

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.¹ 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

¹Under 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 2.²
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

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

Revised

September 5, 2000

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: Annette Vietti-Cook, Secretary */RA/*

SUBJECT: STAFF REQUIREMENTS - SECY-00-0129 - WORKSHOP
FINDINGS ON THE ENTOMBMENT OPTION FOR
DECOMMISSIONING POWER REACTORS AND STAFF
RECOMMENDATIONS ON FURTHER ACTIVITIES

This is to advise you that the Commission has not objected to the development of a rulemaking plan to address the entombment option for power reactors subject to the comments provided below. The staff should provide the resources necessary to address this matter in a timely manner. The staff should ensure the ACNW is appropriately consulted during the rulemaking process.

(EDO)

(SECY Suspense:

2/1/01)

The staff should closely coordinate this rulemaking with the ongoing efforts to update the generic environmental impact statement for the decommissioning of power reactors. The staff should include the entombment option in the GEIS recognizing that not all entombment proposals can be forecast but that the GEIS would provide a bounding analysis. The staff should also address the issue of entombing Greater Than Class C waste.

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
OGC
CIO
CFO
OCA
OIG
OPA
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)
PDR

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

\checkmark 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: \checkmark 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.

\checkmark 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.

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

\checkmark 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 E¹. 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 indicated 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

¹Under 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: Ž 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.

Ž 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.

Ž 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.

Ž 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

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Thomas McLaughlin, NMSS

Concurring Official

Martin J. Virgilio

James Kennedy, NMSS

Jacob Philips, RES

Michael Webb, NRR
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Thomas O'Brien, STP

Ashok Thadani

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Stuart Treby

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.inl.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 months² 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.

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

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 20 and 50

RIN 3150-AG

Entombment Options for Power Reactors

AGENCY: Nuclear Regulatory Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Nuclear Regulatory Commission (NRC) is considering an amendment to its regulations that would clarify the use of entombment for power reactors. The NRC has determined that entombment of power reactors is a technically viable decommissioning alternative and can be accomplished safely. Current regulations governing decommissioning and license termination require that decommissioning be completed within 60 years of permanent cessation of operations. Completion of decommissioning beyond 60 years will be approved by the NRC only when necessary to protect public health and safety. The regulations also establish dose criteria for license termination that includes a provision that permits license termination under restricted and unrestricted release conditions. This advance notice of proposed rulemaking invites early input from affected parties and the public on the issues surrounding the feasibility of entombment.

DATES: The comment period expires **[insert 75 days after publication]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Mail comments to: The Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff. Deliver comments to: 11555 Rockville Pike, Rockville, Maryland, between 7:30 a.m. and 4:15 p.m. on Federal workdays. You may also provide comments via the NRC's interactive rulemaking website (<http://ruleforum.llnl.gov>). This site provides the availability to upload comments as files (any format), if your web browser supports that function. For information about the interactive rulemaking site, contact Ms. Carol Gallagher (301) 415-5905; e-mail CAG@nrc.gov.

The NRC maintains an Agency wide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. These documents may be accessed through the NRC's Public Electronic Reading Room on the Internet at <http://www.nrc.gov/NRC/ADAMS/index.html>. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737 or by email to pdr@nrc.gov.

FOR FURTHER INFORMATION CONTACT: Stephanie P. Bush-Goddard, Ph. D., telephone (301) 415-6257, e-mail spb@nrc.gov, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

Background

A. Current Rulemakings Related to Decommissioning and License Termination

Current requirements pertaining to decommissioning are contained in 10 CFR Part 50. Specific requirements on decommissioning alternatives were published June 27, 1988 (53 FR 24018). These provisions state that the Commission will terminate a license if it determines that the decommissioning has been performed in accordance with an approved decommissioning plan and that terminal radiation surveys and associated documentation demonstrate that the facility and site are suitable for release for unrestricted release. The Supplementary Information (SI) to the 1988 rule defined three broad decommissioning alternatives: DECON, SAFSTOR, and ENTOMB. The term ENTOMB was defined as the alternative, in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained; and surveillance is continued until the radioactivity decays to a level permitting termination of the license with unrestricted release.

Currently, 10 CFR 50.82(a)(3) requires that decommissioning be completed within 60 years of permanent cessation of operations, and completion of decommissioning beyond 60 years 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 the 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 the presence of other nuclear facilities at the site. In addition, the 1988 rule was structured so that use of any decommissioning option would result in termination of the license for unrestricted use. These requirements tended to favor the use of DECON and SAFSTOR. However, as noted in the SI for the June 27, 1988, final rule, the ENTOMB alternative was not specifically precluded because it was recognized that it might be an allowable alternative in protecting public health and safety.

In 1997, the Commission amended its regulations to establish dose criteria for license terminations. These provisions appear 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 not exceed 0.25 mSv/yr (25 mrem/yr) total effective dose equivalent (TEDE) and be as low as reasonably achievable (ALARA) with the restrictions in place, and, if the restrictions were no longer in effect, the dose due to residual radioactivity could not exceed 1 mSv/yr (100 mrem/yr) (or 5 mSv/yr (500 mrem/yr), if additional conditions are met) TEDE and is ALARA. These caps were chosen to provide a safety net in the highly unlikely event that the restrictions failed.

B. Discussion of the Concept of Entombment

Entombment is an alternative method for decommissioning a power reactor that ultimately results in termination of its license. Before the start of entombment, the reactor permanently ceases operations. The spent fuel is permanently removed from the reactor core and either shipped offsite or stored in an independent spent fuel storage installation. After preliminary decommissioning activities are completed, radioactive contaminants to be left on-

site are placed, or left, in the reactor containment building or other structure. This collection of radioactive materials, their volume and radionuclide characterization, is referred to as the source term.

After the radioactive materials are placed in the containment, the material is entombed by designing and constructing engineered barriers that can reliably isolate the radioactive contaminants from the environment. This can be accomplished by suitable hardening to prevent inadvertent intruder exposures (e.g., use of concrete capping, or fill materials) and mitigation of transport of radionuclides to the environment (e.g., use of soil, added sorption materials, site considerations).

The length of time that the entombed structure must remain effective in isolating its contents depends on specific radionuclides present in the entombed structure and the time necessary for those radionuclides to be reduced, through radioactive decay, to a level that is acceptable for license termination.

For radionuclides Cobalt-60 and Cesium-137 (with half-lives of approximately 5.3 and 30 years, respectively), which are the principal dose contributors for reactors, the time estimated to reach the 0.25 mSv/yr (25 mrem/yr) unrestricted use criterion is about 160 and 300 years, respectively. If the long-lived activation products present in reactor internals were included in an entombed structure, the time of isolation for the long-lived activation products will depend not only on their half-lives but other site specific factors such as engineered barriers and site characteristics.

Specific Proposal

The NRC believes that decommissioning a power reactor using the entombment approach appears to be a safe and viable option for many situations, and that it could offer benefits and greater flexibility to accommodate particular site-specific decommissioning situations. In some cases, reactors may be able to achieve decommissioning through an entombment approach to license termination in accordance with the criteria of the license termination rule in 10 CFR Part 20, Subpart E, and within the 60-year timeframe provided in 10 CFR 50.82(a)(3). However, in other cases, the 60-year provision in § 50.82(a)(3) for completion of decommissioning may need to be revised to reflect the period of time required for reduction in dose to meet the restricted release criteria in 10 CFR Part 20, Subpart E, such that use of an entombment approach may require changes to the regulatory requirements and guidance before this option can be treated as a generic alternative.

Specific Considerations

Before it prepares a proposed rule on the subject, the NRC is seeking advice and recommendations on this matter from all interested persons. Specific areas on which the Commission is requesting comment are discussed in the following sections. Comments accompanied by supporting reasons are particularly requested on the questions contained in each section.

A. REGULATORY FRAMEWORK AND APPROACHES - RULEMAKING OPTIONS

Option 1

Do not conduct rulemaking. 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.

The advantage of this option is that current regulations already permit case-specific Commission approval 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.

The disadvantage of this option is that 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, given the limitations for extending the time period. Therefore, this option results in regulating by exemption. Also 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 resources to process the site-specific exemptions for extension of time. Another disadvantage is that this option does not address the disposition of Greater Than Class C (GTCC) material, which otherwise might need to be disposed of in an offsite disposal facility. Finally, 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 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

Another option would be to conduct rulemaking to consider the need 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 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.

The advantage of this option is that amending 10 CFR 50.82 would provide more flexibility for terminating a license without the need for exemptions or Commission approval of

¹Under 20 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, would clarify this issue.

alternative schedules. It also permits flexibility of requirements for a broad variety of possible situations. This would result in resource savings. The use of engineered barriers would be clarified in the regulations. Furthermore, terminating the license is more efficient and effective compared to retaining a disposal license as proposed by Option 3 below.

The disadvantages of this option are that there may not be a defined time period for license termination and 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. Another disadvantage, as in Option 1, is that it does not address the disposition of GTCC material, which otherwise might need to be disposed of in an offsite disposal facility. Finally, 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 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

A third option would be to 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/oversite, 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. Also, since the facility would no longer be a licensed power reactor, but rather a new license, this option could apply to other types of facilities.

The advantage of this option is that it would allow for on-site disposal of GTCC waste, since such waste may only be disposed of at an NRC-licensed facility. This option would address a dose analysis period that may be necessary for GTCC waste. It might also provide an 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 rather than leaving behind residual material in decommissioning. It could also address other license terminations with large source terms requiring extended periods of institutional controls. Furthermore, because no NRC-licensed power reactors have ever been entombed and given the 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.

A disadvantage of this option is that it 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 also require major expenditures of NRC and licensee resources to write a new part to the regulations and to re-license or convert the facility license. It could also require major expenditures to maintain the NRC license over the period of time during which the license would need to be retained. It may have complex policy implications because NRC's responsibility is to license GTCC disposal facilities; however, DOE has overall responsibilities for disposal strategies of GTCC material. Finally, classification of the entombed material as LLW might raise issues concerning State and LLW compact legal authority over the entombment.

Based on this discussion:

- A.1. Does the existing 10 CFR 50.82(a)(3) provide an adequate basis to allow periods of entombment beyond 60 years. If not, in what way should the regulations be changed?
- A.2. Is 10 CFR Part 20, Subpart E, adequate to achieve license termination using an entombment approach? If not, how and why should this rule be modified?
- A.3. Should entombed facilities be required to maintain some type of NRC license after the facility meets the dose criteria of Part 20, Subpart E? If so, what conditions need to prevail before the license may be terminated? What alternatives might exist for adequately managing the radioactive materials left in the entombed structure?

- A.4. A new part is being considered in the regulations to establish performance objectives and requirements for licensing an entombed disposal facility. Should this option replace Subpart E for purposes of entombment or should a licensee have a choice between using Subpart E approach or the entombed facility license approach? Should the dose based criteria for the entombed facility license be based on Subpart E dose limits? If not, what should be the basis for those limits.
- A.5. Should the entombed facility option be available only to power reactors? If not, under what circumstances should it be applied to other than power reactors?
- A.6. Are there other options that the Commission should consider in developing an approach to entombment that will provide for its viability while maintaining the public health and safety?

B. TECHNICAL FEASIBILITY ISSUES

Part 20, Subpart E (10 CFR 20.1403), allows release of a site under restricted conditions if:

- (a) Institutional controls are in place to limit the dose from residual radioactivity to less than 0.25 mSv/yr (25 mrem/yr) TEDE and is as low as reasonable achievable (ALARA), and
- (b) the radioactivity present has been reduced so that, if the institutional controls were no longer in effect, the dose would be less than 1 mSv/yr (100 mrem/yr) TEDE and is ALARA (5 mSv/yr (500 mrem/yr) is allowed if “durable institutional controls” are used).

Thus, the NRC is considering that approval of a license termination plan for an entombment be based on a site-specific technical evaluation of the entombment's ability to fulfill the requirements of 10 CFR Part 20, Subpart E.

An analysis prepared for the NRC indicates that the most likely way that the entombment engineered barrier might lose its effectiveness may be leakage through the barrier. The ability to ensure that any release would not exceed authorized levels is a function of the design, installation, quality, durability, robustness, etc., of the entombed structure, the environment at hand, and the time needed for the protective function to be performed. Each case must be evaluated on its own merits.

- B.1. To what degree should credit be given to engineered barriers for the purposes of dose reduction to meet the license termination criteria of 10 CFR Part 20, Subpart E?

C. ENTOMBMENT OF GREATER THAN CLASS C (GTCC) WASTE

At the time of permanent cessation of power reactor operations, the reactor vessel's internals contain some long-lived radioactive materials, that result from neutron activation of these materials near the reactor core. One of these radionuclides is Niobium (Nb-94), which has a half life of about 20,000 years. If reactor internals with GTCC concentrations of Nb-94 had to be disposed of offsite, a special facility for their disposal would be required, since they cannot be disposed of in LLW facilities. Also removal of the GTCC waste from the reactor internals is difficult work and results in exposure to occupational workers, but these exposures can be maintained within regulatory limits. In addition, the Low-Level Radioactive Waste Policy

Amendments Act of 1985 provides that GTCC waste resulting from NRC licensed activities may only be disposed of in a facility licensed by the NRC.

Alternatively, it may be possible that case-specific permission might be given to dispose of the reactor pressure vessel (RPV) in an LLW facility based on averaging; i.e., calculating the GTCC waste-volume concentration by using the volume of the RPV in the average. The residual radiation after volume averaging could be classified as LLW.

- C.1. Should material that could be classified as GTCC waste be considered in the entombment approach? Are there circumstances under which residual radioactivity that could be classified as GTCC be allowed to be entombed on site? If so, under what conditions?

D. STATE ISSUES

- D.1. Power reactor licensees are exclusively regulated by the NRC (under 10 CFR Part 50), even in Agreement States. The NRC consults with stakeholders, including Agreement and non-Agreement States, about regulatory actions under consideration that may impact stakeholders. What additional role, if any, should the affected States have in the license termination process based on entombment for power reactors? In addition should an Agreement State be permitted to issue a license for an entombed disposal facility?
- D.2. Under 10 CFR Part 20, Subpart E, the entombment contains material having residual radioactivity and is suitable for license termination if the dose criteria are met. However, under other statutes, such as the LLW Policy Act, the material

might be considered to be low level waste. What issues exist for entombment in a State where existing State legislation prohibits LLW disposal?

- D.3. Are there other issues not covered above, for an entombment that impact Low Level Waste Compacts?
- D.4. If the entombment disposal facility option does not include GTCC waste and the disposal license is issued by an Agreement State, what compatibility² categories, as described in NRC's "Policy Statement on Adequacy and Compatibility of Agreement State Programs," published September 3, 1997 (62 FR 46517), and in NRC's Management Directive 5.9, "Adequacy and Compatibility of Agreement State Programs," should be assigned?

E. FURTHER INFORMATION

- E.1. Please provide any other considerations or rule changes that the Commission should consider to facilitate license termination based on an entombment approach, while maintaining the requisite protection of the public health and safety?

The preliminary views expressed in this document may change in light of comments received. If the proposed rule is developed by the Commission, there will be another opportunity for additional public comment in connection with that proposed rule.

²Compatibility refers to the extent to which Agreement State radiation control programs are consistent with NRC's program for the regulation of Atomic Energy Act radioactive materials to ensure that an adequate and coherent nationwide effort is collectively established for regulation of such materials.

List of Subjects

10 CFR Part 20

Byproduct material, Criminal penalties, Licensed material, Nuclear materials, Nuclear power plants and reactors, Occupational safety and health, Packaging and containers, Radiation protection, Reporting and recordkeeping requirements, Special nuclear material, Source material, Waste treatment and disposal.

10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

The authority citation for this document is: 42 U.S.C. 2201; 42 U.S.C. 5841.

Dated at Rockville, Maryland, this ____ day of _____, 2001.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

Comment from the State of Arkansas

In response to your request for comments transmitted in STP-01-017, dated March 7, 2001, the following information is provided:

1. State and local governments must be involved in the proposed rulemaking process.
2. The NRC must consider State authority and law to regulate the eventual disposal of low level radioactive waste after the "entombment" period. Preemption of State authority must be considered. Future low-level radioactive waste requirements may be "more" or "less" stringent, and adequate decommissioning funds must be assured.
3. Public acceptance of the "entombment" by local residents must be considered. The "entombment" may no longer be considered an asset by the local community.
4. The NRC must consider requirements for perpetual care of the facility, as well as the continuation of the operational environmental programs. Continued interface with State authorities and the exchange of monitoring data must be assured during the "entombment" period.
5. State and local governments must be notified of events affecting the "entombment," particularly any inadvertent releases of radioactive material. Appropriate response actions must be assured.
6. Funding of State and local government continuing activities for the "entombment" period must be assured.

Please contact me if you have questions.

David D. Snellings, Jr., CHP, Director
Division of Radiation Control and Emergency Management
Arkansas Department of Health
501.661.2301

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials
Bureau of Radiation & Hazardous Site Management, Room 460
50 Wolf Road, Albany, New York 12233-7252
Phone: (518) 457-9253 FAX: (518) 457-9240
Website: www.dec.state.ny.us



APR 19 2001

Ms. Stephanie Bush-Goddard
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555

Dear Ms. Bush-Goddard:

Re: ANPR Entombment Options for Power Reactors (STP-01-017)

Thank you for the opportunity to review the Nuclear Regulatory Commission's Advanced Notice of Proposed Rulemaking (ANPR) and the draft rulemaking plan, "Entombment Options for Power Reactors." Several of my staff have reviewed the ANPR, the draft rulemaking plan, SECY-00-0129 and transcripts of the "Workshop for Entombment Options for Power Reactors" held on December 14-15, 1999. We have general comments followed by specific comments which address the questions set forth in the ANPR. I have included these comments as a separate enclosure.

In general, we are opposed to any new NRC rulemaking that would specifically provide for entombment (in situ disposal) of low-level radioactive waste (LLRW) or greater than Class C waste (GTCC) at reactor sites in New York State. Prior to adopting any entombment rulemaking, the Nuclear Regulatory Commission (NRC) must prepare a supplemental environmental impact statement pursuant to the National Environmental Policy Act (NEPA, PL 91-190). It is unclear if "entombment" of nuclear plants aboveground would not be considered segmentation under NEPA - postponing the ultimate disposal of radioactive wastes to an uncertain future date.

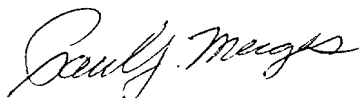
New York State's regulations do not provide for the disposal of GTCC waste within the State. Furthermore, State regulations do not permit the disposal of LLRW in any 100-year floodplains, coastal high hazard areas or wetlands. Also, they do not permit disposal in any areas subject to our New York State Wild, Scenic and Recreational River Systems Regulations. In addition, our seismic-siting criteria for a LLRW disposal site would exclude some nuclear power plant sites.

It is our contention that any anticipated NRC rulemaking that provides for in situ disposal of LLRW at nuclear power reactors is contrary to the intent of the Nuclear Waste Policy Act and if implemented, will adversely impact the financial viability of existing or planned LLRW disposal facilities and state compacts.

Based on our review of this ANPR and supporting documents, this Department would recommend that the NRC choose option "number 1" in the Rulemaking Plan and not undertake any new rulemaking.

Thank you for this opportunity to comment.

Sincerely,

A handwritten signature in cursive script that reads "Paul J. Merges".

Paul J. Merges, Ph.D.

Director

Bureau of Radiation & Hazardous Site Mgt.

Enclosure

JZ/jab PJM-ANPRentombment(3).wpd

NYS Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Radiation & Hazardous Site Management

Comments
On ANPR and Supporting Documents
April 20, 2001

General Comments

Prohibitions on Disposal

The State of New York was actively involved in the siting of a low-level radioactive waste (LLRW) disposal facility during the late 1980's and early 1990's. The New York State Department of Environmental Conservation (NYSDEC) was charged with developing and promulgating regulations which regulate the siting, certification of proposed sites and disposal methods (6 NYCRR Part 382) and the design, construction, operation, closure, post closure and institutional control of such facilities (6 NYCRR Part 383). These regulations were written to be at least as stringent as those found in 10 CFR Part 61. Consistent with that United States Nuclear Regulatory Commission (NRC) rule, our State regulations prohibit the disposal of LLRW in any 100-year floodplains, coastal high hazard areas, and wetlands. Our regulations also prohibit the siting of a disposal facility in any areas subject to the New York State Wild, Scenic and Recreational River Systems Regulations. Most, if not all, of the nuclear power plants in New York State would be located in one or more of these areas. Therefore, entombment, or on-site disposal, of LLRW in those areas would not be permitted.

In addition, our regulations do not provide for the disposal of greater than Class C waste (GTCC) in land disposal facilities and our requirements for concentration averaging are such that this waste would be difficult to reclassify as Class C. GTCC waste is the responsibility of the United States Department of Energy and must be disposed of at a HLW repository. Therefore, entombment of GTCC would not be permitted in New York State.

Impact on the Spirit and Intent of the Nuclear Waste Policy Act

If nuclear power plants implement the entombment option for plant decommissioning in states that do not prohibit such disposal, existing or future LLRW disposal sites may lose a significant portion of their anticipated waste stream. Such a significant loss in waste volume may threaten the economic viability of existing LLRW disposal facilities or preclude the development of any new ones. Should this happen, non-nuclear power plant LLRW generators such as hospitals, universities, state governments and industry may not have an option for waste disposal.

Responsibility for Long-Term Monitoring, Maintenance and Institutional Control

It is unclear what third party (state government, local municipality, other) would be willing to assume the imposing responsibility for the long-term monitoring, maintenance and institutional control required after license termination. It is uncertain whether the licensee would be capable or willing to provide sufficient financial surety that could meet the requirements of NYSDEC's Financial Assurance Requirements (6 NYCRR Subpart 383-6). These regulations require adequate financial assurance to cover the costs for closure, and monitoring and maintenance for the post-closure and institutional control periods. The institutional control period can be no less than 100 years. Would the Federal Government be willing to accept this responsibility in the absence of any other entity? It is also unclear what financial incentives or other offsets could be offered to the community to fully compensate them for hosting a de facto LLRW disposal facility.

Mixed Waste & Hazardous Waste

The United States Environmental Protection Agency's requirements that regulate the disposal of mixed waste and hazardous waste are somewhat different from the NRC's requirements for waste disposal. This important issue was not addressed in the Advance Notice of Proposed Rulemaking (ANPR), the Rulemaking Plan, or the entombment viability study.

Public Reaction

Many states, including New York State, have faced substantial public and political opposition in siting a LLRW disposal facility. This has occurred even though our state requirements (and those of other states) are more stringent than those expressed in 10 CFR 61 and have numerous requirements to ensure the health and safety of local residents.

In light of this, the NRC will face a difficult challenge in adequately explaining to the public the perceived disconnect between the disposal facility siting and waste requirements in 10 CFR 61 and the new proposed rulemaking allowing in-situ disposal (entombment) of LLRW and GTCC waste in geological and geographical sites previously declared unsuitable and unacceptable.

Specific Comments

A. Rulemaking Options

- A.1 Does the existing 10 CFR 50.82(a)(3) provide an adequate basis to allow periods of entombment beyond 60 years.

The existing 10 CFR 50.82(a)(3) does provide an adequate basis to allow periods of entombment in excess of 60 years, provided Commission approval has been granted and only

when necessary to protect public health and safety. This regulation should not be changed, as the 60-year decommissioning timetable places a reasonable upper bound on the time that will be allowed to complete decommissioning. Special action by the Commission should be required if the licensee cannot complete decommissioning within 60 years.

Although much of the discussion in the ANPR details the viability of entombment as a decommissioning alternative, the necessity to implement entombment to protect public health and safety is not addressed. Despite the point made on page eight of the ANPR that, "this (entombment) would result in resource savings for the NRC and licensee," no other benefit to the public, and no benefit due to public health and safety consideration, is mentioned.

Table 1 of Attachment 2, the Richard Smith and Steven Short study from PNNL in May of 1999, shows a projected decrease from 803 person-rem from immediate ENTOMB to 311 person-rem for Delayed ENTOMB. SAFSTOR1 was evaluated to result in 319 person-rem, required institutional control for only 60 years, and cost only 58% of what Delayed ENTOMB cost. The decommissioning worker doses are less for Delayed ENTOMB, but not significantly from the SAFESTOR1 alternative evaluated in this study.

A.2 Is the license termination rule 10 CFR Part 20, Subpart E, adequate to achieve license termination using an entombment approach?

Yes. There is nothing particular in Subpart E that favors one decommissioning alternative over any other. It allows for unrestricted and restricted uses of property following decommissioning. It does not specify in what manner decommissioning must be completed, or when the radiological criteria for license termination must be met.

One element in Subpart E could present a significant, but not insurmountable, obstacle to entombment, if the reactor is decommissioned under restricted conditions. 10 CFR 20.1403(d)(1)(i)(C) specifies that licensees proposing to decommission by restricting use of the site shall seek advice from affected parties regarding whether the institutional controls will impose undue burdens on the local community or other affected parties. Entombment may present unacceptable burdens on the local community due to a permanent waste disposal facility located within the community, undesirable aesthetic impacts, adverse impacts to waterfront revitalization programs, and the inability of the community to return the site to productive use following decommissioning.

A.3 Should entombed facilities be required to maintain some type of NRC license after the facility meets the dose criteria of the license termination rule?

Yes, but there are conflicting federal requirements. If GTCC radioactive waste will remain within the entombment, then current federal law (42 U.S.C. 2021c et seq.) requires the facility be licensed by the NRC.

Sec. 2021c. Responsibilities for disposal of low-level radioactive waste

(b)

(1) *The Federal Government shall be responsible for the disposal of -*

(D) any other low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the Commission for class C radioactive waste, as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on January 26, 1983.

(2) All radioactive waste designated a Federal responsibility pursuant to subparagraph (b)(1)(D) that results from activities licensed by the Nuclear Regulatory Commission under this chapter, shall be disposed of in a facility licensed by the Nuclear Regulatory Commission that the Commission determines is adequate to protect the public health and safety.

However, 10 CFR 61.55(a)(2)(iv) specifies that GTCC waste must be disposed of in a geologic repository as defined in 10 CFR Part 60, unless approved for an alternative disposal method on a case-specific basis by the Commission.

If entombment were to occur without including GTCC waste, the remaining radioactive material should still be licensed and controlled as byproduct material in accordance with 10 CFR Part 30 or LLRW in accordance with 10 CFR Part 61 and applicable State regulations.

A.4 Should a new part being considered in the regulations replace the license termination rule for purpose of entombment or should a licensee have a choice between using the license termination rule approach or the entombment facility license approach?

A new part for the purpose of entombment should not replace the license termination rule, because the license termination rule of 10 CFR Part 20 Subpart E does not specify method or time-period, only the performance-based dose limits that must be met. These limits should be utilized in all license termination cases.

A.5 Should the entombment facility option be available only to power reactors. If not, under what circumstances should it be applied to non-reactor licensees ?

No, if the entombment option is available to power reactors, then it should be made available to non-power reactors as well, since non-power reactors typically have a significantly lower radioactive source term when compared to power reactors.

Under no circumstances should entombment be applied to non-reactor licensees. A foundation of the NRC's argument in favor of the entombment alternative is the significant engineering that was invested in the reactor containment structure. Non-reactor licensees simply do not have the necessary installed structures to enable viable entombment.

A.6 Are there other options that the Commission should consider in developing an approach to entombment that will provide for its viability while maintaining the public health and safety?

In the ANPR, the authors do not consider an entombment alternative between the immediate entombment case and the 130-year delayed entombment. An alternative that works within the 60-year time frame of 10 CFR 50.82(a)(3) should also be considered (50-55 year long safe storage leading up to entombment). This option would lead to a significant drop in the decommissioning worker doses due to the decay of cobalt-60, and to a lesser extent cesium-137 decay, without attempting to reach zero dose. This alternative should be considered in this rulemaking.

Additionally, the Commission could consider the inclusion of chemically engineered barriers in addition to the mechanically engineered barriers discussed in the ANPR. Such chemical barriers could be selected to react with and chemically contain radioactive ions that otherwise might exit the entombment due to mechanical degradation and water infiltration.

Although briefly discussed in some of the supporting documents to the ANPR, the extensive use of aggressive chemical decontamination of reactor internals and electro-polishing should be required to reduce the source term remaining in the entombed waste-form.

B. Technical Feasibility Issue

B.1 To what degree should credit be given to engineered barriers for the purposes of dose reduction to meet the license termination rule of 10 CFR 20, Subpart E?

Engineered barriers are an integral part of the entombment option. To give them no credit for reducing the dose to the public would be illogical. These barriers should be given credit commensurate with the best scientific information available. Estimates of barrier integrity based on computer model predictions that include maximum undetected crack sizes, site-specific rates of corrosion, containment construction particulars, and associated parameters should be valid, as long as an estimate of the modeling uncertainty is also provided.

C. Entombment of Greater than Class C (GTCC) Waste

C.1 Should material, that could be considered GTCC waste, be considered in the entombment approach? Are there circumstances under which residual radioactivity that could be classified as GTCC be allowed to be entombed on site? If so, under what conditions.

No and no. Entombment is merely a reactor decommissioning alternative. It should not be viewed as a solution to national difficulties caused by the United States Department of Energy's inability to properly site and construct a spent nuclear fuel and/or GTCC waste repository. As mentioned in the response to question A.3, federal law currently requires GTCC

waste to be disposed of in a geologic repository, and should not be changed. New York State's regulations on concentration averaging would not allow classifying GTCC waste as Class C. Section 382.80(h)(2) states:

The concentration of radionuclides in discrete objects (such as sealed sources, filters, and metal components containing induced radioactivity) that are encapsulated in solidification agent or matrix must be averaged over the volume of the object, not of the solidification agent or matrix.

