Status of the Decommissioning Program

2017 Annual Report

Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Enclosure 1

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ABBREVIATIONS

ACL	Alternate concentration limit
ADAMS	Agencywide Documents Access and Management System
ALARA	As low as reasonably achievable
BLEU	Blended Low Enriched Uranium
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
CFR	*Code of Federal Regulations*
DCGLs	Derived Concentration Guideline Levels
DOE	U.S. Department of Energy
DOJ	U.S. Department of Justice
DoD	U.S. Department of Defense
DP	Decommissioning plan
DUWP	Division of Decommissioning, Uranium Recovery, and Waste Programs
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FCSE	Division of Fuel Cycle Safety, Safeguards, and Environmental Review
FSSR	Final Status Survey Report
FTE	Full-time equivalents
FY	Fiscal year
GCAP	Groundwater Compliance Action Plan
GE	General Electric
GEIS	Generic Environmental Impact Statement
GETR	General Electric-Hitachi Test Reactor
HLW	High-level waste
IAEA	International Atomic Energy Agency
IDIP	Integrated Decommissioning Improvement Plan
ISFSI	Independent spent fuel storage installation
ISR	In-situ recovery
LCF	Lead Cascade Facility
LTP	License termination plan
LTR	License Termination Rule

LTSP	Long-term surveillance plan
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MOU	Memorandum of Understanding
N/A	Not applicable
NARM	Naturally occurring and accelerator-produced radioactive material
NEA	Nuclear Energy Agency
NFS	Nuclear Fuel Services
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSIR	Office of Nuclear Security and Incident Response
NYSERDA	New York State Energy and Research Development Authority
ODEQ	Oklahoma Department of Environmental Quality
OGC	Office of the General Counsel
PSDAR	Post-Shutdown Decommissioning Activities Report
RAI	Request for additional information
RES	Office of Nuclear Regulatory Research
RP	Reclamation plan
SDMP	Site Decommissioning Management Plan
SER	Safety Evaluation Report
SFC	Sequoyah Fuels Corporation
SNM	Special nuclear material
SRM	Staff Requirements Memorandum
TBD	To be determined
TRIGA	Training, Research, Isotopes General Atomics
UMTRCA	Uranium Mill Tailings Radiation Control Act
UNC	United Nuclear Corporation
USACE	U.S. Army Corps of Engineers
VESR	Vallecitos Experimental Superheat Reactor
WNI	Western Nuclear Incorporated
WPDD	Working Party on Decommissioning and Dismantling
WVDP	West Valley Demonstration Project

1. INTRODUCTION

This report provides a summary of decommissioning activities at nuclear facilities in the United States. Its purpose is to provide a reference document that summarizes the U.S Nuclear Regulatory Commission's (NRC's) decommissioning activities in fiscal year (FY) 2017, including the decommissioning of power reactors, research and test reactors, complex materials sites, uranium recovery facilities, and fuel cycle facilities. As such, this report discusses the current progress and accomplishments with respect to the NRC's Decommissioning Program, provides information supplied by Agreement States on the status of decommissioning activities at sites within their States, and identifies key Decommissioning Program activities that the NRC staff will undertake in the coming year. The information contained in this report is current as of September 30, 2017.

Approximately 15 years ago, the Division of Decommissioning, Uranium Recovery, and Waste Programs (DUWP) began an effort to enhance the effectiveness of the NRC's Decommissioning Program. This effort included several initiatives: developing, updating, and consolidating all guidance associated with decommissioning into a concise guidance document, NUREG-1757, "Consolidated Decommissioning Guidance;" developing metrics to track NRC staff and licensee activities; establishing a proactive communication approach with licensees to facilitate decommissioning; and developing an integrated decommissioning improvement plan to systematically examine the Decommissioning Program for efficiency gains. This effort resulted in a significant improvement in the decommissioning process and a corresponding increase in the number of sites that have been successfully decommissioned since 2000 (over 50), some of which had been in decommissioning since the late 1980s.

As noted in the NRC staff's FY 2016 report (SECY-16-0129, "Status of the Decommissioning Program - 2016 Annual Report"), the Decommissioning Program has changed considerably as the inventory of complex materials sites in decommissioning status has been substantially reduced. In turn, new programmatic issues have arisen as the NRC has increased its involvement with facilities with different decommissioning challenges. Examples of such challenges are the regulation of military sites contaminated with depleted uranium from past testing of munitions and the regulation of military and non-military sites with radium contamination.

Most power reactors undergoing decommissioning will remain in SAFSTOR, with Zion Units 1 and 2, Humboldt Bay, La Crosse, and San Onofre Units 2 and 3 in active decommissioning. The inventory of decommissioning power reactor sites is expected to increase as licensees for several reactors have expressed their intent to permanently cease power operations of those reactors by 2019, including Three Mile Island Unit 1, Pilgrim, and Oyster Creek. Staff within the Office of Nuclear Material Safety and Safeguards (NMSS), the regional offices, as well as the Office of Nuclear Reactor Regulation (NRR), the Office of Nuclear Security and Incident Response (NSIR), and the Office of the General Counsel (OGC) will continue to coordinate extensively on activities that support the transition of operating reactors to plants in a decommissioning status. In FY 2018, the NRC staff expects to complete decommissioning licensing activities at the Beltsville Agricultural Research Center in Beltsville, Maryland. The NRC staff also expects that the licensee will complete decommissioning activities at Humboldt

Bay by the end of 2018. Within the next few years, several Title II[1] uranium recovery sites are also expected to complete decommissioning and be transferred to the U.S. Department of Energy (DOE) for long-term control under a general license.

[1] The Uranium Mill Tailings Radiation Control Act of 1978, as amended, classifies certain facilities that mill or process certain radioactive material as: Title I, which refers to those facilities that were inactive, unregulated processing sites when the act was passed; or Title II, which refers to those facilities licensed by the NRC or an Agreement State. Section 2.4, *infra*, explains this in detail.

2. DECOMMISSIONING SITES

The NRC regulates the decontamination and decommissioning of materials and fuel cycle facilities, power reactors, research and test reactors, and uranium recovery facilities. The purpose of the Decommissioning Program is to ensure that NRC-licensed sites, and sites under NRC authority, are decommissioned in a safe, timely, and effective manner so that they can be returned to beneficial use and to ensure that stakeholders are informed and involved in the decommissioning process, as appropriate. This report summarizes a broad spectrum of activities associated with the program's functions.

Each year, the NRC terminates approximately 100 materials licenses. Most of these license terminations are routine, and the sites require little, if any, remediation to meet the NRC's unrestricted release criteria. This report focuses on the more challenging sites where the termination of the site's license is not a routine licensing action.

As of September 30, 2017, 20 nuclear power and early demonstration reactors, 4 research and test reactors, 13 complex materials facilities, 3 fuel cycle facilities, and 11 Title II uranium recovery facilities are undergoing decommissioning or are in long-term safe storage, under NRC jurisdiction. Additionally, 22 Title I and 6 Title II uranium recovery facilities are in long-term care under a general license held by the DOE in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 40.27 and 40.28. The NRC public Web site contains status summaries for the facilities managed in the Decommissioning Program (http://www.nrc.gov/waste/decommissioning.html). These summaries, which are updated quarterly, describe the status of each site and identify the major technical and regulatory issues affecting the completion of decommissioning. For those licensees or responsible parties that have submitted a decommissioning plan (DP) or license termination plan (LTP), the schedules for completion of decommissioning are based on an assessment of the complexity of the DP or LTP review. For those that have not submitted a DP or LTP, the schedules are based on other available site-specific information and on the anticipated decommissioning approach.

Through the Agreement State Program, 37 States have signed formal agreements with the NRC, by which those States have assumed regulatory responsibility over certain byproduct, source, and small quantities of special nuclear material (SNM), including the decommissioning of some complex materials sites and uranium recovery sites. Agreement States do not have regulatory authority over nuclear reactors licensed under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," or fuel cycle facilities. Section 7 of this report discusses the NRC's coordination with the Agreement States' decommissioning programs.

2.1 Nuclear Power Reactor Decommissioning

The NRC's power reactor decommissioning activities include project management, technical review of licensee submittals in support of decommissioning, core inspections, support for the development of rulemaking and guidance, public outreach efforts, international assistance and cooperation, and participation in industry conferences and workshops. In addition, the NRC staff routinely processes license amendments and exemptions to support the progressive stages of decommissioning. The Decommissioning Program staff regularly coordinate with other offices on issues affecting both operating and decommissioning power reactors, and with the Division of Spent Fuel Management in NMSS regarding the independent spent fuel storage installations (ISFSIs) at reactor sites undergoing decommissioning.

As of September 30, 2017, the 20 nuclear power and early demonstration reactors identified in Table 2-1a are undergoing decommissioning. Table 2-1a provides an overview of the status of these nuclear power reactors. Plant status summaries for all decommissioning nuclear power reactors are available at http://www.nrc.gov/info-finder/decommissioning/power-reactor/. Table 2-1b lists the decommissioned power reactors that have ISFSIs onsite.

2.1.1 Decommissioning Process

The decommissioning process begins when a licensee decides to permanently cease operations. The major steps that make up the reactor decommissioning process are: certification to the NRC of permanent cessation of operations and removal of fuel; submittal and implementation of the Post-Shutdown Decommissioning Activities Report (PSDAR); submittal of the LTP; implementation of the LTP; and completion of decommissioning.

Notification

When the licensee has decided to permanently cease operations, it is required to submit a written certification to the NRC. In addition, the licensee is required to provide certification to the NRC in writing once fuel has been permanently removed from the reactor vessel.

Post-Shutdown Decommissioning Activities Report

Before, or within 2 years after cessation of operations, the licensee must submit a PSDAR to the NRC and a copy to the affected State(s). The PSDAR must include:

- a description of and schedule for the planned decommissioning activities;
- an estimate of the expected costs; and
- a discussion of the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate, previously issued Environmental Impact Statements (EISs).

The NRC will notice receipt of the PSDAR in the *Federal Register* and make the PSDAR available for public comment. In addition, the NRC will hold a public meeting in the vicinity of

the licensee's facility to discuss the PSDAR. Although the NRC does not approve the PSDAR, the licensee cannot perform any major decommissioning activities until 90 days after the NRC has received the PSDAR. After this period, the licensee can perform decommissioning activities as long as the activities do not have the following results:

- Foreclose release of the site for unrestricted use;
- Result in significant environmental impacts not previously reviewed; or
- Jeopardize reasonable assurance that adequate funds will be available for decommissioning.

The regulations in 10 CFR 50.59, "Changes, Tests, and Experiments," allow a reactor licensee to make certain changes to its facility without a license amendment. In taking actions permitted under 10 CFR 50.59 after submittal of the PSDAR, the licensee must notify the NRC, in writing, before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules in the PSDAR (10 CFR 50.82(a)(7)).

The NRC staff will periodically inspect operations at the site to ensure that decommissioning activities are being conducted in accordance with all applicable regulations and commitments.

License Termination Plan

Each power reactor licensee must submit an application for termination of its license. An LTP must be submitted at least 2 years before the license termination date. The NRC and licensee hold pre-submittal meetings to discuss the format and content of the LTP. These meetings are open to the public and intended to improve the efficiency of the LTP development and review process. The LTP must include the following:

- a site characterization;
- identification of remaining dismantlement activities;
- plans for site remediation;
- detailed plans for the final radiological survey;
- description of the end use of the site, if restricted;
- an updated site-specific estimate of remaining decommissioning costs;
- a supplement to the environmental report describing any new information or significant environmental change associated with the licensee's proposed termination activities; and
- identification of parts, if any, of the facility or site that were released for use before approval of the LTP.

In addition, the licensee should demonstrate that it will meet the applicable requirements of the License Termination Rule (LTR) in 10 CFR Part 20, "Standards for Protection Against Radiation," Subpart E, "Radiological Criteria for License Termination."

The NRC will notice receipt of the LTP and make the LTP available for public comment. In addition, the NRC will hold a public meeting in the vicinity of the licensee's facility to discuss the LTP and the LTP review process. The LTP technical review is guided by NUREG-1700, "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans," Revision 1, issued April 2003 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML031270391); NUREG-1757, "Consolidated Decommissioning Guidance," Revision 1 of Volume 2, issued September 2006 (ADAMS Accession No. ML063000243); and NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities—Supplement 1," issued November 2002 (ADAMS Accession No. ML023470327). The LTP is approved by license amendment.

Implementation of the License Termination Plan

After approval of the LTP, the licensee or responsible party must complete decommissioning in accordance with the approved LTP. The NRC staff will periodically inspect the decommissioning operations at the site to ensure compliance with the LTP. These inspections will normally include in-process and confirmatory radiological surveys.

Decommissioning must be completed within 60 years of permanent cessation of operations, unless otherwise approved by the Commission.

Completion of Decommissioning

At the conclusion of decommissioning activities, the licensee will submit a Final Status Survey Report (FSSR) that documents the final radiological conditions of the site, and request that the NRC either: (1) terminate the 10 CFR Part 50 license; or (2) if the licensee has an ISFSI, reduce the 10 CFR Part 50 license boundary to the footprint of the ISFSI. For decommissioning reactors with no ISFSI, or an ISFSI that is authorized via specific license under 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste," completion of reactor decommissioning will result in the termination of the 10 CFR Part 50 license. The NRC will approve the FSSR and the licensee's request if it determines that the licensee has met both of the following conditions:

- The dismantlement has been performed in accordance with the approved LTP.
- The final radiation survey and associated documentation demonstrate that the facility and site are suitable for release in accordance with the LTR.

2.1.2 Summary of Fiscal Year 2017 Activities

- The NRC staff continued its evaluation of a request for an alternate decommissioning schedule for the reactors at the General Electric (GE) Vallecitos facility, which proposes to extend the schedule for decommissioning beyond the 60-year timeline required for power reactor licensees in 10 CFR 50.82(a)(3).

- In February 2017, the NRC received an application to transfer the license for Vermont Yankee from Entergy Nuclear to NorthStar Group Services for the purposes of decommissioning. This requested action is currently under review by the NRC staff.

- In April 2017, the NRC staff approved the La Crosse partial site release of 88 acres of non-impacted land adjacent to the former operating reactor.

- Fort Calhoun permanently ceased operations and transferred into a decommissioning status in October 2016. The NRC staff within NMSS, the Region IV office, NRR, NSIR, and OGC coordinated licensing activities, transfer of inspection responsibilities, and public meetings.

- To ensure openness during the regulatory process, the NRC staff participated in several public meetings,[2] including a meeting regarding the Fort Calhoun PSDAR, a San Onofre Citizens Engagement Panel meeting to discuss the decommissioning inspection program, and a Vermont Yankee Nuclear Decommissioning Citizens Advisory Panel meeting to discuss the license transfer process. In addition, the NMSS staff provided support at Annual Assessment meetings for licensees that have announced their intent to shut down within the next 5 years, including Indian Point Units 2 and 3, Oyster Creek, and Palisades.

- With the support of NRC's Office of Congressional Affairs, the NRC staff provided 9 Congressional staff briefings on the decommissioning process. In addition, staff briefed Congresswoman Lowey (D-NY) regarding the future shutdown of Indian Point Units 2 and 3, and participated in Congressman Carbajal's (D-CA) town hall meeting near Diablo Canyon.

- The NRC staff completed oversight activities and inspections at reactor decommissioning facilities in accordance with Inspection Manual Chapter 2561 at Crystal River 3, Dresden 1, Fermi 1, GE Vallecitos, Humboldt Bay, Indian Point Unit 1, Kewaunee, La Crosse, Millstone Unit 1, Nuclear Ship Savannah, Peach Bottom Unit 1, San Onofre Units 1, 2 and 3, Three Mile Island Unit 2, Vermont Yankee, and Zion Units 1 and 2.

2.1.3 Fiscal Year 2018 Trends and Areas of Focus

[2] Public meetings include formal public meetings sponsored by the NRC, as well as technical meetings that are open to observation by members of the public.

The NRC staff will continue its extensive coordination with other offices while working to complete the transfer of recently shut down reactors to the Decommissioning Program. Reactors that have recently ceased operation remain under NRR project management until formal transfer occurs shortly after the licensee's defueled Technical Specifications and safety analysis are approved. Licensees for several reactors have expressed their intent to permanently cease power operations by 2019, including Three Mile Island Unit 1, Pilgrim, and Oyster Creek.

Table 2-1a Power and Early Demonstration Reactors Undergoing Decommissioning

Reactor		Location	Status	Date of Shutdown	PSDAR* Submitted	LTP Submitted	LTP Approved	Completion of Decom**
1	Crystal River Unit 3	Crystal River, FL	SAFSTOR	2/13	12/13	TBD	TBD	2074
2	Dresden Unit 1	Morris, IL	SAFSTOR	10/78	6/98	TBD	TBD	2036
3	Fermi Unit 1	Newport, MI	SAFSTOR	9/72	4/98	2011***	TBD	2032
4	Fort Calhoun	Blair, NE	SAFSTOR	10/16	3/17	TBD	TBD	2065
5	GE-EVESR	Sunol, CA	SAFSTOR	2/67	N/A	TBD	TBD	2025
6	GE-Vallecitos Boiling Water Reactor	Sunol, CA	SAFSTOR	12/63	7/66	TBD	TBD	2025
7	Humboldt Bay	Eureka, CA	DECON	7/76	2/98	5/13	5/16	2018
8	Indian Point Unit 1	Buchanan, NY	SAFSTOR	10/74	1/96	TBD	TBD	2026
9	Kewaunee	Kewaunee, WI	SAFSTOR	5/13	5/13	TBD	TBD	2073
10	La Crosse	La Crosse, WI	DECON	4/87	5/91	7/16	TBD	2019
11	Millstone Unit 1	Waterford, CT	SAFSTOR	7/98	6/99	TBD	TBD	2056
12	Nuclear Ship Savannah	Baltimore, MD	SAFSTOR	11/70	12/08	TBD	TBD	2031
13	Peach Bottom Unit 1	Delta, PA	SAFSTOR	10/74	6/98	TBD	TBD	2034
14	San Onofre Unit 1	San Clemente, CA	SAFSTOR	11/92	12/98	TBD	TBD	2030
15	San Onofre Unit 2	San Clemente, CA	DECON	6/13	9/14	TBD	TBD	2031
16	San Onofre Unit 3	San Clemente, CA	DECON	6/13	9/14	TBD	TBD	2031
17	Three Mile Island Unit 2	Harrisburg, PA	SAFSTOR	3/79	6/13	TBD	TBD	2036
18	Vermont Yankee	Vernon, VT	SAFSTOR	12/14	12/14	TBD	TBD	2073
19	Zion Unit 1	Zion, IL	DECON	2/97	2/00	12/14	TBD	2020

20	Zion Unit 2	Zion, IL	DECON	9/96	2/00	12/14	TBD	2020

GE General Electric
TBD to be determined
EVESR ESADA (Empire State Atomic Development Associates) Vallecitos Experimental Superheat Reactor

* PSDAR or DP equivalent. Prior to August 28, 1996, the effective date of Final Rule "Decommissioning of Nuclear Power Reactors" (61 FR 39278; July 29, 1996), licensees submitted DPs (or equivalent).

** Anticipated year of completion of decommissioning. For decommissioning reactors with no ISFSI or an ISFSI licensed under 10 CFR Part 72, completion of decommissioning will result in the termination of the 10 CFR Part 50 license. For reactors with an ISFSI licensed under the provisions of 10 CFR Part 50, completion of decommissioning will result in reducing the 10 CFR Part 50 license boundary to the footprint of the ISFSI.

*** Licensing action put on hold at licensee's request.

Table 2-1b Decommissioned Power Reactors That Have Independent Spent Fuel Storage Installations

	Reactor	**Onsite Fuel Status**	**Cask Vendor**	**Model**
1	Big Rock Point	10 CFR 50 ISFSI	Energy Solutions, Inc.	Fuel Solutions W74
2	Connecticut Yankee	10 CFR 50 ISFSI	NAC International, Inc.	NAC-MPC
3	Fort St. Vrain (DOE site)	10 CFR 72 ISFSI	Foster Wheeler Energy Applications, Inc.	Modular Vault Dry Store
4	Maine Yankee	10 CFR 50 ISFSI	NAC International, Inc.	NAC-UMS
5	Rancho Seco	10 CFR 72 ISFSI	Transnuclear, Inc.	NUHOMS-24P
6	Trojan	10 CFR 72 ISFSI	BNFL Transtor/Holtec International	HI-STORM 100
7	Yankee Rowe	10 CFR 50 ISFSI	NAC International, Inc.	NAC-MPC

2.2 Research and Test Reactor Decommissioning

The NRC research and test reactor decommissioning activities include project management, technical review of licensee submittals in support of decommissioning, inspections, support for the development of rulemaking and guidance, public outreach, and participation in industry conferences and workshops. In addition, the NRC staff routinely processes license amendments and exemptions to support the progressive stages of decommissioning.

As of September 30, 2017, the four research and test reactors identified in Table 2-2 were undergoing decommissioning. Plant status summaries for all decommissioning research and test reactors are available at http://www.nrc.gov/info-finder/decommissioning/research-test/.

2.2.1 Decommissioning Process

The decommissioning process begins when a licensee decides to permanently cease operations. The major steps of the decommissioning process are submittal of a DP, review and approval of the DP, implementation of the DP, and completion of decommissioning.

Application

Within 2 years following permanent cessation of operations, and in no case later than 1 year before license expiration, the licensee must submit a written application for license termination to the NRC. Each application for license termination must be accompanied or preceded by a DP submitted for NRC approval. The NRC and licensee hold pre-submittal meetings to discuss the format and content of the DP. These meetings are open to the public and are intended to improve the efficiency of the DP development and review process.

Decommissioning Plan

The DP must include the following:

- The choice of the alternative[3] for decommissioning with a description of the planned decommissioning activities;
- A description of the controls and limits on procedures and equipment to provide for occupational and public health and safety;
- A description of the planned final radiation survey;

[3] An alternative is acceptable if it provides for completion of decommissioning without significant delay. Consideration will be given to alternatives involving a delay in decommissioning only when necessary to protect public health and safety, including cases where waste disposal capacity is unavailable or other site-specific conditions, such as the presence of co-located nuclear facilities, are a factor.

- An updated estimate of the expected costs for the alternative chosen, including the following:
  - A comparison with the estimated present funds set aside for decommissioning.
  - A plan for assuring the availability of adequate funds for completion of decommissioning.

- A description of Technical Specifications, quality assurance provisions, and physical security plan provisions in place during decommissioning.

In addition, the licensee should demonstrate that it will meet the applicable requirements of the LTR.

The NRC staff's technical review of the DP is guided by NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," issued February 1996 (ADAMS Accession No. ML042430055), and applicable portions of NUREG-1757. The DP is approved by license amendment, as a supplement to the Safety Evaluation Report (SER), or equivalent.

Implementation of the Decommissioning Plan

For DPs in which the major dismantlement activities are delayed by first placing the facility in storage, planning for these delayed activities may be less detailed. Updated detailed plans must be submitted and approved before the start of any dismantlement activities.

For DPs that involve delayed completion of decommissioning by including a period of storage or surveillance, the licensee shall meet the following conditions:

- Funds needed to complete the decommissioning process will be placed into an account segregated from the licensee's assets and outside the licensee's administrative control during the storage or surveillance period, or a surety method or fund statement of intent will be maintained in accordance with the criteria of 10 CFR 50.75(e).

- Means will be included for adjusting cost estimates and associated funding levels over the storage or surveillance period.

After approval of the DP, the licensee or responsible party must complete decommissioning in accordance with the approved DP. The NRC staff will periodically inspect the decommissioning operations at the site to ensure compliance with the DP. These inspections will normally include in-process and confirmatory radiological surveys.

Completion of Decommissioning

At the conclusion of decommissioning activities, the licensee will submit an FSSR, which identifies the final radiological conditions of the site. The NRC will terminate the license if it determines that the licensee has met the following conditions:

- The decommissioning process has been performed in accordance with the approved DP.

- The final radiation survey and associated documentation demonstrate that the facility and site are suitable for release in accordance with the LTR.

2.2.2 Summary of Fiscal Year 2017 Activities

- In February 2017, the State University of New York at Buffalo in Buffalo, New York, requested license termination and submitted its final status survey report. This requested action is currently undergoing review by the NRC staff.

- In February 2017, the NRC staff approved new derived concentration guideline levels (DCGLs) for the General Atomics research reactors in San Diego, California. General Atomics requested to use the screening value DCGLs in NUREG-1757, which are more conservative than the criteria approved in the original DP. Work at the two research reactors and hot cell facility is nearing completion.

2.2.3 Fiscal Year 2018 Trends and Areas of Focus

In FY 2018, the NRC staff expects to complete its review of the license termination request for the State University of New York at Buffalo facility.

Table 2-2 Research and Test Reactors Undergoing Decommissioning

Reactor		Location	Date of Shutdown	Status	Completion of Decommissioning
1	General Atomics TRIGA Mark F	San Diego, CA	9/94	DP Approved	2019
2	General Atomics TRIGA Mark I	San Diego, CA	12/96	DP Approved	2019
3	General Electric-Hitachi GETR	Sunol, CA	1/85	Possession-Only	2025
4	State University of New York at Buffalo	Buffalo, NY	7/96	DP Approved	2018

GETR General Electric Test Reactor
TRIGA Training, Research, Isotopes General Atomics

2.3 Complex Materials Facility Decommissioning

Decommissioning activities associated with materials facilities include maintaining regulatory oversight of complex decommissioning sites, undertaking financial assurance reviews, examining issues and funding options to facilitate remediation of sites in Non-Agreement States and sites in Agreement States that have exclusive Federal jurisdiction, interacting with the U.S. Environmental Protection Agency (EPA), interacting with the U.S. Army Corps of Engineers (USACE), inspecting complex decommissioning sites, conducting public outreach, participating in international decommissioning activities, conducting program evaluations, and participating in industry conferences and workshops. In addition, the NRC staff routinely reviews decommissioning financial assurance submittals for operating materials and fuel cycle facilities and maintains a financial instrument security program.

As of September 30, 2017, 13 complex materials sites are undergoing decommissioning (see Table 2-3). Complex materials sites are defined as sites where the complexity of the decommissioning process will require more than minimal technical and administrative support from the headquarters program office. It is expected that for these sites, it will take more than a year to complete the decommissioning process. Examples of complex materials sites include: sites with groundwater contamination; sites containing significant soil contamination; sites in which the owners are in bankruptcy; any site where a decommissioning plan is required; all fuel cycle facilities undergoing decommissioning; and sites where there is significant public and/or Congressional interest.

Table 2-3 indicates which criteria, i.e., either the dose-based LTR criteria or the concentration-based Site Decommissioning Management Plan (SDMP) Action Plan criteria, the licensee or responsible party must use for compliance with site cleanup requirements. Under the provisions of 10 CFR 20.1401(b), any licensee or responsible party that submitted its DP before August 20, 1998, and received NRC approval of that DP before August 20, 1999, may use the SDMP Action Plan criteria for site remediation. Only one complex material site, Cimarron (Kerr-McGee), remains eligible to use the SDMP Action Plan criteria (see Table 2-3). All other sites must use the dose-based criteria in the LTR.

Status summaries for the complex materials sites undergoing decommissioning are provided at http://www.nrc.gov/info-finder/decommissioning/complex/.

2.3.1 Decommissioning Process

Any one of the following events can initiate the decommissioning process:

- The license expires;
- The licensee has decided to permanently cease operations at the entire site (or in any separate building or outdoor area that contains residual radioactivity, such that the building or outdoor area is unsuitable for release in accordance with the NRC requirements. In these cases, the decommissioning process does not lead to license termination).

- No principal activities have been conducted at the site for a period of 24 months.

- No principal activities have been conducted for a period of 24 months in any separate building or outdoor area that contains residual radioactivity, such that the building or outdoor area is unsuitable for release in accordance with the NRC requirements. In these cases, the decommissioning process does not lead to license termination.

Major steps in the decommissioning process are notification of cessation of operations; submittal, review and approval of the DP; implementation of the DP; and completion of decommissioning.

Notification

Within 60 days of the occurrence of any of the triggering conditions described above, the licensee or responsible party must notify the NRC of such occurrence and either begin decommissioning or, if required, submit a DP within 12 months of notification and begin decommissioning activities upon approval of the DP. With NRC approval, the regulations allow alternative schedules.

Decommissioning Plan

A DP must be submitted if required by license condition or if the NRC has not previously approved the procedures and activities necessary to conduct site decommissioning and the procedures could increase potential health and safety impacts on workers or the public, such as in any of the following cases:

- Procedures would involve techniques not applied routinely during cleanup or maintenance operations;

- Workers would be entering areas not normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered during operation;

- Procedures could result in significantly greater airborne concentrations than are present during operations;

- Procedures could result in significantly greater releases of radioactive material to the environment than those associated with operations.

Generally, before submitting a DP, the licensee or responsible party meets with the NRC to discuss the form and content of the DP. This pre-submittal meeting is intended to make the DP review process more efficient by reducing the potential need for requests for additional information (RAIs). It is important for the NRC and the licensee/responsible party to work effectively in a cooperative manner to resolve the issues that make the decommissioning of complex sites challenging.

The DP is approved by license amendment, as a supplement to the SER, or equivalent, and may include specific license conditions based on the findings from the NRC staff's review of the DP.

Implementation of the Decommissioning Plan

After approval of the DP, the licensee or responsible party must complete decommissioning within 24 months in accordance with the approved DP, or apply for an alternate schedule, which must also be approved. The NRC staff will periodically inspect the decommissioning operations at the site to ensure compliance with the DP and the license. These inspections will normally include in-process and confirmatory radiological surveys.

Completion of Decommissioning

As the final step in the decommissioning process, the licensee or responsible party is required to do the following:

- Certify the disposition of all regulated material, including accumulated wastes, by submitting a completed NRC Form 314, "Certificate of Disposition of Materials," or providing equivalent information.

- Conduct a radiation survey of the premises where licensed activities were conducted (in accordance with the procedures in the approved DP, if a DP is required) and submit a report of the results of the final status survey, unless the licensee or responsible party demonstrates in some other manner that the premises are suitable for release in accordance with the LTR.

A license is terminated or the site is released by written notice to the licensee when the NRC determines that the licensee has met the following conditions:

- Regulated material has been disposed of properly.

- Reasonable effort has been made to eliminate residual radioactive contamination, if present.

- The radiation survey has been performed or other information submitted by the licensee or responsible party demonstrates that the premises are suitable for release in accordance with the LTR.

2.3.2 Summary of Fiscal Year 2017 Activities

- The NRC staff received and has evaluated the FSSR for the remediation of the U.S. Department of Agriculture's Beltsville Agricultural Research Center. The NRC staff expects to complete action on this facility by the end of 2017.

- The NRC staff transmitted RAIs regarding the DP that the licensee for Cimarron submitted in December 2015. Based on the licensee's response to the RAIs as well

as discussions between the NRC staff and the licensee, the licensee will be submitting a revised DP in 2018. The NRC staff met with the licensee and the Oklahoma Department of Environmental Quality (ODEQ) to tour the site and to discuss a proposed pilot project related to groundwater transmissivity and other licensee actions that will be factored into the revised DP. In their role as beneficiaries of the Cimarron Environmental Response Trust, the NRC and ODEQ staff reviewed and approved the licensee's proposed budget for 2017 and continued to monitor administration of the budget throughout the year. The NRC staff plans on conducting an in-process inspection in the fall of 2017.

- The NRC staff approved the DP for the Department of the Army, U.S. Armament Research, Development, and Engineering Center, Picatinny Arsenal in Picatinny, New Jersey, in April 2017. In June 2017, the staff conducted a confirmatory measurements inspection and is evaluating the analytical data from selected soil sample results.

- In April 2017, Fansteel was unable to obtain sufficient funds to finance its restructuring plan and then began working with its other creditors to begin partial liquidation of its assets. Despite presenting various arguments to force Fansteel to provide minimal funding to FMRI to ensure public health and safety, the U.S. Department of Justice (DOJ) has been unable to convince the State of Iowa bankruptcy court that such actions are within its jurisdiction. As such, FMRI's cash reserves dropped to the point where NRC staff considered site abandonment to be imminent. On July 14, 2017, the staff issued Order EA-17-102 to make Fansteel and FMRI co-licensees on license SMB-911 so that Fansteel would be obligated to fund the site sufficiently to assure public health and safety. This Order was relaxed on July 26, 2017, because Fansteel and its creditors agreed, consistent with a joint stipulation filed in the Iowa bankruptcy court, to again provide minimal funding to FMRI sufficient to assure public health and safety. The NRC, the DOJ, and the ODEQ continue to be involved in the bankruptcy proceedings and are monitoring the situation as it develops, and will continue to work toward a settlement agreement to ensure minimum payments are provided for the site.

- In November 2015, the U.S. Army withdrew its application for the decommissioning of the Jefferson Proving Ground site in Madison, Indiana. As an alternative, in December 2016, the U.S. Army submitted an amendment request pursuing an exemption to the decommissioning timeliness rule under 10 CFR 40.42 and requested to amend its license to Possession Only.

- The NRC staff maintained contact with the USACE concerning upcoming activities at the Shallow Land Disposal Area site in Vandergrift, Pennsylvania, and attended a public meeting in May 2017 which was coordinated by USACE.

- The NRC staff completed its review of the Supplemental Radiological Survey Plan for the United Nuclear Corporation (UNC) Naval site in New Haven, Connecticut, and in June 2016, UNC began conducting characterization surveys of the additional areas described in the plan. As of September 2017, UNC completed characterization surveys of these areas, is reviewing the results to determine the

extent of remediation that will be required, and will resume the cleanup activities described in the DP, dated October 2007.

- In 2016, the Westinghouse Hematite Decommissioning Project completed its remaining remediation activities. Initially, Westinghouse provided drafts of its FSSRs for portions of the facility, and staff shared general comments on these drafts during weekly public teleconferences with the licensee and members of the public, including the Missouri Department of Natural Resources. Following initial reviews of the drafts, Westinghouse has provided its final FSSRs in serial fashion to the NRC and expects to complete submission by late Fall 2017. The NRC inspection staff have observed independent confirmatory measurements of the facility performed by Oak Ridge Associated Universities. The NRC inspectors plan to conduct final confirmatory surveys in October 2017 to close out inspection concerns regarding possible spread of contamination from contaminated soil piles in the excavated areas following flooding events.

- In February 2017, the NRC staff terminated materials license SUB-1587 for the International Isotopes, Inc., facility in Idaho Falls, Idaho, and released Building 1359 of the facility for unrestricted use.

- The U.S. Department of Health and Human Services, Food and Drug Administration submitted a DP for its Winchester Engineering and Analytical Center, located in Winchester, Massachusetts. The NRC staff expects to complete its review of the DP in 2018.

- In addition, the NRC staff completed inspections or site visits at Alameda Naval Air Station, Cimarron, FMRI, Hunter's Point Shipyard, McClellan Air Force Base, UNC Naval, Treasure Island, West Valley, and Westinghouse Electric-Hematite.

Other significant activities are described below.

Clarification of the NRC's Jurisdiction over Military Radium-226

The Statement of Considerations for the NRC's November 2007 naturally occurring and accelerator-produced radioactive material (NARM) rule included a commitment for the NRC to interact with the military to obtain a common understanding of the uses of discrete sources of radium-226 and resolve any potential conflicts on a case-by-case basis. In August 2014, the NRC staff presented the option for the development and implementation of a comprehensive Memorandum of Understanding (MOU) to the Commission for its consideration in SECY-14-0082. In December 2014, the Commission approved the NRC staff's recommendation to establish a comprehensive MOU. Following the Commission's direction, the NRC staff worked with the U.S. Department of Defense (DoD) working group and finalized an MOU (ADAMS Accession No. ML16092A294). The NRC staff and the DoD have been implementing the MOU. As noted in the FY 2016 annual report, SECY-16-0129, "Status of the Decommissioning Program - 2016 Annual Report," the NRC staff has used a monitoring approach at two "pilot" sites, namely, Treasure Island and Dugway Proving Grounds. The "pilot" site monitoring approach has provided the NRC and DoD with experience using the MOU and the NRC with

experience in using its monitoring procedures. During FY 2017, the "stay-informed" approach for the Alameda, Hunter's Point, and McClellan Air Force Base sites, continued as described in the MOU.

The NRC has conducted many outreach activities with the States regarding the NRC's role under the MOU at these unlicensed military sites. This included: (1) presenting at Organization of Agreement States conference calls; (2) holding a poster session at the 62nd Annual Health Physics Society Meeting; and (3) holding teleconferences with all Agreement States that have MOU sites within their States to gain a better understanding of their current involvement and role (if any) regarding the ongoing cleanups.

Hunters Point, McClellan, Treasure Island, and Alameda Military Sites in California

The NRC staff continued implementing the stay-informed approach approved by the Commission in June 2008 for the Navy's remediation of the Hunters Point Shipyard site in San Francisco, California (see Staff Requirements Memorandum (SRM) – SECY-08-0077 – "Options for U.S. Nuclear Regulatory Commission Involvement with the Navy's Remediation of the Hunters Point Naval Shipyard Site in California," dated June 26, 2008). This approach includes reliance on the Navy's ongoing remediation of this Superfund site conducted under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process and with EPA oversight. The primary purpose of the NRC's approach is to stay informed about the ongoing Navy remediation activities and confirm that remediation of the site meets 10 CFR 20.1402 or 1403 dose limits. The NRC staff also utilized the same approach for the McClellan former Air Force Base, a Superfund site in Sacramento, California, and the Navy's Alameda Naval Air Station in Alameda, California. In lieu of performing annual site visits, the staff conducted teleconferences regarding these sites in 2016, which included discussions with the Navy and Air Force, along with teleconferences with EPA Region 9, and State of California agencies. These discussions with the principal stakeholders that are involved in the ongoing remediation process continue to be an effective way to understand the remediation progress, issues that are being addressed, and the oversight activities of EPA and the State agencies. Based on these interactions, the NRC staff plans to continue its reliance on the CERCLA process and EPA oversight at these three sites.

As part of its oversight of service providers, the NRC performed an investigation into whether Tetra Tech EC, Inc., deliberately falsified soil samples at Hunters Point Shipyard. The NRC subsequently issued a Notice of Violation and escalated enforcement action to Tetra Tech EC, Inc., for the deliberate falsification of soil samples. This effort culminated in Confirmatory Order EA-15-230, issued on October 11, 2016.

As part of the "pilot" site approach discussed in SECY-14-0082, the NRC staff identified the Navy's Treasure Island site in California as the first "pilot" site under the MOU and the staff participates in monthly conference calls with EPA, the State of California, and Navy regarding the status of the site. Characterization activities are scheduled to begin at Treasure Island in early FY 2018, and the NRC staff intends to review the associated plan and observe site activities. The staff also identified the Army's Dugway Proving Ground site in Utah as a second "pilot" site and has performed monitoring activities at the site culminating in a site visit and site monitoring report. Due to the regular communications between the DoD and the NRC staff, implementation of the MOU is going well.

Non-Military Radium Sites

The Energy Policy Act of 2005 gave the NRC authority over radium and some other materials in a category known as NARM. The NRC's first step in implementing that new authority was to put in place regulations. These regulations, known as the NARM rule, became effective on November 30, 2007. While the NRC was developing its program for military radium sites, the NRC staff became aware of radium cleanup efforts at the former Waterbury Clock Factory in Waterbury, Connecticut, and the Great Kills Park site in Staten Island, New York. As the staff learned more about these projects, it began a systematic effort to identify sites around the country where radium was historically used to ensure those sites no longer posed a risk. The staff has identified and prioritized a list of non-military sites with potential radium contamination due to historical manufacturing of consumer products. The staff identified 29 historic sites for followup, as described in SECY-16-0020, "Near-Term Actions to Address Non-Military Sites with Potential Radium Contamination." A site can consist of multiple property owners, and as such, from these 29 historic sites, there are 47 unique site owners. Contamination has been identified at 40 percent of the sites, and contamination that required access controls to ensure public dose limits were not exceeded was identified at four sites. Only one site had contamination that could result in the public dose limit being exceeded in areas accessed by people.

The NRC staff has also initiated near-term followup actions for the identified sites. These actions include contacting the site owners and requesting access to perform surveys in an initial site visit, and in limited instances, conducting a followup scoping survey. The staff has completed contact with all 47 unique site owners. As of September 30, 2017, initial site visits have been performed at 33 of the 47 unique site owner properties. Additionally, the staff has determined that initial site visits are unnecessary at 8 of the 47 unique site owner properties (e.g., some of these site owners possessed intact radium gauges and are already general licensees per 10 CFR 31.12, while others were incorrectly identified). The staff has issued initial site visit reports for 22 unique site owner properties.

Where appropriate, the staff has worked with the site owners to put in place voluntary controls to protect public health and safety at sites. For sites that do not meet NRC's unrestricted use criteria, the staff will work with site owners on risk-informed approaches for site cleanup. The staff will provide oversight appropriate to the scope and complexity of the cleanup at each site, and the level of staff effort will be commensurate with the significance of the contamination. More information regarding this approach is available in Temporary Instruction 2800/043 available at http://www.nrc.gov/materials/radium.html. SECY-17-0026, "Policy Considerations and Recommendations for Remediation of Non-Military, Unlicensed Historic Radium Sites in Non-Agreement States," discusses options for Commission consideration on how the NRC staff should resolve the longer-term policy issues of site cleanup.

Great Kills Park is a Federally-owned landfill with radium contamination that is currently undergoing CERCLA investigation and remediation. The staff has been in discussion with EPA Region 2, the National Park Service, and the U.S. Department of the Interior regarding the possibility of entering into an MOU wherein the NRC would take an approach at Great Kills Park similar to the approach the NRC has taken with respect to military sites to address an overlap between CERCLA and the Atomic Energy Act of 1954, as amended.

Army Depleted Uranium License Application

The NRC staff completed the licensing of U.S. Army Management Command installations which possessed depleted uranium from the Davy Crockett weapons system. A license for the Schofield Barracks and Pohakuloa Training Area sites in Hawaii was issued in October 2013. In June 2015, the NRC received an application from the licensee to amend its license to add 15 other installations, which are located throughout the United States. The staff completed its review and issued Amendment 1 to License SUC-1593 to incorporate the additional sites in March 2016. In June 2016, the NRC received submittals addressing License Condition 17 (submit site-specific environmental radiation monitoring plans for the installations) and License Condition 18 (submit dose assessment evaluations to show that the all-pathway dose for each radiation controlled area was bounded). The staff found the submittals acceptable and amended the license (Amendment 2) in March 2017 to incorporate the site-specific environmental radiation monitoring plans and associated quality assurance plan. In March 2017, the NRC received a petition request to reconsider the licensing of one of the installations located in Hawaii. The staff is currently reviewing the request under the 10 CFR 2.206 process. In June 2017, the licensee requested an amendment to its license to change the sediment sampling locations at three installations and requested approval of a change process to address "minor changes." The staff is currently reviewing the application addressing the change in sediment sampling locations, but asked the licensee for additional information regarding the change process portion.

West Valley Demonstration Project

Throughout FY 2017, progress was made at the West Valley Demonstration Project (WVDP) site near Buffalo, New York, which is a complex and multi-phase decommissioning project. Through the WVDP Act of 1980, the NRC has specific responsibility for informal review, consultation, and monitoring of DOE activities at the portions of the site that DOE is responsible for under the WVDP Act of 1980. DOE's preferred alternative employs a two-phased approach to decommissioning the site. The first phase (Phase 1) involves the decommissioning of most site facilities, including demolition of the Main Plant Process Building and Vitrification Facility and studies to reduce uncertainties associated with decommissioning the remaining facilities (referred to as Phase 1 Studies). The second phase (Phase 2) involves the completion of the decommissioning process and long term management decisionmaking for the site.

Phase 1 of the decommissioning approach is being conducted in accordance with DOE's NRC-approved DP and is estimated to take 10 years to complete. This work includes relocating the 275 high-level waste (HLW) canisters and 3 non-conforming HLW canisters to long-term interim storage on-site with the demolition of on-site structures (Remote Handled Waste Facility, Vitrification Facility, Process Plant), continuing to ship low-level waste, and managing the NRC-licensed disposal area. In October 2016, three large vitrification components were placed into a permanent disposal site in Andrews, Texas, and encased in grout. In December 2016, DOE completed the relocation of the vitrified High-HLW canisters and 3 non-conforming HLW canisters, 1 year ahead of schedule. In FY 2017, DOE continued to ship legacy waste and deactivate buildings for demolition, as well as worked on the shutdown of the vitrification stack and stack monitoring system. As of August 2017, about 63 percent of the legacy waste has been shipped offsite. The remaining legacy waste shipments are estimated to be completed by October 2018. DOE completed the deactivation of the Vitrification Facilty and started its

demolition in October 2017. As of August 2017, DOE estimated that about 73 percent of the deactivation of the Main Process Plant was complete and the deactivation of 19 of the 47 balance of site facilities slated for demolition had been completed. During FY 2017, DOE reconfigured its infrastructure supporting facility demolition to include a new water treatment building and a new data center. In FY 2017, the NRC staff conducted several monitoring visits and reviewed the Vitrification Facility Demolition Work Plan and the Main Process Plant Demolition Work Plan.

During 2017, DOE and the New York State Energy Research and Development Authority (NYSERDA) continued Phase 1 studies which included erosion, exhumation, and engineered barriers. The results of these studies will be used to assist decision-making and to inform the Phase 2 Supplemental EIS. The NRC has confirmed its intent to act as a cooperating agency for the DOE/NYSERDA Supplemental EIS. DOE and NYSERDA awarded the Supplemental EIS contract in April 2017 and are jointly managing the contract. Preliminary work for conducting a probabilistic performance assessment is currently underway.

2.3.3 Fiscal Year 2018 Trends and Areas of Focus

The NRC staff intends to implement the MOU with the DoD for military radium beyond the initial "pilot" effort by prioritizing its activities based on available resources. Factors for consideration in prioritizing annual monitoring activities include: (1) involvement of other regulatory agencies; (2) use of engineered controls and/or land use controls as remedies; (3) contamination in buildings for reuse; (4) amount or type of material and how transportable it is; and (5) previous monitoring activities.

The staff plans to continue its efforts on non-military radium by completing initial site visits and follow-on scoping surveys as necessary. Additionally, the staff will focus on working with site owners on risk-informed approaches for site cleanup.

Table 2-3 Complex Decommissioning Sites

Name		Location	Date DP Submitted	Date DP Approved	Compliance Criteria	Projected Date of Completion
1	Alameda Naval Air Station*	Alameda, CA	N/A	N/A	MOU**	N/A
2	Beltsville Agricultural Research Center	Beltsville, MD	8/09	12/13	LTR-UNRES	2017
3	Cimarron (Kerr-McGee)	Cimarron, OK	4/95 revision expected 2018	8/99	Action-UNRES	2032
4	Department of the Army, U.S. Armament Research, Development, and Engineering Center	Picatinny, NJ	11/13	04/17	LTR-UNRES	TBD
5	FMRI (Fansteel), Inc.	Muskogee, OK	8/99, revised 5/03	12/03	LTR-UNRES	TBD
6	Hunter's Point Naval Shipyard* (former Naval shipyard)	San Francisco, CA	N/A	N/A	MOU**	N/A
7	Jefferson Proving Ground	Madison, IN	8/99 revised 6/02	10/02 retracted 11/15	N/A	N/A
8	McClellan* (former Air Force base)	Sacramento, CA	N/A	N/A	MOU**	N/A

Table 2-3 Complex Decommissioning Sites

Name		Location	Date DP Submitted	Date DP Approved	Compliance Criteria	Projected Date of Completion
9	Shallow Land Disposal Area (BWX Technologies, Inc.)***	Vandergrift, PA	6/01 revised N/A	N/A	LTR-UNRES	TBD
10	Sigma-Aldrich	Maryland Heights, MO	10/08, revision pending	5/09, revised TBD	LTR-UNRES	2019
11	UNC Naval Products	New Haven, CT	8/98, revised 2004,12/06	4/99, revised 10/07	LTR-UNRES	TBD
12	West Valley Demonstration Project	West Valley, NY	Phase 1 3/09	Phase 1 2/10	LTR-UNRES****	TBD
13	Westinghouse Electric-Hematite Facility	Festus, MO	4/04 revised 6/06, 8/09	10/11	LTR-UNRES	2018

* The Hunter's Point Shipyard and Alameda Naval Air Station sites are being remediated by the Navy, and the McClellan site is being remediated by the Air Force, under the CERCLA process and EPA oversight. It is assumed that some licensable material might be present at both sites; however, the NRC has not licensed these sites. Instead, the Commission has approved a "limited involvement approach to stay informed" and the NRC staff will rely on the ongoing CERCLA process and EPA oversight. More information is available on this approach in SECY-08-0077.

** "Memorandum of Understanding Between the U.S. Nuclear Regulatory Commission and the U.S. Department of Defense for Coordination on CERCLA Response Actions at DoD Sites with Radioactive Materials," dated April 28, 2016 (ADAMS Accession No. ML16092A294).

*** USACE's remediation approach for the Shallow Land Disposal Area site is to follow the CERCLA process and adhere to the MOU between the NRC and USACE for coordination, remediation, and decommissioning of FUSRAP sites with NRC-licensed facilities, "Memorandum of Understanding Between the U.S. Nuclear Regulatory Commission and The U.S. Army Corps of Engineers for Coordination of Cleanup & Decommissioning of the Formerly Utilized Sites Remedial Action Program [FUSRAP] Sites with NRC-Licensed Facilities," 66 FR 36606. A Supplemental MOU between USACE, DOE, and the NRC was signed on June 13, 2014, and complements the existing MOU by incorporating the relevant requirements of 10 CFR Parts 70, 73, and 74, and stipulates the specific roles of each Federal entity throughout the remainder of the remediation process.

*** The West Valley Phase I DP includes plans to release a large portion of the site for unrestricted use, while the remainder of the site may have a perpetual license or be released with restrictions.

Notes:

- The compliance criteria identified in this table reflect the NRC staff's most recent information but do not necessarily represent the current or likely outcome.
- Abbreviations used in this table include: "N/A" for not applicable, "TBD" for to be determined, "Action" for SDMP Action Plan criteria, "LTR" for LTR criteria, "RES" for restricted use, and "UNRES" for unrestricted use.
- Reasons for multiple DP submittals range from changes in the favored decommissioning approach, to the phased implementation of decommissioning, to poor quality submittals.

2.4 Uranium Recovery Facility Decommissioning

In enacting the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), as amended, Congress had two general goals. The first was to provide a remedial action program to stabilize and control the residual radioactive material at various identified inactive mill sites. The second was to ensure the adequate regulation of uranium production activities and cleanup of mill tailings at mill sites that were active and licensed by the NRC (or Agreement States). At the time, the NRC did not have direct regulatory control over uranium mill tailings. The tailings themselves did not fall into any category of NRC-licensable material. Before 1978, the NRC was regulating tailings at active mills indirectly through its licensing of source material milling operations under the Atomic Energy Act of 1954, as supplemented by authority provided by the National Environmental Policy Act of 1969.

Through the provisions of Title I of UMTRCA, Congress addressed the problem of inactive, unregulated tailings piles. Title I of UMTRCA specified the inactive processing sites for remediation and required that DOE remediate these sites. Except at the Atlas Moab site, surface reclamation activities have been completed by DOE and approved by the NRC for all Title I sites. However, groundwater cleanup is still ongoing at many of these Title I sites. When groundwater cleanup is completed, DOE will submit a revised long-term surveillance plan (LTSP) for NRC concurrence. Table 2-4a identifies the 22 Title I sites that are undergoing decommissioning. Title 10 of the *Code of Federal Regulations* (10 CFR), Section 40.27, "General License for Custody and Long-Term Care of Residual Radioactive Material Disposal Sites," governs the long-term care of Title I sites under a general license held by either DOE or the State in which the site is located, after decommissioning is complete.

Title II of UMTRCA addresses mill tailings produced at active sites licensed by the NRC or an Agreement State as of the date UMTRCA was passed. UMTRCA amended the definition of byproduct material to include mill tailings and added specific authority for the NRC to regulate this new category of byproduct material at licensed sites. Title II uranium recovery decommissioning activities include review of site characterization plans and data; review and approval of reclamation plans (RPs); preparation of Environmental Assessments (EAs) and EISs; inspection of decommissioning activities, including confirmatory surveys; decommissioning cost estimate reviews, including annual surety updates; and oversight of license termination. Regulations governing uranium recovery facility decommissioning are at 10 CFR Part 40, "Domestic Licensing of Source Material," and in Appendix A to that Part, "Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings of Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for Their Source Material Content." Licensed operations include conventional uranium mill facilities and in situ recovery (ISR) facilities, as both types of facilities conduct "uranium milling" (as defined in 10 CFR 40.4). Table 2-4b identifies the Title II sites no longer operating and in decommissioning status. As of September 30, 2017, 11 Title II uranium recovery facilities are undergoing decommissioning. Title 10 of the *Code of Federal Regulations*, Section 40.28, "General License for Custody and Long-Term Care of Uranium or Thorium Byproduct Materials Disposal Sites," governs the long-term care of Title II conventional uranium mill sites under a general license held by either DOE or the State in which the site is located, after decommissioning is complete. The six Title II sites that have been transferred for long-term care are identified in Table 2-4c. Status summaries for the Title II sites undergoing decommissioning are provided at http://www.nrc.gov/info-finder/decommissioning/uranium/.

2.4.1 Decommissioning Process for Uranium Mills

These facilities are not subject to the license termination criteria set forth in Subpart E, "Radiological Criteria for License Termination," to 10 CFR Part 20, "Standards for Protection Against Radiation." Instead, they are subject to similar requirements in 10 CFR Part 40, Appendix A, as summarized below.

Any one of the following events may initiate the decommissioning process for uranium recovery facilities:

- The license expires or the license is revoked;
- The licensee has decided to permanently cease principal activities at the entire site or in any separate building or outdoor area;
- No principal activities have been conducted for a period of 24 months (except for impoundments and in disposal areas); or
- No principal activities have been conducted for a period of 24 months in any separate building or outdoor area (except for impoundments and disposal areas).

The uranium recovery facility decommissioning process includes several major steps, depending on the type of facility. These steps include notification of intent to decommission; submittal, review, and approval of the DP or RP;[4] implementation of the DP/RP; completion of decommissioning/reclamation; submittal and review of a completion report; submittal and review of a well-field restoration report (for ISR facilities); submittal and review of an LTSP for sites with tailings piles; termination of the license; and transfer of the property to the long-term care custodian, for sites with tailings piles, under a general license held by either DOE or a State.

Notification

Within 60 days of the occurrence of any of the triggering conditions described above, the licensee must notify the NRC of such occurrence and either begin decommissioning or, if required, submit a DP/RP within 12 months of notification and begin decommissioning upon approval of the DP/RP. Under 10 CFR 40.42(f), licensees may delay facility decommissioning if the NRC determines that such a delay is not detrimental to public health and safety and is otherwise in the public interest.

[4] For uranium recovery sites, DPs typically deal with the remediation of structures, while RPs typically deal with tailings impoundments, groundwater cleanup, and other remediation efforts.

Decommissioning Plan/Reclamation Plan

All uranium recovery facilities currently licensed by the NRC have NRC-approved DP/RPs. For new ISR or conventional facilities, the licensee submits groundwater restoration, surface reclamation, and facility DPs with the initial license application. The NRC reviews and approves these plans before issuing a license. Therefore, for existing uranium facilities, the NRC staff would review only amendments to the existing DP/RPs. Amendments would be necessary under the following circumstances:

- Environmental contamination exists or other new conditions arise that were not considered in the existing DP/RP;
- The licensee requests a change in reclamation design or procedures; or
- The licensee requests a change in the timing of restoration.

Depending on the complexity of the revision, a public meeting between the licensee and the NRC staff may be warranted.

Implementation of the Decommissioning Plan/Reclamation Plan

As the licensee prepares to enter decommissioning, it submits a revised DP/RP. After approval of the revised DP/RP, the licensee must complete decommissioning within 24 months or apply for an alternate schedule. For conventional facilities with groundwater contamination, or for ISR facilities where well-field restoration is involved, 24 months to complete decommissioning activities is usually insufficient, because remediation of groundwater contamination is more time-consuming than remediation of surface contamination. As such, an alternate schedule may be appropriate.

The NRC staff will inspect the licensee's activities during decommissioning/reclamation to ensure compliance with the DP/RP, associated license conditions, and NRC and other applicable regulations (e.g., U.S. Department of Transportation regulations). The staff will also ensure that there is no degradation in groundwater quality after the completion of groundwater restoration by requiring monitoring of the groundwater for a period of time.

Decommissioning at uranium recovery sites involves two main activities: surface reclamation (i.e., soil contamination cleanup, 11e.(2) byproduct material reclamation and disposal, equipment removal, and structure decommissioning), and groundwater restoration. Groundwater restoration is considered complete when concentrations on- and off-site (depending on the extent of contaminant migration) meet previously established groundwater protection standards in accordance with Appendix A of 10 CFR Part 40. For the groundwater constituents being monitored at a given site, three types of standards are potentially applicable in accordance with Criterion 5B(5) in Appendix A:

1. NRC-approved background concentrations;
2. Maximum contaminant levels established by the EPA (in Table 5C of 10 CFR Part 40, Appendix A); and

3. NRC-approved alternate concentration limits (ACLs).

If the licensee demonstrates that concentrations of monitored constituents cannot be restored to either background or Appendix A, Table 5C values (whichever value is higher), the NRC staff may approve ACLs, after considering all the factors required in Appendix A, Criterion 5B(6). To obtain approval of ACLs, the licensee submits a license amendment request and a detailed environmental report that addresses all the Criterion 5B(6) factors. If the NRC staff determines that the ACLs are protective of public health and the environment, the staff would typically approve the ACLs.

After surface decommissioning/reclamation has been completed, the licensee submits a completion report for NRC staff review and approval. As part of this review, the staff performs an inspection to confirm that surface reclamation was performed according to the DP/RP, license conditions, and the NRC regulations. Inspections also include surveys of tailings disposal areas to ensure that radon emissions comply with 10 CFR Part 40, Appendix A, Criterion 6. If additional information is required, the staff will issue requests for additional information to address outstanding issues.

License Termination - Conventional Mills

After all reclamation activities have been completed and approved, the licensee, the NRC staff, and the long-term custodian will start license termination procedures. Before a conventional mill license is terminated, the custodial agency (i.e., State agency, DOE, or other Federal agency) will submit an LTSP for NRC staff review and acceptance. The LTSP documents the custodian's responsibilities for long-term care, including security, inspections, groundwater and surface water monitoring, and remedial actions. Concurrent with the staff's acceptance of an LTSP, the existing license is terminated and titles to any mill tailings disposal sites are transferred to the custodian under 10 CFR 40.28, "General License for Custody and Long-Term Care of Uranium or Thorium Byproduct Materials Disposal Sites."

License Termination - In Situ Uranium Recovery Facilities

License termination at an ISR uranium recovery facility occurs when all groundwater contamination has been cleanup up to acceptable levels and surface decommissioning/reclamation has been completed and approved by the NRC. Surface decommissioning completion typically would include an NRC inspection. Because 10 CFR Part 40, Appendix A, Criterion 2 generally prohibits ISR uranium extraction facility owners from disposing of 11e.(2) byproduct material at their sites, long-term care of ISR facilities by a governmental custodian under a general license is not required. However, licensees of ISR facilities are still required to find a licensed 11e.(2) disposal site for facility waste, though some licensees are allowed to dispose of liquid wastes in deep disposal wells. Thus, all groundwater restoration and surface reclamation is performed so that the site can qualify for unrestricted release.

2.4.2 Summary of Fiscal Year 2017 Activities

- The NRC staff continued to evaluate options for completing decommissioning at the American Nuclear Corporation Gas Hills site. The staff also worked with the State of Wyoming to determine the best use of the amount remaining in the decommissioning fund. Based on these discussions, the Confirmatory Order has been revised to allow the Wyoming Department of Environmental Quality to use the remaining decommissioning funds to stabilize the site until the decision is made on how best to complete the decommissioning of the site.

- The NRC staff continued to discuss options with DOE to resolve two technical concerns associated with the Bluewater site that involve (1) subsidence of approximately 40 acres of the cover used to control both radon emissions and erosion, and (2) expansion of a groundwater plume within a regional drinking water aquifer. The staff participated in a joint agency public meeting with the State of New Mexico, the DOE, and the EPA to support a future request by the New Mexico Environmental Department to the New Mexico Office of the State Engineer to prohibit the installation of new groundwater wells within areas impacted by uranium milling operations from the Bluewater site and the nearby Homestake site. At the public meeting, DOE announced that it would sample public groundwater wells at the owners' request, and that it will be enhancing characterization efforts to determine the extent of the groundwater plume.

- The NRC staff issued a Confirmatory Order for five apparent violations identified by the staff at the Homestake site. The staff enhanced communications between the EPA and the State of New Mexico though monthly teleconferences to discuss coordination and alignment between the agencies. The staff also participated in monthly teleconferences with interested members of the community to provide an update on all activities at the Homestake site.

- In 2015, Sequoyah Fuels Corporation (SFC) informed the State of Oklahoma and the Cherokee Nation that there were no viable timely options for off-site disposal of its bagged raffinate material (dried sludge from the old onsite ponds containing uranium, thorium, and radium that is more concentrated than the majority of the waste on site). SFC requested that involved parties concur with its plan to place the raffinate material into the onsite disposal cell. In 2017, the parties declined to concur and obtained a restraining order from the local District Court to prevent SFC from placing the bagged material in its onsite disposal cell. Settlement meetings have been ongoing with the parties, and the State of Oklahoma and the Cherokee Nation are awaiting the outcome of the State of Utah's re-licensing process for the White Mesa Mill to determine whether SFC can ship the material to White Mesa.

- The NRC staff continued to interact with Western Nuclear Incorporated (WNI) to address the groundwater modeling for the WNI Split Rock site and, based on these interactions, the licensee submitted a new groundwater assessment approach for the site that addresses the remaining technical issues identified by the staff. The staff is currently reviewing this new approach. The staff also initiated the review of ExxonMobil's ACL and long-term care boundary revisions in response to previous

staff requests for additional information about the site. The staff reviewed the draft LTSP for the Bear Creek site and, based on the staff's review, DOE revised the LTSP to remove post-license termination groundwater monitoring.

- The NRC staff continued its participation with other Federal agencies and the Navajo Nation in implementing the Five-Year Plan to address uranium contamination on the Navajo Nation. The staff participated in open house meetings at the Tuba City and Shiprock sites and provided training to the Navajo Outreach Coordinator. The staff is also working with the Navajo Nation and involved Federal agencies to develop training for the Navajo on uranium and its health and environmental impacts. In addition, the staff continued participation in Navajo Nation/Hopi/DOE quarterly meetings and community outreach, and worked with the Navajo Nation Environmental Protection Agency and the DOE to address concerns raised by the Navajo Nation regarding the Mexican Hat site in Arizona.

- The NRC staff conducted site inspections/visits at the Homestake Mining and Rio Algom sites. In addition, the staff conducted observational site visits at eight sites that have been transferred to DOE and are generally licensed pursuant to 10 CFR 40.27 and 40.28.

2.4.3 Fiscal Year 2018 Trends and Areas of Focus

In FY 2018, the NRC staff will continue its participation in the activities associated with the Navajo Nation Five-Year Plan, DOE/Navajo Nation/Hopi quarterly meetings, and reviewing DOE reports and plans for the reclamation and management of these sites. The staff expects the completion of remediation activities at the Bear Creek site in FY 2019. The transfer of this site and others (e.g., Sequoyah Fuels) to the DOE for long-term surveillance is expected to occur within the next few years. The staff also plans to submit a paper to the Commission regarding funding options for the ANC site, and will continue to engage with the State of Wyoming on funding options during FY 2018.

Table 2-4a Decommissioning Title I Uranium Recovery Sites			
	Name	**Location**	**Status**
1	Ambrosia Lake	Grants, NM	Monitoring
2	Burrell	Blairsville, PA	Monitoring
3	Canonsburg	Canonsburg, PA	Monitoring
4	Durango	Durango, CO	Monitoring
5	Falls City	Falls City, TX	Monitoring
6	Grand Junction	Grand Junction, CO	Monitoring
7	Green River	Green River, UT	Monitoring
8	Gunnison	Gunnison, CO	Monitoring
9	Lakeview	Lakeview, OR	Monitoring
10	Lowman	Lowman, ID	Monitoring
11	Maybell	Maybell, CO	Monitoring
12	Mexican Hat	Mexican Hat, UT	Monitoring
13	Monument Valley	Monument Valley, AZ	Monitoring
14	Moab Mill	Moab, UT	Active – surface and groundwater remediation
15	Naturita	Naturita, CO	Monitoring
16	Rifle	Rifle, CO	Monitoring
17	Riverton	Riverton, WY	Monitoring
18	Salt Lake City	Salt Lake City, UT	Monitoring

Table 2-4a Decommissioning Title I Uranium Recovery Sites			
19	Shiprock	Shiprock, NM	Active – groundwater remediation
20	Slick Rock	Slick Rock, CO	Monitoring
21	Spook	Converse Co., WY	Monitoring
22	Tuba City	Tuba City, AZ	Active – groundwater remediation (currently suspended)
Note: Active denotes that a site is still undergoing surface reclamation or is resolving groundwater issues. Monitoring denotes that the site is being monitored under its LTSP or a groundwater compliance action plan.			

Table 2-4b Decommissioning Title II Uranium Recovery Sites				
	Name	**Location**	**DP/RP Approved**	**Completion of Decomm.**
1	American Nuclear Corporation	Gas Hills, WY	10/88, Revision 2006	TBD
2	Bear Creek	Converse County, WY	5/89	2018
3	ExxonMobil Highlands	Converse County, WY	1990	TBD
4	Homestake Mining Company	Grants, NM	Revised plan—3/95 Revision pending	TBD
5	Pathfinder—Lucky Mc	Gas Hills, WY	Revised plan—7/98	2018
6	Pathfinder—Shirley Basin	Shirley Basin, WY	Revised plan—12/97	TBD
7	Rio Algom—Ambrosia Lake	Grants, NM	2003 (mill); 2004 (soil)	2021
8	Sequoyah Fuels Corporation	Gore, OK	2008	2020
9	Umetco Minerals Corporation	East Gas Hills, WY	Revised soil plan—4/01	2019
10	United Nuclear Corporation	Church Rock, NM	3/91, Revision 2005	TBD
11	Western Nuclear Inc.—Split Rock	Jeffrey City, WY	1997	2018
TBD to be determined				

Table 2-4c Title II Uranium Recovery Sites – DOE Licensed Under 10 CFR 40.28			
	Name	**Location**	**Transferred to DOE**
1	Bluewater (Arco)	Grants, NM	1997
2	Edgemont	Edgemont, SD	1996
3	L-Bar	Seboyeta, NM	2005
4	Maybell West	Maybell, CO	2010
5	Sherwood	Wellpinit, WA	2001
6	Shirley Basin South	Shirley Basin, WY	2005

2.5 Fuel Cycle Facility Decommissioning

Currently, there are two fuel cycle facilities undergoing partial decommissioning: The Nuclear Fuel Services (NFS) site in Erwin, Tennessee, in accordance with applicable provisions under 10 CFR 70.38; and the Honeywell site in Metropolis, Illinois, in accordance with applicable provisions under 10 CFR 40.42. There is one fuel cycle facility, the Centrus, LLC, Lead Cascade Facility (LCF), undergoing decommissioning for activities that are authorized under the current license using the 10 CFR 70.72 process. The NRC's public Web site at http://www.nrc.gov/info-finder/decommissioning/fuel-cycle/ summarizes additional information about the status of these facilities.

2.5.1 Fuel Cycle Facility Decommissioning Process

The decommissioning processes for fuel cycle facilities and for complex materials sites are similar (see Section 2.3.1). Decommissioning activities at fuel cycle facilities can be conducted during operations (partial decommissioning) or after the licensee has ceased all operational activities.

Project management responsibility for fuel cycle facilities resides within NMSS and the Division of Fuel Cycle Safety, Safeguards, and Environmental Review (FCSE) during licensee operations and partial site decommissioning with technical support from the Decommissioning Program. In cases where the entire site is being decommissioned in support of license termination, the project management responsibility resides within the Decommissioning Program. Project management responsibility for fuel cycle facilities is transferred from FCSE when the licensee has ceased all operational activities and a critical mass of material no longer remains at the site.

2.5.2 Summary of Fiscal Year 2017 Activities

During FY 2017, Honeywell continued decommissioning a portion of its Metropolis Works facility located in Metropolis, Illinois. Honeywell is decommissioning four surface impoundment ponds. The DP was approved in September 2013. The current plan is to decommission the ponds via removal and disposal of the material. Honeywell does not plan to release the ponds from the source material license for unrestricted use and will keep the reclaimed land inside the restricted area.

NFS has continued to work toward releasing portions of an area within its site located in Erwin, Tennessee. NFS is remediating the Building 234 site (former plutonium building). The building has been dismantled and removed from the site. The current phase of decommissioning involves excavation of the contaminated soil which was located under the building. NFS concluded that a DP was not required for this phase of the project under the provisions of 10 CFR 70.38(g). The NRC staff agreed that no DP is required. Recently, NFS began remediating the Blended Low Enriched Uranium (BLEU) Complex that was operated as a joint venture between NFS and AREVA. The BLEU Complex is located outside the protected area at the Erwin site. NFS evaluated the project under 10 CFR 70.38(g) and concluded that it may proceed without an NRC approved DP. The NRC staff agreed that no DP is required. In FY

2017, the staff reviewed FSSRs for several survey units. The FSSRs primarily address subsurface layers of the North Site area, which include former radiological burial areas and ponds that received effluents. Revision 3 to the North Site DP was approved in May 2006. The staff anticipates approving the last FSSR in 2017.

In February 2016, Centrus ceased operations of its LCF, located in Piketon, Ohio. On March 2, 2016, Centrus notified the NRC, in accordance with 10 CFR 70.38(d)(2), of its decision to permanently cease operation of the LCF, and to terminate NRC License SNM-7003 following decontamination and decommissioning activities. On March 1, 2017, Centrus submitted its DP amendment request for the LCF. On October 11, 2017, the staff informed Centrus via letter that the application did not contain sufficient technical information, and the letter included Requests for Supplemental Information that would be necessary to begin the detailed technical review. Decommissioning activities that are authorized under the current license and through use of the 10 CFR 70.72 process, have occurred.

2.5.3 Fiscal Year 2018 Activities and Areas of Focus

In FY 2018, the NRC staff anticipates approving the final FSSR for the NFS North Site area. The staff also expects to conduct a technical review of the Centrus DP, pending receipt of the requested supplemental information.

3. GUIDANCE AND RULEMAKING ACTIVITIES

In FY 2017, the NRC staff worked to increase the effectiveness of the Decommissioning Program through a rulemaking effort for reactor decommissioning and updates to decommissioning guidance. The Decommissioning Program has also been performing a self-evaluation of dose modeling to help it become more effective in the decommissioning of sites.

Decommissioning Rulemaking

With the permanent shutdown of five power reactors in 2013 and 2014, the Commission requested the NRC staff to consider rulemaking to expedite the processing of licensing actions necessary to transition power reactors from operation to decommissioning currently accomplished through a series of exemptions. In SRM-SECY-14-0118, the Commission directed the staff to proceed with rulemaking on reactor decommissioning and set an objective of early 2019 for its completion. The Commission also stated that this rulemaking should address the following:

- issues discussed in SECY-00-0145 such as the graded approach to emergency preparedness;
- lessons learned from the plants that have already (or are currently) going through the decommissioning process;
- the advisability of requiring a licensee's PSDAR to be approved by the NRC;
- the appropriateness of maintaining the three existing options (DECON, SAFSTOR, and ENTOMB) for decommissioning and the timeframes associated with those options;
- the appropriate role of State and local governments and nongovernmental stakeholders in the decommissioning process; and
- any other issues deemed relevant by the NRC staff.

The NRC's goals in amending these regulations would be to provide an efficient decommissioning process, reduce the need for exemptions from existing regulations, and support the principles of good regulation, including openness, clarity, and reliability. This rulemaking effort remains on schedule, and NRR, NMSS, and NSIR continued the process throughout FY 2017. On March 15, 2017, the staff published a draft regulatory basis document in the *Federal Register* to support the "Regulatory Improvements for Reactors Transitioning to Decommissioning" rulemaking initiative (82 FR 13778). The period for public comments closed on June 13, 2017, and staff are currently working to develop the final regulatory basis and expect to provide a draft proposed rule to the Commission in 2018.

Decommissioning Generic Environmental Impact Statement

The NRC staff is planning to revise NUREG-1757, Supplement 1, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Regarding the Decommissioning of Nuclear Power Reactors" (referred to as the Decommissioning Generic Environmental Impact Statement [GEIS]), which was last updated in 2002. The Decommissioning GEIS is used to evaluate environmental impacts during the decommissioning of nuclear power reactors as residual radioactivity at the site is reduced to levels that allow for termination of the NRC

license. The GEIS addresses only the decommissioning of nuclear power reactors licensed by the NRC.

In connection with the Decommissioning Rulemaking effort, the staff identified the need to update the decommissioning GEIS since the GEIS was last updated in 2002. Planned revisions include: (1) adding experience from recent decommissioning facilities, (2) incorporating the conclusions of NUREG-2157, Volumes 1 and 2, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel," issued September 2014 (ADAMS Accession No. ML14198A440), which is also known as the Continued Storage GEIS, (3) revisiting the Decommissioning GEIS findings based on updated information, including comments received on the rulemaking, and (4) revising as necessary to reflect the outcome of the current rulemaking activities. In addition, the staff would incorporate best practices and lessons learned from environmental reviews conducted for other NRC applications. The staff would also evaluate the process for implementing the decommissioning GEIS and make any necessary enhancements to the document. The staff would revise the Decommissioning GEIS on a separate schedule from the decommissioning rulemaking because of the additional public interactions and engagement with other Federal agencies that occur during a National Environmental Policy Act review.

Decommissioning Guidance

Revision 1 of NUREG-1757, Volume 2, "Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria," was published in September 2006. An effort to update the volume was initiated in early 2014. This update will amend the guidance to address longstanding technical issues and lessons learned which would improve the quality of licensee decommissioning plans and license termination plans and improve the efficiency of the NRC staff review of these documents. Some of the revisions pertain to the guidance on as low as reasonably achievable (ALARA) analysis, composite sampling, and licensee versus contractor responsibilities. An update to uranium recovery licensing guidance is also being prepared as Volume 4 of NUREG-1757. This volume will incorporate those provisions and aspects of the existing uranium recovery guidance, which are specifically relevant to the reclamation, restoration, and decommissioning of uranium recovery facilities. All commercial licensed facility types will be addressed: convention mills, ISR, heap leach, and byproduct recovery operations. This volume will incorporate provisions unique to byproduct material (as defined in section 11(e).2 of the Atomic Energy Act of 1954) permanent waste disposal, and financial assurance, which are significantly different from such considerations in the decommissioning of other materials facilities.

Self-Evaluation of Dose Modeling

The staff continued to evaluate of the uses and applicability of computer codes employed in carrying out licensing activities, particularly those codes used for the demonstration of compliance with the decommissioning dose criteria. This evaluation is intended for NRC's use when assessing ways to enhance the efficiency of the use of codes and models and to establish consistency and relevance in the selection of these computer codes and models. This activity is expected to continue into FY 2018.

4. RESEARCH ACTIVITIES

The Office of Nuclear Regulatory Research (RES) continues to focus its support on key decommissioning issues through a number of activities discussed below.

In FY 2017, the RES staff continued the development or modification of computer codes useful for site decommissioning analyses, including the upgrade of several codes identified as part of a FY 2015 User's Need request from NMSS. This includes working on RESRAD-ONSITE, RESRAD-OFFSITE and RESRAD-BUILD to update default parameters, modifying RESRAD-OFFSITE V3.1 to include solubility and diffusion limited leaching source terms, updating and benchmarking MILDOS-AREA, and adding new features to Visual Sampling Plan based on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) final survey protocols.

In FY 2016, RES staff began work on a research program that was created to study the effects of changes in properties of mill tailings engineered covers on the emission of radon and infiltration of water. The purpose of this study is to evaluate the effects of soil structure formation by abiotic and biotic processes on the hydraulic conductivity and gaseous diffusivity of radon barriers, how structural development varies with depth and thickness of the radon barrier, and how structure influences transmission of radon and seepage carrying ground water contaminants. It is a collaboration effort between the DOE Office of Legacy Management and the NRC, with investigators at the University of Wisconsin, University of Virginia, and Navarro Engineering (the DOE contractor). Three mill tailing sites have been visited by the research team: Falls City in Texas, Bluewater in New Mexico, and Shirley Basin South in Wyoming. Data are now being prepared and interpreted from these sites and an additional site, Lakeview in Oregon, will be visited for field work in FY 2018. The RES staff also continued to provide direct assistance to NMSS efforts through participating in the MARSSIM Interagency Working Group which is revising the MARSSIM guidance document.

5. INTERNATIONAL ACTIVITIES

The NRC participates in multiple international activities to fulfill U.S. commitments to international conventions, treaties, and bilateral/multilateral agreements. The NRC staff is also actively engaged in reviewing, developing, and updating international radiation safety standards, and technical support documents through interaction with international organizations, including the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA), as well as foreign governments. The NRC participates in bilateral and trilateral exchanges with other countries. This is accomplished by hosting foreign assignees and providing reciprocal assignments, developing and providing workshops to requesting countries, and providing technical support as needed. The NRC is generally recognized in the international nuclear community as an experienced leader in the regulation and safety of decommissioning, spent fuel management and storage, radioactive waste management and disposal, site remediation, and environmental protection. Interaction with international organizations and governments allows the NRC to share insights about lessons learned and successful, safe, and effective decommissioning approaches. This interaction also allows the NRC staff to provide input for various international guidance documents and standards that benefit other countries in establishing and implementing safe decommissioning strategies. Conversely, the staff gains insight into approaches and methodologies used in the international community and considers these approaches as it continues to risk-inform the NRC Decommissioning Program. The most significant of these activities are summarized below.

- The staff participated in the review and development of IAEA Safety Standards; participated in IAEA projects, conferences, peer reviews, and workshops related to decommissioning and waste disposal; and advised on the development of other countries' regulatory programs. For example, the staff: (1) conducted reviews and updates of IAEA standards related to decommissioning and low-level waste during the Waste Safety Standards Committee (WASSC) 42nd review cycle; (2) participated in IAEA's international peer review of the Decommissioning and Radioactive Waste Management Program in Italy; (3) participated in the International Forum of Uranium Legacy Sites for remediation, supervision, and regulatory development; (4) developed modules and instructor notes for an IAEA training course on the release of sites from regulatory control; and (5) participated in the IAEA project on "Human Intrusion Scenarios Phase II" applicable to waste management and decommissioning.

- The staff participated in technical meetings of the International Forum on Regulatory Supervision of Legacy Sites, related to the remediation of legacy nuclear facilities.

- The staff continued its participation in the IAEA Project on the Decommissioning and Remediation of Damaged Nuclear Facilities.

- The staff participated in the organizational and extraordinary meetings of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in Vienna.

- The staff participated in the 17th Session of the NEA Radioactive Waste Management Committee Bureau and contributed to the Annual Report for the Radioactive Waste Management Committee.

- The staff participated as a U.S. representative and core group member of the NEA Working Party on Decommissioning and Dismantling (WPDD), and participated in WPDD Task Groups meetings.

- The staff participated as U.S. representatives on NEA Working, Task, and Expert Groups, to include: (1) WPDD Core Group; (2) Working Group on Radiological Characterization for Decommissioning - Phase II; (3) Nuclear Site Restoration Task Group; (4) Working Group on Decommissioning Funding; (5) Expert Group on Inventorying and Reporting Methodology; and (6) Task Group on Transitioning into Decommissioning After Shutdown.

- The staff co-authored two key reports issued by the NEA Organization for Economic Co-operation and Development: (a) "Nuclear Site Remediation and Restoration During Decommissioning of Nuclear Installations;" and (b) "Radiological Characterization from a Material and Waste End-State Perspective & Evaluation of the Questionnaires by the NEA Task Group on Radiological Characterization and Decommissioning."

- The staff participated in decommissioning workshops with the Republic of Korea and with Taiwan, including conducting a workshop on reactor decommissioning with the Taiwan Atomic Energy Council in Taipei, Taiwan, and participating in the 2nd International Workshop on the Decommissioning of Aging Nuclear Power Plants in Seoul, South Korea.

6. PROGRAM INTEGRATION AND IMPROVEMENT

The Decommissioning Program currently encompasses power and early demonstration reactors, research and test reactors, complex materials facilities, fuel facilities, and uranium recovery facilities. In addition to the sites undergoing decommissioning that are regulated by the NRC, many complex materials sites are being decommissioned under the regulatory oversight of Agreement States. Given the scope of the decommissioning functional area, the Decommissioning Program has undertaken many initiatives to improve its efficiency and effectiveness.

Power Reactor Program Improvements

The Decommissioning Program has historically sought opportunities to improve its processes in order to accomplish decommissioning activities more effectively. In response to an anticipated increase in workload due to early reactor shutdowns, NMSS staff conducted a program evaluation of its power reactor decommissioning regulatory function. The power reactor decommissioning program evaluation was an outgrowth of the NRC staff's Integrated Decommissioning Improvement Plan (IDIP) efforts and part of its initiative to foster continuous improvement. The evaluation resulted in a set of recommendations to update guidance and policy documents within the power reactor decommissioning program to capture program improvements and lessons learned. Subsequently, NMSS management reviewed associated tasks to promote programmatic enhancement and set task priorities. Revisions to a number of NUREG guidance documents, the Reactor Decommissioning Inspection Manual, and core inspection procedures that began in FY 2015, continued during FY 2017, and are expected to continue over the next few years. In October 2016, staff published a major revision of Inspection Manual Chapter 1248, Appendix F, regarding the Training Requirements and Qualification Journal for Decommissioning Inspectors.

Comprehensive Decommissioning Program

The NRC staff has continued the implementation of an enhanced Comprehensive Decommissioning Program, which allows the staff to compile, in a centralized location, information on the status of decommissioning and decontamination of complex sites and uranium recovery sites in the United States. In FY 2017, State contacts provided responses to letter STC-16-086, "Information Request: Status of Current Complex Decommissioning and Uranium Recovery Sites." This information was compiled and placed into a database, which can be found on NRC's public Web site. Summaries of information on sites undergoing decommissioning that are regulated by the Agreement States are currently available to the public to ensure openness and promote communication, and thus enhance public confidence by providing a national perspective on decommissioning.

Knowledge Management

Progress continued on knowledge management activities identified as part of the IDIP, as several knowledge management seminars were held by managers and senior NRC staff. Seminars were held throughout FY 2017 on a variety of topics, including the power reactor decommissioning process, decommissioning lessons learned, and an overview of staff

international activities. The staff also conducted a seminar on the research and test reactor decommissioning program in January which included presentations on the program and international participation as well as six case studies on recently completed projects. These presentations were also made as part of a special session on research reactor decommissioning at the Health Physics Society midyear meeting. These knowledge management activities should result in future efficiencies and enhancements in the NRC staff's oversight of decommissioning sites.

Uranium Recovery Decommissioning Program Enhancements

Throughout FY 2017, the NRC staff continued interactions with DOE regarding those sites that are generally licensed under 10 CFR 40.27 and 40.28. The staff is working with DOE to develop a site transfer protocol and has continued to hold quarterly telephone conference calls with DOE to discuss overarching policy and technical issues associated with managing the generally licensed sites. In addition, the staff continued discussions with DOE on developing long-term care fees and to align on post-license termination groundwater monitoring expectations. The staff also continued its participation in DOE meetings with the Navajo Nation and Hopi Tribe pertaining to the sites on the Navajo Reservation.

During 2017, the staff continued working with the EPA, along with the Bureau of Indian Affairs, DOE, the Agency for Toxic Substances and Disease Registry, and the Indian Health Service, in consultation with the Navajo Nation, on a coordinated Five-Year Plan to address uranium contamination on the Navajo Reservation from past mining and milling activities. The Five-Year Plan represents a coordinated approach by the agencies, and outlines a strategy for gaining a better understanding and addressing the problem of uranium contamination on the Navajo Reservation from past mining and milling activities. In 2017, the staff participated in several outreach activities at the UMTRCA sites on the Navajo Nation.

Evaluation of Materials and Waste Business Lines

During FY 2017, a working group consisting of subject matter experts was formed to evaluate the Nuclear Materials and Waste Safety Program Business Lines with a goal of identifying alternative approaches that could result in fairer and more equitable fees. The working group evaluated workloads and programs/processes to identify opportunities to improve efficiency and effectiveness and to re-scope levels of effort. The working group considered a range of potential program/process changes including licensing process efficiencies, periodicity of certain licensing reviews, inspection scope and frequency, and changing the level of effort allocated for program infrastructure and other non-fee recoverable activities. The results of this evaluation were provided to the Office of the Executive Director for Operations on October 6, 2017.

7. AGREEMENT STATE ACTIVITIES

Thirty-seven States have signed formal agreements with the NRC and assumed regulatory responsibility over certain byproduct, source, and small quantities of SNM, including the decommissioning of some complex materials sites. After a State becomes an Agreement State, the NRC continues to have formal and informal interactions with the State.

Formal interactions with Agreement States in FY 2017 included the following:

- The staff worked with the Agreement States to incorporate more detailed information about complex materials decommissioning sites and uranium recovery facilities undergoing decommissioning that are under the regulatory purview of the Agreement States on the NRC's public Web site. These summaries are available at http://www.nrc.gov/info-finder/decommissioning/complex/ and http://www.nrc.gov/info-finder/decommissioning/uranium/ for complex materials sites and uranium recovery sites, respectively.

- Integrated Materials Performance Evaluation Program reviews that included an assessment of the decommissioning functional area were conducted in several Agreement States: Iowa, Minnesota, Mississippi, Nevada, New Hampshire, New Mexico, Oregon, and South Carolina.

In October 2016, the State of Wyoming submitted a draft Agreement State application for NRC review, in which the State proposed that the NRC would retain regulatory authority for the six decommissioning uranium mill sites currently licensed under Title II of UMTRCA. The NRC staff worked to address the State's concerns regarding the licensing of these sites, and identified a path forward to include five of the six sites in the State's final application. In the Staff Requirements Memorandum to SECY-17-0081, "Status and Resolution of Issues Associated with the Transfer of Six Decommissioning Uranium Mill Sites to the State of Wyoming," the Commission approved the staff's recommended approach for the ANC site in Gas Hills. More specifically, the NRC would retain regulatory authority over the ANC site after the State of Wyoming becomes an Agreement State, and the State would assume regulatory authority over the other five Wyoming uranium recovery sites undergoing decommissioning.

Table 7-1 identifies the decommissioning and uranium recovery sites in the Agreement States.

Table 7-1 Agreement State Decommissioning Sites				
State	**Name**	**Location**	**Date DP Submitted**	**Date DP Approved**
CA	Chevron Mining, Inc. (formerly Molycorp)	Mountain Pass, CA	6/06	7/08
CA	Eberline Services	Richmond, CA	TBD	TBD
CO	Cotter Uranium Mill	Canon City, CO	9/03	1/05
CO	Hecla Mining Company – Durita	Naturita, CO	10/91	3/92
CO	Umetco Uravan	Uravan, CO	6/93	10/93
FL	Iluka Resources	Green Cove Springs, FL	TBD	TBD
IL	ADCO Services, Inc.	Tinley Park, IL	2/13	TBD
IL	Weston Solutions (formerly Kerr-McGee)	West Chicago, IL	9/93	6/94
KS	Beta Chem Laboratory	Lenexa, KS	TBD	TBD
MA	BASF (formerly Engelhard)	Plainville, MA	N/A	N/A
MA	Norton/St. Gobain	Worcester, MA	TBD	TBD
MA	Shpack Landfill	Norton, MA	09/04	09/04
MA	Starmet Corp. (formerly Nuclear Metals)	Concord, MA	10/06	TBD
MA	Texas Instruments	Attleboro, MA	TBD	TBD
MA	Wyman-Gordon Co.	North Grafton, MA	TBD	TBD
NJ	Shieldalloy Metallurgical Corp.	Newfield, NJ	TBD	TBD
OH	Advanced Medical Systems, Inc.	Cleveland, OH	6/04	5/05

Table 7-1 Agreement State Decommissioning Sites				
State	**Name**	**Location**	**Date DP Submitted**	**Date DP Approved**
OH	Ineos USA (formerly BP Chemical)	Lima, OH	4/92	6/98
OR	PCC Structurals, Inc.	Portland, OR	6/06	9/06
OR	TDY Industries d/b/a Wah Chang	Albany, OR	6/03	3/06
PA	Global Tungsten & Powders Corp.	Towanda, PA	6/13	9/13
PA	Karnish Instruments	Lock Haven, PA	N/A	N/A
PA	Keystone Metals Reduction	Cheswick, PA	N/A	N/A
PA	Remacor	West Pittsburg, PA	N/A	N/A
PA	Safety Light Corporation	Bloomsburg, PA	TBD	TBD
PA	Westinghouse Electric (Waltz Mill)	Madison, PA	4/97	1/00
PA	Whittaker Corporation	Greenville, PA	12/00, revised 8/03, 10/06	5/07
TN	CB&I Federal Services, LLC	Knoxville, TN	6/14	7/14
TX	ASARCO (Federated Metals)	Houston, TX	TBD	TBD
TX	Ascend Performance Materials	Alvin, TX	11/03	3/04
TX	ConocoPhillips	Falls City, TX	11/87	9/89
TX	ExxonMobil	Three Rivers, TX	4/85	9/86
TX	Intercontinental Energy Corp.	Three Rivers, TX	3/03	TBD
TX	Iso-Tex Diagnostics	Houston, TX	11/06, revised 11/10	TBD

Table 7-1 Agreement State Decommissioning Sites				
State	**Name**	**Location**	**Date DP Submitted**	**Date DP Approved**
TX	Pearland-Manvel Landfill	Pearland, TX	2/02	TBD
TX	Rio Grande Resources	Hobson, TX	4/93, revised 5/97	5/97
UT	Rio Algom Uranium Mill	Lisbon Valley, UT	9/02	7/04
WA	Dawn Mining Company	Ford, WA	6/94	1/95
N/A not applicable TBD to be determined				

8. RESOURCES

The total Decommissioning Program staff budget for FY 2017 is 74.5 full-time equivalents (FTE); and for FY 2018, the staff has requested 76.5 FTE. These resource numbers include personnel to perform licensing casework directly related to decommissioning sites; inspections; project management and technical support for decommissioning power reactors, research and test reactors, complex materials sites, uranium mill tailings facilities, and fuel cycle facilities; development of rules and guidance; development of EISs and EAs; research to develop more realistic analytical tools to support licensing and rulemaking activities; and OGC support. These figures also include non-supervisory indirect FTE associated with the Decommissioning Program.

9. FISCAL YEAR 2018 PLANNED PROGRAMMATIC ACTIVITIES

The NRC staff plans to continue to implement the IDIP and its associated knowledge management tasks during FY 2018. This includes identified knowledge management activities for documenting and exchanging decommissioning lessons learned for selected topics (e.g., uranium recovery, restricted release, and ALARA).

The power reactor decommissioning program evaluation resulted in a set of recommendations, including the recommendation to review all guidance and policy documents within the program to identify guidance documents in need of updating as well as other potential improvements. Subsequently, NMSS management reviewed the tasks identified as part of this program evaluation to promote programmatic enhancement and set task priorities. Throughout FY 2018, the staff will continue to work on these programmatic enhancement tasks.

In FY 2018, the staff will continue working on the Decommissioning Rulemaking effort and planned revisions to the Decommissioning GEIS. The staff will also continue its multi-year effort to update decommissioning guidance documents including Volumes 2 and 4 of the Consolidated Decommissioning Guidance, NUREG-1757.

In response to the emerging issue of historic, non-military sites with radium contamination (e.g., Great Kills Park, Waterbury Clock Factory), the staff will continue its efforts at sites identified with potential contamination, including contacting site owners and addressing contamination at these sites, as necessary. The staff will also continue its monitoring role at additional military MOU sites in FY 2018, as discussed in SECY-14-0082.

During FY 2018, the staff will conduct additional activities to re-evaluate NMSS programs and fee classes, and will continue to ensure newly proposed work activities are justified with respect to their safety-significance, value added, and overall contribution to agency goals.