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Title/Desc:

VAPOR & GAS SAMPLING OF SST 241BY108 USING THE
VAPOR SAMPLING SYSTEM

SEP 25 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

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WHC Information Release Administration Specialist:

Kara Broz

9/25/95

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SUPPORTING DOCUMENT

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VAPOR AND GAS SAMPLING OF SINGLE-SHELL TANK 241-BY-108 USING THE VAPOR SAMPLING SYSTEM

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7. Abstract

THIS DOCUMENT PRESENTS SAMPLING DATA RESULTING FROM THE OCTOBER 27, 1994, SAMPLING OF SST 241-BY-108 USING THE VAPOR SAMPLING SYSTEM.

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Using the Vapor Sampling System

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6/20/95
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LIST OF TERMS

CGI	Combustible Gas Indicator
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-108 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-108. This document presents sampling data resulting from the October 27, 1994, sampling of SST 241-BY-108.

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-108 on October 27, 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-108; 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-108 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-WM-SD-TP-275, *Tank 241-BY-108 Tank Characterization Plan* (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 S4-076.

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
- N. P. Buechler, Trailer Support.

The VSS was set up at SST 241-BY-108 on October 27, 1994 and was allowed to warm up. Sampling began shortly after 5:00 p.m. on October 27, 1994, and was completed by 10:30 p.m. the same day.

3.3 AMBIENT CONDITIONS

The weather the day of the sampling event, October 27, 1994, was cool and cloudy with light winds. 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 1 of SST 241-BY-108. The probe length, from the sample inlet to the top of the riser flange, was 7.9 m.

All zones of the VSS were heated to 50 °C during setup of the VSS at SST 241-BY-108 on October 27, 1994. The team stabilized the VSS temperature zones by 3:30 p.m. on October 27, 1994, and the system was ready to collect samples. Measured according to the VSS operating procedure, the pressure and temperature of SST 241-BY-108 were 984 mbar (737.7 torr) and 25.7 °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 4 hours before the first samples were collected, the team began heating the VSS transfer tubing and sampling manifold.

Approximately 3 hours before sampling began, the team purged the sampling manifold with ambient air. The team collected two SUMMA™ canister samples of ambient air, one manually 10 meters upwind of the VSS connection with

SST 241-BY-108, 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 5.7 mbar (4.4 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 13.3 mL/min at a 294 mbar (220.5 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 0.1%, for TST traps sampled at 25 mL/min the dilution was approximately 0.1%, for TST traps sampled at 50 mL/min the dilution was approximately 0.1%, for TST traps sampled at 100 mL/min the dilution was approximately 0.2%, and for sorbent traps the dilution was approximately 0.4%.

The VSS was purged with sample vapor from SST 241-BY-108 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.

Two 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). Three PNL SUMMA™ canisters were to be sent to the Oregon Graduate Institute of Science and Technology (OGIST) for analysis.

3.5 INDUSTRIAL HYGIENE FIELD RESULTS

Before connecting to SST 241-BY-108, an industrial hygiene technician field tested the tank vapors. The technician purged the vapor probe sample tube for 5 minutes and then field measured vapor stream contents using a combustible gas indicator (CGI) and an organic vapor meter (OVM). The technician verbally reported an LEL of 5.0%, an oxygen content of 20R, and a total organic carbon content of 71.8 ppm using the OVM. Dräger tubes were not used to estimate the ammonia content.

3.6 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:

- 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 27, 1994, SST 241-BY-108 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 vapor, 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-108 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-108 tritium sample results are shown in Table 2. The results in Table 2 indicate that the samples collected from SST 241-BY-108 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)	S4076-A35.OU1	Total Alpha = 180 Total Beta = 1060 GEA = 174 (²⁰⁸ Tl) GEA = 513 (²¹² Pb)	=0.59 =3.5 =0.57 =1.69
Downstream HEPA filter (box)	S4076-A36.OD1	Total Alpha = 24.1 Total Beta = <2.29 GEA = <detectable	=0.08 =<0.008 =<detectable
Upstream HEPA filter (VSS)	S4076-A37.OU2	Total Alpha = <.835 Total Beta = 7.51 GEA = <detectable	=<0.003 =0.025 =<detectable
Downstream HEPA filter (VSS)	S4076-A38.OD2	Total Alpha = .517 Total Beta = <2.41 GEA = <detectable	= 0.002 =<0.008 =<detectable
Tritium trap	S4076-A03.OT1	Total activity = <50	=<50.0 ^c

NOTES:

The samples are nonradioactive. These results were evaluated against laboratory acceptance criteria and DOT limits (see Section 3.5).

