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ENGINEERING DATA TRANSMITTAL

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Tank 241-TX-113 Rotary Mode Core Sampling and Analysis Plan

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U.S. Department of Energy Contract DE-AC06-96RL13200

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Revision 0

Tank 241-TX-113 Rotary Mode Core Sampling and Analysis Plan

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Lockheed Martin Hanford Corporation

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

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LIST OF ABBREVIATIONS

Ci	curie
CPO	Characterization Project Operations
DQO	data quality objective
DSC	differential scanning calorimetry
GEA	gamma energy analysis
g	gram
g/L	gram per liter
IC	ion chromatography
ICP/AES	inductively coupled plasma - atomic emission spectroscopy
kgal	kilogallon
kL	kiloliter
L	liter
LFL	lower flammability limit
LiBr	lithium bromide
LMHC	Lockheed Martin Hanford Corporation
mL	milliliter
MSL	mean sea level
PIC	person in charge
PNNL	Pacific Northwest National Laboratory
PRSST	Propagating Reactive System Screening Tool
QA	quality assurance
QC	quality control
RSST	Reactive System Screening Tool
SAP	sampling and analysis plan
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TOC	total organic carbon
TWRS	Tank Waste Remediation System
TX-113	241-TX-113
WMH	Waste Management Hanford
μCi	microcurie
μCi/g	microcurie per gram
μg C/g	micrograms of carbon per gram
μg/g	micrograms per gram
μg/mL	micrograms per milliliter

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 push mode core samples from tank 241-TX-113 (TX-113). It is written in accordance with *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995), *Data Quality Objective to Support Resolution of the Flammable Gas Safety Issue* (Bauer 1998) and the *Historical Model Evaluation Data Requirements* (Simpson and McCain 1997). The *Tank Characterization Technical Sampling Basis* document (Brown et al. 1998) also identifies Retrieval, Pretreatment and Immobilization as an issue that applies to tank TX-113. As a result, a 150 gram composite of solids shall be made and archived for that program.

2.0 SAMPLING EVENT REQUIREMENTS

As of April 30, 1998, tank TX-113 contained a total waste volume of approximately 2,300 kL (607 kgal), consisting entirely of saltcake with 60.6 kL (16 kgal) of drainable liquid (Hanlon 1998). This waste volume is equivalent to 5.80 meters (228 inches) of waste as measured from the centerline of the tank. A physical profile prediction based on waste fill history and previous sampling information is provided in Appendix A. Historical data suggests Al-clad sludge is part of the tank waste (Place 1997).

Prior to core sampling, the dome space (below the riser) shall be measured for the presence of flammable gases. The measurement shall be taken from within the dome space and the data reported as a percentage of the lower flammability limit (LFL). The results shall be transmitted to the tank coordinator within ten working days of the sampling event (Schreiber 1998). If the dome space results are above 10 percent of the LFL when analyzing with a combustible gas meter or above 25 percent of the LFL when analyzing by gas chromatography/mass spectrometry or gas-specific monitoring, the necessity for recurring sampling for the flammable gas concentration and the frequency of such sampling will be determined by the Flammable Gas Safety Project.

During core sampling, the drill string will be monitored for flammable gas. If the monitoring instrument in the drill string indicates a level greater than 10% of the LFL during intrusive activities, then a vapor grab sample shall be taken and sent to Pacific Northwest National Laboratory (PNNL) for analysis (Bauer 1998). Any additional vapor sampling is not within the scope of this SAP.

Tank TX-113 will be rotary mode core sampled using a rotary mode core sampling system. Two core samples, each consisting of 13 segments, are expected to be taken from risers 3 and 5. The sampling objective is to obtain two vertical profiles of the waste; therefore, more or fewer segments may need to be taken depending on the accuracy of the current waste volume records in comparison to presampling zip cord readings.

Universal samplers will be used for these samples. If quality-affecting changes to the sampling requirements must be made (including the risers, sampling truck, or segments to be sampled), the change must be recorded and approved by the cognizant engineer and tank coordinator before sampling. This information may be recorded on a permanent data sheet or recorded directly in sampling work packages WS-98-00072 (riser 3) and WS-98-00073 (riser 5). These work packages contain the operating procedures and the chain-of-custody records for this sampling event.

One field blank for tank TX-113 shall be obtained in accordance with procedure TO-060-003. The Characterization Project Operations (CPO) person in charge (PIC) or the PIC designate will verify that the field blank is properly created and shipped. For sampling events having multiple PICs, CPO shall determine which PIC will be responsible for the field blank. This field blank is to accompany the samples to the laboratory. All collected samples shall be shipped to the laboratory following the Load/Transport Sample Cask(s) procedure (TO-080-090). Core samples should be transported to the laboratory within three calendar days from the time each segment is removed from the tank.

If lithium bromide (LiBr) solution is used in the collection of the core samples, it should be a 0.3 $\pm$0.01 molar solution with a pH greater than 8. Characterization Project Operations must state the batch number and amount of fluid added at each segment. This information should be indicated on the chain-of-custody form that accompanies the sample to the laboratory. A sample of the LiBr solution must be provided to the laboratory. This sample shall consist of a container filled with LiBr solution from the same batch of LiBr solution used during the sampling. This solution shall be analyzed for lithium and bromide in order to determine the concentration of the tracer at the time the sample was taken. If analysis of the waste samples indicates contamination by the LiBr solution, these data will be used to determine the amount of contamination. If more than one batch of LiBr solution is used during sampling event, one solution sample must be provided for each batch in addition to the field blank.

3.0 LABORATORY ANALYSIS REQUIREMENTS

3.1 ANALYSIS SCHEME

In order to comply with Dukelow et al. (1995), Bauer (1998), and Simpson and McCain (1997), the following steps shall be performed on each sample:

- Extrude segments, videotaping the extrusion and photographing the extruded segments. The extrusion procedure is LO-160-103 at the 222-S Laboratory.
- Filter or centrifuge drainable liquids as needed prior to analysis.
- Separate solids into half-segments and homogenize.
- Form stratum composite samples and core composite samples from each core per tank coordinator direction.
- Analyze drainable liquids, homogenized half-segment subsamples, stratum composite, and core composite samples from each core as shown in Tables 1 and 2.
- Form a 150 gram solid composite sample from one (or both) cores and archive this material for the Retrieval, Pretreatment, and Immobilization Program.
- Archive all remaining material.

If liner liquid is observed during extrusion and the liquid is in sufficient quantity to collect, the liner liquid may be retained and analyzed at the discretion of the tank coordinator. In this event, this addition of analyses may not require a revision to this SAP.

For core samples from tank TX-113, the shipping container must be vented every 27 days to release any accumulated gas.

Opportunistic analyses as defined in Kristofzski (1996) are to be included when the laboratory is not operating at maximum capacity. 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 be reported in the data report. The reporting formats for analyses are contained in Tables 1 and 2 and are described in Section 7.0.

3.2 SPECIFIC METHODS AND ANALYSES

The analyses in Tables 1 and 2 to be performed on tank TX-113 core samples are based on the safety screening data quality objective (DQO), the flammable gas DQO, and the historical model DQO referenced in Section 1.0. The laboratory procedure numbers which shall be used for the analyses are included in the tables. Sample preparation procedures that may be used at the 222-S Laboratory are LA-549-141 for fusion digestion, LA-505-159 or LA-505-163 for acid digestion of samples, and LA-504-101 for water leach of solids.

The historical model DQO requires phased analysis periods, and selection of optimal segments for full suite analysis. The laboratory is to notify the tank coordinator once primary analyses are complete for each segment.

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 SAP and permit a minimum 10 mL archive per sample, the laboratory shall notify the tank coordinator within one working day. At that time, a prioritization of the analyses may be provided to the laboratory. Any analyses prescribed by the SAP, but not performed, shall be identified in the appropriate data report with justification provided for nonperformance.

Table 1: Tank TX-113 Chemical, Radiological, and Physical Analytical Requirements: Solids (2 Sheets)

SOLID ANALYSES						
Project Name	TX-113 Rotary Mode Core Sample		COMMENTS		REPORTING LEVELS	
Plan Number	HNF-3039, Rev. 0		Homogenization Test - Per Laboratory Discretion		FORMAT I	Immediate Notification
PROGRAM	PROGRAM CONTACTS		Field Blank - Required		FORMAT II	Process Control
A. Safety Screening	TWRS Safety	R. J. Cash	Hot Cell Blank - Per Laboratory Discretion		FORMAT III	Safety Screening
B. Historical Data	TWRS Proc. Eng.	B. C. Simpson	LiBr Solution Blank - Required if LiBr solution is used		FORMAT IV	Waste Management
C. Process Control	TWRS Proc. Eng.	D. J. McCain	TANK	#CORES	FORMAT V	RCRA Compliance
D. Flammable Gas	TWRS Safety	R. E. Bauer	TX-113	2	FORMAT VI	Special

	PRIMARY ANALYSES			SAMPLE[1]				QUALITY CONTROL[3]				CRITERIA			
PROGRAM	METHOD	ANALYSIS	PROCEDURE	½ SEG SLDG/ SC	STRAT /COMP	COMP	PREP[2]	DUP	SPIKE	BLK	STD	UNITS	NOTIFICATION LIMIT[4]	EXPECTED RANGE[4]	FORMAT
A, B	DSC	Energy	LA-514-113 LA-514-114	x		x	d	ea smpl	N/A	N/A	ea AB	J/g	≥ 480 [5,6]	unknown	I, III, IV
A, B, D	TGA	% H_2O	LA-514-114	x	x	x	d	ea smpl	N/A	N/A	ea AB	wt%	none	63.2	III, IV
A, B, D	Gravimetry	Bulk density	LO-160-103	x[15]	x	x	d	N/A	N/A	N/A	N/A	g/mL	none	1.41	III, IV
A, B	Alpha counting	Total Alpha	LA-508-101	x[15]		x	f or a	ea smpl	1/mtrx	ea PB	ea AB	μCi/g	> 41[6]	unknown	I, III, IV
B, D	Beta counting	^{90}Sr	LA-220-101	x[7]	x	x	f or a	ea smpl	1/mtrx[8]	ea PB	ea AB	μCi/g	none	81	IV
B, D	GEA	^{137}Cs[9]	LA-548-121	x	x	x	f	ea smpl	N/A	ea PB	ea AB	μCi/g	none	189	IV
D	Acidification/ Persulfate oxidation	TIC	LA-342-100		x		d	ea smpl	1/mtrx	ea AB	ea AB	μg C/g	TOC > 45,000[5,6]	unknown	I, IV
A, C	ICP/AES	Li, Al, Cr, Fe, Mn, Na, Ni, Si, U, [11]	LA-505-151 LA-505-161	x			f or a	ea smpl	1/mtrx[20]	ea AB	ea AB	μg/g	none	varied	III, IV
B	ICP/AES	Na, Al, Cr[16]	LA-505-151 LA-505-161			x	f or a	ea smpl	1/mtrx[20]	ea AB	ea AB	μg/g	none	varied	IV
D	ICP/AES	Ca, Fe, K, Ni, Al, Ba, Si, B, Bi, Na, Zr, Zn[17]	LA-505-151 LA-505-161		x		f or a	ea smpl	1/mtrx[20]	ea AB	ea AB	μg/g	none	varied	IV
B	ICP/AES	Na, Al, Cr[16]	LA-505-151 LA-505-161	x[7]		x	w	ea smpl	1/mtrx[20]	ea AB	ea AB	μg/g	none	varied	IV
C	IC	Br[10]	LA-533-105	x			w	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	varied	IV
B	IC	NO_3, SO_4[18]	LA-533-105			x	w	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	varied	IV
D	IC	formate, oxalate, NO_2, PO_4, Cl, F[19]	LA-533-105		x		w	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	varied	IV
B, D	Persulfate	TOC	LA-342-100	x[7]	x	x	d	ea smpl	1/mtrx	ea AB	ea AB	μg C/g	> 45,000[5,6]	15,900	I, IV
B	Beta counting	Total Beta	LA-508-101	x[7]		x	f or a	ea smpl	1/mtrx	ea AB	ea AB	μCi/g	none	unknown	IV
B	Kinetic phosphorescence	Uranium	LA-925-009	x[7]		x	f or a	ea smpl	1/mtrx	ea AB	ea AB	μg/g	none	1,180	IV
D	Titration	OH	LA-211-102		x		w	ea smpl	1/mtrx	ea AB	ea AB	μg/g	none	125,000	IV
D	Spectrophotometry	Cr (VI)	LA-265-101		x		w	ea smpl	1/mtrx	ea AB	ea AB	μg/g	none	2,570	IV
D	Gravimetry	Settling behavior	see[12]	x			d	ea smpl	N/A	N/A	N/A	cm/hr	none	unknown	IV
D	Centrifuge	Vol% solids	LA-519-132	x			d	N/A	N/A	N/A	N/A	vol%	none	unknown	IV

Table 1: Tank TX-113 Chemical, Radiological, and Physical Analytical Requirements: Solids (2 Sheets)

PROGRAM	SECONDARY ANALYSES			SAMPLE[1]				QUALITY CONTROL[3]				CRITERIA			FORMAT
	METHOD	ANALYSIS	PROCEDURE	½ SEG SLDG/SC	STRAT/COMP	COMP	PREP[2]	DUP	SPIKE	BLK	STD	UNITS	NOTIFICATION LIMIT[4]	EXPECTED RANGE[4]	
A	Alpha counting	$^{239/240}Pu$[13]	LA-953-104	x			f	ea smpl	1/mtrx[8]	ea PB	ea AB	µCi/g	none	0.064	III, IV
A	PRSST	propagating behavior[14]	LT-510-103	x			d	N/A	N/A	N/A	see[21]	J/g	none	unknown	IV
A	Furnace Oxidation	TOC[14]	LA-344-105	x[7]			w	ea smpl	1/mtrx	ea AB	ea AB	µg C/g	> 45,000[5,6]	15,900	I, III, IV

[1] ½ SEG SLDG/SC = ½ segment, sludge or saltcake; STRAT/COMP = stratum subsample or composite COMP=Composite for Historical DQO

[2] d = direct, f = fusion, a = acid, w = water

[3] DUP = duplicate, BLK = blank, STD = calibration standard, ea = each, smpl = sample, AB = analytical batch, PB = preparation blank, mtrx = matrix, N/A = not applicable

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

[5] Dry weight basis

[6] These analytes are to be compared to the limit by calculating the one-sided, upper 95% confidence limit for the sample result (to be performed by Process Engineering).

[7] These analyses will be performed on one half-segment per core, as directed by the tank coordinator.

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

[9] Results should be reported for all GEA analytes, however the QC requirements of Table 3 apply to ^{137}Cs.

[10] Br is required to correct %H_2O measurement (to be performed by Process Engineering).
Results should be reported for all IC analytes. However, the QC requirements of Table 3 only apply to those identified in this table.

[11] Li is required to correct %H_2O measurement (to be performed by Process Engineering). Al, Cr, Fe, Mn, Na, Ni, Si, and U are required as secondary safety screening analytes, to be performed if total alpha activity exceeds notification limit.
Results should be reported for all ICP/AES analytes; however, the QC requirements of Table 3 apply only to those identified here.

[12] No procedure is available for the settling rate test. Work will be performed to an approved test plan, which will be referenced in the data package.

[13] Analysis to be performed if total alpha activity limit is exceeded.

[14] TOC/PRSST is required only on the subsegment with the highest result (other than historical DQO optimum segment) if the sample's DSC result exceeds 480 J/g.

[15] These analyses required as a primary analysis only on the lower half-segment of each segment. If the half-segment selected for additional historical DQO analyses is an upper half-segment, they should be done on this sample as well.

[16] Na, Al, Cr are fingerprint analytes for historical. Results should be reported for all ICP/AES analytes; however, the QC requirements of Table 3 apply only to those identified here.

[17] Ca, Fe, K, Ni, Zn, Al, Ba, Si, B, Bi, Na, Zn, and Zr are from the flammable gas DQO, and are required only on the stratum samples. Results should be reported for all ICP/AES analytes; however, the QC requirements of Table 3 apply only to those identified here.

[18] Nitrate and Sulfate are fingerprint analytes for historical DQO. Results should be reported for all IC analytes. However, the QC requirements of Table 3 only apply to those identified in this table.

[19] Formate, oxalate, nitrite, phosphate, chloride, and fluoride are required only on the flammable gas stratum samples. Results should be reported for all IC analytes. However, the QC requirements of Table 3 only apply to those identified in this table.

[20] Either serial dilutions or matrix spikes wil be performed.

[21] Calibration of heater resistance, time, temperature, pressure, containment volume, and sample weight will be performed to measure accuracy as described in procedure LT-510-103.

Table 2: Tank TX-113 Chemical, Radiological, and Physical Analytical Requirements: Liquids (2 Sheets)

LIQUID ANALYSES

Project Name	TX-113 Rotary Mode Core Sample		
Plan Number	HNF-3039, Rev. 0		
PROGRAM	PROGRAM CONTACTS		
A. Safety Screening	TWRS Safety	R. J. Cash	
B. Process Control	TWRS Proc. Eng.	D. J. McCain	
C. Flammable Gas	TWRS Safety	R. E. Bauer	

COMMENTS	
Homogenization Test - Per Laboratory Discretion	
Field Blank - Required	
Hot Cell Blank - Per Laboratory Discretion	
LiBr Solution Blank - Required if HHF is used	
TANK	#CORES
TX-113	2

REPORTING LEVELS	
FORMAT I	Immediate Notification
FORMAT II	Process Control
FORMAT III	Safety Screening
FORMAT IV	Waste Management
FORMAT V	RCRA Compliance
FORMAT VI	Special

	PRIMARY ANALYSES			SAMP[1]			QUALITY CONTROL[3]				CRITERIA			
PROGRAM	METHOD	ANALYSIS	PROCEDURE	FB & SEG LIQ	STRAT	PREP[2]	DUP	SPIKE	BLK	STD	UNITS	NOTIFICATION LIMIT[4]	EXPECTED RANGE[4]	FORMAT
A	DSC	Energy	LA-514-113 LA-514-114	x		d	ea smpl	N/A	N/A	ea AB	J/g	≥ 480[5, 6]	unknown	I, III, IV
A,C	TGA	% H_2O	LA-514-114	x	x	d	ea smpl	N/A	N/A	ea AB	wt%	none	45.9	III, IV
A	Alpha counting	Total Alpha	LA-508-101	x		d	ea smpl	1/mtrx	ea PB	ea AB	μCi/mL	> 61.5[6]	unknown	I, III, IV
A, C	Gravimetry	Specific Gravity	LA-510-112	x	x	d	ea smpl	N/A	N/A	ea AB	none	none	1.43	IV
A, B, C	ICP/AES	Li, Al, Cr, Fe, Mn, Na, Ni, Si, U, Ca, K, Zn, Zr, Ba, B, Bi[7]	LA-505-151 LA-505-161	x	x	d[8]	ea smpl	1/mtrx[9]	ea PB	ea AB	μg/mL	none	varied	III, IV
C	Ion selective electrode	Ammonia[17]	LA-631-001	x		d[8]	ea smpl	1/tank	ea AB	ea AB	μg/mL[12]	none	968	IV
B, C	IC	Br, formate, oxalate, NO_3, NO_2, PO_4, SO_4, Cl, and F[11]	LA-533-105	x	x	d[8]	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	varied	IV
C	Acidification/ Persulfate	TIC/TOC	LA-342-100		x	d	ea smpl	1/mtrx	ea AB	ea AB	μg C/mL	TOC > 45,000[5, 6, 16]	unknown	I, IV
A	Visual	Organic	LA-519-151	x		d	N/A	N/A	N/A	N/A	N/A	presence	none	I, III, IV
C	Titration	OH	LA-211-102		x	d	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	73,500	IV
C	Spectrophotometry	Cr (VI)	LA-265-101		x	d	ea smpl	1/mtrx	ea AB	ea AB	μg/mL	none	3,050	IV
C	GEA	^{137}Cs[19]	LA-548-121		x	d	ea smpl	1/mtrx[14]	ea AB	ea AB	μCi/mL	none	152	IV
C	beta counting	^{90}Sr	LA-220-101		x	d	ea smpl	1/mtrx[14]	ea AB	ea AB	μCi/mL	none	53.8	IV
C	gravimetric	Settling behavior	see[15]	x		d	ea smpl	N/A	N/A	N/A	cm/hr	none	unknown	IV
C	centrifuge	solids fraction	LA-519-132	x		d	N/A	N/A	N/A	N/A	vol%	none	unknown	IV

	SECONDARY ANALYSES			SAMP[1]			QUALITY CONTROL[3]				CRITERIA			
PROGRAM	METHOD	ANALYSIS	PROCEDURE	SEG LIQ		PREP[2]	DUP	SPIKE	BLK	STD	UNITS	NOTIFICATION LIMIT[4]	EXPECTED RANGE[4]	FORMAT
A	Alpha counting	$^{239/240}Pu$[13]	LA-953-104	x		d	ea smpl	1/mtrx[14]	ea AB	ea AB	μCi/mL	none	0.02	III, IV
A	PRSST	propagating behavior[18]	LT-510-103	x		d	N/A	N/A	N/A	see[22]	J/g	none	unknown	IV
A	Furnace Oxidation	TOC[10]	LA-344-105	x		d	ea smpl	1/mtrx	ea AB	ea AB	μg C/mL	> 45,000[5, 6, 16]	unknown	I, III, IV

Table 2: Tank TX-113 Chemical, Radiological, and Physical Analytical Requirements: Liquids (2 Sheets)

[1]FB = field blank, SEG LIQ = segment-level drainable liquid, STRAT = stratum or composite liquid
[2]d = direct
[3]DUP = duplicate, BLK = blank, STD = calibration standard, ea = each, smpl = sample, AB = analytical batch, PB = preparation blank, mtrx = matrix, N/A = not applicable
[4]Units for notification limits and expected range are those listed in the "units" column.
[5] Dry weight basis
[6]These analytes are to be compared to the limit by calculating the one-sided, upper 95% confidence limit for the sample result (to be performed by Process Engineering).
[7]Li is required to correct %H_2O measurement (to be performed by Process Engineering). Al, Cr, Fe, Mn, Na, Ni, Si, and U are required as secondary safety screening analytes; required if total alpha exceeds notification limits. The remainder are for the flammable gas DQO. Results should be reported for all ICP/AES analytes, however, the QC requirements of Table 3 apply only to those identified here.
[8]Direct liquid samples may be diluted in acid or water to adjust to proper sample size and/or pH.
[9]Either serial dilutions or matrix spikes will be performed.
[10]TOC by the furnace oxidation method is performed on a sample if the sample's DSC result exceeds 480 J/g.
[11]Br is required to correct %H_2O measurement (to be performed by Process Engineering). The remainder are required for the flammable gas DQO. Results should be reported for all IC analytes, however, the QC requirements of Table 3 apply only to those listed.
[12]Micrograms ammonia per milliliter of as-received sample.
[13] Performed if total alpha exceeds notification limit.
[14]Tracer or carrier may be used in place of a spike and results corrected for recovery.
[15]No procedure is available for the settling rate test. Work will be performed to an approved test plan, which will be referenced in the data package.
[16]Corrected from weight basis to volumetric basis assuming a liquid density of 1.0 g/mL.
[17]Ammonia analysis should be performed as rapidly as possible following subsampling to minimize volatilization.
[18]Calibration of heater resistance, time, temperature, pressure, containment volume, and sample weight will be performed to measure accuracy as described in procedure LT-510-103.
[19]Results should be reported for all GEA analytes, however, the QC requirements of Table 3 apply only to ^{137}Cs.
[20]No procedure is available for the settling rate test. Work will be performed to an approved test plan, which will be referenced in the data package.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Processes, services, activities, and conditions adverse to quality which do not conform to requirements specified in this SAP 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 the *Nonconformance Item Reporting and Control* (PHMC 1997).

4.1 LABORATORY OPERATIONS

Laboratories performing analyses in support of this SAP shall have approved and implemented Quality Assurance (QA) Plans. These QA plans shall meet the *Hanford Analytical Services Quality Assurance Requirements Document* (DOE 1997) minimum requirements as the baseline for laboratory quality systems. The *222-S Laboratory Quality Assurance Plan* (Markel 1997) specifies the requirements for assuring the quality of sample analysis conducted at the 222-S Laboratory. Quality requirements for conducting Characterization Project sampling and analysis are described in *Tank Waste Remediation System Characterization Project, Quality Policies* (Board 1997) and this SAP. Characterization Project sampling and analysis shall be conducted in conformance with these requirements.

Analytical quality control (QC) requirements (duplicates, spikes, blanks, laboratory control samples) are identified in Tables 1 through 3. 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

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 and special precautions must be taken if needed. If deemed necessary by the sampling cognizant engineers and tank coordinator, video surveillance should be performed to identify any potential problems that may occur during the sampling event.

Samples are to be taken from a tank and shipped to the performing laboratory by CPO in accordance with the respective work package(s). The chain-of-custody form for this work package shall identify samples by a unique number and state the type of sampler used (retained gas sampler or universal sampler) for each sample before being shipped to the 222-S Laboratory. Approved procedure TO-080-090 [Load/Transport Sample Cask(s)] is to be used during the sampling event. Pertinent sampling information (e.g. unusual waste characteristics, x-ray scan results, LiBr solution used, or detecting debris) should be noted in the comment section of the chain-of-custody form.

Characterization Project Operations should transport each sample collected to the performing laboratory within 3 calendar days of removing the sample from the tank. A verbal notification by CPO is to be made to the 222-S Laboratory at 373-2435 at least 24 hours in advance of an expected shipment.

Table 3: QC Precision and Accuracy Requirements for the Analyses

Analysis/Method	Duplicate Criteria (RPD)[1]	Spike Criteria (% recovery)[2]	Preparation Blank Criteria[3]	LCS Criteria (% recovery)[4]
Solids				
DSC	≤ 30	N/A	N/A	80 - 120
TGA	≤ 30	N/A	N/A	80 - 120
Bulk density	N/A	N/A	N/A	N/A
Total Uranium	≤ 20	75 - 125	< EQL	80 - 120
Total alpha	≤ 20	75 - 125	< MDA	70 -130
Total beta	≤ 20	75 - 125	< MDA	80 - 120
ICP/AES	≤ 20	75 - 125	< EQL	80 - 120
PRSST[6]	N/A	N/A	N/A	N/A
IC	≤ 20	75 - 125	< EQL	80 - 120
TOC/TIC	≤ 20	75 - 125	< EQL	80 - 120
^{90}Sr	≤ 20	75 - 125[5]	< MDA	80 - 120
GEA	≤ 20	N/A	< MDA	80 - 120
$^{239/240}$Pu	≤ 20	75 - 125[5]	< MDA	70 - 130
Cr (VI)	≤ 20	75 - 125	< EQL	80 - 120
OH	≤10	75 - 125	< EQL	90 - 110
Settling Rate	≤10	N/A	N/A	N/A
Solids Fraction	N/A	N/A	N/A	N/A

Analysis/Method	Duplicate Criteria (RPD)[1]	Spike Criteria (% recovery)[2]	Preparation Blank Criteria[3]	LCS Criteria (% recovery)[4]
Liquids				
DSC	≤ 20	N/A	N/A	80 - 120
TGA	≤ 20	N/A	N/A	80 - 120
Specific gravity	≤ 20	N/A	N/A	N/A
Total alpha	≤ 20	75 - 125	< MDA	70 -130
ICP/AES	≤ 20	75 - 125	< EQL	80 - 120
PRSST[6]	N/A	N/A	N/A	N/A
IC	≤ 20	75 - 125	< EQL	80 - 120
Ammonia	≤10	75 - 125	< EQL	90 - 110
TIC/TOC	≤ 20	75 - 125	< EQL	80 - 120
OH	≤10	75 - 125	< EQL	90 - 110
Cr (VI)	≤20	75 - 125	< EQL	80 - 120
GEA	≤20	N/A	<MDA	80 - 120
$^{239/240}Pu$	≤ 20	75 - 125[5]	< MDA	70 - 130
^{90}Sr	≤20	75 - 125[5]	<MDA	80 - 120
Settling Rate	≤10	N/A	N/A	N/A
Solids Fraction	N/A	N/A	N/A	N/A

Notes:

N/A = not applicable
MDA = minimum detectable activity
EQL = estimated quantitation limit
LCS = laboratory control standard

[1]For the calculation of the relative percent difference (RPD), both the sample and duplicate results must exceed the EQL or MDA. Failures are permissible if the requirements in the QA section are followed.
[2]The criteria are recommended. Failures are permissible if the requirements in the QA section are followed.
[3]When a blank exceeds the EQL or MDA, sample results that exceed the contribution from the blank twenty-fold or more are reportable. See also the QA section of this SAP.
[4]For some analyses, this could be a method spike or a blank spike. Ranges are percent recovery of theoretical.
[5]A tracer or carrier may be substituted for the spike.
[6]See Section 5.1.

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 (see below).

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

Each sample number shall be created using the sample's core and segment number. For instance, segment 1 of core 197 would be sample number 197-01. 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 222-S Laboratory are described in laboratory procedure LO-090-101.

5.0 EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS

5.1 EXCEPTIONS TO DQO REQUIREMENTS

The safety screening DQO (Dukelow et al. 1995) states that cyanide analysis is required when the energetics notification limit is exceeded and the total organic carbon (TOC) is less than its notification limit. Because the ferrocyanide safety issue has been closed, cyanide analysis is no longer required as a secondary analyte under the safety screening DQO (Cash 1997).

Analysis by the Reactive System Screening Tool (RSST) method is currently required as a secondary analysis by the safety screening DQO. However, the Propagating Reactive System Screening Tool (PRSST) analysis is now preferred over the RSST testing. As such, the RSST requirement in Tables 1 and 2 has been removed replaced by a PRSST requirement.

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 Tables 1 and 2. Each of these issues is discussed below:

- Any exothermic reaction 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).

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

NOTE: A large error in the DSC dry weight basis value may result when the wt% water value is greater than 90 percent water, dry weight basis, however, this conversion is still required.

- The safety screening DQO (Dukelow et al. 1995) requires that additional analyses be performed if total alpha activity is greater than 1 g/L. For solids, total alpha activity is measured in μCi/g rather than g/L. To convert the notification limit for total alpha activity into a number more readily usable by the laboratory, it was assumed that all alpha decay originates from Pu-239. The notification limit may then be calculated as shown in equation (2):

$$\left[\frac{1\,g}{L}\right]\left[\frac{1\,L}{10^{3}\,mL}\right]\left[\frac{1}{density}\,\frac{mL}{g}\right]\left[\frac{0.0615\,Ci}{1\,g}\right]\left[\frac{10^{6}\,\mu Ci}{1\,Ci}\right]=\frac{61.5}{density}\,\frac{\mu Ci}{g} \tag{2}$$

NOTE: Solid samples measured for total alpha activity shall also be measured for density. The notification limit for solid subsamples shall be 41 μCi/g until the density is measured. At such time, the notification limit will be adjusted according to equation 2 and the total alpha activity results will be reevaluated against the new limit.

- The safety screening DQO (Dukelow et al. 1995) states that the analytical results should be compared to their notification limits at a 95% confidence level (one-tailed test). The equation for determining the upper confidence value is shown in equation 3.

$$\hat{\mu} + t_{(n-1)} * \frac{\sqrt{\sigma^2}}{\sqrt{n}} \tag{3}$$

Where $\hat{\mu}$ is the sample mean, σ^2 is the sample variance, n is the number of observations (for a sample run in duplicate, n equals 2), and $t_{(n-1)}$ is the quantile from Student's t distribution with (n-1) degrees of freedom (for a one-sided 95% confidence interval and when n is 2, t is 6.314). This equation is appropriate for confidence limit estimates of the mean when the sample size is small. This equation, as well as a table of values for the Student t statistic, should be found in any introductory statistics textbook (e.g., Lapin 1983).

The laboratory is requested to report all analytical results recovered from the inductively coupled plasma - atomic emission spectroscopy (ICP/AES), gamma energy analysis (GEA), and ion chromatography (IC) analyses, even though only specific analytes are requested. These opportunistic analyses (Kristofzski 1996) should be reported only if no additional preparatory work is required (e.g., running additional standards) and if the error associated with the results is documented. No reruns or additional analyses should be performed to improve recovery for analytes not specifically requested in Tables 1 or 2.

No specific requirements for analytical accuracy and precision are presented with respect to the PRSST method. It is understood that the final results of this measurement are strongly subject to interpretation and that accuracy is dependent upon absolute calibration. To that end, accuracy must be maintained through the calibration of heater resistance, time, temperature, pressure, containment volume, and sample weight as described in procedure LT-510-103.

6.0 ORGANIZATION

The organization and responsibility of key personnel involved with this tank TX-113 characterization project are listed in Table 4.

Table 4: Tank TX-113 Project Key Personnel List

Responsibility	Organization	Individual
TX-113 Tank Coordinator	TWRS Process Engineering (LMHC)	D. J. McCain, 373-1023
222-S Laboratory Point of Contact (day shift)	Analytical Services (WMH)	D. B. Hardy, 376-4878
222-S Laboratory Point of Contact (off-hours)	Analytical Services (WMH)	222-S Laboratory Shift Manager, 373-2435
Single-Shell Tank Farm Point of Contact	Tank Farm Operations	Single-Shell Tank Farm Operations Shift Manager, 373-3475

7.0 DELIVERABLES

All analyses will be reported as Format I, III, or IV as indicated in Tables 1 and 2. Additional information regarding reporting formats is given in Schreiber (1998).

7.1 FORMAT I REPORTING

Tables 1 and 2 contain the notification limits for each analyte. Any results exceeding their notification limits shall be reported via telephone by the 222-S Laboratory Faculty Planning Team to the Single-Shell Tank Farm 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 tank farm operations shift manager, the Tank Waste Remediation System (TWRS) Process Engineering Data Assessment and Interpretation manager, and the tank coordinator responsible for the tank. Additional analyses for verification purposes may be contracted between the performing laboratory and the tank coordinator by either a revision to this SAP or by a letter.

7.2 FORMAT III REPORTING

Analyses identified as primary safety screening analyses in Tables 1 and 2 must be completed within 45 calendar days of the receipt of the last sample at the laboratory sample receiving/loading dock. If no safety screening criteria were exceeded, the laboratory shall electronically notify the tank coordinator and shall follow the notification with a letter to the TWRS Process Engineering Data Assessment and Interpretation manager and the tank coordinator confirming work completion. If any analysis results exceeded the safety screening criteria, a letter identifying the results which exceeded the criteria will be issued.

Any secondary safety screening analyses must be completed within 90 calendar days of the receipt of the last sample at the laboratory sample receiving/loading dock. When the secondary analyses are complete, the laboratory shall issue a letter to the TWRS Process Engineering Data Assessment and Interpretation manager and tank coordinator confirming work completion. If any secondary analysis notification limits were exceeded, the results which exceeded the limits shall be identified.

7.3 FORMAT IV REPORTING

The format IV report shall be a data package reporting the results of analyses performed and will resemble a regulatory data package without third party validation. The data package should be prepared by tank and include the data for all samples, including (as applicable) composites, segments, subsegments, drainable liquids, and associated blanks taken and analyzed for this sampling event. The recommended reporting format and the raw data that shall be included are given in detail in Section A5.0 of Schreiber (1997b). The data package shall be issued 180 days after the last sample is received at the laboratory. The raw data shall be accessible to the program in accordance with the laboratory's Records Inventory and Disposition Schedule and until the respective waste tank is closed or the waste is treated.

In addition to this data package, an electronic version of the analytical results shall be provided to the Tank Characterization Database representative on the same day that the final data package is issued. The data must be available to the Washington State Department of Ecology within 7 days of release of the data package. The electronic version shall be in the standard electronic format (Bobrowski et al. 1994).

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 (such as DQO additions or analysis of new, additional samples) 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 the tank or project coordinator by placing a notation in the permanent record (i.e. note change in extrusion log book or memo to file). Significance is determined by the tank coordinator.

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

Bauer, R. E., 1998, *Data Quality Objective to Support Resolution of the Flammable Gas Safety Issue,* HNF-SD-WM-DQO-004, Rev. 3-A, Lockheed Martin Hanford Corporation, Richland, Washington.

Board, D. C., 1997, *Tank Waste Remediation System, Characterization Project, Quality Policies*, HNF-SD-WM-QAPP-025, Rev. 3, Lockheed Martin Hanford Corporation, 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*, (memorandum TCD-94-002 to C. S. Haller, dated June 16), Pacific Northwest Laboratory, Richland, Washington.

Brown, T. M., J. W. Hunt, and L. J. Fergestrom, 1998, *Tank Characterization Technical Sampling Basis*, HNF-SD-WM-TA-164, Rev. 4, Lockheed Martin Hanford Corporation, Richland, Washington.

Cash, R. J., 1997, *Cancellation of Total Cyanide Requirements*, (letter 2N160-97-012 to J. G. Kristofzski, June 16), DE&S Hanford, Incorporated, Richland, Washington.

DOE, 1997, *Hanford Analytical Services Quality Assurance Requirements Document* DOE/RL-96-68, Rev. 1, U.S. Department of Energy, Richland Operations 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., 1998, *Waste Tank Summary Report for Month Ending April 30, 1998*, HNF-EP-0182-121, Lockheed Martin Hanford Corporation, Richland, Washington.

Kristofzski, J. G., 1996, *Directions for "Opportunistic Analyses"*, (memorandum 79400-96-168 to J.H. Baldwin et al., dated September 11), Westinghouse Hanford Company, Richland, Washington.

Lapin, L. L., 1983, *Probability and Statistics for Modern Engineering*, Brooks/Cole Publishing Company, Monterey, California.

Markel, L. P., 1997, *222-S Laboratory Quality Assurance Plan*, HNF-SD-CP-QAPP-016, Rev. 2, Rust Federal Services of Hanford, Inc., Richland, Washington.

PHMC, 1997, *Project Hanford Quality Assurance Program Description,* "Nonconformance Control" (Section 3.0, paragraph 3.3), HNF-MP-599, Rev. 0, Fluor Daniel Hanford Company, Richland, Washington.

Place, D. E., *Preliminary Tank Characterization Report for Single-Shell Tank 241-TX-113:Best Basis*, HNF-SD-WM-ER-716, Rev.0., SGH Eurisys Services Corporation, Richland, Washington.

Schreiber, R. D., 1998, *Fiscal Year 1998 Memorandum of Understanding for the TWRS Characterization Project*, HNF-2245 Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

Simpson, B. C., and D. J. McCain, 1997, *Historical Model Evaluation Data Requirements*, HNF-SD-WM-DQO-018, Rev. 2, Lockheed Martin Hanford Corporation, Richland, Washington.

APPENDIX A:

EXPECTED PHYSICAL PROFILE OF TANK TX-113 CORE SAMPLES

Table A-1: Tank 241-TX-113 Physical Profile Estimate
Riser 3

Segment #	Inches	Elevation Range (ft. MSL)	Waste Type	Comments
1	17	644.20 - 645.60		metal tapes under riser
	2	644.02 - 644.20	dry, soft saltcake	limited to good recovery with push mode, limited recovery with rotary mode due to N2 purge
2	19	642.44 - 644.02	dry, soft saltcake	limited to good recovery with push mode, limited recovery with rotary mode due to N2 purge
3	19	640.85 - 642.44	dry, hard saltcake	limited recovery
4	19	639.27 - 640.85	dry, hard saltcake	limited recovery
5	19	637.69 - 639.27	dry, hard saltcake	limited recovery
6	19	636.10 - 637.69	dry, hard saltcake	limited recovery
7	19	634.52 - 636.10	dry, hard saltcake	limited recovery
8	19	632.94 - 634.52	dry, hard saltcake	limited recovery
9	19	631.35 - 632.94	dry, hard saltcake	limited recovery
10	19	629.77 - 631.35	damp, soft sludge/saltcake mix	limited to good recovery, saltcake will look like sludge/saltcake
11	0.5	629.73 - 629.77	damp, soft sludge/saltcake mix	limited to good recovery, saltcake will look like sludge/saltcake
	18.5	628.19 - 629.73	damp, soft sludge	good recovery expected
12	19	626.60 - 628.19	damp, soft sludge	good recovery expected
13	19	625.02 - 626.60	damp, soft sludge	good recovery expected

Note: elevations based on inside tank center bottom for Tank 241-TX-113 of 624.73 ft. MSL

Figure A-1: Tank 241-TX-113 Physical Profile Estimate
(Riser 3)

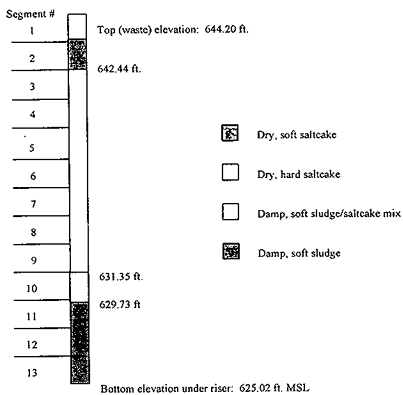
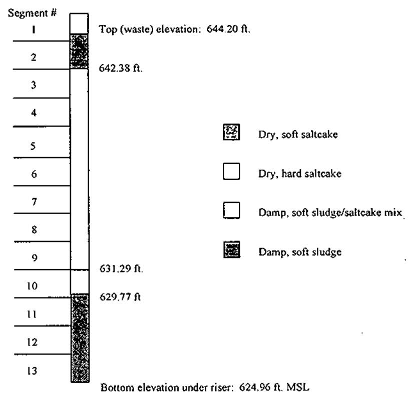


Table A-2: Tank 241-TX-113 Physical Profile Estimate
Riser 5

Segment #	Inches	Elevation Range (ft. MSL)	Waste Type	Comments
1	16	644.20 - 645.54		metal tapes under riser
	3	643.96 - 644.20	dry, soft saltcake	limited to good recovery with push mode, limited recovery with rotary mode due to N2 purge
2	19	642.38 - 643.96	dry, soft saltcake	limited to good recovery with push mode, limited recovery with rotary mode due to N2 purge
3	19	640.79 - 642.38	dry, hard saltcake	limited recovery
4	19	639.21 - 640.79	dry, hard saltcake	limited recovery
5	19	637.63 - 639.21	dry, hard saltcake	limited recovery
6	19	636.04 - 637.63	dry, hard saltcake	limited recovery
7	19	634.46 - 636.04	dry, hard saltcake	limited recovery
8	19	632.88 - 634.46	dry, hard saltcake	limited recovery
9	19	631.29 - 632.88	dry, hard saltcake	limited recovery
10	18	629.77 - 631.29	damp, soft sludge/saltcake mix	limited to good recovery, saltcake will look like sludge/saltcake
	1	629.71 - 629.77	damp, soft sludge/saltcake mix	limited to good recovery, saltcake will look like sludge/saltcake
11	19	628.13 - 629.71	damp, soft sludge	good recovery expected
12	19	626.54 - 628.13	damp, soft sludge	good recovery expected
13	19	624.96 - 626.54	damp, soft sludge	good recovery expected

Note: elevations based on inside tank center bottom for Tank 241-TX-113 of 624.73 ft. MSL

Figure A-2: Tank 241-TX-113 Physical Profile Estimate
(Riser 5)



DISTRIBUTION SHEET

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HNF-3039, Rev. 0, "Tank 241-TX-113 Rotary Mode Core Sampling and Analysis Plan"		ECN No. N/A

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