Final

Site Investigation Report
Boiler Plant No. 2, Building 2278
Parcels 23(7) and 226(7)

Fort McClellan
Calhoun County, Alabama

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Table of Contents

Page

Table of Contents *(Continued)*

Page

List of Appendices

List of Tables

List of Figures

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK08, IT Corporation (IT) and QST Environmental Inc., (QST) completed a site investigation (SI) at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at Boiler Plant No. 2 consisted of the sampling and analysis of six surface soil samples, nine subsurface soil samples, and four groundwater samples by QST.

The analytical results indicate that metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) were detected in the environmental media sampled. To evaluate whether the detected constituents present an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values.

The potential threat to human receptors is expected to be low. Although the site is projected for reuse by the Alabama Army National Guard, the analytical data were screened against residential human health SSSLs to evaluate the site for unrestricted land reuse. In soils, the metals concentrations that exceeded SSSLs were below their respective background concentration or within the range of background values and do not pose an unacceptable risk to human health. VOC and SVOC concentrations in soils were below SSSLs.

In groundwater, several metals were detected in two samples at concentrations exceeding SSSLs and background concentrations. However, the samples with the elevated metals results had high turbidity which is believed to have caused the increased metals concentrations. Therefore, the metals results are suspect and are not believed to be indicative of site conditions. The SVOC bis(2-ethylhexyl)phthalate was detected in two groundwater samples at concentrations exceeding the SSSL. However, bis(2-ethylhexyl)phthalate is a common laboratory contaminant and is not believed to be related to activities at the site.

Several metals were detected in surface soils at concentrations exceeding ESVs and background concentrations. However, with the exceptions of lead and selenium in one sample each, the metals concentrations were within the range of background values. Two VOCs

(tetrachloroethene and trichloroethene) exceeded ESVs in surface soils. Two polynuclear aromatic hydrocarbon (PAH) compounds (fluoranthene and pyrene) exceeded ESVs in one surface soil sample but were below PAH background values. The site is located within the developed area of the Main Post and consists of buildings and paved roads/areas. Viable ecological habitat is limited and is not expected to increase the projected land reuse scenario. Therefore, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at Boiler Plant No. 2 do not appear to have adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health or the environment. Furthermore, the underground storage tanks associated with the boiler plant have either been closed in-place or closed by removal in accordance with State of Alabama regulations. Therefore, IT recommends "No Further Action" and unrestricted land reuse at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted IT Corporation (IT) to provide environmental services for completion of the site investigation (SI) at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7), under Contract Number DACA21-96-D-0018, Task Order CK08.

The U.S. Army Environmental Center (AEC) originally contracted QST Environmental, Inc. (QST) to perform the SI at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7). QST prepared an SI work plan (QST, 1998) and conducted SI field activities in 1998. This SI report summarizes field activities and data compiled by QST for the SI conducted at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7). The site is hereinafter referred to as Boiler Plant No. 2 and includes all associated parcels unless otherwise specified.

1.1 Project Description

Boiler Plant No. 2 was identified as an area to be investigated prior to property transfer. The site was classified as a Category 7 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 sites are areas that are not evaluated and/or that require further evaluation.

The SI consisted of the collection of six surface soil samples, nine subsurface soil samples, and four groundwater samples by QST to determine if potential site-specific chemicals are present at Boiler Plant No. 2.

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Boiler Plant No. 2 at concentrations that present an unacceptable risk to human health or the

environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and polynuclear aromatic hydrocarbon (PAH) background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000a). The PAH background screening values were developed by IT at the direction of the BRAC Cleanup Team to address the occurrence of PAH compounds in surface soils as a result of anthropogenic activities at FTMC. Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide either to propose "No Further Action" at the site or to conduct additional work at the site.

1.3 Site Description and History

Boiler Plant No. 2, Building 2278 (Parcels 23[7] and 226[7]), is located near the intersection of Castle Avenue (formerly 6th Avenue) and 14th Army Band Road (formerly 14th Band Road) in the northwestern portion of the FTMC Main Post (Figure 1-1). Boiler Plant No. 2 was built in 1954 and is currently operated and maintained by Johnson Controls, Inc. (ESE, 1998). The boiler plant is fired by natural gas; however, the plant has a dual-fired boiler that can also operate using heating oil (Jaye, 2001a).

