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NAS CECIL FIELD
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MEMORANDUM REGARDING EMERGENCY PERMIT 0013526-HE-016 FINAL THERMAL
TREATMENT AND SOIL SAMPLE ANALYSIS REPORT NAS CECIL FIELD FL
7/14/2014
RESOLUTION CONSULTANTS

Emergency Permit No. 0013526-HE-016

Final Thermal Treatment and Soil Sample Analysis Report

PREPARED FOR: Florida Department of Environmental Protection
PREPARED BY: Base Realignment and Closure Program Management Office East

DATE: July 14, 2014

In accordance with Florida Department of Environmental Protection (FDEP) Emergency Permit No. 0013526-HE-016, this memorandum summarizes the demolition/treatment event and subsequent soil sampling that occurred in support of the munitions response (MR) activities at Naval Air Station (NAS) Cecil Field Hangar 860 Munitions Response Area (MRA). The emergency treatment/detonation of recovered munitions and explosives of concern (MEC), and the associated post-detonation soil sampling and laboratory analyses, were conducted in accordance with the emergency permit and the references at the end of this memorandum. The treatment involved deactivation or destruction of a reactive waste (i.e., recovered MEC/materials presenting a potential explosive hazard [MPPEH] that presented an unacceptable hazard for transportation to a disposal site). Following is a summary of the emergency detonation events.

MEC Clearance and Removal

CH2M HILL and subcontractor USA Environmental, Inc. (USAE), completed a MEC clearance and removal from the ground surface at NAS Cecil Field Hangar 860 MRA from March 17, 2014, through April 10, 2014. The following list of MEC/MPPEH items were recovered from the site:

MEC/MPPEH Description	Quantity Treated
JAU 22/B initiator	1
Mark 80 Mod 0 pen flare	14

Emergency Treatment/Detonation of MEC/MPPEH

On April 10, 2014, all MEC/MPPEH items recovered were demilitarized through explosive counter charge between the hours of 2:00 PM and 3:00 PM via the procedures detailed in NAVSEA OP 5 Volume 1, Seventh Revision, Change 10, *Ammunition and Explosives Safety Ashore* (NAVSEA, 2011); the approved ESS (Agviq-CH2M HILL, 2012); and the approved work plan (CH2M HILL, 2014). MPPEH was inspected in accordance with the procedures described in the approved ESS and work plan to determine if each item was Material Documented as Safe (MDAS) or Material Documented as an Explosive Hazard (MDEH). All items classified as MDEH were treated by an explosive counter charge; the standard operating procedure followed for the demolition is included as **Attachment 1**.

All discovered items were inspected, determined safe to move, and relocated to a predetermined location for treatment; the location was 30°13'11.5"North, 81°53'41.78"West, as specified in the permit. The total net explosive weight (NEW) did not exceed 2.62 lbs. in accordance with Emergency Permit No. 0013526-HE-016 issued by the FDEP and the Buried Explosives Module (BEM) calculations (Appendix D). Upon completion of treatment operations, all items were inspected and certified as MDAS and were packed in sealed, serialized containers under DD Form 1348-1A.

MDAS was handled in accordance with the procedures described in the approved work plans and ESS and transported off site by Bonetti Explosives for disposal. Bonetti Explosives transported the MDAS to their facility in Columbus, Texas, for disposal via smelting on June 12, 2014, in accordance with NAVSEA OP 5 Volume 1, Seventh Revision, Change 10. Signed copies of the DD Form 1348-1A, the Release of Liability Letter, and the Letter of Consumption are provided in **Attachment 2**.

Personnel Present

The personnel present at the site during the demolition activities were from the Navy's munitions response contractor, CH2M HILL and subcontractor USAE. The daily roster providing all the names of the personnel on site is included as **Attachment 3**.

Post-Emergency Treatment Soil Sampling and Laboratory Analyses

Following detonation, the demolition pit was inspected for raw explosives and buried metal fragments; no raw explosives were observed and buried metal was removed. A composite soil sample was collected from the demolition pit on April 11, 2014; the composite soil sample was collected from 0 to 6 inches below the ground surface and collected from 5 locations within the pit. All samples were sent to an off-site laboratory for the 8 Resource Conservation and Recovery Act (RCRA) metals by U.S. Environmental Protection Agency (EPA) Method 6010C/7471A and nitroaromatic explosives by EPA Method 8330B.

No explosives were detected in the sample. However, four metals were detected in the sample, as summarized in **Table 1**, at concentrations below the FDEP Direct Exposure-Residential or Leachability based on Groundwater Criteria Soil Cleanup Target Levels (SCTLs). The analytical result summary table for all analytes is provided in **Attachment 4**.

Table 1
Analytes Detected in Post-Treatment Soil Sample

Detected Analyte	Concentration in Sample mg/kg	FDEP SCTLs	
		Direct Exposure- Residential mg/kg	Leachability Based on Groundwater Criteria mg/kg
Barium	3.88	120	1600
Chromium	1.81	210	38
Lead	2.67	400	--- *
Mercury	0.0103 J	3.0	2.1
J - Concentration is estimated; result below instrument reporting limit			
* - Site-specific SCTLs for lead leachability have not been calculated			

References

- Agviq-CH2M HILL. 2012. *Amendment No. 02, Correction No. 02, Final Explosives Safety Submission. Execution of a Selected Response for Discarded Military Munitions, Hangar 860 Munitions Response Area, Former Naval Air Station Cecil Field, Jacksonville, Florida.* February.
- CH2M HILL. 2014. *Final Work Plan, Surface Investigation at Hanger 860 Munitions Response Area, Former Naval Air Station Cecil Field, Jacksonville, Florida.* February.
- FDEP. 2014. *Former Naval Air Station Cecil Field; EPA ID No. FL5 170 022 474, Emergency Permit No.0013526-HE-016.* April 4.
- NAVSEA. 2011. *OP 5 Volume 1, Seventh Revision, Change 10, Ammunition and Explosives Safety Ashore.* July.

Attachment 1

MEC/MPPEH Demolition SOP

**STANDARD OPERATING PROCEDURE
OPS-17 – MEC SURFACE SWEEPS****1.0 PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to provide all USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform surface sweep operations at sites potentially containing unexploded ordnance (UXO) and/or munitions and explosives of concern (MEC).

2.0 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the conduct surface sweep operations on the Future P-030 Infantry Squad Battle Course (ISBC) located at MCB Camp Lejeune, NC. The following USA policies and procedures are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with Work Plans, other SOPs, Activity Hazard Analysis (AHAs), CH2M Hill Accident Prevention Plan (APP), and other applicable Federal, State, and local regulations, and contract restrictions and guidance. Consult the documents listed in Section 5.0 of this SOP for additional compliance issues.

3.0 SURFACE SWEEP OPERATIONS

All surface sweep operations at MEC sites will be performed under the direct supervision of fully qualified UXO qualified personnel. USA personnel will strictly adhere to the SSHP and the following general safety practices:

- Operations will be conducted during daylight hours only.
- Access to operating areas will be limited to only those personnel necessary to accomplish the specific operation.
- UXO will only be handled by qualified UXO Technicians.
- During UXO operations the minimum separation distance (MSD) between UXO and non-UXO operations is fragmentation distance of the munition with the greatest fragmentation distance (MGFD), as stated in the Work Plan and/ or Explosives Safety Submission (ESS), if applicable.
- During demolition operations personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item/s for destruction.
- All personnel will attend the daily safety briefing (tailgate safety briefing) prior to entering the operating area.
- Anyone can stop operations for an unsafe act or situation.
- Safety violations and/or unsafe acts will be immediately reported to the UXO Safety Officer (UXOSO).
- Failure to comply with safety rules/procedures may result in termination of employment.

3.1 PERSONNEL QUALIFICATIONS

All personnel involved in MEC Surface sweep operations will meet the training and experience requirement of Department of Defense Explosives Safety Board Technical Paper 18 (DDESB TP 18) for the position assigned. UXO–Sweep personnel, as defined by DDESB TP 18, are provided job and site specific training that includes, but not limited to:

- Explosive safety
- MEC recognition
- Proper use of personnel protective equipment.

UXO-Sweep personnel may perform the following MEC surface sweep tasks:

- Visual and/or detector-aided search activities
- Remove non-hazardous munitions debris and range-related debris that a fully qualified UXO Technician (UXOTII and above) has inspected and determined to be safe for handling.
- Locate and mark suspected Low Level Radiological Waste (LLRW) and notify the Radiological Technician for subsequent screening IAW the Work Plan.

3.2 SITE LAYOUT PROCEDURES

Depending on the method selected and approved by the customer, the site layout and search grids will be established using a Global Positioning System (GPS), licensed surveyor, or compass and measuring tape. Survey crews will be escorted in the field by a UXO Technician II who will provide UXO avoidance including checking the intended survey stake locations with a magnetometer prior to driving stakes into the ground, which will prevent driving stakes into buried MEC. The site layout procedures are as follows:

- Identify and mark the operating area boundaries:
 - The boundary will be marked with survey wooden stakes, with black and yellow survey tape, approximately every 200 meters. The stakes should be visible from one to the next. Therefore depending on the terrain, it may be necessary to place them closer together.
- Identify and mark search grids:
 - Search grids will vary in size depending on the site and the number of personnel to be used in sweeping. The grid width should be in multiples of 5 ft as the typical individual can cover a 5-ft wide lane with a magnetometer. For example, a 30-ft wide grid would accommodate six sweepers on line.
 - Grid boundaries will be marked with survey wooden stakes, with orange survey tape, and temporary survey lanes with white pin flags or twine/string.
- Establish and, mark if required, search lanes:
 - A typical search lane will be a width of approximately 5 ft. The lanes may or may not be established prior to sweeping. If temporary lanes are marked prior to sweeping it will be done by a UXO technician to ensure safety.
 - For wide area surface clearances, sweep lane boundaries may be marked while sweeping. For example, the sweep line would begin sweeping with a grid boundary on one side and place pin flags on the opposite side of the line as they sweep. This would provide a boundary for the return sweep and ensure 100% coverage.

3.3 SWEEP PROCEDURES

Sweep teams will consist of UXO Technician level Is and IIs. Sweeps may be for surface (visible) or sub-surface (buried) MEC. Regardless of the type of clearance, MEC operations will only be performed by qualified UXO Technicians.

- MEC operations are defined as:
 - MEC identification

- Access procedures such as excavation, either by hand or using heavy equipment
- Handling of UXOs, explosives, or explosive items
- Disposal, including movement, transportation, and final disposal of MEC

3.3.1 Flags and Markers

USA uses a system of colored flags/flagging and markers to identify MEC, scrap metal, sweep lanes, and site, zone, and grid boundaries. Table 1 lists the types of markers used.

Table 1: Marking Material

Type Marker	Flag/Flagging Color	Item/Area Marked
Stake	Black and Yellow	Site boundary
Stake	Red and Orange	Zone boundary
Stake	Orange	Grid boundary
Pin Flag	White	Temporary Boundary
Pin Flag	Red	MEC
Pin Flag	Yellow	Subsurface Anomaly
Pin Flag	Blue	MEC Scrap
Pin Flag	Green	Non-MEC Scrap

3.3.2 Surface Sweep

The purpose of a surface sweep of a grid is two fold: first to locate, mark, and record the location of the surface MEC contamination contained in each grid; and second to consolidate the scrap metal contamination within each grid. The typical span of control for a UXO Technician is three to five sweepers. This ensures positive control and safety.

3.3.2.1 Sweep Team Structure

The sweep team will consist of all UXO Technicians. The following is an example and composition of a typical Sweep Team:

- One (1) UXO Technician III, who directs and supervises all team activities, confirms the identification of all MEC encountered, and maintains the sweep team journal.
- One (1) UXO Technician II who assists the UXO Technician III, identifies all MEC encountered, and records the location of the items located.
- Five (5) UXO Technicians Is or IIs who visually search the area for MEC. These personnel perform their duties under the direction and supervision of the UXO Technician III.

3.3.2.2 Surface Sweep Team Procedures

All sweep operations will be performed under the direct supervision of a qualified UXO Technician III. The UXO Technician III will assemble the sweepers into a sweep line and direct their movement across the survey grid.

- Sweepers will be spaced approximately 5 ft apart and, at the direction of the UXO Technician III, move through the grid on line abreast.

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- When an item is encountered, the individual will call out "hold the line", and hold up his/her hand. The line will stop and the UXO Technician II will inspect the object to determine if it is MEC or scrap and mark the item with the appropriate colored Pin Flag. The line will not move again until directed by the UXO Technician III.
 - As the team moves forward the sweeper at the edge of the grid will use the grid stakes as one sweep lane boundary, the sweeper on the opposite end of the line will mark the limit of the sweep lane with White Pin Flags. These flags become the guide for the return sweep and define the limits of the previously cleared lane.
 - This procedure is continued until the grid is completely swept.
 - The UXO Technician III will follow behind the sweep line insuring that proper spacing is maintained, inspect and verify the identification of the flagged items, and record data on the type, nomenclature, and location of the contamination.
 - Upon completion of the grid sweep the sweep team will recover and stockpile metal scrap at a central location. Under the direct supervision of the UXO Technician III, the scrap will be stockpiled in a central location in the grid. Items marked with Red Pin Flags will be left in place for the Disposal Team.

3.3.3 Magnetometer Assisted Surface Sweep

Magnetometer assisted surface sweep procedures are basically the same as surface sweeps. In addition to identifying surface contamination, magnetometers are used to locate buried MEC that may be concealed by brush or heavy grasses. Instructions on the use and calibration of magnetometers are in the USA magnetometer SOP. The purpose of a magnetometer assisted-surface sweep of a grid is to first locate, mark, and record the location of the surface and buried MEC contamination contained in each grid; and second to consolidate the scrap metal contamination within each grid. The typical span of control for a UXO Technician is three to five magnetometer operators. This ensures positive control and safety.

3.3.3.1 Magnetometer Assisted Surface Sweep Team Structure

The sweep team will consist of all UXO Technicians. The following is the structure and composition of a typical Sweep Team:

- One (1) UXO Technician III, who directs and supervises all team activities, confirms the identification of all MEC encountered, and maintains the sweep team journal.
- One (1) UXO Technicians II who assist the UXO Technician III, identify all MEC encountered, excavate and identify buried contacts, and record the location of the items located/detected.
- Five (5) Magnetometer Operators (either UXO Technicians Is or IIs) who visually and electronically search the area for MEC. These personnel perform their duties under the direction and supervision of the UXO Technician III.

3.3.3.2 Magnetometer Assisted Surface Sweep Team Procedures

All sweep operations will be performed under the direct supervision of a qualified UXO Technician III. The UXO Technician III will assemble the Magnetometer Operators into a sweep line and direct their movement across the survey grid. Procedures will be the same as detailed in Section 3.3.2.2 with the exception that the Magnetometer Operators will utilize the magnetometer to assist in searching in heavy brush and grass.

4.0 DISPOSAL OPERATIONS

Disposal operations consist of actions taken at the site to remove the scrap and dispose of the MEC/UXO and explosive contamination. Demolition and transportation of MEC and explosives will be in accordance with USA's Demolition Operations and Explosive Transportation SOPs.

The use of standard Explosive Ordnance Disposal (EOD) procedures for detonating or disposing of MEC will constitute the principle control measure for ensuring safety during demolition operations. These procedures, contained in EOD technical manuals, are designed to limit fragments and harmful blast to the immediate vicinity of the disposal operation. These procedures involve the use of controls such as pits, earth cover (tamping), barricades, sandbags, and/or blast mats, and are tailored to the type of munition, its orientation, and net explosive weight (NEW). In addition, the following measures will be taken:

- All MEC/UXO will be accounted for and identified by nomenclature, if possible. As a minimum, UXO identification will be by type, by function, and filler.
- Coordination will be made with the Federal Aviation Administration to ensure air space clearance prior to the start of operations.
- MEC/UXO that is safe to move may be consolidated at each site to reduce the number of demolition shots and conserve explosives.
- Munitions debris (e.g., inert ordnance, expended munitions, mortar fins) will be removed to the appropriate reutilization office. Should the reutilization office not be established for the receipt of scrap, the contractor will dispose of the scrap through a local scrap dealer at no cost to the Government. All material will be accounted for through appropriate documentation, as required by the Government and/or scrap dealer.
- Avenues of approach to each disposal site will be controlled to prevent unauthorized access.
- Prior to the start of disposal activities, the Senior UXO Supervisor (SUXOS) and UXOSO will verify that the area around the operating site is clear of all nonessential personnel and that other UXO Technicians III have been notified. Prior to priming of demolition charges, all avenues of ingress will be physically blocked by UXO personnel. Radio communications will be maintained among all concerned parties. Avenues of ingress will not be opened without the express permission of the SUXOS. A constant state of vigilance will be maintained by all personnel to detect any intrusion into the fragmentation zone.

Minimum distances of 1,250 ft (non-fragmenting), 2,500 ft (fragmenting), and 4,000 ft (bombs and projectiles greater than 5 inches in diameter) will be established and maintained around the operating site. Depending on the type of munition being destroyed, the fragmentation distance may be increased or decreased based on data obtained from Technical Manual 60A-1-1-4. Personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item/s for destruction.

4.1.1 Disposal Team Structure

The Disposal Team will consist of:

- One UXO Technician III will direct and supervise all team activities, maintain the Site Explosive Log Book, and inspect the scrap for hazardous material.
- Two UXO Technicians II will assist the UXO Technician III and perform disposal operations.

4.1.2 Disposal Team Procedures

The Disposal Team will remove the scrap from each survey grid and transport it to a designated central collection point. During this removal, the UXO Technician III will perform a through examination of the scrap to ensure that it is free of hazardous material. All MEC containing hazardous material will be

disposed of in-situ whenever possible. The preferred method is detonation in place; however, items that are safe to be moved may be consolidated to reduce the number of shots. If MEC cannot be disposed in place or moved, the SUXOS will request EOD support.

5.0 REFERENCES

- USACE Safety Considerations for UXOs
- USA Corporate Safety and Health Program (CSHP)
- OSHA, 29 CFR 1910, Occupational Safety and Health Standards
- OSHA, 29 CFR 1926, Construction Standards
- Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- USACE EM 385-1-1, Safety and Health Requirements Manual
- USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions
- DDESB TB 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- DA PAM 385-64, Ammunition and Explosives Safety Standards
- AR 385-64, Ammunition and Explosives Safety Standards
- AR 200-1, Environmental Protection and Enhancement
- AR 385-10, The Army Safety Program
- AR 385-16, System Safety Engineering and Management
- AR 385-40 w/USACE supplement, Accident Reporting and Records
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- TM 60 Series Publications

Attachment 2
DD Form 1348-1A

Attachment 3

Personnel Present During Treatment

Attachment 3
Personnel Present During Treatment

Name	Company	Title
Brown, Steve	CH2M HILL	UXOQCS
Clark, Denise	USAE	UXO Tech II
Davis, Scott	USAE	UXO Tech II
Edwards, Christopher	USAE	UXO Tech II
Garrett, Edward	USAE	UXO Tech II
Gildea, Patrick	USAE	SUXOS
Lefevre, David	USAE	UXO Tech III
Sanders, Robin	CH2M HILL	UXOSO

Attachment 4
Analytical Sample Results

Attachment 4
Unvalidated Soil Analytical Data

Sample ID	NASCF-H860-041114
Sample Date	4/11/14
Chemical Name	
Explosives (UG/KG)	
1,3,5-Trinitrobenzene	300 U
1,3-Dinitrobenzene	300 U
2,4,6-Trinitrotoluene	300 U
2,4-Dinitrotoluene	300 U
2,6-Dinitrotoluene	300 U
2-Amino-4,6-dinitrotoluene	300 U
2-Nitrotoluene	300 U
3-Nitrotoluene	300 U
4-Amino-2,6-dinitrotoluene	300 U
4-Nitrotoluene	300 U
HMX	300 U
Nitrobenzene	300 U
RDX	300 U
Tetryl	300 U
Total Metals (MG/KG)	
Arsenic	1.13 U
Barium	3.88
Cadmium	0.113 U
Chromium	1.81
Lead	2.67
Mercury	0.0103 J
Selenium	1.13 U
Silver	0.284 U

Notes:

J - Estimated value, result below instrument reporting limit

U - Nondetect

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram