

# New York State Department of Environmental Conservation

## Division of Solid and Hazardous Materials

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Erin M. Crotty  
Commissioner

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,



Paul J. Merges, Ph.D.

Director

Bureau of Radiation & Hazardous Site Mgt.

Enclosure

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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.