

Waste Tank Vapor Project:

**Vapor Characterization of Tank 241-C-103:
Data Report for OVS Samples Collected From
Sample Job 7b, Parts I & II, Received 5/18/94
and 5/24/94**

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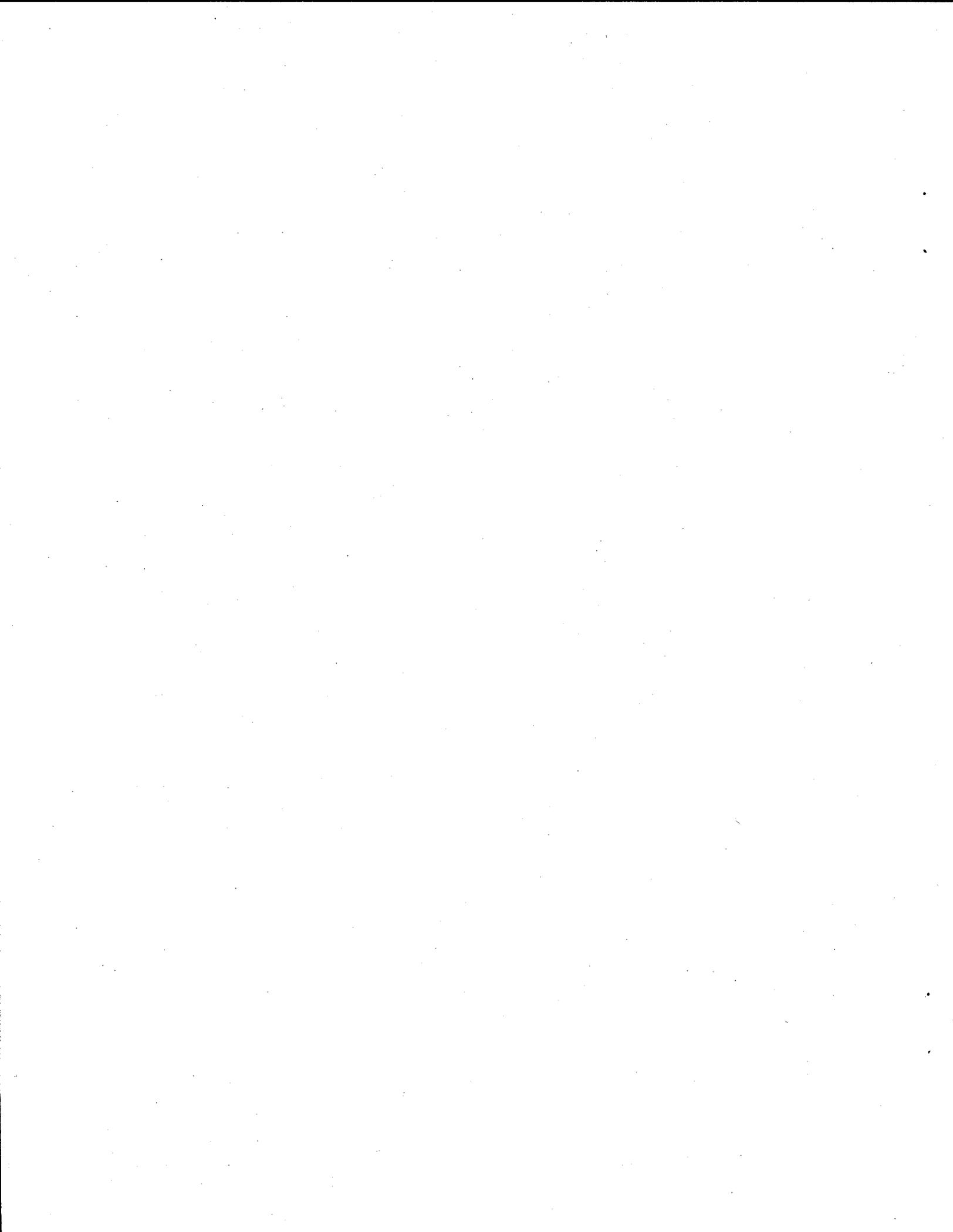
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Summary

On 5/18/94, Westinghouse Hanford Company (WHC) delivered samples to Pacific Northwest Laboratory (PNL) that were collected from waste Tank 241-C-103 on 5/16/94. These samples were from Sample Job (SJ) 7B, Part I. On 5/24/94, WHC delivered samples to PNL that were collected from waste Tank 241-C-103 on 5/18/94. These samples were from SJ7B, Part II.

A summary of data derived from the sampling of waste Tank 241-C-103 for gravimetric (H_2O) and normal paraffin hydrocarbon (NPH) concentrations are shown for SJ7B in the summary table below. Gravimetric analysis was performed on the samples within 24 hours of receipt by PNL. The reported concentration of H_2O is higher for Part II than for Part I. This can be explained by the addition of the mass for H_2O collected by the Occupational Safety and Health Administration (OSHA) versatile samplers (OVS) in Part II to the total H_2O measurement. Gravimetric data were not collected on the OVS tubes sampled in SJ7B Part I.

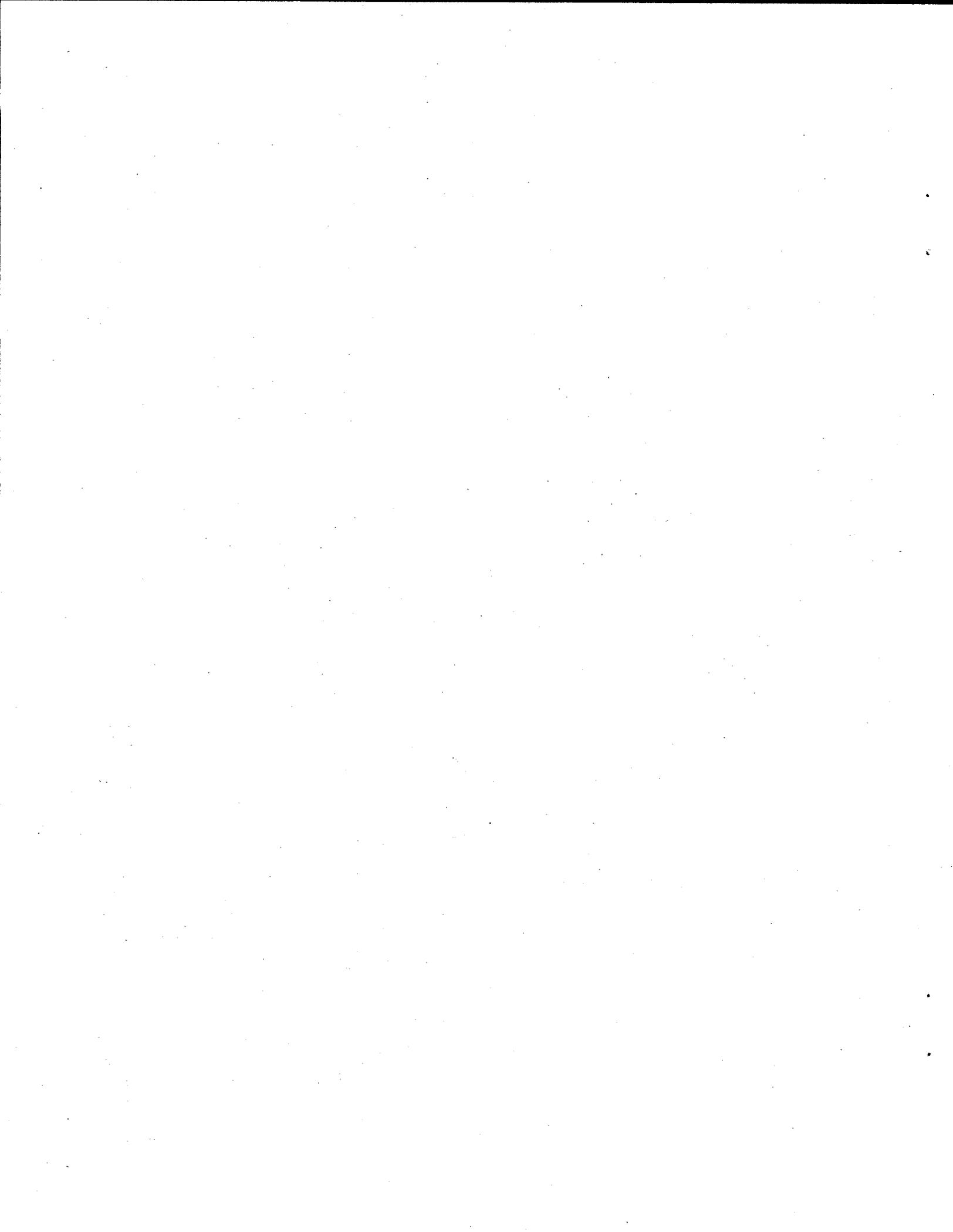
The average normal paraffin hydrocarbon (NPH) concentration of 10 samples collected for Part I was slightly higher than the average concentration for 15 samples collected in Part II, $812 (\pm 133) \text{ mg/m}^3$ and $659 (\pm 88) \text{ mg/m}^3$, respectively. The higher concentrations measured in Part I samples may be because the samples in Part I were collected at a single level, 0.79 meters above the air-liquid interface. Part II samples were collected at three different tank levels, 0.79, 2.92, and 5.05 m above the air-liquid interface.

In Part II, the average NPH concentration for 5 samples collected at each of three levels was similar: $697 (60) \text{ mg/m}^3$ at the low level, $631 (51) \text{ mg/m}^3$ at the mid level, and $651 (134) \text{ mg/m}^3$ at the high level. It is important to note that the measured tridecane to dodecane concentration remained constant in all samples collected in Parts I and II. That ratio is 1.2 ± 0.05 . This consistent ratio indicates that there were no random analytical biases towards either compound.

Summary Table

Summary of Data from OVS Tubes in Sample Job 7B.
Data were taken from (a) averages from data shown in Table 1, (b) Table 3, and (c) Table 4.

<u>Analyte</u>	<u>Average Concentration ($\mu\text{g/L}$)</u>
H_2O (a)	3×10^4
NPH(b) total	7×10^2
C11(c)	$2-3 \times 10$
C12(c)	3×10^2
C13(c)	$3-4 \times 10^2$
C14(c)	5×10



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Waste Tank Vapor Project:

Vapor Characterization Of Tank 241-C-103: Data Report for OVS Samples Collected From Sample Job 7b, Parts I & II, Received 5/18/94 and 5/24/94

Introduction

Westinghouse Hanford Company (WHC) collected samples from a heated tube inserted into the vapor space of waste Tank 241-C-103. The sampling media, Occupational Safety and Health Administration (OSHA) versatile sampler (OVS) tubes, were used to measure the normal paraffin hydrocarbon (NPH) content of the collected vapor. The sampling event, referred to as Sample Job (SJ) 7B, was separated into two parts. Part I OVS tubes were collected on 5/16/94 and delivered to Pacific Northwest Laboratory (PNL)^(a) on 5/18/94. Part II OVS tubes were collected on 5/19/94 and delivered to PNL on 5/24/94. The analytical results from samples collected in Part I were to be used to investigate the potential for losses during sample collection and to assess the reproducibility of sample collection. The analytical data from samples collected in Part II of this sampling event were to be used to determine if the organic components in the vapor head space of Tank 241-C-103 are stratified.

Samples Received

The samples brought to PNL were delivered in a cooler containing ice. Organic and inorganic sample tubes were logged in and inspected upon delivery to the 300 area 326/23B laboratory. The organic samples received for Part I included 15 collected OVS tubes connected to silica tubes, 5 OVS trip blanks, and 5 OVS spiked blanks. The organic samples received for Part II included 15 collected OVS tubes connected to silica tubes, 5 OVS trip blanks, and 5 OVS spiked blanks. The samples were transported to 329/13A where the tube assembly was separated for subsequent analysis.

Sample Preparation

The analytical results from samples collected in Part I were to be used to investigate the potential for losses during sample collection and to assess the reproducibility of the sampling system. The OVS tubes prepared for Part I were spiked with deuterated dodecane (C₁₂D₂₆) at levels one fourth and two times the expected collected sample mass, five at each level. The same tubes were spiked with tridecane at one fourth and two times the expected collected sample mass, respectively, to serve as a standard addition. Another set of 5 OVS tubes was prepared for the field, unspiked. All 15 sample tubes were attached to a preweighed silica sorbent tube. A clamp was placed on the C-FLEX[®] tubing between the two sampling media.

(a) Pacific Northwest Laboratory is operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

The analytical data from samples collected in Part II of this sampling event will be used to determine if the organic components in the vapor headspace of Tank 241-C-103 are stratifying. The sampling media prepared for this event included 15 preweighed OVS tubes connected to each of 15 preweighed silica sorbent tubes. A clamp was placed on the C-FLEX® tubing between the two sampling media.

Gravimetric Analysis

The OVS and silica-tube samples obtained in the vapor space of waste Tank 241-C-103 were removed from the plastic Zip-Lock® bags (outer) and aluminum foil (inner) wrappings and separated from the C-FLEX® tubing. Red end caps were placed on each end of the silica tubes. The silica tubes were held in the 329/7A refrigerator until the time of analysis.

Gravimetric analysis was performed on all the silica tubes within 24 hours of receipt. The silica tubes were weighed, with the red end caps removed, on a Mettler AC 100 balance located in 329/3A. Gravimetric analysis was performed on OVS tubes collected from Part II only. The gravimetric data for the silica tubes from Part I of this sample job are listed in Table 1. The gravimetric data for the samples collected in Part II for OVS and silica are listed in Table 2. It should be noted that mass gains observed for OVS tubes with WHC #S4029-B24-P11 through S4029-B28-P15 are much lower than mass gains observed on the other 10 OVS samples collected in Part II. Field information correlating collected samples with the riser level of the waste tank indicates that these samples were collected at the highest level above the tank air-liquid interface, 5.05 meters.

Analytical Procedure

The OVS tubes were divided into two portions: the front portion contained the glass fiber filter and the front XAD-2 sorbent bed, and the back portion contained the polyurethane foam (PUF) separator, the second XAD-2 sorbent bed, and the PUF plug. Each portion was placed in a labeled 4-mL vial fitted with a Teflon®-lined screw cap.

Front and back portions of the OVS tubes were desorbed by adding 1 mL of carbon disulfide to each vial, recapping the vial, and sonicating for 30 minutes. Portions of the extract were transferred to an auto-sampler vial, to which aliquots of naphthalene-d8 internal standard were also added. The remainder is archived against future analyses. The samples were analyzed using a HP 5890/5970 gas chromatograph/mass spectrometer (GC/MS) instrument under scan acquisition. Quantitation was performed by monitoring a single ion at 57 amu for the n-alkane analytes (C11-C15), at 66 amu for deuterated dodecane (C12d26), and at 136 amu for the deuterated naphthalene (internal standard). Quantitation of the NPH analytes (C11-C15) and C12d26 was performed using the internal standard method.

Results of Waste Tank 241-C-103 Vapor Space Samples

NPH Mass Collected on OVS

An initial analysis of these samples indicated that the amount of dodecane and tridecane collected on the tubes exceeded the instrument's calibration for these analytes, and the sample had to be diluted for accurate mass determination by GC/MS analysis. However, this initial analysis of the OVS tubes was required to obtain accurate masses for undecane, tetradecane, and pentadecane collected on the tube.

Table 3 lists the GC/MS analytical results for all OVS samples collected for Part I. Table 3 also lists the results for Part I samples correcting for the tridecane (C13) standard addition. These results have been corrected for experimentally-determined adsorption of the OVS for NPH. However, a desorption factor for deuterated dodecane has not been determined for OVS tubes, and no correction was applied.

The average recovery of deuterated dodecane was $81\% \pm 7$ for samples S4025-C31-P06 through S4025-C35-P10, which were spiked at one-fourth the expected total NPH loading mass. Recovery of deuterated dodecane was 78% for samples S4025-C36-P11 through S4025-C40-P15, which were spiked at two times the expected total NPH loading mass. The recovery for C12d26 was similar to measurements in recovery expectations calculated with dodecane.

Difficulties with the GC/MS were experienced for samples S4025-C36-P11 through S4025-C40-P15. These were the samples that were logged as being spiked with twice the expected amount of tridecane. Repeated MS analysis of diluted sample aliquots yielded data which indicate that an inadvertent error in the laboratory may have resulted in the OVS not being spiked with additional tridecane before sending them to the field. Ratios of tridecane to dodecane seen in typical, unspiked samples collected in SJ7B, ranged from 1.1 to 1.3. A sample spiked with twice the amount of tridecane would have yielded a tridecane to dodecane ratio of 3.3 to 4. These samples showed tridecane to dodecane ratios of 1.11 to 1.16. Since the laboratory record book entry indicating the spike level for this set of samples is inconsistent with the GC/MS results, NPH data for these samples are not reported.

The front portions of the OVS tubes contained more than 90% of the NPH mass observed in all samples analyzed from Parts I and II. The back portions of the OVS tubes exhibited 10% or less of the total C12 and C13 seen in these samples. Surrogate data are not available at this time to determine if further corrections should be made.

Table 3 lists total NPH concentrations of Part I and Part II samples calculated by using the total collected sample masses which have been corrected for the deuterated dodecane surrogate spike recoveries measured in part I samples. The volumes used to calculate these concentrations were provided by the WHC field sampling team, corrected for the tank vapor space temperature of 38°C and 740 Torr.

Table 4 lists the measured NPH analyte concentrations in mg/m^3 and ppmv for Part I and II OVS samples. The concentrations are calculated from analyte masses corrected for the deuterated dodecane surrogate spike recoveries measured in Part I samples. The volumes used to calculate these concentrations were provided by the WHC field sampling team, corrected for the tank-vapor-space temperature of 38°C and 740 Torr.

Table 5 lists the percent distribution of NPH analytes measured in Part I and II OVS samples. The analyte distribution observed for SJ7B collected samples shows an increase in total mass contribution from undecane (3 to 4%) versus direct vapor space samples collected in December (Ligotke et al. March 1994) which exhibited negligible undecane contribution (0.5 to 1.5%). The total mass contribution of tetradecane for samples collected in SJ7B ranged from 6 to 7.5% while tetradecane mass contributions in direct vapor space samples averaged $12.2 \pm 1.7\%$.

Table 6 lists the results for the deuterated dodecane surrogate spiked samples. The recovery values are listed as a percent of the spiked value. The recoveries for these samples showed good agreement for 9 samples reported. The average recovery for all samples reported, $79 \pm 6\%$ was used as a correction factor for all NPH analytes reported. This correction factor replaces the desorption efficiency factors used in previous studies.

