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Ohio Field Office
West Valley Demonstration Project
10282 Rock Springs Road
West Valley, NY 14171-9799

October 21, 2003

Mr. Chad J. Glenn
U.S. Nuclear Regulatory Commission
Mail Stop T 7-F27
11555 Rockville Pike
Rockville, MD 20852

SUBJECT: Response to U.S. Nuclear Regulatory Commission (NRC) Comments on WVNS-SAR-023, Rev. 1, Draft D, "Safety Analysis Report for the Remote-Handled Waste Facility"

REFERENCE: Letter BCB:88661 - 254.3c, A. C. Williams to C. J. Glenn, "Transmittal of WVNS-SAR-023, Rev. 1, Draft D, 'Safety Analysis Report for the Remote-Handled Waste Facility,'" dated July 23, 2003

Dear Mr. Glenn:

WVNS-SAR-023, Rev. 1, Draft D, was submitted to NRC for review in the above referenced letter. NRC comments on this document were received electronically from your office in August 2003. The enclosure documents these comments and the Ohio Field Office West Valley Demonstration Project (OH/WVDP) comment responses. Based on communications with Bryan Bower of my staff, it is understood that your comments have been addressed satisfactorily with no open issues.

Subsequent to NRC's receipt of this letter, the U.S. Department of Energy anticipates that the NRC will issue a Safety Evaluation Report (SER) or other written documentation of the NRC review, as deemed appropriate and efficient by the NRC. This letter is provided to facilitate the preparation of this written documentation.

If you have any questions regarding the enclosed comment resolutions, please contact Bryan Bower at (716) 942-4368.

Sincerely,

Elizabeth Lowes

Elizabeth A. Lowes, Acting Director
West Valley Demonstration Project

Enclosure: Response to NRC Comments on WVNS-SAR-023, Rev. 1, Draft D, Safety Analysis Report for the Remote-Handled Waste Facility (RHWF)

cc: See Page 2

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cc: J. R. Craig, OH/OOM, w/o enc.
D. R. Kozlowski, OH/Project Acceleration, w/o enc.
T. J. Vero, OH/WVDP, WV-DOE, w/enc.
L. J. Chilson, WVNSCO, WV-AA3, w/o enc.
S. A. MacVean, WVNSCO, WV-B1D, w/o enc.

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BCB/mls

Response to U.S. Nuclear Regulatory Commision (NRC) Comments on WVNS-SAR–023, Rev. 1, Draft D, Safety Analysis Report (SAR) for the Remote-Handled Waste Facility (RHWF)

Comment 1
Section 4.1.1, RHWF Feeds and Section 7.8, Hazardous and Mixed Wastes:

Section 4.1.1 indicates that some of the waste may be contaminated with lead, mercury and PCBs. Section 7.8 only indicates that radioactive mixed wastes that cannot be treated either on-site or off-site are identified in WVDP-299. However, there is no indication in the SAR how these mixed wastes are to be handled. Please provide a description of how mixed wastes will be handled and stored.

Response:
The discussion in WVNS-SAR-001 provided in Section 7.8.3 provides the description of how mixed wastes at the West Valley Demonstration Project (WVDP) are handled and stored. A detailed description of the development, review, and approval of operating procedures to ensure safe execution of WVDP work activities, handing and storage of mixed wastes, inclusive, is contained in WVNS-SAR-001, Section 10.4.1.

West Valley Nuclear Services Company (WVNSCO) has an established policy, WV-227, "Planning for Waste Treatment Storage and Disposal," for planning the treatment, storage, and disposal (TSD) of wastes (radioactive, hazardous, mixed, industrial, and sanitary) prior to the commencement of any work that will generate such waste. All mixed waste at the WVDP is managed under the WVDP Site Treatment Plan (STP), WVDP-299. The STP is updated annually. WV-227 and WVDP- 299 have been provided to NRC electronically.

Waste containers that are processed through the RHWF may contain mixed waste. Mixed waste will be identified, segregated, sampled, packaged, and handled per RHWF operating procedures. Processed mixed waste with a path to treatment and disposal will be characterized and shipped off site per Waste Management procedures. Mixed waste with no immediate path to treatment and disposal will continue to be managed under the WVDP STP.

Comment 2
Section 5.2.2, Receiving Area:

Due to the length of the Waste Tank Farm (WTF) pump boxes, the door from the Receiving Area to the Buffer Area must be open at the same time the door from the Buffer Area to the Work Area is open. Both Buffer Area doors opened at the same time provide an opportunity for either a staff overexposure or the contamination to be spread from the Work Area. Specify what precautions will be in place to prevent an overexposure to staff and the spread of contamination when WTF pump boxes are moved through the Buffer Area into the Work Cell.

Response:
As stated in Section 5.2.2, a temporary confinement structure that effectively extends the Receiving Area, and additional administrative controls (in particular radiation protection controls as given and implemented by radiation protection personnel) will be used for processing the pump boxes. Concerns with this activity are considered to be dominated by localized (immediate worker) radiological protection, not potential airborne doses to onsite personnel (evaluated at 640 meters) or off-site receptors. Localized worker radiological safety concerns are addressed/remedied by the radiation protection program. Additionally, the pumps will be contaminated with high-level waste, which, for a given quantity, has only a small fraction of the actinides (e.g., 0.01) associated with a spent nuclear fuel distribution (as used in the accident analyses in Chapter 9) or waste with significant transuranic (TRU) contaminants. (Actinides are the dominant dose contributors via the inhalation pathway.) Hence, the analysis provided in Chapter 9 is considered to readily bound accident concerns associated with the pumps. It is noted that the construction of temporary confinement structures for airborne material control for relatively short-term jobs is routinely performed throughout the nuclear industry. It is also noted that, as shown on Figure 5.4-2 of WVNS-SAR-023, all Buffer Cell air flows into the Work Cell under normal operating conditions, and nearly all (96.2%) Buffer Cell air comes from the Receiving Area under normal operating conditions.

The Work Cell was sized to accommodate the handling, size-reduction, and packaging of the WTF pumps. However, it was determined during the design phase that sizing the Buffer Cell and the Receiving Area to accommodate this one waste stream was not economical. The use of a temporary containment structure for transferring WTF pump boxes into the Work Cell would provide adequate protection to the workers, the public, and the environment, which is supported by the safety analysis as discussed above.

Comment 3
Section 6.1.3.2, Criticality Prevention and Section 8.7, Prevention of Inadvertent Criticality:

Section 6.1.3.2 states that Table 7.7-4 of WVNS-SAR-001 provides an estimate of the Cs-137 activity in each of the 22 waste boxes. Section 8.7, states, "Analyses contained in the RHWF WVNS-NCSE-005 show that the 274.20 curies of Cs-137 estimated to be contained in the 22 boxes provide the basis for calculating a fissile material inventory of 461 grams (1.02 lbs.)." Explain how the amount of Cs-137 can be used to estimate the amount of fissile material in the waste.

Response:
The distribution of radionuclides associated with spent nuclear fuel that was processed by Nuclear Fuel Services at the West Valley site has been documented. Quantities of uranic and transuranic radionuclides were "scaled" to the quantity of Cs-137 using this distribution. The

calculation contained in WVNS-NCSE-005 provided in response to Comment #9 has additional details on this scaling.

Comment 4
Section 8.6, Off-Site Dose Assessment:

Explain what "realistic abated" facility emissions means and how the effective dose equivalent (EDE) to the maximally exposed off-site individual was determined.

Response:
"Realistic abated" calculations are not required by 40 CFR 61, *National Emissions Standards for Hazardous Air Pollutants*. (The other two shown in Table 8.6-1, namely "maximum abated" and "realistic unabated," are required.) "Realistic abated" has historically been added in WVNSCO's calculations to give the U.S. Environmental Protection Agency (EPA) an indication of the actual releases expected. Approval Request Number 2001-356, "Summary of Dose Assessment," which is cited in Section 8.6 as providing the basis for numbers reported in the SAR, is being provided to the NRC.

Comment 5
Section 9.1.3, Evaluation Guidelines:

Explain how the Public and Onsite Radiological Evaluation Guideline (EG) criteria for both manmade design basis accidents or evaluation basis accidents and for natural phenomena were developed.

Response:
Public and on-site EGs used at the WVDP were developed in the 1993 to 1994 time frame. WVNS-SAR-003, which addressed the Vitrification Facility and has been archived, contained a substantial discussion as to why various EGs where selected. Relevant pages from archived WVNS-SAR-003 are enclosed. Regarding public radiological EGs, Appendix A to DOE-STD-3009-94 stipulates 25 rem for operational accidents, regardless of frequency.

Comment 6
Section 8.2, Sources of Hazards:

In its comments on the PSAR, NRC staff considered Waste Stream 21 to represent the greatest risk for unanticipated accidents. Staff stated that the potential to generate explosive gases should be further investigated before operating the RHWF, or at least before handling and repackaging of these wastes. Section 8.2 of the SAR states that these containers are to be opened in a manner that minimizes the likelihood of an energetic event involving hydrogen during opening of the

containers and associated tanks. Describe the planned steps, or procedure DOE will use to open and process waste stream 21 containers to minimize the risk of an energetic event.

Response:
Waste Stream 21 consists of diatomaceous earth, clay absorbants, Zeolon 100 and water that were originally packaged in 175 gallon steel tanks in 1983. The steel tanks were subsequently overpacked into concrete boxes in 1993. The steel tanks each have a 20" manhole cover and two 2" penetrations in the top of the 14-gauge steel tank. One of the 2" penetrations was cut off with a saw and sealed with a plug so that the tank would fit into the overpack. The manhole cover has a bolted flange and gasket of unknown material. The attached URS calculation (#BUF-2003-091) indicates that this waste has the potential to contain hydrogen above the lower explosive limit if the steel tanks are sealed airtight. First, the 20"D gasket that has seen 20 years of service is very likely to be seriously degraded to the point that it certainly is not airtight. In addition, the penetration sealed with a plug is also very likely not airtight. Therefore, engineering judgement indicates that the assumption that the tanks are airtight is not reasonable. Second, the plan is to transfer these container into the Work Cell of the RHWF and open/vent them to the cell prior to processing the waste. This venting can be accomplished in several ways: (a) unbolt the manhole flange and remove the cover, (b) remove the plug from the 2" penetration, ©) punch a hole in the shell of the tank with a non-sparking tool modified for remote use, and (d) a combination of a, b, and/or c. Third, any operation performed on these containers will be governed by a work instruction package (WIP) in addition to the standard operating procedures for the in-cell processing equipment. The WIP will provide specific instructions to the operators regarding the sequence of operations and the tools to use to perform the work safely.

Comment 7
Section 1.2, Facility Description, Section 7.2, Low-Level, and TRU Wastes, and Section 8.2 Sources of Hazards:

Section 1.2 refers to Table 1.1-1. This table lists: waste streams to be processed in the RHWF, anticipated waste category (TRU, low-level Waste [LLW]), and waste dimension. Section 7.2 states that "DOE 435.1 is used for the characterization of radioactive waste prior to NRC classification of LLW." Section 8.2 states the "Waste streams 12 through 16 encompass the containers of components and debris that were generated as the result of the disassembly and removal of various components from the Chemical Process Cell (CPC). The CPC was used to dissolve spent nuclear fuel. Hence, CPC components are generally expected to be contaminated with a distribution of radionuclides that is consistent with the distribution of radionuclides that is found in spent fuel." Waste stream 23 consists of Waste Tank Farm HLW transfer and mobilization pumps. These pumps are contaminated with a distribution of radionuclides consistent with HLW. Has DOE conducted any Waste Incidental to Reprocessing (WIR) determinations in categorizing waste streams 12 through 16, and waste stream 23 identified in

Table 1.1-1? Are there any other anticipated waste streams that will be processed through the RHWF that should be added to Table 1.1-1? Would wastes from the D&D of the Vitrification Facility be a candidate waste stream for this table?

Response:
WIR determinations will be accomplished on waste streams processed through the Remote Handled Waste Facility in accordance with WV-929, "Waste Incidental to Waste Processing." The WIR evaluation for the mobilization and transfer pumps from Tanks 8D-1 and 8D-2 (i.e., waste stream 23) was performed and provided to DOE in WVNSCO Letter WD:2001:0720, dated November 1, 2001. Other waste streams that may be proposed at a later date for processing through the RHWF will be evaluated through the site's Unreviewed Safety Question Process as stated in Note 3 of Table1.1-1 of WVNS-SAR-023, Rev. 1, Draft D. These additional waste streams would also be evaluated in accordance with WV-929.

Comment 8
Section 5.3.2, Fire Suppression System:

This section indicates that the sprinkler system, will not be installed in the Work Cell, Buffer Cell, or Contact Maintenance Area. Explain why the sprinkler system for fire suppression will not be installed in Buffer Cell, Work Cell, and Contact Maintenance Area. What procedure or planned measures will be used to minimize fire hazard from the buildup of combustible materials from size reducing and repackaging activities in the Work Cell?

Response:
The possibility of fire in the Buffer Cell, Work Cell and Contact Maintenance Area was evaluated in the Fire Hazard Analysis (FHA). The FHA states that the Buffer Cell, Work Cell, and Crane Maintenance Area were exempted from having sprinkler systems for fire protection based on the low risk of a fire in these areas, low combustible loading, greater than 2-hour fire separation provided by shield walls, and inaccessibility for testing and maintaining an installed in-cell system. A fire in these areas is expected to self-terminate and be contained by the significant passive boundaries. The consequences and difficulties associated with installing a system that will introduce water into a highly contaminated area outweigh the fire protection benefits. During facility design reviews it was determined that the potential for a fire in these areas could be effectively minimized by controlling the amount of combustible materials present and by providing non-combustible filters (UL-586) for the cell exhaust system. The FHA also addressed the guidelines in DOE O 420.1, *Facility Safety*, NFPA 801, Standard for Facilities Handling Radioactive Material and other related NFPA standards. In Section 5.1.2 of the FHA, special criteria are provided for operations in these limited access areas. The Standard Operating Procedure (313-14) for RHWF Sorting will include precautions and limitations to address the

minimization of combustible materials in-cell. Furthermore, operator Emergency Response Procedures are being developed to respond to an in-cell fire.

Comment 9
Many of the details for the various safety programs are located in other documents that are referenced in this SAR. Please provide the following documents referenced in the SAR:

- Fire Hazards Analysis Remote-Handled Waste Facility (WV-report number);
- WVDP Hazard Protection Program provided in WVNS-SAR-001;
- Radiological Controls Manual (WVNS-010) and "associated calculations"; and
- NCSA/NCSE (WVNS-NCSE-005).

Response:
The above requested documents that could be forwarded electronically were sent on August 29, 2003. The "associated calculations" and information listed as follows are also provided:

- AR 2001-356, Assessment of Potential Radioactivity Emissions to the Atmosphere from the RHWF, dated August 21, 2001;

- WVNS-SAR-003, Rev. 9 (Draft B), Section C.9.1.1;

- URS Calculation No. BUF-2003-091, Rev. 0, "On The Generation of Hydrogen in Diatomaceous Earth Wastes," dated May 9, 2003; and

- WVNS-SAR-001, Rev. 8, "Safety Analysis Report for Waste Processing and Support Activities." (CD)