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VAPOR & GAS SAMPLING OF SST 241BY107 USING THE
VAPOR SAMPLING SYSTEM

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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**This document was reviewed following the
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7. Abstract

THIS DOCUMENT PRESENTS SAMPLING DATA RESULTING FROM THE OCTOBER 26, 1994, SAMPLING OF SST 241-BY-107 USING THE VAPOR SAMPLING SYSTEM.

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LIST OF TERMS

COC	Chain of Custody
DOT	U.S. Department of Transportation
GC/FID	Gas Chromatograph/Flame Ionization Detector
GEA	Gamma Energy Analysis
HEPA	High-Efficiency Particulate Air (filter)
NH ₃	Ammonia
NO ₂	Nitrogen Dioxide
NO	Nitric Oxide
H ₂ O	Water Vapor
OGIST	Oregon Graduate Institute of Science and Technology
OPC	Offsite Property Control
ORNL	Oak Ridge National Laboratory
PNL	Pacific Northwest Laboratory
SML	Sampling and Mobile Laboratories
SST	Single-Shell Tank
TCP	Tank Characterization Plan
team	SML Vapor Team
TST	Triple Sorbent Trap
VSS	Vapor Sampling System
WHC	Westinghouse Hanford Company

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VAPOR AND GAS SAMPLING OF SINGLE-SHELL TANK 241-BY-107 USING THE VAPOR SAMPLING SYSTEM

1.0 SCOPE

The Vapor Issue Resolution Program tasked the Sampling and Mobile Laboratories (SML) to collect representative headspace samples from Hanford Site single-shell tank (SST) 241-BY-107. This document presents sampling data resulting from the October 26, 1994, sampling of SST 241-BY-107.

2.0 SAMPLING EQUIPMENT DESCRIPTION

2.1 VAPOR SAMPLING SYSTEM

The SML vapor team (the team) used the vapor sampling system (VSS) to collect representative samples of the air, gases, and vapors from the headspace of SST 241-BY-107 on October 26, 1994. Mahon et al. (1994) describes in detail the VSS, its performance, and its operation. The team used the VSS to collect sorbent traps and SUMMA¹ canister headspace samples from SST 241-BY-107; subsequently, the team sent these samples to analytical laboratories for analysis.

The VSS comprises a mobile laboratory, a hot-water-jacketed stainless steel probe that is inserted into the tank headspace, and stainless steel transfer tubing that connects the mobile laboratory to the probe. A vacuum pump draws sample vapor from the tank headspace and through all transfer tubing and the sampling manifold. Electrically activated, pneumatically actuated valves direct sample flow within the VSS. Instrumentation housed in the mobile laboratory monitors and controls system temperature, monitors absolute and differential system pressure, meters and controls mass flow, and monitors sample vapor using a gas chromatograph/flame ionization detector (GC/FID).

A key feature of the VSS is its use of heated transfer tubing and a heated sampling manifold. Maintaining the system temperature at an electronically controlled, elevated temperature prevents vapor condensation and reduces vapor adsorption on surfaces exposed to sample vapor. Mahon et al. (1994) describes various tests and observations that indicate the VSS sample transfer efficiency is consistently high.

Sorbent trap samples are collected at the sorbent trap station of the sampling manifold. Sorbent traps are pencil-size stainless steel or glass tubes that contain vapor-adsorbing media. A known amount of sample vapor is passed through the tube, which traps (by adsorption) virtually all the target

¹SUMMA is a registered trademark of Molectrics, Inc., Cleveland, Ohio.

analytes. The sorbent trap is then sent to an analytical laboratory and analyzed. The concentration of analytes in the vapor sampled is calculated from the quantity of analyte found in the sorbent media and the volume of vapor passed through the sorbent trap.

The sorbent trap station uses highly accurate mass flow controllers to measure and control the flow rate of sample vapor through the sorbent traps. The controllers are located downstream of the sorbent trap station and the in-line driers, which remove water vapor from the vapor before the vapor is metered. Errors associated with the mass flow controllers were determined by the Westinghouse Hanford Company (WHC) Standards Laboratory before the SST 241-BY-107 sampling (see Table 1). Flow rates and the duration of flow are specified by the analytical laboratories that supply and analyze the sorbent traps.

Table 1. Flow Control Calibration.

Flow-indicating Control Valve	Flow (stdcm ³ /min)	Error (%)
1	200	±0.15
3	200	±0.30

The sampling manifold also has a station for sampling vapor with evacuated SUMMA[™] canisters. SUMMA[™] canisters are stainless steel vessels with internal surfaces that have been prepared by the SUMMA[™] process, which passivates active sites on the canister walls to minimize adsorption of gases and vapors. An analytical laboratory must clean and evacuate SUMMA[™] canisters before use. The evacuated canister is filled with sample vapor through a valve, which is then closed to seal the sample inside. SUMMA[™] canisters essentially allow collection and transfer of whole-air samples from location to an analytical laboratory where the sample is analyzed. The standard capacity of each SUMMA[™] canister is 6 liters.

Prior to sampling, a GC/FID confirms that the VSS is free of hydrocarbon contamination to the limit of detection. The GC/FID is part of the VSS and can be used during a sampling event to periodically monitor organic vapor concentrations in the vapor being sampled.

3.0 SAMPLING EVENT DESCRIPTION

3.1 SPECIFICATIONS

The Vapor Issue Resolution Program specifies sampling requirements in WHC-SD-WM-TP-274 (Carpenter 1994). The TCP also specifies the types and number of samples to be collected, flow rates, and durations. These key sampling parameters are summarized on the sample log sheets in Appendix A. In addition to the sample log sheets, checksheets for each individual sample help

ensure correct sampling procedures. SML retains these documents in the project file. This sample event's project-specific number is S4-077.

3.2 OPERATIONS AND SAMPLING PERSONNEL

E. A. Tampos was the Tank Farm Operations person-in-charge. The other SML vapor team members included:

- E. A. Johnson, Field Scientist
- T. B. Utecht, VSS Technician
- R. L. Ragan, Trailer Support
- S. L. Spencer, Trailer Support.

The VSS was set up at SST 241-BY-107 on October 25, 1994 and was allowed to warm up overnight. Sampling began shortly after 12:00 p.m. on October 26, 1994, and was completed by 5:30 p.m. the same day.

3.3 AMBIENT CONDITIONS

The weather the day of the sampling event, October 26, 1994, was cool with wind to 20 miles per hour. Graphs of ambient temperatures and pressures taken at the Hanford Meteorological Station, which is about 4 miles due west of 241-BY tank farm are provided in Appendix B.

3.4 SAMPLE COLLECTION

The hot-water-jacketed sampling probe was located in Riser 5 of SST 241-BY-107. The probe length, from the sample inlet to the top of the riser flange, was 5.5 meters.

All zones of the VSS were heated to 50 °C during setup of the VSS at SST 241-BY-107 on October 25, 1994. The team stabilized the VSS temperature zones by 12:00 p.m. on October 26, 1994, and the system was ready to collect samples. Measured according to the VSS operating procedure, the pressure and temperature of SST 241-BY-107 were 981 mbar (735.7 torr) and 33.1 °C, respectively. The sample log sheets (Appendix A) provide a complete chronology of the sample event including start and end times, flow rates, volumes, and specific sample identifiers.

Approximately 18 hours before the first samples were collected, the team began heating the VSS transfer tubing and sampling manifold. During this warmup period, the team maintained the VSS sampling manifold at a partial vacuum of about 300 mbar (225 torr).

Before heating began, the team purged the sampling manifold with ambient air for approximately 15 hours. The team collected two SUMMA™ canister samples of

ambient air, one manually 10 meters upwind of the VSS connection with SST 241-BY-107, and one using the VSS sampling manifold. The former was collected to establish background levels of trace organic vapors, and the latter was collected to establish the cleanliness of the sampling manifold.

A leak check of the VSS sampling manifold and transfer tubing (up to the connection to the in-tank sampling probe) was performed. Leakage resulted in an increase of 8.93 mbar (6.7 torr) rise in pressure over the 15 minute test. Given a system volume of not more than 10 L, this pressure rise corresponds to a leak rate of approximately 20.2 mL/min at a 295 mbar (221 torr) system pressure. This leak rate was estimated for average SUMMA™, TST, and sorbent sampling pressures. It was found that for the SUMMA™ canisters, dilution by ambient air was approximately 0.2%, for TST traps sampled at 25 mL/min the dilution was approximately 0.4%, for TST traps sampled at 50 mL/min the dilution was approximately 0.6%, for TST traps sampled at 100 mL/min the dilution was approximately 0.8%, for TST traps sampled at 200 mL/min the dilution was approximately 0.7%, and for sorbent traps the dilution was approximately 0.6%.

The VSS was purged with sample vapor from SST 241-BY-107 for 30 minutes at a total flow rate of 5.45 L/min. This purge was performed to flush ambient air from the system and saturate the system's active adsorption sites. Because the volume of transfer tubing and the sampling manifold upstream of the sampling devices is estimated to be no more than 10 L, this purge provided about 16.4 air turnovers in the system.

Three analytical laboratories provided sample media. Oak Ridge National Laboratory (ORNL) provided triple sorbent traps (TSTs) for organic vapors; Pacific Northwest Laboratory (PNL) provided SUMMA™ canisters and sorbent traps for organic vapors, ammonia (NH₃), nitrogen dioxide (NO₂), nitric oxide (NO), and water vapor H₂O; and Oregon Graduate Institute of Science and Technology (OGIST) provided SUMMA™ canisters.

3.5 RADIATION SCREENING

Samples are unconditionally released from the SST farm in accordance with DI-33300-93-004, *Release of Vapor Sampling Equipment* (WHC 1993b). Radiological screening results are used to determine (1) if the samples must be shipped as radioactive or nonradioactive in accordance with U.S. Department of Transportation (DOT) regulations and (2) if the samples meet the laboratory acceptance criteria.

The DOT limits for shipping a nonradioactive sample are 200 pCi/g of beta-gamma activity and 60 pCi/g of alpha activity. Samples exceeding these DOT limits may be shipped as radioactive material, if the samples do not exceed the following laboratory acceptance criteria:

OGIST: The laboratory has supplied no acceptance criteria for alpha-beta-gamma activity. Notify the laboratory if radioactive levels exceed the DOT limits specified above, or if >50 pCi/g tritium are found.

ORNL: Beta-gamma activity <450 pCi/g of sample media. Alpha activity <135 pCi/g.

PNL: Beta-gamma activity <400 pCi/g of sample media. Alpha activity <100 pCi/g of sample media.

To protect the sampling manifold and all sampling devices from radioactive particulates, all sample vapor for the October 26, 1994, SST 241-BY-107 vapor sampling event was drawn through a series of four glass-fiber high-efficiency particulate air (HEPA) filters placed upstream of the sampling manifold. These four filters were in place any time tank headspace air, gases, and vapors were flowing through the system. When sampling was complete, the filters were removed and assigned unique sample identifiers. All four HEPA filters were submitted to Laboratory 222-S for total alpha, total beta, and gamma energy analysis (GEA). The HEPA filter closest to the sampling manifold was analyzed to determine if the samples met DOT shipping criteria and laboratory acceptance criteria. SST 241-BY-107 filter sample results are shown in Table 2. SML scientists use the activity results from Table 2 to calculate pCi/g of sample media. SML maintains this information in the project specific file.

A water vapor sample was also collected through one of the sorbent station ports and analyzed for tritiated water. SST 241-BY-107 tritium sample results are shown in Table 2. The results in Table 2 indicate that the samples collected from SST 241-BY-107 met the laboratory acceptance criteria and the DOT definition of a nonradioactive shipment.

Table 2. Radionuclide Analysis Results.

Filter	Sample Identifier	Activity Results ^a (pCi/sample)	Activity ^b (pCi/L of tank gas)
Upstream HEPA filter (box)	S4077-A35.OU1	Total Alpha = 8450 Total Beta = 2500 GEA = 1100 (²⁰⁸ Tl) GEA = 3680 (²¹² Bi) GEA = 3340 (²¹² Pb)	= 26.16 = 7.74 = 3.41 = 11.39 = 10.34
Downstream HEPA filter (box)	S4077-A36.OD1	Total Alpha = 35 Total Beta = <2.22 GEA = <detectable	= 0.11 = <0.007 = <detectable
Upstream HEPA filter (VSS)	S4077-A37.OU2	Total Alpha = 23.6 Total Beta = <2.22 GEA = <detectable	= 0.073 = <0.007 = <detectable
Downstream HEPA filter (VSS)	S4077-A38.OD2	Total Alpha = 29.6 Total Beta = <2.22 GEA = <detectable	= 0.092 = <0.007 = <detectable
Tritium trap	S4077-A03.OT1	Total activity = <50.0	= <50.0 ^c

NOTES:

The samples are nonradioactive. These results were evaluated against laboratory acceptance criteria and DOT limits.

^aAll less than (<) values represent the minimum detection limits at Laboratory 222-S.

^bNumbers based on an approximation of the total volume of tank vapor through the HEPA filters. Appendix A and the sample checksheets were used to estimate a total flow through the VSS of 323 L.

^cNumber is calculated using a total volume of 1 L passing through the tritium trap.

4.0 SAMPLE CHAIN OF CUSTODY: RECEIPT, STORAGE, AND SHIPMENT

All sorbent trains, sorbent tubes, and SUMMA™ canisters received by SML are stored in a custody locker maintained by SML. Sorbent trains and tubes were maintained at 4 ± 2 °C in a refrigeration unit. SUMMA™ canisters were stored in the same locked storage area, but were not refrigerated.

TSTs are supplied by ORNL. ORNL initiates the chain-of-custody (COC) forms. The sample media is placed in 40-mL volatile organic analysis vials. Evidence tape is applied to the vials, which are then placed in a shipping container along with the relinquished COC forms and shipped to SML. TSTs are shipped to SML in a cooler containing "blue" ice.

The sample media was received, inventoried against the COC forms, and the "received by" block on the COC form was signed by SML. The TSTs were maintained at 4 ± 2 °C before and after the sampling event in a refrigeration unit.

The TSTs were shipped to ORNL using offsite property control (OPC W95-0-0053-34). Table 3 lists the sample identifiers, sample types, and COC form numbers for all ORNL samples. The samples were delivered for transport on November 7, 1994, and shipped by Federal Express for next-day delivery.

Table 3. Oak Ridge National Laboratory Samples.

Sample Identifier	Sample Type	COC Number
S4077-A10.617	TST	006742
S4077-A11.620	TST	006742
S4077-A12.621	TST	006742
S4077-A13.613	TST trip blank	006742
S4077-A14.623	TST	006742
S4077-A15.624	TST	006742
S4077-A16.625	TST	006742
S4077-A17.785	TST	006742
S4077-A18.632	TST	006742
S4077-A19.634	TST	006742
S4077-A20.615	TST trip blank	006742
S4077-A21.646	TST	006742
S4077-A22.651	TST	006742
S4077-A23.655	TST	006742

Sorbent trains and SUMMA™ canister sampling devices were supplied with COC forms by PNL. Sampling devices were picked up from PNL by SML and transported in a government vehicle to a custody locker.

After sampling, the PNL sorbent traps and SUMMA™ canisters were transported by government vehicle directly to PNL and delivered to J. A. Edwards on November 8, 1994. Table 4 lists the sample identifiers, sample types, and COC form numbers for all PNL samples. The sorbent trains were maintained at 4 ± 2 °C before and after the sampling event in a refrigeration unit.

Table 4. Pacific Northwest Laboratory Samples.

Sample Identifier	Sample Type	COC Number
S4077-A01.231	Ambient upwind SUMMA™	008070
S4077-A02.232	Ambient SUMMA™ (VSS)	008070
S4077-A04.233	SUMMA™	008070
S4077-A05.234	SUMMA™	008070
S4077-A06.235	SUMMA™	008070
S4077-A07.236	SUMMA™	008070
S4077-A08.237	SUMMA™	008070
S4077-A09.238	SUMMA™	008070
S4077-A26.64V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A27.65V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A28.66V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A29.67V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A30.68V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A31.69V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008071
S4077-A32.70V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008071
S4077-A33.71V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008071
S4077-A34.72V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008071

SUMMA™ canisters were also supplied by OGIST. The sample media is shipped to SML without a COC form. The sample media is inventoried at SML, where the COC is initiated.

The OGIST SUMMA™ canisters were delivered to PNL for storage on November 8, 1994. Table 5 lists the sample identifiers and sample types for all OGIST samples.

Table 5. Oregon Graduate Institute Samples.

Sample Identifier	Sample Type	COC Number
S4077-A07.236	SUMMA™	008070
S4077-A08.237	SUMMA™	008070
S4077-A09.238	SUMMA™	008070

From the time that samples are received by SML until they are shipped back to the analytical laboratory, COC is maintained by SML in accordance with LO-090-443/AO, *Chain-of-Custody for RCRA and CERCLA Protocol Samples* (WHC 1992). Final COCs from this sampling event are in Appendix C.

5.0 QUALITY ASSURANCE AND CONTROLS

5.1 VAPOR SAMPLING SYSTEM CLEANING

Immediately prior to sampling of SST 241-BY-107, the VSS manifold was heated to 65 °C and ambient air was purged through the system for 15 hours. Throughout this purge, various system valves were actuated to release any contaminants hung up in the VSS valves themselves. After this purge, an ambient air sample was drawn through the VSS manifold and a GC/FID run was initiated and no contaminants were detected by the FID. A second sample confirmed the VSS was free of organic remnants down to the detection limits of the system (no peaks detected) and ready to sample SST 241-BY-107. For further details, refer to Appendix C of LO-080-450/AO (WHC 1993c) and the project-specific file located with SML.

In compliance with the *Vapor Space Probe Cleaning Procedure* (WHC 1993c) the team cleaned the hot-water-jacketed probe before it was installed in SST 241-BY-107. This procedure requires a solvent rinse of all internal probe surfaces with acetone and methanol to clear the sample line of possible contamination remaining from the construction process. The probes are then heated to 90 °C, and dry air is passed through the probe to evaporate the solvents. Before the probes are released, the team ensures, using a hand-held organic vapor meter, that the total organic concentration in the sample line is below 1 ppmv.

SUMMA™ canister ambient air samples were also collected to confirm that the VSS sampling manifold was free of trace organic contaminants (or to determine what contaminants were present). One SUMMA™ canister was filled with ambient air upwind of SST 241-BY-107, and a second canister was filled with ambient air via the VSS sampling manifold. The canisters were shipped to PNL for analysis.

5.2 INSTRUMENT CALIBRATION

Instruments located in the VSS are calibrated on an annual basis at the WHC Standards Laboratory. VSS instrumentation calibration data, maintained in files by SML, is summarized in Table 6. According to the calibration schedule shown in Table 6, all instrumentation was within its calibration period during the SST 241-BY-107 sampling event.

Table 6. Calibration Data.

System	Calibration Date	Expiration Date	WHC Standards Laboratory Code
Temperature Control System	04/21/94	04/21/95	804-67-74-009
Mass Flow System	04/29/94	04/29/95	804-28-03-001
Pressure System	05/03/94	05/03/95	804-67-89-001

5.3 BLANK SAMPLES

Trip blanks are samples that accompany the sample media from the point of generation through sample analysis. Analysis of trip blanks is used to assess cross-contamination of the sample media during transport and storage. Trip blanks are transported to the field with the sample collection media but remain unopened throughout the sampling event.

Spiked blanks are samples that are spiked with a known amount of analyte before shipment. These blanks are handled and analyzed with the other samples. Analysis of the spiked blanks is used to evaluate potential sample loss during shipment or storage.

Ambient blanks are samples of ambient air collected at the sampling location. Analysis of ambient blanks is used to assess contamination that may be present in the atmosphere surrounding the sampling system or in the system itself prior to sampling.

Field blanks are sampling devices prepared and handled in the same manner as the sampler, but no tank gases are drawn through them.

Table 7 lists the blank samples collected during the sampling of SST 241-BY-107.

Table 7. Blank Samples.

Sample Identifier	Blank Type	Sample Media
S4077-A01.231	Ambient	SUMMA™
S4077-A02.232	Ambient through VSS	SUMMA™
S4077-A13.613	Trip	TST
S4077-A20.615	Trip	TST
S4077-A26.64V	Trip	NH ₃ /NO ₂ /NO/H ₂ O
S4077-A27.65V	Trip	NH ₃ /NO ₂ /NO/H ₂ O
S4077.A28.66V	Trip	NH ₃ /NO ₂ /NO/H ₂ O

6.0 ANOMALIES

Due to elevated levels of vapor concentration coming from the riser adjacent to Riser #5, the vapor team was delayed in the setup of the VSS. After a delay of approximately 3 hours, the team was cleared to connect.

All samples were collected in accordance with the TCP and LO-080-450/A0, *Collection of SUMMA Canisters and Sorbent Tube Samples Using the Vapor Sampling System* (WHC 1993a). No anomalies to the TCP or the operating procedure were noted during the sampling of SST 241-BY-107. Further details are available in the project-specific file maintained by SML.

7.0 REFERENCES

49 CFR 100-177, 1992, "Transportation," *Code of Federal Regulations*, as amended.

Carpenter, B. C., 1994, *Tank Characterization Plan for Vapor and Gas Sampling Tank 241-BY-107 Using the Vapor Sampling System*, WHC-SD-WM-274, Westinghouse Hanford Company, Richland, Washington.

Mahon, R. D., C. M. Jones, and M. S. Story, 1994 (draft), *Evaluation of the Capabilities and Use of the Vapor Sampling System for Tank Headspace Sampling and Characterization*, SD-WM-RPT-094, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993a, *Collection of SUMMA Canisters and Sorbent Tube Samples Using the Vapor Sampling System (VSS)*, Procedure LO-080-450/A0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993b, *Release of Vapor Sampling Equipment*, Procedure DI-33300-93-004, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993c, *Vapor Space Probe Cleaning Procedure*, Procedure LO-080-405/A0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, *Chain-of-Custody for RCRA and CERCLA Protocol Samples*, Procedure LO-090-443/A0, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX A
SAMPLE LOG SHEETS

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Waste Tank
241-BY-107

Set up VSS (Section A)(Temperature set point = 60C)

Ensure HEPA filters are installed

Ensure connection to sample probe

System status check sheet. (Verify zones are to temp)

Date: 26 October, 1994

VSS Personnel: E.A. Johnson, R. Westburg

T. Utecht

Trailer Personnel: N. Buechler

		OGI/ORNL	SAP Referenc	Description	Desired	Desired	Actual	Actual	Actual	Desired	
WHC Sample ID	Sample ID		Number		Flow	Duration	Start	End	Total	Total	Port
					Rate	(min.)	Time	Time	Time	Flow	Valve #
Group # 1											
Purge with ambient air for 30 min.							21:00 10/25	12:00	15 hrs.		
S4077- A01	.231	231	1	AMBIENT #1 (PNL)		1	12:02	12:06	1		upwind
GC Run #1							12:24				
S4077- A02	.232	232	2	AMBIENT #2 (PNL)		1	12:37	12:37	1		15
Leak check (Appendix A)			Leak Rate	26.8 Torr/Hour							
Purge with tank air for 30 min.						30 min	13:06	13:36	30		
Measure tank pressure				735.7 Torr							
S4077- A03	.0T1	T1529(222S)	3	Tritium Trap	200	5	13:43	13:48	5	1000	8
GC Run # 2							13:52				
S4077- A04	.233	233	4	SUMMA #3		1	14:03	14:04	1		11
S4077- A05	.234	234	5	SUMMA #4		1	14:09	14:10	1		12
S4077- A06	.235	235	6	SUMMA #5		1	14:14	14:15	1		13
S4077- A07	.236	236	7	SUMMA #6		1	14:19	14:20	1		14
S4077- A08	.237	237	8	SUMMA #7		1	14:25	14:26	1		15
S4077- A09	.238	238	9	SUMMA #8		1	14:30	14:31	1		16
GC Run # 3							14:43				

WHC-SD-WM-RPT-120, Rev. 0

Waste Tank
241-BY-107

WHC Sample ID	OGI/ORNL	SAP Referenc	Description	Desired Flow	Desired Duration	Actual Start	Actual End	Actual Total	Desired Total	Port
Sample ID		Number		Rate	(min.)	Time	Time	Time	Flow	Valve #
S4077- A10 .617	TST# 617	10	TST #1	27	2	14:59	15:01	2	54	9
S4077- A11 .620	TST# 620	11	TST #2	41.5	2	14:59	15:01	2	83	10
S4077- A12 .621	TST# 621	12	TST # 3	25	2	15:11	15:13	2	50	8
S4077- A14 .623	TST# 623	14	TST # 4	25	2	15:11	15:13	2	50	10
S4077- A13 .613	TST# 613	13	TST FIELD BLANK #1			15:07	15:08	1 min		ambient
S4077- A15 .624	TST# 624	15	TST # 5	50	5	15:21	15:26	5	250	9
S4077- A16 .625	TST# 625	16	TST # 6	50	5	15:21	15:26	5	250	10
S4077- A17 .785	TST# 785	17	TST # 7	50	5	15:32	15:37	5	250	8
S4077- A18 .632	TST# 632	18	TST # 8	50	5	15:32	15:37	5	250	10
S4077- A19 .634	TST# 634	19	TST # 9	100	5	15:45	15:50	5	500	9
S4077- A21 .646	TST# 646	21	TST # 10	100	5	15:45	15:50	5	500	10
S4077- A20 .615	TST# 615	20	TST FIELD BLANK #2			15:57	15:58	1 min		ambient
S4077- A22 .651	TST# 651	22	TST # 11	100	5	16:02	16:07	5	500	8
S4077- A23 .655	TST# 655	23	TST # 12	100	5	16:02	16:07	5	500	10
GC Run # 4						16:24				
S4077- A26 .64V	64V	26	NH3/NOx/H2O #1	200	15	16:32	16:47	15	3000	9
S4077- A27 .65V	65V	27	NH3/NOx/H2O #2	200	15	16:32	16:47	15	3000	10
S4077- A28 .66V	66V	28	NH3/NOx/H2O #3	200	15	16:53	17:08	15	3000	8
S4077- A29 .67V	67V	29	NH3/NOx/H2O #4	200	15	16:53	17:08	15	3000	10
S4077- A30 .68V	68V	30	NH3/NOx/H2O #5	200	15	17:14	17:29	15	3000	9
S4077- A31 .69V	69V	31	NH3/NOx/H2O #6	200	15	17:14	17:29	15	3000	10

Waste Tank
241-BY-107

WHC Sample ID	OGI/ORNL Sample Reference	Description	Desired Flow Rate	Desired Duration (min.)	Actual Start Time	Actual End Time	Actual Total Time	Desired Total Flow	Port Valve #
S4077- A35 .0U1	T1530(222S) 35	Upstream HEPA(box)				17:45			
S4077- A36 .0D1	T1531(222S) 36	Downstream HEPA(box)				17:45			
S4077- A37 .0U2	T1532(222S) 37	Upstream HEPA (VSS)				17:45			
S4077- A38 .0D2	T1533(222S) 38	Downstream HEPA (VSS)				17:45			

Trip Blanks (DO NOT EXPOSE)

S4077- A24 .609	TST# 609	24	TST TRIP #1						
S4077- A25 .622	TST# 622	25	TST TRIP #2						
S4077- A32 .70V	70V	32	NH3/NOx/H2O TRIP #1						
S4077- A33 .71V	71V	33	NH3/NOx/H2O TRIP #2						
S4077- A34 .72V	72V	34	NH3/NOx/H2O TRIP #3						

SAMPLING DATE		26 OCT. '94																			
TANK #		BY-107																			
HEPA BOX UPSTREAM FILTER				pCi / filter		pCi / liter		HEPA BOX DOWNSTREAM FILTER				pCi / filter		pCi / liter							
TOTAL VOLUME				322.54				TOTAL VOLUME				322.54									
BETA				2,500		7.75		BETA				< 2.22									
ALPHA				8,450		26.20		ALPHA				35								0.11	
GEA - Am-243				NA				GEA - Am-243				ND									
- Bi-212				3,680		11.41		- Bi-212				ND									
- Np-237				NA				- Np-237				ND									
- Pb-212				3,340		10.36		- Pb-212				ND									
- Th-229				NA				- Th-229				ND									
- Tl-208				1,100		3.41		- Tl-208				ND									
VSS UPSTREAM FILTER				pCi / filter		pCi / liter		VSS DOWNSTREAM FILTER				pCi / filter		pCi / liter							
TOTAL VOLUME				322.54				TOTAL VOLUME				322.54									
BETA				< 2.22				BETA				< 2.22									
ALPHA				23.60		0.07		ALPHA				29.6								0.09	
GEA - Am-243				ND				GEA - Am-243													
- Bi-212				ND				- Bi-212													
- Np-237				ND				- Np-237													
- Pb-212				ND				- Pb-212													
- Th-229				ND				- Th-229													
- Tl-208				ND				- Tl-208													
TRITIUM TRAP				pCi / filter		pCi / liter															
TOTAL VOLUME				1.0																	
TOTAL ACTIVITY				< 50.0		< 50.0															
SORBENT SAMPLING								SUMMA SAMPLING													
TOTAL VOLUME PER SAMPLE								TOTAL VOLUME PER CANISTER													
TST'S																					
TOTAL VOLUME PER SAMPLE																					

APPENDIX B
AMBIENT CONDITIONS

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WEATHER DURING VSS SAMPLING OF 241-BY-107

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APPENDIX C
CHAIN-OF CUSTODY FORMS

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Westinghouse
Hanford Company

CHAIN OF CUSTODY

ORNL-006742

Custody Form Initiator Amy Dindal

Company Contact Roger Jenkins

Project Designation/Sampling Locations 241-BY-107 (VSS)

Ice Chest No.

