RULEMAKING PLAN

Entombment Options For Power Reactors

Regulatory Issue(s)

In response to COMSECY-96-068, April 3, 1997, the Commission requested that the staff provide an analysis of whether entombment is a viable decommissioning option. 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 provided an interim status report to the Commission and 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. The staff concluded that decommissioning a power reactor using the entombment option can be safe and viable for many situations and that it could offer benefits by providing more choices to accommodate site-specific decommissioning 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, implementation of the entombment option may require regulatory amendments and additional guidance before the entombment option can be used.

The U. S. Nuclear Regulatory Staff (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. The workshop was attended by 76 people from industry, public interest groups, Federal agencies, the States, and NRC staff. Formal presentations were given on regulatory considerations and on technical aspects specific to power reactor entombment. Specific topics addressed contaminant isolation issues such as concrete performance assessments, hydrological isolation considerations, and engineering facilitation for entombment design and implementation. Additionally, panels reviewed each issue from the *Federal Register* notice (64 FR 63061), followed by discussions with the panelists and the audience.

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 option of entombment. 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 Advance Notice of Proposed Rulemaking (ANPR).

In an Staff Requirements Memorandum (SRM) dated July 20, 2000, on SECY-00-0129, the Commission directed the staff to develop a rulemaking plan to address the entombment option for power reactors by February 1, 2001. This date was subsequently extended to June 01, 2001. The SRM also directed the staff to consider the issue of GTCC waste.

How the Regulatory Problems Will be Addressed By Rulemaking

The staff is considering rulemaking to specifically address entombment for decommissioning of power reactors. Input from comments on the ANPR will assist the staff in solidifying an option for entombment of power reactors. The staff's suggested options are discussed below.

Rulemaking Options

Option 1-Do not conduct rulemaking, maintain status quo and handle entombment requests on a case-by-case basis.

Currently, 10 CFR 50.82(a)(3) requires that decommissioning be completed within 60 years of permanent cessation of operations. Completion of decommissioning beyond 60 years may be approved by the NRC only when necessary to protect public health and safety. To extend decommissioning based on economic or other non-public health and safety reasons would require an exemption under 10 CFR 50.12. This option requires no resources to conduct a rulemaking, but would require NRC resources to review exemption requests.

Pros:

- Current regulations already permit case-specific exemptions for completing license termination beyond 60 years (10 CFR 50.82) based on health and safety considerations.

- In addition, the current regulations (10 CFR Part 20, Subpart E) for license termination with restricted release provide dose criteria for decommissioning and, in some cases, could apply to entombment within the existing time frame of 10 CFR 50.82.

Cons:

- In some cases, current 10 CFR Part 20 Subpart E requirements for license termination with restricted release may not be sufficiently flexible to achieve license termination within the 60-year period specified in 10 CFR 50.82 given the limitations for extending the time period. This option results in regulating by exemption.

- If the current rules were used for considering the permissibility of entombment for case-specific situations for other than public health and safety reasons, it may require additional staff resources to process the site-specific exemptions.

- Does not address the disposition of GTCC material, which otherwise might need to be disposed of in an offsite disposal facility.

- Under 10 CFR Part 20, the entombment contains residual radioactivity and is considered to be suitable for license termination. However, under other statutes, the residual radioactivity might be considered to be low level waste (LLW). Classification of the entombed material as LLW would raise issues concerning State and LLW compact legal authority over the entombment. Therefore, States and compacts have authority for disposal of LLW, and may prescribe means for its disposal other than entombment. In addition, some States have prescribed their own criteria for LLW disposal that may not be compatible with those in an entombment rule.

Option 2 - 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.

Option 2 would modify the 60-year time period for completion of decommissioning activities. Under this option, the statement of considerations could clarify when credit could be taken for engineered barriers, independent of institutional controls, as a method for meeting the established dose criteria found in 10 CFR Part 20, Subpart E[1]. Engineered barrier system performance objectives, qualifying criteria, and implementation acceptability by the NRC could be specified in the rule to ensure a high level of confidence that the entombment would continue to isolate the radioactive material until it decays to a level that would be acceptable for restricted release. This option could specifically authorize the use of entombment for power reactors as a decommissioning alternative for license termination.

This option requires approximately 3 full time equivalents (FTE) (1.5 FTE from NMSS; 0.5 from NRR; 0.2 from RES; 0.5 from OGC; and 0.3 from OSTP) over a 2 year period to develop the final rule. The cost of contract support for development of rulemaking documents, including support for public meetings, is estimated to be $300,000. This assumes that an Environmental Impact Statement (EIS) would not be needed for this option. In any case, an Environmental Assessment (EA) would still be required. If the EA analysis results indicted that an EIS was required, then the above estimated cost would be replaced by a cost of approximately $450,000.

Pros:
- Amending 10 CFR 50.82 would provide more flexibility for terminating a license without the need for exemptions or Commission approval of alternative schedules. It also permits flexibility of requirements for a broad variety of possible situations. This would result in resource savings for the NRC and licensees.
- The use of engineered barriers would be clarified in the regulations.
- Terminating the license is more efficient and effective compared to retaining a disposal license as proposed by Option 3.

Cons:
- There may not be a defined time period for license termination. This approach may delay completion of decommissioning and license termination. However, there may be other factors that would motivate timely completion of decommissioning activities such as continued requirements for payment of fees, insurance, and other resource impacts on licensees.
- Does not address the disposition of GTCC material, which otherwise might need to be disposed of in an offsite disposal facility.
- Under 10 CFR Part 20, the entombment contains residual radioactivity and is considered to be suitable for license termination. However, under other statutes, the

[1]Under Subpart E to 10 CFR, Part 20, 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, would clarify this issue.

residual radioactivity might be considered to be low level waste (LLW). Classification of the entombed material as LLW would raise issues concerning State and LLW compact legal authority over the entombment. Therefore, States and compacts have authority for disposal of LLW, and may prescribe means for its disposal other than entombment. In addition, some States have prescribed their own criteria for LLW disposal that may not be compatible with those in an entombment rule.

Option 3 -Conduct a rulemaking to establish performance objectives and licensing requirements for an entombed facility.

This option can be characterized as a disposal rather than decommissioning leading to license termination. It would provide for a rulemaking to establish performance objectives and technical requirements under a new or existing part of the regulations for an entombed facility. Relevant requirements established in other existing parts of the NRC regulations (e.g., Part 20, Subpart E, and 10 CFR Part 61) could be incorporated into this rulemaking. These requirements could include, but would not be limited to, overall system performance objectives, institutional controls, including Federal or State ownership, and analyses of the long-term stability of the site. These requirements could also include pathway analysis to demonstrate protection of the average member of the critical group from releases of radioactivity using dose limits, which could include provisions for adequate barriers to prevent inadvertent intrusion. In addition, provisions for engineering features such as barrier controls could be established on a site-specific, license-specific basis. The license could also cover the activities of entombing the radioactive material, operations, and surveillance of controls. Similar to a license under Part 61, the entombed disposal facility would be maintained under an NRC license until the post-closure requirements were met. Since the entombed facility would no longer be a licensed power reactor, but rather a disposal license, this option could apply to other types of NRC-licensed facilities.

This option requires approximately 5 FTE over 3 years to develop a final rule (1.5 from NMSS; 1.0 from RES; 1.0 from OGC; 1.0 from OSTP; and 0.5 from NRR). Contract support for rulemaking development, including development of an EIS and support for four public meetings and/or workshops, is estimated to be $700,000.

Pros:

- This option would allow for on-site disposal of GTCC waste as such waste may only be disposed of at an NRC-licensed facility. It may address a dose analysis period that may be necessary for GTCC waste.

- It may provide a closure approach more acceptable to the public because entombing a large quantity of long-lived isotopes is viewed as more akin to disposal or burial of waste than leaving behind residual material in decommissioning. It could also address other license terminations with large source terms requiring extended periods of institutional controls.

- Because no NRC-licensed power reactors have ever been entombed and given the large potential source term for a power reactor, setting performance objectives and continuation of an NRC license would permit greater confidence that dose criteria would be met.

Cons: ● This option does not terminate the license and may raise questions as to why the radiological dose criteria for license termination alone are not adequate for protecting public health and safety.

● It could require major expenditure of NRC and licensee resources to develop a new part to the regulations and to re-license or convert the facility license and to maintain the NRC license over the period of time during which the license could be retained.

● It may have complex policy implications because NRC has responsibility for licensing GTCC disposal facilities; however, The Department of Energy has overall responsibilities for disposal strategies of GTCC material.

● Classification of the entombed material as LLW would raise issues concerning State and LLW compact legal authority over the entombment. Therefore, States and compacts have authority for disposal of LLW, and may prescribe means for its disposal other than entombment. In addition, some States have prescribed their own criteria for LLW disposal that may not be compatible with those in an entombment rule.

Preferred Options

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

Impacts On Licensees

This rulemaking, as outlined in Options 2 and 3, would give licensees more flexibility for decommissioning power reactors and for option 3, other licensed facilities.

