From: J Hameister [mailto:jhameister@roadrunner.com]
Sent: Monday, October 05, 2015 11:08 AM
To: Moira Maloney <Moira.N.Maloney@wv.doe.gov>; Gordon, Lee M (NYSERDA) <Lee.Gordon@nyserda.ny.gov>
Cc: Bryan Bower <Bryan.C.Bower@wv.doe.gov>; Bembia, Paul J (NYSERDA) <Paul.Bembia@nyserda.ny.gov>
Subject: Exhumation Study Plans

Moira and Lee,

I have attached comments from the Coalition on West Valley Nuclear Wastes. Those of us, who were around when this Pu-Kerosene plume was discovered, received a realistic, albeit discouraging, view of what was to become our mission of good decision-making.

Joanne Hameister
CWVNW

Coalition on West Valley Nuclear Wastes
PO Box 603 Springville NY 14141

Moira Mahoney, DOE
Lee Gordon, NYSERDA
CC: Bryan Bower, DOE
CC: Paul Bembia, NYSERDA

October 5, 2015

Re: Phase 1 Exhumation Study Plan Revision 2 July 2015

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West Valley's NDA Special Holes 10 and 11 were exhumed in 1985-86. This action was necessary due to the detection of contamination in a test well northeast of the NDA in 1983. Ultimate determination of the need for exhumation was that the special hole leak of Plutonium-laden solvent (kerosene) already had produced a plume of 30 feet wide by 150 feet long and heading toward the creek. *(Press Release, Dean Hoffman, WVNS, 2/10/1986.)*

The Coalition does have notes from many meetings with WVNS, DOE and individuals on the subsequent exhumation process, but we hope such details are available from WVNS/DOE files and will be shared with this Task Group.

There exists exhumation experience at West Valley with its 'unique' (for lack of a better word), complex packaging procedures, burial practices and geologic characteristics. Therefore, we urge the inclusion of the West Valley exhumation experience in Task 3.1 of the Study Plan.

1. Six tanks were exhumed from SP10 and two from SP11. Tank welds had ruptured, lids were sealed with duct tape; therefore, contents had leached to the fullest extent so that the tanks were dry. Original burial of SP10 was about 4,000 gallons, 430 gallons were recovered; unaccounted Plutonium-laden solvent leachate is/was about 3,600 gallons.

In 1999, DOE prepared and issued **Plutonium and Uranium Recovery from Spent Fuel Reprocessing by Nuclear Fuel Services at West Valley, New York from 1966 to 1972.** Revised November 1999, US DOE

This report presumably provided a detailed accounting of the recovered two radionuclides from NFS for the reprocessing years, 1966-1972. The sole critical accounting in that report for buried waste follows:

Plutonium & Uranium Recovery from Spent Fuel Reprocessing by Nuclear Fuel Services at West Valley, New York from 1966 to 1972
Revised November 1999, U S DOE

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> Other factors that contribute to the difference between received and recovered plutonium include the measurement uncertainty, process holdup, and normal operating losses/measured discards. Normal operating losses/measured discards occur when known quantities of plutonium are intentionally removed from the inventory because they are technically or economically unrecoverable and are disposed of by approved methods. Two examples of normal operating losses are

> liquid discards to waste storage tanks, and solid waste packaged in drums and crates awaiting shipment to waste disposal facilities generically referred to as "burial sites." Examples of plutonium-bearing items sent to burial sites include discarded piping, spent ion exchange equipment, and contaminated laundry and shoe covers.

The Plutonium was detectible, therefore measurable and should be accounted for.

2. Ralph Wild's URS Source Term Report (Vol. 1, 6-3) states the following relative to the NDA:

> The material used in the solvent extraction process consisted of tri-butyl phosphate (TBP) in n-dodecane. When the solvent had degraded to the point of no longer being useful, it was mixed with an absorbent (vermiculite) and buried in the NDA. According to burial records, there are 23 1,000-gallon tanks and 15 55-gallon drums that contain absorbed solvent in the NDA. The drums were placed in a concrete tomb. In late 1983, the presence of TBP/ndodecane was detected in a monitoring well within the NDA boundary. The solvent was believed to be from six tanks buried in Special Hole 10 (SH-10) and 2 tanks buried in SH-11. Under the kerosene mitigation plan, these tanks were exhumed along with kerosene-contaminated soils and some free solvent was also collected and solidified (DOE, 1987). During exhumation, these materials were sampled and analyzed for radionuclides and the results used to estimate the 10 CFR Part 61 classification of the materials. Results are shown in Table 6-4 together with the estimated classification for the NDA Integrated Database.
>
> There are a total of four NDA burial records for the eight tanks in SH-10 and SH-11: one record for four tanks from SH-10, one record for two tanks in SH-11, and one record each for the two remaining tanks in SH-10. The records give the volume of the tanks (135 ft3 each) but do not provide information about the volume of solvent in the tanks.
>
> Each record includes the maximum dose rate used by any tank included in the record. These dose rates were used to estimate the activity in the tanks by dose-to-curie conversion. Since the volume of solvent was not available, the waste classification in the database is based on the volume of the tanks even though the NRC guidance on concentration averaging (NRC, 1995) requires that only the actual volume of solvent be used. This procedure estimated the classification of four of the tanks in SH-10 as Class C and two as GTCC and the classification of the two tanks in SH-11 as GTCC. The total volume of these tanks is 1,080 ft3.
>
> The report on implementation of the kerosene mitigation plan (DOE, 1987) includes information that suggests that each tank contains approximately 500 gallons of solvent. This information allows the NRC guidance of concentration averaging (NRC, 1995) to be applied to the tanks. The classification of these tanks is controlled by long-lived transuranics so both the weight and volume must be adjusted. This is accomplished by replacing the density of 1.01 g/cc that was applied to the volume of the tanks with the density of n-dodecane of 0.75 g/cc

applied only to the solvent. This results in an increase of a factor of about 2.7 in the sum of the fractions of the TRU nuclides and would result in all eight tanks being GTCC.

From the fact that solvent was detected in the monitoring well, it clear that not all of the solvent was still in the tanks and that other materials may have been contaminated. As shown in Table 6-4, the total volume of kerosene contaminated waste exhumed from SH-10 and SH-11 is 9,791 ft3, nearly ten times the volume of original waste. As a result, the classification of the solvent in the form it was buried cannot be compared directly to the classification of the materials exhumed. If the degraded solvent was the only source of contamination, then radionuclide concentrations in the absorbent must be less since the volume of contaminated material increased. This is what is seen in Table 6-4, although absorbent from two of the tanks still is GTCC. These results are consistent with but do not necessarily validate the classification estimates in the NDA Integrated Database.

Table 6-4 Classification of Solvent Tanks as Disposed Versus Materials for Exhumation of the Tanks
Estimated in Database Database Adjusted for Solvent Volume Materials Exhumed and Packaged

Table 6-4 Classification of Solvent Tanks as Disposed Versus Materials for Exhumation of the Tanks

Estimated in Database	Database Adjusted for Solvent Volume	Materials Exhumed and Packaged
8 Tanks Containing Absorbed Solvent (1,000 gal or 135 ft^3 each) 4 Tanks from SH-10 Class C (540 ft^3) 2 Tanks from SH-10 GTCC (270 ft^3) 2 Tanks from SH-11 GTCC (270 ft^3)	8 Tanks Containing Absorbed Solvent (1,000 gal or 135 ft^3 each) 8 Tanks GTCC (1,080 ft^3)	8,000 ft^3 Contaminated Soil – Class A 880 ft^3 Absorbent from Tanks 3 Tanks from SH-10 330 ft^3 Class A 3 Tanks from SH-10 330 ft^3 Class C 2 Tanks from SH-11 220 ft^3 GTCC 720 ft^3 8 Sectioned Tanks – Class A 191 ft^3 26 Drums of Solidified Solvent – Class A
Total Waste Volume = 1,080 ft^3	Total Waste Volume = 1,080 ft^3	Total Waste Volume = 9,791 ft^3

Incontrovertible uncertainties exist in just these partial examples and should foment serious concerns about the efficacy of the Exhumation Study Plan, particular as it relates to the NDA. The radionuclides of significant importance to the Coalition are the long-lived ones that will not remain *in situ* for the required monitoring duration of 1000's of years. Therefore, exhumation of the buried sources and contaminated soils/plumes must be a priority and a major element in the planning process.

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