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ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
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DOMINION ENERGY SOUTH CAROLINA, INC. (DESC)
VIRGIL C. SUMMER NUCLEAR STATION UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Enclosed is the DESC Annual Radiological Environmental Operating Report as required by Section 6.9.1.6 of the Virgil C. Summer Nuclear Station Technical Specifications.

If there are any questions, please call Ms. Alicia Auton at (803) 941-9523.

Sincerely,

A handwritten signature in dark ink, appearing to read "D. Edwards", written over a light blue horizontal line.

Douglas J. Edwards
Director, Nuclear Station Safety and Licensing
V. C. Summer Nuclear Station

Commitments contained in this letter: None

Enclosure

cc: G. J. Lindamood – Santee Cooper (w/Enclosures)
M. Miller – NRC Region II
G. Miller – NRC Project Manager
NRC Resident Inspector
ANI
Susan Jenkins – SCDES - Bureau of Environmental Health
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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

VIRGIL C. SUMMER NUCLEAR STATION



FOR THE OPERATING PERIOD
JANUARY 1, 2024 - DECEMBER 31, 2024

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
VIRGIL C. SUMMER NUCLEAR STATION
DOMINION ENERGY

FOR THE OPERATING PERIOD
JANUARY 1, 2024 - DECEMBER 31, 2024

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EXECUTIVE SUMMARY

This document is a detailed report of the V.C. Summer Nuclear Station (VCSNS) Unit 1 Radiological Environmental Monitoring Program (REMP) and the program results for the period of January 1st through December 31st of 2024. It is submitted in accordance with Technical Specification 6.9.1.6 and meeting the objectives outlined in (1) the Offsite Dose Calculation Manual (ODCM) and (2) Sections IV.B.2, IV.B.3, and IV.C of Appendix I to 10 CFR Part 50.

Included in this report are a summary of the scheduled sampling program, descriptions of sampling locations, types of analysis performed, tabulated results of those analyses, and interpretations of the results for the reporting period. Comparisons of results to pre-operational environmental data, operational control data, and historical trend data are used to assess the impacts of plant operation on the environment. Also included are the results of the land use census, a summary of the dose evaluation for potential exposure pathways, quality assurance data for analytical processes, and deviations from the sampling schedule.

Sampling activities were conducted as prescribed by the ODCM for VCSNS and applicable Health Physics procedures. Regulatory analyses were performed and detection limits met for required samples with deviations noted. Samples were collected comprising one thousand and eighty-eight analyses (1,088) performed to compile the data for the 2024 Environmental Report. Additional supplemental samples comprising two hundred ninety-five (295) analyses were performed for additional information. Based on the results from the annual land use census, the current sampling sites for V.C. Summer Nuclear Station are sufficient.

Radionuclides observed in the environment in 2024 from V.C. Summer effluent releases were within the range of concentrations observed in the past. Radiation dose calculated from sample results is less than observed with normal fluctuation in natural background. It is therefore concluded that VCSNS operations have no significant radiological impact on the health and safety of the public or the environment.

INTRODUCTION

Virgil C. Summer Nuclear Station (VCSNS) operates a single unit pressurized water reactor rated at 2900 MWt (990 MWe gross). The station is located adjacent to the Monticello Reservoir near Jenkinsville, South Carolina and approximately 26 miles northwest of Columbia. VCSNS achieved initial criticality on October 22, 1982, reached 50% power December 12, 1982, and 100% power June 10, 1983, following steam generator feed water modifications. VCSNS is currently operating in the 29th fuel cycle.

VCSNS is operating in conjunction with the adjacent Fairfield Pump Storage Facility (FPSF) which consists of eight reversible pump-turbine units of 60 MWe capacity each. During periods of off-peak power demand, base load generating capacity is used to pump water from Parr Reservoir to Monticello Reservoir. Monticello Reservoir has a surface area of approximately 6800 acres and lies about 150 feet above Parr Reservoir whose full pool area is approximately 4400 acres. The pump-turbine units operate in the generating mode to meet peak system loads while Monticello Reservoir also provides condenser cooling water for VCSNS. Cooling water intake and discharge structures are separated by a jetty to ensure adequate circulation within the reservoir.

VCSNS is located in Fairfield County which, along with Newberry County, makes up the principal area within a 10 mile radius of the plant. This area is mainly forest with about 30% devoted to small farming activities principally producing small grains, feed crops and beef cattle. Significant portions of Lexington and Richland Counties are encompassed within the 20 mile radius of the plant and exhibit similar agricultural activities. Columbia, the state capital, is the only large city within the 50 mile radius of the plant. Small agricultural activities are the predominant concern; however, these activities make up less than 50% of the land area. Industrial activity is concentrated around Columbia and is generally greater than 20 miles from the VCSNS.

Liquid effluents from VCSNS are released into the Monticello/Parr Reservoirs at two discharge points: the Circulating Water Discharge Canal (CWDC) and the FPSF Penstocks. Non-nuclear drains are released to the CWDC. Effluent from the liquid waste processing system and processed steam generator blow down are released through the penstocks. Radioactive gaseous effluents from VCSNS are released from two points: the Main Plant Vent and the Reactor Building Purge Exhaust, all considered ground level releases.

In 2012, construction began on the Independent Spent Fuel Storage Installation (ISFSI) and concluded in January 2016. The first dry cask storage campaign began March 26, 2016, and finished in the first week of May 2016. Four casks were loaded during this evolution. Campaigns in the second quarter of 2019 and first quarter of 2022 have added eight additional casks for a current total of twelve casks. Area dosimetry monitoring has been established to trend and evaluate changes in conditions around the cask storage area.

Radioactive liquid and gaseous releases from the facility and their potential influence on the surrounding biota and man are the primary concern of the Radiological Environmental Monitoring Program at VCSNS. This report summarizes the results of the Radiological Environmental Monitoring Program conducted during 2024. Data trends, control/indicator and pre-operational/operational data, inter-comparisons, and other data interpretations are presented.

DESCRIPTION OF THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The Radiological Environmental Monitoring Program is carried out in its entirety by Dominion Energy South Carolina. The program has been designed to meet the following general commitments:

1. To analyze selected samples in anticipated pathways for the qualification and quantification of radionuclides released to the environment surrounding VCSNS.
2. To establish correlations between levels of environmental radioactivity and radioactive effluents from VCSNS operation.

The program utilizes the concepts of data trending and data inter-comparisons to evaluate the adequacy of radioactivity source control and to assess environmental radioactivity levels and subsequent radiation dose to man. Since background radiation levels vary across the monitoring area and even across time at a given location, both pre-operational/operational and control/indicator comparisons are utilized. This serves to assess the probability that any observed measurement of radioactivity concentration is due regional fluctuation rather than plant operation.

The presence of fission product activity attributed to residual fallout from atmospheric weapons testing and the Chernobyl accident were detected in environmental sample media during the pre-operational phase of VCSNS and continue to be detected, primarily in grass and sediment media. Comparisons to the pre-operational data provides a means to distinguish any activity related to VCSNS operation.

Sample location, media, and analysis sensitivity requirements have been established to ensure that the maximum dose pathways are monitored and sensitivities represent a small fraction of annual release limits. The required Lower Limits of Detection (LLDs) are verified to have been met by calculating Minimum Detectable Activity (MDA) for each sample based on actual counting parameters relevant to each sample. In all cases the achieved MDA was lower than the required LLD. Effluent dispersion characteristics, demography, hydrology, and land use have been considered in selection of environmental sampling locations. These elements were used to establish both the pre-operational and operational phases of the Radiological Environmental Monitoring Program. Sample media of the program were selected to monitor the impact of both gaseous and liquid effluents released from VCSNS.

Specific methods used in monitoring the pathways of these effluents which may lead to radiation exposure of the public, based on existing demography, are summarized in Table 1. Requirements of the Radiological Environmental Monitoring Program are specified in the VCSNS Offsite Dose Calculation Manual (ODCM).

Table 1 - Monitoring Methods for Critical Radiation Exposure Pathways		
Effluent Release Type	Exposure Pathway	Monitoring Media
Gaseous	Immersion Dose and other External Dose	Thermoluminescent Dosimetry (TLD) Area Monitoring, Air Sampling,
	Vegetation (Ingestion)	Vegetation and Food Crop Sampling,
	Milk (Ingestion)	Milk Sampling, Grass (Forage) Sampling
	Fish (Ingestion)	Fish Sampling
	Water & Shoreline Exposure (Ingestion and Immersion)	Surface Water Sampling, Ground Water Sampling, Shoreline and Bottom Sediment Sampling,
Liquid	Drinking Water (Ingestion)	Drinking Water Sampling

Monitoring sites indicative of plant operation are generally located within a 5 mile radius of the plant. Table 2 provides a list of ODCM required sampling locations. Table 3 provides a list of supplemental sampling locations. Maps showing radiological environmental sampling locations within a radius of approximately 5 miles from VCSNS are presented as Figures 1-2 through 1-5. Figure 1-1 shows monitoring sites at distances greater than 10 miles from the plant.

Environmental data is gathered through various sampling media and analysis measurements. Some sampling sites listed in the tables and figures serve as a combination site for multiple sample types. The regulatory program, as prescribed by the ODCM, is outlined in Table 5, showing all required sample collections and analyses to be performed. Supplemental samples are collected and analyzed in accordance with VCSNS site procedures in addition to the required program as deemed beneficial for monitoring specific sites of interest or to aid in evaluation of regulatory program results. These samples and analyses are outlined in Table 6. Tables 5 and 6 also include designations for which sites are used as indicator data versus control data.

Air monitoring locations provide continuous sampling for air contaminants. At these locations, airborne plant effluents are monitored for gamma immersion dose (noble gases) and particulate radioactive material. These samples are collected and analyzed weekly.

Area monitoring for direct gamma dose is performed using thermoluminescent dosimeters (TLDs). TLDs are changed out quarterly and are processed by a NVLAP accredited vendor. Vendor results are then

assessed by VCSNS staff. Prior to 2024, TLDs were processed by Mirion Technologies. Beginning with the first quarter of 2024, TLD processing was transferred to Radiation Detection Company (RDC).

Two garden locations (Sites 6 and 7) are sampled for broadleaf vegetation for the purpose of monitoring gaseous effluent deposition (ingestion pathway) in the two sectors having the highest deposition coefficients (D/Q) with real potential for exposure. Deposition coefficients are evaluated annually during the Land Use Census using real meteorological data to verify current sampling locations are appropriate.

Liquid effluents are monitored using surface water, groundwater, drinking water, fish, and bottom sediment media. Surface water, fish, and sediment are sampled at the two most probable affected bodies of water around the plant, Parr Reservoir and Monticello Reservoir. Groundwater wells are installed within the plant boundary in strategic locations based on the sites' hydrology to monitor potentially affected groundwater supplies. Local and downstream drinking water supplies are also monitored. Control locations for liquid effluent comparisons include Neal Shoals, upstream on the Broad River, and multiple water supplies outside of VCSNS influence.

Quality of analytical measurements is demonstrated by participation in a laboratory inter-comparison program. Results of the inter-comparison program with an outside vendor and VCSNS Count Room were satisfactory in 2024. Results are summarized in Table 9. The results of each of these quality control checks of the Radiological Environmental Monitoring Program verify the technical credibility of analytical data generated and reported by the program.

MONITORING RESULTS AND DISCUSSION

The results of the Radiological Environmental Monitoring Program for 2024 are summarized in Table 6. For comparison, pre-operational data are summarized in Table 7. The Radiological Environmental Monitoring Program attained a program compliance rate of approximately 98.6%. A listing of program deviations and their respective causes are included in Table 9. Analysis of the impact of these omissions verified that program quality has not been affected. In all analyses performed, the observed MDAs were below the required LLD values, meeting all analytical requirements for detection capability.

Air Sampling

The air sample collection rate for indicator and control samples was 98.4%. Gross beta activities measured in air particulate samples collected at indicator locations around VCSNS were consistent with pre-operational levels and not statistically significant from control locations. The highest site-specific mean activity of 2.21E-2 pCi/m³ was measured at supplemental indicator location, Site 8. This value is within the range of current and pre-operational control data. Gamma spectroscopy measurements of composited air particulate samples and activated charcoal cartridges support the gross beta activity trend. Only natural background activities were detected. The results indicate that the operation of VCSNS has not contributed to detectable increases of airborne gross activity in the environment.

Direct Gamma

The TLD sample collection rate for all indicator and control locations was 98.1%. Environmental dosimetry measurements did not indicate any significant increase from pre-operational measurements or previous historic average. Monitoring location Site 55 (St. Barnabas Church 2.8 miles E) was the indicator location showing the highest mean exposure rate of $1.393\text{E}+1$ $\mu\text{R/hr}$. This value is consistent with the highest mean exposure rate of $1.40\text{E}+1$ $\mu\text{R/hr}$ measured during the pre-operational period. The annual average background for direct exposure as determined from control locations is 81.1 mrem/year. The annual average exposure for all indicator sites is 77.8 mrem/yr.

Independent Spent Fuel Storage Installation (ISFSI)

The impact of Independent Spent Fuel Storage Installation (ISFSI) operation, located within the VCSNS Protected Area, which began cask storage on March 26, 2016, was assessed using six TLD locations monitoring the perimeter of the ISFSI site. The TLD locations were monitored for three quarters prior to fuel storage and continued to be monitored through 2024 during which fuel storage casks were stored. Analysis of monitoring results shows a statistically significant increase in ISFSI perimeter dose as a result of fuel storage. The monitoring location with the highest increase in exposure rate compared to pre-load data was the Southwest ISFSI Boundary with an annual average that is 10.4 mrem per standard quarter greater than the pre-fuel load average. Although the applicable limit for a member of the public applies to a real individual, a conservative analysis was used to demonstrate compliance with 40CFR190 and 10CFR72.104 by assuming an individual is located at the perimeter of the ISFSI Protected Area for 2000 hours per year. In this case, the hypothetical individual would have received 9.5 mrem. This level of exposure would be well under the 40CFR190 limit of 25 mrem.

Surface Water

The sample collection rate for all indicator and control surface water samples was 94.4%. Gamma spectroscopy measurements of surface water samples did not indicate the presence of activated corrosion or fission products for indicator sites. Tritium analysis identified 498 pCi/L in the fourth quarter composite sample for Site 23, Discharge Canal Monticello Reservoir. The activity aligns with data observed from supplemental Site 77, Combined Waste Water Discharge, throughout the fourth quarter which showed tritium levels ranging between 410 and 1170 pCi/L and is located upstream of Site 23. These values are all within or below the range of tritium levels observed in the pre-operational data; therefore, it is concluded that these results do not indicate a change in environmental levels related to plant operations.

Ground Water

Sample collection rate for ODCM indicator and control ground water samples was 100%. Gamma spectroscopy measurements of both ODCM required and supplemental ground water samples did not indicate the presence of activated corrosion or fission products. Tritium was detected within the site boundary at Site 112 (NPDES Well GW-09), in two of four quarterly samples at concentrations of $7.64\text{E}+2$ pCi/L and $8.59\text{E}+2$ pCi/L. Tritium was also detected within the site boundary at Site 123 (NPDES Well GW-16) in three of four quarterly samples at concentrations of $1.07\text{E}+3$ pCi/L, $1.51\text{E}+3$ pCi/L, and $1.80\text{E}+3$ pCi/L. GW-09 is a required monitoring well for the Waste Treatment Facility Settling Ponds. GW-16 is a

supplemental monitoring site also used to monitor around the Waste Treatment system. Groundwater wells at VCSNS are not used for drinking water, however, these values are significantly lower than $2.00\text{E}+4$ pCi/L drinking water standard. These values are consistent with pre-operational data and historical trends; therefore, no changes in plant impact were identified.

Drinking Water

The sample collection rate for all indicator and control drinking water samples was 100%. Gamma and tritium analyses for all ODCM and supplemental samples did not indicate the presence of activated corrosion or fission product activity. Gross beta results for indicator sites ranged between 289 and 485 pCi/L. Control location results ranged between 267 and 305 pCi/L. Pre-operational gross beta data is not available for drinking water; however, historical trends of control data are consistent with the levels observed in the indicator locations. Therefore, no plant related radioactivity was identified.

Milk

No milk samples were collected in 2024. Milk sampling is required to be performed at the three highest dose locations within 5 kilometers of the plant or at 5 to 8 kilometers of the plant if doses are calculated to be greater than 1 mrem/year. Presently, there are no locations meeting these criteria for indicator dairies. The closest dairy is approximately 7 kilometers from the plant (see Table 2). Milk samples will be obtained from this dairy if gaseous releases from the plant exceed 5% of quarterly organ dose limits or radionuclides attributed to the operation of VCSNS are detected in broadleaf vegetation, grass, or air samples.

Broadleaf and Garden Products

The sample collection rate for broadleaf vegetation was 100%. Gamma spectroscopy measurements of the broadleaf samples did not indicate the presence of activated corrosion or fission products.

Supplemental garden products for non-leafy vegetation included fruit and grain samples. Gamma spectroscopy measurements did not indicate the presence of activated corrosion or fission products.

Grass

The sample collection rate for indicator and control supplemental grass was 100%. Gamma spectroscopy measurement of supplemental grass samples collected indicated ^{137}Cs in 2 of 12 samples at Site 2 at concentrations of $3.67\text{E}+1$ pCi/kg and $3.49\text{E}+1$ pCi/kg. These results are within the lower range of pre-operational data and, therefore, are not contributed to plant operation.

Soil and Sediment

The sample collection rate for indicator and control sediment samples was 100%. Gamma spectroscopy measurements of sediment samples indicated the presence of ^{137}Cs in 2 of 4 indicator samples and in 1 of 2 control samples. Comparison of indicator to control and to pre-operational data did not indicate a change in activity levels. Supplemental sites 72 and 73 also indicated ^{137}Cs at concentrations consistent with these results.

Fish and Corbicula

The sample collection rate for fish sampling was 100%. Gamma spectroscopy measurements of fish samples collected did not indicate the presence of activated corrosion or fission products.

Corbicula harvest for possible human consumption was observed in Lake Monticello in 2005. Since that time, Corbicula analysis has been incorporated in the Supplemental Sampling Program. Samples were collected and analyzed for gamma emitting isotopes. No gamma emitting nuclides were detected.

LAND USE CENSUS

Annually a land use census is performed within a 5 mile radius of VCSNS to verify the appropriate siting of sample locations. In addition, the location of the maximum exposed individual (MEI) is identified to ensure the appropriate location is used for calculation of offsite dose impact from VCSNS gaseous effluents. The results of the land use census performed in 2024 are included in Table 10. Identification of the highest offsite dose locations was performed by calculating a hypothetical dose based on source term from the Operating License Environmental Report and 2024 meteorological data. Exposure pathways modeled in the analysis were those identified during the land use census.

The location and pathway presently used in the ODCM for offsite organ dose calculations (E 1.1 miles - residence/garden) was found to have the highest calculated dose. In addition, the ODCM required environmental gardens (ESE 1.0 and E 1.0 miles) were found to have calculated doses higher than any real receptor. There were no milking animals or dairy activity found within 5 kilometers of VCSNS. Therefore, changes to the ODCM gaseous effluent calculations or garden sample locations are not indicated.

CONCLUSION

The 2024 REMP sampling results have undergone comparative analysis with pre-operational data, control data, and historical trends. In all cases where activity was detected above the MDA, concentrations were within the ranges of either pre-operational or control trends. It has, therefore, been determined that VCSNS operations have not resulted in observable effects on the environment or the general public. These results of the REMP substantiate the continued adequacy of source control at VCSNS and conformance of station operation to 10CFR50, Appendix I design objectives.

Appendix A: Data Tables

Table 2 – ODCM Sampling Site Locations				
Site No.	Description	Distance ¹ (Miles)	Direction ²	Sample Type(s) ³
1	Borrow Pit	1.2	179.8 S	DQ
2	Transmission Line	1.2	225.0 SW	AP, RI, DQ
3	Firing Range	1.2	270.0 W	DQ
4	Fairfield Hydro	1.2	289.5 WNW	DQ
5	Transmission Line Entrance	0.9	144.0 SE	DQ
6	Environmental Lab Garden	1.0	111.0 ESE	AP, RI, DQ, GW
7	Environmental Lab Garden	1.0	97.8 E	AP, RI, DQ
8	Monticello Res. S of Rd 224	1.5	62.0 ENE	DQ
9	Ball Park	2.3	41.6 NE	DQ
10	Meteorological Tower #2	2.5	25.5 NNE	DQ
12	Old Hwy 99	4.2	349.4N	DQ
13	North Dam	2.9	333.0 NNW	DQ
16	Parr Pasture	28.0	278.6W	DQ
16	Parr Dairy ⁴	20.0	W	MK, GR
17	Columbia Water Works	25.0	144.0 SE	AP, RI, DQ, DW
18	Pine Island Club	16.5	165.0 S	DQ
19	Residence/Little Saluda	21.0	224.0 SSW	DQ
20	Residence/Whitmire	22.0	309.5 NW	DQ
21	Parr Reservoir	2.7	199.5 SSW	SW, FH, BS
22	Neal Shoals	26.0	343.1 NNW	SW, FH, BS
23	Discharge Canal (Monticello Reservoir)	0.5	104.5 ESE	SW, FH, BS
26	On Site Well (P2)	460 Ft	270.0 W	GW
27	On Site Well (P5)	510 Ft	180.0 S	GW
28	Jenkinsville Post Office	2.8	170.2 SE	DW
29	Trans. Line WSW of VCSNS	1.0	260.6 WSW	DQ
30	Borrow Pit ⁵	1.0 / 0.5	196.2 SSW	AP, RI, DQ
31	McCrorey-Liston School	6.6	11.5 NNE	DQ
32	Clark Bridge Road and Brooks Drive	4.6	24.0 NNE	DQ
33	Rd 48 near Hwy 213	4.2	68.0 ENE	DQ
34	Rd 419 North of Hwy 60	4.9	111.0 ESE	DQ
35	Glenn's Bridge Road	4.6	132.0 SE	DQ

Appendix A: Data Tables

Table 2 – ODCM Sampling Site Locations				
Site No.	Description	Distance ¹ (Miles)	Direction ²	Sample Type(s) ³
36	Woods at Jenkinsville Post Office	3.1	151.0 SSE	DQ
37	Residence	4.9	304.8 NW	DQ
39	Lake Murray Water Treatment Facility	14.0	168.0 SSE	DW
40	Emergency Operations Facility ⁶	11.9	157.0 SSE	GR
41	Peak	3.8	182.0 S	DQ
42	Broad River Rd (Peak Residence)	3.8	198.0 SSW	DQ
43	Hwy 176 and Rd 435	5.2	236.0 SW	DQ
44	Rd 28 at Cannon's Creek	2.8	256.6 WSW	DQ
45	Rd 33 at Pomaria	5.8	253.2 WSW	DQ
46	Rd 28 at Heller's Creek	3.7	291.5 WNW	DQ
47	Fairfield Tailrace	1.0	316.0 NW	DQ
52	Monticello (Rd 11)	3.8	13.0 NNE	DQ
53	Rd 359	3.0	46.5 NE	DQ
54	Jenkinsville School	1.7	72.5 ENE	DQ
55	St. Barnabas Church	2.8	91.5 E	DQ
56	Old Jenkinsville Dinner	2.0	144.0 SE	DQ
58	Residence	2.5	157.0 SSE	DQ
59	New Nuclear Deployment	2.6	170.2 SSE	DQ, GW
60	Rd 98 near Rd 28	3.5	274.6 W	DQ
78	ISFSI - North	0.14	133 NW	DQ
79	ISFSI – North East	266 Ft	102 WNW	DQ
80	ISFSI – South East	256 Ft	61 WSW	DQ
81	ISFSI - South	0.10	63 WSW	DQ
82	ISFSI –South West	0.15	91 W	DQ
83	ISFSI – North West	0.15	104 WNW	DQ
101	Remediation Well (B-2)	300 Ft	NNW	GW

Appendix A: Data Tables

Table 2 – ODCM Sampling Site Locations				
Site No.	Description	Distance ¹ (Miles)	Direction ²	Sample Type(s) ³
102	Remediation Well (B-6)	400 Ft	NE	GW
103	Remediation Well (DW-13)	80 Ft	NE	GW
106	Remediation Well (DW-7)	250 Ft	SE	GW
108	Remediation Well (DW-19)	250 Ft	W	GW
110	Remediation Well (B-36)	300 Ft	NW	GW
112	NPDES Well (GW-9)	0.36	331 SSE	GW
113	NPDES Well (GW-12)	0.33	332 SSE	GW
114	NPDES Well (GW-13A)	0.39	317 SE	GW

Footnotes

- Distance given is the distance between the site location and the VCSNS reactor containment building.
- Direction given in degrees from true north-south line through center of reactor containment building.
- Sample Types:

AP = Air Particulate	GW = Ground Water	GA = Garden
RI = Air Radioiodine	DW = Drinking Water	FH = Fish
DQ = Quarterly TLD	MK = Milk	BS = Bottom Sediment
SW = Surface Water	GR = Grass (Forage)	
- Site 16 is not currently in use. If conditions change requiring a renewal of dairy sampling, this site will be reactivated.
- Site 30 consists of two locations in the same sector. The air sampler is located 0.5 miles from the reactor to support construction of a new facility. The TLD is located 1.0 mile from the reactor in the same sector.
- Site 40 (11.9 miles SSE) serves as a control location for garden monitoring.

Appendix A: Data Tables

Table 3 – Supplemental Sampling Site Locations				
Site No.	Description	Distance ¹ (Miles)	Direction ²	Sample Type(s) ³
2	Transmission Line	1.2	SW	GR
6	Environmental Lab Garden	1.0	ESE	GA
7	Environmental Lab Garden	1.0	E	GA
8	Paul Etta Rd	1.5	ENE	AP, RI
11	Robinson Pasture	3.4	N	DQ
14	Kinard Loop / Shealy's Dairy ⁴	6.5	W	MK, GR, DQ
15	Parr	2.5	SSW	DQ
16	Parr Dairy ⁴	20.0	W	MK, GR
23	Monticello Reservoir	0.5	ESE	CL
25	FPSF Penstocks	0.9	WNW	GR, SO
31	McCrorey Liston School	6.6	NNE	DW
40	Emergency Operation Facility (EOF) Peak Exit	11.9	SSE	GA, GR
49	Dave Cole Rd Power Line	4.1	NNW	DQ
57	Jenkinsville Rd Residence	2.7	SE	DQ
59	Retired Nuclear Training Center – Hwy 213	2.6	SSE	DQ
61	Unit 1 Switchyard	0.1	S	DQ
62	Southwest of AAP	0.13	SW	DQ
63	East of CTC	0.17	W	DQ
68	Fuel Oil Storage Tank	0.2	ESE	DQ
72	Southeast Yard Drain Outfall	0.4	SE	SW
73	Northwest Yard Drain Outfall	0.4	W	SW
77	Combined Waste Water Discharge	0.4	ESE	SW
99	AAP / NNOB ⁵	0.1 / 0.35	SW	DQ, DW
107	Dewatering Well DW-2	175 ft	WSW	GW
111	NPDES Well GW-8A	0.27	SE	GW
115	NPDES Well GW-15A	0.4	SSE	GW
116	Dewatering Well DW-14	175 ft	NE	GW
117	Dewatering Well DW-15	175 ft	N	GW
118	Dewatering Well DW-16	125 ft	NNE	GW
119	Dewatering Well DW-17	150 ft	NW	GW
120	Dewatering Well DW-18	150 ft	W	GW

Appendix A: Data Tables

Table 3 – Supplemental Sampling Site Locations				
Site No.	Description	Distance¹ (Miles)	Direction²	Sample Type(s)³
121	Remediation Well B-23	550 ft	S	GW
122	Dewatering Well DW-3	350 ft	SSE	GW
123	NPDES Well GW-16	0.34	SSE	GW
124	Remediation Well B-22	349 ft	S	GW
005A	Sanitary Waste Sand Filter A	0.3	SE	BS
005B	Sanitary Waste Sand Filter B	0.3	SE	BS
006A	Alum Sludge Basin	0.3	SE	BS
006B	Waste Surge Basin	0.3	SE	BS
008	Chemical Cleaning Pond	0.3	SE	BS

Footnotes

- Distance given is the distance between the site location and the VCSNS reactor containment building.
- Direction given in degrees from true north-south line through center of reactor containment building.
- Sample Types:

AP = Air Particulate	GW = Ground Water	GA = Garden
RI = Air Radioiodine	DW = Drinking Water	SO = Soil
DQ = Quarterly TLD	MK = Milk	BS = Bottom Sediment
SW = Surface Water	GR = Grass (Forage)	CL = Corbicula
- Sites 14 and 16 are not currently in use. If conditions change requiring a renewal of dairy sampling, these sites will be reactivated.
- Site 99 Drinking Water sample is collected from the New Nuclear Operation Building (NNOB). The TLD monitoring site is located behind the AAP security building.

Appendix A: Data Tables

Table 4 – Radiological Environmental Monitoring Program Specifications

Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
AIRBORNE: I. Particulate	A) 3 Indicator samples from locations close to the site boundary, in different sectors, of the highest calculated annual average ground level D/Q or dose. ²	Continuous sampler operation with weekly collection.	2 7 30	Gross beta following filter change; Quarterly composite (by location) for gamma isotopic.
	B) 1 Indicator sample to be taken close to the site boundary in the sector corresponding to the residence having the highest anticipated offsite ground level concentration or dose. ²	Continuous sampler operation with weekly collection.	6	Gross beta following filter change; Quarterly composite (by location) for gamma isotopic.
	C) 1 Indicator sample to be taken at the location of one of the dairies being sampled meeting the criteria of VII(A). ^{2,4}	Continuous sampler operation with weekly collection.	N/A	Gross beta following filter change; Quarterly composite (by location) for gamma isotopic.
	D) 1 Control sample to be taken at a location at least 10 air miles from the site and not in the most prevalent wind directions. ²	Continuous sampler operation with weekly collection.	17	Gross beta following filter change; Quarterly composite (by location) for gamma isotopic.
II. Radioiodine	A) 3 Indicator samples to be taken at two locations as given in I(A) above.	Continuous sampler operation with weekly canister collection.	2 7 30	Gamma Isotopic for Iodine 131 weekly.
	B) 1 Indicator sample to be taken at the location as given in I(B) above.	Continuous sampler operation with weekly canister collection.	6	Gamma Isotopic for Iodine 131 weekly.
	C) 1 Indicator sample to be taken at the location as given in I(C) above.	Continuous sampler operation with weekly canister collection.	N/A	Gamma Isotopic for Iodine 131 weekly.
	D) 1 Control sample to be taken at a location similar in nature to I(D) above.	Continuous sampler operation with weekly canister collection.	17	Gamma Isotopic for Iodine 131 weekly.

Table 4 – Radiological Environmental Monitoring Program Specifications				
Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
III. Direct	<p>A) 13 Indicator stations to form an inner ring of stations in the 13 accessible sectors within 1 to 2 miles of the plant.</p> <p>B) 16 indicator stations to form an outer ring of stations in the 16 accessible sectors within 3 to 5 miles of the plant.</p> <p>C) 11 Stations to be placed in special interest areas such as population centers, nearby residences, schools and in 4 or 5 areas to serve as controls.</p> <p>D) 6 Stations to be placed around the ISFSI boundary.</p>	<p>Monthly or quarterly exchange^{5,7} two or more dosimeters at each location.</p> <p>Monthly or quarterly exchange^{5,7} two or more dosimeters at each location.</p> <p>Quarterly exchange⁷; two or more dosimeters at each location.</p> <p>Quarterly exchange⁷; two or more dosimeters at each location.</p>	<p>1,2,3,4,5,6,7,8,9,10,29,30,47</p> <p>12,13,32,33,34,35,36,37,41,42,43,44,46,53,55,60</p> <p>16,17,18,19,20,31,45,52,54,56,58</p> <p>78,79,80,81,82,83</p>	<p>Gamma dose monthly or quarterly.</p> <p>Gamma dose monthly or quarterly.</p> <p>Gamma dose quarterly.</p> <p>Gamma & neutron dose quarterly.</p>
WATERBORNE: IV. Surface Water	A) 1 Indicator sample downstream to be taken at a location which allows for	Time composite samples ⁶ with collection every month. ⁵	21 ³	Gamma isotopic monthly with quarterly composite (by location) to be analyzed for tritium. ⁷

Table 4 – Radiological Environmental Monitoring Program Specifications

Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
	<p>mixing a dilution in the ultimate receiving river.</p> <p>B) 1 Control sample to be taken at a location on the receiving river sufficiently far upstream such that no effects of pumped storage operation are anticipated.</p> <p>C) 1 Indicator sample to be taken in the upper reservoir of the pumped storage facility at the plant discharge canal.</p>	<p>Time composite samples⁶ with collection every month.⁵</p> <p>Time composite samples⁶ with collection every month.⁵</p>	<p>22³</p> <p>23³</p>	<p>Gamma isotopic monthly with quarterly composite (by location) to be analyzed for tritium.⁷</p> <p>Gamma isotopic monthly with quarterly composite (by location) to be analyzed for tritium.⁷</p>
V. Ground Water	<p>A) 12 Indicator samples to be taken within the exclusion boundary and in the direction of potentially affected ground water supplies.</p> <p>B) 1 Control sample from unaffected location.</p>	<p>Quarterly grab sampling.⁷</p> <p>Quarterly grab sampling.⁷</p>	<p>6, 26, 27, 101-103, 106, 108,110, 112-114</p> <p>59</p>	<p>Gamma isotopic and tritium analyses quarterly.⁷</p> <p>Gamma isotopic and tritium analyses quarterly.⁷</p>
VI. Drinking Water	<p>A) 1 Indicator sample from a nearby public ground water supply source.</p> <p>B) 1 Indicator (finished water) sample from the nearest downstream water supply.</p> <p>C) 1 Control (finished water) sample from an unaffected water supply.</p>	<p>Monthly grab sampling.⁵</p> <p>Monthly composite sampling.</p> <p>Monthly composite sampling.</p>	<p>28</p> <p>17</p> <p>39</p>	<p>Monthly⁵ gamma isotopic and gross beta analyses and quarterly⁷ composite for tritium analyses.</p> <p>Monthly⁵ gamma isotopic and gross beta analyses and quarterly⁷ composite for tritium analyses.</p> <p>Monthly⁵ gamma isotopic and gross beta analyses and quarterly⁷ composite for tritium analyses.</p>

Table 4 – Radiological Environmental Monitoring Program Specifications

Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
INGESTION: VII. Milk ⁴	A) Samples from milking animals in 3 locations within 5 km having the highest dose potential. If there are none then 1 sample from milking animals in each of 3 areas between 5 to 8 km distance where doses are calculated to be greater than 1 mrem per year. ¹⁰	Semimonthly when animals are on pasture ⁸ , monthly other times. ⁵	To be supplied when milk animals are found in accordance with criteria VII.A.	Gamma isotopic and I-131 analysis semimonthly ⁸ when animals are on pasture, monthly other times. ⁵
	B) 1 Control sample to be taken at the location of a dairy > 20 miles distance and not in the most prevalent wind direction. ²	Semimonthly when animals are on pasture ⁸ , monthly other times. ^{5,11}	16	Gamma isotopic and I-131 analysis semimonthly ⁸ when animals are on pasture, monthly other times. ⁵
	C) 1 Indicator grass (forage) sample to be taken at the location of one of the dairies being sampled meeting the criteria of VII(A), above, when animals are on pasture.	Monthly when available. ⁵	To be supplied when milk animals are found in accordance with criteria VII.A.	Gamma isotopic.
	D) 1 Control grass (forage) sample to be taken at the location of VII(B) above.	Monthly when available. ^{5,11}	16	Gamma isotopic.
VIII. Food Products	A) 2 samples of broadleaf vegetation grown in the 2 nearest offsite locations of highest calculated annual average ground level D/Q if milk sampling is not performed within 3 km or if milk sampling is not performed at a location within 5 to 8 km where the doses are calculated to be greater than 1 mrem/yr. ¹⁰	Monthly when available. ⁵	6 7	Gamma isotopic on edible portion.

Appendix A: Data Tables

Table 4 – Radiological Environmental Monitoring Program Specifications				
Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
	B) 1 Control sample for the same foods taken at least 10 miles distance and not in the most prevalent wind direction if milk sampling is not performed within 3 km or if milk sampling is not performed at a location within 5 to 8 km where the doses are calculated to be greater than 1 mrem/yr. ¹⁰	Monthly when available. ⁵	40	Gamma isotopic on edible portion.
IX. Fish	A) 1 Indicator sample to be taken at a location in the upper reservoir.	Semiannual ⁹ collection. ¹	23 ³	Gamma isotopic on edible portions semiannually. ⁹
	B) 1 Indicator sample to be taken at a location in the lower reservoir.	Semiannual ⁹ collection. ¹	21 ³	Gamma isotopic on edible portions semiannually. ⁹
	C) 1 Control sample to be taken at a location on the receiving river sufficiently far upstream such that no effects of pumped storage operation are anticipated.	Semiannual ⁹ collection. ¹	22 ³	Gamma isotopic on edible portions semiannually. ⁹
AQUATIC: X. Sediment	A) 1 Indicator sample to be taken at a location in the upper reservoir.	Semiannual grab sample. ⁹	23 ³	Gamma isotopic.
	B) 1 Indicator sample to be taken on or near the shoreline of the lower reservoir.	Semiannual grab sample. ⁹	21 ³	Gamma isotopic.
	C) 1 Control sample to be taken at a location on the receiving river sufficiently far upstream such that no effects of pumped storage operation are anticipated.	Semiannual grab sample. ⁹	22 ³	Gamma isotopic.

Table 4 – Radiological Environmental Monitoring Program Specifications

FOOTNOTES

1. Fish include 3 groups (Bass, Bream/Crappie, Catfish/Carp.)
2. Sample site locations are based on 5-year average meteorological analysis.
3. Though generalized areas are noted for simplicity of sample site enumeration, airborne, water and sediment sampling are done at the same location, whereas biological sampling sites are generalized areas in order to reasonably assure availability of samples.
4. Milking animal and garden survey results will be analyzed annually. If the survey should indicate new activity the owners shall be contacted with regard to a contract for supplying sufficient samples. If contractual arrangements can be made, site(s) will be added for additional milk sampling up to a total of three Indicator locations.
5. Not to exceed 35 days.
6. Time composite samples are samples which are collected with equipment capable of collecting an aliquot at time intervals which are short relative to the compositing period.
7. At least once per 100 days.
8. At least once per 18 days.
9. At least once per 200 days.
10. The dose shall be calculated for the maximum organ and age group, using the guidance/methodology contained in Regulatory Guide 1.109, Rev. 1 and the parameters particular to the site.
11. Milk and forage sampling at the control location is only required when locations meeting the criteria of VII(A) are being sampled.

Appendix A: Data Tables

Table 5 – Supplemental Radiological Environmental Monitoring

Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
AIRBORNE: S-I. Particulate	A) 1 Indicator sample monitoring the nearest community with the highest anticipated dose or ground level concentration.	Continuous sampler operation with weekly collection.	8	Gross beta following filter change; Quarterly Composite (by location) for gamma isotopic.
S-II. Radioiodine	A) 1 Indicator sample to be taken from the location of S-1(A) above.	Continuous sampler operation with weekly collection.	8	Gamma isotopic for I-131 weekly.
S-III. Direct	A) 5 stations to be placed within the exclusion boundary.	Quarterly exchange ⁷ ; two or more dosimeters at each location.	61,62,63, 68 & 99	Gamma dose quarterly.
	B) 2 stations to be placed around VCSNS sludge lagoons.	Quarterly exchange ⁷ ; two or more dosimeters at each location.	94,97	Gamma dose quarterly.
WATERBORNE: S-IV. Surface Water	A) 1 indicator sample to be taken of the combined wastewater discharge.	Composite samples with monthly collection. ^{13,5}	77	Gamma isotopic monthly and quarterly tritium composite.
	B) 1 Indicator sample taken at each storm drain outfall.	Daily sample with monthly composite.	72,73	Gamma isotopic monthly and quarterly tritium composite.
S-VI. Drinking Water	A) 1 Indicator (finished water) sample to be taken on site.	Monthly ⁵ .	99	Monthly gamma isotopic and gross beta and quarterly composite tritium analysis.
	B) 1 Indicator (finished water) sample of public system.	Monthly ⁵ .	31	Monthly gamma isotopic and gross beta and quarterly composite tritium analysis.

Appendix A: Data Tables

Table 5 – Supplemental Radiological Environmental Monitoring

Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
INGESTION: S-VII. Milk ⁴	A) 1 Sample from one of the nearest affected dairies at or beyond 5 miles.	Biweekly grab sample. ^{8,14,+}	14	Gamma isotopic and I-131 analysis biweekly.
	B) 1 Control sample to be taken at the location of a dairy greater than 20 miles distance and not in the most prevalent wind direction.	Biweekly grab sample. ^{8,14,+}	16	Gamma isotopic and I-131 analysis biweekly.
	C) 1 Indicator grass (forage) sample to be taken at the location of S-VII(A) above.	Monthly when available. ¹⁴	14	Gamma isotopic.
	D) 1 Control grass (forage) sample to be taken at the location of S-VII(B) above.	Monthly when available. ¹⁴	16	Gamma isotopic.
	E) 2 Indicator grass (forage) samples to be taken at 2 of the locations beyond but as close to the exclusion boundary as practical where the highest offsite sectorial ground level concentrations are anticipated.	Monthly when available.	2,7	Gamma isotopic.
	F) 1 Control grass (forage) sample to be used for routine monitoring along with S-VII(E) above.	Monthly when available.	40	Gamma isotopic.
	G) 1 Indicator grass (forage) sample to be taken at location of penstock leak.	Monthly when available.	25	Gamma isotopic.
S-VIII. Food Products	A) 1 Indicator sample of various types of foods grown in the area surrounding the plant (root, fruit, grain).	Annually during growing season. ¹¹	6,7	Gamma isotopic on edible portion.
	B) 1 Control sample of various types of foods grown. (root, fruit, grain).	Annually during growing season. ¹¹	40	Gamma isotopic on edible portion.
Corbicula	C) 1 Indicator sample of edible portions.	Semiannual.	23	Gamma isotopic.

Appendix A: Data Tables

Table 5 – Supplemental Radiological Environmental Monitoring				
Exposure Pathway and/or Sample	Criteria for Selection of Sample Number & Location	Sampling and Collection Frequency	Sample Location	Type & Frequency of Analysis
S-IX. Sediment/ Sludge	A) 1 Indicator sample from each storm drain outfall.	Semiannually	72,73	Gamma isotopic.
	B) 3 Indicator sludge samples taken at sludge lagoons.	Semiannually	006A, 006B & 008	Gamma isotopic.
	C) 1 Indicator sample of topsoil from penstock spill area.	Annually	25	Gamma isotopic.
	D) 1 indicator sample from each sand trap for the Sanitary Waste Pond.	Semiannually	005A & 005B	Gamma Isotopic
S-X. Ground Water	A) 12 Indicator samples to be taken within the exclusion boundary and in the direction of potentially affected ground water supplies.	Quarterly grab sampling. ⁷	107,111, 115 -124	Gamma isotopic and tritium analyses quarterly. ⁷

Table 5 – Supplemental Radiological Environmental Monitoring

FOOTNOTES

1. Reserved for future use.
 2. Reserved for future use.
 3. Reserved for future use.
 4. Milking animal and garden survey results will be analyzed annually. If the survey should indicate new activity the owners shall be contacted with regard to a contract for supplying sufficient samples. If contractual arrangements can be made, site(s) will be added for additional milk sampling up to a total of 3 Indicator locations.
 5. Not to exceed 35 days.
 6. Reserved for future use.
 7. At least once per 100 days.
 8. At least once per 18 days.
 9. At least once per 200 days.
 10. Reserved for future use.
 11. At least once per 400 days.
 12. Reserved for future use.
 13. Weekly, when circulating water is not operational.
 14. Milk and grass (forage) sampling is not required unless VCSNS gaseous releases exceed 5% of quarterly organ dose limits or radionuclides (attributed to VCSNS operation) are detected in broadleaf vegetation, grass or air samples at concentrations greater than required LLD. Sampling should continue for two months after plant releases are reduced to less than trigger levels and milk contamination levels have returned to background levels.
- + The ODCM requires semimonthly sampling when animals are on pasture, monthly at other times.

Appendix A: Data Tables

Table 6 – Radiological Environmental Monitoring Program Summary for 2024

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed ¹	Lower Limit of Detection ² (Required)	All Indicator Locations Mean (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ³ (f) [Range]	Number of Nonroutine Reported ⁴ Measurements
				Name Distance & Direction	Mean ³ (f) [Range]		
Air Particulate (pCi/m ³)	Gross Beta 306	5.57E-3 (1E-2)	2.21E-2 (255/255) [5.13E-3 to 4.83E-2]	Site 8 1.5 miles ENE	2.26E-2 (50/50) [8.83E-3 to 4.83E-2]	2.30E-2 (51/51) [1.08E-2 to 5.11E-2]	0
	Gamma Spec 24						
	¹³⁴ Cs	7.72E-4 (5E-2)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	7.00E-4 (6E-2)	< LLD	-	-	< LLD	0
Air Radioiodine (pCi/m ³)	¹³¹ I 306	1.65E-2 (7E-2)	< LLD	-	-	< LLD	0
Direct (TLD) ⁵ (μR/hr)	Gamma 157	-	9.15E+0 (116/116) [5.8E+0 to 1.63E+1]	Site 55 2.8 miles E	1.39E+1 (4/4) (1.22E+1 to 1.63E+1)	9.62E+0 (41/44) (5.38+0 to 1.36E+1)	0
ISFSI TLD (μR/hr)	Gamma 24	-	1.46E+01 (24/24) [1.32E+01 to 16.3E+01]	Site 82 ISFSI Southwest	1.63E+01 (4/4) [15.7E+01 to 17.1E+01]	-	0
Surface Water (pCi/l)	³ H 12	4.16E+2 (2E+3)	4.98E+2 (1/8) [4.98E+2]	Site 23 0.5 miles ESE	4.98E+2 (1/4) [4.98E+2]	< LLD	0
	Gamma Spec 34						
	⁵⁴ Mn	1.58E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁸ Co	1.66E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	3.22E+0 (3E+1)	< LLD	-	-	< LLD	0
	⁶⁰ Co	1.81E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	3.14E+0 (3E+1)	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 6 – Radiological Environmental Monitoring Program Summary for 2024

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed ¹	Lower Limit of Detection ² (Required)	All Indicator Locations Mean (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ³ (f) [Range]	Number of Nonroutine Reported ⁴ Measurements
				Name Distance & Direction	Mean ³ (f) [Range]		
Surface Water (pCi/l)	⁹⁵ Zr	2.96E+0 (3E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Nb	1.97E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	1.74E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	1.48E+0 (1.8E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ Ba	1.47E+1 (6E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ La	3.03E+0 (1.5E+1)	< LLD	-	-	< LLD	0
Ground Water (pCi/l)	³ H 52	4.57E+2 (2E+3)	8.12E+2 (2/48) [7.64E+2 to 8.59E+2]	Site 112, GW-09 0.36 miles SSE	8.12E+2 (2/4) [7.64E+2 to 8.59E+2]	< LLD	0
.....							
	Gamma Spec 52						
	⁵⁴ Mn	4.61E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁸ Co	4.98E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	1.24E+1 (3E+1)	< LLD	-	-	< LLD	0
	⁶⁰ Co	5.42E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	1.25E+1 (3E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Zr	7.61E+0 (3E+1)	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 6 – Radiological Environmental Monitoring Program Summary for 2024

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed ¹	Lower Limit of Detection ² (Required)	All Indicator Locations Mean (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ³ (f) [Range]	Number of Nonroutine Reported ⁴ Measurements
				Name Distance & Direction	Mean ³ (f) [Range]		
Ground Water (pCi/l)	⁹⁵ Nb	1.50E+1 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	8.46E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	3.45E+0 (1.8E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ Ba	2.76E+1 (6E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ La	7.41E+0 (1.5E+1)	< LLD	-	-	< LLD	0
Drinking Water ⁶ (pCi/l)	Gross Beta 36	3.33E+0 (4E+0)	3.14E+0 (9/24) [2.52E+0 to 4.85+0]	Site 28 2.8 miles SE	3.46E+0 (5/12) [2.89E+0 to 4.85+0]	2.84E+0 (3/12) [2.67E+0 to 3.05E+0]	0
	³ H 12	4.16E+2 (2E+3)	< LLD	-	-	< LLD	0
	Gamma Spec 72 ⁹						
	⁵⁴ Mn	2.48E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁸ Co	2.46E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	4.70E+0 (3E+1)	< LLD	-	-	< LLD	0
	⁶⁰ Co	2.30E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	4.28E+0 (3E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Zr	3.97E+0	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 6 – Radiological Environmental Monitoring Program Summary for 2024

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed ¹	Lower Limit of Detection ² (Required)	All Indicator Locations Mean (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ³ (f) [Range]	Number of Nonroutine Reported ⁴ Measurements	
				Name Distance & Direction	Mean ³ (f) [Range]			
Drinking Water ⁶ (pCi/l)	Gamma Spec 36	(3E+1)						
		⁹⁵ Nb	1.94E+0 (1.5E+1)	< LLD	-	-	< LLD	0
		¹³¹ I	5.77E-1 (1E+0)	< LLD	-	-	< LLD	0
		¹³⁴ Cs	2.16E+0 (1.5E+1)	< LLD	-	-	< LLD	0
		¹³⁷ Cs	2.13E+0 (1.8E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ Ba	1.28E+1 (6E+1)	< LLD	-	-	< LLD	0	
	¹⁴⁰ La	3.71E+0 (1.5E+1)	< LLD	-	-	< LLD	0	
Broadleaf Vegetation (pCi/kg wet)	Gamma Spec 36							
		¹³¹ I	2.18E+1 (6E+1)	< LLD	-	-	< LLD	0
		¹³⁴ Cs	1.71E+1 (6E+1)	< LLD	-	-	< LLD	0
		¹³⁷ Cs	2.72E+1 (8E+1)	2.63E+1 (4/24) [1.49E+1 to 3.97E+1]	Site 7 1.0 mile E	2.63E+1 (4/12) [1.49E+1 to 3.97E+1]	< LLD	0
Fish ⁷ (pCi/kg wet)	Gamma Spec 18							
		⁵⁴ Mn	1.39E+1 (1.3E+2)	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 6 – Radiological Environmental Monitoring Program Summary for 2024

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed ¹	Lower Limit of Detection ² (Required)	All Indicator Locations Mean (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ³ (f) [Range]	Number of Nonroutine Reported ⁴ Measurements
				Name Distance & Direction	Mean ³ (f) [Range]		
	⁵⁸ Co	1.63E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	4.40E+1 (2.6E+2)	< LLD	-	-	< LLD	0
	⁶⁰ Co	1.92E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	3.29E+1 (2.6E+2)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	1.59E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	1.92E+1 (1.5E+2)	< LLD	-	-	< LLD	0
Sediment (pCi/kg) ⁸	Gamma Spec 6						
	⁵⁴ Mn	1.17E+1 (N/A)	< LLD	-	-	< LLD	0
	⁵⁸ Co	9.69E+0 (N/A)	< LLD	-	-	< LLD	0
	⁶⁰ Co	8.22E+0 (N/A)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	5.54E+0 (1.5E+2)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	9.87E+0 (1.8E+2)	2.60E+1 (2/4) [1.16E+1 to 4.04E+1]	Site 21 2.7 miles SSW	4.04E+1 (1/2) [4.04E+1]	2.47E+1 (1/2) [2.47E+1]	0

Table 6 - Radiological Environmental Monitoring Program Summary for 2023

Footnotes

1. Includes indicator and control analyses. Supplemental Site 8, Air Particulates and Air Radioiodines, are included as indicators. Table does not include any other supplemental sample results.
2. Values listed are the maximum MDA values for all indicator locations calculated from the program data analyses.
3. Mean and range are based on detectable measurements only. The fractions of detectable measurements (i.e., number of positive results/total number of measurements) at specific locations are indicated in parentheses.
4. Any confirmed measured level of radioactivity in any environmental medium that exceeds the reporting requirements of ODCM, Section 1.4.1.2.
5. Detection sensitivity is approximately 10 mrem/yr (1.0 μ R/hr).
6. Elevated levels of ^{214}Pb and ^{214}Bi were observed in Jenkinsville drinking water samples. The values are not reported here because they are naturally occurring (do not originate from VCSNS) and furnish no quantifiable information of interest.
7. Fish include 3 groups (Bass, Bream/Crappie, Catfish/Carp.)
8. Elevated levels of ^{214}Pb and ^{214}Bi plus other ^{226}Ra daughter products and ^{228}Ac plus other ^{232}Th daughter products were observed in all sediment samples. The values are not reported here because they are naturally occurring (do not originate from VCSNS) and furnish no quantifiable information of interest.
9. Drinking water resin prepared and counted for ^{131}I as separate sample.

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements	
				Name (Distance & Direction)	Mean ² (f) [Range]			
Air Particulate (pCi/m ³) (1981-1982)	Gross Beta 1300	4.1E-3 (1.0E-2)	1.1E-1 (562/564) ⁴ [1.3E-2 to 5.5E-1]	Site 13, North Dam 2.9 miles NNW	1.3E-1 (52/52) [2.1E-2 to 5.5E-1]	1.2E-1 (153/155) [7.9E-3 to 6.1E-1]	0	
			2.7E-2 (456/462) ⁴ [9.3E-3 to 6.6E-2]	Site 8 Res. S of Rd 224 1.5 miles ENE	3.0E-2 (42/42) [1.2E-2 to 6.0E-2]	2.8E-2 (125/126) [1.2E-2 to 5.8E-2]		
	Gamma Spec 307							
	¹³⁴ Cs		3.0E-3 (1.0E-2)	< LLD	-	-		< LLD
	¹³⁷ Cs	3.1E-3 (1.0E-2)	3.2E-3 (22/241) [1.5E-3 to 5.2E-3]	Site 10, Met Tower 2.4 miles NNE	3.8E-3 (2/22) [2.5E-3 to 5.2E-3]	4.2E-3 (4/66) [3.2E-3 to 5.6E-3]	0	
Air Radioiodine (pCi/m ³) (1982)	¹³¹ I 290	3.6E-2 (7.0E-2)	< LLD	-	-	< LLD	0	
Direct (TLD) ⁵ (μR/hr) (1978-1982)	Gamma 1220 Monthly	0.5 N/A	9.9 (915/915) [6.7 to 14.7]	Site 13, North Dam 2.9 miles NNW	13.1 (61/61) [12.2 to 14.2]	9.7 (305/305) [6.4 to 13.5]	0	
	Gamma 161 Quarterly	0.5 N/A	10.2 (154/154) [6.8 to 14.7]	Site 55, St. Barnabas Church 2.8 miles E	14.0(7/7) [13.1 to 14.7]	-	0	
	Direct (TLD) ⁵ (μR/hr) (2015-2016)	Gamma	N/A	11.0 (18/18) [9.3 to 13.6]	Site 79 ISFSI NE	12.4 (3/3) [10.8 to 13.6]	-	0
Surface Water (pCi/l) (1981-1982)	³ H 43	1.1E+3 (2.0E+3)	1.4E+3 (18/29) [1.1E+3 to 2.4E+3]	Site 17, Columbia Canal 24.7 miles SE	1.6E+3 (2/7) [1.4E+3 to 1.8E+3]	1.2E+3 (6/14) [6.7E+2 to 1.6E+3]	0	
	Gamma Spec 140							
	⁵⁴ Mn	2.7E-1 (1.5E+1)	< LLD	-	-	< LLD	0	

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
Surface Water Cont. (pCi/l)	⁵⁸ Co	2.9E-1 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	6.0E+0 (3.0E+1)	< LLD	-	-	< LLD	0
	⁶⁰ Co	2.4E-1 (1.5E+1)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	7.9E-1 (3.0E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Zr	5.2E-1 (1.5E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Nb	3.3E-1 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	3.0E-1 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	2.2E-1 (1.8E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ Ba	2.2E+0 (6.0E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ La (1982 only)	5.5E-1 (1.5E+1)	< LLD	-	-	< LLD	0
Ground Water (pCi/l) (1981-1982)	³ H 29	9.0E+2 (2.0E+3)	1.5E+3 (16/16) [9.5E+2 to 2.3E+3]	Site 26, Onsite Well P4 265 ft W	1.6E+3 (8/8) [9.5E+2 to 2.3E+3]	1.3E+3 (13/13) [1.0E+3 to 1.9E+3]	0
Gamma Spec 32							
	⁵⁴ Mn	3.7E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁵⁸ Co	3.8E+0 (1.5E+1)	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
Ground Water Cont. (pCi/l)	⁵⁹ Fe	7.8E+0 (3.0E+1)	< LLD	-	-	< LLD	0
	⁶⁰ Co	3.8E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	8.1E+0 (3.0E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Zr	6.8E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	⁹⁵ Nb	4.6E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	3.7E+0 (1.5E + 1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	3.8E+0 (1.8E + 1)	< LLD	-	-	< LLD	0
	¹⁴⁰ Ba	1.9E+1 (6.0E+1)	< LLD	-	-	< LLD	0
	¹⁴⁰ La (1982 only)	5.0E0 (1.5E+1)	< LLD	-	-	< LLD	0
Drinking Water ⁶ (pCi/l) (1981-1982)	Gross Beta ⁷	(2.0E+0)	-	-	-	-	-
	³ H 14	6.3E+2 (1.0E+3)	7.8E+2 (6/14) [6.8E+2 to 9.8E+2]	Site 28, Jenkinsville 2.0 miles SE ⁷	8.4E+2 (3/7) [7.0E+2 to 9.8E+2]	-	0
	Gamma Spec 44						
	⁵⁴ Mn	3.0E-1 (1.5E+1)	< LLD	-	-	-	0
	⁵⁸ Co	2.7E-1 (1.5E+1)	< LLD	-	-	-	0

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
Drinking Water ⁶ Cont. (pCi/l)	⁵⁹ Fe	9.6E0 (3.0E+1)	< LLD	-	-	-	0
	⁶⁰ Co	2.6E-1 (1.5E+1)	< LLD	-	-	-	0
	⁶⁵ Zn	3.4E-1 (3.0E+1)	< LLD	-	-	-	0
	⁹⁵ Zr	4.8E-1 (1.5E+1)	< LLD	-	-	-	0
	¹³¹ I	3.4E-1 (1.5E+1)	< LLD	-	-	-	0
	⁹⁵ Nb	7.4E-1 (1.0E+0)	< LLD	-	-	-	0
	¹³⁴ Cs	2.2E-1 (1.0E+1)	< LLD	-	-	-	0
	¹³⁷ Cs	2.4E-1 (1.8E+1)	< LLD	-	-	-	0
	¹⁴⁰ Ba	2.5E0 (6.0E+1)	< LLD	-	-	-	0
	¹⁴⁰ La (1982 only)	4.4E-1 (1.5E+1)	< LLD	-	-	-	0

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Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
Milk (pCi/l) (1981-1982)	Gamma Spec 94						
	¹³¹ I	6.3E-1 (1.0E+0)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	3.3E+0 (1.5E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	4.6E0 (1.5E+1)	4.1E+0 (8/47) [2.8E+0 to 6.1E+0]	Site 14, Dairy 5.1 miles W	4.1E+0 (8/47) [2.8E+0 to 6.1E+0]	5.7E+0 (37/47) [3.7E+0 to 9.2E+0]	0
	¹⁴⁰ Ba	1.1E+1 (1.5E + 1)	< LLD	-	-	< LLD	0
	¹⁴⁰ La	4.4E+0 (1.5E+1)	< LLD	-	-	< LLD	0
Grass (pCi/kg wet) (1981-1982)	Gamma Spec 82						
	¹³¹ I	6.7E+1 (6.0E+1)	< LLD	-	-	< LLD	0
	¹³⁴ Cs	2.7E+1 (8.0E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	3.3E+1 (8.0E+1)	5.0E+1 (13/51) [1.6E+1 to 1.6E+2]	Site 14, Dairy 5.1 miles W	5.9E+1 (5/29) [1.6E+1 to 1.6E+2]	1.3E+2 (6/31) [1.3E+1 to 3.4E+2]	0
Broadleaf Vegetation (pCi/kg wet) (1980-1982)	Gamma Spec 10						
	¹³¹ I	3.7E+1 (6.0E+1)	< LLD	-	-	-	0

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
	¹³⁴ Cs	1.9E+1 (8.0E+1)	< LLD	-	-	-	0
	¹³⁷ Cs	2.1E+1 (8.0E+1)	3.1E+1 (2/7) [1.8E+1 to 3.6E+1]	Site 2, Trans. Line 1.2 miles SW	3.6E+1 (1/1) [Single Value]	< LLD	0
Other Vegetation (pCi/kg wet) (1980-1982)	Gamma Spec 32						
	¹³⁴ Cs	8.4E+0 (8.0E+1)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	1.0E+1 (8.0E+1)	< LLD	-	-	< LLD	0
Fish (pCi/kg wet) (1980 - 1982)	Gamma Spec 92						
	¹³⁴ Cs	1.4E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	¹³⁷ Cs	1.8E+1 (1.3E+2)	2.8E+1 (50/71) [1.1E+1 to 1.0E+2]	Site 24, Rec. Lake 5.5 miles N	3.4E+1 (17/23) [1.2E+1 to 1.0E+2]	3.1E+1 (19/21) [1.0E+1 to 7.9E+1]	0
	⁵⁸ Co	2.6E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	⁵⁴ Mn	1.8E+1 (1.3E+2)	< LLD	-	-	< LLD	0
	⁵⁹ Fe	9.0E+1 (2.6E+2)	< LLD	-	-	< LLD	0
	⁶⁵ Zn	4.1E+1 (2.6E+2)	< LLD	-	-	< LLD	0
	⁶⁰ Co	1.8E+1 (1.3E+2)	< LLD	-	-	< LLD	0

Appendix A: Data Tables

Table 7– Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Medium or Pathway Sampled (Unit of Measurement and Reporting Period)	Type and Total Number of Analyses Performed	Lower Limit of Detection ¹ Actual (Required Max.)	All Indicator Locations Mean ² (f) [Range]	Location with Highest Annual Mean		Control Locations Mean ² (f) [Range]	Number of Nonroutine Reported ³ Measurements
				Name (Distance & Direction)	Mean ² (f) [Range]		
Sediment (pCi/kg) (1980-1982)	Gamma Spec 24						
		¹³⁴ Cs	2.3E+1 (1.5E+2)	< LLD	-	< LLD	0
		¹³⁷ Cs	2.4E+1 (1.5E+2)	1.7E+2 (12/18) [2.6E+1 to 4.5E+2]	Site 21, Parr Reservoir 2.7 miles SSW 2.6E+2 (6/6) [2.6E+1 to 4.5E+2]	4.2E+2 (6/6) [1.8E+1 to 1.0E+3]	0

Table 7 - Radiological Environmental Monitoring Program Pre-operational (Baseline) Summary

Footnotes

1. Values given are MDA values calculated from the program data analyses with maximum acceptable LLD values allowed from NRC guidelines given in parentheses.
2. Mean and range are based on detectable measurements only. The fractions of detectable measurements at specific locations are indicated in parentheses.
3. A non-routine measurement is any confirmed measured level of radioactivity in an environmental medium that exceeds the reporting requirements of VCSNS ODCM, Section 1.4.1.2.
4. The baseline values are high because of the fallout from the Chinese bomb test in 1980. The first set of data reflects the 1981 baseline. The second set of data reflects the 1982 baseline, essentially free of bomb test fallout. The 1982 data covers the period 1/1/82 - 10/22/82.
5. Detection sensitivity is approximately 5 mrem/yr (0.5 μ R/hr) determined from the analyses of five years of pre-operational data.
6. No control location was specified for drinking water during the pre-operational monitoring period.
7. Inconclusive data.

