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SPECIAL PERFORMANCE ASSESSMENT (PA) RESULTS SUMMARY OF IMPACTS OF THE DISPOSAL OF WEST VALLEY GLASS MELTER IN AREA 5 RADIOACTIVE WASTE MANAGEMENT SITE (RWMS)

Enclosed is the subject document. The Special PA was requested to support the West Valley Glass Melter Waste Incidental to Reprocessing Determination. The Special PA was updated using the Area 5 RWMS PA Model, version 4.105.

If you have any questions, please contact Jhon T. Carilli at (702) 295-0672.

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Enclosure:
As stated

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NNSA/NSO Read File

**Special Performance Assessment Results Summary of Impacts
Of the Disposal of West Valley Glass Melter in
Area 5 Radioactive Waste Management Site (RWMS)**

The summary below is provided in a form suitable for direct incorporation into the Draft Waste Incidental to Reprocessing (WIR) Evaluation.

Key Radionuclides for the Area 5 RWMS

Key radionuclides are defined as those that contribute significantly to the maximum performance assessment results. Performance of the Area 5 RWMS was last evaluated at the end of Fiscal Year 2009 using the estimated closure inventory (National Securities Technologies, LLC, 2010).

The maximum member of public all-pathways dose occurred at 1,000 years for the resident farmer scenario. The resident farmer dose was predominately due to Tc-99 (78 percent) and Pb-210 (13 percent). Lead-210 present at 1,000 years is produced predominately by radioactive decay of U-234 present at the time of disposal.

The maximum acute intruder dose was observed at 1,000 years for the shallow land burial disposal units under the construction scenario. The acute intruder dose is caused by multiple radionuclides including Th-229 (30 percent), U-238 (29 percent), U-233 (16 percent), and U-234 (10 percent). The maximum chronic intruder dose occurred at 1,000 years for the intruder-agriculture scenario. The intruder-agriculture dose is due predominantly to Tc-99 (72 percent) and U-238 (14 percent). Chronic intruder doses continue to be calculated by the performance assessment model but are no longer reported in the Annual Summary Report for reasons specified in that report.

NSTec (National Securities Technologies, LLC), 2010. 2009 Annual Summary Report for the Area 3 and Area 5 Radioactive Waste Management Sites at the Nevada Test Site, Nye County, Nevada: Review of the Performance Assessments and Composite Analyses. Las Vegas, NV: National Security Technologies, DOE/NV/25946—893, March 2010.

Estimated Impact of the Vitrification Melter

The characteristics of the Vitrification Melter have been reviewed by the Nevada Test Site as part of the waste acceptance process, and disposal of the Melter has been considered by the Nevada Test Site Waste Acceptance Review Panel, a group of waste management specialists who review new and different waste streams planned for disposal in the Area 5 RWMS. These reviews, which were based on Revision 1 of the waste profile submitted by the West Valley Demonstration Project (West Valley Environmental Services, 2010), determined that the Vitrification Melter meets waste acceptance criteria, and that disposal of the Melter in the Area 5 Facility would have no significant impact on facility performance.

Even though the Vitrification Melter waste package meets waste acceptance criteria, a special performance assessment was performed to quantify the potential dose impact of disposal of this equipment in the Area 5 Facility for perspective and additional information (DOE 2010b). The impact was assessed by evaluating the Area 5 shallow land burial inventory disposed through Fiscal Year 2009 with and without the Vitrification Melter inventory. Table 5-1 shows the all-pathways results for members of the public.

Table 5-1. Estimated Dose Impacts Associated With Vitrification Melter Disposal (mrem/y)⁽¹⁾

Limiting Pathway/Scenario (Probability)	Limit	Estimated Maximum		
		Area 5 (Without Melter)	Area 5 (With Melter)	Difference (Due to Melter)
Member of Public: All Pathways/Resident Farmer (Mean)	25	1.4	1.4	Negligible
Member of Public: All Pathways/Resident Farmer (95 th Percentile)	25	4.5	4.5	Negligible

NOTES: (1) Information is from DOE 2010b. The limiting pathways/scenarios are those estimated to produce the highest dose. In each case, the peak annual dose is estimated to occur 1,000 years after facility closure.

The information in Table 5-1 shows that disposal of the Vitrification Melter in the Area 5 facility is estimated to have no significant impact on facility performance insofar as members of the public are concerned.

5.2.3 Protection of Individuals from Inadvertent Intrusion

Department of Energy (DOE) requirements of DOE Manual 435.1-1, Section IV.P(2)(h), for protection of individuals from inadvertent intrusion read as follows:

“For purposes of establishing limits on the concentration of radionuclides that may be disposed of near-surface, the performance assessment shall include an assessment of impacts calculated for a hypothetical person assumed to inadvertently intrude for a temporary period into the low-level waste disposal facility. For intruder analyses, institutional controls shall be assumed to be effective in deterring intrusion for at least 100 years following closure. The intruder analyses shall use performance measures for chronic and acute exposure scenarios, respectively, of 100 millirem in a year and 500 millirem total effective dose equivalent excluding radon in air.”

Assessment of Area 5 Performance

The report of the most recent annual review of performance assessments and composite analyses for the Area 3 and Area 5 waste disposal facilities at the Nevada Test Site (NSTec, 2010) indicates that there is a reasonable expectation that the Area 5 facility will meet the intruder dose criteria. The limiting exposure pathway and scenario is the acute construction scenario as indicated in Table 5-2

Estimated Impact of the Vitrification Melter

Table 5-2 shows the estimated impacts of disposal of the Vitrification Melter in the Area 5 facility.

Table 5-2. Estimated Acute Dose Impacts to an Inadvertent Intruder Associated With Vitrification Melter Disposal (mrem/y)⁽¹⁾

Limiting Pathway/Scenario (Probability)	Limit	Estimated Maximum		
		Area 5 (Without Melter)	Area 5 (With Melter)	Difference (Due to Melter)
Inadvertent Intruder: Construction (mean)	500	280	280	Negligible
Inadvertent Intruder: Construction (95 th Percentile)	500	600	600	Negligible

NOTES: (1) Information is from DOE 2010b. The limiting pathways/scenarios are those estimated to produce the highest dose. In each case, the peak annual dose is estimated to occur 1000 years after facility closure.

The information in Table 5-2 shows that disposal of the Vitrification Melter in the Area 5 facility is estimated to have no significant impact on facility performance insofar as inadvertent intruders are concerned.