Table 7 lists the recoveries of field blanks spiked with NPH analytes. The overall average of 10 spiked field blanks shows reasonably good agreement with recoveries observed in previous desorption efficiency studies.

Normal paraffin hydrocarbons were not detected in the laboratory blanks or trip blanks collected for this sampling event.

Conclusion

The concentration of NPHs for the samples collected in Parts I and II were slightly lower than concentrations previously reported from direct sampling of the waste Tank 241-C-103 headspace. A PNL March, 1994 report by Ligothke et al. indicated that the concentration of NPH analytes was estimated to be 1.08 (.23) mg/L using the average of OVS samples collected for 20 minutes (4.4 L). This was a conservative estimate when compared to samples collected for 1 minute (.22 L) and 4 minutes (.88 L) in the same study, which exhibited NPH concentrations of 0.77 (.10) mg/L and 0.70 (0.08) mg/L, respectively. Ten minute (2.5 L) samples collected for Part I of this study gave an average NPH concentration of 0.81 (0.13) mg/L, and samples collected for Part II of this study resulted in an average NPH concentration of 0.66 (0.09) mg/L. While these values compare closely to those found in the March 1994 report, the differences observed in NPH concentration may be attributed to slight differences between the sampling techniques used in SJ7B and the previous study. The changes observed in the NPH analyte distribution for samples collected in SJ7B may be attributed to loss of some tetradecane to the high efficiency particulate air (HEPA) filter in a heated sampling tube. Tank air collected from direct vapor space sampling did not flow through a HEPA filter before deposition onto the OVS tube. The only barrier to any particulate in that sampling technique was the glass fiber filter located at the front portion of the OVS tube. Tetradecane as particulate (aerosol) would have been desorbed from the OVS tube to contribute to total measured NPH.

Reference

Ligothke, M. W., T. R. Clauss, J. S. Fruchter, G. M. Mong, R. E. Hohimer, R. B. Lucke, G. W. Dennis, M. McCulloch, M. T. Dana, and S. C. Goheen. 1994. *Aerosol and Vapor Characterization of Tank 241-C-103: Data Report for In-Tank OVS Samples Obtained 12/02/93*. PNL-9368, Pacific Northwest Laboratory, Richland, Washington.

Table 1. Summary List of PNL Silica and OVS Samples Collected from Tank 241-C-103 for Sample Job 7B Part I. Gravimetric data were determined within 24 hours of sample receipt by PNL. All samples were weighed on a Mettler AC 100 balance.

<u>WHC Sample ID</u>	<u>Sample Description</u>	<u>Sample Elevation (m)</u>	<u>Actual Sample Volume (a) (L)</u>	<u>H₂O Mass (mg)</u>	<u>Average H₂O Mass Gain (mg)</u>
S4025-C26.P01	Silica # 1	0.79	2.501	75	
S4025-C27.P02	Silica # 2	0.79	2.501	76	
S4025-C28.P03	Silica # 3	0.79	2.501	78	
S4025-C29.P04	Silica # 4	0.79	2.501	73	
S4025-C30.P05	Silica # 5	0.79	2.501	78	75
S4025-C31.P06	Silica # 6	0.79	2.501	72	± 3
S4025-C32.P07	Silica # 7	0.79	2.501	74	
S4025-C33.P08	Silica # 8	0.79	2.501	72	
S4025-C34.P09	Silica # 9	0.79	2.501	78	
S4025-C35.P10	Silica #10	0.79	2.501	72	
S4025-C36.P11	Silica #11	0.79	2.501	75	
S4025-C37.P12	Silica #12	0.79	2.501	73	
S4025-C38.P13	Silica #13	0.79	2.501	75	
S4025-C39.P14	Silica #14	0.79	2.501	74	
S4025-C40.P15	Silica #15	0.79	2.501	85	
S4025-C26-P01	OVS 1	0.79	2.501	NA	NA
S4025-C27-P02	OVS 2	0.79	2.501	NA	NA
S4025-C28-P03	OVS 3	0.79	2.501	NA	NA
S4025-C29-P04	OVS 4	0.79	2.501	NA	NA
S4025-C30-P05	OVS 5	0.79	2.501	NA	NA
S4025-C31-P06	OVS 6	0.79	2.501	NA	NA
S4025-C32-P07	OVS 7	0.79	2.501	NA	NA
S4025-C33-P08	OVS 8	0.79	2.501	NA	NA
S4025-C34-P09	OVS 9	0.79	2.501	NA	NA
S4025-C35-P10	OVS 10	0.79	2.501	NA	NA
No WHC #	Silica Laboratory Surrogate #1			6	
No WHC #	Silica Laboratory Surrogate #2			5	
No WHC #	Silica Laboratory Surrogate #3			2	
No WHC #	Silica Field Spare #1			1	
No WHC #	Silica Field Spare #2			-4	
No WHC #	Silica Field Spare #3			-1	

Table 2. Summary List of PNL Silica and OVS Samples Collected from Tank 241-C-103 for Sample Job 7B Part II. Gravimetric data was determined within 24 hours of sample receipt by PNL. All samples were weighed on a Mettler AC100 balance.

