FINAL
REMEDIAL INVESTIGATION REPORT

Volume II - Appendices A through G

REMEDIAL INVESTIGATION OF BURNING GROUNDS, SANITARY LANDFILL, AND PISTOL RANGE AREAS (REMAINING PROPERTY OF THE U.S. GOVERNMENT) CORNHUSKER ARMY AMMUNITION PLANT GRAND ISLAND, NEBRASKA

Prepared for:

U.S. Army Corps of Engineers
Omaha District

Contract: W9128F-16-D-0014
Task Order No. 0002
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APPENDIX A

PHOTOGRAPHS

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PHOTOGRAPH LOG

Date: March 14, 2018

Photograph 1 Notes:

Lean clay encountered in the 20B-MW06 borehole between topsoil and Upper Grand Island Aquifer (UGIA) sand. Wet, iron-stained very-coarse-sand sized clasts are also visible in the photograph.

Photograph 2 Notes:

Clean, well-graded, sub-rounded, medium to very coarse sand of the UGIA and Lower Grand Island Aquifer (LGIA) that extended from 11 feet to 36.5 feet below grade.

PHOTOGRAPH LOG

Date: March 14, 2018

Photograph 3 Notes:

"Blue Clay" of the Fullerton Formation was encountered at 36.5 feet below grade at monitoring well 20B-MW06. Drilling concluded at 40 ft upon discovering this clay, which indicated that the had reached the bottom of the LGIA.

Photograph 4 Notes:

Bentonite plug that were installed at 20B-MW06 from 20-24ft below grade. Bentonite pellets are "time release" to ensure installation at the appropriate interval prior to curing.

PHOTOGRAPH LOG

Date: March 15, 2018

Photograph 1 Notes:

Cement grout seal (95% Portland cement and 5% bentonite) mixing process to prepare for placement into borehole.

Photograph 2 Notes:

Lean clay encountered in 20B-MW08 between the topsoil and the UGIA. Iron stained, wet, very-coarse-sand sized clasts illustrated in photograph.

PHOTOGRAPH LOG

Date: March 15, 2018

Photograph 3 Notes:

Soft topsoil has caused vehicles to become stuck on several occasions. Team considers agenda considering forecasted rain.

Photograph 4 Notes:

The clay sand interface at monitoring well 20B-MW08 was encountered at 14.75 feet bgs. UGIA sand is identical to that of monitoring wells MW05 and MW06 in Tract 20B.

PHOTOGRAPH LOG

Date: March 15, 2018

Photograph 5 Notes:

"Blue Clay" encountered in monitoring well 20B-MW08 in the 38.5 to 40 ft bgs split spoon. Lower sand/clay interface assumed to be around 37 ft bgs (between the 33.5-35 ft split spoot and the 38.5-40 split spoon).

Photograph 6 Notes:

GSI crew pours sand pack around the screen of monitoring well 20B-MW08. The sand pack extends two feet above the top of the screen.

PHOTOGRAPH LOG

Date: March 17, 2018

Photograph 1 Notes:

Wells 20B-MW07 and 20B-MW08 have been installed (excluding concrede pads and bollards). Tire ruts from wet conditions are also shown.

Photograph 2 Notes:

16/30 sand pack used in the boreholes from two feet above the top of the screen to the bottom of the borehole.

PHOTOGRAPH LOG

Date: March 17, 2018

Photograph 1 Notes:

Wells 20B-MW07 and 20B-MW08 have been installed (excluding concrede pads and bollards). Tire ruts from wet conditions are also shown.

Photograph 2 Notes:

16/30 sand pack used in the boreholes from two feet above the top of the screen to the bottom of the borehole.

PHOTOGRAPH LOG

Date: March 17, 2018

Photograph 1 Notes:

Monitoring well and protective bollards were hand augered to 4 and 2 feet, respectively, and scanned for UXO prior to advancement via mechanized equipment.

PHOTOGRAPH LOG

Date: March 18, 2018

Photograph 1 Notes:

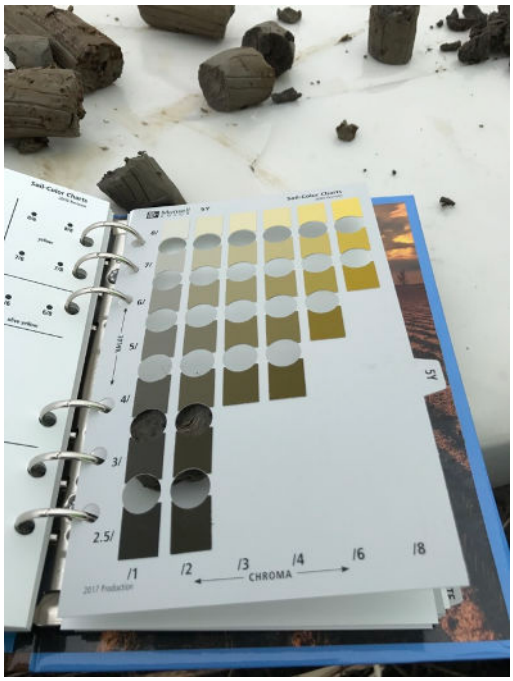
Clay similar in color to the “Blue Clay” typically encountered at the base of the LGIA was encountered at 20B-MW02 from 8.5 to 9 ft bgs.

Photograph 2 Notes:

This track-mounted auger rig replaced the truck-mounted rig to better navigate the muddy terrain. This rig operated without issue in the poor site conditions.

PHOTOGRAPH LOG

Date: March 26, 2018



Photograph 1 Notes:

Munsell Soil Color book used to determine the appropriate color of soil. This photo is of 9.5-10.5ft. interval of BKRD-LGIA-MW16.

Photograph 2 Notes:

Track HSA encountered clay between 37.5-39.5ft. at BKRD-LGIA-MW16

PHOTOGRAPH LOG

Date: March 27, 2018

Photograph 1 Notes:

GSI crew of Tinnell and Hopkins at drill location BKRD-LGIA-MW19 donning the appropriate Level D PPE.

Photograph 2 Notes:

From left to right: topsoil, 2.5Y4/3 silty clay, and 5Y4/1 silty clay; UGIA and LGIA sand; and “Blue Clay” of the Fullerton Formation. This lithology is consistently encountered (in the aforementioned order) in the boreholes advanced throughout Background Area 3.

PHOTOGRAPH LOG

Date: March 28, 2018

Photograph 1 Notes:

BKRD-LGIA-MW17 displays the well with orange casing and grout surface seal. This illustrates the stage prior to installation concrete pad and bollards.

Photograph 2 Notes:

Upon demob from Background Area 3 on March 28th, the ATI crew inspected ground conditions on the Southern Fuse Destruction Area in Tract 20B to observe the response to several consecutive dry days. The area apparently remains soft and muddy.

PHOTOGRAPH LOG

Date: March 29, 2018

Photograph 1 Notes:

Depicted is the construction area adjacent to the work site at BKRD-UGIA-MW09

Photograph 2 Notes:

GSI Bobcat shown compared to the dense vegetation, which is a consistent characteristic of location BKRD3.

PHOTOGRAPH LOG

Date: March 30, 2018

Photograph 1 Notes:

Head driller James Tinnell of GSI using his Bobcat to drill bore holes for the bollards to be placed around BKRD-LGIA-MW18.

Photograph 2 Notes:

Stuart Cameron of ATI examining a bore hole sample from location 21B-BPA-UGIA-MW03. Cameron is also donning the appropriate Level D PPE; high-visibility clothing, steel-toed boots, hard hat, and Nitrile gloves. In addition to the aforementioned PPE safety glasses and hearing protection are also required near machinery and equipment.

PHOTOGRAPH LOG

Date: March 30, 2018

Photograph 3 Notes:

GSI drillers Tinnell and Hopkins at work on location 21B-BPA-UGIA-MW03 donning the appropriate Level D PPE.

PHOTOGRAPH LOG

Date: March 31, 2018

Photograph 1 Notes:

GSI drillers along with their daily equipment: Track HSA rig, water truck, Bobcat, and portable decon station in the foreground.

Photograph 2 Notes:

Weather for March 31st is overcast, high wind gust of over 40mphs, and temperature in the mid 30's.

PHOTOGRAPH LOG

Date: March 31, 2018

Photograph 3 Notes:

Clay encountered at the base of the Grand Island Aquifer 21B-DS-LGIA-MW05 has a higher silt content and color with the "Blue Clay" found at similar depths from track 20B and BKRD3.

PHOTOGRAPH LOG

Date: April 1, 2018

Photograph 1 Notes:

Water color upon completion of well BKRD-UGIA-MW08

Photograph 2 Notes:

Water color upon completion of well BKRD-UGIA-MW07

PHOTOGRAPH LOG

Date: April 1, 2018

Photograph 3 Notes:

Water color upon completion of well BKRD-UGIA-MW10

PHOTOGRAPH LOG

Date: April 2, 2018

Photograph 1 Notes:

Water color upon completion of well 20B-UGIA-MW01

Photograph 2 Notes:

Water color upon completion of well 20B-LGIA-MW02

PHOTOGRAPH LOG

Date: April 2, 2018

Photograph 3 Notes:

Water color upon completion of well 20B-UGIA-MW03

Photograph 4 Notes:

Water color upon completion of well 20B-LGIA-MW04

PHOTOGRAPH LOG

Date: April 2, 2018

Photograph 5 Notes:

Water color upon completion of well 20B-UGIA-MW05

Photograph 6 Notes:

Water color upon completion of well 20B-LGIA-MW06

PHOTOGRAPH LOG

Date: April 3, 2018

Photograph 1 Notes:

Water color upon completion of well BKRD-LGIA-MW18

Photograph 2 Notes:

Water color upon completion of well BKRD-LGIA-MW09

PHOTOGRAPH LOG

Date: April 3, 2018

Photograph 3 Notes:

Water color upon completion of well BKRD-LGIA-MW16

Photograph 4 Notes:

Water color upon completion of well BKRD-LGIA-MW17

PHOTOGRAPH LOG

Date: April 3, 2018

Photograph 5 Notes:

Water color upon completion of well BKRD-LGIA-MW20

Photograph 6 Notes:

Water color upon completion of well BKRD-LGIA-MW06

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PHOTOGRAPH LOG

Date: April 4, 2018

Photograph 1 Notes:

Wells 21B-BPA-UGIA-MW03 and 21B-BPA-LGIA-MW04 are shown being developed. The water depth, pH, conductivity, temperature, and turbidity were monitored continuously, and the wells were surged intermittently to remove fines from the screen and filter pack.

Photograph 2 Notes:

Water from 21B-BPA-LGIA-MW04 after development.

PHOTOGRAPH LOG

Date: April 4, 2018

Photograph 3 Notes:

Water from 21B-BPA-UGIA-MW03 after development.

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PHOTOGRAPH LOG

Date: April 17, 2018

Photograph 1 Notes:

Depicted is the soil pile at Tract 19B.

Photograph 2 Notes:

Soil samples packed into coolers. Each sample is contacting ice inside black trash bags.

PHOTOGRAPH LOG

Date: April 17, 2018

Photograph 3 Notes:

Ice completely covering the samples with a temp. blank at the bottom of each cooler.

Photograph 4 Notes:

Coolers packed and ready to be sent. COC shown on both coolers in the proper position.

PHOTOGRAPH LOG

Date: April 18, 2018

Photograph 1 Notes:

Stuart Cameron of ATI shown hand augering at location Tract 19B-SP43F. Shown is the platform constructed for solid footing to ensure a more efficient way to auger. Note the hilly landscape that is Tract 19B and the ominous clouds.

Photograph 2 Notes:

An overview of Tract 19B looking West from location SP-42D. The stake in the left foreground can give some scale to the photo. To the center and right if the photo you can see the northern peak of the pile.

PHOTOGRAPH LOG

Date: April 19, 2018

Photograph 1 Notes:

The northern most ridge line of Tract 19B looking east to west. All of the location are 3/4 up the hill making the wooden platform essential when hand augering.

Photograph 2 Notes:

Stuart Cameron of ATI shown hand augering at Tract 19B-SP43A standing on the aforementioned wooden platform.

PHOTOGRAPH LOG

Date: April 20, 2018

Photograph 1 Notes:

Stuart Cameron of ATI shown hand augering at location 19B-SP44B. Weather conditions are overcast, wind gusts of 22mph, and chilly temperatures.

PHOTOGRAPH LOG

Date: April 21, 2018

Photograph 1 Notes:

Stuart Cameron of ATI seen hand augering the first location of the day, 19B-SP31J.

Photograph 2 Notes:

View of Tract 19B from the highest location: 19B-SP28B. The picture is looking west to east, Connex and GSI trailer can be seen in the background

PHOTOGRAPH LOG

Date: April 22, 2018

Photograph 1 Notes:

Stuart Cameron of ATI seen at Tract 19B-SP01B using the hand auger.

PHOTOGRAPH LOG

Date: April 23, 2018

Photograph 1 Notes:

Project Manager David Nelson shown inspecting BKRD-LGIA-MW09.

Photograph 2 Notes:

Shown is the repaired barbed wire fence adjacent to the staging area to prevent unauthorized access into the site.

PHOTOGRAPH LOG

Date: April 23, 2018

Photograph 3 Notes:

Shown is the newly repaired gate with a new padlock further preventing unauthorized access into the site.

PHOTOGRAPH LOG

Date: April 30, 2018

Photograph 1 Notes:

Grid stake in the foreground at Tract 19C as well as the topography of undulating dirt piles. The fence line at the westernmost edge of Tract 19C can be seen in the background.

Photograph 2 Notes:

Brant Hylinski of ATI seen using the GPS on Tract 21B Background 2. This picture looks north from Background 2 with heavy equipment seen to the west.

PHOTOGRAPH LOG

Date: May 1, 2018

Photograph 1 Notes:

Upper Grand Island Aquifer Sand. This was collected from a split spoon advanced from 12.5-14.5 ft bgs at 19C-LGIA-DPT07.

Photograph 2 Notes:

The clay/sand interface at 19C-LGIA-DPT12 can be seen in the split spoon advanced from 12.5-14.5 ft bgs. Per this observation, it was recorded that the top of the Grand Island Aquifer is 14.25 ft bgs at this location.

PHOTOGRAPH LOG

Date: May 1, 2018

Photograph 3 Notes:

"Blue Clay" of the Fullerton formation that was encountered at 36.5ft bgs.

PHOTOGRAPH LOG

Date: May 2, 2018

Photograph 1 Notes:

Rig set up at location BKRK-LGIA-MW15

Photograph 2 Notes:

Second soil sample from location BKRD-LGIA-MW15

PHOTOGRAPH LOG

Date: May 2, 2018

Photograph 3 Notes:

Blue clay encountered at 37 feet.

Photograph 4 Notes:

Edge of soil pile in Background Area 1. The top is about 8 ft above the elevation of surrounding areas.

PHOTOGRAPH LOG

Date: May 2, 2018

Photograph 5 Notes:

BKRD-UGIA-MW05 prior to pad and bollard installation.

PHOTOGRAPH LOG

Date: May 2, 2018

Photograph 1 Notes:

The two cores shown display the interface between clay and sand

PHOTOGRAPH LOG

Date: May 4, 2018

Photograph 1 Notes:

Stuart Cameron logging soil with the monsel soil color book.

Photograph 2 Notes:

Drilling rig and team set up at location BKRD-UGIA-03

PHOTOGRAPH LOG

Date: May 4, 2018

Photograph 3 Notes:

The overburden material on the soil pile in Background Area 3 was dense and hard and consisted of intermingled lithology; in contrast, the native soil was softer and consistent in lithology. The transition from overburden to natural soil was encountered at

PHOTOGRAPH LOG

Date: May 5, 2018

Photograph 1 Notes:

Augers are decontaminated with a power washer. The water and soil collects in a portable Decon pad and upon evaporation of the water, the remaining soil is transferred to the rolloff.

PHOTOGRAPH LOG

Date: May 6, 2018

Photograph 1 Notes:

Rolloff containing IDW is covered with a tarp and made taught to resist wind.

PHOTOGRAPH LOG

Date: May 7, 2018

Photograph 1 Notes:

Well development setup for BKRD-UGIA-MW01

Photograph 2 Notes:

Water sample collected at BKRD-LGIA-MW11

PHOTOGRAPH LOG

Date: May 7, 2018

Photograph 3 Notes:

Water sample at BKRD-LGIA-MW12

Photograph 4 Notes:

Water collected at BKRD-UGIA-MW04

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PHOTOGRAPH LOG

Date: May 8, 2018

Photograph 1 Notes:

Water sample taken at BKRD-UGIA-MW03

Photograph 2 Notes:

Water sample taken at BKRD-UGIA-MW13

PHOTOGRAPH LOG

Date: May 8, 2018

Photograph 3 Notes:

Water sample taken at BKRD-UGIA-MW02

Photograph 4 Notes:

Water sample taken at BKRD-UGIA-MW01

PHOTOGRAPH LOG

Date: May 8, 2018

Photograph 5 Notes:

Water sample taken at BKRD-UGIA-MW14

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PHOTOGRAPH LOG

Date: May 9, 2018

Photograph 1 Notes:

Water sample taken at BKRD-UGIA-MW05

Photograph 2 Notes:

Water sample taken at BKRD-LGIA-MW14

PHOTOGRAPH LOG

Date: May 14, 2018

Photograph 1 Notes:

First split spoon sample recovered at location 21B-DS-LGIA-MW04 at interval depth of 3.5-5.5ft.

Photograph 2 Notes:

Depicted is the morass of Tract 21B that ATI, HGL, and GSI has to navigate through to get to the locations for drilling.

PHOTOGRAPH LOG

Date: May 14, 2018

Photograph 3 Notes:

Split spoon sample at interval depth of 38.5-40.5ft.

Photograph 4 Notes:

GSI equipment surrounds 21B-DS-LGIA-MW03 as they set the bentonite past 4pm and will be back tomorrow morning to complete the well installation.