Bill of Lading/Airbill No.

Method of Shipment Federal Express

Shipped to Rick Mahon

Possible Sample Hazards/Remarks NONE

Telephone (615) 576-8594

Collection Date

Field Logbook No.

Offsite Property No.

Sample Identification

✓ TST# 617 ORNL Triple Sorbent Trap ✓
 ✓ TST# 620 ORNL Triple Sorbent Trap ✓
 ✓ TST# 621 ORNL Triple Sorbent Trap ✓
 ✓ TST# 623 ORNL Triple Sorbent Trap ✓
 ✓ TST# 624 ORNL Triple Sorbent Trap ✓
 ✓ TST# 625 ORNL Triple Sorbent Trap ✓
 ✓ TST# 785 ORNL Triple Sorbent Trap ✓
 ✓ TST# 632 ORNL Triple Sorbent Trap ✓
 ✓ TST# 634 ORNL Triple Sorbent Trap ✓
 ✓ TST# 646 ORNL Triple Sorbent Trap ✓
 ✓ TST# 651 ORNL Triple Sorbent Trap ✓
 ✓ TST# 655 ORNL Triple Sorbent Trap ✓

✓ TST# 609 ORNL Trip Blank ✓
 ✓ TST# 622 ORNL Trip Blank ✓
 ✓ TST# 613 ORNL Field Blank ✓
 ✓ TST# 615 ORNL Field Blank ✓

[] Field Transfer of Custody

Chain of Possession

(Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
AB Dindal	9/26/94	942	RD Mahon Rick Mahon	27 SEP 94	2000
RD Mahon Rick Mahon	10/26/94	1934	KB Hulce KB Hulce	10/26/94	1934
KB Hulce	11/7/94	1100	T.B. Hulce / T.B. Hulce	11-7-94	1100
T.B. Hulce / T.B. Hulce	11/7/94	1200	AB Dindal AB Dindal	11-8-94	1431

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:
Comments:		

A-6000-407 (12/92) WEF061

Temperature at Shipping: -10°C To Hanford
 Temperature at Receiving: 1.8°C To ORNL
 C-3
 VWR gauge.
 17 SEP 94
 11:46 AM 4.52
 11:48 AM 6.58

Initials
 XBD
 ABD

**Westinghouse
Hanford Company**
CHAIN OF CUSTODY
WHC 008070

Custody Form Initiator J. A. Edwards-PNL Telephone (509) 373-0141
Page 85-3009 / FAX 376-0418

Company Contact R. D. Mahon-WHC Telephone (509) 373-1101
Page 85-9656 / FAX 373-3193

Project Designation/Sampling Locations 200 East Tank Farm
241-BY-107 Tank Vapor Sample SAF S4077
(VSS Truck) Collection date 10-__-94
Preparation date 10-2 4-94

Ice Chest No. Field Logbook No. WHC-____-____-____

Bill of Lading/Airbill No. N/A Offsite Property No. N/A

Method of Shipment Government Truck

Shipped to PNL Sample Job # _____

Possible Sample Hazards/Remarks Unknown at time of sampling

Sample Identification

S4077-A01.231 Ambient Air #1 Upwind @ VSS (PNL)
S4077-A02.232 Ambient Air #2 Through VSS (PNL)

S4077-A04.233 Sample #3 (PNL)
S4077-A05.234 Sample #4 (PNL)
S4077-A06.235 Sample #5 (PNL)
S4077-A07.236 Sample #6 (OGI)
S4077-A08.237 Sample #7 (OGI)
S4077-A09.238 Sample #8 (OGI)

[] Field Transfer of Custody			[] Chain of Possession (Sign and Print Names)		
Relinquished By	Date	Time	Received By	Date	Time
J. A. Edwards <i>J. A. Edwards</i>	10-24-94	1415	<i>NP Bucklin</i>	10-24-94	1415
<i>NP Bucklin</i>	10-26-94	1935	<i>KB Zille</i>	10-26-94	1935
<i>KB Zille</i>	11-8-94	1330	<i>NP Bucklin</i>	11-8-94	1932
<i>NP Bucklin</i>	11-8-94	1335	<i>JA Edwards JA Edwards</i>	11-8-94	1338

Final Sample Disposition

Comments:

PNL (only) Checklist	Pick-up / Delivery	Comments:
Media labeled and checked?	☒ Y/N	
Letter of instruction?	☒ Y/N	
Media in good condition?	☒ Y/N	
COC info/signatures complete?	☒ Y/N	
Sorbents shipped on ice?	☒ Y/N	
Rad release stickers on samples?	☒ Y/N	
Activity report from 222S?	☒ Y/N	
COC copy for LRB, RIDS filed?	☒ Y/N	
COC copy for sorbent follow-on?	☒ Y/N/A	
POC <i>(Signature)</i>	POC <i>(Signature)</i>	

Westinghouse
Hanford Company

CHAIN OF CUSTODY

WHC 008071

Custody Form Initiator J. A. Edwards-PNL

Telephone (509) 373-0141

Page 85-3009 / FAX 376-0418

Company Contact R. D. Mahon-WHC

Telephone (509) 373-1101

Page 85-9656 / FAX 373-3193

Project Designation/Sampling Locations 200 East Tank Farm
241-BY-107 Tank Vapor Sample SAF S4077
(VSS Truck)

Collection date 10-__-94

Preparation date 10-2 4-94

Ice Chest No.

