WSRC-RP-2000-00387

Task Technical and Quality Assurance Plan for the Characterization of the Tank 40H Samples

by
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DISCLAIMER

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INTRODUCTION

The High Level Waste Tank Farms store and process high-level liquid wastes from a number of sources including F- and H-Canyons and a recycle stream from the Defense Waste Processing Facility (DWPF). The deposition of sodium aluminosilicate along with sodium diuranate in the 242-16H evaporator system[1] led to the removal of authorization to process High Level Waste containing DWPF recycle. Therefore, High Level Waste Engineering has requested SRTC to perform analysis of the contents of Tank 40H and associated transfers from sludge washing to ensure silicon levels are sufficiently low to allow processing of the supernate through the 3H Evaporator.[2]

TASK DESCRIPTION

The following analysis will be conducted in duplicate on each of the Tank 40H Surface samples:

- Density measurements will be taken along with visual observations
- Dilution of a portion of the as-received sample into dilute nitric acid followed by elemental analysis

The following tests will be performed on the Variable Depth sludge sample.

- A portion of the as-received sample will be filtered. The supernate will be analyzed as described for the surface samples. The sludge will be dried and dissolved using either sodium peroxide or cesium hydroxide and characterized using similar analyses.
- Simulated Tank 40H/ESP wash water (1 M sodium hydroxide and 0.4 M sodium nitrate) will be added to a given volume of the VDS sludge sample and agitated in a manner similar to Tank 51K washing experiments.[3] Following agitation, the slurry will be filtered through a 0.2-micron filter. The filtrate will be analyzed for soluble silicon and aluminum.

A confirmatory sample will be obtained from Tank 40H after the initial radioactive washing and analyzed by SRTC in a similar manner as the surface samples.

Table 1 provides a listing of the analysis that the samples will receive. WPT personnel will discuss adaptations to these techniques on a sample by sample basis to tailor the analyses for specific analytes of interest.

Table 1. Analyses to be performed on the Tank 40H Samples

Analytical Method	Surface As-Received	VDS Sludge Sample
Density	X	X
CsOH Dissolution	X	-
Pu 238/241	X	X
ICP-MS (Actinides)	X	X
ICP-ES Scan	X	X
Gamma Scan	X	X
Sr-90	X	X

DELIVERABLES AND ACCEPTANCE

The deliverables include written or oral reports (as requested) and one or more final reports incorporating the results. The final reports will include the results of the various analyses of the Tank 40H samples. Reports will include a design check per WSRC Manual E7, procedure 2.40.[4] The final reports will receive approval from selected CSTE personnel.

RESPONSIBILITIES

Personnel in the Waste Processing Technology Section will:

- Plan and direct the task activities.
- Interpret and document results and conclusions.

Personnel in the Shielded Cells Operations (SCO) Group will:

- Conduct sample dilution, digestion, drying and washing activities and will prepare sample aliquots for submission to Analytical Development Section (ADS) for analysis under direction from WPT and ADS personnel.

Personnel in the Analytical Development Section will:

- Help in the direction of SCO personnel and
- Provide analytical services for the samples.

DOCUMENTATION

All pertinent instructions, results and calculations will be recorded in a numbered notebook (WSRC-NB-yy-xxxx) in accordance with Manual L1, SRTC Procedures Manual, procedure 4.19.[5] A laboratory notebook will provide lifetime storage as a record. Drafts of all preliminary reports will receive review by selected WPTS and HLWE for comments. Final reports will issue after comment resolution.

RISK REVIEW

Table 2 depicts the programmatic risks associated with this task and the associated mitigation, where identified.

Table 2: Programmatic Risk and Mitigation

Risk Factor	Event	Mitigation
Equipment Balances Ovens	Failure	Backup ovens and balances are available in the Shielded Cells.
Analytical Support	Failure of Instrument	Failure could result in short program delays.
Personnel	Illness Vacation	Primary and secondary researchers and analysts have been identified.
Facility Electrical Ventilation	Outage	Could result in short delays.

SCHEDULE

The following schedule estimates the completion of the deliverable for this task.

Issue Task Plan	May 26, 2000
Obtain Samples	May 23, 2000
Complete Washing, Dissolution and Digestions	June 07, 2000
Complete Analyses	June 13, 2000
Issue Report	June 21, 2000

SAFETY

The author has completed the R & D safety checklist as described in the conduct of R & D Manual.[6] It is provided as Attachment 2 of this report.

QUALITY ASSURANCE

Task Quality Assurance Checklist

See Attachment 1.

Conduct of Research and Development Checklist

See Attachment 2.

Documents Requiring Customer Approval

The following documents require customer approval:

- Task Technical and Task Quality Assurance Plan
- Final Report

RECORDS

The following items shall be designated records for this experimental program:

-" Task Technical and Quality Assurance Plan for the Characterization of the Tank 38H Variable Depth and Core Samples," WSRC-RP-2000-00369.
-Controlled laboratory notebook(s)
-Final report
-Supporting documentation as determined by the task leader.

REFERENCES

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[1] W. R. Wilmarth, C. J. Coleman, A. R. Jurgensen, W. M. Smith, J. C. Hart, W. T. Boyce, D. Missmer, and C. M. Conley, "Characterization and Dissolution Studies of Samples from the 242-16H Evaporator," WSRC-TR-2000-00038, Rev. 0, January 31, 2000.
[2] R. Ross, HLW Technical Request Form, HLE-TTR-2000-040, April 24, 2000.
[3] M. S. Hay and N. E. Bibler, "The Characterization and Centrifuge-Settled Washing of a Tank 51 Sludge Sample Obtained in October 1995 (U), WSRC-RP-95-1003, November 25, 1995.
[4] "Design Verification and Checking," Manual E7, Procedure 2.40, Rev. 0, May 26, 1993.
[5] Technical Notebook Use," Manual L1, Procedure 4.19, Rev. 5, February 2, 1998.
[6] "Conduct of Research and Development," WSRC-IM-97-0024, Rev. 1, November 30, 1998

APPROVALS

Authors

5/23/00

W. R. Wilmarth, Waste Processing Technology — Date

Quality Assurance

31 MAY 2000

J. J. Connelly, SRTC Quality Assurance Section — Date

Management

2 JUNE 2000

S. D. Fink, Manager, Level 4 Manager,
Waste Processing Technology — Date

5/23/00

B. L. Lewis, Manager
CST Engineering — Date

ATTACHMENT 1

WPT TASK QUALITY ASSURANCE PLAN CHECKLIST

Task Technical Plan No: WSRC-RP-2000-DRAFT Task Title: Task Technical and Quality Assurance Plan for the Characterization of the Tank 40H Samples

Listed below are the sections of WSRC 1Q. Check WSRC 1Q sections applicable to the task. Also check procedures WPT implements to control the task. This checklist identifies only procedures used to control task activities performed by WPT.

(Form Revised 3/99)

WSRC 1Q Section	Applies To Task	QA Procedures Implemented by WPT	Procedure Used
Organization	X	1Q, QAP 1-1, Organization L1, 1.02, SRTC Organization	X X
		1Q, QAP 1-2, Stop Work	X
QA Program	X	1Q, QAP 2-1, Quality Assurance Program L1, 8.01, SRTC QA Program Implementation L1, 8.02, SRTC QA Program Clarifications	X X X
		1Q, QAP 2-2, Personnel Training & Qual. L1, 5.01, SRTC Training, Orient. & Employee Dev. L1, 1.32, Read and Sign L1, 1.33, Facility Access Training/Employee Orient.	X X X X
		1Q, QAP 2-3, Control of R&D Activities L1, 8.02, SRTC QA Program Clarifications L1, 7.10, Control of Technical Work	X X X
		1Q, QAP 2-4, Auditor/Lead Auditor Qual. & Cert.	NA for WPT
		1Q, QAP 2-5, Qual. & Cert. of Independent Insp. Personnel	NA for WPT
		1Q, QAP 2-6, QA Manual Revisions	X
		1Q, QAP 2-7 QA Program Req. for Analytical Measurement Systems	NA for WPT
		1Q, QAP 2-10, Independent Inspection Personnel On-The-Job Trn.	NA for WPT
		L1, 4.19, Laboratory Notebooks and Logbooks	X
Design Control		1Q, QAP 3-1, Design Control L1, 7.10, Control of Technical Work	
Procurement Document Control		1Q, QAP 4-1, Procurement Document Control 7B & 3E (for reference only) L1, 8.02, SRTC QA Program Clarifications	

WSRC 1Q Section	Applies To Task	QA Procedures Implemented by WPT	Procedure Used
Instructions, Procedures and Drawings	X	1Q, QAP 5-1, Instructions, Procedures, & Drawings E7, 2.30, Drawings L1, 1.01, SRTC Procedure Administration L1, 1.01.1, Work Instruction Administration	X X X
Document Control	X	1Q, QAP 6-1, Document Control L1, 1.30, Document Control	X X
Control of Purchased Items and Services		1Q, QAP 7-2, Control of Purchased Items & Services 7B & 3E (for reference only)	
		1Q, QAP 7-3, Com. Grade Item Dedication & Material Upgrade E7, 3.46, Replacement Item Evaluation/Commercial Grade Item Dedication	
Identification and Control of Items	X	1Q, QAP 8-1, ID and Control of Items L1, 8.02, SRTC QA Program Clarifications	X X
Control of Processes		1Q, QAP 9-1, Control of Processes	NA for WPT
		1Q, QAP 9-2, Control of Nondestructive Examination	NA for WPT
		1Q, QAP 9-3, Control of Welding & Joining Processes Y12	NA for WPT
		1Q, QAP 9-4, Work Control 1Y, 8.01, Work Control Procedure L1, 8.02, SRTC QA Program Clarifications	
Inspection		1Q, QAP 10-1, Inspection & Verification L1, 8.10, Inspection L1, 8.10.1, Independent Inspection Releases	 NA for WPT NA for WPT
Test Control		1Q, QAP 11-1, Test Control (applies to WPT only for acceptance testing)	
Control of Measuring & Test Equipment	X	1Q, QAP 12-1, Control of Measuring &Test Equipment	X
		1Q, QAP 12-2, Control of Installed Process Instrumentation	
		1Q, QAP 12-3, Control & Calibration of Radiation Monitoring Equipment	
Packaging, Handling, Shipping & Storage		1Q, QAP 13-1, Pkg., Handling, Ship. & Storage L1, 8.02, SRTC QA Program Clarifications	
Inspection, Test, and Operating Status		1Q, QAP 14-1, Inspection, Test, & Operating Status L1, 8.02, SRTC QA Program Clarifications	

WSRC 1Q Section	Applies To Task	QA Procedures Implemented by WPT	Procedure Used
Control of Nonconforming Items & Action	X	1Q, QAP 15-1, Control of Nonconforming Items L1, 8.02, SRTC QA Program Clarifications	X X
		1Q, QAP 15-2, Control of Nonconforming Activities L1, 8.02, SRTC QA Program Clarifications	X X
Corrective Action System	X	1Q, QAP 16-1, Corrective Action System	X
		1Q, QAP 16-2, Quality Alert	X
Quality Assurance Records	X	1Q, QAP 17-1, Quality Assurance Records Management	X
Audits	X	L1, 8.18, SRTC QA Audit Program	X
		1Q, QAP 18-2, QA Surveillance L1, 8.18.1, Surveillance	X X
		1Q, QAP 18-3, QA External Audits L1, 8.18, SRTC QA Audit Program	X X
		1Q, QAP 18-4, Management Assessments 12Q, Assessment Manual	X X
		1Q, QAP 18-6, Quality Assurance Internal Audits	
Quality Improvement	X	1Q, QAP 19-2, Quality Improvement L1, 8.02, SRTC QA Program Clarifications	X X
Software Quality Assurance		1Q, QAP 20-1, Software QA L1, 8.20, Software Management & Quality Assurance	
Environmental Quality Assurance		1Q, QAP 21-1, Quality Assurance Requirements for the Collection and Evaluation of Environmental Data	NA for WPT

Attachment 2. R & D Checklist

Conduct of Research & Development Savannah River Technology Center
R&D Hazards Screening Checklist

Listed below are characteristics of an experiment/project that may present hazards above normal risks to SRTC. Circle YES or NO for each item listed. For each "yes" answer you will be directed to a secondary hazard review or reviews that will direct completion of specific actions need to manage/mitigate the identified hazard.

1.1.1.1.1 ENERGIES

A. Electricity (exposed energized parts > 50V). YES **NO**
See Figures 4, 5, 11 & 12.

B. Fissionable materials (accountable or > reportable quantity. YES **NO**
Specify:_____
See Figures 4, 5, 6, 7, 8, 9 & 11.

C. High noise levels (>85dBA). YES **NO**
See Figures 4, 8, & 11.

D. Microwave/radio frequencies (30 KHz- 300 GHz), YES **NO**
electric or magnetic fields.
See Figures 4, 8, & 11.

E. Lasers (other than class 1). YES **NO**
See Figures 4, 8, & 11.

F. Moving equipment (exposed belts, chains, gears, YES **NO**
pinch rollers, pulleys, rotating shafts/blades, wheels, etc.)
See Figures 4, 8 & 11.

G. Radioactive materials. **YES** NO
Specify: RadionuclidesCs-137, Uranium, Plutonium
Amount 0.0003g Cs-137, 4.1E-4 g Uranium, 2.5E-6 g Pu-238, 5.9E-7 g Pu-239, all <reportable
Physical Form High Level Waste Tank Samples (2 variable depth (supernate) 1 sludge sample
See Figures 4, 5, 6, 7, 8, 9, & 11.
No new equipment, facility or process to be started, therefore no JHA required.
Need to complete screening PHR.
Need to complete USQ screening.
No Job Specific RWP required because activity is not non-routine, first time or infrequently performed, nor will it require entry into high or very high radiation area.
No changes to baseline hazards assessment required because no new chemicals or hazardous conditions are introduced.
Environmental Evaluation Checklist not required because activity does not involve new process or change to existing process, and waste will become part of existing waste stream.

No SMI-51 inspection is required since no new or altered equipment will be placed in service.

H. Static magnetic fields > 600 Gauss. YES **NO**
See Figures 4, 8, & 11.

I. Sub-radiofrequency (<30 KHz) electric and magnetic fields. YES **NO**
See Figures 4, 8, & 11.

J. Temperatures (<32°F or >150°F). Consider furnaces, ovens, dryers, boilers, steam systems, heaters, dewars, chillers, and release of compressed gases. YES **NO**
See Figures 4, 8, 10, & 11.

K. Vacuum and external pressure-Are any system parts (including vessels, piping, fitting, sensors, etc.) not rated for the maximum external pressure or vacuum possible in the system? Consider all sources of external pressure and vacuum sources including: closed outlets on vessel, inadvertent valve opening, compressor/pump failure, vacuum pump exhaust plugged, regulator/control valve failure, check valve malfunction, utility failure, process change-including chemical reactions-thermal expansion and transient surges. Example: a 55 gallon drum would implode if a full vacuum was pulled on it. YES **NO**
See Figures 4, 8, 11, & 12.

L. Internal Pressure-Are any system parts (including vessels, piping, fitting, sensors, etc.) not rated for the maximum pressure possible? consider all pressure sources including: closed outlets on vessels, inadvertent valve opening, compressor/pump failure, regulator/control valve failure, check valve malfunction, utility failure, unanalyzed process change or condition-including chemical reactions-thermal expansion and expansion and transient surges. Example: instrumentation not rated for full bottle pressure in case of regulator failure. YES **NO**
See Figures 4, 8, 11, & 12.

M. Pressure vessels (> 15PSI and >6" ID; and/or contain toxic, corrosive, or nuclear materials). YES **NO**
See Figures 4, 8, 11 &12.

WORKSITE ENVIRONMENTAL CONDITIONS

A. Boating or work over water. YES **NO**
See Figure 4, 8, & 11.

B. Cold or heat stress conditions. YES **NO**
See Figure 4, 8, & 11.

C. Confined spaces/trenches/or evacuations. YES **NO**
See Figures 4, 8, & 11.

D. Flammable atmospheres (> 10% LEL). YES **NO**
See Figures 4, 5, 8, 10, & 11.

E. Oxygen deficient atmospheres (<19.5% O_2). YES **NO**
See Figures 4, 5, 8, & 11.

F. Toxic atmosphere (airborne contaminant concentrations expected to exceed 50% of the Threshold Limit Value). YES **NO**
See Figures 4, 5, 8, & 11.

G. Activity performed in a nuclear facility. **YES** NO
See Figure 6.

HAZARDOUS MATERIALS

A. Biological Agents. YES **NO**
See Figures 4, 5, 8, 9, & 11.

B. Carcinogens, mutagens, teratogens. YES **NO**
Specify:_____
See Figures 4, 5, 8, 9, & 11.

C. Corrosives. **YES** NO
See Figures 4, 5, 8, 9, & 11.
Note: Samples will be caustic, but personnel will handle remotely in Shielded Cells.
No JHA will be performed because activity does not involve the startup of new facility, equipment or process.

D. Cryogenic gases/liquids. YES **NO**
See Figures 4, 5, 8, & 11.

E. Flammable/combustible gases, liquids, solids. YES **NO**
Specify: _____
Amount: _____
See Figures 4, 5, 8, 9, 10, & 11.

F. Toxic Chemicals. YES **NO**
Specify: _____
Amount: _____
See Figures 4, 5, 8, 9, & 11.

G. Lead. YES **NO**
See Figure 8.

H. Oxidizers **YES** NO
Specify: Contained in Sample
Amount: _____
See Figures 4, 5, 8, 9, 10, & 11.

I. Any hazardous substance. YES **NO**
Specify:_____
See Figures 4, 5, 8, 9, & 11.

1.1.1.2 ENVIRONMENTAL COMPLIANCE

A. Potential release of regulated gas or particulate to the environment. YES **NO**
See Figure 9.

B. Potential release of regulated materials to a waste disposal system. **YES** NO
See Figure 9.

C. Waste disposal problems (including equipment). YES **NO**
See Figure 9.

D. Creation of hazardous/mixed/radioactive waste. **YES** NO
See Figure 9.

1.1.1.3 EXPERIMENTAL SYSTEM/EQUIPMENT MODIFICATION OR MAINTENANCE

A. System/equipment utilizes/contains hazardous energy. YES **NO**
See Figure 12.

DISTRIBUTION

C. I. Aponte, 703-H
M. J. Barnes, 773-A
C. J. Berry, 704-8T
C. S. Boley, 703-H
T. E. Britt, 703-H
W. C. Clark, 704-56H
J. J. Connelly, 773-41A
S. D. Fink, 773-A
F. F. Fondeur, 773-A
J. R. Fowler, 704-196N
D. T. Hobbs, 773-A
R. A. Jacobs, 704-3N
M. D. Johnson, 703-H
M. T. Keefer, 706-8C
B. L. Lewis, 703-H
T. J. Lex, 703-H
S. W. McCollum, 773-A
M. S. Miller, 704-56H
M. J. Montini, 703-H
J. P. Morin, 703-H
J. K. Norkus, 730-2B
C. A. Nash, 773-43A
L. M. Papouchado, 773-A
R. A. Peterson, 773-A
S. F. Piccolo, 703-H
M. R. Poirier, 773-42A
R. H. Ross, 703-H
L. A. Strong, 703-H
P. C. Suggs, 704-196N
R. F. Swingle, 773-A
W. L. Tamosaitis, 773-A
G. A. Taylor, 704-196N
T. C. Temple, 703-H
W. B. Van Pelt, 773-42A
D. D. Walker, 773-A
W. R. Wilmarth, 773-42A
G. T. Wright, 773-A
LWP Files c/o C. Canada, 773-A
STI, 703-43A