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ENGINEERING DATA TRANSMITTAL

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1	WHC-SD-WM-DP-161	N/A	0	45-Day Safety Screening Report for Tank 241-AP-101, Grab Samples 1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5, and 1AP-95-6	Q	2	1	1

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45-DAY SAFETY SCREENING REPORT FOR TANK 241-AP-101. GRAB SAMPLE 1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5, 1AP-95-6

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Abstract: N/A

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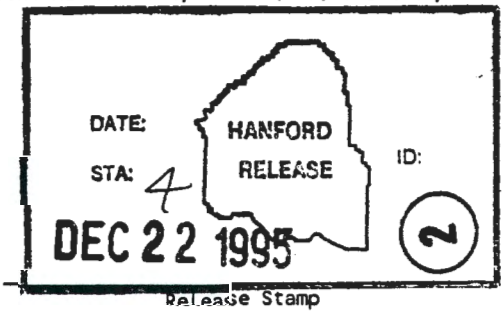

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WHC-SD-WM-DP-161, REV. 0

ANALYTICAL SERVICES

45-DAY SAFETY SCREENING RESULTS FOR TANK 241-AP-101, GRAB SAMPLES 1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5, AND 1AP-95-6

Project Coordinator: RUTH A. ESCH

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

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NARRATIVE

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45 DAY SAFETY SCREENING REPORT FOR TANK 241-AP-101 GRAB SAMPLES 1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5, AND 1AP-95-6

Summary

Six supernate grab samples (1AP-95-1, 1AP-95-2, 1AP-95-3, 1AP-95-4, 1AP-95-5, and 1AP-95-6) and one field blank (1AP-95-7) were taken from tank 241-AP-101. The following analyses were performed in support of the Safety Screening program: differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and total alpha activity (AT). One duplicate result exceeded the notification limit of 480 joules/g (dry weight) stated in the TSAP and the Safety Screening Data Quality Objective (references 1 & 2). The original sample and a third analysis that were run both exhibited no exotherms. Appropriate notifications were made. The need for reruns and/or secondary analyses is being discussed.

Based on the results of vapor monitoring prior to sampling, the vapor in tank AP-101 dome space is far below the lower flammability limits (LFL) stated in the TSAP. Further evaluation of the energetics (DSC) results must take place before the determination of this tank's safety status can be made.

Scope

This document serves as the 45 day report deliverable for the tank 241-AP-101 liquid grab samples collected on November 10 and 13, 1995, and received by the 222-S Laboratory on those same days. The samples were subsampled and analyzed in accordance with the TSAP. Included in this report are the primary safety screening results obtained from the analyses, and copies of all DSC and TGA raw data scans, as requested in the TSAP. The results of the tank dome space flammability screening are also included.

Compatibility Safety issue analyses are also being performed in accordance with the TSAP. These results will be reported in the final report.

Tank Dome Space Flammability Screening

Prior to collecting grab samples, the dome space was sampled and analyzed for the presence of flammable gases. Although the TSAP indicates that the results shall be reported as a percentage of the lower flammability limit (LFL), the instrumentation used to collect the data reports as a percentage of the lower explosive limit (LEL). The Industrial Hygiene engineer responsible for the testing stated that the two values are equivalent. The results of the combustible gas monitoring inside both riser 1 at 210° and riser 1 at 330° are presented in Table 1.

Table 1: Characteristics of Vapor Space in Tank 241-AP-101 Determined by Combustible Gas Monitoring

Vapor Characteristic Measured	Riser 1 @ 210°	Riser 1 @ 330°
Flammable vapor concentration as percent of lower explosion limit (LEL)	0.0%	0.0%
Volume percent oxygen gas	20.7%	20.8%
Concentration of ammonia gas	125 ppm	<200 ppm
Concentration of total organic carbon vapor	9.8 ppm	7.9 ppm

ppm = parts per million

Appearance, OTR and Sample Breakdown

Attachment 1 is provided as a cross-reference for relating the tank farm customer ID numbers with the 222-S Laboratory LABCORE sample numbers. It also identifies the subsamples that were analyzed for inorganic and radionuclide analyses. Each subsample was approximately 20 mL.

Table 2 summarizes the appearance information and the over-the-top (OTR) dose rate readings that were taken for these samples. The reported sampling depths were recorded from the tank farm sample labels attached to the sample container. Note that the depths reported for samples 1AP-95-1 and 1AP-95-2 are switched from those indicated in the TSAP. This change was not recorded on the chain of custody form.

Table 2: Appearance and OTR for Tank 241-AP-101 Liquid Grab Samples

CUSTOMER ID	LAB ID	SAMP DEPTH (IN.)	APPEARANCE				OTR (MRAD/HR)
			Color	Clarity	Org Layer	Solids	
1AP-95-1	S95T003717	516	Yellow	Clear	None	None	3300
1AP-95-2	S95T003718	383	Yellow	Clear	None	None	3500
1AP-95-3	S95T003719	640	Yellow	Clear	None	None	3500
1AP-95-4	S95T003725	383	Yellow	Clear	None	None	3000
1AP-95-5	S95T003726	516	Yellow	Clear	None	None	3400
1AP-95-6	S95T003727	640	Yellow	Clear	None	None	3800
1AP-95-7 Field Blank	S95T003720	240	Colorless	Clear	None	None	0.5

Analytical Results

Attachments

Table 3 is the summary report from the Laboratory Information Management System (LABCORE). Table 4 is supplied to provide the endothermic energy measured, and the calculated net energy for the two samples that gave exotherms. The net energy is defined as (exothermic energy - endothermic energy). The endothermic energy and temperatures were obtained from the raw data. Raw data for the DSC and TGA analyses are also attached.

Thermogravimetric Analysis (TGA)

The percent moisture content was determined by TGA using procedure LA-514-114 Rev. C-1. The analysis was performed in duplicate on direct samples. Results were in the range of 56.03 to 60.56 percent moisture. The field blank gave an average result of 99.41 percent moisture. The relative percent difference (RPD) between sample and duplicate results for all samples were within the criterion of ±10% stated in the TSAP. Each sample (except the field blank) produced a second weight loss step of approximately 3% to 5% between 175° C and 300° C.

Differential Scanning Calorimetry (DSC)

The energetics determination was performed by DSC using procedure LA-514-114 Rev. C-1 and LA-514-113 Rev. C-1. The two procedures are for the Perkin Elmer and Mettler instruments, respectively, and are analytically equivalent. The analysis was performed in duplicate on direct samples. Two samples exhibited an exotherm for the duplicate analysis. In both cases, the original sample analysis did not exhibit an exotherm.

Sample 1AP-95-4 (S95T003728) duplicate had an exotherm of 38.70 joules/g. The average moisture content for this sample was 60.29%, which gives a result of 97.5 joules/g for the dry weight exothermic energy. The mean dry weight value is 48.73 joules/g with a 95% upper confidence value of 356.4 joules/g (statistical calculations are provided in the memo to R. A. Esch from R. D. Cromar in the Correspondence section of this document). These statistics indicate that no additional analyses are required for this sample.

Sample 1AP-95-6 (S95T003730) duplicate had an exotherm of 381.8 joules/g. The average moisture content for this sample was 56.47%, which gives a result of 877.1 joules/g for the dry weight exothermic energy. This value exceeded the action limit of 480 joules/g (dry weight). Appropriate notifications were made. A triplicate analysis on this sample exhibited no exothermic energy. The mean value for the three runs was 292 joules/g with a 95% upper confidence value of 1146 joules/g (statistical calculations are provided in the memo to R. A. Esch from R. D. Cromar in the Correspondence section of this document). The need for additional reruns and/or secondary analyses for this sample is being evaluated. If further analyses are required, those results will be provided in a revision to this report.

Total Alpha (AT)

The AT determination was performed using procedure LA-508-101 Rev. D-2. The analysis was performed in duplicate on direct samples. Each sample was analyzed in replicate. All results were less than the detection level and the highest of the two replicates was reported as the "less than" result. The detection limit is calculated based on the detector background at the time each analytical batch is analyzed.

References

1. WHC-SD-WM-TSAP-062, Rev. 0-A, "Tank 241-AP-101 Grab Sampling and Analysis Plan", dated November 29, 1995, Westinghouse Hanford Company, Richland, WA 99352

2. WHC-SD-WM-SP-004, Rev. 2, "Tank Safety Screening Data Quality Objective", dated August 31, 1995, Westinghouse Hanford Company, Richland, WA 99352

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SD-WM-DP-161, Rev 0
241-AP-101

Due to the large volume,
a copy of the data
supporting the Data
Validation Report and
the Sample Data Summary,

Pages 6 thru 73,

is available only from
Central Files.

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DISTRIBUTION SHEET

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