<u>WHC Sample ID</u>	<u>Sample Description</u>	<u>Sample Elevation (m)</u>	<u>Actual Sample Volume (a) (L)</u>	<u>H₂O Mass (mg)</u>	<u>Average H₂O Mass Gain (mg)</u>
S4029-A34-P01	Silica Sample #1	0.79	2.492	62	
S4029-A35-P02	Silica Sample #2	0.79	2.492	60	
S4029-A36-P03	Silica Sample #3	0.79	2.492	58	
S4029-A37-P04	Silica Sample #4	0.79	2.492	58	
S4029-A38-P05	Silica Sample #5	0.79	2.492	60	
S4029-B10-P06	Silica Sample #1	2.92	2.492	65	
S4029-B11-P07	Silica Sample #2	2.92	2.492	58	63
S4029-B12-P08	Silica Sample #3	2.92	2.492	61	± 6
S4029-B13-P09	Silica Sample #4	2.92	2.492	58	
S4029-B14-P10	Silica Sample #5	2.92	2.492	64	
S4029-B24-P11	Silica Sample #1	5.05	2.492	61	
S4029-B25-P12	Silica Sample #2	5.05	2.492	71	
S4029-B26-P13	Silica Sample #3	5.05	2.492	66	
S4029-B27-P14	Silica Sample #4	5.05	2.492	77	
S4029-B28-P15	Silica Sample #5	5.05	3.234	70	
S4029-A49-P16	Silica Field Spare #1	na	na	0	
S4029-A50-P17	Silica Field Spare #2	na	na	1	
S4029-A51-P18	Silica Field Spare #3	na	na	-1	
S4029-A34-P01	OVS 1	0.79	2.492	39	
S4029-A35-P02	OVS 2	0.79	2.492	55	
S4029-A36-P03	OVS 3	0.79	2.492	41	
S4029-A37-P04	OVS 4	0.79	2.492	35	38
S4029-A38-P05	OVS 5	0.79	2.492	45	± 8
S4029-B10-P06	OVS 1	2.92	2.492	29	
S4029-B11-P07	OVS 2	2.92	2.492	37	
S4029-B12-P08	OVS 3	2.92	2.492	28	
S4029-B13-P09	OVS 4	2.92	2.492	36	
S4029-B14-P10	OVS 5	2.92	2.492	36	
S4029-B24-P11	OVS 1	5.05	2.492	1	
S4029-B25-P12	OVS 2	5.05	2.492	7	
S4029-B26-P13	OVS 3	5.05	2.492	4	6.4
S4029-B27-P14	OVS 4	5.05	2.492	14	± 5
S4029-B28-P15	OVS 5	5.05	3.234	6	

Table 3. Summary List of PNL OVS Samples Collected From Tank 214-C-103 for Sample Job 7b. NPH analyte concentrations are calculated from corrected volumes provided by WHC and NPH mass results corrected for SJ7B Part I, spiked surrogate sample recoveries

<u>WHC Field ID</u>	<u>Sample Description</u>	<u>Sample Elevation</u>	<u>Sample Volume (L)</u>	<u>Corrected NPH Mass (μg)</u>	<u>NPH Concentration (38° C, 740 Torr)</u>		<u>Average NPH Concentration (mg/m³, ppmv)</u>
					(mg/m ³)	(ppmv)	
S4025-C26-P01	OVS 1	0.79	2.501	2087	900	133	
S4025-C27-P02	OVS 2	0.79	2.501	1453	627	93	823
S4025-C28-P03	OVS 3	0.79	2.501	1612	696	103	$\pm 134 \text{ mg/m}^3$
S4025-C29-P04	OVS 4	0.79	2.501	1648	711	105	
S4025-C30-P05	OVS 5	0.79	2.501	2000	863	127	
S4025-C31-P06	OVS 6	0.79	2.501	1939	775	114	121
S4025-C32-P07	OVS 7	0.79	2.501	2712	1084	161	$\pm 20 \text{ ppmv}$
S4025-C33-P08	OVS 8	0.79	2.501	2192	876	128	
S4025-C34-P09	OVS 9	0.79	2.501	1931	772	114	
S4025-C35-P10	OVS 10	0.79	2.501	2313	925	135	
S4029-A34-P01	OVS 1	0.79	2.492	1691	679	100	697
S4029-A35-P02	OVS 2	0.79	2.492	1721	691	102	$\pm 60 \text{ mg/m}^3$
S4029-A36-P03	OVS 3	0.79	2.492	1932	775	114	
S4029-A37-P04	OVS 4	0.79	2.492	1531	615	91	103
S4029-A38-P05	OVS 5	0.79	2.492	1813	728	107	$\pm 9 \text{ ppmv}$
S4029-B10-P06	OVS 1	2.92	2.492	1547	621	92	631
S4029-B11-P07	OVS 2	2.92	2.492	1370	550	81	$\pm 51 \text{ mg/m}^3$
S4029-B12-P08	OVS 3	2.92	2.492	1585	636	94	
S4029-B13-P09	OVS 4	2.92	2.492	1651	663	98	93
S4029-B14-P10	OVS 5	2.92	2.492	1704	684	101	$\pm 8 \text{ ppmv}$
S4029-B24-P11	OVS 1	5.05	2.492	1399	561	83	651
S4029-B25-P12	OVS 2	5.05	2.492	1676	672	99	$\pm 134 \text{ mg/m}^3$
S4029-B26-P13	OVS 3	5.05	2.492	1547	621	91	
S4029-B27-P14	OVS 4	5.05	2.492	2165	869	128	96
S4029-B28-P15	OVS 5	5.05	3.234	1711	529	78	$\pm 20 \text{ ppmv}$
Overall Average					721		
					± 130		

Table 4. Summary List of NPH Analyte Distribution for PNL OVS Samples Collected From Waste Tank 241-C-103, Sample Job 7B. NPH analyte concentrations are calculated from masses corrected for SJ7B Part I dodecane and tridecane spike recoveries and using sample volumes provided by WHC.

WHC Sample ID	Sample Description	C11		C12		C13		C14	
		mg/m ³	ppmv						
Part I									
S4025-C26-P01	OVS 1	25	4	380	59	447	64	48	6
S4025-C27-P02	OVS 2	25	4	263	41	295	42	44	6
S4025-C28-P03	OVS 3	26	4	285	44	350	50	35	5
S4025-C29-P04	OVS 4	25	4	291	45	354	50	41	5
S4025-C30-P05	OVS 5	28	5	358	55	429	61	48	6
S4025-C31-P06	OVS 6	24	4	291	45	417	59	44	6
S4029-B11-P07	OVS 7	26	4	501	77	510	73	46	6
S4025-C33-P08	OVS 8	26	4	296	46	407	58	41	5
S4025-C34-P09	OVS 9	26	4	311	48	402	57	34	4
S4025-C35-P10	OVS 10	39	7	318	49	453	65	115	15
Average		27	5	329	51	406	58	50	7
Standard Deviation		± 4	+ 1	± 70	± 11	± 61	± 9	± 23	± 3
Part II									
S4029-A34-P01	OVS 1	24	4	278	43	324	46	53	7
S4029-A35-P02	OVS 2	25	4	286	44	328	47	51	7
S4029-A36-P03	OVS 3	28	5	322	50	377	54	48	6
S4029-A37-P04	OVS 4	25	4	257	40	290	41	43	6
S4029-A38-P05	OVS 5	25	4	304	47	348	50	51	7
S4029-B10-P06	OVS 1	24	4	251	39	300	43	45	6
S4029-B11-P07	OVS 2	23	4	228	35	257	37	42	6
S4029-B12-P08	OVS 3	23	4	262	40	307	44	44	6
S4029-B13-P09	OVS 4	25	4	278	43	310	44	49	7
S4029-B14-P10	OVS 5	26	4	281	43	331	47	46	6
S4029-B24-P11	OVS 1	19	3	220	34	279	40	42	6
S4029-B25-P12	OVS 2	24	4	268	41	330	47	50	7
S4029-B26-P13	OVS 3	20	3	245	38	311	44	44	6
S4029-B27-P14	OVS 4	28	5	353	54	427	61	61	8
S4029-B28-P15	OVS 5	18	3	213	33	261	37	37	5
Average		23	4	260	40	311	44	46	6
Standard Deviation		± 3	± 1	± 40	± 6	± 48	± 7	± 6	± 1

Table 5. Percent Distribution of NPH Analytes in SJ7B Samples. Percent values were calculated from NPH analyte masses corrected for deuterated dodecane surrogate spike recoveries.

<u>WHC Sample ID</u>	<u>Sample Description</u>	<u>Sample Elevation</u>	<u>% of Total NPH Mass</u>			
			<u>% C11</u>	<u>% C12</u>	<u>% C13</u>	<u>%C14</u>
S4025-C26-P01	OVS 1	0.79	3	42	51	5
S4025-C27-P02	OVS 2	0.79	4	41	48	7
S4025-C28-P03	OVS 3	0.79	3	40	51	5
S4025-C29-P04	OVS 4	0.79	3	39	51	7
S4025-C30-P05	OVS 5	0.79	3	41	51	6
S4025-C31-P06	OVS 6	0.79	3	38	53	6
S4029-B11-P07	OVS 7	0.79	2	47	47	4
S4025-C33-P08	OVS 8	0.79	3	39	52	6
S4025-C34-P09	OVS 9	0.79	3	43	49	5
S4025-C35-P10	OVS 10	0.79	4	35	48	13
	Average % 10 Samples		3 ±1	40.5 ±3	50.1 ±2	6 ±2
<u>Low Level</u>						
S4029-A34-P01	OVS 1	0.79	3	40	49	8
S4029-A35-P02	OVS 2	0.79	3	41	48	7
S4029-A36-P03	OVS 3	0.79	3	41	50	6
S4029-A37-P04	OVS 4	0.79	4	41	48	7
S4029-A38-P05	OVS 5	0.79	3	41	49	7
<u>Mid level</u>						
S4029-B10-P06	OVS 1	2.92	4	40	49	7
S4029-B11-P07	OVS 2	2.92	4	41	48	8
S4029-B12-P08	OVS 3	2.92	3	40	49	7
S4029-B13-P09	OVS 4	2.92	3	41	48	7
S4029-B14-P10	OVS 5	2.92	4	40	49	7
<u>High Level</u>						
S4029-B24-P11	OVS 1	5.05	3	39	51	8
S4029-B25-P12	OVS 2	5.05	3	39	50	8
S4029-B26-P13	OVS 3	5.05	3	39	51	7
S4029-B27-P14	OVS 4	5.05	3	40	50	7
S4029-B28-P15	OVS 5	5.05	3	40	50	7
	Average % 15 samples		3 ±0	39 ±1	50 ±0	7 ±0
	Average % 25 samples		3 ±0	40 ±1	49 ±1	7 ±0

Table 6. Percentage Recovery Results of Deuterated Dodecane Surrogate Spike onto OVS Tubes Sent to the Field. Sample was drawn through the OVS at 200 mL/ min for 10 minutes.

<u>WHC Sample ID</u>	<u>Sample Description</u> (in mg)	<u>Spike Amount</u> (in mg)	<u>Amount Observed</u>	<u>% Recovery Sample</u>	<u>Average</u>
S4025-C31-P06	OVS 6	0.22	-	-	
S4029-B11-P07	OVS 7	0.22	0.16	72	
S4025-C33-P08	OVS 8	0.22	0.20	90	81 ± 7
S4025-C34-P09	OVS 9	0.22	0.18	83	(Low Spike)
S4025-C35-P10	OVS 10	0.22	0.18	80	
S4025-C36-P11	OVS 11	1.48	1.07	72	
S4025-C37-P12	OVS 12	1.48	1.20	81	78 ± 5
S4029-B26-P13	OVS 13	1.48	1.16	78	(High Spike)
S4025-C39-P14	OVS 14	1.48	1.24	84	
S4025-C40-P15	OVS 15	1.48	1.07	72	
				% Average 10 samples	79 ± 6

Table 7. Table of Recoveries From OVS Spiked With NPH Analytes And Sent to the Field for SJ7B. OVS were not opened in the field. NPH analyte masses are not corrected for desorption efficiencies or for SJ7B Part I surrogate spike recoveries.

<u>WHC Sample ID</u>	<u>Description</u>	<u>% Recovery</u>				
		<u>C11</u>	<u>C12</u>	<u>C13</u>	<u>C14</u>	<u>C15</u>
<u>Sample Job 7B, Part I</u>						
S4025-C46-P21	Spike Blank 1	122	118	103	95	103
S4025-C47-P22	Spike Blank 2	125	113	102	98	113
S4025-C48-P23	Spike Blank 3	121	117	105	95	106
S4025-C49-P24	Spike Blank 4	114	108	99	89	97
S4025-C50-P25	Spike Blank 5	115	110	98	90	96
<u>% Average Recovery</u>		120	113	101	93	103
		± 5	± 4	± 3	± 4	± 7
<u>Sample Job 7B, Part II</u>						
S4029-A44-P24	Spike Blank 1	98	87	79	74	85
S4029-A45-P25	Spike Blank 2	96	88	83	76	86
S4029-A46-P26	Spike Blank 3	91	84	77	73	85
S4029-A47-P27	Spike Blank 4	86	75	68	64	72
S4029-A48-P28	Spike Blank 5	100	87	81	74	83
<u>% Average Recovery</u>		94	84	77	72	82
		± 6	± 5	± 6	± 5	± 6
<u>% Average Recovery (10 samples)</u>		107	99	89	83	93
		± 14	± 16	± 13	± 12	± 13

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