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# **Status of the Decommissioning Program**

**2013 Annual Report**

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**Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental Management Programs  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001**

Enclosure

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## ABBREVIATIONS

ACL	alternate concentration limit
ADAMS	Agencywide Documents Access and Management System
CBP	Cementitious Barriers Partnership
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	<i>Code of Federal Regulations</i>
CY	calendar year
DOE	U.S. Department of Energy
DoD	U.S. Department of Defense
DP	decommissioning plan
DOE	U.S. Department of Energy
DWMEP	Division of Waste Management and Environmental Protection
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FCSS	Division of Fuel Cycle Safety and Safeguards
FONSI	Finding of No Significant Impact
FSME	Office of Federal and State Materials and Environmental Management Programs
FSS	final status survey
FSSR	Final Status Survey Report
FRN	<i>Federal Register</i> notice
FTE	full-time equivalents
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
GETR	General Electric-Hitachi Test Reactor
IAEA	International Atomic Energy Agency
IDIP	Integrated Decommissioning Improvement Plan
ISFSI	independent spent fuel storage installation
ISR	in situ recovery

LLW	low-level waste
LTP	license termination plan
LTR	License Termination Rule
LTSP	long-term surveillance plan
MOU	Memorandum of Understanding
N/A	not applicable
NARM	naturally occurring and accelerator-produced radioactive material
NASA	National Aeronautics and Space Administration
NEA	Nuclear Energy Agency
NIST	National Institute of Standards and Technology
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
OGC	Office of the General Counsel
PNNL	Pacific Northwest National Laboratory
PSDAR	Post-Shutdown Decommissioning Activities Report
RAI	request for additional information
RES	Office of Nuclear Regulatory Research
RG	Regulatory Guide
RP	reclamation plan
SDMP	Site Decommissioning Management Plan
SER	Safety Evaluation Report
SLDA	Shallow Land Disposal Area
TBD	to be determined
TER	technical evaluation report
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

# 1. INTRODUCTION

This report provides a summary of decommissioning of commercial nuclear facilities in the United States. Its purpose is to provide a reference document that summarizes the U.S Nuclear Regulatory Commission's (NRC) decommissioning activities in fiscal year (FY) 2013, including the decommissioning of complex materials sites, commercial reactors, research and test reactors, uranium recovery facilities, and fuel cycle facilities. As such, this report discusses current progress and accomplishments of the NRC's Comprehensive Decommissioning Program, provides information supplied by Agreement States on decommissioning in their States, and identifies key Decommissioning Program activities that the staff will undertake in the coming year. The information contained in this report is current as of September 30, 2013.

Approximately 10 years ago, the Division of Waste Management and Environmental Protection (DWMEP) began an effort to enhance the effectiveness of the NRC's Decommissioning Program. These enhancements included several initiatives: upgrading the resources available for decommissioning; developing, updating, and consolidating all guidance associated with decommissioning into a concise NUREG guidance document, NUREG-1757, "Consolidated Decommissioning Guidance;" developing metrics to track 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. In FY 2013, the staff continued to focus on enhancing the effectiveness of the Decommissioning Program through a comprehensive effort to consolidate and update decommissioning guidance for uranium recovery facilities.

As noted in our FY 2012 report (SECY-12-0153, "Status of the Decommissioning Program—2012 Annual Report"), the character of the decommissioning program has changed a great deal as successes in the past have substantially reduced the inventory of complex materials sites in decommissioning status. 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 contamination of military sites with naturally occurring and accelerator-produced radioactive material (NARM).

In terms of accomplishments, remediation activities were completed at the Analytical Bio-Chemistry Laboratories site in Columbia, MO. The sanitary lagoon and the surrounding effluent discharge area were released for unrestricted use in January 2013. Remediation activities were also completed at the ABB site, a former nuclear manufacturing facility located in Windsor, CT. ABB's Special Nuclear Material (SNM) license was terminated in February 2012. The site was released for unrestricted use in September 2013 upon termination of ABB's byproduct license. During FY 2012, decommissioning activities were completed at the National Aeronautics and Space Administration (NASA) Mockup and Plum Brook reactors in Sandusky, OH, and the University of Illinois Research Reactor facility in Urbana, IL. The licenses for these facilities were terminated in October 2012 and January 2013, respectively.

In FY 2014, the NRC expects two to three complex materials sites to complete decommissioning activities, with similar numbers completing decommissioning in succeeding years. Most power reactors undergoing decommissioning will remain in SAFSTOR, with Zion, La Crosse, and Humboldt Bay in active decommissioning. Staff will continue to coordinate extensively with 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) regarding the transition of Crystal River Unit 3, Kewaunee, and San Onofre Units 2 and 3, from operating reactors to decommissioning. Staff will also begin activities related to the transition of Vermont Yankee nuclear power plant, which expects to permanently cease power operation in December 2014. Progress in research and test reactor decommissioning will also continue as two or three more sites are expected to complete decommissioning in FY 2014. Within the next several years, several Title II<sup>1</sup> uranium recovery sites are expected to complete decommissioning and be transferred to the U.S. Department of Energy (DOE) for long-term control under a general license.

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<sup>1</sup> The Uranium Mill Tailings Radiation Control Act of 1978, as amended, classifies certain facilities that mill or process certain radioactive material as: Title 1, 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 that were, or could be, licensed by the NRC, 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 process, as appropriate. This report summarizes a broad spectrum of activities associated with the Program's functions.

Each year, the NRC terminates approximately 150 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, 2013, 18 nuclear power and early demonstration reactors, 7 research and test reactors, 15 complex decommissioning materials facilities, 2 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 DOE under 10 CFR 40.27 and 40.28. The NRC public Web site (<http://www.nrc.gov/about-nrc/regulatory/decommissioning.html>) contains site status summaries for the facilities managed under the Decommissioning Program. These summaries describe the status of each site and identify the current technical and regulatory issues affecting the completion of decommissioning. The site summaries are updated on a quarterly basis. 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 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 Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," or Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 50 or Part 52) 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 for decommissioning power reactors, technical review of licensee submittals in support of decommissioning, core inspections, support for the development of rulemaking and guidance, public outreach efforts, international activities, and participation in industry conferences and

workshops. In addition, the staff routinely processes license amendments and exemptions to support the progressive stages of decommissioning. The staff regularly coordinates with other offices on issues affecting both operating and decommissioning power reactors, and with the Office of Nuclear Material Safety and Safeguards (NMSS) regarding the independent spent fuel storage installations (ISFSIs) at reactor sites undergoing decommissioning.

As of September 30, 2013, the 18 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 a licensee's reactor decommissioning process are: notification to the NRC of cessation of operations; submittal 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 notification to the NRC. In addition, the licensee is required to notify 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 in the 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).

### 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 agree on 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 Document Access and Management System (ADAMS) No. ML031270391); NUREG-1757, “Consolidated Decommissioning Guidance,” Revision 1 of Volume 2, issued September 2006 (ADAMS No. ML063000243); and NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities—Supplement 1,” issued November 2002 (ADAMS 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 identifies 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 holding a 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 remaining 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 2013 Activities**

- During FY 2013, four power reactors permanently ceased operations and entered decommissioning: Crystal River Unit 3, Kewaunee, and San Onofre Units 2 and 3. Staff coordinated extensively with the Regional offices, as well as NRR, NSIR, and OGC regarding End of Cycle meetings, licensing activities, transfer of inspection responsibilities, and public meetings.
- In May 2013, Region III inspection responsibility for Kewaunee was internally transferred from the Division of Reactor Projects to the Division of Nuclear Materials Safety.

- In August 2013, Region II transferred responsibility for the oversight of decommissioning activities at Crystal River Unit 3 to Region I. Region II will retain responsibility for Incident Response until December 2013. This unique transfer required close coordination between Regions I and II, and was necessary because of a previous re-alignment of functions that assigned materials and decommissioning oversight activities to Region I.
- In August 2013, Region IV inspection responsibility for San Onofre Units 2 and 3 was internally transferred from the Division of Reactor Projects to the Division of Nuclear Materials Safety.
- To ensure openness during the regulatory process, the staff held public meetings,<sup>2</sup> including a meeting at Humboldt Bay to discuss the licensee's LTP and meetings at Kewaunee and Three Mile Island to discuss PSDARs. Staff held special government-to-government and non-government organization meetings regarding the San Onofre permanent shutdown. The staff also held a special public meeting near San Onofre to discuss the reactor decommissioning process and respond to public questions.
- The staff conducted the technical reviews associated with exemption requests from certain security requirements in 10 CFR 73.55 for the Three Mile Island Unit 2 and Millstone Unit 1 facilities.
- The staff issued two 10 CFR 20.2002 approvals for alternate disposal of Humboldt Bay decommissioning debris and soils.
- The staff completed oversight activities/inspections at reactor decommissioning facilities in accordance with Inspection Manual Chapter 2561 at Humboldt Bay, Indian Point Unit 1, Millstone Unit 1, Peach Bottom Unit 1, Three Mile Island Unit 2, and Zion Units 1 and 2.

### **2.1.3 Fiscal Year 2014 Trends and Areas of Focus**

Staff will continue its extensive coordination with other offices while working to complete the transfer of Crystal River Unit 3, Kewaunee, and San Onofre Units 2 and 3 to the decommissioning program. Staff also expects the Vermont Yankee nuclear power plant to enter decommissioning in FY 2014.

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<sup>2</sup>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.

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

<b>Reactor</b>	<b>Location</b>	<b>PSDAR* Submitted</b>	<b>LTP Submitted</b>	<b>LTP Approved</b>	<b>Completion of Decomm.**</b>
1	Crystal River Unit 3	TBD	TBD	TBD	TBD
2	Dresden Unit 1	6/98	TBD	TBD	2036
3	Fermi Unit 1	4/98	2011***	TBD	2032
4	GE-VESR	TBD	TBD	TBD	TBD
5	GE-Vallecitos Boiling Water Reactor	7/66	TBD	TBD	2019
6	Humboldt Bay	2/98	2013	TBD	2016
7	Indian Point Unit 1	1/96	TBD	TBD	2026
8	Kewaunee	TBD	TBD	TBD	TBD
9	La Crosse	5/91	TBD	TBD	2026
10	Millstone Unit 1	6/99	TBD	TBD	TBD
11	Nuclear Ship Savannah	12/08	TBD	TBD	2031
12	Peach Bottom Unit 1	6/98	TBD	TBD	2034
13	San Onofre Unit 1	12/98	TBD	TBD	2030
14	San Onofre Unit 2	TBD	TBD	TBD	TBD
15	San Onofre Unit 3	TBD	TBD	TBD	TBD
16	Three Mile Island Unit 2	6/13	TBD	TBD	2053
17	Zion Unit 1	2/00	TBD	TBD	2020
18	Zion Unit 2	2/00	TBD	TBD	2020

GE General Electric  
 TBD to be determined  
 VESR 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).

\*\* 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**

	<b>Reactor</b>	<b>Onsite Fuel Status</b>	<b>Cask Vendor</b>	<b>Model</b>
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	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	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 for the decommissioning of these reactors, 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 staff routinely processes license amendments and exemptions to support the progressive stages of decommissioning. The staff regularly coordinates with other offices on issues affecting research and test reactors, both operating and decommissioning.

As of September 30, 2013, the 7 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, review and approval of a DP, implementation of the DP, and completion of decommissioning.

#### Application

Within two years following permanent cessation of operations, and in no case later than one 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 by a DP submitted for NRC approval. The NRC and licensee hold pre-submittal meetings to agree on the format and content of the DP. These meetings are open to the public, and 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<sup>3</sup> for decommissioning with a description of the planned decommissioning activities;
- A description of the controls and limits on procedures and equipment to protect occupational and public health and safety;
- A description of the planned final radiation survey;

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<sup>3</sup> An alternative is acceptable if it provides for completion of decommissioning without significant delay. Consideration will be given to delayed alternatives 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 technical review is guided by NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," issued February 1996 (ADAMS 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 delay completion of decommissioning by including a period of storage or surveillance, the licensee shall meet the following conditions:

- Funds needed to complete decommissioning 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, and request that the NRC terminate the 10 CFR Part 50 license. The NRC will review the FSSR and the licensee's termination request if it determines that the licensee has met the following conditions:

- The decommissioning 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 2013 Activities**

- The staff reviewed the license termination request for NASA Mockup and Plum Brook reactors in Sandusky, OH, after decommissioning was completed. NRC terminated the licenses for both reactors in October 2012.
- The staff reviewed the FSSRs and request for license termination for the University of Illinois Research Reactor facility in Urbana, IL. The license was terminated in January 2013. NRC performed independent and confirmatory surveys after the completion of decommissioning activities.
- The staff performed confirmatory radiological surveys of the State University of New York at Buffalo reactor building, hot cell, and associate laboratories to allow industrial demolition of the facility.
- The staff performed inspections at the University of Michigan Ford Reactor, Worcester Polytechnic Institute, and State University of New York at Buffalo facilities.

### **2.2.3 Fiscal Year 2014 Trends and Areas of Focus**

In FY 2014, the staff expects the decommissioning to be completed at the University of Michigan Ford Reactor, Worcester Polytechnic Institute, and State University of New York at Buffalo facilities. The privately owned Aerotest Research Reactor is also expected to officially cease operations and transition to decommissioning in 2014.



**Table 2-2 Research and Test Reactors Undergoing Decommissioning**

<b>Reactor</b>	<b>Location</b>	<b>Status</b>	<b>Completion of Decomm.</b>
1	University of Michigan Ford Reactor	DP Approved	2014
2	General Atomics TRIGA Mark F	DP Approved	2019
3	General Atomics TRIGA Mark I	DP Approved	2019
4	General Electric-Hitachi GETR	Possession-Only	2019
5	State University of New York at Buffalo	DP Approved	2014
6	Veterans Administration	DP Submitted	2015
7	Worcester Polytechnic Institute	DP Approved	2014
GETR TRIGA	General Electric Test Reactor Training, Research, Isotopes General Atomics		

## **2.3 Complex Materials Facility Decommissioning**

Materials facilities decommissioning activities 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 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, 2013, 15 complex materials sites are undergoing decommissioning (see Table 2-3). Complex materials sites are defined as sites where the complexity of the decommissioning will require more than minimal technical and administrative support from the headquarters program office. It is expected that these sites 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 identifies whether the completion compliance criteria are based on the dose-based LTR criteria or the concentration-based Site Decommissioning Management Plan (SDMP) Action Plan criteria. 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. In the staff requirements memorandum on SECY-99-195, "Notation Vote on an Exemption for Decommissioning Management Program Sites with Decommissioning Plans under Nuclear Regulatory Commission Review and Eligible for Grandfathering, Pursuant to 10 CFR 20.1401(b)(3)," dated August 18, 1999, the Commission granted an extension of the DP approval deadline for 12 sites to August 20, 2000. In September 2000, the staff notified the Commission that the NRC had approved all 12 DPs by the deadline. All other sites must use the dose-based criteria of the LTR. Only one complex material site remains eligible to use the SDMP Action Plan criteria (see Table 2-3).