Appendix A: Data Tables

Table 8 - Results of 2024 Environmental Inter-Comparison Program with Independent Lab, Eckert & Ziegler Analytics, Inc.					
Comparison Study (Measurement Unit)	Date	Nuclides	Vendor Lab Results	Env Lab Results	Agreement
Gamma Isotopic Liquid 1 Liter (pCi/l)	March 2024	¹³¹ I	51.7	56.8	Yes
		¹⁴¹ Ce	64.6	71.7	Yes
		⁵¹ Cr	175	200	Yes
		¹³⁴ Cs	150	143	Yes
		¹³⁷ Cs	130	134	Yes
		⁵⁴ Mn	139	155	Yes
		⁵⁹ Fe	65.7	80	Yes
		⁶⁵ Zn	134	157	Yes
		⁶⁰ Co	120	124	Yes
Gamma Composite Filter (pCi)	Sept 2024	¹⁴¹ Ce	119	116	Yes
		⁵¹ Cr	263	258	Yes
		¹³⁴ Cs	180	157	Yes
		¹³⁷ Cs	122	135	Yes
		⁵⁸ Co	143	163	Yes
		⁵⁴ Mn	155	179	Yes
		⁵⁹ Fe	109	135	Yes
		⁶⁵ Zn	264	314	Yes
		⁶⁰ Co	226	237	Yes
Alpha/Beta Water (pCi/l)	March 2024	Alpha Beta	77	69.3	Yes
			157	162	Yes
Gamma Isotopic Pulverized Soil (pCi/g)	March 2024	¹⁴¹ Ce	8.34e-02	8.21e-02	Yes
		⁵¹ Cr	2.26e-01	2.13e-01	Yes
		¹³⁴ Cs	1.94e-01	1.83e-01	Yes
		¹³⁷ Cs	1.67e-01	1.78e-01	Yes
		⁵⁴ Mn	1.79e-01	1.89e-01	Yes
		⁵⁹ Fe	8.48e-02	9.37e-02	Yes
		⁶⁵ Zn	1.73e-01	1.92e-01	Yes
		⁶⁰ Co	1.55e-01	1.61e-01	Yes
					Yes
I-131 Resin (pCi)	March 2024	¹³¹ I	93.1	90.7	Yes

Appendix A: Data Tables

Table 8 - Results of 2024 Environmental Inter-Comparison Program with Independent Lab, Eckert & Ziegler Analytics, Inc.					
Comparison Study (Measurement Unit)	Date	Nuclides	Vendor Lab Results	Env Lab Results	Agreement
Tritium (pCi/l)	March 2024	³ H	13900	14200	Yes
Gross Beta Filter (pCi)	Sept 2024	¹³⁷ Cs	219	214	Yes
Charcoal Cartridge (pCi)	Sept 2024	¹³¹ I	92.2	93.5	Yes
Gamma Isotopic Liquid 4 Liter (pCi/l)	Sept 2024	¹³¹ I	52.9	63.0	Yes
		¹⁴¹ Ce	116	134	Yes
		⁵¹ Cr	229	261	Yes
		¹³⁴ Cs	128	133	Yes
		¹³⁷ Cs	158	178	Yes
		⁵⁸ Co	73.6	82.3	Yes
		⁵⁴ Mn	164	192	Yes
		⁵⁹ Fe	88.1	104	Yes
		⁶⁵ Zn	227	267	Yes
		⁶⁰ Co	249	269	Yes

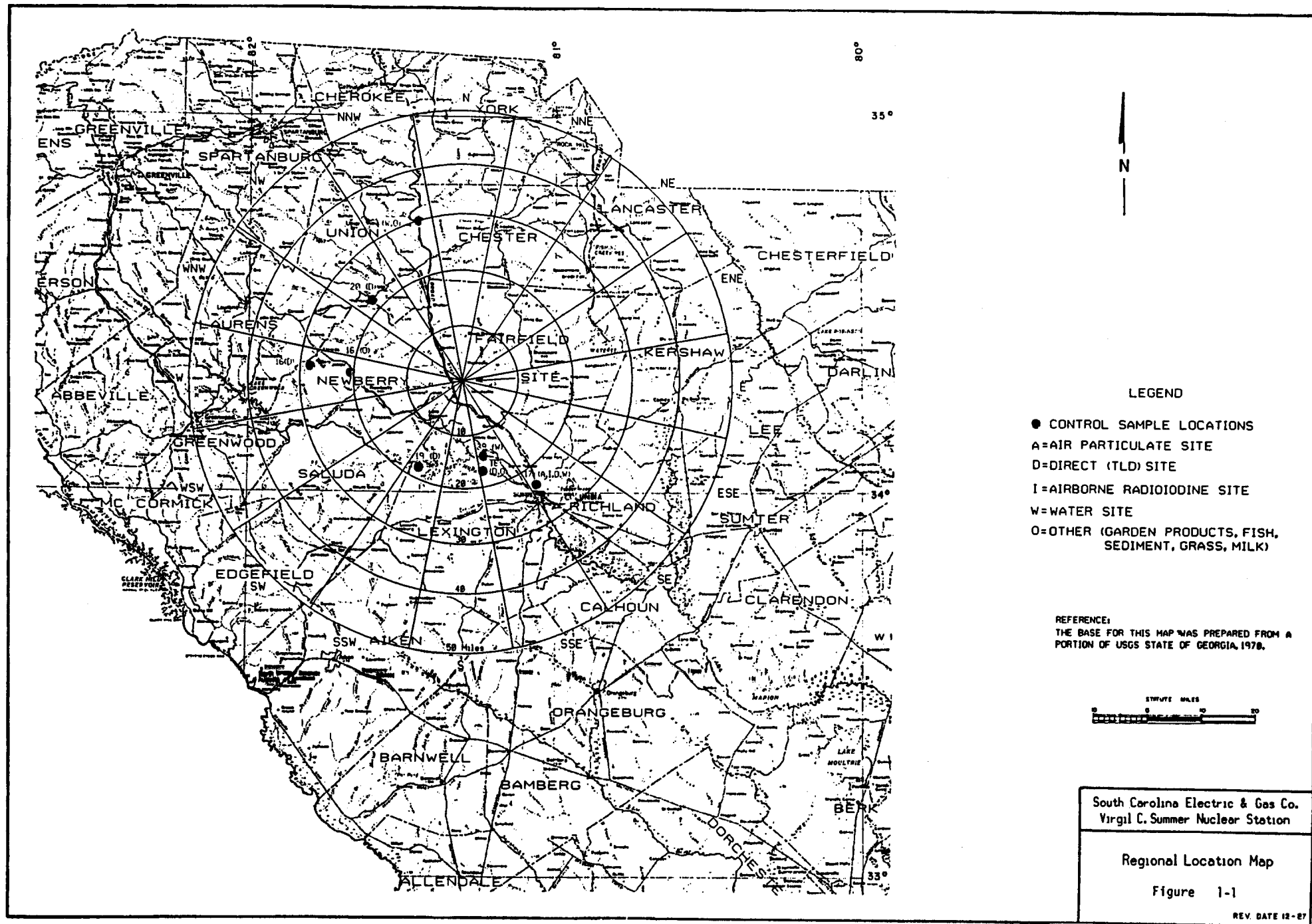
Appendix A: Data Tables

Table 9 – 2024 Environmental Sampling Program Deviations

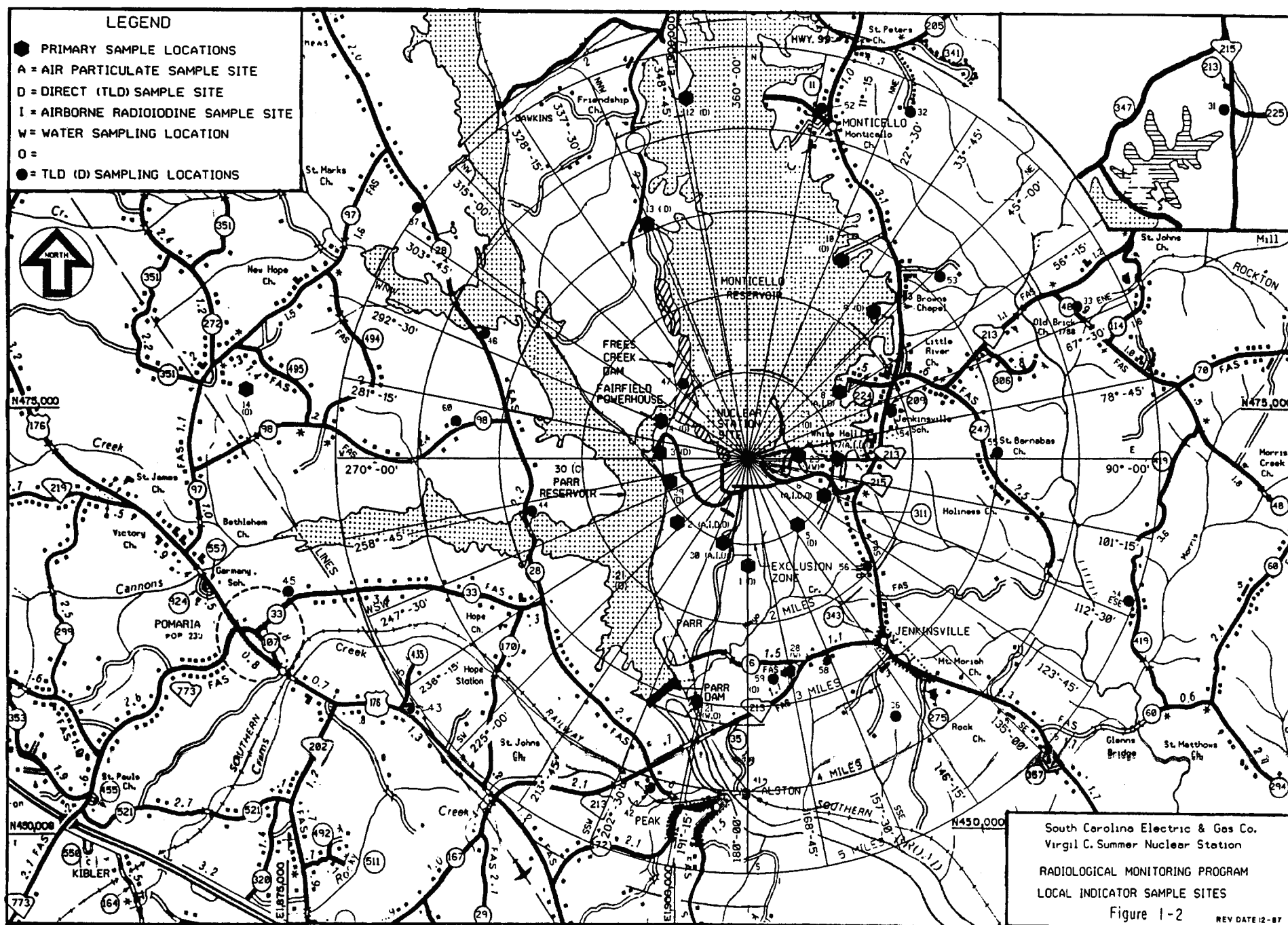
Media	Sample Location	Month / Quarter	Cause for Deviation
TLD	Site 47	1 st Quarter	1 of 2 badges were missing during collection. Collected badge was used for analysis.
	Site 8	2 nd Quarter	TLD's damaged by land management controlled burn. Replacements were installed in sufficient time to meet monitoring period requirements.
	Site 19	2 nd Quarter	Found missing during collection.
	Site 18	3 rd Quarter	Lost due to Hurricane Helene damage.
Air Samples	Site 8	July	
	Site 2	August	Power failure due to storms.
	Sites 2, 6, and 8	October	Power outages due to Hurricane Helene.
	Site 17	December	Mechanical pump failure.
Surface Water	Site 22	January	Sampler washed away due to unexpected rise in river level during flood conditions.
	Site 23	February	Electrical failure due to cable degradation.
Groundwater	Site 118	November	Supplemental sample not collected due to failure of installed pump.
Garden Products	Site 6 and 7	Fall/Winter	Supplemental root crop could not be harvested.

Table 10 – Land Use Census Results					
Sector	Distance from Reactor Building Center (Miles)				
	Nearest Residence	Nearest Garden (> 500 ft²)	Nearest Meat Animal	Nearest Milk Cow	Nearest Milk Goat
S	3.54	3.89	4.5	-	-
SSW	3.02	-	3.43	-	-
SW	2.84	3.31	-	-	-
WSW	3.25	-	1.83	-	-
W	2.55	-	2.43	-	-
WNW	2.59	-	-	-	-
NW	3.86	-	-	-	-
NNW	2.86	-	-	-	-
N	3.73	-	-	-	-
NNE	2.96	-	-	-	-
NE	1.5	-	-	-	-
ENE	1.53	-	-	-	-
E	1.18	-	-	-	-
ESE	1.04	-	-	-	-
SE	1.44	-	-	-	-
SSE	2.39	-	-	-	-

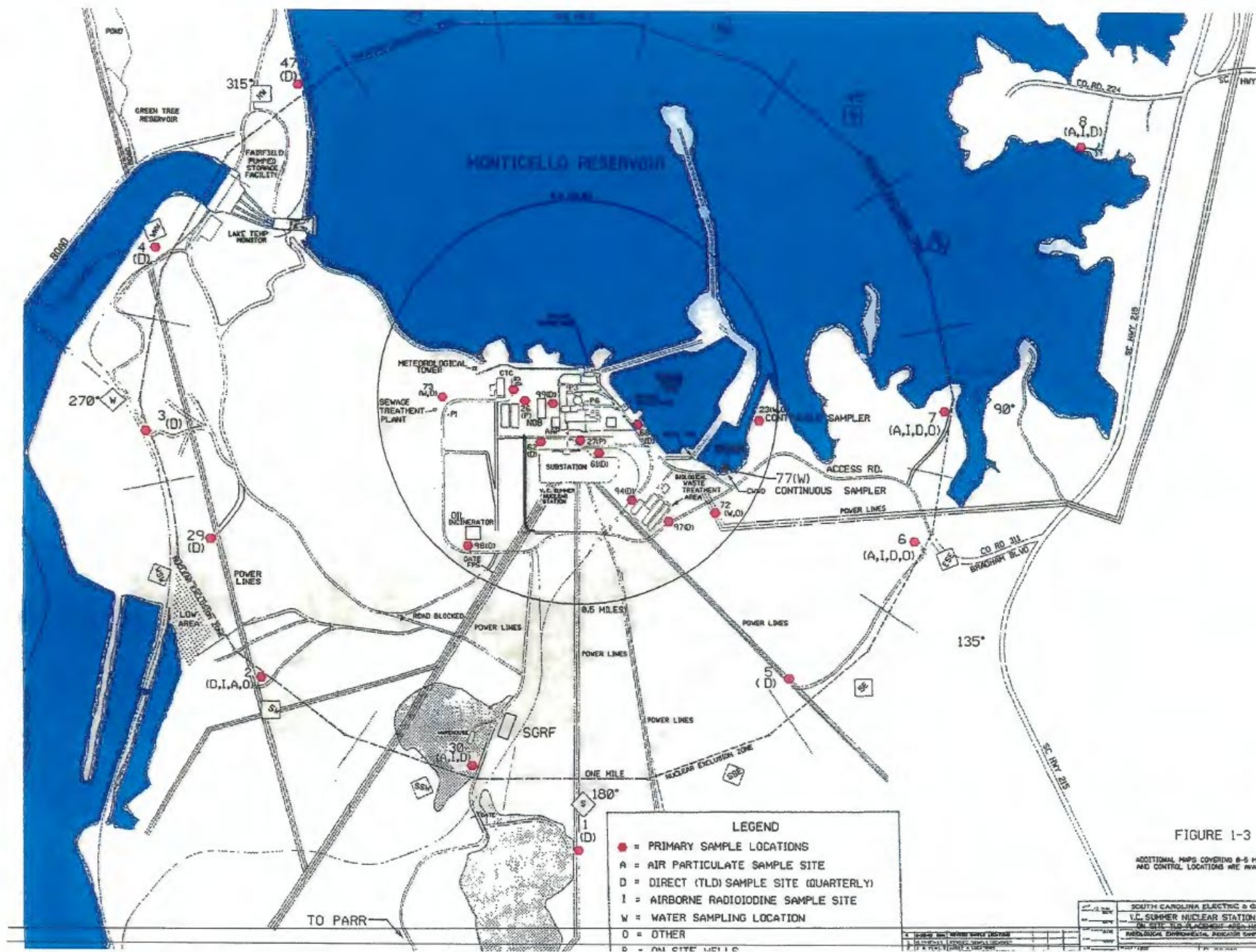
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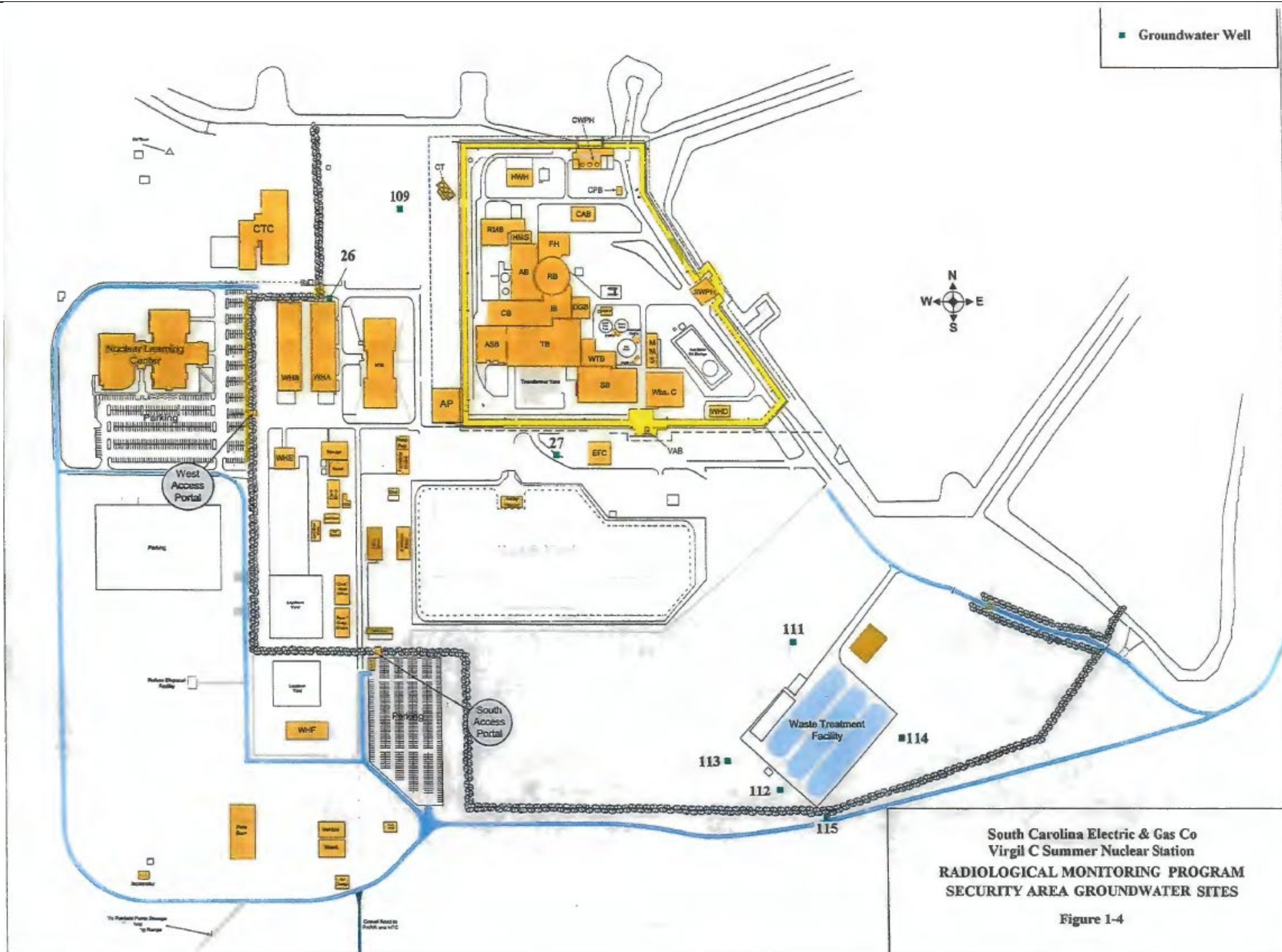
Appendix B: Figures



Appendix B: Figures



Appendix B: Figures



Appendix B: Figures

