
**FINAL
GEOPHYSICAL PROVE-OUT (GPO) PLAN
MORTAR RANGE
REMEDIAL INVESTIGATION
FORT GEORGE G. MEADE
ANNE ARUNDEL COUNTY, MARYLAND**

SEPTEMBER 2007

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**FORT GEORGE G. MEADE
MILITARY MUNITIONS RESPONSE PROGRAM
REMEDIAL INVESTIGATION
ANNE ARUNDEL COUNTY, MARYLAND**

DoD Task Order Contract Number: W912DR-05-D-0004

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Malcolm Pirnie, Inc. prepared this report at the direction of the United States Army Corps of Engineers (USACE). This document should be used only with the approval of the USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

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ACRONYMS

APP	Accident Prevention Plan
ASCII	American Standard Code for Information Interchange
CD	Compact Disc
cm	Centimeter
DGM	Digital Geophysical Mapping
DID	Data Item Description
DQO	Data Quality Objectives
EM	Electromagnetometer
Envimag	Scintrex Envi Proton Precession Magnetometer
ESRI	Environmental Systems Research Institute
FGGM	Fort George G. Meade
G-858	Geometrics 858
GEOQC	Geophysical QC Specialist
GPO	Geophysical Prove-Out
HASP	Health and Safety Plan
Hz	Hertz
in.	Inch
Malcolm Pirnie	Malcolm Pirnie, Inc.
MEC	Munitions and Explosives of Concern
m	Meter
Mk2	Mark 2
mm	millimeter
MMRP	Military Munitions Response Program
MR	Munitions Response
mV	milliVolts
NAEVA	NAEVA Geophysics, Inc.
NAD	North American Datum
nT	nanoTesla
PG	Project Geophysicist
PLS	Professional Land Surveyor
p-p	Peak-to-Peak
QA	Quality Assurance
QC	Quality Control
RI	Remedial Investigation
SNR	Signal-to-Noise Ratio
TP	Target Practice
U.S.	United States
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance

1.0 GPO PLAN

Malcolm Pirnie, Inc. (Malcolm Pirnie) has prepared the following Geophysical Prove-Out (GPO) plan for the Military Munitions Response Program (MMRP) Remedial Investigation (RI) of the Former Mortar Range (FGGM-003-R), hereafter referred to as the Mortar Range, at Fort George G. Meade (FGGM) in Anne Arundel County, Maryland. The RI is being performed under contract W912DR-05-D-0004, Delivery Order 0055 for the United States (U.S.) Army Corps of Engineers (USACE) Baltimore District.

This GPO Plan has been developed to provide a description of the approach, methods, and operational procedures to be used at the GPO to demonstrate the geophysical processes and procedures to be used during the RI at the Mortar Range at Fort Meade. The GPO will be used to evaluate and document the site-specific capabilities of the proposed Digital Geophysical Mapping (DGM) survey instruments, navigation equipment, data analysis procedures, data management techniques, and associated equipment and personnel to operate as an integrated system capable of meeting Data Quality Objectives (DQOs) for project performance goals. Malcolm Pirnie will begin mobilization in September 2007 to survey and install the GPO. The results of the GPO will be reported in a GPO Letter Report, and will be followed by the RI Work Plan for the Mortar Range at FGGM. This GPO plan was developed in accordance with the U.S. Army Corps of Engineers Data Item Description (DID) Munitions Response (MR)-005-05A. Malcolm Pirnie has sub-contracted with NAEVA Geophysics, Inc. (NAEVA) to perform the DGM survey and GPO survey activities at the site.

1.1 GPO Objectives

The objectives of the GPO will be used as standards to verify that the project goals are met. Geophysical instruments will be selected for use during the DGM survey at the site based upon their ability to accurately detect seeded inert munitions, or munitions surrogates, buried prior to the GPO verification process. The objectives for the GPO process are as follows:

- Demonstrate that the geophysical investigation systems/equipment are operating properly
- Determine the ability of the geophysical and navigational systems and/or techniques to adequately perform in the area of the Mortar Range
- Provide a set of isolated objects (e.g., single inert munitions or munitions surrogates) from which the geophysical sensor responses will be evaluated to determine the equipment limitations in the geologic settings
- Provide a set of clustered objects (e.g. multiple inert munitions items and scrap metal items) to determine the geophysical systems capability of identifying areas of high anomaly density, which might be expected at the Mortar Range site

- Assess the operator's performance, update related procedures, and assist in the development of operator measurement techniques
- Establish a baseline of performance capabilities for the selected instruments at the Mortar Range
- Establish decision parameters for target selection by the site geophysicists
- Evaluate navigational/position systems for electronic positional accuracy of identified below ground surface anomalies
- Determine average speed along track sampling
- Correct instrument latency using an appropriate correction routine that accounts for instrument latency time and sensor velocity. Corrections must be specific for all segments of data with equal sensor velocities
- Perform all processing to produce final datasets (including data leveling), which will be evaluated on a dataset by dataset basis to confirm that those routines do not significantly alter the original measured peak responses (above background) for seeded anomalies. For producing final datasets, processing routines shall not alter the peak responses of anomalies by more than 20 %. This limit will be evaluated on the GPO datasets.
- Data positioning errors in the final datasets will not exceed 20 centimeters
- Determine the "effects" of cultural objects, if any, upon the implementation of geophysical instruments and recognition of anomalies

1.2 Personnel Qualifications

NAEVA will provide a two-person field crew, supervised by a Senior Geophysicist, to perform the GPO at FGGM. Malcolm Pirnie will provide one Unexploded Ordnance (UXO) Technician II (or higher) to escort the field team during geophysical prove out, and Geophysics Quality Control (QC) personnel to ensure compliance with the GPO plan.

1.3 Geophysical Prove-Out Area Design

The proposed GPO site location will be outside of the Mortar Range in the area shown on Map 1-1. The proposed GPO location may be moved if the site has significant background noise. NAEVA will conduct the GPO prior to conducting the DGM survey of the Mortar Range. UXO avoidance procedures will be used during the GPO. All work will be in accordance with the Accident Prevention Plan (APP). The APP is included as Appendix A and includes a site specific Health and Safety Plan (HASP). The elements outlined in the following sub-sections describe the procedures associated with the GPO at FGGM. The raw data will be submitted to the USACE within 48 of data collection and processed data will be submitted to the USACE 24 hours after the raw data, and any necessary adjustments will be made based on a preliminary review of the GPO results.

1.3.1 Prove-out Size and Location

The GPO will consist of one approximately 0.25 mile long transect and one 30ft by 30ft grid at one of the proposed locations. Map 1-2 shows the proposed layout of the GPO transect with the proposed seed item locations and Map 1-3 shows the proposed layout of the GPO grid and seed items within the grid. The location of the GPO transect and grid may be moved depending on site access and the background GPO survey of the area.

1.3.2 Prove-Out Grid Construction

One GPO transect and one grid will be constructed for this investigation, since the soil and geologic conditions are relatively homogeneous throughout the project area. Seventeen inert practice munitions, or surrogates, will be seeded on or within several feet of the GPO transect line and in the GPO grid. The inert seeded items will represent the Munitions and Explosives of Concern (MEC) items potentially occurring at the Mortar Range, which are listed in Table 1-1, and will be provided by Malcolm Pirnie and/or obtained from a local Explosive Ordnance Disposal Unit. In addition to the inert munitions items, the GPO will also contain eight pieces of scrap metal.

Table 1-1: Potential MEC Items Represented in GPO Grid

MEC Item in GPO Grid	Potential MEC Item
60 millimeter (mm) (Inert)	Target Practice (TP) 60mm Mortars
81mm (Inert)	TP 81mm Mortars

1.4 Site Preparation

Minimal vegetation removal and site preparation are anticipated at the GPO location.

1.5 Location Surveying

A Maryland licensed professional land surveyor (PLS) will tie into existing control monuments, or will establish a control monument or survey marker with a minimum of “third order” accuracy. The start, end, and inflection points of the GPO transect will then be surveyed by the PLS. The corner points for both of the proposed grids will also be surveyed by the PLS. The proposed GPO transect points are listed in Table 1-2, while Table 1-3 lists the proposed grid corners for the two potential GPO grids. The locations of these points will be modified when the final GPO location is determined. After the 18 inert items have been buried, the location of each of the seed items will be surveyed by the PLS to a horizontal accuracy of at least three centimeters and a vertical accuracy of at least five centimeters. All coordinates will be provided in the Maryland State Plane Coordinate System North American Datum of 1983 (NAD83), with units in U.S. survey feet. The PLS will also survey the surface coordinates and elevations of the seed items once each has been buried.

Table 1-2: Proposed GPO Transect Points

Corner	Northing (ft)*	Easting (ft)*
Start (SW)	520975.977	1391367.685
Inflection1	521572.437	1391348.319
Inflection2	521575.657	1391465.395
End (SE)	520982.465	1391495.841

* Coordinates are in Maryland State Plane NAD83 with units of U.S. Survey Feet.

Table 1-3: Proposed GPO Grid Points

Grid	Corner	Northing* (ft)	Easting (ft)*
Grid 1	SW	521172.951	1391471.799
	NW	521202.946	1391471.139
	NE	521203.606	1391501.134
	SE	521173.611	1391501.794
Grid 2	SW	521020.726	1391475.637
	NW	521050.721	1391474.977
	NE	521051.381	1391504.972
	SE	521021.386	1391505.632

* Coordinates are in Maryland State Plane NAD83 with units of U.S. Survey Feet.

The proposed location of each seed item is displayed on the GPO Transect Layout on Map 1-2 or on the GPO Grid Layout on Map 1-3; while depth, orientation, and offset from transect line of each item are listed in

Table 1-4: **GPO Seed Items**

4. The coordinates listed in Table 1-4 will change depending on the final GPO location. Seed items will be painted blue and tagged with non-biodegradable labels that will identify the items as inert and provide a reference for contact information.

Table 1-4: GPO Seed Items

Seed Item Number	Northing (ft)*	Easting (ft)*	Seed Item	Depth (inches)	Orientation	Offset (feet)
1	521125.750	1391362.822	81mm Mortar	34	Horizontal	0
2	521212.311	1391360.012	60mm Mortar	24	Horizontal	0
3	521417.994	1391353.333	81mm Mortar	12	Horizontal	0
4	521489.316	1391351.018	60mm Mortar	6	Horizontal	0
5	521574.505	1391423.508	60mm Mortar	12	Vertical	0
6	521364.825	1391476.216	81mm Mortar	12	Vertical	2
7	521285.039	1391480.311	60mm Mortar	24	Vertical	0
8	521200.934	1391484.620	81mm Mortar	34	Vertical	0
9	521197.209	1391484.819	60mm Mortar	18	Vertical	0
10	521190.089	1391485.184	81mm Mortar	12	Horizontal	0
11	521175.252	1391485.116	81mm Mortar	24	Horizontal	1
12	521160.023	1391486.840	60mm Mortar	12	Horizontal	0
13	521156.740	1391488.016	60mm Mortar	12	Horizontal	1
14	521153.527	1391489.168	60mm Mortar	12	Horizontal	2
15	521199.562	1391485.733	Scrap Metal (Trailer Ball Hitch)	6	Horizontal	1
16	521185.321	1391485.429	Scrap Metal (Aluminum Can)	2	Horizontal	0
17	521202.235	1391482.872	Scrap Metal	12	Horizontal	1
18	521187.718	1391483.686	Scrap Metal	6	Horizontal	1
19	521199.194	1391482.559	Scrap Metal	12	Horizontal	3
20	521177.817	1391476.238	60mm Mortar	12	Horizontal	10
21	521192.473	1391475.966	81mm Mortar	24	Vertical	10
22	521181.538	1391483.664	Scrap Metal	12	Horizontal	1
23	521179.104	1391487.186	Scrap Metal	12	Horizontal	1
24	521193.863	1391486.488	Scrap Metal	6	Horizontal	1
25	521195.312	1391497.044	81mm Mortar	24	Horizontal	10

* Coordinates are in Maryland State Plane NAD83 with units of U.S. Survey Feet.

1.6 Pre-Seeding Geophysical Survey

The GPO site will be surveyed using both magnetic and electromagnetic methods prior to seeding the area. The Geometrics 858 (G-858) magnetometer will be operated in vertical gradiometer mode and the Geonics electromagnetometer (EM) EM-61 Mark 2 (MK2) will be operated in a man portable mode. A reference magnetometer will be used to record the changes to the earth's magnetic field during the magnetometer survey. These

initial surveys will verify the suitability of the proposed GPO site and provide baseline response data. Subsurface utilities detected by the geophysical instruments will be located and marked on the ground. If a utility is at a location of a planned seed item, a new location will be selected with the concurrence of the USACE, Baltimore District geotechnical representative. In addition, interferences caused by surface and below ground surface man-made objects will be identified in the digital datasets for each sensor as a comparison to the post-seed datasets.

1.7 Quality Control

1.7.1 Procedures

The following QC procedures will be performed and documented during the data collection process and will be reviewed by a qualified geophysicist. All documentation will be available to USACE, Baltimore District personnel.

Data QC will be achieved by field testing, and by checking the sensor and navigation system against a known target, in order to ensure that all equipment is operating properly. The instrument standardization checks described in Section 1.7.2 will be implemented to achieve QC objectives. Operational and test procedures will conform to the manufacturer's standard instructions.

All geophysical instruments and equipment used to gather and generate field data will be calibrated with sufficient frequency, and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. Calibration, repair, and replacement records will be filed and maintained by the site geophysicist and may be subject to audit by the Quality Assurance (QA) Manager. Testing records of the field instrumentation will be filed with the Malcolm Pirnie Geophysical QC Specialist (GEOQC) after the GPO is completed.

Data processing QC is required to assure data quality. Potential data problems include: source data errors, data entry errors, data editing errors, data corruption errors, and user errors. NAEVA's data review will identify and correct any of these errors should they occur. The GEOQC will also QC the data that NAEVA collects and submits, and will independently process the GPO data.

1.7.2 Instrument Standardization

The required equipment tests and frequency of testing that will be conducted by NAEVA are summarized in Table 1-5.

1.7.2.1 Equipment/Electronics Warm-up Test

Purpose: Minimize sensor drift due to thermal stabilization. Most instruments need several minutes to warm up before data collection begins. NAEVA will follow the manufacturer's instructions or, if none are given, observe the data readings until they stabilize.

Acceptance Criteria: Equipment-specific (typically a minimum of five minutes).

1.7.2.2 Record Relative Sensor Positions Test

Purpose: Document relative navigation and sensor offsets, detector separation, and detector heights above the ground surface. This will ensure that detector off-set corrections and gradient calculations can be done correctly, and that the surveys are repeatable.

Acceptance Criteria: +/- 1 in. (2.54 cm).

1.7.2.3 Personnel Test

Purpose: Establish that survey personnel have removed all potential interference sources from their “bodies”. Common interference sources are ballpoint pens in the operator’s pocket and steel toed boots or large metallic belt buckles, which can produce data anomalies similar to MEC targets. All personnel coming into proximity of the sensor during survey operations will approach the sensor only while a second person monitors and records the results.

Acceptance Criteria: EM-61 +/- 2mV, G-858 +/- 3nT.

1.7.2.4 Vibration Test (Cable Shake)

Purpose: Identify and replace shorting cables and broken pin-outs on connectors. With the instrument held in a static position and collecting data, all cables will be shook to test for shorts and broken pin-outs. An assistant will observe any changes in instrument response. If shorts are found, faulty cables will be immediately repaired or replaced. After repair, cables will be rigorously tested before use.

Acceptance Criteria: Data profile does not exhibit data spike responses.

Table 1-5: QC Frequency

Test Number	Test Description	Acceptance Criteria	Power On	Beginning of Day	Beginning and End of Day	First Day On Site for Each Sensor Technology	Repeat Last Two Lines of GPO Grid
1	Equipment Warm Up	Equipment Specific (typically 5 minutes)	X				
2	Record Sensor Positions	+/- 1 inch (in), or 2.54 centimeters (cm)		X			
3	Personnel Test	EM-61 2 milliVolt (mV) peak to peak (p-p), G-858 3 nanoTesla (nT) p-p		X			
4	Vibration Test (Cable Shake)	Data Profile does not exhibit data spikes		X			
5	Static Background & Static Spike	Background: EM-61 2.5 mV p-p, G-858 1 nT p-p;			X		
6	Azimuthal Test	Sensor Orientation that minimizes drop-outs				X	
7	Height Optimization	Maximum Signal-to-Noise Ratio (SNR) that reliably detects smallest target objective				X	
8	Six Line Test	Repeatability of response amplitude +/- 20%, Positional Accuracy +/- 20 centimeters				X	
9	Octant Test (Heading error Test)	Document heading error for post-processing correction				X	
11	Repeat Data	Repeatability of response amplitude +/- 20%, Positional Accuracy +/- 20 centimeters					X

1.7.2.5 Static Background and Static Standard Response (Spike) Test

Purpose: Quantify instrument background readings, electronic drift, locate potential interference spikes in the time domain, and determine impulse response and repeatability of the instrument to a standard test item (e.g., 2-in. diameter steel trailer ball). Improper instrument function, the presence of local sources of ambient noise (such as EM transmissions from high-voltage electric lines), and instability in the earth's magnetic field (as during a magnetic storm) are all potential causes of inconsistent, non-repeatable readings. A minimum of three minutes static background collection after instrument warm-up, followed by a one-minute standard (spike) test and a subsequent one-minute static background collection, will be performed. The operator will review the readings to confirm their stability prior to continuing with the DGM.

Acceptance Criteria:

- Static Background Test: EM-61 +/- 2.5 mV, G-858 +/- 1nT,
- Static Spike Test: EM-61/ G-858, +/- 20% of standard item response, after background correction.

1.7.2.6 Azimuthal Test

The purpose of the Azimuthal Test is to determine the optimal magnetometer sensor orientation to minimize drop-outs at the site. This direction is the orientation that will provide the best magnetic data. Grid and transect lines will be oriented in this direction, and the procedure will be performed on the first day that the magnetometer is on site.

Acceptance Criteria: The orientation that minimizes drop-outs.

1.7.2.7 Height Optimization

The purpose of the Height Optimization Test is to determine the optimal sensor height to use at the site to obtain the maximum SNR that reliably detects the smallest target objective. This test will be performed by each sensor technology that is used at the site on the first day that the sensor is on site.

Acceptance Criteria: The sensor height that maximizes the SNR that reliably detects the smallest target objective.

1.7.2.8 Six Line Test

Purpose: Document latency, heading effects, repeatability of response amplitude, and positional accuracy. This test will be performed prior to collecting data at the GPO in an area relatively clear of anomalous response. The test line will be well marked to facilitate data collection over the exact same line each time the test is performed. Heading effects, repeatability of response amplitude, positional accuracy, and latency will be evaluated. The following procedure will be followed:

- Lay out a 50-ft, non-metallic tape in an north-south or east-west direction;
- At a normal pace, run a survey along the 50-ft line going one direction;
- At a normal walking pace, collect a survey line along the 50-ft line in the reverse direction;

- Place target (e.g., trailer-hitch ball) on clean area of the line at an inline distance of 25-ft;
- At a normal walking pace, collect a survey line along the 50-ft line in one direction;
- At a normal walking pace, collect a survey line along the 50-ft line in the opposite direction;
- At a fast walking pace, collect a survey line along the 50-ft line in one direction; and
- At a slow walking pace, collect a survey line along the 50-ft line in the opposite direction.

Acceptance Criteria: Repeatability of response amplitude +/-20%, Positional Accuracy +/- 20 cm.

1.7.2.9 Octant Test

The purpose of the Octant Test is to determine and document magnetometer heading error for post-processing correction. This test will be performed on the first day that the magnetometer sensor is on site.

Acceptance Criteria: Document heading error for future post-processing.

1.7.2.10 Repeat Data Test

Purpose: Determine positional and geophysical data repeatability. After data collection on the GPO transect, the last 400 ft will be repeated. The data will be viewed in profile form and compared to the original data as a means of evaluating the ability of the instrument to respond consistently with sufficient positional accuracy. The position data will be evaluated by superimposing the initial and repeat line to verify that they do not deviate by more than 20 cm. The repeat data will be evaluated immediately following the download of survey data.

Acceptance Criteria: Repeatability of response amplitude +/- 20 %, Positional Accuracy +/- 20 cm.

1.8 Anomaly Avoidance

A Malcolm Pirnie qualified UXO technician will perform a surface sweep of the prove-out area using anomaly avoidance techniques. This procedure will be done in order to ensure that the site is clear of surface anomalies. The background geophysical data will also be used for anomaly avoidance. Subsurface anomalies identified in the background geophysical surveys will be avoided during the seeding process.

1.9 Seeding

Following the background surveys of the GPO, the transect line and grid will be seeded with seventeen inert ordnance items and eight scrap metal items. A sufficient quantity of items will be used to determine the maximum reliable detection depth under a variety of orientations and inclinations. Once placed, all seeded items will be surveyed and

photographed. The survey will include the horizontal and vertical location of the center and two end points of the seed item. The ground surface elevation above the center of the seed item will also be surveyed after the seed item has been buried. In addition, the orientation and inclination of each seeded item will be recorded and documented. All seeded items will be painted blue and tagged with a non-biodegradable label identifying the items as inert and providing a contact reference, a point of contact address, phone number, and target identifier. The planned GPO target layout plan will be updated to reflect the “as-built” configuration.

It should be noted that items buried deeper than the detection limits of the instrument and items seeded off the transect line may not be detectable during the seeded GPO surveys. This factor will be taken into account during the evaluation of NAEVA’s pass/fail performance.

Unless otherwise directed, the established GPO will be maintained for the project life cycle to demonstrate satisfactory performance of any new or replacement equipment. The seeded GPO targets will be removed at the completion of the project and the land restored to its original condition.

In addition to the known seed items, blind seed items may be buried by the Government, and/or the contractor’s UXO QC Specialist, for QC purposes. Malcolm Pirnie will allot ample time for burial of blind seed items and ensure that adequate excavating equipment is available to attain the seed item burial depths planned.

1.10 Data Collection Variables

An EM-61 MK2 metal detector equipped with a 1.0 x 0.5-meter coil and a G-858 will be used for data collection over the GPO. Data will be collected along the center line of the transect and over 100% of the grid using lines spaced 2.5ft apart. To determine the primary digital geophysical instrument during the DGM survey of the mortar range, both the EM-61 MK2 and G-858 will be operated at a walking pace by one or two people, and data will be collected either on wheels or in tandem mode depending on terrain conditions. Both instruments will be operated in auto mode and positioned using the line and fiducial method. In this positioning method, markers will be placed in the data sets at the start, end, inflection points and at 25-ft. intervals along the transect line and data positions will be interpolated between these points during data processing. Fiducial marks in the grid will be placed at the start and end of each line at a minimum. Data positioning may also be achieved through the use of tape measures and marked ropes placed along the area of investigation, facilitating straight-line profiling within the data sets. Local coordinates will be established and referenced from the northwest corner of the GPO. The same equipment and procedures will be used for the DGM. Each geophysical team will perform the GPO prior to participating in the DGM survey. If any previously unused geophysical equipment or personnel are introduced on site, the GPO will be performed using the criteria in the GPO plan.

The DGM survey of the Mortar Range will be performed using either an EM-61 or a G-858. The results of the GPO will determine which of these digital geophysical instruments will be best-suited for the DGM survey. A brief description of each instrument follows.

1.10.1 *EM-61MK2*

The EM-61 MK2 is a high-resolution time domain EM induction sensor that is capable of detecting both ferrous and non-ferrous metallic objects. In comparison with other metal detectors, especially magnetometers, it is much better suited for work in close proximity to buildings, vehicles, metal fences, and underground utilities. It is efficient to use the instrument in open areas, but considered inefficient to use in areas of difficult terrain or dense vegetation. The EM-61 MK2 system consists of two air-cored coils, a digital data recorder, batteries, and processing electronics. The EM-61's transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. These eddy currents are measured by each of the two spatially separated receiver coils. Secondary voltages induced in both coils are measured in mV at four separate time gates. The arrangement of coils is such that there is a vertical separation of 40 centimeters. Data from four bottom coil time gates will be recorded every 20 cm using conventional methods.

1.10.2 *G-858 (Field Magnetometer)*

The G-858 system is a sensitive, self-oscillating, split-beam cesium vapor magnetometer. It measures the total magnetic field with a sensitivity of +/- 0.01 nT (range 15,000-100,000 nT). An advantage of a cesium vapor magnetometer is greater depth of exploration, as compared to typical EM methods.

The G-858 will be used during the GPO as a total field magnetometer. The G-858 will be operated in the vertical gradiometer mode during one traverse over the GPO and will be operated in the horizontal mode during a second traverse over the GPO. The G-858 data logger will be set to record survey data at a rate of 10 Hz. Because the earth's magnetic field drifts over the course of a day, a base station must be employed to collect continuous readings at 10-second intervals, documenting any diurnal drift so that corrections to survey data can be made. In addition, a Scintrex Envi proton precession magnetometer (Envimag) will be utilized as a base station to continuously measure these diurnal changes at 10-second intervals during the multi-day process of field data collection. The diurnal "drift" exhibited in the base station data will be removed from the horizontal survey magnetometer data by matching the respective time stamps. Positional data will be collected using a local coordinate system and fiducial marks placed in the dataset every 25 ft.

1.10.3 *Scintrex Envimag (Base Magnetometer)*

The Scintrex Envimag will be utilized as a base station to continuously measure diurnal changes at 10-second intervals. It measures magnetic field with a sensitivity of +/- 0.1 nT at a sampling rate of 2 seconds (range 20,000 to 100,000 nT).

1.10.4 *Navigation Equipment*

Because the Mortar Range is largely forested, Global Positioning Systems will not be used for positioning of the GPO data. Instead, data will be collected using a local

coordinate system and will be referenced to the Maryland State Plane Coordinate System NAD83 units of U.S. survey feet during processing. During data collection, the line and fiducial method will be used by placing a location stamp in the data every 25 feet as the instrument passes over the marked location on the ground. Data between the fiducial marks will be linearly interpolated to achieve a high positional accuracy.

1.11 Data Analysis and Interpretation

Initial data processing will be performed in the field by the geophysical team. The geophysical data will be downloaded into a laptop computer for on-site review and editing. Proprietary software supplied by the instrument's manufacturer will be used to make positional corrections based on the fiducial marks in the data. The local geodetic coordinates will be converted to the Maryland State Plane coordinate system NAD83 with units in U.S. survey feet.

Once the initial editing steps have been performed, the data will be transferred to NAEVA's corporate offices for advanced analysis/interpretation and preparation of deliverables. All data will be carefully leveled and any necessary corrections for positional latency applied using Geosoft's Oasis Montaj software. Data will then be gridded, contoured, and displayed on a map for target selection. Targets will be selected from these maps initially using either the Blakely Test Method or by picking peaks along profiles in Geosoft's UX-Detect package. Each of the anomalies selected by UX-Detect as a target will be analyzed by trained geophysicists, and evaluated as to their validity and position. Targets found to be invalid or incorrectly located will be removed or adjusted. Additionally, anomalies that were not selected by UX-Detect, yet deemed to represent a potential UXO target, will be manually selected.

The GEOQC will review the data analysis and interpretation performed by NAEVA. Discrepancies in NAEVA's data analysis and interpretation will be corrected before creating the final target list.

Final target lists, or dig sheets, will be created using minimum response criteria that will be decided following the evaluation of the GPO survey. These final dig sheets will be delivered with the draft and final GPO Letter Reports. Dig sheets will contain a target identification number, state plane coordinate location, and peak amplitude of response for each target selection. The information included on the dig sheet will also be put on an Anomaly Tracking Sheet, which will be updated with reacquisition data and included on the data compact disc (CD) that accompanies the GPO Letter Report. An example Anomaly Tracking Sheet is located in Appendix B. Anomaly coordinates will be provided in Maryland State Plane Zone NAD83 datum with units in U.S. survey feet.

1.12 Geophysical Prove-Out Reacquisition

NAEVA will perform anomaly reacquisition and verification to demonstrate that the proposed anomaly reacquisition procedures will meet project DQOs. NAEVA will perform anomaly reacquisition at the GPO prior to reacquiring targets at the Mortar Range, but not necessarily immediately following the completion of the GPO. Anomaly reacquisition is a two-step process. The first step is to locate the ground position of the

anomaly coordinates as specified on the dig sheet. This will be performed by using a measuring tape and mapped location stakes. A white non-metallic pin flag, labeled with the unique anomaly number, is placed in the ground at the indicated grid coordinates. The second step is to use the selected geophysical equipment to identify the peak location of the anomaly, which is the precise ground location where the excavation should occur. The selected geophysical instrument will be moved back and forth over the general area of the anomaly coordinates until the peak value of the anomaly is located. If the EM-61 MK2, in either man-portable or towed array, is the approved detection technology chosen from the GPO, Channel 3 will be used to determine the peak amplitude anomaly. If more than one peak is located, the peak with the highest amplitude will be selected. If no unique peak value is present (e.g., the same peak value is measured over an area), the center of the maxima area will be selected. If no peak value is located at the indicated location, the white anomaly location flag will be left in place and the NAEVA Project Geophysicist (PG) and GEOQC will be consulted.

NAEVA will record all discrepancies between the dig sheet location and the actual reacquired location, and any anomalies that could not be reacquired. The reacquisition location will be measured and logged and will be included on the Anomaly Tracking Sheet (Appendix B). Final target lists will be created using minimum response criteria that will be decided following the evaluation of the GPO survey. These final dig sheets will be delivered with the draft and final GPO Letter Reports. Anomaly coordinates will be provided in Maryland State Plane NAD83 datum with units in U.S. survey feet.

1.13 Data Evaluation

Successful performance on the prove-out area will be determined by the following criteria:

- Successful detection of at least 90% of the seed items, located within the critical horizontal radius of 50 centimeters
- Quality control results meet project requirements:
 - Warm-up time of at least five minutes
 - Personnel tests do not exceed two-mV p-p for EM-6,1 or three-nT p-p for magnetometers
 - Cable shake results do not exhibit data spikes
 - Static background does not exceed +/- 2.5 mV p-p for EM-61 or +/- one-nT p-p for magnetometers
 - Static response to a known, common target does not exceed +/- 20 % after background correction
 - Six Line-test results demonstrate repeatable anomaly response amplitude within +/- 20% and a positional accuracy within +/- 20 centimeters

- Magnetometer octant results in directionally corrected data that eliminates streaking and directionally dependant anomaly selections
- Repeat amplitude responses do not exceed +/- 20% and position accuracies do not exceed +/- 20 centimeters
- Data collection, processing, and deliverables are completed on schedule according to the SOW
- Fieldwork is performed in accordance with the HASP

The following QC metrics for the DGM survey will also be determined through the GPO process:

- Sensor Velocity
- Along track sampling rate
- Across track data density (e.g. allowable data gaps between adjacent transects)

2.0 GPO REPORTING

Production geophysical mapping will occur after the GPO results are evaluated. The GPO Letter Report will be included as an Appendix to all future work plans and reports associated with this delivery order.

2.1 Geophysical Prove-Out Letter Report

After completing the GPO, a GPO Letter Report will be prepared including the following:

- As-built drawing of the GPO area
- Pictures of the seed items
- Color contour maps of the geophysical background data and the seeded data with targets overlaid
- Dig sheets
- Summary of GPO results, including probability of detection and metrics of sensor velocities, along track data sampling rates, and across track data density
- Recommended equipment, methods, and techniques for the geophysical investigation

2.2 Compact Disc

A CD will accompany the GPO Letter Report, containing the following files:

- GPO Letter Report in Microsoft Word format
- All raw and processed geophysical data. All data, except raw instrument data, shall be provided in column delineated American Standard Code for Information Interchange (ASCII) files in the format x, y, z, v1, v2, etc., where x and y are in Maryland State Plane NAD83 in Easting (feet) and Northing (feet) directions, and v1, v2, v3, etc., are the instrument readings. The last data field will be a time stamp. Each data field will be separated by a comma or tab.
- Geophysical maps in Geosoft and Environmental Systems Research Institute (ESRI) ArcView formats; raster images as PDF
- Seed item location spreadsheet in Microsoft Excel format
- Dig sheet results in Microsoft Excel format
- Spreadsheet of all control points, survey points, and benchmarks established or used during the location surveying task

**Geophysical Prove-Out
FGGM**



**MALCOLM
PIRNIE**

**Map 1-1
GPO Overview**

Legend

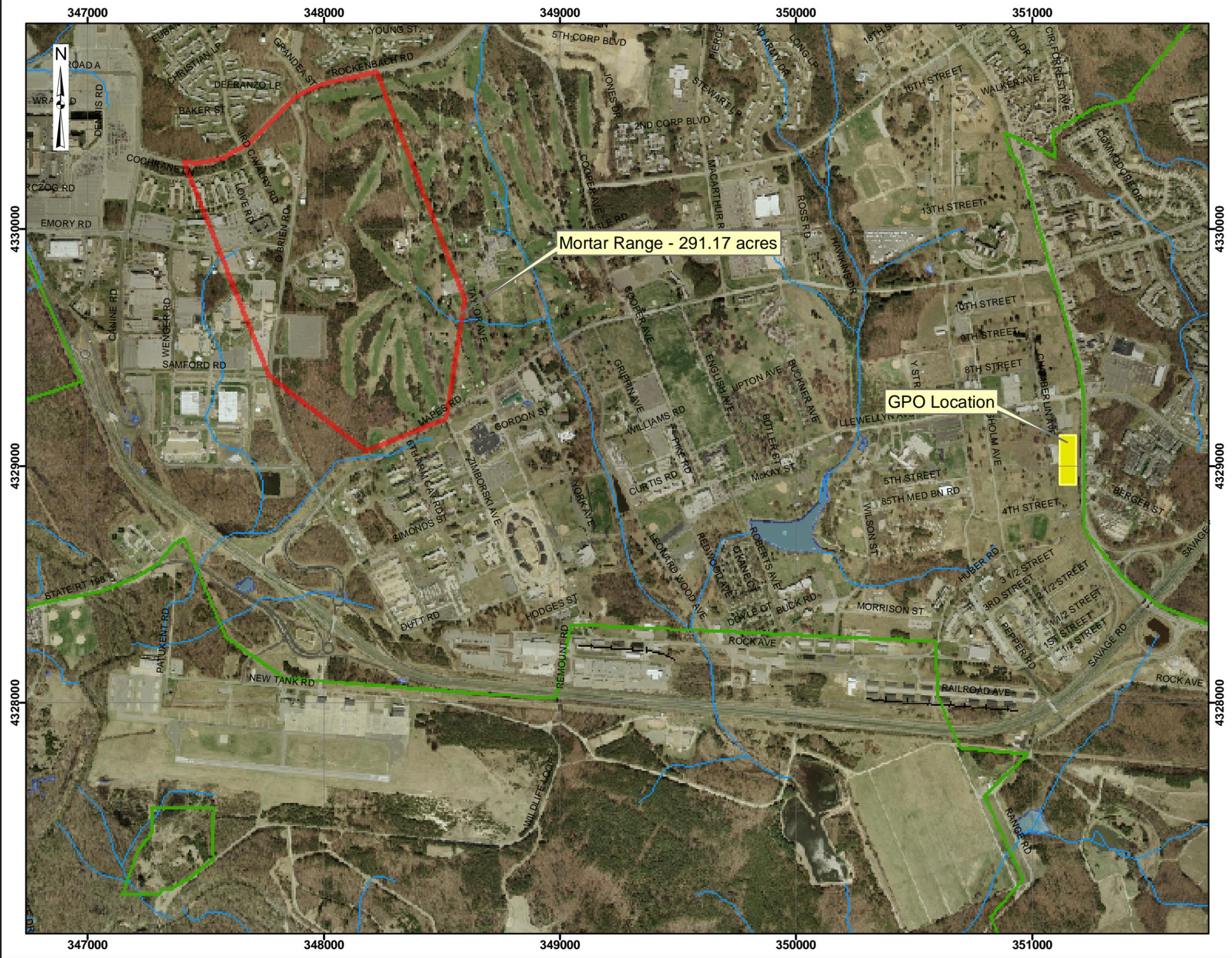
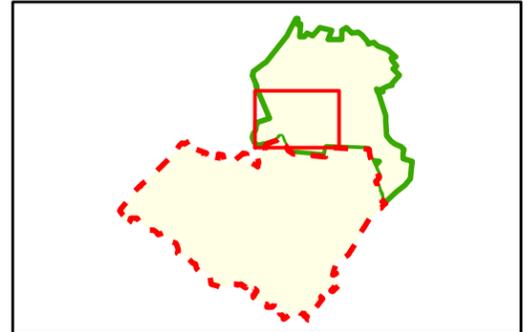
- Installation Boundary
- BRAC Boundary
- Mortar Range
- Streams
- Water Bodies
- GPO Boundary

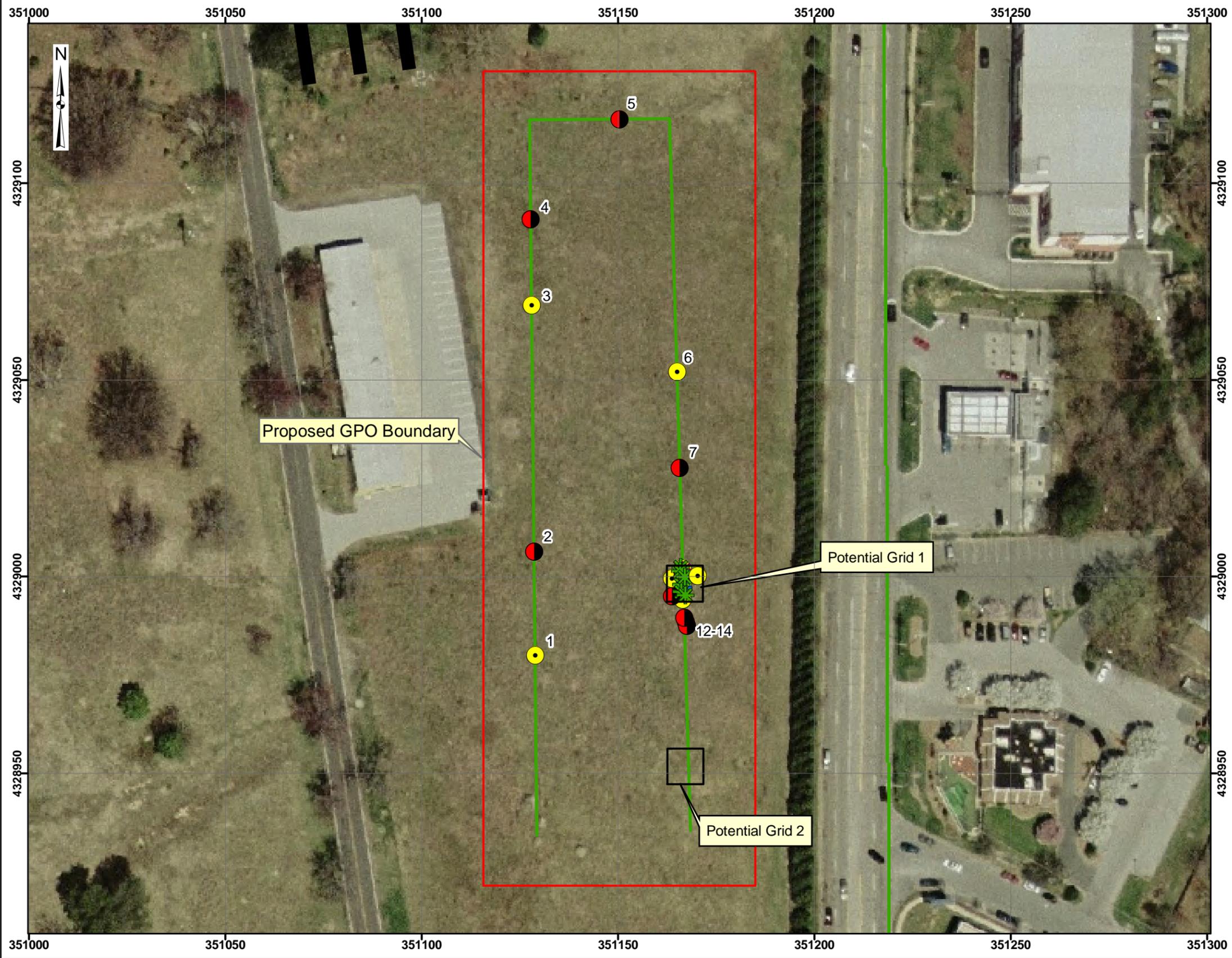


Data Source: FGGM, Digital Orthophoto, 2003
FGGM, GIS Data, 2005
CTT Inventory Data, 2005

Coordinate System: UTM Zone 18
Datum: North American Datum 1983
Units: Meters

Contract: DACA31-00-D-0043
Edition: Geophysical Prove-Out
Date: September 2007





**Geophysical Prove-Out
FGGM**



**MALCOLM
PIRNIE**

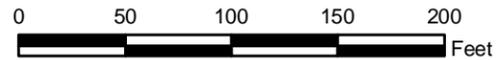
**Map 1-2
Detailed GPO**

Legend

- Proposed GPO Boundary
- GPO Option 14b
- Potential GPO Grid

Proposed GPO Seed Items

- 60mm Mortar
- 81mm Mortar
- ✱ Scrap Metal
- ✱ Scrap Metal (Aluminum Can)
- ✱ Scrap Metal (Trailer Ball Hitch)



Data Source: FGGM, Digital Orthophoto, 2003
 FGGM, GIS Data, 2005
 CTT Inventory Data, 2005

Coordinate System: UTM Zone 18
 Datum: North American Datum 1983
 Units: Meters

Contract: DACA31-00-D-0043
 Edition: Geophysical Prove-Out
 Date: September 2007

**Geophysical Prove-Out
FGGM**

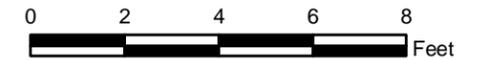
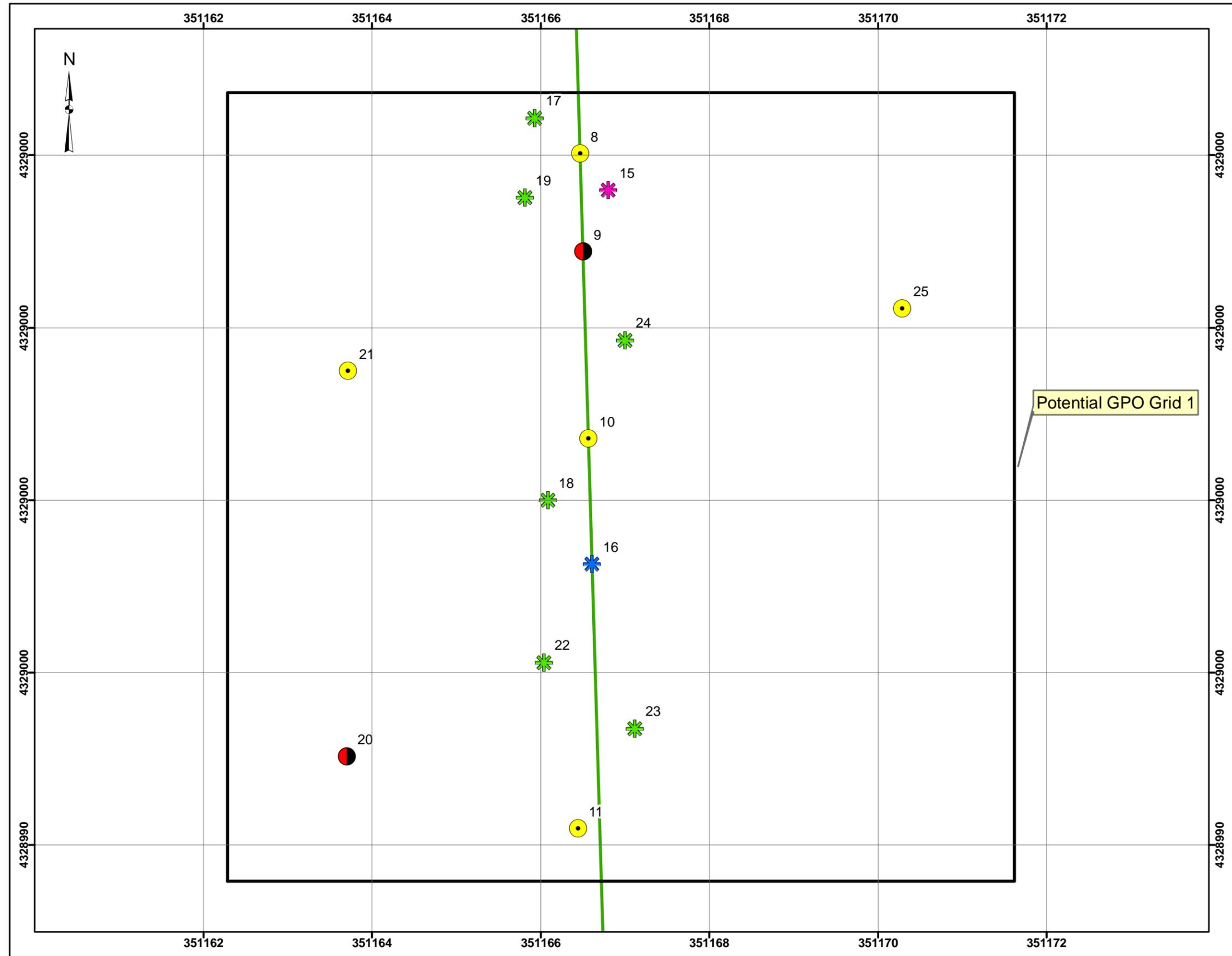


**MALCOLM
PIRNIE**

**Map 1-3
GPO Grid**

Legend

- GPO Option 14b
- Potential GPO Grids
- Proposed GPO Seed Items**
- 60mm Mortar
- 81mm Mortar
- ✱ Scrap Metal
- ✱ Scrap Metal (Aluminum Can)
- ✱ Scrap Metal (Trailer Ball Hitch)



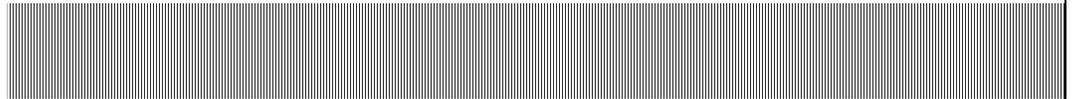
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 FGGM, GIS Data, 2005
 CTT Inventory Data, 2005

Coordinate System: UTM Zone 18
 Datum: North American Datum 1983
 Units: Meters

Contract: DACA31-00-D-0043
 Edition: Geophysical Prove-Out
 Date: September 2007

FGGM, Mortar Range RI, GPO Plan

Appendix A: Accident Prevention Plan



**FINAL
ACCIDENT PREVENTION PLAN
MORTAR RANGE
REMEDIAL INVESTIGATION
FORT GEORGE G. MEADE
ANNE ARUNDEL COUNTY, MARYLAND**

September 2007

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
P.O. Box 1715
Baltimore, Maryland 21203-1715

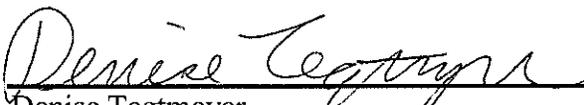
Prepared by:

MALCOLM PIRNIE, INC.
300 East Lombard, Suite 610
Baltimore, Maryland 21202

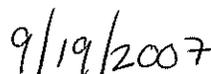
**FINAL
ACCIDENT PREVENTION PLAN
MORTAR RANGE
REMEDIAL INVESTIGATION
FORT GEORGE G. MEADE
ANNE ARUNDEL COUNTY, MARYLAND**

I hereby certify that this Accident Prevention Plan (APP), shown and marked in this submittal, has been prepared in accordance with the United States (U.S.) Army Corps of Engineers (USACE) Safety and Health Requirements Manual, Engineer Manual (EM) 385-1-1. The attached Site Safety and Health Plan (SSHP) is being submitted for Government approval.

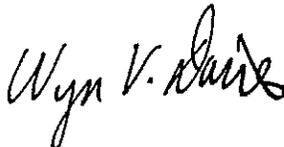
Plan Preparer:

		410-230-9963
Denise Tegtmeier Project Manager Malcolm Pirnie, Inc.	Date	Phone Number

Plan Approval:

		410-230-9961
Heather Polinsky, Vice President Program Officer Malcolm Pirnie, Inc.	Date	Phone Number

Plan Concurrence:

	September 06, 2007	201-398-4409
Wyn Davies, CIH Corporate Health & Safety Malcolm Pirnie, Inc.	Date	Phone Number

Malcolm Pirnie, Inc. prepared this report at the direction of the U.S. Army Corps of Engineers (USACE) under DoD Contract Number: W912DR-05-D-0004. This document should be used only with the approval of the USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

SEPTEMBER 2007

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- Attachment 2 – Activity Hazard Analyses
- Attachment 3 – Site Layout Plan and Work Zones
- Attachment 4 – Emergency Contacts and Hospital Route Map
- Attachment 5 – Listing of Standard Operating Procedures
- Attachment 6 – Supplemental Plans
- Attachment 7 – Resumes
- Attachment 8 – Site Safety and Health Forms

ACRONYMS

Acronym	Definition
AHA	Activity Hazard Analyses
ANSI	American National Standards Institute
ALSI	Analytical Laboratory Service, Inc.
APP	Accident Prevention Plan
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulation
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSM	Conceptual Site Model
CTC	Cost to Complete
dB	Decibels
DDESB	Department of Defense Explosives Safety Board
DID	Data Item Description
DoD	Department of Defense
DOT	Department of Transportation
EM	Engineer Manual
EMO	Environmental Management Office
EMR	Experience Modification Rate
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FGGM	Fort George G. Meade
FPM	Field Project Manager
FUDS	Formerly Used Defense Site
GIS	Geographic Information Systems
GPO	Geophysical Prove Out
H&S	Healthy and Safety
HSD	Health and Safety Director
HIPO	High Loss Potential
IDLH	Immediately Dangerous to Life or Health
kV	killivolt
Malcolm Pirnie	Malcolm Pirnie, Inc.
MC	Munitions Constituents
MD	Maryland
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MR	Munitions Response
MRS	Munitions Response Site
MRSP	Munitions Response Site Prioritization Protocol

Acronym	Definition
MSDS	Material Safety Data Sheet
NAEVA	NAEVA Geophysics, Inc.
OSHA	Occupational Safety and Health Administration
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
QC	Quality Control
RIR	Recordable Incident Rate
SI	Site Investigation
SOW	Scope of Work
SSHO	Site Safety Health Officer
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
TPP	Technical Project Planning
TV	Television
U.S.	United States
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering and Support Center, Huntsville
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
WWII	World War II

1.0 INTRODUCTION

This Accident Prevention Plan (APP) has been prepared by Malcolm Pirnie, Inc. (Malcolm Pirnie) for the Remedial Investigation (RI) for Fort George G. Meade (FGGM) located in Anne Arundel County, Maryland (MD). Work conducted under this contract, W912DR-05-D-0004, Delivery Order #0055, will be performed in accordance with applicable Federal, State, and local safety and occupational health laws and regulations, including: Occupational Safety and Health Administration (OSHA) standards (including 29 Code of Federal Regulation (CFR) 1910 and 29 CFR 1926), the USACE Safety and Health Requirements Manual (EM 385-1-1, 3) and USACE Data Item Description (DID), Munitions Response (MR)-005-06. The contents of the APP are subject to review and revision, as new information becomes available.

1.1 Purpose

This APP has been developed based on known and anticipated potential hazards that may arise during performance of the Scope of Work (SOW) dated July 17, 2007. At least one copy of the APP will be located in a readily accessible, on-site location during all field activities. The APP consists of several components that together define the Safety and Health program as outlined in Table 2-1.

1.2 Application

The requirements established by this APP are mandatory and shall apply to all Malcolm Pirnie employees, its subcontractors, and any other personnel entering designated work areas at the project site during active field operations. All employees, subcontractors, and visitors shall sign-off on the Health and Safety (H&S) Compliance Agreement Form (Attachment 8) after receiving training on this plan and before working at the site. In addition, Malcolm Pirnie shall provide a copy of this plan, if requested, to any authorized personnel who must enter the regulated work area.

1.3 Revisions

Changes in the SOW or unanticipated site conditions may require APP modification and approval, in order to retain field safety compliance with contract requirements and OSHA regulations. All changes to the APP or SSHP (Attachment 1) shall be prepared and/or reviewed by Malcolm Pirnie's Site Safety and Health Officer (SSHO), and submitted to the Malcolm Pirnie Health and Safety Manager and the Project Manager (PM). The revisions will be submitted to the designated USACE, Baltimore District PM for approval, if required.

Table 1-1: Components of the APP

DOCUMENT	PURPOSE
APP	The APP provides general safety and health requirements and practices.
ATTACHMENT 1 – SITE SAFETY AND HEALTH PLAN	The Site Safety and Health Plan (SSHP) (Attachment 1) contains task-specific health and safety requirements that meet OSHA and EM 385-1-1-USACE DID MR-005-06.
ATTACHMENT 2 – ACTIVITY HAZARD ANALYSES	These Activity Hazard Analyses (AHAs) address specific hazards and precautions for major activities of the project.
ATTACHMENT 3 – SITE LAYOUT PLAN AND WORK ZONES	Due to the nature of this project, Malcolm Pirnie will establish control zones each day in the work area(s). A site map is located in Attachment 3.
ATTACHMENT 4 – EMERGENCY CONTACT NUMBERS AND HOSPITAL ROUTE MAP	This attachment provides emergency contact numbers and the route map to the local hospital.
ATTACHMENT 5 – MALCOLM PIRNIE CORPORATE HEALTH AND SAFETY PROGRAMS	Attachment 5 includes a listing of Malcolm Pirnie’s health and safety programs referenced in the APP and SSHP.
ATTACHMENT 6 – SUPPLEMENTAL PLANS	Supplemental plans may be required to address the health and safety requirements of various activities. Many of these requirements are specified in the USACE Safety and Health Requirements Manual (EM 385-1-1) and USACE DID, Type II Work Plan, MR-005-01. Supplemental plans are not required for this PROJECT.
ATTACHMENT 7 – RESUMES	Resumes for key project personnel are provided in Attachment 7.
ATTACHMENT 8 – SITE SAFETY AND HEALTH FORMS	Site Safety and Health Forms are located in Attachment 1 (SSHP).

2.0 BACKGROUND INFORMATION

2.1 Project Description

FGGM is located in Anne Arundel County, MD, almost midway between the cities of Baltimore, MD, and Washington, District of Columbia (D.C.). FGGM lies approximately 4 miles east of Interstate 95 and east of the Baltimore-Washington Parkway, between MD Routes 175 and 32. FGGM is located near the communities of Odenton, Laurel, Columbia, and Jessup. Following the 1988 BRAC realignment, the installation covers 5,415 acres. The current installation boundaries encompass the area previously referred to as the cantonment area, which is used for administrative, recreational, and housing facilities. FGGM contains approximately 65.5 miles of paved roads, 3.3 miles of secondary roads, and about 1,300 buildings.

The SOW was developed to provide a description of the necessary tasks that will be conducted at the Mortar Range by Malcolm Pirnie. The Mortar Range is a 59-acre former range located in the west-central portion of FGGM. The Mortar Range was first identified on a 1923 Special Military Map for Camp Meade. Based on historical maps, the MRS was used as a mortar range from the early 1920s until the late 1930s. Map 1 (Attachment 1) shows both the MRS and the FGGM boundaries.

The objective of this task order is to conduct a Remedial Investigation (RI) for the FGGM Mortar Range. Malcolm Pirnie will perform activities to 1) characterize munitions and explosives of concern (MEC) on the surface; 2) characterize the site subsurface including the areas suspected of MEC and munitions debris; 3) conduct intrusive investigations, required MEC destruction, and munitions debris removal; 4) conduct the necessary environmental sampling and chemical analyses. The secondary goal of the RI is to collect information to update the Munitions Response Site Prioritization Protocol (MRSP), update the Cost to Complete (CTC) estimates for the Mortar Range, update the Conceptual Site Model (CSM), and provide recommendations for adjustments to future land use.

Activities conducted under the project include safely locating, characterizing, investigating, and identifying potential MEC. In addition, intrusive investigation of ordnance-like anomalies will be conducted. The Malcolm Pirnie UXO team will perform demolition operations in full compliance with USACE, Baltimore District; U.S. Army Engineering and Support Center, Huntsville (USAESCH); Department of the Army; and DoD requirements regarding personnel, equipment, and procedures, if needed. Malcolm Pirnie will certify the items are inert and containerize munitions debris and miscellaneous scrap generated during the RI for demilitarization and/or additional scrap processing.

Previous activities were conducted at the Mortar Range include:

- Environmental Baseline Study, URS, May 2004
- Geophysical Survey of Possible Dump Sites and an Abandoned Cemetery, Versar, 2004
- Site Inspection (SI), Malcolm Pirnie, April 2007

Activities planned for the RI include:

- Technical Project Planning (TPP),
- Geophysical Prove-Out (GPO),
- RI Work Plan,
- Explosive Siting Plan,
- Location Surveys and Mapping,
- Brush Clearing,
- Surface Sweep,
- Geophysical Mapping and Evaluation,
- Anomaly Reacquisition and Marking,
- Intrusive Investigation,
- Environmental Sampling and Chemical Analysis,
- RI Report,
- Community Involvement, and
- Project Management

2.2 Contractor Safety Information

Malcolm Pirnie has an excellent safety record. Malcolm Pirnie's experience modification rate (EMR) is less than 1.0, which is indicative of fewer injuries and claims. It is also lower than the OSHA total recordable incident rate (RIR).

Copies of Malcolm Pirnie's OSHA Form are available upon request from the Malcolm Pirnie Health and Safety Representative Jane Weber at 914-641-2559.

2.3 Phases of Work and Activities Requiring AHA

See Attachment 2 for AHAs that address specific hazards and precautions for major activities of the project. If any other activities are added, additional AHAs will be prepared and reviewed in accordance with the revision process listed in Section 1.3.

2.4 Statement of Safety and Health Policy

Malcolm Pirnie's Health and Safety policies are as follows:

- Malcolm Pirnie is committed to providing a safe and healthful work place, free of recognized hazards, and to conduct its operations in accordance with applicable federal, state, and local environmental, health and safety standards, regulations and laws including those of the U.S. Department of Labor, Occupational Health and Safety Administration (OSHA), the U.S. Environmental Protection Agency (EPA) and U.S. Department of Transportation (DOT).

- Malcolm Pirnie expects that all employees will plan and conduct their work activities in a responsible and safe manner that reflects this commitment to their personal well-being, that of our clients, and of the general public.
- Malcolm Pirnie will provide appropriate safety equipment and training to employees to eliminate or reduce exposure to safety and health hazards.
- Malcolm Pirnie staff will promptly report all serious incidents, accidents, injuries and property damage that involve Malcolm Pirnie, the client, or contractor employees, which occur during the execution of their projects. Incidents should be reported to:

Laura Lee-Casey
Sr. Health & Safety Specialist
Cell 914-557-0004
Office 914-641-2707

Gerard Cavaluzzi
General Counsel
Cell 914-843-3158
Office 914-641-2950

- Failure to comply with Malcolm Pirnie's Health & Safety Policies, Procedures or Programs may result in disciplinary action, up to and including termination of employment.

With unequivocal support of these concepts, we will be able to cultivate and maintain a safe and healthful work environment for all our employees. If you have any questions, please contact Joseph Golden, Acting Health & Safety Manager at 914-641-2978.

3.0 RESPONSIBILITIES AND LINES OF AUTHORITY

3.1 Project Personnel

The following paragraphs describe the specific responsibilities associated with the project management personnel. All personnel assigned to this project will meet USACE training and experience requirements for their assigned position. Key personnel will be supported by technical resources throughout the USACE and Malcolm Pirnie on an as-needed basis. Subcontractors will also support the project and provide key technical resources.

3.1.1 *Malcolm Pirnie Project Personnel*

Malcolm Pirnie project personnel and their responsibilities are listed below. In addition, staff performing geophysical surveys in areas suspected to contain MEC and instrument aided visual surveys will be accompanied by UXO-qualified personnel.

Malcolm Pirnie Field Project Manager

The Malcolm Pirnie Field Project Manager (FPM) or Project Manager (PM) is responsible for the overall execution of work assigned under the SOW. The Malcolm Pirnie FPM is responsible for the management of all Malcolm Pirnie team resources needed for the successful implementation of site operations. All support personnel will report to the FPM with the exception of the Malcolm Pirnie Unexploded Ordnance (UXO) team which will report to the Senior UXO Supervisor (SUXOS) who will then report to the Malcolm Pirnie FPM. The FPM is the single Point of Contact (POC) with the USACE, Baltimore District, and is responsible for overall project performance, quality, schedule, and cost performance. The Malcolm Pirnie FPM has full authority over the performance of the project and can direct changes in project implementation.

Malcolm Pirnie Senior UXO Supervisor (SUXOS)

The SUXOS assists the Malcolm Pirnie PM in the development of plans, identification of personnel and equipment requirements, as well as supervision of all daily activities of the field teams. The SUXOS will also act as the Site Safety and Health Officer for this project. The SUXOS is also responsible for overall coordination of on-site MEC activities and for keeping the PM informed of staffing, resource, or other issues that could impact the overall performance of the project.

Malcolm Pirnie Corporate Health and Safety Representative

The Malcolm Pirnie Corporate Health and Safety Representative (CHSR) maintains the organizational freedom and authority for ensuring full implementation of the SSHP and Malcolm Pirnie's corporate health and safety (H&S) policy. The CHSR can direct how the SSHP is implemented. This can include delegating authority to other personnel and directing the enforcement of the SSHP, including removing individuals from the project for non-compliance.

Malcolm Pirnie Geophysical Quality Control (QC) Manager

The Geophysical QC Manager is responsible for reviewing report sections that address geophysical investigations and geophysical QC. The Geophysical QC Manager is also responsible for the overall implementation of these plans, geophysical QC, data analysis, and oversight of subcontractors. Additionally, this individual will consult with the USACE, Baltimore District geotechnical representative regarding stakeholder and regulatory inquiries for data evaluation, if required, and will interface with the Geographic Information Systems (GIS) manager for incorporation of geophysical data into the GIS.

Malcolm Pirnie Unexploded Ordnance (UXO) Safety Officer (UXOSO)

The UXOSO will implement the SSHP and verify compliance with applicable safety and health requirements. The UXOSO will also: implement the explosives safety program in compliance with all DoD, federal, state, and local statutes and codes; analyze MEC and explosives operational risks, hazards, and safety requirements; establish and ensure compliance with all site-specific safety requirements for MEC and explosives operations; and enforce personnel limits and safety exclusion zones for MEC clearance operations and explosives transportation, storage, and destruction.

Malcolm Pirnie UXO Quality Control Specialist (UXOQCS)

The UXOQCS is responsible for monitoring and ensuring that all site MEC activities are conducted in accordance with the SOW, GPO Plan, and Work Plan. The UXOQCS will conduct QC inspections of all MEC and explosives operations for compliance with established procedures, and direct and approve all corrective actions to ensure all MEC-related work complies with contractual requirements.

3.1.2 Other Project Personnel

Table 5-1 lists the individuals and associated agencies/organizations also involved with this project.

Table 3-1: Additional Project Personnel

Name	Org Code	Title/Division	Work Phone
Army Environmental Command (AEC)			
Douglas Scarborough	SF-AEC-RDR	Restoration Manager	(410) 436-1616
USACE, Baltimore District			
Kim Gross	CENAB-EN-HM	Project Manager	(410) 962-6735
Paul Greene	CENAB-EN-HM	OE Manager	(410) 962-6741
Scott Drumheller	CENAB-EN-HM	BRAC Manager	
Tom Colozza	CENAB-EN-HM	Geotechnical Specialist	(410) 962-6647
Fort George G. Meade			
Michael Doetzer	FGGM DCA	Golf Course Support	(410) 677-3774
Mick Butler	FGGM DPW - EMO	EMO Chief	(301) 677-9188
Paul Fluck	FGGM DPW - EMO	Installation Restoration Manager	(301) 677-9365
LTC James	FGGM Emergency	Director	(301) 677-6029

Name	Org Code	Title/Division	Work Phone
Peterson	Services		
CPT Andy Bair	FGGM EOD	EOD, CPT	(410) 537-2466
Summer Barkley	FGGM PAO	Media Relations	(301) 677-1436
Kirk Fechter	FGGM Safety Officer	Chief	(301) 677-4231
Dave Coleman	FGGM Traffic		(301) 677-6600
Environmental Protection Agency (EPA)			
Robert Stround	EPA Region III	Project Manager	(410) 305-2748
Maryland Department of Environment (MDE)			
John Fairbanks	MDE	Chief, Federal Facilities Division	(410) 537-3475
National Security Agency (NSA)			
Jeffrey Williams	NSA	Senior Environmental Engineer	(301) 688-2970
Paul Quillen	NSA	Environmental Engineer	(301) 688-2970

4.0 SUBCONTRACTORS AND SUPPLIERS

4.1 Subcontractors

Subcontractors report to the Malcolm Pirnie SUXOS during their performance of tasks associated with their fieldwork. Subcontractors are responsible for complying with the project APP while on site. The following subcontractors have been hired by Malcolm Pirnie to help complete this project:

- NAEVA (Geophysical Subcontractor)
- Charles P. Johnson & Associates (Professional Land Surveyors)
- Analytical Laboratory Services, Inc. (Laboratory for MC testing)
- Laboratory Data Consultants, Inc. (Data validation laboratory for MC testing)
- Weber Jerman (Brush Clearing Contractor/ Landscaper)

4.2 Supplier Control

All suppliers of safety-related items are required to provide approved and/or appropriate materials for the project, and meet the specifications, testing criteria, or third party certifications. These criteria are identified in this APP, the SOW, or are recommended by the UXOSO.

For safety-critical items, specifications will be identified and receipt inspections will be conducted and documented.

Each hazardous material supplied for site use will be accompanied by a Material Safety Data Sheet (MSDS) and will be added to the site list of hazardous materials. MSDSs and the list will be maintained by the FPM.

Health and safety related supplies will be obtained from recognized safety supply vendors and will meet specified OSHA or consensus standards. These items will be inspected upon receipt by the UXOSO or the UXOQCS.

4.3 Safety Responsibilities

Subcontractor safety is critical to successful performance on projects. When on site subcontractor labor and/or services are needed to perform high loss potential (HIPO) activities, part of the selection criteria may include an evaluation of the subcontractor's safety history and program. The subcontractor safety qualification form will be reviewed as part of the bid and selection process. Subcontractors are expected to comply with the provisions of this APP, the SSHP, and the AHAs. Their activities will be reviewed as part of regular site inspections and audits. Their safety performance on the job will be monitored and substandard practices and conditions will be addressed immediately. Furthermore, subcontractor safety performance will

be evaluated in the Malcolm Pirnie procurement system where the information can be used for future subcontracting decisions.

5.0 TRAINING REQUIREMENTS

5.1 Project Training Requirements

The training listed in Table 5-1 will be provided to project participants as noted, by the UXOSO and SUXOS. In addition to the topics listed below, the UXOSO and SUXOS will identify other topics and work tasks to be included in the training requirements, as needed. These special requirements will be noted in the AHAs. All required training will be documented, and documentation maintained on site.

Table 5-1: Project Training Requirements

TOPIC	DESCRIPTION	PERSONNEL
<i>GENERAL TRAINING</i>		
APP	Review of APP requirements during site orientation, before commencement of field work.	All project personnel
SSHP	Training on site-specific hazards and control requirements before commencement of field work. Includes training in proper use and care of Personal Protective Equipment (PPE).	All project personnel
AHA	Review of AHAs, controls, and training requirements for a specific phase or activity prior to commencement of activity.	Workers, supervisors, and oversight personnel engaged in the activity
DAILY SAFETY BRIEFING	In addition to plan-of-the-day and daily hazard reminders often used to cover a specific topic; provide refresher training on various issues or changes in hazards, controls, or procedures.	All field workers, supervisors, field oversight personnel, and visitors
EMERGENCY ACTION PLAN	Cover the roles, responsibilities, recognition of emergency conditions, reporting and notification, evacuation and other procedures.	All project personnel, with detailed information on procedures for workers with special responsibilities
HAZARD	Discuss requirements for MSDSs, labels;	All project

TOPIC	DESCRIPTION	PERSONNEL
COMMUNICATION	hazards of site materials and controls; location of and access to inventories and MSDSs.	personnel potentially exposed to hazardous materials
FIRE EXTINGUISHER	Provide general education on selection, distribution, and proper use of fire extinguishers.	All project personnel
SPECIAL TRAINING		
FIRST AID/CARDIOPULMINARY RESUSCITATION (CPR)	Provide Red Cross, National Safety Council, or other authorized course with current refresher.	At least two project personnel

All on-site Malcolm Pirnie personnel involved with the field activities will have training and certification for the following areas:

- PPE
- UXO Safety
- OSHA 40-Hour HAZWOPER
- OSHA 8-Hour HAZWOPER Refresher (if needed)

The UXOSO and all supervisory personnel will have additional training, including cardiopulmonary resuscitation (CPR), First Aid, and 8-Hour Hazardous Waste Operations and Emergency Response Supervisor training.

5.2 Visitor Indoctrination Policy

All site visitors will be required to review the daily tailgate safety issues and sign the H&S Compliance Agreement Form. At a minimum, all visitors must be informed of the anticipated hazards and PPE requirements, designated work zones, escort procedures, and emergency procedures by the UXOSO.

6.0 SAFETY AND HEALTH INSPECTIONS

6.1 General Inspection Procedures

Table 6-1 lists the general inspection requirements. Additional specific inspection requirements may be necessary and will be included in the AHA, where applicable.

Refer to Attachment 7 for personnel resumes, which contain proof of competency/qualifications to meet specific OSHA requirements.

Table 6-1: General Inspection Requirements

WHAT	WHO	WHEN	DOCUMENTATION
GENERAL SITE CONDITIONS	UXOSO	DAILY	LOG BOOK
	UXOSO/SSHO	WEEKLY	HEALTH AND SAFETY SITE INSPECTION FORM
	PM	MONTHLY	HEALTH AND SAFETY SITE INSPECTION FORM AND NON-CONFORMANCE REPORT, CC: UXOSO & PROJECT H&S MANAGER
	PROJECT HEALTH AND SAFETY MANAGER	QUARTERLY	HEALTH AND SAFETY SITE INSPECTION FORM
DETECTION EQUIPMENT	UXOQCS	DAILY	QC LOG
TOOLS AND EQUIPMENT	USERS	DAILY	NONE. TAG DEFECTIVE ITEMS OUT OF SERVICE
MEC SITE SPECIFIC HAZARDS AND EXCAVATIONS	UXOSO COMPETENT PERSON	DAILY	IF GREATER THAN 4 FEET DEEP, USE DAILY EXCAVATION/TRENCH INSPECTION FORM IF LESS THAN 4' DEEP: LOG BOOK.
PPE	USERS	INITIAL	LOG BOOK

6.2 External Inspections and/or Certifications

In the event that a regulatory agency arrives on site to conduct an inspection, the SUXOS and one of the following individuals will be contacted immediately:

- Malcolm Pirnie PM
- USACE, Baltimore District PM
- USACE, Baltimore District on-site OE Safety Specialist
- Project Health and Safety Manager
- UXOSO
- FGGM Environmental Management Office (EMO)

7.0 SAFETY AND HEALTH EXPECTATIONS AND COMPLIANCE

This section describes the safety goals for this project, disciplinary procedures, and management accountability implemented to ensure the safety goals are met.

7.1 Safety Goals for this Contract

The safety objectives and goals for this task include the following:

- Conduct all work in accordance with OSHA, USACE, and other applicable safety regulations;
- Complete the project with zero OSHA recordable injuries and illnesses;
- Complete the project with zero HIPO incidents;
- Provide prompt identification and correction of health and safety concerns; and
- Obtain 100% participation of all employees in the maintenance of a safe work environment.

7.2 Disciplinary Procedures

All employees are required to comply with project policies and procedures. Malcolm Pirnie reserves the right to discipline and/or terminate (when justified) employees at its sole discretion for serious safety infractions. Discipline will be in accordance with the Disciplinary Policy described in the Malcolm Pirnie Employee Handbook. Malcolm Pirnie expects that all subcontractors will exercise their right to discipline and/or terminate its employees at its sole discretion, when justified. Malcolm Pirnie retains the right to deny site-access to any individual not sufficiently compliant with safety requirements.

7.3 Manager and Supervisor Accountability

Malcolm Pirnie managers and supervisors are held accountable for safety, not only for providing a safe work environment (through proper staffing, training, and equipment availability), but also through the example that they set. Annual performance reviews and incentive plans for managers and supervisors include assessments of project safety performance, as well as the individual's demonstrated attitude toward safety.

8.0 ACCIDENT REPORTING

8.1 Incident Summary

The UXOSO will provide to the Project H&S Manager, Malcolm Pirnie PM, and USACE, Baltimore PM a monthly incident summary. The summary will include the person-hours worked during the month and a list of incidents.

8.2 Incident Investigation, Reports, Logs

All incidents are reported immediately to the Malcolm Pirnie PM, who will report to:

Laura Lee-Casey
Sr. Health & Safety Specialist
Cell 914-557-0004
Office 914-641-2707

Gerard Cavaluzzi
General Counsel
Cell 914-843-3158
Office 914-641-2950

Incidents include:

- OSHA Recordable Injuries or Illnesses (e.g., medical treatment beyond first aid);
- Any injuries to authorized visitors;
- Fires and explosions of any magnitude;
- Spills and environmental releases;
- Tool or equipment failure which results or could result in serious injury;
- Property damage, equipment damage, or environmental damage resulting in a loss of more than \$500.00 (\$2,000 for client reports); and
- Any event, which under slightly different circumstances, could have resulted in one of the above.

The SUXOS, with the assistance of the UXOSO, will investigate the incident and complete all necessary incident reports and logs, including client or regulatory agency reports.

All incidents, regardless of severity, require some type of investigation and corrective action. Immediate and basic causes will be identified and evaluated, and used to support the recommended corrective actions.

A project-specific record of Work-Related Injuries and Illnesses will be kept at the job site. Minor injuries requiring only first aid will be recorded on a project-specific First Aid Log. From February 1 through April 30 of each year, Form 300A (Summary of Work-Related Injuries and Illnesses) will be posted on the project Safety and Health Bulletin Board.

8.3 Immediate Notification of Major Accidents

The USACE, Baltimore PM will be verbally notified immediately, and will receive a written notification within 24 hours for major accidents. The written report will be submitted on USACE Form 3394. USACE Forms can be found at the following web site: <http://www.usace.army.mil/inet/usace-docs/forms/newforms.htm>.

9.0 MEDICAL SUPPORT

9.1 On Site First Aid Support

On site medical support during project execution will be available from two or more individuals who are trained in First Aid, CPR, and blood borne pathogens. On site first aid kits must meet the requirements of EM 385-1-1 (03.B). First aid kits shall include one pocket mouthpiece or CPR barrier. Kits shall be checked prior to use, and at least weekly when work is in progress to ensure that contents are replaced as used. A minimum of two personnel trained in CPR and First Aid will be on-site during working hours.

9.2 Medical Transport of Employees and Case Management

For non-emergency injuries, the on-base clinic (Kimbrough Ambulatory Care Center) has been identified and its location and phone number are listed in the SSHP (Attachment 4). A Regional Medical Center nurse will be contacted prior to transporting the injured worker to the clinic. Under no circumstances will an injured employee drive unescorted to a hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The UXOSO or other project management personnel will transport the injured person to the facility. The employee who transports the injured person shall be trained in first aid and CPR, whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance.

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written Return to Work statement from the treating physician. This statement shall supply a medical diagnosis of the problem, the proposed date of return to work, and work limitations, if applicable. Should a Return to Work statement such as "light duty" be given, the treating physician will be contacted to determine the specific limitations. Malcolm Pirnie will make an assessment of the work that the employee normally performs, and whether or not the limitation interferes with this employee's normal work.

Whenever there are questions on the appropriateness of the diagnosis or prescribed course of treatment, a second opinion will be obtained.

9.3 Hospital and Emergency Route Map

An emergency route map and local emergency medical support contact information is contained in Attachment 4. Local hospital emergency rooms must be notified of the potential types of injuries and the contaminants involved.

10.0 PERSONAL PROTECTIVE EQUIPMENT

10.1 Hazard Assessments

The purpose of PPE and clothing is to protect individuals from chemical and physical hazards. Specific work tasks with unique hazards and/or PPE requirements must be evaluated or reevaluated prior to beginning work. This task review will be led by the Project H&S Manager and the UXOSO, and will include knowledgeable individuals such as the worker(s) and the Malcolm Pirnie PM or FPM. Requirements for PPE, based on this assessment, will be included in the SSHP or in the AHA for the specific task. All workers must be trained in the requirements of the APP, SSHP, and the applicable AHAs prior to beginning work. The required PPE may be changed by the UXOSO, based on the results of additional air monitoring, or on task-specific needs. Downgrades will require the approval of the Project H&S Manager, unless otherwise permissible by the SSHP.

Equipment designed to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded, Levels A through D. For this project, it is expected that only Level D PPE will be necessary. Level D should be selected only when there are no respiratory or skin hazards suspected or known to exist at the site. Modified Level D PPE is selected when no respiratory hazards are suspected or known to exist, yet the potential for dermal hazards including contact with contaminated soils, splashes, or immersion exists. If the potential for splashes or immersion exists, coated-type chemical resistant coveralls (such as Saranex) and hard hats with face shields should be selected. If the only dermal hazards that exist are related to soil sampling, a non-coated semi-permeable-type coverall (such as Tyvek) should be selected.

Equipment Requirements for Level D are as follows:

- Coveralls or suitable work uniform;
- Gloves (optional);
- Leather or chemical resistant boots with composite toe (steel toed boots should not be worn if using a magnetometer or other geophysical instrument);
- Safety glasses or chemical splash goggles (optional);
- Hard hat (optional) and face shield (optional if hard hat is employed); and
- Hearing protection.

10.2 Personal Protective Equipment Inspection and Care

To provide effective protection during removal and decontamination, PPE will be donned in the reverse order presented in the appropriate decontamination table. Duct tape will be used to seal overlaps between gloves /boots and the protective clothing, and to reinforce weak seams or tighten the waist of the garment. PPE will be cleaned and maintained in accordance with

manufacturer specifications. Section 5.3 in the SSHP (Attachment 1) contains additional information on the inspection and care of personal protective equipment.

10.3 Personnel Decontamination

All personnel, and clothing leaving the site will be decontaminated after environmental sampling. Standard personnel decontamination procedures include the following (Section 5.4 in Attachment 1):

- Level D (e.g., leaving the site or support zone) (Section 5.1 and 5.2 in Attachment 1)
- Ensure no gross contamination remains on work boots or clothing
- Wash hands, face, arms, and other exposed skin.

10.4 General Site Rules

The following site rules are applicable to all Malcolm Pirnie projects:

- Eat, drink, use gum or tobacco products, or apply cosmetics in designated areas only;
- Do not smoke in government buildings or near sources of ignition. Smoking is not allowed at the site. Areas shall be marked where smoking is permitted;
- Wash hands, face, and any exposed skin during decontamination, before eating, drinking or using tobacco products, and at the end of each shift;
- Participate in Tailgate Safety Meetings;
- Continually observe work location and be alert to changes that may affect safety;
- Only enter regulated work areas as instructed by the SUXOS, only at designated control points;
- Avoid direct contact with contamination by not purposefully walking, touching, or contacting any obviously contaminated surfaces;
- Immediately report incidents, accidents, near misses, or unusual situations to UXOSO or the SUXOS;
- Use PPE provided, and as instructed by the UXOSO;
- Do not wear or carry personal items into regulated work area;
- Avoid hand-to-mouth or hand-to-face activities;
- Instruments and safety equipment/vehicles and construction equipment shall be inspected prior to use;
- Minimize the number of personnel in a work area to reduce potential exposures;
- Use the buddy system when entering the site and be continually aware of each other's location;
- Work within physical and mental limits;
- Take adequate rest breaks and replace body fluids (water and electrolyte) continuously;
- At all times follow the instructions of the FPM;
- Do not deviate from the APP or the instruction of the UXOSO;
- Avoid rushing and/or taking short cuts;

- Handle and dispose all waste generated from decontamination procedures per contract requirements. No waste shall be disposed of without the direction of the SUXOS;
- Conduct visual checks on machinery and equipment prior to use, and complete the daily inspection form;
- Take precautions to prevent spillage and splashing. Contain spilled liquid if possible;
- Alert your senses to potentially dangerous situations (e.g., strong, irritating, or nauseating odors);
- Familiarize yourself with the physical characteristics of the site;
- Keep a minimum number of personnel and equipment in the contaminated area, consistent with the requirements of safe-site operations; and
- Dispose of all wastes generated during activities as directed by the SUXOS.

Conformance with these site rules is mandatory for continued project participation.

11.0 PLANS

Malcolm Pirnie's field project management team will hold a meeting to discuss emergency response plans during mobilization and prior to fieldwork to discuss and define the following:

- Personnel roles and line of authority;
- Safety distances from emergency location;
- Evacuation/Hospital route, procedures, and pre-determined meeting place;
- Medical emergency and communication procedures;
- Emergency alert and response procedures; and
- Emergency equipment and its location on-site.

The Emergency Response Plan will be discussed during initial site training and discussed regularly during the Daily Tailgate Safety Meetings. Annually or as needed, the SSHO and the PM will review the plan and make any changes necessary to keep the plan current with new or changing site conditions and information. The UXOSO will conduct drills bi-annually, or more frequently if conditions change, to evaluate the response and test the effectiveness of the Plan.

Conditions that may lead to an emergency situation during field activities will be addressed in specific AHAs as tasks are identified. These conditions can include:

- Fire;
- Vehicle collisions or rollovers;
- Environmental release;
- Severe weather; and
- Medical emergency due to heat/cold stress, physical/physiological incident, allergic reactions.

11.1 Spill and Discharge Control

Potential hazardous spills from the work site are not anticipated for the project. In the event that they are encountered, the following control measures will be employed:

- Provide for secondary containment where required by regulation or contract, and where a spill could result in significant hazard or economic loss;
- Provide other appropriate engineering controls to prevent environmental releases to the ground, water, or air. These will be identified in AHAs or environmental permits (or equivalent);
- Provide equipment and personnel to perform emergency measures to mitigate spills and control their spread;
- Dispose of contaminated materials; and
- Provide a decontamination program to clean previously uncontaminated areas.

11.1.1 Contingency Plan

In the event of a spill or release, Malcolm Pirnie will:

- Notify the USACE, Baltimore District PM immediately;
- Take immediate measures to control and contain the release, including contacting local emergency service providers;
- Isolate and contain hazardous release areas;
- Deny entry to the spill area to unauthorized personnel;
- Do not allow anyone to touch spilled material;
- Stay upwind, keep out of low areas;
- Keep combustible materials away from the spilled material;
- Use water spray to reduce dust, as needed;
- Collect samples for analysis to determine that cleanup is adequate;
- If the release is from tanks, prevent the discharge from traveling beyond site boundaries; and
- Take caution when handling drums and containers (opening, sampling, and over packing).

11.1.2 Notification of Spills and Discharges

Malcolm Pirnie will notify the USACE, Baltimore District PM immediately of any spill or discharge. The USACE, Baltimore District PM will make regulatory notifications unless Malcolm Pirnie is requested to do so. However, Malcolm Pirnie is aware of its regulatory responsibilities and will make such notifications if a delay presents a compliance issue.

11.2 Hazard Communication Plan

The UXOSO is responsible for maintaining a list of hazardous materials used on site, as well as material safety data sheets for each hazardous material. These materials will be maintained in the office or vehicle used by the UXOSO, and for large sites, at other designated areas convenient to field personnel. Employees will be trained in the program, and will have access to the information as part of the site-specific training. Copies of MSDSs will be provided to the client representative.

11.3 Site Sanitation Plan

Employees should not be required to perform work under unsanitary conditions. Adequate supplies of potable water will be provided at the jobsite. Containers used for drinking water will be clearly marked and not used for any other purpose. Cups must not be shared by employees. Outlets for non-potable water (i.e., firefighting purposes) are not to be used by employees for drinking, washing, or cooking purposes. All construction projects must have an adequate number of toilets on the jobsite. Hand washing facilities need to be provided in near proximity to the jobsite.

11.4 Fire Prevention and Protection Plan

Requirements for storage of flammable and combustible liquids include:

- A suitable portable fire extinguisher shall be available at the location where flammable or combustible liquids are stored.
- “No Smoking” signs shall be posted in the storage area.
- Flammable liquids shall be stored in closed containers. Type I or Type II metal safety cans (not greater than 5 gallons capacity) shall be used for small quantities. Plastic storage containers are not allowed.
- Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids, may be stored in a storage cabinet.
- Containers of flammable and combustible liquids shall be stored properly when not in use.
- The grounds around the storage area shall be kept free of weeds, trash, and other unnecessary combustible materials.
- Spills shall be cleaned up promptly.

All project personnel will be responsible for observing and reporting fires and conditions that could lead to fires. During all on-site activities, the following practices will be used for fire prevention and protection:

- Smoking on site is prohibited in designated work areas, contamination reduction zones, and other areas where smoking may create a fire hazard (e.g., dry fields).
- A designated smoking area will be established as necessary by the UXOSO when operations on site begin.
- Accumulations of combustible scrap and debris on site will be promptly removed and properly disposed of.
- Care will be taken with all equipment to reduce the possibility of sparks or open flames.
- Inspect all electrical cords and plugs prior to use; keep cords away from water and moisture.
- Fire extinguishers (minimum 2A:10B:C) will be available at the work area and support area.
- A fire extinguisher will be available on all pieces of heavy equipment.
- Fire extinguishers will be inspected monthly.
- Defective fire fighting equipment will be replaced immediately.
- Fires or open flame devices are prohibited, unless authorized by the UXOSO in accordance with a Hot Work Permit.
- Only employees trained in the use of fire extinguishers will be permitted to use them.
- Only fires in the incipient stage will be addressed using portable fire extinguishers. Regardless of the size and nature of the fire, and Malcolm Pirnie’s ability to respond, all fires will be reported immediately to the local fire department.

12.0 MALCOLM PIRNIE RESPONSIBILITIES

12.1 Site Control

Site control procedures for this project will include the establishment of work zones at each work location, in order to provide site security by avoiding unauthorized access and to secure work locations between shifts. Site-specific requirements are addressed in the SSHP.

Site security will be established by clearly marking all work zones at normal locations of possible entry by unauthorized personnel, in order to minimize and prevent public exposure to hazards created by site activities. In addition, the UXOSO, as well as all Malcolm Pirnie employees and subcontractors, will stay alert for any unauthorized entry and take necessary actions to control the work area.

Work zones will be marked with barricades or signs, and visitors will be instructed to check in at the administrative trailer or access point.

Authorized site visitors may visit the site upon meeting the following conditions:

- Receiving site hazard and safety instructions from the UXOSO;
- Reviewing and complying with the essential elements of the APP;
- Donning PPE to enter regulated work areas per the APP and SSHP; and
- Reporting any observed unsafe act and/or condition at, or affecting, the work site.

12.2 Site Monitoring

The only anticipated exposure monitoring for this site will be for noise. Records will include the date, time, contaminants or hazards monitored, person conducting monitoring, calibration date and method, operations and location of monitoring, and results.

12.3 Responsibilities

During all emergencies, the SUXOS will serve as the Emergency Coordinator and the UXOSO will support the Emergency Coordinator in the safety officer role. Together they will abate and/or contain the emergency.

Upon discovering an emergency, the following series of events will occur:

- Notify personnel;
- Establish communication;
- Stop work activities, if necessary;
- Lower background noises (shut down equipment);

- Begin emergency procedures (order is dependent on the situation);
- Survey casualties;
- Request aid, if necessary;
- Assess existing and potential hazards to site personnel and off-site populations;
- Allocate resources;
- Help extricate and stabilize victims; and
- Evacuate all non-essential personnel.

12.4 Alerting and Communications

An employee alarm system will consist of the use of air horns or verbal instructions, either directly or via radio. Air horn signals, (and hand signals if necessary) will be established and employees will be trained in the signals and appropriate response. Telephones will be used to contact off-site emergency responders. Local contact lists, included in the SSHP, will be kept in on site at all times.

The following information will be communicated:

- Name of the person reporting the emergency;
- Telephone number at the location of the person making the call;
- Name of the injured person, if known;
- Description of the emergency;
- Exact location of the emergency;
- Actions already taken; and
- What assistance is required.

12.5 Coordination with Local Emergency Agencies

Malcolm Pirnie will ensure there is good coordination between our emergency plan and local requirements. Contact agencies, local points of contact, and phone numbers are presented in the SSHP (Attachment 1) and Attachment 4.

12.6 Emergency Action Procedures

At least two employees certified in both First Aid and CPR will be on the project at all times. A first aid kit must be maintained on site and checked weekly. In addition, a log of items used will be maintained.

If an injury or illness requires more than first aid, but is not an emergency, the employee will be taken to the Regional Medical Center for examination or observation

If the injury or illness is considered an emergency, the local ambulance service will be contacted to transport the victim to the local hospital or emergency care facility.

12.7 Rescue Operations

Where employees are engaged in one of the following activities or environments, a rescue plan will be incorporated into the site-specific SSHP:

- Working at elevations;
- Using personal fall arrest systems;
- Confined spaces, or potentially immediately dangerous to life or health (IDLH) atmospheres; and
- Working in remote environments.

12.8 Evacuation Routes and Procedures

The SUXOS and UXOSO will be responsible for training the site personnel in the proper evacuation procedures and for arranging for accountability of all personnel in the event of an evacuation. Generally, this will consist of designating a person to take the daily sign-in sheet(s) to the rally point and taking a roll call.

12.9 Contamination Control During Emergencies

In case of an evacuation, decontamination procedures for site personnel will be disregarded in order to expedite the removal of employees and subcontractors from the site. Everyone will report to the designated meeting point as soon as possible. Arrangement will be made to decontaminate the areas contaminated by the evacuation once the threat of danger is gone.

Whether or not to decontaminate a victim will be based on the type and severity of the illness or injury and the nature of the contaminant. If decontamination cannot be done, the victim will be wrapped in blankets, plastic, or rubber to reduce the possibility of contamination to other personnel. The medical facility will be informed of the potential contamination and a site representative will accompany the victim.

12.10 Emergency Supplies

At a minimum, the following supplies will be immediately available for on-site use:

- Air horns;
- First aid equipment and supplies;
- Emergency eyewash;
- Bloodborne Pathogen PPE;
- Spill control material and equipment;
- Radio and cell phone; and
- Type ABC fire extinguisher, 10 pound capacity, minimum of two.

12.11 Documentation and Review

After the response, Malcolm Pirnie will prepare an Incident Report. It will include such things as a chronological history of the emergency, facts, action, personnel present, sample results (if taken), summary of injuries, and possible exposures. For spills and releases it will also include:

- Description of material spilled, including identity, quantity, and a copy of the waste disposal manifest;
- Exact time and location of the spill, and the description of the area involved;
- Containment procedures utilized;
- Description of the cleanup procedure employed at the site, including disposal of spill residue; and
- Summary of the communications Malcolm Pirnie had with other agencies, if applicable.

This report will be given to the USACE, Baltimore District PM within two days of the incident, along with immediate verbal notification.

The report will also contain a critique of the response, and modifications to this plan will be made if necessary to adequately address subsequent emergencies.

12.12 Accident Prevention Signs, Tags and Labels

Standard accident prevention signs, tags, and labels will be used to communicate hazards and precautions in accordance with Section 8 of EM 385-1-1. Examples that may be used include:

- Project sign, including running injury-free record
- Danger, Warning, and Caution signs
- Work zone signs
- PPE requirement signs
- Lockout/Tagout tags
- Inspection and Do Not Use tags
- Hazardous material signs and labels

Specific items will be determined by UXOSO.

12.13 Postings

Required postings and general safety awareness reminder posters will be used to communicate information to site participants, where applicable.

12.14 Daily Safety Briefings

Daily briefings will be used to communicate daily activities, hazards and precautions, as well as to solicit input from site participants on safety issues or improvements. The briefings may also be used to present safety training topics and refresher items.

12.15 Equipment Operation

To prevent entrapment in moving machinery, Malcolm Pirnie employees will maintain a safe distance from heavy machinery. Malcolm Pirnie employees will remain outside the swing radius of heavy equipment. The UXOSO or designee will remind all site workers each morning about the hazards of moving equipment. Subcontractors are required to place a worker near moving heavy equipment to guide the operator and warn others.

Anticipated equipment operation hazards include:

- Noise;
- Utility Avoidance (overhead and underground);
- Electrical; and
- Brush Removal Equipment.
-

12.16 Biological Hazard Control

A full description of biological hazards associated with the field activities outlined in the SSHP (Attachment 1). Persons working on-site should be aware of the presence of biological hazards, including feral dogs, snakes, poisonous plants, and poisonous insects. Non-poisonous and poisonous snakes may be present, as well. With the exception of some rare species of poisonous snakes, snakes will not attack unless provoked. All snakes encountered should be avoided. If a snake is discovered, the UXOSO should be immediately informed of the snake's location, size, and type, if known. In most cases, only a brief interruption of work will be necessary to allow the snake to vacate the work area on its own.

12.17 Physical Hazard Control

12.17.1 Noise

A Hearing Conservation Program shall be in place whenever employees are exposed to 85 decibels (dB) (slow) averaged over an 8-hour workday, in accordance with Malcolm Pirnie's Corporate Hearing Conservation Program.

Employees will be trained on the contents and purpose of the Hearing Conservation Program when the program is established. Training will also include the proper use and care of various types of hearing protection.

Annual audiograms shall be provided for employees exposed to 85 dB (slow) averaged over an 8-hour work day.

Noise surveys and noise dosimetry shall be conducted to evaluate the potential and existing noise exposures at the work place, and employees will be informed of the results.

12.17.2 Underground Utilities

The PM and/or SUXOS shall be responsible for determining whether utilities “reasonably may be expected to be encountered.”

All known utilities shall be identified and marked prior to excavation/trenching activities. Potential utilities requiring evaluation include electric, gas, oil, chemical lines, pipelines, sewers, telephone/communications, fiber optic, and cable television (TV). Every effort shall be made to identify, trace, and mark utility lines. Unknown underground utilities are not expected at the Nanjemoy Creek and Potomac River South MRSs.

Malcolm Pirnie and the subcontractor(s) are responsible for ensuring that safe work practices are used to identify and avoid contact with underground utilities.

All utility location activities shall be coordinated with the PM, the FPM, and/or local utility locate businesses.

Identified utilities shall be marked with stakes, flags, paint, chalk, offsets, or other visible means of identification.

Intrusive soil activities conducted within a ten foot “Buffer Zone” (horizontal or vertical, as measured from the outside edge of the utility) of any utility (electric, gas, high pressure, chemical storage tanks, pipelines, sewers, etc.) may require the use of non-aggressive excavation methods, such as hand excavation using non-conductive hand tools, use of an air spade, hydro-excavation, or similar means.

If a previously unknown utility line is identified, uncovered, or disturbed during excavation/trenching activities, the excavation activity shall stop immediately and project management notified. Excavation shall not recommence until the line has been evaluated, identified, traced, and/or safe work practices have been developed and implemented to limit or prevent associated hazards.

Excavation spoil piles should not be placed atop surface features or ground markings identifying the locations of underground utilities.

Utilities exposed during site work must be protected. Utilities can shift or sag when the soil that was supporting and protecting the utility is removed. Utilities that are unsupported must be temporarily supported by shoring or other means as excavation continues.

The following are the Uniform Color Codes for the American Public Works Association:

- Red – Electric power distribution and transmission lines, cables, conduit, and lighting cables
- Yellow – Gas and oil distribution systems, steam, petroleum, or other hazardous liquid or gaseous materials
- Orange – Telephone, video, cable TV, other telecommunications, alarm or signal lines, cable or conduit
- Blue – Water, irrigation, and slurry lines
- Green – Sewers, storm sewer facilities, other drain lines
- Pink – Temporary survey markings
- Purple – Slurry and reclaimed water (also used for Cable TV)
- White – Proposed excavation limits, centerline and width of proposed lineal installations

12.17.2.1 Precautions When Near Overhead Utility Lines

The following precautions should be made when near overhead utility lines:

- Best Safety Practice: Never get closer than 10 feet to an overhead power line.
- Before you begin work, survey the site for overhead power lines. LOOK UP!
- All overhead wires shall be considered to be energized until the appropriate utility authorities indicate that it is not an energized line, or that it has been visibly disconnected.
- If overhead lines are present, call the utility company/owner and find out what voltage the lines are run on. Ask if the lines can be de-energized while work is performed near the lines.
- If lines cannot be shut down and/or line insulation is applied, a minimum safe distance of 10 feet must be established. Conduct a pre-work briefing to discuss the planned work. Include discussion of all equipment that could come in contact with the power lines (dump trucks, excavators, back hoes, cranes, etc.).
- For lines rated 50 kilovolts (kV) or below, the minimum clearance between the lines and any part of the equipment (e.g., excavator, loader, crane) or load shall be 10 feet. For lines rated over 50kV, minimum clearance between the lines and any part of the equipment or load shall be 10 feet plus 4 inches for each 10kV over 50 kV. Or, follow the American National Standards Institute (ANSI) guidelines for operating cranes (and other equipment) near overhead power lines, as listed in Table 12-1: Equipment/Power Line Safe Distances (ANSI Standard B30.5-1994, 5-3.4.5)[ANSI 1994]:

Table 12-1: Equipment/Power Line Safe Distances

POWER LINE VOLTAGE PHASE TO PHASE (KV)	MINIMUM SAFE CLEARANCE (FEET)
50 OR BELOW	10
ABOVE 50 TO 200	15
ABOVE 200 TO 350	20
ABOVE 350 TO 500	25
ABOVE 500 TO 750	35
ABOVE 750 TO 1,000	45

- An observer/spotter shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. This shall be the ONLY job the observer is performing when an observer is required.
- Notify line owners before work is performed near power lines.
- Post warnings on equipment cautioning the operators to maintain safe clearance between energized power lines and their equipment.
- Operate all equipment at a slower-than-normal rate in the vicinity of power lines.
- Exercise caution near long spans of overhead power lines, since wind can cause the power lines to sway laterally and reduce the clearance between equipment and the power line.
- Mark safe routes where equipment must travel beneath power lines.
- Exercise caution when traveling over uneven ground that could cause the equipment to weave or bob into power lines.
- Keep all personnel well away from the equipment whenever it is close to power lines.
- Prohibit persons from touching the equipment or loads until a signal person indicates that it is safe to do so.

12.17.2.2 Procedures to Follow If Contact with Overhead Power Line Occurs

The following are procedures to be followed in cases where contact has been made with overhead power lines:

- To protect against electrical shock injury in the event of contact between a piece of equipment and an energized line, the following procedures are recommended:
- The equipment operator should remain inside the cab.
- All other personnel shall keep away from the equipment, crane, ropes, and/or load, as the ground around the equipment might be energized.

- The equipment operator should try to remove the equipment from contact by moving it in the reverse direction from that which caused the contact.
- If the equipment cannot be moved away from contact, the operator shall remain inside cab until the lines have been de-energized.

13.0 SITE-SPECIFIC HAZARDS AND CONTROLS

The anticipated hazards, control measures, and safety procedures for the following site-specific activities and tasks are also presented in the SSHP (Attachment 1).

In addition, Malcolm Pirnie's Corporate H&S Programs, referenced throughout this APP and the SSHP, will be utilized to assist in the identification and implementation of appropriate hazard control measures. A listing of these Programs is presented in Attachment 5..

Attachment 1 - Site Safety and Health Plan

**FINAL
SITE SAFETY AND HEALTH PLAN
MORTAR RANGE
REMEDIAL INVESTIGATION
FORT GEORGE G. MEADE
ANNE ARUNDEL COUNTY, MARYLAND**

SEPTEMBER 2007

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
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**FINAL
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MORTAR RANGE
REMEDIAL INVESTIGATION
FORT GEORGE G. MEADE
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DoD Contract Number:

W912DR-05-D-0004

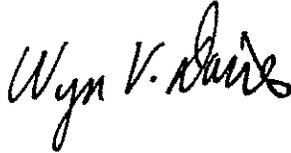
Reviewed and Approved by:



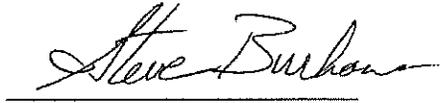
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Malcolm Pirnie, Inc. prepared this report at the direction of the U.S. Army Corps of Engineers (USACE). This document should be used only with the approval of the USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

SEPTEMBER 2007

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- Attachment 2: MEC Avoidance SOP

ACRONYMS

Acronym	Definition
ANSI	American National Standards Institute
APP	Accident Prevention Plan
CHSR	Corporate Health and Safety Representative
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
DC	District of Columbia
EC	Emergency Coordinator
FPM	Field Project Manager
FSP	Field Sampling Plan
GPO	Geophysical Prove-out
HSD	Health and Safety Director
MC	Munitions Constituents
MD	Maryland
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MSDS	Material Safety Data Sheet
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROC	Record of Changes

SSHP	Site Safety and Health Plan
SSO	Site Safety Officer
U.S.	United States
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer
UXOSS	UXO Health and Safety Supervisor
WP	Work Plan

1.0 INTRODUCTION

1.1 Scope

The Malcolm Pirnie, Inc. (Malcolm Pirnie) Site Safety and Health Plan (SSHP) has been developed for conducting a Remedial Investigation (RI) at the Mortar Range at Fort George G. Meade (FGGM) Maryland (MD). The SSHP addresses all occupational safety and health hazards associated with Munitions and Explosives of Concern (MEC) and munitions constituents (MC) operations. The SSHP addresses the requirements of 29 CFR 1910.120(b)(4)(ii), 29 CFR 1926.65(b)(4)(ii), Corps of Engineers Manual, EM 385-1-1, Section 28, ER 385-1-95 and any other applicable Federal, state, and local safety and health requirements. The level of detail provided is tailored to the type of work, complexity of operations to be accomplished, and the hazards anticipated. The SSHP addresses those elements, which are specific to the site, and have the potential for negative effects on the safety and health of workers. Where a specific element is not applicable, the plan element is listed and states that the element is not applicable with a brief justification for its omission. SSHP elements adequately covered in the APP are not duplicated; however, the specific element is listed and stated that the element is addressed in the APP.

1.2 Site Description

FGGM is located in Anne Arundel County, MD, almost midway between the cities of Baltimore, MD, and Washington, District of Columbia (D.C.). FGGM lies approximately 4 miles east of Interstate 95 and east of the Baltimore-Washington Parkway, between MD Routes 175 and 32. FGGM is located near the communities of Odenton, Laurel, Columbia, and Jessup. The current installation boundaries encompass the area previously referred to as the cantonment area, which is used for administrative, recreational, and housing facilities. FGGM contains approximately 65.5 miles of paved roads, 3.3 miles of secondary roads, and about 1,300 buildings.

The Mortar Range is a 291-acre former range located in the west-central portion of FGGM. The Mortar Range was first identified on a 1923 Special Military Map for Camp Meade. Based on historical maps, the MRS was used as a mortar range from the early 1920s until the late 1930s. The site is currently a golf course. The installation can be seen in Map 1.

1.3 Contaminate Characterization

The munitions expected at this site include 60-millimeter (mm) and 81-mm mortars as well as 3-inch and 6-inch Stokes mortars. White phosphorus mortar rounds may also have been used at the Mortar Range since EOD reportedly uncovered a white phosphorus mortar round at the golf course adjacent to Mapes Road in the early 1990s. Subsurface metallic anomalies were detected within the Mortar Range footprint during the 2004 Environmental Baseline Study and the 2004

Geophysical Survey. To date, these anomalies have not been investigated, so it is unknown if these metallic anomalies are related to the former use of the site as a range or to another source.

MC contaminants include aluminum, arsenic, antimony, cadmium, calcium, copper, lead, silver, and zinc. Explosives are also of concern. In the Site Investigation performed by Malcolm Pirnie, no explosives were reported above the laboratory detection limit. All the TAL metals were tested for with high levels of arsenic in every sample. Several samples had above background detections of various other metals; none of the other detections exceeded the USEPA Region 3 RBCs. Silver was above background level for all five samples. Aluminum, antimony, cadmium, calcium, copper, and zinc were above background for one or more samples. Lead exceeded the background value in all ten of the samples, but was well under the USEPA action level for residential soil for lead. All contamination is expected in the surface and subsurface soil.

1.4 Previous Investigations

Studies/investigations have been conducted at FGGM to try and determine the presence of MEC. One study is the *Final Environmental Baseline Survey (EBS), Site M, Fort Meade, Maryland* (May 2004). Site M includes the Mortar Range and its associated SDZ, along with an area east of the Mortar Range. This report presents findings of below regulatory limit detections of explosives within the Mortar Range, its associated SDZ, and the area to the east of the Mortar Range. Another significant investigation was the *Geophysical Survey of Possible Dump Sites and an Abandoned Cemetery Fort George G. Meade, Maryland* (2004) which included information regarding geophysical detections at various locations within the Mortar Range. A Historical Records Review (HRR) and a Site Investigation (SI) were conducted (Malcolm Pirnie, Inc.) in 2006 and 2007, respectively.

SI field work was conducted at the Mortar Range MRS in August 2006. During the field work, no MEC items or munitions debris was identified. Subsurface metallic anomalies were detected within the Mortar Range footprint during the 2004 EBS and the 2004 Geophysical Survey. To date, these anomalies have not been investigated, so it is unknown if these metallic anomalies are related to the former use of the site as a range or to another source. Subsurface metallic anomalies were not recorded during the SI site walk.

2.0 HAZARD AND RISK ANALYSIS

An AHA has been developed for each task/operation to be performed. All AHAs comply with the requirements in 29 CFR 1910.120(b)(4)(ii), 29 CFR 1926.65(b)(4)(ii), Corps of Engineers Manual, EM 385-1-1, MR-005-06, Section 2.2.. AHAs are listed in Attachment 1.

2.1 General Safety

2.1.1 *Slip, Trip, and Fall Hazards*

Ground irregularities due to topography or protruding materials (e.g., nails in boards, broken glass) may pose a slip, trip or fall hazard to workers. Leather or other chemical resistant boots with puncture proof inserts will be worn by personnel to protect against sharp objects possibly protruding from the surface, or when using heavy equipment. There are potential hazards from the presence of wet areas, puddles, oil and grease, debris, loose or sandy soils, or other obstructions that may be on site. Field personnel will be briefed by the UXO Safety Officer (UXOSO) each morning on the location and type of obvious hazards in the work areas. Site workers are to take care in areas where ground irregularities or protruding objects exist and may not be observed due to vegetation.

2.1.2 *Falling Objects*

If there is a danger of falling objects on a property, the entire area inside the work zone will be a hard hat area. Hard hats will also be worn within 50 feet of activities posing an overhead hazard. Storms often break-off higher tree branches that may be snagged and suspended by other branches during their fall, and are appropriately termed “hangers.” Although not a hard-hat requirement, field personnel should remain conscious of the potential overhead threat presented by hangers.

2.2 Explosives and Ordnance Hazards

Physical hazards associated with MEC are suspected at FGGM. Encountered potential munitions may include: 60-millimeter (mm), 81-mm mortars, and 3-inch and 6-inch Stokes mortars. Based on the historical use of the site, MEC may still be present in the area previously used as a mortar range.

A UXO Technician(s) will first perform a visual survey (Surface sweep) of the areas that need to be accessed by walking the site and closely observing and marking any surface MEC hazards. If non-UXO qualified personnel must access an area, a safe access corridor will first be marked with flagging or pin flags, or a qualified UXO Technician will provide escort for any non-UXO qualified personnel. It is critical that all personnel be briefed on both the initial identification of MEC and the steps to take if potential MEC is encountered. MEC hazards, precautions, and

procedures are discussed in the Malcolm Pirnie Standard Operating Procedures for Sites Contaminated with MEC (Attachment 2).

2.3 Chemical Hazards

Potential MC may include explosives as well as a number of metals: aluminum, antimony, cadmium, chromium, copper, lead, selenium, silver, and zinc. No chemical warfare materials (CWM) are believed to have been used on-site.

If munitions with unknown fillers or suspect CWM are encountered, all work will cease, personnel will be evacuated up-wind, and the UXOSO will be notified immediately. The UXOSO will notify the United States Army Corps of Engineers (USACE) Ordnance and Explosives (OE) Safety Specialist and FGGM representative. Site activities will only resume after the Malcolm Pirnie Corporate Health and Safety Representative (CHSR) and Project Manager (PM) have coordinated with the USACE PM on site safety and notified the UXOSO and/or the Field Project Manager (FPM) that it is safe to resume activities.

Potentially complete pathways exist for both human and ecological receptors for MC through the food chain, groundwater, and subsurface and surface soils. Exposure routes include vegetation, game/fish/prey, ingestion, dermal contact, and inhalation (dust). Biota has potential pathways to vegetation and game through burrowing or feeding activities. Direct human or biota contact with subsurface soil is possible if the soil is disturbed through excavation, construction, or other intrusive activities. Biota may also come into direct contact with subsurface soil through burrowing or feeding activities.

The sampling that occurred within this munitions response site (MRS) during the SI conducted by Malcolm Pirnie indicated that MC would have incomplete pathways based on the lack of MC detections above regulatory limits for metals. There were no detections for explosives. However, the 2004 Environmental Baseline Study report had detections for explosives in soil and groundwater on site. Although these detections were below regulatory limits, they represent potentially complete pathways for MC.

2.4 General Physical Hazards

Anticipated physical/biological hazards include:

- Heat Stress (high ambient temperature);
- Cold Stress (low ambient temperature);
- Noise; and
- Equipment Operations.

2.4.1 Heat Stress

Heat stress is probably one of the most common and potentially serious illnesses at hazardous waste sites. It is proposed that work will be conducted during the colder fall and winter months; however, the schedule may change and work may be conducted during the warmer spring/summer/fall months. Therefore, heat exposure is an issue of concern. Exposure monitoring for heat stress is described in Section 8.1.

2.4.2 Cold Stress

Cold stress can result from cold temperatures, high or cold wind, dampness, and cold water. The potential for cold stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. A cold environment forces the body to work harder to maintain its temperature. Exposure monitoring for cold stress is described in Section 8.2.

2.4.3 Noise

OSHA requires the use of hearing protection by all employees when noise levels exceed 85 decibels. This limit may be exceeded on or near heavy equipment. A sound level meter, operating in the dBA slow response mode, will be used to monitor noise levels when personnel are working near heavy equipment. Site workers will wear hearing protection when sustained noise levels exceed 85 decibels. In addition, all Malcolm Pirnie personnel must undergo initial employment and annual examinations (as well as employment termination examinations), during which a hearing test is conducted.

2.4.4 Equipment Operation

To prevent entrapment in moving machinery, Malcolm Pirnie employees will maintain a safe distance from heavy machinery. Malcolm Pirnie employees will remain outside the swing radius of heavy equipment. The UXOSO or designee will remind all site workers each morning about the hazards of moving equipment. Subcontractors are required to place a worker near moving heavy equipment to guide the operator and warn others.

Anticipated equipment operation hazards include:

- Utility Avoidance (overhead and underground);
- Electrical; and
- Brush Removal Equipment.

2.4.4.1 Utility Avoidance (Overhead and Underground)

Underground utilities may pose electrocution, explosion, or other hazards during site activities. The location of underground utilities will be determined prior to intrusive, on-site activities. Utility companies and other responsible authorities will be contacted to locate and mark the locations of all utilities.

- The PM and/or UXOSO are responsible for determining whether utilities “reasonably may be expected to be encountered.”
- All known utilities are identified and marked prior to excavation/trenching activities. Potential utilities requiring evaluation include electric, gas, oil, chemical lines, pipelines, sewers, telephone/communications, fiber optics, and cable television. Every effort is made to identify, trace, and mark utility lines. Unknown underground utilities may exist at many projects, in many areas.
- Malcolm Pirnie and the Subcontractor(s) are responsible for ensuring that safe work practices are used to identify and avoid contact with underground utilities.
- All utility location activities shall be coordinated with the PM, USACE, and/or local utility location businesses.
- Identified utilities shall be marked with stakes, flags, paint, chalk, offsets, or other visible means of identification.
- Intrusive soil activities conducted within a five foot “Buffer Zone” (horizontal or vertical, as measured from the outside edge of the utility) of any utility (electric, gas, high pressure, chemical storage tanks, pipelines, sewers, etc.) may require the use of non-aggressive excavation methods such as hand excavation using non-conductive hand tools, use of an air spade, hydro-excavation, or similar means.
- If a previously unknown utility line is identified, uncovered, or disturbed during excavation/trenching activities, the excavation activity shall stop immediately and project management notified. Excavation shall not recommence until the line has been evaluated, identified, traced, and/or safe work practices have been developed and implemented to limit or prevent associated hazards.
- Excavation spoil piles will not be placed atop surface features or ground markings identifying the locations of underground utilities.

2.4.4.2 *Electrical*

Electrical storms (thunderstorms) may pose an electrocution hazard. During thunderstorms, all heavy equipment will be shut down, drilling activities will be terminated, and all personnel on-site will take refuge in buildings or vehicles if working in a remote area.

All electrical equipment will be inspected for serviceability prior to being placed in use, as well as periodically during the project by the UXOSO. All electrical equipment (i.e., power tools and extension lighting used on-site) will be protected by ground fault circuit interrupters.

2.4.4.3 *Brush Removal Equipment*

Prior to brush removal activities, the UXO personnel will conduct a magnetometer assisted surface sweep for metallic debris. All debris will be set to the side of the desired path. Brush removal will be required for various phases of this project, including construction of the geophysical prove-out, as well as surveying/establishing transect lines and grids. Brush removal will involve the use of weed-eaters and brush-cutters (weed-eaters affixed with saw blades). During equipment operation, eye protection and hearing protection will be worn by operators, in addition to other PPE. Equipment operation will cease if Malcolm Pirnie personnel are within 50 feet of brush-clearing activities. MPI employees will not be involved in brush removal activities and must observe from a distance of 25 feet.

2.5 Radiological Hazards

Given the extent to which radioactive material has been used in industry and government, there is always a possibility of encountering sources of radioactive contamination. It is not anticipated that any radiological hazards will be encountered during this work. However, if any radiological contamination is suspected, work will cease immediately and both the FPM and the UXOSO will be contacted.

Radium nuclear decay emits ionizing radiation in the form of alpha particles. Alpha particles can travel a few inches in the air, but cannot penetrate the skin or other barrier. However, they can be particularly damaging if ingested or inhaled. The potential routes of entry include inhalation of contaminated dusts and ingestion of contaminated dusts from hand-to-mouth contact due to poor personal hygiene.

These techniques are employed to protect workers from ionizing radiation:

- Avoid any suspected radiation emitting devices and contact the FPM immediately;
- Limit time of exposure to radioactive materials;
- Specify safe working distances from sources; and
- Shield against radioactive particles using barriers and/or PPE.

2.6 Biological Hazards

Persons working on-site should be aware of the presence of biological hazards, including feral dogs, snakes, poisonous plants, and poisonous insects. Non-poisonous and poisonous snakes may be present, as well. With the exception of some rare species of poisonous snakes, snakes will not attack unless provoked. All snakes encountered should be avoided.

2.6.1 Insects

- **Spiders** – Spiders in the United States are generally harmless, with two notable exceptions – the black widow spider (*Latrodectus mactans*) and the brown recluse or violin spider (*Loxosceles reclusa*). Field workers must exercise caution when lifting covers off manholes or sumps, or rummaging through wood, rock, brush piles, etc. Both the black widow and brown recluse spiders are typically found in these locations. The following describes the symptoms and treatment for spider bites.
 - **Black Widow Spiders** – (Figure 1) spin tangled webs of coarse silk in dark places, usually outdoors. Webs are usually built near the ground normally in trash, rubble piles, under or around houses, and outbuildings such as privies, sheds, and garages. Symptoms include: slight local swelling, two faint red spots surrounded by local redness, and localized pain in one to three hours, with duration lasting up to 48 hours. Pain normally progresses from the bite site up or down the extremity, finally localizing in the abdomen and back. The abdominal muscles may become rigid and board-like with severe cramps (resembling appendicitis). There may be pain in the muscles and soles of the feet, and eyelids may become swollen. Other symptoms may be nausea, profuse perspiration, tremors, labored breathing and speech, and vomiting. During this time, a feeble pulse, cold clammy skin, unconsciousness, convulsions, and even death may result if the victim does not receive medical attention immediately. Additional complications may occur due to the infection of the bite. If bitten, remain calm, collect the spider (if possible) for positive identification, and get medical attention immediately. First aid is of limited help. Application of a mild antiseptic such as iodine or hydrogen peroxide prevents infection. First Aid – Seek immediate medical attention.
 - **Brown Recluse Spider** – (Figure 2) or violin spider is about 1 inch long. The most distinguishing mark is the violin-like dark patch on their head and thorax with the skinny part of violin pointing toward the abdomen. It is not an aggressive spider, but will attack if trapped. Venom from the brown recluse spider causes local tissue damage. Symptoms include: burning, pain, itching, or redness at the site, which is usually delayed and may develop within several hours or days of the bite; a deep blue or purple area around the bite, surrounded by a whitish ring and large red outer ring similar to a "bull's eye"; an ulcer or blister that turns black; headache, body aches; rash; fever; nausea or vomiting. Symptoms of a brown recluse spider bite may resemble other conditions or medical problems. First Aid - Seek immediate medical attention. Hospitalization may be required.

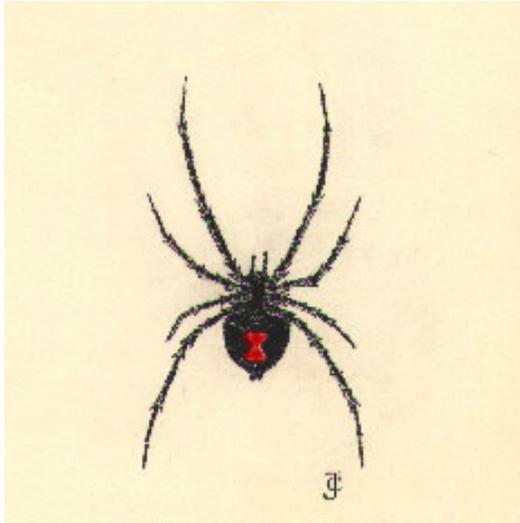


Figure 1: Black Widow Spider



Figure 2: Brown Recluse Spider

- **Ticks** – (Figure 3) Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to bite workers. Ticks can be particularly numerous in the Spring and Fall. Ticks are vectors of many different diseases including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever and Lyme disease. Ticks attach to the skin and intravenously feed on blood, creating an opportunity for disease transmission. Covering exposed areas of the body and using insect repellent containing N,N-diethyl-m-toluamide (DEET) help prevent tick bites. Periodically during the workday, employees should inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:
 - Do not try to detach a tick with your bare fingers; bacteria from a crushed tick may penetrate unbroken or broken skin. Instead, fine-tipped tweezers should be used for tick removal.
 - Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
 - Do not twist the tick as you pull and do not squeeze its body. That may actually inject bacteria into your skin.
 - Thoroughly wash your hands and the bite areas with soap and water. Then apply an antiseptic to the bite area.
 - Notify the UXOSO of any tick bites as soon as possible.

Recently, Lyme disease has been the most prevalent type of disease transmitted by ticks in

the United States. Ticks transmit other diseases that present similar symptoms and long-term consequences. All personnel sustaining a tick bite should report the bite as any other work place injury.



Figure 3: Deer Tick

- **Mosquitoes** – (Figure 4) are common transmitters of the West Nile Virus (WNV). Symptoms of the virus usually develop between 3 and 14 days after being bitten by an infected mosquito. Approximately 80 percent of people who are infected with WNV will not show any symptoms at all. Up to 20 percent of the people who become infected with WNV will display mild symptoms that may include: fever, headache, body aches, nausea, vomiting, swollen lymph glands, or a skin rash on the chest, stomach, and back. Symptoms typically last a few days. About one in 150 people infected with WNV will develop severe illness, with symptoms including high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

General guidelines for prevention of exposure to WNV include:

- Wear long-sleeved shirts.
- Spray exposed skin with an insect repellent containing 15-30% DEET.
- Spray clothing with products containing DEET or permethrin, as mosquitoes may bite through thin clothing. Permethrin should only be used on clothing; do not apply directly to skin. Wash treated clothing before wearing it again.
- Wash treated skin with soap and water after returning indoors.



Figure 4: Mosquito

- **Fire Ants** – (Figure 5) are extremely common in the south, from the southeastern U.S. west into California. There are many different species of fire ants within this region, four of which pose the most threat: the Red Imported Fire Ant, the Black Imported Fire Ant, the Southern Fire Ant, and the native fire ant. Mounds or nests can range from steep structures 10-24 inches in diameter and 18 inches high, to loose soil with many craters scattered over 2 to 4 square feet, to nests constructed around clumps of vegetation, or under objects or in rotting wood. The venom injected from the fire ants upon biting burns and stings, and can cause tiny blisters or white pustules that persist for days if left untreated, or for weeks if scratched or infected, and may leave permanent scars. Some individuals are extremely sensitive to the venom of fire ants, and can have a negative reaction known as anaphylaxis. Symptoms of anaphylaxis are dizziness, nausea, sweating, low blood pressure, headache, and shortness of breath. If bitten by a fire ant, the following procedures should be followed:
 - Immediately disinfect the area bitten.
 - Apply ice to the affected area for at least 10 minutes.
 - Use an antihistamine to reduce itching and redness.
 - If signs of anaphylaxis become evident, seek medical attention immediately.



Figure 5: Fire ant

2.6.2 Hazardous Plants

Poison ivy, poison sumac, and poison oak are hazardous plants that can be found in AL. Poison ivy (Figure 6) is a climbing plant with ternate leaves (arranged in threes) and white berries. Poison sumac (Figure 7) is a tree or shrub with leaves alternating from thin oval to pointed leaflets. Poison oak (Figure 8) is similar to poison ivy, but its leaves appear oak-like in form. The leaves of these poisonous plants produce irritating oil causing an intensely itchy skin rash and characteristic bulbous lesions. These plants are to be avoided.

Preventive measures include wearing long-sleeved shirts and long pants, and cloth or leather gloves. Barrier creams should be applied to exposed skin. Calamine lotion applied over affected area will also help relieve itching and promote healing. Rubbing alcohol can be used to remove the oily resin up to 30 minutes after exposure.



Figure 6: Poison ivy



Figure 7: Poison sumac



Figure 8: Poison oak

2.6.3 Feral animals

- **Dogs, Cats, and Other Wild Animals** – Animal bites (both wild and domestic) can result in both infection and disease. Tetanus, rabies, and various types of fevers can follow an untreated animal bite. Never approach or harass wild animals. Notify the UXOSO of any animals observed on-site. If the animal does not exit the work area voluntarily, appropriate animal control officials will be contacted to assist in the removal.

Animal bites will be evaluated promptly by medical personnel. In the interim:

- Clean the wound thoroughly with soap or detergent solution.
 - Flush it well with water.
 - Cover with a sterile dressing.
 - Immobilize an injured extremity.
 - If unable to capture or kill the animal, provide medical personnel with any information possible to help identify the animal so that they can provide appropriate treatment.
- **Snakes** – All personnel will be informed that site activities have the potential for encountering snakes. Areas with heavy undergrowth or shrubs are of special concern. If an individual is bitten by a snake, the basic rule is -- TREAT ALL SNAKEBITES AS POISONOUS. The probability exists that all snakes may carry tetanus (lockjaw). If bitten, whether poisonous or not, seek immediate medical attention, identify and/or kill the snake (if it can be done quickly and safely), and take it to the hospital for identification.

The following first-aid steps should be taken if bitten by a snake:

- Remain calm, but act swiftly.
- Immobilize the affected area in a position lower than the heart, or in a gravity-neutral position.
- **DO NOT** cut open the bite or attempt to suck out venom. This could potentially cause immediate unconsciousness and/or death.

2.7 Task-Specific Hazards and Control Measures

A summarized AHA will be prepared for all site-specific tasks and included in the Health and Safety Addendum (Attachment 2). The analysis will include a description of the hazards and the mitigating or control measures required to prevent accidents. New activities or tasks will require a new, written hazard analysis prior to conducting the task.

If MEC are found at the site the Malcolm Pirnie UXO team will respond to the MEC find. If the item is suspect MEC, it will be blown in place or it will be removed by the responding Malcolm

Pirnie UXO team. In the unlikely event that munitions with unknown chemical fillers are discovered, all site activities will cease immediately. The site will be evacuated up-wind, the UXOSO will be immediately notified, and the UXOSO will notify the USACE OE Specialist and FGGM representative. Site activities will only resume after the Malcolm Pirnie CHSR and PM have coordinated with the USACE PM on site safety and notified the UXOSO and/or the FPM that it is safe to resume activities.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

3.1 Project Organization of Safety Personnel

This project will be accomplished under the direction of the Malcolm Pirnie personnel identified below (or alternate) in accordance with the responsibilities assigned by their respective organizations.

Table 3-1: Project Organization of Safety Personnel

Title	Organization	Function
Corporate Health and Safety Representative (CHSR)	Malcolm Pirnie	Responsible to the President on all matters related to the health and safety of all Malcolm Pirnie employees and its subcontractors. Has final approval authority on SSHP and modifications recommended by the Field Project Manager.
Field Project Manager (FPM)	Malcolm Pirnie	Manages all on-site activities and responsible for maintaining a healthy work environment.
Unexploded Ordnance Safety Officer (UXOSO)	Malcolm Pirnie	Works closely with the FPM and CHSR and assists with all on-site activities. Responsible for all safety related to MEC. Provides the daily tailgate safety brief, site orientation, and safe escort of non-UXO personnel.
Senior Unexploded Ordnance Supervisor (SUXOS)	Malcolm Pirnie	Assists the Malcolm Pirnie PM in the development of plans, identification of personnel and equipment requirements, as well as supervision of all daily activities of the field teams. Responsible for overall coordination of on-site MEC activities.
Geophysical Quality Control (QC)	Malcolm Pirnie	Responsible for reviewing report sections that address geophysical investigations and geophysical QC. Also responsible for the overall implementation of these plans, geophysical QC, data analysis, and oversight of subcontractors.
Unexploded Ordnance Quality Control Specialist	Malcolm Pirnie	Responsible for monitoring and ensuring that all site MEC activities are conducted in accordance with the SOW, GPO Plan, and Work Plan. Conducts QC inspections of all MEC and explosives operations for compliance with established procedures.

3.2 Safety Responsibilities of Personnel

All Malcolm Pirnie and subcontracted personnel are responsible for compliance with this SSHP. All on-site field personnel are expected to perform only those tasks they believe can be done safely and for which they have been adequately trained. They are responsible for taking all reasonable precautions to prevent injury to themselves and to their fellow employees; for being alert to potentially harmful situations; and for immediately reporting any accidents, near misses, and/or unsafe conditions to the CHSR and UXOSO or designated field representative. Specific safety responsibilities of the safety staff are described below. All Malcolm Pirnie personnel have the authority to stop work in the event of an imminent hazard to health and safety is observed.

Corporate Health and Safety Representative – The CHSR is responsible for development and implementation of this SSHP and for the health and safety of Malcolm Pirnie personnel assigned to the construction support activities. The CHSR will review and approve the SSHP. Other duties of the CHSR include:

- Assisting with actions to provide any required initial installation-specific training;
- Being available for consult by telephone for the full duration of site activities;
- Being available to conduct on-site audits as necessary to observe the effectiveness of the SSHP;
- Being available for emergencies;
- Providing on-site consultation as necessary to verify that the SSHP is fully implemented;
- Being available for consultation with the FPM and the UXOSO, and the Contracting Officer regarding any modifications to the SSHP;
- Being available for consultation with the FPM to evaluate changing site conditions and to recommend changes to engineering controls, work practices and PPE;
- Being available for review of accident reports and results of daily inspections; and
- Serving as a member of the quality control staff.

Field Project Manager – The FPM has responsibility and authority for directing field activities without exposing or endangering site personnel or the public. The FPM enforces safe work practices, removes unfit or unqualified personnel/visitors from the site, and verifies that machinery and mechanized equipment brought to the site have been certified safe to operate. The FPM works closely with the UXOSO and they both share emergency coordinator activities with the facility and assist with accident and incident investigations. The FPM assigns field tasks only to those on-site personnel who have received adequate instruction and training. The FPM ensures that all site personnel understand their respective safety roles, responsibilities and recommends changes in the SSHP if required due to changing site conditions.

UXO Safety Officer – The UXOSO is responsible for supervising all on-site MEC activities and has final authority on field activities involving MEC. He/she may also assist the FPM with general site safety matters. Duties include examining the support zones, work zones, and Material Presenting Potential Explosive Hazard (MPPEH) for potential live ordnance; providing MEC orientation; and safe escort for site personnel. The UXOSO is also responsible for certifying that all materials are positively identified, if this can be accomplished safely, and to ensure that the area around MEC is marked.

The UXOSO will assist other team members in interpreting and documenting health and safety related data relevant to work activities at the site. As site data are obtained and evaluated, the UXOSO may modify this SSHP with approval of the CHSR. The levels of personnel protection outlined in this plan may be upgraded based on such information. The levels of personal protection outlined in this plan cannot be downgraded without the approval of the CHSR. The UXOSO or designee will also conduct regular on-site briefings pertaining to health and safety requirements of the project.

Both the FPM and the UXOSO report to the CHSR, and they have the responsibility and the authority to develop, implement, and verify compliance with the SSHP. These persons advise on all matters related to health and safety and have the authority to stop all work if conditions are judged to be hazardous to on-site personnel or the public. The UXOSO provides the support to the FPM in the event of an emergency. The UXOSO is responsible for implementing the emergency response plan, supporting responding emergency services, and coordinating with the facility contact. He/she is responsible for conducting accident and near-miss investigations and for submitting the Accident Reports and First Aid Incident Report to the CHSR within 24 hours of a significant incident or within eight hours of a serious incident. Additional duties of the FPM and the UXOSO are:

- Verifying personnel training and medical certifications;
- Regularly inspecting the site for hazardous conditions;
- Conducting and reporting accident and near-miss investigations;
- Documenting that all field personnel have read and understand the requirements set forth in the SSHP, and verifying that these requirements are upheld during on-site work activities;
- Conducting daily tailgate health and safety meetings for all participants before starting a specific task;
- Arranging for and providing job safety training, as required;
- Establishing work zones, evacuation routes, and assembly areas;
- Determining whether to maintain or modify levels of protection provided in the SSHP based on site conditions and monitoring data;
- Ensuring that protective clothing and equipment are properly selected, used, stored, and maintained;
- Maintaining a first aid kit and availability of a vehicle in the case of an emergency;

- Maintaining contact with the facility in the event of an imminent MEC hazard;
- Ensuring that the CHSR and Project Manager are informed of any situations out of the norm that may be of concern regarding the investigation, audits, and/or reports;

Malcolm Pirnie Senior UXO Supervisor (SUXOS)

The SUXOS assists the Malcolm Pirnie PM in the development of plans, identification of personnel and equipment requirements, as well as supervision of all daily activities of the field teams. The SUXOS will also act as the Site Safety and Health Officer for this project. The SUXOS is also responsible for overall coordination of on-site MEC activities and for keeping the PM informed of staffing, resource, or other issues that could impact the overall performance of the project.

Malcolm Pirnie Geophysical Quality Control (QC) Manager

The Geophysical QC Manager is responsible for reviewing report sections that address geophysical investigations and geophysical QC. The Geophysical QC Manager is also responsible for the overall implementation of these plans, geophysical QC, data analysis, and oversight of subcontractors. Additionally, this individual will consult with the USACE, Baltimore District geotechnical representative regarding stakeholder and regulatory inquiries for data evaluation, if required, and will interface with the Geographic Information Systems (GIS) manager for incorporation of geophysical data into the GIS.

Malcolm Pirnie UXO Quality Control Specialist (UXOQCS)

The UXOQCS is responsible for monitoring and ensuring that all site MEC activities are conducted in accordance with the SOW, GPO Plan, and Work Plan. The UXOQCS will conduct QC inspections of all MEC and explosives operations for compliance with established procedures, and direct and approve all corrective actions to ensure all MEC-related work complies with contractual requirements.

3.3 Stop Work Authority

All employees have the right to work in a safe and healthful environment that is free from recognized hazards. Conditions or situations that are unsafe must be reported immediately to the FPM and/or the UXOSO. The FPM will evaluate the situation, in consultation with the UXOSO and the CHSR, and determine which appropriate actions need to be taken to ensure a safe working environment. Work will be continued only after these actions have been implemented.

3.4 Required On-Site Documents

The following information (some of which will be included in the site specific SSHP Addendum) must be available at the project site:

- Installation-specific SSHP
- Emergency notifications, services, points of contact phone list and procedures
- Site Evacuation Plan (including routes)
- Site Hospital Route Map
- Material Safety Data Sheets (MSDSs), if needed; and
- Applicable Occupational Safety and Health Administration (OSHA) records (OSHA Forms 300 and 301).

3.5 Project Logs, Records, and Reports

The FPM (or designee) must carefully document the implementation of this SSHP by maintaining the installation-specific Field Binder. The binder will contain the following documents, which will be available for review by the facility or appropriate OSHA representative:

- Daily Employee/Visitor Roster
- Daily Tailgate Safety Meeting Reports
- Supervisor's Report of Injury or Illness
- First Aid Incident Report
- Project Accident First Aid Log
- Incident Reports (for unanticipated MEC discovery, environmental incidents, equipment damage, evacuations, and near-miss events)
- Record of Changes (ROCs) to this SSHP
- Signed Acceptance of SSHP Form (signed by all routine on-site personnel).

4.0 HEALTH AND SAFETY ORIENTATION TRAINING

4.1 General Training

Malcolm Pirnie and subcontractor personnel involved with the investigation activities are required to have completed the 40-Hour OSHA Hazardous Waste Operation and Emergency Response Health and Safety Training as specified in 29 CFR 1910.120. This training, designed to orient personnel potentially exposed to hazardous substances, health hazards, or safety hazards, includes the following:

- Safety and health risk analysis;
- Use of PPE;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment;
- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- Procedures for environmental monitoring, site control, and decontamination;
- Emergency response plans;
- Introductory Radiological Worker Training;
- Chain-of-Command; and
- Hazard Communication Program, including MSDSs;

All personnel will also have proof of attendance at an annual 8-Hour Health and Safety Refresher course if their 40-Hour course was completed more than a year prior to the start of field activities.

An MEC orientation program will be presented to all field personnel before any work begins. Hazardous work permits developed for this investigation, if applicable, will be included in the Field Binder.

4.2 Specialized Training

Malcolm Pirnie personnel are to be knowledgeable in the particular hazards that may be encountered during this project and familiar with safe operating procedures. This will be accomplished through the review of this SSHP, specialized training prior to the commencement of the field work, an audit of field activities, and safety meetings during the program, as discussed below.

Field personnel should have a minimum of three days of actual field experience under a skilled supervisor and be familiar with emergency response procedures outlined in this SSHP. The UXOSO and all supervisory personnel will have additional training, including cardiopulmonary resuscitation (CPR), First Aid, and 8-Hour Hazardous Waste Operations and Emergency

Response Supervisor training. Subcontractors will be responsible for ensuring that their employees receive specialized training for their job functions and responsibilities.

4.2.1 *Pre-Investigation Health and Safety Briefing*

Malcolm Pirnie and Subcontractor personnel involved with the project will attend a health and safety briefing prior to initiation of the field activities. The topics to be discussed will include:

- Characteristics and potential hazards of contaminants known to be present at the site;
- Personal protective clothing function and donning/doffing;
- Respirator selection, use, and care;
- Personal hygiene;
- Environmental monitoring;
- Decontamination procedures;
- Site control and work zone designations;
- General safety concepts;
- Emergency recognition and prevention;
- Cold stress;
- Signs and symptoms of over exposure to site specific chemical hazards;
- Hazard communication;
- Emergency response plan; and
- Site contingency plans.

4.2.2 *Tailgate Safety Meetings*

Tailgate safety meetings will be conducted each morning by the UXOSO for all phases of work during which all field teams will be provided with a daily work order that will include a checklist with utility clearance and known conditions on the property, where applicable. Topics of discussion will include work tasks and associated hazards, work zones and designated PPE, emergency procedures, evacuation routes, and prior safety concerns. Problems relative to respiratory protection, inclement weather, cold stress, or the interpretation of newly available environmental monitoring data are also examples of topics that might be covered during these briefings.

An outline report of meetings giving the date, time, attendees, subjects discussed, and instructor are maintained. Visitors will be properly oriented to existing site conditions, planned activities, levels of personal protection, and other procedures outlined in this SSHP. These meetings must be documented on the prescribed forms.

4.2.3 *Hazard Communication*

Malcolm Pirnie has a written hazard communication program which was established to meet the requirements of 29 CFR 1910.1200, and field activities shall be implemented in accordance with that program, as described below.

MSDSs for hazardous chemicals introduced to the site by Malcolm Pirnie and their subcontractors will be present at the site, for review by all on-site personnel. Labels on containers used by Malcolm Pirnie are as originally received (not to be defaced) and are to contain the following information: (1) the identity of the hazardous chemical(s); (2) the appropriate hazard warnings; and (3) the name and address of the chemical manufacturer. If an employee transfers chemicals from a labeled container to a portable container, a label that contains those three items must be affixed. If the portable container is intended only for that employee's immediate use (during the same work shift), the product name shall be clearly marked on the container. The employee will be responsible for properly emptying, cleaning, or disposing of the portable container immediately after use.

As part of the health and safety orientation conducted by the UXOSO, a review of our hazard communication program will be included to inform employees of hazardous chemicals to which they may be exposed during field activities. Subcontractors will also attend the hazard communication training session. If the chemical hazard changes or a new chemical hazard is introduced into the area after work begins, additional training will be provided by the UXOSO.

Installation-specific hazard communication training for hazardous chemicals introduced to the site by Malcolm Pirnie will include:

- Properties and hazards (chemical, physical, toxicological) of each hazardous chemical;
- Health hazards, including signs and symptoms of exposure and any medical condition known to be aggravated by exposure;
- Measures employees can take to protect themselves, including: appropriate work practices or methods for proper use and handling, procedures for emergency response, and the proper use and maintenance of PPE, as required;
- Work procedures for employees to follow to protect themselves when cleaning hazardous chemical spills and leaks; and
- Use of the container labeling system and the MSDSs, including where MSDSs are located, how to read and interpret the information on both labels and MSDSs, and how employees may obtain additional hazard communication information.

Installation-specific hazard communications training will also cover hazardous chemicals introduced by other employers and shall emphasize:

- Information about the hazardous chemicals to which Malcolm Pirnie's employees may be exposed;
- An explanation of the labeling system other employers are using;
- Information about the precautionary measures Malcolm Pirnie employees need to take to protect themselves during normal operating conditions and in emergencies; and
- Location of MSDSs for hazardous chemicals brought to the site by other employers.

The UXOSO shall document the training, including the agenda and list of attendees. This subsection of the SSHP and the hazard communication training conducted, as described above, shall be the mechanism for informing other employers planning to be on-site of hazardous chemicals introduced to the site by Malcolm Pirnie.

4.2.4 UXO Awareness Training

The work being conducted for this project at FGGM will involve intrusive operations as they relate to RI activities. These activities will include: relocation, marking, excavation, identification, removal, and disposal of subsurface anomalies. The potential for MEC exists at this site. No one under any circumstances shall touch or move MEC, or items resembling MEC, until it is judged safe to move by the Senior UXO Supervisor (SUXOS). It is anticipated that all MEC items found will be detonated by the Malcolm Pirnie UXO team. All non-UXO qualified personnel will be required to remain in those areas that have been marked as safe for access, or they must be escorted by a qualified UXO Technician. During the initial on-site training, all personnel will receive a MEC briefing by a Malcolm Pirnie UXO Technician. In addition to the initial briefing, each morning and before starting any new tasks all site personnel will receive a tailgate safety briefing. The briefing will include the following:

- Type of ordnance and/or explosive items that have been found in the past or are suspected on-site;
- Number of items that have been found at the project site and in the surrounding area;
- Procedures to follow when MEC is found;
- Safe refuge areas that will be used to retreat from the explosive areas (these safety areas are established based on the size of the explosive item encountered to ensure that no fragmentation reaches that area); and
- Specific steps to take if a non-UXO qualified worker encounters MEC include the following:

Step 1: Make NO attempt to touch, move, uncover, recover, or disturb the MEC item that has been found.

Step 2: Call out to the UXOSO on site. Do not make any quick moves. Wait for the UXOSO and point to identify the object. Wait for direction from the UXOSO. If directed to leave the area, slowly move away from the object by retracing your footprints until you are again on a normally used path. Go immediately to the safe area.

Step 3: The UXOSO will ensure that others in the immediate area are alerted to the possible MEC and advise them to wait in a safe area until the item is inspected and clearly marked.

Step 4: No MEC will be moved or repositioned.

Step 5: The SUXOS will photograph (if possible) and document the item in the daily log.

Specific requirements while working in the area include the following:

- Entry to the area is restricted to daylight hours only;
- Vehicles must remain on roadways, designated jeep trails, or areas cleared by UXO personnel;
- When parked, vehicles must be positioned so that they are pointing toward the site exit;
- Personnel must remain in groups of two or more and remain within arms length of their partners;
- Personnel must maintain clear communications with UXO personnel and have a working knowledge of radio procedures; and
- DO NOT transmit on the radio or other transmitting device when within 35 feet of any ordnance item.

4.3 External Inspections and/or Certifications

In the event that a regulatory agency arrives on site to conduct an inspection, the Malcolm Pirnie PM and one of the following individuals will be contacted immediately:

- USACE on-site support
- USACE PM
- Project Health and Safety Manager
- Vice President and General Counsel
- FGGM Environmental Management Office

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 General Protection Levels

Personnel must wear protective equipment when work activities involve known or suspected radiological or chemical atmospheric contamination; when vapors, gases, or particulates may be generated; or when direct contact with dermally active substances may occur. Respirators can protect the lungs, the gastrointestinal tract and the eyes against air toxicants. Chemical-resistant clothing can protect the skin from contact with skin-destructive and skin absorbable chemicals. Good personal hygiene limits or prevents the ingestion of materials.

Equipment designed to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded, Levels A through D. For this project, it is expected that only Level D PPE will be necessary, and is described below:

- Level D/Modified Level D: Level D should be selected only when there are no respiratory or skin hazards suspected or known to exist at the site. Modified Level D PPE is selected when no respiratory hazards are suspected or known to exist, yet the potential for dermal hazards including contact with contaminated soils, splashes, or immersion exists. If the potential for splashes or immersion exists, coated-type chemical resistant coveralls (such as Saranex) and hard hats with face shields should be selected. If the only dermal hazards that exist are related to soil sampling, a non-coated semi-permeable-type coverall (such as Tyvek) should be selected.

The level of protection selected is based primarily on:

- Types and measured concentrations of the contaminants in the ambient atmosphere and their associated toxicity, and
- Potential or measured exposure to substances in the air or splashes of liquids, or other indirect contact with material, due to the task being performed.

In situations where the types of contaminants, concentrations, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards may be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components outlined in the following subsection are based on the widely used Environmental Protection Agency (EPA) Levels of Protection.

In general:

- All protective headgear shall meet the requirements of the American National Standards Institute (ANSI) Z89.1, Class A or ANSI Z89.2, Class B.
- Personnel will be provided with eye and face protective equipment when machines or operations present potential eye or face injury from physical, chemical or radiological agents. Eye and face protective equipment shall meet the requirements in ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection.
- Persons requiring corrective lenses in eyeglasses, when required by this regulation to wear eye protection, will be protected by one of the following:
 - Eyeglasses whose protective lenses provide optical correction; or
 - Goggles that can be worn over corrective lenses without disturbing the adjustment of the spectacles; or
 - Goggles that incorporate corrective lenses mounted behind the protective lenses.
- If excessive noise levels are encountered, particularly around heavy equipment operation, noise protection shall be provided as appropriate.
- Persons handling rough, sharp-edged, abrasive materials or whose work subjects the hand to lacerations, punctures, burns, or bruises will use general-purpose outer hand protection in addition to the chemical resistant inner and outer gloves, as required.
- Employees will wear clothing suitable for the weather and work conditions. The minimum will be sleeved shirt, long trousers, and protective work boots. Canvas tennis or deck shoes are not acceptable.
- Protective footwear will be worn by all persons who are engaged in the work. Steel-toed boots cannot be worn for the site inspections by personnel using anomaly avoidance and/or geophysical survey equipment since the metal in the shoes will limit the effectiveness of the equipment.
- PPE will be inspected regularly and maintained in serviceable and sanitary condition and, before being reissued to another person or returned to storage, will be cleaned, disinfected, inspected, and repaired.

5.2 Required Level of Protection

Based upon current information regarding the hazard evaluation of the tasks to be completed (see Section 1.1, Scope), the required level of personal protection is Level D. A summary of the Level D PPE requirements can be found in Table 5-1.

Level D

Equipment Requirements for Level D are as follows:

- Coveralls or suitable work uniform;
- Gloves (optional);
- Leather or chemical resistant boots with composite toe (steel toed boots should not be worn if using a magnetometer or other geophysical instrument);
- Safety glasses or chemical splash goggles (optional);
- Hard hat (optional) and face shield (optional if hard hat is employed); and
- Hearing protection.

Table 5-1: Summary of Level D PPE Requirements		
Level	When Required	Equipment
Level D	<p>No contaminants are present or contaminants are present below the action level.</p> <p>Work functions preclude splashes, immersion, or potential for unexpected inhalation of any radionuclides.</p>	<p>Non high-static work shirt and full-length cotton pants or coveralls</p> <p>ANSI standard Z41.4 steel-toed work boots (unless conducting magnetometer operations)</p> <p>ANSI standard Z89.1 hard hat (when working around heavy equipment or overhead “bump” hazards)</p> <p>ANSI standard Z87.1 safety glasses when within 50-ft of brush removal equipment</p> <p>Ear plugs for hearing protection (when working in high noise areas [e.g., vegetation removal equipment and heavy equipment])</p> <p>Reflective safety vests when working around traffic areas</p> <p>Heavy duty leather work gloves (when appropriate)</p>

5.3 Personal Protective Equipment Inspection and Care

Individual articles of a PPE ensemble will be sized to fit the individual wearing it. To provide effective protection during removal and decontamination, PPE will be donned in the reverse order presented in the appropriate decontamination table. Duct tape will be used to seal overlaps

between gloves /boots and the protective clothing, and to reinforce weak seams or tighten the waist of the garment. PPE will be cleaned and maintained in accordance with manufacturer specifications.

5.3.1 Fitting PPE

Proper fit of PPE is critical to providing adequate protection. Proper fit is also associated with comfort and comfort is essential if the employees are to wear the PPE provided. Malcolm Pirnie provides employees with a choice of PPE from several different vendors in a selection of sizes. In training, Malcolm Pirnie discusses and practices proper fitting, use and wear of the PPE.

OSHA believes fit is a critical factor in the overall effectiveness of PPE. PPE that fits poorly will not afford the necessary protection. PPE that is too small will bind and tear; PPE that is too large is harder to manage and can become tangled in equipment presenting additional hazards. Care should be taken to ensure the right size is selected. The user should be fit with the protective device and given instructions on care and use of the PPE. It is very important that employees be made aware of all warning labels for, and limitations of, their PPE.

Adjustment of the PPE should be made on an individual basis, with the goal of achieving a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection used against dust and chemical splashes, to ensure that the devices are sealed to the face. In addition, proper

fitting of helmets is important to ensure that no helmet will fall off during work operations. When manufacturer's instructions are available, they should be followed carefully.

5.3.2 Inspection of PPE

Before use of protective clothing, all personnel shall determine that the clothing material is correct for the specified task at hand. The clothing is to be visually inspected for imperfect seams, non-uniform coatings, tears, and malfunctioning closures. It is to be held up to the light to check for pinholes. It is to be flexed to observe for cracks or other signs of shelf deterioration. If the product has been used previously, it should be inspected inside and out for signs of chemical deterioration, such as discoloration, swelling, and stiffness. During work, the clothing should be periodically inspected for evidence of chemical deterioration, closure failure, tears, punctures, and seam discontinuities.

5.3.3 Damaged PPE

Compromised PPE will not be worn by Malcolm Pirnie employees. When a PPE wearer or their buddy notices that an article of PPE has been compromised, the two will quickly move to the decontamination/support zone to replace or repair the defective article(s).

5.4 PPE Doffing Guidelines

The recommended sequence for removing PPE is as follows:

- Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing;
- Remove outer boots, gloves, and clothing (in that order);
- Remove inner latex/nitrile gloves and cloth liners;
- Wash hands; and
- Discard disposable PPE into a properly labeled container (handled as contaminated waste, when necessary).

6.0 MEDICAL SURVEILLANCE AND EXPOSURE MONITORING

6.1 Medical Surveillance

Malcolm Pirnie personnel who may have potential exposure to hazardous materials will have initial employment, annual, and termination examinations. Medical evaluations will be performed by an approved occupational physician in accordance with Malcolm Pirnie's Medical Monitoring Program. All Malcolm Pirnie field personnel shall be enrolled in Malcolm Pirnie's Medical Monitoring Program, be medically approved to wear respirators, and fit-tested in accordance with OSHA requirements, if respirator use is anticipated. Subcontractors are also required to meet medical surveillance requirements for this project.

Purpose - The purposes of the medical evaluation are to: 1) determine fitness for duty on hazardous waste sites and 2) establish baseline data for future reference. Such an evaluation is based upon the employee's occupational and medical history, a comprehensive physical examination, and an evaluation of the ability to work while wearing protective equipment. The medical examinations include an evaluation of the workers' ability to use respiratory protective equipment according to protocol published in 29 CFR 1910.134.

Supplemental Examinations - Supplemental examinations may be performed whenever there is an actual or suspected excessive exposure to chemical contaminants or upon experience of exposure symptoms or following injuries or temperature stress.

7.0 EXPOSURE MONITORING AND AIR SAMPLING

It is not anticipated that there will be chemical exposures that would require air monitoring. Potential chemical hazards are from discrete, identifiable sources, such as oil or cleaning substances used as part of the work. Biological and explosive hazards will be monitored visually. Monitoring is not required for this project and will be addressed as a task specific evolution in the event of a scope of work change.

7.1 Radiological Monitoring

Radiological monitoring is not a part of this project nor are the site workers trained to handle this situation. In the event that any potential radiological devices are discovered, personnel are to withdraw from the area until radiological devices are removed until radiation safety deems the site not to be a radiation hazard

7.2 Noise

A sound level meter, operating in the dBA slow response mode, will be used to monitor noise levels when personnel are working near heavy equipment. Site workers will wear hearing protection when sustained noise levels exceed 85 decibels. In addition, all Malcolm Pirnie personnel must undergo initial employment and annual examinations (as well as employment termination examinations), during which a hearing test is conducted.

8.0 HEAT AND COLD STRESS MONITORING

8.1 Heat Stress Monitoring

Whenever feasible, the level of protection established for workers will be based upon quantitative determinations of the radiological and chemical agents and physical stresses present in the work environment. It is proposed that work will be conducted during the colder fall and winter months; however, the schedule may change and work may be conducted during the warmer spring/summer/fall months. Therefore, heat exposure is an issue of concern.

Heat stress is probably one of the most common and potentially serious illnesses at hazardous waste sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. The effects of heat stress can range from mild symptoms, such as fatigue, irritability, and decreased mobility, to death. The body's response to heat stress includes the following:

Heat Rash: A result of continuous exposure to heat and humidity, heat rash decreases the body's ability to tolerate heat.

Heat Cramps: A result of profuse perspiration with inadequate fluid intake and chemical replacement, heat cramps are signaled by muscle spasms and pain in the abdomen and the extremities.

Heat Exhaustion: A result of increased stress on various organs. The signs of heat exhaustion include shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.

Heat Stroke: The most severe form of heat stress, heat stroke must be relieved immediately to prevent severe injury or death. The signs of heat stroke are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma. The body must be cooled and medical attention sought immediately.

Measures to prevent heat stress include regular work breaks during field activity, regular fluid replenishment, and the availability of shelter (i.e., shaded area). All personnel will be made aware of the symptoms of heat stress. Should one or more symptoms be detected, the affected worker will be assisted to seek shade, drink plenty of fluids, and seek medical attention, if required.

Several screening techniques can be used to detect early warning signs of heat stress. The following method, based on body temperature measurements, is simple and straightforward and may be conducted by the UXOSO. Body temperature may be measured with a digital-readout clinical ear thermometer with disposable tips.

Body temperature may be measured for three minutes with an ear thermometer at the end of each work period and before drinking. Temperature at the end of the work period should not exceed 99.6°F. If the temperature does exceed 99.6°F, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. If the temperature exceeds 99.6°F at the beginning of the next rest period, however, the following work cycle should be further shortened by 33%. Temperature should be measured again at the end of the rest period to make sure that it has dropped below 99.6°F. No worker may be permitted to continue wearing semi-permeable or impermeable garments when his/her temperature exceeds 100.6°F.

8.2 Cold Stress Monitoring

Whenever feasible, the level of protection established for workers will be based upon quantitative determinations of the radiological and chemical agents and physical stresses present in the work environment. It is proposed that work will be conducted during the colder fall and winter months; therefore, cold exposure is an issue of concern.

Cold stress can result from cold temperatures, high or cold wind, dampness, and cold water. The potential for cold stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. A cold environment forces the body to work harder to maintain its temperature. The body's response to cold stress includes the following:

Hypothermia: means “low heat” and can be a very serious medical condition. Hypothermia occurs when heat is lost from the body faster than it is replaced. Certain medications may prevent the body from generating heat normally, and thus can increase the potential for the onset of hypothermia. They include anti-depressants, sedatives, tranquilizers, and some heart medications. Below is a brief discussion of the signs and symptoms for the three types of hypothermia that can ensue: mild, moderate, or severe.

- **Mild** – shivering, lack of coordination, slurred speech, memory loss, and cold skin are symptoms of mild hypothermia. For proper treatment:
 - Move to a warm area and stay active.
 - Remove wet clothes and replace with dry clothes or blankets (be sure to cover head).
 - Drink warm, sugary drink.

- **Moderate** – once hypothermia has progressed to moderate, shivering stops and the inability to walk or stand sets in, along with irritability and confusion. For proper treatment, follow all of the above along with:
 - Call 911 for an ambulance.
 - Cover all extremities completely.

- Place very warm objects, such as hot packs or water bottles, on the victim's head, neck, chest and groin.
- **Severe** – severe muscle stiffness, extreme fatigue, and ice cold skin are symptoms of severe hypothermia, possibly resulting in death. For proper treatment:
 - Call 911 for an ambulance.
 - Treat the victim very gently and do not attempt to warm them, as this should be done by trained medical professionals.

Frostbite: occurs when the body's skin actually freezes and loses water. This condition usually results from temperatures at or below 30 degrees Fahrenheit (°F); however, wind chills can create frostbite at above freezing temperatures. Frostbite typically occurs with the body's extremities (i.e., hands and feet), and can result in the need for amputation in severe frostbite cases. Symptoms include: cold, tingling, stinging, or aching feeling in the frostbitten area, followed by numbness; skin color goes from red to purple to pale or white, and is cold to the touch; and in severe cases, blisters occur. For proper treatment of frostbite:

- Call 911 for an ambulance.
- Wrap in soft cloth, but do not rub the area.
- If help is delayed, immerse affected area in warm water.

Trench foot: or immersed foot, can occur when feet are immersed in cold water for long periods of time. This condition is quite similar to frostbite; however, it is considered much less severe. Symptoms may include: tingling, itching, or burning, and occasionally blisters. For treatment, soak the affected area in warm water and wrap with dry bandages or a blanket. Measures to prevent cold stress include regular work breaks during field activity, regular fluid replenishment (preferably cold *and* hot fluids), and the availability of shelter (i.e., warm, non-breezy area). All personnel will be made aware of the symptoms of cold stress.

Several screening techniques can be used to detect early warning signs of cold stress. The following method, based on body temperature measurements, is simple and straightforward and may be conducted by the UXOSO. Body temperature may be measured with a digital-readout clinical ear thermometer with disposable tips.

Body temperature may be measured for three minutes with an ear thermometer at the end of each work period and before drinking. Temperature at the end of the work period should not fall below 98°F. If the temperature does fall below 98°F, then actions needs to be taken to treat the relative form of hypothermia, as mentioned above.

9.0 STANDARD OPERATING PROCEDURES FOR SAFETY

9.1 Safe Work Practices

A range of physical and explosive hazards exist that must be understood by all field personnel assigned to work on-site. At a minimum, the safe work practices to be followed at the site shall include:

- The number of personnel and equipment on the site shall be minimized, consistent with effective site operations.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers). In addition, the field team will be required to carry two-way radios and have access to a cellular phone.
- Because of potential safety issues associated with abandoned and/or uninhabited buildings, site workers must stay within their designated work areas. No one should enter restricted access areas without being accompanied by the UXOSO.
- Site activities will be performed to minimize dust production and soil disturbance.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, the need for decontamination, and cross contamination.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer of contaminated material, is strictly prohibited in the work area outside the designated clean zone.
- Medicine and alcohol can potentate the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the contractor or subcontractor occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during site work activities.
- When it is necessary for a visitor to observe the fieldwork, that person will be issued appropriate PPE, briefed on potential hazards, safety practices, decontamination procedures and site communications. All site visitors must supply respiratory equipment and proof of training/fit testing to the UXOSO or designee when use of respiratory PPE is anticipated.
- All employees have the obligation to correct or report unsafe work conditions.
- The Senior Unexploded Ordnance Supervisor (SUXOS) will have ultimate responsibility for all MEC avoidance operations. The Project Manager will ensure that all MEC operations are performed in accordance with this SOP (Attachment 2).

9.2 Dig Sheets

FGGM requires a dig permit prior to disturbing ground and USACE requires a utilities risk form prior to starting work. Dig sheets are found in Attachment 3

10.0 SITE CONTROL MEASURES

10.1 General

A daily log containing the names of personnel, site entry and exit times, and their levels of personal protection shall be maintained.

10.2 Site Control

Site Control is necessary to prevent unauthorized, untrained, or unprotected personnel or visitors from being exposed to the various hazards associated with the site. Level D or greater PPE will be observed at all times during the performance of field activities. Personnel performing field activities will always use the buddy system while at the site. If separation is absolutely necessary, a communication device such as cellular phone or radio will be required unless its use is restricted due to safety. Other site control measures may include the following:

- Requiring all personnel and visitors to sign in and out on the Personnel Visitor Daily Roster.
- Requiring all site visitors to receive prior approval from the FPM. Visitors will be allowed on-site solely for the purpose of observing site conditions or operations. Upon arrival, visitors will report to the FPM or UXOSO, where he/she will receive and sign the Visitor Health and Safety Form. Visitors may not enter controlled work areas without producing documentation that training and medical requirements have been met. Visitors must be escorted in MEC areas by a UXO Technician.

10.3 Work Zones

The specific location of work zone boundaries shall be determined jointly by the FPM, the UXOSO or designee, and the Subcontractor prior to field mobilization. Decontamination of personnel will be performed as outlined in Section 10.0 before entering the site. Only personnel who are essential to the completion of the planned work will be allowed access to work areas, if they are wearing the prescribed level of protection.

11.0 DECONTAMINATION PROCEDURES

11.1 Personnel Decontamination

The decontamination procedures for this project will consist of a soap and water wash prior to eating, smoking, or drinking. The project should not involve any direct personal exposure to any hazardous materials. Only materials that are not hazardous or are not regulated by the Resource Conservation and Recovery Act (RCRA) will be used to prevent the generation of mixed waste. Contaminated personnel shall be decontaminated using materials such as waterless hand cleaner and paper towels or rags, whenever possible, to minimize waste volumes. Good house keeping procedures, as well as a common sense approach will be practiced during the project.

11.2 Equipment Decontamination

An equipment decontamination station shall be set up for equipment to be decontaminated when exiting the project site, if necessary. Procedures will be similar to procedures for personnel decontamination in Section 11.1.

12.0 EMERGENCY EQUIPMENT AND FIRST AID

12.1 Emergency Equipment

Emergency equipment will be readily accessible and distinctly marked. Malcolm Pirnie and subcontractor personnel will be familiar with the location and trained in the use of emergency equipment. The following emergency equipment/supplies will be maintained on-site: first aid kit, portable eye wash bottles, blanket or visqueen, and compressed air horn. A minimum of two personnel trained in first aid/ CPR will be available on site during working hours.

12.2 First Aid Kits

- First Aid Kits will conform to Red Cross requirements and the requirements of 29 CFR 1910.151.
- First Aid Kits shall consist of a weatherproof container with individually sealed packages for each type of item.
- First Aid Kits will contain an eye wash.
- First Aid Kits will be fully equipped before being sent to the site. Kits will be checked weekly by the UXOSO or designee and expended items will be replaced.
- First Aid Kits will be carried in the field vehicles, distinctly marked, and readily accessible.

13.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

13.1 Pre-Emergency Planning

The UXOSO or designee shall implement this emergency response plan whenever conditions at the site warrant such action. The UXOSO will be responsible for assuring the evacuation, emergency treatment, and emergency transport of site personnel, as necessary, and notification of emergency response units and the appropriate staff.

The UXOSO or designee will inform the local fire department about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants.

13.2 Personnel Roles, Lines of Authority, and Communication

Working on former training areas requires that site personnel be in constant communication via two-way radios with each other. All work that involves potential exposure of personnel to explosive hazards or MC requires the use of the buddy system. The responsibilities of workers utilizing the buddy system include:

- Providing his/her partner with routine and emergency assistance;
- Observing his/her partner for signs of chemical exposure or heat stress;
- Periodically checking the integrity of his/her partner's PPE; and
- Notifying others if emergency help is required.

Successful communication is essential to ensure the safety of each employee/visitor. The hand signals in _____ will be used on the job site.

Table 13-1: Hand Signals	
Signal	Definition
Hands clutching throat	I cannot breathe
Hands on top of head	Need assistance
Thumbs up	I am OK; affirmative
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately
Horn - one long blast	Evacuate site
Horn - two short blast	All clear, return to site

13.3 Adverse Weather Conditions

In the event of adverse weather conditions, the UXOSO or designee will determine if work can continue without sacrificing the health and safety of site workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for cold stress;
- Inclement weather-related working conditions such as major storms or hurricanes;
- Limited visibility; and
- Potential for electrical storms.

13.4 Decontamination and First Aid

If any personnel have been directly exposed to chemicals or contaminants of concern, follow the procedures outlined below:

- Dermal: Decontaminate and provide medical attention. If necessary, transport to the nearest medical facility.
- Inhalation: Move to fresh air and, if necessary, transport to the nearest medical facility.
- Ingestion: Decontaminate and transport to the nearest medical facility.

A standard Malcolm Pirnie Accident Investigation Report will also be filled out.

13.5 Serious Medical Emergency

In the event of a serious medical emergency, refer to Attachment 2 which includes the following:

- Route to medical facility;
- Maps to medical facility; and
- Emergency numbers.

13.6 Material Safety Data Sheets

MSDSs for hazardous chemicals introduced to the site by Malcolm Pirnie and their subcontractors will be present at the site, for review by all on-site personnel.

14.0 EMERGENCY RESPONSE PLAN

14.1 Operations Requiring the Use of a Hazardous Substance

The only hazardous materials expected to be used on-site at any time include a day's supply of gasoline (approximately 3 gallons) and oil (approximately 1 quart) required for brush clearing equipment.

14.2 Pre-Planning and General Procedures

In the event of an emergency associated with the project activity, the UXOSO shall: 1) take immediate, diligent action to minimize the cause of the emergency; 2) alert the FPM and applicable personnel; and 3) institute measures necessary to prevent any repetition of the emergency. Emergency contact names, telephone numbers, and hospital route maps must be posted in the work area and/or support vehicle. At the beginning of project operations, the FPM and UXOSO will become familiar with the emergency route(s) and the travel time required. These procedures shall be thoroughly discussed in the initial "kick-off" briefing and in daily "tailgate" safety meetings. A cellular telephone, fully charged, will be available for any emergency.

Emergency Coordinator

The emergency coordinator (EC) will normally be the FPM or the UXOSO, with the others providing assistance as directed. First aid and rescue duties will be shared between qualified team members. The EC will contact emergency response agencies and serve as the primary point of contact when they arrive.

Emergency Services

The EC must pre-determine the location and availability of the emergency facilities and services. Medical transport may be via ambulance or life flight, depending on response times and/or weather conditions.

Emergency Equipment

The following emergency equipment/supplies will be maintained on-site: first aid kit, portable eye wash bottles, blanket or visqueen, and compressed air horn.

The emergency and first-aid equipment will be stored in an immediately accessible area (e.g., in the staging area) and will be protected from the elements. The UXOSO will inspect the emergency equipment at the beginning of each field event and periodically thereafter.

14.3 Personnel Roles, Lines of Authority, and Communication

Working on former training areas requires that site personnel be in constant communication via two-way radios with each other. All work that involves potential exposure of personnel to

explosive hazards or MC requires the use of the buddy system. The responsibilities of workers utilizing the buddy system include:

- Providing his/her partner with routine and emergency assistance;
- Observing his/her partner for signs of chemical exposure or heat stress;
- Periodically checking the integrity of his/her partner's PPE; and
- Notifying others if emergency help is required.

14.4 Emergency Recognition and Prevention

As part of the initial installation-specific health and safety briefing, the UXOSO and the FPM will address emergency recognition and prevention. Topics will include hazard recognition regarding tasks to be performed, in addition to hazards associated with site contaminants. Other topics relating to emergency recognition and prevention are mentioned in other chapters of the SSHP.

14.5 Evacuation Procedures/Safe Distances

Evacuation procedures will occur at three levels: (1) withdrawal from immediate work area (100 feet or more upwind); (2) site evacuation; and (3) evacuation of surrounding area. Anticipated conditions that require these responses are described in the following subsections. If site evacuation is required, all field team members will be notified by the UXOSO.

Withdrawal Upwind

Withdrawing upwind (100 feet or more) will be required when: (1) ambient air conditions contain greater contaminant concentrations than guidelines allow for the type of protection being worn (the work crew may return after donning greater protection and/or assessing the situation as transient and past) or (2) a breach in protective clothing or minor accident occurs.

The work crew will observe general wind directions while on-site. Upon observing conditions that warrant moving away from the work site, the crew will relocate upwind a distance of approximately 100 feet or farther. The CHSR, FPM and the Baltimore District Project Manager will be notified if a condition exists to withdraw. When access to the site is restricted and escape is thereby hindered, the crew may be instructed to evacuate the site rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes.

Site Evacuation

Evacuation of the site will be required when: (1) ambient air conditions contain explosive and persistent levels of combustible gas, excessive levels of toxic gases, or excessive dust; (2) a fire or major collapse occurs; or (3) explosion is imminent or has occurred.

After determining that site evacuation is warranted, the UXOSO will notify the work crew of site conditions and the work crew will proceed upwind of the work site. If the decontamination area is upwind and more than 500 feet from the work site, the crew will pass quickly through the decontamination area to remove contaminated outer suits. As more facts are determined from the field crew, they will be relayed to the appropriate agencies by the UXOSO and/or FPM.

The gathering point for this site will be at the Environmental Management Office, located at 2-1/2 St. and Ross Rd. Any modifications to the evacuation route or gathering point will be discussed at the tailgate safety meetings.

Surrounding Area Evacuation

The area surrounding the site will be evacuated when an explosive hazard is imminent.

14.6 Site Security and Control

A daily log containing the names of personnel, including site entry and exit times and their levels of personnel protection, shall be maintained by the UXOSO or designee. Site security may involve the use of security guards to protect equipment or field personnel during investigation activities.

After a site evacuation, the UXOSO or designee will take a “head count” to match against the Employee/Visitor Daily Roster; search/account for missing persons; notify the emergency crews (as applicable); and limit access into the hazardous area to only necessary rescue and response personnel to prevent additional injury and possible exposures. Work shall not resume until all hazard control issues are resolved to the satisfaction of the FPM and UXOSO.

14.7 Decontamination

The project should not involve any direct personal exposure to any hazardous materials. Only materials that are not hazardous or are not regulated by the Resource Conservation and Recovery Act (RCRA) will be used to prevent the generation of mixed waste. Contaminated personnel shall be decontaminated using materials such as waterless hand cleaner and paper towels or rags, whenever possible, to minimize waste volumes. Good house keeping procedures, as well as a common sense approach will be practiced during the project.

14.8 Fire or Explosion

In case of fire or explosion, sound the emergency alarm (using the radio) and contact the facility Fire Department for outside assistance, regardless of the size of the incident. The FPM or UXOSO will evacuate all non-response personnel and visitors to the designated safe area/gathering point and conduct a head-count. Only trained Emergency Crews will handle a large-scale or potentially unmanageable incident. The FPM and/or UXOSO will direct the off-

site responding agencies to the site and will provide them with the site map and a hazard briefing. The FPM and/or UXOSO will complete an Incident Report for submittal to the CHSR.

14.9 Spill Containment Plan

The only hazardous materials expected to be used on-site at any time include a day's supply of gasoline (approximately 3 gallons) and oil (approximately 1 quart) required for brush clearing equipment. All liquids will be kept in a secondary containment when not in use. The following initiatives will be implemented upon observing a spill of any size.

14.9.1 Isolation

Responding personnel will don the proper PPE (according to the MSDS) and mitigate the spill as necessary. Until determined otherwise, any unidentified spilled material will be assumed to be hazardous. Sources of ignition within 50 feet will be extinguished immediately or de-energized (including vehicle engines).

Employees who have had contact with the spilled materials will report immediately to the decontamination area and undergo decontamination consistent with the extent and nature of the contact.

14.9.2 Notification

The UXOSO will be notified as soon as possible of the location, size, and nature of a spill and make additional notifications, as deemed necessary. As the quantities used on site will be limited, emergency conditions and rescue situations are not expected.

14.9.3 Identification

An attempt will be made to identify spilled material to the extent possible through container markings, physical properties of the material, and other available evidence. When doubt exists as to the material's identity, it will be presumed to be hazardous until proven otherwise. Actions will be carried out as though the spill is flammable (presumed gasoline).

14.9.4 Delineation of Spill Area

The spill area will be determined and documented, noting area of contamination. The quantity of the material spilled will be estimated and the basis for the estimate will be noted (i.e., remainder in container, direct observation of the spill in progress, etc.). The area will be marked with stakes, barrier tape or other means as appropriate.

14.9.5 Containment

Containers will be oriented in an upright position to stop the flow of liquids. Although the limited quantities on site will likely be absorbed immediately, surrounding soil, booms, loose sorbent, sorbent pads, or other materials may be used as appropriate to build a dike or berm around the spilled materials. Due to the limited quantities on site, excessive vapors are not expected; however, sorbent pads with impervious backing may be laid over the spill.

14.9.6 Cleanup of Hazardous Materials

Damaged containers will be double-bagged and replaced. Saturated sorbents, soil, spill-control pads, and other spill control material will be collected and double-bagged. Contaminated tools and equipment will subsequently be decontaminated and/or appropriately discarded.

14.9.7 Restoration

Final cleanup of the spill area, which may include post cleanup environmental sampling, will be a function of the following:

- The identity and quantity of the spilled material.
- The physical location of the spill.
- The requirements imposed by regulatory agencies.

14.9.8 Replenishment and Salvage

After an emergency, prompt replenishment of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses.

14.9.9 Community Alert Program

The limited quantities of hazardous materials on-site do not warrant a community alert program.

15.0 EMERGENCY RESPONSE TEAM

In the event of an emergency associated with the project activity, an Emergency Response Team (ERT) shall be prepared beforehand, comprised of, at minimum, the FPM and the UXOSO. The responsibilities of the UXOSO include: 1) take immediate, diligent action to minimize the cause of the emergency; 2) alert the FPM and applicable personnel; and 3) institute measures necessary to prevent any repetition of the emergency. Emergency contact names, telephone numbers, and hospital route maps must be posted in the work area and/or support vehicle. At the beginning of project operations, the FPM and UXOSO will become familiar with the emergency route(s) and the travel time required. The UXOSO will inspect the emergency equipment at the beginning of each field event and periodically thereafter.

First aid and rescue duties will be shared between qualified team members. The EC will contact emergency response agencies and serve as the primary point of contact when they arrive. The FPM must pre-determine the location and availability of the emergency facilities and services.

At a minimum, ERT personnel at the facility or construction project shall be trained to the “First Responder Operations Levels” specified in 29 CFR 1910.120 (q)(6)(ii). Response above and beyond defensive requires additional training and highly qualified supervision under 29 CFR 1910.120(q) and 29 CFR 1926.65(q) and must be specified on a project specific basis.

16.0 CONFINED SPACE ENTRY

There are no permit-required confined spaces anticipated for this project. If an area is suspected to be a confined space, the FPM shall halt work in the affected area and notify the project team that this area is not to be entered until it is no longer considered a confined space.

17.0 RECORD KEEPING

Record keeping will include Medical Surveillance Reports, Training Records, Site Safety and Health Plans, and Incident Reports. In addition, records of meetings on health and safety matters will be prepared by the UXOSO and maintained by the CHSR.

17.1 Medical Surveillance Report

The employer or the employer's medical center will maintain the original medical monitoring record. The 29 CFR 1910.20 requires retention of medical records until termination of employment plus 30 years. The employer shall maintain a copy of the employee's Disclosure Agreement and Physician's Statement.

17.2 Personnel Training Records

Personnel health and safety training records are maintained to document personnel qualifications and capabilities and to demonstrate compliance with company training requirements. Each training session will be documented by a training report. The UXOSO will prepare the report and include the date of training, location, a list of attendees, and a description of the material covered. The original report will be filed with the CHSR. Copies of CPR/first aid training certificates will be retained.

17.3 Accident Reporting

In case of environmental incidents, fires, property damage, power disruption, or mandated work "shut-downs" (e.g., following storms, equipment failure), the UXOSO will complete and transmit an Incident Report to the FPM. Any damage, loss, or theft of government property (e.g., items/tools/equipment purchased for the contract) will be reported via an Incident Report or equivalent. This information will be provided to the Baltimore District Project Manager and Installation Point of Contact. Damage, loss, or theft of company property will be reported to:

Laura Lee-Casey
Sr. Health & Safety Specialist
Cell 914-557-0004
Office 914-641-2707

Gerard Cavaluzzi
General Counsel
Cell 914-843-3158
Office 914-641-2950

17.3.1 Incident Summary

The UXOSO will provide to the Project Health and Safety Manager and USACE a monthly incident summary. The summary will include the person-hours worked during the month and a list of incidents.

17.3.2 Incident Investigation, Reports, Logs

All incidents are reported immediately to the Supervisor. Incidents include:

- OSHA Recordable Injuries or Illnesses (e.g., medical treatment beyond first aid);
- Any injuries to authorized visitors;
- Fires and explosions of any magnitude;
- Spills and environmental releases;
- Tool or equipment failure which results or could result in serious injury; and
- Any event, which under slightly different circumstances, could have resulted in one of the above.

The SUXOS, with the assistance of the UXOSO will investigate the incident and complete all necessary incident reports and logs, including the MPI Incident Report and client or regulatory agency reports.

All incidents, regardless of severity, require some type of investigation and corrective action. Immediate and basic causes will be identified and evaluated, and used to support the recommended corrective actions.

A project-specific log of Work-Related Injuries and Illnesses) will be kept at the job site. Minor injuries requiring only first aid will be recorded on a project-specific First Aid Log. From February 1 through April 30 of each year, Form 300A (Summary of Work-Related Injuries and Illnesses) will be posted on the project Safety and Health Bulletin Board.

17.3.3 Immediate Notification of Major Accidents

The USACE representative will be verbally notified immediately and will receive a written notification within 24 hours for incidents. The written report will be submitted on the USACE Form 3394. USACE Forms can be found at the following web site: The following should be notified:

Laura Lee-Casey
Sr. Health & Safety Specialist
Cell 914-557-0004
Office 914-641-2707

Gerard Cavaluzzi
General Counsel
Cell 914-843-3158
Office 914-641-2950

17.3.4 Near Miss Reporting

Near-miss incidents that do not result in injury must also be recorded and investigated for accident prevention purposes. The FPM/UXOSO will submit completed Incident Reports to the CHSR.

17.4 Daily Reporting

Malcolm Pirnie will develop, retain, and submit, as part of the final report, all visitor registration logs, training logs, and daily safety inspection logs (as part of the daily QC Reports).

17.5 Subcontractor Reporting

The field supervisor of each subcontracting crew will investigate and complete an accident report that specifies preventive measures in accordance with their internal company policy. The FPM will ensure that this report is transmitted to the CHSR within 24 hours of a significant mishap and eight hours of a serious mishap. The UXOSO will record the event on the project Accident/First-Aid Incident Summary Log.

Subcontractor crews will be responsible for attending daily safety meetings. An example of Malcolm Pirnie's Site Safety Tailgate Meeting form is provided in Attachment 1.

17.6 Additional Documents

In addition to the SSHP, the following documents may also be prepared, as necessary, depending on site conditions and circumstances:

- Site Health and Safety Meeting Reports - will be documented in the field binder that becomes part of the permanent project file. Telephone conversation records on health and safety decisions will be retained.
- Site Health and Safety Follow-up Report - will be completed by the FPM after completing work covered by the SSHP. This report is an internal document only and will be maintained by the CHSR.
- Health and Safety Audits - The CHSR or his/her designee will periodically audit field activities to determine compliance with the SSHP.

Enclosure 1: Field Forms

SITE SAFETY AND HEALTH FORMS

The following forms are to be used as instructed by the UXOSO during site operations:

- Health & Safety Plan Compliance Agreement Form
- Health and Safety Site Inspection Form
- Non-Compliance Report
- Daily Excavation / Trench Inspection Form
- Incident Report for Malcolm Pirnie, Inc. Personnel
- Incident Report Involving Contractors or Other Non-Malcolm Pirnie Personnel or Property
- First Aid Log
- Daily Safety Meeting Sign-In Sheet
- Medical Data Sheet
- Visitor Roster

	Malcolm Pirnie Inc	HEALTH & SAFETY PLAN Compliance Agreement Form
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PROJECT NAME: _____

You are entering a hazardous waste/construction site. Unprotected exposure to hazardous chemicals can cause mild to serious health effects. Heavy equipment operations and other inherently dangerous work is underway. You will remain with your designated escort at all times and follow their instructions for your safety and the safety of others. Minimum requirement for personal protective equipment is Level D protection (hard hat, ANSI-approved safety footwear, and safety glasses). Equipment issued must be returned prior to leaving the site.

VISITOR'S CERTIFICATION

I acknowledge that I have been advised of the dangers present at this hazardous waste site facility. I agree to immediately follow all directions given by my escort on site. I also certify that I do relieve MPI, the U.S. Government, the applicable state in which the project site is located, their officers, employees, and agents of all liability of all consequences raising from and related to the potential hazards associated with entry to this site.

PRINT NAME

SIGNATURE

DATE

 <p>MALCOLM PIRNIE <small>INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS</small></p>	<p>Malcolm Pirnie Inc</p>	<p>HEALTH AND SAFETY SITE INSPECTION FORM</p>
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Project:

Date:

Area(s) Inspected:

Inspection Type: Daily Weekly Monthly Corporate Other: _____

Inspector's Name

Affiliation

Inspector's Name

Affiliation

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
EQUIPMENT			
Daily Inspection Checklists (Heavy Equipment)	W		
Hand Portable Tools Inspections	W		
Machine/Equipment Guarding	W		
GFCI in use	W		
3-prong ext. cords, not damaged	W		
FALL PROTECTION/SCAFFOLDING Must be inspected daily when activity is ongoing.			
Anchorage, body belt, lanyard	D		

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Less than 6 feet of freefall	D		
Guardrails	D		
Protection from falling objects	D		
Daily scaffold inspections	D		
HOISTING & RIGGING Must be inspected daily when activity is ongoing.			
Ordinary/Critical Lift Forms Used	D		
Competent Person Signoff	D		
Condition of Chains / Slings	D		
Properly Rated Chains / Slings	D		
EXCAVATION & TRENCHING ACTIVITIES Must be inspected daily when activity is ongoing. See detailed "Trench/Excavation Inspection"			
Excavation Control Measures	D		
Inspections by Competent Person	D		
Entrance / Exit / Ladders	D		
Air Monitoring	D		
Warning Signs / Fences in place	D		
Shoring / Shielding	D		
Spoil Piles 2 Feet from Edge	D		
HAZARD CONTROLS			

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Lockout/Tagout Systems	As needed		
Site Control (EZ, CRZ, SZ)	D		
Decontamination Procedures (equip and personnel)	W		
Safety Awareness/Warning Signage	M		
Site Security	M		
PERSONAL PROTECTIVE EQUIPMENT			
Hearing Protection	D		
Respiratory Protection / Storage	D		
Head Protection	D		
Foot Protection	D		
Eye Protection	D		
Hand Protection	D		
Body Protection	D		
MATERIALS			
Storing of Compressed Gases	W		
Storing of Flammable Liquids	W		
Area Free of Combustibles	W		
Housekeeping of Storage Room	W		
EMERGENCY SYSTEMS			
Fire Extinguisher Availability / Inspections	M		
Eye Wash & Shower	W		
First Aid Kits, First Aid Log	W		
Spill Containment Supplies	M		

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Emergency Instructions	M		
Appropriate Communications Available	W		
GENERAL WORKPLACE			
Housekeeping	W		
Noise Exposure	W		
Lighting/Illumination	M		
Field/Office Ergonomics	M		
Roadways / Traffic Control	W		
Sanitation / Toilet / Wash Facilities	M		
HAZARD COMMUNICATION			
List of Hazardous Materials	M		
Hazardous Materials Labeling	M		
Material Safety Data Sheets	M		
Employee Training	M		
RECORDKEEPING			
OSHA Postings	M		
Employee Safety Training	W		
Medical Surveillance Program	M		
Site Safety & Health Plan Sign-off	M		
Exposure Monitoring Records	M		
Daily Tailgate Safety Meetings	W		
Visitors Sign-Off	M		
Accident Investigation Reports	M		
Hazwoper Training Documentation	M		

CATEGORY	Freq.	Observations / Recommendations (N/A if not applicable)	Corrective Action Completed (Name/Date)
Workers' Compensation Claims (Please indicate claimant's name/date of incident)	M		
OTHER			
Safety Field Logbooks	W		

Note: This form is only a guide for evaluation of workplace hazards. It is not intended to be inclusive, and inspection frequency may vary based on job conditions. Use of the form is optional for Daily Inspections. Corrective actions taken during Daily Inspections should be noted in the safety field logbook. Monthly includes weekly, weekly includes daily.

 <p>INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS</p>	<p>Malcolm Pirnie Inc</p>	<p>NON-CONFORMANCE REPORT</p>
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Contract No. _____ CTO No. _____

NCR Number:	Project Name and Number:	Date:	Page of
<p>Nonconformance Description (include specific requirement violated):</p> <p>Identified by: _____ Date: _____</p>			
<p>Root Cause of Nonconforming Action:</p> 			
<p>Corrective Action(s) to be Taken (include date when action(s) will be complete):</p> <p>To be Performed by: _____ Date: _____</p>			

<p>Action(s) to be Taken to Preclude Recurrence:</p> <p>To be Performed by: _____ Date: _____</p>	
<p>Acceptance by:</p> <p>Project Manager: _____ Date: _____</p> <p>UXOSO : _____ Date: _____</p>	
<p>Corrective Action(s) Completed by and Date:</p>	<p>Verification Completed by and Date:</p>

	<p>Malcolm Pirnie Inc</p>	<p>DAILY EXCAVATION / TRENCH INSPECTION</p>
Location: _____ Date: _____ Time: _____		
<p>A daily inspection of each excavation / trench is required before the start of each shift involving work at that location; after every rainstorm; after other events that could increase hazards (snowstorm, rain, windstorm, thaw); when fissures, cracks, or sloughing occur; when there is a change in the size, location, or placement of the spoil pile; throughout the shift as needed; and prior to any individuals entering the excavation / trench.</p>		
Observation/Issue	Y / N / NA	Comments/Required Action
Has it rained or snowed since the last inspection?		
Are the sidewalls intact?		
Are there tension cracks in the sidewalls, slopes, or surfaces adjacent to the excavation?		
Are there creaking or popping sounds?		
Is equipment located a safe distance from the excavation?		
Has equipment caused sloughing of surface soils?		
Is there evidence of:		
Changes in wall slope?		
Bulges?		
Sloughing of soils?		
Seepage and piping of fine soils?		
Boiling of trench bottom?		
Is there standing water or water accumulation?		
Will personnel be entering the excavation?		
Is the excavation properly shored or benched for personnel protection?		
Are proper entrances and exits provided?		

Has the excavation been monitored for hazardous conditions? (Conduct periodic monitoring as directed by site safety officer.)		
Competent Person / Inspector's Signature: _____ Date _____		

SITE SAFETY TAILGATE MEETING



PROJECT NAME:		CLIENT NAME:	USACE BALTIMORE
PROJECT NUMBER:		FIELD PROJECT LEADER:	
PREPARED BY:		DATE:	
ON-SITE SAFETY MEETING RECORD			
LOCATION:			
TASK TO BE PERFORMED:			
I. Purpose for meeting: (check all that apply)			
	DAILY SAFETY BRIEFING		
	<i>Begin New Task. Task: Windshield Tour</i>		
	<i>Periodic Safety Meeting</i>		
	<i>New Site Procedures</i>		
	<i>New Site Conditions / Information</i>		
	<i>New Site Workers</i>		
MEETING ATTENDEES:			
NAME (Print)	SIGNATURE	COMPANY	

ON-SITE SAFETY MEETING RECORD

II. Topic (check all that apply)

	Site Safety Personnel		Hazard Communication
	Work Area Description		On-site Emergency
	Site Characterization		On-site Injuries
	Equipment Hazard(s)		Evacuation Procedures
	Biological Hazard(s)		Rally Point
	Chemical Hazard(s)		Emergency Communications
	Physical Hazard(s)		Directions to Hospital
	Heat Stress		Emergency Equipment
	Cold Stress		Unexploded Ordnance (UXO)
	Site Control		
	PPE		
	Safe Work Practices		
	Decontamination		
	Emergency Response		

III. Remarks:

V. Verification

I certify that the personnel listed on this roster received the briefing described above. Site personnel not attending this meeting will be briefed before beginning their assigned duties.

Field Project Manager Date

UXO Safety Supervisor Date

		Malcolm Pirnie Inc		WORKPLACE INCIDENT / ILLNESS REPORT	
1. Completed By:		2. Title:		3. Telephone #	
				4. Date:	
5. Office Location:		Office Address:			
INFORMATION ABOUT THE INJURED EMPLOYEE					
6. Employee Name:		7. Employee #	8. Social Security:		9. <input type="checkbox"/> Male <input type="checkbox"/> Female
Employee Home Address :					
11. Date of Birth:		12. Age	13. Job Title:		Group #
INFORMATION ABOUT THE PHYSICIAN OR OTHER HEALTH CARE PROFESSIONAL					
15. Name of the Treating Physician or other Health Care Professional:					
16. If treatment was given away from the workplace, where was it given?			Name of Hospital/Clinic:		Address:
17. What was the treatment provided to the injured?					
18. Was tetanus shot given? <input type="checkbox"/> Yes <input type="checkbox"/> No					
19. Was a Prescription for Medication given? <input type="checkbox"/> Yes <input type="checkbox"/> No					
20. Was Employee treated in an Emergency Room?		21. Was Employee Hospitalized overnight as an		22. Date & Time of Treatment:	

	<p>Malcolm Pirnie Inc</p>	<p>WORKPLACE INCIDENT / ILLNESS REPORT</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	Inpatient? <input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>INFORMATION ABOUT THE INCIDENT/ILLNESS</p>		
23. Case # from the log (transfer the Case # from the log after your record the case).	24. Date of Injury/Illness:	
25. Location of Accident or cause of Illness (give address for location of employer's premises).		
26. Time Employee began work: <input type="checkbox"/> am <input type="checkbox"/> pm	27. Time of Event <input type="checkbox"/> am <input type="checkbox"/> pm <input type="checkbox"/> Check if cannot be determined	
28. What happened? Describe the direct cause of the Incident/Illness and list any other contributing causes:		
29. Describe the Injury/Illness:		
30. Did the Employee lose time at work as a result of this Incident/Injury?		
31. Did the Physician prescribe restricted duty? <input type="checkbox"/> Yes <input type="checkbox"/> No How many days?		
32. What object or substance directly harmed the Employee? (Examples: concrete floor, chlorine gas, radial arm saw).		
33. Was Personal Protection Equipment required? <input type="checkbox"/> Yes <input type="checkbox"/> No	34. Was Personal Protection Equipment being worn? <input type="checkbox"/> Yes <input type="checkbox"/> No DESCRIBE:	

 <p>MALCOLM PIRNIE <small>INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS</small></p>	<p>Malcolm Pirnie Inc</p>	<p>WORKPLACE INCIDENT / ILLNESS REPORT</p>				
<p>If Employee died, when did the death occur? Date of Death:</p>						
<p>36. Name and Phone # of Witness(es) if applicable:</p>						
<p>TO BE FILLED OUT BY HUMAN RESOURCES</p>						
<p>37. Date hired:</p>	<p>38. Average earnings per week:</p>					
<p>39. WCB CASE # (If known)</p>	<p>40. Carrier Case #</p>	<p>Carrier Code #</p>				
<p>41. WC POLICY #</p>	<p>42. Insurance Carrier:</p>					
<p>Carrier's Address:</p>						
<p>44. Classification of Injury/Illness (check one below)</p>						
<p>AW CASE <input type="checkbox"/></p>	<p>RA CASE <input type="checkbox"/></p>	<p>NF CASE <input type="checkbox"/></p>	<p>FA CASE <input type="checkbox"/></p>	<p>PC CASE <input type="checkbox"/></p>	<p>NFR CASE <input type="checkbox"/></p>	<p>ILLNES S <input type="checkbox"/></p>
<p>SIGNATURES (Must be Original)</p>						
<p>45. SIGNATURE OF PERSON COMPLETING THIS FORM</p>				<p>DATE</p>		
<p>ASSOCIATE'S SIGNATURE</p>				<p>DATE</p>		
<p>OFFICER'S SIGNATURE</p>				<p>DATE</p>		

	<p>Malcolm Pirnie Inc</p>	<p>WORKPLACE INCIDENT / ILLNESS REPORT</p>
<p>COMP. & BENEFITS MANAGER'S SIGNATURE</p>		<p>DATE</p>

THIS REPORT MUST BE COMPLETED AND SENT TO DISTRIBUTION WITHIN 5 WORKING DAYS OF THE INCIDENT/ILLNESS.

Distribution:

- Original – Patricia Olsiewicz – HR – WHI
- Copy Mark McGowan – H&S - WHI
- Copy Gerry Cavaluzzi - Legal Department - WHI

INSTRUCTIONS FOR COMPLETING WORKPLACE INCIDENT/ILLNESS REPORT

Please do not leave any spaces blank. Indicate “NA” when the question is not applicable.

1. - 13. Self-explanatory

14. Group (where regularly employed). Enter the name of the group or section in which the individual is regularly employed, even though temporarily working in another department at the time of the injury.

15. - 16. Self-explanatory

17. Treatment. Describe briefly treatment given for injury or illness, (e.g., sutured laceration on left wrist, x-rayed right arm for possible fracture, hospitalized for observation. etc.)

18. - 22. Self-explanatory.

23 Case number from the OSHA No. 300 Log. (See your Human Resource Representative and/or Health & Safety Department)

24. - 27. Self-explanatory.

28. Describe the activity, as well as the tools, equipment, or material employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry." Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet", "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time.")

29. (Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

30. - 31. Self-explanatory.

32. Examples: "concrete floor"; "chlorine floor"; "radial arm saw." If this question does not apply to the incident, leave it blank.

33. - 38. Self-explanatory.

39. - 43. Workman's Compensation/Insurance Carrier Information

44. **AW**, Away-From-Work-Case - is any occupational injury or illness which results in death, permanent impairment, or which renders the injured person unable to work for a full day on any job on any regularly scheduled work day after the injury. (Do not include partial day off)

RA, Restricted Activity Case - is any occupational injury or illness which renders an employee unable to perform all duties of his regularly scheduled job or the employee was assigned to do a temporary job on any regularly scheduled day after the injury or illness.

NF, Non-Fatal Case - is an occupational injury or illness which did not involve a fatality or lost work days, but did result in: a) transfer to another job or termination of employment or b) medical treatment other than first aid or c) diagnosis of occupational illness or d) loss of consciousness.

FA, First Aid Case - One time treatment and subsequent observation of minor scratches, cuts, burns, splinters, which do not ordinarily require professional medical care even though a physician or registered professional personnel provided the treatment.

PC, Precautionary Case - When qualified personnel or physicians can detect no injury or illness, but the employee still alleges injury or illness, the case is precautionary. Documentation is mandatory.

NFR, Not For Record - In many situations, which a case is PC, the case will not be recorded on Company Records or in the U.S. on the OSHA No. 300 Log. Documentation is mandatory.

45. All signatures are required.

 <p>MALCOLM PIRNIE <small>INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS</small></p>	<p>Malcolm Pirnie Inc</p>	<p>INCIDENT REPORT (Involving Contractors or Other Non-Malcolm Pirnie Personnel or Property)</p>
<p>14. Was personal protection equipment being worn? If so, describe.</p>		
<p>15. Name the object, material or substance, which directly injured the employee.</p>		
<p>16. Date / Time / Description of treatment provided to the injured.</p> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/>		
<p>17. Name & Address of treating physician or attendant, first aid or emergency response attendants (if known) and state action taken.</p>		
<p>18. Name & Address of hospital or clinic (if applicable)</p>		
<p>19. Name(s) of witness(es) (if applicable). Were written statements made by witness(es)? Attach.</p>		
<p>20. Any Police Reports or other Government Reports? <input type="checkbox"/></p> <p>Yes <input type="checkbox"/> (Note: Request only with prior approval from counsel.)</p> <p>No</p>		
<p>21. Photograph taken? (If yes, forward upon receipt). <input type="checkbox"/> Yes</p> <p style="padding-left: 350px;"><input type="checkbox"/> No</p> <p>SUBMIT TO PROJECT OFFICER/MANAGER, CORPORATE HEALTH & SAFETY CONSEL WITHIN 3 WORKING DAYS.</p> <p>Forward to Counsel copies of all related records made and/or kept in the ordinary course of business. Unless directed otherwise, continue to provide such information to Counsel on an on-going basis.</p> <p style="text-align: center;">Report by: _____</p> <p style="text-align: center; margin-left: 100px;">Employee Signature</p> <p style="text-align: center;">Title: _____</p>		

	<p>Malcolm Pirnie Inc</p>	<p>MEDICAL DATA SHEET</p>
<p>This Medical Data Sheet should be completed by site personnel and kept in an accessible location during the length of project work. This data sheet is not a substitute for required medical surveillance or qualifications required for work at the site. Where possible, this data sheet should accompany personnel requiring medical assistance as a means of providing potentially important personal information to medical providers. Return completed form to project safety representative and update this medical data sheet as often as necessary to maintain its accuracy. This includes changes in medication, emergency contacts, or allergies and sensitivities.</p> <p>This form may contain confidential information of a personal nature and must be treated/secured accordingly.</p>		
<p>Name:</p>		<p>Date:</p>
<p>Address:</p>		<p>Age (optional):</p>
		<p>Height (optional):</p>
<p>Home Telephone:</p>	<p>Work Telephone:</p>	<p>Weight (optional):</p>
<p>Emergency Contact Name and Telephone Number:</p>		
<p>Medications Currently Taking: (both prescribed and over-the-counter medication)</p>		
<p>Known Allergies or Sensitivities (such as allergic reaction to bee stings, food allergies, penicillin):</p>		
<p>Other Significant Medical Alerts or Precautions:</p>		
<p>Name of Physician (if known):</p>		<p>Telephone No.:</p>
<p>Project:</p>		<p>Supervisor Name:</p>
<p>Task:</p>		<p>Supervisor Title:</p>

Company/Department:	Telephone Number:
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	Malcolm Pirnie Inc	VISITOR ROSTER
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Phase of Project:

Location:

Contract No.:

Project:

Name	Signature	Organization	Date	Time In	Time Out

NOTE: All visitors must sign the SSHP Compliance Agreement Form and receive a safety briefing from the UXOSO.

Attachment 1: Installation-Specific Health and Safety Addendum

Fort George G. Meade Health and Safety Addendum

Site Description:

Fort George G. Meade (FGGM) is located in Anne Arundel County, Maryland (MD), almost midway between the cities of Baltimore, MD, and Washington, District of Columbia (D.C.). FGGM lies approximately 4 miles east of Interstate 95 and east of the Baltimore-Washington Parkway, between MD Routes 175 and 32. FGGM is located near the communities of Odenton, Laurel, Columbia, and Jessup. Following the 1988 BRAC realignment, the installation covers 5,415 acres. The current installation boundaries encompass the area previously referred to as the cantonment area, which is used for administrative, recreational, and housing facilities. FGGM contains approximately 65.5 miles of paved roads, 3.3 miles of secondary roads, and about 1,300 buildings.

Health & Safety Personnel and Contact Information

Project Manager: Denise Tegtmeyer
Mobile Phone: (443) 857-4036

Field Project Manager & UXO Site Safety Officer: Steve Burhans
Mobile Phone: (813) 404-3885

Corporate Health and Safety Manager: Dan Haines
Work Phone: (813) 242-7212

A minimum of two on-site personnel will have current First Aid/CPR qualifications.

Primary Emergency Facility: Laurel Regional Hospital
Address: 7300 Van Dusen Road, Laurel, MD 20646
Phone: 301-725-4300; 410-792-2270

Non Emergency Facility:
Kimbrough Ambulatory Care Center
2480 Llewellyn Ave.
Fort Meade, MD 20755
(301) 677-8800

Other Emergency Numbers:

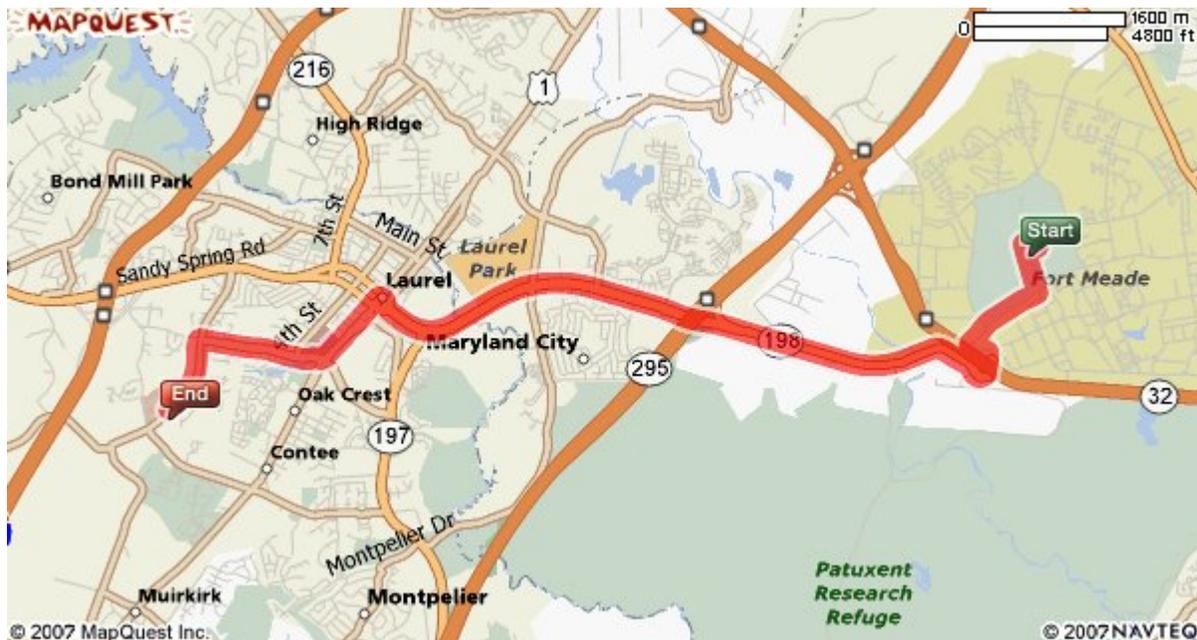
Fire: 911
Police: 911
Ambulance: 911
Fort George G. Meade POC: Paul Fluck (301) 677-9365
Project Manager: Baltimore Corps of Engineers, Kimberly Gross (410) 962-6735

Site-specific health and safety concerns (e.g., poisonous snakes, vegetations): N/A

Directions to: Laurel Regional Hospital

7300 Van Dusen Road
Laurel, MD 20707

- | | |
|---|-----------|
| 1) Start out going north on Kenyon Loop toward Taylor Ave | 0.2 miles |
| 2) Turn left onto Taylor Ave. | 0.4 miles |
| 3) Turn right onto Mapes Road | 0.6 miles |
| 4) Turn slight left | 0.2 miles |
| 5) Enter next roundabout and take 2 nd exit | 0.1 miles |
| 6) Enter next roundabout and take 1 st exit onto MD-198 W | 5.2 miles |
| 7) Turn slight left onto Washington Blvd S/ US-1 S. Follow US-1 S. | 0.6 miles |
| 8) Turn slight right onto Cherry Lane | 1.0 miles |
| 9) Turn left onto Van Dusen Rd. | 0.6 miles |
| 10) End at Laurel Regional Hospital
7300 Van Dusen Road, Laurel MD 20707 | |



Reference: www.mapquest.com

Directions to: Kimbrough Ambulatory Care Center

2480 Llewellyn Ave
Ft. Meade, MD 20755

- | | |
|--|------------|
| 1) Start out going north on Kenyon Loop toward Taylor Ave | 0.2 miles |
| 2) Turn left onto Taylor Ave. | 0.4 miles |
| 3) Turn right onto Mapes Road | 1.4 miles |
| 4) Turn right onto Chamberlin Road | 0.3 miles |
| 5) Turn left onto Llewellyn Ave | <0.1 miles |
| 6) End at Kimbrough Ambulatory Care Center
2480 Llewellyn Ave, Fort Meade, MD 20755 | |



Reference: www.mapquest.com

Final Health and Safety Project Plan

ACTIVITY HAZARD ANALYSIS

1. Phase of Project: RI Work Plan		
2. Location: Fort George G. Meade	3. Contract No.: W912DR-05-D-0004	4. Project: RI
5. Prime Contractor: Malcolm Pirnie	6. Date of Preparation: 21 August 2007	7. Est. of Start Date: December 2007
Potential Safety Hazard	Procedure to Control or Mitigate Hazard	
1. Magnetometer Assisted Site Walk/Geophysical Survey	Use only trails that have been cleared by the UXO Technician. No smoking, eating or drinking. Always use the buddy system. Always check for good radio communications. Report any findings and obtain a second opinion. Do not touch or move anything. Stay within an arms reach of the UXOSS. Wear the appropriate PPE.	
2. Sampling (soil)	Soil samples will be collected at locations of MEC finds and/or random locations. As stated in the SOW, up to 40 total samples will be collected.	
3. Slip/ Trip/ Fall	Maintain firm footing while walking on uneven surfaces. Avoid open excavations. Wear work boots that are in good condition. Watch where you walk. Only walk in areas that are marked as safe to walk in.	
4. Noise	Use hearing protection in designated areas. Maintain noise control devices: mufflers.	
5. Ticks	Check for ticks following field activities. Spray repellent around shoes, ankles and neck. Avoid rubbing against bushes and trees. Advise crew of tick borne disease symptoms. Advise crew of potential hanta virus areas.	
5. Mechanical Hazards (pinch points) for mechanical equipment including off-road vehicles	Maintain belt, chain, rotating shaft and other moving part guards in their proper position. Keep hands away from rotating/ moving parts. Conduct daily equipment safety inspections.	
6. Unexploded Ordnance	Always use trails that have been surveyed by a UXOSS. Do not pick up, move, step on or kick any objects. Immediately report if you observe potential MEC.	
7. Magnetometer Use	Always use firm footing. Pay attention to where you are walking. Do not use as a poker in animals holes.	
8. Contractor's Rep. (Signature and Date)		

Attachment 2: MEC Avoidance SOP

**STANDARD OPERATING PROCEDURE (SOP)
FOR MUNITIONS OF EXPLOSIVE CONCERN (MEC)
AVOIDANCE**

TABLE OF CONTENTS

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4. EQUIPMENT/MATERIAL REQUIREMENTS	2
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ATTACHMENT 1 – MEC Discovery Form and Accountability Log

ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
DGPS	Differential Global Positioning System
MC	Munitions Constituents
MEC	Munitions of Explosive Concern
OE	Ordnance and explosives
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
UXO	Unexploded Ordnance

DEFINITIONS

Munitions Constituents (MC) - Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(3))

Munitions and Explosives of Concern (MEC) - distinguishes specific categories of military munitions that may pose unique explosives safety risks, such as UXO, as defined in 10 U.S.C. 101(e)(5); discarded military munitions, as defined in 10 U.S.C. 2710(e)(2); or munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. § 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Ordnance and Explosives- Bombs, guided and ballistic missiles, mortars, rocket ammunition, small arms ammunition, antipersonnel and antitank mines, demolition charges, pyrotechnics, grenades, sea mines, torpedoes, depth charges, containerized and non-containerized high explosives and propellants, depleted uranium rounds, military chemical agents, and all similar components related to munitions that were designed to cause damage to personnel or material through explosive force, incendiary action, or toxic effects. Non-containerized high explosives, propellants, or soils contaminated with explosive constituents are considered explosives if the concentration of explosive material is 10 percent or higher.

Unexploded Ordnance (UXO) - includes military munitions that— Have been primed, fused, armed, or otherwise prepared for action; Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and

Remain unexploded either by malfunction, design, or any other cause.

UXO-Qualified Personnel - Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

1. PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide procedures for persons conducting Munitions of Explosive Concern (MEC) avoidance escort duties.

2. SCOPE

This SOP applies to all MEC avoidance activities conducted while at sites known or suspected to contain MEC.

3. PERSONNEL REQUIREMENTS

The Senior Unexploded Ordnance Supervisor (SUXOS) will have ultimate responsibility for all MEC avoidance operations. The Project Manager (and their designates) will ensure that all MEC operations are performed in accordance with this SOP. The SUXOS will have direct field responsibility for MEC avoidance. Unexploded Ordnance (UXO) personnel will not carry a Differential Global positioning System (DGPS) during MEC avoidance operations.

Avoidance personnel and associated responsibilities include the following for UXO Specialist II or III:

- Initial surface sweep on point position
- Location of surface and near-surface anomalies with Schonstedt detector
- Documentation of MEC finds
- Field direction of the team during avoidance

The UXO Specialist II or III or the SUXOS may all serve as UXO escorts for site walks. Additional personnel requirements, including training

requirements, should be provided in the project specific Work Plan, Project Management Plan, and/or Health and Safety Plan.

4. EQUIPMENT/MATERIAL REQUIREMENTS

The UXO personnel assigned to the teams will ensure the instruments used for MEC avoidance are inspected and a function test is conducted prior to commencing avoidance operations.

- Geophysical instrument (Schonstedt or other ordnance locator)
- Fiberglass shaft pin flags (as required)
- Brightly colored surveyors tape (as required)
- High visibility, biodegradable spray paint (as required)
- Personal Protective Equipment (PPE) (as required)

Additional equipment/material requirements (e.g., DGPS, digital camera, log book) should be provided in the project specific Work Plan, Project Management Plan, and/or Health and Safety Plan.

5. PROCEDURES

A daily functionality check will be performed on the Schonstedt locator or other appropriate geophysical instrument. The check will consist of using the Schonstedt in the demarcated function check area and verifying its response to designated targets. If the crew is operating in a remote area, an accessible ferrous metal object will be used for performance of the functionality check. Log book entries will be made for each functionality test describing locator performance and serial number of each instrument being used.

At the initial on site visit, all personnel will receive an installation-specific MEC briefing by either a Malcolm Pirnie UXO Technician or Military Explosive Ordnance Disposal (EOD) Unit before beginning any site work. Daily tailgate

safety briefings will also be conducted. All briefings will include the following:

- Type of ordnance and/or explosive items that have been found in the past;
- Number of items that have been found at the project site and in the surrounding area
- Telephone numbers to activate the MEC/EOD team
- Safe refuge areas that will be used to retreat from the explosive areas
- Specific steps to take if a worker encounters MEC
- Emergency procedures

The UXO personnel will enter the Area of Concern (AOC) first and will conduct a surface sweep of the path as the personnel under escort follow behind in single file. The personnel under escort follow the UXO escort, ensuring they walk the same path to avoid any possible MEC. Personnel must remain in groups of two or more and remain within arms length of their partners. Personnel must maintain clear communications with the UXO escort and have a working knowledge of communication procedures.

In the event that MEC is discovered, the UXO escort will inform the team to stop and point out the hazard. The MEC item will be marked with a pin flag, paint, or surveyor tape. The UXO escort will inform the responsible authority, SUXOS/Team Leader/Project Manager/or point of contact (POC) of the MEC item location, type, and condition of the item (if known). No one under any circumstances shall touch or move any MEC or items that may resemble MEC.

DGPS coordinates for the item will be recorded immediately by if equipment is available or later by the UXO escort. The UXO escort will log MEC item's description, size, color, and any distinguishable marks and communicate the information to the SUXOS via radio/cell phone (do not transmit on the radio when within 35 feet of an ordnance item). Pertinent data will be entered on an MEC Discovery Accountability Log Form (Attachment 1). A digital photograph of the item will be taken and the photo number and item

description noted in the log book. At no time will the MEC item be moved or disturbed. After notifying the SUXOS of the MEC item and collecting the necessary data, the team may proceed with their survey if the UXO escort determines that no hazard is present. If an MEC hazard is present, the escorted team will return the way they came to the designated safe area until the situation is safe to proceed with the escort. The SUXOS will be responsible for notifying the appropriate authority/POC (Range Control/EOD).

**ATTACHMENT 1: MEC DISCOVERY FORM
AND ACCOUNTIBILITY LOG**



**MEC DISCOVERY FORM
AND ACCOUNTIBILITY LOG**

Date: _____

UXO Team Leader: _____

Anomaly ID #	
Anomaly Longitude X	
Anomaly Latitude Y	
Photo taken Photo ID Number	: (yes) (no)
Orientation of nose/ Inclination of nose	
Depth to top of item/ Depth to center	

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of mass	
Length and diameter	
Item Description/Justification/Comments	
Anomaly Type/Category (Check Appropriate Box)	
<input type="checkbox"/> UXO <input type="checkbox"/> DMM <input type="checkbox"/> Munitions Debris <input type="checkbox"/> Practice Ordnance <input type="checkbox"/> Inert Ordnance <input type="checkbox"/> Metal Waste	
<input type="checkbox"/> Sub-surface Anomaly <input type="checkbox"/> Other:	
Photo taken: <input type="checkbox"/> Yes <input type="checkbox"/> No File Name:	
Ordnance Positive Identification (If known, record below, include fuze condition and disposition)	
Quantity: ____ Ordnance Mark/Mod: Nose Fuze Mark/Mod: Tail Fuze Mark/Mod:	
Ordnance Filler: <input type="checkbox"/> Explosive <input type="checkbox"/> Propellant <input type="checkbox"/> Pyrotechnic <input type="checkbox"/> Other _____ NEW: _____	
Ordnance Category: <input type="checkbox"/> Bombs <input type="checkbox"/> Cluster/Dispenser <input type="checkbox"/> Grenade <input type="checkbox"/> Guided Missile <input type="checkbox"/> Land Mine <input type="checkbox"/> Mortar	
<input type="checkbox"/> Misc. Explosive Device <input type="checkbox"/> Underwater Ordnance <input type="checkbox"/> Rocket <input type="checkbox"/> Projectile <input type="checkbox"/> Small Arms <input type="checkbox"/> Pyrotechnic/Flare	
Fuze Type: <input type="checkbox"/> Piezio-Electric <input type="checkbox"/> Proximity (VT) <input type="checkbox"/> Base Detonating <input type="checkbox"/> All-ways Acting <input type="checkbox"/> Point Detonating	
<input type="checkbox"/> Impact <input type="checkbox"/> Electric <input type="checkbox"/> Mech. Long Delay <input type="checkbox"/> PIBD <input type="checkbox"/> Mech Time <input type="checkbox"/> Pressure <input type="checkbox"/> Influence	
Status of MEC: <input type="checkbox"/> Armed <input type="checkbox"/> Unarmed Condition: <input type="checkbox"/> Broken open <input type="checkbox"/> Filler visible <input type="checkbox"/> Soil Staining	
Disposition: <input type="checkbox"/> Transport <input type="checkbox"/> Leave in place <input type="checkbox"/> Other:	

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Destroyed by & date:

Remarks:

UXO- Ordnance fuzed, armed or otherwise prepared for action and fired or placed in such a manner that it constitutes a hazard.

DMM- Ordnance that was disposed of by abandonment; may have been fuzed or armed, but was not employed.

Inert- Same physical features as an ordnance item but does not and never did contain energetic material.

Munitions Debris- Ordnance material that contained or was in contact with energetic material, which has been expended. (frag)

Metal Waste- Non-ordnance scrap metal.

Signatures: _____

SUXOS

UXOSS

Attachment 3: Dig Sheets

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DGM Survey Data and Dig Sheet
Quality Control Checklist
Remedial Investigation, FGGM

Sector: _____

Grid: _____

Grid Size (ft.): _____

Non-DGM Sub-Areas: _____

Data Collection Days: _____

Saturated Response Areas: _____

Grid Hubs: _____

Removal Area Boundary: _____

Raw Data QC:

Check all that Apply

Comments:

Data Coverage

AM/PM Static Test Results

Am/PM Replicate Line Results

Hub Detection

Grid DGM Survey:

Check all that Apply

Comments:

Data Tracks/Completeness

Non-DGM Sub-Areas Mapped and Labeled

Cultural Features Identified

Location Control

Background Levels

Noise/Interference Levels

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Data Processing other than Level/Lag

Other DGM Survey Issues

Grid Review Map:

Check all that Apply

Comments:

Basemap Plotted

Standard Map Legend Format

Standard Scale/Color Bar

Cultural Features Mapped and Labeled

SRA/Non-DTM Areas Mapped/Labeled

State Plane NAD83 Coordinates

Grid Edge/Boundary Issues

Plotting/Labeling of Anomalies

Other Grid Mapping Issues

Raw Data Processing:

Check all that Apply

Comments:

Level (UX-Detect Drift)

Lag Correction (2 points)

Line/Data Editing

Grid Extraction (plus buffer)

Grid Target Selection:

Check all that Apply

Comments:

Initial UX-Detect Auto-Selection

QC Codes Assigned

Saturated Response Areas Mapped

Outside of Grid Targets Removed/Edge Issues

Notes on Individual Anomalies and/or Locations

Other Anomaly Selection issues

Targets Sorted by Amplitude

Placement of "Cut Line" (~3 mV)

Submittal Dig Sheet:

Check all that Apply

Comments:

Grid ID

Hubs and Hub Coordinates

Other Dig Sheet Header Information

Anomaly Identification

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Anomaly Location

Anomaly Peak Amplitude

Cut Line Labeled

Non-DGM Sub-Area Clearance Approach

Other Dig Sheet Issues

Review Procedure	Date	Person Performing Task
Raw Data QC		
Grid DGM Survey		
Grid Review Map		
Raw Data Processing		
Grid Target Selection		
Submittal Dig Sheet Review and Posting		
QC Review		

Additional Notes on Processing Parameters:

Attachment 2 - Activity Hazard Analyses

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<p>Note: This RI AHA covers the common hazards and controls that may be applicable to multiple activities at FGGM project site. The specific AHAs will cover hazards and controls unique to those activities or subcontractor operations, per EM 385-1-1. General site environmental conditions such as weather conditions, thermal stressors, and biological hazards are covered in detail in the SSHP. They will be addressed on the AHAs only if the activity itself poses unique or exacerbated hazards or exposures.</p>		
<p>Heavy Equipment Operations</p> <p>Note: Malcolm Pirnie will not be working with Heavy equipment. Recommended controls are for subcontractors unless otherwise noted.</p>	<p>Struck by heavy equipment and other vehicles operating at the site</p>	<ul style="list-style-type: none"> - Inspect vehicles and equipment upon first arrival on site and daily before operations. - Ensure all equipment and vehicles have functional brakes, lights, horns, backup alarms, tire pressure. - Only qualified operators will be permitted to operate heavy construction equipment. Supervisor will observe operation to establish competency. - Site vehicles will only be driven by licensed drivers. - Establish control zones around heavy equipment work area. - Route traffic away from work area. - Ensure vehicles have back-up alarms. - Eye contact with operators shall be made before approaching equipment. - Equipment will not be approached on blind spots. - Use spotters for backing equipment in congested areas. - Park vehicle with blade/bucket on ground, transmission in neutral, parking brake engaged. Rubber tire vehicles should use wheel chocks when parked on incline. - Speed limits: 25 mph on main roads - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
	Struck against other vehicles and objects	<ul style="list-style-type: none"> - Obey speed limits - Perform a 360 degree walkaround around the equipment or vehicle before moving. - Park away from obstructions, such as monitoring wells. - Use spotters for backing equipment in congested areas, flaggers for pulling out into public roadways. - Wear seatbelts at all times. All riders must have a seat and seatbelt - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Caught in or between	<ul style="list-style-type: none"> - Ensure that all guards are in place during inspections - Barricade rotating superstructures of cranes and excavators - Stay out of area between machine and other object - Block parts during maintenance with blocks, cribbing, or supplied ram and steering blocks - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
<p>Heavy Equipment</p> <p>Note: Malcolm Pirnie will not be working with Heavy equipment. Recommended controls are for subcontractors unless otherwise noted.</p>	Tipover	<ul style="list-style-type: none"> - Ensure all construction equipment has Rollover Protection Structure (ROPS) and inspect ROPS daily. - Operate equipment up and down slopes whenever possible, with load on the uphill side. - Operate across slopes within manufacturers recommendations - Don't turn or speed on slopes - Keep loads as low as possible, - Ground tools going down slope as much as possible - Park dump trucks on firm, level ground for dumping. Observe load from safe area behind to ensure even flow. - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Electrocution	<ul style="list-style-type: none"> - Maintain equipment and loads at least 10 feet from energized overhead powerlines less than 50k V. - Increase buffer zone for voltages >50k in accordance with Table 11-3 of EM 385-1-1, 1996. - Use non-conductive tag lines. - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Injury from quick-change buckets becoming detached from equipment.	<ul style="list-style-type: none"> - Verify complete and proper engagement of locking device prior to equipment use (visual inspection). - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
	Excessive noise exposure	<ul style="list-style-type: none"> - Vehicles and equipment will have mufflers. - Monitor noise in work area with sound level meter. - Have workers wear hearing protection when noise levels exceed 85 dBA. - Use quieter equipment, if possible. - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Slips, falls	<ul style="list-style-type: none"> - Use three points of contact during access and egress of cabs. - Keep steps clean and free of mud, snow and ice. - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Spills	<ul style="list-style-type: none"> - Inspect hydraulic hoses and fittings daily. - Use only fuel filling nozzles with automatic shutoffs and do not use latch open dogs on nozzle handle. - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.
	Fires	<ul style="list-style-type: none"> - Shut down engine during fueling. No smoking or open flames in fuel storage and dispensing areas. - All mobile construction equipment provided with fire extinguisher with at least a 3A:40B:C rating (Ansul Sentry AA05VB or equivalent). - Malcolm Pirnie personnel shall not operate any heavy equipment. Personnel will remain a minimum of 50-feet away from any heavy equipment in operation.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Manual Material Handling	Back strain from lifting and moving equipment	<ul style="list-style-type: none"> - Use mechanical lifting devices when feasible (forklifts, cranes, carts, etc.). - Do not lift more than 50 lbs per individual. - Have others help lift excessively heavy loads. - When lifting, maintain ergonomically correct lifting posture.
	Cuts and scrapes from material handling	<ul style="list-style-type: none"> - Ensure loads to be handled are free of sharp edges and points. - Wear leather work gloves and long sleeved work shirts
Using hand and portable power tools	Struck by, caught in or between	<ul style="list-style-type: none"> - Wear leather work gloves and long sleeved work shirts. - Inspect power tools for damage or defects before and after each use. - Ensure all guards are in place. - Use tools only as designed. <p>Receive proper training in tool use.</p>
	Struck by flying debris	<ul style="list-style-type: none"> - Wear impact-resistant, ANSI-approved safety glasses with side shields - Wear face protection in addition to safety glasses for electric or pneumatic grinding, chipping, abrasive saw metal cutting, chain saw and brush cutter work
	Excessive noise exposure	<ul style="list-style-type: none"> - Monitor noise in work area with sound level meter. - Have workers wear hearing protection when noise levels exceed 85 dBA. - Use quieter equipment, if possible.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
	Sprains/strains and vibration-induced musculoskeletal disorders	<ul style="list-style-type: none"> - Do not use heavy tools over shoulder height. - Where tool use is necessary on a continuous or repetitive basis take frequent breaks to rest muscles and joints, particularly if working in awkward positions - Use lightest tool acceptable for application - Use anti-vibration gloves for repetitive use of high velocity or high impact tools, such as impact wrenches, reciprocating saws, etc.
Working with electrical equipment	Contact with energized electrical circuits	<ul style="list-style-type: none"> - Ensure all electrical installation and maintenance work is conducted by a licensed electrician. - Identify all electrical circuits connected to the structures and shut them off at their source, lock and tag them out as per EHS 6-4, disconnect them from the equipment and cap them.
		<ul style="list-style-type: none"> - Ensure electrical power tools are connected to ground fault circuit interrupters - Do not use electrical power tools in wet environments. - Use only heavy duty extension cords and inspect daily to ensure insulation and plug connections are intact. - When lightning in area is observed in an area, work shall halt until 30 minutes after last observed strike.
Working with hazardous energy sources	Exposure to electrical, mechanical, pneumatic energy sources, hazardous liquids and gases, high pressures and temperatures	<ul style="list-style-type: none"> - Shut down systems and implement a Lockout/Tagout program in effect before doing any maintenance or repair on systems
Walking/working at ground level	Slip and trips on equipment and debris left on the ground	<ul style="list-style-type: none"> - Clear work area and walkways of debris. - Wear high traction, safety toe footwear. - Keep walkways dry or surface with slip-resistant materials - Post exit signs and evacuation routes.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
	Struck by dropped, flying objects	- Wear ANSI approved hard hat, safety glasses, safety-toe footwear

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
Cutting of brush/trees Note: Malcolm Pirnie will not be cutting brush/ trees.	Unintended detonation of UXO	<ul style="list-style-type: none"> • Do not clear vegetation until qualified UXO Technicians have conducted a detector-aided search of the vegetation for UXO hazards which may otherwise be difficult to see. • UXO Technicians shall comply with all requirements of USACE EP 75-1-2. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
Recommended controls are for subcontractors unless otherwise noted.	Struck by falling trees	<ul style="list-style-type: none"> • Use heavy equipment with ROPS/FOPS and cab shields to fell trees where feasible. Felling trees using chain saws will be under the supervision of experienced feller or logger. • Plan the tree felling carefully. • Use notch cuts and backcuts for large trees, guy ropes where necessary. • Clear all personnel from possible fall paths before felling. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Struck by falling limbs and deadwood	<ul style="list-style-type: none"> • Inspect work area carefully, look out for dead trees and limbs resting on limbs to be removed. • Clear all personnel from area under limbs to be removed. Separate work teams by adequate distance. • Do not climb trees to top or limb, unless approved by the Project Health and Safety Manager. • Do not use chain saws over shoulder height • Wear ANSI approved hard hats and safety-toe footwear • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
	Severe cuts and bruises from chainsaws and Brush Hogs.	<ul style="list-style-type: none"> • Do not walk with chain engaged • Do not use chainsaws above shoulder. Do not use brushcutters above waist. • Hold equipment with both hands during cutting operations. • The engine shall be started and operated only when all co-workers are clear of the saw. • The operator will shut off chain saw when carrying it over slippery surfaces. • Shoulder harness required for use with brushcutter. • Wear leather or Kevlar chaps, leather work gloves • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Struck by flying debris	<ul style="list-style-type: none"> • Do not operate brushcutter without the debris shield in place and tightly secured. • Do not operate the brushcutter without the safety clip in place. • Wear safety glasses with side shields and full face shield • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Slips/trips/falls on slopes. Falls from heights	<ul style="list-style-type: none"> • Wear high traction work boots. • Whenever possible, choose walking routes carefully to avoid steep slopes. • Do not climb trees to top or limb, unless approved by the Project Health and Safety Manager. If a bucket truck or extensible boom lift is used, ensure operator is trained, wears harness, and attaches lanyard to designated attachment point on platform. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
	Burns from hot exhausts	<ul style="list-style-type: none"> • Wear long sleeves and leather gloves. • Keep hands away from hot exhaust and engines. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Fire/explosion of gasoline	<ul style="list-style-type: none"> • Allow equipment to cool before refueling, and eliminate other sources of ignition. • Use only approved safety cans for gasoline/bar oil. • Cleanup spills immediately. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Exposure to noise	<ul style="list-style-type: none"> • Wear hearing protection. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Contact with poisonous plants (e.g. poison ivy)	<ul style="list-style-type: none"> • Inspect area before starting • Wear long sleeve shirts, tuck sleeves and pant legs. Wear gaiters on ankles. • If there is heavy growth, wear disposable coveralls and use barrier cream, e.g. Ivy Block. • Have Tecnu or other poison ivy cleanser on hand, and wash immediately after contact. • Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeier
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
	Stung by bees/hornets, bit by ticks or snakes	<ul style="list-style-type: none"> Inspect areas for hives. Ensure allergic individuals have emergency medical kit and are committed to using it. Use insect repellent containing DEET on exposed skin, and Permethrin on clothing. Do not approach snakes. If bitten, seek medical attention. <p>Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.</p>
	Repetitive stress injury	<ul style="list-style-type: none"> Switch equipment from one side to the other if possible. Take break or switch team positions if musculoskeletal fatigue is noticed. Malcolm Pirnie personnel shall not participate in the cutting of brush/ trees except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.
Dragging/ Stockpiling brush Note: Malcolm Pirnie will not be dragging/ stockpiling brush. Recommended controls are for subcontractors unless otherwise noted.	Slips/trips/falls	<ul style="list-style-type: none"> Wear high traction safety-toe footwear. Keep loads manageable to not obstruct vision. Malcolm Pirnie personnel shall not participate in the dragging or stockpiling of brush. Personnel will remain a minimum of 50-feet away from any cutting activity.
	Scrapes and cuts	<ul style="list-style-type: none"> Wear safety glasses, gloves and long sleeves. <p>Malcolm Pirnie personnel shall not participate in the dragging or stockpiling of brush. Personnel will remain a minimum of 50-feet away from any cutting activity.</p>
	Back and/or leg strain	<ul style="list-style-type: none"> Maintain manageable loads and stretch prior to work. <p>Malcolm Pirnie personnel shall not participate in the dragging or stockpiling of brush except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.</p>
Chipping brush	Excessive noise	<ul style="list-style-type: none"> Wear hearing protection. Malcolm Pirnie personnel shall not participate in the brush chipping. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
<p>Note: Malcolm Pirnie will not be dragging/stockpiling brush. Recommended controls are for subcontractors unless otherwise noted.</p>	<p>Eye injuries Being struck by debris</p>	<ul style="list-style-type: none"> • The chipper shall be free of obstructions prior to startup. • All personnel shall be clear of the chipper exhaust chute prior to starting. • Wear safety glasses with side shields while chipping. • Stand to the side of the feed area and avoid the discharge area. • Carefully inspect feed material and remove any non-vegetative material. • Brush chippers shall be fed from the side of the centerline, and the operator shall immediately turn away from the feed table when the brush is taken into the rotor; chippers shall be fed from the curbside whenever possible. • Malcolm Pirnie personnel shall not participate in the dragging or stockpiling of brush except for the SUXOS. Personnel will remain a minimum of 50-feet away from any cutting activity.

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
ACTIVITY	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
	Caught in or between moving machinery parts	<ul style="list-style-type: none"> • No loose clothing, gauntlet-type gloves, rings or watches shall be worn by employees operating chippers. • Keep all body parts away from throat and discharge of chipper. • Chippers shall be equipped with mechanical infeed system or shall have a flexible anti-kickback device installed in the infeed hopper for the purpose of protecting the operator and other persons in the machine area from the hazards of flying chips and debris. • Mechanical infeed systems shall have a quick stop and reversing device on the infeed on disk-type tree or brush chippers. The activating mechanism for the quick stop and reversing device shall be located across the top, along each side of, and as close to the feed end of the infeed hopper as possible and within easy reach of the operator. • The feed chute or feed table of the chopper shall have sufficient height on its side members to prevent operator contact with the blades or knives during normal operations. • Push sticks – of materials which can be consumed by brush chipper - shall be used, if necessary. • Shut down machinery and lock out to remove jams or make repairs. • Malcolm Pirnie personnel shall not participate in the brush chipping. Personnel will remain a minimum of 50-feet away from any cutting activity.

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>UXO Intrusive Operations Using Manual Tools and Methods</p> <p>NOTE: These operations are only to be performed by USACE-qualified UXO Technicians and are not to be used by anyone else.</p>	<p>UXO</p>	<ul style="list-style-type: none"> • Ensure Exclusion Zones are established to authorized Minimum Separation Distances for Non-Project Personnel and Team Separation Distances for Project Personnel. • Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to UXO. • Ensure all personnel are USACE-qualified UXO Technicians. • Do not conduct operations within 200 ft or Inhabited Building Distance for blast protection (whichever is greater) of other UXO intrusive operations. • UXO Technicians shall comply with all requirements of USACE EP 75-1-2. • UXO Technicians shall review any archival information available regarding the area of MMR where operations will be conducted, and determine the level of risk associated with traversing the area and any additional specific safety considerations. • Observe general UXO hazards and precautions. <p>Ensure compliance with the UXO Work Plan and relevant SOPs.</p>

ACTIVITY	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>UXO Intrusive Operations Using Manual Tools and Methods (cont.)</p> <p>NOTE: These operations are only to be performed by USACE-qualified UXO Technicians and are not to be used by anyone else.</p>	<p>Loud noise</p>	<ul style="list-style-type: none"> • Reduce the volume level of detection equipment used for anomaly reacquisition before donning headset and engaging power.
	<p>Slips, trips and falls</p>	<ul style="list-style-type: none"> • Wear work boots with lug soles. • Maintain awareness of hazards associated with uneven or wet terrain.
	<p>Dangerous animals and insects</p>	<ul style="list-style-type: none"> • Maintain awareness of hazards associated with dangerous animals and insects. • Observe task PPE requirements.
	<p>Repetitive stress injury</p>	<ul style="list-style-type: none"> • Shift detection equipment from one arm to the other when fatigued. • Take breaks when necessary.
	<p>Back injury</p>	<ul style="list-style-type: none"> • Observe proper lifting techniques setting up or putting away equipment.
	<p>Thermal Stress</p>	<ul style="list-style-type: none"> • Review Heat and Cold Stress SOPs.

<p>Initial PPE will be modified Level D. UXO Detector and related navigation and/or data-recording equipment</p> <p><u>Support Zone</u></p> <ul style="list-style-type: none"> • Cell phone or Radio communication • Eyewash • Fire extinguishers • First Aid kit • Drinking water • 911 Air horn • Spill containment supplies • Air monitoring equipment • Emergency decontamination supplies 	<p>Prior to use, ensure equipment is operational, calibrated according to operating manuals, and performing in accordance with required standards.</p> <p>General Site Safety (Daily)</p>	<ul style="list-style-type: none"> • Ensure non-UXO Technician UXO detection personnel observe general UXO hazards and understand the requirement to be escorted by qualified UXO Technicians when they are within an exclusion zone. • Ensure UXO detection personnel are qualified on the specific UXO detection equipment to be used. • UXO Detection Equipment Refresher. • General and local UXO hazards and precautions. • Daily Tailgate Safety Meeting. • Review “UXO Detection” AHA. • HAZWOPER Certification (40-hr, 8-hr). • OSHA Supervisory (Required for Managers and Supervisors). • First Aid and CPR (At least two employees). • SSHP review and sign-off.
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<p>Detonation of UXO</p>	<p>Accidental Detonation of UXO Slips, Trips, and Falls</p>	<p>Personnel wear modified level D PPE, Review Disposal plan, standard UXO and General EOD safety precautions for demo procedures. Review applicable item ID and disposal information. Demolition operations are to be suspended during electrical storms or other severe weather. No smoking, except in designated areas Personnel will remain up-wind of the demolition site during demolition operations. If possible, UXO will be moved from the area to a safe disposal area.</p>
<p>Handling of demolition explosives: Blasting caps Initiators Time Fuze Explosives Ordnance Items</p>	<p>Accidental Detonation of UXO</p>	<p>Observe UXO safety precautions. Minimize personnel exposure to the UXO. Personnel will wear gloves when handling ordnance. No smoking, except in designated areas If possible, UXO will be moved from the area to a safe disposal area.</p>

Project: FGGM RI		Location: Anne Arundel County, Maryland
Activity: RI		Approved by: Denise Tegtmeyer
EQUIPMENT TO BE USED	INSPECTION	TRAINING REQUIREMENTS
Chain saws and brush cutters	Initial receipt. Daily by users.	Users trained in accordance with manufacturer's training recommendations and operators manuals. (See downloadable Stihl Safety Manuals http://www.stihlusa.com/manuals/index.html) Experience and competency of tree fellers to be verified by Superintendent and QC/HS
Heavy equipment	Initial receipt. Daily by operators.	Competency evaluation by Superintendent.
Chipper	Initial receipt. Daily by operators.	Users trained in accordance with manufacturer's training recommendations and operators manuals.
Heavy equipment	- Receipt by Equipment Supervisor - Daily by operators	Only qualified operators permitted to operate. Qualifications and competency reviewed by Supervisor. Licensed where required by state regulations.
Site vehicles	- Receipt by Equipment Supervisor - Daily by drivers	Drivers must have current license.
Hand and Portable power tools	- Receipt by Equipment Supervisor - Daily by users	Training in use of power tools by Supervisor and review of operating manual. Powder-operated tool users certified by vendor.

Remedial Investigation
FGGM



MALCOLM
PIRNIE

Map 1
Overview of Mortar Range

Legend

-  Installation Boundary
-  BRAC Boundary
-  MMRP Range Fans
-  County Line
-  Mortar Range

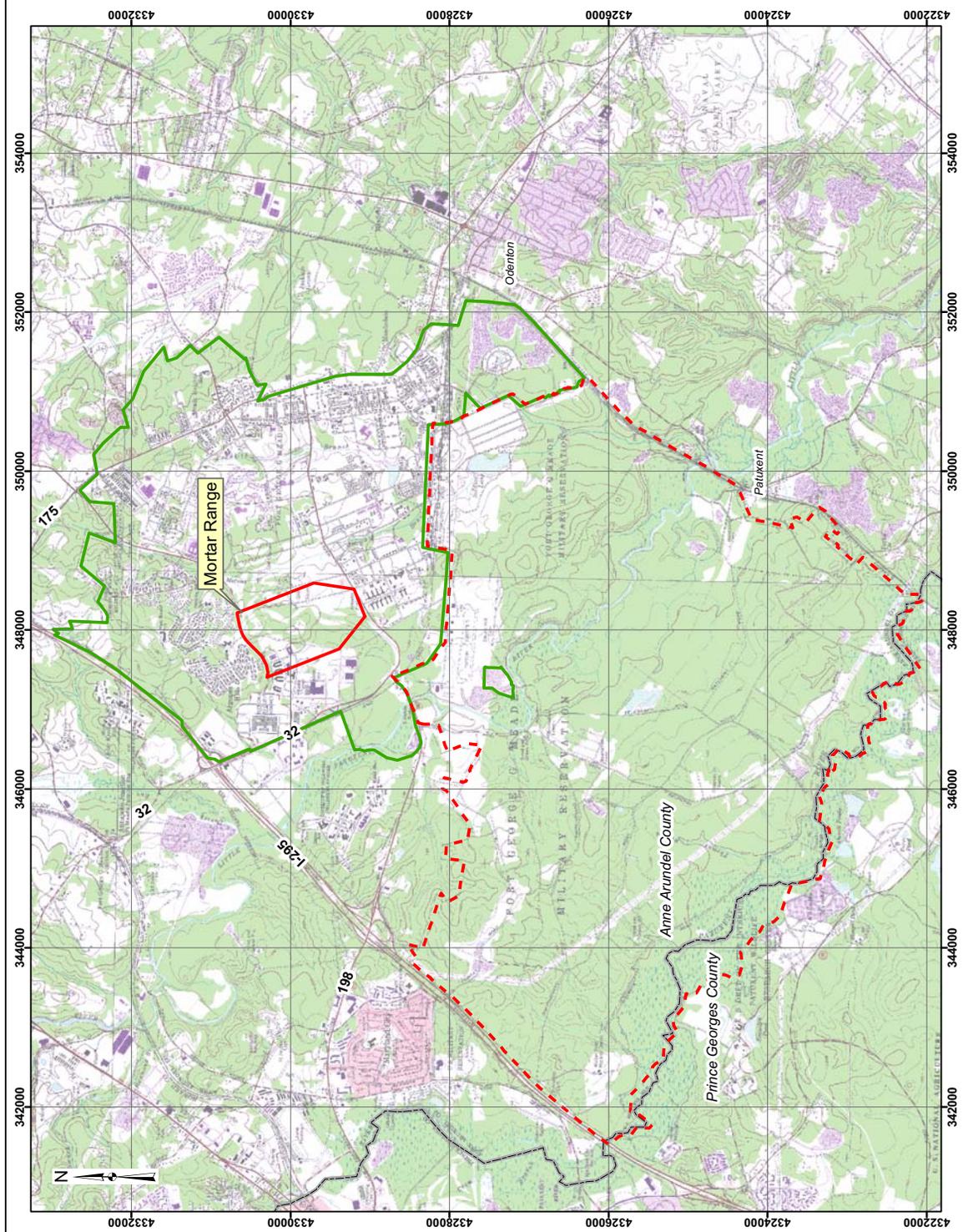
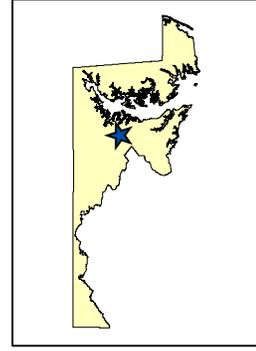


NOTE: BRAC BOUNDARY WAS DIGITIZED
BASED ON CTT BOUNDARY MAP

Data Source: Microsoft, TerraServer, 2006
FGGM, GIS Data, 2005
Malcolm Pirnie, CTT Inventory Data, 2003

Coordinate System: UTM Zone 18
Datum: North American Datum 1983
Units: Meters

Contract: DACA31-00-D-0043
Edition: Remedial Investigation
Date: September 2007



Attachment 4 – Emergency Contacts and Hospital Route Map

Health & Safety Personnel and Contact Information

Project Manager: Denise Tegtmeier
Mobile Phone: (443) 857-4036

Field Project Manager & UXO Site Safety Officer: Steve Burhans
Mobile Phone: (813) 404-3885

Corporate Health and Safety Manager: Dan Haines
Work Phone: (813) 242-7212

A minimum of two on-site personnel will have current First Aid/CPR qualifications.

Primary Emergency Facility:
Laurel Regional Hospital
Address: 7300 Van Dusen Road; Laurel, MD 20707
Phone: 301-725-4300; 410-792-2270

Non Emergency Facility:
Kimbrough Ambulatory Care Center
2480 Llewellyn Ave.
Fort Meade, MD 20755
(301) 677-8800

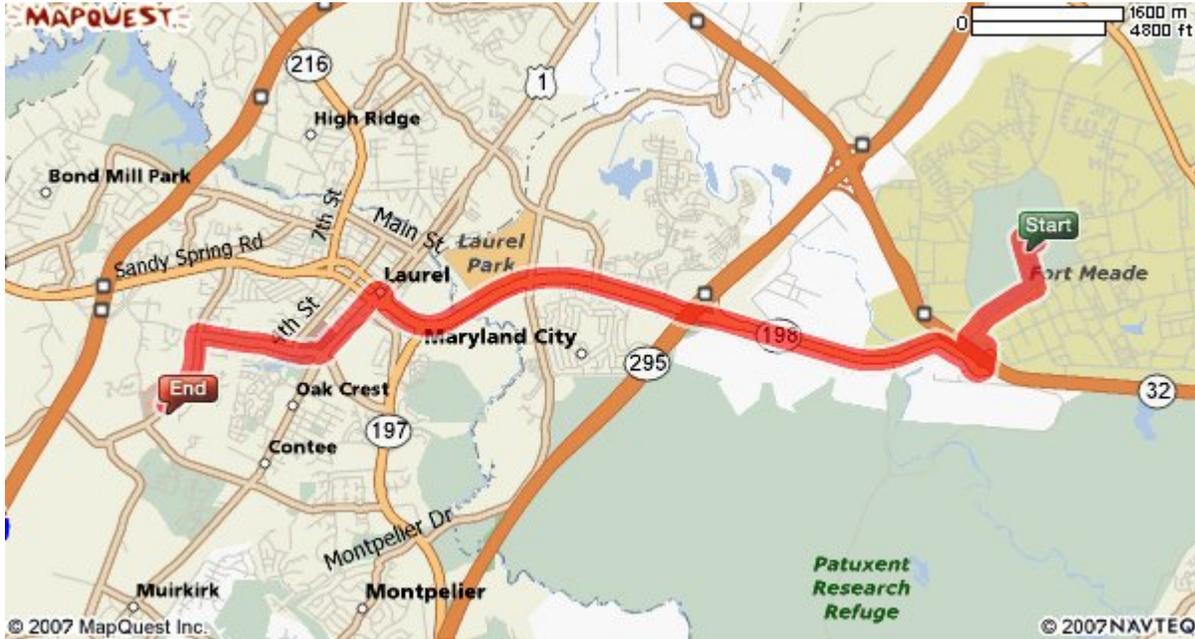
Other Emergency Numbers:
Fire: 911
Police: 911
Ambulance: 911
FGGM POC: Paul Fluck (301) 677-9365
Project Manager: Baltimore Corps of Engineers, Kimberly Gross (410) 962-6735

Directions to: Laurel Regional Hospital
7300 Van Dusen Road
Laurel, MD 20707

- | | |
|--|------------------|
| 1) Start out going north on Kenyon Loop toward Taylor Ave | 0.2 miles |
| 2) Turn left onto Taylor Ave. | 0.4 miles |
| 3) Turn right onto Mapes Road | 0.6 miles |
| 4) Turn slight left | 0.2 miles |
| 5) Enter next roundabout and take 2nd exit | 0.1 miles |
| 6) Enter next roundabout and take 1st exit onto MD-198 W | 5.2 miles |
| 7) Turn slight left onto Washington Blvd S/ US-1 S. Follow US-1 S. | 0.6 miles |

- 8) Turn slight right onto Cherry Lane** **1.0 miles**
- 9) Turn left onto Van Dusen Rd.** **0.6 miles**
- 10) End at Laurel Regional Hospital**

7300 Van Dusen Road, Laurel MD 20707



Reference: www.mapquest.com

Directions to: Kimbrough Ambulatory Care Center

2480 Llewellyn Ave
Ft. Meade, MD 20755

- 1) Start out going north on Kenyon Loop toward Taylor Ave** **0.2 miles**
- 2) Turn left onto Taylor Ave.** **0.4 miles**
- 3) Turn right onto Mapes Road** **1.4 miles**
- 4) Turn right onto Chamberlin Road** **0.3 miles**
- 5) Turn left onto Llewellyn Ave** **<0.1 miles**
- 6) End at Kimbrough Ambulatory Care Center**

2480 Llewellyn Ave, Fort Meade, MD 20755



Reference: www.mapquest.com

Attachment 5 – Listing of Malcolm Pirnie Corporate Health and Safety Programs

The complete Malcolm Pirnie Corporate Health and Safety Programs are located in Attachment 1 (SSHP), and are not duplicated here.

MALCOLM PIRNIE CORPORATE HEALTH & SAFETY PROGRAMS

- Accident/Incident Investigation
- Bloodborne Pathogen
- Confined Space Entry
- Construction Safety
- Driver Safety
- Electrical Safety
- Hazard Communication
- Hazardous Waste
- Health and Safety
- Hearing Conservation
- Incident/Illness Recordkeeping
- Illness and Injury Prevention
- Lockout/Tagout
- Medical Surveillance
- Personal Protective Equipment
- Records/Posters/Documents
- Respiratory Protection
- Substance Abuse
- Training
- UXO Safety

Attachment 6 – Supplemental Plans

Supplemental plans are not required for this project.

Attachment 7 – Resumes

Alvin R. Larkins, UXO PM

Mr. Larkins is a specialist in Military Munitions and its remediation. Mr. Larkins expertise spans over 30 years dealing with Military Munitions including MEC and CWM. His experience was gained while on active duty with the U.S. Navy for over 23 years and while employed as a UXO specialist for the private sector for the past 8 years. Mr. Larkins holds Explosives Safety Officer and Master Explosive Ordnance Disposal certifications. He has served as project manager on multimillion dollar UXO/CWM/MEC environmental remediation projects for the U.S. Army Corps of Engineers, U.S. Naval Facilities Engineering Command, and the U.S. Army National Guard. On these projects Mr. Larkins' responsibilities have included development and management of UXO SSHPs, WPs, and SOPs. He conducts quality control inspections, analyzes UXO and operations risks and hazards, and enforces compliance with safety regulations. While on active duty with the U.S. Navy, Mr. Larkins served as Master EOD Technician responsible for daily detachment operations, planning ordnance clearance operations, training detachment personnel in disposal techniques, and enforcing safety protocols during UXO range clearance and underwater operations.

Detailed Experience

- **U.S. Army Corps of Engineers, Baltimore District: Fort Benning, GA. MMRP SI Anomaly Investigation.** Project Manager for an anomaly investigation at Fort Benning, Georgia. Responsible for technical project planning, work plan preparation, MEC intrusive investigations and report preparation.
- **U.S. Army Corps of Engineers, Baltimore District: SI Fort Foote, MD.** Project Manager for Site Inspection (SI) at Fort Foote, Maryland a Formerly Used Defense site. Responsible for technical project planning, public meetings, environmental and biological risk survey, work plan preparation, MEC geophysical survey, MEC intrusive investigations, MC soil sampling and report preparation.
- **U.S. Army Corps of Engineers, Baltimore District: MMRP SI Volkstone, Camp Dawson /WV.** Project Manager for Site Inspection of a Hand Grenade Assault Course under the Military Munitions Response Program (MMRP) at Volkstone tract of Camp Dawson. Responsible for historical records review and technical project planning. By demonstrating that there was no complete pathways for human receptors and the environment, successfully negotiated No Further Action at the site without the need for intrusive field investigations.
- **U.S. Army Corps of Engineers, Baltimore District: MMRP SI at Anniston Army Depot, Fort Rucker and Tobyhanna Army Depot.** UXO Supervisor for Site Inspections at these 3 MR sites.

PROJECT ROLE: UXO PROJECT MANAGER

Title/Firm:

Field Technician, Senior
Malcolm Pirnie, Inc.

Years of Experience

30

Education

Explosive Ordnance Disposal, U.S. Navy
1982

Licenses and Certifications

Explosives Safety Officer
Master Explosive Ordnance Disposal
USAESCH UXO NUMBER 0512

Professional Training

Construction Quality Management for
Contractors
Government Contracting and
Procurement
U.S. Navy-Approved Safety Officer
UXO Diving Specialist

Employment History

Malcolm Pirnie, Inc. 2003 to present
Environmental Chemical Corporation
1999 to 2003
United States Navy 1975 to 1998

Work includes historical records review, technical project planning, work plan preparation, MEC geophysical survey and MC soil sampling.

- **U.S. Army Corps of Engineers, Fort Worth District: Five Points Outlying Field.** Sr. UXO Supervisor responsible for UXO detection and avoidance during the performance of a site investigation to support the Engineering Evaluation/Cost Analysis (EE/CA) and Site Investigation for this high profile FUDS Site.
- **USMC HQ Support, REVA Program Development.** Key technical team member supporting the development and implementation of the Range Environmental Vulnerability Assessment Program dealing with both closed and active ranges.
- **EFA Northeast, CTT Preliminary Assessment.** Sr. UXO Supervisor supporting the preliminary assessments for all CTT ranges nationwide for the U.S. Navy at over 25 Installations nationwide. Aspects of this program include historical records reviews, regulatory involvement, development of conceptual site models (CSMs), and the Munitions Response Site Prioritization Protocol (MRSP).
- **Kansas Army Ammunition Plant: Soil Remedial Action.** Managed a \$2.5M contract with the USACE, Kansas City District, for remediation of 6,000 cubic yards of RCRA hazardous waste soils contaminated with metals and explosives at the Kansas Army Ammunition Plant, Parsons, Kansas. Conducted solidification/ stabilization (S/S) of soil contaminated with heavy metals, low-temperature thermal desorption (LTTD) treatment of soil contaminated with explosive compounds, and off-site disposal of soil contaminated with both heavy metals and explosive compounds.
- **Former Naval Air Station: UXO Investigations / Adak Island, AK.** Managed 55 personnel and conducted OE operations on 79 AOCs to conduct UXO investigations and the assessment; and detection, identification, removal, and disposal of UXO at the Former Naval Air Station Adak Island, Alaska. Oversaw the identification, removal, and disposal of UXO, ordnance-related materials, and other contaminants from onshore and offshore sites. Ensured work activities were performed in compliance with approved work plan, environmental protection plan, and regulatory requirements. Oversaw the packaging, transportation, and temporary storage of all OE items. Conducted daily project briefings with UXO technicians and inspections of equipment.
 - Assessed risks, hazards, and safety requirements, and assisted in the preparation and implementation of UXO work plan, SOPs, QC plan, and SSHP.
 - Responsible for design and implementation of a VDS course to establish minimum criteria for detection processes and to evaluate UXO detection technologies.
 - Developed remedial design work plans, and CERCLA decision and BRAC Land Transfer documents in efforts to turn the land over to the State of Alaska. Explosives Safety Sub-missions, Record of Decision (ROD), Environmental Baseline Survey (EBS), Remedial Alternatives Analysis (RAA), Finding of Suitability to Transfer (FOST), Explosive Safety Sub-mission (ESS), Remedial Action Work Plan (RAWP), Remedial Investigation/Feasibility Study (RI/FS).

- Worked with Navy to establish good public relations with the local communities.
- Received letters of commendation from Governor Knowles of Alaska and Commanding Officer, NAVFAC, Northwest District for outstanding project performance.

- **UXO Task Manager / Lakewood CO.** As UXO Manager for the USAEC New England District Total Environmental Restoration Contract (TERC), responsible for managing the supervision of labor, subcontractors, equipment, materials, and supplies associated with the UXO investigation, remediation, and removal activities at Massachusetts Military Reservation (MMR) in support of the Impact Area Ground Water Study Program (IAGWSP) for the Army Corps of Engineers and National Guard Bureau.
 - Developed two White Papers: 'Demilitarization of Inert Items' and 'Demilitarization of Energetic Small Arms Ammunition Items (Up to and including 20MM), Pyrotechnics, and Military Munitions Related Items/Components Containing Minor Explosive Components/Residual Explosives.
 - Coordinated with HTRW personnel to develop a materials management plan that addresses how to manage, characterize, and dispose of all investigative derived waste (IDW), OE, and OE scrap.
 - Procured a Thermal Neutron Analyzer (TNA) for use in distinguishing between 'safe to move' explosive-filled and inert-filled ordnance items.

- **UXO Quality Control Specialist.** Conducts quality control inspections of all OE and explosives operations for compliance with established procedures. Directs and approves all corrective actions to ensure that all OE-related work complies with contractual requirements.
 - Initiates UXO QC project planning and implementation of the UXO QC project activities for the Navy PRA sites.
 - Conducts quality control of submittals to ensure contract compliance.

Dan S. Haines, UXOSO

Mr. Hains has extensive experience in the disposal of unexploded ordnance, bulk explosives, and hazardous and reactive materials. He is a graduate of the Naval Explosive Ordnance Disposal (EOD) School, Indian Head, Maryland and certified as Master Explosive Ordnance Disposal Officer. He is also qualified as Senior UXO Supervisor, Quality Assurance Manager, and UXO Safety Manager under U.S. Army Corps of Engineers Regulations. Mr. Hains has worked with the United States Secret Service in support of the munitions countermeasures branch of the Technical Security Division, providing support for the President of the United States and foreign dignitaries. He has also worked as a consultant providing expert witness testimony related to the FBI and the State of Florida Attorney General's office. In addition, Mr. Hains has performed duties as Project Manager and UXO Safety and QC Manager in the environmental area.

DETAILED EXPERIENCE

- **U.S. Army Corps Of Engineers: Unexploded Ordnance Avoidance at Fort Riley KS.** Senior UXO Supervisor responsible for UXO support and personnel safety during the GIS location verification and environmental sampling of 36+ monitoring wells and ground water seeps located on and around the active EOD Open Burn/Open Detonation (OB/OD) range
- **U.S. Navy Engineering Facilities Activities North East (EFANE) MMRP Preliminary Assessments.** Senior UXO Supervisor/Team Leader for 22+ Naval Facilities, responsible for on-site UXO Safety indoctrination training, on-site UXO safety, UXO avoidance during range survey, UXO Research and Technical review of all ordnance related reports and deliverables.
- **U.S. Army Corps of Engineers: Unexploded Ordnance Consultation at Infantry Center / Fort Benning GA.** Responsible for UXO detection, excavation, and disposal of over 3,800 unexploded ordnance items. Acted as quality control manager during the removal and disposal phase of 4-in stokes mortars, 76-mm naval gun rounds, French rifle grenades, and subsequent DD Form 1348-1 documentation for INERT certification of tons of range residue.
- **Lake City Army Ammunition Plant: Unexploded Ordnance Disposal / Independence MO.** Senior UXO Supervisor during the recovery, identification, and water jet cutting of 798 conventional and 280 depleted uranium projectiles. The projectiles had been fired during the 1950s as spotting rounds for the testing and evaluation of the Davey Crockett antitank system. All explosives were neutralized, packaged, and transported to a permitted landfill.
- **U.S. Army Corps of Engineers, Fort Worth District: Five Points Outlying Field Soil Sampling / Houston TX.** As Senior UXO Supervisor, provided UXO support and UXO safety oversight, certifying safe sampling areas for soil sampling using direct-push technology down to a depth of 6 ft.

PROJECT ROLE: UXO SAFETY SPECIALIST

Title/Firm

Environmental Specialist
Malcolm Pirnie, Inc.

Years of Experience

35

Education

BA Business Management Saint Leo University 1990
BS Information Systems Management University of South Florida 1997

Registrations and Certifications

Certified Protection Professional, 1976

Health and Safety Training

Hazardous Waste Operations 40 hour Course
Hazardous Waste Operations Eight (8) hour refresher

- **U.S. Navy: Training and Evaluation / San Francisco CA.** As Explosive Ordnance Disposal Officer and Head of the Training and Evaluation Department, responsible for the supervision of six highly trained instructors/inspectors in all areas of special operations training. Types of training included explosive recognition, handling/employment, storage, security, and disposal; air operations for rapid insertion of emergency response teams; and the operation of biological and radiological reaction teams. Duties included approval of standard operating procedures (SOPs) for deploying explosive ordnance disposal (EOD) teams. Provided command operational/readiness inspections as the chief inspector certifying the operational readiness of six-man EOD teams.
- **State of Florida: Evenrude Artificial Reef / Fort Pierce FL.** Senior UXO Supervisor, Team leader and explosives safety supervisor with overall responsibility for the planning and placement of explosives in the ex-LKA 103 Rankin, for use as an artificial reef 7.5 miles east of Fort Pierce. The explosives were used to open the 469-ft Rankin to the sea in 14 strategic locations to allow for maximum safe diver access to the interior of the artificial reef.
- **CMS Environmental, Inc.: Unexploded Ordnance Consultation / Tampa FL.** Provided unexploded ordnance technical consulting services for quality control and safe handling practices in the preparation of a 400 million dollar request for proposal (RFP) for the UXO cleanup of Kaho'lawe Island HI.
- **Delphi Automotive Systems: Staff Training in Use of Explosives / Matamoros, Mexico.** Lead Instructor, provided safety training and practical exercises in the use of explosives to certify plant workers in the handling and transportation of explosives used in automotive airbags.
- **Confidential Client: Chemical Soil Sampling.** Responsible for environmental site investigations involving pesticides/herbicides and unexploded ordnance throughout the United States. Participated in numerous field service activities, including (but not limited to) site-specific data acquisition and site exploration, providing technical support for expert witnesses, sample collection, sample preservation, storage, and transportation. Organized and participated in site investigations in Idaho and Costa Rica in support of litigation. Coordinated field activities for major site investigations including personnel and logistics, administration of sampling activities (collections of soil, plant tissue, roots, water, and other media), sample custody care and documentation, and transport and shipping of samples to respective laboratories.

EMPLOYMENT HISTORY

Malcolm Pirnie, Inc. 2002 to present

Responsibilities included: Explosives and Safety specialist. Duties include ordnance research, training, safety briefs, site management and project manager.

Assignments:

- 2002-Present, Environmental Specialist

Rapid Entry Systems Technology Corporation 2002 to 2002

Responsibilities included: Conducted inspections of explosive storage facilities and ensured compliance with all federal, state, and local rules and regulations. Planned the inspection and disassembly of 900+ explosive ordnance items and directly supervised six highly trained UXO staff members in performing the work. Processed hazardous explosive and radiological residue for final disposal.

Assignments:

- 2002, Senior Unexploded Ordnance Technician and Explosive Safety Supervisor

U.S.A Environmental, Inc. 2002 to 2002

Responsibilities included: Research, investigation and location and disposal of ordnance.

Assignments:

- 2002-2002, EOD Tech 2

CCN, Inc./First Health 1997 to 2002

Responsibilities included: As Computer Specialist, responsible for desktop IS support for 132+ on-site computer workstations and nine remote users. Generated new user desktop profiles and deployed and trained new employees in their use. Trained customers in the proper operation of their workstations and associated applications. Responsible for troubleshooting user system problems including hardware, software, and business-specific database systems. Deployed new IS equipment and installed new and/or updated application software. Performed quality assurance acceptance testing of a FoxPro database application. Generated weekly/monthly client tracking and use reports, maintained computer asset inventories, and tracked asset retirement and disposal records. Provided IS training to peers and customer clients in hardware/software maintenance, repair, and use.

Assignments:

1997-2002, Desktop Support Representative

U.S. Navy EODMU NINE Training & Evaluation 1994 to 1995

Responsibilities included: Overseeing all training related to explosives, diving, parachuting, and small boat handling. Worked with the United States Secret Service in support of the munitions countermeasures branch of the Technical Security Division, providing support for the President of the United States and foreign dignitaries.

Assignments:

1994-1995, Department Head for Training and Evaluation

U.S. Navy EOD Technology Center, Indian Head 1990 to 1994

Responsibilities included: As Assistant Department Head and Explosive Ordnance Disposal/Explosive Safety Officer, planned, supervised, and conducted inspections on all explosive storage facilities, ensuring strict compliance with all federal, state, and local rules and regulations. Directed/supervised ten highly trained specialists in the disassembly of foreign explosive ordnance items for intelligence exploitation. Conducted in-depth investigations into explosive mishaps during munitions disassembly operations. Assisted in the management of a \$25 million construction project, constructing a state-of-the-art munitions disassembly complex at the Naval EOD Technology Center. Managed \$750,000 budget for research and development of specialized explosive ordnance disposal tools and techniques.

Assignments:

1990-1994, Assistant Department Head

U.S. Navy Commander EOD Group ONE 1984 to 1995

Responsibilities included: Overseeing all training related to explosives, diving, parachuting, and small boat handling. Worked with the United States Secret Service in support of the munitions countermeasures branch of the Technical Security Division, providing support for the President of the United States and foreign dignitaries.

Assignments:

1997-2002, Officer

U.S. Navy Commander EOD Group TWO 1977 to 1984

Responsibilities included: Overseeing all training related to explosives, diving, parachuting, and small boat handling. Worked with the United States Secret Service in support of the munitions countermeasures branch of the Technical Security Division, providing support for the President of the United States and foreign dignitaries.

Assignments:

1997-2002, Officer

U.S. Navy 1969 to 1977

Responsibilities included: Demolition Petty Officer, Range Safety Officer. Planned and carried out explosives operations on surface and underwater. Conducted training for new personnel and taught refresher courses. Provided secret service support to the President of the United States and various foreign dignitaries.

Assignments:

1969-1977, Explosives Ordnance Disposal Tech

Steven Burhans, SUXOS

Mr. Burhans is a retired EOD Army Officer with over twenty years of experience in dealing with Ordnance. He has supervised and worked conventional and chemical incidents. He has organized and coordinated range clearances and disposed of ordnance on a number of military installations while on active duty. Under the BRAC and FUDS systems, he has worked for a number of companies who have contracted to the Corps of Engineers. Having served as Senior UXO Supervisor (SUXOS), Quality Control specialist, Safety Specialist, UXO Specialist (Tech II) and UXO Supervisor (Tech III), he is very familiar with The Corps of Engineers requirements and would be an asset in observing/supervising any sub-contracting company.

Detailed Experience

- **Fort Benning, GA. MMRP SI Anomaly Investigation, SUXOS.** Senior UXO Supervisor for UXO removal on 25 acres site. Planned and developed procedures, techniques and standards for the investigation and disposal of 1371 subsurface anomalies and 27 linear anomalies.
- **Virginia Department of Military Affairs: Ft. Pickett HSMM UXO / Ft. Pickett VA.** Senior UXO Quality Assurance Manager for the Virginia National Guard project.
- **UXO Specialist Tech II, UXO Supervisor Tech III, Safety and Quality Control Specialist: Various Military Sites / Nationwide.** Served as specialist in the areas of investigation and disposal of explosive ordnance, chemical agents and other toxic and hazardous material from contaminated areas. Investigated, planned for disposal and disposed of explosive ordnance, chemical agents and other toxic and hazardous materials from contaminated sites. Planned and developed procedures, techniques and standards for the investigation of sites suspected, or known to be, contaminated with explosive items. Provided technical information relating to safety of personnel when performing field investigations of known or suspected explosive ordnance or chemical-contaminated areas to insure safe operations. Performed Quality Control for clean-up activities at ordnance contaminated sites. Operated and maintained a portable ferromagnetic search instrument (metal detector – Schonstedt, MK 26, Valon, white and EM 61) to locate surface and subsurface unexploded ordnance. Performed downhole monitoring, soil and water sampling escort during UXO avoidance. Operated Heavy equipment in conjunction with UXO Clearance/removal.
- **Chief: Hazardous Devices / Redstone Arsenal, AL.** Responsible for training law enforcement, public safety personnel and FBI personnel in the design, construction, render safe and disposal of hazardous improvised explosive

PROJECT ROLE: SUXOS

Title/Firm:

Technician
Malcolm Pirnie, Inc.

Years of Experience

21

Education

BA, Criminal Justice, Columbia College, MO, 1985
Command and Staff College, Leavenworth, KS 1991
Explosive Ordnance Disposal school, Indianhead, MD, 1981
Chemical Staff Specialist school, Aberdeen, MD, 1975
Military Police School, Fort Gordon, GA, 1972
Hazardous Devices school, Redstone Arsenal, AL, 1992
Terrorist Threat Course, Fort Bragg, NC, 1992

Licenses and Certifications

OSHA 40 hour, 1995
OSHA 8 hour refresher, July 2004
Federal Bureau of Investigation (FBI) Hazardous Devices Certification
Quality Control Certification, Corps of Engineers (CEHND), 1997
Safety Officer Certification, Ashburn, VA (UXB), 1999
CPR Certification, Red Cross, 1999
Dive Certified, (NAUI) 1983
Heavy Equipment Operator, 1999
Confined Space 2004
Safety Certification 2004

Employment History

Malcolm Pirnie, Inc. 2004 to present
UXO Companies 1994 to 2005
EOD: US ARMY 1981 to 1993
US Army: 1973 to 1993
US Army 1973 to-1993

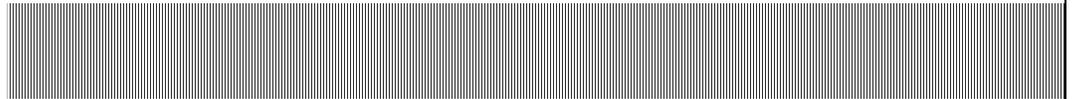
- devices (IED). Additionally served as demolitions range Safety Officer.
- **EOD Detachment Commander / Fort Gillem, GA.** Provided EOD support for nuclear, chemical conventional and improvised explosive device incidents or accidents for a 65 county area in Georgia, Puerto Rico and the Virgin Islands. As Safety Officer organized and conducted multiple range clearances.
 - **Division Ammunition Officer / Fort Riley, KS.** Responsible for forecasting, movement, storage and accountability of the ammunition for the 1st Infantry Division and over 148 other military units. Additionally handled the logistics for six National Training Center rotations at Fort Irwin, CA.
 - **EOD AIT OIC/Range Safety/Chemical Safety Officer / Redstone Arsenal, AL.** Supervised and coordinated all aspects of the Army EOD AIT course and performed as Chemical Safety Officer at the Chemical Training Facility as well as Demolitions Safety Officer for six different ammunition related courses.
 - **EOD/Chemical Safety Officer / Johnston Island.** Maintained chemical agent munitions stocks (VX, HD,GB) bombs, projectiles, rockets, mines, one ton containers, and disposed of unserviceable related ordnance components. Provided emergency Hot Line/decontamination procedures.
 - **EOD Instructor / Redstone Arsenal, AL.** Responsible for writing lessons plans and instructing entry level EOD students. Performed as Toxic Chemical Safety Officer, and served as the primary instructor for Toxic Chemical Agent training. Performed as range Safety Officer during demolitions and disposal procedures.
 - **Chemical Specialist / Fort Riley KS, and Fort Lee, VA.** Responsible for training battalion sized elements in chemical warfare protection and decontamination.

Attachment 8 – Site Safety and Health Forms

Copies of Site Safety and Health Forms are contained in Attachment 1 (SSHP) and are not duplicated here.

FGGM, Mortar Range RI, GPO Plan

Appendix B: Field Forms



DGM Survey Data and Dig Sheet
Quality Control Checklist
Remedial Investigation, FGGM

Sector: _____

Grid: _____

Grid Size (ft.): _____

Data Collection Days: _____

Grid Hubs:

Non-DGM Sub-Areas: _____

Saturated Response Areas: _____

Removal Area Boundary: _____

Raw Data QC:

Check all that Apply

Comments:

Data Coverage

AM/PM Static Test Results

Am/PM Replicate Line Results

Hub Detection

Grid DGM Survey:

Check all that Apply

Comments:

Data Tracks/Completeness

Non-DGM Sub-Areas Mapped and Labeled

Cultural Features Identified

Location Control

Background Levels

Noise/Interference Levels

Data Processing other than Level/Lag

Other DGM Survey Issues

Grid Review Map:

Check all that Apply

Comments:

Basemap Plotted

Standard Map Legend Format

Standard Scale/Color Bar

Cultural Features Mapped and Labeled

SRA/Non-DTM Areas Mapped/Labeled

State Plane NAD83 Coordinates

Grid Edge/Boundary Issues

Plotting/Labeling of Anomalies

Other Grid Mapping Issues

Raw Data Processing:

Check all that Apply

Comments:

Level (UX-Detect Drift)

Lag Correction (2 points)

Line/Data Editing

Grid Extraction (plus buffer)

Grid Target Selection:

Check all that Apply

Comments:

Initial UX-Detect Auto-Selection

QC Codes Assigned

Saturated Response Areas Mapped

Outside of Grid Targets Removed/Edge Issues

Notes on Individual Anomalies and/or Locations

Other Anomaly Selection issues

Targets Sorted by Amplitude

Placement of "Cut Line" (~3 mV)

Submittal Dig Sheet:

Check all that Apply

Comments:

Grid ID

Hubs and Hub Coordinates

Other Dig Sheet Header Information

Anomaly Identification

Anomaly Location

Anomaly Peak Amplitude

Cut Line Labeled

Non-DGM Sub-Area Clearance Approach

Other Dig Sheet Issues

Review Procedure	Date	Person Performing Task
Raw Data QC		
Grid DGM Survey		
Grid Review Map		
Raw Data Processing		
Grid Target Selection		
Submittal Dig Sheet Review and Posting		
QC Review		

Additional Notes on Processing Parameters:

