

RULEMAKING ISSUE NEGATIVE CONSENT

October 25, 2002

SECY-02-0191

FOR: The Commissioners

FROM: William D. Travers */RA/*
Executive Director for Operations

SUBJECT: STATUS OF THE ENTOMBMENT OPTION FOR POWER REACTORS

PURPOSE:

To inform the Commission that the staff plans to defer rulemaking to permit entombment as an option for power reactors until completion of research studies on entombment viability issues (e.g., entombed structure performance, source term development and flow and transport modeling), unless directed otherwise by the Commission. This paper describes: (1) the staff's actions since publication of the Advance Notice of Proposed Rulemaking (ANPR) on entombment; (2) a summary of the comments received in response to publication of the ANPR; and (3) the staff's rationale for the recommendation.

BACKGROUND:

The Commission's decommissioning requirements for power reactors are contained in 10 CFR 50.82, which was published in 1988 (53 FR 24018, June 27, 1988). Section 50.82(a)(3) requires that decommissioning be completed within 60 years of permanent cessation of operations. The Commission may approve completion of decommissioning beyond 60 years if it determines that this is necessary to protect public health and safety. In making this determination, the Commission would consider the unavailability of waste disposal capacity and other site-specific factors affecting the licensee's capabilities to carry out decommissioning, including the presence of other nuclear facilities at the site. As noted in the "Supplementary Information" to the 1988 rule, the entombment alternative was not specifically precluded in the rule, because there could be instances in which entombment might be an allowable alternative in protecting public health and safety.

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In 1997, the Commission amended its regulations to establish dose criteria for license termination (62 FR 39058 July 21, 1997). These requirements are in Subpart E of 10 CFR Part 20 and include a provision that permits license termination under restricted-release conditions. Under these requirements, the dose to the average member of the critical group must not exceed 0.25 milliSievert/yr (25 millirem/yr) total effective dose equivalent (TEDE) and be as low as reasonably achievable (ALARA) with the restrictions in place. If the restrictions were no longer in effect, the dose due to residual radioactivity must not exceed 1 mSv/yr (100 mrem/yr) or 5 mSv/yr (500 mrem/yr) TEDE and be ALARA. These limits were chosen to provide a safety margin in the highly unlikely event that the restrictions failed.

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 concluded that entombment appeared to be a viable decommissioning option. The staff provided information on the technical viability of entombment in SECY-99-187, "Information Paper on the Viability of Entombment as a Decommissioning Option for Power Reactors," dated July 19, 1999.

The U.S. Nuclear Regulatory Commission (NRC) held a workshop on December 14 and 15, 1999, to solicit stakeholder views on the technical bases, issues, and options for treating entombment equally with the other decommissioning alternatives. Findings from the workshop were transmitted to the Commission in SECY-00-0129, "Workshop Findings on the Entombment Option for Decommissioning Power Reactors and Staff Recommendations on Further Activities," dated June 22, 2000. In a Staff Requirements Memorandum (SRM) for SECY-00-0129, dated July 20, 2000, and revised on September 5, 2000, the Commission directed the staff to develop a rulemaking plan to address the entombment option for power reactors.

In SECY-01-0099, "Rulemaking Plan and Advance Notice of Proposed Rulemaking: Entombment for Power Reactors," dated June 1, 2001, the staff provided the Commission with a rulemaking plan and an ANPR. The rulemaking plan contained three options. Option 1 was to not conduct rulemaking and maintain the status quo, and handle entombment requests on a case-by-case basis. Option 2 was to conduct rulemaking amending 10 CFR 50.82 to increase the time frame for completion of decommissioning beyond 60 years, and to clarify the use of engineered barriers for reactor entombments.¹ Option 3 was to conduct rulemaking to establish a new regulation containing performance objectives and licensing requirements for entombed facilities as a disposal option useable by all NRC licensees. The disposal facility would be maintained under an NRC license and would permit termination of the Part 50 license.

¹Under 10 CFR Part 20, Subpart E, engineered barriers may or may not be considered institutional controls depending on the need for, and the degree of, human involvement required to maintain their effectiveness. Option 2, unlike Option 1, would clarify this issue.

The ANPR was published in the Federal Register on October 16, 2001, and solicited stakeholder input in five areas which can be summarized as follows:

1. Whether the existing NRC regulations were adequate to support entombment, and if not, what changes were needed to support entombment;
2. What the views were on the criteria and capability needed for credible engineering barriers used in an entombed facility;
3. What the views were on whether greater than class C waste (GTCC) should or should not be included in an entombed facility;
4. What the role of the Agreement States should be regarding an entombed facility; and
5. Whether licensees would take advantage of the entombment option, and if so, when they would do so.

DISCUSSION:

The ANPR comment period closed on December 31, 2001. NRC received 19 comments from: six States; eight licensees; the Nuclear Energy Institute (NEI); the U.S. Environmental Protection Agency (EPA); the Conference of Radiation Control Program Directors' E-24 Committee on Decommissioning and Decontamination (CRCPD E-24 Committee); the Southeast Compact Commission (SCC); and a private individual.

Generally, the eight utilities and NEI stated that they would like to have entombment available as a decommissioning option; however, none unequivocally committed to using entombment in their decommissioning process. Some utilities noted that their decommissioning choices would be based on cost and availability of low level waste (LLW) disposal sites. Some licensees noted that although increasing the period for decommissioning beyond the current 60-year time limit would provide them more flexibility, they believed that Part 20 provided the necessary regulatory guidance for an entombed facility. Two states, New York and Illinois, opposed any rulemaking that would specifically provide for entombment. Some licensees also stated a preference for NRC oversight for entombed facilities, with no State involvement or co-regulation.

Some Agreement State commenters also endorsed the Part 20 dose limits, with one State adding that a time limit to reach the dose rates should be considered. One State advocated extending the decommissioning period beyond 60 years, but most were silent on the decommissioning regulations in Part 50.

EPA observed that NRC's 1988 Generic Environmental Impact Statement dismissed entombment as not viable because of concerns about structural integrity over time. Although EPA did not endorse any of the three options, it expressed concern about the isolation of non-NRC-licensed contaminants, and their potential impact on the environment, and recommended that entombment be considered an option of last resort.

The CRCPD E-24 Committee also did not endorse any of the three options. It stated that each decommissioning situation was unique and that NRC should seek an opinion from each State separately.

SCC generally supported the concept of entombment but noted that entombing power reactors might have an adverse economic impact on LLW compact disposal sites. This, in turn, could limit the ability of other LLW generators in the compact to dispose of their radioactive waste. Views on the disposition of GTCC waste varied. Although no clear consensus was identified, a majority of commenters suggested excluding GTCC waste from entombment since the U.S. Government has the legislative responsibility for disposal of GTCC waste. New York reported that storage of GTCC is prohibited in its State by law.

Commenters generally agreed that NRC should more clearly define the performance criteria and technical capabilities of engineered barriers, to support an entombed facility, whether the regulations were revised or not. A more detailed summary of the comments received in response to the ANPR is contained in the Attachment.

The staff notes that there was no consensus on a preferred option. Commenters raised a number of technical issues, as well as the issue of whether DOE would be disposing GTCC, that need resolution before entombment is pursued. No commenter unequivocally committed to using the option if NRC made it available. In addition, the Electric Power Research Institute (EPRI) is currently evaluating storage issues related to GTCC waste; issues being considered include, but are not limited to doses from reactor internal components. EPRI expects the results of these analyses to be available in FY 2003. NRC staff believe that this information could be of great benefit.

Although 10 CFR 50.82 does not explicitly permit entombment, it does not preclude it. A licensee wishing to pursue entombment could do so under existing regulations. At present, the Office of Nuclear Regulatory Research (RES) is working to evaluate entombed structure performance over long periods of time. This work is scheduled for completion in 2005.

CONCLUSION:

Given the number and content of the comments on the ANPR, the fact that no licensee has unequivocally committed to pursuing entombment in the foreseeable future, the apparent issues regarding GTCC waste, and the current NRC priorities, the staff plans to defer further action on rulemaking to address entombment. The staff believes that it would be prudent to have RES complete its research to develop the technical basis before further rulemaking activity continues. By that time, the results of EPRI's evaluation of GTCC waste should also be available. The staff will continue to develop the technical bases for entombment and to discuss entombment as a decommissioning option with NRC stakeholders through industry-sponsored conferences.

In addition, the staff notes that NMSS is currently pursuing a number of high-priority initiatives. Examples include, but are not limited to: support for the Office of Nuclear Safety and Incident Response in security and safeguard initiatives and licensing of a mixed oxide fuel fabrication facility which will be significant to the nation's non-proliferation interests. As noted in

SECY-01-0099, Option 2 would require approximately three full-time equivalents (FTE) over two years to develop a final rule. The staff believes that these FTEs could be better used on higher priority initiatives.

AGREEMENT STATE COORDINATION:

A draft of this Commission paper was provided to the Agreement States for review and comment on August 28, 2002. No comments opposing the NRC's proposed action were received.

As previously noted, NRC had requested input from stakeholders on options related to entombment through an ANPR. As noted in the attachment, a number of Agreement States stated opposition to the option of entombment for a variety of reasons.

COORDINATION:

The staff briefed the Advisory Committee on Nuclear Waste (ACNW) on the staff recommendations on June 19, 2002. ACNW did not identify any concerns with the staff's proposed approach. The Office of the General Counsel has no legal objection to the content of this paper. The Office of the Chief Financial Officer has reviewed this Commission Paper for resource implications and also has no objections.

RECOMMENDATION:

Unless otherwise directed by the Commission within 10 days, the staff plans to defer further action on rulemaking to address entombment. Action will not be taken until the SRM is received. We consider this action to be within the delegated authority of the EDO.

/RA/

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Executive Director
for Operations

Attachment: "Staff Analysis of Advance Notice of Proposed Rulemaking Comments For Entombment of Power Reactors"

STAFF ANALYSIS OF ADVANCE NOTICE OF PROPOSED RULEMAKING COMMENTS FOR ENTOMBMENT OF POWER REACTORS

INTRODUCTION

In SECY-01-0099, "Rulemaking Plan and Advance Notice of Proposed Rulemaking: Entombment for Power Reactors," dated June 1, 2001, the staff sent the Commission a rulemaking plan and an Advance Notice of Proposed Rulemaking (ANPR). The rulemaking plan contained three options. Option 1 was to not conduct rulemaking, maintain the status quo, and handle entombment requests on a case-by-case basis. Option 2 was to conduct rulemaking, amending 10 CFR 50.82 to increase the time frame for completion of decommissioning beyond 60 years, and to clarify the use of engineered barriers for reactor entombments.¹ Option 3 was to conduct rulemaking to establish performance objectives and licensing requirements for entombment as a disposal option for all U.S. Nuclear Regulatory Commission (NRC) licensees. Option 3 would also permit termination of the 10 CFR Part 50 license.

The ANPR was published in the Federal Register on October 16, 2001 (66 FR 52551). The ANPR comment period closed on December 31, 2001. NRC received 19 comments from: six States; eight licensees; the Nuclear Energy Institute (NEI); the U.S. Environmental Protection Agency (EPA); the Conference of Radioactive Control Program Directors' Committee on Decommissioning and Decontamination E-24 (CRCPD E-24 Committee); the Southeast Compact Commission (SCC), and a private individual.

The ANPR solicited stakeholder input in five areas that can be summarized as follows:

- A. Whether the existing NRC regulations were adequate to support entombment, and if not, what changes were needed to support entombment (six questions);
- B. What the views were on the criteria and capability needed for credible engineering barriers used in an entombed facility (one question);
- C. What the views were on whether greater than class C waste (GTCC) should or should not be included in an entombed facility (one question);
- D. What the role of the Agreement States should be regarding an entombed facility (four questions); and
- E. Whether licensees would take advantage of the entombment option, and if so, when they would do so (two questions).

Questions for each area and a summary of the comments received for each question follow:

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

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?

Comment Summary:

Nine commenters responded directly to question A.1 from the ANPR. Six commenters (Entergy, Southern Nuclear Operating Company (SNC), Exelon, GPU Nuclear, NEI, and Florida) agreed that the regulation should be changed to modify the 60-year limit in the regulation for the entombment option. Two commenters (South Carolina Electric and Gas (SCE&G), and Illinois) were against changing the regulation, stating that it was adequate as written to deal with entombment. Two states, New York and Illinois, opposed any new rulemaking that would specifically provide for entombment.

Those that agreed that the regulation should be changed believed that the 60-year limit in the existing regulation needed to be changed to allow for more flexibility when applied to the entombment option. They believed the regulation should allow for an extended period beyond the 60-year period and the regulation should emphasize that entombment is a viable option and not precluded, as noted in the Supplementary Information of the 1988 rule. Entombment should be allowed irrespective of the availability of other low level waste (LLW) disposal options.

Those that disagreed that a rule change was necessary believed the current regulation is adequate for addressing the entombment option. One commenter (New York) felt the 60-year regulatory limit was a reasonable upper bound for decommissioning a facility.

Staff View:

The staff agrees that extending the 60-year time limit for decommissioning would provide more flexibility for licensees. The staff also notes that existing regulations do not explicitly preclude an entombment option. Under existing regulations, NRC would have to address a request for entombment on a case-by-case basis and consider the need for exemptions. It is unclear whether utilities would pursue entombment as a long-term storage option or as a disposal option; however, if a number of licensees opt to pursue entombment, NRC should revise the regulations in the future to extend the decommissioning period and address entombment. However, to do this, NRC would need to develop a sufficient technical basis to support a performance-based regulatory framework for an entombed facility.

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?

Comment Summary:

All commenters who responded to this question directly, with the exception of Illinois, stated that Part 20 was adequate for license termination using entombment. One commenter (Entergy) stated that the existing NRC license should remain in effect to provide assurance that the site is adequately monitored using institutional controls and contingency provisions. Another commenter (SNC) stated that guidance should be provided regarding credit for engineered barriers for demonstration of compliance with Subpart E. One commenter (NEI) identified a need for dose modeling guidance to

demonstrate compliance with 10 CFR 20, Subpart E. One state (New York) was concerned about whether entombment presented “unacceptable burdens on the local community due to a permanent waste disposal facility located within the community.” Another state (Illinois) stated 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.” Illinois further stated that “ 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. . . .”

Staff View:

The staff believes that Part 20, Subpart E is a performance-based regulation and is adequate for decommissioning activities. For entombment, the staff believes that credit may be given to engineered barriers based on performance modeling and analysis of monitoring data for the entombed facility. NRC must develop criteria for adequate institutional controls and engineered barriers for the appropriate surveillance and monitoring of an entombed facility. The staff believes that the site radiological dose criteria defined in Part 20, Subpart E requirements provides sufficient protection for the environment and the public.

The staff also believes that although there is no time limit for achieving compliance, the regulations are based on risk-informed, performance-based criteria that are appropriate for decommissioning activities and sites.

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?

Comment Summary:

Most commenters agreed that if existing requirements of Part 20, Subpart E for unrestricted release were met, then no other type of NRC license would be needed. One State (Illinois) raised questions about institutional controls. Two States (New York and Florida) raised concerns about the impact, on State regulations, of leaving GTCC waste in an entombed facility. New York State law precludes disposal of GTCC within the State.

Staff View:

The staff agrees with the commenters that Part 20, Subpart E is adequate if requirements for unrestricted release are met. The issue of GTCC waste is addressed in the question on GTCC waste later in this summary.

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.

Comment Summary:

Nine commenters responded directly to this question. Six commenters (Entergy, SNC, NEI, Exelon, Florida and New York) believed that a new part is not needed and that there is no need to establish separate performance objectives for entombed facilities at the time of license termination. However, most believed that guidance should be developed to establish the exposure scenarios (e.g., intruder), which must be evaluated in order to demonstrate compliance with the license termination rule (LTR).

One State (Illinois) believed the regulatory framework for terminating a facility's license should be consistent whether the decommissioning activity is taking place under the LTR 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 LLW. Additional requirements for preventing excessive doses because of inadvertent intrusion should be included (which may preclude the entombment of GTCC wastes).

One licensee (SCE & G) believes a new part should consider the transfer of authority to an Agreement State and termination of the NRC license. However, another licensee (GPU Nuclear) believes that Subpart E and an entombed facility license approach need not be mutually exclusive. An acceptable option could be developing an entombed facility license approach, which uses Subpart E as the criteria for determining when the license can be terminated.

Staff Analysis:

The staff agrees that a new part is not necessary to address the approval of licensed facilities. Specifically, Part 20, Subpart E, and 10 CFR 50.82, with some revision, can provide the regulatory requirements for an entombed facility. This approach would use consistent dose-based acceptance criteria for an entombed facility.

The staff also agrees that performance criteria and facility design basis requirements are needed for entombed facilities. To that end, NRC should conduct research to develop sound technical bases for a performance-based regulatory framework for such facilities.

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?

Comment Summary:

Two commenters (NEI and Entergy) believe that entombment should be available to any licensee that can meet the requirements for an entombed facility. NEI notes that this should include demonstrating its financial capability to maintain the facility. One State (New York) believed that this option should be available to non-power reactors, but not to non-reactor licensees.

One State (Illinois) is opposed to the use of entombment by any licensee. One State (Florida) believes that entombment should only be available to power reactor licensees.

One licensee (Exelon) stated that if engineered barriers are appropriately defined and the necessary financial assurances are implemented, then other types of radioactive facilities could conceivably use entombment as a decommissioning method.

Staff Analysis:

The staff believes that NRC reactor licensees, both power and non-power, should be permitted to have the entombment option available for decommissioning their facilities. To support this, NRC should conduct research to create the technical basis for a performance-based regulatory framework for reactor facilities. At a later date, NRC may wish to determine whether non-reactor licensees wish to have entombment available as a facility decommissioning option.

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?

Comment Summary:

Four commenters (SNC, Florida Power and Light, Exelon, and Florida) had no additional suggestions. Three commenters (Entergy, New York, and NEI) advocated a variation of the entombment option with varying time limits for decommissioning. New York noted that decommissioning within the existing 60-year time limit should also be considered (50-55 year-long safe storage leading up to entombment). New York also noted that the Commission could include chemically engineered barriers in addition to the mechanically engineered barriers discussed in the ANPR. Illinois stated that entombment of the 14 power reactors in Illinois would have a negative impact on public confidence and trust.

One commenter (SCE&G) suggested decommissioning the nuclear reactor site by entombment to the “brown-field” condition and then having the Agreement States license and oversee the site.

EPA suggested that NRC consider establishing institutional control and monitoring requirements similar to those of LLW disposal sites. EPA noted that NRC should define groundwater monitoring and corrective action requirements to ensure that radiological and non-radiological contaminants do not leach into the environment. EPA also noted that storage of non-NRC-licensed contaminants at the site could require permits from other Federal and State agencies and expressed concern regarding the isolation of non-NRC-licensed contaminants and their potential impact on the environment. EPA recommended that entombment be considered an option of last resort.

Another commenter (GPU Nuclear) noted that Section 151(b) of the Nuclear Waste Policy Act of 1982 provides a process for DOE to assume responsibility for long-term maintenance and monitoring of low-level radioactive waste after license termination. This commenter suggested that a similar process could be established for DOE to assume the responsibility for ongoing monitoring of a reactor site after license termination.

Other commenters provided recommendations on future aspects of entombment of power reactors and issues of public confidence and trust. For example, Entergy suggested that NRC should establish and identify criteria for the next generation of reactors.

Staff Analysis:

The staff believes that NRC needs to develop the technical bases to support a performance-based entombment option. During the development of these technical bases, the staff will consider the comments received following publication of the ANPR.

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?

Comment Summary:

Seven commenters responded directly to this question. All believed that some credit should be given to engineered barriers for reducing facility doses to the license termination criteria of Part 20, Subpart E. However, most commenters had different views on the crediting process.

Entergy endorsed the concept of engineered barriers when used to reduce the site dose to meet the requirements for restricted release as defined in Subpart E; however, it stated that if the postulated failure of entombment exceeds Subpart E limits, an NRC license should be required.

NEI stated: "The criteria that should be used when assessing the effectiveness of the barrier should be: Engineered barriers that provide 'a high level of confidence' that the entombed facility will continue to isolate the residual radioactive material as documented in the performance assessment analysis."

GPU Nuclear believed that engineered barriers should be included in the pathways analysis to the extent that their use could be justified. DOE's Long-Term Stewardship Program has performed research on the ability of engineered barriers to mitigate the spread of contamination and the results of the program should be considered in developing any new rule.

One State (Illinois) believed that engineered barriers should be given the same credit as the engineered barriers in a LLW disposal facility. Specifically, barrier performance should consider the effects of long-term exposure to the elements. New York believed that engineered barriers should be given credit commensurate with the best scientific information available. Florida believed that the amount of "credit" given to engineered

barriers should be considered on a case-by-case basis, relying on evaluation of the information and analysis provided by the licensee.

Staff Analysis:

The staff believes that credit for engineered barriers should be based on modeling the performance of the entombed structure, and subsequent verification of these predictions against actual structure performance. Therefore, NRC should initiate research efforts to evaluate the capabilities of engineered barriers, in order to develop the technical bases for an entombed facility.

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?

Comment Summary:

Although three commenters (Entergy, Florida Power and Light, and Washington) did not oppose considering GTCC in an entombed facility, four commenters (Illinois, Ohio, New York, and Florida) opposed this idea. Florida noted that if GTCC was included in an entombed facility, it should be easily retrievable for removal to a disposal site. New York noted that State law precluded storing GTCC within the State, regardless of how it was stored. Illinois stated that GTCC should “absolutely not” be provided for in the regulations; however, case-by-case decisions on GTCC might be appropriate.

A number of commenters (Entergy, NEI, Exelon, and Florida) suggested that GTCC included in an entombed facility should be removable either for storage in a separate facility, or in a DOE disposal facility.

Two commenters (NEI and GPU Nuclear) noted that the performance-based LTR in Part 20, Subpart E, did not preclude consideration of GTCC. Two commenters (Exelon and EPA) noted that the disposal of GTCC was DOE’s responsibility.

Staff Analysis:

The staff believes that there is no technical reason to preclude including GTCC waste in an entombed facility. However, issues regarding DOE’s responsibility to dispose of GTCC, and the roles of the Agreement States in overseeing the interim storage or disposal of GTCC, need further exploration. At present, licensees are permitted to store GTCC waste in dry casks at reactor sites, pending identification of a disposal site. The staff believes that GTCC waste is best addressed on a case-by-case basis and that specific provisions in an entombment rulemaking are not appropriate or needed at this time.

D.1 Power reactor licensees are exclusively regulated by NRC (under 10 CFR Part 50), even in Agreement States. 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?

Comment Summary:

Most licensees stated that they saw no need for State involvement with entombed facilities. However, States thought that they should have some level of oversight of such facilities. Two commenters (Illinois and SCE&G) noted that States, not NRC, should license entombed facilities.

Staff Analysis:

The staff believes that entombment is a decommissioning alternative. As such, the level of State involvement will depend on the alternative chosen by a given facility. The role of States regarding the entombment will be determined through interactions with stakeholders during the rulemaking process.

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?

Comment Summary:

Seven commenters responded directly to this question. All the licensees and one State (Florida) indicated that entombment should remain a decommissioning option. They also indicated that as a decommissioning activity, entombment is not LLW disposal; therefore there are no issues for States where LLW disposal is prohibited. However, one commenter (Entergy) suggested that clarification of this as an issue of Federal preemption would help avoid dual regulation.

Two States (Illinois and New York) stated that entombment conflicted with State law. Illinois asserted that NRC's description of an entombed facility falls within the Central Midwest Interstate Low-Level Radioactive Waste Compact's (CMC) definition of disposal for LLW, (i.e., isolation of waste from the biosphere in a permanent facility designed for that purpose). Illinois noted that disposal of LLW at a facility other than a regional facility without approval of the CMC Commission is a violation of the compact which is a Class 4 felony. Illinois also noted that entombment of power reactor does not provide disposal for non-reactor generators.

New York stated that the New York Codes, Rules, and Regulations (NYCRR) precludes disposal of radioactive waste by entombment within the State on expiration or termination of the NRC license 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 6 NYCRR Parts 382 and 383.

Staff Analysis:

The staff believes that entombment is a decommissioning alternative, not LLW disposal. As such, there would be no issues for Sstates where LLW disposal is prohibited.

D.3 Are there other issues for an entombment, that impact Low-Level Waste Compacts?

Comment Summary:

Five commenters responded to this question. Most of the commenters raised issues regarding the financial impact of the entombment facility. For example, Illinois stated that it is not economical to develop a regional facility until the nuclear power stations are decommissioned. If the decommissioning waste from the power reactors is entombed, development of a regional disposal facility would not be economical. This could drastically impact all LLW generators. New York agrees, noting that compacts siting disposal facilities consider projections of waste volumes (including significant amounts of power plant decommissioning wastes) in their economic analyses. Typically, the activity and the volume of nuclear power plant decommissioning waste dominates. Allowing entombment as a decommissioning alternative would make a LLW disposal site economically unattractive for a single State or small Interstate Compact.

NEI and Exelon believe that since an entombed facility is not a disposal facility and material is not being transferred into or out of the Compact region, the Compact will need less capacity for LLW disposal. This will affect the financial viability of the facility. SCC generally supported the concept of entombment but noted that entombing power reactors might have an adverse economic impact on LLW compact disposal sites. This, in turn, could limit the ability of other LLW generators in the compact to dispose of their radioactive waste.

Staff Analysis:

The NRC needs to develop the technical bases to support a performance-based entombment option. In the course of doing this, the staff will consider the comments raised.

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?

Comment Summary:

In general, the States which responded stated that the compatibility level should be Category C or D. The utilities reiterated their position that the State should not have control of an entombed reactor site and did not comment on compatibility level.

Staff Analysis:

The staff believes that compatibility levels will vary depending on the specific approach and content of a final rule. The compatibility levels would be addressed as part of that rulemaking following NRC Management Directive 5.9. The staff would then use the criteria and process described in STP Procedure SA-200, "Compatibility Categories and Health and Safety Identification for NRC Regulations and Other Program Elements," to determine which program elements an Agreement State should adopt to maintain an adequate and compatible program.

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 protection of the public health and safety?

Comment Summary:

Five commenters (2 State, 2 utilities, and EPA) provided comments in connection with this question. One commenter (SNC) stated that NRC and licensee resources for this effort should be appropriately focused during the entombment period. As such, the entombment rulemaking should identify a reduced scope of the Part 50 license which provides adequate protection for the public health and safety during entombment, and that specifies appropriate security, insurance, monitoring and maintenance requirements for an entombed facility. Another commenter (Illinois) stated that the entombment option should be abandoned since entombment made no sense from a public policy standpoint. Still another commenter (Florida) believed that a definition in Part 20 would have to be expanded to allow for storage of GTCC in a licensed Part 50 facility. EPA observed that NRC's 1988 Generic Environmental Impact Statement dismissed entombment as not viable because of concerns about structural integrity over time. Although EPA did not endorse any of the three options, it expressed concern about the isolation of non-NRC-licensed contaminants, and their potential impact on the environment, and recommended that entombment be considered an option of last resort.

Staff Analysis:

The staff believes that the suggested issues deserve consideration, and will evaluate them in the rulemaking process.

E.2 Please provide considerations as to the number of licensees likely to pursue entombment as an option? Specifically, it is requested that reactor licensees indicate whether they would choose the entombment option.

Comment Summary:

Seven commenters (five licensees, Florida, and NEI) stated that they supported having the entombment option available for decommissioning. One commenter (Entergy) stated that even if the entombment option was available, it probably would not pursue entombment. In general, licensees noted that their decision on whether to pursue

entombment was predicated on LLW disposal availability, costs, and institutional controls.

One commenter (Dairyland Power Cooperative) noted that, if entombment was made available as an option, it would probably pursue entombing the Lacrosse Boiling Water Reactor. The CRCPD E-24 Committee did not endorse any of the three options; however, it stated that each decommissioning situation was unique and that NRC should seek an opinion from each state separately.

Staff Analysis:

The staff believes that there is some support for entombment among the commenters who responded. However, until NRC develops both the technical basis for an entombed facility and the regulatory framework for licensing such a facility, licensees will not be able to evaluate the merits of pursuing entombment over SAFSTOR or DECON options.

