Sta 4. (2)

MAY 3 1 1996

ENGINEERING DATA TRANSMITTAL

1. EDT № 615414

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Characterization Project Operations (75100)	Characterization Equipment Design (75230)	611312
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
Characterization	D. D. Wanner	N/A

8. Originator Remarks:

ETN-96-003
This report documents the successful completion the ISVS operability test, WHC-SD-WM-OTP-196, REV OA. This report conforms to the guidelines established in WHC-IP-1026, "Engineering Practice Guidelines," Appendix L, "Operability Test Procedures and Reports."

9. Equip./Component No.: N/A

10. System/Bldg./Facility: 200 General

11. Receiver Remarks:

12. Major Assm. Dwg. No.: H-2-825313

13. Permit/Permit Application No.: N/A

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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-OTR-196	ALL	0	OPERABILITY TEST REPORT for the IN SITU VAPOR SAMPLING SYSTEM	SQ	1	1	

16. KEY

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

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng: DD WANNER DD Wanner 5/30/96 S7-12			
1	1	Cog.Mgr: JS SCHOFIELD 5/30/96 S7-12			
1	1	QA: AC TUELL 5/30/96 S7-04			
1	1	Safety: JA HARVEY 5/30/96 S7-07			
1	1	CPO: WJ KENNEDY 5/30/96 S7-03			
1	1	Des.Auth: DW HAMILTON 5/30/96 S7-12			
1	1	TCP: RD MAHON Rick Mahon 30MAY96 S3-27			

18. JE CORBETT — Signature of EDT Originator — Date 5/30/96

19. JG BURTON — Authorized Representative for Receiving Organization — Date 5/30/96

20. JS SCHOFIELD — Cognizant Manager — Date 5/30/96

21. DOE APPROVAL (if required) Ctrl. No.
- [ ] Approved
- [ ] Approved w/comments
- [ ] Disapproved w/comments

OPERABILITY TEST REPORT for the IN SITU VAPOR SAMPLING

J. E. Corbett
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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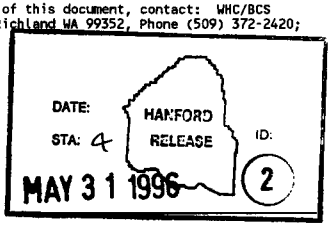
Key Words: Operability Testing, OTR, OTP, In Situ Vapor Sampling, ISVS, vapor sampling, Type IV Cart.

Abstract: This report documents the successful completion of testing for the In Situ Vapor Sampling (ISVS) system. The report includes the test procedure (WHC-SD-WM-OTP-196, Rev 0A), data sheets, exception resolutions, and a test report summary. This report conforms to the guidelines established in WHC-IP-1026, "Engineering Practice Guidelines," Appendix L, "Operability Test Procedures and Reports."



Release Approval 5/31/96
Release Stamp Date

Approved for Public Release

OPERABILITY TEST REPORT for the In Situ Vapor Sampling system

Table of Contents

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1.0 PURPOSE

The purpose of this Operability Test Procedure is to provide instructions for field testing of the In Situ Vapor Sampling System (ISVS), also known as the Type 4 Vapor Sampling System. The procedure follows "Operability Test Procedures and Reports", contained in WHC-CM-6-1, *Standard Engineering Practices*, EP 4.2 "Testing Requirements" Rev 5, Change 1.

2.0 SCOPE

Operability testing of the ISVS will verify that functional and operational requirements have been met. The test will show by demonstration that the ISVS is fully operational to perform the task of obtaining quality vapor samples from Hanford waste tanks. The test will be performed during a sample event in which ISVS and VSS will be operated concurrently on the same tank. This OTP and the side by side comparison are important parts of ISVS validation.

Concurrently, a special study will be conducted by PNL on the ISVS vapor sample probe and its performance under various conditions. The Operability Test Report (OTR) to be generated after testing will summarize the results of the operability test as well as the special study and the side by side sampling. The OTR will be the vehicle for acceptance of the ISVS in terms of field operability and a formal designation of its validation for technical adequacy.

3.0 RESPONSIBILITIES

Safety, Quality Assurance (QA), Characterization Project Operations (CPO), and Characterization Field Engineering (CFE) shall approve this procedure prior to release. Responsibilities are identified as follows:

Test Director –

Responsible for the overall performance of the OTP. Exercises stop work authority for unsafe activities or activities not conforming to this OTP. Directs the conduct and sequence of testing activities. Directs actions to be taken to prevent injury to employees or damage to equipment. Maintains cognizance of and documents test exceptions with concurrence of CFE Cognizant Engineer and the resolution of same. Concurs with all changes and with the acceptability and reliability of the equipment by signing the OTR.

CFE Cognizant Engineer (COG) = E H NIELSEN → DD WANNER

Appoints Test Director. Controls the sequence in which the OTP is conducted through the Test Director with concurrence of the PIC. Provides technical expertise and advice to both the PIC and Test Director as required. Maintains configuration control during testing. Approves any changes to the OTP. Responsible for obtaining additional support from engineering. Acts as the single point of contact for all engineering matters. Concurs with exceptions to testing on "OTP Exception List". Prepares and releases the OTR at conclusion of operability testing. Concurs with the acceptability and reliability by signing the OTR. All COG duties may be performed by COG's designee.

CPO Management = WJ KENNEDY

Reviews and approves test procedure. Ensures effective safety meeting is held prior to test start. Monitors testing to extent approval may be given for satisfactory equipment operability and reliability.

CPO Person-In-Charge (PIC) = STEVE CARTER

Responsible for the assignment of personnel and directing all operations of the side by side sampling event and the OTP for the ISVS. Controls access to the test area in order to maintain a safe environment. Approves changes to the OTP in terms of operational steps or equipment configuration when requested by the Test Director. Conducts a pre-job safety meeting at the start of each shift during the performance of the OTP. Briefs the personnel on testing to be performed that day and associated hazards.

Quality Engineering = RON ARNDT (FIELD) AC TUELL (EVALUATE RESULTS)

Reviews and approves test procedure to assure compliance with applicable regulations. Concurs with exceptions and their resolutions jointly with Test Director and COG. QE (or designee) will witness and/or review performance of this procedure at their discretion.

Safety = JA HARVEY

Reviews and approves test procedure to assure compliance with applicable regulations. Concurs with exceptions and their resolutions jointly with Test Director and COG. Safety (or designee) will witness and/or review performance of this procedure at their discretion.

4.0 INFORMATION

4.1 SYSTEM DESCRIPTION

The system under test is the In Situ Vapor Sampling System. The system consists of a bundle of selected sorbent tubes to be lowered into the headspace of the chosen tank, a sample head assembly which protects the sorbent tubes, a pump and a flow measurement system. The pump used can be either the ISVS cart or the VSS: either is capable of drawing tank gases (essentially air with traces of other chemicals) through the HEPA filter, the sorbent trains, and the tubing bundle and measuring the volume of gas drawn. This test will be conducted using the ISVS cart, as the VSS will be involved in the Type 3 sampling event to be performed concurrently.

4.2 TEST EQUIPMENT

The equipment and materials listed below are necessary to perform this acceptance test:

- The VSS will be on the chosen tank, performing a normal Type 3 sampling event.
- A multiport adapter will be installed on the riser used for the Type 3 sampling. Type 4 sampling is to be performed through the other port on the same riser.
- For this test, the ISVS cart will be used to perform the Type 4 sampling.
- The work package(s) for the Type 3 and Type 4 sampling will specify a list of materials required. This OTP requires no special additional equipment.

4.2 TEST GUIDANCE

Discrepancies, deviations, or irregularities involving the test procedure and equipment performance are to be noted on the "OTP Exception / Resolution Data Sheet". These exceptions shall be jointly resolved between the Test Director, COG, and any assigned witnesses. All resolutions to the exceptions must be agreed upon by the responsible personnel, documented on the exception list, and initialed.

No testing shall be done which involves faulty equipment, as determined by the Test Director. However, at the discretion of the CFE Cognizant Engineer and with approval of the CPO PIC, tests may proceed on equipment which is not affected by faulty equipment.

If, due to circumstances, modifications of the test procedure are warranted, written changes may be made with the concurrence of the Test Director, COG, and any assigned witnesses. Amendments shall be per instructions in WHC-CM-6-1, *Standard Engineering Practices*, EP-4.2, "Testing Requirements" Rev 5, Change 1.

4.3 REFERENCES

WHC-CM-6-1 REV 5 Change 1, *Standard Engineering Practices*, EP-4.2

WHC-IP-1026 REV 1, *Operability Test Procedures and Reports*, Appendix L

WHC-SD-TD-ATP-132 REV 1, *In Situ Vapor Sampling System Acceptance Test Procedure*

H-2-825313 *Vapor Sampling Cart Assembly*

H-2-825314 *Vapor Sampling Cart Electrical Installation*

H-2-825301 *In Situ Sample Head Assembly and Details*

4.4 SAFETY ISSUES

Personal protective equipment and all other safety issues are covered in the work package(s) for Type 3 and Type 4 sampling. Any special safety issues related to the test (possible use of a tracer gas, or special sample handling for contaminated samples, etc) will be evaluated in the approval of the Sampling and Analysis Plan or other document which provides the details of the analytical plan.

4.5 RADIATION AND CONTAMINATION CONTROL

The RWP for routine vapor sampling activities applies for this test.

4.6 QUALITY ENGINEERING

Quality Engineering shall approve this Operability Test Procedure prior to its release. A Quality representative shall witness and/or review test performance at their discretion.

4.7 ACCEPTANCE CRITERIA

The acceptance criteria for this OTP are the operability and predicted reliability of the equipment. Operability shall be determined on a simple "pass-fail" basis: each step shall be evaluated by the Test Director and COG to verify that the equipment is acceptable for continued use. Future reliability of the equipment is not determined quantitatively, but is accepted based on the judgment of the Test Director, COG, and CPO Manager, or their delegates. The judgment of acceptable overall reliability of the system shall be documented by the signatures on the Test Completion Sign-Off Sheet.

5.0 RECORDS

The CFE Cognizant Engineer shall prepare and release an Operability Test Report at the conclusion of OTP testing as described in section 2.

6.0 PROCEDURE

This procedure will be used to perform the operational testing of the ISVS system. As each step is performed initials shall be logged onto the procedure in the blank spaces as indicated. Those initialing here shall also sign the Test Completion - Signoff Sheet.

Step 1: Notify all witnesses immediately prior to commencing the test.

A Safety representative has been identified and will witness test or chooses not to.

J.A. Harvey CPISH 1/25/96
~~Safety~~/Date

A Quality Assurance representative has been identified and will witness test or chooses ~~not to~~.

R.A. ARNDT 1-26-96
QA/Date

OP/CE DD JH Step 2: The following conditions shall be met prior to conduct of this OTP:

VSS is prepared to perform a Type 3 sample event on the chosen tank.

ISVS cart is prepared to perform a Type 4 sample event on the same tank.

OP/CE Step 3: The ISVS cart operating procedure does not normally require step-by-step signoffs. However, as this OTP is intended to verify the adequacy of the **equipment and the procedure**, a more rigorous examination of the procedure under field conditions is required. The ISVS cart operating procedure is written in a general manner, to allow for flexibility in sampling. Each section of the procedure is written to stand alone if necessary, and therefore each page will be performed repeatedly if several samples of the same type are taken. An OPERATIONAL COPY of the procedure shall be prepared before the sample job with sufficient copies of each page to allow the sample job to be completed without having to perform multiple checkoffs on each sheet.

Proceed with the Type 4 sample event, using the OPERATIONAL COPY, marking off the steps as they are accomplished. A check mark beside each step shall be considered adequate documentation of step completion: the person making the check marks shall initial each page as it is completed. Due to the nature of the OPERATIONAL COPY, there will be steps on some pages that do not apply. These shall be lined out. Any **SIGNIFICANT** difficulty encountered in performing the procedure shall be resolved, then recorded as an exception with its resolution, and sampling shall continue.

OP/CE Step 4: **VERIFY** that all steps in the OPERATIONAL COPY of the procedure have been completed. This completes the Operational Test Procedure.

OTP EXCEPTION / RESOLUTION DATA SHEET

STEP #	DESCRIPTION OF PROBLEM	RESOLUTION TO PROBLEM	COG INITIALS	WITNESS INITIALS
Summa Sample	Steps 2, 3, 4 should be 3, 4, 2	Rev procedure	EPP 1-26-96	KG 1-26-96

TEST COMPLETION - SIGN OFF SHEET

All tests have been completed as described in this OTP. All exceptions have been documented and resolved as indicated on the "OTP Exception / Resolution Sheet". The ISVS can be operated in a safe manner and pose no unacceptable hazards to the operator. System reliability is predicted to be acceptable.

NAME	ORGANIZATION	SIGNATURE	DATE
DK DEFORD	Characterization Equipment Development (PROJECT ENGINEER)		1/26/96
WJ KENNEDY	Characterization Project Operations (MGR)		2/12/96
SB CARTER	Characterization Project Operations (PIC)		2/12/96
AC TUELL	Quality Assurance		2/20/96
JA HARVEY	Safety		2/12/96
JS SCHOFIELD	Characterization Field Engineering (MGR)		2/22/96
~~EH NEILSEN~~ D.O Wagner	Characterization Field Engineering (COG)		2/12/96

9.0 OTR CONCLUSION

The OTP was successfully completed on January 26, 1996. The ISVS operability test was performed in parallel with an operational VSS sampling event, as described in section 2.0. Vapor samples were collected from Tank C-107 on January 17, 1996; from Tank BY-108 on January 23, 1996; and from Tank S-102 on January 26, 1996. The three tanks were sampled by both the VSS and ISVS methods from the same access risers within the same eight-hour period. These Tanks were selected because their headspace compositions are diverse, and they represent the highest known levels of several key vapor analytes. Because samples were collected when ambient temperatures were at or below freezing, this test demonstrated the operability of the ISVS method during one of the most adverse field conditions.

The acceptance criteria for the ISVS operability test was met during each sampling event, and is documented per the requirements described in section 4.7. The only exception/resolution noted in section 7.0 was due to an error in the operating procedure. This problem was resolved by an ICA (instruction change authorization) to the operating procedure. Final acceptance of test completion and overall reliability of the system was completed February 22, 1996, per section 8.0.

The OPERATIONAL COPY of the operating procedure, used for step-by-step completion of the sampling event, is provided as the appendix to this report. This procedure was followed and marked according to the instructions given in step 3 of the OTP. The procedure pages in the appendix are in the order that they were assembled for the sampling events. Because samples were collected by the sampling crew using the revised operating procedure, this test demonstrated personnel and procedure readiness.

In addition to the operability testing described above, ISVS testing was performed by PNNL. The special study referred to in section 2.0 and the bench testing referred to in WHC-SD-WM-ETP-193 was performed by PNNL after ATP and prior to OTP. This informal testing resulted in the conclusion that the equipment was ready to support the OTP and that all test information required to support the operational deployment of the system would be obtained in the OTP and by a side by side sampling comparison. This comparison test (referred to as the field cart test in WHC-SD-WM-ETP-193) was analyzed by PNNL. The two sampling methods compared in this test are the truck-mounted vapor sampling system and the cart mounted ISVS. The results of this test are documented in the report "Comparison of Vapor Sampling System (VSS) and In Situ Vapor Sampling (ISVS) Methods on Tanks C-107, BY-108, and S-102 (PNNL-11186) by J. L. Huckaby, et al. This conclusion of this report is summarized in the following two paragraphs.

Results from the two comparison criteria used to evaluate the comparability of the VSS and the ISVS methods indicate that the ISVS method is essentially equivalent to the VSS method. Of 65 comparisons, 56 (86 percent) passed the acceptance criteria. The three dominant vapor space waste constituents (i.e., ammonia, hydrogen, and nitrous oxide) are among those passing the acceptance criteria with sample results very close to the VSS method. Gases and vapors that met the acceptance criteria in all tanks include ammonia, water vapor,

and the permanent gases. Relative percent differences between the sample method means ranged for ammonia and water vapor between three and eight percent, and for the permanent gases from 0.3 to two percent. Total nonmethane hydrocarbon results also met the criteria, except samples from Tank C-107 where contamination from adhesive tape used to seal the sample tube bundle caused results outside the acceptance criteria. An alternate sealing method has since been developed. Most of the organic vapors collected by SUMMA™ canister also met the comparison criteria. Of those organic vapors outside the acceptance criteria (five of 29), two semivolatile organic vapors experienced low transfer to the sample canister through unheated tubing on a very cold day and three demonstrated no trend toward lower or higher concentrations than the VSS sample method (i.e., no consistent bias). Most organic vapors collected by triple sorbent traps (TSTs) also met the acceptance criteria. Seven of 20 results exceeded the acceptance criteria, but also demonstrate no trend toward lower or higher concentrations than the VSS method (i.e., no consistent bias). Those organic vapor results outside the acceptance criteria collected by either ISVS TSTs or ISVS SUMMA™ canisters were considered acceptable, since the difference between VSS TST and VSS SUMMA™ canister sample results were generally greater than the differences between the VSS and ISVS methods.

As was anticipated, certain semivolatile organic vapors in Tank BY-108 were not quantitatively transferred through the ISVS transfer tubing to SUMMA™ canister samples. Future analyses of semivolatile organic vapors in SUMMA™ canisters collected by the ISVS method should thus be considered suspect if their concentrations are very high, as was the case in Tank BY-108. In such situations either the semivolatiles should be measured using the TST samples, or the VSS should be used to collect SUMMA™ canister samples. Tests of the ISVS system with and without a particulate filter were conducted to assess the removal of tributyl phosphate and other semivolatile organic vapors by the filters. The filters are necessary in the VSS method to prevent contamination of the sampling system, but can be eliminated in the ISVS method because of the ease of system decontamination. Results indicated that the filters did adversely affect the collection of low volatility organic vapors, however, because tributyl phosphate was not detected in any of the samples (filtered or unfiltered), the effect of the filters on tributyl phosphate could not be determined. Because of the effect on low volatility organic vapors, the ISVS samples without the particulate filter are used in the comparison study. Future production sampling should be conducted without the filters.

The above PNNL report briefly mentions two problems associated with the initial use of the ISVS method (adhesive tape off-gassing and imperfect SUMMA™ transfer line connections). These problems were not considered a significant difficulty during operability testing and require no further resolution. The ISVS sampling is further discussed in the following three reports: WHC-SD-WM-RPT-216, -217, and -218. Based on all ISVS testing to date, the conclusion of this report is that the ISVS system, including the associated support personnel and work procedures, is ready for operational deployment as described in WHC-SD-WM-ETP-193.

APPENDIX A

OPERATING PROCEDURE SHEETS

OPERATIONAL COPY

INSTRUCTION CHANGE AUTHORIZATION (ICA)

ICA No. IP-6

Instruction No.
WHC-IP-1127, 4.8, "Vapor Sampling of Waste Tanks Using In Situ Sampling System (ISVS)"

Rev. No. 0

Description of Change

Approval Designator S/Q

The term "HEPA" was incorrectly used in this procedure and should be deleted from this procedure. Delete all occurrences of "HEPA" in the procedure.

Page 4, Section 7.0 EQUIPMENT, add the following:
filter - glass fiber filters, Type A/E, Nominal Rating (liquids) = 1 micro meter
filter - PTFE membrane, 2 micro meter, Typical Aerosol Retention of 99.99% for 0.3 micro meter (DOP) at 32 Lpm/100 square cm.

Page 9, FOR SUMMA SAMPLING, Step 3b. Change "150" to "45".

Page 9, FOR SORBENT SAMPLING, Step 3c. Delete this step.

Page 10, Step 5. Change "150" to "45".

Page 11, Add Step 21a. "Wait 5 minutes before closing c-flex clamps and removing sample line (step 24)."

Page 12, Step 5. Change "150" to "45".

[ ] One Time [X] Permanent

Justification

The filters being used in the procedure are not HEPA filters. The term was used incorrectly in this procedure and must be deleted from this procedure.
The flow changes will allow the procedure to follow the direction of the TSAP for C-107, BY-108 and S-102. The flow changes will also improve operational efficiency. Adding step 21a will allow the tube bundle tubing to come back up to tank pressure, correcting for any evacuated pressure in the tubing due to a tightly packed TST. The data sheet was added because there was no place to record data on the original procedure.

Approvals: (Print/Sign Name and Date)

RD Mahon Rick Mahon ICA Author	16JAN96 Date	LL Lockrem ICA Author's Manager	1-16-96 Date
LL Lockrem Instruction Author's Manager	1-16-96 Date	CJ Stephan Quality Assurance (If Required)	1-16-96 1-16-96 Date
DL Edwards RD Mahon for DL Edwards Ron Telecon 11:50AM Other 16 JAN 96	16JAN96 Date	~~PA Moorman~~ KH Jaten Safety (If Required)	1-16-96 Date

INSTRUCTION CHANGE AUTHORIZATION (ICA)		ICA No. IP-6
Instruction No. WHC-IP-1127, 4.8, "Vapor Sampling of Waste Tanks Using In Situ Sampling System (ISVS)"	Rev. No. 0	Page 2 of 2

Description of Change (continued)

Add a data sheet to the procedure (Attached to ICA) for use with Appendix III, Sorbent Tube Sampling.

TANK _____
DATE _____
TIME _____

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
	1			
	2			
	3			
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1

1.0 SUMMARY

The following sampling procedure is used to collect samples of vapors in the underground waste storage tanks at Hanford. Sampling will be directed by a Tank Characterization Plan (TCP). The TCP is provided by the organizations requesting the tank vapor characterization. Samples can be collected by sorbent tubes, SUMMA™ canisters, or flow-through cylinders under this procedure.

2.0 APPLICATIONS

This procedure provides direction only to Sampling and Mobile Laboratories (S&ML) and Special Analytical Studies (SAS) personnel who have been trained in the operation of the In Situ Vapor Sampling System (ISVS).

3.0 LIMITATIONS

This procedure is limited to waste tank vapor characterization efforts supported by protocol sampling. A TCP provided by Characterization Management shall be written for each sampling effort that specifies the operational ISVS parameters.

4.0 QUALITY CONTROL PROTOCOL

All sampling activities shall be performed in accordance with the requirements established in the project specific Quality Assurance Project Plan (QAPjP) and TCP.

Collected samples shall be labeled, evidence-taped, and maintained under chain-of-custody (COC) by S&ML personnel from the time of collection. COC shall be initiated and maintained in accordance with Section 1.3, "Chain of Custody for RCRA/CERCLA Protocol Samples," of this manual.

Quality control samples shall be collected as specified in the project specific QAPjP.

5.0 SAFETY

All vapor sampling activities shall be performed in accordance with site-specific health and safety and radiological work permit (RWP) requirements. As applicable, these documents will include WHC procedures and U.S. Department of Energy safety requirements for access control, radioactive and hazardous waste monitoring, personal protective equipment (PPE), operations, containment, and decontamination.

6.0 RESPONSIBILITIES AND INTERFACES

6.1 Health Physics Technicians (HPTs)

- Supply appropriate RWP to conduct sampling, as appropriate.

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- Monitor sampling activities to ensure the radiological health and safety of the sampling team.
- Assess dose rates of sample containers and transport vessel to ensure compliance with regulations.
- Sign the Onsite Routine Radioactive Shipment Record and Request for Special Analysis form (if applicable).
- Survey samples, sampling equipment, and sampling personnel out of radiation zones, in a timely and efficient manner.
- Provide the appropriate release stickers for samples and used equipment.
- Sign Off-Site Property Control form, if applicable.

6.2 Tank Farms Operations

- Provide a qualified person-in-charge (PIC) to oversee field activities.
- Coordinate with HPTs and Industrial Hygiene to ensure appropriate support is made available.
- Provide PPE as required by the applicable RWP.
- Provide electrician support for bonding and grounding ISVS if required.
- Conduct a pre-job safety meeting.

6.3 Field Scientist

- Conduct overview of the TCP.
- Direct sampling event(s).
- Document and communicate to cognizant management, any anomalies or situations that may compromise the integrity of the samples.
- Review all documents before release from the originating organization.
- Document all pre-job, job specific, and post-job activities associated with the sampling event(s).
- Ensure samples and sampling equipment are transported to and from the sample site.
- Ensure a copy of the TCP is available for reference during sampling.

- Ensure logbook is maintained.
- Perform overall operation of ISVS.
- Coordinate analysis of high efficiency particulate air (HEPA) filters through the 222-S Laboratory.
- Provide the deliverables to the Manager of S&ML.

6.4 Sample Technician(s)

- Assist the field scientist in gathering necessary supplies and equipment to complete the sampling event.
- Assist in the operation of the ISVS.
- Photograph the sampling point. Label the photograph(s) with the date, location, and time. Sign and date the photograph(s).
- Review, date, and initial all documentation.
- Label and package samples.

6.5 Laboratories

6.5.1 Off-Site Laboratories

- Provide all sample media that has been cleaned or prepared in accordance with QAPjP requirements.
- Maintain certificate of cleanliness of the sample collection media.
- Initiate COC for sample media.
- Analyze samples, prepare and submit analytical results.

6.5.2 On-Site Laboratories

- Initiate identifiers for radiation screening samples.
- Analyze samples for radiological activity and provide results for release and shipping criteria.

Tank S-102
Date 26JAN96
Time 0930

7.0 EQUIPMENT

The following is a typical list of equipment that may be used in the collection of samples.

- Filter-glass fiber filters, Type A/E, Nominal Rating (liquids) = 1 micrometer
- Vapor sampling cart
- Tube bundle (length specified in the work package)
- Sample collection media
- Field data forms
- Copy of sampling procedure
- Hand tools
- filter - PTFE membrane, 2 micrometer Typical Aerosol Retention of 99.99% for 0.3 micrometer (DOP) at 32 Lpm/100 square cm.

8.0 PROCEDURE STEPS

8.1 Setup

RM ✓ 1. Check sample cart instrumentation for current calibration.

RM ✓ 2. Clamp off all sample lines at the sample cart end.

RM ✓ 3. Ensure ~~HEPA~~ filters are in ~~HEPA~~ filter bodies F-1 through F-5.

RM ✓ 4. Ensure ~~HEPA~~ filters are positioned in Sample Head.

RM ✓ 5. Take the equipment into the farm and position it for sampling.

RM ✓ 6. Vapor sampling cart must be positioned level outside of the containment structure.

RM ✓ 7. Ensure Electricians have bonded and grounded the ISVS if required.

RM ✓ 8. Supply electricity to sample cart.

RM ✓ 9. Perform leak test (see Appendix I).

RM ✓ 10. Ensure valve V-8 remains closed for all procedures. This valve is to be used as an auxiliary vacuum port only and may effect sampling if left open.

8.1.1 Tube Bundle Placement

NOTE: **The tube bundle is still under COC and the responsibility of the sampling team. It is essential that it be visually monitored throughout the insertion into the tank and during removal.**

1. If sampling from ventilation duct with a pitot tube, see Appendix VI. If not, proceed to step 2.

2. Supply the tube bundle to the Operations PIC.

RDM

Tank S-102
Date 26 JAN 96
Time 0302

APPENDIX I
LEAK TEST

1. Plug-in electronics for the flowmeters and totalizers, 15 minute warm-up is required prior to sampling. On at 0240
2. Ensure cart is not connected to the tube bundle, then place a short section of C-flex with a closed clamp on sample ports 1 thru 5.
3. Ensure SUMMA™ Sampling Station is securely capped.
4. Open valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7.
5. Close rotameter needle valves FG-1, FG-2, FG-3, FG-4, and FG-5 .
6. Turn ON the sample pump.
7. Slowly open rotameter needle valves FG-1, FG-2, FG-3, FG-4 and FG-5 to full on-position.
8. Let pump run for two minutes.
9. Close valve V-7.
10. Turn OFF vacuum pump.
11. Record vacuum pressure from PI-1 in field notes (approx. 23.5 in. Hg). PI-1 start 24.5 in Hg
12. Wait five minutes.
13. Record final vacuum pressure from PI-1. PI-1 Stop 24.0 in Hg
14. If the pressure gain is greater than 1 inch Hg in 5 minutes, troubleshoot and repeat test.
15. Remove jumpers and close valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7. The system is now in stand-by mode.

1-26-96

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING Bundle A Ambient

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 (1 L Flow Rate) mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle A to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RBM

Bundle A Ambient
Tank [illegible]
Date 26 JAN 96
Time 0335

Canister # 123

APPENDIX IV
SUMMA™ CANISTER SAMPLING

✓ 1. **From Stand-by Mode,** remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.

T1 = -4.2°C

✓ 2. Open valve V-5 and V-6.

✓ 3. Start sample pump.

T3 = 32C
T4 = 0°C

✓ 4. Open valve V-7 (1 L/min) — Purge Start Time 0336

✓ 5. Slowly increase FG-5 to unit mark ~~150.~~ 45 — FG-5 Flow reading 45

PI-1 19.5

✓ 6. Let purge for ~~?~~ 5 minutes. — Purge Stop Time 0341

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

✓ 7. Close valves V-6 and V-7.

✓ 8. Turn off sample pump.

✓ 9. Reset Stopwatch

✓ 10. Simultaneously: Open SUMMA canister valve
Start Stopwatch

Start Time = 0341

✓ 11. Allow 60 seconds for canister to fill.

✓ 12. Close the SUMMA™ canister valve. — Stop Time = 0342

0342 Vapor = 4.6
Head = 30.3

✓ 13. Close valve V-5.

✓ 14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.

✓ 15. Record any anomalies in field notes.

✓ 16. Return to standby mode (Section 8.2).

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING Bundle B Ambient

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle B to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   ~~c. Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

Bundle B Ambient
Tank S-102
Date 26JAN96
Time 0851

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 127

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. ✓ Open valve V-5 and V-6.
3. ✓ Start sample pump.
4. ✓ Open valve V-7 — Purge Start Time 0855
5. ✓ Slowly increase FG-5 to unit mark ~~150.~~ 45 — FG-5 reading 45; PI-1 19.5
6. ✓ Let purge for ~~2~~ 5 minutes. — Purge Stop Time 0858

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur. RM

   Truck near ~~Bundle~~ cart may have been started during Ambient B Bundle Purge. Makon not sure when operator started truck. At 0900 Vpor = 6.6 Head = 29
7. ✓ Close valves V-6 and V-7.
8. ✓ Turn off sample pump.
9. ✓ Reset Stopwatch
10. ✓ Simultaneously: Open SUMMA canister valve
    Start Stopwatch — Start Time 0858
11. ✓ Allow 60 seconds for canister to fill.
12. ✓ Close the SUMMA™ canister valve. — Stop Time 0859
13. ✓ Close valve V-5.
14. ✓ Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. ✓ Record any anomalies in field notes.
16. ✓ Return to standby mode (Section 8.2).

1-26-96

RJM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING Bundle C Ambient

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle C to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

Bundle C Ambient
Tank S-102
Date 26 JAN 96
Time 0905

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 165

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45.
6. Let purge for ~~7~~ 5 minutes.

Purge Start Time 0909
FG-5 reading 45
PI-1 19.8
Purge Stop Time 0914

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch

Vehicle was running near cart during bundle C ambient purge. Truck parked near cart. The vehicle was shut off during the purge.

10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 0914

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 0915

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RSM

7.0 EQUIPMENT

The following is a typical list of equipment that may be used in the collection of samples.

- Vapor sampling cart
- Tube bundle (length specified in the work package)
- Sample collection media
- Field data forms
- Copy of sampling procedure
- Hand tools

8.0 PROCEDURE STEPS

8.1 Setup

1. Check sample cart instrumentation for current calibration.
2. Clamp off all sample lines at the sample cart end.
3. Ensure HEPA filters are in HEPA filter bodies F-1 through F-5.
4. Ensure HEPA filters are positioned in Sample Head.
5. Take the equipment into the farm and position it for sampling.
6. Vapor sampling cart must be positioned level outside of the containment structure.
7. Ensure Electricians have bonded and grounded the ISVS if required.
8. Supply electricity to sample cart.
9. Perform leak test (see Appendix I).
10. Ensure valve V-8 remains closed for all procedures. This valve is to be used as an auxiliary vacuum port only and may effect sampling if left open.

8.1.1 Tube Bundle Placement Insert Bundle A

NOTE: **The tube bundle is still under COC and the responsibility of the sampling team. It is essential that it be visually monitored throughout the insertion into the tank and during removal.**

NA 1. If sampling from ventilation duct with a pitot tube, see Appendix VI. If not, proceed to step 2.

2. Supply the tube bundle to the Operations PIC.

RDM

3. Monitor the placement of the tube bundle in the containment structure.

4. Monitor the tube bundle during insertion to ensure Operations placement at the correct depth/location, per TCP instructions.

5. In the field notes, record the;

- Depth and location Depth = 207' Riser 7
- LEL measurement 6%
- OVM reading ~~35.4 ppm~~ 25.1 ppm
- Ammonia concentration measured by colorimetric tubes > 700 PPM
- Any anomalies associated with setup.

8.2 Standby Mode

1. During the standby mode the sample cart shall be ready for operation and in the following configuration:

   a. Tube bundle is in the sampling position/location in the tank but not connected to the cart.
   b. Valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7 are closed.
   c. Sample pump is off.
   d. Power is on to the flowmeters and totallizers

2. The standby mode serves as a reference point from which the following functions can be performed.

Description	Appendix
Leak Test	I
Setting System Flow Rates	II
Sorbent Tube Sampling	III
SUMMA® Canister Sampling	IV
Flow-Through Cylinder Sampling	V

8.3 Shutdown

1. Request HPT coverage during steps 2 through 6.
2. Monitor Operations removal of the tube bundle from the tank.
3. Receive tube bundle and move to low background area.
4. Dismantle tube bundle and bag sorbents for shipment to laboratory.

RPM

APPENDIX II
SETTING SYSTEM FLOW RATES

Bundle A

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle A to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

Bundle A
Tank S102
Date 26JAN 96
Time 1030

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 128

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for ~~7~~ 5 minutes.

1033
Head 35
Vapor = 16.8

Purge Start Time 1032:30
FG-5 reading 45
PI-1 19.9
Purge Stop Time 10:37:30

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 10:37:30

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1038:30

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

Bundle A
Tank 5-102
Date 26 JAN 96
Time 1039

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 129

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1040
FG-5 reading 45
PI-1 10.8
Purge Stop Time 1042

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1042

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1043

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

Bundle A

Tank S-102

Date 25 JAN 96

Time 0947

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 134

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7 — Purge Start Time 1045
5. Slowly increase FG-5 to unit mark ~~150.~~ 45 — FG-5 reading 45; PI-1 20.2
6. Let purge for 2 minutes. — Purge Stop Time 1047

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve, Start Stopwatch — Start Time 1047
11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve. — Stop Time 1048
13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle A PNL TSTs

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 320 sccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle A TSTs

APPENDIX III
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes. 1053 → 1055 PI-1 =

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should occur.

7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1056
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

*Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should occur.

RSM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT #1 205
FT #2 205
FT #3 207
FT #4 _____

RDM

TANK S-102
DATE 26 JAN 96
TIME 1055

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
817	1	1056		205
818	2	1056		205
819	3	1056		207
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1

RSM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7. 45
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle A NH_3/H_2O

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 220 sccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle A NH_3/H_2O

APPENDIX III
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1107
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

RJM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 2004
FT#2 2002
FT#3 2001
FT#4 _____

Time = 1122
Amr = 25 °C
Head = 26.9°C

RJM

TANK 5-102
DATE 26JAN96
TIME 1109

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
805	1	1107		2004
815	2	110730		2002
825	3	1108		2001
	4			

Tank Vapor

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1
1109	216	216	216	0	3.5	24	28	1	28
1114	218	221	219	0	3.5	24.8			

1112 Sample Head = 27.7

RDM

7.0 EQUIPMENT

The following is a typical list of equipment that may be used in the collection of samples.

- Vapor sampling cart
- Tube bundle (length specified in the work package)
- Sample collection media
- Field data forms
- Copy of sampling procedure
- Hand tools.

8.0 PROCEDURE STEPS

8.1 Setup

1. Check sample cart instrumentation for current calibration.
2. Clamp off all sample lines at the sample cart end.
3. Ensure HEPA filters are in HEPA filter bodies F-1 through F-5.
4. Ensure HEPA filters are positioned in Sample Head.
5. Take the equipment into the farm and position it for sampling.
6. Vapor sampling cart must be positioned level outside of the containment structure.
7. Ensure Electricians have bonded and grounded the ISVS if required.
8. Supply electricity to sample cart.
9. Perform leak test (see Appendix I).
10. Ensure valve V-8 remains closed for all procedures. This valve is to be used as an auxiliary vacuum port only and may effect sampling if left open.

8.1.1 Tube Bundle Placement

Insert Bundle B

NOTE: **The tube bundle is still under COC and the responsibility of the sampling team. It is essential that it be visually monitored throughout the insertion into the tank and during removal.**

1. If sampling from ventilation duct with a pitot tube, see Appendix VI. If not, proceed to step 2.
2. Supply the tube bundle to the Operations PIC.

RDM

3. Monitor the placement of the tube bundle in the containment structure.

4. Monitor the tube bundle during insertion to ensure Operations placement at the correct depth/location, per TCP instructions.

5. In the field notes, record the;

   - Depth and location Depth = 20ft Riser 7
   - LEL measurement 6%
   - OVM reading 251 PPM
   - Ammonia concentration measured by colorimetric tubes > 700PPM
   - Any anomalies associated with setup.

8.2 Standby Mode

1. During the standby mode the sample cart shall be ready for operation and in the following configuration:

   a. Tube bundle is in the sampling position/location in the tank but not connected to the cart.
   b. Valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7 are closed.
   c. Sample pump is off.
   d. Power is on to the flowmeters and totallizers

2. The standby mode serves as a reference point from which the following functions can be performed.

Description	Appendix
Leak Test	I
Setting System Flow Rates	II
Sorbent Tube Sampling	III
SUMMA™ Canister Sampling	IV
Flow-Through Cylinder Sampling	V

8.3 Shutdown

1. Request HPT coverage during steps 2 through 6.
2. Monitor Operations removal of the tube bundle from the tank.
3. Receive tube bundle and move to low background area.
4. Dismantle tube bundle and bag sorbents for shipment to laboratory.

RDon

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING Bundle B

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle B to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   ~~c. Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle B
Tank S-102
Date 28JAN 96
Time 1143

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 136

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45
6. Let purge for ~~1~~ 5 minutes.

Purge Start Time 1145
FG-5 reading 45
PI-1 20.5
Purge Stop Time 1150

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1150

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1151

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RJM

Bundle B
Tank S-102
Date 26 JAN 96
Time 1152

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 137

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1154
FG-5 reading 45
PI-1 20.5
Purge Stop Time 1156

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1156

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1157

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

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Bundle B
Tank S-102
Date 5/10/95
Time 1158

Canister # 153

APPENDIX IV
SUMMA™ CANISTER SAMPLING

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1159
FG-5 reading 45
PI-1 20.5
Purge Stop Time 1201

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1201

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1203

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7. 45
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle B TSTs

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 320 sccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle B TSTS

APPENDIX III
SORBENT TUBE SAMPLING

1. **From Stand-by Mode**, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1208
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

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19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 205
FT#2 203
FT#3 203
FT#4 ____

RJM

TANK S-102
DATE 26 JAN 96
TIME 1207

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
S21	1	1208		205
S22	2	1208		203
S23	3	1208		203
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7. 45
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle B NH_3/H_2O

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 220 sccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

APPENDIX III Bundle B NH_3/H_2O
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1220
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

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19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 2003
FT#2 2001
FT#3 2001
FT#4 ____

RDM

TANK S-102
DATE 2ESTAN 96
TIME 1220

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
83S	1	1220		2003
84 S	2	122030		2001
85 S	3	1221		2001
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1
1223	218	220	218	0	-0.5	25.4	25	2	21.2

1226 hrs = Head = 28 °C

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7.0 EQUIPMENT

The following is a typical list of equipment that may be used in the collection of samples.

- Vapor sampling cart
- Tube bundle (length specified in the work package)
- Sample collection media
- Field data forms
- Copy of sampling procedure
- Hand tools.

8.0 PROCEDURE STEPS

8.1 Setup

1. Check sample cart instrumentation for current calibration.
2. Clamp off all sample lines at the sample cart end.
3. Ensure HEPA filters are in HEPA filter bodies F-1 through F-5.
4. Ensure HEPA filters are positioned in Sample Head.
5. Take the equipment into the farm and position it for sampling.
6. Vapor sampling cart must be positioned level outside of the containment structure.
7. Ensure Electricians have bonded and grounded the ISVS if required.
8. Supply electricity to sample cart.
9. Perform leak test (see Appendix I).
10. Ensure valve V-8 remains closed for all procedures. This valve is to be used as an auxiliary vacuum port only and may effect sampling if left open.

8.1.1 Tube Bundle Placement

Insert Bundle C

NOTE: **The tube bundle is still under COC and the responsibility of the sampling team. It is essential that it be visually monitored throughout the insertion into the tank and during removal.**

1. If sampling from ventilation duct with a pitot tube, see Appendix VI. If not, proceed to step 2.
2. Supply the tube bundle to the Operations PIC.

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3. Monitor the placement of the tube bundle in the containment structure.

4. Monitor the tube bundle during insertion to ensure Operations placement at the correct depth/location, per TCP instructions.

5. In the field notes, record the;

   - Depth and location Depth = 20ft Riser 7
   - LEL measurement 6%
   - OVM reading 25.1 PPM
   - Ammonia concentration measured by colorimetric tubes > 700 PPM
   - Any anomalies associated with setup.

8.2 Standby Mode

1. During the standby mode the sample cart shall be ready for operation and in the following configuration:

   a. Tube bundle is in the sampling position/location in the tank but not connected to the cart.
   b. Valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7 are closed.
   c. Sample pump is off.
   d. Power is on to the flowmeters and totallizers

2. The standby mode serves as a reference point from which the following functions can be performed.

Description	Appendix
Leak Test	I
Setting System Flow Rates	II
Sorbent Tube Sampling	III
SUMMA™ Canister Sampling	IV
Flow-Through Cylinder Sampling	V

8.3 Shutdown

1. Request HPT coverage during steps 2 through 6.

2. Monitor Operations removal of the tube bundle from the tank.

3. Receive tube bundle and move to low background area.

4. Dismantle tube bundle and bag sorbents for shipment to laboratory.

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING Bundle C

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle C to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle C
Tank 5-102
Date [illegible]
Time 1317

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 167

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45
6. Let purge for ~~1~~ 5 minutes.

Purge Start Time 1318
FG-5 reading 45
PI-1 19.3
Purge Stop Time ~~1423~~ 1323

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1323

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1324

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

Bundle C
Tank S-102
Date 6-5-96
Time 1325

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 169

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1326
FG-5 reading 1
PI-1 _____
Purge Stop Time 1328

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1328

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1329

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

Bundle C
Tank 3702
Date 26 JAN 96
Time 1330

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 170

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1331
FG-5 reading 45
PI-1 19.1
Purge Stop Time 1333

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1333

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1334

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RJM

Bundle C
Tank 5702
Date 2/27/96
Time 1335

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 229

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1337
FG-5 reading 45
PI-1 19.0
Purge Stop Time 1339

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1339

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1340

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

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Bundle C
Tank 5-102
Date 26JAN96
Time 1339

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 230

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45
6. Let purge for 2 minutes.

Purge Start Time 1341
FG-5 reading 45
PI-1 19
Purge Stop Time 1343

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1343

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1344

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

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Bundle C

Tank 5-102

Date 26 JAN 96

Time 1345

APPENDIX IV
SUMMA™ CANISTER SAMPLING

Canister # 248

1. From Stand-by Mode, remove cap from the SUMMA™ Sampling Station and connect the SUMMA™ canister.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7

Purge Start Time 1346

5. Slowly increase FG-5 to unit mark ~~150.~~ 45

FG-5 reading 45

PI-1 19

6. Let purge for 2 minutes.

Purge Stop Time 1345

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-6 and V-7.
8. Turn off sample pump.
9. Reset Stopwatch
10. Simultaneously: Open SUMMA canister valve
    Start Stopwatch

Start Time 1343

11. Allow 60 seconds for canister to fill.
12. Close the SUMMA™ canister valve.

Stop Time 1349

13. Close valve V-5.
14. Remove the exposed SUMMA™ canister and replace SUMMA™ station cap or install next SUMMA™ sample and repeat procedure at step 2.
15. Record any anomalies in field notes.
16. Return to standby mode (Section 8.2).

RDM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle C PNL TSTS

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   ~~c. Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 320 sccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

APPENDIX III
SORBENT TUBE SAMPLING

Bundle C TSTs

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

#2 & #3 were installed with valve 1,2,3 were open. C-flex clamp was open on line C2. Flow went thru line C2 [illegible]

*Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.

7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1359
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

*Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

RDM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 204
FT#2 260
FT#3 205
FT#4 ____

RDM

TANK S-102
DATE 26 JAN 96
TIME 1358

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
827	1	1359		204
828	2	1359		260
830	3	1359		205
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1

RJM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle C PNL TSTs

Flow already adjusted from previous set of TSTs

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   ~~c. Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 3205ccm
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle C PNL TSTS

APPENDIX III
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 1406
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

RDM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 209
FT#2 207
FT#3 204
FT#4 ____

RJM

TANK S-102
DATE 26JAN96
TIME 1405

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
831	1	1406		209
832	2	1406		207
833	3	1406		204
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1

RJM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7. 45
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bubble C NH_3/H_2O

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range. 220
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle C NH_3/H_2O

APPENDIX III
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150~~ 45.
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7.
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time 4/6
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

RDM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT #1 2002
FT #2 2001
FT #3 2001
FT #4 _____

RDM

TANK S-102
DATE 26JAN96
TIME 1415

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
88 S	1	1416		2002
89 S	2	1416 30		2001
90 S	3	1417		2001
	4			

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1
1421	219	221	221	0	-2.6	23.6	27	-2	2.0.2

RJM

APPENDIX II
SETTING SYSTEM FLOW RATES

FOR SUMMA™ SAMPLING

1. From Stand-by Mode, open valve V-5, V-6.
2. Ensure valves V-1, V-2, V-3 and V-4 are closed.
3. Without SUMMA™ line connected to sample port 5:
   a. Turn on sample pump and open valve V-7.
   b. Adjust rotameter FG-5 to the desired flow range (usually the ~~150~~ 45 mark).
   c. Allow system to purge for the desired time.
   d. Close valve V-7, V-5 and V-6.
   e. Turn OFF the sample pump.
4. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
5. System is operational for SUMMA™ sampling.

FOR SORBENT SAMPLING Bundle NH_3/H_2O

1. From Stand-by Mode, open valves V-1, V-2, V-3, and V-4
2. Ensure valve V-6 is closed.
3. With no sample lines connected to the sample ports:
   a. Turn ON the sample pump.
   b. Open valve V-7
   c. ~~Open rotameters FG-1, FG-2, FG-3, and FG-4 to full on position.~~
   d. With the rotameter needle valves (FG-1 through FG-4), adjust the flow rate, indicated by the Flowmeter, to the desired flow range.
   e. Ensure the totalizers are counting flow volume.
   f. Close valve V-1, V-2, V-3, V-4 and V-7.
   g. Turn OFF the sample pump.
4. System is operational for sorbent sampling.

RDM

Bundle C NH_3/H_2O

APPENDIX III
SORBENT TUBE SAMPLING

1. From Stand-by Mode, ensure the cap is on the SUMMA™ Sampling Station. Connect wire re-enforced teflon line in tube bundle to SUMMA™ sample port.
2. Open valve V-5 and V-6.
3. Start sample pump.
4. Open valve V-7
5. Slowly increase FG-5 to unit mark ~~150.~~ 45
6. Let purge for 2 minutes.

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
7. Close valves V-5, V-6 and V-7.
8. Turn off sample pump.
9. Attach tube bundle sample lines to the sample ports 1 through 4.
10. Second person independently verify correct connections. If any sample port is NOT in use, ensure the respective valve (V-1 through V-4) is closed.
11. On the tube bundle upstream of the sample ports, open C-flex clamps on sample lines in use.
12. Start sample pump.
13. Zero totalizers.
14. Open Valve V-7. 1434
15. Record time and open valves V-1 thru V-4 at 30 second intervals. Start Time ~~14:35~~ AM
16. Verify all Flowmeters are indicating the desired flow range. Adjust as necessary.
17. Verify Totalizers are counting total volume.
18. Verify sicila gel tubes SG-1, SG-2, SG-3 and SG-4 show no liquid contamination.

    *Periodically check silica gel for gross liquid contamination during sorbent sampling. Shut down system should this occur.

RDM

19. At elapsed time, 2 minutes, enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1, T-2, T-3 and T-4.
    c. Internal vacuum indicated at PI-1 in inches of Hg.
    d. Any field observations during sampling.

20. During sorbent tube collection enter into field notes;

    a. Flow rate of each line measured at the corresponding Flowmeter.
    b. Temperature of sampling system T-1 and T-2.
    c. Internal vacuum indicated by PI-1 in inches of Hg.
    d. Any field observations during sampling.

21. When each totalizer has counted the desired volume-range specified in the TCP, close the appropriate valve V-1 through V-4.

21a. Wait 5 minutes before closing c-flex clamps and removing sample lines (step 24)

22. Close valve V-7 and shut off pump.

23. Record sample volumes and actual sample time into field notes.

24. Close C-flex clamps and remove sample lines from sample ports.

25. Record any anomalies in field notes.

26. Return to standby mode (Section 8.2).

FT#1 2000
FT#2 2002
FT#3 1997
FT#4 2001

RJM

TANK S-102
DATE 26JAN96
TIME 1433

Sample #	Port #	Start Time	Stop Time	Totalizer Volume
915	1	1434		2000
925	2	143430		2002
935	3	1435		1997
U1, D1, T1	4	143530		2001

TIME	FM-1	FM-2	FM-3	FM-4	T-1	T-2	T-3	T-4	PI-1
1437	216	217	218	215	-5.3	24	27	-1	19.5
1441	219	221	221	216					

RDM

3. Monitor the placement of the tube bundle in the containment structure.

4. Monitor the tube bundle during insertion to ensure Operations placement at the correct depth/location, per TCP instructions.

5. In the field notes, record the;

   - Depth and location
   - LEL measurement
   - OVM reading
   - Ammonia concentration measured by colorimetric tubes
   - Any anomalies associated with setup.

8.2 Standby Mode

1. During the standby mode the sample cart shall be ready for operation and in the following configuration:

   a. Tube bundle is in the sampling position/location in the tank but not connected to the cart.
   b. Valves V-1, V-2, V-3, V-4, V-5, V-6 and V-7 are closed.
   c. Sample pump is off.
   d. Power is on to the flowmeters and totallizers

2. The standby mode serves as a reference point from which the following functions can be performed.

Description	Appendix
Leak Test	I
Setting System Flow Rates	II
Sorbent Tube Sampling	III
SUMMA™ Canister Sampling	IV
Flow-Through Cylinder Sampling	V

8.3 Shutdown

1. Request HPT coverage during steps 2 through 6.

2. Monitor Operations removal of the tube bundle from the tank.

3. Receive tube bundle and move to low background area.

4. Dismantle tube bundle and bag sorbents for shipment to laboratory.

RJM

5. Collect ~~HEPA~~ filters from the sample head.

   a. Request HPT survey of filters for sample release.
   b. Place upstream ~~HEPA~~ filter in labeled petri dish for submittal to 222-S.
   c. Place downstream ~~HEPA~~ filter in labeled petri dish for submittal to 222-S.

6. Remove ISVS from Tank Farm. ← Several days after sampling event

9.0 RECORDS

All documents generated from sampling activities will be reviewed and evaluated as quality records in accordance with WHC-CM-3-5, *Document Control and Records Management Manual*. Copies of all field generated information will be forwarded to the Tank Farms project manager or cognizant engineer. Original documents will be handled as directed in the appropriate regulation. The following documentation may be required.

- Controlled field logbook (to include)
  - Sample I.D. data
  - Raw data (that is, pressure, temperature, flow rate, time, and so forth).
- Shipping documentation
  - Onsite Routine Radioactive Shipment Record, form A-6000-528.
  - Off-Site Property Control, form 54-3000-479.
  - Off-Site Radioactive Shipment Record, form 54-6000-088.
  - Radionuclides analysis from 222-S Laboratory.
- COC documentation.
- Request for Special Analysis, form BC-6700-181.
- Photograph(s) taken during the sampling activity.

10.0 REFERENCE

WHC-CM-3-5, *Document Control and Records Management Manual*.

RDM

APPENDIX V
FLOW-THROUGH CYLINDER SAMPLING

Not used

1. **From Stand-by Mode**, ensure valve V-5 is closed.
2. Remove the C-flex tube from the downstream side of the SUMMA™ sample station.
3. Connect the upstream side of the flow-through sample cylinder to the downstream side of the SUMMA™ station (be sure to orient proper direction-of-flow arrows on flow-through cylinder valves).
4. On the down-stream side of the flow-through sample cylinder connect the upstream side of C-flex tubing to the pump.
5. Turn on sample pump.
6. Open valve V-6 and V-7.
7. Open upstream valve on the flow-through cylinder.
8. Open downstream valve on the flow-through cylinder.
9. Simultaneously: Open valve V-5
   Start Stopwatch

   *Periodically check carbon\dryrite cylinder for gross liquid contamination during tank gas purge. Shut down system should this occur.
10. If needed, perform slight adjustment to rotameter FG-5 to the appropriate unit mark.
11. Record rotameter FG-5 reading.
12. Purge tank vapor through the cylinder for appropriate time as specified in the TCP.
13. After the specified purge time simultaneously: Close downstream flow-through cylinder valve
    Stop Stopwatch
14. Close upstream flow-through cylinder valve
15. Close valve V-5, V-6, and V-7.
16. Turn off sample pump.
17. Remove flow-through cylinder.

18. Re-connect C-flex to downstream side of SUMMA™ station

19. Record any anomalies in field notes

20. Return to standby mode (Section 8.2).

APPENDIX VI
PITOT TUBE SAMPLING

Not used

Sampling by pitot tube can be performed if the waste tank is equipped with a ventilation port that accesses the vapor or head space in the tank. A fitting must be designed to reduce the ventilation port to accommodate a 1/4 inch pitot tube for sampling operations. The pitot tube should extend 6 inches or half way into the duct and approximately three inches outside the duct. The tube bundle is attached directly to the end of the exposed pitot tube on the outside of the duct.

1. The appropriate site personnel will install the pitot tube in the designated access as directed by the cognizant engineer.

2. The pitot tube will be 1/4 inch stainless steel secured with Swagelok and or NPT fittings.

3. The sample head is equipped with an adapter which allows it to attach directly to the 1/4 inch pitot tube. The tube bundle should be secured in an upright position.

4. Return to Section 8.1.1.

APPROVAL

Approval Designator: SQ

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Approved by: D. L. Edwards, Manager, Sampling and Mobile Laboratories — Date 5/2/95

Approved by: J. G. Hogan, Sampling and Mobile Laboratories — Date 5/2/95

Approved by: R. L. Ragan, Sampling and Mobile Laboratories — Date 5/1/95

Approved by: T. C. Stone, Safety — Date 4/26/95

Approved by: C. J. Stephan, Environmental Quality Assurance — Date 4/27/95

Procedure POC: J. I. Feaster, Hanford Technical Services — Date 4/25/95