

November 23, 1999

TO: The Commissioners

FROM: William D. Travers /s/  
Executive Director for Operations

SUBJECT: AGREEMENT STATE COMPATIBILITY FOR CRITICALITY REQUIREMENTS APPLICABLE TO LOW-LEVEL WASTE DISPOSAL FACILITIES

## PURPOSE:

To inform the Commission of the staff's review of a generic issue regarding proposed changes to the compatibility designation of [10 CFR 61.16\(b\)\(2\)](#) for Agreement State programs, and to request that the Commission approve staff's plan to change this compatibility designation and issue guidance on emplacement criticality safety at low-level waste (LLW) disposal facilities.

## BACKGROUND:

This paper responds, in part, to the April 29, 1998, Staff Requirements Memorandum (SRM) concerning SECY-98-010, "Petition for Envirocare of Utah to Possess Special Nuclear Material in Excess of Current Regulatory Limits" ([Attachment 1](#)) and the March 31, 1999, SRM concerning SECY-99-059, "Agreement State Compatibility for Criticality Requirements Applicable to Low-Level Waste Disposal Facilities" (SECY-99-059 - [Attachment 2](#); SRM-SECY-059 - [Attachment 3](#)). The April 29, 1998, SRM directed the staff to consult with the Advisory Committee on Nuclear Waste on generic issues associated with LLW sites, and consult with and obtain the Commission's approval on policy proposals necessary to resolve these issues. One such issue is the compatibility level for emplacement requirements, in [10 CFR Part 61](#), for the disposal of LLW containing special nuclear material (SNM).

SECY-99-059 provides background information on the regulation of SNM in LLW as prescribed in [10 CFR Parts 150](#) and [61](#), and discusses staff's assessment of the need to change the compatibility designation for Section [61.16\(b\)\(2\)](#). As discussed in that paper, [10 CFR 150.11](#) limits the quantity of SNM that can be licensed by an Agreement State. Section [61.16\(b\)\(2\)](#) requires LLW disposal facility licensees to describe procedures, for avoiding accidental criticality, that address both storage of material before disposal, and waste emplacement for disposal. Section [61.16\(b\)\(2\)](#) is not currently required as a matter of compatibility or health and safety for Agreement States; therefore, there is currently no requirement for LLW disposal facility licensees to demonstrate emplacement criticality safety. As discussed in detail in SECY-99-059, all of the current operating LLW facilities are regulated by Agreement States (i.e., South Carolina, Washington, and Utah), and all three States have addressed emplacement criticality safety as a part of their LLW regulatory programs as license conditions or procedures. Staff believes that Agreement States with LLW regulatory programs should incorporate this provision into their programs to ensure emplacement criticality safety is addressed in future LLW disposal facilities licensed by Agreement States.

The March 31, 1999, SRM approved staff's plan to request Agreement State review and comments on the proposal to revise the compatibility of [10 CFR 61.16\(b\)\(2\)](#) from category *NRC* to category *Health and Safety*. In addition, the Commission stated that consultations with the Agreement States should include a technical basis that includes "realistic scenarios", an assessment that LLW emplacement criticality is a realistic public health and safety concern, the draft emplacement criticality guidance, and an assessment of potential resource impacts on Agreement States.

## DISCUSSION:

Staff has had several interactions with Agreement States on this issue. First, we discussed this issue on June 17, 1999, in the monthly tele-conference with the Executive Committee of the Organization of Agreement States. Second, in All Agreement State letter SP-99-048, dated July 22, 1999, staff informed the Agreement States of the availability of the draft Federal Register notice and the draft guidance ([Attachment 4](#)) on the Agreement State forum web site from July 23 to August 23, 1999, for Agreement State comment. The draft Federal Register notice included the information the Commission requested to be provided to the Agreement States in SRM-SECY-99-059. No comments were received during the comment period. Subsequent to the end of the comment period, the State of Illinois provided comments in a letter dated September 2, 1999 ([Attachment 5](#)). The State's comments related to post-disposal reconcentration of SNM. We responded to these comments in a letter dated October 8, 1999 ([Attachment 6](#)), and requested that the State provide comments relating to [10 CFR 61.16\(b\)\(2\)](#) during the public comment period. We informed Illinois that the NRC had reviewed the post-disposal reconcentration issue and concluded that it was unlikely and had discontinued further research in this area. Also, we informed the State that the draft guidance specifically excluded consideration of post-disposal reconcentration of SNM.