D. State Issues

D.1 What additional role, if any, should the affected States have in the license termination process based on entombment for power reactors? Should an Agreement State be permitted to issue a license for an entombed disposal facility?

The states should be considered co-regulators in the entombment license termination process, because the envisioned process will likely rely on the state in order to be successful. Facility monitoring by a state radiation control program to measure environmental releases and verify performance of the entombment is discussed in many of the supporting documents. Some method for ensuring the funding for such a program would have to be worked out between the NRC and the state. In addition, the state can represent local community interests in the decommissioning decision-making process. Once the NRC license is terminated, Agreement States have the authority under state law to license the residual radioactive material.

D.2 What issues exist for entombment in a state where existing State legislation prohibits LLRW disposal?

In New York State, once the radioactive material was no longer controlled by an NRC license, LLRW disposal of this nature would be regulated by Title 6 of the New York Code of Rules and Regulations (6 NYCRR) Part 380, *Rules and Regulations for Prevention and Control of Environmental Pollution by Radioactive Materials*. So long as the entombed facility is licensed by the NRC, it is allowed under Subpart 380-4.1(a)(4). As soon as the license expires or is terminated, the disposal by entombment is disallowed by 6 NYCRR 380-4.1(b), unless:

- (1) a new regulation specifically authorizing entombment is promulgated,
- (2) the entombment is granted a variance from 6 NYCRR Parts 382 and 383, or
- (3) the entombed facility meets the requirements of 6 NYCRR Parts 382 and 383.

D.3 Are there other issues not covered above, for the entombment option that impact Low Level Waste Compacts?

There would likely be a significant economic impact on the LLRW Compact system if entombment is made an acceptable or codified method for nuclear power plant decommissioning. Compacts attempting to site disposal facilities do consider future projections of waste volumes (including significant amounts of power plant decommissioning wastes) in the analysis of the economic viability of the proposed LLRW disposal site. In these analyses, both the activity and the volume of decommissioning wastes from nuclear reactors dominate. Allowing entombment as a decommissioning alternative would likely make it economically unattractive for a single State or small Interstate Compact to site a LLRW disposal facility.

D.4 If the entombment disposal facility option does not include GTCC waste and the disposal license is issued by an Agreement State, what compatibility categories should be assigned?

We recommend Category C, i.e., embody the essential objectives, but allow the state to add requirements and be more stringent.

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY

1035 OUTER PARK DRIVE • SPRINGFIELD, ILLINOIS 62704
217-785-9900 • 217-782-6133 (TDD)

George H. Ryan
Governor

Thomas W. Ortziger
Director

May 8, 2001

Ms. Stephanie Bush-Goddard
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Dear Ms. Bush-Goddard:

On March 7, 2001, the NRC sent "Request for Comments on an Advance Notice of Proposed Rulemaking (ANPR) and a Draft Rulemaking Plan Concerning an Entombment Options for Power Reactors (STP-01-017)" to All Agreement States. It should be obvious that reactor decommissioning is of great interest to the state of Illinois if one considers there are fourteen power reactors located in the state. Illinois' initial comments regarding entombment as a decommissioning method are provided herein along with responses to the specific questions posed.

As proposed in the ANPR notice, entombment as a reactor-decommissioning alternative is problematic. We will resist its implementation and urge its prohibition for numerous reasons including the following:

Lack of Illinois control in decision-making process - Nuclear power stations are licensed by the Nuclear Regulatory Commission. Under the license termination rule, the NRC approves the decommissioning method proposed by the licensee including the amount of residual radioactivity that would remain at the site. The entombment decommissioning method leaves a significant amount of "residual radioactivity." Illinois' standing in the decision-making process as that of an outside party with no control over the final outcome is unacceptable in the context of the possible outcomes of such decisions.

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Long-term restricted land use - Since the site will contain quantities of radioactive material that do not allow the site to be released for unrestricted use, there will always be land use restrictions imposed on the site. These restrictions may be eliminated after the many centuries required for radioactive decay to occur. However, by the time that happens, the structural integrity of the containment building may have degraded such that it represents a safety hazard. Also, having these containment structures remain on the Illinois landscape and horizon in perpetuity is an unacceptable land use.

Requires a custodial agent - Since the site will have restrictions associated with its future land use, the decommissioning plan needs to identify an agent to monitor and maintain the site following license termination. For a closed, licensed low-level radioactive waste (LLRW) disposal facility, that is expected to be the state or federal government. For an entombed reactor, it is suggested that the custodial agent could be a non-governmental organization. The logic of allowing this is inconsistent with the FEIS for 10 CFR Part 61. The NRC until now has assumed that states could only be relied on for 100 years to providing institutional control. It is inconsistent to now assume that a non-governmental entity could provide institutional control for the centuries required before the site could be released for unrestricted use. It is also presumptuous to assume that the state would be willing to assume this task and long-term liability.

Inconsistent waste management policy - Contamination left behind at a decommissioned site is generally considered "residual contamination". This term implies that the contamination is minimal and removal would have been cost prohibitive. Leaving behind the reactor pressure vessel, steam generators, pumps, piping and turbines cannot rationally be considered residual contamination. It is clearly disposal of radioactive waste. Implying that it is not is arrogant elitist semantic manipulation.

The federal government has established policies regarding the disposal of LLRW. States are required by the federal Low-Level Radioactive Waste Policy Act of 1980 and the Amendments Act of 1985 to provide for the disposal of LLRW generated within their states. States were encouraged to form regional compacts to limit the number of disposal facilities created. As an incentive to form compacts, compacts were given certain rights to limit the import or export of LLRW into or from their region as well as to establish policies regarding the management of LLRW within the region. Allowing the NRC to determine where

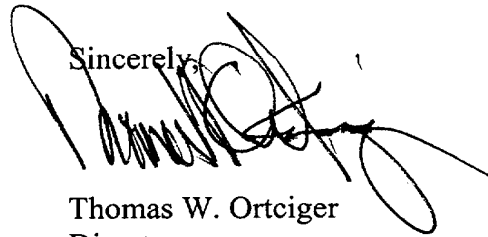
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LLRW will be disposed in a state or region is inconsistent with this waste management framework and unacceptable to the State of Illinois. Illinois, as an Agreement State, has regulatory authority over the disposal of LLRW in Illinois which we contend is no different than reactor entombment as described.

It is inappropriate for the NRC to be licensing decommissioning activities at a nuclear power station in an Agreement State especially if the result is to dispose of LLRW at the site under the guise of an entombment policy. It is understandable that the NRC licenses the plants while there is fuel in the reactor and the potential for criticality exists. However, once the fuel is removed, the Agreement States should license the decommissioning activities. The NRC has little if any, accountability to the citizens of Illinois. It should not be making the long-term land use decisions made during decommissioning. The state of Illinois should be making those decisions.

Attached are responses to the specific questions posed in the notice. Any questions you may have regarding this letter may be directed to me at 217-785-9868.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas W. Ortziger', written over the word 'Sincerely,'.

Thomas W. Ortziger
Director

TWO:bac

Attachment

Response to the Specific Questions Asked in STP-01-017 ANPR for Reactor Entombment as a Decommissioning Method

- A.1.** Does the existing 10 CFR 50.82(a)(3) provide an adequate basis to allow periods of entombment beyond 60 years. If not, in what way should the regulations be changed?

The referenced regulation states:

“(3) Decommissioning will be completed within 60 years of permanent cessation of operations. Completion of decommissioning beyond 60 years will be approved by the Commission only when necessary to protect public health and safety. 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 operations 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.”

If entombment were a viable decommissioning option, the regulation can be interpreted as stating that the entombment activities must be completed within 60 years of the permanent cessation of operations. The waste would obviously remain in perpetuity.

- A.2.** Is the license termination rule 10 CFR Part 20, Subpart E adequate to achieve license termination using an entombment approach? If not, how and why should this rule be modified?

It appears that the requirement in Subpart E to reduce residual radioactivity to ALARA levels would intuitively prohibit the use of entombment as a reactor-decommissioning alternative. Subpart E is deficient for use in licensing any decommissioning activity in that it does not specify the length of time period needed for compliance with the dose limits. While placing all the contaminated material in the containment structure may meet the dose limits in the near-term, it may not in the long-term. Given that the waste material will never be removed, the integrity of the containment structure will only degrade over time thereby allowing the increased potential for release of radioactive material to the environment.

- A.3.** Should entombed facilities be required to maintain some type of NRC license after the facility meet the dose criteria of the license termination rule? If so, what conditions need to prevail before the license may be terminated? What alternatives might exist for adequately managing the radioactive materials left in the entombed structure?

The ANPR was not specific, nor is Subpart E, as to what form the “legally enforceable institutional controls” would take. Given the uncertainty of those agreements and the potential that the regulation could allow for a responsible party that is not a governmental agency, some means to regulate the institutional control period is required. Without a license and some regulatory authority to enforce the license conditions, there is no reliable mechanism to ensure the provisions of the “legally enforceable institutional controls” are being complied with. However, in our view this means NRC intends to license LLRW disposal facilities in Illinois, which is unacceptable.

- A.4.** A new part is being considered in the regulations to establish performance objectives and requirements for licensing an entombment disposal facility. Should this option replace the license termination rule for purpose of entombment or should a licensee have a choice between using the license termination rule approach or the entombment facility license approach? Should the dose criteria for the entombment facility license be based on the license termination rule dose limits? If not, what should be the basis for those limits.

The regulatory framework for terminating a facility’s license should be consistent whether the decommissioning activity is taking place under the license termination rule or an entombment approach. Both methods must be equally protective of the public health and safety. Dose criteria for reactor entombment should be just as protective as the regulations governing the disposal of LLRW. Additional requirements for preventing excessive doses due to inadvertent intrusion should be included (which may preclude the entombment of GTCC wastes).

- A.5.** Should the entombment facility option be available only to power reactors? If not, under what circumstances should it be applied to non-reactor licensees?

The entombment option should not be available to power reactors. Nor should it be available to non-reactor licensees. To do so would result in the unfettered proliferation of radioactively contaminated sites. This is clearly contrary to the intent of Congress in its adoption of the Low-Level Radioactive Waste Policy Act which encouraged the formation of regional compacts to limit the number of LLRW disposal facilities.

- A.6.** Are there other options that the Commission should consider in developing an approach to entombment that will provide for its viability while maintaining the public health and safety?

While entombment may be able to provide for the public health and safety, it does nothing to provide for the public confidence and trust. Anytime land is sacrificed because of expediency, the public loses confidence in the regulatory agencies that allow that to happen. Rather than having up to 14 entombed reactors in the state of Illinois, it makes much greater sense to have one LLRW disposal facility that is sited, designed, operated and closed with one purpose in mind, that being safely isolating the waste from the environment. Allowing wastes to be disposed (or entombed) in a location that doesn't meet the same siting criteria as a disposal facility is, unacceptable, logically inconsistent, and destroys the public confidence in the regulatory framework.

- B.1.** To what degree should credit be given to engineered barriers for the purposes of dose reduction to meet the license termination criteria of 10 CFR Part 20, Subpart E?

Engineered barriers should be given the same credit as the engineered barriers in a LLRW disposal facility. The projected longevity of those engineered barriers should take into consideration the increased degradation caused by continual exposure to the atmosphere.

- C.1.** Should material, that could be classified as GTCC waste, be considered in the entombment approach? Are there circumstances under which residual radioactivity that could be classified as GTCC be allowed to be entombed on site? If so, under what conditions?

Absolutely not. The NRC determined in developing the Part 61 regulations that GTCC waste was not suitable for near-surface disposal. Any potential incorporation of GTCC in an entombed reactor or a LLRW disposal facility should be considered on a case-by-case basis rather than a wholesale provision in the regulations.

- D.1.** Power reactor licensees are exclusively regulated by the NRC (under 10 CFR Part 50), even in Agreement States. The NRC consults with stakeholders, including Agreement and non-Agreement States, about regulatory actions under consideration that may impact stakeholders. What additional role, if any, should the affected States have in the license termination process based on entombment for power reactors? In addition should an Agreement State be permitted to issue a license for an entombed disposal facility?

It is not clear whether NRC has fully thought through the enormous ramifications of its proposal. NRC's query of whether Agreement States should have any more than a consultative role in the creation of LLRW Disposal sites in 24 Agreement States throughout the country indicates that it has not.

NRC should be mindful that the Atomic Energy Act's mandate that NRC retain authority and responsibility with respect to regulation of the construction and operation of nuclear power plants does not include disposal of LLRW generated at nuclear power plants. 42 USCA 2021 (c)(1). The overwhelming preponderance of the LLRW generated in the United States (by both volume and radioactivity) is, of course, generated at nuclear power plants and is disposed of at sites licensed by Agreement States. Furthermore, in an Agreement State, it is currently the Agreement State, not the NRC that has jurisdiction over disposal of LLRW at reactor sites. Reasserting NRC's Authority for Approving Onsite Low-Level Waste Disposal in Agreement States, Withdrawal of Proposed Rule. 61 Fed. Reg. 26852 (1996).

It is beneath the NRC to engage in the semantical charade of denominating long-term isolation of reactor waste as anything other than disposal. The Agreement States' authority to license disposal of LLRW at reactor sites includes authority over entombment of LLRW. Any attempt by the NRC to repeal Agreement State authority under the pretext of merely licensing the decommissioning of commercial nuclear power reactors is virtually guaranteed to be vehemently imposed by Agreement States. If it is the NRC's objective to assert permanent federal control and responsibility over reactor sites, using those sites as a multitude of sacrifice areas throughout the United States, IDNS submits that NRC should make its proposal to Congress for a full and vigorous national debate. It is inconceivable that an entombed reactor could be released for unrestricted use. Who would NRC have manage the disposal sites, the National Park Service?

D.2. Under 10 CFR Part 20, Subpart E, the entombed material is considered residual radioactivity and suitable for license termination if the dose criteria are met. However, under other statutes, such as the LLW Policy Act, the material might be considered to be low level waste. What issues exist for entombment in a State where existing State legislation prohibits LLRW disposal?

There are currently ten interstate compacts adopted under authority of the Low-Level Radioactive Waste Policy Amendments Act. The compacts have been approved by Congress and their provisions have the force of federal law. The compacts cannot be amended or repealed by administrative rule of the NRC.

Illinois and Kentucky are the party states to the Central Midwest Interstate Low-Level Radioactive Waste Compact (CMC). Several provisions of the CMC would prohibit NRC's licensing of low-level radioactive disposal under the guise of entombment at power reactor sites in Illinois.

First, Illinois and Kentucky created the compact for several purposes. Among the purposes were to limit the number of facilities required to manage LLRW generated in the region effectively and efficiently and to ensure the ecological and economical management of LLRW, including the prohibition of shallow-land burial of waste. Disposal of LLRW at 14 entombed reactors throughout the state would neither limit the number of disposal facilities nor avoid shallow-land burial of waste.

Second, an entombed reactor site would not qualify as a "regional facility" because an entombed reactor site would not have been created by a party state pursuant to designation of that state as a host state by the CMC Commission. Entombment would, however, clearly fall within the CMC's definition of disposal, which is "isolation of waste from the biosphere in a permanent facility designed for that purpose." Disposal of LLRW at a facility other than a regional facility without approval of the CMC Commission is a violation of the compact.

Third, each party state to the compact is required to prescribe and enforce penalties for violations of any provisions of the compact. To fulfill this responsibility, Illinois enacted the Radioactive Waste Compact Enforcement Act. Under that Act, disposal of LLRW at a facility other than a regional disposal facility without approval of the CMC Commission is subject to a fine of \$100,000 per occurrence. A person who intentionally engages in such disposal is subject to a class 4 felony.

Fourth, as the host state for the CMC region, Illinois is responsible for developing a regional disposal facility for all generators in the region, not just nuclear power plants. Entombment of power reactor waste may satisfy the needs of the power plants but it does nothing to provide disposal capacity for non-reactor generators, including all of the generators in the Commonwealth of Kentucky. Development of a disposal site without funding for the waste from the nuclear power plants is economically impossible.

D.3. Are there other issues not covered above, for the entombment option that impact Low Level Waste Compacts?

The state of Illinois has conducted economic modeling of a proposed LLRW disposal facility to project disposal costs and determine the most economical timeframe for developing the regional disposal facility. We determined that it is

not economical to develop a regional facility until the nuclear power stations are decommissioned. This is when the waste volumes will increase and economically support the development of the facility. If these decommissioning waste streams were entombed rather than shipped for disposal, it may never be economical to develop a disposal facility. This could drastically impact all LLRW generators should there be no other disposal options available.

D.4. If the entombment disposal facility option does not include GTCC waste and the disposal license is issued by an Agreement State, what compatibility categories, as described in NRC's "Policy Statement on Adequacy and Compatibility of Agreement State Programs," published September 3, 1997 (62 FR 46517), and in NRC's Management Directive 5.9, "Adequacy and Compatibility of Agreement State Programs," should be assigned?

Compatibility level C should be assigned.

E.1. Please provide any other considerations or rule changes that the Commission should consider to facilitate license termination based on an entombment approach while maintaining the requisite protection of the public health and safety?

The Commission should take this opportunity to eliminate the entombment option for facility decommissioning. Disposing of waste in the containment structure at the nuclear power station does not make sense from a public policy standpoint. Allowing it would only increase the number of radioactively contaminated sites across the country. It is better public policy to limit the number of disposal facilities.

In addition, the nuclear power generators are collecting funds to cover the decommissioning of their stations. The funding level is based on decommissioning for unrestricted release. Entombing the waste will be significantly cheaper. What is the NRC proposing to do with the excess decommissioning funds? Would they be returned to the ratepayers who paid them in the first place, or would they represent a sudden economic windfall for the utility? It appears this rulemaking is driven by economics rather than sound public policy.