FINAL

IMA

ADDENDUM #3
TO THE
SAMPLING AND ANALYSIS PLAN
FOR

3d Inf Div (Mech)

PHASE II RCRA FACILITY INVESTIGATIONS
AT THE
FORMER 724TH TANKER PURGING STATION, SWMU 26
AT
FORT STEWART, GEORGIA

Prepared for

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. DACA21-02-D-0004
Delivery Order 0039

June 2004

SAIC®

04-083(doc)/060204

DOCUMENT 11

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U.S. Army Corps of Engineers
Savannah District
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Prepared by

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Regulatory Authority

Resource Conservation and Recovery Act,
Title II, Subtitle C, Section 3004;
42 USC 6901 et seq.; 40 *CFR* 264,

June 2004

APPROVALS

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AT THE
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Greg Grim, Program Manager — Date: 6/8/04

Patricia Stoll, Project Manager — Date: 6/8/04

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ACRONYMS

BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
CQC	Chemical Quality Control
GA EPD	Georgia Environmental Protection Division
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA field investigation
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SWMU	solid waste management unit
VOC	volatile organic compound

1.0 INTRODUCTION

This addendum supplements the *Sampling and Analysis Plan for Phase II RCRA Facility Investigations at the Former 724th Tanker Purging Station, Solid Waste Management Unit 26, at Fort Stewart, Georgia* (SAIC 1997). It addresses the delineation of contamination in groundwater at the Tanker Purging Station. It also presents changes and additions to the Sampling and Analysis Plan (SAP) and the specific sampling requirements for the performance of these field activities.

A Phase II Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) was completed at the site, and the revised final Phase II RFI report was submitted to the Georgia Environmental Protection Division (GA EPD) on November 24, 1998. The Phase II RFI report recommended that a Corrective Action Plan (CAP) be prepared, which was submitted to GA EPD in July 1999. The CAP recommended that an enhanced bioremediation system (PHOSter®II) be installed at the site.

This addendum includes the installing resistivity borings to locate the clay layers at the site, installing additional monitoring wells, conducting quarterly groundwater sampling, and conducting a topographic survey to determine the areas of discharge and recharge.

2.0 PROJECT ORGANIZATION

The organizational chart for this addendum is presented in Figure 1.

3.0 FIELD ACTIVITIES

This section describes the field activities that will be conducted to delineate the soil and groundwater contamination at the Solid Waste Management Unit (SWMU) 26 site. Table 1 presents the sample numbering system that will be used for this investigation. The site-specific investigative activities for the site are presented in Table 2.

3.1 MONITORING WELL INSTALLATION

Five new 2-in. deep monitoring wells will be installed adjacent to existing 2-in. shallow monitoring wells using the hollow-stem auger drilling method. The procedures and methodology for hollow-stem auger drilling are presented in the SAP. The five new deep wells will be installed next to the existing shallow compliance monitoring wells and to approximately 25 ft below ground surface (BGS). The monitoring wells will be developed in accordance with the procedures and methodology presented in the SAP. Upon completion of the development activities, the new monitoring wells will be sampled for volatile organic compound (VOC) analysis.

3.2 INSTALLATION OF RESISTIVITY PROBE BORINGS

Based on the results from the new deep monitoring wells, a total of 20 resistivity probe borings will be installed to locate the clay layers at the site. The new resistivity borings will be installed to approximately

30 ft BGS. Groundwater samples for VOC analysis will be collected from the interval above the clay layer at each resistivity boring. The locations of these borings will depend upon the results of the analytical samples collected from the newly installed deep monitoring wells.

3.3 TOPOGRAPHIC SURVEY

A topographic survey will be conducted to better understand the areas of discharge and recharge at the site. The survey will produce a topographic map of the area with 1-ft contour lines. In addition, the locations of new monitoring wells and sampling points will be surveyed in accordance with the requirements presented in the SAP.

3.4 GROUNDWATER SAMPLING

Groundwater samples will be collected from a total of 51 monitoring wells—the 41 existing wells and the 10 new wells (5 additional wells are proposed in Option 1)—using low-flow techniques. Samples will be analyzed at an off-site laboratory for benzene, toluene, ethylbenzene, and xylenes (BTEX). Field parameters measured during sampling will include dissolved oxygen, temperature, oxidation-reduction potential, conductivity, and pH. The procedures and equipment for groundwater sampling are presented in the SAP.

