

Final

**Munitions Response Third-Party Quality Assessment
Quality Assurance Summary Report for
Remedial Investigation of Investigation Area K (IA K)
Former Mare Island Naval Shipyard
Vallejo, California**

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Former Mare Island Naval Shipyard,
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ABBREVIATIONS AND ACRONYMS

AGS	Advanced Geological Services
BIP	blow-in-place
BRAC	Base Realignment and Closure
DGM	digital geophysical mapping
DMM	discarded military munitions
DQO	data quality objective
ECC	Environmental Chemical Corporation
ECM	Environmental Cost Management, Inc.
ESS	Explosives Safety Submission
ERRG	Engineering/Remediation Resources Group, Inc.
FRP	Fleet Reserve Piers
GPS	global positioning system
IA K	Initial Assessment Study
IVS	Instrument Verification Strip
MC	munitions constituents
MDAS	material documented as safe
MEC	munitions and explosives of concern
MHW	mean high water
MINS	former Mare Island Naval Shipyard
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
MRS	Munitions Response Site
Navy	Department of the Navy
NOSSA	Naval Ordnance Safety and Security Activity
NTCRA	non-time-critical removal action
PMA	Production Management Area
QA	quality assurance

ABBREVIATIONS AND ACRONYMS (Continued)

QAIPP	Quality Assurance Implementation Project Plan
QC	quality control
RI	Remedial Investigation
ROV	Remotely Operated Vehicle
RPM	Remedial Project Manager
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SOP	standard operating procedure
SSA	South Shore Area
SUXOS	Senior Unexploded Ordnance Supervisor
UXO	unexploded ordnance
UXOQC	unexploded ordnance quality control
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
Weston	Weston Solutions, Inc.

1.0 INTRODUCTION

Environmental Cost Management, Inc. (ECM), under Department of the Navy (Navy) Contract No. N62473-13-C-2405, was tasked to provide independent third-party quality assurance (QA) oversight services during the Munitions Response Program (MRP) remedial investigation (RI) at Investigation Area K (IA K), located at the former Mare Island Naval Shipyard (MINS), Vallejo, California. The MRP RI was conducted by Engineering/Remediation Resources Group, Inc. (ERRG) and Leidos (previously known as Science Applications International Corporation [SAIC]).

This report discusses the QA oversight activities that ECM conducted during the MRP RI at IA K from November 3 through November 14, 2014. A total of 10 QA days were logged in the completion of this effort. The Navy tasked ERRG/Leidos with investigating transects along piers and conducting suction dredging operations in heavy-anomaly areas to determine the extent of potential munitions and explosives of concern (MEC) and munitions constituents (MC). The RI included a geophysical survey, intrusive investigation, and sediment sampling for MC. The requirements and activities for the MRP RI are provided in the Remedial Investigation Work Plan for the Munitions Response Program in Investigation Area K (Work Plan) (ERRG and SAIC, 2014b) and Explosives Safety Submission (ESS) (ERRG and SAIC, 2014a).

The MEC QA Specialist followed the NAVFAC-approved Quality Assurance Implementation Project Plan (QAIPP) (ECM, 2013) under Contract No. N62473-13-C-2405. The QAIPP is applicable to all third-party QA activities performed at MINS in Vallejo, California, associated with the MRP. The QAIPP addressed the third-party QA objectives and describes the processes and organization necessary to ensure that all QA activities are performed in accordance with the MRP for MEC and the scope of work for each identified site.

1.1 SITE DESCRIPTION AND BACKGROUND

The current designations for the Munitions Response Sites (MRS) are off-shore Unexploded Ordnance (UXO) Sites 10, 11, 6, and 12, located on MINS in Vallejo, California (Figures 1 and 2). Mare Island is a closed Navy installation, and portions are currently being transferred under the Base Realignment and Closure (BRAC) Program. The four off-shore UXO sites are located in Investigation Area (IA) K. IA K is the off-shore area of Mare Island 300 yards seaward of the mean high water (MHW) line.

The intrusive investigation portion of the MRP RI evaluated the three off-shore UXO sites established within IA K that are associated with onshore areas where munitions were historically handled:

- UXO Site 10: Fleet Reserve Piers (FRP)
- UXO Site 6: Pier 34
- UXO Site 12: Pier 35

The FRP, Pier 34, and Pier 35 sites were defined as the area extending from the MHW line along the shoreline to a 50-foot buffer zone around current pier structures in all seaward directions, including area under the piers. The MHW line represents the shoreward boundary of IA K and is approximately equivalent to the high tide line.

1.2 HISTORY OF MEC USE

Historical practices at MINS may have resulted in a release of MEC to areas within IA K. The FRP was constructed from 1945 to 1946 and was operated by the Pacific Reserve Fleet for approximately 25 years. Its mission was to inactivate and preserve, secure, and maintain naval ships and crafts. Pier 34 was constructed in 1941 and closed in 1975. Operations at this site included offloading and loading ammunition on ships being repaired in the shipyard. Pier 35 was constructed in 1942 and was used to transfer mines manufactured at MINS to ships berthed at the pier.

MEC, including large-caliber (3- to 16-inch) and medium-caliber (20 to 40 millimeter [mm]) projectiles, fuses, primers, grenades, and other items, have been found along the shoreline and intertidal areas of IA K.

1.3 PREVIOUS STUDIES OF EXTENT OF MEC OR MPPEH CONTAMINATION

1.3.1 MPPEH and MEC Previous Investigations and Removal Actions

This section summarizes the results of prior investigations and removal actions within or adjacent to IA K. To date, limited off-shore intrusive work involving investigation of metallic anomalies and recovery of material potentially presenting an explosive hazard (MPPEH) and MEC items has been performed at IA K, especially in the areas around and under piers. As a result, previous investigations relevant to IA K, including onshore intrusive investigations and investigations in the dredge spoils ponds (where MPPEH and MEC items from IA K were deposited because of historical dredging), were reviewed to obtain the most complete picture of MEC items that may be encountered.

1.3.2 Fleet Reserve Piers (within UXO Site 10)

No investigations or removal activities have been conducted. Review of historical records did not identify specific documentation of munitions being discovered, offloaded, or discarded at the FRP. Interviews with former Navy personnel support that munitions were not stored aboard ships at the FRP, mishandled around the piers, or released into the water around the FRP (SulTech, 2006). As a result, MEC is unlikely to be present at the FRP.

1.3.3 Pier 34 (within UXO Site 6)

In June 2000, the Navy completed the initial onshore intrusive investigation of the Production Management Area (PMA), which includes the area landside of Pier 34 (Weston, 2002). In total, 261 MEC items and 580 material documented as safe (MDAS) items were found. The largest MDAS item found in the PMA was a 16-inch armor piercing projectile. MEC items recovered onshore included 6-inch and 8-inch armor piercing and Parrot projectiles. Various 3-inch and 4-inch projectiles were also recovered. A list of MEC items recovered during intrusive investigations of Mare Island is presented in Table 10-1 of the Sampling and Analysis Plan (SAP) for the MRP RI (ERRG and SAIC, 2014b).

In 2006, the Navy completed the initial offshore intrusive investigation for MEC within IA K within the nearshore and mudflat areas offshore of the PMA (ECC, 2010). Thirteen MEC and 230 MDAS items were recovered during this investigation. The largest MEC item found in the nearshore and mudflat areas offshore of PMA was a 5-inch MK 35 Mod6 anti-aircraft projectile. In 2012, the Navy started an onshore non-time-critical removal action (NTCRA) at the PMA and SSA (South Shore Area), which was completed in 2013. Eleven types of MEC were recovered during the PMA/SSA NTCRA, including 20 mm and 40 mm anti-aircraft projectiles, various fuzes, a MK 13 primer, pyro flare, and MK 6 depth charge (without pistol or booster) (see Table 10-1 of the MRP RI SAP).

In general, ordnance types discovered during onshore and offshore investigations have been representative of those manufactured, handled, and stored at the PMA. The munitions encountered during the PMA and SSA NTCRA were consistent with munitions found during previous investigations. These findings are consistent with the historical site use, which required strict controls for handling of munitions in the PMA. The use of strict handling controls likely resulted in fewer incidents of release.

1.3.4 Pier 35 (within UXO Site 12)

In May 1999, the Navy completed an initial onshore intrusive investigation of the SSA. In total, 2,329 discarded military munitions (DMM) items were recovered during the investigation, including 1,582 MEC items (Weston, 2003). In June 2006, the Navy completed an additional intrusive investigation for MEC within IA K at the nearshore and mudflat areas offshore of the SSA (ECC, 2010) and 40 MEC and 292 MDAS items were recovered (ECC, 2010). The largest MEC item recovered offshore of the SSA during the 2006 investigation was a 1.1-inch/75-caliber AA projectile with MK-12 fuze (ECC, 2010). On August 2, 2012, a MK 6 depth charge (without pistol or booster) was found during the onshore NTCRA along the SSA shoreline. Following its discovery, Naval Ordnance Safety and Security Activity (NOSSA) reviewed historical documentation and concluded that it was likely placed on the shoreline along with riprap to prevent shoreline erosion. As a result, NOSSA further concluded that additional MK 6 depth charges, if present, would most likely be found in the SSA shoreline riprap. The onshore munitions NTCRA at the SSA was completed in 2013. A list of MEC items

recovered during the PMA/SSA NTCRA is presented in Table 10-1 of the MRP RI SAP ([ERRG and SAIC, 2014b](#)).

In general, a wider variety of ordnance types, some of which were clustered in disposal pits, was discovered in the onshore portions of the SSA than in the PMA. These findings are consistent with the historical site use, which included storage and transport of ordnance that potentially resulted in improper disposal. According to the Final Investigation Summary Report ([ECC, 2010](#)), off-specification items generated during the ordnance production years were typically detonated and/or burned at IR-05, which is located west of the SSA.

2.0 PROJECT OBJECTIVES AND OPERATIONAL APPROACH

2.1 PROJECT OBJECTIVES

The project objectives were to identify, investigate, and confirm the presence or absence of MEC/MPPEH in IA K. For the geophysical survey, the project goal was to collect geophysical data covering up to 100 percent of the targeted areas at the FRP, Pier 34, and Pier 35 sites and identify potential metallic anomalies. The goal of the intrusive investigation was to recover 100 percent of the detected objects (anomalies) to a depth of 2 feet.

Intrusive investigation was proposed at locations with the highest density of anomalies based on magnetic survey data. The integrated crawler/magnetometer system used by the MRP RI contractors was designed to detect target items equal to 3-inch/50 caliber MK27 projectiles and smaller MEC items (20 to 40 mm rounds) in an underwater environment, if present.

2.2 OPERATIONAL APPROACH

The remotely operated vehicle (ROV) used for data collection was a track-mounted, bottom-crawling device (i.e., crawler) that carried an array of vertical fluxgate magnetometers for digital geophysical mapping. The crawler was also equipped with navigation and video/sonar equipment to determine locations and avoid obstructions, respectively. The location of the crawler was confirmed using a high-accuracy global positioning system (GPS). This detection equipment was determined to be the best technology available for completing the MRP RI activities and achieving the goal of detecting target items to a maximum expected depth of 2 feet below the sediment surface.

When fully configured, the crawler was expected to traverse the various types of seabed terrain and debris anticipated at the three investigation sites. The magnetometers were arranged to cover a 5.9-foot-wide swath of the seafloor simultaneously. The objective was to guide the crawler along preplanned survey lines using a combination of manual (i.e., joystick controlled) and automatic (i.e., autopilot) navigation tools in an attempt to achieve the desired survey coverage. The crawler was navigated directly on the seafloor instead of using a towed sensor to be able to get as close as possible to the piers.

For the intrusive investigation, the ROV/crawler with magnetometer array was first driven over a previously identified magnetic anomaly to confirm its location. Then the survey was performed. Excavation and recovery of items were performed using a barge-mounted Venturi dredge and magnet. The 6-inch-diameter suction hose was inserted into the sediment at the anomaly location to excavate a depression to a depth of 2 feet and covering up to 20 square meters. The excavated material passed into a sieving basket hung in the water column from a barge-mounted crane. The sieving basket filtered out compacted sediment while retaining recovered material similar in size to the smallest MPPEH or MEC item (i.e., 20 mm projectile) or greater

found during previous investigations of the dredge ponds. The sieving basket was maintained underwater during all excavation activities in accordance with ESS requirements.

The following field investigation activities were performed during the MRP RI:

- The instrument verification strip (IVS) was established in an area representative of site conditions and free of interference from background or site-specific anomalies. The IVS was seeded with industry standard objects and a noise strip in an adjacent transect was also surveyed.
- Digital magnetic data were collected over selected areas of the FRP, Pier 34, and Pier 35 to identify metallic anomalies representing potential MEC/MPPEH.
- Quality control (QC) inspection of the geophysical data and data deliverables was performed for each step of the processing sequence. Following QC inspection, the data were evaluated to identify potential anomalies within shallow sediment (less than 2 feet).
- Targeted anomalies were reacquired and intrusively investigated to a depth of 2 feet to recover MPPEH and MEC, if present. A tethered magnet was dragged between two platforms over the dredged area along adjacent transects to capture additional metallic objects.
- The ROV/crawler with magnetometer array conducted a magnetic survey and inspection using video/sonar over the intrusive investigation areas to confirm removal of identified anomalies (when possible depending on terrain, etc.).

2.3 HANDLING, STORAGE, AND DISPOSAL

Handling, storage, and disposal of recovered items were implemented as described in the ESS ([ERRG and SAIC, 2014a](#)). During barge operations, the exclusion zone was implemented. The basket was retrieved onto the barge and washed to remove sediment, and any metal attracted by the magnet during post-dredging screening was also brought onto the barge. The Senior Unexploded Ordnance Supervisor (SUXOS) and UXO Technician sorted and inspected the items within the basket and captured by the magnet to classify the material as MPPEH or MEC. No MEC items were recovered during the MRP RI. Two MPPEH items were recovered (expended 22 mm cartridge and expended/ deteriorated 6-inch Naval round cartridge) at Pier 35 at UXO Site 12. Scrap metal was also recovered at the three intrusive investigation areas.

All inspection, certification, and disposition procedures were followed, including two inspections of the MPPEH items by UXO-qualified personnel prior to removal. Immediately upon recovery, the MPPEH items were certified as presenting no explosive hazard and classified as MDAS in accordance with OP 5, Section 13-15 (NAVSEA, 2009). The MDAS was photo-documented and placed in a segregated 55-gallon drum for transfer to a qualified facility for off-site recycling and demilitarization. The scrap metal was put into a separate 55-gallon drum for recycling.

On November 14, 2014, the MEC QA Specialist accompanied the ERRG UXO team to ALCO recyclers on Mare Island. Both the scrap metal and the two pieces of MDAS were weighed and turned over to ALCO. ALCO executed a DD Form 1348-1A for each piece of MDAS and issued a certificate of destruction to ERRG. Photographs of the MDAS and scrap metal are provided in [Appendix B](#). The DD Forms-1A and certificate of destruction for the MDAS are also included in [Appendix B](#).

2.4 UNDERWATER OPERATIONAL CHALLENGES

As documented in the Daily QA Reports ([Appendix B](#)), field conditions limited data collection and the crawler/ROV had extreme difficulty navigating the underwater terrain. Hardware failure, high currents, muddy bottom conditions, and underwater obstacles prevented the crawler from accessing portions of the proposed survey area. The crawler often became stuck in the mud, tipped over, or was shifted off course. Navigation of the crawler via the joystick introduced off-course motion, making it difficult to perform straight-line transects, which were required to obtain complete coverage. For the IA K investigation, precise target locating was further complicated by the small errors introduced by the underwater acoustic positioning link between the barge and the crawler. The use of a joystick also impacted the crawler's ability to access certain areas near piers due to the 6-foot width of the array and the resulting turning radius. The magnetometer array on the crawler was very sensitive to ferrous objects, which maximized anomaly detection; however, background magnetic noise due to ambient metal (e.g., pier support rods) limited detection of potential MEC items under piers.

In some cases the barge became stuck in the mud and could not easily be positioned. Deployment of the suction dredge and manual magnetic screening system was also impacted by high currents and limitations in the accuracy of the GPS system. This positional uncertainty potentially limited the ability of the system to match specific anomalies found during the geophysical survey with those anomalies recovered during intrusive investigation. However, the contour maps of the IVS data showed an offset of approximately 2 feet between the anomaly center and the plotted locations of some of the seed items ([Appendix D](#)). The SAP, Worksheet #12, specified that positional error for reacquisition of target anomalies should not exceed ± 9.8 inches, slightly less than 2 feet; the GSV Plan noted that based on operating depths and stand-alone accuracies of the combined systems, the anticipated accuracy for positioning magnetic anomalies would be less than 3 feet. The IVS results confirm that reacquisition of previously identified targets was within the detection system's capability.

2.5 SCOPE AND OBJECTIVE OF QA SERVICES

The objective of this QA effort was to assess the Navy contractor's efforts in removing MEC/MPPEH from sites within IA K at MINS, Vallejo, California. The QA process reviewed the field work and project documentation to provide a high degree of confidence that work performed by the Navy's contractor is in accordance with the applicable Work Plan and ESS. The Navy Remedial Project Manager (RPM) uses the QA services to:

- Verify approved Standard Operating Procedures (SOPs) for geophysical surveys, data processing and management, conducting intrusive investigations, etc. are followed.
- Obtain objective evidence about the effectiveness of MEC/MPPEH removal operations.
- Observe and document any necessary onsite destruction/detonation of MEC/MPPEH.
- Assure an audit trail of data is collected, documented, and maintained.
- Document and preserve the quality assessment data gathered during this project.

3.0 QUALITY ASSURANCE OVERSIGHT AND ACTIVITIES

The MEC QA Specialist performed the following QA activities throughout the duration of field activities performed by ERRG/Leidos at the MINS IA K sites:

- Assessed the contractor field teams' overall explosive management program.
- Assessed the contractor's field activities using their site-specific SOPs.
- Assessed the contractor's personnel qualifications.
- Assessed the MEC and geophysical QC program, including on-site procedures, activities, and documentation by the UXO QC Specialist (UXOQCS).
- Assessed implementation of the GSV process, which was intended for instrument validation and tailoring the investigation to meet the challenges of surveying underwater and limitations of the survey equipment (bottom crawler and magnetometer array) to detect anomalies. The IVS and blind seeding program were used to confirm positional accuracy of the system and proper function of the equipment.
- Implemented the QA blind seed program. Blind seeds were manufactured and deployed per instructions contained in the ESS (ERRG and SAIC, 2014a), Work Plan (ERRG and SAIC, 2014b), and QAIPP (ECM, 2013).
- Assessed dredging operations including evidence of excavation depths to 2 feet.
- Assessed the detection of anomalies and removal of MEC.
- Performed QA inspections of no less than 10 per cent of all investigated targets.
- Assessed disposal demolition procedures.
- Assisted with procedures for correcting deficiencies and implementing corrective action based on Requests for Field Change.

All QA oversight activities were performed in accordance with the QAIPP (ECM, 2013). The following subsections discuss each of the QA oversight activities listed above.

3.1 CONTRACTOR EXPLOSIVES MANAGEMENT PROGRAM

The MEC QA Specialist conducted oversight inspections at the onset of field activities and periodically throughout the course of the project to evaluate the compliance of the contractor's explosives management program with the requirements of the Work Plan, including documentation and QC.

Initial QA inspections focused on whether the contractor's personnel performing UXO clearance and digital geophysical mapping (DGM) were in compliance with the requirements of the project Work Plan and the ESS. QA inspections also focused on the qualifications and certifications of

the contractor's personnel. Field observations were made and inspections were conducted on 10 days by the MEC QA Specialist.

The QA Compliance Inspection was documented on the QA Compliance Checklist and observations were recorded on the MEC QA Daily Reports as indicated in the QAIPP (ECM, 2013). The completed QA Compliance Checklist is presented in Appendix A. QA audits of project plans and field documentation and inspections of field operations were also conducted and documented on the MEC QA Daily Reports provided in Appendix B. Blind seeds were utilized by both the QC personnel and the MEC QA Specialist to document the success of removal actions (Appendix B).

3.2 CONTRACTOR FIELD ACTIVITIES

The QA Field Activity Outline (Table 2) contains a list of the areas that the MEC QA Specialist observed during project operations performed by ERRG/Leidos. The table contains the definable features of work and the related references, methods of surveillance, and the QA documentation used.

The MEC QA Specialist observed how the following field equipment functioned: (1) crawler equipped with a mounted all metals magnetometer array at the geophysical test strip, (2) GPS at the predetermined control point, (3) operation of the suction dredge system, and (4) operation of the tethered magnet used to screen areas following dredging. Instrument validation in the IVS was also documented. The MEC QA Specialist observed that ERRG/Leidos personnel regularly checked their equipment and that they were thoroughly trained on their respective equipment prior to operations. The MEC QA Specialist noted on the Compliance Checklist and MEC QA Daily Reports (Appendix B) that equipment was operated properly during the QA inspections and field activities. Field conditions limited operations, however, and data coverage did not meet data quality objectives (DQOs) as described in Section 4.0.

3.3 CONTRACTOR PERSONNEL QUALIFICATIONS

Prior to the start of fieldwork, the MEC QA Specialist reviewed the personnel requirements and certifications of all field personnel to ensure compliance with the requirements of the contract and the Work Plan (ERRG and SAIC, 2014b). No deficiencies were found during these reviews.

3.4 MEC AND GEOPHYSICAL QC PROGRAM

During the field investigation, ECM performed follow-up QA inspections and observations of geophysical surveys, including installation of an underwater IVS and performance and documentation of the unexploded ordnance quality control (UXOQC) procedures (ERRG and SAIC, 2014a). As specified in the QAIPP (ECM 2013) inspections and observations were documented on the MEC QA Daily Reports (Appendix B), which includes the MEC activity being performed, location being observed, and inspection and observation results. The MEC QA Specialist ensured project compliance during the following field activities:

- Implementation of safe work practices when locating and removing MEC
- Use of appropriate personal protective equipment
- Use of proper equipment (e.g., GPS, magnetometer array, etc.)
- Implementation of MEC avoidance procedures
- Implementation and recovery of QA and QC blind seeds
- Operation of heavy equipment such as crane and barge
- Operation of the ROV/crawler
- Operation of the intrusive/suction dredging system
- Storage and disposition of MDAS
- Tracking and documentation of MDAS

Geophysical instrumentation was checked at the IVS daily during high tide when the area was accessible by the barge. Geophysical instruments were determined to be operating properly during the project. The frequency of testing at the IVS was modified due to field conditions as documented in the Request for Field Change 01, dated November 4, 2014 ([Appendix C](#)).

The MEC QA Specialist also observed UXOQC meetings and inspections before and during field activities and recorded the information on the MEC QA Daily Reports provided in [Appendix B](#). The MEC QA Specialist performed inspections to confirm that ERRG/Leidos personnel conducted QC follow-up inspections of field activities to identify items excavated during intrusive activities. Inspections were also performed by the MEC QA Specialist to ensure that UXOQC procedures implemented by ERRG/Leidos complied with the QA/QC procedures stated in the Work Plan. The ERRG/Leidos UXOQC program was found to be in compliance once the Requests for Field Change concerning IVS test frequency and modification of the blind seeding program were approved.

Advanced Geological Services (AGS) was separately subcontracted by ECM to review DGM data processes and procedures. The Third-Party Geophysical QA Summary Report is contained in [Appendix D](#) and the assessment results are discussed in Section 4.0.

3.5 BLIND SEED PLACEMENT AND RECOVERY

The QA blind seed program is a QA process in which QA personnel strategically emplace simulated UXO items within the project production area to test and validate complete area coverage by geophysical and MEC teams and the quality of the detection process. The validity of blind seeding as a QA tool is based on assumptions that seed items will accurately mimic the target munition.

Requirements for blind seeding are specified in the QAIPP (ECM, 2013). The MEC QA Specialist attempted to place a QA blind seed string within the boundaries of each investigation unit. However, difficulties with this approach were noted by the MEC QA Specialist on the first day of operations because the crawler/ROV had extreme difficulty navigating the underwater terrain and could not access all areas proposed for survey. In some cases neither QA nor QC seeds could be deployed due to the inability of the crawler/ROV to access the production area. The MEC QA Specialist also learned that only heavy-anomaly areas, or a subset of investigation units, would be selected for further investigation. The disadvantage of placing blind seeds randomly, as initially planned, was that a given seed might be placed within an area that would never be surveyed, which would be reported as a failure. Further, blind seeds placed in heavy-anomaly areas are likely to be masked by high response levels and interference from surrounding anomalies and not picked as targets. This condition also results in a failure.

Based on the observed site conditions and survey protocol, it was decided that the QA blind seeds would be placed at random locations along the tether line of the QC blind seeds. This approach worked as each time the QA/QC seed line was traversed by the crawler/ROV with the magnetometer array, the seeds were located. Modification of the blind seed program is documented in Request for Field Change 02 (Appendix C).

3.6 DETECTION AND REMOVAL OF ANOMALIES

The MEC QA Specialist performed a QA inspection and oversight of ERRG/Leidos personnel performing intrusive operations and found that once a selected target area was investigated it was clear of anomalies. The MEC QA Specialist observed that ERRG/Leidos personnel properly conducted intrusive operations and properly characterized all items that were excavated.

Two MPPEH items were recovered during investigation of anomalies identified from the Pier 35 transect. Both items, an expended 20 mm cartridge case and the base of a 6-inch Naval round cartridge case, were determined to be MDAS. No MEC items were recovered.

3.7 CORRECTIVE ACTIONS

Three Requests for Field Change (Appendix C) were submitted to the Navy Team during field operations for the MRP RI:

- Request for Field Change 01, dated November 4, 2014, was issued because the IVS could only be surveyed once per day instead of twice a day (start and end of work period) as specified in the Work Plan (ERRG and SAIC, 2014b). The IVS was not accessible outside of the high tide mark, which occurred once during daylight hours in November 2014. The Navy project team concurred with the change as long as field work for the previous day would be redone in the event of an IVS failure. No IVS failures were documented.
- Request for Field Change 02, dated November 7, 2014, was issued to modify the blind seeding program to a seed target selection program. Due to site conditions described in Section 3.5, an alternative blind seeding method was devised for the

MRP RI at IA K. The QA blind seeds were placed at random locations along the tether line of the QC blind seeds to increase the probability that the crawler/ROV would detect the seeds. Although this is not true blind seeding the process did show that the geophysics package was working and operationally capable. Responses in the field data were successfully correlated with QA blind seed locations as noted on the MEC QA Daily Reports ([Appendix B](#)).

- Request for Field Change 03, dated November 11, 2014, requested a variance to the ESS ([ERRG and SAIC, 2014a](#)) to dispose of brass casings and small arms recovered from the site as household waste. These items were classified as MDAS. The Navy project team did not approve this request and stated that DMM and MDAS would be handled in accordance with the approved ESS including off-site recycling and demilitarization.

The following corrective actions were recommended for future work at the site:

- Use equipment that is more functional in this environment and perform testing before deploying data acquisition system.
- Evaluate blind seeding requirements for proposed definable features of work prior to commencement of operations, considering impacts of potential site conditions.

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4.0 DIGITAL GEOPHYSICAL MAPPING QUALITY ASSURANCE

ECM partnered with AGS to provide QA assessment of DGM activities. Mr. Roark Smith, a registered California Geophysicist with AGS, and the MEC QA Specialist evaluated the data obtained at the IA K sites as part of the overall QA effort to assess the MRP RI contractor's MEC/MPPEH removal efforts. ECM/AGS reviewed site-specific data in order to comprehensively analyze the entire digital geophysical survey including data acquisition, processing, and interpretation. The following digital geophysical activities were monitored:

- Operator performance
- Equipment performance
- Operator and equipment procedures
- Anomaly detection to depths of concern
- Removal of targets of interest

The following subsections discuss monitoring of operator performance and acquisition of digital field data.

4.1 OPERATOR PERFORMANCE

The MEC QA specialist observed ERRG/Leidos' geophysical instrument operation, data acquisition, and reacquisition procedures. To obtain the data, the contractor used an array of five vertical fluxgate magnetometers mounted on a C-Talon Benthic Crawler, which was placed underwater and driven back-and-forth across the various survey areas to identify metal objects representing potential MEC/MPPEH. The crawler was remotely operated from a barge floating above each survey area. The magnetometer array was 2 meters wide, so a single crawler traverse scanned an approximately 6-foot wide "swath" centered on the crawler trackline.

On the basis of the provided data, the survey covered only a small portion of the planned investigation area. As discussed in Section 2.4, the crawler/ROV had extreme difficulty negotiating the underwater terrain and could not access all areas proposed for survey. The failure to navigate underwater obstacles and traverse muddy substrate in strong currents is documented on the MEC QA Daily Reports ([Appendix B](#)). Causal analysis indicated that alternate design or modification and further testing of the data acquisition system would be needed to successfully collect data and meet project DQOs.

The third-party QA Geophysicist evaluated the geophysical data output by analyzing the processed data files provided by the contractor, including color-filled contour maps and data profiles. These data consisted mostly of results from scans along the IVS and the background "Noise Strip," along with the results of the Static and Swipe (functional) tests, which were performed before the geophysical survey system was placed in the water.

4.2 DIGITAL FIELD DATA ACQUISITION

The QA Geophysicist evaluated the acquired and processed data. The data were evaluated for the following issues:

- Data gaps along survey lines
- Unreasonable data (e.g., systematic “spikes” or noise)
- Data incongruity across survey grids
- Inadequate data density along survey traverse
- Lack of accurate, precise locations; survey line orientation
- Inadequate and incomplete site survey coverage
- Missing, incomplete, or noncompliant instrument standardization checks

After completion of data evaluation activities, the QA Geophysicist sampled 100 percent of the data by generating their own contour maps. Although the scope of work called for a review of 10 percent of the data, 100 percent of the data was assessed due to the limited amount of data provided. The QA assessment summary report is included in [Appendix D](#), and contains detailed results of digital field data acquisition and processing inspection.

Target picks were not provided; so we were unable to evaluate the contractor’s target picking process. Numerous anomalous responses in the field data were obtained at the three Pier sites; however, it is not known how many of these responses are indicative of potential MEC/MPPEH items and how many (if any) were caused by noise sources associated with pier structures or other non-MEC items. Areas containing magnetic anomalies were dredged to a depth of 2 feet and recovery of items indicates the survey was effective.

The results indicate that the data collected, though limited in extent, are of good quality, as evidenced by the repeatability of the IVS data; the correlation between the anomaly spike responses and seeded item locations along the IVS test line; the smooth, symmetrical anomaly response curves in the IVS data; and an the absence of anomalous responses along the Noise Strip, where no metal objects were present. Similar data quality was observed in the field data collected at the three Pier sites. The magnetometer/crawler survey system was capable of detecting metal objects representing potential MEC and/or MPPEH items. Gaps in coverage were directly related to the inability of the ROV/crawler with magnetic array to access the areas planned for investigation.

5.0 QUALITY ASSURANCE CONCLUSIONS

Third-party QA oversight of field activities were performed to the requirements specified in the QAIPP (ECM, 2013) to ensure that all work performed by ERRG/Leidos during the MRP RI at IA K was in compliance with the Work Plan (ERRG and SAIC, 2014b) and ESS (ERRG and SAIC, 2014a). Specific field activities performed included underwater geophysical data gathering, clearance, excavation (dredging) at specific locations, transport, and disposal of MPPEH, transporting of MDAS, UXOQC activities, and discovery of QA and QC blind seeds.

Based on observations made during third-party QA oversight and QA inspections of all material that was excavated, ERRG/Leidos conducted field activities in compliance with the project documents, including the DQOs presented in Table 1, with some noted exceptions based on encountered site conditions:

- Although the data that were collected were of good quality, and the magnetometer/crawler survey system was capable of detecting metal objects representing potential MEC and/or MPPEH items, data coverage was very limited. Field conditions contributed to difficulty moving the crawler through the mud and strong currents that were encountered in the survey areas.
- The planned blind seed program was modified based on the site conditions and survey protocol, as documented in Request for Field Change 02. The QA seeds were placed at random locations along the tether line of the QC seeds. This approach worked as each time the QA/QC seed line was traversed by the crawler/ROV with the magnetometer array, the seeds were located. Although this is not true blind seeding the process did show that the geophysics package was working and operationally capable.
- The frequency of testing at the IVS for the program was modified to once per day due to tidal conditions in the field as documented in the Request for Field Change 01. The Navy team concurred with this change as long as field work for the previous day would be redone in the event of IVS failure.

The DGM survey coverage at the FRP, Pier 34, and Pier 35 sites was well short of the goal, which was to evaluate “100% of the designated 50-foot buffer area along the sides of the piers (and) 100% of areas under the pier overhangs.” The limited coverage was due to the difficulty of moving the crawler/ROV over obstacles and through the mud and strong currents that were encountered in the survey areas. The crawler covered approximately 3,800 line-feet of survey transect, equating to approximately 0.52 acres of coverage. Considering that approximately 6.2 acres were identified in the Work Plan for possible survey, the acquired data covered only 8.39 percent of the planned survey area.

In conclusion, the MEC contractor followed the Work Plan and ESS, but due to the limited data coverage, the MEC contractor did not achieve the project goal of covering up to 100 percent of the targeted areas at the FRP, Pier 34, and Pier 35 to identify metallic anomalies and conduct intrusive investigations to a depth of 2 feet to identify MPPEH and MEC, if present.

6.0 REFERENCES

- Environmental Chemical Corporation (ECC). 2010. Revised Final Investigation Summary Report for MEC at Mare Island Strait and Carquinez Strait Sites (Portions of IA K and Shoreline Areas of IA F1, IA F2, and IA G), Former Mare Island Naval Shipyard, Vallejo, California. April.
- Environmental Cost Management Inc. (ECM). 2013. Quality Assurance Implementation Project Plan (QAIPP), for Munitions Response Third Party Independent Quality Assurance for the Former Mare Island Naval Shipyard Vallejo, California.
- Engineering/Remediation Resources Group, Inc. (ERRG) and Science Applications International Corporation (SAIC). 2014a. Final Explosives Safety Submission, Munitions Response Program Remedial Investigation in Investigation Area K, Former Mare Island Naval Shipyard, Vallejo, California.
- _____. 2014b. Final Remedial Investigation Work Plan for the Munitions Response Program in Investigation Area K, Former Mare Island Naval Shipyard, Vallejo, California. September.
- Naval Sea Systems Command. 2007. Ammunition and Explosives Safety Ashore. NAVSEA OP5 Volume 1, Seventh Revision. March 1.
- SulTech. 2006. Draft supplemental Site Inspection for Northern Offshore Munitions and Explosives of Concern Sites: Fleet Reserve Pier and Berths 1 and 2, Former Mare Island naval Shipyard, Vallejo, California. June.
- Weston Solutions, Inc. (Weston). 2003. Draft Final Summary Report, Unexploded Ordnance Intrusive Investigation, South Shore Area, Mare Island, Vallejo, California. January.
- _____. 2002. Final Summary Report. Unexploded Ordnance Intrusive Investigation, Production Manufacturing Area and Installation Restoration Site 04, Mare Island Vallejo, California. August.

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FIGURES

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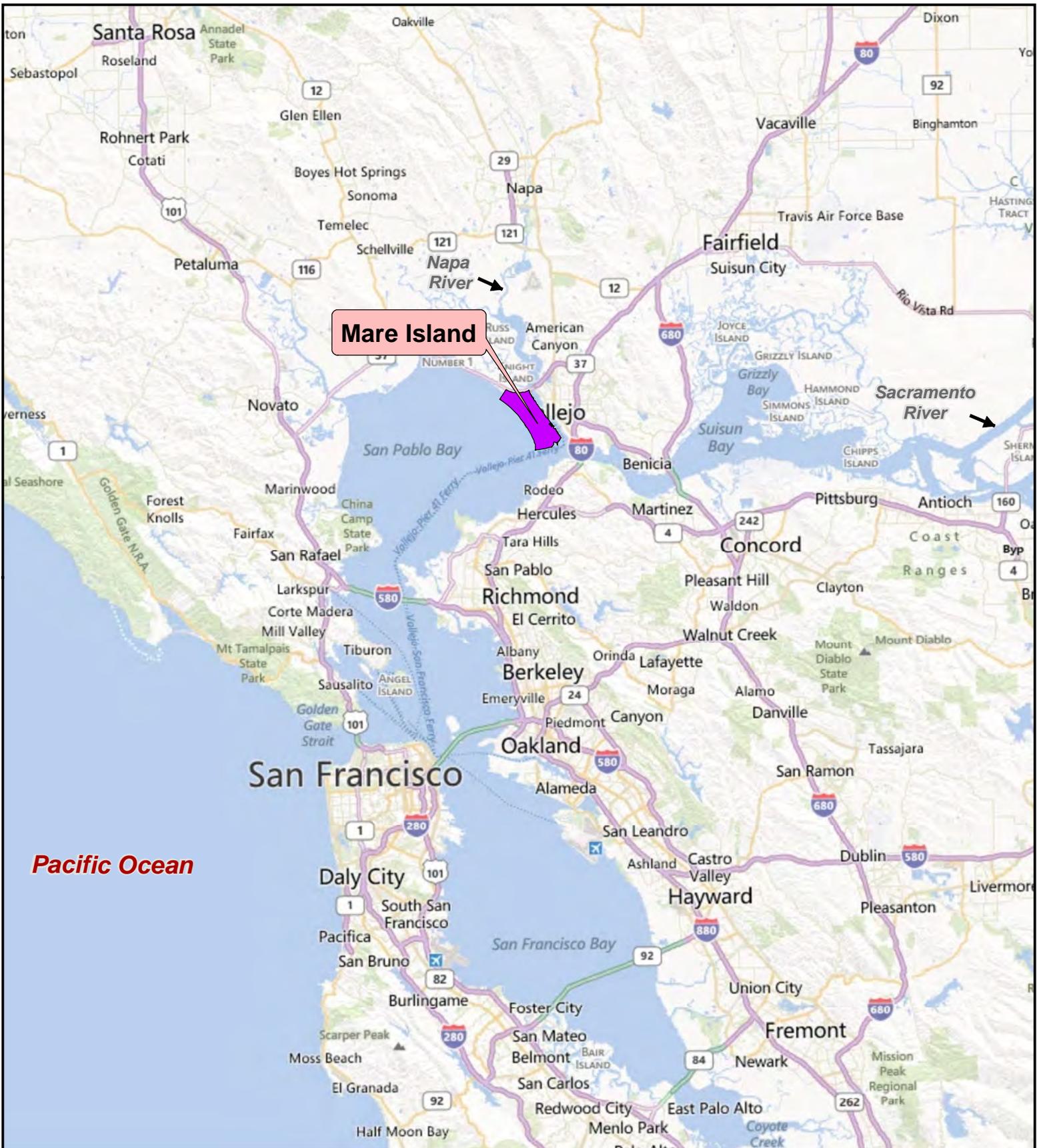
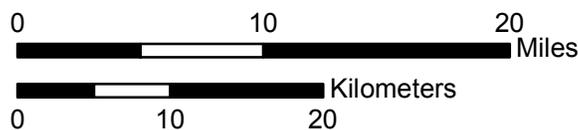


FIGURE 1. Mare Island Location Map.

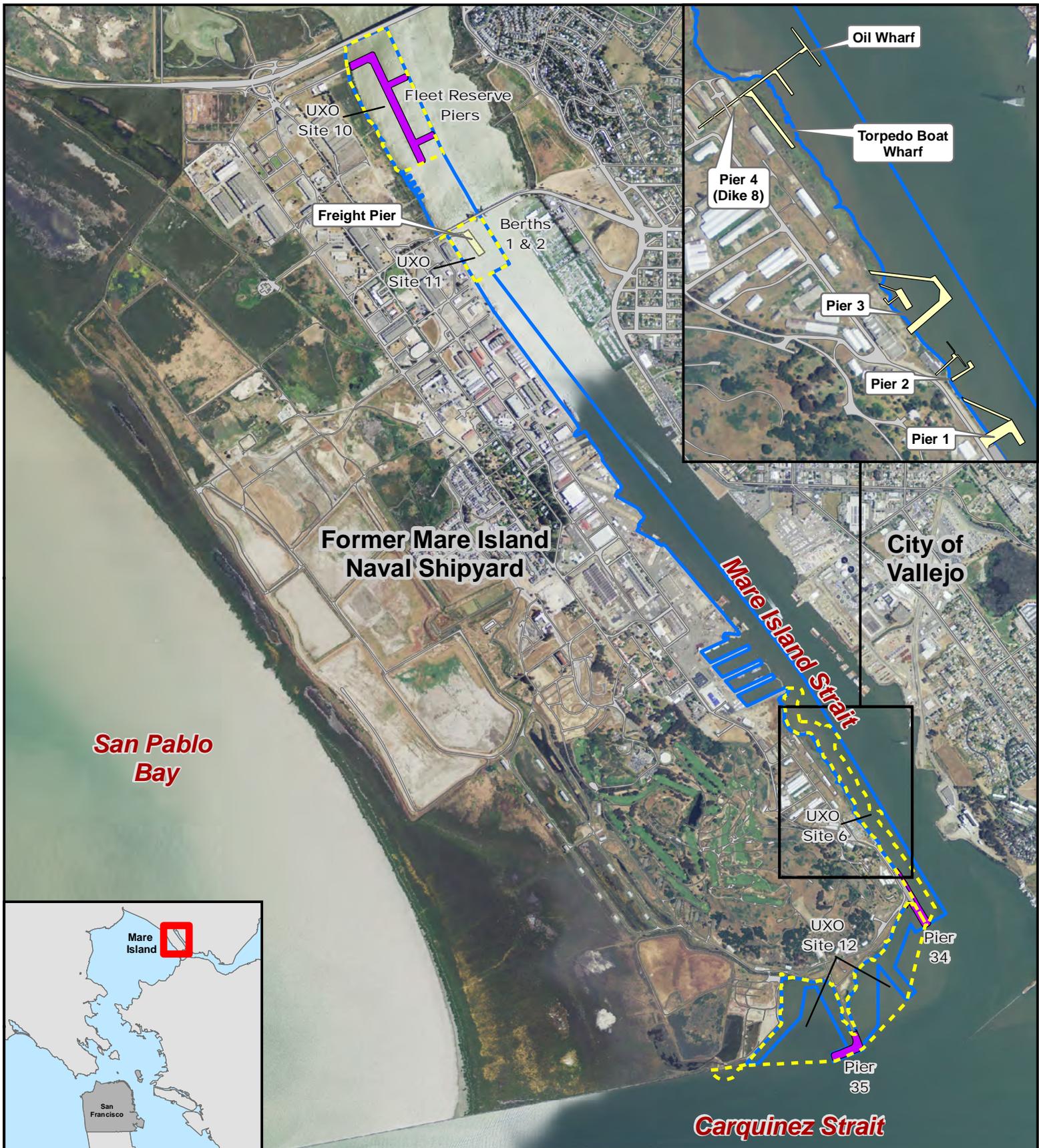


Notes:
 Projection: CA State Plane, Zone 2
 Units: Feet
 Datum: NAD83
 Created by: C. Calabretta
 Date created: October 23, 2012



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- Investigation Area K
- UXO Site Boundary
- Field Investigation Site
- Former Pier

FIGURE 2. Field Investigation Sites Within Investigation Area K.



Notes:
 Projection: CA State Plane, Zone 2
 Units: Feet
 Datum: NAD83
 Orthophoto: NAIP 2009
 Created by: C. Calabretta
 Date created: February 26, 2013
 File: MINS_UXO_Site_Locations_v3.mdx

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TABLES

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Table 1. Data Quality Objectives

What is the DQO?	How Was It Assessed?	Was the DQO Met?
1. Assess the contractor field teams' overall explosive management program	All available documentation for the project was reviewed.	Yes
2. Assess the contractor's field operations using their site specific SOPs.	A QA Review was prepared and completed to evaluate the SOPs and ensure that they were implemented properly.	Yes
3. Assess the contractor's personnel qualifications	Personnel qualifications were reviewed prior to field activities.	Yes
4. Assess the MEC and geophysical QC program and onsite procedures, activities, and documentation for UXOQC.	Construction and functionality of the geophysical test strip was observed and verified by the MEC QA Specialist.	Yes
5. Assess the detection of anomalies and removal of MEC.	The MEC QA Specialist, planned, implemented, and tracked the blind seed action.	Yes

Notes:

- DQOs – data quality objectives
- MEC– munitions and explosives of concern
- QA – quality assurance
- QC – quality control
- SOP – standard operating procedure
- UXOQC – unexploded ordnance quality control

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Table 2. QA Field Activity Outline

Definable Feature of Work	Reference ^{1,2,3,4}	Oversight Method	Documentation	Performance Indicators
Work Plan Execution	Work Plan	Initial Compliance Periodic Field Follow up Inspection	QA Inspection/Daily Report	Compliance with approved plans Personnel knowledgeable of plan requirements Personnel meet qualifications Resources managed effectively
QC	Work Plan	Periodic Review of QC Documentation	QA Inspection/Daily Report	Pass/fail rate on QC inspections Root cause analysis and correction process Blind seed recovery rate
Anomaly and Intrusive Investigation Operations	Work Plan	Periodic Field Inspections Observations	QA Inspection/Daily Report	Safe work practices for MEC Anomaly recovery per the Work Plan and ESS
Anomaly Detection Confidence	Blind Seeding Action	Area Seeded Recorded and Tracked as Discovered	QA Seed Tracking Log/ Daily Report	All blind seeds recovered – pass One or more missed – fail, evaluation and corrective action recommended
Blast and Fragmentation Protection	Work Plan ESS DoD 6055.9-STD	Periodic Field Inspections Observations	QA Observations/ Daily Report	Appropriate EZ's maintained Nonessential personnel not within the EZ Engineering controls used Demolition per ESS
MPPEH Handling	Work Plan DoD 6055.9-STD	Daily Observations	Daily Report	No non MEC items commingled with MEC Security of certified MDAS containers Demilitarization complete

Notes:

1. ERRG and SAIC – Final Explosives Safety Submission for the Investigation of Investigation Area K Former Mare Island Naval Station Vallejo, California.
2. DoD, 2004. DoD Directive 6055.9, “DoD Ammunition and Explosives Safety Standards.” October. Available Online at: <http://www.ddesb.pentagon.mil/DoD6055.9-STD%205%20Oct%202004.pdf>.

DoD – U.S. Department of Defense

ERRG – Engineering/Remediation Resources Group, Inc.

ESS – explosives safety submission

EZ – exclusion zone

MDAS – material documented as safe

MEC – munitions and explosives of concern

MPPEH – material potentially presenting an explosive hazard

QA – quality assurance

QC – quality control

SAIC – Science Applications International Corporation

SOP – standard operating procedure

APPENDIX A
QA COMPLIANCE CHECKLIST

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Project: QAIPP for Munitions Response 3rd Party QA
 Contract: N62473-13-C-2405
 Location: Former Mare Island Naval Shipyard, Vallejo, CA
 Prepared by: John McCormick

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QA Compliance Check List

Date: 11/03/2014

Site Name: Mare Island IA K

1. Project Documents: WP, SAP/QAPP, ESS, APP/SSHP	Yes	No	N/A	COMMENTS
a. On site and signature page signed	X			
b. Check for modifications/changes and up to	X			
c. Proper depth of clearance identified	X			
d. Corrective action standards established	X			
e. Proper target ordnance identified/test sources/ test plot established	X			Contractor Installed an IVS using the proper ISO's
f. Most Probable Munitions (MPM) identified	X			
g. MSD established	X			
h. Standards for turn-in of recovered MPPEH and range-related debris	X			
i. Exclusion Zone (EZ) identified	X			
2. Documentation Requirements/ Publications Available On Site	Yes	No	N/A	COMMENTS
a MRS Self-Assessment Checklist, evaluation completed by the Contractor's Project Manager and SUXOS the first week of field activities. NOSSAINST 8020.15C			X	
b Notice to Proceed from client	X			
c Contractor personnel qualifications and supporting certifications for all UXO personnel verified, e.g., EOD certification, equipment certifications, etc.	X			
d Certificate of grounding, lightning protection for magazines (if required)			X	
e Approval letter, MSD 1/600 (if required)			X	
f Explosive Safety Submission (ESS) (if required)	X			
g Delivery order & all modifications & Change Orders	X			



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2. Documentation Requirements/ Publications Available On Site (cont.)	Yes	No	N/A	COMMENTS
h Explosives permits/license (if required)	X			
i Dig permits for utilities (if required)			X	
j Rights of Entry (ROE) (if required)			X	
k Current MEC SOPs, readily available	X			
l Other applicable reference publications/materials, readily available				
3. QC Files Established IAW, WP, SAP/QAPP	Yes	No	N/A	COMMENTS
a. Daily/weekly QC reports/audits	X			
b. Weekly/monthly reports (if provided)			X	
4. Accident Prevention Plan (APP) Site-Specific Safety & Health Plan (SSHP)	Yes	No	N/A	COMMENTS
a. On site and signature page signed	X			
b Hazard Analysis & Risk Assessment for all tasks & equipment	X			
c. OSHA physical on site and current	X			
d. Training: General site workers, HAZWOPER qualified, 40-hour HAZWOPER & current 8-hour refresher (if required)	X			
e. Personnel Protective Equipment (PPE)	X			
f. First Aid equipment shall be immediately available	X			
g. Emergency eye-washes/showers comply with ANSI standards	X			
h. Fire extinguishers (specify type, size, and location)	X			1 ea 5 lb in each vehicle
i. Visitor safety briefing	X			
j. Emergency Notification List posted & available	X			
k. Emergency routes/maps available & issued to each team	X			



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4. Accident Prevention Plan (APP) Site-Specific Safety & Health Plan (SSHP) (cont.)	Yes	No	N/A	COMMENTS
l. Work task identified in Activity Hazard Analysis (AHA)	X			
m. Current MSDS(s) on site	X			
n. Minimum of two personnel on site, First Aid/CPR trained, EM 385-1-1	X			
o. 16-unit First Aid kits approved by a licensed physician in the ratio of 1 for every 25 personnel or less. EM 385-1-1		X		
p. Adequate means of reporting accidents/near misses to client	X			
5. Facilities – Reference EM 385-1-1	Yes	No	N/A	COMMENTS
a. Adequate work space & facilities (restrooms, etc.)	X			
b. Good housekeeping (no fire hazards, tripping hazards, etc.)	X			
c. Approved and suitable containers for flammable, toxic, or explosive materials			X	
d. Approved/adequate explosive storage facilities	X			
e. Fire/emergency exits clear & unbarred. Fire extinguisher location(s), and route of escape posted as appropriate in facility	X			
f. Site security adequate	X			
g. Toilets IAW EM 385-1-1	X			
h. Washing facilities IAW EM 385-1-1	X			
6. Equipment – Reference Approved WP/Manufacturers Operators Manual	Yes	No	N/A	COMMENTS
a. Tools appropriate and serviceable	X			
b. Personnel Protective Equipment (PPE) present, serviceable & utilized	X			
c. Equipment calibrated (Last Cal. Date-----, Next Cal. Date-----)	X			
d. Survey equipment inspected & serviceable	X			



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6. Equipment – Reference Approved WP/Manufacturers Operators Manual (cont.)	Yes	No	N/A	COMMENTS
e. Heavy equipment inspected & serviceable IAW EM 385-1-1, Section 16; include back up alarm and equipped with 1 fire extinguisher, 5-BC	X			
f. Competent person identified to inspect and accept Heavy Equipment IAW EM 385-1-1	X			
g. Identified site vehicles are equipped with First Aid kits and a 5-BC fire extinguisher IAW EM 385-1-1	X			
h. Geophysical equipment on hand & serviceable	X			
i. Two separate means of communication: radio(s)/cell phone, land line(s)	X			
7. Explosive Storage/Receipt/ Transportation Requirements – Reference NAVSEA OP 5, Volume 1	Yes	No	N/A	COMMENTS
a. Proper storage containers Type 2 magazine(s) conforming to standards set forth in Section 55.206 of ATFP 5400.7	X			Never was used
b. Placards will be displayed on the magazine(s) IAW w/DoD 6055.9-STD, Chapters 2 & 3 for Hazard Division stored in the magazine(s)		X		They were available if needed
c. Explosive compatibility groups segregated into appropriate Hazards Divisions listed in Chapter 3, DoD 6055.9-STD			X	
d. Security locks for the magazine(s) shall meet the requirements listed in Section 55.208 (a) (4), ATFP 5400.7	X			
e. Key control will be documented in the WP			X	Used combo lock
f. Lightning Protection System serviceable & tested (Test Date ____)			X	



7. Explosive Storage/Receipt/ Transportation Requirements – Reference NAVSEA OP 5, Volume 1 (cont.)	Yes	No	N/A	COMMENTS
g. Fire-fighting placarding will be posted on the fence (IAW DoD 6055.9-STD, Chapter 8 and NAVSEA OP 5, Volume 1 for Hazard Division stored in the magazine(s)			X	
h. Fire protection consisting of extinguishers, 10-BC or larger located at magazine area & vegetation and trash cleared in and around magazine area			X	
i. Quantity distance from magazine IAW WP & Explosive Safety Submission (ESS)	X			
j. Accountability records maintained IAW 55.125, ATFP 5400.7			X	
k. Explosive NEW limits do not exceed limits stated in the WP & ESS			X	
l. Licenses/permits (if required)	X			
m. Initial receipt procedures & documentation on site			X	No explosives delvr'd
n. Procedures for transportation of explosives IAW EM 385-1-1, and NAVSEA OP 5 Vol 1	X			
o. Pre-operational checks of vehicle transporting explosives using checklist			X	
p. Cargo properly segregated, blocked, and in approved containers, NAVSEA OP 5, Vol 1			X	
q. Receipt procedures accounting for each item of explosives/documentation on site			X	
r. Individuals authorized to receive, issue, and transport identified in writing	X			
s. Final disposition procedures documented	X			



Project: QAIPP for Munitions Response 3rd Party QA
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7. Explosive Storage/Receipt/ Transportation Requirements – Reference NAVSEA OP 5, Volume 1 (cont.)	Yes	No	N/A	COMMENTS
t. Reconciliation, lost/stolen receipt documents/procedures on site	X			
u. Inventory conducted weekly @ minimum			X	
8. MEC Operational Plans – Approved WP, SAP/QAPP, ESS and APP/SSHP	Yes	No	N/A	COMMENTS
a. Contractor following methodology defined	X			
(1) Daily safety meeting conducted by UXOSO	X			
b. Detection equipment used	X			
(1) Pre-operational checks performed prior to sweep operations	X			
(2) Operational condition annotated in log book	X			
(3) Team composition	X			
(4) Quality control	X			
(5) Quality control documentation	X			
c. Operational teams using approved procedures	X			
(1) SUXO conducted physical check prior to operations	X			
(2) Pre-operational/safety brief conducted	X			
(3) Individual sweep lanes marked IAW WP			X	
(4) Contacts marked & investigated properly	X			
(5) Results of sweep operation recorded	X			



Project: QAIPP for Munitions Response 3rd Party QA
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8. MEC Operational Plans – Approved WP, SAP/QAPP, ESS and APP/SSHP (cont.)	Yes	No	N/A	COMMENTS
(6) All MEC, MD, MDEH and MPPEH is examined and positively identified by at least the SUXO and the UXOQCS			X	No MEC found
(6.1) Actions taken when MEC items identified are consistent with WP/MPM			X	No MEC found
(7) All MEC/UXO clearly marked			X	No MEC found
d. QC operations IAW WP, and SAP/QAPP	X			
e. MPPEH inspected/vented/segregated			X	No MPPEH found
f. Geophysical test grids appropriate	X			
g. Project database and PDAs entries are consistent with intrusive results	X			
9. Disposal Operations IAW WP, SAP/QAPP, ESS and 60-1-1-31	Yes	No	N/A	COMMENTS
a. Disposal method			X	
b. Adequate security for disposal operation			X	
c. Disposal Notification List available			X	
d. All necessary notifications made			X	
e. Movement of MEC items if determined safe to move to explosive storage or consolidate for disposal operations IAW project plans			X	
f. Are protective mitigation measures being used appropriate for MEC being destroyed?			X	
g. Disposal Procedures IAW project plans			X	
h. Conducted adequate Demolition Brief			X	
(1) Misfire procedures properly performed			X	



Project: QAIPP for Munitions Response 3rd Party QA
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10. Location Survey & Mapping Plan	Yes	No	N/A	COMMENTS
a. Registered land surveyor	X			
b. Surveyors received site-specific training	X			
c. UXO escort provided	X			
d. Grid stake, locations swept with geophysical equipment prior to driving stakes	X			
e. Survey notes being recorded	X			
11. Quality Control Plan IAW WP and SAP/QAPP	Yes	No	N/A	COMMENTS
a. QC operational checks being conducted	X			
b. QC grid sweep pattern adequate	X			Conducted during trenching
c. Results of QC checks being recorded	X			
d. Nonconformance reports issued if QC checks show discrepancies, or for QA failures			X	No QC failures
e. Intrusive results/database/PDAs entries are checked by UXOQC	X			
12. Vegetation Removal IAW, WP	Yes	No	N/A	COMMENTS
a. Equipment operated to prevent impact with possible surface MEC	X			
b. Cutting does not present implement hazard	X			
c. UXO personnel monitoring cutting operation	X			
d. MEC discovered marked/handled appropriately			X	
e. Equipment being operated safely & IAW Operators Manual	X			

APPENDIX B
MEC QA DAILY REPORTS

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Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-03-14

Report #: 001

Weather Conditions: Windy

Temperature: Low: 52 High: 72

Wind: MPH 07

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Attended and observed the site safety brief and the daily operational brief.*
- *Observed crawler setup and system checks.*
- *Observed IVS installation IAW the work plan.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- N/A

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- N/A.

5. Other comments or additional information:

- *The contractor installed the IVS IAW the work plan.*

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-03-14

A handwritten signature in cursive script, appearing to read "John McCormick".

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [The three sizes (2 of ea) of ISO's that will be placed in the IVS]



Photo 2: [Rigging the IVS ISO's to a measured tether in SSA1]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
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Photo 3: [Finalizing the IVS installation by performing GPS on ISO locations]



Photo 4: [Barge having difficulty (due to the controlling depth) navigating outside the channel]



Environmental Cost Management, Inc.

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Photo 5: [Performing system checks on the Crawler]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-04-14

Report #: 002

Weather Conditions: Windy

Temperature: Low: 54 High: 74

Wind: MPH 07

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Attended and observed the site safety brief and the daily operational brief.*
- *Observed attempts to perform operations in the Transects.*
- *Placed QA seeds in NW operating side of pier 34.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. **Verbal Instructions received or given:** (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- N/A

4. **Changed Conditions/Delays/Conflicts Encountered:** (List any conflicts, which have hindered the Quality Assurance process):

- *IQA blind seed location has been modified to tie off on the QA blind seed tagline. The placement of the IQA seed is located at #6 on the seed string. This will be selected daily by the IQA and thus the location will be blind. In addition the location of both the QA and QC seeds are blind to the person processing the data.*

5. Other comments or additional information:

- *The base operating station for the Crawler is located on the barge and at the end of the work day and with a low tide Liedos was unable to perform an IVS prove-out. The controlling depth of the water prohibits the barge getting close enough to retrieve the Crawler if it were to get stuck.*
- *No QA seeds nor QC seeds were deployed due to the inability of the Crawler to access the operating area around pier 34.*
- *The Crawler had extreme difficulty in navigating the Transects. It repeatedly got stuck on the bottom or had difficulty negotiating around submerged objects.*
- *The Crawler also had difficulty and eventually was unable to negotiate into a strong tidal current 8-12 knots.*
- *The UXOIQA had prepared QA seeds for the pier 34 NW side operating area and was unable to deploy the seeds as the Crawler was unable to reach the area.*
- *The UXOIQA placed QA seeds for the pier 34 NE side operating area.*



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

- *Due to the tidal action the decision was made by Liedos personnel to attempt to seek calmer water at the pier 35 operating area.*

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-04-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [Due to the low tide; the barge in which the base station for the Crawler is located was unable to access the IVS]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [The Crawler; stuck in the mud again at pier 34 being retrieved by attaching a tether to the boom lift]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [QA Seed 001 tethered and ready for deployment. Was unable to deploy as the Crawler could not reach the operating area due to the current]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 4: [Liedos decided to move to the south end of pier 34 in the hopes of encountering less of a current.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-05-14

Report #: 003

Weather Conditions: Windy

Temperature: Low: 55 High: 79

Wind: MPH 07

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Continued to observe attempts to perform operations in the Transects.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- N/A

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- *QA and QC seeds were deployed at the NW end of pier 35. It was stated by the Liedos personnel that the system located signals that were consistent with the seed sizes however, when questioned by the IQA as to how the data and locations are verified as finds; it was determined by Liedos personnel that it would show up on tomorrow's data.*
- *The QA does not yet consider the seeds as being found until proven by the data.*
- *It appears to the IQA that some of the transects data being gathered are not being started next to the piers and out to 50ft and at time it seems that data is being gathered outside of the 50ft boundary.*
- *Continued IQA modified blind seeding by independently placing the IQA seeds at location #6 along the QC seed tagline. IQA selected the independent location along the tagline so that the seed locations change and are independent from the contractor QC seed placement.*

5. Other comments or additional information:

- *The ERRG PM Virginia Demetrious conducted an operational/safety stand-down with Liedos and DRS Marine personnel as it was noted that inconsistencies such as Liedos personnel in the water while installing the IVS and not staying within the survey boundary. These issues were addressed.*



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-05-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [Deploying the Crawler at pier 35]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [The seed area at the N/W end of pier 35. This is the location of the QC and QA seed area. The Crawlers GPS antennae can be seen in the right hand corner of the photo]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

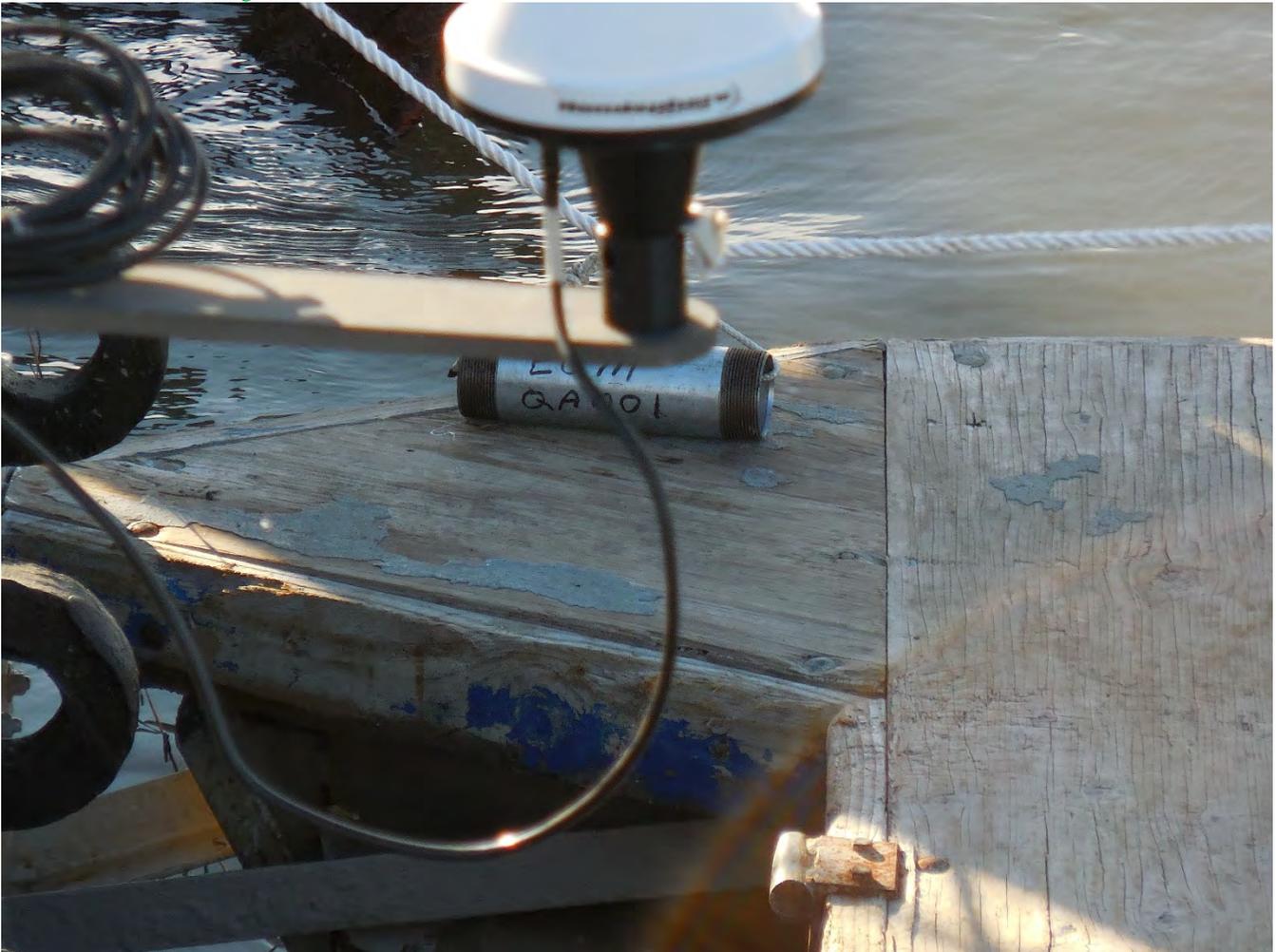


Photo 3: [QA Seed 001 ready for deployment. This Seed is the last seed on a string of QC seeds]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 4: [QC and QA seeds being deployed]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 5: [Crawler being retrieved after getting stuck at the NW corner of pier 35. It also had to be repositioned in order to get on track with the seed field area]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 6: [Liedos Site Safety in the water checking the bottom conditions in the IVS for the Crawlers approach]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-06-14

Report #: 004

Weather Conditions: Windy

Temperature: Low: 55 High: 79

Wind: MPH 07

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Observed Liedos personnel operating the Crawler in the IVS and in the pier 35 work area.*
- *Continued to observe attempts to perform operations in the Transects.*
- *Observed the Crawler operating over the QC/QA seed area located at the NE corner of pier 35.*
- *Observed Liedos personnel performing the USBL test. This test confirms that the Crawlers position is being accurately measured by the sonar system.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- N/A

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- *QA and QC seeds were deployed at the NE end of pier 35. It was again stated by the Liedos personnel that the system located signals that were consistent with the seed sizes. Liedos personnel did provide yesterday's data that illustrates that the QA seed 001 was located.*
- *The QA does not believe that putting seed ISO's in a line then operating the Crawler over the know seed line is "Blind Seeding". This process mirrors the approach used when operating in the IVS. The only difference is the IVS is in a cleared area.*
- *True blind seeding in the operating area is difficult as there are so many data gaps due to the Crawlers inability to negotiate all of the work area. Example; when the Crawler is operating near the piers it often falls into scow trenches and gets stuck thereby, no data gets collected in that area. Any QA seed placed in an inaccessible area would not be found.*
- ***If Liedos collects data in the entire work area; blind seeding can easily be conducted.*** As it is now, the QA has to ask which piece of the work area can



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA

Contract: N62473-13-C-2405

Location: Former Mare Island Naval Shipyard, Vallejo, CA

Prepared by: John McCormick

- Liedos access and then place the seed. Liedos personnel would clearly be able to see the seed placement, defeating the blind seed programs intent.*
- *Continued IQA modified blind seeding by independently placing the IQA seeds at location #6 along the QC seed tagline. IQA selected the independent location along the tagline so that the seed locations change and are independent from the contractor QC seed placement.*

5. Other comments or additional information:

- *It is requested that the QA be allowed to have Liedos place the seed line in the work area before operating in the area. Currently the seed line is being placed in the operating area after collecting data in the same area that the seed line is being deployed.*

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-06-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [Deploying the seed line with six ISO's at pier 35 after collecting data in the same area]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [The Crawler had some mechanical issues today]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [Liedos collecting data at the SE corner of pier 35]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 4: [The Crawler being pulled by the tether line as it was stuck again]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-07-14

Report #: 005

Weather Conditions: Windy

Temperature: Low: 56 High: 79

Wind: MPH 05

Precipitation: 0.00

Site Conditions: AM: Foggy PM: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Observed Lidos personnel operating the Crawler in the IVS and in the Fleet Reserve Pier area.*
- *Continued to observe attempts to perform operations in the Transects.*
- Placed IQA blind seed in location #4 along QC seed tagline.
- *Observed the Crawler operating over the QC/QA seed area located at the NE corner of pier 34.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. **Verbal Instructions received or given:** (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

4. **Changed Conditions/Delays/Conflicts Encountered:** (List any conflicts, which have hindered the Quality Assurance process):

- *Continued IQA modified blind seeding by independently placing the IQA seeds along the QC seed tagline. IQA selected the independent location along the tagline so that the seed locations change and are independent from the contractor QC seed placement.*
- *Discussed with contractor that IQA seed selection along the tag line, if chosen by IQA, could be considered a blind location. The work plan has clearly defined work areas and less than 15% of the area is actually being mapped.*

5. Other comments or additional information:

- *Due to extremely strong currents, the Crawler had difficulty accurately reaching the bottom at the FRP. What would happen, is as the Crawler is lowered to a depth of 32 feet, the current would push the Crawler considerably far under the barge and it could not operate into the current in order to get to its point of beginning.*



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-07-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [IQA observed a commercial fishing vessel operating dragline sine fishing operations up and down and along pier 34 during the site safety brief. Commercial boater notifications will need to be enforced prior to intrusive operations.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [Extremely fogging weather in the morning at the Fleet Reserve Pier.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [The barge passing through the Tennessee Street Causeway draw bridge in the afternoon]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [Contractor gathering data with crawler at the NE corner of pier 34]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 5: [Fiber optic cable connected to the Crawler hung up under the barge]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-10-14

Report #: 006

Weather Conditions: Windy

Temperature: Low: 52 High: 73

Wind: MPH 05

Precipitation: 0.00

Site Conditions: AM: Foggy PM: Dry

- **Work Performed:** (Indicate location and description of activity).
- Attended the MEC/MPPH meeting.
- *Attended the weekly QC meeting*
- *Observed Liedos personnel operating the Crawler in the SW corner of pier 34*
- Placed IQA blind seed in location #3 along QC seed tagline.
- *Observed the Crawler operating over the QC/QA seed area located at the SW corner of pier 34.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- *Navy PM agreed to continue seeding on QC tagline in NW corner of pier 34.*
- *Navy PM requested for IQA to take detailed notes regarding the dredge depth activities.*

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- N/A

5. Other comments or additional information:

- N/A

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-10-14

A handwritten signature in cursive script, appearing to read "John D. McCormick", written in black ink.

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [LIEDOS collecting data at the SW end of Pier 34]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [QA Seed was placed as the 3rd seed on the seed line.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [The Crawler often got stuck and fell over at the SW corner of pier 34]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [Private vessels operating within 100 feet of pier 34. During tomorrow's dredging operations this will have to be monitored closely]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-11-14

Report #: 007

Weather Conditions: Windy

Temperature: Low: 46 High: 66

Wind: MPH 05

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Observed LIEDOS personnel conducting soil sampling at pier 35's grid 35B.*
- *Observed dredging/screening operations conducted at pier 35 in grid 35B.*
- *Observed the Crawler operating in grid 35B after dredging/screening operations were conducted.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- *During dredging/screening operations 1ea expended 20mm cartridge case and 1ea deteriorated and expended 6" Naval round cartridge case was recovered.*

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- N/A

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- *IQA was instructed by the RPM to take extensive field notes of the dredging/screening operations that LIEDOS will be conducting.*
- *IQA discussed the length of the *standpipe on the dredge cage may not be able to be long enough to dredge the FRP location with ERRG. Email and photo was provided to Navy RPM. See photo 9.**
- *IQA and ERRG reviewed how to handle the small arms 20mm expended cartridge and IQA recommended that ERRG submit a field change request. ERRG asked how this was handled on other sites and IQA said that it was often left out but he had seen small arms be disposed as household waste or recycled on other projects in small quantities.*

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- *IQA observed and overheard direction from ERRG that gave inconsistencies on field procedures regarding how and when to contain sediments in 55 gal drums during the dredge operations. IQA observed field team containerize soils when they were predominantly sediment but when the sediment contained gravel they poured it over side. See photo 8. IQA reviewed the WP section 3.7 IDW and it does not clearly detail how to handle dredge sediments.*



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

5. Other comments or additional information:

- *The dredging/screening of the selected areas is a slow process however it has been demonstrated today that it does have the capability to function as designed.*
- *The LIEDOS personnel conducted soil sampling activities in grid 35B adjacent to building A-153. It was noticed by the IQA that the process was executed in IAW the approved procedures. Using a modified Van-Veen collection system, the samples were acquired and processed. The LIEDOS Team decontaminated the sampling equipment each time before collecting the next sample. See photo 1 and 2.*
- *The Crawler does experience difficulty traversing the dredged area in order to verify clearance of the anomalies as the soil has been violently disturbed and is contributing to the Crawlers traction issues.*
- *The dredge basket functions as to screen the sediments and contain larger items. However, fine sediments will pass through the screen and ultimately settle back in their original position thus creating difficulty, or making it impossible, in being able to prove that 2 ft of sediments was dredged. There is a 2 foot deep, 8" extraction pipe that extends below the dredge cage. The IQA observed the deployment line become taught and then slack when it hit the bottom, thus indicating that the cage reached the floor. This is the only real measurement that indicated the dredge hit 2 feet. See white pipe in photo 10.*

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-11-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 1: [Using a modified Van-Veen soil collection system, the LIEDOS Team conducted soil sampling in grid 25B]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [Processing the soil samples from grid 35B]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [GPS mounted on the top of the boom trucks mast, used for positioning and tracking the dredge/screen cage's location]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [Depth marks measured in feet attached to the screen cage]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 5: [The dredge/screen operating and is being lowered to the bottom]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 6: [The dredge screen on deck with recovered items being inspected by the LIEDOS UXO Specialist before being removed]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 7: [Two ordnance related items recovered, 1ea expended 20mm cartridge and expended an expended/deteriorated 6" Naval round cartridge]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 8: [Contactor disposing of sediments into water during dredging operations. IQA observed an inconsistency in during dredging as to when the sediments went into the drum and when the sediments were dumped over side.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 9: [Photo of the dredging measuring stick. Measurements only allow for up to - 34ft and FRP bottom ranged from 33ft-35ft.]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 10: [Dredge cage shown with white 8" suction pipe. Suction pipe extends 2 ft below the dredge cage]

IQA Field Notes; 11-11-14 Mare Island Pier 35 Dredging/Screening of Grid 35B performed by LIEDOS

1253-The measured water depth was 10.5 feet.

1305-LIEDOS personnel started dredging in Grid 35B

1314-LIEDOS stopped dredging (empty 20mm cartridge case was recovered)

1322-Dredging operations restarted.

1331-Dredging stopped.

1338-Stopped dredging placed the cage on the deck of the barge. Plastic was laid down on deck for placing items captured in the cage. Items were inspected and sorted, mud was placed in the 55gl drums, rocks were paced back in the water and foreign objects were placed in another 55gl drum.

1401-Restarted dredging.

1405-The water depth was physically measured and the depth was 14 feet. The depth on the boom gage shows 16 feet. The dredge is operating properly to 2 feet.

1415-Dredging stopped.

1428-Repositioned the barge within 10 feet of the pier in order to make another sweep.

1438-Rechecked water depth, 14 feet.

1440-Start dredging. Boom gage shows 16 feet, the dredge is still going to 2 feet below the bottom and working properly.

1455-Stoppped dredging and recovered the dredge cage. (6" empty naval round cartridge recovered)

1535-Resumed dredging. The QA verified the water depth was at or near 14 feet and that the boom gage was at 16 feet again, showing that the dredge was still pulling material at two feet.

1549-Stopped dredging.

1600-Placed sonar on the barge, detached the dredge cage from the boom truck and deployed the crawler.

1635-LIEDOS (the crawler was having difficulty transitioning the dredge area) determined that after dredging the area, the crawler would have to be redeployed tomorrow. In addition to this the sun was setting and they have to be off the water by sundown and still had to transition back to pier 34.



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-12-14

Report #: 008

Weather Conditions: Windy

Temperature: Low: 46 High: 66

Wind: MPH 05

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Observed LIEDOS personnel conducting soil sampling at the FRP grid FRP-10.*
- *Observed dredging/screening operations conducted at the FRP pier in grid FRP-10.*
- *Observed the Crawler operating in grid FRP-10 after dredging/screening operations were conducted.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- *N/A*

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- *N/A*

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken):

- *Following onsite discussion with the contractor IQA reviewed OP-5 for information regarding MDAS disposal requirements. The IQA then recommended to the ERRG SUXOS and UXOQC that they review OP-5 as it details how to handle the disposal of the recovered expended munition items. IQA also requested to review the 1348's and Chain of Custody Forms so that he could document they were in accordance with OP-5.*

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- *N/A*

5. Other comments or additional information:

- *The LIEDOS personnel conducted soil sampling activities in grid FRP-10*
- *The Crawler again experienced difficulty in traversing the dredge area in grid FRP-10 and had to be assisted by personnel pulling on its tether or it being repositioned by the boom crane.*
- *The water level remained relatively consistent (29' +/- 6") as the dredging operations were mostly performed during a slack tide. It was clear to the IQA when the dredge cage was on the bottom as the tether attaching the cage to the boom crane would slacken indicating that the cage was on the bottom (see photos 5 & 6) and the 2' pipe extension was at the required dredge depth.*



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-12-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [Using a modified Van-Veen soil collection system, the LIEDOS Team “due to a strong incoming tide” had to add weight i.e. a chain in order to be able to conduct soil sampling in grid FRP-10]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [The chain was not enough weight, so LIEDOS added four sandbags]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
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Prepared by: John McCormick



Photo 3: [The actual water depth was 29', the gauge shows almost 30' illustrating that the 2' extension is at approximately 2.9 feet below the bottom as one has to add two feet to the shown #. Most of the dredging was conducted during a slack tide thus keeping the water level fairly consistent]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [The screen cage being inspected after the first run. Only small rocks were discovered]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 5 [The screen cage tether line, “taunt”]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 6 [When the tether line is slack, the IQA can see that the bottom of the screen cage is on the bottom placing the 2' extension pipe 2' in the mud and in it's correct depth position]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 7 [LIEDOS had two platforms in order to drag the magnet back and forth across the bottom of the dredged area]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 8 [The 500lb capacity magnet that is being dragged along the bottom of the dredged area. If it were to attach to an object weighing more than the two personnel traversing it, it would be attached to the boom crane and the item would be extracted]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 9 [GPS tracking of each pass of the magnet being pulled through the dredged area]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 10 [In order for the Crawler to traverse the now softer bottom it had to be assisted by pulling by manpower or the boom crane.]

IQA Field Notes: MINS IAK 11-12-14 "Transcribed"

0935-Barge arrives at the FRP

1040-LIEDOS starts performing soil sampling in FRP-10

1110-Due to a swift incoming tide, LIEDOS had to weight the Van-Veen sampler in order for it to reach the bottom accurately.

1235-LIEDOS rigged the dredge cage for deployment.

1305-Dredge cage was deployed.

1307-Measured water depth was 29'.

1350-LIEDOS stopped dredging in order to inspect the contents of the cage. "Only small rocks were recovered"

1415-Restarted dredging.

1435-Stopped dredging to inspect contents of cage.

1445-Liedos disassembled the dredge cage.

1455-Liedos Setup and started dragging the magnet across the dredge area.

1520-LIEDOS stopped dragging the magnet.

NOTE: LIEDOS used a GPS from the barge to track each pass of the magnets track.

1538-Crawler deployed to dredge area.

1541-Crawler had to be assisted through the dredge area by personnel pulling on a tether of be move by the boom crane in order to help it move through the dredge area.

1605-Crawler was recovered.



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-13-14

Report #: 009

Weather Conditions: Windy

Temperature: Low: 50 High: 66

Wind: MPH 01

Precipitation: 0.00

Site Conditions: Misty Morn Rain

- **Work Performed:** (Indicate location and description of activity).
 - *Observed LIEDOS personnel conducting soil sampling at pier 34 grid 34-C.*
 - *Observed dredging/screening operations conducted at pier 34 grid 34C.*
 - *Observed the magnet being used at pier 35 grid 35B.*
 - *Observed the dredge/screen operations conducted at pier 34 grid 34C.*
1. **Ordnance or Ordnance Related Material Encountered; Condition and Location:**
 - *N/A*
 2. **Disposition of Ordnance Items Encountered, Include Dates:** (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):
 - *N/A*
 3. **Verbal Instructions received or given:** (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken): *N/A*
 4. **Changed Conditions/Delays/Conflicts Encountered:** (List any conflicts, which have hindered the Quality Assurance process):
 - *N/A*
 5. **Other comments or additional information:**
 - *The LIEDOS personnel conducted soil sampling activities in grid 34C*
 - *The Crawler was not deployed in grid 34C in order to confirm the effectiveness of the dredge.*
 - *Due to the lowest tide that this effort has experienced, the barge got stuck in the mud at the SW corner of pier 34 attempting to get the boom crane within the range that was needed to deploy the Van-Veen sampling system.*
 - *The IQA had no difficulty verifying that the dredge screen was at the correct depth (see photo 8).*

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Date: 11-13-14

John D. McCormick

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [LIEDOS deploying the crawler. The crawler was used to reacquire the soil sample locations]



Environmental Cost Management, Inc.

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Contract: N62473-13-C-2405
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Prepared by: John McCormick



Photo 2: [The barge stuck in the mud at the SW corner of pier 34]



Environmental Cost Management, Inc.

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Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [LIEDOS using a magnet to scan the bottom in grid 35B]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [Using the GPS to track the drag lines of the magnet in grid 35B]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 5 [The tide was the lowest seen since this effort began]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 6 [Soil sampling in grid 34C]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 7 [LIEDOS assembling the dredge screen cage]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 8 [This photo illustrates just how low the water level is as the screen cage is on the bottom of the SW corner of pier 34 in grid 34C and the top is sticking out]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 9 [The water level was so low at the SW corner of pier 34 that one of the small boats had to be used to help the Tug Boat]

IQA FIELD NOTES MINS IKA 11-13-14

0915-LIEDOS used the crawler in grid 34C to locate the soil sample location.

1005-1100-LIEDOS and DRS had difficulty in positioning the barge as the tide was very low and the barge was getting stuck in the mud.

1205-The barge was still stuck in the mud.

1230-LIEDOS and DRS mobilized the two small boats to pier 25 grid 35B for magnet operations.

1245-LIEDOS started magnet operations in grid 35B.

1325-LIEDOS completed magnet operations in grid 35B and demobilized back to the barge at pier 34.

1330-The barge is still stuck at the SW end of pier 34.

1355-LIEDOS started taking soil samples in grid 34C.

1456-LIEDOS completed soil sampling in grid 34C.

1500-LIEDOS and DRS began to assemble the dredge/screen box.

1517-LIEDOS began dredge/screen operations in grid 34C.

1545-Stopped dredging in order to reposition the barge.

1600-Resumed dredging/screening.

1605-Stopped the dredging to again reposition the barge.

1625- Resumed dredging.

1631-Stopped dredge, inspected contents of the cage.

1635-Stopped operations and docked the barge.



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Munitions & Explosives of Concern (MEC) QA Daily Report

Date: 11-14-14

Report #: 010

Weather Conditions: Windy

Temperature: Low: 50 High: 66

Wind: MPH 01

Precipitation: 0.00

Site Conditions: Dry

- **Work Performed:** (Indicate location and description of activity).
- *Observed LIEDOS personnel using the IVS.*
- *Observed LIEDOS personnel removing the IVS.*
- *Observed dredging/screening operations conducted at pier 34 grid 34-C.*
- *Observed the magnet being used at pier 34 grid 34-C.*
- *Observed some data gathering at the FRP grid FRP-28.*
- *Observed the proper disposal of the scrap metal and the two pieces of MDAS.*

1. Ordnance or Ordnance Related Material Encountered; Condition and Location:

- N/A

2. Disposition of Ordnance Items Encountered, Include Dates: (i.e. turned over to Military EOD, Disposal by detonation, Storage awaiting disposition):

- The IQA accompanied the ERRG UXO Team to ALCO recyclers on Mare Island. Both the scrap metal and the two pieces of MDAS were weighed and turned over to ALCO. ALCO executed the 1348's. A certificate of destruction was issued to ERRG for the two pieces of MDAS.

3. Verbal Instructions received or given: (List any instructions received from client or given by ECM on Quality Assurance issues identified and the corresponding action to be taken): N/A

4. Changed Conditions/Delays/Conflicts Encountered: (List any conflicts, which have hindered the Quality Assurance process):

- *At 1315, while collecting data at FR-28; the Crawler experienced hardware failure. The LIEDOS Team was unable to make repairs due to not having the parts to make the repairs. Not all of the data was collected in Grid FRP-28.*

5. Other comments or additional information:

- This is the final IQA report for this effort.



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

Contractor's Verification: The above report is complete and correct. All material and equipment used and work performed during this reporting period are in compliance with the plans and specifications except as noted above.

Date: 11-14-14

(Signature)

Name of QA: John McCormick

Unexploded Ordnance Quality Assurance (UXOQA)



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

PICTURES



Photo 1: [LIEDOS deploying the crawler in the IVS and then removing the IVS]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 2: [Dredging the remainder of Grid 24-C. The water was again very shallow]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 3: [LIEDOS using a magnet to scan the bottom in grid 34-C]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 4 [ERRG weighing in at ALCO]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 5 [The scrap metal debris in the 55 gallon drum]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 6 [Destination of the scrap metal debris at ALCO]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 7 [Scarp metal debris after being inspected by ALCO]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 8 [The two pieces of MDAS were weighed and disposed of separately from the scrap metal debris]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo: 9 [The total weight of the MDAS was 10 pounds]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick



Photo 10: [Collecting data in Grid FRP-28]



Environmental Cost Management, Inc.

Project: MINS IAK Third-Party Independent QA
Contract: N62473-13-C-2405
Location: Former Mare Island Naval Shipyard, Vallejo, CA
Prepared by: John McCormick

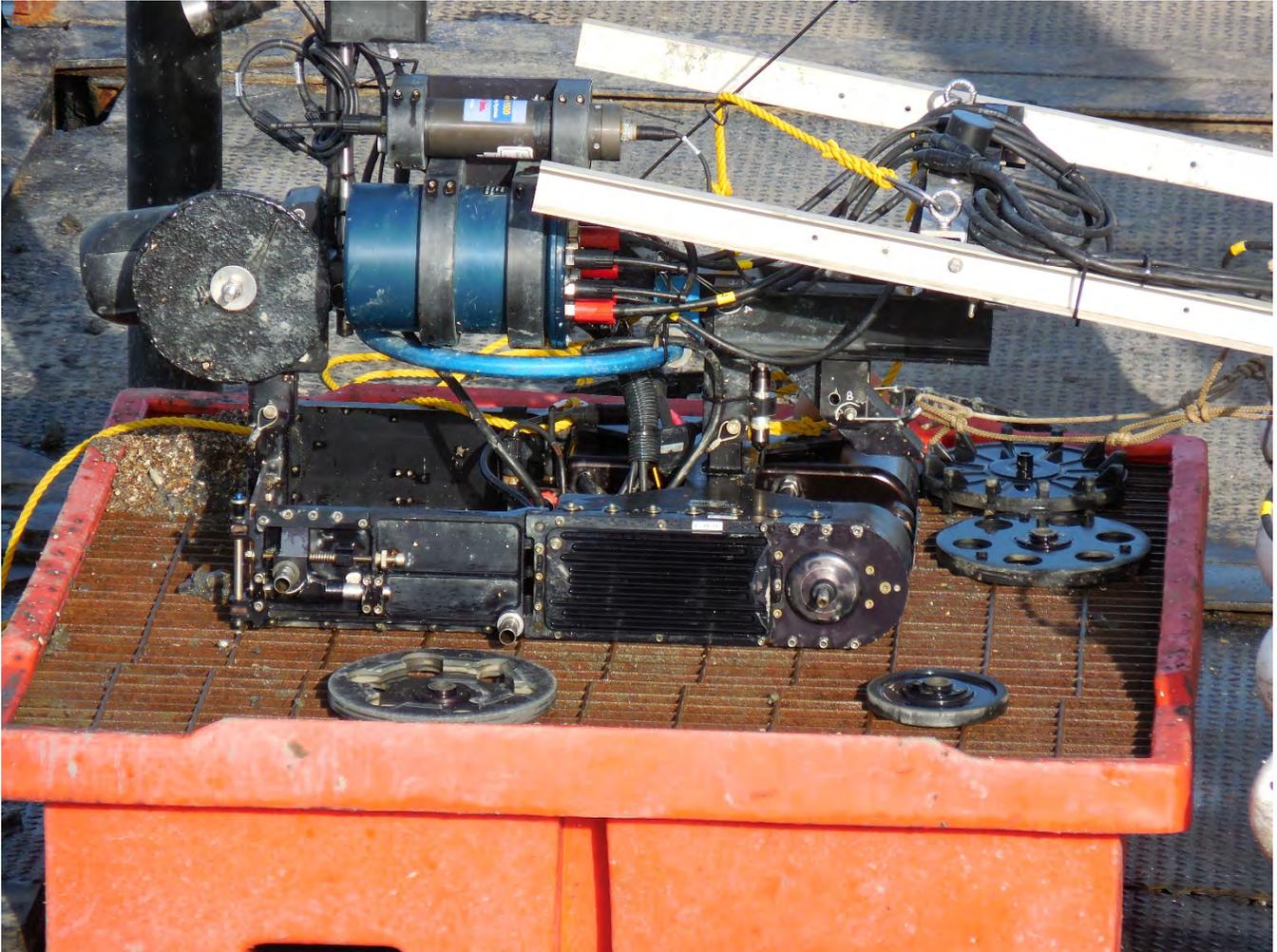


Photo 11: [The Crawlers chassis in a state of disassembly after experiencing hardware failure]

MINS IAK QA Field Notes 11-14-14 "Transcribed"

0700-LIEDOS departs for the IVS.

0725-After using the IVS, LIEDOS removed the IVS.

0755-Moved to pier 34 grid 34-C to begin dredging.

0833-Stopped dredge in order to inspect the contents of the cage.

0850-Stopped dredging operations.

0900-Disassembled the dredge.

0928-Deployed the Crawler in grid 34-C.

1013-Using the two small boats LIEDOS started magnet scanning operations in grid 34-C and the barge departed pier 34 in-route to the FRP.

1105-Completed magnet operations in grid 34-C.

1130-ERRG's UXO Team and the IQA departed for the FRP with the scrap metal and the two pieces of MDAS.

1200-Properly disposed of the Scrap and MDAS. Received a Certificate of Destruction from ALCO.

1200-Bardge arrives at the FRP grid FRP-28 and starts using the Crawler to collect data.

1315-The Crawler experienced hardware failure. LIEDOS did not have the parts on hand to fix it.

1330-With the now broken Crawler, LIEDOS departed the FRP in-route to pier 34.

1415-Bardge arrives at pier 34. The IQA was informed that no further water bourn operations would be conducted today.



Dealers in Ferrous and Non-Ferrous Metals

Corporate Headquarters
Metal Service Center
2140 Davis St.
San Leandro, CA 94577
Ph: 510-562-1107
Fax: 510-562-1354

San Leandro Division
1091 Doolittle Drive
San Leandro, CA 94577
Ph: 510-562-1107
Fax: 510-562-6259

Mare Island Division
321 Azuar Drive
Vallejo, CA 94577
Ph: 707-562-1107
Fax: 707-562-2531

Stockton Division
1815 Navy Drive
Stockton, CA 95206
Ph: 209-932-1107
Fax: 209-939-9647

San Jose Division
1788 Rogers Avenue
San Jose, CA 95112
Ph: 408-436-1107
Fax: 408-452-1354

alco iron & metal co.

DATE Nov. 14, 2014

CERTIFICATE OF DESTRUCTION

This is to certify that the following item's were delivered to Alco Iron & Metal from:

ERRG, Inc
4585 Pacheco Blvd
Martinez, CA 94553

I further certify that all items received from ERRG Inc. were disposed and destroyed in such a manner that it cannot be sold for the use for which it was manufactured and that the Company has taken every reasonable step to prevent any resale of said Disposed Items. Alco Iron & Metal will route all recyclable materials to appropriate vendors. This is in accordance to all current laws and local ordinances.

Items for destruction:

Brass Casing 6" 1 ea. & 20MM Brass Casing 1 ea.

Dates Received: Friday, November 14, 2014

Weight ticket# A-370582

BY: Art Padilla
(SIGNATURE)

NAME: Art Padilla

TITLE: Office Manager

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
UNIT PRICE	DOLLARS		CTS		1. TOTAL PRICE		2. SHIP FROM		3. SHIP TO																																								
DOLLARS		CTS				MARF 26 level		ALCO																																									
						Pacheco level		Steel & Metal																																									
						Vallejo CA		Vallejo CA																																									
						4. MARK FOR																																											
						Recycle/DESTRUCTION																																											
5. DOC DATE		6. NMFC		7. FRT RATE		8. TYPE CARGO		9. PS																																									
11/14/14						SCRAP																																											
10. QTY. RECD		11. UP		12. UNIT WEIGHT		13. UNIT CUBE		14. UFC																																									
				130 LBS																																													
16. FREIGHT CLASSIFICATION NOMENCLATURE																																																	
SCRAP METAL																																																	
17. ITEM NOMENCLATURE																																																	
STEEL DEBRIS																																																	
18. TY CONT		19. NO CONT		20. TOTAL WEIGHT		21. TOTAL CUBE		22. RECEIVED BY																																									
				180 LBS				J. Paulina																																									
								23. DATE RECEIVED																																									
								11-14-14																																									

24. DOCUMENT NUMBER & SUFFIX (30-44)
NAFAL
LO# N62473-09-0-2615
DO# 0003

25. NATIONAL STOCK NO. & ADD (8-22)
ERRG-IUL
4585 Pacheco Blvd Suite 200
Martinez CA 94553
CO # 2010-152

26. RIC (4-8)
QUANTITY (23-24)
CON CODE (71)
DIST (95-98)
UP (74-80)

27. ADDITIONAL DATA

This certifies that the materials potentially presenting an explosive hazard listed has been 100% properly inspected and to the best of our knowledge and belief is inert and/or free of explosive or related material.

Michael Brian
ERRG SUX05

David Williams
ERRG UXO QLS

John McLaughlin
3rd Party QA

Reset

Adobe Designer 8.0

PREVIOUS EDITION MAY BE USED

APPENDIX C
REQUESTS FOR FIELD CHANGE

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REQUEST FOR FIELD CHANGE

To : US Navy Field Change # : 01
 Attn : Reggie Paulding BRAC PMO RPM & Izzat Amadea, Navy, ROICC SF Bay Contract No. : N62473-09-D2615 0003
 Date : November 4, 2014 ERRG Project No.: 2010-152
 Project Title & Location: Mare Island Munition Response Program Remedial Investigation in Investigation Area K, Vallejo, CA
 Brief Description of RFI: IVS frequency
 Reference Specs/Drawing(s): GSV Plan

Request the following variation

The Instrument Verification Stripe (IVS) will be surveyed once per day at high tide vs. twice a day (start and end of work). The IVS is inaccessible outside of the high tide mark, which occurs once during daylight hours at this time of year.

Response Requested: Immediate 7 Days 21 Days

Virginia Demetrios
ERRG, Inc., Project Manager

11/03/2014
Date

Navy Response

Navy project team concurs with the change to once/day for the IVS check as long as the requirement that if the IVS fails; redo the field work for the previous day.

Digitally signed by
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cn=WOCHNICK.HEATHER.MARIE.1366539529
Date: 2014.11.04 13:26:07 -08'00'

Navy Representative, Reggie Paulding, RPM/COR
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Date

Date

Navy Representative, Izzat Amadea, ROICC SF Bay



REQUEST FOR FIELD CHANGE

To : US Navy Field Change # : 02
 Attn : Reginald Paulding, BRAC PMO RPM and Izzat Amadea, Navy, ROICC SF Bay Contract No. : N62473-09-D2615 0003
 Date : November 7, 2014 ERRG Project No.: 2010-152
 Project Title & Location: Mare Island Munition Response Program Remedial Investigation in Investigation Area K, Vallejo, CA
 Brief Description of RFI: Blind Seeding revised to Target Selection
 Reference Specs/Drawing(s): GSV Plan Section 4.0

Request the following variation

Due to challenges with the crawler/ROV repeatedly accessing identical areas and all areas in the survey area, the blind seeding program requires modification to a seed target selection program.

Response Requested: Immediate 7 Days 21 Days

Virginia Demetrios
ERRG, Inc., Project Manager

11/07/2014
Date

Navy Response

Navy project team concurs with the change request. It is the Navy's understanding that the seeds are placed on a rope and dropped into the water while tethered to the barge to increase the probability that the crawler/ROV would detect the seeds.

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Navy Representative, Heather Wochnick, LRP

Date

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 Date: 2014.11.12 12:43:19 -08'00'

Navy Representative, Izzat Amadea, ROICC SF Bay

Date



REQUEST FOR FIELD CHANGE

To : US Navy Field Change # : 03
 Attn : Izzat Amadea, Navy, ROICC SF Bay Contract No. : N62473-09-D2615 0003
 Date : November 11, 2014 ERRG Project No.: 2010-152

Project Title & Location: Mare Island Munition Response Program Remedial Investigation in Investigation Area K, Vallejo, CA

Brief Description of RFI: Casing and Small Arms Disposal

Reference Specs/Drawing(s): _____

Request the following variation

Any brass casings and small arms will be dispose of as household waste.

Response Requested: Immediate 7 Days 21 Days

Virginia Demetrios
ERRG, Inc., Project Manager

11/11/2014
Date

Navy Response

Navy project team does not concur with the change request. Discarded military munitions (DMM) and material documented as safe (MDAS) shall be handled in accordance with the approved Explosive Safety Submission (ESS) (Aug 2013 with Jun 2014 revision) including off-site recycling and demilitarization.

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 cn=WOCHNICK.HEATHER.MARIE.1366539529
 Date: 2014.11.12 13:55:35 -08'00'

Navy Representative, Heather Wochnick, LRPM

_____ Date

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Digitally signed by AMADEA.IZZAT.S.1231907153
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 ou=USN, cn=AMADEA.IZZAT.S.1231907153
 Date: 2014.11.12 12:45:46 -08'00'

Navy Representative, Izzat Amadea, ROICC SF Bay

_____ Date

APPENDIX D
GEOPHYSICAL THIRD-PARTY QA SUMMARY

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1605 School Street, #4
Moraga CA 94556
925 (808-8965)

December 22, 2014

Mr. Don Stevens, P.E.
Environmental Cost Management
5632 Shadle Way
Fair Oaks, California 95628

Subject: Summary Report
Quality Assessment (QA) of Digital Geophysical Mapping (DGM) Data
Investigation Area K (IA K), Former Mare Island Naval Shipyard
Vallejo, California

Dear Mr. Stevens:

1.0 INTRODUCTION

Under contract to Environmental Cost Management (ECM), Advanced Geological Services, Inc. (AGS) has reviewed the digital geophysical mapping (DGM) data obtained at Investigation Area K (IA K) within the former Mare Island Naval Shipyard as part of the overall QA effort to assess the Remedial Investigation (RI) contractor's MEC/MPPEH investigation/removal efforts. It is worth noting that IA K comprises underwater areas along the Mare Island coast within the Mare Island and Carquinez Straits, and the subject DGM survey was focused on 50-foot buffer areas surrounding the Fleet Reserve Piers (FRP), Pier 34, and Pier 35.

AGS' work was confined to reviewing data provided to us by others; accordingly, we did not observe the data acquisition survey work in the field. AGS understands that the geophysical data were obtained by Science Applications International Corporation (SAIC) under contract to Engineering/Remediation Resource Group (EERG). To obtain the data, SAIC used an array of five vertical fluxgate magnetometers mounted on a C-Talon Benthic Crawler, which was placed underwater and driven back-and-forth across the various survey areas to look for metal objects representing potential MEC (munitions and explosives of concern) and/or MPPEH (material potentially presenting an explosive hazard) items. AGS further understands that the crawler was remotely operated from a barge floating above each survey area. The magnetometer array was 2 meters wide, so it follows that a single crawler traverse scanned an approximately 6-foot wide "swath" centered on the crawler trackline. The data acquisition field work was performed over a 10-day period from November 4 to November 14, 2014. The IA K DGM data were provided to AGS periodically during that time period by Engineering/Remediation Resource Group (EERG) using the "Dropbox" file exchange utility and were reviewed in AGS' Moraga, California office. On the basis of the provided data, it appears that the survey covered only a small portion of the planned investigation area.

The IA K data were provided in two useable formats: as ASCII .dat files and as Geosoft databases. The ASCII .dat files contained the following data columns: *Time Stamp*, *Sensor ID*, *X-coordinate*, *Y-coordinate (in State Plane feet)*, and *raw magnetic gradient measurements*. The Geosoft databases contained the following additional columns: *Median Value* (of the magnetic gradient readings), *Demedain Value*, and *Smoothed Demedain Filtered Value*; it appears that demedian filtering of the raw magnetic gradient data and subsequent smoothing of the demedian-filtered data was performed within Geosoft Databases. In addition to the data, EERG/SAIC also provided color-filled contour maps and data profiles in Enhanced Microsoft Windows image (.emf) format. The provided data mostly comprised results from scans along the Instrument Verification Strip (IVS) and the background "Noise Strip", along with the results of the Static and Swipe (functional) tests, which

were performed before the geophysical survey system was placed in the water; only a small amount of data from the three Pier area sites was provided. It appears that grand total of approximately 3,800 line-feet of data, distributed over the three Pier sites, were collected. It is worth noting that no target pick locations (i.e., locations of magnetic anomalies indicative of potential MEC/MPPEH items) were provided.

2.0 QA REVIEW PROCEDURES

AGS examined the IA K data using the Geosoft OASIS montaj software system. Geosoft is a useful tool for data review because it employs multiple windows and dynamic linking, which allows the reviewer to see a given anomaly target on a contour map, simultaneously view the anomaly as a data profile, and also inspect the database directly to see the numerical values of the associated data. In addition, one can “walk” through a data set by viewing the data profiles on a line-by-line basis. Although the Scope of Work for this QA review calls for a review of 10% of the data, it is worth noting that, due to the small amount of data that was provided, AGS was able to broadly assess 100% of the data; in addition, at most of the data were also inspected in detail by viewing data profiles to better evaluate responses along the IVS and Noise Strip and to identify any anomalous responses in the field data that could be indicative of potential MEC/MPPEH items.

To perform the review, AGS first imported the ASCII format data into a new Geosoft data base. This procedure facilitated plotting of the data point locations to a map, preparing color-filled contour maps, and viewing of the data in map and profile format. AGS then plotted all of the data point locations onto a map to check data density and look for any gaps in the data coverage. The data points were plotted in such a manner that the map symbols used to represent the data points were the same width as the magnetometer array. With this procedure, any gaps in the data coverage would be readily apparent as a “white space” on the data coverage map.

On the basis of the provided contour maps and data profiles, it appears that EERG/SAIC’s analysis was performed using the “smoothed demedian-filtered” magnetic gradient data. Accordingly, AGS also inspected the Geosoft databases prepared by EERG/SAIC, wherein the filtering and smoothing of the data was performed. AGS used a kriging algorithm to generate color-filled contour maps of the “smoothed demedian-filtered” magnetic gradient data, and then inspected these maps to look for areas of anomalous response indicative of potential MEC/MPPEH items. AGS compared its maps to those produced by EERG/SAIC, and also viewed the data in profile format, which provides a better view than a contour map of the amplitude and symmetry of anomalous responses. Due to the small amount of field data, AGS’ review focused on the IVS data, which were examined in profile format to assess the correlation between anomalous responses and the seeded item locations. AGS also focused on the Noise Strip data to assess the system’s performance in a “background” area where no metal items are present.

3.0 RESULTS

3.1 Data Coverage

Generally speaking, the DGM survey coverage at IA K comprised a single line that “zig-zaged” through portions of the FRP, Pier 34 and Pier 35 sites. The resulting data coverage is well short of the goal, as stated in the RI Work Plan, of “100% of the designated 50-foot buffer area along the sides of the piers (and) 100% of areas under the pier overhangs.” AGS understands that the limited coverage was due to the difficulty of moving the crawler through the mud and strong currents that were encountered in the survey areas. Overall, the crawler covered approximately 3,800 line feet of survey transect; assuming a 6-foot wide sensor array, this equates to approximately 0.52 acres of coverage. Considering that approximately 6.2 acres were identified in the Work Plan (Figures 4, 5, 6) as “possible” for DGM surveying, the DGM survey covered only 13.5% of the planned survey area.

3.2 Data Quality

Data quality is good, as evidenced by the repeatability of the IVS data collected at the beginning and end of

each day, the correlation between the anomaly spike responses and seeded item locations along the IVS test line, the smooth, symmetrical anomaly response curves in the IVS data, and an the absence of anomalous responses along the Noise Strip, where no metal objects were present. Similar data quality was observed in the field data collected at the three Pier sites.

3.3 Target Picking

As stated previously, no target picks were provided, so AGS was unable to evaluate the contractor's target picking process. AGS observed numerous anomalous responses in the field data obtained at the three Pier sites; however, it is not known how many of these responses are indicative of potential MEC/MPPEH items and how many (if any) were caused by noise sources associated with the piers structures or other non-MEC items. It is worth noting that, in general, magnetometer surveys often produce broad, dipolar anomaly signatures that do not readily lend themselves to locating the anomaly source object as precisely as can be done with EM61 data. And, for IA K investigation in particular, precise target locating may be further complicated by the small errors introduced by the underwater acoustic positioning link between the barge and the crawler. These issues are acknowledged in the Work Plan, where a combined accuracy of "less than three feet" for anomaly reacquisition was expected. This expectation is borne out in the contour maps of the IVS data, where an offset of approximately two feet was observed between the anomaly center and the plotted locations of some of the seed items. Therefore, for the intrusive investigation the search radius for anomaly reacquisition and target removal should be expanded accordingly.

4.0 CONCLUSION

On the basis of the IVS, Noise Strip, and field data, AGS concludes that the IA K DGM data are of good quality and the magnetometer/crawler survey system was capable of detecting metal objects representing potential MEC and/or MPPEH items. However, in view of the limited data coverage— only 13.5% of the combined 6.2-arce planned survey area— it is AGS' opinion that the MEC contractor did not achieve the project goal of obtaining data to provide the Navy RPM with a high degree of confidence that the IA K site was adequately characterized with respect to potential MEC/MPPEH items.

Respectfully,



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