Two 25,000-gallon underground storage tanks (UST) were used to store heating oil at the site (ESE, 1998). The two USTs were installed in 1984 and were closed in-place in 1991. Two new 25,000-gallon fiberglass USTs were installed to replace the closed-in-place USTs (Jaye, 2001a). A closure report for the closed-in-place USTs was not available (ESE, 1998).

The two 25,000-gallon fiberglass USTs installed in 1991 were located on the southwest side of Building 2278, just southwest of the closed-in-place USTs (Figure 1-2). The USTs were used to store heating oil, which was a backup fuel source for the boiler plant. These USTs were removed by Karst Environmental, Inc. in August 2000 in accordance with Alabama Department of Environmental Management (ADEM) regulations. The ADEM UST Closure Site Assessment Report for the removed USTs is included in Appendix A.

A steel aboveground storage tank is located on the southeast side of Building 2278 (Figure 1-2). The tank has a capacity of approximately 300 gallons and is situated on a concrete saddle within a concrete secondary containment vault. The tank is used to store diesel fuel to power a backup generator at the site (Jaye, 2001b).

One reported release was noted at Boiler Plant No. 2. In November 1984, approximately 500 gallons of an alkaline solution (pH of 10.9 to 12) was discharged to Cane Creek (ESE, 1998). The spill resulted in a fish-kill up to 1.5 miles downstream (ESE, 1998). Spill mitigation included pumping out the contaminated holding pool, neutralizing the solution, and discharging the solution to the sanitary sewer. In addition, the storm water drains were flushed out (ESE, 1998).

2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, the U.S. Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual

site inspections were conducted to verify conditions of specific property parcels. Previous UST investigations have been conducted at the site, as described in the following paragraph.

Two 25,000-gallon USTs used to store heating oil were closed in-place at the site in 1991; the USTs were replaced with two 25,000-gallon fiberglass USTs. A closure report for the closed-in-place USTs was not available (ESE, 1998). The USTs were closed in-place because of their close proximity to Building 2278. The two 25,000-gallon fiberglass USTs were removed by Karst Environmental, Inc. in August 2000 in accordance with ADEM regulations. The ADEM UST Closure Site Assessment Report for the removed USTs is included in Appendix A.

Other investigations to document site environmental conditions have not been conducted at Boiler Plant No. 2. Therefore, the site was classified as a Category 7 CERFA site: areas that are not evaluated or require further evaluation.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by QST at Boiler Plant No. 2, including environmental sampling and analysis.

3.1 Environmental Sampling

The environmental sampling performed during the SI at Boiler Plant No. 2 included the collection of surface soil samples, subsurface soil samples, and groundwater samples for chemical analysis. The sample locations were determined by observing site physical characteristics during a site walkover and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.3.

3.1.1 Surface Soil Sampling

Six surface soil samples were collected at Boiler Plant No. 2, at the locations shown on Figure 3-1. Surface soil sampling locations and rationale are presented in Table 3-1. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2.

Sample Collection. Surface soil samples were collected from 0 to 1 foot below ground surface (bgs) using a direct-push sampling system as described in the QST work plan (QST, 1998). The samples were analyzed for parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix B.

3.1.2 Subsurface Soil Sampling

Nine subsurface soil samples were collected from six soil borings at Boiler Plant No. 2, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, and buried and overhead utilities.

Sample Collection. QST contracted Graves Service Company, Inc. to complete the soil borings. Subsurface soil samples were collected from the soil borings at depths greater than 3 feet bgs using a direct-push sampling system, in accordance with procedures outlined in the QST work plan (QST, 1998). Two subsurface soil samples were collected from three of the six

borings (SI02-SS07, SI02-SS08, and SI02-SS09) and one subsurface soil sample was collected from each of the other three borings (SI02-SS01, SI02-SS02, and SI02-SS03). The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix B.

3.1.3 Groundwater Sampling

Groundwater samples were collected from four existing monitoring wells at Boiler Plant No. 2. The well locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and analytical parameters are listed in Table 3-3.

Groundwater samples were collected after purging 3 to 5 well volumes using a centrifugal pump. Groundwater sample parameters were recorded for pH, conductivity, and temperature (turbidity, dissolved oxygen, and oxidation-reduction potential were not monitored). Field parameter readings are summarized in Table 3-4. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3.

3.2 Surveying of Sample Locations

Sample locations were surveyed using global positioning system survey techniques or traditional surveying techniques described in the QST work plan (QST, 1998). Map coordinates for each sample location were determined using a Transverse Mercator (UTM) or State Planar grid to within $\pm$ 3 feet ($\pm$ 1 meter). Horizontal coordinates are included in Appendix C.

3.3 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the site and EPA, ADEM, FTMC, and USACE requirements. The samples collected at Boiler Plant No. 2 were analyzed for the following parameters:

- Volatile organic compounds (VOC) - EPA Method 8260
- Semivolatile organic compounds (SVOC) - EPA Method 8270
- Target analyte list metals - EPA Method 6010/7000
- Total organic carbon (TOC) - EPA Method 9060 (one surface soil sample only).

The samples were analyzed using EPA SW-846 analytical methods, including Update III methods where applicable.

3.4 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed guidelines specified in the QST work plan (QST, 1998).

3.5 Investigation-Derived Waste Management and Disposal

Investigation-derived waste was managed and disposed as outlined in the QST work plan (QST, 1998).

3.6 Variances/Nonconformances

QST did not document any variances or nonconformances to the work plan (QST, 1998).

3.7 Data Quality

QST data were submitted to the Installation Restoration Data Management Information System (IRDMIS) database at the conclusion of SI field activities. Hard-copy data packages were sent to the AEC in Edgewood, Maryland for storage. IT retrieved the electronic data via IRDMIS and the original data packages from the AEC for evaluation. From the IRDMIS data, IT was able to identify the key fields of information (analytical records, well construction and geotechnical information, sample location information, and water level readings) and translate the data into the IT Environmental Management System (ITEMS) database.

QST hard-copy analytical data packages were validated during a complete (100 percent) Level III data validation effort. The validated analytical data are presented in tabular form in Appendix D. Appendix E consists of the data validation summary report that discusses the QST data validation. Selected results were rejected or qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the data validation report. In addition, during the validation the electronic results were compared to the hard-copy results. Concentrations in the database were corrected where necessary and validation qualifiers added to the QST data using ITEMS to reflect the findings summarized in the QST data validation report. The validated data were used in the comparison to the SSSLs, ESVs, and background screening values in Chapter 5.0. The QST analytical data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at Boiler Plant No. 2 provided soil, geologic, and groundwater data used to characterize the geology and hydrogeology of the site.

4.1 Regional and Site Geology

4.1.1 Regional Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold-and-thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults. Repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated, greenish-gray and black mudstone makes up the Nichols Formation with thin interbeds of

siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear to dominate the unit and consist primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consist of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggest that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east and southwest of the Main Post and consists of interlayered bluish-gray or pale yellowish-gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded

to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium-bedded to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark-gray to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.1.2 Site Geology

The soils mapped at Boiler Plant No. 2 consist of Montevallo shaly silty clay loam (MtD3). The Montevallo series consists of shallow, well drained, strongly acidic soils that formed from the residuum of interbedded shale and fine-grained sandstone or limestone. The Montevallo Series of soils occur extensively in the northern part of Calhoun County, but are also found in other parts as well. Fragments of shale (less than 2-inches square) are commonly found within the soil (U.S. Department of Agriculture, 1961).

The bedrock at the site is mapped as the undifferentiated Mississippian/Ordovician Floyd and Athens Shale (Osborne et al., 1997). The Floyd and Athens Shale consists of brown, dark-gray to black shale with localized interbedded limestone and sandstone (Osborne et al., 1997).

Sample logs from six direct-push soil borings installed by QST indicate that the soil at the site is predominately silty sand and clayey sand. Competent bedrock was not encountered during drilling.

4.2 Site Hydrology

4.2.1 Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates. The major surface water

features at the Main Post of FTMC include Remount Creek, Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Site elevation at Boiler Plant No. 2 ranges from approximately 735 to 750 feet above mean sea level. Surface water runoff follows site topography and generally flows to the southwest toward Cane Creek.

4.2.2 Hydrogeology

Based on a FTMC-wide groundwater contour map constructed by IT, groundwater flow in the vicinity of Boiler Plant No. 2 is anticipated to be toward the southwest.

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at Boiler Plant No. 2 indicate that metals, VOCs, and SVOCs were detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metals concentrations exceeding the SSSLs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix F. Additionally, PAH concentrations in surface soil samples that exceeded the SSSLs and ESVs were compared to PAH background screening values. The PAH background screening values were derived from PAH analytical data from 18 parcels at FTMC that were determined to represent anthropogenic activity (IT, 2000a). PAH background screening values were developed for two categories of surface soils: beneath asphalt and adjacent to asphalt. The PAH background screening values for soils adjacent to asphalt are the more conservative (i.e., lower) of the PAH background values and are the values used herein for comparison.

The following sections and Tables 5-1 through 5-3 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix D.

5.1 Surface Soil Analytical Results

Six surface soil samples were collected for chemical analysis at Boiler Plant No. 2. Surface soil samples were collected from the upper 1-foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values, as presented in Table 5-1.

Metals. Twenty-one metals were detected in surface soil samples collected at Boiler Plant No. 2. The concentrations of four metals (aluminum, arsenic, iron, and manganese) exceeded SSSLs.

However, the concentrations of these metals were below their respective background concentrations.

The concentrations of eight metals (aluminum, chromium, cobalt, iron, lead, manganese, selenium, and vanadium) exceeded ESVs. However, with the exceptions of lead (SI02-SS01) and selenium (SI02-SS02), the concentrations of these metals were below their respective background concentration or within the range of background values (Appendix F).

Volatile Organic Compounds. Sixteen VOCs were detected in surface soil samples collected at Boiler Plant No. 2. Four of the methylene chloride results were flagged with a "B" data qualifier signifying that this compound was also detected in an associated laboratory or field blank sample. Sample location SI02-SS05 contained 14 of the 16 detected VOCs.

VOC concentrations in surface soils were below SSSLs. The concentrations of two VOCs (tetrachloroethene and trichloroethene) exceeded ESVs at all of the surface soil sampling locations.

Semivolatile Organic Compounds. Four SVOCs, including three PAH compounds, were detected in surface soil samples collected at the Boiler Plant No. 2. The bis(2-ethylhexyl)phthalate results were flagged with a "B" data qualifier signifying that this compound was also detected in an associated laboratory or field blank sample. In addition, bis(2-ethylhexyl)phthalate was the only detected SVOC at four of the sample locations (SI02-SS03, SI02-SS04, SI02-SS05, and SI02-SS06).

SVOC concentrations in surface soils were below SSSLs. Two PAH compounds (fluoranthene and pyrene) exceeded ESVs in one surface soil sample (SI02-SS02). However, the concentrations of these compounds were below PAH background values.

Total Organic Carbon. One of the surface soil samples (SI02-SS05) was analyzed for TOC content. The TOC concentration in the sample was 16,100 milligrams per kilogram, as summarized in Appendix D.

5.2 Subsurface Soil Analytical Results

Nine subsurface soil samples were collected for chemical analysis at Boiler Plant No. 2. Subsurface soil samples were collected from six soil borings at depths greater than 3 feet bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Twenty-one metals were detected in subsurface soil samples collected at Boiler Plant No. 2. The concentrations of four metals (aluminum, arsenic, iron, and thallium) exceeded SSSLs. With the exception of thallium in two samples, the concentrations of these metals were below their respective background concentrations. The thallium results were within the range of background values determined by SAIC (1998) (Appendix F).

Volatile Organic Compounds. Fifteen VOCs were detected in subsurface soil samples collected at Boiler Plant No. 2. Two of the methylene chloride results were flagged with a "B" data qualifier signifying that this compound was also detected in an associated laboratory or field blank sample. The VOC concentrations in subsurface soils were below SSSLs.

Semivolatile Organic Compounds. Five SVOCs were detected in subsurface soil samples collected at Boiler Plant No. 2. All but one of the bis(2-ethylhexyl)phthalate results and the di-n-butyl phthalate results were flagged with a "B" data qualifier indicating that these compounds were also detected in an associated laboratory or field blank sample. Bis(2-ethylhexyl)phthalate and/or di-n-butyl phthalate were the only detected SVOCs in seven of the nine subsurface soil samples. The SVOC concentrations in subsurface soils were below SSSLs.

5.3 Groundwater Analytical Results

Four groundwater samples were collected for chemical analysis at Boiler Plant No. 2 at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

Metals. Seventeen metals were detected in groundwater samples collected at Boiler Plant No. 2. Samples SI02-GW03 and SI02-GW04 each contained all of the detected metals. Five metals were detected at concentrations exceeding SSSLs, their respective background concentrations, and the range of background values at these sample locations. Based on information provided on the sample collection logs, it appears that the groundwater samples collected from SI02-GW03 and SI02-GW04 had high turbidity at the time of sample collection. Although turbidity values

were not recorded, qualitative descriptions (e.g., muddy, cloudy, slightly cloudy) indicate that groundwater from these wells was turbid at the time of sample collection. Therefore, the elevated metals results are likely the result of high turbidity at the time of sample collection. The effect of high turbidity on metals concentrations in groundwater has been previously demonstrated in a groundwater resampling study conducted by IT at FTMC (IT, 2000b) (Appendix G).

Evaluation of the samples collected from the other two wells indicates that only two metals (aluminum and manganese) were detected at concentrations exceeding SSSLs and their respective background concentrations. However, the aluminum and manganese results were within the range of background values determined by SAIC (1998) (Appendix F).

Volatile Organic Compounds. One VOC, acetone, was detected in one groundwater sample (SI02-GW03) collected at Boiler Plant No. 2. VOCs were not detected in any of the other groundwater samples. The acetone result was flagged with a "B" data qualifier signifying that this compound was also detected in an associated laboratory or field blank sample. The acetone concentration was below the SSSL.

Semivolatile Organic Compounds. Bis(2-ethylhexyl)phthalate was detected in each of the groundwater samples collected at Boiler Plant No. 2. Three of the bis(2-ethylhexyl)phthalate results were flagged with a "B" data qualifier indicating that the compound was also detected in an associated laboratory or field blank sample. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant. The concentrations of bis(2-ethylhexyl)phthalate exceeded the SSSL at sample locations SI02-GW02 and SI02-GW03.

6.0 Summary, Conclusions, and Recommendations

IT and QST completed an SI at Boiler Plant No. 2 at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at Boiler Plant No. 2 consisted of the sampling and analysis of six surface soil samples, nine subsurface soil samples, and four groundwater samples by QST.

Chemical analysis of samples collected at Boiler Plant No. 2 indicates that metals, VOCs, and SVOCs were detected in site media. Analytical results were compared to human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metals concentrations exceeding SSSLs were compared to media-specific background screening values (SAIC, 1998), and PAH concentrations exceeding SSSLs and ESVs in surface soils were compared to PAH background screening values (IT, 2000a).

The potential threat to human receptors is expected to be low. Although the site is projected for reuse by the Alabama Army National Guard, the analytical data were screened against residential human health SSSLs to evaluate the site for unrestricted land reuse. In soils, the metals concentrations that exceeded SSSLs were below their respective background concentration or within the range of background values and do not pose an unacceptable risk to human health. VOC and SVOC concentrations in soils were below SSSLs.

In groundwater, several metals were detected in two samples at concentrations exceeding SSSLs and background concentrations. However, the samples with the elevated metals results had high turbidity which is believed to have caused the increased metals concentrations. Therefore, the metals results are suspect and are not believed to be indicative of site conditions. The SVOC bis(2-ethylhexyl)phthalate was detected in two groundwater samples at concentrations exceeding the SSSL. However, bis(2-ethylhexyl)phthalate is a common laboratory contaminant and is not believed to be related to activities at the site.

Several metals were detected in surface soils at concentrations exceeding ESVs and background concentrations. However, with the exceptions of lead and selenium in one sample each, the metals concentrations were within the range of background values. Two VOCs

(tetrachloroethene and trichloroethene) exceeded ESVs in surface soils. Two PAH compounds (fluoranthene and pyrene) exceeded ESVs in one surface soil sample but were below PAH background concentrations. The site is located within the developed area of the Main Post and consists of buildings and paved roads/areas. Viable ecological habitat is limited and is not expected to increase the projected land reuse scenario. Therefore, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at Boiler Plant No. 2 do not appear to have adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health or the environment. Furthermore, the USTs associated with the boiler plant have either been closed in-place or closed by removal in accordance with State of Alabama regulations. Therefore, IT recommends "No Further Action" and unrestricted land reuse at Boiler Plant No. 2, Building 2278, Parcels 23(7) and 226(7).

7.0 References

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