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**This document was reviewed following the
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Tank 241-A-102 Auger Sampling and Analysis Plan

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TABLE OF CONTENTS

1.0	SAMPLING AND ANALYSIS OBJECTIVES	1
2.0	SAMPLING EVENT REQUIREMENTS	1
2.1	SAMPLING PREPARATION	1
2.2	SAMPLING REQUIREMENTS	1
3.0	LABORATORY ANALYSIS REQUIREMENTS	2
3.1	ANALYSIS SCHEME	2
3.2	SPECIFIC METHODS AND ANALYSES	8
3.3	INSUFFICIENT SAMPLE RECOVERY	8
3.4	PRIORITIES OF REQUESTED ANALYSES	8
4.0	QUALITY ASSURANCE	11
4.1	LABORATORY OPERATIONS	11
4.2	SAMPLE COLLECTION	11
4.3	SAMPLE CUSTODY	11
5.0	ORGANIZATION	12
6.0	EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS	12
6.1	EXCEPTIONS TO DQO REQUIREMENTS	12
6.2	CLARIFICATIONS AND ASSUMPTIONS	12
7.0	DELIVERABLES	13
7.1	PROGRESS REPORTS	13
7.2	FORMAT I REPORTING	14
7.3	FORMAT III REPORTING	14
8.0	CHANGE CONTROL	14
9.0	REFERENCES	15

LIST OF FIGURES

1: Solid Analysis Flow Chart	5
2: Liquid Analysis Flow Chart	6
3: Sample Analysis and Reporting Flow Chart	7

LIST OF TABLES

1: Tank A-102 Chemical, Radiological and Physical Analytical Requirements . . .	9
2: Tank A-102 Project Key Personnel List	12

LIST OF ABBREVIATIONS

A-102	Tank 241-A-102
ACL	Analytical Chemistry Laboratory
DOE	U.S. Department of Energy
DQO	data quality objective
DSC	differential scanning calorimetry
DDSF	double-shell slurry feed
DST	double-shell tank
GEA	gamma energy analysis
IC	ion chromatography
ICP	inductively coupled plasma - atomic emission spectroscopy
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RSST	reactive system screening tool - adiabatic calorimetry
SAP	Sampling and Analysis Plan
SARP	Safety and Analysis Report for Packaging
SST	single-shell tank
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 in accordance with the *Tank Safety Screening Data Quality Objective* (Babad and Redus 1994). This data quality objective (DQO) is described in the Tank Characterization Plan (Jo, 1995) for tank 241-A-102 (A-102). This SAP will also identify procedures and requirement for collecting and characterizing samples from tank A-102 by the auger sampling method.

2.0 SAMPLING EVENT REQUIREMENTS

2.1 SAMPLING PREPARATION

Before auger sampling can be performed of tank A-102, available risers must be identified for use in this 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.

2.2 SAMPLING REQUIREMENTS

As of January 31, 1995, tank A-102 contained 155,000 liters (41,000 gallons) of DSSF waste. The waste was comprised of 117,000 liters (15,000 gallons) of sludge, 83,000 liters (22,000 gallons) of saltcake, and 15,000 liters (4,000 gallons) of supernatant (Hanlon 1995). This total volume of waste corresponded to a depth of 38 centimeters (15 inches).

Tank A-102 is currently scheduled to be auger sampled. Two samples shall be collected from 2 of 3 risers (#2, #18, or #19) of the tank. If a different riser is necessary to meet sampling and analysis requirements, this change must be recorded and approved 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.

Based on current waste depth information, one 20 inch auger bit will be used for the sampling of each riser. In the event that the current depth information is incorrect (± 5 inches), a different sized auger bit may be used. The objective of the sampling event is to obtain a vertical profile of the waste; therefore, more or less samples might need to be taken depending on the accuracy of the current waste volume records. For detailed information regarding the sampling activities, refer to work package ES-95-0255. This 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

Flowcharts depicting the general safety screening sample breakdown and analysis scheme are presented in Figures 1, 2, and 3. These steps are described in detail to provide the hot cell and laboratory chemists with guidance for the breakdown of the samples and may be altered as appropriate by the performing laboratory. Several analyses listed in Table 1 require a 45 day reporting time. The 45-day reporting format, Format III, is explained in Section 7.3.

