

## **Implementing “Continuous Improvement” in the U.S. Nuclear Regulatory Commission’s Decommissioning Program**

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### **ABSTRACT**

The United States Nuclear Regulatory Commission’s (USNRC’s) comprehensive decommissioning program encompasses the decommissioning of all USNRC licensed facilities, ranging from the termination of routine licenses for sealed sources, to the closure of complex materials sites and nuclear power reactor facilities. Of the approximately 200 materials licenses that are terminated each year, most are routine and require little, if any, remediation to meet the USNRC unrestricted release criteria. However, some present technical and policy challenges that require large expenditures of resources, including a few complex materials sites that have requested license termination under the restricted-use provisions of 10 CFR 20.1403. Fiscal constraints to reduce budgeted resources in the decommissioning program, as well as concerns over the time to complete the decommissioning process have led to actions to improve the program and use resources more efficiently. In addition, the USNRC’s Strategic Plan requires efforts to identify and implement improvements to USNRC programs in order to improve efficiency, effectiveness, timeliness, and openness, of the USNRC’s activities, while maintaining the necessary focus on safety. Decommissioning regulations, and more recently the analysis of several issues associated with implementing those regulations, also have been significant catalysts for improvements in the decommissioning program. Actions in response to these catalysts have resulted in a program focused on the management of complex sites in a comprehensive, consistent, and risk-informed manner, as opposed to the past practice of focusing on sites deemed to be problematic. This paper describes the current status of the decommissioning of USNRC-licensed nuclear facilities, including an overview of recent decommissioning project completion efforts. It provides a detailed summary of past, current, and future improvements in the USNRC decommissioning program including the significant improvements implemented since 2000, and ongoing improvement efforts. Finally, the paper discusses how these efforts have been applied at specific sites and have contributed to the improvement in the decommissioning process at nuclear facilities, typically resulting in a reduction in the length of time needed for the decommissioning project or the reduction in the amount of USNRC and licensee resources necessary to complete a project.

### **INTRODUCTION**

"Decommission" is defined in NRC's regulations at 10 CFR 20.1003 as "to remove a facility or site safely from service and reduce residual radioactivity to a level that permits 1) release of the property for unrestricted use and termination of the license; or, 2) release of the property under restricted conditions and the termination of the license.[1] On July 21, 1997, the U.S. Nuclear Regulatory Commission (USNRC) published the final rule on Radiological Criteria for License Termination (the License Termination Rule or LTR) as Subpart E to 10 CFR Part 20.[2] The LTR established 0.25 millisievert/year (25 millirem/year) from all sources of radiation under the licensees control as the decommissioning criteria for USNRC-licensed sites. In addition, the LTR requires that doses be as low as reasonably achievable and that all sources (or pathways) be included in dose estimates. Finally, the

LTR provide for release of sites for unrestricted use and for release from regulatory control with restrictions on future site use.

The USNRC regulates the decontamination and decommissioning of materials and fuel cycle facilities, power reactors, research and test reactors, and uranium recovery facilities, with the ultimate goal of license termination. In June 2004, the elimination of the Site Decommissioning Management Plan (SDMP) designation was announced in the *Federal Register* (69 *Federal Register* 33946). The USNRC now manages materials decommissioning sites as “complex sites,” under a comprehensive decommissioning program. Approximately 200 materials licenses are terminated each year. Most of these license terminations are routine, and the sites require little, if any, remediation to meet the USNRC’s unrestricted release criteria. The decommissioning program focuses on the termination of licenses that are not routine, because the sites involve more complex decommissioning activities. Currently, there are 18 nuclear power reactors, 15 research and test reactors, 38 complex materials facilities, three fuel cycle facilities (partial decommissioning), and 12 uranium recovery facilities that are undergoing non-routine decommissioning or are in long-term safe storage, under USNRC jurisdiction.

## **FISCAL YEAR 2005 ACTIVITIES**

### **Power Reactors**

Currently, there are 18 nuclear power reactors undergoing decommissioning. Of these, 11 are in SAFSTOR and seven are actively decommissioning (DECON).

In Fiscal Year (FY) 2005, decommissioning activities were completed at two power reactors. In December 2004, the Trojan Nuclear Plant completed decommissioning activities, submitted the last supplement of its Final Status Survey Report (FSSR), and submitted an application for termination of its Facility Operating License. The staff terminated Trojan Nuclear Plant’s 10 CFR Part 50 [3] Operating License No. NPF-1 on May 23, 2005. The site was released for unrestricted use. The Trojan Nuclear Plant still holds a 10 CFR Part 72 [4] Independent Spent Fuel Storage Installation (ISFSI) license.

Maine Yankee Atomic Power Company (Maine Yankee) also completed decommissioning activities and submitted its FSSR in FY 2005. The FSSR demonstrated that the Maine Yankee site successfully met the 0.25 millisievert per year (25 millirem/year) unrestricted release criteria of 10 CFR Part 20, Subpart E.[2] The USNRC amended the Maine Yankee’s License No. DPR-36, to reduce site boundaries to approximately the footprint of the ISFSI in September 2005.

Also in FY 2005, the USNRC approved the License Termination Plans (LTPs) for the Big Rock Point and Yankee Rowe sites.

### **Test and Research Reactors**

Currently, 12 research and test reactors have decommissioning orders or amendments. Additionally, three research and test reactors are in “possession-only” status, either waiting for shutdown of another research or test reactor at the site, or for removal of the fuel from the site by the U.S. Department of Energy.

In October 2005, the USNRC issued a license termination letter to the University of Virginia. The USNRC concluded that the decommissioning process is complete and that the 2-MWt Research Reactor, the Cooperatively Assembled Virginia Low Intensity Education Reactor, and associated systems at the university may be released for unrestricted use. In addition, the USNRC issued a termination license to Manhattan College. The USNRC concluded that the decommissioning process is complete and that the Manhattan College Zero Power Reactor, a 0.1-watt tank-type research reactor, may be released for

unrestricted use. Finally, in November 2005 the USNRC concluded that dismantlement and decontamination activities and final radiation surveys and associated documentation demonstrated that the Saxton facility and site have met the criteria for decommissioning in Part 20 of the Commission's regulations and terminated the license.

### **Complex Materials Sites**

Currently, there are 38 complex materials sites undergoing decommissioning. In FY 2005, one site, the US Army's Ft. Belvoir site was added to the complex site list. Six sites were removed from the complex site list through license termination or completion of decommissioning. These sites were: (1) Alliant Ordinance and Ground Systems; (2) Augustana College; (3) Engelhard Minerals - Ravenna; (4) Kerr McGee Technical Center; (5) Kiski Valley Water Pollution Control Authority; and (6) Michigan Department of Natural Resources.

Additionally, in FY 2005, the staff approved Decommissioning Plans (DPs) for four sites, the Michigan Department of Natural Resources, Pathfinder, Eglin Air Force Base and Ft. Belvoir.

### **Uranium Recovery Facilities**

Currently, there are 12 NRC-licensed uranium recovery sites in decommissioning. These licensees include conventional uranium mills and in-situ leach facilities. In FY 2005, the USNRC completed numerous licensing actions for these facilities. The most significant actions included: termination of the licenses for the Sohio Western L-Bar and Petrotomics and transfer of these sites to Department of Energy under a USNRC general license; approval of an application for alternate concentration limits for Pathfinder - Shirley Basin; approval of ground-water monitoring plans for Western Nuclear, Inc, and Sequoyah Fuels Corporation; and, approval of the relocation and closure of evaporation ponds for Rio Algom.

### **Fuel Cycle Facilities**

The USNRC provides licensing oversight and decommissioning project management to fuel cycle facilities, including conversion plants, enrichment plants, and fuel manufacturing plants. Most of these facilities have been in operation for 20 or more years. As technology improves and operations at these facilities change, there are often unused areas on the sites that have residual contamination. In 2005, one conversion facility (Honeywell) and two fuel manufacturers (Framatome Richland and General Atomics) continued some decommissioning activities.

### **Guidance & Rulemaking Activities**

In FY 2005, the staff completed, and issued for public comment, draft revisions to NUREG-1757. Revised guidance was developed for: (1) restricted use/institutional controls; (2) on-site disposal; (3) removal of material after license termination; (4) realistic scenarios; and (5) intentional mixing of soil. (6) engineered barriers, and (7) use of Multi-Agency Radiation Laboratory Analytical Protocols (MARLAP). The draft revised guidance was published for public comment in September 2005, and the staff will inform the Commission of public comments on the restricted use/institutional control issue and other issues before the guidance is finalized in FY 2006.

During FY 2005 the staff used a risk-informed approach to inventory and evaluate information from 82 decommissioning sites to identify which of these sites had subsurface contamination and what caused the contamination. This information was used to identify the types of facilities, components, and operational activities that could have a higher potential, for subsurface contamination. Based on these results, general inspection guidance was completed in September 2005 which will be used in FY 2006 to develop specific inspection and enforcement

procedures tailored to the types of facilities, components, and activities identified in FY 2005. The general guidance will also be used for developing a FY 2006 proposed rulemaking and supporting draft decommissioning guidance related to preventing future legacy sites.

In FY 2005, stakeholder input on staff guidance development and rulemaking efforts was enhanced during a two-day public workshop on decommissioning held in April 2005. The workshop was attended by approximately 200 people, including USNRC staff, licensees, industry representatives, consultants, representatives from other Federal agencies, and State representatives. During the workshop, USNRC received stakeholder input on topics related to the implementation of the requirements of 10 CFR 20, Subpart E.

### **Research Activities**

The USNRC continued to provide information and approaches to support dose modeling of releases of radioactive material from decommissioning sites including supporting development or modification of a number of computer codes useful for site decommissioning analyses. USNRC, in cooperation with other Federal agencies, is modifying dose-assessment codes to incorporate added realism. For example, RESRAD-OFFSITE is being enhanced to enable assessment of more-realistic scenarios for potential future human exposure; FRAMES (Framework for Risk Assessment of Multimedia Environmental Systems); and GMS (the Department of Defense Groundwater Modeling System) are being linked to enable the assessment of complex ground-water systems or sites with existing groundwater contamination; and new data and models for food pathways are being developed to support improved dose calculations. The SADA (Spatial Analysis and Decision Assistance) is being supported to provide aid for characterizing a contaminated site, assessing risk, determining the location of future samples, or designing remedial action. During the past year, USNRC has provided training on the use of RESRAD-OFFSITE, GENII (the Hanford Environmental Radiation Dosimetry Software System) in FRAMES, and SADA.

These codes currently are under testing, evaluation, and verification for beneficial application to on-going reviews at complex decommissioning sites. For example, RESRAD-OFFSITE and FRAMES are being tested for dose modeling analysis of the hybrid Jefferson Proving Ground site. Further, the SADA code is being used to simulate source terms at complex sites in a more realistic fashion, and is being applied in the evaluation of the source term of residual activity at the West Valley Demonstration Project and Mallinckrodt decommissioning sites.

In FY 2005, USNRC advanced the modeling of geochemical processes during radionuclide transport through complex subsurface environments, provided an improved technical basis for estimating financial assurance requirements for the decommissioning on in-situ leach mines, and reported on the advantages and limitations of applying more realistic modeling of geochemical processes to decommissioning. USNRC also is advancing the understanding of the evolution and degradation of clay covers through laboratory testing.

In FY 2005 USNRC also continued to support interagency cooperative activities including the development of the draft Multi-Agency Radiological Survey Assessment for Materials and Equipment (MARSAME) and participation in activities of the Interagency Steering Committee on Radiation Standards (ISCORS) and the Interagency Steering Committee on Multimedia Environmental Models.

### **Stakeholder Outreach**

During FY 2005 the staff completed several enhancements to USNRC's Decommissioning web site (<http://www.nrc.gov/what-we-do/regulatory/decommissioning.html>). The new website consolidates decommissioning information into a single location and expands the scope to include all the

decommissioning activities that are included in the Decommissioning Program. The web site was redesigned and restructured to include more information in a format that should be easier to use.

New information was added that describes the decommissioning process for power reactors, material sites, and uranium recovery sites. Site information was also added, including maps showing facility/site locations and tables with decommissioning schedules for about 90 sites. Links were provided for simple access to electronic documents with detailed descriptions of each site. Links were also provided for regulations, guidance, and program documents important to decommissioning (e.g., annual updates to the status of the Decommissioning Program, the Decommissioning Program Evaluation, and the Memorandum of Understanding with the Environmental Protection Agency). A lessons learned page was added that provides direct links to four sets of previously published USNRC lessons learned as well as an example of a site-specific lesson learned that illustrates the format to be used for future lessons learned. A link is also given to access USNRC's Terminated License Tracking System. Finally, a "contact us" page was added for stakeholders to comment or ask questions about decommissioning. The staff also developed and published a brochure to enhance its communication with the public (NUREG/BR-0325).[9] The brochure briefly describes USNRC's decommissioning process, the facilities it regulates, how members of the public can participate in the decommissioning process, and information sources for the public. The brochure also contains a map showing the facilities currently in decommissioning. This map gives a visual idea of the wide range of facilities subject to USNRC's jurisdiction.

## **CONTINUOUS IMPROVEMENT**

### **Early Improvement Efforts**

Although it is not a new concept, "continuous improvement" has recently received greater focus at the USNRC's Office of Nuclear Material Safety and Safeguards (NMSS). For many years the Decommissioning Program has had several efforts underway to improve the manner in which it oversees the decommissioning of USNRC-licensed facilities. A continuous improvement process has been established for the Decommissioning Program that consists of five principal steps: Assess the program; Identify areas for improvement; Plan the improvement; Implement the improvement; and, Measure the results.

In 1999, the USNRC Decommissioning Program implemented a rebaselining initiative to develop and implement a comprehensive integrated plan for successfully bringing SDMP and complex decommissioning sites to closure. Site status summaries were developed and updated monthly, for each SDMP and complex decommissioning site. These summaries describe the status of each site and identify the technical and regulatory issues impacting removal of the site from the SDMP or completion of decommissioning. The staff also developed Gantt charts for each site to guide the management of decommissioning activities. The Gantt charts identified all major decommissioning activities and schedules for completion.

As part of the rebaselining process, the Decommissioning Program also implemented streamlining objectives such as: (a) assuming a more pro-active role in interacting with licensees undergoing decommissioning; (b) expanding the acceptance review process, to include a limited technical review, to reduce the need for additional rounds of questions; (c) ensuring that institutional controls and financial assurance requirements are adequate before a technical review of the DP; (d) implementing other procedures to reduce the number of requests for additional information; (e) conducting in-process/side-by-side confirmatory surveys; and (f) relying more heavily on licensees' quality assurance programs, rather than conducting large-scale confirmatory surveys.

Furthermore, the USNRC Decommissioning Program incorporated strategies to achieve the performance goals identified as part of the Agency's strategic planning process and Strategic Plan for FY 2000 – 2005 including: focusing on resolving key issues such as institutional controls for restricted releases; addressing partial site release; conducting stakeholder workshops to seek licensee, industry, and public input; updating, consolidating and risk informing/performance orienting decommissioning guidance; and working with industry to identify and resolve technical and policy issue associated with decommissioning; and developing a stakeholder database and website.

### **License Termination Rule Analysis**

USNRC experience using the LTR resulted in identifying implementation issues important to the decommissioning of sites. In June 2002, the USNRC began an analysis of LTR implementation issues, which included realistic scenarios, on-site disposal, and removal of material from sites and placed particular emphasis on the restricted release and institutional control issues. The analysis and recommendations were provided to the Commission in May 2003, (SECY-03-0069) [5] and were approved, with comments, in November 2003. Subsequently, in March 2004, the analysis of a ninth issue on intentional mixing of soil was provided to the Commission (SECY-04-0035) [6] and was approved with comments in May 2004. A summary of the LTR Analysis, Commission direction, and planned activities for each of the nine issues is given in Regulatory Issues Summary (RIS) 2004-08.[7] The recommendations and comments are the basis for the regulatory improvements conducted during FY 2004-2005 and planned for FY 2006-2007.

### **Decommissioning Program Evaluation**

In September 2003, the USNRC conducted a programmatic self-assessment and documented the assessment in a report entitled “Decommissioning Program Evaluation.” In this report, the staff evaluated the effectiveness of NRC’s Division of Waste Management and Environmental Protection (DWMEP) Decommissioning Program and recommended future improvements. The staff evaluated overall program effectiveness using: 1) NRC’s Strategic Plan measures and targets; 2) the NMSS Operating Plan accomplishments; and 3) the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART). The staff used the PART questions as an independent methodology to systematically and comprehensively evaluate its program to identify areas of the program’s effectiveness that might need further improvement. The staff also evaluated the effectiveness of 18 specific changes/improvements that were made to the program during the FY 2001–FY 2003.

The Decommissioning Program Evaluation noted that although significant improvements had been completed, future improvements would be beneficial. In particular, it concluded that the recommendations in the LTR Analysis (SECY-03-0069) [5] to resolve the LTR implementation issues, when implemented as directed by the Commission, offer potentially significant future improvements for the program. To complement these regulatory improvements, the Decommissioning Program Evaluation included additional recommendations that primarily would improve internal program management.

### **Integrated Decommissioning Improvement Plan**

In September 2004 the Decommissioning Program staff developed the Integrated Decommissioning Improvement Plan (IDIP). The purpose of the IDIP is to describe a continual improvement plan for the decommissioning program in the FY 2004-2007 timeframe, to integrate regulatory and program management improvements resulting from the LTR analysis and Decommissioning Program Evaluation and to track improvements needed for the OMB Program Assessment Rating Tool (PART) review of the Decommissioning Program that will be conducted in FY 2006.

The IDIP integrated three sets of improvements: regulatory improvements to resolve the LTR Analysis issues; program management improvements resulting from the recommendations in the 2003 Decommissioning Program Evaluation; and improvements directed by the Commission in the SRM for the October 2004 annual briefing. The plan includes a description of each improvement and associated milestones, schedules, products and staff assignments. The staff plans on periodically revising IDIP as needed. A revision is planned for early in FY 2006 to update plans for work during FY 2006 and FY 2007. IDIP also schedules another revision in FY 2007 to reflect the results of the FY 2006 OMB PART review.

Since its development, the IDIP has become the vehicle for: (1) evaluating the decommissioning program to identify areas where improvements may be appropriate, (2) analyzing these areas to develop improvement approaches and strategies, (3) managing the development and implementation of the improvements, and, (4) reporting the improvements. The FY 2005 Decommissioning Improvement report (summarized below) describes the improvements that were completed in FY 2004-2005 and those planned for FY 2006.

#### **Improvement Activities Completed in FY 2004**

Summarized below are the specific improvement activities completed by the USNRC in FY 2004:

Published a RIS to inform licensees and stakeholders of NRC's analysis and plans for the nine LTR implementation issues (RIS 2004-08) [7];

Completed interim guidance on a Long-Term Control (LTC) license for the Shieldalloy Metallurgical Corporation (SMC) site that the licensee is using to revise its DP and demonstrate compliance with the LTR requirements for legally enforceable institutional controls at a restricted use site;

Restructured into a comprehensive decommissioning program and reorganized the Division of Waste Management into two separate divisions. In addition, eliminated the SDMP as a management tool and began managing all complex site under the comprehensive decommissioning program;

Conducted staff training to implement the three volumes of the Consolidated Decommissioning Guidance in NUREG-1757 [8], and hired staff in critical disciplines;

Shared guidance on LTR Analysis issues with stakeholders (Waste Management 04 Symposia papers and National Mining Association annual meeting).

#### **Improvement Activities Completed in FY 2005**

Summarized below are the specific improvement activities completed by the USNRC in FY 2005:

Prepared draft decommissioning guidance in NUREG-1757 for public comment on LTR Analysis issues: restricted use; onsite disposal; realistic scenarios; removal of material after license termination; and intentional mixing of soil. Also developed draft guidance for other topics including engineered barriers; coordination of radiation surveys and use of MARLAP; and canceling or returning financial assurance instruments;

Continued to implement the decommissioning guidance in NUREG-1757 by training staff on dose modeling, risk-informed approaches, LTR Analysis issues, and institutional controls;

WM'06 Conference, February 26–March 2, 2006, Tucson, AZ

Revised its guidance in NUREG-1757 Supplement 1 to clarify that efficient side-by-side radiological surveys can be achieved by coordination between licensees and USNRC and that USNRC's contractor for conducting radiological surveys, Oak Ridge Institute for Science and Education (ORISE), can be on-site to conduct confirmatory surveys within 72 hours on an emergency basis, (although the normal time-frame for arranging confirmatory surveys is 2 to 4 weeks);

Implemented a program to allow that regional inspectors to collect samples and provide these to ORISE for analysis as another way to facilitate confirmatory surveys and developed an approach where States would supplement the USNRC's conduct of side-by-side confirmatory surveys with the licensee based on USNRC guidance;

Used a risk-informed approach to develop general guidance for inspections and enforcement to reduce the potential for subsurface contamination at operating sites and to prevent future legacy sites (i.e., sites that are complex and cannot decommission within existing resources for a variety of financial and technical reasons);

Began the proposed rulemaking/supporting guidance for changes in financial assurance and operations to prevent future legacy sites by obtaining early stakeholder input at a Decommissioning Workshop and procuring contractor support;

Continued tailored consultations with licensees who are using new guidance and LTR issues (e.g., the SMC site and the West Valley site);

Enhanced critical skills in dose modeling and health physics by hiring new staff and training existing staff from Headquarters and the Regions to conduct dose modeling reviews;

Developed new tools for efficient resource management including a risk-informed work prioritization procedure and a resource expenditure tracking system;

Developed an approach to estimate baseline costs specific activities at decommissioning sites. Explored the feasibility of methods to measure efficiency gains for USNRC activities;

Ensured that goals and long-term outcomes for the program aligned with the new Strategic Plan, revised annual output measures, and added a new performance measure for the effectiveness goal beginning in FY 2006;

Prepared the IDIP that consolidated and integrated the plans for continuous improvement during FY 2004-2007;

Continued meaningful stakeholder involvement by: 1) holding a stakeholder workshop to provide new information about the program, obtain early input on guidance, exchange lessons learned, and obtain suggestions for further program improvements; and 2) establishing a State working group with representatives from the Organization of Agreement States and Conference of Radiation Control Program Directors that assisted the staff in developing the draft guidance;

Continued to enhance stakeholder communications by: 1) enhancing the Decommissioning web site; 2) developing a new decommissioning brochure to inform the public about the program; and 3) revising the annual status report for the Decommissioning Program; 4) Improved the process for guidance development with early involvement by stakeholders, the Advisory Committee on Nuclear Waste (ACNW), and States;



Coordinated with the ACNW to conduct an independent working group meeting. This meeting provided early technical review and comments for the staff to consider in developing the draft guidance for the LTR issues. The working group included five outside decommissioning experts in addition to the ACNW members;

Began a collaborative effort with industry groups and Agreement States to broaden the participation in decommissioning lessons learned;

Established a decommissioning lessons learned page on the new Decommissioning web site. This web page includes a definition of a lesson learned, which is any item that could be of interest and benefit to many licensees. Lessons learned include positive or negative experiences that are worth sharing with USNRC licensees and stakeholders to improve future efficiencies. The web page provides a short summary of each lesson, its potential benefits, and links to publicly available documents that discuss each lesson learned in further detail. The web page includes links to existing published sets of USNRC lessons learned.

### **Outcomes from Improvement Activities**

Decommissioning progress was made at three sites that have particularly challenging decommissioning problems and financial limitations.

One licensee, considering restricted use, was able to make progress revising its DP by proposing the new USNRC LTC license as a legally enforceable and durable institutional control.

Use of the realistic scenario approach for dose modeling was instrumental in making decommissioning progress at several sites that have significant financial limitations.

Realistic scenarios and a risk-informed, phased decommissioning resulted in starting remediation at the FMRI Inc. (formerly Fansteel) site.

At the Kiski Valley Water Pollution Control Authority site, an unlicensed site, USNRC completed its action at the site after determining that no further decommissioning action was needed.

At the Cabot Reading site, the licensee used the realistic scenario approach and the flexibility of the LTR to design an engineered barrier for erosion protection to revise and resubmit its DP. This approach to completing decommissioning is key for the City of Reading to proceed with its extensive redevelopment plans.

At the Michigan Department of Natural Resources site, license termination was facilitated by using the realistic scenario approach. This resulted in not disturbing the contamination, avoiding impacts to workers and the environment and as minimizing the decommissioning costs.

LTR implementation issues were addressed by preparing a draft supplement to the decommissioning guidance in NUREG-1757 for public comment. The draft provides approaches that are more risk-informed, flexible, and realistic.

New risk-informed approaches were developed for institutional controls and engineered barriers.

Flexible implementation of the LTR was enhanced by the guidance for each of the LTR issues and engineered barriers.

Dose modeling will be more realistic by using reasonably foreseeable land uses in exposure scenarios.

Enhanced stakeholder communication tools and early stakeholder involvement with regulatory guidance development have improved stakeholder understanding of the decommissioning process, regulations/guidance, and current issues. The staff also has learned more about stakeholder views on the key issues and ways to improve the Decommissioning Program.

During FY 2004 and FY 2005 there were a higher number of decommissioning project completions than in previous years. This resulted from several process improvements, including: 1) proactive approaches to licensing; 2) implementation of detailed guidance for staff and licensees; 3) improved radiological survey approaches; 4) use of more realistic dose models and approaches for evaluating realistic scenarios; 5) increased number of staff with critical skills; and 6) increased flexibility in resolving technical and policy issues that have been impeding site cleanups. (See Figure 1)

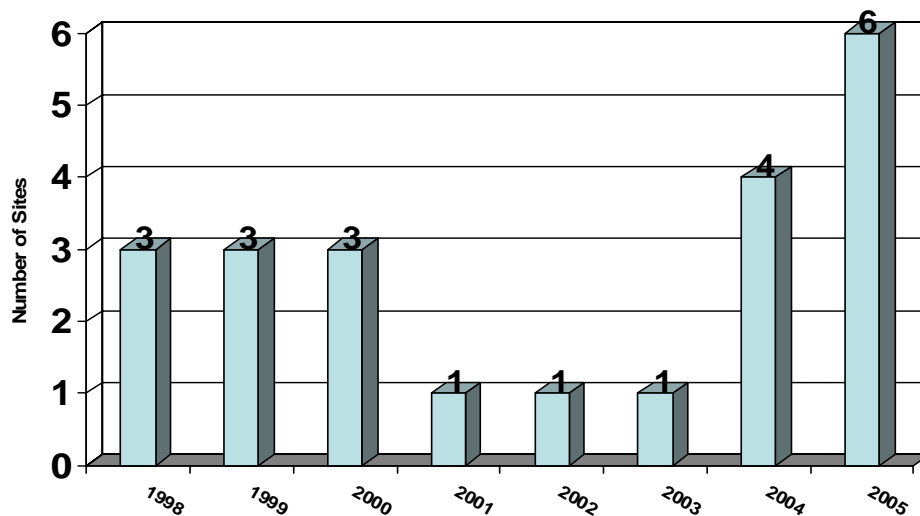


Fig. 1. Decommissioning site completions by year

The process developed for identifying realistic scenarios combined with previous improvements, such as the use of more proactive approaches to interacting with licensees, resulted in a significant reduction in the time to review and approve LTPs. For example, the Yankee Rowe LTP review was completed in 15 months. This review time is approximately one year faster than the average of the five previous LTP reviews (see Figure 2).

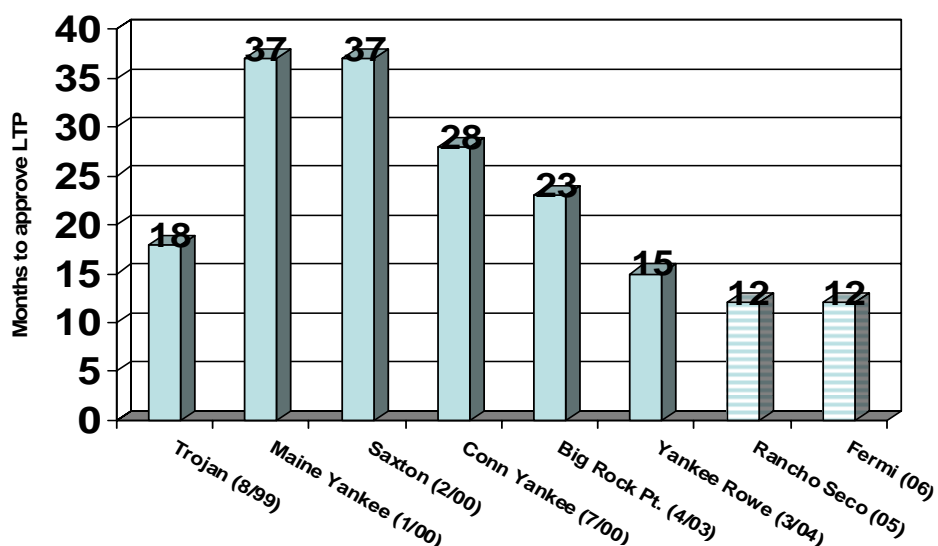


Fig. 2. License Termination Plan review time  
(Numbers in parenthesis are month/year LTP was submitted to USNRC;  
Rancho Seco and Fermi are estimated submission dates)

Efficiencies are already evident in the improved timeliness of major reviews. In addition more efficient use of staff resources should result from using the new tools developed for tracking and managing staff resource expenditures. Understanding of USNRC's decommissioning issues and lessons learned should result in more efficient licensee decommissioning and also might assist the Agreement States' implementation of the LTR for sites in their states.

The identification of the types of operating sites and components that could have a high potential for subsurface contamination and future decommissioning problems was used to develop general guidance for heightened inspections. This guidance should improve the focus of the planned rulemaking to prevent future legacy sites and the development of inspection procedures and enforcement guidance in FY 2006.

## CONCLUSIONS

The USNRC Decommissioning Program has undergone significant improvements since its inception in the mid-1990's. The staff completed a number of improvements in FY 2004 and FY 2005. These improvements have contributed to progress at challenging decommissioning sites, have helped resolve LTR implementation issues, have made decommissioning guidance more risk informed and flexible, and have enhanced stakeholder communications and involvement with the program. The staff expects additional decommissioning progress will result as these improvements are implemented in the future by the staff and licensees. The staff also has a program and process to identify and implement improvements and these efforts should ensure that the decommissioning program is able to successfully manage the decommissioning of a wide variety of sites in an efficient, cost effective and risk-informed manner, address complex technical and policy issues quickly and in a manner that reduces the regulatory burden on licensees and the USNRC staff, and constantly strives to improve while focusing on the safety significant aspects of decommissioning

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