Third, we announced the proposed compatibility designation change and availability of the draft emplacement criticality guidance in the Federal Register on September 20, 1999 ([Attachment 7](#)). This notice solicited public comments on the proposed compatibility designation change and the draft guidance. The public comment period closed on October 20, 1999. We received three comment letters. The Nuclear Energy Institute (NEI) submitted a letter supporting the staff's proposal to change the designation for [10 CFR 61.16\(b\)\(2\)](#) and agreeing that the Agreement States compatibility should be changed to assure that emplacement criticality safety controls are addressed as part of their LLW regulatory programs. NEI also stated that the proposed change should clarify the regulations and facilitate development of new LLW disposal facilities in Agreement States. The State of Washington submitted a letter that reiterated the actions staff identified that would be required if the compatibility was changed and provided the criticality safety limits in the Hanford LLW license.

Envirocare of Utah, Inc. (Envirocare) submitted a letter requesting that it not be subject to the guidance because of the NRC Order issued to Envirocare on May 24, 1999. Once section [61.62\(b\)\(2\)](#) has been designated as a "health and safety" regulation that the Agreement States must apply in their

programs, the implementation of this provision in specific cases will depend on the regulatory decisions of individual Agreement States. Therefore, Envirocare will need to raise its concern with the State of Utah.

After receiving Commission approval, staff plans to revise the compatibility designation of 10 CFR 61.16(b)(2) from category NRC to category Health and Safety (see Management Directive 5.9, "Adequacy and Compatibility of State Programs," for background information on the categories). Staff will issue an All Agreement State letter informing Agreement States of this compatibility change. Those Agreement States that currently have LLW regulatory programs and those States planning to have LLW regulatory programs in the future will be required to adopt the essential objectives of 10 CFR 61.16(b)(2) by regulation or by other legally binding requirements within three years of the final NRC rule. Those Agreement States that have not assumed LLW regulatory authority from the Commission or those States which do not have LLW regulatory programs, will not be required to adopt this provision. Staff will also publish a notice in the Federal Register informing the public of this change. Staff also plans to finalize the emplacement criticality guidance and publish it as a NUREG.

RESOURCES:

It is anticipated that the revision to the compatibility designation and finalization of the guidance can be completed within 6 months after Commission approval (within this fiscal year). Resources of 0.1 FTE and \$16K in contract support are needed to complete this effort and are included in the current fiscal year 2000 budget.

RECOMMENDATION:

Staff recommends that the Commission approve the staff's proposal to revise the compatibility of 10 CFR 61.16(b)(2) from category *NRC* to category *Health and Safety* and finalize the emplacement criticality guidance.

COORDINATION:

The Office of the General Counsel has reviewed this Commission Paper and has no legal objections. The Office of the Chief Financial Officer has reviewed this paper for resource implications and also has no objections.

William D. Travers  
Executive Director for Operations

CONTACT: Tim Harris, NMSS/DWM  
(301) 415-6613

Attachments: 1. SRM, dtd 4/29/98  
2. SECY-99-059  
3. SRM, dtd 3/31/99  
4. Draft Guidance  
5. State of Illinois Comment Letter  
6. Staff Response to Comments  
7. Federal Register notice, dtd 9/20/99

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ATTACHMENT 3

March 31, 1999

MEMORANDUM TO: William D. Travers  
Executive Director for Operations

FROM: Andrew L. Bates, Acting Secretary /s/

SUBJECT: STAFF REQUIREMENTS - SECY-99-059 - AGREEMENT STATE COMPATIBILITY FOR CRITICALITY REQUIREMENTS APPLICABLE TO LOW-LEVEL WASTE DISPOSAL FACILITIES

The Commission has approved the staff's plan to request Agreement State review and comment on the proposal to revise the compatibility of 10 CFR 61.16(b)(2) from category *NRC* to category *Health and Safety*.

Consistent with the April 19, 1998 Staff Requirements Memorandum, the consultations with the Agreement State should include a technical basis that includes "realistic scenarios." If realistic scenarios cannot be developed to demonstrate the need for this proposed revision, staff should inform the Commission.

To assist the Agreement States to focus on the salient aspects of this issue, and thereby foster the development of more objective comments, the

material provided to the States for review should: show that LLW emplacement criticality is a realistic public health and safety issue; present an analysis that is supported by the results of recent technical assessments that have been done on emplacement criticality of LLW; include the emplacement criticality guidance that is currently under development; and, provide a staff assessment of the potential resource impacts on Agreement States as a result of assuming what is predominantly a Federal level technical capability.

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

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ATTACHMENT 5

Mr. Thomas W. Ortziger, Director  
State of Illinois  
Department of Nuclear Safety  
1035 Outer Park Drive  
Springfield, IL 62704

SUBJECT: RESPONSE TO COMMENTS REGARDING PROPOSED COMPATIBILITY CHANGE TO 10 CFR 61.16(b)(2)

Dear Mr. Ortziger:

I am responding to your letter dated September 2, 1999, that transmitted comments to an all Agreement State letter (SP-99-048) issued by the U.S. Nuclear Regulatory Commission. Specifically, our letter requested comment on a draft Federal Register notice regarding possible changes to the compatibility of 10 CFR 61.16 and on draft guidance for evaluating emplacement criticality safety. Your letter notes that Illinois regulations require that a low-level waste (LLW) disposal facility be designed and constructed using engineered modules that would prevent migration of waste. It suggests that the compatibility designation change should only be applied to certain disposal facilities and not to containerized LLW disposal. In addition, it cites a NUREG document that discusses post disposal criticality and states extremely long time periods are necessary to accumulate a critical mass even under the most conservative assumptions and states that post-disposal criticality is not viewed as a credible health and safety concern. The letter concludes that the proposed change in compatibility designation is an attempt to inappropriately force Agreement States to evaluate performance of LLW disposal facilities for time periods far beyond the compliance period inferred in the regulation.

In reviewing your comments, it appears that you have misinterpreted our concern over when a criticality might occur. Your comments address post-disposal criticality. However, the draft notice addresses emplacement criticality. Post-disposal criticality is a postulated problem that would result from the reconcentration or migration of Special Nuclear Material (SNM) in a LLW disposal unit after the waste was originally placed in a safe configuration. That is, the SNM would move from a safe configuration into a possibly critical configuration after disposal. We have addressed the post-disposal criticality issue in SECY-98-239, dated October 19, 1998, and concluded that post-disposal criticality was unlikely and discontinued further research in this area.

The draft guidance (NUREG/CR-6626), which was the subject of the draft Federal Register notice, addresses criticality safety in LLW disposal at the time the waste is placed into the disposal units (i.e., emplacement criticality safety). Section 3.2 of the draft guidance states that it is assumed that SNM does not migrate in solution with infiltration water (i.e., post-disposal criticality is not considered.) The draft guidance provides a flexible graded approach for criticality safety measures at LLW disposal facilities. This includes containerized waste, uncontainerized waste, and waste packages in concrete vaults. The draft Federal Register notice provides a technical basis for the emplacement criticality safety concern and scenarios that might lead to potential emplacement criticality. Because of this safety concern and the current lack of a regulatory requirement for LLW disposal facilities in Agreement States to address criticality safety of SNM waste, we are considering changing the compatibility of 10 CFR 61.16(b)(2).

I trust this clarifies your concerns and addresses your comments. The Federal Register notice was published on September 20, 1999 (99 FR 24254) for public comment on emplacement criticality. We would be interested in any additional comments on the proposed change in compatibility designation and on the draft guidance. If you have any questions or comments, please contact Tim Harris of my staff at (301) 415-6613.

Sincerely,  
John T. Greeves, Director  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards