ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 657303

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [ ] Direct Revision [X] Change ECN [ ] Temporary [ ] Standby [ ] Supersedure [ ] Cancel/Void [ ]	Andrew M. Templeton, Data Development and Interpretation, R2-12, 373-5589	[ ] Yes [X] No	02/16/00
	6. Project Title/No./Work Order No. Tank 241-AZ-101	7. Bldg./Sys./Fac. No. 241-AZ-101	8. Approval Designator QE
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) RPP-5534, Rev. 0	10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[ ] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? [ ] Yes [X] No

Complete revision.

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[ ]	Environmental	[ ]	Facility Deactivation	[ ]
As-Found	[ ]	Facilitate Const	[ ]	Const. Error/Omission	[ ]	Design Error/Omission	[ ]

14b. Justification Details

Changes were incorporated to address editorial comments and to adjust filtering, flow rates and volumes for triple sorbent tubes (TSTs).

15. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

RELEASE STAMP

DATE: MAR 06 2000

STA: 4

HANFORD RELEASE

ID: 2

A-7900-013-2 (05/96) GEF095

A-7900-013-1

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16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

	Signature	Date		Signature	Date
Design Authority			Design Agent		
Cog. Eng. A.M. Templeton	(signature)	2/28/00	PE		
Cog. Mgr. J.G. Field	(signature)	2/23/00	QA		
QA W.L. Adams	(signature)	2/29/00	Safety		
Safety			Design		
Environ. C.H. Mulkey	(signature)	3/1/00	Environ.		
Other K.J. Greenough	(signature)	2/29/00	Other		
J.F. Sickels	(signature)	2-29-00	DEPARTMENT OF ENERGY		
			Signature or a Control Number that tracks the Approval Signature		
			ADDITIONAL		

DISTRIBUTION SHEET

To	From	Page 1 of 3
Distribution	Data Development and Interpretation	Date 02/16/00
Project Title/Work Order		EDT No. N/A
RPP-5534, Rev. 1, "Tank 241-AZ-101 Mixer Pump Test Vapor Sampling and Analysis Plan"		ECN No. ECN-657303

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
CH2M HILL Hanford Group, Inc.					
M. R. Adams	R2-12	X			
W. L. Adams	S6-15	X			
D. G. Baide	S5-05	X			
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J. A. Johnston	S7-03	X			
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R. R. Thompson	R2-12	X			
D. D. Wanner	S7-12	X			
T.C.S.R.C.	R1-10	X			
Cogema					
J. A. Andersen	H1-19	X			
D. B. Bonfoey	S3-31	X			
P. J. Fuller	H1-19	X			
R. E. Mendoza	S7-70	X			
L. A. Pingel	S3-31	X			

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Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
<u>Cogema - continued</u>					
M. P. Rung	H1-19	X			
T. W. Staehr	R3-74	X			
M. Stauffer	S3-31	X			
Y. S. Tran	H3-27	X			
<u>Fluor Hanford</u>					
R. Akita	T6-50	X			
K. E. Bell	T6-12	X			
L. A. Burchfield	T6-12	X			
S. L. Cobb	S3-28	X			
R. A. Esch	T6-12	X			
R. K. Fuller	T6-12	X			
K. J. Greenough	S3-30	X			
J. C. Person	T6-07	X			
K. L. Powell	T6-04	X			
K. Sathyanarayana	H0-34	X			
F. H. Steen	T6-12	X			
R. S. Viswanath	S3-30	X			
<u>Lockheed Martin Services, Inc.</u>					
Central Files	B1-07	X			
<u>MACTEC</u>					
R. D. Potter	R3-73	X			
<u>Numatec Hanford Corporation</u>					
A. B. Carlson	R3-73	X			
P. J. Certa	R3-73	X			
A. F. Choho	R3-73	X			
D. R. Hansen	T6-50	X			
D. L. Herting	T6-07	X			
R. A. Kirkbride	R3-73	X			
W. I. Winters	T6-07	X			
<u>Office of River Protection</u>					
W. Abduhl	H6-60	X			
E. J. Cruz	H6-60	X			
W. Liou	H6-60	X			
J. A. Poppiti	H6-60	X			
DOE Reading Room	H2-53	X			

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Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
Pacific Northwest National Laboratory					
I. E. Burgeson	P7-25	X			
J. L. Huckaby	K7-15	X			
M. J. Truex	K2-10	X			
K. D. Wiemers	H6-61	X			
Y. Onishi	K7-15	X			
Vista Research					
D. G. Douglas	H4-01	X			
P. C. Ohl	H4-01	X			
Waste Management Federal Services of Hanford, Inc.					
D. B. Hardy	S3-30	X			
C. M. Seidel	G1-32	X			

S

Tank 241-AZ-101 Mixer Pump Test Vapor Sampling and Analysis Plan

Andrew M. Templeton
CH2M HILL Hanford Group, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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RECORD OF REVISION	(1) Document Number RPP-5534	Page 1

(2) Title
Tank 241-AZ-101 Mixer Pump Test Vapor Sampling and Analysis Plan

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initially released 01/31/00 on EDT-627271.	A.M. Templeton	J.G. Field
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		A.M. Templeton	J.G. Field 2-28-00

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RPP-5534
Revision 1

Tank 241-AZ-101 Mixer Pump Test Vapor Sampling and Analysis Plan

A. M. Templeton
CH2M HILL Hanford Group, Inc.

Date Published
February 2000

Prepared for the U.S. Department of Energy
Office of River Protection

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LIST OF ABBREVIATIONS

CAS	Chemical Abstracts Service
CHG	CH2M HILL Hanford Group, Inc.
CPO	Characterization Project Operations
DBP	dibutyl phosphate
FID	flame ionization detector
ft	feet
GC/MS	gas chromatography/mass spectrometry
GC/TCD	gas chromatography/thermal conductivity detector
HASQARD	Hanford Analytical Services Quality Assurance Requirements Document
IC	ion chromatography
IDLH	immediately dangerous to life and health
ISVS	In-situ vapor sampler
kgal	kilogallon
kL	kiloliter
L	liter
L/min	liters per minute
LFL	lower flammability limit
LMHC	Lockheed Martin Hanford Corporation
m	meter
mg/m^3	milligrams per cubic meters
mL	milliliters
mL/min	milliliters per minute
min	minutes
Mgal	million gallons
N/A	not applicable or not available
NHC	Numatec Hanford Corporation
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
PNNL	Pacific Northwest National Laboratory
PUF	polyurethane foam
QA	quality assurance
QC	quality control
rpm	revolutions per minute
RPP	River Protection Project
SAP	Sampling and Analysis Plan
STT	sorbent tube train
TBP	tributyl phosphate
TST	triple sorbent trap
VOC	Volatile Organic Compounds
WSCF	Waste Sampling and Characterization Facility
%	percent

1.0 SAMPLING AND ANALYSIS OBJECTIVES

This sampling and analysis plan (SAP) identifies characterization objectives pertaining to sample collection, laboratory analytical evaluation, and reporting requirements for vapor samples obtained during the operation of mixer pumps in tank 241-AZ-101. The primary purpose of the mixer pump test (MPT) is to demonstrate that the two 300 horsepower mixer pumps installed in tank 241-AZ-101 can mobilize the settled sludge so that it can be retrieved for treatment and vitrification. Sampling will be performed in accordance with *Tank 241-AZ-101 Mixer Pump Test Data Quality Objective* (Banning 1999) and *Data Quality Objectives for Regulatory Requirements for Hazardous and Radioactive Air Emissions Sampling and Analysis* (Mulkey 1999). The sampling will verify if current air emission estimates used in the permit application are correct and provide information for future air permit applications.

Tank 241-AZ-101 has been selected for the first full-scale demonstration testing of a retrieval system. Tank 241-AZ-101 is located in the 241-AZ Tank Farm in the 200 East Area. The tank is a 3,785,400-L (1 Mgal), 23-m (75-ft) diameter double-shell underground storage tank. As of January 2, 2000, the surface level ENRAF[1] indicated that tank 241-AZ-101 contained a total waste volume of approximately 3,213 kL (849 kgal). Based upon sludge level measurements taken in August of 1997, tank 241-AZ-101 contains 3,024 kL (799 kgal) of supernate and 178 kL (47 kgal) of sludge. This waste volume is equivalent to 7.8 meters (308.6 inches) of waste as measured from the inside bottom of the tank. A physical profile based on waste sampling information is provided in Appendix A. Previous characterization data indicate that the waste consists primarily of aging waste (Hodgson 1995).

A series of tests will be conducted in which the two mixer pumps in tanks 241-AZ-101 will be operated in fixed and oscillating modes and at different speeds. Vapor samples will be obtained to determine constituents that may be present in the tank headspace during mixer pump operation in tank 241-AZ-101 as the waste is disturbed. During the testing, vapor samples will be obtained from the headspace of tank 241-AZ-101 via riser 15G or 15L using the Type 4 in-situ vapor sampler (ISVS) cart. Riser 16B, the unused port on the standard hydrogen monitoring system (SHMS) will provide as a backup. Results will be used to provide the waste feed delivery program with environmental air permitting data for tank waste disturbing activities. Because of radiological issues, some samples may be extracted at the 222-S laboratory if contaminated. All SUMMA™ canister and some Triple Sorbent Trap (TSTs) and Sorbent Tube Trains (STTs) samples sent to the Waste Sampling and Characterization Facility (WSCF) laboratory will be filtered for particulates. It is recognized that this may remove some organic compounds. Duplicate unfiltered TST and STT samples will also be collected and either analyzed or extracted at 222-S laboratories if contaminated.

The following sections provide the general methodology and procedures to be used in the preparation, retrieval, transport, analysis, and reporting of results from vapor samples retrieved during the mixer pump testing.

[1] ENRAF is a trademark of the ENRAF Corporation, Houston, Texas.

2.0 SAMPLING EVENT REQUIREMENTS

The mixer pumps will be operated during a series of tests. Sample sets will be taken prior to mixer pump operation, during the initial startup of pump #1 in fixed mode, when pump #1 is first operated in oscillating mode and when both pumps are operated in oscillating mode and at maximum speed (1200 rpm). The exact sample time during these activities, except the baseline, will be determined by headspace monitoring using an organic vapor monitor (OVM). A -- minimum set of four sample sets will be collected even if no organics are detected with the OVM. If a release of organics is detected then additional optional sets of samples will be collected as directed by Process Engineering. Before and after sample collection, the SUMMA[2] canister line on the Type 4 ISVS be monitored continuously with an OVM. Riser 24C will be monitored continuously during the mixer pump test under a separate industrial hygiene (IH) sampling/monitoring plan (Fogg 2000). This IH plan will also include headspace monitoring for lower flammability limit (LFL), Notice of Construction (NOC) required stack monitoring and personnel monitoring. Tank vapor will also be monitored via the Standard Hydrogen Monitoring System (SHMS) cabinet. Details of the SHMS is included in the *Data Collection Plan for AZ-101 Mixer Pump Test*, HNF-3839.

2.1 TYPE 4 IN-SITU VAPOR SAMPLER SYSTEM DESCRIPTION

The Type 4 ISVS system includes three major assemblies: sampling cart, tube bundle, and sampling head. The ISVS cart (Figure 2-1), consists of an instrumentation cabinet, vacuum air pump components, a manifold, and various valves, flow meters, flow totalizers, rotameters, and filters mounted on a hand truck. A tube bundle connects the cart with the sampling head and provides a separate sampling tube for a SUMMA™ canister sampler. The sampling head shown in Figure 2-2 (Figure 2-2 is considered a typical arrangement of sorption tubes and filters) contains particulate filters, tritium-trap filters, multiple sorption tubes, and a thermocouple. The selection and arrangement of the sorption tubes and filters is dependent upon the vapor sampling needs identified in the Data Quality Objective (LMHC 1999) document and this sampling analysis plan (SAP) that define tank sampling requirements. The tube-bundle is used to lower the sampling head through a riser into a tank's vapor space. Thermocouples on the sampling head and in the cart's gas manifold are used to measure vapor temperature (Reich 2000).

After sampling is completed, the tube bundle with the sampling head is removed from the tank. The sample head is disconnected from the tube bundle and the ends of the sorption and filter channels are capped. The sampling head is bagged out with protective plastic for shipment to the laboratory (Reich 2000).

[2] SUMMA is a trademark of Molectrics of Ohio.

Figure 2-1. Type 4 In-Situ Vapor Sampling System

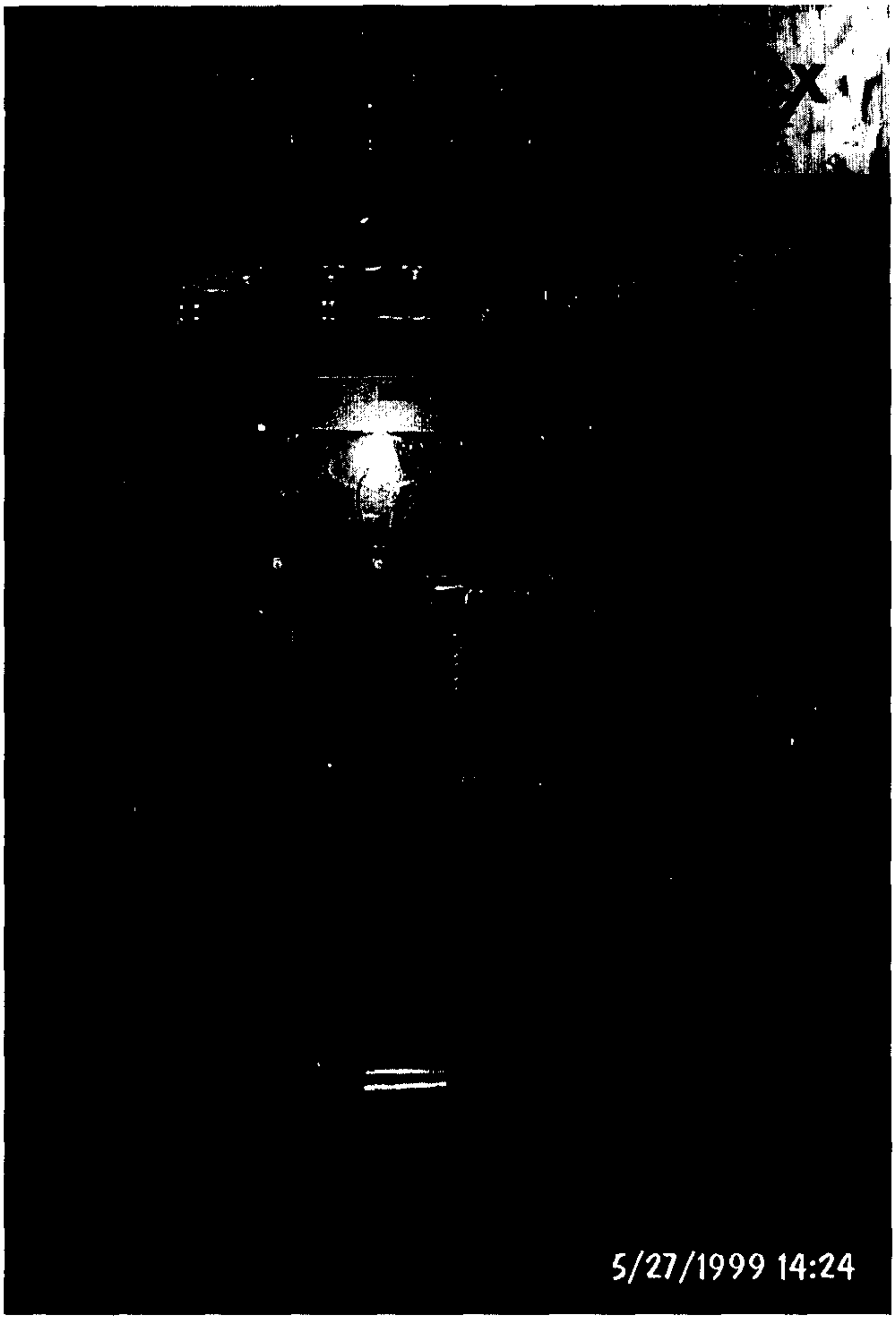
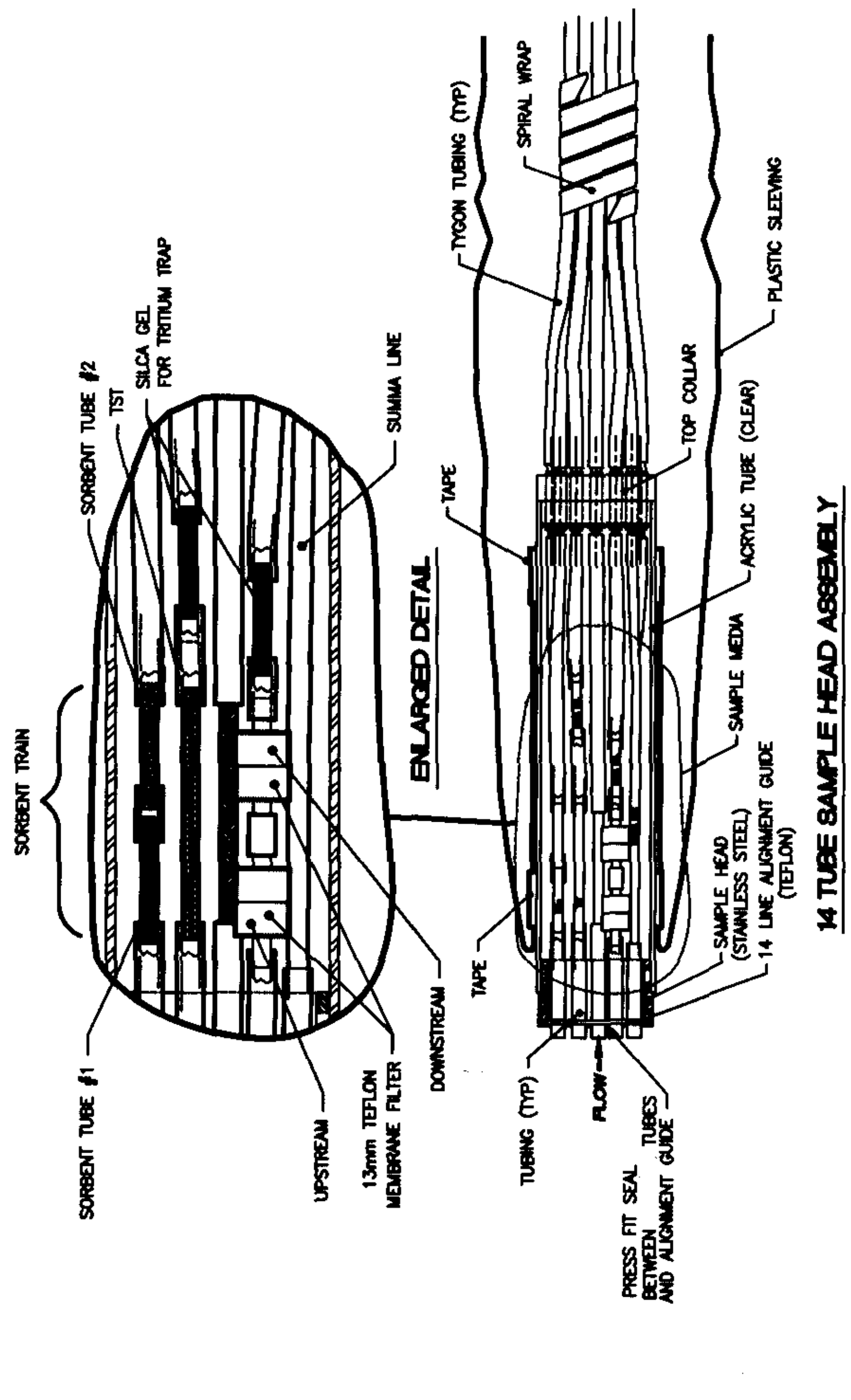


Figure 2-2. Typical Sampling Head Arrangement of Sorption Tubes and Particle Filters.



2.2 SAMPLE PREPARATION

SUMMA™ canister samples, triple sorbent trap (TST) samples, sorbent tube train (STT) samples, and polyurethane foam (PUF) samples will be collected and sent to the laboratory for analysis; field and trip blanks will accompany the samples. The analytical laboratory for this sampling event is Fluor Hanford (FH) WSCF. Particulate filter samples will be collected for radiation screening of the samples. WSCF shall prepare the SUMMA™ canisters, TSTs, STTs, and PUFs for sample collection. WSCF shall also prepare the particulate filter assemblies. Each particulate filter assembly shall contain two particulate filters mounted in series. Sample preparation procedures are listed in Table 2-1. The sample head assembly shall be assembled in accordance with drawing H2-825301, current revision, *In Situ Sample Head Assembly and Details* and documented per Section 4.3, "Sample Custody."

Table 2-1. Sample Preparation Procedures

Sample container	Organization	Preparation Procedure
SUMMA™ canister	WSCF	LO-080-406
TST	WSCF	LA-549-403
STT	WSCF	LA-549-402
PUF	WSCF	N/A
Particulate filter assembly	WSCF	N/A

Notes: N/A = not applicable
PUF = polyurethane foam
STT = sorbent tube train
TST = triple sorbent trap

2.3 SAMPLE COLLECTION

Characterization Project Operations (CPO) will be responsible for the collection of all SUMMA™ canister samples, particulate filter, TST, STT, and PUF samples using the type 4 cart. Samples will be collected in accordance with procedure TO-080-627, *Vapor Sampling of Waste Using In-Situ Vapor Sampling (ISVS) System*. If the type 4 cart is not available, the non-electrical vapor sampling system (NEVS) will be used in accordance with procedure LO-080-400, *Vapor Sampling Using the Non-Electrical Vapor Sampling System (NEVS)*. CPO baseline sampling activities will be performed in accordance with work package ES-00-00030.

Tubing used in the collection of vapor samples must be stainless steel, or Teflon[3], and the length of the tubing used should be minimized. No C-flex or tygon tubing can be used upstream of the sample containers.

The samples shall include the following quality control (QC) samples: one each SUMMA™, TST, STT, and PUF ambient air field blank; and one each STT, and PUF trip blank and up to 8 TST trip blanks. The trip and field blanks are to accompany the vapor samples to the laboratory.

[3]Teflon is a registered trademark of I. E. DuPont De Nemours and Company

For specific information concerning sample and blank handling, custody, and transport, refer to the requirements in Section 4.0.

Characterization Project Operations (CPO) shall record (or calculate) the following information for each sample collected: sample number, start and stop times for the collection of each sample, sample volumes, and any anomalous sampling conditions. The volatile organic compounds (VOC) reading will be collected at the beginning and at the end of the collection of each sample set. The samples shall be sealed in plastic, stored and shipped in a cooler at a nominal 4 degrees Celsius except the SUMMA™ canisters and the particulate filters.

Particulate filter samples shall be shipped by CPO to WSCF for radiation screening analysis within one working day. The remaining filtered SUMMA™ samples shall be stored by CPO until radiation screening is completed and the samples can be released for analysis. Upon completion of the radiation screening and release of the samples, the samples shall be transferred by CPO to WSCF for analysis.

All other filtered and unfiltered samples should be shipped directly to 222-S within one working day.

Table 2-3 provides the sequence of sampling activities for the blanks and the tank 241-AZ-101 headspace air samples. The samples are summarized in Table 2-4. SUMMA™ s and three of the four TST samples per set and on STT per set will be collected through particulate filters. The particulate filter samples shall be collected upstream of the SUMMA™ canisters, TSTs, and STTs.

At a minimum, the following samples are required from the 241-AZ-101 headspace:

- One set of samples before the pumps are started (baseline samples).
- One set of samples after pump #1 is initially started and operating in a fixed mode at minimum speed (700 rpm) and at the direction of Process Engineering (one optional set of samples may also be collected at the direction of Process Engineering).
- One set when pump #1 is first operated in oscillating mode (two optional sets of samples may also be collected at the direction of Process Engineering).
- One set when both pumps are operated at maximum speed in oscillating mode (one optional set of samples may also be collected at the direction of Process Engineering).

The sample sets and optional sample sets are summarized in Table 2-2. After collecting the set of samples for each event the tube bundle and head will be withdrawn from the tank. The sample head will be replaced with the optional sample head and re-installed in the tank headspace. If a release is detected in the headspace, as indicated by the OVM, or has already occurred, the optional sample sets will be collected. The collection of these samples will be determined and directed by Process Engineering.

Table 2-2. Sample Set Summary.

Sample Container	Number	Analyte	Procedure
SUMMA™	1	Organic Speciation	LA-523-404
SUMMA™	1	Permanent Gases	LA-523-409
SUMMA™	1	Total Nonmethane hydrocarbons	LA-523-407
STT	2	NH_3, Oxides of Nitrogen	LA-523-400/402
TST	4	Organic Speciation	LA-523-408
PUF	2	TBP, DPB, SVOCs	LA-523-428
Particulate Filter	1	Total Alpha, Total Beta and Gamma Energy	LA-523-428

The sampling activities of CPO shall be coordinated so that, for each set of samples, the SUMMA™ canisters, TSTs, STTs, and PUFs are obtained at about the same time.

Any decisions, observations, or deviations affecting this SAP shall be documented in controlled notebooks, work packages and justified in the deliverable report.

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
			Leak Test		
---	Perform leak test of Type IV Cart or NEVS	N/A	N/A	N/A	N/A
			Ambient Samples		
001	Collect upwind ambient SUMMA™ before pump is started.	N/A	AZ Tank farm	6 L	2 min
002	Collect system SUMMA™ before pump is started.	N/A	AZ Tank farm	6 L	2 min
003	Collect ambient TST before pump is started	1	AZ Tank farm	0.4 L	50-200 mL/min
004	Collect ambient STT before pump is started	2	AZ Tank farm	8 L	300-500 mL/min
005	Collect ambient PUF before pump is started	3	AZ Tank farm	25 L	2.5-5 L/min

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
Baseline headspace samples					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
006	Collect baseline SUMMA™ canister/particulate filter before pump is started	N/A	241-AZ-101 Headspace	6 L	2 min
007	Collect baseline SUMMA™ canister/particulate filter before pump is started	N/A	241-AZ-101 Headspace	6 L	2 min
008	Collect baseline SUMMA™ canister/particulate filter before pump is started	N/A	241-AZ-101 Headspace	6 L	2 min
009	Collect particulate filter and tritium trap sample before pump is started	4	241-AZ-101 Headspace	1 L	50-200 mL/min
010	Collect baseline TST before pump is started	5	241-AZ-101 Headspace	0.4 L	50-200 mL/min
011	Collect baseline filtered TST before pump is started	6	241-AZ-101 Headspace	0.4 L	50-200 mL/min
012	Collect baseline filtered TST before pump is started	7	241-AZ-101 Headspace	0.4 L	50-200 mL/min
013	Collect baseline filtered TST before pump is started	8	241-AZ-101 Headspace	0.4 L	50-200 mL/min
014	Collect baseline STT before pump is started	9	241-AZ-101 Headspace	4L	300-500 mL/min
015	Collect baseline STT before pump is started	10	241-AZ-101 Headspace	8 L	300-500 mL/min
016	Collect baseline filtered STT before pump is started	11	241-AZ-101 Headspace	25 L	2.5-5 L/min
017	Collect baseline PUF trap before pump is started	12	241-AZ-101 Headspace	25 L	2.5-5 L/min
018	Collect baseline PUF trap before pump is started	13	241-AZ-101 Headspace	25 L	2.5-5 L/min
Sampling during mixer pump operation					
Collect sample set #2 during initial operation of Pump #1 at 700 rpm					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
019	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
020	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
021	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
022	Collect particulate filter and tritium trap sample before pump is started	1	241-AZ-101 Headspace	1 L	50-200 mL/min
023	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
024	Collect filtered TST	3	241-AZ-101 Headspace	0.2 L	20-100 mL/min
025	Collect filtered TST	4	241-AZ-101 Headspace	0.2 L	20-100 mL/min
026	Collect filtered TST	5	241-AZ-101 Headspace	0.2 L	20-100 mL/min
027	Collect STT	6	241-AZ-101 Headspace	4 L	300-500 mL/min
028	Collect STT	7	241-AZ-101 Headspace	8 L	300-500 mL/min
029	Collect filtered STT	8	241-AZ-101 Headspace	25 L	2.5-5 L/min
030	Collect PUF trap	9	241-AZ-101 Headspace	25 L	2.5-5 L/min
031	Collect PUF trap	10	241-AZ-101 Headspace	25 L	2.5-5 L/min
Collect sample set #3 (optional) at direction of Process Engineering.					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
032	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
033	Collect particulate filter and tritium trap sample	1	241-AZ-101 Headspace	1 L	300-500 mL/min
034	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
035	Collect filtered TST	3	241-AZ-101 Headspace	0.2L	20-100 mL/min
036	Collect STT	4	241-AZ-101 Headspace	8 L	300-500 mL/min
037	Collect PUF trap	5	241-AZ-101 Headspace	25 L	2.5-5 L/min
Collect sample set #4 when pump #1 is first operated in oscillating mode.					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
038	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
039	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
040	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
041	Collect particulate filter and tritium trap sample.	4	241-AZ-101 Headspace	1 L	50-200 mL/min
042	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
043	Collect filtered TST	3	241-AZ-101 Headspace	0.2 L	20-100 mL/min
044	Collect filtered TST	4	241-AZ-101 Headspace	0.2 L	20-100 mL/min
045	Collect filtered TST	5	241-AZ-101 Headspace	0.2 L	20-100 mL/min
046	Collect STT	6	241-AZ-101 Headspace	4 L	300-500 mL/min
047	Collect STT	7	241-AZ-101 Headspace	8 L	300-500 mL/min
048	Collect filtered STT	8	241-AZ-101 Headspace	25 L	2.5-5 L/min
049	Collect PUF trap	9	241-AZ-101 Headspace	25 L	2.5-5 L/min
050	Collect PUF trap	10	241-AZ-101 Headspace	25 L	2.5-5 L/min
Collect sample set #5 (optional) at direction of Process Engineering.					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
051	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
052	Collect particulate filter and tritium trap sample.	4	241-AZ-101 Headspace	1 L	50-200 mL/min
053	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
054	Collect filtered TST	3	241-AZ-101 Headspace	0.2 L	20-100 mL/min
055	Collect STT	4	241-AZ-101 Headspace	8 L	300-500 mL/min
056	Collect PUF trap	5	241-AZ-101 Headspace	25 L	2.5-5 L/min
Collect sample set #6 (optional) at direction of Process Engineering.					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
057	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
058	Collect particulate filter and tritium trap sample.	4	241-AZ-101 Headspace	1 L	50-200 mL/min
059	Collect TST	7	241-AZ-101 Headspace	0.2 L	20-100 mL/min
060	Collect filtered TST	8	241-AZ-101 Headspace	0.2 L	20-100 mL/min
061	Collect STT	9	241-AZ-101 Headspace	8 L	300-500 mL/min
062	Collect PUF trap	10	241-AZ-101 Headspace	25 L	2.5-5 L/min
063	Collect PUF trap	11	241-AZ-101 Headspace	25 L	2.5-5 L/min
Collect sample set #7 when both mixer pumps are oscillating and operating at maximum speed (1200 rpm).					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
064	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
065	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
066	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
067	Collect particulate filter and tritium trap sample	1	241-AZ-101 Headspace	1 L	300-500 mL/min
068	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
069	Collect filtered TST	3	241-AZ-101 Headspace	0.2 L	20-100 mL/min
070	Collect filtered TST	4	241-AZ-101 Headspace	0.2 L	20-100 mL/min
071	Collect filtered TST	5	241-AZ-101 Headspace	0.2 L	20-100 mL/min
072	Collect STT	6	241-AZ-101 Headspace	4 L	300-500 mL/min
073	Collect STT	7	241-AZ-101 Headspace	8 L	300-500 mL/min
074	Collect filtered STT	8	241-AZ-101 Headspace	25 L	2.5-5 L/min
075	Collect PUF trap	9	241-AZ-101 Headspace	25 L	2.5-5 L/min
076	Collect PUF trap	`0	241-AZ-101 Headspace	25 L	2.5-5 L/min

Table 2-3. List of Samples and Activities for 241-AZ-101 Headspace (6 sheets).

Sample Code	Sample/Activity Description	Sample Probe Line	Sampler Position During Collection	Sample Volume[2]	Sample Duration or Flow Rate[1]
Collect sample set #8 (optional) at direction of Process Engineering.					
N/A	Purge SUMMA™ line with tank vapor.	N/A	241-AZ-101 Headspace	5L	5.0 L/min
077	Collect SUMMA™ canister/particulate filter	N/A	241-AZ-101 Headspace	6 L	2 min
078	Collect particulate filter and tritium trap sample	1	241-AZ-101 Headspace	1 L	300-500 mL/min
079	Collect TST	2	241-AZ-101 Headspace	0.2 L	20-100 mL/min
080	Collect filtered TST	3	241-AZ-101 Headspace	0.2 L	20-100 mL/min
081	Collect STT	4	241-AZ-101 Headspace	8 L	300-500 mL/min
082	Collect PUF trap	5	241-AZ-101 Headspace	25 L	2.5-5 L/min
Blanks					
083	Store TST Trip Blank for ambient samples	N/A	---	---	---
084	Store TST Trip Blank for event #1	N/A	---	---	---
085	Store TST Trip Blank for event #2	N/A	---	---	---
086	Store TST Trip Blank for event #3	N/A	---	---	---
087	Store TST Trip Blank for event #4	N/A	---	---	---
088	Store TST Trip Blank for event #5	N/A	---	---	---
089	Store TST Trip Blank for event #6	N/A	---	---	---
090	Store TST Trip Blank for event #7	N/A	---	---	---
091	Store STT Trip Blank for event #2	N/A	---	---	---
092	Store PUF Trip Blank for event #2	N/A	---	---	---

Note:
[1]CPO and WSCF at the direction of Process Engineering may adjust sample durations and flow rates as necessary to collect the samples.

[2]The actual sample volume collected is to be within plus or minus 10% as listed

Table 2-4. Vapor Sampling Summary.

Sample Location	Sample Time	Sample Type	Sample Container	Number of Samples
---	Baseline	Trip blank	TST	Up to 8
			SST	1
			PUF	1
---	Baseline	Ambient	SUMMA™	2
			TST	1
			STT	1
			PUF	1
241-AZ-101 Headspace	Baseline	Headspace Set #1	SUMMA™	3
			TST	4
			STT	3
			PUF	2
			Particulate filter assembly	1
	During initial pump operation of Pump #1	Headspace Set #2 and #3	SUMMA™	Up to 4
			TST	Up to 6
			STT	Up to 4
			PUF	Up to 3
			Particulate filter assembly	Up to 2
	When Pump #1 is first operated in oscillating mode.	Headspace Set #4, #5 and #6	SUMMA™	Up to 5
			TST	Up to 8
			STT	Up to 5
			PUF	Up to 5
			Particulate filter assembly	Up to 3
	When both mixer pumps are operating at maximum speed	Headspace Set #7 and #8	SUMMA™	Up to 4
			TST	Up to 6
			STT	Up to 4
			PUF	Up to 3
			Particulate filter assembly	Up to 2

Notes:

Baseline = prior to pump startup
Each particulate filter assembly contains two particulate filters mounted in series.

2.4 RADIATION SCREENING

Surveys using particulate filter samples and tritium traps from the 241-AZ-101 headspace will be performed during the test on selected samples. Particulate filters will be located upstream of the SUMMA™ canisters, three out of four of the TST per set and one STT per set during sample collection. The particulate filters will be used to allow the samples to obtain a radiological release and ensure that the samples meet the WSCF laboratory acceptance criteria. The particulate filter samples will be collected by CPO and sent to WSCF for analysis of both the upstream and downstream particulate filters in each particulate filter assembly. Analytical procedures are specified in Section 3.0. If the samples exceed the WSCF acceptance criteria, the samples will be shipped to 222-S. The results from the radiation screening shall be submitted to CPO, WSCF and the Process Engineering point of contact for vapor sampling for evaluation.

3.0 LABORATORY ANALYSIS REQUIREMENTS

The responsibilities of the analytical laboratories are given in this section. Additional quality control and deliverable requirements are given in Sections 4.0 and 7.0.

Vapor samples shall be analyzed by WSCF in accordance with Table 3-1. Sorbent tube trains shall be analyzed for ammonia and oxides of nitrogen (nitric oxide and nitrogen dioxide). SUMMA™ canisters shall be analyzed for total non-methane hydrocarbons, hydrogen, nitrous oxide, methane, carbon monoxide, carbon dioxide, and selected organic analytes. TSTs shall be analyzed for selected organic analytes. PUF samples shall be analyzed for TBP and DBP.

Required analytes are those listed in Tables 3-2. Quantitation limit goals for the Class A and B toxic air pollutants in these tables are documented in Mulkey (1999). In addition to the compounds listed, a determination is to be made for all other peaks that are at least 10 percent of the nearest internal standard. If possible, peaks smaller than 10 percent of the nearest internal standard should also be identified. All major constituents in the sample should be identified.

It is possible that not all samples will be analyzed. It is expected that, at a minimum, the laboratory will be directed to analyze all trip blanks, field blanks, baseline samples, and at least four sets of samples from tank 241-AZ-101 headspace. Prior to the receipt of the samples at the laboratory, the Process Engineering point of contact for vapor sampling shall provide WSCF with a list identifying the samples not to be analyzed if necessary.

Particulate filter samples shall be analyzed at the WSCF as discussed in Section 2.3 and in accordance with Table 3-1.

If any requested analyses cannot be performed, the Process Engineering point of contact for vapor sampling shall be notified.

Table 3-1. Chemical and Radiological Analytical Requirements.

VAPOR ANALYSES					
Project Name	AZ-101 Mixer Pump Test	**Comments**		**Reporting Formats**	
Plan Number	RPP-5534, Rev. 1	Field Blank - Required Trip Blank - Required		Format I	Immediate Notification
				Format II	Process Control
Program Contact:	A .B. Carlson			Format III	Safety Screen
RPP Contact:	A. M. Templeton			Format IV	Waste Management
Lab Contact:	R. S. Viswanath/Kathy Powell			Format V	RCRA Compliance
Environmental	C. H. Mulkey			Format VI	Special

PRIMARY ANALYSES							CRITERIA			REPORT FORMAT
ANALYSIS METHOD	**PRIMARY ANALYTE**	**PROCEDURE**	**LAB**	**SAMPLE PREP**	**SAMPLE CONTAINER**	**SURROGATE SPIKE**	**NOTIFICATION LIMIT**	**PRECISION**	**ACCURACY**	
GC/MS	Organic Speciation	LA-523-404	WSCF	Direct	SUMMA™	none	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
GC/TCD	CO_2, CO, CH_4, H_2, and N_2O	LA-523-409	WSCF	Direct	SUMMA™	none	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
GC/FID	Total nonmethane hydrocarbons	LA-523-407	WSCF	Direct	SUMMA™	none	≥ 20% LFL	±25%	70-130%	I, VI
IC	NH_3	LA-533-402	WSCF	H_2O Extraction	STT	none	≥ 150 ppmv	±25%	70-130%	I, VI
IC	Oxides of nitrogen	LA-533-400	WSCF	H_2O Extraction	STT	none	≥ 150 ppmv	±25%	70-130%	I, VI
GC/MS	Organic Speciation	LA-523-408	WSCF	Thermal Desorption	TST	all	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
GC/MS	TBP, DBP	LA-523-428	WSCF	Solvent Extraction	PUF	none	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
Total α, total ß, γ Energy	Radionuclides	LA-548-421 LA-508-415 LA-508-462	WSCF	Direct	Particulate Filter	N/A	N/A	±25%	70-130%	II

Notes:
N/A = not applicable
FID = flame ionization detector
GC/MS = gas chromatography/mass spectrometry
GC/TCD = gas chromatography/thermal conductivity detector
IDLH = immediately dangerous to life and health d
LFL = lower flammability limit
RPP = River Protection Project
RCRA = Resource Conservation and Recovery Act
IC = ion chromatography

Table 3-2. Vapor Analytes and Quantitation Limits. (4 sheets)

Analyte	CAS Number	VPRQL (mg/m^3)	VPRQL (ppbv)
VOCs in TST Samples			
Acetone	67-64-1	0.15	63
Acetonitrile	75-05-8	0.15	89
Benzene	71-43-2	0.15	47
1-Butanol	71-36-3	0.15	49
Dodecane	112-40-3	0.15	22
n-Hexane	110-54-3	0.15	43
Propanenitrile	107-12-0	0.15	67
Tridecane	629-50-5	0.15	20
Dichloromethane (methylene chloride)	75-09-2	0.15	43
Butanenitrile	109-74-0	0.15	53
2-Pentanone	107-87-9	0.15	43
n-Heptane	142-82-5	0.15	37
Methyl benzene (toluene)	108-88-3	0.15	40
Pentanenitrile	110-59-8	0.15	44
2-Hexanone (methyl butyl ketone)	591-78-6	0.15	37
Octane	111-65-9	0.15	32
Hexanenitrile	628-73-9	0.15	38
2-Heptanone	110-43-0	0.15	32
n-Nonane	111-84-2	0.15	29
Heptanenitrile	629-08-3	0.15	33
2-Octanone	111-13-7	0.15	29
Decane	124-18-5	0.15	26
Undecane	1120-21-4	0.15	23
Methanol	7-56-1	0.15	110
Ethanol	64-17-5	0.15	80
1-Propanol	71-23-8	0.15	61
Tetrahydrofuran	109-99-9	0.15	51
1, 2, 4-Trimethylbenzene	95-63-6	0.15	30
o-Xylene	95-47-6	0.15	34
Carbon tetrachloride	56-23-5	0.15	24
Chloroform	67-66-3	0.15	31

Table 3-2. Vapor Analytes and Quantitation Limits. (4 sheets)

Analyte	CAS Number	VPRQL (mg/m^3)	VPRQL (ppbv)
1,2 dichloroethane	107-06-2	0.15	TBD
1,1 dichloroethylene	75-35-4	0.15	TBD
2,4 dinitrotoluene	121-14-2	0.15	TBD
Hexachlorobutadiene	87-68-3	0.15	TBD
Hexachloroethane	67-72-1	0.15	TBD
Methyl ethyl ketone	78-93-3	0.15	TBD
Nitrobenzene	98-95-3	0.15	TBD
Pyridine	110-86-1	0.15	TBD
Trichloroethylene	79-01-6	0.15	TBD
2,4,5 trichlorophenol	95-95-4	0.15	TBD
Vinyl chloride	75-01-4	0.15	TBD
Tetrachloroethylene	127-18-4	0.15	22
Permanent Gases in SUMMA ™ Samples			
Carbon Dioxide	124-38-9	90	50 ppmv
Carbon Monoxide	630-08-0	57	50 ppmv
Hydrogen	1333-74-0	4.1.0	50 ppmv
Methane	74-82-8	33	50 ppmv
Nitrous oxide	10024-97-2	90	50 ppmv
TNMOC in SUMMA ™ Samples			
Total non-methane organic compounds		0.07	150
VOCs in SUMMA™ Samples			
Acetone	67-64-1	0.012	5.0
Acetonitrile	75-05-8	0.008	5.0
Benzene	71-43-2	0.016	5.0
Butanal	123-72-8	0.015	5.0
1-Butanol	71-36-3	0.015	5.0
Propanenitrile	107-12-0	0.011	5.0
Chloroethane	75-00-3	0.013	5.0
Trichlorodifluoromethane (Freon 12)	75-71-8	0.025	5.0
Methylbenzene	108-88-3	0.019	5.0
Ethylbenzene	100-41-4	0.022	5.0
2-Butanone	78-93-3	0.015	5.0

Table 3-2. Vapor Analytes and Quantitation Limits. (4 sheets)

Analyte	CAS Number	VPRQL (mg/m^3)	VPRQL (ppbv)
n-Heptane	142-72-5	0.020	5.0
Tetrahydrofuran	109-99-9	0.015	5.0
2-Propanol	67-63-0	0.012	5.0
1-Propanol	71-23-8	0.012	5.0
Trichlorofluoromethane (Freon 11)	75-69-4	0.028	5.0
o-Xylene	95-47-6	0.022	5.0
m-Xylene	108-38-3	0.022	5.0
p-Xylene	106-42-3	0.022	5.0
1,2,4-Trimethylbenzene	95-63-6	0.024	5.0
Decane	124-18-5	0.029	5.0
4-Methyl-2-pentanone	108-10-1	0.020	5.0
Butanenitrile	109-74-0	0.014	5.0
Octane	111-65-9	0.023	5.0
Tetrachloroethylene	127-18-4	0.034	5.0
Chloromethane	74-87-3	0.010	5.0
Dichloromethane (methylene chloride)	75-09-2	0.017	5.0
Chloroform (trichloromethane)	67-66-3	0.024	5.0
Carbon tetrachloride (tetrachloromethane)	56-23-5	0.031	5.0
Pentane	109-66-0	0.015	5.0
2-Methylpentane	107-83-5	0.018	5.0
1-Hexene	592-41-6	0.017	5.0
n-Butane	106-97-8	0.012	5.0
3-Methyl hexane	598-34-4	0.020	5.0
1,4-Diethylene dioxide (dioxin)	123-91-1	0.018	5.0
Chlorobenzene	108-90-7	0.023	5.0
Styrene	100-42-5	0.021	5.0
3-Heptanone	106-35-4	0.023	5.0
Cyclohexanone	108-94-1	0.20	5.0
Furan	110-00-9	0.014	5.0
n-Nonane	111-84-2	0.026	5.0
Ethanol	64-17-5	0.009	5.0

Table 3-2. Vapor Analytes and Quantitation Limits. (4 sheets)

Analyte	CAS Number	VPRQL (mg/m^3)	VPRQL (ppbv)
2-Pentanone	107-87-9	0.018	5.0
2-Hexanone	591-78-6	0.020	5.0
2-Heptanone	110-43-0	0.023	5.0
1,2 dichloroethane	107-06-2	0.15	TBD
1,1 dichloroethylene	75-35-4	0.15	TBD
2,4 dinitrotoluene	121-14-2	0.15	TBD
Hexachlorobutadiene	87-68-3	0.15	TBD
Hexachloroethane	67-72-1	0.15	TBD
Methyl ethyl ketone	78-93-3	0.15	TBD
Nitrobenzene	98-95-3	0.15	TBD
Pyridine	110-86-1	0.15	TBD
Trichloroethylene	79-01-6	0.15	TBD
2,4,5 trichlorophenol	95-95-4	0.15	TBD
Vinyl chloride	75-01-4	0.15	TBD
2-Octanone	111-13-7	0.026	5.0
PUF			
Dibutyl phosphate	107-66-4		100
Tributyl phosphate	126-73-8		100
Inorganic Sorbent Tube Train Samples			
Ammonia	7664-41-7	10	14 ppmv
Nitrogen dioxide	10102-44-0	5.0	2.7 ppmv
Nitrous oxide	10102-43-9	5.0	4.1 ppmv

Notes:

CAS = Chemical Abstracts Service
PUF = polyurethane foam
VPRQL = Vapor Program Required Quantitation Limit
TNMOC = Total non-methane organic compounds

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Vapor sampling and analysis shall be performed in accordance with approved quality assurance (QA) plans. These plans are required to meet the *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD) (DOE 1998) requirements. Validation of this compliance shall be verified either by a HASQARD assessment stating their quality program satisfactorily meets the appropriate requirements, or the quality program plan and applicable procedures will be submitted and approved prior to work performance on sampling or analytical work. Quality requirements for conducting Characterization Project sampling and analysis are described in *Tank Waste Remediation System Characterization Project, Quality Policies* (Board 1998) and this sampling and analysis plan. Characterization Project sampling and analysis shall be conducted in conformance with these QA requirements.

Processes, services, activities, and conditions adverse to quality which do not conform to requirements specified in this sampling and analysis plan or references herein shall be controlled to prevent inadvertent use. Nonconforming sampling and analysis processes shall be identified, controlled, reported, and dispositioned as required by CHG (1999).

4.1 LABORATORY OPERATIONS

Analytical procedures that are to be used for this sample and analysis plan shall be written and approved prior to the performance of analytical work within the laboratory. Analytical QC requirements are identified in Table 3-1. The laboratory shall also use calibration and calibration check standards appropriate for the analytical instrumentation being used (see DOE [1998] for definitions of QC samples and standards). The criteria presented are goals for demonstrating reliable method performance. It is understood that the laboratory will follow its internal QC system for required actions whenever QC failures occur. If sample QC failures occur or if all analyses cannot be performed (e.g., insufficient sample), analysts shall consult with supervisors/customers to determine the proper action. The laboratory should provide a suggested course of action at that time. All sample QC failures and limitations on the associated data shall be discussed in the narrative of the data report. Proper notification of all data not meeting QC requirements shall be included with the data.

4.2 SAMPLE COLLECTION

Sampling shall be performed in accordance with approved procedures and work plans included within the job control system. All data sheets and log entries completed during the performance of sampling shall be copied and included within the job control system package.

Each sample identification number shall have the following format:

VLXXX-YYY-ZZZZ

where,

V indicates a vapor sample,
W = a letter code identifying the organization that prepared the sample container/sample media
W= WSCF,
XXX = a three-digit/letter code identifying the sample location
101 = 241-AZ-101 headspace
AMB = ambient air samples at 241-AZ tank farm
YYY = a three-digit sample code found in Table 2-3
ZZZZ = a special lab-assigned code.

4.3 SAMPLE CUSTODY

Chain-of-custody will be generated at the time of sample head assembly and carefully maintained to assure sample control at all times. Documents (i.e., TSAP), procedures, and drawings (including current revision number) applicable to the sample head assembly will be listed on the chain-of-custody.

5.0 EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS

5.1 CLARIFICATIONS

Trip Blanks and Field Blanks

Trip Blanks are sampling devices prepared and handled in the same manner as samples, except that they are never opened in the field. Field Blanks are sampling devices prepared and handled in the same manner as the samples, but no tank gases are drawn through them.

5.2 EXCEPTIONS

The analytes required for the vapor analyses are found in Mulkey (1999) (Table 8-3 and Table C-1) Only a subset of the analytes listed in Table C-1 will be included for analysis. This subset is the analytes included for the tank 241-C-106 vapor analyses and is shown in Table 3-2.

6.0 ORGANIZATION

The organization and responsibility of key personnel involved with these tank characterization projects are listed in Table 6-1.

Table 6-1. Project Key Personnel

Responsibility	Organization	Individual
Data Development and Interpretation manager	RPP Process Engineering (CHG)	J. G. Field, 376-3753
Process Engineering point of contact for AZ-101 vapor sampling	RPP Process Engineering (CHG)	A. M. Templeton, 373-5589
Waste retrieval mixer pump test technical contact	Retrieval Engineering (NHC)	A. B. Carlson, 376-1642
Process Engineering mixer pump operation contact	RPP Process Engineering, (CHG)	K. G. Carothers, 373-4556
Vapor sampling cognizant engineer	Characterization Field Engineering (CHG)	D. D. Wanner, 373-3297
Vapor Sampling manager	Characterization Project Operations (CPO) (CHG)	J. F. Sickels, 373-0259
Client Services, Analytical Services Project	Fluor Hanford	K, L. Powell, 372-0939
Team Lead, Organic Chemistry, WSCF	Fluor Hanford	R. S. Viswanath,373-9223
Analytical Production, WSCF	Fluor Hanford	K. J. Greenough, 373-7194
Analytical Production, WSCF	Fluor Hanford	S. L. Cobb, 373-7118
Industrial Hygiene and Safety points of contact	Tank Farm Facilities Operations, Field Safety Services (CHG)	R. J. Fogg, 373-0630 N. K. Butler, 376-5795
Double-Shell Tank Farm point of contact	Tank Farm Operations	Double-Shell Tank Farm Operations shift manager, 373-2689
Environmental point of contact	Environmental Services (CHG)	C. H. Mulkey, 373-0956 J. J. Luke, 376-8629

CHG = CH2M HILL Hanford Group, Inc.

7.0 DELIVERABLES

Sampling and analytical results shall be reported as Format VI reports. Any analyte exceeding the notification limit prescribed in Table 3-1 shall also be reported as a Format I report. In addition, Format II reports shall be provided by CPO, and WSCF as described in Section 7.2.

7.1 FORMAT I REPORTING

Table 3-1 contains the notification limits for specific analytes. Analytes that exceed notification limits shall be reported by the Project Manager or delegate by calling the Double-Shell Tank Farms Operations shift manager as soon as the data are obtained and reviewed by the responsible scientist. This verbal notification must be followed within one hour by electronic notification to the Double-Shell Tank Farms Operations shift manager, the Industrial Hygiene and Safety point of contact, the RPP Process Engineering Data Development and Interpretation manager, and the Process Engineering point of contact for vapor sampling. A further review of the data, including quality control results and additional analyses for verification purposes may be contracted with the performing laboratory by either a revision to this sampling and analysis plan or by a letter.

7.2 FORMAT II REPORTING

WSCF shall provide the results of radiological analyses using the standard WSCF analytical laboratory report format. The results shall be faxed to the vapor analysis team at WSCF and the Process Engineering vapor sampling point of contact within 48 hours of receipt of the samples and followed by transmittal of a copy of the results via plant mail.

CPO shall provide information on its sampling activities (copies of sampling data sheets, J-5 forms, chain of custody forms, and other pertinent documentation) to WSCF and the Process Engineering vapor sampling point of contact. The information provided shall include: the sample collection sequence and volumes, start and stop times for the collection of each sample, the VOC reading at the start of the collection of each sample, and any anomalous sampling conditions. This information shall be provided within 48 hours of the collection of the last set of samples.

7.3 FORMAT VI REPORTING

The Format VI report shall consist of two deliverables, preliminary analytical results, and a final data package.

Preliminary sampling and analytical data shall be delivered within three weeks of the receipt of the samples at the laboratory. The receipt at the laboratory is defined as after radiological screening results are complete and the samples are released to the laboratory for headspace vapor analysis. In regards to any vapor analysis or extraction performed at 222-S laboratory the turnaround for preliminary data will be 5 weeks after delivery to the laboratory. The preliminary data shall consist of, at a minimum, data tables reporting sample collection data, particulate filter analysis results, and the results of each analysis performed by the analytical laboratory. The following individuals shall be on distribution for the preliminary results: A. B. Carlson, C. H. Mulkey, K. G. Carothers, G. M. Crummel, A. M. Templeton, G. R. Tardiff, and L. M. Sasaki.

A data package shall be issued as a supporting document within ten weeks of the receipt of the samples at the laboratory. The data package shall contain the elements listed in Table 7-1. The following individuals shall be on distribution for the entire data package: R. A. Bechtold, C. H. Mulkey, G. M. Crummel, A. M. Templeton, and A. E. Young. The following individuals require only the engineering data transmittal: K. G. Carothers, A. B. Carlson, and C. A. Simonen.

In addition to the data package, an electronic version of the analytical results shall be provided to the Tank Vapor Database representative within 4 calendar days from the day that the final data package is issued. The data must be available to the Washington State Department of Ecology within 7 calendar days of release of the data package. The electronic version shall be in the standard electronic format specified in Bobrowski and Simonen (1999).

Table 7-1. Data Package Required Elements (2 sheets).[1]

Prefatory Elements
Executive summary
Table of contents
List of abbreviations and acronyms
Quality assurance data package review results
Non-conformance reports
Sampling Elements
Sampling case narrative
Sample summary and event chronology
Sampling procedures table
Sampling logbook table
Field data
Radiation screening results
Chain of custody forms

Table 7-1. Data Package Required Elements (2 sheets).[1]

Analysis Elements
Analytical case narrative
Analytical procedures table
Data qualifier flag translation table
Target analytes concentration table
Tentatively identified compound concentration table
Laboratory blank summary
Field blank summary
Trip blank summary
Mass spectrometer instrument tune report
Target analyte initial calibration table
Internal standards area counts table
Laboratory control sample results table
Surrogate compounds results table
Quantitation reports
Chromatograms
Mass spectra of reported tentatively identified compounds

Note:
[1]Include all elements as applicable.

8.0 CHANGE CONTROL

Under certain circumstances, it may become necessary for the performing laboratory to make decisions concerning a sample without review of the data by the customer or the Characterization Project. All significant changes shall be documented by RPP Process Engineering via an engineering change notice to this sampling and analysis plan or by a letter. All changes shall also be clearly documented in the final data report. Insignificant changes may be made by placing a notation in the permanent record (i.e., note change in logbook or memorandum to file). Significance is determined by the Process Engineering point of contact for vapor sampling.

9.0 REFERENCES

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Fogg, R. J., 2000, *241-AZ-101 IH Sampling/Monitoring Strategy - Rev/ 1*, (internal memorandum 7B100-RJF-00-002, to J. L. Homan, January 24), CH2M HILL Hanford Group, Inc., Richland, Washington.

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APPENDIX A

AZ-101 CORE PROFILE

AZ-101 PMCS CORE PROFILE

FILE: Core Profile 241AZ101 C266 C269.CRD
DATE: 12/15/99 FINAL