Field Logbook No. WHC-____-____-____

Bill of Lading/Airbill No. N/A

Offsite Property No. N/A

Method of Shipment Government Truck

Shipped to PNL

Sample Job # _____

Possible Sample Hazards/Remarks Unknown at time of sampling

Sample Identification

S4077 - A26 . 64V	NH ₃ /NO _x /H ₂ O (Trap # 1)	Line # 9
S4077 - A27 . 65V	NH ₃ /NO _x /H ₂ O (Trap # 2)	Line #10
S4077 - A28 . 66V	NH ₃ /NO _x /H ₂ O (Trap # 3)	Line # 8
S4077 - A29 . 67V	NH ₃ /NO _x /H ₂ O (Trap # 4)	Line #10
S4077 - A30 . 68V	NH ₃ /NO _x /H ₂ O (Trap # 5)	Line # 9
S4077 - A31 . 69V	NH ₃ /NO _x /H ₂ O (Trap # 6)	Line #10
S4077 - A32 . 70V	NH ₃ /NO _x /H ₂ O a-b-c (Trap Trip Blank# 1)	
S4077 - A33 . 71V	NH ₃ /NO _x /H ₂ O a-b-c (Trap Trip Blank# 2)	
S4077 - A34 . 72V	NH ₃ /NO _x /H ₂ O a-b-c (Trap Trip Blank# 3)	

[] Field Transfer of Custody			[] Chain of Possession		(Sign and Print Names)	
Relinquished By	Date	Time	Received By	Date	Time	
B. Jarrell <i>B. Jarrell</i>	10-24-94	1055	J. A. Edwards <i>J. A. Edwards</i>	10-24-94	1055	
J. A. Edwards <i>J. A. Edwards</i>	10-24-94	1425	<i>JP Bunchler</i>	10-24-94	1425	
<i>JP Bunchler</i>	10-26-94	1935	<i>JK Hulse</i>	10-26-94	1935	
<i>JK Hulse</i>	11-8-94	1345	<i>J. A. Edwards</i>	11-8-94	1345	

Final Sample Disposition

Comments:

PNL (only) Checklist	Pick-up / Delivery	Comments:
Media labeled and checked?	(Y) N	
Letter of instruction?	(Y) N	
Media in good condition?	(Y) N / Y/N	
COC info/signatures complete?	(Y) N / Y/N	
Sorbents shipped on ice?	X / (Y) N	
Rad release stickers on samples?	/ (Y) N	
Activity report from 222S?	/ (Y) N	
COC copy for LRB, RIDS filed?	/ Y/N	
COC copy for sorbent follow-on?	/ Y/N/A	
POC (14)	POC (12)	

(Revised 10/17/94 PNL)

Westinghouse Hanford Company	CHAIN OF CUSTODY 008482				
Custody Form Initiator <u>T.B. Utecht</u>					
Company Contact <u>R.D. Mahon</u>			Telephone <u>373-1101</u>		
Project Designation/Sampling Locations <u>241 BY Tank 107</u>			Collection Date <u>10-26-94</u>		
Ice Chest No. <u>N/A SML-575</u>			Field Logbook No. <u>N/A</u>		
Bill of Lading/Airbill No. <u>N/A</u>			Offsite Property No. <u>N/A</u>		
Method of Shipment <u>Govt Vehicle 4556</u>					
Shipped to <u>222-S 1965 200 West Area</u>					
Possible Sample Hazards/Remarks <u>NONE</u>					
Sample Identification					
<u>54077-001</u>		<u>T- 1530</u>			
<u>54077-001</u>		<u>T- 1531</u>			
<u>54077-002</u>		<u>T- 1532</u>			
<u>54077-002</u>		<u>T- 1533</u>			
<u>54077-011</u>		<u>T- 1529</u>			
COPY					
☒ Field Transfer of Custody CHAIN OF POSSESSION (Sign and Print Name)					
Relinquished By	Date	Time	Received By	Date	Time
<u>T.B. Utecht / T.B. Utecht</u>	<u>10-26-94</u>	<u>1700</u>	<u>KB Zulae KB Mahon</u>	<u>10-26-94</u>	<u>1700</u>
<u>KB Zulae</u>	<u>10-26-94</u>	<u>2010</u>	<u>CA Clark</u>	<u>10-26-94</u>	<u>2010</u>
Final Sample Disposition					
Disposal Method:		Disposed by:		Date/Time:	
Comments:					