Comments on Advance Notice of Proposed Rulemaking for Entombment

| Accession Number | Title/Description | Document Date | Author | Public Availability |
|------------------|--|---------------|---------------|---------------------|
| ML013020021 | Comment (1) submitted by Fred Rippee on Proposed Rule PR 20 & 50 regarding Entombment Options for Power Reactors.. | 10/26/2001 | Rippee F | Publicly Available |
| ML020170156 | Comment (10) submitted by Ohio Department of Health, Roger L. Suppes on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/28/2001 | Suppes R L | Publicly Available |
| ML020170264 | Comment (11) submitted by Nuclear Energy Institute, James W. Davis supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/31/2001 | Davis J W | Publicly Available |
| ML020170267 | Comment (12) submitted by South Carolina Electric & Gas Co. (SCEG), Stephen A. Byrne, opposing Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/06/2001 | Byrne S A | Publicly Available |
| ML020250026 | Comment (13) submitted by Exelon Generation Company, Michael P. Gallagher responding to Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/31/2001 | Gallagher M P | Publicly Available |
| ML020250440 | Comment (14) submitted by NY State Dept. of Environmental Conservation, Paul J. Merges concerning Proposed Rules PR-20 and PR-50 regarding Entombment Options for Power Reactors.. | 12/10/2001 | Merges P J | Publicly Available |

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| ML020310380 | Comment (15) submitted by Conference of Radiation Control Program Directors, Inc., Dennis Zannoni on Proposed Rules 20 & 50 regarding Entombment Options for Power Reactors.. | 01/08/2002 | Zannoni D | Publicly Available |
| ML020310393 | Comment (16) submitted by Kansas Department of Health and Environment, Ronald Fraass on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/26/2001 | Fraass R | Publicly Available |
| ML020320026 | Comment (17) submitted by GPU Nuclear, James J. Byrne on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/21/2001 | Byrne J J | Publicly Available |
| ML020320028 | Comment (18) submitted by Florida Dept. of Health, William A. Passetti supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/19/2001 | Passetti W A | Publicly Available |
| ML020650347 | Comment (19) submitted by Southeast Compact Commission, Kathryn Haynes supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/21/2001 | Haynes K | Publicly Available |
| ML020170166 | Comment (2) submitted by Entergy Nuclear Inc. , Kenneth Hughey, supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/27/2001 | Hughey K | Publicly Available |
| ML013550015 | Comment (2) submitted by Walter Cofer supporting and opposing Proposed Rules PR-20 & PR-50, "Entombment Options for Power Reactors." | 12/17/2001 | Cofer W | Publicly Available |

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|-------------|--|------------|---------------|--------------------|
| ML013550017 | Comment (3) submitted by Clayton J. Bradt on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/18/2001 | Bradt C J | Publicly Available |
| ML020170172 | Comment (3) submitted by Southern Nuclear Operating Company, D. N. Morey, supporting Proposed Rules PR-20 and PR-50 regarding Entombment Options for Power Reactors.. | 12/28/2001 | Morey D N | Publicly Available |
| ML013550020 | Comment (4) submitted by Debra McBaugh on Proposed Rules PR-20 & 50 on Entombment Options for Power Reactors.. | 12/31/2001 | McBaugh D | Publicly Available |
| ML020170198 | Comment (4) submitted by Florida Power & Light Company, Rajiv S. Kundalkar, supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/28/2001 | Kundalkar R S | Publicly Available |
| ML020170223 | Comment (5) submitted by U.S. Environmental Protection Agency, Frank Marcinowski on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/21/2001 | Marcinowski F | Publicly Available |
| ML020380556 | Comment (6) submitted by Washington Department of Health, John Erickson & Mike Wilson recommending Option 3 of Proposed Rules PR 20 & 50 regarding Entombment Options for Power Reactors.. | 12/31/2002 | Erickson J | Publicly Available |
| ML020170252 | Comment (7) submitted by Wheeler, Van Sickle & Anderson, S.C. Thomas J. Zaremba on behalf of Dairyland Power Cooperative supporting Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/27/2001 | Zaremba T J | Publicly Available |

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|-------------|--|------------|---------------|--------------------|
| ML020170253 | Comment (8) submitted by Illinois Department of Nuclear Safety, Thomas W. Ortziger on Proposed Rules PR-20 & PR-50 regarding Entombment Options for Power Reactors.. | 12/18/2001 | Ortciger T W | Publicly Available |
| ML020170262 | Comment (9) submitted by Tennessee Valley Authority, Mark J. Burzynski supporting Proposed Rules PR-20 and 50 regarding Entombment Options for Power Reactors.. | 12/21/2001 | Burzynski M J | Publicly Available |

ATTACHMENT

STAFF ANALYSIS OF
ADVANCE NOTICE OF PROPOSED RULEMAKING COMMENTS FOR
ENTOMBMENT OF POWER REACTORS