~~XXXX~~ RMIS View/Print Document Cover Sheet ~~XXXX~~

This document was retrieved from the Boeing ISEARCH System.

Accession #: D196069902

Document #: SD-WM-TSAP-038

Title/Desc:

TANK 241BX110 AUGER SAMPLING & ANALYSIS PLAN

Sta. 4 (3)

OCT 09 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT NO 613123

2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) Characterization Plans, Coordination and Reports		4. Related EDT No.: N/A	
5. Proj./Prog./Dept./Div.: Tank 241-BX-110/Waste Management/CPCR/Technical Basis Characterization		6. Cog. Engr.: Ruth D. Schreiber		7. Purchase Order No.: N/A	
8. Originator Remarks: This document is being released into the supporting document system for retrievability purposes.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: N/A	
11. Receiver Remarks: For release.				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: 10/09/95	
15. DATA TRANSMITTED					
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Design- nator
1	WHC-SD-WM-TSAP- 038	N/A	0	Tank 241-BX-110 Auger Sampling and Analysis Plan	Q
16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec. 12.7)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)					
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2	1	Cog. Eng. R.D. Schreiber	<i>Ruth D. Schreiber</i>	10/9/95	
2	1	Cog. Mgr. J.G. Kristofzski	<i>J.G. Kristofzski</i>	10/9/95	
2	1	QA T.C. Tribble	<i>T.C. Tribble</i>	10/9/95	
		Safety			
		Env.			
2	1	Prog. W.J. Kennedy	<i>W.J. Kennedy</i>	10/9/95	
2	1	Prog. D.A. Turner	<i>D.A. Turner</i>	10/9/95	
18.		19.		20.	
A.E. Young <i>A.E. Young</i> Signature of EDT Originator		N/A Authorized Representative for Receiving Organization		J.G. Kristofzski <i>J.G. Kristofzski</i> Cognizant Manager	
Date 10-9-95		Date		Date 10/9/95	
21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments					

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-TSAP-038, REV 0

Document Title: Tank 241-BX-110 Auger Sampling and Analysis Plan

Release Date: 10/9/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara Broz

10/9/95

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy. Printed in the United States of America. To obtain copies of this report, contact:

Westinghouse Hanford Company - Document Control Services
P.O. Box 1970, Mailstop H6-08, Richland, WA 99352
Telephone: (509) 372-2420; Fax: (509) 376-4989

SUPPORTING DOCUMENT		1. Total Pages <i>4</i>
2. Title Tank 241-BX-110 Auger Sampling and Analysis Plan	3. Number WHC-SD-WM-TSAP-038	4. Rev No. 0
5. Key Words Tank 241-BX-110, Tank BX-110, BX-110, BX Farm, Auger, Sampling, Analysis, Plan, Organic, Safety Screening	6. Author Name: Ruth D. Schreiber <i>Ruth D. Schreiber</i> Signature Organization/Charge Code 75310/N4G4B	
7. Abstract N/A		
8. RELEASE STAMP <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> OFFICIAL RELEASE 3 BY WHC DATE OCT 09 1995 <i>Sta 4</i> </div>		

Tank 241-BX-110 Auger Sampling and Analysis Plan

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

Los Alamos Technical Associates
8633 Gage Boulevard
Kennewick, Washington 99336

TABLE OF CONTENTS

1.0	SAMPLING AND ANALYSIS OBJECTIVES	1
2.0	SAMPLING EVENT REQUIREMENTS	1
3.0	LABORATORY ANALYSIS REQUIREMENTS	2
3.1	ANALYSIS SCHEME	2
3.2	SPECIFIC METHODS AND ANALYSES	2
3.3	INSUFFICIENT SEGMENT RECOVERY	2
4.0	QUALITY ASSURANCE CONTROL	7
4.1	LABORATORY OPERATIONS	7
4.2	SAMPLE COLLECTION	7
4.3	SAMPLE CUSTODY	7
5.0	EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS	8
5.1	EXCEPTIONS TO DQO REQUIREMENTS	8
5.2	CLARIFICATIONS AND ASSUMPTIONS	8
6.0	DELIVERABLES	9
6.1	FORMAT I REPORTING	9
6.2	FORMAT III REPORTING	9
6.3	FORMAT IV REPORTING	10
7.0	CHANGE CONTROL	10
8.0	REFERENCES	11

LIST OF TABLES

1:	Tank BX-110 Chemical, Radiological, and Physical Analytical Requirements .	3
----	--	---

LIST OF ABBREVIATIONS

BX-110	Tank 241-BX-110
cm	centimeters
DQO	data quality objective
DSC	differential scanning calorimetry
GEA	gamma energy analysis
HPGE/MCA	high purity germanium - multi channel analysis
IC	ion chromatography
ICP	inductively coupled plasma (atomic emission spectroscopy)
LFL	Lower Flammability Limit
OSD	Operating Specification Document
RSST	reactive system screening tool - adiabatic calorimetry
SAP	Sampling and Analysis Plan
SARP	Safety and Analysis Report for Packaging
TCP	Tank Characterization Plan
TGA	thermogravimetric analysis
TOC	total organic carbon
TWRS	Tank Waste Remediation System
WHC	Westinghouse Hanford Company

1.0 SAMPLING AND ANALYSIS OBJECTIVES

This Sampling and Analysis Plan (SAP) will identify characterization objectives pertaining to sample collection, laboratory analytical evaluation, and reporting requirements for vapor and auger samples from tank 241-BX-110 (BX-110). It is written in accordance with the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), and *Data Quality Objective to Support Resolution of the Organic Complexant Safety Issue* (Turner 1995). These Data Quality Objectives (DQOs) are described in the Tank Characterization Plan (TCP) for tank 241-BX-110 (Homi 1995a). This SAP will also identify procedures and requirements for collecting and characterizing vapor and auger samples from tank BX-110.

2.0 SAMPLING EVENT REQUIREMENTS

As of July 31, 1995, tank BX-110 contained 783 kL (207 kgals) of noncomplexed (NCPLX) waste corresponding to a waste depth of 180 cm (71 inches). The tank contents were comprised of 738 kL (195 kgals) of sludge with 34 kL (9 kgals) of saltcake and 49 kL (13 kgals) pumpable liquid remaining (Hanlon 1995). Due to the amount of waste in the tank, a core sampling event is necessary to obtain a full vertical profile. However, the sampling objective of this project is to obtain only the top layer of the waste. Therefore, auger sampling is the appropriate method.

Prior to auger sampling, the dome space (below the riser) shall be sampled and analyzed for the presence of flammable gases. The sample shall be taken from within 3 feet of the waste surface and the data reported as a percentage of the Lower Flammability Limit (LFL). The results shall be submitted to the tank cognizant engineer within one week of the sampling event. If the limits are above 25% of the LFL when analyzing by gas chromatography/mass spectrometer (GC/MS) or gas-specific monitoring gauges, or above 10% of the LFL when analyzing with a combustible gas meter, the necessity for recurring sampling for flammable gas concentration and the frequency of such sampling will be determined by the Flammable Gas Program.

Two samples shall be collected from risers 3 and 6 of tank BX-110 using the auger sampling method. If a different riser is necessary to meet the sampling and analysis requirements, this change must be recorded and approved in writing by the sampling cognizant engineer before sampling. The risers used may be recorded on a permanent data sheet or recorded directly in the work package.

A 20 inch auger bit will be used for the sampling of each riser. For detailed information regarding the sampling activities, refer to work package ES-95-00352. That document contains the operating procedures and the chain-of-custody records for this sampling event. All collected samples shall be shipped to the laboratory according to procedure TO-080-090 ("Load/Transport Sample Cask(s)"). Samples shall be transported to the laboratory within three calendar days of each sample's removal from the tank.

3.0 LABORATORY ANALYSIS REQUIREMENTS

3.1 ANALYSIS SCHEME

In order to comply with the safety screening and the organic DQOs' data requirements, perform the following on each sample:

- ▶ Extrude samples
- ▶ Analyze drainable liquids, and half-segment subsamples from each segment.
- ▶ Filter liquids prior to analysis.
- ▶ Archive at least 10 g of each subsample or drainable liquid from each sample.

As a precautionary measure, the Safety and Analysis Report for Packaging (SARP) in the work procedure T0-080-090 ("Load/Transport Sample Cask(s)") has been reviewed for any safety issues involved with the transportation of auger samples from tank BX-110. For auger samples from tank BX-110, the shipping containers must be vented every fifteen days to release any retained gas.

Any decisions, observations, or deviations made to this work plan or during the sample breakdown and analyses shall be documented in writing with justification. These decisions and observations shall also be reported in the data report. The reporting formats for analyses are contained in Table 1.

3.2 SPECIFIC METHODS AND ANALYSES

The analyses in Table 1 to be performed on the tank BX-110 auger samples are based on the safety screening and organic DQO documents referenced in Section 1.0. The laboratory procedure numbers, which shall be used for the analyses, are included in the table.

3.3 INSUFFICIENT SEGMENT RECOVERY

If the amount of material recovered from samples taken from a tank is insufficient to perform the analyses requested in the respective SAP and permit a minimum 10 mL archive per sample, a prioritization of the analyses may be provided to the laboratories by the tank BX-110 Tank Cognizant Engineer. Any analyses prescribed by the SAP, but not performed, shall be identified in the appropriate data report with justification for non-performance.

WHC-SD-WM-TSAP-038, REV.0

Table 1: BX-110 Chemical, Radiological and Physical Analytical Requirements

SOLID ANALYSES																
Project Name		BX-110 Auger Sample					COMMENTS						REPORTING LEVELS			
Plan Number		WHC-SD-WM-TSAP-038, REV. 0					Homogenization Test - Per Laboratory Discretion Field Blank -Not Required Hot Cell Blank - Per Laboratory Discretion Lithium Bromide Solution Blank - Not Required						FORMAT I		Early Notify	
PROGRAM		PROGRAM CONTACTS											FORMAT II		Process Control	
A. Safety Screening		Safety Screening		E. J. Lipke									FORMAT III		Safety Screen	
B. Organic		TWRS		R. D. Schreiber			TANK BX-110						FORMAT IV		Waste Management	
		Organic		J. E. Meacham									#AUGERS 2		FORMAT V	
													FORMAT VI		Special	
PROGRAM	PRIMARY ANALYSES					PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT
	METHOD	ANAL.	WHC PROCEDURE	½ SEG SLDG	½ SEG SC		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴	
A, B	DSC	Energy	LA-514-113	X	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	J/g ⁵	≥ 480	unknown	I, III, IV
A, B	TGA	% H ₂ O	LA-560-112	X	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	wt%	none	unknown	III, IV
A	α counting	Total Alpha	LA-508-101	X ¹³	X ¹³	f	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	µCi/g	> 1 g/L	unknown	I, III, IV
A	Gravimetry	bulk density	LO-160-103	X	X	d	N/A	N/A	N/A	ea AB	N/A	90-110	g/mL	none	unknown	III, IV
A, B	Persulfate	TOC ¹²	LA-344-100	X	X	d ⁶	ea smpl	1/mtrx	ea AB	ea AB	±10	90-110	µg C/g	> 30,000	unknown	I, III,IV
PROGRAM	SECONDARY ANALYSES					PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT
	METHOD	ANAL.	WHC PROCEDURE	½ SEG SLDG	½ SEG SC		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴	
A	Distillation	CN ⁷	LA-695-102	X	X	d	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	µg/g	> 39,000	unknown	I, III, IV
A	α counting	^{239/40} Pu ¹¹	LA-503-156	X ¹³	X ¹³	f	ea smpl	1/mtrx ⁸	ea PB	ea AB	±10	90-110	µCi/g	> 1 g/L	unknown	I, III, IV
A	RSST ¹⁰	Energy	see ¹⁰	X	X	d	N/A	N/A	N/A	ea AB	±20	80-120	J/g ⁵	≥ 480	unknown	I, III, IV
B	Gravimetric	% H ₂ O ⁶	LA-564-101	X	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	wt%	none	unknown	IV
B	Furnace Oxidation	TOC ¹⁶	LA-344-105	X	X	d	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	µg/g	> 30,000	unknown	I, IV
A ¹¹ , B ¹⁵	ICP	Al, Cr, Fe, Mn, Na, Ni, Si, U, Bi, Ca, P	LA-505-151	X ¹³	X ¹³	f or a	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	µg/g	none	unknown	III, IV
B	HPLC/LC or GC/MS	organic speciation ¹⁴	TBD	X	X	d	ea smpl	per procedure			±20	80-120	µg/g	none	unknown	IV

Table 1: BX-110 Chemical, Radiological and Physical Analytical Requirements

¹ ½ SEG SLDG-½ segment, sludge, ½ SEG SC-½ segment, saltcake

² d-direct, f-fusion dissolution, a-acid dissolution, w-water dissolution

³ PR-precision, AC-accuracy, ea-each, smpl-sample, DUP-duplicate, SPK/MSD-spike and matrix spike duplicate, AB-analytical batch, PB-preparation blank, N/A-not applicable, mtrx-matrix

⁴ Units for notification limits and expected range are those listed in the "units" column.

⁵ Dry weight basis.

⁶ This analysis required if DSC limit is exceeded and TGA result is less than 17 wt%, but should be performed if moisture analysis by TGA is less than 25 wt%.

⁷ This analysis required if TOC by persulfate is less than 3 wt%.

⁸ Tracer or carrier may be used in place of a spike and results corrected for recovery.

⁹ Either serial dilutions or matrix spikes will be performed.

¹⁰ This analysis required on the sample with the highest DSC result that exceeds the limit. The RSST method, yet to be proceduralized, may be found in WHC-SD-WM-TP-104.

¹¹ Performed if total alpha exceeds notification limit.

¹² This is a primary analysis for the organic DQO, but is also a secondary analysis for the safety screening DQO. Therefore, if the DSC limit is exceeded, these analyses must be performed and reported within 90 days of receipt of the last sample at the laboratory dock.

¹³ Analyze the bottom half-segment of each segment extruded.

¹⁴ This analysis to be performed if the RSST limit is exceeded.

¹⁵ Performed if DSC or TOC limits are exceeded.

¹⁶ This analysis required if the energy equivalent of the TOC by hot persulfate is < 75% of the DSC value.

WHC-SD-WM-TSAP-038, REV.0

Table 1: BX-110 Chemical, Radiological and Physical Analytical Requirements

LIQUID ANALYSES																
Project Name		BX-110 Auger Sample				COMMENTS							REPORTING LEVELS			
Plan Number		WHC-SD-WM-TSAP-038, REV. 0				Homogenization Test - Per Laboratory Discretion Field Blank -Not Required Hot Cell Blank - Per Laboratory Discretion Lithium Bromide Solution Blank - Not Required							FORMAT I	Early Notify		
PROGRAM		PROGRAM CONTACTS											FORMAT II	Process Control		
A. Safety Screening		Safety Screening		E. J. Lipke		TANK#AUGERS							FORMAT III	Safety Screen		
B. Organic		TWRS		R. D. Schreiber									FORMAT IV	Waste Management		
		Organic		J. E. Meacham									FORMAT V	RCRA Compliance		
						BX-110		2					FORMAT VI	Special		
PROGRAM	PRIMARY ANALYSES				PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT	
	METHOD	ANAL.	WHC PROCEDURE	S-LEV LIQ		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴		
A,B	DSC	Energy	LA-514-113	X	d ⁶	ea smpl	N/A	N/A	ea AB	±10	90-110	J/g ⁵	≥ 480	unknown	I, III, IV	
B	TGA	% H ₂ O	LA-560-112	X	d ⁶	ea smpl	N/A	N/A	ea AB	±10	90-110	wt%	none	unknown	III, IV	
A	α counting	Total Alpha	LA-508-101	X	d ⁶	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	μCi/g	> 1 g/L	N/A	I, III, IV	
A	Specific Gravity	density	LA-510-112	X	d ⁶	ea smpl	N/A	N/A	ea AB	±20	80-120	g/mL	none	unknown	III, IV	
A,B	Persulfate	TOC ¹⁴	LA-344-100	X	d ⁶	ea smpl	1/mtrx	ea AB	ea AB	±20	80-120	μg C/mL	> 30,000 ¹¹	unknown	I, III, IV	
A,B	Visual	Organic	LA-519-151	X	d	N/A	N/A	N/A	N/A	N/A	N/A	N/A	presence	unknown	I, III, IV	
	SECONDARY ANALYSES				PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT	
PROGRAM	METHOD	ANAL.	WHC PROCEDURE	S-LEV LIQ		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴		
A	RSST ¹²	Energy	see ¹²	X	d ⁶	N/A	N/A	N/A	ea AB	±20	80-120	J/g ⁵	≥ 480	unknown	I, III, IV	
B	Furnace Oxidation	TOC ¹⁶	LA-344-100	X	d ⁶	ea smpl	1/mtrx	ea AB	ea AB	±20	80-120	μg C/g ⁵	> 30,000 ¹¹	unknown	I, III, IV	
A	α counting ⁷	^{239/40} Pu	LA-503-156	X	d ⁶	ea smpl	1/mtrx ⁸	ea PB	ea AB	±10	90-110	μCi/g	> 1 g/L	unknown	I, III, IV	
A ⁷ , B ¹⁵	ICP	Al, Cr, Fe, Mn, Na, Ni, Si, U, Bi, Ca, P	LA-505-151	X	d ⁶	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	μg/mL	none	unknown	I, III, IV	
B	Gravimetric ¹⁰	% H ₂ O	LA-564-101	X	d ⁶	ea smpl	N/A	N/A	ea AB	±20	80-120	μg/mL	none	unknown	IV	

Table 1: BX-110 Chemical, Radiological and Physical Analytical Requirements

SECONDARY ANALYSES		PREP ²	QUALITY CONTROL ³					CRITERIA			FOR-MAT				
PROGRAM	METHOD	ANAL.	WHC PROCEDURE	S-LEV LIQ	DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴		
A	HPLC/LC or GC/MS ¹³	organic speciation	TBD	X	d	ea smpl	per procedure			±20	80-120	µg/mL	none	unknown	IV

¹S-LEV LIQ-liquid taken from the segment level.

²d-direct, f-fusion dissolution, a-acid dissolution, w-water dissolution

³PR-precision, AC-accuracy, ea-each, smpl-sample, DUP-duplicate, SPK/MSD-spike and matrix spike duplicate, AB-analytical batch, PB-preparation blank, N/A-not applicable, mtrx-matrix

⁴Units for notification limits and expected range are those listed in the "units" column.

⁵Dry weight basis.

⁶Direct liquid samples may be diluted in acid or water to adjust to proper sample size and/or pH.

⁷Performed if total alpha exceeds notification limit.

⁸Tracer or carrier may be used in place of a spike and results corrected for recovery.

⁹Either serial dilutions or matrix spikes will be performed.

¹⁰This analysis required if DSC limit is exceeded and TGA result is less than 17 wt%, but should be performed if moisture analysis by TGA is less than 25 wt%.

¹¹Converted from µg/g limit assuming a liquid density of 1.0 g/mL.

¹²This analysis required on the sample with the highest DSC result that exceeds the limit. The RSST method, yet to be proceduralized, may be found in WHC-SD-WM-TP-104.

¹³This analysis to be performed if the RSST limit is exceeded.

¹⁴This is a primary analysis for the organic DQO, but is also a secondary analysis for the safety screening DQO. Therefore, if the DSC limit is exceeded, these analyses must be performed and reported within 90 days of receipt of the last sample at the laboratory dock.

¹⁵Performed if DSC or TOC limits are exceeded.

¹⁶This analysis required if the energy equivalent of the TOC by hot persulfate is < 75% of the DSC value.

4.0 QUALITY ASSURANCE CONTROL

4.1 LABORATORY OPERATIONS

Laboratories performing analysis in support of this Tank Sampling and Analysis Plan shall have approved and implemented quality assurance plans. These QA plans shall meet the *Hanford Analytical Services Quality Assurance Plan* (DOE 1995) minimum requirements as the baseline for laboratory quality systems. Quality requirements for conducting Characterization Project sampling and analysis are described in *TWRS Characterization Program Quality Assurance Program Plan* (Whelan 1994), *Fiscal Year 1996 Tank Waste Remediation System Tank Waste Analysis Plan* (Homi 1995b), and in this SAP. Characterization Project sampling and analysis shall be conducted in conformance with these quality assurance requirements.

Sample quality control (duplicates, spikes, standards) are identified in Table 1. If no criteria are provided, the performing laboratory shall perform to its quality assurance plan.

4.2 SAMPLE COLLECTION

Before sampling can be performed on a tank, available risers must be identified for use in the sampling event. The selected risers must be inspected and prepared to confirm their ability to be used in sampling. Safety hazards must be identified for which special precautions must be made. If deemed necessary by the sampling and tank cognizant engineers, video surveillance should be performed to identify any potential problems that may occur during the sampling event.

Samples are to be taken from tank BX-110 and shipped to the performing laboratory by Sampling Operations in accordance with the respective work package. That work package shall also initiate the chain-of-custody for the samples. Approved procedure TO-080-090 ("Load/Transport Sample Cask(s)") is to be used during the sampling event. Samples shall be identified by a unique number before being shipped to the performing laboratory. The sampling team is responsible for documenting any problems and procedural changes affecting the validity of the sample in a field notebook. Sampling Operations shall enter this information in the comment section of the chain-of-custody form for addition to the data reports.

Sampling Operations should transport each sample collected to the performing laboratory within 1 working day of removing the sample from the tank, but must transport each segment or sample within 3 calendar days. Sampling Operations is responsible for verbally notifying the WHC 222-S Laboratory (373-2435) at least 24 hours in advance of an expected shipment.

4.3 SAMPLE CUSTODY

The chain-of-custody form is initiated by the sampling team as described in the work package. Samples are shipped in a cask and sealed with a Waste Tank Sample Seal.

WASTE TANK SAMPLE SEAL	
Supervisor:	Sample No.:
Date of Sampling:	Time of Sampling:
Shipment No.:	Serial No.:

The sealed and labeled samples are shipped to the laboratory along with the chain-of-custody form. The receipt and control of samples in the WHC 222-S Laboratory are described in laboratory procedure LO-090-101.

5.0 EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS

5.1 EXCEPTIONS TO DQO REQUIREMENTS

In the safety screening DQO, cyanide analysis is required on a quarter-segment basis if the total organic carbon result is less than three weight percent. However, since this would require subsampling all sludge samples on a quarter-segment basis, the Ferrocyanide Safety Program has concurred that the cyanide analysis, if necessary, shall be performed on a half-segment basis.

The safety screening DQO also states that total alpha analysis is to be performed on sludge, saltcake, and drainable liquid samples. However, if the notification limit for total alpha analysis is exceeded, secondary analyses are required only on sludge samples. Discussions with the criticality point of contact revealed that if the total alpha analysis notification limit is exceeded for a saltcake or a drainable liquid sample, secondary analyses are required. Therefore, these secondary analyses have been included in Table 1.

Although the Organic DQO specifies a notification limit for TGA analysis, this limit shall not be included in this plan because it is inconsistent with the Operating Specification Document (OSD), the guiding document for tank farms notifications. In the OSD, no notification for low TGA results is required, so no actions would be taken if notification was made. Therefore, the TGA limit in the Organic DQO shall not be applied to this tank sampling and analysis project.

5.2 CLARIFICATIONS AND ASSUMPTIONS

A number of clarifications and assumptions relating to the notification limits or decision thresholds identified in the applicable DQO efforts need to be made with respect to the analyses in Table 1. Each of these issues are discussed below:

- ▶ Any exothermic reaction (in cal/g or J/g) determined by differential scanning calorimetry (DSC) must be reported on a dry weight basis as shown in equation (1) using the weight percent water determined from thermogravimetric analysis (TGA).

NOTE: A large error in the DSC value may result when converting samples containing greater than 90 percent water to a dry weight basis. However, this conversion is still required.

$$\text{Exotherm (dry wt)} = \frac{[\text{exotherm (wet wt)} \times 100]}{(100 - \% \text{ water})} \quad (1)$$

- Secondary analyses required per the organic DQO are run depending on the comparison between the value of the energy equivalent for TOC and the DSC energetics value. The energy equivalent of TOC is given in equation (2).

$$X = (\text{wt\% TOC dry weight basis}) * \frac{632 \text{ J/g}}{5} \quad (2)$$

NOTE: 632 J/g represents the energy equivalent of 5 wt% TOC (based on sodium acetate average energetics standard).

Secondary TOC analyses for the Organic Safety Program are run on half-segments based on this equation. Therefore the following rules apply:

If the energy equivalent for TOC by hot persulfate is $\leq 75\%$ of the DSC value, run TOC by furnace combustion on the half-segment.

Although not specified in the Organic DQO, TOC analysis on all drainable liquid samples has been requested by the Organic Safety Program and has therefore been included in Table 1.

6.0 DELIVERABLES

All analyses will be reported as Format I, III or IV as indicated in Table 1. Additional information regarding reporting formats is given in (Schreiber 1994a).

6.1 FORMAT I REPORTING

Table 1 contains the notification limits for each analyte. Any results exceeding their notification limits shall be reported via telephone by the 222-S Laboratory Shift Manager to East Tank Farm Operations Shift Manager as soon as the data are obtained and reviewed (Kristofzski 1995). This verbal notification must be followed within one working day by written communication to the Safety Screening Representative, Process Control, and the Characterization Project Office documenting the observations (Schreiber 1994b). Additional analyses for verification purposes may be contracted between the performing laboratory and the contacts above by a revision to this document, or by a memorandum of understanding.

6.2 FORMAT III REPORTING

A Format III report, giving the results of the primary analyses required by the safety screening DQO, shall be issued to the Safety Screening Representative, the Characterization Project, Process Control, the Tank Characterization Resource Center, and the Tank Characterization Database (Schreiber 1994b) within 45 days of receipt of the last sample at the laboratory loading dock. The DSC and TGA scans

have been requested due to the interpretive nature of the analysis. If analyses for the safety screening secondary analytes are required, these results shall be provided within 90 days of receipt of the last sample at the laboratory loading dock. No calibration data are requested for these reports. Detailed information regarding the contents of this reporting format are given in (Schreiber 1994a).

6.3 FORMAT IV REPORTING

This report shall include the results of the analyses required by the organic DQO (see Table 1 for delineation of program requests). The data package shall be provided to the Characterization Project, Organic Safety Program, the Tank Characterization Resource Center, and Tank Characterization Database representatives within 105 days of the sampling event. Detailed information regarding the contents of this reporting format are given in Schreiber (1994a).

In addition to this data package, an electronic version of the analytical results shall be provided to the Tank Characterization Database representative. The data must be available to the Washington State Department of Ecology within 216 days of the sampling event, so this electronic copy must be sent at the time of data package delivery or within 209 days of the sampling event, whichever is earlier, to allow time for data entry. The electronic version shall be in the standard electronic format specified in (Bobrowski 1994).

7.0 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. These changes shall be documented through the use of internal characterization change notices or analytical deviation reports for minor low-impact changes and documented in applicable laboratory reports. All significant changes (such as changes in scope) shall be documented by Characterization Plans, Coordination and Reports via an Engineering Change notice to this plan. All changes shall also be clearly documented in the final data report.

At the request of the Characterization Project, additional analysis of sample material from this characterization project shall be performed according to a revision of this Sampling and Analysis Plan.

8.0 REFERENCES

- Bell, K.E., 1993, *Tank Waste Remediation System Tank Waste Characterization Plan*, WHC-SD-WM-PLN-047, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Bobrowski, S.F., S.J. Harris, and J.D. Schwab, 1994, "Standard Electronic Format Specification for Tank Characterization Database Loader, Version 2.0", Pacific Northwest Laboratory, Richland, Washington (Transmitted by PNL Letter TCD-94-002, June 16, 1994, S. F. Bobrowski, PNL, to C. S. Haller, WHC).
- DOE, 1994, *Hanford Analytical Services Quality Assurance Plan*, DOE/RL-94-55, Rev.0, U.S. Department of Energy, Richland Field Office, Richland, Washington.
- Dukelow, G.T., J.W. Hunt, H. Babad, and J.E Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.
- Hanlon, B.M., 1995, *Waste Tank Summary for Month Ending July 31, 1995*, WHC-EP-0182-88, Westinghouse Hanford Company, Richland, Washington.
- Hill, J.G., W.I. Winters, and B.C. Simpson, 1991, *Waste Characterization Plan for the Hanford Site Single-Shell Tanks*, WHC-EP-0210, Rev. 3, Westinghouse Hanford Company, Richland, Washington.
- Homi, C. S., 1995a, *Tank 241-BX-110 Tank Characterization Plan*, WHC-SD-WM-TP-382, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.
- Homi, C.S., 1995b, *Fiscal Year 1996 Tank Waste Remediation System Tank Waste Analysis Plan*, WHC-SD-WM-PLN-101, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Kristofzski, J.G., 1995, Letter to G. B. Griffin, "Reestablishment of Immediate Notification System", 75310-95-102, dated September 8, 1995.
- Schreiber, R.D., 1994a, Letter to C. S. Haller, "Revised Interim Tank Characterization Plan Guidance", 7E720-94-121, dated May 13, 1994.
- Schreiber, R.D., 1994b, Letter to J. G. Kristofzski, "Point of Contact/Distribution List", 7E720-94-141, dated October 11, 1994.
- Turner, D. A., 1995, *Data Quality Objective to Support Resolution of the Organic Fuel Rich Tank Safety Issue*, WHC-SD-WM-DQO-006, Rev. 2, Westinghouse Hanford Company, Richland, Washington.
- Whelan, T.E., 1994, *TWRS Characterization Program Quality Assurance Program Plan*, WHC-SD-WM-QAPP-025, Rev. 0, Westinghouse Hanford Company, Richland, Washington.