STA 4 (13) SEP 16 1994

ENGINEERING DATA TRANSMITTAL

1. EDT 159072

2. To: (Receiving Organization) ANALYTICAL SERVICES	3. From: (Originating Organization) TWRS/CHARACTERIZATION SUPPORT	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: TWRS ENG/CHAR SUPPORT	6. Cog. Engr.: R. D. SCHREIBER	7. Purchase Order No.: N/A
8. Originator Remarks: N/A		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 2750E/200E
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 09-07-94

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 Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-TP-247		0	TANK 241-A-104 TANK CHARACTERIZATION PLAN	Q	1	1	

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 (M) MSIN	(L) Date	(J) Name	(K) Signature (M) MSIN	(L) Date	(G) Reason	(H) Disp.
1	1	Cog.Eng. R.D. SCHREIBER	R.D. Schreiber	9/6/94	Prog. D.R. BRATZEL	DRBratzel	9/7/94	1	1
1	1	Cog. Mgr. C.S. HALLER	C.Haller	9/6/4	Prog. S.G. MCKINLEY	S.G.McKinley	9/15/94	1	
1	1	QA T.C. TRIBLE	Kimberly Teller	9/16/94	Prog. D.W. HAMILTON	[illegible]		1	1
		Safety			Prog. J.G. KRISTOFZSKI	R.D. Schreiber per telecon	9/15/94	1	1
		Env.							

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
R. D. SCHREIBER R.D.Schreiber 9/6/94 Signature of EDT Originator Date	J. L. DEICHMAN R.D. Schreiber per telecon 9/16/94 Authorized Representative for Receiving Organization Date	C. S. HALLER C.Haller 9/6/4 Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1 (02/89)

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SUPPORTING DOCUMENT

1. Total Pages 21

2. Title	3. Number	4. Rev No.
TANK 241-A-104 TANK CHARACTERIZATION PLAN	WHC-SD-WM-TP-247	0

5. Key Words

CHARACTERIZATION, SAFETY SCREENING, QUALITY CONTROL, SINGLE-SHELL TANK, SAMPLING, ANALYSIS, TANK CHARACTERIZATION PLAN, NON-WATCH LIST, AUGER

APPROVED FOR PUBLIC RELEASE

KMB 9/16/94

6. Author

Name: R. D. SCHREIBER

R.D. Schreiber 9/6/94
Signature

Organization/Charge Code 7E720/N444Y

7. Abstract

This document is a plan which serves as the contractual agreement between the Characterization Program, Sampling Operations, WHC 222-S Laboratory, and PNL 325 Analytical Chemistry Laboratory. The scope of this plan is to provide guidance for the sampling and analysis of auger samples from tank 241-A-104.

9. Approval Designator Q

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC (13)
DATE SEP 16 1994
STA 4

WHC-SD-WM-TP-247
Revision 0

Tank 241-A-104 Tank Characterization Plan

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

TABLE OF CONTENTS

SAMPLE EVENT A: AUGER SAMPLING IN FISCAL YEAR 1994

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ACL	Analytical Chemistry Laboratory
AMS	analytical measurement system
A-104	tank 241-A-104
CASS	Computer Automated Surveillance System
DNFSB	Defense Nuclear Facility Safety Board
DOE	Department of Energy
DQO	data quality objective
DSC	differential scanning calorimetry
DSS	double-shell slurry
DST	double-shell tank
ECN	engineering change notice
FY	fiscal year
GEA	gamma energy analysis
ICP	inductively-coupled plasma
NCPLX	non-complexed waste
RSST	reactive system screening tool
SST	single-shell tank
TCP	Tank Characterization Plan
TGA	thermogravimetric analysis
TIC	total inorganic carbon
TPA	Tri-Party Agreement
TOC	total organic carbon
TWRS	Tank Waste Remediation System
USQ	unreviewed safety question
WHC	Westinghouse Hanford Company

TANK 241-A-104 TANK CHARACTERIZATION PLAN

1.0 SPECIFIC TANK CHARACTERIZATION OBJECTIVES

The Defense Nuclear Facilities Safety Board has directed the DOE to concentrate the near-term sampling and analysis activities on identification and resolution of safety issues (Conway 1993). The data quality objective (DQO) process was chosen as a tool to be used to identify sampling and analytical needs for the resolution of safety issues. As a result, a revision in the Federal Facility Agreement and Consent Order (TPA) milestone M-44-00 has been made, which states that "A Tank Characterization Plan (TCP) will also be developed for each DST and SST using the DQO process. . . Development of TCPs by the DQO process is intended to allow users (e.g., Hanford Facility user groups, regulators) to ensure their needs will be met and that resources are devoted to gaining only necessary information." This document satisfies this requirement for the tank 241-A-104 (A-104) fiscal year 1994 safety screening activity.

This Tank Characterization Plan will identify characterization objectives pertaining to sample collection, hot cell sample isolation, and laboratory analytical evaluation and reporting requirements in accordance with the *Tank Safety Screening Data Quality Objective* (Redus and Babad 1994), in addition to reporting the current contents and status of the tank as projected from historical information.

1.1 Tank Safety Screening Data Quality Objectives

There are four Watch List tank classifications with safety issues related to public and worker health that have been associated with the Hanford Site underground storage tanks: ferrocyanide, organic, flammable gas, and high heat (Babad 1992). Of the 149 single-shell (SSTs) and 28 double-shell tanks (DSTs), 52 are currently classified on one or more of the watch lists (Hanlon 1994).

The *Tank Safety Screening Data Quality Objective* (Redus and Babad 1994) describes the sampling and analytical requirements that are used to screen waste tanks for unidentified safety issues. Both Watch List and non-Watch List tanks will be sampled and evaluated to identify safety conditions related to the ferrocyanide, organic, flammable gas, and criticality safety issues. Safety screening for high heat tanks has already been completed and the vapor safety issue will be handled by ongoing industrial hygiene programs.

With respect to sampling specifications, this DQO requires that "a vertical profile of the waste be obtained from at least two widely-spaced risers...assuming the quality of the data obtained supports appropriate safety classification of the tank. Such sampling can be done by core drilling, by auger sampling (for shallow tanks) and/or by obtaining liquid supernate samples at several levels" (Redus and Babad 1994). Tank A-104 contains a shallow depth, high-solids waste that will be sampled for safety screening purposes using the auger sampling method.

The analytical requirements for the safety screening of a tank are concerned with identifying a common set of primary analytes and characteristics of the waste. These analytes are energetics, total alpha activity, moisture and flammable gas concentrations. If a specific criteria level on one of these items is exceeded, further analysis of a secondary set of analytes and a possible Watch-List tank classification would be warranted. Further details of the analytical procedures and criteria to be followed for this tank A-104 sampling and characterization event are given in Section 3.2.

This Tank Characterization Plan identifies procedures and requirements, in accordance with the safety screening DQO and the Characterization Program, for collecting and characterizing a sample from tank A-104 by the auger sampling method. The dome-space gas flammability determination is being handled separately by the Tank Vapor Issue Resolution Program.

1.2 Relevant Safety Information

1.2.1 Tank Status

Single-shell tank A-104 is classified as a Non-Watch List high heat load tank (50,000 Btu/hr). It was declared an assumed leaker in 1975 and was interim stabilized in September 1978. To prevent further waste additions to the tank, it was isolated and designated as an Intrusion Prevention tank in 1983.

Tank A-104 is estimated to contain approximately 28,000 gallons of sludge and no saltcake or supernatant liquid (28,000 gallons total); its contents are categorized as non-complexed waste material (NCPLX) (Hanlon 1994). Recent results (April 1994) obtained from the CASS database indicate a waste depth of 12 inches below riser 6, which is located about 2/3 of the radial distance from the edge of the tank. From this, the total waste volume is calculated at 33,000 gallons. The temperature of the waste in tank A-104 was recorded at 192°F in February of 1994.

1.2.2 Tank Monitoring Activities

Waste level measurements are taken quarterly from riser 6 using a manual tape. Internal tank waste temperature is recorded from one thermocouple on each of two trees in risers 12 and 18. Seven active dry wells monitor radiation in the surrounding soil.

2.0 SUMMARY OF HISTORICAL INFORMATION FOR TANK A-104

Included in this section are descriptions of tank A-104, its process history, and recorded sampling events.

2.1 Configuration

Tank A-104 is one of six single-shell tanks in the 200 East area A Farm constructed during 1954-55. It is 75 feet in diameter with a flat-shaped base and has a 1,000,000 gal (3,785 m^3) tank capacity.

