UNITED STATES DEPARTMENT OF COMMERCE
National Bureau of Standards
Gaithersburg, Maryland 20899

July 7, 1988

Mr. Charles Peterson
Technical Review Branch
Division of High-Level Waste Management
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Peterson:

This is in reply to the informal request for general technical assistance, rendered under Task 4 of FIN-A-4171-7, on the document entitled "Waste Compliance Plan for the West Valley Demonstration Project High-Level Waste Form", WVDP-055, West Valley, New York, 1986. This waste compliance plan was revised in November or December of 1987. We do not have this later revision, which may have already addressed some of the NBS comments given in the following paragraphs.

We note that this WCP probably followed a 1986 revision of the Waste Acceptance Preliminary Specification (WAPS). We just recently commented on the April 1987 revision of the WAPS.

Introduction, pages 1 - 2.

The composition of the WVDP reference glass in Table I has a wide range of some of the constituents. The range given in this compliance plan may be too broad and needs further explanation based on available leaching data. The effects of variation in the chemical composition of various constituents is needed, especially the effects of Al_2O_3, SiO_2, and Fe_2O_3.

It would be useful to check the glass compositions in the latest version of the WVDP compliance plan. The MCC has done various studies on the effects of composition on leachability of the glass. The ATM-10 reference glass composition is given in Table III on page 10. The ATM-10 reference glass has been shown to be more durable than the CTS (Chemical Test Standard) glass from the WVDP. The Materials Characterization Center (MCC) data on ATM/WV-205 (ATM/WV-205 is a doped version of ATM-10.) indicate that this glass falls within target specifications (ref. NUREG/CR-4735, Vol. 4, pages 22 - 26). The CTS glass also fell within target specifications, but it was less durable than the ATM-10. The CTS glass may not be considered further for use.

1.3 Specification for Radionuclide Release Properties, pages 16 - 23.

More explanation of radionuclide release is needed. For example, how does this release correlate with an element like Boron that is analyzed and taken as a conservative indicator of other elemental release. This topic may not be appropriate for the WCP, but maybe it should be given greater detailed treatment in the WAPS. That document did not give anything on

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this subject, so we wonder what DOE is doing to determine what requirements are needed on rate of radionuclide release for the glass compositions proposed to date.

3.9 Chemical Compatibility Specification, pages 49 - 52.

The compliance plans should specify the service life and requirements for 304 stainless steel canisters. The canister is expected to be given zero credit in a repository and yet it must be known whether these canisters will serve adequately during the period preceding repository emplacement in a repository container. Questions include how long the canister will be open and will the temporary closure will be leak tight according to ANSI 14.5-1977. Information relating to storage times, environmental conditions and required life of the canister is needed.

More detail is needed regarding localized corrosion. Canister heating, due to the pouring of the waste glass and to the subsequent cooling, can affect microstructural phases in the stainless steel. This is likely to result in increased sensitivity to stress corrosion cracking and other forms of corrosion. The 304 stainless steel can be subject to pitting or other local attack if any water is present.

3.12 Drop Test Specification, page 57.

The WVDP should be correlating drop-test studies with other drop-test and glass-fines-release studies that have been conducted by the MCC. The Materials Characterization Center (MCC) has conducted drop tests on glass filled canisters for the Transportation Technology Center (ref. NUREG/CR-4735, Vol.4, pages 20 - 21).

Mechanical damage to the canister occurs as a result of rough handling or dropping. Correlations are needed to establish the relation between mechanical damage and expected service life, based on estimates of the effects of mechanical strain on fracture and corrosion performance.

4.1.2 Test Program, page 66.

The waste compliance schedule is given on page 66. MCC reports indicate that the release rate testing is on schedule.

These comments were developed from the views of Dr. A. Fraker and Dr. E. Plante.

Sincerely,

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