10.0 Fill Area Northwest of Reilly Airfield, Parcel 229(7)

10.1 Site Location

The Fill Area Northwest of Reilly Airfield, Parcel 229(7), is located in the northwestern corner of the Main Post, adjacent to Reilly Airfield and west-southwest of Reilly Lake (Figure 2-1). The site is located north of Landfill No. 4, Parcel 81(5), and west of Reilly Lake campground as shown on Figure 2-1.

10.1.1 Facility Type and Operational Status

Fill Northwest of Reilly Airfield, Parcel 229(7), covers approximately 5.87 acres and contains a potential disposal area identified in the EPIC report from the aerial photo composite dated 1954 (EPA, 1990b). Linear north-south trending mounds are visible at the northern margin of a cleared area (ground scar). Mounded material may be present in the cleared area. It is unclear precisely which feature or features were interpreted by EPIC as being the "Fill Area"; therefore, the site encompasses the entire cleared area, including the linear mound. The detail map is provided on Figure 10-1.

There is no information regarding operations at the Fill Area Northwest of Reilly Airfield, Parcel 229(7). Interviews were conducted with current and retired FTMC personnel regarding past activities at the site; however, no one interviewed could recall any disposal activities at this site.

10.1.2 Previous Work

A brief history of environmental work conducted at Parcel 229(7) includes:

- Site-Specific Field Sampling Plan (IT, 1998c)
- Site Investigation and Fill Area Definition Report (IT, 2001a).

10.1.2.1 Investigation

IT conducted a geophysical survey at the Fill Area Northwest of Reilly Airfield from January 1999 to April 1999. IT utilized the results of the geophysical survey to aid in the placement of subsurface soil sampling and trenching locations. These data were used to determine the horizontal and vertical extent of the landfill, and to characterize the geology and hydrogeology. The geophysical survey encompassed an area of approximately 409,700 square feet (9.4 acres) (Figure 10-2).

670000

670500

1181000

T229-3

T229-2

T229-1

Fill Area Northwest of Reilly Airfield
5.87 acres

PPMP-229-SW/SD02

PPMP-229-GP07

PPMP-229-GP01

T229-4

T229-12

PPMP-229-DEP01

FA-229-SB02

T229-5

PPMP-229-GP05

FA-229-SB01

PPMP-229-GP02

T229-13

PPMP-229-SW/SD01

T229-10

T229-6

PPMP-229-GP06

T229-11

PPMP-229-DEP02

T229-7

PPMP-229-GP04

T229-8

T229-9

PPMP-229-GP03

PPMP-229-SW/SD03

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670000

670500

1181000

Figure 10-1

Detail Map
Fill Area Northwest of Reilly Airfield
Parcel 229(7)

- Proposed Concrete Monument
- Groundwater and Subsurface Soil Sample Location (well)
- Surface and Subsurface Soil Sample Location
- Fill Boundary Observed within Trench Excavations
- Depositional Soil Sample Location
- Subsurface Soil Sample Location
- Groundwater, Surface and Subsurface Soil Sample Location (well)
- Surface Water/Sediment Sample Location
- Storm Drain Utility
- Electric Utility
- Exploratory Trench
- Improved Roads
- 5' Topographic Contours
- Surface Drainage/Creek w/ Flow Direction
- Fill Area Boundary Inferred by Surface Geophysics and Trenches
- Wooded
- Lawn/Cleared Area

0 100 200

State Plane feet, NAD83

N

August 2001

U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

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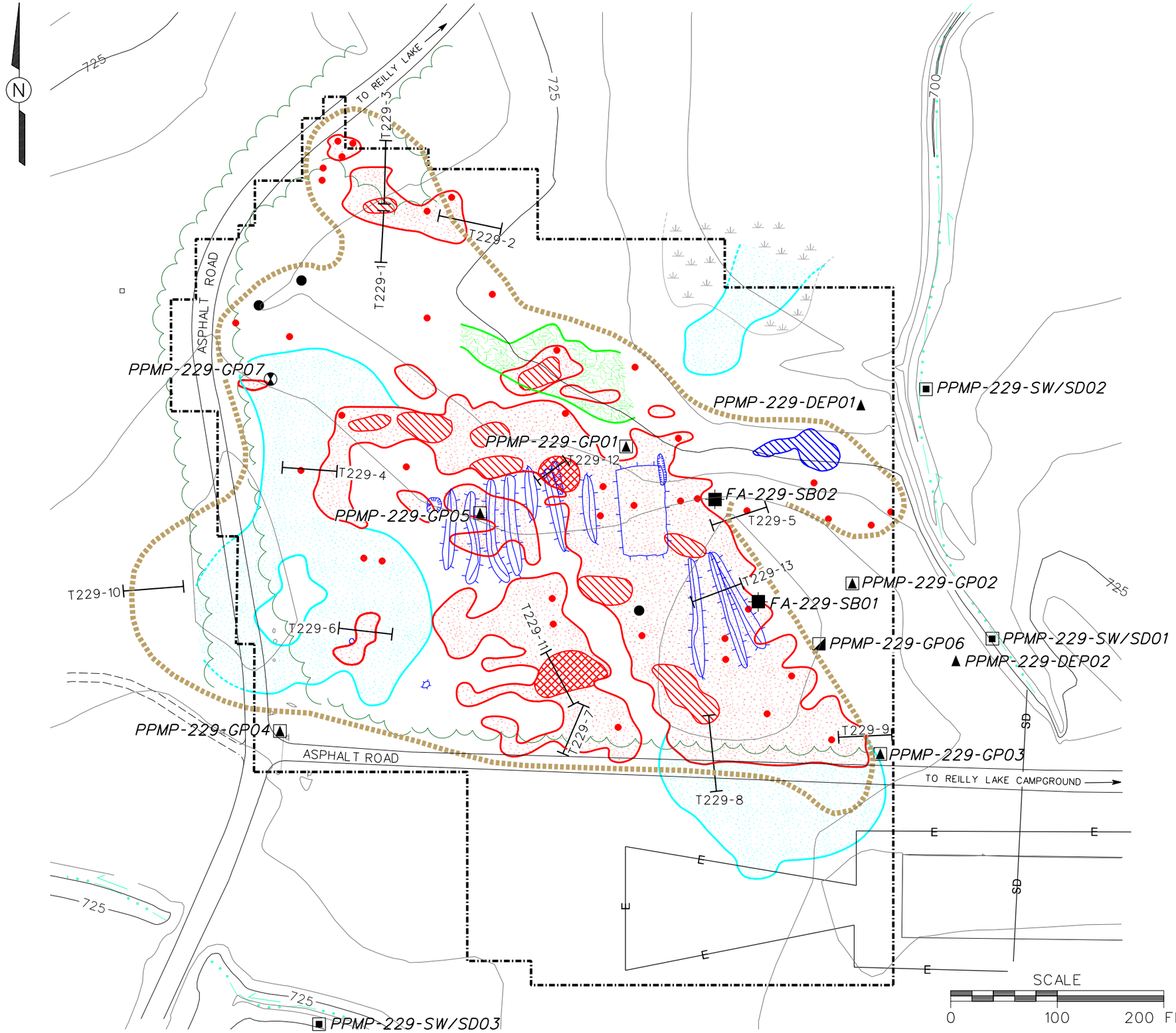

LEGEND

- GEOPHYSICAL SURVEY BOUNDARY
- FILL AREA BOUNDARY INFERRED BY SURFACE GEOPHYSICS AND TRENCHES
- LOW CONCENTRATION OF BURIED METAL
- MODERATE CONCENTRATION OF BURIED METAL
- HIGH CONCENTRATION OF BURIED METAL
- BURIED METAL OBJECT
- ELEVATED CONDUCTIVITY ANOMALY (DASHED WHERE INFERRED)
- LOW CONCENTRATION OF SURFACE DEBRIS
- MODERATE CONCENTRATION OF SURFACE DEBRIS
- SURFACE METAL OBJECT
- TRENCH EXCAVATION
- MOUND
- DEPRESSION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- MARSH / WETLANDS
- TREES / TREELINE
- SURFACE DRAINAGE / CREEK W/FLOW DIRECTION
- SD — STORM DRAIN UTILITY
- E — ELECTRIC UTILITY
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION (WELL)
- GROUNDWATER AND SUBSURFACE SOIL SAMPLE LOCATION (WELL)
- DEPOSITIONAL SOIL SAMPLE LOCATION

FIGURE 10-2
GEOPHYSICAL INTERPRETATION MAP FILL AREA NORTHWEST OF REILLY AIRFIELD PARCEL 229(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. JENKINS
PROJ. MGR.: J. YACOUB
PROJ. NO.: 796886
DATE LAST REV.: 02/25/02
DRAWN BY:
INITIATOR: J. RAGSDALE
DWG. NO.: ...\796886es.012
STARTING DATE: 02/16/01
DRAWN BY: D. BOMAR
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The geophysical survey results indicate seven anomalies exist at the Fill Area Northwest of Reilly Airfield that may be caused by landfill pits, fill areas, anomalous high conductivity areas, and low to moderate concentrations of buried metal and surface metal.

Four large anomalies are interpreted to contain low concentrations of buried metal, two landfill pits are interpreted to contain high concentrations of buried metal, and several smaller pits are interpreted to contain low or moderate concentrations of buried metal.

Surface soil samples were collected from six locations and depositional soil samples were collected from two locations at the Fill Area Northwest of Reilly Airfield. Twenty metals were detected in the surface and depositional soil samples collected. Surface soil samples collected from locations PPMP-229-GP01 and PPMP-229-GP05 contained all of the detected metals. Surface soil samples and depositional soil samples from locations PPMP-229-DEP01, PPMP-229-DEP02, PPMP-229-GP02, PPMP-229-GP03, PPMP-229-GP04, and PPMP-229-GP06 contained 19 of the metals detected.

The concentrations of seven metals (aluminum, chromium, iron, manganese, mercury, selenium, and vanadium) exceeded the ESVs in the samples collected; however, with the exception of manganese (detected in the depositional soil sample collected from location PPMP-229-DEP02), mercury (detected in the surface soil samples collected from locations PPMP-229-GP01 and PPMP-229-GP06), and selenium (detected in the surface soil samples collected from locations PPMP-229-GP03, PPMP-229-GP04, and PPMP-229-GP06), the concentrations of these metals are within the background screening values. Manganese detected in the sample collected from location PPMP-229-DEP02 was present at a concentration exceeding the background screening value, ESV, and SSSL.

Sixteen VOCs were detected in the surface and depositional soil samples collected. None of the VOC detected exceeded the SSSLs. The surface soil sample collected from location PPMP-229-GP01 had detectable concentrations of 1,2-dimethylbenzene, ethylbenzene, and m,p-xylenes exceeding the ESVs.

Subsurface soil samples were collected from seven soil borings. Subsurface soil samples were collected from various intervals at depths ranging from 2 to 12 feet bgs. Twenty metals were detected in the subsurface soil samples collected. The concentrations of seven metals (aluminum, arsenic, chromium, iron, manganese, thallium, and vanadium) exceeded the SSSLs; however, all the concentrations of these metals were within background screening values. Selenium exceeded background screening values at all sample locations except for PPMP-229-

GP01. Mercury exceeded background screening values at PPMP-229-GP02 and PPMP-229-GP05; however, both concentrations were below the SSSLs. Ten SVOCs were detected in one subsurface soil sample. PPMP-229-GP05 had a detectable concentration of benzo(a)pyrene exceeding the SSSL.

Groundwater was sampled from the six temporary wells at the Fill Area Northwest of Reilly Airfield. Seventeen metals were detected in the groundwater samples collected. The concentrations of five metals (aluminum, barium, iron, manganese, and vanadium) exceeded both the SSSLs and background screening values. Chromium (detected in the sample collected from location PPMP-229-GP02) was detected at a level exceeding the SSSL but was within the background screening value. Calcium, potassium, and sodium were detected at concentrations exceeding background screening values but below SSSLs. Metals exceeding background screening values and the SSSLs in groundwater samples collected from PPMP-229-GP02 are attributed to elevated levels of turbidity at the time of sample collection.

One explosive compound (RDX) was detected at levels exceeding the SSSL from two groundwater samples collected at PPMP-229-GP01 and PPMP-229-GP05. The groundwater sample collected from location PPMP-229-GP01 had detectable concentrations of the SVOCs 1,4-dichlorobenzene and naphthalene exceeding the SSSLs.

Sixteen VOCs were detected in the groundwater samples collected. Thirteen of the 16 VOCs were detected in the groundwater sample collected from location PPMP-229-GP01. Naphthalene and 1,4-dichlorobenzene were present at concentrations that exceeded the SSSLs. The remaining five sample locations contained six or less of the VOCs detected. Vinyl chloride was present at a concentration exceeding the SSSL in the sample collected from PPMP-229-GP07. Three VOCs (1,4-dichlorobenzene, naphthalene, and vinyl chloride) were detected at concentrations exceeding the SSSLs.

Ten metals were detected in the three surface water samples collected. None of the detected metal concentrations exceeded the SSSLs. The concentration of five metals (aluminum, barium, iron, manganese, and mercury) detected in the three surface water samples exceeded the ESVs but were within background screening values.

Twenty metals were detected in the sediment samples collected. The sediment samples collected from location PPMP-229-SW/SD01 had detectable concentrations of all 20 of the metals detected. The sediment sample collected from location PPMP-229-SW/SD02 had detectable concentrations of 19 of the 20 metals detected and the sample collected from location

PPMP-229-SW/SD03 had detectable concentrations of 17 of the 20 metals detected. Cadmium, cobalt, copper, and nickel concentrations detected in the sediment sample collected from location PPMP-229-SW/SD01 and the nickel concentration detected in the sediment sample collected from location PPMP-229-SW/SD02 exceeded the background screening values and the ESVs. The lead concentration detected in the sediment sample collected from location PPMP-229-SW/SD01 exceeded the ESV but was within the background screening value.

10.1.2.2 EE/CA Fill Area Definition

Thirteen exploratory trenches were excavated at the Fill Area Northwest of Reilly Airfield to characterize and determine the horizontal and vertical extent of the fill material. Trenches were excavated to depths ranging from 6 to 15 feet bgs. Trench logs do not indicate the presence of groundwater in the trenches. Trenches T229-1 and T229-3 were combined into one large trench due to the proximity of the two trenches. Trench locations T229-1, T229-3, T229-4, T229-6, T229-7, T229-11, T229-12, and T229-13 were placed to characterize the geophysical anomalies. Trench locations T229-2, T229-5, T229-8, T229-9, and T229-10 were used to characterize the horizontal extent of the fill area.

Fill material observed in the 13 trenches included scrap metal, glass bottles, bricks, yellow orange silt and clay, wood, ash, coal, tires, light bulbs, aluminum car body trim, broken plates, leather shoes, newspaper, steel piping, rebar, door parts, crushed steel drums, medical bottles and tubing, and bones. Glass medical bottles were observed in Trench T229-7, T229-10, and T229-13; and syringes were observed in Trench T229-7. Eighteen practice hand grenades and 7 test tubes were observed in Trench T229-9. Intravenous medical tubing was observed in Trench T229-12. During trenching at T229-13, a practice A57 armor piercing round was encountered. FTMC Transition Force confirmed that it was an inert practice round. All the trenches contained varying amounts of steel/metal material, which correspond to the varying concentrations of 'buried metal" anomalies shown in the geophysics report. The anomalies shown as "elevated conductivity" on the geophysical report correspond to the trenches containing varying amounts of disturbed clay and low amounts of metal material.

Based on the results of the exploratory trenching at the Fill Area Northwest of Reilly Airfield, the horizontal extent of the Fill Area has been redefined. The area of fill covers approximately 5.87 acres. Two borings were installed to depths of 10 and 12 feet bgs at the Fill Area Northwest of Reilly Airfield and two fill material samples were collected.

Twenty-two metals were detected in the fill material samples collected. The fill material sample collected from location FA-229-SB01 contained all the detected metals and the fill material

sample collected from location FA-229-SB02 contained 18 of the 22 metals detected. The concentrations of six metals (aluminum, arsenic, chromium, iron, thallium, and vanadium) exceeded the SSSLs; however, with the exceptions of aluminum, chromium, iron, and vanadium detected in the fill material sample collected from location FA-229-SB02, the concentrations of these metals were within background screening values.

IT has estimated the vertical and horizontal extent of fill material at the Fill Area Northwest of Reilly Airfield based on information gathered from previous site investigations and trenching and boring activities discussed in this report. The fill area covers approximately 5.87 acres. The average depth of fill material estimated from the trench and boring log data is approximately 8 feet bgs.

10.1.3 Structures/Topography

The mapped area of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), covers approximately 5.87 acres. The site elevation is approximately 740 feet above msl, and the ground slopes to the north-northeast toward Reilly Lake. The northeast corner of the site is approximately 600 feet from Reilly Lake. The northwest corner of the site is approximately 1,400 feet from Reilly Lake. The site is due west of Reilly Lake, with wetlands located north, northeast, and east of the fill area. The south and west boundaries are access roads to the area.

Refuse and other evidence of past disposal practices are evident along the steep slope (approximately 10 feet downslope) adjacent to the wetland area. Numerous mounds are present in the south-central portion of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), which are the result of historical landfilling activities that have taken place at the site. IT observed various pieces of broken glass, brick, and concrete throughout the site. This site has been graded and covered with fill material, so that no native topsoil remains. Adjacent to the northeastern boundary is an escarpment, with a vertical drop of approximately 40 feet. An unnamed intermittent stream is located at the foot of the escarpment flowing north beyond the parcel and eventually into the creek that flows from Reilly Lake. This intermittent stream is fed from diverted runoff from Landfill No. 4, Parcel 81(5), and the Industrial Landfill, Parcel 175(5), through a storm drain under Reilly Airfield. Surface water drains to the north-northeast into the wetlands area.

10.1.4 Hydrogeology

Six temporary groundwater monitoring wells were installed at the Fill Area Northwest of Reilly Airfield, Parcel 229(7). These wells were drilled into the clays, silts, and sandy clays of the Cambrian Conasauga Formation (Figure 2-2). The depth to groundwater was measured in the

six temporary wells in March 2000. A potentiometric surface map is presented on Figure 2-3. The western portion of the site shows a westerly gradient. The remainder of the site has a northern groundwater gradient that is locally diverted to the northeast by the drainage/creek bed northeast of the site. This creek or drainage flows north to the creek that exits Reilly Lake. Groundwater was observed in Trench T229-7.

Depth to groundwater ranges from 9.6 to 23.4 feet bgs. Water level measurements from the March 2000 monitoring event indicate groundwater elevations that range from 718.15 to 734.22 feet above msl (Figure 2-3). The hydraulic gradient based on the data on Figure 2-3 ranges from .04 to .06 ft/ft.

10.1.5 Surrounding Land Use and Populations

The area of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), is heavily wooded and covered with trees, shrubs, and vines. No active use of the area has been observed, and the area is designated as passive recreational in current base reuse planning documents. There are no buildings or structures within the site boundaries. For the streamlined risk assessment, the primary reuse exposure scenario will be recreational use, with the secondary reuse scenario being residential to provide a comparison. The southwestern corner of the site may be included within a highway right of way that joins the Eastern Bypass and will provide access to the McClellan Industrial Park.

10.1.6 Sensitive Ecosystems

The ecological setting of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), is defined by previous land uses (i.e., landfilling) and the land use of the surrounding area. The habitats vary according to local topography, soils, and ecological successional stage. The original ecological setting has been altered through historical anthropogenic activities. Consequently, the topography and resultant habitat types may not be characteristic of similar areas that have not been altered by man. There are no permanent aquatic features within the southern upland portion of the site. The northeastern boundary of the site is adjacent to a number of streams and forested wetlands that form the headwaters of Reilly Lake. A more complete description of the Fill Area Northwest of Reilly Airfield environmental setting is included in Section 10.3.1.

10.1.7 Analytical Data

The summary tables for the Fill Area Northwest of Reilly Airfield, Parcel 229(7), identify compounds that exceed the screening criteria as defined in the *Human Health and Ecological Screening Values, and PAH Background Summary Report* (IT, 2000a) and the *Final Background Metals Survey Report, FTMC, Alabama* (SAIC, 1998). Appendix A provides a summary of

detected compounds in samples collected at the site and compares analyte concentrations against background values (for metals), SSSL, and ESV for the various sample media collected at the site. Metals exceeding both the background threshold limit (two times background) as well as SSSLs and organic compounds that exceed the SSSLs are summarized for each sample medium in Table 10-1. The Streamlined Human Health and Ecological Risk Assessment (Sections 10.2 and 10.3, respectively) will address the potential for human health risks posed by any identified chemicals of potential concern.

10.1.8 Potential Source of Contaminants

The location of the fill material in the Fill Area Northwest of Reilly Airfield, Parcel 229(7), was interpreted from the geophysical data (Figure 10-2) and from the trench excavations completed by IT in support of the EE/CA. The detail map on Figure 10-1 incorporates all of the historical and recent data in defining the extent of waste at the site.

Thirteen exploratory trenches were excavated at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), to characterize and determine the horizontal and vertical extent of the fill material. Fill material observed in the 13 trenches included scrap metal, glass bottles, bricks, yellow orange silt and clay, wood, ash, coal, tires, light bulbs, aluminum car body trim, broken plates, leather shoes, newspaper, steel piping, rebar, door parts, crushed steel drums, medical bottles and tubing, and bones. Glass medical bottles were observed in Trenches T229-7, T229-10, and T229-13; and syringes were observed in Trench T229-7. Eighteen practice hand grenades and 7 test tubes were observed in Trench T229-9. Intravenous medical tubing was observed in Trench T229-12. During trenching at T229-13 a practice A57 armor piercing round was encountered; FTMC Transition Force confirmed that it was an inert practice round. All the trenches contained varying amounts of steel/metal material, which correspond to the varying concentrations of "buried metal" anomalies shown in the geophysics report. Field notes did not indicate the presence of groundwater. Two of the trenches included moisture content within the excavated materials that ranged from very moist to saturated according to the on site geologist. The two trenches were excavated to a termination depth of 11 and 12 feet bgs.

The analytical data indicate that several metals were detected in both soil and groundwater at concentrations exceeding the residential human health SSSLs. One explosive compound (RDX) was detected in two of the groundwater samples at concentrations (0.0045 mg/L and 0.0043 mg/L) exceeding the SSSL (0.00066 mg/L).

The concentrations of dichlorobenzene and naphthalene, which were quantified as both a VOC and a SVOC, exceeded the SSSLs in the groundwater sample collected at location PPMP-229-

Table 10-1

Site Investigation Analytical Data Summary
Fill Area Northwest of Reilly Airfield, Parcel 229(7)
Fort McClellan, Alabama

Medium Sampled	Metals	VOCs	SVOCs	Pesticides	Explosives	Herbicides	PCBs
Surface and Depositional Soil	Mn > BKG and SSSLs	1,2-Dimethylbenzene, Ethylbenzene, m,p-Xylenes > SSSL	ND	< SSSLs	ND	ND	ND
Subsurface Soil	< BKG and SSSLs	< SSSLs	Benzo(a)pyrene > SSSL	< SSSLs	ND	ND	ND
Sediments	< BKG and SSSLs	< SSSLs	< SSSLs	ND	ND	ND	ND
Fill Material	Al, Cr, Fe, V > both BKG and SSSL values	< SSSLs	< SSSLs	< SSSLs	ND	< SSSLs	ND
Groundwater	Al, Ba, Fe, Mn, V > both BKG and SSSL values	Vinyl chloride, 1,4-Dichlorobenzene, Naphthalene > SSSL	1,4-Dichlorobenzene, Naphthalene > SSSL	< SSSLs	RDX > SSSL	< SSSLs	ND
Surface Water	< BKG and SSSLs	ND	ND	ND	ND	ND	ND

Al - aluminum
Ba - barium
BKG - Background
Cr - chromium
Fe - iron
Mn - manganese
NA - not analyzed
ND - not detected
PCB - polychlorinated biphenyl
RDX - cyclonite
SSSL - site specific screening level
SVOC - semivolatile organic compound
V - vanadium
VOC - volatile organic compound

GP01. Additionally, vinyl chloride was detected in one groundwater sample (PPMP-229-GP07) at a concentration (0.00068 mg/L) exceeding the SSSL (0.00005 mg/L). Although the dichlorobenzene and vinyl chloride results exceeded the SSSLs, the concentrations of these compounds were below EPA maximum contaminant levels (MCL) for drinking water. MCLs for naphthalene and RDX are not available.

10.2 Streamlined Human Health Risk Assessment

Media evaluated at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), include surface soil, surface water, sediment, and groundwater. The recreational site-user and resident were the receptor scenarios selected as the most appropriate for the current and future land use at the Fill Area Northwest of Reilly Airfield. The CSEM for this parcel is provided on Figure C-7. SRA tables, figures, and attachments are found in Appendix C.

10.2.1 Surface Soil

Nine surface soil samples ranging in depth from 0-1 foot bgs were collected in February, March, and April 1999. Seven of the surface soil samples were analyzed for metals, SVOCs, VOCs, explosives, PCBs, chlorinated and organophosphorous pesticides, and chlorinated herbicides. The two samples collected from location PPMP-229-GP04 were analyzed for these same parameters, but the organophosphorous pesticide analysis was performed at a later date (Table C7-1).

Several metals, four pesticides, and many VOCs were detected (Table C7-2). Following the screen against background concentrations and the elimination of nutrients, only selenium, the pesticides, and the VOCs were carried forward to the COPC selection process.

Table C7-3 presents the results of the COPC selection process for the recreational site-user and resident receptors. None of the site-related chemicals in surface soil were identified as COPC for this parcel for either receptor following a comparison of the maximum detected concentrations to the receptor-specific, soil SSSLs.

10.2.2 Surface Water

Three surface water samples were collected at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), in February 1999 (Table C7-4). All three samples were analyzed for metals, SVOCs, VOCs, PCBs, chlorinated and organophosphorous pesticides, chlorinated herbicides, and explosives.

Table C7-5 presents the results of the selection of site-related chemicals in surface water at the Fill Area Northwest of Reilly Airfield, Parcel 229(7). Ten metals were the only constituents detected. Following a comparison to background concentrations and the elimination of essential nutrients, mercury was the only metal that was carried through to the COPC selection process. Mercury was not detected in the surface water samples collected during the background study (SAIC, 1998)

The site-related concentration of mercury was below the surface water SSSLs for both the recreational site-user and the resident (Table C7-6). Therefore, mercury was not identified as a COPC in surface water for this parcel.

10.2.3 Sediment

Five sediment samples were collected from three sample locations at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), in February and April 1999 (Table C7-7). The samples were taken from a depth of 0 to 1 foot bgs. Three samples were analyzed for metals, SVOCs, VOCs, explosives, PCBs, chlorinated and organophosphorous pesticides, and chlorinated herbicides. Two samples were analyzed only for organophosphorous pesticides.

Nineteen metals and one VOC were detected in sediment (Table C7-8). Following a comparison to background concentrations and the elimination of nutrients, eight metals (barium, beryllium, cadmium, cobalt, manganese, nickel, selenium, and zinc) and one VOC (p-cymene) were carried forward to the COPC selection process.

The site-related chemicals were compared to receptor-specific, sediment SSSLs. Results are presented in Table C7-9. None of the MDCs for the site-related chemicals exceeded the sediment SSSLs for the recreational site-user or the resident; therefore, no COPCs were selected for sediment.

10.2.4 Groundwater

Six groundwater samples were collected from six sample locations at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), in March 1999 (Table C7-10). All of the groundwater samples were analyzed for metals, SVOCs, VOCs, explosives, PCBs, chlorinated and organophosphorous pesticides, and chlorinated herbicides.

Fifteen metals, one explosive compound, one chlorinated pesticide, five SVOCs, and fifteen VOCs were detected in groundwater (Table C7-11). Following a comparison to background

concentrations and the elimination of nutrients, six metals (aluminum, barium, chromium, iron, nickel, and vanadium), and all the organics were carried forward to the COPC selection process.

The site-related chemicals were compared to the resident, groundwater SSSLs. Results are presented in Table C7-12. Five metals (aluminum, barium, chromium, iron, and vanadium), one explosive compound (RDX), and three VOCs (1,4-dichlorobenzene, naphthalene, and vinyl chloride) were selected as COPC. Vinyl chloride, RDX, and 1,4-dichlorobenzene were selected based upon their cancer risks; all other COPC were selected based upon their noncancer effects.

It should be noted that naphthalene was analyzed by methodologies for VOCs as well as for SVOCs. Generally, the results from the method showing the lower reporting limits are used in the risk assessment, since the lower reporting limits reflect greater accuracy at the lower concentrations at which environmental concentrations are generally encountered. Reporting limits for naphthalene for the VOC method are approximately an order of magnitude lower than those for the SVOC method, suggesting the VOC method may be expected to be more accurate. In this case, however, the MDC from the VOC method was "J" qualified, indicating that the result was estimated and that there was significant uncertainty about the value returned. The results from the SVOC method, however, exceeded the reporting limit and were not accompanied by qualifiers, indicating maximum confidence in the values. For this reason the naphthalene results from the SVOC method rather than the VOC method were used in the SRA.

Table C7-13 presents the HI and ILCR estimates for the resident exposed to groundwater through ingestion, inhalation, and dermal contact. The resulting ILCR for the COPC with cancer risk is 3E-5, within the generally accepted risk range of 1E-6 to 1E-4. However, the resulting HI for the resident exposed to groundwater is 14. Iron contributes most to the overall HI (HI = 10), but as discussed above, the oral RfD for iron is considered unreliable and iron is not selected as a COC. Also, iron was probably selected as a COPC because its apparent concentration was exaggerated by high turbidity in the groundwater samples. Further discussion of iron is presented within the iron toxicological profile (IT, 2000a). Naphthalene, with an HI of 2.2, is the second highest contributor to the overall HI.

With an HI greater than 1, the noncancer COPC are broken down by the target organ affected by each chemical. The noncancer target organ table is presented in Table C7-14. Only those chemicals affecting target organs with HIs greater than 1 are considered to be COC; therefore, the resulting COC for groundwater is limited to naphthalene, which had an HI of 2.2. Therefore, naphthalene in groundwater is the primary noncancer hazard driver. Table C7-15 presents the RGOs for naphthalene in groundwater.

10.2.5 Uncertainty Analysis

Subsurface soil was not evaluated for this human health SRA. If land use or receptor scenarios differing from those evaluated herein for the Fill Area Northwest of Reilly Airfield, Parcel 229(7), occur or are anticipated to occur, further evaluation of risk and hazard may be necessary. Specifically, if construction work is conducted at this site that may result in exposure to subsurface soil, then risks and hazards associated with this site may need to be revisited.

10.2.6 SRA Conclusion

No site-related contaminants in surface soil, surface water, or sediment at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), pose a cancer risk or noncancer hazard to the resident or recreational site-user. It appears that naphthalene in groundwater does present a noncancer hazard to the resident (Table C7-16). It should be noted, however, that the STC for naphthalene of 6.6E-2 mg/L is below the EPA (2000) Lifetime Health Advisory of 1E-1 mg/L. Furthermore, the target organ for the effects of naphthalene, the erythrocyte, is not shared by other contaminants in other media at the site. It is concluded that the likelihood of adverse health effects from exposure to naphthalene in groundwater is low.

10.3 Screening-Level Ecological Risk Assessment

This section presents the SLERA for Parcel 229(7).

10.3.1 Environmental Setting

The ecological setting of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), is defined by previous land uses (i.e., landfilling) and the land use of the surrounding area. The habitats vary according to local topography, soils, and ecological successional stage. The original ecological setting has been altered through historical anthropogenic activities. As such, the topography and resultant habitat types may not be characteristic of similar areas that have not been altered by man.

The Fill Area Northwest of Reilly Airfield, Parcel 229(7), is located in the northwest corner of the Main Post and encompass a total area of approximately 6 acres. The northern boundary of this area is a forested wetland area and the drainage from Reilly Lake. The eastern boundary of this area is mixed coniferous/deciduous forest, the southern boundary is asphalt road and Reilly Airfield, and the western boundary is asphalt road and mixed coniferous/deciduous forest.

The topography of the southern portion of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), is mostly flat with a steep slope near the northern boundary of the site, which abuts the

forested wetland. Refuse and other evidence of past disposal practices are evident along the steep slope adjacent to the wetland area. Numerous mounds are present in the south-central portion of the site, which are the result of historical landfilling activities that have taken place at the site.

Terrestrial habitat at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), is comprised of mixed coniferous/deciduous forest transitioning to a mixed deciduous forest. The southern portion of the site is the location of the majority of the historical fill material. The historical fill area and the steep embankment are best characterized as mixed deciduous forest with many of the vegetative species characteristic of disturbed land. Some of the tree species commonly found in this area include tulip tree (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), mockernut hickory (*Carya tomentosa*), white oak (*Quercus alba*), scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus prinus*), and red maple (*Acer rubrum*). The dominant understory species of this area are flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginia*), and sourwood (*Oxydendrum arboreum*). The shrub layer is dominated by southern low blueberry (*Vaccinium pallidum*), southern wild raisin (*Viburnum nudum*), and yellowroot (*Xanthorhiza simplicissima*). Numerous muscadine grape (*Vitis rotundifolia*) vines, greenbriar (*Smilax rotundifolia*) and poison ivy (*Toxicodendron radicans*) are also present in this area.

The lowland mixed deciduous forest which is located north (and outside the site boundary) of the steep embankment is characteristic of a ravine or stream floodplain. This area may be inundated during periods of significant rainfall and contains vegetative species indicative of wetlands. Some of the plant species most commonly found in this lowland, mixed deciduous forest include American beech (*Fagus grandifolia*), tulip tree (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), red maple (*Acer rubrum*), white oak (*Quercus alba*), American holly (*Ilex opaca*), pignut hickory (*Carya glabra*), sweetgum (*Liquidambar styraciflua*), common persimmon (*Diospyros virginiana*), and redbud (*Cercis canadensis*).

There are no permanent aquatic features within the southern upland portion of the Fill Area Northwest of Reilly Airfield, Parcel 229(7). However, the northern portion of the site contains a number of streams and forested wetlands that form the headwaters of Reilly Lake. The vegetation of forested wetlands is dominated by willow oak (*Quercus phellos*), overcup oak (*Quercus lyrata*), swamp oak (*Quercus bicolor*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), hackberry (*Celtis laevigata*), American elm (*Ulmus procera*), and tulip tree (*Liriodendron tulipifera*). The understory is characterized by box elder (*Acre negundo*), ironwood (*Carpinus caroliniana*), and alder (*Alnus spp.*).

In general, the terrain at FTMC supports large numbers of amphibians and reptiles. Jacksonville State University has prepared a report titled *Amphibians and Reptiles of Fort McClellan, Calhoun County, Alabama* (Cline and Adams, 1997). The report indicated that surveys in 1997 found 16 species of toads and frogs, 12 species of salamanders, 5 species of lizards, 7 species of turtles, and 17 species of snakes. Typical inhabitants of the upland areas surrounding the site are copperhead (*Agkistrodon contortix*), king snake *(Lampropeltis getulus*), black racer (*Coluber constrictor*), fence lizard (*Sceloporour undulatus*), and six-lined racerunner (*Cnemidophorous sexlineatus*).

Terrestrial species that may inhabit the upland areas of the Fill Area Northwest of Reilly Field, Parcel 229(7), include opossum, short-tailed shrew, raccoon, white-tail deer, red fox, coyote, gray squirrel, striped skunk, a number of species of mice and rats (e.g., white-footed mouse, eastern harvest mouse, cotton mouse, eastern woodrat, and hispid cotton rat), and eastern cottontail. Approximately 200 avian species reside at FTMC at least part of the year (ACOE, 1997). Common species expected to occur in the vicinity of the Fill Area Northwest of Reilly include northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottus*), warblers *(Dendroica spp.*), indigo bunting (*Passerina cyanea*), red-eyed vireo (*Vireo olivaceus*), American crow (*Corvus brachyrhynchos*), bluejay (*Cyanocitta cristata*), several species of woodpeckers (*Melanerpes spp., Picoices spp.*), and Carolina chickadee (*Parus carolinensis*). Game birds present in the vicinity of the site may include northern bobwhite (*Colinus virginianus*), mourning dove (*Zenaida macroura*), and eastern wild turkey (*Meleagris gallopavo*). Woodland hawks (e.g., sharp-shinned hawk) were observed in this area during the ecological investigation (September, 2000) and are expected to use this area for a hunting ground. A variety of other raptors (e.g., red-tailed hawk, barred owl, and great horned owl) could also use portions of this area for a hunting ground, particularly the fringe area where the forested areas abut roads and cleared areas. Because of the presence of the wetland area in the northern portion of the site, piscivorous bird species may also be present in the vicinity of the Fill Area Northwest of Reilly Airfield. These piscivorous birds may include great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), and belted kingfisher (*Ceryle alcyon*).

The wetland area in the northern portion of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), provides habitat for muskrat, beaver, and other aquatic mammals. This wetland area and the adjoining streams provide moderate quality gray bat foraging habitat. Two major requirements for gray bat foraging habitat are contiguous forest cover and habitat for aquatic insects (one of the gray bat's preferred dietary items). These two requirements are met by the

wetland area and adjoining streams; therefore, gray bats could be expected to utilize these areas for foraging.

Although shallow (less than one foot deep) and narrow (1-to-2 feet wide) in the areas closest to the fill area, these streams widen and deepen as they flow towards the northwest border of the Base. This creek and the associated wetlands have the potential to support a variety of amphibious species and some small fish species. Bullfrog *(Rana catesbeiana)* and leopard frog (*Rana sphenocephala*) are examples of amphibians that may be found in the streams in the vicinity of the site. Fish species that may be found in the streams in the vicinity of the site include blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), stoneroller (*Campostoma anomalum*), striped shiner (*Luxilus chrysocephalus*), and various darters (*Etheostoma spp.*).

10.3.2 Chemicals Detected

Chemicals detected in soil, sediment, and surface water at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), are summarized in Appendix A.

10.3.3 Chemicals of Potential Ecological Concern

COPECs are those constituents whose maximum detected concentrations exceed their respective ESVs. The COPECs that have been identified at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), are the following:

- Surface Soil –mercury, selenium, 1,2-dimethylbenzene, ethylbenzene, and m,p-xylenes
- Surface Water –mercury
- Sediment –barium, beryllium, cadmium, cobalt, copper, manganese, nickel, and selenium.

10.3.4 SLERA Uncertainty Analysis

Surface soil at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), exhibited concentrations of the following site-related constituents that exceeded their respective ESVs (Table D-18): mercury, selenium, 1,2-dimethylbenzene, ethylbenzene, and m,p-xylenes. The volatile organic compounds were all detected infrequently (one out of eight samples), and at relatively low concentrations (mean HQ values ranged from 0.38 to 1.95). The mean HQ values for mercury and selenium were 0.86 and 1.07, respectively. Because of the relatively low quality of the terrestrial habitat provided by the historical fill area and the relatively small exceedance of the

ESVs, constituents in soil at the Fill Area Northwest of Reilly Airfield most likely do not pose significant ecological risks to the terrestrial habitats at the site.

Three surface water samples from the wetland north of the Fill Area Northwest of Reilly Airfield, Parcel 229(7), exhibited mercury concentrations greater than the ESV (Table D-19). It should be noted, however, that these detected concentrations were all less than the reporting limit for mercury, thus these results were not reported with a full level of confidence. The maximum and mean HQ values for mercury in surface water were both less than ten. Because of the low level of confidence in the reported mercury concentrations in surface water and the relatively low HQ values, it could be concluded that constituents in surface water at the Fill Area Northwest of Reilly Airfield do not pose significant ecological risk to aquatic or terrestrial communities at FTMC.

Barium, beryllium, cadmium, cobalt, copper, manganese, nickel, and selenium exceeded their ESVs in sediment in the wetland north of the site (Table D-20). Because these HQs are all less than ten and most of these constituents do not appreciably bioaccumulate, constituents in sediment most likely do not pose significant ecological risk. The various lines-of-evidence used to draw these conclusions are presented in Table D-29.

10.3.5 SLERA Conclusions

Terrestrial habitat at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), consists of mixed coniferous/deciduous forest transitioning to a mixed deciduous forest. The southern portion of the Fill Area Northwest of Reilly Airfield is the location of the majority of the historical fill material. The historical fill area and the steep embankment are best characterized as mixed deciduous forest with many of the vegetative species characteristic of disturbed land. The lowland mixed deciduous forest which is located north of the steep embankment is characteristic of a ravine or stream floodplain. This area may be inundated during periods of significant rainfall and contains vegetative species indicative of wetlands. There are no permanent aquatic features within the southern upland portion of the Fill Area Northwest of Reilly Airfield. However, the northern portion of the Fill Area Northwest of Reilly Airfield contains a number of streams and forested wetlands that form the headwaters of Reilly Lake.

Surface soil at the Fill Area Northwest of Reilly Airfield exhibited concentrations of the following constituents that exceeded their respective ESVs (Table D-18): mercury, selenium, 1,2-dimethylbenzene, ethylbenzene, and m,p-xylenes. Three surface water samples from the wetland north of the Fill Area Northwest of Reilly Airfield exhibited mercury concentrations greater than the ESV (Table D-19). Barium, beryllium, cadmium, cobalt, copper, manganese,

nickel, and selenium exceeded their ESVs in sediment in the wetland north of the Fill Area Northwest of Reilly Airfield (Table D-20).

Although the maximum detected concentrations of a number of constituents exceed their respective ESVs in surface soil (Table D-18) surface water (Table D-19), and sediment (Table D-20) at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), additional lines-of-evidence suggest that these COPECs may not pose significant risks to the terrestrial or aquatic ecosystems at Fort McClellan. These COPECs (Table D-28) have been identified through a very conservative screening process that utilizes ESVs based largely on NOAELs from the scientific literature and maximum detected constituent concentrations. If additional lines-of-evidence are considered, it could be concluded that there are no COPECs in surface soil, surface water, or sediment. If, based on a risk management decision, the potential ecological risks at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), are determined to be "unacceptable" at this screening-level stage, then a BERA is appropriate. The goal of the BERA, if deemed necessary, will be to reduce the levels of uncertainty and conservatism in the assessment process and to determine the potential for ecological risk at the Fill Area Northwest of Reilly Airfield, Parcel 229(7), through a number of lines of evidence.

10.4 Recommendations

Based on the results of the field investigations, the current and proposed future land use, and the results of the risk assessments completed for Fill Area Northwest of Reilly Airfield, Parcel 229(7), the recommended remedy under CERCLA is No Further Action.

To facilitate reuse of the property, the Army proposes, but is not limited to, several non-CERCLA actions for this site. These proposals are presented in Attachment 2.

11.0 Fill Area at Range 30, Parcel 231(7)

11.1 Site Location

The Fill Area at Range 30, Parcel 231(7), is located in the north-central portion of the Main Post, east-southeast of Reilly Airfield (Figure 2-1). This parcel fronts an unnamed paved road east of the northern end of 10th Street near Reilly Airfield and lies between two unimproved dirt roads. The size of the fill area could not be determined from the EPIC report; however, it was originally estimated to be about 6 acres. Current estimates of the actual fill area are closer to 3.9 acres (Figure 11-1), based on trenching, field observation, and sampling efforts.

11.1.1 Facility Type and Operational Status

The original CERFA parcel, defined as Fill Area at Range 30, Parcel 231(7), covers approximately 23 acres (EPA, 1990b). The dates of operation for Range 30 could not be determined; however, the area is visible on aerial photographs from 1949, 1954, 1961, 1972, and 1982. On the basis of interviews conducted with Main Post personnel, it appears the range was deactivated between 1983 and 1989. There is no available documentation of fill areas or disposal practices at the site. Photographic signatures, resembling large linear north-south trending mounds, are present in the central portion of the site. Smaller mounds are present at other locations within the parcel. Several piles of construction debris are present along both sides of an unimproved road that traverses the southern portion of the site. Because of the dense vegetation, it could not be determined whether these piles correspond with the mounds identified in the EPIC report photographs (ESE, 1998).

IT did not observe the large linear mounds noted in the EPIC report during a site visit in June 1998. A seep was noted in the southern part of the fill area (Figure 11-1). An intermittent stream (dry in June 1998), originates on the slope southeast of the fill areas flows to the north along the eastern boundary, and crosses underneath the paved road at the northernmost point of the site. The far southern portion of the Fill Area at Range 30, Parcel 231(7), is graded soil without any grass or shrubs. During wet periods, a portion (approximately 20 by 20 feet) of the unimproved road in the southwestern portion of the fill area is covered by a shallow pond.

The site falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC *Archive Search Report Maps* (USACE, 1999b).

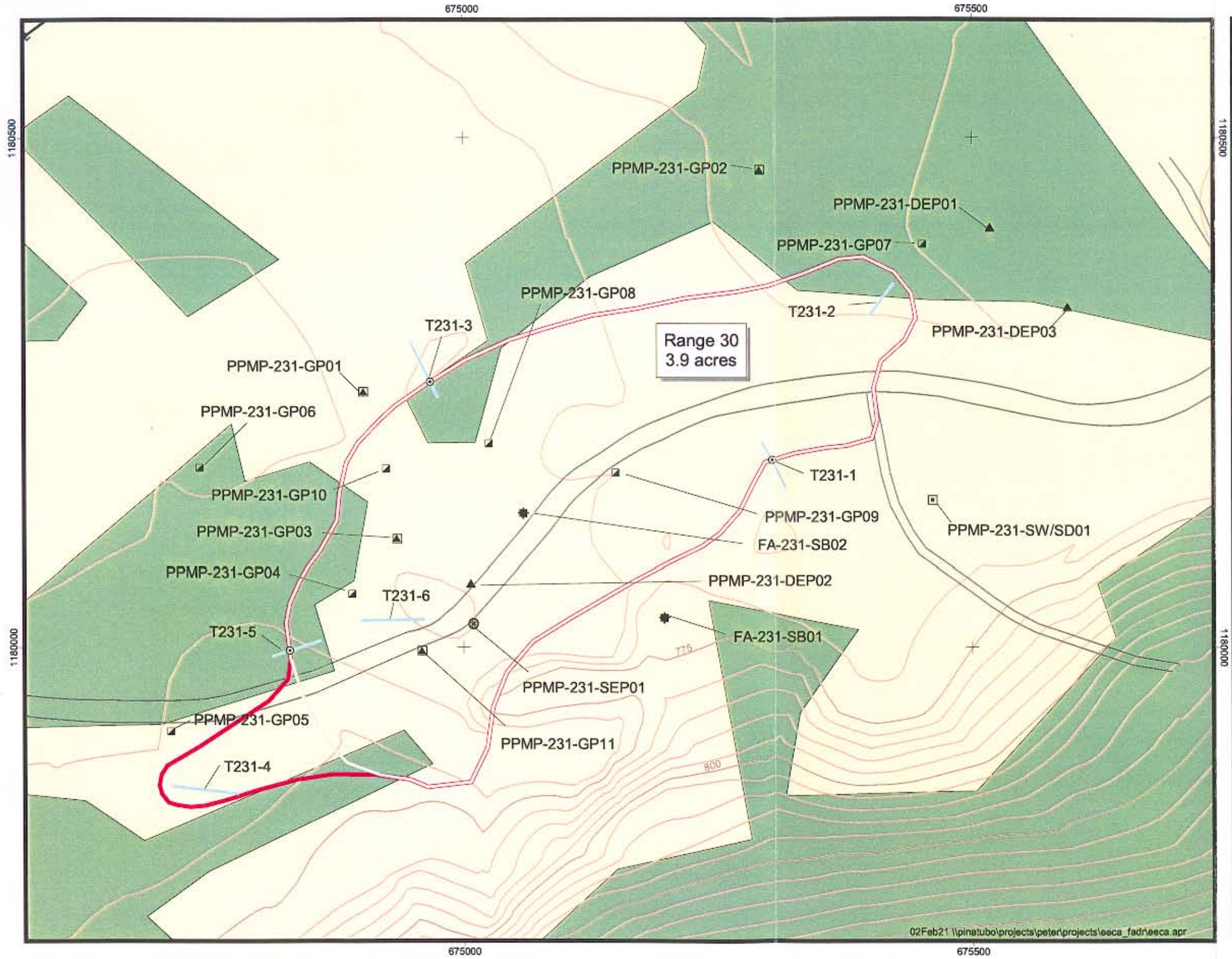

Figure 11-1

Detail Map
Fill Area at Range 30, Parcel 231(7)

- Fill Boundary Observed within Trench Excavations
- Depositional Soil Sample Location
- Subsurface Soil Sample Location
- Groundwater, Surface and Subsurface Soil Sample Location (well)
- Surface and Subsurface Soil Sample Location
- Seep Water Sample Location
- Surface Water/ Sediment Sample Location
- Electric Utility
- Exploratory Trench
- Improved Roads
- 5' Topographic Contours
- Fill Boundary
- CERFA Parcel
- Wooded
- Lawn/Cleared Area

0 100 200

State Plane feet, NAD83

N

August 2001

U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

IT CORPORATION
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11.1.2 Previous Work

A brief history of environmental work conducted at the landfill includes the following:

- Site-Specific Field Sampling Plan (IT, 1998c)
- Site Investigation and Fill Area Definition Report (IT, 2001a).

11.1.2.1 Investigation

Eleven soil borings and four temporary groundwater monitoring wells were installed as part of the SI conducted by IT at the Fill Area at Range 30. Based on the SI soil boring locations, boring PPMP-231-GP01 appears to have been the only boring drilled in fill material. The boring log for PPMP-231-GP01 indicates plastic sheeting was found in the split-spoon sampler at approximately 19 feet to 40 feet bgs. Based on the depth of plastic encountered, it is believed that the plastic sheeting was dragged down from an upper horizon to a deeper depth by the hollow-stem auger. The actual depth of plastic encountered at location PPMP-231-GP01 is not known. Fill material was not observed in any other boring installed during the SI at the Fill Area at Range 30.

Surface soil samples were collected from eleven locations and depositional soil samples were collected from three locations at the Fill Area at Range 30. Six pesticides were detected in the surface soil samples collected. Pesticides 4,4'-DDE and 4,4'-DDT were detected above ESVs in the surface soil samples collected from PPMP-231-GP02 and PPMP-231-GP08. The surface soil sample collected from PPMP-231-GP08 also contained endrin ketone and delta-BCH; however, the reported concentrations did not exceed the SSSLs or ESVs. The surface soil sample collected from location PPMP-231-GP07 also had a detectable concentration of aldrin and endosulfan sulfate.

Twenty-two metals were detected in the surface and depositional soil samples collected. Fourteen exceeded background screening values in various samples. Of those, three metals (arsenic, iron, and vanadium) also exceeded the SSSLs and ESVs in the surface soil sample collected from location PPMP-231-GP01. Three of the metals (lead, mercury, and selenium) exceeded the ESVs but not the SSSLs.

Sixteen SVOCs were detected in the surface and depositional soil samples collected. Fifteen SVOCs were present in the sample collected from PPMP-231-GP08. The surface soil sample collected from PPMP-231-GP08 had detectable concentrations of benzo(a)pyrene which exceeded both the SSSLs and ESVs. The same sample collected from PPMP-231-GP08 had

concentrations of anthracene, fluoranthene, and pyrene that exceeded the ESVs. No other samples contained SVOCs at concentrations exceeding the SSSLs or ESVs.

Subsurface soil samples were collected for chemical analysis from eleven locations at the Fill Area at Range 30. Subsurface soil samples were collected from various intervals at depths ranging from 4 to 12 feet bgs. Twenty-two metals were detected in the subsurface soil samples collected. The concentrations of arsenic and iron exceeded the SSSLs in all samples collected; however, none of these concentrations exceeded the background screening values. Selenium exceeded the background screening values in ten of the samples collected; however, none of these concentrations exceeded the SSSLs.

Groundwater was sampled from the four temporary wells (PPMP-231-GP01, PPMP-231-GP02, PPMP-231-GP03, and PPMP-231-GP11) at the Fill Area at Range 30. Nineteen metals were detected in the groundwater samples collected. The sample collected from location PPMP-231-GP01 had concentrations of aluminum, arsenic, iron, lead, manganese, thallium, and vanadium exceeding both the background screening values and the SSSLs. The thallium result was flagged with a "B" data qualifier signifying that the compound was also detected in an associated laboratory or field blank. The groundwater sample collected from PPMP-231-GP01 also had concentrations of barium, chromium, and nickel exceeding the SSSLs. In addition, beryllium, cobalt, and copper were detected at concentrations above background screening values, but below the SSSLs. Metals exceeding the SSSLs and background screening values in the groundwater sample collected from PPMP-231-GP01 are attributed to elevated levels of turbidity at the time of sample collection.

Seven metals were detected in the surface water sample collected. The surface water sample collected from location PPMP-231-SW/SD01 had detectable concentrations of aluminum and barium exceeding the ESVs. No other metals exceeded background screening values, SSSLs, or ESVs. Nine metals were detected in a seep sample collected. The seep sample collected from location PPMP-231-SEP01 had detectable concentrations of barium exceeding the ESV and the background screening value.

11.1.2.2 EE/CA Fill Area Definition

IT installed two fill material borings and collected fill samples at locations FA-231-SB01 and FA-231-SB02 in March 2000 to characterize the waste fill. Six exploratory trenches were excavated at the Fill Area at Range 30. A remote-controlled excavator was used for the trenching because of the potential for UXO. Trenches were excavated at depths ranging from 2.5 to 8 feet bgs. Trench logs do not indicate the presence of groundwater in the trenches.

Trench location T231-1 was placed to characterize the southeastern horizontal extent of the fill area and the mounds located in this area. Trench T231-2 was placed to characterize the northeastern horizontal extent of the fill area at this location. Trench T231-3 was placed to characterize the northern horizontal extent of the fill area and the mounds at this location. Trench T231-4 was placed to characterize the western horizontal extent of the fill area and the mounds at this location. Trenches T231-5 and T231-6 were placed to characterize mounds located in the western section of the fill area.

Fill material was not observed in trench T231-3. Fill material was observed in all of the other trenches and included: metal pipes and straps, glass, red bricks, reddish-orange sand and silt, light brown silt, cobbles, black coal, orange/red sand and clay, plastic chip bag, plastic sheeting, beer cans, styrofoam, plastic "Texaco®" oil containers, corrugated pipe, concrete chunks, ceramic pieces, tree limbs, leaves, pine needles, carpet, and plastic trash bags.

Based on the results of the exploratory trenching at the Fill Area at Range 30, the horizontal extent of the fill area has been defined and covers approximately 3.9 acres. Two borings were installed at the Fill Area at Range 30. Fill material boring were installed to a depth of 6 feet bgs. One subsurface soil/fill material samples was collected from each boring.

Eighteen metals were detected in the fill material samples collected. Aluminum, arsenic, iron, and thallium exceeded the SSSLs in both samples. Manganese exceeded the SSSL in the fill material sample collected from FA-231-SB02. Calcium, copper, magnesium, and zinc concentrations exceeded background screening values at both sample locations. Lead and nickel concentrations present in the fill material sample collected from FA-231-SB02 exceeded the background screening values.

IT has estimated the vertical and horizontal extent of fill material at the Fill Area at Range 30 based on information gathered from previous site investigations and trenching and boring activities discussed in this report. The fill area covers approximately 3.9 acres. The average depth of fill material estimated from the trench and boring log data is approximately 4 feet bgs.

11.1.3 Structures/Topography

The Fill Area at Range 30, Parcel 231(7), covers approximately 3.9 acres. The site elevation is approximately 765 feet above msl, and the ground slopes to the northwest. The site is bordered to the south by a hill and heavily wooded area beyond. The area to the north is a cleared area, relatively level with a young growth of trees and shrubs. The area to the west, northeast, and

north is dotted with mounds of soil apparently unloaded from dump trucks. This area is relatively open land with low shrubs.

The Fill Area at Range 30, Parcel 231(7), lies completely within the Conasauga Formation, with the Chilhowee Group found in the hills to the south-southeast (Figure 2-2). The Chilhowee Group makes up the basal group of the sedimentary sequence; the contact between the Chilhowee Group and the Conasauga Formation is defined as a thrust fault. This fault possibly controls groundwater and creates some of the seeps identified south of the site. Surface water was not observed on visits to the site.

11.1.4 Hydrogeology

Four temporary groundwater monitoring wells were installed at the Fill Area at Range 30. Well locations and groundwater elevation contours based on March 2000 water levels are presented on Figure 2-3. Groundwater flow locally funnels to the west-northwest. Groundwater elevations range from 735.28 feet above msl at well PPMP-231-GP11 to 733.58 feet above msl at well PPMP-231-GP03. Well PPMP-231-GP02 just north of the fill area had an elevation of 750.53 feet above msl. The hydraulic gradient across the fill area ranges from 0.02 to 0.03 ft/ft.

11.1.5 Surrounding Land Use and Populations

The Fill Area at Range 30, Parcel 231(7), is bound on the south by a hill and a heavily wooded area. The hill was used as a backstop for range activities. Because Range 30 is an impact area, this area is not designated for recreational use. The reuse plan shows a light industrial use for areas adjacent to the site. The streamlined risk assessment will use a groundskeeper scenario, which is the upper bound for light industrial use. A residential reuse scenario will be considered for comparison purposes.

With the military operation discontinued at the Fill Area at Range 30, Parcel 231(7), no significant human activity occurs at the site. The open fields north, west, and northeast of the fill area have been cut to enhance habitat for wildlife (Figure 11-1).

11.1.6 Sensitive Ecosystems

The ecological setting of the Fill Area at Range 30, Parcel 231(7), is defined by the physical characteristics of the site and the type of habitats that can be supported. The original ecological setting has been altered through historical anthropogenic activities. Consequently, the topography and resultant habitat types are not characteristic of similar areas that have not been altered by man.

The Fill Area at Range 30, Parcel 231(7), is located in the northern section of the Main Post and consists of an undeveloped area approximately 3.9 acres in size, completely surrounded by undeveloped land. The topography of the site is flat except for erosional features and man-made mounds. The man-made mounds are the result of historical land-filling activities that have taken place at the Fill Area at Range 30, Parcel 231(7). Past activities at the range area have resulted in large areas of barren ground and mounding of soil. These barren areas have been subject to significant erosion and gullies have formed where the major erosion has occurred. A dirt road bisects the fill area in a northeast-southwest direction. A steep embankment makes up the southern boundary of the Fill Area at Range 30, Parcel 231(7). A more complete description of the environmental setting is included in Section 11.3.1.

11.1.7 Analytical Data

The summary tables for the Fill Area at Range 30, Parcel 231(7), identify compounds that exceed the screening criteria as defined in the *Human Health and Ecological Screening Values, and PAH Background Summary Report* (IT, 2000a) and the *Final Background Metals Survey Report, FTMC, Alabama* (SAIC, 1998). Appendix A provides a summary of detected compounds in samples collected at the Fill Area at Range 30, Parcel 231(7), and compares analyte concentrations against background values (for metals), SSSLs, and ESVs for the various sample media. Metals that exceed both the background threshold limit (two times background) and the SSSL and organic compounds that exceed the SSSLs are summarized for each sample medium in Table 11-1.

11.1.8 Potential Source of Contaminants

Fill material was observed in five of the six exploratory trenches and included metal pipes and straps, glass, red bricks, reddish-orange sand and silt, light brown silt, cobble, black coal, orange/red sand and clay, plastic chip bag, plastic sheeting, beer cans, styrofoam, plastic "Texaco" oil containers, corrugated pipe, concrete chunks, ceramic pieces, tree limbs, leaves, pine needles, carpet, and plastic trash-bags. Groundwater was not encountered during trenching operations conducted at the Fill Area at Range 30, Parcel 231(7).

On the basis of the two borings drilled through the waste fill, the thickness of fill is approximately 4 feet.

Metals were detected in surface soils, depositional soils, and groundwater samples at concentrations exceeding background values and residential SSSLs.

Table 11-1

Site Investigation Analytical Data Summary
Fill Area at Range 30, Parcel 231(7)
Fort McClellan, Alabama

Medium Sampled	Metals	VOCs	SVOCs	Pesticides	Explosives	Herbicides	PCBs
Surface and Depositional Soil	As, Fe, V > BKG and SSSLs	< SSSLs	Benzo(a)pyrene > SSSL	< SSSLs	ND	ND	ND
Subsurface Soil	< BKG and SSSLs	< SSSLs	< SSSLs	< SSSLs	ND	ND	ND
Sediments	< BKG and SSSLs	< SSSLs	ND	ND	ND	ND	ND
Fill Material	< BKG and SSSLs	< SSSLs	< SSSLs	< SSSLs	ND	ND	ND
Groundwater	Al, As, Fe, Mn, Pb, Tl, V > BKG and SSSLs	< SSSLs	< SSSLs	ND	ND	ND	ND
Surface Water	< BKG and SSSLs	< SSSLs	ND	ND	ND	ND	ND
Seep Samples	< BKG and SSSLs	ND	< SSSLs	ND	ND	ND	ND

Al - aluminum
As - arsenic
BKG - background
Fe - iron
Mn - manganese
ND - not detected
NS - not sampled
Pb - lead
PCB - polychlorinated biphenyl
SSSL - site-specific screening level
SVOC - semivolatile organic compound
Tl - thallium
V - vanadium
VOC - volatile organic compound

11.2 Streamlined Human Health Risk Assessment

Surface soil, surface water, sediment, and groundwater are the media evaluated for the Fill Area at Range 30 in this human health SRA. The groundskeeper and resident were selected as the two receptors that best represent potential exposure scenarios for the current and future land use at this site. The CSEM for the Fill Area at Range 30 is provided on Figure C-8. SRA tables, figures, and attachments are found in Appendix C.

11.2.1 Surface Soil

Eighteen surface soil samples were collected from fourteen sampling locations at the Fill Area at Range 30 from January through April 1999 (Table C8-1). Depths of samples ranged from 0 to1 foot bgs. Twelve sampling locations were sampled for metals, SVOCs, VOCs, PCBs, chlorinated and organophosphorous pesticides, chlorinated herbicides, and explosives. Organophosphorous pesticide analyses were conducted on separate samples at four of the sampling locations. The remaining two sampling locations were analyzed for the same constituents, except an analysis for explosives replaced the analysis for explosives.

Twenty metals, six chlorinated pesticides, fifteen SVOCs, and six VOCs were detected (Table C8-2). Following background screening and the elimination of nutrients, three metals (copper, lead, and selenium) and all of the pesticides, SVOCs, and VOCs were carried forward to the COPC selection process.

Site-related chemicals were compared to receptor-specific soil SSSLs to determine COPCs in surface soil for the Fill Area at Range 30. The results of the COPC selection are presented in Table C8-3. One SVOC (benzo(a)pyrene) was selected as a COPC for cancer risk for the resident receptor. Benzo(a)pyrene was only detected in one sample out of fourteen analyzed for SVOCs. The resulting ILCR for this chemical is 2E-06 (Table C8-4). Because benzo(a)pyrene is the only potentially carcinogenic constituent selected as a soil COPC, the total resident ILCR for this medium is 2E-06.

11.2.2 Surface Water

Two surface water samples were collected at the Fill Area at Range 30 in February and March 1999 (Table C8-5). Both samples were analyzed for metals, SVOCs, VOCs, PCBs, chlorinated and organophosphorous pesticides, chlorinated herbicides, and explosives.

Eight metals and one VOC (acetone) were detected (Table C8-6). All of the metals were excluded from consideration as site-related chemicals because their MDCs were lower than their respective background concentrations or 95 percent UTLs, or they were essential nutrients.

Therefore, acetone was the only constituent in surface water at the Fill Area at Range 30 that was carried forward to the COPC selection stage.

The results of the COPC selection are provided in Table C8-7. Acetone was not selected as a COPC because its MDC did not exceed the surface water SSSL for the resident.

11.2.3 Sediment

One sediment sample, collected in March 1999, was used to evaluate sediment at the Fill Area at Range 30 (Table C8-8). The sample was collected at a depth of 0 to 1 foot bgs and was analyzed for metals, SVOCs, VOCs, PCBs, chlorinated and organophosphorous pesticides, chlorinated herbicides, and explosives.

Fourteen metals were detected (Table C8-9). None of these metals exceeded the background screening criteria. Therefore, no chemicals in sediment at this site were carried forward to the COPC selection process.

11.2.4 Groundwater

Four groundwater samples were collected from four sampling locations at the Fill Area at Range 30 in April 1999 (Table C8-10). All samples were analyzed for metals, SVOCs, VOCs, PCBs, chlorinated and organophosphorous pesticides, chlorinated herbicides, and explosives.

Sixteen metals and two VOCs were detected (Table C8-11). Following background screening and the elimination of nutrients, seven metals and both of the VOCs were carried forward to the COPC selection process.

Site-related chemicals were compared to the resident, groundwater SSSLs to determine COPC in groundwater. The results of the COPC selection are presented in Table C8-12. Aluminum, chromium, iron, lead, nickel, and vanadium were selected as COPC for noncancer effects for the resident receptor. No chemicals were selected as COPC based upon cancer risk.

The resulting total HI for these metals is 20 (Table C8-13). When broken down by affected target organs, aluminum, chromium, and vanadium are the resulting COC (Table C8-14). Lead in groundwater was also selected as a COC. Iron in groundwater was not selected as a COC, even though it has an HI greater than 1; this is due to concerns about the oral reference dose; the toxicological profile for iron explains this in more detail (IT, 2000a). Table C8-15 presents the resident groundwater RGOs.

Lead in groundwater was selected as a COC because the source-term concentration (126 micrograms per liter [µg/L]) is greater than the action level of 15 µg/L. It was also determined to be a COC using the IEUBK model for lead in children (EPA, 1994). Using the site-specific information of 31.9 mg/kg lead in surface soil, 32.6 µg/L lead in groundwater, and all other model defaults, 6.4 percent of children (aged 0 to 84 months) have greater than 10 micrograms lead per deciliter blood. EPA Region IV requires that less than 5 percent of children may have more than 10 micrograms of lead per deciliter blood; therefore, based upon the data used in this human health evaluation, lead in groundwater at this site does pose an unacceptable risk to children from lead in groundwater (Appendix C, Attachment C-9).

As previously noted, however, concentrations of metals in groundwater are probably greatly exaggerated because of high turbidity of the groundwater samples.

11.2.5 Uncertainty Analysis

Subsurface soil was not evaluated at this parcel for this human health SRA. If land use or receptor scenarios differing from those evaluated herein for the Fill Area at Range 30 occur or are anticipated to occur, further evaluation of risk and hazard may be necessary. Specifically, if construction work is conducted at this site that may result in exposure to subsurface soil, then risks and hazards associated with this site may need to be revisited.

The other major source of uncertainty arises from the selection of several metals in groundwater as COCs. As discussed above, the concentrations of metals in groundwater probably reflect contamination with sediment rather than a site-related release.

11.2.6 SRA Conclusions

Table C8-16 presents the total ILCR and HI for the resident and the groundskeeper across all media. The groundskeeper had no COPC selected, thus no HI nor ILCR were calculated. Surface soil and groundwater did have COPC for the resident; however, only groundwater had COC. However, metal concentrations in groundwater probably reflect sediment contamination rather than a site-related release. Therefore, it is concluded that no site-related contaminants in surface soil, surface water, sediment, or groundwater at the Fill Area at Range 30 pose a substantial cancer risk or noncancer hazard to the groundskeeper or the resident.

11.3 Screening-Level Ecological Risk Assessment

This section presents the SLERA for Parcel 231(7).

11.3.1 Environmental Setting

The ecological setting of the Fill Area at Range 30, Parcel 231(7), is defined by the physical characteristics of the site and the type of habitats that can be supported. The original ecological setting has been altered through historical anthropogenic activities. As such, the topography and resultant habitat types are not characteristic of similar areas that have not been altered by man.

The Fill Area at Range 30, Parcel 231(7), is located in the northern section of the Main Post and is comprised of an undeveloped area originally estimated to be about 6 acres in size, completely surrounded by undeveloped land. Subsequent investigations indicate the fill area is actually about 3.9 acres in size. The topography of the site itself is flat except for erosional features and man-made mounds. The man-made mounds are the result of historical landfilling activities that have taken place at the site. Past activities at the range area have resulted in large areas of barren ground and mounding of soil. These barren areas have been subject to significant erosion and gullies have formed where the major erosion has occurred. A dirt road bisects the fill area in a northeast-southwest direction. A steep embankment makes up the southern boundary of the site.

Terrestrial habitat at the Fill Area at Range 30, Parcel 231(7), is comprised of "bare" areas and "early successional" areas. The "bare" areas are almost completely devoid of vegetation and dominate the area south of the dirt road that bisects the site. The steep slope that forms the southern boundary of the site is also characterized as "bare". Some loblolly pine (*Pinus taeda*) saplings have begun to colonize these "bare" areas. The remainder of the site is dominated by early successional weeds and loblolly pine saplings.

Typically, the species most likely to colonize an abandoned area are the "weed" species that tend to be vigorous pioneer plants that grow and spread rapidly. The first of the pioneer species to invade an abandoned area are the grasses and herbaceous species. A site in this state is classified as in an early old field successional state. Over time, these grass and herbaceous species are followed by shrubs and small trees. Over time, the shrubs and small trees tend to shade out the ground cover. As the percentage of woody species increases, the site is classified as being in a late old field successional state.

Most of the Fill Area at Range 30, Parcel 231(7), is in various stages of old field succession. The early old field successional areas at the Fill Area at Range 30 are dominated by various grasses and herbs including dock (*Rumex spp.*), clover *(Trifolium spp.*), vetch *(Astragalus spp.*), milkweed *(Ascelepias spp.*), bed straw *(Galium spp.*), ox-eye daisy *(Chrysanthemum leucanthemum*), and johnson grass *(Sorghum halepense*). Other old field herbaceous species occurring at the site are black raspberry *(Rubus occidentalis*), poison ivy *(Toxicodendron*

radicans), *Rubus glabra* (smooth sumac), green brier *(Smilax rotundiflora*), Japanese honeysuckle *(Lonicera japonica*), fox grape *(Vitus labrusca*), and multiflora rose *(Rosa multiflora*).

The late old-field successional areas of the Fill Area at Range 30, Parcel 231(7), are dominated by shrubs and saplings. The tree species that dominate the late old field successional areas are scrub pine *(Pinus virginiana*), loblolly pine *(Pinus taeda*), red cedar *(Juniperus virginiana*), black cherry *(Prunus serotina*), white mulberry *(Morus alba*), redbud *(Cercis canadensis*), dogwood *(Cornus florida*), and tree-of-heaven *(Ailanthus altissima*). The shrub layer and sub-canopy consist mainly of Virginia creeper *(Parthenocissus quinquefolia*), poison ivy *(Toxicodendron radicans*), black huckleberry *(Gaylussacia baccata*), and lowbush blueberry *(Vaccinium palladium*).

Although an area of ponded water often occurs along the southwestern portion of the dirt road that bisects the Fill Area at Range 30, Parcel 231(7), this ponded water is seasonal and does not support aquatic vegetation or animal species. There are no other permanent aquatic features or aquatic habitat at the site.

As stated previously, there are no permanent aquatic features associated with the Fill Area at Range 30, Parcel 231(7); therefore, aquatic organisms are not present at the site. In general, the terrain at FTMC supports large numbers of amphibians and reptiles. Jacksonville State University has prepared a report titled *Amphibians and Reptiles of Fort McClellan, Calhoun County, Alabama* (Cline and Adams, 1997). The report indicated that surveys in 1997 found 16 species of toads and frogs, 12 species of salamanders, 5 species of lizards, 7 species of turtles, and 17 species of snakes. Typical inhabitants of the upland areas surrounding the Fill Area at Range 30 are copperhead (*Agkistrodon contortix*), king snake *(Lampropeltis getulus*), black racer (*Coluber constrictor*), fence lizard (*Sceloporour undulatus*), and six-lined racerunner (*Cnemidophorous sexlineatus*).

Terrestrial species that may inhabit the upland areas of the Fill Area at Range 30, Parcel 231(7), include opossum, short-tailed shrew, raccoon, white-tail deer, red fox, coyote, gray squirrel, striped skunk, a number of species of mice and rats (e.g., white-footed mouse, eastern harvest mouse, cotton mouse, eastern woodrat, and hispid cotton rat), and eastern cottontail. Approximately 200 avian species reside at FTMC at least part of the year (USACE, 1997). Common species expected to occur in the vicinity of the site include northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottus*), warblers *(Dendroica spp.*), indigo bunting (*Passerina cyanea*), red-eyed vireo (*Vireo olivaceus*), American crow (*Corvus*

brachyrhynchos), bluejay (*Cyanocitta cristata*), several species of woodpeckers (*Melanerpes spp., Picoices spp.*), and Carolina chickadee (*Parus carolinensis*). Game birds present in the vicinity of the site may include northern bobwhite (*Colinus virginianus*), mourning dove (*Zenaida macroura*), and eastern wild turkey (*Meleagris gallopavo*). A variety of raptors (e.g., red-tailed hawk, sharp-shinned hawk, barred owl, and great horned owl) could use portions of this area for a hunting ground, particularly the fringe areas where the forested areas abut roads and cleared areas.

11.3.2 Chemicals Detected

Chemicals detected in soil, sediment, and surface water at the Fill Area at Range 30, Parcel 231(7), are summarized in Appendix A.

11.3.3 Chemicals of Potential Ecological Concern

COPECs are those constituents whose maximum detected concentrations exceed their respective ESVs. The COPECs that have been identified at the Fill Area at Range 30, Parcel 231(7), are the following:

- Surface Soil – arsenic, lead, mercury, selenium, vanadium, 4,4'-DDE, 4,4'-DDT, anthracene, benzo(a)pyrene, fluoranthene, and pyrene
- Surface Water – barium
- Sediment – none.

11.3.4 SLERA Uncertainty Analysis

Surface soil at the Fill Area at Range 30 exhibited concentrations of the following site-related constituents that exceeded their respective ESVs (Table D-21): arsenic, lead, mercury, selenium, vanadium, 4,4'-DDE, 4,4'-DDT, anthracene, benzo(a)pyrene, fluoranthene, and pyrene. No site-related constituents were detected in sediment in this area (Table D-23) and only barium was detected in surface water at a concentration that exceeded its ESV (Table D-22).

A detailed description of the ecosystems at the Fill Area at Range 30, Parcel 231(7), is presented in 11.3.1. Because of the low quality of the terrestrial habitat provided by the site, the low frequency of detection, and the relatively small exceedance of most of the ESVs, it could be concluded that none of the constituents detected in surface soil are likely to pose ecological risk to the terrestrial habitats at the site. The various lines-of-evidence used to draw these conclusions are presented in Table D-29.

Although barium was detected in surface water at a maximum concentration that exceeded its ESV, the "aquatic habitat" at this fill area consists of a puddle along the side of the dirt road that transects the fill area. Therefore, the lack of viable aquatic habitat at this fill area precludes the identification of COPECs in surface water. The various lines-of-evidence used to draw these conclusions are presented in Table D-29.

11.3.5 SLERA Conclusions

Terrestrial habitat at the Fill Area at Range 30, Parcel 231(7), is comprised of "bare" areas and "early successional" areas. The bare areas are almost completely devoid of vegetation and dominate the area south of the dirt road that bisects the site. The steep slope that forms the southern boundary of the site is also characterized as bare. Some loblolly pine (*Pinus taeda*) saplings have begun to colonize these bare areas. The remainder of the site is dominated by early successional weeds and loblolly pine saplings.

Although an area of ponded water often occurs along the southwestern portion of the dirt road that bisects the Fill Area at Range 30, Parcel 231(7), this ponded water is seasonal and does not support aquatic vegetation or animal species. There are no other permanent aquatic features or aquatic habitat at the site.

Surface soil at the Fill Area at Range 30, Parcel 231(7), exhibited concentrations of the following site-related constituents that exceeded their respective ESVs (Table D-21): arsenic, lead, mercury, selenium, vanadium, 4,4'-DDE, 4,4'-DDT, anthracene, benzo(a)pyrene, fluoranthene, and pyrene. No site-related constituents were detected in sediment in this area (Table D-23) and only barium was detected in surface water at a concentration that exceeded its ESV (Table D-22).

Although the maximum detected concentrations of a number of constituents exceed their respective ESVs in surface soil (Table D-21) and surface water (Table D-22) at the Fill Area at Range 30, Parcel 231(7), additional lines-of-evidence suggest that these COPECs may not pose significant risks to the terrestrial or aquatic ecosystems at Fort McClellan. These COPECs (Table D-28) have been identified through a very conservative screening process that utilizes ESVs based largely on NOAELs from the scientific literature and maximum detected constituent concentrations. If, based on a risk management decision, the potential ecological risks at the Fill Area at Range 30, Parcel 231(7), are determined to be "unacceptable" at this screening-level stage, then a BERA is appropriate. The goal of the BERA, if deemed necessary, will be to reduce the levels of uncertainty and conservatism in the assessment process and to determine the

potential for ecological risk at the Fill Area at Range 30, Parcel 231(7), through a number of lines of evidence.

11.4 Recommendations

Based on the results of the field investigations, the current and proposed future land use, and the results of the risk assessments completed for Fill Area at Range 30, Parcel 231(7), the recommended remedy under CERCLA is No Further Action. The streamlined risk assessment showed no significant human health risks using both a groundskeeper (most closely represents light industrial exposure) and residential land-use scenario. The ecological risk assessment indicated no significant ecological risk associated with the waste. Physical hazards such as exposed waste debris still exist at the site, but mostly appear to be construction debris. No long-term maintenance is required for the site.

12.0 Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7)

12.1 Site Location

The Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), is located in the southwestern portion of the Main Post, approximately 550 feet west of Iron Mountain Road and immediately southwest of an unnamed asphalt road (Figure 2-1). The parcel covers approximately 1.1 acre, although the parcel boundaries are not clearly defined (see Figure 12-1 for a detailed map).

12.1.1 Facility Type and Operational Status

This potential fill area is identified from a 1949 aerial photo composite in the EPIC report (EPA, 1990b). Information regarding the type of material placed at this location is not available.

The FTMC *Archive Search Report, Maps* (USACE, 1999b), identified the area in the vicinity of Parcel 233(7), as "Combat Range No. 2" and "Rocket Range." Combat Range No. 2 reportedly was built during the inter-war period and its use is unknown. During World War II, Combat Range No. 2 area was divided for other uses, including a rocket range, a machine gun range, and two rifle/grenade ranges. By 1958, all ranges in this area were closed or abandoned. According to the archive search report, 2.36-inch rockets (bazookas) were found on the Rocket Range near Area 17 during a Fill Area West of Iron Mountain Road and Range 19 visit. Additionally, it is stated that 3.5-inch rockets may have been used on this range (USACE, 1999b).

Operational dates for the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), could not be determined from a review of available reports. Information on the type of material stored or disposed of at the site is also unavailable. Rocks, metal debris, tin, dirt mounds, and partially exposed drums were observed by IT during a site visit (Figure 12-2).

The Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC *Archive Search Report, Maps* (USACE, 1999b).

12.1.2 Previous Work

A brief history of environmental work conducted at the fill area includes the following:

- Site-Specific Field Sampling Plan (IT, 1998d)
- Site Investigation and Fill Area Definition Report (IT, 2001a).

664000

664500

1165000

PPMP-233-GP04

PPMP-233-GP02

PPMP-233-GP03 (dry)

T233-1B

T233-1A

PPMP-233-GP05 (dry)

Fill Area West of
Iron Mountain Road
1.123 acres

PPMP-233-GP01

PPMP-233-GP06 (dry)

PPMP-233-DEP01

825

850

02Feb21 \\pinatubo\projects\peter\projects\eeca_fa\meca.apr

Figure 12-1

Detail Map Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7)

- Groundwater, Surface and Subsurface Soil Location (well)
- Depositional Soil Sample Location
- Surface and Subsurface Soil Sample Location
- Exploratory Trench
- Telephone Utility
- Electric Utility
- Improved Roads
- 5' Topographic Contours
- Surface Drainage/Creek w/ Flow Direction
- Landfill Boundary and CERFA Parcel
- Buildings
- Wooded
- Lawn/Cleared Area

0 100 200

State Plane feet, NAD83

August 2001

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U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

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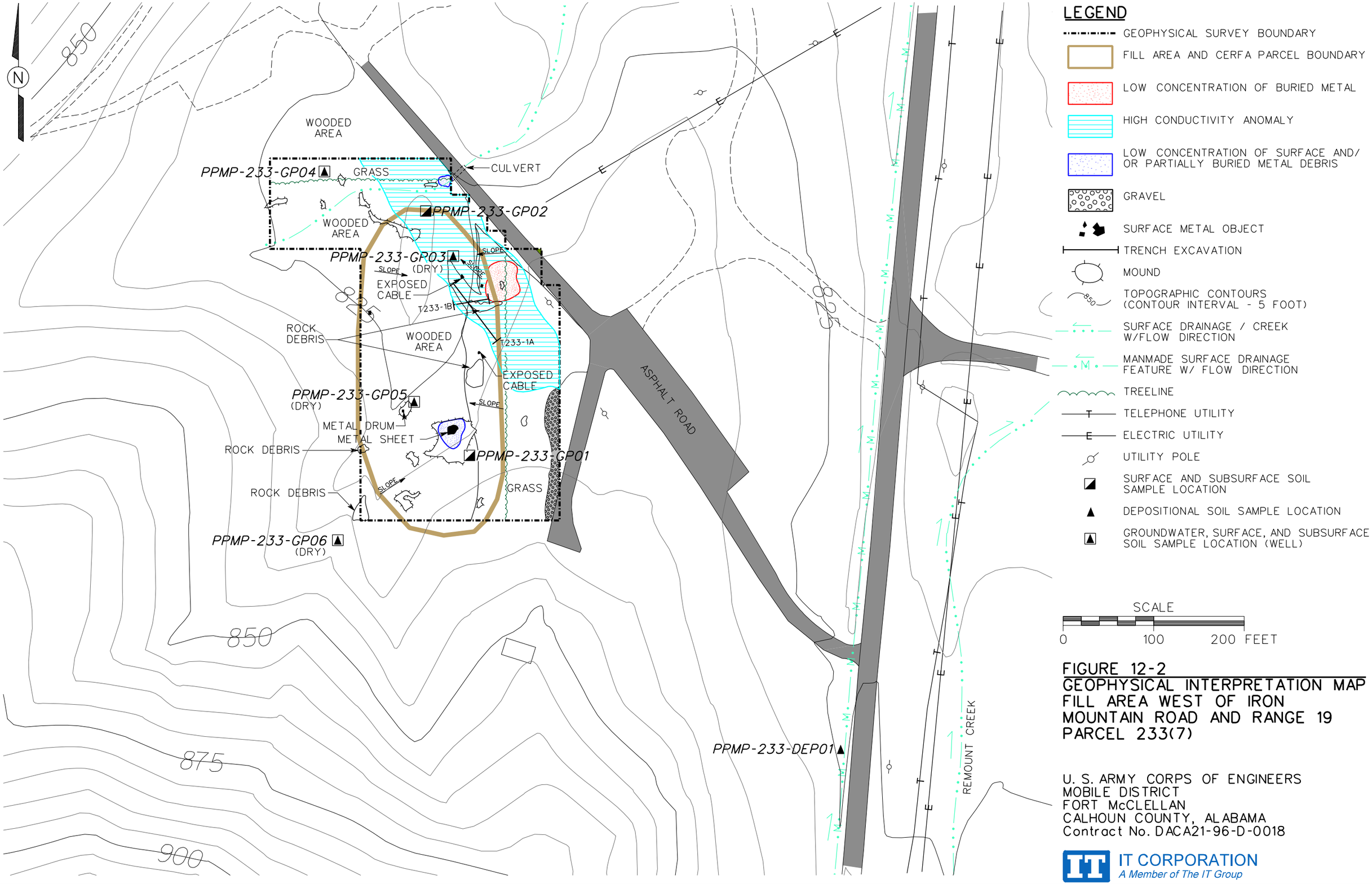

FIGURE 12-2
GEOPHYSICAL INTERPRETATION MAP
FILL AREA WEST OF IRON MOUNTAIN ROAD AND RANGE 19
PARCEL 233(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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DRAWN BY: D. BOMAR | PROJ. MGR.: J. YACOUB | PROJ. NO.: 796886
STARTING DATE: 02/18/01 | INITIATOR: J. RAGSDALE | DWG. NO.: ...\796886es.057
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12.1.2.1 Investigation

IT conducted a geophysical survey at the Fill Area West of Iron Mountain Road and Range 19 in January 2000. IT utilized the results of the geophysical survey to aid in the placement of trench locations. These data were used to determine the horizontal and vertical extent of the landfill, and to characterize the geology and hydrogeology. The survey area encompassed approximately 85,600 square feet (1.97 acres) and is shown on Figure 12-2.

Four permanent groundwater monitoring wells were installed at the Fill Area West of Iron Mountain Road and Range 19. The environmental sampling included the collection of surface and depositional soil samples, subsurface soil samples, and a groundwater sample for chemical analysis. Surface soil samples were collected from six locations and depositional soil samples were collected from one location.

Six metals were detected in the surface and depositional soil samples collected. Concentrations of aluminum and iron exceeded the SSSLs and ESVs in most samples. Beryllium and cobalt also exceeded background screening values in most samples collected. Barium exceeded the SSSLs, background screening values, and ESVs in the sample from location PPMP-233-GP06. Manganese exceeded the SSSLs, background screening values, and ESVs in samples collected from locations PPMP-233-GP02, PPMP-233-GP04, and PPMP-233-GP06.

Subsurface soil samples were collected from six soil boring locations at the Fill Area West of Iron Mountain Road and Range 19. Subsurface soil samples were collected from borings at various intervals at depths ranging from 8 to 12 feet bgs. Twenty-one metals were detected in the subsurface soil samples collected. Three metals (arsenic, iron, and thallium) exceeded the SSSLs in most samples collected; however, most of these metals were within background screening values. Various thallium results were flagged with a "B" data qualifier signifying that the compound was also detected in an associated laboratory or field blank. Beryllium, cobalt, copper, nickel, and zinc exceeded the background screening values in most samples. Barium and manganese exceeded the SSSLs and background screening values in the sample collected from PPMP-233-GP03, and iron exceeded both the background screening value and SSSL in the samples collected from PPMP-233-GP03 and PPMP-233-GP04. Aluminum and chromium concentrations exceeded the SSSLs in the samples collected from PPMP-233-GP04 and PPMP-233-GP06. Cadmium, mercury, selenium, and silver were also detected at concentrations above background screening values in the sample collected from PPMP-233-GP03.

Groundwater was sampled from permanent well PPMP-233-GP04. Groundwater samples were not collected from three of the four permanent monitoring wells (PPMP-233-GP03, PPMP-233-GP05, and PPMP-233-GP06) because the wells did not produce sufficient groundwater.

Thirteen metals were detected in the groundwater sample collected. Chromium, iron, manganese, and nickel exceeded the SSSLs; however, none of the results exceeded the background screening values. Four pesticides were detected in the groundwater sample collected. Aldrin was detected at a concentration exceeding the SSSL.

12.1.2.2 EE/CA Fill Area Definition

Four exploratory trenches were proposed at the Fill Area West of Iron Mountain Road and Range 19 to characterize the horizontal extent of the fill material; however, the on-site geologist determined that a T-shaped trench located in the center section of the fill area (interpreted from the geophysical survey) would better delineate fill material at the site (Figure 12-1). The modified trench excavations consisted of one 50-foot trench (T233-1A) crossed by a second trench 30 feet long (T233-1B). A remote-controlled excavator was used for the trenching because of the potential for UXO. The trenches were excavated to depths of 5 and 6 feet bgs. Trench logs do not indicate the presence of groundwater in the trenches. Fill material was not observed in either trench; however, a bullet blank, a piece of glass, and a piece of metal were observed on the surface at the trench locations.

No fill material borings were installed as part of the fill area definition activities; however, additional soil samples were collected from SI soil boring location PPMP-233-GP05.

IT has estimated the vertical and horizontal extent of fill material at the Fill Area West of Iron Mountain Road and Range 19 based on information gathered from previous site investigations, surface debris observation, and trenching and boring activities discussed in this report. The fill area covers approximately 1.1 acres. On the basis of the trench data, there is no indication of fill material below ground surface at this parcel.

12.1.3 Structures/Topography

On the basis of field observations, the parcel is about 160 feet wide (east to west) and 350 feet long (north to south) and slopes down to the north. Vegetation varies from a thick stand of pine trees in the northern portion of the site to sparse vegetation in other areas of the site. A tributary of Remount Creek is located northwest of the fill area. The intermittent creek flows to the northeast and was dry during an IT site visit in June 1998. Site elevations range from 820 to 835 feet above msl.

The Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), is primarily located in the Shady Dolomite (Cambrian) with the northeastern corner of the site extending into Little Oak and Newala Limestones (Figure 2-2). The contact between the Little Oak and Shady Dolomite is a thrust fault. The contact between the formations approximately parallels, and is very close to, the contact for the high conductivity zone shown on Figure 12-2, possibly indicating a correlation to the conductivity contrast between the two geologic units. Another possible explanation for the conductivity anomaly is the remnants of a munitions backstop berm.

12.1.4 Hydrogeology

IT installed four groundwater monitoring wells during the SI. Total depths ranged from 69 to 81 feet bgs, and groundwater was encountered at depths ranging from 55 to 68 feet bgs. After drilling, subsequent water level measurements found groundwater in only one well. No groundwater flow has been established for the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7). Figure 2-3 shows the relationship of the site to the regional groundwater flow. Soils underlying the site are predominately silts and clays, with minor sands. Groundwater flow is presumed to flow to the northeast into the Remount Creek drainage (Figure 2-3). Groundwater was not encountered in the trenches.

12.1.5 Surrounding Land Use and Populations

This area is within the transportation corridor for the future Eastern Bypass Highway. The land is within the former munitions impact area and is a restricted access area. No major populations or active use exists at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7). The area was heavily wooded and overgrown, but has been significantly cleared due to Eastern Bypass Highway construction activities. Reuse scenarios were primarily based on recreational use, with a secondary scenario for highway construction worker. The secondary scenario most likely matches the exposure pathways for Eastern Bypass Highway construction workers. A baseline reuse scenario for a resident was used for comparison at this site.

12.1.6 Sensitive Ecosystems

The ecological setting of the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), is defined by previous land uses (i.e., landfilling and ranges) and the land use of the surrounding area. The habitats vary according to local topography, soils, and ecological successional stage. The original ecological setting has been altered through historical anthropogenic activities and recent construction activities associated with the Eastern Bypass. Consequently, the topography and resultant habitat types characteristic of similar areas that have not been altered by man. No

sensitive ecosystems exist at the site. A complete discussion on the site environmental setting is presented in Section 12.3.1.

12.1.7 Analytical Data

The summary tables for the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), identify compounds that exceed the screening criteria as defined in the *Human Health and Ecological Screening Values, and PAH Background Summary Report* (IT, 2000a) and the *Final Background Metals Survey Report, FTMC, Alabama* (SAIC, 1998). Appendix A provides a summary of detected compounds in samples collected at the site and compares analyte concentrations against background values (for metals), SSSLs, and ESVs for the various sample media. Metals exceeding both the background threshold limit (two times background) and SSSLs and organic compounds that exceed the SSSLs are summarized for each sample medium in Table 12-1.

12.1.8 Potential Source of Contaminants

Waste fill material was not observed in the trenches excavated at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7). As noted in Section 12.1.2, a bullet blank, a piece of glass, and a piece of metal were observed on the ground surface at the trench locations. Groundwater was not encountered during trenching operations conducted at the site. The high conductivity area along the eastern portion of the site may only reflect the change in geologic units or former range berms.

Three metals (barium, manganese, and iron) were detected above background values and SSSLs in surface soils, depositional soils, and subsurface soils. Metals were not detected above both background values and SSSLs in groundwater. No other constituents have been reported in any of the multimedia samples collected at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7).

12.2 Streamlined Human Health Risk Assessment

Media evaluated at the Fill Area West of Iron Mountain Road and Range 19 for the human health SRA include surface soil, total soil (surface soil data and subsurface soil data combined), and groundwater. The resident, recreational site-user and the highway worker were deemed the most appropriate receptor scenarios for this parcel. The recreational site-user was evaluated for his exposure to surface soil, while the highway worker was evaluated for his exposure to total soil. The resident was evaluated for his exposure to groundwater and surface soil. Figure C-9 presents the CSEM for this parcel (SRA tables and figures are included within Appendix C.)

Table 12-1

Site Investigation Analytical Data Summary
Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7)
Fort McClellan, Alabama

Medium Sampled	Metals	VOCs	SVOCs	Pesticides	Explosives	Herbicides	PCBs
Surface and Depositional Soil	Ba, Mn > BKG and SSSLs	ND	ND	ND	NA	ND	ND
Subsurface Soil	Ba, Fe, Mn > BKG and SSSLs	< SSSLs	< SSSLs	ND	ND*	ND	ND
Sediments	NS	NS	NS	NS	NS	NS	NS
Fill Material	NS	NS	NS	NS	NS	NS	NS
Groundwater	< BKG and SSSLs	ND	ND	Aldrin > SSSL	NA	ND	ND
Surface Water	NS	NS	NS	NS	NS	NS	NS

Ba - barium
BKG - background
Fe - iron
Mn - manganese
NA - not analyzed
ND - not detected
NS - not sampled
SSSL - site-specific screening level
SVOC - semivolatile organic compound
VOC - volatile organic compound

* explosives analyzed on one sample only

12.2.1 Surface Soil

Seven surface soil samples, collected in 2000, were utilized for the SRA (Table C9-1). All of the samples were analyzed for chlorinated herbicides and pesticides, organophosphorous pesticides, metals, PCBs, SVOCs, and VOCs. Nineteen metals, one chlorinated pesticide (endosulfan II), two SVOCs, and seven VOCs were detected in surface soil (Table C9-2). After the background screening and nutrient exclusion, only five metals (barium, beryllium, cobalt, copper, and manganese) were determined to be site related. All organics were also determined to be site-related and were carried forward to the COPC selection table.

Table C9-3 presents the surface soil COPC selection table. No site-related chemicals had MDCs greater than the residential or recreational site-user soil SSSLs. Thus, no chemicals were selected as COPC for surface soil.

12.2.2 Total Soil

The 13 total soil (surface and subsurface soil data) samples used in the highway worker SRA are presented in Table C9-4. Twelve soil samples were analyzed for chlorinated pesticides and herbicides, organophosphorous pesticides, metals, PCBs, SVOCs, and VOCs. One sample, KZ0012, collected from location PPMP-233-GP05, was analyzed for those parameters listed above and explosives.

Twenty-one metals, one chlorinated pesticide, three SVOCs, and seven VOCs were detected in total soil at the Fill Area West of Iron Mountain Road and Range 19. After the background screening, statistical testing, and nutrient exclusion, 8 metals were determined to be site-related along with all the organic chemicals detected (Table C9-5). Using the Mann-Whitney U test (StatSoft, 1998), it was determined that the site-related total soil manganese data and the background total soil manganese data were from the same population (Appendix C, Attachment C-10). Therefore, manganese was not selected as a site-related metal.

Table C9-6 presents the COPC selection table. No metals or organic chemicals had MDCs greater than the highway worker soil SSSLs; therefore, no total soil COPCs were selected for the highway worker. A memorandum documenting the SSSL development for the highway worker is presented in Appendix C, Attachment C-1.

12.2.3 Groundwater

One groundwater sample, collected in July 2000, was used in the residential groundwater SRA (Table C9-7). The sample was analyzed for chlorinated pesticides and herbicides, organophosphorous pesticides, metals, PCBs, SVOCs, and VOCs.

Ten metals and four chlorinated pesticides detected in groundwater at the Fill Area West of Iron Mountain Road and Range 19. After the background screening and nutrient exclusion, two metals (chromium and nickel) were determined to be site-related along with all the organic chemicals detected (Table C9-8).

Table C9-9 presents the COPC selection table. Only chromium, nickel, and aldrin had MDCs greater than the resident, groundwater SSSLs. Table C9-10 presents the HI and ILCR estimates for the resident exposed to groundwater. The total HI is 3, while the total ILCR is 9E-6. A target organ table (Table C9-11) was completed for the chemicals that have noncancer effects, chromium and nickel. However, these are among the metals expected to be found at much higher concentrations in groundwater samples compromised by high turbidity rather than in samples not contaminated by sediment. RGOs for chromium and nickel are presented in Table C9-12. No RGO was calculated for aldrin because the total ILCR was within the acceptable range of 1E-6 to 1E-4.

12.2.4 Uncertainty Analysis

Only one groundwater sample was collected and analyzed from this site for this evaluation. Further groundwater samples would provide enough samples to conduct a statistical evaluation with background metal concentrations in groundwater.

A very significant source of uncertainty pertains to the selection of chromium as a COC for groundwater. As explained above, the HI for chromium of 2.77 probably should be approximately 500-fold lower, in which case the residential evaluation would pass and chromium would not be selected as a COC. Furthermore, the selection of chromium and nickel as COPCs probably reflects sediment contamination rather than a site-related release.

12.2.5 SRA Conclusions

Surface soil at the Fill Area West of Iron Mountain Road and Range 19 does not pose a cancer risk or noncancer hazard to the resident or the recreational site-user. Total soil at this site does not pose a cancer risk or noncancer hazard to the highway worker. Groundwater does pose a noncancer hazard to the resident.

The HI for residential exposure to groundwater exceeded the threshold level of 1, due largely to chromium. However, chromium in drinking water is probably far less toxic than the HI would indicate, and it is likely that the selection of chromium reflects sediment contamination rather

than a site-related release. It is concluded that groundwater does not pose an unacceptable threat for residential use.

12.3 Screening-Level Ecological Risk Assessment

This section presents the SLERA for Parcel 233(7).

12.3.1 Environmental Setting

The ecological setting of the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), is defined by previous land uses (i.e., landfilling) and the land use of the surrounding area (construction of the Eastern Bypass). The habitats vary according to local topography, soils, ecological successional stage, and recent land-clearing activities. The original ecological setting has been significantly altered through historical and current anthropogenic activities. As such, the topography and resultant habitat types are not characteristic of similar areas that have not been altered by man.

The Fill Area West of Iron Mountain Road and Range 19 is located in the southwest corner of the Main Post and encompass a total area of approximately 2 acres. The entire Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), exhibits a gentle grade towards the east. The surrounding area was historically mixed coniferous/deciduous forest characteristic of a typic mesophytic forest. However, recent construction activities related to the Eastern Bypass have resulted in the clear-cutting of most of the previously forested areas in the vicinity of this fill area.

Terrestrial habitat at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), prior to construction activities related to the Eastern Bypass was comprised of mixed coniferous/deciduous forest characteristic of a typic mesophytic forest. The canopy species characteristic of this area were tulip tree (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), white oak (*Quercus alba*), and northern red *oak (Quercus rubra*). The dominant understory species of this area were red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginia*), sweetgum (*Liquidambar styraciflua*), and sourwood (*Oxydendrum arboreum*). The shrub layer was dominated by mountain laurel (*Kalmia latifolia*), southern low blueberry *(Vaccinium pallidum*), southern wild raisin (*Viburnum nudum*), and yellowroot (*Xanthorhiza simplicissima*). Numerous muscadine grape (*Vitis rotundifolia*) vines, greenbriar (*Smilax rotundifolia*) and poison ivy (*Toxicodendron radicans*) were also present in this area.

As stated previously, significant portions of the forested area in the vicinity of this fill area have been clear-cut prior to construction of the Eastern Bypass. Therefore, terrestrial habitat in this area has been significantly altered and will continue to be altered due to on-going construction activities. Currently, there is no vegetation at this site. The entire site has been clear-cut and all brush has been removed. The site was subsequently covered with "mulch" which was created by chipping the vegetative material that was cut down at the site.

There are no permanent aquatic features at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), or the immediate vicinity; therefore, there is no aquatic habitat present in this area.

Terrestrial species that may have historically inhabited the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), include opossum, short-tailed shrew, raccoon, white-tail deer, red fox, coyote, gray squirrel, striped skunk, a number of species of mice and rats (e.g., white-footed mouse, eastern harvest mouse, cotton mouse, eastern woodrat, and hispid cotton rat), and eastern cottontail. Approximately 200 avian species reside at FTMC at least part of the year (ACOE, 1997). Common species that may have occurred in the vicinity of the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), prior to clear-cutting include northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottus*), warblers *(Dendroica spp.*), indigo bunting (*Passerina cyanea*), red-eyed vireo (*Vireo olivaceus*), American crow (*Corvus brachyrhynchos*), bluejay (*Cyanocitta cristata*), several species of woodpeckers (*Melanerpes spp., Picoices spp.*), and Carolina chickadee (*Parus carolinensis*). Game birds that may have been present in the vicinity of the Fill Area West of Iron Mountain Road and Range 19 prior to clear-cutting include northern bobwhite (*Colinus virginianus*), mourning dove (*Zenaida macroura*), and eastern wild turkey (*Meleagris gallopavo*). A variety of raptors (e.g., red-tailed hawk, sharp-shinned hawk, barred owl, and great horned owl) could use portions of this area for a hunting ground, particularly the fringe areas where the remaining forested areas abut roads and cleared areas. Most of the wildlife species that may have inhabited this area prior to clear-cutting of the forest would not be expected to occur at this site under the current conditions.

12.3.2 Chemicals Detected

Chemicals detected in soil, sediment, and surface water at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), are summarized in Appendix A.

12.3.3 Chemicals of Potential Ecological Concern

COPECs are those constituents whose maximum detected concentrations exceed their respective ESVs. The COPECs that have been identified at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), are the following:

- Surface Soil – barium, beryllium, cobalt, manganese, and acetone
- Surface Water – none
- Sediment – none.

12.3.4 SLERA Uncertainty Analysis

Only surface soil samples were collected at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), and the following site-related constituents exceeded their respective ESVs (Table D-24): barium, beryllium, cobalt, manganese, and acetone. These constituents were detected in surface soil at concentrations that exceeded their ESVs by less than an order of magnitude except for barium and manganese. Because this area does not provide sensitive or unique habitats (terrestrial or aquatic) and the constituents detected above their ESVs do not bioaccumulate appreciably, constituents in soil at the Fill Area West of Iron Mountain Road Range 19 most likely do not pose significant ecological risks to the terrestrial habitats at FTMC. The various lines-of-evidence used to draw these conclusions are presented in Table D-29.

12.3.5 SLERA Conclusions

Prior to activities associated with the construction of the Eastern Bypass, terrestrial habitat at the Fill Area West of Iron Mountain Road and Range 19 is comprised of mixed coniferous/ deciduous forest characteristic of a typic mesophytic forest. The vast majority, if not all, of this forest has been clear-cut for the Eastern Bypass corridor. All trees and under-brush have been removed and the area covered with mulch. There are no permanent aquatic features at the Fill Area West of Iron Mountain Road and Range 19 or the immediate vicinity; therefore, there is no aquatic habitat present in this area.

Only surface soil samples were collected at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), and the following site-related constituents exceeded their respective ESVs (Table D-24): barium, beryllium, cobalt, manganese, and acetone.

Although the maximum detected concentrations of a number of constituents exceed their respective ESVs in surface soil (Table D-24) at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), additional lines-of-evidence suggest that these COPECs may not pose significant risks to the terrestrial ecosystems at Fort McClellan. These COPECs (Table D-28)

have been identified through a very conservative screening process that utilizes ESVs based largely on NOAELs from the scientific literature and maximum detected constituent concentrations. If, based on a risk management decision, the potential ecological risks at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), are determined to be "unacceptable" at this screening-level stage, then a BERA is appropriate. The goal of the BERA, if deemed necessary, will be to reduce the levels of uncertainty and conservatism in the assessment process and to determine the potential for ecological risk at the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7), through a number of lines of evidence.

12.4 Recommendations

The recommended remedy for the Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7) is No Further Action. The streamlined risk assessment showed no human health risks using a residential, recreational, and highway-construction- worker land-use scenario. The site may be eliminated through the construction of the Eastern Highway Bypass without health risks to the highway workers from site-related chemicals. The ecological risk assessment indicated no ecological risk associated with the waste. Limited physical hazards, such as exposed waste debris, still exist at the site, but mostly appear to be construction debris. No long-term maintenance is required for the site.

13.0 Stump Dump, Parcel 82(7)

13.1 Site Location

The Stump Dump, Parcel 82(7), is located in the central portion of the Main Post, north of Baines Gap Road and is shown on the site location map on Figure 2-1.

13.1.1 Facility Type and Operational Status

The Stump Dump, Parcel 82(7), was used as a disposal site from sometime before 1985 until approximately 1988. The site originally was intended for the disposal of storm debris (anything that might wash up in a storm flow, i.e., vegetation, tree limbs, stumps, etc.). Uncontrolled and unauthorized dumping of items including construction debris (sheet rock and concrete), batteries, tires, paint cans, refrigerators, landscaping trash, and other materials also occurred at the site (ESE, 1998). The Stump Dump was covered with soil and has engineered features such as terraced decks and engineered slopes. Drainage culverts and retention ponds were installed to control runoff (ESE, 1998). A detail map is illustrated on Figure 13-1.

The Stump Dump, Parcel 82(7), falls within "Possible Explosive Ordinance Impact Area" shown on Plate 10 of the FTMC *Archive Search Report, Maps* (USACE, 1999b).

13.1.2 Previous Work

A brief history of environmental work conducted at the stump dump includes the following:

- Site-Specific Field Sampling Plan (IT, 1998e)
- Site Investigation and Fill Area Definition Report (IT, 2001a).

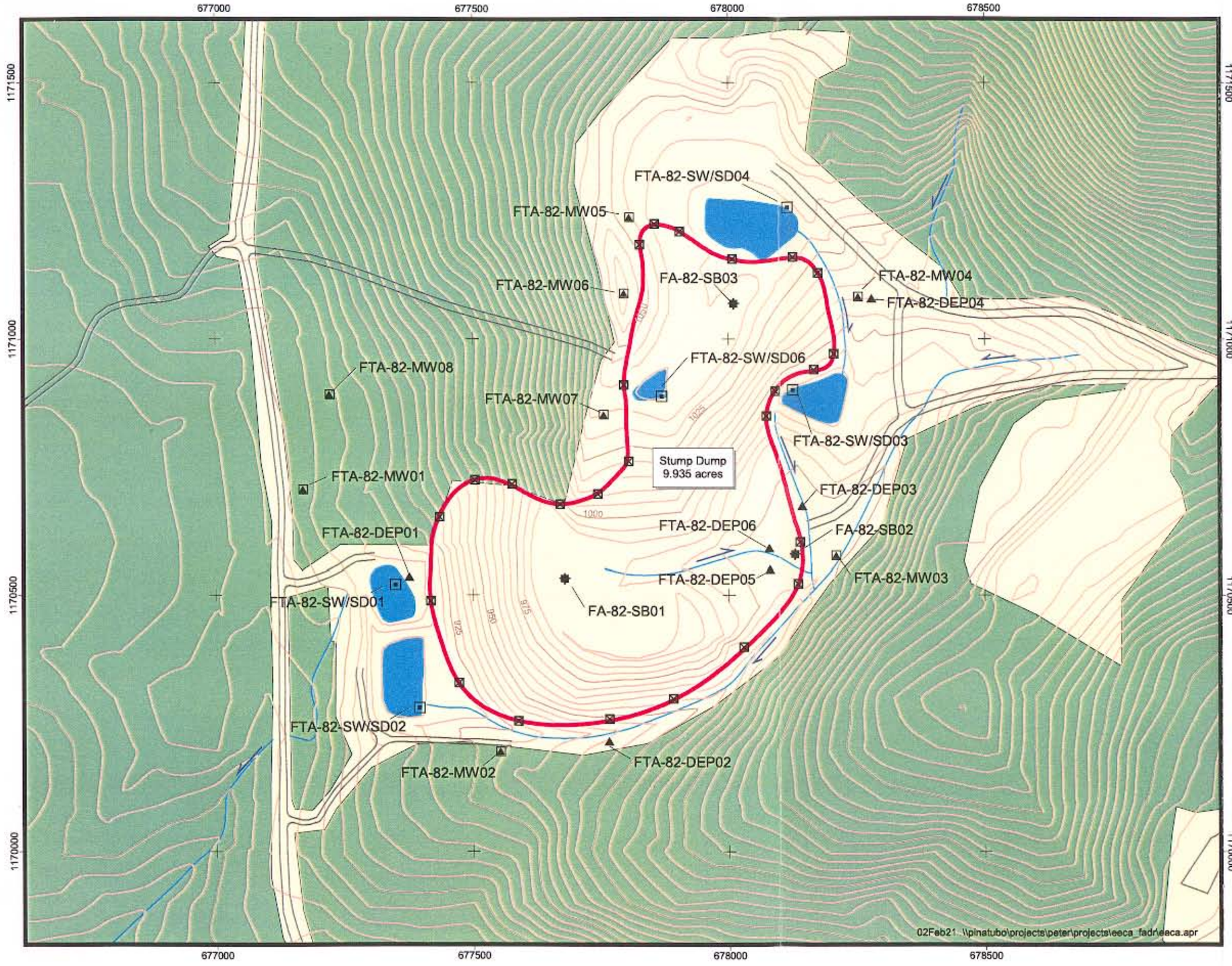
13.1.2.1 Investigation

The SI included field work to collect eight surface soil samples, eight subsurface soil samples, eight groundwater samples, five surface water samples, five sediment samples, and six depositional soil samples.

Four pesticides were detected in the surface soil samples and depositional soil samples collected. Only two surface and one depositional soil sample contained pesticides. No pesticides were detected in any other surface soil samples or depositional soil samples collected. None of the detected pesticides were present at a concentration exceeding the SSSLs. The pesticide 4,4'-DDE detected in the depositional soil sample collected from FTA-82-DEP02 was present at a concentration that exceeded the ESV.

Figure 13-1

Detail Map Stump Dump, Parcel 82(7)



Legend

- Proposed Concrete Monument
- Depositional Soil Sample Location
- Groundwater, Surface and Subsurface Soil Sample Location (well)
- Subsurface Soil Sample Location
- Surface Water/Sediment Sample Location
- Improved Roads
- 5' Topographic Contours
- Surface Drainage/Creek w/ Flow Direction
- Fill Boundary and CERFA Parcel
- Lakes
- Wooded
- Lawn/Cleared Area

0 200 400

State Plane feet, NAD83

August 2001

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U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

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Twenty-one metals were detected in the surface and depositional soil samples collected. Eight of these metals (barium, beryllium, cobalt, copper, mercury, nickel, selenium, and zinc) exceeded the background screening values and ESVs in various samples; however, the concentrations did not exceed the SSSLs. The concentrations of three metals (aluminum, manganese, and iron) exceeded the background screening values, SSSLs, and ESVs in various samples collected.

Eight VOCs were detected in surface soil samples and depositional soil samples collected. Except for the concentration of TCE, detected in the samples collected from FTA-82-MW04 and FTA-82-MW05, none of the VOCs detected were present at a concentration exceeding the ESVs. Additionally, the two TCE results were flagged with a "B" data qualifier signifying that the compounds were also detected in an associated laboratory or field blank. None of the VOCs detected were present at a concentration exceeding the SSSLs.

Subsurface soil samples were collected for chemical analysis from eight soil borings at the Stump Dump. Subsurface soil samples were collected at various intervals at depths ranging from 7 to 54 feet bgs. Twenty-two metals were detected in subsurface soil samples collected. The concentrations of seven metals (aluminum, arsenic, barium, chromium, iron, manganese, and thallium) exceeded the SSSLs in various samples; however, with the exception of aluminum, barium, chromium, iron, and manganese, the concentrations of these metals were within background screening values.

Thirteen SVOCs were detected in subsurface soil samples collected. The subsurface soil sample collected from FTA-82-MW03 contained benzo(a)pyrene at a concentration exceeding the SSSL.

Groundwater was sampled from the eight permanent wells at the Stump Dump. Fifteen metals were detected in the groundwater samples collected. The concentrations of five metals (aluminum, barium, iron, manganese, and thallium) exceeded the background screening values and SSSLs. The thallium results were flagged with a "B" data qualifier. Metals exceeding the SSSLs and background screening values in the groundwater samples collected from FTA-82-MW03, FTA-82-MW05, and FTA-82-MW08 are attributed to elevated levels of turbidity at the time of sample collection.

Five surface water samples were collected at the Stump Dump. The surface water samples were collected from ponds at sample locations shown in Figure 13-1. Fifteen metals were detected in the surface water samples collected. The concentrations of thallium detected in three of the surface water samples collected exceeded the background screening value, ESV, and SSSL; however, all results were flagged with a "B" data qualifier. The concentration of arsenic detected

in one of the samples exceeded the background screening value and the SSSL. The concentrations of aluminum (one sample) and beryllium (two samples) exceeded the background screening values and the ESV; however, the beryllium results were flagged with a "B" data qualifier.

Five sediment samples were collected for chemical analysis at the same locations as the surface water samples. Three pesticides were detected in one of the sediment samples collected. None of the pesticides detected exceeded the SSSLs. Two pesticides (4,4'-DDE and 4,4'-DDT) were detected at concentrations exceeding the ESVs.

Nineteen metals were detected in the sediment samples collected. None of the metal concentrations detected exceeded the SSSLs. Copper was detected in the sediment sample collected from FTA-82-SW/SD01 at a concentration exceeding the ESVs and background screening values. Nine other metals were detected at concentrations exceeding the background screening values.

Fourteen SVOCs were detected in the sediment samples collected. None of the SVOCs detected exceeded the SSSLs. Six SVOCs (benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, and pyrene) were detected in the sample collected from FTA-82-SW/SD02 at concentrations exceeding the ESVs.

The VOC, trichlorofluoromethane was detected in four of the sediment samples at concentrations exceeding its ESV. None of the VOCs detected exceeded the SSSLs.

13.1.2.2 EE/CA Fill Area Definition

IT collected fill samples in March 2000 at this site to determine the vertical extent of the waste fill and to characterize fill materials. The lateral extent of the fill area is defined by the engineered soil cover and, therefore, the excavation of trenches was not necessary. Three soil borings were installed at the Stump Dump to determine the vertical extent of the fill material and to collect a sample of the fill material for chemical analysis. Fill material borings were installed at depths ranging from 3 to 7.5 feet.

Two fill material samples were collected for chemical analysis at the Stump Dump. A fill material sample was not collected for chemical analysis from FA-82-SB01 because the presence of fill could not be confirmed.

Eighteen metals were detected in the fill material samples collected. The concentrations of five metals (arsenic, chromium, iron, manganese, and thallium) exceeded the SSSLs; however, with the exception of chromium detected in the sample collected from location FA-82-SB03, the concentrations of these metals did not exceed background screening values.

Seventeen SVOCs were detected in the fill material samples collected. The fill material sample collected from location FA-82-SB03 had concentrations of benzo(a)pyrene and dibenz(a,h) anthracene which exceeded the SSSLs.

IT has estimated the vertical and horizontal extent of fill material at the Stump Dump based on information gathered from the site investigation and boring activities discussed in this report. The horizontal extent of fill is defined by the existing soil cover and encompasses an area of approximately 10 acres. The average depth of fill material, estimated from the boring log data, is approximately 8 feet bgs.

13.1.3 Structures/Topography

The Stump Dump, Parcel 82(7), is located in the western portion of the Main Post and encompasses a total area of approximately 10 acres. The site is on the side of a steep hill; site elevations range from approximately 910 to 1,055 feet above msl. The entire site is clear of native vegetation, but supports various grasses and sedges; there are no flowing streams on or near the site. There are several borrow pits on or around the site and a rip-rap lined drainage ditch extends along the eastern and southern boundaries of the Stump Dump. The entire site is surrounded by mixed coniferous/deciduous forest. The boundaries of the Stump Dump are irregular; the site is approximately 1,000 feet long (north to south) and over 700 feet in width (east to west).

The Stump Dump, Parcel 82(7), is located within the Shady Dolomite and Chilhowee Group. A thrust fault occurs across the site with the contact indicated between the upper and lower decks (Figure 2-2).

13.1.4 Hydrogeology

During boring and well installation activities, groundwater was encountered in residuum at depths ranging from 47 to 156 feet bgs at wells FTA-82-MW03, FTA-82-MW05, FTA-82-MW06, and FTA-82-MW07. Groundwater was encountered in shale at wells FTA-82-MW01 and FTA-82-MW02, and in weathered shale at well FTA-82-MW08. Groundwater was encountered in consolidated sandstone at FTA-82-MW04 at a depth of 120 feet bgs.

Static groundwater levels were measured in all the groundwater monitoring wells on March 13, 2000. A groundwater elevation map was constructed from the March 2000 data and is shown on Figure 2-3. Groundwater flow at the Stump Dump, Parcel 82(7), is radially distributed to the southwest, southeast, and east. The groundwater contours show that well FTA-82-MW03 is influenced by groundwater flow from the slope east of well FTA-82-MW03. The groundwater potentiometric surface likely reflects natural topography that existed prior to borrowing and landfilling activities. Hydraulic gradients across the site were calculated to be approximately 0.14 to 0.17 ft/ft.

13.1.5 Surrounding Land Use and Populations

The Stump Dump, Parcel 82(7), is bound on the south and west by heavily wooded areas and on the north by a borrow area and a steep, heavily-wooded area. To the east, the site is bound by a steep, heavily-wooded hill and a small access road. There are no structures or buildings on the site or in the immediate area. No major populations or active use exists at the site. The reuse plan shows a passive recreation use for the site. The streamlined risk assessment will use a recreational site-user scenario. A residential reuse scenario will be considered for comparison purposes.

13.1.6 Sensitive Ecosystems

The ecological setting at the Stump Dump, Parcel 82(7), is defined by the fact the site was historically cleared of native vegetation and subsequently re-planted with various grasses and sedges. The original ecological setting has been altered through significant anthropogenic activities. Consequently, the topography and resultant habitat types are not characteristic of similar areas that have not been altered by man. Terrestrial habitat at the site is entirely made up of grasslands. There are four small ponds that adjoin the site. A more complete description of the site environmental setting is presented in Section 13.3.1.

13.1.7 Analytical Data

The summary tables for this Stump Dump, Parcel 82(7), identify compounds that exceed the screening criteria as defined in the *Human Health and Ecological Screening Values, and PAH Background Summary Report* (IT, 2000a) and the *Final Background Metals Survey Report, FTMC, Alabama* (SAIC, 1998). Appendix A provides a summary of detected compounds in samples collected at the site and compares analyte concentrations against background values (for metals), SSSLs, and ESVs for the various sample media collected at the site. Metals that exceed both the background threshold limit (two times background) and the SSSLs, and organic compounds that exceed the SSSLs are summarized for each sample medium in Table 13-1.

Table 13-1

Site Investigation Analytical Data Summary
Stump Dump, Parcel 82(7)
Fort McClellan, Alabama

Medium Sampled	Metals	VOCs	SVOCs	Pesticides	Explosives	Herbicides	PCBs
Surface and Depositional Soil	Fe > BKG and SSSLs	< SSSLs	< SSSLs	4,4'-DDE > SSSL	NS	ND	ND
Subsurface Soil	Al, Ba, Cr, Fe, Mn > BKG and SSSLs	< SSSLs	Benzo(a)pyrene > SSSL	ND	ND	ND	ND
Sediments	< BKG and SSSLs	Trichlorofluoro-methane > SSSL	> SSSL[b]	4,4'-DDE, 4,4'-DDT > SSSL	NS	ND	ND
Fill Material	Cr > BKG and SSSLs	< SSSLs	Benzo(a)pyrene and Dibenzo(a,h)anthracene[a] > SSSL	< SSSLs	ND	ND	ND
Groundwater	Al, Ba, Fe, Mn, Tl > BKG and SSSLs	< SSSLs	< SSSLs	ND	ND	ND	ND
Surface Water	As, Tl > BKG and SSSLs	< SSSLs	ND	ND	NS	ND	ND

Al - aluminum
As - arsenic
Ba - barium
BKG - Background
Cr - chromium
Fe - iron
Mn - manganese
NA - not analyzed
ND - not detected
NS - not sampled
PCB - polychlorinated biphenyl
SSSL - Site Specific Screening Level
SVOC - semivolatile organic compound
Tl - thallium
VOC - volatile organic compound

[a] estimated value between the method detection limit and the practical quantitation limit

[b] Compounds exceeding SSSL values include: benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, and pyrene

13.1.8 Potential Source of Contaminants

The Stump Dump, Parcel 82(7), falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC Archive Search Report, Maps (USACE, 1999b). Other potential contaminant sources include petroleum products (e.g., gasoline, diesel, heating oil, waste oil, and lubricants), solvents, and metals. Figure 13-1 shows the sampling and site details that make up the investigation to date.

Benzo(a)pyrene was detected at levels above the SSSLs in subsurface soils. Metals were detected above background and the SSSLs in surface and subsurface soils, depositional soils, surface water, and groundwater. These compounds will be evaluated in the SRA presented in Sections 13.2 and 13.3.

13.2 Streamlined Human Health Risk Assessment

Media evaluated for the SRA at the Stump Dump include surface soil, surface water, sediment, and groundwater. The recreational site-user and resident were the receptor scenarios determined to be the most appropriate based upon current and future land use. The recreational site-user was evaluated for his exposure to surface soil, surface water, and sediment. The resident was evaluated for his exposure to surface soil, surface water, sediment, and groundwater. A CSEM is presented on Figure C-10 (SRA tables, figures, and attachments are included within Appendix C).

13.2.1 Surface Soil

Fourteen surface soil samples (0 to 2 feet bgs) were collected from the site in 1998 (Table C10-1). Twelve of the samples were analyzed for chlorinated herbicides and pesticides, organophosphorous pesticides, metals, SVOCs, and VOCs. Two of the samples were analyzed for all of the above parameters except chlorinated herbicides.

Twenty metals, four chlorinated pesticides, three SVOCs, and five VOCs were detected at the Stump Dump in surface soil (Table C10-2). After the background screening and nutrient elimination, the only metals determined to be site-related in surface soil are barium, beryllium, copper, nickel, selenium, and zinc.

The five site-related metals and all the organics were carried forward to the COPC selection Table C10-3. None of the MDCs for the site-related chemicals were above their receptor-specific, soil SSSLs; thus, none of the site-related chemicals were selected as surface soil COPC.

13.2.2 Surface Water

Five surface water samples, collected in January 1999, were evaluated in the SRA for the resident and recreational site-user. The five samples were analyzed for chlorinated herbicides and pesticides, organophosphorous pesticides, metals, SVOCs, and VOCs (Table C10-4).

Twelve metals and one VOC, acetone, were detected in surface water at the Stump Dump (Table C10-5). After the background screening and nutrient removal, no metals in surface water were determined to be site-related. Only acetone was carried forward to the COPC selection table.

After comparison of the MDC for acetone to the receptor-specific, surface water SSSL, it was determined that acetone is not a COPC for surface water (Table C10-6).

13.2.3 Sediment

Five sediment samples collected in January 1999 were utilized in the SRA (Table C10-7). All five samples were analyzed for chlorinated herbicides, chlorinated and organophosphorous pesticides, metals, SVOCs, and VOCs.

Eighteen metals, three chlorinated pesticides, thirteen SVOCs (all PAHs), and one VOC (trichlorofluoromethane) were detected in sediment at the Stump Dump (Table C10-8). After the background screening and nutrient exclusion were completed, only one metal (copper) was determined to be site-related. Copper and all the organics were carried forward to the COPC selection table.

Table C10-9 presents the COPC screening table. None of the chemicals determined to be site-related had MDCs above their respective receptor-specific, sediment SSSL. Therefore, no sediment COPC were selected.

13.2.4 Groundwater

Eight groundwater samples were collected from the site in January 1999 (Table C10-10). Seven of the samples were analyzed for chlorinated herbicides and pesticides, organophosphorous pesticides, metals, SVOCs, and VOCs. One of the samples was analyzed for all of the above parameters except chlorinated pesticides. The resident was evaluated for his exposure to groundwater.

Twelve metals, one SVOC, and seven VOCs were detected in groundwater at the Stump Dump (Table C10-11). After the background screening and nutrient exclusion were completed, two

metals (chromium and nickel) were determined to be site-related. The metals and all detected organics were carried forward to the COPC selection table.

Table C10-12 presents the COPC screening table. Chromium was determined to be a COPC; it had an MDC above the resident, groundwater SSSLs. Table C10-13 presents the resulting HI for the resident exposed to groundwater, 3E-1. This HI is less than the threshold of 1; therefore, based upon this analytical data, groundwater does not pose a noncancer hazard to the resident.

13.2.5 Uncertainty Analysis

Subsurface soil was not evaluated for this SRA. If at any time in the future the land use or receptor scenarios examined herein change, it may be necessary to evaluate the other media or different receptor scenarios, such as a construction worker.

13.2.6 SRA Conclusions

Based upon the data sets used within this SRA, the surface soil, surface water, sediment, and groundwater at the Stump Dump do not pose a cancer risk or noncancer hazard to the recreational site-user or the resident (Table C10-13).

13.3 Screening-Level Ecological Risk Assessment

This section presents the SLERA for Parcel 82(7).

13.3.1 Environmental Setting

The ecological setting at the Stump Dump, Parcel 82(7), is defined by the fact the site was historically cleared of native vegetation and subsequently re-planted with various grasses and sedges. The original ecological setting has been altered through significant anthropogenic activities. As such, the topography and resultant habitat types are not characteristic of similar areas that have not been altered by man.

The Stump Dump, Parcel 82(7), is located in the western portion of the Main Post and encompasses a total area of approximately ten acres. The site is on the side of a steep hill with an elevation difference of approximately 150 feet between the lowest portion of the site and the highest. The entire site is devoid of natural vegetation and there are four man-made impoundments adjoining the site. There is also a rip-rap lined drainage ditch along the eastern and southern boundaries of the site. The entire site is surrounded by mixed coniferous/deciduous forest.

Terrestrial habitat at the Stump Dump, Parcel 82(7), is entirely made up of grasslands. The grasslands are comprised of areas that have historically been landfilled and have since been covered with soil and subsequently seeded. Some early successional weeds and grasses have also established themselves in the cleared area. There are few, if any, native plants present at the Stump Dump, Parcel 82(7). A number of longleaf pine (*Pinus palustrus*) saplings have also begun to colonize the areas that were cleared for landfilling purposes. Because the site is on a south-facing slope (the preferred habitat of the mountain longleaf pine), the colonization of this area by longleaf pine may be the early establishment of this unusual and ecologically important community. The area surrounding the Stump Dump is characteristic of a typic mesophytic forest.

There are four small ponds that adjoin the Stump Dump. One pond adjoins the Stump Dump, Parcel 82(7), on the northern boundary and is at the highest elevation of the site. Another pond is on the eastern boundary of the site, slightly down-slope of the northern-most pond. The remaining two ponds are at the southwestern corner of the site and are at the lowest elevation of the site. Three of the four ponds are connected via a rip-rap lined drainage ditch. All of the ponds exhibit the same characteristics, which are typical of man-made retention basins. They all have mud bottoms, are completely devoid of aquatic vegetation, and have no submerged structure. There is no native vegetation along the shoreline of any of the ponds. Although the majority of these ponds were dry at the time of the ecological investigation (September 2000), they most likely contain water during significant portions of the year. A rip-rap lined drainage ditch connects three of the four ponds and provides a spillway for overflow for the upper-most ponds. This drainage ditch provides no significant aquatic habitat because it does not hold water for any extended period of time.

Although the habitat present at the Stump Dump, Parcel 82(7), has been altered from its natural state, the grasslands provide habitat for a number of wildlife species including short-tailed shrew, white-tail deer, red fox, coyote, a number of species of mice and rats (e.g., white-footed mouse, eastern harvest mouse, cotton mouse, eastern woodrat, and hispid cotton rat), and eastern cottontail. Approximately 200 avian species reside at FTMC at least part of the year (ACOE, 1997). Common species that may occur in the vicinity of the Stump Dump include northern mockingbird (*Mimus polyglottus*), warblers *(Dendroica spp.*), American crow (*Corvus brachyrhynchos*), bluejay (*Cyanocitta cristata*), and Carolina chickadee (*Parus carolinensis*). Game birds that may be present in the vicinity of the Stump Dump include northern bobwhite (*Colinus virginianus*), mourning dove (*Zenaida macroura*), and eastern wild turkey (*Meleagris gallopavo*). A variety of raptors (e.g., red-tailed hawk, sharp-shinned hawk, barred owl, and great horned owl) could use portions of this area for a hunting ground, particularly the fringe

areas where the adjoining forested areas abut roads and the cleared area of the Stump Dump itself.

The ponds at the Stump Dump, Parcel 82(7), provide a good water source for the terrestrial wildlife species under normal circumstances and also provide habitat for a number of amphibian species and drought-tolerant fish species. In general, the terrain at FTMC supports large numbers of amphibians and reptiles. Jacksonville State University has prepared a report titled *Amphibians and Reptiles of Fort McClellan, Calhoun County, Alabama* (Cline and Adams, 1997). The report indicated that surveys in 1997 found 16 species of toads and frogs, 12 species of salamanders, 5 species of lizards, 7 species of turtles, and 17 species of snakes. Typical inhabitants of the terrestrial areas of the Stump Dump are copperhead (*Agkistrodon contortix*), king snake *(Lampropeltis getulus*), black racer (*Coluber constrictor*), fence lizard (*Sceloporour undulatus*), and six-lined racerunner (*Cnemidophorous sexlineatus*). Bullfrog *(Rana catesbeiana*) and leopard frog (*Rana sphenocephala*) are examples of amphibians that may be found in the ponds at the Stump Dump.

13.3.2 Chemicals Detected

Chemicals detected in soil, sediment, and surface water at the Stump Dump, Parcel 82(7), are summarized in Appendix A.

13.3.3 Chemicals of Potential Ecological Concern

COPECs are those constituents whose maximum detected concentrations exceed their respective ESVs. The COPECs that have been identified at the Stump Dump, Parcel 82(7), are the following:

- Surface Soil – aluminum, barium, beryllium, cobalt, copper, manganese, mercury, nickel, selenium, and zinc
- Surface Water – aluminum
- Sediment – aluminum, barium, beryllium, copper, selenium, 4,4'-DDE, 4,4'-DDT, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, pyrene, and trichlorofluoromethane.

13.3.4 SLERA Uncertainty Analysis

The following site-related constituents were detected in soil samples from the Stump Dump, Parcel 82(7), at concentrations that exceeded their respective ESVs (Table D-25): aluminum, barium, beryllium, cobalt, copper, manganese, mercury, nickel, selenium, and zinc. All of the constituents that exceeded their ESVs did so by less than an order of magnitude (HQs ranged

from 1.1 to 2.64), except aluminum and manganese. Because this area does not provide sensitive or unique terrestrial habitat and the HQs were almost all less than ten, it could be concluded that none of the constituents detected in soil at the site have the potential to pose significant ecological risks to the terrestrial habitats at FTMC.

All of the site-related constituents in surface water were less than their respective ESVs (Table D-26), except aluminum. Aluminum, barium, beryllium, copper, selenium, trichlorofluoromethane, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, pyrene, 4,4'-DDE, and 4,4'-DDT exceeded their respective ESVs for sediment (Table D-27). All of the site-related constituents in sediment that exceeded their ESVs did so nominally (HQs range from 1.09 to 4.42). Based on the fact that the ponds at the site provide low quality aquatic habitat (Section 13.3.1), these low-level exceedance of ESVs in surface water and sediment are not expected to present significant ecological risks to the aquatic ecosystems at FTMC. The various lines-of-evidence used to draw these conclusions are presented in Table D-29.

13.3.5 SLERA Conclusions

Terrestrial habitat at the Stump Dump, Parcel 82(7), is entirely made up of grasslands. The grasslands are comprised of areas that have historically been landfilled and have since been covered with soil and subsequently seeded. Some early successional weeds and grasses have also established themselves in the cleared area. Long-leaf pine saplings are also beginning to establish themselves on the south-facing slope (the preferred habitat of the mountain long-leaf pine) of this area. There are few, if any, native plants present at the site.

There are four small ponds that adjoin the Stump Dump, Parcel 82(7). One pond adjoins the site on the northern boundary and is at the highest elevation of the site. Another pond is on the eastern boundary of the site, slightly down-slope of the northern-most pond. The remaining two ponds are at the southwestern corner of the site and are at the lowest elevation of the site. Three of the four ponds are connected via a rip-rap lined drainage ditch. All of the ponds exhibit the same characteristics, which are typical of man-made retention basins. They all have mud bottoms, are completely devoid of aquatic vegetation, and have no submerged structure. There is no native vegetation along the shoreline of any of the ponds.

The following site-related constituents were detected in soil samples from the Stump Dump at concentrations that exceeded their respective ESVs (Table D-25): aluminum, barium, beryllium, cobalt, copper, manganese, mercury, nickel, selenium, and zinc.

All of the site-related constituents in surface water were less than their respective ESVs (Table D-26), except aluminum. Aluminum, barium, beryllium, copper, selenium, trichlorofluoromethane, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, pyrene, 4,4'-DDE, and 4,4'-DDT exceeded their respective ESVs for sediment (Table D-27)

These COPECs (Table D-28) have been identified through a very conservative screening process that utilizes ESVs based largely on NOAELs from the scientific literature and maximum detected constituent concentrations. If additional lines-of-evidence are considered, it could be concluded that none of these constituents pose significant ecological risk to terrestrial or aquatic ecosystems at Fort McClellan. If, based on a risk management decision, the potential ecological risks at the Stump Dump, Parcel 82(7), are determined to be "unacceptable" at this screening-level stage, then a BERA is appropriate. The goal of the BERA, if deemed necessary, will be to reduce the levels of uncertainty and conservatism in the assessment process and to determine the potential for ecological risk at the Stump Dump, Parcel 82(7), through a number of lines-of-evidence.

13.4 Recommendations

Based on the results of the field investigations, the current and proposed future land use, and the results of the risk assessments completed for Stump Dump, Parcel 82(7), the recommended remedy under CERCLA is No Further Action. No actions are required since no human health risk associated with chemical constituents was identified during the streamlined risk assessment using both a recreational user and residential land-use scenario. In addition, the ecological risk assessment indicated no significant ecological risk associated with the Stump Dump, Parcel 82(7).

To facilitate property reuse, the Army proposes, but is not limited to, several non-CERCLA actions for this site. Attachment 2 presents these proposals.

14.0 Summary and Recommendations

Summary. This EE/CA provides data to support the Army's actions at ten landfills/fill areas located at FTMC. The EE/CA was performed in accordance with current EPA guidance documents for a non-time-critical removal action under CERCLA. This EE/CA summarizes site characterization information and provides human health and ecological risk assessment for all landfills and fill areas in accordance with CERCLA criteria. In addition, for Landfills No. 2 and No. 3, this EE/CA identifies remedial action objectives, potential remedial action alternatives, analysis of these alternatives, and recommends a remedial action alternative. Table 14-1 summarizes the site characteristics of the landfills and fill areas. A summary of the risk assessments performed for the landfills and fill areas is found in Table 14-2.

Recommendations. Based on data presented in the EE/CA, human health and ecological risk assessment results, and evaluation of the alternatives, the Army recommends the following actions:

- ***Landfill No. 1, Parcel 78(6):*** Landfill No. 1 presents no unacceptable human health or ecological risks under CERCLA. Therefore, No Further Action under CERCLA is required.

- ***Landfill No. 2, Parcel 79(6):*** Lead, PAHs, and arsenic in surface soils pose unacceptable risks for a potential resident. Proposed reuse for Landfill No. 2 is passive recreation and the parcel presents no unacceptable human health risks for the recreational site-user. Surface water and sediments present no unacceptable risks for ecological receptors; metals and other compounds in surface soils pose potential risks for ecological receptors. However, the SLERA presents several uncertainty factors that may mitigate these risks. The Army proposes an LUC to restrict future residential reuse of the property.

- ***Landfill No. 3, Parcel 80(6):*** Exposures to surface soil (thallium) and groundwater (trichloroethene and 1,1,2-2 tetrachloroethane) present unacceptable risks to a resident. Proposed reuse for Landfill No. 3 is passive recreation, and the parcel presents no unacceptable human health risks for the recreational site-user. Additionally, Landfill No. 3 does not present any unacceptable risk to the ecological receptor. However, elevated levels of volatile organic compounds associated with landfilling activities have been detected in groundwater at the site. Therefore, the Army recommends a low permeability soil cover with LUCs and limited long-term groundwater monitoring. The Army is addressing groundwater concerns at this site through an ongoing remedial investigation. The proposed action is compatible with source reduction strategies that will facilitate any future groundwater treatment options the Army may propose.

Table 14-1

Summary of Landfill and Fill Area Site Characteristics
Fort McClellan, Calhoun County, Alabama

Site Name	Parcel No.	Area		Average Depth of Fill (feet bgs)	Fill Area Factor[a]	Estimated Fill Volume (yd^3)	UXO Site	Medical Debris Found[b]	Wetlands or Gray Bat Habitat Area
		Acres	ft^2						
Landfill No.1	78(6)	6.3	274,428	11.5	0.70	81,800	no	yes	no
Landfill No. 2	79(6)	5.6	243,936	8	0.75	54,200	no	no	Yes (L)
Landfill No. 3	80(6)	22.8	993,168	17	0.60	375,200	no	no	no
Landfill No. 4 and Industrial Landfill	81(5)	43.3	1,886,148	25	0.85	1,484,000	no	no	no
	175(5)	15.9	692,604	12	0.10	30,800	no	no	no
Fill Area North of Landfill No. 2	230(7)	2.4	104,544	15	0.50	29,000	yes	no	Yes (L)
Fill Area East of Reilly Airfield and Former Post Garbage Dump	227(7)	4.5	196,020	8	0.50	29,000	no	yes	Yes (M)
	126(7)	2	87,120	3	1.00	9,700	no	no	Yes (M)
Fill Area Northwest of Reilly Airfield	229(7)	5.87	255,697	8	0.70	53,000	no	yes	no
Fill Area at Range 30	231(7)	3.9	169,884	4	0.45	11,300	yes	no	no
Fill Area West of Iron Mountain Road	233(7)	1.1	47,916	1	0.45	800	yes	no	no
Stump Dump	82(7)	10	435,600	8	0.90	116,200	yes	no	no

[a] Engineer's estimate of ratio of fill material to total fill area volume based on method of waste placement.

[b] Medical debris: glass ware, vials, syringes, and intravenous tubing.

bgs - Below ground surface.

ft^2 - square feet

yd^3 - Cubic yard.

L - Low-quality habitat.

M - Moderate-quality habitat.

UXO - Unexploded ordnance.

Formula for estimation of Fill Volume:

Area (acre) x 43560 (ft^2/acre) x Depth (ft) / 27(ft^3/yd^3) x Factor = Volume (yd^3).

Table 14-2

Summary of Landfill and Fill Area Risk Assessments
Fort McClellan, Calhoun County, Alabama

Site, Parcel	Baseline	Proposed Reuse Scenario			Ecological Risk Assessment		
	Human Health Risk Assessment - Residential	Human Health Risk Assessment Recreational	Human Health Risk Assessment - Industrial		Soil	Surface Water	Sediment
			Grounds-keeper	Highway Worker			
Landfill No. 1, Parcel 78(6)	Acceptable	Acceptable	NA	NA	NR	NR	NR
Landfill No. 2, Parcel 79(6)	Unacceptable (SS)	Acceptable	NA	NA	PR	NR	NR
Landfill No. 3, Parcel 80(6)	Unacceptable (SS, GW)	Acceptable	NA	NA	NR	NR	NR
Landfill No. 4, Parcel 81(5), and Industrial Landfill, Parcel 175(5) (Permitted landfill)	Acceptable (Q) (GW metals only)*	NA	NA	NA	NR	NR	NR
Fill Area North of Landfill No. 2, Parcel 230(7)	Acceptable	Acceptable	NA	NA	PR	PR	PR
Fill Area East of Reilly Airfield, Parcel 227(7) and Former Post Garbage Dump, Parcel 126(7)	Acceptable	Acceptable	NA	NA	PR	PR	NR
Fill Area Northwest of Reilly Airfield, Parcel 229(7)	Acceptable (Q) (GW)	Acceptable	NA	NA	NR	PR	NR
Fill Area at Range 30, Parcel 231(7)	Acceptable(Q) (GW metals only)*	NA	Acceptable	NA	NR	NR	NR
Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7)	Acceptable (Q) (GW metals only)*	Acceptable	NA	Acceptable	NR	NR	NR
Stump Dump, Parcel 82(7)	Acceptable	Acceptable	NA	NA	NR	NR	NR

* Metals exceedance a result of high turbidity in groundwater samples.

GW - Groundwater.
NA - Not applicable.
NR - No significant risk.
PR - Potential risk.
Q - Qualified in the streamlined risk assessment.
SS - Surface soil.

- ***Landfill No. 4, Parcel 81(5) and the Industrial Landfill, Parcel 175(5):*** Landfill No. 4 and the Industrial Landfill present no unacceptable human health or ecological risks under CERCLA. The Army proposes No Further Action under CERCLA.

- ***Fill Area North of Landfill No. 2, Parcel 230(7):*** The Fill Area North of Landfill No. 2 presents no unacceptable human health risks under CERCLA. Soils, surface water, and sediments pose potential risks to ecological receptors (metals, pesticides, and SVOCs). However, the SLERA presents several uncertainty factors that could mitigate these risks. Therefore, No Further Action under CERCLA is required.

- ***Fill Area East of Reilly Airfield, Parcel 227(7) and the Former Post Garbage Dump, Parcel 126(7):*** The Fill Area East of Reilly Airfield and Former Post Garbage Dump do not pose any unacceptable risks to human health under CERCLA. Metals and pesticides in soils, and metals and SVOCs in surface water pose potential risks to ecological receptors. However, the SLERA presents several uncertainty factors that could mitigate these risks. Therefore, No Further Action under CERCLA is required.

- ***Fill Area Northwest of Reilly Airfield, Parcel 229(7):*** The Fill Area Northwest of Reilly Airfield does not present any unacceptable human health risks under CERCLA. Mercury in surface water presents a potential risk to ecological receptors. However, the SLERA presents several uncertainty factors that could mitigate these risks. Therefore, No Further Action under CERCLA is required.

- ***Fill Area at Range 30, Parcel 21(7):*** The Fill Area at Range 30 presents no unacceptable human health or ecological, risks under CERCLA. The Army proposes No Further Action at this site.

- ***Fill Area West of Iron Mountain Road and Range 19, Parcel 233(7):*** As shown on Table 14-2, the Fill Area West of Iron Mountain Road and Range 19 presents no unacceptable human health or ecological risks under CERCLA. The Army proposes No Further Action at this site.

- ***Stump Dump, Parcel 82(7):*** The Stump Dump presents no unacceptable human health or ecological risks under CERCLA. Therefore, No Further Action under CERCLA is required.

These actions comply with CERCLA, are compatible with land reuse plans, and are protective of human health and the environment. The Army also proposes, but is not limited to, several non-CERCLA actions at certain fill areas. Attachment 2 presents the non-CERCLA proposals.

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALARNG	Alabama Army National Guard
ALAD	d-aminolevulinic acid dehydratase
ALDOT	Alabama Department of Transportation
amb.	amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
AS/SVE	air sparging/soil vapor extraction
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AUF	area use factor
AWARE	Associated Water and Air Resources Engineers, Inc.
AWQC	ambient water quality criteria
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor; bioconcentration factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
BGR	Bains Gap Road
bgs	below ground surface
BHC	betahexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
$CaCO_3$	calcium carbonate
CAA	Clean Air Act
CAB	chemical warfare agent breakdown products
CAMU	corrective action management unit
CBR	chemical, biological, and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	carbonyl chloride (phosgene)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
CO_2	carbon dioxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; chemical of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical(s) of potential concern
COPEC	chemical(s)/constituent(s) of potential ecological concern
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent; Clean Water Act
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
‘D’	duplicate; dilution
D&I	detection and identification
DAAMS	depot area air monitoring system
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane

List of Abbreviations and Acronyms *(Continued)*

DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter; adamsite
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DSERTS	Defense Site Environmental Restoration Tracking System
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC_{50}	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical/Biological Command
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDA	U.S. Food and Drug Administration
Fe^{+3}	ferric iron
Fe^{+2}	ferrous iron
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
FMP 1300	Former Motor Pool 1300
f_{oc}	fraction organic carbon
FOMRA	Former Ordnance Motor Repair Area
FOST	Finding of Suitability to Transfer
Foster Wheeler	Foster Wheeler Environmental Corporation
FR	Federal Register
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GRA	general response action
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
H&S	health and safety
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
H_2O_2	hydrogen peroxide
HPLC	high performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
HRC	hydrogen releasing compound
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
‘I’	out of control, data rejected due to low recovery
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter

IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
JPA	Joint Powers Authority
K	conductivity
K_d	soil-water distribution coefficient
kg	kilogram
KeV	kilo electron volt
K_{oc}	organic carbon partioning coefficient
K_{ow}	octonal-water partition coefficient
$KMnO_4$	potassium permanganate
L	lewisite; liter
L/kg/day	liters per kilogram per day
l	liter
lb	pound
LBP	lead-based paint
LC	liquid chromatography
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LRA	land redevelopment authority
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MB	method blank
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCPA	4-chloro-2-methylphenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid
MCS	media cleanup standard
MD	matrix duplicate
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
MeV	mega electron volt
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MNA	monitored natural attenuation
MnO_4-	permanganate ion
MOA	Memorandum of Agreement
MOGAS	motor vehicle gasoline
MOUT	Military Operations in Urban Terrain
MP	Military Police
MPA	methyl phosphonic acid
MPM	most probable munition
MQL	method quantitation limit
MR	molasses residue
MRL	method reporting limit
MS	matrix spike
mS/cm	millisiemens per centimeter
mS/m	millisiemens per meter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
MWI&P	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
$NaMnO_4$	sodium permanganate
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NCRP	National Council on Radiation Protection and Measurements
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NO_3^-	nitrate
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
NRHP	National Register of Historic Places
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated

List of Abbreviations and Acronyms *(Continued)*

O_2	oxygen
O_3	ozone
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
OH•	hydroxyl radical
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORC	Oxygen Releasing Compound
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PERA	preliminary ecological risk assessment
PES	potential explosive site
Pest.	pesticides
PETN	pentarey thritol tetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PS	chloropicrin
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
R	rejected data; resample; retardation factor
R&A	relevant and appropriate
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration; red blood cell
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act
sc	clayey sands; sand-clay mixtures
Sch.	Schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDWA	Safe Drinking Water Act
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SF	cancer slope factor
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SINA	Special Interest Natural Area
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SMDP	Scientific Management Decision Point
s/n	signal-to-noise ratio
SO_4^{-2}	sulfate
SOD	soil oxidant demand
SOP	standard operating procedure
SOPQAM	U.S. EPA's *Standard Operating Procedure/Quality Assurance Manual*
sp	poorly graded sands; gravelly sands
SP	submersible pump
SPCC	system performance calibration compound
SPCS	State Plane Coordinate System
SPM	sample planning module
SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
SRM	standard reference material
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSL	soil screening level
SSSL	site-specific screening level
SSSSL	site-specific soil screening level
STB	supertropical bleach
STC	source-term concentration
STD	standard deviation

STEL	short-term exposure limit
STL	Severn-Trent Laboratories
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SWMU	solid waste management unit
SWPP	storm water pollution prevention plan
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TBC	to be considered
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
THI	target hazard index
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TR	target cancer risk
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
UBR	upper background range
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
UIC	underground injection control
UF	uncertainty factor
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VC	vinyl chloride
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

ATTACHMENT 2

NON-CERCLA ACTIONS

ATTACHMENT 2
Non-CERCLA Actions

Under the CERCLA investigation, the EE/CA determined the following sites present no unacceptable risk to human health or the environment. Therefore, remedial actions under CERCLA are not required at these sites. However, the Department of the Army plans to take certain actions to facilitate reuse and minimize safety concerns at these sites. These actions take into consideration the local community's stated future land use. These actions are not CERCLA actions and will not be addressed as such in future documents.

Landfill No. 1, Parcel 78(6). The Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of the potential presence of ordnance and explosives placed in the transfer documentation for the site, notice of landfill and covenant placed in the transfer documentation for the site, regrading and backfilling of trenches to eliminate ponding, surface debris cleanup as needed, decommissioning of the existing groundwater monitoring wells in accordance with ADEM requirements, installation of concrete monuments to delineate the boundary of Landfill No. 1, and demolition of unoccupied dwellings potentially affected by the landfill.

Landfill No. 2, Parcel 79(6). In addition to the proposed Land Use Control to prevent future residential reuse of the property, the Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of landfill and covenant placed in the transfer documentation for the site, site surface debris cleanup as needed, installation of concrete monuments to delineate the boundary of Landfill No. 2, placement of rip-rap and bedding for slope stabilization, and decommissioning of existing groundwater monitoring wells in accordance with ADEM requirements.

Fill Area North of Landfill No. 2, Parcel 230(7). The Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of landfill and covenant placed in the transfer documentation for the site, surface debris cleanup as needed, decommissioning of groundwater monitoring wells in

accordance with ADEM requirements, placement of rip-rap and bedding for slope stabilization, and installation of concrete monuments to delineate the boundary and provide notification of safety hazards at the site.

Fill Area East of Reilly Airfield & Former Post Garbage Dump, Parcels 227(7) and 126(7). The Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of landfill and covenant placed in the transfer documentation for the site, construction of a soil cover to provide a physical barrier to potential exposure, debris cleanup as needed, decommissioning of groundwater monitoring wells in accordance with ADEM requirements, and the installation of concrete monuments to delineate the boundary of the Fill Area East of Reilly Airfield and Former Post Garbage Dump. The soil cover over the exposed slope may encroach on the wetland area and a mitigation plan may be required for that action.

Fill Area Northwest of Reilly Airfield, Parcel 229(7). The Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of landfill and covenant placed in the transfer documentation for the site, construction of a soil cover to provide a physical barrier to potential exposure, debris cleanup as needed, decommissioning of groundwater monitoring wells in accordance with ADEM requirements, and the installation of concrete monuments to delineate the boundary of the Fill Area Northwest of Reilly Airfield.

Stump Dump, Parcel 82(7). The Army has determined that certain actions may be completed to promote reuse of the property and minimize safety concerns. These actions will be in accordance with the proposed future land use, and may include but are not limited to the following: notice of landfill and covenant placed in the transfer documentation for the site, installation of concrete monuments to delineate the boundary of the site, and decommissioning of existing groundwater monitoring wells in accordance with ADEM requirements.