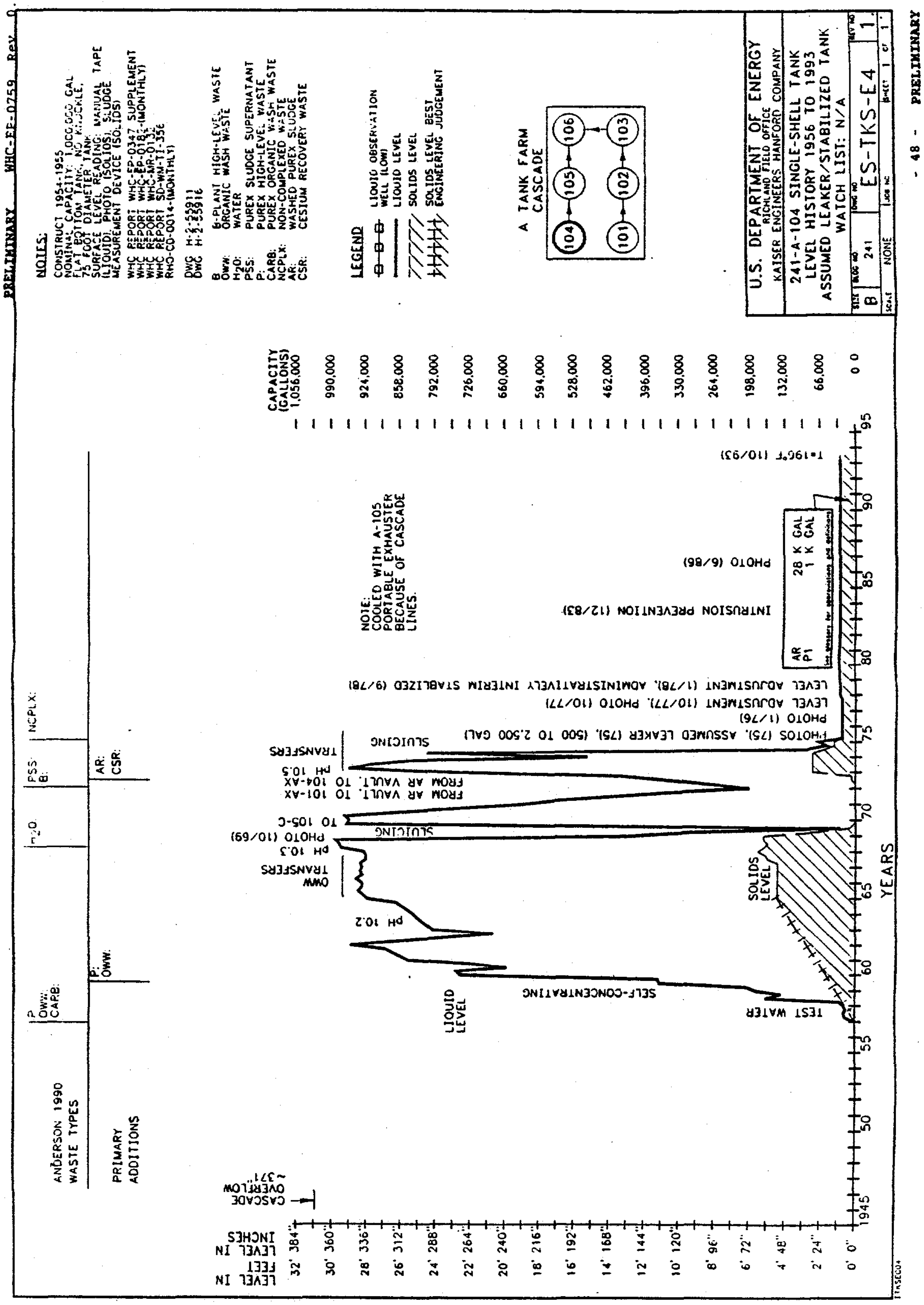
2.2 Process History

From the second quarter of 1957 until the second quarter of 1958 tank A-104 contained up to 28,000 gallons of test water. It then received PUREX carbonate waste and organic wash waste until 1969. During this period the tank waste was a self concentrating or boiling type. In mid-1969 the tank was sluiced for strontium and cesium and then contained the sluicing water waste until late 1972. About 100,000 gallons of B Plant waste was added in the fourth quarter of 1972 and in the following two years the tank received PUREX sludge supernatant. Again, in 1975, strontium and cesium sluicing was commenced until the tank appeared to develop a leak. An estimated 53,000 gallons of supernatant was evacuated and all transfers to the tank were stopped. Left behind, 28,000 gallons of solids remained, which has been labeled as a non-complexed sludge (Anderson 1990). Figure 1 illustrates the historic waste levels in tank A-104.

2.3 Historical Sampling Events

Laboratory receipt and analysis of two sludge samples in 1974 from tank A-104 was identified in a historical records search. However, these samples were obtained prior to the last strontium and cesium sluicing effort that identified probable leakage and initiated the subsequent removal of all pumpable liquid. A waste characterization effort for tank A-104 was performed in 1986 using the core sampling method. No sample analysis results are available due to insufficient sample recoveries. However, field observations made during core sampling indicate that the waste level and the elevation of the tank bottom are variable and not predictable. The bottom of the tank or a very resilient waste material was struck several inches prior to reaching the expected tank bottom under risers 14 and 17, and there was a eleven inch elevation difference between the two riser tank bottom encounters (Weiss and Schull 1988).

Figure 1. Fill history of Tank 241-A-104.



2.3.1 Sample Analytical Results

The 1974 sludge sample analytical results are given in Table 1 (Buckingham and Horton 1974; Wheeler 1974).

Table 1. Analytical Results for Tank A-104 Waste.

Physical Data		
Date of Sample Retrieval	03/25/74	09/04/74
Sample Description	Yellow, <1% solids 600 mrad/hr	Fluid but viscous
Bulk Density	1.132 g/ml	1.64 g/ml
pH	10.49	NR
Chemical Analysis (μg/g)		
Al	140	46,000
Ba	NR	1,000
Ca	NR	10,000
Mg	NR	2,000
Mn	NR	24,000
Fe	NR	170,000
Si	NR	14,000
OH	7,200	NR
Wt% H_2O	NR	42.3%
Radiological Analysis (μCi/g)		
GEA ^{134}Cs	0.73	20
GEA ^{137}Cs	287	700
Cs sep ^{134}Cs	0.87	NR
Cs sep ^{134}Cs	282	NR
$^{89+90}Sr$	NR	26,800
^{60}Co	NR	36
^{125}Sb	NR	360
^{154}Eu	NR	79
^{239}Pu	NR	0.11 g/l

NR = Not reported.

3.0 SCHEDULED SAMPLING EVENT

3.1 Sample Collection and Transport

In fiscal year 1994, auger samples from tank A-104 auger samples will be taken from risers 1, 4, 7, and 17. Eight inches of sludge (approximately 300 g) are expected to be retrieved. No drainable liquids are expected to be recovered; however, some liquids may be contained in the waste. A field/trip blank is not required since this sampling event is not in support of any regulatory issues (Zuroff 1994). For specific information concerning sample handling, custody, and transport refer to quality assurance/quality control requirements in Section 4.1. Documents which contain applicable operating procedures and chain of custody requirements for the A-104 auger sampling activities are procedure TO-080-500 and work package 2E-94-00703.

3.2 Tank-Specific Analytical Procedures

Any decisions, observations, or deviations to this characterization plan made during sample receipt, isolation, and analysis shall be documented in the deliverable report.

3.2.1 Hot Cell Sample Isolation and Analysis Scheme

Before sample removal and breakdown begins, H. Babad or another delegate of the Characterization Program should be contacted so that they may be present to observe the sample breakdown. Because of the limited turn-around time for the safety screening analyses, the laboratory will not delay sample breakdown more than 4 hours to accommodate program observers. The sample isolation and breakdown procedure will follow guidelines provided in this Tank Characterization Plan.

A flowchart showing the general safety screening sample breakdown and analysis scheme is presented as Figure 2. All auger samples are to be prepared and analyzed in accordance with this scheme, assuming adequate sample exists to perform all the analyses. These analysis requirements are prioritized (see section 3.2.2) and should be performed accordingly if insufficient sample is recovered. If necessary, the laboratory may make modifications to this breakdown. Sample receipt, custody, preparation, and analysis shall be performed in accordance with approved procedures.

- Step 1 Receive auger samples at the performing laboratory.
- Step 2 Isolate and break down auger samples. Record visual observations of physical properties of the sample, such as sample color, texture, homogeneity, and consistency. Also note the color and clarity of any drainable liquid. Take a color photograph or videotape documenting the isolated samples.
- Step 3A If the auger contains any drainable liquid, proceed to Step 3B. If no drainable liquid is present go to Step 4A.
- Step 3B Separate the drainable liquid from the solids by allowing the liquid to drain into a bottle. Measure and record the volume of the liquid. The liquids are to be retained for further analyses.

- Step 3C Immediately report any visually observed potential organic layers by the early notification system (Format I). Separate and retain the potential organic liquids for possible future analyses. Proceed to Step 4A.

- Step 4A Inspect the top portion of the auger sample for a hard, dry layer. If present continue to step 4B, otherwise go to step 5.

- Step 4B Separate the hard, dry layer and retain for analysis. Go to Step 5.

- Step 5 Separate remaining auger sample into two equal subsamples.

- Step 6 Homogenize each subsample individually.

- Step 7 Filter the aqueous sample through a 0.45 micron filter. Retain liquid subsamples for safety screening analyses.

- Step 8 Remove aliquots from each solid and liquid subsample obtained in Steps 4B, 6, and 7. Retain enough sample to perform each analysis in Table 2 except RSST adiabatic calorimetry. Secure and retain any remaining subsamples until analyses are complete.

- Step 9 Perform DSC/TGA analysis on each undried solid subsample and liquid sample in duplicate. Perform total alpha analysis on fusion dissolution of each solid aliquot in duplicate; total alpha analysis is not required on the liquid aliquot.

- Step 10A Analyze DSC/TGA scans and total alpha results. Are the DSC/TGA results within the established safety criteria limits? Are the total alpha results less than the established safety criteria limits (see Table 2, Notification Limits)? If the answer is no for either question, go to step 10B. If yes to both questions, then proceed to Step 11.

- Step 10B Report results exceeding notification limits as described in the format I reporting deliverable requirements (see Section 7.1). Proceed to the following steps (10C, etc.).

- Step 10C Perform analyses for secondary analytes.

  - If the DSC safety criteria limit was exceeded, perform micro cyanide distillation and hot persulfate TOC analyses on each solid and liquid aliquot in duplicate. In addition, perform RSST adiabatic calorimetry analysis [1].

  - If the total alpha safety criteria limit was exceeded, determine radiological activity due to the presence of $^{230/240}$Pu on each solid and liquid aliquot in duplicate. Also, determine Iron, Manganese, and Uranium concentrations by Inductively Coupled Plasma (ICP) analysis.

---

1 RSST, if necessary, shall be performed at the 222-S Laboratory from an archived subsample which shows a DSC exotherm.

- •Step 10D Are the results of analyses for secondary analytes within safety criteria limits? If not go to step 10E, if the answer is yes proceed to step 11.
- •Step 10E Report results for the secondary analytes exceeding notification limits as described in the format I reporting deliverable requirements (see Section 7.1).
- • Step 11 Archive remaining sample. Any subsamples remaining from crust/sludge/liquid separations should be archived in separate containers (Bratzel 1994).
- • Step 12 Deliver a Format III Report that summarizes the results of the safety screening for primary analytes within 45 days of receipt of the last sample at the laboratory loading dock. Follow the Format III Reporting requirements provided in Section 7.2.
- • Step 13 Following the same reporting requirements, deliver a Format III Report that summarizes the results of the safety screening for secondary analytes within 90 days of receipt of the last sample at the laboratory loading dock (required only if any primary analytes exceeded notification limits).

3.2.2 Prioritization of Requested Analyses

A list of analyses to be performed for tank safety screening is provided in preferential order in Table 2. However, if the amount of sample recovered is found to be insufficient to perform each analysis in Table 2, Characterization Support and Analytical Services shall be notified (for points of contact, see Section 5.0, Table 3). Confirmation of the prioritization levels or revision of sample breakdown procedures may be provided based upon the sample recovery, readily observable physical property distinctions within the sample, and the requested sample breakdown steps provided in section 3.2.1.

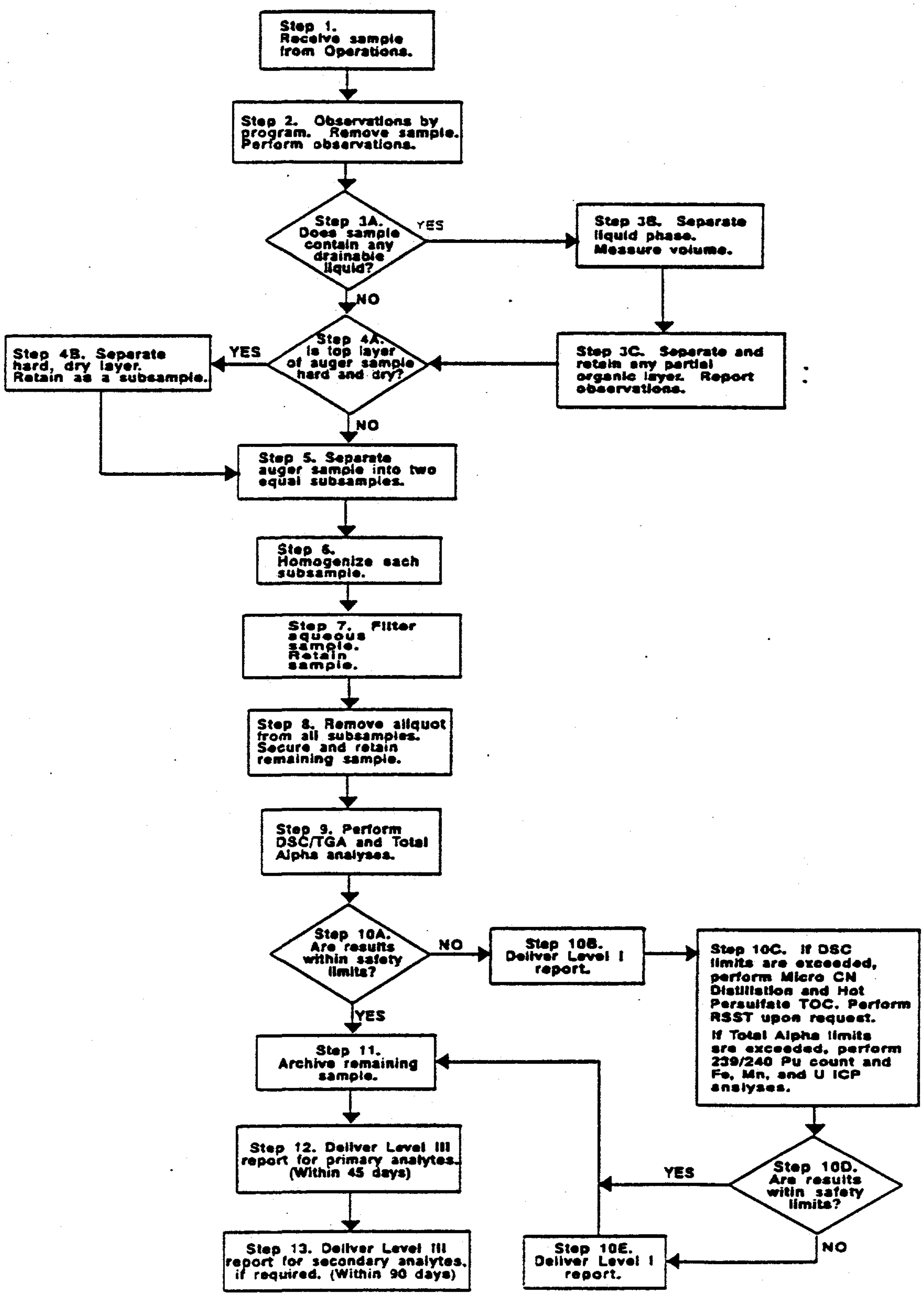
PRIORITY LEVEL 1

First, DSC and TGA analyses shall be performed to determine a fuel energy value and weight percent moisture. Second, total alpha activity will be determined on a fusion preparation.

PRIORITY LEVEL 2

If the net energetics of the tank waste from the thermal analysis are greater than 125 cal/g on a dry weight basis, or if the alpha activity exceeds 41 μCi/g (see Section 6.2 for unit conversion guidelines), further analyses to determine concentration levels of total organic carbon (TOC), cyanide (CN), Plutonium 239/240 ($^{239/240}$Pu), Iron (Fe), Manganese (Mn), and total uranium (U) will be done.

Figure 2: Test Plan Flowchart for Tank Safety Screening.



PRIORITY LEVEL 3

If the DSC shows that a net exotherm greater than or equal to 125 cal/g (on a dry weight basis) exists in tank A-104, and adequate sample is available, personnel at the 222-S Laboratory are directed to perform an adiabatic calorimetry analysis using the Reactive System Screening Tool (RSST) method to characterize the exothermic behavior.

3.2.3 Analytical Methods

Table 2 summarizes the analyses to be performed as well as the corresponding laboratory procedure numbers. All analyses, except RSST adiabatic calorimetry, are requested to be performed in duplicate at the performing laboratory. If the performing laboratory is not the 222-S Laboratory, arrangements shall be made by the performing laboratory for transport of one or more waste samples to the 222-S Laboratory for RSST analysis.

These analyses are based on the *Tank Safety Screening DQO* (Redus and Babad 1994). None of the analyses are being used to support regulatory compliance; therefore, regulatory methods are not required.

Any analyses prescribed by this document but not performed shall be identified, with justification for non-performance, in the appropriate data report. Also in this situation, Characterization Support and Analytical Services personnel shall be contacted (Section 5.0, Table 3).

4.0 QUALITY ASSURANCE/QUALITY CONTROL

4.1 Sampling Operations

Auger samples are to be taken and shipped to the performing laboratory by Sampling Operations in accordance with the Work Package 2E-94-00703. That work package shall also initiate the chain-of-custody form. Approved operating procedures for obtaining an auger sample are provided in procedure TO-080-500 and cask loading and transport procedure TO-080-090.

When a decision is made to perform the sampling activity, Analytical Services Program Management and Integration will designate the performing laboratory based on availability and capacity. The sampling and transportation documentation shall be revised to identify the assignment of the performing laboratory.

The auger samples are to be shipped in a cask and sealed with a waste tank sample seal. All sample shipments are identified by a unique number and labeled with the following information:

WASTE TANK SAMPLE SEAL

Supervisor	Sample No.
Date of Sampling	Time of Sampling
Shipment No.	Serial No.

Sampling Operations should send the samples to the laboratory within 1 working day, if possible, of removing the sample from the tank, but must send the samples within three working days of removal from the tank. Sampling Operations is responsible for verbally notifying the project coordinator at the 222-S Laboratory at least 24 hours in advance of an expected shipment. If the samples are sent to the 325 Analytical Chemistry Laboratory (ACL), Sampling Operations shall notify the project manager at least 72 hours in advance of an expected shipment.

The sampling team is responsible for documenting any problems and procedural changes affecting the validity of the sample in a field notebook in addition to recording this information in the comment section of the chain-of-custody form.

4.2 Laboratory Operations

The sample receipt and control procedures used in the Pacific Northwest Laboratories 325 ACL are reported in the *Quality Assurance Plan for Activity Conducted by the Analytical Chemistry Laboratory (ACL)*, (Kuhl-Klinger 1994). Procedures used in the Westinghouse Hanford 222-S Laboratory are described in LO-090-101.

Analyses and quality assurance/quality control performed at the 325 ACL shall be guided by the 325 Laboratory Quality Assurance Plan (Kuhl-Klinger 1994). The 222-S Laboratory has a quality assurance program plan (Meznarich 1994) and a quality assurance project plan (Taylor 1993) that shall provide the quality assurance/quality control requirements for analyzing the tank waste samples.

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 2. If no criteria are provided in Table 2, the performing laboratory shall perform to its quality assurance plan(s).

Table 2. A-104 Auger Sample Chemical, Phys

Project Name	A-104 Auger	CHARGE CODES	ORGANIZATION
Plan Number	WHC-SD-WM-TP-247	ED4599 (PNL)	Pacific Northwest Laboratory
Tank	A-104	TBD (WHC)	Laboratory Engineering
4 Augers	Auger Nos. 1,2,3,4	TBD (WHC)	Program Support
Program Contact	H. Babad	TBD (WHC)	Laboratory Data Management
TWRS Conta	R. D. Schreiber	TBD (WHC)	Sample Data and Lab Administration
Lab. Project Coordinator	S. G. McKinley (PNL) K. E. Bell (WHC)	TBD (WHC)	Shift Relief/Data Handling

ANALYSES					PREPARATION			
METHOD	ANALYTE	WHC PROCEDURE	PNL PROCEDURE	UNITS	ACID	FUS	H_2O	OTHER
DSC	energy	LA-514-113	PNL-ALO-508	cal/g				direct
TGA	% water	LA-560-112	PNL-ALO-508	%				direct
Alpha Det.	Total α	LA-508-101	PNL-ALO-421 PNL-ALO-423	µCi/g		X		
Visual	Organic Layer	LA-519-151	PNL-ALO-	none				direct
RSST[2]	energy	see [4]	N/A	cal/g				direct
Microdist.[2]	CN	LA-695-102	PNL-ALO-270 PNL-ALO-285	µg/g				direct
Hot Persulfate[2]	TOC	LA-342-100	PNL-ALO-381	µg/g				direct
Sep & α count[3]	Pu-239/240	LA-503-156	PNL-ALO-423 PNL-ALO-422	µCi/g		X		
ICP[3]	Fe, Mn, U	LA-505-151	PNL-ALO-211	µg/g	X	X		

1 ea - each, DUP - duplicate, spk/msd - spike or matrix spike duplicate, PB - preparation batch, AB - analytical batch, NA - not applicable, mtrx - matrix, std - calibration standard.

2 These analyses are performed only if the DSC Measurement indicates an energy content greater than 125 cal/g (dry weight basis).

3 These analyses are performed only if total alpha activity exceeds 41 µCi/g.

cal, and Radiological Analytical Requirements

COMMENTS
Homogenization Test - Not Required Field Blank - Not Required Hot Cell Blank - Not Required

REPORTING FORMATS	
FORMAT I	Early Notify
FORMAT II	Process Control
FORMAT III	Safety Screen
FORMAT IV	Waste Management
FORMAT V	RCRA Compliance
FORMAT VI	Special

QUALITY CONTROL[1]				CRITERIA				REPORT FORMAT
DUP	SPK/MSD[7]	BLANK	STD	PRECISION	ACCURACY	NOTIFICATION LIMIT[8]	EXPECTED RANGE	
ea smpl	N/A	N/A	ea AB	≤10%	90-110%	>125 cal/g (dry)	N/A	I, III
ea smpl	N/A	N/A	ea AB	≤10%	90-110%	<17 wt%	15 - 45 wt%	I, III
ea smpl	1/mtrx	ea PB	ea AB	≤10%	90-110%	>41 μCi/g[6]	N/A	I, III
N/A	N/A	N/A	N/A	N/A	N/A	presence	N/A	I, III
N/A	N/A	N/A	ea AB	≤10%	90-110%	>125 cal/g (dry)	N/A	I, III
ea smpl	1/mtrx	ea AB	ea AB	≤10%	90-110%	>31,000 μg/g (dry)	N/A	I, III
ea smpl	1/mtrx	ea AB	ea AB	≤10%	90-110%	>30,000 μg/g	N/A	I, III
ea smpl	1/mtrx[5]	ea PB	ea AB	≤10%	90-110%	>41 μCi/g[6]	6E-6 Ci/g	I, III
ea smpl	1/mtrx	ea PB	ea AB	≤10%	90-110%	none	1.7E+5 Fe 2.4E+4 Mn N/A U (all μg/g)	III

4 The RSST method, yet to be proceduralized, may be found in WHC-SD-WM-TP-104, Rev. 0.
5 Tracer or carrier may be used in place of a spike and results corrected for recovery.
6 See assumption in Section 6.2 to convert alpha detection results to curies.
7 Post-digestion spike, except for ICP acid digest, which shall have a pre-digestion spike.
8 If not specified, action limits are on wet basis.

5.0 ORGANIZATION

The organization and responsibility of key personnel involved in this tank A-104 safety screening project are listed in Table 3.

Table 3: Tank A-104 Project Key Personnel List.

Individual	Organization	Responsibility
S. G. McKinley	325 Analytical Chemistry Laboratory	Project Manager for Tank Waste Characterization
J. G. Kristofzski	222-S Analytical Operations	Program Support Manager of Analytical Operations
R. D. Schreiber	TWRS Characterization Support	A-104 Tank Characterization Plan Cognizant Engineer
H. Babad	WHC Characterization Program	Characterization Program Point of Contact
J. L. Deichman	Analytical Services	Manager of Analytical Services Program Management and Integration
East Area Shift Operations Manager	Tank Farm Operations	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

At this time no exceptions to the safety screening data quality objective, pertaining to this Tank Characterization Plan, have been identified.

6.2 Clarifications and Assumptions

A number of clarifications and assumptions relating to the notification limits or decision thresholds identified in the applicable DQO effort need to be made with respect to the analyses in Table 2. Each of these issues are discussed below (Bell 1994a).

- Any exotherm 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 thermal gravimetric analysis.

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

- (Redus and Babad 1994) requires that additional analyses be performed if total alpha activity measures greater than 1 g/L. Total alpha activity is measured in μCi/mL rather than g/L. To convert the notification limit for total alpha activity into a number more readily usable by the laboratory, two assumptions and calculations are necessary. All alpha decay will be assumed to originate from Pu-239 and a sample density of 1.50 g/mL is assumed. The notification limit then may then be calculated as:

$$1\ g/L\ limit * 1\ L/E{+}3\ ml * 1\ mL/1.5\ g * 0.062\ Ci/g * E{+}6\ \mu Ci/Ci = 41 \mu Ci/g$$

- The safety screening DQO effort, upon which the analyses are based, does not address the analyses performed on any drainable liquid present. To adequately characterize the tank, all analyses performed on the solids shall also be performed on any drainable liquids with the exception of total alpha activity. Results shall be reported by volume (μg/ml).

- The DQO effort also does not address field and hot cell blanks. Since none of the analyses are being performed for regulatory purposes or for trace amounts of analyte, no field or hot cell blank are required.

7.0 DELIVERABLES

All analyses of tank waste material will be reported as format I or III, as shown in Table 2. The Characterization Program may request progress reports from the laboratory regarding the analyses. However, due to the rapid turn around time required for the safety screening analyses (the laboratories must report the results for primary analytes within 45 days of receipt of the last sample at the laboratory loading dock), no special progress reports for this tank characterization project shall be required from the laboratory. All reports generated as part of normal operations (e.g., monthly reports) shall still be done. All data shall be reported by tank or by sample. The data shall be reported in the units given in Table 2. More information regarding reporting formats is found in (Schreiber 1994a).

7.1 Format I Reporting

Table 2 contains the notification limits for each analyte. Analytes that exceed the notification limits defined in the DQO process shall be reported by calling the East Area Shift Manager of Tank Farm Operations at 373-2689 and the Characterization Program office (Schreiber 1994b). This verbal communication must be followed within 1 working day by written communication to C. DeFigh-Price, D.R. Bratzel and H. Babad of the Characterization Program, R. D. Schreiber of Characterization Support, J. L. Deichman of Analytical Services, and N.W. Kirch of Waste Tank Process Control, documenting the observation(s). A further review of the data, including quality control results and additional analyses for verification of the exceeded analyte, may be contracted between the performing laboratory and the contacts above.

7.2 Format III Reporting

A format III report, involving the results of the primary safety screen analysis, shall be issued to C. Defigh-Price, D. R. Bratzel, H. Babad, R. D. Schreiber P. Sathyanarayana, and N. W. Kirch within 45 days of receipt of the last sample at the laboratory loading dock. Although normally raw data would not be attached to this type of report, the DSC and TGA scans have been requested due to the interpretive nature of the analysis. If analysis for the 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 accordingly. Changes may be documented through the use of analytical deviation reports or internal characterization change notices for minor, low-impact changes. All significant changes shall be documented by Characterization Support via an Engineering Change Notice to this Tank Characterization 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.

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