

Department of Energy

Washington, DC 20585

May 17, 2010

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue N.W.
Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

This is in response to the Defense Nuclear Facilities Safety Board's (Board) January 6, 2010, letter concerning the design and testing of pulse jet mixing (PJM) technology being deployed in the Pretreatment Facility at the Waste Treatment and Immobilization Plant (WTP) at the Hanford site. In that letter the Board expressed concerns that the functional requirements for the mixing and transport systems do not adequately bound the properties of waste to be processed. Further the Board postulated that this could result in three significant safety issues; a criticality event, a flammable gas explosion, or a component material failure due to PJM overblows.

The staff report enclosed with the Board's letter addressed this issue and was based upon staff interactions with the Department of Energy (DOE), Office of River Protection (ORP) and WTP contractor Bechtel National, Inc., (BNI) staff in June, September, and October 2009, and the Board's staff analysis during that timeframe. That report reflects the ORP and BNI findings that the current PJM design for some WTP vessels lacks sufficient power. Vessels with insufficient power have the potential to inadequately mix and transport the most challenging fraction of the solids expected to be present in the Hanford waste inventory.

Since the time period addressed by the Board's letter, ORP and WTP have identified the additional testing and analysis needed to improve the capability of the PJM design. A series of seven key documents were developed and shared with the Board's technical staff that describes the approach to: (1) establish functional requirements and technical criteria for safe operation of the integrated WTP pulse jet mixing, transport, and sampling systems; (2) establish bounding PJM design basis requirements for particle size and density based on feed qualification data; (3) develop design methods that demonstrate that system performance can meet functional requirements with bounding design basis inputs; and (4) establish a criticality safety strategy that reflects the capabilities of the mixing, transport and sampling systems. A summary of these seven documents is provided as Enclosure 1. One of these



documents, *Integrated Pulse Jet Mixed Vessel Design and Control Strategy* (24590-WTP-RPT-ENG-10-001) provides the top level description of the approach to these four elements.

DOE and BNI provided a detailed briefing to the Board on these documents, as well as the timeline for resolution of the PJM issue in March 2010. These briefings also addressed the technical studies and design changes that will be made to add vessel access ports and heel pump-out capability for certain vessels in which testing has determined such systems are necessary. Technical discussions for each of the topics contained in the Board's letter are provided in Enclosures 2 through 5.

DOE is committed to resolving the issues identified in the Board's letter. Testing of the five Newtonian vessels containing high solids concentrations are completed and significant insights have been gained from that testing and analysis. DOE has committed to several modifications to address vessel mixing issues and provide increased confidence in successful operation of the WTP. These include:

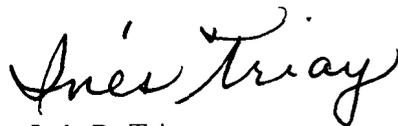
- Adding additional PJMs to vessels HLP-VSL-00022 and UFP-VSL-00001 A/B;
- Adding vessel inspection and heel removal capability with enhanced transfer capacity for ten high-solids vessels;
- Performing a double decant of Low Activity Waste (LAW) feed in the Tank Farms and dedicating a transfer line for LAW feeds to minimize the potential for High Level Waste solids to enter the LAW receipt vessels;
- Adjusting vessel operating limits to assure adequate mixing; and
- Performing integrated tests of the mixing, transfer, sampling and PJM control systems at a larger scale.

In addition, preparations are being made to test the most challenging non-Newtonian vessel configurations that contain high solids concentrations, should testing be determined to be required. The DOE will also make contract changes to WTP waste feed specifications to provide additional defense in-depth while not adversely impacting overall mission life.

A standing briefing schedule between the Board technical staff, ORP and WTP has been established to keep the Board apprised of progress in executing this strategy and completing the testing and design process related to PJM technology.

If you have any questions, please contact me or Dr. Steven L. Krahn, Deputy Assistant Secretary for Safety and Security Program at (202) 586-5151.

Sincerely,

A handwritten signature in black ink that reads "Inés Triay". The signature is written in a cursive style with a prominent loop at the end of the last name.

Inés R. Triay
Assistant Secretary for
Environment Management

Enclosures

cc: D. Chung, EM-2
F. Marcinowski, EM-3
S. Olinger, ORP
M. Whitaker, HS-1.1