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 A-102. For samples from tank A-102, the shipping containers must be vented every ten days from the time of the cask sealing 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.

- Step 1 Receive samples at the laboratory in accordance with approved procedures.
- Step 2 Conduct the following on the material from each sample:
- ▶ Perform a visual examination of the sample(s)
 - ▶ Record observations. This may include a sketch of the sample in addition to written documentation of pertinent descriptive information such as color, texture, homogeneity, consistency.
 - ▶ Note color and clarity of any drainable liquid.
 - ▶ Report sample recovery results to the Characterization Program within one working day of sample breakdown.
 - ▶ Take color photographs and/or a videotape to visually document the sample.
- Step 3 Does the sample contain drainable liquids?
- Yes: Proceed to Step 4A
 No: Proceed to Step 5A
- Step 4A Separate any drainable liquid from the solids. Measure and record the volume. Retain drainable liquids for further processing.
- Step 4B Is the sample 100% drainable liquid?
- Yes: Proceed to Step 11
 No: Proceed to Step 5A

SOLIDS PATH

- Step 5A Is there a hard, dry layer on the top of the auger sample?
- Yes: Proceed to Step 5B
No: Proceed to Step 5C
- Step 5B Separate the hard, dry layer and retain for analysis.
- Step 5C Divide each auger sample into two equal subsamples (i.e., half segments).
- Step 6 Homogenize each subsample using the appropriate approved procedure.
- Step 7 Will a homogenization test be performed?
- Yes: Proceed to Step 8
No: Proceed to Step 9
- NOTE:** One subsample per core, at a minimum, should be used if a homogenization test is to be performed. Additional tests may be performed at the laboratory's discretion.
- Step 8 Conduct the homogenization test by taking 1 to 2 g aliquot from widely separated locations of the homogenized subsample. Conduct the homogenization test in accordance with Bell (1993).
- Step 9 Collect sufficient aliquots from each homogenized subsample to perform the appropriate preparations and analyses listed in Table 1 in duplicate.
- NOTE:** If there is an insufficient amount of sample available in any subsample to perform all required analyses on the subsample, notify the Characterization Program within one business day and follow the prioritization of analyses given in Section 3.4.
- Step 10 Remove at least 20 mL and up to 40 mL of each homogenized subsample for the archive sample (Bratzel 1994).

LIQUIDS PATH

- Step 11 Closely inspect the liquid sample for the presence and approximate volume of any potential organic layers. Does the sample contain any immiscible (potentially organic) layers?
- Yes: Proceed to Step 12A
No: Proceed to Step 13
- Step 12A Report any visually observed immiscible (potential organic) layer immediately by the early notification system (see Section 7.2).

- Step 12B Separate and retain the potential organic layer for possible future analysis.
- NOTE:** Steps 13 through 17 shall be performed on the remaining (probable aqueous) liquid layer only.
- Step 13 Filter the remaining liquid sample through a 0.45 micron filter.
- Step 14 Is there greater than 1 gram of solid on the filter?
- Yes: Proceed to Step 15
 No: Proceed to Step 16
- Step 15 Archive the solids for possible future analysis (Bratzel 1994).
- Step 16 Remove sufficient aliquots from the liquid sample to perform the appropriate analyses listed in Table 1 in duplicate.
- Step 17 Archive at least 20 mL and up to 40 mL of the drainable liquid as the liquid archive (Bratzel 1994).

PRIMARY ANALYSIS PATH

- Step 18 Perform primary analyses as listed in Table 1.
- Step 19 Compare the primary analysis data with notification limits.
- Step 20A Do the results exceed the notification limits (Table 1)?
- Yes: Proceed to Step 20B.
 No: Proceed to Step 23.
- Step 20B Report results exceeding the notification limits using Format I reporting deliverable requirements as listed in Section 7.2.

SECONDARY ANALYSIS PATH

- Step 21 Perform secondary analyses as listed in Table 1.
- Step 22A Do the secondary analyses exceed the notification limits?
- Yes: Proceed to Step 22B
 No: Proceed to Step 23
- Step 22B Report results exceeding the notification limits using Format I reporting deliverable requirements as listed in Section 7.2.
- Step 23 Report results as listed in Section 7.0

Figure 1: Solid Analysis Flow Chart

LIQUID PATH

Figure 2: Liquid Analysis Flow Chart

ANALYSIS AND REPORTING PATH

Figure 3: Sample Analysis and Reporting Flow Chart

3.2 SPECIFIC METHODS AND ANALYSES

The analyses in Table 1, to be performed on the tank A-102 auger samples, are based on the safety screening DQO referenced in Section 1.0. The laboratory procedure numbers, which shall be used for the analyses, are included in the table.

3.3 INSUFFICIENT SAMPLE RECOVERY

If the amount of material recovered from the samples taken from tank A-102 is insufficient to perform the analyses requested and to permit a minimum 20 mL archive per sample, the laboratory shall notify the Tank Cognizant Engineer, listed in Table 2, within one working day. A prioritization of the analyses requested in this document is given in Section 3.4. Any analyses prescribed by this document, but not performed, shall be identified in the appropriate data report, with justification for non-performance.

3.4 PRIORITIES OF REQUESTED ANALYSES

Confirmation of prioritization levels or revision of sample breakdown procedures may be provided by the Characterization Program based upon the sample recovery, readily observable physical property distinctions within the sample, and the requested sample breakdown procedures as provided in Section 3.1. The priority of an analysis is specified by its designation as a primary or secondary analysis. Further prioritization will be determined by the program on a DQO basis.

Table 1: Tank A-102 Chemical, Radiological and Physical Analytical Requirements

SOLID ANALYSES																	
Project Name		A-102 Auger Sample			COMMENTS							REPORTING LEVELS					
Plan Number		WHC-SD-WM-TSAP-004, REV. 0			Homogenization Test - Per Laboratory Discretion Field Blank - Not Required Hot Cell Blank - Per Laboratory Discretion							FORMAT I		Early Notify			
												FORMAT II		Process Control			
PROGRAM		PROGRAM CONTACTS										FORMAT III		Safety Screen			
A. Safety Screening		Safety Screening E.J. Lipke			TANK A-102							FORMAT IV		Waste Management			
		TWRS J. Jo										# AUGERS		FORMAT V		RCRA Compliance	
												2		FORMAT VI		Special	
PROGRAM	PRIMARY ANALYSES			SAMPLE ¹	PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT		
	METHOD	ANAL.	WHC PROCEDURE	½ SEG SOLID		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴			
A	DSC	Energy	LA-514-113	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	J/g ⁵	> 481	unknown	I, III		
A	TGA	% H ₂ O	LA-560-112	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	wt%	< 17	13	I, III		
A	Alpha	Total Alpha	LA-508-101	X	f or a	ea smpl	1/mtrx	ea PB	ea AB	±10	90-110	µCi/g	> 41	unknown	I, III		
PROGRAM	SECONDARY ANALYSES			SAMPLE ¹	PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT		
	METHOD	ANAL.	WHC PROCEDURE	½ SEG SOLID		DUP	SPK/ MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴			
A	RSST ⁹	Energy	see 9 below	X	d	N/A	N/A	N/A	ea AB	±10	90-110	J/g	> 481	unknown	I, III		
A	Distillation ⁹	CN	LA-695-102	X	d	ea smpl	1/mtrx	ea AB	ea AB	±10	90-110	µg/g	> 39,000	unknown	I, III		
A	Hot Persulfate ⁹	TOC	LA-342-100	X	d	ea smpl	1/mtrx	ea AB	ea AB	±10	90-110	µg C/g	> 30,000	unknown	I, III		
A	Sep. & α counting ¹⁰	Pu-239/240	LA-503-156	X	f	ea smpl	1/mtrx ⁷	ea PB	ea AB	±10	90-110	µCi/g	> 41	0.17	I, III		
A	ICP ¹⁰	Fe Mn U	LA-505-151	X	f or a	ea smpl	see ⁸	ea PB	ea AB	±10	90-110	µg/g	none none none	2,360 unknown 5,390	III III III		

¹½ SEG SOLID-½ segment, solids²d-direct, f-fusion dissolution, a-acid dissolution, w-water dissolution³PR-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-matrix⁴Units 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.⁷Tracer or carrier may be used in place of a spike and results corrected for recovery.⁸Either serial dilutions or matrix spikes will be performed.⁹This analysis required if DSC exceeds notification limits. The RSST method, yet to be proceduralized, may be found in WHC-SD-WM-TP-104.¹⁰Performed only if total alpha exceeds notification limit.

Table 1: Tank A-102 Chemical, Radiological and Physical Analytical Requirements

LIQUID ANALYSES															
Project Name		A-102 Auger Sample				COMMENTS						REPORTING LEVELS			
Plan Number		WHC-SD-WM-TSAP-004, REV. 0				Homogenization Test - Per Laboratory Discretion Field Blank - Not Required Hot Cell Blank - Per Laboratory Discretion						FORMAT I		Early Notify	
												FORMAT II		Process Control	
PROGRAM		PROGRAM CONTACTS										FORMAT III		Safety Screen	
A. Safety Screening		Safety Screening E.J. Lipke										FORMAT IV		Waste Management	
		TWRS J. Jo				TANK		# AUGERS				FORMAT V		RCRA Compliance	
						A-102		2				FORMAT VI		Special	
PROGRAM	PRIMARY ANALYSES			SAMPLE ¹	PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT
	METHOD	ANAL.	WHC PROCEDURE	LIQUID		DUP	SPK/MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴	
A	DSC	Energy	LA-514-113	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	J/g ⁵	> 481	unknown	I, III
A	TGA	% H ₂ O	LA-560-112	X	d	ea smpl	N/A	N/A	ea AB	±10	90-110	wt%	< 17	unknown	I, III
A	Visual	Organic Layer	LA-519-151	X	d	N/A	N/A	N/A	N/A	N/A	N/A	none	presence	unknown	I, III
PROGRAM	SECONDARY ANALYSES			SAMPLE ¹	PREP ²	QUALITY CONTROL ³						CRITERIA			FOR-MAT
	METHOD	ANAL.	WHC PROCEDURE	LIQUID		DUP	SPK/MSD	BLK	CALIB STD	PR	AC	UNITS	NOTIFICATION LIMIT ⁴	EXPECTED RANGE ⁴	
A	RSST ¹⁰	Energy	see 10 below	X	d	N/A	N/A	N/A	ea AB	±10	90-110	J/g ⁵	> 481	unknown	I, III
A	Distillation ¹⁰	CN	LA-695-102	X	d ⁶	ea smpl	1/mtrx	ea AB	ea AB	±10	90-110	µg/mL	> 39,000 ⁷	unknown	I, III
A	Hot Persulfate ¹⁰	TOC	LA-342-100	X	d ⁶	ea smpl	1/mtrx	ea AB	ea AB	±10	90-110	µg C/mL	> 30,000 ⁷	unknown	I, III

¹ LIQUID- segment level liquid² d-direct, f-fusion dissolution, a-acid dissolution, w-water dissolution³ 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-matrix⁴ Units for notification limits and expected range are those listed in the "units" column.⁵ Dry weight basis.⁶ Direct liquid samples may be diluted in acid or water to adjust to proper sample size and/or pH.⁷ Action limit converted from weight basis assuming liquid density of 1.0 g/mL.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 if DSC exceeds notification limits. The RSST method, yet to be proceduralized, may be found in WHC-SD-WM-TP-104.

4.0 QUALITY ASSURANCE

4.1 LABORATORY OPERATIONS

The WHC 222-S Laboratory has a quality assurance program plan (Meznarich 1994) and a quality assurance project plan (Taylor 1993) that shall provide the primary direction for the quality assurance when analyzing the waste tank samples at the WHC 222-S Laboratory. Additionally, the *Hanford Analytical Services Quality Assurance Plan* (DOE 1994), when implemented (currently scheduled for August 31, 1995), shall be used as quality assurance requirements.

Method specific quality control such as calibrations and blanks are also found in the analytical procedures. Sample quality control (duplicates, spikes, standards) are identified in Table 1. If no criteria are provided in Table 1, the performing laboratory shall perform to its quality assurance plan(s).

4.2 SAMPLE COLLECTION

Two auger samples are to be taken from tank A-102 and shipped to the performing laboratory by Sampling Operations in accordance with work package ES-95-0255. This work package shall also initiate the chain-of-custody for the samples. Approved work 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 one working day of removing the sample from the tank, but must transport each sample within three 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 work package ES-95-0255. Samples are shipped in a cask and sealed with a Waste Tank Sample Seal.

WASTE TANK SAMPLE	
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 ORGANIZATION

The organization and responsibility of key personnel involved with this tank A-102 characterization project are listed in Table 2.

Table 2: Tank A-102 Project Key Personnel List

Individual	Organization	Responsibility
J. Jo	TWRS Characterization Plans and Reports	Tank A-102 Tank Characterization Plan Cognizant Engineer
E.J. Lipke	WHC Safety Program	Safety Screening Point of Contact
East Tank Farm Operations Shift Manager	Tank Farm Operations	200 East Tank Farm Point of Contact if Action Limit is Exceeded (373-2689)

6.0 EXCEPTIONS, CLARIFICATIONS, AND ASSUMPTIONS

6.1 EXCEPTIONS TO DQO REQUIREMENTS

In the safety screening DQO, it is specified that cyanide analyses are to be run on a quarter-segment level and that the notification limit for the DSC analysis is 125 cal/g (523 J/g). The revised ferrocyanide DQO (Meacham et al. 1994) has changed the requirements such that the cyanide analysis is now to be run on a half-segment level and the DSC notification limit is 115 cal/g (dry weight basis). The next revision to the safety screening DQO will incorporate this change. This Sampling and Analysis Plan specifies that cyanide is to be run on a half-segment basis and that notification shall be made if the DSC value exceeds 481 J/g dry weight basis (115 cal/g).

6.2 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 as follows:

- Any exotherm (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.

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

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

- The safety screening DQO (Babad and Redus 1994) requires that additional analyses be performed if total alpha activity measures greater than 1 g/L. Total alpha is measured in $\mu\text{Ci/g}$ rather than g/L. To convert the notification limit for total alpha 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):

$$\left(\frac{1 \text{ g}}{\text{L}}\right) \left(\frac{1 \text{ L}}{10^3 \text{ mL}}\right) \left(\frac{1}{\text{density}} \frac{\text{mL}}{\text{g}}\right) \left(\frac{0.0615 \text{ Ci}}{1 \text{ g}}\right) \left(\frac{10^6 \mu\text{Ci}}{1 \text{ Ci}}\right) = \frac{61.5}{\text{density}} \frac{\mu\text{Ci}}{\text{g}} \quad (2)$$

NOTE: If a density of 1.5 g/mL is assumed for solid material, the notification limit becomes 41 $\mu\text{Ci/g}$.

- The safety screening DQO, upon which the analyses in Table 1 are based, does not sufficiently address the analyses of any drainable liquid present. In order to characterize the tank waste adequately, all analyses performed on the solids for the safety screening DQO, with the exception of total alpha analyses, shall also be performed on any drainable liquids.

7.0 DELIVERABLES

All analyses of tank A-102 waste material shall be reported as Formats I and/or III as indicated in Table 1. Additional information regarding reporting formats is given in "Revised Interim Tank Characterization Plan Guidance" (Schreiber 1994a).

7.1 PROGRESS REPORTS

Each laboratory performing analyses on tank A-102 waste material from this sampling project shall provide monthly status reports to the Characterization Program. This report shall contain 1) a summary of the activities on the analysis of tank A-102, 2) preliminary results to the program, and 3) schedule and cost information on a DQO basis.

Monthly and accumulative costs will be compared to the base as part of the progress report. Monthly variances greater than 10% or \$10,000, and accumulative variances greater than \$50,000 from the estimated costs or schedule must be explained in the report. Cost reporting shall consist of the following:

1. budgeted cost of work scheduled
2. monthly cost (actual cost of work performed)
3. year-to-date costs (actual cost of work performed)

Schedule reporting shall consist of the following:

1. monthly schedule
2. year-to-date schedule

7.2 FORMAT I REPORTING

Table 1 contains the notification limits for each analyte. Any results exceeding their notification limits shall be reported by calling the East Tank Farm Operations Shift Manager at 373-2689 and the Characterization Program Office (Schreiber 1994b). This verbal notification must be followed within 1 working day by written communication to Characterization Plans and Reports, Characterization Program Office, Safety Screening Representative, and Process Control documenting the observations. Points of contact within each project/program are defined by (Schreiber 1995). 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 letter of instruction.

7.3 FORMAT III REPORTING

A Format III report, reporting the results of the primary safety screening analyses shall be issued to the Safety Screening Representative, Characterization Plans and Reports, Characterization Program Office, Los Alamos Technical Associates, Tank Characterization Resource Center, Process Control, and the Tank Characterization Database representative within 45 days of receipt of the last auger 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).

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 Program. 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 notebooks. All significant changes (such as changes in scope) shall be documented by Characterization Plan and Reports via an Engineering Change Notice to this plan. All changes shall also be clearly documented in the final data package.

Additional analysis of sample material from this characterization project, at the request of the Characterization Program, shall be performed according to a revision of this Tank Characterization Plan.

9.0 REFERENCES

- Babad, H. and K.S. Redus, 1994, *Tank Safety Screening Data Quality Objective*, WHC-SD-WM-SP-004, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Bell, K.E., 1993, *Tank Waste Remediation System Tank Waste Characterization Plan*, WHC-SD-WM-PLN-047, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Bratzel, D.R., 1994, Letter to S.M. Joyce, "Archiving Requirements," 7E720-94-125, dated June 23, 1994.
- Brevick, C.H., L.A. Gaddis, and W.W. Pickett, 1994, *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Area*, WHC-SD-WM-ER-349, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
- DOE, 1994, *Hanford Analytical Services Quality Assurance Plan*, DOE/RL-94-55, Rev. 0, U.S. Department of Energy, Richland Field Office, Richland, Washington.
- Haller, C.S., 1994, *Fiscal Year 1995 Tank Waste Remediation System Tank Waste Analysis Plan*, WHC-SD-WM-PLN-091, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Hanlon, B.M., 1995, *Waste Tank Summary for Month Ending January 31 1995*, WHC-EP-0182-82, Westinghouse Hanford Company, Richland, Washington.
- Jo, J., 1995, *Tank 241-A-102 Tank Characterization Plan*, WHC-SD-WM-TP-358, Westinghouse Hanford Company, Richland, Washington.
- Meacham, J.E., R.J. Cash, G.T. Dukelow, H. Babad, J.W. Buck, C.M. Anderson, B.A. Pulsipher, J.J. Toth, and P.J. Turner, 1994, *Data Requirements for the Ferrocyanide Safety Issue Developed through the Data Quality Objectives Process*, WHC-SD-WM-DQO-007, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Meznarich, H.K., 1994, *Quality Assurance Program Plan for Laboratory Analysis and Process Testing*, WHC-SD-CP-QAPP-003, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- 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, "Format I Reporting Requirement," 7E720-94-128, dated August 15, 1994.
- Schreiber, R.D., 1995, Letter to J.G. Kristofzski, "REVISION: Point of Contact/Distribution List," 71520-95-108 REISSUE, dated March 23, 1995.
- Taylor, L.H., 1993, *Quality Assurance Project Plan for Chemical Analysis of Highly Radioactive Mixed Waste Samples in Support of Environmental Activities on the Hanford Site*, WHC-SD-CP-QAPP-002, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.
- Whelan, T.E., 1994, *TWRS Characterization Program Quality Assurance Program Plan*,