3.5 WATER LEVEL MEASUREMENT

Static water level measurements will be collected from each monitoring well before groundwater sampling. The procedures and equipment are presented in the SAP.

3.6 OPTIONAL FIELD ACTIVITIES

3.6.1 Additional Deep Groundwater Delineation (Option 1)

Five additional new 2-in. monitoring wells will be installed to delineate the deep groundwater contamination in the area. The new monitoring wells will be installed using the hollow-stem auger drilling method. The five new wells will be constructed with 5-ft screens and installed to approximately 25 ft BGS. The monitoring wells will be developed in accordance with the procedures and methodology presented in the SAP.

3.6.2 Quarterly Groundwater Sampling (Option 2)

Based on the results of the first round of groundwater sampling, three quarterly rounds of groundwater sampling and water level measurements will be conducted. All of the site wells, a total of 51, will be sampled for BTEX as described in Section 3.4.

4.0 REFERENCES

SAIC (Science Applications International Corporation) 1997. *Sampling and Analysis Plan for Phase II RCRA Facility Investigations at the Former 724th Tanker Purging Station, Solid Waste Management Unit 26, at Fort Stewart, Georgia*, April.

USACE (U.S. Army Corps of Engineers) 2001. *Engineering and Design – Requirements for the Preparation of Sampling and Analysis Plans,* available at <http://www.usace.army.mil/inet/usace-docs/eng-manuals/em200-1-3/toc.htm>.

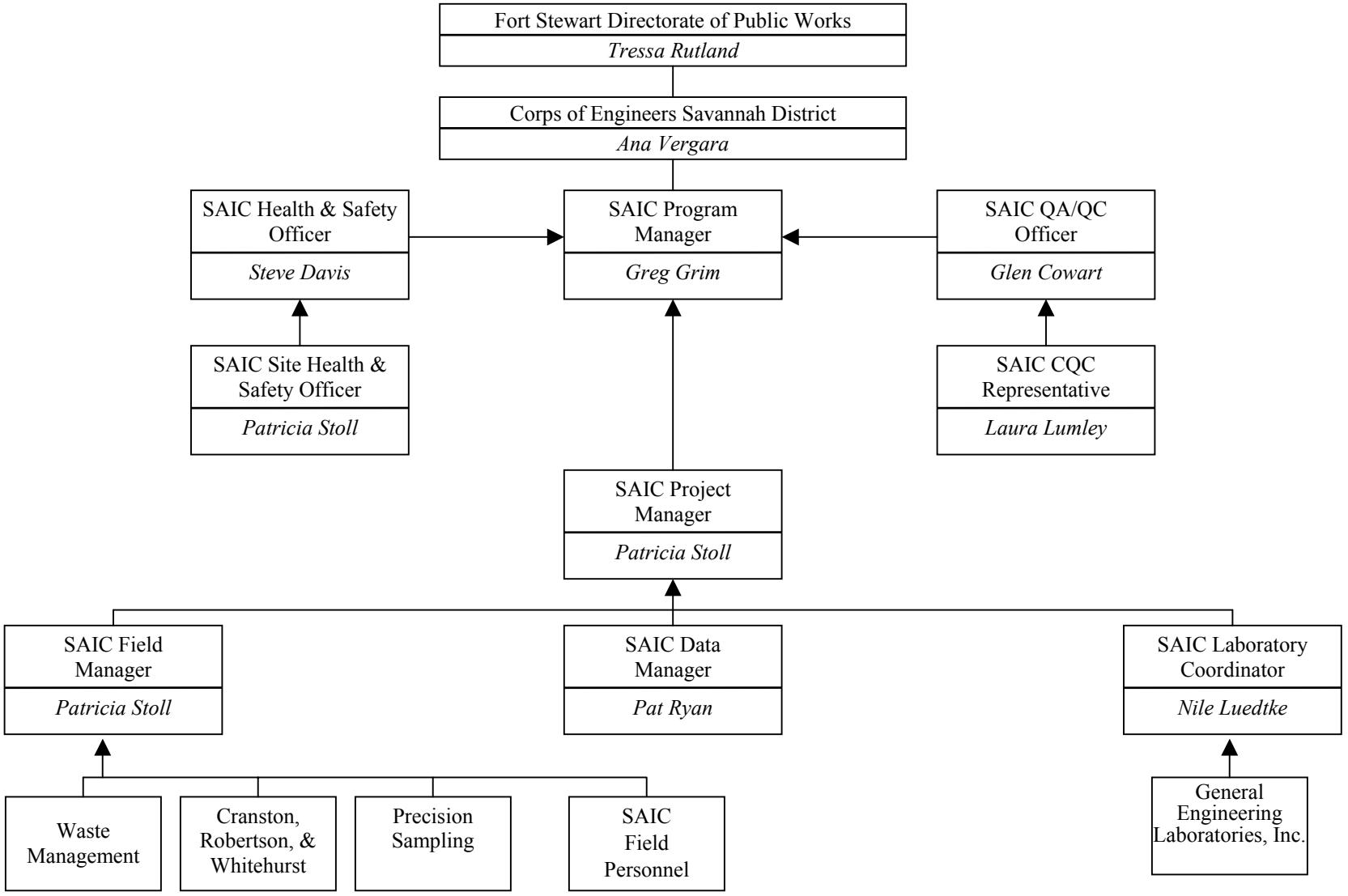

Figure 1. Revised Organizational Chart for SWMU 26 at Fort Stewart, Georgia

Table 1. Sample Number System for SWMU 26

Sample Identification: XXMLT#	
XX = Area Designator	Area designators used for the project will be the SWMU number. **Examples** 26 = SWMU-26
M = Sample Media	**Examples** 1 = Soil 2 = Sediment 3 = Surface water 4 = Groundwater 5 = Soil screening 6 = Groundwater screening 7 = Soil from injection-point installation 8 = Pre-pilot soil from inside trench 9 = Injection-point groundwater 0 = Gas A = Temporary piezometer groundwater B = Temporary piezometer groundwater C = Monitoring well soil D = Monitoring well groundwater
L = Borehole/Sample Location	Sample locations will be consecutive starting from the last sample location. **Examples** 1 = First sample location (MW-1, BS-1) 2 = Second sample location (MW-2, BS-2) 0 = Tenth sample location (MW-10, TP-10) J = Nineteenth location (MW-19, TP-19) M = Twenty-first location (MW-21, TP-21) P = Twenty-third location (MW-23, TP-23) R = Twenty-fourth location (MW-24, TP-24) **B, C, or D** 1 = Thirty-third location (MW-33, TP-33) 2 = Thirty-fourth location (MW-34, TP-34)
T = Sample Type	**Examples** 1 = Environmental sample 2 = Duplicate sample 3 = QA split sample 4 = Rinsate blank 5 = Investigation-derived waste sample
# = Sample Number	Sample number will be a sequential number. **Examples** 1 = First sample from borehole 2 = Second sample from borehole

All trip blanks used during the project will be consecutively identified.
SWMU = Solid waste management unit.

Table 2. Summary of Soil and Groundwater Samples to Be Collected at SWMU 26

Matrix	Analysis	Analytical Procedures	No. Field Samples	QC Duplicates[a]	Field Rinsates[b]	QC Trip Blanks	Total Samples	Holding Time	Preservation Requirements	Sample Containers
Groundwater	BTEX	EPA 8260B	51	5	3	4	63	14 days	Cool to 4°C HCl pH<2	Two 40-mL GSV[c]
IDW Water	VOCs	EPA 8260B	1	0	0	0	1	14 days	Cool to 4°C[c] HCl pH <2	Two 40-mL GSV[c]
	Oil & grease	EPA 413.2	1	0	0	0	1	28 days	Cool to 4°C H_2SO_4	Two 1-L AG
	Total phenols	EPA 420.1/420.2	1	0	0	0	1	28 days	Cool to 4°C H_2SO_4	Two 1-L AG
	pH	EPA 150.1	1	0	0	0	1	ASAP	Cool to 4°C	One 250-mL HDPE
Option 1 Groundwater	BTEX	EPA 8260B	153	15	8	12	188	14 days	Cool to 4°C HCl pH<2	Two 40-mL GSV[c]
Option 1 IDW Water	VOCs	EPA 8260B	3	0	0	0	3	14 days	Cool to 4°C[c] HCl pH <2	Two 40-mL GSV[c]
	Oil & grease	EPA 413.2	3	0	0	0	3	28 days	Cool 4°C H_2SO_4	Two 1-L AG
	Total phenols	EPA 420.1/420.2	3	0	0	0	3	28 days	Cool to 4°C H_2SO_4	Two 1-L AG
	pH	EPA 150.1	3	0	0	0	3	ASAP	Cool to 4°C	One 250-mL HDPE

AG = Amber glass.
ASAP = As soon as possible.
BTEX = Benzene, toluene, ethylbenzene, and xylenes.
EPA = U.S. Environmental Protection Agency.
GSV = Glass septa vial.
HDPE = High-density polyethylene.
IDW = Investigation-derived waste.
QC = Quality control
SWMU = Solid waste management unit.
VOC = Volatile organic compound.
[This table is in conformance with EM 200-1-3 (USACE 2001)].

[a] The number of QC duplicate samples represents a 10% distribution between the different types of investigations to be conducted; however, the actual number of duplicates collected for each investigation type might vary slightly from the distribution presented.

[b] The number of QC rinsate blank samples represents a 5% distribution between the different types of investigations to be conducted; however, the actual number of blanks collected for each investigation type might vary slightly from the distribution presented.

[c] Sample containers will be filled so that no headspace is present.

APPENDIX A

PROPOSED SAMPLING LOCATIONS FOR SWMU 26
FORT STEWART, GEORGIA

LEGEND

- GROUNDWATER MONITORING WELL LOCATIONS
- TEMPORARY PIEZOMETER GROUNDWATER SAMPLING LOCATIONS
- INJECTION WELL LOCATIONS
- PROPOSED MIP LOCATIONS
- PROPOSED DEEP MONITORING WELL LOCATIONS

EXTENT OF SOIL EXCAVATION ON JANUARY 10, 2001

MP-27 MP-22 MP-21 MW-34 MW-33 MP-20 MW-30 MP-19 MW-31 MW-29 MW-1 MW-40 MW-39 MP-28 MP-18 MP-17 MW-3 BS-12 BS-15 MW-15 TP-01 BS-21 MW-20 TP-06 MW-14 BS-05 MW-8 TP-36 MP-16 TP-11 MW-10 DEEP MW-9 BS-11 MW-32 TP-18 TP-15 BS-20 MP-15 TP-07 MW-36 MP-2 BS-13 MP-1 MW-24 MW-16 MW-35 MW-27 TP-39 BS-03 MP-24 BS-06 TP-12 MP-14 BS-19 TP-30 MP-4 MP-5 MW-6 TP-38 MP-3 BS-16 MW-19 TP-08 MP-6 MP-7 BS-10 BS-04 TP-19 TP-29 TP-16 MP-13 TP-31 MP-9 MP-10 MP-8 MW-26 MW-28 MW-25 TP-40 MW-7 TP-37 BS-14 MP-12 MP-11 BS-18 TP-13 BS-09 BS-02 BS-07 MW-22 MW-23 MW-13 MW-21 TP-09 TP-17 MW-18 TP-20 BS-17 BS-08 TP-27 TP-14 TP-33 TP-32 MW-11 TP-28 MW-12 TP-10 TP-24 TP-25 TP-21 MW-17 TP-23 TP-26 TP-22

0 30 60 120

SCALE: 1" = 60'

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FORMER 724TH TANKER
PURGING STATION
PROPOSED DEEP MONITORING WELL LOCATIONS

DRAWN BY:	REV. NO./DATE:	CAD FILE:
W.MEAD	0/05/04/04	96016/DGNS/K66C004-1.DGN

Figure A-1. Proposed Deep Monitoring Well Locations at SWMU 26