

POLICY ISSUE INFORMATION

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FOR: The Commissioners

FROM: Charles L. Miller, Director
Office of Federal and State Materials
and Environmental Management Programs

SUBJECT: STATUS OF THE DECOMMISSIONING PROGRAM—2010 ANNUAL
REPORT

PURPOSE:

To provide the U.S. Nuclear Regulatory Commission (NRC) with the staff's 2010 Annual Report on the Status of the Decommissioning Program, the highlights of key decommissioning accomplishments in fiscal year (FY) 2010, as well as an outlook of activities for FY 2011. This paper does not address any new commitments or resource implications.

BACKGROUND:

The staff requirements memorandum (SRM) to COMSECY-08-0036, "Status of Decommissioning Program—2008 Annual Report," dated January 8, 2009, stated that staff should discontinue publication of the annual report on the status of decommissioning in NUREG-1814, and instead publish an annual Commission paper on the status of the decommissioning program with information substantially equivalent to that contained in the 2008 Annual Report. In accordance with this SRM, the 2010 Annual Report is provided to the Commission for information only.

CONTACT: Kim Conway, FSME/DWMEP
(301) 415-1335

Enclosed is the 2010 Annual Report on the Status of the Decommissioning Program, which provides a comprehensive summary of the NRC's Decommissioning Program. The report summarizes the status of sites undergoing decommissioning since the last report, through September 30, 2010, including the decommissioning of complex materials sites, commercial reactors, research and test reactors, uranium recovery facilities, and fuel cycle facilities. The report also discusses highlights in the decommissioning program since last year's report, and informs the Commission of decommissioning issues that the staff will address in the coming year.

DISCUSSION:

Summary of Status Update for FY 2010

As of September 30, 2010, 12 nuclear power and early demonstration reactors, 12 research and test reactors, 19 complex decommissioning materials facilities, 1 fuel cycle facility (partial decommissioning), 21 Title I¹ uranium recovery facilities, and 11 Title II uranium recovery facilities are undergoing non-routine decommissioning or are in long-term safe storage, under NRC jurisdiction. In FY 2010, the Decommissioning Program continued to make progress at complex sites where decommissioning had long been delayed. For example, the staff completed its reviews of the West Valley Demonstration Project Phase I decommissioning plan. This, along with other actions by the U.S. Department of Energy (DOE) and State of New York, will allow progress to be made in decommissioning major parts of the facility. Progress was also facilitated through innovative decommissioning approaches for existing sites. One example of this is the staff's completion of the license transfer to Zion Solutions from the Exelon Generating Company to facilitate the decommissioning of Zion Units 1 and 2.

Throughout FY 2010, the staff also continued efforts to broaden available information on the Decommissioning Program and reflect a more national perspective. Information, where applicable, was collected from Agreement States on Agreement State sites. In FY 2010, staff also continued its emphasis on the decommissioning of legacy uranium recovery sites and participated in interagency efforts to address uranium contamination in the Navajo Nation and the Grants Mineral Belt area in New Mexico resulting in the development of a 5-year plan for remediation. Additionally, to ensure an efficient and effective regulatory approach on uranium recovery activities, NRC staff implemented a number of initiatives under the Integrated Decommissioning Improvement Plan (IDIP), including: updating site closure and site transition guidance, clearly defining the closure process, and seeking additional program improvements from staff with extensive experience.

The Decommissioning Program also addressed generic technical issues in FY 2010. In particular, a working group designated "Engineered Covers Technical Group" was established to discuss and review the implications of a report that resulted from an Office of Nuclear Regulatory Research project. The project involved assessments of the performance of engineered soil/composite cover materials with regard to infiltration of water through the covers at disposal sites. The technical group was tasked to assess the technical findings, any potential impact on low-level waste, uranium recovery, and decommissioning licensing activities and the

¹ Title I refers to facilities under the Uranium Mill Tailings Radiation Control Act of 1978, as amended, that were inactive, unregulated processing sites when the act was passed, while Title II facilities are those facilities licensed by the NRC or an Agreement State.

short-term/long-term significance of impacts as related to performance of engineered covers on the health and safety of the public and the environment. Given the broad range of facilities that are potentially impacted, engineered cover performance will continue to be a key area of work for the Decommissioning Program.

In FY 2010, the financial assurance working group (FAWG) continued to evaluate the financial assurance required for Category 1 and 2 radioactive sources to ensure that funding is available for the final disposition of the sources. The group also considered the issue of long-term storage of these unused sources. The FAWG formulated recommendations for consideration regarding these issues, and found that until additional disposal capacity is made available, the financial burden related to the disposal of these materials cannot be quantified with any specificity. Thus, the FAWG focused on various mitigation strategies including, but not limited to, modifying current financial assurance regulations to broaden their scope.

Trends in Fiscal Year 2011 and Beyond

It is expected that FY 2011 activity in the Decommissioning Program will remain largely level, as most power reactors remain in SAFSTOR mode. Progress in research and test reactor decommissioning is expected to increase somewhat in FY 2011, with Ford Nuclear Reactor and NASA Mockup and Plum Brook facilities expected to complete decommissioning in the coming year. Additionally, decommissioning activities are expected to be completed at several complex materials sites in FY 2011, including the ABC Laboratories, NWI Breckenridge, Sigma-Aldrich, and UNC Naval Products sites; and some Title II uranium recovery sites are expected to complete decommissioning activities and be transferred to DOE for long-term control. These sites are American Nuclear Corporation, Bear Creek, Exxon Mobil Highlands, and Rio Algom-Ambrosia Lake. It is expected that this progress in sites completing decommissioning will be offset by other sites (e.g., Army depleted uranium) entering the Decommissioning Program.

Finally, FY 2011 also will see continued emphasis on uranium recovery decommissioning in the staff's IDIP. In the past, IDIP focused primarily on materials and reactor decommissioning. The recent emphasis on uranium recovery decommissioning will continue, as staff examines what lessons-learned and best practices can be gained in the decommissioning of uranium recovery facilities, including legacy mill sites and in-situ recovery facilities. In this regard, the staff is working with the Office of International Programs and the International Atomic Energy Agency on programs to address uranium mining and milling contamination in countries lacking a strong regulatory framework.

CONCLUSION:

The staff plans to continue its close oversight of the decommissioning of nuclear power reactors, research and test reactors, complex materials sites, and uranium recovery facilities. In addition, the staff plans to continue to identify and implement methods to make the decommissioning program more efficient and effective and continue its efforts to prevent future legacy sites.

Site summaries for all decommissioning sites are accessible to the Commission and the public through the NRC's decommissioning website (<http://www.nrc.gov/waste/decommissioning.html>). To ensure that the website is current, project managers in the Office of Federal and State Materials and Environmental Management Programs, the

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Office of Nuclear Material Safety and Safeguards, and the Regions routinely review and update the program information.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objections. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

/RA/

Charles L. Miller, Director
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
Status of the Decommissioning
Program—2010 Annual Report

Status of the Decommissioning Program

2010 Annual Report

**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
ANL	Argonne National Laboratory
CBP	Cementitious Barriers Partnership
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	<i>Code of Federal Regulations</i>
CNS	Convention on Nuclear Safety
CRCPD	Conference of Radiation Control Program Directors
DOE	U.S. Department of Energy
DP	decommissioning plan
DWMEP	Division of Waste Management and Environmental Protection
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAWG	financial assurance working group
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
FSSR	Final Status Survey Report
FTE	full-time equivalents
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
GETR	General Electric-Hitachi Test Reactor
HPS	Hunters Point Shipyard
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
N/A	not applicable
NARM	naturally occurring and accelerator-produced radioactive material
NASA	National Aeronautics and Space Administration
NEA	Nuclear Energy Agency
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
OAS	Organization of Agreement States
PNNL	Pacific Northwest National Laboratory
PSDAR	Post-Shutdown Decommissioning Activities Report
RAI	request for additional information
RES	Office of Nuclear Regulatory Research
RP	reclamation plan
RWMC	Radioactive Waste Management Committee
SADA	Spatial Analysis and Decision Assistance
SDMP	Site Decommissioning Management Plan
SER	Safety Evaluation Report
SLDA	Shallow Land Disposal Area
SOC	Statement of Considerations
TAG	technical advisory group
TBD	to be determined
TER	technical evaluation report
TRIGA	Training, Research, Isotopes General Atomics
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	U.S. Army Corps of Engineers
VESR	Vallecitos Experimental Superheat Reactor
WPDD	Working Party on Decommissioning and Dismantling

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 decommissioning activities in fiscal year (FY) 2010, 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 U.S. Nuclear Regulatory Commission's (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. Site summaries on the NRC public website (<http://www.nrc.gov/about-nrc/regulatory/decommissioning.html>) are updated on a quarterly basis. The information contained in this report is current as of September 30, 2010.

As noted in our FY 2009 report (SECY-09-0167, "Status of the Decommissioning Program—2009 Annual Report"), the character of the decommissioning program is changing as: (1) successes in the past have substantially reduced the inventory of the sites in decommissioning; (2) NRC becomes involved with new facilities (e.g. Hunters Point and McClellan); and (3) new programmatic issues arise. Examples of such issues 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 addition, in FY 2010, staff continued the increased emphasis on the decommissioning of conventional uranium milling sites. FY 2010 also marked progress at sites like NWI Breckenridge, where decommissioning had previously been delayed.

It is expected that FY 2011 will see similar trends in the decommissioning program as most power reactors remain in SAFSTOR and progress in research and test reactors increases somewhat. In FY 2011, completion of decommissioning activities at complex materials sites is expected to increase over FY 2010 levels and remain at a similar level for several years. In addition, within the next three years, several Title II¹ 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.

¹ The Uranium Mill Tailings Radiation Control Act of 1978 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 200 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 licenses are not routine licensing actions.

As of September 30, 2010, 12 nuclear power and early demonstration reactors, 12 research and test reactors, 19 complex decommissioning materials facilities, 1 fuel cycle facility, 21 Title I uranium recovery facilities, and 11 Title II uranium recovery facilities are undergoing non-routine decommissioning or are in long-term safe storage, under NRC jurisdiction. 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 special nuclear material, 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," of the *Code of Federal Regulations* (10 CFR Part 50) 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

NRC 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 Materials Safety and Safeguards (NMSS) regarding the independent spent fuel storage installations (ISFSIs) at reactor sites undergoing decommissioning.

As of September 30, 2010, the 12 nuclear power and early demonstration reactors identified in Table 2-1 are undergoing decommissioning. Table 2-1 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/>.

2.1.1 Decommissioning Process

The decommissioning process begins when a licensee decides to permanently cease operations. The major steps that make up the reactor decommissioning process are notification of cessation of operations, submittal and review of the Post-Shutdown Decommissioning Activities Report (PSDAR), submittal, review and approval 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 and schedule for the planned decommissioning activities;
- an estimate of the expected costs; and
- a discussion of the means 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 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. The licensee exercises its own judgment in determining the scope and extent of the latitude provided in 10 CFR 50.59 and proceeds at its own risk.

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 presubmittal meetings to agree on the format and content of the LTP. These meetings are 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 radiation survey;
- description of the end use of the site, if restricted;
- an updated site-specific estimate of remaining decommissioning costs; and
- a supplement to the environmental report describing any new information or significant environmental change associated with the licensee’s proposed termination activities.

In addition, the licensee must 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; NUREG-1757, “Consolidated Decommissioning Guidance,” Revision 1 of Volume 2, issued September 2006; and NUREG-0586, “Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities—Supplement 1,” issued November 2002. 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) which identifies the final radiological conditions of the site and requests that the NRC either: (1) terminate the 10 CFR Part 50 license or (2) 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 2010 Activities

- Staff finalized the transfer of the possession license for Zion Units 1 and 2 from Exelon Generating Company LLC to ZionSolutions LLC to facilitate decommissioning. This will allow the implementation of an innovative approach to reactor decommissioning, which, if successful, could become the model for decommissioning other power reactor sites.
- Staff completed an expanded acceptance review of the revised LTP for Fermi Unit 1 after first indentifying significant additional information necessary for its review.
- In February 2010, staff issued a license amendment to release off-shore portions of the San Onofre Unit 1 cooling intake and outlet pipes for unrestricted use.
- To ensure openness during the regulatory process, the staff held public meetings,² including a meeting regarding Humboldt Bay to discuss decommissioning actions.

² Public meetings include formal public meetings sponsored by the NRC and/or the licensee, as well as technical meetings that are open to observation by members of the public.

- During the past year, staff performed inspections at Dresden Unit 1, Fermi Unit 1, Humboldt Bay, Indian Point 1, La Crosse, Millstone Unit 1, Peach Bottom Unit 1, Three Mile Island Unit 2, and Zion Units 1 and 2.

2.1.3 Fiscal Year 2011 Trends and Areas of Focus

Progress in power reactor decommissioning will remain at a similar level as in FY 2010, with the number of sites expected to stay the same as most reactors stay in SAFSTOR. Fermi and Humboldt Bay reactors are expected to complete decommissioning in 2012 and 2015, respectively. Through unique decommissioning approaches such as the one employed at Zion, there may be an increase in the rate of completion of power reactor decommissioning in the future.

Table 2-1 Power and Early Demonstration Reactors Undergoing Decommissioning

Reactor		Location	PSDAR* Submitted	LTP Submitted	LTP Approved	Completion of Decomm.**
1	Dresden Unit 1	Morris, IL	6/98	TBD	TBD	2036
2	Fermi Unit 1	Newport, MI	4/98	2009	2010	2012
3	Humboldt Bay	Eureka, CA	2/98	2011	2012	2015
4	Indian Point Unit 1	Buchanan, NY	1/96	2020	2022	2026
5	La Crosse	La Crosse, WI	5/91	TBD	TBD	2026
6	Millstone Unit 1	Waterford, CT	6/99	TBD	TBD	TBD
7	Nuclear Ship Savannah	Baltimore, MD	12/08	2014	TBD	2031
8	Peach Bottom Unit 1	Delta, PA	6/98	TBD	TBD	2034
9	San Onofre Unit 1	San Clemente, CA	12/98	TBD	TBD	2030
10	Three Mile Island Unit 2	Harrisburg, PA	2/79	TBD	TBD	2036
11	Vallecitos Boiling Water Reactor	Pleasanton, CA	7/66	TBD	TBD	2019
12	Zion Units 1 & 2	Zion, IL	2/00	TBD	TBD	2020

TBD to be determined

* PSDAR or DP 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.

Note: Licensees submitted DPs (or equivalent) before 1996 and PSDARs after 1996.

2.2 Research and Test Reactor Decommissioning

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, core 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, 2010, the 12 research and test reactors identified in Table 2-2 are undergoing decommissioning, representing an increase of 1 facility (the University of Arizona) from the previous FY. In FY 2010, fuel was transferred from General Atomics TRIGA Mark F and Mark I research reactors to DOE for storage. General Atomics is now proceeding with decommissioning of these reactors. 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 2 years following permanent cessation of operations, the licensee must submit a written application for license termination to the NRC, and in no case later than 1 year before license expiration. Each application for license termination must be accompanied by a DP submitted for NRC approval. The NRC and licensee hold presubmittal meetings to agree on the format and content of the DP. These meetings are intended to improve the efficiency of the DP development and review process.

Decommissioning Plan

The DP must include the following:

- The choice of the alternative³ for decommissioning with a description of the planned decommissioning activities;

³ 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.

- 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;
- 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; and
- A discussion of the means for evaluating the environmental impacts associated with decommissioning activities, such as a supplement to the environmental report describing any new information or significant environmental change associated with the licensee's proposed termination activities.

In addition, the licensee must 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, 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 approve 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 2010 Activities

- In February 2010, the NRC approved a dose assessment approach, via an amendment to the licenses for the National Aeronautics and Space Administration (NASA) Mockup and Plum Brook facilities, to demonstrate that the stream bed and banks of the Plum Brook between the site and the Sandusky Bay meet the criteria for unrestricted use prior to license termination.
- The NRC staff reviewed DPs for the Worcester Polytechnic Institute and University of Arizona facilities.
- The staff performed inspections at Ford Nuclear Reactor, General Atomics TRIGA Mark F, General Atomics TRIGA Mark I, General Electric-VESR, NASA Mockup and Plum Brook, and Veterans Administration facilities.

2.2.3 Fiscal Year 2011 Trends and Areas of Focus

Progress in research and test reactor decommissioning is expected to increase in FY 2011 and beyond, with Ford Nuclear Reactor and NASA Mockup and Plum Brook facilities expected to complete decommissioning in FY 2012. Decommissioning is expected to be completed at the Veterans Administration, University of Arizona, and University of Illinois facilities in FY 2013.

Table 2-2 Research and Test Reactors Undergoing Decommissioning

Reactor	Location	Status	Completion of Decomm.	
1	Ford Nuclear Reactor	Ann Arbor, MI	DP Approved	2011
2	General Atomics TRIGA Mark F	San Diego, CA	DP Approved	2019
3	General Atomics TRIGA Mark I	San Diego, CA	DP Approved	2019
4	General Electric- Hitachi GETR	Sunol, CA	Possession-Only	2019
5	General Electric-Hitachi VESR	Sunol, CA	Possession-Only	2019
6	NASA Mockup	Sandusky, OH	DP Approved	2011
7	NASA Plum Brook	Sandusky, OH	DP Approved	2011
8	University of Arizona	Tucson, AZ	DP Submitted	2012
9	University of Buffalo	Buffalo, NY	Possession-Only	TBD
10	University of Illinois	Urbana, IL	DP Approved	2012
11	Veterans Administration	Omaha, NE	DP Submitted	2012
12	Worcester Polytechnic Institute	Worcester, MA	DP Submitted	TBD

Notes: GETR General Electric Test Reactor
 NASA National Aeronautics and Space Administration
 TBD to be determined
 TRIGA Training, Research, Isotopes General Atomics
 VESR Vallecitos Experimental Superheat Reactor

2.3 Complex Material 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, 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, 2010, 19 complex materials sites are undergoing decommissioning (see Table 2-3). Complex material 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 ground water 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 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 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.⁴ The regulations authorize alternative schedules, with NRC approval.

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.

Before submitting a DP, the licensee or responsible party meets with the NRC to agree on the form and content of the DP. This presubmittal meeting is intended to make the DP review process more efficient by reducing the need for requests for additional information (RAIs). It is

⁴ Unlike the case of nuclear power reactor decommissioning, complex material site licensees or responsible parties cannot proceed with decommissioning until the DP is approved.

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

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 parties' 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 RAls 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 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, 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 survey (FSSR), 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 2010 Activities

- In February 2010, the NRC issued a Technical Evaluation Report documenting its review of the Phase 1 DP for West Valley. Staff also concurred on the EIS for West Valley. This, along with other actions by DOE and the State of New York, will allow progress to be made in decommissioning major parts of the facility.
- In July 2010, the staff approved the Phase 2 DP for Mallinckrodt Chemical, which authorizes Mallinckrodt to proceed with the decommissioning of the NRC-licensed portions of the site.
- 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 (HPS) site in San Francisco, CA.
- The staff conducted a site visit at McClellan Air Force Base and met with Air Force, EPA, State of California agencies, the City of San Francisco, and Sacramento County in March 2010. The staff concluded that the limited involvement approach would be appropriate.
- The staff conducted a full site visit of the Navy's Alameda Naval Air Station in March 2010, and met with the Navy, EPA, State of California agencies, and the City of Alameda. Information from the site visit and additional discussions with the Navy will be evaluated to determine the appropriate approach for Alameda.
- The staff worked closely with the Office of the General Counsel and the U.S. Department of Justice in evaluating and negotiating a settlement agreement to ensure the proper decommissioning of the Kerr-McGee Cimarron site. Tronox, Inc., the licensee for Kerr-McGee Cimarron, filed for Chapter 11 bankruptcy protection in 2009.
- In FY 2010, the staff continued review of DPs for the ABC Laboratories and the Westinghouse Electric-Hematite sites.
- The staff performed inspections at AAR Manufacturing, ABB Prospects, ABC Labs, Jefferson Proving Grounds, Mallinckrodt Chemical, NWI Breckenridge, Sigma-Aldrich, Stepan, UNC Naval Products facilities, and Westinghouse Electric-Hematite.
- During the past year, the staff participated in public meetings for Westinghouse Electric-Hematite, West Valley Demonstration Project, Schofield Barracks, and Pohakuloa Training Area sites. The staff also participated in industry conferences and workshops.

Other significant activities are described below.

Progress at NWI Land Management - Breckenridge

NWI Breckenridge remains in bankruptcy, but a court settlement resulted in the funds necessary to complete remediation. With the availability of funding through the settlement, progress was made throughout FY 2010 to remediate the site. A remediation plan was approved by the NRC in February 2010, and remediation recommenced at the site in May 2010. In August 2010, inspectors responded after NWI Breckenridge's remediation contractor reported a spill of approximately 30 gallons of an unknown and potentially hazardous liquid while performing excavation and remediation activities. Decommissioning has since resumed after analysis of the soil, and the staff will continue to monitor decommissioning activities by performing inspections, and continue to meet with local interest groups. Upon completion of decommissioning, the licensee will perform a final status survey, and the NRC will perform a confirmatory survey.

Interactions with the Military about the Regulation of Residual Contamination

The staff's site visits to the Navy's Alameda site provided insights about radionuclide contaminants that are under NRC jurisdiction (e.g., strontium-90 and depleted uranium) and that are often comingled with radium-226. Until recently, the Navy believed that Alameda only had radium-226 contamination. These radionuclides have been found primarily in soil, buildings, sewer lines, and two landfills, but the strontium-90 was thought to be limited to the landfills where strontium-90 deck and personnel markers were buried in the 1960s and 1970s. The Navy is in the early phase of remediation investigation for both the radioactive and hazardous chemical contaminants under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) process and EPA oversight. The Alameda information prompted the staff to meet with each of the military services to discuss the Alameda example and ask if there are other sites similar to Alameda. The staff requested that the Navy provide a list of sites where radionuclides have been confirmed and where the remediation process has been started. The site list also provides information about each site. The Navy's site list identifies 20 sites with radioactive material under NRC jurisdiction. The information from most of these sites confirms that radium-226 is comingled with other radionuclides. Region and Headquarters decommissioning staff are discussing with the Navy how to effectively and efficiently regulate the decommissioning of these sites in coordination with the ongoing remediation under CERCLA. Each of the services has indicated that there are additional sites on active installations, where contamination is only suspected and information is limited.

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

The Statement of Considerations (SOC) for NRC's NARM rule, included a commitment for NRC to interact with the military to resolve potential issues regarding the discussion in the SOC that the NRC does not have jurisdiction for certain forms of radium-226 that are military operational and under military control. During FY 2010 the staff continued its interactions with the military services to understand the forms of radium-226 that are under military control (e.g., contamination, devices in vehicles and aircraft, and devices in storage) and associated military activities (e.g., remediation of contamination in soil and landfills, and removal of devices from vehicles). The military also provided information to clarify if any of these forms could be used in military operations. The staff is also working with each military service to obtain a list of sites

with confirmed radioactive material, including radium-226, that will provide estimates of how many sites could come under NRC jurisdiction. These interactions as well as the staff reviews of the HPS and McClellan site contributed to identifying potential issues, obtaining the views of each military service regarding the question of the NRC's jurisdiction, and estimating the resources needed to support regulation of this form of radium. This information is the basis for the staff's analysis and recommendations on NRC's jurisdiction for certain forms of military radium-226. The staff plans to submit a separate Commission paper on this topic in FY 2011.

Coordination with U.S. Army Corps of Engineers Regarding FUSRAP Sites

Although New Jersey is now an Agreement State, it did not request regulatory authority for 11(e).2 material. As a result, the NRC retained jurisdiction over the Stepan Company site. There are three burial pits at the Stepan site. To date, the license is suspended for all three burial pits. The NRC staff continues to perform periodic inspections to ensure that the licensee complies with environmental monitoring requirements. In June and August 2010, NRC staff conducted site inspections and independent split samples were collected to confirm final status surveys. In April 2010, Stepan Company submitted a request to dispose of soil stockpiles, generated outside the burial pits, at an off-site Resource Conservation and Recovery Act, Subtitle C facility.

In addition, the staff also participated in three interagency meetings and one public meeting related to the USACE proposed site decommissioning activities at the BWXT Shallow Land Disposal Area (SLDA) Site in Vandergrift, Pennsylvania. The NRC staff is currently reviewing USACE's Revised Work Plans for the BWXT-SLDA site submitted in August 2010. The NRC staff is also working with USACE to finalize a Confirmatory Order by early spring 2011, which will allow suspension of the BWXT-SLDA license and for the USACE to initiate remediation activities of Formerly Utilized Sites Remedial Action Program (FUSRAP) material under their CERCLA authority.

Army Sites in Hawaii

In 2005, an Army contractor clearing a firing range identified 15 "tail fin assemblies" as being from the M101 spotting round – a round used with the Davy Crockett Weapons System. The Davy Crockett was a nuclear-capable weapon, and a depleted uranium spotting round was used during testing activities that were concluded in the 1960s. The depleted uranium was licensed by the Atomic Energy Commission for manufacture and distribution to Army field units. Concerns of residents near firing ranges at the Schofield Barracks (on the island of Oahu) and Pohakuloa Training Area (on the island of Hawaii) resulted in NRC staff performing inspections to verify the presence of depleted uranium at these sites. The Army is in the process of determining the extent to which depleted uranium from Davy Crockett munitions testing is present at other Army bases on the US mainland.

In November 2008, the Army submitted a request for a possession-only license for its sites containing depleted uranium. This license request was supplemented in July 2009, when the Army submitted physical security and radiation monitoring plans. In FY 2010, the staff has reviewed the Army's generic environmental monitoring plan and the specific monitoring plans for Schofield and Pohakuloa. In March 2010, the NRC requested that, within six months, the Army provide plans for each of the seven remaining Army locations containing DU. In September,

NRC received a letter from the Army requesting an additional two-week extension. On September 13, 2010, the Army indicated that it would be submitting a plan for Fort Benning, with subsequent reports to follow on a schedule of one plan per month basis.

2.3.3 Fiscal Year 2011 Trends and Areas of Focus

Progress in the decommissioning of complex material sites is expected to increase in FY 2011, with sites such as ABC Laboratories, Beltsville Agricultural Research Laboratory, NWI Breckenridge, and Sigma-Aldrich expected to complete decommissioning in the coming year. The staff will also continue its focus on Army sites with depleted uranium contamination, and continue to work toward clarifying NRC's jurisdiction of military radium-226.

Table 2-3 Complex Decommissioning Sites

Name		Location	Date DP Submitted	Date DP Approved	Compliance Criteria	Projected Removal
1	AAR Manufacturing, Inc.	Livonia, MI	10/97 revised 9/06, 4/07 ⁺	5/98 TBD	LTR-RES	9/12
2	ABB Prospects, Inc.	Windsor, CT	4/03	6/04	LTR-UNRES	12/11
3	ABC Labs	Columbia, MO	10/09	TBD	LTR-UNRES	9/11
4	Babcock & Wilcox (Shallow Land Disposal Area)	Vandergrift, PA	6/01 revised N/A	N/A	LTR-UNRES	9/15
5	Beltsville Agricultural Research Laboratory	Beltsville, MD	8/09	TBD	LTR-UNRES	12/10
6	FMRI (Fansteel), Inc.	Muskogee, OK	8/99, revised 5/03	12/03	LTR-UNRES	6/23
7	Hunter's Point Naval Shipyard*** (former Naval shipyard)	San Francisco, CA	N/A	N/A	N/A	N/A
8	Jefferson Proving Ground	Madison, IN	8/99 revised 6/02, 9/13	10/02 TBD	LTR-RES	12/13
9	Kerr-McGee	Cimarron, OK	4/95	8/99	Action-UNRES	1/17
10	Mallinckrodt Chemical, Inc.	St. Louis, MO	Phase 1 11/97, Phase 2 9/08	Phase 1 5/02, Phase 2 7/10	LTR-UNRES	1/12

Table 2-3 Complex Decommissioning Sites

Name	Location	Date DP Submitted	Date DP Approved	Compliance Criteria	Projected Removal	
11	McClellan*** (former Air Force base)	Sacramento, CA	N/A	N/A	N/A	N/A
12	NWI Breckenridge	Breckenridge, MI	3/04	8/04	LTR-UNRES	12/10
13	Pohakuloa Training Area (Army site)	Hawaii	N/A	N/A	N/A	N/A
14	Schofield Army Barracks (Army site)	Oahu, HI	N/A	N/A	N/A	N/A
15	Sigma-Aldrich	Maryland Heights, MO	10/08, revised 11/10	5/09, Revised TBD	LTR-UNRES	6/11
16	Stepan Chemical Company	Maywood, NJ	N/A	N/A	LTR-UNRES	9/14
17	UNC Naval Products	New Haven, CT	8/98, revised 2004, 12/06	4/99, revised 10/07	LTR-UNRES	9/11
18	West Valley Demonstration Project	West Valley, NY	Phase 1 3/09	Phase 1 2/10	LTR-UNRES**	TBD
19	Westinghouse Electric (Hematite Facility)	Festus, MO	4/04 revised 6/06, 8/09	TBD	LTR-UNRES	12/13

* Timeline for completion is protracted because of the need to satisfy National Environmental Policy Act requirements, to conduct a public hearing, to address multiphase DP submittals, or a combination of the above.

** 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 Navy's Hunter's Point Shipyard site and the Air Force's McClellan site are being remediated by the Navy and Air Force, respectively, under the required CERCLA process and EPA oversight. It is assumed that some licensable material might be present at both sites; however, 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.

+ The staff is currently reviewing the draft legal agreement and restrictive covenant for restricted use.

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 Decommissioning⁵

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, ground water cleanup is still ongoing at many of these Title I sites. When ground water cleanup is completed, DOE will submit a revised long-term surveillance plan (LTSP) for NRC concurrence. Table 2-4a identifies the 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, 2009, 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. Status summaries for the Title II sites undergoing decommissioning are provided at <http://www.nrc.gov/info-finder/decommissioning/uranium/>.

⁵ This report does not address regulation of new or operating uranium recovery facilities with the exception of a brief discussion on their decommissioning.

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.” They are subject instead 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 DP⁶ 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 ground water 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, ground water 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.

⁶ For uranium recovery sites, DPs typically deal with the remediation of structures, while RPs typically deal with tailings impoundments, ground water 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 DP/RP, the licensee must complete decommissioning within 24 months or apply for an alternate schedule. For conventional facilities, with ground water contamination, or for ISR facilities with well-field restoration, 24 months is usually insufficient, because remediation of ground water 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 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 ground water quality after the completion and approval of ground water restoration by monitoring the ground water 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 ground water restoration. Ground water restoration is considered completed when concentrations on and off site (depending on the extent of contaminant migration) meet previously established ground water 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 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 RAs to address outstanding issues.

License Termination—Conventional Mills

After all reclamation activities have been completed and approved, the licensee, the NRC staff, and the long-term custodian will start license termination procedures. Before a conventional mill license is terminated, the custodial agency (i.e., State agency, DOE, or other Federal agency) will submit an LTSP for NRC staff review and acceptance. The LTSP documents the custodian's responsibilities for long-term care, including security, inspections, ground water 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 ground water 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 ground water restoration and surface reclamation is performed so that the site can qualify for unrestricted release.

2.4.2 Summary of Fiscal Year 2010 Activities

- For Title I facilities in FY 2010, the staff reviewed Groundwater Compliance Action Plans for the Gunnison, Naturita, and Lakeview sites.
- For Title II facilities in FY 2010, the staff reviewed the Pathfinder-Lucky Mc LTSP.
- In FY 2010, staff performed site inspections at the Homestake Mining, PRI Smith Ranch, Rio Algom-Ambrosia Lake, and Western Nuclear Inc.-Split Rock sites. Staff also visited the Green River, Lakeview, Moab, Maybell West, Umetco, Shirley Basin South, and Riverton sites.
- In FY 2010, staff also reviewed and approved the long-term care transfer request for the Maybell West site in Colorado. In March 2010, DOE became the long-term custodian and caretaker of the site.

To reflect an emphasis on uranium recovery activities, NRC staff has implemented a number of initiatives under IDIP, including: updating site closure and site transition management directives, clearly defining the closure process, and seeking additional program improvements from staff with extensive experience. Specifically, some of the activities completed in FY 2010 include:

- Senior staff writing site-specific summaries of their knowledge on issues at all the Title I and II uranium recovery sites, and training more junior staff in the field.
- Documenting and cataloging historic Title I and II site information.
- Creating a library of Title I and II guidance documents.
- Implementing monthly “Lessons Learned” meetings with all of the decommissioning uranium recovery project managers.
- Recorded knowledge-management seminars of the experiences of senior staff at Title I and Title II sites.
- Working with DOE to finalize a site transfer protocol for the license termination of title II sites.

2.4.3 Fiscal Year 2011 Trends and Areas of Focus

The staff expects the termination of several uranium milling licenses within the next few years. American Nuclear Corporation, Bear Creek, ExxonMobil Highlands, and Rio Algom-Ambrosia Lake sites are expected to complete decommissioning activities in 2011, as well as Sequoyah Fuels in 2012. As in FY 2010, staff will continue its increased interaction with other agencies and the Navajo Nation.

Table 2-4a Decommissioning Title I Uranium Recovery Sites			
	Name	Location	Status
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/Monument Valley	Utah	Monitoring
13	Moab Mill	Utah	Active
14	Naturita	Colorado	Monitoring
15	Rifle	Colorado	Active
16	Riverton	Wyoming	Active
17	Salt Lake City	Utah	Monitoring
18	Shiprock	New Mexico	Active
19	Slick Rock	Colorado	Active

Table 2-4a Decommissioning Title I Uranium Recovery Sites			
20	Spook	Wyoming	Monitoring
21	Tuba City	Arizona	Active
<p>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.</p>			

Table 2-4b Decommissioning Title II Uranium Recovery Sites

	Name	Location	DP/RP Approved	Completion of Decomm.
1	American Nuclear Corporation	Casper, WY	10/88, Revision 2006	2011
2	Bear Creek	Converse County, WY	5/89	2011
3	ExxonMobil Highlands	Converse County, WY	1990	2011
4	Homestake Mining Company	Grants, NM	Revised plan—3/95	2017
5	Pathfinder—Lucky Mc	Gas Hills, WY	Revised plan—7/98	TBD
6	Pathfinder—Shirley Basin	Shirley Basin, WY	Revised plan—12/97	TBD
7	Rio Algom—Ambrosia Lake	Grants, NM	2003 (mill); 2004 (soil)	2011
8	Sequoyah Fuels Corporation	Gore, OK	2008	2012
9	Umetco Minerals Corporation	East Gas Hills, WY	Revised soil plan—4/01	TBD
10	United Nuclear Corporation	Churchrock, NM	3/91, Revision 2005	TBD
11	Western Nuclear Inc.—Split Rock	Jeffrey City, WY	1997	TBD
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. TBD to be determined				

2.5 Fuel Cycle Facility Decommissioning

Currently, the only fuel cycle facility undergoing partial decommissioning is the Nuclear Fuel Services site in Erwin, Tennessee. The public Web site at <http://www.nrc.gov/info-finder/decommissioning/fuel-cycle/> summarizes additional information about the status of the facility.

2.5.1 Fuel Cycle Facility Decommissioning Process

The decommissioning processes for fuel cycle facilities and for complex material 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 in NMSS and the Division of Fuel Cycle Safety and Safeguards (FCSS) during licensee operations and partial site decommissioning, and within the Office of Federal and State Materials and Environmental Management Programs (FSME) and within the Division of Waste Management and Environmental Protection (DWMEP) during entire site decommissioning in support of license termination. 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 2010 Activities

In FY 2010, Nuclear Fuel Services submitted FSSRs for partial decommissioning of the Erwin, Tennessee site and these reports are currently undergoing staff review. The licensee will continue to work toward releasing areas of the site.

3. GUIDANCE AND RULEMAKING ACTIVITIES

In FY 2010, 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 which 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 use, 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 2011.

Decommissioning Planning Rule

As the NRC's Decommissioning Program continues to mature, and fewer sites remain in the Decommissioning Program, the program is evolving to focus on ways to expedite the timely and effective decommissioning of sites with difficult issues (e.g., those with ground water contamination) and the prevention of future sites that are unable to complete decommissioning (legacy sites). To help prevent future legacy sites, the NRC submitted SECY-09-0042, dated March 13, 2009, to the Commission requesting approval to publish a final rule, "Decommissioning Planning (10 CFR Parts 20, 30, 40, 50, 70, and 72; RIN: 3150-AI55)," which was previously published as a proposed rule on January 22, 2008 (73 FR 3812). One aspect of the rulemaking focuses on ensuring that licensees have adequate financial assurance to complete decommissioning, while the other ensures that licensees have an adequate ground water monitoring program in place and will implement measures to minimize ground water contamination. Additionally, in certain cases, licensees will have new recordkeeping requirements for documenting spills, leaks, and unplanned releases. Implementation activities are on hold pending the Commission's consideration of the final rule.

4. RESEARCH ACTIVITIES

The Office of Nuclear Regulatory Research (RES) continues to support the dose modeling of releases of radioactive material from decommissioning sites through a number of activities discussed below.

A NUREG/CR that assesses properties of engineered cover soils and composites as they relate to water infiltration and radon release from waste management sites such as those at decommissioning, low-level waste radioactive waste disposal, and uranium mill tailings sites is in preparation. An important conclusion from the research contained in this document is that soil materials used in covers do not retain “as built” properties over the period of regulatory interest as assumed in most performance assessments. Within about 5 to 10 years after installation, the properties of these materials change to values typical of surrounding soils, suggesting that radon releases and water infiltration could be greater than that for which the covers were initially designed. In a workshop held at the NRC on August 3-5, 2010, experts from federal and state agencies, national laboratories, academia, and the private sector discussed the behavior of covers and methods to evaluate and model them. In addition to the planned NUREG/CR, research is underway to investigate the effects of coupling hydrology, erosion and erosion protection approaches on the performance of engineered covers to isolate waste.

RES is continuing the development or modification of computer codes useful for site decommissioning analyses. The incorporation of source-term modeling into RESRAD-OFFSITE is being implemented with Argonne National Laboratory (ANL) incorporating the Disposal Unit Source Term code, which contains several source-term models and was prepared by Brookhaven National Laboratory, into RESRAD-OFFSITE.

Cooperative efforts with the DOE, NIST, academic, private sector and international experts continued on the Cementitious Barriers Partnership (CBP) which is in its 3rd year. 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 was begun to examine pore solution chemistry and mineral phases in cementitious composites with chemical and mineral admixtures.

In the biosphere research program, soil-to-plant concentration ratios were determined for neptunium in three U.S. soils for uptake in alfalfa, corn, potato, and onion. Experiments to determine concentration ratios for iodine in these same plants continued this year. Coordination with international biosphere studies continued with the International Atomic Energy Agency (IAEA) and resulted in the publication of two documents related to the uptake of radionuclides in plants and animals. The IAEA Technical Report Series No. 472 “Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Terrestrial and Freshwater Environments” and the associated technical document, IAEA-TECDOC-1616, “Quantification of Radionuclide Transfer in Terrestrial and Freshwater Environments for Radiological Assessments” were completed and made available to the public. Cooperative studies continued with Pacific

Northwest National Laboratory (PNNL) and Oregon State University to study radionuclide uptake in fruit and nut trees.

Testing of the “Spatial Analysis and Decision Assistance” (SADA) code was completed and the code, documentation including case studies, and training were updated and made available to user office staff and the public. This code provides a tool for optimizing characterization of contaminated sites, assessing risk, determining the location of future volumetric or 3-D samples, and designing remedial action.

Work at PNNL and the United States Geological Survey (USGS) on the long term efficacy of bioremediation of groundwater contaminated with uranium at surficial sites and ISR facilities is progressing. NUREG/CR-7014, “Processes, Properties, and Conditions Controlling In Situ Bioremediation of Uranium in Shallow, Alluvial Aquifers,” dated July 2010, and written by researchers at PNNL, presents modeling results of various conditions for bioremediation of uranium in shallow aquifers. USGS is completing long term column experiments on the bioremediation of uranium in shallow aquifers with results to be modeled by PNNL. Experiments are also being conducted to assess bioremediation of uranium at ISR sites with modeling activities for these sites also underway.

ANL has also conducted research on test methods that have been used to the behaviors of portland cement-based materials and slag waste. Critical evaluations were made of leach tests and modeling approaches that have been used to predict the release of contaminants as these materials are weathered. ANL’s research is to be documented in NUREG/CR-7025, “Radionuclide Release from Slag and Concrete Waste Materials: Conceptual Models of Leaching from Complex Materials and Laboratory Test Methods” which is in the process of being published. The primary conclusion reached from these analyses is that many test results have been misinterpreted due to the inappropriate application of a process model to the data set. The expected product of this activity is a protocol that can be used by the NRC to integrate the results of short-term laboratory tests and field measurements that address long-term waste material degradation and leaching into the model calculations that are used to assess the stability of wastes at NRC-regulated sites.

RES is participating in the Nuclear Energy Agency (NEA) Sorption Project, Phase III, to provide practical and widely accepted guidance for the use of reactive transport models in performance assessments of chemically complex sites. A final report is expected in January 2011. In addition, RES maintains two technical advisory groups (TAGs) that enhance communication on issues important to site decommissioning and provide feedback to RES on research direction. These are the TAG on Groundwater and Performance Monitoring and the TAG on Assessing Uncertainty in Simulation Modeling of Environmental Systems. The TAG on ground water issues continued to be particularly useful this past year in providing insights about the environmental contamination found at several operating nuclear power plants.

5. INTERNATIONAL ACTIVITIES

NRC staff 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 IAEA and the NEA (of the Organization for Economic Cooperation and Development). 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. NRC staff interaction with international organizations and governments allows the NRC to share insights about successful, safe, and effective decommissioning approaches. This interaction also allows NRC staff to provide input for various international guidance and requirements that benefit other countries in establishing and implementing safe decommissioning strategies in the international community. The NRC 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

The NRC staff/management 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 Vienna Convention. Within the past year, the staff participated and supported IAEA activities in the following ways:

- Participated in the 28th and 29th semi-annual review cycles of the IAEA Waste Safety Standards Committee and meetings held in November 2009 and June 2010, respectively. These meetings addressed decommissioning and other related issues specifically, as part of IAEA waste safety activities.
- Participated as a Working Group Chairperson for the IAEA “*Joint Technical Meeting on the Use of Safety Assessments in Planning and Implementation of Decommissioning of Facilities using Radioactive Material*” to help ensure that IAEA guidance is appropriate and sufficient, and to provide insights from the NRC’s Decommissioning Program for developing guidance on the use of safety assessments in decommissioning.
- Participated in the IAEA project and workshop on Research Reactor Decommissioning Demonstration.

- Participated as IAEA consultants to review and further develop the two IAEA Safety Guides: WS-G-2.1 (DS402) Decommissioning of Nuclear Power Plants and Research Reactors; and WS-G-2.4 (DS404) Decommissioning of Fuel Cycle Facilities.
- Participated in two IAEA workgroup meetings to address potential exemption of nuclear installations being decommissioned from the Vienna Convention on Nuclear Liability and from the Convention on Supplementary Compensation. Staff participated in the development of safety criteria and a position statement, which were submitted to the IAEA Expert Group on International Nuclear Liability for consideration.
- Participated in the June 2009 IAEA conference on uranium recovery and cleanup activities, as well as the evaluation of proposed IAEA projects for decommissioning of uranium recovery facilities.
- Participated in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management planning, documentation and organizational activities.
- Participated in the preparation of the Convention on Nuclear Safety (CNS) National Report sections on Decommissioning and Low-Level Waste (LLW).
- Hosted a technical visit by senior managers and staff of the Spanish Consejo de Seguridad Nuclear to U.S. decommissioning and uranium recovery facilities.

Nuclear Energy Agency Activities

- Contributed to the NEA Radioactive Waste Management Committee (RWMC) Bureau Annual Report for the RWMC-43.
- Participated as U.S. representative and core group member of the NEA Working Party on Decommissioning and Dismantling (WPDD). Staff attended the WPDD 10th annual meeting, hosted by France in November 2009. Staff participated in preparation and review of several WPDD documents and delivered two presentations. Staff participated via teleconference in two WPDD core group meetings in March 2010 and September 2010.

6. PROGRAM INTEGRATION

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

In FY 2010, NRC continued the implementation of an enhanced Comprehensive Decommissioning Program, which allows NRC to compile, in a centralized location, more complete information on the status of decommissioning and decontamination of complex sites and uranium recovery sites in the United States. State contacts were provided a username and password to edit their site summaries in NRC's Complex Sites Tracking System database as new information becomes available. 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.

Financial Assurance Working Group

In FY 2010, the financial assurance working group (FAWG) continued to evaluate the financial assurance required for Category 1 and 2 radioactive sources to ensure that funding is available for the final disposition of the sources. The group also considered the issue of long-term storage of these unused sources. It was chaired by DWMEP, and included participants with varied backgrounds from DOE, the U.S. Department of State, EPA, Organization of Agreement States (OAS), and multiple NRC offices. The FAWG met monthly throughout most of FY 2010 and formulated recommendations for consideration. The group found that until additional disposal capacity is made available, the financial burden related to the disposal of these materials cannot be quantified with any specificity. Thus, the FAWG focused on various mitigation strategies including, but not limited to, modifying current financial assurance regulations to broaden their scope.

Engineered Cover Performance

In FY 2010, RES completed a research project involving assessments of the performance of engineered soil/composite cover materials with regard to infiltration of water through the covers at disposal sites. DWMEP established a working group, designated "Engineered Covers Technical Group", to discuss and review the implications of this research project and the report that resulted. The technical group was tasked with assessing the technical findings in the report and its potential impact on LLW, uranium recovery, and decommissioning licensing activities, and assessing the short-term/long-term significance of impacts as related to performance of engineered covers on the health and safety of the public and the environment.

In August 2010, RES and FSME held a workshop to discuss barrier performance. The workshop focused on engineered surface covers and bottom liners designed to isolate waste by

impeding surface-water infiltration into the waste systems and mitigating the migration of contaminants from the waste disposal site. Topics included engineered barrier performance, modeling, monitoring, and regulatory experiences at low-level radioactive waste, decommissioning, and uranium mill tailings sites. The workshop was coordinated with the States (i.e., Texas, South Carolina, Utah, Colorado, Washington, and New York) and Federal agencies (e.g., DOE, EPA, U.S. Department of Agriculture/ Agricultural Research Service, USGS, and DOE National Laboratories).

The Integrated Decommissioning Improvement Plan

The original decommissioning scope of IDIP was expanded to include uranium recovery closure and knowledge management activities. As a result, all DWMEP staff involved with the Uranium Recovery Closure and Decommissioning Programs were asked to identify improvements based on their own work experience. Approved work in FY 2010 and FY 2011 were documented in the IDIP Revision 3 that was completed in 2010. Major areas of work include: (1) consolidate and upgrade uranium recovery closure guidance; (2) prepare interim guidance for selected decommissioning topics (e.g., sensitivity and uncertainty analysis and ALARA for decommissioning); (3) preserve and transfer knowledge (e.g., erosion control desk guide and site summaries); (4) evaluate engineered cover performance based on new research; (5) develop new training courses for uranium recovery; and (6) improve business processes (e.g., improve NRC/DOE site transition process). Guidance and knowledge transfer products along with new training courses should enhance the internal integration of the program by providing information, lessons learned, and new methods that all project managers and technical reviewers can use in their licensing reviews and inspections. External integration with licensees and DOE will also be enhanced by the consolidated guidance and improved DOE site transition process.

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 special nuclear material, 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 2010 included the following:

- DWMEP staff participated in the Conference of Radiation Control Program Directors (CRCPD) activities, including the 2010 Annual Meeting and the Committee on Unwanted Radioactive Material meeting in March 2010.
- 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 (Alabama, Arizona, Arkansas, Colorado, Kansas, Massachusetts, Oklahoma, Pennsylvania, and Texas).
- In July 2010, NRC conducted a Health Physics for Uranium Recovery training course in Denver, Colorado, which was attended by staff from many Agreement State programs.

The following are examples of informal interactions:

- DWMEP staff participated in monthly OAS/CRCPD teleconferences.
- Agreement State representatives participated in the financial assurance working group, discussed in Section 6 of this report.

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	General Atomics	San Diego, CA	10/14/96	8/26/97	TBD
CA	Excel Research Services, Inc	Fresno, CA	6/22/06	8/30/07	TBD
CA	Providencia Holdings, Inc.	Burbank, CA	7/16/01	10/31/02	TBD
CA	Halaco	Oxnard, CA			TBD
CA	The Boeing Company	Simi Valley, CA		2/18/99	TBD
CA	Chevron Mining, Inc. (formerly Molycorp)	Mountain Pass, CA	6/9/06	TBD	TBD
CA	AeroJet Ordnance Company	Chino, CA	2/23/96	5/31/96	TBD
CA	Isotope Specialties	Burbank, CA	N/A	N/A	TBD
CA	Magnesium Alloy Products	Compton, CA	N/A	N/A	TBD
CO	Umetco Uravan	Uravan, CO		2/01/87	TBD
CO	Umetco Maybell	Maybell, CO	01/01/1995	1995	TBD

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
CO	Cotter Uranium Mill	Canon City, CO	Revised 2005	2005	In standby. TBD if going into D&D.
CO	Schwartzwalder Mine (Cotter)	Golden, CO	12/01/1996	1997	TBD
CO	Colorado School of Mines Research Institute Table Mtn.	Golden, CO	08/01/2006	TBD	TBD
CO	Colorado School of Mines Research Institute Creekside	Golden, CO	TBD	TBD	TBD
CO	Sweeney Mining and Milling	Boulder, CO	Pending		TBD
CO	Homestake Mining and Pitch	Sargeants, CO	05/01/2001	06/01/2001	TBD
CO	Redhill Forest	Fairplay, CO	Pending	TBD	TBD
CO	Clean Harbors	Deer Trail, CO	2005	2006	TBD
FL	Inuka Resources	Green Cove Springs, FL	TBD	TBD	TBD
IL	Spectrulite Consortium	Madison, IL			TBD

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
IL	Chicago Magnesium	Blue Island, IL	11/02/02	02/01/04	Phase 1— 12/04 Phase 2— 8/06 Phase 3— 11/10
IL	TRONOX (formerly Kerr-McGee)	West Chicago, IL	09/01/93	09/01/94	Complete 11/05
					Unknown
KS	Air Capitol Dial	Wichita, KS	TBD	TBD	TBD
KS	Aircraft Instrument & Development/RC Allen Instruments	Wichita, KS	TBD	TBD	TBD
KS	Century Instruments Corporation	Wichita, KS	TBD	TBD	TBD
KS	Instrument and Flight Research	Wichita, KS	TBD	TBD	TBD
KS	Kelley Instruments, Inc.	Wichita, KS	TBD	TBD	TBD
KS	Instrument, Inc.	Wichita, KS	TBD	TBD	TBD
MA	Shpack Landfill	Norton, MA	09/04	09/04	TBD

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
MA	BASF (formerly Engelhard)	Plainville, MA	None	N/A	TBD
MA	Starmet Corp. (formerly Nuclear Metals)	Concord, MA	10/06	Pending	TBD
MA	Wyman-Gordon Co.	North Grafton, MA	None	TBD	TBD
MA	Texas Instruments	Attleboro, MA	None	TBD	TBD
MA	Norton/St. Gobain	Worcester, MA	None	TBD	TBD
NE	LLWR Disposal Site (University of Nebraska-Lincoln)	Mead, NE	9/05/07	9/14/07	TBD
NJ	Shieldalloy Metallurgical Corp.	Newfield, NJ	6/06	TBD	2013
OH	Metallurg Vanadium Corp. (Formerly Shieldalloy Metallurgical Corp.)	Cambridge, OH	7/13/99	3/6/02	TBD
OH	Ineos USA, LLC (formerly BP Chemical)	Lima, OH	4/92	6/98	2020

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
OH	Advanced Medical Systems, Inc.	Cleveland, OH	6/01/04	5/23/05	2015
OR	TDY Industries d/b/a Wah Chang	Albany, OR	6/11/03	3/08/06	TBD
OR	PCC Structural, Inc.	Portland, OR	6/10/06	9/14/06	TBD
PA	Curtis-Wright Cheswick	Cheswick, PA	3/06	6/07	TBD
PA	Karnish Instruments	Lock Haven, PA			TBD
PA	Molycorp, Inc. (Washington)	Washington, PA	6/99	8/00	TBD
PA	Superbolt (formerly Superior Steel)	Carnegie, PA			TBD
PA	Quehanna (formerly Permagrain Products, Inc.)	Karthaus, PA	4/98, revised 3/03, 3/06	7/98, 9/03, 11/06	TBD
PA	Safety Light Corporation	Bloomsburg, PA			TBD
PA	Strube Incorporated	Lancaster County, PA			TBD
PA	Westinghouse Electric Corp. (Waltz Mill)	Madison, PA	4/97	1/00	TBD
PA	Whittaker Corporation	Greenville, PA	12/00, revised 8/03, 10/06	5/07	TBD
TX	ExxonMobil	Three Rivers, TX	4/85	9/82	TBD

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
TX	ConocoPhillips	Falls City, TX	11/87	9/80	TBD
TX	Rio Grande Resources	Hobson, TX	4/93 Alternate Concentration Limit—11/97	11/96	TBD
TX	COGEMA	Bruni, TX	11/03	4/06	Ground water complete Surface ongoing
TX	Intercontinental Energy Corp.	Three Rivers, TX	3/03	Ongoing	Ground water complete Surface TBD
TX	Everest Exploration, Inc. (decommissioning of Tex-1, Mt. Lucas sites)	Hobson and Dinero, TX	8/01	Ongoing	Ground water complete Surface cleanup ongoing

Table 7-1 Agreement State Decommissioning Sites					
State	Name	Location	Date DP Submitted	Date DP Approved	Project Complete
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	2013
N/A not applicable					
TBD to be determined					

8. RESOURCES

The total Decommissioning Program staff budget for FY 2010 was 69 full-time equivalents (FTE); and for FY 2011, the program has 69 FTE. Increases in the functional areas of materials licensing, inspection, and legal advice and representation are offset by decreases in other areas. These resource figures include personnel to perform licensing casework directly related to decommissioning sites; inspections; project management and technical support for decommissioning power 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 supervisory and nonsupervisory indirect FTE associated with the Decommissioning Program, and safety and environmental reviews for new uranium recovery facilities.

9. FISCAL YEAR 2011 PLANNED PROGRAMMATIC ACTIVITIES

The staff has planned a number of programmatic activities for FY 2011, including the continued implementation of IDIP. In FY 2011, staff will focus its activities on implementing knowledge management aspects of the IDIP. Specifically, knowledge management activities for the exchange of decommissioning lessons learned for selected topics (e.g., uranium recovery, institutional controls) have been identified by NRC staff. DWMEP management has prioritized the implementation of the identified topics. One of the major tasks that has been identified for implementation is the update of uranium recovery decommissioning and reclamation guidance for Title I and II sites. NRC staff is currently in the early scoping stages for this guidance development project.

Regarding the question about NRC jurisdiction for military radium-226, the staff will develop a Commission paper early in FY 2011 based on the information and views obtained from the military services. Issues will be discussed and approaches for resolving the issues will be recommended. The staff will also continue to coordinate with the military services to obtain a list of sites and site-specific information about radium and other radioactive contaminants that will assist both the staff and military in planning how to regulate the decommissioning of these sites.

In response to the staff requirements memorandum to SECY-07-0177, "Proposed Rule: Decommissioning Planning (10 CFR Parts 20, 30, 40, 50, 70 and 72: RIN: 3150-AH45)," dated December 10, 2007, the staff will continue to make further improvements to the decommissioning planning process for the remediation of significant radioactivity during the operational phase of facilities. The objective is to reduce complex decommissioning challenges (e.g., ground water contamination) that can lead to sites with inadequate financial assurance that are unable to complete decommissioning, also known as legacy sites. The staff is planning to engage stakeholders in developing a technical basis for mandating remediation, possible dose limits, or alternatives to the dose limits to help prevent future legacy sites. The technical bases will be a precursor to a proposed rule to include requirements for licensees to promptly remediate radioactively contaminated areas and thereby minimize the creation of legacy sites. The staff will be working on this technical basis through FY 2011.