Office of General Counsel Legal Analysis

The Office of the General Counsel has reviewed the Rulemaking Plan and is aware of no bases for legal objection to the processes proposed in any of the three rulemaking options. Each is a legally permissible way to proceed with this contemplated rulemaking. Since the options are, at this stage, essentially conceptual, OGC offers no opinion as to whether a legal issue might arise at a later stage of this rulemaking. If such an issue were to arise, OGC would raise it with the NRC staff at that time.

Paperwork Reduction Act

The Office of the Chief Information Officer has reviewed the rulemaking plan for information technology and information management implications and concurs with the plan. However, if the staff goes forward with rulemaking, the rule would likely have additional reporting requirements that would require review by the Office of Management and Budget (OMB) for information collection requirements.

Agreement State Implementation Issues

The compatibility of the proposed rule parts will be determined in accordance with the NRC's "Statement of Principle and Policy for the Agreement State Program; Policy Statement on Adequacy and Compatibility of Agreement State Programs" approved by the Commission on June 30, 1997 (62 FR 46517).

Supporting Documents Needed

This rulemaking will require an environmental assessment (EA) for option 2 to determine whether an Environmental Impact Statement (EIS) needs to be prepared. The staff has already come to the conclusion that Option 3 will require the preparation of an EIS. The rulemaking will also require a regulatory analysis of the costs and benefits associated with implementation of each of the options. The regulatory analysis would also provide the basis for a determination, under the Regulatory Flexibility Act, that the proposed changes would not have a significant economic impact on a substantial number of small entities. A Regulatory Guide and a Standard Review Plan to support implementation may also be needed. An OMB clearance package would be required to support the change in recordkeeping requirements. Depending on the recommended option selected, additional technical basis work may be necessary. The staff also may develop, for issuance concurrent with the issuance of the final rule, supporting guidance documents for the regulated community and the NRC staff.

Small Business Regulatory Enforcement Fairness Act

In accordance with NRC guidance (Section 5.21 of the NRC "Regulations Handbook," NUREG/BR-0053, Rev. 5, March 2001), the staff will make a recommendation to OMB as to whether the rulemaking constitutes a major rule pursuant to the Small Business Regulatory Enforcement and Fairness Act. The staff will consider further what its recommendation will be once a proposed rule has been developed.

Issuance by Executive Director of Operations or Commission

If the staff goes forward with a rulemaking, it will be forwarded to the Commission for approval because of the potentially controversial nature of this rulemaking.

Resources Needed to Complete Rulemaking

The estimated resources to proceed with rulemaking depend on the option recommended by staff and approved by the Commission. Option 1 would not require any resources. Option 2 would require about 3 FTE and Option 3 would require 5 FTE to complete the rulemaking. These resources will come principally from NMSS, NRR, RES, OGC, and OSTP. More resources may be needed for the environmental review and technical basis development as outlined in the options.

Staff Level Working Group	**Concurring Official**
Stephanie P. Bush-Goddard, NMSS Task Leader, 415-6257 Thomas McLaughlin, NMSS	Martin J. Virgilio

James Kennedy, NMSS	
Jacob Philips, RES	Ashok Thadani
Michael Webb,NRR Carl Feldman, NRR	Samuel Collins
Stephen Lewis, OGC	Stuart Treby
Thomas O'Brien, STP	Paul Lohaus

Management Steering Group

NMSS	Donald Cool John Greeves
NRR	Cynthia Carpenter
RES	Thomas King
OGC	Stuart Treby
STP	Paul Lohaus

Public Participation

This rulemaking will use the website entitled "RuleForum" at http://ruleforum.llnl.gov. This site contains proposed rulemakings that have been published by the NRC, in the Federal Register, and petitions for rulemakings that have been received and docketed by the NRC. Through this website, the public is made aware of and may officially comment on these petitions and proposed rules electronically. Proposed rules and petitions are placed on the website when the comment period opens and are removed shortly after the comment period expires. Background files on proposed rules and petitions are available for viewing or downloading from file libraries. Comments on the proposed rulemakings and petitions can be uploaded, as files, by members of the public in lieu of sending written comments into the NRC.

Schedule

Rulemaking Plan and ANPR to Commission	June 2001
Commission Paper requesting approval of preferred option	5 months after end of comment period on ANPR

Proposed rulemaking package to EDO
(includes an environmental assessment and a regulatory analysis;

an OMB clearance package will be submitted to OMB)	12 months[2] after Commission decision on preferred option
Final Rule to EDO	12 months after end of comment period on proposed rule.

Note: OMB review is required and a clearance package will be forwarded to OMB no later than the date the proposed rule is submitted to the Office of the Federal Register for publication.

[2]This may require additional time to develop the necessary technical basis and environmental impact statement if Option 2 or 3 is selected.