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**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



June 9, 2011

Mr. McCoy Oatman
Chairman
Nez Perce Tribal Executive Committee
P.O. Box 305
Lapwai, Idaho 83540

Dear Mr. Oatman:

The Defense Nuclear Facilities Safety Board (Board) received your letter of November 29, 2010, regarding potential damage to a single-shell tank at the Hanford site. The September 23, 2009, incident you discussed involved the use of a Hydraulic Hammer Rig (HHR) to create a borehole near Tank C-105 (borehole C7469). The Board's staff met with personnel from Department of Energy's Office of River Protection (DOE-ORP) and the Tank Farms contractor to discuss your concerns and their corrective actions. The contractor has subsequently prohibited the creation of boreholes within 5 feet of a tank structure to preclude a recurrence of this type of incident, and performed analyses in early 2011 to estimate potential damage to Tank C-105 by the HHR. The Board reviewed these analyses and believes the most prudent course of action is to continue to monitor radionuclide concentrations in the soil near Tank C-105 as waste retrieval activities proceed in the C Farm during the next few years. If concentrations increase appreciably, the Board believes DOE-ORP should evaluate the schedule to expeditiously remove the remaining waste from Tank C-105.

The information provided below answers the questions submitted in your letter of November 29, 2010, based on the efforts of the Tank Farms contractor and the Board's review of the contractor's recent analyses:

1. *What prompted the drilling of a borehole this close to a radioactive waste tank containing 142,000 gallons of high level waste?*

The Tank Farms operators created a borehole very close to Tank C-105 to assist in determining the source of subsurface soil contamination identified near the tank. Knowing the source would help to understand whether the tank had previously leaked or the soil contamination was due to other events. The contractor would then be able to design an appropriate tank waste retrieval system. For example, the retrieval system for an assumed leaker tank would be designed to minimize the quantity of water used to mobilize and transport the waste out of the tank.

- 2. What is standard operating procedure when a drilling apparatus encounters something "hard" near the base of an underground high level waste tank? For example, does the driller cease operations or continue to hammer the apparent obstruction?*

The work instruction used by Tank Farms personnel to operate the HHR directs that when the rig fails to progress at a rate faster than 1 inch per minute, the operators must stop the equipment from pushing further. The Tank Farms personnel stated that in the case of borehole C7469, the operators stopped the equipment after two 30-second cycles that did not progress more than one-half inch.

- 3. Did this apparent risky operation, which could have potentially damaged a high level waste tank that is 65 years old or potentially contaminated personnel and equipment, yield any useful information regarding the tank or contamination in the sediments?*

The borehole operation yielded useful information. The data from the gamma logging in C7469 in 2009 showed that waste probably had leaked during multiple events in the history of the tank, including from a potential leak near the bottom of the tank. The data are detailed in two reports: RPP-ASMT-46452, *Tank 241-C-105 Leak Assessment Completion Report*, and RPP-ASMT-39801, Revision 1, *Tank 241-C-105 Leak Assessment Report*.

While Tank C-105 is now assumed to have leaked, past retrieval operations removed the majority of easily mobilized wastes that had the greatest potential for leaking from the tank.

- 4. Has the integrity of the tank liner, outside concrete shell, or footing been compromised such that additional waste (this tank has leaked in the past) entered the environment?*

Engineers for the Tank Farms contractor expressed the belief that the Tank C-105 concrete footer remains sound and no additional waste entered the environment as a result of the borehole operation. To test this hypothesis, the engineers performed calculations in early 2011 that address local impact effects from the HHR striking the tank footing. The calculations indicate that the HHR had little or no effect on the tank footing.

The Board believes that there are significant uncertainties in both the analytical model and the representation of the HHR load on the tank footing. Detailed HHR parameters that could allow a qualitative estimate of HHR penetration into the tank footing are not available. Obtaining the information necessary to perform a more definitive analysis would require in-situ testing that would necessitate facility worker exposure to several hazards. Based on order of magnitude estimates, the Board

believes the energy imparted by the HHR would not be sufficient to have caused a breach in the liner of the tank or caused damage away from the area contacted by the rig.

The Board concludes that the most prudent course of action is to continue to monitor radionuclide concentrations in the soil near Tank C-105 because the worker exposure risks necessary to undertake a geophysical investigation are excessive. If radionuclide concentrations start to increase significantly, removal of the remaining tank wastes should be expedited.

The Board understands your concern and appreciates the information you provided. Please contact us if you have any further questions regarding this matter.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter S. Winokur". The signature is stylized with a large initial "P" and a long, sweeping underline.

Peter S. Winokur, Ph.D.
Chairman

c: Mr. Scott L. Samuelson
Mrs. Mari-Jo Campagnone