ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN No 621368

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 []	Leela M. Sasaki, Technical Basis and Planning, R2-12, 373-1027	[] Yes [X] No	02/26/99
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Tank 241-AZ-101, Tank 241-AZ-102	241-AZ-101 241-AZ-102	N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-3964, Rev. 0-A	10. Related ECN No(s). ECN-621366	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

Complete revision.

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

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

The changes are necessary to incorporate specific comments pertaining to the collection of the tritium traps.

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

See attached distribution.

RELEASE STAMP

DATE: MAR 02 1999 STA: 4 HANFORD RELEASE ID: 2

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-621368

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. L.M. Sasaki	3/1/99	PE	
Cog. Mgr. J.W. Hunt	3/1/99	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other T.D. Jarecki	3/2/99	Other	
		DEPARTMENT OF ENERGY	
R.L. Brown	3-2-99	Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

Tank 241-AZ-101 and Tank 241-AZ-102, Airlift Circulator Operation Vapor Sampling and Analysis Plan

A. M. Templeton
Lockheed Martin Hanford, Corp., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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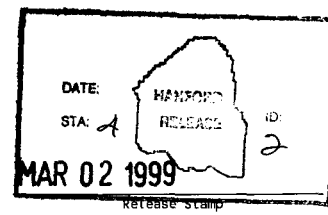
Key Words: Tank 241-AZ-101, Tank AZ-101, AZ-101, Tank 241-AZ-102, Tank AZ-102, AZ-102, AZ Farm, Airlift Circular Operation, Vapor, Sampling, Analysis, Plan, Tank Structure

Abstract: N/A

* Teflon is a registered trademark of E.I. duPont de Nemours and Company

3/2/99
Release Approval Date



Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-3964	Page 1

(2) Title

Tank 241-AZ-101 and Tank 241-AZ-102, Airlift Circulator Operation 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 02/10/99 on EDT-611449.	L.M. Sasaki	J.W. Hunt
0-A RS	Incorporate per ECN-621366.	L.M. Sasaki L.M. Sasaki	J.W. Hunt 2/17/99
1 RS	Incorporate per ECN-621368.	L.M. Sasaki	J.W. Hunt 3/1/99

HNF-3964
Revision 1

Tank 241-AZ-101 and Tank 241-AZ-102 Airlift Circulator Operation Vapor Sampling and Analysis Plan

A. M. Templeton
Lockheed Martin Hanford Corporation

Date Published
February 1999

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Fluor Daniel Hanford, Inc.
P. O. Box 1000
Richland, Washington

Hanford management and Integration Contractor for the
U.S. Department of Energy under Contract DE-AC06-96-RL13200

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

ALC	airlift circulator
CAS	Chemical Abstract Service
CPO	Characterization Project Operations
GC/MS	gas chromatography/mass spectrometry
HASQARD	Hanford Analytical Services Quality Assurance Requirements Document
IDLH	immediately dangerous to life and health
LFL	lower flammability limit
LMHC	Lockheed Martin Hanford Corporation
N/A	not applicable
NHC	Numatec Hanford Corporation
OTP	operational test procedure
ppb	parts per billion
ppmv	parts per million by volume
PHMC	Project Hanford Management Contract
PNNL	Pacific Northwest National Laboratory
QA	quality assurance
QC	quality control
SAP	sampling and analysis plan
SAS	Special Analytical Support
SHMS	standard hydrogen monitoring system
TOC	total organic carbon
TWRS	Tank Waste Remediation System
WMH	Waste Management Hanford
WSCF	Waste Sampling and Characterization Facility

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 the tank 241-AZ-101 and 241-AZ-102 airlift circulators (ALCs). The purpose of the ALC operation is to support portions of the operational test procedure (OTP) for Project W-030 (OTP-W030-001) and to perform functional test in support of Project W-151. Project W-030 is the 241-A-702 ventilation upgrade project (241-AZ-702) and Project W-151 is the 241-AZ-101 Mixer Pump Test. The functional tests will check the operability of the tank 241-AZ-101 ALCs. Process Memo's #2E98-082 and #2E99-001 (LMHC 1999a, LMHC 1999b) direct the operation of the ALCs and the Industrial Hygiene monitoring respectively.

A series of tests will be conducted in which the ALCs in tanks 241-AZ-101 and 241-AZ-102 will be operated at different air flow rates. Vapor samples will be obtained to determine constituents that may be present in the tank headspace during ALC operation at tanks 241-AZ-101 and 241-AZ-102 as the waste is disturbed. During the testing, vapor samples will be obtained from the headspace of tanks 241-AZ-101 and 241-AZ-102 via the unused port on the standard hydrogen monitoring system (SHMS). Results will be used to provide the waste feed delivery program with environmental air permitting data for tank waste disturbing activities. Because of radiological concerns, the samples will be filtered for particulates. It is recognized that this may remove some organic compounds.

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 ALC testing.

2.0 SAMPLING EVENT REQUIREMENTS

The ALCs will be operated during a series of functional and operational tests. Samples will be taken prior to ALC operation and during ALC operation at each tank. ALC testing will initially be performed in tank 241-AZ-101. At tank 241-AZ-101 samples will be collected during the first two days of the ALC operation. Samples will be collected during the first three days of ALC operation at 241-AZ-102.

2.1 SAMPLE PREPARATION

SUMMA™[1] canister samples will be collected and sent to Special Analytical Support (SAS) laboratories, field and equipment blanks will accompany the samples. Tritium trap and particulate filter samples will be collected for radiation screening of the samples and will be analyzed by Waste Management Hanford (WMH) at the Waste Sampling and Characterization Facility (WSCF). Tritium traps will be supplied by SAS while the particulate filters/housing will be supplied by Characterization Project Operations (CPO). SAS will provide evacuated SUMMA canisters for collection of tank vapor samples. SAS will also provide evacuated SUMMA™ canisters for use in collection of particulate filters, tritium traps. Sample preparation procedures are listed in Table 2-1.

Table 2-1. Sample Preparation Procedures

Sample container	Laboratory/Org.	Preparation Procedure
SUMMA™ canister	SAS	LO-080-406
Tritium trap	SAS	N/A
Particulate filter	CPO	N/A

2.2 SAMPLE COLLECTION

CPO will be responsible for the collection of all SUMMA™ canister, tritium trap, and particulate filter samples from the headspace of tanks 241-AZ-101 and 241-AZ-102.

Tables 2-2, and 2-3 provide the sequence of sampling activities of the 241-AZ-101 and 241-AZ-102 headspace, respectively. In summary, the samples will be collected in the headspace of tank 241-AZ-101 prior to ALC operation, and when a flow rate of 3, 5, and 7 cfm have been reached or at the direction of Process Engineering. Samples will also be collected from the headspace in tank 241-AZ-102 prior to ALC operation, and when a flow rate of 3, 5, and 7 cfm have been reached or at the direction of Process Engineering. These flow rates of 3, 5, and 7 cfm are for each ALC. A representative from Process Engineering will be on-site during the sampling.

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[1]SUMMA™ is a trademark of Moletrics, Inc., Cleveland, Ohio.

For each sample, the total organic carbon (TOC) concentration at the start of sample collection, the time at the start of sample collection, and the time at the end of sample collection shall be recorded. Only stainless steel, Teflon or tubing approved by Process Engineering will be used for sampling.

Each filtered tritium sample will be collected from the tank headspace prior to vapor sampling, utilizing a SUMMA canister dedicated for tritium collection. The actual vapor samples will utilize the same particulate filter used during tritium collection. The individual sample numbers, sample volumes and sample durations are listed in Tables 2-2 and 2-3 except for the particulate filter volume which will be 12 liters. The samples are summarized in Table 2-4.

CPO sampling activities will be performed in accordance with work package ES-99-00029 for sampling of the 241-AZ-101 headspace, and work package ES-99-00039 for sampling of the tank 241-AZ-102 headspace.

The samples shall include the following quality control (QC) samples: one SUMMA™ canister ambient air field blank and one SUMMA™ canister equipment blank. The blanks are to accompany the vapor samples to the laboratory. For specific information concerning sample and blank handling, sample custody, and sample transportation, refer to the requirements in Section 4.2, 4.3 and 5.0.

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, SAS shall retrieve its samples from CPO. In the event the samples are determined to be radiologically contaminated by particulate material the samples will be sent to Pacific Northwest National Laboratory (PNNL).

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

Table 2-2. List of Samples and Activities for Tank 241-AZ-101 Headspace Sampling (3 Sheets)

Sample Code	Day	Sample/Activity Description	Sampler Position During Collection	Sample Volume	Sample Duration or Rate
001	Day 1	Collect SUMMA™ field blank	AZ Tank Farm	6 L	2 min.
002	Day 1	Collect SUMMA™ equipment blank	AZ Tank Farm	6 L	2 min.
003	Day 1	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---
004	Day 1	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
005	Day 1	Collect baseline SUMMA™ with Particulate filter prior to start of ALC operation	Tank 241-AZ-101 Headspace	6 L	2 min.
006	Day 1	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---
007	Day 1	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
008	Day 1	Collect SUMMA™ with Particulate filter 1 hour after establishing ALC flow rate of 3 cfm or at the direction of Process Engineering	Tank 241-AZ-101 Headspace	6 L	2 min.
009	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---
010	Day 1-2	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
011	Day 1-2	Collect SUMMA™ with Particulate filter at direction of Process Engineering (Optional)	Tank 241-AZ-101 Headspace	6 L	2 min

Table 2-2. List of Samples and Activities for Tank 241-AZ-101 Headspace Sampling (3 Sheets)

Sample Code	Day	Sample/Activity Description	Sampler Position During Collection	Sample Volume	Sample Duration or Rate
012	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---
013	Day 1-2	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
014	Day 1-2	Collect SUMMA™ with Particulate filter at direction of Process Engineering (Optional)	Tank 241-AZ-101 Headspace	6 L	2 min.
015	Day 1-2	Collect Particulate filter inline during collection of tritium trap	Tank 241-AZ-101 Headspace	---	---
016	Day 1-2	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
017	Day 1-2	Collect SUMMA™ with Particulate filter 1 hour after establishing ALC flow rate of 5 cfm or at the direction of Process Engineering	Tank 241-AZ-101 Headspace	6 L	2 min.
018	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---
019	Day 1-2	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
020	Day 1-2	Collect SUMMA™ with Particulate filter at direction of Process Engineering (Optional)	Tank 241-AZ-101 Headspace	6 L	2 min.
021	Day 2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-101 Headspace	---	---

Table 2-2. List of Samples and Activities for Tank 241-AZ-101 Headspace Sampling (3 Sheets)

Sample Code	Day	Sample/Activity Description	Sampler Position During Collection	Sample Volume	Sample Duration or Rate
022	Day 2	Collect Tritium trap	Tank 241-AZ-101 Headspace	6 L	2 min.
023	Day 2	Collect SUMMA™ with Particulate filter 1 hour after establishing ALC flow rate of 7 cfm or at the direction of Process Engineering	Tank 241-AZ-101 Headspace	6 L	2 min.

Table 2-3. List of Samples and Activities for Tank 241-AZ-102 Headspace Sampling (2 Sheets)

Sample Code	Day	Sample/Activity Description	Sampler Position During Collection	Sample Volume	Sample Duration or Rate
001	Day 1	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
002	Day 1	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.
003	Day 1	Collect baseline SUMMA™ with Particulate filter prior to start of ALC operation	Tank 241-AZ-102 Headspace	6 L	2 min.
004	Day 1	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
005	Day 1	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.
006	Day 1	Collect SUMMA™ with Particulate filter 1 hour after establishing ALC flow rate of 3 cfm or at the direction of Process Engineering	Tank 241-AZ-102 Headspace	6 L	2 min.
007	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
008	Day 1-2	Collect Tritium Trap	Tank 241-AZ-102 Headspace	6 L	2 min.
009	Day 1-2	Collect SUMMA™ with Particulate filter at direction of Process Engineering (Optional)	Tank 241-AZ-102 Headspace	6 L	2 min.
010	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
011	Day 1-2	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.

Table 2-3. List of Samples and Activities for Tank 241-AZ-102 Headspace Sampling (2 Sheets)

Sample Code	Day	Sample/Activity Description	Sampler Position During Collection	Sample Volume	Sample Duration or Rate
012	Day 1-2	Collect SUMMA™ with Particulate filter 1 hour after establishing ALC flow rate of 5 cfm or at the direction of Process Engineering	Tank 241-AZ-102 Headspace	6 L	2 min
013	Day 1-2	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
014	Day 1-2	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.
015	Day 1-2	Collect SUMMA™ with Particulate filter at the direction of Process Engineering (Optional)	Tank 241-AZ-102 Headspace	6 L	2 min.
016	Day 2-3	Collect Particulate filter inline during collection Tritium trap	Tank 241-AZ-102 Headspace	---	---
017	Day 2-3	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.
018	Day 2-3	Collect SUMMA™ with Particulate filter 1 hour after establishing a ALC flow rate of 7 cfm or at the direction of Process Engineering	Tank 241-AZ-102 Headspace	6 L	2 min.
019	Day 2-3	Collect Particulate filter inline during collection of Tritium trap	Tank 241-AZ-102 Headspace	---	---
020	Day 2-3	Collect Tritium trap	Tank 241-AZ-102 Headspace	6 L	2 min.
021	Day 2-3	Collect SUMMA™ with Particulate filter at the direction of Process Engineering (Optional)	Tank 241-AZ-102 Headspace	6 L	2 min.

Table 2-4. Vapor Sampling Summary

Sample location	Sample time	Sample type	Sample container	Number of samples
AZ Tank Farms	Baseline	Field blank/Ambient Air	SUMMA™	1
AZ Tank Farms	Baseline	Equipment blank	SUMMA™	1
Tank 241-AZ-101 Headspace	Baseline	Tank vapor	SUMMA™	1
			Particulate Filter Assembly[1]	1
			Tritium Trap	1
	During operation of air lift circulators	Tank vapor	SUMMA™	3 to 6
			Particulate Filter Assembly[1]	3 to 6
			Tritium trap	3 to 6
Tank 241-AZ-102 Headspace	Baseline	Tank vapor	SUMMA™	1
			Particulate Filter Assembly[1]	1
			Tritium Trap	1
	During operation of air lift circulators	Tank vapor	SUMMA™	3 to 6
			Tritium trap	3 to 6
			Particulate filter Assembly[1]	3 to 6

Notes:
baseline = prior to ALC startup
[1]Each particulate filter assembly contains an upstream particulate filter and a downstream particulate filter.

2.3 RADIATION SCREENING

Tritium trap samples will be collected from tank 241-AZ-101 and 241-AZ-102 headspace and analyzed for tritium. Particulate filter samples will be collected from the 241-AZ-101 and 241-AZ-102 headspace and analyzed for total alpha, total beta, and gamma energy analyses. The results of these analyses will be used to allow the samples to obtain a radiological release and ensure that the samples meet the SAS laboratory acceptance criteria. Tritium traps will be supplied by SAS while the particulate filters/housing will be supplied by CPO. The particulate

filters will contain two individual filters. The particulate samples will be collected inline during the collection of tritium traps and each individual SUMMA™ canister. The samples will be collected by connecting the filters and traps in assembled housings to the sample collection tubing upstream of the tritium trap or SUMMA™. Survey steps sufficient to confirm the absence of contamination will be included in sampling work packages.

The results from the radiation screening are submitted to and shall be evaluated by SAS and SAS shall provide a Format II report to each analytical laboratory (see Section 7.2).

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.

3.1 ANALYSIS SCHEME

Vapor samples shall be analyzed by the laboratory (SAS) in accordance with Table 3-1. SUMMA™ canisters shall be analyzed for hydrogen, nitrous oxide, methane, carbon monoxide, carbon dioxide, and selected organic analytes.

Required analytes are those listed in Tables 3-2 and 3-3. Quantitation limit goals for the Class A and B toxic air pollutants in these tables are documented in Mulkey and Markillie (1995). In addition to the compounds listed, a determination is to be made for all other peaks that are at least 5 ppb based on 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.

At a minimum, the laboratory shall analyze all equipment blanks, field blanks, baseline samples, and the following samples obtained during the operation of the ALCs in tanks 241-AZ-101 and 241-AZ-102: (1) three sets of samples from 241-AZ-101 headspace and (2) three sets of samples from the tank 241-AZ-102 headspace.

Tritium traps and particulate filter samples shall be analyzed at the WSCF as discussed in Section 2.3 and in accordance with Table 3-2.

3.2 INSUFFICIENT SAMPLE RECOVERY

Contact Process Engineering for programmatic directions if there are any problems with the samples received for analysis.

Table 3-1. Chemical and Radiological Analytical Requirements

VAPOR ANALYSES

Project Name	WFD
Plan Number	HNF-3964, Rev. 1
Program Contact:	R D. Potter
TWRS Contact:	A.M. Templeton
Lab Contact (SAS):	R. S. Viswanath
Lab Contact (PNNL):	J. L. Huckaby

Comments

Field Blank - Required
Equipment Blank - Required

Reporting Formats

Format I	Immediate Notification
Format II	Process Control
Format III	Safety Screen
Format IV	Waste Management
Format V	RCRA Compliance
Format VI	Special

PRIMARY ANALYSES

ANALYSIS METHOD	PRIMARY ANALYTE	PROCEDURE	LAB	SAMPLE PREP	SAMPLE CONTAINER	SURROGATE SPIKE	CRITERIA: NOTIFICATION LIMIT	CRITERIA: PRECISION	CRITERIA: ACCURACY	REPORT FORMAT
GC/MS	Organic Speciation	LA-523-404	SAS	Direct	SUMMA™	none	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
		PNL-TVP-03	PNNL							
GC/TCD	CO_2, CO, CH_4, H_2, and N_2O	LA-523-409	SAS	Direct	SUMMA™	none	≥ 20% LFL and/or 50% IDLH	±25%	70-130%	I, VI
MS	CO_2, CO, CH_4, H_2, and N_2O	ALO-284	PNNL	Direct	SUMMA™	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
Liquid Scint.	Tritium	LA-548-411 and LA-508-421	WSCF	Direct	Tritium trap	N/A	N/A	±25%	70-130%	II

Notes:
N/A = not applicable

Table 3-2. Required Analytes: Regulatory

Analyte	CAS Number	LFL (ppmv)	20% LFL (ppmv)	IDLH (ppmv)	50% IDLH (ppmv)
1, 3 Butadiene	106-99-0	20,000	4,000	2,000	1000
Chloroform	67-66-3	N/A	N/A	500	250
1, 4 Dioxane	123-91-1	20,000	4,000	500	250
Benzene	71-43-2	12,000	2,400	500	250
Carbon tetrachloride	56-23-5	N/A	N/A	200	100
Dichloromethane (Methylene chloride)	75-09-2	130,000	26,000	2,300	1,150
Acetaldehyde	75-07-1	40,000	8,000	2,000	1,000
Perchloroethylene (Tetrachloroethylene)	127-18-4	N/A	N/A	150	75
Hexane	110-54-3	12,000	2,400	1,100	550
Acetone	67-64-1	25,000	5,000	2,500	1,250
n-Butanol	71-36-3	14,000	2,800	1,400	700
Nitrous oxide	10024-97-2	N/A	N/A	N/A	N/A
3-Heptanone (Ethyl butyl ketone)	106-35-4	N/A	N/A	1,000	500
Nonane	111-84-2	8,500	1,700	N/A	N/A
4-Heptanone (Dipropyl ketone)	123-19-3	N/A	N/A	N/A	N/A
n-Heptane	142-82-5	10,500	2,100	750	375

Note:
N/A = not applicable or not available

Table 3-3. Required Analytes: Vapor Program Target Analytes (2 Sheets)

Analyte	CAS Number	LFL (ppmv)	20% LFL (ppmv)	IDLH (ppmv)	50% IDLH (ppmv)
Methane, CH_4	74-82-8	50,000	10,000	N/A	N/A
Carbon dioxide, CO_2	124-38-9	N/A	N/A	40,000	20,000
Carbon monoxide, CO	630-08-0	125,000	25,000	1,200	600
Nitrous oxide, N_2O	10024-97-2	N/A	N/A	N/A	N/A
Hydrogen, H_2	1333-74-0	40,000	8,000	N/A	N/A
Dichlorodifluoromethane (Freon 12)	75-71-8	N/A	N/A	15,000	7,500
Methyl chloride	74-87-3	81,000	16,200	2,000	1,000
n-Butane	106-97-8	18,000	3,600	N/A	N/A
Ethyl chloride	75-00-3	38,000	7,600	3,800	1,900
Ethanol	64-17-5	33,000	6,600	3,300	1,650
Trichlorofluoromethane (Freon 11)	75-69-4	N/A	N/A	2,000	1,000
Ethanenitrile (acetonitrile)	75-05-8	30,000	6,000	500	250
Propanone (acetone)	67-64-1	25,000	5,000	2,500	1,250
Furan	110-00-9	N/A	N/A	N/A	N/A
n-Pentane	109-66-0	14,000	2,800	1,500	750
2-Propanol	67-63-0	20,000	4,000	2,000	1,000
Dichloromethane (methylene chloride)	75-09-2	130,000	26,000	2,300	1,150
1-Propanol	71-23-8	22,000	4,400	800	400
2-Methyl pentane	107-83-5	N/A	N/A	N/A	N/A
Propanenitrile	107-12-0	31,000	6,200	N/A	N/A
Butanal	123-72-8	14,000	2,800	1,400	700
1-Hexene	592-41-6	N/A	N/A	N/A	N/A
2-Butanone	78-93-3	14,000	2,800	3,000	1,500
n-Hexane	110-54-3	12,000	2,400	1,100	550
Trichloromethane (chloroform)	67-66-3	N/A	N/A	500	250
Tetrahydrofuran	109-99-9	20,000	4,000	2,000	1,000
1-Butanol	71-36-3	14,000	2,800	1,400	700
Benzene	71-43-2	12,000	2,400	500	250
Tetrachloromethane (carbon tetrachloride)	56-23-5	N/A	N/A	200	100
1-Butanenitrile	109-74-0	16,500	3,300	N/A	N/A
3-Methyl hexane	589-34-4	N/A	N/A	N/A	N/A
2-Pentanone	107-87-9	15,000	3,000	1,500	750
n-Heptane	142-82-5	10,500	2,100	750	375
1,4-Dioxane	123-91-1	20,000	4,000	500	250
4-Methyl-2-pentanone (hexone)	108-10-1	12,000	2,400	500	250
Toluene	108-88-3	11,000	2,200	500	250

Table 3-3. Required Analytes: Vapor Program Target Analytes (2 Sheets)

Analyte	CAS Number	LFL (ppmv)	20% LFL (ppmv)	IDLH (ppmv)	50% IDLH (ppmv)
2-Hexanone	591-78-6	N/A	N/A	150	75
n-Octane	111-65-9	9,500	1,900	1,000	500
Tetrachloroethylene	127-18-4	N/A	N/A	150	75
Chlorobenzene	108-90-7	13,000	2,600	1,000	500
Ethylbenzene	100-41-4	8,000	1,600	800	400
m, p-Xylene	106-42-3	11,000	2,200	900	450
3-Heptanone	106-35-4	N/A	N/A	1,000	500
2-Heptanone	110-43-0	11,000	2,200	800	400
Cyclohexanone	108-94-1	11,000	2,200	700	350
Styrene	100-42-5	9,000	1,800	700	350
n-Nonane	111-84-2	8,500	1,700	N/A	N/A
o-Xylene	95-47-6	9,000	1,800	900	450
1,1,2,2-Tetrachloroethane	79-34-5	N/A	N/A	100	50
2-Octanone	111-13-7	N/A	N/A	N/A	N/A
n-Decane	124-18-5	7,500	1,500	N/A	N/A
1,2,4-Trimethylbenzene	95-63-6	9,000	1,800	N/A	N/A

Note:
N/A = not available or not applicable

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 1997) 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. SAS is currently working under the document *Quality Assurance Management Plan Special Analytical Support*, HNF-SD-WM-QAPP-034, ECN 618830 (Dormant 1998). 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 PHMC (1998).

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 quality control (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 [1997] 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,
L = a letter code identifying the organization that prepared the sample container/sample media

C = CPO
P = PNNL
S= SAS,

XXX = a three-digit code identifying the sample location

101 = tank 241-AZ-101 headspace
102 = tank 241-AZ-102 headspace

YYY = a three-digit sample code found in Tables 2-2 and 2-3
ZZZZ = a special laboratory-assigned code.

4.3 SAMPLE CUSTODY

Chain-of-custody will be carefully maintained to assure sample control at all times.

5.0 EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS

Equipment Blanks and Field Blanks

Field Blanks are sampling devices prepared and handled in the same manner as the samples, but instead of tank gases, ambient air will be drawn into the canister. Equipment Blanks are sampling devices prepared and handled in the same manner as the samples, but instead of tank gases, ambient air will be drawn into the canister through the sampling equipment (tubing).

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 Assessment and Interpretation manager	TWRS Process Engineering (LMHC)	K. M. Hall, 376-5029
Process Engineering point of contact for vapor sampling	TWRS Process Engineering (LMHC)	A. M. Templeton, 373-5589
Operations point of contact[1]	Operations Program (LMHC)	G. P. Hopkins, 373-1166
Cognizant Engineer	Double Shell Tank Engineering (LMHC)	W. J. Powell, 373-1072
Vapor sampling cognizant engineer	Characterization Field Engineering (LMHC)	D. D. Wanner, 373-3297
SAS vapor sampling and analysis project manager	Special Analytical Support (NHC)	L. L. Lockrem, 373-4771
SAS vapor sampling and analysis technical contact	Special Analytical Support (COGEMA)	R. S. Viswanath, 376-9223
PNNL vapor sample analysis project manager	PNNL	K. L. Silvers, 372-4828
PNNL vapor sample analysis technical contact	PNNL	J. C. Evans, 376-0934, J. L. Huckaby, 376-5524
Industrial Hygiene and Safety point of contact	TFFO Field Safety Services (LMHC)	K. M. Bowen, 372-3667 N. K. Butler, 376-5795
Double-Shell Tank Farm point of contact	Tank Farm Operations	Double-Shell Tank Farm Operations shift manager, 373-2689
Waste Feed Delivery point of contact	Tank Waste Retrieval	R. D. Potter, 373-9315
Environmental point of contact	Environmental Permits/Policy (LMHC)	G. M. Crummel, 373-5175

Notes:

[1]Test Director will be appointed by the complex facility manager.

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, SAS shall provide Format II reports to the analytical laboratories 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 TWRS Process Engineering Data Assessment and Interpretation manager, the airlift circulator operations point of contact 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

Information on the sampling shall be reported by the CPO sampling team and WSCF as Format II reports to the SAS and PNNL laboratories and the point of contact in Process Engineering. CPO will provide the sample collection sequence and volumes, start and stop times for the collection of each sample, the TOC reading at the start of the collection of each sample, verification of equipment and field blank use, any anomalous sampling conditions, and WSCF will provide the results of the tritium trap and particulate filter analysis. This report is to accompany, if possible, the shipment of samples. Alternatively, this sampling report may be delivered to SAS and PNNL within 48 hours after the samples have been relinquished from the samplers.

7.3 FORMAT VI REPORTING

The Format VI report shall consist of two deliverables, preliminary analytical results and a final data package. Report Chemical Abstract Service (CAS) numbers in mg/L and ppb.

Preliminary sampling and analytical data shall be delivered within two weeks of the receipt of the samples at the laboratory. The preliminary data shall consist of, at a minimum, data tables reporting sample collection data, tritium trap and particulate filter analysis results, and the results of each analysis performed by the analytical laboratory (SAS or PNNL). The following individuals shall be on distribution for the preliminary results: G. M. Crummel, C. H. Mulkey, R. D. Potter, A. M. Templeton, J. Jo, and J. H. Rasmussen.

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, G. M. Crummel, R. D. Potter, A. M. Templeton, J. H. Rasmussen, and C. A. Simonen.

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

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
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

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

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.

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 (Bobrowski and Simonen, 1999).

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 TWRS Process Engineering via an engineering change notice to this SAP 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 log book or memo to file). Significance is determined by the Process Engineering point of contact for vapor sampling.

At the request of the Characterization Project, additional analysis of sample material from this characterization project shall be performed following a revision of this SAP or issuance of a letter.

9.0 REFERENCES

Board, D. C., 1998, *Tank Waste Remediation System, Characterization Project, Quality Policies*, HNF-SD-WM-QAPP-025, Rev. 4, Lockheed Martin Hanford Corp. for Fluor Daniel Hanford, Inc., Richland, Washington.

Bobrowski, S .F., and C. A. Simonen, 1999, *Standard Electronic Format Specification for Tank Vapor Data MSEXCEL Spreadsheets: Version 1.0*, HNF-3815, Rev. 0, prepared by Pacific Northwest National Laboratory for Lockheed Martin Hanford Corporation, Richland, Washington

DOE, 1997, *Hanford Analytical Services Quality Assurance Requirements Document*, DOE/RL-96-68, Rev. 1, U.S. Department of Energy, Richland Field Office, Richland, Washington.

Dormant, C., 1998, *Quality Assurance Management Plan Special Analytical Support*, HNF-PRO-298, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

LMHC, 1999a, *AZ-101 and AZ-102 Airlift Circulator Operation Instructions*, Process Memo #2E98-082, East Tank Farm Engineering, January 26, 1998, Lockheed Martin Hanford Corporation, Richland, Washington..

LMHC, 1999b, *Gas Sampling For AZ-101 and AZ-102 Airlift Circulator Operation*, Process Memo #2E99-001, East Tank Farm Engineering, January 26, 1998, Lockheed Martin Hanford Corporation, Richland, Washington.

Mulkey, C. H., and K. D. Markillie, 1995, *Data Quality Objectives for Regulatory Requirements for Hazardous and Radioactive Air Emissions Sampling and Analysis*, WHC-SD-WM-DQO-021, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

PHMC, 1998, *Nonconforming Item Reporting and Control*, HNF-PRO-298, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

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Distribution	Data Assessment and Interpretation	Date 02/26/99
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