
PROPOSED PLAN

**INCENDIARY FUEL DISPOSAL AREA
(SOP-Z)**

**FORMER SCIOTO ORDNANCE PLANT
MARION, OHIO**

FUDS Property No.: G05OH0980

Prepared by:

U.S. Army Corps of Engineers
Louisville District
600 Dr. M.L. King Jr. Pl.
Louisville, KY 40202-2232



30 January 2015

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30 January 2015

Executive Summary

This Proposed Plan is for the Incendiary Fuels Disposal Area of the former Scioto Ordnance Plant (SOP) Marion Ohio. This area is referred to as SOP-Z and includes two adjacent lagoons (hereby referred to as east or west lagoon) and an adjacent 3-acre fire break area. Response activities completed by the United States (U.S.) Department of Defense (DOD) at the SOP-Z included a Non-Time Critical Removal Action (NTCRA) addressing carcinogenic polynuclear aromatic hydrocarbons (PAHs) a Time Critical Removal Action (TCRA) for white phosphorous (WP) and material potentially presenting an explosive hazard (MPPEH) (i.e., M-74 incendiary bomblets and M-142 fuzes) associated with DOD activities. These response actions were taken under the Defense Environmental Restoration Program for Formerly Used Defense Sites (FUDS), as implemented by the U.S. Army Corps of Engineers (USACE) on behalf of the DOD. USACE implements the FUDS program consistent with the Comprehensive Environmental Response, Compensation, and Liability Act.

In order to address the DOD contamination at the SOP-Z area, U.S. Army Corps of Engineers (USACE had to) handle post World War II waste material (“non-DOD waste material”) that had been placed on top of the DOD material in the lagoons at SOP-Z by non-DOD landowners. The material placed in the lagoons (sometimes referred to as a “dump”) included concrete, bricks, metal, shingles, trash, soil, and burned and charred building materials associated with the demolition of buildings at SOP. To reach the depth of contaminated soils resulting from past DOD activities, USACE handled non-DOD waste material. The conclusion of the removal action at the lagoons restored the area with clean soil, which reduced the potential for human contact with any residual materials associated with the post-DOD activities.

During the closeout of the lagoons, a cache of M-74 bomblets were discovered east and beyond the extent of the lagoons. The new cache was in the former 3-acre fire break area adjacent to the lagoons and within the radius of Monitoring Well 01 (MW-01) that was decommissioned. A geophysical survey of the 3 -acre fire break area did not find any other burial pit of the M-74s. The M-74s were removed per DOD procedure, and the remaining soil was sifted, tested, and shown to be absent PAH contamination, which allowed the soil to be returned to the excavated area.

Previous USACE removal actions have removed the DOD-related contamination that is eligible under the Formerly Used Defense Sites (FUDS) program to be addressed by USACE. Post removal action sampling and inspection for the lagoons and the 3-acre fire break area adjacent to the lagoons demonstrate that DOD-associated materials were removed and resulted in reduction of human-health and environmental risks associated with carcinogenic PAHs. As a consequence of these achievements, the DOD is proposing that No Further Action is necessary. In addition, it was unnecessary to proceed to a Feasibility Study in accordance with the DERP Manual [DODM 4715.20, paragraph 4.b.(5)3.h. in Enclosure 3], the FUDS manual ER 200-3-1, Figure 4-1, and consistent with EPA guidance [EPA 540-R-98-031, paragraph 8.1 and highlight 8-6].

ACRONYMS AND ABBREVIATIONS

AL	Action Limit
AM	Action Memorandum
ARARS	applicable or relevant and appropriate requirements
B(a)P	benzo(a)pyrene
CAPE	Cape Environmental Management Inc
CELRL	USACE Louisville District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COPC	contaminants of potential concern
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DOD	United States Department of Defense
DDESB	Department of Defense Explosive Safety Board
DU	Decision Unit
EE/CA	Engineering Evaluation / Cost Analysis
EM	Engineering Manual
EP	Engineering Pamphlet
EQM	Environmental Quality Management, Inc.
ERA	Level 1 Ecological Risk Assessment
ESS	Explosives Safety Submittal
FUDS	Formerly Used Defense Site
gpf	grain-per-foot
GPS	Global Positioning System
HE	high energy
HTRW	hazardous, toxic or radioactive waste
ISM	incremental sampling methodology
IVS	Instrument Verification Strip
m	meter(s)
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
MI	multi-incremental
mm	millimeter(s)
MPPEH	material potentially presenting an explosive hazard
mV	milli-volt(s)
MWH	Montgomery Watson Harza
NAEVA	NAEVA Geophysics, Inc.

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEW	net explosive weight
ng/kg	nanograms per kilogram
NTCRA	Non-Time-Critical Removal Action
O&M	operation and maintenance
Ohio EPA	Ohio Environmental Protection Agency
OSWER	USEPA Office of Solid Waste and Emergency Response
PAH	polynuclear aromatic hydrocarbon
ppb	part(s) per billion
PRG	Preliminary Remediation Goal
QA	quality assurance
QC	quality control
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SOP	Scioto Ordnance Plant
SOP-Z	Incendiary Fuel Disposal Area
SRE	Streamlined Risk Evaluation
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	semi-volatile organic compound
TCDD	tetrachlorodibenzodioxin
TCRA	Time-Critical Removal Action
TEF	toxicity equivalency factor
TEQ	toxicity equivalent
TFU	Thermal Flashing Unit
TMV	toxicity, mobility or volume
U.S.	United States
USACE	United States Army Corps of Engineers
USAE	USA Environmental, Inc.
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
WP	white phosphorous
WWII	World War II

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1.0 Introduction

This Proposed Plan addresses the former Incendiary Fuel Disposal Area (SOP-Z or “the Site”) at the former Scioto Ordnance Plant, in Marion, Ohio. **Figures 1, 2, and 7** illustrate the locations of the Incendiary Fuel Disposal Area (SOP-Z), and the follow-on removal area in the 3-acre fire break area adjacent to SOP-Z. The Site is part of a Formerly Used Defense Site (FUDS) property (FUDS Property Number G05OH0980).

Under the Defense Environmental Restoration Program (DERP) FUDS program, the United States (U.S.) Army Corps of Engineers (USACE) is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (*40 Code of Federal Regulations*, Part 300).

The U.S. Department of Defense (DOD) used SOP between 1942 and 1945. The property is located geographically at 40° 37' 49" North and 83° 03' 03" West in the 4th Congressional District and Environmental Protection Agency (EPA) Region 5. The subject property is bounded by Mar-sailles-Galion Road to the north, State Route 98 to the east, railroad tracks comprising the Erie Railroad right-of-way (in Claridon Township), and Fairground Road and Marion-Williamsport Road (in Marion Township) to the south, and Pennsylvania Railroad right-of-way on a southwest to northeast diagonal forming the western border.

From 1946–1948, the DOD transferred the property to various private and public entities. Following transfer of the property, the buildings and structures in the vicinity of SOP were demolished by the property owners, and dumped in the lagoons. The discarded building material (e.g., wood, wire, metal supports, roofing) and debris that the property owners evidently burned to consolidate was then covered with hard building rubble (e.g., concrete, brick, etc.). These later materials (hereafter “non-DOD waste material”, which contain PAH contamination from open burning operations by others.) were placed over and adjacent to materials generated by and disposed of by the DOD at SOP-Z. The DOD materials consisted primarily of incendiary petroleum-based fuels (i.e., PT1 and napalm), referred to as “goop,” that the DOD allowed to burn at high temperatures on the banks of the eastern and southern side of the east lagoons and then pushed into the lagoons. The burnt goop is easily identifiable as a black soft pitch-like matter and/or a hard and brittle gray ash. Photos of these DOD and non-DOD waste materials are provided in **Attachment A**.

USACE investigated the DOD-generated environmental contamination at the Site and conducted multiple removal actions. The original removal action was intended to address DOD-related material within the SOP-Z area that was contaminated with carcinogenic polynuclear aromatic hydrocarbons (PAHs) thought to be a consequence of the DOD using of the area for the disposal and burning of petroleum-based incendiary fuels. Subsequent waste characterization and confirmation sampling indicate that PAH contamination was not related to DOD-related waste material.

During the removal action, munitions and explosives of concern (MEC) (i.e., M-74 bomblets) and white phosphorous (WP) were encountered. The uncovering of M-74s and WP halted the PAH removal effort, and an investigation of the M-74s and WP occurred under an approved DOD Explosive Safety Board (DDESB) Time Critical Explosive Safety Submission (ESS) (EQM/USAE, 2011). Follow-on removal actions included a MEC clearance over a 3-acre fire break area east of SOP-Z, which resulted in removing 549 intact and partial M-74 bomblets. The PAH removal effort was completed with the collection of seven multi-incremental samples (defined in Section 3.2) with analytical results below U.S. Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs) (2004). These PRGs are the action levels (AL) used throughout SOP-Z investigations and removal actions to maintain continuity of clean-up objectives.

USACE – Louisville District (CELRL) is the lead agency for the cleanup activities and is responsible for determining and conducting the cleanup activities at the Site. The Ohio Environmental Protection Agency (Ohio EPA) is the lead regulatory agency for the state of Ohio. USACE, in coordination with the Ohio EPA, prepared this Proposed Plan to gain input from the public on the proposed remedial alternative. This Proposed Plan summarizes the environmental investigations and removal actions performed to-date, and presents the rationale for the USACE’s proposed decision for No Further Action at the Site.

USACE is seeking public input on the decision and encourages the public to review this Proposed Plan, Administrative Record file and provide comments. Comments on the Proposed Plan can be submitted during the public review period. The USACE will review and consider the public and regulator comments received during this review period.

USACE and Ohio EPA encourage the public to review these documents to gain a more comprehensive understanding of the Site and activities that have been conducted to date.

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2.0 Site Background

SOP was located 1 mile northeast of Marion, Ohio, and originally comprised roughly 12,500 acres. It is bordered on the west by the Pennsylvania Railroad right-of-way, on the east by State Route 98, on the south by Fairgrounds Road and the Erie Railroad right-of-way, and on the north by Marseilles-Gallion Road. Construction began in May 1942 and SOP was ready for production by the fall of that year. Fuzes, boosters, 20-millimeter (mm) bullets, .50-caliber shells, 65-mm shells, 75-mm shells, incendiary bombs, and napalm barrel bombs were manufactured. Production ceased with the end of World War II (WWII). Present land use includes commercial and light industry, sparsely populated farmlands, and residential property.

The former Incendiary Fuel Disposal Area is located north of Likens Road, between Pole Lane and New Road (see **Figure 1** for location), and consisted of two adjacent rectangular disposal lagoons, referred to as the east and west lagoons, which occupy 3 acres. The lagoons were used

for disposal of “off-spec” incendiary fuel-related materials (i.e., incendiary fuels, incendiary bombs, napalm barrel bombs and components of these devices) from Artillery Fuze Load Line F4. The incendiary bombs were 10-pound M-74 and 500-pound M-76, which both used the incendiary fuel PT1 (i.e., mixture of magnesium with gasoline and other petroleum products thickened with isobutyl methacrylate) with WP igniting charge. The size of the napalm barrel bombs constructed at SOP is not known. Napalm is gasoline thickened with M1 (i.e., mixture of aluminum naphthenate, aluminum oleate, and aluminum laurate) or M2 (same as M1 with added silica). The term “goop” has been applied to the incendiary fuels. The lagoons have also been referred to as the “goop ponds.”

After closure in 1945, post-DOD property owners graded the surrounding area for farming and moved various materials, including charred and burnt building structures and soil to the lagoons. The DOD wastes were abutted and mostly obscured by non-DOD waste materials. Eventually, the lagoons were filled and the area became an island located within a farmer’s field (**Figure 2**). The area of SOP-Z is currently privately owned and un-used; however, it is surrounded by agricultural fields. The 3-acre fire break area is located east of the east lagoon.

3.0 Site Characteristics

3.1 Characterization of Site – Prior to Removal Action

A multiple-phase investigation of SOP-Z was conducted that involved the collection and analysis of soil and groundwater samples. PAHs and dioxins/furans were identified as contaminants of potential concern (COPCs) in soil. **Figure 3** (MWH, 2009) shows the locations of samples obtained during investigation of SOP-Z.

The figure denotes the approximate surface and subsurface soil extent of PAHs, which are referred to on the figure as semi-volatile organic compounds (SVOCs), relative to exceeding the USEPA residential PRGs. The color blue on the figure indicates the location of sample results less than the PRGs, while green and red colors indicate sample results higher than the PRGs (with red indicating the highest concentrations). The samples that are greater than the PRGs are centered in an area where burned and charred building material predominated. Lower levels of PAHs are shown along the eastern and southern side of the east lagoon where historical photographs show the greatest WWII-era waste disposal activities.

The resultant threats of these COPCs to public health and welfare were determined during a Streamlined Risk Evaluation (SRE) (MWH, 2009) and an Engineering Evaluation/Cost Analysis (EE/CA) (MWH, 2009). The threats to human health presented by SOP-Z without removal action were:

- 1) Based on a comparison of surface soil concentrations to risk-based concentrations (i.e., USEPA Region 9 residential PRGs), surficial soils pose a potential adverse risk, if the Site were used for residential development. Predicted risks based on the maximum surface soil concentrations of the COPCs were above the 1×10^{-4} (i.e., one in 10,000 or 0.0001) cumulative cancer risk threshold used for evaluating when removal action is likely warranted. The primary risk driver was carcinogenic PAHs.

While concentrations of dioxins/furans were detected above the residential soil PRG for 2,3,7,8-tetrachlorodibenzodioxin (TCDD), the cancer risk was much lower than the PAH risks, and below the upper boundary of the cancer risk range (1×10^{-4}). All of the total toxicity equivalent

(TEQ) dioxin/furan soil concentrations were less than the 1,000 nanograms per kilogram (ng/kg) [i.e., 1 parts per billion (ppb)] Superfund Dioxin Cleanup policy criterion]. All the total TEQ dioxin soil concentrations are less than the 1000 ng/kg (or 1 ppb) the Superfund Dioxin Cleanup policy criteria (USEPA 1989, 1998). This USEPA policy states “One ppb (TEQs, or toxicity equivalents) is to be generally used as a starting point for setting cleanup levels for CERCLA remedial sites and as a PRG for remedial sites for dioxin in surface soil involving a residential exposure scenario. For commercial/industrial exposure scenarios, a soil level within the range of 5 ppb to 20 ppb (TEQs) should generally be used as a starting point for setting cleanup levels at CERCLA remedial sites and as a PRG for remedial sites for dioxin in surface soil. These levels are recommended unless extenuating site-specific circumstances warrant a different level.

- 1) There were no suspected public health and welfare threats associated with subsurface soil, surface water, or groundwater. In 2007 USACE determined in a groundwater demonstration final report that no further action was necessary for groundwater underlying the former SOP. In July 2007, Ohio EPA concurred.
- 2) During completion of the removal action for PAHs, white phosphorus (WP), a munition constituent (MC) associated with the cache of buried M-74s was encountered. WP presents a fire hazard when exposed to the air.

USACE determined what threats to the environment at SOP-Z existed by completion of the Level 1 Ecological Risk Assessment (ERA) (MWH, 2006). The Level I ERA determined that no sensitive habitats existed on-site that warranted further ecological evaluation. Using the results of the investigation activities summarized above, USACE developed a comparative analysis of removal action alternatives and selected a preferred alternative which are documented in the EE/CA (MWH, 2009). The EE/CA reflected USACE’s determination that a non-time-critical removal action (NTCRA) should be implemented at SOP-Z for PAH compounds in shallow soil.

Subsequent to the NTCRA, a follow on Time Critical Removal Action (TCRA) for MEC was conducted by USACE at the 3-acre fire break area east of the lagoons. This same area was not shown to contain PAHs in the soil after the removal action was completed.

3.2 Removal Action

The Non-Time-Critical Removal Action (NTCRA), August 2010 AM, and the follow-on action identified in an amendment to the October 2013 AM, were undertaken because SOP-Z was determined to present a threat to human health or welfare or the environment because of the following conditions:

- Actual or potential exposures to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants. (e.g., PAHs and dioxins/furans).
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate (e.g., metals, PAHs and dioxins/furans).
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released (i.e., wind and storm water).

Given the site conditions and the nature of the munitions, plus the potential for uncontrolled release from the Site, an imminent and substantial endangerment to public health, or welfare, or environment would remain if response actions selected in the final and amendments to the Action Memorandum were not implemented.

Field activities associated with the NTCRA were completed between November 8, 2010, and June 17, 2014. The removal action was completed in five stages due to the unanticipated discovery of MEC during the PAH removal process and the need to take proper safety precautions.

Stage 1: November 8 – December 10, 2010

Stage 1 of the NTCRA was conducted between November 8 and December 10, 2010, to the lateral and vertical limits of the area stipulated by the EE/CA (**Figure 4**). **Figure 5** shows the extent of the excavation. The excavation extended to native clay along the eastern side but not on the western side. **Figure 5** includes a line depicting the clay and waste material interface. The excavated materials, which were primarily non-DOD waste materials, were loaded into dump trucks for transport to the Crawford County Landfill in Bucyrus, Ohio, a local licensed Subtitle D landfill. The non-DOD waste materials were handled to allow access to any WWII-era material below. A total of 5,828.7 tons of waste were received at the landfill.

While conducting the NTCRA, it was determined that the NTCRA-area included two different types of waste from past practices at the Site: 1) graded material containing burnt building materials and metal structure braces brought to the Site by post-DOD property owners; and 2) incendiary fuel disposal conducted by the DOD during WWII. **Figure 6** illustrates the NTCRA and TCRA areas; although not depicted in this figure, Area 1 was also part of the NTCRA area and is the graded area covering the non-DOD waste materials from post-WWII activities. Area 2 is the fuel disposal area, which is indicated by the red dashed lines on **Figure 6**. It was determined by CELRL and the Ohio EPA that no further removal actions would be conducted in Area 1, the non-DOD part of the NTCRA-area as DOD is not responsible for non-DOD waste.

Samples of a solid matrix from burnt goop were collected and analyzed for PAHs during this stage of the removal action. The samples were analyzed for carcinogenic PAHs and the results are summarized on **Table 1** (EQM, 2013). No carcinogenic PAHs were present in any of the three samples of soil collected from beneath the waste materials. Two goop samples (i.e., Goop 2 and 3) did not contain carcinogenic PAHs and the concentrations in the other two goop samples (i.e., GMB-1 and Goop 4) were very low. These data for goop are consistent with samples obtained of goop at the Classification Yard (SOP-AJ) (see **Attachment B** for results) (MWH, 2005). This sampling effort demonstrates that burned incendiary fuel does not contain carcinogenic PAHs at concentrations exceeding the project Action Levels (ALs) (i.e., USEPA Region 9 PRGs). The ALs are set at a concentration that does not present an unacceptable uncontrolled human-health risk.

Post-remediation composite samples were prepared for both Area 1 and Area 2. Each composite sample was produced by obtaining 30 discrete grab samples from the bottom of the excavation. Sample ISM-1A1 (and its duplicate ISM-2A1) was primarily composed of non-DOD waste material. Sample ISM-1A2 contained both WWII-era and non-DOD waste materials. Sample ISM-

2A2 was primarily soil. The results are summarized on **Table 2** (EQM, 2013), which shows that the highest concentrations of carcinogenic PAHs are in Area 1, the area of SOP-Z that contains mostly non-DOD waste materials. **Table 2** also shows that the lowest concentrations are in native clay soil beneath Area 2. Sample ISM-1A2 contains the intermediate level of PAHs and is a combination of WWII-era and non-DOD waste materials.

The results for the post-remediation composite samples were used to determine potential human-health risk. The results are presented on **Table 3** (EQM, 2013) as a transformation of the PAH data to benzo(a)pyrene toxicity equivalents (i.e., B(a)P TEQ). When performing risk characterization the analytical results for the carcinogenic PAHs from the sampling events are converted to toxicity effects quotients. In *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons* (EPA/600/R-93/089, July 1993) and regional guidance, EPA recommends that a toxicity equivalency factor (TEF) be used to convert concentrations of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) to an equivalent concentration of benzo(a)pyrene when assessing the risks posed by these substances. These TEFs are based on the potency of each compound relative to that of benzo(a)pyrene. For the toxicity value database, these TEFs have been applied to the toxicity values. The calculations are for human health risk under residential and construction worker (assumed to be equivalent to a farmer working his field) exposure scenarios. The risk evaluation was conducted to determine the human-health carcinogenic risk for the ingestion, dermal contact, and inhalation (indoor and outdoor) pathways of exposure. **Table 3** shows that Area 1, which contains principally non-DOD waste materials, presents a greater human-health risk than does Area 2, which is a mixture of WWII-era and non-DOD waste materials. The data suggest that the primary source of PAHs is burned and charred material brought to SOP-Z after DOD activities had ended.

When MEC items were found during this stage, CELRL called an Explosive Munitions Safety Officer from United States Army Engineering Support Center, Huntsville to evaluate what was uncovered. The *After Action Assessment Report*, dated January 11, 2011, concluded that all M-74s appeared to have undergone thermal treatment prior to being buried and therefore would not have been an explosive concern. No fused or intact munitions were discovered. However, the potential existed for non-thermally treated M-74s to be uncovered. The report concluded that no further intrusive operations should be performed until such time as construction support could be provided from the appropriate explosive safety experts per the USACE *Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities* [Engineering Pamphlet (EP) 75-1-2 (superseded by Engineering Manual (EM) 385-1-97, 17 May 2013)].

Because of the MEC findings, it was determined that: 1) all future activities would be conducted with unexploded ordnance (UXO) support, and 2) investigation and removal of munitions debris (MD) and MEC would be performed for surface clearance and to a depth of at least 12 inches below grade. The removal action for MEC would be designated a Time-Critical Removal Action (TCRA) and the TCRA-area would correspond to Area 2 shown on **Figure 6**.

Stage 2: March 12–16, 2012

Stage 2 of the removal action was completed between March 12 and 16, 2012. During this stage, a DDESB-approved ESS TCRA was conducted in the area previously excavated during Stage 1 (refer to **Figure 6**). MD and material potentially presenting an explosive hazard (MPPEH) were recovered and post removal conformational sampling of native soil was conducted. **No MEC was recovered during this stage.** The TCRA was stopped on March 16 without completion because it was determined that mechanical equipment was needed to address a large metallic anomaly identified in the southwest part of the TCRA area; mechanical removal was not included in the approved ESS. This metallic anomaly was located within a large accumulation of spent goop (see Stage 3).

A total of 1,220 pounds of MD, which were primarily fuzes, and 380 pounds of non-DOD waste material were recovered during this stage of the removal action. The MD was placed in 55-gallon drums and transported to Timberline Environmental, Inc., in Cold Spring, California, for disposal. The non-DOD waste material stayed on-site.

Eighteen post-removal grab samples of native soil were obtained from the bottom of the excavation and analyzed for PAHs. None of the 18 samples contained any PAH compound at a concentration greater than the project ALs demonstrating that the NTCRA objective for carcinogenic compounds in this part of the NTCRA-area had been achieved.

Stage 3: September 18 – November 5, 2012

Stage 3 of the removal action was completed between September 18 and November 5, 2012. During Stage 2, the Ohio EPA re-evaluated site conditions and historical information and determined that potential MEC items may extend beyond the limits of the TCRA area defined in Stage 2. The Ohio EPA requested that USACE conduct MEC clearance for the area depicted on **Figure 7**. The resulting redefinition changed the boundaries of the approved TCRA ESS area and the NTCRA area.

Physical removal of WWII-era material and handling/staging of non-DOD waste material to reach MD/MPPEH was initiated at the far northern extent of the area to be addressed. As the removal progressed south, increasing amounts of MD and MPPEH were encountered, these included several hundred M-74 10-pound bomblets, without incendiary fuel, and hundreds of plastic cups used to hold WP inside of the M-74s. WP spontaneously combusts (i.e., oxidizes vigorously) when exposed to oxygen in the air. The WP was placed in the water-filled ponds during WWII to prevent exposure to oxygen and thus to prevent combustion. Upon removal from the ground the WP came into contact with oxygen and the spontaneous combustion became a significant concern, which led USACE contractors to construct a fire break around the work area and suspension of transport of soil and waste for off-site disposal.

The recovered M-74s were disposed of by detonation on-site. The M-74s were accumulated on cleared ground to the east of the TCRA area in groups of about 50. Detonation cord was wrapped around each item and was remotely triggered. The resulting release of explosive energy broke open the M-74s. None of the M-74s were found to contain incendiary fuel; many contained WP

triggers. A total of 806 M-74s were disposed of during this stage. MD was accumulated in 55-gallon drums, which were transported to Bonetti Explosives in Spearfish, South Dakota, for disposal. Cups containing WP were not detonated. The contractor carefully moved the cups to allow exposure to oxygen causing spontaneous combustion. No MEC was recovered during this stage.

MD/MPPEH-containing material and those non-DOD waste materials handled to reach MD/MPPEH were staged to the east of the NTCRA-area for potential off-site disposal at the Crawford County Landfill. A total of 505 tons of this staged material were sent off-site for disposal to Crawford County Landfill, but off-site disposal was terminated on October 9, 2012, because of the combustion hazard posed by the WP.

This stage of the removal action was terminated on November 5, 2012, without completion. During this stage, the inspection and removal of waste materials was completed throughout the NTCRA-area. The excavation extended down to native clay throughout the NTCRA-area. Fourteen post-removal samples of native soil from the bottom of the excavation were obtained and analyzed for PAHs. None of the 14 samples contained any PAH compound at a concentration greater the project ALs, demonstrating that the NTCRA objective for carcinogenic compounds in this part of the NTCRA-area had been achieved. Because this removal action was not fully completed a follow-up removal action was planned for the treatment of remaining MD/MPPEH containing materials and non-DOD waste materials (see Stage 4).

Stage 4: April 29 – June 27, 2013

Stage 4 of the removal action was completed between April 29 and June 27, 2013. Waste materials within the limits of the TCRA- area were removed down to native clay (**Figure 7**). The waste material, which included both WWII-era and non-DOD waste materials, was screened for MD/MPPEH and the remaining waste was transported and stockpiled east of SOP-Z for on-site treatment for WP. MD/MPPEH items recovered during this stage were MD, intact plastic cups containing WP, intact M-74s without incendiary fuel, and live M-142 fuzes. The M-142 fuzes are MEC. The MD was staged for off-site disposal. The M-74s and M-142 fuzes were disposed of using explosives. During this stage of the removal action, 1,883 intact M-74 bomblets and three M-142 fuzes were disposed of in batches by detonation. An additional 3,935 pounds of MD were recovered. In addition, over 1,000 cubic yards of non-munitions-related waste materials (i.e., the waste pile of soil, burnt goop, and debris from others) were accumulated and stockpiled.

All waste materials removed during this stage were suspected to contain WP requiring treatment prior to disposal. All recovered MD and disposed of M-74s were processed through a Thermal Flashing Unit (TFU) to ensure all residual WP was burned off. After thermal treatment of the MD, a UXOSO and UXOQCS examined the treated metal and verified suitability for containerization per DDESB approved ESS. A total of 45 drums were sent to Bonetti Explosives, Inc. in Columbus, Texas for recycling.

The remaining stockpile of non-DOD waste material (e.g., concrete, brick, etc.) and soil was passed through a series of screens where it was vigorously shaken to promote WP oxidation. About 2,500 cubic yards of soil containing both WWII-era and non-DOD waste material generated during Stages 3 and 4 were treated using the high energy (HE) sifter.

A UXO team conducted final clearance inspection of the bottom of the excavation created during all stages of the NTCRA and TCRA activities. Additionally, the UXO team conducted final clearance around the disposal area to assure that no residual metal was present. The final clearance of all areas was conducted visually and with use of metal detectors. During this process, a large metallic anomaly was found just outside the disposal area. A shallow excavation was made using a shovel and six M-74s were found. Two test pits were installed to investigate the metallic anomaly further. The test pits resulted in the recovery of 97 M-74s, one live M-142 fuze and 300 pounds of MD from what appears to be a previously unknown trench. (Refer to **Figure 7** for location of the fencing that was installed around this area.) The waste was removed for processing and disposal; the excavation was backfilled and orange construction fence was installed to mark the location. This accumulation of bomblets was not associated with the physical boundary of the EE/CA work area.

The mixture of staged material and soils that had been mechanically processed through the HE sifter to treat or render the WP inert was subjected to waste characterization sampling and analysis to determine whether it exhibited the characteristics of hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA) [40 Code of Federal Regulations (CFR) Part 261, Subpart C). If the waste material was determined to be characteristically hazardous it was to be transported for off-site disposal at a properly licensed hazardous waste landfill. Eight composite samples, each consisting of 18 discrete samples representing about 16 cubic yards of waste material each, were obtained and analyzed. None of the samples were determined to be characteristically hazardous per criteria of RCRA, thus the waste pile was determined to be a non-hazardous waste per criteria of RCRA.

Per initial agreement between CELRL and Ohio EPA, it was established that the stockpiled non-hazardous waste pile, which included non-DOD waste materials handled to reach MD/MPPEH, could be returned to the excavation, if PAHs were at or near cleanup goals specified in the work plan or total risk was at or below Ohio's risk goal and the waste material was covered with a minimum of 2 feet of clean soil/fill. The stockpiled material contained PAH compounds at concentrations exceeding the ALs. However, Ohio EPA concurred with the decision to return the soils back to the excavation based on USACE's evidence and conclusion that, outside of identified areas on SOP, surface PAH soil contamination in many areas of the Site appear to be from non-DOD sources and subsurface soils containing MD/MPPEH did not show elevated concentrations of PAHs. The post-removal soils and non-DOD waste materials handled to reach MD/MPPEH were returned to the excavation area (see **Figure 8** for location) by the USACE contractor, and the property owner covered it with a minimum of 2 feet of clean soil/fill material. **Figure 9** presents two cross sections through SOP-Z showing that the clean soil/fill material is more than 2 feet thick over the remaining waste material.

Stage 5: April 15–June 17, 2014 [3-acre fire break area east of east lagoon]

Upon completion of the work described in the Amendment 2 TCRA ESS (January 2013), an additional trench containing M-74s was uncovered during the decommissioning of monitoring well 01, east of the lagoon (see **Figure 8**). The uncovering of the additional trench of M-74s required an Amendment 3 TCRA ESS (April 2014). Stage 5 of the removal action was completed be-

tween April 15 and June 17, 2014. Cape Environmental Management Inc (CAPE) was tasked to perform a MEC clearance in a 3-acre area at the Former SOP. The purpose of stage 5 removal action was to achieve remedial action objectives (RAOs) for PAHs within the 3-acre fire break area east of SOP-Z (see **Figure 10**) and the disposal of any M-74 10-pound incendiary bomblets recovered.

The removal action involved performing a surface sweep, digital geophysical mapping (DGM) survey, subsurface investigation, soil confirmatory sampling, pit excavation and restoration over the entire 3-acre area. CAPE was also tasked with the disposal of any MEC items recovered as a result of the aforementioned activities and to thermally treat all MD prior to off-site disposal, to ensure that no MC left the project Site.

Although five intact M-74 incendiary bomblets were recovered during the course of the project, the vast majority of M-74s requiring disposal were not complete/intact items. The most common condition for the recovered M-74s was a nose cup, with or without a bomb body attached, with an intact dome. No WP containers were found. Visual observation of disposal operations indicated that a majority of these items contained a live fuze as well as a black powder charge.

Excavation of the suspected pit area began on May 16, 2014, with 130 partial and intact M-74s recovered in the top 4 feet. All soil excavated from the pit was kept segregated from other soil excavated from grids B3, B4, B5, C3, C4, C5 and D5, and mechanically sifted as a separate operation to address potential WP. Ultimately, the pit dimensions were 105 feet long by 10 feet wide, at base, by 12 feet deep. It was 36 feet wide at ground level in order to provide appropriate trench sloping and to prevent the side walls from collapsing. A total of 547 partial and intact MEC items recovered from the pit were disposed by demolition operations on-site. On May 21, 2014, pit excavation was completed. The mechanical sifting of pit spoils concluded on May 28, 2014, with an estimated 3,537 cubic yards of soil sifted during this project. However, the consistency and moisture content of the soil required that approximately 40 percent of it be sifted multiple times to ensure an ordnance-free product. In addition, approximately 1 cubic yard of previously burned waste goop precipitate was excavated from the pit and processed through the HE sifter to inert any WP it may contain.

Inspection of MD was a continual process throughout the project. As each MPPEH item was found, it was examined to determine if it contained energetic material. Any items containing energetic material, or any item where it could not be determined if any energetic material was present, were segregated and stored in a temporary MEC storage magazine prior to disposal by demolition operations. After demolition operations occurred, the MD were inspected and transported to the TFU area for thermal processing.

All MD was thermally treated using a TFU heated to 1,500 degrees Fahrenheit and maintained at that temperature for 20 minutes. All MD were inspected by the UXO Quality Control Specialist (UXOQCS) immediately after thermal treatment and placed in 55-gallon drums to await final off-site disposal. Each drum was then sealed to eliminate and detect tampering. The TFU processed a total of 8,923 pounds of MD, which filled 22 55-gallon drums secured and docketed with tamper-proof security seals.

On June 9, 2014, the Senior UXO Supervisor (SUXOS) and UXOQCS inspected each 55-gallon drum of MD and certified the shipment free of energetic material on DOD Form 1348-1A, which they affixed to the exterior and with a copy also placed inside each container. Security seals were attached, and the drums were banded two to a pallet for shipment. The 11 pallets (22 drums) were shipped to CH2M HILL Constructors, Inc., for recycling on June 10, 2014.

Confirmatory soil sampling and analysis was performed after excavation activities to confirm the presence or absence of contamination from the trench and from the sifted soils located in the center of the project Site. Seven multi-incremental (MI) samples were collected from four different decision units (DUs) within the trench. One DU covered the trench floor; another DU covered the east end of the trench. The north and south sidewalls of the trench made up the two remaining DUs. For QC purposes, a duplicate sample was collected from two sample locations. One triplicate sample was also collected. The sampling team divided each DU into 50 sampling cells of equal size. These sampling cells were then divided into quarters, and a 30-gram sample was randomly collected from one of these units. The sampled soils were then homogenized and shipped to the analytical lab for analysis.

The seven samples were received by the laboratory and were weighed on disposable pie pans in aliquots of approximately 500grams and set out to air dry. The samples were re-weighed after drying then passed through a #10 sieve and ground 60 seconds with 2 minute cool-down using the puck mill grinder. The grinder was washed between samples with grinding blanks between samples. Sample aliquots (and grinding blank aliquots) were combined after grinding, mixed and laid out for sub-sampling from 30 or more random locations for a 15g aliquot.

All soil samples were analyzed for PAHs by USEPA Method 8270D, and the analytical results were compared to the USEPA Region 9 PRGs, dated October 2004. Based on this comparison, there were no exceedances for PAHs. The laboratory analytical data is summarized in **Table 5**.

The NTCRA-AM, NTCRA-AM amendments and TCRA-ESSs (i.e., Stages 1 – 5) resulted in:

1. Excavation and removal of waste materials to native clay in an area measuring 3.79 acres.
2. Recovery of MEC/MD/MPPEH items from the excavated waste.
3. Treatment of WP and WP plastic cups.
4. Disposal of 10,289 tons of non-DOD waste material and related wastes as a non-hazardous waste at an off-site landfill.
5. Disposal of 3,335 intact and partial M-74 bomblets (without fuel) and four M-142 fuzes.
6. Off-site processing and disposal of 30,714 pounds of MD, which includes the disposed of bomblets.
7. High Energy sifting of approximately 6,000 cubic yards of a mixture of soil and remaining waste material for oxidation of WP.

4.0 Scope and Role

The USACE serves as the DOD Execution Agent for cleanup of FUDS nationwide. USACE Louisville District is responsible for the environmental investigation and cleanup of DOD-related releases at SOP, including the Incendiary Fuel Disposal Area, -Z in accordance with the DERP and CERCLA. USACE previously determined that the Site was eligible for evaluation under the FUDS Program. Between November 2010 and June 2014 USACE was responsible for the removal or treatment of contaminated soil and waste, MEC/MD/MPPEH, and WP.

This Proposed Plan provides the rationale for the decision that No Further Action is necessary at SOP-Z subsequent to the removal actions described above.

A Site Inspection (SI) Report was prepared for the following sites: Artillery Booster Load Line B-1 (SOP-B), High Explosive Igloos (SOP-L), Inert Storage Buildings (Warehouse Area) (SOP-S), Shop Area (SOP-T), Disposal Area North of Marion Williamsport Road (SOP AG), Dump Area North of Linn Hipsher Road (SOP-AH), Load Line Sanitary Sewers (SOP-D, SOP-E, SOP-F, SOP-G, and SOP-H), Concrete Loading and Shipping Platform (PJ-52), Shipping Platform (PJ-53), High Explosive Shipping Plat-Form (PJ-54), Disturbed Areas by Powder Train Fuse Load Line F-2 (SOP-E1), Disturbed Areas by Artillery Booster Load Line F-4 (SOP-F1), and Disturbed Areas by Artillery Booster Load Line B-1 (SOP-B1).

Based on the results of this SI, no additional investigative activities or remedial action are proposed for Areas of Concern (AOCs): SOP-L; SOP-S; SOP-AH; sanitary sewers at SOP-D, SOP-E, SOP-F, SOP-G, and SOP-H; shipping platforms PJ-52, PJ-53, and PJ-54; disturbed areas SOP-E1 and SOP-F1; and disturbed areas SOP-B1.

Three sites, SOP-B; SOP-T; and SOP-AG moved forward to a Remedial Investigation. No Feasibility Study was completed on the RI 3 AOCs based on evidence that DOD may not be responsible for the residuum of PAHs in the soil at the AOCs. An erratum to the RI dated Feb 2012 explained the contaminant PAHs could not be attributed to DOD. Ohio EPA concurred with the erratum in April 2012.

Additionally based on the results of the SIs, it was determined that two AOCs, SOP-M and SOP-Z required a Remedial Action (RA) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Removal Action was completed at SOP-M Dec 2010; after which a No Further Action (NFA) Proposed Plan became final Sept 2011; followed by the NFA Decision Document finalized June 2012, having Ohio EPA concurrence July 2012. Once the NFA PP and DD are approved for SOP-Z the HTRW facility wide project will close.

5.0 Summary of Site Risks

Samples of WWII-era and non-DOD waste materials in SOP-Z and native soils from the bottom of the NTCRA-area were obtained during the removal action and were analyzed for carcinogenic PAHs to determine if the removal action had achieved its objective to protect human health and the environment. The analytical results of these samples demonstrate the following:

1. The highest concentrations of carcinogenic PAHs were found in Area 1 (Figure 6) of the removal area in non-DOD waste materials, which contains a high volume of burned and charred construction material generated during demolition of the buildings at SOP. The concentrations of many PAHs are greater than the project ALs.
2. The lowest concentrations of carcinogenic PAHs were found to be present in WWII-era burnt goop. The concentrations are less than the project ALs.
3. No PAHs are present beneath the area of the removal actions at the lagoons or 3-acre fire break area at concentrations exceeding the project ALs, thus native soil was not affected by the DOD contamination.
4. Previously completed investigations did not identify any groundwater or ecological concerns.

Additionally, WP, MD, MPPEH (i.e., M-74s), and MEC (i.e. M-142 fuzes) were encountered at SOP-Z. The bomblets and fuzes, which were disposed of by detonation on-site, and the MD were thermally treated and inspected before removal for recycling. A large volume of predominantly non-DOD waste materials removed from SOP-Z during Stage 1 to access the WWII-era materials was transported for off-site disposal as a non-hazardous waste. Additionally, WWII-era and intermingled non-DOD waste materials generated during Stages 3, 4 and 5 were treated on-site to remove WP. All of these actions by USACE resulted in elimination of explosive and fire risk and reduction of the volume of carcinogenic PAHs present on-site.

Sampling completed during the removal actions at the lagoons demonstrates that the burned and charred materials created by non-DOD activities at the lagoons contribute significantly to the residual carcinogenic PAHs in soil returned to SOP-Z lagoons. However, no PAHs remain above ALs in the 3-acre fire break area upon completion of the removal actions. The WWII-era DOD materials (i.e., burnt goop, WP, M-74 bomblets and M-142 fuzes) were successfully removed or treated, eliminating associated human-health and environmental threats.

The removal actions completed at SOP-Z lagoons and the 3-acre fire break area conclude with a No Further Action. The Remedial Action Construction Reports for Incendiary Fuel Disposal Area (SOP-Z) dated October 2013 and November 2014 confirm that the removal actions have removed the DOD related contamination, eliminating the requirement for USACE to perform Five-Year Reviews at this Site.

6.0 No Further Action Determination

Because the DOD-impacted soils remaining at the lagoons and 3-acre fire break area no longer pose an unacceptable risk to human health or the environment, a set of remedial action alternatives was not developed or evaluated for these soils. In addition, MD and MEC/MPPEH have been removed from the project Site. Therefore, only the No Further Action alternative is presented in this Proposed Plan.

It is the position of the USACE that no additional actions are necessary for residual DOD-impacted soils at SOP-Z, located within the former SOP, to protect public health and welfare and

the environment. The preferred response action described in this Proposed Plan for residual DOD-impacted soils at SOP-Z is No Further Action, which means no further environmental investigation or remediation is required.

According to the Marion County Auditor GIS website (mcogis.co.marion.oh.us/flex/viewer), the current property class for the Site is agricultural. The No Further Action alternative for former DOD-impacted soils provides for protection of human health and the environment because former DOD-impacted soils (e.g., burnt goop, WP, MD) do not contain carcinogenic PAHs at concentrations that pose unacceptable human health risk for the current and reasonably anticipated land use of farming. Native clay soils beneath SOP-Z lagoons and 3-acre fire break area were determined through sampling and analysis to be absent of carcinogenic PAHs at concentrations greater than the USEPA Residential Regional Screening Levels.

7.0 Community Participation

USACE and Ohio EPA provided information to the public regarding the cleanup of the SOP-Z through public meetings, newsletters, notices, the Administrative Record File for the Site and the Information Repository. USACE and Ohio EPA encourage the public to gain a more comprehensive understanding of the Site and the cleanup activities for it by participating in these community participation activities.

Copies of this Proposed Plan and supporting documents are available for public review at the following information repositories:

Marion Public Library
445 East Church Street, Marion, Ohio, 43302
(740) 387-0992

And

U.S. Army Corps of Engineers
600 Dr. Martin Luther King Jr. Place
Environmental Engineering Branch, Rm 351
Louisville, KY 40202-2232
502-315-6333

The public comment period provides time to review and comment on the information provided in the Proposed Plan. The public comment period for this Proposed Plan is February 5 – March 6, 2015. Comments on the Proposed Plan or other relevant issues can be submitted in writing via e-mail or mail (postmarked no later than March 6, 2015) to the following addressee:

Dr. David Brancato,
Army Engineer District Louisville
Engineering Division, Environmental Engineering
Branch
P.O. Box 59, Rm. 351, Louisville, KY 40201
David.J.Brancato@usace.army.mil

During the public comment period, USACE may hold a public meeting that will provide an additional opportunity for the public to learn about the preferred alternative and to comment on the Proposed Plan. If a public meeting is to be held, a notice of place and time will be placed in the local newspaper. If held, the USACE will develop a transcript of the public meeting, and a copy of the transcript will be placed in the Administrative Record File.

All comments received on the Proposed Plan during the comment period will be summarized, and responses will be provided in the responsiveness summary section of the Decision Document (DD). The DD will present the selected remedy and will be included in the Administrative Record File. USACE will review and consider the public's input as part of the process before reaching a final decision on the most appropriate action to be taken.

8.0 References

Detailed information about the environmental studies and removal actions performed at the Site can be found online at [<http://bit.ly/SciotoOH>] and at the Marion County Library in the following documents. USACE and Ohio EPA encourage the public to review these documents to gain a more comprehensive understanding of the Site and activities that have been conducted to date.

CAPE, 2013. *Addendum 2 to the Approved Action Memorandum Non-Time-Critical Removal Action Burning Field (SOP-M) and Incendiary Fuel Disposal Area (SOP-Z) Former Scioto Ordnance Plant Marion, Ohio.*

CAPE, 2014. *Remedial Action Completion Report, Time Critical and Non-Time Critical Removal Actions, 3-Acre Fire Break to the Incendiary Fuel Disposal Area (SOP-Z), Former Scioto Ordnance Plant, Marion Ohio.*

EQM, 2010. *Final Action Memorandum Non-Time-Critical Removal Action Burning Field (SOP-M) and Incendiary Fuel Disposal Area (SOP-Z) Former Scioto Ordnance Plant Marion, Ohio.*

EQM and USAE, 2011; Cape Environmental Management Inc, 2014. *Time Critical Explosives Safety Submittal, Military Munitions Response Action, Former Scioto Ordnance Plant, (SOP), Incendiary Fuel Disposal Area (SOP-Z, Areas 2A and 2B, Marion Ohio. (Revised 2013 and 2014).*

EQM, 2013. *Remedial Action Completion Report, Time Critical and Non-Time Critical Removal Actions, Incendiary Fuel Disposal Area (SOP-Z), Former Scioto Ordnance Plant, Marion Ohio. October 2013.*

MWH, 2002. *Groundwater Monitoring Report, Round 1, for the Incendiary Fuel Disposal Area (SOP-Z)*. December 2002.

MWH, 2003. *Site Inspection Report for the Magazine Area (SOP-A), Burning Field (SOP-M), and Incendiary Fuel Disposal Area (SOP-Z)*. July 2003.

MWH, 2003. *Level I Ecological Assessment Report for the Magazine Area (SOP-A), Burning Field (SOP-M), and Incendiary Fuel Disposal Area (SOP-Z)*. July 2003.

MWH, 2003. *Groundwater Monitoring Report, Round 2, for the Incendiary Fuel Disposal Area (SOP-Z)*. July 2003.

MWH, 2003. *Groundwater Monitoring Report, Round 3, for the Incendiary Fuel Disposal Area (SOP-Z)*. December 2003.

MWH, 2004. *Groundwater Monitoring Report, Round 4, for the Incendiary Fuel Disposal Area (SOP-Z)*. July 2004.

MWH, Americas, 2005. *Additional Site Inspection Sampling Activities, Incendiary Fuel Disposal Area (SOP-Z) and Classification Yard (SOP-AJ), Former Scioto Ordnance Plant, Marion, Ohio, February 2005*.

MWH, 2006. *Level I Ecological Assessment Report for the Incendiary Fuel Disposal Area (SOP-Z)*. November 2006.

MWH, 2006. *Site Inspection Report for the Incendiary Fuel Disposal Area (SOP-Z)*. November 2006.

MWH, 2009. *Engineering Evaluation/Cost Analysis Final Report for the Burning Field (SOP-M) and the Incendiary Fuel Disposal Area (SOP-Z)*. April 2009.

USACE, 2010. *Final Action Memorandum Non-Time-Critical Removal Action Burning Field (SOP-M) and Incendiary Fuel Disposal Area (SOP-Z) Former Scioto Ordnance Plant Marion, Ohio* (amended August 2011 and October 2013)

9.0 Glossary

Administrative Record File: A file containing information that is used to make decisions about an environmental site, including work plans, verified sampling data, final reports and studies, maps, and public health assessments. This file is available for public review.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA): The federal law passed by Congress in 1980 and modified in 1986 by the SARA. It requires responsible parties to cleanup releases of hazardous substances and certain pollutants and contaminants and sets out a process for investigating and making decisions about sites that may need to be cleaned up.

Decision Document (DD): A legal document that sets forth the selected remedy for cleanup of a site as decided by the lead federal agency.

Environmental Media: Physical components of the environment that can harbor and/or transfer contamination (typically soil, groundwater, surface water and air).

Formerly Used Defense Site (FUDS) Program: The Department of Defense program that cleans up environmental contamination resulting from DOD activities at properties formerly owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense. A property is eligible for cleanup under the FUDS program if the DOD transferred the property before October 17, 1986. The Army is the executive agent for the program, and the U.S. Army Corps of Engineers is responsible for carrying out the program. FUDS policy is defined in USACE Engineer Regulation 200-3-1, *Formerly Used Defense Sites (FUDS) Program Policy*, May 2004.

Information Repository: Under CERCLA, an information repository is a collection of copies of all the information related to a cleanup action that has been made available to the public (40 *Code of Federal Regulations* 300.430). This contrasts with the Administrative Record, which contains only those documents that form the basis for selecting a response action.

M1: This is a thickening mixture for napalm that includes aluminum naphthenate, aluminum oleate, and aluminum laurate.

M2: This is a thickening mixture for napalm that includes aluminum naphthenate, aluminum oleate, aluminum laurate and silica.

Munitions and Explosives of Concern (MEC): This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 U.S.C. 101(e)(5); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX, WP), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC): MC include any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3))

Munitions Debris (MD): Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Material Potentially Presenting an Explosive Hazard (MPPEH): Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal opera-

tions). Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

National Contingency Plan (NCP): A short title for the National Oil and Hazardous Substances Pollution Contingency Plan. The NCP, 40 CFR Part 300, outlines the responsibilities and authorities for responding to releases into the environment or hazardous substances and other pollutants and contaminants under the statutory authority of CERCLA and section 311 of the Clean Water Act.

Non-Time-Critical Removal Action (NTCRA): Non-time-critical removal actions are conducted at CERCLA sites when the lead Agency determines, based on the site evaluation, that a removal action is appropriate, and a planning period of at least six months is available before on-site activities must begin.

Ohio Environmental Protection Agency (Ohio EPA): The state agency responsible for enforcement of state laws protecting the environment in Ohio.

Proposed Plan (PP): The USEPA definition is: A site cleanup plan that is available for public comment. The ER definition is: The PP document summarizes the remedial alternatives proposed for a project and specifies the preferred cleanup method. The PP can be prepared as a fact-sheet or as a document similar to, but shorter and less conclusive than, the draft ROD. Additional guidance is available from EPA 540R-98-031.

Preliminary Remediation Goal (PRG): U.S. Environmental Protection Agency Region 9 PRGs are risk-based tools for evaluating and cleaning up contaminated sites. They are being used to streamline and standardize all stages of the risk decision-making process. PRGs focus on common exposure pathways (e.g., inhalation and ingestion) to populations (e.g., residential and industrial) at CERCLA / RCRA sites.

PT1: This is a mixture of magnesium, gasoline and thickened with isobutyl methacrylate.

Public comment period: A reasonable time period, of at least 30 days, for the public to review and comment on various documents and actions.

Responsiveness Summary: A summary of oral and written public comments received during a public comment period. The responsiveness summary is a key part of the decision document, highlighting community concerns.

Site Inspection (SI): The physical inspection of a site that may include limited soil and water sampling to determine the nature of chemicals of potential concern. This investigation occurs before a remedial investigation.

Superfund: Superfund is the name given to the environmental program established by Congress to address abandoned hazardous waste sites. It is also the name of the fund established by CERCLA, and is often a term used interchangeably with CERCLA. The fund allows USEPA to

cleanup such sites and to require the responsible parties to perform cleanups or reimburse the government for USEPA-lead cleanups.

Superfund Amendments and Reauthorization Act of 1986 (SARA): USEPA Definition: Legislation that amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on October 17, 1986. SARA reflected EPA's experience in administering the complex Superfund program during its first six years and made several important changes and additions to the program. SARA stressed the importance of permanent remedies and innovative treatment technologies; required Superfund actions to consider the standards and requirements found in other State and Federal environmental laws and regulations; provided new enforcement authorities and settlement tools; increased State involvement; increased the focus on human health problems; encouraged greater citizen participation; and increased the size of the Trust Fund to \$8.5 billion.

Time-Critical Removal Action (TCRA): A response to a release or threat of release that poses such a risk to public health or the environment that clean up or stabilization actions must be initiated within 6 months.

TABLES

Table 1. Stage 1 Post-Removal Grab Samples for Evaluation of Removal Effectiveness

Analyte	Project Action Limit (mg/kg)	Post-Removal Grab Sample Results						
		SOPZ-1, 4 ft below original grade (Soil GMB-1)	SOPZ-2, 3 ft (Soil GMB-2)	SOPZ-3, 3.5 ft (Soil GMB-2)	SOPZ-1 (Goop-2)	SOPZ-2 (Goop-3)	SOPZ-3 (Goop-4)	SOPZ-4, 4 ft (Goop GMB-1)
Benz(a)anthracene	0.62	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.16	0.010
Benzo(b)fluoranthene	0.62	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.29	0.014
Benzo(k)fluoranthene	0.38	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.088	0.0087
Benzo(a)pyrene	0.062	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.16	0.0099
Chrysene	3.8	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.19	0.011
Dibenz(a,h)anthracene	0.062	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.029	0.0039 U
Indeno(1,2,3-cd)pyrene	0.62	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.12	0.0039 U
Naphthalene	1.7	0.0042 U	0.0041 U	0.0041 U	0.0051 U	0.0053 U	0.0093	0.0039 U

Results in mg/kg

U = Not detected above the laboratory reporting limit.

Bold indicates concentration greater than Project Action Limit

Table 2. Stage 2 and 3 Confirmational Sample Results Lagoons

Analyte	Project Action Limits (mg/kg)	Area 1		Area 2		
		ISM-1A1	ISM-2A1 (Duplicate)	ISM-1A2	ISM-1A2 (Duplicate)	ISM-2A2
Benz(a)anthracene	0.62	25	33	21	17	0.25
Benzo(b)fluoranthene	0.62	31	40	19	16	0.23
Benzo(k)fluoranthene	0.38	9.5	19	9	7.3	0.058
Benzo(a)pyrene	0.062	21	30	16	13	0.12
Chrysene	3.8	24	33	18	15	0.25
Dibenz(a,h)anthracene	0.062	4.2	7.9	3.2	2.6	0.015
Indeno(1,2,3-cd)pyrene	0.62	14	20	8.6	7.1	0.061
Naphthalene	1.7	1.3	2.2	2.6	2.1	0.053

Results in mg/kg

Bold = Exceeds Project Action Limit

Area 1 is post-WWII activities and unrelated to DOD activities.

TABLE 3. Stage 2 and 3 Confirmational Results Human-Health Risk Evaluation Lagoons

Analyte	Project Action Limits (mg/kg)	Area 1					B(a)P TEQ (mg/kg)	Area 2				
		ISM-1A1	ISM-2A1 (Duplicate)	Average	TEF	ISM-1A2		ISM-2A2	Average	TEF	B(a)P TE	
Benz(a)anthracene	0.62	25	33	29.00	0.1	2.90	21	0.25	10.63	0.1	1.06	
Benzo(b)fluoranthene	0.62	31	40	35.50	0.1	3.55	19	0.23	9.62	0.1	0.96	
Benzo(k)fluoranthene	0.38	9.5	19	14.25	0.1	1.43	9	0.058	4.53	0.1	0.45	
Benzo(a)pyrene	0.062	21	30	25.50	1.0	25.50	16	0.12	8.06	1.0	8.06	
Chrysene	3.8	24	33	28.50	0.01	0.29	18	0.25	9.13	0.01	0.09	
Dibenz(a,h)anthracene	0.062	4.2	7.9	6.05	0.1	0.61	3.2	0.015	1.61	0.1	0.16	
Indeno(1,2,3-cd)pyrene	0.62	14	20	17.00	0.1	1.70	8.6	0.061	4.33	0.1	0.43	
Naphthalene (1)	1.7	1.3	2.2	1.75	0.001	0.0018	2.6	0.053	1.33	0.001	0.0013	
Total B(a)P TEQ						35.97					11.22	
Total B(a)P TEQ Residential Cancer Risk (Inhalation + Ingestion + Dermal Contact)						6.6E-04					2.1E-04	
Total B(a)P TEQ Construction (farmer) Cancer Risk (Inhalation + Ingestion + Dermal)						1.1E-05					3.5E-06	

Bold = Exceeds Project Action Limit

TEF = Toxicity Equivalency Factor

B(a)P TEQ = Benzo(a)pyrene Toxicity Equivalency

(1) = Not a carcinogenic PAH

Individual analytical results for each of the 8 polynuclear aromatic hydrocarbons (PAHs) converted to equivalent concentrations of B(a)P [i.e., (B(a)P TEQ)].

Individual B(a)P TEQ results summed to produce Total B(a)P TEQ for each of the two subareas of SOP-Z.

Total B(a)P TEQ concentrations used to calculate *residential* and *construction worker* (farmer) cancer risk for ingestion and dermal contact.

Cancer risk calculated as additional cancers per unit population.

Area 1 is post-WWII activities and unrelated to DOD activities.

TABLE 4. Stage 4 Waste Pile Human-Health Risk Evaluation Lagoons

Analyte	Project Action Limit (mg/kg)	SP-4	SP-5	SP-6	SP-7	SP-8	SP-9	SP-10	SP-11	Average Result	TEF	B(a)P TEQ
		Result										
Benz(a)anthracene	0.62	2.4	0.82	1.2	2.1	0.66	0.51	1.6	0.67	1.25	0.1	0.125
Benzo(b)fluoranthene	0.62	2.4	0.77	1.1	2.5	0.63	0.36	2	0.69	1.31	0.1	0.131
Benzo(k)fluoranthene	0.38	1	0.36	0.33	0.76	0.18	0.18	0.47	0.23	0.44	0.1	0.044
Benzo(a)pyrene	0.062	2	0.57	0.82	1.8	0.49	0.32	1.4	0.48	0.99	1	0.985
Chrysene	3.8	2.7	0.98	2.1	2.7	0.93	0.88	1.9	0.9	1.64	0.01	0.016
Dibenz(a,h)anthracene	0.062	0.074	0.039	0.1	0.083	0.04	0.074	0.21	0.039	0.08	1.0	0.080
Indeno(1,2,3-cd)pyrene	0.62	1	0.3	0.35	1	0.25	0.037	0.79	0.27	0.50	0.1	0.050
Naphthalene (1)	1.7	0.36	0.27	0.1	0.44	0.29	0.41	0.23	0.21	0.29	0.001	0.0003
Total B(a)P TE												1.43
Cancer Risk												
Total B(a)P TEQ Residential Cancer Risk (Inhalation + Ingestion + Dermal Contact)												3.4E-05
Total B(a)P TEQ Construction (farmer) Cancer Risk (Inhalation + Ingestion + Dermal)												3.5E-07

Notes:

TEF = Toxicity Equivalency Factor

B(a)P TEQ = Benzo(a)pyrene Toxicity Equivalency

(1) = Not a carcinogenic PAH

Individual analytical results for each of the 8 polynuclear aromatic hydrocarbons (PAHs) converted to equivalent concentrations of B(a)P [i.e., (B(a)P TEQ

Individual B(a)P TEQ results summed to produce Total B(a)P TEQ for each of the two subareas of SOP-Z.

Total B(a)P TEQ concentrations used to calculate *residential* and *construction worker* (farmer) cancer risk for ingestion and dermal contact. Cancer risk calculated as additional cancers per unit population.

**Table 5 - Stage 5 Confirmation Sample Results
Former Scioto Ordinance Plant
Samples Collected May 27 and 28, 2014**

Sample Identification	Project Action Limit	CAPE-SOP-Z-MI-1	CAPE-SOP-Z-MI-2	CAPE-SOP-Z-MI-3	CAPE-SOP-Z-MI-4	CAPE-SOP-Z-MI-5	CAPE-SOP-Z-MI-6	CAPE-SOP-Z-MI-7
Lab Identification		1405250-01	1405250-02	1405250-03	1405250-04	1405250-05	1405250-06	1405250-07
Date Sampled		5/27/2014	5/27/2014	5/27/2014	5/27/2014	5/28/2014	5/28/2014	5/28/2014
Matrix		Solid						
PAHs Method EPA 8270D	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Acenaphthene	3,700,000	3.28UJ	3.32U	3.25U	3.29UJ	3.26U	3.27U	3.28U
Acenaphthylene	NA	3.28UJ	3.32U	3.25U	3.29UJ	3.26U	3.27U	3.28U
Anthracene	22,000,000	3.28UJ	3.32U	3.25U	3.29UJ	3.26U	3.27U	3.28U
Benzo(a)anthracene	620	3.28UJ	2.45J	1.78J	2.88J	2.21J	3.27U	3.28U
Benzo(a)pyrene	62	3.28UJ	2.19J	1.84J	2.59J	2.38J	3.27U	3.28U
Benzo(b)fluoranthene	620	3.28UJ	3.87J	3.11J	6.25J	4.21J	2.63J	2.46J
Benzo(g,h,i)perylene	NA	3.28UJ	3.28J	2.45J	3.60J	3.32J	3.22J	2.28J
Benzo(k)fluoranthene	380	3.28UJ	2.09J	2.01J	2.75J	1.81J	3.27U	3.28U
Chrysene	3,800	2.37J	5.98J	5.56J	6.67J	5.24J	4.21J	3.82J
Dibenz(a,h)anthracene	62	3.28UJ	3.32U	3.25U	3.29U	3.26U	3.27U	3.28U
Fluoranthene	2,300,000	3.28UJ	4.58J	3.43J	6.89J	4.86J	2.62J	2.59J
Fluorene	2,700,000	3.28UJ	3.32U	3.25U	3.29UJ	3.26U	3.27U	3.28U
Indeno(1,2,3-cd)pyrene	620	3.28UJ	2.51J	3.25U	3.45J	2.61J	3.27U	3.28U
2-Methylnaphthalene	NA	26.0J	3.40J	4.54J	3.55J	2.70J	3.18J	3.51J
Naphthalene	1,700	9.99J	3.10J	2.36J	2.83J	2.29J	3.27U	2.95J
Phenanthrene	NA	3.32J	5.90J	5.79J	7.00J	5.95J	4.41J	7.31
Pyrene	2,300,000	3.28UJ	4.50J	3.51J	6.67J	4.47J	2.45J	3.28U

Notes:
 Project Action Levels are taken from USEPA PRG dated October 2004
 ug/kg-micrograms per kilogram
 N/A- Not applicable
 J - Result is a quantitative estimate
 U - Result is not detected
 UJ - Result is not detected and a quantitative estimate
Bold results indicate positively detected value
 Highlighted results exceeds PALs

FIGURES



BASE MAP PROVIDED BY GOOGLE EARTH
 INSET MAP PROVIDED BY OHIO DEPT. OF TRANSPORTATION

REV	DESCRIPTION	DATE	APPROVED

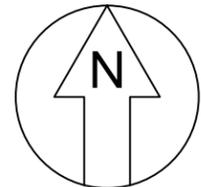
**ENVIRONMENTAL QUALITY
 MANAGEMENT, INC.**
 1800 CARILLON BLVD., CINCINNATI, OHIO 45240
 PHONE: 513.825.7500 | FAX: 513.825.7495
 WWW.EQM.COM

DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013

SITE LOCATION MAP			
SIZE	PROJECT NO.	DWG NO.	REV
B	030240.0017	FIGURE 1	0

SCALE: NOT TO SCALE

REVISIONS

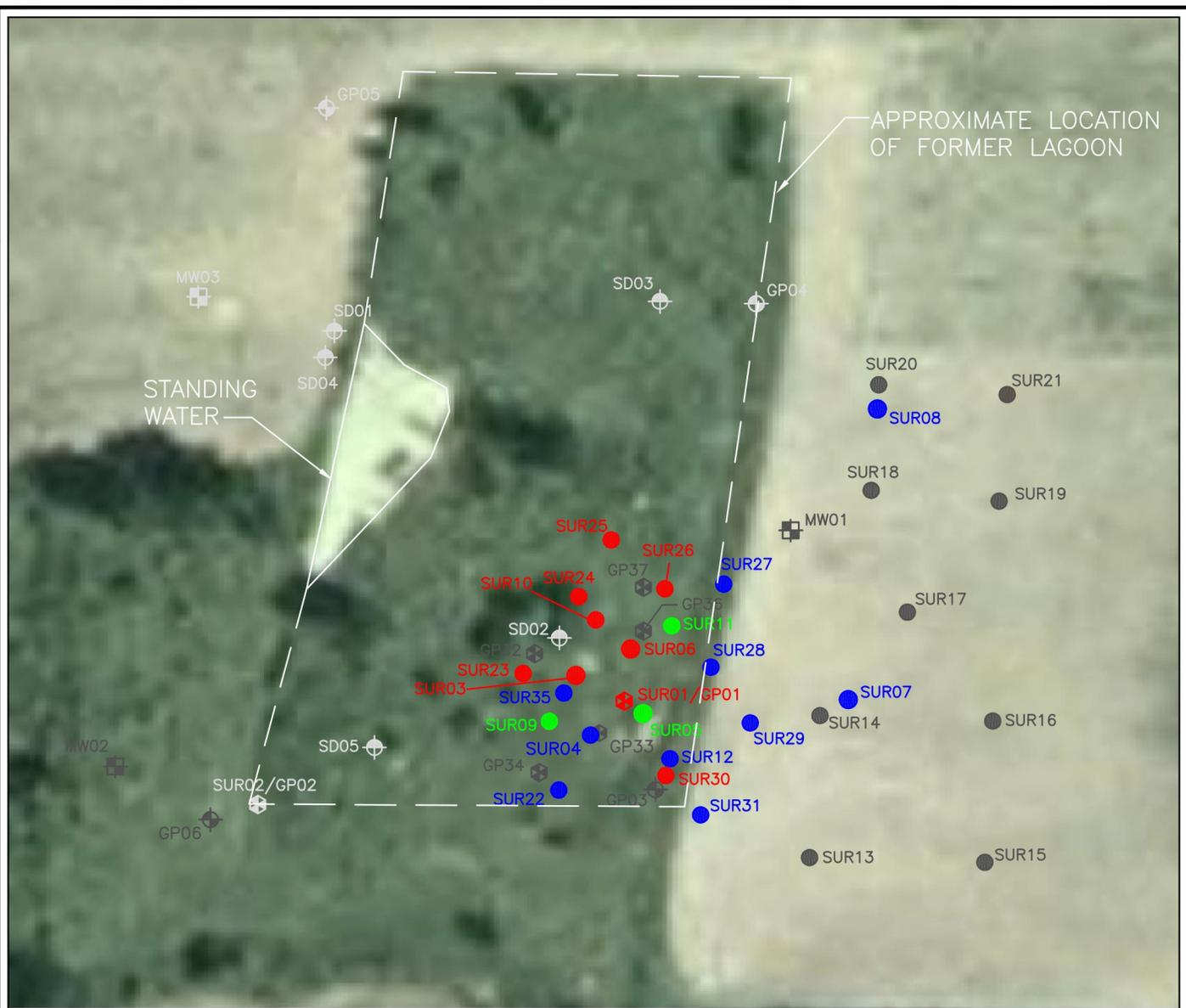


REV	DESCRIPTION	DATE	APPROVED
REVISIONS			

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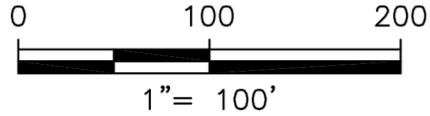
DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013
SCALE:	AS SHOWN	

LOCATION OF SOP-Z			
SIZE	PROJECT NO.	DWG NO.	REV
B	030240.0017	FIGURE 2	0



LEGEND:

- SURFACE SOIL SAMPLE/BORING LOCATION
- BORING LOCATION
- SEDIMENT SAMPLE LOCATION
- MONITORING WELL LOCATION
- SVOC CONCENTRATION GREATER THAN PRGS
- SVOC CONCENTRATION SLIGHTLY GREATER THAN PRGS
- SVOC CONCENTRATION LESS THAN PRG
- NOT SAMPLED FOR SVOCs OR NOT A SOIL SAMPLE

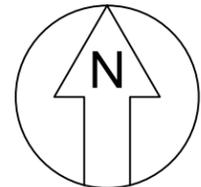


BASEMAP SOURCE:
 USGS 1994 SATELLITE IMAGES OBTAINED
 FROM THE MICROSOFT TERRASERVER
 DATABASE.

ADDITIONAL SITE INSPECTION SAMPLING ACTIVITIES
 FORMER SOP, MARION, OH

SVOC CONCENTRATIONS IN SURFACE SOIL AT THE
 INCENDIARY FUEL DISPOSAL AREA (SOP-Z)

FIGURE 3

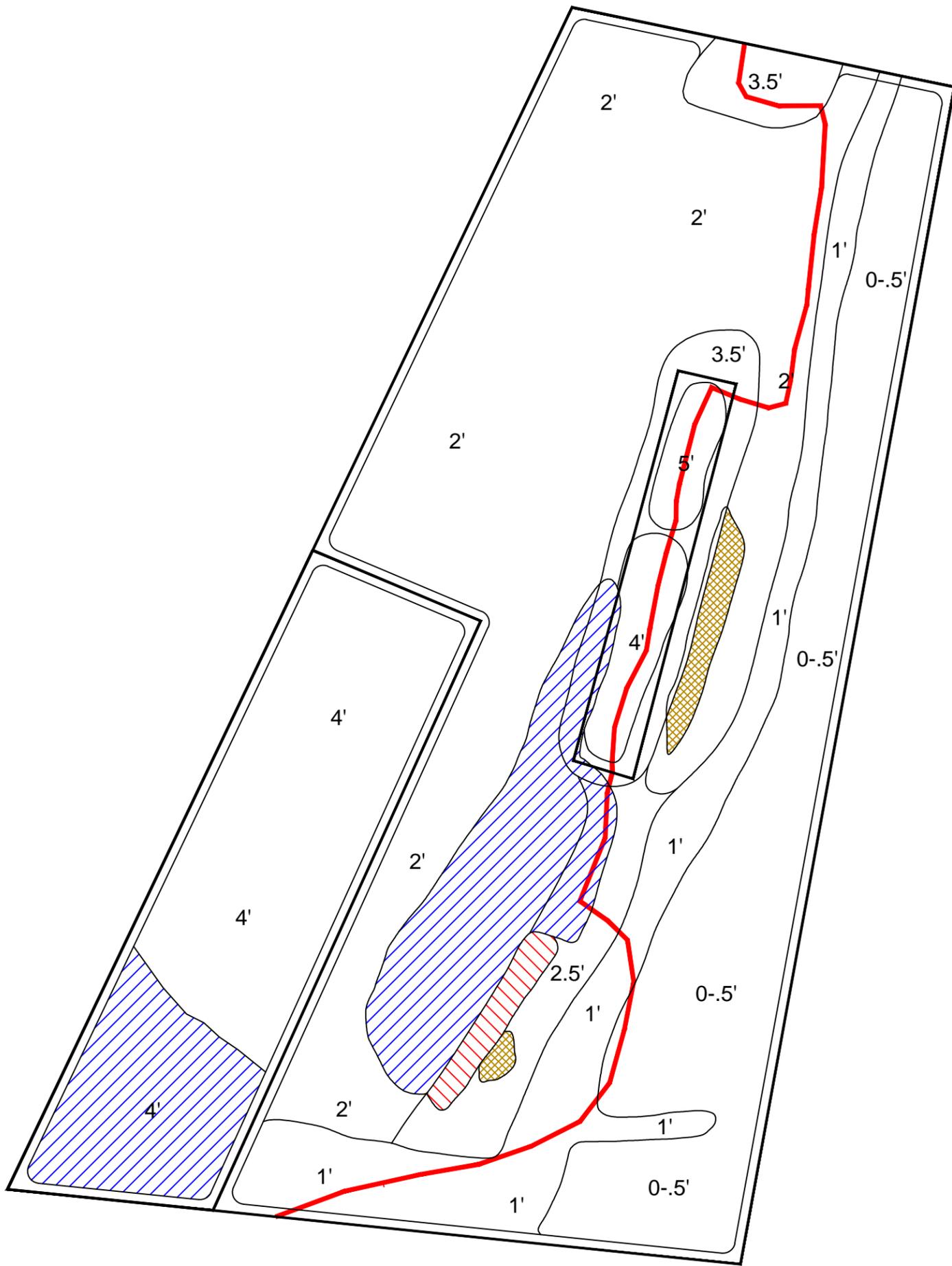


REV	DESCRIPTION	DATE	APPROVED
REVISIONS			

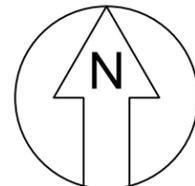

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DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013
SCALE:	AS SHOWN	

SOP-Z SHOWING NTCRA AREA			
SIZE	PROJECT NO.	DWG NO.	REV
B	030240.0017	FIGURE 4	0



- LEGEND**
-  GOOP EXPOSED
 -  POTENTIAL MEC
 -  PHOSPHOROUS
 -  CLAY / WASTE INTERFACE
 - 4' EXCAVATION DEPTH



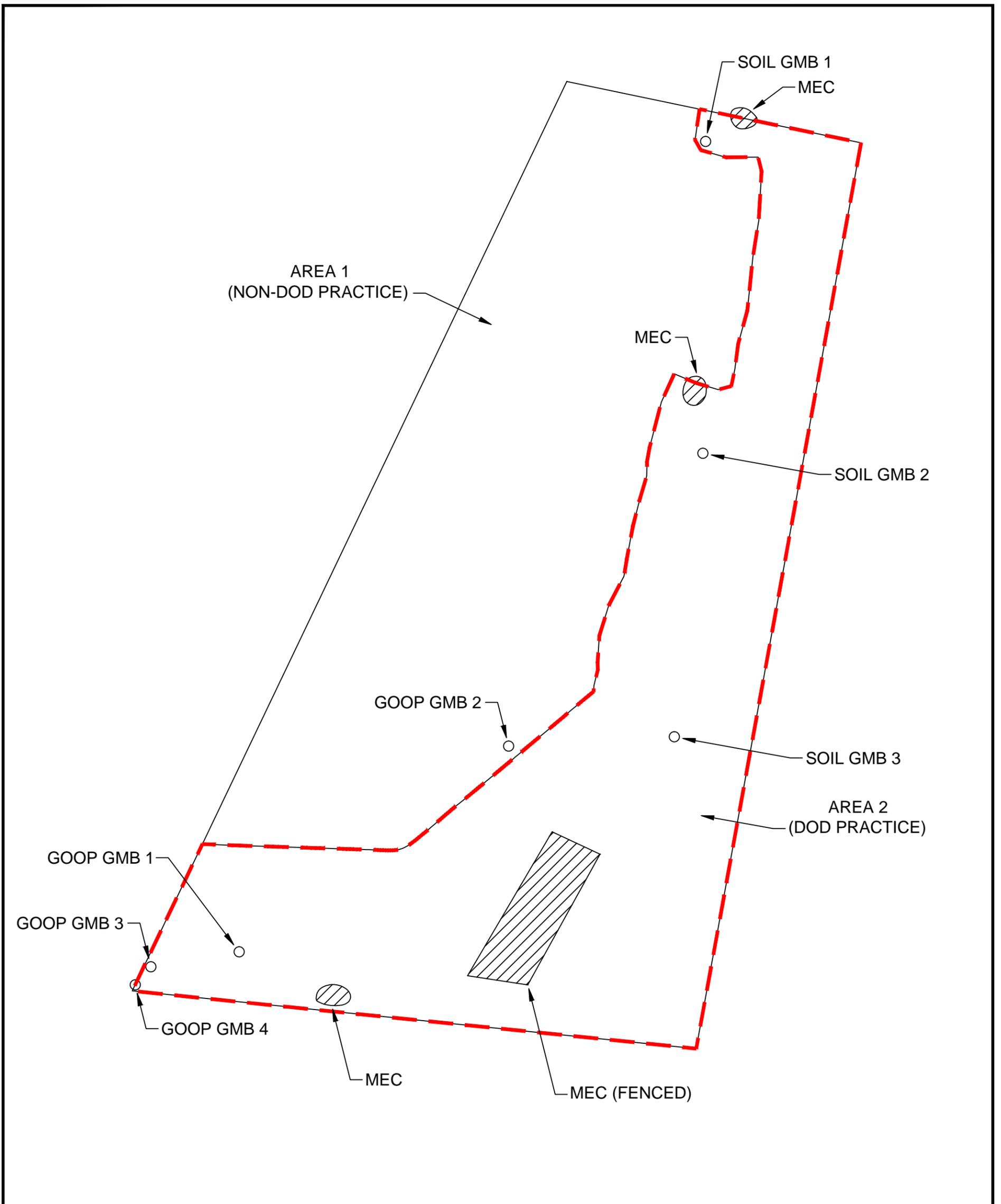
REV	DESCRIPTION	DATE	APPROVED

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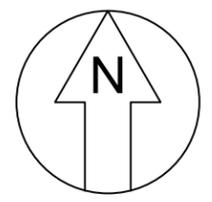
DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013
SCALE:	AS SHOWN	

STAGE 1 POST - REMOVAL EXCAVATION CONTOURS			
SIZE	PROJECT NO.	DWG NO.	REV
B	030240.0017	FIGURE 5	0



LEGEND

- - - NTCRA-AREA & TRCA-AREA (JANUARY 2011)
- MEC
- SAMPLE LOCATION & ID (NOVEMBER 2010)



REV	DESCRIPTION	DATE	APPROVED
REVISIONS			

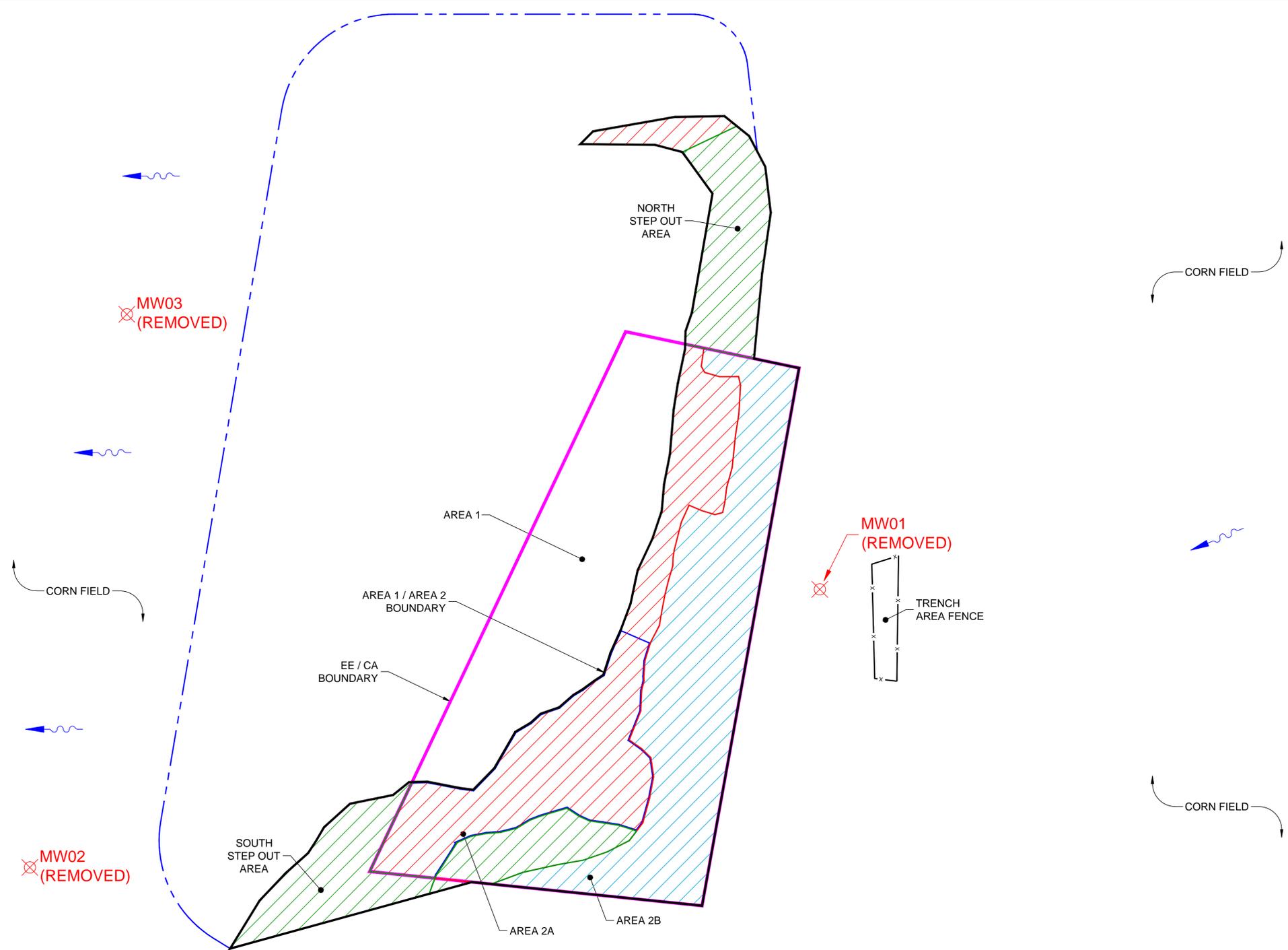
ENVIRONMENTAL QUALITY MANAGEMENT, INC.
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DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013
SCALE:	AS SHOWN	

NTCRA REDEFINITION CONFIGURATION			
SIZE	PROJECT NO.	DWG NO.	REV
B	030240.0017	FIGURE 6	0

LEGEND

-  MEC CLEARED, MARCH 2012
-  MEC CLEARED, SUMMER 2012
-  MEC CLEARED, SPRING 2013
-  MONITORING WELLS
-  LAGOON BOUNDARY
-  SURFACE DRAINAGE
-  ENTIRE AREA OF EXCAVATION



REV	DESCRIPTION	DATE	APPROVED
REVISIONS			


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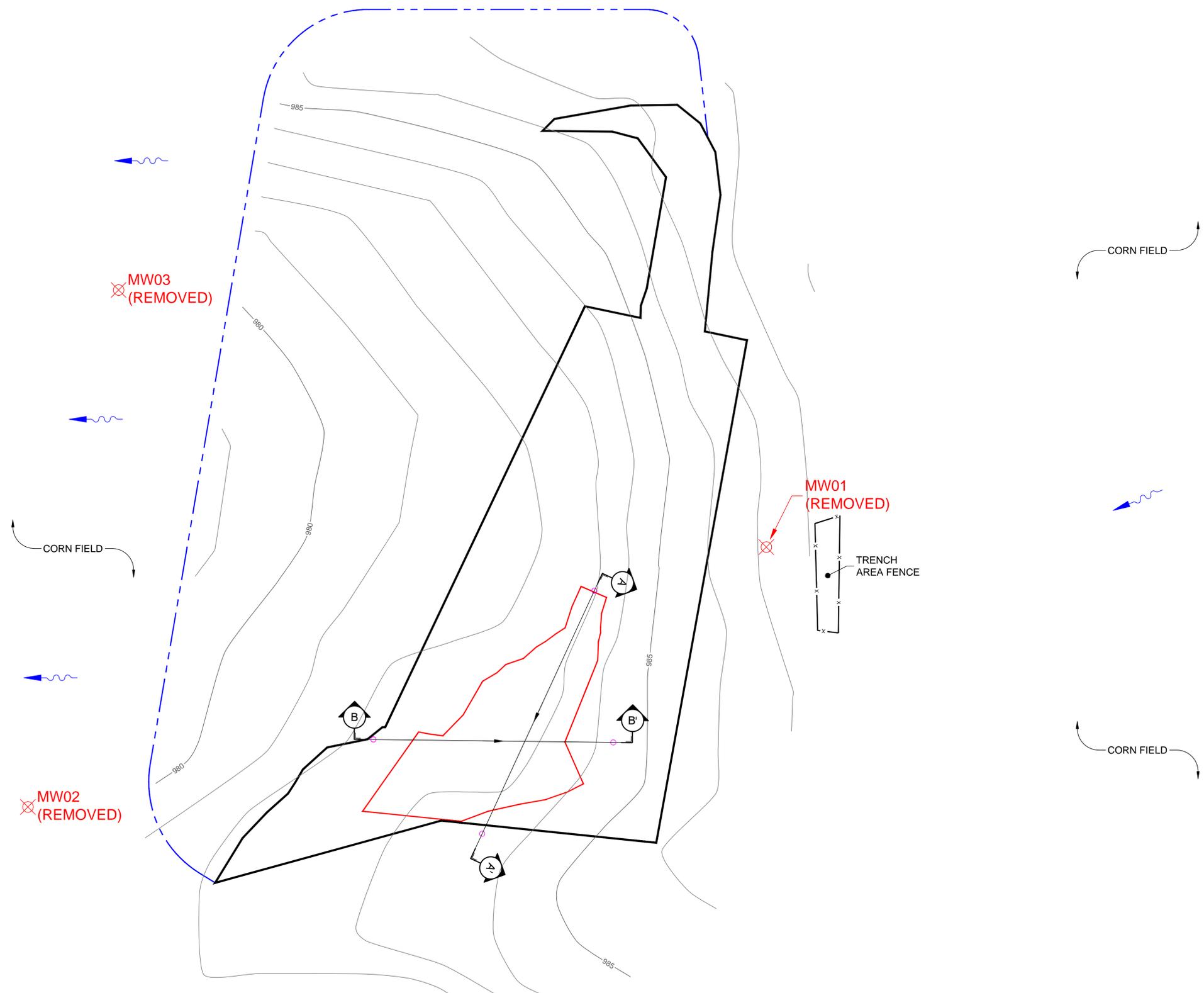
DRAWN	R. RUSSELL	09-23-2013
CHECKED	B. THOMPSON	09-23-2013
APPROVED	B. THOMPSON	09-23-2013
SCALE:	AS SHOWN	

POST NTCRA AND TCRA SITE MAP			
SIZE	PROJECT NO.	DWG NO.	REV
D	030240.0017	FIGURE 7	0

LEGEND

-  MONITORING WELLS
-  LAGOON BOUNDARY
-  SURFACE DRAINAGE
-  ENTIRE AREA OF EXCAVATION
-  TOPO CONTOUR, FEET (msl)
-  APPROXIMATE LOCATION OF BACKFILLED WASTE

SEE FIGURE 3-12 FOR SECTION PROFILES



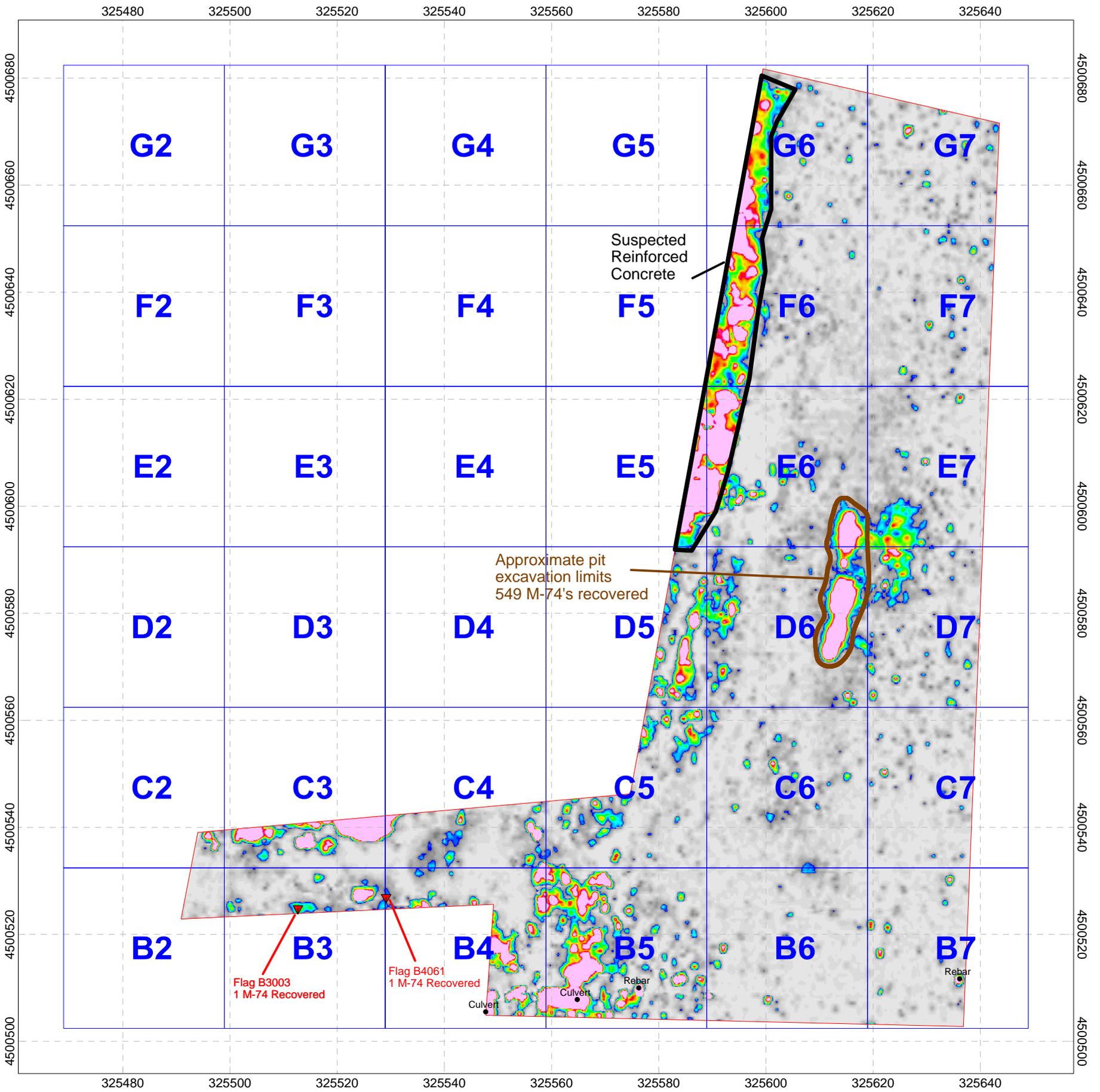
REV	DESCRIPTION	DATE	APPROVED
REVISIONS			



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PHONE 513.825.7500 | FAX 513.825.7495
WWW.EQM.COM

DRAWN	R. RUSSELL	09-24-2013
CHECKED	T. WEY	09-24-2013
APPROVED	T. WEY	09-24-2013
SCALE:	AS SHOWN	

SCIOTO ORDNANCE PLANT AS-BUILT SITE RESTORATION SITE SURVEY MAP (SEPTEMBER 2013)			
SIZE	PROJECT NO.	DWG NO.	REV
D	030240.0017	FIGURE 8	0



Legend

- Area of Investigation
- Grid Boundary
- Suspected Reinforced Concrete
- Excavation Pit (Approximate)
- Culture (if noted)
- ▼ M-74 (MEC)

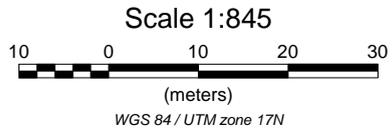
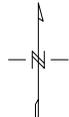


Figure 10

CAPE
EM61 MK2 Bottom Coil Mosaic and Removal Results Former Scioto Ordnance Plant Marion, Ohio
Date of Map Creation: 4/28/2014 Date of Survey: 04/23/2014 & 04/24/2014

ATTACHMENT A

Photographs of Buried DOD and non-DOD waste materials



Photo 1. View of ground surface (typical) prior to start of NTCRA activities.



Photo 2. View of non-DOD material (typical) during NTCRA activities.



Photo 3. View of DOD material (typical) "Goop" during NTCRA activities.



Photo 4. View of DOD material (typical) "Goop" during NTCRA activities.

ATTACHMENT B

Summary of Detected Semivolatile Compounds – Debris and Native Surface Soil,
Classification Yard (SOP-AJ)

TABLE 4-2
 Summary of Detected Semivolatile Organic Compounds - Debris and Native Surface Soil

Classification Yard (SOP-A1)
 Former Scioto Ordnance Plant
 Marion, Ohio
 (µg/kg)

EPA Region IX Residential PRGs - 2004		Point ID	Date	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene
Location ID		WASTE01	08/19/2004	3,681,706	21,896,121	621.5	62.1	621.5	NL	621.5	621.5
SOPAI-WASTE01-COMP		WASTE02	08/19/2004								
SOPAI-WASTE02-COMP		WASTE03	08/19/2004			78.5		68.5		77	88.4
SOPAI-WASTE03-COMP		WASTE04	08/19/2004	167	J 111	654	499	632	188	J 752	779
SOPAI-WASTE04-COMP		WASTE05	08/19/2004								
SOPAI-WASTE05-COMP		WASTE06	08/19/2004								
SOPAI-WASTE06-COMP		GP01-Waste	05/26/2005								
SOPAI-GP01(1-4)		GP02-Native Surface	05/26/2005								
SOPAI-GP02(2-3)		GP03-Native Surface	05/26/2005								
SOPAI-GP03(2-3)		GP04-Native Surface	05/26/2005								
SOPAI-GP04(2.5-3.5)		Duplicate									
SOPAI-WASTE02-COMP DUP		WASTE02	08/19/2004								

µg/kg - micrograms per kilogram
 B - analyte was detected in the method blank
 J - estimated concentration
 R - rejected
 COMP - composite
 DUP - duplicate
 GP - geoprobe
 ID - identification
 PRG - Preliminary Remediation Goal
 USEPA - United States Environmental Protection Agency
 NL - not listed
 Bolded font indicates exceedance of PRGs
 Blank space indicates non detect
 Only detected compounds are shown

TABLE 4-2
 Summary of Detected Semivolatile Organic Compounds - Debris and Native Surface Soil

Classification Yard (SOP-AJ)
 Former Scioto Ordnance Plant
 Marion, Ohio
 (µg/kg)

EPA Region IX Residential PRGs - 2004		Point ID	Date	Dibutylphthalate	Fluoranthene	Hexachlorocyclopentadiene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Bis(2-ethylhexyl)phthalate
Location ID										
SOPAJ-WASTE01-COMP	WASTE01	08/19/2004	NL				621.5	NL	2,315,951	34,741
SOPAJ-WASTE02-COMP	WASTE02	08/19/2004	232	B	R	R				255
SOPAJ-WASTE03-COMP	WASTE03	08/19/2004	126	B	R	R				191
SOPAJ-WASTE04-COMP	WASTE04	08/19/2004	154	B	164	J			148	205
SOPAJ-WASTE05-COMP	WASTE05	08/19/2004	147	B	1500	R	220	J	363	230
SOPAJ-WASTE06-COMP	WASTE06	08/19/2004	132	B		R				192
SOPAJ-GP01(1-4)	GP01-Waste	05/26/2005				R				225
SOPAJ-GP02(2-3)	GP02-Native Surface	05/26/2005								
SOPAJ-GP03(2-3)	GP03-Native Surface	05/26/2005								
SOPAJ-GP04(2.5-3.5)	GP04-Native Surface	05/26/2005								
Duplicate										
SOPAJ-WASTE02-COMP DUP	WASTE02	08/19/2004	2550			R				247

µg/kg - micrograms per kilogram
 B - analyte was detected in the method blank
 J - estimated concentration
 R - rejected
 COMP - composite
 DUP - duplicate
 GP - geoprobe
 ID - identification
 PRG - Preliminary Remediation Goal
 USEPA - United States Environmental Protection Agency
 NL - not listed
 Bolded font indicates exceedance of PRGs
 Blank space indicates non detect
 Only detected compounds are shown

ATTACHMENT C

Stage 5 Site Photographs

Former Scioto Ordnance Plant

DATE: 4/16/14

**PHOTO
NUMBER: #1**

**DESCRIPTION:
SITE
CONDITIONS
PRIOR TO
STARTING
FIELDWORK.**



Former Scioto Ordnance Plant

DATE: 4/23/14

**PHOTO
NUMBER: #2**

**DESCRIPTION:
DIGITAL
GEOPHYSICAL
MAPPING BY A
NAEVA
GEOPHYSICIST.**



Former Scioto Ordnance Plant

DATE: 4/23/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #3**

**DESCRIPTION:
CULTURAL
DEBRIS FROM
THE SURFACE
SWEEP
OPERATIONS.**



Former Scioto Ordnance Plant

DATE: 4/25/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #4**

**DESCRIPTION:
FLAG
PLACEMENT
BASED ON
DGM DATA.**



Former Scioto Ordnance Plant

DATE: 4/25/14

**PHOTO
NUMBER: #5**

**DESCRIPTION:
EXPLOSIVE
STORAGE
MAGAZINES
SETUP.**



Former Scioto Ordnance Plant

DATE: 4/25/14

**PHOTO
NUMBER: #6**

**DESCRIPTION:
PLEXIGLAS
SHIELDING
FOR
EXCAVATOR.**



Former Scioto Ordnance Plant

DATE: 5/1/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #7**

**DESCRIPTION:
WET SITE
CONDITIONS
AND DGM
ANOMALY
INVESTIGATION.**



Former Scioto Ordnance Plant

DATE: 5/7/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #8**

**DESCRIPTION:
TWO FOOT
DEEP
EXCAVATION
AT GRID B3.**



Former Scioto Ordnance Plant

DATE: 5/7/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #9**

**DESCRIPTION:
SIFTING
OPERATION.**



Former Scioto Ordnance Plant

DATE: 5/7/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #10**

**DESCRIPTION:
SIFTING
OPERATION
AND SPOTTER
OVERSEEING
OPERATIONS.**



Former Scioto Ordnance Plant

DATE: 5/8/14
(INCORRECT DATE
STAMP ON CAMERA)

**PHOTO
NUMBER: #11**

**DESCRIPTION:
TWO FEET
DEEP
EXCAVATION
AT GRID C3.**



Former Scioto Ordnance Plant

DATE: 5/10/14

**PHOTO
NUMBER: #12**

**DESCRIPTION:
DEMOLITION
SHOT SETUP
ON MULTIPLE
M-74
INCENDIARY
BOMBS.**



Former Scioto Ordnance Plant

DATE: 5/19/14

**PHOTO
NUMBER: #13**

**DESCRIPTION:
PIT
EXCAVATION.**



Former Scioto Ordnance Plant

DATE: 5/19/14

**PHOTO
NUMBER: #14**

**DESCRIPTION:
INTACT M-74
INCENDIARY
BOMBS
RECOVERED
FROM THE PIT.**



Former Scioto Ordnance Plant

DATE: 5/20/14

**PHOTO
NUMBER: #15**

**DESCRIPTION:
TOTAL
RECOVERED
M-74
INCENDIARY
BOMBS FROM
THE PIT.**



Former Scioto Ordnance Plant

DATE: 5/20/14

**PHOTO
NUMBER: #16**

**DESCRIPTION:
CONSOLIDATED
DEMOLITION
SHOT SETUP.**



Former Scioto Ordnance Plant

DATE: 5/21/14

**PHOTO
NUMBER: #17**

**DESCRIPTION:
EXCAVATED
PIT.**



Former Scioto Ordnance Plant

DATE: 5/23/14

**PHOTO
NUMBER: #18**

**DESCRIPTION:
EXCAVATED
PIT AND
STAGED SOIL
FROM THE PIT
(UPPER LEFT).
STAGED SOIL
IN THE UPPER
RIGHT IS FROM
GRIDS B3, B4,
B5, C3, C4, C5
AND D5.**



Former Scioto Ordnance Plant

DATE: 5/23/14

**PHOTO
NUMBER: #19**

**DESCRIPTION:
MUNITIONS
DEBRIS
AWAITING
THERMAL
FLASHING.**



Former Scioto Ordnance Plant

DATE: 5/27/14

**PHOTO
NUMBER: #20**

**DESCRIPTION:
CONFIRMATORY
MULTI-
INCREMENTAL
SAMPLING.**



Former Scioto Ordnance Plant

DATE: 5/27/14

**PHOTO
NUMBER: #21**

**DESCRIPTION:
CONFIRMATORY
MULTI-
INCREMENTAL
SOIL SAMPLE
COLLECTION.**



Former Scioto Ordnance Plant

DATE: 5/28/14

**PHOTO
NUMBER: #22**

**DESCRIPTION:
QC CHECK OF
THE SIFTED
SOIL.**



Former Scioto Ordnance Plant

DATE: 5/29/14

**PHOTO
NUMBER : #23**

**DESCRIPTION:
THERMAL
FLASH UNIT
SETUP AND
PROCESSING.**



Former Scioto Ordnance Plant

DATE: 5/29/14

**PHOTO
NUMBER: #24**

**DESCRIPTION:
QC
OVERSIGHT OF
THE THERMAL
FLASHING
PROCESS.**



Former Scioto Ordnance Plant

DATE: 5/29/14

**PHOTO
NUMBER: #25**

**DESCRIPTION:
THERMAL
FLASH UNIT
TRAY
LOADING.**



Former Scioto Ordnance Plant

DATE: 5/31/14

**PHOTO
NUMBER: #26**

**DESCRIPTION:
THERMAL
FLASH
RESIDUE ON
M-74 BODIES.**



Former Scioto Ordnance Plant

DATE: 6/3/14

**PHOTO
NUMBER: #27**

**DESCRIPTION:
MUNITIONS
DEBRIS QC
INSPECTION.**



Former Scioto Ordnance Plant

DATE: 6/7/14

**PHOTO
NUMBER: #28**

**DESCRIPTION:
DRUMS FILLED
WITH
MUNITIONS
DEBRIS READY
FOR
SHIPMENT.**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #29**

**DESCRIPTION:
SITE
RESTORATION
AND GRADING
(SOUTH
FACING
NORTH).**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #30**

**DESCRIPTION:
SITE
RESTORATION
AND GRADING
(EAST FACING
NORTH)**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #31**

**DESCRIPTION:
SITE
RESTORATION
AND GRADING
(EAST FACING
WEST).**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #32**

**DESCRIPTION:
SITE
RESTORATION
AND GRADING
(NORTH OF
THE PIT
FACING
SOUTH).**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #33**

**DESCRIPTION:
ACCESS ROAD
FACING
NORTH.**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #34**

**DESCRIPTION:
ACCESS ROAD
FACING
SOUTH.**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #35**

**DESCRIPTION:
ACCESS ROAD
FACING SOUTH**



Former Scioto Ordnance Plant

DATE: 6/16/14

**PHOTO
NUMBER: #36**

**DESCRIPTION:
ACCESS ROAD
FACING SOUTH**

