ESH-EPG-2008-00012

CY2007 Annual Report
Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service

**As Required By The
Federal Facility Agreement
For The Savannah River Site**

March 2008

ACRONYMS

BWR	Bulk Waste Removal
CD	Conceptual Design
CY	Calendar Year
D&R	Dismantlement and Removal
DOE-HQ	United States Department of Energy – Headquarters
DOE-SR	United States Department of Energy – Savannah River Field Office
DWPF	Defense Waste Processing Facility
EPA-4	United States Environmental Protection Agency Region-4
FBSR	Fluidized Bed Steam Reforming (a proposed Technology)
FFA	Federal Facility Agreement for the Savannah River Site
FTF	F-Area Tank Farm
FTF-WD	F-Area Tank Farm Waste Determination
FY	Fiscal Year
HTF	H-Area Tank Farm
LWO	Liquid Waste Organization
NDAA	Ronald W. Reagan National Defense Authorization Act for FY2005 (Pub. L. 108-375)
NRC	Nuclear Regulatory Commission
PA	Performance Assessment
SCDHEC	South Carolina Department of Health and Environmental Control
SMP	Submersible Mixer Pump
SRS	Savannah River Site
USC	United States Code
UT	Ultrasonic Nondestructive Examination
WAO	Wet Air Oxidation (a proposed Technology)
WR	Waste Removal
WSRC	Washington Savannah River Company LLC (formerly Westinghouse Savannah River Company)

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I. Introduction

Subsections IX.B.2.(b) and IX.E.3 of the Federal Facility Agreement for the Savannah River Site (FFA) require the United States Department of Energy – Savannah River (DOE-SR) to submit an annual report to the United States Environmental Protection Agency – Region 4 (EPA-4) and the South Carolina Department of Environmental Control (SCDHEC) on the status of the radioactive liquid waste tanks located in the F- and H-Areas of the Savannah River Site being removed from service. Pursuant to a November 19, 2007 settlement agreement entitled *Statement of Resolution of Dispute Concerning Extension of Closure Dates for Savannah River Site High-Level Radioactive Waste Tanks 19 and 18*, entered into by DOE-SR, SCDHEC, and EPA-4, this annual report includes a status of the bulk waste and heel removal activities for the F- and H-Area Tanks, F- and H-Area Tank Farm Performance Assessments, F- and H-Area Tank Farm Closure Plans, operational closure of groups of tanks in the F- and H-Areas, and implementation of Section 3116(a) of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA) with respect to the F- and H-Area tanks. FFA Tank System/Component Report(s) required to be prepared by the FFA are attached. Finally, this report includes the CY2007 Groundwater Monitoring Report for the F- and H-Area Radioactive Liquid Waste Tank Farms. The status of waste processing related to the Defense Waste Processing Facility, the Saltstone Production Facility and the Saltstone Disposal Facility are provided in quarterly reports such as the recently issued *Saltstone Status Report – Third Quarter 2007*.

II. Overview of Non-Compliant Tanks

Tanks scheduled for removal from service either do not meet current secondary containment and leak detection standards, or have potential leak sites. DOE-SR intends to remove tank systems from service as opposed to providing secondary containment for non-compliant systems. The tanks that do not meet secondary containment and leak detection requirements or that have leaked (as documented in tank assessment reports) include Tanks numbered 241-901F (Tank 1F) through 241-924H (Tank 24H) located in both the F-Area and H-Area Tank Farms. Tanks 241-917F and 241-920F have already undergone both waste removal and operational closure.

Waste removal efforts in CY2007 focused primarily on the installation, testing, and performance of waste removal operations on Tanks 5F, 6F, and 12H. Sludge Batch 4 operations continued through the year, and Sludge Batch 5 preparation commenced development. F-Area Tank Farm Performance Assessment scoping meetings were conducted with SCDHEC, EPA-4, and DOE-SR during the year. The F-Tank Farm Performance Assessment was delivered to DOE-SR in late December of 2007. A review of this performance assessment document by DOE-SR will commence in early CY2008.

III. Other Liquid Waste Organization Developments

Revised Closure Schedule for Tanks 241-919F (19F) and 241-918F (18F)

The Federal Facility Agreement (FFA) dates for closure of the twenty-four old style tanks, including Tanks 19F and 18F, were revised in 2004. In early CY2006, DOE-SR requested a thirteen month extension of the closure dates for Tanks 19F and 18F. On November 19, 2007, in accordance with the provisions of the FFA, SCDHEC, EPA-4, and the DOE-SR agreed to a revised operational closure date of December 31, 2012 for these two tanks. These parties also agreed to dates for bulk waste removal and operational closure efforts on the remaining twenty tanks. The revisions in this resolution supersede the dates shown for operational closure of Tanks 19F and 18F in the FFA Waste Removal Schedule, Revision 2 (09/06/2004). The November 19, 2007 *Statement of Resolution of Dispute Concerning Extension of Closure Dates for Savannah River Site High-Level Radioactive Waste Tanks 19 and 18* is appended to the FFA in new "Appendix L – Statements of Dispute Resolution."

Tank 241-948H (48H) Recovery Project

To support removal of the twenty-two old style tanks from service, space in the remaining tanks is needed. One tank proposed for this purpose is Tank 48H. A technology maturation plan was delivered in early November of 2007 to DOE-SR for both Fluidized Bed Steam Reforming (FBSR) and Wet Air Oxidation (WAO) technologies for the proposed treatment of the contents of Tank 48H. The material in this tank includes Cesium-137 (Cs-137) and tetraphenyl borate (TPB). In order to return Tank 48H to service, the nitrates, nitrites, and organic TPB must be reduced or eliminated. The FBSR and WAO technologies are considered the candidate processes to accomplish this waste removal and treatment activity. An integrated project team is currently reviewing this plan.

Status of Bulk Waste and Heel Removal Activities for the F- and H-Area Tanks

In the H-Area Tank Farm (HTF), Tank 12H remained ready for bulk waste removal activities in support of Sludge Batch 6. For Tank 13H, the Bulk Waste Removal Project Conceptual Design (CD1) milestone was achieved. A vendor demonstration for annulus cleaning of Tank 16H was also performed in calendar year 2007. Tank 13H Bulk Waste Removal Project scope includes plans for using Tank 13H as the processing or hub tank for waste removal activities within HTF. In the F-Area Tank Farm (FTF), Tank 7F has been designated as a hub tank to receive and stage radioactive waste prior to transfer to Tank 51H. Tank 51H has discrete times when it can receive waste based on the Defense Waste Processing Facility's Sludge Batch preparation cycle time. The use of Tank 7F as a hub tank allows waste removal in FTF to continue somewhat independent of HTF operations. Mechanical Sludge Removal was completed in Tank

6F using two Submersible Mixer Pumps (SMPs). Three SMPs were installed in Tank 5F to enable Mechanical Sludge Removal from that tank and actual operation will begin early in CY08. During mid-CY08, Chemical Cleaning of Tanks 5F and 6F will occur. Oxalic Acid will be added to the sludge heels remaining in Tanks 5F and 6F to dissolve most of the metal hydroxides to facilitate additional waste removal. Submersible Mixer Pumps are already installed in Tank 4F to support future sludge waste removal operation. The sludge in Tank 4F is destined for an upcoming Defense Waste Processing Facility Sludge Batch. However, a hard layer of a salt mineral called Burkeite existed on top of the Tank 4F sludge layer. The Burkeite layer was dissolved by adding several batches of Inhibited Water and transferring the resulting solution to another waste tank. Waste removal from Tanks 18F and 19F was originally completed in 2003 and 2001 respectively. Tank 18F had approximately 6,700 gallons of waste remaining and Tank 19F had approximately 16,800 gallons remaining, including supernate, at the end of CY2007. After extensive evaluations, new technology called a Sand Mantis was selected in CY07 that could potentially remove additional waste including zeolite mounds by mechanical means from Tanks 18F and 19F. Current plans are to transfer the removed material to Tank 7F. A contract was awarded to a vendor to design, build, and operate the Sand Mantis in these tanks. Deployment of the Sand Mantis in Tanks 18F and 19F is scheduled for CY08.

F- and H-Area Tank Farm Performance Assessments

The primary technical reference for the Section 3116 Waste Determination and State of South Carolina Closure Plans is the Performance Assessment document. A total of seven F-Area Tank Farm Performance Assessment scoping meetings were conducted with SCDHEC, EPA-4, NRC, DOE-HQ and DOE-SR during the year. Six of the meetings were in Columbia, South Carolina and one meeting was in Washington, D.C. The minutes for these meetings are posted on the following website: http://www.em.doe.gov/Pages/3116Summaries.aspx**.** The pre-decisional draft F-Tank Farm Performance Assessment Revision A was delivered to DOE-SR in late December of 2007. DOE-SR began their review in January 2008 followed by the DOE-HQ Low Level Waste Federal Review Group review and comment incorporation. Planning activities to support development of the Performance Assessment for H-Area Tank Farm (HTF) were begun in November, 2007, and a contract for the HTF Performance Assessment Modeling was awarded in February 2008.

F- and H-Area Tank Farm Closure Plans

The F-Area Tank Farm Performance Assessment (FTF PA) development includes evaluation of both radiological and chemical constituents in the groundwater modeling to determine groundwater concentrations at varying points of assessment as well as other pertinent information that will be utilized in the development of the F-Area Tank Farm Closure Plan. No additional F-Area Tank Farm Closure Plan specific activities were performed in 2007.

Operational Closure of Groups of Tanks in the F- and H-Areas

The F-Area Tank Farm Performance Assessment development work discussed above will support the planning and technical evaluations for operational closure of tank groupings.

Implementation of Section 3116(a) of the Ronald W. Reagan National Defense Authorization Act for FY2005 with respect to the F- and H-Area Tanks

Discussions between SRS, DOE-HQ and the Nuclear Regulatory Commission (NRC) occurred throughout CY2007 and will continue during CY2008 regarding the approach to be taken for development of the F Tank Farm Waste Determination (FTF-WD) as required by Section 3116. As a part of these discussions several Generic Technical Issue meetings were held involving DOE-HQ, DOE-SR, WSRC, DHEC and groups from the DOE complex on several technical issues related to Section 3116 Waste Determination development, including Point of Compliance, Removal of Highly Radioactive Radionuclides / Key Radionuclides to the Maximum Extent Practical, Sensitivity and Uncertainty Analyses and Model Support, and Concentration Averaging. Submittal of the FTF PA for review by the NRC in 2008 will be the next step towards development of the FTF Waste Determination.

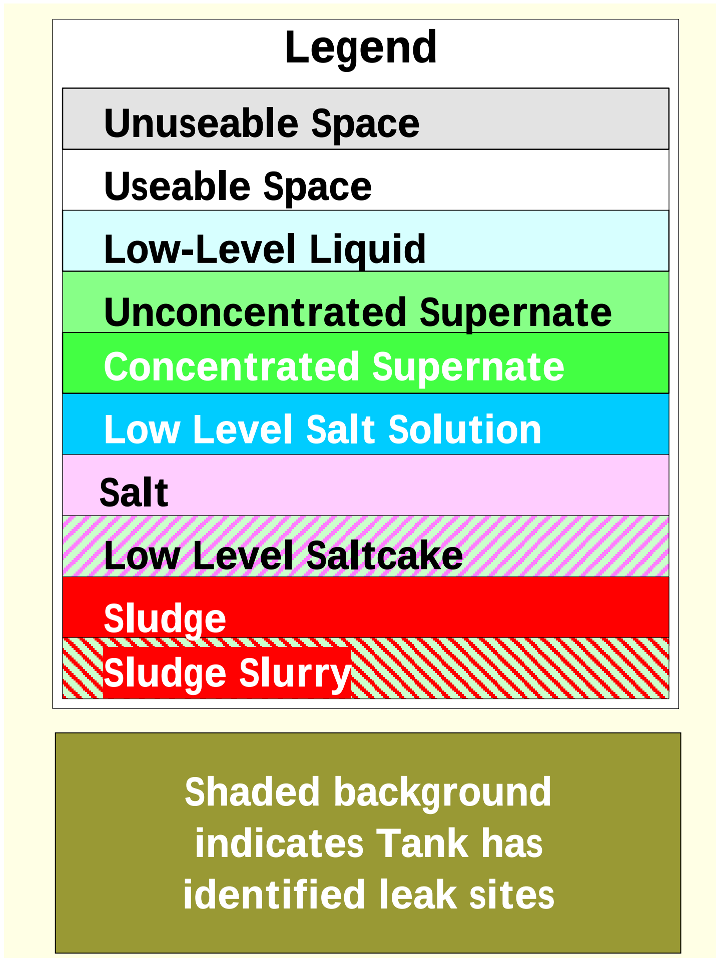
APPENDICES

Appendix A – Individual Tank Status Report

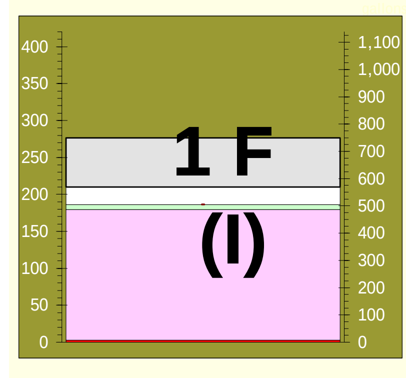
Appendix B – F/H Area Tank System/Component Reports

Appendix C – CY2007 Groundwater Monitoring Report

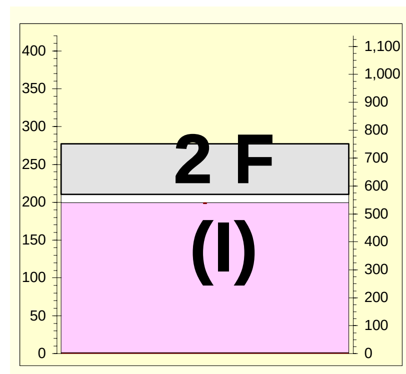
Appendix A – Individual Tank Status Report


Legend
Unuseable Space
Useable Space
Low-Level Liquid
Unconcentrated Supernate
Concentrated Supernate
Low Level Salt Solution
Salt
Low Level Saltcake
Sludge
Sludge Slurry
Shaded background indicates Tank has identified leak sites

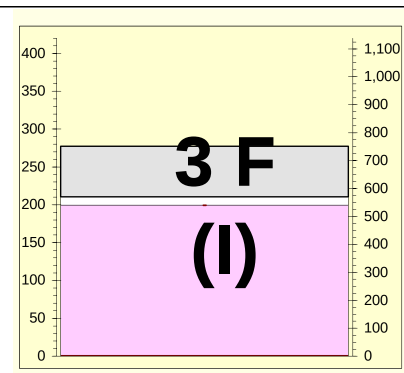
Tank No.: 1 Tank Type: I Contents: Salt

No new activity for CY2007. **Tank 1F has 1 known leak site.**	

Tank No.: 2 Tank Type: I Contents: Salt

No new activity for CY2007. **No known leak sites.**	

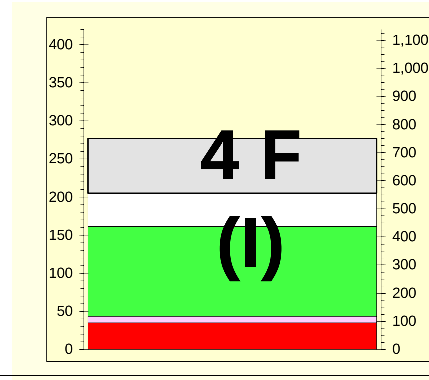
Tank No.: 3 Tank Type: I Contents: Salt

No new activity for CY2007. **No known leak sites.**	

Tank No.: 4 Tank Type: I Contents: Water / Salt/ Sludge

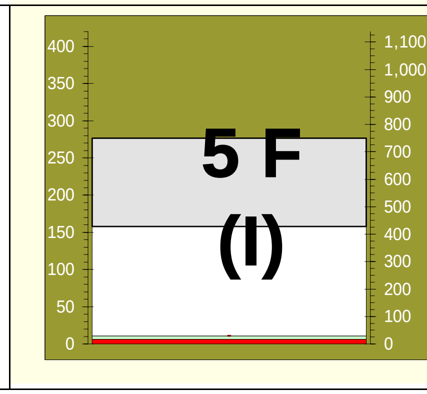
No known leak sites.

Hard salt mineral layer called Burkeite that existed on top of the sludge layer was dissolved by adding multiple batches of Inhibited Water to Tank 4F. The resulting salt solution was transferred out in preparation for future sludge removal.



Tank No.: 5 Tank Type: I Contents: Sludge

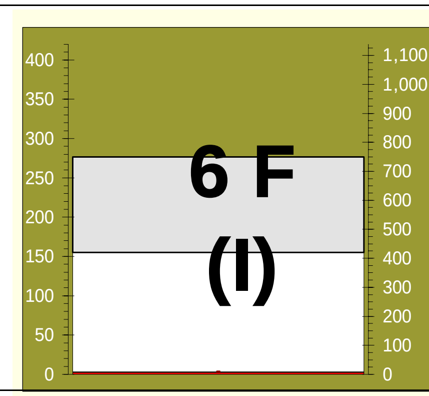
18 known leak sites. Small quantity of waste (less than 10 gallons) is on the annulus floor. Dried salt nodules and deposits have formed on the Tank wall. Three Submersible Mixer Pumps (SMPs) were installed to support mechanical sludge removal. The SMPs will be turned over to FTF Closure Operations in early CY08 and additional sludge will be removed from Tank 5F using the SMPs, the goal being less than 7,500 gallons remaining. Once the SMPs reach their limit of effectiveness, Oxalic Acid will be added to dissolve much of the remaining solids. The resulting acidic solution will be pumped to Tank 7F where it will be neutralized.



Tank No.: 6 Tank Type: I Contents: Sludge / Water

6 known leak sites. Approximately 92 gallons of dried waste is on the annulus floor. An old leak site was reactivated during waste removal operations. Waste is below the lowest known leak site.

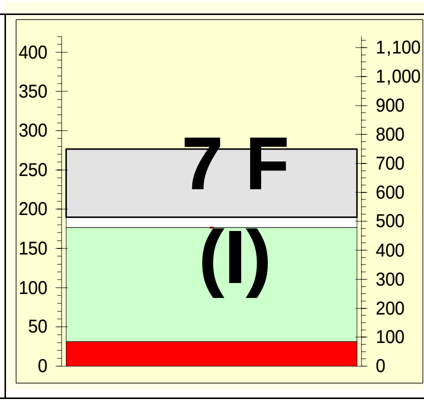
Two Submersible Mixer Pumps (SMPs) were installed to support mechanical sludge removal. Eleven operational campaigns were conducted using the SMPs which resulted in a sludge heel of approximately 5900 gallons. In CY08, Oxalic Acid will be added to dissolve much of the remaining solids. The resulting acidic solution will be pumped to Tank 7F where it will be neutralized.



Tank No.: 7 Tank Type: I Contents: Sludge / Water

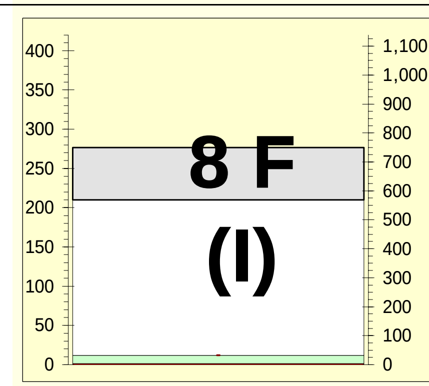
No known leak sites.

Tank 7F has been designated as a hub tank to receive and stage radioactive waste prior to transfer to Tank 51H. This tank is also used to receive acidic solutions from Tanks 5F and 6F for neutralization.



Tank No.: 8 Tank Type: I Contents: Sludge / Water

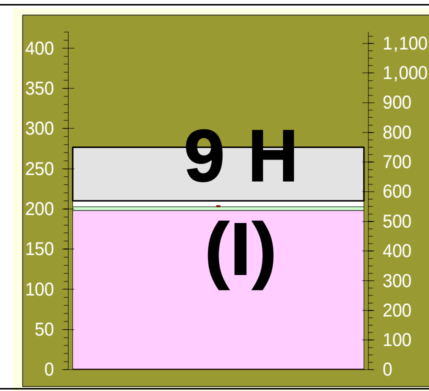
No known leak sites.



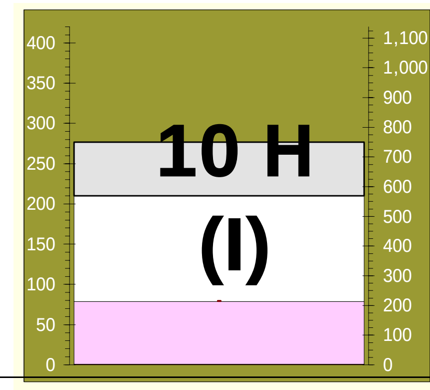
Tank No.: 9 Tank Type: I Contents: Salt

Tank 9H has at least 4 leak sites. Waste has accumulated on the annulus floor.

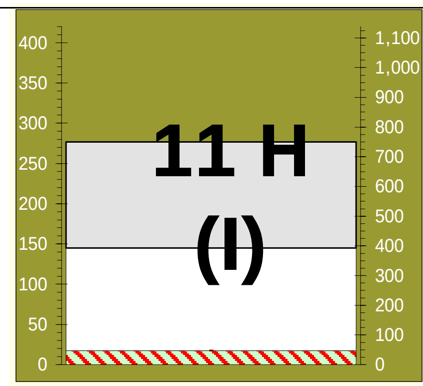
No new activities in CY2007.



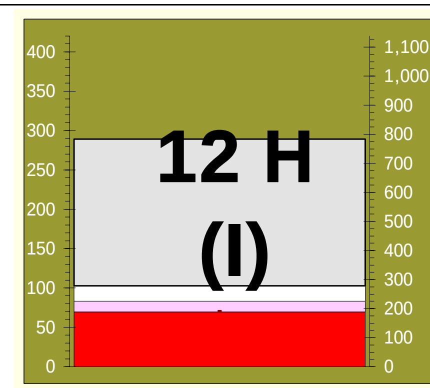
Tank No.: 10 Tank Type: I Contents: Salt

Tank 10H has at least 1 leak site. A small quantity of waste has accumulated on the annulus floor. **No new activities in CY2007.**	

Tank No.: 11 Tank Type: I Contents: Sludge / Water

Tank 11H has 2 leak sites and trace amounts of waste are present on the annulus floor. **Preparation to support the aluminum dissolution campaign for Sludge Batch 5 accomplished in CY2007.**	

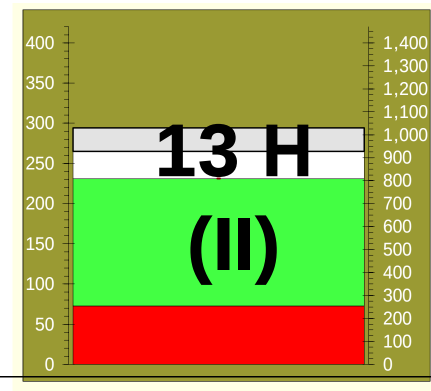
Tank No.: 12 Tank Type: I Contents: Sludge

A total of 5 leak sites have been identified. **Tank ready for Waste Removal program in support of Sludge Batch 6.**	

Tank No.: 13 Tank Type: II Contents: Sludge / Water

Tank 13H has 2 leak sites. A trace amount of waste is present on the annulus floor.

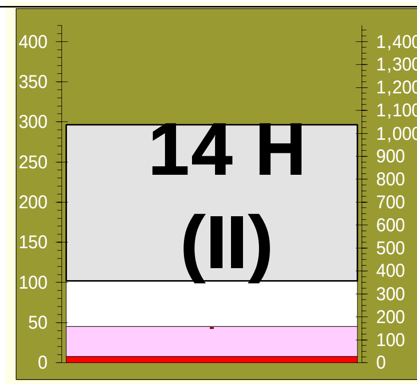
Conceptual Design completed for required Waste Removal equipment. Design for Dismantlement and Removal (D&R) of three risers completed and issued.



Tank No.: 14 Tank Type: II Contents: Mixed Salt / Sludge

Tank 14H has approximately 50 leak sites. A quantity of waste has accumulated on the annulus floor.

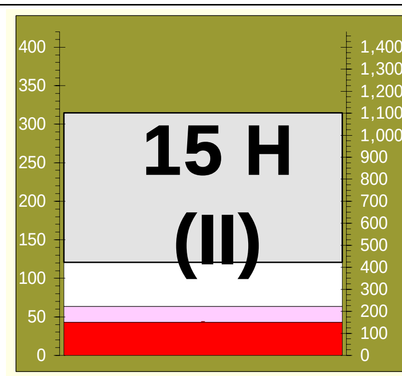
No new activities in CY2007.



Tank No.: 15 Tank Type: II Contents: Salt / Sludge

Tank 15H has 20 leak sites. A small quantity of waste has accumulated on the annulus floor.

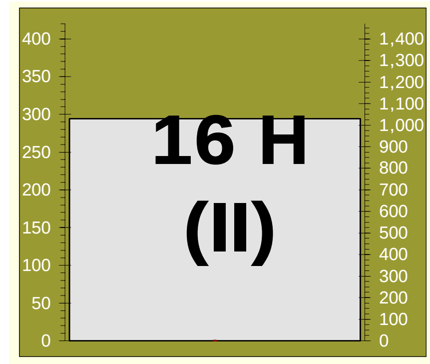
Ultrasonic nondestructive examination (UT) measurements by use of a crawler were completed in CY2007.



Tank No.: 16 Tank Type: II Contents: Empty

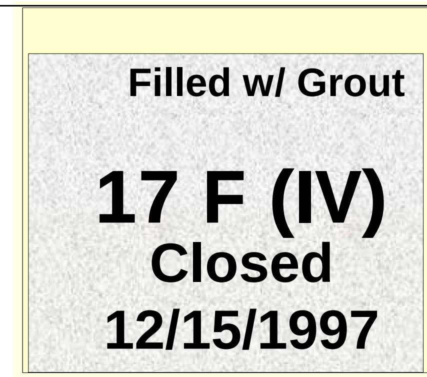
This out of service tank has numerous leak sites. Chemical cleaning of the tank interior has been completed. Some waste remains in the annulus.

Vendor demonstration of annulus cleaning technology was performed in CY2007. Waste in the annulus has been sampled. The annulus was inspected through the use of a crawler. The Conceptual Design for annulus cleaning was completed.



Tank No.: 17 Tank Type: II Contents: Fill Material

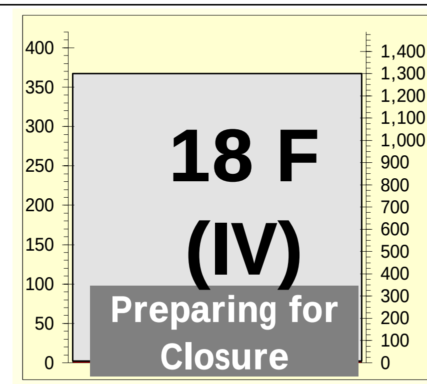
Operational closure of Tank 17F was approved by SCDHEC on December 15, 1997.



Tank No.: 18 Tank Type: IV Contents: Water/Sludge/Zeolite

No known leak sites. The tank has been isolated to preclude waste transfers.

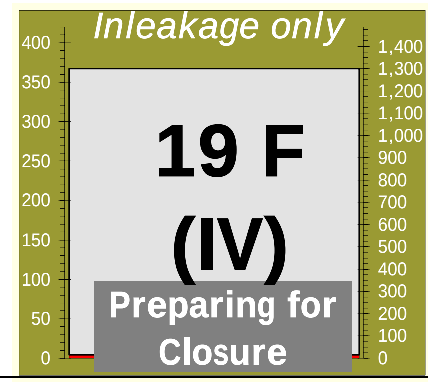
The current waste volume is estimated to be 6,700 gallons. A contract has been awarded to a Vendor to design, fabricate, and operate a Sand Mantis in Tank 18F to remove additional waste. The Sand Mantis will be deployed in Tank 18F in CY08.



Tank No.: 19 Tank Type: IV Contents: Sludge / Zeolite

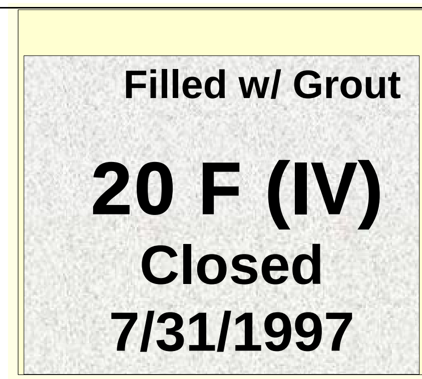
Tank 19F has a leakage history. The tank has been isolated to preclude waste transfers.

The current waste volume is estimated to be 16,800 gallons. A contract has been awarded to a Vendor to design, fabricate, and operate a Sand Mantis in Tank 19F to remove additional waste. The Sand Mantis will be deployed in Tank 19F in CY08.



Tank No.: 20 Tank Type: IV Contents: Fill Material

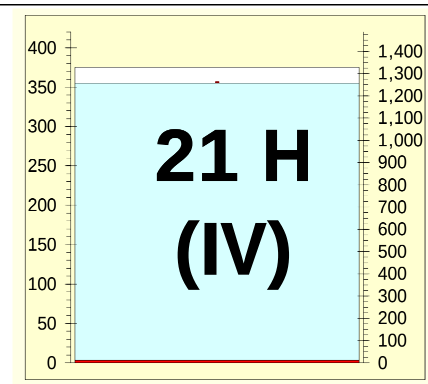
Operational closure of Tank 20F was approved by SCDHEC on July 31, 1997.



Tank No.: 21 Tank Type: IV Contents: Sludge / Water

No known leak sites. Tank 21H is used for storage of dilute wastewater.

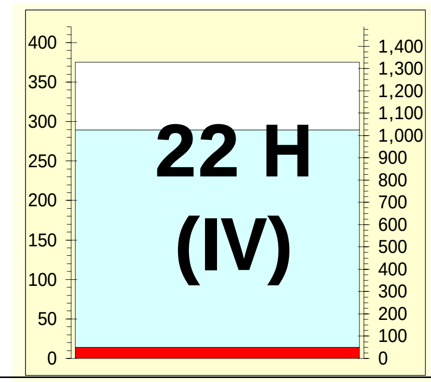
No new activities in CY2007.



Tank No.: 22 Tank Type: IV Contents: Sludge/Dilute Wastewater

No known leak sites. Tank 22H is used to store dilute wastewater.

No new activities in CY2007.

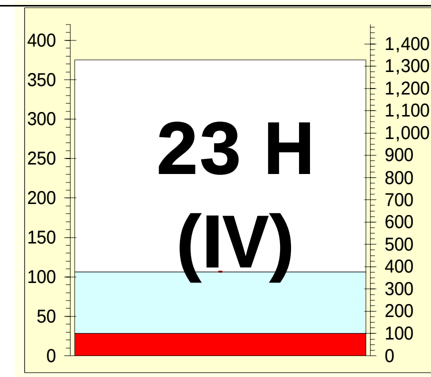


Tank No.: 23 Tank Type: IV Contents: Sludge / Water

No known leak sites.

No new activities in CY2007.

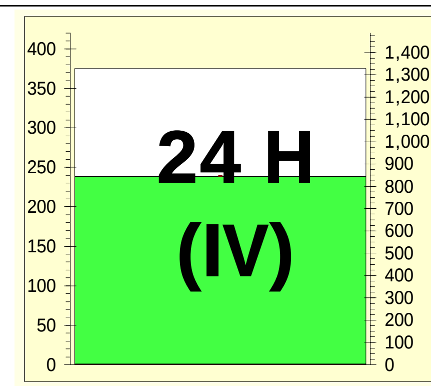
The low activity liquid is used for adjustment in the salt waste material to be processed in the Saltstone Production Facility.



Tank No.: 24 Tank Type: IV Contents: Sludge / Water

No known leak sites. Tank 24H is used to store dilute wastewater.

No new activities in CY2007.



Appendix B

F/H Area Tank System/Component Reports

The following Federal Facility Agreement Tank System/Component assessment reports are attached for activities completed in CY2007:

1. Assessment Report for the Modular Caustic Side Solvent Extraction Unit Transfer Line Tie-In Modification, M-ESR-H-00255, Revision 0 (16 pages).

2. Assessment Report for the Modular Caustic Side Solvent Extraction Unit, M-ESR-H-00271, Revision 0 (30 pages).

3. Assessment Report for the Transfer Line Modifications Between Tank-37 and HDB-6, M-ESR-H-00291, Revision 0 (11 pages).

Appendix B-1

Assessment Report for the Modular Caustic Side Solvent Extraction Unit Transfer Line Tie-In Modification

M-ESR-H-00255, Revision 0

ASSESSMENT REPORT

FOR THE

MODULAR CAUSTIC SIDE SOLVENT EXTRACTION UNIT TRANSFER LINE TIE-IN MODIFICATION

DISCLAIMER

APPROVAL SIGNATURES/SUMMARY OF CHANGES

APPROVALS

PREPARER/TITLE Paul Weller Design Engineer PD&CS/ Design Services Paul Weller	DATE 5/15/06
REVIEWER Cameron Castellaw Paul Weller for Cameron Castellaw per telecon Design Engineer PD&CS/ Design Services	5/15/06
APPROVAL for 5/18/06 Ken Burrows Design Authority Manager ISDP-MCU K Burrows	5/17/06
APPROVAL William Van Pelt Design Authority W.B. Van Pelt Waste Solidification Engineering	5-23-06
APPROVAL Sergio Mazul Project Engineer Sergio Mazul PD&CS/ Design Services	5/18/06

SUMMARY OF CHANGES

Rev. No	Reason for Change	Pages Affected	Issue Date
0	Initial Issue	N/A	

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1.0 Executive Summary

This Assessment Report is being submitted to satisfy requirements of Appendix B of the Savannah River Site (SRS) Federal Facility Agreement (FFA).

The purpose of this modification is to receive feed from the Actinide Removal Process (ARP or 512-S), process the feed in the Modular Caustic Side Solvent Extraction Unit (MCU) and transfer the products to Tank 50 and the Defense Waste Processing Facility (DWPF). The products of the MCU are Decontaminated Salt Solution (DSS) to Tank 50, and Cesium Strip Effluent to DWPF.

This installation will modify Inter-Area Transfer Lines WTS-L-1663 (known as RCZ37 and 1663) and SDP1 as stated below:

- Lines 1663 and SDP1, at the tie-in location, are 3" sch 40 stainless steel core pipes contained in separate secondary containments, 10" sch 40 carbon steel jacket pipes. Line 1663 shares a jacket with Line SDP2 (3" sch 40 stainless steel core pipe) and Line SDP1 shares a jacket with Line PCP341 (3" sch 40 stainless steel core pipe) (See Figures 1-4).
- The current routing of Line 1663 is from the Actinide Removal Process Facility (512-S) to Tank 50. Line SDP1 currently routes from Tank 51 Transfer Valve Box to the Low Point Pump Pit (LPPP). Lines 1663 and SDP1 are routed parallel to the North wall of the new MCU, approximately 50 feet away (See Figure 1).
- A section of both (1663 and SDP1) 3" core pipes and 10" jacket pipes will be removed. The end of Line 1663 (renamed to RCZ37) from 512-S will be routed south to MCU (Line 1459). The end of 1663 to Tank 50 (renamed to RCZ38) will be routed south to MCU (Line 1657). The end of SDP1 to LPPP will be routed south to MCU (Line 1755) and the end of SDP1 from Tank 51 Transfer Valve Box will be capped (See Figures 2, 2A, 3 and 4).
- The existing secondary containments, jacket pipes, slope to active Leak Detection Boxes (LDB). The RCZ37 and RCZ38 jacket collects at LDB 70 and LDB 190 near 512-S, the 1663 jacket collects at LDB 003 near Tank 50 and the SDP1 jacket collects at LDB 20 near LPPP. The three new lines which exit the North wall of the MCU (lines 1459, 1657 and 1755) will slope towards the tie in location with existing transfer lines. In addition, existing LDBs will be utilized as part of the MCU Transfer Line Modifications.

The lengths of hot tie in sections shall be minimized to facilitate installation.

The Transfer Line Tie-In Modification will require the modification of the Tank 51 Transfer Valve Box to provide positive isolation of Line SDP1 during tie-in. The actuator on valve PV-2030 will be deactivated and one Grayloc Blind Seal Ring will be installed on the header side of Line WTS-16054/SDP1 in the Transfer Valve Box (Y351-15-1) (See Figure 5).

This installation is part of the MCU Project (U-MT-H-00085) described in more detail in WSRC Document No. G-TC-H-00041.

This assessment report covers the modification and routing of transfer lines into and out of the MCU Process Area and isolation of Line SDP1 from Tank 51. The modifications as defined in this assessment report meet the requirements of Appendix B of the FFA.

2.0 Design Information

2.1 Modification Activities

The new MCU Transfer Line Tie-In Modification includes the following activities:

a) Tank 51 Transfer Valve Box

- Lift the leads to Actuator Limit Switches, ZS-2030A and ZS-2030B, and solenoid valve, PY-2030.
- Remove the air tubing from the solenoid valve, PY-2030, to the actuator and cap the solenoid and actuator ends.
- Remove the Grayloc remote jumper containing valve, PV-2030, replace the current Grayloc seal ring with a Grayloc blind seal ring on the header side of the jumper and reinstall the jumper (See Figure 5).

b) Transfer Lines

- Excavation for routing transfer lines into north wall of MCU.
- Waste Transfer Lines Modification for tie-ins
  - Cut and modify jacket and core pipe of Line 1663 to provide a feed (RCZ37) and discharge (RCZ38) tie-in for MCU (see Figures 2, 2A, 3 and 4).
  - Cut and modify jacket and core pipe of Line SDP1 to provide a discharge tie-in for MCU (See Figures 2, 2A, 3 and 4).
  - Cut and modify jacket and core pipe of Line PCP341 to provide clearance for Lines 1459 and 1657 to pass overhead.
- Waste Transfer Lines Installation (new)
  - Install jacket and core pipe of Lines 1459 and 1657 to provide a feed path to MCU and discharge to Tank 50 (See Figures 1-4).
  - Install jacket and core pipe of Line 1755 to provide a discharge path to DWPF from MCU (See Figures 1-4).
  - Install jacket and core pipe of Line PCP341 to provide clearance for overpass of Lines 1459 and 1657 while maintaining slope through reduction.

c) For the new secondary containment carbon steel jacket piping, an underground coating system SRUG-40/41 F is used. This coating system is a combination of an inorganic zinc primer with hydrophobic powder (dri-therm or gilsulate) encasement around the jacket piping.

d) Backfill the surrounding area around secondary jacket piping.

2.2 Design Documents

The following design documents cover the design, installation, inspection, examination, and testing of the MCU Transfer Line Tie-In Modification:

2.2.1 M-DCP-H-05011 – Tank 51 Transfer Valve Box Modification

2.2.2 P-DCP-H-05006 – MCU Transfer Line Installation

2.2.3 M-M6-H-02449 – MCU Transfer Line Tie-In P&ID

2.2.4 M-QIP-H-00218 – Quality Inspection Plan for the Modular Caustic Side Solvent Extraction Unit (MCU) T1 Package and Transfer Line Tie-In DCP

2.2.5 M-ML-H-07236 – Piping Data Sheets for 241-278H MCU Transfer Lines

2.2.6 S1 Design Package

- C-CC-H-08275 – MCU Process and Contactor Area Wall Elevations

2.2 References

2.3.1 SRS Standards, Guides and National Codes

Design changes will be executed under the following standards from the SRS Engineering Standards Manual, WSRC-TM-95-1:

01060	SRS Structural Design Criteria
01110	Civil Site Design Criteria
05057	SRS Welding Requirements
05951	Corrosion Evaluation: Stainless Steels and Other Corrosion Resisting Alloys
15060	ASME B 31.3, Additional Requirements for SRS Piping Systems

2.3.2 SRS Engineering Practices Manual WSRC-IM-95-58

Design changes will be executed using the following Guides from the SRS Engineering Standards Manual, WSRC-IM-95-58:

02224-G	Excavation, Backfill and Grading
09903-G	Corrosion Protection - Underground Steel
15060-G	Application of ASME B31.3
15140-G	Field Fabrication and Installation of Pipe Supports

2.3.3 Other FFA Supporting Documents

SRNL-MTS-2006-00088 - "Evaluation of Waste Compatibility in the MCU Transfer Piping"

WSRC-OS-94-14 "Radiological Containment Guide"

3.0 Waste Compatibility

The processes in the Modular Caustic Side Solvent Extraction Unit (MCU) generate and transfer Decontaminated Salt Solution (DSS) to Tank 50, and Cesium Strip Effluent to DWPF. These solutions are transferred in batch mode through a stainless steel core pipe with a carbon steel jacket pipe with a leak detection system.

The DSS to Tank 50 is compatible with waste transfer materials previously evaluated in section 3.7.2 of the Phase II Assessment Report for the F and H-Area HLW Tank Farms for Type II/IIA Transfer Lines.

The Cesium Strip Effluent solution from the MCU to the DWPF will be mildly acidic (0.001M nitric acid). This waste is not compatible with waste transfer materials previously evaluated in section 3.7.2 of the Phase II Assessment Report for the F and H-Area HLW Tank Farms for Type II/IIA Transfer Lines.

The transfer path from MCU to DWPF is routed through the LPPP, which is the low point of this transfer. Due to the existing low point approximately 80-90% of the line volume (1600 gallons) will be full and periodically stagnant (between transfers) with Cesium Strip Effluent solution. Line flushing between transfers is not provided. A 3.38 M nitric acid (15% wt) cleaning solution will be used infrequently during maintenance of the MCU at approximately 500 gallons per cleaning cycle and transferred to DWPF via SDP1.

Addition of caustic to neutralize the Cesium Strip Effluent solution was considered during process development and Hazard Analysis. Concerns for Neutralization of the Cesium Strip Effluent solution are as follows:

- NaOH would be used for neutralization. This adds additional sodium to the process, which increases the volume of waste to be processed in DWPF and potentially increasing the amount of vitrified waste produced.
- Would require additional tank system and other equipment at MCU for the neutralization.
- The solution would need to be re-acidified for processing at DWPF.

Because of the above concerns, it is not prudent to neutralize the Cesium Strip Effluent solution. However, additional pneumatic tests will be conducted to monitor the structural integrity of the carbon steel jacket. The pneumatic tests will provide additional protection to detect the corrosion of carbon steel jacket pipe in case of a leak from a stainless steel core pipe.

In addition, the carbon steel jacket pipe is coated with an inorganic primer and encased in a hydrophobic powder (moisture barrier) to prevent migration of MCU material to the soil in the event of a release.

Also the DSS to Tank 50 will contain approximately 70 ppm total solvent maximum and the high cesium stream to DWPF will contain approximately 70 ppm total solvent maximum (see SRS document G-TC-H-00041). The solvent make-up is 69.14% Isopar-L (diluent), 29.78% Cs-7SB (modifier), 0.94% Bob-Calix (extractant) and 0.13% TriOctylAmine (suppressant). The new and existing materials of construction used in this modification are compatible with all waste streams.

4.0 Foundation Support

The integrity of the waste transfer lines RCZ37, RCZ38, SDP1, 16054, 1459, 1657, 1755 and all the pipe supports have been analyzed for the required loading, and determined to be acceptable.

- T-CLC-H-00773 – Evaluation of MCU Transfer Lines
- T-CLC-H-00242 – Valve Box Seismic Evaluation (Tank 51 Transfer Valve Box)

5.0 Leak Detection and Past Leaks

The core and jacket piping (RCZ37, RCZ38 & SDP2) are sloped to existing leak detection boxes (LDB 20, LDB 70 and LDB 190) at 512-S and Low Point Pump Pit. The core and jacket piping (SDP1 & PCP341) are sloped to existing leak detection boxes (LDB 20 and LDB 70) at Low Point Pump Pit and 512-S. The LDBs contain a leak detection conductivity probe which alarms in the control rooms in the event of liquid detection.

There are no known past leaks in the lines affected by this modification.

6.0 Inspections

The core and jacket piping are installed, examined, tested and inspected to ASME B31.3 requirements for Normal Fluid Service (requirements covered under the FFA section of SRS Engineering Standard 15060). This imposes Category M weld acceptance criteria (same as Normal Fluid Service weld acceptance criteria). All piping including the seal plate spool pieces will be radiographically examined and hydrostatically tested.

Fabrication and installation of Core and Jacket Piping are examined and inspected per the Quality Inspection Plan (QIP) M-QIP-H-00218.

The "hot" tie-in weld joints of all piping will be radiographed and vacuum box leak tested due to As Low As Reasonably Achievable (ALARA) concerns limiting personnel exposure and minimizing contaminated waste water production.

7.0 Determination of Secondary Containment

This modification will cut, remove and reinstall the primary containment (core piping) and the secondary containment (jacket piping) of the associated transfer lines at the tie-ins locations. An engineered glove bag secondary containment will be provided on the jacket containing lines SDP2 and RCZ37 during the modification of those lines. This glove bag secondary containment is described in LWO-WSE-2006-00041 and is designed in accordance with WSRC-OS-94-14 "Radiological Containment Guide". The jacket piping provides secondary containment that meets the requirements of Appendix "B" of the FFA and is subject to a 15 psig leak test prior to placement in service. Pressure testing will be performed routinely during the operation of this facility to ensure that the secondary containment remains free of leaks.

8.0 Professional Engineer Certifications (Design and Construction)

Design

This Assessment Report was prepared under my supervision and direction. I certify that the design for the new MCU Transfer Line Tie-In Modification detailed in M-DCP-H-05011, P-DCP-H-05006, M-M6-H-02449, M-QIP-H-00218, M-ML-H-07236, and C-CC-H-08275 kept with applicable engineering standards and the requirements of Appendix B of the Federal Facility Agreement. These standards have been generally accepted as adequate in demonstrating leak tightness.

Stamp

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 13818 SURENDRA K. GUPTA

Surendra K. Gupta

Name: 13818
License Number:

Construction and Installation

I have conducted an inspection, to the extent possible, of the modifications to the MCU Transfer Lines during and after construction and installation. Based upon the inspection, I certify that, to the best of my knowledge and information, the MCU Transfer Line Tie-In Modification and Tank 51 Valve Box Modification was constructed in accordance with the approved design (M-DCP-H-05011, P-DCP-H-05006, M-M6-H-02449, M-QIP-H-00218, and C-CC-H-08275). I further certify that the modification was tested in accordance with requirements summarized in Section 6.0 of this Report and detailed in M-ML-H-07236, P-DCP-H-05006, M-DCP-H-05011. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14028 JOSEPH CARROLL

3-21-2007

Name: JOSEPH CARROLL
License Number: SC PE 14028

9.0 Attachments

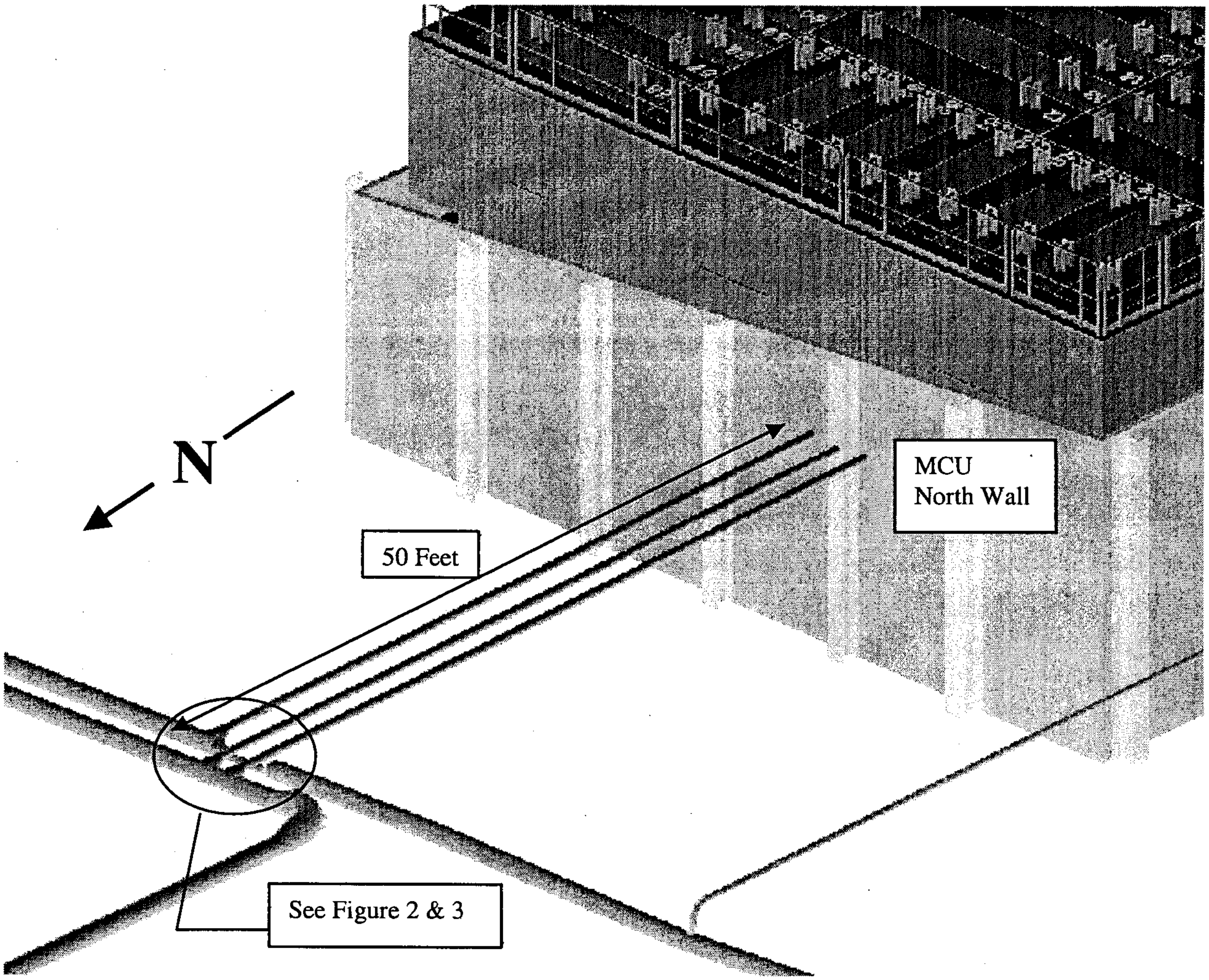


Figure 1: MCU Transfer Line Tie-In Modifications

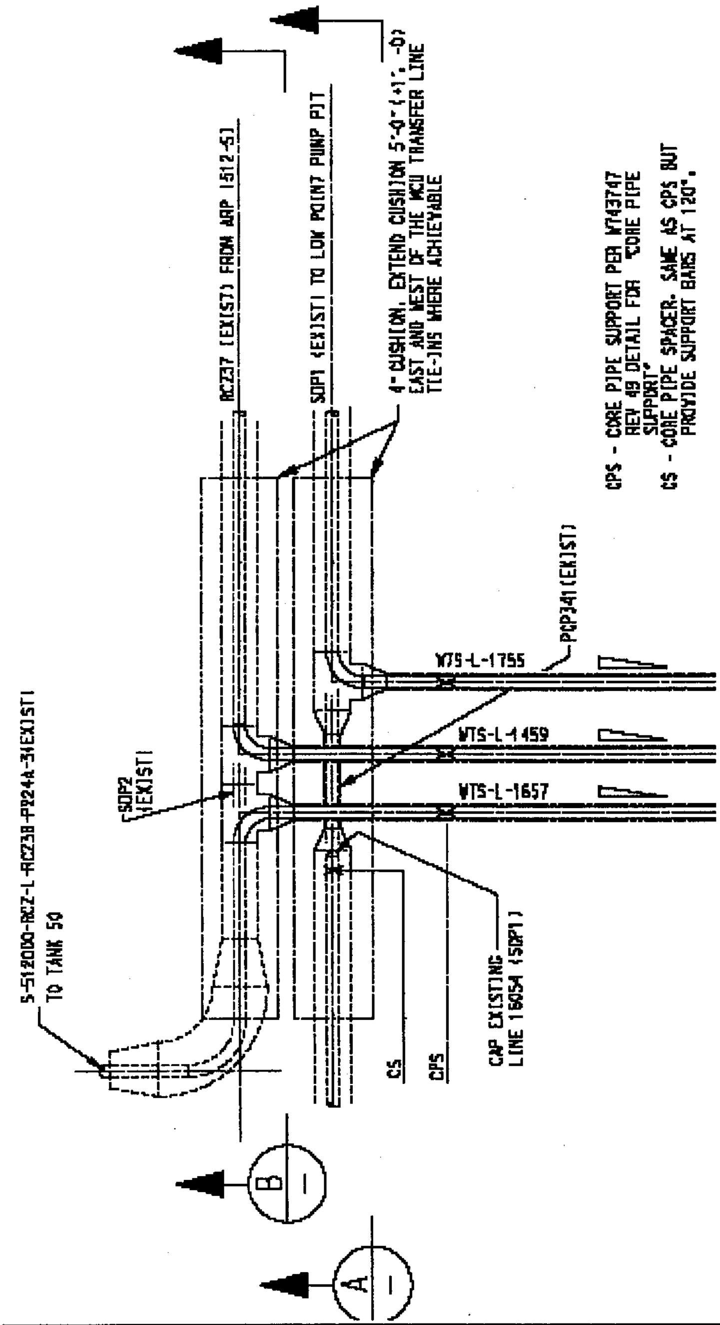


Figure 2: Plan View of Transfer Line Modifications

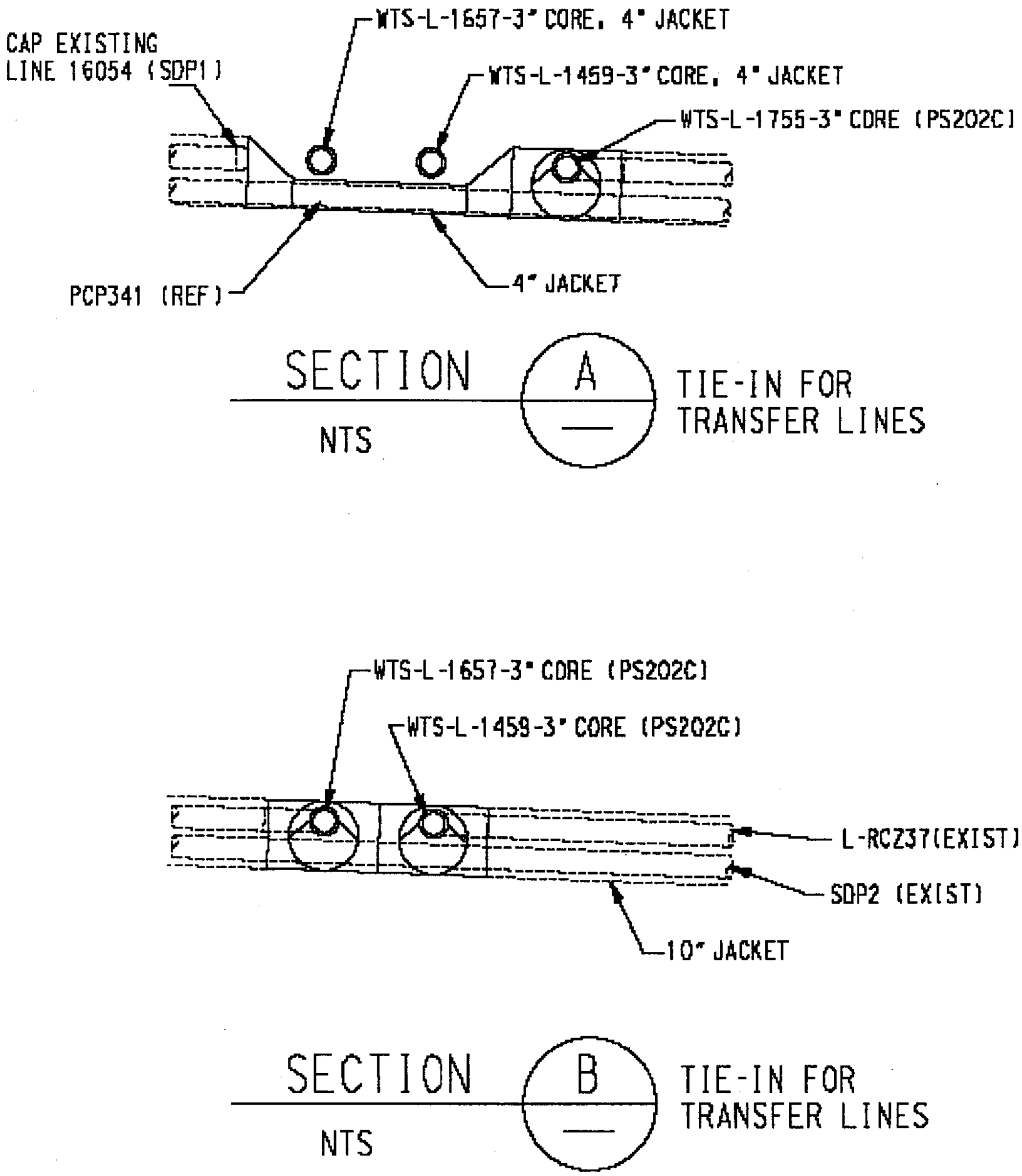


Figure 2A: Cross Section of Transfer Line Modifications

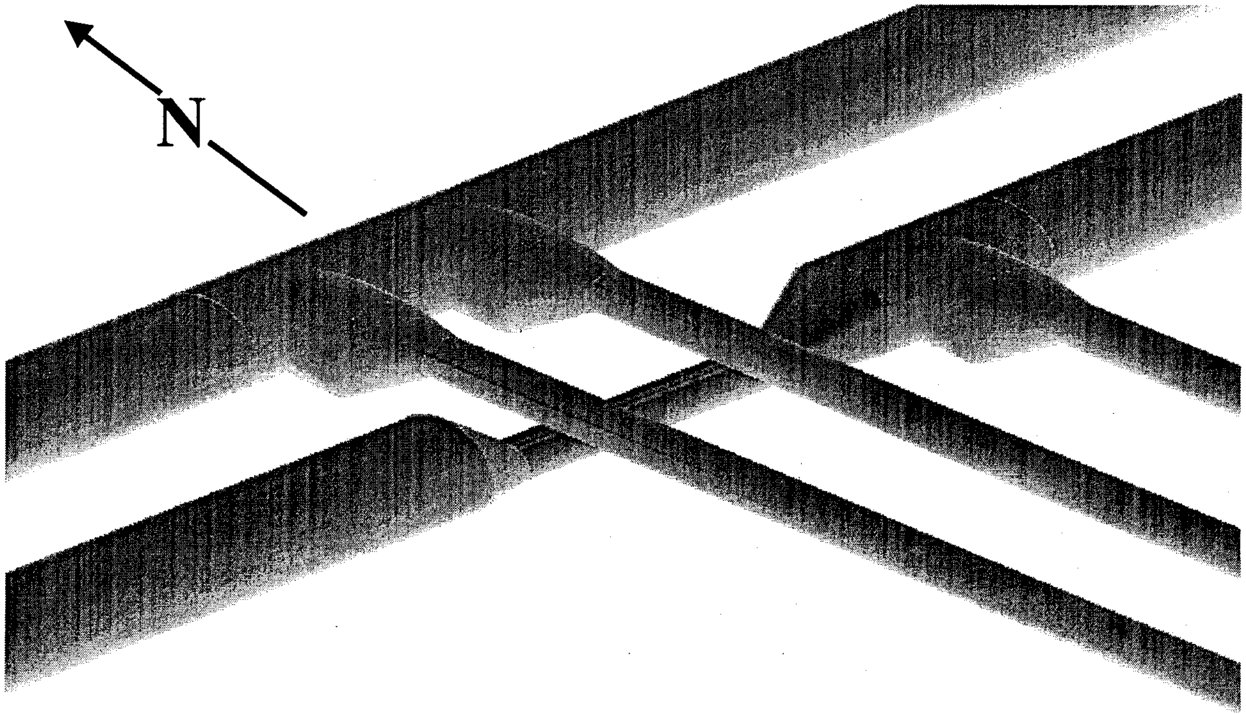


Figure 3: Transfer Line Tie-In Close-Up of Jacket Modifications

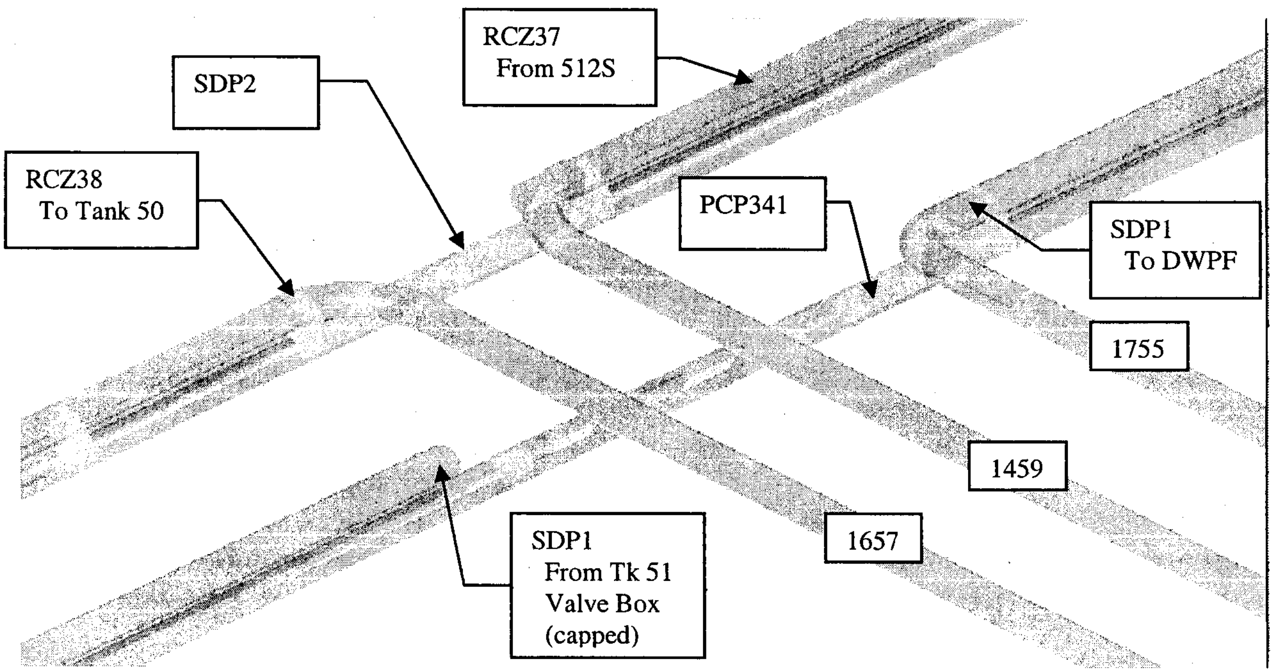


Figure 4: Transfer Line Tie-In Close-Up of Core Modifications

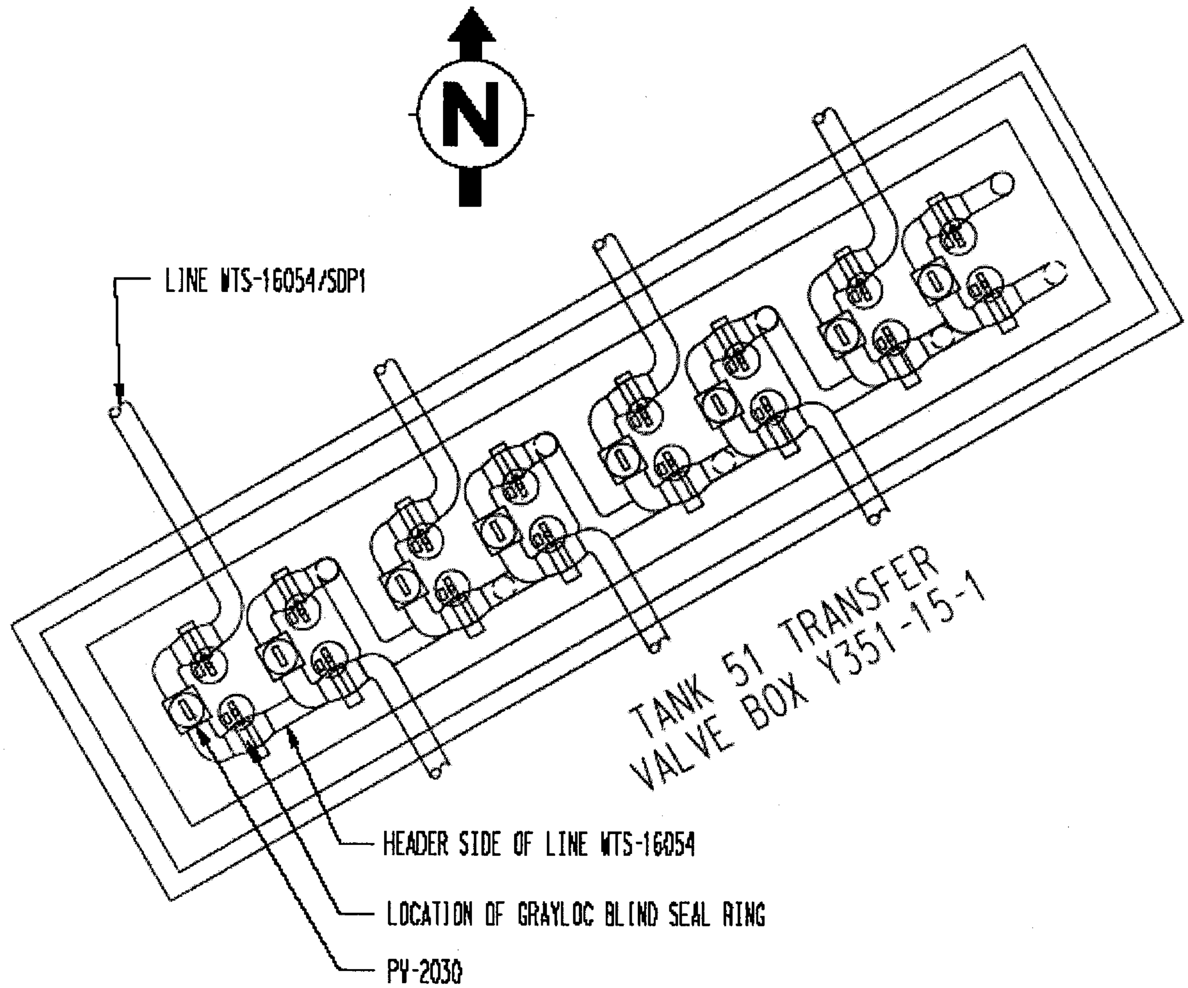


Figure 5: Tank 51 Transfer Valve Box

Appendix B-2

Assessment Report for the Modular Caustic Side Solvent Extraction Unit

M-ESR-H-00271, Revision 0

ASSESSMENT REPORT

FOR THE

MODULAR CAUSTIC SIDE SOLVENT EXTRACTION UNIT

UNCLASSIFIED
DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION
ADC/RO: Rosalind Blocker
(Name and Title)
Date: 5/15/07

M-ESR-H-00271
REVISION 0

DISCLAIMER

APPROVALS

	DATE
PREPARER Mike Munie Design Engineer PD&CS/ Design Services	6-6-06
REVIEWER Salman Khan Design Engineer PD&CS/ Design Services	6/6/06
APPROVAL Kenneth Burrows Design Authority Manager Salt Disposition Engineering	6/12/06
APPROVAL Sergio Mazul Project Engineer PD&CS/ Design Services	6/13/06

SUMMARY OF CHANGES

Rev. No	Reason for Change	Pages Affected	Issue Date
0	Initial Issue	N/A	

TABLE OF CONTENTS

LIST OF ACRONYMS

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ARP	Actinide Removal Process
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CDT	Contactor Drain Tank
°C	Degrees Centigrade
CFR	Code of Federal Regulations
Ci	Curie
Cs	Cesium-137 Radionuclide
CSS	Clarified Salt Solution
CSSX	Caustic Side Solvent Extraction
CWT	Caustic Wash Tank
DCS	Distributed Control System
DSS	Decontaminated Salt Solution
DSSHT	Decontaminated Salt Solution Hold Tank
DWPF	Defense Waste Processing Facility
°F	Degrees Fahrenheit
FFA	Federal Facility Agreement for the Savannah River Site
Gal	Gallon
GPM	Gallons per Minute
HLW	High-Level Radioactive Waste
Hr	Hour
ITP	In-Tank Precipitation Process
Lb	Pounds
m	milli
M	Million
M	Molar(ity)
MCU	Modular Caustic Side Solvent Extraction Unit
mL	milli-Liter
MRads	Million (mega) Radiation Absorbed Dose
MST	Monosodium Titanate
Na	Sodium
NFS	Normal Fluid Service
P&ID	Piping and Instrument Diagram
PD&CS	Project Design and Construction Services
PFD	Process Flow Diagram
SE	Strip Effluent
SEHT	Strip Effluent Hold Tank

SHT	Solvent Hold Tank
SPF	Saltstone Processing Facility
SRS	Savannah River Site
SSC	Safety Significant Component
SSFT	Salt Solution Feed Tank
SSRT	Salt Solution Receipt Tank
SWPF	Salt Waste Processing Facility
TOA	TriOctylAmine
TR&C	Tasks Requirements and Criteria
WSRC	Washington Savannah River Company, LLC

1.0 Executive Summary

This assessment report covers the Modular Caustic Side Solvent Extraction Unit (MCU). This FFA assessment excludes the transfer lines into and out of the concrete MCU Process Area Cells and the isolation of Transfer Line SDP1 from Tank 51. These items are included in a separate assessment, M-ESR-H-00255.

The MCU process located in the H-Area Tank Farm Cold Feeds will treat approximately 1 million gallons (Mgal)/year of High-Level Radioactive Waste (HLW) that is currently stored in underground waste storage tanks in the SRS F- and H-Area Tank Farms. The MCU is being constructed under the SCDHEC Bureau of Water's Industrial Wastewater Treatment Facility Construction Permit Number 19,037-IW. This Permit is considered by SCDHEC to be Phase 1 of the project. Phase II of the project contemplates the modification of the F/H-Area Tank Farms' Industrial Wastewater Treatment Facility Operating Permit number 17,424-IW and the Defense Waste Processing Facility's Operating Permit number 16,783 to allow the MCU facility to receive and process salt waste streams from the Tank Farms.

The primary function of MCU is to extract, strip and concentrate cesium (Cs) from the Clarified Salt Solution (CSS) producing Decontaminated Salt Solution (DSS) and Cesium-laden Strip Effluent (SE) Solution. The DSS will be transferred via underground pipe to the SRS Saltstone Processing Facility (SPF) via Tank 50 for disposal as grout. The Cesium Strip Effluent Solution will be transferred via underground pipe to the SRS Defense Waste Processing Facility (DWPF) for vitrification.

Cesium removal from the CSS utilizes the Caustic Side Solvent Extraction (CSSX) technology. The process uses centrifugal contactors which are similar to the design that will be used in the Salt Waste Processing Facility (SWPF).

The design input for MCU is provided in Modification Traveler, U-MT-H-00085, and in more detail in Task Requirements and Criteria, G-TC-H-00041. The design output pertinent to this assessment is provided in Section 2.3 of this report.

This assessment report was prepared in accordance with Project Design and Construction Services (PD&CS) Manual E7-1, Procedure DE-DP-316.

This Assessment report concludes that the MCU as detailed in Section 2.3 is adequately designed for the purposes of storage and treatment of hazardous or radioactive substances. The facility has sufficient structural strength and compatibility with the materials to be treated to ensure that the waste tank system(s) will not collapse, rupture, or fail. The tank system also complies with applicable engineering standards generally accepted as adequate in demonstrating structural integrity and leak tightness to prevent harm to human health and the environment.

2.0 Design Information

2.1 MCU Process Description

MCU is located in the H-Area Tank Farm Cold Feeds area east of Tank 49 at the bottom of the New Hill. The location of MCU is shown in Attachment 1. Underground waste transfer lines enter the north end of MCU. The waste transfer lines are assessed for FFA compliance in M-ESR-H-00255. The remainder of MCU (i.e., the tank systems and their secondary containment) is assessed in this report.

MCU will use CSSX technologies to process the salt waste portion of the HLW inventory currently stored in SRS F&H Area Tank Farms. MCU includes modifications to utilities, infrastructure and waste transfer systems to support salt waste solidification.

MCU design capacity will sustain the batch output from the combined 512-S and 241-96H, Actinide Removal Process (ARP), which corresponds to 1Mgal salt solution per year while producing DSS that will have a cesium activity less than 0.1 Ci/gal, and a Strip Effluent that will have a cesium activity up to 16.5 Ci/gal. MCU is designed for a three year operational life and a five year design life.

The Process Flow Diagram (PFD) and Process Flow Data for MCU are shown in Attachments 2 and 3. A list of the PFDs and the Piping and Instrument Diagrams (P&IDs) that are associated with the HLW Tank Systems is provided in Ref. 2.3.3.

MCU will receive salt solution filtrate from the ARP facility (Building 512-S). At ARP, strontium, uranium, and plutonium are adsorbed onto Monosodium Titanate (MST) to form insoluble solids and a cesium-laden salt solution. The strontium, MST, and actinides are then filtered to concentrate the solids for transfer to DWPF. The effluent containing cesium is then transferred to MCU as the CSS feed stream.

The salt solution feed (5.6 M Na) from ARP will enter MCU in one of two Salt Solution Receipt Tanks (SSRT1 and SSRT2). The contents of the SSRT(s) are transferred to the Salt Solution Feed Tank (SSFT).

Eighteen centrifugal contactors are grouped into four banks. In the first seven contactors, the cesium in the salt solution is extracted by contacting the CSS feed stream with an organic solvent. The extraction process results in a DSS aqueous phase and a cesium-laden organic phase.

The DSS stream is directed through a coalescer that will enable dispersed organic droplets to agglomerate and then to a DSS decanter, where the solvent carryover is separated from the DSS stream and transferred to the Solvent Hold Tank (SHT). The DSS is continuously monitored for gamma radiation and the waste stream can be recycled to the SSFT, if the stream exceeds preset limits. When sufficient DSS has accumulated in the DSS Hold Tank (DSSHT), it is transferred to Tank 50 for incorporation into grout at SPF.

The organic phase is then scrubbed in a bank of two contactors to remove potassium and iodine. The cesium is then stripped from the solvent in a bank of seven contactors resulting in an aqueous strip effluent stream. The strip effluent (Cs-137 laden strip solution) is directed through a coalescer that will increase the entrained solvent droplet size to the Strip Effluent Decanter, where organic carryover is removed and fed back into the process stream at the Extraction Aqueous Heat Exchanger. The strip effluent is collected in the Strip Effluent Hold Tank (SEHT) where, after accumulation of a sufficient volume, it is transferred to DWPF for vitrification. The solvent is cleaned and neutralized by contacting it with a caustic wash in a bank of 2 contactors and then recycling it to the extraction process. The solvent is regularly analyzed in an off-line laboratory to detect impurity buildup and is replaced as necessary. The caustic wash that is circulated through a Caustic Wash Tank (CWT) is periodically replaced with fresh solution.

The Contactor Drain Tank (CDT) is used to accumulate liquid when the contactor banks are drained. The contents of the CDT are sampled and may be directed to the SEHT, Strip Decanter, DSSHT, Extraction Contactors, SSFT or DSS Decanter depending upon its composition.

The radiological process tanks and decanters are located in a mostly below-grade cell called the Process Area Cell. Access to the Process Area Cell is through removable above-grade cell covers. The contactors and ancillary equipment are located in an above-grade cell called the Contactor Enclosure. Access to the Contactor Enclosure is through an air lock elevated several feet above grade.

To minimize personnel exposure, the Process Area Cell and Contactor Enclosure will not be occupied during normal radiological operations. Personnel will enter these areas only during Non-radioactive Startup Testing, Chemical Runs, or during a maintenance evolution. During these activities, access will be administratively controlled.

Personnel can access the cold feeds area, top of the Process Area Cell covers and Contactor Enclosure roof. This access will obtain material samples, operate equipment in support of MCU operation, perform periodic walkdowns of the equipment, and perform maintenance functions.

Operations personnel will routinely collect material samples from the tanks for chemical analysis. This operation uses air eductors which draw solution from the sampled tank into 10 – 30 mL vials with a vacuum. The eductors and associated sample vials are located in sample boxes outside the south end of the Process Area Cell. Two types of sample boxes are used. One is a shielded sample box, which is used with high curie content waste streams from the SEHT, SHT, and CDT. The second sample box is an unshielded sample box, which is used with low curie content sample streams from the CWT and DSSHT. The sample boxes are located in a Sample Enclosure Building, which provides ventilation control, weather protection, and contamination control.

2.2 Containment Description

Containment of radioactive waste streams consist of a primary containment and a secondary containment.

Equipment, components and a refurbished shielded sampler will provide primary containment of the MCU radioactive waste streams. The existing tanks and related equipment located in the Cold Feeds area were utilized, as much as practical, for support systems but not for tank systems used to contain the radioactive waste streams.

All tanks containing high-activity materials are constructed of stainless steel and are located within the enclosed concrete cells (Process Area Cells and Contactor Enclosure). Equipment Location and Plan drawings identifying the location of the equipment in the cells are provided in Ref. 2.3.2. The cells are inaccessible during normal operations.

The environment is protected from leaks of the primary containment through use of a secondary containment system. The secondary containment system consists of a concrete vault with a chemical, radiation, and fire resistant coating system. The coating is applied to the floor of the cells and contactor enclosure and the bottom two feet of the wall of the Process Area Cell floor, and the bottom one foot of the Contactor Enclosure wall. The remaining wall surfaces of the Process Area Cell and Contactor Enclosure are not coated

The concrete cells and contactor enclosure are provided with a glass fiber mat-reinforced vinyleaster coating system. This coating system is compatible with the salt solutions in the tanks. The coatings, entirely and uniformly, cover the surface of the concrete structure that could come in contact with a released material. The cell floors are sloped to collection sumps. All sumps are equipped with leak detection and level alarm systems to alert operators of a leak. Waste transfer pumps are interlocked to stop if a leak is detected in a sump. Any leaked waste and accumulated precipitation will be removed from the secondary containment within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment.

Protection of rainwater infiltration is achieved through use of tar tape on the cell covers, grading the ground surface adjacent to the MCU walls, and use of an external moisture barrier.

Except for a group of tank sampling lines, all MCU piping, pumps, and valves containing radioactive waste streams are located either in the Process Area Cell or the Contactor Enclosure. The lines used to circulate the sample streams from the tanks to the sample boxes exit the Process Area Cell above-grade. The sampling lines have an outer jacket pipe that extends from the interior of the Process Area Cell wall to the exterior of the sample box. The jacket piping provides a secondary containment system for the sampling lines. The annular space between the sampling lines and the jacket pipe is open to the Process Area Cell. The jacket piping is sloped such that leakage into the jacket piping is directed to the Process Area Cell.

The MCU Process Area Cell and Contactor Enclosure are shown in Attachment 4 (the removable Process Area Cell covers and the permanent roof structure on the Contactor Enclosure are omitted for clarity).

Within the Process Area Cell are seven process tanks and two organic removal decanters each with an internal and external coalescer. The capacity and primary function of this equipment are as follows:

- Two 8,000-gallon tanks (SSRT1 and SSRT2) to receive salt solution filtrate from the ARP facility
- One 8,000-gallon tank (SSFT) to feed the extraction contactors with salt solution filtrate
- One 8,000-gallon tank (DSSHT) to receive the DSS from the extraction contactors
- One 1,000-gallon tank (SEHT) to receive strip effluent from the strip contactors
- One 1,000-gallon tank (CDT) to receive materials drained from the contactors, contactor cleaning materials, and materials collected in the Process Area Cell sumps
- One 500-gallon tank (SHT) to store solvent
- One decanter (1000 gallons) with an internal and external coalescer used for the DSS phase
- One decanter (400 gallons) with an internal and external coalescer used for the strip effluent

Tank capacities shown above are nominal. Required operating capacities and the sizing basis for these tanks are provided in Calculations M-CLC-H-02580 and M-CLC-H-02581 (Ref. 2.3.3). Actual tank capacities, derived analytically, are provided in Calculation M-CLC-H-02732.

The process tanks, coalescers, decanters and ancillary equipment, such as pumps (Ref. 2.3.10), piping, and valves are the primary containment for the MCU Process.

The contactor unit was designed and built by subcontractors with expertise in liquid-liquid separation. The contactor unit components consist of four separate banks of contactors (seven extraction contactors, seven strip contactors, two scrub contactors, and two wash contactors), heaters, heat exchangers, and a 70-gallon CWT with pump, piping and valves.

Beneath the Contactor Unit is a stainless steel catch pan with a drain line routed to a sump in the Contactor Enclosure floor. A liquid level bubbler system is provided in the Contactor Enclosure floor sump. The liquid level bubbler activates an alarm on high liquid level. A drain line is located near the Contactor Enclosure floor sump to collect spilled material in a Process Area Cell sump.

The Process Area Cell floors are sloped to collection sumps as shown in Attachment 5. All sumps are equipped with leak detection and high level alarm systems. Waste transfer pumps are interlocked to stop if a leak is detected in a sump. Isolation valves to and from the associated tanks or process systems automatically close if a high level alarm is activated. The transfer pumps are interlocked to stop on low level in the source tank or high level in the receipt tank.

The sample boxes and sample line jackets provide a secondary containment for the sample lines that exit the south end of the Process Area Cell. The arrangement of the samplers and respective jacketed sample lines is shown in Attachment 6.

Three underground waste transfer lines enter the north end of the Process Area Cell in the vicinity of the SEHT. A seal plate in the Process Area Cell wall is provided to separate the underground jacketed waste transfer lines and the pipe lines in the Process Area Cell (the seal plate and the underground waste transfer lines are assessed in report M-ESR-H-00255). A short segment of Process Area Cell piping will be connected to the existing waste transfer lines during the Construction and Startup phase of the MCU Process Area Cells. The pipe lines will be isolated by a welded cap/blind flange from the existing waste transfer lines until MCU is ready for radiological operations. In accordance with the transfer line tie-in strategy (Ref. 2.4.9) no transfer paths will be available for movement through the three waste transfer lines until MCU is ready for radiological operations. The welded cap/blind flange is provided to ensure radioactive contamination does not migrate to the Process Area Cell from the existing waste transfer lines.

2.3 Design Documents

The following design documents cover the procurement, installation, inspection, examination, and testing of the MCU modification pertinent to the FFA assessment:

2.3.1 MCU Civil/Structural Design

- C-CC-H-08268, Process Area Concrete Plan @ EL 286'-6" and 304'-9"
- C-CC-H-08269, Contactor Area Concrete Plan @ EL 297'-0" and 320'-3"
- C-CC-H-08270, Process Area Precast Beam and Supports, Plan, Section and Details
- C-CC-H-08275, Process and Contactor Area Wall Elevations
- C-CC-H-08278, Process and Contactor Area Wall Elevations
- C-CC-H-08279, Process Area Concrete Sections and Details
- C-CI-H-00175, Process Area Equipment Anchorage Details
- C-SOW-H-00019, Procurement Statement of Work for MCU Excavation
- C-CM-H-07065, Contactor Area Contactor Skid Anchorage and Access Grating Details
- C-CLC-H-01308, Structural Design for MCU Shielding Walls and Cell Cover
- C-CLC-H-01339, Anchorage Design for the Tank Support Frames
- C-CLC-H-01337, Anchorage Design for the Contactor Skid

- C-SPS-G-00085, Furnishing and Delivery of Concrete, GS, PS, SS, Section 03311
- C-SPP-H-00090, Procurement Specification Precast Cell Covers and Beams
- C-CH-G-00004, Routing and Supports for NPS 2 and Smaller Piping
- T-CLC-G-00247, Analytical Support for Small Bore Cookbook
- C-DCF-H-03793, Cold Feeds Area Foundation Sections and Details

2.3.2 MCU Plant Design

- P-PE-H-07485, Strip Effluent Hold Tank and Strip Effluent Decanter Equipment Location
- P-PE-H-07487, Equipment Location
- P-PE-H-07488, Contactor Skid and Contactor Building Roof Equipment Location
- P-PE-H-07489, Cold Feeds Equipment and Sample Building Equipment Location
- P-PE-H-07491, Strip Effluent Decanter and Strip Effluent Hold Tank Enlarged Plan
- P-PE-H-07492, DSS Hold Tank and Salt Solution Feed Tank Enlarged Plan
- P-PE-H-07493, Salt Receipt Tank 1 and Salt Receipt Tank 2 Enlarged Plan
- P-PE-H-07494, Contactor Drain Tank, DSS Decanter and Solvent Hold Tank Enlarged Plan

2.3.3 MCU Mechanical Design

- M-M5-H-08608, MCU Process Flow Diagram Sheet 1 of 2
- M-M5-H-08609, MCU Process Flow Diagram Sheet 2 of 2
- M-M6-H-02408, P&ID, Extraction System Contactor/Separators
- M-M6-H-02410, P&ID, Scrub System Contactor/Separators
- M-M6-H-02412, P&ID, Strip System Contactor/Separators
- M-M6-H-02414, P&ID, Caustic Wash System Contactor/Separators
- M-M6-H-02419, P&ID, Waste Transfer Equipment Salt Solution Receipt Tank 1
- M-M6-H-02420, P&ID, Waste Transfer Equipment Salt Solution Receipt Tank 2
- M-M6-H-02421, P&ID, Waste Transfer Equipment Salt Solution Feed Tank
- M-M6-H-02422, P&ID, Waste Transfer Equipment DSS Decanter
- M-M6-H-02423, P&ID, Waste Transfer Equipment DSS Hold Tank

- M-M6-H-02424, P&ID, Waste Transfer Equipment Strip Effluent Decanter
- M-M6-H-02425, P&ID, Waste Transfer Equipment Strip Effluent Hold Tank
- M-M6-H-02426, P&ID, Waste Transfer Equipment Solvent Hold Tank
- M-M6-H-02427, P&ID, Waste Transfer Equipment Contactor Drain Tank
- M-M6-H-02428, P&ID, Sampling System 1 CDT/SHT/SEHT
- M-M6-H-02429, P&ID, Sampling System 2 DSSHT, CWT Sampling
- M-M6-H-02432, P&ID, Waste Transfer Equipment Cell Sump Containment
- M-CLC-H-02580, Process Tank Sizing Calculation
- M-CLC-H-02581, Cleaning Agent Container and Contactor Drain Tank Operating Volumes Calculation
- M-CLC-H-02606, MCU Cell Sump Capacity Calculation
- M-CLC-H-02732, MCU Tank Calibration Calculation
- M-ML-H-07230, Piping Data Sheets for MCU Process, Utilities, and Cold Feeds

2.3.4 MCU Electrical Design

- E-ER-H-08513, Embedded Conduit Layout Plan

2.3.5 MCU Geotechnical Analysis

- K-ESR-H-00019, Caustic Side Solvent Extraction Facility Geotechnical Report

2.3.6 MCU Process Tank Design

- M-SPP-H-00445, Procurement Specification Storage Tanks
- AC11420A, Storage Tanks Vendor Print File

2.3.7 MCU Contactor Design

- M-SOW-H-00141, Statement of Work Contactor Package
- AC42814A, Contactor Package Vendor Print File

2.3.8 MCU Decanter Design

- M-SPP-H-00443, Procurement Specification Decanters
- AC42842A, Decanters Vendor Print File

2.3.9 MCU Coalescer Design

- M-SPP-H-00453, Procurement Specification Coalescer
- AC46711A, Coalescer Vendor Print File

2.3.10 MCU Process Pump Design

- M-DS-H-00347, 348, 349, 351, 352, 353, 354, 355 Procurement Data Sheets Pumps (Various Titles)
- AC50251A, Pump Vendor Print File

2.3.11 MCU Unshielded Sampler Design

- P-PM-H-08236, Lexan Sampler, Details
- P-PM-H-08237, Lexan Sampler, Assembly Details
- P-PM-H-08238, Lexan Sampler, Assembly Sht. 1 – Protective Casing
- P-PM-H-08239, Lexan Sampler, Assembly Details, Sht. 2
- P-PM-H-08240, Lexan Sampler, Details
- P-PM-H-08241, Lexan Sampler, Details

2.3.12 MCU Shielded Sampler Design

- P-PG-H-08332, Shielded Sampler, Piping Arrangement
- P-PA-H-09028, Horseshoe Replacement Shield, Piping Details
- C-CM-H-07074, Horseshoe Replacement Shield, Details
- C-CS-H-08401, Shielded Sampler, Support Base and Support Stand

2.4 References

2.4.1 SRS Engineering Standards

Design will be executed under the following standards from the SRS Engineering Standards Manual, WSRC-TM-95-1:

1060	SRS Structural Design Criteria
1064	Radiological Design Requirements
01110	Civil Site Design Criteria
05057	SRS Welding Requirements
15060	American Society of Mechanical Engineers (ASME), ASME B31.3, Additional Requirements for SRS Piping Systems
15889	Confinement Ventilation Systems Design Criteria

2.4.2 SRS Engineering Guides

Design will be executed using the following Guides from the SRS Engineering Practices Manual, WSRC-IM-95-58:

02224-G Excavation, Backfill and Grading

15060-G Application of ASME B31.3

2.4.3 WSRC Interoffice Memorandum, CBU-SPT-2005-00220, dated March 6, 2006, MCU Project Compliance with Engineering Standard 01064

2.4.4 WSRC Engineering Study, F-ESR-H-00234, dated, December 20, 2005, Coatings Fire Resistance Equivalency Report

2.4.5 WSRC Interoffice Memorandum, CBU-SPT-2005-00075, dated March 23, 2005, Notification of Approval of Sherwin Williams Coating for MCU Secondary Containment (Magnalux™ #304 FF-Flake Filled Vinyl Ester)

2.4.6 MCU Task Requirements and Criteria, G-TC-H-00041

2.4.7 MCU, Plant Modification Traveler, U-MT-H-00085

2.4.8 Design Change Form, F-DCF-H-00514, MCU Containment Coating System Modification

2.4.9 WSRC Interoffice Memorandum, CBU-SPT-2005-00271, Revision 1, dated February 28, 2006, Transfer Line Tie-in Strategy for Modular Caustic Side Solvent Extraction Unit (MCU)

3.0 Waste Compatibility

3. 1 MCU Waste Streams

- CSS Feed – The MCU feedstream from the ARP process with a nominal sodium molarity of 5.6 and a cesium concentration of 1.1 Ci/gal.
- DSS – The CSS raffinate after the cesium content is reduced to a cesium concentration less than 0.1 Ci/gal.
- SE –The stream containing the concentrated cesium, up to 16.5 Ci/gal, in a 0.001 M nitric acid solution from the strip process.

3. 2 Process Chemicals

- Solvent – The solvent is a mixture of 69.14% Isopar-L (diluent), 29.78% Cs-7SB (modifier), 0.94% Bob-Calix (extractant) and 0.13% TriOctylAmine (TOA or suppressant). The Isopar-L is a blend of C10 to C12 branched chain hydrocarbons with a distillation range of 191 to 205°F and a closed cup flash point of 144°F. Isopar-L is a Class IIIA combustible liquid (140°F < flash point < 200°F). Mixing the Isopar-L with extractant, modifier, and TOA increases the flash point (Ref. 2.4.6). The flash point of the mixture is 148°F.

- Spent Contactor Cleaning Solutions – Nitric acid solution (up to 15 weight % concentration) will be used for decontamination and cleaning equipment.

- Spent Wash Solution – An aqueous solution containing less than or equal to 0.01 M sodium hydroxide that removes various organic and inorganic impurities from the solvent, including low levels of radioactivity.

3. 3 Process Equipment Materials of Construction

MCU solutions are contained by the stainless steel contactors, coalescers, decanters, storage tanks and piping systems. The stainless steel materials of construction are corrosion resistant for the fluids being handled and are compatible with all waste streams. Equipment seals have been selected for compatibility with the materials being processed.

3. 4 Structures and Coatings

All primary containment equipment and piping for the waste streams are located within enclosed concrete cells or within sampling line pipe jackets or sample boxes.

The concrete cells and contactor enclosure are provided with an impermeable coating. The coating on the concrete surfaces provides secondary containment for leaks from the primary containment. The coating is applied to the floor of the cells and contactor enclosure and the bottom two feet of the wall for the Process Area Cell floor, and the bottom one foot of the wall for the Contactor Enclosure floor. The remaining walls of the Process Area Cell and Contactor Enclosure walls are not coated.

The uncoated wall surfaces are above the maximum credible liquid level after a failure of the largest tank. Although not required by the FFA, MCU has incorporated engineering design features to minimize the potential for contaminated liquids to contact the uncoated surfaces. These features prevent the spread of contamination from its source to ensure Operations, Maintenance, Decontamination, or Decommissioning considerations have been addressed (Ref. 2.4.3).

The floor coating for the Process Area Cell and Contactor Enclosure is Sherwin Williams Magnalux #304FF with Magnaplate resin as a saturate coat over the fiberglass mat. This product is a vinyl ester, chemical resistant immersion coating evaluated for use as a secondary containment in Ref. 2.4.5. This coating lends itself to easy decontamination and is compatible with all waste streams (nitric acid, caustic, and solvent solution). The coating is qualified for an integrated radiological dose exposure of 150 MRads. The coating met SRS Fire Protection Program test requirements (Ref. 2.4.4 and 2.4.8).

Coating durability (i.e. protection from mechanical abuse) is enhanced by the addition of protruded fiberglass grating located on floor surfaces not directly under the process tanks in the Process Area Cells. The grating is a minimum 1 inch deep. The grating is specified in drawing C-CC-H-08279 (Ref. 2.3.1).

Protection against the formation of and ignition of vapors within the Process Area Cell or Contactor Enclosure is required by the FFA, if the substance being stored or treated meets the definition of an ignitable waste under Code of Federal Regulations (CFR), 40 CFR Section 261.21.

> 40 CFR Section 261.21 states:
>
> "Waste is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 60 [deg]C (140 [deg]F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 (incorporated by reference, see Sec. 260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78 (incorporated by reference, see Sec. 260.11), or as determined by an equivalent test method approved by the Administrator under procedures set forth in Sec. 260.20 and 260.21".

Mixing the Isopar-L solvent with extractant, modifier, and TOA increases the flash point to a value of 148°F which is greater than the flash point limit of 60°C (140°F) given in 40 CFR Section 261.21. MCU solvent is not ignitable waste as defined in 40 CFR Section 261.21. The other MCU waste streams (CSS, DSS, and SE streams) are not ignitable wastes based on process knowledge. The Process Area Cells and Contactor Enclosure are ventilated for radiological requirements (Ref. 2.3.3).

4.0 SSCs Support

4. 1 Foundation

SSC foundation support consists of the subgrade, the structural elements for the cells, the anchorage of the tank and equipment, the structural elements for the equipment, and the process piping, as follows.

The subgrade soil strength for MCU is documented in Geotechnical Report, K-ESR-H-00019 (Ref. 2.3.5). The subgrade soil for the Process Area Cell and Contactor Enclosure was inspected by Site Geotechnical Services prior to placement of backfill, and documented in applicable Construction Work Packages.

The Process Area Cell and Contactor Enclosure have been designed to the required loading as defined by the TR&C. The Process Area Cell and Contactor Enclosure structural design is provided in Ref. 2.3.1.

The foundations for the Process Area Cell and Contactor Enclosure were determined to be capable of supporting the secondary containment system and capable of preventing failure due to settlement. This analysis is provided in calculation C-CLC-H-01308 (Ref. 2.3.1).

The concrete mix design for the Process Area Cell and Contactor Enclosure is in accordance with specification C-SPS-G-00085 (Ref. 2.3.1).

4. 2 Process SSCs

The process tanks (procurement and design data in Ref. 2.3.6) and decanters (procurement and design data in Ref. 2.3.8) are furnished in a modular frame. The modular frames are welded to embedment plates in the Process Area Cell floor. The ability of the tank and modular frame to resist required loading as defined in the TR&C is provided in Ref. 2.3.6. The integrity of the decanter and modular frame to meet required loading as defined in the TR&C is provided in Ref. 2.3.8.

The anchorage for the process tanks and decanters has been analyzed for the required loading and determined acceptable. This analysis is provided in calculation C-CLC-H-01339 (Ref. 2.3.1).

The contactor unit (Ref. 2.3.7) is furnished in a modular frame. The modular frame is bolted/welded to embedment plates in the Contactor Enclosure floor and wall. The ability of the contactor frame to meet required loading as defined in SRS Structural Design Criteria, 01060 is provided in Ref. 2.3.7. The anchorage for the Contactor Unit (Ref. 2.3.7) has been analyzed for the required loading and determined to acceptable. This analysis is provided in calculation C-CLC-H-01337 (Ref. 2.3.1).

Sample stations are anchored to the concrete foundation (or floor) using ductile post installed anchors to prevent moving or overturning due to earthquake loads.

The structural integrity of the process piping is provided by supporting in accordance with drawing C-CC-G-00004 of with the technical justification documented in calculation T-CLC-G-00247.

5.0 Leak Detection and Past Leaks

5.1 Leak Detection

Leak detection is provided in the sumps of the Process Area Cell. Leaks from the primary containment or infiltration to either the Process Area Cell or the Contactor Enclosure will collect at these sumps with one exception - leaks in the sample boxes would not be detected in the sumps, as discussed below.

Each sump will have leak detection instrumentation that consists of a liquid level bubbler system. The bubbler system uses a dip tube in the sump with a rotameter and level transmitter located outside of the secondary containment structure. The level transmitter provides input to a Distributed Control System (DCS) alarm in the control room in the event of liquid detection. The level transmitter provides the DCS with the liquid level in the sump.

The liquid level bubbler system for each sump is verified through calibration of the associated level transmitters. Each liquid level bubbler system is checked for functionality during preoperational testing.

Three sumps are provided in the Process Area Cell:

- Sump #1 is used to collect leakage from the area of the SSRT1, SSRT2, DSSHT, SHT, SSFT, DSS Decanter, and the sample line jackets.
- Sump #2 is used to collect leakage from the area of the SEHT and Strip Effluent Decanter.
- Sump #3 is used to collect leakage from the area of the Contactor Enclosure and the CDT.

Sump #3 collects leaks from Contactor Enclosure via an embedded drain line between the Contactor Enclosure and the Process Area Cell. In addition to the leak detection in Sump #3, a liquid level bubbler system in the Contactor Enclosure floor sump will detect liquid entering the embedded drain line. This liquid level bubbler will activate a DCS alarm in the control room.

The three sumps share a common pump for transferring liquids collected in the sumps to the CDT. The CDT can be sampled to verify the makeup of the solution. The contents of the CDT can be transferred to other tanks in the MCU process for processing. The sump pump is located above the DSSHT. An air driven eductor is provided to serve as a back-up to the sump pump for emptying Sump #1. This back-up eductor would allow maintenance activities to be performed on the sump pump due to the close proximity of Sump #1 and the sump pump. The other sump areas could remain potentially full during maintenance of the sump pump because of the shielding provided by walls internal to the process area.

Any leaks in the shielded or unshielded sample box would not be detected in the Process Area Cell sumps. The shielded and unshielded sample boxes are routinely rinsed by operating personnel with a cleaning solution which is routed through a drain line from the sample box to the CDT. Leaks in the sample boxes would be identified during the sampling evolution. Leaks would be evident during flushing of the sampler piping which occurs after each use, or during operation of the sampler, such as an inability to pull a sample due to inadequate vacuum. Leaks may produce radiological conditions that would be detected when the sample box doors are opened by the operators.

5.2 Past Leaks

MCU is a new facility, so past leaks are not a concern. MCU is in the former In-Tank Precipitation (ITP) Cold Feeds location which was a non-radiological area. There is no historical evidence of past leaks in this area. No evidence of spills was found during the placement of the MCU foundations.

6.0 Inspections

Process piping used to transfer waste streams will be installed, examined, tested and inspected to ASME B31.3 requirements for Normal Fluid Service (NFS). All process piping will be radiographically examined and hydrostatically tested per the ASME B31.3 Code, Normal Fluid Service (NFS). These requirements are specified in the following documents:

- Field Installed Piping – Specified in Piping Data Sheets, M-ML-H-07230 (Ref. 2.3.3)
- Skid mounted piping on the Contactor Package – Specified in Statement of Work, M-SOW-H-00141 (Ref. 2.3.7)
- Discharge piping on tank-mounted pumps - Specified in Data Sheets (Ref. 2.3.10)

The process tanks, decanters, and coalescers will be fabricated, examined, tested and inspected to ASME Section VIII.

The Contactors will be fabricated, examined, tested and inspected to the requirements specified in M-SOW-H-00141 (Ref. 2.3.7). The tanks, heaters, and heat exchangers included on the Contactor Package will be fabricated, examined, tested and inspected to ASME Section VIII.

The sample boxes will be fabricated, examined, tested and inspected to the requirements specified in Ref. 2.3.11 and 2.3.12.

Concrete will be poured and inspected in accordance with American Concrete Institute, ACI 301-99 and ACI 302.1R-04.

Structural steel will be erected and inspected in accordance with American Institute of Steel Construction, AISC Code of Standard Practice.

The coating on the cell walls and floors will be installed and inspected in accordance with manufacturer's instructions.

Inspection documentation provided by equipment suppliers is stored in the SRS Document Control Center. Inspection documentation for field installations is documented in the applicable Construction Work Package and stored in the facility's Work Management Center.

7.0 Determination of Secondary Containment

Three systems provide secondary containment for the MCU Tank System. The first and foremost method is the secondary containment provided by the Process Area Cell and Contactor Enclosure. The other two systems are the jacket pipes for the sampling lines that exit the south end of the Process Area Cell, and the two sample boxes for the tank sampling devices.

The cells are designed with sufficient capacity to contain 100% of the capacity of the largest tank within its boundary in addition to the maximum credible infiltration from a 25-year, 24-hr, rainfall event as determined in calculation M-CLC-H-02606 (Ref. 2.3.3). The coating on the walls of the Process Area Cell and the Contactor Enclosure is provided to a height that exceeds the calculated maximum level in the cell.

Other elements of the secondary containment system include surface storm water drainage and an external moisture barrier for the cells. These designs were provided on drawings C-CC-H-08268 and W804003 (C-DCF-H-03793).

Groundwater intrusion into the secondary containment is unlikely since the water table is significantly below the bottom of the MCU foundation (Ref. 2.3.5). A chemical resistant water stop is provided to prevent the in-leakage of water into the cells from hydrostatic forces.

There are no penetrations (such as pipes or valve handle reach rods) through the floors of the cells or through the coated portions of the cell walls. All embedded conduits enter the Process Area Cell and Contactor Enclosure above the coating on the wall as shown on drawing E-ER-H-08513 (Ref. 2.3.4).

The jacket pipes for the sampling lines run the length of the sampling line from the interior of the Process Area Cell to either the shielded or unshielded sample box. The jacket pipes are fabricated, examined, tested and inspected to ASME B31.3 requirements (Ref. 2.3.11 and 2.3.12).

The shielded and unshielded sample boxes completely enclose their associated sampling devices. Both sample boxes are fabricated, examined, tested and inspected to SRS requirements.

The design described for the cells, the sample jacket piping, and the sample stations will provide a secondary containment that meets the requirements of Appendix "B" of the FFA.

8.0 Professional Engineer Certifications (Design and Construction)

Design

This Assessment report was prepared under my supervision and direction. I certify that the MCU Tank Systems detailed in Section 2.3 are adequately designed and have sufficient structural strength and compatibility with the hazardous and/or radioactive substances to be stored or treated, to ensure that the waste tank system(s) will not collapse, rupture, or fail". The MCU Tank system comply with applicable engineering standards. . These standards have been generally accepted as adequate in demonstrating structural integrity and leak tightness to prevent harm to human health and the environment.

Stamp

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 13818 SURENDRA K. GUPTA

Name: Surendra K Gupta
License Number: 13818

Construction and Installation

I have conducted an inspection, to the extent possible, of the modifications for the MCU Tank System during and after construction and installation. Based upon the inspection, I certify that, to the best of my knowledge and information, the MCU Tank System was constructed in accordance with the approved design (References in Section 2.3). I further certify that the modification was tested in accordance with requirements summarized in Section 6.0 of this Report and detailed in References in Section 2.3. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

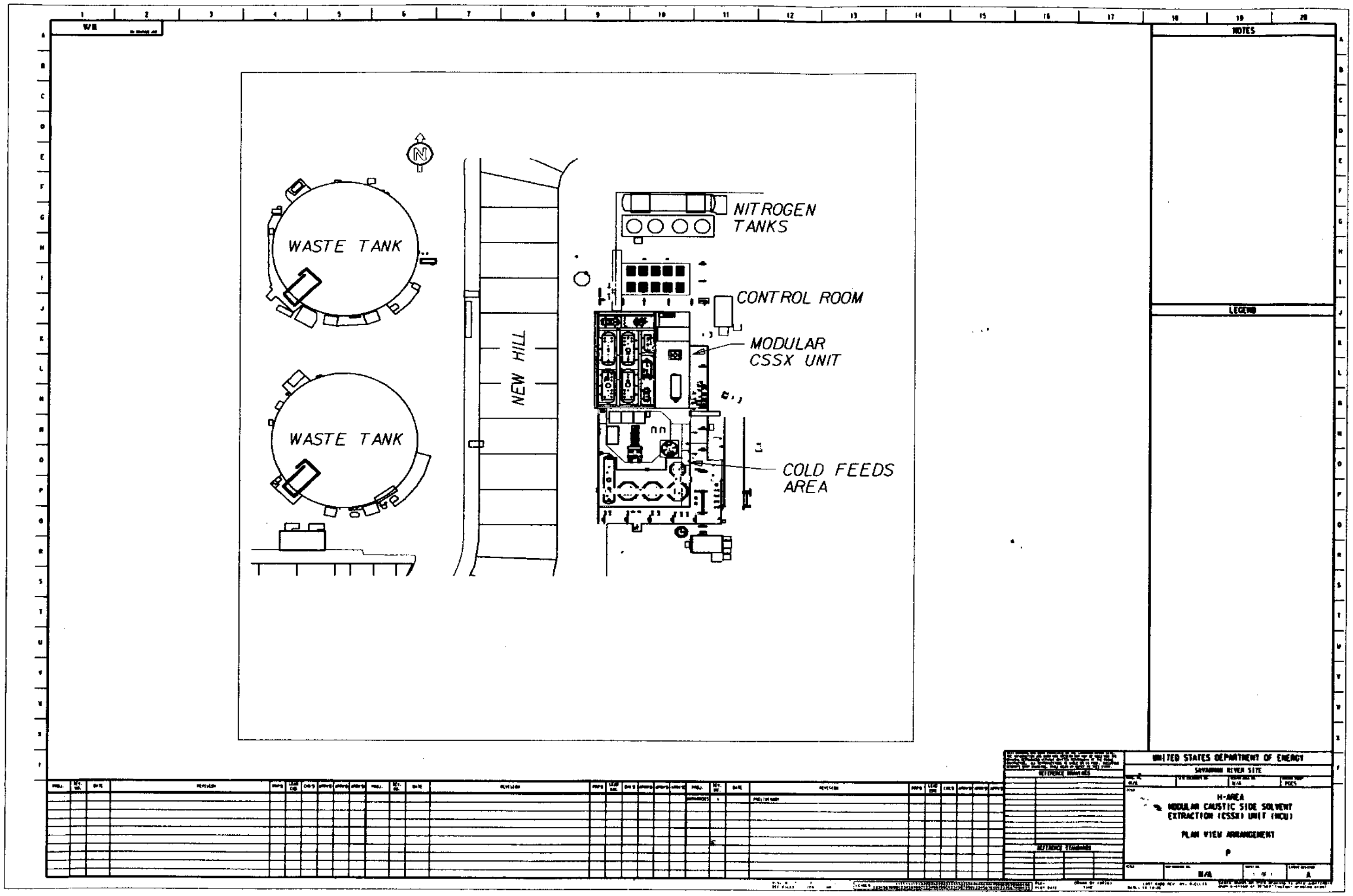
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14828 JOSEPH CARROLL

3-21-2007

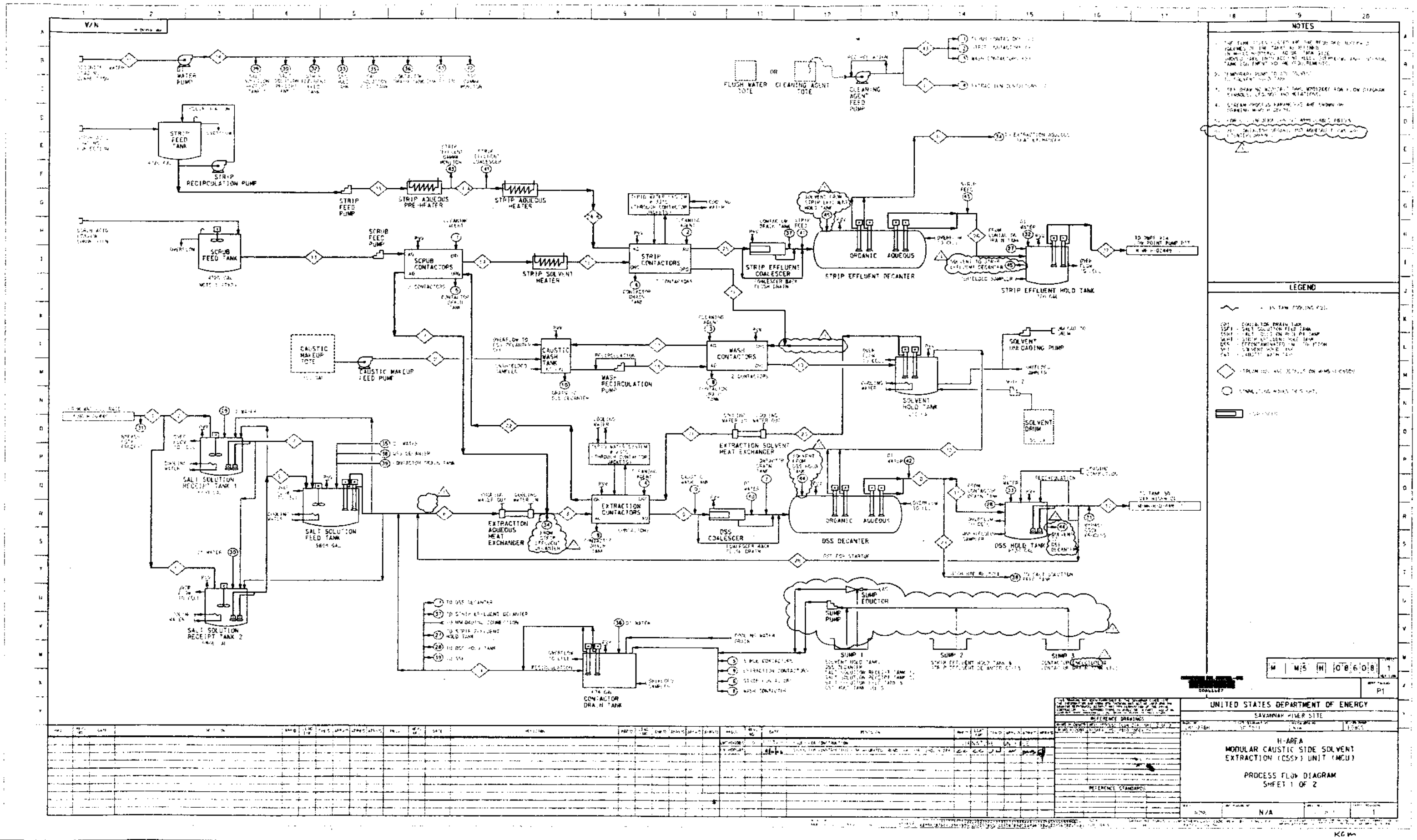
Name: JOSEPH CARROLL
License Number: SC PE 14028

9.0 Attachments

Attachment 1: Location of MCU Project



Attachment 2: MCU Process Flow Diagram



Attachment 3: MCU Process Flow Data

STREAM	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MASS FLOWRATE (LB/HR)	5353	2876	2876	2876	2876	5353	284	5637	5643	5637	5637	5637	284	1228.94
VOLUMETRIC FLOWRATE (GPM)	8.50	4.25	4.25	4.25	4.25	8.50	0.57	9.87	9.87	9.87	9.87	9.87	0.57	2.63
CESIUM FLOWRATE (LB/HR)	0.063	0.032	0.032	0.032	0.032	0.063	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]
SOLVENT FLOWRATE (LB/HR)	0	0	0	0	0	0	0.256	0.256	5.32	0.46	0.46	0.46	0	1228.87
AQUEOUS FLOWRATE (LB/HR)	5353	2876	2876	2876	2876	5353	284	5637	5637	5637	5637	5637	284	0
TEMPERATURE (DEG C)	35	35	35	23	23	23	AMBIENT	23	23	AMBIENT	AMBIENT	AMBIENT	AMBIENT	AMBIENT
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0	0	0.9	0.9	0.9	0.9	0.9	0.9	0.96	0
HYDROXIDE FLOWRATE (LB/HR)	151	76	76	76	76	151	0	151	151	151	151	151	0	0
DESIGN FLOWRATE (GPM)	100	100	100	60	60	0.5	0.57	9.87	9.87	10	10	100	0.57	2.63

STREAM	15	16	17	18	19	20	21	22	23	24 A	24 B	25	26	27
MASS FLOWRATE (LB/HR)	1228.94	1228.62	284	284	1228.37	1234.28	1234.28	1229.22	284	284	284	284	284	284
VOLUMETRIC FLOWRATE (GPM)	2.63	2.63	0.57	0.57	2.63	2.63	2.63	2.63	0.57	0.57	0.57	0.57	0.57	0.57
CESIUM FLOWRATE (LB/HR)	[illegible]	[illegible]	0	0	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	[illegible]	[illegible]	[illegible]
SOLVENT FLOWRATE (LB/HR)	1228.87	1228.61	0.256	0	1228.30	1234.28	1234.28	1229.13	0	0	0	0.256	0.0079	0.0079
AQUEOUS FLOWRATE (LB/HR)	0	0	284	284	0	0	0	0	284	284	284	284	284	284
TEMPERATURE (DEG C)	33	33	33	33	33	23	23	23	AMBIENT	27	33	33	AMBIENT	AMBIENT
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0	0	0	0	0.018	0.018	0.018	0.018	0.018	0.018
HYDROXIDE FLOWRATE (LB/HR)	0	0	0.040	0.040	0	0	0	0	0	0	0	0	0	0
DESIGN FLOWRATE (GPM)	2.63	2.63	0.570	0.570	2.63	2.63	2.63	2.63	0.57	0.57	0.57	0.57	0.57	10

STREAM	28	29	30	31	32	33	34	35	36	37	38	39	40	41
MASS FLOWRATE (LB/HR)	0	0	3.47	0	4.93	DELETED	DELETED	DELETED	DELETED	566	566	DELETED	DELETED	DELETED
VOLUMETRIC FLOWRATE (GPM)	0	0	0.0009	0	0.013					1.13	1.13			
CESIUM FLOWRATE (LB/HR)	0	0	0	0	0					0	0			
SOLVENT FLOWRATE (LB/HR)	0	0	0	0	4.93					0	0			
AQUEOUS FLOWRATE (LB/HR)	0	0	3.47	0	0					566	566			
TEMPERATURE (DEG C)	AMBIENT	AMBIENT	AMBIENT	AMBIENT	AMBIENT					AMBIENT	AMBIENT			
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0					0	0			
HYDROXIDE FLOWRATE (LB/HR)	0	0	0.00045	0	0					0	0			
DESIGN FLOWRATE (GPM)	0.5	0.5	10	10	0.5					33	33			

STREAM	42	43	44	45	46	47	48							
MASS FLOWRATE (LB/HR)	DELETED	DELETED	DELETED	DELETED	0.1001	0	0							
VOLUMETRIC FLOWRATE (GPM)					0.00013	0	0							
CESIUM FLOWRATE (LB/HR)					0	0	0							
SOLVENT FLOWRATE (LB/HR)					0.1001	0	0							
AQUEOUS FLOWRATE (LB/HR)					0	0	0							
TEMPERATURE (DEG C)					AMBIENT	AMBIENT	AMBIENT							
NITRIC ACID FLOWRATE (LB/HR)					0	0	0							
HYDROXIDE FLOWRATE (LB/HR)					0	0	0							
DESIGN FLOWRATE (GPM)					0.5	37	15							

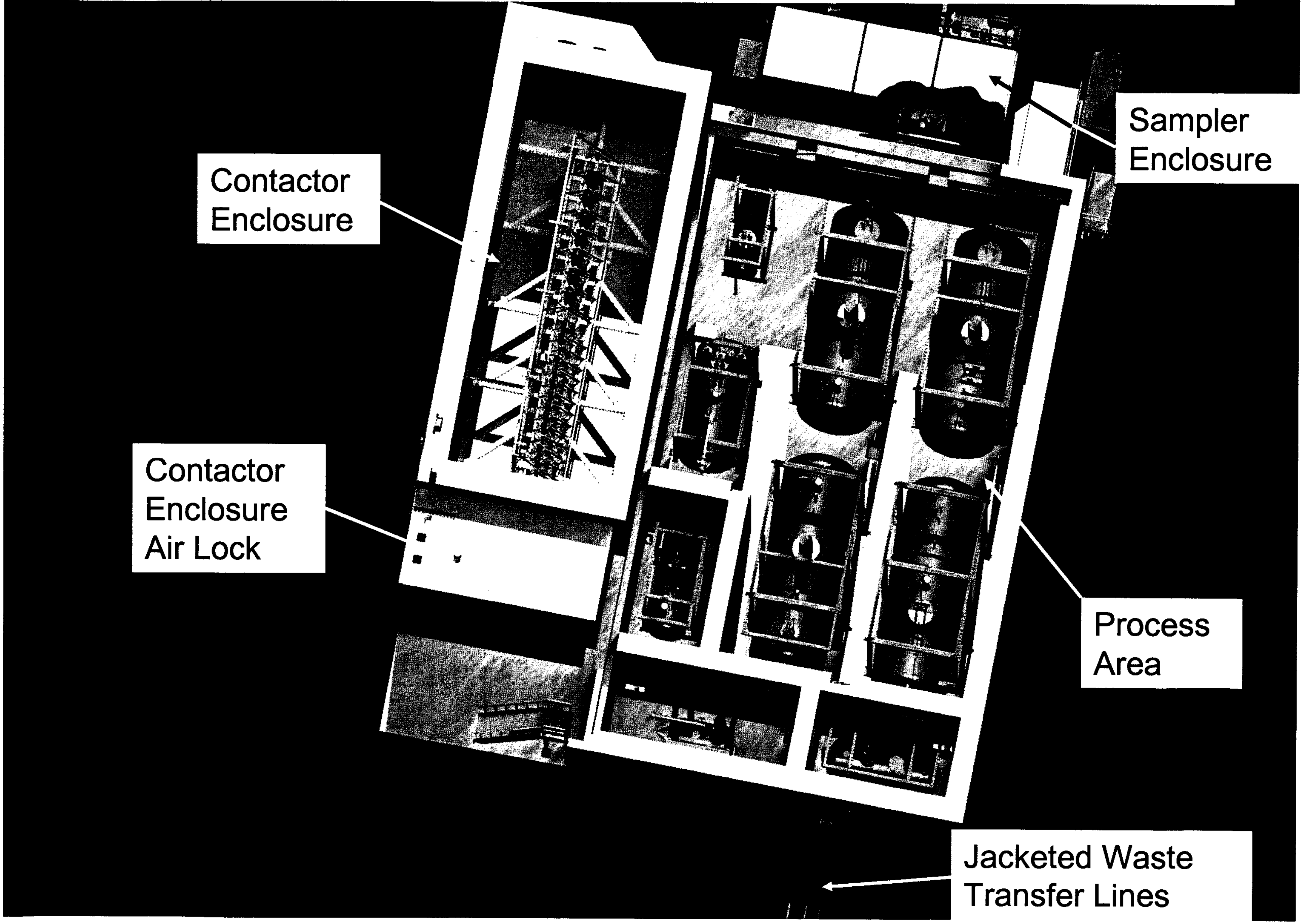
NOTES

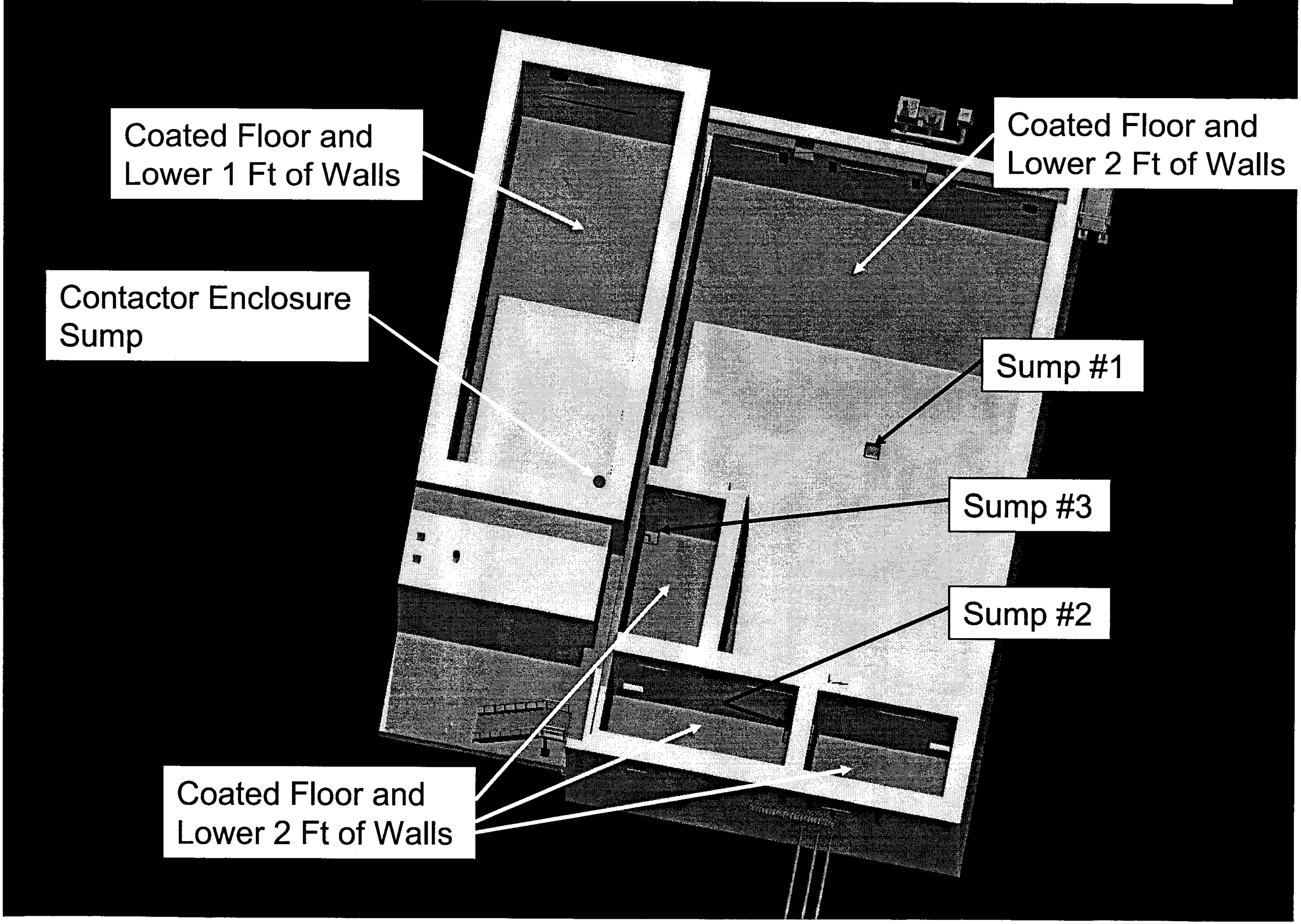
1. FOR STREAM FLOW DATA SEE CALCULATION

LEGEND

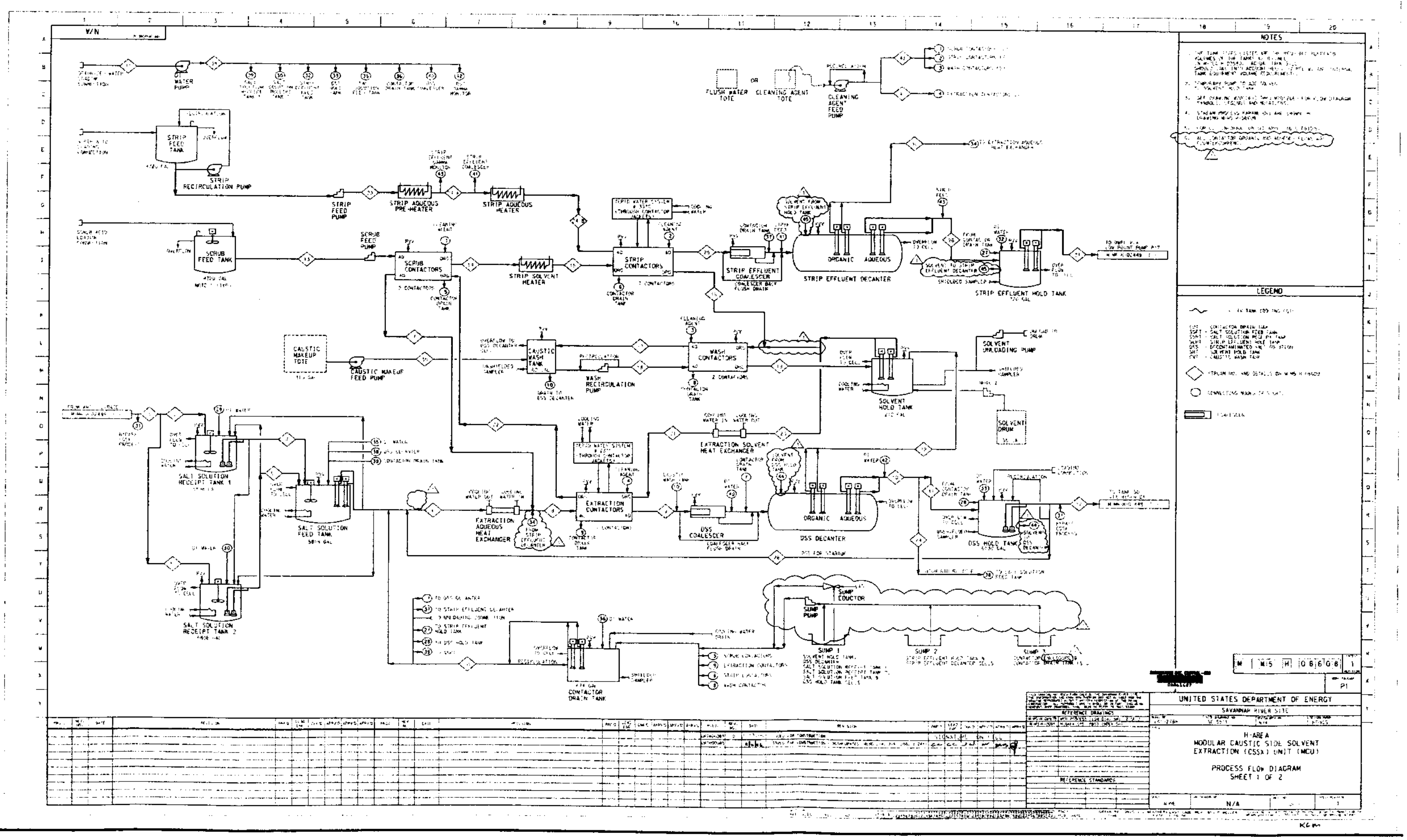
UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

H-AREA
MODULAR CAUSTIC SIDE SOLVENT EXTRACTION (CSSX) UNIT (MCU)
PROCESS FLOW DIAGRAM
SHEET 2 OF 2
(U)


Contactor Enclosure
Contactor Enclosure Air Lock
Sampler Enclosure
Process Area
Jacketed Waste Transfer Lines


Coated Floor and Lower 1 Ft of Walls
Coated Floor and Lower 2 Ft of Walls
Contactor Enclosure Sump
Sump #1
Sump #3
Sump #2
Coated Floor and Lower 2 Ft of Walls

Attachment 2: MCU Process Flow Diagram



Attachment 3: MCU Process Flow Data

STREAM	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MASS FLOWRATE (LB/HR)	5353	2676	2676	2676	2676	5353	284	5637	5642	5637	5637	5637	284	1230.94
VOLUMETRIC FLOWRATE (GPM)	8.50	4.25	4.25	4.25	4.25	8.50	0.57	9.07	9.07	9.07	9.07	9.07	0.57	2.63
CESIUM FLOWRATE (LB/HR)	0.063	0.032	0.032	0.032	0.032	0.063	0.025	0.000	0.003	0.003	0.003	0.003	0	0.000
SOLVENT FLOWRATE (LB/HR)	0	0	0	0	0	0	0.256	0.256	5.33	0.40	0.40	0.40	0	1228.67
AQUEOUS FLOWRATE(LB/HR)	5353	2676	2676	2676	2676	5353	284	5637	5637	5637	5637	5637	284	0
TEMPERATURE (DEG C)	35	35	35	23	23	23	AMBIENT	23	23	AMBIENT	AMBIENT	AMBIENT	AMBIENT	AMBIENT
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0	0	0.9	0.9	0.9	0.9	0.9	0.9	0.90	0
HYDROXIDE FLOWRATE (LB/HR)	151	76	76	76	76	151	0	151	151	151	151	151	0	0
DESIGN FLOWRATE (GPM)	100	100	100	60	60	8.5	0.57	9.07	9.07	10	10	100	0.57	2.63

STREAM	15	16	17	18	19	20	21	22	23	24 A	24 B	25	26	27
MASS FLOWRATE (LB/HR)	1230.94	1228.82	284	284	1230.37	1234.28	1234.28	1229.22	284	284	284	284	284	284
VOLUMETRIC FLOWRATE(GPM)	2.63	2.63	0.57	0.57	2.63	2.63	2.63	2.63	0.57	0.57	0.57	0.57	0.57	0.57
CESIUM FLOWRATE (LB/HR)	0.000	0.000	0	0	0.000	0.000	0.000	0.010	0	0	0	0.000	0.000	0.000
SOLVENT FLOWRATE(LB/HR)	1228.07	1230.6	0.256	0	1230.30	1234.28	1234.28	1229.13	0	0	0	0.256	0.0079	0.0079
AQUEOUS FLOWRATE(LB/HR)	0	0	284	284	0	0	0	0	284	284	284	284	284	284
TEMPERATURE (DEG C)	33	33	33	33	33	23	23	23	AMBIENT	27	33	33	AMBIENT	AMBIENT
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0	0	0	0	0.010	0.010	0.010	0.010	0.010	0.010
HYDROXIDE FLOWRATE(LB/HR)	0	0	0.048	0.048	0	0	0	0	0	0	0	0	0	0
DESIGN FLOWRATE (GPM)	2.63	2.63	0.570	0.570	2.63	2.63	2.63	2.63	0.57	0.57	0.57	0.57	0.57	10

STREAM	28	29	30	31	32	33	34	35	36	37	38	39	40	41
MASS FLOWRATE (LB/HR)	0	0	3.47	0	4.93	DELETED	DELETED	DELETED	DELETED	566	566	DELETED	DELETED	DELETED
VOLUMETRIC FLOWRATE (GPM)	0	0	0.0009	0	0.013					1.13	1.13			
CESIUM FLOWRATE (LB/HR)	0	0	0	0	0					0	0			
SOLVENT FLOWRATE (LB/HR)	0	0	0	0	4.93					0	0			
AQUEOUS FLOWRATE (LB/HR)	0	0	3.47	0	0					566	566			
TEMPERATURE (DEG C)	AMBIENT	AMBIENT	AMBIENT	AMBIENT	AMBIENT					AMBIENT	AMBIENT			
NITRIC ACID FLOWRATE (LB/HR)	0	0	0	0	0					0	0			
HYDROXIDE FLOWRATE (LB/HR)	0	0	0.00145	0	0					0	0			
DESIGN FLOWRATE (GPM)	0.5	0.5	10	10	0.5					33	33			

STREAM	42	43	44	45	46	47	48							
MASS FLOWRATE (LB/HR)	DELETED	DELETED	DELETED	DELETED	0.188	0	0							
VOLUMETRIC FLOWRATE (GPM)					0.00043	0	0							
CESIUM FLOWRATE (LB/HR)					0	0	0							
SOLVENT FLOWRATE (LB/HR)					0.188	0	0							
AQUEOUS FLOWRATE(LB/HR)					0	0	0							
TEMPERATURE (DEG C)					AMBIENT	AMBIENT	AMBIENT							
NITRIC ACID FLOWRATE (LB/HR)					0	0	0							
HYDROXIDE FLOWRATE (LB/HR)					0	0	0							
DESIGN FLOWRATE (GPM)					0.5	27	10							

NOTES

1. FOR STREAM FLOW DATA SEE CALCULATION

LEGEND

UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER SITE

H-AREA
MODULAR CAUSTIC SIDE SOLVENT EXTRACTION (CSSX) UNIT (MCU)
PROCESS FLOW DIAGRAM
SHEET 2 OF 2
(U)

N/A

Appendix B-3

Assessment Report for the Transfer Line Modifications Between Tank-37 and HDB-6

M-ESR-H-00291, Revision 0

S R S

FEDERAL FACILITY AGREEMENT (FFA) ASSESSMENT REPORT

for the

TRANSFER LINE MODIFICATIONS BETWEEN TANK-37 AND HDB-6

DISCLAIMER

APPROVALS

PREPARER B. D. Kuhn, Design Services Engineer Design Engineering LWO Design Managed Modifications (DMM) Closure Business Unit - Liquid Waste Organization Tank Farm Engineering	DATE 1-29-07
REVIEWER Halit Tanaydin, Design Services Engineer Design Engineering LWO Design Managed Modifications (DMM) Closure Business Unit - Liquid Waste Organization Tank Farm Engineering	1/29/07
REVIEWER T. N. Muralidhar, Design Services (Lead) Engineer Design Engineering LWO Design Managed Modifications (DMM) Closure Business Unit - Liquid Waste Organization Tank Farm Engineering	01/29/07
APPROVAL Robert Pyle , Design Authority Closure Business Unit -Liquid Waste Disposition Projects	1/29/07
APPROVAL Mickey Martin, Project Engineer Design Engineering LWO Design Managed Modifications (DMM) Closure Business Unit - Liquid Waste Organization Tank Farm Engineering	1-29-07

SUMMARY OF CHANGES

Rev No	Reason for Change	Pages Affected	Preparer	Approval DA	Approval DE	Issue Date
0	Initial Issue	N/A	BDK			

ORIGINAL

TABLE OF CONTENTS

1.0 Executive Summary

This Assessment Report is being submitted to satisfy requirements of Subsection IX and Appendix B of the Savannah River Site (SRS) Federal Facility Agreement (FFA).

Waste transfer lines 3"-WTS-251-P48 and 3"-WTS-104-P48 run from a connection on the north west side of Tank 37 to Diversion Box 6 (HDB-6). Line 104 transfers waste from HDB-6 to Tank 37; line 251 transfers supernate from Tank 37 to HDB-6. Both these lines are enclosed in a single jacket pipe. This assembly is buried underground. A section of the jacket pipe of this assembly northwest of Tank 37 has deteriorated and did not pass the required pneumatic leak test. The jacket pipe downstream of the deteriorated section, terminating at HDB-6, has been leak tested pneumatically and found to be satisfactory.

A new transfer line will bypass the section of line (core and jacket) that includes the deteriorated jacket pipe. The new section, about 95 feet long, will be installed about eight feet south of the old section. The deteriorated section of the transfer line will be capped and left in place for potential future remediation; it contains no liquid waste.

2.0 Design Information

2.1 The modification is addressed by two design change packages. M-DCP-H-06028 provides design to prefabricate the new piping arrangement in the shop. C-DCP-H-06013 provides design to tie-in the prefabricated pipe to existing piping in the field. Modification details, location of tie-in joints, and boundaries of the new and replacement pipes are provided in these design packages.

2.2 No equipment is affected by this modification.

2.3 Corrosion

2.3.1 Core pipe is corrosion evaluated, stainless steel.

2.3.2 Jacket pipe is carbon steel. Jacket pipe is finished with an epoxy-phenolic coating system, EPO-PHEN, from Sherwin Williams, especially suited for protecting underground carbon steel pipe. Jacket is then enclosed in a hydrophobic powder, Gilsulate, for further moisture protection.

2.4 Leakage

2.4.1 Leakage by inadvertent flows from Tank 37 or from HDB-6:

- By Siphon:

  Inadvertent creation of siphon flow through core line 3"-WTS-251-P48 (Tank 37 jet discharge line) or line 3"-WTS-104-P48 (inlet line to Tank 37) during vacuum box testing. After the new core lines have been welded to the existing core lines at the tie point near Tank 37, a vacuum box will be used to leak check the core pipe welds. If a significant weld leak occurred, a vacuum could be created in either core line which potentially could cause an inadvertent siphon flow in the line. However, such an inadvertent siphon flow will not occur in either core pipe, because it is prevented by a design feature and the required weld inspections described below.

  - By Siphon Through Core Pipe 104

    An air gap will be maintained between the open end of core pipe 104 in the tank and the waste level in Tank 37. Current waste tank level is 8.5" below the bottom of line WTS-104. A high liquid level conductivity probe alarm and administrative controls are in place to prevent tank level from reaching

WTS-104. Also, the tie-in weld must successfully pass a radiography examination before the vacuum box test is started, thus ensuring that there will be no leak through the weld.

- By Siphon Through Core pipe 251

  A siphon break (hole in the line) is in place to prevent an inadvertent siphon. As with pipe 104, the tie weld must successfully pass a radiography examination before the vacuum box test is started, thus ensuring that there will be no leak through the weld.

- By inadvertent flow of liquid waste or spread of airborne contamination from the tank to the environment through process line breaks during modification.

  Opened core pipes will be will be temporarily sealed.

- By jetted flow from Tank 37 of waste through WTS-251 into breached core pipe during this modification

  Steam and plant air to transfer jet at Tank 37 is locked out and the jet inlet isolation valves are locked closed preventing an inadvertent transfer through WTS-251. These valves will remain locked closed until the new transfer line is installed.

- By inadvertent transfer from HDB-6 of waste through WTS-104 and WTS 251 into breached core pipe during this modification

  The isolation valves at HDB-6 for the two core lines are locked closed and verified to seal. These valves will remain locked closed until the new transfer line is installed.

- By overfill flow of waste from Tank 37 through WTS-104 into breached core pipe during this modification

  An air gap will be maintained between the open end of core pipe 104 in the tank and the waste level in the tank. Current waste tank level is 8.5" below the bottom of line WTS-104. A high liquid level conductivity probe alarm and administrative controls are in place to prevent tank level from reaching WTS-104.

2.4.2 Leakage from Pipe Leaks

- From flow of waste from pipe to the environment after modification.

  Shop fabricated pipe spools are hydrostatically leak tested to requirements of ASME B31.3, Category M. No leakage is allowed.

- From flow of waste from pipe tie-ins to the environment after modification.

  Tie-in joints of core pipe are 100% radiographed (RT) and vacuum-box leak tested.

- From flow of waste from jacket tie-ins to the environment after modification.

  Tie-in joints of jacket pipe are 100% RT and vacuum-box leak tested.

2.5 ALARA (As Low As Reasonably Achievable)

Transfer of supernate is followed by flushing of the core pipe. Documented data shows that the core pipe was flushed twice on July 26, 2006, in accordance with site procedure SW 9.1- WTS section 7.24.

2.5.1 At the cut ends of the damaged section of waste transfer line to be replaced

The transfer line slopes downward from Tank 37 to HDB6. A line break will be made at the lowest elevation, and fluid, if any remains from the flushing procedure noted above, will be detected by X ray inspections and by wet taps. Any residual will be contained when the break is made and will be collected and disposed of per Work Package procedure, WO 737333.

2.5.2 At the cut ends of the existing transfer line to remain in service:

As described above, any fluid at the cut locations will be detected by X ray inspections and by wet taps. Any residual will be contained when the break is made and will be collected and disposed of per Work Package procedure, WO 737333.

2.6 Pipe Stress / Stability

2.6.1 Piping Stresses

Calculation T-CLC-H-00816, "Tank 37 Analysis of Re-routed Transfer Piping" determines stresses from loading on the pipe and justifies designs provided in M-DCP-H-06028 and C-DCP-H-06013.

2.6.2 Passage of crane over transfer line

Surface loading of the new transfer pipe by crane access is justified under specific conditions set forth in T-CLC-H-00816 and was determined to be acceptable for the current bounding crane loading for H Tank Farm. Crane movement is administratively controlled by HLWM-16004(14-IPC1) Crane Operations in Liquid Waste Disposition Project Area and by WSRC-TR-96-0362 Hoisting & Rigging Requirements for High Level Waste Facilities.

2.7 Work Scope consists of abandoning deteriorated transfer lines and fabricating and installing new transfer lines. Work scope is set forth in MT-HTF-2006-00062 and is addressed in M-DCP-H-06028 and C-DCP-H-06013.

2.7.1 Shop Work Scope

- Fabricate, examine, and leak test new pipe spools, both core and jacket pipes.
- Apply protective coating to outer surface of new jacket pipe.

2.7.2 Field Work Scope

- Excavate trench.
- Compact subgrade if required.
- Cut and remove a short section of existing transfer line, core and jacket, at the two tie-in locations of the new by pass line.
- Cut, cap, and abandon in place the damaged section of transfer line, core and jacket.
- Install a new section of transfer line, core and jacket, that bypasses the damaged section.
- Examine field welds.
- Leak test tie-in joints by vacuum box.
- Apply protective coating to outer surface of jacket pipe at tie-in locations.

- Install radiation shielding above the jacket pipe, as needed.
- Encase jacket pipe in hydrophobic powder (Gilsulate)
- Backfill and restore excavated area.

2.8 Applicable SRS Engineering Standards and Guides

Contents of "Practices Manual" are labeled "Guides". Within the design change packages that govern the modification, "guides" are invoked as "requirements."

2.8.1 SRS Engineering Standards Manual WSRC-TM-95-1

- 01064 – Radiological Design Requirements
- 01110 – Civil Site Design Criteria
- 05057 – Control of Welding
- 15060 – ASME B31.3 Additional Requirements for SRS Piping Systems

2.8.2 SRS Engineering Practices Manual WSRC-IM-95-58

- 09903-G – Protective Coatings – Underground Steel
- 15060-G – Application of ASME B31.3

2.9 Reference Documents

- ASME Code for Pressure Piping B31.3
- C-DCP-H-06013 TANK 37 Supernate Line Replacement
- HLWM-16004(14-IPC1) Crane Operations in Liquid Waste Disposition Project Area
- M-DCP-H-06028 TANK 37 Supernate Line Replacement (Fabrication Details)
- MT-HTF-2006-00062 Tank 37, Reroute Transfer Line
- SW6-V2-WM-WC-2109 Backfilling of Excavations
- SW9.1- WTS-7.24 Backflushing Tank 37 Transfer Jet
- T-CLC-H-00816 Rev. 2 Tank 37 Analysis of Rerouted Transfer Lines
- Work Package WO 737333
- WSRC-OS-94-42-ADN 89-05-FF Federal Facility Agreement for the Savannah River Site.
- WSRC-TR-96-0362 Hoisting & Rigging Requirements for High Level Waste Facilities
- W701432 Rev 46 Savannah River Plant Bldg 241-H Tanks 35,36 & 37 Additional Waste Storage Tank Process Line Supports & Anchors, Concrete & Steel

3.0 Waste Compatibility

The modification provided in the Tank 37 design change packages and other associated design documents is consistent with the Assessment Report, Phase II For The F and H Area High Level Radioactive Waste Tank Farms Rev.0, August 1991. The materials of construction used in the modification are consistent with the existing materials and compatible with the waste streams. This modification has not introduced any new material; waste characterization remains unchanged.

4.0 Foundation Support

Structural stresses on the new waste transfer line were evaluated in T-CLC-H-00816 and were found to justify the designs provided by M-DCP-H-06028 and C-DCP-H-06013. See section 2.6. The replacement/rerouted line will be placed about 8'-0" closer to Tank 37 than the existing line. Thus it is assumed that the quality of the backfill and subgrade at the new location is the same or very similar to the existing backfill and subgrade. This assumption is validated by Drawing W701432, Revision 46, in notes 3 and 4.

5.0 Leak Detection and Past Leaks

The existing installation is consistent with Section 3.7.2 Type II/IIA Transfer Lines of the Assessment Report, Phase II, noted above. As stated in the Report, there are no known past or present leaks associated with the Type II High Level Waste transfer line to be modified.

This modification does not change the containment properties or the release detection features of existing piping system.

Existing core and jacket pipes are sloped from Tank 37 toward the diversion box, HDB-6, so there should be no stagnant liquid within the line. If liquid remains from the flushing noted above, it will be collected and disposed of according to Work Package WO 737333.

6.0 Inspections

For this modification, all piping material, fabrication, assembly, erection, inspection, examination and testing requirements are in accordance with ASME Code B31.3, SRS Engineering Standard 15060, SRS Engineering Guide 15060-G and SRS Engineering Standard 05057 SRS Welding Requirements as supplemented by the Federal Facility Agreement.

Fabrication, installation, examination and testing of modified core and jacket piping are performed according to Quality Inspection Plans (QIPs) within M-DCP-H-06028 and C-DCP-H-06013.

Shop fabricated welds of core pipe are hydro tested and 100% X-ray examined. Shop fabricated welds of jacket pipe are hydro tested and 20% X-ray examined. Field fabricated tie-in welds and closure welds of both core and jacket pipe are vacuum box leak tested and 100% X-ray examined.

7.0 Determination of Secondary Containment

Upon restoration, primary and secondary containment associated with the transfer lines will meet all FFA requirements. Therefore, no further assessment of the primary and secondary containments of this modification is required.

8.0 Professional Engineer Certifications (Design and Construction)

Design

This assessment report was prepared under my supervision and direction. I certify that the design modifications detailed in M-DCP-H-06028 Rev. 0, C-DCP-H-06013 Rev. 0, and associated design documents comply with applicable engineering standards and the requirements of Appendix B of the Federal Facility Agreement. These standards have been generally accepted as adequate in demonstrating leak tightness.

Stamp

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 13818 SURENDRA K. GUPTA

Name: SURENDRA K GUPTA

License Number: 13818

Construction

I have conducted an inspection, to the extent possible, of the completion of the fabrication and installation of the tie-in joints. Based upon the inspection, I certify that, to the best of my knowledge, information and belief that the tie-in joints were constructed in accordance with the approved design. I further certify that the tie-in joints were tested in accordance with requirements summarized in Section 6.0 of this Report and detailed in design change package M-DCP-H-06028 Rev. 0, C-DCP-H-06013 Rev. 0 and associated design documents. The tests conducted to demonstrate leak tightness of the referenced waste transfer lines were found to be acceptable.

Stamp

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14028 JOSEPH CARROLL

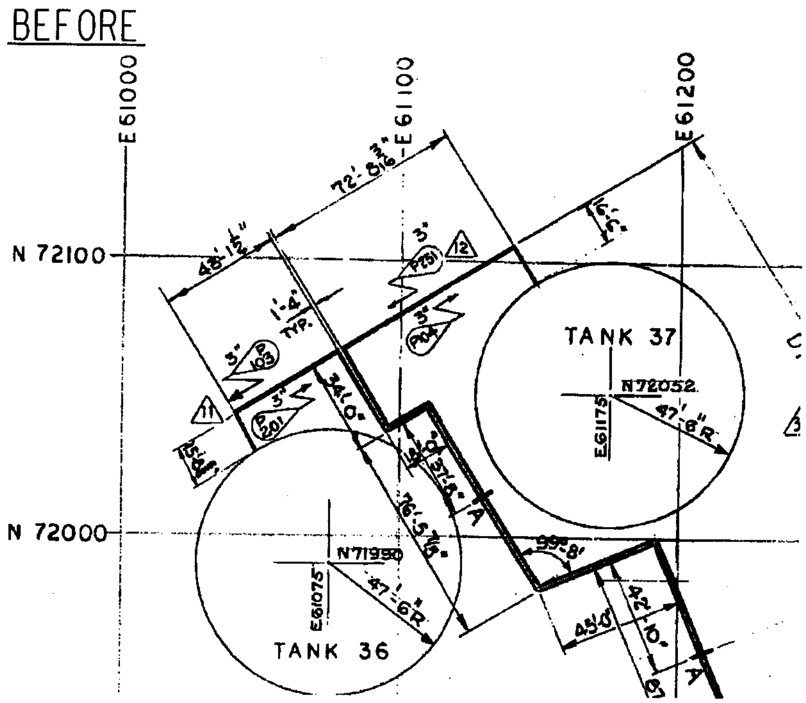
Name: JOSEPH CARROLL

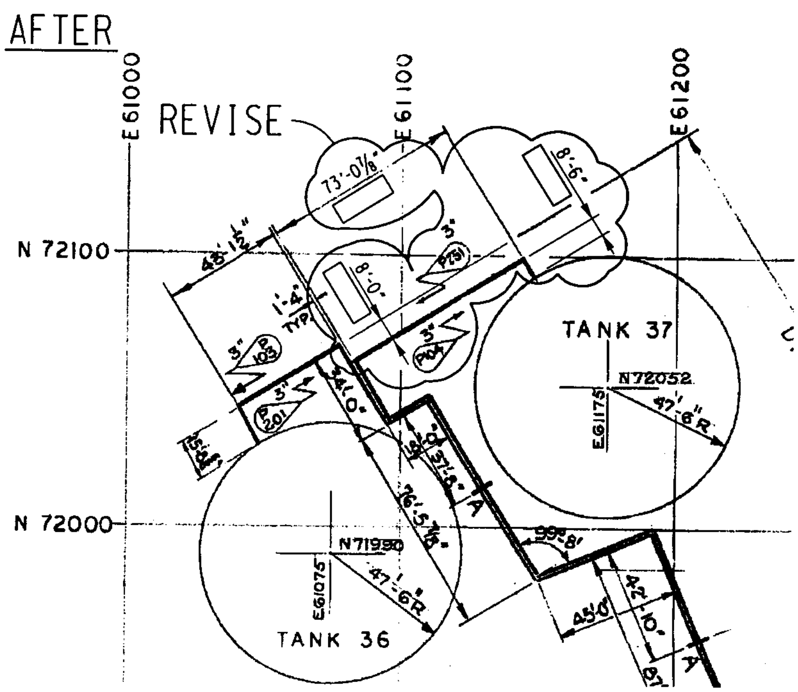
License Number: 14028

04/04/2007

9.0 Attachment

9.1 Sketch for Tank 37 Transfer Line Modification





Appendix C

CY2007 Groundwater Monitoring Report for the Radioactive Liquid Waste Tank Farms

ESH-EMS-2008-00044

ESH-EMS-2008-00044

2007 GROUNDWATER MONITORING REPORT FOR THE RADIOACTIVE LIQUID WASTE TANK FARMS

FEBRUARY 2008

Introduction

This report presents the results of groundwater monitoring at the Radioactive Liquid Waste Tank Farms for calendar year 2007. A total of 61 wells were sampled. Eleven (11) wells were sampled at F Tank Farm and fifty (50) wells were sampled at H Tank Farm.

The monitoring results, which are presented in Appendix A, are generally similar to those from past years. There were no results that appeared anomalous. The water level measurements and analytical results were generally similar to those from past years.

Setting

The tank farms are located between Upper Three Runs Creek and Fourmile Branch in the central part of the Savannah River Site (figure 1). The uppermost aquifer in the area is the Upper Three Runs Aquifer (UTRA). This aquifer is divided into upper and lower aquifer zones by a leaky confining layer commonly referred to as the "tan clay". The UTRA is separated from the underlying Gordon Aquifer by the Gordon Confining unit which is commonly referred to as the "green clay". Water from the UTRA discharges into both Upper Three Runs Creek and Fourmile Branch. Water from the Gordon Aquifer discharges into Upper Three Runs Creek.

Groundwater Monitoring at F Area Tank Farm

Eleven wells were sampled at F Tank Farm (figure 2). Wells FTF 28 and FSL 11C are set in the lower aquifer zone of the UTRA. The other wells are set in the upper aquifer zone of the same unit. Piezometric surface maps for the two units are shown in figures 3 and 4.

Samples were analyzed for gross alpha, nonvolatile beta, tritium and nitrate/nitrite. Samples were also analyzed for sodium and chromium to check for releases from the cooling water system. The monitoring results are presented in Appendix A**.** Additional metals and volatile analyses were run for some wells. The Soil and Groundwater Closure Projects organization reports those results separately in connection with ongoing work on the General Separations Area Western Groundwater Operable Unit.

The monitoring results are similar to those from previous years. There were no detections of gross alpha exceeding the practical quantitation limit. Tritium was present in all samples but the activities were not unusual for F Area. The 2007 sample results yielded nonvolatile beta detections in wells FSL 11C, FTF 28, FTF 21, and FTF 18 that were not estimated (J qualified) and one estimated detection in Well FTF 19 (FTF 28 had both qualified and unqualified results). The results continue to indicate the existence of a nonvolatile beta plume extending from the tank farm to the southwest through wells FTF 28 and FSL 11C (figure 5). Samples from these two wells were analyzed for specific radionuclides in 2007 (table 1). The predominant radionuclide present appears to be technetium 99. In fact, the result for FTF 28 was 1040 pCi/L which is above the 4 mrem/year drinking water standard for Tc 99 (equivalent to 900 pCi/L). The plume is probably related to a well-documented 1961 release near Tank 8. Because this plume is of particular interest, samples from wells FTF 28 and FSL 11C will be analyzed for Tc 99 annually.

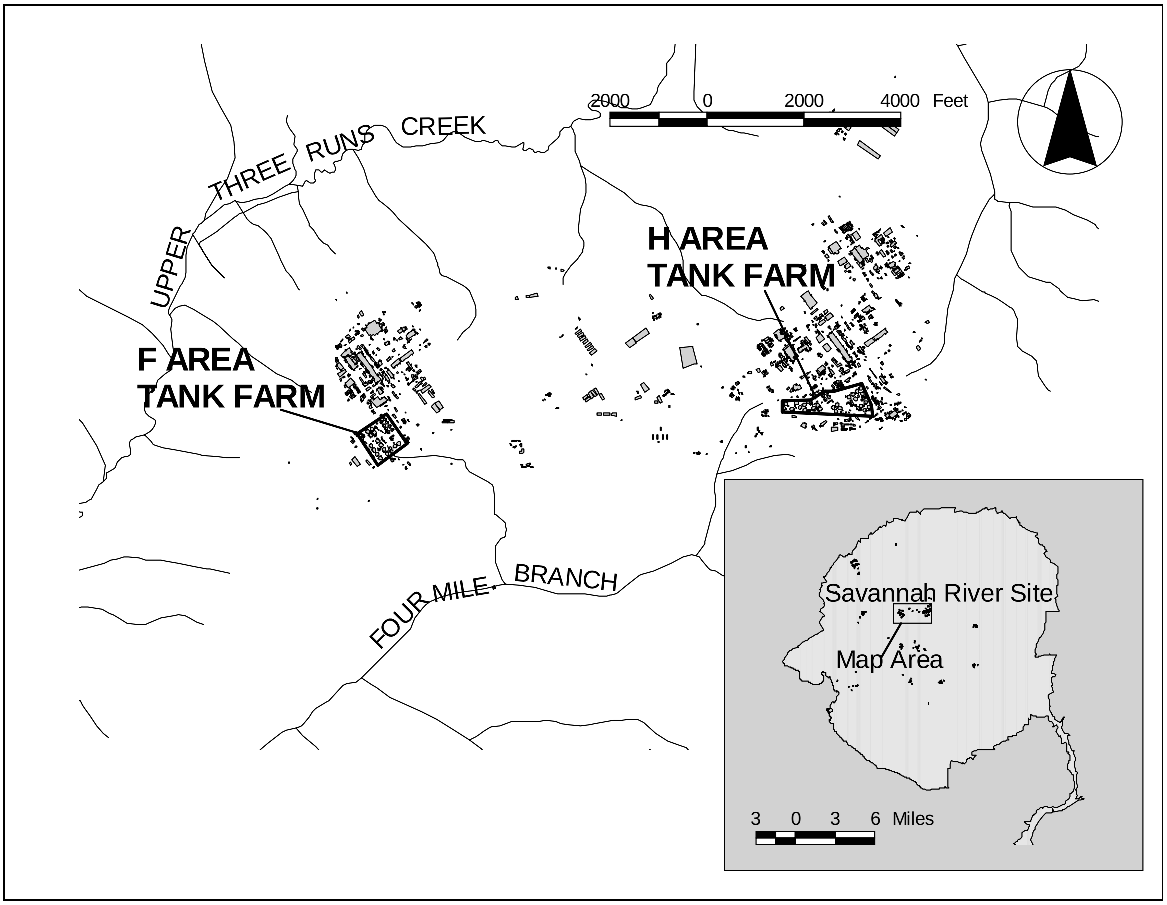


Figure 1. Locations of F Area and H Area Tank Farms.

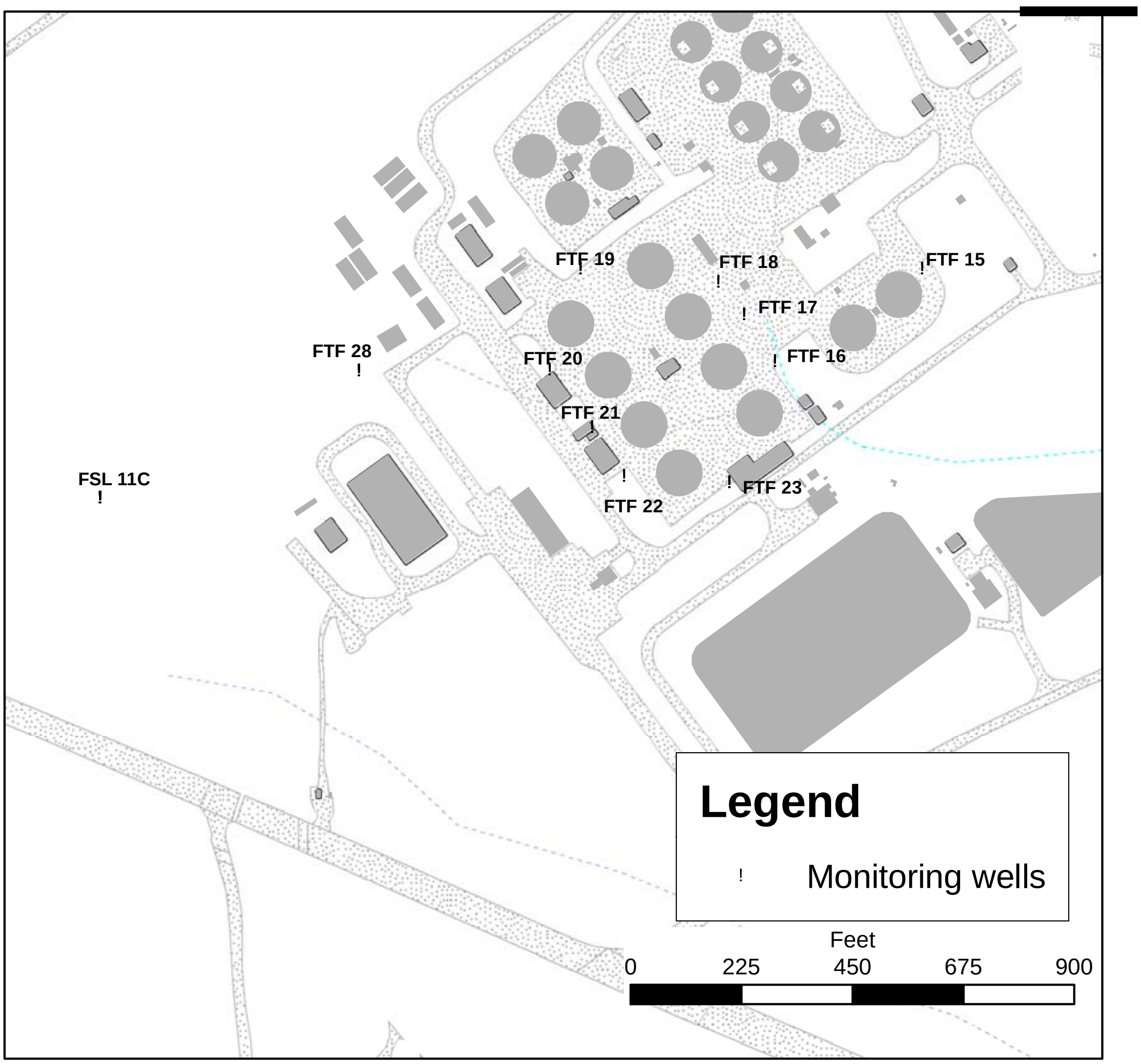


Figure 2. Wells sampled at F Tank Farm in 2007.

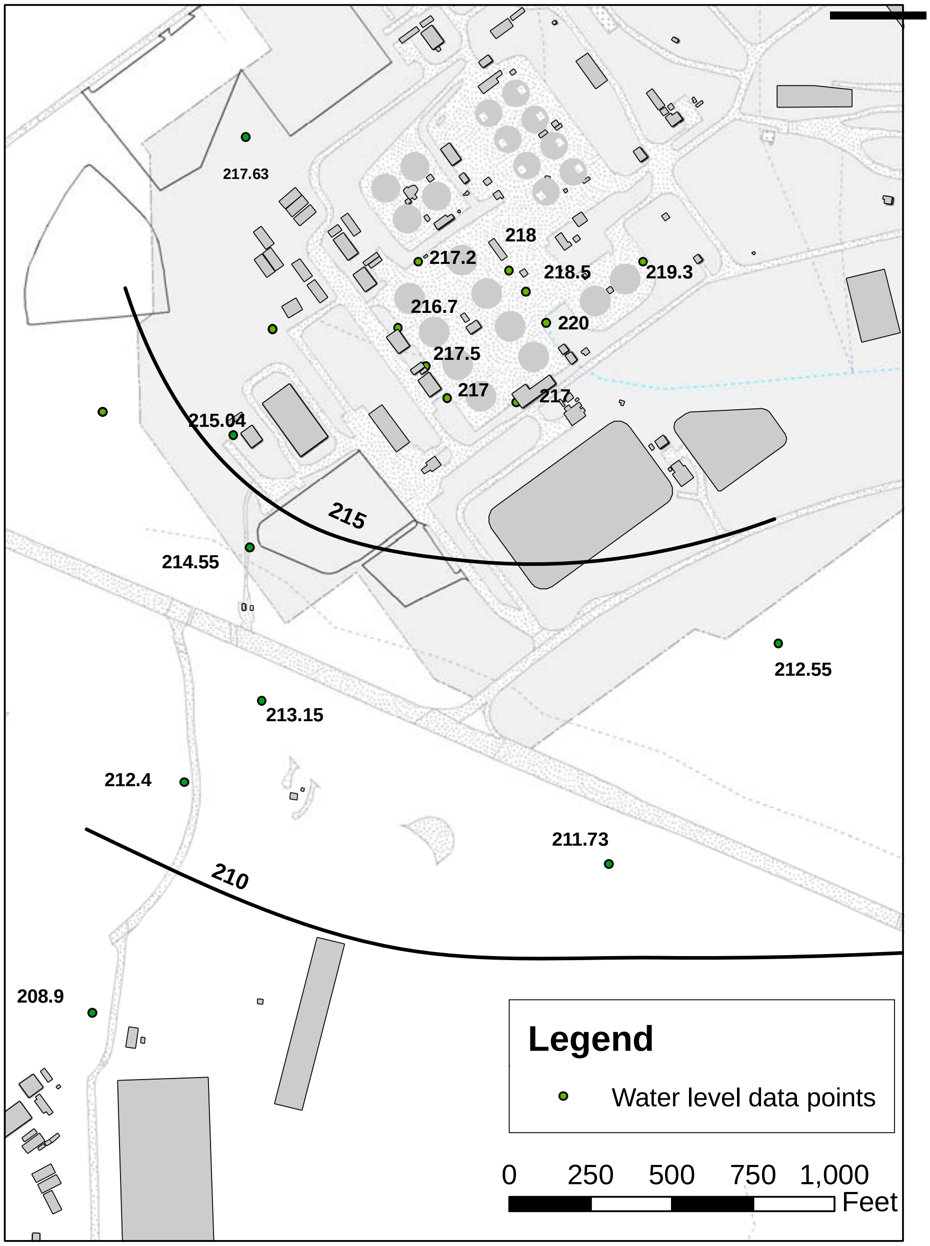


Figure 3. Water levels for the Upper Aquifer Zone of the Upper Three Runs Aquifer during the second half of 2007 near F Tank Farm.

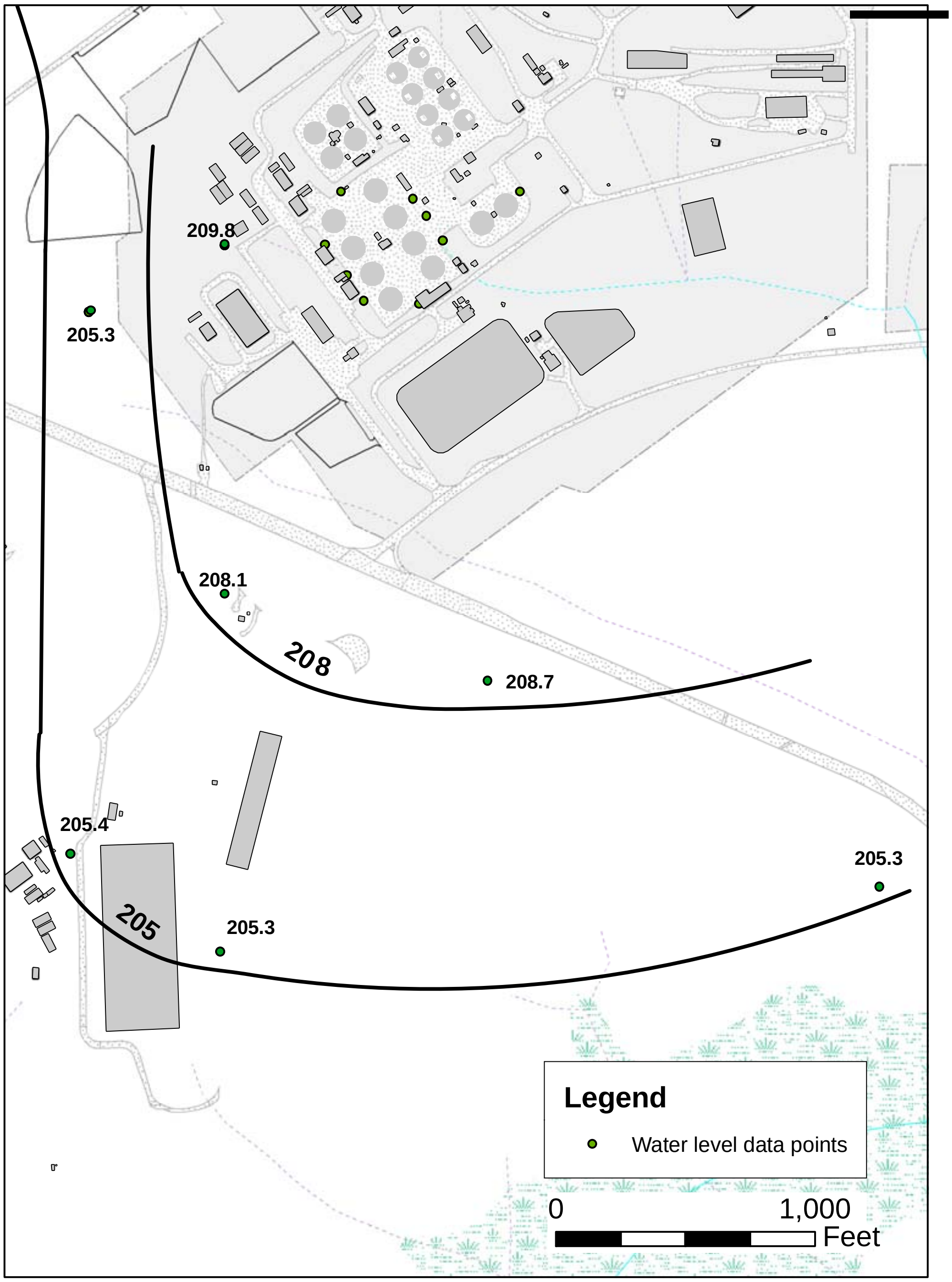


Figure 4. Water levels for the Lower Aquifer Zone of the Upper Three Runs Aquifer during the second half of 2007 near F Tank Farm.

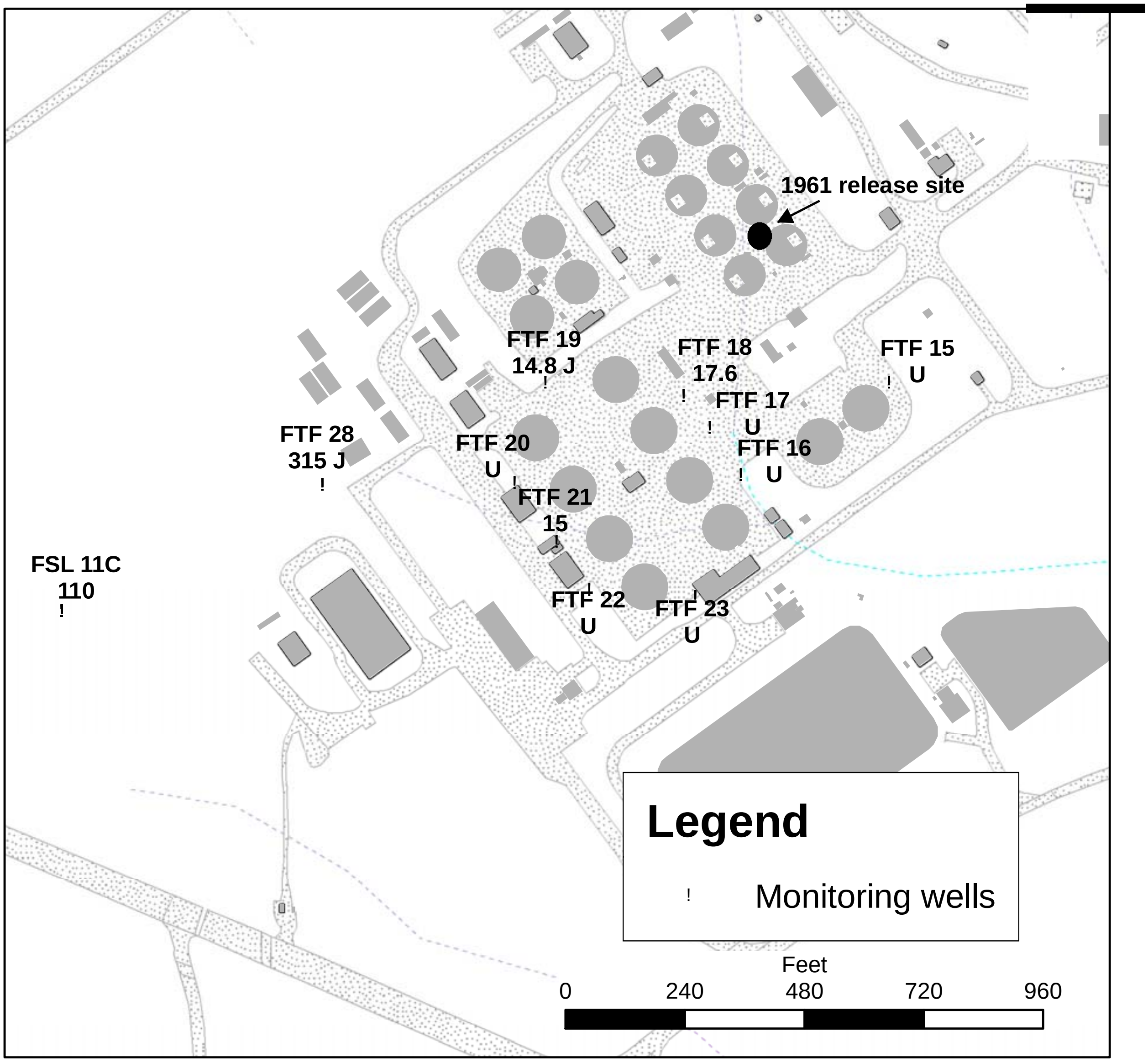


Figure 5. Nonvolatile beta results in pCi/L for F Tank Farm. "U" indicates a result below detection. "J" indicates an estimated result.

Table 1. Radiological results from wells FSL 11C and FTF 28.

WELL	DATE	ANALYTE_NAME	LAB QUALIFICATION	RESULT	UNITS
FSL 11C	1/29/07	AMERICIUM-241	U	0.0132	pCi/L
FSL 11C	1/29/07	CARBON-14	U	2.85	pCi/L
FSL 11C	1/29/07	CESIUM-137	U	-0.555	pCi/L
FSL 11C	9/18/07	CESIUM-137	U	-0.0522	pCi/L
FTF 28	10/16/07	CESIUM-137	U	-0.463	pCi/L
FTF 28	10/16/07	CESIUM-137	U	-1.69	pCi/L
FSL 11C	1/29/07	COBALT-60	U	0.136	pCi/L
FSL 11C	1/29/07	CURIUM-242	U	0.035	pCi/L
FSL 11C	1/29/07	CURIUM-243/244	U	0.0273	pCi/L
FSL 11C	1/29/07	CURIUM-245/246	U	0.0377	pCi/L
FSL 11C	1/29/07	PLUTONIUM-238	U	0.0615	pCi/L
FSL 11C	1/29/07	PLUTONIUM-239/240	U	0.0393	pCi/L
FSL 11C	1/29/07	RADIUM, TOTAL ALPHA-EMITTING	U	0.168	pCi/L
FSL 11C	1/29/07	RADIUM-226	J	0.695	pCi/L
FSL 11C	8/9/07	RADIUM-226	U	0.483	pCi/L
FTF 28	2/15/07	RADIUM-226	U	0.504	pCi/L
FTF 28	9/25/07	RADIUM-226	J	0.684	pCi/L
FSL 11C	1/29/07	RADIUM-228	U	0.311	pCi/L
FSL 11C	8/9/07	RADIUM-228	U	0.699	pCi/L
FTF 28	2/15/07	RADIUM-228	U	0.152	pCi/L
FTF 28	9/25/07	RADIUM-228	U	-0.0984	pCi/L
FSL 11C	1/29/07	STRONTIUM-90	U	-0.126	pCi/L
FSL 11C	8/9/07	STRONTIUM-90	U	-3.57	pCi/L
FTF 28	2/15/07	STRONTIUM-90	U	1.48	pCi/L
FTF 28	9/25/07	STRONTIUM-90	U	1.13	pCi/L
FSL 11C	1/29/07	TECHNETIUM-99		268	pCi/L
FSL 11C	9/18/07	TECHNETIUM-99		191	pCi/L
FTF 28	10/16/07	TECHNETIUM-99		1040	pCi/L
FSL 11C	1/29/07	THORIUM-228	U	0.454	pCi/L
FSL 11C	1/29/07	THORIUM-230	U	0.0214	pCi/L
FSL 11C	1/29/07	THORIUM-232	U	0.0781	pCi/L
FSL 11C	1/29/07	URANIUM-233/234	U	0.155	pCi/L
FSL 11C	8/9/07	URANIUM-233/234	U	0.0417	pCi/L
FTF 28	2/15/07	URANIUM-233/234	U	-0.00918	pCi/L
FTF 28	9/25/07	URANIUM-233/234	U	0	pCi/L
FSL 11C	1/29/07	URANIUM-235	U	0.0231	pCi/L
FSL 11C	8/9/07	URANIUM-235	U	0	pCi/L
FTF 28	9/25/07	URANIUM-235	U	0	pCi/L
FSL 11C	1/29/07	URANIUM-238	U	0.0373	pCi/L
FSL 11C	8/9/07	URANIUM-238	U	0.0156	pCi/L
FTF 28	2/15/07	URANIUM-238	U	0.115	pCi/L
FTF 28	9/25/07	URANIUM-238	U	0.0414	pCi/L

Groundwater Monitoring at H Tank Farm

Fifty wells were sampled at the H Tank Farm during 2007 (figure 6). The wells are set in three zones. The "A" wells are set in the Gordon Aquifer. The "B" and "D" wells are set in the lower and upper zones of the UTRA respectively. Piezometric maps for the upper and lower aquifer zones of the UTRA are presented in figures 7 and 8.

Samples were analyzed for gross alpha, nonvolatile beta, tritium and nitrate/nitrite. **s**amples were also analyzed for sodium and chromium to check for releases from the cooling water system. The monitoring results are presented in Appendix A. Additional metals and volatile analyses were run for some wells. The Soil and Groundwater Closure Projects organization reports those results separately in connection with ongoing work on the General Separations Area Eastern Groundwater Operable Unit.

The 2007 sample results are consistent with historical results. There were no detections of gross alpha exceeding the practical quantitation limit. Tritium was present in all samples with nine results exceeding 10 pCi/ml and one at more than twice the 20 pCi/ml drinking water standard (48pCi/ml at HAA 12D). The highest tritium values came from watertable wells almost 1000 feet from any suspected tank farm release sites, but only about 200 feet from the H Area Inactive Process Sewer Line (HIPSL). It is likely that the HIPSL is a major contributor of tritium to these wells. Only three wells, HTF 1, HAA 12B and HAA 15A, yielded nonvolatile detections that were not flagged as estimates (J qualified). Seven others yielded J qualified results.

The HTF 1 result was 30.5 pCi/L. This upper UTR well may have been impacted by contamination that originated near Tank 16. A significant release is known to have occurred near this tank in 1960. Three upper UTR wells yielded results that were flagged as estimates. The spatial distribution of upper UTR results (figure 9) indicates that any contamination present in that aquifer zone is not widespread.

There were two nonvolatile beta detections in the lower UTR wells one of which was an estimate (figure 10). There were four detections in Gordon Aquifer wells. Three of them were estimates while the fourth, from well HAA 15A, was 31.4 pCi/L (figure 11). The wells yielding detections were all in clusters where the shallower wells were below detection. This indicates that the contamination originated some distance away. The source of this contamination is the quite possibly the source responsible for the HTF 1 results. Additional investigation will address any uncertainty regarding the source(s) of the contamination.

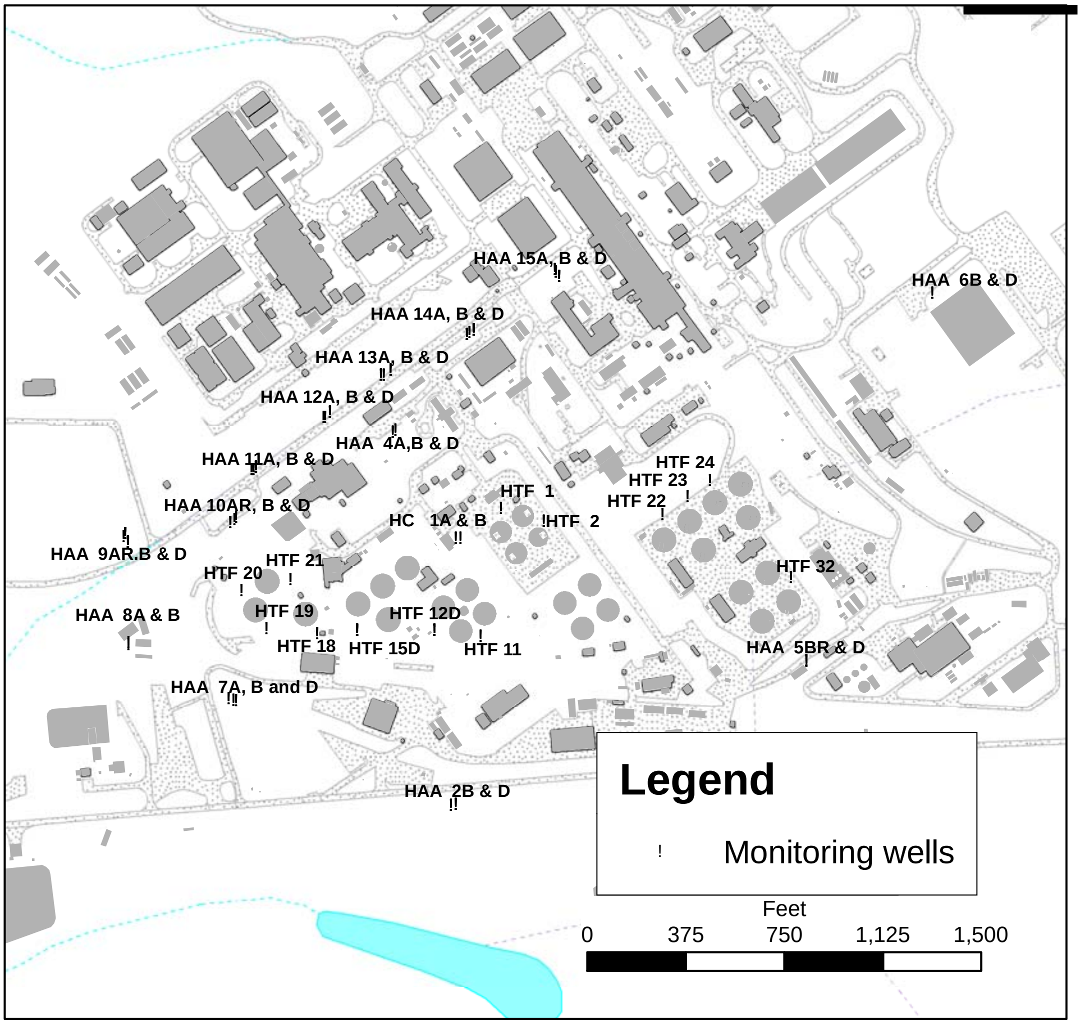


Figure 6. Wells sampled at H Tank Farm during 2007.

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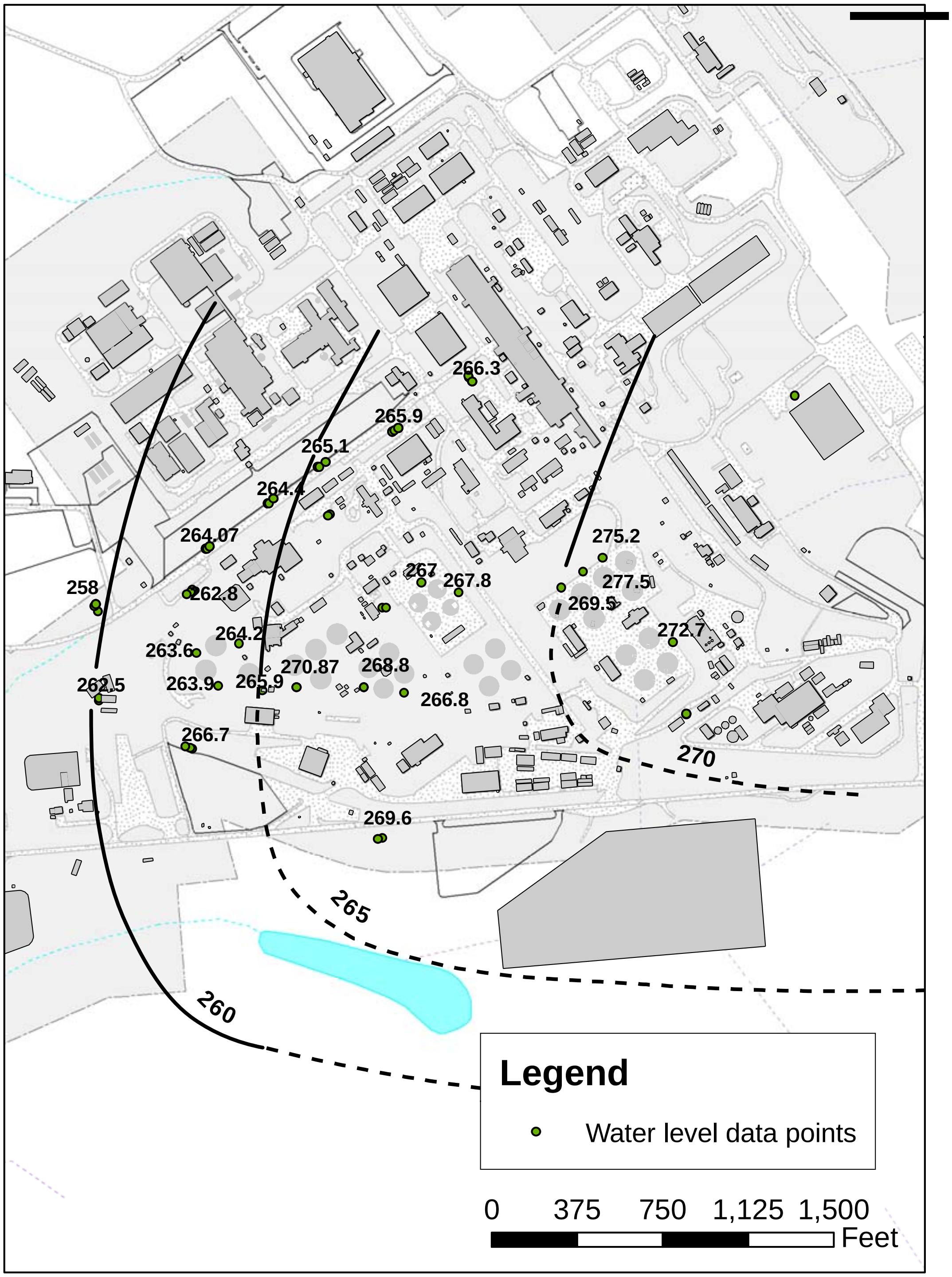

Figure 7. Water levels for the Upper Aquifer Zone of the Upper Three Runs Aquifer during the second half of 2007 near H Tank Farm.

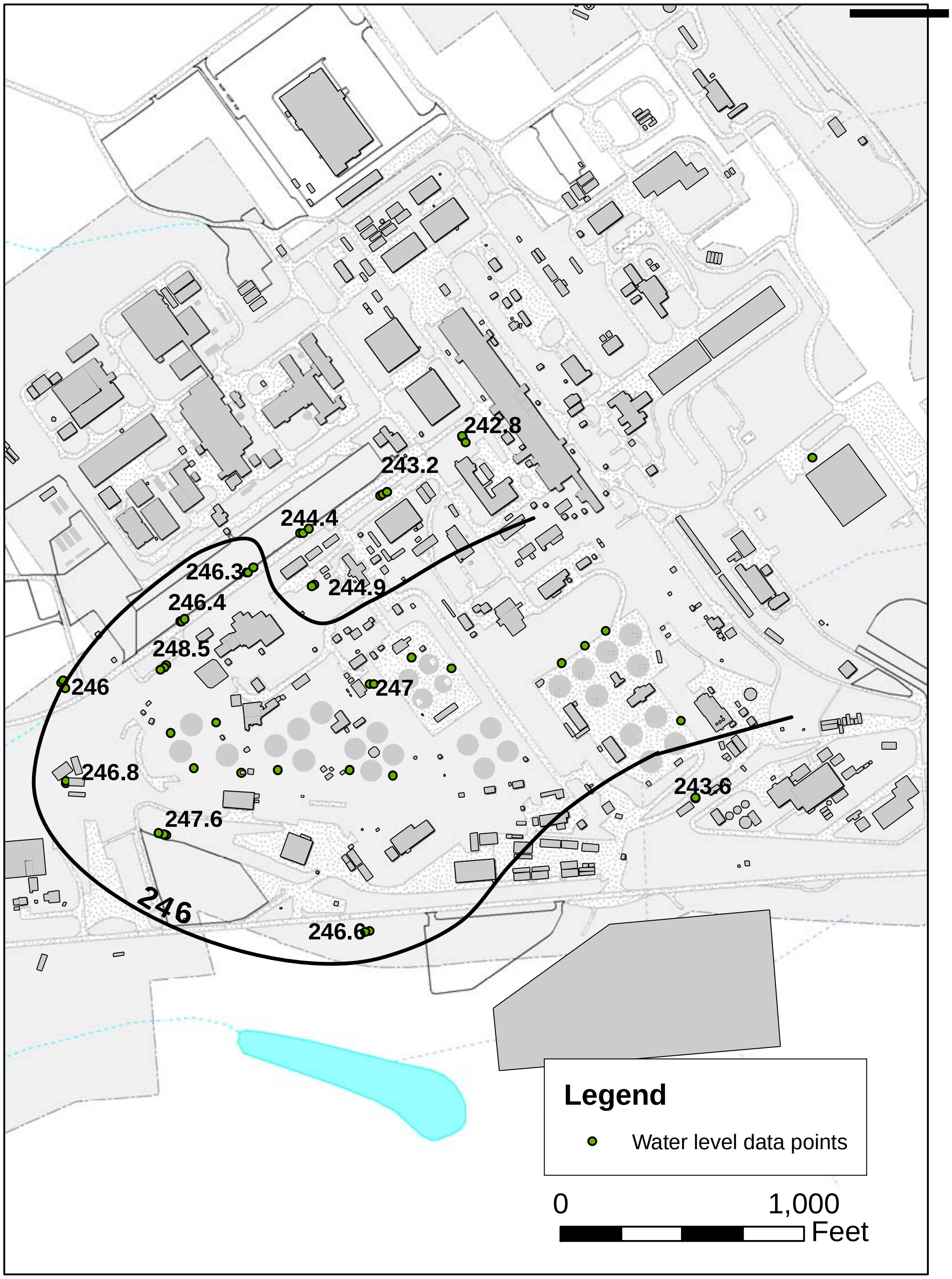

Figure 8. Water levels for the Lower Aquifer Zone of the Upper Three Runs Aquifer during the second half of 2007 near H Tank Farm.

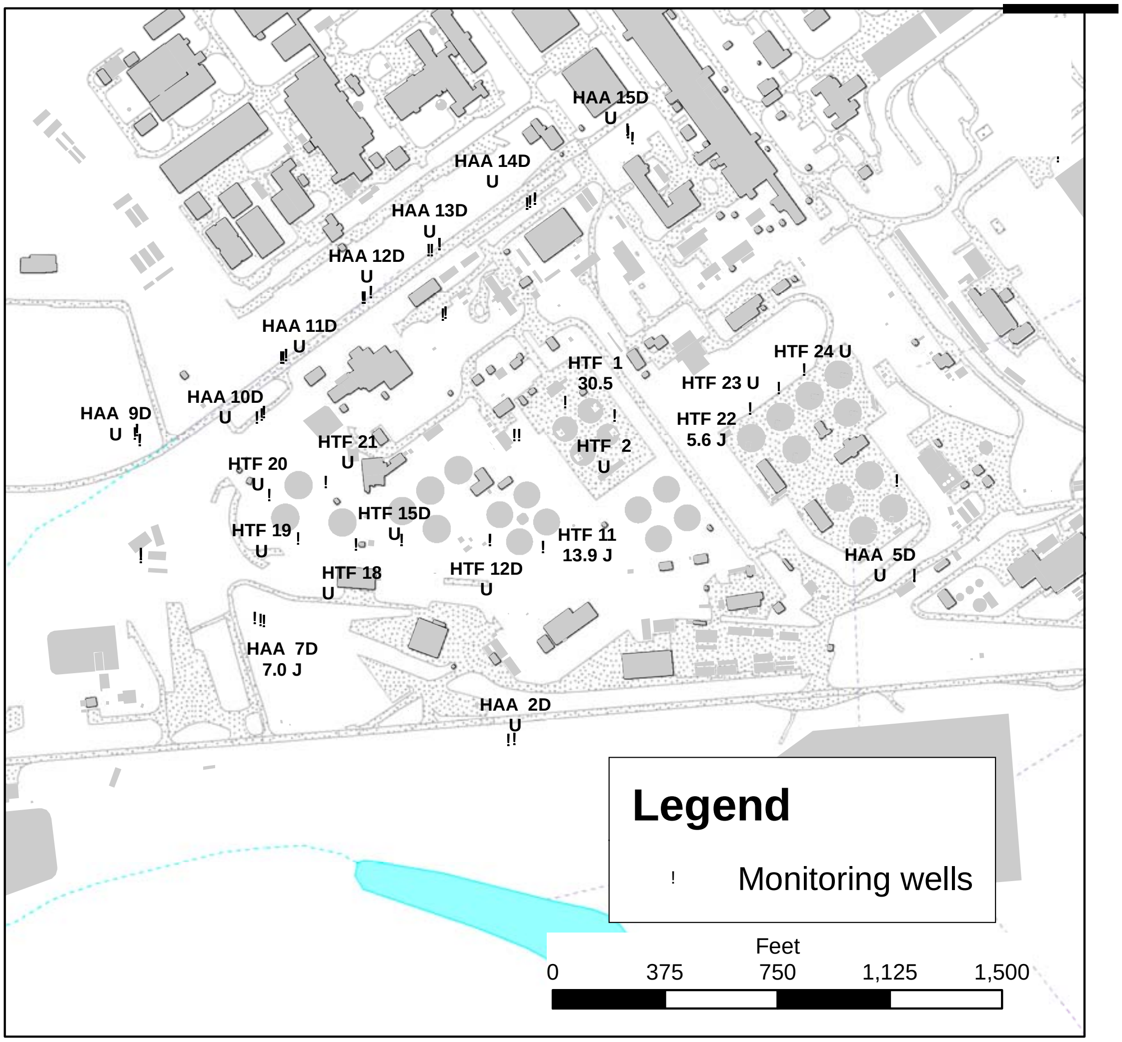

Figure 9. Nonvolatile beta results in the upper Upper Three Runs Aquifer at H Tank Farm in pCi/L . “J” indicates an estimated result. “U” indicates a result below detection.

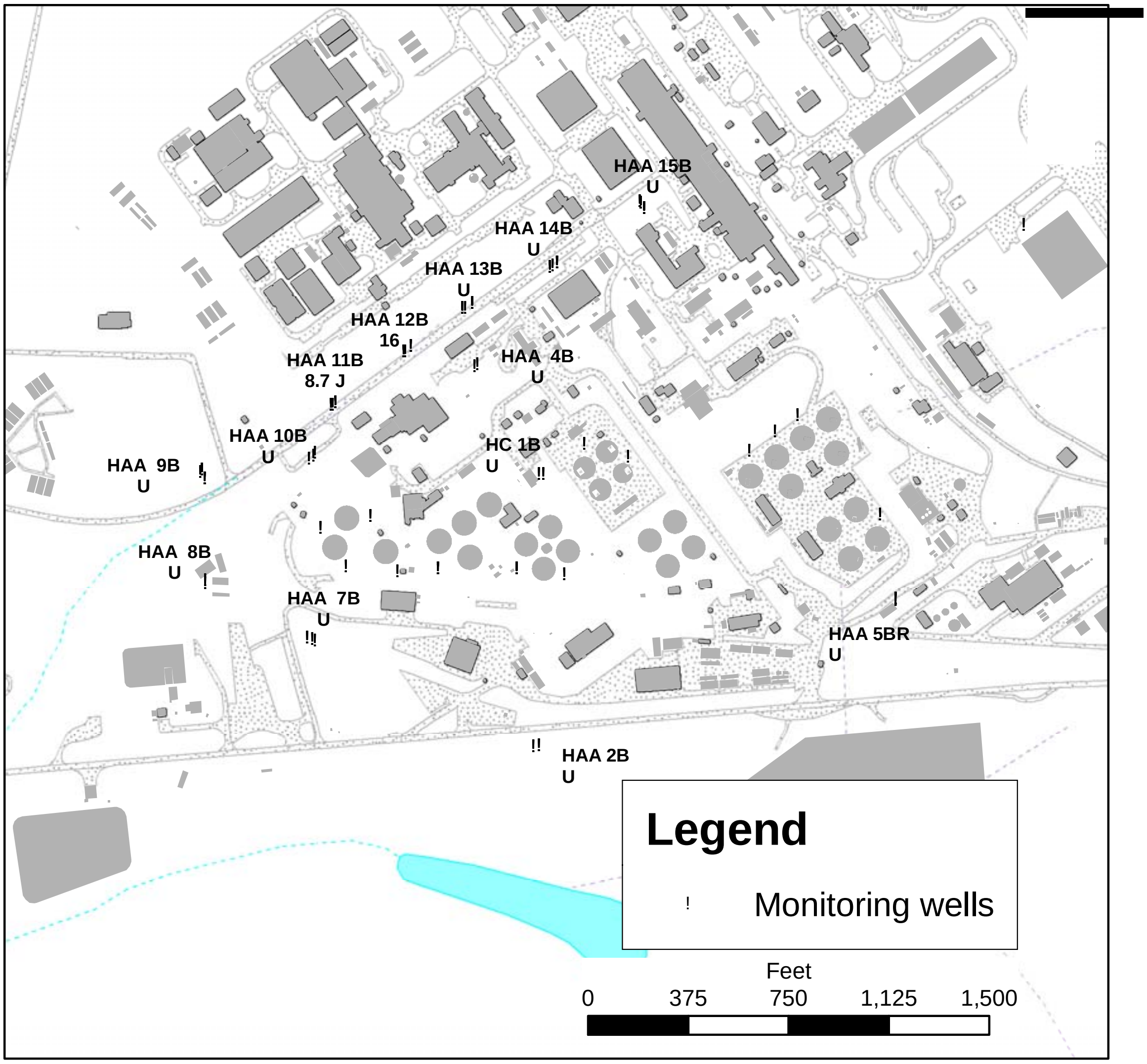

Figure 10. Nonvolatile beta results in the lower Upper Three Runs Aquifer at H Tank Farm in pCi/L . "J" indicates an estimated result. "U" indicates a result below detection.

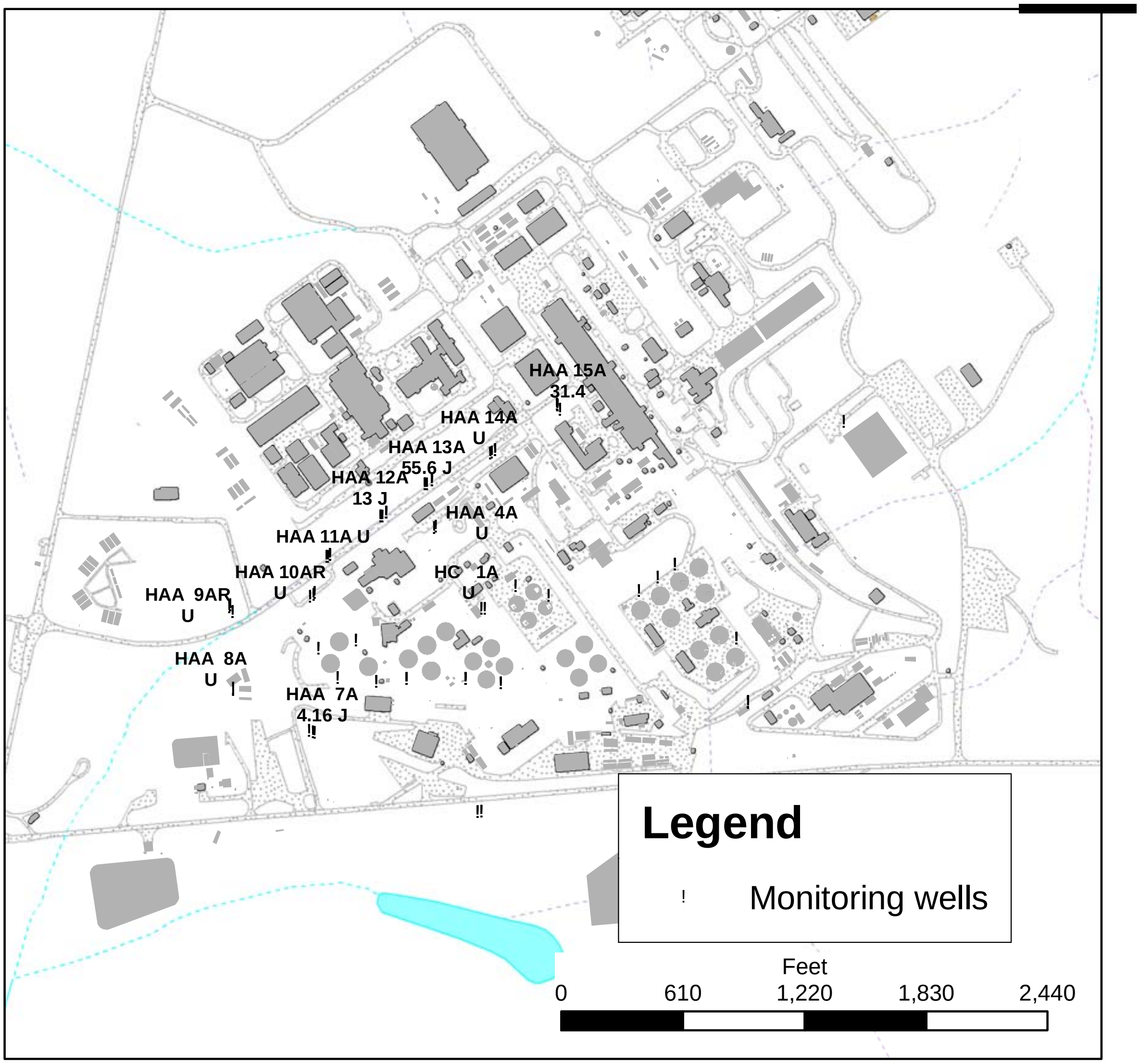

Figure 11. Nonvolatile beta results in the Gordon Aquifer at H Tank Farm in pCi/L. "J" indicates an estimated result. "U" indicates a result below detection.

Conclusions

Groundwater monitoring beneath the high level waste tank farms yielded no unexpected results during 2007. Of the total 61 wells sampled during 2007, five out of eleven wells in F Tank Farm Area and ten out of fifty wells in H Tank Farm Area had detectable nonvolatile beta results. Those results are compared to historical results in table 2. The areas of contamination that are present are best explained as resulting from well-documented releases that occurred decades ago. At F Area, a nonvolatile beta plume is present just beyond the facility fence at FTF 28, but this is a predictable result of a 1961 release near Tank 8. At H Tank Farm, the groundwater at wells HTF 1, HAA 12B and HAA 15A is contaminated with nonvolatile beta. These wells may have been impacted by contamination slowly migrating away from the site of a 1960 release near Tank 16.

Table 2. 2007 Results for nonvolatile beta compared to historical results.

Well #	**Aquifer**	**Nonvolatile Beta Results (pCi/L)**			
		2007	**2006**	**2005**	**2004**
FSL 11C	UTR – L	110	111	90.7	88.7
FTF 18	UTR - U	17.6	U	7.1 (J)	10.9 (J)
FTF 19	UTR – U	14.8 (J)	U	8.1 (J)	8.5 (J)
FTF 21	UTR - U	15	13.6 (J)	18	23.8 (J)
FTF 28	UTR – L	315 (J)	491	185	506
HAA 11B	UTR – L	8.7 (J)	U		
HAA 12A	Gordon	13 (J)	7.77 (J)	16.3	20
HAA 12B	UTR – L	16	9.97 (J)		
HAA 13A	Gordon	55.6 (J)	63.6		U
HAA 15A	Gordon	31.4	14.2	40.7 (J)	45.9
HAA 7A	Gordon	4.16 (J)	5.11 (J)	8.31 (J)	U
HAA 7D	UTR – U	7.0 (J)	9.9 (J)	12.2 (J)	U
HTF 1	UTR – U	30.5	27.7		26.4 (J)
HTF 11	UTR – U	13.9 (J)	U	9.6 (J)	U
HTF 22	UTR – U	5.6 (J)	8.4 (J)		6.7 (J)

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
FSL 11C	1/29/07	AMERICIUM-241	RADA-011	0.252	0.452		U		0.0132	pCi/L
FSL 11C	1/29/07	CARBON-14	RADA-003	10.2	22.2		U		2.85	pCi/L
FSL 11C	1/29/07	CESIUM-137	L3.21-10021	7.89	16.6		U		-0.555	pCi/L
FSL 11C	9/18/07	CESIUM-137	L3.21-10021	8.95	18.7		U		-0.0522	pCi/L
FSL 11C	1/29/07	CHROMIUM	EPA6020	1	3	V	J		6.57	ug/L
FSL 11C	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		3.16	ug/L
FSL 11C	1/29/07	COBALT	EPA6020	0.1	1	21	J		0.695	ug/L
FSL 11C	1/29/07	COBALT-60	L3.21-10021	7.75	16.2		U		0.136	pCi/L
FSL 11C	1/29/07	COPPER	EPA6020	0.2	1	V	J		2.16	ug/L
FSL 11C	1/29/07	CURIUM-242	RADA-011	0.105	0.242		U		0.035	pCi/L
FSL 11C	1/29/07	CURIUM-243/244	RADA-011	0.273	0.513		U		0.0273	pCi/L
FSL 11C	1/29/07	CURIUM-245/246	RADA-011	0.113	0.261		U		0.0377	pCi/L
FSL 11C	1/29/07	DEPTH_TO_WATER							90.95	ft
FSL 11C	1/29/07	DEPTH_TO_WATER							90.95	ft
FSL 11C	4/25/07	DEPTH_TO_WATER							91.1	ft
FSL 11C	4/25/07	DEPTH_TO_WATER							91.1	ft
FSL 11C	8/9/07	DEPTH_TO_WATER							91.3	ft
FSL 11C	8/9/07	DEPTH_TO_WATER							91.3	ft
FSL 11C	10/29/07	DEPTH_TO_WATER							95.7	ft
FSL 11C	10/29/07	DEPTH_TO_WATER							95.7	ft
FSL 11C	1/29/07	GROSS ALPHA	L3.21-10001	2.51	5.77		U		1.02	pCi/L
FSL 11C	1/29/07	GROSS ALPHA	L3.21-10001	2.53	5.8		U		1.01	pCi/L
FSL 11C	4/25/07	GROSS ALPHA	L3.21-10001	2.4	6.55		U		1.97	pCi/L
FSL 11C	8/9/07	GROSS ALPHA	L3.21-10001	1.7	4.33		U		1.11	pCi/L
FSL 11C	8/9/07	GROSS ALPHA	L3.21-10001	1.71	4.34		U		1.11	pCi/L
FSL 11C	9/18/07	GROSS ALPHA	L3.21-10001	1.38	4.09		U		0.872	pCi/L
FSL 11C	10/29/07	GROSS ALPHA	L3.21-10001	1.51	5.9	21	J		4.88	pCi/L
FSL 11C	1/29/07	IODINE-129	RADA-006	0.495	1.52		U		0.206	pCi/L
FSL 11C	8/9/07	IODINE-129	RADA-006	0.655	1.33		U		0.215	pCi/L
FSL 11C	1/29/07	NITRATE-NITRITE AS NITROGEN	EPA353.1	0.014	0.05				1.26	mg/L
FSL 11C	4/25/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				1.61	mg/L
FSL 11C	8/9/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.45	mg/L
FSL 11C	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.52	mg/L
FSL 11C	10/29/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.41	mg/L
FSL 11C	1/29/07	NONVOLATILE BETA	L3.21-10001	4.41	25.6				97.1	pCi/L
FSL 11C	1/29/07	NONVOLATILE BETA	L3.21-10001	4.41	26.8				110	pCi/L
FSL 11C	4/25/07	NONVOLATILE BETA	L3.21-10001	4.55	21.4				62.3	pCi/L
FSL 11C	8/9/07	NONVOLATILE BETA	L3.21-10001	2.9	12.7				39.2	pCi/L
FSL 11C	8/9/07	NONVOLATILE BETA	L3.21-10001	2.9	13.3				44.6	pCi/L
FSL 11C	9/18/07	NONVOLATILE BETA	L3.21-10001	3.03	12				29.3	pCi/L
FSL 11C	10/29/07	NONVOLATILE BETA	L3.21-10001	3.32	17.2				78.3	pCi/L
FSL 11C	1/29/07	PH							5.2	pH
FSL 11C	4/25/07	PH							5.5	pH
FSL 11C	8/9/07	PH							5.3	pH
FSL 11C	10/29/07	PH							5.6	pH
FSL 11C	1/29/07	PLUTONIUM-238	RADA-011	0.0922	0.263		U		0.0615	pCi/L
FSL 11C	1/29/07	PLUTONIUM-239/240	RADA-011	0.188	0.365		U		0.0393	pCi/L
FSL 11C	1/29/07	RADIUM, TOTAL ALPHA-EMITTING	RADA-010	0.355	0.777		U		0.168	pCi/L
FSL 11C	1/29/07	RADIUM-226	RADA-008	0.561	1.38	21	J		0.695	pCi/L
FSL 11C	8/9/07	RADIUM-226	RADA-008	0.601	1.39		U		0.483	pCi/L
FSL 11C	1/29/07	RADIUM-228	RADA-009	0.324	0.746		U		0.311	pCi/L
FSL 11C	8/9/07	RADIUM-228	RADA-009	0.774	1.77	V	U		0.699	pCi/L
FSL 11C	1/29/07	SELENIUM	EPA6020	2.5	5		U		5	ug/L
FSL 11C	1/29/07	SILVER	EPA6020	0.2	1		U		1	ug/L
FSL 11C	9/18/07	SODIUM	EPA6010B	10	100				2200	ug/L
FSL 11C	1/29/07	SPECIFIC CONDUCTANCE							39	uS/cm
FSL 11C	4/25/07	SPECIFIC CONDUCTANCE							39	uS/cm
FSL 11C	8/9/07	SPECIFIC CONDUCTANCE							39	uS/cm
FSL 11C	10/29/07	SPECIFIC CONDUCTANCE							38	uS/cm
FSL 11C	1/29/07	STRONTIUM-90	RADA-004	3.83	7.63		U		-0.126	pCi/L
FSL 11C	8/9/07	STRONTIUM-90	RADA-004	4.85	8.99		U		-3.57	pCi/L
FSL 11C	1/29/07	TECHNETIUM-99	RADA-005	7.89	25.3				268	pCi/L
FSL 11C	9/18/07	TECHNETIUM-99	L3.21-10015	0.00418	0.0162				0.191	pCi/mL
FSL 11C	1/29/07	THORIUM-228	RADA-012	0.553	1.27		U		0.454	pCi/L
FSL 11C	1/29/07	THORIUM-230	RADA-012	0.249	0.461		U		0.0214	pCi/L
FSL 11C	1/29/07	THORIUM-232	RADA-012	0.184	0.406		U		0.0781	pCi/L
FSL 11C	1/29/07	TRITIUM	L3.21-10015	0.471	1.27				2.55	pCi/mL
FSL 11C	4/25/07	TRITIUM	L3.21-10015	0.608	1.52				2.24	pCi/mL
FSL 11C	8/9/07	TRITIUM	L3.21-10015	0.437	1.19				2.44	pCi/mL
FSL 11C	9/18/07	TRITIUM	L3.21-10015	0.581	1.49				2.56	pCi/mL
FSL 11C	10/29/07	TRITIUM	L3.21-10015	0.488	1.32				2.7	pCi/mL
FSL 11C	1/29/07	TURBIDITY							0.2	NTU
FSL 11C	4/25/07	TURBIDITY							0.2	NTU
FSL 11C	8/9/07	TURBIDITY							0.3	NTU
FSL 11C	10/29/07	TURBIDITY							0.3	NTU
FSL 11C	1/29/07	URANIUM-233/234	RADA-011	0.278	0.634		U		0.155	pCi/L
FSL 11C	8/9/07	URANIUM-233/234	L3.21-10005	0.0565	0.175	V	U		0.0417	pCi/L
FSL 11C	1/29/07	URANIUM-235	RADA-011	0.246	0.43		U		0.0231	pCi/L
FSL 11C	8/9/07	URANIUM-235	L3.21-10005	0.0697	0.0697		U		0	pCi/L
FSL 11C	1/29/07	URANIUM-238	RADA-011	0.236	0.446		U		0.0373	pCi/L
FSL 11C	8/9/07	URANIUM-238	L3.21-10005	0.105	0.191	V	U		0.0156	pCi/L
FTF 13	12/6/07	DEPTH_TO_WATER							67	ft
FTF 15	12/6/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
FTF 15	12/6/07	DEPTH_TO_WATER							67.7	ft
FTF 15	12/6/07	GROSS ALPHA	L3.21-10001	2.86	8.68	21	J		3.98	pCi/L
FTF 15	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				3.64	mg/L
FTF 15	12/6/07	NONVOLATILE BETA	L3.21-10001	4.9	11.6		U		1.61	pCi/L
FTF 15	12/6/07	PH							4.4	pH
FTF 15	12/6/07	SODIUM	EPA6010B	10	100				3680	ug/L
FTF 15	12/6/07	SPECIFIC CONDUCTANCE							63	uS/cm
FTF 15	12/6/07	TRITIUM	L3.21-10015	0.599	1.53				2.62	pCi/mL
FTF 15	12/6/07	TURBIDITY							0.4	NTU
FTF 16	12/6/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 16	12/6/07	DEPTH_TO_WATER							69	ft
FTF 16	12/6/07	GROSS ALPHA	L3.21-10001	2.86	8.09	21	J		3.08	pCi/L
FTF 16	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				3.01	mg/L
FTF 16	12/6/07	NONVOLATILE BETA	L3.21-10001	4.81	11.2		U		0.815	pCi/L
FTF 16	12/6/07	PH							4.8	pH
FTF 16	12/6/07	SODIUM	EPA6010B	10	100				3890	ug/L
FTF 16	12/6/07	SPECIFIC CONDUCTANCE							47	uS/cm
FTF 16	12/6/07	TRITIUM	L3.21-10015	0.595	1.52				2.59	pCi/mL
FTF 16	12/6/07	TURBIDITY							0	NTU
FTF 17	12/6/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 17	12/6/07	DEPTH_TO_WATER							7.5	ft
FTF 17	12/6/07	GROSS ALPHA	L3.21-10001	2.9	9.61	21	J		5.42	pCi/L
FTF 17	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.76	mg/L
FTF 17	12/6/07	NONVOLATILE BETA	L3.21-10001	5.04	11.6		U		0.804	pCi/L
FTF 17	12/6/07	PH							4.3	pH
FTF 17	12/6/07	SODIUM	EPA6010B	10	100				7460	ug/L
FTF 17	12/6/07	SPECIFIC CONDUCTANCE							72	uS/cm
FTF 17	12/6/07	TRITIUM	L3.21-10015	0.592	1.5				2.39	pCi/mL
FTF 17	12/6/07	TURBIDITY							0.2	NTU
FTF 18	12/6/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 18	12/6/07	DEPTH_TO_WATER							70	ft
FTF 18	12/6/07	GROSS ALPHA	L3.21-10001	2.9	9.04	21	J		4.46	pCi/L
FTF 18	12/6/07	GROSS ALPHA	L3.21-10001	2.9	10.5	21	J		7.21	pCi/L
FTF 18	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				3.58	mg/L
FTF 18	12/6/07	NONVOLATILE BETA	L3.21-10001	5.22	14.6	21	J		11.4	pCi/L
FTF 18	12/6/07	NONVOLATILE BETA	L3.21-10001	4.95	15.4				17.6	pCi/L
FTF 18	12/6/07	PH							4.5	pH
FTF 18	12/6/07	SODIUM	EPA6010B	10	100				5100	ug/L
FTF 18	12/6/07	SPECIFIC CONDUCTANCE							0	uS/cm
FTF 18	12/6/07	TRITIUM	L3.21-10015	0.6	1.5				2.24	pCi/mL
FTF 18	12/6/07	TURBIDITY							0.4	NTU
FTF 19	12/6/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 19	12/6/07	DEPTH_TO_WATER							69.8	ft
FTF 19	12/6/07	GROSS ALPHA	L3.21-10001	2.99	9.33	21	J		4.61	pCi/L
FTF 19	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.59	mg/L
FTF 19	12/6/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.49	mg/L
FTF 19	12/6/07	NONVOLATILE BETA	L3.21-10001	4.96	14.9	21	J		14.8	pCi/L
FTF 19	12/6/07	PH							5.7	pH
FTF 19	12/6/07	SODIUM	EPA6010B	10	100				4690	ug/L
FTF 19	12/6/07	SPECIFIC CONDUCTANCE							120	uS/cm
FTF 19	12/6/07	TRITIUM	L3.21-10015	0.591	1.56				3.25	pCi/mL
FTF 19	12/6/07	TRITIUM	L3.21-10015	0.595	1.58				3.35	pCi/mL
FTF 19	12/6/07	TURBIDITY							1	NTU
FTF 20	12/10/07	CHROMIUM	EPA6010B	1	10	21	J		1.07	ug/L
FTF 20	12/10/07	DEPTH_TO_WATER							70.3	ft
FTF 20	12/10/07	GROSS ALPHA	L3.21-10001	2.94	11.1	21	J		8.29	pCi/L
FTF 20	12/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.68	mg/L
FTF 20	12/10/07	NONVOLATILE BETA	L3.21-10001	5.31	11.7		U		-0.813	pCi/L
FTF 20	12/10/07	PH							4.6	pH
FTF 20	12/10/07	SODIUM	EPA6010B	10	100				8170	ug/L
FTF 20	12/10/07	SPECIFIC CONDUCTANCE							112	uS/cm
FTF 20	12/10/07	TRITIUM	L3.21-10015	0.534	1.51				3.88	pCi/mL
FTF 20	12/10/07	TURBIDITY							3	NTU
FTF 21	12/10/07	CHROMIUM	EPA6010B	1	10	21	J		2.27	ug/L
FTF 21	12/10/07	DEPTH_TO_WATER							70.5	ft
FTF 21	12/10/07	GROSS ALPHA	L3.21-10001	3.49	8.06		U		1.53	pCi/L
FTF 21	12/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.685	mg/L
FTF 21	12/10/07	NONVOLATILE BETA	L3.21-10001	4.66	14.5				15	pCi/L
FTF 21	12/10/07	PH							8.5	pH
FTF 21	12/10/07	SODIUM	EPA6010B	10	100				23100	ug/L
FTF 21	12/10/07	SPECIFIC CONDUCTANCE							27	uS/cm
FTF 21	12/10/07	TRITIUM	L3.21-10015	0.536	1.35				1.94	pCi/mL
FTF 21	12/10/07	TURBIDITY							15	NTU
FTF 22	12/10/07	CHROMIUM	EPA6010B	1	10	21	J		1.3	ug/L
FTF 22	12/10/07	DEPTH_TO_WATER							70	ft
FTF 22	12/10/07	GROSS ALPHA	L3.21-10001	2.88	8.73	21	J		4	pCi/L
FTF 22	12/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.7	mg/L
FTF 22	12/10/07	NONVOLATILE BETA	L3.21-10001	4.9	12.5		U		4.87	pCi/L
FTF 22	12/10/07	PH							4.8	pH
FTF 22	12/10/07	SODIUM	EPA6010B	10	100				5830	ug/L
FTF 22	12/10/07	SPECIFIC CONDUCTANCE							79	uS/cm
FTF 22	12/10/07	TRITIUM	L3.21-10015	0.535	1.43				2.87	pCi/mL
FTF 22	12/10/07	TURBIDITY							0	NTU

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
FTF 23	12/10/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 23	12/10/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
FTF 23	12/10/07	DEPTH_TO_WATER							69	ft
FTF 23	12/10/07	GROSS ALPHA	L3.21-10001	2.88	11.9	21	J		10.4	pCi/L
FTF 23	12/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				4.21	mg/L
FTF 23	12/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				4.05	mg/L
FTF 23	12/10/07	NONVOLATILE BETA	L3.21-10001	5.52	13.5		U		4.17	pCi/L
FTF 23	12/10/07	PH							3.5	pH
FTF 23	12/10/07	SODIUM	EPA6010B	10	100				5650	ug/L
FTF 23	12/10/07	SODIUM	EPA6010B	10	100				5670	ug/L
FTF 23	12/10/07	SPECIFIC CONDUCTANCE							68	uS/cm
FTF 23	12/10/07	TRITIUM	L3.21-10015	0.535	1.43				2.83	pCi/mL
FTF 23	12/10/07	TURBIDITY							4.9	NTU
FTF 28	10/16/07	CESIUM-137	L3.21-10021	8.54	18		U		-0.463	pCi/L
FTF 28	10/16/07	CESIUM-137	L3.21-10021	8.44	18		U		-1.69	pCi/L
FTF 28	10/16/07	CHROMIUM	EPA6010B	1	10	21	J		2.35	ug/L
FTF 28	10/16/07	CHROMIUM	EPA6010B	1	10	21	J		2.34	ug/L
FTF 28	2/15/07	DEPTH_TO_WATER							85.75	ft
FTF 28	2/15/07	DEPTH_TO_WATER							85.75	ft
FTF 28	9/25/07	DEPTH_TO_WATER							87.5	ft
FTF 28	9/25/07	DEPTH_TO_WATER							87.5	ft
FTF 28	10/16/07	DEPTH_TO_WATER							58	ft
FTF 28	2/15/07	GROSS ALPHA	L3.21-10001	1.9	4.43	13	U	UJ	0.533	pCi/L
FTF 28	9/25/07	GROSS ALPHA	L3.21-10001	2.87	6.84	13	U	UJ	1.28	pCi/L
FTF 28	10/16/07	GROSS ALPHA	L3.21-10001	2.5	6.96		U		2.39	pCi/L
FTF 28	2/15/07	IODINE-129	RADA-006	0.0862	0.268	V	U	U	0.00938	pCi/L
FTF 28	9/25/07	IODINE-129	L3.21-10021	0.571	1.21	Q	U	R	0.176	pCi/L
FTF 28	9/25/07	IODINE-129	L3.21-10021	0.579	1.36	Q	U	R	-0.00145	pCi/L
FTF 28	2/15/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				2.28	mg/L
FTF 28	9/25/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.19	mg/L
FTF 28	10/16/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				2.05	mg/L
FTF 28	10/16/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				2.05	mg/L
FTF 28	2/15/07	NONVOLATILE BETA	L3.21-10001	3.95	33.6	13		J	315	pCi/L
FTF 28	9/25/07	NONVOLATILE BETA	L3.21-10001	4.69	35.7	13		J	213	pCi/L
FTF 28	10/16/07	NONVOLATILE BETA	L3.21-10001	4.58	39.2				257	pCi/L
FTF 28	2/15/07	PH							5.1	pH
FTF 28	9/25/07	PH							5.2	pH
FTF 28	10/16/07	PH							7.3	pH
FTF 28	2/15/07	RADIUM-226	RADA-008	0.605	1.41		U	U	0.504	pCi/L
FTF 28	9/25/07	RADIUM-226	RADA-008	0.403	1.06	21	J	J	0.684	pCi/L
FTF 28	2/15/07	RADIUM-228	RADA-009	0.503	1.07		U	U	0.152	pCi/L
FTF 28	9/25/07	RADIUM-228	RADA-009	0.901	1.88		U	U	-0.0984	pCi/L
FTF 28	10/16/07	SODIUM	EPA6010B	10	100				2700	ug/L
FTF 28	10/16/07	SODIUM	EPA6010B	10	100				2810	ug/L
FTF 28	2/15/07	SPECIFIC CONDUCTANCE							38	uS/cm
FTF 28	9/25/07	SPECIFIC CONDUCTANCE							38	uS/cm
FTF 28	10/16/07	SPECIFIC CONDUCTANCE							55	uS/cm
FTF 28	2/15/07	STRONTIUM-90	RADA-004	5.68	12.1		U	U	1.48	pCi/L
FTF 28	9/25/07	STRONTIUM-90	RADA-004	3.65	7.81		U	U	1.13	pCi/L
FTF 28	10/16/07	TECHNETIUM-99	L3.21-10015	0.00462	0.0308				1.04	pCi/mL
FTF 28	2/15/07	TRITIUM	L3.21-10015	0.582	1.54				3.19	pCi/mL
FTF 28	9/25/07	TRITIUM	L3.21-10015	0.584	1.55				3.27	pCi/mL
FTF 28	10/16/07	TRITIUM	L3.21-10015	0.609	1.6				3.19	pCi/mL
FTF 28	2/15/07	TURBIDITY							0.3	NTU
FTF 28	9/25/07	TURBIDITY							0.2	NTU
FTF 28	10/16/07	TURBIDITY							3.3	NTU
FTF 28	2/15/07	URANIUM-233/234	RADA-011	0.481	0.837	V	U	U	-0.00918	pCi/L
FTF 28	9/25/07	URANIUM-233/234	L3.21-10005	0.0642	0.0642	V	U	U	0	pCi/L
FTF 28	9/25/07	URANIUM-235	L3.21-10005	0.0792	0.0792		U	U	0	pCi/L
FTF 28	2/15/07	URANIUM-238	RADA-011	0.172	0.49	V	U	U	0.115	pCi/L
FTF 28	9/25/07	URANIUM-238	L3.21-10005	0.119	0.256	V	U	U	0.0414	pCi/L
HAA 2B	10/10/07	CHROMIUM	EPA6010B	1	10	21	J		6.01	ug/L
HAA 2B	10/10/07	GROSS ALPHA	L3.21-10001	2.14	4.81		U		0.775	pCi/L
HAA 2B	10/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 2B	10/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 2B	10/10/07	NONVOLATILE BETA	L3.21-10001	4.4	9.82		U		0.247	pCi/L
HAA 2B	10/10/07	SODIUM	EPA6010B	10	100				7430	ug/L
HAA 2B	10/10/07	TRITIUM	L3.21-10015	0.59	1.26		U		-0.161	pCi/mL
HAA 2D	10/10/07	CHROMIUM	EPA6010B	1	10				12.3	ug/L
HAA 2D	10/10/07	GROSS ALPHA	L3.21-10001	2.08	6.53	21	J		2.55	pCi/L
HAA 2D	10/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	21	J		0.048	mg/L
HAA 2D	10/10/07	NONVOLATILE BETA	L3.21-10001	4.6	11.3		U		3.59	pCi/L
HAA 2D	10/10/07	SODIUM	EPA6010B	10	100				4200	ug/L
HAA 2D	10/10/07	TRITIUM	L3.21-10015	0.688	1.85				4.24	pCi/mL
HAA 2D	10/10/07	TRITIUM	L3.21-10015	0.719	1.94				4.45	pCi/mL
HAA 4A	9/26/07	CHROMIUM	EPA6010B	1	10	21	J		2.96	ug/L
HAA 4A	9/26/07	GROSS ALPHA	L3.21-10001	2.91	5.85		U		0.485	pCi/L
HAA 4A	9/26/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.055	mg/L
HAA 4A	9/26/07	NONVOLATILE BETA	L3.21-10001	4.48	10		U		1.07	pCi/L
HAA 4A	9/26/07	SODIUM	EPA6010B	10	100				2020	ug/L
HAA 4A	9/26/07	TRITIUM	L3.21-10015	0.612	1.34		U		0.175	pCi/mL
HAA 4B	9/26/07	CHROMIUM	EPA6010B	1	10	21	J		3.42	ug/L
HAA 4B	9/26/07	GROSS ALPHA	L3.21-10001	2.9	7.74		U		2.41	pCi/L

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HAA 4B	9/26/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.249	mg/L
HAA 4B	9/26/07	NONVOLATILE BETA	L3.21-10001	4.68	10.4		U		1.17	pCi/L
HAA 4B	9/26/07	SODIUM	EPA6010B	10	100				2320	ug/L
HAA 4B	9/26/07	TRITIUM	L3.21-10015	0.618	1.46	21	J		1.25	pCi/mL
HAA 5BR	9/26/07	CHROMIUM	EPA6010B	1	10	21	J		1.1	ug/L
HAA 5BR	9/26/07	GROSS ALPHA	L3.21-10001	2.95	7.46		U		1.96	pCi/L
HAA 5BR	9/26/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 5BR	9/26/07	NONVOLATILE BETA	L3.21-10001	4.64	10.7		U		2.03	pCi/L
HAA 5BR	9/26/07	SODIUM	EPA6010B	10	100				5900	ug/L
HAA 5BR	9/26/07	TRITIUM	L3.21-10015	0.58	1.88				8.49	pCi/mL
HAA 5BR	9/26/07	TRITIUM	L3.21-10015	0.58	1.87				8.27	pCi/mL
HAA 5D	5/23/07	DEPTH_TO_WATER							27.6	ft
HAA 5D	5/23/07	DEPTH_TO_WATER							27.6	ft
HAA 5D	5/23/07	GROSS ALPHA	L3.21-10001	2.43	5.04		U	U	0.6	pCi/L
HAA 5D	5/23/07	NONVOLATILE BETA	L3.21-10001	4.36	9.61		U	U	-0.252	pCi/L
HAA 5D	5/23/07	PH							5.1	pH
HAA 5D	5/23/07	SPECIFIC CONDUCTANCE							65	uS/cm
HAA 5D	5/23/07	TRITIUM	L3.21-10015	0.569	1.55				3.61	pCi/mL
HAA 5D	5/23/07	TURBIDITY							3.9	NTU
HAA 6B	10/10/07	CHROMIUM	EPA6010B	1	10	21	J		4.2	ug/L
HAA 6B	10/10/07	GROSS ALPHA	L3.21-10001	2.13	6.66	21	J		2.61	pCi/L
HAA 6B	10/10/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	21	J		0.015	mg/L
HAA 6B	10/10/07	NONVOLATILE BETA	L3.21-10001	4.61	10.8		U		1.84	pCi/L
HAA 6B	10/10/07	SODIUM	EPA6010B	10	100				3590	ug/L
HAA 6B	10/10/07	TRITIUM	L3.21-10015	0.609	1.31		U		-0.0653	pCi/mL
HAA 7A	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		4.12	ug/L
HAA 7A	9/18/07	GROSS ALPHA	L3.21-10001	1.41	4.19		U		0.905	pCi/L
HAA 7A	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.179	mg/L
HAA 7A	9/18/07	NONVOLATILE BETA	L3.21-10001	3.03	8.32	21	J		4.16	pCi/L
HAA 7A	9/18/07	SODIUM	EPA6010B	10	100				4370	ug/L
HAA 7A	9/18/07	TRITIUM	L3.21-10015	0.58	1.29		U		0.319	pCi/mL
HAA 7B	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		3.63	ug/L
HAA 7B	9/18/07	GROSS ALPHA	L3.21-10001	1.41	4.5		U		1.37	pCi/L
HAA 7B	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	V	J		0.104	mg/L
HAA 7B	9/18/07	NONVOLATILE BETA	L3.21-10001	3.07	7.96		U		2.04	pCi/L
HAA 7B	9/18/07	SODIUM	EPA6010B	10	100				4670	ug/L
HAA 7B	9/18/07	TRITIUM	L3.21-10015	0.59	1.29		U		0.0811	pCi/mL
HAA 7D	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		1.58	ug/L
HAA 7D	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		1.56	ug/L
HAA 7D	9/18/07	GROSS ALPHA	L3.21-10001	1.37	6.23	21	J		5.37	pCi/L
HAA 7D	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.61	mg/L
HAA 7D	9/18/07	NONVOLATILE BETA	L3.21-10001	3.38	9.43	21	J		7.03	pCi/L
HAA 7D	9/18/07	SODIUM	EPA6010B	10	100				1840	ug/L
HAA 7D	9/18/07	SODIUM	EPA6010B	10	100				1870	ug/L
HAA 7D	9/18/07	TRITIUM	L3.21-10015	0.583	1.75				6.25	pCi/mL
HAA 8A	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		2.85	ug/L
HAA 8A	9/18/07	GROSS ALPHA	L3.21-10001	1.4	4.03		U		0.674	pCi/L
HAA 8A	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.226	mg/L
HAA 8A	9/18/07	NONVOLATILE BETA	L3.21-10001	3.02	7.97		U		2.57	pCi/L
HAA 8A	9/18/07	SODIUM	EPA6010B	10	100				4470	ug/L
HAA 8A	9/18/07	TRITIUM	L3.21-10015	0.578	1.27		U		0.172	pCi/mL
HAA 8B	9/18/07	CHROMIUM	EPA6010B	1	10	21	J		3.22	ug/L
HAA 8B	9/18/07	GROSS ALPHA	L3.21-10001	1.37	4.09		U		0.884	pCi/L
HAA 8B	9/18/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	V	J		0.054	mg/L
HAA 8B	9/18/07	NONVOLATILE BETA	L3.21-10001	3.03	7.44		U		-0.01	pCi/L
HAA 8B	9/18/07	SODIUM	EPA6010B	10	100				1890	ug/L
HAA 8B	9/18/07	TRITIUM	L3.21-10015	0.579	1.27		U		0.141	pCi/mL
HAA 9AR	9/20/07	CHROMIUM	EPA6010B	1	10	21	J		1.89	ug/L
HAA 9AR	5/15/07	DEPTH_TO_WATER							111.6	ft
HAA 9AR	5/15/07	DEPTH_TO_WATER							111.6	ft
HAA 9AR	5/15/07	GROSS ALPHA	L3.21-10001	2.56	6.8		U	U	1.9	pCi/L
HAA 9AR	9/20/07	GROSS ALPHA	L3.21-10001	2.75	6.54		U		1.37	pCi/L
HAA 9AR	9/20/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.215	mg/L
HAA 9AR	5/15/07	NONVOLATILE BETA	L3.21-10001	4.47	10.4		U	U	2.3	pCi/L
HAA 9AR	9/20/07	NONVOLATILE BETA	L3.21-10001	4.57	10.8		U		2.87	pCi/L
HAA 9AR	5/15/07	PH							6.6	pH
HAA 9AR	9/20/07	SODIUM	EPA6010B	10	100				2120	ug/L
HAA 9AR	5/15/07	SPECIFIC CONDUCTANCE							65	uS/cm
HAA 9AR	5/15/07	TRITIUM	L3.21-10015	0.575	1.24	9;18	U	U	-0.0676	pCi/mL
HAA 9AR	9/20/07	TRITIUM	L3.21-10015	0.615	1.34		U		0.058	pCi/mL
HAA 9AR	5/15/07	TURBIDITY							0.3	NTU
HAA 9B	9/20/07	CHROMIUM	EPA6010B	1	10	21	J		3.53	ug/L
HAA 9B	9/20/07	GROSS ALPHA	L3.21-10001	2.94	7.85		U		2.45	pCi/L
HAA 9B	9/20/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.136	mg/L
HAA 9B	9/20/07	NONVOLATILE BETA	L3.21-10001	4.69	9.9		U		-0.341	pCi/L
HAA 9B	9/20/07	SODIUM	EPA6010B	10	100				6770	ug/L
HAA 9B	9/20/07	TRITIUM	L3.21-10015	0.616	1.38		U		0.461	pCi/mL
HAA 9D	5/15/07	DEPTH_TO_WATER							24.53	ft
HAA 9D	5/15/07	DEPTH_TO_WATER							24.53	ft
HAA 9D	5/15/07	DEPTH_TO_WATER							24.53	ft
HAA 9D	5/15/07	GROSS ALPHA	L3.21-10001	2.53	6.32		U	U	1.43	pCi/L
HAA 9D	5/15/07	GROSS ALPHA	L3.21-10001	2.52	6.7		U	U	1.87	pCi/L
HAA 9D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.41	9.85	9	U	U	0.914	pCi/L

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HAA 9D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.46	10.4		U	U	2.05	pCi/L
HAA 9D	5/15/07	PH							5	pH
HAA 9D	5/15/07	SPECIFIC CONDUCTANCE							45	uS/cm
HAA 9D	5/15/07	TRITIUM	L3.21-10015	0.574	1.99	9			10.9	pCi/mL
HAA 9D	5/15/07	TRITIUM	L3.21-10015	0.579	1.98				10.6	pCi/mL
HAA 9D	5/15/07	TURBIDITY							1.2	NTU
HAA 10AR	9/19/07	CHROMIUM	EPA6010B	1	10	21	J		1.86	ug/L
HAA 10AR	9/19/07	DEPTH_TO_WATER							118.3	ft
HAA 10AR	9/19/07	GROSS ALPHA	L3.21-10001	1.39	3.46		U		-0.0158	pCi/L
HAA 10AR	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.233	mg/L
HAA 10AR	9/19/07	NONVOLATILE BETA	L3.21-10001	2.96	7.68		U		1.71	pCi/L
HAA 10AR	9/19/07	PH							6.5	pH
HAA 10AR	9/19/07	SODIUM	EPA6010B	10	100				1700	ug/L
HAA 10AR	9/19/07	SPECIFIC CONDUCTANCE							47	uS/cm
HAA 10AR	9/19/07	TRITIUM	L3.21-10015	0.582	1.32		U		0.548	pCi/mL
HAA 10AR	9/19/07	TRITIUM	L3.21-10015	0.581	1.29		U		0.33	pCi/mL
HAA 10AR	9/19/07	TURBIDITY							1.2	NTU
HAA 10B	9/19/07	CHROMIUM	EPA6010B	1	10	21	J		6.1	ug/L
HAA 10B	9/19/07	DEPTH_TO_WATER							40.5	ft
HAA 10B	9/19/07	GROSS ALPHA	L3.21-10001	1.47	4.81		U		1.66	pCi/L
HAA 10B	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.679	mg/L
HAA 10B	9/19/07	NONVOLATILE BETA	L3.21-10001	3.09	7.7		U		0.603	pCi/L
HAA 10B	9/19/07	PH							6.6	pH
HAA 10B	9/19/07	SODIUM	EPA6010B	10	100				3960	ug/L
HAA 10B	9/19/07	SPECIFIC CONDUCTANCE							153	uS/cm
HAA 10B	9/19/07	TRITIUM	L3.21-10015	0.582	1.55				3.31	pCi/mL
HAA 10B	9/19/07	TURBIDITY							9.8	NTU
HAA 10D	9/19/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HAA 10D	9/19/07	DEPTH_TO_WATER							25.6	ft
HAA 10D	9/19/07	GROSS ALPHA	L3.21-10001	1.4	4.33		U		1.13	pCi/L
HAA 10D	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.389	mg/L
HAA 10D	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.39	mg/L
HAA 10D	9/19/07	NONVOLATILE BETA	L3.21-10001	3.05	8.12		U		2.97	pCi/L
HAA 10D	9/19/07	PH							5.2	pH
HAA 10D	9/19/07	SODIUM	EPA6010B	10	100				12100	ug/L
HAA 10D	9/19/07	SPECIFIC CONDUCTANCE							74	uS/cm
HAA 10D	9/19/07	TRITIUM	L3.21-10015	0.579	2.08				12.4	pCi/mL
HAA 10D	9/19/07	TURBIDITY							4	NTU
HAA 11A	9/20/07	CHROMIUM	EPA6010B	1	10	21	J		1.63	ug/L
HAA 11A	5/16/07	DEPTH_TO_WATER							120.61	ft
HAA 11A	5/16/07	DEPTH_TO_WATER							120.61	ft
HAA 11A	9/20/07	DEPTH_TO_WATER							123	ft
HAA 11A	5/16/07	GROSS ALPHA	L3.21-10001	2.56	6.46		U	U	1.51	pCi/L
HAA 11A	9/20/07	GROSS ALPHA	L3.21-10001	2.81	5.63		U		0.467	pCi/L
HAA 11A	9/20/07	GROSS ALPHA	L3.21-10001	2.8	7.49		U		2.33	pCi/L
HAA 11A	9/20/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.153	mg/L
HAA 11A	5/16/07	NONVOLATILE BETA	L3.21-10001	4.4	10.7		U	U	2.86	pCi/L
HAA 11A	9/20/07	NONVOLATILE BETA	L3.21-10001	4.47	10.3		U		1.82	pCi/L
HAA 11A	9/20/07	NONVOLATILE BETA	L3.21-10001	4.67	11		U		2.92	pCi/L
HAA 11A	5/16/07	PH							6.2	pH
HAA 11A	9/20/07	PH							7.6	pH
HAA 11A	9/20/07	SODIUM	EPA6010B	10	100				3050	ug/L
HAA 11A	5/16/07	SPECIFIC CONDUCTANCE							72	uS/cm
HAA 11A	9/20/07	SPECIFIC CONDUCTANCE							71	uS/cm
HAA 11A	5/16/07	TRITIUM	L3.21-10015	0.543	1.18	18	U	U	0.0125	pCi/mL
HAA 11A	9/20/07	TRITIUM	L3.21-10015	0.617	1.33		U		-0.0691	pCi/mL
HAA 11A	5/16/07	TURBIDITY							0.2	NTU
HAA 11A	9/20/07	TURBIDITY							1.1	NTU
HAA 11B	9/20/07	CHROMIUM	EPA6010B	1	10	21	J		3.29	ug/L
HAA 11B	9/20/07	DEPTH_TO_WATER							46.6	ft
HAA 11B	9/20/07	GROSS ALPHA	L3.21-10001	3.09	8.63		U		3.07	pCi/L
HAA 11B	9/20/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.703	mg/L
HAA 11B	9/20/07	NONVOLATILE BETA	L3.21-10001	4.74	12.8	21	J		8.67	pCi/L
HAA 11B	9/20/07	PH							9.8	pH
HAA 11B	9/20/07	SODIUM	EPA6010B	10	100				4920	ug/L
HAA 11B	9/20/07	SPECIFIC CONDUCTANCE							278	uS/cm
HAA 11B	9/20/07	TRITIUM	L3.21-10015	0.618	1.54				2.3	pCi/mL
HAA 11B	9/20/07	TURBIDITY							3.6	NTU
HAA 11D	5/16/07	DEPTH_TO_WATER							29.93	ft
HAA 11D	5/16/07	DEPTH_TO_WATER							29.93	ft
HAA 11D	9/20/07	DEPTH_TO_WATER							31.2	ft
HAA 11D	5/16/07	GROSS ALPHA	L3.21-10001	2.5	7.43	21	J	J	2.84	pCi/L
HAA 11D	5/16/07	NONVOLATILE BETA	L3.21-10001	4.55	10.5		U	U	1.29	pCi/L
HAA 11D	5/16/07	PH							4.6	pH
HAA 11D	5/16/07	SPECIFIC CONDUCTANCE							52	uS/cm
HAA 11D	5/16/07	TRITIUM	L3.21-10015	0.54	1.96				11.3	pCi/mL
HAA 11D	5/16/07	TURBIDITY							0.4	NTU
HAA 12A	9/19/07	CHROMIUM	EPA6010B	1	10	21	J		3.12	ug/L
HAA 12A	5/15/07	DEPTH_TO_WATER							128.83	ft
HAA 12A	5/15/07	DEPTH_TO_WATER							128.83	ft
HAA 12A	9/19/07	DEPTH_TO_WATER							130	ft
HAA 12A	5/15/07	GROSS ALPHA	L3.21-10001	3.44	11.7	21	J	J	6.19	pCi/L
HAA 12A	9/19/07	GROSS ALPHA	L3.21-10001	1.8	7.45	21	J		5.26	pCi/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
HAA 12A	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.224	mg/L
HAA 12A	5/15/07	NONVOLATILE BETA	L3.21-10001	4.8	13.9	21	J	J	13	pCi/L
HAA 12A	9/19/07	NONVOLATILE BETA	L3.21-10001	3.3	9.74	21	J		9.5	pCi/L
HAA 12A	5/15/07	PH							11.3	pH
HAA 12A	9/19/07	PH							10.9	pH
HAA 12A	9/19/07	SODIUM	EPA6010B	10	100				5100	ug/L
HAA 12A	5/15/07	SPECIFIC CONDUCTANCE							2089	uS/cm
HAA 12A	9/19/07	SPECIFIC CONDUCTANCE							1580	uS/cm
HAA 12A	5/15/07	TRITIUM	L3.21-10015	0.575	1.75	9			6.54	pCi/mL
HAA 12A	9/19/07	TRITIUM	L3.21-10015	0.579	1.7				5.49	pCi/mL
HAA 12A	5/15/07	TURBIDITY							0.2	NTU
HAA 12A	9/19/07	TURBIDITY							3	NTU
HAA 12B	9/19/07	CHROMIUM	EPA6010B	1	10	21	J		5.7	ug/L
HAA 12B	9/19/07	DEPTH_TO_WATER							55.7	ft
HAA 12B	9/19/07	GROSS ALPHA	L3.21-10001	1.64	5.65	21	J		2.38	pCi/L
HAA 12B	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				3.29	mg/L
HAA 12B	9/19/07	NONVOLATILE BETA	L3.21-10001	3.14	10.4				16	pCi/L
HAA 12B	9/19/07	PH							10.8	pH
HAA 12B	9/19/07	SODIUM	EPA6010B	10	100				8630	ug/L
HAA 12B	9/19/07	SPECIFIC CONDUCTANCE							981	uS/cm
HAA 12B	9/19/07	TRITIUM	L3.21-10015	0.578	2.2				15.1	pCi/mL
HAA 12B	9/19/07	TURBIDITY							5	NTU
HAA 12D	5/15/07	DEPTH_TO_WATER							36.45	ft
HAA 12D	5/15/07	DEPTH_TO_WATER							36.45	ft
HAA 12D	9/19/07	DEPTH_TO_WATER							37	ft
HAA 12D	5/15/07	GROSS ALPHA	L3.21-10001	2.52	5.85		U	U	0.98	pCi/L
HAA 12D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.36	10.7		U	U	3.74	pCi/L
HAA 12D	5/15/07	PH							4.8	pH
HAA 12D	5/15/07	SPECIFIC CONDUCTANCE							37	uS/cm
HAA 12D	5/15/07	TRITIUM	L3.21-10015	0.571	3.26	9			48	pCi/mL
HAA 12D	5/15/07	TURBIDITY							0.4	NTU
HAA 13A	5/17/07	DEPTH_TO_WATER							131.8	ft
HAA 13A	5/17/07	DEPTH_TO_WATER							131.8	ft
HAA 13A	5/17/07	GROSS ALPHA	L3.21-10001	12.2	36.2	21	J	J	14.2	pCi/L
HAA 13A	5/17/07	NONVOLATILE BETA	L3.21-10001	18.6	56.2	21	J	J	55.6	pCi/L
HAA 13A	5/17/07	PH							11.6	pH
HAA 13A	5/17/07	SPECIFIC CONDUCTANCE							6724	uS/cm
HAA 13A	5/17/07	TRITIUM	L3.21-10015	0.537	1.16	18	U	U	0.0195	pCi/mL
HAA 13A	5/17/07	TURBIDITY							62.1	NTU
HAA 13B	9/19/07	CHROMIUM	EPA6010B	1	10	21	J		4.31	ug/L
HAA 13B	9/19/07	DEPTH_TO_WATER							61.6	ft
HAA 13B	9/19/07	GROSS ALPHA	L3.21-10001	1.47	4.53		U		1.19	pCi/L
HAA 13B	9/19/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05				0.362	mg/L
HAA 13B	9/19/07	NONVOLATILE BETA	L3.21-10001	3.06	7.8		U		1.34	pCi/L
HAA 13B	9/19/07	PH							7.4	pH
HAA 13B	9/19/07	SODIUM	EPA6010B	10	100				3940	ug/L
HAA 13B	9/19/07	SPECIFIC CONDUCTANCE							199	uS/cm
HAA 13B	9/19/07	TRITIUM	L3.21-10015	0.579	1.39				1.4	pCi/mL
HAA 13B	9/19/07	TURBIDITY							1.3	NTU
HAA 13D	5/15/07	DEPTH_TO_WATER							39.8	ft
HAA 13D	5/15/07	DEPTH_TO_WATER							39.8	ft
HAA 13D	9/19/07	DEPTH_TO_WATER							40.9	ft
HAA 13D	5/15/07	GROSS ALPHA	L3.21-10001	2.51	7.04		U	U	2.31	pCi/L
HAA 13D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.51	9.8		U	U	0.212	pCi/L
HAA 13D	5/15/07	PH							5.7	pH
HAA 13D	5/15/07	SPECIFIC CONDUCTANCE							37	uS/cm
HAA 13D	5/15/07	TRITIUM	L3.21-10015	0.572	2.27	9			17.2	pCi/mL
HAA 13D	5/15/07	TURBIDITY							141	NTU
HAA 14A	10/11/07	CHROMIUM	EPA6010B	1	10	21	J		2.07	ug/L
HAA 14A	5/15/07	DEPTH_TO_WATER							134.3	ft
HAA 14A	5/15/07	DEPTH_TO_WATER							134.3	ft
HAA 14A	5/15/07	DEPTH_TO_WATER							134.3	ft
HAA 14A	10/11/08	DEPTH_TO_WATER							135.3	ft
HAA 14A	5/15/07	GROSS ALPHA	L3.21-10001	2.53	5.88		U	U	0.988	pCi/L
HAA 14A	5/15/07	GROSS ALPHA	L3.21-10001	2.54	5.89		U	U	0.988	pCi/L
HAA 14A	10/11/07	GROSS ALPHA	L3.21-10001	2.11	2.54		U		-0.154	pCi/L
HAA 14A	10/11/07	GROSS ALPHA	L3.21-10001	2.1	5.29		U		1.22	pCi/L
HAA 14A	10/11/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 14A	5/15/07	NONVOLATILE BETA	L3.21-10001	4.36	8.78		U	U	-1.47	pCi/L
HAA 14A	5/15/07	NONVOLATILE BETA	L3.21-10001	4.36	9.6		U	U	0.52	pCi/L
HAA 14A	10/11/07	NONVOLATILE BETA	L3.21-10001	4.29	10.2		U		1.96	pCi/L
HAA 14A	10/11/07	NONVOLATILE BETA	L3.21-10001	4.45	10.1		U		0.894	pCi/L
HAA 14A	5/15/07	PH							6.2	pH
HAA 14A	10/11/08	PH							6.4	pH
HAA 14A	10/11/07	SODIUM	EPA6010B	10	100				1660	ug/L
HAA 14A	5/15/07	SPECIFIC CONDUCTANCE							44	uS/cm
HAA 14A	10/11/08	SPECIFIC CONDUCTANCE							45	uS/cm
HAA 14A	5/15/07	TRITIUM	L3.21-10015	0.577	1.26	18	U	U	0.0785	pCi/mL
HAA 14A	5/15/07	TRITIUM	L3.21-10015	0.584	1.26	9;18	U	U	-0.0253	pCi/mL
HAA 14A	10/11/07	TRITIUM	L3.21-10015	0.488	1.05		U		-0.0345	pCi/mL
HAA 14A	5/15/07	TURBIDITY							0.9	NTU
HAA 14A	10/11/08	TURBIDITY							0.3	NTU
HAA 14B	10/11/07	CHROMIUM	EPA6010B	1	10	21	J		4.81	ug/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
HAA 14B	10/11/08	DEPTH_TO_WATER							64.8	ft
HAA 14B	10/11/07	GROSS ALPHA	L3.21-10001	2.24	5.65		U		1.3	pCi/L
HAA 14B	10/11/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 14B	10/11/07	NONVOLATILE BETA	L3.21-10001	4.47	10.5		U		1.66	pCi/L
HAA 14B	10/11/08	PH							6.5	pH
HAA 14B	10/11/07	SODIUM	EPA6010B	10	100				3720	ug/L
HAA 14B	10/11/08	SPECIFIC CONDUCTANCE							209	uS/cm
HAA 14B	10/11/07	TRITIUM	L3.21-10015	0.487	1.08		U		0.261	pCi/mL
HAA 14B	10/11/08	TURBIDITY							0.9	NTU
HAA 14D	10/11/07	CHROMIUM	EPA6010B	1	10	21	J		8.93	ug/L
HAA 14D	5/15/07	DEPTH_TO_WATER							40.7	ft
HAA 14D	5/15/07	DEPTH_TO_WATER							40.7	ft
HAA 14D	10/11/08	DEPTH_TO_WATER							42.1	ft
HAA 14D	5/15/07	GROSS ALPHA	L3.21-10001	2.51	6.27		U	U	1.42	pCi/L
HAA 14D	10/11/07	GROSS ALPHA	L3.21-10001	2.08	7.2	21	J		3.45	pCi/L
HAA 14D	10/11/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				2.54	mg/L
HAA 14D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.41	10.4		U	U	2.65	pCi/L
HAA 14D	10/11/07	NONVOLATILE BETA	L3.21-10001	4.7	10.6		U		0.874	pCi/L
HAA 14D	5/15/07	PH							5	pH
HAA 14D	10/11/08	PH							6	pH
HAA 14D	10/11/07	SODIUM	EPA6010B	10	100				2680	ug/L
HAA 14D	5/15/07	SPECIFIC CONDUCTANCE							37	uS/cm
HAA 14D	10/11/08	SPECIFIC CONDUCTANCE							37	uS/cm
HAA 14D	5/15/07	TRITIUM	L3.21-10015	0.571	2.1				13.3	pCi/mL
HAA 14D	10/11/07	TRITIUM	L3.21-10015	0.483	1.89				12.3	pCi/mL
HAA 14D	5/15/07	TURBIDITY							1.5	NTU
HAA 14D	10/11/08	TURBIDITY							70	NTU
HAA 15A	10/11/07	CHROMIUM	EPA6010B	1	10	21	J		2.42	ug/L
HAA 15A	5/15/07	DEPTH_TO_WATER							136.3	ft
HAA 15A	5/15/07	DEPTH_TO_WATER							136.3	ft
HAA 15A	10/11/07	DEPTH_TO_WATER							137.7	ft
HAA 15A	5/15/07	GROSS ALPHA	L3.21-10001	3.7	14.6	21	J	J	10.5	pCi/L
HAA 15A	10/11/07	GROSS ALPHA	L3.21-10001	2.99	12.9	21	J		9.3	pCi/L
HAA 15A	10/11/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05		U		0.05	mg/L
HAA 15A	5/15/07	NONVOLATILE BETA	L3.21-10001	5.06	17.8	9			31.4	pCi/L
HAA 15A	10/11/07	NONVOLATILE BETA	L3.21-10001	5.08	16.9				25.2	pCi/L
HAA 15A	5/15/07	PH							11.5	pH
HAA 15A	10/11/07	PH							10.8	pH
HAA 15A	10/11/07	SODIUM	EPA6010B	20	200				22800	ug/L
HAA 15A	5/15/07	SPECIFIC CONDUCTANCE							2252	uS/cm
HAA 15A	10/11/07	SPECIFIC CONDUCTANCE							1916	uS/cm
HAA 15A	5/15/07	TRITIUM	L3.21-10015	0.574	1.26	9;18	U	U	0.174	pCi/mL
HAA 15A	10/11/07	TRITIUM	L3.21-10015	0.486	1.06		U		0.118	pCi/mL
HAA 15A	5/15/07	TURBIDITY							0.3	NTU
HAA 15A	10/11/07	TURBIDITY							0.4	NTU
HAA 15B	10/11/07	CHROMIUM	EPA6010B	1	10	21	J		3.64	ug/L
HAA 15B	10/11/07	DEPTH_TO_WATER							68.2	ft
HAA 15B	10/11/07	GROSS ALPHA	L3.21-10001	2.31	6.35		U		1.84	pCi/L
HAA 15B	10/11/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.16	mg/L
HAA 15B	10/11/07	NONVOLATILE BETA	L3.21-10001	4.53	10.7		U		2.07	pCi/L
HAA 15B	10/11/07	PH							5.7	pH
HAA 15B	10/11/07	SODIUM	EPA6010B	10	100				2210	ug/L
HAA 15B	10/11/07	SPECIFIC CONDUCTANCE							91	uS/cm
HAA 15B	10/11/07	TRITIUM	L3.21-10015	0.488	1.09		U		0.286	pCi/mL
HAA 15B	10/11/07	TURBIDITY							5.1	NTU
HAA 15D	5/15/07	DEPTH_TO_WATER							42.7	ft
HAA 15D	5/15/07	DEPTH_TO_WATER							42.7	ft
HAA 15D	5/15/07	GROSS ALPHA	L3.21-10001	2.52	6.69		U	U	1.87	pCi/L
HAA 15D	5/15/07	NONVOLATILE BETA	L3.21-10001	4.46	10		U	U	1.06	pCi/L
HAA 15D	5/15/07	PH							5.7	pH
HAA 15D	5/15/07	SPECIFIC CONDUCTANCE							39	uS/cm
HAA 15D	5/15/07	TRITIUM	L3.21-10015	0.576	1.94				9.88	pCi/mL
HAA 15D	5/15/07	TURBIDITY							12.1	NTU
HAA 2B	10/10/07	DEPTH_TO_WATER							46.7	ft
HAA 2B	10/10/07	PH							4.8	pH
HAA 2B	10/10/07	SPECIFIC CONDUCTANCE							77	uS/cm
HAA 2B	10/10/07	TURBIDITY							2	NTU
HAA 2D	10/10/07	DEPTH_TO_WATER							23.4	ft
HAA 2D	10/10/07	PH							4.1	pH
HAA 2D	10/10/07	SPECIFIC CONDUCTANCE							45	uS/cm
HAA 2D	10/10/07	TURBIDITY							170	NTU
HAA 4A	9/26/07	DEPTH_TO_WATER							130	ft
HAA 4A	9/26/07	PH							6.8	pH
HAA 4A	9/26/07	SPECIFIC CONDUCTANCE							182	uS/cm
HAA 4A	9/26/07	TURBIDITY							0	NTU
HAA 4B	9/26/07	DEPTH_TO_WATER							56.1	ft
HAA 4B	9/26/07	PH							6.2	pH
HAA 4B	9/26/07	SPECIFIC CONDUCTANCE							208	uS/cm
HAA 4B	9/26/07	TURBIDITY							1	NTU
HAA 5BR	9/26/07	DEPTH_TO_WATER							58.4	ft
HAA 5BR	9/26/07	PH							8	pH
HAA 5BR	9/26/07	SPECIFIC CONDUCTANCE							254	uS/cm
HAA 5BR	9/26/07	TURBIDITY							5.4	NTU

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
HAA 6A	10/10/07	DEPTH_TO_WATER							105	ft
HAA 6A	10/10/07	PH							5.7	pH
HAA 6A	10/10/07	SPECIFIC CONDUCTANCE							44	uS/cm
HAA 6A	10/10/07	TURBIDITY							31	NTU
HAA 6D	10/7/07	DEPTH_TO_WATER							20	ft
HAA 7A	9/18/07	DEPTH_TO_WATER							117.3	ft
HAA 7A	9/18/07	PH							7	pH
HAA 7A	9/18/07	SPECIFIC CONDUCTANCE							86	uS/cm
HAA 7A	9/18/07	TURBIDITY							2	NTU
HAA 7B	9/18/07	DEPTH_TO_WATER							42.4	ft
HAA 7B	9/18/07	PH							5.7	pH
HAA 7B	9/18/07	SPECIFIC CONDUCTANCE							72	uS/cm
HAA 7B	9/18/07	TURBIDITY							3	NTU
HAA 7D	9/18/07	DEPTH_TO_WATER							23.3	ft
HAA 7D	9/18/07	PH							4.4	pH
HAA 7D	9/18/07	SPECIFIC CONDUCTANCE							75	uS/cm
HAA 7D	9/18/07	TURBIDITY							9.7	NTU
HAA 8A	9/18/07	DEPTH_TO_WATER							118.9	ft
HAA 8A	9/18/07	PH							7	pH
HAA 8A	9/18/07	SPECIFIC CONDUCTANCE							80	uS/cm
HAA 8A	9/18/07	TURBIDITY							2	NTU
HAA 8B	9/18/07	DEPTH_TO_WATER							43.2	ft
HAA 8B	9/18/07	PH							6.3	pH
HAA 8B	9/18/07	SPECIFIC CONDUCTANCE							36	uS/cm
HAA 8B	9/18/07	TURBIDITY							1.9	NTU
HAA 8D		DEPTH_TO_WATER							27.5	ft
HAA 9AR	9/20/07	DEPTH_TO_WATER							114.1	ft
HAA 9AR	9/20/07	PH							7.2	pH
HAA 9AR	9/20/07	SPECIFIC CONDUCTANCE							61	uS/cm
HAA 9AR	9/20/07	TURBIDITY							1	NTU
HAA 9B	9/20/07	DEPTH_TO_WATER							38	ft
HAA 9B	9/20/07	PH							6.7	pH
HAA 9B	9/20/07	SPECIFIC CONDUCTANCE							208	uS/cm
HAA 9B	9/22/05	TURBIDITY							1.2	NTU
HAA 9D	9/20/07	DEPTH_TO_WATER							26	ft
HAA016D	5/16/07	DEPTH_TO_WATER							17.84	ft
HAA016D	5/16/07	DEPTH_TO_WATER							17.84	ft
HAA016D	5/16/07	GROSS ALPHA	L3.21-10001	2.48	7.02		U	U	2.36	pCi/L
HAA016D	5/16/07	NONVOLATILE BETA	L3.21-10001	4.49	10.4		U	U	1.39	pCi/L
HAA016D	5/16/07	PH							4.4	pH
HAA016D	5/16/07	SPECIFIC CONDUCTANCE							18	uS/cm
HAA016D	5/16/07	TRITIUM	L3.21-10015	0.541	1.81				8.47	pCi/mL
HAA016D	5/16/07	TRITIUM	L3.21-10015	0.543	1.8	18			8.31	pCi/mL
HAA016D	5/16/07	TURBIDITY							0.7	NTU
HC 1A	12/13/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HC 1A	12/13/07	GROSS ALPHA	L3.21-10001	2.91	7.17		U		1.75	pCi/L
HC 1A	12/13/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		U		0.25	mg/L
HC 1A	12/13/07	NONVOLATILE BETA	L3.21-10001	4.67	11		U		1.13	pCi/L
HC 1A	12/13/07	SODIUM	EPA6010B	10	100				2040	ug/L
HC 1A	12/13/07	TRITIUM	L3.21-10015	0.457	0.987		U		-0.0181	pCi/mL
HC 1B	12/13/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HC 1B	12/13/07	GROSS ALPHA	L3.21-10001	2.88	6.19		U		0.819	pCi/L
HC 1B	12/13/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		U		0.25	mg/L
HC 1B	12/13/07	NONVOLATILE BETA	L3.21-10001	4.56	11		U		1.84	pCi/L
HC 1B	12/13/07	SODIUM	EPA6010B	10	100				1930	ug/L
HC 1B	12/13/07	TRITIUM	L3.21-10015	0.458	1.01		U		0.186	pCi/mL
HC 1A	12/13/07	DEPTH_TO_WATER							27.5	ft
HC 1A	12/13/07	PH							7.8	pH
HC 1A	12/13/07	SPECIFIC CONDUCTANCE							111	uS/cm
HC 1A	12/13/07	TURBIDITY							6.9	NTU
HC 1B	12/13/07	DEPTH_TO_WATER							54	ft
HC 1B	12/13/07	PH							8.1	pH
HC 1B	12/13/07	SPECIFIC CONDUCTANCE							76	uS/cm
HC 1B	12/13/07	TURBIDITY							14	NTU
HTF 1	12/12/07	CHROMIUM	EPA6010B	1	10	21	J		1.84	ug/L
HTF 1	12/12/07	GROSS ALPHA	L3.21-10001	3.12	9.09	21	J		3.79	pCi/L
HTF 1	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.33	mg/L
HTF 1	12/12/07	NONVOLATILE BETA	L3.21-10001	4.87	17.6				30.5	pCi/L
HTF 1	12/12/07	SODIUM	EPA6010B	10	100				4690	ug/L
HTF 1	12/12/07	TRITIUM	L3.21-10015	0.458	1.64				9.19	pCi/mL
HTF 2	12/12/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 2	12/12/07	GROSS ALPHA	L3.21-10001	3.04	8.59	21	J		3.27	pCi/L
HTF 2	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25	21	J		0.17	mg/L
HTF 2	12/12/07	NONVOLATILE BETA	L3.21-10001	4.82	11.3		U		1.08	pCi/L
HTF 2	12/12/07	SODIUM	EPA6010B	10	100				4840	ug/L
HTF 2	12/12/07	TRITIUM	L3.21-10015	0.459	1.65				9.29	pCi/mL
HTF 1	12/12/07	DEPTH_TO_WATER							15	ft
HTF 1	12/12/07	PH							7.2	pH
HTF 1	12/12/07	SPECIFIC CONDUCTANCE							380	uS/cm
HTF 1	12/12/07	TURBIDITY							160	NTU
HTF 11	12/13/07	CHROMIUM	EPA6010B	1	10				13.7	ug/L
HTF 11	12/13/07	DEPTH_TO_WATER							56.2	ft
HTF 11	12/13/07	GROSS ALPHA	L3.21-10001	2.96	8.34	21	J		3.16	pCi/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
HTF 11	12/13/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				4.82	mg/L
HTF 11	12/13/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				4.64	mg/L
HTF 11	12/13/07	NONVOLATILE BETA	L3.21-10001	4.81	14.5	21	J		13.9	pCi/L
HTF 11	12/13/07	PH							6.4	pH
HTF 11	12/13/07	SODIUM	EPA6010B	10	100				6380	ug/L
HTF 11	12/13/07	SPECIFIC CONDUCTANCE							112	uS/cm
HTF 11	12/13/07	TRITIUM	L3.21-10015	0.467	1.76				11.1	pCi/mL
HTF 11	12/13/07	TURBIDITY							28	NTU
HTF 12D	12/12/07	CHROMIUM	EPA6010B	1	10	21	J		2.35	ug/L
HTF 12D	5/22/07	DEPTH_TO_WATER							53.48	ft
HTF 12D	5/23/07	DEPTH_TO_WATER							54.02	ft
HTF 12D	5/23/07	DEPTH_TO_WATER							54.02	ft
HTF 12D	12/12/07	DEPTH_TO_WATER							57.2	ft
HTF 12D	5/23/07	GROSS ALPHA	L3.21-10001	2.7	10.5	21	J	J	7.18	pCi/L
HTF 12D	12/12/07	GROSS ALPHA	L3.21-10001	3.01	9.97	21	J		5.62	pCi/L
HTF 12D	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.655	mg/L
HTF 12D	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.665	mg/L
HTF 12D	5/23/07	NONVOLATILE BETA	L3.21-10001	4.99	11.3		U	U	0.961	pCi/L
HTF 12D	12/12/07	NONVOLATILE BETA	L3.21-10001	5.05	12.2		U		2.58	pCi/L
HTF 12D	5/22/07	PH								pH
HTF 12D	5/23/07	PH							10.3	pH
HTF 12D	12/12/07	PH							10.4	pH
HTF 12D	12/12/07	SODIUM	EPA6010B	20	200				13600	ug/L
HTF 12D	5/22/07	SPECIFIC CONDUCTANCE							0	uS/cm
HTF 12D	5/23/07	SPECIFIC CONDUCTANCE							641	uS/cm
HTF 12D	12/12/07	SPECIFIC CONDUCTANCE							199	uS/cm
HTF 12D	5/23/07	TRITIUM	L3.21-10015	0.562	1.9				9.55	pCi/mL
HTF 12D	12/12/07	TRITIUM	L3.21-10015	0.451	1.61				9.06	pCi/mL
HTF 12D	5/22/07	TURBIDITY							0	NTU
HTF 12D	5/23/07	TURBIDITY							4.2	NTU
HTF 12D	12/12/07	TURBIDITY							18	NTU
HTF 15D	5/22/07	DEPTH_TO_WATER							53.13	ft
HTF 15D	5/23/07	DEPTH_TO_WATER							53.2	ft
HTF 15D	5/23/07	DEPTH_TO_WATER							53.2	ft
HTF 15D	12/12/07	DEPTH_TO_WATER							63	ft
HTF 15D	5/23/07	GROSS ALPHA	L3.21-10001	2.42	5.59		U	U	1.05	pCi/L
HTF 15D	5/23/07	NONVOLATILE BETA	L3.21-10001	4.41	10.3		U	U	1.38	pCi/L
HTF 15D	5/22/07	PH								pH
HTF 15D	5/23/07	PH							6.1	pH
HTF 15D	5/22/07	SPECIFIC CONDUCTANCE								uS/cm
HTF 15D	5/23/07	SPECIFIC CONDUCTANCE							73	uS/cm
HTF 15D	5/23/07	TRITIUM	L3.21-10015	0.567	1.79				7.43	pCi/mL
HTF 15D	5/22/07	TURBIDITY								NTU
HTF 15D	5/23/07	TURBIDITY							7.6	NTU
HTF 18	12/13/07	CHROMIUM	EPA6010B	1	10				10.1	ug/L
HTF 18	12/13/07	DEPTH_TO_WATER							58.1	ft
HTF 18	12/13/07	GROSS ALPHA	L3.21-10001	2.86	11.6	21	J		9.86	pCi/L
HTF 18	12/13/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5				2.02	mg/L
HTF 18	12/13/07	NONVOLATILE BETA	L3.21-10001	5.47	13.6		U		5.02	pCi/L
HTF 18	12/13/07	PH							4.4	pH
HTF 18	12/13/07	SODIUM	EPA6010B	10	100				3680	ug/L
HTF 18	12/13/07	SPECIFIC CONDUCTANCE							54	uS/cm
HTF 18	12/13/07	TRITIUM	L3.21-10015	0.457	1.54				7.32	pCi/mL
HTF 18	12/13/07	TURBIDITY							340	NTU
HTF 19	12/12/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 19	12/12/07	DEPTH_TO_WATER							61.1	ft
HTF 19	12/12/07	GROSS ALPHA	L3.21-10001	2.85	9.71	21	J		5.79	pCi/L
HTF 19	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25	21	J		0.24	mg/L
HTF 19	12/12/07	NONVOLATILE BETA	L3.21-10001	5.09	11.7		U		0.693	pCi/L
HTF 19	12/12/07	PH							4.8	pH
HTF 19	12/12/07	SODIUM	EPA6010B	10	100				2230	ug/L
HTF 19	12/12/07	SPECIFIC CONDUCTANCE							38	uS/cm
HTF 19	12/12/07	TRITIUM	L3.21-10015	0.459	1.35				4.21	pCi/mL
HTF 19	12/12/07	TURBIDITY							22	NTU
HTF 2	12/12/07	DEPTH_TO_WATER							14.2	ft
HTF 2	12/12/07	PH							7.6	pH
HTF 2	12/12/07	SPECIFIC CONDUCTANCE							126	uS/cm
HTF 2	12/12/07	TURBIDITY							220	NTU
HTF 20	12/12/07	CHROMIUM	EPA6010B	1	10	21	J		1.42	ug/L
HTF 20	12/12/07	DEPTH_TO_WATER							61.4	ft
HTF 20	12/12/07	GROSS ALPHA	L3.21-10001	2.83	6.56		U		1.25	pCi/L
HTF 20	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	V	J		0.1	mg/L
HTF 20	12/12/07	NONVOLATILE BETA	L3.21-10001	4.61	11.1		U		1.73	pCi/L
HTF 20	12/12/07	PH							4.4	pH
HTF 20	12/12/07	SODIUM	EPA6010B	10	100				4920	ug/L
HTF 20	12/12/07	SPECIFIC CONDUCTANCE							53	uS/cm
HTF 20	12/12/07	TRITIUM	L3.21-10015	0.454	1.59				8.4	pCi/mL
HTF 20	12/12/07	TURBIDITY							6.5	NTU
HTF 21	12/12/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 21	12/12/07	DEPTH_TO_WATER							60.8	ft
HTF 21	12/12/07	GROSS ALPHA	L3.21-10001	2.85	8.05	21	J		3.06	pCi/L
HTF 21	12/12/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.01	0.05	V	J		0.073	mg/L
HTF 21	12/12/07	NONVOLATILE BETA	L3.21-10001	4.81	11.4		U		1.56	pCi/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS
HTF 21	12/12/07	PH							4.2	pH
HTF 21	12/12/07	SODIUM	EPA6010B	10	100				4490	ug/L
HTF 21	12/12/07	SPECIFIC CONDUCTANCE							53	uS/cm
HTF 21	12/12/07	TRITIUM	L3.21-10015	0.457	1.64				9.22	pCi/mL
HTF 21	12/12/07	TURBIDITY							6.9	NTU
HTF 22	11/8/07	CHROMIUM	EPA6010B	1	10				23.9	ug/L
HTF 22	11/8/07	DEPTH_TO_WATER							64.5	ft
HTF 22	11/8/07	GROSS ALPHA	L3.21-10001	3.06	11.2	21	J		8.14	pCi/L
HTF 22	11/8/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.925	mg/L
HTF 22	11/8/07	NONVOLATILE BETA	L3.21-10001	5.27	13.2	21	J		5.58	pCi/L
HTF 22	11/8/07	PH							6.5	pH
HTF 22	11/8/07	SODIUM	EPA6010B	10	100				8130	ug/L
HTF 22	11/8/07	SPECIFIC CONDUCTANCE							83	uS/cm
HTF 22	11/8/07	TRITIUM	L3.21-10015	0.553	1.61				4.42	pCi/mL
HTF 22	11/8/07	TRITIUM	L3.21-10015	0.549	1.64				4.93	pCi/mL
HTF 22	11/8/07	TURBIDITY							600	NTU
HTF 23	11/8/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 23	11/8/07	DEPTH_TO_WATER							56.5	ft
HTF 23	11/8/07	GROSS ALPHA	L3.21-10001	2.99	8.86	21	J		3.9	pCi/L
HTF 23	11/8/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				0.68	mg/L
HTF 23	11/8/07	NONVOLATILE BETA	L3.21-10001	4.86	11.3		U		1.48	pCi/L
HTF 23	11/8/07	PH							5.5	pH
HTF 23	11/8/07	SODIUM	EPA6010B	10	100				4810	ug/L
HTF 23	11/8/07	SPECIFIC CONDUCTANCE							48	uS/cm
HTF 23	11/8/07	TRITIUM	L3.21-10015	0.486	1.41				4.11	pCi/mL
HTF 23	11/8/07	TURBIDITY							9.5	NTU
HTF 24	11/8/07	CHROMIUM	EPA6010B	1	10	21	J		1.2	ug/L
HTF 24	11/8/07	DEPTH_TO_WATER							58.8	ft
HTF 24	11/8/07	GROSS ALPHA	L3.21-10001	2.99	5.84		U		0.269	pCi/L
HTF 24	11/8/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.46	mg/L
HTF 24	11/8/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.46	mg/L
HTF 24	11/8/07	NONVOLATILE BETA	L3.21-10001	4.46	11.2		U		3.81	pCi/L
HTF 24	11/8/07	PH							6	pH
HTF 24	11/8/07	SODIUM	EPA6010B	10	100				4410	ug/L
HTF 24	11/8/07	SPECIFIC CONDUCTANCE							40	uS/cm
HTF 24	11/8/07	TRITIUM	L3.21-10015	0.487	1.55				6.05	pCi/mL
HTF 24	11/8/07	TURBIDITY							14	NTU
HTF 32	11/8/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 32	11/8/07	CHROMIUM	EPA6010B	1	10		U		10	ug/L
HTF 32	11/8/07	DEPTH_TO_WATER							56.3	ft
HTF 32	11/8/07	GROSS ALPHA	L3.21-10001	2.98	6.8		U		1.17	pCi/L
HTF 32	11/8/07	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25				1.66	mg/L
HTF 32	11/8/07	NONVOLATILE BETA	L3.21-10001	4.57	10.9		U		2.1	pCi/L
HTF 32	11/8/07	PH							4.9	pH
HTF 32	11/8/07	SODIUM	EPA6010B	10	100				5570	ug/L
HTF 32	11/8/07	SODIUM	EPA6010B	10	100				5520	ug/L
HTF 32	11/8/07	SPECIFIC CONDUCTANCE							46	uS/cm
HTF 32	11/8/07	TRITIUM	L3.21-10015	0.469	1.48				5.35	pCi/mL
HTF 32	11/8/07	TURBIDITY							6	NTU

WELL	DATE	ANALYTE	METHOD	MDL	PQL	STORET CODE	LAB CODE	EPA CODE	RESULT	UNITS

APPENDIX A- MONITORING DATA

Definitions:

MDL method detection limit

PQL practical quantitation limit

LAB CODE USEPA Functional Guideline Codes applied by labs.

EPA CODE USEPA Functional Guideline Codes applied by SRS

USEPA Functional Guideline Codes

J The detected analyte was positively identified but the result is approximate.
NJ The detected analyte was only tentatively identified and the result is approximate. All usable TIC results receive this code.
U The analyte was analyzed for, but not detected. The sample detection and quantitation limits (MDL & SQL) are valid unless blank contamination is indicated.
UJ The analyte was analyzed for, but not detected. The MDL & SQL are approximate, and may be inaccurate or imprecise.
R The sample result is rejected as unusable due to serious deficiencies in meeting quality control criteria. The analyte may be present or absent.

STORET Codes

(Null) Data not remarked.
A The result is the mean of two or more results.
C The result is calculated.
G The result reported is the maximum of two or more results.
H The result is from a field kit determination and may not be accurate.
I2 The result is less than the SQL, but equal to or greater than the ssMDL.
K The actual concentration is suspected to be less than the reported result.
L The actual concentration is suspected to be greater than the reported result.
P[1] Too numerous to count (TNTC).
Q The sample was held beyond the normal holding time prior to analysis.
S Result equaling SQL is actual laboratory test output.
T The result is less than the criteria of detection.
V The analyte was detected in the lab method blank.
W 1 Nondetect result is a raw value, not the quantitation limit.
Y The result is from an unpreserved or incorrectly preserved sample; the data may not be accurate.
Z[1] There were too many colonies present to count (TNTC); the numeric value represents the filtration volume.
1 Compound identification criteria were not met.
2 LCS criteria were not met.
3 ICP serial dilution criteria were not met.
4 Matrix interference is present.
5 Matrix spike concentration was < 0.25× the sample concentration, and the percent recovery cannot be determined.
6 The analyte was detected in the field blank.
7 The analyte was detected in the equipment rinsate blank.
8 The analyte was detected in the trip blank.
9 The field duplicate RPD was not within control limits.
10 Internal standard or carrier criteria were not met when affecting quantitation.
11 Matrix spike recovery was not within the control limits.
12 A tentatively identified compound is a suspected aldol-condensation product.
13 Initial or continuing calibration criteria was not met.
14 Surrogate or tracer spike recovery is out of specification.
15[1] Graphite furnace atomic absorption QC
a. Duplicate injection criteria were not met.
b. Post-digestion spike recovery was not within control limits and the sample absorbance is > 50% of the post-digestion spike absorbance.
16 The sample was analyzed by the method of standard additions.
17[1] Graphite furnace atomic absorption QC: the post-digestion spike recovery is not within control limits and the sample absorbance is < 50% of the postdigestion spike absorbance.
18 The laboratory duplicate RPD or MS/MSD RPD was not within control limits.
19 Analyte detected in storage blank.
20[1] The analyte was detected in the material blank.
21 Result is above detection, but less than SQL.
22 DHEC-required certification for analyte-method combination was not held by lab.
23 Result was derived beyond the calibration range of the instrument/method.

NOTES:
1 This code is not currently used but may be used in the future or in other SRS programs.
2 This code is redundant to another code and is not used at this time.