been filed as part of this Annual Report on Form 10-K for the fiscal year ended September 30, 2024 ("Annual Report"):

(1) Consolidated Financial Statements. The following documents are provided in Part II, Item 8, Financial Statements and Supplementary Data herein:

Consolidated Statements of Operations
Consolidated Statements of Comprehensive Income (Loss)
Consolidated Balance Sheets
Consolidated Statements of Cash Flows
Consolidated Statements of Changes in Proprietary Capital
Notes to Consolidated Financial Statements
Report of Independent Registered Public Accounting Firm (Ernst & Young LLP)

(2) Consolidated Financial Statement Schedules.

Schedules not included are omitted because they are not required or because the required information is provided in the consolidated financial statements, including the notes thereto.

(3) List of Exhibits

Exhibit No.	Description
3.1	Tennessee Valley Authority Act of 1933, as amended, 16 U.S.C. §§ 831-831ee (Incorporated by reference to Exhibit 3.1 to TVA's Quarterly Report on Form 10-Q for the quarter ended December 31, 2016, File No. 000-52313)
3.2	Bylaws of the Tennessee Valley Authority Adopted by the TVA Board of Directors on May 18, 2006, as amended on April 3, 2008, May 19, 2008, June 10, 2010, February 13, 2014, August 21, 2014, and November 6, 2014 (Incorporated by reference to Exhibit 3.2 to TVA's Annual Report on Form 10-K for the year ended September 30, 2014, File No. 000-52313)
4.1	Basic Tennessee Valley Authority Power Bond Resolution Adopted by the TVA Board of Directors on October 6, 1960, as Amended on September 28, 1976, October 17, 1989, and March 25, 1992 (Incorporated by reference to Exhibit 4.1 to TVA's Annual Report on Form 10-K for the year ended September 30, 2006, File No. 000-52313)
10.1	Second Amended and Restated March Maturity Credit Agreement Dated as of March 25, 2022, Among Tennessee Valley Authority, as the Borrower, Toronto Dominion (Texas) LLC, as Administrative Agent, The Toronto-Dominion Bank, New York Branch, as Letter of Credit Issuer and a Lender, Bank of America, N.A., Canadian Imperial Bank of Commerce, New York Branch, First Horizon Bank, Morgan Stanley Bank, N.A., and The Bank of New York Mellon (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on March 30, 2022, File No. 000-52313)
10.2	Second Amended and Restated September Maturity Credit Agreement Dated as of September 21, 2021, Among Tennessee Valley Authority, as the Borrower, Royal Bank of Canada, as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on September 24, 2021, File No. 000-52313)
10.3	First Amendment Dated as of March 29, 2023, to Second Amended and Restated September Maturity Credit Agreement Dated as of September 21, 2021, Among Tennessee Valley Authority, as the Borrower, Royal Bank of Canada, as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.2 to TVA's Current Report on Form 8-K filed on April 3, 2023, File No. 000-52313)
10.4	$500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, Among TVA, Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on August 7, 2015, File No. 000-52313)
10.5	First Amendment Dated as of February 28, 2017, to the $500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, Among TVA, Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on March 3, 2017, File No. 000-52313)
10.6	Second Amendment Dated as of February 21, 2018, to the $500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, and Amended as of February 28, 2017, Among TVA, Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on February 26, 2018, File No. 000-52313)

10.7	Third Amendment Dated as of February 27, 2020, to the $500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, and Amended as of February 28, 2017, and February 21, 2018, Among TVA, Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on March 3, 2020, File No. 000-52313)
10.8	Fourth Amendment Dated as of January 5, 2023, to the $500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, and Amended as of February 28, 2017, February 21, 2018, and February 27, 2020, Among TVA, Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on January 6, 2023, File No. 000-52313)
10.9	Fifth Amendment Dated as of June 14, 2024, to the $500,000,000 February Maturity Credit Agreement Dated as of August 7, 2015, and Amended as of February 28, 2017, February 21, 2018, February 27, 2020, and January 5, 2023, Between TVA and Bank of America, N.A., as Administrative Agent, Letter of Credit Issuer, and a Lender (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on June 14, 2024, File No. 000-52313)
10.10	December 2019 Maturity Community Bank Credit Agreement Dated as of December 12, 2016, with SunTrust Bank as Administrative Agent and a Lender, Branch Banking and Trust Company as Letter of Credit Issuer and a Lender, First National Bank, First Tennessee Bank National Association, HomeTrust Bank, Pinnacle Bank, Regions Bank, Trustmark National Bank, and United Community Bank (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on December 15, 2016, File No. 000-52313)
10.11	First Amendment Dated as of December 11, 2018, to December Maturity Community Bank Credit Agreement Dated as of December 12, 2016 (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on December 14, 2018, File No. 000-52313)
10.12	Second Amendment Dated as of February 9, 2021, to December Maturity Community Bank Credit Agreement Dated as of December 12, 2016, and Amended as of December 11, 2018 (Incorporated by reference to Exhibit 10.3 to TVA's Quarterly Report on Form 10-Q for the quarter ended December 31, 2020, File No. 000-52313)
10.13	Third Amendment Dated as of March 29, 2023, to December Maturity Community Bank Credit Agreement Dated as of December 12, 2016, and Amended as of December 11, 2018 and February 9, 2021, Among Tennessee Valley Authority, as the Borrower, Truist Bank, as Administrative Agent, Letter of Credit Issuer, and a Lender, and the Other Lenders Party Thereto (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on April 3, 2023, File No. 000-52313)
10.14	TVA Discount Notes Selling Group Agreement (Incorporated by reference to Exhibit 10.2 to TVA's Quarterly Report on Form 10-Q for the quarter ended June 30, 2008, File No. 000-52313)
10.15	Electronotes® Selling Agent Agreement Dated as of June 1, 2006, Among TVA, LaSalle Financial Services, Inc., A.G. Edwards & Sons, Inc., Citigroup Global Markets Inc., Edward D. Jones & Co., L.P., First Tennessee Bank National Association, J.J.B. Hilliard, W.L. Lyons, Inc., Merrill Lynch, Pierce, Fenner & Smith Incorporated, Morgan Stanley & Co. Incorporated, and Wachovia Securities, LLC (Incorporated by reference to Exhibit 10.4 to TVA's Annual Report on Form 10-K for the year ended September 30, 2006, File No. 000-52313)
10.16	Amendment Dated as of December 4, 2013, to Electronotes® Selling Agent Agreement Dated as of June 1, 2006, Among TVA, LaSalle Financial Services, Inc., A.G. Edwards & Sons, Inc., Citigroup Global Markets Inc., Edward D. Jones & Co., L.P., First Tennessee Bank National Association, J.J.B. Hilliard, W.L. Lyons, Inc., Merrill Lynch, Pierce, Fenner & Smith Incorporated, Morgan Stanley & Co. Incorporated, and Wachovia Securities, LLC (Incorporated by reference to Exhibit 10.3 to TVA's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014, File No. 000-52313)
10.17	Second Amendment Dated as of August 28, 2015, to Electronotes® Selling Agent Agreement Dated as of June 1, 2006, and Amended as of December 4, 2013, Among TVA, LaSalle Financial Services, Inc., A.G. Edwards & Sons, Inc., Citigroup Global Markets Inc., Edward D. Jones & Co., L.P., First Tennessee Bank National Association, J.J.B. Hilliard, W.L. Lyons, Inc., Merrill Lynch, Pierce, Fenner & Smith Incorporated, Morgan Stanley & Co. Incorporated, and Wachovia Securities, LLC (Incorporated by reference to Exhibit 10.9 to TVA's Annual Report on Form 10-K for the year ended September 30, 2015, File No. 000-52313)
10.18	Assumption Agreement Between TVA and Incapital LLC Dated as of February 29, 2008, Relating to the Electronotes® Selling Agent Agreement Dated as of June 1, 2006, Among TVA, LaSalle Financial Services, Inc., A.G. Edwards & Sons, Inc., Citigroup Global Markets Inc., Edward D. Jones & Co., L.P., First Tennessee Bank National Association, J.J.B. Hilliard, W.L. Lyons, Inc., Merrill Lynch, Pierce, Fenner & Smith Incorporated, Morgan Stanley & Co. Incorporated, and Wachovia Securities, LLC (Incorporated by reference to Exhibit 10.1 to TVA's Quarterly Report on Form 10-Q for the quarter ended March 31, 2008, File No. 000-52313)
10.19	Facility Lease-Purchase Agreement Dated as of January 17, 2012, Between John Sevier Combined Cycle Generation LLC and TVA (Incorporated by reference to Exhibit 10.1 to TVA's Quarterly Report on Form 10-Q for the quarter ended December 31, 2011, File No. 000-52313)
10.20	Head Lease Agreement Dated as of January 17, 2012, Among the United States of America, TVA, and John Sevier Combined Cycle Generation LLC (Incorporated by reference to Exhibit 10.2 to TVA's Quarterly Report on Form 10-Q for the quarter ended December 31, 2011, File No. 000-52313)

10.21*	Asset Purchase Agreement Dated as of August 6, 2013, Between TVA and Seven States Southaven, LLC (Incorporated by reference to Exhibit 10.33 to TVA's Annual Report on Form 10-K for the year ended September 30, 2013, File No. 000-52313)
10.22	Facility Lease-Purchase Agreement Dated as of August 9, 2013, Between Southaven Combined Cycle Generation LLC and TVA (Incorporated by reference to Exhibit 10.34 to TVA's Annual Report on Form 10-K for the year ended September 30, 2013, File No. 000-52313)
10.23	Head Lease Agreement Dated as of August 9, 2013, Among the United States of America, TVA, and Southaven Combined Cycle Generation LLC (Incorporated by reference to Exhibit 10.35 to TVA's Annual Report on Form 10-K for the year ended September 30, 2013, File No. 000-52313)
10.24	Facility Lease-Purchase Agreement Dated as of October 2, 2024, Between Johnsonville Aeroderivative Combustion Turbine Generation LLC and TVA
10.25	Head Lease Agreement Dated as of October 2, 2024, Among the United States of America, TVA, and Johnsonville Aeroderivative Combustion Turbine Generation LLC
10.26	Construction Management Agreement Dated as of October 2, 2024, Between Johnsonville Aeroderivative Combustion Turbine Generation LLC and TVA
10.27*	Federal Facilities Compliance Agreement Between the United States Environmental Protection Agency and TVA (Incorporated by reference to Exhibit 10.2 to TVA's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011, File No. 000-52313)
10.28*	Consent Decree Among Alabama, Kentucky, North Carolina, Tennessee, the Alabama Department of Environmental Management, the National Parks Conservation Association, Inc., the Sierra Club, Our Children's Earth Foundation, and TVA (Incorporated by reference to Exhibit 10.3 to TVA's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011, File No. 000-52313)
10.29†	Amended and Restated TVA Compensation Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.30†	Amended and Restated Supplemental Executive Retirement Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.5 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.31†	Amended and Restated Executive Annual Incentive Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.2 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.32†	Amended and Restated Deferred Compensation Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.7 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.33†	Amended and Restated Long-Term Incentive Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.3 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.34†	Amended and Restated Executive Severance Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.4 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.35†	Amended and Restated Restoration Plan Approved by the TVA Board on May 9, 2024 (Incorporated by reference to Exhibit 10.6 to TVA's Current Report on Form 8-K filed on May 9, 2024, File No. 000-52313)
10.36†	Retention Incentive Plan Effective as of October 1, 2015 (Incorporated by reference to Exhibit 10.2 to TVA's Current Report on Form 8-K filed on October 1, 2015, File No. 000-52313)
10.37†	Offer Letter to Jeffrey J. Lyash Approved as of February 14, 2019 (Incorporated by reference to Exhibit 10.1 to TVA's Current Report on Form 8-K filed on February 14, 2019, File No. 000-52313)
10.38†	Acknowledgment by TVA and Jeffrey J. Lyash on March 25, 2019, Relating to the Offer Letter to Mr. Lyash Approved as of February 14, 2019 (Incorporated by reference to Exhibit 10.2 to TVA's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, File No. 000-52313)

10.39†	Offer Letter to Timothy S. Rausch Accepted as of September 18, 2018 (Incorporated by reference to Exhibit 10.39 to TVA's Annual Report on Form 10-K/A for the year ended September 30, 2019, File No. 000-52313)
10.40†	Offer Letter to David Fountain Accepted as of April 1, 2020 (Incorporated by reference to Exhibit 10.42 to TVA's Annual Report on Form 10-K for the year ended September 30, 2021, File No. 000-52313)
10.41†	Offer Letter to Donald A. Moul Approved as of May 24, 2021 (Incorporated by reference to Exhibit 10.2 to TVA's Quarterly Report on Form 10-Q for the quarter ended June 30, 2021, File No. 000-52313)
14.1	Disclosure and Financial Ethics Code (Incorporated by reference to Exhibit 14 to TVA's Annual Report on Form 10-K for the year ended September 30, 2006, File No. 000-52313)
14.2	TVA Conflict of Interest Policy, as amended (Incorporated by reference to Exhibit 14.2 to TVA's Annual Report on Form 10-K for the year ended September 30, 2014, File No. 000-52313)
19.1	Tennessee Valley Authority Insider Trading Policy Adopted by the TVA Board of Directors on November 9, 2023 (Incorporated by reference to Exhibit 19.1 to TVA's Annual Report on Form 10-K for the year ended September 30, 2023, File No. 000-52313)
31.1	Rule 13a-14(a)/15d-14(a) Certification Executed by the Chief Executive Officer
31.2	Rule 13a-14(a)/15d-14(a) Certification Executed by the Chief Financial Officer
32.1	Section 1350 Certification Executed by the Chief Executive Officer
32.2	Section 1350 Certification Executed by the Chief Financial Officer
97.1	Tennessee Valley Authority Policy for the Recovery of Erroneously Awarded Compensation Adopted by the TVA Board on November 9, 2023 (Incorporated by reference to Exhibit 97.1 to TVA's Annual Report on Form 10-K for the year ended September 30, 2023, File No. 000-52313)
101.INS	Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH	Inline XBRL Taxonomy Extension Schema
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase
104	Cover Page Interactive Data File - formatted in Inline XBRL and contained in Exhibit 101

† Management contract or compensatory arrangement.

* Certain schedule(s) and/or exhibit(s) have been omitted. TVA hereby undertakes to furnish supplementally copies of any of the omitted schedules and/or exhibits upon request by the Securities and Exchange Commission.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13, 15(d), or 37 of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: November 13, 2024

TENNESSEE VALLEY AUTHORITY
(Registrant)

By: /s/ Jeffrey J. Lyash
Jeffrey J. Lyash
President and Chief Executive Officer

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Jeffrey J. Lyash Jeffrey J. Lyash	President and Chief Executive Officer (Principal Executive Officer)	November 13, 2024
/s/ John M. Thomas, III John M. Thomas, III	Executive Vice President and Chief Financial and Strategy Officer (Principal Financial Officer)	November 13, 2024
/s/ Diane Wear Diane Wear	Vice President and Controller (Principal Accounting Officer)	November 13, 2024
/s/ Joe H. Ritch Joe H. Ritch	Chair	November 13, 2024
/s/ Beth H. Harwell Beth H. Harwell	Director	November 13, 2024
/s/ Brian E. Noland Brian E. Noland	Director	November 13, 2024
/s/ Beth P. Geer Beth P. Geer	Director	November 13, 2024
/s/ L. Michelle Moore L. Michelle Moore	Director	November 13, 2024
/s/ Robert P. Klein Robert P. Klein	Director	November 13, 2024
/s/ William J. Renick William J. Renick	Director	November 13, 2024
/s/ A. Wade White A. Wade White	Director	November 13, 2024

EXHIBIT 31.1

RULE 13a-14(a)/15d-14(a) CERTIFICATION

I, Jeffrey J. Lyash, certify that:

1. I have reviewed this Annual Report on Form 10-K of the Tennessee Valley Authority;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 13, 2024

/s/ Jeffrey J. Lyash
Jeffrey J. Lyash
President and Chief Executive Officer

EXHIBIT 31.2

RULE 13a-14(a)/15d-14(a) CERTIFICATION

I, John M. Thomas, III, certify that:

1. I have reviewed this Annual Report on Form 10-K of the Tennessee Valley Authority;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 13, 2024

/s/ John M. Thomas, III

John M. Thomas, III

Executive Vice President and Chief Financial and Strategy Officer
(Principal Financial Officer)

EXHIBIT 32.1

CERTIFICATION FURNISHED PURSUANT TO
SECURITIES EXCHANGE ACT RULE 13a-14(b)
OR RULE 15d-14(b) AND 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of the Tennessee Valley Authority (the "Company") for the year ended September 30, 2024, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Jeffrey J. Lyash, President and Chief Executive Officer of the Company, certify, for the purposes of complying with Rule 13a-14(b) or Rule 15d-14(b) of the Securities Exchange Act of 1934, as amended, and Section 1350 of Chapter 63 of Title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Jeffrey J. Lyash
Jeffrey J. Lyash
President and Chief Executive Officer
November 13, 2024

EXHIBIT 32.2

CERTIFICATION FURNISHED PURSUANT TO
SECURITIES EXCHANGE ACT RULE 13a-14(b)
OR RULE 15d-14(b) AND 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of the Tennessee Valley Authority (the "Company") for the year ended September 30, 2024, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, John M. Thomas, III, Executive Vice President and Chief Financial and Strategy Officer of the Company, certify, for the purposes of complying with Rule 13a-14(b) or Rule 15d-14(b) of the Securities Exchange Act of 1934, as amended, and Section 1350 of Chapter 63 of Title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ John M. Thomas, III

John M. Thomas, III

Executive Vice President and Chief Financial and Strategy Officer
(Principal Financial Officer)

November 13, 2024

EXHIBIT 10.25

This Head Lease Agreement has been filed to provide investors with information regarding its terms. It is not intended to provide any other factual information about the Tennessee Valley Authority. The representations and warranties of the parties in this Head Lease Agreement were made to, and solely for the benefit of, the other parties to this Head Lease Agreement. The assertions embodied in the representations and warranties may be qualified by information included in schedules, exhibits, or other materials exchanged by the parties that may modify or create exceptions to the representations and warranties. Accordingly, investors should not rely on the representations and warranties as characterizations of the actual state of facts at the time they were made or otherwise.

Execution Version

This instrument prepared by:
Kyle W. Drefke, Esq.
Orrick, Herrington & Sutcliffe LLP
2100 Pennsylvania Avenue NW
Washington, D.C. 20037
(212) 339-8434

HEAD LEASE AGREEMENT

Dated as of October 2, 2024

among

THE UNITED STATES OF AMERICA,

TENNESSEE VALLEY AUTHORITY,
as Head Lessor

and

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC,
as Head Lessee

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE FACILITY
located in Humphreys County, Tennessee

TABLE OF CONTENTS

Page

SECTION 1. DEFINITIONS 1

SECTION 2. LEASE OF THE FACILITY 1

SECTION 3. TERM AND RENT 2

Section 3.1. Head Lease Term 2

Section 3.2. Rent for the Facility 2

SECTION 4. RIGHT OF QUIET ENJOYMENT 2

SECTION 5. TRANSFERS OF THE FACILITY; CONVEYANCE OF TITLE 2

SECTION 6. TERMINATION; SURRENDER; AND RETURN 3

Section 6.1. Surrender and Termination of this Head Lease 3

Section 6.2. Termination of Head Lease at Option of Head Lessee 3

Section 6.3. Return 3

SECTION 7. LIENS 3

Section 7.1. Head Lessee Covenant 3

Section 7.2. Head Lessor Covenant 4

SECTION 8. NONTERMINABILITY 4

SECTION 9. MODIFICATIONS; REPLACEMENT COMPONENTS 4

SECTION 10. RELEASE OF COMPONENTS 5

SECTION 11. NONMERGER 5

SECTION 12. APPLICATION OF PAYMENTS FROM GOVERNMENTAL ENTITY 5

SECTION 13. SECURITY FOR THE HEAD LESSEE'S OBLIGATIONS 5

SECTION 14. MISCELLANEOUS 6

Section 14.1. Amendments and Waivers 6

Section 14.2. Notices 6

Section 14.3. Survival 6

Section 14.4. Successors and Assigns 6

Section 14.5. Business Day 6

Section 14.6. Governing Law 6

Section 14.7. Severability 7

Section 14.8. Counterparts 7

Page

Section 14.9. Headings and Table of Contents 7
Section 14.10. Further Assurances 7
Section 14.11. Effectiveness 7
Section 14.12. Measuring Life 7
Section 14.13. Limitation of Liability 8
Section 14.13. Effect of the Facility Lease 8
Appendix A Definitions
Attachment A Description of the Facility
Attachment B Permitted Closing Date Liens

Head Lease Agreement

This **HEAD LEASE AGREEMENT**, dated as of October 2, 2024 (this "Head Lease"), among **THE UNITED STATES OF AMERICA** (the "Government"), **TENNESSEE VALLEY AUTHORITY**, a wholly owned corporate agency and instrumentality of the United States ("TVA") (the Government, solely for purposes of Section 2, and TVA, collectively, together with their successors and permitted assigns, the "Head Lessor"), and **JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC**, a Delaware limited liability company (together with its successors and permitted assigns, the "Head Lessee").

WHEREAS, TVA is constructing the Johnsonville aeroderivative combustion turbine facility located in Humphreys County, Tennessee, a simple cycle generating facility designed to have a summer net generation capacity of approximately 550 megawatts (as constructed from time to time and as more particularly described on Attachment A hereto, the "Facility");

WHEREAS, the Head Lessor holds title to the Facility, and desires to lease the Facility to the Head Lessee, and the Head Lessee desires to lease the Facility from the Head Lessor, in each case on the terms and conditions provided herein; and

WHEREAS, pursuant to the Ground Lease, the Head Lessee will lease and accept the conveyance of the Ground Interest from the Head Lessor for a term equal to the term of this Head Lease;

NOW, THEREFORE, in consideration of the premises, the mutual agreements herein contained, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

SECTION 1. DEFINITIONS.

Unless the context otherwise requires, capitalized terms used in this Head Lease, including those used in the recitals, and not otherwise defined herein shall have the respective meanings set forth in Appendix A hereto. The general provisions of Appendix A shall apply to terms used in this Head Lease and specifically defined herein.

SECTION 2. LEASE OF THE FACILITY.

The Head Lessor hereby leases the Facility to the Head Lessee, upon the terms and conditions set forth herein, for the term described below, and the Head Lessee hereby leases the Facility, upon the terms and conditions set forth herein, from the Head Lessor. The Head Lessor and the Head Lessee understand and agree that (a) legal title to the Facility remains vested in the Head Lessor throughout the Head Lease Term, (b) this Head Lease is subject to the Permitted Closing Date Liens set forth in Attachment B hereto and (c) this Head Lease is intended to be a lease of personal property under Tennessee law. The Head Lessor and the Head Lessee acknowledge and agree that (as of the date hereof) the Facility has not achieved Substantial Completion. The Head Lessor and Head Lessee further acknowledge and agree that

title to portions of the Facility which will be added to, or otherwise become a part of, the Facility after the Closing Date in accordance with the Johnsonville Construction Contract (at no additional cost to the Head Lessee and with no adjustment to Basic Lease Rent or Termination Value) shall remain in the Head Lessor and shall automatically and, without further act, become subject to this Head Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture, and shall be deemed part of the Facility for all purposes, including for purposes of this Head Lease. The Facility also includes an interest in (i) all Modifications which are incorporated in the Facility and which pursuant to Section 8.3 of the Facility Lease and Section 9 hereof become subject to this Head Lease and (ii) all Replacement Components which become part of the Facility pursuant to Section 7.2 of the Facility Lease and Section 10 hereof.

SECTION 3. TERM AND RENT.

Section 3.1. Head Lease Term. The term of this Head Lease shall commence on the Closing Date and shall terminate at 11:59 p.m. (New York City time) on October 2, 2074 (the "Head Lease Term"), subject to earlier termination pursuant to the express terms hereof. Notwithstanding anything to the contrary set forth in this Section 3.1, in no event shall the Head Lease Term terminate so long as the Head Lessee's interest under this Head Lease shall be subject to the Lien of the Lease Indenture.

Section 3.2. Rent for the Facility.

(a) The Head Lessee hereby agrees to pay the Head Lessor rent of $680,000,000 (the "Head Lease Rent") on the Closing Date for the entire Head Lease Term. The Head Lessor acknowledges receipt of such amount in full satisfaction of the Head Lessee's obligation to pay rent during the Head Lease Term.

(b) Head Lease Rent paid pursuant to Section 3.2(a) shall be retained by the Head Lessor in any and all events which are contemplated, prospective or possible under the provisions and conditions of this Head Lease and the other Transaction Documents and shall be absolute and irrevocable under any circumstances whatsoever, including any rescission or termination of this Head Lease, in whole or in part.

SECTION 4. RIGHT OF QUIET ENJOYMENT.

The Head Lessor agrees that, during the Head Lease Term, neither the Head Lessor, any Affiliate nor any other Person claiming title superior to, or by, through or under it shall interfere with or interrupt the quiet enjoyment of the use, operation and possession by the Head Lessee of the Facility subject to the terms hereof; *provided* that the Head Lessor's covenant does not relate to actions of the Lease Indenture Trustee. The Head Lessor and Head Lessee acknowledge and agree that the Head Lessor shall retain the right to fully access, modify, and improve the Facility in a manner necessary to perform the Work and complete the Facility pursuant to the terms of the Construction Management Agreement.

SECTION 5. TRANSFERS OF THE FACILITY

The Head Lessee agrees that, prior to the expiration or earlier termination of the Facility Lease Term, it shall not assign, transfer or convey the Head Lessee's leasehold interest in the Facility, in whole or in part, except as part of the Head Lessee's transfer of all or part of the Owner Lessor's Interest pursuant to, and as permitted by, the Transaction Documents. The Head Lessor acknowledges that (a) the Facility will be leased to the Facility Lessee pursuant to the Facility Lease, (b) the Head Lessee shall have the right to transfer and convey all or part of the Head Lessee's leasehold interest in the Facility under and in accordance with Sections 5.1, 15.2, 16 and 18.2 of the Facility Lease in connection with the transfer thereunder of all or part of the Owner Lessor's Interest (or, in connection with a partial termination pursuant to Section 15.2 of the Facility Lease, the Relevant Portion of the Facility), and (c) the Facility Lessee shall have the right to sublease the Facility in accordance with Section 20.2 of the Facility Lease.

SECTION 6. TERMINATION; SURRENDER; AND RETURN.

Section 6.1. Surrender and Termination of this Head Lease.

(a) The Head Lessee shall surrender all of its interest in this Head Lease upon (i) the termination in whole of the Facility Lease pursuant to Section 15.2 thereof, (ii) the expiration of the Facility Lease Term in accordance with Section 16 of the Facility Lease or (iii) the expiration or termination of the Head Lease Term in accordance herewith.

(b) If the Facility Lease is terminated pursuant to Section 15.2 thereof in part with respect to a Relevant Portion of the Facility, this Head Lease shall terminate in part with respect to such Relevant Portion of the Facility on the same date and time as the termination of the Facility Lease with respect to such Relevant Portion.

Section 6.2. Termination of Head Lease at Option of Head Lessee. At any time on or following (a) termination of the Facility Lease pursuant to Section 18.2 thereof, or (b) the expiration of the Facility Lease Term in circumstances under which the Facility Lessee is required to deliver possession of the Facility to the Owner Lessor in accordance with Section 5 of the Facility Lease, the Head Lessee may elect to terminate this Head Lease upon written notice to the Head Lessor, in each case without any obligation or liability to the Head Lessor. In connection with any termination of this Head Lease pursuant to this Section 6.2, the Head Lessee shall return the Facility to the Head Lessor in accordance with Section 6.3.

Section 6.3. Return. Upon (a) surrender of the Head Lessee's interest in this Head Lease pursuant to Section 6.1(a), (b) termination of this Head Lease in whole pursuant to Section 6.2 or (c) termination of this Head Lease in part with respect to a Relevant Portion of the Facility pursuant to Section 6.1(b), the Head Lessee shall (i) return the Facility or the Relevant Portion of the Facility, as the case may be, to the Head Lessor, by delivering possession of the same to the Head Lessor at its location on the Facility Site and (ii) execute, acknowledge and deliver a

release, surrender or conveyance of all its right, title, interest and estate in the Facility or Relevant Portion of the Facility, as the case may be, to the Head Lessor, to be prepared by and at the expense of the Head Lessor in a form reasonably satisfactory to the Head Lessee, in each case on an "as is," "where is," and "with all faults" basis.

SECTION 7. LIENS.

Section 7.1. Head Lessee Covenant. The Head Lessee agrees that it shall (a) not, directly or indirectly, create, incur, assume or suffer to exist, any Owner Lessor's Liens, (b) promptly notify the Head Lessor and, so long as the Lien of the Lease Indenture has not been discharged, the Lease Indenture Trustee, of the imposition of any such Owner Lessor's Lien of which the Head Lessee is aware, and (c) promptly, at its own expense, take such action as may be necessary to fully discharge or release any such Owner Lessor's Lien; *provided*, *however*, that the Head Lessee shall not be in breach of this covenant so long as it shall be diligently contesting such Lien and such contest shall not present any material risk of the sale, foreclosure or loss of the Owner Lessor's Interest or any part thereof or the rights of the Head Lessor or, so long as the Lien of the Lease Indenture has not been terminated or discharged, the Lease Indenture Trustee under the Transaction Documents.

Section 7.2. Head Lessor Covenant. The Head Lessor agrees that it shall (a) not, directly or indirectly, create, incur, assume or suffer to exist any Lien on or with respect to the Facility or any interest therein or in, to or on its interest in this Head Lease, other than Permitted Liens, (b) promptly notify the Head Lessee and, so long as the Lien of the Lease Indenture has not been discharged, the Lease Indenture Trustee of the imposition of any such Lien (other than Permitted Liens) of which the Head Lessor is aware, and (c) promptly, at its own expense, take such action as may be necessary to fully discharge or release any such Lien (other than Permitted Liens); *provided*, *however*, that the Head Lessor shall not be in breach of this covenant so long as it shall be diligently contesting such Lien and such contest shall not present any material risk of the sale, foreclosure or loss of the Owner Lessor's Interest or any part thereof or the rights of the Head Lessee or, so long as the Lien of the Lease Indenture has not been terminated or discharged, the Lease Indenture Trustee under the Transaction Documents.

SECTION 8. NONTERMINABILITY.

Neither the rights nor obligations of the Head Lessee or the Head Lessor under this Head Lease shall be terminated, extinguished, diminished, lost or otherwise impaired prior to the expiration or early termination of the Head Lease Term in accordance herewith by any circumstances of any character, including, without limitation: (a) any loss or destruction of, or damage to, or failure to complete construction of, all or any part of the Facility, the Facility Site or any Component for any reason whatsoever and of whatever duration, (b) the condemnation, requisitioning (by eminent domain or otherwise), expropriation, seizure or other taking of title to or use of the Facility, the Facility Site or any Component thereof or any other portion of the Facility or the Facility Site by any Governmental Entity or otherwise, (c) any prohibition, limitation or restriction on the use by any Person of all or any part of its property or the interference with such use by any Person, or any eviction by paramount title or otherwise, (d) any inadequacy, incorrectness or failure of the description of the Facility, the Facility Site or any part thereof or any rights or property in which an

interest is intended to be granted or conveyed by this Head Lease, (e) insolvency, bankruptcy, reorganization or similar proceedings by or against the Head Lessor, the Head Lessee or any other Person, (f) the failure by the Head Lessee or the Head Lessor to comply with Section 7 hereof or with any other Transaction Documents or (g) any other reason whatsoever, whether similar or dissimilar to any of the foregoing.

SECTION 9. MODIFICATIONS; REPLACEMENT COMPONENTS.

All Required Modifications, all Nonseverable Modifications and all Modifications financed by the Owner Lessor by an Additional Equity Investment or a Supplemental Financing pursuant to Section 11.2 of the Participation Agreement shall automatically upon being affixed to or incorporated into the Facility become subject to this Head Lease without any action by any Person whatsoever and shall be deemed to be a part of the Facility for all purposes of this Head Lease. Any Removable Modification shall not become subject to this Head Lease unless the Owner Lessor shall have leased such Removable Modification in accordance with Section 5.2 of the Facility Lease. All Replacement Components incorporated in the Facility in accordance with the Facility Lease shall automatically become subject to this Head Lease without any action by any Person whatsoever and shall be deemed to be a part of the Facility for all purposes of this Head Lease.

SECTION 10. RELEASE OF COMPONENTS.

Whenever a Component is replaced or any surplus or obsolete Component is removed because it is no longer necessary for the use, operation or maintenance of the Facility, in each case pursuant to, and in accordance with, Section 7.2 of the Facility Lease, and thereafter ceases to be subject to the Facility Lease, the Head Lessee's interest in such replaced, surplus or obsolete Component shall automatically and without further act of any Person be released from this Head Lease, and the Head Lessee shall, upon the written request of, and at the cost and expense of, the Head Lessor, execute and deliver to, and as directed in writing by, the Head Lessor an appropriate instrument (in due form for recording) releasing such replaced, surplus or obsolete Component from this Head Lease.

SECTION 11. NONMERGER.

The reversionary interests of the Head Lessor in the Facility shall not merge into any interests in the Facility leased by, through or under this Head Lease even if such reversionary interests and such leased interests are at any time vested in or held directly or indirectly by the same Person, but this Head Lease shall nonetheless remain in full force and effect in accordance with its terms notwithstanding such vesting or holding. Notwithstanding this Section 11, nothing shall preclude termination of this Head Lease pursuant to Section 6.1.

SECTION 12. APPLICATION OF PAYMENTS FROM GOVERNMENTAL ENTITY.

Any payments received during or with respect to the Facility Lease Term by the Head Lessor or by the Head Lessee from any Governmental Entity with respect to the seizure,

expropriation, condemnation or requisition of the use of, or title to, the Facility shall be applied in accordance with Section 10.2 of the Facility Lease. Any payments received with respect to the period after the expiration of the Facility Lease Term by the Head Lessor or by the Head Lessee from any Governmental Entity with respect to the seizure, expropriation, condemnation or requisition of the use of, or title to, the Facility shall be paid over to, or retained by, the Head Lessee.

SECTION 13. SECURITY FOR THE HEAD LESSEE'S OBLIGATIONS.

In order to secure the Lessor Notes, the Head Lessee will by the Lease Indenture assign and grant a Lien to the Lease Indenture Trustee in and to all of the Head Lessee's right, title and interest in, to and under this Head Lease and the Owner Lessor's Interest including its leasehold interest in the Facility, other than Excepted Payments and subject to Excepted Rights. The Head Lessor hereby consents to such assignment and to the creation of such Lien and acknowledges receipt of a copy of the Lease Indenture, it being understood that such consent shall not affect any requirement or the absence of any requirement for any consent under any other circumstances. TO THE EXTENT, IF ANY, THAT THIS HEAD LEASE CONSTITUTES CHATTEL PAPER (AS SUCH TERM IS DEFINED IN THE UNIFORM COMMERCIAL CODE AS IN EFFECT IN ANY APPLICABLE JURISDICTION), NO SECURITY INTEREST IN THIS HEAD LEASE MAY BE CREATED THROUGH THE TRANSFER OR POSSESSION OF ANY COUNTERPART HEREOF OTHER THAN THE ORIGINAL COUNTERPART, WHICH SHALL BE IDENTIFIED AS THE COUNTERPART CONTAINING THE RECEIPT THEREFOR EXECUTED BY THE LEASE INDENTURE TRUSTEE ON THE SIGNATURE PAGE THEREOF.

SECTION 14. MISCELLANEOUS.

Section 14.1. Amendments and Waivers. No term, covenant, agreement or condition of this Head Lease may be terminated, amended or compliance therewith waived (either generally or in a particular instance, retroactively or prospectively) except by an instrument or instruments in writing executed by each party hereto.

Section 14.2. Notices. Any notices, requests or communications hereunder shall be given or made in accordance with the provisions of Section 15.5 of the Participation Agreement.

Section 14.3. Survival. Except as expressly set forth herein, the warranties and covenants made by each party hereto shall not survive the expiration or termination of this Head Lease in accordance with the terms hereof.

Section 14.4. Successors and Assigns.

(a) This Head Lease shall be binding upon and shall inure to the benefit of, and shall be enforceable by, the parties hereto and their respective successors and permitted assigns as permitted by and in accordance with the terms hereof.

(b) The Head Lessor hereby consents to the entry by the Head Lessee into, and the performance by the Head Lessee of, the Transaction Documents. Except as expressly provided herein or in any other Transaction Document, neither party may assign its interests or transfer its obligations herein without the consent of the other party hereto.

Section 14.5. Business Day. Notwithstanding anything herein to the contrary, if the date on which any payment or performance is to be made pursuant to this Head Lease is not a Business Day, the payment otherwise payable on such date shall be payable on the next succeeding Business Day with the same force and effect as if made on such scheduled date and (provided such payment is made on such succeeding Business Day) no interest shall accrue on the amount of such payment from and after such scheduled date to the time of such payment on the next succeeding Business Day.

Section 14.6. Governing Law. This Head Lease shall be governed by, and construed and interpreted in accordance with, the laws of the State of New York (without regard to conflicts of laws principles other than as provided in Section 5-1401 of the NY General Obligations Law), except to the extent that Tennessee law or U.S. federal law shall apply.

Section 14.7. Severability. If any provision hereof shall be invalid, illegal or unenforceable under the Applicable Law of any jurisdiction, the validity, legality and enforceability of such provision in any other jurisdiction, and of the remaining provisions hereof in any jurisdiction, shall not be affected or impaired thereby.

Section 14.8. Counterparts. This Head Lease may be executed by the parties hereto in separate counterparts, each of which when so executed and delivered shall be an original, but all such counterparts shall together constitute but one and the same instrument. This Head Lease may be executed by signatures delivered by email, and a copy hereof that is executed and delivered by a party by email (including in *.pdf* format) will be binding upon that party to the same extent as a copy hereof containing that party's original signature. The words "execution," "execute," "signed," "signature," and words of like import in or related to any document to be signed in connection with this Head Lease shall be deemed to include electronic signatures (e.g., signatures effected through *DocuSign*), which shall be of the same legal effect, validity or enforceability as a manually executed signature to the extent and as provided for in any Applicable Law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

Section 14.9. Headings and Table of Contents. The headings of the sections of this Head Lease and the Table of Contents are inserted for purposes of convenience only and shall not be construed to affect the meaning or construction of any of the provisions hereof.

Section 14.10. Further Assurances. Each party hereto shall promptly and duly execute and deliver such further documents to make such further assurances for and take such further action reasonably requested by the other party hereto, all as may be reasonably necessary to carry out more effectively the intent and purpose of this Head Lease.

Section 14.11. Effectiveness. This Head Lease shall be effective as of the date first above written.

Section 14.12. Measuring Life. If and to the extent that any of the rights and privileges granted under this Head Lease, would, in the absence of the limitation imposed by this sentence, be invalid or unenforceable as being in violation of the rule against perpetuities or any other rule or law relating to the vesting of interests in property or the suspension of the power of alienation of property, then it is agreed that notwithstanding any other provision of this Head Lease, such options, rights and privileges, subject to the respective conditions hereof governing the exercise of such options, rights and privileges, shall be exercisable only during (a) the longer of (i) a period which shall end twenty-one (21) years after the death of the last survivor of the descendants living on the date of the execution of this Head Lease of the following Presidents of the United States: Franklin D. Roosevelt, Harry S. Truman, Dwight D. Eisenhower, John F. Kennedy, Lyndon B. Johnson, Richard M. Nixon, Gerald R. Ford, James E. Carter, Ronald W. Reagan, George H.W. Bush, William J. Clinton, George W. Bush, Barack H. Obama, Donald J. Trump and Joseph R. Biden, Jr. or (ii) the period provided under the Uniform Statutory Rule Against Perpetuities or (b) the specific applicable period of time expressed in this Head Lease, whichever of (a) and (b) is shorter.

Section 14.13. Limitation of Liability. It is expressly understood and agreed by the parties hereto that (a) this Head Lease is executed and delivered by the Lessor Manager, not individually or personally but solely as the manager of the Head Lessee under the Owner Lessor LLC Agreement, in the exercise of the powers and authority conferred and vested in it pursuant thereto, (b) each of the representations, undertakings and agreements herein made on the part of the Head Lessee is made and intended not as personal representations, undertakings and agreements by the Lessor Manager, but is made and intended for the purpose for binding only the Head Lessee, (c) nothing herein contained shall be construed as creating any liability on the Lessor Manager, individually or personally, to perform any covenant either expressed or implied contained herein, all such liability, if any, being expressly waived by the parties hereto or by any Person claiming by, through or under the parties hereto and (d) under no circumstances shall the Lessor Manager be personally liable for the payment of any indebtedness or expenses of the Head Lessee or be liable for the breach or failure of any obligation, representation, warranty or covenant made or undertaken by the Head Lessee under this Head Lease.

Section 14.14. Effect of the Facility Lease. Except for its obligations under Sections 4, 6, or 7.1 hereof, by entering into the Facility Lease, the Head Lessee shall be deemed to have complied with any covenant or agreement made by it hereunder with respect to the operation, maintenance and use of the Facility during the Facility Lease Term, without necessity of any action by the Head Lessee and regardless of whether the Facility Lessee complies with its corresponding obligations under the Facility Lease.

(Signatures Follow On Next Page)

IN WITNESS WHEREOF, the Head Lessor and the Head Lessee have caused this Head Lease to be duly executed and delivered by their respective officers thereunto duly authorized on the dates below their respective signatures, but effective as of the date first set forth above.

THE UNITED STATES OF AMERICA

By: Tennessee Valley Authority, as legal agent

By: /s/ Joshua J. Carlon
Name: Joshua J. Carlon
Title: Director, Corporate Finance
Date: September 26, 2024

STATE OF TENNESSEE___)
) ss.:
COUNTY OF KNOX_____)

Personally appeared before me, the undersigned authority in and for the said county and state, on this _26th_ day of September, 2024, within my jurisdiction, the within named Joshua J. Carlon, who acknowledged to me that he is Director, Corporate Finance of Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States of America and agent for the United States of America, and that for and on behalf of Tennessee Valley Authority as agent for the United States of America, and as the act and deed of the United States of America, he executed the above and foregoing instrument, after first having been duly authorized by Tennessee Valley Authority and the United States of America so to do.

/s/ Greta N. Chapman
Notary Public

My Commission expires:
10/30/2027

TENNESSEE VALLEY AUTHORITY,
as Head Lessor

By: /s/ Joshua J. Carlon
Name: Joshua J. Carlon
Title: Director, Corporate Finance
Date: September 26, 2024

STATE OF TENNESSEE____)
) ss.:
COUNTY OF KNOX_____)

Personally appeared before me, the undersigned authority in and for the said county and state, on this 26th day of September, 2024, within my jurisdiction, the within named Joshua J. Carlon, who acknowledged to me that he is Director, Corporate Finance of Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States of America, and that for and on behalf of the Tennessee Valley Authority, and as its act and deed, he executed the above and foregoing instrument, after first having been duly authorized so to do.

/s/ Greta N. Chapman
Notary Public

My Commission expires:
10/30/2027

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC,
as Head Lessee
By:Johnsonville Holdco LLC, not in its individual capacity, but solely as Lessor Manager under the Owner Lessor LLC Agreement

By: /s/ Bernard J. Angelo
Name: Bernard J. Angelo
Title: Vice President
Date: September 26, 2024

STATE OF NY_____)
) ss.:
COUNTY OF Suffolk_____)

Personally appeared before me, the undersigned authority in and for the said county and state, on this _26th day of __September__, 2024, within my jurisdiction, the within named _____, who acknowledged to me that he is _____ of Johnsonville Holdco LLC as Lessor Manager of the Johnsonville Aeroderivative Combustion Turbine Generation LLC, a Delaware limited liability company (the "Owner Lessor"), and that for and on behalf of Johnsonville Holdco LLC, solely as Lessor Manager of the Owner Lessor, and as the act and deed of Johnsonville Holdco LLC, solely as Lessor Manager of the Owner Lessor, and as the act and deed of the Owner Lessor, he executed the above and foregoing instrument, after first having been duly authorized by Johnsonville Holdco LLC and Owner Lessor so to do.

/s/ Kevin P. Burns
Notary Public

My Commission expires: May 22, 2027

The name and address of the Head Lessor are:

HEAD LESSOR: United States of America
Tennessee Valley Authority
c/o Realty Services
1101 Market Street
Chattanooga, Tennessee 37402-2801
Telephone No.: (423) 751-7691
Attention: Senior Manager

The name and address of the Head Lessee are:

HEAD LESSEE: Johnsonville Aeroderivative Combustion Turbine Generation LLC
c/o Johnsonville Holdco LLC
68 South Service Road, Suite 120
Melville, NY 11747
Telephone No.: 631-930-7202
E-mail: Jrangelo@gssnyc.com
Attention: Bernard J. Angelo

Tax Parcel No. 112 001.00 (portion of)

*Receipt of the original counterpart of the foregoing Head Lease is hereby acknowledged on this __2nd__ day of __October_ ___, 2024.

WILMINGTON TRUST, NATIONAL ASSOCIATION,

not in its individual capacity, but solely
as Lease Indenture Trustee

By: /s/ Jeff Marvel
Name: Jeff Marvel
Title: Assistant Vice President

STATE OF ___Deleware_____)
) ss.:
COUNTY OF New Castle__)

Personally appeared before me, the undersigned authority in and for the said county and state, on this 26 day of _September__, 2024, within my jurisdiction, the within named _Jeff Marvel, who acknowledged to me that he is __AVP____ of Wilmington Trust, National Association, and as the act and deed of Wilmington Trust, National Association solely as Lease Indenture Trustee, he executed the above and foregoing instrument, after first having been duly authorized by Wilmington Trust, National Association so to do.

/s/ Josh M. Flores __
Notary Public

My Commission expires:

Appendix A
to
Head Lease

DEFINITIONS

Appendix A

Definitions

Johnsonville Aeroderivative Combustion Turbine Facility

Appendix A – Definitions

GENERAL PROVISIONS

In this Appendix A and each Transaction Document (as hereinafter defined), unless otherwise provided herein or therein:

(a) the terms set forth in this Appendix A or in any such Transaction Document shall have the meanings herein provided for and any term used in a Transaction Document and not defined therein or in this Appendix A but in another Transaction Document shall have the meaning herein or therein provided for in such other Transaction Document;

(b) any term defined in this Appendix A by reference to another document, instrument or agreement shall continue to have the meaning ascribed thereto whether or not such other document, instrument or agreement remains in effect;

(c) words importing the singular include the plural and vice versa;

(d) words importing a gender include either gender;

(e) a reference to a part, clause, section, paragraph, article, party, annex, appendix, exhibit, schedule or other attachment to or in respect of a Transaction Document is a reference to a part, clause, section, paragraph, or article of, or a part, annex, appendix, exhibit, schedule or other attachment to, such Transaction Document unless, in any such case, otherwise expressly provided in any such Transaction Document;

(f) a reference to any statute, regulation, proclamation, ordinance or law includes all statutes, regulations, proclamations, ordinances or laws varying, consolidating or replacing the same from time to time, and a reference to a statute includes all regulations, policies, protocols, codes, proclamations and ordinances issued or otherwise applicable under that statute unless, in any such case, otherwise expressly provided in any such statute or in such Transaction Document;

(g) a definition of or reference to any document, instrument or agreement includes an amendment or supplement to, or restatement, replacement, modification or renovation of, any such document, instrument or agreement unless otherwise specified in such definition or in the context in which such reference is used;

(h) a reference to a particular section, paragraph or other part of a particular statute shall be deemed to be a reference to any other section, paragraph or other part substituted therefor from time to time;

(i) if a capitalized term describes, or shall be defined by reference to, a document, instrument or agreement that has not as of any particular date been executed and delivered and such document, instrument or agreement is attached as an exhibit to the Participation Agreement (as hereinafter defined), such reference shall be deemed to be to such form and,

following such execution and delivery and subject to paragraph (h) above, to the document, instrument or agreement as so executed and delivered;

(j) a reference to any Person (as hereinafter defined) includes such Person's successors and permitted assigns;

(k) any reference to "days" shall mean calendar days unless "Business Days" (as hereinafter defined) are expressly specified;

(l) if the date as of which any right, option or election is exercisable, or the date upon which any amount is due and payable, is stated to be on a date or day that is not a Business Day, such right, option or election may be exercised, and such amount shall be deemed due and payable, on the next succeeding Business Day with the same effect as if the same was exercised or made on such date or day (without, in the case of any such payment, the payment or accrual of any interest or other late payment or charge, provided such payment is made on such next succeeding Business Day);

(m) words such as "hereunder", "hereto", "hereof" and "herein" and other words of similar import shall, unless the context requires otherwise, refer to the whole of the applicable document and not to any particular article, section, subsection, paragraph or clause thereof;

(n) a reference to "including" shall mean including without limiting the generality of any description preceding such term, and for purposes hereof and of each Transaction Document the rule of *ejusdem generis* shall not be applicable to limit a general statement, followed by or referable to an enumeration of specific matters, to matters similar to those specifically mentioned;

(o) all accounting terms not specifically defined herein or in any Transaction Document shall be construed in accordance with GAAP; and

(p) unless the context or the specific provision otherwise requires, whenever in the Transaction Documents a provision requires that the rating of a Person or the Lessor Notes be confirmed, such provisions shall be deemed to mean that each Rating Agency shall have confirmed the rating of the senior long-term unsecured debt of such Person or the Lessor Notes, if then rated by such Rating Agency, a copy of which confirmation shall be delivered by TVA to the Equity Investor, the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, to the Lease Indenture Trustee and shall be without indication that such Person or the Lessor Notes, as the case may be, has been placed on credit watch, credit review, or any similar status with negative implications or which does not indicate the direction of the potential ratings change.

DEFINED TERMS

"**2024 Lessor Notes**" shall mean the 5.078% Series 2024 Bonds due October 1, 2054 issued on the Closing Date by the Owner Lessor and any Lessor Notes issued in replacement therefor pursuant to Section 2.9 of the Lease Indenture.

"**Access Property**" shall mean the access routes to and from the Facility Site and to and from the Global Common Facilities Site, as more particularly described in Exhibit 3 to the Ground Lease.

"**Actual Knowledge**" shall mean, with respect to any Transaction Party, actual knowledge of, or receipt of written notice by, an officer (or other employee whose responsibilities include the administration of the Transaction) of such Transaction Party; *provided* that neither the Lease Indenture Trustee nor the Lessor Manager shall be deemed to have Actual Knowledge of any fact solely by virtue of an officer of the Lease Indenture Trustee or the Lessor Manager, as the case may be, having actual knowledge of such fact unless such officer is an officer in the Corporate Trust Administration Department of the Lease Indenture Trustee or the Lessor Manager, as the case may be, responsible for the administration of this transaction.

"**Additional Equity Investment**" shall mean the amount, if any, provided by the Equity Investor to finance all or a portion of the cost of any Modification financed pursuant to Section 11.2(a) of the Participation Agreement.

"**Additional Facility**" shall have the meaning specified in Section 4.4 of the Ground Lease.

"**Additional Lessor Notes**" shall have the meaning specified in Section 2.12 of the Lease Indenture.

"**Additional Owner**" shall have the meaning specified in Section 4.4 of the Ground Lease.

"**Affiliate**" of a particular Person shall mean any Person directly or indirectly controlling, controlled by or under common control with such particular Person. For purposes of this definition, "control" when used with respect to any particular Person shall mean the power to direct the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise, and the terms "controlling" and "controlled" have meanings correlative to the foregoing; *provided*, *however*, that under no circumstances shall the Lessor Manager or the Equity Manager be considered an Affiliate of any of the Owner Lessor or the Equity Investor or any Equity Note Purchaser, nor the Owner Lessor, any Equity Investor or any Equity Note Purchaser be considered an Affiliate of the Equity Manager or the Lessor Manager; *provided, further*, that no federal Governmental Entity shall be considered to be an Affiliate of TVA.

"**After-Tax Basis**" shall mean, with respect to any payment to be received by any Person, the amount of such payment (the base payment) supplemented by a further payment (the additional payment) to that Person so that the sum of the base payment plus the additional payment shall, after deduction of the amount of all federal, state and local income Taxes required to be paid

by such Person in respect of the receipt or accrual of the base payment and the additional payment (taking into account any reduction in such income Taxes resulting from Tax benefits realized or to be realized by the recipient as a result of the payment or the event giving rise to the payment), be equal to the amount required to be received. Such calculations shall be made on the basis of the highest generally applicable federal, state and local income tax rates applicable to the Person for whom the calculation is being made for all relevant periods, and shall take into account the deductibility of state and local income taxes for federal income tax purposes.

"**Applicable Law**" shall mean, without limitation, all applicable laws, including all Environmental Laws, and treaties, judgments, decrees, injunctions, writs and orders of any court, arbitration board or Governmental Entity and rules, regulations, orders, ordinances, licenses and permits of any Governmental Entity.

"**Applicable Permits**" shall mean any valid waiver, exemption, variance, franchise, permit, authorization, license or similar order of or from, or filing or registration with, or notice to, any Governmental Entity having jurisdiction over the matter in question, including any decision of a Governmental Entity accompanying any of the foregoing, required by Applicable Law (including Environmental Laws) to be obtained or maintained in connection with the construction, operation and maintenance of the Facility and the Facility Site, transmission of electricity, performance of the Work, testing, commissioning, health and safety or any Environmental Condition.

"**Applicable Rate**" shall mean 5.74% per annum.

"**Appraisal Procedure**" shall mean (except with respect to the Closing Appraisal and any appraisal to determine Fair Market Sales Value after a Lease Event of Default shall have occurred and be continuing) an appraisal conducted by an appraiser or appraisers in accordance with the procedures set forth in this definition of "Appraisal Procedure." The Equity Investor and TVA will consult with the intent of selecting a mutually acceptable Independent Appraiser. If a mutually acceptable Independent Appraiser is selected, the Fair Market Sales Value shall be determined by such Independent Appraiser. If the Equity Investor and TVA are unable to agree upon a single Independent Appraiser within a 15-day period, one shall be appointed by the Equity Investor, and one shall be appointed by TVA (or its designee), which Independent Appraisers shall attempt to agree upon the value, period, amount or other determination that is the subject of the appraisal. If either the Equity Investor or TVA does not appoint its appraiser, the determination of the other appraiser shall be conclusive and binding on the Equity Investor and TVA. If the appraisers appointed by the Equity Investor and TVA are unable to agree upon the value, period, amount or other determination in question, such appraisers shall jointly appoint a third Independent Appraiser or, if such appraisers do not appoint a third Independent Appraiser, the Equity Investor and TVA shall jointly appoint the third Independent Appraiser. In such case, the average of the determinations of the three appraisers shall be conclusive and binding on the Equity Investor and TVA, unless the determination of one appraiser differs from the middle determination by more than twice the amount by which the third determination differs from the middle determination, in which case the determination of the most disparate appraiser shall be excluded, and the average of the remaining two determinations shall be conclusive and binding on the Equity Investor and TVA.

"**Appraiser**" shall mean Federal Appraisal LLC.

"**Arbitration Proceeding**" shall mean a procedure whereby the party seeking to arbitrate a dispute concerning an amount payable under the Support Agreement shall provide written notice of its intention to arbitrate at the time and to the other party of the Support Agreement. Such notice (i) shall specify the section or sections of the Support Agreement which authorizes or authorize an Arbitration Proceeding, (ii) provide reasonable detail of the item or items in dispute, and (iii) set forth the name and address of the person designated to act as the arbitrator on behalf of the party providing such notice. Within 20 Business Days after such notice is given, the party to which such notice was given shall give notice to the first party, specifying the name and address of the person designated to act as arbitrator on its behalf. If the second party fails to notify the first party of the appointment of its arbitrator within such 20 Business Day period, then the appointment of the second arbitrator shall be made in the same manner as hereinafter provided for the appointment of a third arbitrator. The arbitrators so chosen shall meet within 10 Business Days after the second arbitrator is appointed and within 20 Business Days thereafter shall decide the dispute. If within such period they cannot agree upon their decision, they shall within 10 Business Days thereafter appoint a third arbitrator and, if they cannot agree upon such appointment, the third arbitrator shall be appointed upon their application or upon the application of either party, by the American Arbitration Association, or any organization which is a successor thereto from a panel of arbitrators having expertise in the business of operating simple cycle combustion turbines. The three arbitrators shall meet and decide the dispute within 20 Business Days of the appointment of the third arbitrator. Any decision or determination in which two of the three arbitrators shall concur or, if no two of the three arbitrators shall concur, the decision or determination of the arbitrator last selected shall be final and binding upon the parties. In designating arbitrators and in deciding the dispute, the arbitrators shall act in accordance with the rules of the American Arbitration Association then in force, *subject*, *however*, to express provisions to the contrary, if any, contained in the Support Agreement. In the event that the American Arbitration Association or a nationally recognized successor shall not then be in existence, the arbitration shall proceed under comparable laws or statutes then in effect. The parties to the arbitration shall be entitled to present evidence and argument to the arbitrators. Each party shall pay (i) the fees and expenses of the arbitrator appointed by or on its behalf, and (ii) equal shares of (a) the other expenses of the arbitration properly incurred and (b) the fees and expenses of the third arbitrator, if any. For purposes of this definition, the Facility User shall be deemed to be one party and TVA shall be deemed to be the other party.

"**Assigned Documents**" shall have the meaning specified in clause (2) of the Granting Clause of the Lease Indenture.

"**Assignment and Assumption Agreement**" shall mean an assignment and assumption agreement in form and substance substantially in the form of Exhibit F to the Participation Agreement.

"**Bankruptcy Code**" shall mean the United States Bankruptcy Code of 1978, as amended from time to time, 11 U.S.C. §101 *et seq*.

"**Base Rate**" shall mean the rate of interest publicly announced from time to time by Citibank, N.A. at its New York office as its base rate for domestic commercial loans, such rate to change

as and when such base rate changes. For purpose of this definition, "base rate" shall mean that rate announced by Citibank, N.A. from time to time as its base rate as that rate may change from time to time with changes to occur on the date Citibank, N.A.'s base rate changes.

"**Basic Lease Rent**" shall have the meaning specified in Section 3.2 of the Facility Lease.

"**Basic Lease Rent (Debt Portion)**" for any Rent Payment Date shall mean the amount set forth under the heading "Basic Lease Rent (Debt Portion)" on Schedule 1 of the Facility Lease for such Rent Payment Date.

"**Basic Lease Rent (Equity Portion)**" for any Rent Payment Date shall mean the amount set forth under the heading "Basic Lease Rent (Equity Portion)" on Schedule 1 of the Facility Lease for such Rent Payment Date.

"**Benefit Plan**" shall mean an employee benefit plan as defined in Section 3(3) of ERISA that is subject to Title I of ERISA, a plan as defined in Section 4975(e) of the Code that is subject to Section 4975 of the Code or any entity that is deemed to hold the assets of any such employee benefit plan or plan by virtue of such employee benefit plan's or plan's investment in such entity.

"**Bond Resolution**" shall mean the Basic Tennessee Valley Authority Power Bond Resolution adopted October 6, 1960, as amended.

"**Boundary Property**" shall have the meaning specified in Section 4.3(a) of the Ground Lease.

"**Burns & McDonnell**" shall have the meaning specified in the first recital of the Construction Management Agreement.

"**Business Day**" shall mean any day other than a Saturday, a Sunday, any federal holiday, or a day on which banking institutions are authorized or required by law, regulation or executive order to be closed in Wilmington, Delaware, Knoxville, Tennessee, or the city and the state in which the Corporate Trust Office of the Lease Indenture Trustee, the Lessor Manager or the Equity Manager is located.

"**Called Amount**" shall mean the amount of the Equity Investment that is being repaid, determined by reference to the Termination Value (Equity Portion) with respect to the applicable Termination Date.

"**Capability**" shall mean the amount of Energy, expressed in megawatt hours, that can be generated by the Facility.

"**Capacity**" shall mean megawatts of electric energy generating capacity.

"**Capital Expenditure Budget**" shall have the meaning set forth in Section 4.4(a) of the Support Agreement.

"**Claim**" shall mean any liability (including in respect of negligence (whether passive or active or other torts), strict or absolute liability in tort or otherwise, warranty, latent or other defects (regardless of whether or not discoverable), statutory liability, property damage, bodily injury or death), obligation, loss, settlement, damage, penalty, claim, action, suit, proceeding (whether civil or criminal), judgment, penalty, fine and other legal or administrative sanction, judicial or administrative proceeding, cost, expense or disbursement, including reasonable legal, investigation and expert fees, expenses and reasonable related charges, of whatsoever kind and nature (including any losses incurred in connection with enforcement of indemnity obligations), but excluding Taxes.

"**Closing**" shall have the meaning specified in Section 2.2(a) of the Participation Agreement.

"**Closing Appraisal**" shall mean the appraisal, dated the Closing Date, prepared by the Appraiser for the use of TVA.

"**Closing Date**" shall have the meaning specified in Section 2.2(a) of the Participation Agreement.

"**CMA Payment**" shall have the meaning specified in Section 6.1 of the Construction Management Agreement.

"**Code**" shall mean the Internal Revenue Code of 1986, as amended from time to time, and any successor statute.

"**Co-Equity Manager**" shall mean a co-Manager appointed pursuant to Section 21 of the Equity Investor LLC Agreement.

"**Co-Lessor Manager**" shall mean a co-Independent Manager appointed pursuant to Section 16.6 of the Owner Lessor LLC Agreement.

"**Collateral**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Common Facilities**" shall mean all property and facilities intended for common use in the operation of the Units as more particularly described on Exhibit A to the Facility Lease, and shall include any Modifications to such facilities which become subject to the Head Lease during the Facility Lease Term and any Modifications to the Common Facilities made in accordance with the Support Agreement, but shall not include any property or facilities that are used in whole or in part solely for operation or maintenance of other TVA generating units.

"**Competitor**" shall have the meaning specified in Section 7.1(b) of the Participation Agreement.

"**Component**" shall mean any appliance, part, instrument, appurtenance, accessory, furnishing, equipment or other property of whatever nature that may from time to time be incorporated in any Unit or the Facility, except to the extent constituting Modifications.

"**Confidential Information**" shall have the meaning specified in Section 13.2 of the Participation Agreement.

"**Construction Cost**" shall mean, with respect to any Modification, the actual cost or purchase price (after deducting amounts realized as the salvage value of any component or item of equipment which is being replaced by the Modification, determined in accordance with Prudent Industry Practice), including, without limitation, (i) all costs of architectural and engineering services, labor, materials, equipment, supplies, personnel training, testing, permits and licenses, and legal services, (ii) payroll, including related fringe benefits and payroll taxes, of direct full time employees of TVA allocable on an actual time basis to such acquisition or construction and not included in costs described in clause (vi) below, (iii) reasonable and allocable traveling expenses including use of TVA's transportation equipment, (iv) all costs relating to injury or damage claims and claims by contractors or suppliers arising under construction contracts and arising out of such acquisition or construction, (v) all Taxes legally required to be paid with respect to such acquisition or construction if paid by TVA and (vi) administrative and other overhead costs of TVA as apportioned by TVA to such Modification in accordance with the Uniform System of Accounts, applicable to such acquisition or construction of such Modification, all in accordance with the Capital Expenditure Budget in effect from time to time.

"**Construction Management Agreement**" shall mean the Construction Management Agreement dated as of the Closing Date between TVA and the Owner Lessor.

"**Construction Period Financing Account**" shall have the meaning specified in Section 2.17(a) of the Lease Indenture.

"**Construction Period Financing Costs**" shall mean a dollar amount equal to the sum of (a) $22,629,677 with respect to the Lessor Notes and (b) $2,283,244 with respect to the Equity Investment.

"**Contractor**" shall mean TVA as contractor under the Construction Management Agreement.

"**Contract Year**" shall mean the 12-month period commencing at 12:01 a.m. on January 1 of each year and ending at 12:01 a.m. on the following January 1, except that the first Contract Year shall begin on the Service Commencement Date and the last Contract Year shall end on the Final Shutdown Date.

"**Debt Portion**" shall mean the separate portions of the Net TV Amount (Debt Portion), which portions correspond to the 2024 Lessor Notes and each series of Additional Lessor Notes that may have been issued from time to time and are determined by multiplying (a) the Net TV Amount (Debt Portion), by (b) the fraction (i) the numerator of which is the outstanding principal amount of the applicable 2024 Lessor Notes or such series of Additional Lessor Notes and (ii) the denominator of which is the aggregate outstanding principal amount of the 2024 Lessor Notes and the Additional Lessor Notes.

"**Deed of Trust Trustee**" shall mean John Seehorn, Esq.

"**Design Documents**" shall have the meaning specified in Section 2.2.1 of the Construction Management Agreement.

"**Discounted Value**" shall mean, with respect to the Called Amount of any Equity Investment, the amount obtained by discounting all Remaining Scheduled Payments with respect to such Called Amount from their respective scheduled due dates to the Settlement Date with respect to such Called Amount, in accordance with accepted financial practice and at a discount factor (applied on the same periodic basis as that on which return on the Equity Investment is payable) equal to the Reinvestment Yield with respect to such Called Amount.

"**Dollars**" or the sign "**$**" shall mean United States dollars or other lawful currency of the United States.

"**DTC**" shall mean The Depository Trust Company, a New York corporation.

"**Early Buy Out**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Early Buy Out Date**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Early Buy Out Notice**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Effective Date**" shall mean September 25, 2024.

"**Election Notice**" shall have the meaning specified in Section 13.1 of the Facility Lease.

"**Energy**" shall mean megawatt hours of electric energy.

"**Enforcement Notice**" shall have the meaning specified in Section 5.1 of the Lease Indenture.

"**Engineering Consultant**" shall mean Sargent & Lundy, L.L.C.

"**Engineering Report**" shall mean the report of the Engineering Consultant, dated August 30, 2024.

"**Environmental Condition**" shall mean any action, omission, event, condition or circumstance, including the presence of any Hazardous Substance, that does or reasonably could (i) require assessment, investigation, abatement, correction, removal or remediation under any Environmental Law, (ii) give rise to any obligation or liability of any nature (whether civil or criminal, arising under a theory of negligence or strict liability, or otherwise) under any Environmental Law, or (iii) constitute a violation of or non-compliance with any Environmental Law.

"**Environmental Laws**" shall mean any federal, state or local laws, common law, ordinances, rules, orders, statutes, decrees, judgments, injunctions, directives, permits, licenses, approvals, codes and regulations relating to the environment, human health, natural resources or Hazardous Substances, now or hereafter in effect and as each may from time to time be amended, supplemented or supplanted.

"**Equity Breakage**" shall mean, with respect to a Called Amount, an amount equal to the excess, if any, of the Discounted Value with respect to the Called Amount of such Equity Investment over the amount of such Called Amount, *provided* that the Equity Breakage may in no event be less than zero.

"**Equity Collateral Agent**" shall mean Wilmington Trust, National Association, or any successor thereto, as collateral agent appointed pursuant to the Equity Note Purchase Documents.

"**Equity Guarantor**" shall have the meaning specified in Section 7.1 of the Participation Agreement.

"**Equity Guaranty**" shall mean any guaranty agreement guaranteeing the obligations of the Equity Investor or entered into pursuant to Section 7.1 of the Participation Agreement in form and substance substantially in the form of Exhibit G to the Participation Agreement.

"**Equity Investment**" shall mean the amount specified under the heading "Equity Investment" in Schedule 4 to the Participation Agreement.

"**Equity Investor**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement; *provided* that if the Membership Interests are transferred pursuant to the Participation Agreement such that more than one person is a holder thereof, the term "Equity Investor" shall be deemed to include each holder of the Membership Interests.

"**Equity Investor LLC Agreement**" shall mean the limited liability company agreement, dated on or about the Effective Date, between the Owner Participant and the Equity Manager.

"**Equity Investor's Lien**" shall mean, with respect to the Equity Investor, any Equity Note Purchaser, the Equity Note Purchaser or the Equity Manager, any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Claims against or any act or omission of the Equity Investor, an Equity Note Purchaser or the Equity Manager or any Affiliate of any thereof that are not related to, or that are in violation of, any Transaction Document or the transactions contemplated thereby or that are in breach of any covenant or agreement of the Equity Investor or the Equity Manager set forth therein, (ii) Taxes against the Equity Investor, any Equity Note Purchaser, the Equity Manager or any respective Affiliate thereof that are not indemnified against by TVA pursuant to any Transaction Document or (iii) Claims against or affecting the Equity Investor, any Equity Note Purchaser, the Equity Manager or any respective Affiliate thereof arising out of the voluntary or involuntary transfer by the Equity Manager or the Equity Investor (except as contemplated or permitted by the Transaction Documents) of any portion of the Equity Investor's Membership Interests.

"**Equity Manager**" shall have the meaning set forth in the introductory paragraph of the Participation Agreement.

"**Equity Note**" shall mean, with respect to any Equity Note Purchaser, the Equity Note issued by the Equity Investor as of the Closing Date to such Equity Note Purchaser substantially in the form attached as Exhibit 1 to the Equity Note Purchase Agreement.

"**Equity Note Purchase Agreement**" shall mean the Note Purchase Agreement, dated as of the Closing Date, between the Equity Investor and the Equity Note Purchasers.

"**Equity Note Purchase Documents**" shall mean the Equity Note Purchase Agreement, the Equity Notes, the Equity Pledge Agreement and the Equity Investor LLC Agreement.

"**Equity Note Purchaser**" or "**Equity Note Purchasers**" shall mean the Persons set forth under the caption "Equity Note Purchaser" on Schedule 4 to the Participation Agreement.

"**Equity Note Purchaser's Percentage Interest of the Notes**" shall mean, as of any date of determination, the percentage of the outstanding principal amount of Equity Notes held by the applicable Equity Note Purchaser.

"**Equity Placement Agent**" shall mean Morgan Stanley & Co. LLC.

"**Equity Pledge Agreement**" shall mean the Pledge Agreement, dated as of the Closing Date, between the Equity Investor and the Equity Collateral Agent.

"**Equity Portion**" shall mean the separate portions of the Net TV Amount (Equity Portion), which portions correspond to the Equity Investment and each series of Additional Equity Investment that may have been issued from time to time and are determined by multiplying (a) the Net TV Amount (Equity Portion), by (b) the fraction (i) the numerator of which is the outstanding principal amount of the applicable Equity Investment or such series of Additional Equity Investment and (ii) the denominator of which is the aggregate outstanding principal amount of the Equity Investment and the Additional Equity Investments.

"**ERISA**" shall mean the Employee Retirement Income Security Act of 1974, as amended from time to time.

"**Event of Loss**" shall mean, with respect to any Unit or Units, any of the following events:

(a) loss of such Unit or Units or use thereof due to destruction or damage to such Unit or Units, the Common Facilities or the Global Common Facilities that is beyond economic repair or that renders such Unit or Units permanently unfit for normal use;

(b) damage to such Unit or Units, the Common Facilities or the Global Common Facilities that results in an insurance settlement with respect to such Unit or Units on the basis of a total loss or an agreed constructive or a compromised total loss of such Unit or Units; and

(c) seizure, condemnation, confiscation or taking of, or requisition of title to or use of, all or substantially all of a Unit or Units, the Common Facilities or the Global Common Facilities by any Governmental Entity, which in the case of a requisition of use prevents the Facility Lessee from operating and maintaining all or substantially all of the Facility, such Unit or Units or the Facility Site for a period of 365 days or more, in each case following any contest thereof and exhaustion of all permitted appeals or an election by TVA not to pursue such appeals.

"**Evidences of Indebtedness**" shall have the meaning specified in the Bond Resolution.

"**Excepted Payments**" shall mean and include (a)(i) any indemnity or other payment (whether or not constituting Supplemental Lease Rent and whether or not a Lease Event of Default exists) payable to the Equity Investor, the Equity Manager, any Equity Note Purchaser, the Lessor Manager or to their respective successors and permitted assigns (other than the Lease Indenture Trustee) pursuant to Section 2.4, 9.1 or 9.2 of the Participation Agreement and Section 11.1 of the Owner Lessor LLC Agreement or (ii) any amount payable by TVA to the Owner Lessor, the Equity Investor, the Lessor Manager, the Equity Manager or any Equity Note Purchaser to reimburse any such Person for its costs and expenses in exercising its rights under the Transaction Documents, (b) insurance proceeds, if any, payable to the Owner Lessor or the Equity Investor under insurance separately maintained by the Owner Lessor or the Equity Investor with respect to the Facility as permitted by Section 11.1 of the Facility Lease, (c) any amount payable to the Equity Investor as the purchase price of the Equity Investor's Membership Interests in connection with any permitted sale or transfer thereof pursuant to Section 7.1 of the Participation Agreement or Section 13 of the Facility Lease, (d) any amounts payable to the Equity Investor upon exercise by TVA of the Special Lessee Transfer pursuant to Section 12 of the Participation Agreement; (e) all other fees expressly payable to the Owner Lessor, the Equity Investor, the Lessor Manager, the Equity Manager or any Equity Note Purchaser under the Transaction Documents; (f) any amounts payable by TVA to the Owner Lessor pursuant to Section 13.2 of the Facility Lease; and (vii) any payments in respect of interest to the extent attributable to payments referred to above that constitute Excepted Payments.

"**Excepted Rights**" shall mean the rights specified in Section 5.6 of the Lease Indenture.

"**Excess Amounts**" shall have the meaning specified in Section 9.12 of the Lease Indenture.

"**Exchange Act**" shall mean the Securities Exchange Act of 1934, as amended.

"**Exchange Date**" shall mean, when used with respect to any Lessor Notes being replaced and exchanged for Replacement Power Bonds, the date fixed for such replacement and exchange

by or pursuant to the Lease Indenture or the respective Lessor Notes, which date shall be a Termination Date.

"**Excluded Property**" shall mean Excepted Payments and rights reserved to the Owner Lessor and included within Excepted Rights, collectively.

"**Excluded Taxes**" shall have the meaning specified in Section 9.2(b) of the Participation Agreement.

"**Expected Completion Date**" shall have the meaning specified in Section 4.1.2 of the Construction Management Agreement

"**Expiration Date**" shall mean October 1, 2054, the scheduled expiration date of the Facility Lease Term.

"**Facility**" shall have the meaning specified in the first recital of the Participation Agreement.

"**Facility Lease**" shall mean the Facility Lease-Purchase Agreement, dated as of the Closing Date, between the Owner Lessor and TVA, substantially in the form of Exhibit B to the Participation Agreement.

"**Facility Lease Term**" shall have the meaning specified in Section 3.1 of the Facility Lease.

"**Facility Lessee**" shall mean TVA as lessee under the Facility Lease.

"**Facility Lessee's Interest**" shall mean the Facility Lessee's interest in and to the Facility under the Facility Lease and the Ground Interest under the Ground Sublease.

"**Facility Lessor**" shall mean the Owner Lessor as lessor under the Facility Lease.

"**Facility Operating Fee**" shall have the meaning specified in Section 3.5 of the Support Agreement.

"**Facility Operation and Maintenance Expense**" shall mean all payments made, costs incurred, and obligations and liabilities incurred, by TVA for or in connection with engineering, contract preparation, purchasing, repairing, insuring, supervising, recruiting, training, expediting, inspecting, accounting, providing legal services, testing, protecting, operating, insuring, using, decommissioning, retiring, and maintaining the Facility, *including, but not limited to*, Station Service Requirements and all such payments made, and obligations incurred, during an operating emergency, and with respect to the purchase of materials, supplies and spare parts, *but excluding* the Construction Cost of Modifications and any other cost included in a Capital Expenditure Budget. Facility Operation and Maintenance Expenses shall include the properly allocable direct overheads of TVA in the operation and maintenance of the Facility. Facility Operation and Maintenance Expenses

shall be determined under and in accordance with the Uniform System of Accounts and shall be in accordance with the Operation and Maintenance Expense Budget in effect from time to time. There shall be credited against Facility Operation and Maintenance Expenses for such Month the proceeds of the sale by TVA of any surplus materials or supplies constituting part of, or used in connection with, the Facility. Facility Operation and Maintenance Expense shall not include any payments made by the Ground Lessee for Taxes pursuant to Section 3.2 of the Ground Lease and payments made, or costs incurred, for commodities, equipment or services supplied by TVA to the Facility User under separate contract, including transmission services supplied under contracts negotiated pursuant to Section 5 of the Support Agreement.

"**Facility Site**" shall mean the land on which the Facility is situated, as more particularly described in Exhibit 1 to the Ground Lease.

"**Facility User**" shall mean (i) the Owner Lessor, (ii) any Person to which the Owner Lessor has transferred its interest in the Facility or is leasing the Facility, or (iii) any other Person during the time and to the extent such Person has possession and control of the Facility, in each case under circumstances giving the Owner Lessor or such Person, as the case may be, the right to market and sell Energy from the Facility for its own account, including any Person designated by the Owner Lessor to be so entitled.

"**Fair Market Rental Value**" or "**Fair Market Sales Value**" shall mean with respect to any property or service as of any date, the cash rent or cash price obtainable in an arm's length lease, sale or supply, respectively, between an informed and willing lessee or purchaser under no compulsion to lease or purchase and an informed and willing lessor or seller or supplier under no compulsion to lease or sell or supply the property or service in question, and shall, in the case of an Owner Lessor's Interest, be determined (except as otherwise provided below or in the Transaction Documents) on the basis that (a) the Facility is located on the Facility Site and the conditions contained in Sections 7 and 8 of the Facility Lease shall have been complied with in all respects, (b) the lessee or buyer shall have rights in, or an assignment of, the Transaction Documents to which the Owner Lessor is a party and the obligations relating thereto and (c) the Owner Lessor's Interest is free and clear of all Liens (other than Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens) and taking into account (i) the remaining term of the Ground Lease and the Ground Sublease and (ii) in the case of the Fair Market Rental Value, the terms of the Facility Lease and the Transaction Documents. If the Fair Market Sales Value of the Owner Lessor's Interest is to be determined during the continuance of a Lease Event of Default or in connection with the exercise of remedies by the Owner Lessor pursuant to Section 18 of the Facility Lease, such value shall be determined by an appraiser appointed by the Owner Lessor on an "as-is," "where-is" and "with all faults" basis and shall take into account all Liens (other than Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens); *provided*, *however*, in any such case where the Owner Lessor shall be unable to obtain constructive possession sufficient to realize the economic benefit of the Owner Lessor's Interest, Fair Market Sales Value of the Owner Lessor's Interest shall be deemed equal to $0. If in any case other than in the preceding sentence the parties are unable to agree upon a Fair Market Sales Value of the Owner Lessor's Interest within 30 days after a request therefor has been made, the Fair Market Sales Value of the Owner Lessor's Interest shall be determined by appraisal pursuant to the Appraisal Procedures. Any fair market value determination of a Severable

Modification shall take into consideration any liens or encumbrances to which the Severable Modification being appraised is subject and which are being assumed by the transferee.

"**Federal Power Act**" shall mean the Federal Power Act, as amended.

"**FERC**" shall mean the Federal Energy Regulatory Commission.

"**Final Acceptance**" shall have the meaning specified in Section 5.3 of the Construction Management Agreement.

"**Final Acceptance Certificate**" shall have the meaning specified in Section 5.4 of the Construction Management Agreement.

"**Final Determination**" shall mean (i) a decision, judgment, decree or other order by any court of competent jurisdiction, which decision, judgment, decree or other order has become final after all allowable appeals or rehearings by either party to the action have been exhausted or the time for filing such appeal has expired, or in any case where judicial review shall at the time be unavailable because the proposed adjustment involves a decrease in net operating loss carryforward or a business credit carryforward, a decision, judgment, decree or other order of an administrative official or agency of competent jurisdiction, which decision, judgment, decree or other order has become final (*i.e.*, where all administrative appeals have been exhausted by all parties thereto), (ii) a closing agreement entered into under section 7121 of the Code, or any other settlement agreement entered into in connection with an administrative or judicial proceeding or (iii) the expiration of the time for instituting a claim for refund, or if such a claim was filed, the expiration of the time for instituting suit with respect thereto.

"**Final Shutdown**" shall mean the permanent removal from operation and commercial service of the Facility.

"**Final Shutdown Date**" shall mean the date on which Final Shutdown occurs.

"**Fitch**" shall mean Fitch Ratings, Inc. and any successor thereto.

"**FMV Net Termination Value**" shall have the meaning set forth in Section 18.2(d) of the Facility Lease.

"**GAAP**" shall mean generally accepted accounting principles used in the United States consistently applied.

"**Global Common Facilities**" shall mean all property and facilities intended for use in the operation and maintenance of the Facility and which are common to the operation and maintenance of the Facility, the Johnsonville Combustion Turbine Plant and any other facility existing on or adjacent to the Facility Site, as more particularly described in Attachment C to the Owner Lessor Mortgage.

"**Global Common Facilities Operating Fee**" shall have the meaning specified in Section 2.4 of the Support Agreement.

"**Global Common Facilities Operation and Maintenance Expense**" shall mean all payments made, costs incurred, and obligations and liabilities incurred, by TVA for or in connection with engineering, contract preparation, purchasing, repairing, insuring, supervising, recruiting, training, expediting, inspecting, accounting, providing legal services, testing, protecting, operating, insuring, using, decommissioning, retiring, and maintaining the Global Common Facilities, including depreciation and all such payments made, and obligations incurred, during an operating emergency, and with respect to the purchase of materials, supplies and spare parts. Global Common Facilities Operation and Maintenance Expenses shall include the properly allocable direct overheads of TVA in the operation and maintenance of the Global Common Facility. Global Common Facilities Operation and Maintenance Expenses shall be determined under and in accordance with the Uniform System of Accounts. There shall be credited against Global Common Facilities Operation and Maintenance Expenses for such Month the proceeds of the sale by TVA of any surplus materials or supplies constituting part of, or used in connection with, the Global Common Facilities. Global Common Facilities Operation and Maintenance Expense shall not include any payments made by the Ground Lessee for Taxes pursuant to Section 3.2 of the Ground Lease and any payments made, or costs incurred, for commodities, equipment or services supplied by TVA to the Facility User under separate contract, including transmission services supplied under contracts negotiated pursuant to Section 5 of the Support Agreement.

"**Global Common Facilities Percentage**" at any point in time, shall mean a percentage equal to a fraction the numerator of which is the then current rated Capacity of the Facility and the denominator of which is the sum of the then current rated Capacities of all generating facilities for the operation of which the Global Common Facilities are then utilized.

"**Global Common Facilities Site**" shall mean the land on which the Global Common Facilities are located, as more particularly described in Exhibit 2 to the Ground Lease.

"**Government**" shall mean the United States of America.

"**Governmental Entity**" shall mean and include the Government, any national government, any political subdivision of a national government or of any state, county or local jurisdiction therein or any board, commission, department, division, organ, instrumentality, court or agency of any thereof, but shall not include TVA.

"**Ground Interest**" shall mean (i) a leasehold in the Facility Site, (ii) a nonexclusive easement in, to and over the Global Common Facilities Site and (iii) a nonexclusive easement in, to and over the Access Property, granted pursuant to, and for the purposes and subject to the limitations set forth in, Section 5 of the Ground Lease.

"**Ground Lease**" shall mean the Ground Lease and Easement Agreement, dated as of the Closing Date, among the Ground Lessor and the Ground Lessee, substantially in the form of Exhibit C to the Participation Agreement.

"**Ground Lease Term**" shall have the meaning specified in Section 2.2 of the Ground Lease.

"**Ground Lessee**" shall mean the Owner Lessor as lessee of the Ground Interest under the Ground Lease.

"**Ground Lessor**" shall mean TVA and the Government (solely for purposes of Section 2.1 of the Ground Lease), as lessor of the Ground Interest under the Ground Lease.

"**Ground Lessor's Release Rights**" shall have the meaning specified in Section 4.2 of the Ground Lease.

"**Ground Sublease**" shall mean the Ground Sublease and Easement Agreement, dated as of the Closing Date, among the Ground Sublessor and the Ground Sublessee, substantially in the form of Exhibit D to the Participation Agreement.

"**Ground Sublease Term**" shall have the meaning specified in Section 2.2 of the Ground Sublease.

"**Ground Sublessee**" shall mean TVA and the Government (solely for purposes of Section 2.1 of the Ground Sublease) as sublessee of the Ground Interest under the Ground Sublease.

"**Ground Sublessor**" shall mean the Owner Lessor as sublessor of the Ground Interest under the Ground Sublease.

"**Guaranteed Provisional Acceptance Date**" shall mean September 25, 2025.

"**Hazardous Substance**" shall mean any pollutant, contaminant, hazardous substance, hazardous waste, toxic substance, chemical substance, extremely hazardous substance, petroleum or petroleum derived substance, waste, or additive, asbestos, PCBs, radioactive material, corrosive, explosive, flammable or infectious material, lead, radon or other compound, element, material or substance in any form whatsoever (including products) defined, regulated, restricted or controlled by or under any Environmental Law.

"**Head Lease**" shall mean the Head Lease Agreement, dated as of the Closing Date, among the Head Lessor and the Head Lessee, substantially in the form of Exhibit A to the Participation Agreement.

"**Head Lease Rent**" shall have the meaning specified in Section 3.2(a) of the Head Lease.

"**Head Lease Term**" shall have the meaning specified in Section 3.1 of the Head Lease.

"**Head Lessee**" shall mean the Owner Lessor as lessee of the Facility under the Head Lease.

"**Head Lessor**" shall mean TVA and the Government (solely for purposes of Section 2 of the Head Lease) as lessor of the Facility under the Head Lease.

"**Indemnitee**" shall have the meaning specified in Section 9.1(a) of the Participation Agreement.

"**Indemnity Period**" shall have the meaning specified in Section 11 of the Ground Lease.

"**Independent Appraiser**" shall mean a disinterested, licensed industrial property appraiser who is a member of the Appraisal Institute having experience in the business of evaluating facilities similar to the Facility.

"**Investment Banker**" shall have the meaning specified in Section 2.10(b) of the Lease Indenture.

"**Johnsonville Combustion Turbine Plant**" shall mean the Johnsonville Combustion Turbine Plant consisting of 20 simple-cycle combustion turbine units with a combined summer net generation capacity of 1,269 MW located at a site adjacent to the Facility Site.

"**Johnsonville Construction Contract**" shall have the meaning specified in the first recital of the Construction Management Agreement.

"**Lease Commencement Date**" shall mean the earlier of (i) the date the Facility achieves Substantial Completion in accordance with the Construction Management Agreement and (ii) the Outside Lease Commencement Date.

"**Lease Debt Rate**" shall mean the interest rate under the 2024 Lessor Notes.

"**Lease Default**" shall mean any event or circumstance that, with the passage of time or the giving of notice, or both, would become a Lease Event of Default.

"**Lease Event of Default**" shall have the meaning specified in Section 17 of the Facility Lease.

"**Leasehold Deed of Trust Trustee**" shall mean R. Culver Schmid.

"**Lease Indenture**" shall mean the Indenture of Trust, Deed of Trust and Security Agreement and Fixture Filing, dated as of the Closing Date, among the Owner Lessor, the Lease Indenture Trustee and the Deed of Trust Trustee, substantially in the form of Exhibit E to the Participation Agreement.

"**Lease Indenture Bankruptcy Default**" shall mean any event or occurrence, which, with the passage of time or the giving of notice or both, would become a Lease Indenture Event of Default under Section 4.2(e) or (f) of the Lease Indenture.

"**Lease Indenture Estate**" shall have the meaning specified in the Granting Clause of the Lease Indenture.

"**Lease Indenture Event of Default**" shall have the meaning specified in Section 4.2 of the Lease Indenture.

"**Lease Indenture Payment Default**" shall mean any event or occurrence, which, with the passage of time or the giving of notice or both, would become an Lease Indenture Event of Default under Section 4.2(b) of the Lease Indenture.

"**Lease Indenture Trustee**" shall mean Wilmington Trust, National Association, not in its individual capacity, but solely as Lease Indenture Trustee under the Lease Indenture, and each other Person who may from time to time be acting as Lease Indenture Trustee in accordance with the provisions of the Lease Indenture.

"**Lease Indenture Trustee Office**" shall mean the office to be used for notices to the Lease Indenture Trustee from time to time pursuant to Section 9.5 of the Lease Indenture.

"**Lease Indenture Trustee's Account**" shall mean the account identified as the Lease Indenture Trustee's Account on Schedule 4 of the Participation Agreement.

"**Lease Indenture Trustee's Liens**" shall mean any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Taxes against or affecting the Lease Indenture Trustee, or any Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby, (ii) Claims against or any act or omission of the Lease Indenture Trustee, or Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby or that is in breach of any covenant or agreement of the Lease Indenture Trustee specified therein, (iii) Taxes imposed upon the Lease Indenture Trustee, or any Affiliate thereof, that are not indemnified against by TVA pursuant to any Transaction Document, or (iv) Claims against or affecting the Lease Indenture Trustee, or any Affiliate thereof, arising out of the voluntary or involuntary transfer by the Lease Indenture Trustee of any portion of the interest of the Equity Manager or the Lease Indenture Trustee in the Lessor Estate, other than pursuant to the Transaction Documents.

"**Lessee Person**" shall mean the Facility Lessee, any sublessee of the Facility Lessee or any other Person using or having possession of the Facility during the Facility Lease Term or any portion thereof and any Affiliate, successor, assignee, transferee, agent or employee of any of the foregoing or any Person claiming through any of the foregoing, except that none of the Owner Lessor, the Equity Investor, the Equity Manager, any Equity Note Purchaser nor the Lease Indenture Trustee, nor any Affiliate, successor, assignee, transferee, agent or employee

of any of the foregoing, nor any Person claiming through any of the foregoing, shall be a Lessee Person.

"**Lessor Estate**" shall mean all the estate, right, title and interest of the Owner Lessor in, to and under the Facility, the Ground Interest and the Transaction Documents, including all funds advanced to the Owner Lessor by the Equity Investor, all installments and other payments of Basic Lease Rent, Supplemental Lease Rent, Termination Value, condemnation awards, purchase price, sale proceeds and all other proceeds, rights and interests of any kind for or with respect to the estate, right, title and interest of the Owner Lessor in, to and under the Facility, the Ground Interest, the Transaction Documents, and any of the foregoing.

"**Lessor Manager**" shall have the meaning set forth in the introductory paragraph of the Participation Agreement.

"**Lessor Notes**" shall mean the 2024 Lessor Notes and any Additional Lessor Notes.

"**Lien**" shall mean any mortgage, security deed, security title, pledge, lien, charge, encumbrance, lease, or security interest or title retention arrangement.

"**List of Competitors**" shall mean the initial list attached to the Participation Agreement as Schedule 2, as amended from time to time pursuant to Section 7.1(b) of the Participation Agreement.

"**Majority in Interest of Noteholders**" as of any date of determination, shall mean Noteholders holding in aggregate more than 50% of the total outstanding principal amount of Lessor Notes; *provided*, *however*, that any Lessor Notes held by TVA and/or any Affiliate of TVA shall not be considered outstanding for purposes of this definition unless TVA and/or such Affiliate shall hold title to all the Lessor Notes outstanding.

"**Make Whole Premium**" shall mean, with respect to the Lessor Notes subject to redemption pursuant to the Lease Indenture, an amount equal to the Discounted Present Value of the Lessor Notes *less* the unpaid principal amount of such Lessor Notes; *provided* that the Make Whole Premium shall not be less than zero. For purposes of this definition, the "Discounted Present Value" of any Lessor Notes subject to redemption pursuant to the Lease Indenture shall be equal to the discounted present value of all principal and interest payments scheduled to become due after the date of such redemption in respect of the Lessor Notes, calculated using a discount rate equal to the sum of (i) the yield to maturity on the U.S. Treasury security having a life equal to the remaining average life of the Lessor Notes and (ii) 15 basis points; *provided*, *however*, that if there is no U.S. Treasury security having a life equal to the remaining average life of the Lessor Notes, such discount rate shall be calculated using a yield to maturity interpolated or extrapolated on a straight-line basis (rounding to the nearest calendar month, if necessary) from the yields to maturity for two U.S. Treasury securities having lives most closely corresponding to the remaining average life of the Lessor Notes.

"**Material Adverse Effect**" shall mean with respect to any Person a materially adverse effect on (i) the business, assets, revenues, results of operations, or financial condition of such Person, (ii) the ability of such Person to perform its obligations under the Transaction Documents, or (iii) the

validity or enforceability of the Transaction Documents, the Liens granted thereunder, or the rights and remedies thereto.

"**Maximum Net Generating Capacity**" shall mean the maximum net Capability of the Facility to produce Energy under conditions existing from time to time.

"**Membership Interests**" shall mean the membership interests of the Equity Investor in the Owner Lessor.

"**Modification**" shall mean a modification, alteration, improvement, addition, betterment or enlargement of the Facility, including any Required Modifications and Optional Modifications, but not Components.

"**Month**" shall mean a calendar month.

"**Moody's**" shall mean Moody's Investors Service, Inc. and any successor thereto.

"**Net TV Amount**" shall mean the FMV Net Termination Value or the Sale Net Termination Value, as applicable.

"**Net TV Amount (Debt Portion)**" shall be the amount equal to the product of (a) the applicable Net TV Amount as of the applicable Termination Date, *multiplied by* (b) a fraction (i) the numerator of which is the Termination Value (Debt Portion) as of such Termination Date and (ii) the denominator of which is the Termination Value as of such Termination Date.

"**Net TV Amount (Debt Portion) Rate**" shall mean, with respect to the applicable Debt Portion, a rate per annum equal to (a) 7.078% per annum with respect to the Debt Portion that corresponds to the 2024 Lessor Notes; or (b) the interest rate on the applicable Additional Lessor Notes *plus* two percent (2%) per annum with respect to the Debt Portion that corresponds to such Additional Lessor Notes.

"**Net TV Amount (Equity Portion)**" shall be the amount equal to the product of (a) the applicable Net TV Amount as of the applicable Termination Date, *multiplied by* (b) a fraction (i) the numerator of which is the Termination Value (Equity Portion) as of such Termination Date and (ii) the denominator of which is the Termination Value as of such Termination Date.

"**Net TV Amount (Equity Portion) Rate**" shall mean, with respect to the applicable Equity Portion, a rate per annum equal to (a) 7.74% per annum with respect to the Equity Portion that corresponds to the Equity Investment; and (b) the interest rate on the applicable Additional Equity Investment *plus* two percent (2%) per annum with respect to the Equity Portion that corresponds to such Additional Equity Investment.

"**Nonseverable Modifications**" shall mean any Modification that is not a Severable Modification.

"**Note Register**" shall have the meaning specified in Section 2.8 of the Lease Indenture.

"**Noteholder**" shall mean any holder from time to time of outstanding Lessor Notes, and each such holder's successors and permitted assigns.

"**Offering Circular**" shall mean the Offering Circular, dated September 25, 2024, with respect to the 2024 Lessor Notes.

"**Officer's Certificate**" shall mean with respect to any Person a certificate signed by the Responsible Officer of such Person.

"**Operating Fee**" shall mean the Global Common Facilities Operating Fee and, if the Owner Lessor shall elect to appoint TVA operator of the Facility pursuant to Section 3.1 of the Support Agreement and TVA shall not be precluded by law from so serving, the Facility Operating Fee.

"**Operation and Maintenance Expense**" shall mean the Facility Operation and Maintenance Expense and the Global Common Facilities Operation and Maintenance Expense.

"**Operation and Maintenance Expense Budget**" shall have the meaning set forth in Section 4.4(c) of the Support Agreement.

"**Operative Documents**" shall mean the Participation Agreement, the Head Lease, the Facility Lease, the Ground Lease, the Ground Sublease, any Equity Guaranty, the Owner Lessor Mortgage, the Lease Indenture, the Lessor Notes, the Owner Lessor LLC Agreement and the Support Agreement.

"**Optional Modification**" shall have the meaning specified in Section 8.2 of the Facility Lease.

"**Other Exchange Date Payment Amounts**" shall mean the following amounts (without duplication) to be paid by the Facility Lessee on the Exchange Date: (a) if the Exchange Date is also a Rent Payment Date, Basic Lease Rent payable on such Exchange Date; *plus* (b) all reasonable documented out-of-pocket costs and expenses incurred by the Owner Lessor, the Equity Investor, the Equity Note Purchasers and the Lease Indenture Trustee in connection with the exercise of the Early Buy Out (without duplication of any such costs and expenses payable pursuant to the Facility Lease); *plus* (c) any other Supplemental Lease Rent payments due and unpaid on the Exchange Date under any other Transaction Document.

"**Other Redemption Date Payment Amounts**" shall mean the following amounts (without duplication) to be paid by the Facility Lessee on the Redemption Date: (a) if the Redemption Date is also a Rent Payment Date, Basic Lease Rent payable on such Redemption Date; plus (b) all reasonable documented out-of-pocket costs and expenses incurred by the Owner Lessor, the Equity Investor, the Equity Note Purchasers and the Lease Indenture Trustee in connection with the exercise of the Early Buy Out (without duplication of any such costs and

expenses payable pursuant to the Facility Lease); *plus* (c) any other Supplemental Lease Rent payments due and unpaid on the Redemption Date under any other Transaction Document.

"**Outside Lease Commencement Date**" shall mean September 25, 2025.

"**Overdue Rate**" (a) when used with reference to the Lessor Notes, Basic Lease Rent (Debt Portion) or Termination Value (Debt Portion) shall mean two percent (2%) per annum over the greater of (i) the Base Rate and (ii) the stated interest rate on the Lessor Notes, (b) when used with reference to the Basic Lease Rent (Equity Portion) or Termination Value (Equity Portion), shall mean two percent (2%) over the greater of (A) the Base Rate and (B) 5.74% per annum or (c) when used with reference to any amount which is due and owing and not referenced in clause (a) or (b) of this definition, the Base Rate *plus* two percent (2%) per annum.

"**Owner Lessor**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**Owner Lessor Indemnified Parties**" shall have the meaning specified in Section 7.2 of the Construction Management Agreement.

"**Owner Lessor LLC Agreement**" shall mean the limited liability company agreement of the Owner Lessor, dated on or about the Effective Date, between the Equity Investor, and the Lessor Manager.

"**Owner Lessor Mortgage**" shall mean the Leasehold Deed of Trust, Security Agreement and Fixture Filing, dated as of the Closing Date, made by the Owner Lessor to the Leasehold Deed of Trust Trustee and TVA, substantially in the form of Exhibit I to the Participation Agreement.

"**Owner Lessor's Account**" shall mean the account identified as the Owner Lessor's Account on Schedule 4 to the Participation Agreement.

"**Owner Lessor's Interest**" shall mean the Owner Lessor's right, title and interest in and to (i) the Facility under the Head Lease, (ii) the Ground Interest under the Ground Lease and (iii) the Support Agreement.

"**Owner Lessor's Lien**" shall mean any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Taxes against or affecting the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby, (ii) Claims against, or any act or omission of, the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby or that is in breach of any covenant or agreement of the Lessor Manager or the Owner Lessor specified therein, (iii) Taxes imposed upon the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof that are not indemnified against by TVA pursuant to any Transaction Document, or (iv) Claims against or affecting the Lessor Manager or the Owner Lessor, or

any respective Affiliate thereof arising out of the voluntary or involuntary transfer by the Lessor Manager or the Owner Lessor of any portion of the interest of the Lessor Manager or the Owner Lessor in the Owner Lessor's Interest, other than pursuant to the Transaction Documents.

"**Owner Participant**" shall mean the owner of the membership interests of the Equity Investor which shall mean GSS Holdings (Johnsonville), Inc. until such time, if any, that it has transferred such membership interest in accordance with the Equity Investor LLC Agreement, and, thereafter shall mean such transferee or its permitted successor or assign.

"**Partial Early Buy Out**" shall mean TVA's exercise of the Early Buy Out with respect to less than all Units.

"**Partial Event of Loss**" shall mean an Event of Loss with respect to less than all Units.

"**Participation Agreement**" shall mean the Participation Agreement, dated as of the Effective Date, among TVA, the Owner Lessor, the Lessor Manager, the Equity Manager, the Equity Investor and the Lease Indenture Trustee.

"**Paying Agent**" shall have the meaning specified in Section 2.6 of the Lease Indenture.

"**Permitted Closing Date Liens**" shall mean those matters listed on Exhibit 5 to the Ground Lease.

"**Permitted Instruments**" shall mean (a) Permitted Securities, (b) overnight loans to or other customary overnight investments in commercial banks of the type referred to in paragraph (d) below, (c) open market commercial paper of any corporation (other than TVA or any Affiliate thereof) incorporated under the laws of the United States or any state thereof which is rated not less than "prime 1" or its equivalent by Moody's and "A 1" or its equivalent by S&P maturing within one year after such investment, or such other comparable rating by a nationally recognized rating agency, (d) certificates of deposit issued by commercial banks organized under the laws of the United States or any state thereof or a domestic branch of a foreign bank (i) having a combined capital and surplus in excess of $500,000,000 and (ii) which are rated "AA" or better by S&P and "Aa2" or better by Moody's, or such other comparable rating by a nationally recognized rating agency; *provided* that no more than $20,000,000 may be invested in such deposits at any one such bank and (e) a money market fund registered under the Investment Company Act of 1940, as amended, the portfolio of which is limited to Permitted Securities.

"**Permitted Liens**" shall mean (i) the interests of TVA, the Equity Investor, the Owner Lessor and the Lease Indenture Trustee under any of the Transaction Documents; (ii) all Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens; (iii) the interests of TVA in the Facility and the Facility Site; (iv) Permitted Closing Date Liens; (v) Liens for taxes either not delinquent or being contested in good faith and by appropriate proceedings if adequate reserves with respect thereto are maintained on the books of TVA if required by generally accepted accounting principles, so long as such proceedings shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (vi) materialmen's, mechanics', workers', repairmen's, employees' or other like

liens arising in the ordinary course of business for amounts either not delinquent or being contested in good faith and by appropriate proceedings if adequate reserves with respect thereto are maintained on the books of TVA if required by generally accepted accounting principles, so long as such proceedings shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (vii) liens arising out of judgments or awards against TVA with respect to which at the time an appeal or proceeding for review is being prosecuted in good faith by TVA, so long as such judgment, award or appeal shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (viii) utility rights of way and easements; and (ix) Liens permitted pursuant to Section 4.2 or 4.3 of the Ground Lease.

"**Permitted Post Facility Lease Term Liens**" shall mean the Permitted Liens referred to in clauses (ii), (iii) and (ix) of the definition thereof.

"**Permitted Securities**" shall mean securities (and security entitlements with respect thereto) that (a) are (i) direct obligations of the United States of America or obligations guaranteed as to principal and interest by the full faith and credit of the United States of America, and (ii) securities issued by agencies of the U.S. federal government whether or not backed by the full faith and credit of the United States rated "AA" and "Aa2" by S&P and Moody's, respectively, which, in either case under clauses (i) or (ii) are not callable or redeemable at the option of the issuer thereof, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government obligation or a specific payment of interest on or principal of any such U.S. Government obligation held by such custodian for the account of the holder of a depository receipt, *provided* that (except as required by law) such custodian is not authorized to make any deduction in the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government obligation or the specific payment of interest on or principal of the U.S. Government obligation evidenced by such depository receipt and (b) have a stated maturity no later than the date of the expected use of the funds.

"**Person**" shall mean any individual, corporation, cooperative, partnership, joint venture, association, joint stock company, limited liability company, trust, unincorporated organization or government or any agency or political subdivision thereof.

"**Personalty**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Plan**" shall mean any "employee benefit plan" (as defined in Section 3(3) of ERISA) that is subject to ERISA, any "plan" (as defined in Section 4975(e)(1) of the Code) that is subject to Section 4975 of the Code, any trust created under any such plan or any "governmental plan" (as defined in Section 3(32) of ERISA or Section 414(d) of the Code) that is organized in a jurisdiction having prohibitions on transactions with government plans similar to those contained in Section 406 of ERISA or Section 4975 of the Code.

"**Point or Points of Interconnection**" shall mean the points of interconnection of the transmission facilities owned by TVA with regional transmission lines of entities to which TVA wheels power on behalf of the Owner Lessor pursuant to Section 5 of the Support Agreement, as such points may be agreed upon by the Parties from time to time.

"**Power**" shall mean megawatts of Capacity and associated Energy.

"**Proceeds**" shall mean the proceeds from the sale of the 2024 Lessor Notes by the Owner Lessor to the Noteholders on the Closing Date.

"**Provisional Acceptance**" shall have the meaning specified in Section 5.1 of the Construction Management Agreement.

"**Provisional Acceptance Certificate**" shall have the meaning specified in Section 5.2 of the Construction Management Agreement.

"**Prudent Industry Practice**" shall mean, at a particular time, either (a) any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry with respect to facilities similar in nature to the Facility, or (b) any of the practices, methods and acts which, in the exercise of reasonable judgment at the time the decision was made, could have been expected to accomplish the desired result at the lowest reasonable cost consistent with good business practices, reliability, safety and expedition. "Prudent Industry Practice" is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be a spectrum of possible practices, methods or acts.

"**Punch List**" shall have the meaning specified in Section 2.3.2 of the Construction Management Agreement.

"**Quarter**" means a calendar three-month period, ending on March 31, June 30, September 30 or December 31.

"**Rates**" shall have the meaning specified in Section 5.5 of the Participation Agreement.

"**Rating Agencies**" shall mean S&P, Moody's and Fitch and any other comparable nationally recognized rating agency.

"**Real Property**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Reasonable Basis**" for a position shall exist if tax counsel may properly advise reporting such position on a tax return in accordance with Formal Opinion 85 352 issued by the Standing Committee on Ethics and Professional Responsibility of the American Bar Association (or any successor to such opinion).

"**Rebuilding Closing Date**" shall have the meaning specified in Section 10.3(b) of the Facility Lease.

"**Redemption Date**" shall mean, when used with respect to any Lessor Notes to be redeemed, the date fixed for such redemption by or pursuant to the Lease Indenture or the respective Lessor Notes, which date shall be a Termination Date.

"**Registrar**" shall have the meaning specified in Section 2.8 of the Lease Indenture.

"**Regulatory Event of Loss**" shall mean a condition or circumstance where, if elected by the Owner Lessor, the Equity Investor or one or more affected Equity Note Purchasers (by notice to the Facility Lessee) within 12 months of obtaining knowledge of the event or circumstance causing a "Regulatory Event of Loss," the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers become subject to rate of return regulation or other applicable public utility law or regulation of a Governmental Entity that, in the reasonable opinion of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers, is materially burdensome to the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers and cannot be remedied by cooperation among the parties and the taking of reasonable measures to alleviate the source or consequence of any such regulation or law, *provided* that: (i) such regulation or law is applicable solely as a result of the participation of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers in the transactions contemplated by the Transaction Documents and not as a result of (A) any other investments, loans, or other business activities of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates or the nature of properties or assets owned, held or otherwise available to the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates or (B) a failure of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates to perform routine, administrative or ministerial actions which would not have a material adverse consequence on the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates; and (ii) the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers would no longer be subject to such law or regulation if the Owner Lessor terminated the Head Lease and the Facility Lease and transferred possession of the Facility to the Head Lessor, the Equity Investor disposed of its Membership Interests, or such affected Equity Note Purchaser or Purchasers disposed of its or their Equity Notes as the case may be.

"**Regulatory Event of Loss Termination Payment**" shall mean, with respect to any Termination Date, an amount equal to the product of (a) the Termination Value (Equity Portion) with respect to such Termination Date, *multiplied* by (b) the applicable Equity Note Purchaser's Percentage Interest of the Notes.

"**Related Party**" shall mean, with respect to any Person or its successors and assigns, an Affiliate of such Person or its successors and assigns and any director, officer, servant, employee or agent of that Person or any such Affiliate or their respective successors and assigns; *provided* that the Lessor Manager and the Owner Lessor shall not be treated as Related Parties to each other and neither the Owner Lessor nor the Lessor Manager shall be treated as a Related Party to the Equity Investor except that, for purposes of Section 9 of the Participation Agreement, the Owner Lessor will be treated as a Related Party to the Equity Investor to the extent that the Owner Lessor acts on the express direction or with the express consent of the Equity Investor.

"**Released Property**" shall have the meaning specified in Section 4.2 of the Ground Lease.

"**Relevant Portion**" shall mean (a) with respect to Section 10 of the Facility Lease, the Unit or Units suffering an Event of Loss or (b) with respect to Section 15 of the Facility Lease, the Unit or Units subject to TVA's exercise of the Early Buy Out, in either case with respect to a termination of the Facility Lease with respect to less than the entire Facility.

"**Reinvestment Yield**" shall mean, with respect to the Called Amount of any Equity Investment, 0.50% over the yield to maturity implied by the yield(s) reported as of 10:00 a.m. (New York City time) on the second Business Day preceding the Settlement Date with respect to such Called Amount, on the display designated as "Page PX1" (or such other display as may replace Page PX1) on Bloomberg Financial Markets for the most recently issued actively traded on-the-run U.S. Treasury securities **("Reported")** having a maturity equal to the Remaining Average Life of such Remaining Scheduled Payments as of such Settlement Date. If there are no such U.S. Treasury securities Reported having a maturity equal to such Remaining Average Life, then such implied yield to maturity will be determined by (a) converting U.S. Treasury bill quotations to bond equivalent yields in accordance with accepted financial practice and (b) interpolating linearly between the yields Reported for the applicable most recently issued actively traded on-the-run U.S. Treasury securities with the maturities (1) closest to and greater than such Remaining Average Life and (2) closest to and less than such Remaining Average Life. The Reinvestment Yield shall be rounded to the number of decimal places as appears in the interest rate of the applicable Equity Investment. If such yields are not Reported or the yields Reported as of such time are not ascertainable (including by way of interpolation), then "**Reinvestment Yield**" shall mean, with respect to the Called Amount of any Equity Investment, 0.50% over the yield to maturity implied by the U.S. Treasury constant maturity yields reported, for the latest day for which such yields have been so reported as of the second Business Day preceding the Settlement Date with respect to such Called Amount, in Federal Reserve Statistical Release H.15 (or any comparable successor publication) for the U.S. Treasury constant maturity having a term equal to the Remaining Average Life of such Called Amount as of such Settlement Date. If there is no such U.S. Treasury constant maturity having a term equal to such Remaining Average Life, such implied yield to maturity will be determined by interpolating linearly between (1) the U.S. Treasury constant maturity so reported with the term closest to and greater than such Remaining Average Life and (2) the U.S. Treasury constant maturity so reported with the term closest to and less than such Remaining Average Life. The Reinvestment Yield shall be rounded to the number of decimal places as appears in the interest rate of the applicable Equity Investment.

"**Remaining Average Life**" shall mean, with respect to any Called Amount, the number of years obtained by dividing (i) such Called Amount into (ii) the sum of the products obtained by multiplying (a) the return of equity component of each Remaining Scheduled Payment with respect to such Called Amount by (b) the number of years, computed on the basis of a 360-day year composed of twelve 30-day months, that will elapse between the Settlement Date with respect to such Called Amount and the scheduled due date of such Remaining Scheduled Payment.

"**Remaining Scheduled Payments**" shall mean, with respect to the Called Amount of any Equity Investment, all payments of Basic Lease Rent (Equity Portion) that would be due after the Settlement Date if no payment of such Called Amount were made prior to its scheduled due date.

"**Remediate**" or "**Remediation**" means an action or actions required by a Governmental Entity pursuant to Applicable Law to address an Environmental Condition or a release of Hazardous Substances, including monitoring, investigation, assessment, treatment, cleanup, containment, removal, mitigation, response or remediation work in connection with such Environmental Conditions or a release of Hazardous Substances.

"**Removable Modification**" shall have the meaning specified in Section 8.3 of the Facility Lease.

"**Rent**" shall mean Basic Lease Rent and Supplemental Lease Rent.

"**Rent Payment Date**" shall mean each April 1 and October 1, commencing April 1, 2025, to and including October 1, 2054.

"**Replacement Component**" shall have the meaning specified in Section 7.2 of the Facility Lease.

"**Replacement Power Bond**" shall have the meaning specified in Section 2.10(c) of the Lease Indenture.

"**Reported**" shall have the meaning specified in the definition of Reinvestment Yield in this Appendix A.

"**Required Modification**" shall have the meaning specified in Section 8.1 of the Facility Lease.

"**Responsible Officer**" shall mean (a) with respect to a corporation or limited liability company, its Chairman of the Board, its President, any Senior Vice President, the Chief Financial Officer, any Vice President, the Treasurer, its Independent Manager or any other management employee (i) that has the power to take the action in question and has been authorized, directly or indirectly, by the Board of Directors (or equivalent body) of such Person, (ii) working under the direct supervision of such Chairman of the Board, President, Senior Vice President, Chief Financial Officer, Vice President or Treasurer, and (iii) whose responsibilities include the administration of the transactions and agreements contemplated by the Transaction Documents, (b) with respect to the Lease Indenture Trustee, an officer in its corporate trust administration department, (c) with respect to TVA, its Chairman of the Board, its President, any Senior Vice President, the Chief Financial Officer, any Vice President, the Treasurer or any other management employee, (d) with respect to the Owner Lessor, the Lessor Manager and (e) with respect to the Equity Investor, the Equity Manager.

"**Revenues**" shall have the meaning specified in the Granting Clause of the Lease Indenture.

"**S&P**" shall mean S&P Global Ratings or any successor thereto.

"**Sale Net Termination Value**" shall have the meaning set forth in Section 18.2(e) of the Facility Lease.

"**Scheduled Closing Date**" shall mean October 2, 2024 and any date set for the Closing in a notice of postponement pursuant to Section 2.3(a) of the Participation Agreement.

"**Scheduled Payment Date**" shall mean a Rent Payment Date.

"**SEC**" shall mean the Securities and Exchange Commission, as from time to time constituted, created under the Securities Exchange Act of 1934.

"**Secured Indebtedness**" shall have the meaning specified in Section 1 of the Lease Indenture.

"**Secured Obligations**" shall have the meaning set forth in the Granting Clause of the Owner Lessor Mortgage.

"**Securities Act**" shall mean the Securities Act of 1933, as amended.

"**Security**" shall have the same meaning as in Section 2(a)(1) of the Securities Act.

"**Service Commencement Date**" shall mean the date upon which the Facility Lease expires or terminates and possession and control of the Owner Lessor's Interest is delivered to the Owner Lessor or its designee pursuant to Section 5 or Section 18.2 of the Facility Lease.

"**Settlement Date**" shall mean, with respect to the Called Amount of any Equity Investment, the date, which shall be a Termination Date, on which such Called Amount is to be repaid pursuant to Section 15 of the Facility Lease.

"**Severable Modification**" shall mean any Modification that is removable without causing material damage to the Facility that cannot readily be repaired.

"**Significant Lease Default**" shall mean any of: (i) TVA shall fail to make any payment of Basic Lease Rent or Termination Value on the relevant payment date or after the same shall have become due and payable, (ii) TVA shall fail to make any payment of Supplemental Lease Rent in excess of $350,000 (other than Excepted Payments, or Termination Value or any amount determined by reference thereto) on the relevant payment date after the same shall have become due and payable, except to the extent such amounts are the subject of a good faith dispute and have not been established to be due and payable, or (iii) an event which is or, with the passage of time would be, a Lease Event of Default under Section 17(e) or (f) of the Facility Lease.

"**Significant Lease Indenture Default**" shall mean a failure by the Owner Lessor to make any payment of principal or interest on the Lessor Notes after the same shall have become due and payable.

"**Similar Law**" shall mean any federal, state or local law that is substantially similar to Title I of ERISA or Section 4975 of the Code.

"**Site**" shall mean the Facility Site, the Global Common Facilities Site and the Access Property.

"**Special Lessee Transfer**" shall have the meaning specified in Section 12 of the Participation Agreement.

"**Special Lessee Transfer Amount**" shall mean for any Termination Date, the amount determined as follows: (i) the Termination Value (Equity Portion) under the Facility Lease on such Termination Date; *plus* (ii) any unpaid Basic Lease Rent (Equity Portion) due on or before such Termination Date; *plus* (iii) the Equity Breakage.

"**Station Service Requirements**" shall mean the Capacity and Energy required during any period (including initial start-up and testing) and supplied from any source other than the Facility for operation of all on-site process and auxiliary equipment and systems used or useful in connection with the operation and maintenance of the Facility.

"**Subcontractors**" shall have the meaning specified in the third recital of the Construction Management Agreement.

"**Subordinated Resolution**" shall mean the Tennessee Valley Authority Subordinated Debt resolution adopted March 29, 1995, as amended and supplemented.

"**Supplemental Financing**" shall have the meaning specified in Section 11.2(b) of the Participation Agreement.

"**Supplemental Lease Rent**" shall mean any and all amounts, liabilities and obligations (other than Basic Lease Rent or any amount determined by reference thereto) that TVA assumes, agrees to or is required to pay under the Transaction Documents (whether or not identified as "Supplemental Lease Rent") to the Owner Lessor or any other Person, including Termination Value and Make Whole Premium.

"**Support Agreement**" shall mean the Operating and Support Agreement, dated as of the Closing Date, between the Owner Lessor and TVA, substantially in the form of Exhibit H to the Participation Agreement.

"**Tax**" or "**Taxes**" shall mean all fees, taxes (including sales taxes, use taxes, stamp taxes, value added taxes, ad valorem taxes and property taxes (personal and real, tangible and intangible)), levies, assessments, withholdings and other charges and impositions of any nature, plus all related interest, penalties, fines and additions to tax, now or hereafter imposed by any federal, state, local or foreign government or other taxing authority (including penalties or other amounts payable pursuant to subtitle B of Title I of ERISA).

"**Tax Advance**" shall have the meaning specified in Section 9.2(g)(iii)(4) of the Participation Agreement.

"**Tax Benefit**" shall have the meaning specified in Section 9.2(e) of the Participation Agreement.

"**Tax Claim**" shall have the meaning specified in Section 9.2(g)(i) of the Participation Agreement.

"**Tax Event**" shall mean any event or transaction that results in a Noteholder being subject to U.S. federal income tax on a different amount, in a different manner or at a different time than would have been the case if such event had not occurred.

"**Tax Indemnitee**" shall have the meaning specified in Section 9.2(a) of the Participation Agreement.

"**Term-Out Notice Date**" shall mean the date on which TVA delivers written notice to the Owner Lessor of TVA's election to pay the Net TV Amount in accordance with Section 18.4 of the Facility Lease.

"**Term-Out Payment Dates**" shall have the meaning specified in Section 18.4 of the Facility Lease.

"**Termination Date**" shall mean each of the monthly dates during the Facility Lease Term identified as a "Termination Date" on Schedule 2 of the Facility Lease.

"**Termination Value**" for any Termination Date shall mean an amount equal to the sum of (a) Termination Value (Debt Portion) and (b) Termination Value (Equity Portion) for such Termination Date.

"**Termination Value (Debt Portion)**" for any Termination Date shall mean the amount set forth under the heading "Termination Value (Debt Portion)" on Schedule 2 of the Facility Lease for such Termination Date.

"**Termination Value (Equity Portion)**" for any Termination Date shall mean the amount set forth under the heading "Termination Value (Equity Portion)" on Schedule 2 of the Facility Lease for such Termination Date.

"**Transaction**" shall mean, collectively, the transactions contemplated under the Participation Agreement and the other Transaction Documents.

"**Transaction Costs**" shall mean the following costs to the extent substantiated or otherwise supported in reasonable detail:

(i) the cost of reproducing and printing the Transaction Documents and the Offering Circular and all costs and fees, including filing and recording fees and recording, transfer, mortgage, intangible and similar taxes in connection with the execution, delivery, filing and recording of the Head Lease, the Facility Lease, the Ground Lease, the Ground Sublease and any other Transaction Document, and any other document required to be filed or recorded pursuant to the provisions hereof or of any other Transaction Document and any Uniform Commercial Code filing fees in respect of the perfection of any security interests created by any of the Transaction Documents or as otherwise reasonably required by the Owner Lessor or the Lease Indenture Trustee;

(ii) the reasonable fees and expenses of Pillsbury Winthrop Shaw Pittman LLP, counsel to the Owner Lessor, the Equity Investor and the Equity Note Purchasers, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents, subject to the terms set forth in the fee arrangement between TVA and Pillsbury Winthrop Shaw Pittman LLP;

(iii) the reasonable fees and expenses of Bass, Berry & Sims PLC, Tennessee counsel to the Equity Investor and the Underwriters, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents, subject to the terms set forth in the fee agreement between TVA and Bass, Berry & Sims PLC dated as of July 17, 2024;

(iv) the reasonable fees and expenses of Orrick, Herrington & Sutcliffe LLP, special counsel to TVA, and Baker, Donelson, Bearman, Caldwell, & Berkowitz, PC, Tennessee counsel to TVA, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement, the other Transaction Documents and the Underwriting Agreement and the preparation of the Offering Circular, subject to the terms of the fee agreement between TVA and Orrick, Herrington & Sutcliffe LLP dated as of April 9, 2024, and the fee arrangement between TVA and Baker, Donelson, Bearman, Caldwell, & Berkowitz, PC;

(v) the reasonable fees and expenses of Morris James LLP, counsel for the Owner Lessor, the Lessor Manager, the Equity Manager and the Equity Collateral Agent, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents;

(vi) the reasonable fees and expenses of White & Case, LLP, counsel to the Underwriters, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement, the other Transaction Documents and the Underwriting Agreement and the preparation of the Offering Circular, subject to the terms set forth in the fee arrangement between TVA and White & Case, LLP;

(vii) the reasonable fees and expenses of Richards, Layton & Finger PA, counsel for the Lease Indenture Trustee for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents;

(viii) the underwriting discounts and commissions payable to, and reasonable out of pocket expenses of, the Underwriters;

(ix) the reasonable fees and expenses of Ernst & Young LLP for services rendered in connection with the Transaction;

(x) the reasonable, documented out-of-pocket expenses of the Equity Investor, each Equity Note Purchaser, the Owner Participant and the Owner Lessor;

(xi) the initial fees and expenses of the Lease Indenture Trustee in connection with the execution and delivery of the Participation Agreement and the other Transaction Documents to which it is or will be a party;

(xii) the fees and expenses of the Appraiser, for services rendered in connection with delivering the Closing Appraisal required by Section 4 of the Participation Agreement;

(xiii) the fees and expenses of the Engineering Consultant, for services rendered in connection with delivering the Engineering Report required by Section 4 of the Participation Agreement; and

(xiv) the fees and expenses of the Rating Agencies in connection with the rating of the Lessor Notes.

Notwithstanding the foregoing, Transaction Costs shall not include internal costs and expenses such as salaries and overhead of whatsoever kind or nature nor costs incurred by the parties to the Participation Agreement pursuant to arrangements with third parties for services (other than those expressly referred to above), such as the fees and expenses of financial analysis and consulting, advisory services, and costs of a similar nature.

"**Transaction Documents**" shall mean the Operative Documents, the Construction Management Agreement and the Equity Note Purchase Documents.

"**Transaction Party(ies)**" shall mean, individually or collectively as the context may require, all or any of the parties to the Transaction Documents (including Wilmington Trust).

"**Transferee**" shall have the meaning specified in Section 7.1(a) of the Participation Agreement.

"**Transmission Services Guidelines**" shall mean the "Transmission Services Guidelines" of TVA or any successor tariff thereto of general applicability governing the provision of such transmission services and associated ancillary services over the TVA transmission facilities.

"**Treasury Regulations**" shall mean regulations, including temporary regulations, promulgated under the Code.

"**Trust Indenture Act**" shall mean the Trust Indenture Act of 1939 as in force at the date as of which this instrument was executed except as provided in Section 905 of such act; *provided*, *however*, that in the event the Trust Indenture Act of 1939 is amended after such date, "Trust Indenture Act" means, to the extent required by any such amendment, the Trust Indenture Act of 1939 as so amended.

"**TVA**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**TVA Act**" shall mean the Tennessee Valley Authority Act of 1933, as amended.

"**Uncontrollable Forces**" shall have the meaning set forth in Section 8.2 of the Support Agreement.

"**Underwriters**" shall mean Morgan Stanley & Co. LLC, Barclays Capital Inc., BofA Securities, Inc. and RBC Capital Markets, LLC.

"**Underwriting Agreement**" shall mean the Underwriting Agreement, dated the Effective Date, between TVA and the Underwriters.

"**Uniform Commercial Code**" or "**UCC**" shall mean the Uniform Commercial Code as in effect in the applicable jurisdiction.

"**Uniform System of Accounts**" shall mean the Uniform System of Accounts prescribed by FERC, as in effect on the Closing Date and as from time to time and thereafter amended, or the chart of accounts and accounting classifications which may be substituted for such Uniform System of Accounts from time to time by FERC or its successor for such purpose.

"**Unit** " and collectively the "**Units**" shall mean each of the ten (10) General Electric LM6000PF1 combustion turbine generators and any Components exclusively related thereto, as more particularly described on Exhibit A to the Facility Lease.

"**U.S. Government Obligations**" shall mean securities that are (i) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (ii) obligations of a Person controlled or supervised by and acting as an agency or instrumentality of the United States of America the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America, which, in either case under clauses (i) or (ii) are not callable or redeemable at the option of the issuer thereof, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government Obligation or a specific payment of interest on or principal of any such U.S. Government Obligation held by such custodian for the account of the holder of a depository receipt, *provided* that (except as required by law) such custodian is not authorized to make any deduction in the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government Obligation or the specific payment of interest on or principal of the U.S. Government Obligation evidenced by such depository receipt.

"**Verifier**" shall have the meaning specified in Section 3.4(c) of the Facility Lease.

"**Wilmington Trust**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**Work**" shall have the meaning specified in Section 2.1(a) of the Construction Management Agreement.

Copies of the Ground Lease, the Ground Sublease, the Head Lease, the Facility Lease, the Owner Lessor Mortgage, and the Lease Indenture are of record with the office of the Register of Deeds of Humphreys County, Tennessee.

2024 Lessor Notes 4
Access Property 4
Actual Knowledge 4
Additional Equity Investment 4
Additional Facility 4
Additional Lessor Notes 4
Additional Owner 4
Affiliate 4
After-Tax Basis 4
Applicable Law 5
Applicable Permits 5
Applicable Rate 5
Appraisal Procedure 5
Appraiser 5
Arbitration Proceeding 5
Assigned Documents 6
Assignment and Assumption Agreement 6
Bankruptcy Code 6
Base Rate 6
Basic Lease Rent 6
Basic Lease Rent (Debt Portion) 7
Basic Lease Rent (Equity Portion) 7
Benefit Plan 7
Bond Resolution 7
Boundary Property 7
Burns & McDonnell 7
Business Day 7
Called Amount 7
Capability 7
Capacity 7
Capital Expenditure Budget 7
Claim 7
Closing 8
Closing Appraisal 8
Closing Date 8
CMA Payment 8
Code 8
Co-Equity Manager 8
Co-Lessor Manager 8
Collateral 8
Common Facilities 8
Competitor 8
Component 8
Confidential Information 8
Construction Cost 8

Construction Management Agreement 9
Construction Period Financing Account 9
Construction Period Financing Costs 9
Contract Year 9
Contractor 9
Debt Portion 9
Deed of Trust Trustee 9
Design Documents 9
Discount Value 9
Dollars 9
DTC 9
Early Buy Out 10
Early Buy Out Date 10
Early Buy Out Notice 10
Effective Date 10
Election Notice 10
Energy 10
Enforcement Notice 10
Engineering Consultant 10
Engineering Report 10
Environmental Condition 10
Environmental Laws 10
Equity Breakage 10
Equity Collateral Agent 10
Equity Guarantor 10
Equity Guaranty 10
Equity Investment 11
Equity Investor 11
Equity Investor LLC Agreement 11
Equity Investor's Lien 11
Equity Manager 11
Equity Note 11
Equity Note Purchase Agreement 11
Equity Note Purchase Documents 11
Equity Note Purchaser 11
Equity Note Purchaser's Percentage Interest of the Notes 11
Equity Placement Agent 11
Equity Pledge Agreement 12
Equity Portion 12
ERISA 12
Event of Loss 12
Evidences of Indebtedness 12
Excepted Payments 12
Excepted Rights 13
Excess Amounts 13

Exchange Act 13
Exchange Date 13
Excluded Property 13
Excluded Taxes 13
Expected Completion Date 13
Expiration Date 13
Facility 13
Facility Lease 13
Facility Lease Term 13
Facility Lessee 13
Facility Lessee's Interest 13
Facility Lessor 13
Facility Operating Fee 13
Facility Operation and Maintenance Expense 14
Facility Site 14
Facility User 14
Fair Market Rental Value 14
Fair Market Sales Value 14
Federal Power Act 15
FERC 15
Final Acceptance 15
Final Acceptance Certificate 15
Final Determination 15
Final Shutdown 15
Final Shutdown Date 15
Fitch 15
FMV Net Termination Value 15
GAAP 15
Global Common Facilities 16
Global Common Facilities Operating Fee 16
Global Common Facilities Operation and Maintenance Expenses 16
Global Common Facilities Site 16
Government 16
Governmental Entity 16
Ground Interest 16
Ground Lease 17
Ground Lease Term 17
Ground Lessee 17
Ground Lessor 17
Ground Lessor's Release Rights 17
Ground Sublease 17
Ground Sublease Term 17
Ground Sublessee 17
Ground Sublessor 17
Guaranteed Provisional Acceptance Date 17

Hazardous Substance 17
Head Lease 17
Head Lease Rent 17
Head Lease Term 17
Head Lessee 17
Head Lessor 18
Indemnitee 18
Independent Appraiser 18
Investment Banker 18
Johnsonville Combustion Turbine Plant 18
Johnsonville Construction Contract 18
Lease Commencement Date 18
Lease Debt Rate 18
Lease Default 18
Lease Event of Default 18
Lease Indenture 18
Lease Indenture Bankruptcy Default 18
Lease Indenture Estate 18
Lease Indenture Event of Default 18
Lease Indenture Payment Default 19
Lease Indenture Trustee 19
Lease Indenture Trustee Office 19
Lease Indenture Trustee's Account 19
Lease Indenture Trustee's Liens 19
Leasehold Deed of Trust Trustee 18
Lessee Person 19
Lessor Estate 19
Lessor Manager 19
Lessor Notes 20
Lien 20
List of Competitors 20
Majority in Interest of Noteholders 20
Make Whole Premium 20
Material Adverse Effect 20
Maximum Net Generating Capacity 20
Membership Interests 20
Modification 20
Month 20
Moody's 21
Net TV Amount 21
Net TV Amount (Debt Portion) 21
Net TV Amount (Debt Portion) Rate 21
Net TV Amount (Equity Portion) 21
Net TV Amount (Equity Portion) Rate 21
Nonseverable Modifications 21

Note Register 21
Noteholder 21
Offering Circular 21
Officer's Certificate 21
Operating Fee 21
Operation and Maintenance Expense 21
Operation and Maintenance Expense Budget 22
Operative Documents 22
Optional Modification 22
Other Redemption Date Payment Amounts 22
Outside Lease Commencement Date 22
Overdue Rate 22
Owner Lessor 22
Owner Lessor Indemnified Party 22
Owner Lessor LLC Agreement 22
Owner Lessor Mortgage 23
Owner Lessor's Account 23
Owner Lessor's Interest 23
Owner Lessor's Lien 23
Owner Participant 23
Partial Early Buy Out 23
Partial Event of Loss 23
Participation Agreement 23
Paying Agent 23
Permitted Closing Date Liens 23
Permitted Instruments 23
Permitted Liens 24
Permitted Post Facility Lease Term Liens 24
Permitted Securities 24
Person 25
Personalty 25
Plan 25
Point or Points of Interconnection 25
Power 25
Proceeds 25
Provisional Acceptance 25
Provisional Acceptance Certificate 25
Prudent Industry Practice 25
Punch List 25
Quarter 25
Rates 25
Rating Agencies 26
Real Property 26
Reasonable Basis 26
Rebuilding Closing Date 26

Redemption Date 26
Registrar 26
Regulatory Event of Loss 26
Regulatory Event of Loss Termination Payment 27
Reinvestment Yield 27
Related Party 27
Released Property 27
Relevant Portion 27
Remaining Average Life 28
Remaining Scheduled Payments 28
Remediate 28
Removable Modification 28
Rent 28
Rent Payment Date 28
Replacement Component 28
Replacement Power Bond 28
Reported 28
Required Modification 28
Responsible Officer 28
Revenues 29
S&P 29
Sale Net Termination Value 29
Scheduled Closing Date 29
Scheduled Payment Date 29
SEC 29
Secured Indebtedness 29
Securities Act 29
Security 29
Service Commencement Date 29
Settlement Date 29
Severable Modification 29
Significant Lease Default 29
Significant Lease Indenture Default 30
Similar Law 30
Site 30
Special Lessee Transfer 30
Special Lessee Transfer Amount 30
Station Service Requirements 30
Subcontractors 30
Subordinated Resolution 30
Supplemental Financing 30
Supplemental Lease Rent 30
Support Agreement 30
Tax 30
Tax Advance 31

Tax Benefit 31
Tax Claim 31
Tax Event 31
Tax Indemnitee 31
Taxes 30
Termination Date 31
Termination Value 31
Termination Value (Debt Portion) 31
Termination Value (Equity Portion) 31
Term-Out Notice Date 31
Term-Out Payment Dates 31
Transaction 31
Transaction Costs 31
Transaction Documents 33
Transaction Party(ies) 33
Transferee 33
Transmission Services Guidelines 33
Treasury Regulations 33
Trust Indenture Act 33
TVA 33
TVA Act 33
U.S. Government Obligations 34
Uncontrollable Forces 33
Underwriters 34
Underwriting Agreement 34
Uniform Commercial Code" or "UCC 34
Uniform System of Accounts 34
Unit 34
Units 34
Verifier 34
Wilmington Trust 34
Work 34

Attachment A
to
Head Lease

DESCRIPTION OF THE FACILITY

The Facility consists of generating Units, Common Facilities, and other equipment, material or property, other than real property, associated with the Units and Common Facilities (but not associated with the Global Common Facilities), all of which are located on, under, or over the Facility Site, which Facility Site is the real property located in Humphreys County, Tennessee and is described in greater detail in Exhibit 1 to the Ground Lease.

The Facility will have ten aeroderivative simple cycle combustion turbine-generator units, each with a nominal output of 55 MW. Each Unit consists of a General Electric LM6000PF1 combustion turbine generator ("CTG") and any ancillary equipment, except for any Component exclusively constituting Common Facilities. These CTG units are specifically designed for frequent cycling and load variability, with the capability of five minute starts. Each unit will have a clutch between turbine and generator to enable Synchronous Condensing operation for reactive power/voltage support. Each unit will also be capable of Black Start to start and provide electrical generation in the event of the total loss of AC power.

Natural gas will be the only fuel.

Components for each Unit include the following:

GE Combustion Turbine with Air Inlet Filtration and Evaporative Cooling Systems
Gearbox with integral clutch
Andritz Generator with Air Inlet Filtration
Exhaust System with Selective Catalytic Reduction (SCR) and Carbon Monoxide (CO) catalyst
Lube Oil Systems
SPRINT water injection system for power augmentation
Mark VIe Control System
Fuel Gas Filter/Separator
CO2 Fire Protection System
Power Control Module (PCM) Enclosure
Waste Heat Recovery Anti-Icing System
Main Step-up Transformer (One per two units)
Continuous Emissions Monitoring Systems (CEMS) on CT exhaust
Electro-Hydraulic Starting System
Compressor Wash System

The Common Facilities are equipment and facilities that are used for the operation of the Units at the Facility, but are not Global Common Facilities. These shared facilities support the Units. The Common Facilities are as follows:

Compressed Air System
Fuel Gas Compressor System
Ammonia Supply System for SCR
Oil-Water Separation and Discharge System
Fire Loop System
Black Start Generator System (natural gas-fueled recip)
Potable Water System
Eye Wash System
Storm Water Drains
Demineralized Water Storage System
Control/Administration/Maintenance Building
Power Distribution Building

Attachment B
to
Head Lease

PERMITTED CLOSING DATE LIENS

None.

EXHIBIT 10.24

This Facility-Lease Purchase Agreement has been filed to provide investors with information regarding its terms. It is not intended to provide any other factual information about the Tennessee Valley Authority. The representations and warranties of the parties in this Facility-Lease Purchase Agreement were made to, and solely for the benefit of, the other parties to this Facility-Lease Purchase Agreement. The assertions embodied in the representations and warranties may be qualified by information included in schedules, exhibits, or other materials exchanged by the parties that may modify or create exceptions to the representations and warranties. Accordingly, investors should not rely on the representations and warranties as characterizations of the actual state of facts at the time they were made or otherwise.

Execution Version

This instrument prepared by:
Kyle W. Drefke, Esq.
Orrick, Herrington & Sutcliffe LLP
2100 Pennsylvania Avenue NW
Washington, D.C. 20037
(212) 339-8434

FACILITY LEASE-PURCHASE AGREEMENT

Dated as of October 2, 2024

between

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC,
as Owner Lessor

and

TENNESSEE VALLEY AUTHORITY,
as Facility Lessee

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE FACILITY
located in Humphreys County, Tennessee

CERTAIN OF THE RIGHT, TITLE AND INTEREST OF THE OWNER LESSOR IN AND TO THIS FACILITY LEASE AND THE RENT DUE AND TO BECOME DUE HEREUNDER HAVE BEEN ASSIGNED AS COLLATERAL SECURITY TO, AND ARE SUBJECT TO A SECURITY INTEREST IN FAVOR OF, WILMINGTON TRUST, NATIONAL ASSOCIATION, NOT IN ITS INDIVIDUAL CAPACITY BUT SOLELY AS LEASE INDENTURE TRUSTEE UNDER AN INDENTURE OF TRUST, DEED OF TRUST AND SECURITY AGREEMENT, DATED AS OF OCTOBER 2, 2024, BETWEEN SAID LEASE INDENTURE TRUSTEE, AS SECURED PARTY, AND THE OWNER LESSOR, AS DEBTOR. SEE SECTION 22 HEREOF FOR INFORMATION CONCERNING THE RIGHTS OF THE ORIGINAL HOLDER AND THE HOLDERS OF THE VARIOUS COUNTERPARTS HEREOF.

TABLE OF CONTENTS

Page

SECTION 1. DEFINITIONS 1

SECTION 2. LEASE OF THE FACILITY 2

Section 2.1 Binding Nature 2

Section 2.2 Lease 2

Section 2.3 Title; Construction Completion; Modifications; Replacements 2

SECTION 3. FACILITY LEASE TERM AND RENT 2

Section 3.1 Facility Lease Term 2

Section 3.2 Rent 3

Section 3.3 Supplemental Lease Rent 3

Section 3.4 Adjustment of Lease Schedules 3

Section 3.5 Manner of Payments 5

SECTION 4. DISCLAIMER OF WARRANTIES; RIGHT OF QUIET ENJOYMENT 5

Section 4.1 Disclaimer of Warranties 5

Section 4.2 Quiet Enjoyment 7

SECTION 5. RETURN OF FACILITY 7

Section 5.1 Return 7

Section 5.2 Condition Upon Delivery of Possession to Owner Lessor 7

Section 5.3 Deferred Maintenance on the Facility 8

SECTION 6. LIENS 8

SECTION 7. MAINTENANCE; REPLACEMENTS OF COMPONENTS 9

Section 7.1 Maintenance 9

Section 7.2 Replacement of Components 9

SECTION 8. MODIFICATIONS 9

Section 8.1 Required Modifications 9

Section 8.2 Optional Modifications 10

Section 8.3 Title to Modifications 10

SECTION 9.[i] NET LEASE 10

SECTION 10. EVENTS OF LOSS 12

Section 10.1 Occurrence of Events of Loss 12

Section 10.2 Condemnation Payments 12

TABLE OF CONTENTS
(continued)

Page

Section 10.3 Rebuild or Replace 12
Section 10.4 Application of Payments Not Relating to an Event of Loss 14
SECTION 11. INSURANCE 14
Section 11.1 Insurance by Owner Lessor 14
Section 11.2 Insurance by the Facility Lessee 14
SECTION 12. INSPECTION 15
SECTION 13. REGULATORY EVENT OF LOSS 15
Section 13.1 Occurrence of a Regulatory Event of Loss 15
Section 13.2 Procedure for Termination With Respect to a Regulatory Event of Loss 16
SECTION 14. [RESERVED] 17
SECTION 15. EARLY BUY OUT 17
Section 15.1 Election of Early Buy Out 17
Section 15.2 Procedure for Exercise of an Early Buy Out 18
Section 15.3 Replacement and Exchange of the Lessor Notes 19
SECTION 16. TRANSFER UPON THE EXPIRATION DATE 20
SECTION 17. EVENTS OF DEFAULT 20
SECTION 18. REMEDIES 22
Section 18.1 Remedies for Lease Event of Default 22
Section 18.2 Additional Remedies for Specified Lease Events of Default 23
Section 18.3 Application of Funds Held as Security; Liability for Basic Lease Rent, Costs and Expenses 24
Section 18.4 Payment of FMV Net Termination Value or Sale Net Termination Value 24
Section 18.5 Cumulative Remedies 25
Section 18.6 No Delay or Omission to Be Construed as Waiver 25
SECTION 19. SECURITY INTEREST AND INVESTMENT OF SECURITY FUNDS. 26
SECTION 20. FACILITY LESSEE'S RIGHT TO SUBLEASE; ASSIGNMENT 26
Section 20.1 Assignment and Sublease 26
Section 20.2 Right to Sublease 26
SECTION 21. OWNER LESSOR'S RIGHT TO PERFORM 27

TABLE OF CONTENTS
(continued)

Page

SECTION 22. SECURITY FOR OWNER LESSOR'S OBLIGATION TO THE LEASE INDENTURE TRUSTEE 27

SECTION 23. MISCELLANEOUS 27

Section 23.1 Amendments and Waivers 27

Section 23.2 Notices 27

Section 23.3 Survival 29

Section 23.4 Successors and Assigns 29

Section 23.5 Intended Tax Treatment 29

Section 23.6 Business Day 29

Section 23.7 Governing Law 29

Section 23.8 Severability 29

Section 23.9 Counterparts 30

Section 23.10 Headings and Table of Contents 30

Section 23.11 Further Assurances 30

Section 23.12 Effectiveness 30

Section 23.13 Measuring Life 30

Section 23.14 Owner Lessor Covenant 31

Section 23.15 Limitation on Liability 31

APPENDICES:

Appendix A Definitions

SCHEDULES:

Schedule 1 Basic Lease Rent
Schedule 2 Termination Values

EXHIBITS:

Exhibit A Description of the Facility

Facility Lease-Purchase Agreement

This **FACILITY LEASE-PURCHASE AGREEMENT,** dated as of October 2, 2024 (this "Facility Lease"), between **JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC**, a Delaware limited liability company (the "Owner Lessor"), and **TENNESSEE VALLEY AUTHORITY**, a wholly owned corporate agency and instrumentality of the United States (the "Facility Lessee" or "TVA").

WITNESSETH:

WHEREAS, TVA is constructing the Johnsonville aeroderivative combustion turbine facility located in Humphreys County, Tennessee, a simple cycle generating facility designed to have a summer net generation capacity of approximately 550 megawatts (as constructed from time to time and as more particularly described on Exhibit A to this Facility Lease, the "Facility");

WHEREAS, the Facility Lessee holds title to the Facility, and, pursuant to the Head Lease as of the Closing Date, the Owner Lessor has leased the Facility from the Facility Lessee as of the Closing Date for the Head Lease Term;

WHEREAS, on the Closing Date, the Facility Lessee is entering into the Construction Management Agreement pursuant to which TVA is agreeing to complete construction of the Facility;

WHEREAS, the Facility Lessee and the Owner Lessor desire to enter into this Facility Lease, which provides, among other terms, that the Facility Lease Term will commence upon the Lease Commencement Date;

WHEREAS, pursuant to and subject to the terms and conditions of this Facility Lease, the Owner Lessor will sublease the Facility to the Facility Lessee for the Facility Lease Term;

WHEREAS, the Facility is located on the Facility Site;

WHEREAS, pursuant to the Ground Lease, the Owner Lessor is acquiring from the Ground Lessor the Ground Interest for the Ground Lease Term; and

WHEREAS, pursuant to the Ground Sublease, the Owner Lessor will sublease and grant the Ground Interest to the Facility Lessee, as Ground Sublessee, for the term provided therein.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual agreements herein contained, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

Section 1. DEFINITIONS

Unless the context hereof otherwise requires, capitalized terms used in this Facility Lease, including those in the recitals, and not otherwise defined herein shall have the respective meanings set forth in Appendix A hereto. The general provisions of such Appendix A shall apply to the terms used in this Facility Lease and specifically defined herein.

Section 2. LEASE OF THE FACILITY

Section 2.1 Binding Nature. This Facility Lease has been executed and delivered by, and is binding on, and enforceable against, the Facility Lessee and the Owner Lessor as of the Closing Date, *provided, however*, that the Facility Lease Term shall commence upon the occurrence of the Lease Commencement Date.

Section 2.2 Lease. On the Lease Commencement Date, without the necessity for any further action, the Owner Lessor shall sublease, and as of the Lease Commencement Date subleases, the Facility to the Facility Lessee and the Facility Lessee shall sublease, and as of the Lease Commencement Date subleases, the Facility from the Owner Lessor, subject in each case to the terms set forth herein.

Section 2.3 Title; Construction Completion; Modifications; Replacements. The Facility Lessee and the Owner Lessor understand and agree that (a) this Facility Lease is a sublease and is subject to the Head Lease and the interest of the Head Lessor under the Head Lease, (b) legal title to the Facility remains vested in the Head Lessor, (c) this Facility Lease is subject to Permitted Closing Date Liens, (d) the Facility (as of the date hereof) has not achieved Substantial Completion, and (e) this Facility Lease is intended to be a lease of personal property under Tennessee law. Any portion of the Facility which is added to, or otherwise becomes a part of, the Facility after the Closing Date in accordance with the Construction Management Agreement shall (at no cost to the Owner Lessor and with no adjustment to Basic Lease Rent or Termination Value) automatically (i) become subject to this Facility Lease (subject to the occurrence of the Lease Commencement Date) and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture, and (ii) be deemed part of the Facility for all purposes, including for purposes of this Facility Lease. The Facility Lessee and the Owner Lessor further understand and agree that the Owner Lessor's Interest shall also include an interest in (A) all Modifications which are incorporated in the Facility and which pursuant to Section 8.3 hereof become subject to this Facility Lease and (B) all Replacement Components which become part of the Facility pursuant to Section 7.2 hereof, and that any such Modifications and Replacement Components shall, immediately upon such incorporation or replacement, become subject to this Facility Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture.

Section 3. FACILITY LEASE TERM AND RENT

Section 3.1 Facility Lease Term. The term of this Facility Lease (the "Facility Lease Term") shall commence on the Lease Commencement Date and shall terminate at 11:59 p.m., New York City time, on the Expiration Date, subject to earlier termination (a) in whole pursuant to Sections 15 or 18 hereof or (b) in part with respect to a Relevant Portion of the Facility pursuant to Section 15 hereof; *provided, however*, that if a Significant Lease Default shall have occurred prior to the then scheduled expiration of the Facility Lease Term and is continuing on such date, the Facility Lease Term shall be extended until such time as either (i) such Significant Lease Default has been cured and all relevant amounts due and payable by TVA hereunder and under the other Transaction Documents have been paid or (ii) the Facility Lessee has delivered possession of the Facility and the Facility Site to the Owner Lessor in accordance with the terms hereof, including as a result of the exercise of the dispossessory remedies set forth in Section 18.2 hereof.

Section 3.2 *Rent*. The Facility Lessee hereby agrees to pay to the Owner Lessor basic lease rent ("Basic Lease Rent") for the lease of the Facility during the Facility Lease Term in installments payable on each Rent Payment Date in the amount set forth opposite such Rent Payment Date under the columns entitled "Basic Lease Rent (Debt Portion)" and "Basic Lease Rent (Equity Portion)" on Schedule 1 hereto, subject to adjustment in accordance with Section 3.4 hereof. In the event this Facility Lease shall have been terminated in part pursuant to Section 15 with respect to a Relevant Portion of the Facility, Basic Lease Rent payable on any Rent Payment Date thereafter shall be determined by multiplying the amount calculated pursuant to the immediately preceding sentence by a fraction, the numerator of which is the number of Units that continue to be subject to this Facility Lease and the Head Lease after giving effect to such termination and the denominator of which is the number of Units subject to this Facility Lease immediately prior to such partial termination, and Basic Lease Rent and Termination Value shall be adjusted downward by such amount in accordance with Section 3.4. All Basic Lease Rent to be paid pursuant to this Section 3.2 shall be payable in the manner set forth in Section 3.5.

Section 3.3 *Supplemental Lease Rent*. The Facility Lessee also agrees to pay to the Owner Lessor, or to any other Person entitled thereto as expressly provided herein or in any other Transaction Document, as appropriate, any and all Supplemental Lease Rent, promptly as the same shall become due and owing, or where no due date is specified, promptly after demand by the Person entitled thereto, and on an After-Tax Basis to the extent such Supplemental Lease Rent is paid in order to pay, or reimburse the Owner Lessor or the Indenture Trustee for, costs or expenses of the Owner Lessor or the Indenture Trustee under any Transaction Document and in the event of any failure on the part of the Facility Lessee to pay any Supplemental Lease Rent, the Owner Lessor shall have all rights, powers and remedies provided for herein. The Facility Lessee will also pay as Supplemental Lease Rent, to the extent permitted by Applicable Law, an amount equal to interest at the Overdue Rate on any part of any payment of Basic Lease Rent not paid when due for any period for which the same shall be overdue and on any Supplemental Lease Rent not paid when due (whether on demand or otherwise) for the period from such due date until the same shall be paid. All Supplemental Lease Rent to be paid pursuant to this Section 3.3 shall be payable in the manner set forth in Section 3.5.

Section 3.4 *Adjustment of Lease Schedules*.

(a) The Facility Lessee and the Owner Lessor agree that Basic Lease Rent shall be adjusted after the Closing Date, either upwards or downwards, to reflect (i) a reduction in Basic Lease Rent in connection with a partial termination of the Facility Lease pursuant to Section 15 calculated in accordance with the second sentence of Section 3.2, (ii) a reduction in Basic Lease Rent in connection with the prepayment of one or more Equity Notes in connection with a Regulatory Event of Loss calculated in accordance with Section 13.2(c), and (iii) either a reduction or an increase in Basic Lease Rent to reflect the principal amount, amortization and interest rate on any Additional Lessor Notes issued pursuant to Section 2.12 of the Lease Indenture in connection with (A) a refinancing of the Lessor Notes pursuant to Section 11.1 of the Participation Agreement or (B) a Supplemental Financing pursuant to Section 11.2 of the Participation Agreement. Any adjustments pursuant to this Section 3.4 shall be calculated in a manner to ensure that Basic Lease Rent payable hereunder is in an amount sufficient to enable the Owner Lessor to pay the principal of and interest on the Lessor Notes (after taking into account such Additional Lessor Notes issued pursuant to Section 11.2 of the Participation Agreement and refinancing of Lessor Notes in

accordance with Section 11.1 of the Participation Agreement, as applicable) due and payable on each scheduled payment date in respect of such Lessor Note and to preserve the return on and of the Equity Investment and, in the case of a Supplemental Financing, any Additional Equity Investment made pursuant to Section 11.2 of the Participation Agreement, as contemplated at the time the Equity Investment or Additional Equity Investment, if any, was made through the end of the Facility Lease Term calculated in a manner consistent with the initial calculation of the return on and of the Equity Investment of the Owner Lessor and the Equity Investor, including as to the U.S. federal, state and local income tax consequences of the return on and of such investment and of the receipt of Basic Lease Rent and Supplemental Lease Rent by the Owner Lessor for the payment of amounts due and payable by the Owner Lessor under or with respect to the Lessor Notes or the Lease Indenture. The adjustments contemplated by this Section 3.4 will result in corresponding adjustments to the Termination Values. Any adjustment pursuant to this Section 3.4(a) shall be made subject to and in compliance with Section 3.4(b) hereof.

(b) Anything herein or in any other Transaction Document to the contrary notwithstanding, Basic Lease Rent payable on any Rent Payment Date, whether or not adjusted in accordance with this Section 3.4, shall, in the aggregate, be in an amount at least sufficient to pay in full the scheduled principal of and interest payments on the Lessor Notes on such Rent Payment Date, other than any such scheduled principal of and interest payments on the Lessor Notes to the extent paid from the Construction Period Financing Account pursuant to Section 2.17 of the Lease Indenture. Anything herein or in any other Transaction Document to the contrary notwithstanding, Termination Values on any date under this Facility Lease, whether or not adjusted in accordance with this Section 3.4, shall, together with Basic Lease Rent due and owing on such date, be in an amount at least sufficient to pay in full the principal of, and accrued interest on, the Lessor Notes payable on such date.

(c) Any adjustment pursuant to this Section 3.4 shall initially be computed by the Facility Lessee, subject to the verification procedure described in this Section 3.4(c). Once computed, the results of such computation shall promptly be delivered by the Facility Lessee to the Owner Lessor. Within 20 days after the receipt of the results of any such adjustment, the Owner Lessor may request that a nationally recognized firm of independent public accountants (which firm shall not be the primary accountants for the Facility Lessee, the Owner Lessor, the Equity Investor or the Lease Indenture Trustee) jointly selected by the Owner Lessor and the Facility Lessee (the "Verifier") verify, after consultation with the Owner Lessor and the Facility Lessee, the accuracy of such adjustment in accordance with this Section 3.4. The Owner Lessor and the Facility Lessee hereby agree, subject to the execution by the Verifier of an appropriate confidentiality agreement, to provide the Verifier with all information and materials (other than income tax returns) as shall be necessary in connection therewith. If the Verifier confirms that such adjustment is in accordance with this Section 3.4, it shall so certify to the Facility Lessee and the Owner Lessor and such certification shall be final, binding and conclusive on the Facility Lessee, the Owner Lessor and the Equity Investor. If the Verifier concludes that such adjustment is not in accordance with this Section 3.4, and the adjustments to Basic Lease Rent or Termination Value calculated by the Verifier are different from those calculated by the Facility Lessee, then it shall so certify to the Facility Lessee and the Owner Lessor and the Verifier's calculation shall be final, binding and conclusive on the Facility Lessee, the Owner Lessor and the Equity Investor. If the Owner Lessor does not request verification of any adjustment within the period specified

above, the computation provided by the Facility Lessee shall be final, binding and conclusive on the Facility Lessee, the Owner Lessor and the Equity Investor. The final determination of any adjustment hereunder shall be set forth in an amendment to this Facility Lease, executed and delivered by the Owner Lessor and the Facility Lessee; *provided, however*, that any omission to execute and deliver such amendment shall not affect the validity and effectiveness of any such adjustment. The reasonable fees, costs and expenses of the Verifier in verifying an adjustment pursuant to this Section 3.4 shall be paid by the Facility Lessee. Notwithstanding anything herein to the contrary, the sole responsibility of the Verifier shall be to verify the calculations hereunder and matters of interpretation of this Facility Lease or any other Transaction Document shall not be within the scope of the Verifier's responsibilities.

Section 3.5 Manner of Payments. All Rent (whether Basic Lease Rent or Supplemental Lease Rent) shall be paid by the Facility Lessee in lawful currency of the United States of America in immediately available funds to the recipient not later than 1:00 p.m. (New York City time) on the date due. All Rent payable to the Owner Lessor (other than Excepted Payments) shall be paid by the Facility Lessee to the Owner Lessor by payment to the Owner Lessor's Account, or to such other place as the Owner Lessor shall notify the Facility Lessee in writing; *provided, however*, that so long as the Lien of the Lease Indenture has not been discharged, the Owner Lessor hereby irrevocably directs (it being agreed and understood that such direction shall be deemed to have been revoked after the Lien of the Lease Indenture shall have been fully discharged in accordance with its terms), and the Facility Lessee agrees, that all payments of Rent (other than Excepted Payments) payable to the Owner Lessor shall be paid by wire transfer directly to the Lease Indenture Trustee's Account or to such other place as the Lease Indenture Trustee shall notify the Facility Lessee in writing pursuant to the Lease Indenture. Payments constituting Excepted Payments shall be made to the Person entitled thereto at the address for such Person set forth in the Participation Agreement, or to such other place as such Person shall notify the Facility Lessee in writing.

Section 4. DISCLAIMER OF WARRANTIES; RIGHT OF QUIET ENJOYMENT

Section 4.1 Disclaimer of Warranties.

(a) Without waiving any claim the Facility Lessee may have against any manufacturer, vendor or contractor, THE FACILITY LESSEE ACKNOWLEDGES AND AGREES SOLELY FOR THE BENEFIT OF THE OWNER LESSOR, THE LESSOR MANAGER, THE EQUITY INVESTOR AND THE LEASE INDENTURE TRUSTEE THAT (i) THE FACILITY AND EACH COMPONENT THEREOF IS OF A SIZE, DESIGN, CAPACITY AND MANUFACTURE ACCEPTABLE TO THE FACILITY LESSEE, (ii) THE FACILITY LESSEE IS SATISFIED THAT THE FACILITY AND EACH COMPONENT THEREOF IS SUITABLE FOR THEIR RESPECTIVE PURPOSES, (iii) NONE OF THE OWNER LESSOR, THE LESSOR MANAGER, THE EQUITY INVESTOR OR THE LEASE INDENTURE TRUSTEE IS A MANUFACTURER OR A DEALER IN PROPERTY OF SUCH KIND, AND (iv) THE FACILITY IS LEASED HEREUNDER TO THE EXTENT PROVIDED HEREBY FOR THE FACILITY LEASE TERM SPECIFIED HEREIN SUBJECT TO ALL APPLICABLE LAWS NOW IN EFFECT OR HEREAFTER ADOPTED, INCLUDING (A) ZONING REGULATIONS, (B) ENVIRONMENTAL LAWS AND (C) BUILDING RESTRICTIONS, AND IN THE STATE AND CONDITION OF EVERY PART THEREOF

WHEN THE SAME FIRST BECAME SUBJECT TO THIS FACILITY LEASE, WITHOUT REPRESENTATION OR WARRANTY OF ANY KIND BY THE OWNER LESSOR, THE LESSOR MANAGER, THE EQUITY INVESTOR OR THE LEASE INDENTURE TRUSTEE AND (vi) THE OWNER LESSOR LEASES FOR THE FACILITY LEASE TERM SPECIFIED HEREIN AND THE FACILITY LESSEE TAKES THE FACILITY UNDER THIS FACILITY LEASE "AS-IS", "WHERE-IS" AND "WITH ALL FAULTS", AND THE FACILITY LESSEE ACKNOWLEDGES THAT NONE OF THE OWNER LESSOR, THE LESSOR MANAGER, THE EQUITY INVESTOR OR THE LEASE INDENTURE TRUSTEE MAKES NOR SHALL BE DEEMED TO HAVE MADE, AND EACH EXPRESSLY DISCLAIMS, ANY AND ALL RIGHTS, CLAIMS, WARRANTIES OR REPRESENTATIONS, EITHER EXPRESS OR IMPLIED, AS TO THE VALUE, CONDITION, FITNESS FOR ANY PARTICULAR PURPOSE, DESIGN, OPERATION, MERCHANTABILITY OF THE FACILITY OR AS TO THE TITLE TO THE FACILITY, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF THE FACILITY OR CONFORMITY THEREOF TO SPECIFICATIONS, FREEDOM FROM PATENT, COPYRIGHT OR TRADEMARK INFRINGEMENT, THE ABSENCE OF ANY LATENT OR OTHER DEFECT, WHETHER OR NOT DISCOVERABLE, OR AS TO THE ABSENCE OF ANY OBLIGATIONS BASED ON STRICT LIABILITY IN TORT OR ANY OTHER EXPRESS OR IMPLIED REPRESENTATION OR WARRANTY WHATSOEVER WITH RESPECT THERETO, except that the Owner Lessor represents and warrants that on the Closing Date and the Lease Commencement Date, the Facility will be free of Owner Lessor's Liens. It is agreed that all such risks, as between the Owner Lessor, the Lessor Manager, the Equity Investor and the Lease Indenture Trustee on the one hand and the Facility Lessee on the other hand are to be borne by the Facility Lessee with respect to acts, occurrences or omissions prior to or during the Facility Lease Term. None of the Owner Lessor, the Lessor Manager, the Equity Investor or the Lease Indenture Trustee shall have any responsibility or liability to the Facility Lessee or any other Person with respect to any of the following: (1) any liability, loss or damage caused or alleged to be caused directly or indirectly by the Facility or any Component or by any inadequacy thereof or deficiency or defect therein or by any other circumstances in connection therewith; (2) the use, operation or performance of the Facility, any Unit or any Component thereof or any risks relating thereto; or (3) the construction, delivery, operation, servicing, maintenance, repair, improvement, replacement or decommissioning of the Facility, any Unit or any Component thereof. The provisions of this paragraph (a) of this Section 4.1 have been negotiated, and, except to the extent otherwise expressly stated, the foregoing provisions are intended to be a complete exclusion and negation of any representations or warranties of the Owner Lessor, the Lessor Manager, the Equity Investor and the Lease Indenture Trustee, express or implied, with respect to the Facility, any Unit or any Components thereof that may arise pursuant to any Applicable Law now or hereafter in effect, or otherwise.

(b) From and after the Closing Date, the Owner Lessor hereby appoints irrevocably and constitutes the Facility Lessee its agent and attorney-in-fact, coupled with an interest, to assert and enforce, from time to time so long as the Owner Lessor does not have the right to exercise remedies pursuant to Section 18.2, in the name and for the account of the Owner Lessor and the Facility Lessee, as their interests may appear, but in all cases at the sole cost and expense of the Facility Lessee, whatever claims and rights the Owner Lessor may have in respect of the Facility, any Unit or any Component thereof, against any manufacturer, vendor or contractor, or under any express or implied warranties relating to the Facility, any Unit or any Component thereof; *provided*, *however*,

that, the Owner Lessor may revoke such appointment, by written notice to the Facility Lessee, if (i) a Lease Event of Default shall have occurred and be continuing, (ii) any manufacturer, vendor or contractor is in default or otherwise not in compliance with its obligations or warranties relating to the Facility, the Unit or any Component thereof and (iii) the Facility Lessee has failed to diligently pursue the enforcement of rights under the respective warranties against such manufacturer, vendor or contractor, and such failure could reasonably be expected to result in a material adverse effect on the operation and maintenance of the Facility, the Global Common Facilities or the Site.

Section 4.2 *Quiet Enjoyment*. The Owner Lessor expressly agrees that, notwithstanding any provision of any other Transaction Document, but without limiting the rights and remedies which may be available to the Owner Lessor (and the Lease Indenture Trustee as its assignee) under and in accordance with Section 18, neither it, the Lessor Manager, the Equity Investor, the Equity Manager nor any other party acting by, through or under the Owner Lessor, the Lessor Manager, the Equity Investor or the Equity Manager shall interfere with or interrupt the quiet enjoyment of the use, operation and possession by the Facility Lessee of the Facility prior to the expiration or early termination of this Facility Lease in accordance with the terms hereof.

Section 5. RETURN OF FACILITY

Section 5.1 *Return.* Upon the early termination of this Facility Lease pursuant to Section 18.2 or, if the Facility Lessee shall fail to satisfy the requirements set forth in Section 16, the exercise of dispossessory remedies under Section 18.2 on or after the Expiration Date, the Facility Lessee, at its own expense, shall deliver possession of the Facility (together with Modifications to the Facility that shall have become subject to the Head Lease and this Facility Lease pursuant to Section 9 of the Head Lease and Section 8.3 hereof) to the Owner Lessor or any permitted transferee or assignee of the Owner Lessor. The Facility Lessee shall effect delivery of the Facility at its own cost and expense by surrendering the Facility into the possession of the Owner Lessor or such transferee or assignee and by executing and delivering to the Owner Lessor or such transferee or assignee an instrument or instruments in form and substance reasonably acceptable to the Owner Lessor evidencing surrender by the Facility Lessee of the Facility Lessee's right to the Facility under this Facility Lease and to the possession thereof. In connection with such return, the Facility Lessee shall (a) assign, to the extent permitted by Applicable Law, and shall cooperate with all reasonable requests of the Owner Lessor for purposes of obtaining, or enabling the Equity Investor, the Owner Lessor or such transferees or assignees to obtain, any and all licenses, permits, approvals and consents of any Governmental Entities or other Persons that are or will be required to be obtained by the Equity Investor, the Owner Lessor or such transferee or assignee in connection with the use, operation or maintenance of the Facility on or after such return in compliance with Applicable Law; and (b) provide the Owner Lessor or a permitted transferee or assignee of the Owner Lessor, subject to any equipment manufacturer-imposed conditions of confidentiality, copies of all documents, instruments, plans, maps, specifications, manuals, drawings and other documentary materials relating to the installation, maintenance, operation, construction, design, modification or repair of the Facility or any portion thereof, as shall be in the Facility Lessee's possession and shall be reasonably appropriate or necessary for the ownership, possession, operation or maintenance of the Facility.

Section 5.2 *Condition Upon Delivery of Possession to Owner Lessor*. In connection with the delivery of possession of the Facility by the Facility Lessee to the Owner Lessor pursuant to

Section 5.1, the Facility Lessee shall ensure, at the Facility Lessee's sole cost and expense, that the Facility complies with each of the following conditions:

(a) the Facility (including all Required Modifications and Nonseverable Modifications) will be in at least as good condition as if it had been maintained, repaired and operated during the Facility Lease Term in compliance with the provisions of this Facility Lease, ordinary wear and tear and degradation excepted;

(b) the Facility shall be free and clear of all Liens other than Permitted Post Facility Lease Term Liens;

(c) the Facility control capability will be operational such that the Facility can be operated independently of any other power generation facility owned or operated by the Facility Lessee;

(d) the Facility shall have at least the capability and functional ability to perform, substantially at the ratings for which it was designed in normal commercial operation, all functions for which it was designed (normal wear and tear and degradation excepted); and

(e) no Component shall be a temporary Component and any Replacement Component shall comply with Prudent Industry Practice.

The Facility Lessee, at the request of the Owner Lessor, shall lease (subject to all existing encumbrances) to the Owner Lessor (or its designee) at the then Fair Market Rental Value thereof under the Head Lease, determined by agreement between the Facility Lessee and the Owner Lessor or, absent agreement, by an appraisal conducted according to the Appraisal Procedures, any or all Optional Modifications that are Removable Modifications and which have been made to the Facility following the Lease Commencement Date. The Facility Lessee shall enter into any amendments or modifications to the Head Lease necessary to cause such Modifications to be subject thereto; *provided*, that title to such Modifications will remain vested in the Head Lessor. The appraiser's fees and expenses incurred pursuant to this clause shall be paid by the Owner Lessor.

Section 5.3 Deferred Maintenance on the Facility. In connection with a delivery of possession of the Facility by the Facility Lessee to the Owner Lessor pursuant to Section 5.1, the Facility Lessee will, at the cost and expense of the Facility Lessee, perform such maintenance on the Facility that is required to satisfy the conditions described in Section 5.2. If the Facility Lessee is unable to perform such requested maintenance, it will use reasonable efforts to arrange on behalf of the Owner Lessor and with no liability to the Owner Lessor to have such maintenance performed by a Person acceptable to the Owner Lessor. The Facility Lessee shall promptly pay such rates charged by any Person in connection with such requested maintenance.

Section 6. LIENS

The Facility Lessee will not directly or indirectly create, incur, assume or suffer to exist any Lien on or with respect to the Facility, the Facility Site or any interest therein or in, to or on its interest in this Facility Lease or its interest in any other Transaction Document, except Permitted Liens, and the Facility Lessee shall promptly notify the Owner Lessor of the imposition of any such

Lien of which the Facility Lessee is aware and shall promptly, at its own expense, take such action as may be necessary to fully discharge or release any such Lien.

Section 7. MAINTENANCE; REPLACEMENTS OF COMPONENTS

Section 7.1 Maintenance. The Facility Lessee, at its own cost and expense, will (a) cause the Facility to be maintained in accordance with Prudent Industry Practice, and will not operate the Facility other than in compliance with all Applicable Laws of any Governmental Entity having jurisdiction (provided that the Facility Lessee may contest, in good faith and by appropriate proceedings, the validity or applicability of any such Applicable Law) and (b) make, or cause to be made, all necessary repairs, renewals and replacements thereof in accordance with Prudent Industry Practice. Nothing in this Facility Lease or in the other Transaction Documents will require TVA to operate the Facility; *provided* that if and when TVA does operate the Facility, the Facility shall be operated in accordance with Prudent Industry Practice.

Section 7.2 Replacement of Components. In the ordinary course of maintenance, service, repair or testing, the Facility Lessee, at its own cost and expense, may remove or cause or permit to be removed from the Facility any Component; *provided, however*, that the Facility Lessee shall cause such Component to be replaced by a replacement Component which shall be free and clear of all Liens (except Permitted Liens) and in as good operating condition as the Component replaced, assuming that the Component replaced was maintained in accordance with this Facility Lease (each such replacement Component being herein referred to as a "Replacement Component"). If any Component that is subject to this Facility Lease is at any time removed from the Facility, such Component shall remain subject to this Facility Lease, wherever located, until such time as such Component shall be replaced by a Replacement Component that has been incorporated in the Facility and that meets the requirements for Replacement Components specified above. Immediately upon any Replacement Component becoming incorporated in the Facility, without further act (and at no cost to the Owner Lessor and with no adjustment to Basic Lease Rent or Termination Value), (a) the removed Component shall no longer be subject to the Head Lease, this Facility Lease or the Lien of the Lease Indenture, and shall be free and clear of all rights of the Owner Lessor and the Lease Indenture Trustee and (b) the Replacement Component shall automatically (i) become subject to the Head Lease, this Facility Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture and (ii) be deemed a part of the Facility for all purposes of the Head Lease and this Facility Lease. Notwithstanding anything in this Section 7.2 or elsewhere in this Facility Lease to the contrary, if the Facility Lessee has determined that a Component is surplus or obsolete and not necessary for the operation of the Facility in accordance with this Facility Lease, the Facility Lessee shall have the right to remove such Component without replacing such Component, and upon such removal, the removed Component shall no longer be subject to the Head Lease, this Facility Lease or the Lien of the Lease Indenture.

Section 8. MODIFICATIONS

Section 8.1 Required Modifications. The Facility Lessee, at its own cost and expense, shall make or cause or permit to be made all Modifications to the Facility as are required by Applicable Law or any Governmental Entity having jurisdiction (each, a "Required Modification"); *provided, however,* that the Facility Lessee may, in good faith and by appropriate

proceedings, diligently contest the validity or application of any Applicable Law in any reasonable manner which does not involve any material risk of (a) foreclosure, sale, forfeiture or loss of, or imposition of a material Lien on the Facility or any impairment of the use, operation or maintenance of the Facility in any material respect, or (b) any criminal or material civil liability being imposed on the Lessor Manager, the Equity Investor, the Equity Manager, any Equity Note Purchaser, or the Owner Lessor, the Lease Indenture Trustee or any Noteholder.

Section 8.2 Optional Modifications. The Facility Lessee at any time may, at its own cost and expense and without the consent of any other Person, make or cause or permit to be made any Modification to the Facility as the Facility Lessee considers desirable in the proper conduct of its business (any such Modification which is not a Required Modification being referred to as an "Optional Modification").

Section 8.3 Title to Modifications. Title to all Modifications shall be with the Head Lessor. All Required Modifications, all Nonseverable Modifications and all Modifications financed by the Owner Lessor by an Additional Equity Investment or a Supplemental Financing pursuant to Section 11.2 of the Participation Agreement shall (at no cost to the Owner Lessor and with no adjustment to Head Lease Rent, or except in the case of a Supplemental Financing and Additional Equity Investment, Basic Lease Rent or Termination Value) automatically upon being affixed to or incorporated into the Facility (a) become subject to the Head Lease and this Facility Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture and (b) be deemed part of the Facility for all purposes of the Head Lease and this Facility Lease. The Facility Lessee, at its own cost and expense, shall take such steps as either the Owner Lessor or, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee may reasonably require from time to time to confirm that the Modifications set forth in the preceding sentence are subject to the Head Lease and this Facility Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture. No Optional Modification which is a Severable Modification (other than such Optional Modifications which are financed by the Owner Lessor by an Additional Equity Investment or a Supplemental Financing pursuant to Section 11.2 of the Participation Agreement, any such Optional Modification that is a Severable Modification that has not been so financed is referred to as a "Removable Modification") shall become subject to the Head Lease and this Facility Lease or the Lien of the Lease Indenture unless the Owner Lessor shall have elected to lease, in accordance with Section 5.2, such Removable Modification. Removable Modifications may be removed by the Facility Lessee at any time prior to the exercise by the Owner Lessor of its remedies under Section 18.2 at the Facility Lessee's cost and expense. The Facility Lessee will repair, at its own cost and expense, any damage caused by its removal of any Removable Modifications.

Section 9. NET LEASE

This Facility Lease is a "net lease" and the Facility Lessee's obligation to pay all Basic Lease Rent payable hereunder, as well as any Termination Value (or amount computed by reference thereto) in lieu of Basic Lease Rent following termination of this Lease, shall be absolute and unconditional under any and all circumstances and shall not be terminated, extinguished, diminished, lost or otherwise impaired by any circumstance of any character, including by (a) any setoff, counterclaim, recoupment, defense or other right which the Facility Lessee may have against the Owner Lessor, the Lessor Manager, the Equity Investor, the Equity

Manager, any Equity Note Purchaser, or the Lease Indenture Trustee, the Noteholders or any other Person, including any claim as a result of any breach by any of said parties of any covenant or provision in this Facility Lease or any other Transaction Document, (b) any lack or invalidity of title or other interest or any defect in the title or other interest, condition, design, operation, merchantability or fitness for use of the Facility or any Component or any portion thereof, or any eviction by paramount title or otherwise, or any unavailability of the Facility, the Global Common Facilities, the Site, any Component or any portion thereof, (c) the failure to complete the construction of the Facility, or to reach Substantial Completion or Final Completion under, and as defined in, the Construction Management Agreement, (d) any loss or destruction of, or damage to, the Facility, the Global Common Facilities, the Site or any Component or any portion thereof or interruption or cessation in the use or possession thereof or any part thereof by the Facility Lessee for any reason whatsoever and of whatever duration, (e) the condemnation, requisitioning, expropriation, seizure or other taking of title to or use of the Facility, the Global Common Facilities, the Site or any Component or any portion thereof by any Governmental Entity or otherwise, (f) the invalidity or unenforceability or lack of due authorization or other infirmity of this Facility Lease or any other Transaction Document, (g) the lack of right, power or authority of the Owner Lessor to enter into this Facility Lease or any other Transaction Document, (h) any ineligibility of the Facility, the Global Common Facilities, the Site or any Component or any portion thereof for any particular use, whether or not due to any failure of the Facility Lessee to comply with any Applicable Law, (i) any event of "force majeure", (j) any legal requirement similar or dissimilar to the foregoing, any present or future law to the contrary notwithstanding, (k) any insolvency, bankruptcy, reorganization or similar proceeding by or against the Facility Lessee or any other Person, (l) any Lien of any Person with respect to the Site, the Facility, the Global Common Facilities or any Component or any portion thereof, or (m) any other cause, whether similar or dissimilar to the foregoing, any present or future law notwithstanding, except as expressly set forth herein or in any other Transaction Document, it being the intention of the parties hereto that all Basic Lease Rent (and all amounts, including Termination Value (or amounts computed by reference thereto), in lieu of Basic Lease Rent following termination of this Facility Lease in whole or in part) payable by the Facility Lessee hereunder shall continue to be payable in all events in the manner and at times provided for herein. All Rent, including Basic Lease Rent (and all amounts, including Termination Value (or amounts computed by reference thereto), in lieu of Basic Lease Rent following termination of this Facility Lease in whole or in part), shall not be subject to any abatement and the payments thereof shall not be subject to any setoff or reduction for any reason whatsoever, including any present or future claims of the Facility Lessee or any other Person against the Owner Lessor or any other Person under this Facility Lease or otherwise. To the extent permitted by Applicable Law, the Facility Lessee hereby waives any and all rights which it may now have or which at any time hereafter may be conferred upon it, by statute or otherwise, to terminate, cancel, quit or surrender this Facility Lease except in accordance with Sections 10, 13 or 15 hereof. If for any reason whatsoever this Facility Lease shall be terminated in whole or in part by operation of law or otherwise, except as specifically provided herein, the Facility Lessee nonetheless agrees, to the extent permitted by Applicable Law, to pay to the Owner Lessor an amount equal to each installment of Basic Lease Rent and all Supplemental Lease Rent due and owing, at the time such payment would have become due and payable in accordance with the terms hereof had this Facility Lease not been so terminated. Nothing contained herein shall be construed to waive any claim which the Facility Lessee might have

under any of the Transaction Documents or otherwise or to limit the right of the Facility Lessee separately to make any claim it might have against the Owner Lessor or any other Person or to separately pursue such claim in such manner as the Facility Lessee shall deem appropriate.

Section 10. EVENTS OF LOSS

Section 10.1 Occurrence of Events of Loss. The Facility Lessee will promptly notify the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee of any damage to, or other event with respect to, any portion of the Facility which the Facility Lessee reasonably anticipates will cause an Event of Loss. If an Event of Loss shall occur, then no later than eighteen months following such occurrence, the Facility Lessee shall notify the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee, in writing of its election to either (a) subject to the satisfaction of the conditions set forth in Section 10.3(a), rebuild or replace the Facility or a Relevant Portion of the Facility or (b) terminate this Facility Lease, in whole or in part with respect to the Facility or a Relevant Portion of the Facility, as the case may be, by electing to effect an Early Buy Out pursuant to Section 15.1 hereof; *provided, however*, that the Facility Lessee may only elect to terminate the Facility Lease in part with respect to a Relevant Portion of the Facility to the extent that the remaining Units subject to the Facility Lease continue to be (or will be, after repairing in accordance with this Facility Lease any damage to such remaining Units which may have occurred as a result of the Event of Loss to a Relevant Portion of the Facility to which such partial termination relates) commercially viable in accordance with Prudent Industry Practice. Subject to the last sentence of Section 15.1, the Facility Lessee may elect the option provided in clause (b) of the preceding sentence regardless of whether a Relevant Portion of the Facility is to be rebuilt or replaced. If the Facility Lessee fails to make an election as provided above, an Event of Loss shall be deemed to occur with respect to the Facility or, if the Event of Loss relates to less than all of the Units, a Relevant Portion of the Facility, as of the end of the eighteen-month period referred to in the second sentence of this Section 10.1 and the Facility Lessee will be deemed to have made the election to terminate this Facility Lease, in whole or in part, as the case may be, by exercising its Early Buy Out pursuant to Section 15.2 and will be deemed to have delivered an Early Buy Out Notice pursuant to Section 15.2 as of the end of such eighteen-month period.

Section 10.2 Condemnation Payments. Any payments received at any time by the Owner Lessor, the Lease Indenture Trustee or the Facility Lessee from any Governmental Entity as a result of the occurrence of an Event of Loss described in clause (c) of the definition of Event of Loss shall be promptly paid to the Owner Lessor or, if the Lien of the Lease Indenture shall not have been discharged or terminated, to the Lease Indenture Trustee, to be held as security for the Facility Lessee's obligations hereunder and under the other Transaction Documents, and shall be promptly applied, first, to satisfy the Facility Lessee's obligation to pay Termination Value and other amounts required to be paid by it under Section 15.2(a), if any, and, so long as no Significant Lease Default shall then have occurred and be continuing, the balance shall be paid to or retained by, as applicable, the Facility Lessee.

Section 10.3 Rebuild or Replace. The Facility Lessee's right to rebuild or replace the Facility or any Relevant Portion of the Facility pursuant to Section 10.1(a) shall be subject to the

fulfillment, at the Facility Lessee's sole cost and expense, in addition to the conditions contained in said clause (a), of the following conditions:

(a) the Facility Lessee shall cause the rebuilding or replacement of the Facility or any Relevant Portion of the Facility to commence as soon as reasonably practicable after notifying the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee pursuant to Section 10.1(a) of its election to rebuild or replace the Facility or any Relevant Portion of the Facility, and in all events within thirty-six (36) months of the occurrence of the event that caused such Event of Loss, and will cause work on such rebuilding or replacement to proceed diligently thereafter. As the rebuilding or replacement of the Facility or any Relevant Portion of the Facility progresses and title to the rebuilt or replacement Facility or Relevant Portion of the Facility vests in the Head Lessor, the rebuilt or replacement facilities shall become subject to the Head Lease, this Facility Lease and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lien of the Lease Indenture and be deemed a part of the Facility for all purposes of the Head Lease and this Facility Lease, automatically without any further act by any Person; and

(b) within thirty (30) days after the date of the completion of such rebuilding or replacement (the "Rebuilding Closing Date") the following documents shall be duly authorized, executed and delivered and, if appropriate, filed for recordation by the respective party or parties thereto and shall be in full force and effect, and an executed counterpart of each thereof shall be delivered to the Owner Lessor, the Lessor Manager and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee: (i) supplements to the Head Lease and this Facility Lease subjecting the rebuilt or replacement facilities to the Head Lease and this Facility Lease (with no change in Head Lease Rent or in Basic Lease Rent as a result of such rebuilding or replacement), (ii) so long as the Lien of the Lease Indenture shall not have been terminated or discharged, supplements to the Lease Indenture subjecting the rebuilt or replacement facilities to the Lien of the Lease Indenture, (iii) such recordings and filings as may be reasonably requested by the Owner Lessor or the Lease Indenture Trustee to be made or filed, (iv) an opinion of counsel of the Facility Lessee, such counsel and such opinion to be reasonably satisfactory to the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee to the effect that (A) the supplements to the Head Lease and this Facility Lease required by clause (i) above constitute effective instruments for subjecting the rebuilt or replacement facilities to the Head Lease and this Facility Lease, (B) the supplements to the Lease Indenture required by clause (ii) above, if any, constitute effective instruments for subjecting the rebuilt or replacement facilities to the Lien of the Lease Indenture, and (C) all filings and other action necessary to perfect and protect the Owner Lessor's and, if applicable, the Lease Indenture Trustee's interest in the rebuilt or replacement facilities have been accomplished, (v) a report by an independent engineer certifying that the rebuilt or replacement facilities are in a state of repair and condition required by this Facility Lease, and (vi) an Officer's Certificate of the Facility Lessee as to compliance with this Section 10.3 and that no Lease Event of Default shall have occurred and be continuing as a result of the rebuilding or replacement.

Whether or not the transactions contemplated by this Section 10.3 are consummated, the Facility Lessee agrees to pay or reimburse, on an After-Tax Basis, any costs or expenses (including reasonable and documented legal fees and expenses) incurred by the Owner Lessor, the Lessor

Manager and the Lease Indenture Trustee in connection with the transactions contemplated by this Section 10.3.

Section 10.4 Application of Payments Not Relating to an Event of Loss. In the event that during the Facility Lease Term the use of all or any portion of the Facility is requisitioned or taken by or pursuant to a request of any Governmental Entity under the power of eminent domain or otherwise for a period which does not constitute an Event of Loss, the Facility Lessee's obligation to pay all installments of Basic Lease Rent shall continue for the duration of such requisitioning or taking. The Facility Lessee shall be entitled to receive and retain for its own account all sums payable for any such period by such Governmental Entity as compensation for such requisition or taking of possession; *provided, however,* that if at the time of such payment a Significant Lease Default shall have occurred and be continuing, all such sums shall be paid to and held by the Lease Indenture Trustee, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, or thereafter, the Owner Lessor as security for the obligations of the Facility Lessee under this Facility Lease, and such amount shall be paid to the Facility Lessee only at such time as no Significant Lease Default shall be continuing.

Section 11. INSURANCE

Section 11.1 Insurance by Owner Lessor. At any time, the Owner Lessor (either directly or in the name of the Equity Investor), the Equity Investor or the Lease Indenture Trustee may at its own expense and for its own account carry insurance with respect to its interest in the Facility or the Ground Interest. Any insurance payments received from policies maintained by the Owner Lessor, the Equity Investor or the Lease Indenture Trustee pursuant to the previous sentence shall be retained by the Owner Lessor, the Equity Investor or the Lease Indenture Trustee, as the case may be.

Section 11.2 Insurance by the Facility Lessee.

(a) If and for so long as the Facility Lessee is rated less than BBB+ by S&P or Baa1 by Moody's, the Facility Lessee shall maintain (or cause to be maintained) property and commercial general liability insurance with respect to the Facility customarily carried by other operators of similar facilities of comparable size as the Facility and against such loss, damage or liability and with such deductibles as are customarily insured against. Any such property insurance required to be maintained pursuant to this Section 11.2(a) shall, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, name the Lease Indenture Trustee as loss payee with respect to any claim in excess of $10 million and such amounts shall be paid to the Facility Lessee as and when needed to pay or reimburse the Facility Lessee for any construction costs to repair the damage to which such claim relates, with the balance, if any paid to the Facility Lessee upon completion of such repairs, or applied at the direction of the Facility Lessee to pay Termination Value or any other amounts payable by the Facility Lessee under Section 15 in connection with an Event of Loss. During the period the Facility Lessee is required to maintain insurance pursuant to this Section 11.2(a), the Facility Lessee shall no less frequently than annually provide the Owner Lessor, the Equity Investor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee, a description of the insurance it is maintaining pursuant to this Section 11.2 and evidence which may at the Facility Lessee's

option, be in the form of an Officer's Certificate, that all premiums in respect of such policies are current and that such insurance is in effect.

(b) Notwithstanding Section 11.2(a), the Facility Lessee agrees that if and to the extent the Facility Lessee is insuring other gas-fired combustion turbine generating facilities similar to the Facility which are owned or leased by the Facility Lessee or self-insures for third party liability for the Facility Lessee's operation of such other facilities owned or leased by the Facility Lessee, the Facility Lessee shall maintain (or cause to be maintained) insurance for property damage or third party liability, as the case may be, with respect to the Facility in comparable amounts, with comparable deductibles and on other terms substantially comparable to the insurance maintained with respect to such other facilities.

Section 12. INSPECTION

During the Facility Lease Term, the Owner Lessor, and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee and their representatives may, during normal business hours, on reasonable notice to the Facility Lessee and at their own risk and expense (except, at the expense but not risk, of the Facility Lessee when a Significant Lease Default or a Lease Event of Default has occurred and is continuing), inspect the Facility and the records with respect to the operations and maintenance thereof, in the Facility Lessee's custody; *provided, however,* that so long as no Significant Lease Default or Lease Event of Default shall have occurred and be continuing, each such Person (together with their representatives) shall only be entitled to make one inspection in any twelve-month period; *provided, further*, that the limitations on the number of inspections included in the preceding proviso shall not apply with respect to any such inspection made in connection with the occurrence of (a) a catastrophic failure of any Component or system which causes a forced outage in excess of sixty (60) days, (b) failure or malfunction of any equipment resulting in serious injury or death, (c) a significant curtailment of operations due to a final, nonappealable order of a Governmental Entity having jurisdiction over Environmental Laws or safety, or (d) following commencement of commercial operations, cessation of operations of the Facility for more than one-hundred and eighty (180) days. Any such inspection will not unreasonably interfere with the operation or maintenance of the Facility or the conduct by the Facility Lessee of its business and will be in accordance with Applicable Law and the Facility Lessee's safety and security precautions and confidentiality undertakings, as applicable. In no event shall the Owner Lessor, the Lessor Manager, the Equity Investor or the Lease Indenture Trustee have any duty or obligation to make any such inspection and such Persons shall not incur any liability or obligation by reason of not making any such inspection.

Section 13. REGULATORY EVENT OF LOSS

Section 13.1 Occurrence of a Regulatory Event of Loss. The Owner Lessor and the Equity Investor shall promptly notify the Facility Lessee and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee of an event or occurrence of which it has Actual Knowledge that it reasonably believes constitutes a Regulatory Event of Loss with respect to it. Such notice shall specify in reasonable detail the event or occurrence giving rise to such Regulatory Event of Loss and the materially burdensome rate of return regulation or other applicable public utility law or regulation of a Governmental Entity. The Owner Lessor, the

Equity Investor and the Facility Lessee shall reasonably cooperate and take reasonable measures to alleviate such Regulatory Event of Loss at the cost and expense of the party requesting such cooperation. The Owner Lessor or the Equity Investor may elect to declare a Regulatory Event of Loss by giving notice to the Facility Lessee within twelve (12) months of obtaining Actual Knowledge of an event or circumstance which upon the giving of such notice would be a Regulatory Event of Loss (the "Election Notice").

Section 13.2 Procedure for Termination With Respect to a Regulatory Event of Loss. If a Regulatory Event of Loss occurs, then, within sixty (60) days of receiving the Election Notice from the Owner Lessor or the Equity Investor, the Facility Lessee shall elect one of the following:

(a) If the event or occurrence giving rise to such Regulatory Event of Loss would be alleviated by transferring one or more Equity Notes to the Facility Lessee, the Facility Lessee may purchase such Equity Notes from the applicable Equity Note Purchaser on the next succeeding Termination Date, for an amount equal to the Regulatory Event of Loss Termination Payment *plus* Equity Breakage, in which case each such Equity Note Purchaser shall transfer all of its right, title and interest in its Equity Note by appropriate instruments of transfer without representations (other than that such Equity Note is free and clear of any Liens) to the Facility Lessee or such other Person as the Facility Lessee shall designate;

(b) If the event or occurrence giving rise to such Regulatory Event of Loss would be alleviated by transferring one or more Equity Notes to another Person, the Facility Lessee may pay each Equity Note Purchaser that holds such Equity Notes on the next succeeding Termination Date the amount, if any, by which (i) the Regulatory Event of Loss Termination Payment *plus* Equity Breakage, *exceeds* (ii) the net proceeds of the sale of such Equity Note Purchaser's Equity Note pursuant to this clause (b) received by such Equity Note Purchaser; *provided*, that if the Facility Lessee elects to make the payment pursuant to this clause (b), then such Equity Note Purchaser shall sell its Equity Note in such manner, to such Person and at such price as directed by the Facility Lessee, at the cost and expense of the Facility Lessee; *provided, however*, that if such sale does not occur on or before the Termination Date referred to in clause (a) above, then the Facility Lessee shall be deemed to have elected to purchase such Equity Note Purchaser's Equity Note under clause (a) and shall make the payment required to be made thereunder to such Equity Note Purchaser pursuant thereto on such Termination Date;

(c) If the event or occurrence giving rise to such Regulatory Event of Loss would be alleviated by causing the Equity Investor to prepay one or more Equity Notes, the Facility Lessee may cause the Equity Investor to prepay such Equity Notes by paying to the Owner Lessor for distribution to the Equity Investor for prepayment of such Equity Notes pursuant to the Equity Note Purchase Agreement on the next succeeding Termination Date an amount equal to the Regulatory Event of Loss Termination Payment *plus* Equity Breakage, whereupon Basic Lease Rent (Equity Portion) and Termination Value (Equity Portion) shall be reduced in accordance with Section 3.4 hereof in an amount equal to the product of (i) Basic Lease Rent (Equity Portion) or Termination Value (Equity Portion), as applicable, *multiplied* by (ii) the Equity Note Purchaser's Percentage Interest; *provided*, that the Facility Lessee may only make an election under this clause (c) with respect to an Equity Note if (A) the total number of Equity Note Purchasers for which an election under this clause (c) is made is less than a majority of the aggregate number of Equity Note

Purchasers and (B) the Equity Notes held by such Equity Note Purchasers are less than a majority of the aggregate outstanding amount of Equity Notes of the Equity Investor; or

(d) If the event or occurrence giving rise to such Regulatory Event of Loss would be alleviated by transferring the Equity Investor's Membership Interests in whole or in part to another Person, the Facility Lessee may pay the Equity Investor on the next succeeding Termination Date the amount, if any, by which (i) the Termination Value (Equity Portion) *plus* Equity Breakage, *exceeds* (ii) the net proceeds of the sale of Membership Interests pursuant to this clause (d) received by the Equity Investor; *provided*, that if the Facility Lessee elects to make the payment pursuant to this clause (d), then the Equity Investor shall sell such Membership Interests in such manner, to such Person (which, subject to Applicable Law, may be the Facility Lessee) and at such price as directed by the Facility Lessee, at the cost and expense of the Facility Lessee; *provided, however*, that if such sale does not occur on or before the Termination Date referred to in clause (a) above, then the Facility Lessee shall be deemed to have elected to purchase such Membership Interests and shall pay the Equity Investor an amount equal to the Termination Value (Equity Portion) *plus* Equity Breakage, in which case the Equity Investor shall transfer all of its right, title and interest in such Membership Interests by appropriate instruments of transfer without representations to the Facility Lessee or such other Person as the Facility Lessee shall designate.

(e) The Facility Lessee may terminate the Facility Lease (in whole but not in part) by electing an Early Buy Out in accordance with Section 15.1 hereof.

Simultaneously with the payment of any amounts contemplated under clauses (a), (b), (c) or (d) of this Section 13.2 and as a condition to the sale, transfer or prepayment of the applicable Equity Notes or Equity Investor's Membership Interests, as applicable, the Facility Lessee shall pay all Basic Lease Rent (Equity Portion) and Supplement Lease Rent due and payable on the applicable Termination Date (including all costs and expenses of the Equity Investor, the Owner Lessor or any Equity Note Purchaser incurred in connection therewith and all sales, use, value added and other Taxes required to be paid by the Facility Lessee to the Equity Investor or applicable Equity Note Purchaser associated with the sale, transfer or retirement of the Equity Note Purchaser's Equity Notes or Equity Investor's Membership Interests, as applicable) whereupon the Facility Lessee shall cease to have any liability with respect to the Transaction Documents to such Equity Note Purchaser in the case of the payment of amounts pursuant to clauses (a), (b) and (c) and to all Equity Note Purchasers and the Equity Investor in the case of the payment of amounts pursuant to clause (d), except for obligations (including those under Sections 9.1 and 9.2 of the Participation Agreement) surviving pursuant to the express terms of any Transaction Document or which have otherwise accrued but not been paid as of the applicable Termination Date. If necessary, the parties shall reasonably cooperate to cause the provisions of the Owner Lessor LLC Agreement to be amended to reflect the existence of more than one Equity Investor with a Membership Interest in the Owner Lessor.

Section 14. [RESERVED]

Section 15. EARLY BUY OUT

Section 15.1 Election of Early Buy Out. The Facility Lessee shall have the right, at its option and at any time (including (a) during the occurrence and continuance of a Significant

Lease Default or Lease Event of Default so long as the Facility Lease shall not have been terminated by the Owner Lessor pursuant to Section 18.2, (b) following an Event of Loss pursuant to Section 10.1 and (c) following a Regulatory Event of Loss for which the Facility Lessee has made the election described in Section 13.2(d)), by giving written notice (the "Early Buy Out Notice") to the Owner Lessor, the Lessor Manager, and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee, to purchase the Owner Lessor's Interest and terminate this Facility Lease, either in whole with respect to the entire Facility or in part with respect to a Relevant Portion of the Facility (an "Early Buy Out"). In the case of an Early Buy Out other than in connection with an Event of Loss or a Regulatory Event of Loss, the Facility Lessee will specify a Termination Date in the Early Buy Out Notice upon which date such purchase and termination will occur (the "Early Buy Out Date"), which Early Buy Out Date shall occur on a date occurring at least thirty (30) days after the delivery of the Early Buy Out Notice. In the case of an Early Buy Out in connection with an Event of Loss, the Early Buy Out Date shall occur on (i) the next Termination Date occurring at least one month after the Facility Lessee's delivery of the Early Buy Out Notice, or (ii) if the Event of Loss shall be deemed to have occurred pursuant to the last sentence of Section 10.1, on the Termination Date occurring next following thirty (30) days after the date as of which an Event of Loss shall have been so deemed to have occurred. In the case of an Early Buy Out in connection with a Regulatory Event of Loss, the Early Buy Out Date shall be the Termination Date next succeeding the date of delivery of the Early Buy Out Notice pursuant to Section 13.2(d) with respect to such Regulatory Event of Loss. The Facility Lessee may only purchase the Owner Lessor's Interest in part or terminate the Facility Lease in part with respect to a Relevant Portion of the Facility to the extent that the remaining Units subject to the Facility Lease continue to be commercially viable in accordance with Prudent Industry Practice. If the Facility Lessee exercises the Early Buy Out in connection with an Event of Loss or Regulatory Event of Loss and the Facility Lessee certifies either that (A) such Early Buy Out is in connection with an Event of Loss described in clause (c) of the definition thereof or a Regulatory Event of Loss or (B) such Early Buy Out is in connection with an Event of Loss described in clauses (a) or (b) of the definition thereof and the Facility Lessee has no current intention to rebuild or replace the Facility or a Relevant Portion of the Facility, then such Early Buy Out shall constitute an Early Buy Out in connection with an Event of Loss or a Regulatory Event of Loss, as applicable, and no Make Whole Premium shall be due in connection with such Early Buy Out.

Section 15.2 Procedure for Exercise of an Early Buy Out.

(a) If the Facility Lessee shall have exercised its option under Section 15.1, then, on the Early Buy Out Date the Facility Lessee shall pay to the Owner Lessor (i) the Termination Value with respect to the Termination Date that coincides with the Early Buy Out Date, (ii) all amounts of Supplemental Lease Rent (including all reasonable and documented out-of-pocket costs and expenses of the Owner Lessor, the Lessor Manager, the Equity Investor, any Equity Note Purchaser and the Lease Indenture Trustee, and all sales, use, value added and other Taxes associated with the exercise of the Early Buy Out pursuant to this Section 15 and required to be indemnified by the Facility Lessee pursuant to Section 9.2 of the Participation Agreement) on an After-Tax Basis due and payable on or prior to such Early Buy Out Date, (iii) any unpaid Basic Lease Rent due on or before such Early Buy Out Date, and (iv) the Equity Breakage in respect of the Equity Investment and, other than in the case of an Early Buy Out exercised in connection with an Event of Loss or a Regulatory Event of Loss so long as the Facility Lessee has delivered the certificate referred to in

the last sentence of Section 15.1, the Make Whole Premium, if any, due on the Lessor Notes being prepaid pursuant to this Section 15.

(b) Upon receipt by the Lease Indenture Trustee, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, or thereafter, the Owner Lessor, of the payments required to be made pursuant to Section 15.2(a), (i) Basic Lease Rent shall cease to accrue, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, calculated pursuant to Section 3.2, (ii) the Facility Lessee's obligations hereunder shall terminate, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, except for Supplemental Lease Rent and other obligations (including those under Sections 9.1 and 9.2 of the Participation Agreement) surviving pursuant to the express provisions of any Transaction Document, (iii) this Facility Lease and the Head Lease shall terminate, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, (iv) the Owner Lessor shall, at the Facility Lessee's cost and expense, execute and deliver to the Facility Lessee a release or termination of this Facility Lease, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility, or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, (v) the Owner Lessor shall transfer (by an appropriate instrument of transfer in form and substance reasonably satisfactory to the Owner Lessor and prepared and recorded by and at the expense of the Facility Lessee) all of its right, title and interest in and to the Owner Lessor's Interest, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility, or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, to the Facility Lessee pursuant to this Section 15.2 and Section 6.2 of the Head Lease on an "as is," "where is" and "with all faults" basis, without representations or warranties other than a warranty as to the absence of Owner Lessor's Liens and a warranty of the Equity Investor as to the absence of Equity Investor's Liens, and (vi) the Owner Lessor shall discharge the Lien of the Lease Indenture, in whole, in the case of an exercise of the Early Buy Out with respect to the entire Facility, or in part, with respect to a Relevant Portion of the Facility, in the case of an exercise of the Early Buy Out with respect to a Relevant Portion of the Facility, and execute and deliver appropriate releases and other documents or instruments necessary or desirable to effect the foregoing, all to be prepared, filed and recorded (as appropriate) by and at the cost and expense of the Facility Lessee.

Section 15.3 Replacement and Exchange of the Lessor Notes. In connection with any proper exercise of the Early Buy Out under this Section 15 with respect to the entire Facility, the Facility Lessee may, at its option, elect to replace and exchange in full all the Lessor Notes for Replacement Power Bonds and if (a) the Facility Lessee shall have replaced and exchanged the Lessor Notes for Replacement Power Bonds in accordance with Section 2.10(c) of the Lease Indenture, (b) all other conditions contained in such Section 2.10(c) thereof shall have been satisfied, and (c) no Significant Lease Default or Lease Event of Default shall have occurred and be continuing after giving effect to such replacement and exchange, then the obligation of the Facility Lessee to pay the Termination Value pursuant to Section 15.2 shall be reduced by the

outstanding principal amount of and accrued interest on the Lessor Notes so replaced and exchanged by the Facility Lessee.

Section 16. TRANSFER UPON THE EXPIRATION DATE

On or after the Expiration Date, so long as no Significant Lease Default shall then have occurred and be continuing and the Owner Lessor has not exercised dispossessory remedies under Section 18.2 in connection therewith, then upon payment of all amounts of Basic Lease Rent and all amounts of Supplemental Lease Rent then due and payable (including all reasonable out of pocket costs and expenses of the Owner Lessor, the Equity Investor and the Lease Indenture Trustee, all sales, use, value added and other Taxes required to be indemnified by the Facility Lessee pursuant to Section 9.2 of the Participation Agreement associated with the transfer to be effected pursuant to this Section 16 and any Basic Lease Rent due on or before the Expiration Date), (i) the Facility Lessee shall cease to have any liability to the Owner Lessor hereunder or under the other Transaction Documents, except for Supplemental Lease Rent and other obligations (including those under Sections 9.1 and 9.2 of the Participation Agreement) surviving pursuant to the express terms of any Transaction Document, (ii) subject to clause (i) above, this Facility Lease shall terminate, (iii) the Owner Lessor shall transfer to the Facility Lessee, at the Facility Lessee's cost and expense, by an appropriate instrument of transfer (in form and substance reasonably satisfactory to the Owner Lessor and prepared by and at the expense of the Facility Lessee), all of its right, title and interest in and to the Owner Lessor's Interest pursuant to this Section 16 and Section 6.2 of the Head Lease on an "as is," "where is" and "with all faults" basis, without representations or warranties other than a warranty as to the absence of Owner Lessor's Liens and a warranty of the Equity Investor as to the absence of Equity Investor's Liens and (iv) the Owner Lessor shall discharge the Lien of the Lease Indenture, and the Owner Lessor and the Equity Investor shall execute and deliver appropriate releases and other documents or instruments necessary or desirable to effect the foregoing, all to be prepared, filed and recorded (as appropriate) by and at the cost and expense of the Facility Lessee. In connection with the transfer described in clause (iii) of the preceding sentence, the Owner Lessor (at the Facility Lessee's cost and expense) shall (a) assign, to the extent permitted by Applicable Law, and shall cooperate with all reasonable requests of the Facility Lessee for purposes of obtaining, or enabling the Facility Lessee to obtain, any and all licenses, permits, approvals and consents of any Governmental Entities or other Persons that are held in the name of the Owner Lessor or the Lessor Manager and are or will be required to be obtained by the Facility Lessee in connection with the Facility Lessee's ownership, use, operation and maintenance of the Facility on or after such transfer in compliance with Applicable Law. Except for amounts expressly set forth in this Section 16 (including Supplemental Lease Rent and other obligations (including those under Sections 9.1 and 9.2 of the Participation Agreement) surviving pursuant to the express terms of any Transaction Document), the Facility Lessee shall not be obligated to pay any additional amounts or compensation to the Owner Lessor, the Lessor Manager, the Equity Investor, and the Equity Manager in connection with the transfer to the Facility Lessee of the Owner Lessor's right, title and interest in the Facility pursuant to this Section 16.

Section 17. EVENTS OF DEFAULT

The following events shall constitute a "Lease Event of Default" hereunder (whether any such event shall be voluntary or involuntary or come about or be effected by operation of law or

pursuant to or in compliance with any judgment, decree or order of any court or any order, rule or regulation of any Governmental Entity):

(a) the Facility Lessee shall fail to make any payment of Basic Lease Rent or Termination Value after the same shall have become due and such failure shall have continued for five (5) Business Days after the same shall become due; or

(b) the Facility Lessee shall fail to make any payment of Supplemental Lease Rent (other than Excepted Payments, unless the Equity Investor shall have declared a default with respect thereto, and Termination Value described in clause (a)), after the same shall have become due and such failure shall have continued for a period of thirty (30) days after receipt by the Facility Lessee of written notice of such default from the Lessor Manager, the Owner Lessor, or the Lease Indenture Trustee; or

(c) the Facility Lessee shall fail to perform or observe in any material respect any covenant, obligation or agreement to be performed or observed by it under this Facility Lease, the Participation Agreement, the Head Lease, the Ground Lease or the Ground Sublease (other than any covenant, obligation or agreement referred to in clauses (a) or (b) of this Section 17), which shall continue unremedied for sixty (60) days after receipt by the Facility Lessee of written notice thereof from the Lessor Manager (acting at the direction of the Equity Investor) or the Lease Indenture Trustee; *provided, however,* that if such condition cannot be remedied within such sixty (60)-day period, then the period within which to remedy such condition shall be extended up to an additional two-hundred and seventy (270) days, so long as the Facility Lessee diligently pursues such remedy and such condition is capable of being remedied within such additional two-hundred and seventy (270)-day period; *provided, further,* that, in the case of the Facility Lessee's obligation set forth in clause (a) of Section 7.1, if, to the extent and for so long as a test, challenge, appeal or proceeding shall be prosecuted in good faith by the Facility Lessee, the failure by the Facility Lessee to comply with such requirement shall not constitute a Lease Event of Default if such test, challenge, appeal or proceeding shall not involve any material risk of (i) foreclosure, sale, forfeiture or loss of, or imposition of a lien on, the Facility, (ii) the impairment of the use, operation or maintenance of the Facility in any material respect or (iii) any criminal liability being incurred by, or any material adverse effect on the interests of, the Lessor Manager, the Equity Investor, any Equity Note Purchaser, the Equity Manager, the Owner Lessor, any Noteholder or the Lease Indenture Trustee, including subjecting the Equity Investor, any Equity Note Purchaser or the Owner Lessor to regulation as a public utility or similar entity under Applicable Law; and *provided, further,* that in the case of the Facility Lessee's obligation set forth in clause (a) of Section 7.1, if the noncompliance is not a type that can be immediately remedied, the failure to comply shall not be a Lease Event of Default if the Facility Lessee is taking all reasonable action to remedy such noncompliance and if, but only if, such noncompliance shall not involve any material risk described in clause (i), (ii) or (iii) of the preceding *proviso*; or

(d) any representation or warranty made by the Facility Lessee in the Operative Documents shall prove to have been incorrect in any material respect when made and continues to be material and unremedied for a period of sixty (60) days after receipt by the Facility Lessee of written notice thereof from the Equity Investor or the Lease Indenture Trustee; *provided, however*, that if such condition cannot be remedied within such sixty (60)-day period, then the period within which to remedy such condition shall be extended up to an additional two-hundred and seventy

(270) days, so long as the Facility Lessee diligently pursues such remedy and such condition is reasonably capable of being remedied within such additional two-hundred and seventy (270)-day period; or

(e) the Facility Lessee shall (i) commence a voluntary case or other proceeding seeking relief under Title 11 of the Bankruptcy Code or liquidation, reorganization or other relief with respect to itself or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect, or apply for or consent to the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, or (ii) consent to, or fail to controvert in a timely manner, any such relief or the appointment of or taking possession by any such official in any voluntary case or other insolvency proceeding commenced against it, or (iii) file an answer admitting the material allegations of a petition filed against it in any such proceeding, or (iv) make a general assignment for the benefit of creditors; or

(f) an involuntary case or other proceeding shall be commenced against the Facility Lessee seeking (i) liquidation, reorganization or other relief with respect to it or its debts under Title 11 of the Bankruptcy Code or any bankruptcy, insolvency or other similar law now or hereafter in effect, or (ii) the appointment of a trustee, receiver, liquidator, custodian or other similar official with respect to it or any substantial part of its property or (iii) the winding-up or liquidation of the Facility Lessee; and such involuntary case or other insolvency proceeding shall remain undismissed and unstayed for a period of ninety (90) days (unless, in lieu of dismissal or stay of such proceeding, the Facility Lessee shall deliver to the Owner Lessor and the Lease Indenture Trustee an opinion of counsel reasonably satisfactory to each of them to the effect that the Facility Lessee is not an entity which can become a "debtor" under Section 101 of Title 11 of the Bankruptcy Code); or

(g) the Facility Lessee shall repudiate or disaffirm the validity or enforceability of this Facility Lease, the Head Lease or the Ground Lease.

Section 18. REMEDIES

Section 18.1 Remedies for Lease Event of Default. Upon the occurrence of any Lease Event of Default and at any time thereafter so long as the same shall be continuing, the Owner Lessor may, at its option, declare this Facility Lease to be in default by written notice to the Facility Lessee; *provided*, that upon the occurrence of a Lease Event of Default described in paragraph (e) or (f) of Section 17, this Facility Lease shall automatically be deemed to be in default without the need for giving any notice; and at any time thereafter, so long as the Facility Lessee shall not have remedied all outstanding Lease Events of Default, the Owner Lessor may proceed by appropriate court action or actions, either at law or in equity, to enforce performance by the Facility Lessee, at the Facility Lessee's sole cost and expense, of the applicable covenants and terms of this Facility Lease or to recover damages for breach thereof, including recovery of any payment of Rent then due and unpaid, *provided*, *further*, that in connection with such action or actions, the Owner Lessor may not, except as permitted under Section 18.2, seek (i) termination of this Facility Lease or any other Transaction Document, (ii) dispossession of the Facility Lessee or (iii) acceleration or early payment of amounts not yet due and payable under this Facility Lease or any other Transaction Document.

Section 18.2 Additional Remedies for Specified Lease Events of Default. On a date no earlier than one-hundred and eighty (180) days after the occurrence of a Lease Event of Default specified in Sections 17(a) or (b), or immediately upon the occurrence of a Lease Event of Default specified in Sections 17(e), (f), or (g), but, in each case, only to the extent the applicable Lease Event of Default is then continuing, and at any time thereafter so long as the same shall be continuing, the Owner Lessor, in its sole discretion, may elect, and to the extent permitted by, and subject to compliance with any mandatory requirements of, Applicable Law then in effect:

(a) by notice in writing to the Facility Lessee, to terminate this Facility Lease whereupon all right of the Facility Lessee to the possession and use under this Facility Lease of the Facility shall absolutely cease and terminate but the Facility Lessee shall remain liable as hereinafter provided; and thereupon, the Owner Lessor may demand that the Facility Lessee, and the Facility Lessee shall, upon written demand of the Owner Lessor and at the Facility Lessee's expense, forthwith deliver possession of the Facility to the Owner Lessor in the manner and condition required by, and otherwise in accordance with all of the provisions of, Section 5, except those provisions relating to periods of notice; and the Owner Lessor may thenceforth hold, possess and enjoy the same, free from any right of the Facility Lessee, or its successor or assigns, to use the Facility for any purpose whatever;

(b) to sell the Owner Lessor's Interest at public or private sale, as the Owner Lessor may determine, free and clear of any rights of the Facility Lessee under this Facility Lease and without any duty to account to the Facility Lessee with respect to such sale or for the proceeds thereof (except to the extent required (i) by paragraph (e) below if the Owner Lessor elects to exercise its rights under such paragraph and (ii) by Applicable Law), in which event the Facility Lessee's obligation to pay Basic Lease Rent hereunder due for any periods subsequent to the date of such sale shall terminate (except to the extent that Basic Lease Rent is to be included in computations under paragraph (d) or (e) below if the Owner Lessor elects to exercise its rights under said paragraphs);

(c) to hold, keep idle or lease to others the Facility as the Owner Lessor in its sole discretion may determine, free and clear of any rights of the Facility Lessee under this Facility Lease and without any duty to account to the Facility Lessee with respect to such action or inaction or for any proceeds with respect thereto, except that the Facility Lessee's obligation to pay Basic Lease Rent due for any periods subsequent to the date upon which the Facility Lessee shall have been deprived of possession and use of the Facility pursuant to this Section 18.2 shall be reduced by the net proceeds, if any, received by the Owner Lessor from subleasing the Facility to any Person other than the Facility Lessee;

(d) whether or not the Owner Lessor shall have exercised, or shall thereafter at any time exercise, any of its rights under paragraph (a) above with respect to the Facility, to specify, by written notice to the Facility Lessee, a Termination Date that shall not be earlier than thirty (30) days after the date of such notice, and to demand that the Facility Lessee pay to the Owner Lessor, and the Facility Lessee shall pay to the Owner Lessor, on the Termination Date specified in such notice, any unpaid Basic Lease Rent due on or before such Termination Date, any Supplemental Lease Rent due and payable as of the Termination Date specified in such notice, plus, as liquidated damages for loss of a bargain and not as a penalty (in lieu of the Basic Lease Rent due after the Termination Date specified in such notice), an amount equal to the excess, if any, of the

Termination Value computed as of the Termination Date specified in such notice over the Fair Market Sales Value of the Owner Lessor's Interest as of the Termination Date specified in such notice (such amount, the "FMV Net Termination Value"), and upon payment of such excess amount, this Facility Lease and the Facility Lessee's obligation to pay Basic Lease Rent hereunder due for any periods subsequent to the date of such payments shall terminate; or

(e) if the Owner Lessor shall have sold the Owner Lessor's Interest pursuant to paragraph (b) above, to demand that the Facility Lessee pay to the Owner Lessor, and the Facility Lessee shall pay to the Owner Lessor, as liquidated damages for loss of a bargain and not as a penalty (in lieu of the Basic Lease Rent due after the date of such sale), an amount equal to (i) any unpaid Basic Lease Rent and Supplemental Lease Rent due on or before the date of such sale, (ii) if that date is not a Termination Date, the daily equivalent of Basic Lease Rent for the period from the preceding Termination Date to the date of such sale, and (iii) the amount, if any, by which the Termination Value for the Facility computed as of the Termination Date next preceding the date of such sale or, if such sale occurs on a Rent Payment Date or a Termination Date then computed as of such date, exceeds the proceeds of such sale net of all costs and expenses incurred by or on behalf of the Owner Lessor or the Lease Indenture Trustee in connection with or otherwise attributable to such sale (such amount set forth in subclause (iii), the "Sale Net Termination Value"), and, upon payment of such amount, this Facility Lease and the Facility Lessee's obligation to pay Basic Lease Rent for any periods subsequent to the date of such payment shall terminate.

Section 18.3 Application of Funds Held as Security; Liability for Basic Lease Rent, Costs and Expenses. In connection with the exercise of remedies under Sections 18.1 or 18.2, the Owner Lessor may apply any amounts which are held by the Owner Lessor or the Lease Indenture Trustee under Section 10.2 or 11.2 as security for the Facility Lessee's obligations hereunder and under any other Transaction Documents against any amounts owed by the Facility Lessee hereunder or under any other Transaction Document. In addition, the Facility Lessee shall be liable, except as otherwise provided in Sections 18.2(d) and (e), for (i) any and all unpaid Basic Lease Rent due hereunder before or during the exercise of any of the foregoing remedies, and (ii) on an After-Tax Basis for all legal fees and other documented costs and expenses incurred by reason of the occurrence of any Lease Event of Default or the exercise of the Owner Lessor's remedies with respect thereto (whether those remedies are exercised by the Owner Lessor, the Lease Indenture Trustee or a designee of either), including the repayment in full of any documented costs and expenses necessary to be expended in connection with the return of the Facility in accordance with Section 5, and any costs and expenses incurred by the Owner Lessor, the Equity Investor and the Lease Indenture Trustee in connection with retaking constructive possession of, or in repairing, such Facility in accordance with Section 18.2, in order to cause it to be in compliance with all maintenance standards imposed by this Facility Lease.

Section 18.4 Payment of FMV Net Termination Value or Sale Net Termination Value. If the Owner Lessor elects to exercise its rights set forth in Section 18.2(d) or (e) and the Facility Lessee is obligated to pay FMV Net Termination Value or Sale Net Termination Value, as applicable, subject to payment of all other amounts due and owing by the Facility Lessee pursuant to Section 18.2(d) or (e), as applicable, the Facility Lessee may, subject to the conditions set forth in this Section 18.4 below, elect to pay the Owner Lessor such FMV Net Termination Value or such Sale Net Termination Value, as applicable, in three equal installments payable on the first,

second and third anniversaries of the Term-Out Notice Date (the "Term-Out Payment Dates"), together with interest (a) on the Net TV Amount (Debt Portion) of such FMV Net Termination Value or such Sale Net Termination Value, as applicable, at the Net TV Amount (Debt Portion) Rate, and (b) on the Net TV Amount (Equity Portion) of such FMV Net Termination Value or such Sale Net Termination Value, as applicable, at the Net TV Amount (Equity Portion) Rate. The Facility Lessee shall only be permitted to make such election by written notice given to the Owner Lessor, the Lessor Manager, and the Lease Indenture Trustee given within thirty (30) days of delivery of the written notice from the Owner Lessor pursuant to Section 18.2 with respect to the Owner Lessor's election to exercise remedies set forth in Section 18.2(d) or (e), as applicable, certifying that the issuance of Evidences of Indebtedness under the Bond Resolution is legally impossible or commercially unreasonable at such time in an amount sufficient to pay FMV Net Termination Value or Sale Net Termination Value when due under Section 18.2(d) or (e), as applicable. Upon the Facility Lessee's delivery of the notice described in the previous sentence, the Facility Lessee shall become obligated to pay FMV Net Termination Value or Sale Net Termination Value, as applicable, as provided above, and this Facility Lease and the Facility Lessee's obligation to pay Basic Lease Rent for any periods subsequent to the date of the delivery of such notice shall terminate. If the Facility Lessee (i) fails to deliver the notice described in the second preceding sentence with respect to any unpaid Net TV Amount, (ii) fails to certify by written notice given the Owner Lessor, the Lessor Manager and the Lease Indenture Trustee concurrently with its payment of an installment then due and payable on any Term-Out Payment Date that the issuance of Evidences of Indebtedness under the Bond Resolution is still legally impossible or commercially unreasonable or (iii) fails to pay any installment of the Net TV Amount then due and payable within ten (10) Business Days of the applicable Term-Out Payment Date, then in each case any unpaid Net TV Amount shall immediately become due and payable and the Owner Lessor may exercise any remedies available to it in accordance with Applicable Law. The Facility Lessee's obligation to make payment of FMV Net Termination Value or Sale Net Termination Value, as applicable, shall survive the termination of this Facility Lease.

Section 18.5 Cumulative Remedies. Except as otherwise provided in this Section 18, the remedies in this Facility Lease provided in favor of the Owner Lessor shall not be deemed exclusive, but shall be cumulative and shall be in addition to all other remedies in its favor existing at law or in equity; and the exercise or beginning of exercise by the Owner Lessor of any one or more of such remedies shall not, except as otherwise provided in this Section 18, preclude the simultaneous or later exercise by the Owner Lessor of any or all of such other remedies.

Section 18.6 No Delay or Omission to Be Construed as Waiver. No delay or omission to exercise any right, power or remedy accruing to the Owner Lessor upon any breach or default by the Facility Lessee under this Facility Lease shall impair any such right, power or remedy of the Owner Lessor, nor shall any such delay or omission be construed as a waiver of any breach or default, or of any similar breach or default hereafter occurring; nor shall any waiver of a single breach or default be deemed a waiver of any subsequent breach or default. To the extent permitted by Applicable Law, but subject to Section 18.2, the Facility Lessee hereby waives any rights now or hereafter conferred by statute or otherwise which may require the Owner Lessor to sell, lease or otherwise use the Facility or any Component thereof in mitigation of the Owner Lessor's damages as set forth in this Section 18 or which otherwise may limit or modify any of the Owner Lessor's rights and remedies under this Section 18.

Section 19. SECURITY INTEREST AND INVESTMENT OF SECURITY FUNDS.

Any moneys received by the Owner Lessor or the Lease Indenture Trustee pursuant to Sections 10.2 or 11.2, until paid to the Facility Lessee in accordance with such Section, shall be held by the Owner Lessor or the Lease Indenture Trustee, as the case may be, as security for the Facility Lessee's obligations under this Facility Lease and be invested in Permitted Instruments by the Owner Lessor or the Lease Indenture Trustee, as the case may be, at the sole risk of the Facility Lessee, from time to time as directed in writing by the Facility Lessee if such instruments are reasonably available for purchase. So long as no Significant Lease Default has occurred and is continuing, any gain (including interest received) realized as the result of any such Permitted Instrument (net of any fees, commissions, taxes and other expenses, if any, incurred in connection with such Permitted Instrument) shall be applied or remitted to the Facility Lessee in the same manner as the principal invested.

Section 20. FACILITY LESSEE'S RIGHT TO SUBLEASE; ASSIGNMENT

Section 20.1 Assignment and Sublease. Except as provided in Section 20.2, the Facility Lessee shall not have the right to assign or sublease the Facility Lessee's Interest and shall not be released from its obligations under this Facility Lease and the Transaction Documents without the consent of the Owner Lessor, and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, the Lease Indenture Trustee.

Section 20.2 Right to Sublease. The Facility Lessee may sublease the Facility without the consent of the Owner Lessor, the Lessor Manager, the Equity Investor, the Equity Manager, Equity Note Purchasers and the Lease Indenture Trustee under the following conditions:

(a) the sublessee is a solvent corporation, partnership, business trust, limited liability company or other person or entity not then involved in a bankruptcy proceeding and that is, or has engaged a third party that is, experienced in the operation of similar facilities;

(b) the sublease is expressly subject and subordinated to the Head Lease, this Facility Lease, the Ground Lease and the Ground Sublease;

(c) all terms and conditions of this Facility Lease and the other Transaction Documents remain in effect and the Facility Lessee remains fully and primarily liable for its obligations under this Facility Lease and the other Transaction Documents;

(d) no Significant Lease Default or Lease Event of Default shall have occurred and be continuing at the time of the entering into of such sublease;

(e) the sublease prohibits further assignment or subletting; and

(f) the Lien of the Lease Indenture is not impaired by the sublease.

The Facility Lessee shall pay all reasonable, documented out-of-pocket expenses of the Owner Lessor, the Equity Investor, the Equity Manager, the Lessor Manager and the Lease Indenture Trustee in connection with such sublease.

Section 21. OWNER LESSOR'S RIGHT TO PERFORM

If the Facility Lessee fails to make any payment required to be made by it hereunder or fails to perform or comply with any of its other agreements contained herein after notice to the Facility Lessee and failure of the Facility Lessee to so perform or comply within 10 days thereafter, the Owner Lessor or the Equity Investor may make such payment or perform or comply with such agreement in a reasonable manner, but shall not be obligated hereunder to do so, and the amount of such payment and of the reasonable documented expenses of the Owner Lessor or the Equity Investor incurred in connection with such payment or the performance of or compliance with such agreement, as the case may be, together with interest thereon at the Overdue Rate, to the extent permitted by Applicable Law, shall be deemed to be Supplemental Lease Rent, payable by the Facility Lessee to the Owner Lessor on demand.

Section 22. SECURITY FOR OWNER LESSOR'S OBLIGATION TO THE LEASE INDENTURE TRUSTEE

In order to secure the Lessor Notes, the Owner Lessor will assign and grant a Lien to the Lease Indenture Trustee in and to all of the Owner Lessor's right, title and interest in, to and under this Facility Lease, and grant a security interest in favor of the Lease Indenture Trustee in all of the Owner Lessor's right, title and interest in and to the Owner Lessor's Interest (other than Excepted Payments and Excepted Rights). The Facility Lessee hereby consents to such assignment and to the creation of such Lien and security interest and acknowledges receipt of copies of the Lease Indenture, it being understood that such consent shall not affect any requirement or the absence of any requirement for any consent of the Facility Lessee under any other circumstances. Unless and until the Facility Lessee shall have received written notice from the Lease Indenture Trustee that the Lien of the Lease Indenture has been fully terminated, the Lease Indenture Trustee shall have the right to exercise the rights of the Owner Lessor under this Facility Lease to the extent set forth in and subject in each case to the exceptions set forth in the Lease Indenture. TO THE EXTENT, IF ANY, THAT THIS FACILITY LEASE CONSTITUTES CHATTEL PAPER (AS SUCH TERM IS DEFINED IN THE UNIFORM COMMERCIAL CODE AS IN EFFECT IN ANY APPLICABLE JURISDICTION), NO SECURITY INTEREST IN THIS FACILITY LEASE MAY BE CREATED THROUGH THE TRANSFER OR POSSESSION OF ANY COUNTERPART HEREOF OTHER THAN THE ORIGINAL COUNTERPART, WHICH SHALL BE IDENTIFIED AS THE COUNTERPART CONTAINING THE RECEIPT THEREFOR EXECUTED BY THE LEASE INDENTURE TRUSTEE ON THE SIGNATURE PAGE THEREOF.

Section 23. MISCELLANEOUS

Section 23.1 Amendments and Waivers. No term, covenant, agreement or condition of this Facility Lease may be terminated, amended or compliance therewith waived (either generally or in a particular instance, retroactively or prospectively) except by an instrument or instruments in writing executed by each party hereto.

Section 23.2 Notices. Unless otherwise expressly specified or permitted by the terms hereof, all communications and notices provided for herein to a party hereto shall be in writing or by a telecommunications or electronic device capable of creating a written record, and any such

notice shall become effective (a) upon personal delivery thereof, including by overnight mail or courier service, (b) in the case of notice by United States mail, certified or registered, postage prepaid, return receipt requested, upon receipt thereof, or (c) in the case of notice by such a telecommunications or electronic device, upon transmission thereof, provided such transmission is promptly confirmed by either of the methods set forth in clauses (a) and (b) above, in each case addressed to such party and copy party at its address set forth below or at such other address as such party or copy party may from time to time designate by written notice to the other party:

If to the Owner Lessor:

Johnsonville Aeroderivative Combustion Turbine Generation LLC
c/o Johnsonville Holdco LLC
68 South Service Road, Suite 120
Melville, NY 11747
Telephone No.: 631-930-7202
E-mail: jrangelo@gssnyc.com
Attention: Bernard J. Angelo

with a copy to the Equity Investor:

Johnsonville Holdco LLC
c/o GSS Holdings (Johnsonville), Inc.
68 South Service Road, Suite 120
Melville, NY 11747
Telephone No.: 631-930-7202
E-mail: jrangelo@gssnyc.com
Attention: Bernard J. Angelo

and to the Lease Indenture Trustee:

Wilmington Trust, National Association
Rodney Square North
1100 North Market Street
Wilmington, Delaware 19890-0001
Telephone No.: 302-651-1409
E-mail: jjmarvel@wilmingtontrust.com
Attention: Corporate Trust Administration – TVA Johnsonville Facility

If to the Facility Lessee:

Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902
Telephone No.:(865) 632-3366
Facsimile No.: (865) 632-6673
E-mail: leasenotices@tva.gov
Attention: Treasurer

Section 23.3 Survival. Except for the provisions of Sections 3.3, 3.5, 5, 9, 18 and 23, which shall survive, the warranties and covenants made by each party hereto shall not survive the expiration or termination of this Facility Lease in accordance with its terms.

Section 23.4 Successors and Assigns.

(a) This Facility Lease shall be binding upon and shall inure to the benefit of, and shall be enforceable by, the parties hereto and their respective successors and assigns as permitted by and in accordance with the terms hereof.

(b) Except as expressly provided herein or in the other Transaction Documents, neither party hereto may assign its interests or transfer its obligations herein without the consent of the other party hereto.

(c) This Facility Lease is a registered instrument. A manually signed copy of this Facility Lease shall be evidence only of Owner Lessor's rights and is not a bearer instrument. Owner Lessor and Facility Lessee hereby agree that the Facility Lessee shall keep books of registry in which it will register by book entry any transfer of Owner Lessor's interest in the Facility, in this Facility Lease and in the rights to receive any payment hereunder. No transfer by Owner Lessor of any interest in this Facility Lease or in the right to receive any payments hereunder shall be permitted unless a book entry of such transfer is made upon such registry and such transfer is effected in compliance with this Section 23.4(c). Prior to the registration of any transfer by Owner Lessor (or any successor of Owner Lessor) as provided in this paragraph, Facility Lessee may deem and treat the registered owner of this Facility Lease as the owner hereof for all purposes.

Section 23.5 Intended Tax Treatment. The Facility Lessee and the Owner Lessor hereby agree that for U.S. federal, state and local income tax purposes only, the Facility Lessee is intended to be the owner of the Facility and this Facility Lease is not a true lease and neither party will take any inconsistent position in any U.S. federal, state or local income tax filing, unless otherwise required by a change of law after the date hereof or a non-appealable judgment of a court of competent jurisdiction.

Section 23.6 Business Day. Notwithstanding anything herein to the contrary, if the date on which any payment or performance is to be made pursuant to this Facility Lease is not a Business Day, the payment otherwise payable on such date shall be payable on the next succeeding Business Day with the same force and effect as if made on such scheduled date and (provided that such payment is made on such succeeding Business Day) no interest shall accrue on the amount of such payment from and after such scheduled date to the time of such payment on such next succeeding Business Day.

Section 23.7 Governing Law. This Facility Lease shall be governed by, and construed and interpreted in accordance with, the laws of the State of New York (without regard to conflicts of laws principles other than as provided in Section 5-1401 of the NY General Obligations Law), except to the extent that Tennessee law or U.S. federal law shall apply.

Section 23.8 Severability. Any provision of this Facility Lease that is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such

prohibition or unenforceability without invalidating the remaining provisions hereof, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

Section 23.9 Counterparts. This Facility Lease may be executed by the parties hereto in separate counterparts, each of which, subject to Section 22, when so executed and delivered shall be an original, but all such counterparts shall together constitute but one and the same instrument. This Facility Lease may be executed by signatures delivered by email, and a copy hereof that is executed and delivered by a party by email (including in *.pdf* format) will be binding upon that party to the same extent as a copy hereof containing that party's original signature. The words "execution," "execute," "signed," "signature," and words of like import in or related to any document to be signed in connection with this Facility Lease shall be deemed to include electronic signatures (e.g., signatures effected through *DocuSign*), which shall be of the same legal effect, validity or enforceability as a manually executed signature to the extent and as provided for in any Applicable Law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

Section 23.10 Headings and Table of Contents. The headings of the sections of this Facility Lease and the Table of Contents are inserted for purposes of convenience only and shall not be construed to affect the meaning or construction of any of the provisions hereof.

Section 23.11 Further Assurances. Each party hereto will promptly and duly execute and deliver such further documents and assurances for and take such further action reasonably requested by the other party, all as may be reasonably necessary to carry out more effectively the intent and purpose of this Facility Lease.

Section 23.12 Effectiveness. This Facility Lease shall be effective as of the date first above written.

Section 23.13 Measuring Life. If and to the extent that any of the rights and privileges granted under this Facility Lease would, in the absence of the limitation imposed by this sentence, be invalid or unenforceable as being in violation of the rule against perpetuities or any other rule or law relating to the vesting of interests in property or the suspension of the power of alienation of property, then it is agreed that, notwithstanding any other provision of this Facility Lease, such options, rights and privileges, subject to the respective conditions hereof governing the exercise of such options, rights and privileges, will be exercisable only during (a) the longer of (i) a period which will end twenty-one (21) years after the death of the last survivor of the descendants living on the date of the execution of this Facility Lease of the following Presidents of the United States: Franklin D. Roosevelt, Harry S. Truman, Dwight D. Eisenhower, John F. Kennedy, Lyndon B. Johnson, Richard M. Nixon, Gerald R. Ford, James E. Carter, Ronald W. Reagan, George H.W. Bush, William J. Clinton, George W. Bush, Barack H. Obama, Donald J. Trump and Joseph R. Biden, Jr. or (ii) the period provided under the Uniform Statutory Rule Against Perpetuities or (b) the specific applicable period of time expressed in this Facility Lease, whichever of (a) and (b) is shorter.

Section 23.14 Owner Lessor Covenant. So long as this Facility Lease shall remain in effect, the Owner Lessor (or any successor thereto) hereby agrees and covenants to comply with the applicable provisions of 41 C.F.R. section 60-1.4, 41 C.F.R. section 60-250.4 and 41 C.F.R. section 60-741.4.

Section 23.15 Limitation on Liability. It is expressly understood and agreed by the parties hereto that (a) this Facility Lease is executed and delivered by the Lessor Manager, not individually or personally but solely as in its capacity as manager of the Owner Lessor under the Owner Lessor LLC Agreement, in the exercise of the powers and authority conferred and vested in it pursuant thereto, (b) each of the representations, undertakings and agreements herein made on the part of the Owner Lessor is made and intended not as personal representations, undertakings and agreements by the Lessor Manager, but is made and intended for the purpose for binding only the Owner Lessor, (c) nothing herein contained shall be construed as creating any liability on the Lessor Manager, individually or personally, to perform any covenant either expressed or implied contained herein, all such liability, if any, being expressly waived by the parties hereto or by any Person claiming by, through or under the parties hereto and (d) under no circumstances shall the Lessor Manager, be personally liable for the payment of any indebtedness or expenses of the Owner Lessor or be liable for the breach or failure of any obligation, representation, warranty or covenant made or undertaken by the Owner Lessor under this Facility Lease.

[*Signature page follows.*]

IN WITNESS WHEREOF, the Owner Lessor and the Facility Lessee have caused this Facility Lease to be duly executed and delivered under seal by their respective officers thereunto duly authorized on the dates below their respective signatures, but effective as of the date first set forth above.

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC

By: Johnsonville Holdco LLC, not in its individual capacity, but solely as Lessor Manager under the Owner Lessor LLC Agreement

By: /s/ Bernard J. Angelo
Name: Bernard J. Angelo
Title: Vice President
Date: September 26, 2024

STATE OF __NY_____)
) ss.:
COUNTY OF __Suffolk_____)

Personally appeared before me, the undersigned authority in and for the said county and state, on this 26th day of September , 2024, within my jurisdiction, the within named Bernard J. Angelo __, who acknowledged to me that he is Manager of Johnsonville Holdco LLC as Lessor Manager of the Johnsonville Aeroderivative Combustion Turbine Generation LLC, a Delaware limited liability company (the "Owner Lessor"), and that for and on behalf of Johnsonville Holdco LLC solely as Lessor Manager of the Owner Lessor, and as the act and deed of Johnsonville Holdco LLC solely as Lessor Manager of the Owner Lessor, and as the act and deed of the Owner Lessor, he executed the above and foregoing instrument, after first having been duly authorized by Johnsonville Holdco LLC and Owner Lessor so to do.

/s/ Kevin P. Burns__
Notary Public

My Commission expires: May 22, 2027

TENNESSEE VALLEY AUTHORITY

By: /s/ Joshua J. Carlon
Name: Joshua Carlon
Title: Director, Corporate Finance
Date: September 26, 2024

STATE OF _TENNESSEE___)
) ss.:
COUNTY OF _KNOX_____)

Personally appeared before me, the undersigned authority in and for the said county and state, on this __26th_ day of _September___, 2024, within my jurisdiction, the within named_Joshua J. Carolon___, who acknowledged to me that he is Director, Corporate Finance of Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States of America, and that for and on behalf of the Tennessee Valley Authority, and as its act and deed, he executed the above and foregoing instrument, after first having been duly authorized so to do.

/s/ Greta N. Chapman__
Notary Public

My Commission expires:

10/30/2027

The name and address of the Owner Lessor are:

OWNER LESSOR: c/o Johnsonville Holdco LLC
68 South Service Road, Suite 120
Melville, NY 11747
Telephone No.: 631-930-7202
E-mail: jrangelo@gssnyc.com
Attention: Bernard J. Angelo

The name and address of the Facility Lessee are:

FACILITY LESSEE: Tennessee Valley Authority
c/o Realty Services
1101 Market Street
Chattanooga, Tennessee 37402-2801
Telephone No. (423) 751-7691
Attention: Senior Manager

Tax Parcel No. 112 001.00 (portion of)

*Receipt of the original counterpart of the foregoing Facility Lease is hereby acknowledged on this _2nd_ day of __October__, 2024.

WILMINGTON TRUST, NATIONAL ASSOCIATION,
not in its individual capacity, but solely as Lease Indenture Trustee
under the Lease Indenture

By: /s/ Jeff Marvel
Name: Jeff Marvel
Title: Assistant Vice President

STATE OF _Deleware)
) ss.:
COUNTY OF __New Castle)

Personally appeared before me, the undersigned authority in and for the said county and state, on this __26 day of ___September_____, 2024, within my jurisdiction, the within named Jeff Marvel _, who acknowledged to me that he is _AVP_____ of Wilmington Trust, National Association, and as the act and deed of Wilmington Trust, National Association solely as Lease Indenture Trustee, he executed the above and foregoing instrument, after first having been duly authorized by Wilmington Trust, National Association so to do.

/s/ Josh M. Flores__
Notary Public

My Commission expires:

APPENDIX A
to
Facility Lease-Purchase Agreement

DEFINITIONS

Appendix A

Definitions

Johnsonville Aeroderivative Combustion Turbine Facility

Appendix A – Definitions

GENERAL PROVISIONS

In this Appendix A and each Transaction Document (as hereinafter defined), unless otherwise provided herein or therein:

(a) the terms set forth in this Appendix A or in any such Transaction Document shall have the meanings herein provided for and any term used in a Transaction Document and not defined therein or in this Appendix A but in another Transaction Document shall have the meaning herein or therein provided for in such other Transaction Document;

(b) any term defined in this Appendix A by reference to another document, instrument or agreement shall continue to have the meaning ascribed thereto whether or not such other document, instrument or agreement remains in effect;

(c) words importing the singular include the plural and vice versa;

(d) words importing a gender include either gender;

(e) a reference to a part, clause, section, paragraph, article, party, annex, appendix, exhibit, schedule or other attachment to or in respect of a Transaction Document is a reference to a part, clause, section, paragraph, or article of, or a part, annex, appendix, exhibit, schedule or other attachment to, such Transaction Document unless, in any such case, otherwise expressly provided in any such Transaction Document;

(f) a reference to any statute, regulation, proclamation, ordinance or law includes all statutes, regulations, proclamations, ordinances or laws varying, consolidating or replacing the same from time to time, and a reference to a statute includes all regulations, policies, protocols, codes, proclamations and ordinances issued or otherwise applicable under that statute unless, in any such case, otherwise expressly provided in any such statute or in such Transaction Document;

(g) a definition of or reference to any document, instrument or agreement includes an amendment or supplement to, or restatement, replacement, modification or renovation of, any such document, instrument or agreement unless otherwise specified in such definition or in the context in which such reference is used;

(h) a reference to a particular section, paragraph or other part of a particular statute shall be deemed to be a reference to any other section, paragraph or other part substituted therefor from time to time;

(i) if a capitalized term describes, or shall be defined by reference to, a document, instrument or agreement that has not as of any particular date been executed and delivered and such document, instrument or agreement is attached as an exhibit to the Participation Agreement (as hereinafter defined), such reference shall be deemed to be to such form and,

following such execution and delivery and subject to paragraph (h) above, to the document, instrument or agreement as so executed and delivered;

(j) a reference to any Person (as hereinafter defined) includes such Person's successors and permitted assigns;

(k) any reference to "days" shall mean calendar days unless "Business Days" (as hereinafter defined) are expressly specified;

(l) if the date as of which any right, option or election is exercisable, or the date upon which any amount is due and payable, is stated to be on a date or day that is not a Business Day, such right, option or election may be exercised, and such amount shall be deemed due and payable, on the next succeeding Business Day with the same effect as if the same was exercised or made on such date or day (without, in the case of any such payment, the payment or accrual of any interest or other late payment or charge, provided such payment is made on such next succeeding Business Day);

(m) words such as "hereunder", "hereto", "hereof" and "herein" and other words of similar import shall, unless the context requires otherwise, refer to the whole of the applicable document and not to any particular article, section, subsection, paragraph or clause thereof;

(n) a reference to "including" shall mean including without limiting the generality of any description preceding such term, and for purposes hereof and of each Transaction Document the rule of *ejusdem generis* shall not be applicable to limit a general statement, followed by or referable to an enumeration of specific matters, to matters similar to those specifically mentioned;

(o) all accounting terms not specifically defined herein or in any Transaction Document shall be construed in accordance with GAAP; and

(p) unless the context or the specific provision otherwise requires, whenever in the Transaction Documents a provision requires that the rating of a Person or the Lessor Notes be confirmed, such provisions shall be deemed to mean that each Rating Agency shall have confirmed the rating of the senior long-term unsecured debt of such Person or the Lessor Notes, if then rated by such Rating Agency, a copy of which confirmation shall be delivered by TVA to the Equity Investor, the Owner Lessor and, so long as the Lien of the Lease Indenture shall not have been terminated or discharged, to the Lease Indenture Trustee and shall be without indication that such Person or the Lessor Notes, as the case may be, has been placed on credit watch, credit review, or any similar status with negative implications or which does not indicate the direction of the potential ratings change.

DEFINED TERMS

"**2024 Lessor Notes**" shall mean the 5.078% Series 2024 Bonds due October 1, 2054 issued on the Closing Date by the Owner Lessor and any Lessor Notes issued in replacement therefor pursuant to Section 2.9 of the Lease Indenture.

"**Access Property**" shall mean the access routes to and from the Facility Site and to and from the Global Common Facilities Site, as more particularly described in Exhibit 3 to the Ground Lease.

"**Actual Knowledge**" shall mean, with respect to any Transaction Party, actual knowledge of, or receipt of written notice by, an officer (or other employee whose responsibilities include the administration of the Transaction) of such Transaction Party; *provided* that neither the Lease Indenture Trustee nor the Lessor Manager shall be deemed to have Actual Knowledge of any fact solely by virtue of an officer of the Lease Indenture Trustee or the Lessor Manager, as the case may be, having actual knowledge of such fact unless such officer is an officer in the Corporate Trust Administration Department of the Lease Indenture Trustee or the Lessor Manager, as the case may be, responsible for the administration of this transaction.

"**Additional Equity Investment**" shall mean the amount, if any, provided by the Equity Investor to finance all or a portion of the cost of any Modification financed pursuant to Section 11.2(a) of the Participation Agreement.

"**Additional Facility**" shall have the meaning specified in Section 4.4 of the Ground Lease.

"**Additional Lessor Notes**" shall have the meaning specified in Section 2.12 of the Lease Indenture.

"**Additional Owner**" shall have the meaning specified in Section 4.4 of the Ground Lease.

"**Affiliate**" of a particular Person shall mean any Person directly or indirectly controlling, controlled by or under common control with such particular Person. For purposes of this definition, "control" when used with respect to any particular Person shall mean the power to direct the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise, and the terms "controlling" and "controlled" have meanings correlative to the foregoing; *provided*, *however*, that under no circumstances shall the Lessor Manager or the Equity Manager be considered an Affiliate of any of the Owner Lessor or the Equity Investor or any Equity Note Purchaser, nor the Owner Lessor, any Equity Investor or any Equity Note Purchaser be considered an Affiliate of the Equity Manager or the Lessor Manager; *provided, further*, that no federal Governmental Entity shall be considered to be an Affiliate of TVA.

"**After-Tax Basis**" shall mean, with respect to any payment to be received by any Person, the amount of such payment (the base payment) supplemented by a further payment (the additional payment) to that Person so that the sum of the base payment plus the additional payment shall, after deduction of the amount of all federal, state and local income Taxes required to be paid

by such Person in respect of the receipt or accrual of the base payment and the additional payment (taking into account any reduction in such income Taxes resulting from Tax benefits realized or to be realized by the recipient as a result of the payment or the event giving rise to the payment), be equal to the amount required to be received. Such calculations shall be made on the basis of the highest generally applicable federal, state and local income tax rates applicable to the Person for whom the calculation is being made for all relevant periods, and shall take into account the deductibility of state and local income taxes for federal income tax purposes.

"**Applicable Law**" shall mean, without limitation, all applicable laws, including all Environmental Laws, and treaties, judgments, decrees, injunctions, writs and orders of any court, arbitration board or Governmental Entity and rules, regulations, orders, ordinances, licenses and permits of any Governmental Entity.

"**Applicable Permits**" shall mean any valid waiver, exemption, variance, franchise, permit, authorization, license or similar order of or from, or filing or registration with, or notice to, any Governmental Entity having jurisdiction over the matter in question, including any decision of a Governmental Entity accompanying any of the foregoing, required by Applicable Law (including Environmental Laws) to be obtained or maintained in connection with the construction, operation and maintenance of the Facility and the Facility Site, transmission of electricity, performance of the Work, testing, commissioning, health and safety or any Environmental Condition.

"**Applicable Rate**" shall mean 5.74% per annum.

"**Appraisal Procedure**" shall mean (except with respect to the Closing Appraisal and any appraisal to determine Fair Market Sales Value after a Lease Event of Default shall have occurred and be continuing) an appraisal conducted by an appraiser or appraisers in accordance with the procedures set forth in this definition of "Appraisal Procedure." The Equity Investor and TVA will consult with the intent of selecting a mutually acceptable Independent Appraiser. If a mutually acceptable Independent Appraiser is selected, the Fair Market Sales Value shall be determined by such Independent Appraiser. If the Equity Investor and TVA are unable to agree upon a single Independent Appraiser within a 15-day period, one shall be appointed by the Equity Investor, and one shall be appointed by TVA (or its designee), which Independent Appraisers shall attempt to agree upon the value, period, amount or other determination that is the subject of the appraisal. If either the Equity Investor or TVA does not appoint its appraiser, the determination of the other appraiser shall be conclusive and binding on the Equity Investor and TVA. If the appraisers appointed by the Equity Investor and TVA are unable to agree upon the value, period, amount or other determination in question, such appraisers shall jointly appoint a third Independent Appraiser or, if such appraisers do not appoint a third Independent Appraiser, the Equity Investor and TVA shall jointly appoint the third Independent Appraiser. In such case, the average of the determinations of the three appraisers shall be conclusive and binding on the Equity Investor and TVA, unless the determination of one appraiser differs from the middle determination by more than twice the amount by which the third determination differs from the middle determination, in which case the determination of the most disparate appraiser shall be excluded, and the average of the remaining two determinations shall be conclusive and binding on the Equity Investor and TVA.

"**Appraiser**" shall mean Federal Appraisal LLC.

"**Arbitration Proceeding**" shall mean a procedure whereby the party seeking to arbitrate a dispute concerning an amount payable under the Support Agreement shall provide written notice of its intention to arbitrate at the time and to the other party of the Support Agreement. Such notice (i) shall specify the section or sections of the Support Agreement which authorizes or authorize an Arbitration Proceeding, (ii) provide reasonable detail of the item or items in dispute, and (iii) set forth the name and address of the person designated to act as the arbitrator on behalf of the party providing such notice. Within 20 Business Days after such notice is given, the party to which such notice was given shall give notice to the first party, specifying the name and address of the person designated to act as arbitrator on its behalf. If the second party fails to notify the first party of the appointment of its arbitrator within such 20 Business Day period, then the appointment of the second arbitrator shall be made in the same manner as hereinafter provided for the appointment of a third arbitrator. The arbitrators so chosen shall meet within 10 Business Days after the second arbitrator is appointed and within 20 Business Days thereafter shall decide the dispute. If within such period they cannot agree upon their decision, they shall within 10 Business Days thereafter appoint a third arbitrator and, if they cannot agree upon such appointment, the third arbitrator shall be appointed upon their application or upon the application of either party, by the American Arbitration Association, or any organization which is a successor thereto from a panel of arbitrators having expertise in the business of operating simple cycle combustion turbines. The three arbitrators shall meet and decide the dispute within 20 Business Days of the appointment of the third arbitrator. Any decision or determination in which two of the three arbitrators shall concur or, if no two of the three arbitrators shall concur, the decision or determination of the arbitrator last selected shall be final and binding upon the parties. In designating arbitrators and in deciding the dispute, the arbitrators shall act in accordance with the rules of the American Arbitration Association then in force, *subject*, *however*, to express provisions to the contrary, if any, contained in the Support Agreement. In the event that the American Arbitration Association or a nationally recognized successor shall not then be in existence, the arbitration shall proceed under comparable laws or statutes then in effect. The parties to the arbitration shall be entitled to present evidence and argument to the arbitrators. Each party shall pay (i) the fees and expenses of the arbitrator appointed by or on its behalf, and (ii) equal shares of (a) the other expenses of the arbitration properly incurred and (b) the fees and expenses of the third arbitrator, if any. For purposes of this definition, the Facility User shall be deemed to be one party and TVA shall be deemed to be the other party.

"**Assigned Documents**" shall have the meaning specified in clause (2) of the Granting Clause of the Lease Indenture.

"**Assignment and Assumption Agreement**" shall mean an assignment and assumption agreement in form and substance substantially in the form of Exhibit F to the Participation Agreement.

"**Bankruptcy Code**" shall mean the United States Bankruptcy Code of 1978, as amended from time to time, 11 U.S.C. §101 *et seq*.

"**Base Rate**" shall mean the rate of interest publicly announced from time to time by Citibank, N.A. at its New York office as its base rate for domestic commercial loans, such rate to change

as and when such base rate changes. For purpose of this definition, "base rate" shall mean that rate announced by Citibank, N.A. from time to time as its base rate as that rate may change from time to time with changes to occur on the date Citibank, N.A.'s base rate changes.

"**Basic Lease Rent**" shall have the meaning specified in Section 3.2 of the Facility Lease.

"**Basic Lease Rent (Debt Portion)**" for any Rent Payment Date shall mean the amount set forth under the heading "Basic Lease Rent (Debt Portion)" on Schedule 1 of the Facility Lease for such Rent Payment Date.

"**Basic Lease Rent (Equity Portion)**" for any Rent Payment Date shall mean the amount set forth under the heading "Basic Lease Rent (Equity Portion)" on Schedule 1 of the Facility Lease for such Rent Payment Date.

"**Benefit Plan**" shall mean an employee benefit plan as defined in Section 3(3) of ERISA that is subject to Title I of ERISA, a plan as defined in Section 4975(e) of the Code that is subject to Section 4975 of the Code or any entity that is deemed to hold the assets of any such employee benefit plan or plan by virtue of such employee benefit plan's or plan's investment in such entity.

"**Bond Resolution**" shall mean the Basic Tennessee Valley Authority Power Bond Resolution adopted October 6, 1960, as amended.

"**Boundary Property**" shall have the meaning specified in Section 4.3(a) of the Ground Lease.

"**Burns & McDonnell**" shall have the meaning specified in the first recital of the Construction Management Agreement.

"**Business Day**" shall mean any day other than a Saturday, a Sunday, any federal holiday, or a day on which banking institutions are authorized or required by law, regulation or executive order to be closed in Wilmington, Delaware, Knoxville, Tennessee, or the city and the state in which the Corporate Trust Office of the Lease Indenture Trustee, the Lessor Manager or the Equity Manager is located.

"**Called Amount**" shall mean the amount of the Equity Investment that is being repaid, determined by reference to the Termination Value (Equity Portion) with respect to the applicable Termination Date.

"**Capability**" shall mean the amount of Energy, expressed in megawatt hours, that can be generated by the Facility.

"**Capacity**" shall mean megawatts of electric energy generating capacity.

"**Capital Expenditure Budget**" shall have the meaning set forth in Section 4.4(a) of the Support Agreement.

"**Claim**" shall mean any liability (including in respect of negligence (whether passive or active or other torts), strict or absolute liability in tort or otherwise, warranty, latent or other defects (regardless of whether or not discoverable), statutory liability, property damage, bodily injury or death), obligation, loss, settlement, damage, penalty, claim, action, suit, proceeding (whether civil or criminal), judgment, penalty, fine and other legal or administrative sanction, judicial or administrative proceeding, cost, expense or disbursement, including reasonable legal, investigation and expert fees, expenses and reasonable related charges, of whatsoever kind and nature (including any losses incurred in connection with enforcement of indemnity obligations), but excluding Taxes.

"**Closing**" shall have the meaning specified in Section 2.2(a) of the Participation Agreement.

"**Closing Appraisal**" shall mean the appraisal, dated the Closing Date, prepared by the Appraiser for the use of TVA.

"**Closing Date**" shall have the meaning specified in Section 2.2(a) of the Participation Agreement.

"**CMA Payment**" shall have the meaning specified in Section 6.1 of the Construction Management Agreement.

"**Code**" shall mean the Internal Revenue Code of 1986, as amended from time to time, and any successor statute.

"**Co-Equity Manager**" shall mean a co-Manager appointed pursuant to Section 21 of the Equity Investor LLC Agreement.

"**Co-Lessor Manager**" shall mean a co-Independent Manager appointed pursuant to Section 16.6 of the Owner Lessor LLC Agreement.

"**Collateral**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Common Facilities**" shall mean all property and facilities intended for common use in the operation of the Units as more particularly described on Exhibit A to the Facility Lease, and shall include any Modifications to such facilities which become subject to the Head Lease during the Facility Lease Term and any Modifications to the Common Facilities made in accordance with the Support Agreement, but shall not include any property or facilities that are used in whole or in part solely for operation or maintenance of other TVA generating units.

"**Competitor**" shall have the meaning specified in Section 7.1(b) of the Participation Agreement.

"**Component**" shall mean any appliance, part, instrument, appurtenance, accessory, furnishing, equipment or other property of whatever nature that may from time to time be incorporated in any Unit or the Facility, except to the extent constituting Modifications.

"**Confidential Information**" shall have the meaning specified in Section 13.2 of the Participation Agreement.

"**Construction Cost**" shall mean, with respect to any Modification, the actual cost or purchase price (after deducting amounts realized as the salvage value of any component or item of equipment which is being replaced by the Modification, determined in accordance with Prudent Industry Practice), including, without limitation, (i) all costs of architectural and engineering services, labor, materials, equipment, supplies, personnel training, testing, permits and licenses, and legal services, (ii) payroll, including related fringe benefits and payroll taxes, of direct full time employees of TVA allocable on an actual time basis to such acquisition or construction and not included in costs described in clause (vi) below, (iii) reasonable and allocable traveling expenses including use of TVA's transportation equipment, (iv) all costs relating to injury or damage claims and claims by contractors or suppliers arising under construction contracts and arising out of such acquisition or construction, (v) all Taxes legally required to be paid with respect to such acquisition or construction if paid by TVA and (vi) administrative and other overhead costs of TVA as apportioned by TVA to such Modification in accordance with the Uniform System of Accounts, applicable to such acquisition or construction of such Modification, all in accordance with the Capital Expenditure Budget in effect from time to time.

"**Construction Management Agreement**" shall mean the Construction Management Agreement dated as of the Closing Date between TVA and the Owner Lessor.

"**Construction Period Financing Account**" shall have the meaning specified in Section 2.17(a) of the Lease Indenture.

"**Construction Period Financing Costs**" shall mean a dollar amount equal to the sum of (a) $22,629,677 with respect to the Lessor Notes and (b) $2,283,244 with respect to the Equity Investment.

"**Contractor**" shall mean TVA as contractor under the Construction Management Agreement.

"**Contract Year**" shall mean the 12-month period commencing at 12:01 a.m. on January 1 of each year and ending at 12:01 a.m. on the following January 1, except that the first Contract Year shall begin on the Service Commencement Date and the last Contract Year shall end on the Final Shutdown Date.

"**Debt Portion**" shall mean the separate portions of the Net TV Amount (Debt Portion), which portions correspond to the 2024 Lessor Notes and each series of Additional Lessor Notes that may have been issued from time to time and are determined by multiplying (a) the Net TV Amount (Debt Portion), by (b) the fraction (i) the numerator of which is the outstanding principal amount of the applicable 2024 Lessor Notes or such series of Additional Lessor Notes and (ii) the denominator of which is the aggregate outstanding principal amount of the 2024 Lessor Notes and the Additional Lessor Notes.

"**Deed of Trust Trustee**" shall mean John Seehorn, Esq.

"**Design Documents**" shall have the meaning specified in Section 2.2.1 of the Construction Management Agreement.

"**Discounted Value**" shall mean, with respect to the Called Amount of any Equity Investment, the amount obtained by discounting all Remaining Scheduled Payments with respect to such Called Amount from their respective scheduled due dates to the Settlement Date with respect to such Called Amount, in accordance with accepted financial practice and at a discount factor (applied on the same periodic basis as that on which return on the Equity Investment is payable) equal to the Reinvestment Yield with respect to such Called Amount.

"**Dollars**" or the sign "**$**" shall mean United States dollars or other lawful currency of the United States.

"**DTC**" shall mean The Depository Trust Company, a New York corporation.

"**Early Buy Out**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Early Buy Out Date**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Early Buy Out Notice**" shall have the meaning specified in Section 15.1 of the Facility Lease.

"**Effective Date**" shall mean September 25, 2024.

"**Election Notice**" shall have the meaning specified in Section 13.1 of the Facility Lease.

"**Energy**" shall mean megawatt hours of electric energy.

"**Enforcement Notice**" shall have the meaning specified in Section 5.1 of the Lease Indenture.

"**Engineering Consultant**" shall mean Sargent & Lundy, L.L.C.

"**Engineering Report**" shall mean the report of the Engineering Consultant, dated August 30, 2024.

"**Environmental Condition**" shall mean any action, omission, event, condition or circumstance, including the presence of any Hazardous Substance, that does or reasonably could (i) require assessment, investigation, abatement, correction, removal or remediation under any Environmental Law, (ii) give rise to any obligation or liability of any nature (whether civil or criminal, arising under a theory of negligence or strict liability, or otherwise) under any Environmental Law, or (iii) constitute a violation of or non-compliance with any Environmental Law.

"**Environmental Laws**" shall mean any federal, state or local laws, common law, ordinances, rules, orders, statutes, decrees, judgments, injunctions, directives, permits, licenses, approvals, codes and regulations relating to the environment, human health, natural resources or Hazardous Substances, now or hereafter in effect and as each may from time to time be amended, supplemented or supplanted.

"**Equity Breakage**" shall mean, with respect to a Called Amount, an amount equal to the excess, if any, of the Discounted Value with respect to the Called Amount of such Equity Investment over the amount of such Called Amount, *provided* that the Equity Breakage may in no event be less than zero.

"**Equity Collateral Agent**" shall mean Wilmington Trust, National Association, or any successor thereto, as collateral agent appointed pursuant to the Equity Note Purchase Documents.

"**Equity Guarantor**" shall have the meaning specified in Section 7.1 of the Participation Agreement.

"**Equity Guaranty**" shall mean any guaranty agreement guaranteeing the obligations of the Equity Investor or entered into pursuant to Section 7.1 of the Participation Agreement in form and substance substantially in the form of Exhibit G to the Participation Agreement.

"**Equity Investment**" shall mean the amount specified under the heading "Equity Investment" in Schedule 4 to the Participation Agreement.

"**Equity Investor**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement; *provided* that if the Membership Interests are transferred pursuant to the Participation Agreement such that more than one person is a holder thereof, the term "Equity Investor" shall be deemed to include each holder of the Membership Interests.

"**Equity Investor LLC Agreement**" shall mean the limited liability company agreement, dated on or about the Effective Date, between the Owner Participant and the Equity Manager.

"**Equity Investor's Lien**" shall mean, with respect to the Equity Investor, any Equity Note Purchaser, the Equity Note Purchaser or the Equity Manager, any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Claims against or any act or omission of the Equity Investor, an Equity Note Purchaser or the Equity Manager or any Affiliate of any thereof that are not related to, or that are in violation of, any Transaction Document or the transactions contemplated thereby or that are in breach of any covenant or agreement of the Equity Investor or the Equity Manager set forth therein, (ii) Taxes against the Equity Investor, any Equity Note Purchaser, the Equity Manager or any respective Affiliate thereof that are not indemnified against by TVA pursuant to any Transaction Document or (iii) Claims against or affecting the Equity Investor, any Equity Note Purchaser, the Equity Manager or any respective Affiliate thereof arising out of the voluntary or involuntary transfer by the Equity Manager or the Equity Investor (except as contemplated or permitted by the Transaction Documents) of any portion of the Equity Investor's Membership Interests.

"**Equity Manager**" shall have the meaning set forth in the introductory paragraph of the Participation Agreement.

"**Equity Note**" shall mean, with respect to any Equity Note Purchaser, the Equity Note issued by the Equity Investor as of the Closing Date to such Equity Note Purchaser substantially in the form attached as Exhibit 1 to the Equity Note Purchase Agreement.

"**Equity Note Purchase Agreement**" shall mean the Note Purchase Agreement, dated as of the Closing Date, between the Equity Investor and the Equity Note Purchasers.

"**Equity Note Purchase Documents**" shall mean the Equity Note Purchase Agreement, the Equity Notes, the Equity Pledge Agreement and the Equity Investor LLC Agreement.

"**Equity Note Purchaser**" or "**Equity Note Purchasers**" shall mean the Persons set forth under the caption "Equity Note Purchaser" on Schedule 4 to the Participation Agreement.

"**Equity Note Purchaser's Percentage Interest of the Notes**" shall mean, as of any date of determination, the percentage of the outstanding principal amount of Equity Notes held by the applicable Equity Note Purchaser.

"**Equity Placement Agent**" shall mean Morgan Stanley & Co. LLC.

"**Equity Pledge Agreement**" shall mean the Pledge Agreement, dated as of the Closing Date, between the Equity Investor and the Equity Collateral Agent.

"**Equity Portion**" shall mean the separate portions of the Net TV Amount (Equity Portion), which portions correspond to the Equity Investment and each series of Additional Equity Investment that may have been issued from time to time and are determined by multiplying (a) the Net TV Amount (Equity Portion), by (b) the fraction (i) the numerator of which is the outstanding principal amount of the applicable Equity Investment or such series of Additional Equity Investment and (ii) the denominator of which is the aggregate outstanding principal amount of the Equity Investment and the Additional Equity Investments.

"**ERISA**" shall mean the Employee Retirement Income Security Act of 1974, as amended from time to time.

"**Event of Loss**" shall mean, with respect to any Unit or Units, any of the following events:

(a) loss of such Unit or Units or use thereof due to destruction or damage to such Unit or Units, the Common Facilities or the Global Common Facilities that is beyond economic repair or that renders such Unit or Units permanently unfit for normal use;

(b) damage to such Unit or Units, the Common Facilities or the Global Common Facilities that results in an insurance settlement with respect to such Unit or Units on the basis of a total loss or an agreed constructive or a compromised total loss of such Unit or Units; and

(c) seizure, condemnation, confiscation or taking of, or requisition of title to or use of, all or substantially all of a Unit or Units, the Common Facilities or the Global Common Facilities by any Governmental Entity, which in the case of a requisition of use prevents the Facility Lessee from operating and maintaining all or substantially all of the Facility, such Unit or Units or the Facility Site for a period of 365 days or more, in each case following any contest thereof and exhaustion of all permitted appeals or an election by TVA not to pursue such appeals.

"**Evidences of Indebtedness**" shall have the meaning specified in the Bond Resolution.

"**Excepted Payments**" shall mean and include (a)(i) any indemnity or other payment (whether or not constituting Supplemental Lease Rent and whether or not a Lease Event of Default exists) payable to the Equity Investor, the Equity Manager, any Equity Note Purchaser, the Lessor Manager or to their respective successors and permitted assigns (other than the Lease Indenture Trustee) pursuant to Section 2.4, 9.1 or 9.2 of the Participation Agreement and Section 11.1 of the Owner Lessor LLC Agreement or (ii) any amount payable by TVA to the Owner Lessor, the Equity Investor, the Lessor Manager, the Equity Manager or any Equity Note Purchaser to reimburse any such Person for its costs and expenses in exercising its rights under the Transaction Documents, (b) insurance proceeds, if any, payable to the Owner Lessor or the Equity Investor under insurance separately maintained by the Owner Lessor or the Equity Investor with respect to the Facility as permitted by Section 11.1 of the Facility Lease, (c) any amount payable to the Equity Investor as the purchase price of the Equity Investor's Membership Interests in connection with any permitted sale or transfer thereof pursuant to Section 7.1 of the Participation Agreement or Section 13 of the Facility Lease, (d) any amounts payable to the Equity Investor upon exercise by TVA of the Special Lessee Transfer pursuant to Section 12 of the Participation Agreement; (e) all other fees expressly payable to the Owner Lessor, the Equity Investor, the Lessor Manager, the Equity Manager or any Equity Note Purchaser under the Transaction Documents; (f) any amounts payable by TVA to the Owner Lessor pursuant to Section 13.2 of the Facility Lease; and (vii) any payments in respect of interest to the extent attributable to payments referred to above that constitute Excepted Payments.

"**Excepted Rights**" shall mean the rights specified in Section 5.6 of the Lease Indenture.

"**Excess Amounts**" shall have the meaning specified in Section 9.12 of the Lease Indenture.

"**Exchange Act**" shall mean the Securities Exchange Act of 1934, as amended.

"**Exchange Date**" shall mean, when used with respect to any Lessor Notes being replaced and exchanged for Replacement Power Bonds, the date fixed for such replacement and exchange by

or pursuant to the Lease Indenture or the respective Lessor Notes, which date shall be a Termination Date.

"**Excluded Property**" shall mean Excepted Payments and rights reserved to the Owner Lessor and included within Excepted Rights, collectively.

"**Excluded Taxes**" shall have the meaning specified in Section 9.2(b) of the Participation Agreement.

"**Expected Completion Date**" shall have the meaning specified in Section 4.1.2 of the Construction Management Agreement

"**Expiration Date**" shall mean October 1, 2054, the scheduled expiration date of the Facility Lease Term.

"**Facility**" shall have the meaning specified in the first recital of the Participation Agreement.

"**Facility Lease**" shall mean the Facility Lease-Purchase Agreement, dated as of the Closing Date, between the Owner Lessor and TVA, substantially in the form of Exhibit B to the Participation Agreement.

"**Facility Lease Term**" shall have the meaning specified in Section 3.1 of the Facility Lease.

"**Facility Lessee**" shall mean TVA as lessee under the Facility Lease.

"**Facility Lessee's Interest**" shall mean the Facility Lessee's interest in and to the Facility under the Facility Lease and the Ground Interest under the Ground Sublease.

"**Facility Lessor**" shall mean the Owner Lessor as lessor under the Facility Lease.

"**Facility Operating Fee**" shall have the meaning specified in Section 3.5 of the Support Agreement.

"**Facility Operation and Maintenance Expense**" shall mean all payments made, costs incurred, and obligations and liabilities incurred, by TVA for or in connection with engineering, contract preparation, purchasing, repairing, insuring, supervising, recruiting, training, expediting, inspecting, accounting, providing legal services, testing, protecting, operating, insuring, using, decommissioning, retiring, and maintaining the Facility, *including, but not limited to*, Station Service Requirements and all such payments made, and obligations incurred, during an operating emergency, and with respect to the purchase of materials, supplies and spare parts, *but excluding* the Construction Cost of Modifications and any other cost included in a Capital Expenditure Budget. Facility Operation and Maintenance Expenses shall include the properly allocable direct overheads of TVA in the operation and maintenance of the Facility. Facility Operation and Maintenance Expenses shall be determined under and in accordance with the Uniform System of Accounts and shall be in accordance with the Operation and Maintenance Expense Budget in effect from time to time. There shall be

credited against Facility Operation and Maintenance Expenses for such Month the proceeds of the sale by TVA of any surplus materials or supplies constituting part of, or used in connection with, the Facility. Facility Operation and Maintenance Expense shall not include any payments made by the Ground Lessee for Taxes pursuant to Section 3.2 of the Ground Lease and payments made, or costs incurred, for commodities, equipment or services supplied by TVA to the Facility User under separate contract, including transmission services supplied under contracts negotiated pursuant to Section 5 of the Support Agreement.

"**Facility Site**" shall mean the land on which the Facility is situated, as more particularly described in Exhibit 1 to the Ground Lease.

"**Facility User**" shall mean (i) the Owner Lessor, (ii) any Person to which the Owner Lessor has transferred its interest in the Facility or is leasing the Facility, or (iii) any other Person during the time and to the extent such Person has possession and control of the Facility, in each case under circumstances giving the Owner Lessor or such Person, as the case may be, the right to market and sell Energy from the Facility for its own account, including any Person designated by the Owner Lessor to be so entitled.

"**Fair Market Rental Value**" or "**Fair Market Sales Value**" shall mean with respect to any property or service as of any date, the cash rent or cash price obtainable in an arm's length lease, sale or supply, respectively, between an informed and willing lessee or purchaser under no compulsion to lease or purchase and an informed and willing lessor or seller or supplier under no compulsion to lease or sell or supply the property or service in question, and shall, in the case of an Owner Lessor's Interest, be determined (except as otherwise provided below or in the Transaction Documents) on the basis that (a) the Facility is located on the Facility Site and the conditions contained in Sections 7 and 8 of the Facility Lease shall have been complied with in all respects, (b) the lessee or buyer shall have rights in, or an assignment of, the Transaction Documents to which the Owner Lessor is a party and the obligations relating thereto and (c) the Owner Lessor's Interest is free and clear of all Liens (other than Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens) and taking into account (i) the remaining term of the Ground Lease and the Ground Sublease and (ii) in the case of the Fair Market Rental Value, the terms of the Facility Lease and the Transaction Documents. If the Fair Market Sales Value of the Owner Lessor's Interest is to be determined during the continuance of a Lease Event of Default or in connection with the exercise of remedies by the Owner Lessor pursuant to Section 18 of the Facility Lease, such value shall be determined by an appraiser appointed by the Owner Lessor on an "as-is," "where-is" and "with all faults" basis and shall take into account all Liens (other than Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens); *provided*, *however*, in any such case where the Owner Lessor shall be unable to obtain constructive possession sufficient to realize the economic benefit of the Owner Lessor's Interest, Fair Market Sales Value of the Owner Lessor's Interest shall be deemed equal to $0. If in any case other than in the preceding sentence the parties are unable to agree upon a Fair Market Sales Value of the Owner Lessor's Interest within 30 days after a request therefor has been made, the Fair Market Sales Value of the Owner Lessor's Interest shall be determined by appraisal pursuant to the Appraisal Procedures. Any fair market value determination of a Severable

Modification shall take into consideration any liens or encumbrances to which the Severable Modification being appraised is subject and which are being assumed by the transferee.

"**Federal Power Act**" shall mean the Federal Power Act, as amended.

"**FERC**" shall mean the Federal Energy Regulatory Commission.

"**Final Acceptance**" shall have the meaning specified in Section 5.3 of the Construction Management Agreement.

"**Final Acceptance Certificate**" shall have the meaning specified in Section 5.4 of the Construction Management Agreement.

"**Final Determination**" shall mean (i) a decision, judgment, decree or other order by any court of competent jurisdiction, which decision, judgment, decree or other order has become final after all allowable appeals or rehearings by either party to the action have been exhausted or the time for filing such appeal has expired, or in any case where judicial review shall at the time be unavailable because the proposed adjustment involves a decrease in net operating loss carryforward or a business credit carryforward, a decision, judgment, decree or other order of an administrative official or agency of competent jurisdiction, which decision, judgment, decree or other order has become final (*i.e.*, where all administrative appeals have been exhausted by all parties thereto), (ii) a closing agreement entered into under section 7121 of the Code, or any other settlement agreement entered into in connection with an administrative or judicial proceeding or (iii) the expiration of the time for instituting a claim for refund, or if such a claim was filed, the expiration of the time for instituting suit with respect thereto.

"**Final Shutdown**" shall mean the permanent removal from operation and commercial service of the Facility.

"**Final Shutdown Date**" shall mean the date on which Final Shutdown occurs.

"**Fitch**" shall mean Fitch Ratings, Inc. and any successor thereto.

"**FMV Net Termination Value**" shall have the meaning set forth in Section 18.2(d) of the Facility Lease.

"**GAAP**" shall mean generally accepted accounting principles used in the United States consistently applied.

"**Global Common Facilities**" shall mean all property and facilities intended for use in the operation and maintenance of the Facility and which are common to the operation and maintenance of the Facility, the Johnsonville Combustion Turbine Plant and any other facility existing on or adjacent to the Facility Site, as more particularly described in Attachment C to the Owner Lessor Mortgage.

"**Global Common Facilities Operating Fee**" shall have the meaning specified in Section 2.4 of the Support Agreement.

"**Global Common Facilities Operation and Maintenance Expense**" shall mean all payments made, costs incurred, and obligations and liabilities incurred, by TVA for or in connection with engineering, contract preparation, purchasing, repairing, insuring, supervising, recruiting, training, expediting, inspecting, accounting, providing legal services, testing, protecting, operating, insuring, using, decommissioning, retiring, and maintaining the Global Common Facilities, including depreciation and all such payments made, and obligations incurred, during an operating emergency, and with respect to the purchase of materials, supplies and spare parts. Global Common Facilities Operation and Maintenance Expenses shall include the properly allocable direct overheads of TVA in the operation and maintenance of the Global Common Facility. Global Common Facilities Operation and Maintenance Expenses shall be determined under and in accordance with the Uniform System of Accounts. There shall be credited against Global Common Facilities Operation and Maintenance Expenses for such Month the proceeds of the sale by TVA of any surplus materials or supplies constituting part of, or used in connection with, the Global Common Facilities. Global Common Facilities Operation and Maintenance Expense shall not include any payments made by the Ground Lessee for Taxes pursuant to Section 3.2 of the Ground Lease and any payments made, or costs incurred, for commodities, equipment or services supplied by TVA to the Facility User under separate contract, including transmission services supplied under contracts negotiated pursuant to Section 5 of the Support Agreement.

"**Global Common Facilities Percentage**" at any point in time, shall mean a percentage equal to a fraction the numerator of which is the then current rated Capacity of the Facility and the denominator of which is the sum of the then current rated Capacities of all generating facilities for the operation of which the Global Common Facilities are then utilized.

"**Global Common Facilities Site**" shall mean the land on which the Global Common Facilities are located, as more particularly described in Exhibit 2 to the Ground Lease.

"**Government**" shall mean the United States of America.

"**Governmental Entity**" shall mean and include the Government, any national government, any political subdivision of a national government or of any state, county or local jurisdiction therein or any board, commission, department, division, organ, instrumentality, court or agency of any thereof, but shall not include TVA.

"**Ground Interest**" shall mean (i) a leasehold in the Facility Site, (ii) a nonexclusive easement in, to and over the Global Common Facilities Site and (iii) a nonexclusive easement in, to and over the Access Property, granted pursuant to, and for the purposes and subject to the limitations set forth in, Section 5 of the Ground Lease.

"**Ground Lease**" shall mean the Ground Lease and Easement Agreement, dated as of the Closing Date, among the Ground Lessor and the Ground Lessee, substantially in the form of Exhibit C to the Participation Agreement.

"**Ground Lease Term**" shall have the meaning specified in Section 2.2 of the Ground Lease.

"**Ground Lessee**" shall mean the Owner Lessor as lessee of the Ground Interest under the Ground Lease.

"**Ground Lessor**" shall mean TVA and the Government (solely for purposes of Section 2.1 of the Ground Lease), as lessor of the Ground Interest under the Ground Lease.

"**Ground Lessor's Release Rights**" shall have the meaning specified in Section 4.2 of the Ground Lease.

"**Ground Sublease**" shall mean the Ground Sublease and Easement Agreement, dated as of the Closing Date, among the Ground Sublessor and the Ground Sublessee, substantially in the form of Exhibit D to the Participation Agreement.

"**Ground Sublease Term**" shall have the meaning specified in Section 2.2 of the Ground Sublease.

"**Ground Sublessee**" shall mean TVA and the Government (solely for purposes of Section 2.1 of the Ground Sublease) as sublessee of the Ground Interest under the Ground Sublease.

"**Ground Sublessor**" shall mean the Owner Lessor as sublessor of the Ground Interest under the Ground Sublease.

"**Guaranteed Provisional Acceptance Date**" shall mean September 25, 2025.

"**Hazardous Substance**" shall mean any pollutant, contaminant, hazardous substance, hazardous waste, toxic substance, chemical substance, extremely hazardous substance, petroleum or petroleum derived substance, waste, or additive, asbestos, PCBs, radioactive material, corrosive, explosive, flammable or infectious material, lead, radon or other compound, element, material or substance in any form whatsoever (including products) defined, regulated, restricted or controlled by or under any Environmental Law.

"**Head Lease**" shall mean the Head Lease Agreement, dated as of the Closing Date, among the Head Lessor and the Head Lessee, substantially in the form of Exhibit A to the Participation Agreement.

"**Head Lease Rent**" shall have the meaning specified in Section 3.2(a) of the Head Lease.

"**Head Lease Term**" shall have the meaning specified in Section 3.1 of the Head Lease.

"**Head Lessee**" shall mean the Owner Lessor as lessee of the Facility under the Head Lease.

"**Head Lessor**" shall mean TVA and the Government (solely for purposes of Section 2 of the Head Lease) as lessor of the Facility under the Head Lease.

"**Indemnitee**" shall have the meaning specified in Section 9.1(a) of the Participation Agreement.

"**Indemnity Period**" shall have the meaning specified in Section 11 of the Ground Lease.

"**Independent Appraiser**" shall mean a disinterested, licensed industrial property appraiser who is a member of the Appraisal Institute having experience in the business of evaluating facilities similar to the Facility.

"**Investment Banker**" shall have the meaning specified in Section 2.10(b) of the Lease Indenture.

"**Johnsonville Combustion Turbine Plant**" shall mean the Johnsonville Combustion Turbine Plant consisting of 20 simple-cycle combustion turbine units with a combined summer net generation capacity of 1,269 MW located at a site adjacent to the Facility Site.

"**Johnsonville Construction Contract**" shall have the meaning specified in the first recital of the Construction Management Agreement.

"**Lease Commencement Date**" shall mean the earlier of (i) the date the Facility achieves Substantial Completion in accordance with the Construction Management Agreement and (ii) the Outside Lease Commencement Date.

"**Lease Debt Rate**" shall mean the interest rate under the 2024 Lessor Notes.

"**Lease Default**" shall mean any event or circumstance that, with the passage of time or the giving of notice, or both, would become a Lease Event of Default.

"**Lease Event of Default**" shall have the meaning specified in Section 17 of the Facility Lease.

"**Leasehold Deed of Trust Trustee**" shall mean R. Culver Schmid.

"**Lease Indenture**" shall mean the Indenture of Trust, Deed of Trust and Security Agreement and Fixture Filing, dated as of the Closing Date, among the Owner Lessor, the Lease Indenture Trustee and the Deed of Trust Trustee, substantially in the form of Exhibit E to the Participation Agreement.

"**Lease Indenture Bankruptcy Default**" shall mean any event or occurrence, which, with the passage of time or the giving of notice or both, would become a Lease Indenture Event of Default under Section 4.2(e) or (f) of the Lease Indenture.

"**Lease Indenture Estate**" shall have the meaning specified in the Granting Clause of the Lease Indenture.

"**Lease Indenture Event of Default**" shall have the meaning specified in Section 4.2 of the Lease Indenture.

"**Lease Indenture Payment Default**" shall mean any event or occurrence, which, with the passage of time or the giving of notice or both, would become an Lease Indenture Event of Default under Section 4.2(b) of the Lease Indenture.

"**Lease Indenture Trustee**" shall mean Wilmington Trust, National Association, not in its individual capacity, but solely as Lease Indenture Trustee under the Lease Indenture, and each other Person who may from time to time be acting as Lease Indenture Trustee in accordance with the provisions of the Lease Indenture.

"**Lease Indenture Trustee Office**" shall mean the office to be used for notices to the Lease Indenture Trustee from time to time pursuant to Section 9.5 of the Lease Indenture.

"**Lease Indenture Trustee's Account**" shall mean the account identified as the Lease Indenture Trustee's Account on Schedule 4 of the Participation Agreement.

"**Lease Indenture Trustee's Liens**" shall mean any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Taxes against or affecting the Lease Indenture Trustee, or any Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby, (ii) Claims against or any act or omission of the Lease Indenture Trustee, or Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby or that is in breach of any covenant or agreement of the Lease Indenture Trustee specified therein, (iii) Taxes imposed upon the Lease Indenture Trustee, or any Affiliate thereof, that are not indemnified against by TVA pursuant to any Transaction Document, or (iv) Claims against or affecting the Lease Indenture Trustee, or any Affiliate thereof, arising out of the voluntary or involuntary transfer by the Lease Indenture Trustee of any portion of the interest of the Equity Manager or the Lease Indenture Trustee in the Lessor Estate, other than pursuant to the Transaction Documents.

"**Lessee Person**" shall mean the Facility Lessee, any sublessee of the Facility Lessee or any other Person using or having possession of the Facility during the Facility Lease Term or any portion thereof and any Affiliate, successor, assignee, transferee, agent or employee of any of the foregoing or any Person claiming through any of the foregoing, except that none of the Owner Lessor, the Equity Investor, the Equity Manager, any Equity Note Purchaser nor the Lease Indenture Trustee, nor any Affiliate, successor, assignee, transferee, agent or employee of any of the foregoing, nor any Person claiming through any of the foregoing, shall be a Lessee Person.

"**Lessor Estate**" shall mean all the estate, right, title and interest of the Owner Lessor in, to and under the Facility, the Ground Interest and the Transaction Documents, including all funds advanced to the Owner Lessor by the Equity Investor, all installments and other payments of Basic Lease Rent, Supplemental Lease Rent, Termination Value, condemnation awards, purchase price, sale proceeds and all other proceeds, rights and interests of any kind for or with respect to the estate, right, title and interest of the Owner Lessor in, to and under the Facility, the Ground Interest, the Transaction Documents, and any of the foregoing.

"**Lessor Manager**" shall have the meaning set forth in the introductory paragraph of the Participation Agreement.

"**Lessor Notes**" shall mean the 2024 Lessor Notes and any Additional Lessor Notes.

"**Lien**" shall mean any mortgage, security deed, security title, pledge, lien, charge, encumbrance, lease, or security interest or title retention arrangement.

"**List of Competitors**" shall mean the initial list attached to the Participation Agreement as Schedule 2, as amended from time to time pursuant to Section 7.1(b) of the Participation Agreement.

"**Majority in Interest of Noteholders**" as of any date of determination, shall mean Noteholders holding in aggregate more than 50% of the total outstanding principal amount of Lessor Notes; *provided*, *however*, that any Lessor Notes held by TVA and/or any Affiliate of TVA shall not be considered outstanding for purposes of this definition unless TVA and/or such Affiliate shall hold title to all the Lessor Notes outstanding.

"**Make Whole Premium**" shall mean, with respect to the Lessor Notes subject to redemption pursuant to the Lease Indenture, an amount equal to the Discounted Present Value of the Lessor Notes *less* the unpaid principal amount of such Lessor Notes; *provided* that the Make Whole Premium shall not be less than zero. For purposes of this definition, the "Discounted Present Value" of any Lessor Notes subject to redemption pursuant to the Lease Indenture shall be equal to the discounted present value of all principal and interest payments scheduled to become due after the date of such redemption in respect of the Lessor Notes, calculated using a discount rate equal to the sum of (i) the yield to maturity on the U.S. Treasury security having a life equal to the remaining average life of the Lessor Notes and (ii) 15 basis points; *provided*, *however*, that if there is no U.S. Treasury security having a life equal to the remaining average life of the Lessor Notes, such discount rate shall be calculated using a yield to maturity interpolated or extrapolated on a straight-line basis (rounding to the nearest calendar month, if necessary) from the yields to maturity for two U.S. Treasury securities having lives most closely corresponding to the remaining average life of the Lessor Notes.

"**Material Adverse Effect**" shall mean with respect to any Person a materially adverse effect on (i) the business, assets, revenues, results of operations, or financial condition of such Person, (ii) the ability of such Person to perform its obligations under the Transaction Documents, or (iii)

the validity or enforceability of the Transaction Documents, the Liens granted thereunder, or the rights and remedies thereto.

"**Maximum Net Generating Capacity**" shall mean the maximum net Capability of the Facility to produce Energy under conditions existing from time to time.

"**Membership Interests**" shall mean the membership interests of the Equity Investor in the Owner Lessor.

"**Modification**" shall mean a modification, alteration, improvement, addition, betterment or enlargement of the Facility, including any Required Modifications and Optional Modifications, but not Components.

"**Month**" shall mean a calendar month.

"**Moody's**" shall mean Moody's Investors Service, Inc. and any successor thereto.

"**Net TV Amount**" shall mean the FMV Net Termination Value or the Sale Net Termination Value, as applicable.

"**Net TV Amount (Debt Portion)**" shall be the amount equal to the product of (a) the applicable Net TV Amount as of the applicable Termination Date, *multiplied by* (b) a fraction (i) the numerator of which is the Termination Value (Debt Portion) as of such Termination Date and (ii) the denominator of which is the Termination Value as of such Termination Date.

"**Net TV Amount (Debt Portion) Rate**" shall mean, with respect to the applicable Debt Portion, a rate per annum equal to (a) 7.078% per annum with respect to the Debt Portion that corresponds to the 2024 Lessor Notes; or (b) the interest rate on the applicable Additional Lessor Notes *plus* two percent (2%) per annum with respect to the Debt Portion that corresponds to such Additional Lessor Notes.

"**Net TV Amount (Equity Portion)**" shall be the amount equal to the product of (a) the applicable Net TV Amount as of the applicable Termination Date, *multiplied by* (b) a fraction (i) the numerator of which is the Termination Value (Equity Portion) as of such Termination Date and (ii) the denominator of which is the Termination Value as of such Termination Date.

"**Net TV Amount (Equity Portion) Rate**" shall mean, with respect to the applicable Equity Portion, a rate per annum equal to (a) 7.74% per annum with respect to the Equity Portion that corresponds to the Equity Investment; and (b) the interest rate on the applicable Additional Equity Investment *plus* two percent (2%) per annum with respect to the Equity Portion that corresponds to such Additional Equity Investment.

"**Nonseverable Modifications**" shall mean any Modification that is not a Severable Modification.

"**Note Register**" shall have the meaning specified in Section 2.8 of the Lease Indenture.

"**Noteholder**" shall mean any holder from time to time of outstanding Lessor Notes, and each such holder's successors and permitted assigns.

"**Offering Circular**" shall mean the Offering Circular, dated September 25, 2024, with respect to the 2024 Lessor Notes.

"**Officer's Certificate**" shall mean with respect to any Person a certificate signed by the Responsible Officer of such Person.

"**Operating Fee**" shall mean the Global Common Facilities Operating Fee and, if the Owner Lessor shall elect to appoint TVA operator of the Facility pursuant to Section 3.1 of the Support Agreement and TVA shall not be precluded by law from so serving, the Facility Operating Fee.

"**Operation and Maintenance Expense**" shall mean the Facility Operation and Maintenance Expense and the Global Common Facilities Operation and Maintenance Expense.

"**Operation and Maintenance Expense Budget**" shall have the meaning set forth in Section 4.4(c) of the Support Agreement.

"**Operative Documents**" shall mean the Participation Agreement, the Head Lease, the Facility Lease, the Ground Lease, the Ground Sublease, any Equity Guaranty, the Owner Lessor Mortgage, the Lease Indenture, the Lessor Notes, the Owner Lessor LLC Agreement and the Support Agreement.

"**Optional Modification**" shall have the meaning specified in Section 8.2 of the Facility Lease.

"**Other Exchange Date Payment Amounts**" shall mean the following amounts (without duplication) to be paid by the Facility Lessee on the Exchange Date: (a) if the Exchange Date is also a Rent Payment Date, Basic Lease Rent payable on such Exchange Date; *plus* (b) all reasonable documented out-of-pocket costs and expenses incurred by the Owner Lessor, the Equity Investor, the Equity Note Purchasers and the Lease Indenture Trustee in connection with the exercise of the Early Buy Out (without duplication of any such costs and expenses payable pursuant to the Facility Lease); *plus* (c) any other Supplemental Lease Rent payments due and unpaid on the Exchange Date under any other Transaction Document.

"**Other Redemption Date Payment Amounts**" shall mean the following amounts (without duplication) to be paid by the Facility Lessee on the Redemption Date: (a) if the Redemption Date is also a Rent Payment Date, Basic Lease Rent payable on such Redemption Date; plus (b) all reasonable documented out-of-pocket costs and expenses incurred by the Owner Lessor, the Equity Investor, the Equity Note Purchasers and the Lease Indenture Trustee in connection with the exercise of the Early Buy Out (without duplication of any such costs and

expenses payable pursuant to the Facility Lease); *plus* (c) any other Supplemental Lease Rent payments due and unpaid on the Redemption Date under any other Transaction Document.

"**Outside Lease Commencement Date**" shall mean September 25, 2025.

"**Overdue Rate**" (a) when used with reference to the Lessor Notes, Basic Lease Rent (Debt Portion) or Termination Value (Debt Portion) shall mean two percent (2%) per annum over the greater of (i) the Base Rate and (ii) the stated interest rate on the Lessor Notes, (b) when used with reference to the Basic Lease Rent (Equity Portion) or Termination Value (Equity Portion), shall mean two percent (2%) over the greater of (A) the Base Rate and (B) 5.74% per annum or (c) when used with reference to any amount which is due and owing and not referenced in clause (a) or (b) of this definition, the Base Rate *plus* two percent (2%) per annum.

"**Owner Lessor**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**Owner Lessor Indemnified Parties**" shall have the meaning specified in Section 7.2 of the Construction Management Agreement.

"**Owner Lessor LLC Agreement**" shall mean the limited liability company agreement of the Owner Lessor, dated on or about the Effective Date, between the Equity Investor, and the Lessor Manager.

"**Owner Lessor Mortgage**" shall mean the Leasehold Deed of Trust, Security Agreement and Fixture Filing, dated as of the Closing Date, made by the Owner Lessor to the Leasehold Deed of Trust Trustee and TVA, substantially in the form of Exhibit I to the Participation Agreement.

"**Owner Lessor's Account**" shall mean the account identified as the Owner Lessor's Account on Schedule 4 to the Participation Agreement.

"**Owner Lessor's Interest**" shall mean the Owner Lessor's right, title and interest in and to (i) the Facility under the Head Lease, (ii) the Ground Interest under the Ground Lease and (iii) the Support Agreement.

"**Owner Lessor's Lien**" shall mean any Lien on the Facility, the Global Common Facilities, the Site, the Lessor Estate or any part thereof arising as a result of (i) Taxes against or affecting the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby, (ii) Claims against, or any act or omission of, the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof, that is not related to, or that is in violation of, any Transaction Document or the transactions contemplated thereby or that is in breach of any covenant or agreement of the Lessor Manager or the Owner Lessor specified therein, (iii) Taxes imposed upon the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof that are not indemnified against by TVA pursuant to any Transaction Document, or (iv) Claims against or affecting the Lessor Manager or the Owner Lessor, or any respective Affiliate thereof arising out of the voluntary or involuntary transfer by the Lessor Manager or the Owner

Lessor of any portion of the interest of the Lessor Manager or the Owner Lessor in the Owner Lessor's Interest, other than pursuant to the Transaction Documents.

"**Owner Participant**" shall mean the owner of the membership interests of the Equity Investor which shall mean GSS Holdings (Johnsonville), Inc. until such time, if any, that it has transferred such membership interest in accordance with the Equity Investor LLC Agreement, and, thereafter shall mean such transferee or its permitted successor or assign.

"**Partial Early Buy Out**" shall mean TVA's exercise of the Early Buy Out with respect to less than all Units.

"**Partial Event of Loss**" shall mean an Event of Loss with respect to less than all Units.

"**Participation Agreement**" shall mean the Participation Agreement, dated as of the Effective Date, among TVA, the Owner Lessor, the Lessor Manager, the Equity Manager, the Equity Investor and the Lease Indenture Trustee.

"**Paying Agent**" shall have the meaning specified in Section 2.6 of the Lease Indenture.

"**Permitted Closing Date Liens**" shall mean those matters listed on Exhibit 5 to the Ground Lease.

"**Permitted Instruments**" shall mean (a) Permitted Securities, (b) overnight loans to or other customary overnight investments in commercial banks of the type referred to in paragraph (d) below, (c) open market commercial paper of any corporation (other than TVA or any Affiliate thereof) incorporated under the laws of the United States or any state thereof which is rated not less than "prime 1" or its equivalent by Moody's and "A 1" or its equivalent by S&P maturing within one year after such investment, or such other comparable rating by a nationally recognized rating agency, (d) certificates of deposit issued by commercial banks organized under the laws of the United States or any state thereof or a domestic branch of a foreign bank (i) having a combined capital and surplus in excess of $500,000,000 and (ii) which are rated "AA" or better by S&P and "Aa2" or better by Moody's, or such other comparable rating by a nationally recognized rating agency; *provided* that no more than $20,000,000 may be invested in such deposits at any one such bank and (e) a money market fund registered under the Investment Company Act of 1940, as amended, the portfolio of which is limited to Permitted Securities.

"**Permitted Liens**" shall mean (i) the interests of TVA, the Equity Investor, the Owner Lessor and the Lease Indenture Trustee under any of the Transaction Documents; (ii) all Owner Lessor's Liens, Equity Investor's Liens and Indenture Trustee's Liens; (iii) the interests of TVA in the Facility and the Facility Site; (iv) Permitted Closing Date Liens; (v) Liens for taxes either not delinquent or being contested in good faith and by appropriate proceedings if adequate reserves with respect thereto are maintained on the books of TVA if required by generally accepted accounting principles, so long as such proceedings shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (vi) materialmen's, mechanics', workers', repairmen's, employees' or other like liens arising in the ordinary course of business for amounts either not delinquent or being contested in good faith and by appropriate

proceedings if adequate reserves with respect thereto are maintained on the books of TVA if required by generally accepted accounting principles, so long as such proceedings shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (vii) liens arising out of judgments or awards against TVA with respect to which at the time an appeal or proceeding for review is being prosecuted in good faith by TVA, so long as such judgment, award or appeal shall not involve any danger of the sale, forfeiture or loss of any part of the Facility or the Facility Site; (viii) utility rights of way and easements; and (ix) Liens permitted pursuant to Section 4.2 or 4.3 of the Ground Lease.

"**Permitted Post Facility Lease Term Liens**" shall mean the Permitted Liens referred to in clauses (ii), (iii) and (ix) of the definition thereof.

"**Permitted Securities**" shall mean securities (and security entitlements with respect thereto) that (a) are (i) direct obligations of the United States of America or obligations guaranteed as to principal and interest by the full faith and credit of the United States of America, and (ii) securities issued by agencies of the U.S. federal government whether or not backed by the full faith and credit of the United States rated "AA" and "Aa2" by S&P and Moody's, respectively, which, in either case under clauses (i) or (ii) are not callable or redeemable at the option of the issuer thereof, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government obligation or a specific payment of interest on or principal of any such U.S. Government obligation held by such custodian for the account of the holder of a depository receipt, *provided* that (except as required by law) such custodian is not authorized to make any deduction in the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government obligation or the specific payment of interest on or principal of the U.S. Government obligation evidenced by such depository receipt and (b) have a stated maturity no later than the date of the expected use of the funds.

"**Person**" shall mean any individual, corporation, cooperative, partnership, joint venture, association, joint stock company, limited liability company, trust, unincorporated organization or government or any agency or political subdivision thereof.

"**Personalty**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Plan**" shall mean any "employee benefit plan" (as defined in Section 3(3) of ERISA) that is subject to ERISA, any "plan" (as defined in Section 4975(e)(1) of the Code) that is subject to Section 4975 of the Code, any trust created under any such plan or any "governmental plan" (as defined in Section 3(32) of ERISA or Section 414(d) of the Code) that is organized in a jurisdiction having prohibitions on transactions with government plans similar to those contained in Section 406 of ERISA or Section 4975 of the Code.

"**Point or Points of Interconnection**" shall mean the points of interconnection of the transmission facilities owned by TVA with regional transmission lines of entities to which TVA wheels power on behalf of the Owner Lessor pursuant to Section 5 of the Support Agreement, as such points may be agreed upon by the Parties from time to time.

"**Power**" shall mean megawatts of Capacity and associated Energy.

"**Proceeds**" shall mean the proceeds from the sale of the 2024 Lessor Notes by the Owner Lessor to the Noteholders on the Closing Date.

"**Provisional Acceptance**" shall have the meaning specified in Section 5.1 of the Construction Management Agreement.

"**Provisional Acceptance Certificate**" shall have the meaning specified in Section 5.2 of the Construction Management Agreement.

"**Prudent Industry Practice**" shall mean, at a particular time, either (a) any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry with respect to facilities similar in nature to the Facility, or (b) any of the practices, methods and acts which, in the exercise of reasonable judgment at the time the decision was made, could have been expected to accomplish the desired result at the lowest reasonable cost consistent with good business practices, reliability, safety and expedition. "Prudent Industry Practice" is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be a spectrum of possible practices, methods or acts.

"**Punch List**" shall have the meaning specified in Section 2.3.2 of the Construction Management Agreement.

"**Quarter**" means a calendar three-month period, ending on March 31, June 30, September 30 or December 31.

"**Rates**" shall have the meaning specified in Section 5.5 of the Participation Agreement.

"**Rating Agencies**" shall mean S&P, Moody's and Fitch and any other comparable nationally recognized rating agency.

"**Real Property**" shall have the meaning specified in the Granting Clause of the Owner Lessor Mortgage.

"**Reasonable Basis**" for a position shall exist if tax counsel may properly advise reporting such position on a tax return in accordance with Formal Opinion 85 352 issued by the Standing Committee on Ethics and Professional Responsibility of the American Bar Association (or any successor to such opinion).

"**Rebuilding Closing Date**" shall have the meaning specified in Section 10.3(b) of the Facility Lease.

"**Redemption Date**" shall mean, when used with respect to any Lessor Notes to be redeemed, the date fixed for such redemption by or pursuant to the Lease Indenture or the respective Lessor Notes, which date shall be a Termination Date.

"**Registrar**" shall have the meaning specified in Section 2.8 of the Lease Indenture.

"**Regulatory Event of Loss**" shall mean a condition or circumstance where, if elected by the Owner Lessor, the Equity Investor or one or more affected Equity Note Purchasers (by notice to the Facility Lessee) within 12 months of obtaining knowledge of the event or circumstance causing a "Regulatory Event of Loss," the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers become subject to rate of return regulation or other applicable public utility law or regulation of a Governmental Entity that, in the reasonable opinion of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers, is materially burdensome to the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers and cannot be remedied by cooperation among the parties and the taking of reasonable measures to alleviate the source or consequence of any such regulation or law, *provided* that: (i) such regulation or law is applicable solely as a result of the participation of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers in the transactions contemplated by the Transaction Documents and not as a result of (A) any other investments, loans, or other business activities of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates or the nature of properties or assets owned, held or otherwise available to the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates or (B) a failure of the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates to perform routine, administrative or ministerial actions which would not have a material adverse consequence on the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers or their Affiliates; and (ii) the Owner Lessor, the Equity Investor or such affected Equity Note Purchaser or Purchasers would no longer be subject to such law or regulation if the Owner Lessor terminated the Head Lease and the Facility Lease and transferred possession of the Facility to the Head Lessor, the Equity Investor disposed of its Membership Interests, or such affected Equity Note Purchaser or Purchasers disposed of its or their Equity Notes as the case may be.

"**Regulatory Event of Loss Termination Payment**" shall mean, with respect to any Termination Date, an amount equal to the product of (a) the Termination Value (Equity Portion) with respect to such Termination Date, *multiplied* by (b) the applicable Equity Note Purchaser's Percentage Interest of the Notes.

"**Related Party**" shall mean, with respect to any Person or its successors and assigns, an Affiliate of such Person or its successors and assigns and any director, officer, servant, employee or agent of that Person or any such Affiliate or their respective successors and assigns; *provided* that the Lessor Manager and the Owner Lessor shall not be treated as Related Parties to each other and neither the Owner Lessor nor the Lessor Manager shall be treated as a Related Party to the Equity Investor except that, for purposes of Section 9 of the Participation Agreement, the Owner Lessor will be treated as a Related Party to the Equity Investor to the extent that the Owner Lessor acts on the express direction or with the express consent of the Equity Investor.

"**Released Property**" shall have the meaning specified in Section 4.2 of the Ground Lease.

"**Relevant Portion**" shall mean (a) with respect to Section 10 of the Facility Lease, the Unit or Units suffering an Event of Loss or (b) with respect to Section 15 of the Facility Lease, the Unit or Units subject to TVA's exercise of the Early Buy Out, in either case with respect to a termination of the Facility Lease with respect to less than the entire Facility.

"**Reinvestment Yield**" shall mean, with respect to the Called Amount of any Equity Investment, 0.50% over the yield to maturity implied by the yield(s) reported as of 10:00 a.m. (New York City time) on the second Business Day preceding the Settlement Date with respect to such Called Amount, on the display designated as "Page PX1" (or such other display as may replace Page PX1) on Bloomberg Financial Markets for the most recently issued actively traded on-the-run U.S. Treasury securities **("Reported")** having a maturity equal to the Remaining Average Life of such Remaining Scheduled Payments as of such Settlement Date. If there are no such U.S. Treasury securities Reported having a maturity equal to such Remaining Average Life, then such implied yield to maturity will be determined by (a) converting U.S. Treasury bill quotations to bond equivalent yields in accordance with accepted financial practice and (b) interpolating linearly between the yields Reported for the applicable most recently issued actively traded on-the-run U.S. Treasury securities with the maturities (1) closest to and greater than such Remaining Average Life and (2) closest to and less than such Remaining Average Life. The Reinvestment Yield shall be rounded to the number of decimal places as appears in the interest rate of the applicable Equity Investment. If such yields are not Reported or the yields Reported as of such time are not ascertainable (including by way of interpolation), then "**Reinvestment Yield**" shall mean, with respect to the Called Amount of any Equity Investment, 0.50% over the yield to maturity implied by the U.S. Treasury constant maturity yields reported, for the latest day for which such yields have been so reported as of the second Business Day preceding the Settlement Date with respect to such Called Amount, in Federal Reserve Statistical Release H.15 (or any comparable successor publication) for the U.S. Treasury constant maturity having a term equal to the Remaining Average Life of such Called Amount as of such Settlement Date. If there is no such U.S. Treasury constant maturity having a term equal to such Remaining Average Life, such implied yield to maturity will be determined by interpolating linearly between (1) the U.S. Treasury constant maturity so reported with the term closest to and greater than such Remaining Average Life and (2) the U.S. Treasury constant maturity so reported with the term closest to and less than such Remaining Average Life. The Reinvestment Yield shall be rounded to the number of decimal places as appears in the interest rate of the applicable Equity Investment.

"**Remaining Average Life**" shall mean, with respect to any Called Amount, the number of years obtained by dividing (i) such Called Amount into (ii) the sum of the products obtained by multiplying (a) the return of equity component of each Remaining Scheduled Payment with respect to such Called Amount by (b) the number of years, computed on the basis of a 360-day year composed of twelve 30-day months, that will elapse between the Settlement Date with respect to such Called Amount and the scheduled due date of such Remaining Scheduled Payment.

"**Remaining Scheduled Payments**" shall mean, with respect to the Called Amount of any Equity Investment, all payments of Basic Lease Rent (Equity Portion) that would be due after the Settlement Date if no payment of such Called Amount were made prior to its scheduled due date.

"**Remediate**" or "**Remediation**" means an action or actions required by a Governmental Entity pursuant to Applicable Law to address an Environmental Condition or a release of Hazardous Substances, including monitoring, investigation, assessment, treatment, cleanup, containment, removal, mitigation, response or remediation work in connection with such Environmental Conditions or a release of Hazardous Substances.

"**Removable Modification**" shall have the meaning specified in Section 8.3 of the Facility Lease.

"**Rent**" shall mean Basic Lease Rent and Supplemental Lease Rent.

"**Rent Payment Date**" shall mean each April 1 and October 1, commencing April 1, 2025, to and including October 1, 2054.

"**Replacement Component**" shall have the meaning specified in Section 7.2 of the Facility Lease.

"**Replacement Power Bond**" shall have the meaning specified in Section 2.10(c) of the Lease Indenture.

"**Reported**" shall have the meaning specified in the definition of Reinvestment Yield in this Appendix A.

"**Required Modification**" shall have the meaning specified in Section 8.1 of the Facility Lease.

"**Responsible Officer**" shall mean (a) with respect to a corporation or limited liability company, its Chairman of the Board, its President, any Senior Vice President, the Chief Financial Officer, any Vice President, the Treasurer, its Independent Manager or any other management employee (i) that has the power to take the action in question and has been authorized, directly or indirectly, by the Board of Directors (or equivalent body) of such Person, (ii) working under the direct supervision of such Chairman of the Board, President, Senior Vice President, Chief Financial Officer, Vice President or Treasurer, and (iii) whose responsibilities include the administration of the transactions and agreements contemplated by the Transaction Documents, (b) with respect to the Lease Indenture Trustee, an officer in its corporate trust administration department, (c) with respect to TVA, its Chairman of the Board, its President, any Senior Vice President, the Chief Financial Officer, any Vice President, the Treasurer or any other management employee, (d) with respect to the Owner Lessor, the Lessor Manager and (e) with respect to the Equity Investor, the Equity Manager.

"**Revenues**" shall have the meaning specified in the Granting Clause of the Lease Indenture.

"**S&P**" shall mean S&P Global Ratings or any successor thereto.

"**Sale Net Termination Value**" shall have the meaning set forth in Section 18.2(e) of the Facility Lease.

"**Scheduled Closing Date**" shall mean October 2, 2024 and any date set for the Closing in a notice of postponement pursuant to Section 2.3(a) of the Participation Agreement.

"**Scheduled Payment Date**" shall mean a Rent Payment Date.

"**SEC**" shall mean the Securities and Exchange Commission, as from time to time constituted, created under the Securities Exchange Act of 1934.

"**Secured Indebtedness**" shall have the meaning specified in Section 1 of the Lease Indenture.

"**Secured Obligations**" shall have the meaning set forth in the Granting Clause of the Owner Lessor Mortgage.

"**Securities Act**" shall mean the Securities Act of 1933, as amended.

"**Security**" shall have the same meaning as in Section 2(a)(1) of the Securities Act.

"**Service Commencement Date**" shall mean the date upon which the Facility Lease expires or terminates and possession and control of the Owner Lessor's Interest is delivered to the Owner Lessor or its designee pursuant to Section 5 or Section 18.2 of the Facility Lease.

"**Settlement Date**" shall mean, with respect to the Called Amount of any Equity Investment, the date, which shall be a Termination Date, on which such Called Amount is to be repaid pursuant to Section 15 of the Facility Lease.

"**Severable Modification**" shall mean any Modification that is removable without causing material damage to the Facility that cannot readily be repaired.

"**Significant Lease Default**" shall mean any of: (i) TVA shall fail to make any payment of Basic Lease Rent or Termination Value on the relevant payment date or after the same shall have become due and payable, (ii) TVA shall fail to make any payment of Supplemental Lease Rent in excess of $350,000 (other than Excepted Payments, or Termination Value or any amount determined by reference thereto) on the relevant payment date after the same shall have become due and payable, except to the extent such amounts are the subject of a good faith dispute and have not been established to be due and payable, or (iii) an event which is or, with the passage of time would be, a Lease Event of Default under Section 17(e) or (f) of the Facility Lease.

"**Significant Lease Indenture Default**" shall mean a failure by the Owner Lessor to make any payment of principal or interest on the Lessor Notes after the same shall have become due and payable.

"**Similar Law**" shall mean any federal, state or local law that is substantially similar to Title I of ERISA or Section 4975 of the Code.

"**Site**" shall mean the Facility Site, the Global Common Facilities Site and the Access Property.

"**Special Lessee Transfer**" shall have the meaning specified in Section 12 of the Participation Agreement.

"**Special Lessee Transfer Amount**" shall mean for any Termination Date, the amount determined as follows: (i) the Termination Value (Equity Portion) under the Facility Lease on such Termination Date; *plus* (ii) any unpaid Basic Lease Rent (Equity Portion) due on or before such Termination Date; *plus* (iii) the Equity Breakage.

"**Station Service Requirements**" shall mean the Capacity and Energy required during any period (including initial start-up and testing) and supplied from any source other than the Facility for operation of all on-site process and auxiliary equipment and systems used or useful in connection with the operation and maintenance of the Facility.

"**Subcontractors**" shall have the meaning specified in the third recital of the Construction Management Agreement.

"**Subordinated Resolution**" shall mean the Tennessee Valley Authority Subordinated Debt resolution adopted March 29, 1995, as amended and supplemented.

"**Supplemental Financing**" shall have the meaning specified in Section 11.2(b) of the Participation Agreement.

"**Supplemental Lease Rent**" shall mean any and all amounts, liabilities and obligations (other than Basic Lease Rent or any amount determined by reference thereto) that TVA assumes, agrees to or is required to pay under the Transaction Documents (whether or not identified as "Supplemental Lease Rent") to the Owner Lessor or any other Person, including Termination Value and Make Whole Premium.

"**Support Agreement**" shall mean the Operating and Support Agreement, dated as of the Closing Date, between the Owner Lessor and TVA, substantially in the form of Exhibit H to the Participation Agreement.

"**Tax**" or "**Taxes**" shall mean all fees, taxes (including sales taxes, use taxes, stamp taxes, value added taxes, ad valorem taxes and property taxes (personal and real, tangible and intangible)), levies, assessments, withholdings and other charges and impositions of any nature, plus all related interest, penalties, fines and additions to tax, now or hereafter imposed by any federal, state, local or foreign government or other taxing authority (including penalties or other amounts payable pursuant to subtitle B of Title I of ERISA).

"**Tax Advance**" shall have the meaning specified in Section 9.2(g)(iii)(4) of the Participation Agreement.

"**Tax Benefit**" shall have the meaning specified in Section 9.2(e) of the Participation Agreement.

"**Tax Claim**" shall have the meaning specified in Section 9.2(g)(i) of the Participation Agreement.

"**Tax Event**" shall mean any event or transaction that results in a Noteholder being subject to U.S. federal income tax on a different amount, in a different manner or at a different time than would have been the case if such event had not occurred.

"**Tax Indemnitee**" shall have the meaning specified in Section 9.2(a) of the Participation Agreement.

"**Term-Out Notice Date**" shall mean the date on which TVA delivers written notice to the Owner Lessor of TVA's election to pay the Net TV Amount in accordance with Section 18.4 of the Facility Lease.

"**Term-Out Payment Dates**" shall have the meaning specified in Section 18.4 of the Facility Lease.

"**Termination Date**" shall mean each of the monthly dates during the Facility Lease Term identified as a "Termination Date" on Schedule 2 of the Facility Lease.

"**Termination Value**" for any Termination Date shall mean an amount equal to the sum of (a) Termination Value (Debt Portion) and (b) Termination Value (Equity Portion) for such Termination Date.

"**Termination Value (Debt Portion)**" for any Termination Date shall mean the amount set forth under the heading "Termination Value (Debt Portion)" on Schedule 2 of the Facility Lease for such Termination Date.

"**Termination Value (Equity Portion)**" for any Termination Date shall mean the amount set forth under the heading "Termination Value (Equity Portion)" on Schedule 2 of the Facility Lease for such Termination Date.

"**Transaction**" shall mean, collectively, the transactions contemplated under the Participation Agreement and the other Transaction Documents.

"**Transaction Costs**" shall mean the following costs to the extent substantiated or otherwise supported in reasonable detail:

(i) the cost of reproducing and printing the Transaction Documents and the Offering Circular and all costs and fees, including filing and recording fees and recording, transfer, mortgage, intangible and similar taxes in connection with the execution, delivery, filing and recording of the Head Lease, the Facility Lease, the Ground Lease, the Ground Sublease and any other Transaction Document, and any other document required to be filed or recorded pursuant to the provisions hereof or of any other Transaction Document and any Uniform Commercial Code filing fees in respect of the perfection of any security interests created by any of the Transaction Documents or as otherwise reasonably required by the Owner Lessor or the Lease Indenture Trustee;

(ii) the reasonable fees and expenses of Pillsbury Winthrop Shaw Pittman LLP, counsel to the Owner Lessor, the Equity Investor and the Equity Note Purchasers, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents, subject to the terms set forth in the fee arrangement between TVA and Pillsbury Winthrop Shaw Pittman LLP;

(iii) the reasonable fees and expenses of Bass, Berry & Sims PLC, Tennessee counsel to the Equity Investor and the Underwriters, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents, subject to the terms set forth in the fee agreement between TVA and Bass, Berry & Sims PLC dated as of July 17, 2024;

(iv) the reasonable fees and expenses of Orrick, Herrington & Sutcliffe LLP, special counsel to TVA, and Baker, Donelson, Bearman, Caldwell, & Berkowitz, PC, Tennessee counsel to TVA, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement, the other Transaction Documents and the Underwriting Agreement and the preparation of the Offering Circular, subject to the terms of the fee agreement between TVA and Orrick, Herrington & Sutcliffe LLP dated as of April 9, 2024, and the fee arrangement between TVA and Baker, Donelson, Bearman, Caldwell, & Berkowitz, PC;

(v) the reasonable fees and expenses of Morris James LLP, counsel for the Owner Lessor, the Lessor Manager, the Equity Manager and the Equity Collateral Agent, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents;

(vi) the reasonable fees and expenses of White & Case, LLP, counsel to the Underwriters, for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement, the other Transaction Documents and the Underwriting Agreement and the preparation of the Offering Circular, subject to the terms set forth in the fee arrangement between TVA and White & Case, LLP;

(vii) the reasonable fees and expenses of Richards, Layton & Finger PA, counsel for the Lease Indenture Trustee for services rendered in connection with the negotiation, execution and delivery of the Participation Agreement and the other Transaction Documents;

(viii) the underwriting discounts and commissions payable to, and reasonable out of pocket expenses of, the Underwriters;

(ix) the reasonable fees and expenses of Ernst & Young LLP for services rendered in connection with the Transaction;

(x) the reasonable, documented out-of-pocket expenses of the Equity Investor, each Equity Note Purchaser, the Owner Participant and the Owner Lessor;

(xi) the initial fees and expenses of the Lease Indenture Trustee in connection with the execution and delivery of the Participation Agreement and the other Transaction Documents to which it is or will be a party;

(xii) the fees and expenses of the Appraiser, for services rendered in connection with delivering the Closing Appraisal required by Section 4 of the Participation Agreement;

(xiii) the fees and expenses of the Engineering Consultant, for services rendered in connection with delivering the Engineering Report required by Section 4 of the Participation Agreement; and

(xiv) the fees and expenses of the Rating Agencies in connection with the rating of the Lessor Notes.

Notwithstanding the foregoing, Transaction Costs shall not include internal costs and expenses such as salaries and overhead of whatsoever kind or nature nor costs incurred by the parties to the Participation Agreement pursuant to arrangements with third parties for services (other than those expressly referred to above), such as the fees and expenses of financial analysis and consulting, advisory services, and costs of a similar nature.

"**Transaction Documents**" shall mean the Operative Documents, the Construction Management Agreement and the Equity Note Purchase Documents.

"**Transaction Party(ies)**" shall mean, individually or collectively as the context may require, all or any of the parties to the Transaction Documents (including Wilmington Trust).

"**Transferee**" shall have the meaning specified in Section 7.1(a) of the Participation Agreement.

"**Transmission Services Guidelines**" shall mean the "Transmission Services Guidelines" of TVA or any successor tariff thereto of general applicability governing the provision of such transmission services and associated ancillary services over the TVA transmission facilities.

"**Treasury Regulations**" shall mean regulations, including temporary regulations, promulgated under the Code.

"**Trust Indenture Act**" shall mean the Trust Indenture Act of 1939 as in force at the date as of which this instrument was executed except as provided in Section 905 of such act; *provided*, *however*, that in the event the Trust Indenture Act of 1939 is amended after such date, "Trust Indenture Act" means, to the extent required by any such amendment, the Trust Indenture Act of 1939 as so amended.

"**TVA**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**TVA Act**" shall mean the Tennessee Valley Authority Act of 1933, as amended.

"**Uncontrollable Forces**" shall have the meaning set forth in Section 8.2 of the Support Agreement.

"**Underwriters**" shall mean Morgan Stanley & Co. LLC, Barclays Capital Inc., BofA Securities, Inc. and RBC Capital Markets, LLC.

"**Underwriting Agreement**" shall mean the Underwriting Agreement, dated the Effective Date, between TVA and the Underwriters.

"**Uniform Commercial Code**" or "**UCC**" shall mean the Uniform Commercial Code as in effect in the applicable jurisdiction.

"**Uniform System of Accounts**" shall mean the Uniform System of Accounts prescribed by FERC, as in effect on the Closing Date and as from time to time and thereafter amended, or the chart of accounts and accounting classifications which may be substituted for such Uniform System of Accounts from time to time by FERC or its successor for such purpose.

"**Unit**" and collectively the "**Units**" shall mean each of the ten (10) General Electric LM6000PF1 combustion turbine generators and any Components exclusively related thereto, as more particularly described on Exhibit A to the Facility Lease.

"**U.S. Government Obligations**" shall mean securities that are (i) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (ii) obligations of a Person controlled or supervised by and acting as an agency or instrumentality of the United States of America the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America, which, in either case under clauses (i) or (ii) are not callable or redeemable at the option of the issuer thereof, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government Obligation or a specific payment of interest on or principal of any such U.S. Government Obligation held by such custodian for the account of the holder of a depository receipt, *provided* that (except as required by law) such custodian is not authorized to make any deduction in the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government Obligation or the specific payment of interest on or principal of the U.S. Government Obligation evidenced by such depository receipt.

"**Verifier**" shall have the meaning specified in Section 3.4(c) of the Facility Lease.

"**Wilmington Trust**" shall have the meaning set forth in the introductory paragraph to the Participation Agreement.

"**Work**" shall have the meaning specified in Section 2.1(a) of the Construction Management Agreement.

Copies of the Ground Lease, the Ground Sublease, the Head Lease, the Facility Lease, the Owner Lessor Mortgage, and the Lease Indenture are of record with the office of the Register of Deeds of Humphreys County, Tennessee.

Index

2024 Lessor Notes 4
Access Property 4
Actual Knowledge 4
Additional Equity Investment 4
Additional Facility 4
Additional Lessor Notes 4
Additional Owner 4
Affiliate 4
After-Tax Basis 4
Applicable Law 5
Applicable Permits 5
Applicable Rate 5
Appraisal Procedure 5
Appraiser 5
Arbitration Proceeding 5
Assigned Documents 6
Assignment and Assumption Agreement 6
Bankruptcy Code 6
Base Rate 6
Basic Lease Rent 6
Basic Lease Rent (Debt Portion) 7
Basic Lease Rent (Equity Portion) 7
Benefit Plan 7
Bond Resolution 7
Boundary Property 7
Burns & McDonnell 7
Business Day 7
Called Amount 7
Capability 7
Capacity 7
Capital Expenditure Budget 7
Claim 7
Closing 8
Closing Appraisal 8
Closing Date 8
CMA Payment 8
Code 8
Co-Equity Manager 8
Co-Lessor Manager 8
Collateral 8
Common Facilities 8
Competitor 8
Component 8
Confidential Information 8
Construction Cost 8
Construction Management Agreement 9
Construction Period Financing Account 9
Construction Period Financing Costs 9
Contract Year 9
Contractor 9
Debt Portion 9
Deed of Trust Trustee 9
Design Documents 9
Discount Value 9
Dollars 9
DTC 9
Early Buy Out 10
Early Buy Out Date 10
Early Buy Out Notice 10
Effective Date 10
Election Notice 10
Energy 10
Enforcement Notice 10
Engineering Consultant 10
Engineering Report 10
Environmental Condition 10
Environmental Laws 10
Equity Breakage 10
Equity Collateral Agent 10
Equity Guarantor 10
Equity Guaranty 10
Equity Investment 11
Equity Investor 11
Equity Investor LLC Agreement 11
Equity Investor's Lien 11
Equity Manager 11
Equity Note 11
Equity Note Purchase Agreement 11
Equity Note Purchase Documents 11
Equity Note Purchaser 11
Equity Note Purchaser's Percentage Interest of the Notes 11
Equity Placement Agent 11
Equity Pledge Agreement 12
Equity Portion 12
ERISA 12
Event of Loss 12

Evidences of Indebtedness 12
Excepted Payments 12
Excepted Rights 13
Excess Amounts 13
Exchange Act 13
Exchange Date 13
Excluded Property 13
Excluded Taxes 13
Expected Completion Date 13
Expiration Date 13
Facility 13
Facility Lease 13
Facility Lease Term 13
Facility Lessee 13
Facility Lessee's Interest 13
Facility Lessor 13
Facility Operating Fee 13
Facility Operation and Maintenance Expense 14
Facility Site 14
Facility User 14
Fair Market Rental Value 14
Fair Market Sales Value 14
Federal Power Act 15
FERC 15
Final Acceptance 15
Final Acceptance Certificate 15
Final Determination 15
Final Shutdown 15
Final Shutdown Date 15
Fitch 15
FMV Net Termination Value 15
GAAP 15
Global Common Facilities 16
Global Common Facilities Operating Fee 16
Global Common Facilities Operation and Maintenance Expenses 16
Global Common Facilities Site 16
Government 16
Governmental Entity 16
Ground Interest 16
Ground Lease 17
Ground Lease Term 17
Ground Lessee 17
Ground Lessor 17
Ground Lessor's Release Rights 17
Ground Sublease 17
Ground Sublease Term 17
Ground Sublessee 17
Ground Sublessor 17
Guaranteed Provisional Acceptance Date 17
Hazardous Substance 17
Head Lease 17
Head Lease Rent 17
Head Lease Term 17
Head Lessee 17
Head Lessor 18
Indemnitee 18
Independent Appraiser 18
Investment Banker 18
Johnsonville Combustion Turbine Plant 18
Johnsonville Construction Contract 18
Lease Commencement Date 18
Lease Debt Rate 18
Lease Default 18
Lease Event of Default 18
Lease Indenture 18
Lease Indenture Bankruptcy Default 18
Lease Indenture Estate 18
Lease Indenture Event of Default 18
Lease Indenture Payment Default 19
Lease Indenture Trustee 19
Lease Indenture Trustee Office 19
Lease Indenture Trustee's Account 19
Lease Indenture Trustee's Liens 19
Leasehold Deed of Trust Trustee 18
Lessee Person 19
Lessor Estate 19
Lessor Manager 19
Lessor Notes 20
Lien 20
List of Competitors 20
Majority in Interest of Noteholders 20
Make Whole Premium 20
Material Adverse Effect 20
Maximum Net Generating Capacity 20
Membership Interests 20
Modification 20
Month 20
Moody's 21

Net TV Amount 21
Net TV Amount (Debt Portion) 21
Net TV Amount (Debt Portion) Rate 21
Net TV Amount (Equity Portion) 21
Net TV Amount (Equity Portion) Rate 21
Nonseverable Modifications 21
Note Register 21
Noteholder 21
Offering Circular 21
Officer's Certificate 21
Operating Fee 21
Operation and Maintenance Expense 21
Operation and Maintenance Expense Budget 22
Operative Documents 22
Optional Modification 22
Other Redemption Date Payment Amounts 22
Outside Lease Commencement Date 22
Overdue Rate 22
Owner Lessor 22
Owner Lessor Indemnified Party 22
Owner Lessor LLC Agreement 22
Owner Lessor Mortgage 23
Owner Lessor's Account 23
Owner Lessor's Interest 23
Owner Lessor's Lien 23
Owner Participant 23
Partial Early Buy Out 23
Partial Event of Loss 23
Participation Agreement 23
Paying Agent 23
Permitted Closing Date Liens 23
Permitted Instruments 23
Permitted Liens 24
Permitted Post Facility Lease Term Liens 24
Permitted Securities 24
Person 25
Personalty 25
Plan 25
Point or Points of Interconnection 25
Power 25
Proceeds 25
Provisional Acceptance 25
Provisional Acceptance Certificate 25
Prudent Industry Practice 25
Punch List 25
Quarter 25
Rates 25
Rating Agencies 26
Real Property 26
Reasonable Basis 26
Rebuilding Closing Date 26
Redemption Date 26
Registrar 26
Regulatory Event of Loss 26
Regulatory Event of Loss Termination Payment 27
Reinvestment Yield 27
Related Party 27
Released Property 27
Relevant Portion 27
Remaining Average Life 28
Remaining Scheduled Payments 28
Remediate 28
Removable Modification 28
Rent 28
Rent Payment Date 28
Replacement Component 28
Replacement Power Bond 28
Reported 28
Required Modification 28
Responsible Officer 28
Revenues 29
S&P 29
Sale Net Termination Value 29
Scheduled Closing Date 29
Scheduled Payment Date 29
SEC 29
Secured Indebtedness 29
Securities Act 29
Security 29
Service Commencement Date 29
Settlement Date 29
Severable Modification 29
Significant Lease Default 29
Significant Lease Indenture Default 30
Similar Law 30
Site 30
Special Lessee Transfer 30

Special Lessee Transfer Amount 30
Station Service Requirements 30
Subcontractors 30
Subordinated Resolution 30
Supplemental Financing 30
Supplemental Lease Rent 30
Support Agreement 30
Tax 30
Tax Advance 31
Tax Benefit 31
Tax Claim 31
Tax Event 31
Tax Indemnitee 31
Taxes 30
Termination Date 31
Termination Value 31
Termination Value (Debt Portion) 31
Termination Value (Equity Portion) 31
Term-Out Notice Date 31
Term-Out Payment Dates 31
Transaction 31
Transaction Costs 31
Transaction Documents 33
Transaction Party(ies) 33
Transferee 33
Transmission Services Guidelines 33
Treasury Regulations 33
Trust Indenture Act 33
TVA 33
TVA Act 33
U.S. Government Obligations 34
Uncontrollable Forces 33
Underwriters 34
Underwriting Agreement 34
Uniform Commercial Code" or "UCC 34
Uniform System of Accounts 34
Unit 34
Units 34
Verifier 34
Wilmington Trust 34
Work 34

SCHEDULE 1
to
Facility Lease

BASIC LEASE RENT

Rent Payment Date	Basic Lease Rent (Debt Portion)	Basic Lease Rent (Equity Portion)	Basic Lease Rent Interest Portion[1]
April 1, 2025	$22,629,677	$2,283,244	$20,462,484
October 1, 2025	22,629,677	2,804,717	20,463,803
April 1, 2026	22,629,677	2,804,717	20,335,916
October 1, 2026	22,629,677	2,804,717	20,204,734
April 1, 2027	22,629,677	2,804,717	20,070,171
October 1, 2027	22,629,677	2,804,717	19,932,140
April 1, 2028	22,629,677	2,804,717	19,790,552
October 1, 2028	22,629,677	2,804,717	19,645,315
April 1, 2029	22,629,677	2,804,717	19,496,335
October 1, 2029	22,629,677	2,804,717	19,343,515
April 1, 2030	22,629,677	2,804,717	19,186,756
October 1, 2030	22,629,677	2,804,717	19,025,956
April 1, 2031	22,629,677	2,804,717	18,861,012
October 1, 2031	22,629,677	2,804,717	18,691,815
April 1, 2032	22,629,677	2,804,717	18,518,256
October 1, 2032	22,629,677	2,804,717	18,340,223
April 1, 2033	22,629,677	2,804,717	18,157,599
October 1, 2033	22,629,677	2,804,717	17,970,267
April 1, 2034	22,629,677	2,804,717	17,778,105
October 1, 2034	22,629,677	2,804,717	17,580,988

[1] For the avoidance of doubt, the amounts set forth under the column entitled "Basic Lease Rent Interest Portion" are provided for informational purposes only and reflect the amount included within the payment of Basic Lease Rent (Debt Portion) and Basic Lease Rent (Equity Portion) that constitutes, and shall be treated by the parties as, interest for U.S. federal income tax purposes and the listing of such amount does not create a payment obligation in addition to Basic Lease Rent.

Rent Payment Date	Basic Lease Rent (Debt Portion)	Basic Lease Rent (Equity Portion)	Basic Lease Rent Interest Portion[2]
April 1, 2035	22,629,677	2,804,717	17,378,788
October 1, 2035	22,629,677	2,804,717	17,171,373
April 1, 2036	22,629,677	2,804,717	16,958,610
October 1, 2036	22,629,677	2,804,717	16,740,359
April 1, 2037	22,629,677	2,804,717	16,516,479
October 1, 2037	22,629,677	2,804,717	16,286,826
April 1, 2038	22,629,677	2,804,717	16,051,248
October 1, 2038	22,629,677	2,804,717	15,809,594
April 1, 2039	22,629,677	2,804,717	15,561,706
October 1, 2039	22,629,677	2,804,717	15,307,424
April 1, 2040	22,629,677	2,804,717	15,046,581
October 1, 2040	22,629,677	2,804,717	14,779,009
April 1, 2041	22,629,677	2,804,717	14,504,534
October 1, 2041	22,629,677	2,804,717	14,222,976
April 1, 2042	22,629,677	2,804,717	13,934,154
October 1, 2042	22,629,677	2,804,717	13,637,879
April 1, 2043	22,629,677	2,804,717	13,333,959
October 1, 2043	22,629,677	2,804,717	13,022,196
April 1, 2044	22,629,677	2,804,717	12,702,387
October 1, 2044	22,629,677	2,804,717	12,374,324
April 1, 2045	27,302,246	2,733,852	12,037,794
October 1, 2045	27,302,246	2,733,852	11,575,975
April 1, 2046	27,302,246	2,733,852	11,102,291
October 1, 2046	27,302,246	2,733,852	10,616,438
April 1, 2047	27,302,246	2,733,852	10,118,102
October 1, 2047	27,302,246	2,733,852	9,606,962
April 1, 2048	27,302,246	2,733,852	9,082,688
October 1, 2048	27,302,246	2,733,852	8,544,943
April 1, 2049	27,302,246	2,733,852	7,993,381
October 1, 2049	27,302,246	2,733,852	7,427,644
April 1, 2050	27,302,246	2,733,852	6,847,369

Rent Payment Date	Basic Lease Rent (Debt Portion)	Basic Lease Rent (Equity Portion)	Basic Lease Rent Interest Portion[3]
October 1, 2050	27,302,246	2,733,852	6,252,182
April 1, 2051	27,302,246	2,733,852	5,641,698
October 1, 2051	27,302,246	2,733,852	5,015,525
April 1, 2052	27,302,246	2,733,852	4,373,258
October 1, 2052	27,302,246	2,733,852	3,714,483
April 1, 2053	27,302,246	2,733,852	3,038,775
October 1, 2053	27,302,246	2,733,852	2,345,698
April 1, 2054	27,302,246	2,733,852	1,634,806
October 1, 2054	27,302,246	8,229,600	905,639

SCHEDULE 2
to
Facility Lease

TERMINATION VALUES

Termination Date (Monthly)	Termination Value (Debt Portion)	Termination Value (Equity Portion)
October 2, 2024	$720,000,000	$80,000,000
November 1, 2024	722,945,240	80,369,911
December 1, 2024	725,992,040	80,752,578
January 1, 2025	729,038,840	81,135,244
February 1, 2025	732,085,640	81,517,911
March 1, 2025	735,132,440	81,900,578
April 1, 2025	738,179,240	82,283,244
May 1, 2025	718,577,530	80,382,667
June 1, 2025	721,605,497	80,765,333
July 1, 2025	724,633,465	81,148,000
August 1, 2025	727,661,432	81,530,667
September 1, 2025	730,689,399	81,913,333
October 1, 2025	733,717,366	82,296,000
November 1, 2025	714,096,776	79,871,516
December 1, 2025	717,105,862	80,251,749
January 1, 2026	720,114,948	80,631,983
February 1, 2026	723,124,034	81,012,216
March 1, 2026	726,133,120	81,392,449
April 1, 2026	729,142,206	81,772,683
May 1, 2026	709,502,254	79,345,695
June 1, 2026	712,491,980	79,723,426
July 1, 2026	715,481,705	80,101,156
August 1, 2026	718,471,431	80,478,886

September 1, 2026	721,461,157	80,856,616
October 1, 2026	724,450,882	81,234,346
November 1, 2026	704,791,078	78,804,784
December 1, 2026	707,760,952	79,179,939
January 1, 2027	710,730,825	79,555,094
February 1, 2027	713,700,699	79,930,249
March 1, 2027	716,670,572	80,305,404
April 1, 2027	719,640,445	80,680,559
May 1, 2027	699,960,286	78,248,348
June 1, 2027	702,909,803	78,620,854
July 1, 2027	705,859,320	78,993,360
August 1, 2027	708,808,837	79,365,866
September 1, 2027	711,758,355	79,738,372
October 1, 2027	714,707,872	80,110,879
November 1, 2027	695,006,839	77,675,943
December 1, 2027	697,935,483	78,045,724
January 1, 2028	700,864,128	78,415,505
February 1, 2028	703,792,772	78,785,286
March 1, 2028	706,721,416	79,155,067
April 1, 2028	709,650,060	79,524,848
May 1, 2028	689,927,625	77,087,109
June 1, 2028	692,834,866	77,454,087
July 1, 2028	695,742,107	77,821,065
August 1, 2028	698,649,348	78,188,043
September 1, 2028	701,556,590	78,555,021
October 1, 2028	704,463,831	78,921,999
November 1, 2028	684,719,449	76,481,376
December 1, 2028	687,604,744	76,845,470
January 1, 2029	690,490,038	77,209,565
February 1, 2029	693,375,333	77,573,659
March 1, 2029	696,260,628	77,937,753
April 1, 2029	699,145,923	78,301,848

May 1, 2029	679,379,037	75,858,258
June 1, 2029	682,241,829	76,219,386
July 1, 2029	685,104,620	76,580,514
August 1, 2029	687,967,411	76,941,642
September 1, 2029	690,830,202	77,302,770
October 1, 2029	693,692,994	77,663,898
November 1, 2029	673,903,033	75,217,257
December 1, 2029	676,742,749	75,575,334
January 1, 2030	679,582,465	75,933,410
February 1, 2030	682,422,182	76,291,486
March 1, 2030	685,261,898	76,649,563
April 1, 2030	688,101,614	77,007,639
May 1, 2030	668,287,993	74,557,859
June 1, 2030	671,104,048	74,912,797
July 1, 2030	673,920,103	75,267,734
August 1, 2030	676,736,159	75,622,671
September 1, 2030	679,552,214	75,977,609
October 1, 2030	682,368,270	76,332,546
November 1, 2030	662,530,387	73,879,537
December 1, 2030	665,322,180	74,231,245
January 1, 2031	668,113,974	74,582,953
February 1, 2031	670,905,768	74,934,661
March 1, 2031	673,697,562	75,286,369
April 1, 2031	676,489,356	75,638,077
May 1, 2031	656,626,595	73,181,746
June 1, 2031	659,393,511	73,530,133
July 1, 2031	662,160,427	73,878,519
August 1, 2031	664,927,343	74,226,905
September 1, 2031	667,694,260	74,575,291
October 1, 2031	670,461,176	74,923,678
November 1, 2031	650,572,906	72,463,929
December 1, 2031	653,314,313	72,808,898

January 1, 2032	656,055,720	73,153,867
February 1, 2032	658,797,127	73,498,836
March 1, 2032	661,538,534	73,843,805
April 1, 2032	664,279,941	74,188,774
May 1, 2032	644,365,514	71,725,511
June 1, 2032	647,080,764	72,066,965
July 1, 2032	649,796,014	72,408,418
August 1, 2032	652,511,264	72,749,872
September 1, 2032	655,226,514	73,091,326
October 1, 2032	657,941,764	73,432,780
November 1, 2032	638,000,516	70,965,900
December 1, 2032	640,688,945	71,303,738
January 1, 2033	643,377,374	71,641,575
February 1, 2033	646,065,803	71,979,413
March 1, 2033	648,754,232	72,317,250
April 1, 2033	651,442,661	72,655,088
May 1, 2033	631,473,911	70,184,488
June 1, 2033	634,134,838	70,518,606
July 1, 2033	636,795,765	70,852,724
August 1, 2033	639,456,692	71,186,841
September 1, 2033	642,117,618	71,520,959
October 1, 2033	644,778,545	71,855,076
November 1, 2033	624,781,595	69,380,650
December 1, 2033	627,414,322	69,710,941
January 1, 2034	630,047,048	70,041,232
February 1, 2034	632,679,775	70,371,523
March 1, 2034	635,312,502	70,701,814
April 1, 2034	637,945,228	71,032,104
May 1, 2034	617,919,362	68,553,742
June 1, 2034	620,523,172	68,880,096
July 1, 2034	623,126,982	69,206,450
August 1, 2034	625,730,792	69,532,805

September 1, 2034	628,334,603	69,859,159
October 1, 2034	630,938,413	70,185,513
November 1, 2034	610,882,896	67,703,101
December 1, 2034	613,457,056	68,025,406
January 1, 2035	616,031,216	68,347,710
February 1, 2035	618,605,375	68,670,015
March 1, 2035	621,179,535	68,992,320
April 1, 2035	623,753,695	69,314,625
May 1, 2035	603,667,774	66,828,047
June 1, 2035	606,211,531	67,146,186
July 1, 2035	608,755,287	67,464,325
August 1, 2035	611,299,044	67,782,464
September 1, 2035	613,842,800	68,100,603
October 1, 2035	616,386,557	68,418,742
November 1, 2035	596,269,461	65,927,879
December 1, 2035	598,782,042	66,241,732
January 1, 2036	601,294,623	66,555,586
February 1, 2036	603,807,205	66,869,440
March 1, 2036	606,319,786	67,183,294
April 1, 2036	608,832,367	67,497,147
May 1, 2036	588,683,304	65,001,876
June 1, 2036	591,163,919	65,311,321
July 1, 2036	593,644,533	65,620,766
August 1, 2036	596,125,148	65,930,212
September 1, 2036	598,605,762	66,239,657
October 1, 2036	601,086,376	66,549,103
November 1, 2036	580,904,535	64,049,296
December 1, 2036	583,352,371	64,354,207
January 1, 2037	585,800,207	64,659,118
February 1, 2037	588,248,043	64,964,028
March 1, 2037	590,695,879	65,268,939
April 1, 2037	593,143,715	65,573,849

May 1, 2037	572,928,263	63,069,378
June 1, 2037	575,342,488	63,369,624
July 1, 2037	577,756,714	63,669,869
August 1, 2037	580,170,939	63,970,115
September 1, 2037	582,585,164	64,270,361
October 1, 2037	584,999,389	64,570,606
November 1, 2037	564,749,474	62,061,336
December 1, 2037	567,129,235	62,356,783
January 1, 2038	569,508,996	62,652,230
February 1, 2038	571,888,757	62,947,676
March 1, 2038	574,268,518	63,243,123
April 1, 2038	576,648,279	63,538,570
May 1, 2038	556,363,024	61,024,363
June 1, 2038	558,707,446	61,314,873
July 1, 2038	561,051,869	61,605,384
August 1, 2038	563,396,291	61,895,894
September 1, 2038	565,740,713	62,186,404
October 1, 2038	568,085,135	62,476,915
November 1, 2038	547,763,643	59,957,629
December 1, 2038	550,071,829	60,243,061
January 1, 2039	552,380,015	60,528,493
February 1, 2039	554,688,200	60,813,925
March 1, 2039	556,996,386	61,099,357
April 1, 2039	559,304,572	61,384,789
May 1, 2039	538,945,924	58,860,280
June 1, 2039	541,216,953	59,140,488
July 1, 2039	543,487,983	59,420,696
August 1, 2039	545,759,012	59,700,904
September 1, 2039	548,030,041	59,981,112
October 1, 2039	550,301,070	60,261,320
November 1, 2039	529,904,323	57,731,437
December 1, 2039	532,137,252	58,006,271

January 1, 2040	534,370,182	58,281,105
February 1, 2040	536,603,111	58,555,939
March 1, 2040	538,836,041	58,830,773
April 1, 2040	541,068,970	59,105,608
May 1, 2040	520,633,155	56,570,196
June 1, 2040	522,827,018	56,839,502
July 1, 2040	525,020,880	57,108,808
August 1, 2040	527,214,742	57,378,114
September 1, 2040	529,408,605	57,647,420
October 1, 2040	531,602,467	57,916,726
November 1, 2040	511,126,593	55,375,628
December 1, 2040	513,280,396	55,639,247
January 1, 2041	515,434,199	55,902,866
February 1, 2041	517,588,003	56,166,485
March 1, 2041	519,741,806	56,430,104
April 1, 2041	521,895,609	56,693,723
May 1, 2041	501,378,659	54,146,775
June 1, 2041	503,491,386	54,404,544
July 1, 2041	505,604,113	54,662,313
August 1, 2041	507,716,840	54,920,082
September 1, 2041	509,829,567	55,177,851
October 1, 2041	511,942,294	55,435,621
November 1, 2041	491,383,225	52,882,654
December 1, 2041	493,453,833	53,134,406
January 1, 2042	495,524,441	53,386,157
February 1, 2042	497,595,049	53,637,908
March 1, 2042	499,665,656	53,889,659
April 1, 2042	501,736,264	54,141,410
May 1, 2042	481,134,007	51,582,254
June 1, 2042	483,161,426	51,827,814
July 1, 2042	485,188,845	52,073,375
August 1, 2042	487,216,265	52,318,935

September 1, 2042	489,243,684	52,564,496
October 1, 2042	491,271,104	52,810,056
November 1, 2042	470,624,561	50,244,531
December 1, 2042	472,607,695	50,483,723
January 1, 2043	474,590,830	50,722,916
February 1, 2043	476,573,964	50,962,108
March 1, 2043	478,557,098	51,201,300
April 1, 2043	480,540,232	51,440,492
May 1, 2043	459,848,280	48,868,416
June 1, 2043	461,786,005	49,101,057
July 1, 2043	463,723,730	49,333,698
August 1, 2043	465,661,455	49,566,339
September 1, 2043	467,599,180	49,798,981
October 1, 2043	469,536,904	50,031,622
November 1, 2043	448,798,390	47,452,806
December 1, 2043	450,689,552	47,678,709
January 1, 2044	452,580,715	47,904,611
February 1, 2044	454,471,877	48,130,513
March 1, 2044	456,363,040	48,356,415
April 1, 2044	458,254,202	48,582,317
May 1, 2044	437,467,943	45,996,569
June 1, 2044	439,311,361	46,215,538
July 1, 2044	441,154,778	46,434,508
August 1, 2044	442,998,196	46,653,477
September 1, 2044	444,841,614	46,872,447
October 1, 2044	446,685,032	47,091,416
November 1, 2044	425,849,816	44,498,537
December 1, 2044	427,644,277	44,710,375
January 1, 2045	429,438,737	44,922,213
February 1, 2045	431,233,198	45,134,051
March 1, 2045	433,027,659	45,345,890
April 1, 2045	434,822,120	45,557,728

May 1, 2045	409,244,362	43,028,717
June 1, 2045	410,968,851	43,233,557
July 1, 2045	412,693,339	43,438,398
August 1, 2045	414,417,827	43,643,239
September 1, 2045	416,142,316	43,848,080
October 1, 2045	417,866,804	44,052,921
November 1, 2045	392,217,297	41,516,712
December 1, 2045	393,870,036	41,714,355
January 1, 2046	395,522,775	41,911,998
February 1, 2046	397,175,514	42,109,641
March 1, 2046	398,828,253	42,307,284
April 1, 2046	400,480,992	42,504,926
May 1, 2046	374,757,914	39,961,313
June 1, 2046	376,337,082	40,151,551
July 1, 2046	377,916,250	40,341,790
August 1, 2046	379,495,418	40,532,028
September 1, 2046	381,074,586	40,722,266
October 1, 2046	382,653,754	40,912,505
November 1, 2046	356,855,237	38,361,274
December 1, 2046	358,358,966	38,543,895
January 1, 2047	359,862,696	38,726,516
February 1, 2047	361,366,425	38,909,138
March 1, 2047	362,870,154	39,091,759
April 1, 2047	364,373,883	39,274,380
May 1, 2047	338,498,012	36,715,314
June 1, 2047	339,924,386	36,890,099
July 1, 2047	341,350,761	37,064,885
August 1, 2047	342,777,136	37,239,670
September 1, 2047	344,203,511	37,414,456
October 1, 2047	345,629,886	37,589,241
November 1, 2047	319,674,696	35,022,115
December 1, 2047	321,021,753	35,188,840

January 1, 2048	322,368,809	35,355,564
February 1, 2048	323,715,866	35,522,289
March 1, 2048	325,062,922	35,689,014
April 1, 2048	326,409,978	35,855,739
May 1, 2048	300,373,457	33,280,321
June 1, 2048	301,639,181	33,438,754
July 1, 2048	302,904,905	33,597,187
August 1, 2048	304,170,629	33,755,620
September 1, 2048	305,436,353	33,914,053
October 1, 2048	306,702,078	34,072,486
November 1, 2048	280,582,159	31,488,537
December 1, 2048	281,764,486	31,638,440
January 1, 2049	282,946,813	31,788,343
February 1, 2049	284,129,139	31,938,246
March 1, 2049	285,311,466	32,088,150
April 1, 2049	286,493,793	32,238,053
May 1, 2049	260,288,360	29,645,329
June 1, 2049	261,385,172	29,786,458
July 1, 2049	262,481,984	29,927,586
August 1, 2049	263,578,796	30,068,715
September 1, 2049	264,675,608	30,209,843
October 1, 2049	265,772,421	30,350,971
November 1, 2049	239,479,301	27,749,222
December 1, 2049	240,488,427	27,881,323
January 1, 2050	241,497,554	28,013,425
February 1, 2050	242,506,680	28,145,527
March 1, 2050	243,515,806	28,277,629
April 1, 2050	244,524,932	28,409,731
May 1, 2050	218,141,900	25,798,695
June 1, 2050	219,061,114	25,921,512
July 1, 2050	219,980,328	26,044,328
August 1, 2050	220,899,542	26,167,144

September 1, 2050	221,818,756	26,289,961
October 1, 2050	222,737,970	26,412,777
November 1, 2050	196,262,743	23,792,189
December 1, 2050	197,089,762	23,905,453
January 1, 2051	197,916,781	24,018,718
February 1, 2051	198,743,800	24,131,982
March 1, 2051	199,570,819	24,245,246
April 1, 2051	200,397,837	24,358,510
May 1, 2051	173,828,074	21,728,096
June 1, 2051	174,560,557	21,831,534
July 1, 2051	175,293,040	21,934,972
August 1, 2051	176,025,523	22,038,410
September 1, 2051	176,758,006	22,141,848
October 1, 2051	177,490,488	22,245,286
November 1, 2051	150,823,789	19,604,764
December 1, 2051	151,459,335	19,698,094
January 1, 2052	152,094,882	19,791,423
February 1, 2052	152,730,429	19,884,753
March 1, 2052	153,365,975	19,978,083
April 1, 2052	154,001,522	20,071,412
May 1, 2052	127,235,425	17,420,492
June 1, 2052	127,771,574	17,503,423
July 1, 2052	128,307,723	17,586,355
August 1, 2052	128,843,872	17,669,286
September 1, 2052	129,380,021	17,752,217
October 1, 2052	129,916,170	17,835,149
November 1, 2052	103,048,152	15,173,531
December 1, 2052	103,482,380	15,245,766
January 1, 2053	103,916,608	15,318,000
February 1, 2053	104,350,836	15,390,235
March 1, 2053	104,785,064	15,462,470
April 1, 2053	105,219,292	15,534,704

May 1, 2053	78,246,765	12,862,083
June 1, 2053	78,576,484	12,923,314
July 1, 2053	78,906,203	12,984,545
August 1, 2053	79,235,922	13,045,775
September 1, 2053	79,565,641	13,107,006
October 1, 2053	79,895,360	13,168,237
November 1, 2053	52,815,670	10,484,296
December 1, 2053	53,038,227	10,534,207
January 1, 2054	53,260,783	10,584,118
February 1, 2054	53,483,340	10,634,030
March 1, 2054	53,705,896	10,683,941
April 1, 2054	53,928,453	10,733,852
May 1, 2054	26,738,880	8,038,267
June 1, 2054	26,851,553	8,076,533
July 1, 2054	26,964,226	8,114,800
August 1, 2054	27,076,900	8,153,067
September 1, 2054	27,189,573	8,191,333
October 1, 2054	27,302,246	8,229,600

EXHIBIT A
to
Facility Lease

DESCRIPTION OF THE FACILITY

The Facility consists of generating Units, Common Facilities, and other equipment, material or property, other than real property, associated with the Units and Common Facilities (but not associated with the Global Common Facilities), all of which are located on, under, or over the Facility Site, which Facility Site is the real property located in Humphreys County, Tennessee and is described in greater detail in Exhibit 1 to the Ground Lease.

The Facility will have ten aeroderivative simple cycle combustion turbine-generator units, each with a nominal output of 55 MW. Each Unit consists of a General Electric LM6000PF1 combustion turbine generator ("CTG") and any ancillary equipment, except for any Component exclusively constituting Common Facilities. These CTG units are specifically designed for frequent cycling and load variability, with the capability of five minute starts. Each unit will have a clutch between turbine and generator to enable Synchronous Condensing operation for reactive power/voltage support. Each unit will also be capable of Black Start to start and provide electrical generation in the event of the total loss of AC power.

Natural gas will be the only fuel.

Components for each Unit include the following:

GE Combustion Turbine with Air Inlet Filtration and Evaporative Cooling Systems
Gearbox with integral clutch
Andritz Generator with Air Inlet Filtration
Exhaust System with Selective Catalytic Reduction (SCR) and Carbon Monoxide (CO) catalyst
Lube Oil Systems
SPRINT water injection system for power augmentation
Mark VIe Control System
Fuel Gas Filter/Separator
CO2 Fire Protection System
Power Control Module (PCM) Enclosure
Waste Heat Recovery Anti-Icing System
Main Step-up Transformer (One per two units)
Continuous Emissions Monitoring Systems (CEMS) on CT exhaust
Electro-Hydraulic Starting System
Compressor Wash System

The Common Facilities are equipment and facilities that are used for the operation of the Units at the Facility, but are not Global Common Facilities. These shared facilities support the Units. The Common Facilities are as follows:

Compressed Air System
Fuel Gas Compressor System
Ammonia Supply System for SCR
Oil-Water Separation and Discharge System
Fire Loop System
Black Start Generator System (natural gas-fueled recip)
Potable Water System
Eye Wash System
Storm Water Drains
Demineralized Water Storage System
Control/Administration/Maintenance Building
Power Distribution Building

EXHIBIT 10.26

This Construction Management Agreement has been filed to provide investors with information regarding its terms. It is not intended to provide any other factual information about the Tennessee Valley Authority. The representations and warranties of the parties in this Construction Management Agreement were made to, and solely for the benefit of, the other parties to this Construction Management Agreement. The assertions embodied in the representations and warranties may be qualified by information included in schedules, exhibits, or other materials exchanged by the parties that may modify or create exceptions to the representations and warranties. Accordingly, investors should not rely on the representations and warranties as characterizations of the actual state of facts at the time they were made or otherwise.

Execution Version

CONSTRUCTION MANAGEMENT AGREEMENT

Dated as of October 2, 2024

between

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC,
as Owner Lessor

and

TENNESSEE VALLEY AUTHORITY,
as Contractor

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE FACILITY
located in Humphreys County, Tennessee

4162-5270-6896.7

TABLE OF CONTENTS

Page

ARTICLE 1 DEFINITIONS 1

1.1 Definitions; Rules of Interpretation 1

ARTICLE 2 DESIGN AND CONSTRUCTION OF FACILITY 2

2.1 Design and Construction of the Facility 2

2.2 Work to Be Performed 2

2.3 Work Progress; Provisional Acceptance 3

2.4 Suspension of the Work by Contractor 4

2.5 Clean-Up and Disposal 4

2.6 Hazardous Substances 4

2.7 Protection of Property 4

2.8 Availability of Documents to Owner Lessor 5

2.9 Labor Relations 5

2.10 Safety Precautions 5

2.11 Further Assurances 5

ARTICLE 3 STANDARD OF PERFORMANCE 5

3.1 Standard of Performance 5

ARTICLE 4 OWNER'S INFORMATION; ACCESS TO THE FACILITY; INSPECTIONS 6

4.1 Owner Lessor's Information 6

4.2 Facility Site Access 6

4.3 Inspection by Contractor 7

4.4 Inspection by Owner Lessor 7

ARTICLE 5 PROVISIONAL ACCEPTANCE; FINAL ACCEPTANCE 7

5.1 Provisional Acceptance 7

5.2 Achievement of Provisional Acceptance 8

5.3 Final Acceptance 8

5.4 Achievement of Final Acceptance 9

5.5 Acceptance by Owner Lessor Not a Release of Contractor 9

ARTICLE 6 PRICE AND PAYMENT 9

6.1 CMA Payment 9

TABLE OF CONTENTS
(continued)

Page

ARTICLE 7 SUBCONTRACTS 9

7.1 Subcontractors 9

7.2 Payments to Subcontractors 9

7.3 No Privity; No Assignment 10

ARTICLE 8 REPRESENTATIONS AND WARRANTIES 10

8.1 Representations and Warranties of Contractor 10

8.2 Representations and Warranties of Owner Lessor 11

ARTICLE 9 LIABILITY AND DAMAGES 12

9.1 CONSEQUENTIAL DAMAGES 12

9.2 Further Limitation of Liability 12

ARTICLE 10 WARRANTIES 12

10.1 General Warranty 12

10.2 EXCLUSIVE WARRANTIES 12

ARTICLE 11 UNCONTROLLABLE FORCES 13

11.1 Excused Performance 13

ARTICLE 12 INDEMNIFICATION 13

12.1 Claims Indemnified 13

12.2 Survival of Agreement 13

ARTICLE 13 INSURANCE 13

13.1 Insurance Obtained by Contractor 13

ARTICLE 14 TERMINATION AND DEFAULT 13

14.1 Termination 13

14.2 Owner Lessor Remedies 14

14.3 Surviving Obligations 14

ARTICLE 15 CONFIDENTIAL INFORMATION 14

15.1 Confidentiality 14

15.2 Public Statements 15

ARTICLE 16 DISPUTE RESOLUTION 15

16.1 Resolution of Disputes 15

ARTICLE 17 TAX MATTERS 15

TABLE OF CONTENTS
(continued)

Page

17.1 Tax Matters 15

ARTICLE 18 MISCELLANEOUS 15

18.1 Assignment 15

18.2 Successors and Assigns 16

18.3 Collateral Assignment 16

18.4 Contractor as Owner Lessor's Agent 16

18.5 Waivers 16

18.6 CHOICE OF LAW 16

18.7 Severability 17

18.8 Notice 17

18.9 Headings and Table of Contents 17

18.10 Entire Agreement 17

18.11 Amendments 18

18.12 No Third Party Rights 18

18.13 Limited Recourse 18

18.14 Limitation of Liability 18

18.15 Counterparts 18

EXHIBITS:

Exhibit A Description of Facility
Exhibit B Form of Provisional Acceptance Certificate
Exhibit C Form of Final Acceptance Certificate

CONSTRUCTION MANAGEMENT AGREEMENT

This CONSTRUCTION MANAGEMENT AGREEMENT (this "Agreement"), dated as of October 2, 2024, is made by and between Johnsonville Aeroderivative Combustion Turbine Generation LLC, a Delaware limited liability company, as owner lessor (the "Owner Lessor"), and Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States, as contractor (the "Contractor").

W I T N E S S E T H :

WHEREAS, in connection with the construction of the Facility, the Contractor has entered into the TVA Contract – Engineering, Procurement and Construction (EPC) Contract for Johnsonville Aero Project, dated as of March 2, 2022 (the "Johnsonville Construction Contract"), with Burns & McDonnell Engineering Company, Inc. ("Burns & McDonnell"), pursuant to which the Contractor engaged Burns & McDonnell to perform construction services relating to the Facility;

WHEREAS, in connection with the financing of the construction of the Facility, the Contractor, the Owner Lessor, Johnsonville Holdco LLC, not in its individual capacity, but solely as manager under the Owner Lessor LLC Agreement (the "Lessor Manager"), GSS Holdings (Johnsonville), Inc., not in its individual capacity, but solely as manager under the Equity Investor LLC Agreement (the "Equity Manager"), Johnsonville Holdco LLC, a Delaware limited liability company (the "Equity Investor"), and Wilmington Trust, National Association, a national banking association, not in its individual capacity, but solely as trustee under the Lease Indenture (the "Lease Indenture Trustee"), have entered into the Participation Agreement, dated as of September 25, 2024 (the "Participation Agreement");

WHEREAS, the Contractor has engaged other contractors to perform various services at the Facility (together with Burns & McDonnell, the "Subcontractors");

WHEREAS, pursuant to the Participation Agreement, on the date hereof, the Contractor entered into the Head Lease with the Owner Lessor and leased the partially completed Facility to the Owner Lessor;

WHEREAS, the Owner Lessor desires to engage the Contractor to complete the construction of the Facility on the terms hereof; and

WHEREAS, it is a condition to the lease of the Facility under the Participation Agreement that the parties enter into this Agreement.

NOW, THEREFORE, in consideration of the premises and the mutual covenants herein contained, the parties hereto, intending to be legally bound, hereby agree as follows:

Article 1

DEFINITIONS

1.1 Definitions; Rules of Interpretation. The capitalized terms used in this Agreement, including the foregoing recitals, and not otherwise defined herein shall have the

respective meanings specified in Appendix A to the Participation Agreement. The general provisions of Appendix A to the Participation Agreement shall apply to terms used in this Agreement and specifically defined herein.

Article 2
DESIGN AND CONSTRUCTION OF FACILITY

2.1 Design and Construction of the Facility.

(a) Subject to the terms and conditions hereof, the Contractor shall perform, or cause to be performed, all work (the "Work") necessary to design, engineer, procure, construct, license, start-up, test, commission and complete the Facility in accordance with the requirements of this Agreement.

(b) The Contractor shall at no time after the date of this Agreement modify, vary, or amend in any material respect any of the features or specifications of the Facility outlined in Exhibit A without first notifying the Owner Lessor in writing and obtaining the Owner Lessor's consent in writing, which consent shall not be unreasonably withheld, *provided* that it shall not be unreasonable for the Owner Lessor to withhold its consent to any modification, variation or amendment which would, or would be likely to, materially adversely affect the ability of the Contractor to comply with its obligations under this Agreement. Notwithstanding the foregoing, the Contractor shall have the right, at any time, upon notice to, but without a prior approval of, the Owner Lessor, to make changes to any portion of the Work to the extent required to be made to comply with Prudent Industry Practice, including, but not limited to, in connection with the occurrence of Uncontrollable Forces or a change in Applicable Laws.

(c) The Contractor agrees to provide, at its expense, all power system components on the Facility Site, including all transformation, switching and auxiliary equipment, such as synchronizing and protection and control equipment.

2.2 Work to Be Performed. Without limiting the generality of the foregoing, the Contractor shall perform or has performed, or shall cause or has caused to be performed, all Work necessary to complete the Facility described herein or reasonably inferable from the provisions contained herein and the other Transaction Documents and to cause the Facility to be completed, including without limitation each of the following elements of the Work:

2.2.1 design for civil works, structures, mechanical systems, and electrical systems and preparation of drawings and specifications, including design standards, design reports, models and calculations, all as described in the drawings and specifications for the Work (the "Design Documents");

2.2.2 procurement of all labor, plant, materials, equipment and an initial spare parts inventory;

2.2.3 handling of material, equipment and construction equipment, including, as necessary, inspection, expediting, shipping, unloading, receiving and transportation to and storage at the Facility Site;

2.2.4 Facility Site preparation and Facility Site security, to the extent required for the completion of the Work;

2.2.5 acquisition of all rights-of-way necessary to complete the Work;

2.2.6 all relocation of utility services, demolition of existing structures as appropriate, construction and installation work, to the extent necessary to complete the Work, including subcontracting;

2.2.7 procurement of Applicable Permits in connection with the design, development, acquisition, equipping or other management of the Facility and rights of way or performance of the Work, or necessary for the operation of the Facility by the Contractor or its duly qualified and licensed designee, including construction approvals and permits for lay-down and staging area, state and federal environmental permits and building and heritage permits, and maintenance thereof to the extent necessary to complete the Work in accordance herewith;

2.2.8 arrangement, installation and payment for all temporary utilities and temporary utilities relocations and supply of all fuel, chemicals and consumables required to perform the Work, including Facility construction, start up and testing;

2.2.9 handling of all safety and industrial relations matters; and

2.2.10 commissioning of the Facility in accordance with the performance, testing and commissioning procedures of the Contractor.

2.3 Work Progress; Provisional Acceptance.

2.3.1 The Contractor agrees to use its commercially reasonable efforts to ensure that the Facility achieves Provisional Acceptance by the Guaranteed Provisional Acceptance Date or as soon thereafter as commercially practicable. If the Contractor anticipates that Provisional Acceptance will not be achieved by the Guaranteed Provisional Acceptance Date, the Contractor shall promptly provide notice of such anticipated delay to the Owner Lessor, together with a corrective action plan the Contractor intends to adopt in order to achieve Provisional Acceptance as soon after the Guaranteed Provisional Acceptance Date as commercially practicable.

2.3.2 The Contractor shall develop a list of items which, in the Contractor's reasonable discretion, require completion following Provisional Acceptance in order to achieve Final Acceptance (the "Punch List"), and following Provisional Acceptance, shall use its commercially reasonable efforts to complete or procure completion of the items on the Punch List and to ensure that the Facility achieves Final Acceptance; *provided* that the Contractor shall have the right to expand, reduce or otherwise modify the Punch List at any time in its reasonable discretion.

2.3.3 Notwithstanding anything in this Agreement or any other Operative Document to the contrary, the parties acknowledge and agree that any failure of the Facility to achieve Provisional Acceptance by the Guaranteed Provisional Acceptance Date or achieve Final Acceptance by any particular date will not: (a) in and of itself constitute a default of the Contractor under this Agreement or any Operative Document; (b) permit the Owner Lessor or

the Contractor to terminate this Agreement or any other Operative Document; (c) be deemed a repudiation by the Contractor of, or give rise to any remedies of the Owner Lessor based on anticipatory repudiation of, this Agreement or any other Operative Document; or (d) result in any liability of the Contractor for the payment of any liquidated damages (including any liquidated damages which may be payable to the Contractor by its subcontractors).

2.4 Suspension of the Work by Contractor. Upon the occurrence and during the continuance of any of the following events, the Contractor shall have the right to suspend performance of all or any portion of the Work: (a) Uncontrollable Forces; (b) change in Applicable Law that has a materially adverse impact on the performance of the Work; (c) the discovery of pre-existing Hazardous Substances on or under the Facility; (d) a request by a Governmental Entity having jurisdiction over the Facility or the Contractor to utilize one or all of the Units to meet electrical demand; or (e) circumstances under which any Subcontractor has the right to suspend the Work or any portion thereof in accordance with the Johnsonville Construction Contract. The Contractor shall provide to the Owner Lessor prompt notice of any such suspension of the Work, and shall recommence performance of the Work as soon as reasonably practicable after the occurrence of any such event, to the extent consistent with Applicable Law and permitted under the Johnsonville Construction Contract.

2.5 Clean-Up and Disposal. The Contractor shall dispose of waste materials, rubbish and other debris developed, obtained or excavated in the course of performance of the Work in compliance with Applicable Law and Prudent Industry Practice.

2.6 Hazardous Substances. The Contractor shall be fully responsible for any Hazardous Substances discovered in, on, under or emanating from, or brought onto, the Facility Site, and for the proper testing, handling, removal, transportation and disposal of such Hazardous Substances, in each case with the exception for any such Hazardous Substances introduced by the Owner Lessor or any of its Affiliates or agents (other than the Contractor or any Subcontractor). Such Hazardous Substances shall be stored and used in accordance with the requirements of Applicable Law and the Applicable Permits. The Contractor shall use reasonable commercial efforts to minimize the use of Hazardous Substances in the construction of the Facility and shall not utilize or cause, and shall use reasonable commercial effort to not permit any Subcontractor to utilize, such Hazardous Substances as are prohibited from being used in the United States or the State of Tennessee under Applicable Law. The Contractor shall be responsible for all clean-up and mitigation required in connection with any spills, emissions or releases of Hazardous Substances on, at or from the Facility Site, whether before or after the date hereof, with the exception of any such Hazardous Substances introduced by the Owner Lessor or any of its Affiliates or agents (other than the Contractor or any Subcontractor). The Contractor shall notify the Owner Lessor within forty-eight (48) hours of obtaining Actual Knowledge of any release of a Hazardous Substance on, at or from the Facility which is required under Applicable Laws to be reported to any Governmental Entity.

2.7 Protection of Property. During the performance of the Work, the Contractor shall use reasonable commercial efforts to protect the Facility, the Facility Site, and any and all related materials, construction equipment and tools from damage as a result of the performance of the Work by the Contractor or its Subcontractors. The Contractor shall be responsible for the damage or destruction of any property damaged or destroyed in the course of the performance of the Work, and

the Contractor shall at its own expense rebuild, restore or replace such damaged or destroyed property to a condition at least equal to the condition of such property before such damage or destruction occurred. The Contractor shall use reasonable commercial efforts to provide, and to ensure that each Subcontractor provides, in accordance with Prudent Industry Practice, protection from damage or loss to the Facility, the Facility Site, and any and all related materials, construction equipment and tools during the course of performance of the Work hereunder. Where ingress and egress to and from the Facility Site require the traverse of public or private lands, the Contractor (a) shall be fully responsible for any and all damage to such other property resulting from any movement of its crews and equipment (and of all Subcontractors and each of their crews and equipment), (b) shall be fully responsible for, and exercise commercially reasonable efforts to avoid, marring such lands, and (c) shall in all material respects comply with all obligations of, and any restrictions imposed under, Applicable Law.

2.8 Availability of Documents to Owner Lessor. Upon Owner Lessor's request, the Contractor shall make available to the Owner Lessor following reasonable notice by the Owner Lessor to the Contractor and upon such other reasonable conditions as the Contractor may require and subject to any obligation of confidentiality owed to any third party (other than an Affiliate of the Contractor): (i) the Johnsonville Construction Contract and all Applicable Permits (to the extent required at such time in connection with the Work); (ii) to the extent in the possession of the Contractor, any requested Design Documents, safety manuals, operation and instruction manuals, quality plans, or any other such manuals or plans that have been prepared in connection with the Work; and (iii) financial records and books of account of the Contractor pertaining to the Facility and the Work maintained in accordance with generally accepted accounting principles.

2.9 Labor Relations. The Contractor shall be responsible for all labor relations matters with respect to the Contractor's and any Subcontractor's personnel relating to the Work and shall at all times use commercially reasonable efforts to maintain harmony among personnel employed in connection with the Work. The Contractor shall at all times exercise commercially reasonable efforts to avoid work stoppages, slowdowns, disputes and strikes.

2.10 Safety Precautions. The Contractor shall comply, and shall exercise commercially reasonable efforts to ensure that each Subcontractor complies, with the safety procedures and requirements set forth in the Johnsonville Construction Contract and the Contractor's standard safety procedures, including, but not limited to, the safety procedures set forth in the then-current applicable safety manual and procedures.

2.11 Further Assurances. The Contractor shall execute and deliver all further instruments and documents, and take all further action that, in each case, may be reasonably necessary to enable the Contractor to perform the Work and achieve Provisional Acceptance, or cause the Work to be performed and Provisional Acceptance achieved, or to otherwise effectuate the purposes or intent of this Agreement.

Article 3
STANDARD OF PERFORMANCE

3.1 Standard of Performance. With respect to the Contractor's performance of the Work, subject to the terms and conditions of this Agreement, the Contractor shall comply with,

and shall cause the Work and the Facility and all Components thereof to comply with, Prudent Industry Practice, Applicable Law, all Applicable Permits, all applicable codes and standards, the requirements of all relevant insurance policies and the requirements of this Agreement, and shall use the degree of care, skill and diligence that would be expected to be exercised by a prudent, skilled and experienced contractor engaged in the same types of undertakings as the construction of the Facility under the same or similar circumstances and conditions as those applying to the design, development and construction of the Facility.

Article 4
OWNER'S INFORMATION; ACCESS TO THE FACILITY; INSPECTIONS

4.1 Owner Lessor's Information.

4.1.1 Commencing on the date of this Agreement and continuing until the date on which Provisional Acceptance is achieved, the Contractor shall provide to the Owner Lessor each monthly progress report received by the Contractor from Burns & McDonnell pursuant to the Johnsonville Construction Contract with respect to the progress of the Work and the status of efforts made to achieve Provisional Acceptance. The Contractor shall not agree to any material change to the monthly progress reporting requirements under the Johnsonville Construction Contract that would extend the time to furnish reports or reduce the amount of information to be provided without the consent and approval of the Owner Lessor. The Contractor shall provide such reports to the Owner Lessor promptly following receipt by the Contractor from Burns & McDonnell. To the extent that Burns & McDonnell fails to provide any such report when required under the Johnsonville Construction Contract, the Contractor shall use reasonable commercial efforts to cause Burns & McDonnell to deliver such report as promptly as possible. At the Owner Lessor's request, the Contractor shall provide an opportunity during usual business hours for the Owner Lessor (and its authorized representatives), to meet with appropriate personnel of the Contractor to discuss and assess the contents of any such progress report. Following the date of Provisional Acceptance, the Contractor shall provide to the Owner Lessor any progress reports received by it from Burns & McDonnell promptly following receipt of any such reports.

4.1.2 In addition to the reports it is required to provide pursuant to Section 4.1.1, the Contractor shall also provide the Owner Lessor with prompt notice of any material incident, event or concern that may occur or arise during the course of the development, construction or commissioning of the Facility that could reasonably be expected to prevent the Contractor from achieving Provisional Acceptance by the Guaranteed Provisional Acceptance Date, or, if Provisional Acceptance has not occurred by the Guaranteed Provisional Acceptance Date, by the date most recently projected by the Contractor as the date on which Provisional Acceptance will occur (the "Expected Completion Date").

4.2 Facility Site Access. The Contractor, pursuant to the reservation in favor of the Contractor (as Ground Lessor) in Section 4.3 of the Ground Lease, and as owner of the land adjacent to the Facility Site, shall be responsible for ensuring that the Contractor and the Subcontractors, and each of their agents and employees, have unlimited rights of ingress and egress to and from the Facility Site in connection with the performance of the Work.

4.3 Inspection by Contractor. The Contractor shall perform all inspection, expediting, quality surveillance and traffic services that are required for performance of the Work on a timely basis. The Contractor shall perform a detailed inspection of all Work in progress at intervals appropriate to the stage of construction of the Facility Site, as is necessary to ensure that such Work is proceeding in accordance with this Agreement and the Johnsonville Construction Contract and to protect the Owner Lessor against defects and deficiencies in such Work. Contractor's responsibilities under this Section 4.3 shall include inspection of all materials and equipment both on and off the Facility Site that comprise or will comprise the Facility or that are to be used in connection with the performance of the Work hereunder. The Contractor shall notify the Owner Lessor of any significant deficiencies revealed through such inspections which could reasonably be expected to delay the achievement of Provisional Acceptance beyond the Guaranteed Provisional Acceptance Date, or, if applicable, the Expected Completion Date, and of the measures proposed by the Contractor to remedy such deficiencies.

4.4 Inspection by Owner Lessor. The Owner Lessor (and its authorized representatives) shall have the right to inspect the Work and the Facility Site, and to monitor any material performance tests of the Facility, subject to any conditions on any inspection or monitoring the Contractor or any Subcontractor reasonably determines is necessary or appropriate for safety or security reasons. The Contractor shall use reasonable commercial efforts to provide the Owner Lessor (and its authorized representatives) with advance notice of the scheduled date, time, location and purpose of any material performance tests, if practicable, but failure to do so shall not constitute a default giving rise to any remedies as a result thereof and the Contractor shall have no obligation to provide such Person notice of any acceleration, delay or rescheduling of any such material performance test. All such inspections shall be conducted in a manner that does not unreasonably interfere with the progress of the Work. No inspection performed, witnessed, or failed to be performed or witnessed by the Owner Lessor (or any of its authorized representatives), or any recommendation or lack of recommendation from the Owner Lessor (or any of its authorized representatives) in connection therewith, shall constitute a waiver of any of Contractor's obligations hereunder. The Contractor shall have no obligation to reimburse the Owner Lessor or its Affiliates (or any authorized representative of the Owner Lessor or its Affiliates) in connection with the exercise of any of their rights under this Section 4.4 unless a Lease Event of Default has occurred and is continuing.

Article 5
PROVISIONAL ACCEPTANCE; FINAL ACCEPTANCE

5.1 Provisional Acceptance. "Provisional Acceptance" shall be achieved if and only if with respect to the Facility:

(a) the Facility and all Work required to be performed under this Agreement on or prior to Provisional Acceptance have been completed in all material respects excepting Punch List items that do not materially and adversely affect the ability of the Facility to operate in accordance with Prudent Industry Practice;

(b) the Facility has commenced commercial operations in simple cycle mode with an aggregate net output the Contractor determines to be commercially reasonable for an electric generation facility with the structure and components of the Facility, in light of, and taking into

account, the Johnsonville Construction Contract and the results of any performance tests conducted thereunder;

(c) interconnection and synchronization of the Facility with the electrical grid has been achieved;

(d) the Contractor has obtained all Applicable Permits for the operation of the Facility by the Contractor under the Facility Lease;

(e) the Facility is performing in accordance with all Applicable Permits (including air permit emissions limitations);

(f) the Contractor has developed the Punch List; and

(g) the Contractor has received from each Subcontractor all documentation deemed necessary by the Contractor for the safe and reliable operation of the Facility and such documentation is in all respects satisfactory to the Contractor (in its sole discretion).

5.2 Achievement of Provisional Acceptance. No later than five (5) Business Days after the date on which the Contractor determines, in its reasonable discretion, that Provisional Acceptance has been achieved, the Contractor shall deliver to the Owner Lessor an executed Provisional Acceptance Certificate, a form of which is attached hereto as Exhibit B (the "Provisional Acceptance Certificate"). For purposes of this Agreement, the date of achievement of Provisional Acceptance shall be the date on which the Contractor delivers to the Owner Lessor the Provisional Acceptance Certificate.

5.3 Final Acceptance. Following the achievement of Provisional Acceptance, Contractor shall use its commercially reasonable efforts to ensure that the Facility achieves Final Acceptance in a timely manner. "Final Acceptance" shall be achieved hereunder if and only if, with respect to the Facility:

(a) Provisional Acceptance has been achieved;

(b) All items on the Punch List have been completed to the Contractor's satisfaction;

(c) The Contractor has (i) prepared final drawings, specifications and other documentation that represents the physical placement of all Facility components and systems as installed or constructed at completion or (ii) obtained any such documents that have been prepared on behalf of the Contractor;

(d) The Contractor has received all quality assurance documentation with respect to commissioning and testing of the Facility, to the extent deemed necessary by the Contractor for the safe and reliable operation of the Facility; and

(e) The Contractor has delivered to the Owner Lessor any customary releases of mechanic's liens received by the Contractor from each applicable Subcontractor.

5.4 Achievement of Final Acceptance. No later than five (5) Business Days after the date on which the Contractor determines, in its reasonable discretion, that it has achieved Final Acceptance, the Contractor shall deliver to the Owner Lessor an executed Final Acceptance Certificate, substantially in the form attached hereto as Exhibit C (the "Final Acceptance Certificate"). For purposes of this Agreement, the date of achievement of Final Acceptance shall be the date on which the Contractor delivers to the Owner Lessor the Final Acceptance Certificate.

5.5 Acceptance by Owner Lessor Not a Release of Contractor. No issuance of any Provisional Acceptance Certificate or Final Acceptance Certificate shall constitute a waiver or relinquishment by the Owner Lessor of any of its rights under this Agreement, nor exonerate or relieve the Contractor from any obligation, warranty or liability under this Agreement, except to the extent expressly provided herein.

Article 6
PRICE AND PAYMENT

6.1 CMA Payment. As full consideration to the Contractor for the timely, full and complete performance of the Work and all costs incurred in connection therewith, the Owner Lessor shall pay, and Contractor shall accept, the sum of $95,087,079 (the "CMA Payment"), to be paid in full in immediately available funds on the Closing Date. The parties acknowledge and agree that the CMA Payment shall not be subject to adjustment for any reason, including for (i) any Facility construction costs or schedule overruns or savings, which shall in any and all cases remain the responsibility of, or accrue to the benefit of, the Contractor, as applicable, or (ii) consequences of any Uncontrollable Forces or change in Applicable Law.

Article 7
SUBCONTRACTS

7.1 Subcontractors. The Contractor may subcontract the Work, in whole or in part, to any Person without further approval by the Owner Lessor, and the Owner Lessor acknowledges that the Contractor has, prior to the date of this Agreement, engaged Subcontractors to perform the Work. Notwithstanding any agreement with any Subcontractor, the Contractor shall be solely responsible for the Work and shall not be entitled to relief if any portion of the Work is incomplete or delayed due to any disagreement between or among Subcontractors or between any Subcontractor and the Contractor.

7.2 Payments to Subcontractors. The Contractor shall be solely responsible for paying each Subcontractor and any other Person to whom any amount is due from the Contractor in connection with the performance of the Work, and shall fully indemnify, save harmless and defend the Owner Lessor, the Equity Manager, the Lessor Manager, the Lease Indenture Trustee and Wilmington Trust, and their respective Affiliates, successors, assigns, agents, directors, officers or employees (the "Owner Lessor Indemnified Parties"), from and against any and all Claims of any Subcontractor imposed on or asserted against any Owner Lessor Indemnified Party for any amount due from the Contractor in connection with the performance of the Work. The foregoing indemnity is in addition to the Contractor's indemnity obligations set forth in Section 12.1 and the Operative Documents, and is for the exclusive benefit of the Owner Lessor Indemnified Parties and in no

event shall inure to the benefit of any other Person or diminish or otherwise relieve the Contractor from its indemnity obligations set forth in Section 12.1 or the Operative Documents.

7.3 No Privity; No Assignment. The Owner Lessor shall not be deemed by virtue of this Agreement to have any contractual obligation to or relationship with any Subcontractor. The parties acknowledge and agree that (i) none of the Johnsonville Construction Contract have been or are being assigned to the Owner Lessor pursuant to this Agreement or any other Transaction Document, and (ii) as between the Contractor and the Owner Lessor, the Contractor shall have the right, in its sole discretion, to amend, modify or terminate, or waive any requirement under, the Johnsonville Construction Contract; *provided* that no such amendment, modification, termination or waiver shall materially adversely affect the ability of the Contractor to comply with its obligations under this Agreement.

Article 8
REPRESENTATIONS AND WARRANTIES

8.1 Representations and Warranties of Contractor. The Contractor represents and warrants to the Owner Lessor that:

8.1.1 Legal Status. The Contractor is an instrumentality and agency of the Government duly created and validly existing under the provisions of the TVA Act and has full power and authority to enter into and perform its obligations under this Agreement.

8.1.2 Due Authorization; Enforceability; Etc. This Agreement has been duly authorized, executed and delivered by all necessary corporate action by the Contractor, and, assuming the due authorization, execution and delivery by the Owner Lessor, this Agreement constitutes the legal, valid and binding obligations of the Contractor, enforceable against it in accordance with its terms, except as the same may be limited by fraudulent transfer, moratorium or other laws of general applicability relating to or affecting the rights of creditors and by general principles of equity.

8.1.3 Non-Contravention. The execution, delivery and performance by the Contractor of this Agreement, the consummation by the Contractor of the transaction contemplated hereby, and compliance by the Contractor with the terms and provisions hereof, do not and will not (i) contravene the TVA Act or any other Applicable Law binding the Contractor or its property, or (ii) constitute a default by the Contractor under, or result in the creation of any Lien on the property of the Contractor (other than as contemplated by or permitted pursuant to any Transaction Document) under, or require any approval or consent of, or notice to, any holder of any indebtedness of the Contractor under the Bond Resolution, the Subordinated Resolution or any other similar bond resolution governing the issuance of indebtedness of TVA (whether senior or subordinated) or any other material contract, agreement or instrument to which the Contractor is a party or by which the Contractor or any of its property is bound.

8.1.4 Litigation. There is no pending or, to the Actual Knowledge of the Contractor, threatened, action, suit, investigation or proceeding against the Contractor before any Governmental Entity questioning the validity of this Agreement.

8.1.5 Patents, Licenses; Franchises. The Contractor owns or possesses all the patents, trademarks, service marks, trade names, copyrights, licenses, franchises, permits and rights with respect to the foregoing necessary to perform the Work without conflict with the rights of others, except where noncompliance will not have a Material Adverse Effect or involve a material risk of (i) foreclosure, sale, forfeiture or loss of, or imposition of a material Lien on, the Facility or the Facility Site, (ii) the impairment of its ability to perform the Work or other services hereunder or (iii) any criminal or material civil liability being incurred by the Lessor Owner, the Equity Investor, the Equity Note Purchasers, the Lessor Manager, the Equity Manager or the Lease Indenture Trustee.

8.1.6 Compliance with Laws. The Contractor is in compliance with Applicable Law relating to the construction of the Facility, except where noncompliance will not have a Material Adverse Effect or involve a material risk of (i) foreclosure, sale, forfeiture or loss of, or imposition of a material Lien on, the Facility or the Facility Site, (ii) the impairment of its ability to perform the Work or other services hereunder or (iii) any criminal or material civil liability being incurred by the Owner Lessor, the Equity Investor, the Equity Note Purchasers, the Lessor Manager, the Equity Manager, the Lease Indenture Trustee or the Noteholders.

8.2 Representations and Warranties of Owner Lessor. The Owner Lessor represents and warrants to Contractor that:

8.2.1 Due Organization. The Owner Lessor is duly organized, validly existing and in good standing under the laws of the State of Delaware and has the power and authority to execute and deliver, and to perform its obligations under, this Agreement.

8.2.2 Due Authorization; Enforceability; Etc. This Agreement has been duly authorized, executed and delivered by the Owner Lessor, and assuming the due authorization, execution and delivery of this Agreement by the Contractor, this Agreement constitutes the legal, valid and binding obligation of the Owner Lessor, enforceable against the Owner Lessor in accordance with its terms, except as the same may be limited by bankruptcy, insolvency, fraudulent conveyance, reorganization, arrangement, moratorium or other laws relating to or affecting the rights of creditors generally and by general principles of equity.

8.2.3 Non-Contravention. The execution and delivery by the Owner Lessor of this Agreement, the consummation by the Owner Lessor of the transactions contemplated hereby and the compliance by the Owner Lessor with the terms and provisions hereof, do not and will not contravene any Applicable Law of the United States of America or the State of Delaware, or the Owner Lessor LLC Agreement or the Owner Lessor's other organizational documents or contravene the provisions of, or constitute a default by the Owner Lessor under, any indenture, mortgage or other material contract, agreement or instrument to which the Owner Lessor is a party or by which the Owner Lessor or its property is bound, or result in the creation of any Owner Lessor's Lien upon the Lessor Estate.

8.2.4 Litigation. There is no pending or, to the Actual Knowledge of the Owner Lessor, threatened action, suit, investigation or proceeding against the Owner Lessor before any Governmental Entity.

8.2.5 Compliance With Laws. The Owner Lessor has complied with Applicable Law such that the Owner Lessor is not subject to any fines, penalties, injunctive relief or criminal liabilities which in the aggregate have materially affected or are reasonably likely to have a Material Adverse Effect or impair the Owner Lessor's ability to perform its obligations hereunder.

Article 9
LIABILITY AND DAMAGES

9.1 CONSEQUENTIAL DAMAGES. NEITHER THE OWNER LESSOR NOR THE CONTRACTOR NOR ANY CONTRACTORS OR AGENTS OF EITHER PROVIDING EQUIPMENT, MATERIALS OR SERVICES FOR THE PERFORMANCE OF THE WORK SHALL BE LIABLE TO THE OTHER OR ANY OF ITS CONTRACTORS OR AGENTS FOR CONSEQUENTIAL LOSSES OR DAMAGES, INCLUDING LOSS OF USE OR LOSS OF PROFIT, AND THE OWNER LESSOR AND THE CONTRACTOR EACH HEREBY RELEASES THE OTHER AND ITS CONTRACTORS AND AGENTS FROM ANY SUCH LIABILITY. THE FOREGOING EXCLUSION SHALL NOT BE CONSTRUED TO LIMIT RECOVERY UNDER ANY INDEMNITY IN ARTICLE 12 IN RESPECT OF THIRD PARTY CLAIMS FOR DAMAGE TO OR DESTRUCTION OF PROPERTY OF, OR DEATH OF OR BODILY INJURY TO, ANY PERSON.

9.2 Further Limitation of Liability. The limitations of liability and the exclusions of consequential damages set forth in this Agreement (including this Article 9) shall apply irrespective of whether a party hereto or any Affiliate thereof, or any partner, shareholder, officer, director or employee of a party hereto or an Affiliate thereof, asserts a theory of liability in contract, tort, negligence, misrepresentation (including negligent misrepresentation), strict liability or any other theory of liability.

Article 10
WARRANTIES

10.1 General Warranty. The Contractor warrants to the Owner Lessor that throughout the period commencing with Provisional Acceptance and, if later, the installation of any property or the performance of any service constituting part of the Work, and ending one (1) day prior to the first anniversary of Provisional Acceptance or such later date: all Work furnished pursuant to this Agreement (a) shall comply with the requirements of this Agreement; (b) will be free from latent and patent defects in construction; and (c) will be suitable and adequate for its intended purpose as reasonably inferable from the terms of this Agreement. During such period, the Contractor shall, at its expense, re-perform, remove, repair, replace, and/or reinstall as necessary all Work, or portions thereof, which fail to comply with any or all of the aforementioned warranties.

10.2 EXCLUSIVE WARRANTIES. THERE ARE NO WARRANTIES OF THE CONTRACTOR TO THE OWNER LESSOR HEREUNDER, EXPRESS OR IMPLIED, OTHER THAN AS SET FORTH IN THIS ARTICLE 10. ALL IMPLIED WARRANTIES (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) ARE HEREBY DISCLAIMED.

Article 11
UNCONTROLLABLE FORCES

11.1 Excused Performance. Notwithstanding any other provisions of this Agreement, any obligation of either party under this Agreement shall be excused (expect with respect to the Contractor's payment obligations hereunder) to the extent that such party's inability to perform is caused by Uncontrollable Forces. Each party hereto shall use reasonable efforts to cure, minimize, mitigate or remedy the effects of Uncontrollable Forces. In order to cure, minimize, mitigate or remedy the effects of Uncontrollable Forces, the Contractor may, among other things, suspend performance of the Work in accordance with Section 2.4. The rights or the performance by the Contractor of its obligations under this Agreement shall resume upon the cessation of the Uncontrollable Forces.

Article 12
INDEMNIFICATION

12.1 Claims Indemnified. The Contractor shall fully indemnify, save harmless and defend the Owner Lessor Indemnified Parties from and against any and all Claims imposed on, incurred or suffered by or asserted against any Owner Lessor Indemnified Party in any way relating to or resulting from or arising out of or attributable to (a) the Work (including the design, procurement, construction, installation, start-up or testing of the Facility), including Claims for any damage to or destruction of property of, or death of or bodily injury to, any Person (whether such Person is an Owner Lessor Indemnified Party, the Contractor or any Subcontractor, or is a Person unaffiliated with the Facility or the performance of the Work), or (b) Contractor's fault, breach of this Agreement, tortious act, negligence, or strict liability in the performance of the Contractor's obligations hereunder. The Contractor's indemnity under this Section 12.1 is for the exclusive benefit of the Owner Lessor Indemnified Parties and in no event shall inure to the benefit of any other Person, and is in addition to the obligations of the Contractor under any Operative Document (including Sections 9.1 and 9.2 of the Participation Agreement).

12.2 Survival of Agreement. This Article 12 shall survive the termination or expiration of this Agreement.

Article 13
INSURANCE

13.1 Insurance Obtained by Contractor. The Contractor shall, or shall cause its Subcontractors to, maintain in full force and effect, at the Contractor's or such Subcontractors' expense, as applicable, the insurance coverages required to be maintained under the Johnsonville Construction Contract.

Article 14
TERMINATION AND DEFAULT

14.1 Termination. Unless terminated by the mutual written agreement of the parties hereto, this Agreement shall terminate on the earlier of (a) the date of termination of the Facility Lease pursuant to the terms thereof, and (b) the date that is two (2) years following the date on which Final Acceptance is achieved.

14.2 Owner Lessor Remedies. Upon the occurrence of any default by the Contractor of its obligations hereunder, and at any time thereafter so long as the same shall be continuing, the Owner Lessor may, at its option, declare the Contractor to be in default by written notice to the Contractor; and at any time thereafter, so long as the Contractor shall not have remedied all outstanding defaults hereunder, the Owner Lessor may proceed by appropriate court action or actions, either at law or in equity, as its sole and exclusive remedy for any default hereunder, to specifically enforce performance by the Contractor of its obligations hereunder of the applicable covenants and terms of this Agreement or to recover damages for breach thereof, at the Contractor's sole cost and expense. For the avoidance of doubt, any remedies for a default by the Contractor of its obligations hereunder shall not include: (i) termination of this Agreement or any other Transaction Document, or (ii) removal of the Contractor from the performance of its obligations hereunder.

14.3 Surviving Obligations. Termination of this Agreement (a) shall not relieve either party hereto of its obligations with respect to the confidentiality of the other party's information as set forth in Article 15, (b) shall not relieve either party hereto of any obligation hereunder which expressly survives termination hereof, and (c) shall not relieve Contractor of its indemnification obligations under Article 12 hereof or warranty obligations under Section 10.1 hereof. This Section 14.3 shall survive the termination or expiration of this Agreement.

Article 15
CONFIDENTIAL INFORMATION

15.1 Confidentiality. Except as set forth in this Section 15.1, and, with respect to any Confidential Information contained in, or delivered in connection with, the Johnsonville Construction Contract, subject in all respects to the confidentiality provisions of the Johnsonville Construction Contract, each of the parties hereto shall hold in confidence any Confidential Information for a period ending five (5) years after the earlier of (a) the achievement of Final Acceptance, or (b) termination of this Agreement; *provided, however,* that nothing in this Section 15.1 shall prevent any of the parties hereto from disclosing Confidential Information (i) to its, or to its Affiliate's, directors, officers, employees, agents and professional consultants or advisors, including legal counsel and independent auditors, (ii) in connection with any assignment of this Agreement, *provided* that any potential assignee is subject to confidentiality provisions substantially similar to those set forth herein, (iii) to any Person to whom such disclosure is reasonably required in connection with the exercise of any remedy hereunder or to protect the interests of the disclosing Person thereunder, (iv) to any federal or state regulatory authority having jurisdiction over any disclosing Person, or any Affiliate of such Person, (v) to any other Person to whom disclosure is necessary (A) to comply with any law, rule, regulation or order applicable to the disclosing Person, (B) to comply with any subpoena or other legal or administrative process or informal investigative order applicable to the disclosing Person or (C) in connection with any litigation to which the disclosing Person or any Affiliate of such Person is a party or (vi) to the Equity Investor or to any Equity Note Purchaser; *provided further* that in the case of any disclosure made pursuant to clause (v) of this Section 15.1, (x) such disclosing Person shall have used its reasonable best efforts to give the other party hereto prior written notice of any disclosure to be made, unless such notice is prohibited by law or court order and (y) such disclosing Person shall not oppose the other party's seeking an appropriate protective order with respect to any Confidential Information to be so disclosed.

15.2 Public Statements. The Owner Lessor and its respective Affiliates, successors, assigns, agents, directors, officers or employees shall not make any press announcements or public statement about the Facility or any of the transactions contemplated herein, nor shall any such Person make any statement that could reasonably be expected to be used by any third party for such purposes without the prior written consent of the Contractor, such consent not to be unreasonably withheld, conditioned or delayed.

Article 16
DISPUTE RESOLUTION

16.1 Resolution of Disputes. In the event a dispute arises between the Owner Lessor and the Contractor regarding the application or interpretation of this Agreement, the Owner Lessor and the Contractor shall exercise commercially reasonable efforts to reach a reasonable and equitable resolution of the matter. If the Owner Lessor and the Contractor are unable to resolve the matter within thirty (30) days, either party hereto may refer the matter by written notice to the senior officers of the parties hereto. If the Owner Lessor and the Contractor cannot resolve the matter, the parties hereto shall exercise commercially reasonable efforts to agree upon an appropriate method of non-judicial dispute resolution, including mediation, mini-trial, or arbitration. In any event, neither party hereto shall seek judicial resolution of any dispute until thirty (30) days after the matter has been referred in writing to the senior officers of the parties hereto. In the event of a dispute each of the parties hereto shall, subject to any confidentiality obligations owed to any third party unrelated to any of the parties hereto, make available to the other such data and information as may reasonably be requested. The pendency of this dispute resolution mechanism shall not in and of itself relieve either party hereto of its duty to perform under this Agreement.

Article 17
TAX MATTERS

17.1 Tax Matters. The Owner Lessor shall reasonably cooperate with the Contractor at the Contractor's sole cost and expense to minimize the Contractor's obligation to pay Taxes (if any) in connection with the Work, including by cooperating with the preparation and overall coordination of the making of tax exemption applications and in preparation of tax agency inquiries and presentations to the extent exemptions in the Owner Lessor's name are available, *provided* that the Owner Lessor shall not be required to take any action or refrain from any action that would involve (a) a material risk of foreclosure, sale, forfeiture or loss of, or the imposition of any material Lien (other than a Permitted Lien) on the Owner Lessor's interest in the Facility Site, the Facility, the Ground Interest or any portion or Component thereof or any interest therein or (b) a risk of the imposition of criminal penalties as a result of such action.

Article 18
MISCELLANEOUS

18.1 Assignment. The Owner Lessor has assigned its right, title and interest in this Agreement to the Lease Indenture Trustee. The Contractor shall not have the right to assign all or part of its right, title, and interest in this Agreement, and shall not be released from its

obligations under this Agreement, without the consent of the Owner Lessor, which consent shall not be unreasonably withheld, delayed or conditioned.

18.2 Successors and Assigns. This Agreement shall be binding upon and shall inure to the benefit of, and shall be enforceable by, the parties hereto and their respective successors and assigns as permitted by and in accordance with the terms hereof. Except as expressly provided herein, no party hereto may assign its interests herein without the consent of the other parties hereto.

18.3 Collateral Assignment. The parties acknowledge that the Owner Lessor's rights in and to the Facility, the Facility Site and this Agreement have been assigned to, and are subject to the Lien of, the Lease Indenture Trustee as security for the performance of the Owner Lessor's obligations under the Lease Indenture. The Contractor hereby consents to such assignment and to the creation of such Lien and acknowledges receipt of copies of the Lease Indenture, it being understood that such consent shall not affect any requirement or the absence of any requirement for any consent of the Contractor under any other circumstances. Unless and until the Contractor shall have received written notice from the Lease Indenture Trustee that the Lien of the Lease Indenture has been fully terminated, the Lease Indenture Trustee shall have the right to exercise the rights of the Owner Lessor under this Agreement to the extent set forth in and subject in each case to the exceptions set forth in the Lease Indenture. Notwithstanding anything to the contrary contained herein, the rights of the Lease Indenture Trustee, as the assignee of the Owner Lessor's interests, in and to the Facility, the Facility Site or this Agreement shall be subject in all respects to the appointment made under Section 4.1(b) of the Facility Lease, as described below.

18.4 Contractor as Owner Lessor's Agent. The parties acknowledge that, pursuant to Section 4.1(b) of the Facility Lease, the Owner Lessor has irrevocably appointed and constituted the Contractor its agent and attorney-in-fact, coupled with an interest, to assert and enforce, from time to time and so long as the Owner Lessor (or the Lease Indenture Trustee) has not exercised remedies pursuant to Section 18.2 of the Facility Lease, in the name and for the account of the Owner Lessor and the Contractor, as their interests may appear, but in all cases at the sole cost and expense of the Contractor, whatever claims and rights the Owner Lessor may have in respect of the Facility or any Component thereof, against any manufacturer, vendor or contractor, or under any express or implied warranties relating to the Facility or any Component thereof (including any such claim or right that the Owner Lessor may have against the Contractor under this Agreement); *provided*, *however*, that such appointment may be revoked in accordance with Section 4.1(b) of the Facility Lease.

18.5 Waivers. No failure to exercise, and no delay in exercising, any right, power or remedy under this Agreement shall impair any right, power or remedy which any party hereto may have, nor shall such failure or delay be construed to be a waiver of any such rights, powers or remedies, or an acquiescence in any breach or default under this Agreement, nor shall any waiver of any breach or default be deemed a waiver of any default or breach subsequently occurring under this Agreement.

18.6 CHOICE OF LAW. THIS AGREEMENT WILL BE GOVERNED BY, AND CONSTRUED AND INTERPRETED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK (WITHOUT REGARD TO CONFLICTS OF LAWS PRINCIPLES OTHER

THAN AS PROVIDED IN SECTION 5-1401 OF THE NY GENERAL OBLIGATIONS LAW), EXCEPT TO THE EXTENT THAT U.S. FEDERAL LAW SHALL APPLY.

18.7 Severability. If any provision in this Agreement shall be invalid, illegal or unenforceable under Applicable Law of any jurisdiction, the validity, legality and enforceability thereof in any other jurisdiction, and of the remaining provisions hereof in any jurisdiction, shall not be affected or impaired thereby.

18.8 Notice. Unless otherwise expressly specified or permitted by this Agreement, all communications and notices provided for herein shall be in writing or by a telecommunications or electronic device capable of creating a written record, and any such notice shall become effective (a) upon personal delivery thereof, including by overnight mail or courier service, (b) in the case of notice by United States mail, certified or registered, postage prepaid, return receipt requested, upon receipt thereof, or (c) in the case of notice by such a telecommunications or electronic device, upon transmission thereof, provided such transmission is promptly confirmed by either of the methods set forth in clauses (a) or (b) above, in each case addressed to the applicable party hereto at its address set forth below, or at such other address as such party may from time to time designate by written notice to the other party hereto:

If to the Owner Lessor:

Johnsonville Aeroderivative Combustion Turbine Generation LLC
c/o Johnsonville Holdco LLC
68 South Service Road, Suite 120
Melville, NY 11747
Telephone No.: 631-930-7202
E-mail: jrangelo@gssnyc.com
Attention: Bernard J. Angelo

If to the Contractor:

Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902
Telephone No.: (865) 632-3366
Facsimile No.: (865) 632-6597
E-mail: leasenotices@tva.gov
Attention: Treasurer

18.9 Headings and Table of Contents. The headings of the Articles and Sections of this Agreement and the Table of Contents are inserted for purposes of convenience only and shall not be construed to affect the meaning or construction of any of the provisions hereof.

18.10 Entire Agreement. This Agreement contains the entire agreement between the Owner Lessor and the Contractor with respect to the Work and the subject matter hereof, and supersedes any and all prior and contemporaneous written and oral agreements, proposals, negotiations, specifications, understandings and representations pertaining to the Work.

18.11 Amendments. No amendments or modifications hereof shall be valid unless evidenced by a written agreement executed by both parties hereto.

18.12 No Third Party Rights. This Agreement and all rights hereunder are intended for the sole benefit of the Owner Lessor (and permitted successors and assigns thereof), the Contractor and the Owner Lessor Indemnified Parties (to the extent provided in Article 12), and shall not imply or create any rights on the part of, or obligations to, any other Person or any other rights on the part of, or other obligations to, any Owner Lessor Indemnified Party beyond the rights and obligations expressly set forth in such provision.

18.13 Limited Recourse. The Owner Lessor and the Contractor acknowledge that the Owner Lessor has entered into this Agreement entirely on its own behalf, and in no manner on behalf of any parent, subsidiary or affiliate company of the Owner Lessor or any equity holder in or joint venturers of the Owner Lessor or any affiliates of any of them, and that the Contractor shall have no recourse against any parent, subsidiary or affiliate company of the Owner Lessor or any equity holder in or joint venturers of the Owner Lessor or any parent, subsidiary or affiliate company thereof (other than the Owner Lessor), or any partners, shareholders or other equity owners, joint venturers, officers, directors, successors or assigns of any such Person for any reason.

18.14 Limitation of Liability. It is expressly understood and agreed by the parties hereto that (a) this Agreement is executed and delivered by the Lessor Manager, not individually or personally but solely as manager of the Owner Lessor under the Owner Lessor LLC Agreement, in the exercise of the powers and authority conferred and vested in it pursuant thereto, (b) each of the representations, undertakings and agreements herein made on the part of the Owner Lessor is made and intended not as personal representations, undertakings and agreements by the Lessor Manager, but is made and intended for the purpose for binding only the Owner Lessor, (c) nothing herein contained shall be construed as creating any liability on the Lessor Manager, individually or personally, to perform any covenant either expressed or implied contained herein, all such liability, if any, being expressly waived by the parties hereto or by any Person claiming by, through or under the parties hereto and (d) under no circumstances shall the Lessor Manager be personally liable for the payment of any indebtedness or expenses of the Owner Lessor or be liable for the breach or failure of any obligation, representation, warranty or covenant made or undertaken by the Owner Lessor under this Agreement.

18.15 Counterparts. This Agreement may be executed by the parties hereto in separate counterparts, each of which when so executed and delivered shall be an original, but all such counterparts shall together constitute but one and the same instrument. This Agreement may be executed by signatures delivered by email, and a copy hereof that is executed and delivered by a party by email (including in *.pdf* format) will be binding upon that party to the same extent as a copy hereof containing that party's original signature. The words "execution," "execute," "signed," "signature," and words of like import in or related to any document to be signed in connection with this Agreement shall be deemed to include electronic signatures (e.g., signatures effected through *DocuSign*), which shall be of the same legal effect, validity or enforceability as a manually executed signature to the extent and as provided for in any Applicable Law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

[*Signature page follows*.]

IN WITNESS WHEREOF, the Owner Lessor and the Contractor, intending to be legally bound, have caused this Agreement to be executed and delivered by their respective officers thereunto duly authorized on the dates below their respective signatures, but effective as of the date first set forth above.

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE GENERATION LLC

By: Johnsonville Holdco LLC, not in its individual capacity, but solely as Lessor Manager under the Owner Lessor LLC Agreement

By: /s/ Bernard J. Angelo
Name: Bernard J. Angelo
Title: Manager
Date:

TENNESSEE VALLEY AUTHORITY

By: /s/ Joshua J. Carlon
Name: Joshua J. Carlon
Title: Director, Corporate Finance
Date:

EXHIBIT A
to
Construction
Management Agreement

Description of Facility

The Facility consists of generating Units, Common Facilities, and other equipment, material or property, other than real property, associated with the Units and Common Facilities (but not associated with the Global Common Facilities), all of which are located on, under, or over the Facility Site, which Facility Site is the real property located in Humphreys County, Tennessee and is described in greater detail in Exhibit 1 to the Ground Lease.

The Facility will have ten aeroderivative simple cycle combustion turbine-generator units, each with a nominal output of 55 MW. Each Unit consists of a General Electric LM6000PF1 combustion turbine generator ("CTG") and any ancillary equipment, except for any Component exclusively constituting Common Facilities. These CTG units are specifically designed for frequent cycling and load variability, with the capability of five minute starts. Each unit will have a clutch between turbine and generator to enable Synchronous Condensing operation for reactive power/voltage support. Each unit will also be capable of Black Start to start and provide electrical generation in the event of the total loss of AC power.

Natural gas will be the only fuel.

Components for each Unit include the following:

GE Combustion Turbine with Air Inlet Filtration and Evaporative Cooling Systems
Gearbox with integral clutch
Andritz Generator with Air Inlet Filtration
Exhaust System with Selective Catalytic Reduction (SCR) and Carbon Monoxide (CO) catalyst
Lube Oil Systems
SPRINT water injection system for power augmentation
Mark VIe Control System
Fuel Gas Filter/Separator
CO2 Fire Protection System
Power Control Module (PCM) Enclosure
Waste Heat Recovery Anti-Icing System
Main Step-up Transformer (One per two units)
Continuous Emissions Monitoring Systems (CEMS) on CT exhaust
Electro-Hydraulic Starting System
Compressor Wash System

The Common Facilities are equipment and facilities that are used for the operation of the Units at the Facility, but are not Global Common Facilities. These shared facilities support the Units. The Common Facilities are as follows:

Compressed Air System
Fuel Gas Compressor System
Ammonia Supply System for SCR
Oil-Water Separation and Discharge System
Fire Loop System
Black Start Generator System (natural gas-fueled recip)
Potable Water System
Eye Wash System
Storm Water Drains
Demineralized Water Storage System
Control/Administration/Maintenance Building
Power Distribution Building

EXHIBIT B
to
Construction
Management Agreement

Form of
Provisional Acceptance Certificate

_____, 20__

PROVISIONAL ACCEPTANCE CERTIFICATE
JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE FACILITY

Reference is made to the Construction Management Agreement, dated as of October 2, 2024 (the "Agreement"), by and between Johnsonville Aeroderivative Combustion Turbine Generation LLC, a Delaware limited liability company ("Owner Lessor"), and Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States ("Contractor"). Capitalized terms used herein and not otherwise defined herein shall have the meanings ascribed to them in the Agreement.

Pursuant to Sections 5.1 and 5.2 of the Agreement, Contractor hereby certifies that Provisional Acceptance of the Facility occurred on _____, 20__.

IN WITNESS WHEREOF, the Contractor has caused this Provisional Acceptance Certificate to be executed and delivered by its duly authorized representative as of the date first set forth above.

TENNESSEE VALLEY AUTHORITY

By:
Name:
Title:

EXHIBIT C
to
Construction
Management Agreement

Form of
Final Acceptance Certificate

_____, 20__

FINAL ACCEPTANCE CERTIFICATE
JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINE FACILITY

Reference is made to the Construction Management Agreement, dated as of October 2, 2024 (the "Agreement"), by and between Johnsonville Aeroderivative Combustion Turbine Generation LLC, a Delaware limited liability company ("Owner Lessor"), and Tennessee Valley Authority, a wholly owned corporate agency and instrumentality of the United States ("Contractor"). Capitalized terms used herein and not otherwise defined herein shall have the meanings ascribed to them in the Agreement.

Pursuant to Sections 5.3 and 5.4 of the Agreement, Contractor hereby certifies that Final Acceptance of the Facility occurred on _____, 20__.

IN WITNESS WHEREOF, the Contractor has caused this Final Acceptance Certificate to be executed and delivered by its duly authorized representative as of the date first set forth above.

TENNESSEE VALLEY AUTHORITY

By:
Name:
Title:

Appendix 1C TVA 10Q Financial Statement

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-Q

(MARK ONE)

☒ QUARTERLY REPORT PURSUANT TO SECTION 13, 15(d), OR 37 OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended December 31, 2024

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission file number 000-52313

TENNESSEE VALLEY AUTHORITY
(Exact name of registrant as specified in its charter)

A corporate agency of the United States created by an act of Congress *(State or other jurisdiction of incorporation or organization)*	62-0474417 *(I.R.S. Employer Identification No.)*
400 W. Summit Hill Drive Knoxville, Tennessee *(Address of principal executive offices)*	37902 *(Zip Code)*

(865) 632-2101
(Registrant's telephone number, including area code)

None
(Former name, former address and former fiscal year, if changed since last report)

Securities registered pursuant to Section 12(b) of the Act

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
N/A	N/A	N/A

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13, 15(d), or 37 of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).
Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Accelerated filer ☐
Non-accelerated filer ☒ Smaller reporting company ☐
Emerging growth company ☐
If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).
Yes ☐ No ☒

Number of shares of common stock outstanding at February 4, 2025: N/A

Table of Contents

	Page
GLOSSARY OF COMMON ACRONYMS	3
FORWARD-LOOKING INFORMATION	4
GENERAL INFORMATION	6
PART I - FINANCIAL INFORMATION	
ITEM 1. FINANCIAL STATEMENTS	7
Consolidated Statements of Operations (Unaudited)	7
Consolidated Statements of Comprehensive Income (Loss) (Unaudited)	7
Consolidated Balance Sheets (Unaudited)	8
Consolidated Statements of Cash Flows (Unaudited)	9
Consolidated Statements of Changes in Proprietary Capital (Unaudited)	11
Notes to Consolidated Financial Statements (Unaudited)	12
ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS	40
Executive Overview	40
Results of Operations	41
Liquidity and Capital Resources	46
Key Initiatives and Challenges	48
Environmental Matters	49
Legal Proceedings	50
Critical Accounting Estimates	50
New Accounting Standards and Interpretations	50
Legislative and Regulatory Matters	50
ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK	50
ITEM 4. CONTROLS AND PROCEDURES	50
Disclosure Controls and Procedures	50
Changes in Internal Control over Financial Reporting	51
PART II - OTHER INFORMATION	
ITEM 1. LEGAL PROCEEDINGS	51
ITEM 1A. RISK FACTORS	51
ITEM 5. OTHER INFORMATION	51
ITEM 6. EXHIBITS	52
SIGNATURES	53

GLOSSARY OF COMMON ACRONYMS

Following are definitions of some of the terms or acronyms that may be used in this Quarterly Report on Form 10-Q for the quarter ended December 31, 2024 (the "Quarterly Report"):

Term or Acronym	Definition
AOCI	Accumulated other comprehensive income (loss)
ARO	Asset retirement obligation
ART	Asset Retirement Trust
Bonds	Bonds, notes, or other evidences of indebtedness
CCR	Coal combustion residuals
CCR Rule	2015 Coal Combustion Residual Rule
CEO	Chief Executive Officer
CT	Combustion turbine
CY	Calendar year
DCP	Deferred Compensation Plan
FHP	Financial Hedging Program
GAAP	Accounting principles generally accepted in the United States of America
GAC	Grid access charge
GEH	GE Hitachi Nuclear Energy
Holdco	John Sevier Holdco LLC
JACTG	Johnsonville Aeroderivative Combustion Turbine Generation LLC
JHLLC	Johnsonville Holdco LLC
Johnsonville Facility	Johnsonville Aeroderivative Combustion Turbine Facility
JSCCG	John Sevier Combined Cycle Generation LLC
kWh	Kilowatt hours
Legacy CCR Rule	Final legacy CCR rule
LPCs	Local power company customers
MLGW	Memphis Light, Gas and Water Division
mmBtu	Million British thermal unit(s)
Moody's	Moody's Investors Service, Inc.
MtM	Mark-to-market
NAV	Net asset value
NDT	Nuclear Decommissioning Trust
NEIL	Nuclear Electric Insurance Limited
NES	Nashville Electric Service
NRC	Nuclear Regulatory Commission
PPA(s)	Power Purchase Agreement(s)
RP	Restoration Plan
SCCG	Southaven Combined Cycle Generation LLC
SEC	Securities and Exchange Commission
SERP	Supplemental Executive Retirement Plan
SHLLC	Southaven Holdco LLC
TVA	Tennessee Valley Authority
TVA Act	Tennessee Valley Authority Act of 1933, as amended
TVA Board	TVA Board of Directors
U.S. Treasury	United States Department of the Treasury
VIE	Variable interest entity
XBRL	eXtensible Business Reporting Language

FORWARD-LOOKING INFORMATION

This Quarterly Report contains forward-looking statements relating to future events and future performance. All statements other than those that are purely historical may be forward-looking statements. In certain cases, forward-looking statements can be identified by the use of words such as "may," "will," "should," "expect," "anticipate," "believe," "intend," "project," "plan," "predict," "assume," "forecast," "estimate," "objective," "possible," "probably," "likely," "potential," "speculate," "aim," "aspiration," "goal," "seek," "strategy," "target," the negative of such words, or other similar expressions.

Although the Tennessee Valley Authority ("TVA") believes that the assumptions underlying any forward-looking statements are reasonable, TVA does not guarantee the accuracy of these statements. Numerous factors could cause actual results to differ materially from those in any forward-looking statements. These factors include, among other things:

- Significant additional costs for TVA to manage and operate its coal combustion residuals ("CCR") facilities;
- The cost of complying with known, anticipated, or new environmental requirements, some of which could render continued operation of many of TVA's aging coal-fired generation units not cost-effective or result in their removal from service, perhaps permanently;
- Federal legislation aimed specifically at curtailing TVA's activities, including legislation that may require the divestiture of TVA or the sale of certain of TVA's assets; restrict access to its United States Department of the Treasury ("U.S. Treasury") account; eliminate its sole authority to set rates; restrict its authority to manage the Tennessee River system; lower the debt ceiling on bonds, notes, or other evidences of indebtedness (collectively, "Bonds") specified in the Tennessee Valley Authority Act of 1933, as amended ("TVA Act"); or limit its ability to pay its Chief Executive Officer or other employees competitive salaries;
- New, existing, or amended laws, regulations, executive orders ("EOs"), or administrative orders or interpretations, including those related to climate change and other environmental matters, and the costs of complying with these laws, regulations, EOs, or administrative orders or interpretations;
- Loss of TVA's protected service territory if the Federal Energy Regulatory Commission ("FERC") were to limit the application of the anti-cherrypicking provision, or if Congress were to eliminate the anti-cherrypicking provision, without corresponding legislative modifications to the territorial limitations imposed by the fence;
- Additional federal reliability standards set forth by the North American Electric Reliability Corporation ("NERC") and approved by FERC and the costs of complying with these new standards;
- The failure of TVA's generation, transmission, navigation, flood control, and related assets and infrastructure, including CCR facilities, dams, and spent nuclear fuel storage facilities, to operate as anticipated, resulting in health, safety, or environmental problems, lost revenues, damages, or other costs that are not reflected in TVA's financial statements or projections, including due to aging, technological issues, or extreme weather conditions;
- Significant delays and additional costs, and/or inability to obtain necessary regulatory approvals, licenses, or permits, for major projects, including for assets that TVA needs to serve its existing and future load and to meet its carbon reduction aspirations;
- Risks associated with the operation of nuclear facilities or other generation and related facilities, including CCR facilities and dams;
- Events at a nuclear facility, whether or not operated by or licensed to TVA, which, among other things, could lead to increased regulation or restriction on the construction, ownership, operation, or decommissioning of nuclear facilities or on the storage of spent fuel, obligate TVA to pay retrospective insurance premiums, reduce the availability and affordability of insurance, increase the costs of operating TVA's existing nuclear units, or cause TVA to forego future construction at these or other facilities;
- The inaccuracy of certain assumptions about the future, including economic forecasts, anticipated energy and commodity prices, cost estimates, construction schedules, power demand forecasts, potential regulatory environments, and the appropriate generation mix to meet demand;
- Circumstances that cause TVA to change its determinations regarding the appropriate mix of generation assets;
- Inability to continue to operate certain assets, especially nuclear facilities, including due to the inability to obtain, or loss of, regulatory approval for the operation of assets;
- Physical attacks, threats, or other interference causing damage to TVA's facilities or interfering with TVA's operations;
- Unforeseeable occurrences negatively impacting TVA assets or their supporting infrastructure;
- Events at TVA facilities, which, among other things, could result in loss of life, damage to the environment, damage to or loss of the facility, or damage to the property of others;
- Events that negatively impact TVA's reliability, including problems at other utilities or at TVA facilities or the increase in intermittent sources of power;
- Disruption of supplies of fuel, purchased power, or other critical items or services, which may result from, among other things, economic conditions, weather conditions, physical or cyber attacks, political developments, international trade restrictions or tariffs, legal actions, mine closures or reduced mine production, increases in fuel exports, environmental regulations affecting TVA's suppliers, transportation or delivery constraints, shortages of raw materials, supply chain difficulties, labor shortages, force majeure events, forced outages, intentional defaults, strikes, inflation, or similar events and which may, among other things, hinder TVA's ability to operate its assets, complete projects on time and on budget, and meet its contractual obligations to deliver power;
- Global conflicts, terrorist activities, or military actions by the United States ("U.S.") government and its allies;

- Cyber attacks on TVA's assets or the assets of third parties upon which TVA relies, which may become more frequent and sophisticated due to advances in artificial intelligence ("AI");
- The failure of TVA's information technology systems;
- Lower future demand for electricity than TVA currently expects or is financially planning for, which would lead to unexpected revenue constraints that could negatively impact TVA's ability to meet financial obligations, including those associated with financing of projects to meet the anticipated demand;
- The need for significant future contributions associated with TVA's pension plans, other post-retirement benefit plans, or health care plans;
- Limitations on TVA's ability to borrow money, which may result from, among other things, TVA's approaching or substantially reaching the debt ceiling or TVA's losing access to the debt markets, and which may impact TVA's ability to make planned capital investments;
- Downgrades of TVA's credit ratings or the United States' sovereign credit ratings which may negatively impact TVA and the owners of TVA securities;
- Changes in technology, which, among other things, may affect relationships with customers and require TVA to change how it conducts its operations;
- Loss of competitive edge due to TVA's governmental status affecting TVA's ability to keep up with technological changes;
- Changes in the market price of commodities such as purchased power, coal, uranium, natural gas, fuel oil, crude oil, construction materials, reagents, or emission allowances;
- A limitation on the market for TVA Bonds, which may be influenced by the fact that the payment of principal and interest on TVA securities is not guaranteed by the U.S. government;
- Failure to attract or retain an appropriately qualified workforce;
- Changes in the membership of the TVA Board of Directors ("TVA Board") or TVA senior management, which may impact how TVA operates;
- Loss of quorum of the TVA Board, which may limit TVA's ability to adapt to meet changing business conditions;
- Weather conditions, including changing weather patterns, extreme weather conditions, and other events such as flooding, droughts, wildfires, heat waves, and snow or ice storms that may result from climate change, which may hamper TVA's ability to supply power, cause customers' demand for power to exceed TVA's then-present power supply, pose health, safety, or environmental risks, or otherwise negatively impact TVA's operations or financial condition;
- Events affecting the supply or quality of water from the Tennessee River system or Cumberland River system, or elsewhere, which could interfere with TVA's ability to generate power;
- Catastrophic events, such as fires, earthquakes, explosions, solar events, electromagnetic pulses, geomagnetic disturbances, droughts, floods, hurricanes, tornadoes, polar vortexes, icing events, pipeline explosions, or other casualty events, wars, national emergencies, terrorist activities, pandemics, widespread public health crises, geopolitical events, or other destructive or disruptive events;
- Ineffectiveness of TVA's financial control system to control issues and instances of fraud or to prevent or detect errors;
- Inability to use regulatory accounting for certain costs;
- Inability of TVA to implement its business strategy successfully, including due to the increased use in the public of distributed energy resources or energy-efficiency programs;
- Inability of TVA to achieve or maintain its cost reduction goals, which may require TVA to increase rates and/or issue more debt than planned;
- Failure of TVA’s organizational structure to adequately support TVA’s anticipated business needs or enable it to meet the needs of its current or potential customers;
- Inability of TVA to adapt its business model to changes in the utility industry and customer preferences and to remain cost competitive;
- Changes in commodity prices, investment prices, interest rates, currency exchange rates, or inflation rates;
- Reliability or creditworthiness of counterparties including but not limited to customers, suppliers, renewable resource providers, and financial institutions;
- Changes in the U.S. economy and volatility in financial markets;
- Ineffectiveness of TVA’s disclosure controls and procedures or its internal control over financial reporting;
- Changes in customer preferences for energy produced from cleaner generation sources;
- Increases in TVA’s financial liabilities for decommissioning its nuclear facilities and retiring other assets;
- The requirement or decision to make additional contributions to TVA’s Nuclear Decommissioning Trust (“NDT”) or Asset Retirement Trust (“ART”);
- Events or changes involving transmission lines, dams, and other facilities not operated by TVA, including those that affect the reliability of the interstate transmission grid of which TVA’s transmission system is a part and those that increase flows across TVA’s transmission grid;
- Actions taken, or inaction, by the U.S. government relating to the national debt ceiling or automatic spending cuts in government programs;
- Inability to respond quickly enough to current or potential customer demands or needs or to act solely in the interest of ratepayers;
- Addition or loss of customers by TVA or TVA’s local power company customers (“LPCs”);
- Differences between estimates of revenues and expenses and actual revenues earned and expenses incurred;
- Changes in the market price of equity securities, debt securities, or other investments;

- An increase in TVA's cost of capital, which may result from, among other things, changes in the market for Bonds, disruptions in the banking system or financial markets, changes in the credit rating of TVA or the U.S. government, or, potentially, an increased reliance by TVA on alternative financing should TVA approach its debt limit;
- Costs or liabilities that are not anticipated in TVA's financial statements for third-party claims, natural resource damages, environmental cleanup activities, or fines or penalties associated with unexpected events such as failures of a facility or infrastructure;
- Adverse effects from global, national, or regional health or other emergencies;
- Negative impacts on TVA's reputation; or
- Other unforeseeable events.

See also Part I, Item 1A, Risk Factors, and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations in TVA's Annual Report on Form 10-K for the year ended September 30, 2024 (the "Annual Report"), and Part I, Item 2, Management's Discussion and Analysis of Financial Condition and Results of Operations in this Quarterly Report for a discussion of factors that could cause actual results to differ materially from those in any forward-looking statement. New factors emerge from time to time, and it is not possible for TVA to predict all such factors or to assess the extent to which any factor or combination of factors may impact TVA's business or cause results to differ materially from those contained in any forward-looking statement. TVA undertakes no obligation to update any forward-looking statement to reflect developments that occur after the statement is made, except as required by law.

GENERAL INFORMATION

Fiscal Year

References to years (2025, 2024, etc.) in this Quarterly Report are to TVA's fiscal years ending September 30. Years that are preceded by "CY" are references to calendar years.

Notes

References to "Notes" are to the Notes to Consolidated Financial Statements contained in Part I, Item 1, Financial Statements in this Quarterly Report.

Available Information

TVA files annual, quarterly, and current reports with the Securities and Exchange Commission ("SEC") under Section 37 of the Securities Exchange Act of 1934 (the "Exchange Act"). TVA's SEC filings are available to the public at www.tva.com, free of charge, as soon as reasonably practicable after such reports are electronically filed with or furnished to the SEC. Information contained on or accessible through TVA's website shall not be deemed to be incorporated into, or to be a part of, this Quarterly Report or any other report or document that TVA files with the SEC. All TVA SEC reports are available to the public without charge from the website maintained by the SEC at www.sec.gov.

PART I - FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF OPERATIONS (Unaudited)
Three Months Ended December 31
(in millions)

	2024	2023
Operating revenues		
Revenue from sales of electricity	$ 2,876	$ 2,731
Other revenue	44	34
Total operating revenues	2,920	2,765
Operating expenses		
Fuel	505	496
Purchased power	394	359
Operating and maintenance	905	867
Depreciation and amortization	557	521
Tax equivalents	146	133
Total operating expenses	2,507	2,376
Operating income	413	389
Other income, net	17	23
Other net periodic benefit cost	25	23
Interest expense	280	262
Net income	$ 125	$ 127

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS) (Unaudited)
Three Months Ended December 31
(in millions)

	2024	2023
Net income	$ 125	$ 127
Other comprehensive income (loss)		
Net unrealized gain (loss) on cash flow hedges	(19)	20
Net unrealized (gain) loss reclassified to earnings from cash flow hedges	37	(19)
Total other comprehensive income	18	1
Total comprehensive income	$ 143	$ 128

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED BALANCE SHEETS (Unaudited)
(in millions)

ASSETS

	December 31, 2024	September 30, 2024
Current assets		
Cash and cash equivalents	$ 507	$ 502
Restricted cash of variable interest entity	25	—
Accounts receivable, net	1,709	1,801
Inventories, net	1,198	1,155
Regulatory assets	110	191
Other current assets	159	120
Total current assets	3,708	3,769
Property, plant, and equipment		
Completed plant	70,690	70,989
Less accumulated depreciation	(38,220)	(38,793)
Net completed plant	32,470	32,196
Construction in progress	5,430	4,879
Nuclear fuel	1,310	1,261
Finance leases	708	729
Total property, plant, and equipment, net	39,918	39,065
Investment funds	4,919	4,968
Regulatory and other long-term assets		
Regulatory assets	9,287	9,408
Operating lease assets, net of amortization	157	149
Other long-term assets	374	344
Total regulatory and other long-term assets	9,818	9,901
Total assets	$ 58,363	$ 57,703

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED BALANCE SHEETS (Unaudited)
(in millions)

LIABILITIES AND PROPRIETARY CAPITAL

	December 31, 2024	September 30, 2024
Current liabilities		
Accounts payable and accrued liabilities	$ 2,781	$ 2,910
Accrued interest	290	280
Asset retirement obligations	301	283
Regulatory liabilities	186	174
Short-term debt, net	1,357	1,167
Current maturities of power bonds	2,372	1,022
Current maturities of long-term debt of variable interest entities	46	37
Total current liabilities	7,333	5,873
Other liabilities		
Post-retirement and post-employment benefit obligations	2,801	2,887
Asset retirement obligations	10,521	10,523
Finance lease liabilities	689	700
Other long-term liabilities	1,479	1,712
Regulatory liabilities	78	83
Total other liabilities	15,568	15,905
Long-term debt, net		
Long-term power bonds, net	16,485	17,867
Long-term debt of variable interest entities, net	1,675	897
Total long-term debt, net	18,160	18,764
Total liabilities	41,061	40,542
Contingencies and legal proceedings (Note 20)		
Proprietary capital		
Power program appropriation investment	258	258
Power program retained earnings	16,562	16,437
Total power program proprietary capital	16,820	16,695
Nonpower programs appropriation investment, net	516	518
Accumulated other comprehensive loss	(34)	(52)
Total proprietary capital	17,302	17,161
Total liabilities and proprietary capital	$ 58,363	$ 57,703

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF CASH FLOWS (Unaudited)
For the Three Months Ended December 31
(in millions)

	2024	2023
Cash flows from operating activities		
Net income	$ 125	$ 127
Adjustments to reconcile net income to net cash provided by operating activities		
Depreciation and amortization[1]	563	527
Amortization of nuclear fuel cost	75	99
Non-cash retirement benefit expense	36	33
Other regulatory amortization and deferrals	22	46
Changes in current assets and liabilities		
Accounts receivable, net	116	153
Inventories and other current assets, net	(68)	(105)
Accounts payable and accrued liabilities	(234)	(201)
Accrued interest	12	(2)
Pension contributions	(75)	(75)
Settlements of asset retirement obligation	(73)	(88)
Other, net	(49)	(121)
Net cash provided by operating activities	450	393
Cash flows from investing activities		
Construction expenditures	(1,209)	(863)
Nuclear fuel expenditures	(159)	(146)
Purchases of investments	(4)	(1)
Loans and other receivables		
Advances	—	(4)
Repayments	1	2
Other, net	(7)	10
Net cash used in investing activities	(1,378)	(1,002)
Cash flows from financing activities		
Long-term debt		
Issues of variable interest entities	800	—
Redemptions and repurchases of power bonds	(1)	(1)
Short-term debt issues, net	189	610
Payments on leases and leasebacks	(12)	(10)
Financing costs, net	(12)	—
Other, net	(6)	7
Net cash provided by financing activities	958	606
Net change in cash, cash equivalents, and restricted cash	30	(3)
Cash, cash equivalents, and restricted cash at beginning of period	523	521
Cash, cash equivalents, and restricted cash at end of period	$ 553	$ 518

Note
(1) Includes amortization of debt issuance costs and premiums/discounts.

The accompanying notes are an integral part of these consolidated financial statements.

TENNESSEE VALLEY AUTHORITY
CONSOLIDATED STATEMENTS OF CHANGES IN PROPRIETARY CAPITAL (Unaudited)
For the Three Months Ended December 31, 2024 and 2023

	Power Program Appropriation Investment	Power Program Retained Earnings	Nonpower Programs Appropriation Investment, Net	Accumulated Other Comprehensive Income (Loss)	Total
Balance at September 30, 2023	$ 258	$ 15,302	$ 525	$ (29)	$ 16,056
Net income (loss)	—	129	(2)	—	127
Total other comprehensive income	—	—	—	1	1
Return on power program appropriation investment	—	(2)	—	—	(2)
Balance at December 31, 2023	$ 258	$ 15,429	$ 523	$ (28)	$ 16,182
Balance at September 30, 2024	$ 258	$ 16,437	$ 518	$ (52)	$ 17,161
Net income (loss)	—	127	(2)	—	125
Total other comprehensive income	—	—	—	18	18
Return on power program appropriation investment	—	(2)	—	—	(2)
Balance at December 31, 2024	$ 258	$ 16,562	$ 516	$ (34)	$ 17,302

The accompanying notes are an integral part of these consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Unaudited)
(Dollars in millions except where noted)

Note		Page
1	Summary of Significant Accounting Policies	12
2	Impact of New Accounting Standards and Interpretations	14
3	Accounts Receivable, Net	15
4	Inventories, Net	15
5	Other Current Assets	15
6	Plant Closures	15
7	Other Long-Term Assets	16
8	Regulatory Assets and Liabilities	17
9	Variable Interest Entities	18
10	Other Long-Term Liabilities	20
11	Asset Retirement Obligations	21
12	Debt and Other Obligations	22
13	Risk Management Activities and Derivative Transactions	23
14	Fair Value Measurements	28
15	Revenue	34
16	Other Income, Net	36
17	Supplemental Cash Flow Information	37
18	Benefit Plans	37
19	Collaborative Arrangement	37
20	Contingencies and Legal Proceedings	38

1. Summary of Significant Accounting Policies

General

The Tennessee Valley Authority ("TVA") prepares its consolidated interim financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") for consolidated interim financial information. Accordingly, TVA's consolidated interim financial statements do not include all of the information and notes required by GAAP for annual financial statements. As such, they should be read in conjunction with the audited financial statements for the year ended September 30, 2024, and the notes thereto, which are contained in TVA's Annual Report on Form 10-K for the year ended September 30, 2024 (the "Annual Report"). In the opinion of management, all adjustments (consisting of items of a normal recurring nature) considered necessary for fair presentation are included on the consolidated interim financial statements.

Fiscal Year

TVA's fiscal year ends September 30. Years (2025, 2024, etc.) refer to TVA's fiscal years unless they are preceded by "CY," in which case the references are to calendar years.

Basis of Presentation

The accompanying consolidated interim financial statements, which have been prepared in accordance with GAAP, include the accounts of TVA and variable interest entities ("VIEs") of which TVA is the primary beneficiary. See Note 9 — *Variable Interest Entities*. Intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements requires TVA to estimate the effects of various matters that are inherently uncertain as of the date of the consolidated financial statements. Although the consolidated financial statements are prepared in conformity with GAAP, TVA is required to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities, and the amounts of revenues and expenses, reported during the reporting period. Each of these estimates varies in regard to the level of judgment involved and its potential impact on TVA's financial results. Estimates are considered critical either when a different estimate could have reasonably been used, or where changes in the estimate are reasonably likely to occur from period to period, and such use or change would materially impact TVA's financial condition, results of operations, or cash flows.

Cash, Cash Equivalents, and Restricted Cash

Cash includes cash on hand, non-interest bearing cash, and deposit accounts. All highly liquid investments with original maturities of three months or less are considered cash equivalents. Cash and cash equivalents that are restricted, as to withdrawal or use under the terms of certain contractual agreements, are recorded in Other long-term assets on the Consolidated Balance Sheets. Restricted cash and cash equivalents include cash held in trusts that are currently restricted for TVA economic development loans and for certain TVA environmental programs in accordance with agreements related to compliance with certain environmental regulations. In addition, as of December 31, 2024, TVA had restricted cash related to variable interest entities. See Note 9 — *Variable Interest Entities.*

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported on the Consolidated Balance Sheets and Consolidated Statements of Cash Flows:

Cash, Cash Equivalents, and Restricted Cash
(in millions)

	At December 31, 2024	At September 30, 2024
Cash and cash equivalents	$ 507	$ 502
Restricted cash of variable interest entity	25	—
Restricted cash and cash equivalents included in Other long-term assets	21	21
Total cash, cash equivalents, and restricted cash	$ 553	$ 523

Allowance for Uncollectible Accounts

TVA recognizes an allowance that reflects the current estimate for credit losses expected to be incurred over the life of the financial assets based on historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amounts. The appropriateness of the allowance is evaluated at the end of each reporting period.

To determine the allowance for trade receivables, TVA considers historical experience and other currently available information, including events such as customer bankruptcy and/or a customer failing to fulfill payment arrangements by the due date. TVA's corporate credit department also performs an assessment of the financial condition of customers and the credit quality of the receivables. In addition, TVA reviews other reasonable and supportable forecasts to determine if the allowance for uncollectible amounts should be further adjusted in accordance with the accounting guidance for Current Expected Credit Losses.

To determine the allowance for loans receivables, TVA aggregates loans into the appropriate pools based on the existence of similar risk characteristics such as collateral types and internal assessed credit risks. In situations where a loan exhibits unique risk characteristics and is no longer expected to experience similar risks to the rest of its pool, the loan will be evaluated separately. TVA derives an annual loss rate based on historical loss and then adjusts the rate to reflect TVA's consideration of available information on current conditions and reasonable and supportable future forecasts. This information may include economic and business conditions, default trends, and other internal and external factors. For periods beyond the reasonable and supportable forecast period, TVA uses the current calculated long-term average historical loss rate for the remaining life of the loan portfolio.

The allowance for uncollectible accounts was less than $1 million at both December 31, 2024, and September 30, 2024, for trade accounts receivable. Additionally, loans receivable of $94 million and $105 million at December 31, 2024, and September 30, 2024, respectively, are included in Accounts receivable, net and Other long-term assets, for the current and long-term portions, respectively. Loans receivables are reported net of allowances for uncollectible accounts of $2 million at both December 31, 2024, and September 30, 2024.

Pre-Commercial Plant Operations

As part of the process of completing the construction of a generating unit, the electricity produced is used to serve the demands of the electric system. TVA estimates revenues earned during pre-commercial operations at the fair value of the energy delivered based on TVA's hourly incremental dispatch cost. Pre-commercial plant operations began on Paradise combustion turbine ("CT") Units 5-7 in the first quarter of 2024, and the units became operational on December 29, 2023. Estimated revenue of $3 million related to this project was capitalized to offset project costs for the three months ended December 31, 2023. TVA also capitalized related fuel costs for this project of $3 million for the three months ended December 31, 2023. Pre-commercial plant operations began on Johnsonville Aeroderivative CT Units 25-28 in the first quarter of 2025. Estimated revenue of less than $1 million related to this project was capitalized to offset project costs for the three months ended December 31, 2024. TVA also capitalized related fuel costs for this project of less than $1 million for the three months ended December 31, 2024.

Depreciation

TVA accounts for depreciation of its properties using the composite depreciation convention of accounting. Under the composite method, assets with similar economic characteristics are grouped and depreciated as one asset. Depreciation is generally computed on a straight-line basis over the estimated service lives of the various classes of assets. The estimation of asset useful lives requires management judgment, supported by external depreciation studies of historical asset retirement experience. Depreciation rates are determined based on external depreciation studies that are updated approximately every five years, with the latest study implemented during the first quarter of 2022. Depreciation expense was $471 million and $452 million for the three months ended December 31, 2024 and 2023, respectively. See Note 6 — *Plant Closures* for a discussion of the impact of plant closures.

2. Impact of New Accounting Standards and Interpretations

The following accounting standards or rules have been issued but as of December 31, 2024, were not effective and have not been adopted by TVA:

Improvements to Reportable Segment Disclosures	
Description	This guidance improves reportable segment disclosure requirements, primarily through enhanced disclosures about significant segment expenses. The amendment requires a public entity to disclose, on an annual and interim basis, significant segment expenses that are regularly provided to the chief operating decision maker and included within each reported measure of segment profit and loss. It also requires a public entity that has a single reportable segment to provide all of the disclosures required by the amendment and all existing segment disclosures. The amendment is effective for public entities for fiscal years beginning after December 15, 2023, and interim periods in fiscal years beginning after December 15, 2024. Upon adoption, a public entity should apply the amendments retrospectively to all prior periods presented in the financial statements.
Effective Date for TVA	Annual disclosures to be adopted for the fiscal year ending September 30, 2025 and interim period disclosures to be adopted beginning October 1, 2025.
Effect on the Financial Statements or Other Significant Matters	The adoption of this standard will result in TVA including the additional required disclosures, and TVA does not expect an impact on its financial condition, results of operations, or cash flows.

Enhancement and Standardization of Climate-Related Disclosures for Investors	
Description	In March 2024, the SEC adopted its climate-related final rule (SEC Release No. 34-99678, The Enhancement and Standardization of Climate-Related Disclosures for Investors), and in April 2024, the SEC voluntarily stayed the new rule as a result of pending legal challenges. The new rule, if implemented as adopted, will require registrants to provide certain climate-related information in their annual reports and registration statements and will also require the dollar impact of severe weather events and other natural conditions, as well as amounts related to carbon offsets and renewable energy credits or certificates, to be disclosed in the audited financial statements in certain circumstances. The disclosure requirements are currently expected to begin phasing in for fiscal years beginning on or after January 1, 2027 for non-accelerated filers.
Effective Date for TVA	Fiscal year beginning October 1, 2027.
Effect on the Financial Statements or Other Significant Matters	TVA is currently evaluating the impact of the rule on its disclosures.

Disaggregation of Income Statement Expenses	
Description	This guidance improves the disclosures about a public entity's expenses in the notes to financial statements and requires disclosure of specified information about certain costs and expenses. The amendment requires a public entity to disclose, on an annual and interim basis, purchases of inventory, employee compensation, depreciation, intangible asset amortization, and depletion for each income statement line item that contains those expenses. Specified expenses, gains, or losses that are already disclosed under existing US GAAP are required to be included in the disaggregated income statement expense line item disclosures, and any relevant remaining amounts need to be described qualitatively. Separate disclosures of total selling expenses and an entity’s definition of those expenses are also required. The amendment is effective for public entities for fiscal years beginning after December 15, 2026, and interim periods within fiscal years beginning after December 15, 2027. Upon adoption, a public entity can apply the amendments prospectively or apply them retrospectively to all prior periods presented in the financial statements.
Effective Date for TVA	Fiscal year beginning October 1, 2027, and interim periods beginning October 1, 2028.
Effect on the Financial Statements or Other Significant Matters	The adoption of this standard will result in TVA including the additional required disclosures, and TVA does not expect an impact on its financial condition, results of operations, or cash flows.

3. Accounts Receivable, Net

Accounts receivable primarily consist of amounts due from customers for power sales. The table below summarizes the types and amounts of TVA's accounts receivable:

Accounts Receivable, Net
(in millions)

	At December 31, 2024	At September 30, 2024
Power receivables	$ 1,569	$ 1,683
Other receivables	140	118
Accounts receivable, net[1]	$ 1,709	$ 1,801

Note
(1) Allowance for uncollectible accounts was less than $1 million at both December 31, 2024, and September 30, 2024, and therefore is not represented in the table above.

4. Inventories, Net

The table below summarizes the types and amounts of TVA's inventories:

Inventories, Net
(in millions)

	At December 31, 2024	At September 30, 2024
Materials and supplies inventory	$ 954	$ 931
Fuel inventory	310	286
Renewable energy certificates/emissions allowance inventory, net	10	11
Allowance for inventory obsolescence	(76)	(73)
Inventories, net	$ 1,198	$ 1,155

5. Other Current Assets

Other current assets consisted of the following:

Other Current Assets
(in millions)

	At December 31, 2024	At September 30, 2024
Prepaid software maintenance	$ 43	$ 22
Inventory work-in-progress	42	41
Prepaid insurance	23	19
Commodity contract derivative assets	17	5
Current portion of prepaid long-term service agreements	13	7
Prepaid cloud assets	8	13
Other	13	13
Other current assets	$ 159	$ 120

Commodity Contract Derivative Assets. See Note 13 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and *— Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

6. Plant Closures

Background

TVA must continuously evaluate all generating assets to ensure an optimal energy portfolio that provides safe, clean, and reliable power while maintaining flexibility and fiscal responsibility to the people of the Tennessee Valley. In January 2023, TVA issued its Record of Decision to retire the two coal-fired units at Cumberland Fossil Plant ("Cumberland") by the end of CY 2026 and CY 2028. In April 2024, TVA issued its Record of Decision to retire the nine coal-fired units at Kingston Fossil Plant ("Kingston") by CY 2027. In addition, TVA is evaluating the impact of retiring the balance of the coal-fired fleet by 2035, and that evaluation includes environmental reviews, public input, and TVA Board of Directors ("TVA Board") approval.

Financial Impact

TVA's policy is to adjust depreciation rates to reflect the most current assumptions, ensuring units will be fully depreciated by the applicable retirement dates. TVA's decision to retire the two units at Cumberland is estimated to result in approximately $16 million of additional depreciation quarterly, which does not include any potential impact from additions or retirements to net completed plant. The cumulative impact approximates $128 million of additional depreciation since January 2023, related to this decision. In addition, TVA's decision to retire the nine units at Kingston is estimated to result in approximately $9 million of additional depreciation quarterly, which does not include any potential impact from additions or retirements to net completed plant. The cumulative impact approximates $27 million of additional depreciation since April 2024, related to this decision.

7. Other Long-Term Assets

The table below summarizes the types and amounts of TVA's other long-term assets:

Other Long-Term Assets
(in millions)

	At December 31, 2024	At September 30, 2024
Loans and other long-term receivables, net	$ 85	$ 84
Cloud assets	56	35
Prepaid capital assets	55	29
Prepaid long-term service agreements	54	62
EnergyRight® receivables, net	44	44
Commodity contract derivative assets	1	2
Other	79	88
Total other long-term assets	$ 374	$ 344

Loans and Other Long-Term Receivables. At December 31, 2024, and September 30, 2024, the carrying amount of the loans receivable, net of discount, reported in Accounts receivable, net was $9 million and $21 million, respectively. Loans receivables are reported net of allowances for uncollectible accounts. See Note 1 — *Summary of Significant Accounting Policies — Allowance for Uncollectible Accounts*.

The allowance components, which consist of a collective allowance and specific loans allowance, are based on the risk characteristics of TVA's loans. Loans that share similar risk characteristics are evaluated on a collective basis in measuring credit losses, while loans that do not share similar risk characteristics with other loans are evaluated on an individual basis.

Allowance Components
(in millions)

	At December 31, 2024	At September 30, 2024
EnergyRight® loan reserve	$ 1	$ 1
Economic development loan specific loan reserve	1	1
Total allowance for loan losses	$ 2	$ 2

Cloud Assets. At December 31, 2024, and September 30, 2024, the carrying amount of the cloud assets reported in Other current assets was $8 million and $13 million, respectively.

Prepaid Long-Term Service Agreements. At December 31, 2024, and September 30, 2024, prepayments of $13 million and $7 million, respectively, were recorded in Other current assets.

EnergyRight® Receivables. In association with the EnergyRight® program, TVA's local power company customers ("LPCs") offer financing to end-use customers for the purchase of energy-efficient equipment. Depending on the nature of the energy-efficiency project, loans may have a maximum term of five years or 10 years. TVA purchases the resulting loans receivable from its LPCs. The loans receivable are then transferred to a third-party bank with which TVA has agreed to repay in full any loans receivable that have been in default for 180 days or more or that TVA has determined are uncollectible. Given this continuing involvement, TVA accounts for the transfer of the loans receivable as secured borrowings. The current and long-term portions of the loans receivable are reported in Accounts receivable, net and Other long-term assets, respectively, on TVA's Consolidated Balance Sheets. At both December 31, 2024, and September 30, 2024, the carrying amount of the loans receivable, net of discount, reported in Accounts receivable, net was $12 million. See Note 10 — *Other Long-Term Liabilities* for information regarding the associated financing obligation.

Commodity Contract Derivative Assets. See Note 13 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

8. Regulatory Assets and Liabilities

TVA records certain assets and liabilities that result from the regulated ratemaking process that would not be recorded under GAAP for non-regulated entities. As such, certain items that would generally be reported in earnings or that would impact the Consolidated Statements of Operations are recorded as regulatory assets or regulatory liabilities. Regulatory assets generally represent incurred costs that have been deferred because such costs are probable of future recovery in customer rates. Regulatory liabilities generally represent obligations to make refunds to customers for previous collections for costs that are not likely to be incurred or deferral of gains that will be credited to customers in future periods. Components of regulatory assets and regulatory liabilities are summarized in the table below.

Regulatory Assets and Liabilities
(in millions)

	At December 31, 2024	At September 30, 2024
Current regulatory assets		
Unrealized losses on commodity derivatives	$ 55	$ 102
Unrealized losses on interest rate derivatives	46	54
Fuel cost adjustment receivable	9	35
Total current regulatory assets	110	191
Non-current regulatory assets		
Non-nuclear decommissioning costs	6,202	6,187
Retirement benefit plans deferred costs	1,959	1,979
Nuclear decommissioning costs	440	362
Unrealized losses on interest rate derivatives	282	447
Environmental compliance and remediation costs	215	215
Unrealized losses on commodity derivatives	32	64
Other non-current regulatory assets	157	154
Total non-current regulatory assets	9,287	9,408
Total regulatory assets	$ 9,397	$ 9,599
Current regulatory liabilities		
Fuel cost adjustment tax equivalents	$ 169	$ 169
Unrealized gains on commodity derivatives	17	5
Total current regulatory liabilities	186	174
Non-current regulatory liabilities		
Retirement benefit plans deferred credits	77	81
Unrealized gains on commodity derivatives	1	2
Total non-current regulatory liabilities	78	83
Total regulatory liabilities	$ 264	$ 257

9. Variable Interest Entities

A variable interest entity ("VIE") is an entity that either (i) has insufficient equity to permit the entity to finance its activities without additional subordinated financial support or (ii) has equity investors who lack the characteristics of owning a controlling financial interest. When TVA determines that it has a variable interest in a VIE, a qualitative evaluation is performed to assess which interest holders have the power to direct the activities that most significantly impact the economic performance of the entity and have the obligation to absorb losses or receive benefits that could be significant to the entity. The evaluation considers the purpose and design of the business, the risks that the business was designed to create and pass along to other entities, the activities of the business that can be directed and which party can direct them, and the expected relative impact of those activities on the economic performance of the business through its life. TVA has the power to direct the activities of an entity when it has the ability to make key operating and financing decisions, including, but not limited to, capital investment and the issuance of debt. Based on the evaluation of these criteria, TVA has determined it is the primary beneficiary of certain entities and as such is required to account for the VIEs on a consolidated basis.

John Sevier VIEs

In 2012, TVA entered into a $1.0 billion construction management agreement and lease financing arrangement with John Sevier Combined Cycle Generation LLC ("JSCCG") for the completion and lease by TVA of the John Sevier Combined Cycle Facility ("John Sevier CCF"). JSCCG is a special single-purpose limited liability company formed in January 2012 to finance the John Sevier CCF through a $900 million secured note issuance (the "JSCCG notes") and the issuance of $100 million of membership interests subject to mandatory redemption. The membership interests were purchased by John Sevier Holdco LLC ("Holdco"). Holdco is a special single-purpose entity, also formed in January 2012, established to acquire and hold the membership interests in JSCCG. A non-controlling interest in Holdco is held by a third party through nominal membership interests, to which none of the income, expenses, and cash flows are allocated.

The membership interests held by Holdco in JSCCG were purchased with proceeds from the issuance of $100 million of secured notes (the "Holdco notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each January 15 and July 15, with a final payment due in January 2042. The payment dates for the mandatorily redeemable membership interests are the same as those of the Holdco notes. The sale of the JSCCG notes, the membership interests in JSCCG, and the Holdco notes closed in January 2012. The JSCCG notes are secured by TVA's lease payments, and the Holdco notes are secured by Holdco's investment in, and amounts receivable from, JSCCG. TVA's lease payments to JSCCG are equal to and payable on the same dates as JSCCG's and Holdco's semi-annual debt service payments. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by JSCCG and Holdco. Certain agreements related to this transaction contain default and acceleration provisions.

Due to its participation in the design, business activity, and credit and financial support of JSCCG and Holdco, TVA has determined that it has a variable interest in both of these entities. Based on its analysis, TVA has concluded that it is the primary beneficiary of JSCCG and Holdco and, as such, is required to account for the VIEs on a consolidated basis. Holdco's membership interests in JSCCG are eliminated in consolidation.

Southaven VIE

In 2013, TVA entered into a $400 million lease financing arrangement with Southaven Combined Cycle Generation LLC ("SCCG") for the lease by TVA of the Southaven Combined Cycle Facility ("Southaven CCF"). SCCG is a special single-purpose limited liability company formed in June 2013 to finance the Southaven CCF through a $360 million secured notes issuance (the "SCCG notes") and the issuance of $40 million of membership interests subject to mandatory redemption. The membership interests were purchased by Southaven Holdco LLC ("SHLLC"). SHLLC is a special single-purpose entity, also formed in June 2013, established to acquire and hold the membership interests in SCCG. A non-controlling interest in SHLLC is held by a third party through nominal membership interests, to which none of the income, expenses, and cash flows of SHLLC are allocated.

The membership interests held by SHLLC were purchased with proceeds from the issuance of $40 million of secured notes (the "SHLLC notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each February 15 and August 15, with a final payment due on August 15, 2033. The payment dates for the mandatorily redeemable membership interests are the same as those of the SHLLC notes, and the payment amounts are sufficient to provide returns on, as well as returns of, capital until the investment has been repaid to SHLLC in full. The rate of return on investment to SHLLC is seven percent, which is reflected as interest expense in the Consolidated Statements of Operations. SHLLC is required to pay a pre-determined portion of the return on investment to Seven States Southaven, LLC on each lease payment date as agreed in SHLLC's formation documents (the "Seven States Return"). The current and long-term portions of the Membership interests of VIE subject to mandatory redemption are included in Accounts payable and accrued liabilities and Other long-term liabilities, respectively.

The payment dates for the mandatorily redeemable membership interests are the same as those of the SHLLC notes. The SCCG notes are secured by TVA's lease payments, and the SHLLC notes are secured by SHLLC's investment in, and amounts receivable from, SCCG. TVA's lease payments to SCCG are payable on the same dates as SCCG's and SHLLC's semi-annual debt service payments and are equal to the sum of (i) the amount of SCCG's semi-annual debt service payments,

(ii) the amount of SHLLC's semi-annual debt service payments, and (iii) the amount of the Seven States Return. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by SCCG and SHLLC. Certain agreements related to this transaction contain default and acceleration provisions.

In the event that TVA were to choose to exercise an early buy out feature of the Southaven facility lease, in part or in whole, TVA must pay to SCCG amounts sufficient for SCCG to repay or partially repay on a pro rata basis the membership interests held by SHLLC, including any outstanding investment amount plus accrued but unpaid return. TVA also has the right, at any time and without any early redemption of the other portions of the Southaven facility lease payments due to SCCG, to fully repay SHLLC's investment, upon which repayment SHLLC will transfer the membership interests to a designee of TVA.

TVA participated in the design, business activity, and financial support of SCCG and has determined that it has a direct variable interest in SCCG resulting from risk associated with the value of the Southaven CCF at the end of the lease term. Based on its analysis, TVA has determined that it is the primary beneficiary of SCCG and, as such, is required to account for the VIE on a consolidated basis.

Johnsonville VIE

In October 2024, TVA entered into an $800 million construction management agreement and lease financing arrangement with Johnsonville Aeroderivative Combustion Turbine Generation LLC ("JACTG") for the completion and lease by TVA of the Johnsonville Aeroderivative Combustion Turbine Facility ("Johnsonville Facility"). JACTG is a special single-purpose limited liability company formed in September 2024 to finance the Johnsonville Facility through a $720 million secured note issuance (the "JACTG notes") and the issuance of $80 million of membership interests subject to mandatory redemption. The membership interests were purchased by Johnsonville Holdco LLC ("JHLLC"). JHLLC is a special single-purpose entity, also formed in September 2024, established to acquire and hold the membership interests in JACTG. A non-controlling interest in JHLLC is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows are allocated.

The membership interests held by JHLLC in JACTG were purchased with proceeds from the issuance of $80 million of secured notes (the "JHLLC notes") and are subject to mandatory redemption pursuant to a schedule of amortizing, semi-annual payments due each April 1 and October 1, with a final payment due in October 2054. The payment dates for the mandatorily redeemable membership interests are the same as those of the JHLLC notes. The sale of the JACTG notes, the membership interests in JACTG, and the JHLLC notes closed in October 2024. The JACTG notes are secured by TVA's lease payments, and the JHLLC notes are secured by JHLLC's investment in, and amounts receivable from, JACTG. TVA's lease payments to JACTG are equal to and payable on the same dates as JACTG's and JHLLC's semi-annual debt service payments. In addition to the lease payments, TVA pays administrative and miscellaneous expenses incurred by JACTG and JHLLC. Certain agreements related to this transaction contain default and acceleration provisions.

Due to its participation in the design, business activity, and credit and financial support of JACTG and JHLLC, TVA has determined that it has a variable interest in both of these entities. Based on its analysis, TVA has concluded that it is the primary beneficiary of JACTG and JHLLC and, as such, is required to account for the VIEs on a consolidated basis. JHLLC's membership interests in JACTG are eliminated in consolidation.

Approximately $775 million of the proceeds from the secured notes issuances was paid to TVA in accordance with the terms of the head lease and the construction management agreement. JACTG deposited approximately $25 million with a lease indenture trustee to fund the payments due on April 1, 2025, in connection with the JACTG notes and JHLLC's membership interests in JACTG. The deposit is reflected as Restricted cash of variable interest entity on the Consolidated Balance Sheets. TVA intends to use the proceeds from the transaction to meet its requirements under the Tennessee Valley Authority Act of 1933, as amended ("TVA Act").

Impact on Consolidated Financial Statements

The financial statement items attributable to carrying amounts and classifications of JSCCG, Holdco, SCCG, JACTG, and JHLLC at December 31, 2024, and September 30, 2024, as reflected on the Consolidated Balance Sheets, are as follows:

Summary of Impact of VIEs on Consolidated Balance Sheets
(in millions)

	At December 31, 2024	At September 30, 2024
Current assets		
Restricted cash of variable interest entity	$ 25	$ —
Total assets	$ 25	$ —
Current liabilities		
Accrued interest	$ 30	$ 9
Accounts payable and accrued liabilities	1	1
Current maturities of long-term debt of variable interest entities	46	37
Total current liabilities	77	47
Other liabilities		
Other long-term liabilities	16	16
Long-term debt, net		
Long-term debt of variable interest entities, net	1,675	897
Total liabilities	$ 1,768	$ 960

Interest expense of $22 million and $12 million for the three months ended December 31, 2024 and 2023, respectively, is included in the Consolidated Statements of Operations related to debt of VIEs and membership interests of VIEs subject to mandatory redemption.

Creditors of the VIEs do not have any recourse to the general credit of TVA. TVA does not have any obligations to provide financial support to the VIEs other than as prescribed in the terms of the agreements related to these transactions.

10. Other Long-Term Liabilities

Other long-term liabilities consist primarily of liabilities related to certain derivative agreements as well as liabilities related to operating leases. The table below summarizes the types and amounts of Other long-term liabilities:

Other Long-Term Liabilities
(in millions)

	At December 31, 2024	At September 30, 2024
Interest rate swap liabilities	$ 589	$ 792
Environmental compliance and remediation costs	210	212
Long-term project cost accruals	160	140
Currency swap liabilities	127	109
Operating lease liabilities	93	88
EnergyRight® financing obligation	52	52
Long-term deferred revenue	49	48
Long-term deferred compensation	37	50
Commodity contract derivative liabilities	32	64
Advances for construction	32	55
Other	98	102
Total other long-term liabilities	$ 1,479	$ 1,712

Interest Rate Swap Liabilities. See Note 13 — *Risk Management Activities and Derivative Transactions — Overview of Accounting Treatment* and *Derivatives Not Receiving Hedge Accounting Treatment — Interest Rate Derivatives* for information regarding the interest rate swap liabilities.

Environmental Compliance and Remediation Costs. At December 31, 2024, and September 30, 2024, the current amount of the environmental compliance and remediation costs reported in Accounts payable and accrued liabilities was $5 million and $3 million, respectively.

Long-Term Project Cost Accruals. At December 31, 2024, and September 30, 2024, the current amount of the long-term project cost accruals reported in Accounts payable and accrued liabilities was $252 million and $124 million, respectively.

Currency Swap Liabilities. See Note 13 — *Risk Management Activities and Derivative Transactions — Overview of Accounting Treatment* and *Cash Flow Hedging Strategy for Currency Swaps* for more information regarding the currency swap liabilities.

Operating Lease Liabilities. At December 31, 2024, and September 30, 2024, the current portion of TVA's operating leases reported in Accounts payable and accrued liabilities was $69 million and $63 million, respectively.

EnergyRight® Financing Obligation. At both December 31, 2024, and September 30, 2024, the carrying amount of the financing obligation reported in Accounts payable and accrued liabilities was $13 million. See Note 7 — *Other Long-Term Assets* for information regarding the associated loans receivable.

Long-Term Deferred Revenue. At December 31, 2024, and September 30, 2024, the current amount of deferred revenue recorded in Accounts payable and accrued liabilities was $27 million and $28 million, respectively.

Long-Term Deferred Compensation. At December 31, 2024, and September 30, 2024, the current amount of deferred compensation recorded in Accounts payable and accrued liabilities was $33 million and $74 million, respectively.

Commodity Contract Derivative Liabilities. See Note 13 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP* for a discussion of TVA's commodity contract derivatives.

Advances for Construction. At December 31, 2024, and September 30, 2024, the current amount of advances for construction recorded in Accounts payable and accrued liabilities was $85 million and $60 million, respectively.

11. Asset Retirement Obligations

During the three months ended December 31, 2024, TVA's total asset retirement obligations ("ARO") liability increased $16 million as a result of increases from periodic accretion, partially offset by revisions in estimate to non-nuclear asset AROs and settlements related to retirement projects that were conducted during the period. The nuclear and non-nuclear accretion amounts were deferred as regulatory assets. During the three months ended December 31, 2024, $55 million of the related regulatory assets were amortized into expense as these amounts were collected in rates. See Note 8 — *Regulatory Assets and Liabilities*. TVA maintains investment trusts to help fund its decommissioning obligations. See Note 14 — *Fair Value Measurements — Investment Funds* and Note 20 — *Contingencies and Legal Proceedings — Contingencies — Decommissioning Costs* for a discussion of the trusts' objectives and the current balances of the trusts.

Asset Retirement Obligation Activity
(in millions)

	Nuclear	Non-nuclear	Total
Balance at September 30, 2024	$ 3,814	$ 6,992	$ 10,806 [1]
Settlements	(7)	(61)	(68)
Revisions in estimate (non-cash)	—	(24)	(24)
Accretion (recorded as regulatory asset)	43	65	108
Balance at December 31, 2024	$ 3,850	$ 6,972	$ 10,822 [1]

Note
(1) Includes $301 million and $283 million at December 31, 2024, and September 30, 2024, respectively, in Current liabilities.

Revisions in non-nuclear estimates decreased the liability balance by $24 million for the three months ended December 31, 2024. The decrease was primarily attributable to a change in closure liabilities of $34 million at Paradise Fossil Plant based on scope changes, new vendor bids, and updated cost estimates for activities associated with final closure. The decrease was partially offset by increased revisions in estimates of $16 million related to the final legacy coal combustion residual rule ("Legacy CCR Rule").

12. Debt and Other Obligations

Debt Outstanding

Total debt outstanding at December 31, 2024, and September 30, 2024, consisted of the following:

Debt Outstanding
(in millions)

	At December 31, 2024	At September 30, 2024
Short-term debt		
Short-term debt, net of discounts	$ 1,357	$ 1,167
Current maturities of power bonds issued at par	2,372	1,022
Current maturities of long-term debt of VIEs issued at par	46	37
Total current debt outstanding, net	3,775	2,226
Long-term debt		
Long-term power bonds[1]	16,610	17,995
Long-term debt of VIEs, net	1,675	897
Unamortized discounts, premiums, issue costs, and other	(125)	(128)
Total long-term debt, net	18,160	18,764
Total debt outstanding	$ 21,935	$ 20,990

Note
(1) Includes total net exchange gain from currency transactions of $96 million and $62 million at December 31, 2024, and September 30, 2024, respectively.

Debt Securities Activity

The table below summarizes the long-term debt securities activity for the period from October 1, 2024, to December 31, 2024:

Debt Securities Activity

	Date	Amount (in millions)
Issues		
Debt of variable interest entities	October 2024	$ 800
Total		$ 800
Redemptions/Maturities[1]		
2009 Series B	December 2024	$ 1
Total redemptions/maturities of debt		$ 1

Note
(1) All redemptions were at 100 percent of par.

Credit Facility Agreements

TVA has funding available under four long-term revolving credit facilities totaling $2.7 billion. See the table below for additional information on the four long-term revolving credit facilities. The interest rate on any borrowing under these facilities varies based on market factors and the rating of TVA's senior unsecured, long-term, non-credit-enhanced debt. TVA is required to pay an unused facility fee on the portion of the total $2.7 billion that TVA has not borrowed or committed under letters of credit. This fee, along with letter of credit fees, may fluctuate depending on the rating of TVA's senior unsecured, long-term, non-credit-enhanced debt. At December 31, 2024, and September 30, 2024, there were $500 million and $566 million, respectively, of letters of credit outstanding under these facilities, and there were no borrowings outstanding. TVA's letters of credit are primarily posted as collateral under TVA's interest rate swaps. See Note 13 — *Risk Management Activities and Derivative Transactions — Other Derivative Instruments — Collateral.* TVA may also post collateral for TVA's currency swaps, for commodity derivatives under the Financial Hedging Program ("FHP"), or for certain transactions with third parties that require TVA to post letters of credit.

The following table provides additional information regarding TVA's funding available under the four long-term revolving credit facilities:

Summary of Long-Term Credit Facilities
At December 31, 2024
(in millions)

Maturity Date	Facility Limit	Letters of Credit Outstanding	Cash Borrowings	Availability
March 2026	$ 150	$ 38	$ —	$ 112
September 2026	1,000	68	—	932
March 2027	1,000	180	—	820
February 2028	500	214	—	286
Total	$ 2,650	$ 500	$ —	$ 2,150

TVA and the United States ("U.S.") Department of the Treasury ("U.S. Treasury"), pursuant to the TVA Act, have entered into a memorandum of understanding under which the U.S. Treasury provides TVA with a $150 million credit facility. This credit facility was renewed for 2025 with a maturity date of September 30, 2025. Access to this credit facility or other similar financing arrangements with the U.S. Treasury has been available to TVA since the 1960s. TVA can borrow under the U.S. Treasury credit facility only if it cannot issue bonds, notes, or other evidences of indebtedness (collectively, "Bonds") in the market on reasonable terms, and TVA considers the U.S. Treasury credit facility a secondary source of liquidity. The interest rate on any borrowing under this facility is based on the average rate on outstanding marketable obligations of the U.S. with maturities from date of issue of 12 months or less. There were no outstanding borrowings under the facility at December 31, 2024. The availability of this credit facility may be impacted by how the U.S. government addresses the possibility of approaching its debt limit.

13. Risk Management Activities and Derivative Transactions

TVA is exposed to various risks related to commodity prices, investment prices, interest rates, currency exchange rates, and inflation as well as counterparty credit and performance risks. To help manage certain of these risks, TVA has historically entered into various derivative transactions, principally commodity option contracts, forward contracts, swaps, swaptions, futures, and options on futures.

Overview of Accounting Treatment

TVA recognizes certain of its derivative instruments as either assets or liabilities on its Consolidated Balance Sheets at fair value. The accounting for changes in the fair value of these instruments depends on (1) whether TVA uses regulatory accounting to defer the derivative gains and losses, (2) whether the derivative instrument has been designated and qualifies for hedge accounting treatment, and (3) if so, the type of hedge relationship (for example, cash flow hedge).

The following tables summarize the accounting treatment that certain of TVA's financial derivative transactions receive:

Summary of Derivative Instruments That Receive Hedge Accounting Treatment (part 1)
Amount of Mark-to-Market Gain (Loss) Recognized in Accumulated Other Comprehensive Income (Loss)
(in millions)

Derivatives in Cash Flow Hedging Relationship	Objective of Hedge Transaction	Accounting for Derivative Hedging Instrument	Three Months Ended December 31 2024	2023
Currency swaps	To protect against changes in cash flows caused by changes in foreign currency exchange rates (exchange rate risk)	Unrealized gains and losses are recorded in AOCI and reclassified to Interest expense to the extent they are offset by gains and losses on the hedged transaction	$ (19)	$ 20

Summary of Derivative Instruments That Receive Hedge Accounting Treatment (part 2)[(1)]
Amount of Gain (Loss) Reclassified from Accumulated Other Comprehensive Income (Loss) to Interest Expense
(in millions)

Derivatives in Cash Flow Hedging Relationship	Three Months Ended December 31 2024	2023
Currency swaps	$ (37)	$ 19

Note
(1) There were no amounts excluded from effectiveness testing for any of the periods presented. Based on forecasted foreign currency exchange rates, TVA expects to reclassify approximately $11 million of gains from Accumulated other comprehensive income (loss) ("AOCI") to Interest expense within the next 12 months to

offset amounts anticipated to be recorded in Interest expense related to the forecasted exchange loss on the debt.

Summary of Derivative Instruments That Do Not Receive Hedge Accounting Treatment
Amount of Gain (Loss) Recognized in Income on Derivatives[1]
(in millions)

			Three Months Ended December 31	
Derivative Type	**Objective of Derivative**	**Accounting for Derivative Instrument**	**2024**	**2023**
Interest rate swaps	To fix short-term debt variable rate to a fixed rate (interest rate risk)	Mark-to-market gains and losses are recorded as regulatory liabilities and assets, respectively Realized gains and losses are recognized in Interest expense when incurred during the settlement period and are presented in operating cash flow	$ (10)	$ (8)
Commodity derivatives under the FHP	To protect against fluctuations in market prices of purchased commodities (price risk)	Mark-to-market gains and losses are recorded as regulatory liabilities and assets, respectively Realized gains and losses are recognized in Fuel expense or Purchased power expense as the contracts settle to match the delivery period of the underlying commodity[2]	(37)	(54)

Notes
(1) All of TVA's derivative instruments that do not receive hedge accounting treatment have unrealized gains (losses) that would otherwise be recognized in income but instead are deferred as regulatory assets and liabilities. As such, there were no related gains (losses) recognized in income for these unrealized gains (losses) for the three months ended December 31, 2024 and for the three months ended December 31, 2023.
(2) Of the amount recognized for the three months ended December 31, 2024, $30 million and $7 million were reported in Fuel expense and Purchased power expense, respectively, and of the amount recognized for the three months ended December 31, 2023, $44 million and $10 million were reported in Fuel expense and Purchased power expense, respectively.

Fair Values of TVA Derivatives
(in millions)

	At December 31, 2024		At September 30, 2024	
Derivatives That Receive Hedge Accounting Treatment:				
	Balance	**Balance Sheet Presentation**	**Balance**	**Balance Sheet Presentation**
Currency swaps				
£250 million Sterling	$ (64)	Accounts payable and accrued liabilities $(5); Other long-term liabilities $(59)	$ (49)	Accounts payable and accrued liabilities $(4); Other long-term liabilities $(45)
£150 million Sterling	(72)	Accounts payable and accrued liabilities $(4); Other long-term liabilities $(68)	(67)	Accounts payable and accrued liabilities $(3); Other long-term liabilities $(64)
Derivatives That Do Not Receive Hedge Accounting Treatment:				
	Balance	**Balance Sheet Presentation**	**Balance**	**Balance Sheet Presentation**
Interest rate swaps				
$1.0 billion notional	$ (481)	Accounts payable and accrued liabilities $(29); Accrued interest $(7); Other long-term liabilities $(445)	$ (622)	Accounts payable and accrued liabilities $(10); Accrued interest $(26); Other long-term liabilities $(586)
$476 million notional	(154)	Accounts payable and accrued liabilities $(10); Other long-term liabilities $(144)	(218)	Accounts payable and accrued liabilities $(3); Accrued interest $(9); Other long-term liabilities $(206)
Commodity contract derivatives	6	Other current assets $11; Other long-term assets $1; Accounts payable and accrued liabilities $(3); Other long-term liabilities $(3)	2	Other current assets $5; Other long-term assets $2; Accounts payable and accrued liabilities $(3); Other long-term liabilities $(2)
Commodity derivatives under the FHP	(75)	Other current assets $6; Accounts payable and accrued liabilities $(52); Other long-term liabilities $(29)	(161)	Accounts payable and accrued liabilities $(99); Other long-term liabilities $(62)

Cash Flow Hedging Strategy for Currency Swaps

To protect against exchange rate risk related to British pound sterling denominated Bond transactions, TVA entered into foreign currency hedges at the time the Bond transactions occurred. TVA had two currency swaps outstanding at December 31, 2024, with total currency exposure of £400 million and expiration dates in 2032 and 2043.

When the dollar strengthens against the British pound sterling, the exchange gain on the Bond liability and related accrued interest is offset by an equal amount of loss on the swap contract that is reclassified out of AOCI. Conversely, the exchange loss on the Bond liability and related accrued interest is offset by an equal amount of gain on the swap contract that is reclassified out of AOCI. All such exchange gains or losses on the Bond liability and related accrued interest are included in Long-term debt, net and Accrued interest, respectively. The offsetting exchange losses or gains on the swap contracts are recognized in AOCI. If any gain (loss) were to be incurred as a result of the early termination of the foreign currency swap contract, the resulting income (expense) would be amortized over the remaining life of the associated Bond as a component of Interest expense. The values of the currency swap liabilities are included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets.

Derivatives Not Receiving Hedge Accounting Treatment

Interest Rate Derivatives. Generally TVA uses interest rate swaps to fix variable short-term debt to a fixed rate, and TVA uses regulatory accounting treatment to defer the mark-to-market ("MtM") gains and losses on its interest rate swaps. The net deferred unrealized gains and losses are classified as regulatory liabilities or assets on TVA's Consolidated Balance Sheets and are included in the ratemaking formula when gains or losses are realized. The values of these derivatives are included in Accounts payable and accrued liabilities, Accrued interest, and Other long-term liabilities on the Consolidated Balance Sheets, and realized gains and losses, if any, are included on TVA's Consolidated Statements of Operations. For the three months ended December 31, 2024 and the three months ended December 31, 2023, the changes in fair market value of the interest rate swaps resulted in the reduction in unrealized losses of $177 million and the increase in unrealized losses of $189 million, respectively. TVA may hold short-term debt balances lower than the notional amount of the interest rate swaps from time to time due to changes in business conditions and other factors. While actual balances vary, TVA generally plans to maintain average balances of short-term debt equal to or in excess of the combined notional amount of the interest rate swaps.

Commodity Derivatives. TVA enters into certain derivative contracts for natural gas that require physical delivery of the contracted quantity of the commodity. TVA may also enter into power purchase agreements ("PPAs") that provide an option to financially settle contracted power deliveries. This option creates an embedded derivative in the hosting PPA. TVA marks to market these contracts and defers the unrealized gains (losses) as regulatory liabilities (assets). At December 31, 2024, TVA's natural gas contract derivatives had terms of up to 11 years.

Commodity Contract Derivatives

	At December 31, 2024			At September 30, 2024		
	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)
Natural gas contract derivatives	51	508 million mmBtu	$ 6	45	321 million mmBtu	$ 2

Commodity Derivatives under the FHP. Currently, TVA is hedging exposure to the price of natural gas under the FHP. There is no Value at Risk aggregate transaction limit under the current FHP structure, but the TVA Board reviews and authorizes the use of tolerances and measures annually. TVA's FHP policy prohibits trading financial instruments under the FHP for speculative purposes. At December 31, 2024, TVA's natural gas swap contracts under the FHP had remaining terms of up to three years.

Commodity Derivatives under Financial Hedging Program[1]

	At December 31, 2024			At September 30, 2024		
	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)	Number of Contracts	Notional Amount	Fair Value (MtM) (in millions)
Natural gas swap contracts	173	280 million mmBtu	$ (75)	126	230 million mmBtu	$ (161)

Note
(1) Fair value amounts presented are based on the net commodity position with the counterparty. Notional amounts disclosed represent the net value of contractual amounts.

TVA defers all FHP unrealized gains (losses) as regulatory liabilities (assets) and records the realized gains or losses in Fuel expense and Purchased power expense to match the delivery period of the underlying commodity.

Offsetting of Derivative Assets and Liabilities

The amounts of TVA's derivative instruments as reported on the Consolidated Balance Sheets are shown in the table below:

Derivative Assets and Liabilities[1]
(in millions)

	At December 31, 2024	At September 30, 2024
Assets		
Commodity contract derivatives	$ 12	$ 7
Commodity derivatives under the FHP[2]	6	—
Total derivatives subject to master netting or similar arrangement	$ 18	$ 7
Liabilities		
Currency swaps	$ 136	$ 116
Interest rate swaps[3]	635	840
Commodity contract derivatives	6	5
Commodity derivatives under the FHP[2]	81	161
Total derivatives subject to master netting or similar arrangement	$ 858	$ 1,122

Notes
(1) Offsetting amounts include counterparty netting of derivative contracts. Except as discussed below, there were no other material offsetting amounts on TVA's Consolidated Balance Sheets at either December 31, 2024, or September 30, 2024.
(2) At December 31, 2024, the gross derivative asset and gross derivative liability were $31 million and $106 million, respectively, with offsetting amounts for each totaling $25 million. At September 30, 2024, the gross derivative asset and gross derivative liability were $4 million and $165 million, respectively, with offsetting amounts for each totaling $4 million.
(3) Letters of credit of $469 million and $535 million were posted as collateral at December 31, 2024, and September 30, 2024, respectively, to partially secure the liability positions of one of the interest rate swaps in accordance with the collateral requirements for this derivative.

Other Derivative Instruments

Investment Fund Derivatives. Investment funds consist primarily of funds held in the Nuclear Decommissioning Trust ("NDT"), the Asset Retirement Trust ("ART"), the Supplemental Executive Retirement Plan ("SERP"), the TVA Deferred Compensation Plan ("DCP"), and the Restoration Plan ("RP"). See Note 14 — *Fair Value Measurements — Investment Funds* for a discussion of the trusts, plans, and types of investments. The NDT and ART may invest in derivative instruments which may include swaps, futures, options, forwards, and other instruments. At December 31, 2024, and September 30, 2024, the NDT held investments in forward contracts to purchase debt securities. The fair values of these derivatives were in net asset positions totaling $9 million and $11 million at December 31, 2024, and September 30, 2024, respectively.

Collateral. TVA's interest rate swaps, currency swaps, and commodity derivatives under the FHP contain contract provisions that require a party to post collateral (in a form such as cash or a letter of credit) when the party's liability balance under the agreement exceeds a certain threshold. At December 31, 2024, the aggregate fair value of all derivative instruments with credit-risk related contingent features that were in a liability position was $858 million. TVA's collateral obligations at December 31, 2024, under these arrangements were $411 million, for which TVA had posted $469 million in letters of credit. These letters of credit reduce the available balance under the related credit facilities. TVA's assessment of the risk of its nonperformance includes a reduction in its exposure under the interest rate swap contracts as a result of this posted collateral.

For all of its derivative instruments with credit-risk related contingent features:

- If TVA remains a majority-owned U.S. government entity but S&P Global Ratings ("S&P") or Moody's Investors Service, Inc. ("Moody's") downgrades TVA's credit rating to AA or Aa2, respectively, TVA's collateral obligations would likely increase by $22 million, and

- If TVA ceases to be majority-owned by the U.S. government, TVA's credit rating would likely be downgraded and TVA would be required to post additional collateral.

Counterparty Risk

TVA may be exposed to certain risks when a counterparty has the potential to fail to meet its obligations in accordance with agreed terms. These risks may be related to credit, operational, or nonperformance matters. To mitigate certain counterparty risk, TVA analyzes the counterparty's financial condition prior to entering into an agreement, establishes credit limits, monitors the appropriateness of those limits, as well as any changes in the creditworthiness of the counterparty, on an

ongoing basis, and when required, employs credit mitigation measures, such as collateral or prepayment arrangements and master purchase and sale agreements.

Customers. TVA is exposed to counterparty credit risk associated with trade accounts receivable from delivered power sales to local power company customers ("LPCs"), and from industries and federal agencies directly served, all located in the Tennessee Valley region. Of the $1.6 billion and $1.7 billion of receivables from power sales outstanding at December 31, 2024, and September 30, 2024, respectively, nearly all of the counterparties were rated investment grade. The majority of the obligations of these customers that are not investment grade are secured by collateral. TVA is also exposed to risk from exchange power arrangements with a small number of investor-owned regional utilities related to either delivered power or the replacement of open positions of longer-term purchased power or fuel agreements. TVA believes its policies and procedures for counterparty performance risk reviews have generally protected TVA against significant exposure related to market and economic conditions. See Note 1 — *Summary of Significant Accounting Policies — Allowance for Uncollectible Accounts,* Note 3 — *Accounts Receivable, Net,* and Note 7 — *Other Long-Term Assets*.

TVA had revenue from two LPCs that collectively accounted for 16 percent of total operating revenues for both the three months ended December 31, 2024 and the three months ended December 31, 2023.

Suppliers. TVA assesses potential supplier performance risks, including procurement of fuel, purchased power, parts, and services. If suppliers are unable to perform under TVA's existing contracts or if TVA is unable to obtain similar services or supplies from other vendors, TVA could experience delays, disruptions, additional costs, or other operational outcomes that may impact generation, maintenance, and capital programs. If certain fuel or purchased power suppliers fail to perform under the terms of their contract with TVA, TVA might lose the money that it paid to the supplier under the contract and have to purchase replacement fuel or power on the spot market, perhaps at a significantly higher price than TVA was entitled to pay under the contract. In addition, TVA might not be able to acquire replacement fuel or power in a timely manner and thus might be unable to satisfy its own obligations to deliver power. TVA continues evaluating potential supplier performance risks and supplier impact but cannot determine or predict the duration of such risks/impacts or the extent to which such risks/impacts could affect TVA's business, operations, and financial results or cause potential business disruptions.

TVA continues to experience impacts due to inflation, supply chain material challenges, and labor availability. This has led to project delays, limited availability, and/or price increases for supplies and labor. TVA has been able to manage these challenges with limited business disruptions at this time; however, should pressures continue long term, TVA could experience more significant disruptions and pressure to further increase power rates.

Natural Gas and Fuel Oil. TVA purchases a significant amount of its natural gas requirements through contracts with a variety of suppliers and purchases substantially all of its fuel oil requirements on the spot market. TVA delivers to its gas fleet under firm and non-firm transportation contracts on multiple interstate natural gas pipelines. TVA contracts for storage capacity that allows for operational flexibility and increased supply during peak gas demand scenarios or supply disruptions. TVA uses contracts of various lengths and terms to meet the projected natural gas needs of its natural gas fleet. TVA also maintains on-site, fuel oil backup to operate at the majority of the CT sites in the event of major supply disruptions. In the event a supplier experiences an incident that limits its ability to fulfill its firm contractual obligations to supply TVA with natural gas, TVA intends to leverage its storage and balancing services and/or replace the volume with a third party to ensure reliability of generation.

Coal. To help ensure a reliable supply of coal, TVA had coal contracts with multiple suppliers as of December 31, 2024. The contracted supply of coal is sourced from several geographic regions of the U.S. and is delivered via barge and rail. As a result of emerging technologies, environmental regulations, industry trends, and natural gas market volatility over the past few years, coal suppliers are facing increased financial pressure, which has led to relatively poor credit ratings and bankruptcies, restructuring, mine closures, or other scenarios. A long-term continued decline in demand for coal could result in more consolidations, additional bankruptcies, restructuring, mine closures, or other scenarios.

Nuclear Fuel. Nuclear fuel is obtained predominantly through long-term uranium concentrate supply contracts, contracted conversion services, contracted enrichment services, or a combination thereof, and contracted fuel fabrication services. The supply markets for uranium concentrates and certain nuclear fuel services are subject to price fluctuations and availability restrictions. Supply market conditions may make procurement contracts subject to credit risk related to the potential nonperformance of counterparties. In the event of nonperformance by these or other suppliers, TVA believes that replacement uranium concentrate and nuclear fuel services can be obtained, although at prices that may be unfavorable when compared to the prices under the current supply agreements.

Purchased Power. TVA acquires power from a variety of power producers through long-term and short-term PPAs as well as through spot market purchases. Because of the reliability risk of purchased power, TVA requires that the PPAs contain certain counterparty performance assurance requirements to help insure counterparty performance during the term of the agreements.

Other Suppliers. Mounting solar supply chain constraints, commodity price increases, and the trade policy investigations into solar panel imports have created challenges for the U.S. solar industry. TVA's existing solar PPA portfolio is

not immune from these challenges. Similar to the experience of the rest of the industry, the majority of TVA's contracted PPAs from previous requests for proposals ("RFPs") that are not yet online have been impacted by project delays and price increases.

Derivative Counterparties. TVA has entered into physical and financial contracts that are classified as derivatives for hedging purposes, and TVA's NDT, ART, and qualified defined benefit plan ("pension plan") have entered into derivative contracts for investment purposes. If a counterparty to one of the physical or financial derivative transactions defaults, TVA might incur costs in connection with entering into a replacement transaction. If a counterparty to the derivative contracts into which the NDT, the ART, or the pension plan have entered for investment purposes defaults, the value of the investment could decline significantly or perhaps become worthless. TVA has concentrations of credit risk from the banking, coal, and gas industries because multiple companies in these industries serve as counterparties to TVA in various derivative transactions. At December 31, 2024, all of TVA's commodity derivatives under the FHP, currency swaps, and interest rate swaps were with counterparties whose Moody's credit ratings were A2 or higher. TVA classifies forward natural gas contracts as derivatives. At December 31, 2024, the forward natural gas contracts were with counterparties whose ratings ranged from B1 to A1.

14. Fair Value Measurements

Fair value is determined based on the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the asset or liability's principal market, or in the absence of a principal market, the most advantageous market for the asset or liability in an orderly transaction between market participants. TVA uses market or observable inputs as the preferred source of values, followed by assumptions based on hypothetical transactions in the absence of market inputs.

Valuation Techniques

The measurement of fair value results in classification into a hierarchy by the inputs used to determine the fair value as follows:

Level 1	—	Unadjusted quoted prices in active markets accessible by the reporting entity for identical assets or liabilities. Active markets are those in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing.
Level 2	—	Pricing inputs other than quoted market prices included in Level 1 that are based on observable market data and that are directly or indirectly observable for substantially the full term of the asset or liability. These include quoted market prices for similar assets or liabilities, quoted market prices for identical or similar assets in markets that are not active, adjusted quoted market prices, inputs from observable data such as interest rate and yield curves, volatilities and default rates observable at commonly quoted intervals, and inputs derived from observable market data by correlation or other means.
Level 3	—	Pricing inputs that are unobservable, or less observable, from objective sources. Unobservable inputs are only to be used to the extent observable inputs are not available. These inputs maintain the concept of an exit price from the perspective of a market participant and should reflect assumptions of other market participants. An entity should consider all market participant assumptions that are available without unreasonable cost and effort. These are given the lowest priority and are generally used in internally developed methodologies to generate management's best estimate of the fair value when no observable market data is available.

A financial instrument's level within the fair value hierarchy (where Level 1 is the highest and Level 3 is the lowest) is based on the lowest level of input significant to the fair value measurement.

The following sections describe the valuation methodologies TVA uses to measure different financial instruments at fair value. Except for gains and losses on SERP, DCP, and RP assets, all changes in fair value of these assets and liabilities have been recorded as changes in regulatory assets, regulatory liabilities, or AOCI on TVA's Consolidated Balance Sheets and Consolidated Statements of Comprehensive Income (Loss). Except for gains and losses on SERP and DCP assets, there has been no impact to the Consolidated Statements of Operations or the Consolidated Statements of Cash Flows related to these fair value measurements.

Investment Funds

At December 31, 2024, Investment funds were comprised of $4.9 billion of equity securities and debt securities classified as trading measured at fair value. Equity and trading debt securities are held in the NDT, ART, SERP, DCP, and RP. The NDT holds funds for the ultimate decommissioning of TVA's nuclear power plants. The ART holds funds primarily for the costs related to the future closure and retirement of TVA's other long-lived assets. The balances in the NDT and ART were $3.3 billion and $1.5 billion, respectively, at December 31, 2024.

TVA established a SERP to provide benefits to selected employees of TVA which are comparable to those provided by competing organizations. The DCP is designed to provide participants with the ability to defer compensation to future periods. The RP is a non-qualified excess 401(k) plan designed to allow certain eligible employees whose contributions to the 401(k) plan are limited by Internal Revenue Service ("IRS") rules to save additional amounts for retirement and receive non-elective and matching employer contributions. The NDT, ART, SERP, DCP, and RP funds are invested in portfolios of securities generally designed to achieve a return in line with overall equity and debt market performance.

The NDT, ART, SERP, DCP, and RP are composed of multiple types of investments and are managed by external institutional investment managers. Most U.S. and international equities, U.S. Treasury inflation-protected securities, and real estate investment trust securities and certain derivative instruments are measured based on quoted exchange prices in active markets and are classified as Level 1 valuations. Fixed-income investments, high-yield fixed-income investments, currencies, and most derivative instruments are non-exchange traded and are classified as Level 2 valuations. These measurements are based on market and income approaches with observable market inputs. Cash equivalents and other short-term investments are highly liquid securities with maturities of less than three months and 12 months, respectively. These consist primarily of discount securities such as repurchase agreements and U.S. Treasury bills. These securities may be priced at cost, which approximates fair value due to the short-term nature of the instruments. These securities are classified as Level 2. Active market pricing may be utilized for U.S. Treasury bills, which are classified as Level 1.

Private equity limited partnerships, private real asset investments, and private credit investments may include holdings of investments in private real estate, venture capital, buyout, mezzanine or subordinated debt, restructuring or distressed debt, and special situations through funds managed by third-party investment managers. These investments generally involve a three-to-four-year period where the investor contributes capital, followed by a period of distribution, typically over several years. The investment period is generally, at a minimum, 10 years or longer. The NDT had unfunded commitments related to private equity limited partnerships of $380 million, private real assets of $129 million, and private credit of $89 million at December 31, 2024. The ART had unfunded commitments related to limited partnerships in private equity of $146 million, private real assets of $68 million, and private credit of $47 million at December 31, 2024. These investments have no redemption or limited redemption options and may also impose restrictions on the NDT's and ART's ability to liquidate their investments. There are no readily available quoted exchange prices for these investments. The fair value of these investments is based on information provided by the investment managers. These investments are valued on a quarterly basis. TVA's private equity limited partnerships, private real asset investments, and private credit investments are valued at net asset values ("NAV") as a practical expedient for fair value. TVA classifies its interest in these types of investments as investments measured at NAV in the fair value hierarchy.

Commingled funds represent investment funds comprising multiple individual financial instruments. The commingled funds held by the NDT, ART, SERP, DCP, and RP consist of either a single class of securities, such as equity, debt, or foreign currency securities, or multiple classes of securities. All underlying positions in these commingled funds are either exchange traded or measured using observable inputs for similar instruments. The fair value of commingled funds is based on NAV per fund share (the unit of account), derived from the prices of the underlying securities in the funds. These commingled funds can be redeemed at the measurement date NAV and are classified as Commingled funds measured at NAV in the fair value hierarchy.

Realized and unrealized gains and losses on equity and trading debt securities are recognized in current earnings and are based on average cost. The gains and losses of the NDT and ART are subsequently reclassified to a regulatory asset or liability account in accordance with TVA's regulatory accounting policy. See Note 1 — *Summary of Significant Accounting Policies* of the Notes to Consolidated Financial Statements in the Annual Report and Note 8 — *Regulatory Assets and Liabilities*. TVA recorded unrealized gains and losses related to its equity and trading debt securities held during each period as follows:

Unrealized Investment Gains (Losses)[1]
(in millions)

		Three Months Ended December 31	
Fund	**Financial Statement Presentation**	**2024**	**2023**
NDT	Regulatory assets[2]	$ (75)	$ 197
ART	Regulatory assets[3]	(20)	89
SERP	Other income, net	(6)	7
DCP	Other income, net	(1)	1

Notes
(1) The unrealized gains for the RP were less than $1 million for both the three months ended December 31, 2024 and December 31, 2023, and therefore were not represented in the table above.
(2) Includes $43 million of unrealized losses and $61 million of unrealized gains related to NDT equity securities (excluding commingled funds) for the three months ended December 31, 2024 and December 31, 2023, respectively.
(3) Includes $11 million of unrealized losses and $18 million of unrealized gains related to ART equity securities (excluding commingled funds) for the three months ended December 31, 2024 and December 31, 2023, respectively.

Currency and Interest Rate Swap Derivatives

See Note 13 — *Risk Management Activities and Derivative Transactions — Cash Flow Hedging Strategy for Currency Swaps* and *Derivatives Not Receiving Hedge Accounting Treatment* for a discussion of the nature, purpose, and contingent features of TVA's currency swaps and interest rate swaps. These swaps are classified as Level 2 valuations and are valued based on income approaches using observable market inputs for similar instruments.

Commodity Contract Derivatives and Commodity Derivatives under the FHP

Commodity Contract Derivatives. Most of these derivative contracts are valued based on market approaches, which utilize short-term and mid-term market-quoted prices from an external industry brokerage service. These contracts are classified as Level 2 valuations.

Commodity Derivatives under the FHP. Swap contracts are valued using a pricing model based on New York Mercantile Exchange inputs and are subject to nonperformance risk outside of the exit price. These contracts are classified as Level 2 valuations.

See Note 13 — *Risk Management Activities and Derivative Transactions — Derivatives Not Receiving Hedge Accounting Treatment — Commodity Derivatives* and — *Commodity Derivatives under the FHP*.

Nonperformance Risk

The assessment of nonperformance risk, which includes credit risk, considers changes in current market conditions, readily available information on nonperformance risk, letters of credit, collateral, other arrangements available, and the nature of master netting arrangements. TVA is a counterparty to currency swaps, interest rate swaps, commodity contracts, and other derivatives which subject TVA to nonperformance risk. Nonperformance risk on the majority of investments and certain exchange-traded instruments held by TVA is incorporated into the exit price that is derived from quoted market data that is used to mark the investment to market.

Nonperformance risk for most of TVA's derivative instruments is an adjustment to the initial asset/liability fair value. TVA adjusts for nonperformance risk, both of TVA (for liabilities) and the counterparty (for assets), by applying credit valuation adjustments ("CVAs"). TVA determines an appropriate CVA for each applicable financial instrument based on the term of the instrument and TVA's or the counterparty's credit rating as obtained from Moody's. For companies that do not have an observable credit rating, TVA uses internal analysis to assign a comparable rating to the counterparty. TVA discounts each financial instrument using the historical default rate (as reported by Moody's for CY 1983 to CY 2023) for companies with a similar credit rating over a time period consistent with the remaining term of the contract. The application of CVAs resulted in a less than $1 million decrease in the fair value of assets and a less than $1 million decrease in the fair value of liabilities at December 31, 2024.

Fair Value Measurements

The following tables set forth by level, within the fair value hierarchy, TVA's financial assets and liabilities that were measured at fair value on a recurring basis at December 31, 2024, and September 30, 2024. Financial assets and liabilities have been classified in their entirety based on the lowest level of input that is significant to the fair value measurement. TVA's assessment of the significance of a particular input to the fair value measurement requires judgment and may affect the determination of the fair value of the assets and liabilities and their classification in the fair value hierarchy levels.

	Fair Value Measurements At December 31, 2024 (in millions)			
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Assets				
Investments				
Equity securities	$ 704	$ —	$ —	$ 704
Government debt securities[1][2]	398	56	—	454
Corporate debt securities[3]	—	378	—	378
Mortgage and asset-backed securities	—	41	—	41
Institutional mutual funds	337	—	—	337
Forward debt securities contracts	—	9	—	9
Cash equivalents and other short-term investments[2][4]	49	215	—	264
Private equity funds measured at net asset value[5]	—	—	—	765
Private real asset funds measured at net asset value[5]	—	—	—	441
Private credit funds measured at net asset value[5]	—	—	—	258
Commingled funds measured at net asset value[5]	—	—	—	1,268
Total investments	1,488	699	—	4,919
Commodity contract derivatives	—	12	—	12
Commodity derivatives under the FHP	—	6	—	6
Total	$ 1,488	$ 717	$ —	$ 4,937

	Quoted Prices in Active Markets for Identical Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Liabilities				
Currency swaps[6]	$ —	$ 136	$ —	$ 136
Interest rate swaps	—	635	—	635
Commodity contract derivatives	—	6	—	6
Commodity derivatives under the FHP	—	81	—	81
Total	$ —	$ 858	$ —	$ 858

Notes
(1) Includes obligations of government-sponsored entities.
(2) There are $398 million of U.S. Treasury securities in Level 1 Government debt securities and $49 million of U.S. Treasury securities in Level 1 Cash equivalents and other short-term investments for a total of $447 million of U.S. Treasury securities within Level 1 of the fair value hierarchy.
(3) Includes both U.S. and foreign debt.
(4) Includes $76 million net payables (interest receivable, dividends receivable, receivables for investments sold, and payables for investments purchased), and $179 million of repurchase agreements in Level 2 Cash equivalents and other short-term investments.
(5) Certain investments that are measured at fair value using the NAV or its equivalent (alternative investments) have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets.
(6) TVA records currency swaps net of cash collateral received from or paid to the counterparty, to the extent such amount is not recorded in Accounts payable and accrued liabilities. See Note 13 — *Risk Management Activities and Derivative Transactions — Offsetting of Derivative Assets and Liabilities*.

	Fair Value Measurements At September 30, 2024 (in millions)			
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Assets				
Investments				
Equity securities	$ 770	$ —	$ —	$ 770
Government debt securities[1][2]	400	57	—	457
Corporate debt securities[3]	—	378	—	378
Mortgage and asset-backed securities	—	43	—	43
Institutional mutual funds	342	—	—	342
Forward debt securities contracts	—	11	—	11
Cash equivalents and other short-term investments[2][4]	95	183	—	278
Private equity funds measured at net asset value[5]	—	—	—	738
Private real asset funds measured at net asset value[5]	—	—	—	432
Private credit funds measured at net asset value[5]	—	—	—	219
Commingled funds measured at net asset value[5]	—	—	—	1,300
Total investments	1,607	672	—	4,968
Commodity contract derivatives	—	7	—	7
Total	$ 1,607	$ 679	$ —	$ 4,975

	Quoted Prices in Active Markets for Identical Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Liabilities				
Currency swaps[6]	$ —	$ 116	$ —	$ 116
Interest rate swaps	—	840	—	840
Commodity contract derivatives	—	5	—	5
Commodity derivatives under the FHP	—	161	—	161
Total	$ —	$ 1,122	$ —	$ 1,122

Notes

(1) Includes obligations of government-sponsored entities.

(2) There are $400 million of U.S. Treasury securities in Level 1 Government debt securities and $95 million of U.S. Treasury securities in Level 1 Cash equivalents and other short-term investments for a total of $495 million of U.S. Treasury securities within Level 1 of the fair value hierarchy.

(3) Includes both U.S. and foreign debt.

(4) Includes $78 million net payables (interest receivable, dividends receivable, receivables for investments sold, and payables for investments purchased), and $174 million of repurchase agreements in Level 2 Cash equivalents and other short-term investments.

(5) Certain investments that are measured at fair value using the NAV or its equivalent (alternative investments) have not been categorized in the fair value hierarchy. The inputs to these fair value measurements include underlying NAVs, discounted cash flow valuations, comparable market valuations, estimated benchmark yields, and adjustments for currency, credit, liquidity, and other risks. The fair value amounts presented in this table are intended to permit reconciliation of the fair value hierarchy to the amounts presented on the Consolidated Balance Sheets.

(6) TVA records currency swaps net of cash collateral received from or paid to the counterparty, to the extent such amount is not recorded in Accounts payable and accrued liabilities. See Note 13 — *Risk Management Activities and Derivative Transactions — Offsetting of Derivative Assets and Liabilities*.

Other Financial Instruments Not Recorded at Fair Value

TVA uses the methods and assumptions described below to estimate the fair value of each significant class of financial instruments. The fair value of the financial instruments held at December 31, 2024, and September 30, 2024, may not be representative of the actual gains or losses that will be recorded when these instruments mature or are called or presented for early redemption. The estimated values of TVA's financial instruments not recorded at fair value at December 31, 2024, and September 30, 2024, were as follows:

Estimated Values of Financial Instruments Not Recorded at Fair Value
(in millions)

		At December 31, 2024		At September 30, 2024	
	Valuation Classification	Carrying Amount	Fair Value	Carrying Amount	Fair Value
EnergyRight® receivables, net (including current portion)	Level 2	$ 56	$ 56	$ 56	$ 56
Loans and other long-term receivables, net (including current portion)	Level 2	94	86	105	99
EnergyRight® financing obligations (including current portion)	Level 2	65	74	66	74
Membership interests of VIEs subject to mandatory redemption (including current portion)	Level 2	17	18	17	19
Long-term outstanding power bonds, net (including current maturities)	Level 2	18,857	18,356	18,889	19,416
Long-term debt of VIEs, net (including current maturities)	Level 2	1,721	1,694	934	966

The carrying values of Cash and cash equivalents, Restricted cash and cash equivalents, Accounts receivable, net, and Short-term debt, net approximate their fair values.

The fair value for loans and other long-term receivables is estimated by determining the present value of future cash flows using a discount rate equal to lending rates for similar loans made to borrowers with similar credit ratings and for similar remaining maturities, where applicable. The fair value of long-term debt and membership interests of VIEs subject to mandatory redemption is estimated by determining the present value of future cash flows using current market rates for similar obligations, giving effect to credit ratings and remaining maturities.

15. Revenue

Revenue from Sales of Electricity

TVA's revenue from contracts with customers is primarily derived from the generation and sale of electricity to its customers and is included in Revenue from sales of electricity on the Consolidated Statements of Operations. Electricity is sold primarily to LPCs for distribution to their end-use customers. In addition, TVA sells electricity to directly served industrial companies, federal agencies, and others.

LPC sales	Approximately 91 percent of TVA's Revenue from sales of electricity for both the three months ended December 31, 2024 and the three months ended December 31, 2023, was from LPCs, which then distribute the power to their customers using their own distribution systems. Power is delivered to each LPC at delivery points within the LPC's service territory. TVA recognizes revenue when the customer takes possession of the power at the delivery point. For power sales, the performance obligation to deliver power is satisfied in a series over time because the sales of electricity over the term of the customer contract are a series of distinct goods that are substantially the same and have the same pattern of transfer to the customer. TVA has no continuing performance obligations subsequent to delivery. Using the output method for revenue recognition provides a faithful depiction of the transfer of electricity as customers obtain control of the power and benefit from its use at delivery. Additionally, TVA has an enforceable right to consideration for energy delivered at any discrete point in time and will recognize revenue at an amount that reflects the consideration to which TVA is entitled for the energy delivered. The amount of revenue is based on contractual prices approved by the TVA Board. Customers are invoiced monthly for power delivered as measured by meters located at the delivery points. The net transaction price is offset by certain credits available to customers that are known at the time of billing. Credits are designed to achieve objectives of the TVA Act and include items such as hydro preference credits for residential customers of LPCs, economic development credits to promote growth in the Tennessee Valley, wholesale bill credits to maintain long-term partnerships with LPCs, and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. Payments are typically due within approximately one month of invoice issuance.
Directly served customers	Directly served customers, including industrial customers, federal agencies, and other customers, take power for their own consumption. Similar to LPCs, power is delivered to a delivery point, at which time the customer takes possession and TVA recognizes revenue. For all power sales, the performance obligation to deliver power is satisfied in a series over time since the sales of electricity over the term of the customer contract are a series of distinct goods that are substantially the same and have the same pattern of transfer to the customer. TVA has no continuing performance obligations subsequent to delivery. Using the output method for revenue recognition provides a faithful depiction of the transfer of electricity as customers obtain control of the power and benefit from its use at delivery. Additionally, TVA has an enforceable right to consideration for energy delivered at any discrete point in time and will recognize revenue at an amount that reflects the consideration to which TVA is entitled for the energy delivered. The amount of revenue is based on contractual prices approved by the TVA Board. Customers are invoiced monthly for power delivered as measured by meters located at the delivery points. The net transaction price is offset by certain credits available to customers that are known at the time of billing. Examples of credits include items such as economic development credits to promote growth in the Tennessee Valley and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. Payments are typically due within approximately one month of invoice issuance.

Other Revenue

Other revenue consists primarily of wheeling and network transmission charges, sales of excess steam that is a by-product of power production, delivery point charges for interconnection points between TVA and the customer, Renewable Energy Certificate sales, and certain other ancillary goods or services.

Disaggregated Revenues

During the three months ended December 31, 2024, revenues generated from TVA's electricity sales were $2.9 billion, and accounted for virtually all of TVA's revenues. TVA's operating revenues by state for the three months ended December 31, 2024 and 2023, are detailed in the table below:

Operating Revenues By State
(in millions)

	Three Months Ended December 31	
	2024	**2023**
Alabama	$ 431	$ 408
Georgia	74	69
Kentucky	182	177
Mississippi	269	255
North Carolina	21	23
Tennessee	1,886	1,789
Virginia	12	11
Subtotal	2,875	2,732
Off-system sales	1	2
Revenue capitalized during pre-commercial plant operations[(1)]	—	(3)
Revenue from sales of electricity	2,876	2,731
Other revenue	44	34
Total operating revenues	$ 2,920	$ 2,765

Note
(1) Represents revenue capitalized during pre-commercial operations at Johnsonville Aeroderivative CT Units 25-28 in the three months ended December 31, 2024 and Paradise CT Units 5-7 in the three months ended December 31, 2023. Revenue capitalized at Johnsonville Aeroderivative was less than $1 million for the three months ended December 31, 2024.

TVA's operating revenues by customer type for the three months ended December 31, 2024 and 2023, are detailed in the table below:

Operating Revenues by Customer Type
(in millions)

	Three Months Ended December 31	
	2024	**2023**
Revenue from sales of electricity		
Local power companies	$ 2,616	$ 2,487
Industries directly served	230	217
Federal agencies and other	30	30
Revenue capitalized during pre-commercial plant operations[(1)]	—	(3)
Revenue from sales of electricity	2,876	2,731
Other revenue	44	34
Total operating revenues	$ 2,920	$ 2,765

Note
(1) Represents revenue capitalized during pre-commercial operations at Johnsonville Aeroderivative CT Units 25-28 in the three months ended December 31, 2024 and Paradise CT Units 5-7 in the three months ended December 31, 2023. Revenue capitalized at Johnsonville Aeroderivative was less than $1 million for the three months ended December 31, 2024.

TVA and LPCs continue to work together to meet the changing needs of consumers around the Tennessee Valley. In 2019, the TVA Board approved a partnership agreement option that better aligns the length of LPC power contracts with TVA's long-term commitments. Under the partnership arrangement, the LPC power contracts automatically renew each year and have a 20-year termination notice. The partnership arrangements can be terminated under certain circumstances, including TVA's failure to limit rate increases to no more than 10 percent during any consecutive five-fiscal-year period, as more specifically described in the agreements. Participating LPCs receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term commitment, which enables TVA to recover its long-term financial commitments over a commensurate period. The total wholesale bill credits to LPCs participating in the Partnership Agreement were $50 million and $47 million for the three months ended December 31, 2024 and 2023, respectively. In 2020, TVA provided participating LPCs a flexibility option, named Generation Flexibility, that allows them to locally generate or purchase up to approximately five percent of their average total

hourly energy sales over a certain time period in order to meet their individual customers' needs. Revised flexibility agreements were made available to LPCs in 2023 which permit projects to be located anywhere in TVA's service area, either connected to the LPC distribution system or TVA's transmission system, and make it easier for LPCs to partner in projects. As of December 31, 2024, 148 LPCs had signed the Partnership Agreement with TVA, and 102 LPCs had signed a Power Supply Flexibility Agreement.

The number of LPCs by contract arrangement, the revenues derived from such arrangements for the three months ended December 31, 2024, and the percentage those revenues comprised of TVA's total operating revenues for the same period, are summarized in the table below:

TVA Local Power Company Contracts
At or for the Three Months Ended December 31, 2024

Contract Arrangements[1]	Number of LPCs	Revenue from Sales of Electricity to LPCs (in millions)	Percentage of Total Operating Revenues
20-year termination notice	148	$ 2,272	77.8 %
5-year termination notice	5	344	11.8 %
Total	153	$ 2,616	89.6 %

Note
(1) Ordinarily, the LPCs and TVA have the same termination notice period; however, in a contract with one of the LPCs with a five-year termination notice, TVA has a 10-year termination notice (which becomes a five-year termination notice if TVA loses its discretionary wholesale rate-setting authority). Certain LPCs have five-year termination notices or a shorter period if any act of Congress, court decision, or regulatory change requires or permits that election.

TVA's two largest LPCs — Memphis Light, Gas and Water Division ("MLGW") and Nashville Electric Service ("NES") — have contracts with a five-year and a 20-year termination notice period, respectively. Sales to MLGW and NES each accounted for eight percent of TVA's total operating revenues for the three months ended December 31, 2024 and for the three months ended December 31, 2023.

Contract Balances

Contract assets represent an entity's right to consideration in exchange for goods and services that the entity has transferred to customers. TVA did not have any material contract assets at December 31, 2024.

Contract liabilities represent an entity's obligations to transfer goods or services to customers for which the entity has received consideration (or an amount of consideration is due) from the customers. These contract liabilities are primarily related to upfront consideration received prior to the satisfaction of the performance obligation. See *Economic Development Incentives* below and Note 10 — *Other Long-Term Liabilities — Long-Term Deferred Revenue*.

Economic Development Incentives. Under certain economic development programs, TVA offers incentives to existing and potential power customers in targeted business sectors that make multi-year commitments to invest in the Tennessee Valley. TVA records those incentives as reductions of revenue. Incentives recorded as a reduction to revenue were $85 million and $73 million for the three months ended December 31, 2024 and 2023, respectively. Incentives that have been approved but have not been paid are recorded in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. At December 31, 2024, and September 30, 2024, the outstanding unpaid incentives were $189 million and $187 million, respectively. Incentives that have been paid out may be subject to claw back if the customer fails to meet certain program requirements.

16. Other Income, Net

Income and expenses not related to TVA's operating activities are summarized in the following table:

Other Income, Net
(in millions)

	Three Months Ended December 31	
	2024	2023
Interest income	$ 10	$ 10
External services	9	4
Gains (loss) on investments	(2)	9
Total other income, net	$ 17	$ 23

17. Supplemental Cash Flow Information

Construction in progress and nuclear fuel expenditures included in Accounts payable and accrued liabilities at December 31, 2024 and 2023, were $1.0 billion and $552 million, respectively, and are excluded from the Consolidated Statements of Cash Flows for both the three months ended December 31, 2024 and the three months ended December 31, 2023, as non-cash investing activities. ARO project accruals included in Accounts payable and accrued liabilities at December 31, 2024 and 2023, were $40 million and $46 million, respectively, and are excluded from the Consolidated Statements of Cash Flows for the three months ended December 31, 2024 and 2023, as non-cash operating activities.

Cash flows from swap contracts that are accounted for as hedges are classified in the same category as the item being hedged or on a basis consistent with the nature of the instrument.

18. Benefit Plans

TVA sponsors a pension plan that covers most of its full-time employees hired before July 1, 2014, a qualified defined contribution plan ("401(k) plan") that covers most of its full-time employees, two unfunded post-retirement health care plans that provide for non-vested contributions toward the cost of eligible retirees' medical coverage, other post-employment benefits, such as workers' compensation, the SERP, and the RP. The pension plan and the 401(k) plan are administered by a separate legal entity, the TVA Retirement System ("TVARS"), which is governed by its own board of directors.

The components of net periodic benefit cost for the three months ended December 31, 2024 and 2023, were as follows:

Components of Net Periodic Benefit Cost[1]
(in millions)

	For the Three Months Ended December 31			
	Pension Benefits		Other Post-Retirement Benefits	
	2024	2023	2024	2023
Service cost	$ 8	$ 7	$ 3	$ 3
Interest cost	131	144	4	5
Expected return on plan assets	(126)	(124)	—	—
Amortization of prior service credit	(22)	(22)	(4)	(4)
Recognized net actuarial loss (gain)	42	25	—	(1)
Total net periodic benefit cost	33	30	3	3

Note
(1) The components of net benefit cost other than the service cost component are included in Other net periodic benefit cost on the Consolidated Statements of Operations.

TVA's minimum required pension plan contribution for 2025 is $300 million. TVA contributes $25 million per month to TVARS and as of December 31, 2024, had contributed $75 million. The remaining $225 million will be contributed by September 30, 2025. For the three months ended December 31, 2024, TVA also contributed $8 million (net of $1 million in rebates) to the other post-retirement plans. TVA expects to contribute $7 million to the SERP in 2025.

19. Collaborative Arrangement

In 2023, TVA, Ontario Power Generation, BWRX TCA sp. z.o.o., and GE Hitachi Nuclear Energy ("GEH") entered into a multi-party collaborative arrangement to advance the global deployment of the GEH BWRX-300 small modular reactor. GEH is responsible for standard design development. Under the agreement, TVA will contribute up to $88 million for design costs incurred by GEH through 2026. At the time feasibility is determined, TVA will have the right to use the design and may receive additional economic benefits.

Payments pursuant to the agreement are recorded as research and development expense, which is reflected as Operating and maintenance expense on TVA's Consolidated Statement of Operations in the period incurred. TVA recorded $7 million and $9 million of expenses related to this agreement for the three months ended December 31, 2024 and the three months ended December 31, 2023, respectively. TVA also had a $6 million letter of credit posted under this arrangement at December 31, 2024.

20. Contingencies and Legal Proceedings

Contingencies

Nuclear Insurance. Section 170 of the Atomic Energy Act, commonly known as the Price-Anderson Act, provides a layered framework of financial protection to compensate for liability claims of members of the public for personal injury and property damages arising from a nuclear incident in the U.S. This financial protection consists of two layers of coverage. The primary level is private insurance underwritten by American Nuclear Insurers and provides public liability insurance coverage of $500 million for each nuclear power plant licensed to operate. If this amount is not sufficient to cover claims arising from a nuclear incident, the second level, Secondary Financial Protection, applies. Within the Secondary Financial Protection level, the licensee of each nuclear reactor has a contingent obligation to pay a retrospective premium, equal to its proportionate share of the loss in excess of the primary level, regardless of proximity to the incident of fault, up to a maximum of approximately $166 million per reactor per incident. With TVA's seven reactors, the maximum total contingent obligation per incident is $1.2 billion. This retrospective premium is payable at a maximum rate currently set at approximately $25 million per year per nuclear incident per reactor. Currently, 95 reactors are participating in the Secondary Financial Protection program.

In the event that a nuclear incident results in public liability claims, the primary level provided by American Nuclear Insurers combined with the Secondary Financial Protection should provide up to $16.3 billion in coverage.

Federal law requires that each Nuclear Regulatory Commission ("NRC") power reactor licensee obtain property insurance from private sources to cover the cost of stabilizing and decontaminating a reactor and its station site after an accident. TVA carries property, decommissioning liability, and decontamination liability insurance from Nuclear Electric Insurance Limited ("NEIL") and European Mutual Association for Nuclear Insurance. The limits available for a loss are up to $2.1 billion for two of TVA's nuclear sites and up to $2.8 billion for the remaining site. Some of this insurance may require the payment of retrospective premiums up to a maximum of approximately $115 million.

TVA purchases accidental outage (business interruption) insurance for TVA's nuclear sites from NEIL. In the event that an accident covered by this policy takes a nuclear unit offline or keeps a nuclear unit offline, NEIL will pay TVA, after a waiting period, an indemnity (a set dollar amount per week) with a maximum indemnity of $490 million per unit. This insurance policy may require the payment of retrospective premiums up to a maximum of approximately $44 million, but only to the extent the retrospective premium is deemed necessary by the NEIL Board of Directors to pay losses unable to be covered by NEIL's surplus.

Decommissioning Costs. TVA recognizes legal obligations associated with the future retirement of certain tangible long-lived assets related primarily to nuclear generating plants, coal-fired generating plants, hydroelectric generating plants/dams, transmission structures, and other property-related assets. See Note 11 — *Asset Retirement Obligations*.

Nuclear Decommissioning. Provision for decommissioning costs of nuclear generating units is based on options prescribed by the NRC procedures to dismantle and decontaminate the facilities to meet the NRC criteria for license termination. At December 31, 2024, $3.9 billion, representing the discounted value of future estimated nuclear decommissioning costs, was included in nuclear AROs. The actual decommissioning costs may vary from the derived estimates because of, among other things, changes in current assumptions, such as the assumed dates of decommissioning, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. Utilities that own and operate nuclear plants are required to use different procedures in calculating nuclear decommissioning costs under GAAP than those that are used in calculating nuclear decommissioning costs when reporting to the NRC. The two sets of procedures produce different estimates for the costs of decommissioning primarily because of differences in the underlying assumptions. TVA bases its nuclear decommissioning estimates on site-specific cost studies. The most recent study was approved and implemented in September 2022. Site-specific cost studies are updated for each of TVA's nuclear units at least every five years.

TVA maintains an NDT to provide funding for the ultimate decommissioning of its nuclear power plants. See Note 14 — *Fair Value Measurements — Investment Funds*. TVA monitors the value of its NDT and believes that, over the long term and before cessation of nuclear plant operations and commencement of decommissioning activities, adequate funds from investments and additional contributions, if necessary, will be available to support decommissioning. TVA's operating nuclear power units are licensed through various dates between 2033 - 2055, depending on the unit. It may be possible to extend the operating life of some of the units with approval from the NRC. See Note 8 — *Regulatory Assets and Liabilities* and Note 11 — *Asset Retirement Obligations*.

Non-nuclear Decommissioning. At December 31, 2024, $7.0 billion, representing the discounted value of future estimated non-nuclear decommissioning costs, was included in non-nuclear AROs. This decommissioning cost estimate involves estimating the amount and timing of future expenditures and making judgments concerning whether or not such costs are considered a legal obligation. Estimating the amount and timing of future expenditures includes, among other things, making projections of the timing and duration of the asset retirement process and how costs will escalate with inflation. The actual decommissioning costs may vary from the derived estimates because of changes in current assumptions, such as the assumed dates of decommissioning, changes in regulatory requirements, changes in technology, and changes in the cost of labor, materials, and equipment. TVA updates its underlying assumptions for non-nuclear decommissioning AROs at least every five

years. However, material changes in underlying assumptions that impact the amount and timing of undiscounted cash flows are continuously monitored and incorporated into ARO balances in the period identified.

TVA maintains an ART to help fund the ultimate decommissioning of its non-nuclear power assets. See Note 14 — *Fair Value Measurements — Investment Funds*. Estimates involved in determining if additional funding will be made to the ART include inflation rate, rate of return projections on the fund investments, and the planned use of other sources to fund decommissioning costs. See Note 8 — *Regulatory Assets and Liabilities* and Note 11 — *Asset Retirement Obligations*.

Environmental Matters. TVA's generation activities, like those across the utility industry and in other industrial sectors, are subject to federal, state, and local environmental laws and regulations. Major areas of regulation affecting TVA's activities include air quality control, greenhouse gas ("GHG") emissions, water quality control, and management and disposal of solid and hazardous wastes. Regulations in these major areas continue to become more stringent and have, and will continue to have, a particular emphasis on climate change, renewable generation, and energy efficiency.

TVA has incurred, and expects to continue to incur, substantial capital and operating and maintenance costs to comply with evolving environmental requirements primarily associated with, but not limited to, the operation of TVA's coal-fired and natural gas-fired generating units in general and emissions of pollutants from those units. Environmental requirements placed on the operation of coal-fired and other generating units using fossil fuels such as oil and natural gas will likely continue to become more restrictive over time. Failure to comply with environmental and safety requirements can result in enforcement actions and litigation, which can lead to the imposition of significant civil liability, including fines and penalties, criminal sanctions, and/or temporary or permanent closure of non-compliant facilities. Historical non-compliance can also lead to difficulty in renewing existing permits, as well as difficulty in obtaining permits to bring new generation facilities online. Other obstacles to renewal or permitting of new facilities include a proliferation of non-government organizations seeking to use litigation tools to drive up costs associated with, and delay or prevent permitting of, new fossil fuel facilities in favor of renewable energy projects.

Compliance with the Environmental Protection Agency's ("EPA") 2015 CCR rule, as revised ("2015 CCR Rule") required implementation of a groundwater monitoring program, additional engineering, evaluation of authorized closure methods, coordination with certain state authorities, and ongoing analysis at each TVA CCR unit. As further analyses are performed, including evaluation of monitoring results, there is the potential for additional costs for investigation and/or remediation. In addition, on May 8, 2024, EPA published its Legacy CCR Rule, which expands the scope of the existing regulatory requirements of the 2015 CCR Rule to include two additional classes of CCR units: Legacy Surface Impoundments and Coal Combustion Residual Management Units. As a result of the enactment of the final rule, during 2024, TVA recorded additional estimated AROs and recorded a corresponding regulatory asset due to AROs being associated with closed sites and asset retirement costs having been fully depreciated. However, the amounts recorded are subject to various uncertainties, and actual amounts may differ materially based upon a number of factors, including, but not limited to, the outcome of legal challenges to the Legacy CCR Rule, ongoing evaluations of the number and scope of newly regulated units, and determinations on final closure requirements and performance standards.

In May 2024, EPA also published (1) a final rule that establishes more stringent technology-based effluent limitations for four waste streams from coal-fired plants, (2) a rule that strengthens and updates the Mercury and Air Toxics Standards for electric generating units to reflect recent developments in control technologies, and (3) a rule that establishes GHG emission guidelines for existing coal-fired plants and GHG performance standards for new natural gas-fired power plants. These rules are all subject to legal challenges, and if the challenges are not successful, TVA would incur substantial costs to comply with the rules.

Liability for releases, natural resource damages, and required cleanup of hazardous substances is primarily regulated by the federal Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), the Resource Conservation and Recovery Act ("RCRA"), and other federal and parallel state statutes. In a manner similar to many other governmental entities, industries, and power systems, TVA has generated or used hazardous substances over the years. TVA operations at some facilities have resulted in releases of contaminants that TVA has addressed or is addressing consistent with state and federal requirements. At both December 31, 2024, and September 30, 2024, TVA's estimated liability for required cleanup and similar environmental work for those sites for which sufficient information is available to develop a cost estimate was $15 million, on a non-discounted basis, and was included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. Additionally, the potential inclusion of new hazardous substances under CERCLA and RCRA jurisdiction could significantly affect TVA's future liability for remediating historical releases.

In August 2015, the Tennessee Department of Environment and Conservation ("TDEC") issued an order that includes an iterative process through which TVA and TDEC will identify and evaluate any CCR contamination risks and, if necessary, respond to such risks. TVA is also following a similar process pursuant to a consent order. At both December 31, 2024, and September 30, 2024, TVA's estimated liability for costs associated with environmental remediation activities for the sites covered by these orders for which sufficient information is available to develop a cost estimate was approximately $215 million on a non-discounted basis and was included in Accounts payable and accrued liabilities and Other long-term liabilities on the Consolidated Balance Sheets. The current estimated time frame for work related to these remediation activities for which TVA has a cost estimate is through 2046.

Legal Proceedings

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting TVA's activities. There have been no material changes to the Legal Proceedings described in Note 22 — *Commitments and Contingencies — Legal Proceedings* of the Annual Report, except as described below.

Case Involving Johnsonville Aeroderivative Combustion Turbine Project. On December 22, 2022, the Southern Environmental Law Center filed a lawsuit in the U.S. District Court for the Middle District of Tennessee on behalf of the Sierra Club, alleging that TVA violated the National Environmental Policy Act ("NEPA") in deciding to build a new aeroderivative combustion turbine project at its Johnsonville facility. Both parties moved for summary judgment, and on September 30, 2024, the court granted TVA's motion for summary judgment and dismissed the lawsuit. The Sierra Club did not file an appeal within 60 days from the date of the decision, so this litigation has now ended. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Case Involving Johnsonville Aeroderivative Combustion Turbine Project* in the Annual Report.

Case Involving Kingston Gas-Fired Plant. On October 10, 2024, Appalachian Voices, the Center for Biological Diversity, and the Sierra Club filed a lawsuit in the U.S. District Court for the Eastern District of Tennessee alleging that TVA violated NEPA and TVA's least-cost planning obligations in deciding to build a gas plant at its Kingston Facility. TVA filed its response on December 16, 2024. See Note 22 — *Commitments and Contingencies — Legal Proceedings — Case Involving Kingston Gas-Fired Plant* in the Annual Report.

Challenge to Kingston Construction Permit. On December 16, 2024, the Southern Environmental Law Center filed an appeal on behalf of Appalachian Voices challenging the construction permit that the Division of Air Pollution Control of TDEC issued to TVA on November 15, 2024, for the construction of new natural gas generation at Kingston. Appalachian Voices alleges that TDEC unlawfully issued a construction permit that would allow TVA to construct the plant without meeting the requirements set forth in the Clean Air Act’s Prevention of Significant Deterioration program. Among other things, Appalachian Voices is requesting that the Tennessee Air Pollution Control Board stay the effectiveness of the permit and order TDEC to revoke the permit. On January 7, 2025, TVA filed a petition to intervene in the administrative proceeding, which was granted on January 15, 2025.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") explains the results of operations and general financial condition of the Tennessee Valley Authority ("TVA"). The MD&A should be read in conjunction with the accompanying unaudited consolidated financial statements and TVA's Annual Report on Form 10-K for the year ended September 30, 2024 (the "Annual Report").

Executive Overview

TVA's operating revenues were $2.9 billion and $2.8 billion for the three months ended December 31, 2024 and 2023, respectively. Operating revenues increased for the three months ended December 31, 2024, as compared to the same period of the prior year, primarily as a result of higher effective base rates, sales volume, and fuel rates. Effective base rates were higher primarily due to the TVA Board of Directors ("TVA Board") action to approve a 5.25 percent wholesale base rate increase effective October 1, 2024. The higher sales volume was driven primarily by increases within the data processing, hosting, and related services sector, and higher fuel rates were primarily due to higher coal prices.

Total operating expenses increased $131 million for the three months ended December 31, 2024, as compared to the three months ended December 31, 2023. Fuel and purchased power expense increased $44 million for the three months ended December 31, 2024, as compared to the same period of the prior year, primarily due to less availability of nuclear generation and higher coal prices. There was a $38 million increase in Operating and maintenance expense primarily due to increases in payroll and benefit costs related to labor escalation for cost of living increases and additional headcount to support operational needs and outage expense primarily due to an increase in nuclear outage days. In addition, Depreciation and amortization expense increased $36 million primarily as a result of the decision to retire Kingston Fossil Plant ("Kingston"), increases in the amortization of finance leases and retirement of regulatory assets, and additions to net completed plant.

Pre-commercial plant operations began on Johnsonville Aeroderivative combustion turbine ("CT") Units 25-28 in the first quarter of 2025 and began on Units 29 and 30 in January 2025.

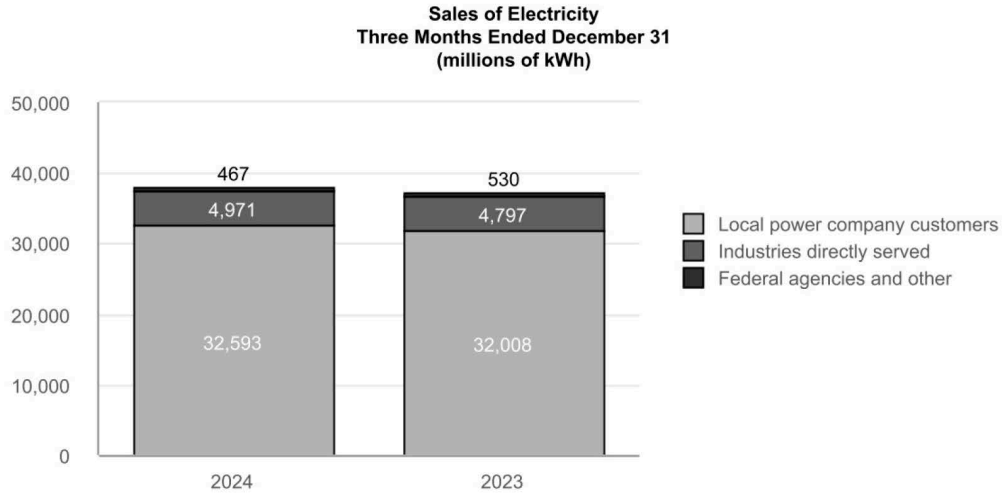
On January 22, 2025, TVA reached a preliminary all-time record high peak power demand of approximately 35,319 megawatts ("MW"). This estimated peak was over 700 MW greater than TVA's previous all-time peak set in January 2024.

Results of Operations

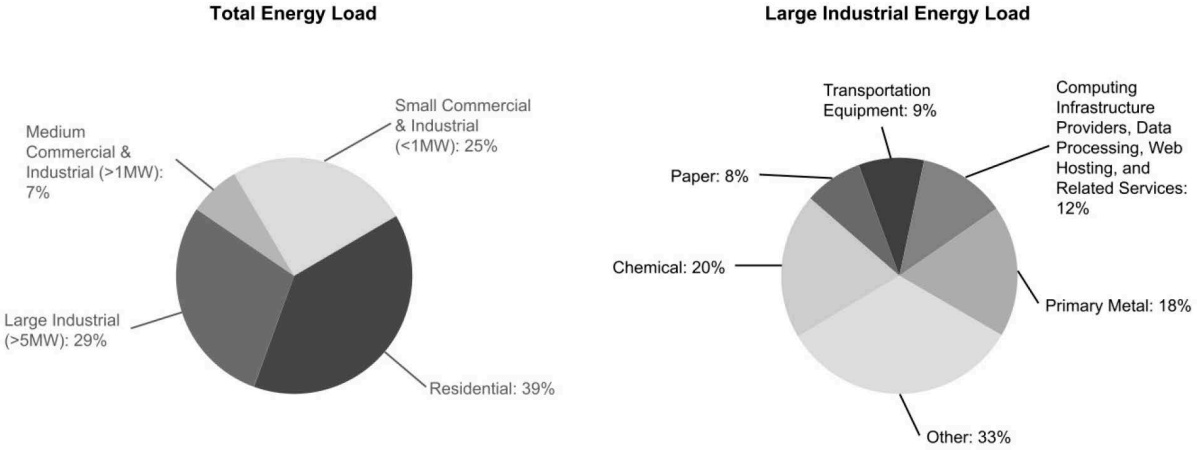
Sales of Electricity

Sales of electricity, which accounted for nearly all of TVA's operating revenues, were 38,031 million and 37,335 million kilowatt hours ("kWh") for the three months ended December 31, 2024 and the three months ended December 31, 2023, respectively. The total sales of electricity during the three months ended December 31, 2024 included 8 thousand kWh of pre-commercial generation at Johnsonville Aeroderivative CT Units 25-28. The total sales of electricity during the three months ended December 31, 2023 included 137 thousand kWh of pre-commercial generation at Paradise CT Units 5-7. TVA sells power at wholesale rates to local power company customers ("LPCs") that then resell the power to their customers at retail rates. TVA also sells power to directly served customers, consisting primarily of federal agencies and customers with large or nonstandard loads. In addition, power exceeding TVA's system needs is sold under exchange power arrangements with certain other power systems.

The following charts compare TVA's sales of electricity by customer type for the periods indicated:



The following charts show a breakdown of TVA's energy load:



Note
Information included in the charts above was derived from energy usage of directly served customers and customers served by LPCs during calendar year ("CY") 2023, and these graphs will continue to be updated on a CY basis.

Weather affects both the demand for TVA power and the price for that power. TVA uses degree days to measure the impact of weather on its power operations. Degree days measure the extent to which the TVA system 23-station average temperatures vary from 65 degrees Fahrenheit.

	Degree Days						
	Variation from Normal						Change from Prior Period
	2024	Normal	Percent Variation	2023	Normal	Percent Variation	Percent Change
Heating Degree Days							
Three Months Ended December 31	983	1,243	(20.9)%	1,094	1,243	(12.0)%	(10.1)%
Cooling Degree Days							
Three Months Ended December 31	89	61	45.9 %	69	61	13.1 %	29.0 %

Sales of electricity increased two percent for the three months ended December 31, 2024, as compared to the same period of the prior year. The increased sales volume for LPCs and industries directly served was driven primarily by increases within the data processing, hosting, and related services sector.

Financial Results

The following table compares operating results for the three months ended December 31, 2024 and 2023:

Summary Consolidated Statements of Operations
(in millions)

	Three Months Ended December 31			
	2024	2023	Change	Percent Change
Operating revenues	$ 2,920	$ 2,765	$ 155	5.6 %
Operating expenses	2,507	2,376	131	5.5 %
Operating income	413	389	24	6.2 %
Other income, net	17	23	(6)	(26.1)%
Other net periodic benefit cost	25	23	2	8.7 %
Interest expense	280	262	18	6.9 %
Net income	$ 125	$ 127	$ (2)	(1.6)%

Operating Revenues. Operating revenues for the three months ended December 31, 2024 and 2023, were $2.9 billion and $2.8 billion, respectively. The following table compares TVA's operating revenues for the periods indicated:

Operating Revenues by Customer Type
(in millions)

	Three Months Ended December 31			
	2024	2023	Change	Percent Change
Operating revenues				
Local power company customers	$ 2,616	$ 2,487	$ 129	5.2 %
Industries directly served	230	217	13	6.0 %
Federal agencies and other	30	30	—	— %
Revenue capitalized during pre-commercial plant operations[1]	—	(3)	3	(100.0)%
Other revenue	44	34	10	29.4 %
Total operating revenues	$ 2,920	$ 2,765	$ 155	5.6 %

Note
(1) Represents revenue capitalized during pre-commercial operations at Johnsonville Aeroderivative CT Units 25-28 in the three months ended December 31, 2024 and Paradise CT Units 5-7 in the three months ended December 31, 2023. Revenue capitalized at Johnsonville Aeroderivative was less than $1 million for the three months ended December 31, 2024.

TVA's two largest LPCs — Memphis Light, Gas and Water Division ("MLGW") and Nashville Electric Service ("NES") — have contracts with a five-year and a 20-year termination notice period, respectively. Sales to MLGW and NES each accounted

for eight percent of TVA's total operating revenues for both the three months ended December 31, 2024 and the three months ended December 31, 2023.

TVA's rate structure uses pricing signals to indicate seasons and hours of higher cost to serve its customers and to capture a portion of TVA's fixed costs in fixed charges. The structure includes three base revenue components: time of use demand charges, time of use energy charges, and a grid access charge ("GAC"). The demand charges are based upon the customer's peak monthly usage. The energy charges are based on time differentiated kWh used by the customer. Both of these components can be significantly impacted by weather. The GAC captures a portion of fixed costs and is offset by a corresponding reduction to the energy rates. The GAC also reduces the impact of weather variability to the overall rate structure.

TVA has a Partnership Agreement option that better aligns the length of LPC power contracts with TVA's long-term commitments. Under the partnership arrangement, the LPC power contracts automatically renew each year and have a 20-year termination notice. The partnership arrangements can be terminated under certain circumstances, including TVA's failure to limit rate increases to no more than 10 percent during any consecutive five-fiscal-year period, as more specifically described in the
agreements. Participating LPCs receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term commitment, which enables TVA to recover its long-term financial commitments over a commensurate period. As of December 31, 2024, 148 LPCs had signed the 20-year Partnership Agreement with TVA.

In addition to base revenues, the rate structure includes a separate fuel rate that includes the costs of natural gas, fuel oil, purchased power, coal, emission allowances, nuclear fuel, and other fuel-related commodities; realized gains and losses on derivatives purchased to hedge the costs of such commodities; and payments to states and counties in lieu of taxes ("tax equivalents") associated with the fuel cost adjustments.

TVA is required to charge rates for power that will produce gross revenues sufficient to cover various costs as discussed in Part I, Item I, Business — *Rates* of the Annual Report. In August 2024, the TVA Board approved a 5.25 percent wholesale base rate increase (excluding fuel) effective October 1, 2024, primarily due to additional capacity needs and rising costs. This rate adjustment is estimated to produce an additional $495 million of revenue during 2025.

The changes in revenue components are summarized below:

Changes in Revenue Components
(in millions)

	Three Months Ended December 31		
	2024	**2023**	**Change**
Base revenue			
Energy revenue	$ 1,188	$ 1,112	$ 76
Demand revenue	905	868	37
Grid access charge	162	156	6
Long-term partnership credits for LPCs	(50)	(47)	(3)
Other charges and credits[2]	(160)	(140)	(20)
Total base revenue	2,045	1,949	96
Fuel cost recovery	830	783	47
Off-system sales	1	2	(1)
Pre-commercial operations[1]	—	(3)	3
Revenue from sales of electricity	2,876	2,731	145
Other revenue	44	34	10
Total operating revenues	$ 2,920	$ 2,765	$ 155

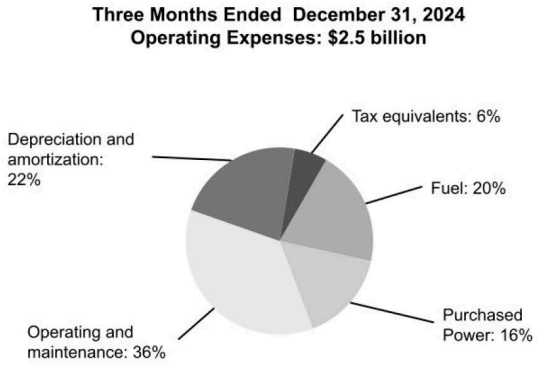
Notes
(1) Represents revenue capitalized during pre-commercial operations at Johnsonville Aeroderivative CT Units 25-28 in the three months ended December 31, 2024 and Paradise CT Units 5-7 in the three months ended December 31, 2023. Revenue capitalized at Johnsonville Aeroderivative was less than $1 million for the three months ended December 31, 2024.
(2) Includes economic development credits to promote growth in the Tennessee Valley, hydro preference credits for residential customers of LPCs, and demand response credits allowing TVA to reduce industrial customer usage in periods of peak demand to balance system demand. See Note 15 — *Revenue*.

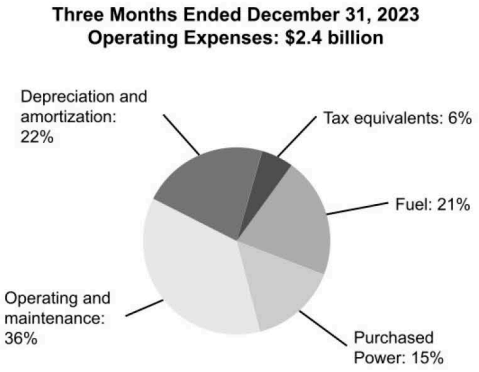
Operating revenues increased $155 million for the three months ended December 31, 2024, as compared to the same period of the prior year, primarily due to a $96 million increase in base revenue. The $96 million increase in base revenue was driven by a $54 million increase attributable to higher effective base rates and a $42 million increase attributable to higher sales volume. The increase in effective base rates was primarily due to the TVA Board action to approve a 5.25 percent wholesale base rate increase effective October 1, 2024. The higher sales volume was driven primarily by increases within the data processing, hosting, and related services sector. In addition, there was a $47 million increase in fuel cost recovery revenue

driven by a $32 million increase attributable to higher fuel rates and a $15 million increase attributable to higher sales volume. The higher fuel rates were primarily due to higher coal prices.

See *Sales of Electricity* above for further discussion of the change in the volume of sales of electricity and *Operating Expenses* below for further discussion of the change in fuel expense.

Operating Expenses. Operating expense components as a percentage of total operating expenses for the three months ended December 31, 2024 and December 31, 2023, consisted of the following:





Operating Expenses
(in millions)

	Three Months Ended December 31			
	2024	2023	Change	Percent Change
Operating expenses				
Fuel	$ 505	$ 496	$ 9	1.8 %
Purchased power	394	359	35	9.7 %
Operating and maintenance	905	867	38	4.4 %
Depreciation and amortization	557	521	36	6.9 %
Tax equivalents	146	133	13	9.8 %
Total operating expenses	$ 2,507	$ 2,376	$ 131	5.5 %

Fuel expense increased $9 million for the three months ended December 31, 2024, as compared to the same period of the prior year. This increase was primarily due to an increase in effective fuel rates due to higher coal prices, resulting in a $51 million increase in fuel expense. Partially offsetting this increase was a decrease of $33 million due primarily to the one-time collection of favorable coal contract price adjustments that occurred in the same period of the prior year. This collection was deferred and credited to customer rates in subsequent quarters. Additionally, fuel expense decreased $9 million due to less availability of nuclear generation as compared to the same period of the prior year.

Purchased power expense increased $35 million for the three months ended December 31, 2024, as compared to the same period of the prior year. This increase was primarily due to less availability of nuclear generation, resulting in an increase of $80 million. Partially offsetting this increase was a $45 million decrease in purchased power expense from lower purchased power market prices compared to the same period of the prior year.

Operating and maintenance expense increased $38 million for the three months ended December 31, 2024, as compared to the same period of the prior year. This increase was primarily due to $28 million of increased payroll and benefit costs primarily due to labor escalation for cost of living increases and additional headcount to support operational needs and a $28 million increase in outage expense primarily due to an increase in nuclear outage days. Partially offsetting these increases was a decrease in contract labor of $20 million primarily due to more natural gas project work in the prior year.

Depreciation and amortization expense increased $36 million for the three months ended December 31, 2024, as compared to the same period of the prior year. The increase was primarily driven by an increase in depreciation expense of $9 million related to the decision in April 2024 to retire Kingston and an $8 million increase in both amortization expense of finance leases and retirement of regulatory assets. Additionally, there was an increase due to depreciation of additions to net completed

plant.

Tax equivalents expense increased $13 million for the three months ended December 31, 2024, as compared to the same period of the prior year. This change is primarily driven by an increase in TVA's revenue from sales of electricity in 2024, which is used as the basis for calculating tax equivalent expense.

Generating Sources. The following tables show TVA's generation and purchased power by generating source as a percentage of all electrical power generated and purchased (based on kWh) for the periods indicated.

Total Power Supply by Generating Source
For the three months ended December 31
(millions of kWh)

	2024		2023	
Nuclear	13,990	36 %	17,851	47 %
Natural gas and/or oil-fired[1]	8,862	23 %	7,513	20 %
Coal-fired	5,336	14 %	4,320	11 %
Hydroelectric	3,359	8 %	2,496	7 %
Total TVA-operated generation facilities[2][3]	31,547	81 %	32,180	85 %
Purchased power (natural gas and/or oil-fired)[4]	4,041	11 %	3,424	9 %
Purchased power (other renewables)[5]	1,605	4 %	1,686	4 %
Purchased power (coal-fired)	934	2 %	595	2 %
Purchased power (hydroelectric)	657	2 %	146	— %
Total purchased power[3]	7,237	19 %	5,851	15 %
Total power supply	38,784	100 %	38,031	100 %

Notes
(1) The generation for the three months ended December 31, 2024 includes 8 thousand kWh of pre-commercial generation at Johnsonville Aeroderivative CT Units 25-28. The generation for the three months ended December 31, 2023 includes 137 thousand kWh of pre-commercial generation at Paradise CT Units 5-7.
(2) Generation from TVA-owned renewable resources (non-hydroelectric) is less than one percent for all periods shown and therefore is not represented in the table above.
(3) Raccoon Mountain Pumped-Storage Plant net generation is allocated against each TVA-operated generation facility and purchased power type for both the three months ended December 31, 2024, and three months ended December 31, 2023. See Part I, Item 1, Business — *Power Supply and Load Management Resources — Hydroelectric Pumped-Storage* in the Annual Report for a discussion of Raccoon Mountain Pumped-Storage Plant.
(4) Purchased power (natural gas and/or oil-fired) includes generation from Caledonia Combined Cycle Plant ("Caledonia CC"), which is currently a leased facility operated by TVA. Generation from Caledonia CC was 1,238 million kWh and 910 million kWh for the three months ended December 31, 2024, and three months ended December 31, 2023, respectively.
(5) Purchased power (other renewables) includes purchased power from the following renewable sources: solar, wind, biomass, and renewable cogeneration. TVA acquires Renewable Energy Certificates ("RECs") in connection with certain purchased power transactions and sells some of these RECs to customers.

In addition to power supply sources included here, TVA offers energy efficiency programs that effectively reduce energy needs. In 2025, TVA expects to invest $104 million on its energy efficiency programs and anticipates approximately 345 gigawatt hours of net incremental energy efficiency savings.

Interest Expense. Interest expense and interest rates for the three months ended December 31, 2024, and the three months ended December 31, 2023, were as follows:

Interest Expense and Rates
(in millions)

	Three Months Ended December 31		
	2024	2023	Percent Change
Interest expense[1]	$ 280	$ 262	6.9 %
Average blended debt balance[2]	$ 21,509	$ 20,610	4.4 %
Average blended interest rate[3]	4.99 %	4.89 %	2.0 %

Notes
(1) Includes amortization of debt discounts, issuance, and reacquisition costs, net.
(2) Includes average balances of long-term power bonds, debt of variable interest entities ("VIEs"), and discount notes.
(3) Includes interest on long-term power bonds, debt of VIE, and discount notes.

Total interest expense increased $18 million for the three months ended December 31, 2024, as compared to the same period of the prior year. This increase was primarily driven by a $10 million increase in alternative financing interest due to the

new Johnsonville lease financing arrangement and a $6 million increase primarily from higher average rates on long-term debt. The increase was also driven by a $2 million increase from higher average balances of short-term debt and a $1 million increase in interest related to finance leases, partially offset by a $1 million decrease from lower average rates on short-term debt.

Liquidity and Capital Resources

Sources of Liquidity

TVA depends on various sources of liquidity to meet cash needs and contingencies. TVA's primary sources of liquidity are cash from operations and proceeds from the issuance of short-term debt in the form of discount notes, along with periodic issuances of long-term debt. TVA's balance of short-term debt typically changes frequently as TVA issues discount notes to meet short-term cash needs and pay scheduled maturities of discount notes and long-term debt. TVA's next significant power bond maturity is $1.0 billion in May 2025. The periodic amounts of short-term debt issued are determined by near-term expectations for cash receipts, cash expenditures, and funding needs, while seeking to maintain a target range of cash and cash equivalents on hand. TVA may hold higher cash balances from time to time in response to potential market volatility or other business conditions. In addition, cash balances may include collateral received from counterparties.

In addition to cash from operations and proceeds from the issuance of short-term and long-term debt, TVA's sources of liquidity include four long-term revolving credit facilities totaling $2.7 billion, a $150 million credit facility with the United States Department of the Treasury ("U.S. Treasury"), and proceeds from other financings. See Note 12 — *Debt and Other Obligations — Credit Facility Agreements.* The TVA Board authorized TVA to issue power bonds and enter into other financing arrangements in an aggregate amount not to exceed $4.0 billion during 2025. Other financing arrangements may include, but are not limited to, lease financings, energy prepayments from customers, and other similar agreements. TVA may also engage in other alternative forms of financing such as sales of receivables, or loans, from time to time.

The Tennessee Valley Authority Act of 1933, as amended ("TVA Act"), authorizes TVA to issue bonds, notes, or other evidences of indebtedness (collectively, "Bonds") in an amount not to exceed $30.0 billion outstanding at any time. Bonds outstanding, excluding unamortized discounts and premiums and net exchange gains from foreign currency transactions, at December 31, 2024, were $20.4 billion (including current maturities). The balance of Bonds outstanding directly affects TVA's capacity to meet operational liquidity needs and to strategically use Bonds to fund certain capital investments as management and the TVA Board may deem desirable. Other options for financing not subject to the limit on Bonds, including lease financings, could provide supplementary funding if needed. Currently, TVA expects to utilize a combination of Bonds, other financings, and potentially additional power revenues through power rate increases to meet its ongoing operational liquidity needs while making planned capital investments through the decade. TVA may also utilize available funding through the Inflation Reduction Act of 2022 ("IRA") and the Bipartisan Infrastructure Law ("BIL"), other federal funding opportunities, or other third-party financing arrangements. See *Lease Financings* below, Note 9 — *Variable Interest Entities*, and Note 12 — *Debt and Other Obligations* for additional information.

TVA may from time to time seek to retire or purchase its outstanding debt through cash purchases and/or exchanges for securities, in open market purchases, privately negotiated transactions, or otherwise. Such repurchases or exchanges, if any, will depend on prevailing market conditions, TVA's liquidity requirements, contractual restrictions, and other factors. The amounts involved may be material.

Debt Securities. TVA's Bonds are not obligations of the U.S., and the U.S. does not guarantee the payments of principal or interest on Bonds. TVA's Bonds consist of power bonds and discount notes. Power bonds have maturities of between one and 50 years. At December 31, 2024, the average maturity of long-term power bonds was 13.71 years, and the weighted average interest rate was 4.69 percent. Discount notes have maturities of less than one year. Power bonds and discount notes have a first priority and equal claim of payment out of net power proceeds. Net power proceeds are defined as the remainder of TVA's gross power revenues after deducting the costs of operating, maintaining, and administering its power properties and tax equivalents, but before deducting depreciation accruals or other charges representing the amortization of capital expenditures, plus the net proceeds from the sale or other disposition of any power facility or interest therein. In addition to power bonds and discount notes, TVA had long-term debt associated with certain VIEs outstanding at December 31, 2024. See *Lease Financings* below, Note 9 — *Variable Interest Entities*, and Note 12 — *Debt and Other Obligations* for additional information.

The following table provides additional information regarding TVA's short-term borrowings:

Short-Term Borrowings
(in millions)

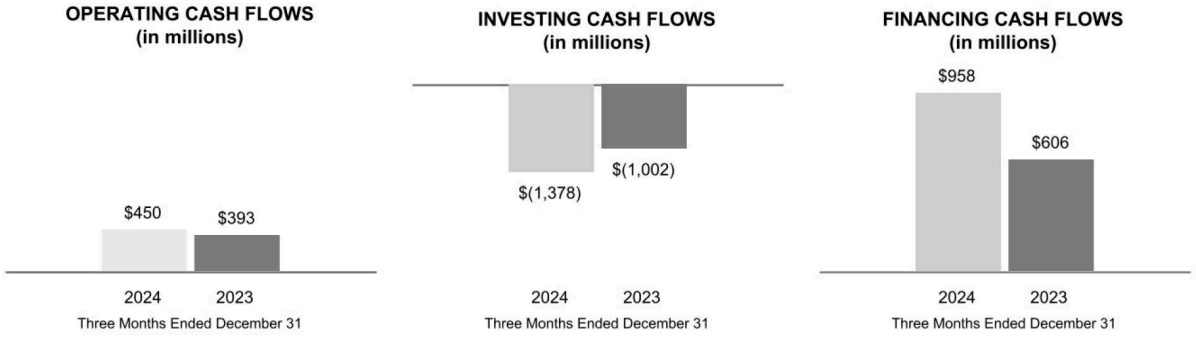
	At December 31, 2024	Three Months Ended December 31, 2024	At December 31, 2023	Three Months Ended December 31, 2023
Gross Amount Outstanding (at End of Period) or Average Gross Amount Outstanding (During Period)				
Discount notes	$1,359	$683	$1,043	$525
Maximum Month-End Gross Amount Outstanding (During Period)				
Discount notes	N/A	$1,359	N/A	$1,043
Weighted Average Interest Rate				
Discount notes	4.33%	4.68%	5.28%	5.41%

Lease Financings. TVA has entered into certain leasing transactions with special purpose entities ("SPEs") to obtain third-party financing for its facilities. These SPEs are sometimes identified as VIEs of which TVA is determined to be the primary beneficiary. TVA is required to account for these VIEs on a consolidated basis. See Note 9 — *Variable Interest Entities*.

Summary Cash Flows

A major source of TVA's liquidity is operating cash flows resulting from the generation and sale of electricity. Cash, cash equivalents, and restricted cash totaled $553 million and $518 million at December 31, 2024 and 2023, respectively. A summary of cash flow components for the three months ended December 31, 2024 and 2023, follows:

Cash provided by (used in):



Operating Activities. TVA's cash flows from operations are primarily driven by sales of electricity, fuel expense, and operating and maintenance expense. The timing and level of cash flows from operations can be affected by the weather, changes in working capital, commodity price fluctuations, outages, and other project expenses.

Net cash flows provided by operating activities increased $57 million for the three months ended December 31, 2024, as compared to the same period of the prior year. The increase was primarily due to lower purchased power payments and higher revenue collections. This increase was partially offset by higher payroll and benefit related payments compared to the same period of the prior year. Revenue collections increased primarily due to the increase in the 2025 wholesale base rate in addition to higher sales volume.

Investing Activities. The majority of TVA's investing cash flows are due to investments to acquire, upgrade, or maintain generating and transmission assets, including environmental projects and the purchase of nuclear fuel.

Net cash flows used in investing activities increased $376 million for the three months ended December 31, 2024, as compared to the same period of the prior year, primarily driven by increased expenditures for capacity expansion projects and nuclear fuel during the period. Nuclear fuel expenditures vary depending on the number of outages and the prices and timing of purchases of uranium and enrichment services.

Financing Activities. TVA's cash flows provided by or used in financing activities are primarily driven by the timing and level of cash flows provided by operating activities, cash flows used in investing activities, and net issuance and redemption of debt instruments to maintain a strategic balance of cash on hand.

Net cash provided by financing activities increased $352 million for the three months ended December 31, 2024, as compared to the same period of the prior year, primarily due to higher debt issuances as a result of a new lease financing arrangement. Higher net cash flows provided by operating activities were offset by higher net cash used in investing activities which resulted in the need for net debt issuances to maintain targeted cash balance levels during the period. TVA anticipates a need to increase debt in the coming years as it continues to invest in power system assets, which may result in positive net cash flows provided by financing activities in future periods.

Contractual Obligations

TVA has certain obligations and commitments to make future payments under contracts. TVA's contractual obligations are discussed in the Annual Report in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Liquidity and Capital Resources*, Note 8 — *Leases,* Note 11 — *Variable Interest Entities*, Note 14 — *Debt and Other Obligations*, Note 20 — *Benefit Plans*, and Note 22 — *Commitments and Contingencies*.

During the three months ended December 31, 2024, TVA entered into multiple natural gas contracts totaling $640 million with new commitments from 2025 to 2035, and three new natural gas storage contracts totaling $193 million with commitments from 2025 through 2034. In addition, TVA entered into a new power purchase agreement ("PPA") totaling $293 million with commitments from 2025 to 2028. TVA also entered into a new lease financing arrangement during the three months ended December 31, 2024. See Note 9 — *Variable Interest Entities.*

Key Initiatives and Challenges

There have been no material changes to the key initiatives and challenges described in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges* of the Annual Report, except as described below.

Optimum Energy Portfolio

Natural Gas-Fired Units. As TVA continues to evaluate the impact of retiring its coal-fired fleet by 2035 and works to accelerate the growth of renewables, it also continues to evaluate adding flexible lower carbon-emitting gas plants as a strategy to maintain reliability. Pre-commercial plant operations began on Johnsonville Aeroderivative CT Units 25-28 in the first quarter of 2025 and began on Units 29 and 30 in January 2025.

TVA is replacing generation for one unit at Cumberland with a 1,450 MW combined cycle plant that is expected to be operational by the end of CY 2026. As of December 31, 2024, TVA had spent $1.3 billion on this project. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Natural Gas-Fired Units* in the Annual Report.

Two cases are currently pending before the United States Court of Appeals for the Sixth Circuit ("Sixth Circuit") challenging permits for a pipeline that needs to be constructed to serve the Cumberland Combined Cycle Plant. On October 11, 2024, the Sixth Circuit issued an order staying the permit in both cases until the court can review the merits of these cases. The Sixth Circuit heard oral arguments on the merits on December 10, 2024, but has not yet issued a ruling. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Optimum Energy Portfolio — Natural Gas-Fired Unit*s in the Annual Report.

TVA is constructing 1,500 MW of natural gas generation at TVA's Kingston site that is expected to be operational by the end of CY 2027. As of December 31, 2024, TVA had spent $1.1 billion on this project. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Natural Gas-Fired Units* in the Annual Report.

On December 16, 2024, the Southern Environmental Law Center filed an appeal on behalf of Appalachian Voices challenging the construction permit that the Division of Air Pollution Control of the Tennessee Department of Environment and Conservation (“TDEC”) issued to TVA on November 15, 2024, for the construction of new natural gas generation at Kingston. Appalachian Voices alleges that TDEC unlawfully issued a construction permit that would allow TVA to construct the plant without meeting the requirements set forth in the Clean Air Act’s Prevention of Significant Deterioration program. Among other things, Appalachian Voices is requesting that the Tennessee Air Pollution Control Board stay the effectiveness of the permit and order TDEC to revoke the permit. On January 7, 2025, TVA filed a petition to intervene in the administrative proceeding, which was granted on January 15, 2025.

Small Modular Reactors. In January 2025, TVA and a consortium of co-applicants applied for a U.S. Department of Energy grant to support the potential development and future deployment of a small modular reactor (“SMR”) at TVA’s Clinch River site. The potential development and any future deployment of a SMR at the Clinch River site are subject to TVA Board approval. TVA is following a structured planning process that advances the Clinch River project in phases at which the TVA Board will evaluate and consider approving any next steps. This funding could support not only the deployment of this first-of-a-kind technology, but also help establish the supply chain for advanced nuclear and support future deployment of the reactor across the United States. In January 2025, TVA also requested public comment on a draft Supplemental Environmental Impact Statement that addresses the potential environmental effects associated with site preparation, construction, operation, and decommissioning of one SMR, the GE Hitachi Nuclear Energy BWRX-300, at the Clinch River site.

Hurricane Helene

In late September 2024, Hurricane Helene caused significant damage in communities in East Tennessee and Western North Carolina. TVA completed inspections at numerous dams, finding no substantial impacts. TVA is working on debris management at Douglas Reservoir to aid major disaster declarations with the Federal Emergency Management Agency ("FEMA"). TVA anticipates reimbursement from FEMA for this work. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges — Hurricane Helene* in the Annual Report.

Corporate Governance

The terms of Beth H. Harwell and Brian E. Noland as members of the TVA Board ended January 3, 2025, with the adjournment of the most recent session of Congress. Although their terms of office expired May 18, 2024, the TVA Act permitted them to continue to serve as Directors until the end of this session of Congress.

On January 13, 2025, TVA announced that Thomas C. Rice had been appointed as TVA’s new Senior Vice President and Chief Financial Officer, effective January 27, 2025. Mr. Rice will be responsible for directing all of TVA’s financial functions, including treasury, risk management, accounting, financial operations and performance, financial planning and investor relations. He will succeed John M. Thomas, III, who, on December 2, 2024, announced his retirement from TVA effective March 7, 2025, as reported by TVA on December 5, 2024. Until his retirement, Mr. Thomas will serve as Executive Vice President and Advisor to the Chief Executive Officer ("CEO") and assist with the transition of his responsibilities.

On January 29, 2025, Jeffrey J. Lyash, TVA's President and CEO, notified his executive leadership team, and the TVA Board, of his intention to retire no later than October 2, 2025. Mr. Lyash will continue to serve in his current role as TVA undergoes a search for a new President and CEO.

Executive Actions

On January 20, 2025, President Trump issued an executive order (“EO”) that revoked a number of EOs, including the following EOs discussed in Part I, Item 1, Business — *Environmental Matters — Climate Change — Executive Actions* in TVA's Annual Report on Form 10-K for the year ended September 30, 2024: EO 13990, "Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis"; EO 14008, "Tackling the Climate Crisis at Home and Abroad”; EO 14030, “Climate-Related Financial Risk”; EO 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability"; EO 14082, “Implementation of the Energy and Infrastructure Provisions of the Inflation Reduction Act of 2022”; and EO 14096, “Revitalizing Our Nation's Commitment to Environmental Justice for All.” In addition, on January 21, 2025, the Office of Management and Budget issued Memorandum M-25-11, which requires agencies to immediately pause disbursement of certain funds appropriated under the IRA or the BIL, which may delay any award of grants for which TVA has applied under these acts. Furthermore, President Trump and the Administration have taken a number of other actions that may impact TVA, and TVA is currently reviewing these actions.

Environmental Matters

There have been no material changes to the environmental matters described in Part I, Item 1, Business — *Environmental Matters* of the Annual Report, except as described below.

Cleanup of Solid and Hazardous Wastes

Coal Combustion Residuals. In August 2015, TDEC issued an order that includes an iterative process through which TVA and TDEC will investigate, assess, and remediate any unacceptable risks resulting from coal combustion residual (“CCR”) management and disposal at TVA CCR units in the State of Tennessee. As part of this process, TVA has submitted environmental assessment reports (“EARs”) to TDEC, and after the EARs are approved, TVA will submit Corrective Action/Risk Assessment (“CARA”) Plans that will identify the unacceptable risks and TVA's proposed remediation. TDEC will review the CARA Plans and provide comments, and TVA will make revisions to address TDEC's comments until TDEC approves a final CARA Plan for each site. The public also will have an opportunity to review and comment on each CARA Plan prior to TDEC's approval of the final plan. TDEC approved the EAR for Bull Run Fossil Plant ("Bull Run") on November 15, 2024, and TVA

submitted the initial draft of the Bull Run CARA Plan to TDEC in January 2025. See Part I, Item I, Business — *Environmental Matters — Cleanup of Solid and Hazardous Wastes — Coal Combustion Residuals* in the Annual Report.

Legal Proceedings

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting its activities. As of December 31, 2024, TVA had accrued $11 million with respect to Legal Proceedings. No assurance can be given that TVA will not be subject to significant additional claims and liabilities. If actual liabilities significantly exceed the estimates made, TVA's results of operations, liquidity, and financial condition could be materially adversely affected.

For a discussion of certain current material Legal Proceedings, see Note 20 — *Contingencies and Legal Proceedings — Legal Proceedings*, which discussions are incorporated into this Part I, Item 2, Management's Discussion and Analysis of Financial Condition and Results of Operations.

Critical Accounting Estimates

The preparation of financial statements requires TVA to estimate the effects of various matters that are inherently uncertain as of the date of the financial statements. Although the financial statements are prepared in conformity with accounting principles generally accepted in the U.S., TVA is required to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities, and the amounts of revenues and expenses reported during the reporting period. Each of these estimates varies in regard to the level of judgment involved and its potential impact on TVA's financial results. Estimates are deemed critical either when a different estimate could have reasonably been used, or where changes in the estimate are reasonably likely to occur from period to period, and such use or change would materially impact TVA's financial condition, results of operations, or cash flows. TVA's critical accounting estimates and policies are discussed in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Critical Accounting Estimates* and Note 1 — *Summary of Significant Accounting Policies* of the Notes to Consolidated Financial Statements in the Annual Report.

Legislative and Regulatory Matters

For additional discussion on legislative and regulatory matters, including a discussion of environmental legislation and regulation, see *Environmental Matters* and *Key Initiatives and Challenges* above. Also, see Part I, Item 1, Business — *Environmental Matters* and Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Key Initiatives and Challenges* of the Annual Report.

TVA does not engage, and does not control any entity that is engaged, in any activity listed under Section 13(r) of the Securities Exchange Act of 1934 (the "Exchange Act"), which requires certain issuers to disclose certain activities relating to Iran involving the issuer and its affiliates. Based on information supplied by each such person, none of TVA's directors and executive officers are involved in any such activities. While TVA is an agency and instrumentality of the U.S., TVA does not believe its disclosure obligations, if any, under Section 13(r) extend to the activities of any other departments, divisions, or agencies of the U.S.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

There are no material changes related to market risks disclosed under Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — *Risk Management Activities* in the Annual Report. See Note 13 — *Risk Management Activities and Derivative Transactions* for additional information regarding TVA's derivative transactions and risk management activities.

New Accounting Standards and Interpretations

For a discussion of new accounting standards and interpretations, see Note 2 — *Impact of New Accounting Standards and Interpretations*, which discussion is incorporated into this Part I, Item 2, Management's Discussion and Analysis of Financial Condition and Results of Operations.

ITEM 4. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

TVA maintains disclosure controls and procedures designed to ensure that information required to be disclosed by TVA in reports that it files or submits under the Exchange Act is recorded, processed, summarized, and reported, within the time periods specified in the Securities and Exchange Commission’s rules and forms, and is accumulated and communicated to TVA’s management, as appropriate, to allow timely decisions regarding required disclosure. TVA's management, including the President and CEO, the Senior Vice President and Chief Financial Officer, and members of the Disclosure Control Committee,

including the Vice President and Controller (Principal Accounting Officer) (collectively "management"), evaluated the effectiveness of TVA's disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act) as of December 31, 2024. Based on this evaluation, management concluded that TVA's disclosure controls and procedures were effective as of December 31, 2024.

Changes in Internal Control over Financial Reporting

During the quarter ended December 31, 2024, there were no changes in TVA's internal control over financial reporting that materially affected, or are reasonably likely to materially affect, TVA's internal control over financial reporting.

PART II - OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

From time to time, TVA is party to or otherwise involved in lawsuits, claims, proceedings, investigations, and other legal matters ("Legal Proceedings") that have arisen in the ordinary course of conducting its activities. While the outcome of the Legal Proceedings to which TVA is a party cannot be predicted with certainty, any adverse outcome to a Legal Proceeding involving TVA may have a material adverse effect on TVA's financial condition, results of operations, and cash flows.

For a discussion of certain current material Legal Proceedings, see Note 20 — *Contingencies and Legal Proceedings — Legal Proceedings*, which discussions are incorporated by reference into this Part II, Item 1, Legal Proceedings.

ITEM 1A. RISK FACTORS

There are no material changes related to risk factors from the risk factors disclosed in Part I, Item 1A, Risk Factors in the Annual Report.

ITEM 5. OTHER INFORMATION

Insider Trading Arrangements and Policies

During the three months ended December 31, 2024, no director or officer of TVA notified TVA of the adoption or termination of a "Rule 10b5-1 trading arrangement" or "non-Rule 10b5-1 trading arrangement," as each term is defined in Item 408(a) of Regulation S-K.

Amended and Restated Executive Annual Incentive Plan

On January 30, 2025, TVA amended and restated its Executive Annual Incentive Plan (“EAIP”) to eliminate the use of the corporate multiplier and to authorize the TVA Board of Directors ("TVA Board") to utilize a standard discretionary range to adjust the scorecard achievement by plus or minus 20 percent beginning with the fiscal year 2025 performance cycle. This standard discretionary range allows the TVA Board to account for extraordinary occurrences or significant events that impact TVA’s performance. A copy of the amended and restated EAIP, which also includes minor administrative revisions, is attached as an exhibit to this report and is incorporated herein by reference. The foregoing description is qualified in its entirety by reference to such document.

ITEM 6. EXHIBITS

Exhibit No.	Description
3.1	Tennessee Valley Authority Act of 1933, as amended, 16 U.S.C. §§ 831-831ee (Incorporated by reference to Exhibit 3.1 to TVA's Quarterly Report on Form 10-Q for the quarter ended December 31, 2016, File No. 000-52313)
3.2	Bylaws of the Tennessee Valley Authority Approved by the TVA Board on May 18, 2006, as amended on April 3, 2008, May 19, 2008, June 10, 2010, February 13, 2014, August 21, 2014, and November 6, 2014 (Incorporated by reference to Exhibit 3.2 to TVA's Annual Report on Form 10-K for the year ended September 30, 2014, File No. 000-52313)
10.1	Facility Lease-Purchase Agreement Dated as of October 2, 2024, Between Johnsonville Aeroderivative Combustion Turbine Generation LLC and TVA (Incorporated by reference to Exhibit 10.24 to TVA's Annual Report on Form 10-K for the year ended September 30, 2024, File No. 000-52313)
10.2	Head Lease Agreement Dated as of October 2, 2024, Among the United States of America, TVA, and Johnsonville Aeroderivative Combustion Turbine Generation LLC (Incorporated by reference to Exhibit 10.25 to TVA's Annual Report on Form 10-K for the year ended September 30, 2024, File No. 000-52313)
10.3	Construction Management Agreement Dated as of October 2, 2024, Between Johnsonville Aeroderivative Combustion Turbine Generation LLC and TVA (Incorporated by reference to Exhibit 10.26 to TVA's Annual Report on Form 10-K for the year ended September 30, 2024, File No. 000-52313)
10.4	Offer Letter to Thomas C. Rice Accepted as of January 13, 2025
10.5	Amended and Restated Executive Annual Incentive Plan Approved as of January 30, 2025
31.1	Rule 13a-14(a)/15d-14(a) Certification Executed by the Chief Executive Officer
31.2	Rule 13a-14(a)/15d-14(a) Certification Executed by the Chief Financial Officer
32.1	Section 1350 Certification Executed by the Chief Executive Officer
32.2	Section 1350 Certification Executed by the Chief Financial Officer
101.INS	Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH	Inline XBRL Taxonomy Extension Schema
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase
104	Cover Page Interactive Data File - formatted in Inline XBRL and contained in Exhibit 101

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 4, 2025

TENNESSEE VALLEY AUTHORITY
(Registrant)

By: /s/ Jeffrey J. Lyash
Jeffrey J. Lyash
President and Chief Executive Officer
(Principal Executive Officer)

By: /s/ Thomas C. Rice
Thomas C. Rice
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

Exhibit 10.4

TENNESSEE VALLEY AUTHORITY

1101 Market Street, Chattanooga, Tennessee 37402

January 13, 2025

Thomas C. Rice

Dear Mr. Rice,

On behalf of TVA, it is with great pleasure that I offer you the position of SVP & Chief Financial Officer, effective January 27, 2025. The compensation components for your new role are as follows:

Your salary will be $600,000.

Your Executive Annual Incentive Plan (EAIP) opportunity will increase to 75% and will be prorated for the FY 2025 plan year based upon full months in new role. Actual EAIP amounts will be based on scorecard results.

You will be issued a new prorated Long-Term Incentive Performance grants in the amounts of $342,870 for the FY23-25 cycle, $616,000 for the FY24-26 cycle and $893,444 for the FY25-27 cycle, based on a target award of $980,000 for your new role. This grant will replace
the previously awarded FY23-25, FY24-26 and FY25-27 performance grants. Actual LTI-P amounts will be based on scorecard results.

Your Long-Term Retention grant target award will be set at $420,000, with remaining FY23-25, FY24-26 and FY25-27 awards prorated based upon full months in new role.

Please indicate your acceptance of this offer (below).

Regards,

Jeff Lyash
President & Chief Executive Officer

Accepted: ___/s/ Thomas C. Rice_____
Thomas C. Rice

cc: Executive Compensation
Human Resources

Exhibit 10.5

TENNESSEE VALLEY AUTHORITY

EXECUTIVE ANNUAL INCENTIVE PLAN

Amended and Restated as of January 30, 2025

Approved by: /s/ Carol E. Eimers 1-30-2025
Carol E. Eimers, VP and Chief Human Resources Officer Date

Validation Date: 01/30/2025
Review Frequency: 3 years
Validated By: Stephen Gaby

TABLE OF CONTENTS

Page

1. PURPOSE AND SCOPE 1

1.1 Establishment 1
1.2 Purpose 1

2. DEFINITIONS 1

2.1 “Authorized Parties” 1
2.2 “Corporate Performance Goals” 1
2.3 “Corporate Performance Measures” 1
2.4 “EAIP Award” 1
2.5 “EAIP Incentive Opportunity” 1
2.6 “Individual Performance Multiplier” 1
2.7 “Participant” 2
2.8 “Performance Cycle” 2
2.9 “Plan Year” 2
2.10 “Retirement” 2
2.11 “SBU” 2
2.12 “SBU Performance Goals” 2
2.13 “SBU Performance Measures” 2
2.14 “Scorecard Achievement” 2
2.15 “Section 409A” 2
2.16 “Separation from Service” 2
2.17 “Target EAIP Award” 2
2.18 “Total Cash Compensation” 2

3. PARTICIPATION 3

4. PERFORMANCE CYCLE 3

5. PERFORMANCE MEASURES AND GOALS 3

5.1 Corporate Performance Measures and Goals 3
5.2 SBU Performance Measures and Goals 3

6. DETERMINATION OF AWARDS 4

6.1 Eligibility and Vesting 4
6.2 EAIP Incentive Opportunity 4
6.3 Scorecard Achievement 4
6.4 Individual Performance Multiplier 5
6.5 Award Calculation 5
6.6 Maximum Payout 5
6.7 Standard Discretion and Award Adjustment 5
6.8 Change in Position 6
6.9 Termination Prior to End of Performance Cycle 6

7. PAYMENT OF AWARDS 6

8. DEFERRAL ELECTION OPTION 7

8.1 Eligibility for Deferral for Existing Participants 7
8.2 Eligibility for Deferral for New Participants 7

9. PLAN ADMINISTRATION 8

9.1 Authority of Plan Administrator 8
9.2 Determinations by Plan Administrator 9

10. AMENDMENT OR TERMINATION OF THE PLAN 9

11. GENERAL PROVISIONS 9

11.1 Board Delegations 9
11.2 Non-Transferability of Rights and Interests 9
11.3 Sources of Payments 10
11.4 Severability 10
11.5 Limitation of Rights 10
11.6 Titles 10
11.7 Governing Law 10
11.8 Authorized Representatives 11
11.9 Certain Rights and Limitations 11
11.10 Compliance with Section 409A 11
11.11 Tax Withholding 11

1. PURPOSE AND SCOPE

1.1 ***Establishment***. The Tennessee Valley Authority ("TVA") hereby amends and restates in its entirety its short-term incentive program for officers and executives, which shall be known as the "Executive Annual Incentive Plan" ("EAIP" or "Plan"). The Plan supports TVA's compensation philosophy, which is designed to attract, retain, and engage employees needed to accomplish TVA's broad mission.

1.2 ***Purpose***. The Plan is designed to encourage and reward TVA officers and other Participants for their performance and contribution to the successful achievement of financial, operational, and individual goals.

This is accomplished by linking a significant element of variable annual compensation to the accomplishment of selected short-term financial, operational, and individual performance standards. The Plan, in conjunction with salary, provides total annual compensation opportunities similar to those found at competing companies, thus assisting TVA in retaining and recruiting executive talent critical to TVA's success.

2. DEFINITIONS

Wherever used herein, the following terms have the meanings set forth below, unless a different meaning is clearly required by the context:

2.1 "Authorized Parties" means the TVA Board of Directors ("Board") or its designees.

2.2 "Corporate Performance Goals" means the annual goals established for each Corporate Performance Measure.

2.3 "Corporate Performance Measures" means the specific metrics used to measure performance at the corporate level.

2.4 "EAIP Award" means the actual dollar amount awarded to a Participant under the EAIP.

2.5 "EAIP Incentive Opportunity" means the award opportunity expressed as a percent of the Participant's salary.

2.6 "Individual Performance Multiplier" means the adjustment to the EAIP Award based on the eligible Participant's individual achievements and performance.

2.7 “Participant” means TVA employees eligible to receive an award under the EAIP.

2.8 “Performance Cycle” means the period of time over which performance is measured for the purpose of awarding incentives.

2.9 “Plan Year” means TVA’s fiscal year (October 1 through September 30).

2.10 “Retirement” and like phrases mean an employee has met one of the following criteria: (i) the employee has reached the age of 55 with at least 10 years of full-time TVA service, (ii) the employee has reached the age of 60 with at least five years of full-time TVA service, or (iii) the employee is in the Civil Service Retirement System or Federal Employees Retirement System and is eligible for an immediate retirement benefit upon termination as outlined in the applicable plan.

2.11 “SBU” means a Strategic Business Unit within TVA.

2.12 “SBU Performance Goals” means the annual goals established for each SBU Performance Measure.

2.13 “SBU Performance Measures” means the specific metrics used to measure performance at the SBU level.

2.14 “Scorecard Achievement” means the level of performance compared to the approved performance measures and performance goals over the Performance Cycle (expressed as a percentage of performance).

2.15 “Section 409A” means Section 409A of the Internal Revenue Code and the regulations and other binding guidance thereunder.

2.16 “Separation from Service” and like phrases shall have the meaning set forth in 26 C.F.R. §1.409A-1(h), as such provision may be amended from time to time.

2.17 "Target EAIP Award” is the product of the Participant’s base salary (at the time an EAIP Incentive Opportunity is approved in accordance with this Plan) and the Participant’s EAIP Incentive Opportunity.

2.18 “Total Cash Compensation” means the Participant’s compensation that includes salary plus EAIP Award.

3. PARTICIPATION

An Authorized Party shall approve individual employees as Participants in accordance with delegations approved by the Board.

Eligibility is limited to officers and key managers serving in jobs within the Officer/Executive pay band.

4. PERFORMANCE CYCLE

The EAIP performance cycle follows TVA's fiscal year (October 1 through September 30).

5. PERFORMANCE MEASURES AND GOALS

The Plan incorporates the use of performance measures that focus primarily on the achievement of TVA's short-term financial and/or operational goals in key areas essential for the achievement of TVA's strategic objectives. Performance measures and goals are evaluated over the one-year period of the Performance Cycle. Performance measures, performance measure weighting, and the identification of performance goals for each performance measure will be (1) established for each Performance Cycle by the Board or its designee and (2) communicated by an Authorized Party.

The Board will generally set performance measures and goals within the first 90 days of the Performance Cycle. It is the intention of TVA that changes to the performance measures and goals will not be made during or at the conclusion of the Performance Cycle; however, the Board retains the right to do so in its discretion. The results of the performance measures and goals are approved for each Performance Cycle by the Board.

5.1 ***Corporate Performance Measures and Goals***. The Plan uses Corporate Performance Measures and Goals, which focus on key areas essential for the achievement of TVA's strategic priorities.

5.2 ***SBU Performance Measures and Goals***. The Plan may also use SBU Performance Measures and Goals, which focus on key areas essential for top performance in identified SBUs. When SBU Performance Measures and Goals are used for a Performance Cycle:

5.2.1 These measures will be focused on a balance among responsibility, rates, and reliability.

5.2.2 Achievement of the SBU Performance Measures and Goals is used in the determination of EAIP Awards for all Participants in TVA organizations that have SBU Performance Measures and Goals.

5.2.3 The SBU Performance Measures and Goals for each SBU will vary depending on the type of organization and its particular goals within TVA's strategic objectives.

5.2.4 Participants who are employed in organizations that are not tied to a specific set of SBU Performance Measures and Goals will have EAIP Awards determined based on the achievement of Corporate Performance Measures and Goals.

6. DETERMINATION OF AWARDS

6.1 ***Eligibility and Vesting***. To be eligible for an EAIP Award, the Participant must (1) be a TVA employee at the end of the Performance Cycle and (2) have been employed for a minimum of 90 consecutive days during the Performance Cycle. Participants with an annual performance review rating of "Unsatisfactory" are not eligible for an award.

Participants who meet eligibility requirements and fall into one of the following categories will receive a pro-rated award:

- Employed for less than the full Plan Year, or
- Leave Without Pay ("LWOP") for more than 30 days during the Plan Year (unless LWOP is due to a service-related injury or active military duty).

For the avoidance of doubt, a Participant has a vested right to an EAIP Award either (1) when he or she meets the eligibility requirements as defined above or (2) when he or she is entitled to an EAIP Award under Section 6.9.

6.2 ***EAIP Incentive Opportunity***. Annual EAIP Incentive Opportunities for each Participant are established based on market data, level of responsibility, and relationship with other TVA positions in order to ensure a consistent approach among TVA organizations. Annual EAIP Incentive Opportunities under the Plan are designed to align each position's Total Cash Compensation with relevant labor market practices. EAIP Incentive Opportunities for each Participant are approved in accordance with delegations approved by the Board.

6.3 ***Scorecard Achievement***. Scorecards have goals that are essential to TVA success and may include goals around performance of fleet assets, reliability to customers, TVA's impact on the environment, and overall financial and operational performance. Scorecard results for all Participants other than the CEO can range from 0% to 200%

depending on performance and can range from 0% to 150% for the CEO depending on performance.

6.4 ***Individual Performance Multiplier***. Actual EAIP Awards for eligible Participants may be adjusted, up or down, by an individual's supervisor/manager based on an evaluation of the Participant's individual achievements and performance over the Performance Cycle within a range of 0% to 150%. Final awards for all Participants will be approved in accordance with delegations approved by the Board.

6.5 ***Award Calculation*.** EAIP Awards for Participants other than the CEO are calculated as follows:

EAIP Award (225% Max)	=	Salary	X	Position's EAIP Incentive Opportunity %	X	Scorecard Achievement (0% - 200%)	X	Individual Performance Multiplier (0% - 150%)

EAIP Awards for the CEO will be calculated in the same manner except that the Scorecard Achievement will range from 0% to 150% instead of 0% to 200%.

6.6 ***Maximum Payout.*** The maximum payout after all factors are applied is 225% of the Participant's Target EAIP Award except for the CEO, whose maximum payout is 150% of the CEO's Target EAIP Award (the "Maximum Payout"). In the event that the Participant's EAIP Award calculation (as illustrated in Section 6.5) exceeds the Maximum Payout, the Participant's award will be adjusted not to exceed the Maximum Payout.

6.7 ***Standard Discretion and Award Adjustment***. The Board has established and can utilize a standard discretionary range to adjust the Scorecard Achievement by plus or minus 20 percent. This standard discretionary range allows the Board to account for extraordinary events or significant occurrences that impact TVA's performance, including (but not limited to) fatalities, major accidents, significant operational issues, regulatory/environmental violations, extraordinary operational performance during extreme weather, or early achievement of a strategic objective. The adjustment within this range reflects the Board's assessment of these events' impact on safety, operational integrity, and mission achievement.

Notwithstanding the previous paragraph, the Board, in its sole discretion, may reduce (to zero) or increase (in an amount not to exceed the Maximum Payout established in Section 6.6) EAIP Awards for any or all Participants. This ensures that the Plan remains flexible, promotes

accountability, and aligns with TVA's commitment to operational excellence and financial health.

6.8 ***Change in Position***. Awards are based on the Participant's base salary, the EAIP Incentive Opportunity assigned to the Participant's position, and TVA's achievement of performance measures and goals for the Performance Cycle. Participants who have a change in salary, incentive opportunity, or scorecard during a Performance Cycle as a result of a change in position or reclassification will have their EAIP Award calculated based on time in each position, salary, incentive opportunity, and/or scorecard during the Performance Cycle. Participants who change their full-time/part-time status during the Performance Cycle will receive a prorated EAIP Award based on time spent at part time and full time during the Performance Cycle.

6.9 ***Termination Prior to End of Performance Cycle.*** Participants who meet the eligibility requirements (e.g., employed 90 consecutive days during the Performance Cycle) and terminate employment with TVA before the end of the Performance Cycle for reasons that are beyond the Participant's control and acceptable to TVA may be eligible to receive a pro-rated EAIP Award.

Participants who meet the eligibility requirements (e.g., employed 90 consecutive days during the Performance Cycle) and terminate employment with TVA before the end of the Performance Cycle for reasons that are voluntary or who are terminated "for Cause" are not eligible for any EAIP Award.

If a Participant is terminated during the Performance Cycle and the participant is eligible for Retirement (as defined by Section 2.10), the Participant's eligibility for an EAIP Award shall be unaffected and the Participant will remain eligible for a prorated EAIP Award, if any, available to the Participant under the Plan upon Separation from Service. If eligible for Retirement, leaving for other reasons does not impact right to receive payment.

7. PAYMENT OF AWARDS

Except in the case of deferral, EAIP Awards will be paid in a lump sum during the first quarter of the next fiscal year following the Plan Year in which the awards are earned, typically late November to early December, but in no event will the EAIP Awards be paid later than December 15. EAIP Awards will be approved by an Authorized Party prior to payment in accordance with delegations approved by the Board. Each EAIP Award shall be paid in cash after deducting the amount of applicable federal, state, and local withholding taxes of any kind required by law to be withheld by TVA.

8. DEFERRAL ELECTION OPTION

Participants may defer the payment of EAIP Awards under the Plan in accordance with the criteria set forth below:

8.1 ***Eligibility for Deferral for Existing Participants.*** Participants who are employed by TVA before the performance measures and goals for a Performance Cycle have been established may be eligible to elect to defer all or a portion of any eligible EAIP Award for a Performance Cycle to the TVA Deferred Compensation Plan under the following conditions:

8.1.1 The deferral election must be made before the first day of the Performance Cycle;

8.1.2 The deferral election is irrevocable as of the date set forth in Section 8.1.1 above;

8.1.3 The deferral must be made in 1 percent increments of the actual EAIP Award;

8.1.4 Before the deferral election becomes irrevocable, the Participant must elect to have deferred amounts paid out in accordance with the options set forth in the TVA Deferred Compensation Plan; and

8.1.5 The Participant performs services at TVA continuously from the date the Participant's performance measures and goals are established through the date the deferral election is made.

8.2 ***Eligibility for Deferral for New Participants***. Participants who become eligible to participate in the Plan after the performance measures and goals for a Performance Cycle have been established and who have not at any time previously been eligible to participate in the Plan or in any other plan required to be aggregated and treated with the Plan as a single plan under Section 409A may be eligible to elect to defer a portion of any eligible EAIP Award for that Performance Cycle to the TVA Deferred Compensation Plan under the following conditions:

8.2.1 The deferral election must be made within thirty (30) days after the date the Participant becomes eligible to participate in the Plan;

8.2.2 The deferral is irrevocable as of the date set forth in Section 8.2.1 above;

8.2.3 The deferral must be made with respect to 1 percent increments of the actual EAIP Award;

8.2.4 The deferral election applies only with respect to compensation paid for services to be performed after the election is made; and

8.2.5 Before the deferral election becomes irrevocable, the Participant must elect to have deferred amounts paid out in accordance with the options set forth in the TVA Deferred Compensation Plan.

9. PLAN ADMINISTRATION

9.1 ***Authority of Plan Administrator***. The Plan shall be administered by the CEO or the designee of the CEO (the "Plan Administrator") unless otherwise delegated by the Board. When the CEO is a Participant, the Board or its designee shall be the Plan Administrator with respect to matters affecting the CEO. Subject to the express provisions of the Plan, the Plan Administrator shall have the power, authority, and sole and exclusive discretion to construe, interpret, and administer the Plan, including without limitation, the power and authority to make factual determinations relating to, and correct mistakes in, EAIP Awards and to take such other action in the administration and operation of the Plan as the Plan Administrator deems appropriate under the circumstances, including but not limited to the following:

9.1.1 The Plan Administrator may, from time to time, prescribe forms and procedures for carrying out the purposes and provisions of the Plan.

The Plan Administrator shall have the authority to prescribe the terms of any communications made under the Plan, to interpret and construe the Plan, any rules and regulations under the Plan, and the terms and conditions of any EAIP Award, and to answer all questions arising under the Plan, including questions on the proper construction and interpretation of the Plan.

9.1.2 The Plan Administrator may (1) notify each Participant that he or she has been selected as a Participant and (2) obtain from each Participant such agreements and powers and designations of beneficiaries as the Plan Administrator shall reasonably deem necessary for the administration of the Plan.

9.1.3 To the extent permitted by law, the Plan Administrator may at any time delegate such powers and duties to one or more other executives or managers, whether ministerial or discretionary, as the Plan Administrator may deem appropriate, including but not limited to, authorizing the Plan Administrator's delegate to execute documents on the Plan Administrator's behalf.

9.2 ***Determinations by Plan Administrator***. All decisions, determinations, and interpretations by the Plan Administrator regarding the Plan, any rules and regulations under the Plan, and the terms and conditions of or operation of any EAIP Award, shall be final and binding on all Participants, beneficiaries, heirs, or other persons holding or claiming rights under the Plan or any EAIP Award. The Plan Administrator shall consider such factors as it deems relevant, in its sole and absolute discretion, in making such decisions, determinations, and interpretations including, without limitation, the recommendations or advice of an Authorized Party or any other employee of TVA and such consultants and accountants as it may select.

10. AMENDMENT OR TERMINATION OF THE PLAN

The Board may at any time amend or terminate the Plan without the consent of any Participant, beneficiary, or other person; provided that TVA and the Plan Administrator, after any such termination, shall continue to have full administrative powers to take any and all action contemplated by the Plan which is necessary or desirable and to make payment of any outstanding awards earned by Participants in accordance with the terms of the Plan. No amendment or termination of the Plan may adversely affect, other than as specified in the Plan, any right acquired by any Participant or any beneficiary under an EAIP Award vested before the effective date of such amendment or termination. Upon termination of the Plan, distribution of vested EAIP Awards shall be made to Participants and beneficiaries in the manner and at the time described in Section 7, unless an Authorized Party determines in its sole discretion that all such amounts shall be distributed upon termination of the Plan.

11. GENERAL PROVISIONS

11.1 ***Board Delegations***. Approvals regarding awards under the Plan for each Participant, such as the Target EAIP Award opportunity and the amount of actual awards, will be made in accordance with delegations approved by the Board.

11.2 ***Non-Transferability of Rights and Interests***. Neither a Participant nor a beneficiary may alienate, assign, transfer or otherwise encumber his or her rights and interests under the Plan. No such interest or right to receive a distribution may be taken, either voluntarily or involuntarily, for the satisfaction of the debts of, or other obligations or claims against, such person, and any attempt to do so shall be null and void. In the event of a Participant's death, the Plan Administrator shall authorize payment of any EAIP Award due a Participant under the Plan to the Participant's beneficiary.

11.3 ***Sources of Payments.*** All EAIP Awards shall be payable out of TVA's general assets. Each Participant's or beneficiary's claim, if any, for the payment of an EAIP Award shall not be superior to that of any general and unsecured creditor of TVA. Nothing contained in the Plan and no action taken pursuant to the provisions of the Plan shall create or be construed to create a trust of any kind or a fiduciary relationship between TVA and any Participant, beneficiary, or other person. If an error or omission is discovered in any of the determinations, the Plan Administrator shall cause an appropriate equitable adjustment to be made in order to remedy such error or omission.

11.4 ***Severability***. In the event that any provision or portion of the Plan shall be determined to be invalid or unenforceable for any reason, the remaining provisions and portions of the Plan shall be unaffected thereby and shall remain in full force and effect to the fullest extent permitted by law.

11.5 ***Limitation of Rights***. Nothing in the Plan shall be construed to give any employee any right to be selected as a Participant or to receive an EAIP Award or to be granted an EAIP Award other than as is provided in this document. Nothing in the Plan or any EAIP Award issued pursuant to the Plan shall be construed to limit in any way the right of TVA to terminate a Participant's employment at any time, without regard to the effect of such termination on any rights such Participant would otherwise have under the Plan, or give any right to a Participant to remain employed by TVA in any particular position or capacity or at any particular rate of remuneration. During the lifetime of the Participant, only the Participant (or the Participant's legal representative) may exercise the rights and receive the benefits of any EAIP Award.

11.6 ***Titles***. The titles of the sections herein are included for convenience of reference only and shall not be construed as part of the Plan or have any effect upon the meaning of the provisions hereof. Unless the context requires otherwise, the singular shall include the plural and the masculine shall include the feminine. Such words as "herein," "hereafter," "hereof," and "hereunder" shall refer to this instrument as a whole and not merely to the subdivision in which such words appear.

11.7 ***Governing Law***. TVA is a corporate agency and instrumentality of the United States, and the Plan shall be governed by and construed under federal law. In the event federal law does not provide a rule of decision for any matter or issue under the Plan, the law of the State of Tennessee shall apply; provided, however, in no event shall Tennessee's choice of law provisions apply.

11.8 ***Authorized Representatives***. Whenever TVA under the terms of the Plan is permitted or required to do or to perform any act or matter or thing, it shall be done and performed by a duly authorized representative of TVA.

11.9 ***Certain Rights and Limitations***. The establishment of the Plan shall not be construed as conferring any legal rights upon any employee or other person for a continuation of employment, nor shall it interfere with the rights of TVA to discharge any employee and to treat any employee without regard to the effect that such treatment might have upon that employee as a Participant in the Plan.

11.10 ***Compliance with Section 409A***. At all times, to the extent Section 409A applies to amounts deferred under the Plan: (i) the Plan shall be operated in accordance with the requirements of Section 409A; (ii) any action that may be taken (and, to the extent possible, any action actually taken) by an Authorized Party, the Plan Administrator, and the Participants or their beneficiaries shall not be taken (or shall be void and without effect), if such action violates the requirements of Section 409A; (iii) any provision in the Plan that is determined to violate the requirements of Section 409A shall be void and without effect; and (iv) any provision that is required by Section 409A to appear in the Plan that is not expressly set forth shall be deemed to be set forth herein, and the Plan shall be administered in all respects as if such provision were expressly set forth herein. The payments of EAIP Awards, to the extent no deferral election is made, are intended to be interpreted, operated, and administered in a manner consistent with the short-term deferral exemption from Section 409A. No provision of the Plan is intended or shall be interpreted to create any right with respect to the tax treatment of the amounts paid hereunder, and TVA shall not, under any circumstances, have any liability to a Participant or Beneficiary for any taxes, penalties, or interest due on amounts paid or payable under the Plan, including taxes, penalties, or interest imposed under Section 409A.

11.11 ***Tax Withholding***. TVA is authorized to withhold from any EAIP Award taxes due or potentially payable in connection with any transactions involving the Plan and to take any other actions TVA may deem advisable to allow TVA to satisfy obligations for the payment of withholding taxes and other tax obligations related to any EAIP Award.

EXHIBIT 31.1

RULE 13a-14(a)/15d-14(a) CERTIFICATION

I, Jeffrey J. Lyash, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of the Tennessee Valley Authority;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 4, 2025

/s/ Jeffrey J. Lyash
Jeffrey J. Lyash
President and Chief Executive Officer

EXHIBIT 31.2

RULE 13a-14(a)/15d-14(a) CERTIFICATION

I, Thomas C. Rice, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of the Tennessee Valley Authority;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 4, 2025

/s/ Thomas C. Rice
Thomas C. Rice
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

EXHIBIT 32.1

**CERTIFICATION FURNISHED PURSUANT TO
SECURITIES EXCHANGE ACT RULE 13a-14(b)
OR RULE 15d-14(b) AND 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of the Tennessee Valley Authority (the "Company") for the quarter ended December 31, 2024, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Jeffrey J. Lyash, President and Chief Executive Officer of the Company, certify, for the purposes of complying with Rule 13a-14(b) or Rule 15d-14(b) of the Securities Exchange Act of 1934, as amended, and Section 1350 of Chapter 63 of Title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Jeffrey J. Lyash

Jeffrey J. Lyash
President and Chief Executive Officer
February 4, 2025

EXHIBIT 32.2

**CERTIFICATION FURNISHED PURSUANT TO
SECURITIES EXCHANGE ACT RULE 13a-14(b)
OR RULE 15d-14(b) AND 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of the Tennessee Valley Authority (the "Company") for the quarter ended December 31, 2024, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Thomas C. Rice, Senior Vice President and Chief Financial Officer of the Company, certify, for the purposes of complying with Rule 13a-14(b) or Rule 15d-14(b) of the Securities Exchange Act of 1934, as amended, and Section 1350 of Chapter 63 of Title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Thomas C. Rice

Thomas C. Rice

Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

February 4, 2025

ENCLOSURE 2

Clinch River Nuclear Site Construction Permit Application
Enclosure 5, Environmental Report
(Public Version)

TENNESSEE VALLEY AUTHORITY

Clinch River Nuclear Site Environmental Report

Construction Permit Application – Enclosure 5

Revision 0

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION 1-1

1.1 BACKGROUND 1-1

1.2 CONSTRUCTION PERMIT APPLICATION REVIEW 1-2

1.3 PROPOSED ACTION AND PURPOSE AND NEED 1-3

1.4 PLANNED ACTIVITIES AND SCHEDULE. 1-7

1.5 STATUS OF REVIEWS, APPROVALS, AND CONSULTATIONS. 1-7

1.6 REPORT CONTENTS 1-17

1.7 METHODOLOGY FOR ADDRESSING 10 CFR 51.50(c)(1) 1-17

1.8 NEW AND SIGNIFICANT INFORMATION 1-20

1.9 REFERENCES. 1-27

CHAPTER 2 AFFECTED ENVIRONMENT. 2-1

2.1 STATION LOCATION 2-1

2.2 LAND 2-5

2.3 WATER 2-9

2.4 ECOLOGY 2-26

2.5 SOCIOECONOMICS 2-47

2.6 GEOLOGY 2-51

2.7 METEOROLOGY AND AIR QUALITY 2-51

2.8 NONRADIOLOGICAL HEALTH 2-52

2.9 RADIOLOGICAL ENVIRONMENT AND RADIOLOGICAL MONITORING . . . 2-53

2.10 RELATED FEDERAL PROJECTS AND OTHER PROJECT ACTIVITIES . . . 2-53

2.11 REFERENCES. 2-53

CHAPTER 3 PLANT AND PROJECT DESCRIPTION. 3-1

3.1 EXTERNAL APPEARANCE AND PLANT LAYOUT 3-2

3.2 PLANT DESCRIPTION 3-21

TABLE OF CONTENTS

3.3 BUILDING ACTIVITIES - PLANT CONSTRUCTION 3-68

3.4 OPERATIONAL ACTIVITIES - PLANT OPERATIONS AND MAINTENANCE 3-76

3.5 REFERENCES 3-77

CHAPTER 4 ENVIRONMENTAL IMPACTS OF PLANT CONSTRUCTION 4-1

4.1 LAND USE 4-1

4.2 WATER RESOURCES 4-8

4.3 ECOLOGICAL RESOURCES 4-19

4.4 SOCIOECONOMICS 4-38

4.5 HISTORIC AND CULTURAL RESOURCES 4-42

4.6 AIR RESOURCES 4-46

4.7 NONRADIOLOGICAL HEALTH 4-46

4.8 RADIOLOGICAL HEALTH 4-46

4.9 NONRADIOACTIVE WASTE MANAGEMENT 4-47

4.10 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING BUILDING 4-48

4.11 REFERENCES 4-48

CHAPTER 5 ENVIRONMENTAL IMPACTS FROM OPERATION OF THE PROPOSED PLANT 5-1

5.1 LAND USE 5-1

5.2 WATER RESOURCES 5-2

5.3 ECOLOGICAL RESOURCES 5-9

5.4 SOCIOECONOMICS 5-11

5.5 HISTORIC AND CULTURAL RESOURCES 5-15

5.6 AIR RESOURCES 5-16

5.7 NONRADIOLOGICAL HEALTH 5-16

TABLE OF CONTENTS

5.8 RADIOLOGICAL HEALTH DURING NORMAL OPERATION 5-17

5.9 NONRADIOACTIVE WASTE MANAGEMENT 5-17

5.10 ENVIRONMENTAL IMPACTS OF POSTULATED ACCIDENTS. 5-18

5.11 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING OPERATION 5-21

5.12 REFERENCES. 5-21

CHAPTER 6 FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS 6-1

6.1 URANIUM FUEL CYCLE IMPACTS 6-1

6.2 TRANSPORTATION OF RADIOACTIVE MATERIALS 6-1

6.3 DECOMMISSIONING 6-2

6.4 SUMMARY OF URANIUM FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS 6-2

CHAPTER 7 IMPACTS OF REASONABLY FORESEEABLE FUTURE ACTIONS 7-1

7.1 HISTORIC AND CULTURAL RESOURCES 7-17

7.2 ALL OTHER RESOURCEs 7-18

7.3 CONCLUSIONS. 7-19

7.4 REFERENCES. 7-25

CHAPTER 8 NEED FOR POWER 8-1

8.1 NON-POWER GOALS AND ANCILLARY BENEFITS OF THIS PROJECT . . . 8-2

8.2 NEED FOR POWER 8-2

8.3 REFERENCES. 8-6

CHAPTER 9 ALTERNATIVES TO THE PROPOSED ACTION 9-1

9.1 NO ACTION ALTERNATIVE 9-1

9.2 ENERGY ALTERNATIVES 9-2

9.3 ALTERNATIVE SITES 9-3

TABLE OF CONTENTS

9.4 ALTERNATIVE PLANT SYSTEMS 9-3

9.5 REFERENCES 9-6

CHAPTER 10 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION 10-1

10.1 IMPACTS OF THE PROPOSED ACTIONS 10-1

10.2 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS 10-1

10.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES 10-9

10.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE HUMAN ENVIRONMENT 10-10

10.5 ALTERNATIVES TO THE PROPOSED ACTION 10-11

10.6 BENEFIT-COST BALANCE 10-12

10.7 REFERENCES 10-21

APPENDIX A CONSULTATIONS A-1

APPENDIX B NRC ESP FEIS TABLE J-2 COMPARISON B-1

APPENDIX C ENVIRONMENTAL PROTECTION PLAN (NON-RADIOLOGICAL) C-1

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
°C	Degrees Celsius
°F	Degrees Fahrenheit
ALARA	As Low As Reasonably Achievable
APE	Area of Potential Effects
BMP	Best Management Practices
BTA	Barge and Traffic Area
BWR	Boiling Water Reactor
CFR	Code of Federal Regulation
Ci	Curies
COC	Cycles of Concentration
CP	Construction Permit
CPA	Construction Permit Application
CRM	Clinch River Mile
CRN	Clinch River Nuclear
CRN-1	CRN Unit 1
CW	Circulating Water Supply
CWA	Clean Water Act
CWS	Circulating Water System
DBA	Design Basis Accident
DOE	U.S. Department of Energy
DRH	Division of Radiological Health
EA	Environmental Assessment
EFS	Equipment and Floor Drain System
e.g.	exempli gratia (for example)
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
ESP	Early Site Permit
ESPA	Early Site Permit Application
et seq.	et sequens (and the following)
ETTP	East Tennessee Technology Park
FEIS	Final Environmental Impact Statement
FLH	Fort Loudoun Hydroelectric Plant

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
FONSI	Finding of No Significant Impact
FP	Fossil Plant
FR	Federal Register
GAI	Geographic Area of Interest
GEH	GE Hitachi Nuclear Energy
GNF2	Fuel Assembly Produced by Global Nuclear Fuel
GPM	Gallons Per Minute
HP	Hydroelectric Plant
HPA	Habitat Protection Area
IC	Isolation Condenser
ICS	Isolation Condenser System
i.e.	Id est (that is)
IPaC	Information for Planning and Consultation
IPPP	Integrated Pollution Prevention Plan
IRP	Integrated Resource Plan
KIF	Kingston Fossil Plant
kV	Kilovolt
kW	Kilowatt
kWe	Kilowatt Electric
kWh	Kilowatt Hour
LLC	Limited Liability Company
LLRW	Low Level Radioactive Waste
LWMS	Liquid Waste Management System
LNAPL	Light Non-Aqueous Phase Liquid
LWR	Light Water Reactor
m	Meter(s)
MBTU	Million British Thermal Units
MHH	Melton Hill Hydroelectric Dam
MTBM	Micro-Tunnel Boring Machine
MTU	Metric Tons Uranium
MW	Megawatt(s)
MWD	Megawatt-Day
MWe	Megawatt Electric
MWt	Megawatt Thermal

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHS	Normal Heat Sink
NLCD	National Land Cover Database
NOI	Notice of Intent
NOx	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NRIC	National Reactor Innovation Center
OGS	Offgas System
OL	Operating License
OLA	Operating License Application
OREM	Oak Ridge Office of Environmental Management
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OW	Observation Well
PA	Programmatic Agreement
PCB	Polychlorinated biphenyl
pCi/g	Picocuries Per Gram
PCW	Plant Cooling Water
PEIS	Final Programmatic Environmental Impact Statement
PPE	Plant Parameter Envelope
RFFA	Reasonably Foreseeable Future Action
RG	Regulatory Guide
RIMS II	Regional Input-Output Modeling System
RO	Reverse Osmosis
ROD	Record of Decision
ROI	Region of Influence
SEIS	Supplemental Environmental Impact Statement
SMR	Small Modular Reactor
SME	Subject Matter Expert
SOx	Sulfur Oxides

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
SPCC	Spill Prevention Control and Countermeasures
SW	Service Water
SWMS	Solid Waste Management System
SWPPP	Stormwater Pollution Prevention Plan
SWS	Service Water System
TAC	Texas Administrative Code
TCA	Tennessee Code Annotated
ΔT	Change in River Water Temperature
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TN	Tennessee
TN 58	Tennessee Highway 58
TNSHPO	Tennessee State Historic Preservation Office
TPO	Tribal Preservation Officer
TRAM	Tennessee Rapid Assessment Method
TRM	Tennessee River Mile
TROC	Temperature-Rate-of-Change
TVA	Tennessee Valley Authority
TVAR	Tennessee Valley Archaeological Research
UF	Ultrafiltration
UHS	Ultimate Heat Sink
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WBRLMP	Watts Bar Land Management Plan
WWC	Wet Weather Conveyance

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION 1-1

1.1 BACKGROUND 1-1

1.2 CONSTRUCTION PERMIT APPLICATION REVIEW 1-2

1.3 PROPOSED ACTION AND PURPOSE AND NEED 1-3

1.3.1 Proposed Action 1-3

1.3.2 Purpose and Need 1-4

1.3.3 Plant Owners and Reactor Type 1-4

1.4 PLANNED ACTIVITIES AND SCHEDULE. 1-7

1.4.1 Pre-Application Public Involvement 1-7

1.4.2 Construction and Operations Schedule 1-7

1.5 STATUS OF REVIEWS, APPROVALS, AND CONSULTATIONS. 1-7

1.6 REPORT CONTENTS 1-17

1.7 METHODOLOGY FOR ADDRESSING 10 CFR 51.50(c)(1) 1-17

1.7.1 Demonstration That the Facility Design Falls within the Site Characteristics and Design Parameters in the ESP 1-17

1.7.2 Information to Resolve any Significant Environmental Issues that Were Not Resolved in the ESP Proceeding 1-18

1.7.3 Environmental Terms and Conditions 1-18

1.8 NEW AND SIGNIFICANT INFORMATION 1-20

1.8.1 Data Review Process 1-21

1.9 REFERENCES 1-27

LIST OF TABLES

Table 1.5-1 Consultations Required for the Construction Permit 1-8

Table 1.5-2 Authorizations Required for Preconstruction and Construction Activities 1-10

Table 1.5-3 Authorizations Required for Operation Activities 1-14

Table 1.7-1 Disposition of Issues Not Resolved in ESP Proceeding. 1-18

Table 1.8-1 Summary of Impact Findings and New and Significant Information Determinations 1-24

LIST OF FIGURES

Figure 1.3-1 CRN Site Location Map 1-6

Figure 1.8-1 Four-Step Data Review Process for CRN Site CPA ER Development 1-23

CHAPTER 1 INTRODUCTION

In accordance with the licensing process established by the United States (U.S.) Nuclear Regulatory Commission (NRC) in Title 10 of the Code of Federal Regulations (10 CFR) Part 50, *Domestic Licensing of Production and Utilization Facilities*, the Tennessee Valley Authority (TVA) is applying for a Construction Permit (CP) for the Clinch River Nuclear (CRN) Site in Oak Ridge, Roane County, Tennessee. 10 CFR 51.50, *Environmental report - construction permit, early site permit, or combined license stage*, establishes the requirements for the applicant's Environmental Report (ER) associated with the Construction Permit Application (CPA). This ER is prepared and submitted as part of TVA's CPA to construct one GE Hitachi Nuclear Energy (GEH) BWRX-300 small modular reactor (SMR) at the CRN Site. This project is hereafter referred to as CRN Unit 1 (CRN-1).

Issuance of a CP would represent NRC's approval for TVA to construct CRN-1. TVA has not yet decided to construct CRN-1. Certain construction activities are subject to TVA Board approval, the issuance of appropriate permits, and the completion of associated environmental reviews. TVA would need to submit an Operating License (OL) Application and the NRC would need to issue an OL to authorize operation of CRN-1. In accordance with NRC regulations, TVA has prepared this ER to analyze the potential environmental impacts associated with the construction, operation, and decommissioning of CRN-1. The NRC will use this ER to conduct an environmental review under the National Environmental Policy Act (NEPA), 42 U.S. Code 4321 et seq., which requires federal agencies to consider the potential environmental effects of proposed actions before making a decision to proceed (issuance of a CP).

This chapter is divided into the following sections:

- Background (Section 1.1)
- Construction Permit Application Review (Section 1.2)
- The Proposed Action and Purpose and Need (Section 1.3)
- Planned Activities and Schedule (Section 1.4)
- Status of Reviews, Approvals, and Consultations (Section 1.5)
- Report Contents (Section 1.6)
- Methodology for Addressing 10 CFR 51.50(c)(1) (Section 1.7)
- New and Significant Information (Section 1.8)
- References (Section 1.9)

1.1 BACKGROUND

In May 2016, TVA submitted an Early Site Permit (ESP) application to the NRC for the CRN Site. As part of the ESP application (ESPA), TVA also prepared an ER that supported the preparation of NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA for the CRN Site. The ESPA ER provided sufficient information to allow NRC to resolve the majority of environmental issues associated with construction and operation of two or more small modular reactors (SMRs) at the CRN Site with a combined nuclear generating

capacity not to exceed 2,420 megawatts thermal (MWt) (800 megawatts electric [MWe]) and a maximum rated thermal power for a single reactor core of 800 MWt. In April 2019, the NRC issued a FEIS for the CRN Site ESP. On December 19, 2019, NRC issued ESP-006 which provides NRC approval of the CRN Site for the development of new nuclear power units demonstrating the feasibility of SMR technology. ESP-006 is valid for 20 years from the day of issuance and expires on December 19, 2039.

As part of the process of issuing an ESP, the NRC evaluated whether the CRN Site is environmentally suitable for the generation of nuclear power, and if one or more SMRs producing up to 800 MWe could be safely sited, constructed, and operated at the CRN Site. This CPA ER incorporates the information presented in the ESPA ER, the NRC ESP FEIS, and ESP-006 by reference, updates relevant information, and presents new and significant information related to the impacts of construction and operation that were resolved in the ESP proceeding.

In June 2019, TVA released the *2019 Integrated Resource Plan* (IRP) (TVA, 2019b) and the associated IRP FEIS (TVA, 2019a). The IRP identified various generating resources that TVA intends to pursue to meet the energy needs of the TVA Power Service Area over a 20-year planning period. The 2019 IRP recommended that TVA continue to evaluate emerging nuclear technologies, including SMRs, as part of technology innovation efforts aimed at developing future electricity generation capabilities (TVA, 2019a). In September 2024, TVA released a new Draft IRP for public review and comment. The 2019 IRP remains valid and guides future generation planning consistent with least-cost planning principles until TVA's subsequent IRP is issued as final with any new or modified recommendations. In February 2022, TVA's Board of Directors announced a New Nuclear Program to explore advanced reactor options (TVA, 2022b).

In July 2022, TVA published the *Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement* (CRN PEIS) (TVA, 2022a) to assess the potential environmental impacts associated with site preparation, construction, operation, and decommissioning of an advanced nuclear technology park at the CRN Site. TVA's Record of Decision, signed on September 29, 2022, confirms TVA's selection of Alternative D, which determined that construction of one or more SMRs and/or advanced non-light-water reactors (LWRs) at Area 1 and one or more advanced non-LWRs at Area 2 was the preferred alternative. The BWRX-300 is one of the technologies evaluated in the CRN PEIS. This ER evaluates the environmental impacts associated with potential demonstration of the BWRX-300 technology within the footprint of Area 1 of the CRN PEIS.

In January 2025, TVA published the *Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Unit 1 Draft Supplemental Environmental Impact Statement* (CRN SEIS) to assess the environmental impacts associated with site preparation, construction, operation, and decommissioning of CRN-1.

1.2 CONSTRUCTION PERMIT APPLICATION REVIEW

The NRC considers matters that have been resolved in an ESP as resolved in a subsequent application for a CP or a Combined License (COL) that references the ESP. Because the NRC ESP FEIS contains unresolved items, TVA is providing information to resolve several significant environmental issues that were either not considered or not resolved in ESP-006.

The regulation in 10 CFR 51.50(a) does not address a CPA referencing an ESP issued under 10 CFR Part 52 (Subpart A, Early Site Permits). However, ESP-006 acknowledges that an applicant for a CP could reference the ESP. Therefore, TVA intends to conform with the requirements provided in 10 CFR 51.50(c) to incorporate ESP-006 into this ER supporting the CPA. As stated in 10 CFR 51.50(c)(1), an application referencing an ESP:

> *"…need not contain information or analyses submitted to the Commission in "Applicant's Environmental Report-Early Site Permit Stage," or resolved in the Commission's early site permit environmental impact statement, but must contain, in addition to the environmental information and analyses otherwise required:*
>
> - *information to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the early site permit;*
> - *information to resolve any significant environmental issue that was not resolved in the early site permit proceeding;*
> - *any new and significant information for issues related to the impacts of construction and operation of the facility that were resolved in the early site permit proceeding;*
> - *a description of the process used to identify new and significant information regarding the NRC's conclusions in the early site permit final environmental impact statement. The process must use a reasonable methodology for identifying such new and significant information; and*
> - *a demonstration that all environmental terms and conditions that have been included in the early site permit will be satisfied by the date of issuance of the combined license. Any terms or conditions of the early site permit that could not be met by the time of issuance of the combined license, must be set forth as terms or conditions of the combined license."*

10 CFR 52.39, *Finality of early site permit determinations*, paragraph (a)(2), states:

> *"…if the application for the construction permit or combined license references an early site permit, the Commission shall treat as resolved those matters resolved in the proceeding on the application for issuance or renewal of the early site permit, except as provided for in paragraphs (b), (c), and (d) of this section."*

Sections 1.7 and 1.8 describe TVA's conformance to 10 CFR 51.50(c)(1).

1.3 PROPOSED ACTION AND PURPOSE AND NEED

1.3.1 Proposed Action

The proposed action is the issuance of a CP by the NRC in accordance with the provisions of 10 CFR Part 50, which would allow TVA to demonstrate the capability to license and construct a SMR at the CRN Site.

1.3.2 Purpose and Need

The primary purpose of the proposed action is to demonstrate the feasibility to license, construct, and operate a SMR at the CRN Site. Section 1.1 of the ESPA ER and Section 1.3 of the NRC ESP FEIS describe TVA's proposed action, purpose and need, and objectives, which are incorporated here by reference.

The proposed action is needed to support the recommendations outlined in TVA's 2019 IRP to evaluate emerging nuclear technologies, including SMRs, as part of technology innovation efforts aimed at developing future electricity generation capabilities (TVA IRP, 2019a) and to enable TVA's Board of Directors to consider next steps in TVA's efforts to explore advanced reactor options (TVA, 2022b).

1.3.3 Plant Owners and Reactor Type

This section provides a brief description of the proposed project, the applicant and owner, the reactor type under evaluation, and other plant design features.

1.3.3.1 The Applicant and Owners

TVA is the applicant, owner, and sole point of contact with the NRC in matters related to this CPA ER. TVA is a corporate agency of the U.S. that provides electricity for business customers and local power distributors serving 10 million people in parts of seven southeastern states. As authorized by the Tennessee Valley Authority Act, TVA is committed to maintaining a national leadership role in technological innovation. An important element of TVA's statutory mission is to be a leader in the generation and distribution of affordable, reliable, increasingly clean power and a steward of the Tennessee Valley's natural resources. TVA currently maintains a fleet of seven nuclear units at three sites in two states. Compared to these large LWRs, SMRs offer advantages in enhanced safety, reduced construction time and cost, and reduced operating expenditures. TVA's efforts to demonstrate the ability to permit, license, construct, and operate this technology exhibit its leadership in a movement toward cleaner, lower-cost, and more reliable electricity for its customers and the region.

1.3.3.2 Site Location

The CRN Site is located on the northern bank of the Clinch River arm of the Watts Bar Reservoir (Reservoir) in Oak Ridge, Roane County, Tennessee. The CRN Site's shoreline stretches from approximately Clinch River Mile (CRM) 19.0 to approximately CRM 14.5. The CRN Site is approximately 7 miles east of Kingston, Tennessee, and approximately 25 miles west-southwest of Knoxville, Tennessee. Figure 1.3-1 shows the location of the CRN Site. Additional information regarding the CRN Site location is provided in Section 2.1.

1.3.3.3 Reactor Information

The BWRX-300 is a thermal fission boiling water reactor (BWR) that is light-water moderated, cooled with natural circulation, designed with passive safety systems, and is capable of producing a nominal gross electrical power output of 300 MWe. It is the tenth generation of the GEH BWR, an evolution of the 1,520 MWe Economic Simplified BWR previously licensed by the NRC. Additional information regarding the reactor is provided in Subsection 3.2.1.

1.3.3.4 Cooling System Information

The condenser cooling system is a recirculating (closed-cycle) cooling water system with makeup water supplied by the Reservoir. Makeup water is withdrawn from the Reservoir through a shoreline intake structure located at approximately CRM 17.9. Mechanical draft cooling towers provide condenser cooling. A discharge structure located downstream of the intake structure, at approximately CRM 15.55, conveys water from the blowdown holding pond to the Reservoir. Additional information regarding the cooling system is provided in Subsection 3.2.3.

1.3.3.5 Transmission System Information

CRN-1 is served by a 161-kilovolt (kV) switchyard. The existing Kingston Fossil Plant (FP) - Fort Loudon Hydroelectric Plant (HP) #1 161-kV transmission line is being looped into the CRN-1 switchyard and relocated along the western side of the CRN Site to connect to the new switchyard. Additionally, a new transmission line is looped into the existing Kingston FP - Bethel Valley HP #2 161-kV north of Bear Creek Road and across the northeastern and central portion of the CRN Site also connecting to the CRN-1 switchyard. Additional information regarding the transmission system is provided in Subsection 3.2.6.

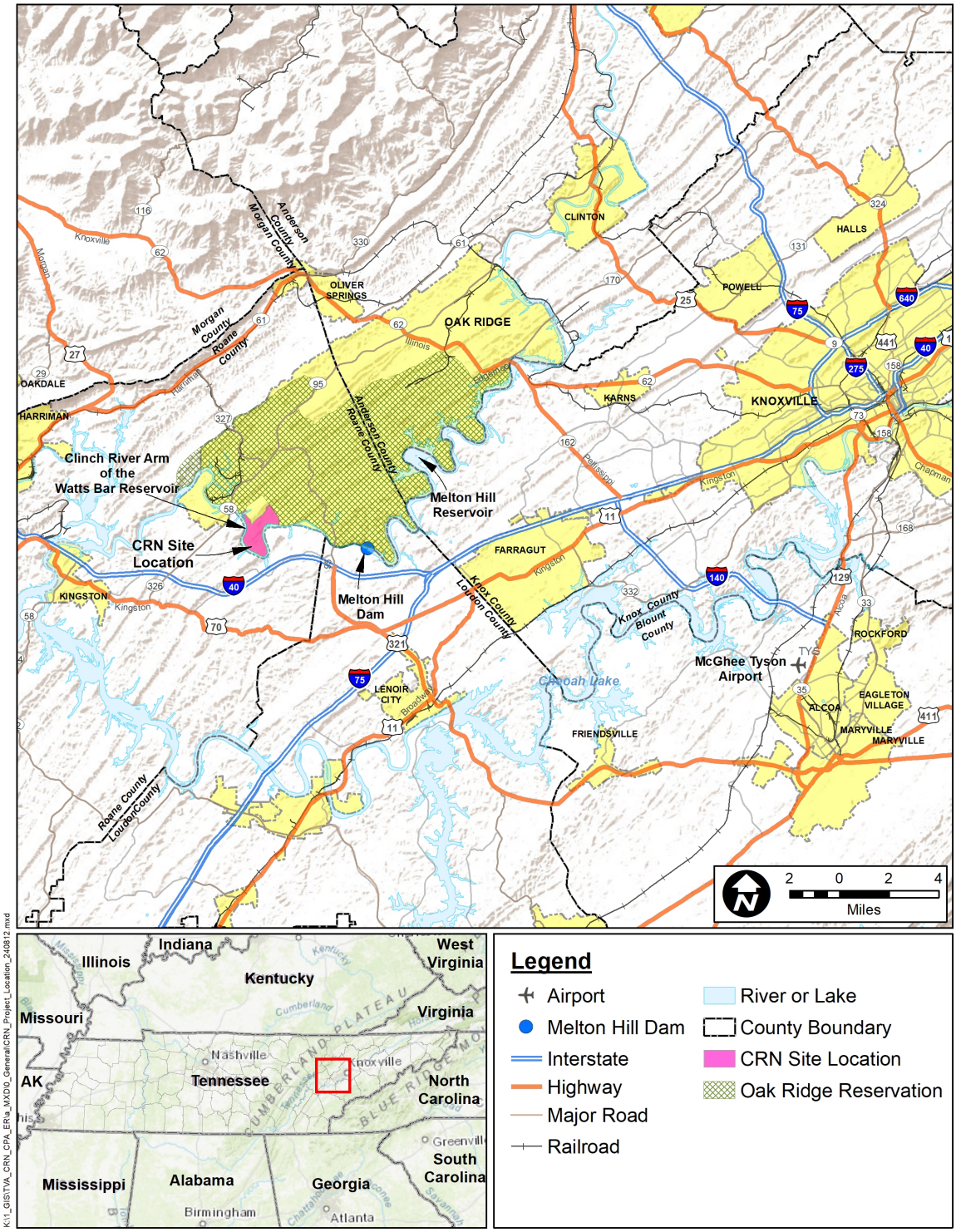


Figure 1.3-1 CRN Site Location Map

1.4 PLANNED ACTIVITIES AND SCHEDULE

1.4.1 Pre-Application Public Involvement

The possibility of deployment of CRN-1 at the CRN Site, and SMR development in general, has been publicized widely in the local and national press, trade journals, electronic media, and at professional conferences. TVA has participated in several NRC preapplication public meetings conducted virtually. These meetings have occurred since July 2022 and covered various technical topics. In addition to participation in NRC preapplication public meetings, TVA encourages public involvement during its NEPA reviews. TVA conducted two public webinars (in 2021 and 2022) for the CRN PEIS. TVA hosted a public webinar and an open house in February 2025 in association with the CRN Draft SEIS.

1.4.2 Construction and Operations Schedule

Subject to required regulatory approvals, appropriate environmental reviews, and a TVA Board decision to pursue construction of CRN-1, the following list contains generally estimated dates related to construction and operation:

- Initiation of Preconstruction: 2025
- Safety-Related Construction Begins: 2028
- Safety-Related Construction Ends: 2031
- Commercial Operation Begins: 2032

1.5 STATUS OF REVIEWS, APPROVALS, AND CONSULTATIONS

Numerous reviews, approvals, and consultations will be required for the preconstruction, construction, and operation of CRN-1. Appropriate consultations with federal, state, and local agencies required for the CP have been initiated and are listed in Table 1.5-1. Table 1.5-2 and Table 1.5-3 identify the following information for each authorization for preconstruction, construction, and operation:

- Permit/authorization
- Responsible agency
- Applicable law, ordinance, or regulation
- Principal environmental factors covered by the authorization
- Status of the authorization

**Table 1.5-1 Consultations Required for the Construction Permit
(Sheet 1 of 2)**

Agency	Authority	Requirement	Activity
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act, 16 USC 1536	Consultation regarding potential to adversely affect protected non-marine species	Concurrence with no adverse effect or consultation on appropriate mitigation measures
	Bald and Golden Eagle Protection Act, 16 USC 668-668c	Consultation regarding potential to adversely affect bald eagles	Concurrence with no adverse effect or consultation on appropriate mitigation measures
Tennessee Department of Environment and Conservation (TDEC) - Division of Natural Heritage and Tennessee Wildlife Resources Agency	Rare Species Protection and Conservation Act, TN Code §70-8-101	Consultation regarding potential to adversely affect protected species	Concurrence with no adverse effect or consultation on appropriate mitigation measures
Tennessee Historical Commission (THC)	National Historic Preservation Act, 16 USC 470 et seq.	Consultation with Tennessee State Historic Preservation Office (TNSHPO) regarding potential to adversely affect historic resources	Continue to comply with the stipulations of the 2016 *Programmatic Agreement between TVA, Tennessee State Historic Preservation Office, and the United Keetoowah Band of Cherokee Indians in Oklahoma regarding the management of historic properties affected by the Clinch River SMR Project*.
THC	National Historic Preservation Act 36 CFR Part 800	Section 106 Review: Consultation with TNSHPO to determine National Register of Historic Places listing of property	Concurrence with findings of Phase II cultural resources survey in accordance with the 2016 Clinch River SMR Programmatic Agreement

Table 1.5-1 Consultations Required for the Construction Permit (Sheet 2 of 2)

Agency	Authority	Requirement	Activity
TDEC - Division of Air Pollution Control	Clean Air Act, USC 42 et seq.	Consultation regarding potential adverse effects on ozone standards	Concurrence with no adverse effect or consultation on appropriate mitigation measures
US Army Corps of Engineers (USACE)	Federal Clean Water Act, 33 CFR 330 Rivers and Harbors Act, 33 USC 403	Consultation regarding potential adverse effects on waters of the United States	Concurrence with no adverse effect or consultation on appropriate mitigation measures

Table 1.5-2 Authorizations Required for Preconstruction and Construction Activities (Sheet 1 of 4)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
NRC	Atomic Energy and Energy Reorganization Acts 10 CFR 52 Subpart A	ESP	ESP-006; (issued 12-19-2019)	Site licensing, including safety-related construction activities and operation of a nuclear power facility (including the Source Material, Special By-Product Material, and Special Nuclear Material Licenses issued pursuant to 10 CFR Parts 30, 40, and 70 and addressed in the operating license application)
	10 CFR 50.23	Construction Permit		
	10 CFR 50.57	Operating License		
Federal Aviation Administration	Federal Aviation Act 49 USC 1501; 14 CFR 77	Construction Notice		Erection of structures greater than 200 feet high that potentially may affect air navigation
Tennessee Department of Transportation (TDOT)	TCA 54-5-302	Entrance Permits		Construction of entrances including ramps, driveways, and other access points Requires traffic studies and engineering designs to show design and potential impacts of proposed changes
TDOT	Tennessee Code Annotated (TCA) 54-5-302	Right-of-way permit		Installation of utilities in highway rights-of-way
USACE	Clean Water Act 33 CFR 323 and 330	Section 404 Permit		Filling-in of waters of the United States
	Rivers and Harbors Act 33 USC 403	Section 10 Permit		Dredge and fill activities for intake, discharge and barge structures in navigable waters of the United States

Table 1.5-2 Authorizations Required for Preconstruction and Construction Activities (Sheet 2 of 4)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
U.S. Coast Guard	Ports and Waterways Safety Act 33 USC 1221, et seq.	Private Aids to Navigation Permit		Construction of intake structure and discharge pipeline in navigable waters
U.S. Environmental Protection Agency (EPA) and TDEC	Resource Conservation and Recovery Act, Section 3010	Acknowledgement of Notification of Hazardous Waste Activity		Hazardous Waste Generation
	EPA Facility Response Plan (40 CFR 9 and 112), and the EPA Hazardous Waste Contingency Plan	Facility Response Plan Approval		Spill/Discharge Response Program
	Spill Prevention, Control and Countermeasures (SPCC) rule (40 CFR 112), Appendix F, Sections 1.2.1 and 1.2.2	SPCC/Integrated Pollution Prevention Plan (IPPP)		Spill/Discharge Prevention Plan
USFWS	Endangered Species Act Section 7 (16 USC 1536)	Consultation/Biological Assessment		Evaluation of effects on listed species
USFWS	Migratory Bird Treaty Act/ Executive Order 13186	Responsibility of Federal Agencies to Protect Migratory Birds		TVA is exempt from the Act requirements but complies voluntarily. TVA is subject to the Executive Order.
City of Oak Ridge		Sanitary Sewer connection		Connection to the city wastewater treatment system
		Potable Water		Extension of existing potable waterline

Table 1.5-2 Authorizations Required for Preconstruction and Construction Activities (Sheet 3 of 4)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
TDEC	Federal Clean Water Act (33 USC 1251 et seq.) and TCA §69-3-108: Tennessee Water Quality Control Act of 1977	Notice of Intent (NOI) for coverage under an Individual National Pollution Discharge Elimination System (NPDES) Permit for stormwater discharges associated with construction activities.		Discharges to waters of the state due to construction of the new plant, switchyards, and transmission lines. Construction/ operation of stormwater control measures (detention basins, etc.). Provided that pollution prevention measures are implemented, the construction general permit covers discharges associated with: • Construction activities • Construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) • Dewatering of work areas of collected stormwater and groundwater • Water used to wash vehicles • Water used to control dust • Routine building washdown • Uncontaminated groundwater • Unpolluted foundation or footing drains Appropriate dewatering controls include, but are not limited to: weir tank, dewatering tank, gravity bag filter, sand media particulate filter, pressurized bag filter, cartridge filter or other control units providing the level of treatment necessary to comply with permit requirements.

Table 1.5-2 Authorizations Required for Preconstruction and Construction Activities (Sheet 4 of 4)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
TDEC (continued)	Federal Clean Water Act (33 USC 1251 et seq.) and TCA §69-3-108: Tennessee Water Quality Control Act of 1977 (continued)	Stormwater Pollution Prevention Plan, to include Common Plan of Development, Soil Erosion and Sediment Control Plan (structural control measures, engineering design of sediment basin/controls for projects 10 acres or greater), etc.		Discharges to waters of the state due to construction of the new plant, switchyards, and transmission lines
		Aquatic Resource Alteration Permit required for alterations of a stream or wetland, including diversion of surface waters of the state.		Withdrawal of water from the Reservoir for cooling purposes Project construction within freshwater streams, wetlands, and transitional areas
		NOI for NPDES General Permit of Discharges from the Application of Pesticides (TNP100000)		Discharges of pesticides used for mosquito and other flying insect pest control, weed and algae control, animal pest control, and forest canopy pest control to waters of the state
		Sanitary Wastewater - Use of licensed wastewater hauler		Portable Facilities
TNSHPO/Tribal Preservation Officer (TPO)	Section 106 of the National Historic Preservation Act	As a federal agency, TVA is required to comply with Section 106, which includes TNSHPO/ TPO, and identification of potentially affected resources (i.e., a site survey).		Protection of archaeological and historical resources

Table 1.5-3 Authorizations Required for Operation Activities
(Sheet 1 of 3)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
U.S. Department of Transportation	Hazardous Material Transportation Act 49 CFR 107 Subpart G	Certificate of Registration		Transportation of hazardous materials
EPA and TDEC	Resource Conservation and Recovery Act, Section 3010	Acknowledgement of Notification of Hazardous Waste Activity		Hazardous Waste Generation
	EPA Facility Response Plan (40 CFR 9 and 112), and the EPA Hazardous Waste Contingency Plan	Facility Response Plan Approval		Spill/Discharge Response Program
	SPCC rule (40 CFR 112), Appendix F, Sections 1.2.1 and 1.2.2	SPCC/IPPP		Spill/Discharge Prevention Plan
City of Oak Ridge		Sanitary Sewer connection		Connection to the City Wastewater Treatment System
		Potable Water		Extension of existing potable waterline
TDEC	Federal Clean Water Act (33 USC 1251 et seq.) and Tennessee Code Annotated (TCA) §69-3-108: Tennessee Water Quality Control Act of 1977	NPDES Industrial Stormwater General Permit for plant operation activities; EPA Application Forms 2D (Application for Permit to Discharge Process Wastewater) and 2F (Application for Permit to Discharge Stormwater Discharges Associated with Industrial Activity)		Discharge of cooling water, service water, and stormwater runoff from plant operations

Table 1.5-3 Authorizations Required for Operation Activities
(Sheet 2 of 3)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
		Permanent Sanitary Wastewater		Connection to Wastewater Treatment Plant
	TCA §§69-7-301, et seq.	Water Resources Notification; Water Withdrawal Registration		Surface water withdrawal of an average of 10,000 gallons or more per day
	Federal Clean Air Act, 42 USC 7401	Title V Operating Permit; Prevention of Significant Deterioration Preconstruction Permit		Discharge of air pollutants from cooling tower(s), emergency generators, auxiliary boiler(s), and ancillary equipment
Texas Department of State Health Services, Radiation Control Program, Radiation Safety Licensing Branch	25 Texas Administrative Code (TAC) §289.252 "Licensing of Radioactive Material"	Emergency Plan for the response to an accident or incident involving shipments of radioactive waste Proof of financial responsibility such as insurance that the carrier has in order to comply with DOT requirements		Transportation of low-level radioactive waste (LLRW) to the Texas Disposal Facility
	25 TAC §289.257 "Packaging and Transportation of Radioactive Material"	Provide list of approved shipping containers along with their certificates of compliance or other certifying documentation. For a shipper that manufactures their own containers they must submit their quality assurance procedures.		Shipping of LLRW to the Texas Disposal Facility

Table 1.5-3 Authorizations Required for Operation Activities
(Sheet 3 of 3)

Agency	Authority	Requirement	License/ Permit No. and Status	Activity Covered
TDEC Division of Radiological Health (DRH)	TCA §68-23-212; TDEC Rule 0400-20-10-.32	Obtain a License-for-Delivery from the DRH (Form RHS 8-30). Persons whose activities result in the generation of radioactive waste have the primary responsibility to verify that a License-for-Delivery is obtained.		Transportation of radioactive waste within the State of Tennessee to a disposal/ processing facility

1.6 REPORT CONTENTS

This ER is organized as follows.

- Chapter 1 provides the purpose and need for the proposed action, the methodology used to prepare the ER, and the status of regulatory compliance and consultation activities.
- Chapter 2 describes the proposed site and environment that are affected by the construction and operation of CRN-1.
- Chapter 3 describes CRN-1 and its interfaces with the environment that are the bases for evaluating environmental impacts.
- Chapter 4 evaluates the environmental impacts of construction.
- Chapter 5 evaluates the environmental impacts of operations.
- Chapter 6 evaluates the impacts of the uranium fuel cycle, transportation of fuel associated with operating the facility, and decommissioning at the end of plant life.
- Chapter 7 evaluates the impacts of the proposed action in conjunction with other past, present, and reasonably foreseeable future actions in the vicinity of the CRN Site.
- Chapter 8 addresses the need for power.
- Chapter 9 addresses alternatives to the proposed action and alternative energy sources.
- Chapter 10 summarizes the environmental consequences of the proposed action.

If a topic was previously addressed and resolved in the ESPA ER, and there is no new and significant information, this ER identifies the sections of the ESPA ER and NRC ESP FEIS that address the topic and states that no new and significant information has been identified.

1.7 METHODOLOGY FOR ADDRESSING 10 CFR 51.50(c)(1)

This ER provides the supplemental information required by 10 CFR 51.50(c)(1). The following sections demonstrate how TVA intends to comply with the requirements provided in 10 CFR 51.50(c) to incorporate ESP-006 into this CPA.

1.7.1 Demonstration That the Facility Design Falls within the Site Characteristics and Design Parameters in the ESP

In accordance with NRC ESP FEIS Table J-1, Table 3.1-1 provides a comparison of the CRN-1 environmental site characteristics to the site characteristics identified in NRC ESP FEIS Tables I.1 and I.3.

In accordance with NRC ESP FEIS Table J-1, Table 3.1-2 provides a comparison of the CRN-1 site-related design parameters to the site-related design parameters identified in NRC ESP FEIS Table I.2.

Additionally, in accordance with NRC ESP FEIS Table J-2, Appendix B provides a comparison of the representations and assumptions TVA developed for CRN-1 to the NRC representations and assumptions identified in NRC ESP FEIS Table J-2. The comparison table provided in Appendix B is organized by technical area, consistent with NRC ESP FEIS Table J-2.

1.7.2 Information to Resolve any Significant Environmental Issues that Were Not Resolved in the ESP Proceeding

Several issues were not resolved in the ESP proceeding. The issues previously identified as unresolved in the NRC ESP FEIS, including the sections in which they are addressed, are listed in Table 1.7-1.

One issue that remains unresolved and is subject to further analysis in conjunction with the OL Application (OLA) is:

- Severe Accident Mitigation Alternatives (Subsection 5.10.3)

1.7.3 Environmental Terms and Conditions

10 CFR 51.50(c)(1)(v) requires an applicant to demonstrate that environmental terms and conditions that were included in the ESP be satisfied by the date of issuance of the COL. There were no relevant terms and conditions listed in ESP-006.

Table 1.7-1 Disposition of Issues Not Resolved in ESP Proceeding (Sheet 1 of 3)

Issue	NRC ESP FEIS Chapter/ Section(s)	Description of Issue in NRC ESP FEIS	CPA ER Chapter/ Section
Transmission System	Section 4.3	Potential impacts were evaluated. However, specific actions required to modify the transmission system could not be evaluated in the ESP application.	Onsite and near offsite transmission described in Section 3.2 and evaluated in Section 4.1, 4.3 and 5.5.
Payments in lieu of Taxes	Sections 4.4.3 and 5.4.3	In the ESP, TVA stated that estimates of impact-related payments were not possible at the time - Revisit impacts at CPA.	Section 4.4
Summary of economic impacts to the community	Section 4.4.2	Information about the specific costs of the proposed project were not available at the ESP stage.	Sections 4.4 and 5.4

Table 1.7-1 Disposition of Issues Not Resolved in ESP Proceeding (Sheet 2 of 3)

Issue	NRC ESP FEIS Chapter/ Section(s)	Description of Issue in NRC ESP FEIS	CPA ER Chapter/ Section
Consideration of conditions related to Clean Water Act (CWA) Section 401 certification	Sections 4.2 and 5.2	Considerations relevant to water quality impact assessment and permitting.	Sections 4.2 and 5.2
Consideration of impacts, avoidance and minimization measures related to Section 7 consultation for species listed under the Endangered Species Act (ESA)	Sections 4.3.1 and 5.3.1	Considerations relevant to terrestrial ecosystems impact assessment and Section 7 consultation.	Sections 4.3 and 5.3
Summary of Design Basis Accidents (DBAs)	Section 5.11	DBA selection in ESPA was based on a surrogate SMR. NRC Staff concluded impacts to be SMALL - DBAs to be revisited in CPA based on selection of a specific reactor design.	Section 5.9
Severe Accident Mitigation Alternatives	Section 5.11.3	Not required to be addressed in an ESP application per 10 CFR 51.50(b)(2) because this is a benefit-cost evaluation.	Deferred to OLA
Decommissioning financial requirements	Section 6.3	At the time of application submittal, NRC regulations (10 CFR 70.75) require certification that financial assurance for radiological decommissioning would be provided. The ESPA ER and NRC ESP FEIS both established that this assurance is not required for an ESP.	Deferred to OLA
Need for Power	Chapter 8	Not required to be addressed in an ESP application per 10 CFR 51.50(b)(2).	Chapter 8
Alternative Energy	Section 9.2	Not required to be addressed in an ESP application per 10 CFR 51.50(b)(2).	Section 9.2
Water treatment alternatives for the circulating water system (CWS)	Section 9.4	Not described in the ESPA ER. Thus, CWS water-treatment alternatives and water-treatment needs were not resolved in the NRC ESP FEIS.	Section 9.4

Table 1.7-1 Disposition of Issues Not Resolved in ESP Proceeding (Sheet 3 of 3)

Issue	NRC ESP FEIS Chapter/ Section(s)	Description of Issue in NRC ESP FEIS	CPA ER Chapter/ Section
Benefits and Costs (including Need for Power)	Section 10.5	Not required to be addressed in an ESP application per 10 CFR 51.50(b)(2).	Chapter 10 (Operational Costs deferred to OLA)

1.8 NEW AND SIGNIFICANT INFORMATION

To satisfy the requirements of 10 CFR 51.50(c)(1), TVA developed a data review process to identify any new and significant information for issues related to the impacts of construction and operation of the facility that were previously resolved in the ESP proceeding. The new and significant information determination was specifically focused on those categories for which the NRC came to an impact conclusion in the NRC ESP FEIS.

The NRC defines new information as any information that was:

- not considered in preparing the ESPA ER or NRC ESP FEIS, and
- not generally known or publicly available during the preparation of the NRC ESP FEIS.

For new information to be significant it must be material to the issue being considered. That is, it must have the potential to affect the finding or conclusions of the NRC staff's evaluation of the issue, as documented in the NRC ESP FEIS.

In accordance with 10 CFR 51.92, *Supplement to the final environmental impact statement*, (see 72 Federal Register [FR] 49431) the identification of information that may be "new and significant" is dependent upon the analysis of the issues related to the impacts of construction and operation of the facility that were resolved in the ESP proceeding. Information that may differ from (or potentially exceed) the values or assumptions in the NRC ESP FEIS Appendix I or J (respectively), are assessed as they relate to the analysis of impacts. Differences in plant parameter values or the magnitude of environmental effects are only considered as new and significant information if the differences affect (or change) the impact finding for the issue relative to the NRC staff's conclusion in the NRC ESP FEIS.

The following subsections describe the process to determine new and significant information. Table 1.8-1 summarizes the new and significant information for each resource category.

1.8.1 Data Review Process

The data review process for this ER was implemented by qualified subject matter experts (SMEs), licensing specialists, engineers, and environmental professionals using a thorough and systematic four-step process to evaluate key inputs. The four-step process depicted in Figure 1.8-1 considered the impact of each key data input on ER findings relative to the NRC ESP FEIS. A brief summary of the four-step process is provided in the following subsections.

1.8.1.1 Step 1: Determine Key Input

Key inputs applicable to each resource category were identified from both the ESPA ER and the NRC ESP FEIS and were used to compile a Master List of key inputs for preparation of the CPA ER. For the purposes of this ER, "key inputs" are information or assumptions that the NRC staff relied on to support their findings and conclusions in the NRC ESP FEIS. The Step 1 process included the following elements:

- Identify. The NRC ESP FEIS and ESPA ER were reviewed by SMEs for each resource category to identify key inputs for each resource category.
- Compile. The Master List of key inputs was compiled.
- Sort. Based on an initial review of current environmental conditions, SMEs identified data needs and data gaps. Key inputs were categorized and sorted by type.

Information about the affected environment and its interactions with the proposed action are found in the NRC ESP FEIS. The NRC included key site characteristics and plant parameter values in Appendix I and representations and assumptions in Appendix J of the NRC ESP FEIS. Using this information, key inputs were identified for resource categories described or assessed in various chapters of the NRC ESP FEIS and related to the characteristics of the affected environment, the proposed action, and environmental impacts.

1.8.1.2 Step 2: Determine if New Information Exists

Key inputs were reviewed to determine if new information exists. Elements of the Step 2 process for obtaining inputs, designs, and parameters included:

- conducting initial reviews of key designs and studies as identified in annotated outline review;
- issuing design reports and studies for SME review;
- SME identification of key input values, key designs, and studies; and
- SME consultation with agencies and external experts, as appropriate.

Finally, the TVA team integrated the new information into the Master List of key inputs which is used in Step 3 to facilitate evaluation against conditions and inputs represented in the NRC ESP FEIS.

Key inputs and relevant information were evaluated by various means, including reviews of previous data collected in support of the CRN PEIS, reviews of new environmental resource data, resource analyses, and the completion of project-specific preliminary designs and technical reports.

Based on the new information for each key input and its potential environmental impacts, SMEs determined whether the information was either confirmatory or notable:

- Confirmatory - key inputs for which information was effectively the same or substantially similar to that considered by NRC in the ESP FEIS
- Notable - key inputs for which the information was new and not previously considered or substantially different from that considered by the NRC in the ESP FEIS

Key inputs determined to be notable were considered to be relevant and a discussion of new and notable information was incorporated into the ER.

1.8.1.3 Step 3: Assess Impacts and Determine Significance

SMEs used best professional judgement as NEPA practitioners to:

- Assess impacts. By considering key inputs, the magnitude of the impact, timing, context, and sensitivity of resource issues were evaluated.
- Compare and Determine Changes in Significance. Based on the updated considerations of potential environmental impacts, qualified SMEs completed the assessment process by assigning appropriate impact findings consistent with the NRC definitions in the NRC ESP FEIS and by documenting the underlying assumptions or basis for the impact finding. Those resources for which the impact finding was either greater or less than that determined by NRC were identified.
- Make New and Significant Information Determination. Resources identified as having an impact finding that was either greater or less than that determined by NRC were determined to represent new and significant information and appropriately documented.

1.8.1.4 Step 4: Document New and Significant Determination for ER

Relevant supporting information and conclusions resulting from the data review process were incorporated into this ER. Appropriate sections of this ER include a description and evaluation of the information that was reviewed and a summary regarding its significance relative to prior NRC impact findings.

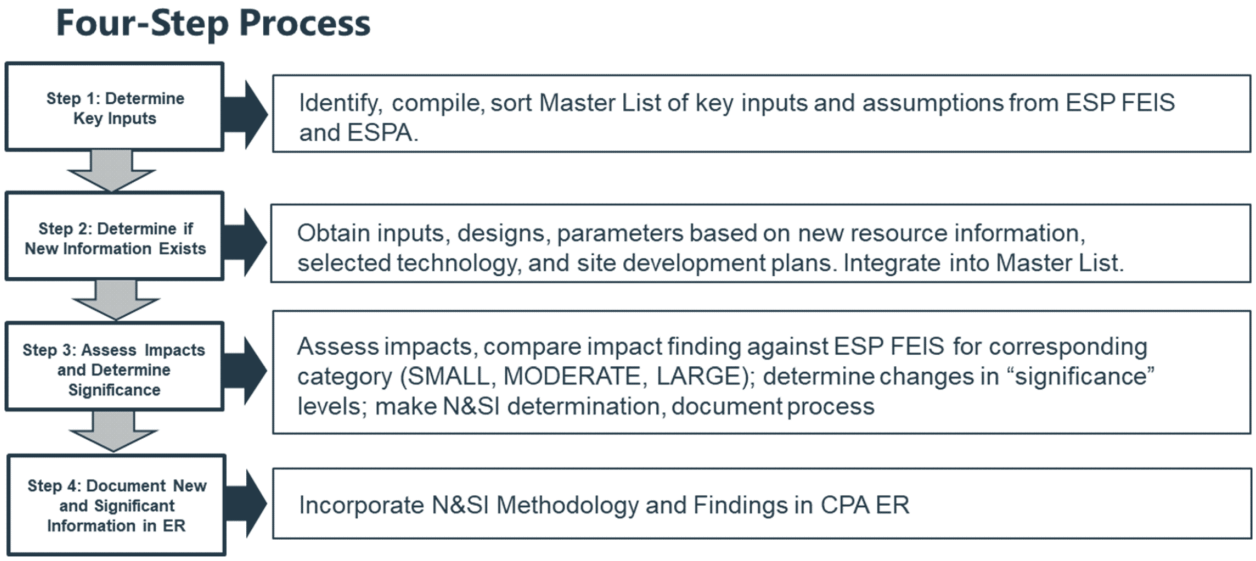


Figure 1.8-1 Four-Step Data Review Process for CRN Site CPA ER Development

Table 1.8-1 Summary of Impact Findings and New and Significant Information Determinations (Sheet 1 of 3)

Resource Category	Building		Operation	
	Impact	Determined to be New and Significant Information (Yes/No)	Impact	Determined to be New and Significant Information Determination (Yes/No)
Land Use				
Site and Vicinity	MODERATE	No	SMALL	No
Water-Related				
Hydrologic Alterations-Surface Water	SMALL	NA	SMALL	NA
Hydrologic Alterations-Groundwater	SMALL	NA	SMALL	NA
Water Use - Surface Water	SMALL	No	SMALL	No
Water Use - Groundwater Use	SMALL	No	SMALL	No
Water Quality - Surface Water	SMALL	No	SMALL	No
Water Quality - Groundwater	SMALL	No	SMALL	No
Ecology				
Terrestrial Ecosystems	MODERATE	No	SMALL	No
Aquatic Ecosystems	SMALL	No	SMALL	No
Socioeconomics				
Physical Impacts	SMALL to MODERATE	No	SMALL to MODERATE (Aesthetics)	No
Demography	SMALL	No	SMALL	No

Table 1.8-1 Summary of Impact Findings and New and Significant Information Determinations (Sheet 2 of 3)

Resource Category	Building		Operation	
	Impact	**Determined to be New and Significant Information (Yes/ No)**	**Impact**	**Determined to be New and Significant Information Determination (Yes/No)**
Economic Impacts on the Community	SMALL (beneficial to region)	No	SMALL (beneficial to region)	No
Infrastructure and Community Services	SMALL (for all categories except Traffic), MODERATE to LARGE (Traffic)	No	SMALL to MODERATE (Recreation)	No
Historic And Cultural Resources (Onsite Direct and Indirect Effects Area of Potential Affect)	SMALL	Yes	SMALL	No
Meteorology and Air Quality	SMALL	No	SMALL	No
Nonradiological Human Health	SMALL to MODERATE	No	SMALL to MODERATE	No
Radiological Health	SMALL	No	SMALL	No
Non-Radioactive Waste Management	SMALL	No	SMALL	No
Postulated Accidents	NA	No	SMALL	No

Table 1.8-1 Summary of Impact Findings and New and Significant Information Determinations (Sheet 3 of 3)

Resource Category	Building		Operation	
	Impact	Determined to be New and Significant Information (Yes/No)	Impact	Determined to be New and Significant Information Determination (Yes/No)
Fuel Cycle, Transportation, and Decommissioning	NA	No	SMALL	No

NA = Not applicable because NRC did not make an impact finding for this resource.

1.9 REFERENCES

Tennessee Valley Authority (TVA), 2019a. Integrated Resource Plan. Vol. II Final Environmental Impact Statement.

TVA, 2019b. Integrated Resource Plan. Vol. I Final Resource Plan.

TVA, 2022a. Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement, Roane County, Tennessee, July 2022.

TVA, 2022b. TVA Board Authorizes New Nuclear Program to Explore Innovative Technology. Feb 10, 2022. Website: https://www.tva.com/newsroom/press-releases/tva-board-authorizes-new-nuclear-program-to-explore-innovative-technology#:~:text=The%20New%20Nuclear%20Program%20will,to%20support%20future%20energy%20needs, accessed July 5, 2022.

TABLE OF CONTENTS

CHAPTER 2 AFFECTED ENVIRONMENT 2-1

2.1 STATION LOCATION 2-1

2.1.1 Project Setting Related to other Principal Land Uses 2-2

2.1.2 CRN Site Utilization Plan 2-2

2.2 LAND 2-5

2.2.1 Land Use and Land Cover 2-5

2.2.2 Borrow Sites 2-5

2.2.3 Watts Bar Reservoir Land Management Plan 2-6

2.2.4 Associated Offsite Transmission Line 2-6

2.3 WATER 2-9

2.3.1 Hydrology 2-9

2.3.2 Water Use 2-11

2.3.3 Water Quality 2-11

2.4 ECOLOGY 2-26

2.4.1 Terrestrial Ecology 2-26

2.4.2 Aquatic Ecology 2-33

2.5 SOCIOECONOMICS 2-47

2.5.1 Demography 2-47

2.5.2 Community Characteristics 2-47

2.5.3 Historic Properties 2-48

2.6 GEOLOGY 2-51

2.7 METEOROLOGY AND AIR QUALITY 2-51

2.7.1 Climate 2-51

2.7.2 Regional Air Quality 2-52

2.7.3 Severe Weather 2-52

TABLE OF CONTENTS

2.8 NONRADIOLOGICAL HEALTH 2-52

2.9 RADIOLOGICAL ENVIRONMENT AND RADIOLOGICAL MONITORING . . . 2-53

2.10 RELATED FEDERAL PROJECTS AND OTHER PROJECT ACTIVITIES . . . 2-53

2.11 REFERENCES 2-53

LIST OF TABLES

Table 2.2-1 U.S. Geological Survey Land Cover for the Associated Offsite 161-kV Transmission Corridor 2-7

Table 2.3-1 Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas 2-16

Table 2.3-2 Updated Surface Water Resources (Streams/Ponds) on the TVA CRN Site and Associated Offsite Areas 2-19

Table 2.3-3 Summary of Gradients of Selected Onsite Streams 2-20

Table 2.4-1 Extent of Habitat Types for the CRN Site and Associated Offsite Areas 2-35

Table 2.4-2 Wetlands Delineated in the CRN Site and Associated Offsite Areas, 2021/2023 2-36

Table 2.4-3 Federally and State-Listed Terrestrial Animal Species Documented Within Roane County and Within 5 Miles of the CRN Site and Associated Offsite Areas 2-39

Table 2.4-4 Plant Species of Conservation Concern Previously Reported from within 5 Miles of the CRN Site and Federally Listed Plants with Potential to Occur within the CRN Site and Associated Offsite Areas 2-41

Table 2.4-5 Taxonomic Composition of Macrophyte Species Occurring in the Clinch River arm of the Watts Bar Reservoir from CRM 14.1 to CRM 23.1 and Melton Hill Reservoir from CRM 23.1 to 53.5 2-43

LIST OF FIGURES

Figure 2.1-1 CRN Site 6-Mile Vicinity Map 2-3

Figure 2.1-2 CRN-1 Site Utilization Plan 2-4

Figure 2.2-1 CRN Site and Offsite Areas Land Cover Types 2-8

Figure 2.3-1 Identified Surface Water Resources on the CRN Site and Associated Offsite Areas 2-21

Figure 2.3-2 Surface Water Drainages within the CRN Site 2-22

Figure 2.3-3 Profiles and Valley Cross Sections of Selected Streams on the CRN Site 2-23

Figure 2.3-4 Average and Range of Hourly Water Temperature in the Tailwater below MHH (data from 2004 to 2022) 2-24

Figure 2.3-5 Evaluation of Thermal Pancake as Related to Releases from MHH under Summer Conditions 2-25

Figure 2.4-1 Updated Habitat Map of the CRN Site, BTA, and Offsite 161-kV Transmission Corridor 2-44

Figure 2.4-2 Sensitive Habitat Features for Important Species on the CRN Site, BTA, and Offsite 161-kV Transmission Corridor 2-45

Figure 2.4-3 Location of Aquatic Macrophyte Growth Areas in the Clinch River Arm of the Watts Bar Reservoir Adjacent to the CRN Site 2-46

CHAPTER 2 AFFECTED ENVIRONMENT

In accordance with Title 10 of the Code of Federal Regulations (CFR) Part 51, *Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions*, and in keeping with the guidance provided in NUREG-1555, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan*, and Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations*, the Environmental Report (ER) must contain a description of environmental conditions. Chapter 2 incorporates by reference the affected environment documented in NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA for the Clinch River Nuclear (CRN) Site and vicinity for key inputs for which no new information was identified and key inputs for which new information was determined to be confirmatory of the conditions considered in the NRC ESP FEIS. Additionally, Chapter 2 presents a discussion of new and notable information related to each resource area.

This chapter also provides a broad, in-depth examination of the environmental setting, including, but not limited to, characteristics of the land, water (both surface and groundwater), terrestrial and aquatic ecology, aspects of demographics, air quality, potential additional federal actions in the area of the proposed site, and non-radiological health topics.

This chapter is divided into the following sections:

- Station Location (Section 2.1)
- Land (Section 2.2)
- Water (Section 2.3)
- Ecology (Section 2.4)
- Socioeconomics (Section 2.5)
- Geology (Section 2.6)
- Meteorology and Air Quality (Section 2.7)
- Nonradiological Health (Section 2.8)
- Radiological Environment and Radiological Monitoring (Section 2.9)
- Related Federal Projects and Other Project Activities (Section 2.10)
- References (Section 2.11)

2.1 STATION LOCATION

The CRN Site Early Site Permit Application (ESPA) ER Section 2.1 and NRC ESP FEIS Section 2.1 describe the station location and immediate vicinity, including a description of the project, specific location of the CRN Site within the State of Tennessee (TN), and access to the site. This section addresses new information regarding the station location and the immediate vicinity. The NRC ESP FEIS did not identify any issues regarding station location that were not resolved.

Having implemented the process described in Section 1.8, Tennessee Valley Authority (TVA) identified new and notable information regarding the following:

- Project setting related to other principal land uses
- CRN Site utilization plan

This new and notable information is addressed in the following subsections.

2.1.1 Project Setting Related to other Principal Land Uses

TVA expanded the TVA managed Grassy Creek Habitat Protection Area (HPA) by 14 acres as a mitigation measure to provide additional protection to the state-listed rigid sedge and pale green orchid species that are located in this area. This mitigation measure was associated with potential impacts to these plants that could occur due to loss of habitat in the offsite 161-kilovolt (kV) transmission corridor that crosses through the Grassy Creek HPA. This 161-kV transmission corridor is new and was not addressed in the ESPA ER or the NRC ESP FEIS. The updated extent of the Grassy Creek HPA is reflected in Figure 2.1-1 and Figure 2.1-2.

2.1.2 CRN Site Utilization Plan

Figure 2.1-2 presents information related to the CRN Site Utilization Plan. The new information addresses CRN Unit 1 (CRN-1) and key project features necessary to support CRN-1, proposed transmission corridors, the barge landing area, roadway access, the adjacent Grassy Creek HPA, and other relevant features. Detailed information related to proposed transmission corridors, including lengths and widths, is provided in Subsection 3.2.6.1.

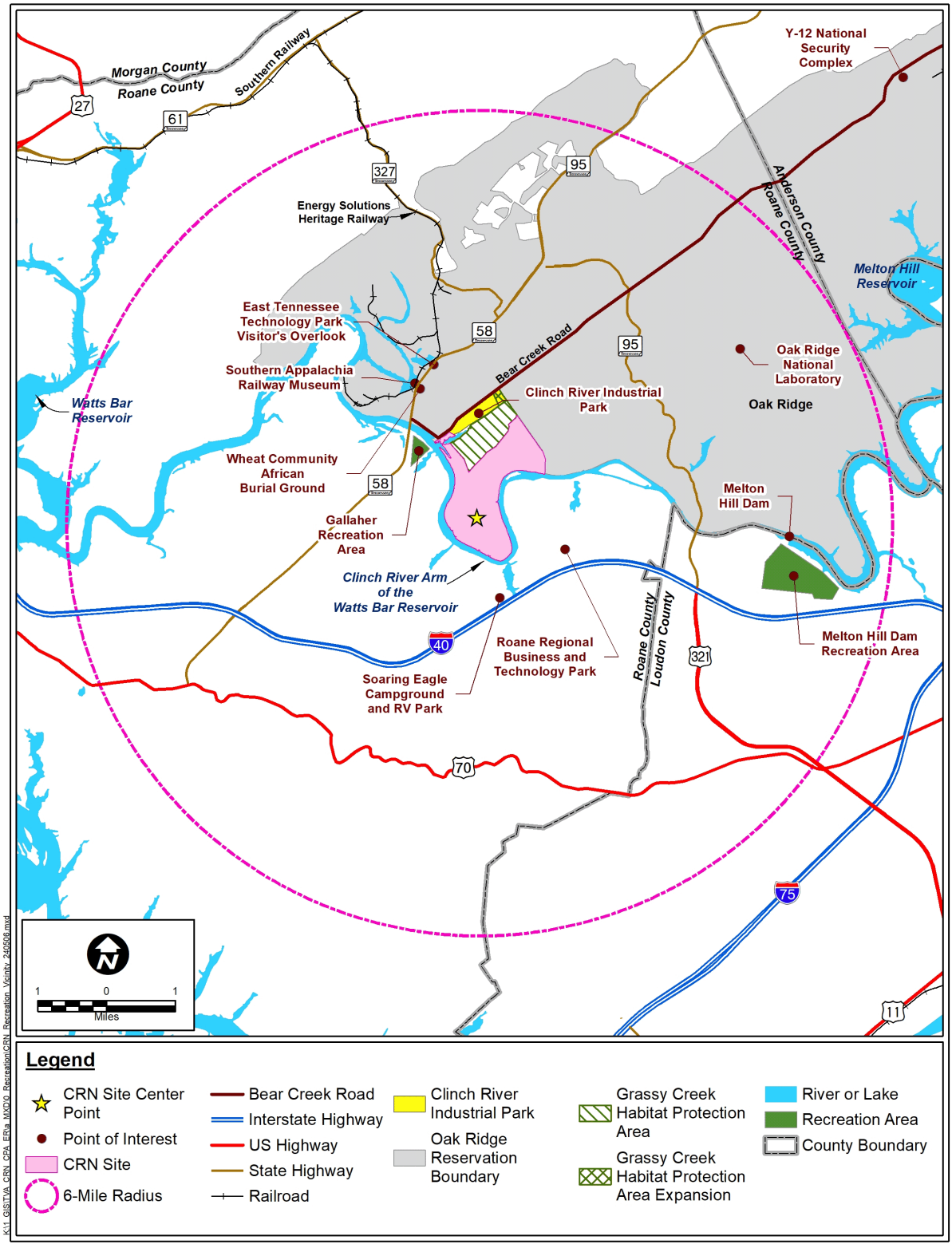


Figure 2.1-1 CRN Site 6-Mile Vicinity Map

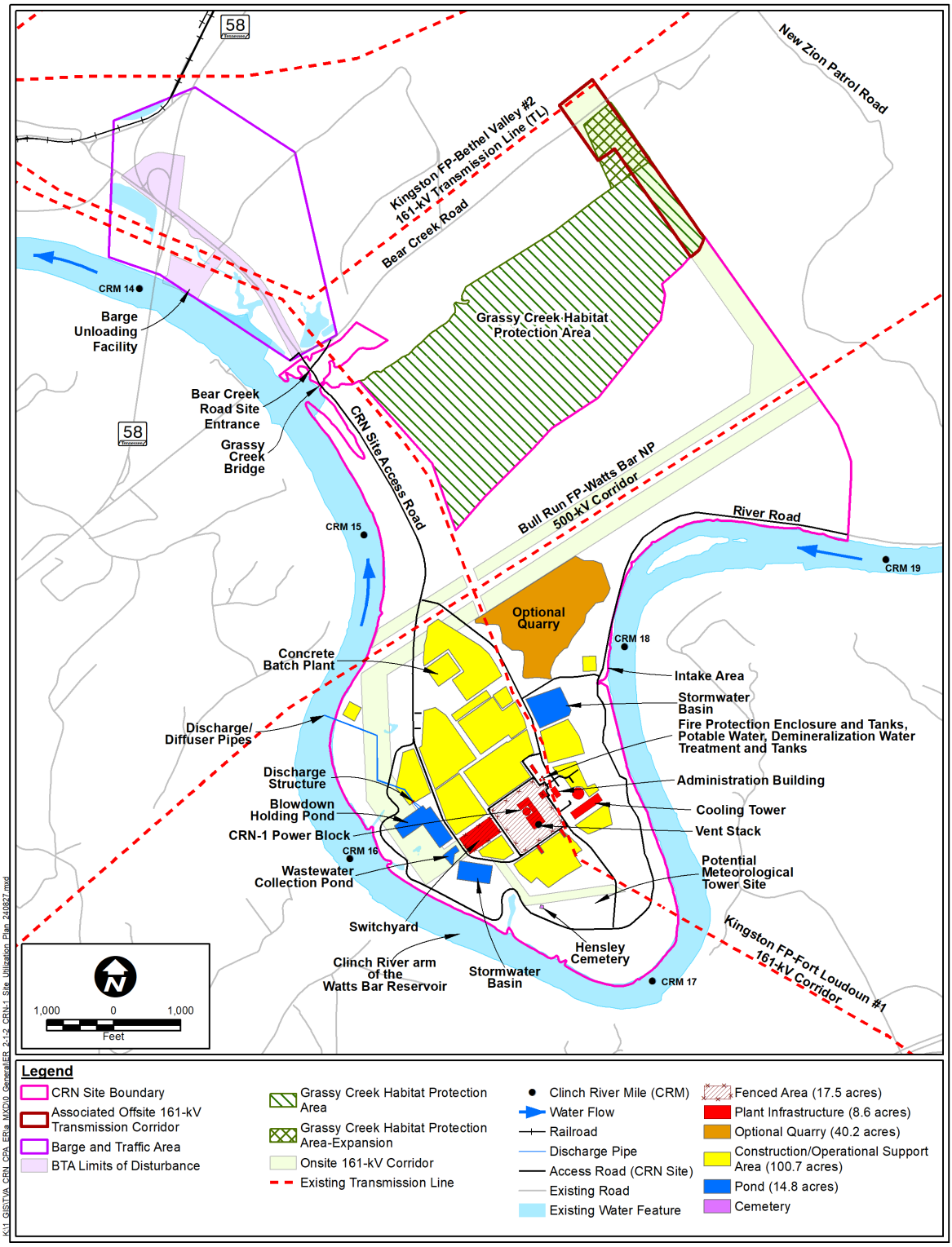


Figure 2.1-2 CRN-1 Site Utilization Plan

2.2 LAND

ESPA ER Section 2.2 and NRC ESP FEIS Section 2.2 describe the environment at the CRN Site and vicinity in relation to land use. The NRC ESP FEIS identified one issue that was not resolved for land related to transmission lines. In the ESPA ER, TVA noted that exact locations required to modify the transmission system as a result of the proposed reactor units could not be precisely estimated and would be considered at the combined license application stage. This section addresses new information regarding land use.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- The City of Oak Ridge land use plan

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Land use and land cover
- Borrow sites
- Watts Bar Reservoir Land Management Plan (WBRLMP)
- Associated offsite transmission line

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.2.1 Land Use and Land Cover

Land cover on the CRN Site, the Barge and Traffic Area (BTA), and the associated offsite 161-kV transmission corridor is shown in Figure 2.2-1. New and notably different land cover information for the CRN Site includes plans for an approximately 29 acre offsite 161-kV transmission corridor, addressed in Subsection 2.2.4 below. As shown in Table 2.2-1, the land cover within this proposed transmission corridor is predominantly forested and includes deciduous forest, woody wetland, mixed forest, and developed open space.

2.2.2 Borrow Sites

TVA is evaluating the development of an onsite quarry as an option to supply borrow material needed for construction of CRN-1. The optional quarry facility is located near the center of the CRN Site, just south of the 500-kV line, as depicted in Figure 2.1-2. TVA is also evaluating the potential to obtain borrow material from an offsite quarry as an alternative to developing the onsite quarry. Both alternatives are evaluated as part of a bounding analysis for selection during detailed design. As part of this bounding analysis, TVA has identified an existing permitted quarry, Midway Quarry, where suitable backfill material is available. Midway Quarry is located approximately 59 miles northeast of the CRN Site.

2.2.3 Watts Bar Reservoir Land Management Plan

As part of managing its reservoirs, TVA establishes land use zones within reservoir management plans. TVA's Natural Resource Plan (TVA, 2011) establishes seven land planning zones. In the 2009 WBRLMP, portions of the CRN Site were allocated to Zone 2 (Project Operations) and to Zone 3 (Sensitive Resource Management/Natural Area). This information was conveyed in the NRC ESP FEIS. However, in February 2021, TVA re-designated Parcel 144 to Zone 2 (Project Operations) (TVA, 2021a). More recently, TVA determined that the entire CRN Site is a power asset, not a reservoir asset subject to the requirements of the Natural Resources Plan (TVA, 2023), and it will be removed from the WBRLMP and managed by the TVA power program.

The CRN Site is adjacent to the Grassy Creek HPA, which is designated as Zone 3 (Sensitive Resource Management/Natural Area) in the WBRLMP (TVA, 2021a). As described above and in Section 2.1, the associated offsite 161-kV transmission line that extends offsite from the CRN Site and crosses Bear Creek Road would also cross through a portion of the Grassy Creek HPA. Due to potential impacts to state-listed plants located in this offsite transmission corridor, TVA has expanded the Grassy Creek HPA by 14 acres as a mitigation measure (see Section 2.1).

2.2.4 Associated Offsite Transmission Line

The associated offsite 161-kV transmission corridor interconnects with the Kingston Fossil Plant - Bethel Valley Hydroelectric Plant #2 transmission line that parallels a portion of Bear Creek Road. This line extends from the interconnection point on DOE-managed land on the north side of Bear Creek Road (approximately 5 acres), crossing through TVA land south of the road through the northeastern part of the Grassy Creek HPA (approximately 24 acres), before entering the CRN Site. This transmission corridor is shown in Figure 2.2-1.

Table 2.2-1 U.S. Geological Survey Land Cover for the Associated Offsite 161-kV Transmission Corridor

Type	Acres	Percent
Deciduous Forest	22.0	75
Developed, Low Intensity	0.3	1
Developed, Open Space	2.0	7
Evergreen Forest	0.1	0(1)
Hay/Pasture	1.5	5
Mixed Forest	1.1	4
Woody Wetlands	2.1	7
Total(1)	29.2	100.0

Source: Dewitz, 2021

Column total may not equal sum of individual values due to rounding

1) 0 entries are associated with trace values.

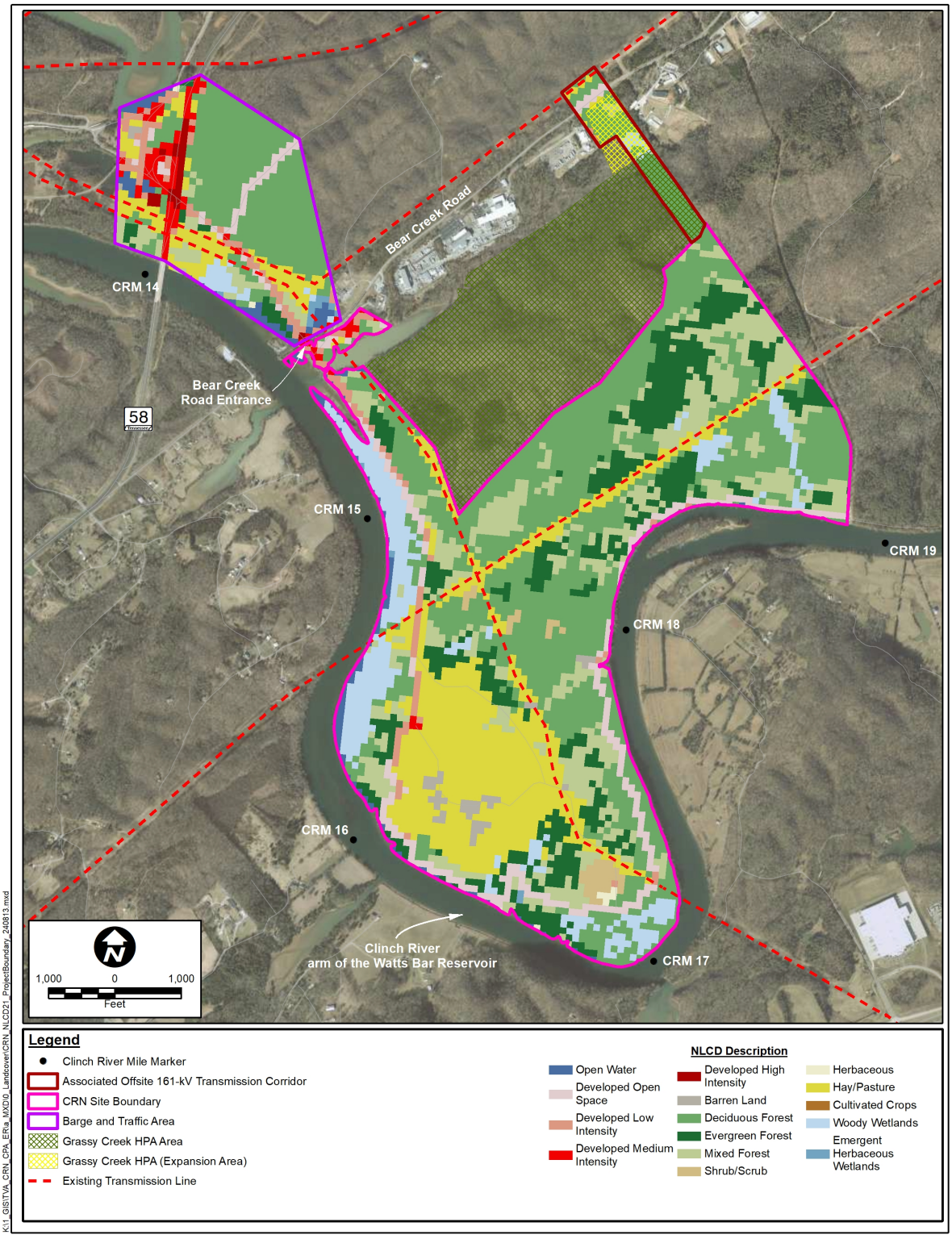


Figure 2.2-1 CRN Site and Offsite Areas Land Cover Types

2.3 WATER

ESPA ER Section 2.3 and NRC ESP FEIS Section 2.3 describe the environment at the CRN Site and vicinity in relation to water resources. This section addresses new information regarding water resources on the CRN Site and associated offsite areas.

2.3.1 Hydrology

ESPA ER Section 2.3.1 and NRC ESP FEIS Subsection 2.3.1 describe the environment at the CRN Site and vicinity in relation to hydrology.

2.3.1.1 Surface Water Hydrology

ESPA ER Subsection 2.3.1.1 and NRC ESP FEIS Subsection 2.3.1.1 describe surface water hydrology. The NRC did not identify any issues regarding surface water hydrology that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Watts Bar Reservoir characteristics
  - Water elevations
  - Bathymetry
  - Sediment transport characteristics
  - Other physical attributes

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Identified surface water resources
- Physical characteristics of onsite drainages

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.3.1.1.1 Identified Surface Water Resources

In 2021, TVA updated the surface water resource delineations and functional assessments for streams and ponds located on the CRN Site in conjunction with the preparation of the *Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement* (CRN PEIS) (TVA, 2022). Specific surface water resources identified on the CRN Site and associated offsite areas are illustrated in Table 2.3-1 and Figure 2.3-1.

Table 2.3-2 provides a summary comparison of the 2021 survey results of non-wetland surface water resources to those previously included in ESPA ER Subsection 2.3.1.1.1.5 and NRC ESP FEIS Subsection 2.3.1.1.1. New information includes quantification of length/area of surface water resources. The 2021 surface water resource delineation identified fewer ponds, perennial streams, and wet weather conveyances (WWCs) and two additional intermittent streams within the CRN Site project area. The reduced number of ponds on the CRN Site is due to the reclassification of all or parts of onsite ponds as wetland areas (e.g., W007, W011, W028) or the redesignation of a feature as a constructed non-wetland depression (e.g., P03). Additionally, there were notably fewer WWCs found in the BTA in the 2021 surface water resource survey because the survey focused on the narrower areas of anticipated impact rather than the entirety of the BTA. Differences among identified streams and WWCs are also due to the reclassification of these resources based upon field observation during the updated delineation and the addition of the associated 161-kV offsite transmission corridor.

Wetland resources are discussed in Section 2.4.

2.3.1.1.2 Physical Characteristics of Onsite Drainages

There are numerous drainage areas within the CRN Site. Drainage areas and drainage profile lengths and slopes vary. Elevations at drainage divides vary but can exceed 950 feet, or approximately 220 feet above the normal water surface elevation of the Clinch River arm of the Watts Bar Reservoir (Reservoir). Drainage lengths may exceed 3,500 feet. Headwater slopes at the tops of drainages are typically quite steep, ranging from 20 to 25 percent. Onsite drainages are shown in Figure 2.3-2.

Slopes of representative identified stream segments on the CRN Site (Figure 2.3-3) were assessed that included STR04, STR05, STR07, STR10, and STR11. Stream segments are relatively short (i.e., less than 1,000 feet). Slopes are variable, ranging from short, upper-profile slopes of greater than 12 percent to less than 0.5 percent. Some stream segments are uniform slopes (STR05, STR10, STR11) and two defined stream segments (STR04, STR07) included a compound slope. Table 2.3-3 summarizes estimated representative slopes for the defined stream segments. Lower profile slopes are provided for those streams onsite with a compound slope.

2.3.1.2 Groundwater

ESPA ER Subsection 2.3.1.2 and NRC ESP FEIS Subsection 2.3.1.2 describe groundwater hydrology. The NRC ESP FEIS did not identify any issues regarding groundwater hydrology that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Seasonal trends in water levels and groundwater flow pathways
- Measured or calculated groundwater parameters including gradient and velocity
- Onsite groundwater levels in vicinity of the optional quarry

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.3.2 Water Use

ESPA ER Section 2.3 and NRC ESP FEIS Subsection 2.3.2 describe the environment at the CRN Site and vicinity in relation to water use.

2.3.2.1 Surface Water

ESPA ER Subsection 2.3.1.2 and NRC ESP FEIS Subsection 2.3.2 describe surface water use. The NRC ESP FEIS did not identify any issues regarding surface water use that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Net water demand in the Clinch River watershed
- Non-consumptive and consumptive water use
- Water demand and capacity for the City of Oak Ridge

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.3.2.2 Groundwater

ESPA ER Subsection 2.3.2.2 and NRC ESP FEIS Subsection 2.3.2.2 describe groundwater use. The NRC ESP FEIS did not identify any issues regarding groundwater use that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Regional groundwater use levels
- Well locations within 1.5 miles of the CRN Site

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.3.3 Water Quality

ESPA ER Section 2.3 and NRC ESP FEIS Subsection 2.3.2 describe the environment at the CRN Site and vicinity in relation to water quality.

2.3.3.1 Surface Water Quality

ESPA ER Subsection 2.3.3.1 and NRC ESP FEIS Subsection 2.3.2.3 describe surface water quality. The NRC ESP FEIS did not identify any issues regarding surface water quality that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Onsite and vicinity surface water quality
- Surface water quality in onsite stormwater retention ponds
- State monitoring and the Tennessee Department of Environment and Conservation (TDEC) 303(d) list

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Temperature data for the Reservoir
- Sediment characteristics for the Reservoir

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.3.3.1.1 Temperature Data for Clinch River Arm of Watts Bar Reservoir

Updated average water temperature data is available from TVA that characterizes average temperatures in the tailwater of Melton Hill Hydroelectric Dam (MHH). This data set provides eight years of temperature monitoring data in addition to those included in the NRC ESP FEIS. While MHH operations are expected to continue in the same manner during construction and operation of CRN-1, the Bull Run Fossil Plant on Melton Hill Reservoir (upstream of the CRN Site) ceased operation at the end of 2023 (TVA, 2021b). As such, future water temperature fluctuations and seasonal variability are expected to exhibit a reduced range and degree of stratification relative to existing conditions. Average water temperatures in the tailwater of MHH for the period from 2004 to 2022 are shown in Figure 2.3-4 (TVA, 2023b).

Temperature was further characterized along the Reservoir by TVA. Mean temperatures in the Reservoir range between approximately 45 degrees Fahrenheit (°F) and 75°F, which are similar to temperatures documented in the NRC ESP FEIS.

2.3.3.1.1.1 Baseline Hydrothermal Modeling

Hydrothermal two-dimensional modeling was conducted using the Watts Bar Ce-Qual-W2 model to evaluate ambient (baseline) conditions within the Reservoir.

Model runs were set up for both summer and winter conditions, exploring a range of MHH releases from minimum daily average flows required by the *Reservoir Operations Study Environmental Impact Statement* to more typical seasonal flows. All flows were input to the model as hourly values that represent actual operations of the dams. Other model input parameters, such as water temperature data, Watts Bar headwater elevations, and meteorology, were also input on an hourly basis. Modeling focused on the months of July and March to evaluate worst case conditions for water temperature compliance. These months were chosen because water temperatures usually peak in the East Tennessee Region in late July. In the wintertime, the

lowest flows often occur in mid- to late-March because water is retained in Norris and other storage reservoirs valley-wide to facilitate filling of the reservoir pools toward summer levels, resulting in reduced flows downstream. Watts Bar Reservoir also undergoes an approximate 5-foot pool elevation change between winter and summer pool levels. March represents winter pool conditions under typical operating conditions and usually has a range of cold to warm weather conditions and periods of low flow (TVA, 2023b).

Modeling indicated that under certain conditions, a thermal "pancake" of warm surface water extends from Watts Bar Hydroelectric Dam (WBH) up to Fort Loudoun Hydroelectric Dam (FLH) and also extends nearly up to MHH (see Figure 2.3-5). This pancake is a layer of hot surface water created by hot weather conditions, solar radiation, particularly on very sunny days with little wind, and lower summer flows from the dams. The position and thickness of the thermal pancake varies with the volume of the MHH releases, the FLH releases, outflows at WBH, and meteorology.

The cool water releases from MHH and FLH have the effect of temporarily shifting the upper end of the thermal pancake upstream or downstream based on whether or not the dams are generating electricity. Importantly, sudden large releases from MHH in the summer may have the effect of pushing the upstream end of the thermal pancake downstream past the CRN Site, creating the potential for a temperature-rate-of-change or a change in temperature relative to ambient conditions in which the water quality of the Reservoir exceeds water temperature compliance parameters (TVA, 2023b). This potential exists without the existence of CRN-1.

2.3.3.1.2 Sediment Characteristics within the Clinch River Arm of the Watts Bar Reservoir

As the result of hazardous and radioactive contamination of benthic sediments from historical practices and activities that occurred on the Oak Ridge Reservation in the vicinity of White Oak Creek upstream of the CRN Site, the Reservoir from Clinch River Mile (CRM) 0.0 to CRM 44 is designated as a Comprehensive Environmental Response, Compensation, and Liability Act site (U.S. Environmental Protection Agency [EPA], 1997). Contaminants exceeding background levels in 2015, as identified by the NRC ESP FEIS, included aluminum, boron, lithium, potassium, and cesium-137 (NRC and U.S. Army Corps of Engineers [USACE], 2019).

In 2011, sediment samples were collected at CRMs 15.5, 18.5, and 22.0 to characterize contaminants in benthic sediments. In 2023, sediment samples were collected at CRMs 14.0, 15.0, 18.0, and 21.5 to characterize contaminants for comparison.

Due to riverine conditions in the Reservoir reach, depositional areas were lacking in the mid-channel area. The mid-channel substrates were predominantly composed of varying proportions of bedrock, cobble, gravel, sands, and/or mollusk shells. Depositional areas were encountered only at near-shore locations, primarily where bank structures divert enough river flow to reduce velocities enough to allow suspended sediments (silts and clays) to be deposited. Additionally, only shallow layers (up to four inches deep) of depositional sediments were encountered, and most depositional sediments were mixed with a high proportion of sand.

The 2023 analytical results of the sediment samples were compared to EPA Region 4 ecological screening values for freshwater sediments (EPA, 2018), as well as constituent concentrations in sediment samples collected between 2010 and 2022 at far-field locations upstream (Melton Hill Reservoir, CRM 24.5) and downstream (Watts Bar Reservoir, Tennessee River Mile [TRM] 532.5 and TRM 560.8) of the CRN Site. The EPA's ecological screening values are provided as a reference point only. Results exceeding these screening values do not necessarily indicate that constituent concentrations were elevated above background for the given area/region (TVA, 2023c).

Polychlorinated biphenyls (PCBs) and pesticides were not detected in the sediment samples collected in the vicinity of the CRN Site, and metals concentrations were below EPA Region 4 ecological screening values. Additionally, the sediments collected in the vicinity of the CRN Site had lower metals concentrations than typically found in more lacustrine environments within TVA reservoirs. Measurement of radiological parameters detected low concentrations of gross alpha and gross beta that ranged from 2.86 to 24.4 picocuries per gram (pCi/g). Additionally, results for cesium-137, radium-226, and radium-228 ranged from 0.012 to 3.083 pCi/g. By comparison, ecological screening criteria values for radium-226 and radium-228 are substantially higher (100 and 90 pCi/g, respectively) than those recorded in sampling (TVA, 2023c).

The lack of high depositional areas near the CRN Site likely resulted in sediments having higher fractions of sands and gravels, or coarse particulates, than typically encountered in more lacustrine environments where velocity is not sufficient to keep fine silts and clays in suspension. Higher fractions of coarse particulates can influence (reduce) the amount of adsorbed chemicals (chlorinated pesticides, PCBs, and most metals) present. Surficial sediments (upper 1.5 inches) collected at the far-field locations in Melton Hill and Watts Bar Reservoirs were found to contain detectable concentrations of PCB Aroclor 1242 in some years. Furthermore, TDEC's Division of Water Pollution Control has issued fish consumption advisories for Melton Hill and Watts Bar Reservoirs due to PCBs (TVA, 2023c).

Results of these analyses indicated that the sediments in the Reservoir near the CRN Site are of higher quality than prior characterizations. In accordance with the terms of the 1991 Watts Bar Interagency Agreement that includes the USACE, DOE, TDEC, and the EPA, TVA consulted with the Watts Bar Interagency Working Group regarding the sediment sampling results. On July 30, 2024, the Watts Bar Interagency Working Group concluded the results are below the risk-based action level of concern.

2.3.3.2 Groundwater Quality

ESPA ER Subsection 2.3.3.2 and NRC ESP FEIS Subsection 2.3.2.4 describe groundwater quality. The NRC ESPA FEIS did not identify any issues regarding groundwater quality that were not resolved. However, the NRC ESP FEIS did indicate the contamination previously reported in observation well (OW)-422L would need to be addressed and dispositioned by TVA following a determination by TDEC.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Onsite groundwater quality

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- OW-422 Cluster

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.3.3.2.1 OW-422 Cluster

In 2023, TVA conducted sampling and analysis of groundwater at OW-422U, OW-422L, and OW-422D and performed a petroleum forensic evaluation for groundwater and light non-aqueous phase liquids (LNAPL) on the groundwater sample collected from OW-422L. The sampling and analysis indicated:

- the presence of total petroleum hydrocarbons in groundwater samples collected from OW-422L, OW-422U, and OW-422D;
- volatile organic compounds below laboratory reported detection levels in groundwater samples collected from OW-422U and OW-422D;
- benzene and toluene concentrations that exceed corresponding EPA maximum contaminant level comparison criteria in the groundwater sample collected from OW-422L; and
- total xylenes in the sample from OW-422L below the corresponding EPA maximum contaminant level comparison criterion.

The laboratory analysis of the purge water generated during the sampling of the three observation wells indicated that the purge water was below the hazardous threshold values for benzene and pH. However, the laboratory results for flashpoint (81.9°F) indicate the waste was hazardous in nature. Supplemental forensic evaluation indicated the following:

- The petroleum compounds detected in the OW-422L groundwater sample were compositionally similar to the LNAPL sample.
- The petroleum sample analysis did not identify the presence of chemical additives associated with refined petroleum.
- The petroleum sample analysis indicated low sulfur and lacked indicators identifying the petroleum to be from a coal or biogenetic substance.
- The origin of petroleum in OW-422L is an immature to medium maturity crude feedstock.

TVA transmitted results of the sampling and forensic analysis to TDEC for their consideration and received a response from TDEC Oak Ridge Office indicating that TDEC had reviewed and agreed with the findings of the forensic information associated with the hydrocarbon materials identified in OW-422L. TDEC indicated that it did not expect to have further concerns with regard to OW-422L and concurred with TVA's plans to abandon the well. Subsequently, TVA completed abandonment of wells OW-422U, OW-422L, and OW-422D in 2023 in accordance with TDEC requirements.

Table 2.3-1 Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas (Sheet 1 of 3)

Location	Type	Identifier	Number	Length (feet)	Area (acres)
Clinch River/Watts Bar Reservoir				**37,223**	
	CRN Site Shoreline(1)	R01a		29,659	
	BTA Shoreline(2)	R01b		7,564	
CRN Site					
	Ponds	-	**3**	**-**	**0.65**
		P01	**-**	-	0.31
		P02	**-**	-	0.18
		P04	**-**	-	0.16
	Perennial Streams	-	**3**	**2,777**	-
		STR07	**-**	603	-
		STR11	**-**	2,116	-
		STR12	**-**	58	-
	Intermittent Streams	-	**4**	**878**	-
		STR04	**-**	165	-
		STR05	**-**	299	-
		STR06	**-**	123	-
		STR10	**-**	291	-

**Table 2.3-1 Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 2 of 3)**

Location	Type	Identifier	Number	Length (feet)	Area (acres)
	WWCs	-	**14**	**6,056**	-
		EPH03	**-**	139	-
		EPH04	**-**	56	-
		EPH05	**-**	25	-
		EPH06	**-**	118	-
		EPH07	**-**	124	-
		EPH08	**-**	124	-
		EPH09	**-**	614	-
		EPH10	**-**	679	-
		EPH11	**-**	1,052	-
		EPH12	**-**	919	-
		EPH13	**-**	540	-
		EPH14	**-**	322	-
		EPH18	**-**	83	-
		EPH19	**-**	1,261	-
Associated Offsite Areas					
Barge and Traffic Area					
	Ponds	-	**0**	-	**0**
	Perennial Streams[3]	-	**1**	**1,666**	-
		STR03	**-**	1,666	-
	Intermittent Streams	-	**1**	**335**	-
		STR01	**-**	335	-
	WWCs	-	**2**	**1,107**	-
		EPH01	**-**	553	-
		EPH02	**-**	554	-

Table 2.3-1 Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 3 of 3)

Location	Type	Identifier	Number	Length (feet)	Area (acres)
161-kV Offsite Transmission Line					
	Ponds	-	**0**	-	**0**
	Perennial Streams	-	**1**	**384**	-
		STR09		384	
	Intermittent Streams	-	**2**	**1,301**	-
		STR08	**-**	1,181	-
		STR17		120	
	WWCs	-	**1**	**242**	-
		EPH18	**-**	242	-
Project Area Total					
	Ponds	-	**3**	-	**0.65**
	Perennial Streams	-	**5**	**4,827**	-
	Intermittent Streams	-	**7**	**2,514**	-
	WWCs(4)	-	**16**	**7,405**	-

1) Approximately Clinch River Mile (CRM) 14.2 to CRM 18.9
2) Approximately CRM 13.9 to CRM 14.2
3) STR03 is considered to be a backwater feature of the Clinch River arm of the Watts Bar Reservoir and not a unique feature for the BTA.
4) WWC EPH18 crosses from the CRN Site into the 161-kV transmission corridor and is only counted once in the project area total.

Note: - = Not Applicable

Table 2.3-2 Updated Surface Water Resources (Streams/Ponds) on the TVA CRN Site and Associated Offsite Areas

Location	Type	ESPA ER/ NRC ESP FEIS	Updated Surface Water Resource Delineations[1]		
		Number	Number	Length (feet)	Area (acres)
CRN Site	Ponds	6	3	-	0.65
	Perennial Streams	5	3	2,777	-
	Intermittent Streams	1	4	878	-
	WWCs	19	14	6,056	-
Barge and Traffic Area	Ponds	2	0	-	-
	Perennial Streams	2	1	1,666	-
	Intermittent Streams	4	1	335	-
	WWCs	15	2	1,107	-
161-kV Offsite Transmission Line	Ponds	-	0	-	-
	Perennial Streams	-	1	384	-
	Intermittent Streams	-	2	1,301	-
	WWCs	-	1	242	-
Project Area Total	Ponds	8	3	-	0.65
	Perennial Streams	7	5	4,827	-
	Intermittent Streams	5	7	2,514	-
	WWCs[2]	34	16	7,405	-

Source: NRC and USACE, 2019

1) Wetlands are excluded from this table. See Section 2.4.

2) WWC EPH18 crosses from the CRN Site into the 161-kV transmission corridor and is only counted once in the project area total.

Note: - = Not Applicable

Table 2.3-3 Summary of Gradients of Selected Onsite Streams

Onsite Stream	Average or Upper Profile Slope			Lower Profile Slope		
	Length (feet)	Fall (feet)	Slope (percent)	Length (feet)	Fall (feet)	Slope (percent)
STR04	80	10	12.5	500	2	0.4
STR05	600	18	3.0	-	-	-
STR07	100	8	8.0	350	8	2.3
STR10	700	8	1.1	-	-	-
STR11	1000	4	0.4	-	-	-

Note: - = Not Calculated

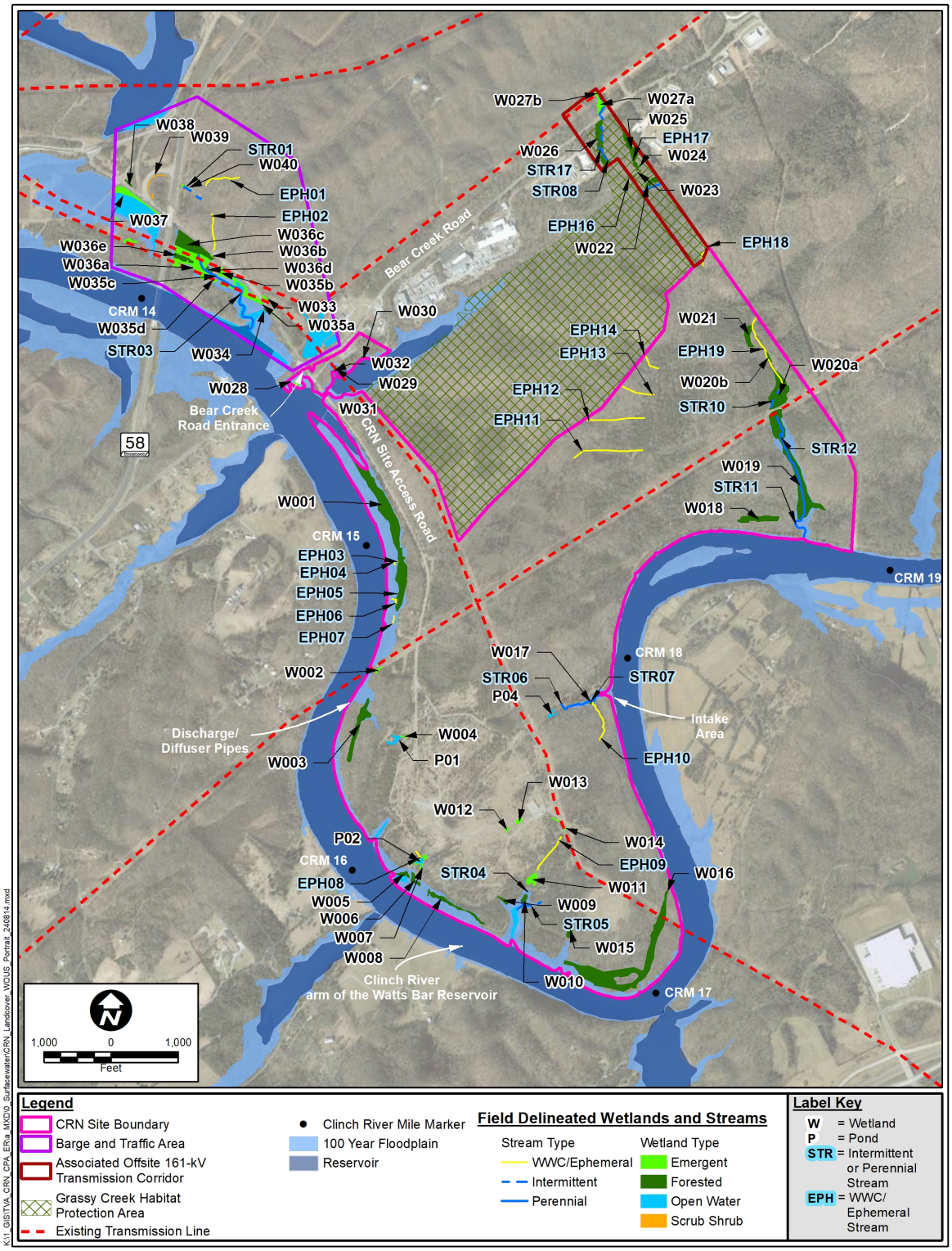


Figure 2.3-1 Identified Surface Water Resources on the CRN Site and Associated Offsite Areas

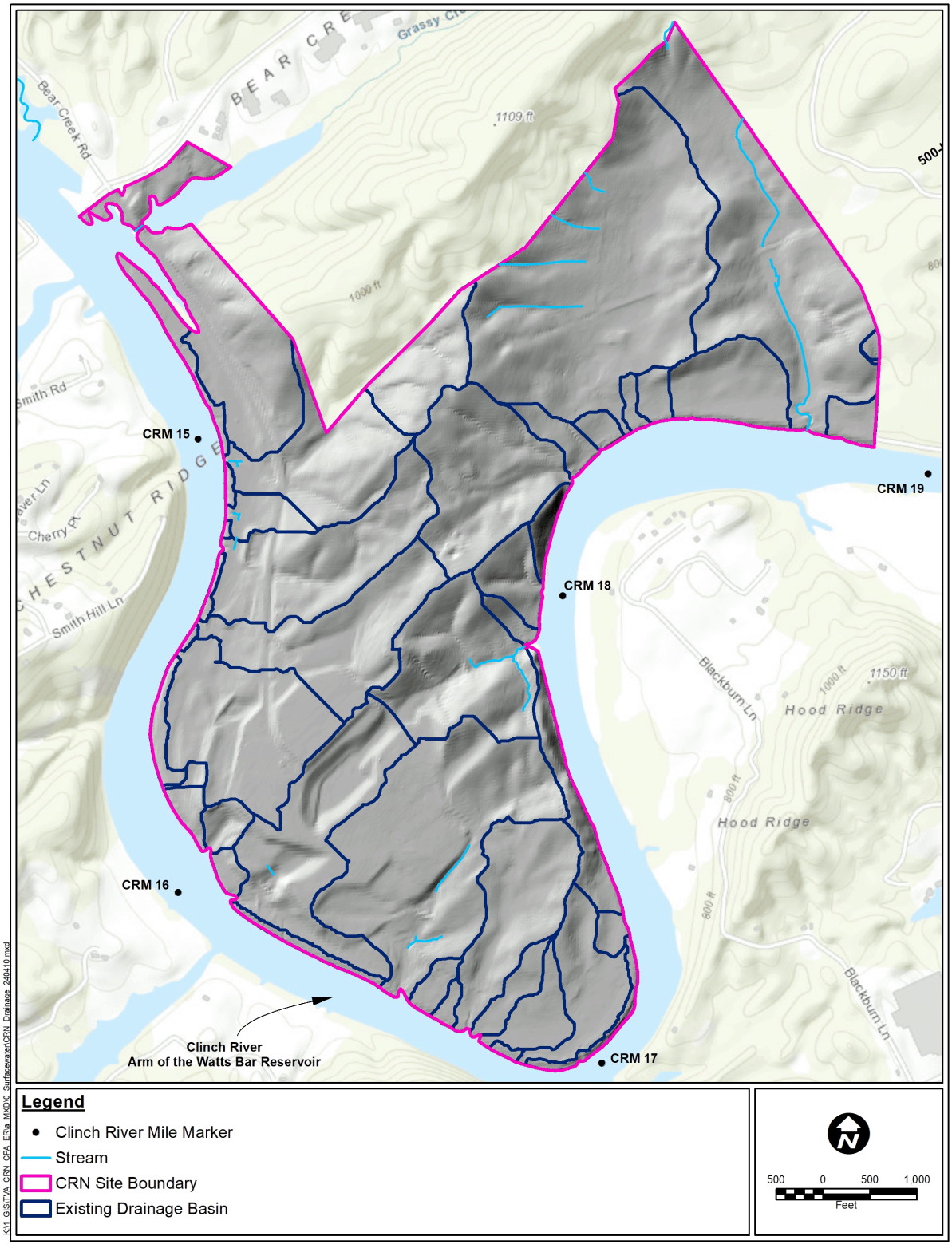


Figure 2.3-2 Surface Water Drainages within the CRN Site

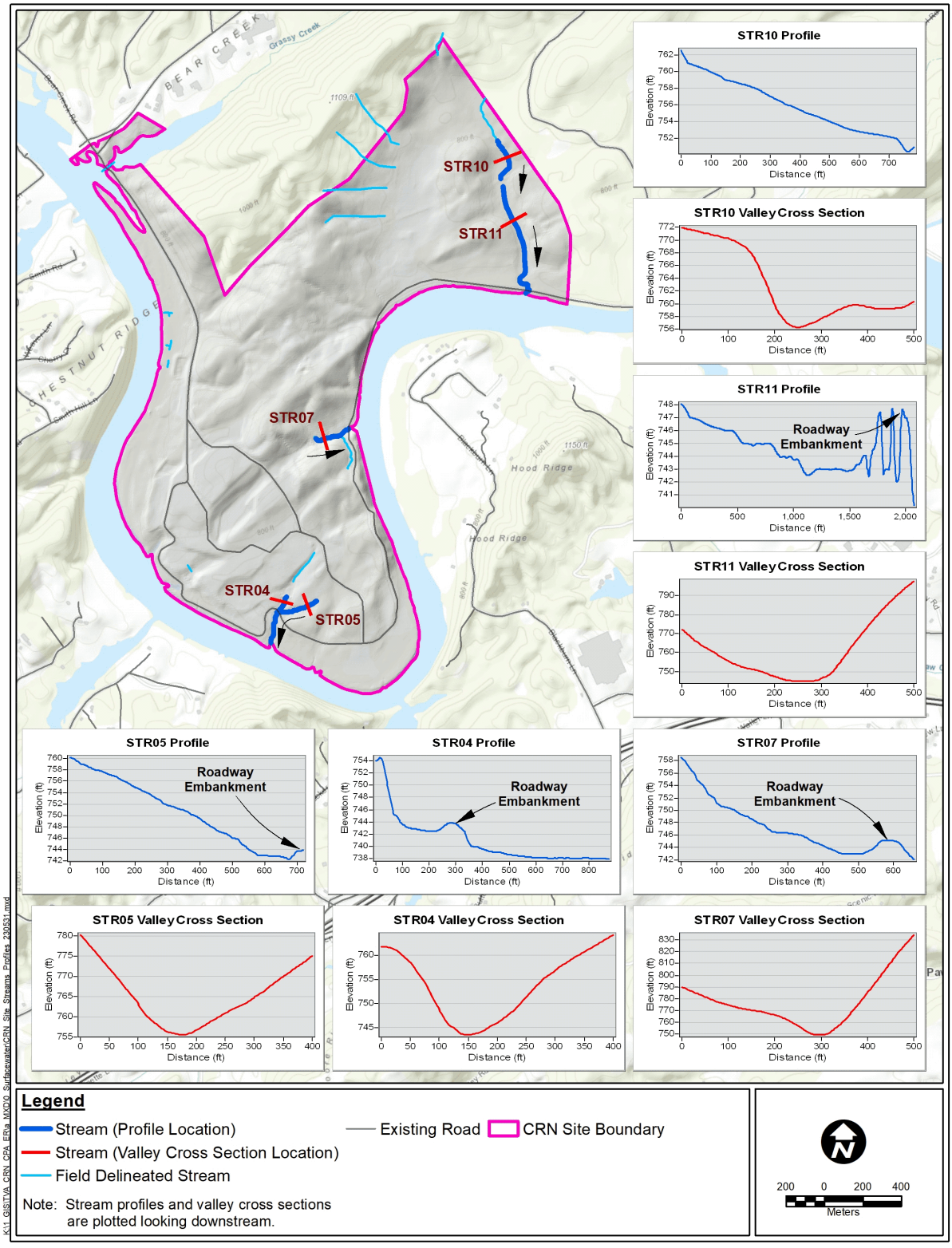
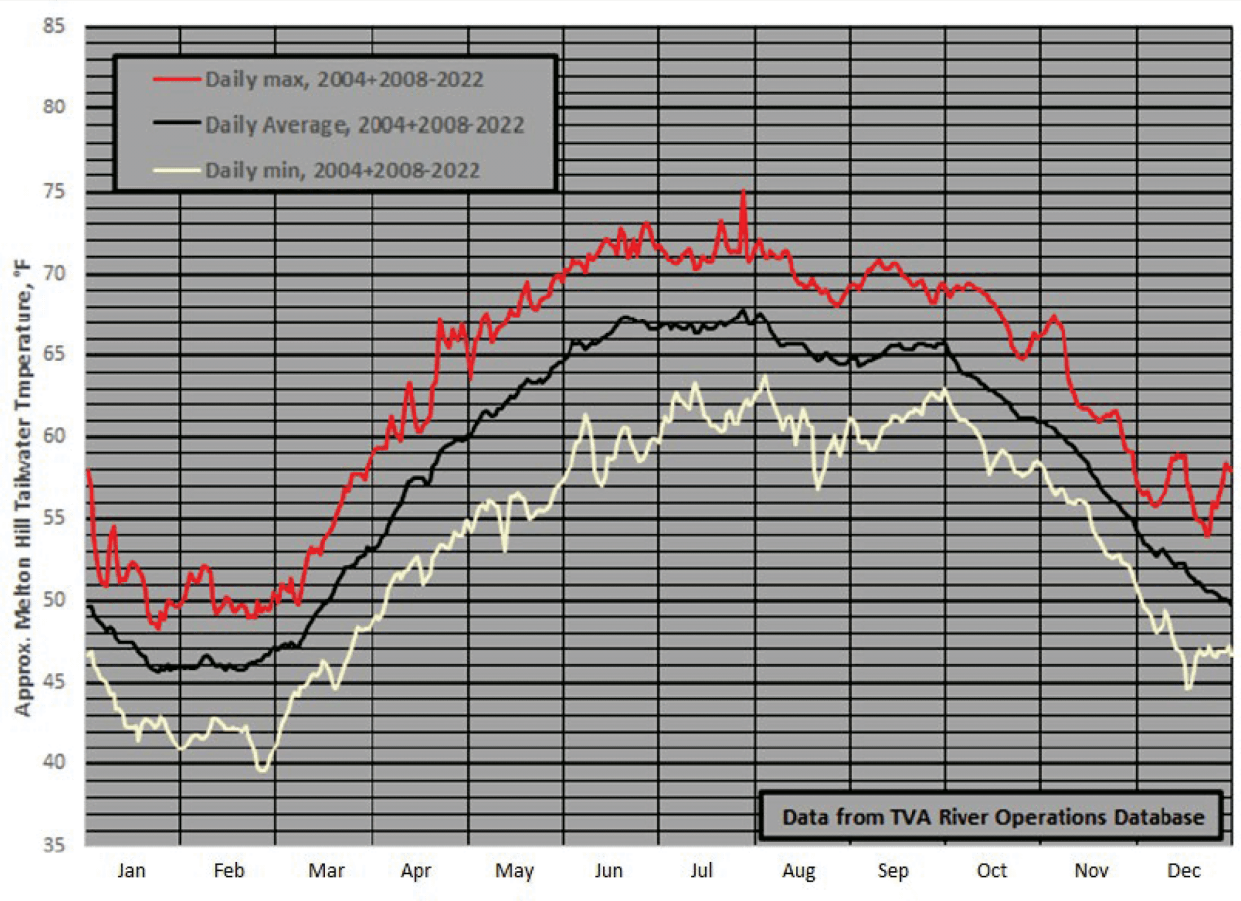
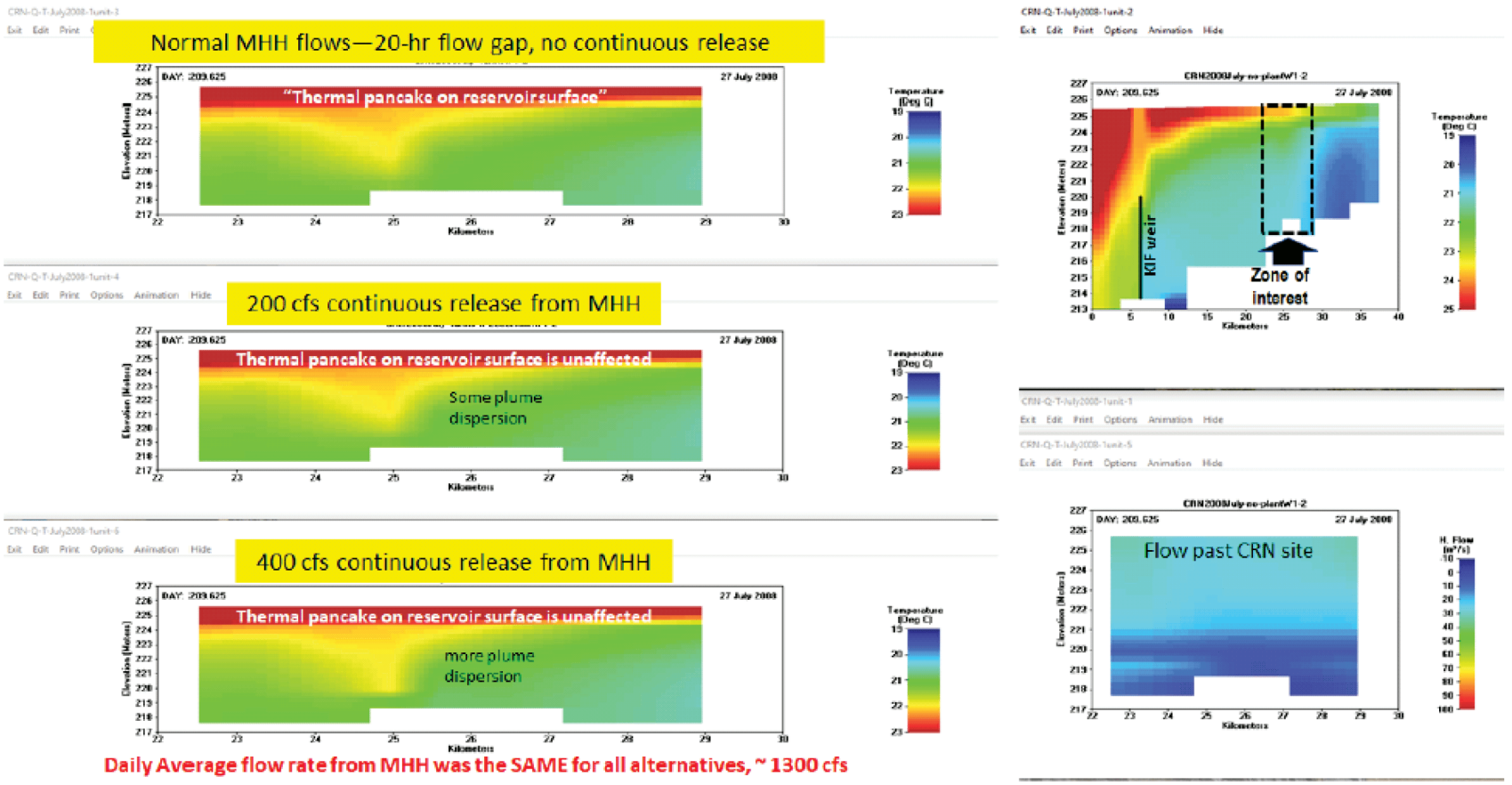


Figure 2.3-3 Profiles and Valley Cross Sections of Selected Streams on the CRN Site



Source: TVA, 2023b

Figure 2.3-4 Average and Range of Hourly Water Temperature in the Tailwater below MHH (data from 2004 to 2022)



Source: TVA, 2023b

Figure 2.3-5 Evaluation of Thermal Pancake as Related to Releases from MHH under Summer Conditions

2.4 ECOLOGY

ESPA ER Section 2.4 and NRC ESP FEIS Section 2.4 describe the ecology of the CRN Site and region. This section addresses new information regarding ecological resources on the CRN Site and associated offsite areas.

2.4.1 Terrestrial Ecology

NRC ESP FEIS Subsections 4.3.1.3 and 5.3.1.3 identified one issue that was not resolved related to terrestrial ecology . This issue was the consideration of impacts and avoidance and minimization measures related to Section 7 consultation for species listed under the Endangered Species Act (ESA). NRC initiated informal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the ESA in March 2018, and this correspondence is included in Appendix F of the NRC ESP FEIS. The USFWS responded on July 9, 2018, stating that because the ESP did not authorize activities that may affect federally listed species, Section 7 consultation was not required. The USFWS also stated that it would expect the NRC to consult again in the future if TVA applies for a Combined License or a Construction Permit to build a reactor on the CRN Site. Mitigation measures to protect listed species and habitat, if any, will be developed during TVA's Section 7 consultation with USFWS.

In January 2025, TVA submitted a Biological Assessment to the USFWS for consideration. Information provided in TVA's Section 7 consultation with USFWS represents new information not considered in the NRC ESP FEIS.

Having implemented the process described in Section 1.8, TVA did not identify new information related to wildlife travel corridors and existing ecological effects and environmental stresses.

TVA identified new and notable information regarding the following:

- Character and quality of upland habitats
- Wetland community types, distribution, and functional value
- Character and quality of important species and habitats
- Character and quality of transmission corridor habitats and species

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.4.1.1 Character and Quality of Upland Habitats

In 2022, based on interpretation of aerial photographs and the findings of TVA field surveys, TVA created a refined coverage map documenting dominant habitats and other land cover types on the CRN Site and the associated offsite 161-kV transmission corridor (Figure 2.4-1) (TVA, 2022). (Note: see Subsection 2.4.1.4 for additional discussion regarding the offsite 161-kV corridor.) This refined coverage map represents new information since the publication of the NRC ESP FEIS. In 2023, TVA used this same process to create an updated habitat map of the BTA.

These newly developed maps were used to determine character and quality of upland habitat and unique upland habitat types/natural areas on the CRN Site and associated offsite areas. Table 2.4-1 compares the extent of habitat types reported in the NRC ESP FEIS for the CRN Site and BTA with those of the updated habitat maps. The extent of habitat types for the offsite 161-kV transmission corridor is also shown in Table 2.4-1 and represents new information because this corridor was not assessed in the NRC ESP FEIS.

2.4.1.2 Wetland Community Types, Distribution, and Functional Value

NRC ESP FEIS Subsection 1.1.4 identified one issue that was not resolved for wetlands. This issue was the consideration of conditions related to Clean Water Act (CWA) Section 401 certification (33 United States Code 1251 *et seq*.). This certification is issued by TDEC and ensures that the project does not conflict with state and federal water quality management programs and is relevant to wetland impact assessment and permitting. Because the ESP did not authorize any activities, a CWA Section 401 certification was not required prior to its issuance. However, Section 401 certification from the State of Tennessee is required prior to issuance of a Construction Permit, and any conditions of the CWA Section 401 certification would be incorporated into the license pursuant to 10 CFR 50.54(aa). This certification must also be obtained before USACE would issue a CWA Section 404 permit.

New information for wetlands includes the results of recent wetland delineations on the CRN Site and associated offsite areas conducted by TVA for the CRN PEIS between January and June 2021 and in November 2023 to determine wetland presence, extent, and condition (TVA, 2022, 2023d). The 2021 wetland assessment included a review of delineations conducted between 2011 and 2015 within the CRN Site project area, verification and update of previously mapped wetland features and their condition, and mapping of wetlands not previously documented. The 2023 wetland assessment included delineations within areas of the BTA that were not assessed in the ESP proceeding or the 2021 wetland assessment.

Wetland determinations were conducted in accordance with USACE methods, which require documentation of hydrophytic vegetation, hydric soils, and wetland hydrology (Environmental Laboratory, 1987; USACE, 2012, 2018). Broader definitions of wetlands, such as those provided by Executive Order (EO) 11990, *Protection of Wetlands*, the USFWS, and TVA Environmental Review Procedures, were also considered in the 2021 and 2023 wetland determinations. TVA used the Tennessee Rapid Assessment Method (TRAM) during the 2021 and 2023 delineations to evaluate wetland conditions. TRAM quantifies wetland function and ranks wetlands into three categories, consisting of low, moderate, or exceptional resource value based on six metrics coordinating to indicator functions (TDEC, 2017).

Within the CRN Site, 25 wetlands totaling approximately 30.9 acres were delineated and assessed during the 2021 and 2023 delineations, as depicted on Figure 2.3-1 in Section 2.3. Within the potential limits of disturbance on the BTA, 17 wetlands totaling approximately 7.2 acres were delineated, and within the offsite 161-kV transmission corridor, seven wetlands totaling approximately 3.6 acres were delineated (TVA, 2022, 2023d). New delineated wetlands information is summarized in Table 2.4-2.

2.4.1.3 Character and Quality of Important Species and Habitats

This section addresses new information regarding character and quality of important terrestrial plant and wildlife species and habitats.

2.4.1.3.1 Terrestrial Plant Communities

This section addresses new information regarding character and quality of important terrestrial plant species and habitats.

2.4.1.3.1.1 Vegetation Field Surveys

New information for plant communities includes the results of vegetation field surveys of the CRN Site and associated offsite areas conducted by TVA between September 2020 and June 2021. Field surveys were conducted across the entire CRN Site, the associated 161-kV offsite transmission corridor, and in proximity to the offsite barge facility area (see Figure 2.4-1). These efforts were focused on documenting plant communities and established populations of invasive plant species and searching for possible threatened and endangered plant species on the CRN Site and associated offsite areas. Areas representative of each vegetation type present on the CRN Site were visited during the surveys.

New information obtained during the 2020 to 2021 delineation of terrestrial vegetation communities included a newly delineated area of herbaceous vegetation that resembles a cedar glade or barren, which is a notable habitat in the region. The ESPA ER describes an approximately 1.4-acre disturbed cedar glade located in the center of the southern part of the CRN Site within the existing 161-kV transmission corridor and the presence of several native species found in cedar glade habitat on other areas of the site. The 2020 to 2021 surveys delineated this 1.4-acre area and another approximately five-acre less-disturbed cedar glade near the intake area of the CRN Site (TVA, 2022) (see Figure 2.4-2). This area was characterized by shallow, drought-prone soils and scattered eastern red cedar around canopy openings. No plant species that are considered rare and tracked by the State of Tennessee were observed, but many notable herbaceous species that are characteristic of cedar glades were present. These included grey headed coneflower (*Ratibida pinnata*), aromatic aster (*Symphyotrichum oblongifolium*), prickly pear (*Opuntia* sp.), glade St. Johnswort (*Hypericum dolabriforme*), spreading aster (*Symphyotrichum patens*), smooth aster (*S. laeve*), Indian grass (*Sorghastrum nutans*), Adam's needle (*Yucca filamentosa*), whorled milkweed (*Asclepias verticillata*), green comet milkweed (*A. viridiflora*), rough dropseed (*Sporobolus compositus*), false aloe (*Manfreda virginica*), and numerous others (TVA, 2022).

In addition, new information from the 2020 to 2021 field surveys not identified in the NRC ESP FEIS or the ESPA ER includes the discovery of a deciduous calcareous wetland forest, located just south of Bear Creek Road within the associated offsite 161-kV transmission corridor (Figure 2.4-2). This community is fundamentally different from other wetland forests that are within the CRN Site. This is likely because the geology and landscape position of this area differs from other forested wetlands onsite. According to the 2020 to 2021 field surveys, grass and sedge diversity is high in this area and includes fringed sedge (*Carex crinita*), sharpscale sedge (*C. oxylepis*), inflated narrow leaf sedge (*C. grisea*), squarrose sedge (*C. squarrosa*), lurid sedge

(*C. lurida*), broom-like sedge (*C. bromoides*), nodding fescue (*Festuca subverticillata*), and slender spikerush (*Eleocharis tenuis*). Wetland forbs present include turtlehead (*Chelone sp.*), giant goldenrod (*Solidago gigantea*), sweet flag iris (*Iris virginica*), groundnut (*Apios americana*), ironweed (*Vernonia gigantea*), and others. Notable species in this wetland include the state-listed threatened pale green orchid (*Platanthera flava var. herbiola*) and state-listed endangered rigid sedge (*Carex tetanica*) (TVA, 2022).

2.4.1.3.1.2 Important Plant Species

The updated review of the TVA Regional Natural Heritage database indicated that no federally listed plants have been previously reported within 5 miles of the CRN Site. However, according to the USFWS Information for Planning and Conservation (IPaC) website, two federally listed plants have the potential to occur within the CRN Site and associated offsite areas: white fringeless orchid (*Platanthera integrilabia*) and Virginia spiraea (*Spiraea virginiana*) (Table 2.4-4; TVA, 2022, USFWS, 2023). These two federally listed plants have not been observed in TVA field surveys of the CRN Site (TVA, 2022), and their preferred habitats were not found to be present. Federally designated critical habitat for plants does not occur on the CRN Site or associated offsite areas. Federally listed plant species are not known to occur in the project area.

The TVA Regional Natural Heritage database indicates that 19 species tracked by the State of Tennessee have been reported within 5 miles of the CRN Site (Table 2.4-4; TVA, 2022). Of these species, two (spreading false-foxglove [*Aureolaria patula*] and pale green orchid) were observed during 2021 field surveys within the project area. As described in Subsection 2.4.1.4, one additional state endangered plant not previously observed near the CRN Site (rigid sedge) was also documented during the 2021 field surveys. Spreading false-foxglove was observed in steep calcareous deciduous forest associated with bluffs along the Reservoir (Figure 2.4-2). Rigid sedge and pale green orchid were observed in a calcareous forested wetland within the associated offsite transmission corridor just south of Bear Creek Road (Figure 2.4-2; TVA, 2022).

Important plant species with potential to occur or that were observed within the CRN Site and associated offsite areas that were not identified in the NRC ESP FEIS include rigid sedge, pale green orchid, waterweed (*Elodea nuttalli*), Godfrey's thoroughwort (*Eupatorium godfreyanum*), and Ozark bunchflower (*Veratrum woodii*). However, waterweed, Godfrey's thoroughwort, and Ozark bunchflower have not been observed on the CRN Site. Species descriptions for rigid sedge and pale green orchid are included below.

Rigid sedge is a grass-like species that is distributed across the northeastern U.S., with a few isolated occurrences in the southeast. In the southern part of its range, rigid sedge only occurs in high-quality habitats with other species of conservation concern. At the CRN Site, rigid sedge is located within a calcareous wetland just southeast of Bear Creek Road in the associated offsite 161-kV transmission corridor. In the State of Tennessee this species has only been documented from one other location, a calcareous seep in Campbell County about 30 air miles north-northeast of the CRN Site. Given the clonal nature of the species, it is difficult to estimate how many individual plants occur onsite, but the species is common over about 0.5 acres (TVA, 2022).

Pale green orchid occurs in high-quality swamps and floodplains throughout the northeastern U.S. While the species has a wide range, it is listed as rare in most states where it occurs. In the State of Tennessee pale green orchid has been documented in eight counties, but the vast majority of occurrences are located near the City of Oak Ridge in close proximity to the CRN Site. This species is low growing with inconspicuous flowers, which makes it difficult to see amongst other vegetation. While a census was not conducted, several hundred plants likely occur throughout the wetland complex southeast of Bear Creek Road (TVA, 2022).

2.4.1.3.1.3 Invasive Plant Species

New information for invasive plant species includes the results of vegetation field surveys of the CRN Site and associated offsite areas conducted by TVA between September 2020 and June 2021. No federal noxious weeds were observed during the field surveys, but many non-native invasive plant species were observed throughout the study area (TVA, 2022). Common invasive plant species and their extent on the CRN Site remain similar to those reported in Table 2-16 of Subsection 2.4.1.12 in the NRC ESP FEIS.

Invasive plant species present within the associated offsite 161-kV transmission corridor were similar to those on the adjacent CRN Site. However, because this area is less disturbed than the CRN Site, there are generally fewer invasive plants and more high-quality species within the corridor.

2.4.1.3.2 Wildlife Communities and Habitats

This section addresses new information regarding character and quality of important terrestrial wildlife species and habitats.

2.4.1.3.2.1 Wildlife Surveys

New information for important terrestrial wildlife and plant species includes updated reviews of the TVA Regional Natural Heritage database and the USFWS IPaC website for important species with the potential to occur in the project area, results of recent terrestrial wildlife and vegetation field surveys of the CRN Site and associated offsite areas conducted by TVA, and coordination and consultation with regulating agencies. Field surveys of the CRN Site and vicinity were conducted in 2020, 2021, and 2023, as described in Subsection 2.4.1.3.1.1, to observe and identify important wildlife and plant species.

New information for wildlife includes the results of recent terrestrial wildlife and habitat field surveys of the CRN Site and associated offsite areas conducted by TVA between January and May 2021 and in November 2023. During these surveys, 13 active osprey nests were observed on or adjacent to the CRN Site, seven of which were on large transmission line structures. Four of the nests were located on small utility poles and two were on nesting platforms (see Figure 2.4-2). In addition, evidence of a colony of cliff swallows (i.e., nests) was observed on the side of the Tennessee State Route 58 bridge (Gallaher Bridge) over the Reservoir during November 2023 surveys (TVA, 2023e).

Avoidance, minimization, and mitigation practices implemented in coordination with U.S. Department of Agriculture (USDA) Wildlife Services to comply with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, such as removal and/or relocation of nests, creation of alternative osprey nesting platforms, or installation of deterrents to provide nesting opportunities away from the site are being conducted by TVA on an ongoing basis in conjunction with CRN Site management practices to reduce the potential presence of osprey nests on land potentially disturbed by construction activities.

2.4.1.3.2.2 Important Wildlife Species

The updated review of TVA's Regional Natural Heritage Database for terrestrial wildlife indicated that there are records of 10 state-listed or tracked terrestrial wildlife species and two federally listed species within 5 miles of the CRN Site and associated offsite areas (Table 2.4-3; TVA, 2022). One additional federally protected species (bald eagle, [*Haliaeetus leucocephalus*]) is known in Roane County. According to the USFWS IPaC website, the CRN Site and associated offsite areas are also in the range of the federally endangered Indiana bat (*Myotis sodalis*) (TVA, 2022), although no records of this species are currently known from Roane County. The IPaC website also identified the whooping crane (*Grus americana*) as potentially occurring in the project area. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements, but federal agencies must not jeopardize their existence (section 7(a)(4))). Foraging habitat for whooping crane does not occur in the project area. This species is not known to breed in Tennessee. No federally designated critical habitat for any of these species exists within 5 miles of the project area (TVA, 2022).

New information not presented in the NRC ESP FEIS includes changes in the listing status of several species pursuant to the ESA. The northern long-eared bat (*Myotis septentrionalis*) has been reclassified as endangered under the ESA, and the tricolored bat (*Perimyotis subflavus*) has been proposed for listing as endangered. Also, the monarch butterfly (*Danaus plexippus*) has been proposed for listing as a threatened species under the ESA and has the potential to occur in the project area (USFWS, 2023). The eastern hellbender (*Cryptobranchus alleganiensis*) has also been proposed for listing as endangered under the ESA. One possibly historical record of this species exists 1.13 miles from the CRN Site in the Reservoir.

Three tricolored bats were captured during 2011 mist net surveys on the CRN Site. In addition, one post-lactating female tricolored bat was captured during 2021 mist net surveys on DOE property approximately 1.7 miles from the site. The post-lactating condition of the captured bat indicates there was a maternity site in the vicinity of the project area (TVA, 2022, 2023f). Four gray bats (*Myotis grisescens*), three of which were pregnant, were captured during mist net surveys in 2021; one of these was on the CRN Site and three were on the adjacent DOE property. Gray bats were also acoustically detected at six of the seven sites during 2021 surveys (TVA, 2022).

A transitional roosting cave for the gray bat was identified in 2021 across the Reservoir from the project area. Winter cave surveys documented one gray bat and five tricolored bats roosting inside the cave in March 2021 (TVA, 2022). A small pile of guano was also documented in the cave, suggesting that a small number of gray bats use the cave at other times of the year. Summer emergence counts, using infrared and visual methods, performed at this cave in June 2021 did not observe bats emerging. Therefore, TVA determined that this cave is not a maternity roost, and it was determined not to be a significant winter roost (TVA, 2023f). Three additional caves are located on the Grassy Creek HPA, adjacent to the project area. A small number of tricolored bats were observed inside each of these caves during cave surveys in March 2021 (TVA, 2023f).

In addition, potentially suitable summer roosting habitat for Indiana bat, northern long-eared bat, and tricolored bat was identified across the CRN Site during the 2021 field surveys. Forest types vary across the site, but large contiguous areas of mature deciduous forest with nearby sources of water offer ideal habitat for many bat species. While no Indiana bats or northern long-eared bats were captured or heard during 2021 surveys, suitable roosting habitat for state-listed species including little brown bat (*Myotis lucifugus*), was delineated in mature forests on the CRN Site and associated offsite areas (Figure 2.4-2; TVA, 2022).

2.4.1.3.2.3 Distribution and Extent of Disease Vector, Invasive, and Pest Animal Species

Terrestrial nuisance species typically are invasive species that are non-native and likely to cause economic and/or environmental harm. These species are also described as alien, non-indigenous, exotic, or undesirable species. The non-native European starling (*Sturnus vulgaris*) and rock pigeon (*Columba livia*), and the native American beaver (*Castor canadensis*) were identified as nuisance species in the ESPA ER.

New information available since publication of the NRC ESP FEIS includes the presence of non-native fire ants observed on the CRN Site. Two species of imported fire ants, the black fire ant (*Solenopsis richteri*) and the red fire ant (*Solenopsis invicta*), have an impact on agriculture and natural resources by damaging crops and agricultural equipment and affecting wildlife in the U.S. Also, their bite can cause allergic reactions in humans (USDA, 2023). The USDA works to prevent artificial (human-assisted) spread of imported fire ants by enforcing the Federal Quarantine (7 CFR 301.81) in states where imported fire ants are present, including the State of Tennessee. TVA follows the quarantine guidelines by restricting the movement of certain "articles," mainly soil or baled hay and straw stored in contact with the ground, in areas where the fire ant is thought to occur.

The feral hog (*Sus scrofa*) is another non-native, nuisance animal species that has the potential to occur on the CRN Site. Wild hogs can cause extensive damage to crops and wildlife habitats, contribute to erosion and water pollution, and carry diseases harmful to livestock and humans. In the State of Tennessee, they are classified as a species deemed destructive and it is illegal to possess, transport, or release live wild hogs (TWRA, 2024).

2.4.1.4 Character and Quality of Transmission Corridor Habitats and Species

The new associated offsite 161-kV transmission corridor extends outside of the CRN Site boundary to an interconnection with the existing 161-kV line north of Bear Creek Road on DOE-managed land. As shown in Table 2.4-1 and Figure 2.4-1, the habitats within the offsite portion of the corridor include approximately 16 acres of mixed forest, 6 acres of deciduous forest, 3.6 acres of wetlands (mostly forested), and 3.5 acres of herbaceous and shrubland vegetation. The corridor intersects the eastern edge of the Grassy Creek HPA. Important habitat within this corridor includes deciduous calcareous wetland (see Figure 2.4-2) that is different from other wetland forests within the project area. Important species within this corridor include the state-listed rigid sedge and pale green orchid. These important habitats and species are described in Subsection 2.4.1.3.1.2 and Subsection 2.4.1.3.2.2, respectively.

2.4.2 Aquatic Ecology

ESPA ER Section 2.4 and NRC ESP FEIS Section 2.4.2 describe aquatic ecology.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Aquatic habitats onsite and in the project vicinity
- Onsite aquatic biological communities
- Reservoir aquatic biological community
- Protected aquatic species

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Aquatic biota
- Non-native and nuisance species

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.4.2.1 Aquatic Biota

The NRC ESP FEIS description of aquatic macrophytes found within the Reservoir indicated the absence of macrophytes on either bank (TVA, 2013). An aquatic macrophyte survey was conducted in the Clinch River arm of the Watts Bar Reservoir and Melton Hill Reservoir in July 2022. This survey consisted of an aerial survey of the river channel, with ground reconnaissance to determine the abundance, distribution, and composition of aquatic plant communities. The 2022 survey identified a total of eight species of aquatic macrophytes. The location of aquatic plant growth areas is indicated in Figure 2.4-3. A total area of 35.92 acres of macrophyte growth was identified in the Reservoir in the vicinity of the CRN Site. The most abundant macrophyte species encountered in the Reservoir were coon-tail (*Ceratophyllum demersum*) and water stargrass (*Heteranthera dubia*). The highest density of water stargrass

was found just below MHH at CRM 22.6. Coon-tail was the most abundant species identified downstream of the Tennessee State Route 95 Bridge. However, it was often mixed with water stargrass colonies. In the Melton Hill Reservoir, a total of 11 species were encountered, the most abundant of which was Eurasian watermilfoil (*Myriophyllum spicatum*) (TVA, 2023g). A taxonomic list of macrophyte species found in the Clinch River arm of the Watts Bar Reservoir and Melton Hill Reservoir during the 2022 survey is provided in Table 2.4-5 (TVA, 2023g).

2.4.2.2 Non-Native and Nuisance Species

As described in Subsection 2.4.2.1, an aquatic macrophyte survey was conducted by TVA in the Reservoir in 2022. This survey consisted of an aerial survey of the river channel, with ground reconnaissance to determine the abundance, distribution, and composition of aquatic plant communities. Several aquatic nuisance species were identified in the 2022 survey. The NRC ESP FEIS listed the following aquatic macrophytes as nuisance species:

- Eurasian watermilfoil
- Hydrilla (*Hydrilla verticillata*)
- Spiny-leaf naiad (*Najas minor*) (also known as brittle naiad)
- Curly-leaved pondweed (*Potamogeton crispus L.*)

The NRC ESP FEIS also noted that in prior surveys of the shoreline near the CRN Site, no macrophytes were observed. However, in the 2022 survey, three of the nuisance species listed above were observed, including Eurasian watermilfoil, hydrilla, and spiny-leaf naiad. Within the Reservoir, hydrilla was determined to be common, whereas Eurasian watermilfoil was determined to be scattered. By comparison, within Melton Hill Reservoir, Eurasian watermilfoil was determined to be common/widespread, and both brittle naiad and hydrilla were determined to be scattered and uncommon, respectively (see Table 2.4-5).

One non-native crayfish, the red swamp crayfish (*Procambarus clarkii*), was identified in STR11 on the CRN Site during onsite aquatic surveys conducted by TVA in 2023. This species was also identified in the backwaters of the Reservoir. This species is considered a nuisance species in the State of Tennessee due to potential for disturbance of native fauna, including destruction of aquatic vegetation, competition with native species, and predation upon other aquatic species (TVA, 2023h).

Table 2.4-1 Extent of Habitat Types for the CRN Site and Associated Offsite Areas(1)

Habitat/Land Cover Type	CRN Site	Barge and Traffic Area (acres)	Offsite 161-kV Transmission Corridor
Mixed Evergreen-Deciduous Forest	384.2	2.4	15.7
Deciduous Forest	270.0	125.3	6.0
Herbaceous Vegetation	202.2	26.0	2.3
Evergreen Forest	32.0	0	0
Wetlands	30.9	8.7	3.6
Roads/Developed Areas	14.1	14.9	0.4
Ponds/Open Water	2.0	16.5	0
Shrubland	0	7.9	1.2
Barren	0	0.8	0
Total(2)	**935.3**	**202.5**	**29.2**

1) Table 2.4-1 presents a more refined representation of vegetation/land cover types than the National Land Cover Database (NLCD) land cover data presented in Section 2.2, Table 2.2-1. Dominant vegetation communities and other land cover types on the CRN Site, Barge and Traffic Area, and 161-kv corridor were drawn in GIS based on aerial photographs and information from TVA field surveys and mapping.

2) Column total may not equal sum of individual values due to rounding.

Table 2.4-2 Wetlands Delineated in the CRN Site and Associated Offsite Areas, 2021/2023 (Sheet 1 of 3)

Wetland ID	Wetland Type[1]	TRAM Category[2]	Total Wetland Acreage
CRN Site			
W001	PFO1E	Moderate	6.86
W002	PEM1E	Low	0.11
W003	PFO1E	Moderate	1.71
W004	PEM/PSS1E	Low	0.10
W005	PFO1E	Moderate	0.26
W006	PFO1E	Moderate	0.29
W007	PEM/PUBHx	Low	0.23
W008	PFO1E	Low	0.94
W009	PFO1E	Low	0.17
W010	PFO1E	Moderate	0.36
W011	PEM/PSS1E	Low	0.48
W012	PEM1E	Low	0.07
W013	PEM1E	Low	0.13
W014	PEM1E	Low	0.15
W015	PFO1E	Moderate	0.35
W016	PFO1E	Moderate	7.88
W017	PFO1E	Low	0.23
W018	PFO1E	Moderate	1.16
W019	PFO1E	Exceptional	5.70
W020a	PFO1E	Moderate	2.48
W020b	PFO1E	Moderate	0.18
W021	PFO1E	Low	0.68
W028	PEM/SS/FO1E	Moderate	0.15
W029	PEM1E	Low	0.08
W030	PFO1E	Low	0.11
Total			**30.88**
Associated Offsite Areas			

Table 2.4-2 Wetlands Delineated in the CRN Site and Associated Offsite Areas, 2021/2023 (Sheet 2 of 3)

Wetland ID	Wetland Type[1]	TRAM Category[2]	Total Wetland Acreage
Barge and Traffic Area (Only Includes Wetlands within the Potential Limits of Disturbance)			
W031	PEM1E	Low	0.02
W032	PEM1E	Low	0.02
W033	PEM1E	Low	0.13
W034	PFO1E	Moderate	0.03
W035a	PEM/SS1E	Low	0.13
W035b	PEM/SS1E	Low	0.22
W035c	PEM/SS1E	Low	0.01
W035d	PEM1F	Low	0.07
W036a	PEM/SS1E	Moderate	2.60
W036b	PEM/SS1E	Moderate	0.02
W036c	PFO1E	Moderate	2.07
W036d	PFO1E	Moderate	0.10
W036e	PFO1E	Moderate	0.44
W037	PEM1F	Low	0.94
W038	PFO1E	Low	0.08
W039	PSS1E	Low	0.20
W040	PEM1F	Moderate	0.11
Total			**7.19**
161-kV Offsite Transmission Line			
W022	PFO1E	Low	0.38
W023	PFO1E	Low	0.08
W024	PFO1E	Low	0.08
W025	PFO1E	Moderate	0.96
W026	PFO1E	Moderate	1.44
W027a	PEM/PFO1E	Moderate	0.53
W027b	PEM1E	Moderate	0.13
Total[3]			**3.60**

Table 2.4-2 Wetlands Delineated in the CRN Site and Associated Offsite Areas, 2021/2023 (Sheet 3 of 3)

Wetland ID	Wetland Type(1)	TRAM Category(2)	Total Wetland Acreage

Source: TVA, 2021c, 2022, and 2023d

1) Classification codes as defined in Cowardin et al., 1979: E = seasonally flooded/saturated; F = semi-permanently flooded; H = permanently flooded; P = Palustrine; EM1 = emergent, persistent vegetation; FO1= forested, broad-leaved deciduous vegetation, seasonally flooded/saturated; SS1= scrub-shrub, broad-leaved deciduous vegetation; UB = unconsolidated bottom; x = excavated.
2) TRAM Category as defined by TDEC, 2017: Low = low resource value; Moderate = moderate resource value; Exceptional = exceptional waters.
3) Column total may not equal sum of individual values due to rounding.

Table 2.4-3 Federally and State-Listed Terrestrial Animal Species Documented Within Roane County and Within 5 Miles of the CRN Site and Associated Offsite Areas (Sheet 1 of 2)

Common Name	Scientific Name	Federal Status[1]	State Status[1]	State Rank[2]
Amphibians				
Four-toed salamander	*Hemidactylium scutatum*	-	D	S3
Hellbender	*Cryptobranchus alleganiensis*	PS[3]	E	S3
Birds				
Bachman's sparrow	*Aimophila aestivalis*	-	E	S1B
Bald eagle	*Haliaeetus leucocephalus*	DL	D	S3
Cerulean warbler	*Setophaga cerulea*	-	D	S3B
Sharp-shinned hawk	*Accipiter striatus*	PS[3]	-	S3B,S4N
Swainson's warbler	*Limnothlypis swainsonii*	-	D	S3
Whooping crane	*Grus americana*	EXPN	-	SX
Mammals				
Gray bat	*Myotis grisescens*	E	E	S2
Northern long-eared bat	*Myotis septentrionalis*	E	E	S1S2
Indiana bat	*Myotis sodalis*	E	E	S1
Little brown bat	*Myotis lucifugus*	-	T	S3
Meadow jumping mouse	*Zapus hudsonius*	PS[3]	-	S4
Southeastern shrew	*Sorex longirostris*	-	-	S4
Tricolored bat	*Perimyotis subflavus*	PE	T	S2S3

Table 2.4-3 Federally and State-Listed Terrestrial Animal Species Documented Within Roane County and Within 5 Miles of the CRN Site and Associated Offsite Areas (Sheet 2 of 2)

Common Name	Scientific Name	Federal Status(1)	State Status(1)	State Rank(2)
Insects				
Monarch	*Danaus plexippus*	C	-	S4

Source: TVA, 2022; USFWS, 2023

1) Status abbreviations: D = Deemed in Need of Management; DL = Recovered, delisted, and being monitored, E = Endangered, T = Threatened; PE = Proposed Endangered; EXPN = non-essential experimental population; PS = Partial Status; C = Candidate for listing.
2) State Rank Definitions: S1 - critically imperiled; S2 - imperiled; S3 - rare or uncommon; S4 - widespread, abundant and apparently secure, but with cause for long-term concern; SX - presumed extirpated; S#B = Status of Breeding population; S#N = Status of non-breeding population.
3) Species in this table with Partial Status are federally listed elsewhere in the U.S. but are not federally listed in Roane County, Tennessee.

Note: - = Not Listed

Table 2.4-4 Plant Species of Conservation Concern Previously Reported from within 5 Miles of the CRN Site and Federally Listed Plants with Potential to Occur within the CRN Site and Associated Offsite Areas
(Sheet 1 of 2)

Common Name	Scientific Name	Federal Status[1]	State Status[1]	State Rank[2]
Earleaf foxglove	*Agalinis auriculata*	-	E	S2
Spreading false-foxglove[4]	*Aureolaria patula*	-	S	S3
River bulrush	*Bolboschoenus fluviatilis*	-	S	S1
Rigid sedge[4]	*Carex tetanica*	-	E	S1
Tall larkspur	*Delphinium exaltatum*	-	E	S2
Northern bush-honeysuckle	*Diervilla lonicera*	-	T	S2
Branching whitlow-wort	*Draba ramosissima*	-	S	S2
Waterweed	*Elodea nuttallii*	-	S	S2
Godfrey's thoroughwort	*Eupatorium godfreyanum*	-	S	S1
Naked-stem sunflower	*Helianthus occidentalis*	-	S	S2
Butternut	*Juglans cinerea*	-	T	S3
Short-head rush	*Juncus brachycephalus*	-	S	S2
Slender blazing-star	*Liatris cylindracea*	-	T	S2
Loesel's twayblade	*Liparis loeselii*	-	T	S1
Pale green orchid[4]	*Platanthera flava var. herbiola*	-	T	S2
White fringeless orchid[3]	*Platanthera integrilabia*	T	E	S2S3
Heller's catfoot	*Pseudognaphalium helleri*	-	S	S2
Prairie goldenrod	*Oligoneuron album*	-	E	S1S2
Virginia spiraea[3]	*Spiraea virginiana*	T	E	S2
Shining ladies'-tresses	*Spiranthes lucida*	-	T	S1S2

Table 2.4-4 Plant Species of Conservation Concern Previously Reported from within 5 Miles of the CRN Site and Federally Listed Plants with Potential to Occur within the CRN Site and Associated Offsite Areas
(Sheet 2 of 2)

Common Name	Scientific Name	Federal Status[1]	State Status[1]	State Rank[2]
Ozark bunchflower	*Melanthrium woodii*	-	S	S2

Source: TVA, 2022 (within 5 miles of the CRN Site); USFWS, 2023 (within the CRN Site and associated offsite areas)

1) Status Codes: E = Listed Endangered; S = Listed Special Concern; T = Listed Threatened
2) State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; SH = Possibly Extirpated (Historical); S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
3) Federally listed species occurring within the county where work would occur, but not within 5 miles of the Project Area
4) State-tracked plant species observed during 2021 field surveys of the CRN Site

Note: - = Not Listed

Table 2.4-5 Taxonomic Composition of Macrophyte Species Occurring in the Clinch River arm of the Watts Bar Reservoir from CRM 14.1 to CRM 23.1 and Melton Hill Reservoir from CRM 23.1 to 53.5

Common Name	Scientific Name	Growth Form	Relative Abundance
Clinch River arm of the Watts Bar Reservoir			
Coon-tail	*Ceratophyllum demersum*	Submerged	Abundant/Widespread
Eurasian watermilfoil(1)	*Myriophyllum spicatum*	Submerged	Scattered
Hydrilla	*Hydrilla verticillata*	Submerged	Common
Nuttal's waterweed	*Elodea nuttallii*	Submerged	Scattered/Widespread
Sago pondweed	*Stuckenia pectinata*	Submerged	Rare
Small pondweed	*Potamogeton pusillus*	Submerged	Scattered
Southern naiad	*Najas guadalupensis*	Submerged	Scattered
Water stargrass	*Heteranthera dubia*	Submerged	Common/Widespread
Melton Hill Reservoir			
American Pondweed	*Potamogenton nodosus*	Floating	Uncommon
Brittle Naiad(1)	*Najas minor*	Submerged	Scattered
Coon-tail	*Ceratophyllumdemersum*	Submerged	Widespread
Eurasian Watermifoil(1)	*Myriophyllum spicatum*	Submerged	Common/Widespread
Hydrilla(1)	*Hydrilla verticillata*	Submerged	Uncommon
Muskgrass	*Chara sp.*	Submerged	Widespread
Nuttall's Waterweed	*Elodea nuttallii*	Submerged	Scattered
Scared Lotus	*Nelumbo nucifera*	Emergent	Rare
Small Pondweed	*Potamogeton pusillus*	Submerged	Scattered
Southern Naiad	*Najas guadalupensis*	Submerged	Scattered
Water Star-grass	*Heteranthera dubia*	Submerged	Common/Widespread

Source: TVA, 2023g

1) Species noted to be aquatic nuisance species (NRC and USACE, 2019)

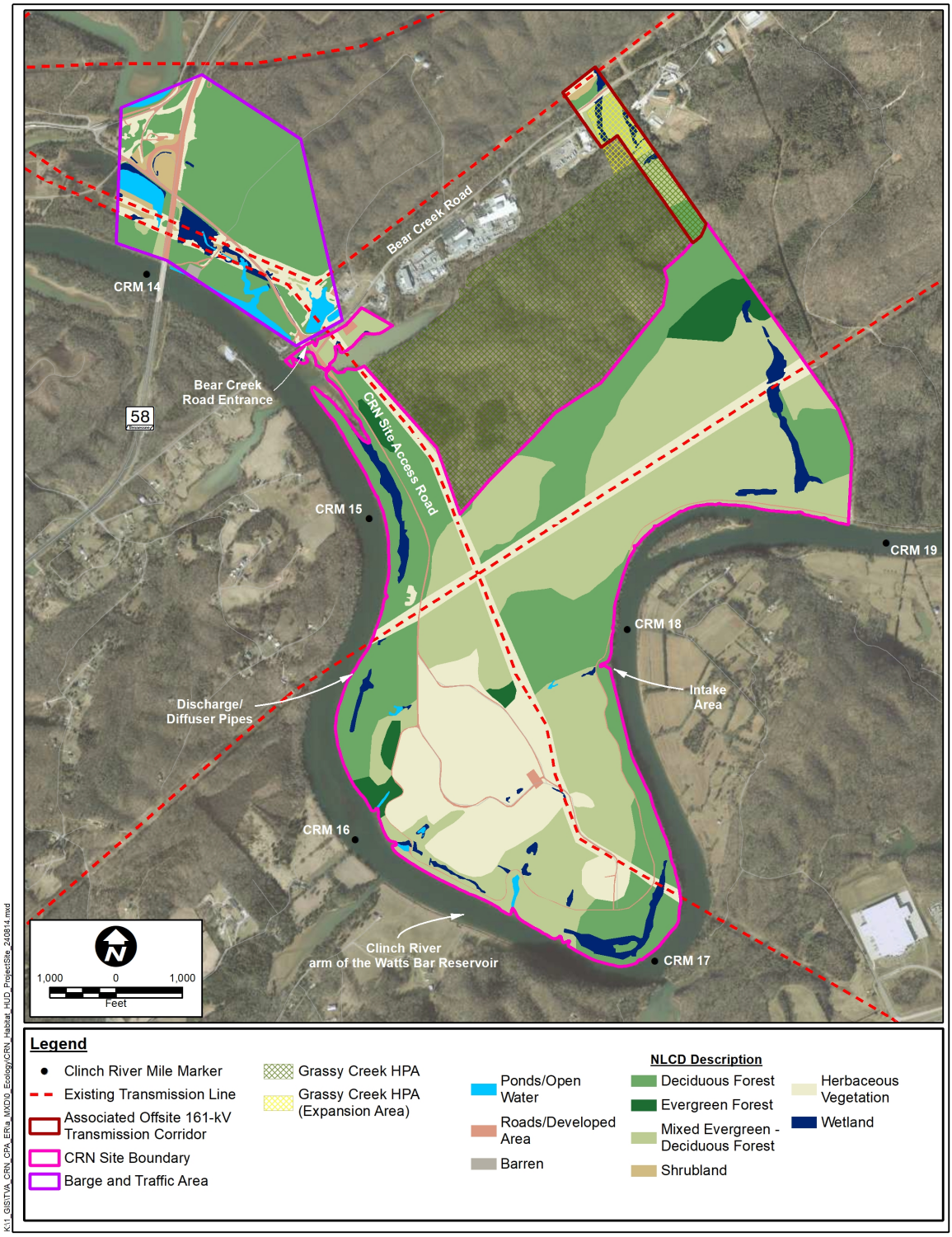


Figure 2.4-1 Updated Habitat Map of the CRN Site, BTA, and Offsite 161-kV Transmission Corridor

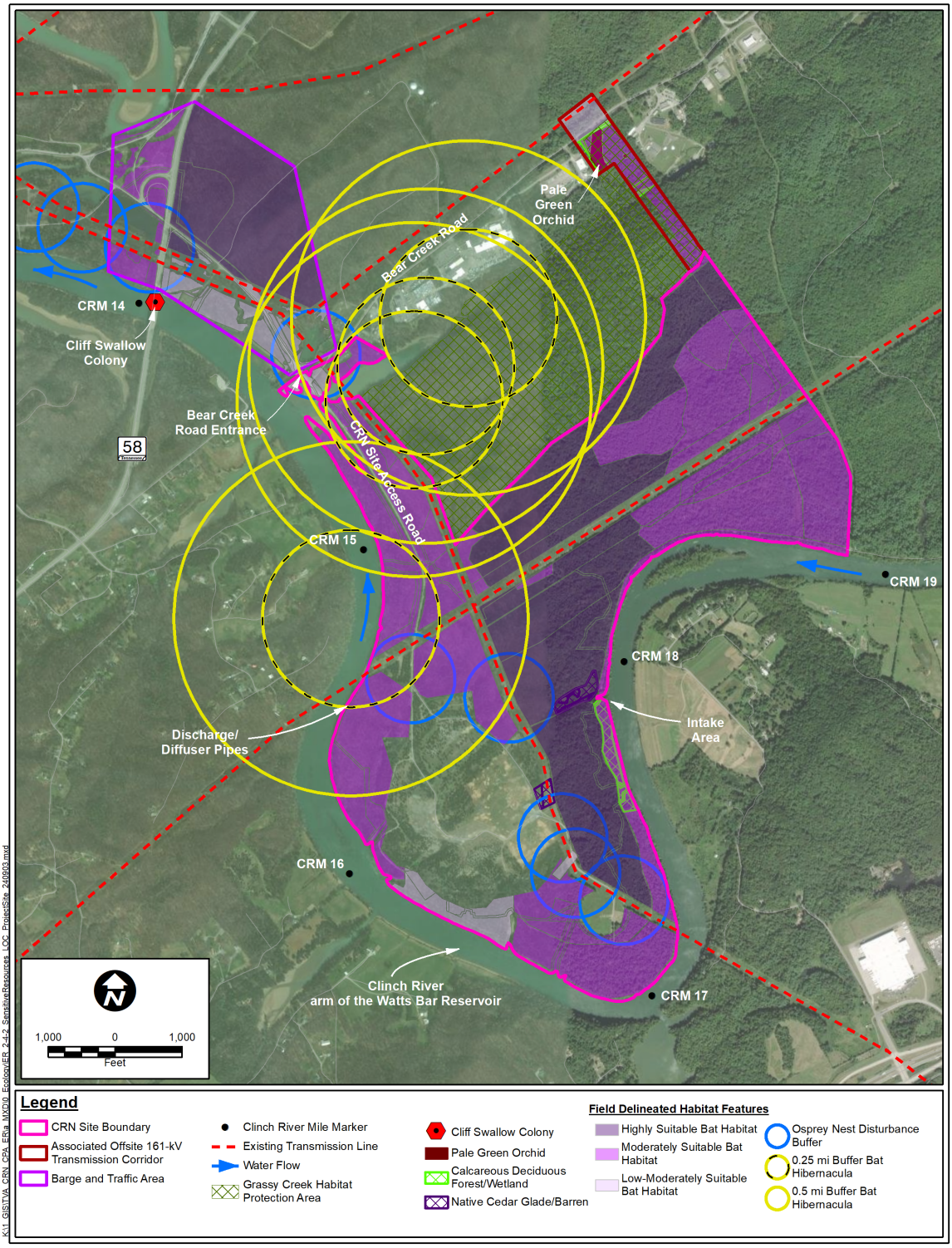


Figure 2.4-2 Sensitive Habitat Features for Important Species on the CRN Site, BTA, and Offsite 161-kV Transmission Corridor

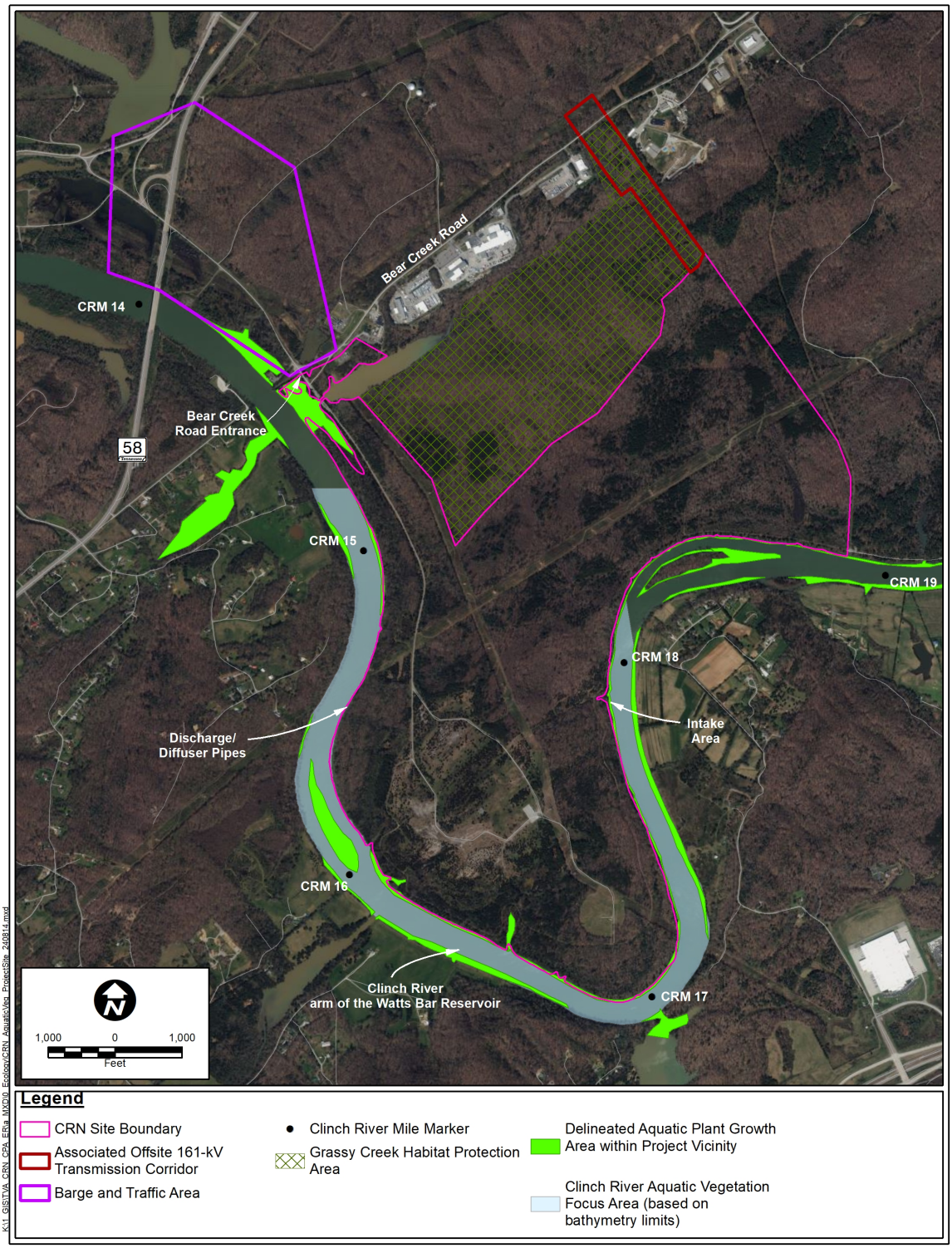


Figure 2.4-3 Location of Aquatic Macrophyte Growth Areas in the Clinch River Arm of the Watts Bar Reservoir Adjacent to the CRN Site

2.5 SOCIOECONOMICS

ESPA ER Section 2.5 and NRC ESP FEIS Section 2.5 describe the environment at the CRN Site and vicinity in relation to socioeconomic resources. This section addresses new information regarding socioeconomic resources that could be affected by building and operating CRN-1.

2.5.1 Demography

ESPA ER Section 2.5 and NRC ESP FEIS Subsection 2.5.1 and Section 2.6 describe demographic characteristics of populations within the region surrounding the CRN Site. The NRC ESP FEIS did not identify any issues regarding demography that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Resident population within 50 miles of the CRN Site
  - Historic and projected population data
  - Demographic characteristics of the region
- Location of minority and low-income populations within a 50-mile radius
- Transient population affected by the proposed project
- Migrant population affected by the proposed project

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.5.2 Community Characteristics

ESPA ER Section 2.5 and NRC ESP FEIS Subsection 2.5.2 describe community characteristics. The NRC ESP FEIS did not identify any issues regarding community characteristics that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Economic characteristics
- Transportation systems
  - Existing railways
  - Traffic volumes on affected roadways
- Tax structures
- Local land use plans and zoning regulations
- Available housing

- Infrastructure and public services
  - Water and wastewater systems
  - Law enforcement
  - Fire protection
  - Medical services
- Education services

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Community characteristics

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.5.2.1 Recreational Facilities

The Manhattan Project National Historical Park, established in November 2015, includes elements that are located in three states, including New Mexico, Washington, and Tennessee. The Tennessee portion of the National Park is located in Oak Ridge, TN. One of the Oak Ridge facilities is located approximately 2.6 miles north of the CRN Site. The Manhattan Project National Historic Park at Oak Ridge includes historic sites, community centers and museums, and research facilities operated by the DOE (National Park Service, 2023).

2.5.3 Historic Properties

ESPA ER Subsection 2.5.3 and NRC ESP FEIS Section 2.7 describe the existing archaeological resources and historic architectural properties on and immediately adjacent to the CRN Site and the MHH, and the historic properties within a 10-mile radius of the center of the CRN Site. Historic and cultural resources that have been determined to be significant include those that have been determined eligible for inclusion on, or listed in, the National Register of Historic Places (NRHP).

This section addresses new information regarding historic and cultural resources within the Area of Potential Effects (APE) that was not considered during the preparation of the ESPA ER and NRC ESP FEIS. The APE includes the CRN Site, the associated offsite 161-kV transmission line, and the BTA. Therefore, because the associated offsite 161-kV transmission line was not previously included, the APE is modified from that described and documented in the NRC ESP FEIS.

Having implemented the process described in Section 1.8, TVA identified new and notable information regarding the following:

- Modification of MHH to accommodate thermal mixing

- Investigation, analysis, and determination of NRHP-listed or NRHP-eligible archaeological resources within the APE
- Programmatic agreements

The information presented in the following subsections reflects a baseline environmental condition that is notably different from that previously documented.

2.5.3.1 Modification of MHH to Accommodate Thermal Mixing

ESPA ER Subsection 3.4.2.5 and NRC ESP FEIS Subsection 3.2.2.3.5 identify the possible need for a future operational modification of MHH, a NRHP-listed property, to promote mixing of the thermal discharge from the CRN Site under certain flow conditions. TVA has determined that a modification to MHH is not required for CRN-1. Therefore, MHH will not be affected by the project and has been removed as a feature of the affected environment for historic properties. TVA determined that the supplemental information regarding modification of MHH reflects a baseline environmental condition that is notably different from that previously documented.

2.5.3.2 Investigation, Analysis, and Determination of NRHP-Listed or NRHP-Eligible Archaeological Resources within the APE

New information related to the investigation, analysis, and determination for NRHP-listed or NRHP-eligible historic and archaeological resources within the APE includes the results of two cultural resources surveys conducted since the ESPA proceeding.

In accordance with the 2016 *Programmatic Agreement Between the Tennessee Valley Authority and Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project* (2016 Clinch River SMR PA) (TVA et al., 2016), in 2021, Wood Environment and Infrastructure Solutions, Inc., conducted a phase I cultural resource survey that included both an archaeological survey and a historic architectural viewshed survey for the proposed CRN Advanced Nuclear Reactor Technology Park that was the subject of the CRN PEIS (Hunter et al., 2021). The archaeological survey boundary included the 500-kV transmission corridor on the CRN Site and a section of land on DOE-managed property that would be affected by the associated offsite 161-kV transmission line. The survey revisited four previously recorded archaeological sites [ ]$^{(a)(3)}$ (40RE156, 40RE159, 40RE162, and 40RE547), but did not identify any archaeological deposits associated with any of the sites. Therefore, these sites were recommended as ineligible for the NRHP. TVA consulted with the Tennessee State Historic Preservation Office (TNSHPO) and federally recognized Indian tribes regarding these findings. The TNSHPO concurred with TVA's survey and the NRHP ineligibility recommendations for these sites. No concerns or objections were raised by the federally recognized tribes with interest in the undertaking. Appendix A includes correspondence with regulatory agencies regarding the cultural resources consultation associated with the CRN-1 project.

In accordance with stipulations outlined in Section 1.B of the 2016 Clinch River SMR PA (TVA et al., 2016), TVA also conducted a phase II cultural resources investigation on the CRN Site to evaluate the significance of archaeological sites that are potentially eligible for listing in the NRHP and would potentially be adversely affected by construction and operation of CRN-1. Between September 12 and December 20, 2022, Tennessee Valley Archaeological Research (TVAR) conducted phase II archaeological testing at four sites (40RE107, 40RE108, 40RE595, and 40RE600) located [

]$^{(a)(3)}$ (Meeks et al., 2023). TVAR's phase II investigations were formulated to address two primary goals: 1) assess the integrity and data potential of archaeological deposits within each site to determine each site's NRHP eligibility under Criterion D of the NRHP, and 2) provide TVA with recommendations for additional archaeological resource management measures for each site, if warranted.

Based on the results of the phase II investigations, TVAR concluded that sites 40RE107, 40RE595, and 40RE600 lack the potential to yield important information regarding the area's prehistory under Criterion D of the NRHP. Accordingly, these three sites are not eligible for inclusion in the NRHP and TVAR recommended no additional investigations. TVAR's phase II investigations identified two locations within the recorded boundary of site 40RE108 deemed sensitive cultural resource areas (designated Sensitive Areas 1 and 2) that may contribute to the resource's overall eligibility for inclusion in the NRHP under Criterion D.

TVAR concluded that all areas within the recorded boundary of site 40RE108 that are located outside of Sensitive Areas 1 and 2 would not contribute to the resource's overall eligibility for inclusion in the NRHP under Criterion D. TVAR recommended no additional archaeological investigations for these areas of site 40RE108. TVA reviewed the TVAR phase II report and agreed with TVAR's recommendations. Due to the possibility of intact stratified deposits in the two sensitive areas, TVA has determined that site 40RE108 should continue to be considered potentially eligible for the NRHP. TVA has also determined that any ground disturbance within the boundary of site 40RE108, outside the two sensitive areas would not adversely affect the site. TNSHPO concurred with TVA's eligibility determinations and finding that the undertaking would not affect the two sensitive areas provided TVA can avoid them. No concerns or objections were raised by the federally recognized tribes with interest in the undertaking.

2.5.3.3 Programmatic Agreements

As discussed in ESPA ER Subsection 2.5.3.2 and NRC ESP FEIS Section 2.7, in 2016, TVA executed the 2016 Clinch River SMR PA. The United Keetoowah Band of Cherokee Indians in Oklahoma was also a signatory to the 2016 Clinch River SMR PA. The 2016 Clinch River SMR PA is applicable during construction of CRN-1. There is no new information related to the 2016 Clinch River SMR PA.

In 2019, TVA executed the *Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the*

National Historic Preservation Act Of 1966 (2019 Valleywide Section 106 PA). The 2019 Valleywide Section 106 PA identifies routine, repetitive actions TVA may undertake in the implementation of its responsibilities throughout the TVA Power Service Area that can be excluded from further Section 106 review, as well as actions with low potential to affect historic properties that, under specific circumstances, TVA may deem as not resulting in adverse effects on historic properties without further consultation. In accordance with Section 106 of the NHPA, its implementing regulations at 36 CFR Part 800.1-16, and the 2019 Valleywide Section 106 PA, TVA will avoid, minimize, or mitigate potential operation-related impacts (TVA et al., 2019). The 2019 Valleywide Section 106 PA is applicable during operation of CRN-1.

2.6 GEOLOGY

ESPA ER Section 2.6 and NRC ESP FEIS Section 2.8 describe the basic geology underlying the CRN Site and region. The NRC ESP FEIS did not identify any issues regarding geology that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Supplemental geotechnical borings conducted to provide additional information for the Preliminary Safety Analysis Report

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.7 METEOROLOGY AND AIR QUALITY

ESPA ER Section 2.7 and NRC ESP FEIS Section 2.9 describe the environment at the CRN Site and vicinity in relation to meteorology and air quality. This section addresses new information regarding the local and regional climatology and meteorology, as well as air quality, in the vicinity of the CRN Site.

2.7.1 Climate

ESPA ER Subsections 2.7.1 and 2.7.4 and NRC ESP FEIS Subsection 2.9.1 describe the climate in the State of Tennessee and in the region of the CRN Site. The NRC ESP FEIS did not identify any issues regarding climate that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Tennessee climate description
- CRN Site climate description
    - Dry bulb temperatures
    - Atmospheric water vapor
    - Precipitation
    - Wind conditions

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.7.2 Regional Air Quality

ESPA ER Subsection 2.7.2 and NRC ESP FEIS Subsection 2.9.2 describe the regional air quality in the vicinity of the CRN Site. The NRC ESP FEIS did not identify any issues regarding air quality that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Ambient air quality from state and federal reports
    - Background air quality

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.7.3 Severe Weather

ESPA ER Subsection 2.7.3 and NRC ESP FEIS Subsection 2.9.1 describe severe weather in the vicinity of the CRN Site. The NRC ESP FEIS did not identify issues regarding severe weather that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Local climate and meteorological characteristics
    - Thunderstorms, hail, and lightning
    - Extreme winds
    - Tornadoes
    - Winter storms
    - Heavy fog

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.8 NONRADIOLOGICAL HEALTH

ESPA ER Section 2.8 and Subsection 2.5.2.2 and NRC ESP FEIS Section 2.10 describe nonradiological health at the CRN Site and in the vicinity. The NRC ESP FEIS did not identify any issues regarding nonradiological health that were not resolved. This section addresses new information regarding nonradiological health.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Public and occupational health
    - Annual occupational injury and fatality rates

  - Etiological Agents
- Noise
  - Identification of sensitive noise environments
- Transportation
- Electromagnetic fields

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.9 RADIOLOGICAL ENVIRONMENT AND RADIOLOGICAL MONITORING

ESPA ER Subsection 4.7.6 and NRC ESP FEIS Section 2.11 describe the radiological environment of the CRN Site, including natural background radiation, radiation from other sources in the area of the site, and radionuclides present as the result of contamination from legacy activities at nearby facilities. The NRC ESP FEIS did not identify any issues regarding the radiological environment and radiological monitoring that were not resolved. This section addresses new information regarding the radiological environment and radiological monitoring.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Presence of legacy radiological contaminants in groundwater

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

2.10 RELATED FEDERAL PROJECTS AND OTHER PROJECT ACTIVITIES

ESPA ER Section 2.9 and NRC ESP FEIS Section 2.12 describe related federal projects. Related federal projects and other project activities are addressed in Chapter 7.

2.11 REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetland and Deepwater Habitats of the United States, Washington, D.C., U.S. Fish and Wildlife Publication FWS/OBS-79/31.

Dewitz, J., and U.S. Geological Survey , 2021, National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release, doi:10.5066/P9KZCM54, Website: https://www.mrlc.gov, accessed May 15, 2023.

Environmental Laboratory, 1987. Corps of Engineers Wetland Delineation Manual. Vicksburg, Mississippi: U.S. Army Corps of Engineers Waterways Experiment Station. Technical Report Y-87-1.

EPA. See U.S. Environmental Protection Agency.

Hunter, J.A., M. Langmyer, C. Cantrell, A. Soergel, and D.M. Bradley. 2021. Phase I Cultural Resources Survey for the Proposed Jones Road/TN-95 Interchange, Clinch River SMR Project, Loudon and Roane Counties, Tennessee.

Meeks, S.C., H.J. Cyr, K.J. Little, R. Reeder Dutton, H. Bass, and M. Rogers. 2023. Phase II Archaeological Testing of Four Sites (40RE107, 40RE108, 40RE595, and 40RE600) Located on the Clinch River Nuclear Site, Roane County, Tennessee.

National Park Service. 2023. Oak Ridge, TN, Website: https://www.nps.gov/mapr/oak-ridge.htm, accessed March 28. 2023.

NRC. See U.S. Nuclear Regulatory Commission.

Tennessee Department of Environment and Conservation (TDEC), 2017. Tennessee Rapid Assessment Method. TDEC Division of Water Resources Natural Resources Unit, Nashville, Tennessee.

Tennessee Valley Authority (TVA), 2011. Natural Resource Plan, Website: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/natural-resource-plan, accessed May 19, 2023.

TVA, 2013. Biological Monitoring to Characterize the Aquatic Community near the Site of the Proposed Clinch River Small Modular Reactor 2011. Chattanooga, Tennessee. ADAMS Accession No. ML17334A058.

TVA, 2019. Clinch River Nuclear Site Early Site Permit Application, Part 03-Environmental Report (Revision 2). Chattanooga, Tennessee.

TVA, 2021a. Watts Bar Reservoir Land Management Plan Amendment, Volume II, July 2021.

TVA, 2021b. Bull Run Fossil Plan. Website: https://www.tva.com/energy/our-power-system/coal/bull-run-fossil-plant, accessed July 19, 2021.

TVA, 2021c. Clinch River Small Modular Reactor Study Area - Wetland Assessment Technical Report. Prepared by Britta Lees, Biological Compliance Wetland Biologist. July 15, 2021.

TVA, 2022. Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement, Website: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/clinch-river-nuclear-site-advanced-nuclear-reactor-technology-park, accessed January 23, 2023.

TVA, 2023a. Watts Bar Reservoir - Clinch River Project - Property Classification - WBR-1790, February 17, 2023.

TVA, 2023b. Hydrothermal Modeling Report for the Proposed Clinch River Small Modular Reactor, 2023 Update to the 2015 Hydrothermal Task Force Report, WR-2-23-90-920, November 2023.

TVA, 2023c. Biological Monitoring to Characterize the Aquatic Community near the Clinch River Nuclear Site, 2022 and 2023, Fisheries and Aquatic Monitoring, Chattanooga, Tennessee, October 2023.

TVA, 2023d. Clinch River Nuclear Barge Landing Tract B - Wetland Assessment Technical Report.

TVA, 2023e. Clinch River - Comprehensive Site Study Technical Report.

TVA, 2023f. National Reactor Innovation Center (NRIC) Demonstration Request for Concurrence (Project Code: 2023-0035599). January 31, 2023. U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office Concurrence dated April 28, 2023.

TVA, 2023g. Assessment of the Potential for Aquatic Plants to Impact the Clinch River Nuclear Site. January 24, 2023.

TVA, 2023h. Aquatic T&E (Threatened and Endangered) Species Technical Report. Clinch River Small Modular Reactor Site.

TVA, Advisory Council on Historic Preservation, and State Historic Preservation Officers, 2019. Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966.

TVA, Tennessee State Historic Preservation Office (TNSHPO), and United Keetoowah Band of Cherokee Indians in Oklahoma, 2016. Programmatic Agreement Between the Tennessee Valley Authority and Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project. TVA, Knoxville Tennessee and TNSHPO, Nashville, Tennessee.

Tennessee Wildlife Resources Agency (TWRA), 2024. Wild Hogs. Website: https://www.tn.gov/content/tn/twra/wildlife/mammals/large/wild-hog.html, accessed January 11, 2024.

U.S. Army Corps of Engineers (USACE), 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0), ed. J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, C.V. Noble. ERDC/EL TR-12-9. Vicksburg, Mississippi, U.S. Army Engineer Research and Development Center.

USACE, 2018. National Wetland Plant List, version 3.4. U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, Website: http://wetland-plants.usace.army.mil/, accessed August 2021.

U.S. Department of Agriculture (USDA), 2023. Imported Fire Ants. Last modified on August 22, 2023. Website: https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/imported-fire-ants/CT_Imported_Fire_Ants, accessed January 11, 2024.

U.S. Environmental Protection Agency (EPA), 1997. EPA Superfund Record of Decision: Oak Ridge Reservation (USDOE), Clinch River & Poplar Creek Operable Units, Oak Ridge, Tennessee, EPA/541/R-97/075, Washington, D.C.

U.S. EPA, 2018. Region 4 Ecological Risk Assessment Supplemental Guidance, March 2018 Update, Screening Values.

U.S. Fish and Wildlife Service (USFWS), 2023. Information for Planning and Consultation. Website: https://ipac.ecosphere.fws.gov/, accessed April 5, 2023.

U.S. Nuclear Regulatory Commission (NRC) and U.S. Army Corps of Engineers (USACE), 2019. Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site. NUREG-2226, Volume 1, Washington, D.C., ADAMS Accession Number ML19073A099.

TABLE OF CONTENTS

CHAPTER 3 PLANT AND PROJECT DESCRIPTION 3-1

3.1 EXTERNAL APPEARANCE AND PLANT LAYOUT 3-2

3.1.1 Site Layout 3-2

3.1.2 Power Plant Description 3-2

3.1.3 Site-Related Design Parameters 3-3

3.2 PLANT DESCRIPTION 3-21

3.2.1 Reactor Power Conversion System 3-21

3.2.2 Plant Water Use 3-24

3.2.3 Cooling System 3-29

3.2.4 Radioactive Waste Management System 3-43

3.2.5 Nonradioactive Waste Systems 3-62

3.2.6 Power Transmission System 3-66

3.3 BUILDING ACTIVITIES - PLANT CONSTRUCTION 3-68

3.3.1 Power Block and Cooling Tower 3-69

3.3.2 Cooling Water Intake and Discharge Structures 3-71

3.3.3 Rail Siding and Barge Facility Improvements 3-71

3.3.4 Obtaining Borrow Material 3-72

3.3.5 Transmission Lines 3-73

3.3.6 Melton Hill Hydroelectric Dam Bypass 3-73

3.3.7 Construction Timeline, Traffic, and Workforce 3-73

3.4 OPERATIONAL ACTIVITIES - PLANT OPERATIONS AND MAINTENANCE 3-76

3.4.1 Plant-Environmental Interfaces During Operation 3-76

3.4.2 Workforce Characterization 3-77

3.5 REFERENCES 3-77

LIST OF TABLES

Table 3.1-1 CRN Site Characteristics 3-4

Table 3.1-2 CRN Site-Related Design Parameters 3-6

Table 3.2-1 Water Treatment Chemicals 3-27

Table 3.2-2 CRN-1 Reactor Modes 3-31

Table 3.2-3 CRN Site Projected Average Normal Liquid Radioactive Release 3-47

Table 3.2-4 CRN Site Projected Average Normal Gaseous Radioactive Release 3-51

Table 3.2-5 Projected Principal Radionuclides in Solid Radioactive Waste from the CRN Site 3-54

Table 3.2-6 Projected Blowdown Constituents and Concentrations 3-63

Table 3.2-7 Projected Maximum Annual Emissions from Standby Diesel Generators and Other Stationary Sources 3-65

Table 3.3-1 Anticipated Timeline for Building and Operation of CRN-1 3-75

LIST OF FIGURES

Figure 3.1-1 CRN-1 Disturbed Areas 3-19

Figure 3.1-2 Architectural Rendering of CRN-1 3-20

Figure 3.2-1 Simplified Power Conversion Flow Diagram 3-23

Figure 3.2-2 CRN Site Water Use Diagram 3-28

Figure 3.2-3 Recessed Intake Alternative Structure Plan 3-36

Figure 3.2-4 Recessed Intake Alternative Structure Profile 3-37

Figure 3.2-5 Submerged Offshore Intake Alternative Structure Plan 3-38

Figure 3.2-6 Submerged Offshore Intake Alternative Structure Profile 3-39

Figure 3.2-7 Diffuser and Discharge Piping Plan View 3-40

Figure 3.2-8 Discharge Structure Plan and Profile 3-41

Figure 3.2-9 Diffuser Profile in Channel 3-42

Figure 3.2-10. Waste Collection and Filtering Subsystem Simplified Diagram 3-56

Figure 3.2-11. Waste Sampling Subsystem Simplified Diagram 3-57

Figure 3.2-12. Condensate Storage and Transfer Subsystem Simplified Diagram 3-58

Figure 3.2-13. Refueling Water Storage and Cleanup Subsystem Simplified Diagram 3-59

Figure 3.2-14. Offgas System Simplified Diagram 3-60

Figure 3.2-15. Solid Waste Management System Simplified Diagram 3-61

CHAPTER 3 PLANT AND PROJECT DESCRIPTION

Chapter 3 presents a description of the proposed action, including site layout, design, activities required to construct and operate the plant, and structures and facilities associated with these activities. This description is used to assess the environmental impacts of the proposed action.

Chapter 3 of the Early Site Permit Application (ESPA) Environmental Report (ER) describes a generic plant design based on a plant parameter envelope (PPE) developed for use in evaluating potential environmental impacts of building and operating two or more small modular reactors (SMR) at the Clinch River Nuclear (CRN) Site. The Early Site Permit (ESP) PPE contains a set of site characteristics and site-related design parameters that Tennessee Valley Authority (TVA) expected to bound the design characteristics of the reactor or reactors that might be constructed at the CRN Site. The PPE values serve to bound actual reactor design information. The PPE was used by the United States Nuclear Regulatory Commission (NRC) in the preparation of NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA and was issued to support ESP-006.

This Construction Permit Application (CPA) evaluates a single GE Hitachi (GEH) Nuclear Energy BWRX-300 SMR at the CRN Site, hereafter referred to as CRN Unit 1 (CRN-1). Title 10 of the Code of Federal Regulations (10 CFR) 51.50, *Environmental report - construction permit, early site permit, or combined license stage*, states that applicants for a Combined License that reference an ESP must demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the ESP. However, ESP-006 acknowledges that an applicant for a CP could reference the ESP. Because this CPA references ESP-006, this chapter describes the specific proposed plant design and compares PPE parameter values from the NRC ESP FEIS with those for CRN-1.

In addition, this ER addresses environmental issues that were considered to be unresolved in the NRC ESP FEIS or that are affected by new and significant information. This chapter provides additional plant descriptions to the extent necessary to support these supplemental analyses.

This chapter is divided into the following sections:

- External Appearance and Plant Layout (Section 3.1)
- Plant Description (Section 3.2)
- Building Activities - Plant Construction (Section 3.3)
- Operational Activities - Plant Operations and Maintenance (Section 3.4)
- References (Section 3.5)

3.1 EXTERNAL APPEARANCE AND PLANT LAYOUT

ESPA ER Section 3.1 and NRC ESP FEIS Section 3.1 describe external appearance and plant layout. This section addresses new information related to CRN-1.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Site characteristics

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Site layout
- Power plant description
- Site-related design parameters

The information presented in the following subsections reflects plant characteristics that are notably different from those previously documented.

3.1.1 Site Layout

The site layout is addressed in ESPA ER Section 3.1 and NRC ESP FEIS Section 3.1. The NRC ESP FEIS did not identify any issues regarding site layout that were not resolved.

Figure 2.1-2 presents the site utilization plan for CRN-1. Figure 3.1-1 shows the extent of cleared areas at the site. Figure 3.1-2 shows a rendering of the proposed facility. The proposed facility layout differs from that presented in the ESPA ER and the NRC ESP FEIS. Differences in plant layout include the location of the cooling tower, blowdown holding pond, and switchyard and the addition of an optional onsite quarry outside the plant area to support building activities. Throughout this document, "power block" refers to the structures that contain the reactor, turbine, radioactive waste systems, control room, and other support facilities. "Plant area" refers to all the structures and facilities associated with CRN-1, including the power block, other buildings, switchyard, cooling tower, blowdown holding pond, stormwater basins, intake and discharge structures, and parking lots. Construction/Operational Support Areas are used for the concrete batch plant, parking, temporary water management, construction laydown, and storage.

3.1.2 Power Plant Description

The height of the CRN-1 power block area is provided in Table 3.1-2 (Item 1.1.1). However, the final building height is yet to be determined. If necessary, TVA will supplement this description following completion of detailed design. As described in the ESPA ER, buildings are constructed using standard building and siding materials such as concrete, metal, or wood. The design and construction of building structures takes into consideration the surroundings to minimize aesthetic impacts. A rendering of the facility is provided in Figure 3.1-2.

The CRN-1 circulating water system (CWS) includes one mechanical draft cooling tower with make-up water drawn from the Clinch River arm of the Watts Bar Reservoir (Reservoir). The intake structure is located at Clinch River Mile (CRM) 17.9. The intake structure is described in Subsection 3.2.3.2.1. The discharge structure is located at CRM 15.55. The discharge structure is described in Subsection 3.2.3.2.3.

The location of the blowdown holding pond, stormwater basins, and wastewater collection pond are shown on Figure 2.1-2. Dimensions of the blowdown holding pond are presented in Subsection 3.2.3.2.2. For purposes of this analysis, the southwestern stormwater basin is estimated to be approximately 3.1 acres in area and the eastern stormwater basin is estimated to be approximately 4.7 acres in area. Both are assumed to be approximately 10 feet deep. The wastewater pond is expected to be approximately 0.7 acre in area. If necessary, TVA will supplement the descriptions of the ponds following completion of detailed design.

As shown in Figure 2.1-2, the 161-kilovolt (kV) switchyard required to support CRN-1 is located to the southwest of the power block. The figure also shows the planned relocation of the existing Kingston Fossil Plant (FP)-Fort Loudoun Hydroelectric Plant (HP) #1 161-kV line. Further information about power transmission systems at the CRN Site is found in Subsection 3.2.6.

After the completion of construction, areas used to support construction activities that are not reused to support facility operations would be regraded and landscaped. Some areas cleared for temporary construction facilities would be revegetated, and topographical features created during construction would be re-contoured to match the surrounding areas. Other areas may be left as graveled lots for future operational use. More information about TVA's sustainability planning associated with future management of the site is provided in Subsection 4.3.1.5.2.

3.1.3 Site-Related Design Parameters

Tables 3.1-1 and 3.1-2 provide a comparison of PPE values for site characteristics and site-related design parameters from Appendix I, Tables I.1 and I.2, of the NRC ESP FEIS to the corresponding values for CRN-1. The tables also indicate in which ER section(s) non-bounded parameters are discussed in more detail. Red text in Table 3.1-2 indicates values that are not bounded by the ESP-006 PPE and represent new and notable information.

Table 3.1-1 CRN Site Characteristics
(Sheet 1 of 2)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[4]	ESPA ER Section[4]	CRN-1 Value[2]	Comments
9. Unit Vent/Airborne Effluent Release Point						
9.1 Atmospheric Dispersion (X/Q) (Accident)						
9.1.1 0-2 hours at exclusion area boundary	The atmospheric dispersion coefficients used in the design safety analysis to estimate dose consequences of accident airborne releases in the limiting two-hour interval.	Site	5.58E-04 s/m^3	7.1	5.58E-04 s/m^3	Same as ESP PPE.
9.1.2 0-8 hours at low population zone (LPZ)	The atmospheric dispersion coefficients used in the design safety analysis to estimate dose consequences of accident airborne releases in the first eight hours.	Site	4.27E-05s/m^3	7.1	4.27E-05s/m^3	Same as ESP PPE.
9.1.3 8-24 hours at LPZ	The atmospheric dispersion coefficients used in the design safety analysis to estimate dose consequences of accident airborne releases between hours 8 and 24 after the accident.	Site	3.80E-05 s/m^3	7.1	3.80E-05 s/m^3	Same as ESP PPE.
9.1.4 1-4 day at LPZ	The atmospheric dispersion coefficients used in the design safety analysis to estimate dose consequences of accident airborne releases between the first day and the fourth day after the accident	Site	2.94E-05 s/m^3	7.1	2.94E-05 s/m^3	Same as ESP PPE.

Table 3.1-1 CRN Site Characteristics
(Sheet 2 of 2)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[4]	ESPA ER Section[4]	CRN-1 Value[2]	Comments
9.1.5 4-30 day at LPZ	The atmospheric dispersion coefficients used in the design safety analysis to estimate dose consequences of accident airborne releases between day four until the end of the first 30 days after the accident.	Site	2.04E-05 s/m^3	7.1	2.04E-05 s/m^3	Same as ESP PPE.
9.3 Calculated Dose Consequences						
9.3.1 Normal	The design radiological dose consequences due to airborne releases from normal operation of the plant.	Site	10 CFR 20, 10 CFR 50 Appendix I	5.4[3]	10 CFR 20, 10 CFR 50 Appendix I	Same as ESP PPE.
9.3.2 Post-Accident	The design radiological dose consequences due to airborne releases from postulated accidents.	Site	10 CFR 52.17 (a)(1) (ix), 10 CFR 100.20	7.1[3]	10 CFR 20, 10 CFR 50 Appendix I, 10 CFR 100	Same as ESP PPE.

1) The numbering of the PPE listing is not meant to be sequential and was compiled from and is consistent with the list developed by industry and refined for the ESPA. Names and numbering are based on Nuclear Energy Institute's (NEI) "Industry Guideline for Developing a Plant Parameter Envelope in Support of and Early Site Permit" NEI 10-01, Revision 1 (NEI, 2012).

2) No new calculations were performed; ESP ER values are considered bounding for CRN-1.

3) Information from NEI 10-01 is utilized in the development of the impacts described in this section but not referenced specifically in the text.

4) Values are taken directly from Appendix I of NRC ESP FEIS.

Abbreviations: X/Q = atmospheric dispersion coefficient, s/m^3 = seconds per cubic meter

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 1 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
1. Structure						
1.1 Building Characteristics						
1.1.1 Height (without Stack and Cooling Towers)	The height from finished grade to the top of the tallest power block structure, excluding cooling towers (excludes stairway towers, elevator, etc.).	Rx	160 feet	2.5.2, 3.1, 4.4, 5.8	103 feet (31 m)	Lower than ESP PPE.
1.1.2 Foundation Embedment	The depth from finished grade to the bottom of the basemat or the most deeply embedded power block structure (excavation depth is the same elevation as embedment depth).	Rx	138 feet	3.1	<120 feet (36.5 m)	Lower than ESP PPE.
3. Normal Plant Heat Sink						
3.1 Condenser						
3.1.2 Condenser / Heat Exchanger Duty	Design value for the waste heat rejected to the CWS across the condensers.	Eng	1639 MW (5593 MBTU/ hour)	3.4	~570 MW (1,945 MBTU/ hour)	Lower than ESP PPE.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 2 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
3.2 Non-Safety Related Service Water Systems						
3.2.3 Miscellaneous Plant Water Uses Intake	The maximum, and normal, water intake of the plant neglecting cooling tower makeup, potable/sanitary water users, and liquid radwaste treatment.	Eng	Maximum: 5100 gpm Normal: 1345 gpm See ESPA ER Figure 3.3-1	3.4	4 gpm (normal) 889 gpm (maximum)[3]	Lower than ESP PPE.
3.2.4 Miscellaneous Plant Water Uses Discharge	The maximum, and normal, water discharge of the plant neglecting cooling tower makeup, potable/ sanitary water users, and liquid radwaste treatment.	Eng	Maximum: 4200 gpm Normal: 445 gpm See ESPA ER Figure 3.3-1	3.4	2 gpm (normal) 861 gpm (maximum)[3]	Lower than ESP PPE.
3.3 Mechanical Draft Cooling Towers						
3.3.1 Acreage	The land required for cooling towers, including support facilities such as equipment sheds, basins, canals, or shoreline buffer areas.	Eng	21 acres See ESPA ER Figure 3.1-1.	3.4, 5.3	~4 acres	Lower than ESP PPE.
3.3.3 Blowdown Constituents and Concentrations	The maximum expected concentrations for anticipated constituents in the cooling water systems blowdown to the receiving water body.	Eng	ESPA ER Table 3.6-1	3.6	Table 3.2-6	Some values higher and others lower than ESP PPE. See Section 3.2.5.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 3 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
3.3.4 Blowdown Flow Rate	The normal (and maximum) flow rate of the blowdown stream from the cooling water systems to the receiving water body for closed system designs.	Eng	Maximum: (2 COC) 12,800 gpm Expected: (4 COC) 4,270 gpm	3.4	1,341 gpm	Lower than ESP PPE.
3.3.5 Blowdown Temperature	The maximum expected blowdown temperature at the point of discharge to the receiving water body.	Eng	90 °F	3.4	90.7 °F	Higher than ESP PPE. See Section 3.2.3.
3.3.6 Cycles of Concentration (COC)	The ratio of total dissolved solids in the cooling water blowdown streams to the total dissolved solids in the make-up water streams.	Eng	Maximum: 4 Minimum: 2	3.4, 5.3	4	Same as ESP PPE.
3.3.7 Evaporation Rate	The expected (and maximum) rate at which water is lost by evaporation from the cooling water systems.	Eng	12,800 gpm (expected and maximum)	3.4	2,800 gpm (average) 4,022 gpm (maximum)	Lower than ESP PPE.
3.3.8 Height	The vertical height above finished grade of mechanical draft cooling towers associated with the cooling water systems.	Eng	65 feet	3.4, 5.3, 5.8	64 feet	Lower than ESP PPE.
3.3.9 Makeup Flow Rate	The expected (and maximum) rate of removal of water from a natural source to replace water losses from closed cooling water system.	Eng	17,078 gpm (expected), 25,608 gpm (maximum)	3.4	4,143 gpm (average) 5,365 gpm (maximum)	Lower than ESP PPE.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 4 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
3.3.10 Noise	The maximum expected sound level produced by operation of cooling towers, measured at 1000 feet from the noise source.	Eng	<70 dBa at 1000 feet	5.3, 5.8, 9.3	<70 dBa at 1000 feet[7]	No update to ESP PPE value.
3.3.11 Cooling Tower Temperature Range	The temperature difference between the cooling water entering and leaving the towers.	Eng	18°F	3.4	~25°F	Higher than ESP PPE. See Section 3.2.3.
3.3.12 Cooling Water Flow Rate	The total cooling water flow rate through the condenser/heat exchangers.	Eng	755,000 gpm	3.4, 5.3	244,680 gpm	Lower than ESP PPE.
3.3.14 Maximum Consumption of Raw Water	The expected maximum short-term consumptive use of water by the cooling water systems (evaporation and drift losses).	Eng	12,808 gpm	3.4	4,024 gpm	Lower than ESP PPE.
3.3.16 Stored Water Volume	The quantity of water stored in cooling water system impoundments, basins, tanks and/or ponds.	Eng	5 million gallons	3.4	4.8 million gallons	Lower than ESP PPE.
3.3.17 Drift	Rate of water lost from the tower as liquid droplets entrained in the vapor exhaust air stream.	Eng	8 gpm	3.4	2 gpm	Lower than ESP PPE.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 5 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
5. Potable Water/Sanitary Waste System						
5.1 Discharge to Municipal Sewer[4]						
5.1.1 Flow Rate (Potable/Sanitary Normal)	The expected (normal) effluent flow rate from the potable/sanitary water system to the municipal sewer.	Rx	50 gpm	3.4, 3.6, 5.5	3 gpm	Lower than ESP PPE.
5.1.2 Flow Rate (Potable/Sanitary Maximum)	The maximum effluent flow rate from the potable/sanitary water system to the municipal sewer.	Rx	100 gpm	3.4, 3.6, 5.5	50 gpm	Lower than ESP PPE.
9.5 Source Term						
9.5.1 Gaseous (Normal)	The expected annual activity, by radionuclide, contained in routine plant airborne effluent streams, excluding tritium.	Rx	ESP ER Table 3.5-3 CPA ER Table 3.2-4	3.5	CPA ER Table 3.2-4	Total activity dose consequence lower than ESP PPE. See Section 3.2.4.
10. Liquid Radwaste System						
10.2 Release Point						
10.2.1 Flow Rate	The discharge (including minimum dilution flow, if any) flow rate of liquid potentially radioactive effluent streams from plant systems to the receiving water body.	Eng	900 gpm (expected normal and maximum)	3.4	Maximum ratio of 1 gpm radwaste discharge to 100 gpm nonradioactive discharge[5]	Lower than ESP PPE.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 6 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
10.3 Source Term						
10.3.1 Liquid	The annual activity, by radionuclide, contained in routine plant liquid effluent streams, excluding tritium.	Rx	ESPA ER Table 3.5-1 CPA ER Table 3.2-3	3.5	CPA ER Table 3.2-3	Total activity dose consequence lower than ESP PPE. See Section 3.2.4.
11. Solid Radwaste System						
11.2 Solid Radwaste						
11.2.1 Activity	The annual activity, by radionuclide, contained in solid radioactive wastes generated during routine plant operations.	Rx	ESPA ER Table 3.5-5 CPA ER Table 3.2-5	3.5	CPA ER Table 3.2-5[7]	No update to ESP PPE value.
11.2.3 Volume	The expected volume of solid radioactive wastes generated during routine plant operations.	Rx	5,000 cubic feet/year (site value)	3.5, 3.8, 5.7, 7.4	5,000 cubic feet/year[7]	No update to ESP PPE value.
13. Auxiliary Boiler System						
13.1 Exhaust Elevation	The height above finished plant grade at which the flue gas effluents are released to the environment.	Eng	Plant Grade	3.6	Not Applicable	CRN-1 does not have an auxiliary boiler.
13.2 Flue Gas Effluents	The expected combustion products and anticipated quantities released to the environment due to operation of the auxiliary boilers.	Eng	ESPA ER Table 3.6-2	3.6	Not Applicable	CRN-1 does not have an auxiliary boiler.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 7 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
14. Standby Power System						
14.1 Diesel						
14.1.2 Diesel Exhaust Elevation	The elevation above finished grade of the release point for standby diesel exhaust releases.	Eng	25 feet	3.6	25 feet[7]	No update to ESP PPE value.
14.1.3 Diesel Flue Gas Effluents	The expected combustion products and anticipated quantities released to the environment due to operation of the emergency standby diesel generators.	Eng	ESPA ER Table 3.6-3	3.6	Table 3.2-7	Lower than ESP PPE.
14.2 Gas Turbine						
14.2.2 Gas-Turbine Exhaust Elevation	The elevation above finished grade of the release point for standby gas turbine exhaust releases.	Eng	50 feet	3.6	Not Applicable	CRN-1 does not have a gas turbine.
14.2.3 Gas-Turbine Flue Gas Effluents	The expected combustion products and anticipated quantities released to the environment due to operation of the emergency standby gas-turbine generators.	Eng	ESPA ER Table 3.6-4	3.6	Not Applicable	CRN-1 does not have a gas turbine.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 8 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
15. Plant Layout Considerations						
15.1 Access Routes						
15.1.1 Heavy Haul Routes	The land usage required for permanent heavy haul routes to support normal operations and refueling.	Eng	5 acres	3.9	1 acre (0.4 hectare)	Lower than ESP PPE.
15.2 Acreage to Support Plant Operations	The land area required to provide space for plant facilities.	Eng	94 acres ESPA ER Figure 3.1-1	3.7	~53.2 acres (21.5 hectares)	Lower than ESP PPE.
16. Plant Operations Considerations						
16.1 Megawatts Thermal (MWt)	The thermal power generated by one unit (may be the total of several modules). Specify both core thermal power and reactor coolant pump (RCP) thermal power (if there are RCPs in the design).	Rx	800 MWt (core) 805 MWt (core + RCP), 2,420 MWt total for site	5.7, 7.4	~870 MWt	Lower than ESP PPE for site total; higher than ESP PPE for a single unit. See Sections 3.2.1.1 and 5.10.2
16.2 Plant Design Life	The operational life for which the plant is designed.	Rx	60 years	3.2	60 years	Same as ESP PPE.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 9 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
16.3 Plant Population						
16.3.1 Operation	The estimated number of total permanent staff to support operations of the plant.	Eng	500 (value per site)	3.10, 5.8, 9.3	205 people	Lower than ESP PPE.
16.3.2 Refueling / Major Maintenance	The estimated additional number of temporary staff required to conduct refueling and major maintenance activities.	Eng	1,000	5.8, 9.3	280 people	Lower than ESP PPE.
16.4 Station Capacity Factor	The percentage of time that a plant is capable of providing power to the grid.	Eng	Maximum 98% Minimum: 90%	5.7, 7.4	95%	Within range of ESP PPE.
16.6 Megawatts Electrical (MWe) (at 100% power with 85 °F circulating water)	Best estimate of MWe generator output.	Eng	800 MWe (value for site)	3.2, 5.7, 5.9, 7.4, 9.4, 10.1	300 MWe gross/unit (value for site)	Lower than ESP PPE.
17. <u>Construction</u>						
17.2 Acreage						
17.2.1 Laydown Areas	The land area required to provide space for construction support facilities. Provide a list of what buildings and/or areas and the associated acreage for each.	Eng	151 acres ESPA ER Figure 3.1-1	3.7	161 acres total (140 acres for laydown and shops 21 acres for construction parking)	Higher than ESP PPE. See Section 4.1.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 10 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
17.3 Construction						
17.3.1 Noise	The maximum expected sound level due to construction activities, measured at 50 feet from the noise source.	Eng	101 dB at 50 feet	3.9	~101 dB at 50 feet for routine construction noise[7] 126 dBa at 50 feet for blasting[6]	See Section 4.7.
17.4 Plant Population						
17.4.1 Construction	Maximum number of people onsite during construction.	Eng	2,200 (value per site)	3.10	1,301; Not including utility/ customer oversight and regulator presence	Lower than ESP PPE.
18. Miscellaneous Items						
18.0.1 Fuel Characteristics	What is the form of the reactor fuel and the burnup in gigawatt days per metric ton uranium (GWD/MTU)?	Rx	UO_2, 51 GWD/ MTU	5.7, 7.4	UO_2 - Gd_2O_3[8], 65 GWD/MTU	Burnup is higher than ESP PPE. See Sections 5.10 and 6.2.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 11 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
18.0.2 Fuel assemblies	Provide the number of fuel assemblies per core and the weight (in MTU) of each assembly.	Rx	Number of Fuel Assemblies: 96 Weight of Each Assembly: 0.304 MTU	3.8, 5.7, 7.4	240 assemblies 0.187 MTU per assembly	Higher number of assemblies, lower weight per assembly than ESP PPE. See Sections 5.10 and 6.2.
18.0.4 Refueling	Provide the refueling frequency, average number of assemblies per refueling, and fuel pool capacity (in years).	Rx	Frequency 2 years, Assemblies per Refueling: 96, Capacity: Minimum of 6 years	3.8, 5.7, 5.8	1- or 2- year refueling cycle; 32 (1-year cycle) or 72 (2-year cycle) assemblies per refueling; 8 years fuel pool capacity	Same or shorter refueling cycle as ESP PPE. Higher pool capacity than ESP PPE.
18.0.5 Irradiation fuel transportation	Provide the weight of irradiated fuel per spent fuel shipping cask (MTU).	Rx	21.2 MTU	5.7	12.7 MTU	Lower than ESP PPE.
18.1 Maximum Fuel Enrichment	Concentration (weight percent fraction) of Uranium-235 in the fuel uranium.	Rx	<5% Uranium-235	3.2, 5.7, 7.4	<5% Uranium-235	Same as ESP PPE.
18.2 Maximum Average Assembly Burnup	Maximum assembly average burn-up at end of assembly life.	Rx	51 GWD/MTU	3.2, 5.7, 7.4	65 GWD/MTU[9]	Higher than ESP PPE. See Section 3.2.1, 5.10, and 6.2.

Table 3.1-2 CRN Site-Related Design Parameters
(Sheet 12 of 12)

PPE Section[1]	Definition	Parameter Type	ESP-006 PPE Value[2]	ESPA ER Section[2]	CRN-1 Value	Comments
18.3 Peak fuel rod exposure at end of life	Peak fuel rod exposure at end of life.	Rx	62 GWD/MTU	3.2	62 GWD/ MTU[10]	Same as ESP PPE.
18.7 Clad Material	Fuel rod clad material.	Rx	Zirc Alloy (Zircaloy)	5.7	Zircaloy-2	Same as ESP PPE.

Notes:

1) The numbering of the PPE listing is not meant to be sequential and was compiled from and is consistent with the list developed by industry and refined for the ESPA. Names and numbering are based on NEI's "Industry Guideline for Developing a Plant Parameter Envelope in Support of and Early Site Permit" NEI 10-01, Revision 1 (NEI, 2012).

2) Values are taken directly from Appendix I of NRC ESP FEIS.

3) As shown in Figure 3.2-2, value includes backwash from greensand and walnut shell filters, but assumes only one filter is backwashing at a time.

4) Section 5.1 of NEI 10-01 (NEI, 2012) is labeled "Discharge to Site Water Bodies" and descriptions for Items 5.1.1 and 5.1.2. are for "flow to the receiving water body." These labels were retained in the ESPA ER, but the values given in the ESPA ER for Items 5.1.1 and 5.1.2 represent discharge to the municipal sewer system, *not* to a site water body. Likewise, CRN-1 discharges potable water/ sanitary waste system water to the municipal sewer. To preserve the comparison of PPE values, labels and descriptions have been edited in this table to reflect potable water/sanitary waste system discharge to the municipal sewer. The value for potable water/ sanitary waste system water discharge to site water bodies for both ESPA ER and CRN-1 is 0 gpm.

5) The maximum liquid radwaste system discharge to the environment is based on a ratio of 1 gpm of radwaste discharge to 100 gpm of nonradioactive discharge from the holding pond to the Reservoir. Makeup water can bypass the cooling tower if necessary to support higher volume liquid radwaste effluents. During zero discharge plant operation the liquid radwaste discharge to the diffuser is 0 gpm.

6) The primary noise limit concern for construction projects like CRN-1 is steam blows; hydrolasing is used to minimize this impact. The anticipated highest levels of noise during construction would be from blasting. Sandblasting, which is comparable to hydrolasing in noise level, has an average maximum noise level at 50 feet of 96 decibels and is therefore bounded by the ESP PPE noise limit. The estimated maximum average noise level from blasting, 126 decibels at 50 feet, is not bounded by the ESP PPE noise limit. The ESPA ER assumed that blasting would be an intermittent activity during construction. Blasting is also expected to be an intermittent activity during the building of CRN-1, but the frequency of blasting would depend on whether the optional onsite quarry is developed as part of the building activities for CRN-1.

7) No new value is available for this parameter; however, it is expected that ESP PPE values found in the NRC FEIS, Appendix I, remain bounding. Values will be re-evaluated as new information is obtained.

8) There is Gd_2O_3 in the fuel that provides a burnable neutron absorber for reactivity control early in the fuel cycle. For the purposes of the impact analyses, CRN-1 can be considered to have the same UO_2 fuel type as the reactors described in the ESPA ER.

9) Mechanical evaluations have been performed up to a bundle-average discharge exposure of 65 GWD/MTU. This analyzed exposure limit is higher than the peak rod exposure limit (Item 18.3), and the more limiting of the two controls actual core design.

10) The GNF2 fuel rod thermal-mechanical design analyses are performed using the PRIME fuel rod T-M performance model. This model limits the peak rod exposure at end of life to 62 GWD/MTU.

Abbreviations: Rx = Reactor Parameter; Eng = Owner Engineered Parameter; °F = degrees Fahrenheit; dB = decibels; dBA = A-rated decibels; gpm = gallons per minute; m = meter(s); MBTU = millions of British thermal units; MW = megawatt(s); UO_2 = uranium dioxide; Gd_2O_3 = gadolinium oxide

Shaded rows indicate values that are not bounded by ESP-006 PPE and represent new and notable information.

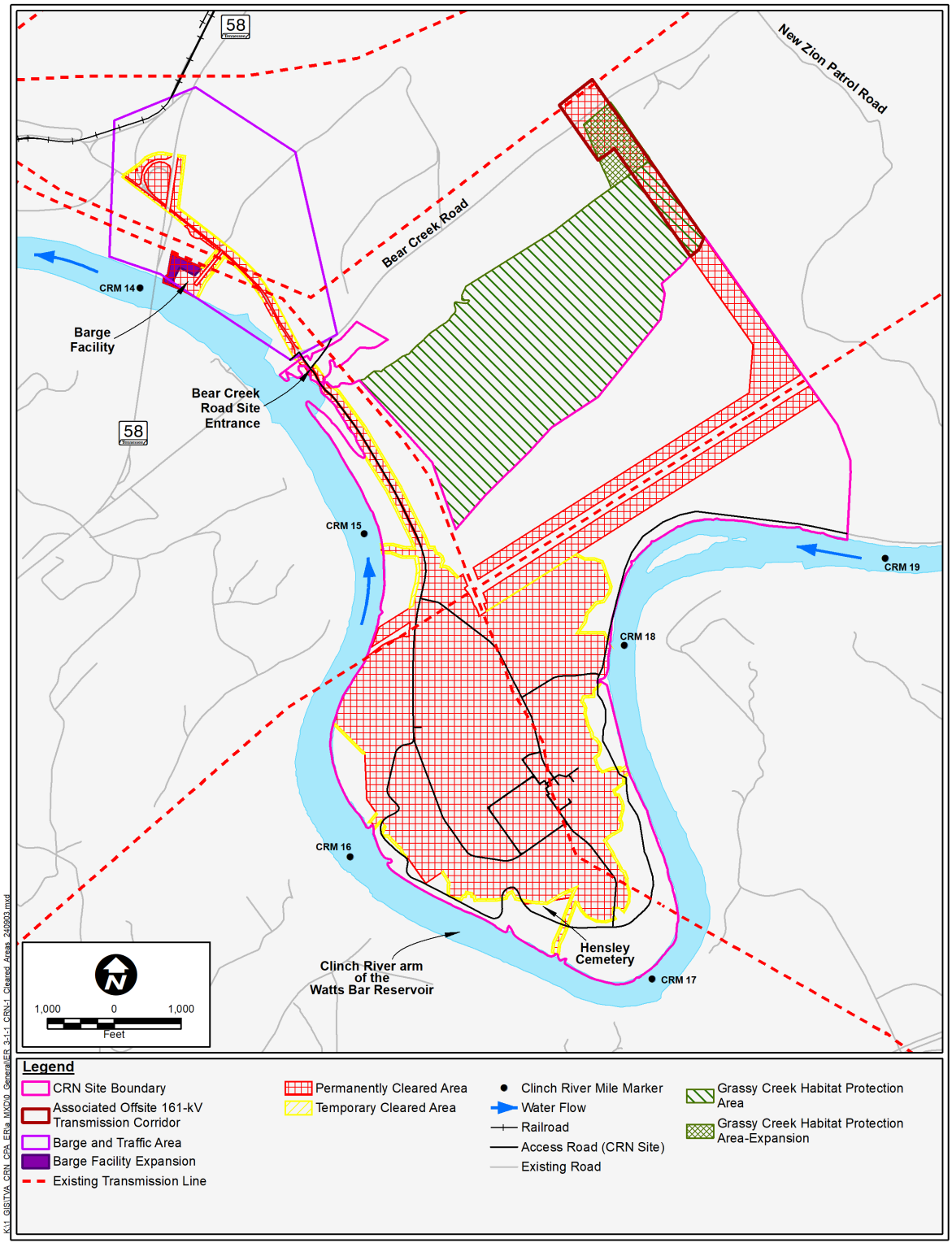


Figure 3.1-1 CRN-1 Disturbed Areas

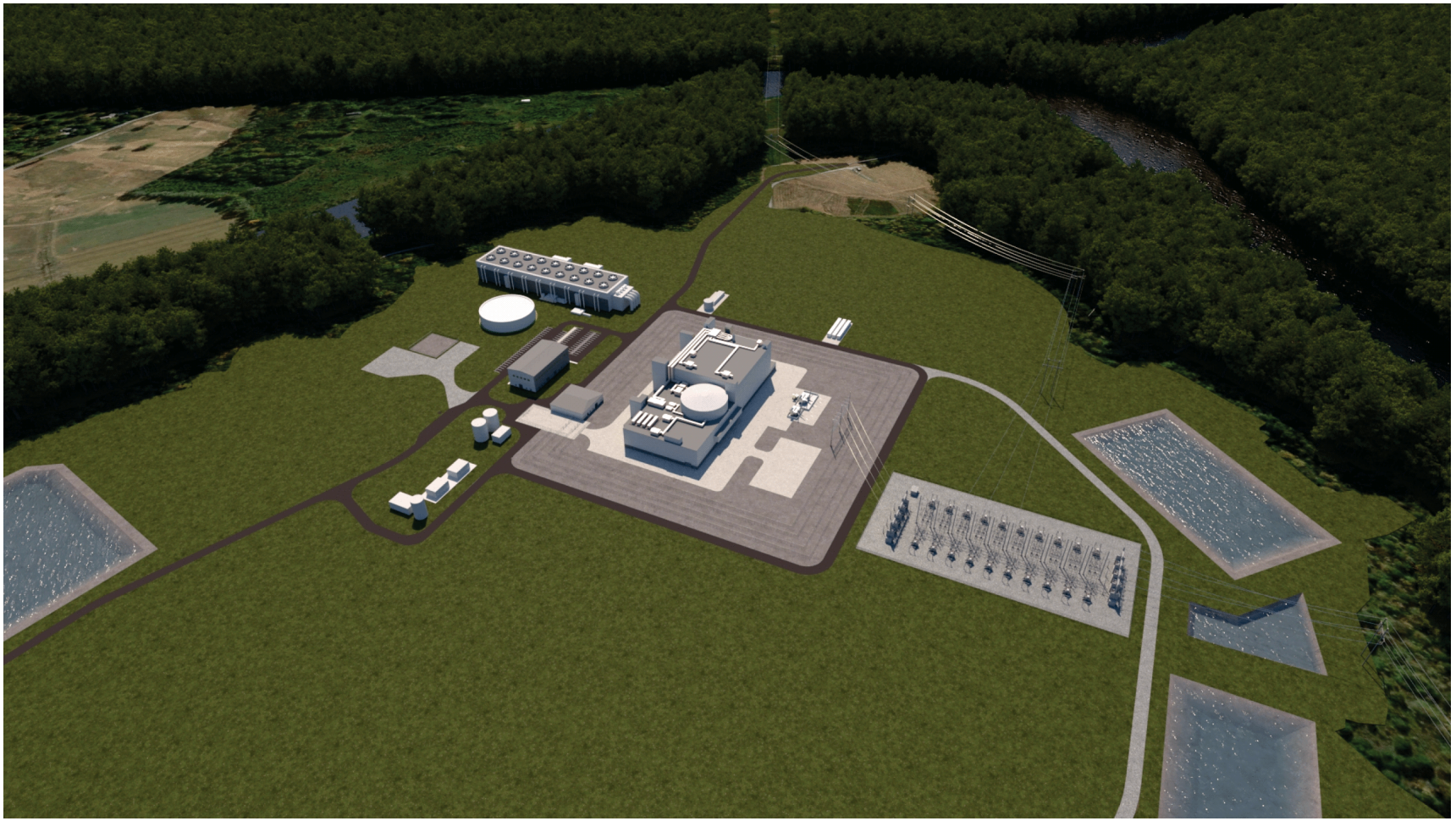


Figure 3.1-2 Architectural Rendering of CRN-1

3.2 PLANT DESCRIPTION

ESPA ER Section 3.2 and NRC ESP FEIS Section 3.2 describe external appearance and plant layout. This section addresses new information related to CRN-1.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Reactor power conversion system
- Plant water use
- Cooling system
- Radioactive waste management
- Nonradioactive waste management system
- Power transmission system

The information presented in the following subsections reflects plant characteristics that are notably different from those previously documented.

3.2.1 Reactor Power Conversion System

Section 3.2 of the ESPA ER and Subsection 3.2.1 of the NRC ESP FEIS describe the reactor power conversion system based on a PPE developed for use in evaluating potential environmental impacts in advance of selection of a specific plant technology. This ER evaluates construction and operation of a single unit, CRN-1. A description of the CRN-1 power conversion system including reactor description, engineered safety features, and power conversion systems, is provided below.

3.2.1.1 Reactor Description

The thermal power output for CRN-1 is approximately 870 megawatts thermal (MWt) (Table 3.1-2, Item 16.1) and the nominal gross electrical power output is 300 megawatts electric (MWe) (Table 3.1-2, Item 16.6) while minimizing house loads to the extent practical. The planned station capacity factor is 95 percent (Table 3.1-2, Item 16.4). The reactor uses uranium dioxide fuel with a maximum enrichment of less than 5 percent (Table 3.1-2, Items 18.0.1 and 18.1). The initial fuel loading of CRN-1 is 45 metric tons uranium (MTU). The reactor core contains 240 GNF2 fuel assemblies (Table 3.1-2, Item 18.0.2). Each GNF2 assembly consists of a 10 x 10 array of 78 full-length fuel rods, 14 part-length rods, and two large central water rods. The maximum average assembly burnup at the end of life is 65,000 megawatt-days (MWD) per MTU and the peak fuel rod exposure at the end of life is 62,000 MWD/MTU (Table 3.1-2, Items 18.2 and 18.3).

Table 3.1-2 provides a comparison of values from the PPE to values for CRN-1. The thermal output for CRN-1 is bounded by the thermal output of 2,420 MWt detailed in the PPE. However, the PPE is based on the construction of two or more SMRs with a maximum rated thermal power for a single reactor core of 800 MWt. The thermal power for the CRN-1 reactor core is 870 MWt. CRN-1 electrical power output, station capacity factor, and peak fuel rod exposure are bounded

by the PPE values. Consistent with the PPE presented in ESP-006, CRN-1 uses uranium dioxide fuel. The number and weight of fuel assemblies differ from the PPE values and the CRN-1 electrical power output (for a single reactor) and maximum average burnup exceed the PPE values. Consequences of the difference in thermal power and its relevance to new and significant information are considered in the analyses described throughout this ER, particularly in Chapter 5, which describes environmental impacts from the operation of the proposed plant. Consequences of the difference in burnup and its relevance to new and significant information are considered in the conclusions presented in Section 5.10 and Section 6.2.

3.2.1.2 Engineered Safety Features

Engineered safety features are provided to mitigate the consequences of design-basis or loss-of-coolant accidents. Engineered safety features for CRN-1 include fission product containment, containment cooling systems, and emergency core cooling systems. Emergency core cooling for CRN-1 is provided by the isolation condenser system (ICS).

3.2.1.3 Power Conversion Systems

A simplified power conversion flow diagram is presented in Figure 3.2-1. The reactor has two steam lines from the reactor vessel. This steam drives a turbine-generator system, is liquefied in the condenser, and returns to the reactor vessel. The condenser is cooled by the CWS. Material and equipment selection for the system components has not yet taken place but is based on a 60-year design life (Table 3.1-2, Item 16.2), with appropriate provisions for maintenance and replacement. At design conditions, the plant will reject approximately 570 MWt waste heat to the environment (Table 3.1-2, Item 3.1.2) via a mechanical draft cooling tower.

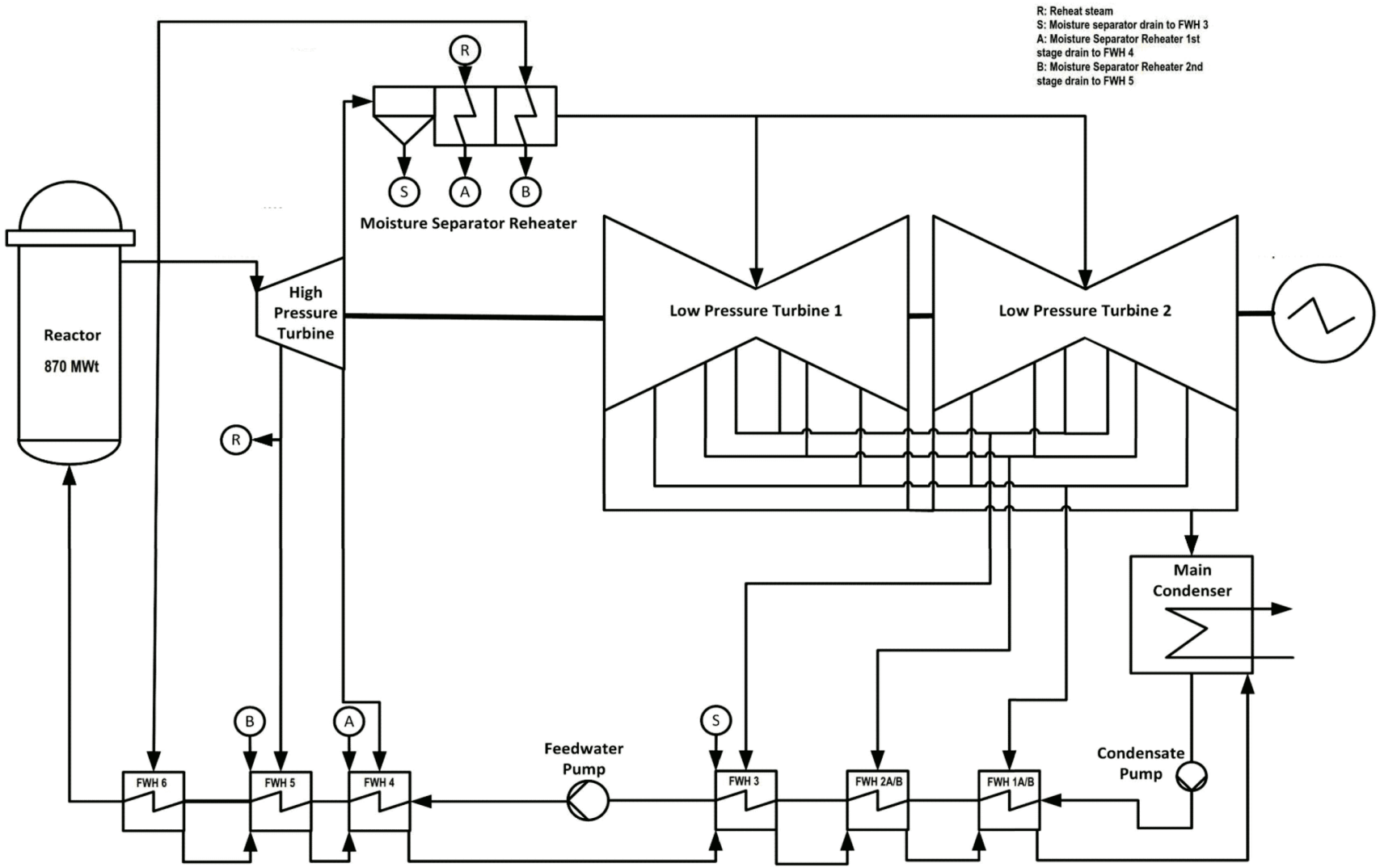


Figure 3.2-1 Simplified Power Conversion Flow Diagram

3.2.2 Plant Water Use

Water is required to support CRN-1 during construction and operation. ESPA ER Section 3.3 describes plant water use and NRC ESP FEIS Subsection 3.2.2 describes plant structures with a major environmental interface, including structures involved in water use. These descriptions were based on a PPE developed for use in evaluating potential environmental impacts in advance of selection of a specific reactor technology. Water uses for the construction of the facility include dust control, washdown during Reactor Building excavation to facilitate inspections, concrete batch plant operation, and potable and sanitary water for the construction workforce, which are discussed in more detail in Chapter 4. Water uses for the operation of CRN-1 include those related to the CWS, potable and sanitary water system, fire protection system, demineralized water, and a liquid radioactive waste treatment system, which are discussed in more detail in Chapter 5.

3.2.2.1 Water Consumption

The main source of water for operation of CRN-1 is the Reservoir. A water-use diagram for the proposed facility is provided in Figure 3.2-2. The diagram shows the average and maximum flow rates for the intake from and discharge to the Reservoir, the rates for consumptive uses, and the relationships between the various water flow systems. This figure is based on the expected limiting values for normal plant operation with cooling tower operation at four cycles of concentration (COC). Consumption during normal plant operation is expected to be the bounding condition for all reactor modes. Mode-specific water consumptions are not currently available, and are expected to be provided in the Operating License Application. The cooling tower may operate a variable COC for optimal chemistry conditions.

The proposed location for the water intake is at approximately CRM 17.9. The intake is expected to withdraw an estimated average of 4,147 gallons per minute (gpm) with a designed summer withdrawal of 5,414 gpm. The raw water passes through greensand and walnut shell filters (or equivalent), as described in Subsection 3.2.2.2. Periodic backwash of each filter requires an additional flow of 840 gpm. It is expected that only one filter would be in backwash at a time. Of the total intake volume, 5,365 gpm is the design makeup water for the CWS during normal plant operation. The proposed CWS uses a mechanical draft cooling tower for heat dissipation.

The mechanical draft cooling tower releases water through evaporation and drift. The average and maximum drift rate is estimated to be 2 gpm, and the average evaporation rate is estimated at 2,800 gpm (maximum 4,022 gpm). Blowdown from the cooling tower is released to the blowdown holding pond to the west of the plant area as shown in Figure 2.1-2. The average and maximum blowdown rate is estimated at 1,341 gpm. The blowdown holding pond discharges water back to the Reservoir through the proposed discharge structure located at CRM 15.55. Subsection 3.2.3.1.2 describes the function of the cooling water system during all reactor modes.

Of the total intake withdrawal volume, an estimated average of 4 gpm (maximum 49 gpm) is directed to the demineralizer, from which an average of approximately 2 gpm (maximum 21 gpm) is discharged to the blowdown holding pond and an average of approximately 2 gpm (maximum 28 gpm) is directed to downstream demineralized water users, including the liquid radioactive waste system. The consumptive uses of water within these systems are negligible. During

normal operation, it is expected that processed water from the liquid waste management system (LWMS) can be reused in the plant with no discharges to the environment. When the plant's overall water inventory does not allow for water to be recycled, the effluent from the LWMS is discharged directly to the Reservoir through the proposed discharge at CRM 15.55 at a maximum ratio of 1 gpm radioactive discharge per 100 gpm nonradioactive discharge. Makeup water can bypass the cooling tower if necessary to support a higher volume of liquid radioactive waste effluent.

The ICS consists of three independent trains, each containing a heat exchanger or isolation condenser (IC) that is submerged in a pool of water located inside the reactor building, above the reactor, and connected to the reactor pressure vessel by steam supply and condensate return piping. The water in the complex of pools located in the reactor building, including the IC pools, reactor cavity pool, and the equipment pool, represents the ultimate heat sink (UHS) for protecting the CRN-1 reactor core under an off-normal event in which the main condenser is not available and the reactor pressure vessel becomes isolated. The water in the Fuel Pool is the UHS for fuel in the pool at all times. The initial and makeup source of water for the ICS is demineralized water. The reactor cavity pool, equipment pool, and Fuel Pool are normally filled via the Condensate Storage Tank.

The source of water for the potable and sanitary water systems and for the fire protection system is municipal water from the City of Oak Ridge Public Works Department. Consumptive uses of this water are expected to be negligible. Wastewater is discharged to the City of Oak Ridge sanitary treatment system. The average water supply rate for the potable and sanitary water systems during plant operation is approximately 3 gpm, with the maximum rate expected to be 50 gpm (Table 3.1-2, Items 5.1.1 and 5.1.2). The rate of potable water use during construction is expected to be one to two gallons per worker per day. The expected maximum water supply rate for the fire protection system is expected to be 30 gpm.

The water use for concrete batch plant operation during construction is estimated at 5,000 to 10,000 gallons per day. This water is most likely to be drawn from the municipal water supply. However, non-potable water sources, such as surface water, may be treated and used for concrete batch operation.

Surface water may be used during construction for purposes such as dust control and washdown of Reactor Building excavation surfaces to facilitate inspections, at a rate of approximately 30,000 to 40,000 gallons per day.

3.2.2.2 Water Treatment

Specific water treatment options were not described in the ESPA ER. NRC ESP FEIS Section 9.4 noted that water treatment methods would need to be resolved as part of any application referencing the associated ESP.

Raw water from the Reservoir is used for cooling tower makeup and to produce demineralized water. Treatment of raw water is described below, or with a similar process, to achieve the desired water quality. Raw water is filtered using a greensand filter, or equivalent, to reduce manganese concentration and a walnut shell filter, or equivalent, to reduce oil and grease

concentrations. The greensand filter also removes suspended solids and iron, precluding the need for a separate clarifier. Raw water is treated with sodium hypochlorite or potassium permanganate before it enters the greensand filter to oxidize the iron and manganese and precipitate on the filter media.

Sulfuric acid is added to the cooling tower basin, as needed, to reduce alkalinity to manufacturer recommended limits. The amount of sulfuric acid to be added is calculated using the alkalinity measured in the makeup system.

In addition, other chemicals are added to the CWS for biocide control, scale inhibition, and dechlorination of the blowdown. A sodium hypochlorite solution is recommended as the biocide. ChemTreat CL1355, or equivalent, is recommended as an antiscalant and corrosion inhibitor. Sodium bisulfite or sodium sulfite, or equivalent, is used as a dechlorination agent.

Demineralized water is produced from raw water that has been treated using the greensand and walnut shell filters, or equivalent. The demineralized water treatment system consists of ultrafiltration (UF), reverse osmosis (RO), and a mixed bed demineralizer. UF is performed to remove suspended solids. As in the CWS, CL1355, or equivalent, is added to demineralized water as a scaling inhibitor. A dechlorination agent may be added downstream of the greensand and walnut shell filters as needed. The water is then passed through RO membranes. GEH-specified water quality is achieved with the use of mixed bed ion exchange demineralizer units. Periodic cleaning of the RO and UF units is performed using citric acid (ChemTreat CL5633), sodium hydroxide, and sodium hypochlorite, or equivalent.

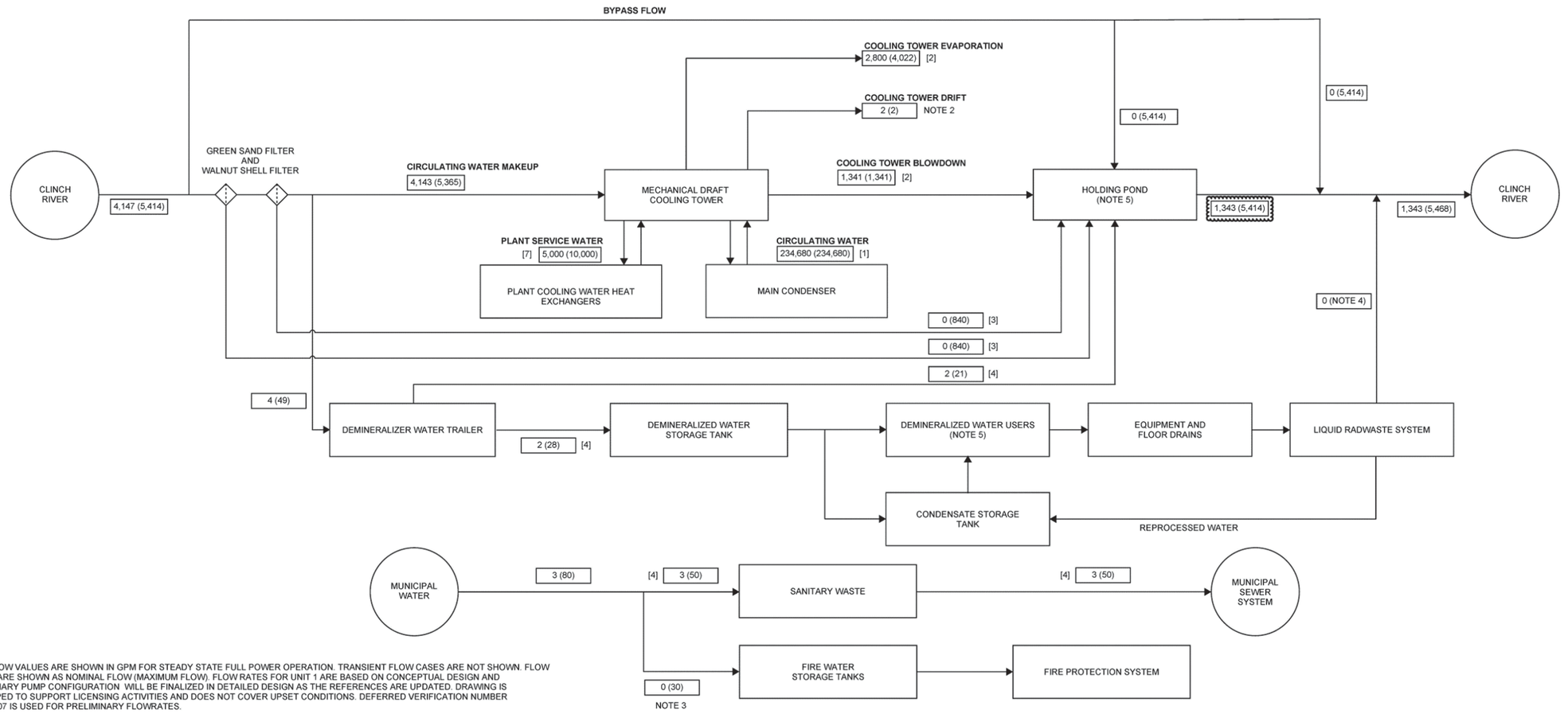
The quantities and concentrations of chemicals to be used will be in accordance with a Biocide/Corrosion Treatment Plan, which will be submitted as part of the National Pollution Discharge Elimination System (NPDES) permit application to the Tennessee Department of Environment and Conservation (TDEC).

CRN-1 is expected to operate at a minimum of four COC. The COC can be increased provided that the basin water chemistry is maintained within limits to minimize chemical usage. Table 3.2-1 identifies, for the chemicals proposed, the expected addition rate at four COC. As discussed in Subsection 3.2.5, TVA identified new information about nonradioactive waste management systems for CRN-1, including information about chemical concentrations in blowdown, and determined that this information is confirmatory of that used to prepare the NRC ESP FEIS.

Table 3.2-1 Water Treatment Chemicals

Chemical	Addition rate (gph)
Sulfuric acid (CWS)	1.1
Sodium hypochlorite	10.8
Sodium bisulfite	
Blowdown	0.8
Demineralized water production makeup	0.03
Filter backwash	0.05
Total	0.88
CL1355	
CWS makeup	2.4
Demineralized water production makeup	0.017
Total	2.417
CL5633 for RO and UF cleaning	20 gallons per month
Sodium hydroxide for RO cleaning	10 gallons per month
Sodium hypochlorite for UF cleaning	10 gallons per month

Abbreviations: gph = gallons per hour



NOTES:

1. ALL FLOW VALUES ARE SHOWN IN GPM FOR STEADY STATE FULL POWER OPERATION. TRANSIENT FLOW CASES ARE NOT SHOWN. FLOW VALUES ARE SHOWN AS NOMINAL FLOW (MAXIMUM FLOW). FLOW RATES FOR UNIT 1 ARE BASED ON CONCEPTUAL DESIGN AND PRELIMINARY PUMP CONFIGURATION WILL BE FINALIZED IN DETAILED DESIGN AS THE REFERENCES ARE UPDATED. DRAWING IS DEVELOPED TO SUPPORT LICENSING ACTIVITIES AND DOES NOT COVER UPSET CONDITIONS. DEFERRED VERIFICATION NUMBER M-2599-007 IS USED FOR PRELIMINARY FLOWRATES.

2. COOLING TOWER DRIFT FLOW RATE IS BASED ON 0.001% OF THE CIRCULATING WATER FLOW RATE.

3. FIRE PROTECTION FLOW RATE IS BASED ON MAXIMUM USAGE FOR ACTIVITIES SUCH AS MAINTAINING SYSTEM FILLED AND PRESSURIZED AND PERIODIC TESTING. INITIAL FILL FLOWRATE IS NOT CONSIDERED FOR NORMAL FLOW OR MAXIMUM FLOW. WATER USED FOR TESTING WILL BE DISCHARGED TO SEVERAL OUTLETS DEPENDING ON SITE LOCATION.

4. THE MAXIMUM LIQUID RADWASTE SYSTEM DISCHARGE TO THE ENVIRONMENT IS BASED ON A RATIO OF 1GPM OF RADIOACTIVE DISCHARGE TO 100 GPM OF NONRADIOACTIVE DISCHARGE FROM THE HOLDING POND TO THE CLINCH RIVER. MAKEUP WATER CAN BYPASS COOLING TOWER IF NECESSARY TO SUPPORT HIGHER VOLUME LIQUID RADWASTE EFFLUENTS. DURING ZERO DISCHARGE PLANT OPERATION THE LIQUID RADWASTE DISCHARGE TO THE DIFFUSER IS 0 GPM.

5. EVAPORATIVE LOSSES FOR THE DEMINERALIZED WATER USERS AND HOLDING POND ARE NOT SHOWN.

6. WATER LOSS THROUGH SOLID WASTE DISPOSAL IS NOT SHOWN.

7. FIRE WATER STORAGE TANK ALTERNATE SUPPLY FROM THE RAW WATER IS NOT SHOWN.

8. RAW WATER AND DEMINERALIZED WATER CHEMICAL TREATMENT FLOWS ARE NOT SHOWN.

9. THE MAKEUP BYPASS FLOW CAN BE SENT TO THE HOLDING POND OR DIRECTLY TO THE DIFFUSER.

10. PLANT SERVICE WATER STRAINER TYPE WILL BE FINALIZED IN DETAILED DESIGN.

11. REFERENCES TO FLOWRATES ARE INCLUDED IN BRACKETS NEXT TO FLOW VALUES. FLOWRATES WITHOUT BRACKETS ARE THE SUM OF UPSTREAM OR DOWNSTREAM VALUES (AS APPROPRIATE) FOR STEADY STATE CONDITIONS.

12. ALTERNATE HEAT SINK FLOW PATH USING MAKEUP WATER TO PCW HEAT EXCHANGERS AND RETURNING TO BYPASS LINE IS NOT SHOWN.

REFERENCES:

1. "CRN BWRX-300 NORMAL HEAT SINK DESIGN FOR LOWEST CAPITAL AND PLANT OPERATING COST", FILE NO. 413227.40.1200.1461, REVISION 0.
2. "COOLING TOWER EVAPORATION AND BLOWDOWN FLOWRATES", FILE NO. 413227.58.2324.6001, REVISION 2.
3. "W24 - COOLING TOWER MAKEUP PIPELINE SIZING", FILE NO. 413227.58.2324.6102, REVISION 0.
4. "CLINCH RIVER NUCLEAR SITE WATER SUPPLY AND SANITARY DISPOSAL ASSESSMENT", FILE NO. 413227.58.2553.6001, REVISION 0.
5. "Y53 WATER, GAS, CHEMICAL PADS (WGC) PIPELINE SIZING", FILE NO. 413227.58.2553.6100 REVISION 1.
6. "BWRX-300 GENERIC PARAMETER ENVELOPE", FILE NO. 005N3953 REVISION D.
7. "HEAT LOAD AND FLOW RATE FOR P40 PLANT COOLING WATER (PCW) SYSTEM", FILE NO. 407081.58.1640.6101 REVISION 0.

ALL REVISION 2 CHANGES ARE DENOTED BY A CLOUD SYMBOL.

REV LOG	REASON
1	UPDATED REVISION NUMBER FOR REFERENCES. CHANGED MAKEUP EXCESS FLOW LINE NAME TO BYPASS LINE. UPDATED FLOWRATES DUE TO CHANGE IN MAKEUP WATER PUMP OPERATION. INCLUDED REFERENCES IN BRACKETS FOR FLOWRATES. ADDED NOTE 11 AND NOTE 12. ADDED CLARIFICATION TO NOTE 1.
2	CORRECTED NORMAL FLOWRATE EXITING THE HOLDING POND. CORRECTED ISSUE DATE FOR REVISION 1.

NOT TO BE USED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION.

Figure 3.2-2 CRN Site Water Use Diagram

3.2.3 Cooling System

ESPA ER Section 3.4 describes the cooling system for the plant defined by the ESP-006 PPE. NRC ESP FEIS Subsections 3.2.2.2 and 3.4.2.2 describe the cooling system interface with the environment and NRC ESP FEIS Subsection 3.4.1 describes the cooling system operational modes.

3.2.3.1 System Description and Function

3.2.3.1.1 System Description

The CWS for CRN-1 provides cooling water to the main condenser and transfers heat from the condenser to the environment through the normal heat sink (NHS). The CWS has two subsystems: the main condenser circulating water supply (CW) and the service water supply (SW). The main condenser CW supply provides cooling water to the Main Condenser and Auxiliaries System during all modes of condenser heat removal. SW supplies cooling water to reject the heat loads from the plant cooling water (PCW) heat exchangers through the NHS. The SW supply provides cooling water to the PCW heat exchangers for normal and off-normal operating modes.

The CWS is a closed-cycle cooling system using a mechanical draft cooling tower. Makeup water for the system is drawn from the Reservoir through an intake structure and pumped into the cooling tower basin. Pumps for CW and SW withdraw water from the cooling tower basin. Water flows through the condenser and PCW heat exchangers and is returned to the cooling tower. A portion of the water is lost through evaporation and drift. The colder water is collected in the cooling tower basin where it can be recirculated back to the condenser. To maintain chemistry in the CWS, a portion of the water in the cooling tower basin is discharged to the holding pond as blowdown. Water from the blowdown holding pond is discharged into the Reservoir through a diffuser pipe. In addition, the NHS has provisions to tie-in with the SW supply and return piping to provide once through cooling flow to a PCW heat exchanger in the event that the cooling tower is not available.

The water in the IC pools removes heat from the reactor pressure vessel during off-normal conditions and design basis accidents. The ICS is described in Subsection 3.2.2.1. Each of the three ICs has a capacity of approximately 33 MWt.

3.2.3.1.2 System Function

The CWS provides plant cooling for normal reactor modes. The CWS removes heat from both the condenser and the PCW system. The heat load from the CW subsystem is approximately 570 MWt. The PCW subsystem has two 100 percent capacity heat exchangers. During normal operation one of the heat exchangers will be in service with a heat load of less than 10 MWt. The CWS provides heat dissipation to the atmosphere via the mechanical draft cooling tower during all modes of plant operation. Table 3.2-2 lists the five reactor modes for CRN-1 and the CWS subsystem which provides cooling in each mode.

During power operation, the circulating water pumps provide cooling water to the main condenser and reject the heat from the main condenser to the environment via the mechanical draft cooling tower.

During a plant shutdown, both PCW heat exchangers and SW pumps are typically in service to facilitate shutdown. The SW pumps and associated components must remain in service during all modes of operation to supply the heat sink for the PCW heat exchangers.

Table 3.2-2 CRN-1 Reactor Modes

Mode	Cooling Provided by
Power Operation	CW & SW
Startup	CW & SW
Hot Shutdown	CW & SW
Cold Shutdown	SW
Refueling	SW

3.2.3.1.3 Heat Generated, Dissipated to the Atmosphere, and Released in Liquid Discharges

In power operation mode, heat will be generated at a maximum rate of approximately 1,945 million British thermal units (MBTU) per hour and released to the atmosphere via the CWS cooling tower (approximately 1,935 MBTU per hour) and to the Reservoir as liquid discharges in the cooling tower blowdown (approximately 10.3 MBTU per hour). The maximum heat load to the Reservoir is expected to be approximately 13 MBTU per hour during planned outages when the cooling tower is not available and once through cooling is used as described in Subsection 3.2.3.1.1. Mode-specific information is expected to be provided in the Operating License Application if available.

3.2.3.1.4 Water Source and Quantities of Water Withdrawn, Consumed, and Discharged

During steady state operation, the CWS withdraws makeup water from the Reservoir at a maximum rate of approximately 5,414 gpm, which comprises 5,365 gpm for CWS makeup and 49 gpm for the demineralizer. The normal intake flow can be temporarily increased by 840 gpm when operating the greensand or walnut shell filters in backwash operating mode. As a result, the maximum intake flow is 6,254 gpm. The normal CRN-1 discharge flow is 1,343 gpm. The maximum discharge flow is approximately 5,414 gpm and occurs with the cooling tower in bypass. When operating with the cooling tower in bypass, the greensand and walnut filters are not aligned in backwash operating mode. As a result, the peak discharge flow occurs in cooling tower bypass alignment, which bounds the plant discharge flow in normal alignment with filter backwash in operation. Consumptive water losses to the environment include evaporation at a maximum rate of approximately 4,022 gpm, and drift at an average and maximum rate of 2 gpm. Thus, the maximum consumptive water use is approximately 4,024 gpm. CRN-1 is expected to operate at four COC with a normal blowdown flow rate of approximately 1,341 gpm. Combined with approximate maximum potential discharge from the demineralizer of 21 gpm and 840 gpm from filter backwash, the total maximum discharge during normal operation is approximately 2,202 gpm. CRN-1 is expected to operate with no discharge of liquid radioactive waste to the environment. If the plant's overall water inventory will not allow for the water to be recycled, liquid radioactive waste may be discharged at a ratio not greater than 1 gpm per 100 gpm of nonradioactive liquid discharge.

A water flow chart depicting CRN-1 water use, including flow rates for the cooling system is provided as Figure 3.2-2.

3.2.3.2 Component Descriptions

The following sections describe the various components of the cooling system, including intake system, blowdown holding pond, and discharge system, as well as overall heat dissipation parameters and an assessment of requirements for bypass flow from the Melton Hill Hydroelectric Dam (MHH) to maintain CRN-1 discharges within acceptable thermal limits.

3.2.3.2.1 Intake System

TVA is evaluating two alternatives for the cooling water intake. Both alternatives are evaluated to provide flexibility for final selection during detailed design.

The first alternative consists of a recessed shoreline intake structure located outside of the Reservoir's defined navigation channel, which is bank to bank at the intake location, and avoids potential conflicts with navigation. Figure 3.2-3 shows the intake structure plan view and Figure 3.2-4 shows the intake structure profile. The intake is a rectangular concrete structure partitioned into separate bays for each pump unit. The structure extends approximately 50 feet inland and is approximately 28 feet high. A short channel connects the structure to the Reservoir.

The recessed intake features chain-and-flight raking systems and trash racks at the inlets to intercept heavy debris load in the Reservoir and prevent the bulk of entrained material from reaching the downstream fish screens. The fish screens include traveling screen modules with spray bar assemblies at their head stations and belt conveyors for transporting debris to designated loading or disposal areas. The belts are fitted with troughs for containment of impinged fish and flights for removing debris that collects on the screens. Each screen module is approximately 3 to 4 feet wide by 25 feet tall. Individual pump station bays are fitted with a sluice gate and actuator to isolate the respective bay from the Reservoir while the pump station is in operation. As shown in Figure 3.2-4, the elevation of the bottom of the intake bay is 729 feet. The minimum Reservoir water level, as maintained by TVA River Management, is 735 feet. Thus, the minimum water height approaching and passing through the screens is 6 feet.

The second alternative consists of a submerged offshore intake structure. The submerged intake system includes a subsurface conduit extending between a submerged intake in the Reservoir, within the navigation channel, and a vertical shaft wet well on the bank. Figure 3.2-5 shows the intake structure plan view and Figure 3.2-6 shows the intake structure profile. The wet well, located on the shoreline, is approximately 20 feet in diameter and 50 feet deep. Two offshore intakes are each connected to the wet well via a 36-inch diameter steel conduit that gravity conveys water to the wet well where the pump station equipment is located. Screens cover the submerged intakes. A compressed airburst system prevents debris and sediment collecting at the screen surfaces. The maximum screen height above the Reservoir floor is limited to 3 feet to avoid impacts on navigation. At this location, the maintained commercial navigation channel bottom elevation is 724 feet. The elevation of the bottom of the Reservoir is 718 feet. To protect the intake infrastructure from future dredging of the commercial navigation channel, the screens cannot project higher than 721 feet and the intake conduits are buried at least 3 feet below the bottom of the Reservoir.

Both intake structure designs comply with the Clean Water Act (CWA) 316(b) regulations. The maximum through-screen velocity is maintained at less than 0.5 feet per second, per the requirements of the CWA. Water treatment is described in Subsection 3.2.2.2.

3.2.3.2.2 Blowdown Holding Pond

Blowdown from the cooling tower and effluent from the production of demineralized water and raw water filter backwash are discharged to a blowdown holding pond located west of the power block, as shown in Figure 2.1-2. The blowdown holding pond is approximately 8 feet deep with an area of 55,300 square feet, and a total volume of approximately 442,200 cubic feet (3,307,886 gallons). The usable volume will be determined upon completion of detailed design and TVA will supplement the description of the blowdown holding pond, if necessary. This blowdown holding pond provides adequate settling for CRN-1. Water from the blowdown holding pond enters the Reservoir through the discharge pipe.

3.2.3.2.3 Discharge System

The discharge structure is located near the blowdown holding pond and the discharge diffuser is located at CRM 15.55. Water from the blowdown holding pond and the liquid radioactive waste system is discharged through this diffuser. Routine liquid radioactive waste discharges are not anticipated. CRN-1 is expected to reuse processed water from this system in the plant. However, discharges occur when the plant's overall water inventory does not allow for the water to be recycled. The discharge diffuser promotes mixing in the Reservoir to minimize potential hydrothermal impacts. The diffuser and discharge piping and the bottom geometry of the Reservoir at the diffuser location are shown in Figure 3.2-7. A plan and profile view of the discharge structure are shown in Figure 3.2-8. A profile view of the diffuser in the channel is shown in Figure 3.2-9. The water surface elevation in Watts Bar Reservoir is generally maintained between 735 feet and approximately 740 feet above mean sea level.

As shown in Figure 3.2-7, water passes from the blowdown holding pond via a buried pipe and travels through an instrumentation vault for measurement of flow and temperature, then continues into two approach conduits to two diffusers located at the Reservoir bottom. The design of the diffuser ports results in an exit velocity of approximately 8 to 10 feet per second. As discussed in Subsection 3.2.5, TVA identified new information about nonradioactive waste management systems for CRN-1, including information about chemical concentrations in blowdown, and determined that this information is confirmatory of that used to prepare the NRC ESP FEIS.

3.2.3.2.4 Heat Dissipation

Heat dissipation for the CWS is accomplished using a mechanical draft cooling tower. The cooling tower is located east of the plant area as shown in Figure 2.1-2. The cooling tower occupies approximately 4 acres on the CRN Site (Table 3.1-2, Item 3.3.1). The cooling tower deck is 64 feet above plant grade. The quantity of water in the cooling tower basin is approximately 4.8 million gallons and water circulates through the tower at a rate of approximately 244,680 gpm. The maximum blowdown temperature at the point of discharge to the Reservoir is approximately 90.7 degrees Fahrenheit (°F) (Table 3.1-2, Item 3.3.5). The plant is expected to operate at four COC. These values are bounded by the ESP-006 PPE with the exception of the maximum blowdown temperature. Thermal impacts of discharge from the cooling system are discussed in Subsection 5.2.3.1.

Discharges to the Reservoir are regulated by TDEC through a NPDES permit. The CRN-1 NPDES permit will include discharge limits established to protect receiving waters and monitoring requirements to ensure compliance with those limits. Temperatures and chemical concentrations for all discharges will be in compliance with the terms and conditions of the NPDES permit.

3.2.3.2.5 Melton Hill Hydroelectric Dam Bypass Flow

Subsection 3.4.2.5 of the ESPA ER described a bypass structure to be constructed at MHH to maintain a continuous flow of 400 cubic feet per second, even when hydropower generating units were not operating, to prevent discharge from the plant described by the ESP-006 PPE from exceeding mixing zone guidelines or temperature requirements. TVA determined that this bypass flow would not provide a thermal compliance benefit for CRN-1. Therefore, this bypass is not required for the operation of CRN-1 and no alterations to the MHH are proposed.

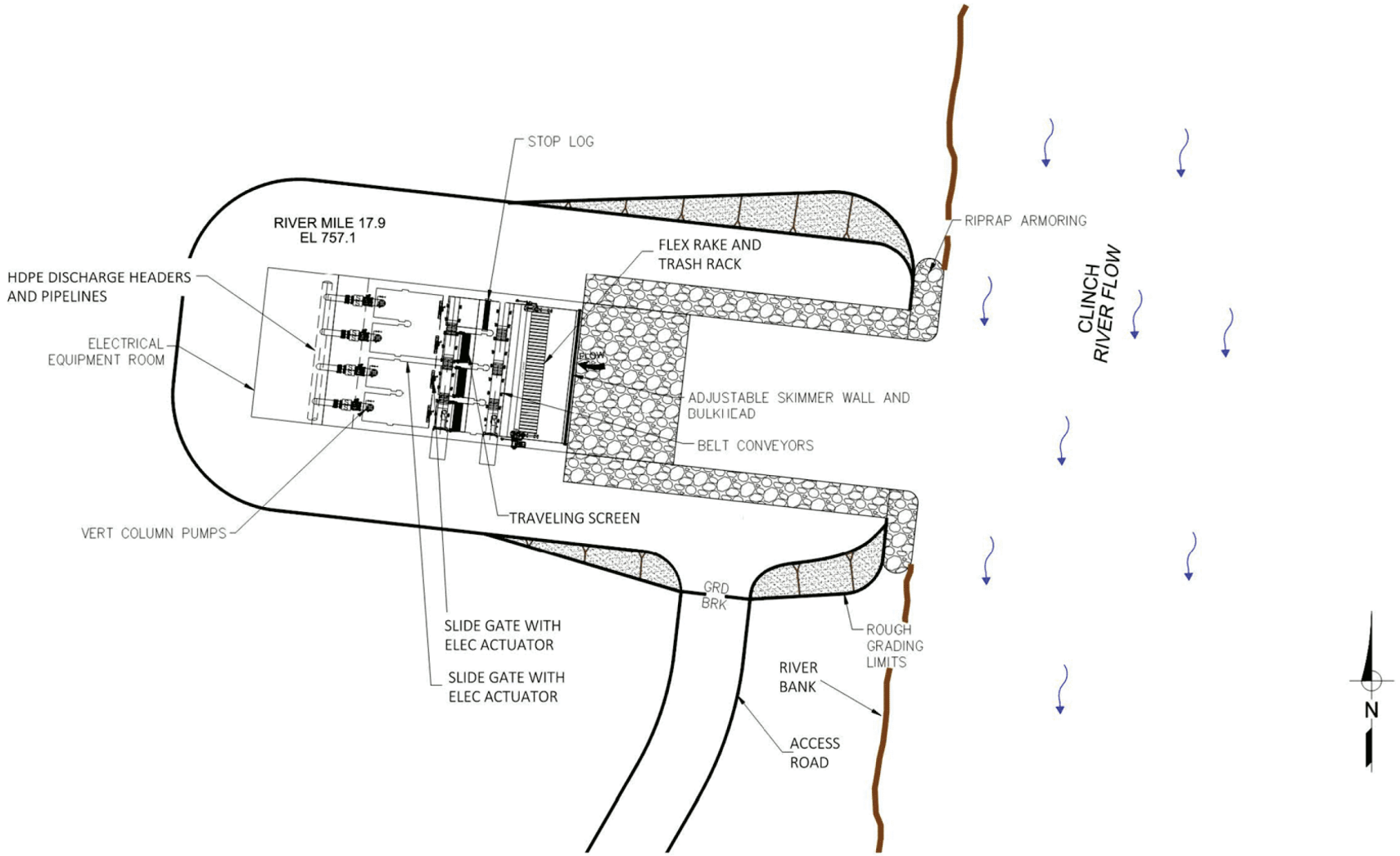


Figure 3.2-3 Recessed Intake Alternative Structure Plan

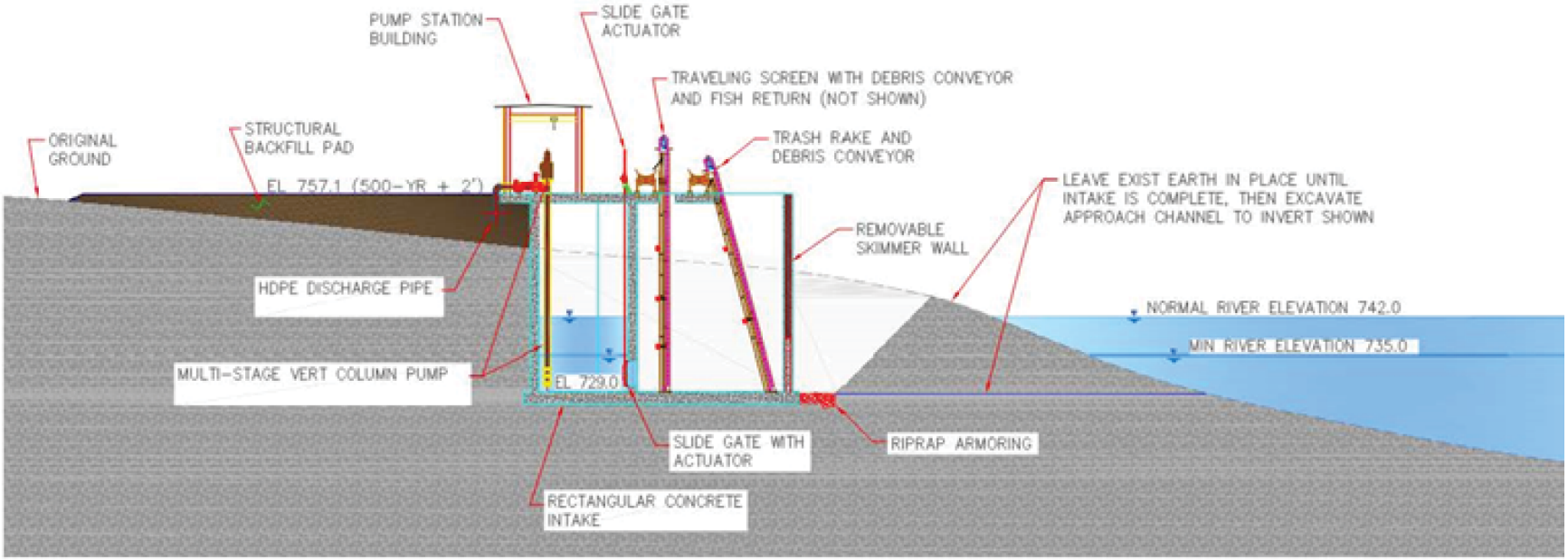


Figure 3.2-4 Recessed Intake Alternative Structure Profile

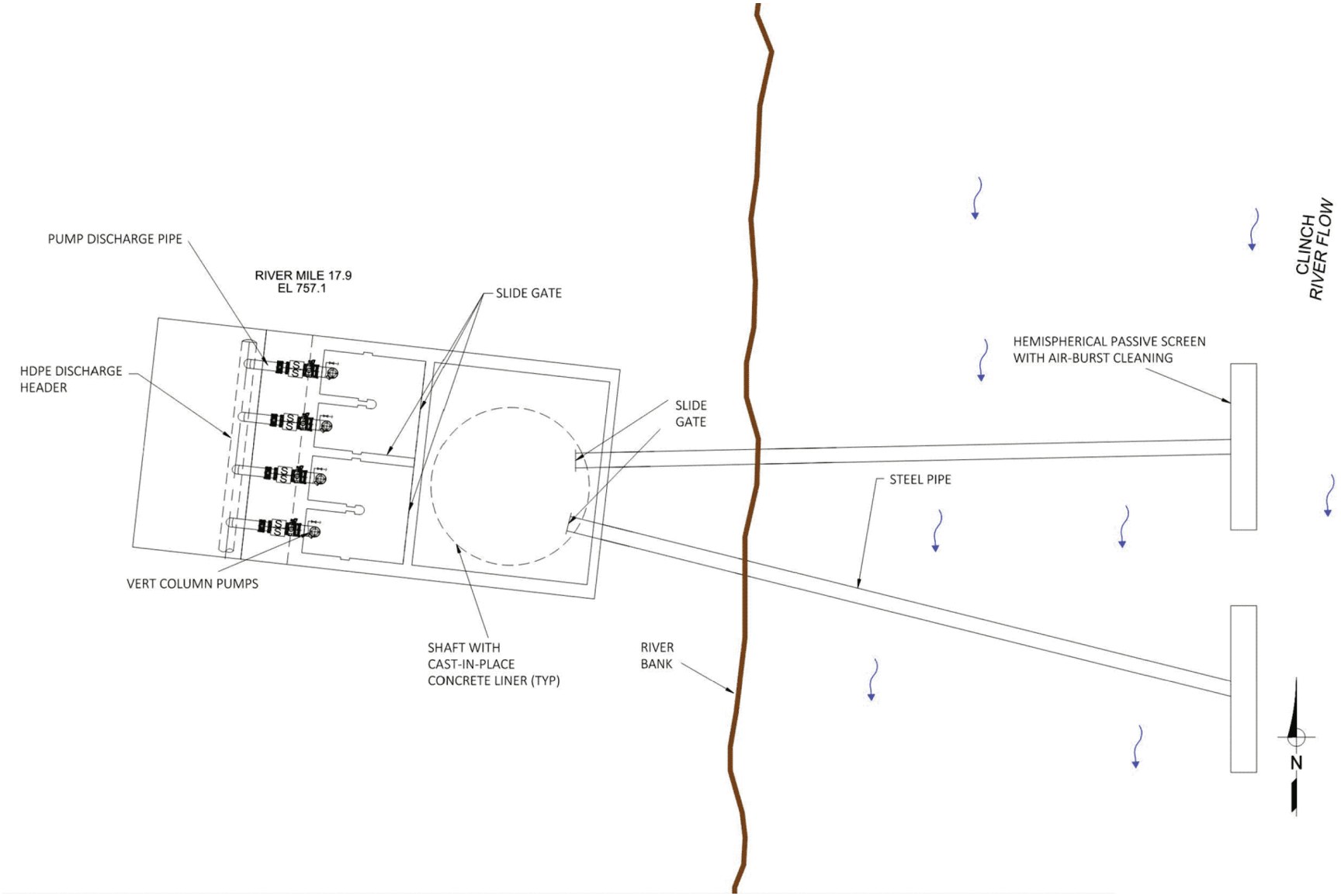


Figure 3.2-5 Submerged Offshore Intake Alternative Structure Plan

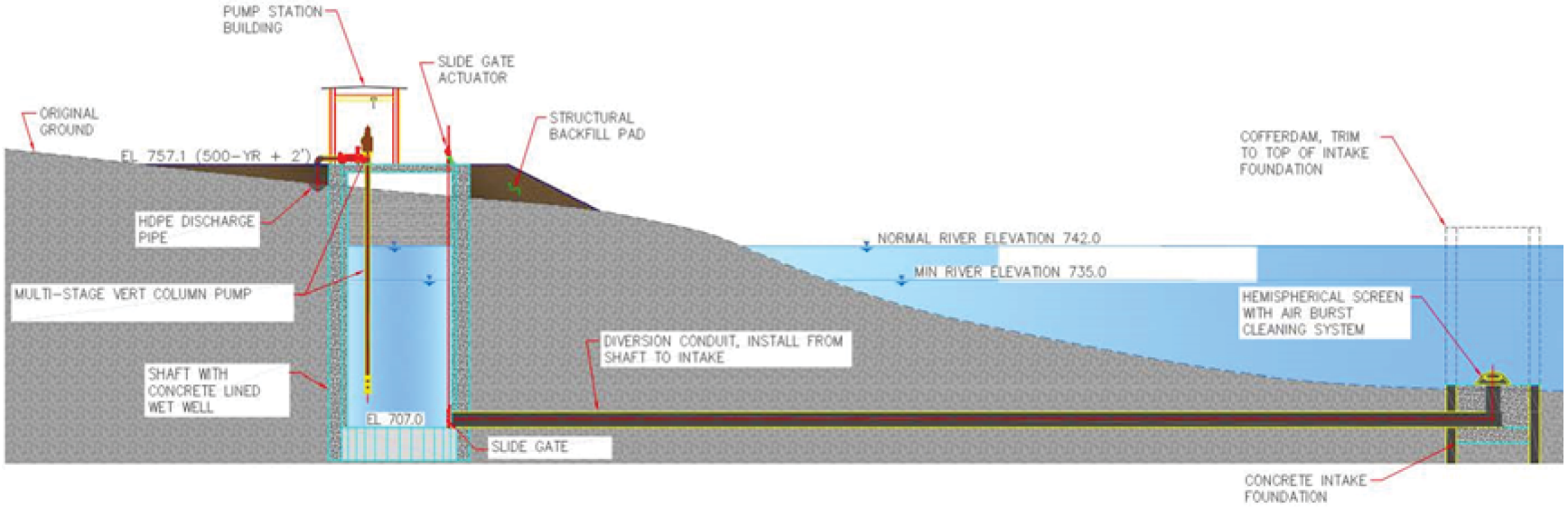


Figure 3.2-6 Submerged Offshore Intake Alternative Structure Profile

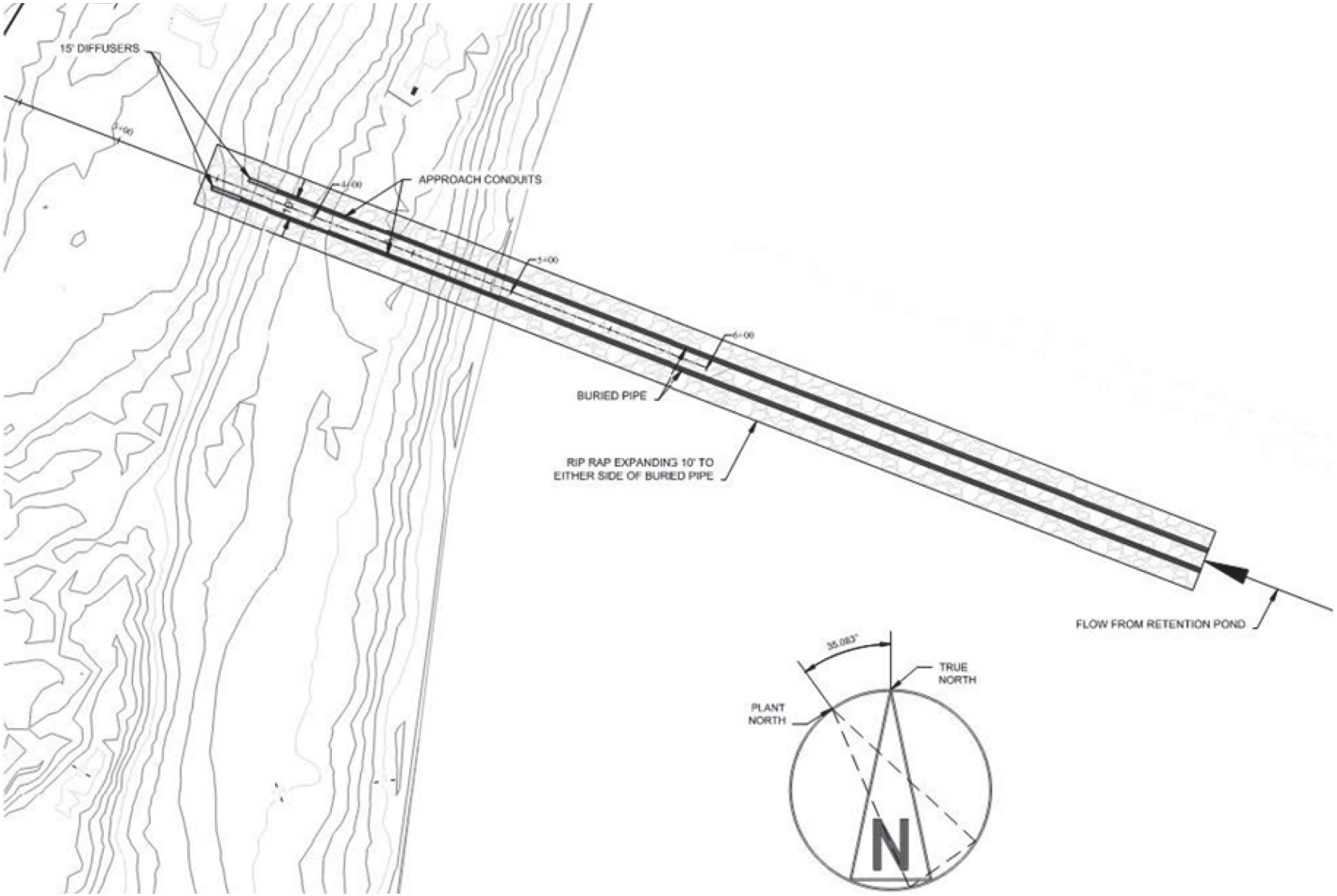


Figure 3.2-7 Diffuser and Discharge Piping Plan View

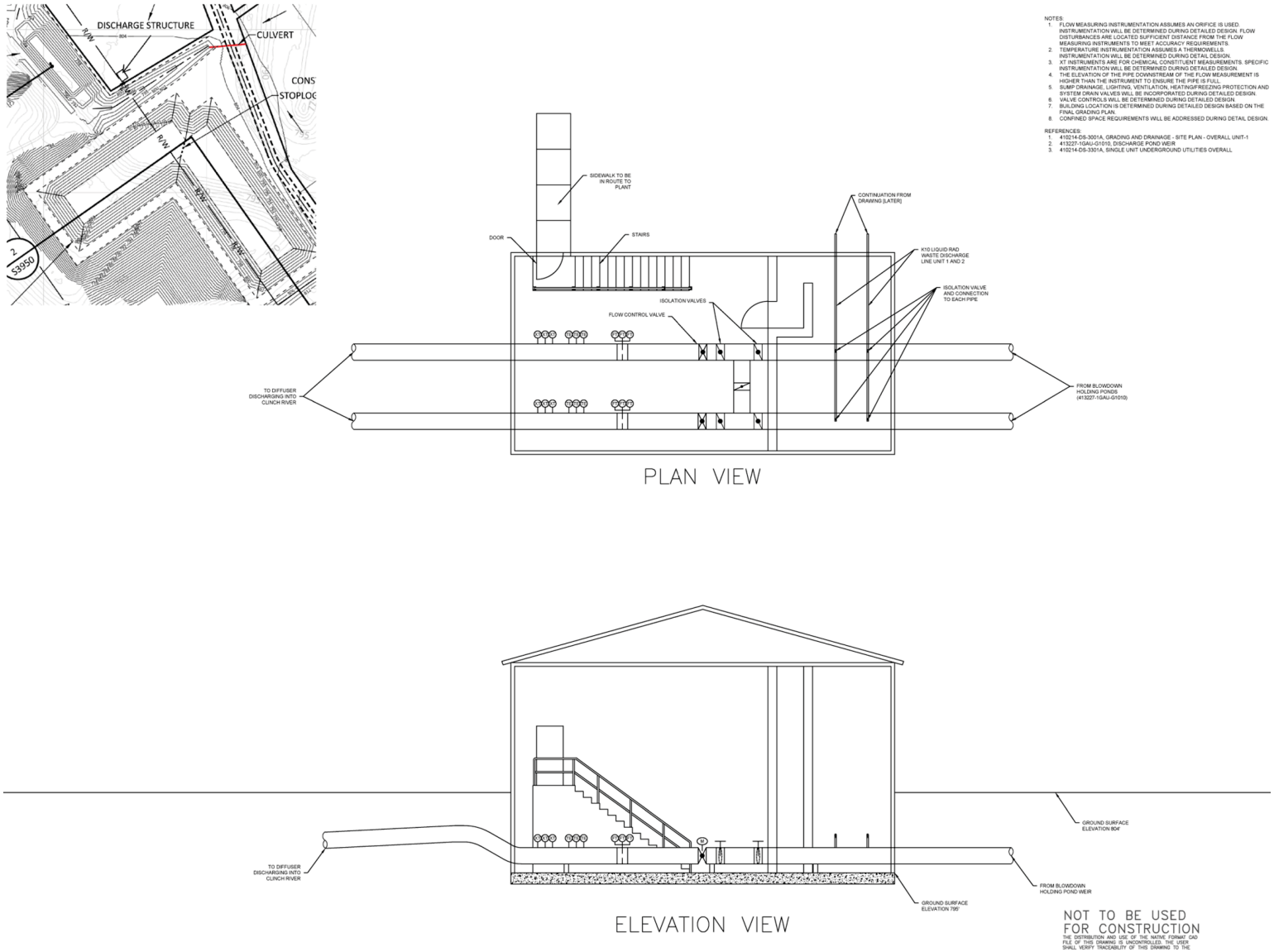
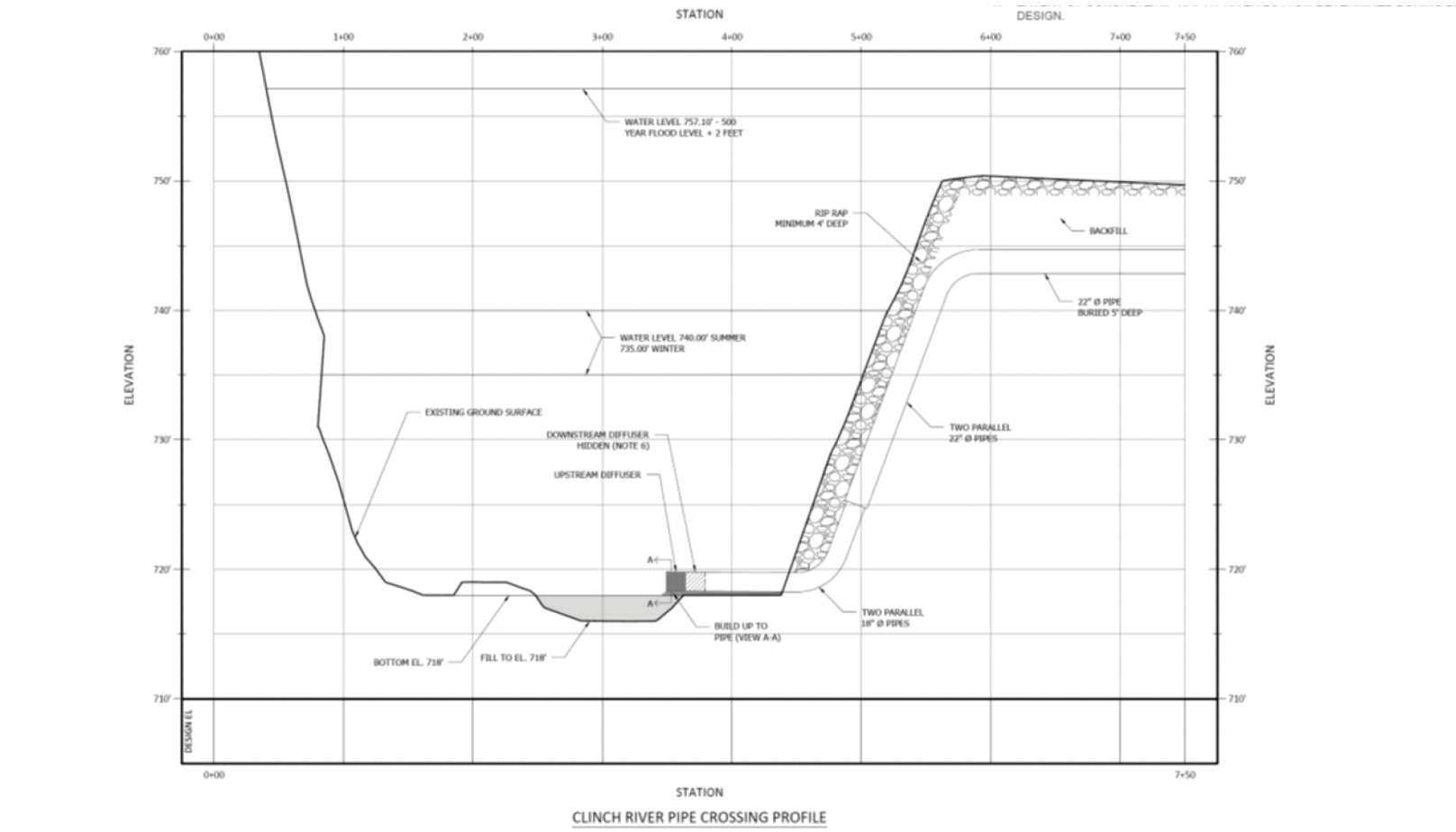
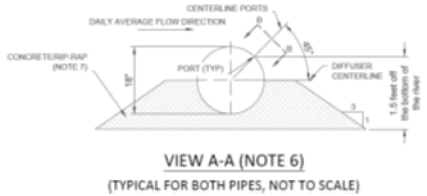


Figure 3.2-8 Discharge Structure Plan and Profile





VIEW A-A (NOTE 6)
(TYPICAL FOR BOTH PIPES, NOT TO SCALE)

NOT TO BE USED FOR CONSTRUCTION
THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER

Figure 3.2-9 Diffuser Profile in Channel

3.2.4 Radioactive Waste Management System

This section describes the radioactive waste management system for CRN-1, including subsystems for liquid, gaseous, and solid wastes.

ESPA ER Section 3.5 and NRC ESP FEIS Subsection 3.4.3 describe radioactive waste management systems and radioactive effluents for the plant at the CRN Site described by the PPE. The NRC ESP FEIS noted that while specific radioactive waste management systems were not identified in the ESPA ER, the ESP-006 PPE provides a bounding analysis of liquid and gaseous radioactive effluent activities and solid radioactive waste volume and activities.

3.2.4.1 General Description of Radioactive Waste System

Radioisotopes are produced during the normal operation of nuclear reactors through the processes of fission and activation. Fission products may enter the reactor coolant by diffusing from the fuel and then passing through the fuel cladding via leaks or by diffusion. The primary cooling water may contain dissolved or suspended corrosion products and nonradioactive materials leached from plant components. These products and materials can be activated by the neutrons in the reactor core as the water passes through the core. These radioisotopes leave the reactor coolant via plant systems designed to remove impurities, via small leaks that occur in the reactor coolant system and auxiliary systems, or via breaching of systems for maintenance. Therefore, CRN-1 generates liquid, gaseous, and solid radioactive waste.

The radioactive waste management systems are designed to restrict releases of radioactive materials in effluents to "as low as reasonably achievable" (ALARA) levels to meet the requirements of 10 CFR Parts 20 and 50, including the design objectives of 10 CFR Part 50 Appendix I. Brief descriptions of the radioactive waste management systems, the anticipated effluent releases from CRN-1, and a comparison of these with the bounding analysis in the ESP-006 PPE are provided.

3.2.4.1.1 Liquid Waste Management System

The LWMS collects, processes, and disposes of liquid radioactive wastes generated as a result of normal operation.

The LWMS collects liquid waste from various plant areas and systems through the equipment and floor drain system (EFS). Liquid waste consists of floor drain wastes, equipment drains, and process drains collected throughout the entire facility. These waste sources are collected by drains and drain headers, routed by gravity drainage piping to a sump, and pumped to LWMS for processing. Additional inputs to the LWMS resulting from normal operation include overboarding from the Shutdown Cooling System and Reactor Water Cleanup System and water from the reactor cavity. The LWMS consists of the collection tanks, sample tanks, filtration skids, refueling water storage tank, condensate storage tank, and associated pumps, piping, and instrumentation. The LWMS filtration skids separate and process the radioactive waste, and then send the processed water to the condensate storage tank for plant reuse. During normal operation, it is expected that processed water from the LWMS can be reused in the plant with no discharges to the environment. However, if the plant's overall water inventory does not allow for

the water to be recycled (e.g., when the tank is full and there is no demand from systems using condensate storage tank), the filtered water can be discharged to the Reservoir through the diffuser. Discharges from the LWMS meet regulatory requirements as described in 10 CFR Part 20 and 10 CFR Part 50 Appendix I. Diagrams illustrating the Waste Collection and Filtering Subsystem and the Waste Sampling Subsystem for the LWMS are provided as Figure 3.2-10 and Figure 3.2-11. Diagrams illustrating the Condensate Storage and Transfer Subsystem and the Refueling Water Storage and Cleanup Subsystem are provided as Figure 3.2-12 and Figure 3.2-13.

Table 3.2-3 provides the average normal liquid radioactive effluent activities for CRN-1. Values are given for both the ESP-006 PPE bounding analysis and CRN-1. The total projected annual release activity in liquid effluents for CRN-1 is 0.0995 Curies (Ci) per year, which is less than 887 Ci/year total activity in the ESP-006 PPE (Item 10.3.1). However, some isotopes are not bounded by the ESP-006 PPE analysis.

3.2.4.1.2 Gaseous Waste Management System

Typical gaseous radioactive wastes results from venting from collection tanks and processing equipment and non-condensables in steam systems. The offgas system (OGS) processes non-condensable gases that are produced through normal nuclear power operations. The main process influent to the system is a mix of steam, air, hydrogen, and radioactive noble gases. The objective of OGS is to process this influent prior to release to the environment. This processing is meant to reduce the release of gaseous radionuclides to maintain the exposure of persons in unrestricted areas to radioactive effluents As Low As Reasonably Achievable (ALARA) and below applicable regulatory limits. The processing includes two main functions:

- Recombination of hydrogen and oxygen into water to maintain plant water inventory and reduce hydrogen detonation risk
- Controlled adsorptive holdup of the radioactive isotopes of krypton, xenon, and argon to achieve adequate decay, thereby reducing effluent radioactivity releases from the plant.

The plant vent stack release point for radioactive effluent is at a height of approximately 36 meters (m). Additionally, the ICS pool vent release point is located approximately 18 m above grade. However, in determining impacts of radioactive releases, a ground level release is conservatively assumed.

The primary functions of the OGS are most applicable when the reactor is operating at high power. Production of radiolytic hydrogen and oxygen and of radioactive noble gas isotopes are minimal outside of power operation mode. Thus, the OGS is not required to be running in reactor startup, shutdown, and refueling modes.

During normal plant operation, non-condensable gases develop in the reactor steam. To maintain turbine efficiency, these gases are removed from the main condenser via steam jet air ejectors. The mixture is then passed through the offgas recombiner where hydrogen and oxygen are catalytically recombined to form water. After recombination, the offgas is routed to a condenser to remove moisture, then routed to effluent conditioning components and charcoal adsorber tanks. The charcoal adsorber tanks provide a delay period for radioisotope decay. The mixture exiting

the adsorber tanks is routed to a chimney for release to the environment. The OGS includes sample capability from various points for radiochemistry information and system health information. A diagram illustrating the Offgas System is provided as Figure 3.2-14.

Table 3.2-4 gives the average normal gaseous radioactive effluent activities for CRN-1 and the associated ESP-006 PPE bounding values. The total projected annual release activity in gaseous effluents for CRN-1 is 665 Ci/year, which is less than 7,130 Ci/year, the total activity in the ESP-006 PPE (Item 9.5.1). However, some isotopes are not bounded by the PPE analysis. Refer to Subsection 3.2.4 for further discussion of gaseous radioactive effluent activities and the comparison between the ESP-006 PPE and CRN-1.

3.2.4.1.3 Solid Waste Management System

The solid waste management system (SWMS) controls, collects, handles, processes, packages, and temporarily stores solid waste generated by the plant prior to shipping the waste offsite. The SWMS processes the filter backwash sludges, charcoal media, and bead resins. Contaminated solids such as High Efficiency Particulate Air filters, cartridge filters, rags, plastic, paper, clothing, tools, and equipment are also disposed of in the SWMS. Other sources of waste including solids from lab samples, sump waste, and oily waste from the EFS will be processed through the SWMS. To the greatest extent possible, all discarded chemicals (including those classified as hazardous) will be kept out of the SWMS. Liquids from the SWM system are drained to EFS. The EFS sump then transfers the liquid to the LWMS for processing. A diagram illustrating the SWMS is provided as Figure 3.2-15.

The SWMS continuously operates during all reactor modes, including startup, refueling, and shutdown; and is capable of receiving, processing, and dewatering the solid radioactive waste inputs for permanent offsite disposal in accordance with NUREG-0800.

Dry solid radioactive wastes are collected in containers located in appropriate areas throughout the plant, as dictated by volume of wastes generated during operation and maintenance. The filled containers are sealed and moved to controlled-access enclosed areas for temporary storage. Wet solid radioactive wastes are collected in a 208-liter drum and loaded in the drum evaporator. The drum evaporator removes excess moisture through evaporation, which is routed to the radwaste building ventilation system for elimination. Both wet and dry drums are stored until they can be shipped offsite.

Class A, B, and C waste from CRN-1 are transported for disposal to a permitted radioactive waste disposal facility in Andrews, Texas. Class A waste may also go to a permitted facility in Clive, Utah. Other permitted facilities may also be used for radioactive waste disposal from CRN-1. Impacts of transportation of radioactive waste are discussed in Section 6.2.

Table 3.2-5 provides the average normal annual activities from projected principal radionuclides in solid radioactive waste from the ESP-006 PPE. Values for CRN-1 are not yet available. Therefore, for this CPA, values from the ESP-006 PPE are considered bounding. CRN-1-specific values will be provided in the Operating License Application. The total projected annual activity

from solid waste in the ESP-006 PPE is 57,200 Ci/year. The projected volume of solid radioactive waste generated per year in the ESP-006 PPE is 5,000 cubic feet per year (Table 3.1-2, Item 11.2.3). This is assumed to be bounding for CRN-1.

Spent fuel is stored in the CRN-1 Fuel Pool, located in the reactor building. The Fuel Pool design for the BWRX-300 varies from that provided in Appendix J of the NRC ESP FEIS. Each of the SMR vendors listed in the ESPA ER indicated their Fuel Pools would be at or below grade level and either within the reactor building or the containment. The CRN-1 Fuel Pool is located in the reactor building. The reactor building is a Seismic Category I structure. The reactor building is a vertical right cylinder shaft that mitigates the effects of external events including aircraft impact, adverse weather, flooding, fires, and earthquakes. The bottom of the cask pit in the Fuel Pool is at grade; the top of the cask pit/bottom of the Fuel Pool and the top of the Fuel Pool are located above grade. While the configuration of the Fuel Pool is different from that of the four technologies considered in the NRC ESP FEIS, the Fuel Pool meets 10 CFR 50.150 and the seismic requirements for a safety related Seismic Category I structure. In addition, the requirements of 10 CFR 50.155(e) related to monitoring wide-range water level of the Fuel Pool are met.

The Fuel Pool has sufficient capacity to store eight years of spent fuel and an additional full core off-load. When necessary, spent fuel will be stored onsite in dry casks at an independent spent fuel storage installation to be licensed in a separate, future licensing action.

Specific information describing the LWMS, OGS, and SWMS was not presented in the ESPA ER, and therefore, the descriptions of those systems constitute new and notable information. However, estimates of projected average normal liquid and gaseous radioactive releases and the projected principal radionuclides in solid radioactive waste were provided in the ESPA ER, and values for CRN-1 presented are bounded by the values in the ESPA ER. Therefore, this information is confirmatory of the ESPA ER. Similarly, while the CRN-1 Fuel Pool configuration varies from that described in the NRC ESP FEIS, the CRN-1 Fuel Pool design meets NRC regulations, as described above. Therefore, this information is considered confirmatory of that presented in the ESPA ER.

Table 3.2-3 CRN Site Projected Average Normal Liquid Radioactive Release (Sheet 1 of 4)

Element	Isotope	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release[(1)] (Ci/year)
Silver (Ag)	Ag-110	3.48E-08	-
	Ag-110m	2.66E-02	7.00E-05
Americium (Am)	Am-241	1.85E-10	-
Barium (Ba)	Ba-137m	2.07E-03	-
	Ba-139	6.16E-08	**2.20E-04**
	Ba-140	4.80E-02	4.90E-03
Bromine (Br)	Br-82	7.48E-06	-
	Br-83	1.41E-05	**6.70E-04**
	Br-84	1.01E-03	-
	Br-85	9.68E-09	-
Carbon (C)	C-14	9.83E-03	-
Cerium (Ce)	Ce-141	1.58E-04	**3.30E-04**
	Ce-143	3.25E-04	1.60E-04
	Ce-144	2.99E-03	2.30E-04
Curium (Cm)	Cm-242	3.78E-08	-
	Cm-244	1.76E-09	-
Cobalt (Co)	Co-58	5.51E-02	3.40E-03
	Co-60	8.21E-03	6.60E-03
Chromium (Cr)	Cr-51	1.28E-01	1.20E-02
Cesium (Cs)	Cs-134	3.44E-02	2.30E-03
	Cs-136	1.17E-02	1.30E-03
	Cs-137	4.24E-02	3.50E-03
	Cs-138	1.42E-02	-
Copper (Cu)	Cu-64	6.72E-03	**7.40E-03**
Iron (Fe)	Fe-55	4.87E-02	1.40E-02
	Fe-59	1.19E-02	3.50E-03
Hydrogen (H)	H-3	8.85E+02	-
Iodine (I)	I-129	5.04E-09	-

Table 3.2-3 CRN Site Projected Average Normal Liquid Radioactive Release (Sheet 2 of 4)

Element	Isotope	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release[(1)] (Ci/year)
Iodine	I-130	1.85E-05	-
	I-131	1.66E-01	1.10E-03
	I-132	1.32E-01	1.50E-04
	I-133	2.76E-01	1.90E-03
	I-134	3.91E-02	-
	I-135	1.64E-01	8.60E-04
Lanthanum (La)	La-140	4.27E-03	-
	La-141	8.80E-08	-
	La-142	1.19E-08	**1.80E-04**
Manganese (Mn)	Mn-54	6.53E-02	6.50E-03
	Mn-56	1.09E-03	2.00E-04
Molybdenum (Mo)	Mo-99	4.52E-02	2.80E-03
Sodium (Na)	Na-24	8.40E-03	1.90E-03
Niobium (Nb)	Nb-95	1.07E-03	**1.20E-03**
	Nb-98		**1.00E-05**
Neodymium (Nd)	Nd-147	1.07E-06	**4.00E-05**
Nickel (Ni)	Ni-63	1.84E-01	1.00E-04
	Ni-65		**4.00E-05**
Neptunium (Np)	Np-239	2.99E-02	2.10E-03
Phosphorus (P)	P-32	3.03E-04	**4.70E-04**
Praseodymium (Pr)	Pr-143	6.93E-05	**5.90E-04**
	Pr-144	1.69E-03	-
Plutonium (Pu)	Pu-238	2.64E-09	-
	Pu-239	3.39E-10	-
	Pu-240	4.27E-10	-
	Pu-241	1.28E-07	-
Rubidium (Rb)	Rb-86	7.48E-05	-
	Rb-88	1.49E-02	-

Table 3.2-3 CRN Site Projected Average Normal Liquid Radioactive Release (Sheet 3 of 4)

Element	Isotope	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release[(1)] (Ci/year)
	Rb-89	6.18E-04	-
Rhodium (Rh)	Rh-103m	4.37E-06	-
	Rh-105	4.27E-07	-
	Rh-106	3.74E-07	-
Ruthenium (Ru)	Ru-103	2.63E-03	2.70E-04
	Ru-105	7.04E-08	**7.90E-04**
	Ru-106	3.92E-02	4.80E-04
Antimony (Sb)	Sb-124	2.29E-04	-
	Sb-125	7.92E-09	-
Antimony	Sb-127	4.40E-08	-
	Sb-129	1.76E-08	-
Strontium (Sr)	Sr-89	1.67E-04	5.00E-05
	Sr-90	1.43E-05	-
	Sr-91	6.67E-04	**2.00E-03**
	Sr-92	2.36E-04	**4.80E-04**
Technetium (Tc)	Tc-99	1.76E-08	-
	Tc-99m	2.27E-02	2.80E-03
Tellurium (Te)	Te-127	1.28E-05	-
	Te-127m	5.72E-06	-
	Te-129	1.65E-04	-
	Te-129m	6.90E-02	5.00E-04
	Te-131	4.05E-05	-
	Te-131m	1.98E-03	2.10E-04
	Te-132	1.32E-01	7.00E-05
	Te-134	1.06E-06	-
Tungsten (W)	W-187	6.30E-04	**7.40E-04**
Yttrium (Y)	Y-90	1.86E-06	-
	Y-91	1.25E-04	**6.70E-04**

Table 3.2-3 CRN Site Projected Average Normal Liquid Radioactive Release (Sheet 4 of 4)

Element	Isotope	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release(1) (Ci/year)
	Y-91m	2.67E-05	-
	Y-92	9.01E-04	**1.50E-03**
	Y-93	7.25E-04	1.60E-04
Zinc (Zn)	Zn-65	2.11E-02	2.70E-03
	Zn-69m		**4.20E-03**
Zirconium (Zr)	Zr-95	2.20E-03	1.10E-03
	Zr-97	4.40E-07	**2.00E-05**
	Total (without H-3)	1.88E+00	9.95E-02
	H-3	8.85E+02	**-**
	Total Liquid Radionuclide Release Activity	8.87E+02	9.95E-02

1) This analysis is performed with the GALE-BWR 3.2 code described in NUREG-0016, Revision 2, which implements the analysis methods and assumptions for liquid effluent releases in Regulatory Guide 1.112.

Note: - = CRN-1 does not release this isotope. **Bold** text = CRN-1 value exceeds PPE value.

Table 3.2-4 CRN Site Projected Average Normal Gaseous Radioactive Release (Sheet 1 of 3)

Element	Radionuclide	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release[1] (Ci/year)
Silver (Ag)	Ag-110m	2.14E-03	6.5E-07
Argon (Ar)	Ar-41	5.44E+02	8.8E-03
Barium (Ba)	Ba-140	1.67E-02	1.9E-04
Bromine (Br)	Br-84	1.28E-05	-
Carbon (C)	C-14	1.00E+01	**1.1E+01**
Cerium (Ce)	Ce-141	5.68E-03	1.2E-05
	Ce-143	1.16E-07	-
	Ce-144	1.17E-05	2.0E-06
Cobalt (Co)	Co-57	1.10E-04	-
	Co-58	6.90E-02	1.4E-04
	Co-60	2.64E-02	3.0E-04
Chromium (Cr)	Cr-51	2.17E-02	5.3E-04
Cesium (Cs)	Cs-134	6.90E-03	1.8E-05
	Cs-136	3.68E-04	9.9E-06
	Cs-137	3.26E-02	2.8E-05
	Cs-138	1.05E-04	3.0E-06
Copper (Cu)	Cu-64	6.18E-03	1.6E-04
Iron (Fe)	Fe-55	4.01E-03	6.6E-04
	Fe-59	9.55E-04	1.6E-04
Hydrogen (H)	H-3	1.01E+03	2.6E+01
Iodine (I)	I-129	8.02E-11	-
	I-131	2.31E-01	1.4E-02
	I-132	1.35E+00	8.3E-02
	I-133	1.05E+00	6.5E-02
	I-134	2.33E+00	2.4E-01
	I-135	1.49E+00	1.3E-01
Krypton (Kr)	Kr-83m	1.28E-02	**8.9E+00**

Table 3.2-4 CRN Site Projected Average Normal Gaseous Radioactive Release (Sheet 2 of 3)

Element	Radionuclide	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release[(1)] (Ci/year)
	Kr-85	7.20E+02	6.0E+01
	Kr-85m	3.39E+02	9.3E-01
	Kr-87	3.27E+01	3.2E+00
	Kr-88	1.45E+02	3.2E+00
	Kr-89	5.00E-07	**3.3E+02**
Lanthanum (La)	La-140	1.12E-03	4.4E-05
Manganese (Mn)	Mn-54	5.22E-03	3.1E-04
	Mn-56	2.17E-03	1.2E-05
Molybdenum (Mo)	Mo-99	3.68E-02	7.0E-05
Sodium (Na)	Na-24	2.50E-03	3.9E-05
Niobium (Nb)	Nb-95	7.50E-03	4.8E-05
Nickel (Ni)	Ni-63	1.46E-02	6.6E-07
Neptunium (Np)	Np-239	7.35E-03	4.8E-05
Phosphorus (P)	P-32	5.68E-04	1.9E-05
Praseodymium (Pr)	Pr-144	1.17E-05	2.3E-09
Rubidium (Rb)	Rb-88	9.80E-06	-
	Rb-89	2.67E-05	1.2E-06
Rhodium (Rh)	Rh-103m	1.48E-08	**5.0E-08**
	Rh-106	4.57E-11	**2.8E-07**
Ruthenium (Ru)	Ru-103	2.17E-03	1.2E-05
	Ru-106	2.34E-04	2.0E-06
Antimony (Sb)	Sb-124	1.12E-04	1.3E-08
	Sb-125	3.77E-05	-
Strontium (Sr)	Sr-89	9.00E-03	2.2E-06
	Sr-90	3.60E-03	9.8E-08
	Sr-91	6.18E-04	4.6E-05
	Sr-92	4.84E-04	2.8E-05
Technetium (Tc)	Tc-99m	1.83E-04	6.1E-06

Table 3.2-4 CRN Site Projected Average Normal Gaseous Radioactive Release (Sheet 3 of 3)

Element	Radionuclide	ESP-006 PPE Total Site Release (Ci/year)	CRN-1 Release(1) (Ci/year)
Tellurium (Te)	Te-129m	1.35E-04	2.3E-05
	Te-131m	4.68E-05	4.1E-06
	Te-132	7.13E-05	1.8E-06
Tungsten (W)	W-187	1.17E-04	1.4E-05
Xenon (Xe)	Xe-131m	1.67E+03	1.0E+00
	Xe-133	2.24E+03	4.3E+01
	Xe-133m	1.05E+02	3.1E-02
	Xe-135	2.82E+02	3.4E+01
	Xe-135m	1.28E+01	**3.2E+01**
	Xe-137	3.00E+00	**4.5E+01**
	Xe-138	1.14E+01	**6.6E+01**
Yttrium (Y)	Y-90	2.84E-05	2.4E-08
	Y-91	1.49E-04	2.4E-05
	Y-92	3.84E-04	1.1E-05
	Y-93	6.86E-04	3.5E-06
Zinc (Zn)	Zn-65	6.86E-03	1.3E-04
Zirconium (Zr)	Zr-95	3.00E-03	5.1E-05
	Total (without H-3)	6.12E+03	6.4E+02
	H-3	1.01E+03	2.6E+01
	Total Gaseous Radionuclide Release Activity	7.13E+03	6.6E+02

1) This analysis is performed with the GALE-BWR methodology in NUREG-0016, Revision 2, which implements the assumptions outlined in NRC Regulatory Guide 1.112, Revision 1.

Note: - = CRN-1 does not release this isotope. **Bold** text = CRN-1 value exceeds PPE value.

Table 3.2-5 Projected Principal Radionuclides in Solid Radioactive Waste from the CRN Site
(Sheet 1 of 2)

Element	Radionuclide	ESP-006 PPE Total Site Activity (Ci/year)
Silver (Ag)	Ag-110m	2.84E-02
Barium (Ba)	Ba-137m	1.01E+04
	Ba-140	1.38E+01
Bromine (Br)	Br-83	8.16E+00
	Br-84	3.96E-01
	Br-85	4.35E-03
Carbon (C)	C-14	1.76E-01
Cerium (Ce)	Ce-144	6.60E-01
Cobalt (Co)	Co-58	3.77E+02
	Co-60	2.84E+02
Chromium (Cr)	Cr-51	3.44E+02
Cesium (Cs)	Cs-134	1.11E+04
	Cs-136	2.00E+03
	Cs-137	1.06E+04
	Cs-138	1.23E+01
Iron (Fe)	Fe-55	1.85E+03
	Fe-59	5.14E+01
Hydrogen (H)	H-3	9.92E-01
Iodine (I)	I-129	3.99E-03
	I-130	1.04E+01
	I-131	6.33E+03
	I-132	2.29E+02
	I-133	1.93E+03
	I-134	8.49E+00
	I-135	4.41E+02
Lanthanum (La)	La-140	1.24E+01
Manganese (Mn)	Mn-54	1.57E+03
	Mn-56	5.52E+02

**Table 3.2-5 Projected Principal Radionuclides in Solid Radioactive Waste from the CRN Site
(Sheet 2 of 2)**

Element	Radionuclide	ESP-006 PPE Total Site Activity (Ci/year)
Molybdenum (Mo)	Mo-99	1.24E+01
Niobium (Nb)	Nb-95	2.00E-01
Nickel (Ni)	Ni-63	8.78E+03
Neptunium (Np)	Np-239	6.98E+00
Plutonium (Pu)	Pu-241	7.04E-02
Rubidium (Rb)	Rb-86	3.45E+01
Rubidium	Rb-88	2.93E+01
	Rb-89	1.14E+00
Strontium (Sr)	Sr-89	5.28E+01
	Sr-90	1.27E+01
	Sr-91	1.35E+00
	Sr-92	1.16E-01
Technetium (Tc)	Tc-99m	5.64E-01
Tellurium (Te)	Te-127m	5.78E-01
	Te-131m	1.75E-01
	Te-132	5.51E+00
Yttrium (Y)	Y-90	1.24E+01
	Y-91	6.36E-01
	Y-91m	4.05E-01
	Y-92	4.86E-02
	Y-93	1.05E-04
Zinc (Zn)	Zn-65	4.33E+02
Zirconium (Zr)	Zr-95	4.42E-02
	Other	1.85E+01
	Total Activity from Solid Waste	5.72E+04

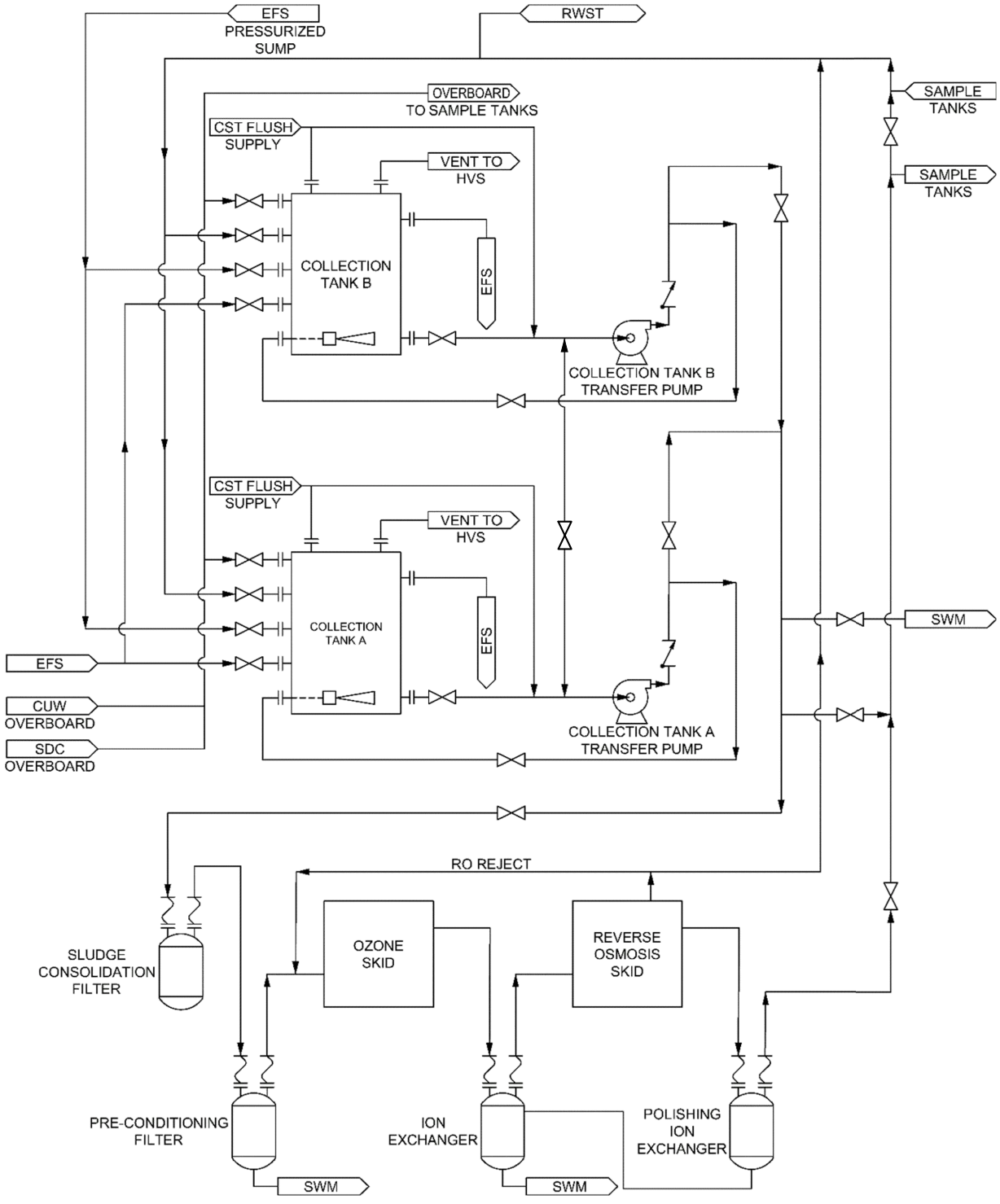


Figure 3.2-10. Waste Collection and Filtering Subsystem Simplified Diagram

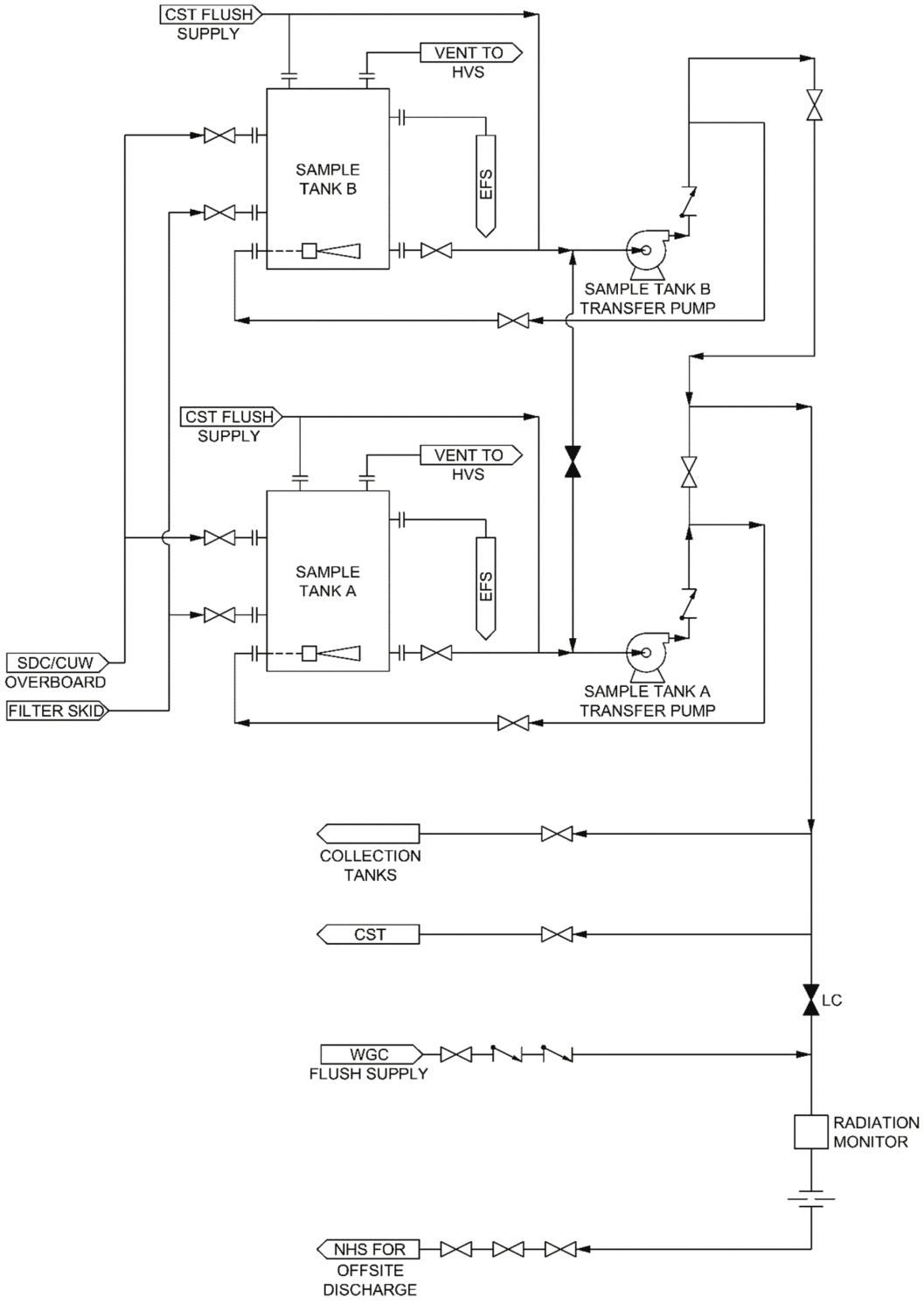


Figure 3.2-11. Waste Sampling Subsystem Simplified Diagram

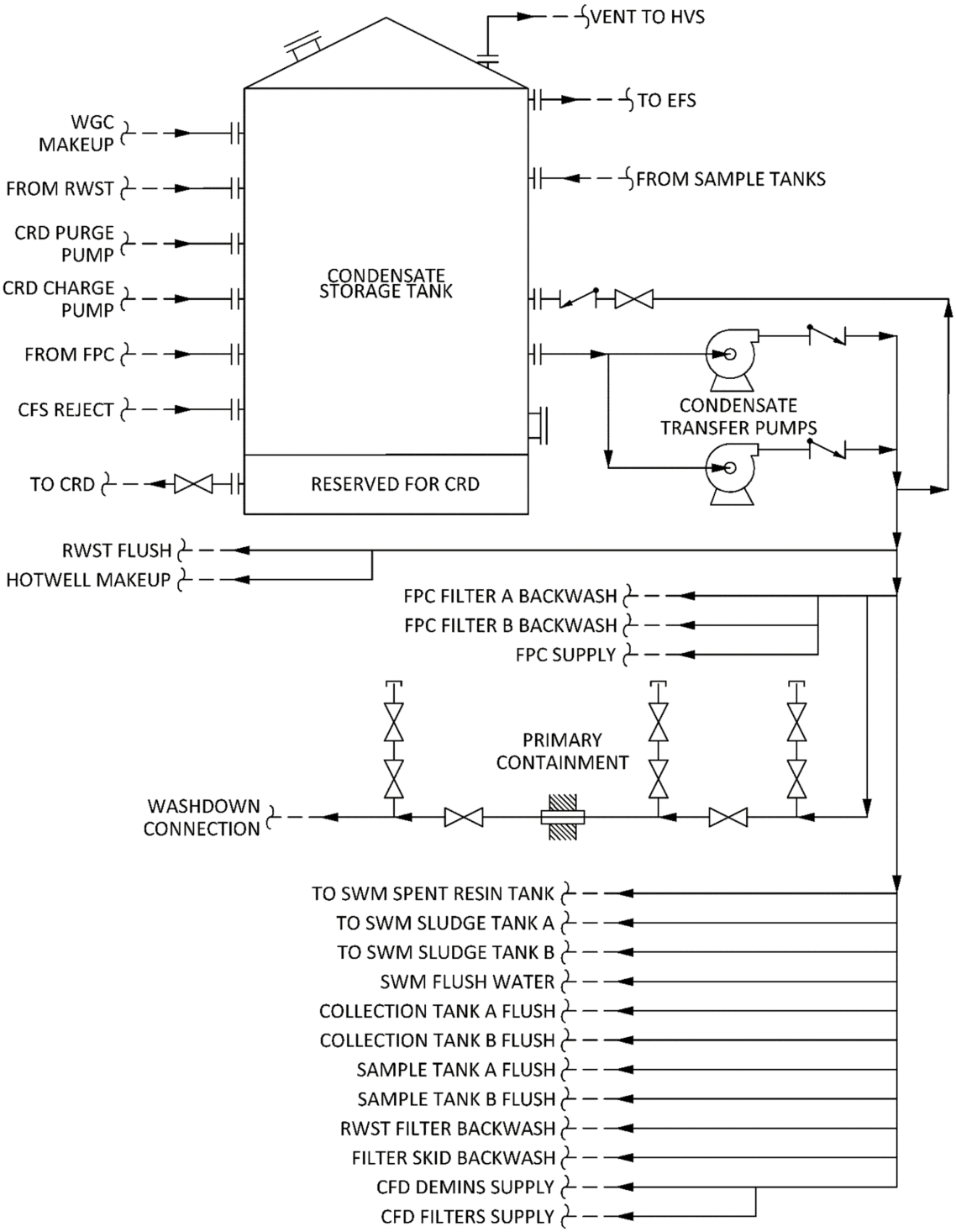


Figure 3.2-12. Condensate Storage and Transfer Subsystem Simplified Diagram

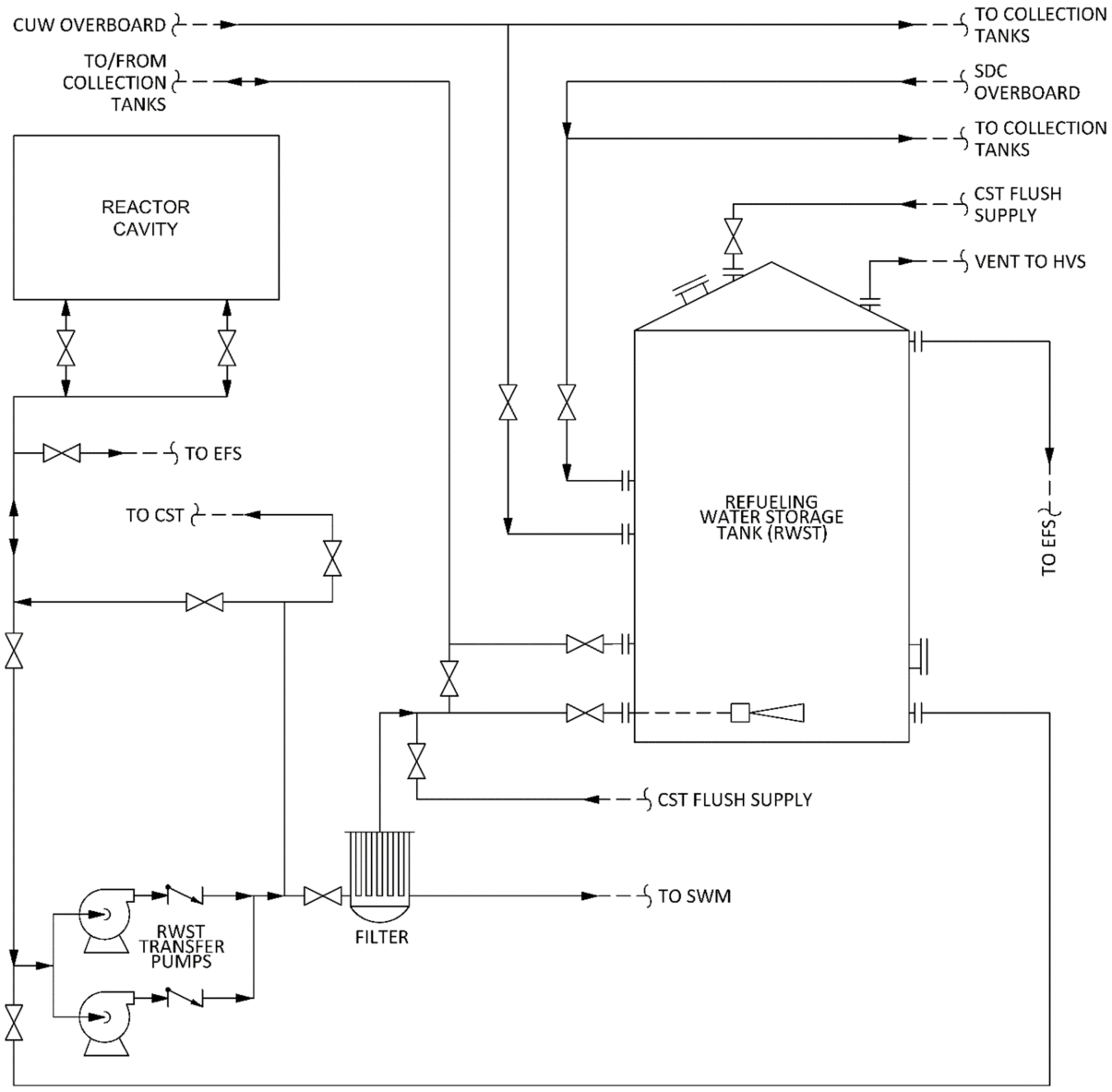


Figure 3.2-13. Refueling Water Storage and Cleanup Subsystem Simplified Diagram

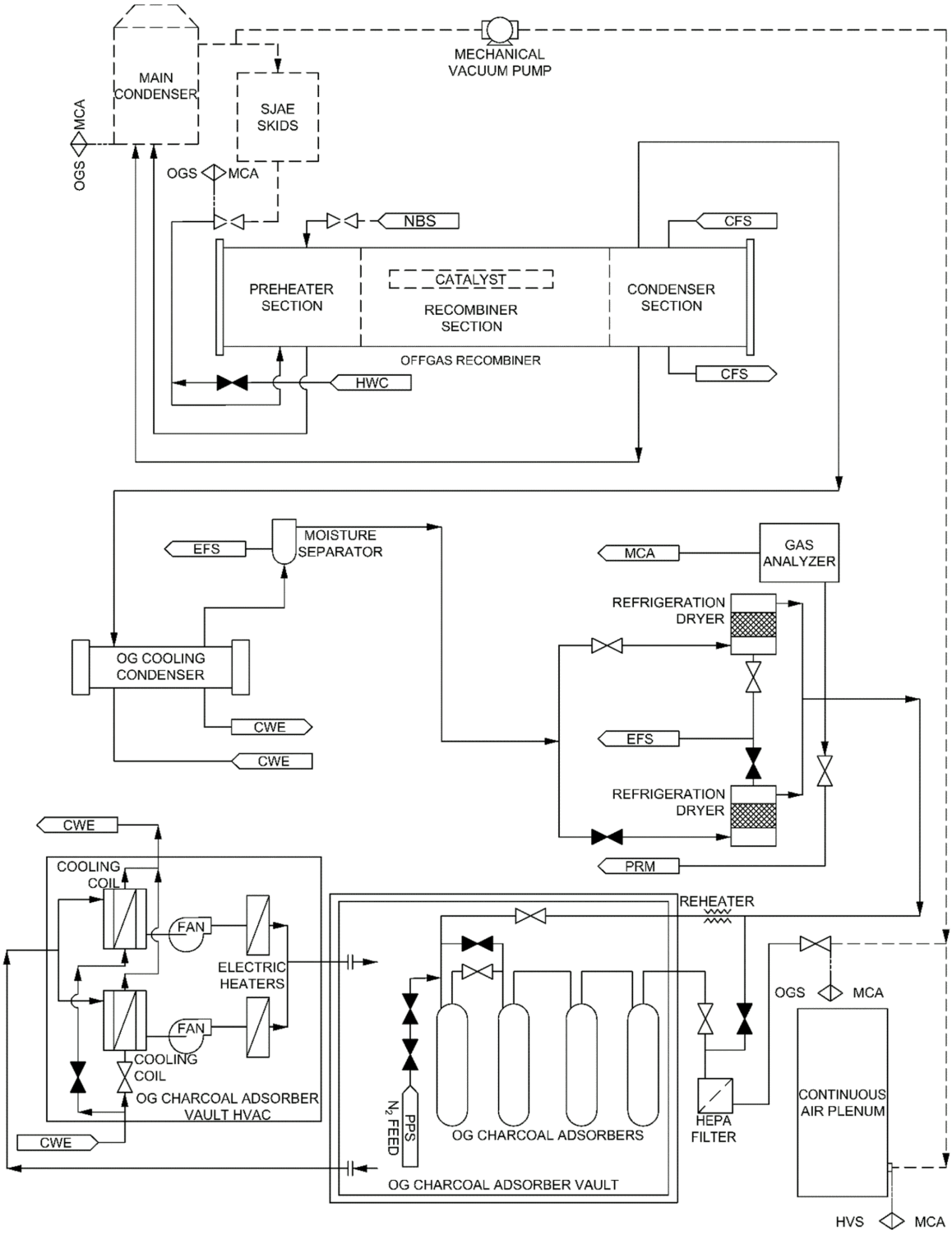


Figure 3.2-14. Offgas System Simplified Diagram

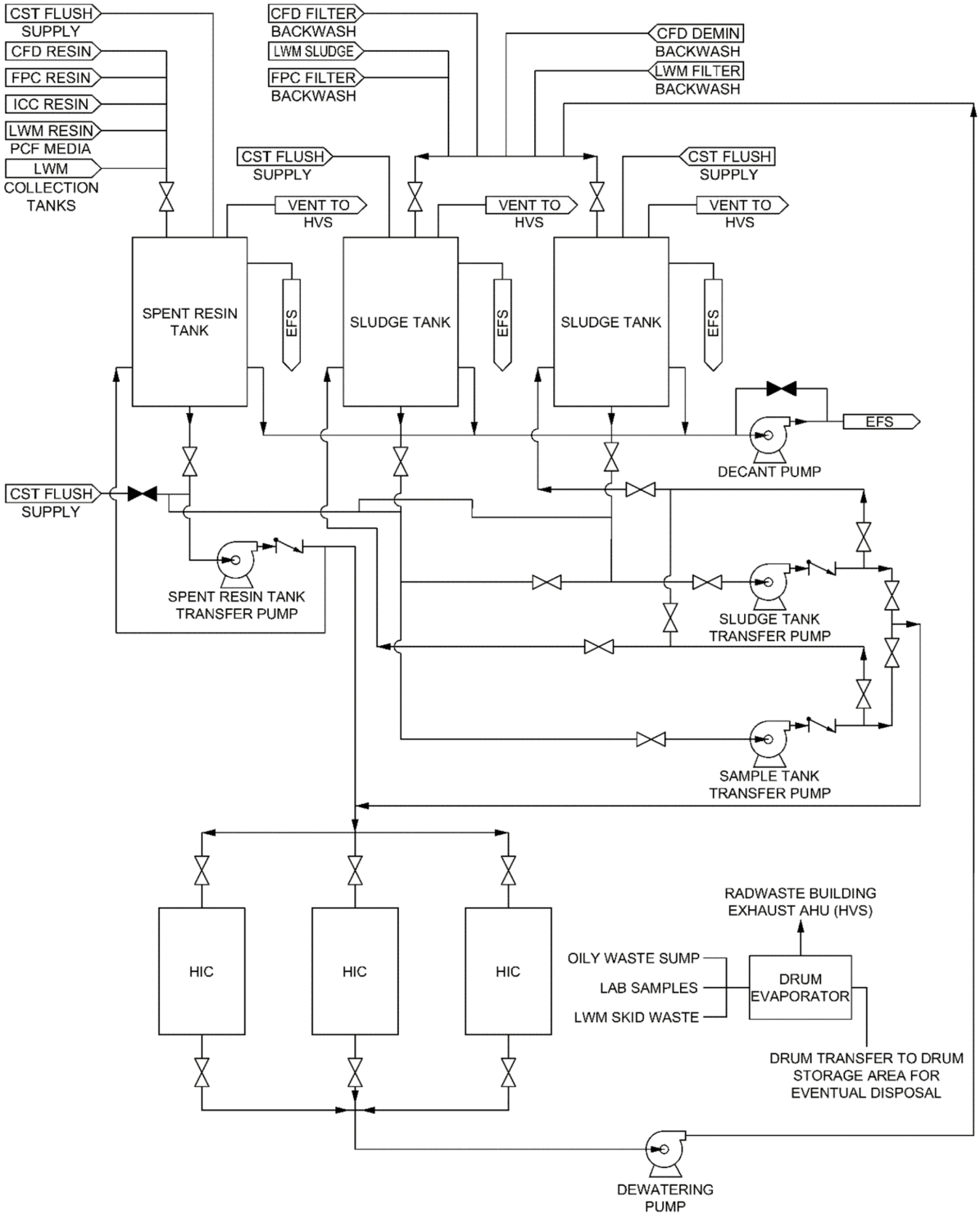


Figure 3.2-15. Solid Waste Management System Simplified Diagram

3.2.5 Nonradioactive Waste Systems

This section describes the CRN-1 nonradioactive waste management systems for solid, liquid, gaseous, hazardous, and mixed waste. Nonradioactive waste systems are described in ESPA ER Section 3.6 and NRC ESP FEIS Subsection 3.4.4. The NRC ESP FEIS did not identify any issues regarding nonradioactive waste management systems that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information regarding nonradioactive waste management systems for related to:

- Chemical concentrations in effluent streams
- Sanitary waste management and disposal
- Nonradioactive solid waste effluents
- Nonradioactive liquid waste effluents
- Nonradioactive gaseous waste effluents

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

Tables 3.2-6 and 3.2-7 present projected blowdown constituents and concentrations and projected maximum annual emissions from standby diesel generators and other stationary sources. TVA determined the new information about nonradioactive waste systems is confirmatory of that used in the NRC ESP FEIS. However, values for CRN-1 are presented alongside ESP PPE values to demonstrate the PPE values are bounding, as required by 10 CFR 51.50.

Table 3.2-6 Projected Blowdown Constituents and Concentrations (Sheet 1 of 2)

Constituent	PPE Maximum Potential Concentration (ppm)	CRN-1 Maximum Potential Concentration (ppm)(1)
Chlorine (Cl) demand	1000	-
Chloride	0.5 (Free available Cl)	0.019 (as Cl)*
Chromium	-	0.019
Copper	6	0.013*
Iron	3.5	0.883
Zinc	0.6	0.12*
Phosphate	7.2	0.829
Sulfate	3500	253.5
Oil and grease	< 10	3.17
Total dissolved solids	17000	1337.3
Total suspended solids	150	19.28
Biological Oxygen Demand, 5-day	< 5	-
Calcium	260	156.8
Magnesium	85	50.2
Sodium	990	44.0
Manganese	0.1	0.0609
Alkalinity	150 (as calcium carbonate [$CaCO_3$])	476.2 (as M-Alkalinity)
Nitrate (NO_3)	52	0.955 (as NO_3)
Silicon Dioxide (SiO_2)	150	14.3
pH Range	7.5-8.5	6-9
Potassium	-	6.66
Total Organic Carbon (as C)	-	68.9
Ammonia (as N)	-	0.951
Fluoride (as F)	-	0.242
ChemTreat CL1355 (Antiscalant)	-	28.0
ChemTreat CL5633	-	10.6

Table 3.2-6 Projected Blowdown Constituents and Concentrations (Sheet 2 of 2)

Constituent	PPE Maximum Potential Concentration (ppm)	CRN-1 Maximum Potential Concentration (ppm)(1)
Antimony	-	0.019
Arsenic	-	0.011
Beryllium	-	0.002
Cyanide	-	0.022*
Cadmium	-	0.0018*
Lead	-	0.0095
Mercury	-	0.001
Nickel	-	0.019
Selenium	-	0.0095
Silver	-	0.0032*
Thallium	-	0.004

1) As the design progresses, future evaluation will be required to demonstrate the final design is compliant with state and federal water quality discharge requirements necessary for attaining permits for this site. The discharge concentration for any constituent will not exceed the maximum limits established by the State of Tennessee or United States Environmental Protection Agency. Values marked with an (*) indicate constituents for which the value provided is the regulatory limit for maximum daily concentration. CRN-1-specific values are to be determined as design progresses.

Abbreviations: ppm = parts per million

Note: - = No measurable concentration from the cooling tower blowdown is expected.

Table 3.2-7 Projected Maximum Annual Emissions from Standby Diesel Generators and Other Stationary Sources

Pollutant Discharged	PPE Emissions (lb/year)	CRN-1 Emissions (lb/year)
Particulates	281	211
Sulfur Oxides	-	-
Carbon Monoxide	3,124	1,230
Hydrocarbons	740	-
Nitrogen oxides	38,983	2,692

Notes: The emissions are based on inputs as follows:

Fuel used is No. 2 diesel oil with 35° American Petroleum Institute gravity and lower heating value of 18,390 British thermal units/lb.

Standby diesel generators operating at 100% load.

Abbreviations: lb = pound(s)

Note: - = Not Available

3.2.6 Power Transmission System

This section describes the existing power transmission infrastructure at the CRN Site and the plans to connect a reactor to this system, as well as required modifications and additions to the existing facilities. The power transmission system for CRN-1 described in the subsections below differs from that presented in the ESPA ER and NRC ESP FEIS as a result of TVA system changes since the development of these documents and because of the smaller power output of CRN-1 compared to the total power output of 800 MWe assumed in the ESPA ER.

ESPA ER Section 3.7 and NRC ESP FEIS Subsection 3.2.2.3.6 describe the power transmission systems that would connect a plant at the CRN Site with a maximum electrical output of 800 MWe to the TVA power grid in the region. The NRC ESP FEIS identified an issue regarding the power transmission system that was not resolved. The NRC ESP FEIS noted that while potential impacts of the power transmission system were evaluated in the ESPA ER, specific actions required to modify the transmission system could not be evaluated. Subsection 4.3.1.2 of the NRC ESP FEIS stated that specific offsite corridor segments, modifications, and resultant impacts would be identified in a future licensing action.

NRC ESP FEIS Subsection 3.2.2.3.6 states that up to 439 miles of transmission lines had been identified by TVA as in need of uprating, reconductoring, or both to accommodate the additional load from the plant described in the ESP-006 PPE. Transmission line activities on the CRN Site and those offsite extending to the first transmission line interconnect at Bear Creek Road are directly attributable to CRN-1. The components and activities to complete interconnection between the existing transmission lines and CRN-1 are described in Subsection 3.2.6.1. Potential transmission system improvements beyond the interconnect with the Kingston FP-Bethel Valley HP #2 transmission line may include recircuiting, reconductoring, or other improvements associated with changes in other generation sources or system needs in the vicinity of the CRN Site. However, these potential improvements are heavily dependent on future activities associated with other TVA power generation assets. As such, improvements beyond the first transmission line interconnect are considered system maintenance activities and are evaluated as part of the analysis of impacts of the proposed action in conjunction with other reasonably foreseeable future actions in Chapter 7.

Having implemented the process described in Section 1.8, TVA identified new and notable information regarding the following:

- Onsite and offsite components and activities to complete interconnection between existing transmission lines and CRN-1
- Other offsite transmission upgrades

The information presented in the following subsections reflects transmission characteristics that are notably different from those previously documented.

3.2.6.1 Onsite and Offsite Components and Activities to Complete Interconnection between Existing Transmission Lines and CRN-1

Components and activities required to complete interconnection between existing transmission lines and the plant described in the ESP-006 PPE were described in ESPA ER Subsection 3.7.1 and NRC ESP FEIS Subsection 3.2.2.3.6.

The following interconnection components and activities are necessary to complete the connection between CRN-1 and the existing power transmission systems and to comply with National Electrical Safety Code standards.

- Onsite construction of a 161-kV switchyard
- Loop in the Kingston FP – Fort Loudoun HP #1 161-kV transmission line (approximately 0.2-mile double circuit), including a relocated portion of the line within the CRN Site boundary
- Loop in the Kingston FP – Bethel Valley HP #2 161-kV line (approximately 0.7-mile double circuit)

The 161-kV switchyard is located southwest of the main plant area, as shown in the Site Utilization Plan, Figure 2.1-2.

TVA plans to loop in the existing Kingston FP-Fort Loudoun HP #1 161-kV line and the Kingston-Bethel Valley #2 161-kV line for CRN-1. This includes relocating the existing Kingston FP-Fort Loudoun HP #1 161-kV line within the CRN Site boundary. The location of the existing transmission lines (500-kV and 161-kV) and the approximate position of the 161-kV transmission line relocation are provided on Figure 2.1-2. Within the CRN Site boundary, the 161-kV line will run parallel to the existing 500-kV line for approximately 1.41 miles, down the east side of the site for approximately 0.75 mile to the switchyard, then run 0.49 mile from the switchyard to rejoin the existing line. Figure 2.1-2 shows a bounding footprint for this line parallel to the 500-kV corridor. Similarly, the corridor extending from the 500-kV line to the interconnect at Bear Creek Road is depicted using a bounding width of 280 feet to accommodate a 120-foot-wide corridor for the 161-kV loop-in. This corridor is approximately 0.48 mile in length between the 500-kV line and the Grassy Creek Habitat Protection Area (HPA), 0.48 mile in length at the northeastern edge of the Grassy Creek HPA, and 0.08 mile in length between the Grassy Creek HPA and the Bear Creek Road interconnect. Unless required for line interactions, no changes to the 500-kV line are planned, as shown in Figure 2.1-2.

NRC ESP FEIS Subsection 5.3.1.1.2 reported that TVA maintains the vegetation in its transmission corridors according to procedures outlined in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Practices, Revision 2.1* (TVA, 2012). In 2019, TVA adopted the *Transmission System Vegetation Management Final Programmatic Environmental Impact Statement* (Vegetation Management PEIS) (TVA, 2019) which establishes a system-wide strategy and policy providing direction for managing vegetation throughout the TVA Power Service Area.

Subsequent site-specific environmental assessments support analysis for implementing transmission system vegetation management practices in specific areas of the TVA service territory. While the Vegetation Management PEIS is subject to a federal court injunction (*Sherwood*) pursuant to ongoing litigation of the same, TVA is complying with the terms of the injunction in pursuing vegetation management practices in TVA's transmission ROWs.

With the issuance of the Vegetation Management PEIS, TVA has implemented a process of vegetation community conversion within the full extent of actively-managed transmission rights-of-way to promote the establishment of a low-growing herbaceous plant community compatible with the safe and reliable operation of the transmission system. This includes the use of best management practices per *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities Revision 4-2022* (TVA, 2022), an update to the guide referenced in the NRC ESPA FEIS. These maintenance activities occur both onsite and offsite, including for the relocated 161-kV line.

Additionally, new information related to transmission corridor maintenance relates to TVA's implementation of a vegetation management plan that seeks to foster biodiversity in select areas by promoting native wildflowers and grasses. This plan would benefit pollinators and other wildlife like grassland birds and would be first implemented during the design and construction phase. TVA plans to continually assess the feasibility of incorporating biodiversity conservation measures into the final layout as site development continues. Specific sustainability measures for the 161-kV corridor (as well as other areas of the CRN Site) will be finalized and implemented when construction at the site is complete.

3.2.6.2 Other Offsite Transmission Upgrades

ESPA ER Section 3.7 and NRC ESP FEIS Subsection 3.2.2.3.6 describe the construction of a new 69-kV underground line within the existing Watts Bar Nuclear Plant - Bull Run FP 500-kV transmission corridor from the CRN Site to the Bethel Valley Substation, the related expansion of the Bethel Valley Substation, and offsite rebuilding, reconductoring, and uprating of transmission lines in multiple locations within the existing TVA transmission ROWs. The new 69-kV line is not part of the design for CRN-1.

As described in Section 3.2.6, potential improvements beyond the first interconnect are heavily dependent on future activities associated with other TVA power generation assets. As such, these improvements are considered system maintenance activities and associated environmental impacts are addressed as part of the analysis of impacts of the proposed action in conjunction with other reasonably foreseeable future actions in Chapter 7.

Maintenance activities for offsite transmission lines are as described for onsite transmission lines above.

3.3 BUILDING ACTIVITIES - PLANT CONSTRUCTION

ESPA ER Section 3.9 and NRC ESP FEIS Section 3.3 describe building activities at the CRN Site.

This section describes construction and preconstruction activities (collectively referred to as "building activities") on the CRN Site, in the vicinity, and in associated offsite areas. As stated in the NRC ESP FEIS Section 3.3, "building" the plant on the CRN site includes both construction and preconstruction activities. The NRC's authority is limited to construction activities that have a reasonable nexus to radiological health and safety or common defense and security. Other activities are grouped under the term "preconstruction." Additional information related to the delineation of construction and preconstruction activities and the environmental impacts of building activities associated with CRN-1 are discussed in Chapter 4.

The NRC ESP FEIS did not identify any issues regarding building activities that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Landscape and stormwater

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Power block and cooling tower
- Cooling tower intake and discharge structures
- Rail siding and barge facility improvements
- Obtaining borrow material
- Transmission lines
- MHH bypass
- Construction timeline, traffic, and workforce

The information presented in the following subsections reflects building activities that are notably different from those previously documented.

3.3.1 Power Block and Cooling Tower

ESPA Subsection 3.9.3 and ESPA ER Subsection 3.3.1.2 describe building activities for the power block and cooling tower at the CRN Site. The ESPA ER did not evaluate a specific technology. Layout and design of CRN-1 are discussed in Section 3.2. The plant area, including the power block and cooling tower, is shown in Figure 2.1-2.

Preparing the locations of the power block and cooling tower involves clearing, grubbing, grading, deep excavation, potential for excavation dewatering, placement of structural fill, fabrication, and module staging activities.

Excavation for the power block occurs in conjunction with other site preparation activities. The power block includes the reactor building, turbine building, radwaste building, control building, and service building. The reactor building is primarily below grade and requires deep excavation. The radwaste building, turbine building, control building, and service building are above-grade structures which require minimal excavation.

Construction of the reactor building consists of vertical shaft excavation methods using conventional construction equipment. Once the shaft is fully excavated, the reactor building is constructed by lowering prefabricated steel composite assemblies that are then filled with self-consolidating concrete.

Construction of the turbine building follows construction of the reactor building to avoid construction sequence interruptions. However, the circulating water piping and underground duct banks are installed immediately after site preparation in parallel with the reactor building excavation. The turbine building is located adjacent to the deeply embedded reactor building structure and is separated from the reactor building by seismic gaps. The turbine building is supported on drilled shaft piers. Construction of a drilled shaft involves excavation, cleaning for concrete preparation, placing reinforcement and concrete, and finishing the top for connection to the structure. Erection of the turbine building will follow completion of the basemat and turbine generator pedestal components, which is then followed by the installation of the turbine building crane and assembly of the turbine generator.

Construction of the radwaste building begins after the reactor building structure exterior walls are above grade at least one floor level. The radwaste building is a cast-in-place, reinforced concrete structure which is supported on drilled shaft piers. The radwaste building base slab will be installed following the below grade foundation components. Construction sequence follows traditional cast-in-place means and methods.

Construction of the control building begins after the reactor building structure exterior walls are above grade at least one floor level. The control building is a three-story, engineered metal building set on a cast-in-place floor slab. Areas critical to plant operation are designed with cast-in-place concrete walls. The control building is supported on drilled shaft piers. The base slab is constructed after installation of the below grade foundational components, followed by construction of the remainder of the building.

The service building is a three-story steel-framed metal structure, utilizing a cast-in-place reinforced floor slab, with underground infrastructure that supports the building utilities, piping, electrical, heating, ventilation, and air conditioning, and lighting. The service building is supported on drilled shaft piers. Construction installation sequencing is coordinated as required so as not to interfere with reactor building and turbine building critical path work activities.

The mechanical draft cooling tower is expected to be erected by the vendor while the cooling tower basin and the underground piping are constructed by the Engineering, Procurement, and Construction contractor.

3.3.2 Cooling Water Intake and Discharge Structures

ESPA ER Subsection 3.9.2.9 and NRC ESP FEIS Subsections 3.3.1.3 and 3.3.1.4 describe building activities for the cooling water intake and discharge structures at the CRN Site. The ESPA ER did not evaluate a specific technology. Layout and design of the cooling water intake and discharge structures are discussed in Subsection 3.2.3. The locations of the intake and discharge for CRN-1 are shown in Figure 2.1-2.

TVA is evaluating two alternative intake designs. The first alternative consists of a recessed shoreline intake structure. This option is located outside the Reservoir's defined navigation channel, which is bank to bank at the intake location, and avoids potential conflicts with navigation. An intake channel connects the structure to the Reservoir. The second alternative is a submerged offshore intake structure. The submerged intake system consists of a subsurface conduit extending between a submerged intake in the Reservoir, within the navigation channel, and a vertical shaft wet well on the bank. The maximum height above the Reservoir floor is limited to 3 feet to avoid impacts on navigation. Both alternatives are evaluated as part of a bounding analysis to provide flexibility for selection during detailed design.

Excavation of the recessed shoreline intake structure takes place in two stages. Excavation of the onshore facility and part of the connecting channel occurs first, while leaving the shoreline intact to act as a dam during building. After completion of the first stage, the portion of the shoreline acting as a dam is removed to complete the channel connection to the Reservoir. Excavation will use onshore equipment.

Excavation for the submerged offshore intake structure alternative includes onshore excavation for the vertical shaft wet well foundation and offshore excavation for the in-Reservoir retrieval pit. The onshore vertical shaft wet well serves as a launch pit for a micro-tunnel boring machine (MTBM) and is ultimately used for the pump station. The MTBM is advanced through the substrata to a retrieval pit excavated in the Reservoir. A cellular cofferdam is needed in the Reservoir for creating a dry working environment to construct the retrieval pit portion of the intake and to install the intake screens.

The plant effluent discharges to the Reservoir using a system that consists of a blowdown holding pond, discharge structure, discharge piping, and a diffuser to promote mixing in the Reservoir. The discharge structure is located at CRM 15.55, as shown in Figure 2.1-2. The discharge piping is buried or is located inside the discharge structure between the blowdown holding pond and the diffuser. Building of the diffuser requires underwater excavation work.

3.3.3 Rail Siding and Barge Facility Improvements

ESPA ER Subsection 3.9.2.4 and ESP FEIS Subsections 3.3.1.6 and 3.3.1.7 describe preconstruction activities for rail siding and barge facility improvements at the CRN Site. TVA does not anticipate utilizing the Energy*Solutions* Heritage Railroad rail siding near the CRN Site for deliveries.

TVA anticipates making improvements to the existing Department of Energy former K-25 Barge Loading Area, near Bear Creek Road between Tennessee State Route 58 and the CRN Site entrance, for deliveries of equipment and materials. The depth of the Reservoir in this area is sufficient for delivery of equipment and materials needed for construction of CRN-1. CRN-1 activities will include expanding the barge facility by approximately 5 acres on the northwest to northeast sides of the existing facility.

Refurbishment of the K-25 barge facility may include improvements such as reducing the height of the sheet pile wall; vegetation clearing; grubbing and grading; replacement of a culvert; limited placement of fill, widening, and resurfacing of the haul path; addition of tie off points for the barge; and installation of temporary support of overhead lines. Tree removal may be required. No in-water work is anticipated.

3.3.4 Obtaining Borrow Material

TVA is evaluating two alternatives for obtaining borrow material needed for building of CRN-1. Both alternatives are evaluated as part of a bounding analysis to provide flexibility for selection during detailed design.

The first alternative is obtaining borrow material from an offsite quarry. Activities at the offsite quarry are outside the scope of this analysis. Approximately 400,000 cubic yards of fill material from the offsite quarry would be brought to the CRN Site by truck during an approximately two-year period using existing roads and haul roads developed onsite.

The second alternative is development of an onsite quarry to supply borrow material. The optional quarry facility is located near the center of the CRN Site, just south of the 500-kV transmission corridor, as depicted in Figure 2.1-2. Operations at this optional onsite quarry include stripping of the overburden and weathered rock formations that are not suitable as backfill. Drilling and blasting are used to establish the pit. Forty-foot drill and blast benches are tailored to the conditions and materials to ensure safe and efficient operations. Up to approximately 400,000 cubic yards of structural fill will be recovered from the quarry.

The quarry is expected to be operational for two years. Drilling operations will be conducted continuously. Initial blasting frequency will be up to two times per week to establish the pit. Once routine quarry operations are established, the blasting operations are anticipated weekly. TVA would stabilize, but not restore the quarry pit area following quarrying activities.

Material excavated during quarry operations that cannot be used as fill is disposed of onsite within the identified area of disturbance. See Section 4.9 for further discussion of disposal of waste material from building activities.

The quarry design will include equipment and/or holding ponds within the disturbed area for managing run-off and wastewater generated by the quarry. Stormwater best management practices will be instituted and maintained during the entire period of building and quarry operations. See Section 4.9 for further discussion of dewatering.

Haul roads to access the quarry site are required, along with utilities to support operations such as temporary power, water and sewer services, parking area, stockpile areas for crushed material, and work trailers.

3.3.5 Transmission Lines

ESPA ER Section 3.7 and NRC ESP FEIS Subsection 3.2.2.3.6 describe building activities associated with building or modification of the transmission system. Building activities required to complete switchyard building and above ground transmission line building and modification are unchanged from the description of these activities in the ESPA ER and NRC ESP FEIS. Although the location of the 161-kV transmission line has changed from that evaluated in the ESPA ER and the NRC ESP FEIS, as described in Subsection 3.2.6, the building activities are unchanged from the description in the ESPA ER and the NRC ESP FEIS. ESPA ER Subsections 3.7.3.4 and 3.7.3.7 describe building of an underground 69-kV line. It has been determined that this line is not required for CRN-1. Therefore, activities related to building the underground transmission line are not evaluated.

3.3.6 Melton Hill Hydroelectric Dam Bypass

Subsection 3.4.2.5 of the ESPA ER described a bypass structure to be constructed at MHH. Subsection 3.2.3.2.5 describes new information regarding the MHH bypass. As described in that subsection, no alterations to the MHH are required for the operation of CRN-1. Therefore, activities related to the bypass are not evaluated.

3.3.7 Construction Timeline, Traffic, and Workforce

ESPA ER Subsections 3.9.1 and 3.9.5 describe the construction timeline, traffic, and workforce for the CRN Site.

The construction timeline has been updated based on currently available project information. Table 3.3-1 summarizes the projected major milestones for the preconstruction activities, construction, startup testing, and commercial operation. Currently, preconstruction is scheduled to begin in 2025.

ESPA ER Subsection 3.9.5 determined that the maximum number of vehicles entering and exiting the CRN Site would normally coincide with the arrival and departure of day-shift construction workers and would depend on the number of workers. ESPA ER Section 3.10 described the construction workforce and estimated a maximum construction workforce of 2,200.

The expected workforce for construction of CRN-1 is less than that evaluated in the ESPA ER. The maximum workforce during construction of CRN-1 is approximately 1,300 (Table 3.2-1, Item 17.4.1). Quarry operation is anticipated to occur two years prior to construction of power block foundations, with material stockpiled onsite. Peak quarry operation requires 30 total staff and is not expected to overlap with the peak construction workforce for CRN-1. However, if additional material is required once power block construction begins, then a workforce of approximately 15 additional people is required for the onsite quarry. The continued workforce of 15 people is included in the peak construction workforce of approximately 1,300. The quarry is

not expected to be staffed once power block foundations are complete. It is expected that the construction workforce, taking into account carpooling, would result in peak onsite traffic of 1,001 vehicles.

Table 3.3-1 Anticipated Timeline for Building and Operation of CRN-1

Milestone	Estimated Date
Initiation of Preconstruction	Time (T) = 0 (2025)
Safety-Related Construction Begins	T = 30 months
Safety-Related Construction Complete	T = 75 months
Startup Testing Begins	T = 86 months
Commence Commercial Operation	T = 95 months

3.4 OPERATIONAL ACTIVITIES - PLANT OPERATIONS AND MAINTENANCE

This section describes operational activities and maintenance at CRN-1 associated with structures that have a major interface with the environment, as well as the workforce required for operation of CRN-1.

ESPA ER Sections 3.3, 3.4, 3.6, and 3.7 and NRC ESP FEIS Section 3.4 describe operational activities and maintenance associated with the CWS, other water systems, management of stormwater and nonradioactive waste, and maintenance for power transmission lines and corridors. The NRC ESP FEIS descriptions are based on the bounding parameters of the ESP-006 PPE for power operation, as other operational modes are bounded by this mode. Similarly for CRN-1, reactor modes are bounded by power operation. Therefore, parameters presented in this section are those for normal power operation. ESPA ER Section 3.10 describes the plant operational workforce.

In Section 9.4 of the NRC ESP FEIS, the NRC noted that water treatment was not described in the ESPA ER and that water treatment needs would have to be resolved as part of any application referencing the ESPA ER. Water treatment for CRN-1 is described in Section 3.2.2.

The NRC ESP FEIS did not identify any other issues regarding operational activities that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information for operational activities related to:

- Plant-environmental interfaces during operation
    - Stormwater management system
    - CWS effluent streams
    - Water systems other than the CWS
    - Air emissions

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Plant-environmental interfaces during operation
- Workforce characterization

The information presented in the following subsections reflects operational activities that are notably different from those previously documented.

3.4.1 Plant-Environmental Interfaces During Operation

Subsection 3.2.2 and 3.2.3 provide new and notable information about CRN-1 plant water use and cooling systems, including a complete description of the water treatment system for CRN-1.

Subsection 3.2.3.2.5 describes new information regarding the MHH bypass. As described in that subsection, no alterations to the MHH are necessary to support operation of CRN-1, eliminating an interface with the environment described in the ESPA ER and NRC ESP FEIS.

TVA determined that the supplemental information regarding the MHH bypass is updated from that previously included in the ESPA ER and NRC ESP FEIS and represents a characteristic of the proposed action that is notably different from that previously documented. Environmental consequences related to this change in the proposed action are addressed in Subsection 5.2.1 related to hydrological alterations, Subsection 5.3.2 related to impacts on aquatic ecosystems, and Section 5.5 related to impacts on historic and cultural resources.

Subsection 3.2.6.1 describes maintenance for the power transmission system. This subsection describes TVA's implementation of the Vegetation Management PEIS in 2019 and additional TVA sustainability measures related to land management. These new and additional management guidelines and measures differ from those described in the ESPA ER and NRC ESP FEIS.

Environmental impacts of offsite land use related to CRN operation are addressed in Section 5.1 and impacts on terrestrial ecosystems are addressed in Subsection 5.3.1.

3.4.2 Workforce Characterization

TVA identified new information related to workforce characterization. Workforce for CRN-1 is less than half of that presented in the ESPA ER. The estimated plant workforce during operations for CRN-1 is estimated to be 205 people, with up to 280 additional people for refueling or major maintenance activities (Table 3.1-2, Items 16.3.1 and 16.3.2). Section 3.10 of the ESPA ER estimated a total operations workforce of 500, with an additional 1,000 workers during refueling and major maintenance activities. Environmental impacts of the operating workforce for CRN-1 are addressed in Sections 5.4 and 5.9.

3.5 REFERENCES

Nuclear Energy Institute (NEI), 2012. Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit, NEI 10-01, Revision 1, May 2012, Agencywide Documents Access and Management System (ADAMS) Accession No. ML12144A429.

Tennessee Valley Authority (TVA), 2012. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Practices, Revision 2.1.

TVA, 2019. Transmission System Vegetation Management Final Programmatic Environmental Impact Statement (PEIS).

TVA, 2022. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4.

TABLE OF CONTENTS

CHAPTER 4 ENVIRONMENTAL IMPACTS OF PLANT CONSTRUCTION 4-1

4.1 LAND USE 4-1

4.1.1 Permanent and Temporary Land Conversion 4-2

4.1.2 Land Use Plans 4-3

4.1.3 Floodplain Encroachment 4-3

4.1.4 Summary of Land Use Impacts 4-4

4.2 WATER RESOURCES 4-8

4.2.1 Hydrologic Alterations 4-8

4.2.2 Water Use Impacts 4-12

4.2.3 Water Quality Impacts 4-12

4.3 ECOLOGICAL RESOURCES 4-19

4.3.1 Terrestrial Ecosystems 4-19

4.3.2 Aquatic Ecology 4-28

4.4 SOCIOECONOMICS 4-38

4.4.1 Physical Impacts 4-38

4.4.2 Demography 4-39

4.4.3 Economic Impacts to the Community 4-40

4.4.4 Community Infrastructure Impacts 4-42

4.5 HISTORIC AND CULTURAL RESOURCES 4-42

4.5.1 Location of Ground Disturbing Activities on the CRN Site and BTA 4-42

4.5.2 Offsite Construction Activities 4-44

4.5.3 Summary of Impacts on Historic and Cultural Resources 4-44

TABLE OF CONTENTS

4.6 AIR RESOURCES 4-46

4.7 NONRADIOLOGICAL HEALTH 4-46

4.8 RADIOLOGICAL HEALTH 4-46

4.9 NONRADIOACTIVE WASTE MANAGEMENT 4-47

4.10 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING BUILDING 4-48

4.11 REFERENCES 4-48

LIST OF TABLES

Table 4.1-1 Permanent Land Use Impacts in the Associated Offsite 161-kV Transmission Corridor 4-5

Table 4.1-2 Impacts Associated with Floodplain Encroachment 4-6

Table 4.2-1 Summary of Impacts to Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas 4-14

Table 4.2-2 Impacts to Individual Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas 4-16

Table 4.3-1 Habitat Types Potentially Disturbed by Development on the CRN Site, BTA, and Proposed Offsite 161-kV Transmission Corridor Compared to Impact Areas Reported from the NRC ESP FEIS. 4-31

Table 4.3-2 Impacts to Wetlands Delineated in the Project Area in 2021 and 2023 4-34

LIST OF FIGURES

Figure 4.1-1 Building Impacts on Land Use 4-7

Figure 4.2-1 Impacts to Surface Water and Wetlands 4-18

Figure 4.3-1 Building Impact Areas Overlaid on Terrestrial Habitats and Wetlands. . . . 4-37

Figure 4.5-1 Potentially NRHP-Eligible and NRHP-Eligible Archaeological Sites within the CRN-1 Disturbance Area 4-45

CHAPTER 4 ENVIRONMENTAL IMPACTS OF PLANT CONSTRUCTION

Chapter 4 presents the potential environmental impacts of building the GE Hitachi Nuclear Energy BWRX-300 small modular reactor (SMR) at the Clinch River Nuclear (CRN) Site, hereafter referred to as CRN-1.

As stated in Section 3.3, "building" CRN-1 includes preconstruction and construction activities. Title 10 of the Code of Federal Regulations (CFR) 50.10, *License required; limited work authorization,* "construction" includes activities related to installation of structures, systems, and components related to safety, security, fire protection, or onsite emergency facilities. "Preconstruction" activities include site exploration, preparation for construction (including clearing, grading, and establishment of temporary roads), excavation, and erection of temporary construction support buildings.

The impacts of building activities documented in NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's Early Site Permit Application (ESPA) for the CRN Site are incorporated by reference for key inputs for which no new information was identified and key inputs for which new information pertaining to CRN-1 was determined to be confirmatory of the analyses contained in the NRC ESP FEIS. The comprehensive analyses of environmental impacts of building CRN-1 incorporate key inputs and analyses associated with new and notable information for each resource.

This chapter is divided into the following sections:

- Land Use (Section 4.1)
- Water Resources (Section 4.2)
- Ecological Resources (Section 4.3)
- Socioeconomics (Section 4.4)
- Historic and Cultural Resources (Section 4.5)
- Air Resources (Section 4.6)
- Nonradiological Health (Section 4.7)
- Radiological Health (Section 4.8)
- Nonradioactive Waste Management (Section 4.9)
- Measures and Controls to Limit Adverse Impacts During Building (Section 4.10)
- References (Section 4.11)

4.1 LAND USE

ESPA ER Section 4.1 and the NRC ESP FEIS Section 4.1 describe potential impacts to land use at the CRN Site and vicinity and associated offsite areas resulting from building a new nuclear power plant at the CRN Site. The NRC ESP FEIS identified one issue that was not resolved for land use impacts regarding specific upgrades (reconductor, uprate, or rebuild) required to modify

the existing Tennessee Valley Authority (TVA) transmission system that would receive power from the CRN Site. Offsite transmission upgrades are discussed in Subsection 3.2.6. The NRC ESP FEIS did not identify any other issues regarding land use that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Permanent and temporary land conversion
  - CRN Site (land cover)
  - Barge and Traffic Area (BTA)
- Borrow sites

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Permanent and temporary land conversion
  - CRN Site Quarry
  - Associated Offsite 161-kV Transmission Corridor
  - Land use plans
  - Floodplain encroachment

The environmental impacts associated with this new and notable information are addressed in the following subsections.

4.1.1 Permanent and Temporary Land Conversion

4.1.1.1 CRN Site

TVA is evaluating the potential development of an onsite quarry with an approximately 40-acre footprint on the CRN Site (Figure 3.1-1), including an estimated 10- to 20-acre quarry pit with associated crushing, blending, and stockpiling operations. It is estimated that the quarry, if needed, can supply 400,000 cubic yards of engineered backfill material for use during construction. Construction roads to access the quarry site would be required, along with utilities to support operations (e.g., temporary power, water, sewer services), a parking area, a stockpile area for crushed material, work trailer, and other activities. Development of the 10- to 20-acre quarry results in a pit depth of approximately 85 feet below grade. TVA would not restore the quarry pit area following quarrying activities. As such, land areas established within the quarry pit area are permanently altered in a manner that was not previously considered in the NRC ESP FEIS.

4.1.1.2 Associated Offsite 161-kV Transmission Corridor

ESPA ER Subsection 4.1.2 and NRC ESP FEIS Subsection 4.1.2 describe the potential impacts from building activities on land use for transmission corridors and offsite areas. TVA considered appropriate key inputs to the analysis of potential effects to land use from building a new nuclear power plant.

The associated offsite 161-kV transmission corridor begins at the northeastern edge of the CRN Site and runs north through the Grassy Creek Habitat Protection Area (HPA) to connect with the Kingston Fossil Plant - Bethel Valley Hydroelectric Plant #2 transmission line that parallels a portion of Bear Creek Road. The proposed offsite portion of the 161-kV transmission corridor requires a width of 120 feet. However, TVA has assessed impacts on a 280-foot-wide corridor as a conservative bounding approach. Based upon the bounded 280-foot corridor, approximately 29 acres of land are impacted within the associated offsite 161-kV transmission corridor including approximately 24 acres in the Grassy Creek HPA and approximately 5 acres of the U.S. Department of Energy (DOE)-managed land north of Bear Creek Road. Figure 4.1-1 shows the area of permanent and temporary land use impacts and Table 4.1-1 details the quantities of disturbed land cover type within this transmission corridor based on the bounding 280-foot corridor. However, based upon final design of the 120-foot-wide corridor, it is likely that the affected area would be limited to approximately half this total (15 acres). TVA will acquire right-of-way for the transmission line from DOE in this area. Additionally, TVA will minimize impacts to these resources and engage in consultation with state and federal authorities, as well as coordination and approval from DOE, prior to commencing building activities (see Section 4.3).

4.1.2 Land Use Plans

The associated offsite 161-kV transmission corridor is constructed partially within the Grassy Creek HPA, which is designated as Zone 3 (Sensitive Resource Management/Natural Area) in the Watts Bar Reservoir Land Management Plan (WBRLMP) (TVA, 2009). Building this corridor has the potential to impact sensitive plant species (see Subsection 4.3.1) located within Parcel 147. TVA has expanded the Grassy Creek HPA (Parcel 146) by approximately 14 acres to include the habitat where these plants are located to provide additional protection. Accordingly, the next update to the WBRLMP will include reallocation of a 14-acre area of Parcel 147 to Parcel 146, reducing the size of Parcel 147 by 14 acres. TVA's mitigation measures are consistent with the protection and enhancement of sensitive resources inherent in the Zone 3 classification, as TVA will update the WBRLMP to include reallocation of the expanded 14-acre area of the Grassy Creek HPA from Zone 5 (Industrial Use) to Zone 3. As such, building the associated offsite 161-kV transmission corridor is consistent with the WBRLMP.

4.1.3 Floodplain Encroachment

Table 4.1-2 presents total acreage of floodplain on the CRN Site and the BTA that is within temporary and permanent disturbance areas. Building activities associated with CRN-1 occur in 27.7 acres of floodplain within the permanent disturbance area and 3.4 acres of floodplain within the temporary disturbance area. Much of the impact to floodplain is permanent conversion of

land cover rather than filling in the floodplain. Building activities within the floodplain along the Clinch River arm of the Watts Bar Reservoir (Reservoir) are associated with intake construction, discharge pipeline installation, transmission line construction and maintenance, and expansion of the offsite barge facility within the BTA.

Building activities associated with CRN-1 will adhere to Executive Order 11988, *Floodplain Management* and the TVA Flood Storage Loss Guideline.

4.1.4 Summary of Land Use Impacts

Overall, land use impacts associated with building CRN-1 and the associated offsite 161-kV transmission corridor noticeably alter attributes of the existing land on the CRN Site and associated offsite areas. Some building impacts to land use are temporary because some areas of the site will be revegetated once building is complete (though possibly not with the same vegetation as before). However, much of the site is permanently converted. Impacts related to land use planning are minimal.

The impact of building CRN-1 on land use is MODERATE and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

Table 4.1-1 Permanent Land Use Impacts in the Associated Offsite 161-kV Transmission Corridor

Land Cover Type	Associated Offsite 161-kV Transmission Corridor	
	Area (acres)	Percent (%)
Barren Land	-	-
Deciduous Forest	22.1	75.2
Developed, Open Space	2.0	6.7
Developed, Low Intensity	0.3	1.2
Developed, Med Intensity	0.0(1)	0.1
Developed, High Intensity	0.0(1)	0.0(1)
Evergreen Forest	0.1	0.2
Hay/Pasture	1.5	5.3
Herbaceous	-	-
Mixed Forest	1.1	3.9
Open Water	-	-
Shrub/Scrub	-	-
Woody Wetlands	2.1	7.3
Total(1)	**29.2**	**100.0**

Source: Dewitz and U.S. Geological Survey (USGS), 2021

1) Column totals may not equal sum of individual values due to rounding. 0 entries are associated with trace values.

Note: - = Not Present

Table 4.1-2 Impacts Associated with Floodplain Encroachment

	Permanent		Temporary	
	Area (acres)	**Percent (%)**	**Area (acres)**	**Percent (%)**
Barge and Traffic Area	3.6	12.8	0.7	20.1
CRN Site	24.2	87.2	2.7	79.9
Associated Offsite 161-kV Transmission Corridor	0	0	0	0
Total(1)	27.7	100	3.4	100

Source: Dewitz and USGS, 2021; Federal Emergency Management Agency (FEMA), 2023

1) Column totals may not equal sum of individual values due to rounding.

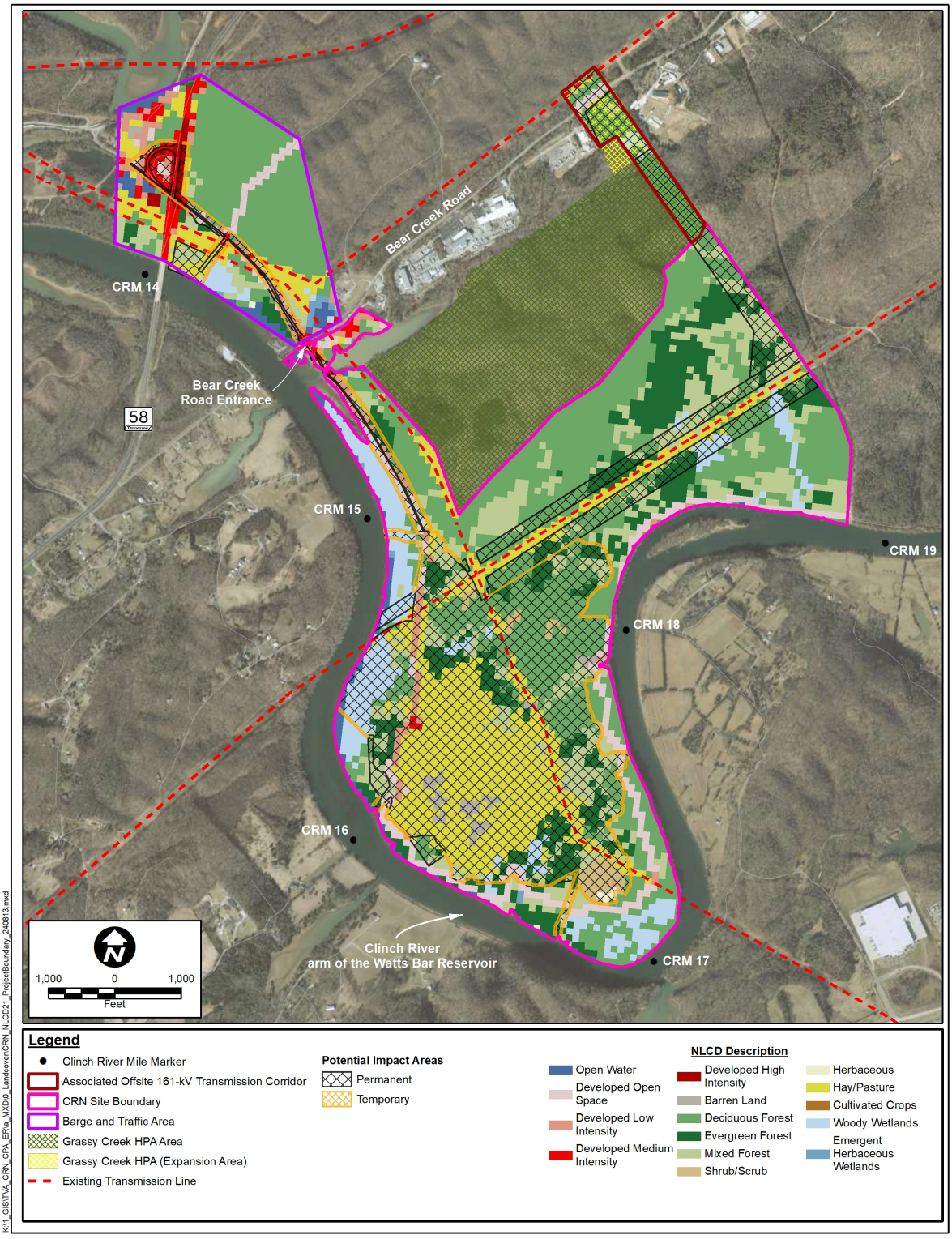


Figure 4.1-1 Building Impacts on Land Use

4.2 WATER RESOURCES

ESPA ER Section 4.2 and NRC ESP FEIS Section 4.2 describe potential impacts to water resources resulting from building a new nuclear power plant at the CRN Site. This section describes water-related impacts that could result from site preparation and from building CRN-1. Subsection 4.2.1 addresses hydrologic alterations, Subsection 4.2.2 and Subsection 4.2.3 address water use impacts and water quality impacts, respectively.

4.2.1 Hydrologic Alterations

ESPA ER Section 4.2.1 and NRC ESP FEIS Subsection 4.2.1 describe the impacts from hydrologic alterations associated with construction of CRN-1.

4.2.1.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding hydrologic alterations to surface water that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Hydrologic alterations to the Reservoir
- Mitigative measures for unavoidable impacts to surface water resources
- Alterations to the flow bypass system at the Melton Hill Hydroelectric Dam (MHH)

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Hydrologic alterations of surface water

The environmental impacts associated with this new and notable information are addressed in the following subsection.

4.2.1.1.1 Hydrologic Alterations to Onsite and Offsite Streams and Ponds

Figures 2.1-2 and 4.2-1 provide detailed information regarding the extent of hydrological alterations that will occur as a result of building activities in the project area. Figure 3.1-1 identifies the disturbance areas on the CRN Site. Table 4.2-1 presents a summary of total impacts to individual streams and ponds.

For a discussion of floodplain alterations see Subsection 4.1.3.

In total, the proposed action potentially results in permanent impacts to:

- 0.65 acre of three ponds (P01, P02, and P04)
- 3,586 lineal feet of 11 perennial/intermittent streams (STR03, STR04, STR05, STR06, STR07, STR08, STR09, STR10, STR11, STR12, and STR17)
- 2,694 lineal feet of eight wet weather conveyances (WWC) (EPH02, EPH03, EPH04, EPH08, EPH09, EPH10, EPH18, and EPH19)

The proposed action also potentially results in temporary impacts to:

- 101 lineal feet of three perennial/intermittent streams (STR01, STR03, and STR04)
- 64 lineal feet of three WWCs (EPH02, EPH04, and EPH10)

Permanent impacts to streams STR11 and STR12 on the CRN Site are related to building the 161-kV transmission corridor, and these streams will be avoided where possible. Upgrades to the barge facility may include vegetation clearing; grubbing and grading; replacement of a culvert; limited placement of fill, widening, and resurfacing of the haul path; and installation of temporary support for overhead lines. These improvements would impact perennial stream STR03. Quantification of impacts to specific surface water resources located on the CRN Site and in the associated offsite areas, based upon the proposed disturbance areas, can be found in Table 4.2-2.

The NRC ESP FEIS (Subsection 4.2.1) included an assessment of impacts associated with the installation of a 5-mile long underground 69-kV transmission line from the CRN Site to Bethel Valley Substation. However, this transmission project is not necessary to support operation of CRN-1, and building the transmission line is not included in this evaluation. Therefore, impacts to streams associated with building the 69-kV transmission line would not occur as a part of the CRN-1 project.

Replacement of culverts along River Road and the installation of a new bridge across Grassy Creek at the entrance to the CRN Site were completed in 2023 in conjunction with on-going operations and maintenance (TVA, 2023a). These past actions have been included in the analysis of impacts of the proposed action in conjunction with other reasonably foreseeable future actions in Chapter 7.

Information updated from that presented in the NRC ESP FEIS includes impacts to one additional pond, with three total ponds impacted onsite during building activities. Additional updates include an increase in total number of perennial and intermittent streams impacted on the CRN Site and a decrease in total number of WWCs impacted within the BTA. Updated information regarding impacts to perennial and intermittent streams and ponds is related to regulated waters determinations and the CRN-1 site utilization plan.

Permanent impacts to streams within the transmission corridor are localized and minimized in accordance with TVA's streamside management zone provisions as described in TVA's *A Guide for Environmental Protection and Best Management Practices for Construction and Maintenance Activities* (TVA, 2022b).

Indirect physical alteration of receiving streams may also result from increased runoff volumes and rates during building or diversions of runoff in conjunction with the disturbance of land on the CRN Site. Conversion of existing undeveloped land to either impervious uses (developed areas, parking lots, buildings) or less pervious land may result in increased runoff rates to receiving streams. Stormwater runoff from the CRN Site is controlled via engineered structures, collected in engineered stormwater retention ponds, and allowed to infiltrate the ground or released to the Reservoir in a controlled manner. As illustrated in Figure 2.1-2, two stormwater retention ponds would be constructed to moderate the increased runoff from impervious structures and surfaces. Supplemental stormwater ponds are included as appropriate during detailed site design to manage overall site runoff. These retention ponds limit stormwater flow rates into receiving streams and the Reservoir and associated increases in stormwater discharges during high intensity precipitation events.

Hydrologic alterations to streams will comply with applicable permit requirements, including a Clean Water Act Section 404 permit from the USACE and an Aquatic Resource Alteration Permit authorization from the Tennessee Department of Environment and Conservation (TDEC). Additionally, a stormwater pollution prevention plan (SWPPP) would be in place for erosion protection and stormwater management. The SWPPP would meet TDEC stormwater construction permit discharge requirements and would incorporate best management practices (BMPs) to minimize erosion and stabilize the land surface.

The impact of building activities on surface water hydrology is mitigated and SMALL. The NRC ESP FEIS did not make an impact determination for hydrologic alterations to surface water. Therefore, a new and significant information determination is not applicable.

4.2.1.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding hydrologic alterations to groundwater that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Extent of land surface alterations
- Extent of dewatering during building

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Hydrologic alterations of groundwater
    - Development of an onsite quarry

The environmental impacts associated with this new and notable information are addressed in the following subsection.

4.2.1.2.1 Development of Onsite Quarry

As described in Subsection 3.3.4, TVA is evaluating two alternatives for obtaining borrow material needed for building CRN-1. The first alternative is obtaining borrow material from an offsite quarry, and the second alternative is the development of an onsite quarry to supply borrow material. The potential onsite quarry facility is located near the center of the CRN Site, just south of the 500-kV line, as depicted in Figure 2.1-2.

For an onsite quarry, the overburden and weathered rock formations that are not suitable as backfill are stripped. Drilling and blasting are used to establish the pit. Safe and efficient drilling and blasting depths per bench are expected to be approximately 40 feet. The resulting quarry floor depth may be 80 to 85 feet below local grade elevations. The quarry design includes equipment and/or holding ponds within the disturbed area for managing run-off and wastewater generated by the quarry. Stormwater BMPs will be instituted and maintained during the entire period of building and quarry operations.

Land and sub-surface modifications associated with quarry development result in local alterations to groundwater recharge. These include an increase in recharge over the area of the quarry footprint due to the removal of overburden and bedrock that would normally slow the infiltration of direct precipitation. As a result of the removal of these materials, potential increases in groundwater recharge within permeable areas of the quarry may occur from stormwater runoff entering the quarry. The Clinch River Breeder Reactor Project estimated that normal water flow into the excavation site would be 1,000 gallons per minute (gpm), and that an upper limit coincident with heavy rain and runoff would be 3,000 gpm. Water entering the quarry by seepage from the quarry face or stormwater that is not removed from the quarry through stormwater management practices could contribute to recharge of groundwater.

Additionally, the blasting activities and removal of bedrock material likely result in the removal or collapsing of fractures and solution channels. The creation of new fracture and solution channels may change the local bedrock flow paths within localized areas around the quarry potentially affected by blasting.

Together, these activities are expected to noticeably alter the spatial and temporal pattern of infiltration and recharge and groundwater flow directions in the shallow aquifers on the CRN Site in proximity to the quarry. However, groundwater at and near the proposed quarry is assumed to flow toward and discharge to the Reservoir locally on the CRN Site. This would potentially continue during and after quarry operations, but by altered pathways. The effects on infiltration, recharge, and groundwater flow are localized in proximity to the quarry and are negligible off the CRN Site. Therefore, the overall impacts of quarry development on groundwater discharge to the Reservoir are minor but long term in their effect. Because such effects are localized to the CRN Site, potential effects to offsite groundwater users are also minor.

The supplemental information regarding hydrologic alterations to groundwater is new. The impact of building activities on groundwater hydrology is SMALL.

The NRC ESP FEIS did not make an impact determination for hydrologic alterations to groundwater. Therefore, a new and significant information determination is not applicable.

4.2.2 Water Use Impacts

ESPA ER Section 4.2.2 and NRC ESP FEIS Subsection 4.2.2 describe the impacts to water use associated with building CRN-1.

4.2.2.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding surface water impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Building-phase surface water use

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on surface water use is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.2.2.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding groundwater use impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA did not identify new information related to groundwater use. The impact of building activities on groundwater use is SMALL and is the same as in the NRC ESP FEIS.

4.2.3 Water Quality Impacts

ESPA ER Section 4.2.3 and NRC ESP FEIS Subsection 4.2.3 describe the impacts to water quality associated with building CRN-1.

4.2.3.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding water quality impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Extent of instream disturbance in the Reservoir

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on surface water quality is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.2.3.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding groundwater quality impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Water quality effects from the Clinch River Breeder Reactor Project wells
- Water quality of groundwater derived from quarry dewatering

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on groundwater quality is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

Table 4.2-1 Summary of Impacts to Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 1 of 2)

Location	Impacts to Streams and Ponds for CRN-1				ESPA ER/NRC ESP FEIS[1]
	Type	Number	Disturbance Type	Length (feet) / Area (acres)	Number
CRN Site					
	Ponds (acres)	3	Permanent	0.65	2
		0	Temporary	-	
	Streams (feet)	7	Permanent	1,822	1
		1	Temporary	25	
	WWCs (feet)	7	Permanent	2,375	6
		2	Temporary	51	
Associated Offsite Areas					
Barge and Traffic Area					
	Ponds (acres)	0	Permanent	-	
		0	Temporary	-	
	Streams (feet)	1	Permanent	79	1
		2	Temporary	76	1
	WWCs (feet)	1	Permanent	77	6
		1	Temporary	13	
161-kV Offsite Transmission Line(1)					
	Ponds (acres)	0	Permanent	-	
		0	Temporary	-	
	Streams (feet)	3	Permanent	1,685	
		0	Temporary	-	
	WWCs (feet)	1	Permanent	242	
		0	Temporary	-	
Project Area Total					
	Ponds (acres)	3	Permanent	0.65	2
		0	Temporary	-	
	Streams (feet)	11	Permanent	3,586	2

**Table 4.2-1 Summary of Impacts to Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 2 of 2)**

Location	Impacts to Streams and Ponds for CRN-1				ESPA ER/NRC ESP FEIS[1]
	Type	Number	Disturbance Type	Length (feet) / Area (acres)	Number
		3	Temporary	101	1
	WWCs (feet)	8	Permanent	2,694	12
		3	Temporary	64	

Source: [1]NRC and USACE, 2019

1) Impacts to streams within the 161-kV transmission corridor are localized and minimized in accordance with TVA's streamside management zone provisions as described in the TVA *Guide for Environmental Protection and Best Management Practices for Construction and Maintenance Activities* (TVA, 2022b).

Note: - = Not Applicable

Table 4.2-2 Impacts to Individual Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 1 of 2)

Feature ID	Type	Permanent Impacts	Temporary Impacts
CRN Site			
Ponds (acres)			
P01	Pond	0.31	0
P02	Pond	0.18	0
P04	Pond	0.16	0
Total (acres)		**0.65**	**0**
Streams (lineal feet)			
STR04	Intermittent	140	25
STR05	Intermittent	299	0
STR06	Intermittent	123	0
STR07	Perennial	603	0
STR10	Intermittent	284	0
STR11	Perennial	315	0
STR12	Perennial	58	0
EPH03	Ephemeral/WWC	139	0
EPH04	Ephemeral/WWC	38	18
EPH08	Ephemeral/WWC	124	0
EPH09	Ephemeral/WWC	614	0
EPH10	Ephemeral/WWC	130	33
EPH18[(1)]	Ephemeral/WWC	83	0
EPH19	Ephemeral/WWC	1,247	0
Total (feet)		**4,197**	**76**
Associated Offsite Areas			
Barge and Traffic Area			
Streams (lineal feet)			
STR01	Intermittent	0	16
STR03[(2)]	Perennial	79	60
EPH02	Ephemeral/WWC	77	13

Table 4.2-2 Impacts to Individual Surface Water Resources (Streams/Ponds) on the CRN Site and Associated Offsite Areas
(Sheet 2 of 2)

Feature ID	Type	Permanent Impacts	Temporary Impacts
Total (feet)		**156**	**89**
161-kV Offsite Transmission Corridor[3]			
Streams (lineal feet)			
STR08	Intermittent	1,181	0
STR09	Perennial	384	0
STR17	Intermittent	120	0
EPH18[1]	Ephemeral/WWC	242	0
Total (feet)		**1,927**	**0**

1) WC EPH18 crosses from the CRN Site into the 161-kV transmission corridor and is only counted once in the project area total.

2) STR03 is considered to be a backwater feature of the Reservoir and not a unique feature for the BTA.

3) Impacts to streams within the 161-kV transmission corridor are localized and minimized in accordance with TVA's streamside management zone provisions as described in the TVA *Guide for Environmental Protection and Best Management Practices for Construction and Maintenance Activities* (TVA, 2022b).

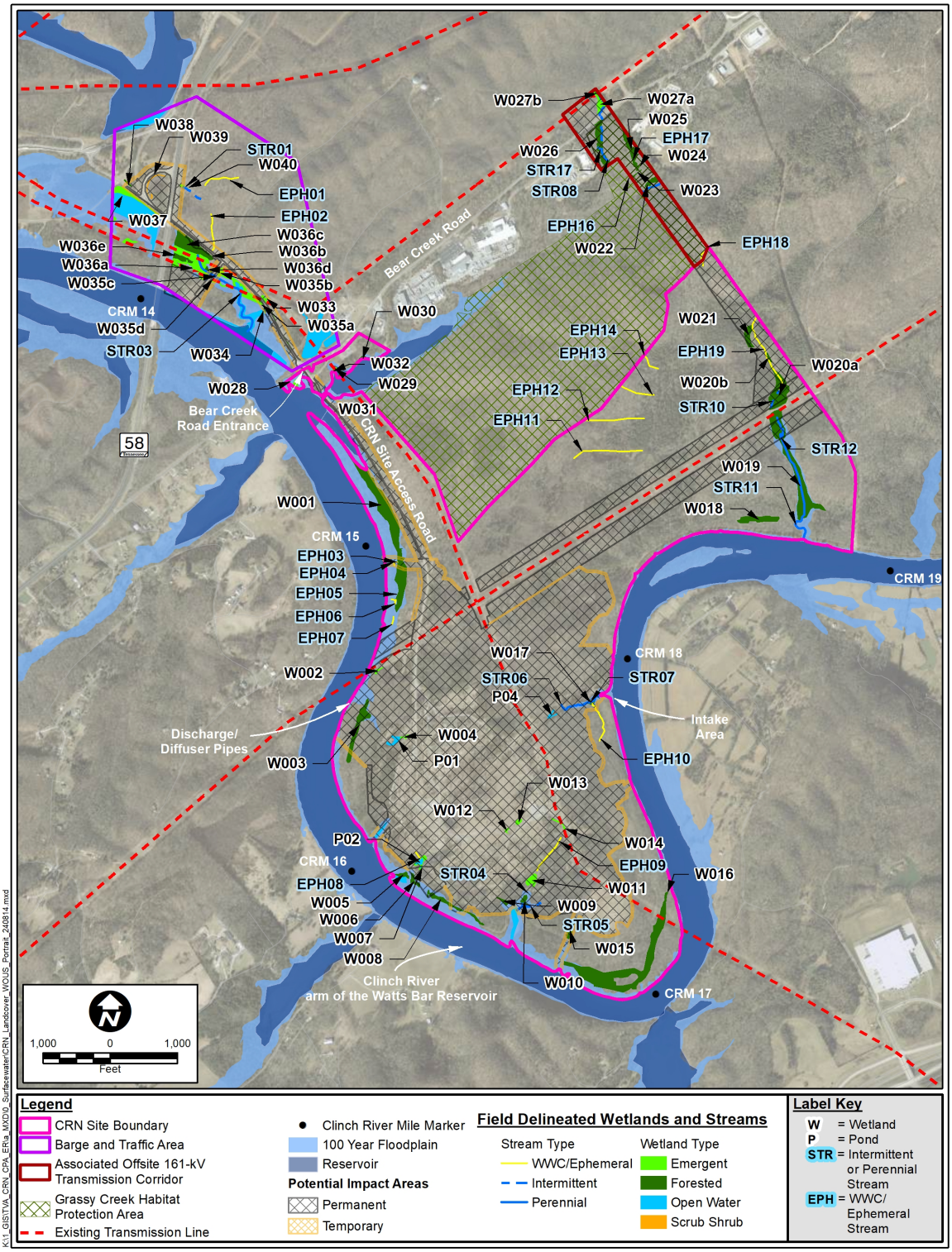


Figure 4.2-1 Impacts to Surface Water and Wetlands

4.3 ECOLOGICAL RESOURCES

ESPA ER Section 4.3 and NRC ESP FEIS Section 4.3 describe potential impacts to ecological resources resulting from building a new nuclear power plant at the CRN Site. This section describes impacts to ecological resources that could result from building CRN-1. Subsection 4.3.1 addresses terrestrial ecosystems and Subsection 4.3.2 addresses aquatic ecology.

4.3.1 Terrestrial Ecosystems

ESPA ER Subsection 4.3.1 and NRC ESP FEIS Subsection 4.3.1 describe potential impacts from CRN-1 building activities to the terrestrial ecology of the CRN Site and associated offsite areas. The NRC ESP FEIS identified two issues related to terrestrial ecology and wetlands that were not resolved.

As discussed in Section 2.4, one unresolved issue was impacts and avoidance and minimization measures related to Section 7 consultation for species listed under the Endangered Species Act (ESA).

In January 2025, TVA submitted a Biological Assessment to the USFWS for consideration. Proposed avoidance, minimization, and conservation measures are described in TVA's Biological Assessment. Information provided in the consultation responses from USFWS regarding impacts and avoidance and minimization measures related to Section 7 consultation represents new information not included in the NRC ESP FEIS. TVA would also engage with DOE at an appropriate time to negotiate an easement for the proposed 161-kV interconnect along Bear Creek Road.

The second unresolved terrestrial ecology issue in the NRC ESP FEIS was related to Clean Water Act (CWA) Section 401 certification (33 United States Code § 1251 *et seq*.). Because the ESP did not authorize any building activities, a CWA Section 401 certification was not required prior to the issuance of the ESP. A Section 401 certification from the State of Tennessee is required prior to issuance of a construction permit, and any conditions of the CWA Section 401 certification would be incorporated into the license pursuant to 10 CFR 50.54(aa). This certification must also be obtained before USACE would issue a CWA Section 404 permit.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Terrestrial habitats on the CRN Site and Associated Offsite Areas
    - Uplands
        - CRN Site
        - BTA
    - Terrestrial habitats on Other Offsite Areas
        - Offsite borrow areas
- Impacts to wildlife

- Management and mitigation measures
    - Extent of revegetation of temporarily disturbed areas

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Terrestrial Ecosystems
    - Upland habitats within the associated offsite 161-kV transmission corridor
    - Wetlands on the CRN Site and associated offsite areas

The environmental impacts associated with this new and notable information are addressed in the following subsections.

4.3.1.1 Upland Habitats within the Associated Offsite 161-kV Transmission Corridor

ESPA ER Subsection 4.3.1.1 and NRC ESP FEIS Subsection 4.3.1.1.1 describe the potential impacts from building activities to the upland habitats of the CRN Site and associated offsite areas. TVA considered appropriate key inputs to the analysis of potential effects from building activities on upland habitats.

Table 4.3-1 presents habitat types potentially disturbed by development on the CRN Site. Areas of potential disturbance were calculated by overlaying the CRN-1 site utilization plan on the habitat maps that were updated in 2022 (TVA, 2022a). This table also compares the CRN-1 impact areas with the impact areas reported in the NRC ESP FEIS for the CRN Site and BTA. The areas of impact to habitats are displayed in Figure 4.3-1.

The extent of impacts from the associated offsite 161-kV transmission corridor represents new information because this corridor was not assessed in the NRC ESP FEIS. Although this transmission line requires a 120-foot-wide corridor, TVA has established a 280-foot-wide bounding analysis for the corridor as a conservative measure for considering potential effects. Based upon the bounding 280-foot-wide corridor, there would be approximately 29 acres of impact to various habitats from development of the associated offsite 161-kV transmission corridor (Table 4.3-1). However, based upon final design of the 120-foot-wide corridor, it is likely that the affected area would be limited to approximately half this total (15 acres).

Most of the potential impact area within the 280-foot-wide offsite corridor would be permanent conversion of forested habitats to herbaceous and/or shrub/scrub vegetation (approximately 25 out of 29 acres). TVA would use targeted herbicide applications or mechanical means to maintain herbaceous vegetation in the 161-kV transmission corridor. Approximately 12.7 acres of the potentially affected area is important deciduous calcareous upland and wetland forest that contains state-listed plant species, rigid sedge, and pale green orchid (see Subsection 4.3.1.4). However, TVA would minimize impacts by designing the offsite transmission line to avoid the species and their habitat to the greatest extent possible. TVA transmission engineers would consult with the TVA botanist during design to consider the habitat early in the process. TVA

would consider additional avoidance measures once a final transmission route is determined. Furthermore, TVA has expanded the Grassy Creek HPA by approximately 14 acres to include the area where rigid sedge and pale green orchid occur to provide additional protection.

TVA intends to manage the vegetation within the transmission corridors in accordance with TVA's *Transmission System Vegetation Management Final Programmatic Environmental Impact Statement* (TVA, 2019) only when and if a court of competent jurisdiction dissolves the *Sherwood* injunction, and with *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2022b). Permanent impacts within areas subject to clearing result from the conversion of forested cover types to emergent wetland, herbaceous, and shrub/scrub cover types. Such areas would continue to exhibit some habitat functions typical of such communities, but at a reduced functional capacity (Scott et al., 1990).

In consideration of the supplemental information summarized above, TVA determined that the information related to the associated offsite 161-kV transmission corridor is new and results in impacts to upland habitats. However, TVA will avoid and minimize effects to these resources during detailed design based on a narrower 120-foot-wide corridor.

4.3.1.2 Wetlands on the CRN Site and Associated Offsite Areas

ESPA ER Subsection 4.3.1.2 and NRC ESP FEIS Subsection 4.3.1.1.2 describe the potential impacts of building activities to the wetland habitats of the CRN Site and associated offsite areas. TVA considered appropriate key inputs to the analysis of potential effects from plant construction on wetland habitats.

Impacts to wetlands were not resolved in the ESP proceeding because ESP-006 does not authorize construction, and jurisdictional determinations by USACE and TDEC were not required prior to issuance. TVA requested jurisdictional determinations from USACE and TDEC on May 23, 2023. In response, TDEC determined that all identified wetland features fall under state jurisdiction. On April 9, 2025, the USACE provided a letter documenting its preliminary jurisdictional determination and approved jurisdictional determination (USACE, 2025). For project planning purposes, TVA has assumed that all identified wetlands affected by building CRN-1 at the CRN Site are jurisdictional.

TVA identified new information, including a CRN-1 site utilization plan that delineates building impact areas in the project area. The CRN-1 site utilization plan was overlaid on the updated wetlands map created from field delineations to quantify impacts of building CRN-1 to wetlands on the CRN Site and associated offsite areas (Table 4.3-2).

4.3.1.2.1 CRN Site

As shown in Table 4.3-2, the total area of impact from building activities on wetlands on the CRN Site is estimated to be approximately 9.2 acres, which is notably greater than the 1.2 acres of wetland impacts reported in the NRC ESP FEIS. The approximately 9.2 acres of impact represent about 0.7 percent of the total acreage of wetlands within the 6-mile vicinity (see Table 2.2-1), suggesting a minor reduction in wetlands in the surrounding landscape. Mitigation

for wetland fill and forested wetland conversion would be provided to compensate for this loss of wetland function in compliance with applicable water regulatory permitting. BMPs would also be implemented, including those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2022b), the *Tennessee Erosion and Sediment Control Handbook* (TDEC, 2012), the project-specific SWPPP, and site-specific Integrated Pollution Prevention Plan (IPPP).

4.3.1.2.2 Barge and Traffic Area

As shown in Table 4.3-2, the total area of impact from building activities on wetlands in the BTA is estimated to be approximately 1.7 acres, which is notably greater than the 0.6 acres of wetland impacts reported in the NRC ESP FEIS. The approximately 1.7 acres of impact represent approximately 0.1 percent of the total acreage of wetlands within the 6-mile vicinity (see Table 2.2-1), suggesting a minor reduction in wetlands in the surrounding landscape. However, as discussed above for wetlands impacts on the CRN Site, the nature and magnitude of wetland impacts would be determined using specific plans for development in the BTA, and compensatory mitigation will be developed in consultation with the USACE or TDEC, and BMPs will be implemented to avoid and minimize impacts.

4.3.1.2.3 Associated 161-kV Offsite Transmission Corridor

Approximately 3.6 acres of wetlands, about 2.9 acres of which are forested, are located within the associated offsite 161-kV transmission corridor (Table 4.3-1) and will be avoided to the extent practicable. Permanent impacts within areas subject to clearing result from the conversion of forested cover types to emergent and shrub/scrub cover types. These areas would continue to exhibit wetland functions typical of such communities, but at a reduced functional capacity (Scott et al., 1990).

Post-building impacts would also be reduced in a manner consistent with TVA's *Transmission System Vegetation Management Final Programmatic EIS* (TVA, 2019) and subsequent environmental reviews, and only when and if a court of competent jurisdiction dissolves the *Sherwood* injunction. As these wetlands contain state-listed plant species, management and conservation of those populations are considered in tandem with impacts. Wetlands and other sensitive biological resources are protected by conducting field surveys prior to vegetation management to allow for hand clearing and selective spraying, as well as other methods, as directed by TVA BMPs.

4.3.1.2.4 Summary of Impacts to Wetlands

In summary, building CRN-1 results in direct and indirect impacts to approximately 14 acres of wetlands in the project area. Fill activities result in loss of wetlands, and partially filled wetlands result in loss or reduced quality of the impacted wetlands. Temporarily filled wetlands incur direct impacts during building activities and indirect impact post-building until the wetlands are restored to pre-existing function. Forested wetlands converted to emergent wetlands within the proposed transmission corridor incur effects related to a change in wetland function. Overall wetland impacts are relatively small and not notable on a regional scale. Additionally, unavoidable impacts to wetlands would be mitigated in accordance with Section 404 and 401 of the CWA as

required by both USACE and TDEC permitting requirements. With restoration and mitigation requirements in place that ensure no net loss of wetland function, impacts to wetlands are considered minor.

This new information provides confirmation that there would be a minor reduction in wetland habitat in relation to the surrounding landscape. The nature and magnitude of wetland impacts are contingent on finalization of facility design, specific plans for development in the BTA, and any compensatory mitigation that may be imposed by the USACE or TDEC. In addition, BMPs would be implemented, including those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2022b), the *Tennessee Erosion and Sediment Control Handbook* (TDEC, 2012), the project-specific SWPPP, and site-specific IPPP.

Because wetland impacts are substantially increased relative to those included in the NRC ESP FEIS, and because TVA is assuming all wetlands within the project area are jurisdictional, TVA determined that the supplemental information regarding wetlands updating that which was previously included in the ESPA ER and NRC ESP FEIS is notably different from that used to prepare the NRC ESP FEIS. However, in consideration of restoration and compensatory mitigation requirements in place that ensure no net loss of wetland function, the overall environmental impact does not change from that previously documented.

4.3.1.3 Terrestrial Habitats on Other Offsite Areas - Other Transmission Corridors

NRC ESP FEIS Subsection 4.3.1.1.1 considered potential effects to up to 210 acres of herbaceous and shrub/scrub habitat that would be temporarily disturbed beyond the CRN Site by installation of the proposed 69-kV underground line within the existing Watts Bar Nuclear Plant – Bull Run FP 500-kV corridor. However, the development of the 69-kV transmission line is not necessary to support operation of CRN-1 and is no longer being considered by TVA as part of the CRN-1 project. Because the effects of the offsite 69-kV transmission line previously considered in the NRC ESP FEIS are no longer relevant, TVA has concluded that the effects to terrestrial habitat are reduced from that previously included in the ESPA ER and NRC ESP FEIS and are notably different from that used to prepare the NRC ESP FEIS.

4.3.1.4 Important Terrestrial Species and Habitats

ESPA ER Subsection 4.3.1.5 and NRC ESP FEIS Subsection 4.3.1.3 describe the potential impacts from building activities to the important terrestrial species and habitats of the CRN Site and associated offsite areas. TVA considered appropriate key inputs to the analysis of potential effects from building CRN-1 on important terrestrial species and habitats.

TVA identified new information related to changes in the federal listing status and addition of several species pursuant to the ESA and the results of recent terrestrial plant and wildlife surveys within the project area.

4.3.1.4.1 Federally Listed and Rare Wildlife Species

As described in Subsection 2.4.1, new information for important terrestrial species includes changes in the federal listing status of several species pursuant to the ESA. Since publication of the NRC ESP FEIS, the northern long-eared bat has been reclassified as endangered under the ESA, and the tricolored bat has been proposed to be listed as endangered. Although the listing status of both the northern long-eared bat and tricolored bat has changed, potential impacts to these species, described in Subsection 4.3.1.3 and Appendix M of the NRC ESP FEIS, remain the same and would be subject to consultation requirements under Section 7 of the ESA. Because the northern long-eared bat and the tricolored bat were documented on the CRN Site in 2011 and the tricolored bat was documented near the site in 2021 (TVA, 2022a), both of these species may be present in the project area.

New information available since publication of the NRC ESP FEIS also includes the delineation of potentially suitable summer roosting habitat and the detection of gray bats and tricolored bats on and in the vicinity of the CRN Site in 2021 (TVA, 2022a; TVA, 2023b). A cave used by these bat species for roosting and/or hibernation was identified across the Reservoir in 2021 on TVA Reservoir Land. The presence of tricolored bats was also detected in several other caves located on the Grassy Creek HPA (TVA, 2022a). Potential noise-related indirect impacts to bats within these caves will be addressed in conjunction with consultation with the USFWS and through implementation of conservation measures, as appropriate. Removal of forested habitats that serve as potentially suitable summer roosting and foraging habitats in the project area could affect travel corridors for listed bat species, as discussed in Subsection 4.3.1.3.2 of the NRC ESP FEIS.

In addition, the monarch butterfly has been proposed for listing as a threatened species under the ESA and has the potential to occur in the project area. Potentially suitable herbaceous and shrub/scrub foraging habitat for the monarch butterfly could be affected by building activities (Table 4.3-1). However, the potentially suitable habitat is only present in scattered pockets across the CRN-1 project area, and this loss represents a fraction of the herbaceous, pasture, and shrub/scrub habitats (over 16,000 acres) available within the 6-mile vicinity (see Table 2.2-1). TVA will implement sustainability practices during building of CRN-1 that include development of pollinator habitats. Therefore, impacts to this species are expected to be minor, and proposed actions would not jeopardize the continued existence of the monarch butterfly.

The eastern hellbender is now a proposed endangered species under the ESA. It was previously addressed in the PEIS as a state-listed species. A record of this species from 1989 exists within 3 miles of the proposed activities. Due to the age of the record, it is categorized as "possibly historical" in the TVA Regional Natural Heritage database. The USFWS Eastern Hellbender Species Status Assessment (USFWS 2024c) indicates that eastern hellbenders are likely functionally or presumed extirpated in the reach of the Reservoir that is adjacent to the proposed actions. Due to the lack of extant populations of eastern hellbender near the CRN Site, proposed actions would not jeopardize the continued existence of the species.

A recent query of the Information for Planning and Consultation website identified the whooping crane as potentially occurring in the project area (USFWS, 2023), and this species was not evaluated in the NRC ESP FEIS. However, this species is federally listed as a non-essential experimental population in this region. Foraging habitat for this species does not occur in the project area, and this species is not known to breed in the State of Tennessee. Building CRN-1 would not jeopardize the existence of the whooping crane.

TVA considered appropriate key inputs to the analysis of potential effects from building activities on important wildlife species. New information was identified and evaluated related to changes in the federal listing status of several species pursuant to the ESA and the results of recent terrestrial plant and wildlife surveys within the project area. This new information confirms that the impacts to important wildlife species remain similar to impacts reported in the NRC ESP FEIS and avoidance and minimization of impacts are subject to Section 7 consultation with the USFWS.

4.3.1.4.2 Rare Plant Species

As described in Subsection 2.4.1, new information available since publication of the NRC ESP FEIS includes the discovery of three important state-listed plant species (spreading false-foxglove, pale green orchid, and rigid sedge) during 2021 field surveys within the expanded project area. Spreading false-foxglove was observed in steep calcareous deciduous forest associated with bluffs along the Reservoir. Rigid sedge and pale green orchid were observed in a calcareous deciduous forested wetland within the associated offsite 161-kV transmission corridor just south of Bear Creek Road (see Figure 2.4-2 in Subsection 2.4.1; TVA, 2021; TVA, 2022a). Building CRN-1 potentially affects the habitats that support these rare plant species and potential impacts to these important habitats are discussed in Subsection 4.3.1.4.3.

Approximately 0.8 acre of spreading false foxglove habitat could be affected by building activities. However, most of this habitat is on steep terrain associated with bluffs adjacent to the Reservoir and, therefore, is not likely to be directly affected by building activities. If the population were directly impacted, overall impacts to the species would not be substantial because spreading false-foxglove has been observed in at least 70 locations in the State of Tennessee and eliminating a single occurrence would not jeopardize the status of the species in the state (TVA, 2022a).

Rigid sedge and pale green orchid occur just south of Bear Creek Road within an area of calcareous wetland potentially affected by the associated offsite 161-kV transmission corridor (see Figure 2.4-2 in Subsection 2.4.1). A specific corridor has not been determined, but a future transmission line alignment could impact one or both species. However, TVA will avoid or minimize effects on these resources during detailed design based on a 120-foot corridor. While the pale green orchid is known to occur in about 20 locations within the State of Tennessee, rigid sedge has only been documented in one other location in the state. Therefore, elimination or substantial degradation of this habitat would substantially impact rigid sedge in the State of Tennessee. To minimize impacts to rigid sedge and pale green orchid habitat, TVA transmission engineers will consult with TVA botanists during design of the offsite 161-kV transmission line to facilitate avoidance. With implementation of environmental commitments, building CRN-1 is not

expected to impact populations of rigid sedge or pale green orchid. Furthermore, TVA has expanded the Grassy Creek HPA by approximately 14 acres to include the area where these species occur to provide additional protection for these species.

4.3.1.4.3 Important Habitats

ESPA ER Subsection 2.4.1.1.1 describes an approximately 1.4-acre disturbed cedar glade habitat that is present in the existing 161-kV transmission corridor in the south-central portion of the CRN Site. TVA overlaid the CRN-1 site utilization plan on the recently delineated plant community maps and determined that building CRN-1 removes about 1.9 acres (rather than 1.4 acres) of disturbed cedar glade habitat in the transmission corridor and approximately 3.6 acres of newly identified disturbed cedar glade habitat located near the proposed intake area of the CRN Site (see Figure 2.4-2 in Subsection 2.4.1). Though the CRN Site contains several native species found in cedar glade habitats, the small size of these disturbed glade habitats, the high level of previous disturbance, and the absence of rare plant species typical of glades limits the conservation value of these two cedar glade habitats.

In addition, approximately 12.7 acres of calcareous deciduous upland forest and forested wetland habitats are present within the 240-foot-wide corridor for the associated offsite 161-kV transmission line just south of Bear Creek Road (see Figure 2.4-2 in Subsection 2.4.1), which contain state-listed rigid sedge and pale green orchid. As discussed in Subsection 4.3.1.4.2, TVA will avoid or minimize effects to these calcareous deciduous forest and forested wetland habitats during detailed design based on a narrower 120-foot-wide corridor, and TVA has expanded the Grassy Creek HPA by approximately 14 acres to provide additional protection to this important habitat.

There is also an approximately 7.3-acre area of calcareous deciduous forest on the CRN Site that is associated with bluffs along the Reservoir (see Figure 2.4-2 in Section 2.4) that contains spreading false-foxglove, which is designated a plant species of special concern by the State of Tennessee. Approximately 0.8 acre of this important habitat could be affected by building activities. However, most of this habitat is on steep terrain adjacent to the Reservoir and is not likely to be directly affected by building activities.

4.3.1.5 Management and Mitigation Measures

The following subsections describe management and mitigation measures that TVA will implement for CRN-1.

4.3.1.5.1 Natural Resource Sustainability Management

TVA will implement sustainability measures while building CRN-1 that include development of pollinator habitats and other sustainable development and land management policies in association with a site biodiversity plan that will be prepared in accordance with TVA's Biodiversity Policy. TVA's commitment to implement natural resource sustainability management on the CRN Site is more detailed and notably different from that used to prepare the NRC ESP FEIS.

4.3.1.5.2 Wetland Mitigation

TVA will implement a wetland and stream mitigation plan in accordance with USACE and TDEC requirements. Mitigation consists of replacing impacted aquatic functions by creation, restoration, or improvements to streams and wetland habitat elsewhere within the landscape. To achieve this functional replacement, compensatory mitigation typically is conducted through either credit purchase from existing mitigation banks, credit purchase from an in-lieu fee program, or provision of permittee responsible mitigation. A mitigation bank, in-lieu fee site, and permittee responsible mitigation generate mitigation credits based on functional lift to degraded aquatic resources. TVA will determine functional loss associated with proposed aquatic resource impacts and coordinate with the USACE and TDEC to ensure acquired mitigation credits suffice to compensate for unavoidable impacts.

As indicated in the NRC ESP FEIS, TVA would comply with required wetland mitigation measures determined for jurisdictional wetlands that could be affected by building and operating at the CRN Site. Furthermore, TVA would follow the State of Tennessee BMPs and TVA BMPs when working in wetlands (NRC and USACE, 2019). As such, the information is new but confirmatory of that used to prepare the NRC ESP FEIS and reflects wetland mitigation that is not notably different from that previously documented.

4.3.1.5.3 Avoidance and Minimization Measures for Listed Species

Proposed appropriate avoidance, minimization, and conservation measures are described in TVA's Biological Assessment submitted to USFWS in January 2025 and will be finalized during Section 7 consultation.

TVA will implement sustainability practices while building CRN-1 that include development of pollinator habitats to enhance habitat suitability for the monarch butterfly.

To minimize potential noise-related indirect impacts to bats within the caves located within a half-mile of construction activities that are used for summer roosting, transitional roosting, and as a winter hibernaculum for federally listed bats, TVA is consulting with the USFWS and will implement conservation measures, as appropriate.

TVA is consulting with USFWS under Section 7(a)(2) of the ESA regarding potential impacts to federally listed bats for construction and operation activities. Conservation measures, including removal of up to 250 acres of trees in winter (November 15 – March 31) to avoid nesting and roosting wildlife and installation of artificial bat roosting structures, would be implemented to minimize adverse impacts to bats. Additional avoidance and minimization measures would reduce or eliminate the potential for drilling and blasting to impact bats roosting in caves. Potential impacts to federally listed tree-roosting bats alongside existing corridors were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2), originally completed in April 2018 and updated in May 2023 (TVA, 2023c). For those activities with potential to affect federally listed bats, TVA committed to implementing specific conservation measures. With the use of avoidance, minimization, and conservation measures, there would likely be no major impacts to threatened and endangered species.

The final corridor has not been determined, but a future transmission line alignment could impact one or both state-listed plant species (rigid sedge and pale green orchid) within the associated offsite 161-kV transmission corridor. However, TVA will avoid or minimize effects to rare plant species within the offsite 161-kV transmission corridor during detailed design. TVA would minimize impacts to rigid sedge and pale green orchid by designing the associated offsite 161-kV transmission line to avoid the species and their habitat to the greatest extent possible. TVA transmission engineers would consult with the TVA botanist during design to consider the habitat early in the process.

4.3.1.6 Summary of Impacts to Terrestrial Ecology

TVA identified new information related to the physical impacts of building CRN-1 to terrestrial habitats on the CRN Site and associated offsite areas, to wildlife including important species and habitats, and to terrestrial ecology management and mitigation practices. Based on the assessments of environmental impacts detailed above, TVA's consultation with appropriate regulatory agencies, and TVA's commitments to avoid, minimize, and mitigate impacts to terrestrial resources including wetlands and important species and habitats within the associated 161-kV offsite transmission corridor, the impacts of building activities on terrestrial ecology are MODERATE.

The impact of building CRN-1 on terrestrial ecology is MODERATE and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.3.2 Aquatic Ecology

ESPA ER Subsection 4.3.2 and NRC ESP FEIS Subsection 4.3.2 describe potential impacts from building CRN-1 to aquatic ecology of the CRN Site and associated offsite areas. The NRC ESP FEIS did not identify any issues regarding aquatic ecology that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Aquatic ecology of the Reservoir
- Mitigative measures for unavoidable impacts

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Aquatic ecology
    - Streams and ponds on the CRN Site and associated offsite areas
    - Offsite transmission corridors

The environmental impacts associated with this new and notable information are addressed in the following subsection.

4.3.2.1 Streams and Ponds on the CRN Site and Associated Offsite Areas

ESPA ER Subsection 4.3.2 and NRC ESP FEIS Subsection 4.3.2.1.1 describe the potential impacts from building activities to the streams and ponds on the CRN Site and associated offsite areas. The NRC ESP FEIS did not identify any issues related to streams and ponds that were not resolved.

Building impacts to perennial and intermittent onsite and associated offsite aquatic habitats are updated based on the CRN-1 site utilization plan. Approximately 3,586 lineal feet of streams and 2,694 lineal feet of WWCs on the CRN Site and in associated offsite areas are permanently impacted by building. Aquatic habitats onsite within streams and ponds are limited. Mitigative measures required by TDEC and USACE guidelines will be used to minimize impacts to streams and ponds onsite and in associated offsite areas. Building activities on the CRN Site and in associated offsite areas do not result in notable ecological impacts on aquatic species or communities. Therefore, impacts to aquatic ecosystems in onsite streams and ponds are minor.

As described in Subsection 4.2.1, TVA will minimize and compensate for impacts to jurisdictional waters and will implement a wetland and stream mitigation plan in accordance with USACE and TDEC requirements that will provide compensation for related losses in aquatic habitat resulting from building CRN-1.

TVA identified new information regarding impacts to onsite streams and ponds. The impact of building CRN-1 on streams and ponds is SMALL and is the same as in the NRC ESP FEIS.

4.3.2.2 Offsite Transmission Corridors

ESPA ER Subsection 4.3.2 and NRC ESP FEIS Subsection 4.3.2.1.1 describe the potential impacts from building to the streams and ponds associated with offsite transmission corridors. The NRC ESP FEIS did not identify any issues related to aquatic ecology in offsite transmission corridors that were not resolved. TVA identified new information related to the CRN-1 offsite transmission corridors.

The development of the 69-kV transmission line is not necessary to support operation of CRN-1 and is not included as part of building CRN-1. Impacts to aquatic ecosystems associated with building the 69-kV transmission line will not occur as a part of the associated building activities. Because the NRC ESP FEIS previously considered the effects of the 69-kV transmission line, TVA has concluded that the reduced effects to aquatic ecosystems from the development of the offsite 69-kV transmission line are notable and reflect an environmental impact that is reduced from that previously documented.

4.3.2.3 Summary of Impacts on Aquatic Ecology

TVA considered appropriate key inputs to the analysis of potential effects from building CRN-1 on aquatic ecosystems. New information was identified and evaluated related to aquatic ecology within streams and ponds of the CRN Site and associated offsite areas, offsite transmission corridors, the Reservoir, and compensatory mitigation measures for unavoidable impacts.

Based on the assessments of environmental impacts detailed above, TVA's consultation with appropriate regulatory agencies, and TVA's commitments to avoid, minimize, and mitigate impacts to aquatic resources, the impacts of building activities on aquatic ecology are SMALL.

The impact of building CRN-1 on aquatic ecology is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

Table 4.3-1 Habitat Types Potentially Disturbed by Development on the CRN Site, BTA, and Proposed Offsite 161-kV Transmission Corridor Compared to Impact Areas Reported from the NRC ESP FEIS
(Sheet 1 of 3)

Location/Habitat/Land Cover Type	Approximate Acreage Permanently Affected		Approximate Acreage Temporarily Affected		Total Acreage Affected	
	2019 NRC ESP FEIS[3]	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]
CRN Site						
Mixed Evergreen-Deciduous Forest	106	183.9	90	6.6	196	190.5
Deciduous Forest	53	94.5	19	5.7	72	100.2
Herbaceous Vegetation	152	157.1	41	0.7	193	157.8
Evergreen Forest	3	13.8	17	0.9	20	14.7
Emergent Herbaceous Wetlands	0.3	1.3	0	0.0	0.3	1.3
Woody Wetlands	0.9	7.2	0	0.6	0.9	7.9
Roads/Developed Areas	13	8.0	0	0.1	13	8.1
Ponds/Open Water	0	0.9	0	0.0	0	1.0
Shrub/Scrub	0	0.0	0	0.0	0	0.0
Barren	0	0.0	0	0.0	0	0.0
CRN Site Subtotal[2]	**327**	**466.7**	**167**	**14.6**	**494**	**481.4**
CRN Site Total Forest	162	299.4	126	13.8	289	313.2
CRN Site New Transmission Corridor Forest Conversion	-	83.4	-	0	-	83.4

Table 4.3-1 Habitat Types Potentially Disturbed by Development on the CRN Site, BTA, and Proposed Offsite 161-kV Transmission Corridor Compared to Impact Areas Reported from the NRC ESP FEIS
(Sheet 2 of 3)

Location/Habitat/Land Cover Type	Approximate Acreage Permanently Affected		Approximate Acreage Temporarily Affected		Total Acreage Affected	
	2019 NRC ESP FEIS[3]	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]
Offsite BTA						
Mixed Evergreen-Deciduous Forest	0	0.0	0	0.0	0	0.0
Deciduous Forest	9	9.1	14	1.6	23	10.7
Herbaceous Vegetation	1	3.5	1	0.4	2	3.9
Evergreen Forest	0	0.0	0	0.0	0	0.0
Emergent Herbaceous Wetlands	0.6	0.9	0	0.3	0.6	1.2
Woody Wetlands	-	0.5	0	0.0	-	0.5
Roads/Developed Areas	20	2.4	0	0.1	20	2.5
Ponds/Open Water	0	0.0	0	0.0	0	0.0
Shrub/Scrub	0	4.6	0	0.4	0	5.0
Barren	0	0.8	0	0.0	0	0.8
BTA Subtotal[2]	**30**	**21.8**	**15**	**2.9**	**45**	**24.6**
BTA Total Forest	9	9.6	14	1.6	23	11.2

Table 4.3-1 Habitat Types Potentially Disturbed by Development on the CRN Site, BTA, and Proposed Offsite 161-kV Transmission Corridor Compared to Impact Areas Reported from the NRC ESP FEIS
(Sheet 3 of 3)

Location/Habitat/Land Cover Type	Approximate Acreage Permanently Affected		Approximate Acreage Temporarily Affected		Total Acreage Affected	
	2019 NRC ESP FEIS[3]	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]	2019 NRC ESP FEIS	Updated Habitat Map[1]
Associated Offsite 161-kV Corridor						
Mixed Evergreen-Deciduous Forest	-	15.7	-	0.0	-	15.7
Deciduous Forest	-	6.0	-	0.0	-	6.0
Herbaceous Vegetation	-	2.3	-	0.0	-	2.3
Evergreen Forest	-	0.0	-	0.0	-	0.0
Emergent Herbaceous Wetlands	-	0.7	-	0.0	-	0.7
Woody Wetlands	-	2.9	-	0.0	-	2.9
Roads/Developed Areas	-	0.4	-	0.0	-	0.4
Ponds/Open Water	-	0.0	-	0.0	-	0.0
Shrub/Scrub	-	1.2	-	0.0	-	1.2
Barren	-	0.0	-	0.0	-	0.0
Offsite 161-kV Corridor Subtotal[2]	-	**29.2**	-	**0.0**	-	**29.2**
Offisite161-kV Corridor Total Forest	-	24.6	-	0.0	-	24.6
Total[2] (All Areas)	357	517.7	182	17.5	539	535.2

1) Table 4.3-1 presents a more refined representation of vegetation/land cover types than the National Land Cover Database land cover data presented in Section 2.1, Table 2.2-1. Dominant vegetation communities and other land cover types on the CRN Site, BTA, and 161-kV corridor were drawn in Geographic Information System based on aerial photographs and information from TVA field surveys and mapping.
2) Column totals may not equal sum of individual values due to rounding.
3) Wetlands were not differentiated from other habitat types in Table 5-2 of the NRC ESP FEIS; therefore, areas of wetlands shown from the NRC ESP FEIS do not contribute to column totals.

Note: - = no data available

Table 4.3-2 Impacts to Wetlands Delineated in the Project Area in 2021 and 2023 (Sheet 1 of 3)

Wetland ID	Wetland Type[1]	TRAM Category[2]	Delineated Wetland Size (Acres)	Impact Type[3]	Wetland Impact Area (Acres)
CRN Site					
W001	PFO1E	Moderate	6.86	Permanent	0.39
				Temporary	0.48
W002	PEM1E	Low	0.11	Permanent	0.11
W003	PFO1E	Moderate	1.71	Permanent	1.44
				Temporary	0.05
W004	PEM/PSS1E	Low	0.10	Permanent	0.10
W007	PEM/PUBHx	Low	0.23	Permanent	0.23
				Temporary	0.00
W008	PFO1E	Low	0.94	Permanent	0.15
				Temporary	0.05
W009	PFO1E	Low	0.17	Permanent	0.17
W010	PFO1E	Moderate	0.36	Permanent	0.36
W011	PEM/PSS1E	Low	0.48	Permanent	0.48
W012	PEM1E	Low	0.07	Permanent	0.07
W013	PEM1E	Low	0.13	Permanent	0.13
W014	PEM1E	Low	0.15	Permanent	0.15
W015	PFO1E	Moderate	0.35	Permanent	0.29
				Temporary	0.06
W017	PFO1E	Low	0.23	Permanent	0.23
New Onsite Transmission Corridor					
W006	PFO1E	Moderate	0.29	Conversion	0.08
W008	PFO1E	Low	0.94	Conversion	0.11
W019	PFO1E	Exceptional	5.70	Conversion	1.09
W020a	PFO1E	Moderate	2.48	Conversion	2.13
W020b	PFO1E	Moderate	0.18	Conversion	0.18
W021	PFO1E	Low	0.68	Conversion	0.61
				CRN Site Total[4]	**9.15**

Table 4.3-2 Impacts to Wetlands Delineated in the Project Area in 2021 and 2023 (Sheet 2 of 3)

Wetland ID	Wetland Type[1]	TRAM Category[2]	Delineated Wetland Size (Acres)	Impact Type[3]	Wetland Impact Area (Acres)
Associated Offsite Areas					
Barge and Traffic Area (Potential Limits of Disturbance)					
W031	PEM1E	Low	0.02	Permanent	0.01
W032	PEM1E	Low	0.02	Permanent	0.02
W033	PEM1E	Low	0.13	Permanent	0.13
				Temporary	0.01
W034	PFO1E	Moderate	0.03	Permanent	0.03
W035a	PEM/SS1E	Low	0.13	Permanent	0.13
W035b	PEM/SS1E	Low	0.22	Permanent	0.10
				Temporary	0.10
W035c	PEM/SS1E	Low	0.01	Permanent	0.01
W035d	PEM1F	Low	0.07	Permanent	0.03
				Temporary	0.04
W036a	PEM/SS1E	Moderate	2.60	Permanent	0.15
				Temporary	0.07
W036b	PEM/SS1E	Moderate	0.02	Permanent	0.01
W036c	PFO1E	Moderate	2.07	Permanent	0.38
				Temporary	0.01
W036d	PFO1E	Moderate	0.10	Permanent	0.02
				Temporary	0.02
W037	PEM1F	Low	0.94	Permanent	0.06
				Temporary	0.08
W038	PFO1E	Low	0.08	Permanent	0.03
				Temporary	0.02
W039	PSS1E	Low	0.20	Permanent	0.20
W040	PEM1F	Moderate	0.11	Permanent	0.02
				Temporary	0.03
			Barge and Traffic Area Total[4]		**1.69**

Table 4.3-2 Impacts to Wetlands Delineated in the Project Area in 2021 and 2023 (Sheet 3 of 3)

Wetland ID	Wetland Type[1]	TRAM Category[2]	Delineated Wetland Size (Acres)	Impact Type[3]	Wetland Impact Area (Acres)
161-kV Offsite Transmission Corridor					
W022	PFO1E	Low	0.38	Conversion	0.38
W023	PFO1E	Low	0.08	Conversion	0.08
W024	PFO1E	Low	0.08	Conversion	0.08
W025	PFO1E	Moderate	0.96	Conversion	0.96
W026	PFO1E	Moderate	1.44	Conversion	1.44
W027a	PEM/PFO1E	Moderate	0.53	Temporary	0.53
W027b	PEM1E	Moderate	0.13	Temporary	0.13
				161-kV Transmission Corridor Total[4]	**3.60**
				Grand Total[4]	**14.45**

Source: TVA, 2021, 2022a, and 2023d

1) Classification codes as defined in Cowardin et al., 1979: E = seasonally flooded/saturated; F = semi-permanently flooded; H = permanently flooded; P = Palustrine; EM1 = emergent, persistent vegetation; FO1= forested, broad-leaved deciduous vegetation, seasonally flooded/saturated; SS1= scrub-shrub, broad-leaved deciduous vegetation; UB = unconsolidated bottom; x = excavated.
2) TRAM Category as defined by TDEC, 2017: Low = low resource value; Moderate = moderate resource value; Exceptional = exceptional waters.
3) Permanent = permanent loss of wetland habitat; Temporary = temporary loss of habitat during building; Conversion = permanent loss of forested land cover and conversion to herbaceous and scrub shrub habitats within transmission corridor.
4) Column total may not equal sum of individual values due to rounding.

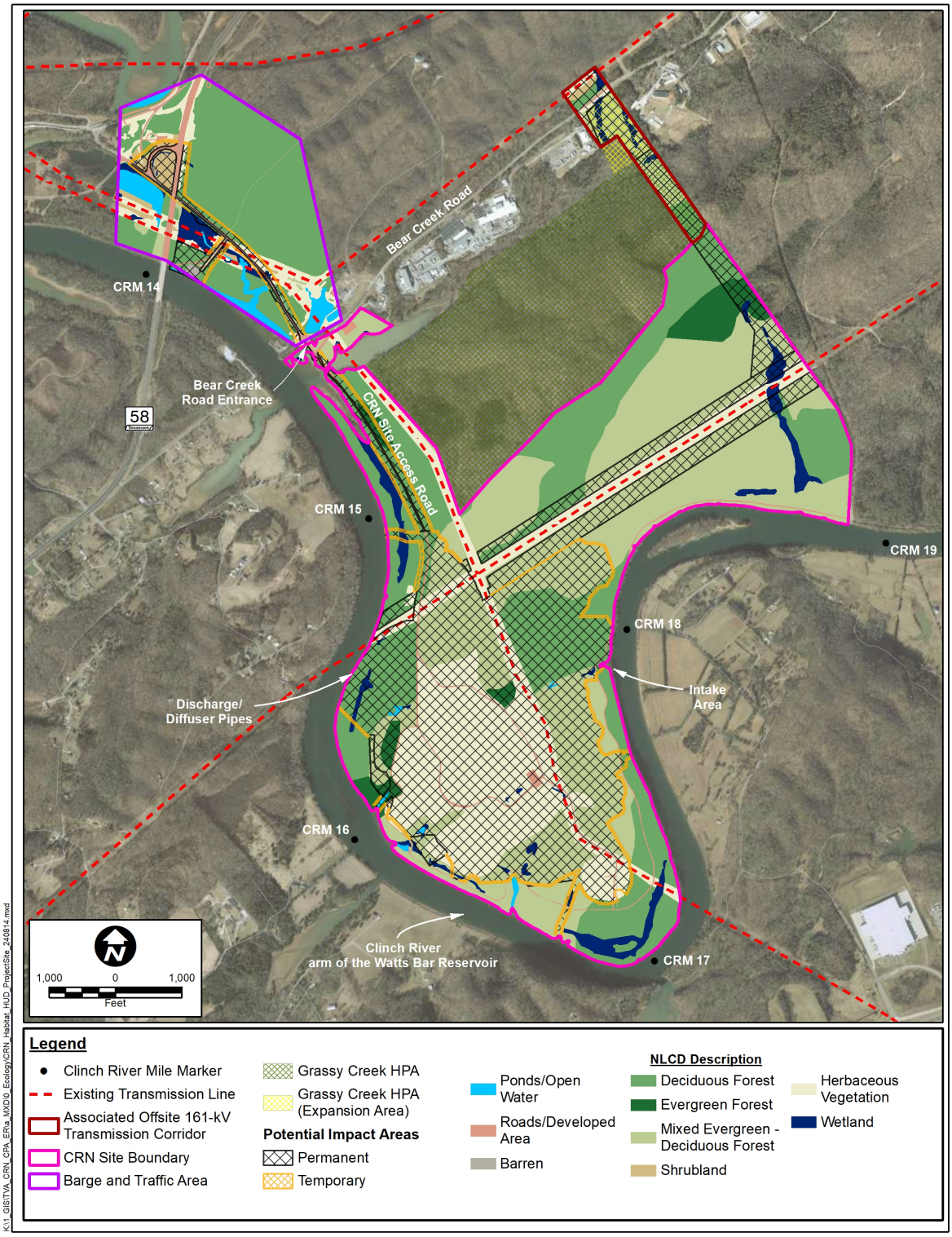


Figure 4.3-1 Building Impact Areas Overlaid on Terrestrial Habitats and Wetlands

4.4 SOCIOECONOMICS

ESPA ER Section 4.4 and NRC ESP FEIS Sections 4.4 and 4.5 describe potential impacts to socioeconomics resulting from building a new nuclear power plant at the CRN Site. This section describes impacts to socioeconomics that could result from building CRN-1. Subsection 4.4.1 addresses physical impacts, Subsection 4.4.2 addresses demographics, Subsection 4.4.3 address economic impacts to the community, and Subsection 4.4.4 addresses infrastructure impacts to the community.

4.4.1 Physical Impacts

ESPA ER Subsection 4.4.1 and NRC ESP FEIS Subsection 4.4.1 describe the physical impacts of building activities on the community. The NRC ESP FEIS did not identify any issues regarding physical impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Noise emissions (see Section 4.7)
- Air quality emissions (see Section 4.6)

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Aesthetics

The environmental impacts associated with this new and notable information are addressed in the following subsection.

4.4.1.1 Aesthetics

ESPA ER Section 4.4.2.6 and NRC ESP FEIS Section 4.4.1.4 describe the potential impacts to aesthetics from building activities. TVA considered appropriate key inputs to the analysis of potential effects from building activities on aesthetics.

TVA identified new information related to building the expanded barge unloading area and a new 161-kV transmission line.

Building activities result in an additional impact to approximately 5 acres of shoreline habitat in conjunction with the expanded barge unloading area. Clearing of established vegetation in vicinity of this area results in aesthetic viewshed impacts from the Reservoir and Tennessee State Route 58. However, shoreline vegetation along much of the perimeter of the CRN Site and the BTA remains and provides an undisturbed zone of vegetation of varying width that represents a visual buffer from building activities occurring within the central portion of the project site.

New information also expands the area of visual impacts on the CRN Site associated with the new 161-kV transmission line because building this new transmission line is partially located within the existing 500-kV corridor and partially in a new transmission corridor running north towards and across Bear Creek Road passing through the Grassy Creek HPA. Aesthetic impacts from building this transmission line are primarily limited to the presence of construction workers and associated equipment within the corridor and on nearby roadways. Building the transmission line results in a minor discord in the aesthetic environment due to an increase in personnel and equipment which would disrupt the undisturbed nature of the Grassy Creek HPA. While the Grassy Creek HPA is not a recreational resource, construction workers and equipment within the associated offsite 161-kV transmission line are visible by travelers on Bear Creek Road. Because existing transmission lines are present within the area and on the CRN Site, building the new 161-kV transmission line would be noticeable but would not significantly alter the visual landscape or the viewshed from Bear Creek Road.

TVA identified new information related to aesthetics. The impact of building CRN-1 on aesthetics is SMALL to MODERATE and is the same as in the NRC ESP FEIS. Therefore, the information related to physical impacts from building is "new, but not significant."

4.4.2 Demography

ESPA ER Subsections 4.4.2 and 4.4.3 and NRC ESP FEIS Subsection 4.4.2 and Section 4.5 describe the demographic impacts of building activities on the community. The NRC ESP FEIS did not identify any issues regarding demographic impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- In-migration of peak construction workforce and their families
- Adverse physical and environmental effects on identified minority or low-income populations
- Adverse socioeconomic effects on identified minority or low-income populations

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on demography is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.4.3 Economic Impacts to the Community

ESPA ER Subsections 4.4.2.2 and 4.4.2.4 and NRC ESP FEIS Subsection 4.4.3 describe the economic impacts of building activities on the community. The NRC ESP FEIS identified the following issues that were not resolved:

- Information regarding the cost of the proposed project was not available at the ESP stage.
- Distribution of expenditures across localities and the expected sales of goods with associated sales tax were not known at the ESP stage.
- Estimates of impact-related payments in-lieu of taxes were not available, as they are based on estimated costs of the proposed project.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Income and employment attributable to building activities.

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Construction expenditures
- Tax revenue

The environmental impacts associated with this new and notable information are addressed in the following subsections.

4.4.3.1 Construction Expenditures

Because TVA did not assume any cost values in the ESPA ER, the NRC ESP FEIS estimated the economic impacts that might be expected using a range of potential costs based on a dollar amount ($5,000 to $7,000 [2010 dollars]) per kilowatt (electrical) (kWe) and the assumption that for SMRs, 87 percent of the costs are allocated for offsite modular manufacturing and the remaining 13 percent are allocated for onsite installation of the units. Based on these assumptions, adjusted to 2016 dollars, it was estimated that a plant with the bounding capacity of 800 megawatt electric (MWe) would cost approximately $4.1 to $5.8 billion, of which $533 to $728 million would be expected to be spent locally (NRC and USACE, 2019).

TVA's current cost estimates for the manufacturing and building of CRN-1 are based on the results of a DOE report that concludes that as of 2023, overnight capital costs for first-of-a-kind advanced nuclear power plants are estimated to range from approximately $6,000 to $10,000 per kWe (DOE, 2023). Applying this range of potential costs per kWe to CRN-1, which has a nominal power output of approximately 300 MWe, results in an estimated cost of approximately $1.8 to $3.0 billion. Utilizing the same Energy Policy Institute estimates (EPI, 2010) as the NRC ESP FEIS (i.e., 87 percent of the costs for SMRs are allocated for offsite modular manufacturing and the remaining 13 percent are allocated for onsite installation of the units), approximately $234 to

$390 million of the total cost is expected to be spent locally in association with site preparation and onsite installation. While these costs are less than the estimates from the NRC ESP FEIS, the locally obtained materials and supplies still have a relatively minor but beneficial economic effect on the Region of Influence (ROI), consisting of Anderson, Knox, Loudon, and Roane Counties.

4.4.3.2 Tax Revenue

The NRC ESP FEIS noted that while TVA is not subject to sales tax, some local expenditures related to construction materials and supplies could potentially be subject to sales and use taxes. Distribution of expenditures across localities and the expected sales of goods with associated sales tax were not known during the ESP proceeding, but the NRC ESP FEIS expected that sales tax revenues from project purchases would be minimal. The State of Tennessee imposes a 7.0 percent base sales tax (Tennessee Department of Revenue, 2023a). If all local expenditures (approximately $234 to $390 million, per Subsection 4.4.3.1) were subject to sales and use taxes, the maximum impact to state sales tax revenues would be $27.3 million over the course of the six-year building period, an average of $4.6 million per year. However, because TVA's direct purchases are not subject to sales tax, the tax revenues from project purchases are expected to be minimal in relation to statewide sales tax revenue, which totaled approximately $13.8 billion in fiscal year 2022-2023 (Tennessee Department of Revenue, 2023b). The local expenditures associated with building CRN-1 are less than those described in the NRC ESP FEIS, and associated impacts to state sales tax revenue are beneficial, but minimal.

As described in the NRC ESP FEIS, per Tennessee Code Annotated 67-9-101(a)(3), the State of Tennessee allocates three percent of the tax equivalent payments it receives from TVA to impacted local governing areas where TVA construction on facilities to produce electric power is taking place. These funds can be used by counties to address impacts on county services. Estimates of these impact-related payments were not available at the ESP stage. However, the NRC ESP FEIS expected that the additional payments to the counties of the ROI would be minimal in relation the other existing revenue streams.

An estimate of payments that will be made within the ROI associated with building CRN-1, by county, cannot be calculated at this time. The allocation of impact payments will be determined by the State of Tennessee after TVA notifies the state that TVA has initiated major construction activities at the CRN Site. Impact payments are minimal when compared to the total amount of taxes collected within the ROI.

4.4.3.3 Summary of Economic Impacts to the Community

TVA determined that the supplemental information regarding economic impacts of building activities on the community is notably different from that used to prepare the NRC ESP FEIS. The economic impact of building CRN-1 on the community is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.4.4 Community Infrastructure Impacts

ESPA ER Subsection 4.4.2.7 and NRC ESP FEIS Subsection 4.4.4 describe the impacts of building activities on infrastructure and community services. The NRC ESP FEIS did not identify any issues related to community infrastructure impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Planned access to the site via roadways and rail
- Impacts to recreation from in-migrating workforce population and building activities
- Impacts to housing and public services from in-migrating workforce population

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impacts of building CRN-1 on community infrastructure are SMALL (in-migrating construction workforce) and MODERATE to LARGE (traffic) and are the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.5 HISTORIC AND CULTURAL RESOURCES

ESPA ER Subsection 4.1.3 and NRC ESP FEIS Section 4.6 describe potential impacts from building a new nuclear power plant to historic and cultural resources on the CRN Site and associated offsite areas. This section describes the impacts to historic and cultural resources that could result from building CRN-1.

The NRC ESP FEIS did not identify any issues regarding historic and cultural resource impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new and notable information regarding the following:

- Location of ground disturbing activities on the CRN Site and BTA
- Offsite construction activities

This new and notable information is addressed in the following subsections.

4.5.1 Location of Ground Disturbing Activities on the CRN Site and BTA

New information related to the location of ground-disturbing activities includes the land disturbance for CRN-1 shown in Figure 4.5-1. NRC ESP FEIS subsection 4.6.1 states that building-related ground-disturbing activities could impact an unknown number of the 16 potentially National Register of Historic Places (NRHP)-eligible archaeological resources, one NRHP-eligible archaeological resource, and deeply buried archaeological deposits located within the onsite direct-effects Area of Potential Effect (APE) (TVA et al., 2016). ESPA ER subsection 4.1.3 states that six of these potentially NRHP-eligible archaeological sites (40RE107, 40RE595,

40RE549, 40RE104, 40RE105, and 40RE138) and one NRHP-eligible site (40RE233) could be impacted by building activities. As discussed in Subsection 2.5.3, two of these sites (40RE107 and 40RE595) were determined to be not eligible for the NRHP in 2023.

Ground disturbance activities that could affect archaeological sites include clearing, grading, and installation of transmission tower foundations on the CRN Site and associated transmission corridors and potential roadway improvements to the Bear Creek Road Ramp in the BTA. As shown on Figure 4.5-1, the CRN-1 project could impact five potentially NRHP-eligible archaeological sites (40RE108, 40RE166, and 40RE167 on the CRN Site and 40RE138 and 40RE232 in the BTA) and one NRHP-eligible site (40RE233 in the BTA). Although site 40RE108 is within the CRN-1 disturbance area, the CRN-1 site utilization plan avoids the two sensitive areas described in Subsection 2.5.3. TVA will avoid impacts by setting up brightly colored construction fencing surrounding both sensitive areas and indicating sensitive areas on project plans. TVA will train construction personnel on the need to avoid the areas and their locations. If design plans change such that a sensitive cultural resource area of the site or a potentially NRHP-eligible archaeological site is to be disturbed, additional archaeological investigation would be needed to better ascertain whether the sensitive area would contribute to the resource's overall eligibility for inclusion in the NRHP under Criterion D.

The remaining potentially impacted sites, 40RE232 and 40RE233, [ ]$^{(a)(3)}$ Roadway improvements for CRN-1 are dependent on final design planning in conjunction with the Tennessee Department of Transportation, City of Oak Ridge, and DOE. TVA does not expect to disturb these sites. If design plans change such that these sites would be disturbed, additional archaeological investigation would be required and would be conducted in accordance with the stipulations of the 2016 *Programmatic Agreement between TVA, Tennessee State Historic Preservation Office, and the United Keetoowah Band of Cherokee Indians in Oklahoma regarding the management of historic properties affected by the Clinch River SMR Project* (2016 Clinch River SMR Programmatic Agreement [PA]).

As noted in the NRC ESP FEIS, as project plans are finalized, the number of historic and cultural resources impacted by construction could change and would be addressed in accordance with the 2016 Clinch River SMR PA. For any potentially eligible or undetermined sites that would be physically affected by building CRN-1, TVA will follow the stipulations of the 2016 Clinch River SMR PA, which includes phase II testing for potentially NRHP-eligible sites to confirm eligibility (TVA et al., 2016). Additionally, the 2016 Clinch River SMR PA stipulates the steps that TVA will take to make any needed changes to the APE as project plans develop. These steps include identifying historic properties in the APE; evaluating the project's potential effects on historic properties; and seeking ways to avoid, minimize, or mitigate adverse effects on historic properties (TVA et al., 2016).

TVA determined that the information regarding impacts to NRHP-eligible and NRHP-potentially eligible archaeological sites is updated from that previously included in the ESPA ER and NRC ESP FEIS and is notably different from that used to prepare the NRC ESP FEIS.

4.5.2 Offsite Construction Activities

The NRC ESP FEIS also considered the potential impacts on historic and cultural resources located in offsite areas from associated project activities, including a new 69-kV underground transmission line within an existing TVA transmission corridor onsite and right-of-way offsite, upgrades and reconductoring of existing TVA transmission lines beyond the interconnect at Bear Creek Road, offsite borrow area developments, and installation of a flow bypass at the MHH. With the exception of the associated offsite 161-kV transmission line that will interconnect with the existing 161-kV transmission line across Bear Creek Road on DOE property, these other offsite activities are not included in the CRN-1 project scope, and therefore do not impact historic properties. As discussed in Subsection 2.5.3.2, TVA conducted a phase I survey of the associated offsite 161-kV transmission corridor and did not identify any archaeological sites.

TVA determined that the information regarding potential impacts on historic and cultural resources located in offsite areas is updated from that previously documented in the ESPA ER and NRC ESP FEIS and is notably different from that used to prepare the NRC ESP FEIS.

4.5.3 Summary of Impacts on Historic and Cultural Resources

TVA considered appropriate key inputs to the analysis of potential effects from building CRN-1 on historic and cultural resources. New information was identified and evaluated related to the disturbance areas for CRN-1 and the BTA that reflects a reduced impact to archaeological sites on the CRN Site and the BTA. New information was also evaluated regarding the elimination of project elements associated with offsite transmission lines and the MHH bypass, which were evaluated in the ESPA ER but are not within the scope of the CRN-1 project. Elimination of these project elements results in correspondingly reduced effects on historic and cultural resources. The supplemental information is new relative to that used to prepare the NRC ESP FEIS and reflects an environmental impact that is notably different.

Based on the above assessments of environmental impacts and TVA's commitments to comply with the terms of the 2016 Clinch River SMR PA and to avoid, minimize, and mitigate impacts as described above, the impacts of building activities on historic and cultural resources are SMALL.

TVA determined, based on the new information, that the impact of building activities on historic and cultural resources is SMALL, which differs from the impact determination of the NRC ESP FEIS of MODERATE to LARGE. Therefore, this information is determined to be "new and significant."

[

]$^{(a)(3)}$

Figure 4.5-1 Potentially NRHP-Eligible and NRHP-Eligible Archaeological Sites within the CRN-1 Disturbance Area

4.6 AIR RESOURCES

ESPA ER Subsection 4.4.1.2 and NRC ESP FEIS Section 4.7 describe impacts from odors, fugitive dust, and air pollution due to building at the CRN Site. The impacts of air pollution from construction equipment and vehicular traffic are addressed in Section 4.9.

The NRC ESP FEIS did not identify any issues regarding odors and fugitive dust that were not resolved.

Having implemented the process described in Section 1.8, TVA did not identify new information related to impacts on air quality from building. Therefore, impacts on air quality are SMALL and are the same as in the NRC ESP FEIS.

4.7 NONRADIOLOGICAL HEALTH

ESPA ER Section 4.7.7 and NRC ESP FEIS Section 4.8 describe nonradiological health impacts resulting from building a new nuclear power plant at the CRN Site. This section describes the nonradiological health impacts that could result from building CRN-1.

The NRC ESP FEIS did not identify any issues regarding nonradiological health impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Construction worker injuries
- Noise levels at sensitive noise receptors
- Traffic-related accidents

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impacts of building CRN-1 on nonradiological health are SMALL for all categories with the exception of noise (MODERATE) and are the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.8 RADIOLOGICAL HEALTH

ESPA ER Section 4.5 and NRC ESP FEIS Section 4.9 evaluate potential radiological impacts to construction workers at the CRN Site. This section describes the potential radiological impacts on workers at the CRN Site during building of CRN-1.

The NRC ESP FEIS did not identify any issues regarding radiological health impacts to construction workers that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new and notable information related to:

- Number of existing operating plants adjacent to the project building site

The ESPA ER and NRC ESP FEIS describe potential radiological impacts on construction workers for several possible reactor designs at the CRN Site, including scenarios in which multiple units are sequentially installed, exposing construction workers to effluent from functioning reactors during building of subsequent units. This Construction Permit Application evaluates the building and operation of CRN-1. During building of CRN-1, there are no operating plants on or adjacent to the project site. Thus, construction workers are not exposed to radioactive materials or effluent from operating reactors at the site. At certain times during building, TVA would receive, possess, and use specific radioactive material in support of building. These sources of low-level radiation, which have very specific uses under controlled conditions, result in a negligible contribution to construction worker dose.

The impact of building CRN-1 on radiological health is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.9 NONRADIOACTIVE WASTE MANAGEMENT

ESPA ER Subsections 4.1.1.1, 4.2.1.1.2, 4.2.2, 4.4.1.2, and 4.4.2.7 and NRC ESP FEIS Section 4.10 describe the environmental impacts of nonradioactive waste to land, water, and air during building. The NRC ESP FEIS did not identify any issues regarding nonradioactive waste management that were not resolved.

This section evaluates potential environmental impacts of nonradiological waste management.

Nonradioactive waste systems are described in Subsection 3.2.5.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Handling and disposal of underwater excavation material
- Handling and disposal of nonradioactive solid waste from building activities
- Stormwater handling at the CRN Site
- Excavation dewatering for the onsite quarry
- Capacity of sanitary treatment facility
- Emissions from building activities for the plant area associated with the operation of motor vehicles and engines
- Emissions from quarry operations
- Haul road information (paved/unpaved and length)

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on nonradiological waste management is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

4.10 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING BUILDING

ESPA ER Section 4.6 and NRC ESP FEIS Section 4.11 describe measures and controls to limit adverse impacts during building. NRC ESP FEIS summarizes overall impacts of building. The NRC ESP FEIS did not identify any issues regarding measures and controls to limit adverse impacts during building that were not resolved.

This section describes adverse environmental impacts associated with building CRN-1 and delineates measures and controls to limit these adverse impacts.

Having implemented the process described in Section 1.8, TVA identified new information regarding the evaluation of measures and controls to limit adverse impacts during building. The new information is confirmatory of that used to prepare the NRC ESP FEIS.

4.11 REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetland and Deepwater Habitats of the United States. Washington, D.C.: U.S. Fish and Wildlife Publication FWS/OBS-79/31.

Dewitz, J., and U.S. Geological Survey (USGS), 2021. National Land Cover Database 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release, doi:10.5066/P9KZCM54, Website: https://www.mrlc.gov, accessed June 2023.

DOE. See U.S. Department of Energy.

Energy Policy Institute (EPI), 2010. Economic and Employment Impacts of Small Modular Nuclear Reactors, Boise, Idaho. ADAMS Accession No. ML18023A166, June 1, 2010.

Federal Emergency Management Agency (FEMA), 2023. Flood Insurance Rate Map 47145C0120F, September 28, 2007, and 4745C0140G, November 18, 2009, Website: https://hazards-fema.maps.arcgis.com/apps/webappviewer, accessed July 5, 2023.

NRC. See U.S. Nuclear Regulatory Commission.

Scott, M.L., B.A. Kleiss, W.H. Patrick, and C.A. Segelquist, 1990. The Effect of Developmental Activities on Water Quality Functions of Bottomland Hardwood Ecosystems: The Report of the Water Quality Workgroup. As reported in: Gosslink, J.G. et al. (1990) Ecological processes and cumulative impacts: illustrated by bottomland hardwood wetland ecosystems/edited. Lewis Publishers, Chelsea, Michigan.

Tennessee Department of Environment and Conservation (TDEC), 2012. Tennessee Erosion & Sediment Control Handbook, A stormwater Planning and Design Manual for Construction Activities fourth edition, August 2012, Website: https://www.tn.gov/content/dam/tn/tdot/documents/TDEC_Erosion_and_Sediment_Control_Handbook.pdf, accessed November 9, 2023.

TDEC, 2017. Tennessee Rapid Assessment Method for Wetlands. TDEC Division of Water Resources Natural Resources Unit, Nashville, Tennessee.

Tennessee Department of Revenue, 2023a. Sales and Use Tax, Website: https://www.tn.gov/revenue/taxes/sales-and-use-tax.html, accessed December 15, 2023.

Tennessee Department of Revenue, 2023b. 2022-2023 Annual Report, Website: https://www.tn.gov/content/dam/tn/revenue/documents/pubs/Annual%20Report%202023.pdf, accessed December 15, 2023.

Tennessee Valley Authority (TVA), 2009. Watts Bar Reservoir Land Management Plan, Website: https://www.tva.com/environment/environmental-stewardship/land-management/reservoir-land-management-plans/watts-bar-reservoir-land-management-plan, accessed May 19, 2023.

TVA, 2019. Transmission System Vegetation Management, Final Programmatic Environmental Impact Statement. August 2019.

TVA, 2021. *Clinch River Small Modular Reactor Study Area – Wetland Assessment Technical Report*. Prepared by Britta Lees, Biological Compliance Wetland Biologist. July 15, 2021.

TVA, 2022a. Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement, Website: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/clinch-river-nuclear-site-advanced-nuclear-reactor-technology-park, accessed January 23, 2023.

TVA, 2022b. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4. Edited by S.T. Benefield, R.L. Brannon, J.C. Buttram, B.V. Dalton, G.D. Dalton, C.A. Henley, W.G. Martin, A.E. Masters, C.L. Phillips, C.A. Suttles, and R.C Wilson. Chattanooga, TN.

TVA, 2023a. CEC 50241 Clinch River Nuclear Site River Road Culvert Replacements. Prepared by TVA.

TVA, 2023b. National Reactor Innovation Center (NRIC) Demonstration Request for Concurrence (Project Code: 2023-0035599). January 31, 2023. U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office Concurrence dated April 28, 2023.

TVA, 2023c. Reinitiation of the Programmatic Biological Assessment for Evaluation of the Impacts of Tennessee Valley Authority's Routine Actions on Federally Listed Bats. Prepared by Tennessee Valley Authority, April 2023, Website: https://www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews, accessed November 9, 2023.

TVA, 2023d. Clinch River Nuclear Barge Landing Tract B – Wetland Assessment Technical Report. Prepared by Fallon Parker Hutcheon, Biological Compliance Wetland Biologist. December 7, 2023.

TVA, Tennessee State Historic Preservation Office (TNSHPO), and United Keetoowah Band of Cherokee Indians in Oklahoma, 2016. Programmatic Agreement Between the Tennessee Valley Authority and Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project. TVA, Knoxville Tennessee and TNSHPO, Nashville, Tennessee.

U.S. Department of Energy (DOE), 2023. Pathways to Commercial Liftoff: Advanced Nuclear. March 2023.

U.S. Fish and Wildlife Service (USFWS), 2023. Information for Planning and Consultation, Website: https://ipac.ecosphere.fws.gov, accessed January 4, 2023.

U.S. Army Corps of Engineers (USACE), 2025. File No. LRN-2014-00155, TVA; Jurisdictional Determination, Clinch River Nuclear Site, Oak Ridge, Roane County, Tennessee. April 2025.

U.S. Nuclear Regulatory Commission (NRC) and USACE, 2019. Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site. NUREG-2226, Volume 1, Washington, D.C., ADAMS Accession Number ML19073A099.

TABLE OF CONTENTS

CHAPTER 5 ENVIRONMENTAL IMPACTS FROM OPERATION OF THE PROPOSED PLANT 5-1

5.1 LAND USE 5-1

5.2 WATER RESOURCES 5-2

5.2.1 Hydrologic Alterations 5-2

5.2.2 Water Use Impacts 5-3

5.2.3 Water Quality Impacts 5-3

5.3 ECOLOGICAL RESOURCES 5-9

5.3.1 Terrestrial Ecosystem Impacts 5-9

5.3.2 Aquatic Ecosystem Impacts 5-10

5.4 SOCIOECONOMICS 5-11

5.4.1 Physical Impacts 5-11

5.4.2 Demographic Impacts 5-12

5.4.3 Economic Impacts to the Community 5-13

5.4.4 Infrastructure and Community Services 5-14

5.5 HISTORIC AND CULTURAL RESOURCES 5-15

5.6 AIR RESOURCES 5-16

5.7 NONRADIOLOGICAL HEALTH 5-16

5.8 RADIOLOGICAL HEALTH DURING NORMAL OPERATION 5-17

5.9 NONRADIOACTIVE WASTE MANAGEMENT 5-17

5.9.1 Impacts to Land 5-18

5.9.2 Impacts to Water 5-18

5.9.3 Impacts to Air 5-18

5.9.4 Summary of Nonradioactive and Mixed Waste Impacts 5-18

TABLE OF CONTENTS

5.10 ENVIRONMENTAL IMPACTS OF POSTULATED ACCIDENTS 5-18

5.10.1 Design Basis Accidents 5-19

5.10.2 Severe Accidents 5-19

5.10.3 Severe Accident Mitigation Alternatives 5-20

5.10.4 Transportation Accidents 5-20

5.10.5 Summary of Postulated Accident Impacts 5-21

5.11 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING OPERATION 5-21

5.12 REFERENCES 5-21

LIST OF FIGURES

Figure 5.2-1 Two-Dimensional Modeled Discharge Plume for Summer Low-Flow Conditions 5-6

Figure 5.2-2 Two-Dimensional Modeled Discharge Plume for Winter Conditions with Average and Extreme Plant Temperature Rise 5-7

CHAPTER 5 ENVIRONMENTAL IMPACTS FROM OPERATION OF THE PROPOSED PLANT

Chapter 5 presents the potential environmental impacts of operating the GE Hitachi Nuclear Energy BWRX-300 small modular reactor (SMR) at the Clinch River Nuclear (CRN) Site, hereafter referred to as CRN-1.

The impacts of operations documented in NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's Early Site Permit Application (ESPA) for the CRN Site are incorporated by reference for key inputs for which no new information was identified and for which new information pertaining to CRN-1 was determined to be confirmatory of the analyses contained in the NRC ESP FEIS. The comprehensive analyses of environmental impacts of operating CRN-1 incorporate a consideration of key inputs and analyses associated with new and notable information for each resource.

This chapter is divided into the following sections:

- Land Use (Section 5.1)
- Water Resources (Section 5.2)
- Ecological Resources (Section 5.3)
- Socioeconomics (Section 5.4)
- Historic and Cultural Resources (Section 5.5)
- Air Resources (Section 5.6)
- Nonradiological Health (Section 5.7)
- Radiological Health during Normal Operation (Section 5.8)
- Nonradioactive Waste Management (Section 5.9)
- Environmental Impacts of Postulated Accidents (Section 5.10)
- Measures and Controls to Limit Adverse Impacts During Operation (Section 5.11)
- References (Section 5.12)

5.1 LAND USE

The CRN Site ESPA Environmental Report (ER) Section 5.1 and the NRC ESP FEIS Section 5.1 describe land use impacts at the CRN Site and associated offsite areas resulting from plant operation. The NRC ESP FEIS identified one issue that was not resolved for land use impacts regarding specific upgrades (reconductor, uprate, or rebuild) required to modify the existing Tennessee Valley Authority (TVA) transmission system that would receive power from the proposed CRN Site. Offsite transmission upgrades are addressed in Subsection 3.2.6.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Land occupied by permanent uses and presence of remaining land on CRN Site as buffer land
- Cooling tower fogging, icing, and salt deposition effects on nearby land

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on land use is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.2 WATER RESOURCES

ESPA ER Sections 5.2 and 5.3 and NRC ESP FEIS Section 5.2 provide the assessment of water resource impacts resulting from plant operations. This section describes water-related impacts that could result from operation of CRN-1. Subsection 5.2.1 addresses hydrologic alterations and Subsection 5.2.2 and Subsection 5.2.3 address water use impacts and water quality impacts, respectively.

5.2.1 Hydrologic Alterations

ESPA ER Section 5.2.1 and NRC ESP FEIS Subsection 5.2.1 describe the impacts from hydrologic alterations associated with operation of CRN-1.

5.2.1.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding hydrologic alterations of surface water that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Average and maximum total withdrawal rates from the cooling water intake structure
- Discharge of cooling water blowdown and plant systems wastewater
- Alterations in flow in the Reservoir
- Physical impacts of cooling water discharge

The new information regarding hydrologic alterations to surface water is confirmatory of that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on surface water hydrology is SMALL.

The NRC ESP FEIS did not make an impact determination for hydrologic alterations to surface water. Therefore, a new and significant information determination is not applicable.

5.2.1.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding hydrologic alterations of groundwater that were not resolved.

Having implemented the process described in Section 1.8, TVA did not identify new information related to groundwater hydrology. The impact of operating CRN-1 on groundwater hydrology is SMALL.

The NRC ESP FEIS did not make an impact determination for hydrologic alterations to groundwater. Therefore, a new and significant information determination is not applicable.

5.2.2 Water Use Impacts

ESPA ER Section 5.2.2 and NRC ESP FEIS Subsection 5.2.2 describe the impacts to water use associated with operation of CRN-1.

5.2.2.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding surface water use impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Operational phase water demand

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of building CRN-1 on surface water use is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.2.2.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding groundwater use impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA did not identify new information related to groundwater use. The impact of operating CRN-1 on groundwater use is SMALL and is the same as in the NRC ESP FEIS.

5.2.3 Water Quality Impacts

ESPA ER Section 5.2.2.2 and NRC ESP FEIS Subsection 5.2.3 describe the impacts to water quality associated with operation of CRN-1.

5.2.3.1 Surface Water

The NRC ESP FEIS did not identify any issues regarding surface water quality impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Impacts of cooling water system discharge on surface water quality in the Reservoir
  - Water quality effects of plant effluents
  - Physical water quality effects of plant discharge

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Thermal effects of plant discharge

The environmental impacts associated with this new and notable information are addressed in the following subsections.

5.2.3.1.1 Thermal Effects of Plant Discharge

The applicable temperature-related Tennessee water-quality criteria (Tennessee Department of Environment Conservation (TDEC) Rule 0400-40-03-.03(3)(e)) for the CRN Site discharge and include the following:

1. The maximum change in river water temperature (ΔT) caused by the effluent shall not exceed 3 degrees Celsius (°C) (5.4 degrees Fahrenheit [°F]) relative to an upstream control point.

2. The maximum river water temperature caused by the effluent shall not exceed 30.5°C (86.9°F).

3. The maximum water temperature-rate-of-change (TROC) in the river shall not exceed ±2°C per hour (±3.6°F per hour).

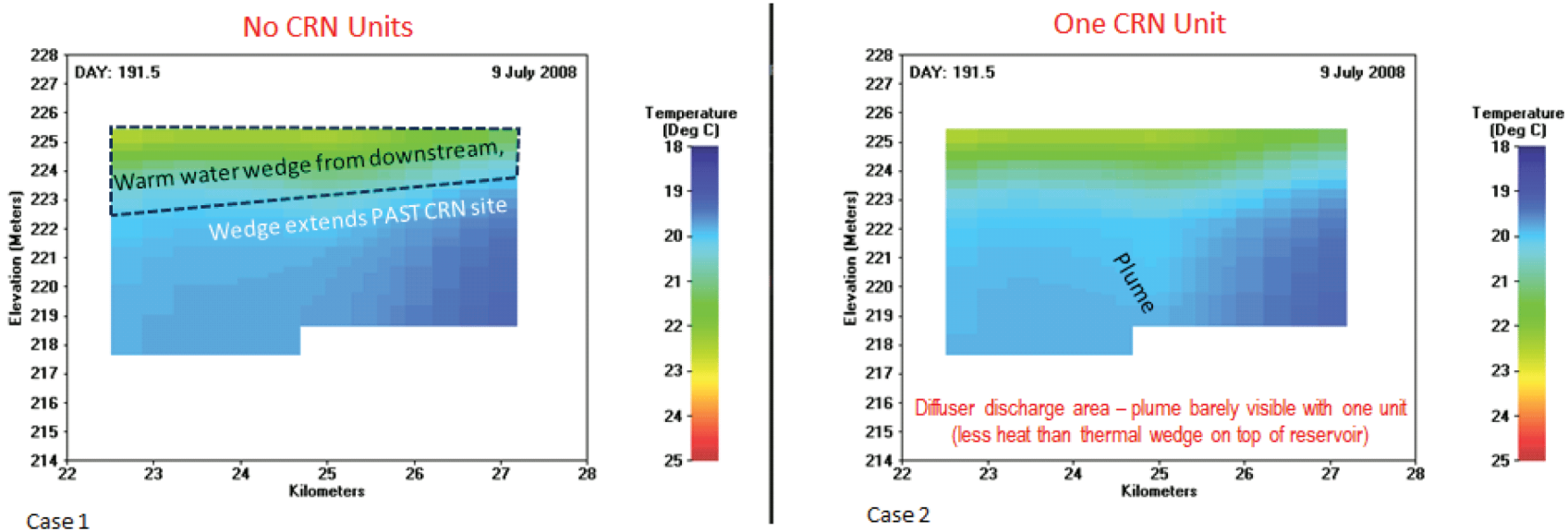
These criteria are required to be met at the edge of the plant discharge mixing zone are applicable at a depth of 5 feet and, which would be determined as part of the National Pollutant Discharge Elimination System (NPDES) permit along with any monitoring requirements. Additionally, TDEC (TDEC Rule 0400-40-03-.05(2)) requires that the mixing zone be restricted in area and length and not prevent the free passage of fish or cause aquatic life mortality in the receiving waters, among other requirements (TDEC, 2011).

As indicated in NRC ESP FEIS Subsection 5.2.3.1, prior hydrothermal modeling simulations determined that the addition of a Melton Hill Hydroelectric Dam (MHH) bypass to provide a steady downstream 400 cubic feet per second flow would improve thermal mixing. Modeling also determined that the discharge would meet the applicable water-quality criteria with a mixing zone about 150 feet in diameter.

TVA performed hydrothermal modeling to characterize the thermal impacts of operation of CRN-1 on the Reservoir. Specifically, hydrothermal impacts of operation within the Reservoir were modeled under differing flow scenarios, as flows within the Reservoir depend upon water releases from the MHH and the Fort Loudoun Hydroelectric (FLH) facilities.

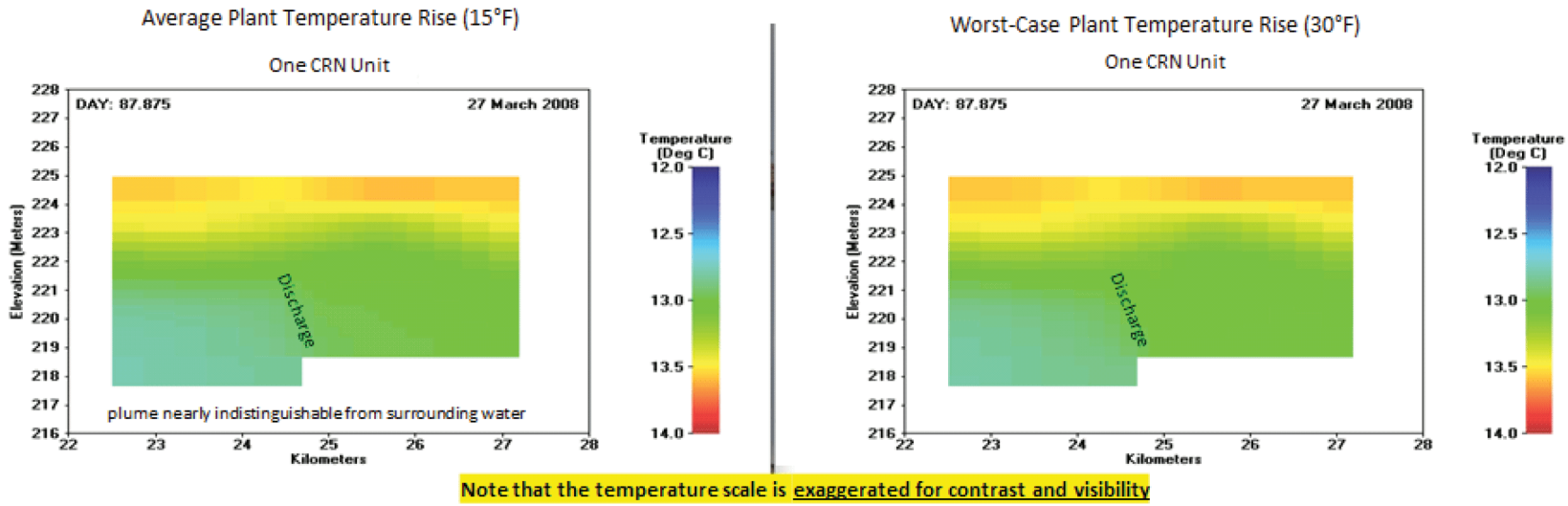
TVA produced a two-dimensional model using CE-QUAL-W2 (Version 4.1) that presents average temperatures at depth across a longitudinal centerline within the Reservoir. The CE-QUAL-W2 model was applied to the Reservoir by breaking it into a large number of "segments" that have length and vertical layers of one meter thickness. Initial modeling results are based upon monthly mean values and modeling runs using monthly maximum values (i.e., worst case extreme low-flow conditions). Both summer and winter conditions were modeled in addition to a range of release scenarios from MHH, and simulations represent actual operations of dams (TVA, 2023). Summer operations of MHH tend to result in extreme events for maximum river water temperature, ΔT and TROC, while winter operating conditions tend to lead to extreme events for ΔT and TROC (TVA, 2023). Extreme temperature events occur from displacing the upper end of a warm water pancake that naturally occurs in Watts Bar Reservoir and is present to various extents nearly year-round when MHH is not continuously operated.

The two-dimensional model results indicate that, in the summer months under low flow conditions, the discharge plume is not a major factor in thermal compliance (Figure 5.2-1). In the winter modeling runs, when the difference between the river temperature and the diffuser discharge temperature (i.e., the "excess" temperature) is larger than in the summer, model results indicate water temperature impacts from the operation of CRN-1 are negligible (Figure 5.2-2). Modeling runs did not indicate any potential temperature violation issues for CRN-1 operation. Based on the modeling analysis, no supplemental releases from MHH were needed to support thermal mixing, and therefore, the MHH bypass would not provide a thermal compliance benefit and the bypass would not be needed (TVA, 2023).



Source: TVA, 2023

Figure 5.2-1 Two-Dimensional Modeled Discharge Plume for Summer Low-Flow Conditions



Source: TVA, 2023

Figure 5.2-2 Two-Dimensional Modeled Discharge Plume for Winter Conditions with Average and Extreme Plant Temperature Rise

Additionally, mixing of the thermal discharge with the ambient river water was analyzed using CORMIX version 12.0GT (Black & Veatch, 2023). Mixing conditions are complex because of the flow characteristics of the Reservoir at the CRN-1 discharge location. At times conditions are stagnant due to zero discharge from MHH. At other times the flow reverses to an upstream direction (i.e., flow reversal) due to rising water levels further downstream in Watts Bar Reservoir due to releases from FLH.

CORMIX software simulations were made in both summer and winter operating conditions. CORMIX analyses assumed a flow condition velocity of 0.0 feet per second. The diffuser type selected is a unidirectional diffuser with all ports directed downstream and upward at an angle of 45°. Results of CORMIX modeling also indicated that, based on critical temperature values for representative important species and the rapid mixing of the diffuser, the zone of passage is effectively the entirety of the cross-sectional area of the Reservoir. Therefore, the thermal plume does not create a barrier to upstream or downstream movement of important fish species. As such, the distance of the thermal plume is less than the 150-foot mixing zone considered in the NRC ESP FEIS.

A thermal "pancake," of warm surface water, as described in Subsection 2.3.3.1, is present in the Reservoir. However, as described in the NRC ESP FEIS, the upstream location in the vicinity of the proposed intake was considered to exhibit only weak thermal stratification in the water column, suggesting that the water was well mixed at this location as a result of the inflow from MHH. The current characterization of a thermal pancake demonstrates a condition that is better understood as a more persistent thermal stratified condition. Sudden large releases from MHH in the summer may have the effect of pushing the upstream end of the thermal "pancake" downstream past the CRN Site, creating the potential for a TROC or a ΔT relative to ambient conditions in which the existing water quality (temperature) of the Reservoir exceeds water temperature compliance parameters (TVA, 2023).

Thermal effects of the discharge of CRN-1 are less than those estimated in the NRC ESP FEIS. However, the presence of a thermal pancake within the Reservoir results in a condition in which water temperature compliance parameters may be periodically exceeded. This condition is present in the Reservoir in the absence of CRN-1 and was noted in the NRC ESP FEIS as stratification within this section of the Reservoir. TVA will work with TDEC throughout the NPDES permitting process to establish appropriate permit conditions to support operation of CRN-1 to minimize impacts of the thermal discharge on the Reservoir. As such, the supplemental information reflects an impact analysis that is notably different from that previously documented.

TVA considered appropriate key inputs to the analysis of potential effects resulting from plant operation on groundwater quality. The information regarding groundwater quality is notably different from that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on groundwater quality is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.2.3.2 Groundwater

The NRC ESP FEIS did not identify any issues regarding groundwater quality impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA did not identify new information related to groundwater quality. The impact of operating CRN-1 on groundwater quality is SMALL and is the same as in the NRC ESP FEIS.

5.3 ECOLOGICAL RESOURCES

ESPA ER Subsection 5.6.1 and NRC ESP FEIS Subsection 5.3.1 describe the potential impacts related to terrestrial resources and wetlands from transmission system operation. Additionally, ESPA ER Subsection 5.3.3.2 and NRC ESP FEIS Section 5.3 describe impacts on terrestrial ecology resulting from plant operations. This section describes ecology-related impacts that could result from operation of CRN-1. Subsection 5.3.1 addresses terrestrial and wetland impacts and Subsection 5.2.3 addresses aquatic impacts.

5.3.1 Terrestrial Ecosystem Impacts

ESPA ER Subsections 5.3.3.2 and 5.6.1 and NRC ESP FEIS Subsection 5.3.1 describe potential impacts to ecological resources resulting from operating a new nuclear power plant at the CRN Site. This section describes impacts to terrestrial ecosystems that could result from operating CRN-1. Subsection 5.3.1.1 addresses impacts from transmission systems and Subsection 5.3.1.2 addresses non-transmission system impacts.

5.3.1.1 Transmission System Impacts

The NRC ESP FEIS identified one issue that was not resolved for transmission system impacts regarding specific upgrades (reconductor, uprate, or rebuild) required to modify the existing TVA transmission system that would receive power from the proposed CRN Site. Offsite transmission upgrades are addressed in Subsection 3.2.6.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Transmission corridor maintenance and vegetation management within terrestrial habitats

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.3.1.2 Non-Transmission System Impacts

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Cooling tower fogging, icing, and salt deposition effects on vegetation
- Vehicle traffic impacts on wildlife
- Avian collisions
- Noise-related impacts on wildlife

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Natural resources sustainability management

The environmental impacts associated with this new and notable information are addressed in the following subsection.

5.3.1.2.1 Natural Resource Sustainability Management

TVA will implement sustainability measures during operation of CRN-1 to include development of pollinator habitats and other sustainable development and land management policies in association with a site biodiversity plan that will be prepared in accordance with TVA's Biodiversity Policy. TVA's commitment to implement natural resource sustainability management on the CRN Site is more detailed and notably different from that used to prepare the NRC ESP FEIS.

5.3.1.3 Summary of Terrestrial Ecosystem Impacts

The impact of operating CRN-1 on terrestrial and wetland resources is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.3.2 Aquatic Ecosystem Impacts

ESPA ER Subsections 5.3.1.2 and 5.3.2.2 and NRC ESP FEIS Subsection 5.3.2 describe potential impacts to aquatic ecosystems resulting from operating a new nuclear power plant at the CRN Site. This section describes impacts to aquatic ecosystems that could result from operating CRN-1. Subsection 5.3.2.1 addresses impacts from transmission systems and Subsection 5.3.2.2 addresses non-transmission system impacts.

The NRC ESP FEIS did not identify any issues regarding aquatic ecosystem impacts that were not resolved.

5.3.2.1 Transmission System Impacts

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Transmission corridor maintenance and management within aquatic habitats

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.3.2.2 Non-Transmission System Impacts

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Withdrawal and consumption of water from the Reservoir
- Impingement and entrainment
- Impacts from discharges related to operation of the cooling water system

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.3.2.3 Summary of Aquatic Ecosystem Impacts

The impact of operating CRN-1 on aquatic ecosystems is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.4 SOCIOECONOMICS

ESPA ER Section 5.8 and NRC ESP FEIS Sections 5.4 and 5.5 describe the assessment of socioeconomic impacts resulting from plant operations. This section describes socioeconomic related impacts that could result from operation of CRN-1. Subsection 5.4.1 addresses physical impacts, Subsection 5.4.2 addresses demographic impacts, Subsection 5.4.3 addresses economic impacts, and Subsection 5.4.4 addresses community infrastructure impacts.

5.4.1 Physical Impacts

ESPA ER Subsection 5.8.1 and NRC ESP FEIS Subsection 5.4.1 describe the potential physical impacts on nearby communities or residents resulting from plant operations. The NRC ESP FEIS did not identify any issues regarding physical impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Noise levels at offsite sensitive noise receptors
- Air emissions at offsite residences and recreational facilities
- Effects of salt deposition from cooling tower drift on structures
- Operational effects on the transportation network

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Degradation in aesthetic quality of the viewshed

The environmental impacts associated with this new and notable information are addressed in the following subsection.

5.4.1.1 Degradation in Aesthetic Quality of the Viewshed

TVA considered appropriate key inputs to the analysis of potential effects resulting from plant operations on aesthetics.

TVA identified new information related to the operation of a new 161-kilovolt (kV) transmission line. This new information expands the area of visual intrusions on the CRN Site, as the associated offsite 161-kV transmission line is located within a new transmission corridor that extends north to Bear Creek Road. This corridor also passes through the Grassy Creek Habitat Protection Area (HPA) and TVA and U.S. Department of Energy (DOE)-managed land located outside the Grassy Creek HPA. The addition of new towers and cleared areas would result in a noticeable visual intrusion to sensitive areas in the Grassy Creek HPA and to travelers along Bear Creek Road.

The impact of operating CRN-1 on aesthetics is SMALL to MODERATE and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.4.2 Demographic Impacts

ESPA ER Subsections 5.8.2.1.1 and 5.8.3 and NRC ESP FEIS Subsection 5.4.2 and Section 5.5 describe the demographic impacts of plant operation. The NRC ESP FEIS did not identify any issues regarding demographic impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- In-migration of the operations workforce and their families
- Evaluation of disproportionately high and adverse health effects on identified minority or low-income populations
- Evaluation of disproportionately high and adverse physical and environmental effects on identified minority or low-income populations
- Evaluation of disproportionately high and adverse socioeconomic effect on identified minority or low income populations

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The demographic impacts of building CRN-1 is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.4.3 Economic Impacts to the Community

ESPA ER Subsections 5.8.2.2 and 5.8.2.4 and NRC ESP FEIS Subsection 5.4.3 describe the economic impacts of plant operation on the community. The NRC ESP FEIS identified the following issues regarding economic impacts to the community that were not resolved:

- An estimation of operating expenditures was not available at the ESP stage
- Estimates of tax revenue impacts expected in association with operations were not known at the ESP stage

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Income and employment attributable to operation activities

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Operation expenditures
- Tax revenue

The environmental impacts associated with this new and notable information are addressed in the following subsections.

5.4.3.1 Operation Expenditures

Because TVA did not provide an estimation of expenditures expected from operating SMR units in the ESPA ER, the NRC ESP FEIS estimated the economic impacts that might be expected using the Energy Information Administration's cost estimates for operating utility-scale generating plants (i.e., fixed operations and maintenance costs for advanced nuclear power plants average to $93.28 per kilowatt [kW] per year and variable operations and maintenance costs average $2.14 per kilowatt hour [kWh]). Based on these assumptions and the plant parameter envelope (PPE)-based output estimates (800 megawatts electric [MWe], with an average capacity factor of 95 percent), it was estimated that annual operating and maintenance costs would amount to $88.871 million (2012 dollars) if the plant were operating at the PPE output level. The NRC ESP FEIS also assumed that 50 percent of TVA's annual operation expenditures would be made in the Region of Influence (ROI), consisting of Anderson, Knox, Loudon, and Roane Counties, resulting in approximately $44.4 million per year in local expenditures made to local enterprises for labor and services. This assumption was based on the results of two studies which suggested that the region surrounding the DOE Oak Ridge Reservation has a larger nuclear-specialized labor and services sector than most areas surrounding nuclear facilities and that the ROI would be more likely to retain a larger proportion of a nuclear energy project's expenditures than other regions (NRC and USACE, 2019).

Cost estimates for the operation and maintenance of CRN-1 assume a full-time operations staff of 205 employees. Utilizing the same assumptions as the NRC ESP FEIS (i.e., 50 percent of TVA's annual operation expenditures would be made in the ROI), and are expected to be spent locally for labor and services. While these costs are less than the estimates from the NRC ESP FEIS due to the smaller workforce and lower electrical output of the proposed project, the locally obtained materials and supplies will have a relatively minor but beneficial economic effect on the ROI.

5.4.3.2 Tax Revenue

Tax revenue impacts expected in association with operations were not known during ESP proceedings. However, the NRC ESP FEIS concluded that the tax revenue from operations would have a negligible impact within the ROI given that the impacts from construction were minor relative to other sources of revenue available to the affected jurisdictions and that the revenue impacts expected from operations would be much smaller by comparison.

As noted in Subsection 4.4.3.2, the State of Tennessee imposes a 7.0 percent base sales tax. If all local expenditures (approximately $40.3 million annually, per Subsection 5.4.3.1) are subject to sales and use taxes, the maximum impact to state sales tax revenue is approximately $2.8 million per year. However, as TVA's direct purchases are not subject to sales tax, the tax revenues from project purchases are expected to be significantly lower and minimal in relation to both statewide and local sales tax revenue. Because the size of the operations workforce and local expenditures associated with CRN-1 are less than that described in the NRC ESP FEIS, associated impacts to sales tax revenue are beneficial, but minimal in relation to total tax revenue.

5.4.3.3 Summary of Economic Impacts to the Community

The economic impact of operating CRN-1 on the community is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.4.4 Infrastructure and Community Services

ESPA ER Subsection 5.8.2.7 and NRC ESP FEIS Subsection 5.4.4 describe the impacts of plant operation on community infrastructure and services. The NRC ESP FEIS did not identify any issues regarding infrastructure and community services that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Traffic increases on area roadways from commuting operations workforce
- Changes to the availability and experience of recreational resources
- Demand placed on housing and public services from in-migrating operations workforce

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The socioeconomic impacts of building CRN-1 are SMALL and MODERATE (recreation) and are the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.5 HISTORIC AND CULTURAL RESOURCES

ESPA ER Subsection 5.1.3 and NRC ESP FEIS Section 5.6 describe potential impacts from operation of a new nuclear power plant on the CRN Site on historic and cultural resources. The NRC ESP FEIS did not identify any issues regarding historic and cultural resources that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new and notable information related to:

- The *Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966*, executed in 2019 (Section 106 Programmatic Agreement [PA]), signed by the Alabama Coushatta Tribe of Texas, the Chickasaw Nation, Coushatta Tribe of Louisiana, Delaware Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Jena Band of Choctaw Indians, The Muscogee (Creek) Nation, Poarch Band of Creek Indians, The Seminole Nation of Oklahoma, Shawnee Tribe, Thlopthlocco Tribal Town, and United Keetoowah Band of Cherokee Indians in Oklahoma.

In 2019, TVA executed a PA with the Advisory Council on Historic Preservation, the State Historic Preservation Officers in the TVA Power Service Area, and federally recognized Indian tribes who have an interest in the TVA region that identifies routine, repetitive actions that can be excluded from further Section 106 review, as well as actions with low potential to affect historic properties for which, under specific circumstances, TVA may find, without further consultation, do not result in adverse effects on historic properties. In accordance with Section 106 of the National Historic Preservation Act (NHPA), its implementing regulations at 36 Code of Federal Regulation (CFR) Part 800.1-16, and the 2019 Section 106 PA, TVA will avoid, minimize, or mitigate potential operation-related impacts (TVA et al., 2019).

The impact of operating CRN-1 on historic and cultural resources is SMALL and is the same as in the NRC ESP FEIS. This conclusion is based on (1) TVA's ongoing consultation with federally recognized Indian tribes and the Tennessee State Historic Preservation Office, (2) TVA's federal cultural resource compliance responsibilities, (3) TVA's procedures and management plans that take into consideration impacts on cultural resources during operations, and (4) the 2019 Section 106 PA. Therefore, TVA determined that there will be no adverse effect on historic properties from operational activities and the information is determined to be "new, but not significant."

5.6 AIR RESOURCES

ESPA ER Subsection 5.8.1.2 and NRC ESP FEIS Subsection 5.7.1 describe the air quality effects of station operations and ESPA ER Subsection 5.3.3 describes the impact from visible plumes, ground fog and icing, plume shadowing, salt deposition, and interaction with other pollutant sources. NRC ESP FEIS Subsection 5.7.3 describes the transmission line impacts on air quality. This section addresses air quality impacts from the operation of CRN-1.

The NRC ESP FEIS identified one issue that was not resolved for transmission system impacts regarding specific upgrades (reconductor, uprate, or rebuild) required to modify the existing TVA transmission system that would receive power from the proposed CRN Site. Upgrades to the offsite transmission system are discussed in Subsection 3.2.6 of this document. Subsection 3.2.6 states that discussion of environmental impacts associated with offsite transmission line upgrades is not included in the Construction Permit Application (CPA) ER except as part of the analysis of impacts of the proposed action in conjunction with other reasonably foreseeable future actions in Chapter 7. The NRC ESP FEIS did not identify any additional issues regarding air-quality degradation that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Greenhouse gas and criteria pollutant emissions
- Emissions from cooling towers and auxiliary systems (including auxiliary boilers, diesel generators, gas turbines)
- Emissions from new transmission lines

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on air quality is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.7 NONRADIOLOGICAL HEALTH

ESPA ER Subsection 5.8.1 and NRC ESP FEIS Section 5.8 describe nonradiological health impacts on the public and workers. This section describes the nonradiological health impacts that could result from operation of CRN-1.

The NRC ESP FEIS identified one issue that was not resolved for transmission system impacts regarding specific upgrades (reconductor, uprate, or rebuild) required to modify the existing TVA transmission system that would receive power from the proposed CRN Site. Upgrades to the offsite transmission system required to support operation of CRN-1 are addressed in Subsection 3.2.6.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Etiological (disease-causing) agents
- Noise levels at sensitive noise receptors
- Occupational injuries
- Traffic-related accidents

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on nonradiological health is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.8 RADIOLOGICAL HEALTH DURING NORMAL OPERATION

ESPA ER Section 5.4 and NRC ESP FEIS Section 5.9 describe the radiological impact of normal operations. This section describes the radiological impacts of normal operation of CRN-1. Information regarding radioactive effluents is provided in Subsection 3.2.4. The NRC ESP FEIS determined that radiological impacts of normal operation would be SMALL.

The NRC ESP FEIS did not identify any issues regarding radiological health during normal operation that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Effluent source term
- Radiological environmental monitoring program

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS. The impact of operating CRN-1 on radiological health is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.9 NONRADIOACTIVE WASTE MANAGEMENT

ESPA ER Subsection 5.5.1 and NRC ESP FEIS Section 5.10 describe the impacts of nonradioactive waste to land, water, and air. The environmental impacts of mixed waste are described in ESPA ER Subsection 5.5.2 and NRC ESP FEIS Subsection 5.10.4. This section evaluates nonradioactive waste impacts that could result from operation of CRN-1. Nonradioactive waste systems are described in Subsection 3.2.5.

The NRC ESP FEIS did not identify any issues regarding nonradioactive waste management that were not resolved.

5.9.1 Impacts to Land

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Solid waste generation and existing available landfill capacity

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.9.2 Impacts to Water

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Nonradioactive liquid wastes generated during operations
  - Maximum expected concentrations for anticipated constituents in the cooling water systems blowdown to the receiving waterbody
  - Normal and maximum flow rate of the blowdown stream from the cooling water systems to the receiving water body
  - Ratio of total dissolved solids in the cooling water blowdown streams to the makeup water streams
  - Stormwater handling at the CRN Site
  - Expected (normal) and maximum effluent flow rates from the potable/sanitary system to the receiving water body

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.9.3 Impacts to Air

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Air emissions sources

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.9.4 Summary of Nonradioactive and Mixed Waste Impacts

The impact of nonradioactive and mixed waste from CRN-1 operation on land, water, and air is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.10 ENVIRONMENTAL IMPACTS OF POSTULATED ACCIDENTS

ESPA ER Chapter 7 and the NRC ESP FEIS Sections 5.11 and 6.2 describe the impacts of postulated accidents. This section describes the impacts of postulated accidents for CRN-1.

5.10.1 Design Basis Accidents

The NRC ESP FEIS did not identify any issues related to design basis accidents that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Design basis accident doses at exclusion area boundary and boundary of the low population zone

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.10.2 Severe Accidents

ESPA ER Section 7.2 and NRC ESP FEIS Section 5.11.2 describe the environmental impacts of severe accidents at the CRN Site. The NRC ESP FEIS did not identify any issues related to severe accidents that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Site-specific population
- Site-specific land-use data

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

TVA also identified new and notable information regarding the following:

- Severe accident source term

The information presented in the following subsection reflects a baseline condition that is notably different from that previously documented.

5.10.2.1 Severe Accident Source Term

In the ESPA ER, TVA estimated the severe accident source terms based on the largest SMR design being considered for the CRN Site. The SMR design used for this analysis differs from the surrogate SMR defined by the PPE. The ESP PPE defined a maximum thermal power rating for the CRN Site based on the range of SMR designs under consideration. The individual reactor considered for the severe accident analysis used the maximum thermal power rating for a single reactor unit (800 megawatt thermal [MWt]) from one of the potential SMR vendors; thus maximizing the severe accident consequences for an accident involving a single unit. CRN-1 has a maximum thermal power level of approximately 870 MWt, approximately 8.75% higher than the reactor considered in the previous severe accident analysis.

In the NRC ESP FEIS, NRC concluded that the resulting health risks for the SMR designs considered at the CRN Site are lower than the risks associated with current-generation reactors presented in NUREG-1150 and are well below the safety goals for average individual early fatality and latent cancer fatality risks from reactor accidents in the Safety Goal Policy Statement. As stated in the NRC ESP FEIS, the population doses estimated for the largest SMR considered at the CRN Site are well below the mean and median values for current-generation reactors that have undergone or are undergoing license renewal and are lower than the current reactor minimum. Finally, the NRC ESP FEIS stated that the population dose risk associated with a severe accident is less than the dose risk associated with normal operations.

Based upon the above analysis, the effect of increasing the maximum thermal power level of a single reactor at the CRN Site by 8.75% is minimal, especially when considering the conservative approach in the analysis described in the NRC ESP FEIS.

Severe Accident Analysis event sequences are selected based upon the Level 2 Probabilistic Risk Assessment (PRA). Design of CRN-1 is on-going. Based on the current state of design, the Level 2 PRA reflecting the final site-specific design needed to provide inputs to the severe accident analyses is not yet available. Results from the Level 2 PRA being developed will be submitted in a future Operating License Application (OLA), which will include an update to this ER. The OLA ER will identify and evaluate severe accidents and their impacts.

5.10.3 Severe Accident Mitigation Alternatives

The NRC ESP FEIS identified one unresolved issue for severe accident mitigation alternatives. Severe accident mitigation alternatives remain unresolved for the CPA ER and will be addressed in a future OLA, as mentioned in Table 1.7-1.

Additional features or other actions which would prevent or mitigate the consequences of severe accidents are known as severe accident mitigation design alternatives (SAMDAs) when applied at the design stage, or severe accident mitigation alternatives (SAMAs) when applied in the context of extending an existing license. However, the scope of the analyses is the same for SAMDAs and SAMAs.

Design of CRN-1 is on-going. Based on the current state of design, a Probabilistic Safety Assessment reflecting the final site-specific design needed to provide quantitative information on the effects of design alternatives on the radiological risk for SAMDA analyses is not yet available. In the interim, as part of the design process, the risk-informed design approach is using risk metrics from the design-phase PSA models to evaluate design alternatives. Following completion of plant design, a SAMDA analyses will be performed using Probabilistic Safety Assessment models which will reflect the final design. The OLA ER will identify and evaluate SAMDAs.

5.10.4 Transportation Accidents

The NRC ESP FEIS did not identify any issues related to transportation accidents that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Accident analysis of the environmental impacts for the transportation of unirradiated fuel, irradiated fuel, and radioactive waste transported to and from the CRN Site

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.10.5 Summary of Postulated Accident Impacts

The impact of postulated accidents from CRN-1 operation is SMALL and is the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

5.11 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING OPERATION

ESPA ER Section 5.10 and NRC ESP FEIS Section 5.12 describe measures and controls to limit adverse impacts during operation. NRC ESP FEIS Section 5.13 summarizes overall impacts of operation. This section describes adverse environmental impacts associated with operation of CRN-1 and delineates measures and controls to limit these adverse impacts.

The NRC ESP FEIS did not identify any issues regarding measures and controls to limit adverse impacts during operation that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to:

- Specific measures and controls for each environmental resource affected by plant operation, given the expected environmental disturbance and significance of impact

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

5.12 REFERENCES

Black & Veatch. 2023. Discharge Diffuser Design. Rev 3. Record No. 413227.51.2002. Prepared for the Tennessee Valley Authority.

NRC. See U.S. Nuclear Regulatory Commission

Tennessee Department of Environment and Conservation (TDEC), 2011. General Water Criteria, Chapter 1200-04-03, Rules of Tennessee Department of Environment and Conservation, Tennessee Water Quality Control Board, Division of Water Pollution Control, May 2001 (Revised).

Tennessee Valley Authority (TVA), 2023. Hydrothermal Modeling Report for the Proposed Clinch River Small Modular Reactor. 2023 Update to the 2015 Hydrothermal Task Force Report. Rev. A. Report No. WR-2023-90-920. March 2023.

TVA, Advisory Council on Historic Preservation (ACHP), and State Historic Preservation Office, 2019. Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966.

U.S. Nuclear Regulatory Commission (NRC) and U.S. Army Corps of Engineers (USACE). 2019. Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site. Final Report. NUREG-2226, Volume 1.

TABLE OF CONTENTS

CHAPTER 6 FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS 6-1

6.1 URANIUM FUEL CYCLE IMPACTS 6-1

6.2 TRANSPORTATION OF RADIOACTIVE MATERIALS 6-1

6.3 DECOMMISSIONING 6-2

6.4 SUMMARY OF URANIUM FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS 6-2

CHAPTER 6 FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS

The Clinch River Nuclear Site (CRN Site) Early Site Permit Application (ESPA) Environmental Report (ER) and NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's Early Site Permit Application (ESPA) for the CRN Site describe the environmental impacts of the uranium fuel cycle for two or more small modular reactors (SMRs) with a combined maximum net electrical power output of 800 megawatt electric (MWe) and transportation of radioactive materials for the same to and from the CRN Site.

Chapter 6 addresses the environmental impacts of the uranium fuel cycle and the transportation of radioactive materials associated with the operation of CRN-1. It also addresses the environmental impacts of decommissioning CRN-1 at the end of its operational life.

This chapter is divided into the following sections:

- Uranium Fuel Cycle Impacts (Section 6.1)
- Transportation of Radioactive Materials (Section 6.2)
- Decommissioning (Section 6.3)

6.1 URANIUM FUEL CYCLE IMPACTS

ESPA ER Subsection 5.7.1 and NRC ESP FEIS Section 6.1 describe the impacts of the uranium fuel cycle for two or more SMRs with a combined maximum net electrical output of 800 MWe at the CRN Site. Bounding values for key plant characteristics were provided in the ESP Plant Parameter Envelope (PPE). The NRC ESP FEIS did not identify any issues regarding uranium fuel cycle impacts that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to the uranium fuel cycle. The new information is confirmatory of that used to prepare the NRC ESP FEIS.

6.2 TRANSPORTATION OF RADIOACTIVE MATERIALS

ESPA ER Subsection 5.7.2 and NRC ESP FEIS Section 6.2 describe the impacts of the transportation of radioactive materials to and from the CRN Site. Bounding values for key plant characteristics were provided in the ESP PPE. The NRC ESP FEIS did not identify any issues regarding the transportation of radioactive materials that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to the transportation of radioactive materials. The new information is confirmatory of that used to prepare the NRC ESP FEIS.

6.3 DECOMMISSIONING

NRC ESP FEIS Section 6.3 states that impacts from the proposed reactor designs are to be bounded by those found in NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1, with the potential for site-specific issues that would be addressed at the time of decommissioning. The NRC ESP FEIS did not identify any issues regarding decommissioning that were not resolved.

Having implemented the process described in Section 1.8, TVA identified new information related to decommissioning. The new information is confirmatory of that used to prepare the NRC ESP FEIS.

6.4 SUMMARY OF URANIUM FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING IMPACTS

The impact of the uranium fuel cycle, transportation of radioactive materials, and decommissioning are SMALL and are the same as in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

TABLE OF CONTENTS

CHAPTER 7 IMPACTS OF REASONABLY FORESEEABLE FUTURE ACTIONS 7-1

7.1 HISTORIC AND CULTURAL RESOURCES 7-17

7.2 ALL OTHER RESOURCES 7-18

7.3 CONCLUSIONS 7-19

7.4 REFERENCES 7-25

LIST OF TABLES

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions 7-3

Table 7-2 Reasonably Foreseeable Future Actions and Effects on Each Resource 7-20

Table 7-3 Impacts of Reasonably Foreseeable Future Actions in Conjunction with the Proposed Action 7-23

CHAPTER 7 IMPACTS OF REASONABLY FORSEEABLE FUTURE ACTIONS

The Clinch River Nuclear (CRN) Site Early Site Permit Application (ESPA) Environmental Report (ER) Sections 4.11 and 5.11 and Chapter 7 of NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA for the CRN Site, describe potential cumulative impacts from the building and operation of two or more small modular reactors (SMRs) at the CRN Site.

This chapter is divided into the following sections:

- Historic and Cultural Resources (Section 7.1)
- All Other Resources (Section 7.2)
- Conclusions (Section 7.3)
- References (Section 7.4)

The Tennessee Valley Authority (TVA) has not included a discussion of the severe accidents and severe accident mitigation design alternatives. Accordingly, TVA has not provided an analysis of this issue in the assessment of impacts of the proposed action in conjunction with other reasonably foreseeable future actions (RFFAs). In accordance with 10 Code of Federal Regulations (CFR) 51.53, *Postconstruction environmental reports,* TVA will evaluate severe accidents and severe accident mitigation alternatives as new information at the operating license stage.

Key inputs to the RFFA effects analysis are integrated in the analyses summarized in NRC ESP FEIS Section 7.0. As indicated above, this analysis integrates an evaluation of the combined effects of past, present, and RFFAs for each environmental resource. Actions that have a timing that is "past" or "present" inherently have exerted environmental effects that are already integrated into the base condition for each of the resources analyzed in the affected environment described in Chapter 2 of the NRC ESP FEIS. NRC also considered the additional effects of identified RFFAs in the NRC ESP FEIS (including the proposed development of the CRN Site). Table 7-1 of the NRC ESP FEIS includes the effects of the proposed action associated with the CRN ESPA and other RFFAs. Key inputs used by NRC in their analysis included:

- Past actions, present actions, and RFFAs
- Resource impacts of past, present, and RFFAs in the Geographic Area of Interest (GAI)

Having implemented the process described in Section 1.8, TVA identified no new information related to many of the past actions, present actions, and RFFAs that were included in Table 7-1 of the NRC ESP FEIS. However, as described in the following section, TVA performed an extensive review to identify updated information pertaining to actions included in NRC ESP FEIS Table 7-1, as well as new actions that were not previously considered in the analysis in the NRC

ESP FEIS. Past and present actions and those RFFAs whose status had not changed were assumed to be encompassed in NRC's analysis and were therefore not considered to be new information. TVA identified new information related to the following:

- Current or planned local economic development programs or projects (e.g., commercial, industrial, and/or residential)
- Current or planned infrastructure improvements (e.g., transportation, electric, and water utility)
- Current or planned projects at nearby federal facilities and within the nuclear industry

This review considered the list of actions contained in NRC ESP FEIS Table 7-1, information regarding RFFAs that were identified in conjunction with the *Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park Final Programmatic Environmental Impact Statement* (CRN PEIS) (TVA, 2022), other ongoing National Environmental Policy Act (NEPA) actions, and a review of new actions as identified by the above considerations.

Those actions previously identified in NRC's analysis in NRC ESP FEIS Table 7-1, which were identified in this analysis as having had a change in status or were identified as a new action not previously identified by NRC, were considered key inputs that represented new information. Table 7-1 identifies the major projects near the CRN Site that were considered new and notable information in the analysis of impacts of the proposed action in conjunction with other RFFAs. Additionally, Table 7-2 provides a list of those projects for which updated or newly identified actions were considered to have the potential to substantially contribute to impacts on each resource.

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 1 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
TVA Generation/Site Projects					
Future Development of CRN Site (ESP)	Construction and operation of two or more SMRs with a total combined nuclear generating capacity not to exceed 800 megawatts (MW) electric.	Not Applicable	NRC issued ESP-006 on December 19, 2019.	N	NRC, 2019
CRN Site Advanced Nuclear Reactor Technology Park PEIS	Construction and operation of an advanced nuclear reactor technology park, to demonstrate the feasibility of emerging nuclear technologies as part of TVA's technology innovation efforts aimed at evaluating and developing future electricity generation capabilities. Technologies may include SMRs and/or Advanced Non-Light Water Reactors at Area 1 and/or Area 2 on the CRN Site.	Not Applicable	TVA issued a Record of Decision (ROD) on September 29, 2022. At present, TVA has not identified any projects suitable for Area 2, therefore, development of Area 2 is not currently considered a RFFA.	N	TVA, 2022
CRN Site Grassy Creek Bridge Replacement	Replacement of a damaged culverted crossing and temporary bridge with new culvert and permanent bridge to access the CRN Site.	Not Applicable	Completed in 2023 by TVA.	N	None
CRN Site National Reactor Innovation Center (NRIC) Project	The CRN Site has been identified as a candidate host location for a construction demonstration project.	Not Applicable	NRIC is currently engaged in final site selection, design, and planning.	N	NRIC, 2024
CRN Site Culvert Replacement Project	Replacement of two culverts on CRN Site River Road	Not Applicable	Completed in 2023.	N	TVA, 2023a

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 2 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Watts Bar Nuclear Generating Station Units 1 and 2	Revise Watts Bar Nuclear Plant Units 1 and 2 technical specifications to change the number of tritium producing burnable absorber rods and revision to reactor vessel surveillance capsule removal schedule for Units 1 and 2.	31 miles southwest	TVA published a Determination of NEPA Adequacy regarding production of tritium at Watts Bar Nuclear Plant. Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) issued by NRC and published in Federal Register on February 23, 2024.	U	TVA, 2023b NRC, 2024
Other Energy/U.S. Department of Energy-Related Projects					
Retirement and Replacement of the Kingston Fossil Plant (KIF)	TVA will demolish the nine existing KIF coal units, construct a new 1,500-MW natural gas dual-fuel capable combined cycle aeroderivative combustion turbine plant, a 3 to 4-MW solar array, a 100-MW battery energy storage system, and a new transmission line infrastructure on the Kingston Reservation. Off-site transmission system upgrades are proposed along six existing transmission lines located in east Tennessee (TN).	8 miles west	TVA released a FEIS on February 16, 2024 that evaluates the potential impacts of retirement and replacement. The April 2024 ROD reflects TVA's final decision regarding the KIF retirement and replacement project.	U	TVA, 2024a, b
Fusion Facility at Former Bull Run Fossil Plant	Pilot demonstration project to research, build, and operate a prototype fusion device. Project would utilize the former Bull Run Fossil Plant turbine building and construct some additional structures such as tanks within the Bull Run Reservation.	15.5 miles northeast	TVA is in review of the project proposal, in discussions with the project proponent, and in planning for anticipated NEPA review.	N	Knox News, 2024

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 3 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Retirement of the Bull Run Fossil Plant	Decontamination and deconstruction of the 865-MW net-capacity coal-fired plant.	15.5 miles northeast	In December 2023, TVA retired the Plant. TVA released the Final EA for the Bull Run Fossil Decontamination and Deconstruction project in June 2023.	U	TVA, 2023c
Melton Hill Hydroelectric Dam Turbine and Rotor Replacement	TVA replaced the current variable blade Kaplan turbine with a fixed blade propeller turbine on Unit 1. Work included installation of discharge ring, turbine shaft, turbine guide bearing, generator shaft, wicket gate mechanisms, servo motors, shift ring, head cover, and other components.	4 miles east	TVA completed a categorical exclusion checklist to satisfy NEPA requirements that was signed on May 4, 2021. The unit returned to service in May 2023.	N	TVA, 2021
Kairos Power, Limited Liability Company (LLC) Hermes Low Power Demonstration Reactor Construction Permit (CP)	Construct and operate Hermes to demonstrate key elements of the Kairos Power Fluoride Salt-Cooled, High Temperature Reactor technology for possible future commercial deployment.	3.5 miles northwest	NRC's FEIS was released August 17, 2023. Construction Permit was issued on December 12, 2023. Construction started in July 2024.	N	NRC, 2023a Kairos, 2024
Kairos Power, LLC Hermes 2 Reactor CP	Construct and operate Hermes 2, consisting of two 35-MW reactors adjacent to the Hermes Test Reactor at East Tennessee Technology Park (ETTP) in Oak Ridge, TN.	3.5 miles northwest	CP application (CPA) under review by NRC.	N	NRC, 2023b
TRISO-X Fuel Fabrication Facility	Construction of fuel fabrication facility at Horizon Center Industrial Park for production of TRISO-X fuel for use in Xe-100 reactors.	3 miles north-northeast	Facility is set to be commissioned and operational by 2025. NRC's Environmental Impact Statement for the issuance of a license for the possession and use of special nuclear material is underway. The public scoping period closed February 14, 2023.	N	NRC, 2022

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 4 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
ETTP Property Transfer / Development of Heritage Center Industrial Park	Transfer of DOE property to private companies/ Community Reuse Organization of East Tennessee and development of the 1,200-acre Heritage Center. Both new and renovated industrial buildings are available for sale or lease, as well as approximately 555 acres served by a robust, redundant utility system.	2 miles north	In 2020, core clean-up was completed at the ETTP site which included demolishing more than 500 structures, addressing major areas of soil contamination, and final cleanup decisions for the majority of ETTP. Remaining soil and groundwater remediation is underway and is expected to continue through 2024. An additional 600 acres is slated for transfer for economic development in the years ahead. Numerous parcels within the Heritage Center industrial park have recently sold or are pending sale. DOE released its updated 10-year Program Plan in November 2022, which includes completion of soil and groundwater cleanup and all land transfers at ETTP within that period.	U	Oak Ridge Office of Environmental Management (OREM), 2023 Heritage Center, 2022
Coqui Pharma Medical Isotope Production Facility	Planned 250,000 square foot medical isotope production facility on Duct Island within the Heritage Center Industrial Park.	3 miles north-northwest	Construction has not yet begun. The facility is expected to be fully operational in 2026.	N	Coqui Pharma, 2019

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 5 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Oak Ridge National Laboratory (ORNL)	Remediation of radiologically and chemically contaminated facilities	Within Oak Ridge Reservation (ORR)	DOE released its updated 10-year Program Plan in November 2022. The plan includes removal of all uranium-233 inventory and debris, all transuranic waste at ORNL, as well as remediating numerous former reactors, associated infrastructure, and shuttered laboratories within the central campus.	U	OREM, 2022a
Y-12 National Security Complex	Remediation of contaminated facilities and mercury contamination.	Within ORR	DOE and National Nuclear Security Administration released an updated 10-year Program Plan in November 2022. The plan includes the demolition of high-risk buildings at Y-12 and remediation of underlying contaminated soil and groundwater.	U	OREM, 2022a
Uranium Processing Facility (UPF) at Y-12	Construction of a multi-facility complex to replace aging infrastructure at Y-12; will have processing capabilities for enriched uranium casting, oxide production, and salvage and accountability operations to support the United States' nuclear weapons stockpile, defense nuclear non-proliferation, and naval reactors program.	Within ORR	UPF is currently under construction. Construction of four of the seven project components is complete. Construction advertised to be complete by the end of 2025.	U	Bechtel Corporation, 2023 Oakridger, 2022 DOE, 2011

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 6 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Outfall 200 Mercury Treatment Facility at Y-12	Construction of headworks, treatment facility, and interconnecting pipeline for mercury treatment facilities.	Within ORR	Construction was scheduled to be complete in December 2022 with commissioning and start up activities through mid-2023; however, construction delays have occurred. Construction crews installed the initial equipment to the project's treatment plant site and placed micro-piles to help lay the foundation for the headworks facility site in March 2023.	N	Oakridger, 2023a
Sludge Processing Mock Test Facility at ORNL	The facility will play a vital role in maturing technologies needed to continue processing Oak Ridge's inventory of transuranic sludge waste. DOE's Oak Ridge Office of Environmental Management (OREM) contractor will test six critical technology elements to gather the data necessary to complete the final design and construction of the Sludge Processing Facility later this decade. Two of those technologies will be tested at the mock test facility.	Within ORR	Site preparation for the Sludge Processing Mock Test Facility was completed in 2022. DOE's OREM anticipates approximately two years of testing to gather the data needed to confirm the best designs and approaches for the Sludge Processing Facility's final design.	U	OREM, 2020 OREM, undated
Oak Ridge Enhanced Technology and Training Center	Operation of a facility to train first responders and other experts in nuclear operations, safeguards, and emergency response. Facilities consist of a Simulated Nuclear and Radiological Activities Facility and a Technical Rescue Training Area; an Emergency Response Training Facility; a maintenance building; and utilities, roads, and supporting infrastructure.	5.5 miles north	Construction has been completed. Facility opened on January 9, 2023.	N	Oakridger, 2023b

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 7 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Ultra Safe Nuclear Corporation (USNC) Pilot Fuel Manufacturing Facility	A Pilot Fuel Manufacturing operation at the ETTP, site of Manhattan Project's former K-25 gaseous diffusion plant. USNC commissioned and operates production-scale modules involved in manufacturing of TRISO coated fuel particles and its proprietary Fully Ceramic Micro-encapsulated® fuel.	3 miles north	USNC held a ribbon cutting on August 18, 2022.	N	Nuclear Newswire, 2022
Environmental Management Waste Management Facility	Landfill for low-level radiological and hazardous wastes generated from ORNL/ORR's cleanup projects comprised of six disposal areas, or cells, that have a total disposal capacity of 2.3 million cubic yards.	2 miles north within ETTP	The existing disposal area has only 18 percent capacity remaining. As a result, the Environmental Management Disposal Facility is being constructed.	U	OREM, 2022b
Environmental Management Disposal Facility	DOE OREM's contractor will build a new hazardous and radioactive waste disposal facility to manage radioactive, hazardous, and toxic wastes generated by the remediation of Y-12, ETTP and ORNL.	Within ORR	On September 30, 2022, the DOE, the U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC) signed a ROD completing the Comprehensive Environmental Response, Compensation, and Liability Act process. A ground-breaking was conducted in 2023.	U	TDEC, 2023
Orano Project Ike	Orano would develop the "Project Ike" uranium enrichment facility consisting of 750,000 square feet, resulting in 305 full time jobs.	5 miles north	Planning and licensing application in development	N	Orano USA, 2024

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 8 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Transmission Projects					
Future Transmission Uprates and Reconductoring	Various uprate and reconductoring projects beyond the first transmission interconnect with the CRN Site. These are subject to recurring TVA maintenance activities, new TVA projects, and would largely be conducted within existing transmission corridors. Actions may include transmission upgrades to address potential thermal overloads, transmission loops, fiber lines, and new or upgraded breakers.	Various	Subject to future TVA transmission and project planning.	U	None
Rugby-Sunbright Transmission System	Improve the existing power supply in the Sunbright, Tennessee area by constructing, operating, and maintaining a 7.5-mile 69-kilovolt (kV) transmission line consisting of steel pole structures on 100-foot right-of-way and new Rugby 161-kV substation.	30 to 37 miles northwest	On February 16, 2017, TVA issued a Final EA and signed FONSI. On January 24, 2019, a ribbon cutting was held to open the new Rugby Substation.	U	TVA, 2023d Plateau Electric Cooperative, 2019
Plateau 500-kV Substation	Improve the existing power supply system in Cumberland and Putnam Counties, Tennessee, and surrounding areas by constructing and operating a new 500-kV substation. The proposed substation would be connected to the adjacent existing Roane-Wilson 500-kV and Monterey-Peavine 161-kV transmission lines.	44 miles west	On November 13, 2013, TVA issued an EA and signed FONSI approving the project. Construction began in June 2016. Construction is complete and the substation is operational.	U	TVA, 2023e

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 9 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Transportation/Infrastructure Projects					
Oak Ridge General Aviation Airport	Development of a general aviation airport to support projected growth in the region. The proposed airport includes a 5,000-foot runway and would support general aviation in the vicinity of Oak Ridge.	3 miles north	The State of Tennessee's 2023 budget included $11M which was used towards the purchase of property. A Draft EA (April 2023) was issued by the Federal Aviation Administration. A public hearing was conducted in August 2023. The goal is to have the airport completed and operational in 2026. Airport plan paused due to proposed Orano facility. Airport location is uncertain.	U	Goodwyn Mills Cawood, LLC, 2023 City of Oak Ridge, 2024b Oakridger 2024b
West End Corridor Intersection Improvements	Intersection improvements along Oak Ridge Turnpike (Tennessee State Route 95 (TN 95)/ Tennessee State Route 58 (TN 58)) at Renovare Boulevard, Novus Drive, Heritage Center Boulevard, and Broadberry Avenue at Gallaher Road.	2 miles west to 5 miles north	Estimated completion by 2030. Included in Mobility Plan 2045 approved in 2021.	N	Knoxville Regional Transportation Planning Organization, 2021
Future Planned Tennessee Department of Transportation (TDOT) or Local Roadway Improvement Projects within Project Vicinity	Roadway improvement projects in Roane County including bridge repair/replacement, resurfacing, maintenance, and repair.	Various	As of January 23, 2023, TDOT lists 317 projects that are underway or planned within Roane County. An additional 1,317 projects are identified within the surrounding counties of Loudon (212), Knox (820), and Anderson (285).	U	TDOT, 2023

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 10 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
City of Oak Ridge Water Treatment Plant	The City of Oak Ridge has designed and is constructing a new ultrafiltration membrane drinking water treatment plant to replace the existing 80-year old conventional treatment plant, which is currently at capacity and beyond its useful life. The project also includes construction of raw water intake pumps, traveling screens, a finished water pump station, and water pipelines as well as the rehabilitation of the existing finished water tanks. The new plant will have a capacity of 12 million gallons per day and will be located at the existing raw water intake off Pump House Road.	11 miles northeast	Groundbreaking occurred on October 19, 2022. The plant is expected to be operating by spring 2025.	N	EPA, 2023c
Other Industry/Development Projects					
Tellico West Industrial Park	Industrial Park with sites for development.	20 miles south-southeast	Approximately 225-acre development site. Facilities and parcels in the Park are available for development.	U	Tellico Reservoir Development Agency, 2023

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 11 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Roane Regional Business and Technology Park	Business and Industrial Park (655 acres) with sites for development.	1 mile east	Currently 24 sites are available for development. On June 17, 2022, the Jones Road Site, the largest site in the park (40 acres) was sold to The TPA Group, a developer from Atlanta, Georgia, for $1.3M, with plans to build a 250,000 square foot speculative building, a total planned investment of $32M. Site preparation and construction is underway. The Roane Regional Business and Technology Park Master Plan has identified approximately 317 acres available for development.	N	Roane ESC, Undated Roane Alliance, 2022 Roane ECD, 2018
Roane County Industrial Park Cardiff Valley Road Site	Roane Specialized Services, LLC (made up of Roane Transportation and Roane Metals) purchased the 45-acre site. Plans included the addition of a new corporate office and warehouse facility, truck fleet parking, and storage space for their existing customers.	15 miles west	Roane County Industrial Development Board accepted formal offer in February 2021. Construction of a 50,000 square foot warehouse and corporate office completed in 2023.	N	Roane Alliance, 2021 Shea, J., 2023
Horizon Center Industrial Park	1,000-acre business park that can accommodate 4 million square feet of space for research and development, light manufacturing, and office facilities. 500 acres have been set aside for environmental preservation and protection.	4 miles north	Development sites available ranging in size from 11 to 148 acres.	N	Oak Ridge Industrial Development Board, 2023
Helium Test Facility	Test facility to support small modular reactor design validation.	5 miles north	15-acre project site in Horizon Center Industrial Park currently in planning stage for facility development.	N	Kinectrics, 2023

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 12 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
Rockwood Iron and Metal Cleanup Project	Clean up of former ironworks and metals operations.	18 miles west	EPA has designated the site as a non-National Priorities List Superfund (Brownfields) site. An Eligible Response Site Exclusion decision has been made at this site. Clean up is dependent on state-led action.	U	EPA, 2023a
Smokey Mountain Smelters	Clean up of former fertilizer and smelting operations.	25 miles east	EPA placed the site on the Superfund National Priorities List in 2010 because of contaminated soils, sediment, and surface water resulting from past industrial operations at the site. The EPA has performed short-term cleanup actions to stop immediate threats. The Remedial Action began in February 2023 and was completed by September 2023.	U	EPA, 2023b
Downtown Oak Ridge Development Project	Downtown Oak Ridge development project along the Wilson Street corridor creating an intimate, walkable and urban place with buildings addressing the street, flanked by generous sidewalks and streetscapes. Restaurants, shops, offices, apartments, condominiums, and green spaces combine to make a vibrant new district.	11 miles northeast	On January 13, 2020, Oak Ridge City Council unanimously approved a resolution endorsing the Vision for the Wilson Street Corridor. A request for proposals was issued to develop the now mostly vacant land. In March 2022, two firms were selected and the two proposals were blended into a single master plan.	N	Oak Ridge, 2020 Ballard, T., 2023

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 13 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
The Preserve at Clinch River	The Preserve is a 1,400-acre, master planned community, currently separated into eight neighborhoods.	2-3.5 miles west	Located west of TN 58, construction began in 2002 and new homes continue to be constructed. Additional areas are planned for development, and lots continue to be released for sale. Three of the neighborhoods have sold all available lots.	N	The Preserve, 2023
Roane County School Construction	Proposed plan would retire Kingston, Harriman, and Rockwood high schools, combining them in a new 1600 student facility near Roane State Community College. It would also include moving Oliver Springs High to the Oliver Springs Middle school, adding a new gym and technical education space, sewer upgrades for the Midway area schools, moving Ridge View Elementary to Rockwood High School and moving Harriman Middle School to Harriman High School.	13 miles west	On July 9, 2018, the Roane County Commission voted unanimously against a property tax increase that would help fund the entire project. However, the County Commission did fund the Oliver Springs and Midway portions of the project. On April 27, 2021, the Roane County School Board approved a motion to study building a new Roane County High School and another new high school that would combine Harriman and Rockwood. The study would also provide information on moving Ridge View Elementary School to Rockwood High School and moving Harriman Middle School to Harriman High School.	N	Ball, D., 2018 Jones, B., 2021

Table 7-1 Summary of New Information Regarding Reasonably Foreseeable Future Actions (Sheet 14 of 14)

Project Name	Description	Approximate Distance from CRN Site	Status	New (N), Updated (U), or Discontinued (D)	Reference(s)
American Nuclear Corporation	Producer of radioactive sources and detectors, active from 1962 to 1970. License revoked in 1970 after discovery of contamination leaking into the Clinch River.	15 miles northeast	Remediation of the site began in spring 2024. Activities include stabilizing building contamination for safe dismantling and demolition; dismantling and demolishing the former facility and hot cell, excavating contaminated soils and buried debris, and transporting and disposing of contaminated materials to an approved offsite disposal facility. Work could be completed in late 2024.	U	Cooper, W., 2022 EPA, 2024 Oakridger, 2024a
Actions Evaluated in ESP Proceeding that are No Longer Considered					
Roane-Pineville 500-kV Transmission Line	70-mile-long transmission line	Not Applicable	Proposed in-service date of 2018. Project has not been progressed and is presumed to be discontinued.	D	None

7.1 HISTORIC AND CULTURAL RESOURCES

The description of the affected environment in Subsection 2.5.3 serves as a baseline for the analysis of impacts of the proposed action in conjunction with other RFFAs for historic and cultural resources. As described in Sections 4.5 and 5.5, the impacts on historic and cultural resources from building and operation of CRN Unit 1 (CRN-1) are SMALL.

Cumulative impacts to historic properties are described in ESPA ER Subsections 4.7.5.3 and 5.11.6 and NRC ESP FEIS Section 7.5. In NRC ESP FEIS Section 7.5, NRC selected the Area of Potential Effects (APE) established in TVA's consultation with the Tennessee State Historic Preservation Officer (TNSHPO) as the GAI for its historic and cultural resource analysis of both direct and indirect impacts associated with the proposed action. The APE was undefined for related actions that included potential upgrades or rebuilds of offsite transmission lines, expansions, development of offsite borrow source areas, alterations that may affect the Melton Hill Hydroelectric Dam (MHH) historic district and other impacts associated with general future urbanization within the region.

As described in Sections 4.5 and 5.5, effects on historic and cultural resources are more limited than those described in the NRC ESP FEIS. Modification of MHH, development of an offsite borrow, construction of an additional exit ramp from TN 58 to Bear Creek Road, and construction of an underground transmission line connecting the CRN Site to a substation on ORR are not included in the CRN-1 project. Therefore, the GAI is altered from that considered in the NRC ESP FEIS for CRN-1.

The effects of past and present actions are reflected in the characteristics of the affected environment for historic and cultural resources, as described in ESPA ER Subsection 2.5.3 and in NRC ESP FEIS Subsection 2.5.2. New or updated actions identified as part of this analysis are identified in Table 7-1. Each of the new or updated actions were considered in the RFFA effects analysis for historic and cultural resource impacts in this Section.

As noted in the NRC ESP FEIS, projects within the GAI that may have an impact on historic and cultural resources include ongoing infrastructure improvements and future urbanization. Among the projects listed in Table 7-1, no new or updated actions within the GAI (i.e., the APE) were identified that have the potential to contribute to impacts on historic and cultural resources.

As discussed in Section 4.5, TVA conducted additional investigations of previously identified archaeological sites in 2022 and determined that several were not eligible for listing on the National Register of Historic Places. Furthermore, TVA determined that the identified historic sites potentially impacted by building CRN-1 are avoidable. In 2016, TVA executed the *Programmatic Agreement [PA] Between the Tennessee Valley Authority and Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project* (2016 Clinch River SMR PA). The United Keetoowah Band of Cherokee Indians in Oklahoma was also a signatory to the 2016 Clinch River SMR PA. The 2016 Clinch River SMR PA stipulates the steps that TVA will take to make any needed changes to the

CRN APE as project plans develop; identify historic properties in the CRN APE; evaluate the project's potential effects on historic properties; and seek ways to avoid, minimize, or mitigate adverse effects on historic properties (TVA and TNSHPO, 2016).

Additionally, in 2019, TVA executed the *Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966* (2019 Valleywide Section 106 PA). The 2019 Valleywide Section 106 PA identifies routine, repetitive actions TVA may undertake in the implementation of its responsibilities throughout the TVA Power Service Area that can be excluded from further Section 106 review, as well as actions with low potential to affect historic properties for which, under specific circumstances, TVA may find, without further consultation, do not result in adverse effects on historic properties. In accordance with Section 106 of the NHPA, its implementing regulations at 36 CFR Part 800.1-16, and the 2019 Section 106 PA, TVA will avoid, minimize, or mitigate potential operation-related impacts (TVA, Advisory Council on Historic Preservation, and SHPOs, 2019). The 2019 Valleywide Section 106 PA is applicable during operations of CRN-1. As such, as indicated in Sections 4.5 and 5.5, TVA determined that operational impacts from operation of CRN-1 on historic properties are SMALL.

TVA considered appropriate key inputs to the analysis of impacts of the proposed action in conjunction with other RFFAs on historic and cultural resources. The supplemental information is updated from that previously included in the ESPA ER and NRC ESP FEIS, is updated from that used to prepare the NRC ESP FEIS and reflects an environmental impact that is notably different from that previously documented.

Because no new or updated projects have been identified within the GAI, the effect of the proposed action on historic and cultural resources with other past, present, and RFFAs is SMALL. As discussed in Sections 4.5 and 5.5, the impact of the building and operation of CRN-1 would not be a significant contributor to the SMALL impact on historic and cultural resources. Furthermore, TVA concludes that the incremental contribution related to building and operation of CRN-1 would be a minor contributor to the SMALL impact on historic and cultural resources.

The impact of the proposed action in conjunction with other RFFAs on historic and cultural resources is SMALL and differs from the impact in the NRC ESP FEIS of MODERATE TO LARGE. Therefore, this information is determined to be "new and significant."

7.2 ALL OTHER RESOURCEs

ESPA ER Sections 4.7 and 5.11 and NRC ESP FEIS Chapter 7 evaluate cumulative impacts for each resource associated with the construction, preconstruction, operation, and decommissioning of two or more new SMRs at the CRN Site and other RFFAs (listed in Table 7-1) for all other resources.

TVA determined the new information is confirmatory of that used to prepare the NRC ESP FEIS.

7.3 CONCLUSIONS

TVA considered the potential impacts resulting from building, operation, and decommissioning of CRN-1 and other past, present, and RFFAs. The specific resources that could be affected by the proposed action and other past, present, and RFFAs in the GAI were assessed. This assessment included the impacts of building and operation of CRN-1.

Table 7-2 provides a list of those projects for which updated or newly identified actions were considered by Subject Matter Experts to have the potential to substantially contribute to impacts on each resource. Inclusion of actions in Table 7-2 considered potential intensity of impact, sensitivity of resource, and the characteristics and condition of the resource within their respective GAI.

The incremental impacts of the new or updated actions, in conjunction with previously assessed past, present, and reasonably foreseeable future federal and non-federal actions (listed in Table 7-1) are summarized in Table 7-3.

Having implemented the process described in Section 1.8, TVA determined the impacts of the proposed action in conjunction with other RFFAs for most of the resource areas do not differ from the impact determination documented in the NRC ESP FEIS. Therefore, the information related to RFFA impacts for all other resources except historic and cultural resources is "new, but not significant".

Table 7-2 Updated or Newly Identified Reasonably Foreseeable Future Actions and Effects on Each Resource (Sheet 1 of 3)

Project Name	Land Use	Waster Use-Surface Water	Water Use-Groundwater	Water Quality-Surface Water	Water Quality-Groundwater	Terrestrial Ecosystems	Aquatic Ecosystems	Physical Impacts	Demography	Taxes and Economy	Infrastructure and Community Services	Historic and Cultural Resources	Air Quality	Nonradiological Health	Nonradioactive Waste	Radiological Health	Postulated Accidents	Fuel Cycle, Transportation and Decommissioning
No RFFAs Identified			X		X							X			X			
Kairos Power, LLC Hermes Test Reactor CP									X	X	X		X	X		X	X	X
Kairos Power, LLC Hermes 2 Reactor CP									X	X	X		X	X		X	X	X
TRISO-X Fuel Fabrication Facility						X			X	X	X		X	X		X	X	X
ETTP Property Transfer / Development of Heritage Center Industrial Park									X		X		X	X		X	X	X
Coqui Pharma Medical Isotope Production Facility									X	X	X		X	X		X	X	X
Oak Ridge Enhanced Technology and Training Center						X								X				
USNC Pilot Fuel Manufacturing Facility									X	X	X		X			X	X	X
Tellico West Industrial Park	X					X				X								
Roane Regional Business and Technology Park	X					X		X		X				X				

Table 7-2 Updated or Newly Identified Reasonably Foreseeable Future Actions and Effects on Each Resource (Sheet 2 of 3)

Project Name	Land Use	Waster Use-Surface Water	Water Use-Groundwater	Water Quality-Surface Water	Water Quality-Groundwater	Terrestrial Ecosystems	Aquatic Ecosystems	Physical Impacts	Demography	Taxes and Economy	Infrastructure and Community Services	Historic and Cultural Resources	Air Quality	Nonradiological Health	Nonradioactive Waste	Radiological Health	Postulated Accidents	Fuel Cycle, Transportation and Decommissioning
Roane County Industrial Park Cardiff Valley Road Site	X					X				X								
Horizon Center Industrial Park	X					X				X				X				
Helium Test Facility	X					X				X								
Orano Project Ike	X					X			X	X	X		X	X		X	X	X
Oak Ridge General Aviation Airport	X					X	X		X	X	X		X	X				
Future Planned TDOT Roadway Improvement Projects	X					X	X				X							
Future Transmission Uprates and Reconductoring	X	X		X		X	X	X						X				
City of Oak Ridge Water Treatment Plant		X									X							
The Preserve at Clinch River	X					X					X							

Table 7-2 Updated or Newly Identified Reasonably Foreseeable Future Actions and Effects on Each Resource (Sheet 3 of 3)

Project Name	Land Use	Waster Use-Surface Water	Water Use-Groundwater	Water Quality-Surface Water	Water Quality-Groundwater	Terrestrial Ecosystems	Aquatic Ecosystems	Physical Impacts	Demography	Taxes and Economy	Infrastructure and Community Services	Historic and Cultural Resources	Air Quality	Nonradiological Health	Nonradioactive Waste	Radiological Health	Postulated Accidents	Fuel Cycle, Transportation and Decommissioning
Potential Retirement and Replacement of the KIF		X		X									X	X				
Retirement of the Bull Run Fossil Plant		X		X									X	X				

Table 7-3 Impacts of Reasonably Foreseeable Future Actions in Conjunction with the Proposed Action (Sheet 1 of 2)

Resource Category	NRC ESP FEIS Impact Level	CRN-1 CPA Impact Level
Land Use	MODERATE	MODERATE
Water-Related		
Water Use — Surface Water	MODERATE	MODERATE
Water Use — Groundwater Use	SMALL	SMALL
Water Quality — Surface Water	MODERATE	MODERATE
Water Quality — Groundwater	MODERATE	MODERATE
Ecology		
Terrestrial Ecosystems	MODERATE	MODERATE
Aquatic Ecosystems	LARGE	LARGE
Socioeconomic		
Physical Impacts	SMALL to MODERATE	SMALL to MODERATE
Demography	SMALL	SMALL
Taxes and Economy	SMALL	SMALL
Infrastructure and Community Services	MODERATE to LARGE	MODERATE to LARGE
Historic and Cultural Resources	MODERATE to LARGE	SMALL
Air Quality	SMALL for criteria pollutants and MODERATE for GHGs	SMALL for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL to MODERATE	SMALL to MODERATE
Nonradioactive Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL

Table 7-3 Impacts of Reasonably Foreseeable Future Actions in Conjunction with the Proposed Action (Sheet 2 of 2)

Resource Category	NRC ESP FEIS Impact Level	CRN-1 CPA Impact Level
Postulated Accidents	SMALL	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL	SMALL

7.4 REFERENCES

Ball, D., 2018. Roane Co. mega-school project put on hold. WVLT Knoxville. Available at: https://www.wvlt.tv/content/news/67M-Roane-mega-school-project-put-on-hold-488053061.html

Ballard, T., 2023. After 75 years Oak Ridge will soon have its downtown. Teknovation.biz. https://www.teknovation.biz/after-75-years-oak-ridge-will-soon-have-its-downtown/. Accessed on: December 12, 2023.

Bechtel Corporation., 2023. Uranium Processing Facility, Oak Ridge Tennessee. Available at: https://www.bechtel.com/projects/uranium-processing-facility/. Accessed on December 12, 2023.

City of Oak Ridge, Tennessee, 2024. Oak Ridge Airport Project Frequently Asked Questions (FAQs), Oak Ridge Airport Project Frequently Asked Questions (FAQs) | Oak Ridge, TN (oakridgetn.gov), accessed on August 7, 2024.

Cooper, W., 2022. TDEC commits to cleaning former nuclear site in Anderson County. Available at: https://www.wate.com/news/anderson-county-news/tdec-commits-to-cleaning-former-nuclear-site-in-anderson-county/. Accessed on: December 12, 2023.

Coqui Pharma, 2019. Coqui Pharma on Track to Build Medical Isotope Production Facility in Tennessee. Available at: http://coquipharma.com/coqui-pharma-on-track-to-build-medical-isotope-production-facility-in-tennessee/. Accessed on December 12, 2023.

DOE. See U.S. Department of Energy.

EPA. See U.S. Environmental Protection Agency.

Goodwyn Mills Cawood, LLC, 2023. Oak Ridge Airport Environmental Assessment (Draft). Prepared on Behalf of the City of Oak Ridge. Prepared for Federal Aviation Administration. Available at: https://www.oakridgetn.gov/DocumentCenter/View/190/Oak-Ridge-Airport-Environmental-Assessment-PDF. Accessed on: December 12, 2023.

Heritage Center, 2022. Heritage Center Industrial Park. Available at: https://heritagectr.com/. Accessed on December 12, 2023.

Jones, B., 2021. Roane School Board Looking at Building Two New Schools. BBB TV 12 Communications. Available at: https://www.bbbtv12.com/2021/04/roane-school-board-looking-at-building-two-new-schools/. Accessed on: December 12, 2023.

Kairos, 2024. Kairos Power Begins Construction on Hermes Low-Power Demonstration Reactor. Available at: https://kairospower.com/external_updates/kairos-power-begins-construction-on-hermes-low-power-demonstration-reactor/. Accessed on: August 7, 2024.

Kinectrics, 2023. Kinectrics Announces Purchase of Site in Oak Ridge, Tennessee to Build Helium Test Facility. Available at: https://www.kinectrics.com/media-center/news-releases/2023-kinectrics-announces-purchase-of-site-in-oak-ridge-tennessee-to-build-helium-test-facility. Accessed on: December 12, 2023.

Knox News. 2024. TVA's closed Bull Run Plant Could Get Second Life Harnessing Fuel Hotter Than The Sun. Available at: https://www.knoxnews.com/story/news/local/2024/02/21/type-one-energy-picks-tva-bull-run-coal-plant-for-nuclear-fusion-tests/72628012007/. Accessed on April 24, 2024.

Knoxville Regional Transportation Planning Organization, 2021. Mobility Plan 2045. Available at: https://knoxtpo.org/wp-content/uploads/2021/12/MobilityPlan20145_Final-Compressed.pdf. Accessed on December 12, 2023.

National Reactor Innovation Center (NRIC), 2024. Partnerships, NRIC National Footprint. Available at: https://nric.inl.gov/partnerships/. Accessed on: August 27, 2024.

NRC. See U.S. Nuclear Regulatory Commission.

Nuclear Newswire, 2022. Ultra Safe Nuclear opens pilot-scale TRISO fuel facility in Oak Ridge. Available at: https://www.ans.org/news/article-4242/ultra-safe-nuclear-opens-pilotscale-triso-fuel-facility-in-oak-ridge/. Accessed on: December 12, 2023.

Oak Ridge, 2020. Wilson Street Corridor - Vision for Downtown Oak Ridge. Available at: http://oakridgeblueprint.info/wilson-street-corridor-vision-for-downtown-oak-ridge/. Accessed on: December 12, 2023.

Oak Ridge Industrial Development Board, 2023. Horizon Center Industrial Park. Available at: https://oridb.net/horizon-center-park/. Accessed on: December 12, 2023.

Oakridger, 2022. UPF buildings are all 'in the dry'. Available at: https://www.oakridger.com/story/news/2022/04/07/nnsas-uranium-processing-facility-achieves-construction-milestone/7234357001/. Accessed on December 12, 2023.

Oakridger, 2023a. Oak Ridge Team Makes Headway on New Mercury treatment Facility. Available at: https://www.oakridger.com/story/news/local/2023/04/05/oak-ridge-team-makes-headway-on-new-mercury-treatment-facility/70065175007/. Accessed on January 31, 2024.

Oakridger, 2023b. Oak Ridge Enhanced Technology & Training Center - latest in long line of training successes. Available at: https://www.oakridger.com/story/lifestyle/features/2023/01/27/oak-ridge-enhanced-technology-training-center-tat-school-more/69835656007/; Accessed on May 16, 2024.

Oakridger, 2024a. Cleanup work underway at former American Nuclear Corp. site in Claxton. Available at: https://www.oakridger.com/story/news/local/2024/04/17/cleanup-work-underway-at-former-american-nuclear-corp-site-in-claxton/73352965007/. Accessed on August 7, 2024.

Oakridger, 2024b. Oak Ridge airport project on hold; state, city working together on possible relocation. Available at: https://www.oakridger.com/story/news/local/2024/09/13/officials-pause-oak-ridge-airport-project-may-pick-another-site/75203440007/, Accessed on: November 27, 2024.

Orano USA, 2024. Project Ike Enrichment. Available at: https://www.orano.group/usa/en/our-portfolio-expertise/project-ike-enrichment/, Accessed on November 27, 2024.

OREM. See U.S. Department of Energy, Oak Ridge Office of Environmental Management.

Plateau Electric Cooperative, 2019. PEC cuts ribbon on Rugby substation. Available at: https://plateauelectric.com/2019/01/24/pec-cuts-ribbon-on-rugby-substation/. Accessed on: December 12, 2023.

Roane Alliance, 2021. Roane Specialized Services Expands - Purchasing 45 Acres In Rockwood. Available at: https://www.roanealliance.org/news/74/roane-specialized-services-expands-purchasing-45-acres-in-rockwood/. Accessed on December 12, 2023.

Roane Alliance, 2022. RCIDB Sells Jones Road Site In Roane Regional Business & Technology Park. Available at: https://www.roanealliance.org/news/105/rcidb-sells-jones-road-site-in-roane-regional-business-technology-park/.

Roane ECD. 2018. Roane Regional Business and Technology Park Master Pla. Available at: https://www.roaneecd.com/lib/file/manager/Sites/Roane_B_T_Park_revisions4_18_18.pdf, Accessed December 21, 2023.

Roane ESC, Undated. Roane Regional Business & Technology Park. Available at: https://www.roaneecd.com/sites/roane-regional-business-tech-park/, Accessed on December 12, 2023.

Shea, J., 2023. Roane Transportation expects to have new location grand opening next month. Roane County News. Available at: https://www.themountainpress.com/roane/news/business/roane-transportation-expects-to-have-new-location-grand-opening-next-month/article_eed2bb2f-9747-5b39-8950-1d260d772950.html. Accessed on: December 12, 2023.

Tellico Reservoir Development Agency, 2023. Available Properties. Available at: https://tellico.com/properties. Accessed on December 12, 2023.

Tennessee Department of Environment and Conservation (TDEC), 2023. DOE Environmental Management Disposal Facility. Available at: https://www.tn.gov/content/tn/environment/program-areas/rem-remediation/orr/emdf.html. Accessed on: March 1, 2024.

Tennessee Department of Transportation (TDOT), 2023. Roadway Improvement Projects in Roane County. Available at: https://www.tn.gov/tdot/search-results.html#q=roane%20county&tab=department. Accessed on: December 12, 2023.

Tennessee Valley Authority (TVA). 2021. CEC 42040 Melton Hill Hydro Unit 1 Turbine and Rotor Replacement Project. Prepared by TVA.

TVA, 2022. Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park, Final Programmatic Environmental Impact Statement and Record of Decision. Available at: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/clinch-river-nuclear-site-advanced-nuclear-reactor-technology-park. Accessed on December 12, 2023.

TVA, 2023a. CEC 50241 Clinch River Nuclear Site River Road Culvert Replacements. Prepared by TVA.

TVA, 2023b. Determination of NEPA Adequacy, Production of Tritium in a Commercial Light Water Nuclear Reactor (Watts Bar Nuclear Plant), Tennessee Valley Authority. Signed February 6, 2023.

TVA, 2023c. Bull Run Fossil Decontamination and Deconstruction Final Environmental Assessment. Available at: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/bull-run-fossil-decontamination-and-deconstruction-final-environmental-assessment. Accessed on: December 12, 2023.

TVA, 2023d. Rugby-Sunbright Power Supply Improvements. Available at: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Rugby-Sunbright-Power-Supply-Improvements. Accessed on: December 12, 2023.

TVA, 2023e. Putnam-Cumberland, Tennessee-Improve Power Supply Project. Available at: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Putnam-Cumberland-Tennessee. Accessed on: December 12, 2023.

TVA, 2024a. Kingston Fossil Plant Retirement Final Environmental Impact Statement. Available at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/environment/environmental-stewardship/nepa-environmental-reviews/kingston-retirement/kingston-final-environmental-impact-statement-(february-2024).pdf?sfvrsn=9293ca39_3. Accessed on: February 22, 2024.

TVA, 2024b. Kingston Fossil Plant Retirement Final Environmental Impact Statement Record of Decision. April 9, 2024. Federal Register 89, No. 68, pp. 24557-24565. Available at: https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/environment/environmental-stewardship/nepa-environmental-reviews/kingston-retirement/kif-record-of-decision-4-9-2024.pdf?sfvrsn=496e8b11_3. Accessed on: April 15, 2024.

TVA, Advisory Council on Historic Preservation, and State Historic Preservation Officers (SHPOs), 2019. Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966.

TVA, and Tennessee State Historic Preservation Officer (TNSHPO). 2016. Programmatic Agreement Between the Tennessee Valley Authority and Tennessee State Historic Preservation Officer Regarding the Management of Historic Properties Affected by the Clinch River SMR Project. TVA, Knoxville Tennessee and TNSHPO, Nashville, Tennessee.

The Preserve, 2023. Neighborhoods. Available at: https://thepreserveatoakridge.com/neighborhoods/. Accessed on: December 12, 2023.

U.S. Department of Energy (DOE), 2011. Final Site-Wide Environmental Impact Statement for the Y-12 National Security Complex. DOE/EIS-0387. February 2011.

U.S. DOE, Oak Ridge Office of Environmental Management (OREM), 2022a. Oak Ridge Unveils Cleanup Vision for Next Decade. Available at: https://www.energy.gov/em/articles/oak-ridge-unveils-cleanup-vision-next-decade. Accessed on December 12, 2023.

U.S. DOE OREM, 2022b. Oak Ridge Waste Disposal Facility Marks 20 Years of Safe, Successful Operation. Available at: https://www.energy.gov/em/articles/oak-ridge-waste-disposal-facility-marks-20-years-safe-successful-operation. Accessed on December 12, 2023.

U.S. DOE OREM, 2023. East Tennessee Technology Park. Available at: https://www.energy.gov/em/articles/oak-ridge-waste-disposal-facility-marks-20-years-safe-successful-operation. Accessed on December 12, 2023.

U.S. DOE OREM, undated. Oak Ridge Strategic Vision: 2023-2033. Available at: https://www.energy.gov/em/oak-ridge-strategic-vision-2023-2033. Accessed on: May 20, 2024.

U.S. Environmental Protection Agency (EPA), 2023a. Superfund Site Information, Rockwood Iron And Metal. Available at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0405895. Accessed on: December 12, 2023.

U.S. EPA, 2023b. Smokey Mountain Smelters Knoxville, TN Cleanup Activities. Available at: https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0406753. Accessed on: December 12, 2023.

U.S. EPA, 2023c. Oak Ridge Water Treatment Plant Design and Construction. Available at: https://www.epa.gov/wifia/oak-ridge-water-treatment-plant-design-and-construction. Accessed on: December 12, 2023.

U.S. EPA, 2024. The United States Environmental Protection Agency Announces the Removal Action Start at the American Nuclear Site, Clinton, TN. Available at https://andersoncountytn.gov/wp-content/uploads/2024/03/EPA-News-Release_American-Nuclear.pdf. Accessed August 7, 2024.

U.S. Nuclear Regulatory Commission (NRC), 2019. Issued Early Site Permit - Clinch River Nuclear Site. Available at: https://www.nrc.gov/docs/ML1935/ML19352D868.pdf, Accessed on December 12, 2023.

U.S. NRC, 2022. Acceptance of the TRISO-X, LLC License Application for a Fuel Fabrication Facility (Enterprise Project Identification Number L-2022-NEW-0005 AND L-2022-LNE-0002). Available at: https://www.nrc.gov/docs/ML2232/ML22320A110.pdf. Accessed on December 12, 2023.

U.S. NRC, 2023a. Environmental Impact Statement for the Construction Permit for the Kairos Hermes Test Reactor - Final Report (NUREG-2263). Available at: https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2263/index.html. Accessed on December 12, 2023.

U.S. NRC, 2023b. Hermes 2 - Kairos Application. Available at: https://www.nrc.gov/reactors/non-power/new-facility-licensing/hermes2-kairos.html. Accessed on: December 12, 2023.

U.S. NRC, 2024. Watts Bar Nuclear Plant, Units 1 and 2 - Environmental Assessment and Finding of No Significant Impact Related to an Increase in the Maximum Number of Tritium Producing Burnable Absorber Rods (EPID L-2023-LLA-0039), ADAMS Accession Number ML24009A171, February 16, 2024. Available at: https://www.federalregister.gov/documents/2024/02/23/2024-03665/tennessee-valley-authority-watts-bar-nuclear-plant-units-1-and-2-environmental-assessment-and. Accessed on March 8, 2024.

TABLE OF CONTENTS

CHAPTER 8 NEED FOR POWER 8-1

8.1 NON-POWER GOALS AND ANCILLARY BENEFITS OF THIS PROJECT . . . 8-2

8.2 NEED FOR POWER 8-2

8.2.1 Description of the TVA Power System 8-4

8.2.2 Power Demand. 8-4

8.2.3 Power Supply 8-5

8.2.4 Capacity Gap 8-5

8.3 REFERENCES. 8-6

LIST OF FIGURES

Figure 8.2-1 Total System Demand 8-5

Figure 8.2-2 Capacity Gap Range, Summer Net Dependable (SND) MW 8-6

CHAPTER 8 NEED FOR POWER

The Atomic Energy Act requires the social and environmental consequences of the civilian use of nuclear materials be weighed against the benefits that their use would provide. Historically, the primary benefit of nuclear power generation projects has been to provide electrical power to the grid. The purpose of the need for power analysis is to provide confidence that the power generated by the proposed project will be produced and consumed in a manner consistent with the stated purpose and need of the project. The U.S. Nuclear Regulatory Commission (NRC) reaffirmed the importance of the need for power analysis in a 2003 response to a petition for rulemaking (68 Federal Register (FR) 55905 - 55911).

In 68 FR 55910, the NRC concluded that:

> *The need for power must be addressed in connection with new power plant construction so that the NRC may weigh the likely benefits (e.g., electrical power) against the environmental impacts of constructing and operating a nuclear power reactor. The Commission emphasizes, however, that such an assessment should not involve burdensome attempts to precisely identify future conditions. Rather, it should be sufficient to reasonably characterize the costs and benefits associated with proposed licensing actions.*

In 68 FR 55909, the NRC stated:

> *Recently, the Commission has recognized that there may be multiple benefits to a proposed project. In LES [Louisiana Energy Services], the Commission held that the Licensing Board should consider multiple benefits of the proposed uranium enrichment facility -including enhanced competition from another market participant, furtherance of national policy goals, and the creation of an alternative, more energy-efficient technology—when performing the ultimate cost-benefit balancing under NEPA. LES, 47 NRC at 89–96. Similarly, the Commission acknowledges that the construction and operation of a nuclear power plant could have multiple benefits such as reducing greenhouse gases and other air pollutants and increasing energy efficiency by retiring older, less efficient sources of power.*

Consistent with the desire to develop new technologies, some small modular reactors (SMRs) may be built for purposes other than supplying electrical power to the grid (e.g., supplying direct power to industry, generation of process heat, water desalination, production of hydrogen, or as a research and demonstration project). TVA's technology innovation mission supports evaluating advanced nuclear technologies like SMRs to consider their potential to play a future key role in TVA's continued mission of environmental stewardship while supporting capability for anticipated increased future electricity demand. Additionally, SMR technologies can assist certain TVA customers achieve their goals, including those driven by internal and external policy objectives.

Accordingly, the purpose and need for this project is not based on a need for power. Rather, the purpose and need for this project has multiple aspects, as discussed in Chapter 1. The primary purpose is to demonstrate the ability to license, construct, and operate a SMR at the Clinch River Nuclear (CRN) Site. Successfully demonstrating the ability to license, construct, and operate

CRN-1 supports Tennessee Valley Authority (TVA)'s efforts. Further, successful demonstration of the SMR technology would enable TVA to consider utilizing SMRs throughout the TVA Power Service Area.

This chapter is divided into the following sections:

- Non-Power Goals and Ancillary Benefits of the Project (Section 8.1)
- Need for Power (Section 8.2)
- References (Section 8.3)

Section 8.1 briefly addresses the non-power goals and ancillary benefits of this project that will serve public interest. These benefits are more fully addressed in Chapter 10 (i.e., benefit-cost analysis). Section 8.2 addresses need for power and the electricity that will be produced by this project.

8.1 NON-POWER GOALS AND ANCILLARY BENEFITS OF THIS PROJECT

As discussed in Chapter 1, and in the NRC Early Site Permit (ESP) Final Environmental Impact Statement (FEIS) (NRC, 2019), the primary purpose and need of the proposed action is to support TVA's goal of demonstrating the feasibility to license, construct, and operate SMR technology at the CRN Site. TVA is utilizing the two-step licensing process established in 10 Code of Federal Regulation (CFR) Part 50 to demonstrate that it can obtain a permit to construct, and ultimately a license to operate, CRN-1.

TVA's *2019 Integrated Resource Plan* (IRP) (TVA, 2019a) identified the various generating resources that TVA intends to pursue to meet the energy needs of the TVA Power Service Area over a 20-year planning period. The 2019 IRP recommended that TVA continue to evaluate emerging nuclear technologies, including SMRs, as part of technology innovation efforts aimed at developing future electricity generation capabilities. TVA's pursuit and acquisition of an ESP for the CRN Site in 2019 supported the recommendation in the 2019 IRP. In September 2024, TVA released a new Draft IRP for public review and comment. The 2019 IRP remains valid and guides future generation planning consistent with least-cost planning principles until TVA's subsequent IRP is issued as Final with any new or modified recommendations. In February 2022, TVA's Board of Directors announced a New Nuclear Program to explore advanced reactor options (TVA, 2022b).

Pursuit of a construction permit enables TVA to evaluate a specific SMR technology and determine whether SMRs could be used to help advance the recommendations of TVA's Final 2019 IRP and TVA's New Nuclear Program.

8.2 NEED FOR POWER

Although unrelated to the stated purpose and need for this project, any power generated from the operation of CRN-1 would be made available for regional electricity needs, thereby supporting recommended technology innovation efforts outlined in TVA's 2019 IRP. This section explains how the power generated by the deployment of CRN-1 could be used to satisfy future power needs within the TVA Power Service Area.

As detailed in Chapter 4 of the 2019 IRP (Need for Power Analysis), a primary purpose of the IRP was to study the optimal mix of resources to supply the power the TVA Power Service Area will need over the 20-year study period (2019 to 2038). TVA estimated a capacity gap by comparing anticipated demand and current (at the time the 2019 IRP was developed) supply, and then studied the type and amount of additional generating resources or energy management services needed to fill the gap. TVA would also consider whether retirements of certain resources may be economical, such as in low load cases.

As described in Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations*, Revision 3 (RG 4.2), the applicant's need for power analysis to support the NRC's need for power evaluation should meet the following four criteria discussed in the NUREG-1555, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan*: 1) systematic, 2) comprehensive, 3) subject to confirmation, and 4) responsive to forecasting uncertainty. It is TVA's determination that the 2019 IRP satisfies these criteria and no additional independent review by the NRC is required. In developing the 2019 IRP, TVA utilized an integrated, least-cost framework that considered multiple views of the future to determine how potential power-generation resource portfolios could perform in different market and external conditions. The IRP process was conducted in a transparent, inclusive manner that provided numerous opportunities for public education and participation. Stakeholders and the public provided input that helped shape the IRP. The analysis performed in the IRP study relied on industry-standard models and incorporated best practices while using an innovative methodology to evaluate the role of distributed energy resources. Resource cost and performance input data were independently validated. TVA designed scenarios that are outside of TVA's control but represent possible futures in which TVA may find itself operating. TVA created a list of uncertainties that could alter the future operating environment and affect the cost of electricity and/or mix of optimal resources. In addition, TVA utilized varying strategies, alternate business approaches within TVA's control, that differ in the type and amount of resources that are promoted in the future.

The IRP recommended that TVA continue to evaluate emerging nuclear technologies, including SMRs, as part of technology innovation efforts. As part of the IRP process, TVA prepared a Final Environmental Impact Statement in accordance with the National Environmental Policy Act (NEPA) to analyze the 2019 IRP's potential impacts on the environment, economy, and population in the TVA Power Service Area. It is TVA's determination that the 2019 IRP satisfies the four criteria identified in RG 4.2. Therefore, no additional independent review by the NRC is required.

In the following discussion, the "Base Case" represents TVA's assumptions (at the time the 2019 IRP was developed) and forecasts for key uncertainties and reflects modest economic growth offset by increasing efficiencies. The "Valley Load Growth" case represents economic growth driven by migration into the TVA Power Service Area and a technology-driven boost to productivity, underscored by increased electrification of industry and transportation.

8.2.1 Description of the TVA Power System

TVA's Power Service Area encompasses an 80,000-square-mile region that includes almost all of the State of Tennessee and portions of the States of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. TVA serves 153 local power companies and 60 directly served customers, which include seven federal agency customers. TVA supplies almost all electricity needs in the State of Tennessee, 32 percent in Mississippi, 27 percent in Alabama, and 26 percent in Kentucky. TVA's contribution to the electricity needs in Virginia, North Carolina, and Georgia is 3 percent or less.

TVA operates the third largest nuclear fleet in the United States. With a capacity of approximately 8,000 megawatts (MW), it provides over 40 percent of TVA's electricity generation. With the CRN Site project, TVA intends to extend its leadership in technology innovation by executing a rigorous, integrated plan to potentially deploy innovative SMR technology throughout the TVA Power Service Area.

8.2.2 Power Demand

TVA continuously monitors a variety of market conditions to inform its planning, including forecasts for loads, commodities, and resource costs. Higher demand expectations for residential and supporting services, such as data centers, are being driven by an observed shift in interstate migration patterns into the Valley that are expected to continue. Upon incorporating these trends, current TVA load forecasts point to slightly increasing peak loads over the next 20 years.

Peak load growth (Total System Demand) during the 2019 through 2038 time period is 0.3 percent annually in the Base Case and 1.7 percent Compound Average Growth Rate (CAGR) in the Valley Load Growth case. This results in relatively flat growth of about 2,000 MW in the Base Case and about 12,000 MW in the Valley Load Growth case over the 20-year study period (TVA, 2019a).

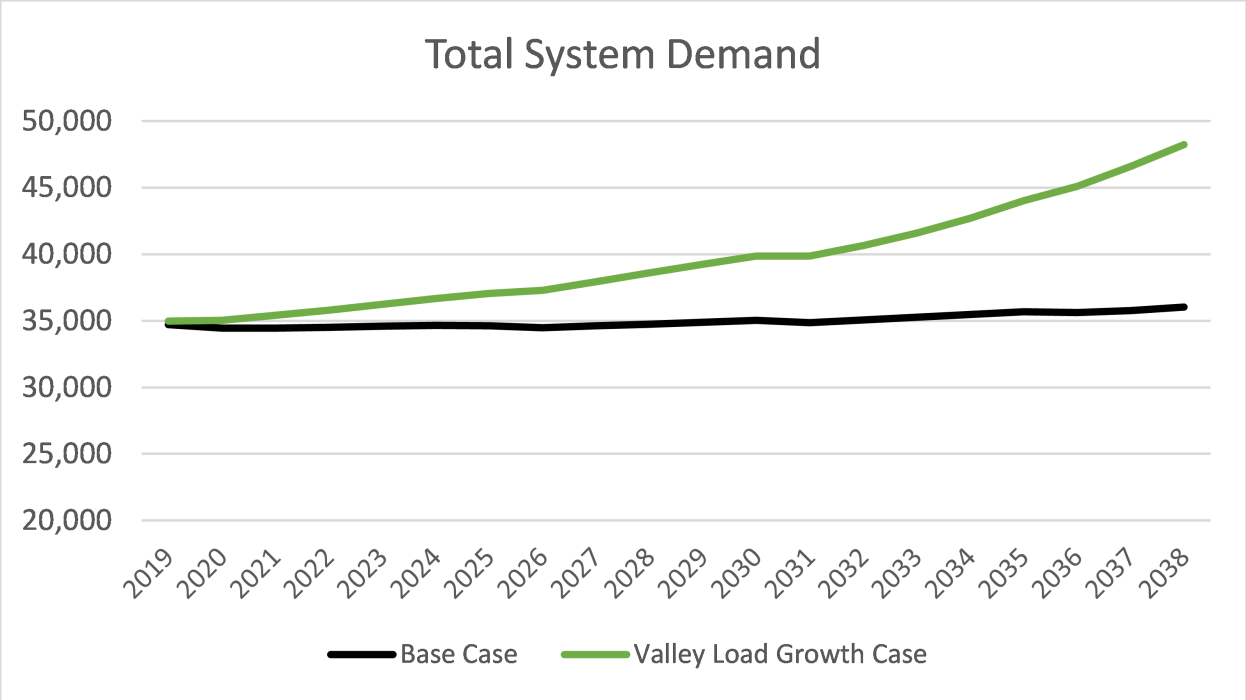


Figure 8.2-1 Total System Demand

Source: TVA 2019 Integrated Resource Plan, Figure 4-4 (TVA, 2019a)

8.2.3 Power Supply

TVA uses a wide range of technologies to meet the needs of the residents, businesses, and industries in the TVA Power Service Area. Having a diverse portfolio of resource types—including coal, nuclear, natural gas, hydro, and other renewable resources—and being able to use these resources in different ways enables TVA to provide reliable, low-cost power while minimizing the risk of disproportionate reliance on any one type of resource. In FY2024, approximately 55 percent of TVA's energy was sourced from emission-free assets such as nuclear power and renewable resources including hydro.

As described in the 2019 IRP, existing resources decrease through 2038 primarily because of the anticipated retirement of coal-fired units and the expiration of existing contracts (power purchase agreements). The renewable component of the existing portfolio is primarily composed of wind power purchase agreements that expire in the early 2030s. Because the power generated from wind and other renewable resources is intermittent, the firm capacity (or the amount of capacity that can be applied to firm requirements) for these assets is lower than the nameplate capacity.

8.2.4 Capacity Gap

Capacity gap is the difference between total supply and total demand. More specifically, it is the difference in megawatts between a power provider's existing firm capacity and the forecast annual peak adjusted for any interruptible customer loads and long-term planning reserve requirements. The 2019 IRP assumed long-term planning reserve requirements of 17 percent for summer and 25 percent for winter.

As demonstrated by Figure 8.2-2, TVA estimates an approximately 6,000 MW gap between supply and demand in the Base Case and approximately 18,000 MW in the Valley Load Growth case evaluated in the 2019 IRP.

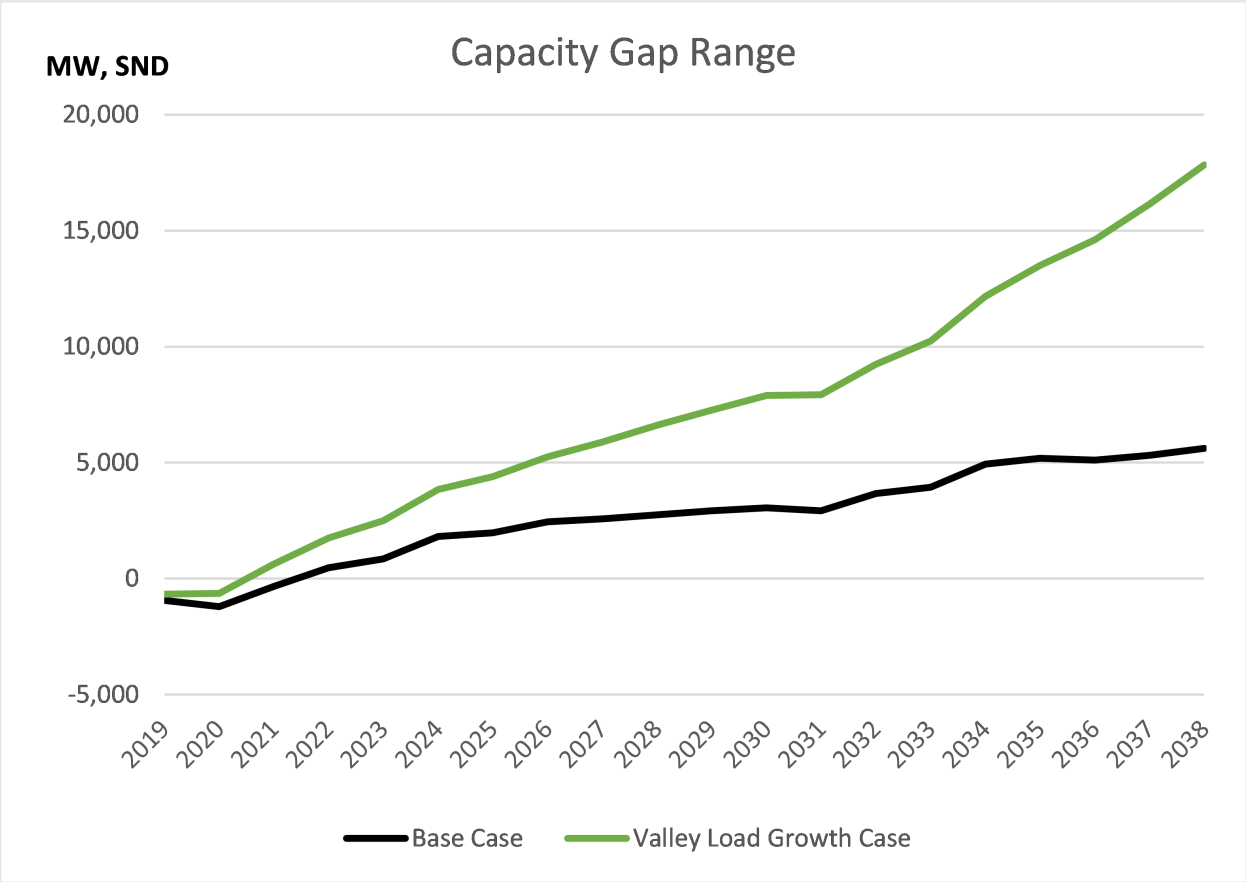


Figure 8.2-2 Capacity Gap Range, Summer Net Dependable (SND) MW

Source: TVA 2019 Integrated Resource Plan, Figure 4-10 (TVA, 2019a)

Electricity resulting from the operation of CRN-1 could be used to fill a portion of the gap between future generation and future demand, thereby satisfying a small portion of the potential future electrical needs within the TVA Power Service Area.

8.3 REFERENCES

NRC. See U.S. Nuclear Regulatory Commission

Tennessee Valley Authority (TVA), 2019a. Integrated Resource Plan. Vol. I Final Resource Plan.

TVA, 2019b. Integrated Resource Plan. Vol. II Final Environmental Impact Statement.

TVA, 2022b. TVA Board Authorizes New Nuclear Program to Explore Innovative Technology. Feb 10, 2022. Website: https://www.tva.com/newsroom/press-releases/tva-board-authorizes-new-nuclear-program-to-explore-innovative-technology#:~:text=The%20New%20Nuclear%20Program%20will,to%20support%20future%20energy%20needs, accessed July 5, 2022.

U.S. Nuclear Regulatory Commission (NRC), 2019. Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site. NUREG-2226, Volume 1, Washington, D.C. ADAMS Accession No. ML19073A099.

TABLE OF CONTENTS

CHAPTER 9 ALTERNATIVES TO THE PROPOSED ACTION 9-1

9.1 NO ACTION ALTERNATIVE 9-1

9.2 ENERGY ALTERNATIVES 9-2

9.3 ALTERNATIVE SITES 9-3

9.4 ALTERNATIVE PLANT SYSTEMS 9-3

9.4.1 Heat Dissipation Systems 9-3

9.4.2 Circulating Water Systems 9-4

9.4.3 Other Systems Alternatives 9-6

9.5 REFERENCES 9-6

CHAPTER 9 ALTERNATIVES TO THE PROPOSED ACTION

This chapter assesses the feasibility and potential impact of alternatives to demonstrating the GE Hitachi (GEH) BWRX-300 technology at the Clinch River Nuclear (CRN) Site. This project is hereafter referred to as CRN Unit 1 (CRN-1).

As discussed in Chapter 1, the Tennessee Valley Authority (TVA) intends to pursue various generating resources to meet the energy needs of the TVA Power Service Area, including evaluating a small modular reactor (SMR) demonstration, as part of technology innovation efforts aimed at developing future electricity generation capabilities.

Consistent with NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA for the CRN Site (NRC, 2019), the purpose and need of the proposed action is to support TVA's goal of demonstrating the feasibility of licensing, constructing, and operating a SMR at the CRN Site. The demonstration will inform the evaluation of whether SMR technology can effectively be used to help advance the recommendations of the *2019 Integrated Resource Plan*. TVA is utilizing the two-step licensing process established in 10 Code of Federal Regulations (CFR) Part 50. Pursuit of a Construction Permit (CP) is the first step in this two-step licensing process.

This chapter is divided into the following sections:

- No Action Alternative (Section 9.1)
- Energy Alternatives (Section 9.2)
- Alternative Sites (Section 9.3)
- Alternative Plant and Transmission Systems (Section 9.4)
- References (Section 9.5)

9.1 NO ACTION ALTERNATIVE

The No Action Alternative is described in ESPA ER Section 9.1 and NRC ESP FEIS Section 9.1. TVA is utilizing the two-step licensing process established in 10 CFR Part 50, *Domestic Licensing of Production and Utilization Facilities*, to assess whether SMR technology can effectively be demonstrated and used. Under the No Action Alternative, the NRC would not issue the CP and TVA would not construct CRN-1. Therefore, the SMALL to LARGE environmental consequences of constructing, and ultimately operating CRN-1 would be avoided. However, the primary objectives of the project would remain unfulfilled and the value of the ESP would be diminished.

Based on the analyses presented herein, the environmental impacts of building and operating CRN-1 were concluded to be SMALL to LARGE. Building and operating CRN-1 provides socioeconomic benefits described in Sections 4.4 and 5.4, including increases in tax revenues to local jurisdictions. Additionally, building and operating CRN-1 would successfully demonstrate the ability to license, construct, and eventually operate a SMR at the CRN Site. These benefits would not be realized under the No Action Alternative if the reactor were not constructed and ultimately operated. These benefits would not be realized under the No Action Alternative.

Leaving the benefits unfulfilled is neither desirable nor consistent with the project purpose and need. However, because the purpose and need for this project is not based on a need for power, TVA would not have any other necessary actions under the No Action Alternative and therefore, no further evaluation is required.

9.2 ENERGY ALTERNATIVES

Energy alternatives are described in ESPA ER Section 9.2 and NRC ESP FEIS Section 9.2. A key aspect of the energy alternatives analysis is that the energy alternatives should be capable of meeting the purpose and need of the proposed project. Consistent with the guidance in Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations*, the first step in the discussion of energy alternatives is to evaluate and identify the energy sources other than nuclear that have the potential to meet the purpose and need for the project and eliminate from detailed discussion energy sources that cannot meet the purpose and need. Additionally, the guidance states that the energy alternatives analysis need only consider those alternatives that are reasonable. Reasonable alternatives are those that can meet the purpose and need of the project. If an alternative cannot meet the purpose and need for the project, it can be eliminated from further consideration.

Historically, the primary benefit of nuclear power generation projects has been to provide electrical power to the power grid, which necessitates an evaluation of energy alternatives other than nuclear energy that have the potential to meet the purpose and need for the project. However, as noted in Chapter 8, SMRs may be built for purposes other than energy production (e.g., to generate process heat, to desalinate water, or as a research and demonstration project).

As discussed in Chapters 1 and 8, and in the NRC's ESP FEIS (NRC and USACE, 2019), the purpose and need of this proposed action is to support TVA's goal of demonstrating the feasibility to license, construct, and operate SMR technology at the CRN Site. Because the purpose and need and the objectives of this project require the demonstration of TVA's ability to license, construct, and operate a SMR, and because the purpose and need and the main objectives of this project are unrelated to the generation and sale of electricity to the public, there are no alternative energy sources other than a SMR that have the potential to meet the purpose and need for the project.

In January 2024, TVA developed a nuclear technology readiness assessment that evaluated ten potential advanced nuclear reactor and SMR designs to determine the current state of readiness. Although secondary to the purpose and need of this project, these systems were selected because they are currently the most likely candidates to produce grid-level electricity. The reactor types included in the evaluation consisted of light-water boiling water reactor and pressurized water reactor, high-temperature gas-cooled reactor, liquid sodium, and molten salt reactor designs. Each technology was evaluated based on the overall technology readiness level. In addition, each technology was subjected to a technology assessment, a licensing assessment, an economic assessment, a manufacturing assessment, and a risk assessment, with the intention of gaining insight into the key areas of development needed to progress the designs.

The evaluation determined that the GEH BWRX-300 design is currently the most commercial-ready system for utility-scale electricity production. This determination is based largely on:

- GEH BWRX-300's commonalities with the existing nuclear fleet, including TVA's Browns Ferry Nuclear Plant;
- prior NRC licensing approvals, including an existing licensed nuclear fuel type;
- decades of global construction and operating experience;
- a well-established supply chain; and
- international interest in the GEH BWRX-300.

TVA has concluded that no other energy alternatives satisfy the purpose and need, and the GEH BWRX-300 technology is the most viable option to demonstrate the capability to satisfy the project's purpose and need and to achieve TVA's goals and objectives as stated in this ER.

9.3 ALTERNATIVE SITES

Alternative sites are described in ESPA ER Section 9.3 and NRC ESP FEIS Section 9.3. Alternative sites were evaluated in Early Site Permit Application (ESPA) ER Section 9.3 and fully resolved in NRC ESP FEIS Section 9.3. In accordance with 10 CFR 51.92(e)(3), and consistent with the ESP Finality on Environmental Issues in SECY-06-0220, *Final Rule to Update 10 CFR Part 21, Licenses, Certification, and Approvals for Nuclear Power Plants*, no further discussion is required.

9.4 ALTERNATIVE PLANT SYSTEMS

Alternative plant systems are described in ESPA ER Section 9.4 and NRC ESP FEIS Section 9.4. This section discusses alternative plant systems for CRN-1. This information is provided to describe alternatives to proposed plant. The heat dissipation and circulating water systems (CWS) for CRN-1 are presented in ER Subsections Subsection 3.2.2 and Subsection 3.2.3. Subsection 9.4.1 evaluates alternative heat dissipation systems, Subsection 9.4.2 considers CWS alternatives, and Subsection 9.4.3 discusses transmission system alternatives.

9.4.1 Heat Dissipation Systems

Subsection 3.2.3 describes the CRN-1 cooling system in detail. The purpose of a heat dissipation system is to dissipate heat energy from plant operations to the environment. The main heat dissipation system for the proposed CRN-1 is via evaporation of water in the mechanical draft (wet) cooling towers. The preferred primary method of condenser heat dissipation described in ESPA ER Section 3.4 is a similar closed system consisting of mechanical draft cooling towers. This method meets the cooling requirements of the proposed turbine condenser and provides environmental protection for the Clinch River arm of the Watts Bar Reservoir (Reservoir). A closed heat dissipation system limits withdrawals from the Reservoir to makeup water and limits discharges to blowdown.

NRC ESP FEIS Subsection 9.4.1 evaluates the heat dissipation alternatives to mechanical draft (wet) cooling towers for the CWS. These alternatives included natural draft (wet) cooling towers, wet/dry cooling towers, dry cooling towers, cooling ponds, and spray ponds. NRC did not find any of these alternatives environmentally preferable. The service water system (SWS) was not described in the ESPA ER, but the NRC assumed that the SWS heat-dissipation needs would be a small fraction of the 5.593×10^9 British thermal units per hour heat dissipation required from the CWS based on the plant characteristics described in the ESP plant parameter envelope.

The NRC ESP FEIS did not identify any issues regarding heat dissipation alternatives that were not resolved.

Having implemented the process described in Section 1.8, TVA identified no new inputs associated with the proposed action that would alter the NRC ESP FEIS analysis of alternate CWS heat dissipation designs. Therefore, information from the NRC ESP FEIS Subsection 9.4.1 is incorporated by reference.

9.4.2 Circulating Water Systems

The CWS for CRN-1 is described in Chapter 3. CWS water supply sources and CWS water treatment are described in Subsection 3.2.2. Intake and discharge designs and locations are discussed in Subsection 3.2.3.

The NRC ESP FEIS did not identify any issues regarding alternate intake designs that were not resolved.

The proposed intake design described in the NRC ESP FEIS consists of a shoreline intake structure that is compliant with Clean Water Act 316(b) requirements for protection of aquatic life, with maximum intake and screen velocities less than 0.5 feet per second. The NRC considered alternatives to the proposed intake system, including a mid-channel intake pipe, an intake canal, a radial collector well system, and alternative intake structure locations, and concluded that they were either not environmentally preferable or not suitable for the CRN Site.

Having implemented the process described in Section 1.8, TVA identified new inputs associated with the proposed action related to the details of the intake structure, including consideration of navigational requirements. In particular, TVA evaluated options that included sloping bank-mount screens with circular wet wells, on-bank rectangular intakes with traveling screens, suction manifold intakes with conical screens, off-channel intake with dual flow band screens, trestle-supported screens with inclined pumps, and an offshore submerged intake connected to a vertical shaft wet well. Each of these options includes design features that maintain compliance with Clean Water Act 316(b) and includes a maximum intake through screen velocity of less than 0.5 feet per second.

Subsection 3.2.3 describes the development of a bounding case using parameters of two different intake alternatives: a recessed shoreline intake structure with traveling screens and a submerged offshore intake. The submerged intake system would consist of a vertical shaft wet well shoreline facility with a subsurface conduit extending to an offshore submerged intake equipped with an air burst system to periodically clear debris from the intake. TVA evaluated the

environmental impact of the intake structure alternatives and determined that the impacts are similar to those assessed in the NRC ESP FEIS. Therefore, this information is determined to be "new, but not significant."

9.4.2.1 Discharge Designs and Alternative Water Sources

NRC ESP FEIS Subsection 9.4.2 evaluated alternative discharge designs as well as alternative CWS water supply sources. NRC considered alternatives to the proposed discharge system, including various combinations of direct release to the Reservoir, use of a holding pond, an oriented spray cooling system, a bypass for the Melton Hill Hydroelectric Dam, and increase in cycles of concentration. NRC considered water supply alternatives including groundwater, City of Oak Ridge water, and recycled wastewater. NRC did not find any of these alternatives environmentally preferable.

The NRC ESP FEIS did not identify any issues regarding alternate discharge or alternative CWS water supply that were not resolved.

Having implemented the process described in Section 1.8, TVA identified no new inputs associated with the proposed action that would alter the NRC ESP FEIS analysis of alternate discharge designs or CWS water supply.

9.4.2.2 Water Treatment

The proposed treatment of the water supply for operation of the CWS is described in Subsection 3.2.2. Biocides and other chemicals are used to treat cooling and process water. The quantities and concentrations of chemicals to be used will be in accordance with a Biocide/ Corrosion Treatment Plan submitted as part of the National Pollution Discharge Elimination System (NPDES) permit application to the Tennessee Department of Environment and Conservation (TDEC).

Because water treatment was not described in the ESPA ER, the NRC did not evaluate CWS water treatment alternatives. As such, water treatment needs were not resolved in the NRC ESP FEIS. As described in Section 5.2, effluent from the water treatment system selected for use will meet the NPDES permit requirements from TDEC. Because any system chosen must meet such regulatory requirements, no environmentally equivalent or superior alternative water treatment option is identified.

Having implemented the process described in Section 1.8, TVA identified no new inputs associated with the proposed action that would alter the NRC ESP FEIS analysis of water treatment.

9.4.3 Other Systems Alternatives

As described in Subsection 3.2.2, the quantities and concentrations of constituents within wastewater streams will be managed in accordance with a Biocide/Corrosion Treatment Plan and provisions of the NPDES permit issued by TDEC. As such, the impact of effluents from CRN-1 on the environment does not warrant consideration of alternative designs for other systems.

9.5 REFERENCES

U.S. Nuclear Regulatory Commission (NRC), 2019. Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site. NUREG-2226, Volume 1, Washington, D.C. ADAMS Accession No. ML19073A099.

TABLE OF CONTENTS

CHAPTER 10 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION 10-1

10.1 IMPACTS OF THE PROPOSED ACTIONS 10-1

10.2 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS 10-1

10.2.1 Unavoidable Adverse Impacts During Preconstruction and Construction 10-2

10.2.2 Unavoidable Adverse Impacts during Operation 10-2

10.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES 10-9

10.3.1 Irreversible Commitments of Resources 10-9

10.3.2 Irretrievable Commitments of Resources 10-9

10.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE HUMAN ENVIRONMENT 10-10

10.5 ALTERNATIVES TO THE PROPOSED ACTION 10-11

10.6 BENEFIT-COST BALANCE 10-12

10.6.1 Benefits 10-12

10.6.2 Costs 10-14

10.6.3 Summary 10-15

10.7 REFERENCES 10-21

LIST OF TABLES

Table 10.2-1 Updated Unavoidable Adverse Environmental Impacts during Construction and Preconstruction 10-3

Table 10.2-2 Updated Unavoidable Adverse Environmental Impacts during Operation 10-7

Table 10.6-1 CRN-1 Benefits Summary 10-16

Table 10.6-2 CRN-1 Costs Summary 10-17

CHAPTER 10 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

The potential environmental consequences of constructing and operating a nuclear power plant at the Clinch River Nuclear (CRN) Site are summarized in CRN Early Site Permit Application (ESPA) Environmental Report (ER) Chapter 10 and Chapter 10 of NUREG-2226, *Environmental Impact Statement for an Early Site Permit (ESP) at the Clinch River Nuclear Site: Final Report* (NRC ESP FEIS), associated with the environmental review of TVA's ESPA for the CRN Site. Supplemental information regarding potential environmental consequences of constructing and operating CRN Unit 1 (CRN-1) is presented in the following sections.

10.1 IMPACTS OF THE PROPOSED ACTIONS

The following chapters present new and notable information relating to the impacts.

- Chapter 4 describes the impacts of building CRN-1.
- Chapter 5 describes the impacts of operating of CRN-1.
- Chapter 6 describes the impacts associated with the fuel cycle, transportation, and decommissioning for CRN-1.
- Chapter 7 describes the impacts associated with building, operating, and decommissioning CRN-1 when considered along with other past, present, and reasonably foreseeable future projects in the geographic region around the site.

As described in each of the above chapters, having implemented the process described in Section 1.8, Tennessee Valley Authority (TVA) identified information regarding unavoidable adverse impacts that is updated from that previously included in the ESPA ER and NRC ESP FEIS.

This chapter is divided into the following sections:

- Impacts of the Proposed Actions (Section 10.1)
- Unavoidable Adverse Environmental Impacts (Section 10.2)
- Irreversible and Irretrievable Commitments of Resources (Section 10.3)
- Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment (Section 10.4)
- Alternatives to the Proposed Action (Section 10.5)
- Benefit-Cost Balance (Section 10.6)
- References (Section 10.7)

10.2 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

This section describes principal unavoidable adverse environmental impacts for which mitigation measures are either considered impractical, do not exist, or cannot entirely eliminate the impact. Chapter 4 describes the impacts of building CRN-1 and Chapter 5 describes the impacts of operating CRN-1. The unavoidable adverse impacts identified in Chapters 4 and 5 are discussed in Subsection 10.2.1.

10.2.1 Unavoidable Adverse Impacts During Preconstruction and Construction

As described in Section 3.3, "building" the plant on the CRN site includes both preconstruction and construction activities. Preconstruction activities are not related to nuclear safety and are generally site-wide in scope. Construction activities are more likely to be unit-specific and include activities associated with safety-related structures, systems, and components.

Table 10.2-1 summarizes the updated information relative to the information included in Table 10-1 of the NRC ESP FEIS. This includes updated impact determinations related to building activities for each resource, the mitigation and control measures available to reduce those impacts, and the remaining unavoidable adverse impacts. The impact determinations in the text and in Table 10.2-1 address the combined impacts of building activities. Mitigation measures and TVA's programs, policies, and procedures for reducing building-related impacts include enhanced habitat protection within the Grassy Creek Habitat Protection Area (HPA), implementation of the Stormwater Pollution Prevention Plan (SWPPP) and Integrated Pollution Prevention Plan (IPPP), use of other best management practices (BMPs) that minimize erosion and stabilize the land surface, compliance with National Pollutant Discharge Elimination System (NPDES) permitting limits, implementation of wetland and stream mitigation plans in accordance with U.S. Army Corps of Engineers (USACE) and Tennessee Department of Environment and Conservation (TDEC) requirements, implementation of conservation measures in accordance with Endangered Species Act Section 7 consultation, and adherence to the terms of the Programmatic Agreements (PAs) for historic and cultural resources as appropriate. The BMPs are implemented through permitting requirements and plans and procedures developed for building and operating CRN-1.

As indicated in Table 10.2-1, updated unavoidable adverse environmental impacts during building are primarily attributable to:

- Land impacts associated with quarry development
- Land disturbance from building the associated offsite 161-kilovolt (kV) transmission line
- Building activities within streams, wetlands, and floodplains
- Visual intrusions from the associated offsite 161-kV transmission line

10.2.2 Unavoidable Adverse Impacts during Operation

Table 10.2-2 contains updated information relative to the information included in Table 10-1 of the NRC ESP FEIS. This includes updated impact determinations related to operational activities for each resource, the mitigation and control measures available to reduce those impacts, and the remaining unavoidable adverse impacts.

Table 10.2-1 Updated Unavoidable Adverse Environmental Impacts during Construction and Preconstruction (Sheet 1 of 4)

Resource Area	Impact Determination	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
Land Use	MODERATE	Approximately half of the 280-foot-wide transmission corridor (14 acres) is affected based upon final design. TVA will minimize impacts to sensitive species in consultation with the U.S. Fish and Wildlife Service. TVA has expanded the Grassy Creek HPA (Parcel 146, Zone 3 – Sensitive Resource Management) by approximately 14 acres to include sensitive plant species habitat to provide additional protection. TVA will update the Watts Bar Reservoir Land Management Plan to include reallocation of the expanded 14-acre area of the Grassy Creek HPA from Zone 5 Industrial to Zone 3 – Sensitive Resource Management.	Building activities associated with the new transmission line occur in approximately 29 offsite acres. It is likely the affected area will be limited to 15 acres. Building activities occur in 27.7 acres of floodplain within the permanent disturbance area and 3.4 acres of floodplain within the temporary disturbance area. Building activities associated with the development of an onsite quarry occur within an approximately 40-acre footprint on the CRN Site that will include an estimated 10 to 20-acre quarry pit and associated crushing, blending, and stockpiling operation.

Table 10.2-1 Updated Unavoidable Adverse Environmental Impacts during Construction and Preconstruction (Sheet 2 of 4)

Resource Area	Impact Determination	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
Water Resources			
Surface Water Hydrologic Alterations	SMALL	Hydrologic alterations to streams will comply with applicable permit requirements, including a Clean Water Act Section 404 permit from the USACE and an Aquatic Resource Alteration Permit authorization from the TDEC. Additionally, a SWPPP will be in place for erosion protection and stormwater management. A SWPPP will be prepared to meet TDEC stormwater construction permit discharge requirements and will incorporate BMPs to minimize erosion and stabilize the land surface. To minimize and compensate for impacts to regulated aquatic resources, TVA will implement a wetland and stream mitigation plan in accordance with USACE and TDEC requirements. Additionally, temporary impacts to streams within the transmission corridor will be localized and minimized in accordance with TVA's streamside management zone provisions as described in TVA's *A Guide for Environmental Protection and Best Management Practices for Construction and Maintenance Activities*.	Permanent impacts to: • 3 ponds (0.65 acre) • 11 perennial/intermittent streams (3,586 lineal feet) • 8 wet weather conveyances (WWCs) (2,694 lineal feet) Temporary impacts to: • 3 perennial/intermittent streams (101 lineal feet) • 3 WWC's (64 lineal feet) Additionally, permanent impacts to perennial stream STR03, which is also a backwater feature of the Clinch River arm of the Watts Bar Reservoir (Reservoir), will result from improvements to the barge access haul road.

Table 10.2-1 Updated Unavoidable Adverse Environmental Impacts during Construction and Preconstruction (Sheet 3 of 4)

Resource Area	Impact Determination	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
Ecological Impacts			
Terrestrial and Wetland Resources	MODERATE	TVA will use targeted herbicide applications or mechanical means to maintain herbaceous vegetation in the 161-kV transmission corridor and minimize significant impacts to state-listed species by designing the transmission line to avoid the species and their habitat to the greatest extent possible. TVA transmission engineers will consult with the TVA botanist during design to consider habitat locations early in the process. TVA will consider additional avoidance measures once a final transmission route is determined. TVA has also expanded the Grassy Creek HPA by approximately 14 acres to include the area where rigid sedge and pale green orchid occur to provide additional protection. BMPs will be implemented, including those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2022a), the *Tennessee Erosion and Sediment Control Handbook* (TDEC, 2012), the project-specific SWPPP, and site-specific IPPP. TVA will implement sustainability measures during building to include development of pollinator habitats and other sustainable development and land management policies in association with a site biodiversity plan that will be prepared in accordance with TVA's Biodiversity Policy.	Approximately 29 acres of impact within associated offsite 161-kV transmission corridor to various habitats. Most of the potential impact area within the 280-foot-wide offsite corridor will consist of permanent conversion of forested habitats to herbaceous and/or shrub/scrub vegetation (approximately 25 out of 29 acres). Approximately 12.7 acres of important deciduous calcareous upland and wetland forest that contains state-listed plant species, rigid sedge and pale green orchid are potentially affected by the 161-kV transmission corridor. Building activities affect 0.8-acre of spreading false-foxglove habitat. Area of wetland impact from building activities includes approximately 9.2 acres of the CRN Site, 1.7 acres in the Barge and Traffic Area (BTA), and 3.6 acres in the associated 161-kV transmission corridor which will be avoided to the extent practical.

Table 10.2-1 Updated Unavoidable Adverse Environmental Impacts during Construction and Preconstruction (Sheet 4 of 4)

Resource Area	Impact Determination	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
		Impacts in the associated offsite 161-kV transmission corridor will also be minimized because the transmission line will only occupy a 120-foot wide route within the 280-foot wide analyzed corridor. Additionally, only when and if the injunction is lifted, post-building impacts will be minimized by maintaining the transmission line in a manner consistent with TVA's *Transmission System Vegetation Management Final Programmatic Environmental Impact Statement* (TVA, 2019a). TVA will also implement a wetland and stream mitigation plan in accordance with USACE and TDEC requirements.	
Aquatic Resources	SMALL	TVA will minimize and compensate for impacts to jurisdictional waters and will implement a wetland and stream mitigation plan in accordance with USACE and TDEC requirements that will provide compensation for related losses in aquatic habitat resulting from building CRN-1.	Approximately 3,586 lineal feet of streams and 2,694 lineal feet of WWCs on the CRN Site and in associated offsite areas will be permanently impacted by building.
Socioeconomic Impacts			
Physical	SMALL To MODERATE	No update	Visual intrusion will result from building the associated offsite 161-kV transmission line.
Historic and Cultural Resources	SMALL	To ensure avoidance of sensitive resource areas during construction activities, TVA staff will set up brightly colored construction fencing surrounding identified sensitive areas and will ensure that the sensitive areas are indicated on project plans and that construction personnel understand the need to avoid the areas and their location.	Unavoidable adverse impacts to four sites potentially eligible for the National Register of Historic Places (NRHP) are reduced.

Table 10.2-2 Updated Unavoidable Adverse Environmental Impacts during Operation (Sheet 1 of 2)

Resource Area	Adverse Impacts	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
Water Resources			
Surface Water Quality Impacts	SMALL	TVA will work with TDEC throughout the NPDES permitting process to establish appropriate permit conditions to support operation of CRN-1 to minimize impacts of the thermal discharge on the Reservoir.	Thermal effects of the discharge of CRN-1 are less than those estimated in the NRC ESP FEIS. However, the presence of a thermal pancake within the Reservoir results in a condition in which water temperature compliance parameters may be periodically exceeded.
Ecological Resources			
	SMALL	TVA will implement sustainability measures during operation of CRN-1 to include development of pollinator habitats and other sustainable development and land management policies in association with a site biodiversity plan that will be prepared in accordance with TVA's Biodiversity Policy.	No update
Socioeconomic Impacts			
Physical	SMALL to MODERATE (aesthetics)	No update	The addition of new transmission line towers and cleared areas for the associated offsite 161-kV transmission line results in a noticeable visual intrusion.

Table 10.2-2 Updated Unavoidable Adverse Environmental Impacts during Operation (Sheet 2 of 2)

Resource Area	Adverse Impacts	Updated Actions to Mitigate Impacts	Updated Unavoidable Adverse Impacts
Historic and Cultural Resources	SMALL	In 2019, TVA executed the Programmatic Agreement (PA) between TVA, the State Historic Preservation Officers of states within TVA's Power Service Area, and federally recognized tribes regarding undertakings subject to Section 106 of the National Historic Preservation Act (NHPA) (2019 Valleywide Section 106 PA). The 2019 Valleywide Section 106 PA identifies routine, repetitive actions across the TVA Power Service Area that can be excluded from Section 106 review, as well as actions with low potential to affect historic properties for which, under specific circumstances, TVA may find, without consultation, do not result in adverse effects on historic properties. In accordance with Section 106 of the NHPA, its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800.1-16, and the 2019 Valleywide Section 106 PA, TVA will avoid, minimize, or mitigate potential operation-related impacts associated with CRN-1.	No update

10.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The commitment of resources summarized in this section is discussed in Chapters 4, 5, and 6.

10.3.1 Irreversible Commitments of Resources

Irreversible commitments of environmental resources from preconstruction, construction, and operation of a nuclear power plant at the CRN Site, in addition to the materials used for the nuclear fuel, are addressed in CRN ESPA ER Section 10.2 and the NRC ESP FEIS Section 10.3.1. The NRC did not identify any issues regarding the irreversible commitment of resources that were not resolved.

Based upon a review of the analyses contained in Chapters 4, 5, and 6, TVA did not identify any new irreversible commitment of resources associated with building and operating CRN-1 on land use, water use and quality, terrestrial and aquatic biota, socioeconomic resources, and air quality. Although the associated offsite 161-kV transmission line that extends from the CRN Site through the Grassy Creek HPA and across Bear Creek Road to interconnect with the Kingston Fossil Plant (FP)-Bethel Valley Hydroelectric Plant (HP) #2 transmission line is a new component of the project, the land supporting the transmission line could revert to its former vegetated state or be used for other purposes once the nuclear power plant ceases operations or is decommissioned in accordance with NRC requirements.

However, TVA identified new information related to irreversible commitment of resources associated with historic and cultural resources. As described in Section 4.5 and Section 5.5, new information regarding a Phase II archaeological investigation on the CRN Site and changes to the disturbance areas for CRN-1 compared to what was assessed for the NRC ESP FEIS have significantly reduced the potential for permanent damage to historic and cultural resources located at the CRN Site. As such, the irreversible commitment of historic and cultural resources is reduced from that described in the NRC ESP FEIS.

10.3.2 Irretrievable Commitments of Resources

Irretrievable commitments of resources during the building of a new nuclear power plant at the CRN Site are addressed in CRN ESPA ER Section 10.2 and NRC ESP FEIS Subsection 10.3.2. The NRC did not identify any issues regarding the irretrievable commitment of resources that were not resolved.

Based upon a review of the analyses contained in Chapters 3, 4, 5, and 6, TVA did not identify any new irretrievable commitment of resources associated with building and operating CRN-1. However, TVA identified new information regarding the plant size. The NRC used a study by the

DOE (DOE, 2004) to estimate the commitment of construction resources (e.g., concrete, steel, and other building materials). This study was based on a typical 1,300-megawatt-electric (MWe) nuclear power plant and provides the following new reactor construction estimates:

- 12,239 cubic yards of concrete and 3,107 tons of steel reinforcement (i.e. rebar) for a reactor building
- 13,000,000 linear feet of cable
- Up to 275,000 linear feet of piping (greater than or equal to 2.5 inches) for a single 1,300-MWe unit

Historical records of operating reactors suggest a total of about 182,900 cubic yards of concrete and 20,512 tons of structural steel would be required to construct the reactor building, major auxiliary buildings, turbine generator building, and turbine generator pedestal (DOE, 2005).

Based on the nominal gross electrical power output of 300 MWe of CRN-1, and compared to the 800-MWe capacity for the CRN Site evaluated in the NRC ESP FEIS, the quantities of construction materials required for CRN-1 can be scaled to approximately 38 percent of the NRC analysis. For CRN-1, rock to produce backfill material would be obtained at either an existing commercial offsite quarry or an onsite quarry developed by TVA. The use of construction materials in the quantities associated with those expected for a nuclear power plant, while irretrievable (unless they are recycled at decommissioning) would be of small consequence with respect to the availability of such resources and is confirmatory of NRC's finding.

As indicated in the NRC ESP FEIS, the main resource that would be irretrievably committed during operation of two or more small modular reactors (SMRs) at the CRN Site would be uranium. The availability of uranium ore and existing stockpiles of highly enriched uranium that could be processed into fuel are sufficient so that the irretrievable commitment would be negligible. Because the nominal gross generating capacity of CRN-1 is 300 MWe, as compared to the 800-MWe capacity for the CRN Site evaluated in the NRC ESP FEIS, the amount of uranium that is irretrievably committed to the operation of CRN-1 is less than that evaluated in the NRC ESP FEIS. As such, the irretrievable commitment of uranium would be negligible and is confirmatory of the NRC ESP FEIS finding.

10.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE HUMAN ENVIRONMENT

The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity are addressed in CRN ESPA ER Section 10.3 and NRC FEIS Section 10.2. The NRC did not identify any issues regarding the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity that were not resolved.

As indicated in the NRC ESP FEIS, the local use of the human environment by developing two or more SMRs at the CRN Site can be summarized as the unavoidable adverse environmental impacts of preconstruction, construction, and operations along with the irreversible and irretrievable commitments of resources. With the exception of the consumption of depletable

resources as a result of preconstruction, construction, and operation, these uses may be categorized as short-term. The principal short-term benefit of building and operating two or more SMRs would be the production of electrical energy. The economic productivity of the CRN Site, when used for the production of electrical energy, would be extremely large when compared to the productivity from other probable uses for the site.

Based upon a review of the impacts of the proposed action as summarized in Chapters 4, 5, and 6, TVA determined that the unavoidable adverse environmental impacts of building and operations along with the irreversible and irretrievable commitments of resources associated with CRN-1 are short term and similar to that determined in the NRC ESP FEIS. Because the nominal gross generating capacity of CRN-1 is 300 MWe, as compared to the 800-MWe capacity for the CRN Site evaluated in the NRC ESP FEIS, the short-term benefit of the production of electrical energy and its secondary economic benefits is reduced.

Similar to the analysis presented in the NRC ESP FEIS, the maximum long-term impact on productivity at the CRN Site would result if CRN-1 was not immediately dismantled at the end of its period of operation. Consequently, the land occupied by the plant structures would be unavailable for any other use. However, it is expected that the successful demonstration of the CRN-1 project would lead to a correspondingly large increase in regional long-term productivity that would not be equaled by any other long-term use of the site. In addition, most long-term impacts resulting from land-use preemption by plant structures could be eliminated by removing these structures or by converting them to other productive uses at the end of operations. When CRN-1 ceases operation, plant structures would be decommissioned according to the NRC regulations. Once decommissioning was completed and the NRC license was terminated, the site would become available for other uses.

As discussed in Chapter 9, the purpose and need of the proposed action is to support TVA's goal of demonstrating the feasibility of licensing, constructing, and operating a SMR technology at the CRN Site. The demonstration will inform the evaluation of whether SMR technology can effectively be used. In accordance with TVA's goal, the successful licensing, construction, and operation of CRN-1 provide for the long-term benefits stated above.

10.5 ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the proposed actions are discussed in Chapter 9. The No Action Alternative, as described in Section 9.1, refers to a scenario where the NRC would not issue the Construction Permit (CP) and TVA could not construct CRN-1. The No Action Alternative is not conducive to meeting the project's purpose and need.

Energy alternatives are discussed in Section 9.2. As stated in Section 9.2, because the purpose and need and the objectives of this project require the demonstration of TVA's ability to license, construct, and operate a SMR, and because the purpose and need and the main objectives of this project are unrelated to the generation and sale of electricity to the public, there are no alternative energy sources other than a SMR that have the potential to meet the purpose and need for the project.

As stated in Section 9.3, alternative sites were evaluated in ESPA ER Section 9.3 and fully resolved in NRC ESP FEIS Section 9.3.

Section 9.4 discusses alternatives to proposed plant and transmission systems.

10.6 BENEFIT-COST BALANCE

The balance of benefits and costs was not included in TVA's CRN ESPA ER or the NRC ESP FEIS because such an assessment is not required for an ESPA per 10 CFR 51.50(b)(2). The following supplemental information assesses the expected benefits and costs of the proposed action.

10.6.1 Benefits

10.6.1.1 Demonstration of Technological Capabilities

As discussed in Chapter 1 and the NRC ESP FEIS, the primary purpose for this project is to demonstrate the ability to license, construct, and operate SMR technology at the CRN Site. TVA is utilizing the two-step licensing process established in 10 CFR Part 50 to demonstrate that it can obtain a permit to construct, and ultimately a license to operate CRN-1. Successfully demonstrating the ability to license, construct, and operate CRN-1 supports TVA's purpose and need and would enable TVA to consider utilizing SMRs throughout the TVA Power Service Area.

TVA's pursuit and acquisition of an Early Site Permit for the CRN Site in 2019 supported the recommendation in the *2019 Integrated Resource Plan* (TVA, 2019b). In February 2022, TVA's Board of Directors announced a New Nuclear Program to explore advanced reactor options (TVA, 2022b). In June 2019, TVA released the Final 2019 IRP and the associated IRP FEIS. The IRP identifies the various generating resources that TVA intends to pursue to meet the energy needs of the Tennessee River Valley (the Valley) over a 20-year planning period. In September 2024, TVA released a new Draft IRP for public review and comment. The 2019 IRP remains valid and guides future generation planning consistent with least-cost planning principles until TVA's subsequent IRP is issued as Final with any new or modified recommendations.

As discussed in Section 10.4, pursuit of a CP enables TVA to evaluate a specific SMR technology and determine whether SMRs could be used to help advance the recommendations of TVA's 2019 IRP and TVA's New Nuclear Program.

10.6.1.2 Emission Reduction Benefits

Nuclear fission does not result in emissions of air pollutants (e.g., NO_x and SO_x) or methyl mercury. As described in Section 5.6, emissions associated with CRN-1 are limited to relatively small amounts of criteria pollutants from auxiliary systems (including auxiliary boilers, diesel generators, and gas turbines) and particulate emissions from cooling towers. Thus, CRN-1 represents a substantial benefit in air emission reduction compared to other equivalent power sources.

10.6.1.3 Infrastructure Benefits

To minimize traffic impacts associated with the building of CRN-1, TVA will coordinate with the Tennessee Department of Transportation, DOE, and the City of Oak Ridge to consider any necessary mitigation strategies, such as:

- Construction of an additional westbound receiving lane on Bear Creek Road Ramp that extends through the ramp and continues southbound on Bear Creek Road
- Extension of the existing eastbound right-turn lane storage and construction of an additional eastbound left-turn lane (making dual left-turn lanes) on Bear Creek Road Ramp at Tennessee State Route 58 (TN 58)
- Construction of a traffic signal at TN 58 and Bear Creek Road Ramp intersection
- Addition of left- and right-turn only lanes at Bear Creek Road at the CRN Site entrance
- Installation of bollards on Bear Creek Road extending from southbound Bear Creek Road through the CRN Site entrance intersection to direct southbound vehicles to the outermost receiving lane into the site
- Realignment of U.S. Government Property Road at Bear Creek Road Ramp to develop an improved intersection

Roadway improvements undertaken to mitigate CRN-1 traffic impacts benefit the surrounding community by preventing delay and improving traffic flow on TN 58. This is particularly advantageous for the area as a number of the major projects considered as part of the RFFA effects analysis in Chapter 7 are also located along TN 58, within several miles of the Bear Creek Road Ramp intersection. These include developments at the East Tennessee Technology Park (Kairos Power, LLC Hermes Test Reactor and Hermes 2 Reactor, Coqui Pharma Medical Isotope Production Facility, Ultra Safe Nuclear Corporation Pilot Fuel Manufacturing Facility, and Heritage Center Industrial Park), the Oak Ridge General Aviation Airport, and the Horizon Center Industrial Park where the TRISO-X Fuel Fabrication Facility and the Helium Test Facility are planned for development. Users of TN 58, including vehicles associated with these reasonably foreseeable future actions, benefit from the improved traffic flow resulting from road improvements made as part of the CRN-1 project.

10.6.1.4 Socioeconomic Benefits

Additional important benefits from the building and operation of CRN-1 include socioeconomic effects such as increases in purchases of local and regional goods and services, local and regional direct and indirect employment, and tax revenues to local taxing jurisdictions.

Expenditures during the building phase of CRN-1 benefit employment in other sectors of the local economy, including local vendors and shops that provide materials and supplies and that serve the in-migrating construction workforce. The Economics and Statistics Division of the U.S. Bureau of Economic Analysis provides Regional Input-Output Modeling System (RIMS II) regional multipliers for industry employment and earnings. TVA obtained current multipliers for the socioeconomic Region of Influence (ROI), consisting of Anderson, Knox, Loudon, and Roane counties (BEA, 2023). For every job created in conjunction with the building of CRN-1

(approximately 1,300 workers during the peak building period), an additional 0.9534 jobs are created within the ROI. Thus, an estimated 1,239 indirect and induced jobs in the economic region are expected during the peak construction employment period. For each dollar of earnings paid to newly hired workers, 0.706 additional dollars in labor income are expected to be generated in the ROI.

Likewise, the purchases by TVA during operations support employment in other sectors of the local economy that provide materials and supplies. CRN-1 requires 205 full-time operations workers, approximately 50 percent of which would relocate from outside the ROI. Utilizing RIMS II regional multipliers for the ROI, it is estimated that for every direct operations job imported to the ROI, an additional 2.1457 indirect and induced jobs are created in the ROI. Thus, the 103 new full-time operations jobs in the ROI add an estimated 221 indirect and induced jobs in the regional economy. The income generated by the new operations jobs also generates indirect and induced income within the ROI. For operations-related income, each dollar of income generates 0.8785 dollars of indirect and induced income in the ROI (BEA, 2023).

As detailed in Subsection 4.4.3 and Subsection 5.4.3, sales tax revenues from project purchases during building and operation of CRN-1 would be beneficial, but minimal in relation to statewide sales tax revenue. In addition, the State of Tennessee allocates three percent of the tax equivalent payments it receives from TVA to impacted local governing areas that are experiencing TVA construction activity on facilities to produce electric power. These funds could be used by Anderson, Knox, Loudon, and Roane Counties to address impacts on county services. An estimate of payments that will be made within the ROI in association with building CRN-1 cannot be calculated at this time. The allocation of impact payments will be determined by the State of Tennessee after TVA notifies the State that TVA has initiated major construction activities at the CRN Site. While the impact payments may appear large in absolute terms, they are minimal when compared to the total amount of taxes collected within the ROI.

10.6.2 Costs

The costs associated with new plant building and operation are broken down into internal and external costs. Internal costs are those expended by the applicant in support of the building and operation of a new plant and are generally expressed in monetary values. External costs are the environmental costs that result from the building and operation of the new plant, and are expressed in terms of monetary, quantitative, and qualitative values.

10.6.2.1 Internal (Monetary) Costs

The estimated overnight capital cost for construction of CRN-1 is contained in Enclosure 1 of the Construction Permit Application, "General Information."

Estimates of annual operating expenses for operation and maintenance will be provided at the operating license stage.

10.6.2.2 External Costs

External costs are those environmental and societal costs that remain after mitigation and controls have been taken into account. The environmental impacts of building and operation of CRN-1 are addressed in Chapters 4 and 5, respectively. Section 10.2 identifies unavoidable adverse impacts of the proposed action (i.e., impacts after consideration of proposed mitigation actions) and Section 10.3 identifies irreversible and irretrievable commitments of resources and materials. Table 10.6-2 summarizes these costs.

10.6.3 Summary

Table 10.6-1 and Table 10.6-2 summarize benefits and costs of the proposed action. As detailed in Section 10.2 and Section 10.3, the costs of plant construction and operation are reduced by continuing efforts to avoid and minimize impacts to environmental resources. Design features, BMPs, permitting, controls, and mitigation measures reduce environmental impacts to SMALL to MODERATE. The benefits of CRN-1 are significant with respect to the emission of air pollutants, demonstration of project objectives, and economic benefits in the long-term of the licensing period.

Table 10.6-1 CRN-1 Benefits Summary

Benefit Category	Description
Demonstration	Successful demonstration of the ability to license, construct, and operate CRN-1 supports TVA's technology innovation efforts aimed at evaluating and developing future electricity generation capabilities and enables TVA to consider utilizing SMRs throughout the TVA Power Service Area.
Emissions Reduction	Demonstration of nuclear power generation that significantly reduces emissions of air pollutants when compared to equivalent sources of electricity.
Infrastructure	Roadway improvements undertaken to mitigate CRN-1 traffic impacts benefit the surrounding community by improving traffic flow and safety, thus reducing the potential for delay and accidents.
Socioeconomics	
Building	Approximately 1,300 construction workers create an incremental increase of 1,239 indirect jobs within the ROI during peak building period. Indirect jobs and expenditure of capital result in significant indirect and induced economic activity in the ROI.
Operations	205 full-time operations workers create an incremental increase in 221 indirect jobs within the ROI while the plant is operating. Indirect jobs and expenditure of capital result in significant indirect and induced economic activity in the ROI for the duration of the operating license.
Taxes and Revenue	Increased tax revenue supports improvements to public infrastructure and social services.

Table 10.6-2 CRN-1 Costs Summary
(Sheet 1 of 4)

Cost Category	Summary of Cost from NRC ESP FEIS	Additional or Updated Cost for CRN-1 Relative to NRC ESP FEIS Cost
Internal/Monetary Costs [1]		
Building Costs	Not Included in the NRC ESP FEIS	$6,000 to $10,000 per kWe for a total of $1.8 to $3.0 billion (overnight capital cost)
Financing Costs and Other Costs	Not Included in the NRC ESP FEIS	Allowance for Funds Used During Construction applied using weighted average cost of capital of 7 percent Annual average of approximately 2 percent escalation
Operation Costs	Not Included in the NRC ESP FEIS	Deferred to Operating License Application
External Costs		
Land Use	Noticeable impacts including approximately 327 acres of vegetated land permanently converted to industrial use. Approximately 167 acres temporarily disturbed and revegetated once building activities are complete.	Up to approximately 29 acres of land impacted within the associated offsite 161-kV transmission corridor. Building activities associated with the development of an onsite quarry within an approximately 40-acre footprint on the CRN Site.

Table 10.6-2 CRN-1 Costs Summary
(Sheet 2 of 4)

Cost Category	Summary of Cost from NRC ESP FEIS	Additional or Updated Cost for CRN-1 Relative to NRC ESP FEIS Cost
Hydrologic Alterations and Water Use Surface Water	Building activities result in minor impacts to surface waterbodies on and near the CRN Site, including the Reservoir, Grassy Creek, and small streams and ponds on the CRN Site, in the BTA, and in the transmission line right-of-way.	No update to Reservoir impacts Permanent impacts to: • 3 ponds (0.65 acres) • 11 perennial/intermittent streams (3,586 lineal feet) • WWCs (2,694 lineal feet) Temporary impacts to: • 3 perennial/intermittent streams (101 lineal feet) • 3 WWC's (64 lineal feet)
Consumptive Use	Consumptive use of water from the Reservoir associated with evaporation and drift from cooling towers results in a minor water loss. Additional minor water loss in potable and sanitary water supplied by the City of Oak Ridge public water supply system.	No update
Groundwater	No groundwater used for building or operations.	No update
Water Quality	Minor effects to surface water and groundwater quality after implementation of the SWPPP and IPPP, and controls associated with compliance with TDEC NPDES permit conditions.	No update
Aquatic Resources	Minor losses of aquatic biota due to habitat alteration during construction and entrainment and impingement during operation; minor localized impact to aquatic biota from thermal plume during operation.	No update

Table 10.6-2 CRN-1 Costs Summary
(Sheet 3 of 4)

Cost Category	Summary of Cost from NRC ESP FEIS	Additional or Updated Cost for CRN-1 Relative to NRC ESP FEIS Cost
Terrestrial and Wetland Resources	Noticeable habitat loss due to clearing and grading during building.	Approximately 29 acres of impact to various habitats within associated offsite 161-kV transmission corridor.
	Disturbance or destruction of wetlands during building.	Approximately 12.7 acres of important deciduous calcareous upland and wetland forest could be affected in the 161-kV transmission corridor that contains state-listed plant species (rigid sedge and pale green orchid). Building activities affect 0.8-acres of calcareous deciduous forest on the CRN Site which contain the state-listed spreading false-foxglove. Wetland impacts from building activities include approximately 9.2 acres on the CRN Site, 3.6 acres in the associated offsite 161-kV transmission corridor, and 1.7 acres in the BTA.
Historic and Cultural Resources	Potential noticeable adverse effects on 16 potentially NRHP-eligible archaeological resources, one NRHP-eligible archaeological resource (40RE233), deeply buried archaeological deposits, and one NRHP-eligible Melton Hill Dam District.	Historic and cultural resources either determined ineligible for NRHP or are avoided by building and operations activities or minimized in accordance with a PA. Disturbance of the NRHP-eligible Melton Hill Dam District is no longer proposed.

Table 10.6-2 CRN-1 Costs Summary
(Sheet 4 of 4)

Cost Category	Summary of Cost from NRC ESP FEIS	Additional or Updated Cost for CRN-1 Relative to NRC ESP FEIS Cost
Infrastructure and Community Services	Moderate to large traffic impacts on local roadways near the site during peak building period; minimal and localized during operations. Minimal impacts on recreational activities in the vicinity, except for a noticeable, but not destabilizing, reduction in recreational enjoyment due to aesthetic impacts. Minimal impacts to housing; water supply and wastewater treatment; police, fire protection, and healthcare services; and schools.	Additional visual intrusion as a result of building the associated offsite 161-kV transmission line from the CRN Site boundary, passing through the Grassy Creek HPA and across Bear Creek Road onto DOE-managed land to the intersect with the Kingston FP-Bethel Valley HP #2 transmission line.
Radiological	Doses to members of the public would be below NRC and U.S. Environmental Protection Agency standards, and there would be no observable health impacts. Occupational doses to plant workers at the site would be below NRC standards and program to maintain doses as low as reasonably achievable would be implemented. Accident dose associated with the plant parameter envelope meets the site acceptance criteria of 10 CFR 50.34 and 10 CFR Part 100.	No update

1) Internal/monetary costs were not addressed in the ESP proceeding.

10.7 REFERENCES

U.S. Bureau of Economic Analysis (BEA), 2023. Regional Input-Output Modeling System (RIMS II) Multipliers for CRN ROI, Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation, U.S. Department of Commerce, Bureau of Economic Analysis, Economics and Statistics Division. Based on 2012 Benchmark Input-Output Table for the Nation and 2021 regional data.

U.S. Department of Energy (DOE), 2004. Application of Advanced Construction Technologies to New Nuclear Power Plants. In NP2010 Improved Construction Technologies, O&M Staffing and Cost, Decommissioning Costs, and Funding Requirements Study. MPR-2610, Revision 2, Washington, D.C.

U.S. DOE, 2005. Cost Estimating Guidelines for Generation IV Nuclear Energy Systems. Rev. 2.02 Final, Economic Modeling Working Group, Washington D.C.

Tennessee Department of Environment and Conservation (TDEC), 2012. Tennessee Erosion and Sediment Control Handbook. A stormwater Planning and Design Manual for Construction Activities, Fourth Edition, August 2012.

Tennessee Valley Authority (TVA), 2019a. Transmission System Vegetation Management Final Programmatic EIS.

TVA, 2019b. Integrated Resource Plan. Vol. I Final Resource Plan.

TVA, 2022a. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4, 2022.

TVA, 2022b. TVA Board Authorizes New Nuclear Program to Explore Innovative Technology. Feb 10, 2022. Website: https://www.tva.com/newsroom/press-releases/tva-board-authorizes-new-nuclear-program-to-explore-innovative-technology#:~:text=The%20New%20Nuclear%20Program%20will,to%20support%20future%20energy%20needs, accessed July 5, 2022.

APPENDIX A CONSULTATIONS

Consultation / Interagency Correspondence

Correspondence ID	Incoming / Outgoing	Correspondence Date	Agency From	Agency To	Document Number	Subject
01 - Historic and Cultural Resources						
01-01	Outgoing	8/26/2021	TVA	TN Historical Commission - SHPO (TNSHPO)	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear (CRN) Site Advanced Nuclear Reactor Technology Park Project, Cultural Resources Survey, Loudon and Roane Counties, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972)
01-02	Incoming	8/27/2021	TNSHPO	TVA	N/A	TVA / Tennessee Valley Authority, Clinch River Nuclear Site, Jones Island Road Improvements and New 161-KV Line, Loudon and Roane Counties, TN - Archaeological Review
01-03	Incoming	9/2/2021	TNSHPO	TVA	N/A	TVA / Tennessee Valley Authority, Architecture Review, Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park, Jones Island Rd Improvements and new Transmission Line, Loudon and Roane Counties, TN
01-04	Incoming	1/7/2022	TVA	TNSHPO	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear (CRN) Site Advanced Nuclear Reactor Technology Park Project, Cultural Resources Survey, Loudon and Roane Counties, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972)
01-05	Outgoing	7/28/2022	TVA	TNSHPO	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear (CRN) Site Advanced Nuclear Reactor Technology Park Project, Roane County, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972) - Proposed Phase II Testing at Sites 40RE107, 40RE108, 40RE548, and 40RE600
01-06	Incoming	7/29/2022	TNSHPO	TVA	N/A	Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, Roane County, TN
01-07	Outgoing	9/12/2023	TVA	TNSHPO	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear Site Advanced Nuclear Reactor Technoogy Park Project, Roane County, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972) - Phase II Testing at Sites 40RE10, 40RE108, 40RE549, and 40RE600) (SHPO0001419)
01-08	Outgoing	9/12/2023	TVA	Tribes	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear Site Advanced Nuclear Reactor Technoogy Park Project, Roane County, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972) - Phase II Testing at Sites 40RE10, 40RE108, 40RE549, and 40RE600) (SHPO0001419)
01-09	Incoming	9/12/2023	TNSHPO	TVA	N/A	Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, , Roane County, TN
01-10	Outgoing	9/15/2023	TVA (TVAR)	TNSHPO	N/A	Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA's CRN Project (Roane County)
01-11	Incoming	10/6/2023	TDOA	TVA	N/A	Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA's CRN Project (Roane County)
01-12	Outgoing	10/17/2023	TVA	TNSHPO	N/A	Tennessee Valley Authority (TVA) - Clinch River Nuclear Site Advanced Nuclear Reactor Technoogy Park Project, Roane County, Tennessee (35.89923, -84.37794) (TVA Tracking Number - CID 77972) - Phase II Testing at Sites 40RE10, 40RE108, 40RE549, and 40RE600) (SHPO0001419)
01-13	Incoming	10/19/2023	TNSHPO	TVA	N/A	Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, Roane County, TN

Correspondence ID 01-01

TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

August 26, 2021

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) - CLINCH RIVER NUCLEAR (CRN) SITE ADVANCED NUCLEAR REACTOR TECHNOLOGY PARK PROJECT, CULTURAL RESOURCES SURVEY, LOUDON AND ROANE COUNTIES, TENNESSEE (35.89923, -84.37794) (TVA TRACKING NUMBER – CID 77972)

TVA is continuing to evaluate potential effects of siting one or more nuclear power plant(s) on the TVA CRN Site, located in Oak Ridge, in Roane County, Tennessee. The CRN Site occupies approximately 935 acres of TVA managed lands adjacent to the U.S. Department of Energy's (DOE) Oak Ridge Reservation. In May 2016, TVA submitted an application to the Nuclear Regulatory Commission (NRC) for an early site permit at the CRN Site for two or more new nuclear power units demonstrating small modular reactor (SMR) technology. Prior to submitting the application, TVA completed cultural resources investigations and consulted with your office and federally recognized Indian tribes regarding the SMR project's potential effects on historic properties. Our offices entered into a programmatic agreement in 2015 ("Programmatic Agreement Between the Tennessee Valley Authority and the Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project"). This agreement defined the project's area of potential effects (APE) and allowed for the phased identification and evaluation of historic properties. In August 2016, our offices executed an Amended and Restated Programmatic Agreement (hereafter, "Agreement"). The Agreement implemented several changes to the original agreement: enlarged the scope of the Agreement to include SMR construction; corrected errors in the original agreement concerning the participating tribes and the acreage of DOE land exempted from a recent archaeological survey; and corrected minor drafting issues. That same month, we also consulted with your office regarding an expansion of the APE to include Melton Hill Dam and a half-mile radius surrounding it, as a result of TVA's consideration of possible changes at the dam related to the SMR project.

TVA is now assessing the potential environmental effects associated with the construction, operation, and decommissioning of an advanced nuclear reactor technology park ("Nuclear Park") at the CRN Site. TVA's project goal is to demonstrate new nuclear technology through the construction and operation of one or more advanced nuclear reactors at the CRN Site. The Nuclear Park would contain one or more advanced nuclear reactors (an SMR or another type of

non-light water reactor) with a cumulative electrical output not to exceed 800 MW electric. This proposed project represents the further development of TVA's Clinch River SMR project. The purposes of the Nuclear Park would be to: evaluate emerging nuclear technologies as part of technology innovation efforts aimed at developing future generation capacities; support TVA's 2019 Integrated Resource Plan (IRP) by continuing to evaluate emerging nuclear technologies as part of technology innovation efforts aimed at developing future generation capacities; and support TVA's innovation mission as another way to serve the people of the Valley.

The advanced reactors being considered would be built within the 935-acre CRN Site, which is within the APE as defined in the Agreement. The potential effects of this project on archaeological sites or aboveground properties listed in or eligible for listing in the National Register of Historic Places (NRHP) do not differ substantially from the potential effects of the SMR project as we described it in our prior consultations, for the activities that would take place within the CRN Site. All potential physical and visual effects of the proposed Nuclear Park (including the demonstration project) in the CRN Site would be consistent with the types and scales of potential effects we took into consideration in those prior consultations and as described in the Agreement.

However, TVA also is considering two related actions that would require new construction outside the Clinch River SMR APE. We have not previously consulted on these actions:

1. TVA is considering possible roadway improvements along Jones Island Road in order to accommodate the traffic necessary for construction. Roadway improvements could include widening, turn lanes, and traffic signals, and a roundabout at the Jones Island Road/TN95 intersection. The affected property is owned by the DOE.

2. TVA is also considering the construction of a 161-kilovolt (kV) transmission line at the CRN Site, connecting to an existing TVA transmission line on adjacent DOE property. Construction of this transmission line would require extensive vegetation clearing and the installation of multiple steel transmission structures; some of this activity would take place outside the CRN Site.

The areas that could be affected by the newly proposed roadway improvements (approximately 69 acres), and the northern portion of the area that would be affected by the 161-kV transmission line (18 acres), were not included in our previous cultural resources surveys. Therefore, TVA proposes to enlarge the undertaking's APE to include these two areas. Figure 1 shows the CRN site and these two additional areas that we propose to include in the APE. Most of these areas are in Roane County, but a small portion of the Jones Island Road corridor is in Loudon County. Most of the 161-kV transmission line corridor is within the CRN Site, but an 18-acre portion extends onto DOE property north of the CRN Site.

To comply with the requirements of Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR § 800, TVA conducted a new Phase I Cultural Resources survey to identify archaeological sites and above-ground historic properties that may be affected by the proposed road modifications. Although the majority of the transmission line corridor was

included in our prior surveys and consultation, out of an abundance of caution we included the entire proposed 161-kV transmission line corridor in the archaeological survey.

TVA contracted with Wood E&I Solutions ("Wood") for the cultural resources survey that included an archaeological survey in the project corridors and a survey of historic architectural resources in the viewshed of Jones Island Road. To facilitate the historic architectural survey, TVA requested that Wood provide a GIS-based viewshed model. Wood completed both surveys in April 2021. The report, titled, *Phase I Cultural Resources Survey for the Proposed Jones Island Road/TN-95 Interchange, Clinch River SMR Project, Loudon and Roane Counties, Tennessee*, can be downloaded.

Seven previously recorded archaeological sites are located within the survey area. Sites 40RE156, 40RE159, 40RE162, and 04RE547 were previously identified within the proposed 161-kV transmission line corridor; sites 40RE101-40RE104 are located within the Jones Island Road corridor. Site 40RE159 has been destroyed by previous construction associated with the Clinch River Breeder Reactor project. Previous investigators recommended site 40RE104 as potentially eligible for the NRHP and sites 40RE156, 40RE162, and 40RE547 as ineligible. Despite close-interval shovel testing, none of the previously recorded sites was relocated during the current survey. The survey identified two additional sites, 40RE631 and 40RE632. Wood recommends that 40RE631, a late 19th/early 20th century homestead site with associated structural remains (and a minor precontact component), could be eligible for the NRHP and that if the project would result in ground disturbance at this location, that additional archaeological investigations be conducted to determine eligibility. Wood recommends that site 40RE632, a low-density precontact lithic scatter, is ineligible.

The historic architectural survey included areas within a half-mile radius of the proposed Jones Island Road improvements, which had not been included in TVA's prior historic architectural survey and desktop review. (The prior survey and desktop review are described in our May 20, 2015 letter to your office regarding the Clinch River SMR project). Wood's research indicated that 15 potentially historic aboveground resources (FS-1 through FS-15) fall within the half-mile radius; these include six historic cemeteries. Based on Wood's analysis, all but one of these resources (FS-1 through FS-4 and FS-6 through FS-15) should be considered ineligible for the NRHP. Wood recommends that FS-5, a ca. 1830 Colonial Revival house, should be considered eligible under Criterion C for architectural significance. Wood's viewshed analysis shows that this house would only have very limited visibility to the proposed project due to dense vegetation, which includes abundant evergreen vegetation (cedars in particular). Wood recommends, therefore, that the proposed modifications to Jones Island Road and the new 161-kV transmission line within the CRN Site would not result in an adverse effect on this property.

The northern extension of the proposed 161-kV transmission line would extend approximately 680 feet north of the CRN Site and tap into an existing TVA 161-kV transmission line running along the north side of Grassy Creek (Figure 2). This area was not included in the Phase I

Cultural Resources survey, and falls outside the area of the previous architectural reviews. Therefore, TVA Cultural Compliance staff conducted a desktop review of this approximately 18-acre area outside the CRN Site and surrounding areas within a half-mile radius in order to evaluate potential visual effects on any NRHP-listed or –eligible aboveground resources.

Construction of this new 161-kV transmission line would require vegetation clearing to create a 100-foot wide cleared corridor within an extensive wooded area. However, TVA would leave intact a wide buffer of forest on all sides. The visibility of the new transmission line would be greatly reduced by this vegetation, and also by topography. Grassy Creek runs through a narrow valley between Pine Ridge and Chestnut Ridge; both ridges rise over 300 feet in elevation above the floodplain (Figure 3). Bear Creek Road parallels Grassy Creek on the north side and provides access to three small light industrial facilities. TVA anticipates that the viewshed of the transmission line would essentially consist of the cleared transmission line right-of-way itself and the cleared area surrounding one of the industrial facilities. Figure 4, a photograph taken during the 2010 field review, shows the characteristic forest and slopes in this area.

The Tennessee Historical Commission Online Viewer indicates no inventoried properties within a half mile of this area, and there are no NRHP listings in this area. Historic maps (1941 editions of the U.S.G.S Bethel Valley, Tennessee and Elverton, Tennessee 7.5-minute quadrangles; see Figure 5) indicate three structures along Bear Creek Road. Satellite imagery suggests those structures may no longer be extant, but cannot confirm if that is the case. However, current satellite imagery and observations made during a 2010 field review document that the thick vegetation that characterizes this area would block views of the transmission lines from those three locations, and that the industrial development along Bear Creek Road has compromised the historic integrity of setting. TVA finds the construction of the 161-kV transmission line would affect no NRHP-listed or –eligible aboveground historic properties.

[

]$^{(a)(3)}$

TVA agrees with Wood's recommendations regarding the majority of the aboveground resources, with the exceptions of the Waller Cemetery (FS-12), Hensley Cemetery (FS-13), and the Gallaher Cemetery (FS-14). The Waller Cemetery was established in 1878 and appears to retain integrity of setting and feeling. Wood's scope of work did not include extensive genealogical or historical research on the Waller family; therefore, the cemetery's potential eligibility under Criteria A and B has not been fully evaluated. Similarly, TVA did not have Wood

perform extensive genealogical or historical research on the Hensley Cemetery (established ca. 1920s) or Gallaher Cemetery (ca. 1872-1876). The Gallahers were one of the early Euroamerican families who initially settled land on James White's original grant in the 1820s (Barrett et al. 2011:35). This cemetery also appears to retain some integrity. TVA considers the Waller, Hensley, and Gallaher cemeteries to be of undetermined eligibility for the NRHP.

As shown by Wood's photographic documentation, the Waller Cemetery (FS-12) is entirely surrounded by a thick stand of mixed vegetation. This vegetation would block views from the Waller Cemetery toward the project. The Hensley Cemetery (FS-14) and the Gallaher Cemetery (FS-15) are both located in small clearings within thickly wooded areas, and would have no clear views toward the project. Therefore, none of these cemeteries would have a direct line of sight to the proposed Jones Island Road changes or the proposed 161-kV transmission line. In addition, none of TVA's plans for the Nuclear Technology Park project, including the proposed 161-kV line and Jones Island Road improvements, would physically affect any of the cemeteries. TVA finds that all three cemeteries are located outside the undertaking's APE. As project plans are developed, TVA will ensure that the undertaking will include no physical effects on any of the six cemeteries identified in the cultural resources survey, regardless of their NRHP eligibility status.

TVA finds that a single NRHP-eligible resource, FS-5 (Colonial Revival House) is located within the APE. TVA finds further that the proposed Jones Island Road improvements and 161-kV transmission line would result in no adverse effects on any properties that are included in or eligible for the NRHP.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding properties within the proposed project's APE that may be of religious and cultural significance to them and eligible for the NRHP.

Pursuant to 36 CFR Part 800.5(c) we are seeking your agreement with TVA's eligibility determinations, finding that the undertaking as currently planned will have no adverse effects on historic properties, and intention to follow the Clinch River SMR PA regarding the undertaking's potential effects on archaeological site 40RE631.

Please contact Steve Cole by email, sccole0@tva.gov, with your comments.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

Mr. E. Patrick McIntyre, Jr.
Page 6
August 26, 2021

SCC:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

Reference Cited

Barrett, Jared, Kelly Hockersmith, Ted Karpynec, and Larry McKee
2011 *Phase I Archaeological Survey of the Clinch River small Modular Reactors Project (SMR), Roane County, Tennessee*. Prepared by TRC Environmental Corporation, Nashville, Tennessee, for Tennessee Valley Authority, Norris, Tennessee.

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

S. Dawn Booker, BR 2C-C
J. Taylor Cates, BR 2C-C
Stephen C. Cole, WT 11C-K
Michael C. Easley, BR 2C-C
Carol Freeman, BR 2C-C
Brandon J. Hartline, BR 2C-C
Ruth M. Horton, WT 11B-K
Susan R. Jacks, WT 11C-K
Dana M. Nelson, WT 11B-K
Rebecca C. Tolene, WT 11C-K
William B. Wells, BR 2A-C,
W. Douglas White, WT 11C-K
ECM, ENVRecords

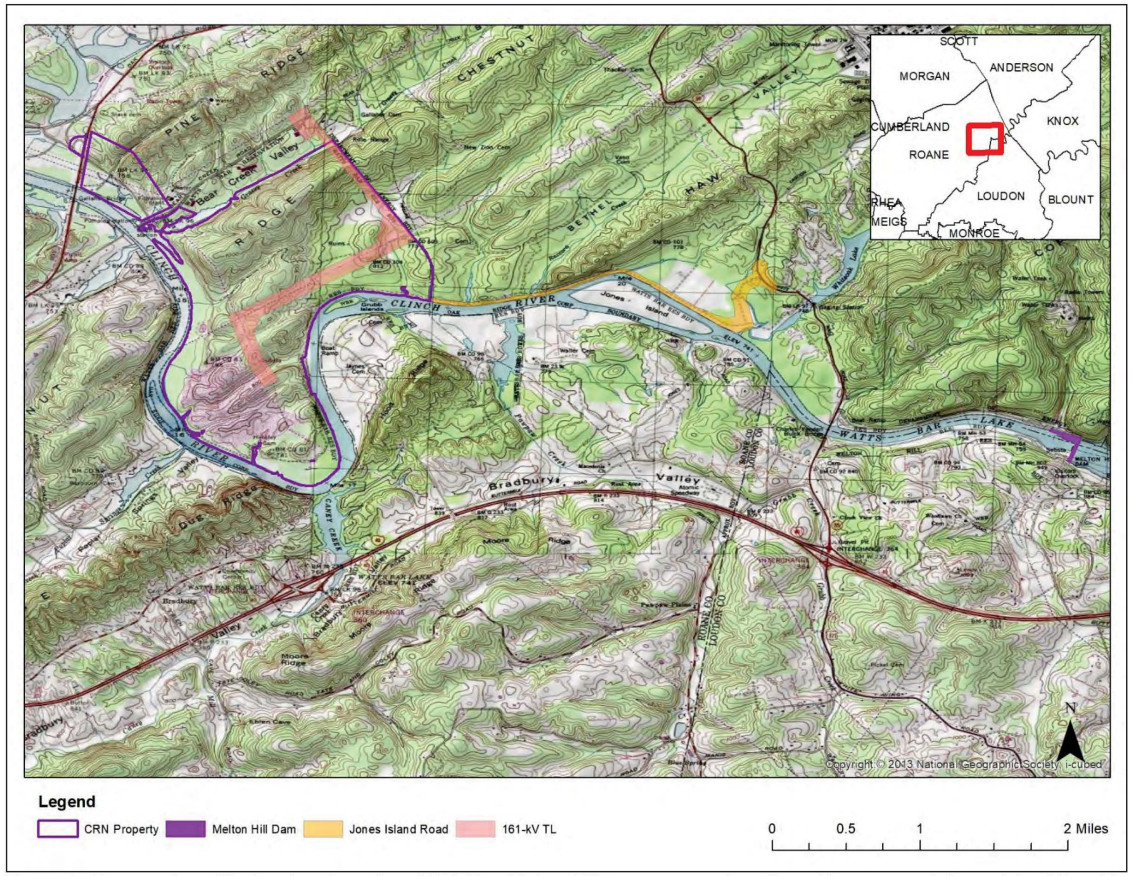


Figure 1. Proposed modified project footprint: CRN Site, Melton Hill Dam, area to be affected by proposed Jones Island Road improvements, and proposed 161-kV transmission line corridor.

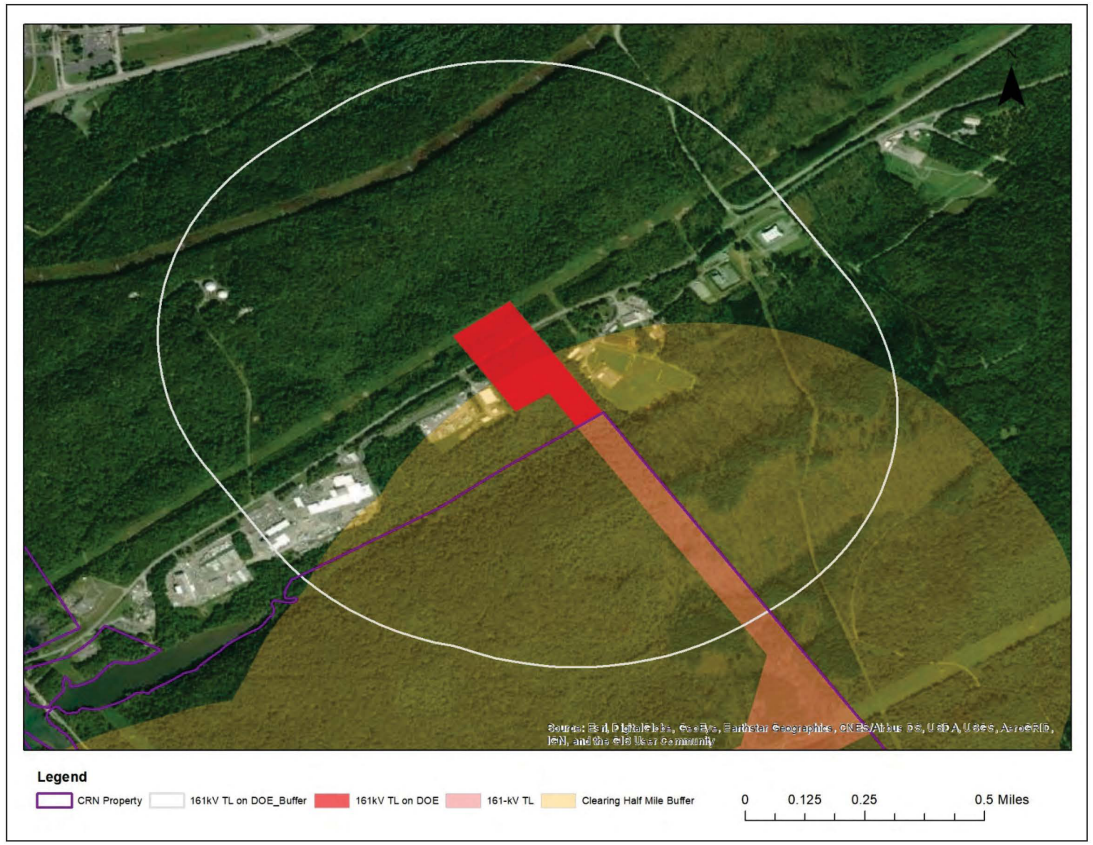


Figure 2. Section of proposed 161-kV transmission line corridor on DOE property, with associated half-mile radius. "Clearing Half Mile Buffer": area of 2015 historic architectural review, as described in our May 20, 2015 letter to the Tennessee SHPO.

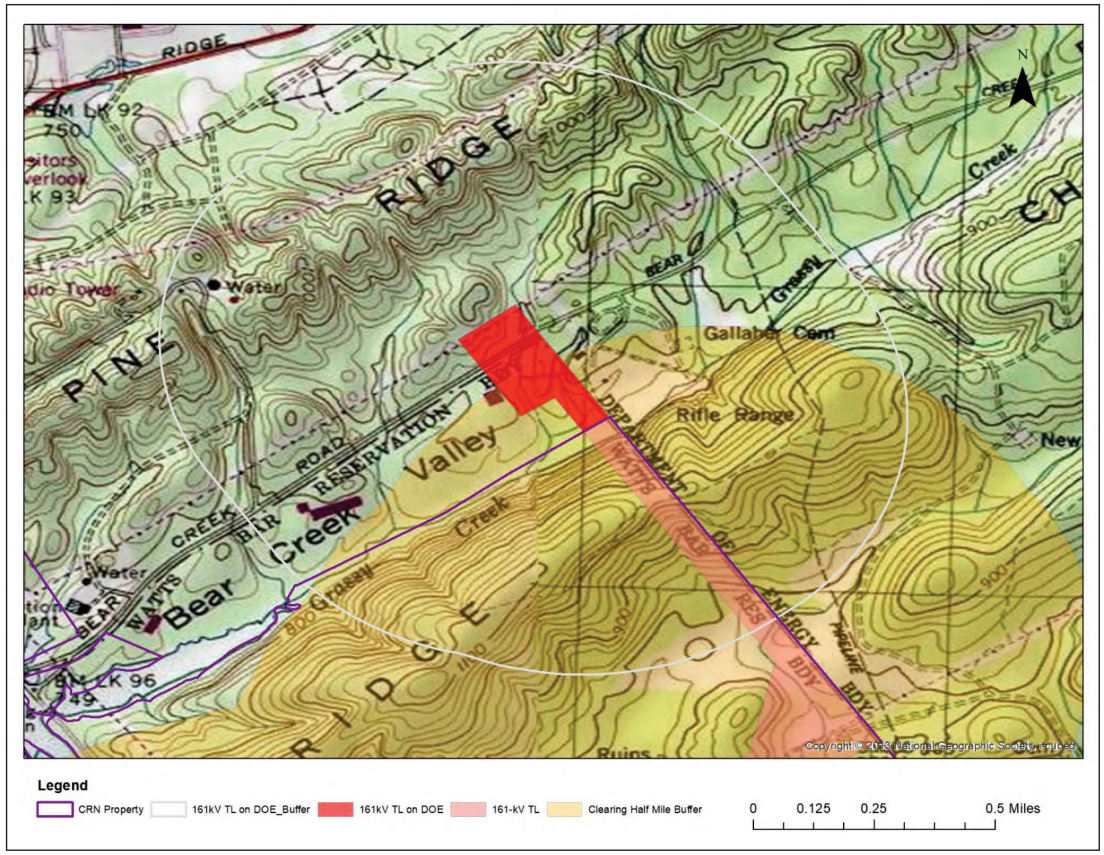


Figure 3. Section of proposed 161-kV transmission line corridor on DOE property, with associated half-mile radius. U.S.G.S Bethel Valley, TN and Elverton, TN 7.5-minute quadrangles.



Figure 4. General view of Grassy Creek area, near proposed 500-kV transmission line corridor. View to northeast along TVA/DOE property line.

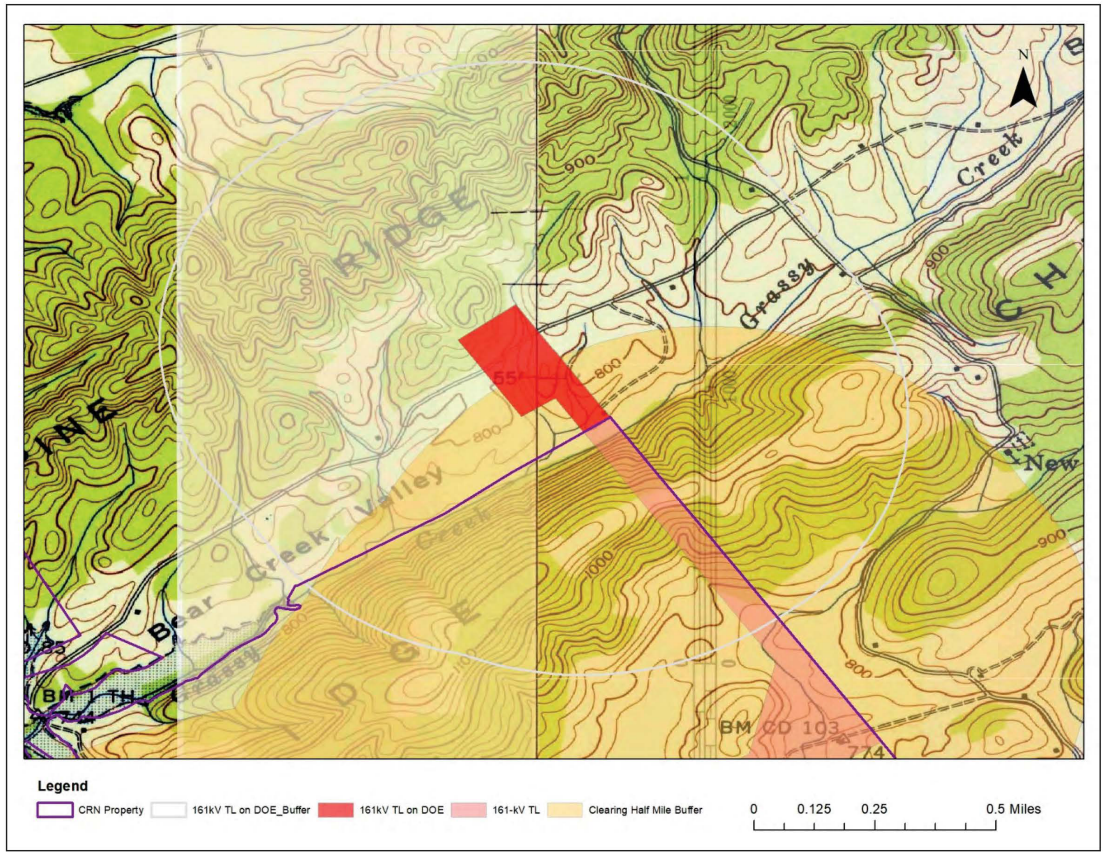


Figure 5. Section of proposed 161-kV transmission line corridor on DOE property, with associated half-mile radius. U.S.G.S Bethel Valley, TN and Elverton, TN 7.5-minute quadrangles (1941 editions).

Correspondence ID 01-02

TENNESSEE HISTORICAL COMMISSION
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

August 27, 2021

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Clinch River Nuclear Site, Jones Island Road Improvements and New 161-KV Line, Loudon and Roane Counties, TN - Archaeological Review

Dear Mr. Jones:

In response to your request, we have reviewed archaeological documentation submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act and the signed programmatic agreement for the Clinch River SMR Project.

The report does not meet the Tennessee State Historic Preservation Office Standards and Guidelines for Archaeological Resource Management Studies. Please address the following comments:

1. Updated site records for previously recorded sites 40RE156, 40RE159, 40RE162, 40RE547, 40RE101, 40RE102, 40R3103, and 40RE104 must be submitted to the Tennessee Division of Archaeology (TDOA). While these sites may have not been relocated or were previously destroyed, the site records must be updated to reflect this current data.
2. Per the TN SHPO Standards and Guidelines, "Background research must be completed prior to beginning fieldwork." The report notes that archaeological background information was requested from the TDOA on February 24, 2021 and that fieldwork was conducted between February 22nd and 26th. The background information was not requested until the third day of fieldwork. The TDOA responded with the background research information on March 9th. Fieldwork should not have begun until after the consultants had received this information on March 9th. Please detail the steps that TVA will take to ensure that all archaeological consultants follow the correct steps necessary prior to beginning fieldwork.

Considering available information, we find that the project as currently proposed may adversely affect properties that are eligible for listing in the National Register of Historic Places. Site 40RE631 should either be avoided by all ground-disturbing activities, or subject to additional archaeological evaluation per the stipulations of the programmatic agreement.

You should continue to consult with our office to resolve these potential adverse effects and archaeological documentation deficiencies. Please direct questions and comments to Jennifer M. Barnett (615 687-4780). We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Correspondence ID 01-03

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

September 2, 2021

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Architecture Review, Clinch River Nuclear Site Advanced Nuclear Reactor Technology Park, Jones Island Rd Improvements and new Transmission Line, Loudon and Roane Counties, TN

Dear Mr. Jones:

In response to your request, we have reviewed the architectural survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we find that the properties identified in the APE labeled FS-1 through FS-15 are not eligible for listing in the National Register of Historic Places. Further, we find that no architectural resources eligible for listing in the National Register of Historic Places will be affected by this undertaking.

If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Kelley Reid (615) 770-1099.

Your cooperation is appreciated.

Sincerely,

Kelley J Reid

for: E. Patrick McIntyre, Jr.
State Historic Preservation Officer

Kelley Reid
Historic Preservation Specialist/Coordinator
Section 106 Review and Compliance Program
Tennessee State Historic Preservation Office

Correspondence ID 01-04

TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

January 7, 2022

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

RE: TENNESSEE VALLEY AUTHORITY (TVA), CLINCH RIVER NUCLEAR SITE (CRN), ADVANCED NUCLEAR REACTOR TECHNOLOGY PARK PROJECT, CULTURAL RESOURCES SURVEY, LOUDON AND ROANE COUNTIES, TENNESSEE (35.89923, -84.37794) (TVA TRACKING NUMBER – CID 77972)

TVA consulted with your office by letter dated August 26, 2021 regarding TVA's assessment of the potential environmental effects associated with the construction, operation, and decommissioning of an advanced nuclear reactor technology park on the CRN located in Oak Ridge, Roane County, Tennessee. We contracted with Wood E&I Solutions ("Wood") for a Phase I Cultural Resources survey of two areas that would be affected by road improvements along Jones Island Road and construction of a new 161-kilovolt transmission line, which were not fully included in any of the prior surveys that TVA has completed at the CRN Site. TVA found that the proposed Jones Island Road improvements and 161-kV transmission line would result in no adverse effects on any properties that are included in or eligible for the National Register of Historic Places (NRHP).

In your response letter dated September 2, 2021, you agreed with our eligibility assessments for FS-1 through FS-4 and FS-6 through FS-15, but indicated that you disagree with TVA's assessment that FS-5 (Colonial Revival House) is eligible. You agreed with our finding that no NRHP-eligible architectural resources would be affected by the undertaking. In your letter of August 27, 2021, you agreed with TVA's finding that site 40RE631 should be avoided by ground-disturbing activities or subject to additional archaeological investigations per the stipulations of our project Programmatic Agreement. However, you also requested updated site records for previously recorded sites 40RE156, 40RE159, 40RE162, 40RE547, 40RE101, 40RE102, 40R3103, and 40RE104. In response to your request, we asked Wood to provide the updated site forms to the Tennessee Division of Archaeology; they did so on September 17.

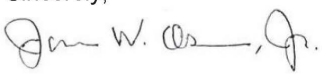
Your letter also noted that Wood began fieldwork prior to completing the required background research. As you stated, fieldwork should not have begun until after the consultants had received the background information on March 9. You requested that we detail the steps that TVA will take to ensure that all archaeological consultants follow the correct steps necessary prior to beginning fieldwork.

We have taken steps to address the error, and we will take additional steps. In requesting proposals for cultural resource surveys, our current practice includes inserting language in each proposal request requiring background research (especially site files checks) prior to fieldwork. The consultants generally copy this information into their proposal, which is included with the project contract as supporting documentation. This is what was done in this case, and in this manner, Wood committed in writing to performing the background research prior to fieldwork on the CRN Advanced Reactor/Jones Island Road project (please see excerpt from their proposal, attached below). Unfortunately, this was not enough to prevent the mistake.

Wood performs cultural surveys for TVA under a Master Services Agreement (MSA). Under that agreement, Wood must meet certain performance standards. For example, we require our consultants to adhere to state guidelines for cultural resources identification surveys, including the need to complete background research prior to beginning field surveys. As noted, Wood failed to meet that requirement in this case. After learning about it we spoke with Wood and reminded them of the need to adhere to this requirement, and they acknowledged their mistake. In addition, each of the consultants on our MSA undergoes an annual performance review with TVA's Supply Chain staff. Any performance issues are noted during this review. Each consultant's continued participation in the contract is dependent on being able to meet all contractual requirements. During the next review, we will remind Wood that any repeated performance issues could jeopardize their contract with TVA. Finally, we will make a point of underscoring that requirement in upcoming proposal requests for which Wood submits a bid.

Please contact Steve Cole by email, sccole0@tva.gov, with any questions or comments.

Sincerely,



James W. Osborne, Jr.
Manager
Cultural Compliance

SCC:ABM
Enclosure
cc (Enclosure):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

S. Dawn Booker, BR 2C-C
J. Taylor Cates, BR 2C-C
Stephen C. Cole, WT 11C-K
Michael C. Easley, BR 2C-C
Carol Freeman, BR 2C-C
Brandon J. Hartline, BR 2C-C
Ruth M. Horton, WT 11B-K
Susan R. Jacks, WT 11C-K
Rebecca C. Tolene, WT 11C-K
William B. Wells, BR 2A-C,
W. Douglas White, WT 11C-K
ECM, ENVRecords

Correspondence ID 01-05

TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

July 28, 2022

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) - CLINCH RIVER NUCLEAR (CRN) SITE ADVANCED NUCLEAR REACTOR TECHNOLOGY PARK PROJECT, ROANE COUNTY, TENNESSEE (35.89923, -84.37794) (TVA TRACKING NUMBER – CID 77972) – PROPOSED PHASE II TESTING AT SITES 40RE107, 40RE108, 40RE549, AND 40RE600

TVA has further developed project plans for the above-cited undertaking, for which we have consulted with your office in the past year (please see our letters of 8/27/21 and 1/7/2022). TVA previously completed phase I archaeological surveys on TVA's CRN Site property and identified, in consultation with your office and federally recognized Indian tribes, 14 archaeological sites with undetermined eligibility for inclusion in the National Register of Historic Places (NRHP) on the CRN Site, plus three sites located in the undertaking's area of potential effects (APE) outside the CRN Site. In 2015 our offices executed a programmatic agreement (PA) titled, *Programmatic Agreement Between the Tennessee Valley Authority and the Tennessee State Historic Preservation Office Regarding the Management of Historic Properties Affected by the Clinch River SMR Project*). TVA amended the PA in 2016 to include Melton Hill Dam as part of the APE. The PA stipulates the process by which, as details of the undertaking are developed, TVA will identify historic properties that would be adversely affected by the undertaking, seek ways to avoid effects, and resolve adverse effects through minimization and/or mitigation.

Figure 1 shows major features of the current project plans; Figure 2 shows the locations of the 17 archaeological sites in the APE with a status of "potentially eligible" or "undetermined". Based on the most current project plans, TVA finds that four of these sites could be affected directly by construction activities: 40RE107, 40RE108, 40RE549, and 40RE600. Therefore, pursuant to PA Stipulation I.B, items 2 and 3, TVA plans to conduct phase II evaluation studies of these sites. In this letter we describe the project activities that could affect the sites and describe our proposed phase II testing plan.

[

]$^{(a)(3)}$

Mr. E. Patrick McIntyre, Jr.
Page 2
July 28, 2022

[

]$^{(a)(3)}$

TVA took the locations of sensitive archaeological sites into consideration during planning for the project but were unable to identify alternatives that would have avoided any effects on potentially-eligible sites. Therefore, TVA proposes to conduct phase II testing at all four sites in order to provide the information necessary to fully evaluate each site's National Register of Historic Places (NRHP) eligibility. Our proposed phase II testing plan includes the excavation of a limited number of test units and backhoe trenches at each site, and limited plowzone stripping at site 40RE108 (which is the only site with areas outside the forest) to identify cultural features. Features exposed by the hand-excavated test units or mechanically excavated trenches would be fully excavated but features exposed by the plowzone stripping would be mapped and left intact. Sufficient analysis of sediments, artifacts, and faunal and floral remains would be completed in order to determine each site's potential eligibility under Criterion D. The four sites and the testing plan are described in greater detail in the attached scope of work, prepared by Tennessee Valley Archaeological Research , who would carry out the phase II testing.

At the completion of the phase II testing TVA will provide a report to your office and invite comments and will seek your concurrence regarding the eligibility determinations.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Please contact Steve Cole by email, sccole0@tva.gov, with any questions or comments.

Sincerely,

James W. Osborne, Jr.
Manager
Cultural Compliance

Mr. E. Patrick McIntyre, Jr.
Page 3
July 28, 2022

SCC:ERB
Enclosure
cc (Enclosure):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

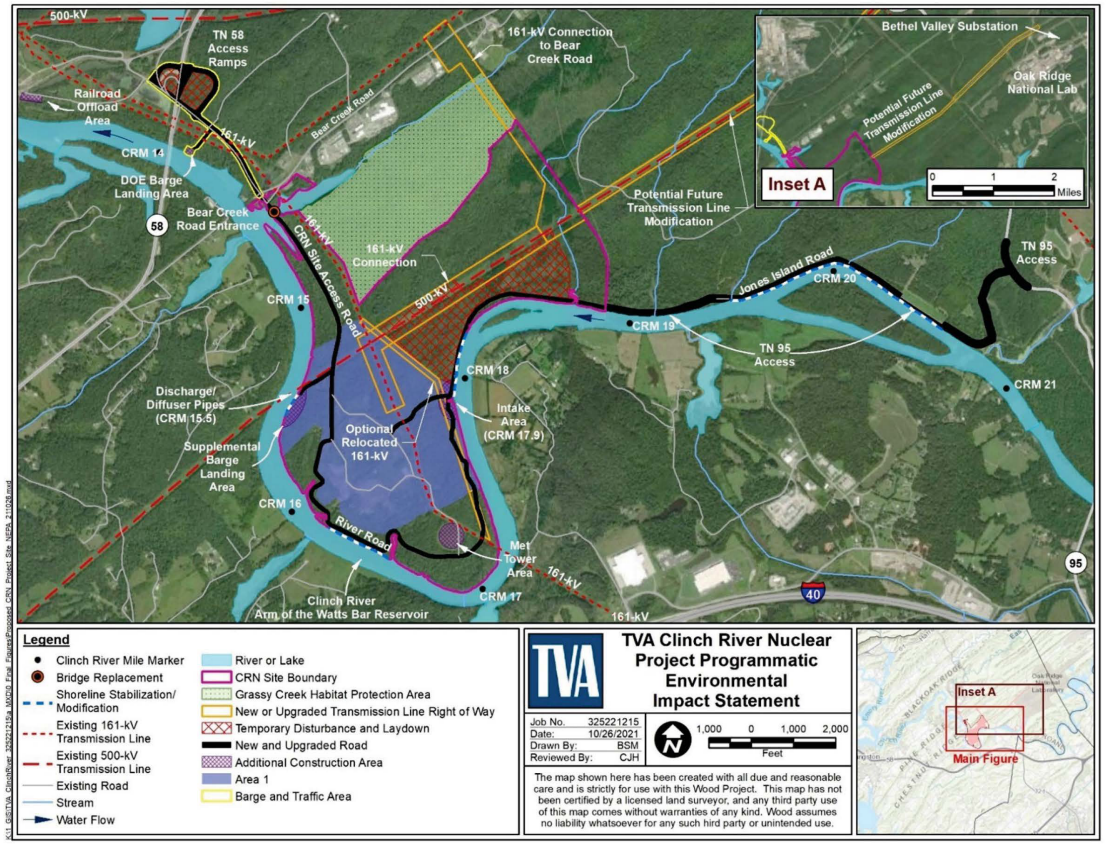


Figure 1. Conceptual project design for Alternative B, Construction of Nuclear Park at Area 2.

[

]$^{(a)(3)}$

Correspondence ID 01-06

From: TN Help
To: Beliles, Emily
Cc: Cole, Steve C; McCampbell, Amy Boardman; jwosborne@tva.gov
Subject: Clinch River Nuclear Site, Small Modular Reactors, CID 77972 - Project # SHPO0001419
Date: Friday, July 29, 2022 4:22:45 PM
Attachments: State Seal for TDEC.pngx
patricksignature.pngx

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

07-29-2022 15:19:42 CDT

James Osborne, Jr.
TVA
jwosborne@tva.gov

RE: Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, Roane County, TN

Dear Mr. Osborne:

At your request, our office has reviewed the above-referenced archaeological testing proposal for sites 40RE107, 40RE108, 40RE595 and 40RE600. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the proposed testing strategy meets the Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies.

Your continued cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG6741061_lgkLvJiCoKEMvVnajzyF

Correspondence ID 01-07

TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 12, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) - CLINCH RIVER NUCLEAR SITE ADVANCED NUCLEAR REACTOR TECHNOLOGY PARK PROJECT, ROANE COUNTY, TENNESSEE (35.89923, -84.37794) (TVA TRACKING NUMBER – CID 77972) – PHASE II TESTING AT SITES 40RE107, 40RE108, 40RE549, AND 40RE600 (SHPO0001419)

TVA has completed phase II testing at the four potentially eligible precontact archaeological sites listed above, using the research design we provided to your office and federally recognized Indian tribes. An electronic copy of the report, prepared by Tennessee Valley Archaeological Research (TVAR), can be downloaded from the following link:

[

]$^{(a)(3)}$

buried under modern soils. Mechanical stripping over an area of 1,009 square meters in the site failed to expose any precontact cultural features, nor were any cultural features identified in test units or trenches in this site. At site 40RE595, TVAR excavated four test units and investigated the cut bank, recovering five pieces of debitage and 41 grams of fire-modified rock. TVAR excavated one test unit (and inspected the cut bank) at site 40RE600 and recovered 14 artifacts. The report also includes a detailed geomorphological study of all four sites by Howard Cyr.

We have reviewed the report and find that the investigation provides a secure basis for re-evaluating the eligibility of the four sites for inclusion in the National Register of Historic Places (NRHP) for sites 40RE107, 40RE595, and 40RE600. Based on the results, TVAR recommends that these three sites fail to meet criteria of significance and should not be considered NRHP-eligible. TVA agrees with this recommendation.

[

]$^{(a)(3)}$

TVA has reviewed the report and agrees with TVAR's recommendations. Due to the possibility of intact stratified deposits in the two sensitive areas, TVA has determined that site 40RE108 should continue to be considered potentially eligible for the NRHP. TVA has also determined that any ground disturbance within the site boundary, outside the two sensitive areas, would not adversely affect the site, were the site to be determined eligible for the NRHP.

To date, TVA has made no plans that would result in any physical effects to Sensitive Areas 1 and 2. TVA has prepared a preliminary layout of the proposed nuclear plant, and based on this layout the undertaking will avoid both areas (Figure 2). To ensure avoidance, TVA Cultural Compliance staff will set up brightly colored construction fencing surrounding both and will also ensure that the sensitive areas are indicated on project plans and that construction staff understand the need to avoid the areas. With these protective measures in place TVA finds that

the proposed undertaking would result in no adverse effects on any archaeological sites listed in, or eligible for listing in, the NRHP.

Should future modifications to project plans indicate a potential for ground disturbance in the sensitive areas, TVA will seek ways to avoid adverse effects, in consultation with your office and federally recognized Indian tribes. If avoidance is not practicable or the consulting parties fail to agree on avoidance measures, TVA will continue consultation and, if necessary, complete additional investigations in the two sensitive areas, prior to making any final decisions on the undertaking, pursuant to 36CFR Part 800.4 and 800.5.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's area of potential effect that may be of religious and cultural significance and are eligible for the NRHP.

Pursuant to 36 CFR Part 800.5(c) we are notifying you of TVA's finding of no adverse effect; providing the documentation specified in § 800.11(e); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no adverse effects on historic properties.

Please contact Steve Cole by email, sccole0@tva.gov with any questions or comments.

Sincerely,

James W. Osborne, Jr.
Manager
Cultural Compliance

SCC:ERB
Enclosure
cc (Enclosure):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

[

]$^{(a)(3)}$

Correspondence ID 01-09

From: TN Help
To: Beliles, Emily
Cc: Osborne, James W Jr; Cole, Steve C
Subject: Clinch River Nuclear Site, Small Modular Reactors, CID 77972 - Project # SHPO0001419
Date: Tuesday, September 12, 2023 3:27:06 PM
Attachments: State Seal for TDEC.pngx
patricksignature.pngx

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

09-12-2023 14:23:25 CDT
James Osborne
TVA
RE: Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, , Roane County, TN
Dear James Osborne:
At your request, our office has reviewed the above-referenced cultural resources report. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicants for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).
In accordance with the Tennessee State Historic Preservation Office Standards and Guidelines for Archaeological Resource Management Studies, updated site records for sites 40RE107, 40RE108, 40RE595, and 40RE600 must be submitted to, and accepted by, the Tennessee Division of Archaeology (TDOA).
Upon receipt of formal notification from your agency that the site records updates have been submitted to, and accepted by, the TDOA, we will continue our review of this undertaking as expeditiously as possible. Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met. Please inform this office if this project is not funded, licensed, permitted, or is canceled by the federal agency. You should refer to your Project # when you submit additional materials concerning this undertaking. Questions and comments may be directed to Jennifer Barnett, who drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.
Your cooperation is appreciated.
Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer
Ref:MSG9936686_PqH8ngAYLrwjpzfJjjVz

1216 Foster Avenue
Cole Building #3
Nashville, TN 37243
p. 615-687-4784
paige.silcox@tn.gov
http://www.tennessee.gov/environment/section/arch-archaeology

From: scott tvaresearch.com < scott@tvaresearch.com >
Sent: Friday, September 15, 2023 7:32 PM
To: TDOA SiteFile < TDOA.SiteFile@tn.gov >
Cc: Paige Silcox < Paige.Silcox@tn.gov > ; Satin Platt < Satin.Platt@tn.gov >
Subject: [EXTERNAL] Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA's CRN Project (Roane County)

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Please find attached two zipped folders related to TVAR's updates for sites 40RE107, 40RE108, 40RE595, and 40RE600 in Roane County, Tennessee. One folder contains the updated site records (I have also included low resolution pdfs of report chapters for each site [detailed reporting for each site for the TDOA site records]). One folder contains shapefiles for each site.

For reasons noted on each site form, I did not provide site size/boundary input on the forms (but I did attach topo maps of the sites with the current TDOA boundaries).

Should you have any questions, need any additional information, or have issues with the attached files, please do not hesitate to contact me.

Regards,
Scott

Correspondence ID 01-11

From: Freeman, Carol
To: Daigle, David Louis
Subject: FW: Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA"s CRN Project (Roane County)
Date: Wednesday, November 20, 2024 8:52:52 AM
Attachments: image001.png

Carol Butler Freeman
NEPA Specialist
M. 719-323-8646

From: Cole, Steve C <sccole0@tva.gov>
Sent: Tuesday, November 19, 2024 12:56 PM
To: Freeman, Carol <cfreeman2@tva.gov>
Subject: FW: Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA's CRN Project (Roane County)

From: TDOA SiteFile <TDOA.SiteFile@tn.gov>
Sent: Friday, October 6, 2023 3:50 PM
To: scott tvaresearch.com <scott@tvaresearch.com>
Subject: RE: Updated Site Forms (40RE107, 40RE108, 40RE595, 40RE600) TVA's CRN Project (Roane County)

Hi Scott,

The updates for 40RE107, 40RE108, 40RE595, and 40RE600 have been reviewed and approved.

A few notes for future submissions:

- No need to copy Satin or my direct email when you use the tdoa.sitefile address. It's a shared address that we can both access.
- When updating Site Records, if you are not making changes to the Cultural Affiliation and Site Type section, you can leave it blank. If you are adding CA or Site Type, you should select the previously recorded options as well as the new ones you are adding.
- When updating Site Records, fill out the Site Conditions section with the previously recorded data if you are not making changes to those fields.

No need to revise any of the ones you've sent. I can make the corrections on my end.

Best,
Paige

TN Department of Environment & Conservation

Paige Silcox | Site File Archaeologist
Tennessee Division of Archaeology

Correspondence ID 01-12

TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

October 17, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA) - CLINCH RIVER NUCLEAR SITE ADVANCED NUCLEAR REACTOR TECHNOLOGY PARK PROJECT, ROANE COUNTY, TENNESSEE (35.89923, -84.37794) (TVA TRACKING NUMBER – CID 77972) – PHASE II TESTING AT SITES 40RE107, 40RE108, 40RE595, AND 40RE600 (SHPO0001419)

We received your response (dated September 12, 2023) regarding our consultation on the above-cited phase II testing project. You requested that updated site records for sites 40RE107, 40RE108, 40RE595, and 40RE600 be submitted to and accepted by the Tennessee Division of Archaeology (TDOA) before you can continue your review. Our consultant, Tennessee Valley Archaeological Research, submitted the site form updates on September 15, and was notified by TDOA on October 6 of their acceptance. Please see the attached email from Paige Silcox.

Pursuant to 36 CFR Part 800.5(c) we continue to invite you to review TVA's eligibility determinations and finding that the undertaking as currently planned will have no adverse effects on historic properties.

Please contact Steve Cole by email, sccole0@tva.gov with any questions or comments.

Sincerely,

James W. Osborne, Jr.
Manager
Cultural Compliance

SCC:ERB
Enclosure
cc (Enclosure):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

Correspondence ID 01-13

From: TN Help
To: Beliles, Emily
Cc: Osborne, James W Jr; Cole, Steve C
Subject: Clinch River Nuclear Site, Small Modular Reactors, CID 77972 - Project # SHPO0001419
Date: Tuesday, October 24, 2023 1:03:25 PM
Attachments: State Seal for TDEC.pngx
patricksignature.pngx

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

10-19-2023 12:53:52 CDT

James Osborne
TVA

RE: Tennessee Valley Authority (TVA), Clinch River Nuclear Site, Small Modular Reactors, CID 77972, Project#: SHPO0001419, , Roane County, TN

Dear James Osborne:

In response to your request, we have reviewed the archaeological report of investigations and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

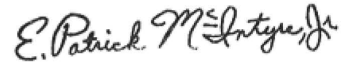
Considering the information provided, we concur that sites 40RE600, 40RE595, are 40RE107 are not eligible for inclusion in the National Register of Historic Places. We further concur that site 40RE108 is potentially eligible for the National Register and that the areas described as "Sensitive Areas 1 and 2" should be avoided by all ground-disturbing activities. The remaining portions of the site do not contribute to it's

potential eligibility.

Given the conditions stated above and detailed in your correspondence, we concur that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please provide your Project # when submitting any additional information regarding this undertaking. Questions or comments may be directed to Jennifer Barnett, who drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.

Your cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG10564925_AwyMSJThRBDfRHBvqRo

APPENDIX B NRC ESP FEIS TABLE J-2 COMPARISON

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Site Layout, Project Description			
	The majority of module and component deliveries would be over road and rail.	The Tennessee Valley Authority (TVA) is no longer considering rail as an option for deliveries to the Clinch River Nuclear (CRN) Site.	CPA ER Subsection 3.3.3
	Shoreline excavation would be required for construction of the intake structure, along a length of shoreline approximately 50 ft wide. The diffuser pipe for the discharge would be partially buried, which would also require underwater excavation. No dredging would be required for construction in the barge/traffic area (BTA).	TVA is evaluating two alternatives for the intake design: Alternative 1 - Recessed shoreline intake structure; Rectangular concrete structure that extends roughly 50 feet inland and is approximately 28 feet high. The intake would connect to the Clinch River Arm of the Watts Barr Reservoir (Reservoir) via an 80 feet long channel. Shoreline excavation is required for this design. Building a temporary cofferdam of approximately 55 feet by 20 feet is required for installation of the intake screens. Alternative 2 - Submerged offshore intake structure; Consists of a subsurface conduit extending between a submerged intake in the reservoir and a vertical shaft wet well on the bank. The shoreline wet well is roughly 20 feet in diameter and 50 feet deep. At this location, the bottom of the reservoir is 718 feet, so the intake conduits to the screens must be buried 3 feet below elevation 718. Building a temporary cofferdam with similar parameters to Alternative 1. Discharge Structure: The diffuser pipe for the discharge would be partially buried, which would also require underwater excavation. No dredging required for construction.	CPA ER Subsection 3.2.3.2.1 CPA ER Subsection 3.2.3.2.3 CPA ER Figure 3.2-7

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The volume of equipment delivered by barge during operation is expected to be similar to the volume delivered during construction.	No new information.	Not Applicable
Land Use			
	The CRN Site construction footprint is shown in Figure 3.1-2 in the ER.	Figure 2.1-2 presents the planned site layout for CRN Unit 1 (CRN-1). Figure 3.1-1 shows the extent of cleared areas at the site. Figure 3.1-2 shows a rendering of the proposed facility.	CPA ER Figure 2.1-2 CPA ER Figure 3.1-1 CPA ER Figure 3.1-2
	The CRN Site would total 935 ac. The BTA would total 203 ac.	No new information. Table 2.4-1 identifies the CRN Site total as 935.3 acres and the Barge and Traffic Area (BTA) as 202.5 acres. Updates to the National Land Cover Database (NLCD) Land Cover/ Land Use Categories for the CRN Site and Surrounding Areas result in changes to habitat areas, however the CRN Site and BTA totals remain the same.	CPA ER Table 2.4-1
	An estimated 494 ac of the existing 935-ac CRN Site would be affected by the construction of a new nuclear power plant.	An estimated 481.4-acres of the existing 935-acres CRN site would be affected by building of the CRN Site.	CPA ER Table 4.3-1
	Permanent facilities and structures (primarily the power-block area, cooling-tower area, and intake structures and their associated pipelines) for new small modular reactor (SMR) units would occupy approximately 327 ac and temporary facilities would occupy approximately 167 ac.	New information is updated from that previously included in the Early Site Permit Application (ESPA) Environmental Report (ER) and the U.S. Nuclear Regulatory Commission (NRC) Early Site Permit (ESP) Final Environmental Impact Statement (FEIS) The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	In the BTA, 30 ac would be permanently disturbed with new roadways and barge-landing improvements and 15 ac would be temporarily disturbed for the installation of the new roadways.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.1
	Building activities, including barge slip reconditioning activities, would not require dredging.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.1.1
	No prime farmland impacts exceeding U.S. Department of Agriculture thresholds would result from the proposed project.	No new information.	Not Applicable
	Heritage Rail Offload Area would be refurbished and stabilized for deliveries. The U.S. Department of Energy former K-25 Barge-Loading Area between State Route (SR) 58 and the CRN Site entrance would also be refurbished for deliveries. Alternatively, a new barge slip may be constructed.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.1
	Salt drift from any cooling-tower design would be localized with some areas of drift during summer exceeding NRC guidance thresholds (EIS Figure 5-2). Exceedance areas would be located in early successional habitat within the Clinch River Breeder Reactor Project (CRBRP) footprint that mostly would be occupied by facilities and to a lesser extent in forested habitat that would be cleared during preconstruction. No fogging or icing impacts are expected on transportation areas around the CRN Site.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.1
	A new switchyard would be constructed for use with new SMR units at the CRN Site.	A new switchyard would be constructed for use by CRN-1 at the CRN Site.	CPA ER Subsection 3.2.6

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The extent of land required for borrow pits would not exceed designated capacities.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.1 CPA ER Subsection 4.1.1.1
	Potential areas for the temporary storage of earthwork and excavation spoils have been identified on the site. The total amount of spoils and the extent of land required have not been determined but are assumed to not extend beyond the construction footprint identified in Figure 4.3-1 in the ER. The excavated material would be managed with the appropriate erosion and sediment control measures, and best management practices (BMPs) would be used as necessary for these storage areas.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.9
	A minor intrusion to the Clinch River 100-year floodplain would be disturbed by clearing and grading activities necessary to building the proposed intake and blowdown structures, and installing the plant intake and discharge structures makeup and blowdown lines. Most impacts would be temporary, except for building and operating the CRN plant intake and discharge structures.	Building activities associated with CRN-1 occur in 27.7 acres of floodplain within the permanent disturbance area and 3.4 acres of floodplain within the temporary disturbance area. Much of the impact to floodplain is permanent conversion of land cover rather than filling in the floodplain. Building activities within the floodplain along the Reservoir are associated with intake construction, discharge pipeline installation, transmission line construction and maintenance, and expansion of the offsite barge facility within the BTA.	CPA ER Subsection 4.1.3

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The hypothesized offsite transmission lines with assumed modifications to affected rights-of-way are based on injecting 800 MW(e) to the grid at the CRN Site.	The power transmission system for CRN-1 differs from that presented in the ESPA ER and NRC ESP FEIS both as a result of TVA system changes since the development of these documents and because of the smaller power output of CRN-1 (nominal 300 megawatt electric (MWe)), compared to the total power output of 800 MWe assumed in the ESPA ER. Improvements beyond the first transmission line interconnect are considered system maintenance activities and are evaluated as part of the analysis of impact of the proposed action in conjunction with other reasonably foreseeable future actions (RFFAs) in Chapter 7 of the CPA ER.	CPA ER Subsection 3.2.6
	Hypothesized offsite transmission corridor impacts included a 12.7-mi segment where lines will be rebuilt, including potential excavation work. These impacts would be confined to established right-of- ways.	The associated offsite 161-kilovolt (kV) corridor extending from the 500-kV line to the interconnect with the Kingston Fossil Plant – Bethel Valley Substation transmission line at Bear Creek Road, also shown in Figure 2.1-2 is established with a width of 280 feet to accommodate a 120-feet-wide corridor for the 161-kV loop-in.	CPA ER Subsection 3.2.6.1
	Hypothesized transmission line upgrades would affect currently unspecified areas within existing right- of-ways of a total of 439 mi or 5,327 ac of offsite transmission line corridors.	It is not currently possible to determine whether uprating, reconductoring, or other activities beyond the first transmission line interconnect are part of routine maintenance and upgrade activities for the regional power transmission system or a direct downstream effect resulting from the construction and operation of CRN-1. Therefore, such activities and associated environmental impacts are addressed as part of the analysis of impact of the proposed action in conjunction with other RFFAs in Chapter 7.	CPA ER Section 3.2.6

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Water Use and Quality			
	Stormwater runoff from the CRN Site would be controlled via engineered structures, collected in engineered retention ponds, and infiltrated to the ground, or released to the Clinch River in a controlled manner according to the terms of the National Pollutant Discharge Elimination System (NPDES) permit. This permit would be obtained prior to any building activities at the site.	Stormwater runoff from the CRN Site is controlled via engineered structures, collected in engineered stormwater retention ponds, and infiltrated to the ground, or released to the Reservoir in a controlled manner. Two additional stormwater retention ponds would be constructed to moderate the increased runoff from impervious structures and surfaces and allow infiltration to reduce runoff directly into the Reservoir. These retention ponds limit stormwater flow rates into receiving streams and the Reservoir and associated increases in stormwater discharges during high intensity precipitation events.	CPA ER Subsection 4.2.1.1.1
	No dredging during building would occur.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.1.1
	Underwater excavation for construction of the intake and discharge structures would use BMPs to limit disturbance of sediments according to applicable regulations, including procedures of the Watts Bar Interagency Agreement Working Group.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.1.1
	Underwater excavation material would be sampled and characterized for contamination, and disposed of according to applicable regulations.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.1.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Engineering control measures (e.g., grouting of fractures) would be used during construction to limit the rate of excavation dewatering required.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.2.2
	Excavation dewatering required would be similar to the CRBRP experience: the rate would be low. Monitoring would be carried out to evaluate the effect of dewatering on the surrounding groundwater and any nearby surface waterbodies, including wetlands.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.2.2
	Dewatering flows would be routed to one of the stormwater retention ponds.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.3.2
	Construction of a Melton Hill Dam bypass capable of providing 400 cfs of continuous discharge from the dam would be constructed at the site. Construction of the bypass would be conducted with appropriate engineering controls to avoid water-quality impacts.	There are no building activities associated with the Melton Hill Dam.	CPA ER Subsection 3.3.6
	Installation of the underground 69-kV transmission line would be conducted with minor localized and temporary effects on streams traversed.	The proposed underground 69-kV transmission development project is not necessary to support operation of CRN-1 and is not included as part of the building of CRN-1.	CPA ER Subsection 3.2.6.2
	Construction water would be obtained from the City of Oak Ridge and would not exceed 231,660 gpd. Any upgrades to existing infrastructure would conform to applicable local, State, and Federal permits.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.2.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Surface water would be obtained directly from the Clinch River for dust suppression and other building purposes and would not exceed 5,000 gpd.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.2.2.1
	No groundwater would be used during construction.	No new information.	CPA ER Subsection 4.2.2.2
	Makeup water for a new plant's circulating-water system would be obtained from the Clinch River arm of the Watts Bar Reservoir.	Makeup water for the system is drawn from the Reservoir through an intake structure and pumped into the cooling tower basin.	CPA ER Subsection 3.2.3.1.1
	Net water demand in the Clinch River basin, including consumptive water use of a plant at the CRN Site would not exceed the demand projections used in the development of the current reservoir operations policy.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.2.2.1
	No groundwater would be used during operations.	No new information.	CPA ER Subsection 5.2.2.2
	No dredging during operation would occur	No new information.	Not Applicable
	The Melton Hill Dam bypass would operate continuously during plant operations	There are no building activities associated with the Melton Hill Dam.	CPA ER Subsection 3.3.6
	Plant discharge would be in compliance with terms and conditions of the NPDES permit.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.2.3.1
	Design and construction of the holding pond would preclude groundwater contamination during site operations.	No new information.	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Terrestrial Ecology – Clinch River Site, Barge/Traffic Area, 69-kV Buried Transmission Line			
	The CRN Site would total 935 ac. The BTA would total 203 ac.	No new information. Table 2.4-1 identifies the CRN Site total as 935.3 acres and the BTA as 202.5 acres. Updates to the NLCD Land Cover/Land Use Categories for the CRN Site and Surrounding Areas result in changes to habitat areas, however the CRN Site and BTA totals remain the same.	CPA ER Table 2.4-1
	An estimated 494 ac of the existing 935-ac CRN Site and an estimated 45 ac of the existing 203-ac BTA would be affected by the construction of two or more SMRs.	An estimated 481.4 acres of the existing CRN Site and an estimated 24.6 acres of the existing BTA would be affected by construction of CRN-1.	CPA ER Table 4.3-1
	The CRN Site and BTA construction footprint would generally be as shown in Figure 4.3.1 in the ER	The CRN Site, BTA, and associated 161-kV transmission corridor are shown in Figure 4.3-1	CPA ER Figure 4.3-1
	Permanent disturbance would occur on approximately 327 ac, and temporary disturbance would occur on approximately 167 ac on the CRN Site.	Permanent disturbance will occur on approximately 466.7 acres, and temporary disturbance will occur on approximately 14.6 acres on the CRN Site.	CPA ER Table 4.3-1
	Permanent disturbance would occur on approximately 30 ac, and temporary disturbance would occur on approximately 15 ac on the BTA.	Permanent disturbance will occur on approximately 21.8 acres, and temporary disturbance will occur on approximately 2.9 acres on the BTA.	CPA ER Table 4.3-1
	Disturbance for the buried 69-kV transmission line, extending from the CRN Site to the Bethel Valley Substation would occur only within the corridor of an existing 500-kV transmission line.	The proposed underground 69-kV transmission development project is not necessary to support operation of CRN-1 and is not included as part of the building of CRN-1.	CPA ER Subsection 3.2.6.2
	Disturbance of wetland habitat would total an estimated 1.8 ac on the CRN Site and BTA.	Table 4.3-2, the total area of impact from building activities on Wetlands in the CRN Site is 9.2 acres, 1.7-ac. in the BTA, and approx. 3.6 ac. within the 161-kV TL corridor.	CPA ER Table 4.3-2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Mechanical draft cooling towers approximately 65 ft in height or less would be used to cool the SMRs.	The vertical height above finished grade of mechanical draft cooling towers associated with the cooling water systems is approximately 64 feet.	CPA ER Table 3.1-2
	TVA would propose use only of those borrow pits (without expansion) that were presented in the ESP application	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.1 CPA ER Subsection 4.1.1.1
	TVA would comply with all required wetland mitigation measures determined for jurisdictional wetlands that could be affected by the building and operating at the CRN Site.	TVA will implement a wetland and stream mitigation plan in accordance with U.S. Army Corps of Engineers (USACE) and TDEC requirements. To compensate for unavoidable impacts to WOTUS and/or Tennessee Department of Environment and Conservation (TDEC) regulated waters, including wetlands, TVA will provide compensatory mitigation in accordance with USACE and TDEC requirements. Mitigation consists of replacing impacted aquatic functions by creation, restoration, or improvements to streams and wetland habitat elsewhere within the landscape.	CPA ER Subsection 4.3.1.5.2
	TVA would follow the State of Tennessee BMPs and TVA BMPs and when working in wetlands.	TVA would follow the State of Tennessee Best Management Practices (BMPs) and TVA BMPs when working in wetlands.	CPA ER Subsection 4.3.1.5.2
	Temporarily affected areas would be revegetated or otherwise restored after construction using native or noninvasive plant species.	TVA will implement sustainability measures during building of CRN-1 to include development of pollinator habitats and other sustainable development and land management policies in association with a site biodiversity plan in accordance with TVA's Biodiversity Policy.	CPA ER Subsection 4.3.1.5.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The potential impacts on Federally listed threatened and endangered terrestrial species and designated critical habitats are documented in the NRC's Biological Assessment (BA) in Appendix M. However, the U.S. Fish and Wildlife Service (FWS) concluded that this ESP does not require further ESA Section 7 consultation. The NRC would update its BA as part of consultation conducted in connection with the NRC's review of any future COL or CP application that references a CRN Site ESP.	Conservation measures, including removal of up to 250 acres of trees in winter (November 15 – March 31) to avoid nesting and roosting wildlife and installation of artificial bat roosting structures, would be implemented to minimize adverse impacts to bats. Additional avoidance and minimization measures would reduce or eliminate the potential for drilling and blasting to impact bats roosting in caves. Consultation under Section 7(a)(2) of the ESA is underway regarding potential impacts to federally listed bats for construction and operation activities. Potential impacts to federally listed tree-roosting bats alongside existing corridors were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2), originally completed in April 2018 and updated in May 2023. For those activities with potential to affect federally listed bats, TVA committed to implementing specific conservation measures. With the use of avoidance, minimization, and conservation measures, there would likely be no major impacts to threatened and endangered species.	CPA ER Subsection 4.3.1.5.3

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Any offsite transmission line upgrades proposed by TVA would be limited to the existing rights-of-way of the transmission lines presented in the ESP application.	It is not currently possible to determine whether uprating, reconductoring, or other activities beyond the first transmission line interconnect are part of routine maintenance and upgrade activities for the regional power transmission system or a direct downstream effect resulting from the construction and operation of CRN-1. Therefore, such activities and associated environmental impacts are addressed as part of the analysis of impact of the proposed action in conjunction with other RFFAs in Chapter 7.	CPA ER Subsection 3.2.6
	Any ground disturbance from the offsite transmission line upgrades would not encroach into land outside of the existing rights-of-way.	It is not currently possible to determine whether uprating, reconductoring, or other activities beyond the first transmission line interconnect are part of routine maintenance and upgrade activities for the regional power transmission system or a direct downstream effect resulting from the construction and operation of CRN-1. Therefore, such activities and associated environmental impacts are addressed as part of the analysis of impact of the proposed action in conjunction with other RFFAs in Chapter 7.	CPA ER Subsection 3.2.6
	TVA would prevent or minimize to the extent practicable impacts to forests, wetlands, or sensitive biota due to ground disturbance resulting from the offsite transmission line upgrades by using established BMPs.	It is not currently possible to determine whether uprating, reconductoring, or other activities beyond the first transmission line interconnect are part of routine maintenance and upgrade activities for the regional power transmission system or a direct downstream effect resulting from the construction and operation of CRN-1. Therefore, such activities and associated environmental impacts are addressed as part of the analysis of impact of the proposed action in conjunction with other RFFAs in Chapter 7.	CPA ER Subsection 3.2.6

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Aquatic Ecology			
	Onsite and offsite descriptions of aquatic resources for the CRN Site, consistent with NUREG-1555 (NRC 2000-TN614), would be as provided in ER Sections 2.4.2.1 and 2.4.2.2.	Onsite and offsite descriptions of aquatic resources have been updated.	CPA ER Subsection 4.3.2
	Important aquatic species would be as discussed in Section 2.4.2.3 of the ER.	Important and other aquatic species are discussed.	CPA ER Subsection 2.4.2
	The potential impacts on Federally listed threatened and endangered aquatic species and designated critical habitats are documented in the NRC's BA in Appendix M. However, the FWS concluded that this ESP does not require further ESA Section 7 consultation. The NRC would update its BA as part of consultation conducted in connection with the NRC's review of any future COL or CP application that references a CRN Site ESP.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.3.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Building activities that could directly affect onsite and offsite aquatic ecosystems would include site preparation for installation of plant structures and the barge-unloading facility in the barge transport area; and installing the cooling-water system intake and discharge structures. This includes the use of BMPs including silt-curtains and cofferdams as appropriate. Shoreline installation and site preparation activities would require a stormwater pollution prevention plan, developed as part of the Tennessee Department of Environment and Conservation (TDEC) stormwater permit, which would describe BMPs to control sedimentation and erosion and provide stormwater management. In-water building activities would comply with the terms and conditions included in the Department of the Army permit issued by the U.S. Army Corps of Engineers (USACE) and the TDEC Aquatic Resource Alteration Permit and the NPDES Construction Stormwater Permit requirements.	Mitigative measures required by TDEC and USACE guidelines will be used to minimize impacts to streams and ponds onsite and in associated offsite areas.	CPA ER Subsection 4.3.2.1 CPA ER Subsection 4.3.2.3
	TVA would comply with all required mitigation measures determined for jurisdictional streams that could be affected by building and operating at the CRN Site. TVA has committed to restoring any disturbance to streams immediately after work is completed. It is expected that the USACE would require TVA to restore surface disturbances to jurisdictional streams as part of any Department of the Army permit issued under the Clean Water Act.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.3.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	One perennial stream (S01), six ephemeral streams/wet-weather conveyances (WWCs; C01, C02, C03, C13, C14, C15), and two freshwater ponds (P04 and P06) lie within the TVA's estimated construction footprint. Building activities in the vicinity of the intake would result in the loss of these waterbodies including the entire 925-ft channel composing Stream S01. Five additional ephemeral streams located in the northeast section of the CRN Site (C04, C05, C06, C07, and C08) may be temporarily disturbed and then restored. Within the BTA, two intermittent streams (S09 and S10) and six ephemeral streams (C26, C27, C28, C29, C30, and C31) would be affected by building improvements related to Bear Creek Road, the CRN Site entrances, and development of a new intersection and access ramps on SR 58. Stream S10 and the six ephemeral streams would be permanently altered through grading and filling as part of the road development.	The proposed action results in permanent impacts to: • 0.65 acres of three ponds (P01, P02, and P04) • 3,586 lineal feet of 11 perennial/intermittent streams (STR03, STR04, STR05, STR06, STR07, STR08, STR09, STR10, STR11, STR12, and STR17) • 2,694 lineal feet of eight WWCs (EPH02, EPH03, EPH04, EPH08, EPH09, EPH10, EPH18, and EPH19) Construction of CRN-1 results in temporary impacts to: Three perennial/intermittent streams (STR01, STR03, STR04) totaling 101 lineal feet, and three wet weather conveyances (WWCs) (EPH02, EPH04, EPH10) totaling 64 lineal feet.	CPA ER Subsection 4.2.1.1.1
	Building activities include burying a 69-kV underground transmission line in the existing 500-kV transmission line corridor where it crosses streams or creeks. TVA has indicated that preliminary plans include tunneling under the streams where practicable.	The proposed underground 69-kV transmission development project is not necessary to support operation of CRN-1 and is not included as part of the building of CRN-1.	CPA ER Subsection 3.2.6.2
	A buffer of undisturbed riparian forest vegetation would be left between disturbed lands and the river to assist in prevention of erosion and sedimentation, and would provide shaded aquatic habitats.	No new information	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	BMPs would be used during uprating, reconductoring, and rebuilding of offsite overhead transmission line segments to prevent or minimize impacts on aquatic habitats.	No new information	Not Applicable
	The location, design, construction, and capacity of the cooling-water intake structure would reflect the best technology available for minimizing environmental impacts and would be compliant with U.S. Environmental Protection Agency 316(b) Phase I requirements (40 CFR Part 125-TN254).	CRN-1 intake structure designs comply with the Clean Water Act (CWA) 316(b) regulations. The maximum through-screen velocity is maintained at less than 0.5 feet per second per the requirements of the CWA.	CPA ER Subsection 3.2.3.2.1
	Thermal discharge would be regulated as part of an NPDES permit administered by TDEC.	TVA will work with TDEC throughout the NPDES permitting process to establish appropriate permit conditions to support operation of CRN-1 to minimize impacts of the thermal discharge on the Reservoir.	CPA ER Subsection 5.2.3.1.1
	The planned 400 cfs Melton Hill Dam bypass would be functioning during plant operations.	There are no building activities associated with the Melton Hill Dam.	CPA ER Subsection 3.3.6
	Maintenance of upgraded overhead transmission lines would be in accordance with TVA guidance for environmental protection and BMPs.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.3.1.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Socioeconomics			
	Construction materials would be shipped to the CRN Site and construction debris and associated waste not placed in the onsite disposal pit would be removed from the site via road, rail, and/or barge. A portion of Bear Creek Road and access to the Rail Offload Area would be modified to handle heavy-haul traffic. The CRN Site Access Road would also be modified to handle heavy-haul traffic into the CRN Site. River Road would be improved to handle regular patrol traffic.	TVA anticipates making improvements to the existing Department of Energy former K-25 Barge Loading Area, near Bear Creek Road between Tennessee State Route 58 and the CRN Site entrance, for deliveries of equipment and materials. CRN-1 activities will include expanding the barge facility by approximately 5 acres on the northwest to northeast sides of the existing facility. Refurbishment of the K-25 barge facility may include improvements such as reducing the height of the sheet pile wall; vegetation clearing; grubbing and grading; replacement of a culvert; limited placement of fill, widening, and resurfacing of the haul path; addition of tie off points for the barge; and installation of temporary support of overhead lines. Tree removal may be required. No in-water work is anticipated.	CPA ER Subsection 3.3.3
	Definition of the affected demographic and economic regions would be those suggested in the ER. The review team relied upon American Community Survey 2011-2015 5-year data for most demographic statistics and for the analyses of potential impacts. Populations projections would be based on information from the State of Tennessee.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 2.5

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Site preparation and construction activities would continue for approximately 6 years and would employ as many as 3,300 construction workers. During concurrent building of a unit and operation of another, the total workers would be 3,666 people. TVA would employ up to 500 operations and 1,000 outage workers. Of the maximum workforce employed across all shifts, the maximum number of workers onsite at one time would be 2,200, as indicated in the plant parameter envelope.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 3.3.7
	The in-migrating building and operations workforce would be distributed geographically in a manner similar to the existing Oak Ridge Reservation workforce.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.4.2
	Traffic impacts would be based on the AECOM Technical Services Inc. traffic impact analysis (AECOM 2015-TN5000).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 10.6.1.3
	The household size for in-migrating workers would be 2.53 persons	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.4.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	TVA would construct two or more SMRs with the combined capacity listed in the plant parameter envelope (PPE) (800 MW(e)). The cost of reactors is would be $5,183–-7,256 per kW(e) in 2016 dollars. (Used the Bureau of Economic Analysis' Regional Input-Output Modeling System II multipliers for indirect workforce.)	TVA's current cost estimates for the manufacturing and building of CRN-1 are based on the results of a DOE report which concludes that as of 2023, overnight capital costs for first of a kind advanced nuclear power plants are estimated to range from approximately $6,000 to $10,000 per kWe. Applying this range of potential costs per kWe to CRN-1, which has a nominal power output of 300 MWe, results in an estimated cost of approximately $1.8 to $3.0 billion.	CPA ER Subsection 4.4.3.1
	Construction worker annual income would be $40,920 and operations worker income would be $65,520.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 4.4.3
	Aesthetic impacts would include 160-ft-tall SMR buildings and mechanical draft cooling towers and associated plumes.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS. Aesthetic impacts from building this transmission line are primarily limited to the presence of construction workers and associated equipment within the corridor and on nearby roadways. Building the transmission line results in a minor discord in the aesthetic environment due to an increase in personnel and equipment which would disrupt the undisturbed nature of the Grassy Creek Habitat Protection Area (HPA). Updated aesthetic impacts from associated offsite 161-kV transmission line.	CPA ER Table 3.1-2 CPA ER Subsection 4.4.1.1 CPA ER Subsection 5.4.1.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Water and wastewater services would be 145 and 75 gpd, respectively.	Parameter not considered in the analysis for CRN-1.	Not Applicable
	All construction and operations noise would be sufficiently attenuated by TVA's identified mitigation and the physical properties (i.e., topography, foliage, etc.) of the area to reduce the overall noise levels to below the NRC threshold for minor impacts (65 dBA).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Table 3.1-2 CPA ER Subsection 4.4.1 CPA ER Section 4.7 CPA ER Subsection 5.4.1 CPA ER Section 5.7
	American Community Survey 2011–2015 5-year data were used as the baseline for the analyses of potential impacts. Minority and low-income populations would continue to exist in the same proportions and locations as populations increase.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 2.5.1
	Field reconnaissance did not reveal evidence of any special populations or subsistence activities in close proximity to the CRN Site.	No new information.	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Historic and Cultural Resources			
	TVA has executed a Programmatic Agreement (PA) in accordance with 36 CFR Part 800 (TN513) that outlines how TVA would avoid, minimize, or mitigate impacts on historic and cultural resources from preconstruction and construction activities within the onsite and offsite direct- and indirect-effects areas of potential effect (APE). The PA also outlines a process for TVA to amend the APE as project plans are finalized for the COL application. Included in this process are the steps TVA would take to identify, evaluate, and mitigate newly identified significant historic and cultural resources as well as inadvertent discoveries. Notification and consultation with Tennessee Historical Commission (THC) and American Indian Tribes are also stipulated for these steps. TVA has committed to keeping the NRC informed of updates concerning its National Historic Preservation Act (NHPA) Section 106 consultation (TVA 2017- TN4922). It is expected that as part of its COL application, TVA would have implemented its PA which commits them to following the NHPA Section 106 compliance process in consultation with the Tennessee Historical Commission and Tribes for building-related activities within the direct and indirect APEs at the CRN Site (NRC 2018-TN5844).	No new information	CPA ER Subsection 2.5.3.3 CPA ER Section 5.5

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	During the course of the NRC's NHPA Section 106 consultation for the ESP, American Indian Tribes provided comments on TVA's undertaking, cultural resource survey reports, and its PA. These comments were captured at a high level in Section 2.7.4 for the purposes of documenting the results of NRC's NHPA Section 106 consultation for the ESP as part of the administrative record. Most comments provided by Tribes and the THC are pertinent to TVA's undertaking and do not apply to NRC's current undertaking associated with the ESP. The NRC provided these comments to TVA because they are pertinent to TVA's undertaking and its ongoing NHPA Section 106 consultation considerations. It is expected that prior to its COL application, TVA will have resolved and addressed any ongoing concerns raised by consulting parties including American Indian Tribes (NRC 2018-TN5844).	In addition to the 2016 Clinch River SMR PA governing construction activities, TVA executed the Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966 (2019 Valley-wide Section 106 PA). Under the 2019 Valley-wide Section 106 PA TVA will avoid, minimize, or mitigate potential operation-related impacts.	CPA ER Subsection 2.5.3.3 CPA ER Section 5.5
	It is expected that the USACE would be a cooperating agency on the COL EIS. The USACE will defer its Section 106 NHPA consultation until the COL stage of the application process and will define its permit area at that time.	No new information	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	To avoid and minimize unintentional impacts on historic and cultural resources from operation and maintenance activities, TVA would follow appropriate Federal historic and cultural resource protection requirements (i.e., NHPA; 54 U.S.C. § 300101 et seq. [TN4157]), Archaeological Resources Protection Act (16 U.S.C. § 470aa et seq. [TN1687]), Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001 et seq. [TN1686]), and Archeological and Historic Preservation Act (54 U.S.C. § 312501 et seq. [TN4844]), American Indian Religious Freedom Act (42 U.S.C. § 1996 et seq. [TN5281]), Executive Order (EO) 13007 "Indian Sacred Sites" (TN5250), and EO 13175 "Consultation and Coordination with Indian Tribal Governments" (TN4846). These laws also require TVA to notify the THC and American Indian Tribes in the event of inadvertent discovery of human remains or historic and cultural resources. These requirements would also apply to the COL application.	As project plans are finalized, the number of historic and cultural resources impacted by construction could change and would be addressed in accordance with the 2016 Clinch River SMR Programmatic Agreement (PA). For any potentially eligible or undetermined sites that would be physically affected by building CRN-1, TVA will follow the stipulations of the 2016 Clinch River SMR PA with the Tennessee State Historic Preservation Office (TNSHPO) and the United Keetoowah Band of Cherokee Indians in Oklahoma which includes phase II testing for potentially National Register of Historic Places-eligible sites to confirm eligibility. Additionally, the 2016 Clinch River SMR PA stipulates the steps that TVA will take to make any needed changes to the Area of Potential Effects (APE) as project plans develop; identify historic properties in the APE; evaluate the project's potential effects on historic properties; and seek ways to avoid, minimize, or mitigate adverse effects on historic properties.	CPA ER Subsection 4.5.1
Meteorology and Air Quality			
	Temporary emissions, including fugitive dust and construction equipment engine exhaust, would be minimized with a preconstruction and construction-related mitigation plan. These mitigation measures could include any or all of the measures identified in Section 4.4.1.2 of this EIS.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.6

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Meteorological data for the CRN Site are presented in the Environmental Report (ER). The data from 2011 to 2013 are assumed to be representative.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 2.7.1
	Air emissions from the CRN Site would be bounded by those listed in EIS Sections 4.7, 5.7, 6.1.3, 6.3, and 7.6. Greenhouse gas emissions would be bounded by those in Appendix K over the life cycle of the facility	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.6
	Auxiliary boilers and diesel generators and/or gas turbines are assumed to be required for a new nuclear power plant, and these devices would release permitted pollutants to the air. The ER describes the annual estimated emissions, and these emissions have been considered in EIS Table 5-3.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.6
	The normal heat sink that would be used to dissipate heat from the turbine cycle for a new nuclear power plant would use cooling towers to reject that heat directly into the atmosphere.	The cooling water system (CWS) for CRN-1 provides cooling water to the main condenser and transfers heat from the condenser to the environment through the normal heat sink (NHS). The CWS has two subsystems: the main condenser circulating water supply (CW) and the service water supply (SW). The main condenser CW supply provides cooling water to the Main Condenser and Auxiliaries System during all modes of condenser heat removal. SW supplies cooling water to reject the heat loads from the plant cooling water (PCW) heat exchangers through the NHS. The SW supply provides cooling water to the PCW heat exchangers for all normal and off-normal operating modes.	CPA ER Subsection 3.2.3.1.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Cooling towers would have drift eliminators comparable in effectiveness to the drift eliminators in current-generation cooling towers.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.11
	The maximum salt deposition rate from the two linear mechanical draft cooling towers was estimated to be 6,276 kg/km2 per month and would occur at a distance of 100 m west of the towers.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.1 CPA ER Subsection 5.3.1.2
	A meteorological monitoring program would be re-established for the operational phase of the project. The monitoring program would be a similar to the meteorological monitoring program for the site preparation monitoring.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.8
Nonradiological Human Health – CRN Site			
	The nearest sensitive receptor (residence) would be approximately 0.36 mi (1,900 ft) from the planned cooling-tower location.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.7
	Nighttime construction activities would not exceed 65 dBA at the site boundary.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.7
	The peak noise level would be 102 dBA measured from 50 ft from the source during construction. Peak noise levels during operations would be 70 dBA 1,000 ft from the source, and would be primarily from cooling-tower operation.	The peak noise level would be 101 A-rated decibels (dBA) measured from 50 feet from the source during construction. Peak noise levels during operations would be 70 dBA 1,000 feet from the source, and would be primarily from cooling-tower operation.	CPA ER Table 3.1-2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	All construction and operations noise would be sufficiently attenuated by TVA's identified mitigation and the physical properties (i.e., topography, foliage, etc.) to levels below the NRC threshold for minor impacts (65 dBA) at the site boundary.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS, The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 4.7 CPA ER Subsection 5.4.1 CPA ER Section 5.7
	Noise levels associated with blasting activities during construction are infrequent, temporary, and limited to daytime hours. Although this noise-producing activity is discussed in the Terrestrial Ecology sections of this EIS, it is not appropriate for analysis with respect to human health.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Table 3.1-2 CPA ER Subsection 3.3.4 CPA ER Subsection 4.3.1.4.1 CPA ER Subsection 4.3.1.5.3 CPA ER Subsection 5.3.1.2
Nonradioactive Waste			
	Water and wastewater services would be 100 gpm and 75 gpd, respectively.	Parameter not considered in the analysis for CRN-1.	Not Applicable
Radiological Human Health			
	Radioactive waste management systems would be designed to minimize releases from reactor operations to values as low as is reasonably achievable. These systems would be designed and maintained to meet the requirements of 10 CFR Part 20 (TN283) and Appendix I in 10 CFR Part 50 (TN249).	The radioactive waste management systems are designed to restrict releases of radioactive materials in effluents to "as low as is reasonably achievable" (ALARA) levels to meet the requirements of 10 CFR Parts 20 and 50, including the design objectives of 10 CFR 50 Appendix I.	CPA ER Subsection 3.2.4.1
	The expected single unit annual activities by isotope contained in the airborne effluent, liquid effluent, and solid radioactive waste streams generated during routine plant operations are based on the PPE approach, where bounding direct radiation and liquid and gaseous radiological effluents were used in the evaluation.	Table 3.2-3 provides the average normal liquid radioactive effluent activities for CRN-1. Values are given for both the ESP-006 Plant Parameter Envelope (PPE) bounding analysis and CRN-1. The total projected annual release activity in liquid effluents for CRN-1 is 0.0995 Curies (Ci) per year, which is less than 887 Ci/year total activity in the ESP-006 PPE (Item 10.3.1). However, some isotopes are not bounded by the ESP-006 PPE analysis.	CPA ER Subsection 3.2.4

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The exposure pathways considered and the analytical methods used to estimate doses to the maximally exposed individual and to the population surrounding a new nuclear power plant are based on NRC Regulatory Guide 1.109, *Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I* (Rev.1, October 1977 [TN249]) (RG 1.109, NRC 1977-TN90), and NRC Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water- Cooled Reactors (Revision 1, July 1977) (RG 1.111, NRC 1977-TN91).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 5.8
	ER Table 5.4-15 estimates the total body and organ doses to the maximally exposed individual from liquid effluents and gaseous releases per unit based on the PPE approach for analytical endpoints prescribed in 10 CFR Part 50, Appendix I (TN249).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.10.1
	The estimated annual doses from all pathways for the CRN Site are summarized in ER Table 5.4-16. ER Table 5.4-16 compares these doses to the public dose criteria in 40 CFR Part 190 (TN739). TVA states that by demonstrating compliance with the requirements of 40 CFR Part 190 (TN739), it in turn demonstrates compliance with the requirements of 10 CFR 20.1301 (TN283).	TVA determined that while the information related to liquid and gaseous effluents is updated from that previously included in the NRC ESP FEIS. The supplemental information is bounded by that analysis.	CPA ER Section 5.8

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Because a specific reactor design has not been selected, the calculated construction worker direct doses are based on data available for the Westinghouse Advanced Passive 1000 (AP1000) pressurized water reactor (PWR). Although thought to be bounding, it is possible that these dose rates would increase in the future as site conditions change. However, the site would be monitored continually during the construction period, and appropriate actions would be taken as necessary to ensure that the construction workers are protected from radiation.	During building of this single unit, there are no operating plants on or adjacent to the project site. Thus, construction workers are not exposed to radioactive materials or effluent from operating reactors at the site. At certain times during building, TVA would receive, possess, and use specific radioactive material in support of building. These sources of low-level radiation have very specific uses under controlled conditions. Therefore, these sources are expected to result in a negligible contribution to construction worker doses. Workers can be considered members of the public and are not subject to monitoring.	CPA ER Section 4.8
	The new nuclear power plant would release liquid effluents to the Clinch River arm of the Watts Bar Reservoir via the cooling-water discharge stream.	During normal operation, it is expected that processed water from the Liquid Waste Management System (LWMS) can be reused in the plant with no discharges to the environment. However, if the plant's overall water inventory does not allow for the water to be recycled (when the tank is full and there is no demand from systems using condensate storage tank), the filtered water can be discharged to the Reservoir through the diffuser.	CPA ER Subsection 3.2.4.1.1
Transportation			
	Overall, the generating output of the SMRs at the CRN Site or alternative sites would be 800 MW(e) and the station capacity factor would be 90 percent.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	Table 3.1-2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Unirradiated fuel assemblies would be shipped to the CRN Site by truck only shortly before they would be needed.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	Radioactive waste and spent fuel would be shipped from the CRN Site by truck only. The number of radioactive waste shipments was based on 2.34 m3/shipment. The number of spent fuel shipments was based on 0.5 MTU/ shipment.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	The radionuclide inventory used in the transportation accident analysis was based on AP1000 reactor fuel.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	The new nuclear power plant would have storage capacity exceeding that needed to accommodate 5- year cooling of irradiated fuel before transport offsite.	The Fuel Pool has sufficient capacity to store eight years of spent fuel and an additional full core off-load. When necessary, spent fuel will be stored onsite in dry casks on an independent spent fuel storage installation.	CPA ER Subsection 3.2.4.1.3
	The transportation impact analysis for the surrogate SMR spent fuel shipments assumed the radiation dose rate emitted from the shipments would be the maximum allowed by Federal regulations.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	It was assumed that shipping casks for the surrogate SMR spent fuel would provide equivalent mechanical and thermal protection of the spent fuel cargo (relative to the current light water reactor [LWR] spent fuel shipping cask designs).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	For this assessment, release fractions for current-generation LWR fuels were used to approximate the impacts from advanced reactor spent fuel shipments. This essentially assumes that the behavior of fuel materials and containment systems (e.g., cladding and fuel coatings) is similar to that of the current-generation LWR fuel under applied mechanical and thermal conditions.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	The proposed geologic repository at Yucca Mountain was used as a surrogate destination for spent fuel shipments.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	It was assumed that no shipments of unirradiated fuel, irradiated fuel, or radioactive waste would be made by barge or rail.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
	It was assumed that shipments of spent nuclear fuel would be shipped directly to a geologic repository. Shipment of spent nuclear fuel to an interim storage facility followed by shipment to a geologic repository was not analyzed.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.2
Decommissioning			
	Impacts from decommissioning new reactor unit(s) designs are considered to be bounded by those in NUREG-0586, Supplement 1 (NRC 2002-TN665).	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Section 6.3

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
Nuclear Fuel Cycle and Fuel Storage			
	All of the SMR technologies considered have a design storage capacity for spent fuel pools of a minimum of 6 years, a period sufficient to accommodate a 5-year cooling period, as required in 10 CFR Part 961, Appendix E (TN300).	The Fuel Pool has sufficient capacity to store eight years of spent fuel and an additional full core off-load. When necessary, spent fuel will be stored onsite in dry casks on an independent spent fuel storage installation.	CPA ER Subsection 3.2.4.1.3
	After a sufficient decay period of at least 5 years, the fuel would be removed from the pool and packaged in spent fuel shipping/storage casks either for storage onsite at an independent spent fuel storage installation (ISFSI) or for transportation offsite. Onsite storage would be licensed in accordance with 10 CFR Part 72 (TN4884), "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Waste, and Reactor-Related Greater than Class C Waste," and transferred either to an ISFSI facility onsite or an offsite disposal facility. Offsite transportation would be conducted in accordance with 49 CFR Part 173 (TN298), 49 CFR Part 178 (TN5160), and 10 CFR Part 71 (TN301).	The Fuel Pool has sufficient capacity to store eight years of spent fuel and an additional full core off-load. When necessary, spent fuel will be stored onsite in dry casks on an independent spent fuel storage installation.	CPA ER Subsection 3.2.4.1.3
Accidents			
	The exclusion area boundary (EAB) is 0.21 mi (1,100 ft or 335 m) in all directions from the effluent release boundary and encloses potential release points from the nuclear island. No major roads, public buildings, or residences are located within the exclusion area.	No new information.	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	Because TVA's ESP application does not rely on information based on an approved SMR design certification, the design basis accident (DBA) analysis is based on a surrogate SMR and only applying a loss of coolant accident (LOCA) source term as a bounding calculation.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.10.1
	The LOCA source term is based on the vendor design of the four SMR designs under consideration that resulted in the highest doses at both the EAB and the low-population zone boundary. The source term is based on uranium fuel enriched to no more than 5 percent, which is representative of the SMR designs under consideration, a maximum single unit power level of 800 megawatts thermal (MW(t)), and a maximum average burnup of 51 gigawatt days per metric tons of uranium (GWD/MTU), while the maximum average burnup for the remaining SMR designs is less than 41 GWD/MTU.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.10.1
	In accordance with RG 1.183 (NRC 2000-TN517), the DBA dose for the EAB is from the 2-hour period that yields the maximum dose.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 5.10.1
	Population growth in the vicinity of the CRN Site would not alter the population distribution in the region.	New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS.	CPA ER Subsection 2.5.1

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The severe accident source term was based on a ratio of the maximum PPE thermal power rating of 800 MW(t) to that of a large PWR previously analyzed.	CRN-1 has a maximum thermal power level of approximately 870 MWt, approximately 8.75% higher than the reactor considered in the previous severe accident analysis. New information is updated from that previously included in the ESPA ER and NRC ESP FEIS. The effect of increasing the maximum thermal power level of a single reactor at the CRN Site by 8.75% is minimal, especially when considering the conservative approach in the analysis described in the NRC ESP FEIS. The supplemental information is confirmatory of that used to prepare the NRC ESP FEIS. Severe Accident Analysis event sequences are selected based upon the Level 2 Probabilistic Risk Assessment. Results from the Level 2 Probabilistic Risk Assessment being developed will be submitted in a future Operating License Application (OLA), which will include an update to this ER. The OLA ER will identify and evaluate severe accidents and their impacts.	CPA ER Subsection 5.10.2
	The severe accident risks are based on the assumption that 99.5 percent of the population evacuates within the 2 mi and 10 mi emergency planning zones (EPZs) and the other 0.5 percent of the population does not evacuate. No evacuation is assumed to occur for the site boundary EPZ analysis.	Severe Accident Analysis event sequences are selected based upon the Level 2 Probabilistic Risk Assessment. Results from the Level 2 Probabilistic Risk Assessment being developed will be submitted in a future OLA, which will include an update to this ER. The OLA ER will identify and evaluate severe accidents and their impacts.	CPA ER Subsection 5.10.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The core damage frequencies are based on the largest SMR considered for the CRN Site based on proprietary vendor information provided to TVA.	Severe Accident Analysis event sequences are selected based upon the Level 2 Probabilistic Risk Assessment. Results from the Level 2 Probabilistic Risk Assessment being developed will be submitted in a future OLA, which will include an update to this ER. The OLA ER will identify and evaluate severe accidents and their impacts.	CPA ER Subsection 5.10.2
	To assess health risks from a severe accident, the projected population that resides within a 50-mi radius of the CRN Site in 2067 was assumed.	Severe Accident Analysis event sequences are selected based upon the Level 2 Probabilistic Risk Assessment. Results from the Level 2 Probabilistic Risk Assessment being developed will be submitted in a future OLA, which will include an update to this ER. The OLA ER will identify and evaluate severe accidents and their impacts.	CPA ER Subsection 5.10.2

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
	The spent fuel pool would be constructed at or below grade level. The spent fuel pools have a design storage capacity of 1,800 spent fuel assemblies. This allows for a period sufficient to accommodate a 5- year radioactive decay time and cooling period, as required in 10 CFR Part 961, Appendix E (TN300). After a sufficient decay period of at least 5 years, the fuel would be removed from the pool and packaged in spent fuel shipping/storage casks either for storage onsite at an ISFSI or for transportation offsite.	The CRN-1 spent fuel pool is located in the reactor building. The reactor building is a Seismic Category 1 structure. The reactor building is designed as a vertical right cylinder shaft that mitigates the effects of external events including aircraft impact, adverse weather, flooding, fires, and earthquakes. The bottom of the BWRX-300 cask pit in the spent fuel pool is at grade; the top of the cask pit / bottom of the spent fuel pool is located 4.9 meters above grade; and the top of the spent fuel pool is located 13 meters above grade. While the location of the spent fuel pool is different from that of the four technologies reviewed in the ESPA ER, the BWRX-300 meets 10 CFR 50.150 and the seismic requirements for a safety related Seismic Category I structure. In addition, requirements of 10 CFR 50.155(e) related to monitoring wide-range water level of the spent fuel pool are met. The Fuel Pool has sufficient capacity to store eight years of spent fuel and an additional full core off-load. When necessary, spent fuel will be stored onsite in dry casks at an independent spent fuel storage installation to be licensed in a separate, future licensing action.	CPA ER Subsection 3.2.4.1.3
	An appropriately sized ISFSI would be constructed and operational within 22 years from the commencement of operations. After a sufficient decay period of at least 5 years, the fuel would be removed from the pool and packaged in spent fuel shipping/storage casks either for storage onsite at an ISFSI or for transportation offsite.	No new information.	Not Applicable

NRC ESP FEIS Appendix Table J-2		CRN-1 CPA Environmental Report	
Technical Area	**Representations/Assumptions**	**CRN-1 Representations/Assumptions**	**CPA ER Reference**
System Design Alternatives			
	Water-treatment alternatives for the circulating-water system were not described in the ER and not evaluated in the ESP EIS. Therefore, this issue is not resolved.	Water treatment is described.	CPA ER Subsection 3.2.2.2
Cumulative Impacts			
	The proposed nearby projects and activities that could have a cumulative effect on the construction or operation of a new nuclear power plant at the CRN Site are those identified in EIS Sections 2.12 and 7.0.	New information regarding proposed nearby projects and activities that could have impacts on the construction or operation of a new nuclear power plant at the CRN Site are those identified in ER Table 7-1.	CPA ER Table 7-1

APPENDIX C ENVIRONMENTAL PROTECTION PLAN (NON-RADIOLOGICAL)

1.0 Objective of the Environmental Protection Plan

The objectives of the Environmental Protection Plan (EPP) are to ensure compliance with Biological Opinions issued pursuant to the Endangered Species Act of 1973, as amended (ESA), and to ensure that the U.S. Nuclear Regulatory Commission (NRC) is kept informed of other environmental matters. The EPP is intended to be consistent with Federal, State, and local requirements for environmental protection. As a Federal instrumentality, TVA is responsible for independent compliance requirements apart from the EPP, and may conduct other actions or carry out other responsibilities as required by applicable permit, consultation or other regulatory requirements.

2.0 Environmental Protection Issues

In the Final Supplemental Environmental Impact Statement (FSEIS) dated [TBD], NRC staff considered the environmental impacts associated with the construction and operation of Unit 1 at the Clinch River Nuclear (CRN) Site (CRN-1). This EPP applies to the licensee's actions affecting the protected environmental resources evaluated in the FSEIS and the licensee's actions that may affect any newly discovered protected environmental resources.

2.1 Aquatic Resources Issues

Federal agencies other than the NRC, such as the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE), have jurisdiction to regulate aquatic resources under the Federal Water Pollution Control Act (Clean Water Act or CWA) and the Rivers and Harbors Appropriation Act of 1899 (RHA). Certain water quality environmental considerations identified in the FSEIS, including effluent limitations, monitoring requirements, and mitigation measures, are regulated under the licensee's CWA permits, such as National Pollutant Discharge Elimination System (NPDES) and Section 404 permits, and RHA Section 10 permit. Nothing within this EPP shall be construed to place additional requirements on the regulation of aquatic resources except the imposition of the requirements in a Biological Opinion under the ESA (see Section 2.3). The licensee is required to inform the NRC of events or situations concerning aquatic resources consistent with the provisions of 10 CFR 50.72(b)(2)(xi), and this EPP does not expand any reporting requirement required by that regulation.

2.2 Terrestrial Resources Issues

Several statutes govern the regulation of terrestrial resources. For example, the U.S. Fish and Wildlife Service (USFWS) regulates matters involving migratory birds and their nests in accordance with the Migratory Bird Treaty Act. Activities affecting migratory birds or their nests may require permits under the Migratory Bird Treaty Act. The USFWS also regulates matters involving the protection and taking of bald and golden eagles in accordance with the Bald and Golden Eagle Protection Act. The licensee shall inform NRC of any events or situations concerning terrestrial resources consistent with the provisions of 10 CFR 50.72(b)(2)(xi), and this EPP does not expand any reporting requirement required by that regulation.

2.3 Endangered Species Act of 1973

The NRC may be required to protect some aquatic resources and terrestrial resources in accordance with the ESA. If a Biological Opinion is issued in accordance with ESA Section 7, the licensee shall comply with the terms and conditions set forth in the Incidental Take Statement of the Biological Opinion. If any Federally listed species or critical habitat is discovered in an area affected by construction or operation of the plant that was not previously identified as occurring in such areas, including species and critical habitat that were not previously Federally listed, the licensee shall inform the NRC within four hours of discovery. The time of discovery is identified as the specific time when a decision is made to notify another agency or to issue a press release. Similarly, the licensee shall inform the NRC within four hours of discovery of any take, as defined in the ESA, of a Federally listed species or destruction or adverse modification of critical habitat. The four-hour discovery notifications shall be made to the NRC Operations Center via the Emergency Notification System. The licensee shall provide any necessary information to the NRC if the NRC initiates or reinitiates consultation under the ESA.

Unusual Event - The licensee shall inform the NRC of any onsite mortality, injury, or unusual occurrence of any species protected by the ESA within four hours of discovery, followed by a written report in accordance with Section 4.1. The time of discovery is identified as the specific time when a decision is made to notify another agency or to issue a press release. Such incidents shall be reported regardless of the licensee's assessment of causal relation to plant construction or operation.

3.0 Consistency Requirements

The licensee shall notify the NRC of proposed changes to permits or certifications concerning aquatic or terrestrial resources by providing the NRC with a copy of the proposed change(s) at the same time it is submitted to the permitting agency. The licensee shall provide the NRC with a copy of the application for renewal of permits or certifications at the same time the application is submitted to the permitting agency.

Changes to or renewals of such permits or certifications shall be reported to the NRC within 30 days following the later of the date the change or renewal is approved or the date the change becomes effective. If a permit or certification, in part or in its entirety, is appealed and stayed, the NRC shall be notified within 30 days following the date the stay is granted.

4.0 Administrative Procedures

4.1 Plant Reporting Requirements: Non-Routine Reports

A written report shall be submitted to the NRC within 30 days of occurrence of any unusual event described in Section 2.3 of this EPP. The report shall: (a) describe, analyze, and evaluate the event, including extent and magnitude of the impact and plant operating characteristics at the time of the event, (b) describe the probable cause of the event, (c) indicate the action taken to correct the reported event, (d) indicate the corrective action taken to preclude repetition of the event and to prevent similar occurrences involving similar components or systems, and (e) indicate the agencies notified and their preliminary responses.

Events reportable under this subsection, which also require reports to other Federal, State, or local agencies, shall be reported in accordance with those reporting requirements in lieu of the requirements of this subsection. The NRC shall be provided a copy of such report at the same time it is submitted to the other agency.

4.2 Review and Audit

The licensee shall provide for review and audit of compliance with Section 2.3 of this EPP. The audits shall be conducted independently of the individual or groups responsible for performing the specific activity. A description of the organizational structure utilized to achieve the independent review and audit function and results of the audit activities shall be maintained and made available for inspection.

4.3 Records Retention

Records required by this EPP shall be made and retained in a manner convenient for review and inspection. These records shall be made available to the NRC on request. The records, data, and logs relating to this EPP shall be retained for five years or, where applicable, in accordance with the requirements of other agencies.

4.4 Changes in the Environmental Protection Plan

A request for a change in the EPP shall include an assessment of the environmental impact of the proposed change and a supporting justification. Implementation of such changes in the EPP shall not commence prior to NRC approval of the proposed changes in the form of a license amendment incorporating the appropriate revision to the EPP.

The licensee shall request a license amendment to incorporate the requirements of any Terms and Conditions set forth in the Incidental Take Statement of applicable Biological Opinions issued subsequent to the effective date of this EPP.

ENCLOSURE 5

TVA Affidavit and Request for Withholding from Public Disclosure
(10 CFR 2.390(a)(3) and (4))

Enclosure 5

United States Nuclear Regulatory Commission
Washington, District of Columbia

In the Matter of	)
Tennessee Valley Authority	)
Clinch River Nuclear Site	)
Construction Permit Application	)
	)

AFFIDAVIT

STATE OF TENNESSEE	)
	)
COUNTY OF HAMILTON	)

Scott W. Hunnewell, after being duly sworn in, deposes and says:

1. I am employed as the Vice President, New Nuclear Program for the Tennessee Valley Authority (TVA), an agency and instrumentality of the United States Government. I am familiar with the Construction Permit Application for TVA's Clinch River Nuclear Site and have personal knowledge of the matters stated herein.

2. I am submitting this affidavit in accordance with 10 CFR § 2.390(a)(3), § 2.390(a)(4) and 10 CFR § 9.17 because certain information contained in Enclosures 3 and 4 to this submittal has been determined by TVA to be of the type customarily held in strict confidence by the agency and is exempted from disclosure by 10 CFR § 2.390(a)(4), or is required to be withheld from the public by statute under the Archaeological Resource Protection Act, Section 470hh; the National Historic Preservation Act of 1966, Section 304, as amended; and Executive Order 13007, Indian Sacred Sites May 24, 1996 and is thus exempted from disclosure by 10 CFR § 2.390(a)(3).

3. The information that should not be released to the public has been collected and organized into Enclosures 3 and 4 of this submittal.

4. The submittal Enclosure 3 includes proprietary commercial and financial information exempted from disclosure by 10 CFR §2.390(a)(4).

    a. Public disclosure of this information would create substantial harm to TVA's business interests because such information has significant commercial value to TVA and its disclosure could adversely affect other TVA transactions.

5. The submittal Enclosure 4 includes information concerning the nature and location of archaeological resources exempted from disclosure by statute per 10 CFR §2.390(a)(3).

    a. The application includes culturally sensitive information subject to restricted access in accordance with the following statutes: The Archaeological Resources Protection Act of 1979, Section 470hh; the National Historic Preservation Act of 1966, Section 304, as amended; and Executive Order 13007, Indian Sacred Sites May 24, 1996.

b. Public disclosure of this information would create risk of harm to these historic resources or to the sites at which these resources are located.

6. The information sought to be withheld ("the information") is being submitted to the NRC in confidence.

7. The information is the sort of information regularly and customarily held in confidence by TVA based on the statutes requiring the withholding of such information; and is, in fact, so held.

8. The information has consistently been held in confidence by TVA.

9. No public disclosure of the information has been made by TVA.

10. All disclosures of the information to third parties by TVA, including any transmittals to the NRC, have been made pursuant to regulatory provisions or proprietary agreements which provide that the information is to be maintained in confidence.

S. W. Hunnewell
Vice President, New Nuclear Program

Subscribed and sworn to before me,

Notary Public, this 28th day of April 2025:



Molly Simbeck

My Commission expires: 9/7/25