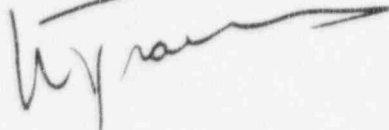




UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20585-0001

March 18, 1996

MEMORANDUM TO: Dr. John Larkins, Executive Director  
Advisory Committee on Reactor Safeguards  
and Advisory Committee on Nuclear Waste

FROM: William D. Travers, Director  
Spent Fuel Project Office  
Office of Nuclear Materials,  
Safety and Safeguards 

SUBJECT: AGENDA FOR BRIEFING OF JOINT ACRS/ACNW SUBCOMMITTEE

This memorandum summarizes the topics that will be briefed before the Joint Subcommittee of the Advisory Committee on Reactor Safeguards and Advisory Committee on Nuclear Waste by the Spent Fuel Project Office on March 26, 1996.

The briefing is meant to provide a status summary of the activities conducted by the Spent Fuel Project Office (SFPO) since its creation in May 1995. This briefing will be given by William Travers and Charles Haughney from 8:35 - 10:30 A.M.

The agenda is as follows:

- Discussion of the creation and status of the SFPO
- Current status of SFPO activities
- Summary of current and expected SFPO casework
- Overview of the Dry Cask Storage Action Plan
- Overview of recent guidance issued by the SFPO
- Discussion of additional guidance planned by the SFPO

Copies of the following documents have been provided to your staff separately:

- (1) First Dry Cask Storage Action Plan (July 28, 1995)
- (2) Update to the Dry Cask Storage Action Plan (January 26, 1996)
- (3) Inspection Procedure 60851, "Design Control of ISFSI Components"
- (4) Inspection Procedure 60852, "ISFSI Component Fabrication by Outside Fabricators"
- (5) Inspection Procedure 60853, "Onsite Fabrication of Components and Construction of an ISFSI"
- (6) Inspection Procedure 60854, "Preoperational Testing of an ISFSI"
- (7) Inspection Procedure 60855, "Operation of an ISFSI"
- (8) Draft Standard Review Plan for Dry Cask Storage Systems

J. Larkins

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The Draft Standard Review Plan for Dry Cask Storage Systems (SRP) was issued for public review, with comments due by June 14, 1996. We expect to revise the draft SRP and reissue it in final form by the end of 1996. No action is requested from the subcommittee at this time; however, comments regarding the SRP would be welcomed prior to issuance of the final document which is currently projected in the last quarter of 1996.

Please contact Earl Easton of my staff with any questions.

Distribution:

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CJHaughney

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

January 25, 1996

MEMORANDUM TO: James M. Taylor  
Executive Director for Operations

FROM: Carl J. Paperiello, Director  
Office of Nuclear Material Safety  
and Safeguards

Handwritten signature of Carl J. Paperiello in black ink.

William T. Russell, Director  
Office of Nuclear Reactor Regulation

Handwritten signature of Roy P. Zimmerman in black ink.

SUBJECT: UPDATE TO THE DRY CASK STORAGE ACTION PLAN

This memorandum provides an update to the Dry Cask Storage Action Plan originally transmitted to you on July 28, 1995. The Plan was developed to identify major issues and problems in the area of dry cask storage and to discuss resolution of such issues. At this time, many of the actions identified in the plan are complete, with the remaining items progressing towards resolution. Issuance of the draft standard review plan for storage casks and the inspection procedures is now anticipated in February 1996.

Both of our offices have made significant progress in resolving the short-term technical issues. Preliminary information and guidance needed to support inspection of dry cask storage activities have been issued. At this time, all immediate concerns in this area have been addressed; however, multi-disciplined task groups have been developed to further investigate the heavy load and unloading procedure issues. These groups will determine whether further NRC actions or guidance in either of these two areas are needed.

Recently, an open dialogue with the Nuclear Energy Institute (NEI) was initiated to inform the industry of NRC's concerns and expectations regarding utility performance in the area of dry cask storage. Partly in response to the NRC's concerns, NEI established a Dry Cask Storage Working Group. This working group is comprised of representatives of utilities who are currently pursuing or plan on pursuing operation of an Independent Spent Fuel Storage Installation (ISFSI). Periodic meetings with the working group are planned. Thus far, discussions with NEI on dry cask storage have been useful, and NEI has been invited to propose solutions to the long-term technical issues identified in the Plan.

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415-2828

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Coordination and communications within the Agency continue to be key elements of the Action Plan. We, and our staffs, have met periodically to review progress on the Action Plan. Conference calls involving staff from NMSS, NRR, and all four Regions are conducted roughly every three weeks to encourage open staff discussions, identify new or pressing issues, and to develop solutions to these problems. Time sensitive items are distributed to designated Region representatives electronically. Training of affected NMSS, NRR, and Region staff has been conducted on the design bases and licensing processes for ISFSIs, with additional sessions being planned for the remaining affected staff. In addition, NRC is planning a workshop to discuss dry cask issues (including recent utility performance), new NRC inspection procedures, and the draft Dry Cask Storage Standard Review Plan.

Two plants are scheduled to conduct preoperational testing of their cask systems in the near future. We continue to place priority on resolving issues at those plants (Oyster Creek and Arkansas Nuclear One, Unit 2) planning on completing their dry run testing within the next three months.

In summary, we believe that the resolutions described in the attached Plan are helping to improve the performance in the area of dry cask storage. We will provide the next Action Plan update in July 1996.

Attachment: Updated Dry Cask Storage Action Plan

Distribution:  
See attached list

DOCUMENT NAME: G:\ENG\NOV95.UPD \* see previous concurrence

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NAME	PEng		CHaughney		WTravers		CPaperiello	
DATE	12/19/95		12/19/95		12/20/95		01/25/96	

OFC	NRR:PD33*		NRR:ADP RPZ	C	NRR:DOMRE RPZ	C
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# **UPDATED DRY CASK STORAGE ACTION PLAN**

**January 26, 1996**

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## SUMMARY OF PROGRESS

The Dry Cask Storage Action Plan was developed by staff from the Regions, NMSS, and NRR in an effort to improve agency performance and to increase the NRC's effectiveness in regulating Independent Spent Fuel Storage Installations. The plan identified major issues and problems related to design, fabrication, construction and preoperational test activities associated with the storage of spent fuel in dry casks. The action plan had two basic goals:

1. To resolve identified problems and to address anticipated licensing and inspection issues for dry cask storage.
2. To develop and maintain more efficient communications both within the NRC, and with industry and to foster greater communications on dry cask storage issues among industry organizations.

This report contains the first update since the plan was issued on July 28, 1995.

Since July 1995, significant progress has been made on the Technical Near-Term Actions. Actions to support inspection efforts were completed on schedule, and cask vendors have been requested to modify their Safety Analysis Reports to explicitly identify critical design and testing parameters for cask trunnions and hydrostatic testing in their design descriptions. In addition, multi-disciplined working groups have been formed to determine whether additional actions are needed in the areas of Cask Loading and Unloading Procedures and Heavy Loads Control. Implementation of any recommendations regarding the need for additional guidance in these two areas is scheduled for April and December 1996, respectively.

Training sessions on Independent Spent Fuel Storage Installations (ISFSIs), including current regulatory requirements, design criteria, and licensing methods were held in NRC Headquarters and Region IV to provide training to NRR, NMSS, and Regional staff. Feedback from trainees has been very positive. Additional training sessions will be held in the remaining regions and in NRC Headquarters to ensure that all affected staff are familiar with issues related to ISFSIs. Conference calls are periodically held with staff from NRR, NMSS and all four regions to update the staff on items of interest affecting dry cask storage. Time sensitive information is electronically distributed to designated staff.

An open dialog was initiated with the Nuclear Energy Institute (NEI) in August 1995. NEI subsequently established a dry cask storage working group which meets approximately every 6 to 8 weeks. At NEI's request, NRC staff attended portions of these meetings in order to exchange information with NEI. At the last meeting, NEI was invited to develop industry positions regarding the Long-Term Technical Issues identified in the Action Plan.

The Spent Fuel Project Office is currently developing ISFSI inspection procedures and a Standard Review Plan for the review of storage casks. These guidance documents are currently scheduled to be issued during the first quarter of CY 1996 and will clarify NRC's

expectations for the design, construction and operation of an ISFSI. Publication of these guidance documents will resolve most of the issues identified in the Processes section of the Action Plan. NRC is planning to sponsor a workshop in 1996 to discuss these documents as well as other issues pertaining to ISFSIs.

NRR and NMSS are continuing to work on clarification of how licensee changes to plant programs, fabrication processes and cask component designs should be documented. To date, changes to casks designated for near-term loading have been reviewed by cognizant NMSS and NRR staff. These reviews have not identified any safety significant deficiencies; however, NMSS is considering whether to develop additional guidance for review of licensee activities conducted under 10 CFR 72.48. Thus far, the quality of licensee 10 CFR 50.59 evaluations to support dry cask loading has been inconsistent. NRR will continue to monitor licensee performance in this area.

TECHNICAL NEAR-TERM ACTIONS

ISSUE:      HEAVY-LOAD CONTROL/CRANE ISSUES

This issue included the suitability and adequacy of crane qualifications at specific sites, possible inadequacies of generic qualification standards for crane components, appropriateness of paths traversed by cranes when handling casks (safe load paths), and adequacy of licensee procedures and load drop analyses.

Licensees have different plant configurations requiring site specific evaluations. Interpretation and implementation of existing requirements and commitments, including NUREG 0612 and licensee responses to Generic Letter 85-11, also varies slightly from site to site. The potential for inconsistent approaches is high.

LEAD:      NRR with NMSS assistance

STATUS:      A working group consisting of two NRR staff and a representative from Region I was formed. Their charter is to review existing NRC guidance and licensee performance, identify potential issues and determine whether additional guidance regarding the handling of casks should be issued.

The Staff plans to complete its review of the existing NRC position and obtain management concurrence on a method of resolution by April 30, 1996. Inspection procedures, if appropriate, will be written and approved by December 31, 1996. No additional issues have been identified.

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ISSUE:      CASK TRUNNIONS

Requirements for the design and acceptance testing of trunnions and special lifting devices for casks were not well understood by affected NRC staff and licensees. Although each cask design met the requirements, testing requirements were not consistently documented from cask SAR to cask SAR. This caused confusion during pre-operational testing.

LEAD:      NMSS

STATUS:      NMSS has historically required that cask vendors design the cask lifting attachments and special lifting devices to the requirements of NUREG 0612 and ANSI N14.6. NMSS has included a statement in the Standard Review Plan for the Review of Storage Casks as a reminder to NRC reviewers that cask vendors should explicitly define trunnion design and testing requirements in their Safety Analysis Reports. NMSS has also compiled tables listing the design and acceptance values for storage cask lifting attachments and special lifting devices for casks currently in use. These tables have been distributed to the inspection staff and affected NRC management. Current cask vendors



have been requested to revise their SARs to explicitly identify the design and testing values.

This resolves all known concerns related to cask trunnions. This item is considered complete.

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**ISSUE:**      HYDROSTATIC TESTING

Requirements for hydrostatically testing the primary confinement for dry cask storage systems were not specifically documented in SARs in that test pressures were not explicitly identified in some cases. Also, vendors often did not explicitly state the cask maximum normal operating pressure from which the test pressure is derived.

**LEAD:**      NMSS

**STATUS:**      NMSS has included a statement in the Standard Review Plan for the Review of Storage Casks as a reminder to NRC reviewers that cask vendors should explicitly define both the maximum normal operating pressure and the hydrostatic test pressure for the cask in their Safety Analysis Reports. NMSS has compiled tables listing the design and test acceptance values for storage cask pressure testing for casks currently in use. These tables have been distributed to the inspection staff and affected NRC management. Current cask vendors have been requested to revise their SARs to explicitly identify the maximum normal operating pressure, hydrostatic test pressure and the section of the ASME Code that applies to their cask.

This resolves all known concerns related to hydrostatic testing of storage casks. This item is considered complete.

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**ISSUE:**      SEISMIC REQUIREMENTS FOR SPENT FUEL STORAGE PADS

Under the provisions of the Part 72 general license, licensees are required to verify that "cask storage pads and areas have been designed to adequately support the casks" and "whether or not reactor site parameters...are enveloped by the cask design parameters." One licensee attempted to perform a simple comparison of the reactor site earthquake spectra to the cask design bases without evaluating the spectra at the actual location of the ISFSI. Although subsequent analyses proved that the cask design values were bounding, the NRC determined that the requirements for analysis of the cask storage pad location needed clarification.

**LEAD:**      NMSS with NRR assistance

STATUS: Information Notice 95-28, "Emplacement of Support Pads for Spent Fuel Dry Storage Installations at Reactor Sites," was issued on June 5, 1995. The staff is considering issuance of a supplement to the Information Notice, to notify licensees that in certain locations the seismic spectra applicable for analysis of ISFSI support pads at reactor sites differs from that used for the plant Safe Shutdown Earthquake.

This resolves all known concerns related to seismic requirements for spent fuel storage pads at this time. This item will be considered complete following determination of whether a supplement to the Information Notice is appropriate.

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## TECHNICAL LONG-TERM ACTIONS

ISSUE:      CASK WEEPING

Transfer casks submerged in spent fuel pools over a period of days are decontaminated upon removal from the pool. Occasionally these casks exhibit recurrent surface contamination a few days later. This phenomenon is attributed to contaminated water becoming entrapped in the interstitial spaces of the metal and "weeping" out over time.

LEAD:      NMSS

STATUS:      This issue currently is not a safety significant issue in that storage casks typically do not remain in spent fuel pools long enough for the phenomenon to occur. Proposed industry solutions to future occurrences will be evaluated as they arise.

This item is considered closed.

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ISSUE:      CASK LOADING AND UNLOADING

Recent experience has shown that some cask loading and unloading procedures have been inadequate and of variable quality. Unloading procedures often are simplistic and may not include sufficient detail for actual use. Few procedures fully account for failed fuel, taking of additional air samples, cask disassembly and radiation protection requirements. Licensees inconsistently apply their procedure writing guidelines to documents governing these activities. Thus far, this issue has been dealt with on a site specific basis.

LEAD:      NRR with NMSS assistance

STATUS:      Issues affecting plants loading in the near term have been addressed as they arise. Guidance regarding inspection of cask loading and unloading activities will be included in the ISFSI inspection procedures. A working group has been formed including representatives from NMSS, Region III, the Reactor Systems Branch, and the Emergency Preparedness and Radiation Protection Branch to evaluate past experience and to develop additional staff guidance for oversight of these activities.

The NRC working group is identifying and categorizing observed procedural issues and will provide their recommendations by April 30, 1996. This effort is on schedule.

ISSUE:      OFF LOADING CAPABILITY

Some licensees planning to permanently shut down their reactors may choose to build an ISFSI in order to remove all fuel from the spent fuel pool. Part 72 requires that fuel stored in dry casks be retrievable. This means that plants that have decommissioned their spent fuel pools and operate an ISFSI must have a viable method for retrieving the fuel from the casks for inspection, further processing or disposal. This requirement applies even if a spent fuel pool is not available; therefore, such licensees must provide an alternate method for retrieving their fuel. NRC expectations regarding retrievability of fuel should be clarified and communicated to the industry.

LEAD:          NMSS

STATUS:        Guidance for reviewing dry transfer methods is being considered. Submittal of an application for use of a dry transfer system is expected in the spring of 1996, and will require NRC review.

This item is considered closed until a proposal is received.

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ISSUE:      FAILED FUEL STORAGE

Guidelines for the storage of failed fuel or fuel otherwise susceptible to significant cladding structural failures do not exist. Fuel stored in casks must remain in a coolable geometry for both criticality and cask handling considerations.

LEAD:          NMSS

STATUS:        This subject has been discussed with representatives of DOE, utilities and NEI, who were encouraged to develop a proposed definition of "failed fuel" and to develop a proposal for the safe storage of such fuel. The NRC is currently reviewing a request for storage of spent fuel with degraded cladding. The review is scheduled for completion by June 1996. Progress on this review, as well as the projected review schedule, will be discussed in the next update of the Action Plan.

ISSUE:      SAFEGUARDS CONCERNS

Safeguards concerns have repeatedly been raised by members of the public.

LEAD:      NMSS

STATUS:    The staff completed its analysis of the concerns in December 1995. Final conclusions supported the initial assessment that current protection levels are adequate.

This item is considered closed.

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## COMMUNICATIONS

ISSUE:      INTERNAL COMMUNICATIONS - COORDINATION

In some cases, communications among NRC offices were incomplete or ineffective. Some examples of NRC offices not informing each other of planned inspection activities, issuance of inspection reports, status of technical review activities and receipt of intervenor communications in a timely manner were noted.

LEAD:      NRR and NMSS

STATUS:      Individuals for NRR, NMSS, and each Region have been identified as official points of contact for dry cask issues. Concurrence requirements have been discussed among NRR, NMSS, and all four Regions. Staff have been requested to add a designated representative from each organization to the distribution list for documents related to dry cask storage and ISFSIs. The designated representatives meet by conference call roughly every three weeks to exchange information and to identify concerns related to ISFSIs. In addition, time sensitive information is electronically distributed to the designated representatives on an as needed basis.

The roles of the NRR and NMSS project managers have been clarified and disseminated to NRR and NMSS staff through training and distribution of the Memorandum of Understanding. Three training sessions, including a discussion of the roles of the NRR and NMSS Project Managers, have been conducted: one in Region IV and two in NRC Headquarters. Training sessions for the remaining regions as well as makeup sessions for affected NRC Headquarters staff are being planned.

A master schedule of known inspections of dry cask activities, including inspections of vendors, component fabrication, and licensee preoperational testing activities is in preparation.

No additional concerns regarding internal coordination have been identified. The effectiveness of these initiatives will be monitored for the next six months. If no additional issues are raised, these efforts will continue as standard operating procedure; therefore, status of this issue will be dropped from the Action Plan.

This item is on schedule.

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ISSUE:      INTERNAL COMMUNICATIONS - STAFF TRAINING

Many assigned NRC staff had not previously worked on dry cask storage and were unfamiliar with the associated regulatory requirements, inspection activities, and licensing process. General information regarding the design bases, regulatory requirements, inspection findings, and lessons learned from observation of licensee dry cask storage activities was not provided to NRC staff in an efficient manner.

LEAD:      NMSS with NRR assistance

STATUS:      Training regarding the responsibilities of NRR and NMSS, as delineated in the March 15, 1995, Memorandum of Understanding; roles of NRR and NMSS Project Managers; design bases applied to storage casks; the cask certification process; ISFSI license types; status of licensing reviews; and lessons learned through inspection observations has been presented in NRC Headquarters and Region IV. Attendees included new NMSS staff, NRR Project Managers, Project Directors, NRR technical staff, and a number of Regional staff. Additional sessions, including sessions in each of the remaining regions are being planned. Training regarding the SAR revision process, NRR PM responsibilities, and the scope and objective of the NRC inspection program was provided to NMSS staff in a separate session. An Independent Spent Fuel Storage Installation Handbook is being prepared for issuance as a NUREG.

No additional concerns have been identified in this area and feedback from staff is positive. Training sessions will be held periodically to accommodate staff encountering ISFSI issues for the first time.

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ISSUE:      EXTERNAL COMMUNICATIONS - INDUSTRY INTERFACE

Past communications with licensees have not always been effective or timely. In some cases, NRC became involved after licensee and vendor decisions, based on erroneous interpretations of NRC requirements, had been made based thereby causing disputes and delays.

LEAD:      NMSS

STATUS:      Administrative Letter 95-04 was issued on November 1, 1995, to inform the industry of the responsibilities of NRR and NMSS pertaining to the oversight and regulation of ISFSIs and the benefits of notifying the NRC as soon as practicable of any intent to construct an ISFSI. These benefits were also discussed with the NEI working group.

Following a meeting of the Directors of NRR and NMSS with senior NEI staff, NEI established a dry cask storage working group to assess industry's role in developing guidance in this area. NRC staff have since met with NEI representatives several times and plan on meeting with NEI's Dry Cask Storage working group periodically to discuss items of mutual interest.

NRC also plans on hosting an industry workshop to discuss ISFSI related issues such as NRC's Standard Review Plan for Storage Casks, ISFSI inspection procedures, lessons learned from staff observations of ISFSI activities, and to better understand industry's perspectives on dry cask storage.

This item is on schedule. No additional concerns have been identified in this area and feedback from affected parties is positive.

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**ISSUE:**      **EXTERNAL COMMUNICATIONS - PUBLIC RESPONSIVENESS**

Members of both the public and Congress have expressed concern regarding recent licensee plans and NRC regulatory activities related to ISFSIs. This has been exacerbated by confusion as to whether NRR or NMSS is responsible for answering inquiries from the public on ISFSI matters as well as by poor communications among NRC staff.

**LEAD:**      NRR with NMSS assistance

**STATUS:**      The responsibility of NRR to serve as the focal point for inquiries from the public associated with a reactor site has been clarified and provided to NRC staff through training and by distribution of the Memorandum of Understanding between NRR and NMSS. Information regarding external requests for information on ISFSIs and related press releases are routinely shared among the affected Regions, NRR, and NMSS through the periodic communications mentioned previously in this document.

No new concerns have been identified in this area. This item will be monitored for the next six months. If no new issues are identified, this item will be closed.

PROCEDURAL ISSUES

ISSUE:      CHANGE PROCESSES

The method for approving changes to cask SARs was not well understood. Some staff members were unfamiliar with the practices and requirements for licensee documentation of the analyses supporting changes to plant programs and procedures as well as cask design and fabrication methods.

LEAD:      NMSS for Part 72; NRR for Part 50

STATUS:      NMSS expectations for reviewing and approving changes to cask SARs was provided to NMSS staff by training presented in August 1995. Inspector guidance will be included in the ISFSI inspection procedures as well as the Standard Review Plan for Storage Casks. The procedures and the draft SRP are scheduled to be issued during the first calendar quarter of 1996. NMSS may provide additional guidance regarding changes to cask designs in a subsequent revision of the inspection procedures. These documents and the NRC's expectations related to requests for changes to cask SARs will be discussed at an industry workshop planned for the spring of 1996.

NRR is concurrently reviewing licensee performance related to 50.59 changes associated with the construction and operation of an ISFSI to determine whether additional guidance for NRR staff in this area is necessary.

NRC continues to evaluate change processes and is considering issuance of additional inspection guidance in this area. Progress on this item will be reported on in the next update to the action plan. v

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ISSUE:      PART 72 REPORTING REQUIREMENTS

Utilities have questioned whether they are subject to the reporting requirements delineated in sections of Part 72. A formal challenge regarding the applicability of 10 CFR 72.82(e) was received by the NRC on July 28, 1995.

LEAD:      NMSS, with assistance from OGC and NRR

STATUS:      On September 19, 1995, the NRC informed the licensee that they were required to comply with the provisions of 10 CFR 72.82(e).

This resolves all known concerns related to Part 72 reporting requirements. This item is considered complete.



ISSUE:      INSPECTION OF SITE ACTIVITIES

In some cases, inspections of site activities under Parts 50 and 72 are not clearly defined. On-site inspections have been conducted utilizing either existing general inspection modules or site-specific comprehensive inspection plans. An inspection program and pertinent procedures must be developed for oversight of ISFSIs. Also, required resources should be determined and incorporated into the resource allocation discussions for plants expecting to employ an ISFSI.

LEAD:      NMSS for Part 72 issues; NRR for Part 50 issues; with support from the Regions

STATUS:      Inspection requirements and guidance for oversight of ISFSI activities will be issued during the first quarter of CY 1996. NMSS is pursuing acquisition of contract assistance as well as additional SFPO and IMNS staff to support increased inspections in FY96. Allocation of inspection responsibilities among NMSS and NRR staff are being discussed by senior management. NRR is reviewing current inspection guidance regarding on site programs to determine whether additional guidance should be developed.

No additional concerns have been identified in this area.

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ISSUE:      VENDOR INSPECTION

Inspections of vendors to ensure consistency with dry cask design requirements have been scheduled when components are near completion. This schedule made it difficult for the fabricator to correct any identified deficiencies. Inspections were primarily focused on the Quality Assurance Program.

LEAD:      NMSS, with support from NRR and the Regions

STATUS:      Inspection requirements and guidance for vendor inspections will be included in the ISFSI inspection procedures currently scheduled to be issued in the first quarter of CY 1996. NMSS vendor inspections have been increased in scope to include oversight of fabrication and engineering design change activities. Inspection staff have been supplemented by new SFPO staff, Region, and resident inspectors.

Issuance of the revised Manual Chapter 2690, which will provide inspection program guidance, is delayed; however, the delay will not impact ongoing field and review activities. No new issues have been identified in this area.

**ISSUE:** CASK DESIGN AND SAR DIFFERENCES

Cask Safety Analysis Reports vary among vendors in style and format. Cask designs vary, and design features and related test requirements differ from cask to cask. In addition, the technical basis for cask designs are not consistently documented among the various cask SARs.

**LEAD:** NMSS

**STATUS:** Tables of design and testing parameters for the various current cask designs have been compiled and disseminated to the review and inspection staff.

NMSS has contacted the vendors of existing casks to request that they revise their SARs to explicitly state design and testing requirements. A Standard Review Plan for the Review of Storage Casks is being prepared and will express NRC's expectations regarding the explicit statement of the rationale and standards used in specifying component design and testing requirements.

This item is slightly behind schedule in that issuance of the draft SRP is now expected in mid-February 1996. No additional concerns in this area have been identified.

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# Site Decommissioning Management Plan

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Manuscript Completed: October 1995  
Date Published: November 1995

D. N. Fauver, M. F. Weber, T. C. Johnson, J. D. Kinneman

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



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## 1. INTRODUCTION

Each year, the U.S. Nuclear Regulatory Commission (NRC) must evaluate requests, primarily from materials licensees, to discontinue licensed operations. The majority of those requests are routine, relatively straightforward, and acted on in a timely manner such that the sites are remediated, if necessary, and released for unrestricted use. However, termination of licenses at some sites is considerably more complex because of the presence of soils and structures with non-routine levels of radiological contamination.

In two reports submitted to the Office of the Secretary of the Commission (SECY), the NRC staff listed over 30 sites that involve unique and difficult issues requiring special attention to ensure timely decommissioning. (These reports were SECY-88-308, "Contaminated Material Licensee Facilities," dated October 31, 1988, and SECY-89-369, "Strategy for Decommissioning of Materials Licensee Sites," dated December 8, 1989.) While none of the listed sites represents an immediate threat to public health and safety, all of the sites have contamination that exceeds existing NRC criteria for unrestricted release. All of these sites require some degree of remediation, and several involve regulatory issues that the Commission must address before releasing the sites for unrestricted use and terminating the applicable licenses.

These problematic sites have buildings, former waste disposal areas, large piles of tailings, ground water, and soil contaminated with low levels of uranium or thorium (source material) or other radionuclides. Consequently, the sites present varying degrees of radiological hazard, remediation complexity, and cost.

Some of the problematic sites still have active NRC licenses, whereas licenses for other sites were already terminated or were never issued. At some sites, the licensee is financially and technically capable of completing decommissioning in a reasonable time frame. At other sites, the licensee or responsible party may be unable or unwilling to perform decommissioning. In addition, the sites are currently in various stages of decommissioning. Some licensees have already initiated decommissioning, while others have not yet planned or initiated the process.

In the staff requirements memorandum (SRM) dated August 22, 1989, the Commission directed the staff to develop a comprehensive strategy for NRC activities to deal with these contaminated sites in order to achieve closure on decommissioning issues in a timely manner. In a subsequent SRM dated January 31, 1990, the Commission directed the staff to "...submit a list of contaminated sites in order of priority including the name and location of the site, name of responsible party, condition of the site, schedule and description of the next step in site cleanup, and other pertinent information. The list should be accompanied by a discussion of criteria used to rank each site."

On March 29, 1990, the staff submitted SECY-90-121, "Site Decontamination Management Program," as the original report outlining the planned strategy. The staff updated that report in April 1991 and May 1992, with the submission of SECY-91-096 and SECY-92-200, both entitled "Site Decommissioning Management Plan" (SDMP). The staff again updated the report in June 1993; however, to facilitate distribution to interested parties, and to simplify future reference, the update was published in October 1993 as NUREG-1444, "Site Decommissioning Management Plan."

NUREG-1444 contained detailed descriptions of each site, and discussed all policy issues that have been addressed since the inception of the SDMP in 1990. The NRC intends to supplement NUREG-1444 biennially with current information about program issues, site status, and schedules. The supplements will also discuss program management activities, as well as decommissioning activities conducted at each site over the preceding 2 years, and progress on remaining open issues. This report, NUREG-1444, Supplement 1, is the first of the planned biennial updates.

## 2. SDMP PROGRAM MANAGEMENT

### 2.1 Program Management Plan

This section discusses the objectives and background information underlying the NRC's plan for managing the decommissioning program. Section 2.2 then addresses specific program initiatives.

#### 2.1.1 Objectives

The NRC's regulatory program for decommissioning has the following objectives:

- *Safety and Timeliness* — Ensure timely and safe decommissioning of licensed and unlicensed sites that are contaminated with radioactive materials associated with the possession and use of source, special nuclear, and byproduct materials.
- *Documentation* — Ensure that decommissioning decisions are thoroughly documented to develop a record that will withstand the test of time and avoid transferring a burden to future generations to redevelop information on the radiological status of formerly licensed sites.
- *Coordination* — Coordinate decommissioning actions with other regulatory agencies at the Federal, State, and local levels, with interested parties, and with members of the public to promote efficiency and finality for decommissioning actions.
- *Minimal Burden* — Minimize the regulatory burden imposed on licensees and other responsible parties consistent with accomplishing the other objectives.
- *Review Capabilities* — Develop and maintain NRC review capabilities, as required to fulfill the objectives of the decommissioning program.

The management plan identifies approaches that can be used to reduce the level of NRC resources devoted to decommissioning, while ensuring effective oversight of decommissioning projects listed in the NRC's SDMP and other significant decommissioning actions at materials facilities.

#### 2.1.2 Background

Over the last 5 years, the level of NRC resources devoted to the SDMP sites and policy issues has increased, reaching a maximum in Fiscal Year (FY) 1993 at 48 full-time equivalents (FTEs). The budgeted FTEs include overhead (clerical and administrative support, as well as management at the Branch Chief level and above) and time expended on activities such as staff development, professional meetings, general administration, annual leave, and sick leave. Actual direct efforts have been far less than the budgeted levels (e.g., 24 FTEs in FY93 for all materials decommissioning).

These resources are distributed between the Office of Nuclear Material Safety and Safeguards (NMSS) and NRC regional offices (primarily Regions I and III). Staff members have a full complement of technical and regulatory expertise in the areas of decommissioning, environmental and operational health physics, nuclear engineering, and earth sciences.

In addition to staff resources, the NRC has acquired technical support by contracting with Oak Ridge Institute for Science and Education (ORISE) to conduct radiological assessments (e.g., confirmatory surveys). The NRC has also contracted with Oak Ridge National Laboratory (ORNL) to acquire technical support for developing environmental impact statements (EISs). In FY95, the technical support for these two projects totalled approximately \$3 million. An additional \$160,000 of contractor effort by ICF, Inc. is required to support staff reviews of financial assurance mechanisms and special cases.

Under existing procedures and policies, the NRC staff typically reviews site characterization plans and reports to ensure that licensees have established the extent and type(s) of radiological contamination before initiating remediation. Site characterization provides the basis for developing the remediation or decommissioning plan, which is typically submitted as a license amendment request for a licensed site where decommissioning procedures have not already been approved or where decommissioning could result in impacts (such as effluents or doses) that have not been enveloped during operations. The decommissioning process is illustrated in Figure 1.

Remediation begins once the NRC has approved the licensee's decommissioning plan. For licensed sites, approval of the plan is implemented through a license amendment authorizing decommissioning. In issuing the amendment, the NRC staff may offer an opportunity for a hearing concerning the amendment, and may include a decommissioning schedule as a license condition. To promote broad acceptance and finality of the planned actions, the NRC coordinates extensively with State and local authorities and other interested parties in reviewing and approving the decommissioning plan.

At the conclusion of the remedial actions, the licensee or site owner conducts a termination radiological survey to demonstrate that residual radioactivity levels have been sufficiently reduced in accordance with NRC criteria. The NRC then conducts a confirmatory survey to confirm the results of the licensee's termination survey. (Confirmatory surveys are either conducted by NRC staff or under contract with ORISE.)

Despite the dedication of an increased amount of NRC resources and enhanced experience with decommissioning, progress in remediating the sites has not met the expectations of the NRC or the public. Delays continue for a variety of technical, legal, and policy-related reasons. In addition, several remediation projects have been placed on hold pending completion of EISs that assess the environmental impact and alternatives to onsite disposal of the radioactive waste.

At present, the number of sites on the SDMP list is increasing faster than sites are being remediated and released. In particular, sites are being added to the list as the regions review sites for which the licenses were initially terminated without sufficient radiological surveys or documentation to confirm that residual contamination levels are acceptably low.



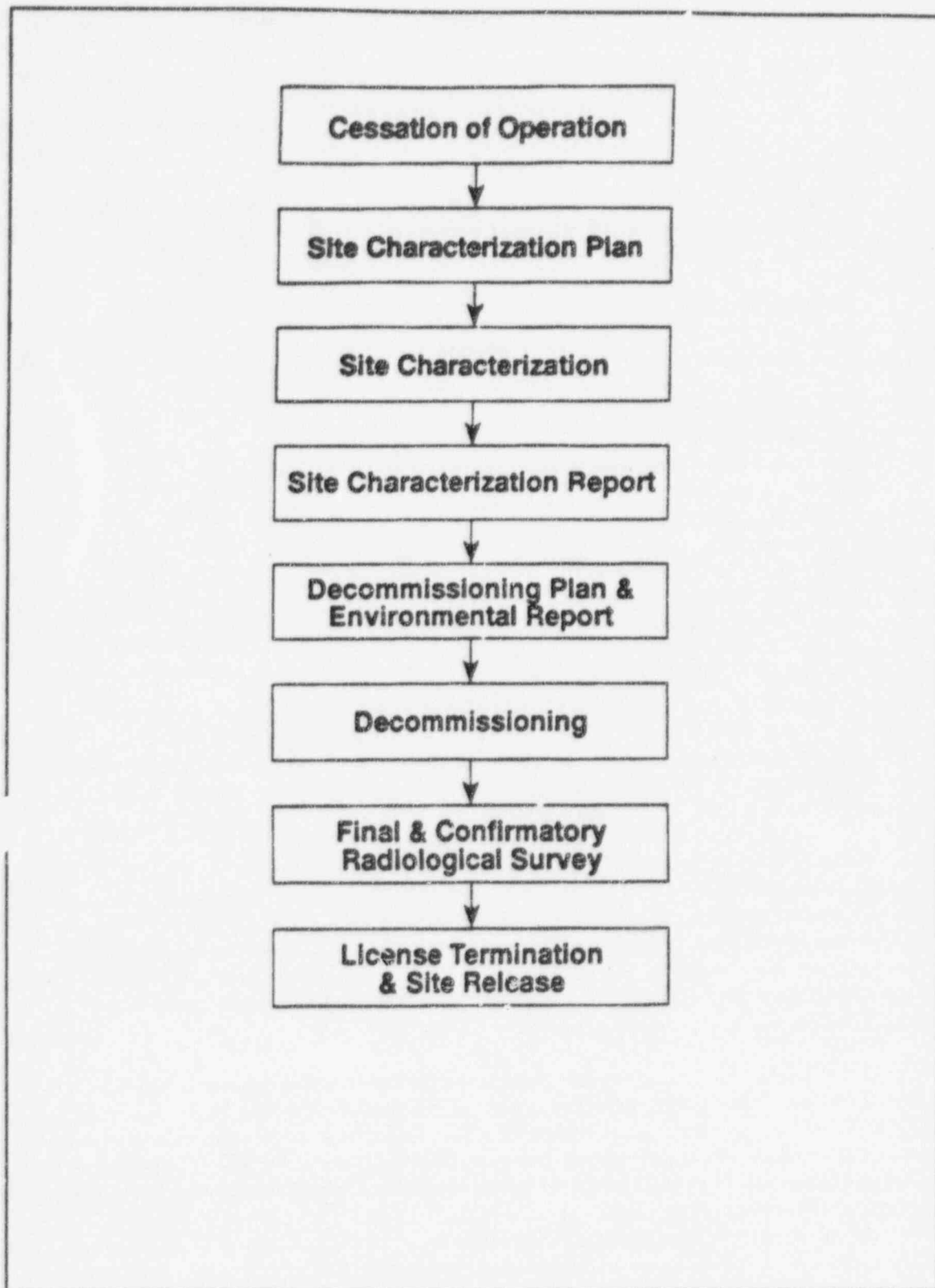


Figure 1: The General Decommissioning Process

Budget reductions and competition between NRC programs have forced the NRC to evaluate whether a more efficient and cost-effective regulatory approach could be used to oversee site remediation while ensuring the same level of public protection. In the FY96 budget, for example, the NMSS has been forced to reduce funding for ORISE confirmatory surveys by 66% (approximately \$2 million) from baseline funding. In addition, consistent with direction from Congress and the Office of Management and Budget, staff resources dedicated to the SDMP program have been capped at existing levels to ensure that sufficient resources will be available to support other NRC programs during FY96 through FY98. At the same time, SDMP resources are increasingly being tapped to support non-SDMP work, such as review of formerly terminated licensed sites and more routine decommissioning projects. The NRC staff is also considering reducing support of mobile and fixed laboratories operated out of the NRC regional offices.

## 2.2 Program Initiatives

This section discusses the following decommissioning program initiatives:

- procedures for decommissioning
- revised performance measures
- site characterization reviews
- confirmatory surveys
- business process redesign
- the interactive resolution process
- preliminary hazards analysis
- the SDMP database
- deferrals to Environmental Protection Agency (EPA) and other programs

### 2.2.1 Procedures for Decommissioning

The 1989 General Accounting Office (GAO) report on decommissioning identified the lack of procedures as a principal deficiency of the NRC's regulatory program for decommissioning nuclear materials facilities. The GAO expressed concern that the NRC was not ensuring a thorough and effective evaluation of residual contamination levels before terminating licenses and releasing sites for unrestricted use.

The NRC staff has gained considerable experience over the last 5 years in overseeing the SDMP and other decommissioning activities involving significant radioactive contamination. In addition, since the inception of the SDMP in 1990, the NRC has promulgated new requirements on financial assurance, recordkeeping, and timeliness for decommissioning materials facilities. Further, the staff has developed specific procedures, standard review plans, and regulatory guidance on a variety of topics related to decommissioning materials facilities and SDMP sites. The program has now matured to the extent that development of standard procedures for decommissioning is appropriate and achievable.

Members of the NRC staff in the Low-Level Waste and Decommissioning Projects Branch (LLDP) are currently developing a comprehensive Manual Chapter to define the procedures for decommissioning SDMP sites and other licensed sites that used nuclear materials. The objective of the procedures is to promote consistent and efficient regulatory reviews concerning decommissioning activities. The procedures will also promote adherence to a consistent policy and set of practices for ensuring safe and timely decommissioning. In addition, development of the procedures will transfer experience from the SDMP program for use in decommissioning other nuclear materials facilities and sites, including unlicensed sites with elevated levels of contamination from source, special nuclear, or byproduct material use.

The Manual Chapter will provide a roadmap for NRC staff to follow in coordinating and reviewing decommissioning actions. In addition, the Manual Chapter will direct staff to consult established reference

documents, such as regulations, inspection procedures, policy and guidance directives, standard review plans, regulatory guides, NUREGs, and other documents that provide specific criteria for evaluating the adequacy of decommissioning actions.

A preliminary draft of the procedures to be included in the Manual Chapter was circulated to headquarters and regional offices, at the staff level, in June 1995. The preliminary draft was discussed during an NRC counterpart meeting scheduled for July 1995. The final procedures will be issued by the end of 1995, and will be implemented by the NMSS and NRC's regional offices. Implementation of these procedures should resolve the procedural deficiencies previously identified by GAO.

Once issued, the NRC staff may revise the procedures from time to time to reflect significant developments in the decommissioning program, such as the amendments to the standards for residual radioactivity established by the *Code of Federal Regulations*, Title 10, Part 20 (10 CFR Part 20).

### 2.2.2 Revised Performance Measures

The Government Performance and Results Act of 1993 (GPRA) mandates the use of performance budgeting by all Federal agencies by FY97. As part of the approach required by the GPRA, agencies are required to identify, implement, and evaluate performance of government programs using specific performance measures. These measures are supposed to emphasize "outcome" (that is, the quality and impact of the program), rather than merely "output" or "economy" (the number of tasks completed or the unit cost of completing the tasks, respectively). The Administration's National Performance Review similarly focuses on "outcome" by emphasizing responsiveness to customers, reducing overlap and regulatory burden, and enhancing the efficiency and effectiveness of government programs.

Since the inception of the SDMP, the NRC has used a single performance measure for the program, namely the number of sites decommissioned and removed from the list of sites contained in the SDMP. On the basis of this measure, progress has been limited. To date, only five sites have been sufficiently remediated to be removed from the list. Other sites have been removed from the list for programmatic reasons. For example, Kerr-McGee's West Chicago site was removed from the list when regulatory jurisdiction for the site was transferred to the Illinois Agreement State program. However, the NRC did not take credit for removal of this site because contamination at the site was not remediated or ensured before the site was removed from the list. Other sites have fully or partially completed remediation, but have not yet been removed from the list for a variety of reasons.

From an objective standpoint, the number of sites removed is an inadequate performance measure for the program, and only partially reflects the overall objectives of the NRC's decommissioning program (see Section 2.1.1). In particular, this measure only evaluates output, and yields little or no insight about the quality of NRC performance. For example, the NRC could accelerate approval of decommissioning actions to improve the apparent performance against the measure. However, such an acceleration might sacrifice the desired outcome of a safe, coordinated, documented, and final decommissioning.

In addition, a performance measure based on the number of sites removed only indicates completion of the decommissioning process and provides no indication about interim progress. As a result, this measure is not useful for assessing performance at most sites that are at earlier stages in the decommissioning process. In fact, as the NRC staff commented in reviewing a draft GAO report on the SDMP program in early 1995, use of this measure ignores the considerable progress made in completing reviews of site characterization plans and reports, decommissioning plans, and termination surveys, *where the bulk of program resources have been devoted over the last couple years*. Successful completion of these earlier milestones is a necessary prerequisite to completing decommissioning in a safe, timely, coordinated, and final manner.

Consequently, the NRC staff is developing alternative performance measures that will better track the progress and outcome of the NRC's materials decommissioning program in general, and the SDMP program in particular. For example, the staff is considering alternative measures that would evaluate progress in reviewing and approving decommissioning plans.

### 2.2.3 Site Characterization Reviews

The performance of licensees and site owners listed in the SDMP varies significantly. Some have implemented effective programs, staffed by competent professionals, that are making timely progress in remediating contaminated sites. At other sites, various factors have resulted in more limited or non-existent progress.

Recognizing this significant variability in the performance of licensees and site owners, the NRC could conserve its resources and reduce licensee fees by conducting less in-depth reviews of licensees that exhibit a high level of performance. Specifically, the NRC could reduce the amount of oversight currently devoted to reviewing site characterization plans and reports.

The NRC emphasized the need for early and ongoing coordination between licensees and the NRC in planning and conducting site characterization. For example, the SDMP Action Plan, released in April 1992, encouraged such interactions and submission of characterization plans for NRC review. This approach was based on the NRC's experience with decommissioning SDMP sites, as well as the experience of the EPA and State agencies in the hazardous waste and Superfund programs.

Since the SDMP Action Plan was released in April 1992, the NRC has devoted considerable attention to site characterization at both the generic and site-specific levels. In November 1992 and November 1994, the NRC conducted public workshops concerning the SDMP program that featured the importance of site characterization to the success of decommissioning. In addition, the NRC published preliminary draft guidance on site characterization in July 1992, as well as the "Draft Branch Technical Position on Site Characterization for Decommissioning" in November 1994. The final rule on "Timelines in Decommissioning of Materials Facilities" published in the Federal Register (59 FR 36026) added a requirement to submit characterization data with the decommissioning plan. The NRC has clearly established and communicated expectations to the licensees and other responsible parties for site characterization in support of decommissioning.

The NRC complemented these generic efforts by reviewing numerous site characterization plans and reports for specific sites between 1992 and 1995. In typical cases, the NRC staff invested approximately one-half to a full person-month of effort (spread out over several months) in reviewing each site characterization plan and report. Although the reviews raised substantive issues that required resolution by the licensees and responsible parties, they proved costly and delayed decommissioning that could otherwise have proceeded in parallel with resolving outstanding issues. In addition, ultimate resolution of some issues depended upon the licensee's preferred approach for decommissioning, which is not established until the licensee submits a proposed decommissioning plan. In some cases, such as the Babcock & Wilcox (B&W) Parks Township Shallow Land Disposal Area (SLDA), discussions about site characterization issues were placed on hold pending the licensee's submission of its preferred approach.

As an alternative, the NRC plans to forego review of site characterization plans and reports for most licensees and responsible parties. Instead, site characterization information will be considered in the NRC's review of the decommissioning plan. This alternative is consistent with NRC regulations, which require characterization data to be submitted with the decommissioning plan.

The NRC's alternative approach will also promote a more coordinated and focused review of site characterization information. This is because reviewers will be compelled to emphasize issues that affect the selection and implementation of a decommissioning approach. (By contrast, the current approach allows reviewers to consider issues that are more academic in nature and may have little bearing on actual performance of decommissioning.) As a result, the new approach will allow the NRC staff to focus on the decommissioning plan reviews that are more critical to ensuring protection of the public and the environment.

The new approach may delay identification of significant information gaps. However, the NRC will partially compensate for this risk by increasing routine contact with licensees through site visits and meetings. In addition, the NRC will pay heightened attention to licensees and responsible parties that have lower levels of performance. Resources thus conserved will then be focused on sites needing increased staff attention, or on other NRC priorities.

The NRC would generally use the following criteria to identify a licensee or responsible party warranting heightened attention during site characterization planning:

- (1) a Severity Level I, II, or III violation on the most recent inspection
- (2) issuance of an order or other escalated enforcement on the most recent inspection, or based on a licensing review or petition response
- (3) inclusion of a "management paragraph" in the cover letter transmitting the notice of violation on the most recent inspection; a management paragraph requires that the licensee describe how it is ensuring adequate management control over the licensed program
- (4) occurrence of a significant event requiring a reactive inspection
- (5) repetitive violations
- (6) failure to take appropriate short-term corrective measures to mitigate or control existing contamination resulting in current public doses that are a significant fraction of the public dose limit or that are actively migrating in soil, groundwater, or other environmental media
- (7) limited financial and technical viability of the licensee or responsible site owner

The goal of these criteria is to predict sites where past performance indicates a likelihood that characterization may be inadequate or incomplete. For these sites, it will likely be more efficient to apply staff resources to early review of the characterization plan developed by the licensee or responsible party.

In addition, for some sites, very limited information may exist as to the type(s) and location(s) of contamination present. This information shortage may result from a lack of individuals with institutional memory of operations and waste disposal practices at the site, or from a lack of reliable records. This may be the case for a significant number of the sites identified through the ongoing NRC review of files concerning terminated materials licenses.

Another common problem at the sites identified through the terminated license review is the lack of an organization with demonstrated capabilities to perform the characterization in accordance with NRC regulations and guidance. For these cases, increased NRC staff attention early in the characterization process, including the review of characterization plans and reports, may still be the most efficient method for ensuring timely remediation.



Licensees and responsible site owners that are judged not to need heightened NRC staff attention during characterization planning, may nevertheless request NRC review of site characterization plans and reports. The NRC would entertain such requests on a resource-available basis. A limited (e.g., 1- to 2-day) review of such documents may be conducted to provide informal, yet documented, comments and reactions to the licensees and owners. As an alternative approach, the NRC could visit the site near the beginning and end of site characterization to observe efforts underway, review planned actions and preliminary results, and identify any obvious data gaps or limitations of the methods used by the licensee or responsible party.

The implementation of this approach will reduce the expenditure of NRC staff resources. However, in some cases, this approach may delay decommissioning, and increase resource expenditure by the licensee or responsible party. For example, if significant gaps in characterization data are identified during the review of the decommissioning plan, additional characterization would be required. Remobilizing the personnel and equipment necessary to conduct the additional characterization may take more time and resources than if the data had been collected during the initial characterization effort.

It is the responsibility of the licensee or responsible party to ensure that adequate expertise and resources are devoted to characterization planning and performance. The NRC staff will work closely with licensees or responsible parties during characterization planning to ensure that they are aware of existing guidance, and to provide timely informal comments to identify significant data gaps.

#### 2.2.4 Confirmatory Surveys

For complex decommissioning actions, such as the SDMP sites, the NRC has routinely conducted a confirmatory survey. The purpose of a confirmatory survey is to validate, on an audit basis, the data in the licensee's termination survey report. The survey is normally conducted after the NRC staff completes the review of the licensee's termination survey report. In some cases, the NRC staff performs the survey; in other cases, the ORISE performs the survey under contract to the NRC.

In each case, the NRC compares the results of the confirmatory survey to the survey results submitted by the licensee or responsible party. If the results compare favorably, the NRC determines that decommissioning is complete and the site is ready for release in accordance with NRC requirements. If the comparison reveals significant differences between the survey results, additional investigation is required to determine the causes and the need for additional sampling, scans, or remediation.

The licensee reimburses the NRC for the cost of the confirmatory survey, which is proportional to the scope of the survey and typically ranges from \$20,000 to \$200,000. The most expensive confirmatory survey to date was conducted at the Shoreham Nuclear Power Station in Long Island, New York, at a cost of \$800,000.

The NRC's confirmatory surveys are discretionary; that is, existing NRC regulations do not require the performance of confirmatory surveys. However, in recent years, such confirmatory surveys have become routine in NRC's review and release of the more complex contaminated sites.

To some extent, the NRC staff has come to rely on the confirmatory survey to compensate for less comprehensive quality assurance in the licensee's termination survey, and less scrutiny of the licensee's performance while the survey is in progress. Also, the public relies on the NRC's survey because of the perception that the licensee's survey is inherently biased in favor of the licensee and cannot be trusted as a final basis for releasing a site.

Similar to the initiative described to reduce characterization plan review, the NRC staff will reduce the scope of confirmatory surveys, placing greater emphasis on the licensee's or responsible party's termination radiological survey for most sites. Confirmatory surveys will continue to be performed, either by NRC staff

or an NRC contractor, but with reduced frequency and scope. The extent of the confirmatory survey will be based on the following factors:

- past performance assessed using the conditions listed in Section 2.2.3
- results of NRC inspections while the licensee's survey is in process
- results of the licensee's quality assurance/quality control (QA/QC) efforts as reported in the termination survey report and as observed during inspections

This initiative places greater emphasis on the licensee's QA/QC program and in-process NRC inspections during the licensee's termination survey. This is a more prudent, effective, and efficient approach for evaluating the adequacy of remediation. The NRC would increase the effort applied to reviewing the termination survey plan, which is already part of the decommissioning plans submitted by licensees and responsible parties, to ensure that it includes an appropriate QA/QC program. This would consist of the following provisions, among others:

- sample analysis by accredited laboratories that perform routine cross-comparison programs conducted by EPA and others
- submission of QC samples (blanks, spikes, standards)
- adherence to training and sampling procedures
- qualification of field and laboratory technicians

A number of these provisions are being incorporated in the Multi-Agency Radiological Site Survey Investigation Manual (MARSSIM) being developed by the EPA, NRC, Department of Energy (DOE), and Department of Defense (DOD). To complement the MARSSIM guidance, the NRC staff may need to develop limited guidance on appropriate QC measures for termination surveys. The agencies are also initiating development of complementary procedures in the Multi-Agency Radiological Laboratory Procedures Manual (MARLAP). In addition, during performance of the licensee's termination survey, the NRC will collect split samples or measurements with the licensee to verify the reliability of the data, as necessary.

These approaches are more consistent with the EPA's new approaches for overseeing remediation at Superfund sites or in hazardous waste facility assessments and corrective action programs. In some cases, an independent third-party may be involved to confirm the results submitted in the licensee's termination survey. Unless a licensee voluntarily commits to independent third-party sampling, the NRC may need to resort to orders to require such surveys when justified on the basis of health and safety considerations.

For SDMP sites, and other complex decommissioning cases, the NRC staff will conduct a routine closeout inspection before terminating the license. For less complex cases a closeout inspection may not be needed. When required, the inspection would typically include general area scans using appropriate survey equipment (such as handheld or large-area floor survey probes), limited fixed measurements, and random samples collected from areas suspected of having elevated contamination levels.

Implementation of this approach incurs some increased risk that sites could be released with elevated levels of residual radioactivity in isolated "hot spots." Past confirmatory surveys have identified hot spots at a number of sites. These spots have been limited, and in most cases did not pose significant health and safety concerns. Nonetheless, release of sites with hot spots could increase the likelihood that future land owners, or other interested parties, may deem it necessary to reevaluate the site.

The staff believes, however, that the potential is low that such reevaluation would identify a significant risk to the environment or public health and safety. This position is supported by recent staff efforts to develop risk-based methods for evaluating hot spots. Preliminary results indicate that, for many cases, current NRC guidance on the acceptable levels of radioactivity in a given hot-spot is conservative, and may be increased without exceeding current decommissioning dose criteria. If the hot spot guidance is revised to allow higher levels of radioactivity, the probability of a site being subject to future inquiries should decrease, and the risks of reducing the scope of confirmatory surveys should be mitigated.

Reducing the scope of confirmatory surveys would also decrease the availability of independent documentation demonstrating that a site meets NRC criteria. This documentation has, in the past, been shown to be reassuring to the public.

The NRC will manage these risks by increasing emphasis on the review of licensee documentation of termination survey plans and reports, including QA/QC records necessary to confirm that the program remained effective throughout the survey. The NRC will place the greatest emphasis on licensees or responsible parties that exhibit poor performance based on past experience, including the results of NRC inspection during the licensee's termination survey. The NRC will also consider increasing the scope of confirmatory surveys for licensees or responsible parties where past experience indicates a potential for submittal of inadequate or incomplete termination survey data.

Independent measurements collected by the NRC during the licensee's survey and any additional measurements collected during the closeout inspection could indicate elevated contamination at the sites. If discrepancies cannot be readily resolved between survey measurements, the NRC may require (by order) or request that a licensee or responsible party conduct additional independent surveys to confirm the radiological status of the site, or the NRC may itself conduct a more comprehensive confirmatory survey. Timing of such a survey will be determined by the availability of funding and other program priorities. Such a survey could result in substantial delays and economic impacts on licensees or responsible parties before release of the sites.

#### 2.2.5 Business Process Redesign

Application of the Business Process Redesign (BPR) approach to the current licensing process results in a fundamentally new licensing process for regulating routine uses of licensed materials. This new licensing process, summarized in SECY-95-114, "Implementation of a Redesigned Materials Licensing Process," dated May 5, 1995, is composed of three major concepts:

- (1) a Regulatory Product Design Center where technical members of the materials licensing and inspection community can interact, in both virtual and actual space, to design and prepare regulatory products necessary to support, maintain, and enhance the new licensing process
- (2) improved processing of licenses through reviewer-performed and computer-assisted licensing, using a graded approach commensurate with the safety hazards posed by the application
- (3) a new way of working in Agency-wide teams

The NRC staff has used many of these concepts to oversee the remediation of most SDMP sites. As new concepts and methods are developed to facilitate the goals of the BPR project, the staff will evaluate their applicability to the SDMP program.

The staff currently plans to explore two specific areas where the BPR project may have near-term applicability to the SDMP program. First, the staff has begun exploring the possibility of using a contractor



to facilitate a functional review of the SDMP program to identify handoffs, track turnarounds, and assess the progress of the program. Second, the staff plans to explore the idea of forming SDMP decommissioning management teams. As currently envisioned, these teams would consist of staff members from NMSS, other Headquarters Offices, and the Regions, with decommissioning experience and regulatory/licensing responsibility for the SDMP site. These teams will function in the same manner as the BPR Agency-wide teams, managing by exception, reaching collaborative team-based decisions, and employing parallel concurrence to expedite the evaluation and approval of decommissioning plans and reports.

The SDMP and BPR program staffs have been discussing, and will continue to discuss, the applicability of the BPR concepts to the SDMP program, while moving forward with the staff's current initiatives. The staff also plans to conduct an initial assessment concerning application of the BPR concepts to SDMP, in conjunction with its review of licensing and inspection programs under Phase II of the National Performance Review. Results of this assessment will be available in March 1996.

The staff anticipates that, as the BPR and SDMP programs continue to mature, there will be several opportunities to incorporate into the SDMP the methods or concepts developed under BPR. In order to keep the Commission informed of the staff's efforts, the staff will discuss the application of the BPR concepts and methods in future SDMP program updates.

#### 2.2.6 Interactive Resolution Process

In March 1995, the NRC staff met with the Nuclear Energy Institute (NEI) and Fuel Cycle Facilities Forum (FCFF) to discuss implementation of an interactive issue resolution process. The objectives of the process are to share information about generic or specific precedents that may be of general interest, and to exchange information about ongoing implementation of the decommissioning program outside of specific rulemaking and licensing actions.

The industry is currently developing a list of specific implementation issues for NRC consideration. The NEI and FCFF transmitted the first set of issue worksheets on June 6, 1995. An open meeting between the NEI, FCFF, and NRC was held on June 13, 1995, to discuss these issues, as well as planned guidance documents and policy positions. These discussions were the prelude for a more interactive process for developing regulatory guidance on issues associated with decommissioning, such as methods for determining background radiation levels, modeling potential exposures, conducting survey measurements, and implementing the timeliness rule.

On May 4, 1995, the NEI proposed to the Commission that the NRC use a similar interactive process to develop regulatory guidance documents that implement the final rule on radiological criteria for decommissioning. The NRC successfully used such an approach in developing the regulatory guides that implemented the 1991 revisions to 10 CFR Part 20. This interactive process should conserve staff resources by ensuring fulfillment of the following objectives:

- (1) Licensees and responsible parties are aware of NRC staff positions on various issues before preparing and submitting decommissioning and survey plans.
- (2) The staff applies a consistent, streamlined set of procedures and policies in reviewing proposed decommissioning actions.
- (3) Staff efforts to develop guidance are responsive to program needs, and provide constructive approaches for resolving issues associated with decommissioning.

### 2.2.7 Preliminary Hazards Analysis

The NRC will develop a more detailed method for assessing risk at sites identified through the ORNL and NRC staff review of terminated licenses (Section 4.1.4) that are confirmed to have residual contamination from formerly licensed operations. The purpose of the risk assessment is to determine if residual contamination contained in a relatively small area poses a significant risk to the environment or public health and safety, and whether it warrants additional action by the responsible party and the NRC.

Any site identified through the terminated license review project would require remediation if the average contamination level exceeds the guideline value at the 95% confidence level. However, for ongoing decommissioning projects, additional remediation may also be recommended if localized contamination exceeds the averaging criteria described in NUREG/CR-5849, "Manual for Conducting License Termination in Support of License Termination."

The averaging guidance in NUREG/CR-5849 was designed for sites that have widespread contamination. This guidance is used to help plan the site remediation and design the survey to demonstrate compliance with decommissioning criteria (termination survey). This guidance may not be appropriate for sites where a license was previously terminated. In such cases, localized areas with elevated contamination levels may be acceptable, on a risk basis, depending on the total inventory present, the size of the localized contaminated area, the radionuclide of concern, and other factors. The staff is performing a more detailed evaluation of the risk associated with localized contamination as a part of the development of the MARSSIM discussed in Section 2.2.4.

Before requesting that the licensee or responsible party perform additional site characterization, and possibly remediation, it is important that the NRC conduct a more detailed risk assessment of localized contamination for three reasons:

- (1) Detailed risk assessment is consistent with the Commission's direction in the 1992 SDMP Action Plan to ensure finality in decommissioning unless a significant impact on public health and safety is identified.
- (2) Performing additional characterization and remediation for a very low-risk site may require an unnecessary expenditure of resources and cause undue public concern.
- (3) Detailed risk assessment would set a desirable precedent as to how the NRC will respond to future discoveries of low levels of contamination at sites.

The staff will consider formerly terminated licensed sites in a two-step process. First, after determining that a site contains elevated levels of residual contamination, the staff will conduct a preliminary assessment based on available information to determine whether additional characterization and remediation are necessary. Some sites may have such minimal levels of contamination that they do not pose a significant risk and do not warrant additional action. The NRC will document these findings in a letter to the current property owner and the former licensee.

Second, for sites that warrant additional characterization, and possibly remediation, the staff will perform additional hazards analysis to identify those that should receive prompt attention and higher NRC priority. The hazards analysis would be conducted based on available information (including scoping surveys) by comparing site conditions against the following priority criteria:

- (1) The site currently causes doses to members of the general public in excess of 50 millirem/year (total effective dose equivalent), or 50% of the NRC's public dose limit in 10 CFR 20.1301.

- (2) The site currently exhibits measurable migration of radiological contamination to groundwater, surface water, soil, sediment, or other environmental media.
- (3) The responsible party lacks the financial and technical capability or management commitment to ensure security and control of the contaminated material.

Compared to other contaminated sites that are added to the SDMP or considered to be more typical decommissioning cases, sites that meet *any* of the above criteria would receive higher priority consideration by the NRC for reviews of proposed decommissioning plans, site characterization data, and radiological surveys. Contaminated sites that do not satisfy any of these criteria would be backlogged for reviews, and addressed by the staff as the higher priority sites are resolved and as resources become available. This approach will allow the NRC staff to focus on contaminated sites having greater risk, while containing the size of the SDMP and decommissioning program to within existing staff budgets.

#### 2.2.8 SDMP Database

Over the past several years, the NRC has manually tracked completion of licensing actions and other decommissioning milestones in the SDMP program. During this period, the staff has received frequent requests (from the Commission, Congress, and outside parties) for status information. Such requests have required considerable effort in reviewing the licensing dockets and project files to compile the requested information.

In 1994, the staff initiated development of a comprehensive database management system containing information on SDMP sites. The prototype database has been developed, using the Microsoft ACCESS computer program, as a cooperative effort between the NRC Office of Information Resources Management (IRM) and NMSS. Status information and other site characterization data will be loaded into the database and routinely maintained by licensing assistants in LLDP.

The database will be used to produce periodic reports to NRC management on SDMP accomplishments and status, as well as the annual reports to the Commission on the SDMP. As such, the database reports will substitute for the more labor-intensive descriptions of the individual SDMP sites that have been included in previous reports on the SDMP. In addition, the database will be used to respond to internal and external requests for information concerning the status and characteristics of the SDMP sites. (The most recent request was from Senator Glenn in a letter dated May 8, 1995, with the response from the Commission dated June 22, 1995.)

Maintenance of the database is expected to require about 0.2 FTE annually. Use of the database in place of the individual site descriptions and manual searches of the files should save about 0.5 FTE per year.

#### 2.2.9 Deferrals to EPA and Other Programs

In SECY 95-056, the NRC staff recommended that the Commission defer oversight of decommissioning actions at two sites that are already being addressed under EPA's Superfund program under the Comprehensive Environmental Response, Compensation, and Liability Act. The two sites were the DuPont Corporation site in Newport, Delaware, which was not listed in the SDMP, and the West Lake Landfill near Bridgeton, Missouri, which was listed in the SDMP. The staff based its recommendation on recognition of the following factors:

- NRC regulation of the remediation of radioactive contamination at the two sites would overlap with and duplicate the EPA's actions under Superfund.

- The EPA's actions would be sufficient to protect the public and the environment from radiological hazards present.

The Commission approved the staff's recommendation in an SRM dated April 28, 1995. The NRC has since notified the EPA that it plans no further action on either site, and will remove the West Lake Landfill from the SDMP list. This decision sets a precedent for other deferrals to EPA regulation of remedial activities, as well as other similar actions by States and DOE, where such actions are expected to provide sufficient protection to the public and the environment.

Several other sites listed in the SDMP or addressed in other decommissioning projects may be candidates for such deferrals. For example, the Pesse site in Pulaski, Pennsylvania, is being remediated by EPA under Superfund. In such cases, the NRC staff will assess the adequacy of existing or proposed remediation of these sites, and will determine whether deferral is appropriate. In addition, the NRC staff will coordinate proposed deferral actions with the other agency(ies) that regulate the remediation, and will inform the Commission before formally initiating any deferral.

### 3. SDMP SITE STATUS OVERVIEW

Since May 1993, the staff has removed the following sites from the SDMP list, and submitted the indicated papers to inform the Commission:

- AMAX, Inc. (Washington Bottom, West Virginia)  
Memorandum from James M. Taylor, "Removal of the AMAX Site from the Site Decommissioning Management Plan," dated April 25, 1994.
- Chevron Corporation (Pawling, New York)  
SECY-94-162, "Pawling Site Release and Removal from the Site Decommissioning Management Plan."
- Old Vic, Inc. (Cleveland, Ohio)  
SECY-93-062, "Old Vic, Inc., License Termination and Removal from the Site Decommissioning Management Plan."

In addition, decommissioning has been essentially completed at the following sites:

- UNC Recovery Systems (Wood River Junction, Rhode Island)
- United Technologies/Pratt & Whitney (Middletown, Connecticut)
- Babcock & Wilcox (Apollo, Pennsylvania)
- Aluminum Company of America (ALCOA) (Cleveland, Ohio)

Limited surveys or other administrative activities need to be completed before these sites can be removed from the SDMP list. For example, at the UNC site, issues related to nitrate contamination of the groundwater have delayed removal of the site from the list. These issues have been resolved through a consent agreement between the State of Rhode Island and UNC. Similarly, at the B&W Apollo site, a 1-year period of groundwater monitoring was required after decommissioning activities were completed. This 1-year period ends in November 1995. All four of these sites should be removed from the SDMP list in 1995.

Seven additional sites have approved decommissioning plans, and remediation is ongoing at these sites. Portions of two other sites have been decommissioned and released for unrestricted use. These sites, Cabot (Reading, Pennsylvania) and Northeast Ohio Regional Sewer District (Cleveland, Ohio), will remain on the SDMP list until the entire site is decommissioned.

Figure 2 presents a map depicting the location of each of the 51 sites listed in the SDMP. For each of these sites, Appendix A updates the decommissioning progress since May 1993 (the end of the period covered by NUREG-1444). Detailed background information is not repeated for sites that were listed in NUREG-1444. However, for sites that have been added to the SDMP since May 1993, Appendix A presents detailed descriptions including site operations, radioactive wastes, radiological hazards, financial assurance and responsible organization, status of decommissioning activities, NRC/licensee actions and schedule, and problems/issues.



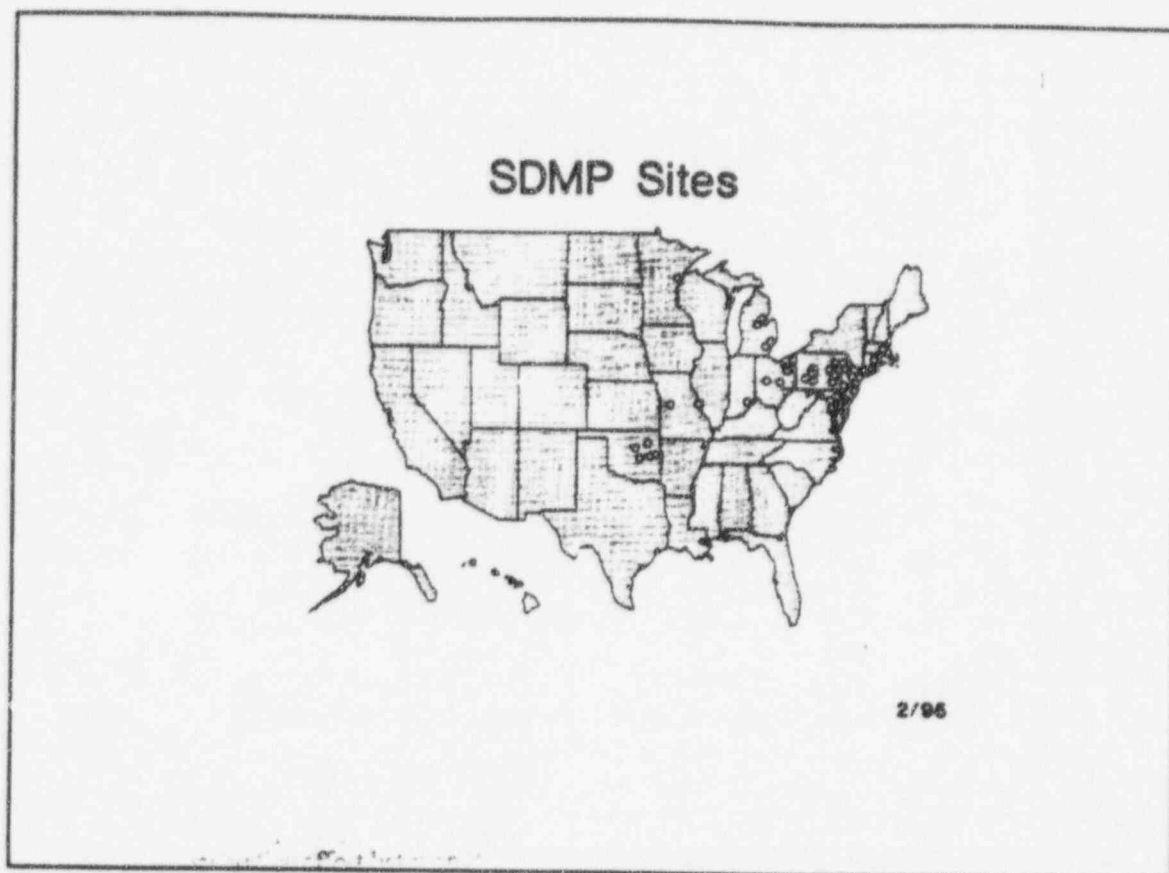


Figure 2: Location of SDMP Sites

Of the 51 sites currently listed in the SDMP, licensed operations are ongoing at 5 sites, and the licensees do not anticipate ceasing operations in the near future. In general, the objective at these 5 sites is not to decommission the entire site in the near future. Instead, the objective is to prepare for decommissioning, or to evaluate various site-specific problems that would likely lead to a complex decommissioning action, extended over a protracted period of time, if operations were to cease. Progress at these 5 sites is evaluated on a case-by-case basis. See Appendix A for descriptions of activities at these sites since May 1, 1993.

The 46 remaining sites listed in the SDMP require decommissioning of the entire site, or an inactive contaminated portion of the site. Licensed operations have ceased at these 46 sites or inactive areas. The status of each of these sites can be reasonably gauged by tracking the following 8 decommissioning activities, or milestones:

- (1) Site characterization, including preparing the characterization plan, performing the characterization, and preparing the characterization report
- (2) NRC review and approval of the site characterization plan and report
- (3) Development and submittal of the decommissioning plan
- (4) NRC review and approval of the decommissioning plan
- (5) Performance of the decommissioning actions described in the plan

- (6) Performance of the termination survey, and preparation and submittal of the termination survey report
- (7) NRC performance and documentation of the confirmatory survey
- (8) NRC termination of the license

Submittal and review of site characterization plans and reports are included as milestones in the progress summaries, as is conduct of the confirmatory surveys. However, as discussed in the management plan (Section 2 of this update), the resources committed to these areas will be decreased. The review of characterization data will continue, but, in most cases, will be conducted along with the decommissioning plan review. Separate reviews of characterization plans and reports, before submittal of the decommissioning plan, will be reduced. For confirmatory surveys, some level of effort will be required at each site listed in the summary figures and tables; however, the extent of the confirmatory survey will be reduced, in some cases significantly.

Figure 3 summarizes the overall decommissioning progress at the SDMP sites as of May 1, 1995, by displaying the total number of sites that have completed a given decommissioning milestone. Figure 3 includes milestones that apply to the entire site, as well as those that apply when portions of the site have been characterized, remediated, or surveyed, which in many cases represents significant progress. However, the "Release Site" category includes only the five sites that have completed the decommissioning of the entire site, and have been removed from the SDMP.

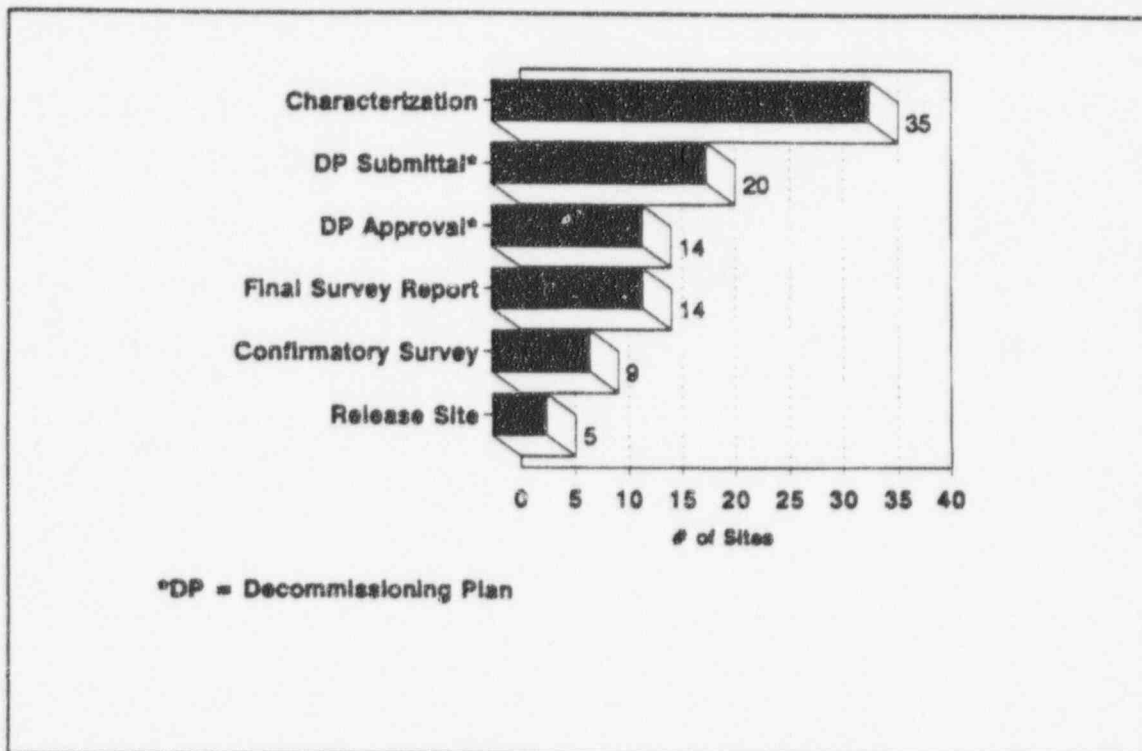


Figure 3: Decommissioning Activities Completed Before May 1995

It is apparent from Figure 3 that a substantial portion of the decommissioning effort to date has been applied to site characterization. Of the 51 sites, 35 have completed all or part of the site characterization. In many cases this included staff review and approval of characterization plans. Following characterization, 19 sites have submitted decommissioning plans for all or part of the site, and 14 plans have been approved by NRC.



Approval of the decommissioning plan is the most significant milestone, since it initiates the reduction or long-term stabilization of contamination at a site and the corresponding reduction in risk to public health and safety. In addition, the review and approval of the decommissioning plan generally poses the greatest technical and policy challenges.

After approval of the decommissioning plan, the activities become more routine, although problems can be encountered that can cause delays or require revisions to the approved decommissioning plan. This is apparent from Figure 3, which shows that 14 sites have approved decommissioning plans, but only 5 sites have completed decommissioning and been removed from the SDMP list. The approved schedule for decommissioning may be protracted as a result of legitimate technical or cost considerations.

While Figure 3 summarizes decommissioning progress since the beginning of the SDMP program in 1990, Table 1 provides a site-specific breakdown of the decommissioning activities completed since May 1993, the end of the period covered by NUREG-1444. Table 1 shows the effort expended over the last 2 years in planning and performing site characterizations for all or part of 13 sites. After completing the characterizations over the last 2 years, 2 sites submitted, and received NRC approval of, decommissioning plans for the entire site. These sites, Anne Arundel County/Curtis Bay and ALCOA, have nearly completed decommissioning, and should be removed from the SDMP list in 1996. Eight additional decommissioning plans were submitted over the last 2 years, and four were approved.

Table 1 - Decommissioning Activities Completed Between May 1, 1993 and May 1, 1995

Decommissioning Activity Scheduled	Site
SITE CHARACTERIZATION PLAN	
Submittal	AAR Manufacturing, Inc. Cabot Corporation (Reading, PA) Frome Investment Company Hartley and Hartley Landfill (SCA) Whittaker Corporation Safety Light Corporation Sequoyah Fuels Corporation
Approval	AAR Manufacturing, Inc. Babcock and Wilcox (Parks Township, PA) Magnesium Elektron Molycorp, Inc. (Washington, PA)
Submittal and Approval	Clevite Corporation Engelhard Corporation Lake City Ammunition Plant (U.S. Army) Molycorp, Inc. (York, PA) Northeast Ohio Regional Sewer District/Southerly Plant Westinghouse Electric Corporation (Waltz Mill Site)
SITE CHARACTERIZATION REPORT	
Submittal	Babcock and Wilcox (Parks Township, PA) Cabot Corporation (Revere, PA) Engelhard Corporation Lake City Ammunition Plant Magnesium Elektron Molycorp, Inc. (Washington, PA) Northeast Ohio Regional Sewer District/Southerly Plant Nuclear Metals, Inc. Permagrain Products, Inc. RMI Titanium Company Texas Instruments, Inc. Westinghouse Electric Corporation (Waltz Mill Site)
DECOMMISSIONING PLAN	
Approval of Partial Plan	Engelhard Corporation Northeast Ohio Regional Sewer District/Southerly Plant
Submittal of Partial Plan	Dow Chemical Company

Table 1 - Decommissioning Activities Completed Between May 1, 1993 and May 1, 1995 (Continued)

Decommissioning Activity Scheduled	Site
DECOMMISSIONING PLAN (cont.)	
Submittal and Approval of Partial Plan	Cabot Corporation (Reading, PA)
Submittal of Final Plan	Hartley and Hartley Landfill Kerr-McGee Cushing Kerr-McGee Cimarron Chemetron Corporation (Harvard Ave.) Chemetron Corporation (Bert Ave.) RMI Titanium Company
Submittal and Approval of Final Plan	Anne Arundel County/Curtis Bay Aluminum Company of America
Approval of Final Plan	Chevron Corporation Elkem Metals, Inc. Watertown Arsenal/Mall Watertown GSA
TERMINATION SURVEY REPORT	
Submittal of Report for Partial Site	Cabot, Inc. (Reading, PA) Northeast Ohio Regional Sewer District/Southerly Plant BP Chemicals America, Inc. Jefferson Proving Ground
Submittal of Final Report	Aluminum Company of America Babcock & Wilcox (Apollo, PA) Chevron Corporation Elkem Metals, Inc. Old Vic, Inc.

Table 1 - Decommissioning Activities Completed Between May 1, 1993 and May 1, 1995 (Continued)

Decommissioning Activity Scheduled	Site
NRC CONFIRMATORY SURVEY	
Confirmatory Survey of Partial Site	Northeast Ohio Regional Sewer District/Southerly Plant Aluminum Company of America BP Chemicals America, Inc. Cabot Corporation (Reading, PA)
Final Confirmatory Survey	Babcock & Wilcox (Apollo) Chevron Corporation Old Vic, Inc.
RELEASE FOR UNRESTRICTED USE	
Release Partial Site	Aluminum Company of America BP Chemicals America, Inc. Northeast Ohio Regional Sewer District/Southerly District Cabot Corporation (Reading, PA) United Technologies - Pratt & Whitney
Release Entire Site	Old Vic, Inc. Chevron Corporation
REMOVE SITE FROM SDMP LIST	
	Old Vic, Inc. Chevron Corporation AMAX

Figure 4 shows the number of decommissioning activities scheduled for completion by May 1, 1997. Including those completed by May 1995, a total of 41 sites are scheduled to complete the characterization of part or all of the site by May 1997. In addition, 25 decommissioning plans should be approved, with a total of 14 sites completing all of the actions required for removal from the SDMP list (including those completed by May 1995).

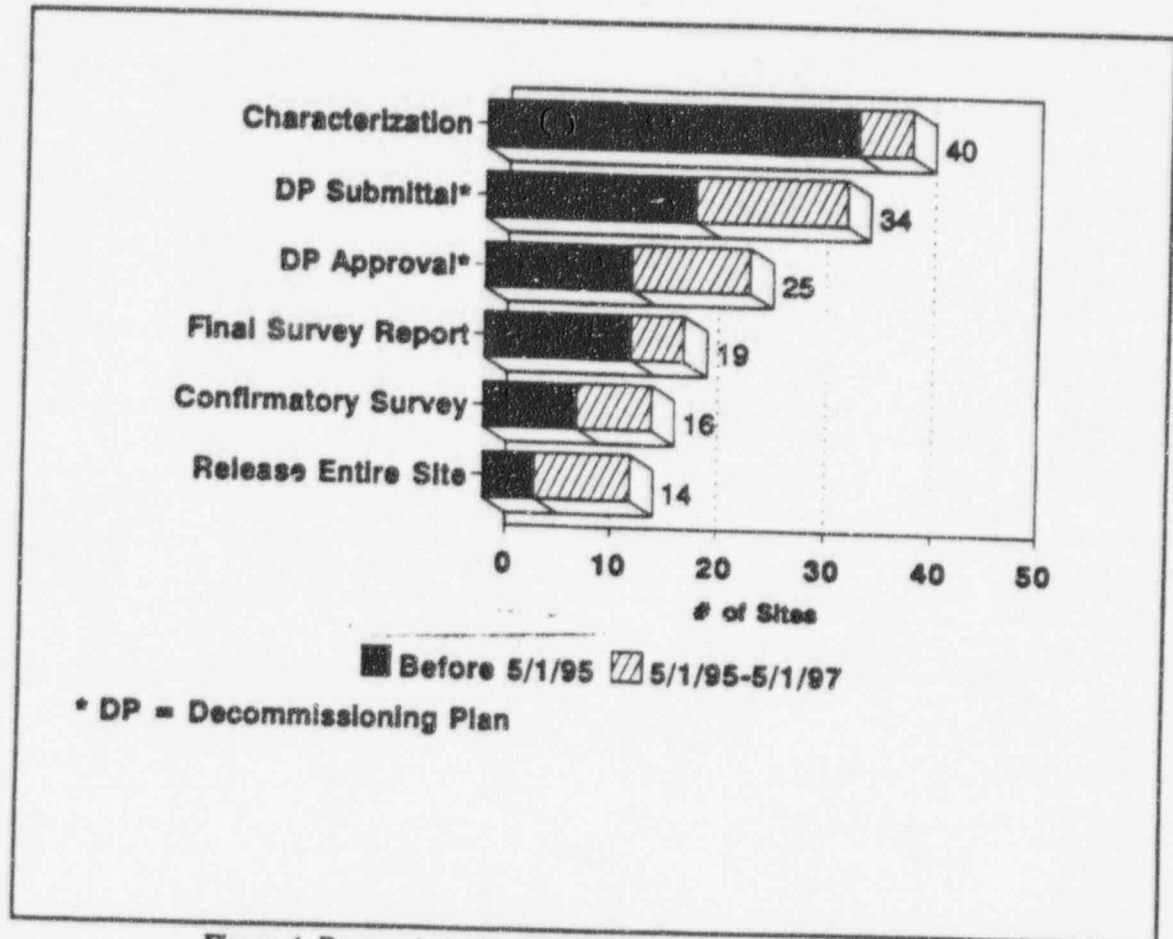


Figure 4: Decommissioning Activities to be Completed by May 1997

Table 2 provides the site-specific decommissioning milestones projected for completion between May 1995 and May 1997. Notably, the number of projected characterizations has decreased compared to previous years. Specifically, 12 characterization reports were submitted between May 1993 and May 1995, but only 6 are scheduled for submittal from May 1995 to May 1997. However, 11 decommissioning plans are scheduled for approval over the next 2 years, compared with 9 approved over the last 2 years. In addition, the decommissioning plans to be approved over the next 2 years are generally more complex than those previously approved. Together with the initiative discussed in Section 2.2.3 aimed at reducing NRC staff resources devoted to the review of characterization plans and reports before submittal of the decommissioning plans, the decrease in scheduled site characterizations is a positive indication that staff resources over the next 2 years should be adequate to complete the scheduled decommissioning plan reviews. Finally, Table 2 indicates that 9 additional sites are scheduled for removal from the SDMP by May 1997.

Table 2 - Decommissioning Activities Scheduled for Completion During the Period  
May 1, 1995 to May 1, 1997

Decommissioning Activity Scheduled	Site
SITE CHARACTERIZATION REPORT	
Submittal	Aberdeen Proving Ground (Risk Assessment) Clevite Corporation Safety Light Corporation Sequoyah Fuels Corporation Shieldalkyl Metallurgical Corporation (Cambridge, Ohio)
DECOMMISSIONING PLAN	
Submittal of Partial Plan	Lake City Army Ammunition Plant (U.S. Army) Sequoyah Fuels Corporation Whittaker Corporation
Approval of Partial Plan	Lake City Army Ammunition Plant (U.S. Army) Whittaker Corporation
Submittal of Final Plan:	Clevite Corporation Hartley and Hartley Landfill (MDNR) Hartley and Hartley Landfill (SCA) Molycorp, Inc. (Washington, PA) Molycorp, Inc. (York, PA) Nuclear Metals, Inc. Shieldalloy (Cambridge, OH)
Submittal and Approval of Final Plan	Dow Chemical Company Northeast Ohio Regional Sewer District/Southerly Plant Permagrain Products, Inc. Westinghouse Electric Corporation, Waltz Mill
Approval of Final Plan	BP Chemicals America, Inc. Chemetron (Bert Ave.) Chemetron (Harvard Ave.) RMI Titanium Company Kerr-McGee Cimarron

Decommissioning Activity Scheduled	Site
<p>TERMINATION SURVEY REPORT</p> <p>Submittal of Report for Partial Site</p> <p>Submittal of Final Report</p>	
	<p>Anne Arundel County/Curtis Bay Texas Instruments, Inc. Watertown Arsenal/Mall Watertown GSA</p>
<p>NRC CONFIRMATORY SURVEY</p> <p>Confirmatory Survey of Partial Site</p> <p>Final Confirmatory Survey</p>	
	<p>Jefferson Proving Ground</p> <p>Aluminum Company of America Anne Arundel County/Curtis Bay Elkem Metals, Inc. RTI, Inc. Texas Instruments, Inc. Watertown Arsenal/Mall Watertown GSA West Lake Landfill United Technologies - Pratt &amp; Whitney</p>
<p>RELEASE FOR UNRESTRICTED USE</p> <p>Release Partial Site</p> <p>Release Entire Site</p>	
	<p>RTI, Inc.</p> <p>Aluminum Company of America Anne Arundel County/Curtis Bay Babcock and Wilcox (Apollo, PA) Texas Instruments, Inc. UNC Recovery Systems United Technologies - Pratt &amp; Whitney</p>



Decommisioning Activity Scheduled	Site
REMOVE SITE FROM SDMP LIST	Aluminum Company of America Anne Arundel County/Curtis Bay Babcock and Wilcox (Apollo, PA) Magnesium Elektron KTI, Inc. Texas Instruments, Inc. UNC Recovery Systems United Technologies - Pratt & Whitney West Lake Landfill

Since May 1993, the following six sites were added to the SDMP:

- (1) AAR Manufacturing Inc. (Brooks and Perkins Corporation)  
Livonia, Michigan
- (2) Clevite Corporation (Neighborhood Progress, Inc.)  
Cleveland, Ohio
- (3) Fromme Investment Company (Brooks and Perkins Corporation)  
Detroit, Michigan
- (4) Horizons, Inc. (Lamotite)  
Cleveland, Ohio
- (5) Jefferson Proving Ground  
Madison, Indiana
- (6) Kaiser Aluminum Specialty Products  
Tulsa, Oklahoma

With the exception of Jefferson Proving Ground, these sites were identified through the ongoing review of terminated materials licenses. The sites were added to the SDMP after NRC inspectors conducted a scoping survey at the sites and identified contamination exceeding the NRC's current criteria for unrestricted use. Section 4.1.4 presents additional information on the review of terminated licenses. Appendix A provides detailed descriptions of the six new SDMP sites listed above.

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#### 4. DECOMMISSIONING POLICY ISSUES

As the NRC focused on remediation of the SDMP sites, several issues emerged as impediments to their timely cleanup. A primary objective of the SDMP is to identify these issues and ensure that the NRC staff resources are devoted to their resolution in order for decommissioning of the SDMP sites to proceed in a timely manner.

Several policy issues have generic implications for the NRC's overall decommissioning program, or involve other matters that must ultimately be decided by the Commission. Resolution of the policy issues discussed below will provide a regulatory framework for more efficient and consistent licensing actions for future site remediation and decommissioning.

##### 4.1 Open Issues

This section discusses the following open issues with generic implications for the NRC's overall decommissioning program:

- enhanced participatory rulemaking on radiological criteria for decommissioning
- rulemaking on timeliness in decommissioning of materials facilities
- rulemaking on decommissioning, recordkeeping, and license termination
- review of licensed sites terminated after 1965
- guidance on the conduct of termination surveys
- previous waste disposal under 10 CFR 20.302 and 20.2002
- review of non-power reactor license terminations
- development of procedures to ensure that future license terminations meet NRC requirements
- review and modification of license termination procedures
- consideration of a "reopener" rulemaking

NUREG-1444 contained comprehensive background information on each of these open issues. Instead of repeating the background information, this supplement discusses the progress made since May 1993, which was the end of the period covered by NUREG-1444.

##### 4.1.1 Enhanced Participatory Rulemaking on Radiological Criteria for Decommissioning

This section discusses the following issues concerning enhanced participatory rulemaking on radiological criteria for decommissioning:

- rulemaking
- development of technical bases for decommissioning lands and structures
- regulatory guide

##### 4.1.1.1 Rulemaking

Since May 1993, the NRC conducted an enhanced participatory rulemaking to establish radiological criteria for decommissioning. The proposed rule was published in the *Federal Register* (59 FR 43200) on August 22, 1994, as proposed amendments to 10 CFR Part 20.

Comments received on the proposed rule raised a variety of concerns, including the reasonableness of selecting 15 millirem per year as the dose limit for unrestricted use, and whether costs associated with remediation of contaminated soil and groundwater had been appropriately estimated. In order to address the substantial comments received on the proposed rule, the NRC staff will not submit the rulemaking package

for Commission review until December 1995. In the meanwhile, the staff plans to conduct a public workshop in the Washington, DC area in September 1995. This workshop will provide an opportunity to discuss practical implementation issues raised by the comments, describe current staff evaluations based on real-world data, and explore alternative approaches that could be used to implement the final criteria.

The NRC staff is also coordinating with the EPA in that agency's development of residual radioactivity standards. The EPA circulated a preproposal draft of its standards in May 1994. Many of the same issues raised in the public comments on the NRC's proposed rule were also raised about the EPA's draft standards. The objective of the agency discussions is to allow the EPA to find that the NRC's requirements provide sufficient protection of the public and the environment. Based on such a finding, the EPA would exclude the NRC and Agreement State licensees from the scope of its standards.

Until the NRC promulgates radiological criteria for decommissioning in 10 CFR Part 20, the staff will continue to use the criteria identified in the Action Plan to Compel Cleanup of Site Decommissioning Management Plan Sites, which was published in the *Federal Register* (57 FR 13389) on April 16, 1992.

The NRC actions needed to complete rulemaking and the estimated dates for completion are as follows:

- Conduct workshop to discuss implementation issues raised by the public comments  
(lead: RES; support: DWM, OGC) September 1995
- Submit final rule to the Commission  
(lead: RES; support: DWM, OGC) December 1995

#### 4.1.1.2 Development of Technical Bases for Decommissioning Lands and Structures

The NRC Office of Nuclear Regulatory Research (RES) is developing NUREG/CR-5512, "Residual Radioactive Contamination from Decommissioning," to provide the technical bases for use in preparing regulations containing radiological criteria for decommissioning. NUREG/CR-5512 is expected to be published, for interim use and comment, in three volumes and one supplement. Volume 1, containing mathematical formulations with parameter values and references, was published in October 1992. Volume 2, containing the computer code and related user manual and example applications, is expected to be published in March 1996. The publication date for Volume 3, containing sensitivity analyses and comparisons, has not yet been determined. A NUREG will be developed to provide a hierarchy of increasingly sophisticated ground water models in connection with the NUREG/CR-5512 methodology.

The NRC actions needed to develop technical bases for decommissioning land and structures, and the estimated dates for completion, are as follows:

- Complete NUREG/CR-5512, Volume 2  
(lead: RES; support: DWM, NRR) March 1996
- Complete NUREG/CR-5512, Volume 3  
(lead: RES; Support DWM, NRR) TBD
- Complete Supplement 1 to NUREG/CR-5512  
(lead: RES; Support: DWM) TBD

#### 4.1.1.3 Regulatory Guide

The NRC staff will prepare a regulatory guide containing radiological criteria for decommissioning. In addition, this regulatory guide will provide detailed guidance on an acceptable approach for demonstrating compliance with the decommissioning criteria in the final rule and license termination.

The NRC actions needed to develop the regulatory guide and estimated dates for completion are as follows:

- Issue draft Regulatory Guide for comment  
(lead: RES; support: NRR, DWM, OGC) December 1995
- Issue final Regulatory Guide  
(lead: RES; support: NRR, DWM, IMNS, OGC) December 1997

#### 4.1.2 Rulemaking on Timeliness in Decommissioning of Materials Facilities

The final rule on "Timeliness in Decommissioning of Materials Facilities" was published in the *Federal Register* (59 FR 36026) on July 15, 1994, with an effective date of August 15, 1994. The rule established specific time periods for decommissioning unused portions of operating nuclear materials facilities and for decommissioning the entire site upon termination of operations. The rule is intended to reduce the potential risk to the environment or public health and safety from radioactive material remaining for long periods of time at such facilities after licensed operations have ceased.

The final timeliness rule was announced and summarized in the September/October 1994 NMSS Newsletter (NUREG/BR-0117, No. 94-3). In addition, NMSS is developing guidance for its staff to use in implementing the timeliness rule. When the guidance is finalized, its availability will be announced, possibly in a future NMSS Newsletter or an Information Notice.

This issue is closed, and no further action is required.

#### 4.1.3 Rulemaking on Decommissioning, Recordkeeping, and License Termination

The final rule on "Decommissioning, Recordkeeping, and License Termination: Documentation Additions" was published in the *Federal Register* (58 FR 39628) on July 26, 1993, with an effective date of October 25, 1993. The rule applies to holders of a specific license for possession of certain byproduct materials, source materials, special nuclear materials, or for independent storage of spent nuclear fuel and high-level waste. The rule requires such licensees to prepare and maintain additional documentation identifying the following areas:

- all restricted areas where licensed materials and equipment were stored or used
- all areas outside of restricted areas where documentation is required under current decommissioning regulations for unusual occurrences or spills
- all areas outside of restricted areas where waste has been buried
- all areas outside of restricted areas containing material such that if the license were terminated, the licensee would be required to decontaminate the area or seek special approval for disposal.

The final rule also requires licensees to submit specific information at the time of final decommissioning. Such information must identify decontaminated equipment that had been involved in the licensed activity that will remain onsite at the time of license termination. The information required by this rule will provide

greater assurance that decontamination and decommissioning of licensee facilities have been carried out in accordance with the Commission's regulations.

This issue is closed, and no further action is required.

#### 4.1.4 Review of Licensed Sites Terminated After 1965

In 1990, the NRC initiated a review of terminated materials licenses following commitments made to Congress by Chairman Carr. The first stage of the review has been performed for the NRC by ORNL, under a technical assistance agreement. ORNL developed an expert system computer program to process information from docket files and make a relative evaluation of the likelihood and magnitude of site contamination. This evaluation is an estimate based on the information in the files, which is often incomplete. ORNL completed development and testing of the computer code in 1991, and began to enter information from the files for evaluation.

The first phase of the project involved the evaluation of approximately 17,000 licenses retired between 1965 and 1985. The evaluation yielded a list of 322 licenses with inadequate documentation to preclude the potential for residual contamination.

Beginning in 1992, NRC Regional Offices further investigated the licenses to determine whether there was indeed residual contamination at the sites. The regional investigations included reviews of the files; contacts with former licensee personnel, current site owners, and State authorities; and, if warranted, site visits. The regional investigations identified a number of contaminated sites.

Licenses retired before 1965 had previously been reviewed between 1977 and 1981, and were therefore not included in the initial scope of work. However, the success of the evaluation of licenses terminated between 1965 and 1985 caused the staff to reevaluate its decision not to include licenses terminated earlier.

The current review revealed contamination at a number of sites that had been cleared in the earlier review, and permitted a greater assurance of accuracy in the review. Entering the previously terminated licenses into the common database also yields a more complete database, facilitating comparison of sites on a uniform basis.

The contractor has completed the review of the pre-1965 terminations and has identified 300 additional licenses without adequate documentation to preclude the potential for site contamination, bringing the total to 622. The regional investigations of these 622 licenses resulted in the discovery of 26 contaminated sites, 6 of which have been placed on the SDMP list. The Regions have cleared 241 licenses, leaving 365 to be resolved.

#### 4.1.5 Guidance on the Conduct of Termination Surveys

In early 1994, the staff reviewed comments received concerning Draft NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," and considered finalizing the NUREG. However, at that time, the RES had projects underway to develop technical support documents that could be used to demonstrate compliance with the proposed rule on Radiological Criteria for Decommissioning. In addition, in cooperation with the NRC, DOE, and DOD, the EPA initiated an effort to develop a multi-agency manual to provide guidance on investigating radiologically contaminated sites.

The staff decided to postpone finalizing NUREG/CR-5849, pending the conclusion of rulemaking on radiological criteria and completion of the multi-agency manual. The staff envisions that the multi-agency manual will incorporate the germane aspects of the final technical support documents, as well as providing



additional direction that can be used to supersede Draft NUREG/CR-5849 as the NRC guidance on conducting termination surveys.

Supporting technical documents will be issued by the staff in August 1995, and discussed at the workshop on radiological criteria in September 1995. The draft multi-agency manual should be issued for public comment in November 1995.

The NRC actions needed to develop the guidance on the conduct of termination surveys, and estimated dates for completion, are as follows:

- Issue draft multi-agency radiological site investigation manual  
(lead: RES; support: DWM, IMNS, OGC, FCSS, Regions) November 1995

#### 4.1.6 Previous Disposals of Wastes Under 10 CFR 20.302 and 20.2002

The staff originally planned to issue an Information Notice on recordkeeping and decommissioning for disposals under 10 CFR 20.302 and 20.2002. However, the staff determined that the Final Rule on "Timeliness in Decommissioning of Materials Facilities" (59 FR 36026, effective August 15, 1994) applied to previous burials if the former disposal site met the definition of an inactive outdoor area.

The NRC Office of the General Counsel (OGC) confirmed the staff's position that inactive 10 CFR 20.302, 20.304, and 20.2002 disposal sites at facilities licensed under 10 CFR 30, 40, 70, and 72 are subject to the requirements of the Timeliness rule. Because this interpretation was considered a new NRC staff position, the document will be changed from an Information Notice to a Generic Letter. The staff is currently making the required changes to the document, and plans to issue the Generic Letter in September 1995.

In addition, the original staff plans called for a Temporary Instruction to the NRC Regional Offices to identify sites with onsite disposal areas. However, such an instruction is no longer necessary. Because the Timeliness Rule now requires that licensees provide a decommissioning plan for the disposals, or propose an alternative decommissioning schedule, within a specified time frame, the NRC will be able to identify the former onsite disposals. The need to identify former burials will be incorporated into the decommissioning inspection procedures discussed in Section 4.1.8.

The NRC actions needed to develop guidance for recordkeeping and decommissioning for waste disposal areas, and estimated dates for completion, are as follows:

- Issue final generic letter  
(lead: DWM; support: IMNS, FCSS, Regions, OGC) September 1995

#### 4.1.7 Review of Non-Power Reactor License Terminations

Based on a review of 59 docket files of terminated licenses for test and research reactors by the ORISE, the NRC staff reached the following conclusions:

- Of the 59 sites, 13 satisfy the present guidelines for unrestricted use.
- Of the 59 sites, 16 sites may have contained residual radioactive contamination. These sites are currently licensed for other activities, and will be decommissioned as part of the termination process of the subsuming licenses.



- For the remaining 30 sites insufficient information exists in the docket files to determine whether the current status of these sites would meet the criteria for unrestricted release.

In conjunction with the NRR Non-Power Reactors and Decommissioning Project Directorate (ONDD), the LLDP developed a strategy to address the remaining 30 sites. The staff's findings follow:

- Of the 30 sites, 12 had a very low probability of containing residual radioactivity in excess of current criteria for unrestricted use. The staff based its determination on the type of the reactors (either AGN or L-77) employed at these sites, as well as favorable confirmatory inspection results at the time of license termination. The staff concludes that the licenses for these sites were acceptably terminated.
- Eight sites are currently under another license. These sites will be decommissioned as part of the termination process of the subsuming licenses. The staff concludes that the licenses for these sites were acceptably terminated.
- For one site, the State of California Department of Health Services oversaw the decommissioning process. Based on the results of the State's calculations and surveys, the staff concludes that the license for this site was acceptably terminated.
- Three sites required that the NRC perform limited confirmatory surveys. Based on the results of these surveys, the staff concludes that the licenses for these sites were acceptably terminated.
- For two sites, sufficient information was available for the staff to determine that the licenses for these sites were acceptably terminated.
- For three sites, the staff concluded that additional surveys are required before a determination can be made concerning the acceptability of the license terminations.
- For one site, the staff is still gathering and evaluating available information before deciding if additional site surveys are necessary.

The NRC actions needed to address the remaining four sites and the estimated date for completion are as follows:

- Perform follow up surveys and collect additional information  
(lead: DWM; support: ONDD)

December 1995

#### 4.1.8 Development of Procedures To Ensure That Future License Terminations Meet NRC Requirements

A draft Manual Chapter entitled "Decommissioning Inspection Program For Fuel Cycle Facilities and Materials Licensees" was circulated for comment within the NRC. The Manual Chapter has since been finalized, and is being issued through the NRR inspection manual coordinator. The Manual Chapter serves the following purposes:

- Provide the general policy for the inspection program for fuel cycle and materials licensees undergoing decommissioning.
- Provide guidance for planning and conducting inspections of fuel cycle and materials licensees undergoing decommissioning.

- Promote consistent inspection of facilities undergoing decommissioning.

In addition, separate decommissioning inspection procedures will be developed for fuel cycle facilities and materials facilities by June 1996.

The NRC actions needed to develop procedures to ensure that future license terminations meet NRC requirements, and the estimated dates for completion are as follows:

- Issue Final Manual Chapter  
(lead: DWM; support: IMNS, FCSS, NRR, Regions) August 1995
- Issue draft inspection procedures for fuel cycle and materials facilities (lead: DWM; support: IMNS, FCSS, Regions) June 1996

#### 4.1.9 Review and Modification, If Needed, of License Termination Procedures

The decommissioning rulemaking completed in June 1988 (53 FR 24018) modified the license termination procedures used by licensees and the NRC staff. The staff had planned to develop a Regulatory Guide to reflect the 1988 decommissioning rule, and RES had the lead for this project. However, this task was not initiated because of competing priorities, primarily the RES effort to develop a rule concerning radiological criteria for decommissioning.

As described in Section 2.2.1, the NMSS recently initiated the development of a Manual Chapter on decommissioning that will clarify the staff procedures for license termination. This Manual Chapter will include procedures for the NRC staff to use in assessing compliance with the Timeliness rule (Section 4.3.2), the Recordkeeping rule (Section 4.3.3), and the 1988 Decommissioning rule. Although this guidance is intended for use by the NRC staff, it will also be made available to licensees. In addition, a draft Regulatory Guide will be issued concurrently with the final rule on radiological criteria for decommissioning. These documents supersede the proposed Regulatory Guide on the 1988 Decommissioning rule.

This issue is considered closed, and no further action is required.

#### 4.1.10 Consideration of a "Reopener" Rulemaking To Require Additional Decontamination

With the submittal of SECY-89-369 on December 8, 1989, the staff informed the Commission of its intention to develop procedures to notify licensees that terminated licenses may be recalled if final NRC or EPA residual contamination standards indicate the need for further remediation. In an SRM dated January 31, 1990, the Commission requested that the NRC staff expedite the residual contamination rulemaking. As part of that rulemaking, the Commission requested that the NRC staff provide a general notice to licensees that additional remediation may be necessary to comply with future EPA standards. In addition, the Commission directed the staff not to develop specific procedures providing such notice to licensees. As a result, no rulemaking is contemplated to reopen terminated licenses as a result of more stringent EPA standards.

In a related SRM issued on February 28, 1992, the Commission stated its position regarding the need to recall terminated licenses if future NRC standards are more restrictive than criteria currently used by the NRC. Specifically, the Commission stated that if a licensee or responsible entity remediates a site under an NRC-approved decommissioning plan that meets the criteria at the time the plan is approved, the NRC will not reopen the case as a result of any changes in NRC criteria or standards. This position on finality of decommissioning is reflected in the SDMP Action Plan and the proposed rule on radiological criteria for

decommissioning. In addition, the staff is working cooperatively with the EPA to ensure consistency with EPA standards.

This issue is closed, and no further action is required.

#### 4.2 Potential Issues

The NRC staff is currently evaluating the following policy issues for which resolution could enhance the NRC's performance and progress in regulating the decommissioning of nuclear materials facilities:

- allowing for concentration averaging
- delaying certain decommissioning actions
- using more realistic exposure scenarios and assumptions
- coordinating regulatory review and public information with other agencies
- drawing generic conclusions from site-specific EISs
- establishing convenient institutional control arrangements for sites that will be released with land use restrictions.

This section describes these issues and the related staff evaluations presently underway.

##### 4.2.1 Concentration Averaging

The NRC staff is assessing the technical and policy implications of allowing various types of concentration averaging associated with reviews of proposed decommissioning actions. Averaging could be implemented at decommissioning sites in at least three different ways:

- (1) Average measured concentrations of radioactive materials in soil over a finite area to develop an "average" concentration for use in dose or risk assessments.
- (2) Allow credit for unavoidable dilution that occurs during excavation and placement of both contaminated and uncontaminated soils during remediation, or results from the treatment of the waste.
- (3) Intentionally blend contaminated and uncontaminated soils to reduce the average concentration of radioactive material, as well as potential individual doses associated with exposure to the diluted soil

Current NRC requirements do not specifically address or prohibit averaging of soil concentrations in evaluating the adequacy of decommissioning actions. Other NRC requirements implicitly allow dilution or averaging of radionuclide concentrations. For example, liquid effluent limits in 10 CFR Part 20 consider the effect of dilution in evaluating the associated projected doses. In addition, the waste concentration limits in 10 CFR Part 61 allow dilution in calculations that relate concentrations to potential doses to inadvertent intruders. The EPA has taken a similar approach in promulgating waste and effluent limitations for both radiological and non-radiological contaminants.

The staff allows credit for averaging soil concentrations where the staff determines that a proposed approach results in residual radioactivity levels that are as low as reasonably achievable (ALARA) and controls are

place to prevent higher concentrations of radioactive material. The staff has determined that this approach is consistent with the Action Plan to Ensure Timely Decommissioning of SDMP Sites. This approach is particularly attractive for long-lived contamination (e.g., thorium and uranium), recognizing the uncertainties associated with the long-term performance of engineered barriers intended to contain the waste, and the value of diluting the soil concentrations to ensure that individual doses remain suitably low.

Nonetheless, staff practice and policy have generally disallowed credit for averaging soil concentrations in evaluating potential exposures to humans from residual radioactive material associated with decommissioning or waste disposal. For example, in the now defunct policy statement on "Below Regulatory Concern," the NRC committed that it would not allow licensees to intentionally dilute waste concentrations solely to meet exemption criteria.

This approach results in increased costs and delays in decommissioning. Without taking credit for some averaging, soil concentrations at existing SDMP sites exceed established NRC criteria for unrestricted release, especially for uranium and thorium. In these situations, licensees are required either to excavate and dispose of the contaminated material at existing offsite disposal facilities, or to seek an exemption or explicit authorization from the NRC to dispose of the contaminated soil onsite. Because of the relatively large volumes of contaminated soil and disposal costs ranging from \$10 to \$300/ft<sup>3</sup> or more, SDMP site owners would have to spend millions of dollars to excavate, transport, and dispose of contaminated soils offsite. Requests for exemptions or authorization for onsite disposal are also costly and time consuming. The NRC has typically considered such requests through the development of an EIS, and has coordinated their review with other Federal, State, and local authorities. A typical EIS may cost on the order of \$1 million in NRC fees alone, and may require 2 years to complete.

The LLDP staff is preparing a preliminary analysis of the policy and technical implications of adopting an approach that would allow more credit for averaging soil concentrations. The staff examined a variety of subissues associated with averaging, such as potential individual and population doses, cost-effectiveness of the various alternatives, risk-risk trade-offs between averaging and offsite disposal, legal and regulatory precedents for averaging, and long-term uncertainties of human exposure. The preliminary analysis will also supplement the technical bases for adopting more realistic exposure scenarios and assumptions (see section 4.2.3), as well as the rulemaking on radiological criteria for decommissioning. Following internal management review of the preliminary analysis, the staff will evaluate a specific site as a case-study of the implications of an averaging policy for decommissioning.

#### 4.2.2 Decommissioning Timeliness

In July 1994, the NRC completed a rulemaking that established scheduling requirements for notification, initiation, and completion of decommissioning actions at materials facilities (the Timeliness rule). These requirements became effective on August 15, 1994.

Immediately before the requirements were promulgated, the Barnwell low-level waste (LLW) disposal facility in Barnwell, South Carolina, closed to waste generators outside the Southeast Compact. However, although legislative and regulatory actions are in a state of flux, the Barnwell LLW disposal facility began accepting LLW from throughout the United States (except North Carolina) on July 1, 1995.

The staff will continue to monitor the status of the Barnwell site, and other LLW disposal sites (Hanford and Envirocare), as well as the effect of disposal site access on decommissioning timeliness. If site access is again severely limited, licensees and other responsible parties may not have a suitable disposal facility to send decommissioning waste. In some cases, decommissioning may have a minimal benefit if the wastes generated will have to be stored for an indefinite period pending disposal site access. In other cases, substantial delay of decommissioning may result in increased public exposure, environmental contamination, loss of control of radioactive materials, liabilities for remediation costs, and public burden for decommissioning. The staff will



consider such factors when reviewing requests for alternative decommissioning schedules under the Timeliness rule.

#### 4.2.3 Realistic Exposure Assessment

Licensees and other interested parties have often pointed out that the level of protection accomplished in the decommissioning program is a function of the criteria, as well as the dose modeling and survey protocols used to implement the criteria. The NRC spent more than a decade developing the screening method for converting surface contamination levels and soil concentrations into projected doses. The method was documented in NUREG/CR-5512 and circulated widely in support of the proposed rulemaking on radiological criteria for decommissioning. The NRC staff has since implemented a standard set of exposure scenarios for residual radioactivity in Policy and Guidance Directive 8-08, dated May 1994.

At the NRC workshop on site characterization for decommissioning, and in comments on the proposed rule, numerous commentors raised concerns about the unrealistic nature of the assumptions used in estimating doses from residual radioactivity. Specifically, commentors indicated that modeling tends to overestimate potential doses by making assumptions that can increase doses by an order of magnitude or more.

Similar concerns surfaced in comparing NRC and EPA approaches to risk assessment as part of the interagency project on risk harmonization. (See the draft *White Paper on Risk Harmonization*, dated January 1995.) For example, the NRC typically assumes that an individual is continuously exposed to residual radioactivity throughout a 70-year lifetime. In contrast, the EPA typically assumes 30 years of exposure in assessing potential human risks to onsite residents in the Superfund program. In addition, the NRC routinely assumes that engineered barriers, such as earthen covers, will not be effective in limiting or preventing human exposure over long periods (e.g., greater than 500 years). Consequently, the NRC staff estimates potential human doses by assuming that an onsite resident farmer will intrude into the waste and be exposed to residual radioactivity through a wide variety of exposure pathways. In contrast, in the hazardous waste program under the Resource Conservation and Recovery Act (RCRA), the EPA typically assumes that institutional controls (e.g., deed restrictions) will remain effective in indefinitely preventing human exposure to hazardous wastes. Further, industry representatives have requested that the staff consider the probability of human intrusion and failure of institutional controls and engineered barriers in evaluating potential exposure to humans.

The staff has initiated a review of the potential conservatisms that have been included in the NRC's standard exposure scenarios and dose modeling used to implement radiological criteria for decommissioning. This review supports the evaluation of public comments concerning the proposed rulemaking on radiological criteria for decommissioning, dose modeling at individual sites, and risk harmonization with EPA and other agencies. The review will include consideration of the likelihood and significance of standard exposure assumptions that comprise the resident farmer scenario.

Preliminary results of the review should be completed by the end of June 1995. To promote a consistent and coherent approach to radiological risk assessment, significant conclusions based on the review will be coordinated with other Federal agencies through the Interagency Steering Committee on Radiation Standards.

#### 4.2.4 Coordination with States and Other Agencies

Decommissioning projects at NRC-licensed sites often fall under the jurisdiction of several Federal, State, and local entities. For example, the presence of hazardous or solid waste onsite could subject the decommissioning action to regulation by the NRC, the EPA, and a State environmental agency. In some cases, decommissioning is already progressing at the sites under separate environmental programs, apart from the requirements of the Atomic Energy Act. In other cases, decommissioning requirements are

complementary. Coordination of the regulatory reviews promotes adoption of consistent solutions and reduces the regulatory burden.

In SECY 95-056, the Commission approved deferral to regulatory oversight of two such overlapping remedial actions conducted by the EPA under the Comprehensive Environmental Response Compensation and Liability Act. Specifically, the two projects were remediation of the DuPont site in Newport, Delaware, and the West Lake Landfill near Bridgeton, Missouri. In both cases, the staff proposed to defer to the existing remedial programs conducted by the EPA based on the staff's finding that those programs will adequately protect the public from radioactive wastes at the sites. Other cases, such as the Pesses site in Pulaski, Pennsylvania, will also be considered for deferral.

The NRC has begun negotiating a memorandum of understanding (MOU) with the Pennsylvania Department of Environmental Resources. The objective of the MOU is to promote a coordinated and consistent governmental response and oversight of proposed remedial actions at the site and other sites in the Commonwealth of Pennsylvania. The staff's development of the MOU is described in SECY 95-108. Based on the Commission's review of the proposed MOU, the staff plans to develop similar MOUs and agreements with other State and Federal agencies to foster a coordinated governmental response. For example, a similar agreement may be necessary for coordination of decommissioning actions at sites in Ohio.

These coordination activities include efforts to inform and involve the public in the decommissioning process. The objective of these efforts is to provide early and meaningful opportunities for public involvement in the decommissioning process. This approach has been promoted generically in the proposed rulemaking on radiological criteria for decommissioning. In addition, the staff has initiated public information meetings at the Parks Township SLDA and the Sequoyah Fuels Corporation facility. Stakeholder representatives are routinely invited to participate in roundtable discussions and information exchanges on the status and issues associated with the decommissioning project. These initiatives are consistent with the staff's draft public responsiveness plan defined in NUREG/BR-199. Other public information meetings and involvement efforts will be implemented on a site-specific basis, within available resources, to address specific needs that exist in affected communities.

#### 4.2.5 Generic Conclusions on Disposal of Uranium and Thorium Waste

In the proposed rulemaking on radiological criteria for decommissioning, the Commission identified tens of sites that will not be able to satisfy the proposed criteria. These sites are similar to near-surface disposal facilities for radioactive waste. The staff has begun developing site-specific EISs to consider onsite disposal of uranium and thorium wastes at five such sites:

- (1) Shieldalloy-Cambridge
- (2) Shieldalloy-Newfield
- (3) Parks Township SLDA
- (4) Jefferson Proving Ground
- (5) Sequoyah Fuels

Several additional SDMP sites are candidates for other EISs. These include Molycorp-Washington, Whittaker, 3M, Wyman-Gordon, Lake City Army Arsenal, and Fansteel. However, the staff has not begun developing EISs for these sites because of resource limitations or the current status of decommissioning actions at the sites.

The EISs specifically evaluate whether onsite disposal of existing radioactive wastes at the sites is feasible and preferred, with some appropriate land use restrictions to prevent or inhibit human intrusion into the waste. Although the site and waste characteristics vary for each site, the alternatives under consideration are



substantially similar among the EISs (i.e., onsite disposal, offsite disposal, combination of onsite/offsite disposal, and no action).

After completing its review and evaluation of comments on the draft EISs for three of the five sites, the NRC plans to assess in mid-1996 whether any generic conclusions can be drawn based on the site-specific EISs and supporting generic calculations. If generic conclusions can be supported, the staff will consider developing a generic EIS regarding onsite waste disposal, in lieu of the more costly and time-consuming preparation of tens of site-specific EISs. The generic EIS could support either site-specific licensing actions authorizing onsite disposal or some other alternatives, or a rulemaking on disposal of residual radioactivity using onsite disposal.

#### 4.2.6 Institutional Controls

The proposed rulemaking on radiological criteria for decommissioning allows for restricted termination of NRC licenses in accordance with specified criteria. In addition, as discussed in Section 4.2.5, institutional controls may be needed for some decommissioning projects that involve the stabilization of large volumes of low-activity, bulk radioactive waste onsite. However, the form and mechanisms for implementing the institutional controls have not yet been established. In the absence of general approaches, licensees would have to develop and defend specific proposals for applying such institutional controls to ensure protection of the public and environment.

However, under section 151(b) of the Nuclear Waste Policy Act, the DOE has already been authorized to take possession of waste disposal sites provided that the following criteria are met:

- The NRC certifies that the disposal action satisfies applicable requirements
- The licensee sets aside sufficient funds to ensure that long-term custody would be at no cost to the Federal government
- The NRC determines that such controls are necessary or desirable to protect the public.

A similar provision in section 151(c) was used as the vehicle to transfer custody of the AMAX site near Parkersburg, West Virginia, from AMAX to DOE.

If DOE is supportive and has available resources, and if the legislative history supports the use of 151(b) in this manner, the section 151(b) option would constitute a ready-made mechanism to provide for long-term institutional control of the waste disposal sites. Use of this option would eliminate the need for licensees and responsible parties to develop and negotiate specific institutional controls for disposal sites. This approach could reduce the regulatory burden and simplify the demonstration that would otherwise be required to show that the proposed control mechanism will be durable and effective in protecting the public.

In August 1995, the NRC staff intends to initiate discussions with the DOE to inquire whether, and under what terms, the DOE would be amenable to using the provision in section 151(b) to transfer custody of disposal sites and accomplish long-term control and surveillance of the sites. If the DOE is amenable, the NRC could develop a standard procedure for transferring the sites. In addition, the NRC could then provide guidance to licensees and responsible parties about the use of the mechanism, and implement the provision in conjunction with the final rulemaking on radiological criteria for decommissioning. If one or more barriers to the use of this provision exist, the NRC could draft and submit similar legislation for Congressional consideration. In this latter case, the negotiations with DOE would prove instructive regarding the types of issues that are likely to arise during legislative consideration of the proposal.

## WHAT IS DECOMMISSIONING?

- **NRC Regulations**

**Decommissioning means to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted or restricted use and termination of the license.**

- **Does not include care and disposal of spent fuel\***
- **Does not include non-radiological demolition  
(Example: restoration to "green field" conditions)**

**\* Covered separately by 10 CFR 50.54 (bb) which requires  
submittal of spent fuel management and funding program.**

## DECOMMISSIONING ALTERNATIVES\*

- Under DECON (immediate dismantlement), equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release for unrestricted use and termination of the license. (See Reg. Guide 1.86 for guidance)
- Under SAFSTOR, often considered "delayed DECON," a nuclear facility is placed and maintained in a condition that allows the decay of radioactivity to reduce radiation levels at the facility; after this it is dismantled.
- Under ENTOMB, radioactive contaminants are encased in a structurally long-lived material such as concrete and the entombed structure is appropriately maintained and monitored until the radioactivity decays to a level

permitting unrestricted release of the property.

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\*Described in Generic Environmental Impact Statement on  
Decommissioning; NUREG-0586.

**COMPLETED & CURRENT  
DECOMMISSIONING PROJECTS**

- 63 research and test reactor licenses terminated
- 11 research and test reactors now being dismantled or have license amended for Possession-Only

- **17 power reactors in decommissioning process**
  - **2 power reactors completed  
Pathfinder & Shoreham**
  - **1 power reactor now being dismantled  
Fort St. Vrain**
  - **9 power reactors with approved SAFSTOR  
decommissioning plans  
CVTR, Dresden, Fermi 1, GE VBWR, Humboldt Bay 3,  
La Crosse, Peach Bottom 1, Rancho Seco, & Indian  
Point 1; Three Mile Island 2 in Post-  
Defueling Monitored Storage**
  - **5 power reactor decommissioning plans under review  
Big Rock Point, San Onofre 1, Trojan, Yankee Rowe &  
Saxton**



## **TYPICAL CURRENT REGULATORY PROCESS FOR PREMATURE DECOMMISSIONING**

- Continued compliance with license and regulations is required after shutdown
- Licensee submits license amendments/relief requests to NRC
- Possession-only license amendment
- Reliefs/exemptions granted may include:
  - Containment leak testing
  - Licensed operators
  - Offsite emergency preparedness reduction
  - Property damage liability insurance reduction

- Decommissioning plan approved by Order

## **RULEMAKING ACTIVITIES**

- Radiological Release Criteria for Decommissioning Facilities
- Initial Part 50 Decommissioning Applicability
- Revise Spent Fuel Pool Fire Sequence Affected Regulations and Indemnity Levels for Permanently Shut Down Reactors
- Physical Protection for Storage of Spent Fuel
- Decommissioning Cost and Funding Evaluations
- Operators, Plant Staffing, and Training for Shut Down Reactors

## TECHNICAL GUIDANCE

- Revise RG 1.86 - Will be a new guide
- Standard Format and Content for Decommissioning Submittals
- Standard Review Plan

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## PLANT DECOMMISSIONING STATUS

### INDIAN POINT UNIT 1

- January 31, 1996, the order approving SAFSTOR decommissioning plan was issued. Spent fuel will remain onsite until federal repository available. License extended until 2006.

### HUMBOLDT BAY POWER PLANT UNIT 3

- Shut down in July 1976; July 1988-NRC approved SAFSTOR Decommissioning Plan & extended license until 2015.
- Activities continue in accordance with approved Plan. Spent fuel will remain onsite in spent fuel pool until federal repository is available. Considering early component removal program.

### DRESDEN UNIT 1

- Shut down in October 1978. SAFSTOR Decommissioning Plan & license extension approved in September 1993.
- Activities continue in accordance with approved Plan. ComEd plans to go to dry cask storage.

## **RANCHO SECO**

- Shut down in June 1989. SAFSTOR Decommissioning Plan approved in March 1995.
- Conducting activities in accordance with approved plan.
- SMUD internal review considering DECON decommissioning alternative.
- Part 72 (specific license) ISFSI pad is completed and horizontal storage modules are being delivered. Part 71 (transportation) license application undergoing NRC review for multipurpose (storage/transport) cask. Licensee could be ready to offload fuel to ISFSI by October 1996.

## **YANKEE ROWE**

- Shut down in October 1991. SAFSTOR Decommissioning Plan approved February 1995. Appeals Court decision (July 1995) granted hearing opportunity.
- On March 1, 1996, after a prehearing conference, Atomic Safety and Licensing Board issued an order stating its finding regarding the the joint petition of Citizens Awareness Network and New England Coalition on Nuclear Pollution to intervene on the Yankee decommissioning plan. Although the ASLB determined the petitioners had standing, the ASLB did not find any of the five contentions to be admissible. Subsequent Commission order prevents staff re-approval of Plan until appeal process completed.
- Yankee Atomic applied for a (10 CFR 71) license to enable shipment of the reactor vessel. The vessel will not be shipped before summer 1996.
- Yankee intends to pursue dry cask storage of its spent fuel.



### THREE MILE ISLAND UNIT 2

- Accident occurred in March 1979; Defueling completed April 1990
- License plans for Post-Defueling Monitored Storage (PDMS) and Possession-Only License approved by NRC in 1993.
- Conducting activities in accordance with approved PDMS technical specifications.

### SAN ONOFRE, UNIT 1

- Shut down November 1992.
- Conducting activities in accordance with approved permanently defueled technical specifications. Proposed decommissioning plan awaiting NRC review.
- Licensee considering ISFSI, but has not submitted Part 72 license request.

### TROJAN

- Shut down November 1991
- November 1, 1995, licensee completed the large component removal project.
- Commission issued order preventing further dismantlement until final decommissioning plan approved.
- No requests for hearing received for December 22, 1995, *Federal Register* notice on Environmental Assessment and Safety Evaluation for decommissioning plan.
- Combined NRC/State of Oregon public meeting held February 13, 1996, to discuss the results of NRC and State decommissioning plan review.
- No requests for hearing received by State of Oregon for its public notice. Hearing regarding State approval of decommissioning plan held on March 7, 1996. State approval granted.

#### TROJAN (Continued)

- Licensee is considering removing the pressure vessel with reactor vessel internals intact and shipping by barge to low-level waste repository at Hanford in early 1998.
- Licensee selected Sierra Nuclear as vendor for dry cask storage commencing in 1998.

#### BIG ROCK POINT

- May 31, 2000, is expiration date of current license.
- Proposed SAFSTOR Decommissioning Plan undergoing NRC review. Licensee requested NRC deferral of review until after revised decommissioning regulations issued.

## DECOMMISSIONING NUCLEAR POWER PLANTS

### Background

Several licensees have announced their decisions to permanently cease power operation of their nuclear power plants. The licensees' decisions have been based on economic and technical considerations. Thus, these facilities and several others have entered the decommissioning process before their operating licenses expire, earlier than originally anticipated. Decommissioning highlights for individual plants are presented in Tables 1 and 2.

### Decommissioning

Title 10 of the Code of Federal Regulations, Section 50.2 (10 CFR 50.2), defines decommissioning as the safe removal of a facility from service and reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. Decommissioning involves three different alternatives: DECON, SAFSTOR, or ENTOMB.

Under DECON (immediate dismantlement), equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release for unrestricted use and termination of the license.

Under SAFSTOR, often considered "delayed DECON," a nuclear facility is maintained in a condition that allows the decay of radioactivity to reduce radiation levels at the facility; afterwards, it is dismantled.

Under ENTOMB, radioactive contaminants are encased in a structurally long-lived material such as concrete and the entombed structure is appropriately maintained and monitored until the radioactivity decays to a level permitting unrestricted release of the property.

To be acceptable, the method selected must provide for completion of decommissioning within 60 years. A time beyond 60 years will be considered only when necessary to protect public health and safety in accordance with Nuclear Regulatory Commission (NRC) regulations.

### Regulations

The procedure for decommissioning a nuclear power plant is set out principally in NRC regulations (10 CFR Parts 50.75, 50.82, 51.53, and 51.95). An underlying assumption embodied in the current regulations is that decommissioning would occur after the facility operating license expired. Five years before the licensee expects to end operation of the plant, it is obligated to submit a preliminary decommissioning plan containing a cost estimate for decommissioning and an up-to-date assessment of the major technical factors that could affect planning for decommissioning. Then, within one year before expiration of the license, (or two years after operation for plants closing before their license expires) a licensee must submit to NRC an application for authority to decommission that facility.

together with an environmental report covering the proposed decommissioning activities. The application must also be accompanied, or preceded, by a proposed decommissioning plan that includes:

- (1) A description of the decommissioning alternative chosen and activities involved;
- (2) A financial plan showing an up-to-date cost estimate for decommissioning, the amount of funds currently available for decommissioning, and plans for ensuring the availability of adequate funds for completion of decommissioning.

The NRC reviews the decommissioning plan, determines its impact on the environment through an environmental impact statement or environmental assessment and gives notice to interested persons. If the NRC finds the proposed decommissioning plan to be satisfactory, it issues a decommissioning order that approves the proposed decommissioning plan and authorizes decommissioning. Upon completion of decommissioning activities, including the termination radiation survey, the NRC issues an order that terminates the license.

#### Prematurely Shutdown Plants

Since the final decommissioning rule was published in 1988, six power reactor facilities have shut down prematurely:

- Fort St. Vrain Nuclear Generating Station,
- Shoreham Nuclear Power Station,
- Rancho Seco Nuclear Generating Station,
- Yankee Rowe Nuclear Station,
- San Onofre Nuclear Generating Station, Unit 1, and
- Trojan Nuclear Plant.

Three Mile Island Nuclear Station, Unit 2, also ceased operation after the March 28, 1979, accident. In addition, Indian Point Nuclear Generating Station Unit 1 and Dresden Nuclear Power Station Unit 1, which were shut down in 1974 and 1978, respectively, are in the decommissioning process.

#### Approved Decommissioning Plans

In June 1992, the NRC issued an order to Long Island Power Authority, approving the Shoreham decommissioning plan. Long Island Power Authority announced completion of dismantlement of the facility in October 1994.

In November 1992, the NRC issued an order approving the Fort St. Vrain decommissioning plan and dismantlement activities are ongoing.

The NRC approved Yankee Rowe's decommissioning plan on February 14, 1995.

On June 16, 1993, the NRC staff issued its safety evaluation and environmental assessment of the Rancho Seco decommissioning plan. The plan proposes safe storage (SAFSTOR) of the facility for about 20 years followed by dismantlement

and decontamination. Approval of the decommissioning plan was delayed because of contentions raised by the Environmental and Resources Conservation Organization (ECO). However, ECO reached a settlement with the Sacramento Municipal Utility District, the licensee for Rancho Seco, and on August 1, 1994, withdrew from the proceeding. The staff reviewed and updated its previous safety evaluation and issued the order authorizing decommissioning of Rancho Seco on March 20, 1995.

#### Early Component Removal

In January 1993, the Commission issued guidance regarding activities that may be permitted before a decommissioning plan is approved. Licensees of plants that do not have operating licenses or have shutdown orders should not undertake any decommissioning activity that would (1) foreclose the release of the site for possible unrestricted use, (2) significantly increase decommissioning costs, (3) cause any significant environmental impact not previously reviewed, or (4) violate the terms of the existing license. Also, licensees may be permitted to use their decommissioning funds for approved decommissioning activities, even though their decommissioning plans have not yet been approved by the NRC.

In accordance with NRC guidance, in November and December 1993, Yankee Atomic Electric Company (YAEC) shipped the four steam generators and the pressurizer from the Yankee Rowe plant to the low level waste burial site in Barnwell, South Carolina. Between March and June 1994, YAEC conducted a second phase on early component removal in which it shipped the reactor coolant pumps, and contaminated piping to Barnwell.

During the early component removal process, the Citizens Awareness Network (CAN), a group in the Rowe, Massachusetts area, filed a complaint in the Massachusetts District Federal Court claiming the NRC did not follow the National Environmental Protection Act (NEPA) in its review of the licensee's early component removal program. The court denied the complaint on jurisdictional grounds; however, CAN appealed to the U.S. Court of Appeals for the First Circuit in Boston. On July 20, 1995, the Court issued its decision, which found that the NRC erred when it rejected CAN's request for a hearing on the component removal program, that CAN was entitled to a hearing under section 189a of the Atomic Energy Act, and that the NRC had violated NEPA by permitting YAEC to initiate the component removal program before the agency had prepared an environmental assessment or impact statement. The Court remanded the case to the NRC for further action.

In the September 6, 1995, *Federal Register*, the Commission provided notice to the public of the Court of Appeals decision, solicited public comment regarding the Commission's legal authority to allow or forbid further decommissioning activity at Yankee, and stated the NRC's intention to issue a future *Federal Register* notice that would offer an opportunity for a hearing on the Yankee decommissioning plan. On October 12, 1995, the NRC issued an Order that forbid the licensee for Yankee, Yankee Atomic Electric Company, from conducting further "major" decommissioning activities at the Yankee facility until the hearing is completed.



On October 27, 1995, the NRC provided public notice of the opportunity for a hearing regarding reapproval of the Yankee decommissioning plan. On November 30, 1995, CAN and the New England Coalition on Nuclear Pollution (NECNP) submitted a joint petition to intervene on the Yankee decommissioning plan. On January 16, 1996, the Commission turned over the petitioners' pleadings to the Atomic Safety and Licensing Board (ASLB). The Commission provided guidance to the ASLB that requests that if the ASLB determines a hearing is required, the Commission would have it start in mid-April 1996.

In November 1994, the licensee for the Trojan Nuclear Plant, Portland General Electric, commenced its large component removal project (LCRP). The project included the removal and shipment of the Trojan steam generators and pressurizer to the U.S. Ecology low-level waste repository at Hanford, Washington. On September 6, 1995, in a *Federal Register* notice separate from, but similar to, the Yankee notice, the Commission announced its intention to issue a *Federal Register* notice offering an opportunity for a hearing on whether to approve the Trojan decommissioning plan. In addition, it solicited public comment on the decommissioning activity at Trojan. Following publication of the *Federal Register* notice, the Don't Waste Oregon Council filed lawsuits in the Oregon State Supreme Court and the U.S. Court of Appeals for the Ninth Circuit requesting suspension of the LCRP activities. In response to the injunctions, the two courts imposed stays that they subsequently lifted due to the courts' determinations that they lacked jurisdiction over the matter. On October 12, 1995, the NRC issued an Order to Portland General Electric that stated that NRC would not require PGE to halt LCRP, but expected PGE to take no further decommissioning actions involving major dismantling at Trojan until final NRC approval of the decommissioning plan. The LCRP was completed on November 1, 1995, when the final component to be shipped, the pressurizer, was buried at Hanford. On December 22, 1995, the NRC staff published a *Federal Register* notice offering an opportunity for public comment on the Environmental Assessment and Safety Evaluation for the decommissioning plan.

#### Dresden Incident and NRC Followup Actions

On January 25, 1994, Commonwealth Edison Company (CECo) workers at the Dresden Unit 1 site discovered about 55,000 gallons of water in the containment building. The source of the water was a service water line that had frozen and ruptured within the unheated containment. The water was pumped from the containment building for processing by the site radwaste system. The NRC conducted a two-week special team inspection to review and evaluate the circumstances and significance of this event. The inspectors identified a pattern of declining management oversight at the facility after the unit was permanently shut down in 1978. The NRC imposed a civil penalty of \$200,000 on CECo for its failure to maintain required systems and the staffing of Dresden Unit 1 in accordance with the Dresden Unit 1 decommissioning plan. CECo is taking corrective actions to resolve the identified deficiencies.

The incident at Dresden Unit 1 prompted an NRC review of the likelihood of similar events at other facilities in the decommissioning process. The staff issued Bulletin 94-01 on April 14, 1994, to each of the licensees of the permanently shutdown nuclear power reactors with spent fuel in the spent fuel



pool to inform them of the results of the special NRC inspection at Dresden Unit 1 and to request that they take actions to ensure that the cooling and shielding for fuel in the spent fuel pool were not compromised. The NRC completed team inspections in 1994 confirming adherence to the bulletin by each of the eight affected facilities.

### Rulemaking

Throughout fiscal year 1995, the NRC staff continued work on revisions to NRC regulations to clarify their applicability and to make certain changes in decommissioning policy regarding permanently shut down reactors. On July 20, 1995, the Commission issued a "Notice of Proposed Rulemaking on Decommissioning of Nuclear Power Plants." The proposed rule redefines the decommissioning process, defines terminology related to decommissioning, requires licensees to provide the NRC with early notification of planned decommissioning activities at their facilities, and explicitly sets forth the applicability of certain NRC requirements to permanently shutdown reactors. The Commission believes the proposed amendments would enhance efficiency and uniformity in the decommissioning process for nuclear power reactors. The proposed amendments would allow for greater public participation in the decommissioning process and furnish the licensed community and the public a better understanding of the process as the operating personnel at a nuclear power reactor facility undergo the transition from an operating organization to a decommissioning organization. Public comments have been received and are being analyzed by the staff. A final rule will be considered by the Commission in the next few months.

A new rule, entitled "Safeguards for Spent Nuclear Fuel or High-Level Radioactive Waste - 10 CFR Parts 60, 72, 73, and 75" (SECY-95-104), addresses physical protection requirements for the storage of spent fuel and high level radioactive waste in a permanently shutdown reactor, independent spent fuel storage installation, monitored retrievable storage installation, or a geologic repository. The Commission published the proposed rule on August 18, 1995. The public comment period expired on November 13, 1995, and a final rule is scheduled to be issued in Summer 1996.

Other rulemakings that are anticipated in the decommissioning area include a revision of regulations to address spent fuel cooling periods and indemnity issues; decommissioning costs, funding, and financial assurance.

### Big Rock Point

Although Consumers Power Company plans to continue to operate Big Rock Point until its current license expires on May 31, 2000, the licensee submitted its proposed SAFSTOR decommissioning plan for the plant on February 27, 1995. This submittal of a decommissioning plan was made several years earlier than required by NRC regulations to allow for early NRC review of the plan as the plant continued to operate. Review activities are ongoing and are expected to be completed in February 1996.

NRR/NMSS Memorandum of Understanding on Decommissioning

On March 15, 1995, the Office of Nuclear Reactor Regulation (NRR) and the Office of Nuclear Material Safety and Safeguards (NMSS) reached agreement on a realignment of certain responsibilities regarding power reactor decommissioning. In the future, NRR will maintain project management responsibility for power reactor facilities until fuel is permanently transferred from the spent fuel pool. Consistent with the new responsibilities, project management responsibilities for the Humboldt Bay Power Plant Unit 3, LaCrosse Boiling Water Reactor, and Vallecitos Boiling Water Reactor nuclear facilities were transferred from NMSS to NRR.

CONTACT:

Seymour H. Weiss, Non-Power Reactors and Decommissioning Project Directorate,  
Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission,  
Washington, DC 20555, (301) 415-2170

TABLE 1

DECOMMISSIONING HIGHLIGHTS

INDIAN POINT UNIT 1

- October 31, 1974, plant was permanently shut down because its emergency core cooling system did not meet current regulatory requirements.
- January 1976, reactor was defueled.
- June 19, 1980, NRC order revoked authority to operate plant.
- October 17, 1980, licensee submitted proposed decommissioning plan. NRC review has been ongoing since then and has prompted numerous supplemental licensee submittals.
- January 1996, the proposed decommissioning plan was submitted to Commission for approval.

HUMBOLDT BAY POWER PLANT UNIT 3

- July 2, 1976, plant was shut down due to seismic issues.
- July 30, 1984, Decommissioning Plan submitted.
- July 19, 1988, SAFSTOR Decommissioning Plan approved. Spent fuel (390 assemblies) will remain onsite in the spent fuel pool until a federal repository is available for it.

DRESDEN UNIT 1

- October 31, 1978, plant was shut down to meet new federal regulations and to perform chemical decontamination of major piping systems.
- January 7, 1986, while plant was still out of service, licensee announced its decision to decommission the plant, rather than comply with regulations imposed in response to the March 1979 accident at Three Mile Island Unit 2.
- July 23, 1986, license was amended to possession only license (POL) status.
- September 3, 1993, decommissioning plan was approved.
- January 25, 1994, licensee personnel discovered about 55,000 gallons of water in the containment building. The source of the water was a service water line which had frozen and ruptured within the unheated containment. The water was pumped from the containment building for processing by the site radwaste system. The NRC responded by conducting a two-week special team inspection that identified numerous discrepancies that the licensee had to address.
- July 13, 1994, licensee submitted a check for \$200,000 in response to the NRC-imposed civil penalty for its failure to maintain required systems and to staff unit in accordance with Dresden Unit 1 decommissioning plan.

FORT ST. VRAIN

- August 18, 1989, plant was permanently shut down because of failure of the control rod drives and degradation of the steam generator ring

header.

- May 21, 1991, license was amended to possession only license (POL) status.
- June 11, 1992, all fuel was placed in an onsite independent spent fuel storage installation (ISFSI).
- November 23, 1992, NRC issued order approving licensee decommissioning plan.
- September 1, 1993, removal of the prestressed concrete reactor vessel top head was completed.
- April 1, 1994, all of the graphite reflector blocks had been removed from the reactor vessel and shipped to the low level waste burial site at Hanford, Washington.

#### SHOREHAM

- June 28, 1989, licensee's shareholders approved agreement with the New York State to not operate the facility.
- August 24, 1989, reactor vessel was defueled.
- June 14, 1991, license was amended to POL status.
- February 29, 1992, license was transferred to Long Island Power Authority for decommissioning of plant.
- June 11, 1992, NRC issued order approving licensee decommissioning plan.
- September 1993, transfer of fuel to Limerick began. Fuel transfer was completed June 1994.
- October 1994, the licensee announced completion of the dismantlement. Confirmatory surveys conducted.
- April 11, 1995, decommissioning complete, POL terminated.

#### RANCHO SECO

- June 7, 1989, plant was shut down because voters approved non-binding referendum prohibiting licensee from operating facility.
- December 8, 1989, reactor vessel was defueled.
- March 17, 1992, license was amended to POL status.
- Environmental and Resources Conservation Organization (ECO) was active intervenor in regards to proposed decommissioning plan.
- June 16, 1993, NRC issued safety evaluation and environmental assessment of proposed decommissioning plan.
- November 30, 1993, the Atomic Safety and Licensing Board (ASLB) admitted for hearing certain contentions associated with decommissioning funding and costs of Rancho Seco independent spent fuel storage installation.
- August 1, 1994, ECO reached settlement with Sacramento Municipal Utility District and filed notice of withdrawal; ASLB terminated proceeding.
- September 2, 1994 Commission order (CLI-94-14) authorized NRC staff to issue decommissioning order.
- March 20, 1995, NRC approved the decommissioning plan for SAFSTOR by issuing the decommissioning order.

## YANKEE ROWE

- October 1, 1991, plant was shut down and vessel defueled because of concerns about reactor vessel integrity.
- February 27, 1992, licensee announced permanent cessation of operations because of inability to address uncertainties associated with the safety margin of the reactor vessel.
- August 5, 1992, license was amended to POL status.
- July 15, 1993, NRC stated it had "no objection to early component removal activities" proposed by the licensee.
- November 16 to December 8, 1993, as part of the early component removal activities, the four steam generators and pressurizer were shipped from the plant to the low level waste burial site in Barnwell, South Carolina.
- March 11, 1994, NRC stated it had "no objection" to use of decommissioning trust funds for proposed second phase of activities associated with early removal of components, including reactor coolant pumps, contaminated piping, and asbestos. Activities were completed by June 30, 1994.
- March 31, 1994, Citizens Awareness Network (CAN) filed a complaint in the Massachusetts District Federal Court claiming the NRC did not follow National Environmental Protection Act (NEPA) in its review of licensee's early component removal program. The court denied the complaint on jurisdictional grounds; however, CAN appealed to the U.S. Court of Appeals for the First Circuit in Boston.
- February 14, 1995, NRC approved the decommissioning plan for SAFSTOR.
- March 23, 1995, Yankee Atomic applied for a (10 CFR 71) license to enable shipment of the reactor vessel. The vessel will not be shipped before summer 1996.
- July 20, 1995, First Circuit found that the Commission erred when it rejected CAN's request for a hearing on the component removal program, that CAN was entitled to a hearing under section 189a of the Atomic Energy Act, and that the NRC had violated NEPA by permitting YAEC to initiate the component removal program before the agency had prepared an environmental assessment or impact statement. The Court remanded the case to the Commission for further action.
- October 27, 1995, in response to the July 1995 Court of Appeals decision, the NRC staff issued a Federal Register notice offering the public an opportunity for hearing.
- November 30, 1995, CAN and the New England Coalition on Nuclear Pollution submitted a joint petition to intervene on the Yankee decommissioning plan.
- January 16, 1996, the Commission turned over the petitioners' pleadings to the Atomic Safety and Licensing Board (ASLB). The Commission provided guidance to the ASLB that requests that if the ASLB determines a hearing is required, the Commission would have it start in mid-April 1996.

## THREE MILE ISLAND UNIT 2

- March 28, 1979, accident occurred in the plant that caused permanent cessation of operations.

#### BP24 (03/96)

- January 30, 1990, reactor was defueled.
- August 12, 1993, processing of accident-generated water was completed.
- September 14, 1993, POL amendment was issued.
- December 28, 1993, post-defueling monitored storage technical specifications were issued.

#### SAN ONOFRE, UNIT 1

- November 30, 1992, based on settlement agreement with California Public Utilities Commission licensee permanently shut down plant rather than bring it into compliance with current NRC safety requirements.
- October 23, 1992, POL amendment was issued. Amendment became effective March 9, 1993, when reactor vessel was certified as completely defueled.
- December 28, 1993, permanently defueled technical specifications were issued.
- November 3, 1994, licensee submitted proposed decommissioning plan for NRC review.

#### TROJAN

- January 4, 1993, licensee announced permanent cessation of operations.
- January 27, 1993, reactor was defueled.
- May 5, 1993, NRC issued POL amendment.
- November 1994, licensee commenced removal of steam generators and pressurizer for shipment to the U.S. Ecology low level waste burial site at Hanford, Washington.
- January 26, 1995, licensee submitted proposed decommissioning plan.
- September 6, 1995, in a *Federal Register* notice the Commission announced its intention to issue a future *Federal Register* notice offering an opportunity for a hearing on whether to approve the Trojan decommissioning plan.
- November 1, 1995, licensee completed the large component removal project.
- December 22, 1995, NRC staff published *Federal Register* notice offering opportunity for public comment on Environmental Assessment and Safety Evaluation for the decommissioning plan.

#### BIG ROCK POINT

- May 31, 2000, is expiration date of current license.
- February 27, 1995, licensee submitted SAFSTOR decommissioning plan for early NRC review. Review is ongoing and expected to be completed in February 1996.



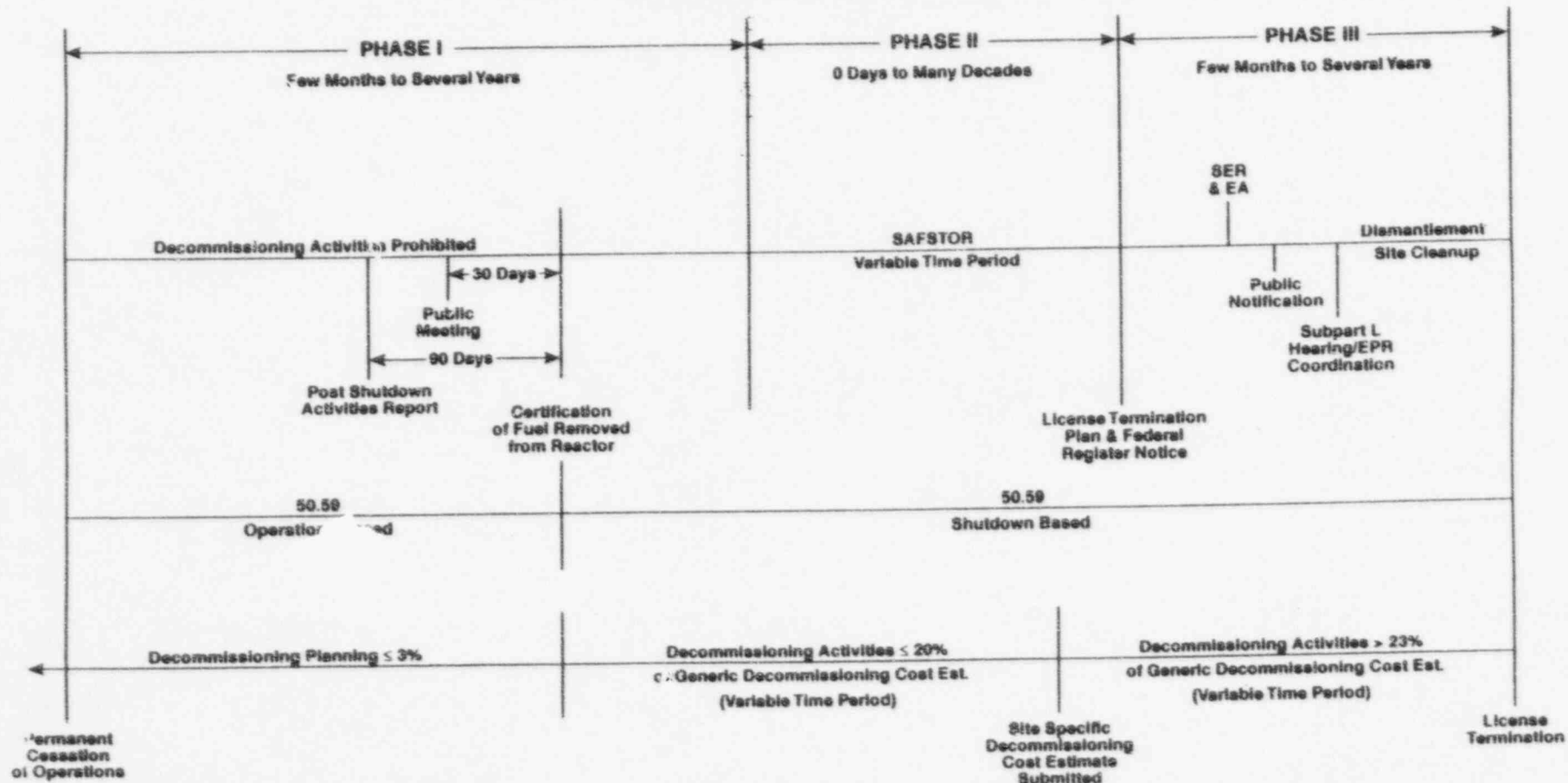
TABLE 2  
REACTOR DECOMMISSIONING STATUS  
SHUTDOWN POWER REACTORS

DOCKET NO. REACTOR	THERMAL POWER	LOCATION	SHUT DOWN	PRESENT STATUS	FUEL ONSITE?
50-3 Indian Point 1 (PWR)	615 MW	Buchanan New York	10/31/74	Possession Only Lic.	Yes
50-10 Dresden 1 (BWR)	700 MW	Morris Illinois	10/31/78	SAFSTOR Approved	Yes
50-16 Fermi 1 (Fast Breeder)*	200 MW	Monroe Co. Michigan	9/22/72	SAFSTOR Approved	No
150-18 GE VBWR (BWR)	50 MW	Alameda Co. California	12/9/63	SAFSTOR Approved	No
50-29 Yankee Rowe (PWR)	600 MW	Franklin Co. Massachusetts	10/1/91	SAFSTOR/ DECON Approved	Yes
50-114 CVTR (Pressure Tube, Heavy Water)	65 MW	Parr S. Carolina	1/67	Byproduct Lic. (St.)	No
50-130 Pathfinder (Nuclear Superheat BWR)*	190 MW	Sioux Falls South Dakota	9/16/67	DECON NRC Part 30	No
50-133 Humboldt Bay 3 (BWR)	200 MW	Eureka California	7/2/76	SAFSTOR Approved	Yes
50-171 Peach Bottom 1 (HTGR)*	115 MW	York Co. Pennsylvania	10/31/74	SAFSTOR Approved	No
50-206 San Onofre 1 (PWR)	1347 MW	San Clemente California	11/30/92	Possession Only Lic.	Yes
50-267 Fort St. Vrain (HTGR)*	842 MW	Platteville Colorado	8/18/89	DECON Approved	Yes
50-312 Rancho Seco (PWR)	2772 MW	Sacramento California	6/7/89	SAFSTOR Approved	Yes
50-320 Three Mile Island 2 (PWR)	2772 MW	Middletown Pennsylvania	3/28/79	Possession Only Lic.**	No
50-322 Shoreham (BWR)*	2436 MW	Suffolk Co. New York	6/28/89	License Terminated	No
50-344 Trojan (PWR)	3411 MW	Portland Oregon	11/9/92	Possession Only Lic.	Yes
50-409 LaCrosse (BWR)	165 MW	LaCrosse Wisconsin	4/30/87	SAFSTOR Approved	Yes

\* Project management assigned to Office of Nuclear Material Safety and Safeguards.

\*\* Post-defueling monitored storage (PDMS).

# DECOMMISSIONING TIMELINE



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# Decommissioning Planning When There's No Place to Put the Waste

By L. Rutland, S.M. Stoller Corporation

## Introduction

The delay in the federal waste management system to begin accepting spent nuclear fuel (SNF) and the continuing unavailability of off-site low-level radioactive waste (LLW) disposal affect nuclear power plant (NPP) decommissioning planning. The status of SNF and LLW disposal, current waste management alternatives, and the projected schedule for disposal facilities becoming operational are important factors for those NPP's.

Until a repository for SNF becomes operational, affected NPP's can use dry storage technologies, which will be compatible with the transportation and disposal features of the evolving federal waste management system. For LLW, strategies are available to reduce the volume of LLW from nuclear plant operations and decommissioning activities. Furthermore, plant areas such as the radioactive waste and turbine buildings may be suitable with minimal modifications to accommodate extended storage of LLW.

Even if a NPP is not actively engaged in decommissioning, at least the financial planning for decommissioning should be updated to account for the changing LLW waste and SNF disposal situation. For plants that are actively planning or engaged in decommissioning, the reality is that a NPP's license cannot be terminated until the SNF and LLW have been removed. A variety of NRC approved on-site dry storage technologies for SNF are now available for use when the capacity of the spent fuel pool is exceeded, or to benefit from the more simple, passive mode of operation. The options for management of LLW are not so straight-forward. This presentation primarily considers how decommissioning planning is affected when access to a LLW disposal facility is not available. Of particular interest is the significant storage space that the radioactive waste building (RWB) can provide for extended storage of accumulated LLW.

## SNF and LLW Disposal

SNF will remain on-site until away-from-reactor storage/disposal becomes available. The federal repository for SNF is projected to be available in the year 2010, at the earliest. A monitored retrievable storage (MRS) facility to fill the gap is not likely to be completed even long after January 31, 1998, the date when the DOE was to begin accepting commercial NPP SNF (under the provisions of the Nuclear Waste Policy Act of 1982, as amended in 1987). The timetable for off-site disposition of SNF must await future developments.

Most states, either individually or as parties to compacts, have plans to provide access to a licensed LLW facility by, or before, the year 2001. The end of that period corresponds to the beginning of the period when the operating licenses (OL) for the oldest NPP's start to expire. Therefore, the number of NPP's with an operating license (OL) that will expire while LLW disposal facilities are being developed should be small. No OL's will expire before the year 2000. Thereafter, there will only be one in each of the years 2000, 2004, and 2006. However, most NPP's that have shut down did so before license expiration. It may be anticipated that several NPP's will shut down in a period when LLW disposal is not available. The NPP's that will be affected most are those that have already shut down and those that will shut down before LLW disposal again becomes available. For those plants, the time until the end of the decade will be eventful. It will be a time when:

- the DOE commitment to begin accepting commercial SNF in 1998 will be clarified
- an MRS could become available as a government or commercial operation
- plans and schedule for the operation of the federal repository are defined
- state/compact LLW disposal facilities are planned to be operational for most NPP's

Past experience has shown that roadblocks exist for the eventual availability of LLW and SNF disposal. NPP's should be

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prepared for the possibility of considerable delay. Until SNF and LLW disposal become available, decommissioning planning and preparations must account for the wastes that will remain on-site.

## SNF and LLW Decommissioning

### SNF Management

SNF is normally stored in the spent fuel pool until the pool capacity is exhausted. Additional SNF can be accommodated in on-site dry storage facilities, an increasing number of which are approved by the site specific or general license provisions of Title 10 of the Code of Federal Regulations Part 72 (10 CFR 72), Licensing Requirements for the Storage of Spent Nuclear Fuel and High Level Waste. Even if all the SNF were contained in the spent fuel pool when the plant is shut down, a transition from wet storage to dry storage could be beneficial.

Decommissioning operations are more complicated with SNF in the spent fuel pool. With SNF in the spent fuel pool the license technical specifications include stringent safety related security, procedural, operational, and reporting requirements. However, SNF

(Continued on page 18)

## Decommissioning...

Continued from page 16

must remain in the spent fuel pool for at least five years (10 CFR 961, Appendix E). The removal of the SNF from the spent fuel pool is on the critical path for decommissioning operations. One alternative to avoid the high cost associated with maintaining the spent fuel pool, and resulting more complex operations for decommissioning, is to transfer the SNF to an independent spent fuel storage installation (ISFSI) using dry storage technology. The capital investment for an ISFSI would eventually be offset by the lower cost to maintain an ISFSI, and lower costs for subsequent decommissioning operations that would no longer be affected by the presence of SNF in the spent fuel pool.

### LLW Management

Even if LLW disposal is not available at the start of decommissioning, the DECON (prompt decommissioning) alternative can remain as a possible alternative. In that case, LLW could be stored on-site until access to a LLW disposal facility becomes available. Under these conditions, strategies to reduce the volume of LLW to be stored on-site become especially important. The following are examples of approaches that are routinely used to reduce the amount of LLW for interim on-site storage:

- contaminated equipment can be offered as surplus material for use by others
- contaminated metals can be melted and recycled for use as shielding material, to fabricate containers for LLW, or to be stored on-site as billets
- burn contaminated waste oils on-site (NRC regulations have been changed to permit this)
- off-site volume reduction facility used to decontaminate, compact or incinerate LLW (NRC regulations have been changed to permit volume reduced LLW to be returned to a NPP from an off-site volume reduction facility)

Instead of building an interim on-site LLW storage facility, the RWB of

a NPP could be used to store LLW, as may be required to support decommissioning. Also, many of the features noted in the following discussion for use of a RWB may be found as well in the turbine building to provide even more LLW storage space. Available storage space in the RWB could be increased by selectively removing interfering contaminated systems, structures and components. That removal would be most beneficial if the items removed to increase storage capacity were items that would be eventually removed in the subsequent dismantlement work. Storage capacity on the order of 100,000 cubic feet, or more, would not be unusual. Accommodating a five year generation of LLW from a typical operating BWR would require storage for about 28,000 cubic feet of LLW, and only a small fraction of that (perhaps only 5000 cubic feet) after return from an off-site volume reduction facility. Typically, LLW generation from a PWR would be less by a factor of 3, or more. If the state/compact LLW disposal facility for the plant becomes operational without significant delay, the above mentioned typical volumes of LLW expected from plant operation in the interim should easily be accommodated within the RWB.

A RWB often can be suitable for storing decommissioning LLW because the design basis typically was to perform the functions of a LLW storage and shipping facility as well as a LLW treatment facility. Use of a RWB for storage of LLW then can be considered as a continuation of its original function. RWB's were typically designed with features to fully support handling and storage of LLW containers with high levels of radiation. The existing features, such as, radiation shielding and monitoring, material handling, lighting, HVAC, fire detection/protection, and floor drains and sumps, are generally suitable to support the storage of LLW in accordance with ALARA principles.

The use of a RWB for interim storage of decommissioning LLW may require the licensee to perform a written safety evaluation in accordance with 10 CFR 50.59. The evaluation is to ascertain that the planned storage in the RWB:

- is not prohibited in the existing

license conditions or technical specifications.

- does not create an unreviewed safety question.
- does not exceed the LLW generation from five years of operation.

LLW storage operations must not affect the demonstrated ability of the building to withstand design basis events such as high winds, earthquake, fire and flooding. Operation must comply with the principles of ALARA, and the existing license. Off-site radiation doses must demonstrate compliance with 40 CFR Part 190.

For use as an interim storage facility, the RWB should satisfy the design objectives and criteria in guidance documents, including:

- NRC Generic Letter 81-38, Storage of Low-Level Radioactive Wastes at Power Reactors
- NRC Information Notice No. 90-09, Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees
- NUREG-0800, Standard Review Plan, Section 11.4, Solid Waste Management Systems
- NRC Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components.

Operation of a RWB for the storage of LLW also must satisfy:

- license conditions
- 10 CFR Part 20 standards for radiation protection
- 10 CFR Part 50 license requirements
- 10 CFR Part 61 waste forms for land disposal
- 10 CFR Part 71 and 49 CFR Parts 170 to 178 packaging and transportation requirements.

If storage is to extend for longer than five years, a license amendment under 10 CFR Part 30 must be submitted before the end of the five year period. The NRC review of the license amendment will consider container integrity and retrievability, and the implications of extended storage.

LLW waste forms and packaging for interim on-site storage should be consistent with current or draft requirements for disposal at the state/compact LLW disposal facility for the NPP. Any LLW returned to the plant site from an off-site waste treatment contractor also should be



compatible with long term storage requirements.

Utilization of a RWB for interim storage of decommissioning LLW should include planning in the following areas:

- prepare a safety evaluation according to 10 CFR 50.59
- prepare station modifications
- initiate a 10 CFR 30 license application, if storage will be for more than five years
- specify material handling equipment
- develop building security and protection provisions
- specify waste forms and containers for extended storage
- specify fire detection/protection equipment
- specify computer software storage data tracking
- select a treatment system for LLW generated from storage activities

In general, modifications would be involved mostly with equipment removal. Existing lighting, HVAC, drains and sumps, fire detection and suppression,

and radiation and effluent monitoring are normally adequate for utilization during the storage period.

## Conclusions

An ISFSI may be necessary if spent fuel pool capacity is exceeded. Even if the capacity is not exceeded, the benefits of an ISFSI could justify the capital investment especially when the SNF storage duration becomes protracted. With all fuel removed from the spent fuel pool, decommissioning planning and implementation would benefit from the resulting simpler procedures, operations and security.

LLW generated during NPP operation while LLW disposal is unavailable can be minimized using available methods to reduce on-site storage requirements. Without LLW disposal, prompt decommissioning (DECON alternative) must be delayed or LLW from decontamination and dismantlement activities must be accommodated on-site. If interim on-site LLW storage space is needed, the RWB may be suitable to provide extended storage for even a

large volume of decommissioning waste. If the state/compact disposal facility for a shut down NPP does not proceed on schedule, then the two NRC decommissioning alternatives, SAFSTOR (safe storage) and ENTOMB (entombment), both of which do not depend on off-site disposal for LLW, may become the only decommissioning alternatives that remain.

## Contact

For details, contact L. Rutland, S.M. Stotler Corporation, 485 Washington Avenue, Pleasantville, NY 10570; telephone (914)741-1200.

## Errata

The contact phone number in the technical paper titled *Segmentation of the Yankee Reactor Internals* by Cedric L. Child, Yankee Atomic Electric Company, and Michael S. McGough and Gregg Smith, PCI Energy Services, September-October 1995 issue, was incorrect. The correct telephone number of Michael S. McGough, PCI Energy Services, is (847) 680-8100.



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# Decommissioning and Decontamination Report

## UTILITY DEREGULATION BILL PROVIDES NUCLEAR UTILITIES SOME PROTECTION

Sen. Bennett Johnston (D-La.), ranking minority member of the Energy and Natural Resources Committee, introduced Jan. 25 comprehensive legislation proposing to deregulate the electric power industry. Included in the bill is a provision that will essentially require state utility commissions to allow utilities with nuclear power plants to roll "standard costs" such as the expense of facility decommissioning into their rate base. The provision is necessary, according to Johnston, because in an unregulated market nuclear utilities would not be able to compete with other electric generators given such standard costs, particularly decommissioning. The senator said he wants to "level the playing field" so utilities that own nuclear power plants can compete with other electricity providers who are not burdened with the high costs of decommissioning.

Two key laws regulating the utility market now under debate are the Public Utility Holding Company Act (PUHCA), passed in 1935 and amended under the Energy Policy Act of 1992, which grants states regulatory authority and restricts mergers and acquisitions, and the Public Utilities Regulatory Policy Act of 1978, which requires utilities to purchase electricity from independent power companies at their avoided cost.

### Johnston Bill a Comprehensive Approach

Johnston's bill (S. 1525) offers the most comprehensive package of reforms introduced in the Senate. In the House, Rep. Dan Schaefer (R-Colo.) is expected to introduce a proposal soon after completing a series of public hearings on electricity industry restructuring. Various degrees of reform are included in bills offered

by Sen. Don Nickles (R-Okla.) (S. 708); Rep. Edward Markey (D-Mass.) (H.R. 2929); Rep. Clifford Stearns (R-Fl.) (H.R. 2562); Sen. Alphonse D'Amato (R-N.Y.) (S. 1317); and Rep. Jack Fields (R-Texas), whose bill has not yet been assigned a number.

Johnston's bill is designed to encourage price competition and access to the electricity market. In introducing the bill on the Senate floor, Johnston declared that competition must be met "on a level playing field," which he said can only occur when utilities have the ability to recover stranded costs, such as nuclear investments or decommissioning costs.

"Nuclear decommissioning costs are an extremely large percentage of many utilities' embedded costs," argued Johnston. "The law of the land should be that all nuclear decommissioning costs are recoverable. Moreover, no nuclear licensee should be able to avoid decommissioning liability."

### Public Interest Group Opposes Measure

Nancy Hirsh, of the Environmental Action Foundation, said her organization does not support "a 100 percent stranded cost recovery" provision, which is called for under Johnston's bill. "His approach would have ratepayers pay for everything," she said, adding that the costs should be split between the shareholders, consumers and ratepayers.

But Nuclear Energy Institute spokeswoman Leigh Ann Marshall said the bill would safeguard a commonplace practice. "It mandates that utilities can collect what they need for decommissioning in a deregulated market."

## PORTLAND GENERAL SEEKS LICENSE FACILITY FOR SPENT FUEL, GTCC WASTE

Portland General Electric Co. is seeking approval from the Nuclear Regulatory Commission to store spent fuel and greater-than-Class-C (GTCC) waste in a proposed onsite independent spent fuel storage installation (ISFSI) included in the decommissioning plan for the Trojan Nuclear Plant. Portland General officials said approval of the request would clarify interim storage procedures and allow spent nuclear fuel and radioactive waste exceeding Class C radionuclide concentrations to be stored in dry casks until the Department of Energy is

ready to take the waste for permanent disposal. In their petition for rulemaking, Portland General asserts that the proposal would result in savings "associated with preparation of multiple requests for handling GTCC by licensees and the review of those requests by the NRC."

The petition, published in the Feb. 1 *Federal Register*, attempts to amend ISFSI issuance licensing requirements (10 CFR part 72) to "explicitly provide for storage of



GTCC waste produced from reactor operations pending its transfer to a permanent disposal facility."

NRC has taken the position that GTCC waste is not suitable for near-surface disposal and, lacking another alternative, can only be disposed of in the HLW repository "unless the NRC authorizes disposal at another licensed site."

#### **Proposal Would Streamline Regulation**

Michael Lackey, general manager of engineering and de-commissioning for Trojan Nuclear Plant, said the petition for rulemaking would streamline the storage procedure governed by Part 72 regulations and would avoid maintaining "parallel programs" for storing the spent fuel and GTCC waste. Lackey argues that emergency planning and

safety requirements would not be compromised. The petition emphasizes the "proposed amendments would provide identical public health and safety, and environmental protection as required for spent fuel located in an ISFSI."

Portland General believes the proposed amendments would avoid duplicative NRC reviews of GTCC disposal requests and "avoid the costs associated with preparation of multiple requests for handling GTCC by licensees and the review of those requests by the NRC."

Comments will be accepted until April 16 and should be submitted to: Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch. Or for further information, call Michael Lesar at 301-415-7163.

### **NRC SEEKS PUBLIC COMMENTS**

NRC is seeking public comments on draft environmental and technical reports on Atlas Corp.'s proposal for the cleanup of uranium mill tailings at Moab, Utah. The preferred alternative appears to be a proposal to stabilize the tailings in place at the Moab site. NRC staff found this acceptable. Another, more expensive, option proposed is to move all the tailings and contaminated material to an alternate site, removing the waste from close proximity to the Colorado River.

The NRC will hold a public hearing at Star Hall in Moab on Feb. 28. Written comments can be sent to: Chief, High-Level Waste and Uranium Recovery Projects Branch, Division of Waste Management, Office of Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. ◀



*United States  
Nuclear Regulatory Commission*

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**Overview of NRC's Decommissioning Program  
and Responsibilities**

**Division of Waste Management  
March 1996**

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## **OVERVIEW**

- **Program Responsibilities**
- **Materials Decommissioning Program**
- **Site Decommissioning Management Plan**
- **Remaining Challenges**

# **PROGRAM RESPONSIBILITIES**

## **NRR**

- **Licensing power reactor decommissioning prior to permanent removal of fuel**
- **Licensing non-power reactor decommissioning**

## **NMSS**

- **Licensing power reactor decommissioning after fuel removal**
- **Licensing materials and fuel facility decommissioning**
- **Site Decommissioning Management Plan**

## **PROGRAM RESPONSIBILITIES**

*(Continued)*

### **Regions**

- **Inspection and enforcement of licensee decommissioning**
- **Licensing materials facility decommissioning**

### **RES**

- **Rulemaking to establish and update decommissioning requirements**

STATUS REPORT  
DECOMMISSIONING

Subject: Background on current NRC decommissioning related activities.

Purpose: To: 1) provide cursory background information on the latest status of decommissioning activities for both reactors and non-reactors; 2) update the status of the decommissioning rule previously reviewed (1995) by the ACRS; and 3) review proposed residual contamination levels for decommissioning and provide subcommittee with a review of comments received to date (proposed rule previously discussed with the ACNW).

Additionally, this session is intended to have the joint subcommittee (as representatives of their parent Committee) increase their familiarity with the broader issues associated with the topic of decommissioning and thereby determine whether there is sufficient interest to further pursue the subject, either as a joint subcommittee effort or as a topic divisible into each of the parent Committees' area of expertise - and responsibility.

Jt. Subcommittee Lead Member: Dr. B. J. Garrick

Jt. Subcommittee Staff Lead: H. J. Larson

NRC Staff Leads:

- 1) Non-Reactor Decommissioning Update Report; NRC Decommissioning Responsibilities and Organization-M. Weber, NMSS
- 2) Reactor Decommissioning Update Report - S. Weiss, S.Bawja, NRR
- 3) Decommissioning Rule - Power Reactors-C.A. Trottier, RES
- 4) Residual Contamination Rule Report-J. E. Glenn, F. Cardile, RES

Action: As determined by the subcommittee. Could consist of a letter to the staff, a report back to each parent Committee with recommended action(s) or a determination that the presentation was for information only and did not require followup.

The subcommittee may:

- 1) be interested in determining if the agency's organization (as presented by Mr. Weber) does provide an overall, integrated plan for approaching this topic in a manner that will provide assurance to the public that its health and safety concerns are being addressed in an orderly, technically competent and consistent fashion.



2) wish to comment on the EDO response to the ACRS letter on the proposed decommissioning rule.

Background: The subject of decommissioning is one that transcends the interests and responsibilities of both parent Committees, and yet is one that has not received significant attention by either Committee. As will be seen from the presentations, there is much activity underway at present in both the reactor and non-reactor arenas, with various facilities in various stages of decommissioning activity.

This is an area that will continue to grow in importance as older facilities are phased out due to any one of a number of reasons- major aging problems; no longer economical to operate; uneconomical repair or replacement or maintenance of plant systems or components; public pressures; legislative actions; etc.

The Committee may also be interested in determining if there have been lessons learned from the D&D efforts to date that can be applied to future D&D undertakings, albeit regulatory, construction practice, or dose related.

The decommissioning rule status will be updated. The ACRS letter, along with the untimely (significant delay) response from the EDO are included in the referenced/attached information.

The presentation on residual contamination levels for decommissioning will be one that briefly discusses the proposed rule and the comments received to date. Neither a proposed final resolution of comments nor a final proposed rule will be presented.

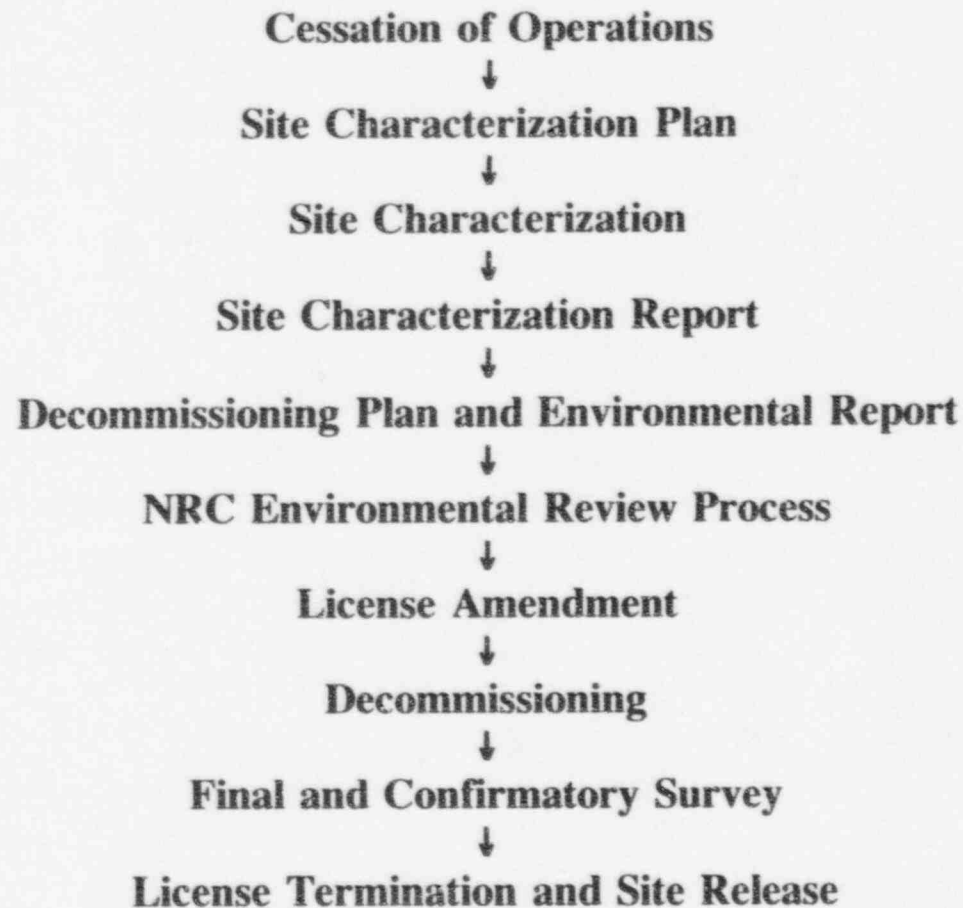
## DEFINITION

***Decommission*** means to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for *unrestricted use* and *termination* of license.

## **MATERIALS DECOMMISSIONING**

- **NRC terminates about 300 licenses each year**
- **Most license terminations are routine with limited potential for residual radioactivity**
- **Less than 10% are non-routine terminations**
  - ✓ **Fuel cycle facilities**
  - ✓ **SDMP sites**
- **NRC is also reviewing formerly terminated licenses**

# DECOMMISSIONING PROCESS



## **SITE DECOMMISSIONING MANAGEMENT PLAN**

- **Program Management Plan**

- ✓ **Objectives**
- ✓ **Responsibilities**
- ✓ **Resources**

- **Contaminated Sites**

- ✓ **Listing/Delisting Criteria**
- ✓ **Site Descriptions**
- ✓ **Status**

- **Policy Issues**

## POLICY ISSUES

Problem	Solution
Poor recordkeeping	Decommissioning recordkeeping rule - 1993 Formerly terminated licenses review - 1991 to present Manual Chapter on Decommissioning (draft under review)
No schedule constraints	SDMP Action Plan - 1992 License conditions and orders Decommissioning timeliness rule - 1994
No residual radioactivity standards	SDMP Action Plan - 1992 Enhanced Participatory Rulemaking - 1993 to present (Proposed rule in August 1994; final rule in 1996)
Inadequate financial assurance	General decommissioning requirements - 1988 License renewals and conditions Financial assurance clarification rule - 1994 Orders and enforcement
Inadequate procedures for termination and surveys	Survey procedures (NUREG/CR-5849) - 1992 Standard Review Plan - 1993 Inspection Procedures - 1995 Decommissioning Manual Chapter - in process Multi-Agency Radiological Site Investigation Manual - in process



## **REMAINING CHALLENGES**

- **Codifying radiological criteria for license termination -- "how clean is clean"**
- **Upgrading financial assurances for decommissioning**
- **Streamlining review process and confirmatory surveys**
- **Completing review of formerly terminated licenses (1950s to present)**
- **Maturing and implementing the program**
  - ✓ **Program guidance - licensing and inspection**
  - ✓ **Licensee guidance - modeling, surveys, restricted use**
  - ✓ **Program oversight - ongoing and periodic reviews**



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20545-0001

March 15, 1995

*Gail Marcus*

MEMORANDUM TO: James M. Taylor  
Executive Director for Operations

FROM: William T. Russell, Director *W. Russell*  
Office of Nuclear Reactor Regulation

Robert M. Bernero, Director *Robert M. Bernero*  
Office of Nuclear Material Safety and Safeguards

SUBJECT: REALIGNMENT OF REACTOR DECOMMISSIONING PROGRAM

The attached "Memorandum of Understanding Between NRR and NMSS" (MOU) defines the realignment of reactor decommissioning program management. This paper defines the program responsibilities of NRR and NMSS, both under current regulations and under the proposed regulations, and specifies distinct areas of mutual support expected from NRR and NMSS. The MOU outlines the major actions to implement decommissioning program realignment.

Attachment: As stated

Contact: Anthony W. Markley, ONDD/NRR  
415-1169

*9508250180*

*11*

## Memorandum of Understanding Between NRR and NMSS (MOU)

The Office of Nuclear Reactor Regulation (NRR) and the Office of Nuclear Material Safety and Safeguards (NMSS) have completed a review of the decommissioning program responsibilities as reflected in SECY-88-355, "Transfer of Regulatory Responsibility for Power Reactor Decommissioning from NRR to NMSS" (abbreviated title), and the challenges experienced during its implementation. This review also included evaluation of the respective capabilities of both NRR and NMSS and the opportunities to utilize the strengths of each organization effectively and efficiently. This MOU uses a matrix approach to indicate the staff possessing the requisite expertise during the various phases of the decommissioning process.

Furthermore, this MOU is responsive to the requirements of the proposed rule to amend 10 CFR Parts 2, 50, and 51 related to the decommissioning of nuclear reactors. This MOU also defines the interactions, licensing program management responsibilities, and support functions for the decommissioning of nuclear reactors. This MOU supersedes in toto the assignment of responsibilities identified in SECY-88-355.

### Management of the Power Reactor Decommissioning and Spent Fuel Programs

The power reactor decommissioning and spent fuel programs will be managed as specified below. The overall objective is to eliminate dual Office responsibilities for regulatory oversight. This process is designed to utilize the experience and expertise of both NMSS and NRR and indicates the specific areas of expertise and support of each office.

1. NRR will maintain regulatory project management, oversight, and inspection support responsibilities, including the spent fuel physical protection program, for a reactor undergoing decommissioning until all spent fuel is permanently transferred from the spent fuel pool. For operating reactors, NRR will retain responsibility for the spent fuel physical protection program until the spent fuel is removed from the site.
2. For decommissioning and for operating reactors, NRR will maintain cognizance over and provide inspection oversight for spent fuel pool operations, spent fuel cask loading, and transfer and unloading activities until the fuel is safely placed in an ISFSI, or moved to available space in another Part 50 licensed spent fuel pool, or shipped directly from the spent fuel pool to an offsite storage facility.
3. For decommissioning and for operating reactors, NMSS will, except for the physical protection program at operating reactors, maintain cognizance over and provide inspection support for facilities related to fuel storage in an ISFSI, for spent fuel shipment from the ISFSI to an offsite storage facility, and for any dry fuel handling facilities at the ISFSI.

4. NMSS will assume regulatory project management and oversight of a reactor undergoing decommissioning, including emergency preparedness, after the spent fuel is permanently transferred from the spent fuel pool.
5. NRR will provide technical support, as requested by NMSS, for structural and seismic issues associated with both the reactor facility and the ISFSI.
6. NMSS will continue to maintain cognizance over the review of ISFSI casks, facilities, and their construction, vendors, and respective inspections. NMSS will also continue to maintain cognizance over topical reports and generic design approvals related to dry fuel handling facilities. NMSS will keep the cognizant NRR project manager informed of any Part 72 licensing matters pertaining to the Part 50 license and will coordinate with the NRR project manager prior to the issuance of correspondence regarding issues and inspection findings under NMSS purview. NMSS will also coordinate onsite visits and inspections through the cognizant NRR project manager in accordance with Field Policy Manual, FPM No. 12.
7. NRR will be the primary NRC contact for the public and the media until license project management responsibilities are transferred to NMSS.
8. NRR will oversee all early component removal programs.
9. NRR will assume responsibility for reviewing any cost estimates and financial or funding assurance plans submitted by licensees, either with the decommissioning plan or pursuant to 10 CFR 50.54(bb) regarding financial assurance for interim storage of spent fuel.
10. NRR will review any decommissioning plan or report discussing planned activities following plant shutdown and will prepare, as necessary, any environmental assessment, safety evaluation report, or decommissioning order or amendment.
11. NMSS will continue to provide technical input to NRR for environmental radiological surveys and site characterization issues associated with the decommissioning plan reviews and as requested by NRR.
12. NRR will maintain responsibility for evaluation of all insurance or indemnity issues until termination of the Part 50 license even at those sites where project management has been transferred to NMSS.
13. NMSS will review the license termination plan and prepare the safety evaluation report, the environmental assessment, and the license termination order or amendment. NMSS will be responsible for all confirmatory survey and license termination activities, including assurance that appropriate site release criteria are met.

14. NMSS will maintain responsibility for reviewing any cost estimates and financial or funding assurance plans that licensees submit with the license termination plan.
15. NRR will provide primary support for State and local meetings to discuss decommissioning plans and Post-Shutdown Activity Reports. NMSS will provide support in transportation and other areas, as requested by NRR. NMSS will provide primary support for State and local meetings and hearings to discuss license termination plans.

#### Management of Non-Power Reactor Decommissioning

The realignment of responsibility does not include non-power (research, test, or training) reactors. The Non-Power Reactor Decommissioning Program will remain under the cognizance of NRR.

#### Transition Plan and Tasks

The realignment of decommissioning program responsibilities would take place during the first calendar quarter of 1995. The major actions accomplished and anticipated during the transition period before publication of the new rule in final form are as follows:

##### 1. Transfer of Regulatory Project Management.

The transfer of regulatory project management responsibility from NMSS to NRR for the following shutdown reactors with wet spent fuel storage began on December 14, 1994, and was completed during the first week of January 1995: Humboldt Bay Unit 3 and La Crosse. The Vallecitos boiling water reactor, which no longer has fuel, was transferred to NRR to make more effective use of resources because there are two shutdown and one operating non-power reactors on this site under NRR cognizance.

NMSS will maintain regulatory project management for the following shutdown reactors that do not have wet spent fuel storage: Fort St. Vrain, Shoreham, Fermi Unit 1, Peach Bottom Unit 1, and Pathfinder facilities.

##### 2. Decommissioning Plan Reviews

NMSS has completed the decommissioning plan review for the Yankee Rowe plant. Decommissioning plan reviews for the Trojan, San Onofre, and Big Rock Point plants will be completed by NRR. NRR will review the decommissioning plans at the level of review envisioned for the Post-Shutdown Activities Report under the proposed rule and will prepare the environmental assessments, the safety evaluation reports, and the decommissioning orders.

3. Development of Standard Review Plans for Decommissioning Plans and Post-Shutdown Activity Reports

NRR will assume responsibility for developing appropriate guidance for the preparation and evaluation of decommissioning plans and Post-Shutdown Activity Reports. This guidance will be consistent with the level of review envisioned for the Post-Shutdown Activities Report under the proposed rule.

4. Development of Standard Decommissioning Technical Specifications

NRR will maintain responsibility for developing appropriate standard decommissioning technical specifications for permanently shutdown reactors.

5. Development of Standard Review Plans for License Termination Plans

NMSS will assume responsibility for developing appropriate guidance for preparation and evaluation of license termination plans.

Resources

No resource transfers between NRR or NMSS are contemplated to implement the proposed realignment as described in this MOU.