

## RULEMAKING ISSUE

(Notation Vote)

June 1, 2001

SECY-01-0099

FOR: The Commissioners

FROM: William D. Travers  
Executive Director for Operations

SUBJECT: RULEMAKING PLAN AND ADVANCE NOTICE OF PROPOSED  
RULEMAKING: ENTOMBMENT FOR POWER REACTORS

PURPOSE:

This paper requests Commission approval of a rulemaking plan and an Advance Notice of Proposed Rulemaking (ANPR) indicating that the U.S. Nuclear Regulatory Commission (NRC) is considering the development of a proposed rule allowing entombment as an option for power reactors. This package describes actions that the NRC staff has taken to date to develop entombment options in the rulemaking plan and provides an ANPR that summarizes the entombment option and provides specific questions for stakeholders.

BACKGROUND:

In SECY-98-099, "Status Report of Staff Activities Related to Reviewing the Viability of Entombment as a Decommissioning Option for Power Reactors," dated May 4, 1998, the staff stated its preliminary conclusion that entombment appeared to be a viable decommissioning option. In SECY-99-187, "Information Paper on the Viability of Entombment as a Decommissioning Option for Power Reactors," dated July 19, 1999, the staff informed the Commission of the technical viability of entombment as a decommissioning option for power reactors.

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Based on the assessment of the efforts of Pacific Northwest National Laboratory (PNNL) in SECY-98-187, the staff concluded that decommissioning a power reactor using the entombment option can be safe and viable for many situations. Also, from a technical perspective, isolation of Greater Than Class C (GTCC) materials in an entombed structure appears to have realistic possibilities. However, as also noted in that paper, implementation of the entombment option may require regulatory amendments and additional guidance before the entombment option can be implemented to provide reasonable assurance of protecting public health and safety and the environment.

The NRC staff conducted a workshop on December 14 and 15, 1999. This workshop solicited stakeholder views on the technical basis, issues, and options for treating entombment equally with the other decommissioning alternatives. In SECY-00-0129, "Workshop Findings on the Entombment Option for Decommissioning Power Reactors and Staff Recommendations on Further Activities," dated June 22, 2000, the staff provided the Commission with its findings from the public workshop. The staff recommended that further public input is needed before recommending an entombment option. Also, the staff recommended proceeding with the development of a rulemaking plan. As part of the plan, the staff recommended seeking additional input through an ANPR. In a Staff Requirements Memorandum (SRM), dated July 20, 2000, and revised on September 5, 2000, on SECY-00-0129, the Commission directed the staff to develop a rulemaking plan to address the entombment option for power reactors (Attachment 1).

Current requirements pertaining to decommissioning of power reactors are primarily contained in 10 CFR 50.82. Specific requirements on decommissioning alternatives were originally published in 1988 and amended in 1996. These requirements state that the Commission will terminate a license if it determines that a decommissioning has been performed in accordance with an approved license termination plan and that the terminal radiation survey and associated documentation demonstrate that the facility and site are suitable for release in accordance with 10 CFR Part 20, Subpart E.

Currently, 10 CFR 50.82(a)(3) requires that decommissioning be completed within 60 years of permanent cessation of operations and that completion of decommissioning beyond 60 years will be approved by the NRC only when necessary to protect public health and safety. The factors that will be considered by the Commission in evaluating an alternative that provides for completion of decommissioning beyond 60 years of permanent cessation of operation include unavailability of waste disposal capacity and other site-specific factors affecting the licensee's capability to carry out decommissioning, including presence of other nuclear facilities at the site.

In 1997, the Commission amended its regulations to establish a dose criterion for license termination. These provisions are contained in 10 CFR Part 20, Subpart E, and include a provision that permits license termination under restricted release conditions. Under a restricted release, the dose to the average member of the critical group must be As Low As Reasonable Achievable (ALARA) and not exceed 0.25 mSv/yr (25 mrem/yr) with the restrictions in place, and, if the restrictions failed, the dose from residual radioactivity can not exceed 1 mSv/yr (100 mrem/yr) (or 5 mSv/yr (500 mrem/yr), if additional conditions were met).

DISCUSSION:

The staff has developed three options in the rulemaking plan (attachment 2). Option 1 is to continue with the current approach and handle entombment requests on a case-by-case basis. Option 2 is to conduct rulemaking to add flexibility to 10 CFR 50.82 to amend the 60-year time frame for completion of decommissioning and to clarify the use of engineered barriers for reactor entombments.<sup>1</sup> Option 3 is to conduct rulemaking to establish performance objectives and licensing requirements for a reactor entombment. Option 3 would consider entombment as a disposal option rather than a decommissioning option in which the license could be terminated. Furthermore, Option 3 could have applicability to other than reactor facilities.

In the course of preparing the rulemaking plan and ANPR (attachment 3), the staff has discussed the options with the Advisory Committee on Nuclear Waste and will closely coordinate this rulemaking with the ongoing effort to update the generic environmental impact statement for decommissioning of power reactors.

The staff also is identifying research needs to address significant challenges for evaluating performance for entombed structures. They include:

- 1) Developing strategies to evaluate the physical condition of the entombed structure, assess and quantify the extent of degradation including cracking, and conducting testing to obtain the necessary data for inputs to concrete performance codes for the performance assessments of these facilities.
- 2) Characterizing the source term and conducting leaching tests to provide data on radionuclide sorption and solubility in cemented grout environments, or other infills.
- 3) Modeling the flow and transport to the environment (primarily to shallow and surficial water bodies) and estimating the dose from the entombed structures. Investigating the need for chemical barriers within and outside the entombed facility to impede radionuclide transport.
- 4) Evaluating surveillance and monitoring strategies to obtain data to confirm the performance model of the entombed structures.

On March 7, 2001, the NRC sent the draft rulemaking plan, the draft ANPR, and the PNNL Assessment, "Viability of the Entombment Option for Decommissioning Nuclear Power Reactors" dated May 11, 1999, to the Agreement States for a 30-day comment period. The States of Arkansas, New York and Illinois sent comments in response to this request (attachment 4). The comments from the State of Arkansas did not take issue with any of the technical aspects of any of the options, but rather stressed a number of concerns regarding State and stakeholder involvement that the NRC should consider as part of the development of the proposed rule. The State of New York opposes any new NRC rulemaking that would

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<sup>1</sup>Under 10 CFR Part 20, Subpart E, engineered barriers may be considered institutional controls depending upon the need for, and the degree of human involvement, to maintain their effectiveness. Option 2, unlike Option 1, will clarify this issue.

specifically provide for entombment (in-situ disposal) of low-level radioactive waste or GTCC. Therefore, New York also recommended that the NRC choose Option 1 and not undertake any new rulemaking. The State of Illinois feels that entombment as a reactor-decommissioning alternative is problematic. They will resist its implementation and urge its prohibition because of the lack of State control in the decision making process and problems with long-term restricted land use.

The staff has reviewed the comments from the States of Arkansas, New York and Illinois and does not recommend any modifications to the Rulemaking Plan and ANPR as a result of the comments. However, their comments will be considered along with other comments received on the ANPR.

### Issues for Consideration

The ANPR will solicit comments and recommendations on entombment from all interested persons, including recommendations on the feasibility of proceeding with certain options of this rulemaking. The issues are discussed below.

- Regulatory Framework and Approaches

Currently, entombment for power reactors is considered a decommissioning option and is regulated under 10 CFR Part 50. The staff has broadened the scope of entombment by proposing an alternative regulatory framework as a disposal option (option 3 in the rulemaking plan).

- Technical Feasibility and Requirement Issues

License termination would be based on the licensee demonstrating that the engineered barrier system used for validating the entombment satisfies the dose criteria specified in 10 CFR Part 20, Subpart E. The staff is seeking input on what credit can be given to engineered barriers for purposes of dose reduction.

- Consideration of Entombment of GTCC Waste

In the SRM on SECY-00-0129, the Commission requested the staff to address the issue of GTCC waste. NRC disposal strategies for GTCC waste may have complex policy implications. The Nuclear Waste Policy Act of 1982 gave NRC the responsibility for licensing GTCC disposal facilities and gave The Department of Energy (DOE) the responsibility for disposal strategies for GTCC material. The ANPR requests comments on the feasibility of including GTCC in an entombment.

- State Responsibilities and Requirements

State involvement is necessary in some of the options being considered, whether the entombment process is characterized as a decommission option or as a disposal approach, in particular, because the Low Level Radioactive Waste Policy Amendments Act of 1985 states

that States have the responsibility for providing for the disposal for LLW, either by themselves or in cooperation with other States and compacts. Thus, there must be public involvement and continued interface with State authorities. Additionally, concerted efforts should be made to include the public in development of the entombment option.

#### RESOURCES:

Option 1 would require no resources to conduct a rulemaking, but would require NRC resources to review exemption requests for licensees seeking to use entombment. Option 2 would require approximately 3 full-time equivalents (FTE) over 2 years to develop a final rule. Contract support for rulemaking development, including support for public meetings, is estimated to be \$300,000. This assumes an Environmental Impact Statement would not be needed for this option. In any case, an Environmental Assessment (EA) would still be required. If the EA analysis results indicate that an EIS is required, then the above estimated cost would be increased by approximately \$150,000. Option 3 would require approximately 5 FTE over 3 years to develop a final rule. Contract support for rulemaking development, including development of an Environmental Impact Statement and support for public meetings, is estimated to be \$700,000. This also could result in additional scheduling and budget adjustments. Once the ANPR comments have been received and analyzed, the staff will provide the Commission with a recommendation on how to proceed.

#### PREFERRED OPTION(S):

Before making a decision on proceeding with a particular rulemaking option, the staff recommends soliciting additional public input on the options. A recommendation on a preferred option will be made after evaluating the comments received in response to the ANPR.

#### COORDINATION:

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

RECOMMENDATIONS:

That the Commission:

1. Approve the rulemaking plan provided in Attachment 2.<sup>2</sup>
2. Approve publication of the ANPR as described in Attachment 3.

*/RA/*

William D. Travers  
Executive Director  
for Operations

Attachments:

1. SRM dated (revised) 9/05/2000
2. Rulemaking Plan
3. Advance Notice of Proposed Rulemaking
4. State Comments

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<sup>2</sup>The staff will inform the commission of the preferred rulemaking option after considering comments received in response to the ANPR.

**RECOMMENDATIONS:**

That the Commission:

1. Approve the rulemaking plan provided in Attachment 2.<sup>2</sup>
2. Approve publication of the ANPR as described in Attachment 3.

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<sup>2</sup>The Staff will inform the Commission of the preferred rulemaking option considering comments received in response to the ANPR.