^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 303 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 TSTs were 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 back to ORNL after the sampling event 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
S4076-A10.649	TST	006743
S4076-A11.479	TST	006743
S4076-A12.815	TST	006743
S4076-A13.658	TST field blank	006743
S4076-A14.855	TST	006743
S4076-A15.837	TST	006743
S4076-A16.838	TST	006743
S4076-A17.766	TST	006743
S4076-A18.728	TST	006743
S4076-A19.796	TST	006743
S4076-A20.665	TST field blank	006743
S4076-A21.647	TST	006743
S4076-A22.366	TST	006743
S4076-A23.608	TST	006743
S4076-A24.347	TST trip blank	006743
S4076-A25.296	TST trip blank	006743

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
S4076-A01.218	Ambient upwind SUMMA™	008064
S4076-A02.219	Ambient SUMMA™ (VSS)	008064
S4076-A04.220	SUMMA™	008064
S4076-A05.221	SUMMA™	008064
S4076-A06.222	SUMMA™	008064
S4076-A07.228	SUMMA™	008064
S4076-A08.229	SUMMA™	008064
S4076-A09.230	SUMMA™	008064
S4076-A26.50V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A27.51V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A28.52V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A29.53V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A30.54V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A31.55V	NH ₃ /NO ₂ /NO/H ₂ O sorbent	008065
S4076-A32.56V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008065
S4076-A33.57V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008065
S4076-A34.58V	NH ₃ /NO ₂ /NO/H ₂ O trip blank	008065

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-108, the VSS manifold was heated to 50 °C and ambient air was purged through the system for 3 hours. After this purge, an ambient air sample was drawn through the VSS manifold and a GC/FID run was initiated. This first run showed that organic contaminants were possibly present. The oven was heated to 325 °C. A second sample confirmed the VSS was free of organic remnants down to the detection limits of

the system and ready to sample SST 241-BY-108. For further details, refer to Appendix C of LO-080-450/A0 (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-108. 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-108, 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 5. According to the calibration schedule shown in Table 5, all instrumentation was within its calibration period during the SST 241-BY-108 sampling event.

Table 5. 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 6 lists the blank samples collected during the sampling of SST 241-BY-108.

Table 6. Blank Samples.

Sample Identifier	Blank Type	Sample Media
S4076-A01.218	Ambient	SUMMA™
S4076-A02.219	Ambient through VSS	SUMMA™
S4076-A24.347	Trip	TST
S4076-A25.296	Trip	TST
S4076-A13.658	Field Blank	TST
S4076-A20.665	Field Blank	TST
S4076-A32.56V	Trip	NH ₃ /NO ₂ /NO/H ₂ O
S4076-A33.57V	Trip	NH ₃ /NO ₂ /NO/H ₂ O
S4076.A34.58V	Trip	NH ₃ /NO ₂ /NO/H ₂ O

6.0 ANOMALIES

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). TST's 837 and 838 were inadvertently sampled through the same flow controller. A total volume of 125 mL was reported to ORNL. No other anomalies to the TCP or the operating procedure were noted during the sampling of SST 241-BY-108. 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-108 Using the Vapor Sampling System*, WHC-SD-WM-TP-275, 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-108

Set up VSS (Section A)(Temperature set point = 50C)

Date: 27 October, 1994

Ensure HEPA filters are installed

VSS Personnel: E.A. Johnson

Ensure connection to sample probe

T. Utecht, R. Ragan

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

Trailer Personnel: N. Buechler

WHC Sample ID			OGI/ORN LAP Referen		Description		Desired		Desired		Actual		Actual		Desired	
Sample ID	Sample ID	Number					Flow	Duration	Start	End	Time	Time	Total	Time	Total	Port
Group # 1							Rate	(min.)	Time	Time	Time	Time	Flow	Valve #		
Purge with ambient air for 30 min.								30 min	13:00	16:00	3 hrs.					
076- A01 .218	218	1	AMBIENT #1 (PNL)					1	16:12	16:13	1					upwind
GC Run #1									16:25							
4076- A02 .219	219	2	AMBIENT #2 (PNL)					1	16:29	16:30	1					15
Leak check (Appendix A)			Leak Ra		17.6 Torr/Hr.											
Purge with tank air for 30 min.								30 min	18:14	18:44	30					
Measure tank pressure					737.7 Torr											
4076- A03 .0T1	T1552(222S	3	Tritium Trap				200	5	18:52	18:57	5				1000	8
GC Run # 2									19:44							
4076- A04 .220	220	4	SUMMA #3					1	19:03	19:04	1					11
4076- A05 .221	221	5	SUMMA #4					1	19:08	19:09	1					13
4076- A06 .222	222	6	SUMMA #5					1	19:13	19:14	1					15
4076- A07 .228	228	7	SUMMA #6					1	19:18	19:19	1					12
4076- A08 .229	229	8	SUMMA #7					1	19:24	19:25	1					14
4076- A09 .230	230	9	SUMMA #8					1	19:31	19:32	1					16

Waste Tank
241-BY-108

WHC Sample ID	OGI/ORN LAP Referen	Sample ID	Number	Description	Desired		Actual		Desired		Actual		Desired	
					Flow	Rate	Duration	Start	End	Time	Total	Flow	Total	Port
							(min.)	Time	Time					Valve #
4076- A10 .649		TST# 649	10	TST #1		25	2	19:53	19:55	2.2	55	55	9	
4076- A11 .479		TST# 479	11	TST #2		25	2	19:53	19:55	2.2	55	55	10	
4076- A12 .815		TST# 815	12	TST #3		25	2	20:02	20:04	2.2	55	55	8	
4076- A14 .855		TST# .855	14	TST #4		25	2	20:02	20:04	2.2	55	55	10	
4076- A13 .658		TST# .658	13	TST FIELD BLANK #1				20:08	20:09	1 min			ambient	
4076- A15 .837		TST# 837	15	TST #5		50	5	20:21	20:26	5	125**	125**	9	
4076- A16 .838		TST# 838	16	TST #6		50	5	20:29	20:34	5	250	250	10	
4076- A17 .766		TST# 766	17	TST #7		50	5	20:21	20:26	5	125**	125**	8	
4076- A18 .728		TST# 728	18	TST #8		50	5	20:40	20:45	5	250	250	10	
4076- A19 .796		TST# 796	19	TST #9		100	5	20:52	20:57	5	500	500	9	
4076- A21 .647		TST# 647	21	TST #10		100	5	20:52	20:57	5	500	500	10	
4076- A20 .665		TST# 665	20	TST FIELD BLANK #2				20:41	20:42	1 min			mbient	
4076- A22 .366		TST# 366	22	TST #11		100	5	21:04	21:09	5	500	500	8	
4076- A23 .608		TST# 608	23	TST #12		100	5	21:04	21:09	5	500	500	10	
GC Run # 3 (Tank run #2)								21:14						
4076- A26 .50V		50V	26	NH3/NOx/H2O #1		200.4	15	21:27:10	21:42:10	15	3006	3006	9	
4076- A27 .51V		51V	27	NH3/NOx/H2O #2		200	15	21:27:10	21:42:10	15	3000	3000	10	
4076- A28 .52V		52V	28	NH3/NOx/H2O #3		200	15	21:48	22:03	15	3000	3000	8	
4076- A29 .53V		53V	29	NH3/NOx/H2O #4		200	15	21:48	22:03	15	3000	3000	10	
4076- A30 .54V		54V	30	NH3/NOx/H2O #5		200	15	22:08	22:23	15	3000	3000	9	
4076- A31 .55V		55V	31	NH3/NOx/H2O #6		200	15	22:08	22:23	15	3000	3000	10	

*** These samples inadvertently run together, thus sample volumn assumed to be 1/2 of total of 250 sccm, or 125 sccm.

Waste Tank
241-BY-108

WHC Sample ID	OGI/ORN LAP Referen	Description	Desired Flow Rate	Desired Duration (min.)	Actual Start Time	Actual End Time	Actual Total Time	Desired Total Flow	Port Valve #
	Sample ID	Number							
4076- A35 .0U1	T1548(222S	35	Upstream HEPA(box)			22:45			
4076- A36 .0D1	T1549(222S	36	Downstream HEPA(box)			22:45			
4076- A37 .0U2	T1550(222S	37	Upstream HEPA (VSS)			22:45			
4076- A38 .0D2	T1551(222S	38	Downstream HEPA (VSS)			22:45			

Trip Blanks (DO NOT EXPOSE)

4076- A24 .347	TST# 347	24	TST TRIP #1
4076- A25 .296	TST# 296	25	TST TRIP #2
4076- A32 .56V	56V	32	NH3/NOx/H2O TRIP #1
4076- A33 .57V	57V	33	NH3/NOx/H2O TRIP #2
4076- A34 .58V	58V	34	NH3/NOx/H2O TRIP #3

VSS SAMPLING RADIOLOGICAL SCREENING RESULTS

SAMPLING DATE 27 OCT. 94		TANK # BY-108																	
HEPA BOX UPSTREAM FILTER		Liters		pCi / liter		HEPA BOX DOWNSTREAM FILTE		Liters		pCi / liter		pCi / liter							
TOTAL VOLUME		302.5				TOTAL VOLUME		302.5											
BETA				1.060		BETA				3.50		< 2.29							
ALPHA				180		ALPHA				0.60		24.1						0.08	
GEA - Am-243				ND		GEA - Am-243						ND							
- Bi-212				ND		- Bi-212						ND							
- Np-237				ND		- Np-237						ND							
- Pb-212				513		- Pb-212				1.70		ND							
- Th-229				ND		- Th-229						ND							
- Tl-208				174		- Tl-208				0.58		ND							
VSS UPSTREAM FILTER		Liters		pCi / liter		VSS DOWNSTREAM FILTER		Liters		pCi / liter		pCi / liter							
TOTAL VOLUME		302.5				TOTAL VOLUME		302.5				< 2.41							
BETA				7.51		BETA				0.02		0.517						.002	
ALPHA				< .835		ALPHA													
GEA - Am-243				ND		GEA - Am-243						ND							
- Bi-212				ND		- Bi-212						ND							
- Np-237				ND		- Np-237						ND							
- Pb-212				ND		- Pb-212						ND							
- Th-229				ND		- Th-229						ND							
- Tl-208				ND		- Tl-208						ND							
TRITIUM TRAP				pCi / liter						pCi / liter									
TOTAL VOLUME		1.0								< 50.0									
TOTAL ACTIVITY				< 50.0															
SAMPLE EXPOSURE ANALYSIS, USING VSS DOWNSTREAM FILTER ANALYSIS AS POSSIBLE EXPOSURE LEVEL																			
= BETA < 2.41 pCi/Filter, ALPHA 0.002 pCi/Filter, GEA not detected																			
SORBENT SAMPLING						TST'S						Alpha per sample							
TOTAL VOLUME PER SAMPLE		3.00		Liters		TOTAL VOLUME PER SAMPLE						Liters							
ALPHA PER SAMPLE		0.00		pCi		TST 649, 479, 815, 855						0.055		< 0.00		pCi			
INDIVIDUAL SORBENTS						TST 837, 766						0.125		< 0.00		pCi			
NH3 (0.75 gram)		0.01		pCi per gram		TST 621 & 622						0.125		< 0.00		pCi			
NO2 (0.60 gram)		0.01		pCi per gram		TST 838, 728						0.25		< 0.00		pCi			
H2O (0.45 gram)		0.01		pCi per gram		TST 796, 647, 366, 608						0.5		< 0.00		pCi			
SUMMA SAMPLING																			
TOTAL VOLUME PER CANISTE		6		Liters															
ALPHA PER SAMPLE		0.01		pCi															

APPENDIX B
AMBIENT CONDITIONS

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WEATHER DURING VSS SAMPLING OF 241-BY-108

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APPENDIX C
CHAIN-OF CUSTODY FORMS

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Collection Date

Field Logbook No.

Offsite Property No.

ORNL-006743

Offsite Property No.

Offsite Property No.

Offsite Property No.

Offsite Property No.

Offsite Property No.

Offsite Property No.

Offsite Property No.

Westinghouse
Hanford Company

CHAIN OF CUSTODY

WHC 008064

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-108 Tank Vapor Sample SAF S4076
(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

S4076-A01.218

Ambient Air #1 Upwind @ VSS (PNL)

S4076-A02.219

Ambient Air #2 Through VSS (PNL)

S4076-A04.220

Sample #3 (PNL)

S4076-A05.221

Sample #4 (PNL)

S4076-A06.222

Sample #5 (PNL)

S4076-A07.228'

Sample #6 (OGI)

S4076-A08.229'

Sample #7 (OGI)

S4076-A09.230'

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>J. P. Buchter</i>	10-24-94	1415
<i>J. P. Buchter</i>	11-8-94	1330	<i>J. A. Edwards</i>	11-8-94	1330

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, RJDS filed?	☒ Y / ☒ N	
COC copy for sorbent follow-on?	☒ Y / ☒ N/A	
POC ☒	POC ☒	

(Revised 10/17/94 PNL)

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-108 Tank Vapor Sample SAF S4076

(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

S4076 - A26 . 50V	NH ₃ /NO _x /H ₂ O (Trap # 1) Line # 9
S4076 - A27 . 51V	NH ₃ /NO _x /H ₂ O (Trap # 2) Line # 10
S4076 - A28 . 52V	NH ₃ /NO _x /H ₂ O (Trap # 3) Line # 8
S4076 - A29 . 53V	NH ₃ /NO _x /H ₂ O (Trap # 4) Line # 10
S4076 - A30 . 54V	NH ₃ /NO _x /H ₂ O (Trap # 5) Line # 9
S4076 - A31 . 55V	NH ₃ /NO _x /H ₂ O (Trap # 6) Line # 10
S4076 - A32 . 56V	NH ₃ /NO _x /H ₂ O a-b-c (Trap Trip Blank# 1)
S4076 - A33 . 57V	NH ₃ /NO _x /H ₂ O a-b-c (Trap Trip Blank# 2)
S4076 - A34 . 58V	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
AL KRUPSHA	10-24-94	1440	J. A. Edwards	10-24-94	1440
G. B. Jarrell	10-24-94	1440	R. D. Mahon	10-24-94	1440
J. A. Edwards	11-8-94	1345	J. A. Edwards	11-8-94	1345
R. D. Mahon					

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	☒ Y / ☐ N	

(Revised 10/17/94 PNL)

Westinghouse Hanford
Company

CHAIN OF CUSTODY

COPY
008502Custody Form Initiator T.B. UtechCompany Contact R. D. MahonTelephone 373-1101Project Designation/Sampling Locations 241-BY Farm Tank 108

Collection Date _____

Ice Chest No. N/AField Logbook No. N/ABill of Lading/Airbill No. N/AOffsite Property No. N/AMethod of Shipment Govt VehicleShipped to 222-S labs 200 West AvePossible Sample Hazards/Remarks NONE

Sample Identification

S4076-041

T1548

S4076-041

T1549

S4076-042

T1550

S4076-042

T1551

S4076-041

T1552

☒ Field Transfer of Custody

CHAIN OF POSSESSION

(Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
<u>T.B. Utech</u>	<u>10-28-94</u>	<u>0910</u>	<u>R. D. Mahon</u>	<u>10-28-94</u>	<u>0910</u>

Final Sample Disposition

Disposal Method:

Disposed by:

Date/Time:

Comments: