Dr. Barry Siskind
Brookhaven National Laboratories
Nuclear Waste
and Materials Technology Division
Upton, LI, NY 11973

Dear Barry:

REFERENCE: TRANSMITTAL OF REVISED TECHNICAL POSITION ON WASTE FORM

I am sending to you the final version of the Technical Position on Waste Form, Revision 1, dated January 1991. I have enclosed the letter to licensees that accompanied its distribution to commission licensees, and the Federal Register Notice (FRN) announcing its availability. The FRN was issued on January 28, 1991.

As we discussed, I am also enclosing a copy of my meeting report for the West Valley trip on December 18, 1990.

Sincerely,

ORIGINAL SIGNED BY
Mary Thoma Adams, Civil Engineer
Technical and Special Issues Section
Low-Level Waste Management Branch
Division of Low-Level Waste Management
and Decommissioning
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

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SUBJECT ABSTRACT: TRANSMITTAL OF REVISED TECHNICAL POSITION ON WASTE FORM

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 24 1991

ATTENTION: Commission Licensees

SUBJECT: Waste Form Technical Position, Revision 1

The regulation, "Licensing Requirements for Land Disposal of Radioactive Waste," 10 CFR Part 61, establishes a waste classification system based on the radionuclide concentrations in the wastes. Class B and C waste are required to be stabilized. Class A wastes have lower concentrations and may be segregated without stabilization. Class A wastes may also be stabilized and disposed of with stabilized Class B and C wastes. All Class A liquid wastes, however, require solidification or absorption to meet the free liquid requirements. Structural stability is intended to ensure that the waste does not degrade and (a) promote slumping, collapse, or other failure of the cap or cover over a near-surface disposal unit and thereby lead to water infiltration, or (b) impart a substantial increase in surface area of the waste form that could lead to an increase in leach rate. Stability is also a factor in limiting exposure to an inadvertent intruder since it provides greater assurance that the waste form will be recognizable and nondispersable during its hazardous lifetime. Structural stability of a waste form can be provided by the waste form itself (as with activated stainless steel components), by processing the waste to a stable form (e.g., solidification), or by emplacing the waste in a container or structure that provides stability (e.g., high integrity container or engineered structure).

This technical position on waste form was initially developed in 1983 to provide guidance to both fuel-cycle and non-fuel-cycle waste generators on waste form test methods and results acceptable to the NRC staff for implementing the 10 CFR Part 61 waste form requirements. It has been used as an acceptable approach for demonstrating compliance with the 10 CFR Part 61 waste stability criteria. This position includes guidance on (1) the processing of wastes into an acceptable, stable waste form, (2) the design of acceptable high integrity containers, (3) the packaging of filter cartridges, and (4) minimization of radiation effects on organic ion-exchange resins. The regulation, 10 CFR 20.311 (d)(1), requires waste generators and processors to prepare wastes that meet the waste characteristics requirements of Part 61 (including the requirements for structural stability). The recommendations and guidance provided in this technical position are an acceptable method to demonstrate waste stability. One way of demonstrating conformance with the general recommendations contained in this technical position is to reference an approved Topical Report, because such reports are reviewed and approved in accordance with the acceptance criteria contained in this technical position. However, additional actions (e.g., plant-specific process control procedures) by waste generators will be needed to demonstrate that a stabilized plant-specific waste stream satisfies Part 61 waste form requirements.

Since the initial issuance of the Technical Position, it has been the intent of the NRC staff to provide additional guidance on waste form as it became necessary to address other pertinent waste form issues. One such issue involves the use of cement to stabilize low-level wastes. Field experience and laboratory testing of cement-solidified low-level radioactive waste has indicated that some unique chemical and physical interactions can occur between the cement constituents and the chemicals and compounds that can exist in the waste materials. Therefore, an appendix (Appendix "A") dealing with the qualification testing, performance confirmation and reporting of mishaps involving cement-stabilized waste forms has been included in this revision to the Technical Position.

To provide more comprehensive guidance on cement stabilization of low-level radioactive waste, Appendix A addressed several areas of concern that were not considered in the May 1983, Revision 0, version of this Technical Position. Thus, information and guidance on cement waste form specimen preparation, statistical sampling and analysis, waste characterization, process control program (PCP) specimen preparation and examination, surveillance specimens and reporting of mishaps are provided in Appendix A. The guidance provided in Appendix A is the culmination of an extended period of study and information gathering and exchange between the NRC staff and representatives of various organizations, including government laboratories, the Advisory Committee on Nuclear Waste (ACNW), cement processing vendors, other waste form vendors, nuclear utilities, and state regulatory agencies. Especially useful in the development of the guidance in Appendix A was the information exchanged in a Workshop on Cement Stabilization of Low-Level Radioactive Waste held in June 1989. The Workshop proceedings have been published as an NRC report, NUREG/CP-0103, which is available from the following sources:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 37082
Washington, DC 20013-7082

and

National Technical Information Service
Springfield, VA 22161

The waste form technical position is attached to this letter. Questions on the technical position paper may be referred to Dr. M. Tokar (301-492-0590), or to Ms. M. T. Adams (301-492-0505) of my staff. The information collections contained in the technical position have been approved under OMB number 3150-0014.

Michael Tokar
for

Paul H. Lohaus, Chief
Low-Level Waste Management Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

Enclosure: As stated