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 the parenthetical cases, the decommissioning process does not lead to license termination;
- No principal activities have been conducted 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, the licensee or responsible party is required to notify the NRC of such occurrence and either begin decommissioning or, if required, submit a DP within 12 months of notification and begin decommissioning after approval of the plan. With the 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 decommission 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 agree on the form and content of the DP. This pre-submittal meeting is intended to make the DP review process more efficient by reducing the need for requests for additional information

(RAIs). It is important for the NRC and the licensee to work effectively in a cooperative manner to resolve the issues that make the decommissioning of complex sites challenging.

In a process similar to LTPs and research and test reactor DPs, the complex material site DP review process begins with an acceptance review, to ensure that the DP contains: (1) all required information; (2) legible drawings; (3) justification for any proprietary information claims; and, (4) no obvious technical inadequacies. The objective of the acceptance review is to verify that the application contains sufficient information before the staff begins an in-depth technical review. In addition, the staff will conduct a limited technical review to identify significant technical deficiencies at an early stage, thereby avoiding a detailed technical review of a technically inadequate submittal. At the conclusion of the acceptance review, the NRC will either accept the DP for detailed technical review or not accept it and return it to the licensee or responsible party with the deficiencies identified. The staff's detailed technical review is guided by NUREG-1757 and its supporting references.

The staff documents the results of its detailed technical review in an SER and either an Environmental Assessment (EA) or EIS. If an EA is developed and a Finding of No Significant Impact (FONSI) is made, the final EA is published in full or summary form in the *Federal Register*. If a FONSI cannot be made, an EIS is developed. Before finalizing the EA/EIS, the staff provides its draft to the appropriate State agency for review and comment.

The NRC conducts reviews of DPs proposing restricted release in two phases. The first phase of the review focuses on the financial assurance and institutional control provisions of the DP. The staff will begin the review of the remainder of the DP only after it is satisfied that the licensee's or responsible party's proposed institutional control and financial assurance provisions comply with the requirements of the LTR. The applicable portions of NUREG-1757 guide both phases of the review.

The second phase of the review addresses all other sections of the technical review and will usually include the development of an EIS. If an EIS is to be prepared, the following steps are taken:

- Publication of a Notice of Intent;
- Public scoping meeting;
- Preparation and publication of the scoping report;
- Preparation and publication of the draft EIS;
- Public comment period on the draft EIS, including a public meeting; and
- Preparation and publication of the final EIS.

In parallel with the development of the EIS, the staff develops a draft and final SER. The staff coordinates the development of the draft SER with the development of the draft EIS so that any RAIs can be consolidated.

Regardless of whether an EA or EIS is developed, the staff structures its reviews to minimize the number of RAIs, without diminishing the technical quality or completeness of the licensee's or responsible party's ultimate submittal. For example, the staff first develops a set of additional information needs and clarifications, including the bases for the additional information and clarifications, and then meets with the licensee or responsible party to discuss the issues. The staff gives notice of, and conducts, this meeting in accordance with the NRC requirements for meetings open to the public. The staff documents the results of the meeting in a meeting report. The formal RAI includes any issues that cannot be resolved during the meeting. In developing the final RAI, the staff documents the insufficient or inadequate information submitted by the licensee or responsible party and communicates what additional information is needed to address the identified deficiencies. The quality and completeness of the licensee's DP factor directly into the scope and extent of the NRC's RAIs.

After publication of the FONSI or EIS, and presuming a determination that the DP is otherwise acceptable, the NRC issues a license amendment, approving the DP, along with any additional license conditions found to be necessary as a result of the findings of the EA, EIS, and/or the SER.

#### 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. 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

As the final step in decommissioning, 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 equivalent information.
- Conduct a radiation survey of the premises where licensed activities were carried out (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.

Licenses are terminated or the site is released by written notice 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 2013 Activities**

- In September 2013, Region I staff completed actions to terminate the NRC license for the ABB site in Windsor, CT, and released the site for unrestricted use. Region I staff worked closely with FSME, OGC, EPA, USACE, and Connecticut Department of Energy and Environmental Protection to complete this multi-year project, during which ABB remediated buildings, a burial site, contaminated soil areas, and a brook.
- Remediation activities were completed at the Analytical Bio-Chemistry Laboratories (ABC Labs) site in Columbia, MO. Region III staff reviewed FSSRs and the license amendment requesting the release of the sanitary lagoon and the surrounding effluent discharge area. Region III staff concluded that the areas met the criteria for unrestricted use, and issued a license amendment to release them in January 2013.
- In December 2012, staff issued a license amendment to the United States Department of Agriculture to authorize decommissioning of its Low-Level Radiation Burial Site at the Beltsville Agricultural Research Center in Beltsville, MD.
- Staff completed oversight activities associated with the demolition of the 01-14 Building at the West Valley site. The work on this building began in December 2012 and was completed in May 2013. It was the first major structure demolition and removal at the site, which is a complex, multi-phase decommissioning effort. The staff also reviewed and consulted with DOE on its documented safety analysis that served as the safety basis for the design of the new High Level Waste Canister Interim Storage Facility.
- In May 2013, the staff approved a DP Addendum for the UNC Naval Products site located in New Haven, CT, which revised the Derived Concentration Guideline Limits. The staff performed an extensive review of the DP Addendum, and evaluated the dose assessment methodology and the parameters utilized in order to ensure that the dose estimates were adequately supported.
- Considerable decommissioning progress was made at the Mallinckrodt site in St. Louis, MO. Mallinckrodt completed removal of most of the contaminated soil from the NRC-licensed portion of the site. Mallinckrodt has completed most final status surveys and submitted the FSSRs to NRC for review.
- The staff completed inspections or site visits at Beltsville Agricultural Research Laboratory, FMRI, Cimarron, Mallinckrodt, Shallow Land Disposal Area (SLDA), and West Valley. The staff also conducted site visits at McClellan Air Force Base, Alameda Naval Air Station, and Hunters Point Shipyard.

Other significant activities are described below.

### Shallow Land Disposal Area

After the NRC placed the BWX Technologies, Inc., license in abeyance for the SLDA site, USACE assumed physical possession of the site on August 22, 2011, and began cleanup activities. The USACE is congressionally mandated to clean-up the SLDA site under the Formerly Utilized Sites Remediation Action Program (FUSRAP).

On September 30, 2011, USACE ceased excavation activities because their contractor deviated from accepted field procedures. In August 2012, all exhumed material was safely shipped off-site. Based on several interagency meetings with USACE and other Federal partners, a consensus was reached that USACE would remain as the lead agency for the SLDA remediation project with on-site support from DOE, with the NRC remaining in its consulting role.

Throughout FY 2013, the NRC staff has been assisting USACE with the development of an interagency Site-specific Supplemental Memorandum of Understanding (MOU) between USACE, DOE, and the NRC. The Supplemental MOU complements the existing MOU and incorporates for SLDA the relevant and appropriate requirements of 10 CFR Parts 70, 73 and 74. The Supplemental MOU will also stipulate the specific roles of each Federal entity throughout the remainder of the remediation process. In August 2013, the NRC participated in the Corps After-Action Review of 2011 SLDA activities with USACE representatives from Corps Headquarters, the Omaha, Pittsburgh and Buffalo District Offices, the Cincinnati Division Office and DOE. The NRC is a member of the USACE SLDA Project Development Team. The NRC staff will continue to work collaboratively with USACE with respect to site remediation activities. One challenging aspect of this cleanup effort is that the records and type of material disposed in the ten burial trenches at the SLDA site are incomplete.

### Hunters Point, McClellan, and Alameda Military Sites in California

The staff continued implementing the Limited Involvement 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 28, 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 Limited Involvement Approach is to stay informed about the ongoing Navy remediation activities and confirm its continued reliance on the CERCLA process and EPA oversight. The 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. The staff conducted its fifth annual visit to these sites in August 2013, which included site visits with the Navy and Air Force, along with meetings with EPA Region 9, and State of California agencies. These discussions with the principal stakeholders that are participating 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 staff plans to continue its reliance on the CERCLA process and EPA oversight at these three sites.

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

The Statement of Considerations for the NRC's November 2007 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. Issues and staff recommendations for clarifying the NRC's jurisdiction for certain types of radium-226 under military control were identified in a February 16, 2011, SECY paper (SECY-11-0023). On March 24, 2011, the Commission approved the staff's recommendation to prepare a guidance document and *Federal Register* notice (FRN) clarifying that certain types of military radium-226 would be subject to the NRC regulations, and described possible regulatory approaches to be used to implement the NRC authority for radium-226 contamination and radium-226 in items and equipment (SRM-SECY-11-0023). The FRN and associated draft Regulatory Issue Summary (RIS) were issued on July 8, 2011 (76 FR 40282), for public comment.

The NRC staff continued its discussions with the DoD working group consisting of representatives from each of the military services and the Office of the Deputy Under Secretary of Defense to address the DoD comments on the draft RIS. During FY 2013, three discussions were conducted that addressed DoD's comments on licensing concerns, legal issues, NRC fees, and remediation of other unlicensed Atomic Energy Act material under CERCLA. As a result, the NRC staff and DoD working group agreed to proceed with NRC's involvement with DoD remediation under the CERCLA process through a MOU, rather than licensing as proposed in the draft RIS. The proposed MOU would be comprehensive and provide one process for all services. Key components of the MOU were discussed. As requested by the NRC staff, on August 1, 2013, DoD provided a letter that supports the MOU approach.

#### Army Depleted Uranium License Application

In 2013, the NRC staff continued its review of the U.S. Army's depleted uranium license application and their Radiation Safety, Physical Security, Range Safety, and Environmental Radiation Monitoring Plans for the Schofield Barracks and Pohakuloa Training Area in Hawaii. Staff provided several rounds of RAIs and reviewed several revisions of the aforementioned Plans. Staff developed a draft license with extensive license conditions, and held public meetings/webinars to discuss the NRC reviews. Staff also continued consultations with Native Hawaiian Organizations, State of Hawaii, and U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. The license was issued in October 2013.

### **2.3.3 Fiscal Year 2014 Trends and Areas of Focus**

Progress in the decommissioning of complex materials sites is expected to increase in FY 2014. Beltsville, Stepan and Mallinckrodt are expected to complete decommissioning or license termination in the near future. The staff will also continue its focus on Army sites with depleted uranium contamination, and continue to work with DoD toward clarifying the NRC's jurisdiction



of military radium-226 and involvement with military remediation of residual radioactive material. Staff is in the preliminary stages of involvement with the remediation under the CERCLA process of the National Park Service's Great Kills Park site, located in Staten Island, New York, as well as other non-military sites with radium contamination. NRC staff is also developing a process to begin identifying historic non-military sites with potential radium contamination.

**Table 2-3 Complex Decommissioning Sites**

<b>Name</b>	<b>Location</b>	<b>Date DP Submitted</b>	<b>Date DP Approved</b>	<b>Compliance Criteria</b>	<b>Projected Removal</b>
1 AAR Manufacturing, Inc.	Livonia, MI	10/97 revised 9/06, 4/07	5/98 TBD	LTR-UNRES	TBD
2 Alameda Naval Air Station**	Alameda, CA	N/A	N/A	N/A	N/A
3 Beltsville Agricultural Research Laboratory	Beltsville, MD	8/09	12/13	LTR-UNRES	2014
4 Cimarron (Kerr-McGee)	Cimarron, OK	4/95	8/99	Action-UNRES	2017
5 FMRI (Fansteel), Inc.	Muskogee, OK	8/99, revised 5/03	12/03	LTR-UNRES	2023
6 Hunter's Point Naval Shipyard** (former Naval shipyard)	San Francisco, CA	N/A	N/A	N/A	N/A
7 Jefferson Proving Ground	Madison, IN	8/99 revised 6/02, resubmittal planned 9/13	10/02 TBD	LTR-RES	2015
8 Mallinckrodt Chemical, Inc.	St. Louis, MO	Phase 1 11/97, Phase 2 9/08	Phase 1 5/02, Phase 2 7/10	LTR-UNRES	2014

**Table 2-3 Complex Decommissioning Sites**

<b>Name</b>	<b>Location</b>	<b>Date DP Submitted</b>	<b>Date DP Approved</b>	<b>Compliance Criteria</b>	<b>Projected Removal</b>
9 McClellan** (former Air Force base)	Sacramento, CA	N/A	N/A	N/A	N/A
10 Shallow Land Disposal Area (BWX Technologies, Inc.)	Vandergrift, PA	6/01 revised N/A	N/A	LTR-UNRES	2020
11 Sigma-Aldrich	Maryland Heights, MO	10/08, revised 11/10	5/09, revised TBD	LTR-UNRES	2015
12 Stepan Company	Maywood, NJ	N/A	N/A	LTR-UNRES	2014
13 UNC Naval Products	New Haven, CT	8/98, revised 2004, 12/06	4/99, revised 10/07	LTR-UNRES	TBD
14 West Valley Demonstration Project	West Valley, NY	Phase 1 3/09	Phase 1 2/10	LTR-UNRES*	TBD
15 Westinghouse Electric-Hematite Facility	Festus, MO	4/04 revised 6/06, 8/09	10/11	LTR-UNRES	TBD

\* 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.

\*\* 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 required 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 will rely on the ongoing CERCLA process and EPA oversight. More information is available on this approach in SECY-08-0077.

Notes:

- The compliance criteria identified in this table present the 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 submittals.

## 2.4 Uranium Recovery Facility Decommissioning<sup>4</sup>

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, as it was then construed.

Through the provisions of Title I of UMTRCA, Congress addressed the problem of inactive, unregulated tailings piles. Title I of UMTRCA specifies the inactive processing sites for remediation. Except at the Atlas Moab site, surface reclamation activities have been completed and approved by the NRC at 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 the 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.

Title II of UMTRCA addresses mill tailings produced at active sites licensed by the NRC or an Agreement State. Title II amended the definition of byproduct material to include mill tailings and added specific authority for the Commission to regulate this new category of byproduct material at licensed sites. Title II uranium recovery decommissioning activities include regulatory oversight of decommissioning uranium recovery sites; review of site characterization plans and data; review and approval of reclamation plans (RPs); preparation of 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 these 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. As of September 30, 2013, 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. The six Title II sites that have been transferred for

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<sup>4</sup> This report does not address regulation of new or operating uranium recovery facilities with the exception of a brief discussion on their decommissioning.

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 disposal areas);
- 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 may include notification of intent to decommission; submittal, review and approval of the DP<sup>5</sup> or RP; 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 events, 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 plan approval. 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. For ISR facilities, groundwater restoration should occur at one well-field, while other well-fields are actively extracting uranium. Under 10 CFR 40.42(f), facilities may delay decommissioning if the NRC determines that such a delay is not detrimental to public health and the environment and is in the public interest.

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<sup>5</sup> 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—Existing Facilities

All uranium recovery facilities currently licensed by the NRC have NRC-approved DP/RPs. Therefore, for these facilities, the 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 meeting between the licensee and the NRC staff may be warranted.

### Decommissioning Plan/Reclamation Plan—New Facilities

Procedures for reviewing DP/RPs for new facilities are similar to those for existing facilities. Note that, under 10 CFR 51.20(b)(8), preparation of an EIS is a required part of the licensing process for new uranium milling facilities. A generic EIS is now in place for ISR facilities. Site specific supplemental EISs (SEISs) are being developed for the new ISR license applications under review, and these SEISs will tier off of the generic EIS.

### Implementation of the Decommissioning Plan/Reclamation Plan

Typically, a DP/RP is submitted with an application for an ISR facility. As the licensee prepares to enter decommissioning, a revised DP/RP is submitted. 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 with well-field restoration, 24 months 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 and approval of groundwater restoration by monitoring 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 completed 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 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 staff determines that the ACLs are protective of public health and the environment, the staff may approve the ACLs.

After surface decommissioning/reclamation is completed, the licensee issues a construction completion report for staff review and approval. As part of this review, the staff performs a completion 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 RAIs 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 the 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 is restored to acceptable levels and surface decommissioning/reclamation is completed and approved by the NRC. Surface decommissioning completion typically would include an 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, ISR facilities are still required to find a licensed 11e.(2) disposal site for their waste, though some facilities 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 2013 Activities

- In FY 2013, the NRC staff conducted in-process inspections of the decommissioning activities at the Sequoyah Fuels site in Gore, OK. Remediation of impacted soil in the Phase III Disposal Cell footprint and removal/packaging of the Sanitary Lagoon sediments and soils was completed. In addition, contaminated groundwater that was perched on top of bedrock in the Phase III footprint was recovered, treated and released. The Phase III Cell Base construction was then completed and waste materials (treated calcium fluoride sludge, miscellaneous contaminated soils and demolition debris) are presently being placed in the Phase III portion of the disposal cell.
- Staff continued to work with the State of Wyoming to evaluate options for completing decommissioning at the ANC Gas Hills site, including determining the best use of the amount remaining in the decommissioning fund. One option includes the construction of a diversion channel around Pond #1 to avoid erosion in the event of a flood.
- The United Nuclear Corporation (UNC) Church Rock Mill Site is licensed by NRC and designated a Superfund Site by the EPA. A small scale groundwater remediation system, and semi-annual groundwater monitoring is in progress at the UNC Mill Site. In September 2011, the EPA issued a Non-Time-Critical Removal Action Memorandum for permanent disposal of approximately one million cubic yards of mine waste from the adjoining Northeast Church Rock Mine Site at the UNC Church Rock Mill Site. This proposed action will require UNC to submit a license amendment request to place the mine waste above the existing tailings impoundment. Moreover, disposal of mine waste from the Northeast Church Rock Mine Site at the UNC Mill Site would be a major Federal action requiring significant collaboration among multiple agencies and with the Navajo Nation. As a result, the staff has been participating in the EPA's Technical Design Committee to ensure close coordination of the effort. In April 2013, the licensee (UNC) submitted a license amendment request to change groundwater background values for the Church Rock Mill Site. The staff noticed the license amendment request in the *Federal Register*, provided RAIs, and held publicly noticed meetings on this licensing action.
- Groundwater reclamation activities continue at the Homestake Mining Company of California (Homestake) site near Milan, NM. Groundwater restoration activities are being conducted in accordance with the NRC License SUA-1471. In 2006, Homestake submitted an updated groundwater Corrective Action Plan for the NRC review and approval. Based on a NRC request for additional information, Homestake submitted Revision 2 of the Corrective Action Plan in March 2012 for NRC review and approval. NRC staff review of Revision 2 of the Corrective Action Plan is ongoing. In April 2013, Homestake submitted an update to its Decommissioning and Reclamation Plan for NRC review and approval, and NRC staff review is ongoing.

- In FY 2013, staff continued its increased interaction with the Navajo Nation by participating in the EPA Navajo Nation Uranium Contamination Stakeholder Workshop and participating in Navajo Nation/DOE Quarterly Meetings. NRC senior managers met with Navajo Nation President Ben Shelly at NRC Headquarters to discuss issues associated with uranium milling and reclamation activities on or near the Navajo Nation. NRC staff continued to work with other Federal agencies on the Navajo Nation 5-Year Plan. A summary report of accomplishments achieved during the first five years of the Navajo Nation 5-Year Plan was published in January 2013.
- Regional staff conducted observational site visits at sites that have been transferred to DOE and are generally licensed pursuant to 10 CFR 40.27 and 40.28. Site visits were conducted at Falls City, Grand Junction, Maybell, Maybell West, Naturita, and Slick Rock.
- In addition, staff also performed site inspections or site visits at the ANC Gas Hills, Homestake, UNC Church Rock, Sequoyah Fuels, Durita, Green River, Moab, Rifle, and Uravan sites.

### **2.4.3 Fiscal Year 2014 Trends and Areas of Focus**

In FY 2014, the staff expects the completion of decommissioning at the Bear Creek, Pathfinder Lucky Mc, and Umetco facilities in Wyoming, and the subsequent transfer of these sites to the DOE for long term surveillance and monitoring. The staff will also be evaluating UNC Church Rock Mill Site's license amendment request for changing groundwater background values, as well as the anticipated license amendment request for the mine waste to be placed in the disposal cells on the UNC Church Rock Mill Site. In FY 2014, staff will continue its outreach efforts for the four Title I sites located within the Navajo Nation by participating in future DOE/Navajo Nation/Hopi quarterly meetings and consulting with the Navajo Nation on the review of DOE reports and plans for the reclamation and management of these sites. Staff will also continue to work with the State of Wyoming on a path forward for the ANC Gas Hills site.

**Table 2-4a Decommissioning Title I Uranium Recovery Sites**

	<b>Name</b>	<b>Location</b>	<b>Status</b>
1	Ambrosia Lake	New Mexico	Monitoring
2	Burrell	Pennsylvania	Monitoring
3	Canonsburg	Pennsylvania	Monitoring
4	Durango	Colorado	Active
5	Falls City	Texas	Monitoring
6	Grand Junction	Colorado	Monitoring
7	Green River	Utah	Active
8	Gunnison	Colorado	Active
9	Lakeview	Oregon	Active
10	Lowman	Idaho	Monitoring
11	Maybell	Colorado	Monitoring
12	Mexican Hat	Utah	Monitoring
13	Monument Valley	Arizona	Active
14	Moab Mill	Utah	Active
15	Naturita	Colorado	Monitoring
16	Rifle	Colorado	Active
17	Riverton	Wyoming	Monitoring
18	Salt Lake City	Utah	Monitoring
19	Shiprock	New Mexico	Active

**Table 2-4a Decommissioning Title I Uranium Recovery Sites**

20	Slick Rock	Colorado	Active
21	Spook	Wyoming	Monitoring
22	Tuba City	Arizona	Active

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.

<b>Table 2-4b Decommissioning Title II Uranium Recovery Sites</b>				
	<b>Name</b>	<b>Location</b>	<b>DP/RP Approved</b>	<b>Completion of Decomm.</b>
1	American Nuclear Corporation	Casper, WY	10/88, Revision 2006	TBD
2	Bear Creek	Converse County, WY	5/89	2014
3	ExxonMobil Highlands	Converse County, WY	1990	TBD
4	Homestake Mining Company	Grants, NM	Revised plan—3/95	2017
5	Pathfinder—Lucky Mc	Gas Hills, WY	Revised plan—7/98	2014
6	Pathfinder—Shirley Basin	Shirley Basin, WY	Revised plan—12/97	TBD
7	Rio Algom—Ambrosia Lake	Grants, NM	2003 (mill); 2004 (soil)	2015
8	Sequoyah Fuels Corporation	Gore, OK	2008	2018
9	Umetco Minerals Corporation	East Gas Hills, WY	Revised soil plan—4/01	2014
10	United Nuclear Corporation	Churchrock, NM	3/91, Revision 2005	TBD
11	Western Nuclear Inc.—Split Rock	Jeffrey City, WY	1997	TBD
<p>Note: COGEMA, Crow Butte, Kennecott Uranium Company, and Power Resources Inc., are all operating, or in standby, uranium recovery facilities in various stages of partial restoration/decommissioning.</p> <p>TBD to be determined</p>				

<b>Table 2-4c Title II Uranium Recovery Sites – DOE Licensed Under 10 CFR 40.28</b>			
	<b>Name</b>	<b>Location</b>	<b>Transferred to DOE</b>
1	Bluewater (Arco)	New Mexico	2003
2	Edgemont	South Dakota	2003
3	L-Bar	New Mexico	2003
4	Maybell West	Colorado	2010
5	Sherwood	Washington	2003
6	Shirley Basin South	Wyoming	2003

## **2.5 Fuel Cycle Facility Decommissioning**

Currently, there are two fuel cycle facilities undergoing partial decommissioning: the Nuclear Fuel Services site in Erwin, TN, and the Honeywell site in Metropolis, IL. 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 and Safeguards (FCSS) during licensee operations and partial site decommissioning with technical support from FSME. In cases where the entire site is being decommissioned in support of license termination, the project management responsibility resides within FSME, and specifically, DWMEP. Project management responsibility for fuel cycle facilities is transferred from FCSS to DWMEP 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 2013 Activities**

NMSS approved a proposal from Honeywell to decommission a portion of its Metropolis Works facility located in Metropolis, IL. DWMEP staff supported FCSS in the review of the DP for this partial decommissioning action. The DP approval is documented in Amendment 10 to SUB-526, issued September 27, 2013, which includes a Safety Evaluation Report and an EA and FONSI.

Nuclear Fuel Services has continued to work toward releasing portions of an area within its site located in Erwin, TN. DWMEP staff is providing support to FCSS by reviewing FSSRs for several survey units in the North Site area.

### **3. GUIDANCE AND RULEMAKING ACTIVITIES**

In FY 2013, the staff worked to increase the effectiveness of the Decommissioning Program and to gain a better perspective on decommissioning as a whole. The Decommissioning Program has been performing a self-evaluation of dose modeling to help it become more effective in the decommissioning of sites. Additionally, staff has been working on initiatives that will help prevent the creation of sites that are unable to complete decommissioning.

#### Division of Waste Management and Environmental Protection Self-Evaluation of Dose Modeling

DWMEP is conducting an evaluation of the uses and applicability of computer codes employed in carrying out DWMEP licensing activities, particularly those codes used for the demonstration of compliance with the decommissioning dose criteria. This evaluation is intended for DWMEP management'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 2014.

#### Decommissioning Guidance

In December 2012, the NRC issued Regulatory Guide (RG) 4.22, "Decommissioning Planning During Operations," a guidance document in support of the Decommissioning Planning Rule (76 FR 35512). RG 4.22 addresses the identification of contamination for which there must be decommissioning financial assurance. The Decommissioning Planning Rule became effective on December 17, 2012, and revised the requirements for timeliness in decommissioning of materials facilities, the requirements for financial assurance for decommissioning, and the recordkeeping requirements related to eventual decommissioning.

During FY 2013, DWMEP staff worked toward the issuance of RG 1.184, "Decommissioning of Nuclear Power Reactors." The document provides guidance on the actions required of licensees to decommissioning nuclear power reactors licensed under the provisions of 10 CFR Parts 50 and 52.

As the guidance for uranium recovery licensing goes back to the late 1970s, the NRC staff determined that a thorough reexamination, consolidation, and updating of the guidance being used by DWMEP staff would be appropriate. This is a multi-year effort to review, consolidate and update over 130 uranium recovery decommissioning guidance documents. The update is 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, as amended, permanent waste disposal, and financial assurance, which are significantly different from such considerations in the decommissioning of other materials facilities.



## 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.

The RES staff is continuing the development or modification of computer codes useful for site decommissioning analyses. The incorporation of source-term modeling into RESRAD-OFFSITE was completed with Argonne National Laboratory incorporating the Disposal Unit Source Term (DUST) code, which contains several source-term models and was prepared by Brookhaven National Laboratory, into RESRAD-OFFSITE. A final report on the use of the DUST-modified RESRAD-OFFSITE has been submitted for publication. Work is underway to update the RESRAD-OFFSITE user manual. Work was also completed in FY 2013 to adapt the Decontamination and Decommissioning Code to current computational environments.

Cooperative efforts with the DOE, National Institute of Standards and Technology (NIST), and academic, private sector, and international experts continued on the Cementitious Barriers Partnership (CBP). The CBP memorandum of understanding among DOE, NRC and NIST ended this year and is now being revised to address activities for the next five years. The CBP is a multi-disciplinary collaboration formed to develop the next generation of simulation tools to evaluate the structural, hydraulic and chemical performance of cementitious barriers used in nuclear applications over extended time frames (e.g., more than 100 years for operating facilities and greater than 1000 years for waste management applications). The CBP has published numerous reports assessing the behavior of cementitious materials for waste disposal and describing models for their evaluation and prediction of long-term processes. Complementary work at NIST to examine pore solution chemistry and mineral phases in cementitious composites with chemical and mineral admixtures has been completed. A final NUREG/CR report has been reviewed and is in preparation for publication.

Cooperative studies between Pacific Northwest National Laboratory (PNNL) and Oregon State University to study radionuclide uptake in fruit and nut trees were completed. A NUREG/CR report on "Transfer Factors for Nuclide Uptake by Fruit and Nut Trees" is ready for publication.

Researchers at PNNL and the U.S. Geological Survey completed their work to determine the long term efficacy of bioremediation of groundwater contaminated with uranium at both surficial sites and deeper ISR facilities. The U.S. Geological Survey has completed long term column experiments on the bioremediation of uranium in shallow aquifers. These results and those from the PNNL modeling show that uranium can be readily reoxidized and released to solution in these shallow formations. The use of added iron (as proposed by a licensee) to generate large quantities of adsorptive minerals, was shown to reduce uranium concentrations and release rates but not enough to allow use of this technology on near-surface sites. As a result, RES has recommended that this approach for shallow systems should not be relied on to sequester uranium. The NUREG/CR report containing experimental and modeling results is in final editing. All work has been completed to assess bioremediation of uranium at ISR sites including modeling activities. Results for these deeper sites indicate that re-establishing the natural reducing conditions at depth can be an effective remediation strategy in spite of the severe disruption of the original biological community by the ISR process. The experimental and

modeling results are documented in NUREG/CR-7167 "Assessing the Potential for Bioremediation of Uranium In-Situ Recovery Sites," which is in final review in RES.

The draft NUREG/CR "Radionuclide Release from Slag and Concrete Waste Materials: Part 3 Testing Protocols" is in final editing and will be ready for publication soon. This report, taking information from the previous two NUREG/CR reports for this project, recommends short-term testing protocols and modeling approaches to characterize the release of contaminants from waste materials in large-scale surface disposal sites. The objectives of these tests are to provide contaminant release rates and to characterize transport behavior within the waste pile, based on representative samples of the waste material. Results can then be used in performance assessment models.

The RES staff also continued direct assistance to FSME efforts through a variety of tasks that included: (1) contributing to the critical review for the Savannah River F-Tanks and H-Tanks Performance Assessments; (2) participating in the MARSSIM Interagency Working Group; and (3) interacting with DOE and NIST to develop renewal for the CBP. A User Need Response is being prepared for work requested by FSME to examine radon emissions from uranium mill tailing caps.

## 5. INTERNATIONAL ACTIVITIES

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

### International Atomic Energy Agency Activities

- Staff participated in the review and development of IAEA Safety Standards, and also participated in IAEA projects related to decommissioning and waste disposal, the International Project on Evaluation and Demonstration of Safety for Decommissioning of Facilities Using Radioactive Material, and developing safety criteria/positions regarding exemption of decommissioning installations from liability under the Vienna Convention.
- Staff has initiated the preparation of a United State National Report on the safety of spent fuel, radioactive waste and disused sealed sources. This process involves an interagency (NRC, DOE, EPA and the State Department) working group and is prepared as a national obligation under the provisions of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention). Decommissioning staff in NRC provided technical and programmatic support to the U.S. Delegation to the Inter-Sessional Meeting of the Joint Convention which took place in April 2013. Decommissioning of nuclear facilities was included in the scope of this convention for achieving a uniform global level of safety in such management of radioactive materials and activities. The DWMEP Division Director served as the Chairman of a Country Review Group and continues to serve as a member of the General Committee.
- Staff supported the meeting of the IAEA Research Reactor Decommissioning Demonstration Project workshop held at the State University of New York at Buffalo in December 2012.

- The NRC provided technical experts to support the IAEA in the preparation of Safety Standards, which are drafted in consultancy meetings. One such example was the Consultancy Meeting on Draft Decommissioning Safety Guide (DS-452) “Decommissioning of Nuclear Facilities,” August 30 to September 7, 2013 in Vienna, Austria.
- Staff participated in a technical meeting of the International Forum on Regulatory Supervision of Legacy Sites, related to the remediation of legacy nuclear facilities.
- The NRC coordinated the Member State review of the General Safety Requirements Part 6, “Safety Requirements for Decommissioning of Nuclear Facilities.”

#### Nuclear Energy Agency Activities

- The NRC contributed to the 16<sup>th</sup> Session of the NEA Radioactive Waste Management Committee Bureau Annual Report for the Radioactive Waste Management Committee.
- Staff continued as a U.S. representative and core group member of the NEA Working Party on Decommissioning and Dismantling, and participated in the 13<sup>th</sup> annual meeting in Penrith, United Kingdom.
- Staff co-authored the NEA technical report on “R&D and Innovation Needs for Decommissioning.”
- Staff provided technical support for a presentation in the NEA Policy Debate on Decommissioning.

#### International Conferences and Presentations

- The Acting Director of FSME gave a plenary speech at the 15<sup>th</sup> International Conference on Environmental Remediation and Radioactive Waste Management held in Brussels, Belgium, in September 2013.
- Staff delivered presentations for delegates from Japan, Vietnam, and the United Kingdom, and provided technical support for a training workshop and exchange of information with Taiwan on the decommissioning of nuclear power reactors.

## **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 regulated by the NRC, many complex decommissioning sites are being decommissioned under the purview of the Agreement States. Given this breadth of projects, the Decommissioning Program has undertaken many initiatives to keep abreast of sites undergoing decommissioning.

### Comprehensive Decommissioning Program

The NRC has continued the implementation of an enhanced Comprehensive Decommissioning Program, which allows the NRC 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 2013, State contacts provided responses to letter FSME-13-077, "Information Request: Status of Current Complex Decommissioning and Uranium Recovery Sites." This site information was compiled and placed into a database for publication on NRC's public website. Summaries of information on sites regulated by the Agreement States are currently available to the public to ensure openness and promote communication and thus enhance public confidence by providing them with a national perspective on decommissioning.

### Knowledge Management

Progress continued on knowledge management activities identified in the staff's June 2010 Integrated Decommissioning Improvement Plan (IDIP), Rev. 3, with an ongoing emphasis on the uranium recovery part of the decommissioning program. These knowledge management activities should result in future efficiencies and enhancements in the staff's oversight of uranium recovery sites under general license with the DOE for long term surveillance as well as those uranium recovery sites in closure and under specific licenses to private entities. In addition, the staff has taken a proactive approach to enhance knowledge transfer by conducting several decommissioning-related seminars and by implementing succession planning in FY 2013.

### Uranium Recovery Decommissioning Program Enhancements

In 2007, responsibility for the uranium recovery sites undergoing decommissioning was transferred to DWMEP, along with the staff from FCSS responsible for oversight of the decommissioning uranium recovery sites. At that time, the price of uranium was low and it was expected that most of the staff's efforts would be associated with the oversight of uranium recovery sites undergoing decommissioning. However, shortly after the transfer, the price of uranium increased significantly, resulting in the uranium industry submitting, or planning to submit over 25 applications for new and/or expanded facilities or to re-start facilities that were in standby.

In order to accommodate this increase in uranium recovery site licensing, and to enhance the oversight of decommissioning uranium recovery facilities, the staff in FSME's Decommissioning and Uranium Recovery Licensing Directorate began a multi-phased effort focused on increasing the efficiency and the effectiveness of the oversight of decommissioning UR facilities.

In addition to the oversight activities by project managers, in FY 2013, staff developed and implemented a program to conduct observational site visits at sites that have been transferred to DOE and are generally licensed pursuant to 10 CFR 40.27 and 40.28. The effort included development of guidance for conducting the site visits, performing sites visits at a number of sites to determine the effectiveness of the guidance and to identify areas for improving the guidance. Based on improvements identified during site visits in 2012, the guidance was revised and reissued for use by Regional and Project Managers in September 2012. The guidance was also incorporated into Volume 4 of NUREG-1757 that is currently being developed.

The NRC staff also continued its interactions with DOE for those sites that are generally licensed under 10 CFR 40.27 and 40.28. Staff is working with DOE to develop a site transfer protocol and has provided comments to DOE on its site transfer guidance for DOE staff. Staff has also continued its participation in DOE meetings with the Navajo Nation and Hopi Tribe pertaining to the sites on the Navajo Nation and Hopi reservation.

DOE routinely submits groundwater and data validation information to the NRC for each of the sites that it has responsibility for under UMTRCA. In FY 2011, staff began the development of a site activities/issues database to better track the review of these documents as well as issues that are complicating the oversight of the sites. Staff is also developing quantifiable metrics to track the review and comment or approval of the information for those sites that are specifically licensed and those that have transferred to DOE and are generally licensed under 10 CFR 40.27 and 40.28.

In 2013, the NRC staff continued working with the EPA, along with the Bureau of Indian Affairs, DOE, and the Indian Health Service on a coordinated Five-Year Plan to address uranium contamination in consultation with Navajo Nation. 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 Nation from past mining and milling activities. In 2013, the NRC worked with the agencies to develop a summary report for Congress on the progress made during the first five years in completing the goals outlined in the Five-Year Plan.

## 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. However, 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 2013 included the following:

- On August 5, 2013, the NRC reinstated the State of New Jersey's authority to regulate the Shieldalloy Metallurgical Corporation site in Newfield, NJ. During the time between April 15, 2013, and August 5, 2013, while the NRC maintained authority for the site, the NRC staff issued License SMB-743 (Amendment 11), which incorporated administrative license conditions developed while the site was under the State of New Jersey's regulatory authority.
- DWMEP staff worked with the Agreement States to incorporate more detailed information about complex materials decommissioning sites and uranium recovery facilities undergoing decommissioning under the purview of the Agreement States on the decommissioning Web site. These site summaries are available at <http://www.nrc.gov/info-finder/decommissioning/complex/>.
- Integrated Materials Performance Evaluation Program reviews that included decommissioning were conducted in several Agreement States (Georgia, Illinois, Mississippi, New Hampshire, New Mexico, Nevada, North Dakota, Washington).

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	Project Complete	
CA	Halaco	Oxnard, CA	N/A	N/A	TBD	
CA	The Boeing Company	Simi Valley, CA	10/03	10/03	2014	
CA	Chevron Mining, Inc. (formerly Molycorp)	Mountain Pass, CA	6/06	7/08	2015	
CA	Isotope Specialities	Burbank, CA	2013	TBD	2016	
CA	Magnesium Alloy Products	Compton, CA	2006	2008	2016	
CO	Umetco Uravan	Uravan, CO		2/01/87	TBD	
CO	Cotter Uranium Mill	Canon City, CO	2005, revision pending	2005, TBD	In standby. TBD if going into D&D.	
CO	Schwartzwalder Mine (Cotter)	Golden, CO	12/01/96	1997	TBD	
CO	Sweeney Mining and Milling	Boulder, CO	Pending	TBD	TBD	
CO	Homestake Mining and Pitch	Sargeants, CO	05/01/01	06/01/01	TBD	
CO	Redhill Forest	Fairplay, CO	Pending	TBD	TBD	
CO	Clean Harbors	Deer Trail, CO	2005	2006	TBD	
FL	Iluka Resources	Green Cove Springs, FL	TBD	TBD	TBD	



Table 7-1 Agreement State Decommissioning Sites						
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete	Project Complete
IL	Spectrulite Consortium	Madison, IL	TBD	TBD	TBD	TBD
IL	TRONOX (formerly Kerr-McGee)	West Chicago, IL	09/01/93	09/01/94	Phase 1— 11/05	Phase 2— TBD
KS	Air Capitol Dial	Wichita, KS	TBD	TBD	TBD	TBD
KS	Aircraft Instrument & Development/RC Allen Instruments	Wichita, KS	TBD	TBD	TBD	TBD
KS	Century Instruments Corporation	Wichita, KS	TBD	TBD	TBD	TBD
MA	Shpack Landfill	Norton, MA	09/04	09/04	TBD	TBD
MA	BASF (formerly Engelhard)	Plainville, MA	None	N/A	TBD	TBD
MA	Starmet Corp. (formerly Nuclear Metals)	Concord, MA	10/06	Pending	TBD	TBD
MA	Wyman-Gordon Co.	North Grafton, MA	None	TBD	TBD	TBD
MA	Texas Instruments	Attleboro, MA	None	TBD	TBD	TBD
MA	Norton/St. Gobain	Worcester, MA	None	TBD	TBD	TBD
NJ	Shieldalloy Metallurgical Corp.	Newfield, NJ	TBD	TBD	TBD	TBD

Table 7-1 Agreement State Decommissioning Sites						
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete	
OH	Ineos USA, LLC (formerly BP Chemical)	Lima, OH	4/92	6/98	2020	
OH	Advanced Medical Systems, Inc.	Cleveland, OH	6/04	5/05	2016	
OR	TDY Industries d/b/a Wah Chang	Albany, OR	6/11/03	3/08/06	TBD	
OR	PCC Structurals, Inc.	Portland, OR	6/10/06	9/14/06	TBD	
PA	Curfis-Wright Cheswick	Cheswick, PA	3/06	6/07	TBD	
PA	Global Tungsten & Powders Corporation	Towanda, PA	6/13	9/13	2014	
PA	Karnish Instruments	Lock Haven, PA			2015	
PA	Keystone Metals Reduction	Cheswick, PA			TBD	
PA	Remacor	West Pittsburg, PA			TBD	
PA	Safety Light Corporation	Bloomsburg, PA	None	TBD	TBD	
PA	Strube Incorporated	Lancaster Co., PA			2016	
PA	Superbolt (formerly Superior Steel)	Carnegie, PA	None	TBD	TBD	
PA	Westinghouse Electric Corp. (Waltz Mill)	Madison, PA	4/97	1/00	TBD	

Table 7-1 Agreement State Decommissioning Sites						
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete	
PA	Whittaker Corporation	Greenville, PA	12/00, revised 8/03, 10/06	5/07	TBD	
TN	Duratek Services, Inc.	Oak Ridge, TN	8/12	10/12	2015	
TX	ASARCO (Federated Metals)	Houston, TC			TBD	
TX	ExxonMobil	Three Rivers, TX	4/85	9/82	TBD	
TX	ConocoPhillips	Falls City, TX	11/87	9/80	TBD	
TX	Iso-Tex Diagnostics	Houston, TX			TBD	
TX	Pearland-Manvel Landfill	Pearland, TC			TBD	
TX	Rio Grande Resources	Hobson, TX	4/93 Alternate Concentration Limit—11/97	11/96	TBD	
TX	Intercontinental Energy Corp.	Three Rivers, TX	3/03	Ongoing	Groundwater complete Surface TBD	
TX	South Texas Mining Venture, LLP (decommissioning of Tex-1, Mt. Lucas sites)	Hobson and Dinero, TX	8/01	Ongoing	Groundwater complete Surface cleanup ongoing	

**Table 7-1 Agreement State Decommissioning Sites**

<b>State</b>	<b>Name</b>	<b>Location</b>	<b>Date DP Submitted</b>	<b>Date DP Approved</b>	<b>Project Complete</b>
UT	Rio Algom Uranium Mill	Lisbon Valley, UT	9/03/02	7/06/04	TBD
WA	Dawn Mining Company	Ford, WA	12/94	02/95	2014
D&D decontamination and decommissioning					
N/A not applicable					
TBD to be determined					

## **8. RESOURCES**

The total Decommissioning Program staff budget for FY 2013 was 58.6 full-time equivalents (FTE); and for FY 2014, the program has 59.2 FTE. These resource figures 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; EISs and EAs; research to develop more realistic analytical tools to support licensing and rulemaking activities; and Office of the General Counsel support. These figures also include nonsupervisory indirect FTE associated with the Decommissioning Program, and safety and environmental reviews for new uranium recovery facilities.

## **9. FISCAL YEAR 2014 PLANNED PROGRAMMATIC ACTIVITIES**

The staff plans the continued implementation of IDIP and its knowledge management tasks during FY 2014. Specifically, the NRC staff have identified knowledge management activities for documenting and exchanging decommissioning lessons learned for selected topics (e.g., uranium recovery, restricted release, and ALARA).

Work will continue on the update of uranium recovery decommissioning and reclamation guidance for Title I and II sites, which was one of the major tasks previously identified. In FY 2011, staff began a multi-year effort to review, consolidate, and update over 130 uranium recovery decommissioning guidance documents as part of the IDIP improvement process. This process will continue throughout FY 2014, and, when completed, this document will be published as Volume 4 of the Consolidated Decommissioning Guidance, NUREG-1757.

Regarding the question about the NRC jurisdiction for military radium-226, the staff is preparing a Commission information paper that describes the results of its discussions with DoD and its plans to complete an MOU and RIS during FY 2014. This paper is currently scheduled to be submitted to the Commission during the second quarter of FY 2014, but it is dependent on receiving additional inputs from DoD.