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Accession #: D295186380

Document #: SD-WM-RPT-171

Title/Desc:

VAPOR & GAS SAMPLING OF SST 241AX102 USING THE
VAPOR SAMPLING SYSTEM

Pages: 41

STL 4 (3)

2. To: (Receiving Organization) DISTRIBUTION	3. From: (Originating Organization) SAMPLING AND MOBILE LABS OM624	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: VAPOR/HTS/SAMPLING AND MOBILE LABS	6. Cog. Engr.: RICKY MAHON 3-7437	7. Purchase Order No.: N/A
8. Originator Remarks: 241-AX-102, SAMPLING USING THE VAPOR SAMPLING SYSTEM		9. Equip./Component No.: N/A
		10. System/BLdg./Facility: M0292/WSCF
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 27 OCTOBER 95

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-RPT-171	ALL	0	VAPOR AND GAS SAMPLING OF SINGLE-SHELL TANK 241-AX-102 USING THE VAPOR SAMPLING SYSTEM	Q	2	1	

16. KEY		
Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, O, D or N/A (see WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature MSIN	(L) Date	(M)	(G)	(H)
2	1	Cog. Eng. R. D. MAHON	<i>Ricky Mahon</i>	10/23/95	S3-27	RESOURCE CENTER		R2-12		3	
2	1	Cog. Mgr. J. D. DORIAN	<i>John J. Dorian</i>	10/23/95	S3-27	JAMES L. HUCKABY		K6-80		3	
2	1	QA C. J. STEPHAN	<i>C. J. Stephan</i>	11/2/95	T6-03	57-07					
3		DAVE BRATZEL			S7-21						
3		JOHN DEICHMAN			T6-03						
3		RAMPUR VISWANATH			S3-90						
3		CENTRAL FILES			A3-88						

18. Signature of EDT Originator <i>Glean S. Capparo</i> Date: 10/23/95	19. Authorized Representative for Receiving Organization Date	20. Signature Manager <i>John J. Dorian</i> Date: 10/23/95	21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-RPT-171, REV 0

Document Title: Vapor and Gas Sampling of Single-Shell Tank 241-AX-102 Using the Vapor Sampling System

Release Date: 11/7/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:


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11/7/95

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SUPPORTING DOCUMENT

1. Total Pages **36**

2. Title

VAPOR AND GAS SAMPLING OF SINGLE-SHELL TANK 241-AX-102 USING THE VAPOR SAMPLING SYSTEM

3. Number

WHC-SD-WM-RPT-171

4. Rev No.

0

5. Key Words

241-AX-102
VSS
SUMMA
TST
SORBENT
TANK

6. Author

Name: G.S. CARRIO

Signature 

Organization/Charge Code 0M624/E61920

7. Abstract

THIS DOCUMENT PRESENTS SAMPLING DATA RESULTING FROM THE JUNE 28, 1995, SAMPLING OF SST 241-AX-102 USING THE VAPOR SAMPLING SYSTEM.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC



DATE NOV 08 1995

Sta 4

APPROVALS

Document title: Vapor and Gas Sampling of Single-Shell Tank 241-AX-102
Using the Vapor Sampling System

Approved by: *R. A. Westberg* 10/9/95
R. A. Westberg, Field Scientist Date
Vapor Sampling Project
Sampling and Mobile Laboratories

Approved by: *Rick Mahon* 17 OCT 95
R. D. Mahon, Project Lead Date
Vapor Sampling Project
Sampling and Mobile Laboratories

Approved by: *D. L. Edwards* 10-23-95
D. L. Edwards, Technical Lead Date
Vapor Sampling Project
Sampling and Mobile Laboratories

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LIST OF TERMS

CGI	Combustible Gas Indicator
COC	Chain Of Custody
DOT	U.S. Department of Transportation
GC	Gas Chromatograph
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 _x	Nitric Oxide
H ₂ O	Water Vapor
OPC	Offsite Property Control
ORNL	Oak Ridge National Laboratory
OVM	Organic Vapor Meter
PNL	Pacific Northwest Laboratory
SML	Sampling and Mobile Laboratories
SST	Single-Shell Tank
TCP	Tank Characterization Plan
team	SML Vapor Team
TOC	Total Organic Carbon
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-AX-102 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-AX-102. This document presents sampling data resulting from the June 27, 1995 sampling of SST 241-AX-102. Analytical results will be presented in separate reports issued by the laboratories that supplied and analyzed the sampling media.

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-AX-102 on June 27, 1995. Mahon et al. (1994) describes in detail the VSS, its performance, and its operation. The team used the VSS to collect sorbent trap and SUMMA¹ canister headspace samples from SST 241-AX-102. The team then sent these samples to the 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 vapor mass flow, and monitors sample vapor total organic carbon (TOC) content 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.

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

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 analytes. 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 FICV-1 through FICV-9 are mounted on top of the sorbent station between the inlet and outlet valves. Controllers FICV-10 and FICV-11 are located downstream of the sorbent trap station and the in-line driers, which remove moisture from the sample vapor before it is metered. Errors associated with the mass flow controllers were determined by the Westinghouse Hanford Company (WHC) Standards Laboratory before the SST 241-AX-102 sampling event (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	Typically used Flow (stdcm ³ /min)	% Change from 647 to Actual	% Change from Datalogger to Actual
1	200	-0.7	-0.85
2	200	0.05	-0.10
3	200	-0.45	-0.60
4	200	0.05	-0.10
5	200	0.55	0.35
6	200	0.25	0.05
7	200	0.4	0.20
8	200	0.25	-1.81
9	50	-0.128	-0.27
10	200	-1.1	-1.20
11	5000	0.332	0.17

The VSS is also equipped with a gas chromatograph (GC). The Hewlett Packard 5890 Series II GC is equipped with a flame-ionization detector (FID), a 1 mL sample loop, a 10 port injection valve, a 2 meter chromatographic column,² a programmable oven, and a portable computer loaded with the HP-Chemstation²

²HP-Chemstation is a registered trademark of the Hewlett Packard Company, Avondale, Pennsylvania.

software used to control the GC. The GC is plumbed to directly transfer sample from the VSS manifold to the GC sample loop. After the sample is transferred into the sample loop and reaches equilibrium, the run is initiated manually. HP-Chemstation™ software activates the 10 port valve to transfer the sample from the sample loop to the column. The sample passes through the column and the FID generates a signal for total organic carbon (TOC). All data is then transmitted to the computer where it is stored for further analysis.

The GC is equipped with a HP-5 column which is 2 meters long, 0.25 mm inside diameter, and which contains a 0.25 um phenyl methyl silicone phase. The GC oven is programmed to heat from 50 °C to 270 °C at a rate of approximately 70 °C per minute. Helium is the carrier gas, air and hydrogen the combustion gases, and nitrogen the make-up gas.

The GC/FID is configured to quantitatively estimate concentrations of total organic carbon (TOC). The GC/FID confirms sampling system cleanliness, ambient air background TOC concentrations during sampling, and TOC concentration of tank vapor samples. The system is multi-point calibrated at the weather station on a as available basis, the last time being January 1995. The GC/FID has displayed a high degree of stability over a period of months. For further details, see Section 3.6, Field GC/FID Results.

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 manually operated valve, which is then closed to seal the sample inside. SUMMA™ canisters essentially allow collection and transfer of whole-air samples from the sample site to an analytical laboratory where the sample is analyzed. The standard capacity of each SUMMA™ canister is 6 liters.

3.0 SAMPLING EVENT DESCRIPTION

3.1 SPECIFICATIONS

The Vapor Issue Resolution Program specifies sampling requirements in WHC-SD-WM-TP-335, Rev. 0D, *Vapor Sampling and Analysis Plan* (Homi 1995). The sampling and analysis plan 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 S5-035.

3.2 OPERATIONS AND SAMPLING PERSONNEL

Steve Carter was the Tank Farm Operations person-in-charge. The other SML vapor team members included:

- G. S. Caprio, VSS Technician
- R. D. Mahon, VSS Lead Scientist
- T. B. Utecht, VSS Technician
- R. A. Westberg, Field Scientist.

The VSS was set up at SST 241-AX-102 on June 26, 1995 and was allowed to warm up overnight. Sampling began shortly after 9:00 a.m. on June 27, 1995, and was completed by 1:30 p.m. the same day.

3.3 INDUSTRIAL HYGIENE FIELD RESULTS

Before hooking up to SST 241-AX-102, an industrial hygiene technician field tested 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 measurements were verbally reported, LEL 0.0%, NH₃ 25 ppm, O₂ 20.9%, and total organic carbon 3 ppm.

3.4 AMBIENT CONDITIONS

The weather the day of the sampling event, June 27, 1995 was warm with gusty winds blowing from the tank towards the exhauster. Graphs of ambient temperatures and pressures taken at the Hanford Meteorological Station, which is about 6 miles west of AX-Farm, are provided in Appendix B.

3.5 SAMPLE COLLECTION

The hot-water-jacketed sampling probe was located in Riser R9E of SST 241-AX-102. The probe length, from the sample inlet to the top of the riser flange, was 7.9 meters.

All zones of the VSS were heated to 60 °C during setup of the VSS at SST 241-AX-102 on June 26, 1995. The team stabilized the VSS temperature zones by 9:00 a.m. on June 27, 1995, and the system was ready to collect samples. Measured according to the VSS operating procedure, the pressure and temperature of SST 241-AX-102 were 996 mbar (747 torr) and 24.6 °C, respectively. The sample log sheets in Appendix A provide a complete chronology of the sample event including start and end times, flow rates, volumes, and specific sample identifiers.

Approximately 20 hours before the first samples were collected, the team began heating the VSS transfer tubing and sampling manifold. During this warmup period, the team began a purge of all vapor transfer tubing and the sampling manifold with ambient air. Before sampling tank vapors on June 27, 1995, the

team collected two SUMMA™ canister samples of ambient air, one manually 10 meters upwind of the VSS connection with SST 241-AX-102, and the other 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 sampling probe) was performed prior to opening the tank probe vapor sampling valve. The system was evacuated to 285 mbar (210.4 torr) and leakage of ambient air into the system was observed by monitoring system pressure for 15 minutes. Leakage resulted in an increase of 5.3 mbar (4 torr) in system pressure during the 15 minute test. Given a system volume of not more than 10 L, this pressure increase corresponds to a leak rate of approximately 12.7 mL/min at a 281 mbar (210.4 torr). This leak rate was then estimated for average SUMMA™, triple sorbent trap (TST), and sorbent sampling pressures. It was found that for the SUMMA™ canisters, dilution by ambient air was approximately 0.1%, for TSTs sampled at 50 mL/min the dilution was approximately 0.8%, for TSTs sampled at 200 mL/min the dilution was approximately 0.6%, and for sorbent traps the dilution was approximately 0.5%.

The tank probe vapor sampling valve was opened and the VSS was purged with sample vapor from SST 241-AX-102 for 30 minutes at a total flow rate of 5.46 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 TSTs for organic vapors; and Pacific Northwest Laboratory (PNL) provided SUMMA™ canisters, TSTs, and sorbent traps for organic vapors, ammonia (NH₃), nitrogen dioxide (NO₂), and water vapor (H₂O).

3.6 FIELD GC/FID RESULTS

The GC was single point calibrated on the day of sampling using 6.0 ppmC Propane standard by Scott Specialty Gas. The standard is an E.P.A. Protocol Gas that is ±2% NIST traceable.

Table 2 displays the Field GC/FID results from the sampling of SST 241-AX-102.

Table 2. TOC Results.

Number of Runs	Description	Average TOC Concentration (ppmC)	% Standard Deviation
3	Propane	6.00	0.49
4	Ambient	2.84	0.89
4	Tank Vapor	11.47	0.78

3.7 RADIATION SCREENING

Samples are unconditionally released from the SST farm in accordance with 1995-33300-RSP-03, *Release of Vapor Sampling Equipment* (WHC 1995c). 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 2,000 combined pCi/g of beta-gamma activity and 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 sampling devices from radioactive particulates, all sample vapor for the June 27, 1995, SST 241-AX-102 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 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. Moisture from the tank vapors was collected in a silica gel trap through one of the sorbent station ports and analyzed for tritiated water. SST 241-AX-102 filter and silica gel analysis results are shown in Table 3. SML scientists use the activity results in Table 3 to calculate pCi/g of sample media. SML maintains this information in the project-specific file. The results in Table 3 indicate that the samples collected from SST 241-AX-102 met the laboratory acceptance criteria and the DOT definition of a nonradioactive shipment.

Table 3. Radionuclide Analysis Results.

Filter	Sample Identifier	Activity Results ^a (pCi/sample)	Activity ^b (pCi/L of tank gas)
Upstream HEPA filter (box)	S5035-A51.OU1	Total Alpha = 741 Total Beta = 521 GEA = 830 (¹⁰⁹ Cd) GEA = 168 (²⁰⁸ Tl) GEA = 529 (²¹² Pb) GEA = 251 (²³⁷ Np) GEA = 138 (²⁴³ Am)	= 2.2 = 1.6 = 2.5 = 0.5 = 1.6 = 0.7 = 0.4
Downstream HEPA filter (box)	S5035-A52.OD1	Total Alpha = 741 Total Beta = <2.93 GEA = <detectable	= 2.2 = <0.009 = <detectable
Upstream HEPA filter (VSS)	S5035-A53.OU2	Total Alpha = 37.2 Total Beta = 11.5 GEA = <detectable	= 0.1 = 0.03 = <detectable
Downstream HEPA filter (VSS)	S5035-A54.OD2	Total Alpha = 22.6 Total Beta = 2.22 GEA = <detectable	= <0.07 = <0.006 = <detectable
Tritium trap	S5035-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 335 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 kept in a custody locked storage area 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 and 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. They were maintained at 4 ± 2 °C before and after the sampling event in the storage area refrigeration unit.

The TSTs were shipped back to ORNL after the sampling event using offsite property control (OPC W95-0-0435-17). Table 4 lists the sample identifiers, sample types, and COC form numbers for all ORNL samples. The samples were delivered to shipping on June 29, 1995 with instructions to ship by Federal Express, next-day delivery.

Table 4. Oak Ridge National Laboratory Samples.

Sample Identifier	Sample Type	COC Number
S5035-A7.1000	TST	006768
S5035-A8.1001	TST	006768
S5035-A9.1002	TST	006768
S5035-A10.1008	TST field blank	006768
S5035-A11.801	TST	006768
S5035-A12.1003	TST	006768
S5035-A13.1004	TST	006768
S5035-A14.813	TST	006768
S5035-A15.736	TST	006768
S5035-A16.1005	TST	006768
S5035-A17.745	TST field blank	006768
S5035-A18.1006	TST	006768
S5035-A19.1007	TST	006768
S5035-A20.738	TST	006768
S5035-A21.1009	TST trip blank	006768
S5035-A22.723	TST trip blank	006768

PNL supplied sorbent chain traps, TSTs, and SUMMA™ canisters, including COC forms. These sampling devices were picked up from PNL by SML and transported in a government vehicle to a custody locked storage area. The sorbent trains were maintained at 4 ± 2 °C before and after the sampling event in storage area refrigeration unit.

After sampling, the PNL sorbent tubes and SUMMA™ canisters were transported by government vehicle directly to PNL and delivered to J. A. Edwards on June 29, 1995. Table 5 lists the sample identifiers, sample types, and COC form numbers for all PNL samples.

Table 5. Pacific Northwest Laboratory Samples.

Sample Identifier	Sample Type	COC Number
S5035-A01.257	Ambient upwind SUMMA™	008898
S5035-A02.258	Ambient SUMMA™ (VSS)	008898
S5035-A04.212	SUMMA™	008898
S5035-A05.218	SUMMA™	008898
S5035-A06.220	SUMMA™	008898
S5035-A23.U36	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A24.U37	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A25.U38	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A26.U39	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A27.U40	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A28.U41	NH ₃ /NO _x /H ₂ O sorbent	008897
S5035-A29.U42	NH ₃ /NO _x /H ₂ O trip blank	008897
S5035-A30.U43	NH ₃ /NO _x /H ₂ O trip blank	008897
S5035-A31.U44	NH ₃ /NO _x /H ₂ O trip blank	008897
S5035-A32.U45	NH ₃ /NO _x /H ₂ O field blank	008897
S5035-A33.U46	NH ₃ /NO _x /H ₂ O field blank	008897
S5035-A34.U47	NH ₃ /NO _x /H ₂ O field blank	008897
S5035-A35.500	PNL TST	008906
S5035-A36.501	PNL TST	008906
S5035-A37.502	PNL TST	008906
S5035-A38.503	PNL TST field blank	008906
S5035-A39.504	PNL TST	008906
S5035-A40.505	PNL TST	008906
S5035-A41.506	PNL TST	008906
S5035-A42.507	PNL TST	008906
S5035-A43.508	PNL TST	008906
S5035-A44.509	PNL TST	008906
S5035-A45.510	PNL TST field blank	008906
S5035-A46.511	PNL TST	008906
S5035-A47.512	PNL TST	008906
S5035-A48.513	PNL TST	008906
S5035-A49.514	PNL TST trip blank	008906
S5035-A50.515	PNL TST trip blank	008906

From the time that samples are received by SML until they are shipped back to the analytical laboratory, all COCs are maintained by SML in accordance with WHC-IP-1127-1.3, *Chain-of-Custody/Special Analysis Request for RCRA and CERCLA Protocol Samples* (WHC 1995a). Copies of the completed COC forms for this sampling event are included in Appendix C.

5.0 QUALITY ASSURANCE AND CONTROLS

5.1 VAPOR SAMPLING SYSTEM CLEANING

Immediately prior to sampling of SST 241-AX-102, the VSS manifold and vapor sample transfer tubing was heated to 60 °C and ambient air was purged through the system for 23 hours. Also, all pertinent system valves were actuated to release any contaminants that may have collected 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. No significant level of contaminants was detected. A second ambient air GC/FID run confirmed that the VSS manifold and transfer tubing was free of organic remnant residue down to ambient levels. A SUMMA™ canister ambient air sample was then collected to confirm by laboratory analysis that the VSS sampling manifold was free of trace organic contaminants (or to determine which contaminants were present and at what concentration), as discussed in Section 3.5. For further details, refer to Appendix E of WHC-IP-1127-4.10 (WHC 1995b) and the project-specific file located with SML.

The hot-water-jacketed probe was initially cleaned in compliance with LO-080-405/A0, *Vapor Space Probe Cleaning Procedure* (WHC 1993) the team cleaned the hot-water-jacketed probe before it was installed in SST 241-B-103. 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 by a hand-held organic vapor meter that the total organic concentration in the sample line is below 1 ppmv. Following the sampling of 241-B-103 the probe was removed and transferred to AX Farm. Before installation in 241-AX-102 the probe was recleaned in accordance with Appendix E of WHC-IP-1127-4.10 (WHC 1995b).

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, are summarized in Table 6. According to the calibration schedule shown in Table 6, all instrumentation was within its calibration period during the SST 241-AX-102 sampling event.

Table 6. Calibration Data.

Element	Calibration Date	Expiration Date	WHC Standards Laboratory Code
FICV-1	5/08/95	5/08/96	518-28-03-012
FICV-2	5/08/95	5/08/96	518-28-03-008
FICV-3	5/08/95	5/08/96	518-28-03-004
FICV-4	5/08/95	5/08/96	518-28-03-006
FICV-5	5/08/95	5/08/96	518-28-03-011
FICV-6	5/08/95	5/08/96	518-28-03-009
FICV-7	5/08/95	5/08/96	518-28-03-014
FICV-8	5/08/95	5/08/96	518-28-03-013
FICV-9	5/08/95	5/08/96	518-28-03-007
FICV-10	5/08/95	5/08/96	518-28-03-010
FICV-11	5/08/95	5/08/96	518-28-03-005
PE-1	5/04/95	5/04/96	518-80-02-005
PE-2	5/04/95	5/04/96	518-80-02-006
PE-3	5/04/95	5/04/96	518-80-02-008
PE-4	5/04/95	5/04/96	518-80-02-007
PD-1	5/04/95	5/04/96	518-80-02-004
PD-2	5/04/95	5/04/96	518-80-02-003
Temperature Control System	3/30/95	3/30/96	804-67-74-009

5.3 BLANK SAMPLES

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

Field blanks are sampling devices similar to trip blanks. They are prepared and handled in the same manner as the sampling media, but no tank vapors are drawn through them.

Spiked blanks are prepared as regular sampling media but also contain a known amount of special analyte. Tank vapors are drawn through these blanks and

they are handled and analyzed just like any other sample. 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 or in the transfer tubing or sampling manifold of the VSS immediately prior to sampling operations.

Tables 4 and 5 also list sample blanks used during the sampling of SST 241-AX-102.

6.0 ANOMALIES

All samples were collected in accordance with the Tank Characterization Plan (TCP) and WHC-IP-1127-4.10, *Collection of Parallel Sorbent Tube and SUMMA Canister Samples Using the Vapor Sampling System* (1995b). There were no anomalies during the sample collection and the samples maintained their integrity.

7.0 REFERENCES

- 49 CFR 100-177, 1992, "Transportation," *Code of Federal Regulations*, as amended.
- Homi, C. S., 1995, *Vapor Sampling and Analysis Plan*, WHC-SD-WM-TP-335, Rev. 0D, 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, 1995a, *Chain-of-Custody/Special Analysis Request for RCRA and CERCLA Protocol Samples*, Procedure WHC-IP-1127-1.3, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995b, *Collection of Parallel Sorbent Tube and SUMMA Canister Samples Using the Vapor Sampling System (VSS)*, Procedure WHC-IP-1127-4.10, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995c, *Release of Vapor Sampling Equipment*, Procedure 1995-33300-RSP-03, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1993, *Vapor Space Probe Cleaning Procedure*, Procedure LO-080-405/A0, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A
SAMPLE LOG SHEETS

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Waste Tank
241-AX-102

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

Ensure HEPA filters are installed

Ensure connection to sample probe

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

Tank Temperature 24.6 C

GC Standard Runs

GC Ambient Air Runs through port 10

PNL

ORNL Port

Sample ID Valve #

Description

Desired Flow Rate SCCM

Desired Duration (min.)

Desired Total Flow SCCM

Actual Flow Rate SCCM

Actual Start Time

Actual End Time

Actual Total Time (min.)

Actual Total Flow Liters

Date: 6/27/95

VSS Personnel: Westberg, Mahon, Caprio, Utecht

Trailer Personnel: Utecht

Purge with ambient air for 30 min. Overnight 30 165000 5500 6/26-12:18 6/27-8:44 1226 6743.00

S5035-A01. 257 257 AMBIENT #1 1 9:09 9:10 1

GC Run #1 Ambient air/Cleanliness check 9:19

S5035-A02. 258 15 AMBIENT #2 1 9:24 9:25 1

GC RUN#2 Ambient air 9:28:30

LEAK CHECK(APPENDIX A) Leak Rate: 16 torr/hr

Purge with tank air for 30 min 5500 30 165000 5500 10:08 10:38 30 165.00

Measure tank pressure 747.0 torr

S5035-A03. 0T1 T-2105 (222-S) 8 Tritium Trap 200 1000 10:46 10:51:15 5.25 1.05

GCRUN #3 (Tank run #1) 10:56

S5035-A04. 212 212 11 SUMMA #3 1 11:02 11:03 1 6.00

S5035-A05. 218 218 13 SUMMA #4 1 11:07 11:08 1 6.00

S5035-A06. 220 220 15 SUMMA #5 1 11:12 11:13 1 6.00

GCRUN #4 (Tank run # 2) 11:17

Waste Tank
241-AX-102

WHC Sample ID	PNL		Port Valve #	Description	Desired		Desired		Actual		Actual	
	ORNL Sample ID	Sample ID			Flow Rate SCCM	Duration (min.)	Total Flow SCCM	Flow Rate SCCM	Start Time	End Time	Total Flow Liters	Total Time (min.)
S5035-A07.1000	TST#1000	TST#1000	1	TST #1	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A35.500	PNL TST#500	PNL TST#500	2	PNL TST #1	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A08.1001	TST#1001	TST#1001	3	TST #2	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A36.501	PNL TST#501	PNL TST#501	4	PNL TST #2	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A09.1002	TST#1002	TST#1002	5	TST #3	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A37.502	PNL TST#502	PNL TST#502	6	PNL TST #3	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A11.801	TST#801	TST#801	7	TST #4	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A39.504	PNL TST#504	PNL TST#504	8	PNL TST #4	50	4	200	50.00	11:26	11:30	4	0.20
S5035-A12.1003	TST#1003	TST#1003	1	TST #5	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A40.505	PNL TST#505	PNL TST#505	2	PNL TST #5	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A13.1004	TST#1004	TST#1004	3	TST #6	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A41.506	PNL TST#506	PNL TST#506	4	PNL TST #6	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A14.813	TST#813	TST#813	5	TST #7	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A42.507	PNL TST#507	PNL TST#507	6	PNL TST #7	200	5	1000	200.00	11:42	11:47	5	1.00
S5035-A15.736	TST#736	TST#736	7	TST #8	200	5	1000	192.90	11:42	11:47	5	0.96
S5035-A43.508	PNL TST#508	PNL TST#508	8	PNL TST #8	200	5	1000	190.00	11:42	11:47	5	0.95

Waste Tank
241-AX-102

WHC Sample ID	PNL ORNL Sample ID	Port Valve #	Description	Desired Flow Rate SCCM	Desired Duration (min.)	Desired Total Flow SCCM	Actual Flow Rate SCCM	Actual Start Time	Actual End Time	Actual Total Time (min.)	Actual Total Flow Liters
S5035-A16. 1005	TST#1005	1	TST # 9	200	20	4000	200.00	12:03	12:23	20	4.00
S5035-A44. 509	PNL TST#509	2	PNL TST # 9	200	20	4000	200.00	12:03	12:23	20	4.00
S5035-A18. 1006	TST#1006	3	TST # 10	200	20	4000	169.00	12:03	12:23	20	3.38
S5035-A46. 511	PNL TST#511	4	PNL TST # 10	200	20	4000	200.00	12:03	12:23	20	4.00
S5035-A19. 1007	TST#1007	5	TST # 11	200	20	4000	200.00	12:03	12:23	20	4.00
S5035-A47. 512	PNL TST#512	6	PNL TST # 11	200	20	4000	200.00	12:03	12:23	20	4.00
S5035-A20. 738	TST#738	7	TST # 12	200	20	4000	192.00	12:03	12:23	20	3.84
S5035-A48. 513	PNL TST#513	8	TST # 12	200	20	4000	189.60	12:03	12:23	20	3.79
S5035-A10. 1008	TST#1008	5	TST FIELD BLANK #1					12:30	12:31		
S5035-A17. 745	TST#745	7	TST FIELD BLANK #2					12:30	12:31		
S5035-A38. 503	PNL TST#503	6	NL TST FIELD BLANK #1					12:30	12:31		
S5035-A45. 510	PNL TST#510	8	NL TST FIELD BLANK #2					12:30	12:31		
GCRUN#5 (Tank run #3)								12:27			
S5035-A23. U36	U36	1	NH3/NOx/H2O #1	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A24. U37	U37	2	NH3/NOx/H2O #2	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A25. U38	U38	3	NH3/NOx/H2O #3	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A26. U39	U39	4	NH3/NOx/H2O #4	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A27. U40	U40	5	NH3/NOx/H2O #5	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A28. U41	U41	6	NH3/NOx/H2O #6	200	15	3000	200.00	12:44	12:59	15	3.00
S5035-A32. U45	U45	4	3/NOx/H2O FIELD BLANK#1					13:03	13:04		
S5035-A33. U46	U46	5	3/NOx/H2O FIELD BLANK#2					13:03	13:04		
S5035-A34. U47	U47	6	3/NOx/H2O FIELD BLANK#3					13:03	13:04		
GCRUN#6 (Tank run #4)								13:02			
TOTAL TANK GAS USED DURING SAMPLING RUNS											77.58
S5035-A51. OU1 T-2106 (222S)			Upstream HEPA(box)								

Waste Tank
241-AX-102

WHC Sample ID	PNL ORNL Sample ID	Port Valve #	Description	Desired		Actual		Desired		Actual		Actual	
				Flow Rate SCCM	Duration (min.)	Total Flow SCCM	Flow Rate SCCM	Start Time	End Time	Total Time (min.)	Total Flow Liters		

S5035-A52.0D1 T-2107 (222S) Downstream HEPA(box)

S5035 A53.0U2 T-2108 (222S) Upstream HEPA(VSS)

S5035-A54.0D2 T-2109 (222S) Downstream HEPA (VSS)

Trip Blanks (DO NOT EXPOSE)

S5035-A21.1009	TST#1009		TST TRIP #1										
S5035-A22.723	TST#723		TST TRIP #2										
S5035-A29.U42	U42		NH3/NOx/H2O TRIP #1										
S5035-A30.U43	U43		NH3/NOx/H2O TRIP #2										
S5035-A31.U44	U44		NH3/NOx/H2O TRIP #3										
S5035-A49.514	PNL TST#514		PNL TST TRIP #1										
S5035-A50.515	PNL TST#515		PNL TST TRIP #2										

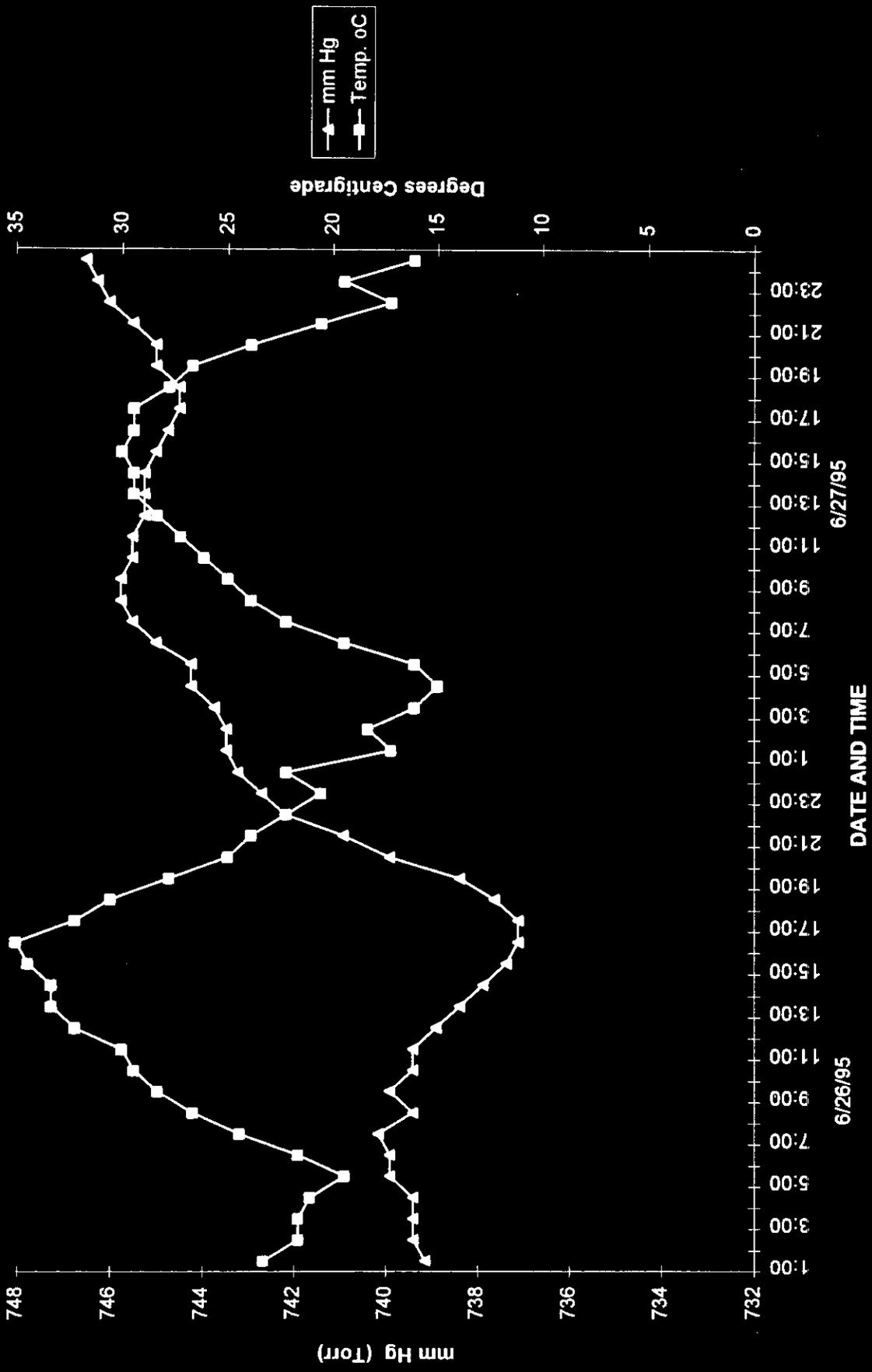
AX-102
TOTAL TANK VAPOR USED

	NUMBER OF EVENTS	TIME IN MINUTES	VOLUME IN SCCM	TOTAL VOLUME, LITERS
LEAK CHECKS	1	0	5600	5.60
TANK PURGE PUMP DOWNS	3	1	5600	16.80
TANK PURGE TIME (From Spreadsheet)	1	30	5450	165.00
GC PURGES	4	2	5000	40.00
SUMMA PURGES	3	2	5000	30.00
ALL SAMPLES COLLECTED				77.58
TOTAL FOR TANK SAMPLING RUN				334.98

APPENDIX B
AMBIENT CONDITIONS

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WEATHER DURING VSS SAMPLING OF 241-AX-102



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APPENDIX C
CHAIN-OF-CUSTODY FORMS

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028310

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COPY

Page 1 of 1

Date Turnaround
 Priority
 Normal

Collector: T.B. Utecht
 Project Designation: 241-AX
 Job Chest No.: N/A
 Shipped To: 028-S Labs
 Possible Sample Hazard/Remarks: NONE

Company Contact: R.D. Mahan
 Sampling Location: 241-AX-102
 Field Logbook No.: WHC-N-647 #10
 Office Property No.: N/A

Telephone No.: 373-7437
 SAF No.: SS035
 Method of Shipment: Boat Vehicle # 930
 Date of Loading/Air Use No.: N/A

Sample No.	Matrix*	Date Sampled	Time Sampled	Preservative	Type of Container	No. of Containers(l)	Volume	Special Handling and/or Storage
SS035-071	Silica Gel	6-27-95	1400	N/A	Petri Dish	(5)	47ml	
SS035-041	Hepa							
SS035-041	Hepa							
SS035-042	Hepa							
SS035-0D2	Hepa							

SAMPLE ANALYSIS

SPECIAL INSTRUCTIONS: Please fax info to 724
Tim Utecht at 373-7076
Thanks
X = Silica Gel and Hepa Filters.

Signature/Name	Date/Time
Received By: <u>SPR... EFD... 1025</u>	Date/Time: <u>6-28-95</u>
Received By:	Date/Time:
Received By:	Date/Time:
Received By:	Date/Time:

- Matrix*
- S Soil
 - SE Sediment
 - SO Solid
 - SL Sludge
 - W Water
 - O Oil
 - A Air
 - DS Drum Solids
 - DL Drum Liquids
 - T Tissue
 - WT Waste
 - L Liquid
 - V Vegetation
 - X Other

Received By: _____ Date/Time: _____

Disposal Method: _____

Dispersed By: _____ Date/Time: _____

ORNL	CHAIN OF CUSTODY (Rev 1)	# 006768
Custody Form Initiator	Amy Dindal	Sampling Location
ORNL Contact	Roger Jenkins	Telephone
Method of Shipment	Federal Express	Shipped to
		241-AX-102 (VSS)
		(615) 576-8594
		Rick Mahon

Sample Identification

WHC Identifier	TST #	Trap Type	Received at WHC (✓)	Received at ORNL (✓)
S5035-A7.1000	1000	SAMPLE	✓	✓
S5035-A8.1001	1001	SAMPLE	✓	✓
S5035-A9.1002	1002	SAMPLE	✓	✓
S5035-A11.801	801	SAMPLE	✓	✓
S5035-A12.1003	1003	SAMPLE	✓	✓
S5035-A13.1004	1004	SAMPLE	✓	✓
S5035-A14.813	813	SAMPLE	✓	✓
S5035-A15.736	736	SAMPLE	✓	✓
S5035-A16.1005	1005	SAMPLE	✓	✓
S5035-A18.1006	1006	SAMPLE	✓	✓
S5035-A19.1007	1007	SAMPLE	✓	✓
S5035-A20.738	738	SAMPLE	✓	✓
S5035-A21.1009	1009	TRIP BLANK	✓	✓
S5035-A22.723	723	TRIP BLANK	✓	✓
S5035-A10.1008	1008	FIELD BLANK	✓	✓
S5035-A17.745	745	FIELD BLANK	✓	✓

COMMENTS: Sample Date 6-27-95 - Log Book WHC-N-647 #10

<input type="checkbox"/> Field Transfer of Custody		Chain of Possession		(Sign and Print Names)	
Relinquished By	Date	Time	Received By	Date	Time
ABDindal / ABDindal	5/31/95	1221	TR. Ueckert / E. Blum	6-1-95	1930
TR. Ueckert / E. Blum	6-29-95	1300	AB Dindal / AB Dindal	6/20/95	2:10 pm

Cooler Temperature Status

Temperature (°C)	Min	Max
When Shipped from ORNL	-2°	4°
When Received at WHC	-12°	12°
When Shipped from WHC	3°	5°
When Received at ORNL	-10°	7°

Battelle Pacific Northwest Laboratory

CHAIN OF CUSTODY

WIIC 008897

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) 373-2891
 Page 85-3152 / FAX 373-3793

Project Designation/Sampling Locations **200 West Tank Farm** Collection date **06-27-95**
241-AX-102 Tank Vapor Sample SAF S5-035 Preparation date **05-26-95**
 (VSS Truck)

Ice Chest No. Field Logbook No. **WHC-N-647-10**

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

Method of Shipment **Government Truck**

Shipped to **WHC**

Possible Sample Hazards/Remarks **Unknown at time of sampling**

Sample Identification

S5-035 - A23 . U36 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 1)	Line # 9
S5-035 - A24 . U37 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 2)	Line # 10
S5-035 - A25 . U38 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 3)	Line # 8
S5-035 - A26 . U39 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 4)	Line # 10
S5-035 - A27 . U40 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 5)	Line # 9
S5-035 - A28 . U41 .	NH ₃ /NO _x /H ₂ O (Sorbent Trap # 6)	Line # 10
S5-035 - A29 . U42 .	NH ₃ /NO _x /H ₂ O (Trap Trip Blank # 1)	
S5-035 - A30 . U43 .	NH ₃ /NO _x /H ₂ O (Trap Trip Blank # 2)	
S5-035 - A31 . U44 .	NH ₃ /NO _x /H ₂ O (Trap Trip Blank # 3)	
S5-035 - A32 . U45 .	NH ₃ /NO _x /H ₂ O (Trap Field Blank # 1)	Line # 8
S5-035 - A33 . U46 .	NH ₃ /NO _x /H ₂ O (Trap Field Blank # 2)	Line # 9
S5-035 - A34 . U47 .	NH ₃ /NO _x /H ₂ O (Trap Field Blank # 3)	Line # 10

[] Field Transfer of Custody		[] Chain of Possession		(Sign and Print Names)	
Relinquished By	Date	Time	Received By	Date	Time
G W Dennis <i>A.W.D.</i>	05-30-95	0930	J A Edwards <i>J A Edwards</i>	05-30-95	0930
J A Edwards <i>J A Edwards</i>	05-31-95	0900	T B Utecht <i>T B Utecht</i>	05-31-95	0900
<i>Tim Utecht / T B Utecht</i>	6-29-95	1415	J A EDWARDS / <i>J A Edwards</i>	06-29-95	1415

Final Sample Disposition

Comments:

PNL (only) Checklist	Pick-up / Delivery	Comments:
Media labeled and checked?	<input checked="" type="checkbox"/> / N	
Letter of instruction?	<input checked="" type="checkbox"/> / N	
Media in good condition?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
COC info/signatures complete?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
Sorbents shipped on ice? (<10°C)	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
Rad release stickers on samples?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
Activity report from 222S?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
COC copy for LRB, RIDS filed?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	
COC copy for sorbent follow-on?	<input checked="" type="checkbox"/> / <input checked="" type="checkbox"/> / N	Original COC follows sorbent media

POC *[Signature]* POC *[Signature]*

(Revised 05/10/95 PNL)

**Battelle
Pacific Northwest Lab**

CHAIN OF CUSTODY

WHC 008898

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) 373-2891
Page 85-3152 / FAX 373-3793

Project Designation/Sampling Locations 200 West Tank Farm
241-AX-102 Tank Vapor Sample SAF S5-035
(VSS Truck)

Collection date 06 - 27 - 95
Preparation date 05 - 26 - 95

Ice Chest No.

Field Logbook No. WHC-~~N-647-10~~

Bill of Lading/Airbill No. N/A

Offsite Property No. N/A

Method of Shipment Government Truck

Shipped to PNL

Possible Sample Hazards/Remarks Unknown at time of sampling

Sample Identification

S5-035 - A01 . 257	Ambient Air SUMMA #1 Upwind of AX-102
S5-035 - A02 . 258	Ambient Air SUMMA #2 Through Port 15
S5-035 - A04 . 212	SUMMA #3 Port 11
S5-035 - A05 . 218	SUMMA #4 Port 13
S5-035 - A06 . 220	SUMMA #5 Port 15

[] 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>	05-31-95	0900	T B Utech <i>T B Utech</i>	05-31-95	0900		
T.B. Utech / <i>T B Utech</i>	6-27-95	1415	J A EDWARDS <i>J A Edwards</i>	06-27-95	1415		

Final Sample Disposition

Comments:

- | | | |
|--|--|------------------|
| <ul style="list-style-type: none"> ◊ PNL (only) Checklist ◊ Media labeled and checked? ◊ Letter of instruction? ◊ Media in good condition? ◊ COC info/signatures complete? ◊ Rad release stickers on samples? ◊ Activity report from 222S? ◊ COC copy for LRB, RIDS filed? | <p>Pick-up / Delivery</p> <ul style="list-style-type: none"> Y/N Y/N Y/N / Y/N <p>POC <i>[Signature]</i> POC <i>[Signature]</i></p> | <p>Comments:</p> |
|--|--|------------------|

(Revised 10/17/94 PNL)

Battelle Pacific Northwest Laboratory

CHAIN OF CUSTODY

WHC 008906

Custody Form Initiator J. A. Edwards - PNL

Telephone (509) 373-0141
Page 85-3009 / P8-08 / FAX 376-0418

Company Contact R. D. Mahon - WHC

Telephone (509) 373-7437
Page 85-9656 / S3-27 / FAX 373-7076

Project Designation/Sampling Locations 200 West Tank Farm
241-AX-102 Tank Vapor Sample SAF S5-035
(VSS Truck)

Collection date 06-27-95
Preparation date 06-21-95

Ice Chest No.

Field Logbook No. WHC-11-647-10

Erico Hi/Lo thermometer No. PNL-T-001

Bill of Lading/Airbill No. N/A

Offsite Property No. N/A

Method of Shipment Government Truck

Shipped to WHC

Possible Sample Hazards/Remarks Unknown at time of sampling

Sample Identification

S5-035 - A35 . 500 .	Collect PNL Triple Sorbent Trap (TST) Sample # 1	Line # <u>2</u>
S5-035 - A36 . 501 .	PNL TST Sample # 2	Line # <u>4</u>
S5-035 - A37 . 502 .	PNL TST Sample # 3	Line # <u>6</u>
S5-035 - A38 . 503 .	Open, close & store PNL TST Field Blank # 1	In VSS truck
S5-035 - A39 . 504 .	PNL TST Sample # 4	Line # <u>8</u>
S5-035 - A40 . 505 .	PNL TST Sample # 5	Line # <u>2</u>
S5-035 - A41 . 506 .	PNL TST Sample # 6	Line # <u>4</u>
S5-035 - A42 . 507 .	PNL TST Sample # 7	Line # <u>6</u>
S5-035 - A43 . 508 .	PNL TST Sample # 8	Line # <u>8</u>
S5-035 - A44 . 509 .	PNL TST Sample # 9	Line # <u>2</u>
S5-035 - A45 . 510 .	Open, close & store PNL TST Field Blank # 2	In VSS truck
S5-035 - A46 . 511 .	PNL TST Sample # 10	Line # <u>4</u>
S5-035 - A47 . 512 .	PNL TST Sample # 11	Line # <u>6</u>
S5-035 - A48 . 513 .	PNL TST Sample # 12	Line # <u>8</u>
S5-035 - A49 . 514 .	Store PNL TST Trip Blank # 1	None
S5-035 - A50 . 515 .	Store PNL TST Trip Blank # 2	None

[] Field Transfer of Custody		[] Chain of Possession		(Sign and Print Names)	
Relinquished By	Date	Time	Received By	Date	Time
J A Edwards	06-26-95	1030	Tim Utechl	06-26-95	1030
T.B. Utechl / J.A. Edwards	6-29-95	1415	J.A. Edwards / T.B. Utechl	06-29-95	1415

Final Sample Disposition

Comments:

- PNL (only) Checklist
- ◇ 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? (<5°C) (Y) N
 - ◇ Hi/Lo thermometer - *Keep upright!* (Y) N
 - ◇ Hi/Lo thermometer / (Y) N
 - ◇ Rad release stickers on samples? / (Y) N
 - ◇ Activity report from 222S? / (Y) N
 - ◇ COC copy for LRB, RIDS filed? / (Y) N

Comments:

Cooler Temperature Status	
Hi 4 °C / Lo 5 °C (pick up at PNL to WHC)	
Hi 2 °C / Lo 5 °C (delivery at WHC from PNL)	
Hi 6 °C / Lo 5 °C (at return to PNL from WHC)	
Hi 7 °C / Lo 5 °C (at delivery from WHC to PNL)	

POC (Signature) POC (Signature)

(Revised 06/21/95 PNL)

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