Naval Facilities Engineering Command

Final

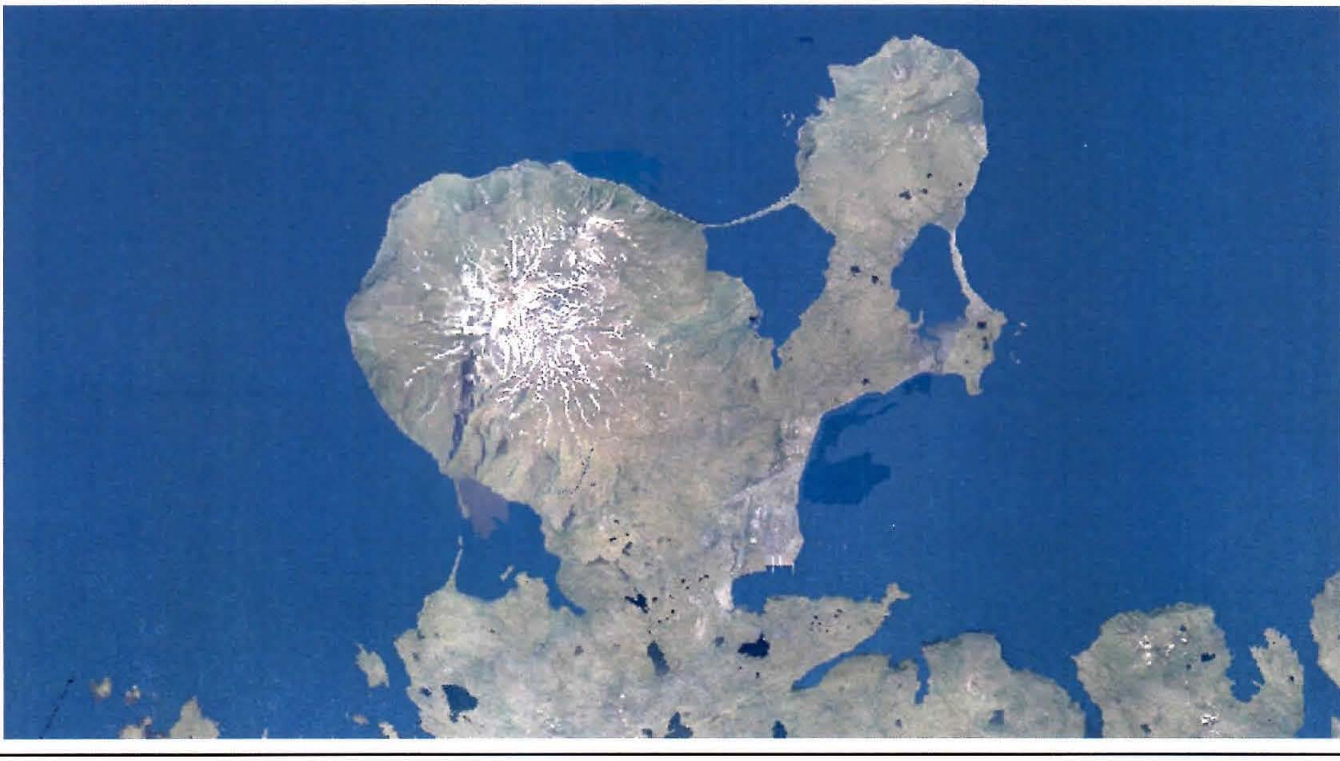
September 2012

Adak OU B-1 Area of Concern MM-10F, MM-10G and MM-10H Remedial Action Project Documentation

Former Adak Naval Complex

Adak, Alaska

Department of the Navy
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315



Naval Facilities Engineering Command
NAVFAC NORTHWEST

LETTER OF TRANSMITTAL

Date: 12/26/12

To:
Guy Warren
Remedial Project Manager
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

From:
Justin Peach
Remedial Project Manager
NAVFAC NW
1101 Tautog Circle, Suite 201
Silverdale, WA, 98315

Subject: Final Adak OU B-1 Area of Concern MM-10F, MM-10G, MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska

Transmitting:
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The Following:
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__ Report
__ CD/Disk
__ Survey
__ Work Plan
__ Assessment
__ Decision Document
__ Site Closure
__ Public Information
__ Memorandum
__ Graphic
__ Construction Drawing
__ Specification
__ Shop Drawing
__ Letter
__ Public Press Release
__ Comments/Response to Comments
__ Document for Restoration Advisory Board

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Guy-
Attached for your use is the Final Adak OU B-1 Area of Concern MM-10F, MM-10G, and MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska. The next phase in the OU B-1 closure sequence will be the OU B-1 Remedial Action Closure Report that encompasses all AOCs.

Please let me know if you have any questions or comments concerning the document.

Justin Peach

NAVFAC
Naval Facilities Engineering Command
NAVFAC NORTHWEST

LETTER OF TRANSMITTAL

Date: 12/26/12

To:
Christopher Cora
Remedial Project Manager
U.S. Environmental Protection Agency
1200 6th Ave, ECL-115
Seattle, WA 98107

From:
Justin Peach
Remedial Project Manager
NAVFAC NW
1101 Tautog Circle, Suite 201
Silverdale, WA, 98315

Subject: Final Adak OU B-1 Area of Concern MM-10F, MM-10G, MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska

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Chris-
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Please let me know if you have any questions or comments concerning the document.

Justin Peach

NAVFAC
Naval Facilities Engineering Command
NAVFAC NORTHWEST

LETTER OF TRANSMITTAL

Date: 12/26/12

To: Tony Cange, President
Aleut Real Estate, LLC
4000 Old Seward Highway
Suite 300
Anchorage, AK 99503

From: Justin Peach
Remedial Project Manager
NAVFAC NW
1101 Tautog Circle, Suite 201
Silverdale, WA, 98315

Subject: Final Adak OU B-1 Area of Concern MM-10F, MM-10G, MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska

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Tony-
Attached for your use is the Final Adak OU B-1 Area of Concern MM-10F, MM-10G, and MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska. The next phase in the OU B-1 closure sequence will be the OU B-1 Remedial Action Closure Report that encompasses all AOCs.

Please let me know if you have any questions or comments concerning the document.

Justin Peach

Naval Facilities Engineering Command
NAVFAC NORTHWEST

LETTER OF TRANSMITTAL

Date: 12/26/12

To: Merry Maxwell
U.S. Fish & Wildlife Service
Alaska Maritime National Wildlife Refuge
95 Sterling Highway, Suite 1
Homer, AK 99603

From: Justin Peach
Remedial Project Manager
NAVFAC NW
1101 Tautog Circle, Suite 201
Silverdale, WA, 98315

Subject: Final Adak OU B-1 Area of Concern MM-10F, MM-10G, MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska

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Merry-
Attached for your use is the Final Adak OU B-1 Area of Concern MM-10F, MM-10G, and MM-10H Remedial Action Project Documentation, Former Adak Naval Complex, Adak, Alaska. The next phase in the OU B-1 closure sequence will be the OU B-1 Remedial Action Closure Report that encompasses all AOCs.

Please let me know if you have any questions or comments concerning the document.

Justin Peach

FINAL

Adak OU B-1 Remedial Action Project Documentation

Former Naval Air Facility Adak, Alaska

Contract No. N62473-07-D-4013
Task Order No. 023

Prepared for:

Naval Facilities Engineering Command

Naval Facilities Engineering Command, Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

Battelle
The Business of Innovation

505 King Ave.
Columbus, OH 43201

September 2012

FINAL

Adak OU B-1 AOC MM-10F, MM-10G and MM-10H Remedial Action Project Documentation

Executive Summary

Contract No. N62473-07-D-4013
Task Order No. 023

Prepared for:

Naval Facilities Engineering Command, Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

Battelle
The Business of Innovation

505 King Ave.
Columbus, OH 43201

In conjunction with:

EODT Technology (EODT)
Lenoir City, TN 37771

September 2012

EXECUTIVE SUMMARY

Presented here is a summary of the results of the Adak Operable Unit (OU) B-1 Area of Concern (AOC) MM-10F, MM-10G and MM-10H remedial action. The field work lasted three field seasons: 2008, 2009 and 2010. The 2008 field season comprised all of the digital geophysical mapping (DGM) of the 476 primary grids, and included the intrusive investigation of 165 of these grids. The 2009 field season focused on completing the intrusive work begun in 2008 in the remaining 311 primary grids, along with DGM and intrusive work on five step-outs identified from the 2008 intrusive work. In 2010 the contractor completed the intrusive investigation excavation backfilling, completed repairs on the roads and ruts created during the field work, and performed a siltation survey to determine whether the field activities left any adverse effects on surface water bodies.

Background

The three Mount Moffett sites (MM-10F, MM-10G, and MM-10H) were originally associated with OU B-1 sites MM-10A, MM-10B, and MM-10E. They were not included in the Final OU B-1 Remedial Investigation (RI) and Feasibility Study (FS), but were part of the Mount Moffett sites (MM-10 sites) added to the OU B-1 Record of Decision (ROD) before it was executed. Investigation and clearance operations were conducted within OU B-1 sites from 1999 through 2004. Mount Moffett impact AOCs MM-10F and MM-10G were established within the boundary of AOC MM-10E following the 2004 field season due to higher concentrations of munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) than anticipated. The Navy elected to remediate these areas independent from other OU B-1 AOCs. The third AOC, MM-10H, was created in 2004 when additional investigation was recommended because of the proximity of three unexploded ordnance (UXO) items (90 mm projectiles). This AOC is located just northeast of the original MM-10E boundary.

Document Organization

Documentation of the field work performed in 2008, 2009, and 2010 is presented in four parts as described below:

- Part One –MEC AOC Certification, Munitions Constituents (MC) Data Validation, and Conclusions and Recommendations. Part One is the parent document of the series. It provides the documentation required by Worksheet #37 of the MEC Quality Assurance Project Plan (QAPP) usability assessment and MC QAPP data validation, referred to here as the AOC Certification.

- Part Two – A single, combined After Action Report (AAR) for the 2008, 2009 and 2010 field seasons. Part Two includes Adak and site history, previous investigations, and contractor methodology and contractor results for all three field seasons, including MEC, MC, quality control (QC) and audits.

- Part Three – A Quality Assurance (QA) Summary Report for the 2008, 2009 and 2010 field seasons. Part Three summarizes the activities of the Navy's independent QA contractors for each of the three field seasons. This document helps support the conclusions and recommendations by providing information supplemental to the production and QC data.

- Part Four – A Non-Conformance Report (NCR) Resolution Document. Part Four includes a discussion of the 27 NCRs issued by QA for the project. This document details each NCR and their resolution.

These four parts and associated appendices are attached to this Executive Summary.

General Project Information

Consistent with provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the ROD for OU B-1 for the former Naval Air Facility at Adak Island, Alaska, provides the basis for selection of final remedies to address UXO, discarded military munitions (DMM) and MC. Pursuant to the OU B-1 ROD, the Navy agreed to complete a remedial action that removed detected UXO and DMM to a depth of 4 feet below the top of the mineral surface. Remedial actions were required to be completed to address the covenant under CERCLA 120 (h) (3). In addition, completion of the remedial action also addresses the requirements of Department of Defense (DoD) Ammunition and Explosives Safety Standards (DoD 6055.09-M, Volume 7) for remediation of UXO-contaminated sites prior to real estate transfer outside of the Federal Government.

The remedial action objective (RAO) for the three primary AOCs are derived from the OU B-1 ROD that was finalized in December 2001. The objective is summarized as follows:

To reduce MEC and MC risk to an acceptable level and to the satisfaction of stakeholders for the reasonably anticipated future land use.

The remedial action goal (RAG) is to perform remedial actions in these AOCs in accordance with the project planning documents to support both the current and reasonably expected future (unrestricted) land use, and to protect human health and the environment. MEC clearance work was completed for this remedial action with a goal to meet the requirements of the OU B-1 ROD, including applicable or relevant and appropriate requirements (ARARs).

- For MEC, clearance goals were established to remove identified target anomalies equal to or greater than a 37 mm projectile to a maximum of 4 feet below the top of the mineral surface, or to bedrock if encountered first.
- For MC, the clearance goal was to ensure soil at breached munition sites was less than the clearance level so as to protect human health risk or the environment. This was accomplished through field testing, soil removal as necessary and confirmation sampling.

To meet the ROD requirements, the following project objectives were identified:

- Mobilize personnel and equipment to the site;
- Qualify all of the DGM and anomaly reacquisition teams in a geophysical prove-out (GPO) to a standard of 0.85 probability of detection (Pd) at a 90% confidence level (CL);
- Perform DGM over 100% of the accessible area within the three AOCs and receive concurrence from the Navy's QA contractor with the target lists generated from the DGM;
- Reacquire and investigate 100% of the target anomalies identified from the DGM data;
- Dispose of all MEC;

- Inspect, certify, verify and process all MPPEH through a thermal flashing unit (TFU) and package the MPPEH for shipment off Adak Island for recycling.
- Perform and document QC on all definable features of work (DFW).
- Demobilize personnel and equipment from the site;
- Prepare project reports in accordance with the approved work plans.

Finally, the project objectives were converted into DFWs as shown in Table ES-1.

Table ES-1. Crosswalk from the ROD Requirements to the Project DFWs

ROD Requirement	Project DFW
Remove all metallic debris from the surface that could interfere with geophysical surveys	Surface Clearance
Conduct geophysical mapping at the sites to find possible ordnance and explosives (OE)/UXO	Site Specific Training and GPO Certification Geophysical Survey
Identify locations to dig for possible OE/UXO (based upon geophysical data)	Geophysical data processing and Interpretation
Re-locate and excavate (dig) identified targets to 4 feet bgs	Target Reacquisition Intrusive Operations
Dispose of OE/UXO by detonation in place or removal and treatment at a remote location	MEC Disposal MPPEH certification, Flashing and Disposal Donor Explosives Handling and Storage
Test for explosives-related chemical contamination at suspected locations and manage any contaminated soil	MC Contaminated Soil Sampling, Excavation, and Disposal

Note: DFWs for planning and mobilization and step-out areas are discussed or mentioned in the ROD as general requirements.

Remedial actions at OU B-1 sites MM-10F, MM-10G, and MM-10H were executed according to a MEC QAPP with supporting documents including:

- MC QAPP;
- Technical Management Plan (TMP);
- Explosives Safety Submittal (ESS);
- Environmental Protection Plan (EPP) and Waste Management Plan (WMP);
- Accident Prevention Plan (APP) with Site Safety and Health Plan (SSHP); and,
- Standard Operating Procedures (SOPs).

The MEC QAPP and supporting documents were prepared by EOD Technology, Inc. (EODT) under Contract Number N44255-08-C-6004 for the Naval Facilities Engineering Command, Northwest. EODT performed all of the remedial action work at the OU B-1 sites during all three field seasons.

Independent QA was provided to the Navy by Battelle Memorial Institute (Battelle) in the 2008 and 2010 field seasons and by the team of Camp, Dresser and McKee and Zapata Engineering, Inc. (CDM/Zapata) in 2009. The purpose for the independent QA was to address QA on the full range of contractor QC as presented in the approved project plans. To accomplish this purpose, QA would:

- Identify to the Government any contractor work that deviates from the approved project plans or is not completed, in whole or in part, as required by the approved project plans;
- Evaluate the contractor work against the pre-work performance measures, including, but not limited to, personnel qualifications and the successful demonstration of GPO;
- Conduct QA audits of DGM and MEC removal activities including, but not limited to:
  - daily field audits of the data collection process;
  - daily field audits of the dig/removal/disposal process;
  - verifying no-finds; and
  - daily review of contractor QC documentation to evaluate whether there was an excessive no-find rate or other circumstance that would support a changed condition.
- Conduct QA of DGM data by reprocessing contractor production/QC data, picking targets and matching QA picks against contractor picks. The objective was to reach concurrence with the target picks and provide this concurrence in writing to the Navy.
- Perform QA on the completeness of grids in accordance with the approved project plans (i.e., re-survey selected lanes within grids, process data and evaluate, reacquire randomly selected targets within grids and verify clearance in accordance with contract requirements) and provide a statement of concurrence for each grid; and
- Prepare an end of field season QA report that includes, at a minimum, methodologies, findings, conclusions and recommendations. The purpose of this report is to memorialize the independent government determination of whether the project met all of the QC requirements specified in the approved project plans.

The QA contractor installed the GPO prior to the beginning of field work in 2008. The GPO was installed in accordance with the GPO Installation Plan (Tetra Tech, 2008). Production geophysical and intrusive teams were certified in the GPO by QA in accordance with the GPO Certification Plan (Tetra Tech, 2008). Production QA work was conducted during all three field seasons in accordance with a Quality Assurance Surveillance Plan (QASP) prepared by Battelle in 2008 (Battelle, 2008). A detailed summary of the project follows.

Part One Summary: MEC AOC Certification, MC Data Validation Summary, and Conclusions and Recommendations

Part One provides the MEC AOC Certification documentation, the MC Data Validation Summary, and Conclusions and Recommendations for the entire project. Part One comprises a review of the data gathered to ensure the data package to be used to support a decision meets the previously agreed upon standards for quantity and quality of data and that any deviations from these standards are evaluated to assess the impact these deviations may have on the decisions to be made by the project team.

MEC AOC Certification Documentation

The project team developed a plan for conducting a usability assessment and termed this plan the AOC Certification Process during development of the MEC QAPP. This process was documented in MEC QAPP Worksheets #36 and #37. Worksheet #36, (Product QC Tier 3 Summary) outlines the steps to be taken to ensure the quality of the information relied upon to make a determination that no further action is required for the AOC other than prescribed institutional controls as identified in the OU B-1 ROD. Worksheet #37 (Usability Assessment-AOC Certification Checklist) is the checklist developed to reflect the requirements described in Worksheet #36. These two worksheets identify the parties responsible for conducting the review, the specific data elements to be reviewed and the process to be used for evaluation of these data elements. The overarching goal of the usability assessment is to identify any deficiencies in data that may have resulted in non-attainment of the project quality objectives (PQOs). If deficiencies or non-compliance with agreed upon procedures were identified, the usability assessment would provide an analysis and determine whether or not the impact prevents attainment of PQOs. If so, corrective actions necessary to address these issues would be identified as part of the usability assessment.

Worksheet #36 is comprised of five primary QC inspection steps, numbered I-V and described below:

- Step I documents and reviews the preparatory QC activities including personnel training and qualifications and GPO certification.
- Step II summarizes and reviews the initial and follow-up phases of QC inspections and certification. The initial and follow-up phase checklists will be used to document that all aspects of the remedial action are completed in accordance with the applicable procedures. The combined checklists are designed to verify that the SOP-specific sampling and analysis, geophysical surveying, and MEC clearance procedures are being followed during the performance of remedial action field operations.
- Step III reviews documentation of pre-intrusive surface clearance and the specific quality requirements for geophysical processing and interpretation.
- Step IV is a continuation of Step II and includes a review of MEC clearance operations including review of follow-up phase QC checklists and compliance with the MEC QAPP surveillance requirements.
- Step V documents the production contractor's actions to ensure that all detected MEC items have been cleared from the AOC in accordance with MIL-STD-1916.

MC Data Validation Summary

MC AOC Documentation is provided in MC QAPP (Sampling and Analysis Plan [SAP]) Worksheets #35, #36 and #37. Worksheet #35 contains the Validation (Steps IIa and IIb) Process Table, Worksheet #36 contains the Validation (Steps IIa and IIb) Summary Table, and Worksheet #37 provides the Usability Assessment.

Worksheet #35 (Validation [Steps IIa and IIb] Process Table) describes and confirms the processes to be followed to validate project data. It is divided into two subparts:

- Step IIa assesses and documents compliance with methods, procedures and contracts;
- Step IIb assesses and documents a comparison with measurement performance criteria (MPC) in the QAPP.

Worksheet #36 (Validation [Steps IIa and IIb] Summary Table) identifies the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data. It is divided into two subparts:

- Step IIa assesses and documents compliance with methods, procedures and contracts;
- Step IIb assesses and documents a comparison with MPC in the QAPP.

Worksheet #37 (Usability Assessment) determines the adequacy of the data, based on the results of validation and verification, for the decisions being made. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP. This worksheet is provided in text discussions only in the MC QAPP and the primary steps are as follows:

- Data Quality and Usability
- Personnel Training and Experience
- Precision
- Accuracy/Bias

Conclusions and Recommendations

The documentation in the Part One, MEC AOC Certification and MC Data Validation report, and supporting documents (Parts Two, Three, and Four) support the conclusion that all identified target anomalies were investigated and sufficiently removed from the accessible areas of OU B-1 AOC MM-10F, MM-10G and MM-10H to a depth of 4 feet below the mineral surface layer in compliance with the requirements of the ROD and project planning documents. Environmental media sampling and analysis performed as part of this remedial action also demonstrate that for areas where breached munitions were found, MC is no longer present at OU B-1AOC MM-10F, MM-10G, and MM-10H above levels that present a hazard to the public or the environment.

An effective QC process was employed at the site. QC installed 476 QC blind seeds, and 473 (99%) were detected by the DGM survey teams, selected as target anomalies, reacquired in the field, and identified and recovered during intrusive investigation. The corrective actions for the three missed QC blind seeds are documented on the deficiency notice (DN) forms and logs discussed in this document, and the AAR (Part Two). Contractor QC re-checked 13,248 (32%) of the 41,393 targets selected and investigated at the site without finding any MEC.

The Navy instituted an independent QA process. All DGM data were first processed and targets picked by the contractor, then reviewed by an independent QC geophysicist, then independently, all DGM data were re-processed and targets re-picked by Navy QA. A total of 41,393 targets were selected in the 481 grids (476 primary grids plus five step-outs) comprising the primary AOCs. QA installed 301 blind seeds and all of these seeds were accounted for. QA re-checked more than 3,100 (7%) randomly selected targets of the 41,393 targets without finding any MEC. Statistical analysis using only the QA investigations at random targets (total of 3,101) indicates that there is an extremely low probability of any remaining MEC at the site. This analysis shows a 99.999% certainty (confidence) that at least (a minimum of) 99.6% of all of the remaining DGM targets which have not been checked by QA do not contain MEC.

There were a total of 27 NCRs issued by Navy QA during the remedial action. None of the NCRs were caused by discovery of a MEC item, and all of the NCRs were resolved.

All remedial activities in AOCs MM-10F, MM-10G and MM-10H have been completed and have met all the requirements of the OUB-1 ROD and NOSSAINST 8020.15A. The AOC Certification Document (Part One) completes the remedial action for AOCs MM-10F, MM-10G and MM-10H required in the OU B-1 ROD. Based on the AOC Certifications provided in this document, no further action and regulatory close out are recommended for AOCs MM-10F, MM-10G and MM-10H. Information from this AOC Certification Document (and the other parts) will be added to the Remedial Action Completion Report (RACR) for all OU B-1 AOCs, scheduled to begin upon stakeholder approval of this report.

MEC AOC Certification Data Deficiencies

Three deficiencies were noted in QC Step I documentation (missing personnel qualifications documentation, missing documentation of training for EPP/WMP for one team in 2008, and missing documentation for TMP training for chemical [MC] sampling person). One deficiency was noted in QC Step II documentation (missing one DGM coverage map for one grid). Three deficiencies were noted in QC Steps I and II (missing preparatory QC inspection for DFW-Mobilization/Site Preparation, missing preparatory inspections for geophysical team members [SOP2], and missing preparatory inspection for one person for geophysical data processing [SOP3]). Four deficiencies were noted in QC Steps II and IV (two missing records for follow-up QC inspections for SOP2, missing one follow-up inspection for SOP3, missing two follow-up QC inspections for SOP4, missing one follow-up QC inspection for SOP5, and missing QC, or other inspection documentation for one follow-up QC inspection for SOP7). All of these deficiencies were considered minor and did not impact the AOC certification.

MC Data Validation Data Deficiencies

Two breached munitions were found during the project (one in AOC MM-10F and one in AOC MM-10G), that required MC sampling. One deficiency was noted in Worksheet #35 Step IIb (missing QC record to validate a review of the on-site analytic work against the MC QAPP requirements). This deficiency is not considered serious as the follow-on components (Laboratory testing in Worksheet #36) were used to validate the onsite analytical data. Two deficiencies were noted in Worksheet #36 Step IIb (both of these were due to lab results from the MM-10G munition that exceeded the QAPP Worksheet #15 reference limits. Text from ADEC on September 28, 2009 states: “We have reviewed the summary of the preliminary lab results provided via e-mail on September 23, 2009. Based on a review of this preliminary data ADEC does not feel additional soil removal and sampling is necessary. While the results indicate a slight exceedance of ADEC's 18 AAC 75.341 soil cleanup levels for TNT (53 ppm vs 36 ppm, direct contact, over 40 inch zone). ADEC's Migration to Ground Water (MTGW) values are not applicable for this issue for various reasons. This slight exceedance does not indicate a threat to human health or the environment.”

Part Two Summary: After Action Report

Part Two addresses the work performed by EODT at AOCs MM-10F, MM-10G and MM-10H between 2008 and 2010. The AAR is composed of eight chapters, which cover an introduction, major work activities, technical approach, field procedures and documentation, data management, and QC. The AAR includes a compilation of the findings and results based on the field work and data collected during the field seasons. Table ES-2 describes the report sections and their general content.

Table ES-2. Report Sections and General Content

Section Number and Title	General Content
Section One - Introduction	Section One provides the background for the project including the characteristics and military history of Adak, site characteristics and regulatory history, previous site work and the results of previous investigations.
Section Two – Project Requirements	Section Two states the remedial action objectives (RAO), remedial action goals (RAG), ROD requirements, project scope and shows the linkage from the ROD requirements to the project DFWs and associated tasks.
Section Three – DFW-specific MEC Procedures	Section Three describes the procedures, documentation requirements, and QC measures that were required to be followed for each definable feature of work and associated task. This section is organized according to MEC QAPP, Worksheet (WS) #14 which identifies each DFW and its supporting subtasks.
Section Four – DFW-specific Procedures for MC	Section Four describes the procedures, documentation requirements and QC measures that were required to be followed for each definable feature of work and associated task. This section is organized according to the MC QAPP (SAP), Worksheet (WS) #14.
Section Five – Project Quality Control	Section Five discusses the overarching quality control procedures used during the OU B-1 remedial action. This section describes how the 3-phases of control QC methodology was required to be implemented, requirements for the blind seed program, change control management and the QC process to be applied for final AOC certification.
Section Six – Production Results	Section Six presents the combined results for all three field seasons. Results are presented as both narrative and in summary tables detailing each DFW, with each table indicating the reference to documentation that the requirements specified in Section 3.0 were met for the DFW. Section 6.1 presents the results for the MEC remedial action. Section 6.2 presents the results for the MC remediation.
Section Seven – Project Quality Control Results	Section Seven focuses on the overall QC program, deficiencies and/or non-conforming conditions, QC inspections, surveillances, and sampling.
Section Eight – References	Section Eight provides the references cited in Part Two.

Field Activities After-Action Summary

Surface Clearance

Surface clearance was conducted in MM-10G and MM-10H, plus five step-out grids off the primary AOCs. The work was conducted using handheld metal detectors to assist the UXO field personnel in locating metal on or near the surface that could adversely impact the geophysical surveys or cause a safety hazard. AOC MM-10F received a verification surface walk to confirm that the surface clearance performed by another contractor in 2004 left the AOC in acceptable condition for DGM surveys. On AOC MM-10G significant amounts of metal debris were located and removed from the surface clearance. This debris was categorized as coming from an aircraft crashing into the AOC several years prior to the 2008 remedial action. A total of 3,529 lb of metal were removed during surface clearances. No MEC were found during any of the surface clearances.

Geophysical Survey

DGM surveying was performed from June 23 through August 29 for the 2008 field season, and from August 8 through September 22 for the 2009 field season. DGM in the individual AOCs was completed as follows:

- 476 grids in MM-10F, MM-10G and MM-10H
- Five step-out grids in the primary AOCs

DGM was completed in all accessible areas using the hoop-skirt configuration. Inaccessible areas are defined as areas with greater than a 30 degree slope or areas with physical features such as rock outcrops, boulders, crevasses, ponds, and swiftly moving water which prevent safely collecting data. All of the site not exhibiting one of the inaccessible-area characteristics was surveyed.

Geophysical Data Processing and Interpretation

Production target selection began on June 23, 2009, using a threshold (sum of Channels 2, 3 and 4) of 2.9 mV. This threshold was changed to 4 mV on approximately July 28 and finally to 4.4 mV on approximately August 11. At the conclusion of the 2008 DGM processing, 24 grids were finalized using the 2.9 mV threshold, 203 grids were finalized using the 4 mV threshold and 249 grids were finalized using the 4.4 mV threshold. All of the 2009 DGM data were processed using the 4.4 mV threshold level. All of the step-outs and transects in MM-10E were processed using the 4.4 mV threshold. Table ES-3 shows the count of geophysical target anomalies by AOC. The numbers in Table ES-3 show that the second party QC added about 8% and QA added about 17% to the final target list totals.

Table ES-3. Count of Geophysical Anomalies by Area

AOC	Base Picks	QC Additions	QA Additions	Total
MM-10F Grids	28,859	2,373	5,564	36,796
MM-10G Grids	3,045	216	482	3,743
MM-10H Grids	759	79	16	854
Primary Area Totals	**32,663**	**2,668**	**6,062**	**41,393**

Target Reacquisition

In 2008, reacquisition activities started on July 10, 2008, and were completed on September 9, 2008. In 2009, reacquisition began on June 18, 2009 and was completed on September 9, 2009. All step-outs were reacquired between August 11, 2009 and September 1, 2009.

Reacquisition teams were responsible for identifying no-finds. A no-find is defined as no reading on the reacquisition metal detector. Approximately 11% (4,877) of the reacquired target locations were classified as no-finds by the reacquisition teams.

One DN was written relating to reacquisition activities. DN-001 was written in June 2008 to correct a deficiency noted when the reacquisition data were reviewed. In part, the DN stated:

"During UXO Team 1's Reacquisition of the GPO, the coordinates of the interpreted location were not recorded in the GPS Data Collector in accordance with the SOP. Reoccupation of the interpreted location within 3 inches is an important step in the process to ensure that the actual anomaly mapped in the DGM data was reacquired."

Analysis of the deficiency identified the need to re-write portions of the SOP and provide updated training to make it more clear to the operator how to be sure to get the coordinates logged into the data logger.

Intrusive Investigations

A total of 41,393 targets were investigated in the primary AOCs and primary AOC step-outs. In the 2008 field season, 12,823 target excavations were conducted, with the balance of excavations (28,570) completed in 2009. A total of 31,972 targets (77%) were characterized as MPPEH 5X, weighing 4.1 tons, which were inspected, certified, verified and processed through a TFU and shipped offsite for demilitarization and recycling. Thirty-eight (38) MEC items were found (about 0.1% of the targets investigated) in the primary AOCs and primary AOC step-outs. All target excavations conducted in 2008 were backfilled in 2008. Some of the target excavations in 2009 were backfilled; however, many were left unfilled at the end of the 2009 field season. These remaining excavation locations were backfilled during the 2010 field season. Table ES-4 shows the summary of anomaly types per AOC and step-out.

Table ES-4. Summary of Anomaly Types per AOC and Step-Outs

AOC	MPPEH-3X	MPPEH-5X	Dig Abandoned	Hot Geology	Hot Soil*	No Find	Non Munitions Debris***	Not Dug**	Other	QA Seed	QC Seed	Survey Pin	MEC	Grand Total Anomaly
MM-10F	3	29,747	4	489	2	3,476	140	1	643	255	417	1,590	29	36,796
MM-10G		1,891		59		894	531	1	50	44	60	205	8	3,743
MM-10H		313	2	3		502	4		4		3	22	1	854
Total	3	31,951	6	551	2	4,872	675	2	697	299	480	1,817	38	41,393

*Targets designated with hot soil encountered mineral soil with elevated millivolt readings rather than a single "Hot Rock.

**Targets designated as not dug were either underwater or underneath an immovable rock.

***Does not include material collected during surface clearance.

The following MEC were recovered during the intrusive investigation:

- 12 ea – 37 mm MkII
- 1 ea – 37 mm Shell, H.E., M63,w/fuze, BD
- 2 ea – 40 mm Cartridge, HE-T (SD MKII or MK.II-Mod 2)
- 1 ea – 60 mm Shell, H.E., M49A2
- 9 ea – 75 mm Shell, H.E., M41A1
- 4 ea – 81 mm Shell, H.E., M43A1
- 3 ea – 81 mm US Cartridges, 81 mm, Illuminating, M301A1
- 6 ea – 90 mm Shell, H.E., M71

Table ES-5 shows the depth of recovery for the recovered MEC.

Table ES-5. Depth of Recovery for MEC

Depth in Inches	# of MEC Items Encountered
0-6	5
6-12	14
12-18	10
18-24	4
24-30	2
30-36	3
36+	1

Site Restoration Activities

Between August 18, 2010 and September 14, 2010, a complete surface sweep was conducted, checking all excavation spoils for ordnance fragments over 3 inches in any dimension, with none being found. All open excavations were backfilled. If insufficient spoils material was available to completely fill the holes, the sides were sloped to match the surrounding land contours. Areas requiring vegetation were fertilized and reseeded with an approved seed mixture for the Adak area. All roads, ATV trails and access points to the AOCs were mapped and repaired, with reseeding as required.

A Site Siltation Survey was conducted prior to the start of field activities on August 13 and 14, 2010. All streams were investigated at the point where the water flowed out of the AOC to determine if any siltation existed from the previous seasons' field activities, and was tracked to the nearest standing bodies of water that the streams entered. Some minor siltation was found in the streams near vehicle crossing points, but did not extend into any standing bodies of water, or was overshadowed by areas of natural erosion further downstream that was significantly more substantial than that caused by production activities. The report recommended no further actions were required and no erosion controls were needed to be installed.

MEC Disposal

During the clearance operations, 38 MEC were located and disposed by detonation, and three items categorized as 3X MPPEH were explosively vented. Items were destroyed or vented using either the blow in place (BIP) methodology or by consolidating the items into a single detonation event. In 2008, there were two BIPs and three consolidated shots. In 2009, there were no BIPs and four consolidated shots.

During the 2010 field season, two MEC were found that required disposal. An unfuzed 75 mm projectile was found 160 feet outside of MM-10G, near Grid A06, and an unfuzed 37 mm projectile containing some explosives residue was located in Grid K16 of AOC MM-10F. Both munitions were turned over to Navy Explosive Ordnance Disposal Detachment NW for disposal.

MPPEH Certification, Flashing and Disposal

UXO intrusive team members inspected all MPPEH at the time of removal in the grids. A second inspection was performed by the team leader who ensured munitions debris (MD) and non-munitions debris (NMD) were separated and live MEC or MPPEH was not present. UXO teams transported the MD and NMD items daily to former Power Station 5 (PS5). PS5 was the TFU operating location and scrap storage area. All items were inspected a third time by the Senior UXO Supervisor (SUXOS) and/or QC person, placed in a 55 gal holding drum and locked in a secure caged area. QA personnel and QC personnel conducted a weekly joint inspection of the items in the holding drum, certified them as 5X and placed a numbered seal on the drum in preparation for TFU operations.

The TFU was operated from August 3 to October 15, 2009, with 211 batches completed to flash all of the MPPEH. During the post-flashing MPPEH inspection, no high explosive (HE) contaminated items were found. The inspection of 8,255 lb of MPPEH scrap metal was certified explosives-free by the SUXOS and QA inspectors; flashed; and shipped off-island to Squak Mountain Materials, Inc., in Issaquah, Washington. In 2010, a single 55-gallon barrel of MD (which had been flashed in the TFU in 2009) was taken off the island and disposed of at Allen Scrap Metal, Loris, SC. The Certificate of Demilitarization for 2009 was received on October 9, 2009 stating all items had been demilitarized in accordance with DoD 4160 M-1. One batch failed on August 12, 2009. The associated EXPRAY test showed a positive reading on one item. The batch was successfully re-processed on the same day. Non-munitions scrap, mostly aircraft residue, was secured in a 10-foot container and shipped off island along with the MPPEH in September 2009.

An additional 177 lb of MPPEH were fully processed after the above-mentioned material was shipped off-island in mid-September 2009. This partial barrel was sealed and shipped at the end of the 2010 season’s demobilization and was disposed of at Allen Scrap Metal, Loris, SC. The Certificate of Demilitarization for 2010 was received on November 19, 2010 stating all items had been demilitarized in accordance with DoD 4160 M-1.

Donor Explosives Handling, Storage and Disposal

Demolition materials were transported to Adak via barge in 2008. A chartered aircraft transported donor explosives to Adak for the 2009 field season. No explosives were shipped to Adak for the 2010 field season. The donor explosives used on the remedial action included electric blasting caps, detonation cord and pre-formed shape charges (perforators). All explosives were destroyed prior to demobilizing from the site at the end of each field season; therefore, no explosives were left unattended.

GPO Area Step-outs

When QA installed the GPO areas for the OU B-1 work, they performed DGM over the prospective test areas and intrusively investigated all the targets selected from the data. Among those targets were two 37 mm AP-T projectiles and an 81 mm mortar fin. The project team determined that step-out grids should be established over the location of the items and DGM and intrusive investigation performed in accordance with the Remedial Action Design Work Plan (RADWP) that was used for the rest of the OU B-1 MM-10E work in 2004. Results of the work are as follows:

- In the east GPO area, the September 1 intrusive investigation produced one MEC item, a Japanese 2 inch NI mortar. Demolition was conducted in conformance with the Work Plan. Following the Work Plan, an additional step-out grid was placed with 100% DGM data collection on September 22, 2009. During intrusive investigation on September 30, no MEC was found, a discussion with the project team occurred and it was decided no further step-out field work was required.
- In the calibration grid area, MEC 5X fragments were found on September 1 but no MEC. Following the plan, an additional set of transects were placed on September 22 and no MEC or additional 5X was found. A project team discussion occurred and it was decided no further step-out field work was required.

Munitions Constituents Results Summary

During excavation, breached munitions were found at two locations that required MC sampling – AOC MM-10F, Grid E23 and AOC MM-10G, Grid B02. MC sampling was performed at the two locations on September 1-2, 2009, in accordance with the MC SAP. Personnel collected five-point composite samples from both AOCs to confirm trinitrotoluene (TNT) concentrations were not above the cleanup levels stated in the MC SAP. The field test kit used was the EnSys® TNT Field Test Kit Model 7002000. The sample location in AOC MM-10F did not require additional field screening because the samples reflected no detection of TNT. However, in accordance with the MC QAPP, a confirmatory fixed-based sample was collected in MM-10F, Grid E-23. The results confirmed that no additional soil removal was necessary.

The TNT concentration in the soil collected from AOC MM-10G exceeded the cleanup level, therefore, additional excavation and field screening was performed in accordance with the MC SAP. A five-point composite confirmation sample was collected, packaged, and shipped to Agriculture and Priority Pollutants Laboratories, Inc., (APPL), Clovis, CA, for analysis. Although the MM-10G location contained MC concentrations above the action level after excavation, the Adak project team determined that remaining contaminant concentrations were not high enough to cause unacceptable risk to human health or the environment. Therefore, additional excavation and testing were not required. This was confirmed in an e-mail from the Navy on October 1, 2009. Two 5-gallon containers of soil were collected. A solid waste profile sheet was completed and accepted by the Tennessee Department of Environment and Conservation. The solid waste and buckets were disposed of in the Chestnut Ridge Landfill in Heiskell, Tennessee.

Project Quality Control Results

Project quality was administered using the three-phases of control methodology. Table ES-6 shows the total number of inspections performed for each DFW during each field season and provides a snapshot of the level of QC activities performed. Preparatory inspections and GPO certification were performed at the beginning of each field season. The 2010 season field effort was limited to site restoration activities and did not require GPO Certification. General site specific training and applicable MEC QAPP SOP training were conducted prior to the start of field activities each year. Initial and follow-up inspections were performed in accordance with the schedule in the MEC QAPP.

Table ES-6. QC Inspection Totals

Definable Feature of Work	2008			2009			2010			
	Prep	Initial	Follow Up	Prep	Initial	Follow Up	Prep	Initial	Follow Up	Totals
Surface Clearance	2(*)	1	8	5	1	0	0	0	0	17
Geophysical Survey	7	5	66	3	1	3	0	0	0	85
Geophysical Data Processing	1	1	6	1	1	3	0	0	0	13
Target Reacquisition	3	11	9	3	14	22	0	0	0	62
Intrusive Operations	2	3	51	2	5	63	3	2	17	148
MEC Disposal	2	1	4	1	1	3	0	0	0	12
MPPEH Certification, Flashing, and Disposal	2	1	2	3	2	22	0	0	0	32
Donor Explosive Handling and Storage	2	1	16	2	2	15	0	0	0	38
Totals	21	24	162	20	27	131	3	2	17	407

*****Additionally, a preparatory inspection was performed on the grid staking survey work.

Table ES-7 provides a summary of QC activities performed for each of the three field seasons.

Table ES-7. Summary of QC Activities

Activity	Quantity
Production DGM QC Support • Independent QC Targets added • DGM Seeds Planted • DGM Seeds detected in the DGM data • Issued DN for DGM or Civil Survey work	 2,669 476 474 2
Field QA Activities • Random Anomaly Checks (VLIII) • Random Anomaly Checks (VLIV) • Biased QC Anomaly Checks • No-finds Checked • Issued DN for Intrusive Investigation	 746 3,751 4,893 4,428 8

Blind Seed Program

Four hundred and seventy-six (476) QC blind seeds were placed in the primary AOCs. None of the step-out grids or the GPO-area work (MM-10E) was seeded. Of the 476 QC blind seeds placed in the field, 473 were detected by DGM survey teams, selected as target anomalies, reacquired in the field, and identified and recovered during intrusive investigation. Resolution of the three missing seeds is as follows:

- Two were not mapped in the DGM data. Of these, one was the subject of DN-03 where the DGM team did not map close enough to an inaccessible area to pick up the seed. One was discovered to be in an inaccessible area during the missed seed investigation.
- One was placed and found in the DGM but was never reported recovered in the dig data and is classified as missing.

A quality performance result of over 99% success rate was achieved for QC acceptance sampling during the blind seed program.

Intrusive Investigation QC Results

QC personnel performed and documented final inspection sampling (independently re-surveying target anomaly locations) of approximately 32% of the target anomaly locations (13,248 target anomaly locations). The results of the inspections indicate successful inspection of over 99% of the selected locations. Six of the inspections failed and are reported in DNs 4, 6, 7, 9 and 10 (two targets). Distribution of the QC inspections is as follows:

- MM-10F - 11,204 inspections (30% of targets)
- MM-10G - 1,633 inspections (44% of targets)
- MM-10H - 393 inspections (46% of targets)
- MM-10E - 33 inspections (42% of targets)

Included in these percentages are the additional inspections implemented as a result of NCR 2009-06 which was issued on August 19, 2009. The additional inspections were implemented to reduce uncertainty and to aid QC in determining whether a systemic issue existed with regard to the complete removal of residue from target locations in accordance with the project plans. In order to accomplish this, a tightened inspection criterion was instituted according to Table 36-1 of the MEC QAPP and as specified in Worksheet #35. The effect of this was to subject all units of production (UoPs) that had not yet received final QC certification to the tightened standard. In many cases, individual grids that had already been QC certified had additional inspection performed. The tightened QC inspections did not find any items meeting the failure criteria of either MEC QAPP SOP-05 or the MEC QAPP.

In September 2009, additional QC checks were added again in an attempt to verify that the changes in procedures as listed in the SOPs did not have an adverse effect on the quality of the work being performed. MEC QAPP SOP-11 was generated to support this additional QC work. Between September 29, 2009 and October 2, 2009, 451 target locations were re-checked using a Vallon VMH-3CS, and between October 1-5, 2009, 524 targets were re-checked using a EM61-MK2. Under MEC QAPP SOP-11, 975 targets were re-checked for verification work, and no MEC items were found. None of the checked target locations discovered any failing items identified in the MEC QAPP or MEC QAPP SOP-11.

Field Change Requests

A total of 20 FCRs were generated during the project. The FCRs were developed to clarify the plans, remove conflict between the various plans, enhance the plans in response to DNs/NCRs, or to implement more efficient procedures. FCRs were discussed weekly at the contractor quality control conference call. All FCRs were approved before implementing the revised procedure. One exception to this is FCR-18, where work was started based on an interim version of the FCR. Once the final FCR was approved, the changes between the interim and final version required the contractor to re-do all previously performed FCR-18-related work.

Deficiency Notices

Ten DNs were generated during the project. DNs were issued by the QC team when deficiencies in the work were identified. All of the deficiencies were investigated and resolved during the field season that the DN was issued.

Non-Conformance Reports

A total of 27 NCRs were generated by QA, four in 2008 and 23 in 2009. The reader is referred to Part Four of this Executive Summary and Part Four of this report for a description, root cause analysis, corrective action, and resolution of the NCRs.

Alaska Department of Environmental Conservation and Naval Ordnance Safety & Security Activity Audits

During site operations in OU B-1, Alaska Department of Environmental Conservation (ADEC) (June and August 2008, and June 2009) and Naval Ordnance Safety & Security Activity (NOSSA) (July 2008) conducted site visits to audit the field procedures for compliance with the approved plans. Although there were some findings, all of these findings were adequately addressed, and as a result, did not adversely impact this project.

NOSSA and DDESB Closure

The production contractor, EODT, has completed an AAR documenting field activities associated with this effort as required by NOSSA 8020.15C (NOSSA 2011). The Final After-Action Report, Operable Unit B-1 AOCs MM-10F, MM-10G, and MM-10H Remedial Action (EODT 2012) has been accepted by both NOSSA (NOSSA 2012) and the Department of Defense Explosives Safety Board (DDESB) (DDESB 2012).

Part Three: Navy QA Summary

Part Three, the QA Summary Report, provides a summary of all of the activities performed by the QA contractors for the Navy during the Adak 2008, 2009, and 2010 OU B-1 field seasons. This summary draws from QA work accomplished by Battelle during the 2008 and 2010 field seasons, and CDM/Zapata during the 2009 field season. For each of the field seasons, the QA contractor prepared a detailed, stand-alone QA report that was delivered to the Navy.

Summary of the QA Activities

During the 2008 field season, QA installed the GPO grids, prepared a QASP, and provided QA on contractor operations in OU B-1. QA installed 301 blind seeds in the AOCs, provided GPO certifications of all contractor DGM and reacquisition teams (20), QA of the DGM data and target picks (476 grids, 41,301 targets), field surveillances of the DGM and intrusive teams (357), QA of MEC and MPPEH operations (two), independent QA investigation of targets (1,678 targets) and QA approval documentation of a portion of the grids (122) in OU B-1. In the 2008 field season, QA issued four NCRs to the production contractor. All of these NCRs were successfully resolved either during the 2008 field season or by early in the following field season (2009).

During the 2009 field season, QA provided GPO certifications for one DGM and eight reacquisition teams, QA of the DGM data and target picks (five grids, 92 targets), field surveillances of the DGM and intrusive teams (80), QA of MEC and MPPEH operations (five), independent QA investigation of targets (4,615 targets) and QA documentation for the remainder of the grids in OU B-1. In the 2009 field season, QA issued 23 NCRs to the production contractor. However, only four of the NCRs issued during the 2009 field season (2009-01 through 2009-04) were closed during the 2009 field season. Nineteen NCRs from 2009 remained open at the conclusion of the 2009 field season.

Project Team meetings were conducted in early 2010, and the parties agreed that a stand-alone NCR Resolution Document (Part Four) would be prepared, and that additional work would be required to meet project requirements (and to help satisfy deficiencies reported in the NCRs) in the 2010 field season. Two FCRs were written by QA with critical review by the Navy, regulators and the contractor. These FCRs are discussed in detail in the 2010 QA Report (Battelle, 2010), and Part Three (QA Summary Report), and are summarized below:

- FCR#19-provides modifications to the EPP/WMP to address management of storm water runoff caused by field activities associated with the remedial action. This requires an evaluation/assessment report (Siltation Survey). In addition, this FCR addresses repairing damage to the landscape caused by off-road vehicles and seeding of damaged areas with a specific seed mixture for the area.
- FCR# 20-provides modifications to contractor SOP-05, Intrusive Operations, to address backfill of target excavations in grids that were intrusively investigated in 2009. Some criteria of this FCR are: ensuring the filled excavation conforms to the natural contour of the terrain, investigating clods/clumps for MEC and metal fragments, removing metal from the surface spoils near target excavations (metal with dimensions of 3 inches or greater is removed from the grid and treated; with smaller metal buried inconspicuously in backfilled excavations), and seeding backfilled excavations.

During the 2010 field season, QA provided field surveillances of all FCR 19 and 20 work. In the 2010 field season, QA found all work to be sufficient and did not issue any NCRs to the production contractor.

At the conclusion of this project, QA had acquired and investigated a total of 474 DGM targets, and 2,627 Vallon hole checks at the original DGM target locations. Although some of these investigations resulted in NCRs, none of the QA investigations found MEC. A statistical analysis of these independent QA investigations shows that there is a 99.999% certainty (confidence) that at least (a minimum) of 99.6% of all of the remaining (original) DGM targets do not contain MEC. Table ES-8 provides a quantitative summary of the QA work accomplished during the 2008, 2009, and 2010 field seasons for each of the three primary work activities (DGM, Intrusive, and Post-Clearance).

Table ES-8. Quantitative Summary of QA Work Accomplished During the 2008-2010 Adak Field Seasons

Digital Geophysical Mapping						
Year	**Blind Seeds Installed**	**Contractor DGM Teams Certified in the GPO**	**Surveillances of DGM Crews**	**Processing of DGM Grids**	**Concur with Target Lists**	**NCRs**
2008	301	11	290	476	616	2
2009	6	1	2	5	5	0
2010	0	0	0	0	0	0
Totals	307	12	292	481	621	2

Intrusive Investigation					
Year	**Blind Seeds Accounted**	**Contractor Reacquisition Teams Certified in GPO**	**Surveillance of Intrusive Teams**	**Verification of MEC Disposal Operations**	**NCRs**
2008	301	9	67	2	1
2009	6	8	78	5	2
2010	0	0	0	0	0
Totals	307	17	145	7	3

Post-clearance Activities							
Year	**QA DGM Remapping (Grids)**	**QA DGM Remapping (Targets Investigated**	**Verification of No-Finds**	**QA Vallon Hole Checks**	**Documented Grids Pass/Fail/Withhold (Grids)**	**Road/Rut Repairs (Grids)**	**NCRs**
2008	93	642	291	745	122	0	1
2009	213	2,208	236	2,171	359	0	21
2010	0	0	0	0	0	481	0
Totals	306	2,850	527	2,916	481	481	22

Part Four: NCR Resolution Document Summary

QA identified failures or deviations in contractor field work during the 2008 and 2009 field seasons. The QA/Navy response to a failure or deviation was to issue an NCR. In response to the NCR, the contractor was to conduct a root cause analysis for the failure or deviation and propose a corrective action. The Navy would review the proposed corrective action and when in agreement, upon successful implementation of the corrective action, QA would verify the action and the NCR would be closed. During the 2008-2009 field seasons, a total of 27 NCRs were issued to the contractor on the OU B-1 project. All of these NCRs have been closed through various processes:

- Five of the NCRs (2008_03, 2008_04, 2009_02, 2009_03, and 2009_04) had been completed and approved in total during the 2008-2009 field seasons.
- Three of the NCRs (2008_01, 2008_02 and 2009_01) had been verbally approved by QA during the 2008-2009 field seasons, but did not have final QA/NTR signatures during these field seasons. Signatures have been obtained for these NCRs and they are now closed.
- Eight of the NCRs (2009_05, and 1009_013 through 019) were either incomplete (typically missing final signatures from the QA and Navy NTR personnel that were responsible for the 2008-2009 work) or required additional analysis of data that had previously been collected in the 2008-2009 field seasons to close. These actions have been completed and these NCRs have been closed.
- Eleven of the 2009 NCRs (2009_06 through 012 and 020 through 023) required additional field work that was completed during the 2010 field season. Five of these NCRs were closed via successful completion of work outlined in Field Change Requests (FCRs #19 and #20). Five of the NCRs were closed via completion of QA investigations that were not completed in 2009. One of the NCRs (2009_21) was closed via separate direction provided in the NCR Resolution document.

Part Four, NCR Resolution Document, was prepared to present the Navy's rationale for closing the NCRs. Each NCR is presented as a stand-alone section (e.g., Section 2.0 is NCR 2008_01, Section 3.0 is NCR 2008_02, etc.). The paragraphs within the sections present the details about the NCR (e.g., relevant dates, version information, a summary of the NCR, a summary of the root cause analysis and corrective action presented by the contractor, a summary of QA actions and the justification for the Navy's decision to close the NCR). Within each section are the file names of the supporting documents for that NCR. Each supporting document is presented as an appendix. For example, Appendix 2-A is the pdf copy of the NCR; Appendix 2-B is an FCR which was generated in response to the NCR and so on for each document. All of the supporting documents are provided in Appendix 29-A in the format described above.

None of the NCRs were issued for the discovery of a MEC item. Out of the total of 27 NCRs, five were issued for the specific failure criteria outlined in the QASP and the MEC QAPP. The remainder of the NCRs was issued for deviations from the project plans. The failure criteria in the QASP and MEC QAPP were:

- Failure to identify and remove a QA seed;
- A piece of metal larger than a 37 mm and a DGM reading above the target selection threshold (4.4 mV).

FINAL

Adak OU B-1 Area of Concern MM-10F, MM-10G and MM-10H Remedial Action Project Documentation

Part One

Area of Concern Certification, Data Validation and Conclusions and Recommendations

Contract No. N62473-07-D-4013
Task Order No. 023

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CONTENTS

APPENDICES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AAR	After Action Report
ADEC	Alaska Department of Environmental Conservation
AOC	Area of Concern
DFW	definable feature of work
DGM	digital geophysical mapping
DGPS	differential global positioning system
DN	Deficiency Notice
DQCR	Daily QC Report
EODT	EOD Technology, Inc.
EPP	Environmental Protection Plan
GPO	Geophysical Prove-out
HE	high explosive
MC	munitions constituent
MEC	munitions and explosives of concern
MPC	measurement performance criteria
mV	millivolt
NCR	Non-Conformance Report
NOSSA	Naval Ordnance Safety & Security Activity
NTR	Navy Technical Representative
OU	Operable Unit
PQCM	Project Quality Control Manager
PQO	project quality objective
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAO	remedial action objective
ROD	Record of Decision
RPM	Remedial Project Manager
SCL	Soil Cleanup Level
SOP	Standard Operating Procedure
TMP	Technical Management Plan
TNT	trinitrotoluene
UoP	Unit of Production
U.S. EPA	U.S. Environmental Protection Agency
UXO	unexploded ordnance

UXOQCS	UXO Quality Control Specialist
WMP	Waste Management Plan

Section 1.0: INTRODUCTION

Adak Operable Unit (OU) B-1 Area of Concern (AOC) MM-10F, MM-10G and MM-10H Remedial Action field work occurred in 2008, 2009 and 2010, and involved complexities which prompted the Navy to deviate from a typical reporting format using a single, stand-alone After Action Report (AAR). Instead, the project documentation is presented in four parts.

Presented in this Part One document are the results of the Munitions and Explosives of Concern (MEC) AOC Certification, Munitions Constituents (MC) Data Validation, and Conclusions and Recommendations. This Part One provides the documentation required by Worksheet #37 of the MEC Quality Assurance Project Plan (QAPP) (Usability Assessment) and MC QAPP (Data validation), referred to here as the AOC Certification.

As part of the process of developing the QAPP, the project team developed a plan for conducting the usability assessment and termed this plan the AOC Certification Process. This Process was documented in MEC QAPP Worksheets #36 and #37. Worksheet #36 (Product QC Tier 3 Summary) outlines the steps to be taken to ensure the quality of the information relied upon to make a determination that no further action is acceptable for the AOC other than prescribed institutional controls as identified in the OU B-1 Record of Decision (ROD). MEC QAPP Worksheet #37 (Usability Assessment-AOC Certification Checklist) is the checklist developed to reflect the requirements described in MEC QAPP Worksheet #36. These two worksheets identify the parties responsible for conducting the review, the specific data elements to be reviewed and the process to be used for evaluation of these data elements. The overarching goal of the usability review is to identify any deficiencies in data that may have resulted in non-attainment of the project quality objectives (PQOs). If deficiencies or non-compliance with agreed upon procedures are identified, the usability assessment should provide an analysis and determine whether or not the impact prevents attainment of PQOs, AOC certification and no further action. If so, corrective actions necessary to address these issues should be identified as part of the usability assessment. This report presents the Usability Assessment and supporting discussion.

Section 2.0 of Part One contains the MEC AOC Certification Documentation, Section 3.0 contains the MC Data Validation Documentation and Section 4.0 contains the Conclusions and Recommendations. Appendices referenced in this Part One document are provided in digital format on enclosed disks.

Section 2.0: MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) AOC CERTIFICATION DOCUMENTATION

2.1 Certification Requirements

The following sections provide documentation required by the approved MEC QAPP (Worksheets #36 and #37) to satisfy AOC certification of AOCs MM-10F, MM-10G and MM-10H.

Worksheet #36 (Product QC Tier 3 Process Summary) outlines the steps to be taken to ensure the quality of the information relied upon to make a no further action determination for these AOCs other than prescribed institutional controls as identified in the OU B-1 ROD. The certification process encompasses five steps as follows.

Step I documents and reviews the preparatory quality control (QC) activities including personnel training and qualifications and geophysical prove-out (GPO) certification (see Worksheet #34). Step I details are:

(a) For each production team, a Preparatory Phase Checklist will be used to document training, personnel qualifications, and equipment status.

(b) Geophysical and unexploded ordnance (UXO) field teams will be tested through the GPO prior to commencing actual field operations. A GPO Certification Form, documenting geophysical and UXO team members by name, search equipment serial numbers, and GPO score, will be maintained in each field team's QC file. Each field team must obtain a minimum score of 0.85 probability of detection at a 90 percent confidence level to achieve GPO certification.

Step II summarizes and reviews the initial and follow-up phases of QC inspections and certification (see Worksheet #35). The initial and follow-up phase checklists will be used to document that all aspects of the remedial action are completed in accordance with the applicable procedures. The combined checklists are designed to verify that the Standard Operating Procedure (SOP)-specific sampling and analysis, geophysical surveying, and MEC clearance procedures are being followed during the performance of remedial action field operations. Step II details are:

(a) Teams performing geophysical and intrusive UXO work at project field sites will be successfully GPO certified for the entire time that they performed the field work leading to the completion of clearance activities in an AOC grid.

(b) Grid corners will be certified as being placed in the correct location(s).

(c) QC surveillance forms for geophysical and UXO field teams will document that each team has followed the appropriate SOP for the fieldwork being conducted.

(d) The entire AOC grid will undergo digital geophysical mapping (DGM) with an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.

(e) All blind seeds will be identified in the geophysical survey and properly reacquired.

(f) UXO dig sheets will be inspected to verify that all target anomalies have been investigated.

(g) All MEC items found in an AOC grid will be properly disposed.

(h) All grids within an AOC will be completed prior to submission of AOC documentation to the AOC Certification Board, which will certify completion of the remedial action objectives (RAOs).

Step III reviews documentation of pre-intrusive surface clearance and the specific quality requirements for geophysical processing and interpretation. Step III details are:

(a) Independent verification of the DGM target list. This verification will initially verify 100 percent of the data but may be modified as to percentage as discussed below. The independent verification team will generate a dig sheet and the Project Geophysicist and geophysics quality control assistant (GeoQCA) will compare it with the dig sheet of the production team. If discrepancies between the two target sets exist, the Project Geophysicist, GeoQCA, and the geophysical data processing team leads will compare processing techniques. Following a period of no fewer than 10 grids, the Project Quality Control Manager (PQCM) can petition the Remedial Project Manager (RPM)/Navy Technical Representative (NTR) for a reduced QC state. The sampling reduced state is invoked after 10 grids that are reprocessed by the independent verification team have no discrepancies as documented by the GeoQCA. At that time, the number of grids that must be reprocessed will decrease by 50 percent until, at the very least, 20 percent of the grids are being reprocessed. Conversely, if a discrepancy is found, the number of grids that will be processed by the independent verification team will automatically increase to 100 percent QC for a minimum of 10 succeeding grids. All grids of the preceding nine grids will likewise be 100 percent processed by the independent verification team. The number of grids to be processed by the independent verification team may decrease by the 50 percent interval again as long as no discrepancies are found in the next set and approved by the RPM/NTR. A record of additional QC targets found by the independent verification team will be maintained in the AOC QC file and the site QC file and reported in the Daily QC Report (DQCR).

(b) Additionally, the last lane of each grid will be recollected in the opposite direction to examine the precision of the geophysical data (signal strength) and to check for positional accuracy.

Step IV is a continuation of Step II and includes a review of MEC clearance operations including review of follow-up phase QC checklists and compliance with the MEC QAPP surveillance requirements. Step IV details are:

(a) An SOP specific follow-up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting MEC clearance and MC-contaminated soil removal operations in accordance with the approved procedures.

(b) Worksheet #35 of the MEC and MC QAPPs provides the frequency of inspection for the definable feature of work (DFW).

Step V documents the production contractor's actions to ensure that all detected MEC items will be cleared from the AOC in accordance with MIL-STD-1916. After each grid (or step-out) is completed, the PQCM (or his designee) will ensure that the following QC checks are performed:

(a) The Unexploded Ordnance Quality Control Specialist (UXOQCS) or his designee checks each no-find to ensure that no target was missed.

(b) Randomly select 5 percent of the identified geophysical anomalies within the grid for post-clearance verification. The UXOQCS and his/her team will physically reinvestigate each of these locations using a differential global positioning system (DGPS) and Vallon to ensure that the anomaly has been completely removed.

(c) After 10 contiguous grids (or more grids if the combined area is 10 acres or less) have been completed, those grids (and any additional step-outs adjacent to the grids) will be designated a completed Unit of Production (UoP). Based on the total number of anomalies in the UoP, and using Tables I and II from MIL-STD-1916, the desired number of QC samples will be determined. Initially Verification Level III will be used; this may be tightened or reduced based on site-specific performance results.

(d) The MIL-STD-1916 inspection requirements (number of inspections required per verification level) were copied into Table 36-1 of Worksheet #36. However, the number of inspections listed in Table 36-1 is incorrect. This discrepancy between the MIL-STD-1916 requirements and the numbers of inspections listed in Table 36-1 was not noticed during the Project Team review of the work plans. Since Table 36-1 was used to determine the number of inspections needed in grids with tightened QC inspection requirements, in some grids the number of inspections performed was insufficient to meet the requirements of MIL-STD-1916. In all grids, the number of QC inspections does meet the requirements of Table 36-1. In those grids affected, when the number of random, independent quality assurance (QA) inspections is added to the number of random QC inspections performed, the sum of these inspections exceeds the MIL-STD-1916 requirement.

Worksheet #36 is provided in text discussions only in the MEC QAPP and a table of the steps was not provided. The steps and QC checks from Worksheet #36 listed above are tabulated here in Part One and are used to confirm completion of this worksheet on a UoP/grid basis.

Worksheet #37 (Usability Assessment-AOC Certification Checklist) from the MEC QAPP provides the AOC Certification Steps listed in a table. These steps are similar but not identical to those in Worksheet #36. However, the approval of Worksheet #37 is essentially completed once Worksheet #36 is approved as most of the components of Worksheet #37 are duplicated with Worksheet #36. This worksheet has been completed on an AOC/UoP basis.

2.1.1 Worksheets #36 and #37 Compliance. Figure 2-1 tabulates the individual QC steps for Worksheets #36 and #37 and provides a comparison between the worksheets.

This figure is color coded to show the equivalent QC steps between the worksheets. Note that Worksheet #36 contains a QC Step (IIg) that references documentation for proper disposal of MEC that is not contained in Worksheet #37. Also note that Worksheet #37 contains a signatory inspection (i.e., Ik, Iii, IIe, IVd and Vf) for the major QC steps that is not contained in Worksheet #36.

To satisfy compliance with both worksheets, spreadsheets (and other documents) were created (or existing documents referenced) that compile information from major aspects of the QC process. Table 2-1 provides a listing and description of the spreadsheets (or other documents) with a reference to the relevant MEC Worksheets #36 and #37 QC steps. The linkage between the spreadsheets and the QC steps for both worksheets is also shown on Figure 2-1. These spreadsheets are attached to this report on the data disk, and they provide direct references to detailed data contained in folders in the appendices (also on the data disk). The spreadsheets are provided in the root directory of the respective appendix on the data disk.

WS#36

QC Step	Items to be checked/verified
QC Step I	a)Preparatory Phase Checklist for Training, Personnel Qualifications and Equipment status.
	b)Geophysical and UXO field teams will be tested through the GPO prior to commencing actual field operations.
QC Step II	a)Teams performing geophysical and intrusive UXO work at project field sites were successfully GPO certified for the entire time that they performed the field work leading to the completion of clearance activities in an AOC grid.
	b)Grid corners are certified as being placed in the correct location(s).
	c)QC surveillance forms for Geophysical and UXO field teams have documented that each team has followed the appropriate SOP for the fieldwork being conducted.
	d)The entire AOC grid has been geophysically surveyed by an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.
	e)All blind seeds were identified in the geophysical survey and properly reacquired.
	f)Inspection of UXO dig sheets to verify that all target anomalies have been investigated.
	g)All MEC items found in an AOC grid have been properly disposed.
	h)All grids within an AOC have been completed prior to submission of AOC documentation to the AOC Certification Board, which will certify completion of the RA objectives.
QC Step III	a)Independent verification of the DGM target list.
	b)Additionally, the last lane of each grid will be recollected in the opposite direction to examine the precision of the geophysical data (signal strength) and to check for positional accuracy.
QC Step IV	a)An SOP specific Follow-Up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting MEC clearance and MC-contaminated soil removal operations in accordance with the approved procedures. WS #35 of
QC Step V	a)The UXOQCS (or his designee) checks each no-find to ensure that no target was missed.
	b)Randomly select 5 percent of the identified geophysical anomalies within the grid for post-clearance verification. The UXOQCS and his/her team will physically reinvestigate each of these locations using a DGPS and Vallon to ensure that the anomaly has b
	c)After 10 contiguous grids (or more grids if the combined area is 10 acres or less) have been completed, those grids (and any additional step-outs adjacent to the grids) will be designated a completed UoP. Based on the total number of anomalies in the Uo

WS#37

QC Step	Items to be checked/verified
QC Step I	a)Verified Qualifications/Training Checklist has been completed for all personnel.
	b)Have the TMP, MEC QAPP and APP been reviewed by UXO Teams during the preparatory phase?
	c)Have Personnel Certification Qualifications been documented for UXO teams?
	d)Discrepancies found in the Preparatory Phase checklist have been corrected prior to Initial Phase Inspections for UXO teams.
	e)Verified Preparatory Phase 1 Checklist has been completed for all DFWs/SOPs.
	f)Have the TMP, MEC QAPP and APP plan been reviewed by GEO teams during the preparatory phase?
	g)Have Personnel Certification Qualifications been documented for GEO teams?
	h)Discrepancies found in the Preparatory Phase 1 checklist have been corrected prior to initial Phase Inspections for GEO teams.
	i)Verification of UXO Team(s) GPO Certification.
	j)Verification of GEO Team(s) GPO Certification.
	k)Signatures on appropriate documents (SOPs, forms, etc.)?
QC Step II	a)Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).
	b)Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the UXO team(s).
	c)Have all personnel assigned to the UXO team been GPO Certified?
	d)Have all equipment assigned to the UXO team been GPO Certified?
	e)Verification that the initial and follow-up three-phase quality control checklists have been completed for GEO team(s).
	f)Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the GEO team(s).
	g)Have all personnel assigned to the GEO team been GPO certified?
	h)Have all equipment assigned to the GEO team been GPO certified?
	i)Signatures on appropriate documents?
QC Step III	a)Verified that the GEOQCA re-processed random 5 percent of grid geophysical pick lists.
	b)Verified that the Project Geophysicist compared QC and GEO targets.
	c)Discrepancies have been investigated and the results have been documented.
	d)Appropriate actions have been taken by the PQCM regarding the results of the QC Phase III investigation.
	e)Signatures on appropriate documents?
QC Step IV	a)Verification of follow-up checklist or quality control surveillances have been completed for UXO teams.
	b)Discrepancies found in the follow-up three-phase quality control checklist or quality control
	c)Verify that surveillances in the MEC QAPP were completed?
	d)Signatures on appropriate documents?
QC Step V	a)If non-conforming units were found, corrective actions followed the MEC QAPP.
	b)Discrepancies corrected and surveillances written.
	c)GEO Review sample population meets MIL STD 1916 VL III sample size.
	d)QA Phase V GEO Random Sampling inspection samples were identified and investigated.
	e)Discrepancies have been investigated and the results have been documented for the Phase V surveillance.
	f)Signatures on appropriate documents?

Legend	Colour
Appendix A	yellow
Appendix B	tan
Appendix C	light blue
Appendix D	light blue
Appendix E	pink
Appendix F	peach
Appendix G	light green
Appendix H	lavender

Figure 2-1. Tabulation of Individual QC Steps for Worksheets #36 and #37 and Comparison between the Worksheets

Table 2-1. Documentation Summarizing and Referencing Supporting Data

Spreadsheet (or Document) Name	Appendix	Description	MEC Worksheet #36 QC Step	MEC Worksheet #37 QC Step
APPENDIX_A_2008-2010_Training Matrix.xls	A	Provides matrix of personnel training.	Ia	Ia, Ib, Ic, Ig
APPENDIX_B_GPO_Certifications.xls	B	Provides a matrix of GPO certifications for DGM and UXO crews.	Ib, IIa	Ii, Ij, IIc, IId, IIg, IIh
APPENDIX_C_GRID_STAKE_Verification.xls	C	Provides information on random grid stake verifications.	IIb,	
APPENDIX_D_Grid Data QC_QA.xls	D	Provides information on QC seed and Grid Corner Nails detection, repeat line test data, number of QC DGM target picks, information verifying inspection of all target anomalies, UXOQCS target checks, No-find checks, GeoQC millivolt comparisons, MIL-STD 1916 compliance, information verifying independent QC and Navy QA DGM data processing and target selection.	IIb, IId, IIe, IIf, IIh, IIIa, IIIb, Va, Vb and Vc	IIIa, IIIb, IIIc, IIId, Vc, Vd, Ve
APPENDIX_E_Preparatory QC Inspections.xls	E	Provides a matrix of Preparatory QC inspections pertaining to the DFWs.	Ia, IIc	Id, Ie, If, Ih
2008 MEC_Data.xls, 2009 MEC Accountability Log.pdf	F	Provides a listing and disposition of MEC found.	IIg	
APPENDIX_G_Initial_FollowUP QC Inspection.xls	G	Provides a matrix of Initial and Follow-up QC inspections pertaining to the DFWs.	IIc, IVa	IIa, IIb, IIe, IIf, IVa, IVc, Vb
DN Log.doc	H	Listing of Deficiency Notices providing description and status.	IVa	IIa, IIf, IVb, Va, Vb

Note that all QC steps from both worksheets are documented in the spreadsheets, with the exception of the Worksheet #37 signatory requirement for each major QC step. This QC step does not lend itself for cataloging, and was checked during the evaluation of the QC documents. Deficiencies in the spreadsheets are highlighted in yellow, and discussed in Section 2.1.2 of this report.

The field work was conducted over the course of three field seasons, and as the focus of the work changed during each season, the crew composition and tasks changed also. The spreadsheets illustrate this change in crew composition over the duration of the project. The spreadsheets also show that some crews and personnel did not receive training/inspections in all the DFWs, as the particular crew or individual may not have been involved in all DFWs. The spreadsheets often show that QC inspections may have been intermittent for some periods of time when the work on a particular DFW may also have been intermittent. Thus, some entries in the spreadsheets show "N/A" indicating that the training, certification, inspection, etc. was not applicable.

Information to certify compliance with the worksheets was extracted primarily from the AAR (Part Two), but also from the summary QA report (Part Three) and the NCR Resolution Documents (Part Four) of this submittal package. The spreadsheets were constructed in different formats depending upon the QC step(s) they cover. A description of contents and format for each spreadsheet is provided below.

Because the majority of the field work was conducted by DGM and Intrusive teams, the Training Matrix spreadsheet (Appendix A) is constructed so that crew members (and their team) were grouped by year. In this spreadsheet, documents (provided in the digital Appendix A) are listed for each training requirement. These requirements comprised training in SOPs 1-6, and verification of personnel qualifications.

The GPO certification spreadsheet (Appendix B) is constructed so that crew members (and their team) were grouped by year. In this spreadsheet, GPO certification documents (provided in the digital Appendix B) are listed for each crew member/team. This spreadsheet shows that some of the crew members/teams received GPO certification in both DGM (geophysical) and intrusive (reacquire) operations. Geophysical crew members/teams often obtained multiple GPO certifications at different target selection thresholds. The final (highest) target selection threshold used at the site was 4.4 mV (sum of Channels 2, 3, and 4), and this topic is discussed in the Part Two (AAR), and Part Three (QA Summary) documents. Entries in the spreadsheet with "N/A" indicate that the requirement was not applicable for that crew member/team.

The Grid Stake Verification spreadsheet (Appendix C) references three QC documents. The criteria for verification of the grid stakes is specifically called out in Worksheet #36, but not Worksheet #37. The documents pertaining to this specific QC step are: a surveillance of the grid staking crew, QC team verification of 25 random grid stakes in MM-10F, and QC team verification of eight random grid stakes in MM-10G. In addition to these specific QC documents, the grid stake locations were also verified during the DGM data analysis, as discussed in the next section.

The Grid Data QC/QA spreadsheet (Appendix D) is organized by AOC, then UoP, then grid designation. For each grid, the spreadsheet provides documentation of the primary DGM and intrusive activities listed in the Worksheet #36 and #37 QC steps (as listed in the top three rows). A detailed listing of these QC steps (and cross reference for both worksheets) is provided in Table 2-2.

Table 2-2. Worksheet #36 and #37 QC Steps Referenced in Spreadsheet APPENDIX_D_GridData QC_QA.xls

WS#36 QC Step	WS#37 QC Step	Description of Document(s)
IIIb	N/A	QC Approval of DGM equipment Tests
IId	N/A	DGM Foot print
IIb, IIc	N/A	QC Seed detection and Grid Corner detection via DGM
IId	N/A	DGM coverage-Maps
IIf	N/A	Verify that all Targets Inspected
Vb	N/A	5% of Targets reinvestigated by UXOQCS
Va	N/A	All No-Finds checked by QC.
Va	N/A	QC Inspections of random targets, No-Finds and Geo QC millivolt comparisons.
IIh, Vc	N/A	Certification that QC target inspections for UOP conform to MIL-STD 1916.
IIIa	IIIa, IIIb	Independent QC DGM data processing and Target selection by QC.
IIIa	N/A	Independent verification of target list by Navy QA.

Table 2-2 shows that the spreadsheet primarily addresses multiple, specific Worksheet #36 QC steps. Most of these Worksheet #36 QC steps do not have a direct corollary to Worksheet #37 QC steps, except for Worksheet #36 QC Step IIIA to Worksheet #37 QC Steps IIIa and IIIb (independent QC DGM data processing and target selection by QC). Note that this spreadsheet contains a Worksheet #36 QC Step (IIIa) specifically referencing a Navy QA task. All other steps are QC tasks.

The Preparatory QC Inspection spreadsheet (Appendix E) is based on the SAP Worksheet #34 (Verification [Tier I] Process Table-Preparatory and Initial Inspections) in the MEC QAPP which lists the project DFWs and supporting (required) QC documents for the DFWs. This spreadsheet is constructed so that crew members (and their team) were grouped by year. In this spreadsheet, documents (provided in the digital Appendix E) are listed for each preparatory inspection requirement. These requirements are primarily comprised of site training, GPO certifications, preparatory inspections of SOPs 1-8, as well as MC related tasks. Note that entries for site-specific training and GPO certification refer to other spreadsheets (Appendix A and B) that detail these data.

A consolidated spreadsheet was not created to summarize the disposition of MEC found at the site. All MEC were found and disposed in the 2008-2009 field seasons, and the original QC documents summarizing the disposition of the MEC are used to validate the disposition. These documents, including the MEC accountability logs from 2008 and 2009, are provided in Appendix F.

The Initial-FollowUp QC Inspection spreadsheet (Appendix G) is based on SAP Worksheet #35 (Tier 2 QC Process Summary Table) in the MEC QAPP which lists the DFW, frequency of inspection, and supporting (required) QC documents for the DFWs. The DFWs in this worksheet (and spreadsheet) are comprised of follow-up inspections of SOPs 1-8, as well as MC related tasks. This spreadsheet is constructed with the work days (for all three years) referenced against SOPs 1-8. Initial and follow-up QC inspections are required on a temporal basis (i.e., daily, weekly, etc.) while the work governed by the SOP is ongoing. The nominal frequency of QC inspections is listed beneath the SOP description.

The DN Log spreadsheet (Appendix H) provides a summary of deficiency notices (DNs) over the duration of the project. There were a total of 10 DNs issued by QC (six in 2008, and four in 2009). All DN documents are provided in Appendix H in digital format.

2.1.2 Deficiencies. Deficiencies found related to the Appendix A through H spreadsheets are discussed below.

APPENDIX_A_2008-2010_Training Matrix.xls

- This training matrix shows that a deficiency in documentation for “Qualifications Verified” was noted because a document showing all personnel and their qualifications was not prepared for the 2008-2010 field seasons. The spreadsheet references a document “Personnel Qualifications Discussion. Doc” provided in Appendix A. This document shows that there are other information sources that validate appropriate qualifications for the contractor personnel: 1) contractor Human Resources department evaluated all personnel qualifications during the hiring process, 2) Naval Ordnance Safety and Security Activity (NOSSA) conducted a personnel qualifications audit during 2008, and 3) Navy QA performed contractor personnel qualifications audits for all field seasons. These information sources satisfy this deficiency resulting in no impact to the AOC certification process.
- This training matrix shows that members of the Reac Team 1 in 2008 did not have documentation of training for the Environmental Protection Plan (EPP)/Waste Management Plan (WMP). This was an oversight and is not expected to impact the AOC certification process because all other field teams (65 personnel) were documented as being provided this training during the 2008 field season.
- This training matrix shows that the person responsible for chemical sampling did not have documentation of training for the Technical Management Plan (TMP). Since this person was always escorted by the contractor Site Management, and the duration of the chemical sampling was brief, this deficiency is not considered significant and did not result in an impact to the AOC certification process.

APPENDIX_B_GPO_Certifications.xls

- Analysis of this spreadsheet shows that all crew members/teams that performed DGM or intrusive work at the site were provided proper GPO certification(s). That is, there were no deficiencies in GPO training/certifications noted so there were no impacts to the AOC certification process for this portion of the work.

APPENDIX_C_GRID_STAKE_Verification.xls

- No deficiencies were noted with regards to grid stake verification and therefore there were no impacts to the AOC certification process.

APPENDIX_D_Grid Data QC_QA.xls

- Analysis of this spreadsheet shows one deficiency due to a missing DGM coverage map for MM-10G, UOP6, grid B03. This deficiency is not significant as the Navy QA reprocessed 100% of the contractor DGM data and verified coverage on this grid, resulting in no impact to the AOC certification process.

APPENDIX_E_Preparatory QC Inspections.xls

Analysis of this spreadsheet shows the following deficiencies:

- The SAP Worksheet #34 (basis for spreadsheet) shows that a preparatory QC inspection is required for the DFW-Mobilization/Site Preparation. No documentation of this preparatory QC inspection was produced. This preparatory inspection was inadvertently omitted. No impact to the AOC certification process is anticipated.
- During the 2008 field season, preparatory inspections for geophysical teams (SOP2-Geophysical Survey) were provided to the geophysical team leaders, but not the rest of the geophysical team members. This deficiency is minor, as the geophysical team leaders were responsible for the entire team activities. Note that this minor deficiency was rectified in the 2009 field season. This inspection was not applicable during the 2010 field season as there were no geophysical survey activities that season. The result is no impact to the AOC certification process.
- There is no record of preparatory inspection for one of the Geophysical Data Processors (Richard Perry) for SOP3 in the 2008 field season. This deficiency is minor as this person was verified as qualified for this DFW during the hiring process. Note that this person received appropriate preparatory inspection for this DFW in the following (2009) season. There is no impact to the AOC certification process from this deficiency.

APPENDIX F: 2008 MEC_Data.xls and 2009 MEC Accountability Log.pdf

Analysis of these two documents showed no deficiencies. These documents show that all MEC found at the site were accounted and disposed of properly. Therefore, there were no impacts to the AOC certification process.

APPENDIX_G_Initial_FollowUp QC Inspections.xls

Analysis of these two documents shows the following deficiencies:

- There are no records of follow-up QC inspection for SOP2 (Geophysical Survey) on June 23, 2008 and July 21, 2008. Both of these discrepancies occurred on Mondays, and were likely an oversight. These deficiencies are not critical as QC inspections for this DFW were completed over the remainder of the week, and remaining weeks of the season at the proper frequency (60 of the required 62 inspections [~97%] were conducted according to schedule). This deficiency did not impact the AOC certification process.
- There is no record of follow-up QC inspection for SOP3 (Geophysical Data Processing) on July 30, 2008. This deficiency is not critical as QC inspections for this DFW were completed the remainder of the 2008 field season at the proper frequency (nine of the required 10 inspections [90%] were conducted according to schedule). This deficiency did not impact the AOC certification process.
- There are no records of follow-up QC inspection for SOP4 (Target Reacquisition) for the weeks of August 17, 2009 and September 28, 2009. These deficiencies are not critical as QC inspections for the associated DFW SOP5 (Intrusive Operations) were completed during these weeks. Since SOP4 and SOP5 are related DFWs, it is likely that the SOP4 inspections were conducted, but not documented. SOP4 inspections were conducted over the remaining weeks of the season at the proper frequency (10 of the required 12

inspections [~83%] were conducted according to schedule). This deficiency did not impact the AOC certification process.

- There is no record of follow-up QC inspection for SOP5 (Intrusive Operations) on August 13, 2008. This deficiency is not critical as QC inspections for this DFW were completed the remainder of the 2008 field season at the proper frequency (48 of the required 49 inspections [98%] were conducted according to schedule). This deficiency did not impact the AOC certification process.
- There are no QC reports for follow-up QC inspections for SOP7 (Explosive Demolition) on September 6, 2008, September 10, 2008, July 23, 2009 and August 15, 2009. These dates correspond to demolition of MEC items listed in Appendix F, and there are no other QC inspection reports for SOP7 during these weeks. However, there are other documents showing QC (or management) oversight for the demolition shots on September 10, 2008, July 23, 2009 and August 15, 2009. There are no other records for QC (or management) oversight for the demolition shot on September 6, 2008. This deficiency did not impact the AOC certification process.

<u>APPENDIX H: DN Log.doc</u>

Analysis of this document shows that the 10 DNs were properly logged and resolved during the course of the project. Therefore, there were no impacts to the AOC certification process.

2.2 Organization of the MEC AOC Certification Documentation

Specific data justifying compliance with Worksheet #36 is provided in subsequent sections as follows:

- AOC MM-10F in Section 2.3
- AOC MM-10G in Section 2.4
- AOC MM-10H in Section 2.5

For each of these sections (2.3 to 2.5), first the completed Worksheet #36 for the AOC is provided. Worksheet #36 lists all UoPs within the AOC and provides direct references to spreadsheets in the appendices which, in-turn, reference the detailed compliance data.

Sub-sections for each AOC provide UoP-specific information such as maps of the UoPs, listings of DGM and UXO crew activity dates, and discussion of salient topics. The maps are provided to illustrate grids associated with the UoP, the locations of any MEC in the UoP, and grids with associated Non-conformance reports (NCRs) (if applicable). The listing of DGM and UXO crew activity dates is provided, so that the reader can correlate the crews with QC inspection criteria listed in the spreadsheets.

Figure 2-2 provides a graphical illustration of the organization of the information supporting Worksheet #36 compliance. For simplicity, this graphic illustrates a portion of the documentation provided in Section 2.3 for AOC MM-10F. Documentation for the other sections (AOCs) follows the same structure.

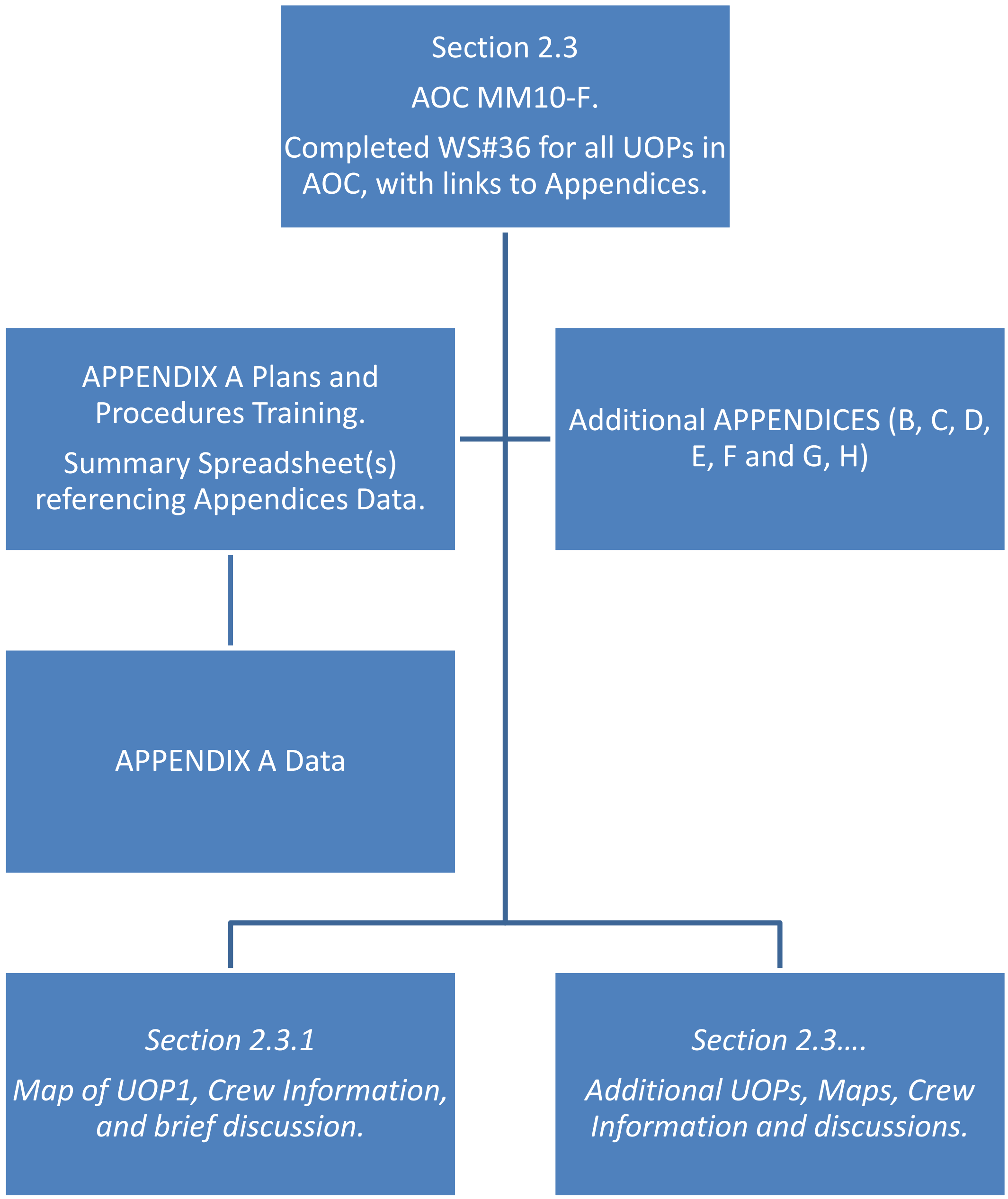

Figure 2-2. Organization of Information Supporting Worksheet #36 Compliance (Illustrated for AOC MM-10F)

Section 2.6 contains the completed Worksheet #37 (Usability Assessment-AOC Certification Checklist) for AOCs MM-10F, MM-10G, and MM-10H.

2.3 AOC Certification (Worksheet #36 Compliance) for AOC MM-10F

AOC MM-10F is comprised of 40 UOPs (#1-40). The completed Worksheet #36 for this AOC is provided below. Additional information on the UOPs is provided in the sections following the worksheet.

Adak MM-10F WS#36 Compliance Matrix

QC Step	Items to be checked/verified	Reference Documents (Summary Spreadsheets)	UOP 1	UOP 2	UOP 3	UOP 4	UOP 5	UOP 6	UOP 7	UOP 8	UOP 9	UOP 10	UOP 11	UOP 12	UOP 13	UOP 14	UOP 15	UOP 16	UOP 17	UOP 18	UOP 19	UOP 20	UOP 21	UOP 22	UOP 23	UOP 24	UOP 25	UOP 26	UOP 27	UOP 28	UOP 29	UOP 30	UOP 31	UOP 32	UOP 33	UOP 34	UOP 35	UOP 36	UOP 37	UOP 38	UOP 39	UOP 40
QC Step I	a)Preparatory Phase Checklist for Training, Personnel Qualifications and Equipment status.	APPENDIX_A_2008-2010_Training Matrix.xls, APPENDIX_E_Preparatory QC Inspections.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	b)Geophysical and UXO field teams will be tested through the GPO prior to commencing actual field operations.	APPENDIX_B_GPO_Certifications.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step II	a)Teams performing geophysical and intrusive UXO work at project field sites were successfully GPO certified for the entire time that they performed the field work leading to the completion of clearance activities in an AOC grid.	APPENDIX_B_GPO_Certifications.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	b)Grid corners are certified as being placed in the correct location(s).	APPENDIX_C_GRID_STAKE_Verification.xls and APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	c)QC surveillance forms for Geophysical and UXO field teams have documented that each team has followed the appropriate SOP for the fieldwork being conducted.	APPENDIX_F_Initial_FollowUP QC Inspection.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	d)The entire AOC grid has been geophysically surveyed by an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	e)All blind seeds were identified in the geophysical survey and properly reacquired.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	f)Inspection of UXO dig sheets to verify that all target anomalies have been investigated.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	g)All MEC items found in an AOC grid have been properly disposed.	Appendix F: 2008 MEC_Data.xls and 2009 MEC Accountability Log.pdf	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	h)All grids within an AOC have been completed prior to submission of AOC documentation to the AOC Certification Board, which will certify completion of the RA objectives.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step III	a)Independent verification of the DGM target list.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	b)Additionally, the last lane of each grid will be recollected in the opposite direction to examine the precision of the geophysical data (signal strength) and to check for positional accuracy.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step IV	a)An SOP specific Follow-Up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting MEC clearance and MC-contaminated soil removal operations in accordance with the approved procedures. WS #35 of the MEC and MC QAPPs provides the frequency of inspection for the DFW.	APPENDIX_G_Initial_FollowUP QC Inspection.xls, APPENDIX H, File: DN Log.doc	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step V	a)The UXOQCS (or his designee) checks each no-find to ensure that no target was missed.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	b)Randomly select 5 percent of the identified geophysical anomalies within the grid for post-clearance verification. The UXOQCS and his/her team will physically reinvestigate each of these locations using a DGPS and Vallon to ensure that the anomaly has been completely removed.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	c)After 10 contiguous grids (or more grids if the combined area is 10 acres or less) have been completed, those grids (and any additional step-outs adjacent to the grids) will be designated a completed UoP. Based on the total number of anomalies in the UoP, and using Tables I and II from MIL-STD-1916, the desired number of QC samples will be determined. Initially Verification Level III will be used; this may be tightened or reduced based on site specific performance results.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

2.3.1 MM-10F: UOP 1. MM-10F: UOP 1 is comprised of 14 grids as shown on Figure 2-3.

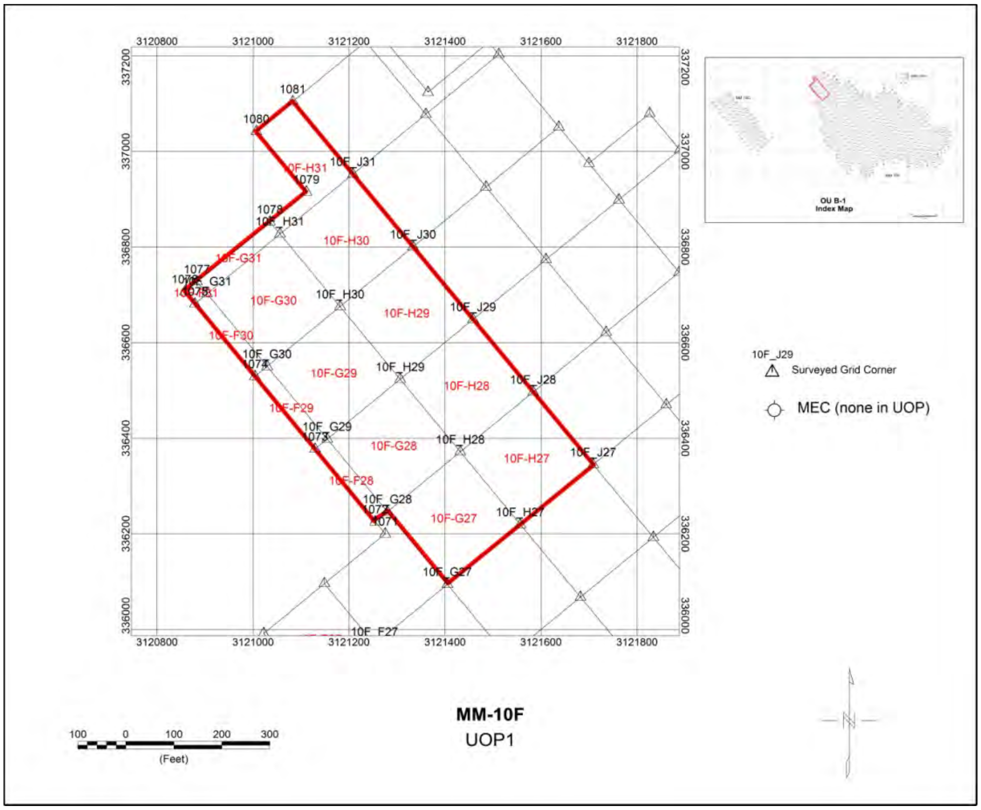

Figure 2-3. MM-10F, UOP1

Table 2-3 shows the DGM and UXO field teams that conducted work on this UOP.

Table 2-3. DGM and UXO Field Teams That Worked MM-10F: UOP1

Grid	DGM Crew	Date	UXO Team	Date
F28	GEO 1	7/28/2008	UXO2	8/14/2008
F29	GEO 1	8/4, 8/5/2008	UXO2	8/20/2008
F30	GEO 1	8/4/2008	UXO2	8/19/2008
F31	GEO 1	8/4/2008	UXO2	8/19/2008
G27	GEO 1	8/1/2008	UXO1	8/23/2008
G28	GEO 1	7/28/2008	UXO2	8/12, 8/13/2008
G29	GEO 1	8/4, 8/5/2008	UXO2	8/20/2008
G30	GEO 1	8/4/2008	UXO2	8/19/2008
G31	GEO 1	8/4/2008	UXO2	8/19/2008
H27	GEO 1	7/31, 8/1/2008	UXO1	8/23/2008
H28	GEO 1	7/28/2008	UXO2	8/14/2008
H29	GEO 1	7/22/2008	UXO2	8/13/2008
H30	GEO 1	7/22/2008	UXO2	8/11/2008
H31	GEO 1	7/28/2008	UXO1 and UXO2	8/9, 8/2/2008

Additional discussion of Worksheet#36 for MM-10F: UOP1 follows:

- QC Step IIg: No MEC were found in this UoP.
- There were no NCRs issued by QA for specific failures in this UoP.

2.3.2 MM-10F: UOP 2. MM-10F: UOP 2 is comprised of 10 grids as shown on Figure 2-4.

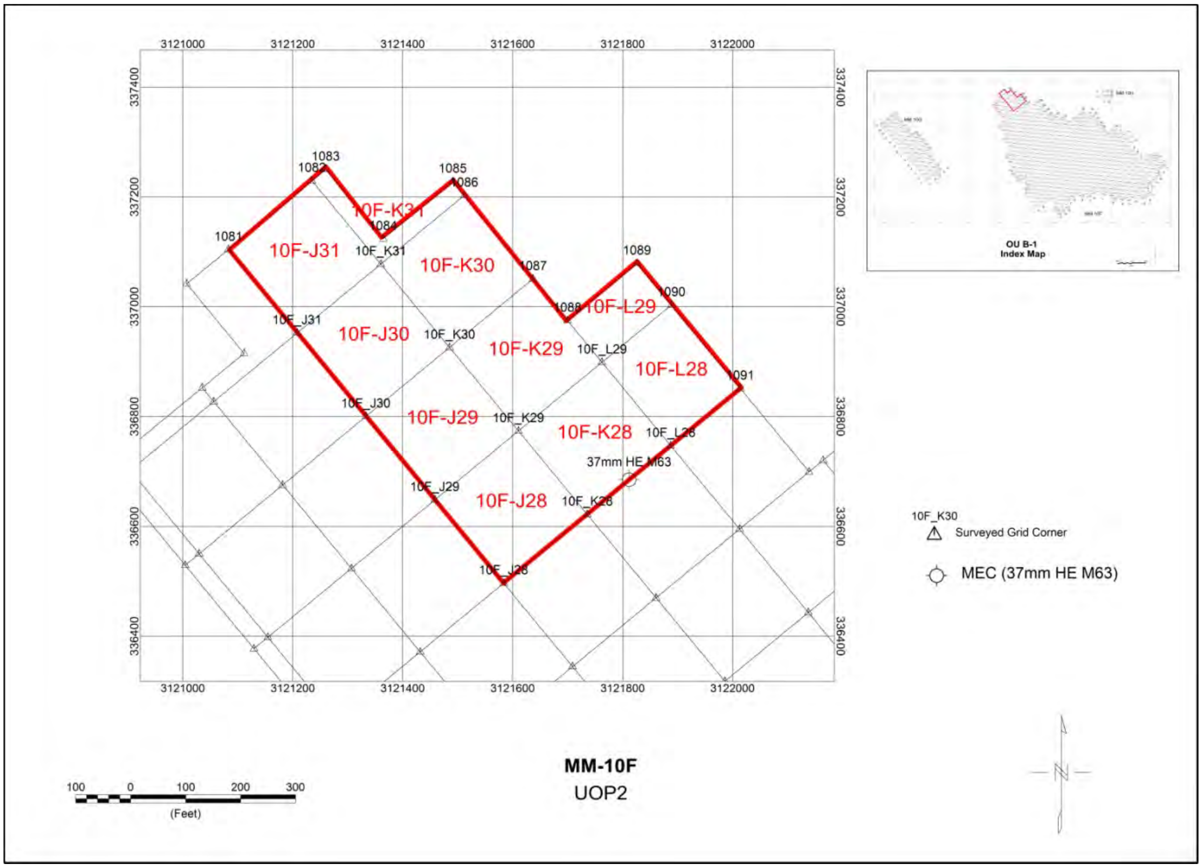

Figure 2-4. MM-10F, UOP2

Table 2-4 shows the DGM and UXO field teams that conducted work on this UOP.

Additional discussion of Worksheet #36 for MM-10F: UOP2 follows:

- QC Step IIg: APPENDIX F, file 2008 MEC_Data.xls shows that one MEC item (37 mm high explosive [HE] M63) was discovered in Grid K28. This MEC item was disposed by blow in place operations on August 20, 2008.
- There were no NCRs issued by QA for specific failures in this UoP.

Table 2-4. DGM and UXO Field Teams That Worked MM-10F: UOP2

Grid	DGM Crew	Date	UXO Team	Date
J28	GEO 1	7/25/2008	UXO3	7/29/2008
J29	GEO 1	7/24/2008	UXO1	8/5/2008
J30	GEO 1	7/21/2008	UXO1 and UXO2	8/2, 8/9/2008
J31	GEO 1	7/18/2008	UXO2	8/20/2008
K28	GEO 5	8/20/2008	UXO1 and UXO2	7/27, 7/28, 8/20/2009
K29	GEO 1	7/24/2008	UXO1	8/6/2008
K30	GEO 1	7/21/2008	UXO2	8/2, 8/11/2008
K31	GEO 1	7/18/2008	UXO1	8/5/2008
L28	GEO 1	7/23/2008	UXO1	8/6, 8/8/2008
L29	GEO 1	7/23/2008	UXO1	8/9/2008

2.3.3 MM-10F: UOP 3. MM-10F: UOP 3 is comprised of 10 grids as shown on Figure 2-5.

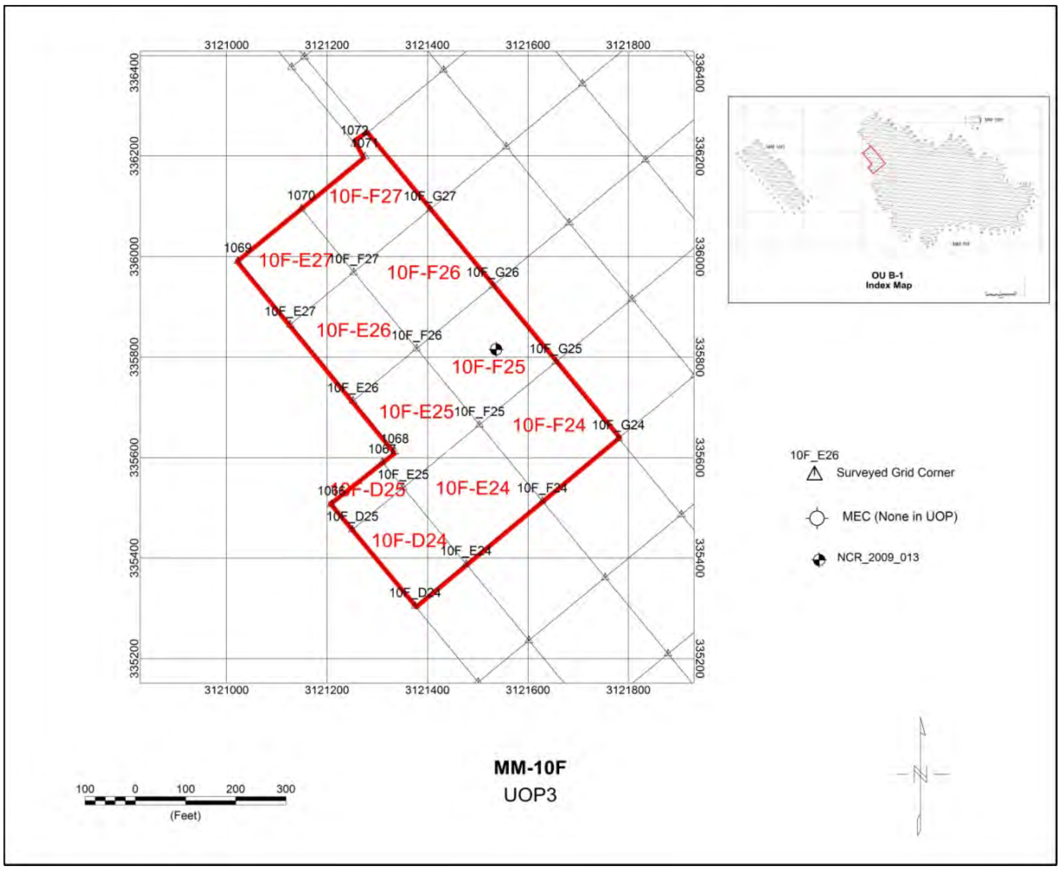

Figure 2-5. MM-10F, UOP3

Table 2-5 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-5. DGM and UXO Field Teams That Worked MM-10F: UOP3

Grid	DGM Crew	Date	UXO Team	Date
D24	GEO 3	7/21/2008	UXO1	8/18/2008
D25	GEO 3	7/21/2008	UXO1	8/18/2008
E24	GEO 3	7/16/2008	UXO1	8/25/2008
E25	GEO 3	7/21/2008	UXO1	8/18/2008
E26	GEO 5	8/22/2008	UXO5, QC	7/9, 7/27/2009
E27	GEO 5	8/22/2008	UXO5, QC, UXO1	7/9, 7/27, 8/20/2009
F24	GEO 3	7/14/2008	UXO1	8/25/2009
F25	GEO 5	8/23/2008	UXO1	8/20, 8/21/2009
F26	GEO 5	8/23, 8/25/2008	UXO1	8/20, 8/21/2009
F27	GEO 5	8/23, 8/25/2008	UXO1	8/20, 8/21/2009

Additional discussion of Worksheet #36 for MM-10F: UOP3 follows:

- QC Step IIg: No MEC were found in this UoP.
- QA issued one NCR (NCR_2009_013) in this UoP for a failure item found by QA DGM surveys in grid F25. The failure item did not exceed the failure criteria (an anomaly that exceeded the GPO threshold [>4.4 mV], and produced a piece of metal larger than a 37 mm) and there were a combined 30 QC and QA checks, comprising 32% of unknown targets conducted, in this grid without failures; therefore, this NCR was closed without additional action. A complete discussion of this NCR is provided in Section 18 of the Part Four, NCR Resolution Document.

2.3.4 MM-10F: UOP 4. MM-10F: UOP 4 is comprised of 10 grids as shown on Figure 2-6.

Table 2-6 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP4 follows:

- QC Step IIg: No MEC were found in this UoP.
- There were no NCRs issued by QA for specific failures in this UoP.

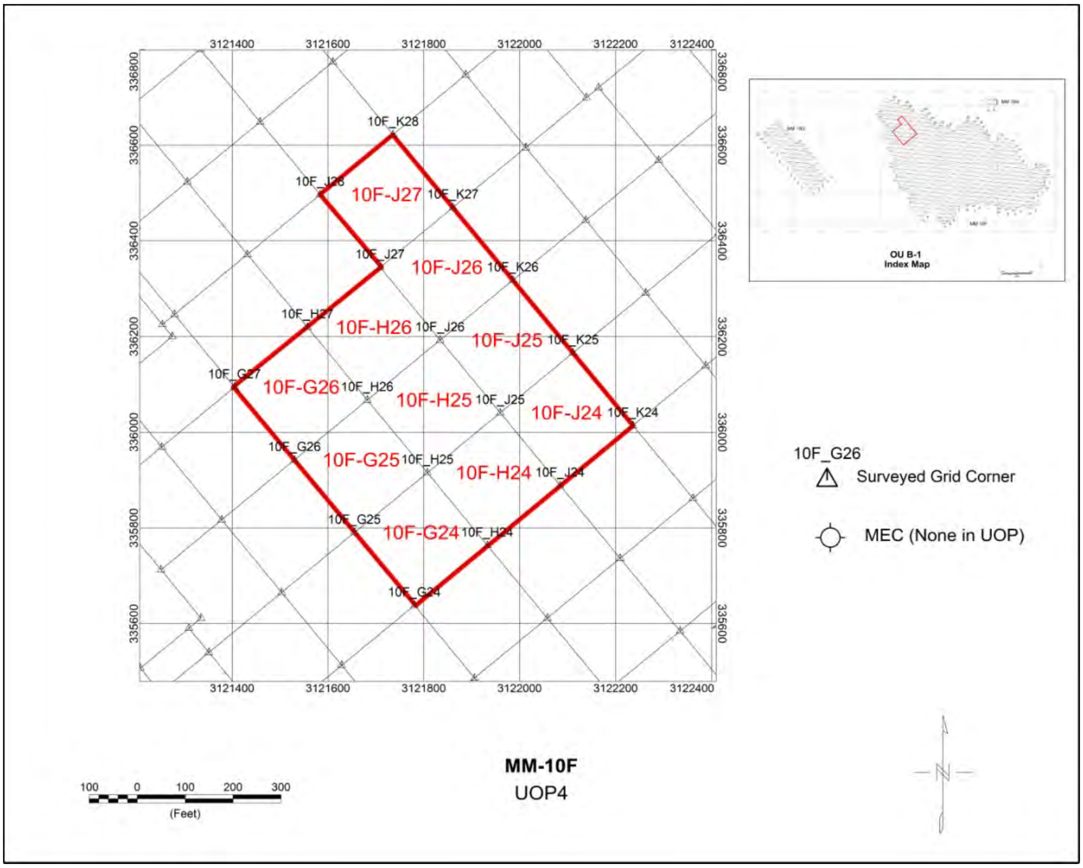

Figure 2-6. MM-10F, UOP4

Table 2-6. DGM and UXO Field Teams That Worked MM-10F: UOP4

Grid	DGM Crew	Date	UXO Team	Date
G24	GEO 5	8/27/2008	UXO1	8/22/2009
G25	GEO 5	8/23, 8/25/2008	UXO1	8/21, 8/22/2009
G26	GEO 5	8/25/2008	UXO2	7/28/2008
H24	GEO 5	8/27/2008	UXO2	7/25/2008
H25	GEO 5	8/30/2008	UXO3	7/28, 7/29/2009
H26	GEO 1	8/1, 8/4/2008	UXO1	8/22, 8/23/2009
J24	GEO 5	8/26/2008	UXO2	7/24/2009
J25	GEO 5	8/26/2008	UXO3	7/28/2009
J26	GEO 1	7/29/2008	UXO1	8/19, 8/20/2009
J27	GEO 1	7/25/2008	UXO3	7/27, 7/28/2009

2.3.5 MM-10F: UOP 5. MM-10F: UOP 5 is comprised of 10 grids as shown on Figure 2-7.

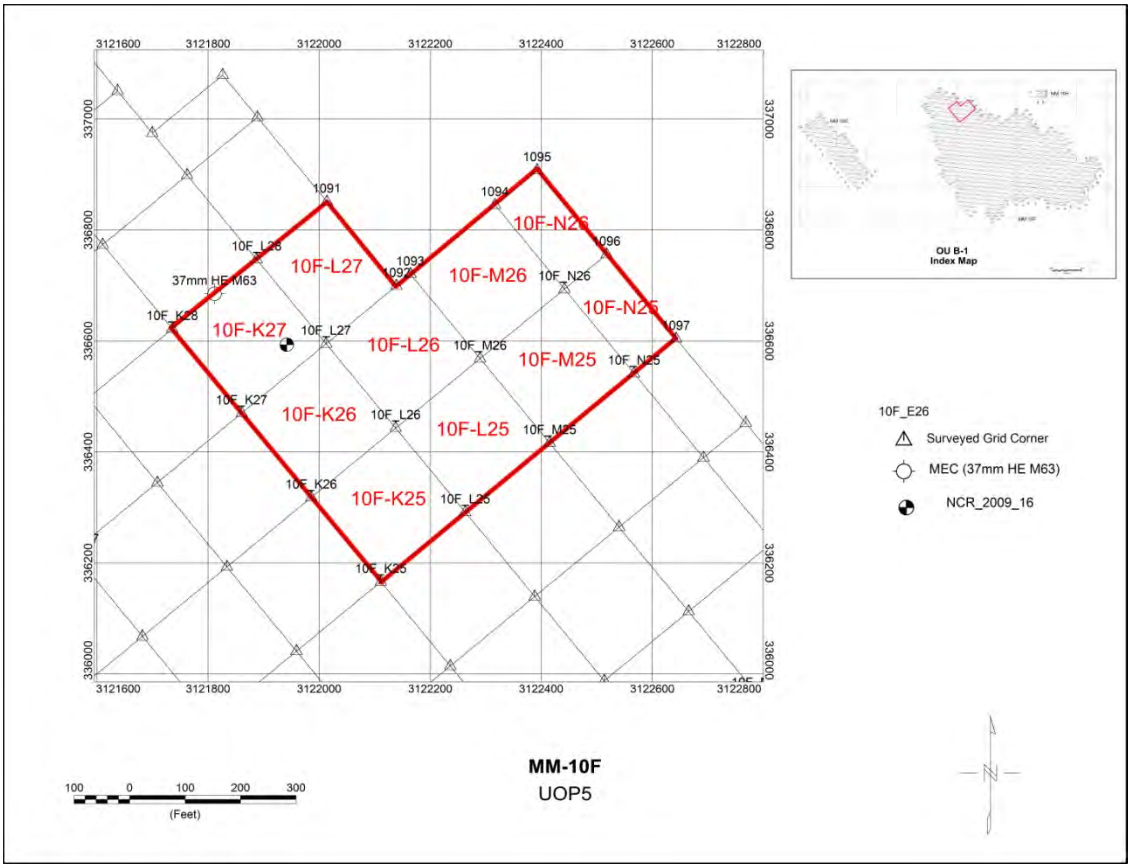

Figure 2-7. MM-10F, UOP5

Table 2-7 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-7. DGM and UXO Field Teams That Worked MM-10F: UOP5

Grid	DGM Crew	Date	UXO Team	Date
K25	GEO 1	7/29/2008	UXO1	8/27/2009
K26	GEO 5	8/21/2008	UXO3	7/27/2009
K27	GEO 5	8/20/2008	UXO2	7/27/2008
L25	GEO 1	8/22/2008	UXO1	7/30/2008
L26	GEO 5	8/21/2008	UXO5	7/28/2009
L27	GEO 1	7/30/2008	UXO2	8/16, 8/18, 8/19/2009
M25	GEO 1	8/22/2008	UXO1	7/28/2009
M26	GEO 1	7/30/2008	UXO2	8/15, 8/16/2009
N25	GEO 1	8/23, 8/26/2008	UXO5	8/11/2009
N26	GEO 1	7/30/2008	UXO2	8/14, 8/15/2009

Additional discussion of Worksheet #36 for MM-10F: UOP5 follows:

- QC Step IIg: A MEC (37 mm HE M63) was found in Grid K28, just north of this UoP in UOP2 (see Section 2.4.2).
- QA issued one NCR (NCR_2009_016) in this UoP for a failure item found by QA Vallon hole checks in Grid K27 (target ID K27-077). Because this failure item was not specifically identified as exceeding the failure criteria (an anomaly that exceeded the GPO threshold [>4.4 mV], and produced a piece of metal larger than a 37 mm) and there were significant QC and QA checks (38 targets or 26% of the unknown targets) conducted in this grid, this NCR was closed without additional action. A complete discussion of this NCR is provided in Section 21 of the Part Four, NCR Resolution Document.

2.3.6 MM-10F: UOP 6. MM-10F: UOP 6 is comprised of 10 primary grids and one step-out as shown on Figure 2-8.

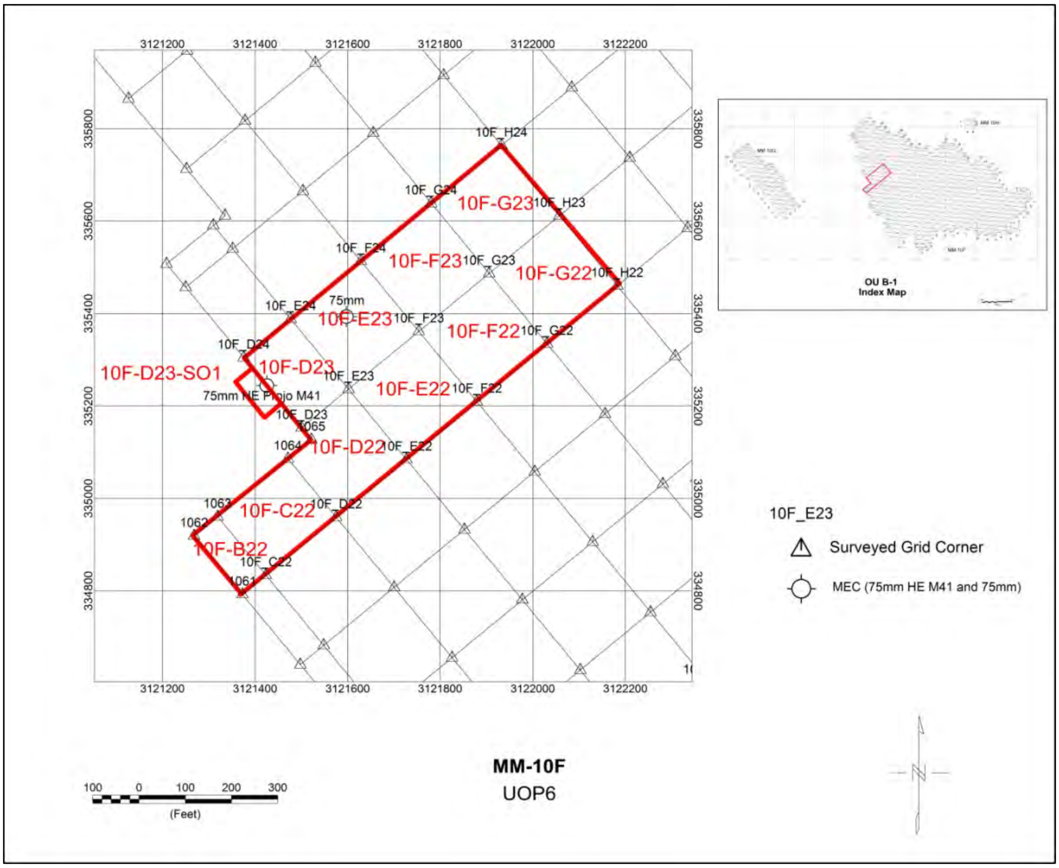

Figure 2-8. MM-10F, UOP6

Table 2-8 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-8. DGM and UXO Field Teams That Worked MM-10F: UOP6

Grid	DGM Crew	Date	UXO Team	Date
B22	GEO 2	7/29/2008	UXO1	8/19/2008
C22	GEO 2	7/30/2008	UXO1	8/21, 8/22/2008
D22	GEO 3	7/17/2008	UXO1	8/20/2008
D23	GEO 3	7/17/2008	UXO1	8/18/2008
D23-SO1	GEO 1	8/15/2009	UXO1	8/28/2009
E22	GEO 3	7/16, 7/17, 7/18/2008	UXO1	8/28, 8/29/2008
E23	GEO 3	7/16/2008	UXO1	8/28, 8/29/2008
F22	GEO 3	7/25/2008	UXO2	8/27/2008
F23	GEO 3	7/22/2008	UXO1	8/30, 9/1/2008
G22	GEO 3	7/22, 7/23, 7/25/2008	UXO2	8/27/2008
G23	GEO 3	8/25/2008	UXO2	7/29/2009

Additional discussion of Worksheet #36 for MM-10F: UOP6 follows:

- QC Step IIg: Two MEC items were found in this UoP: a 75 mm HE Projo M41 in Grid D23, and a 75 mm HE Projo M309 in Grid E23. The 75 mm Projo found in Grid D23 was consolidated with disposal in Grid K28 on August 20, 2008, and the 75 mm Projo found in Grid E23 was consolidated with disposal in Grid N22 on August 30, 2008.
- There were no NCRs issued by QA for specific failures in this UoP.

2.3.7 MM-10F: UOP 7. MM-10F: UOP 7 is comprised of 10 grids as shown on Figure 2-9.

Table 2-9 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP7 follows:

- QC Step IIg: Three MEC items were found in this UoP: a 37 mm HE Projo MKII in Grid K23, a 90 mm HE Projo M71 in Grid K21, and a 37 mm HE Projo MKII in Grid H21. The 37 mm Projo found in Grid K23 was consolidated with disposal in Grid K21 on August 15, 2009, the 90 mm Projo found in Grid K21 was disposed (in same grid) on August 15, 2009, and the 37 mm Projo found in Grid H21 was consolidated in Grid G20 and disposed on August 15, 2009.
- QA issued an NCR (NCR_2009_20) for the discovery of a QA seed found in a clump that was not investigated in the vicinity of Targets 10F-K23-060/084/151. The metal found in an uninvestigated clump is a system-wide failure, as defined in the MEC QAPP Worksheet #36. Spoils investigations and backfilling operations on a system-wide scale are addressed in the NCR Resolution Document (Section 27). In this specific grid (MM-10F-K23), the contractor field work, contractor QC and independent QA performed in 2010 showed that all spoils were inspected and backfilled into existing excavations, with no failures noted. The work completed (and approved) in 2010 was adequate to recommend no further action on this NCR. See NCR Resolution Document (Section 25) for more detailed discussions.

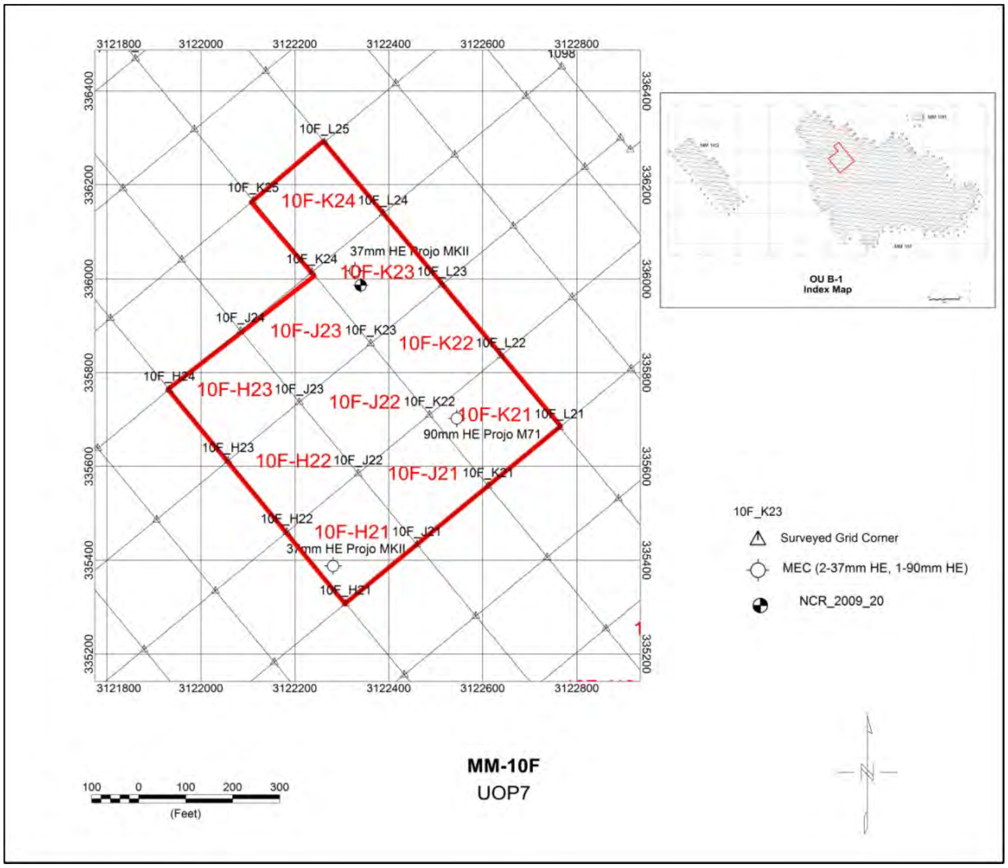

Figure 2-9. MM-10F, UOP7

Table 2-9. DGM and UXO Field Teams That Worked MM-10F: UOP7

Grid	DGM Crew	Date	UXO Team	Date
H21	GEO 3	8/27/2008	UXO3	7/29, 7/30/2009
H22	GEO 3	8/26/2008	UXO3	7/30/2009
H23	GEO 3	8/25/2008	UXO2	7/28, 7/29/2009
J21	GEO 1	8/7, 8/9/2008	UXO1	7/30, 7/31, 8/1, 8/3/2009
J22	GEO 3	8/27/2008	UXO3	7/24, 7/25/2009
J23	GEO 1	8/6/2008	UXO2	7/29, 7/30/2009
K21	GEO 1	8/7, 8/8/2008	UXO5	7/23, 7/24, 7/25, 7/27, 7/28/2009
K22	GEO 1	8/6/2008	UXO4	7/24, 7/25 7/27, 7/28, 7/30/2009
K23	GEO 1	8/5, 8/6/2008	UXO2	730, 7/31/2009
K24	GEO 1	8/5/2008	UXO1	8/25, 8/26/2009

2.3.8 MM-10F: UOP 8. MM-10F: UOP 8 is comprised of 10 primary grids and one step-out as shown on Figure 2-10.

Table 2-10 shows the DGM and UXO field teams that conducted work on this UoP.

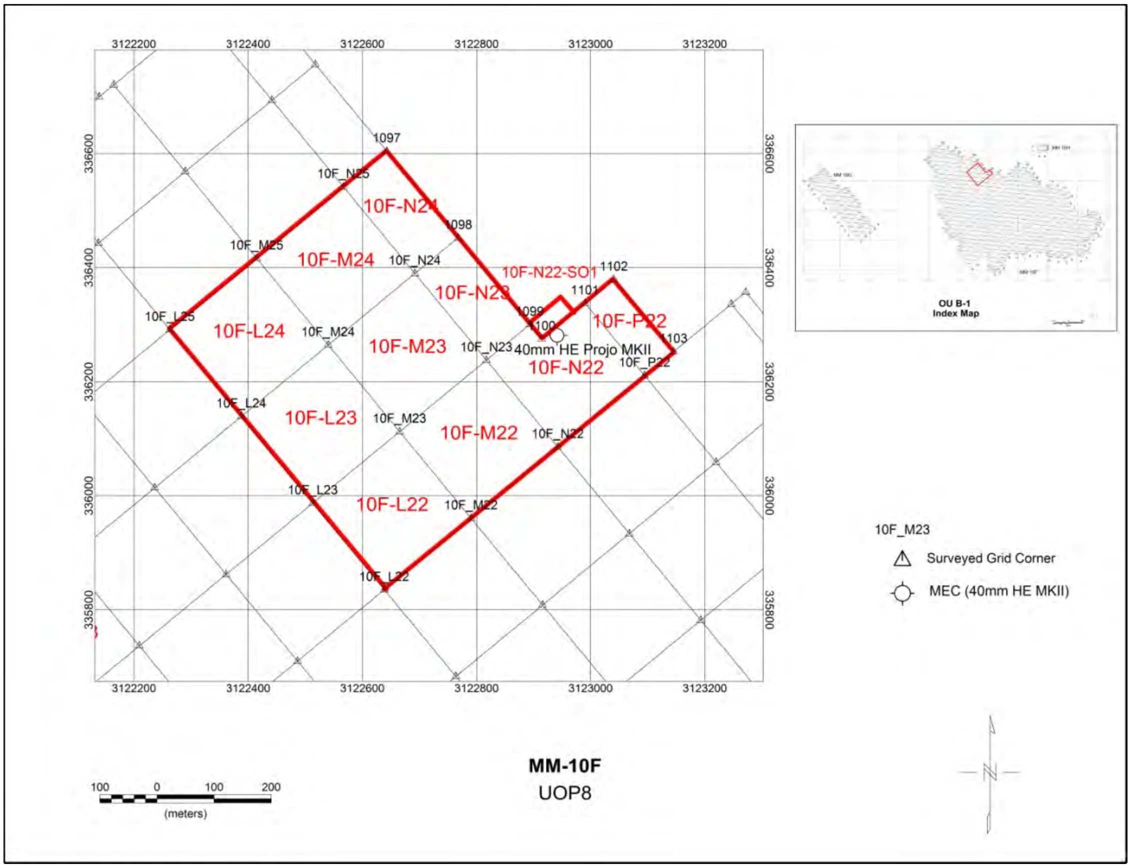

Figure 2-10. MM-10F, UOP8

Table 2-10. DGM and UXO Field Teams That Worked MM-10F: UOP8

Grid	DGM Crew	Date	UXO Team	Date
L22	GEO 1	8/8/2008	UXO2	8/26, 8/29/2008
L23	GEO 1	7/31/2008	UXO2	8/23, 8/25, 8/26/2008
L24	GEO 1	7/31/2008	UXO1	8/26, 8/27/2008
M22	GEO 1	8/11/2008	UXO2	8/22, 8/23/2008
M23	GEO 1	8/11, 8/12/2008	UXO1	7/29/2009
M24	GEO 1	8/23/2008	UXO1	7/29, 7/30/2009
N22	GEO 1	8/11/2008	UXO2	8/22/2008
N22-SO1	GEO 1	8/28/2008	UXO5	8/11/2009
N23	GEO 1	8/11, 8/12/2008	UXO4	7/29/2009
N24	GEO 1	8/12/2008	UXO4	7/28/2009
P22	GEO 4	7/30/2008	UXO4	7/29/2009

Additional discussion of Worksheet #36 for MM-10F: UOP8 follows:

- QC Step IIg: One MEC item was found in this UoP: a 40 mm HE Projo MKII in Grid N22. This MEC item triggered the step-out (Grid N22-SO1). This 40 mm Projo was blown in place on August 30, 2008.
- There were no NCRs issued by QA for specific failures in this UoP.

2.3.9 MM-10F: UOP 9. MM-10F: UOP 9 is comprised of 11 grids as shown on Figure 2-11.

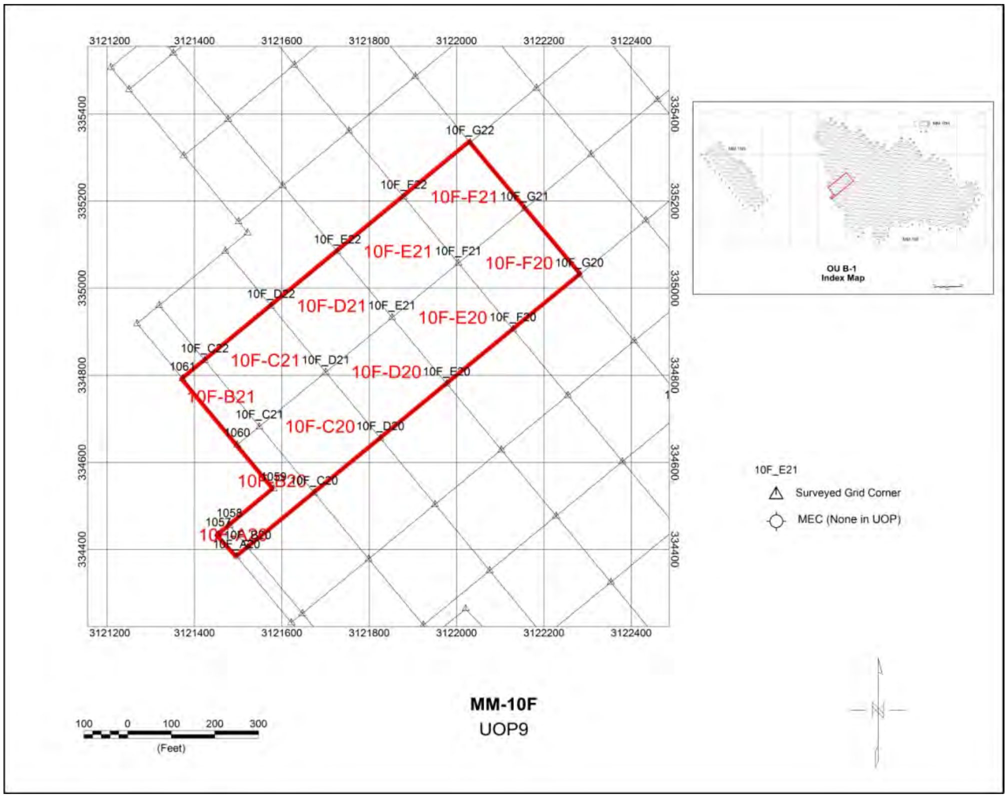

Figure 2-11. MM-10F, UOP9

Table 2-11 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP9 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs issued by QA for specific failures in this UoP.

Table 2-11. DGM and UXO Field Teams That Worked MM-10F: UOP9

Grid	DGM Crew	Date	UXO Team	Date
A20	GEO 2	7/22/2008	UXO1	8/22/2008
B20	GEO 2	7/29/2008	UXO1	8/19/2008
B21	GEO 2	7/29/2008	UXO1	8/19/2008
C20	GEO 2	7/25/2008	UXO2	8/21/2008
C21	GEO 2	7/28/2008	UXO1	8/20, 8/21/2008
D20	GEO 2	7/25/2008	UXO1	9/1/2008
D21	GEO 2	7/26, 7/28, 7/29/2008	UXO1	8/22/2008
E20	GEO 2	7/31/2008	UXO1	9/5/2008
E21	GEO 3	7/24/2008	UXO1	8/27/2008
F20	GEO 2	7/31, 8/1, 8/2/2008	UXO1	8/29, 8/30/2008
F21	GEO 3	7/24/2008	UXO1	8/29/2008

2.3.10 **MM-10F: UOP 10.** MM-10F: UOP 10 is comprised of nine grids as shown on Figure 2-12.

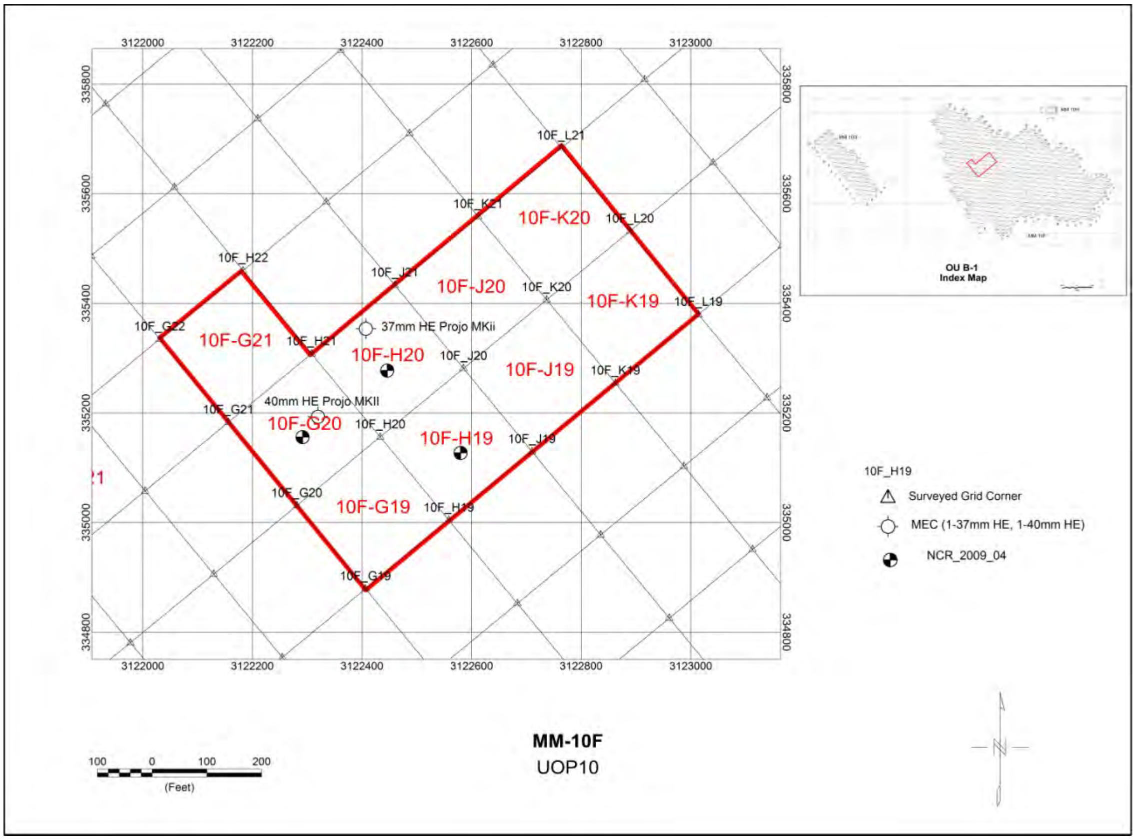

Figure 2-12. MM-10F, UOP10

Table 2-12 shows the DGM and UXO field teams that conducted work on this UOP.

Table 2-12. DGM and UXO Field Teams That Worked MM-10F: UOP10

Grid	DGM Crew	Date	UXO Team	Date
G19	GEO 2	8/5/2008	UXO2	7/10, 7/11/2009
G20	GEO 2	8/4/2008	UXO3	7/8, 7/9, 7/10, 7/27/2009
G21	GEO 3	7/23/2008	UXO2	9/2/2008
H19	GEO 2	8/6/2008	UXO3	7/10, 7/11, 7/27/2009
H20	GEO 2	8/4/2008	UXO3	7/9, 7/10/2009
J19	GEO 5	8/18/2008	UXO3	7/31, 8/1, 8/3, 8/4/2009
J20	GEO 5	8/19/2008	UXO3	7/30, 7/31, 8/1, 8/4/2009
K19	GEO 2	8/26/2008	UXO3	7/23, 7/24/2009
K20	GEO 2	8/27/2008	UXO5	7/31, 8/1/2009

Additional discussion of Worksheet #36 for MM-10F: UOP10 follows:

- QC Step IIg: Two MEC items were found in this UoP: a 40 mm HE Projo MKII in Grid G20 and a 37 mm HE Projo MKII in Grid H20. The 40 mm Projo was disposed in the same grid (G20) on August 15, 2009, and the 37 mm Projo was moved to Grid G20 for consolidation and disposal on the same date (August 15, 2009).

- Grids G20, H19 and H20 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.11 MM-10F: UOP 11 MM-10F: UOP 11 is comprised of 10 grids as shown on Figure 2-13.

Table 2-13 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP11 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids M20, M21, N21, P21 and Q20 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

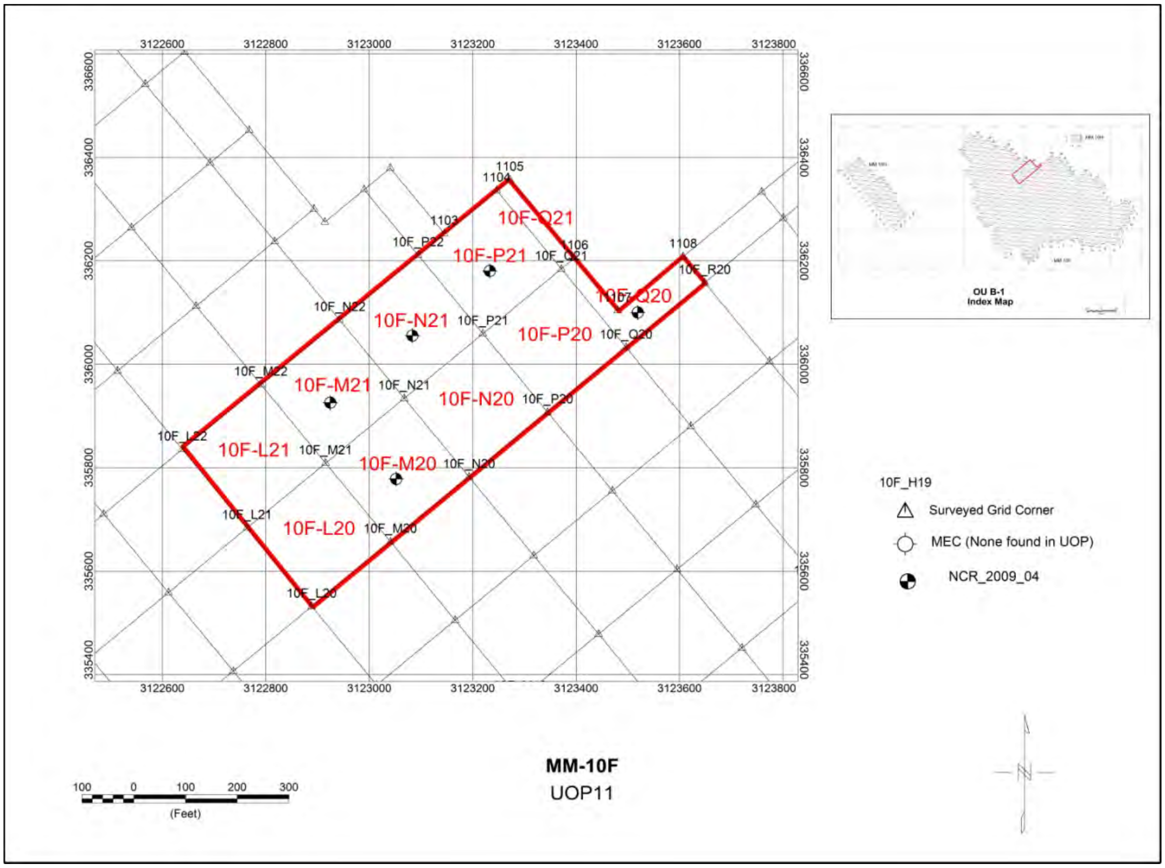

Figure 2-13. MM-10F, UOP11

Table 2-13. DGM and UXO Field Teams That Worked MM-10F: UOP11

Grid	DGM Crew	Date	UXO Team	Date
L20	GEO 2	8/26, 8/27/2008	UXO2	7/31, 8/1/2009
L21	GEO 1	8/8, 8/9/2008	UXO2	8/30, 9/1/2008
M20	GEO 2	8/14/2008	UXO1	7/8, 7/9, 7/27/2009
M21	GEO 1	8/9, 8/11/2008	UXO5	7/8, 7/27/2009
N20	GEO 2	8/14, 8/15/2008	UXO4	7/8, 7/9/2009
N21	GEO 4	7/30/2008	UXO2	7/8, 7/9, 7/27/2009
P20	GEO 2	8/16, 8/18/2008	UXO4	7/7, 7/8/2009
P21	GEO 4	7/29/2008	UXO2	7/7, 7/8, 7/27/2009
Q20	GEO 2	8/18, 8/19/2008	UXO2	7/7, 7/27/2009
Q21	GEO 4	7/29/2008	UXO2	7/7/2009

2.3.12 MM-10F: UOP 12. MM-10F: UOP 12 is comprised of 12 grids as shown on Figure 2-14. Table 2-14 shows the DGM and UXO field teams that conducted work on this UoP.

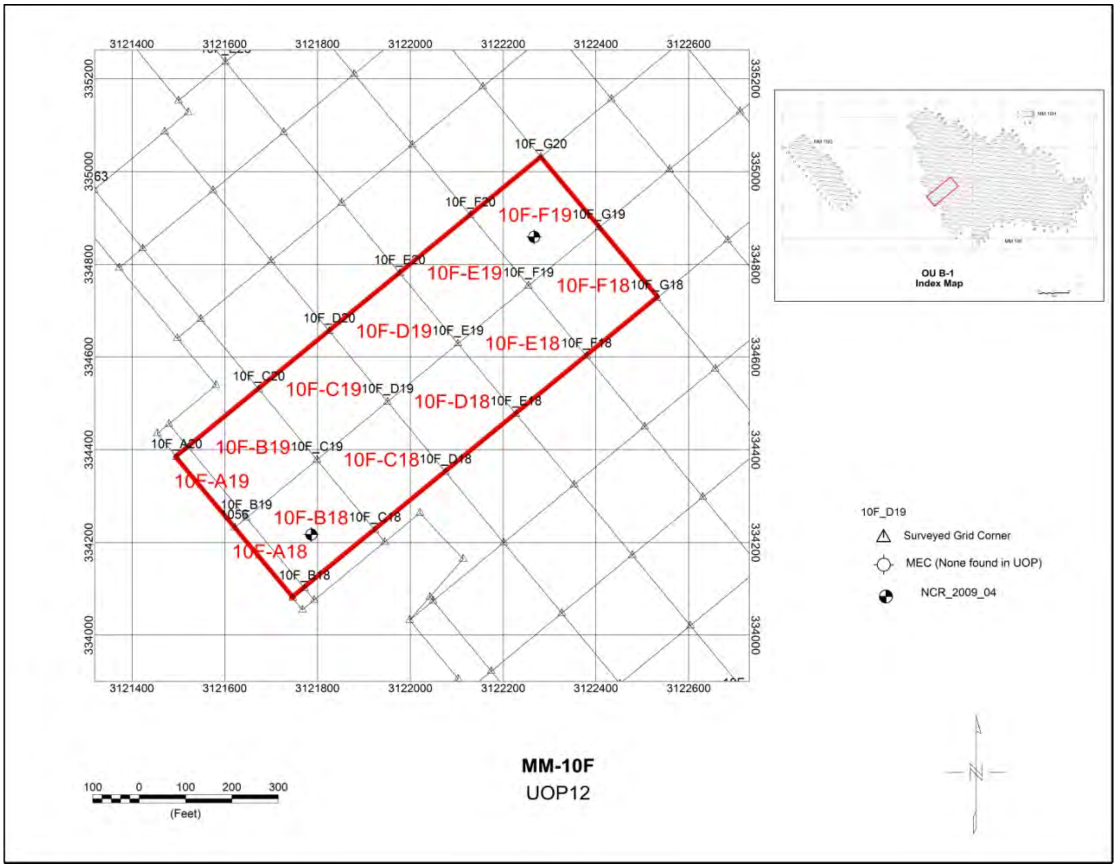

Figure 2-14. MM-10F, UOP12

Table 2-14. DGM and UXO Field Teams That Worked MM-10F: UOP12

Grid	DGM Crew	Date	UXO Team	Date
A18	GEO 2	7/22/2008	UXO1	8/19/2008
A19	GEO 2	7/22/2008	UXO1	8/19/2008
B18	GEO 2	7/23, 8/6/2008	UXO1	7/3, 7/27/2009
B19	GEO 2	7/23/2008	UXO1	8/22/2008
C18	GEO 2	7/30, 7/31/2008	UXO1	9/1/2008
C19	GEO 2	7/24/2008	UXO1	8/21, 8/22/2008
D18	GEO 4	7/24/2008	UXO2	8/4, 8/11/2008
D19	GEO 2	7/24/2008	UXO1	9/1/2008
E18	GEO 4	7/19/2008	UXO2	8/4, 8/12/2008
E19	GEO 4	7/24/2008	UXO1	9/5/2008
F18	GEO 2	8/7, 8/8, 8/11/2008	UXO5	7/9/2009
F19	GEO 3	7/25, 7/26/2008	UXO3	7/8, 7/27/2009

Additional discussion of Worksheet #36 for MM-10F: UOP12 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids B18 and F19 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check

results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.13 MM-10F: UOP 13. MM-10F: UOP 13 is comprised of 10 grids as shown on Figure 2-15.

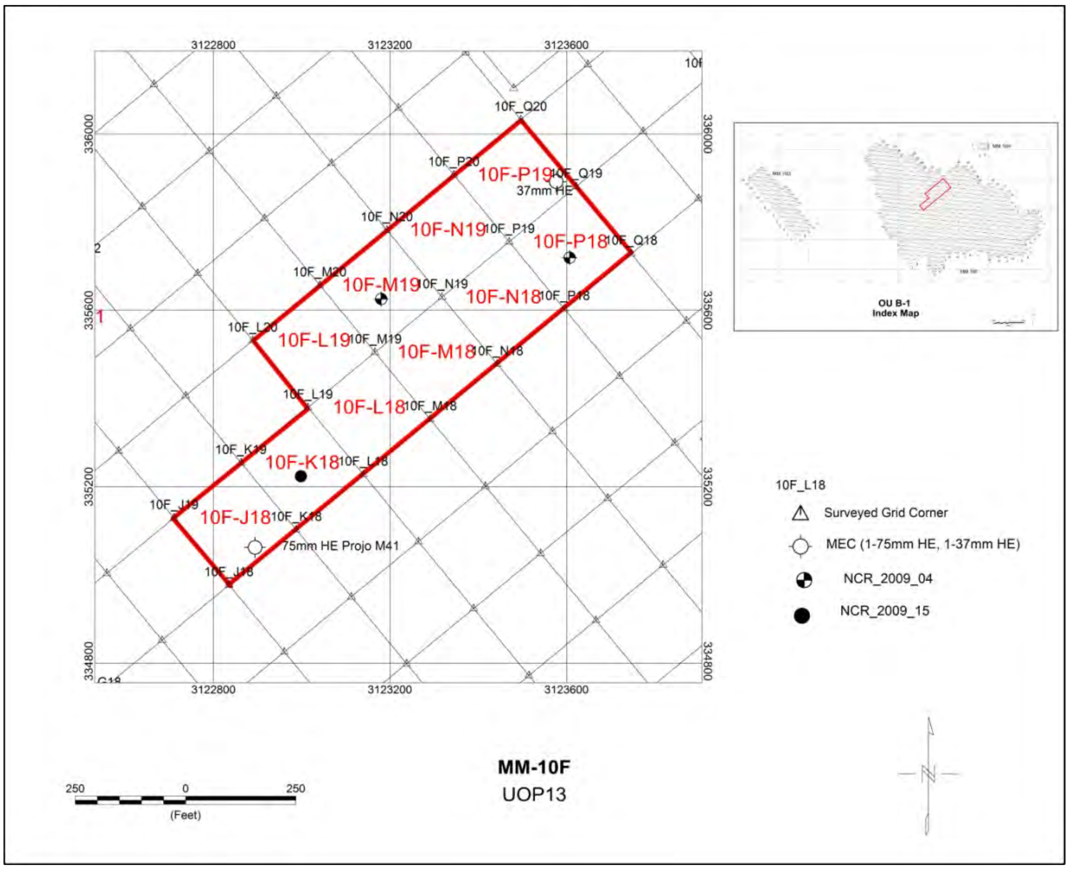

Figure 2-15. MM-10F, UOP13

Table 2-15 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-15. DGM and UXO Field Teams That Worked MM-10F: UOP13

Grid	DGM Crew	Date	UXO Team	Date
K18	GEO 2	8/23, 8/25, 8/26/2008	UXO1	7/23, 7/24/2009
J18	GEO 5	8/18/2008	UXO5	8/3, 8/4/2009
L18	GEO 2	8/23/2008	UXO4	7/30, 7/31, 8/3/2009
L19	GEO 2	8/25/2008	UXO4	8/3, 8/4, 8/5/2009
M18	GEO 2	8/20/2008	UXO4	7/31, 8/1, 8/3, 8/5/2009
M19	GEO 2	8/19, 8/20/2008	UXO1	7/9, 7/10/2009
N18	GEO 2	8/16/2008	UXO2	7/9/2009
N19	GEO 2	8/15/2008	UXO4	7/9, 7/10/2009
P18	GEO 5	8/2/2008	UXO3	7/11, 7/13/2009
P19	GEO 2	8/18/2008	UXO2	7/11, 7/13/2009

Additional discussion of Worksheet #36 for MM-10F: UOP13 follows:

- QC Step IIg: Two MEC items were found in this UoP: a 75 mm HE Projo M41 in Grid J18 and a 37 mm HE in Grid P19. The 75 mm Projo was disposed in the same grid (J18) on August 15, 2009, and the 37 mm HE was moved to Grid J18 for consolidation and disposal on the same date (August 15, 2009).
- Grids M19 and P18 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.
- Grid K18 was the subject of NCR 2009_15. This NCR was issued to address insufficient clearance of a target location. The evidence was the discovery of multiple fuze fragments found during QA Vallon hole checks at Target 10F-K18-087. However, none of the fuze fragments were greater than the failure criteria. This NCR was closed (see NCR Resolution Document, Section 20) based on the fact that the fuze fragments did not meet the stated failure criteria (an anomaly that exceeded the GPO threshold [>4.4 mV], and produced a piece of metal larger than a 37 mm). Also, numerous QA and QC checks in this grid (199 targets or 59% of the unknown targets) did not find any additional failures.

2.3.14 MM-10F: UOP 14. MM-10F: UOP 14 is comprised of 13 grids as shown on Figure 2-16.

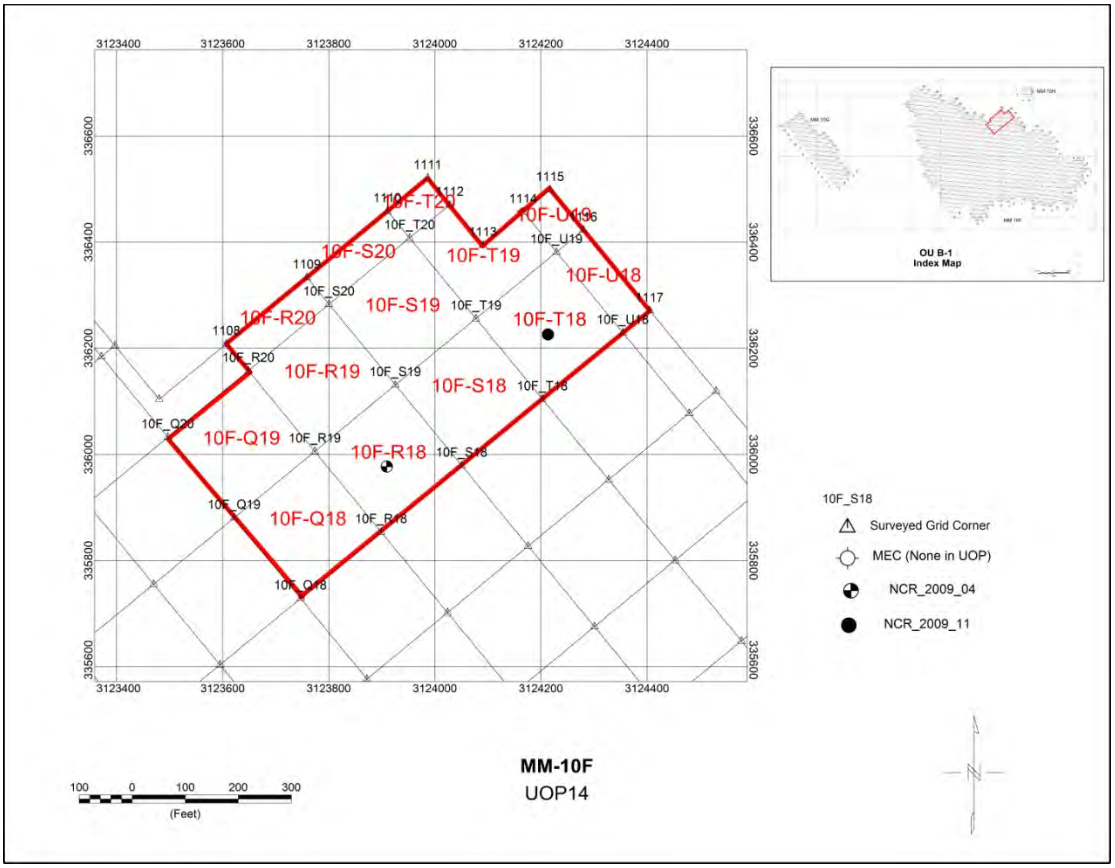

Figure 2-16. MM-10F, UOP14

Table 2-16 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-16. DGM and UXO Field Teams That Worked MM-10F: UOP14

Grid	DGM Crew	Date	UXO Team	Date
T18	GEO 4	7/9/2008	UXO3	7/14, 7/15/2009
Q18	GEO 5	8/1/2008	UXO4	7/14, 7/15/2009
Q19	GEO 2	8/19/2008	UXO5	7/13, 7/14/2009
R18	GEO 5	7/31, 8/1/2008	UXO3	7/13, 7/14/2009
R19	GEO 4	7/2/2008	UXO1	8/12, 8/13, 8/15, 8/16/2009
R20	GEO 4	6/30/2008	UXO1	8/11, 8/12/2008
S18	GEO 4	7/7/2008	UXO1	8/13, 8/15/2008
S19	GEO 4	7/3/2008	UXO1	8/2, 8/4, 8/11/2008
S20	GEO 4	7/2/2008	UXO1	8/1/2008
T19	GEO 4	7/4/2008	UXO1	8/4, 8/11, 8/12/2008
T20	GEO 4	7/3/2008	UXO1	7/30/2008
U18	GEO 4	7/9/2008	UXO1	7/31/2008
U19	GEO 4	7/4/2008	UXO1	7/30/2008

Additional discussion of Worksheet #36 for MM-10F: UOP14 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grid R18 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.
- Grid T18 was the subject of NCR 2009_11. This NCR was issued because QA found unexcavated metal (fuze parts and an M48 PD fuze) as the source to a QA DGM target (amplitude 11.03 mV) above the GPO threshold (4.4 mV). The anomaly was located about 2 feet from Target 10F-T18-023. This item (M48 PD fuze) exceeds the failure criteria. This NCR was closed (see NCR Resolution Document, Section 16) based on the fact that the contractor re-worked this entire grid and did not find any additional failures.

2.3.15 MM-10F: UOP 15

MM-10F: UOP 15 is comprised of 12 grids as shown on Figure 2-17.

Table 2-17 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP15 follows:

- QC Step IIg: One MEC item was found in this UoP: an 81 mm HE Mortar M43 in Grid C16. This mortar was blown in place on September 10, 2008.
- Grids F16 and F17 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

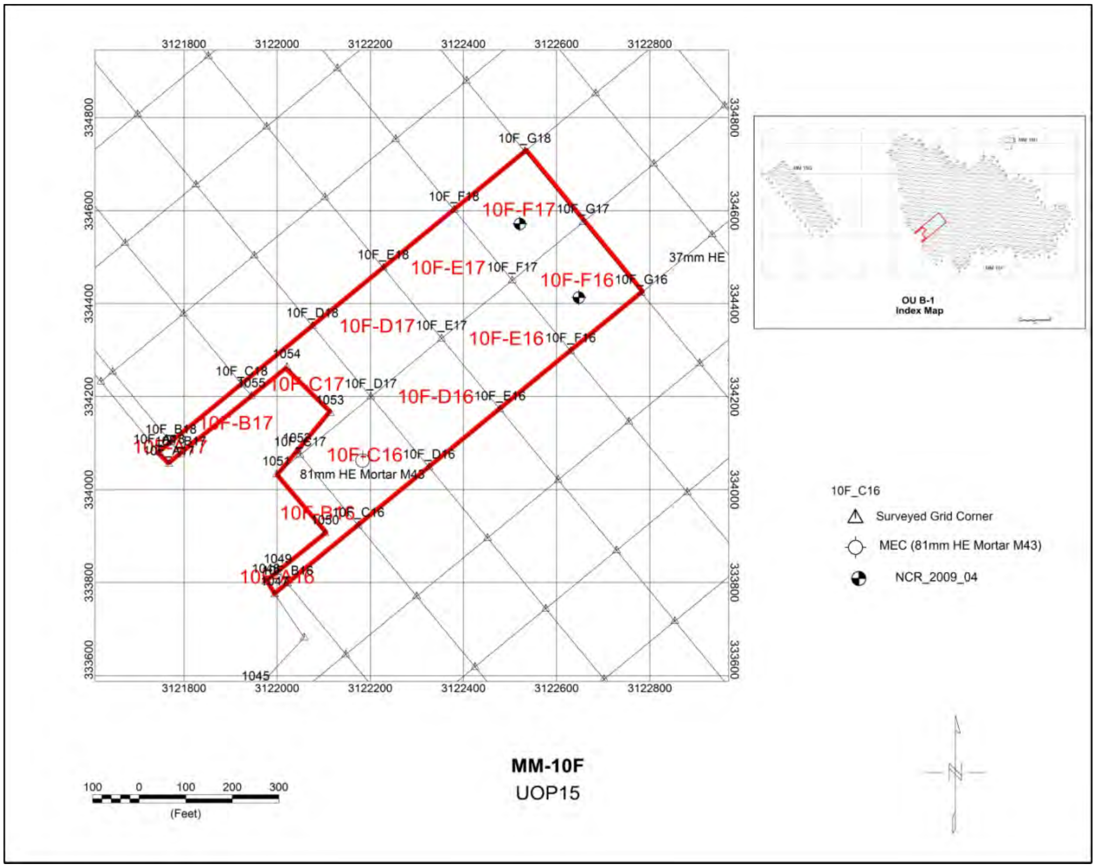

Figure 2-17. MM-10F, UOP15

Table 2-17. DGM and UXO Field Teams That Worked MM-10F: UOP15

Grid	DGM Crew	Date	UXO Team	Date
A16	GEO 3	7/9/2008	UXO2	7/31/2008
A17	GEO 2	7/22/2008	UXO1	8/19/2008
B16	GEO 3	7/10/2008	UXO2	7/31/2008
B17	GEO 2	7/22/2008	UXO1	8/19/2008
C16	GEO 3	8/18/2008	UXO1	9/3/2008
C17	GEO 2	7/22/2008	UXO1	8/19/2008
D16	GEO 3	8/18/2008	UXO1	9/3/2008
D17	GEO 3	7/19/2008	UXO1	9/2/2008
E16	GEO 4	7/15/2008	UXO1	9/4/2008
E17	GEO 4	7/16/2008	UXO1	9/4/2008
F16	GEO 3	8/19/2008	UXO1	7/11, 7/27/2009
F17	GEO 2	8/8/2008	UXO5	7/9, 7/27/2009

2.3.16 MM-10F: UOP 16. MM-10F: UOP 16 is comprised of 10 grids as shown on Figure 2-18.

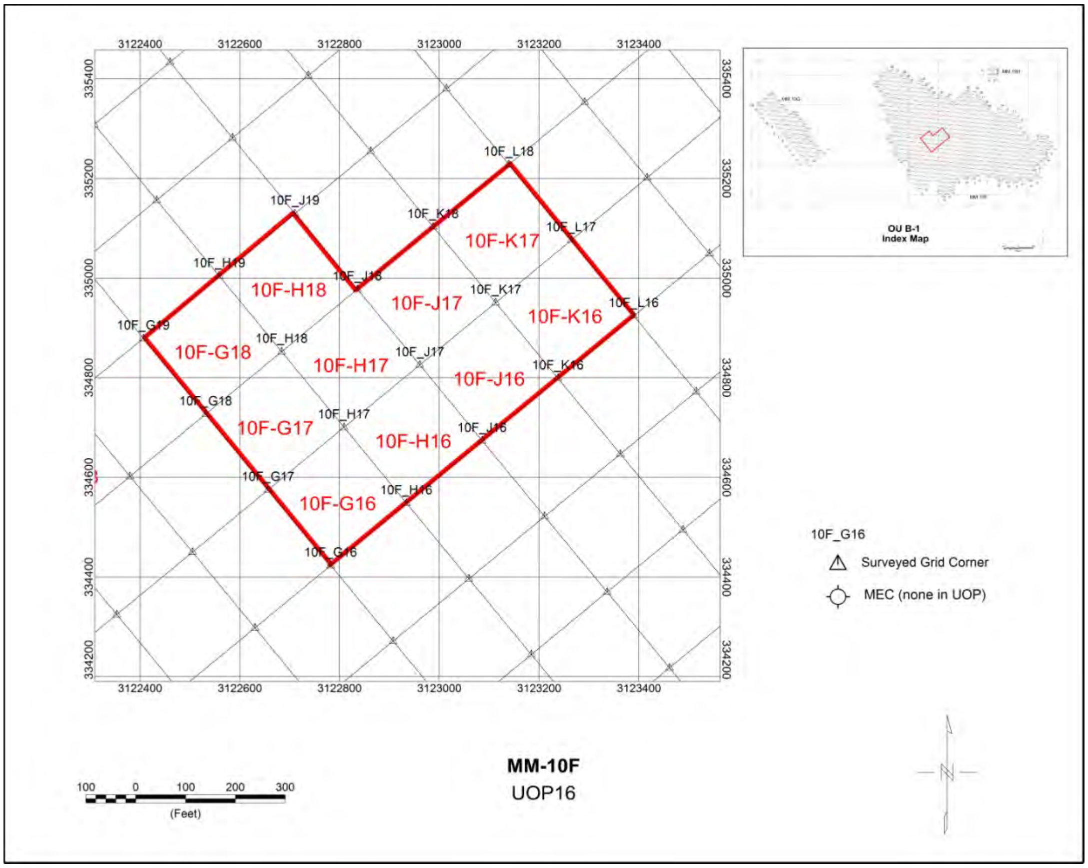

Figure 2-18. MM-10F, UOP16

Table 2-18 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-18. DGM and UXO Field Teams That Worked MM-10F: UOP16

Grid	DGM Crew	Date	UXO Team	Date
G16	GEO 2	8/13/2008	UXO3	8/4, 8/5/2009
G17	GEO 2	8/9/2008	UXO2	8/4, 8/5/2009
G18	GEO 2	8/6/2008	UXO2	7/10/2009
H16	GEO 2	8/13/2008	UXO5	8/4, 8/5/2009
H17	GEO 2	8/11/2008	UXO2	8/4/2009
H18	GEO 2	8/7/2008	UXO1	8/3, 8/4/2009
J16	GEO 5	8/19/2008	UXO1	8/1, 8/3/2009
J17	GEO 5	8/19/2008	UXO2	9/2/2008
K16	GEO 1	7/14/2008	UXO2	7/22, 7/23/2009
K17	GEO 1	7/15/2008	UXO2	7/23, 7/24/2009

Additional discussion of Worksheet #36 for MM-10F: UOP16 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs issued by QA for specific failures in this UoP.

2.3.17 MM-10F: UOP 17. MM-10F: UOP 17 is comprised of 10 grids as shown on Figure 2-19.

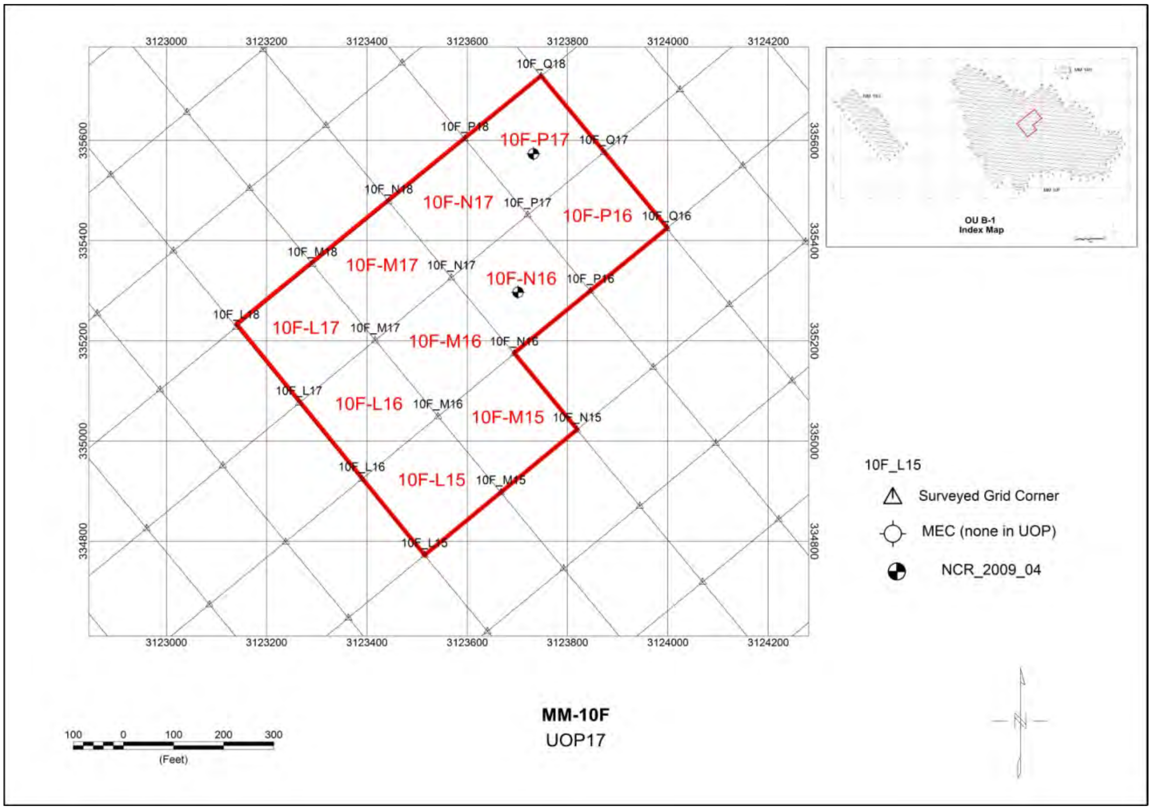

Figure 2-19. MM-10F, UOP17

Table 2-19 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-19. DGM and UXO Field Teams That Worked MM-10F: UOP17

Grid	DGM Crew	Date	UXO Team	Date
L15	GEO 1	7/12/2008	UXO2	7/21, 7/22/2009
L16	GEO 1	7/14/2008	UXO2	7/20, 7/21/2009
L17	GEO 1	7/15/2008	UXO4	7/22, 7/23/2009
M15	GEO 1	7/12/2008	UXO1	7/21, 7/22/2009
M16	GEO 1	7/16/2008	UXO4	7/20, 7/21/2009
M17	GEO 2	8/20/2008	UXO4	7/22/2009
N16	GEO 1	7/16/2008	UXO1	7/4, 7/6, 7/7, 7/27/2009
N17	GEO 6	8/9/2008	UXO4	8/17, 8/18/2009
P16	GEO 6	7/24/2008	UXO1	7/13, 7/14/2009
P17	GEO 4	7/14/2008	UXO1	7/14, 7/15, 7/18, 7/27/2009

Additional discussion of Worksheet #36 for MM-10F: UOP17 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids N16 and P17 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.18 MM-10F: UOP 18. MM-10F: UOP 18 is comprised of 10 grids as shown on Figure 2-20.

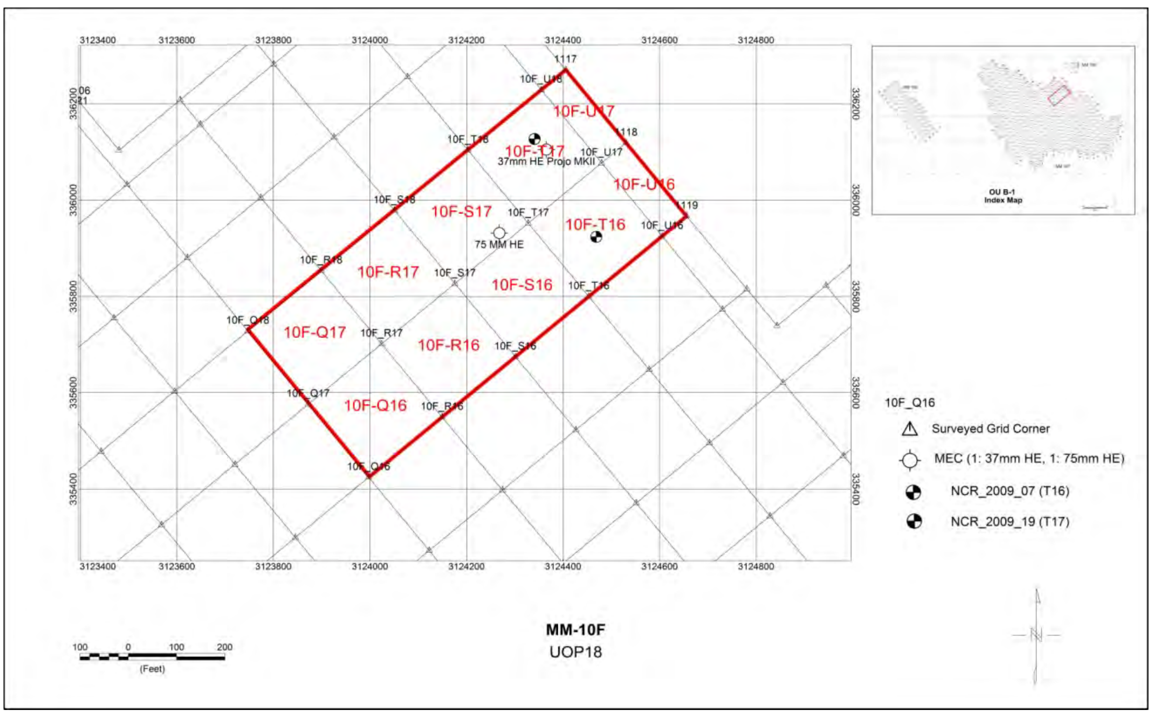

Figure 2-20. MM-10F, UOP18

Table 2-20 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-20. DGM and UXO Field Teams That Worked MM-10F: UOP18

Grid	DGM Crew	Date	UXO Team	Date
Q16	GEO 5	6/30/2008	UXO5	7/14, 7/15/2009
Q17	GEO 5	8/2/2008	UXO4	7/13, 7/14/2009
R16	GEO 5	7/31/2008	UXO5	7/18/2009
R17	GEO 5	7/31/2008	UXO2	7/13, 7/14/2009
S16	GEO 5	7/12/2008	UXO5	7/18, 7/20/2009
S17	GEO 5	7/15/2008	UXO2	7/14, 7/15/2009
T16	GEO 5	7/14/2008	UXO4	7/18, 7/20/2009
T17	GEO 5	8/4/2008	UXO5	7/20, 7/21/2009
U16	GEO 5	7/14/2008	UXO5	7/6/2009
U17	GEO 5	8/4/2008	UXO5	7/6/2009

Additional discussion of Worksheet #36 for MM-10F: UOP18 follows:

- QC Step IIg: Two MEC items were found in this UoP: a 75 mm HE in Grid S17 and a 37 mm HE MKII in Grid T17. The 75 mm was consolidated in Grid N15 and disposed on August 15, 2009. The 37 mm HE was also consolidated in Grid N15 and disposed on the same date (August 15, 2009).

- Grid T16 was impacted by NCR 2009_07. NCR 2009_07 was issued for two incidents of the same non-conformance: (1) a target was found during QA DGM remapping with a response of 37.93 mV. QA determined the source as uninvestigated metal (six pieces of frag) which was found in a spoils pile on the surface in MM-10F-T16, near original DGM Target 10F-T16-021. The original DGM target amplitude was 15.17 mV. (2) A second target was found during QA DGM remapping with a response of 15.93 mV. QA identified the source for this anomaly as uninvestigated metal (15 pieces of frag) which was found in the excavation at original DGM Target 10F-T16-017. The original DGM target amplitude was 16.53 mV. In both cases, the metal comprising the source for these anomalies in the QA DGM data comprise smaller pieces which individually, are not larger than a 37 mm projectile (failure criteria); because they were not investigated, there is no way for production personnel to know that they did not meet the clearance standard and, therefore, when combined with the amplitude above the GPO threshold, comprise the criteria for a grid failure. In this specific grid (MM-10F-T16), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. The work completed (and approved) in 2010 is adequate to document no further action on the first portion of the NCR. QA and QC performed 59 target checks (29 QA and 30 QC) in this grid that did not show any failures. In addition, both the blind QA seed and QC seed in this grid were detected in the DGM data and recovered by the UXO team. This work is sufficient to recommend no further action on the second portion of the NCR. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 12.

- Grid T17 was impacted by NCR 2009_19. This NCR was issued because QA found that the failure criteria was exceeded during QA random hole checks. QA found multiple pieces of frag (one measuring 8 inches × 1.5 inches, which is larger than the 37 mm projectile) during QA hole checks at Target 10F-T17-084. The frag was found in the sidewall of the excavation. The dig sheet indicates that the depth to the top of the anomaly that the contractor recovered was 14 inches. Contractor re-work of this grid, additional QA checks and successful detection and removal of the QC and QA seeds were deemed sufficient to close this NCR. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 24.

2.3.19 MM-10F: UOP 19. MM-10F: UOP 19 is comprised of 10 grids as shown on Figure 2-21.

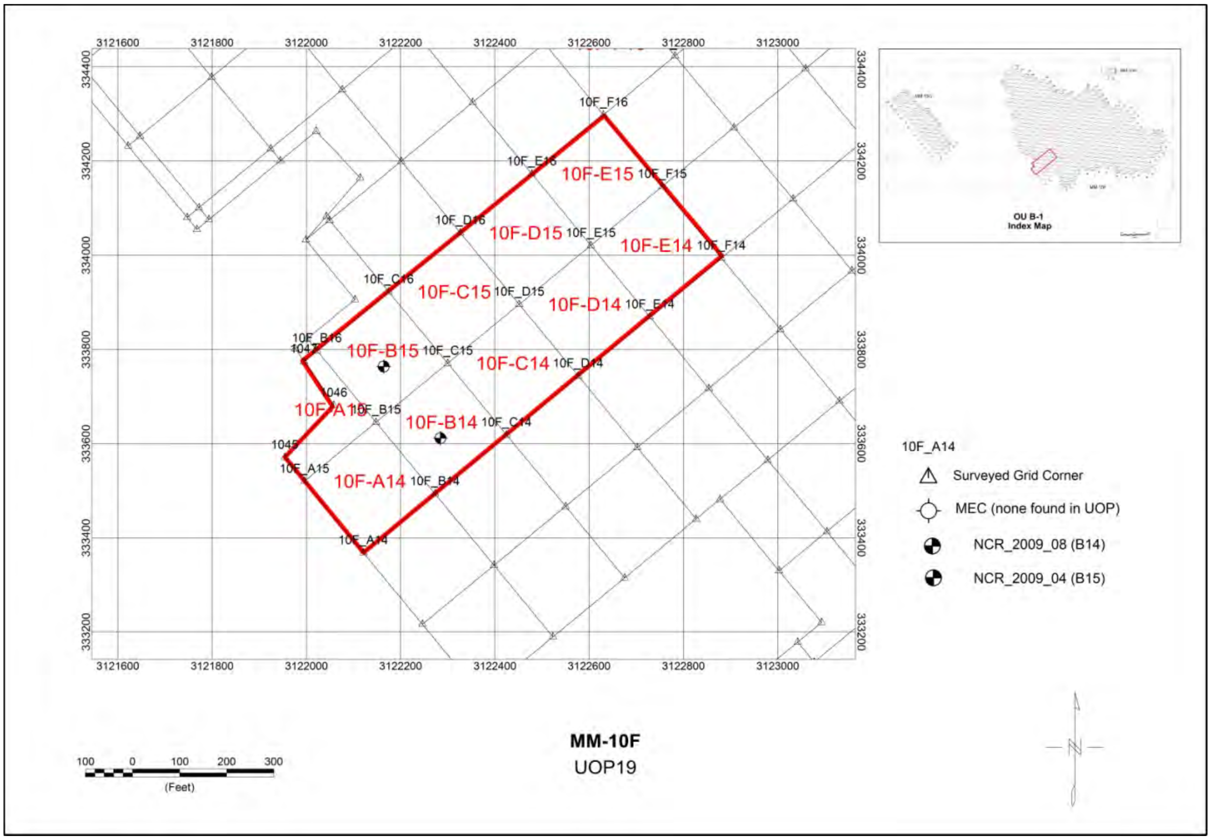

Figure 2-21. MM-10F, UOP19

Table 2-21 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-21. DGM and UXO Field Teams That Worked MM-10F: UOP19

Grid	DGM Crew	Date	UXO Team	Date
A14	GEO 3	7/9/2008	UXO2	8/21/2008
A15	GEO 3	7/10/2008	UXO2	8/21/2008
B14	GEO 3	8/9/2008	UXO1	7/27, 7/28/2009
B15	GEO 3	7/10/2008	UXO1	7/3, 7/27/2009
C14	GEO 3	8/12/2008	UXO3	9/6/2008
C15	GEO 3	8/11/2008	UXO1	9/2/2008
D14	GEO 3	8/12/2008	UXO1	9/2, 9/3/2008
D15	GEO 3	8/16/2008	UXO1	9/5/2008
E14	GEO 3	8/14/2008	UXO1	9/4, 9/5/2008
E15	GEO 3	8/15/2008	UXO1	9/4/2008

Additional discussion of Worksheet #36 for MM-10F: UOP19 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grid B14 was impacted by NCR 2009_08. This NCR was issued for a grid failure resulting from a QA DGM target with a millivolt response (20.16 mV) exceeding the GPO threshold criteria (4.4 mV) and the source of the anomaly was determined to be eight pieces of frag (including one larger than a 37 mm) in an uninvestigated spoil clump in MM-10F-B14, near original DGM Target 10F-B14-030. In this specific grid (MM-10F-B14), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. In addition, QA completed the remaining target inspections (six Vallon hole checks and eight DGM remapping target inspections) without any failures noted. The work completed (and approved) in 2010 is adequate to recommend no further action on this NCR . Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 13.
- Grid B15 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.20 MM-10F: UOP 20. MM-10F: UOP 20 is comprised of 10 grids as shown on Figure 2-22.

Table 2-22 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP20 follows:

- QC Step IIg: One MEC item (37 mm HE Projo MKII) was found in Grid H15 of this UoP. This item was blown in place on August 15, 2009.
- Grid F14 was impacted by NCR 2009_05. This NCR was issued because the grid failed according to the failure criteria: (1) an anomaly greater than the GPO threshold (16.9 mV during DGM remapping) <u>and</u> a piece of metal equivalent or larger than the size of a 37 mm projectile. The 16.9 mV anomaly came from the QA DGM data. The location of the anomaly coincided with the original target number 10F-F14-011 (original amplitude of 22 mV). The Navy does not recommend further action to resolve this NCR. The NCR was written for a specific failure in MM-10F-F14, and the contractor re-worked this entire grid. Contractor QC also re-evaluated this grid after re-work. In addition, the contractor retrained their personnel, and instituted a "tightened" MILSTD 1916 QC sampling. This non-conformance was discovered by QA investigations during certification (via QA DGM remapping); however, there were an additional 23 QA investigations in this grid that did not show any failures. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 10.

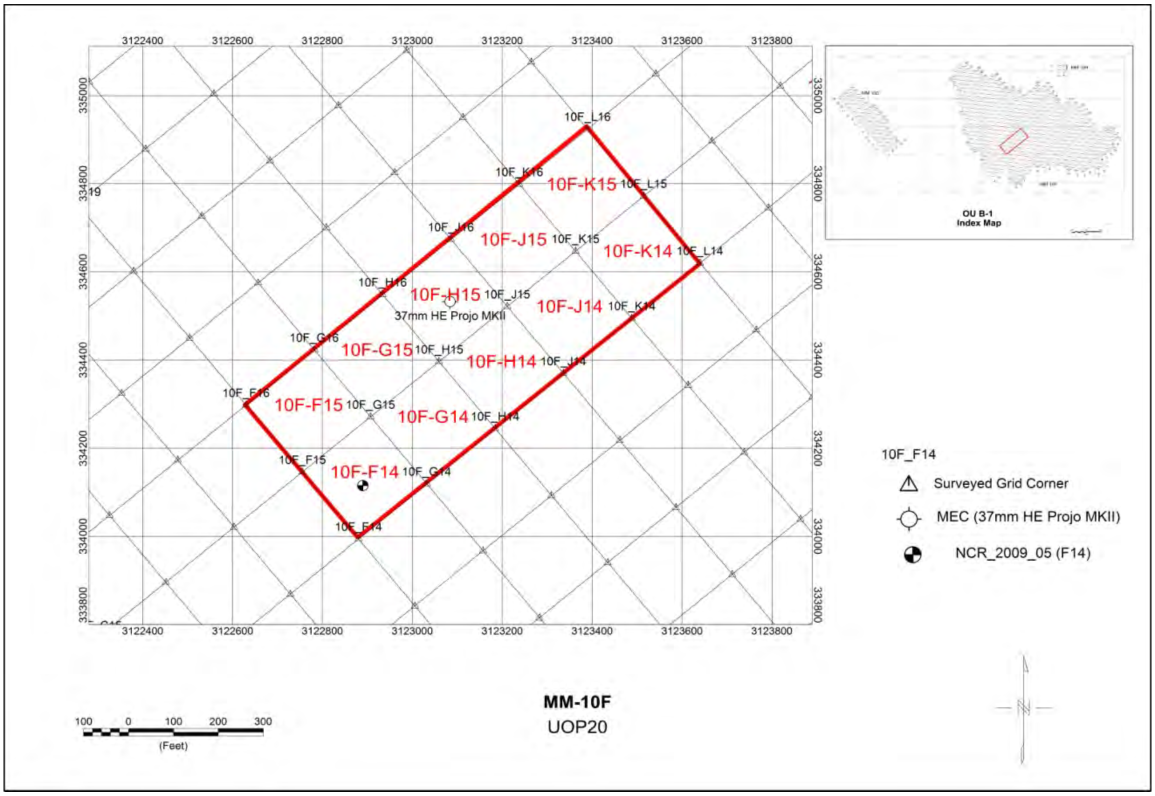

Figure 2-22. MM-10F, UOP20

Table 2-22. DGM and UXO Field Teams That Worked MM-10F: UOP20

Grid	DGM Crew	Date	UXO Team	Date
F14	GEO 3	8/13/2008	UXO2	7/11, 7/13/2009
F15	GEO 3	8/21/2008	UXO1	7/10, 7/11/2009
G14	GEO 2	7/18/2008	UXO2	8/5, 8/6/2009
G15	GEO 3	8/19/2008	UXO3	8/5/2009
H14	GEO 2	7/17/2008	UXO5	8/6, 8/7/2009
H15	GEO 2	8/13/2008	UXO5	8/5, 8/6/2009
J14	GEO 2	7/21/2008	UXO4	8/6, 8/7/2009
J15	GEO 5	8/19/2008	UXO1	8/6, 8/7/2009
K14	GEO 1	7/10/2008	UXO5	7/22, 7/23/2009
K15	GEO 1	7/10/2008	UXO1	7/22, 7/23/2009

2.3.21 MM-10F: UOP 21. MM-10F: UOP 21 is comprised of 10 grids as shown on Figure 2-24. Table 2-23 shows the DGM and UXO field teams that conducted work on this UOP.

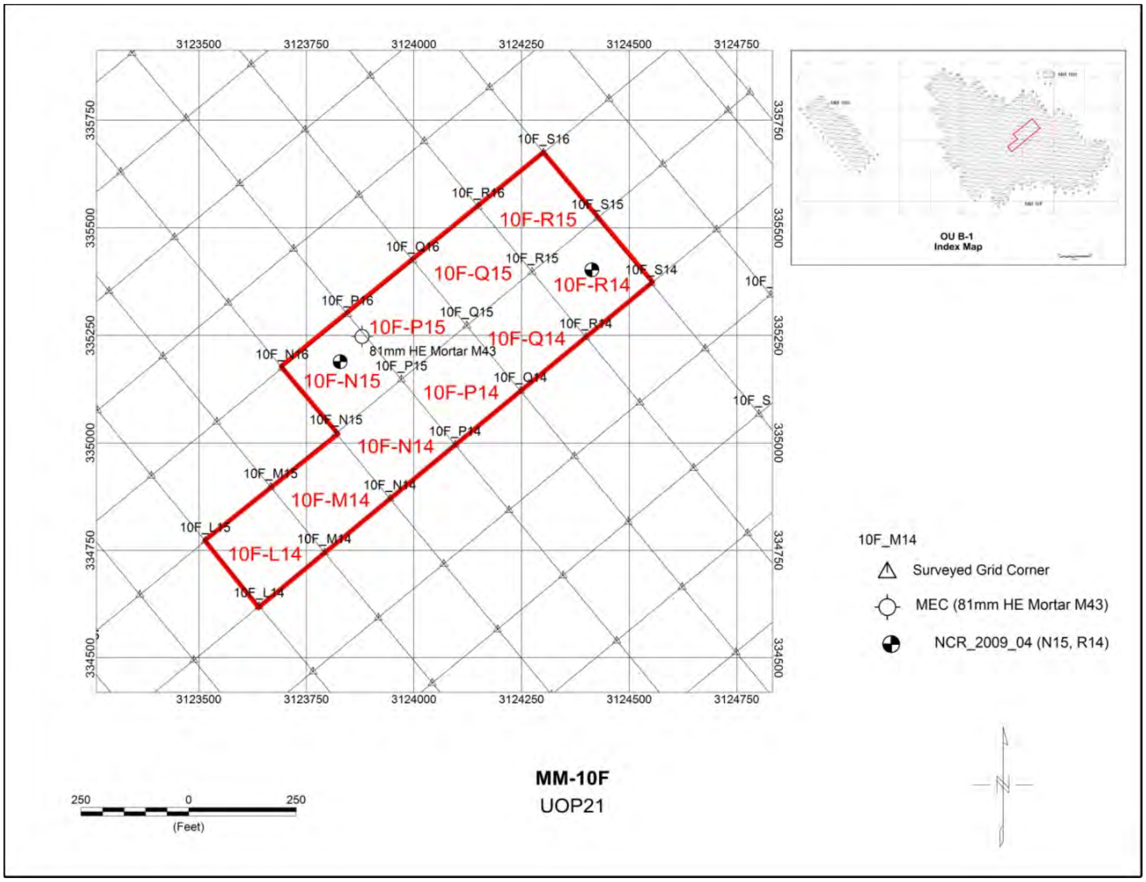

Figure 2-23. MM-10F, UOP21

Table 2-23. DGM and UXO Field Teams That Worked MM-10F: UOP21

Grid	DGM Crew	Date	UXO Team	Date
L14	GEO 1	7/9/2008	UXO3	7/22, 7/23/2009
M14	GEO 1	7/9/2008	UXO1	7/18, 7/20, 7/21/2009
N14	GEO 6	7/17/2008	UXO2	7/18/2009
N15	GEO 6	7/18/2008	UXO3	7/2, 7/3, 7/4/2009
P14	GEO 6	7/16/2008	UXO2	7/15/2009
P15	GEO 6	7/19/2008	UXO3	7/20, 7/21/2009
Q14	GEO 5	7/3/2008	UXO3	7/18, 7/20, 7/22/2009
Q15	GEO 5	7/9/2008	UXO2	7/21, 7/22, 7/26, 7/28/2009
R14	GEO 5	7/15/2008	UXO3	7/15, 7/18, 7/20, 7/28/2009
R15	GEO 5	7/9/2008	UXO2	8/28/2009

Additional discussion of Worksheet #36 for MM-10F: UOP21 follows:

- QC Step IIg: One MEC item (81 mm HE Mortar MK43) was found in Grid N15 of this UoP. This item was blown in place on August 15, 2009.
- Grids N15 and R14 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids

MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.22 MM-10F: UOP 22. MM-10F: UOP 22 is comprised of 11 grids as shown on Figure 2-24.

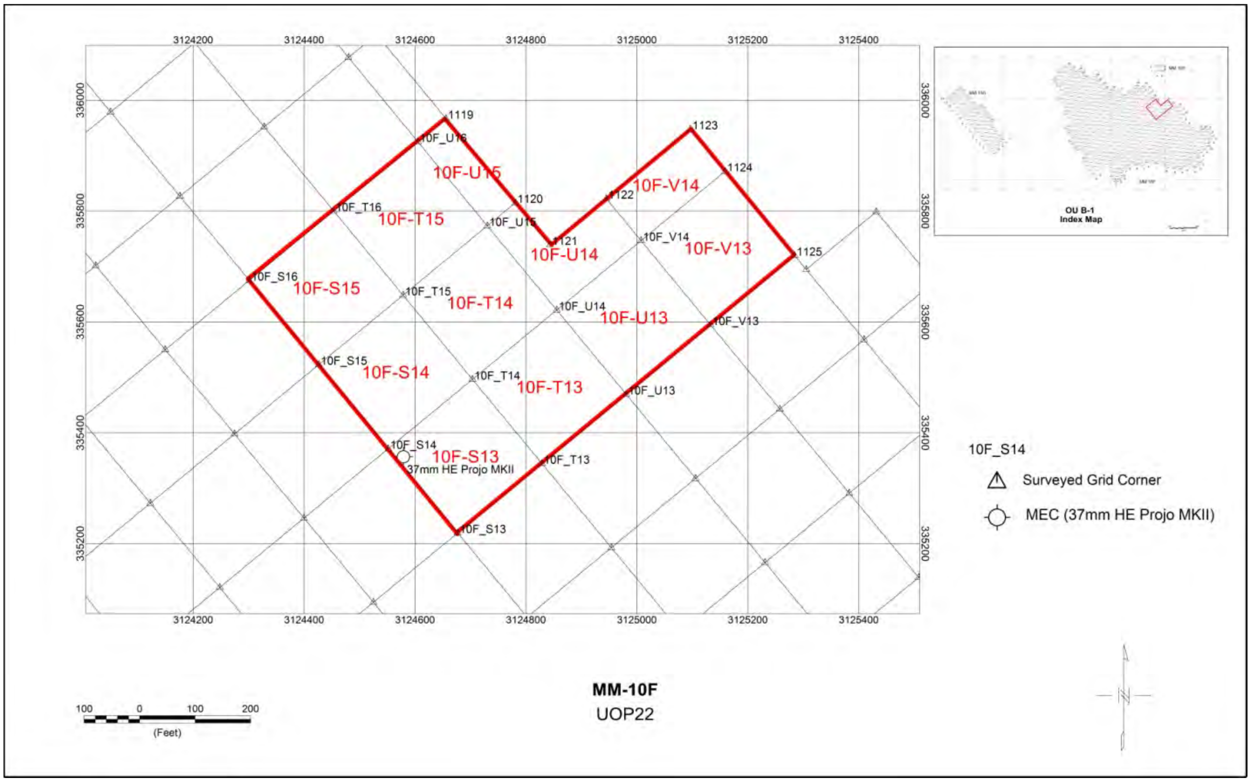

Figure 2-24. MM-10F, UOP22

Table 2-24 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP22 follows:

- QC Step IIg: One MEC item (37 mm HE Projo MKII) was found in Grid S13 of this UoP. This item was blown in place on September 3, 2009.
- There were no NCRs associated with this UoP.

Table 2-24. DGM and UXO Field Teams That Worked MM-10F: UOP22

Grid	DGM Crew	Date	UXO Team	Date
S13	GEO 5	7/29/2008	UXO4	8/18/2009
S14	GEO 5	7/30/2008	UXO2	7/18, 7/20/2009
S15	GEO 5	7/10/2008	UXO2	7/20/2009
T13	GEO 5	7/25/2008	UXO4	8/18, 8/19/2009
T14	GEO 5	7/24/2008	UXO4	7/20/2009
T15	GEO 5	7/11/2008	UXO4	7/18/2009
U13	GEO 5	7/26/2008	UXO4	8/19/2009
U14	GEO 5	7/24/2008	UXO5	7/6/2009
U15	GEO 5	7/11/2008	UXO5	7/6/2009
V13	GEO 6	6/24/2008	UXO4	7/6, 7/7/2009
V14	GEO 5	7/25/2008	UXO4	7/7/2009

2.3.23 MM-10F: UOP 23. MM-10F: UOP 23 is comprised of 10 grids as shown on Figure 2-25.

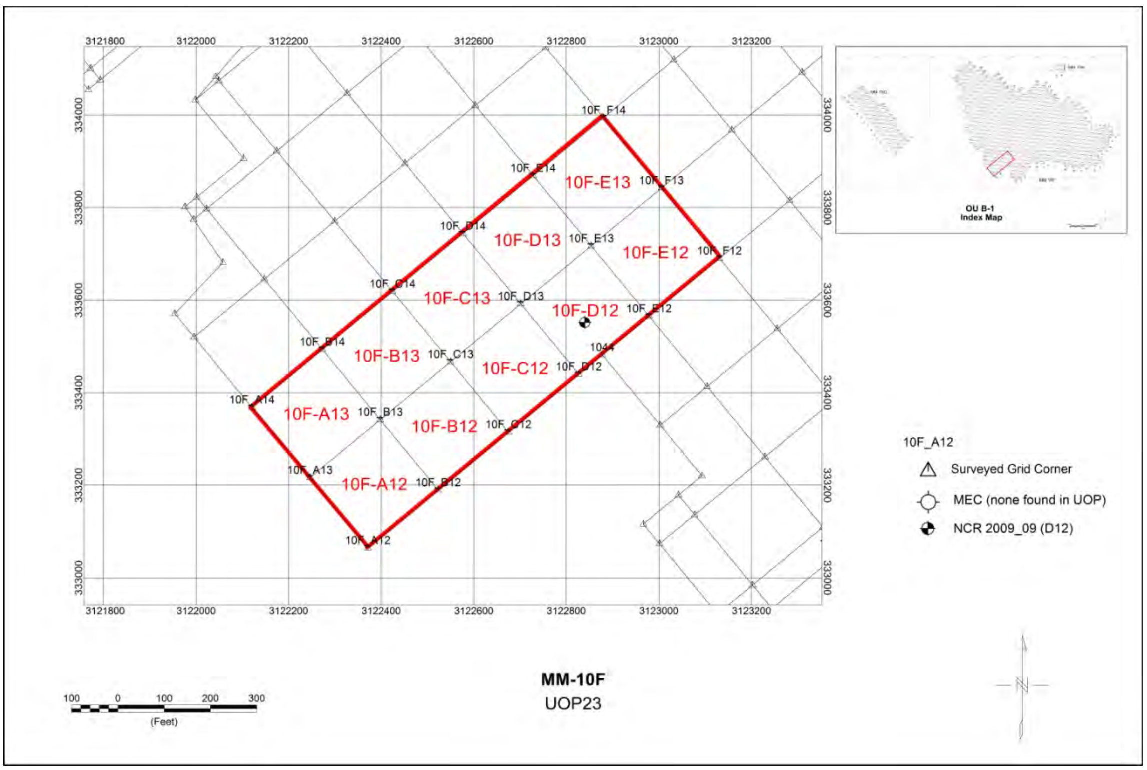

Figure 2-25. MM-10F, UOP23

Table 2-25 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-25. DGM and UXO Field Teams That Worked MM-10F: UOP23

Grid	DGM Crew	Date	UXO Team	Date
A12	GEO 3	7/8/2008	UXO2	8/21, 8/29/2008
A13	GEO 3	7/9/2008	UXO2	8/21/2008
B12	GEO 3	7/8/2008	UXO2	9/2, 9/3/2008
B13	GEO 3	8/8/2008	UXO1	7/27/2009
C12	GEO 1	7/17/2008	UXO3	9/6/2008
C13	GEO 1	7/17/2008	UXO3	9/6/2008
D12	GEO 3	8/22/2008	UXO5	8/10/2009
D13	GEO 3	8/8/2008	UXO1	9/4, 9/5/2008
E12	GEO 3	8/5/2008	UXO5	7/10/2009
E13	GEO 3	8/7/2008	UXO5	7/11/2009

Additional discussion of Worksheet #36 for MM-10F: UOP23 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grid D12 was impacted by NCR 2009_09. This NCR was issued under the failure criteria of an anomaly amplitude (12.55 mV) which was above the GPO threshold (4.4 mV) and a piece of metal larger than a 37 mm projectile (8.5 inches long and 2.75 inches wide). The item was found in an uninvestigated soil clump in MM-10F-D12, near original DGM Targets 10F-D12-016 and 703. In this specific grid (MM-10F-D12), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. In addition, QA completed the remaining target inspections (five Vallon hole checks and nine DGM remapping target inspections) without any failures noted. The work completed (and approved) in 2010 was adequate to recommend no further action on this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 14.

2.3.24 MM-10F: UOP 24. MM-10F: UOP 24 is comprised of 10 grids as shown on Figure 2-26.

Table 2-26 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP24 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs associated with this UoP.

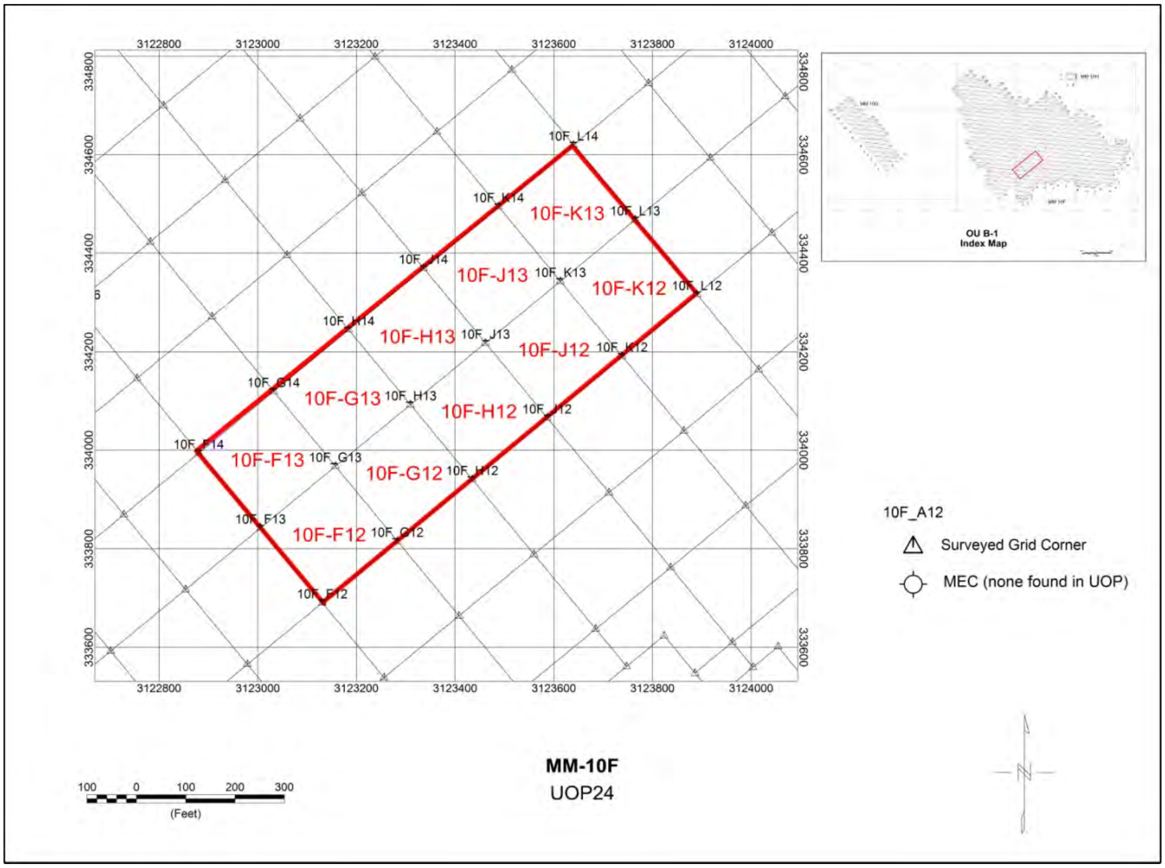

Figure 2-26. MM-10F, UOP24

Table 2-26. DGM and UXO Field Teams That Worked MM-10F: UOP24

Grid	DGM Crew	Date	UXO Team	Date
F12	GEO 3	8/5/2008	UXO4	7/10/2009
F13	GEO 2	7/16/2008	UXO4	7/11/2009
G12	GEO 2	7/14/2008	UXO4	8/12, 8/13/2009
G13	GEO 2	7/16/2008	UXO2	8/6/2009
H12	GEO 2	7/12/2008	UXO5	8/7/2009
H13	GEO 2	7/17/2008	UXO2	8/6, 8/7/2009
J12	GEO 2	7/15/2008	UXO1	8/7, 8/8/2009
J13	GEO 2	7/21/2008	UXO4	8/5, 8/6/2009
K12	GEO 4	7/25/2008	UXO5	8/18, 8/19/2009
K13	GEO 2	7/19/2008	UXO5	8/17, 8/18/2009

2.3.25 MM-10F: UOP 25. MM-10F: UOP 25 is comprised of 10 grids as shown on Figure 2-27.

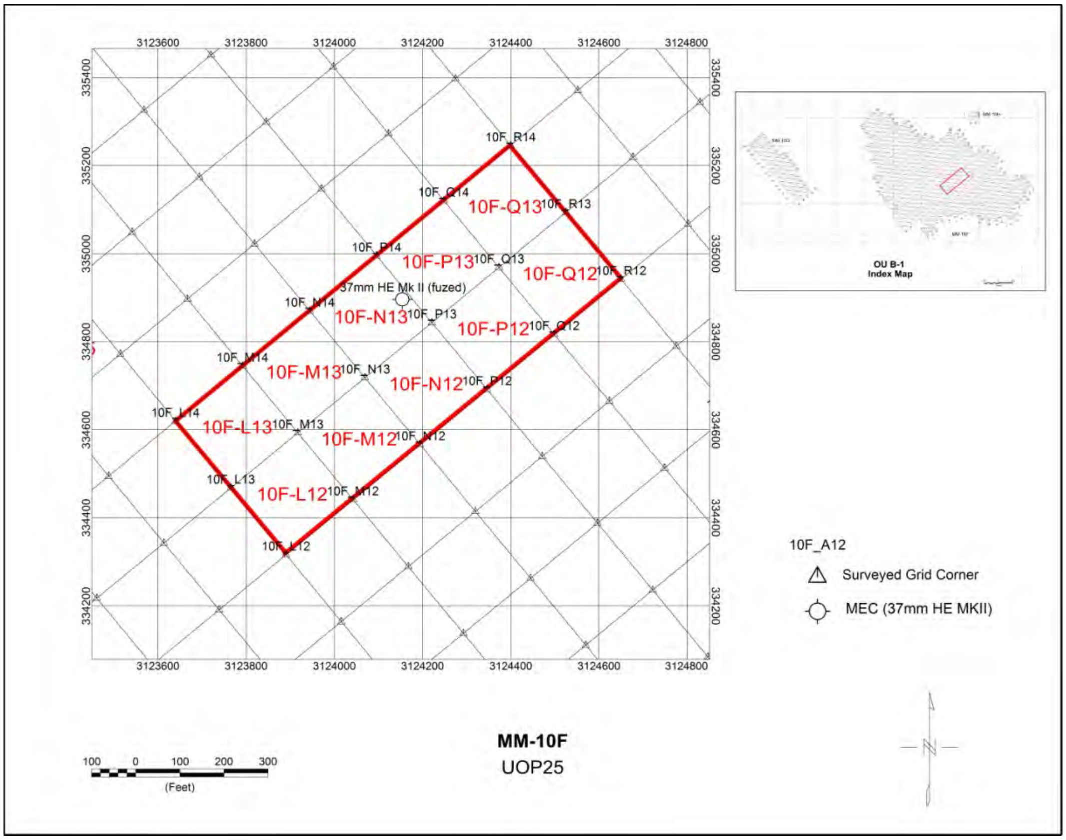

Figure 2-27. MM-10F, UOP25

Table 2-27 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-27. DGM and UXO Field Teams That Worked MM-10F: UOP25

Grid	DGM Crew	Date	UXO Team	Date
L12	GEO 4	7/28/2008	UXO5	8/25/2009
L13	GEO 4	7/29/2008	UXO1	8/22, 8/25, 8/28/2009
M12	GEO 4	7/28/2008	UXO5	8/25, 8/28/2009
M13	GEO 1	7/9/2008	UXO3	8/25, 8/28, 8/29/2009
N12	GEO 6	7/9/2008	UXO3	9/5/2009
N13	GEO 6	7/17/2008	UXO4	8/25, 8/28/2009
P12	GEO 6	7/9/2008	UXO4	8/24, 8/25/2009
P13	GEO 6	7/17/2008	UXO4	8/24, 8/25/2009
Q12	GEO 6	7/7/2008	UXO4	8/21, 8/24/2009
Q13	GEO 5	7/2/2008	UXO4	8/20, 8/21/2009

Additional discussion of Worksheet #36 for MM-10F: UOP25 follows:

- QC Step IIg: One MEC item (37 mm HE Projo MKII) was found in Grid N13 in this UoP. This item was blown in place on September 3, 2009.
- There were no NCRs associated with this UoP.

2.3.26 MM-10F: UOP 26. MM-10F: UOP 26 is comprised of 11 grids as shown on Figure 2-28.

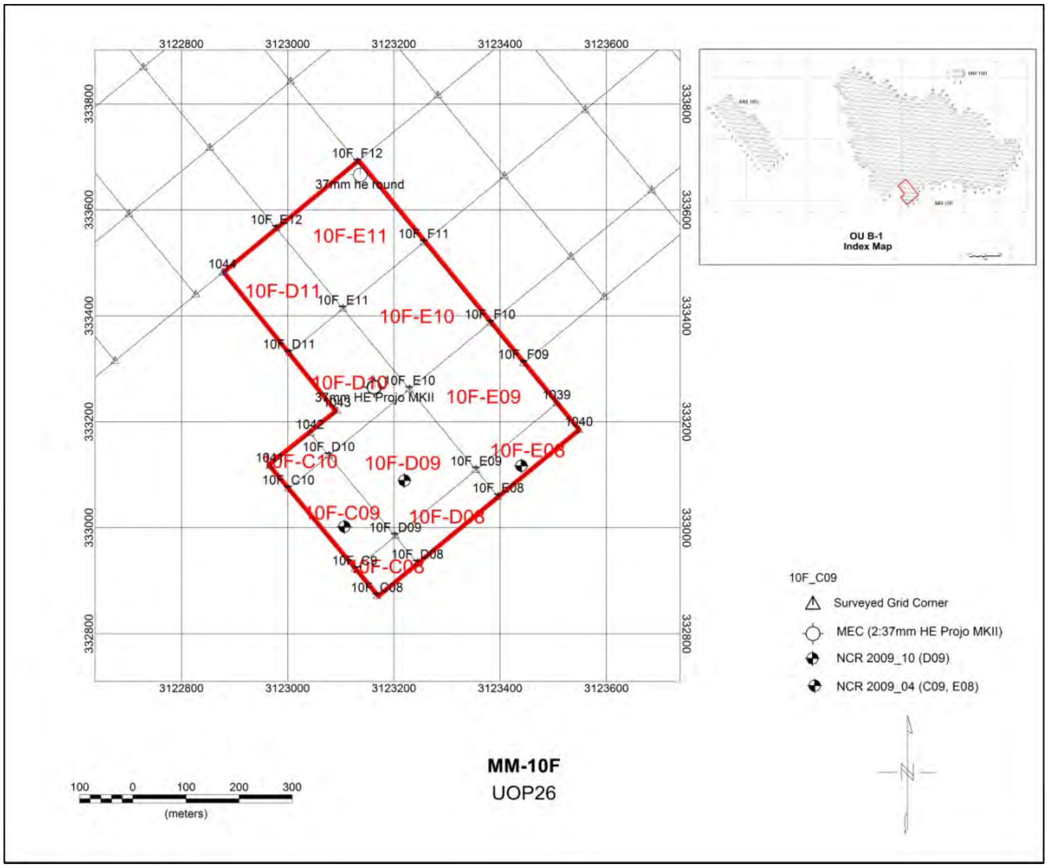

Figure 2-28. MM-10F, UOP26

Table 2-28 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-28. DGM and UXO Field Teams That Worked MM-10F: UOP26

Grid	DGM Crew	Date	UXO Team	Date
C08	GEO 3	7/31/2008	UXO2	7/2/2009
C09	GEO 3	8/1/2008	UXO2	7/2, 7/25/2009
C10	GEO 3	8/1/2008	UXO2	7/2/2009
D08	GEO 3	7/31/2008	UXO2	7/3, 7/25/2009
D09	GEO 3	7/31/2008	UXO1	7/25/2009
D10	GEO 3	8/1/2008	UXO1	7/25/2009
D11	GEO 1	8/28/2008	UXO5	8/10/2009
E08	GEO 3	7/12/2008	UXO2	7/3, 7/25/2009
E09	GEO 3	7/12/2008	UXO2	7/3, 7/25/2009
E10	GEO 3	7/12/2008	UXO2	9/3/2008
E11	GEO 3	8/6/2008	UXO1	7/13/2009

Additional discussion of Worksheet #36 for MM-10F: UOP26 follows:

- QC Step IIg: Two MEC items (both 37 mm HE Projos) were found in this UoP, one in Grid D10 and one in Grid E11. Both items were moved to Grid G20 for consolidation and disposed on August 15, 2009.
- Grid D09 was impacted by NCR 2009_10. This NCR was issued for unexcavated anomalies found during QA Vallon hole checks at Target 10F-D09-013. At this location, QA found 13 pieces of frag varying in size up to 2 inches long and 2 inches wide. The Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector (same as NCR 2009-03, which when this grid was investigated, had not had corrective action applied). Based upon the successful completion of the 2010 QA field work (three random hole checks and 10 DGM remapping targets) the Navy recommended that no further action was necessary on this NCR. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 15.
- Grids C09 and E08 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.27 MM-10F: UOP 27. MM-10F: UOP 27 is comprised of 10 grids as shown on Figure 2-29.

Table 2-29 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP27 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grid H10 was impacted by NCR 2009_10. This NCR was issued to address insufficient clearance of a target location. The evidence to support the NCR was the discovery of nine pieces of frag found during QA Vallon hole checks at Target 10F-H-10062. None of this frag exceeded the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector. The frag was found at a depth of about 11 inches, about 3 inches deeper than the excavation depth. This NCR was closed on its merits. Nothing discovered in the grid meets the failure criteria. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 22.

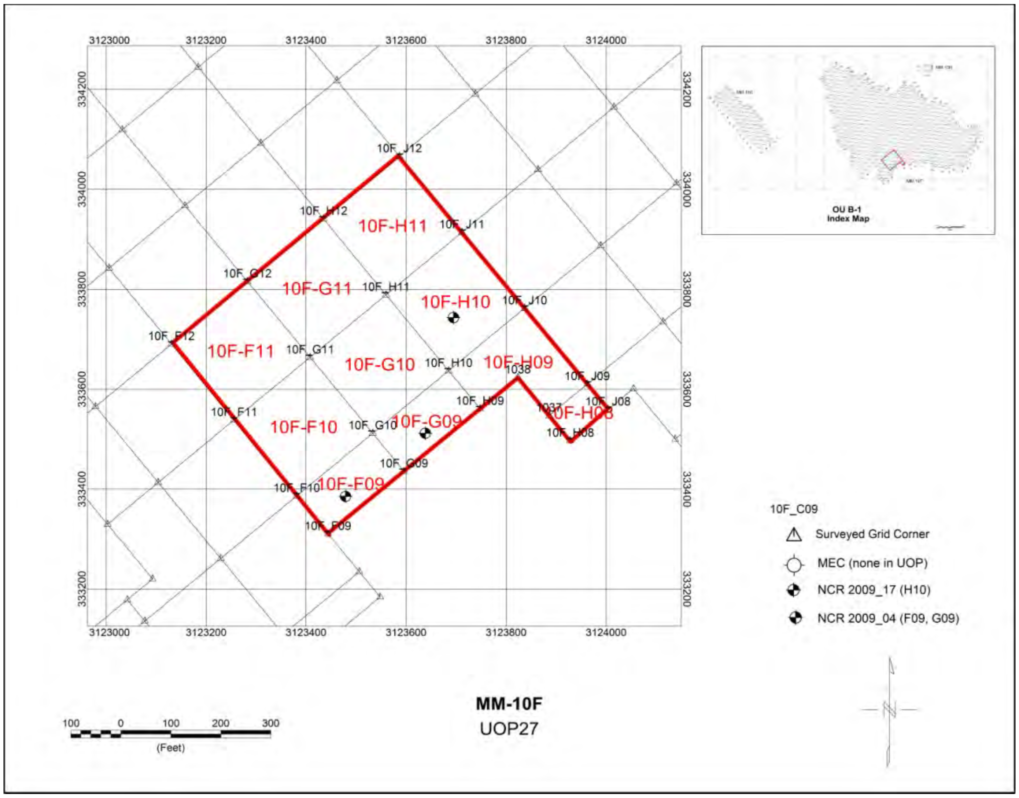

Figure 2-29. MM-10F, UOP27

Table 2-29. DGM and UXO Field Teams That Worked MM-10F: UOP27

Grid	DGM Crew	Date	UXO Team	Date
F09	GEO 3	8/1/2008	UXO2	7/3, 7/25/2009
F10	GEO 1	7/19/2008	UXO5	8/12/2009
F11	GEO 3	8/4/2008	UXO5	8/10, 8/11, 8/12/2009
G09	GEO 3	8/4/2008	UXO2	7/4, 7/25/2009
G10	GEO 3	8/2/2008	UXO4	8/13/2009
G11	GEO 2	7/15/2008	UXO4	8/11, 8/12/2009
H08	GEO 2	7/7/2008	UXO2	7/30/2008
H09	GEO 2	7/7/2008	UXO4	7/3, 7/4/2009
H10	GEO 2	7/9/2008	UXO4	8/13, 8/14/2009
H11	GEO 2	7/11/2008	UXO2, UXO5	8/7, 8/8, 8/12, 8/13/2009

- Grids F09 and G09 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.28 MM-10F: UOP 28. MM-10F: UOP 28 is comprised of 10 grids as shown on Figure 2-30.

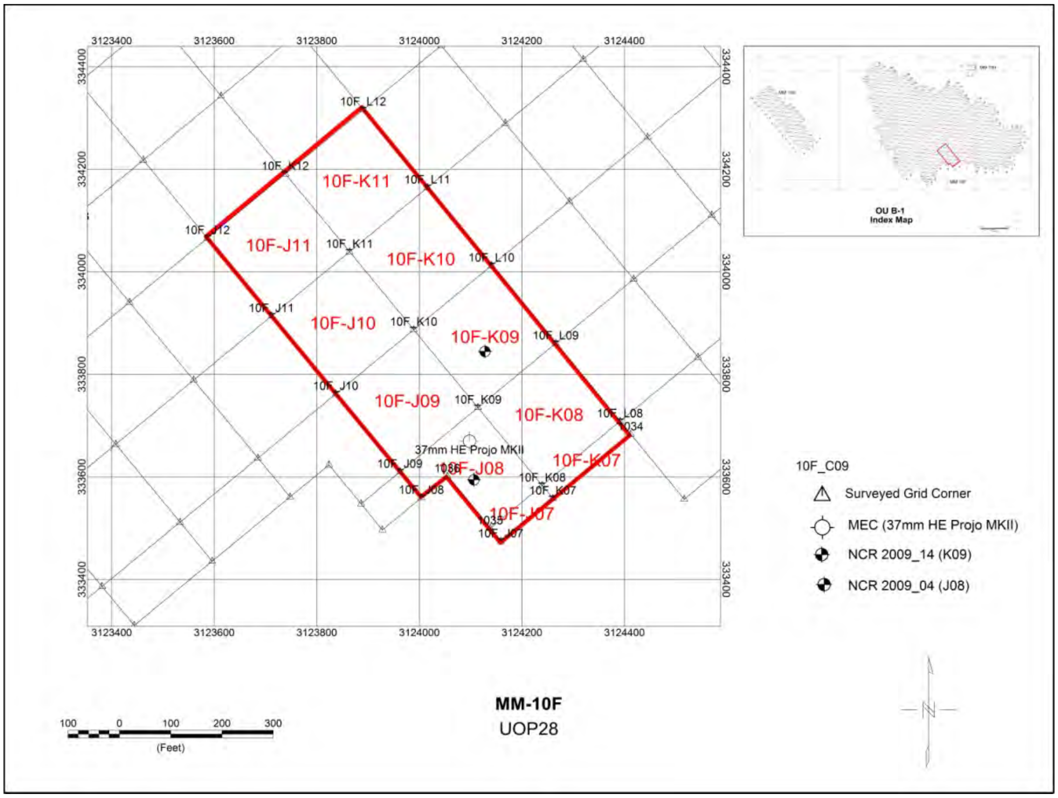

Figure 2-30. MM-10F, UOP28

Table 2-30 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-30. DGM and UXO Field Teams That Worked MM-10F: UOP28

Grid	DGM Crew	Date	UXO Team	Date
J07	GEO 2	6/30/2008	UXO2	7/30/2008
J08	GEO 2	6/30/2008	UXO2	7/4, 7/27/2009
J09	GEO 2	7/5/2008	UXO5	8/14/2009
J10	GEO 2	7/9/2008	UXO5	8/13, 8/14/2009
J11	GEO 2	7/10/2008	UXO4	8/7, 8/10/2009
K07	GEO 2	7/2/2008	UXO2	7/30/2008
K08	GEO 2	7/2/2008	UXO5	7/3/2009
K09	GEO 2	7/4/2008	UXO5	8/21, 8/21/2009
K10	GEO 2	7/10/2008	UXO4	8/14, 8/17/2009
K11	GEO 4	7/25/2008	UXO5	8/19, 8/20/2009

Additional discussion of Worksheet #36 for MM-10F: UOP28 follows:

- QC Step IIg: One MEC item (37 mm HE Projo MKII) was found in this UoP in Grid J08. This item was moved to Grid G20 for consolidation and disposed on August 15, 2009.
- Grid K09 was impacted by NCR 2009_14. This NCR was issued for the discovery of 50+ pieces of frag found with QA DGM mapping with a response of 11.65 mV. None of this frag exceeded the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector. This location is 4 feet from the nearest grid Target 10F-K09-032. This NCR was closed because the frag did not meet the failure criteria, and QC and QA checks in this grid (59 targets or 55% of the unknown targets) did not reveal any failures. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 19.
- Grid J08 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.29 **MM-10F: UOP 29.** MM-10F: UOP 29 is comprised of 10 grids as shown on Figure 2-31.

Table 2-31 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP29 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids P10, P11, Q10 and Q11were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

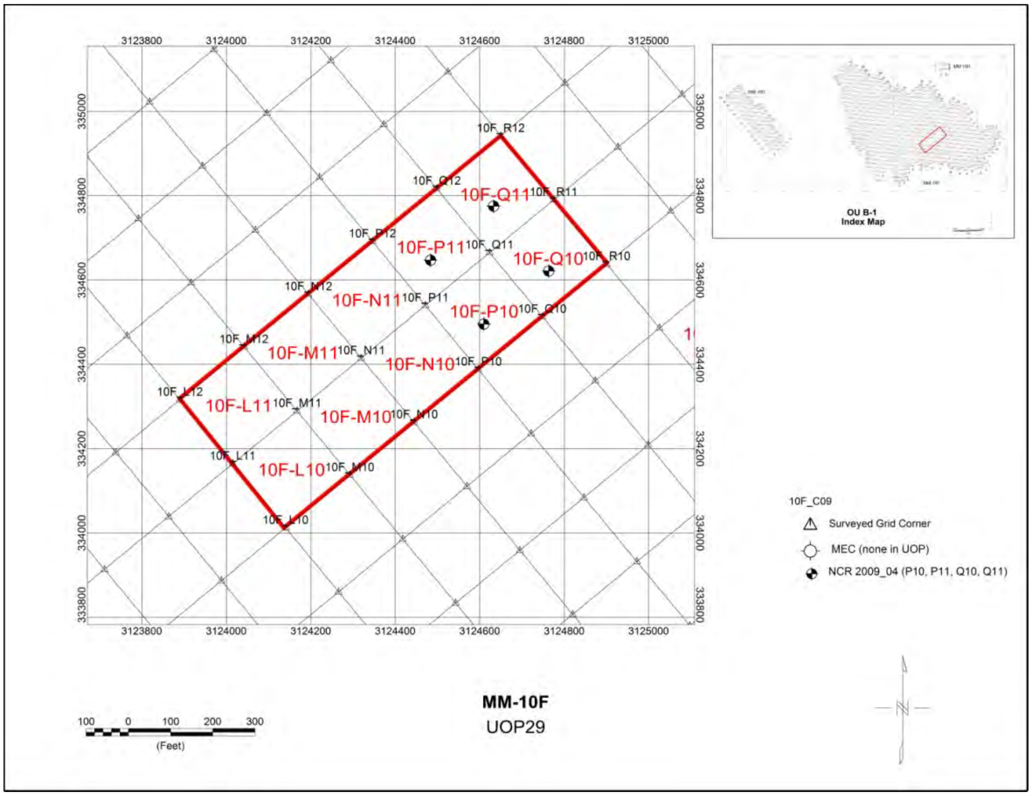

Figure 2-31. MM-10F, UOP29

Table 2-31. DGM and UXO Field Teams That Worked MM-10F: UOP29

Grid	DGM Crew	Date	UXO Team	Date
L10	GEO 4	7/24/2008	UXO5	8/22, 8/24/2009
L11	GEO 4	7/24/2008	UXO5	8/24/2009
M10	GEO 4	7/22/2008	UXO5	8/31/2009
M11	GEO 4	7/22/2008	UXO5	8/28, 8/29/2009
N10	GEO 4	7/10/2008	UXO3	9/5/2008
N11	GEO 6	7/3/2008	UXO5	8/29/2009
P10	GEO 6	7/3/2008	UXO1	7/1, 7/25/2009
P11	GEO 6	7/4/2008	UXO1	7/7, 7/25/2009
Q10	GEO 6	7/2/2008	UXO1	7/2, 7/25/2009
Q11	GEO 6	7/5/2008	UXO5	7/2, 7/3, 7/25/2009

2.3.30 MM-10F: UOP 30. MM-10F: UOP 30 is comprised of 10 grids as shown on Figure 2-32.

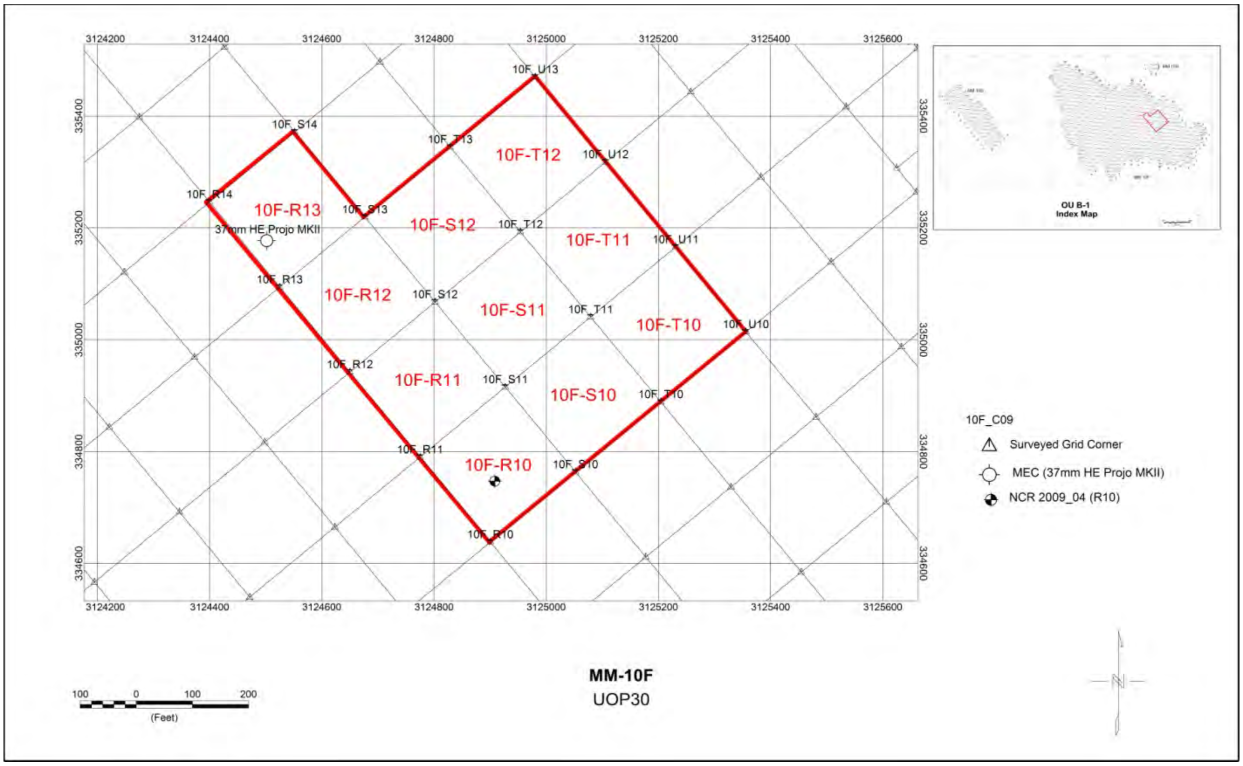

Figure 2-32. MM-10F, UOP30

Table 2-32 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-32. DGM and UXO Field Teams That Worked MM-10F: UOP30

Grid	DGM Crew	Date	UXO Team	Date
R10	GEO 6	6/30/2008	UXO5	6/29/2009
R11	GEO 6	7/12/2008	UXO5	9/2/2009
R12	GEO 6	7/9/2008	UXO3	9/2/2009
R13	GEO 6	7/14/2008	UXO4	8/19, 8/20/2009
S10	GEO 4	8/16/2008	UXO2	8/15/2008, 9/2/2009
S11	GEO 4	8/18/2008	UXO2	9/2/2009
S12	GEO 5	7/29/2008	UXO2	8/31, 9/2/2009
T10	GEO 5	8/12/2008	UXO2	8/25/2009
T11	GEO 4	8/15/2008	UXO2	8/31/2009
T12	GEO 5	7/28/2008	UXO2	8/29, 8/31/2009

Additional discussion of Worksheet #36 for MM-10F: UOP30 follows:

- QC Step IIg: One MEC item (37 mm HE Projo MKII) was found in this UoP in Grid R13. This item was blown in place on September 3, 2009.
- Grid R10 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-

10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.31 MM-10F: UOP 31. MM-10F: UOP 31 is comprised of nine grids as shown on Figure 2-33.

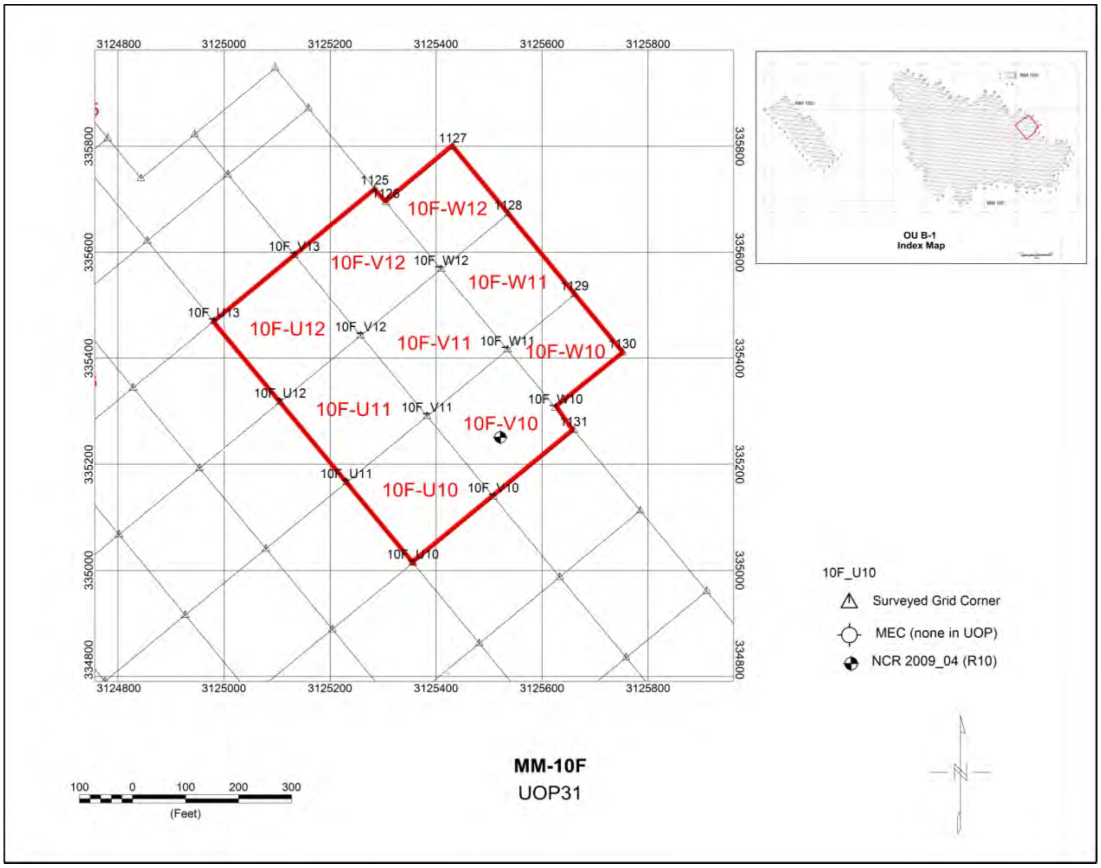

Figure 2-33. MM-10F, UOP31

Table 2-33 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP31 follows:

- QC Step IIg: No MEC items were found in this UoP.

Table 2-33. DGM and UXO Field Teams That Worked MM-10F: UOP31

Grid	DGM Crew	Date	UXO Team	Date
U10	GEO 3	7/5/2008	UXO2	8/24, 8/25/2009
U11	GEO 3	7/12/2008	UXO2	8/29/2009
U12	GEO 5	7/28/2008	UXO2	8/29/2009
V10	GEO 2	6/26/2008	UXO5	7/7, 7/28/2009
V11	GEO 2	6/27/2008	UXO2	8/29/2009
V12	GEO 6	8/25/2008	UXO4	7/6/2009
W10	GEO 2	6/28/2008	UXO2	8/1/2008
W11	GEO 2	6/27/2008	UXO4	7/4, 7/6/2009
W12	GEO 6	6/25/2008	UXO4	7/4/2009

- Grid V10 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.32 MM-10F: UOP 32. MM-10F: UOP 32 is comprised of 10 grids as shown on Figure 2-34.

Table 2-34 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP32 follows:

- QC Step IIg: No MEC items were found in this UoP.

  Grids P08, P09 and Q08 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

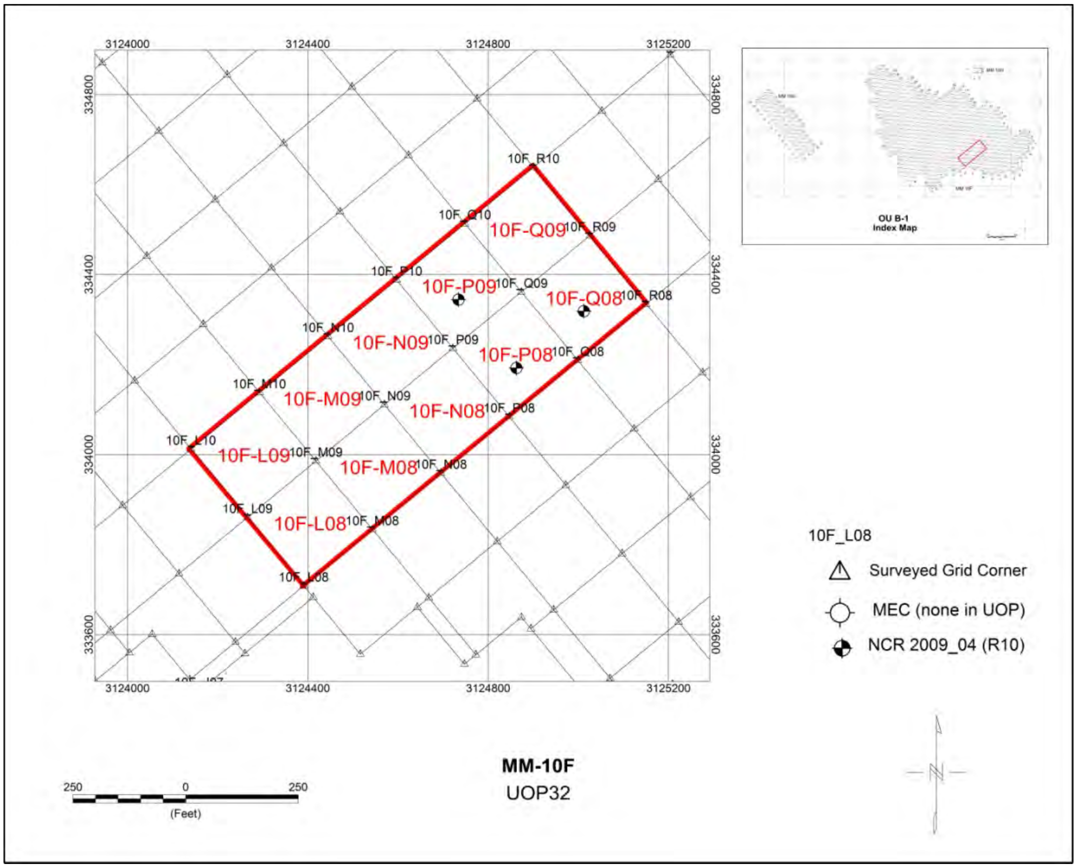

Figure 2-34. MM-10F, UOP32

Table 2-34. DGM and UXO Field Teams That Worked MM-10F: UOP32

Grid	DGM Crew	Date	UXO Team	Date
L08	GEO 1	6/24/2008	UXO5	8/22/2009
L09	GEO 2	7/3/2008	UXO5	8/21, 8/22/2009
M08	GEO 4	7/12/2008	UXO5	8/31, 9/1/2009
M09	GEO 4	7/23/2008	UXO5	8/31/2009
N08	GEO 1	6/28/2008	UXO5	9/1/2009
N09	GEO 4	7/18/2008	UXO3	9/5/2008
P08	GEO 4	7/21/2008	UXO2	7/1, 7/2, 7/28/2009
P09	GEO 4	7/19/2008	UXO1	6/30/2009
Q08	GEO 6	6/27/2008	UXO2	7/2, 7/28/2009
Q09	GEO 6	6/28/2008	UXO3	8/31, 9/1/2009

2.3.33 MM-10F: UOP 33. MM-10F: UOP 33 is comprised of 10 grids as shown on Figure 2-35.

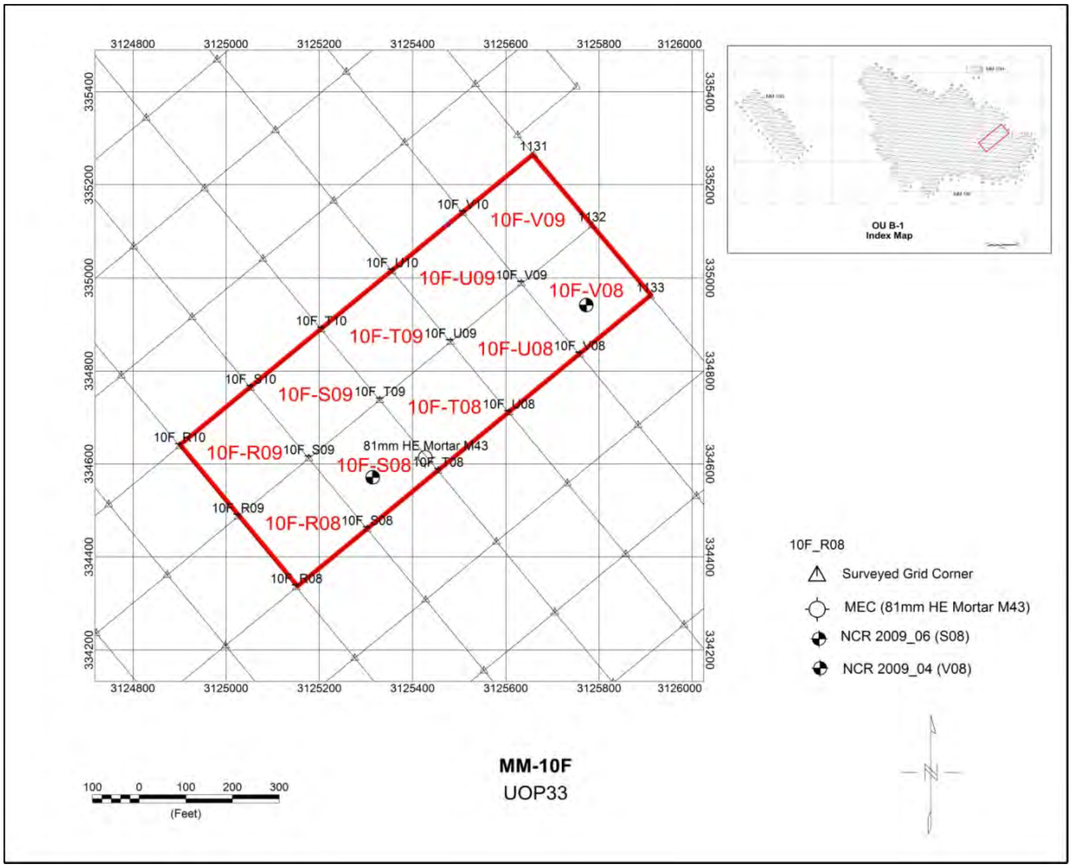

Figure 2-35. MM-10F, UOP33

Table 2-35 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-35. DGM and UXO Field Teams That Worked MM-10F: UOP33

Grid	DGM Crew	Date	UXO Team	Date
L08	GEO 1	6/24/2008	UXO5	8/22/2009
L09	GEO 2	7/3/2008	UXO5	8/21, 8/22/2009
M08	GEO 4	7/12/2008	UXO5	8/31, 9/1/2009
M09	GEO 4	7/23/2008	UXO5	8/31/2009
N08	GEO 1	6/28/2008	UXO5	9/1/2009
N09	GEO 4	7/18/2008	UXO3	9/5/2008
P08	GEO 4	7/21/2008	UXO2	7/1, 7/2, 7/28/2009
P09	GEO 4	7/19/2008	UXO1	6/30/2009
Q08	GEO 6	6/27/2008	UXO2	7/2, 7/28/2009
Q09	GEO 6	6/28/2008	UXO3	8/31, 9/1/2009

Additional discussion of Worksheet #36 for MM-10F: UOP33 follows:

- QC Step IIg: One MEC item (81 mm HE Mortar M43) was found in Grid S08 in this UoP. This item was blown in place on July 23, 2009.
- Grid S08 was impacted by NCR 2009_06. This NCR was issued because the grid failed according to the failure criteria: (1) an anomaly greater than the GPO threshold (27.99 mV during DGM remapping) and a piece of metal larger than the size of a 37 mm projectile (81 mm tail boom). The location of the anomaly coincided with the original Target 10F-S08-010 (original amplitude of 17.14 mV). This NCR was closed without further action. The NCR was written for a specific failure in MM-10F-S08, and the contractor re-worked this entire grid with no additional reported issues. The contractor QC also performed additional checks in this grid as part of the tightened QC inspection state. In addition, QA investigated 19 targets (five in 2009 and 14 in 2010) in this grid that did not show any failures. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 11.
- Grid V08 was impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.34 MM-10F: UOP 34. MM-10F: UOP 34 is comprised of 10 grids as shown on Figure 2-36.

Table 2-36 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP34 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs associated with this UoP.

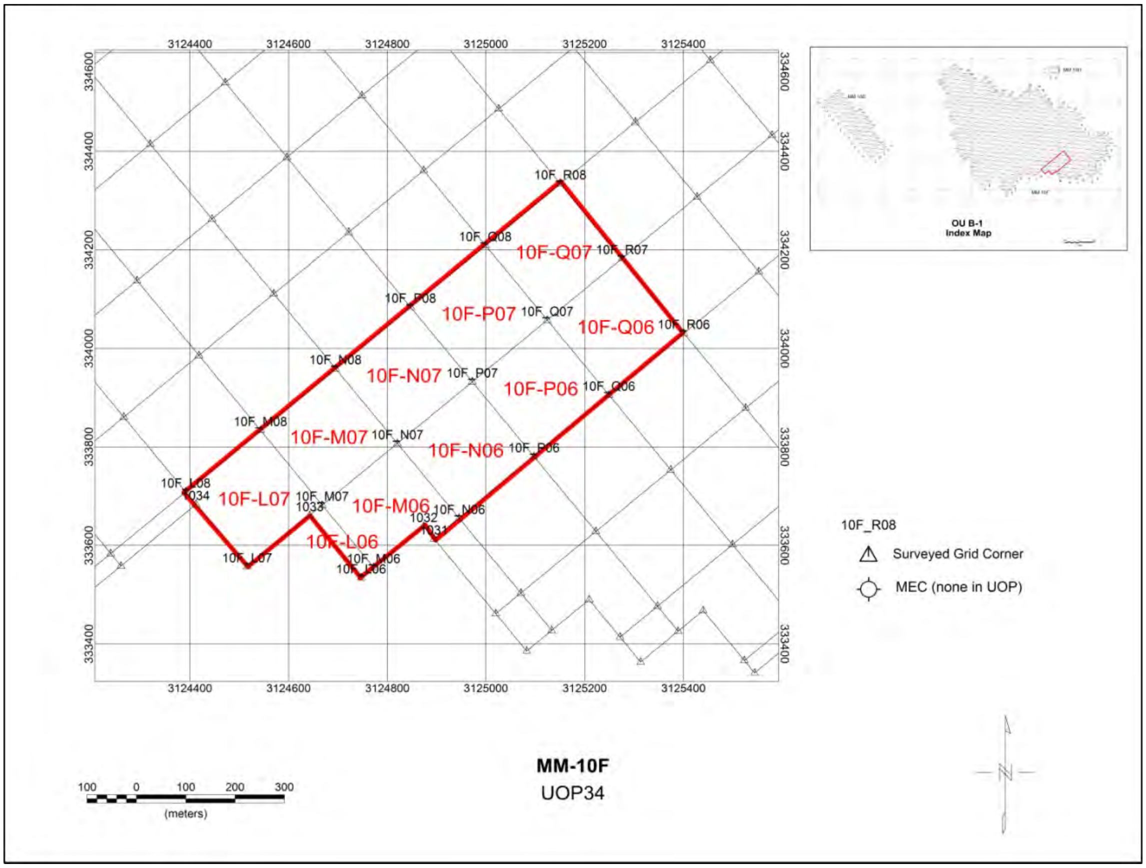

Figure 2-36. MM-10F, UOP34

Table 2-36. DGM and UXO Field Teams That Worked MM-10F: UOP34

Grid	DGM Crew	Date	UXO Team	Date
L06	GEO 1	6/25/2008	UXO2	7/18/2008
L07	GEO 1	6/25/2008	UXO2	7/18, 7/19, 7/21/2008
M06	GEO 1	6/26/2008	UXO2	7/16, 7/17/2008
M07	GEO 1	6/27/2008	UXO2	7/14, 7/15, 7/16/2008
N06	GEO 1	6/30/2008	UXO1	7/18/2008
N07	GEO 1	6/27/2008	UXO5	9/1, 9/2/2008
P06	GEO 1	7/2/2008	UXO4	9/2/2009
P07	GEO 1	7/4/2008	UXO4	9/1, 9/2/2009
Q06	GEO 1	7/2/2008	UXO5	7/29, 7/30/2009
Q07	GEO 1	7/3/2008	UXO5	7/30/2009

2.3.35 MM-10F: UOP 35. MM-10F: UOP 35 is comprised of 10 grids as shown on Figure 2-37.

Table 2-37 shows the DGM and UXO field teams that conducted work on this UoP.

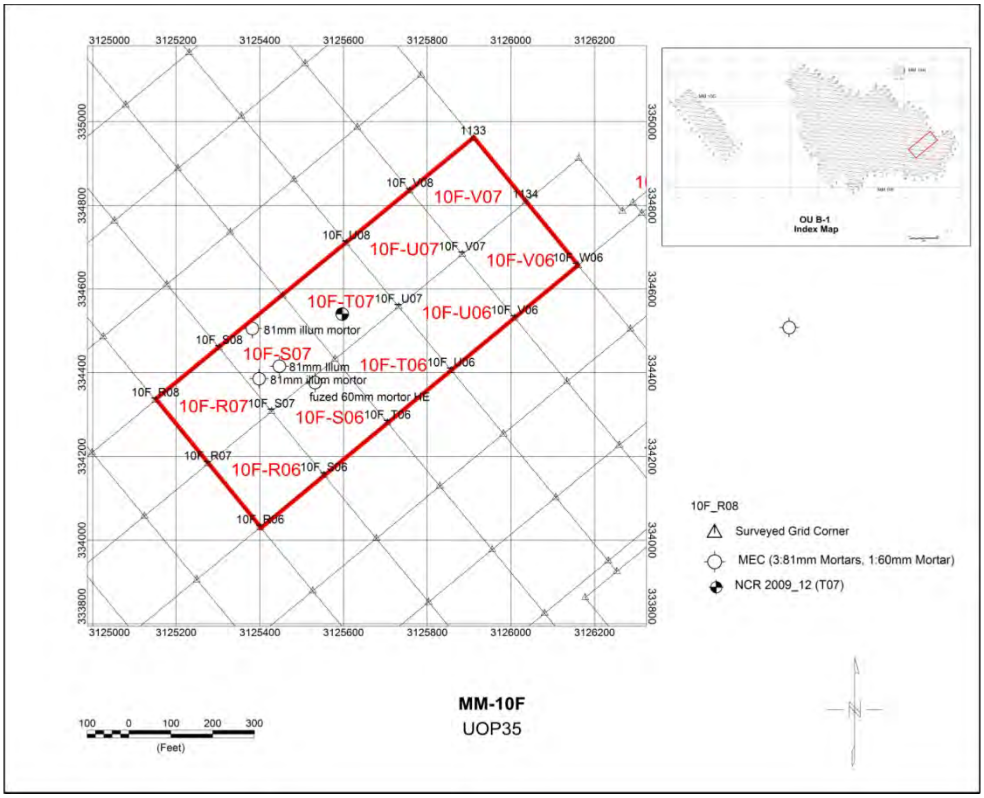

Figure 2-37. MM-10F, UOP35

Table 2-37. DGM and UXO Field Teams That Worked MM-10F: UOP35

Grid	DGM Crew	Date	UXO Team	Date
R06	GEO 1	7/7/2008	UXO5	7/30/2009
R07	GEO 6	6/26/2008	UXO4	9/1, 9/2/2009
S06	GEO 1	8/20/2008	UXO4	6/29, 6/30/2009
S07	GEO 4	8/19/2008	UXO4	6/30, 7/2, 7/3/2009
T06	GEO 5	8/8/2008	UXO2	8/21/2009
T07	GEO 5	8/9/2008	UXO2	8/21/2009
U06	GEO 5	8/14/2008	UXO2	8/20/2009
U07	GEO 5	8/5/2008	UXO2	8/20/2009
V06	GEO 3	7/14/2008	UXO5	7/7, 7/24/2009
V07	GEO 3	7/15/2008	UXO5	7/4/2009

Additional discussion of Worksheet #36 for MM-10F: UOP35 follows:

- QC Step IIg: Four MEC items were found in this UoP: In Grid S07, three 81 mm illum mortars were found, and in Grid S06 a 60 mm HE Mortar M49 was found. All of these items were blown in place on July 23, 2009.
- Grid T07 was impacted by NCR 2009_12. This NCR was issued for a grid failure where the failure criteria were exceeded. The failure was caused from unexcavated metal found during intrusive investigation of a QA DGM target. A DGM anomaly with an amplitude of 39 mV, well above the GPO threshold (4.4 mV) was detected about 2 feet from Target

10F-T07-025. Upon investigation, QA found a shallow (about 3 inches deep) piece of metal measuring 6 inches by 1.5 inches, which exceeds the size of a 37 mm projectile. The amplitude of the original DGM target was 6.08 mV. The Navy recommended closing the NCR based on the successful completion of the FCR #20 field work during the 2010 field season. Additional discussion of the NCR is provided in the NCR Resolution Document-Part Four, Section 17.

2.3.36 MM-10F: UOP 36. MM-10F: UOP 36 is comprised of nine grids as shown on Figure 2-38.

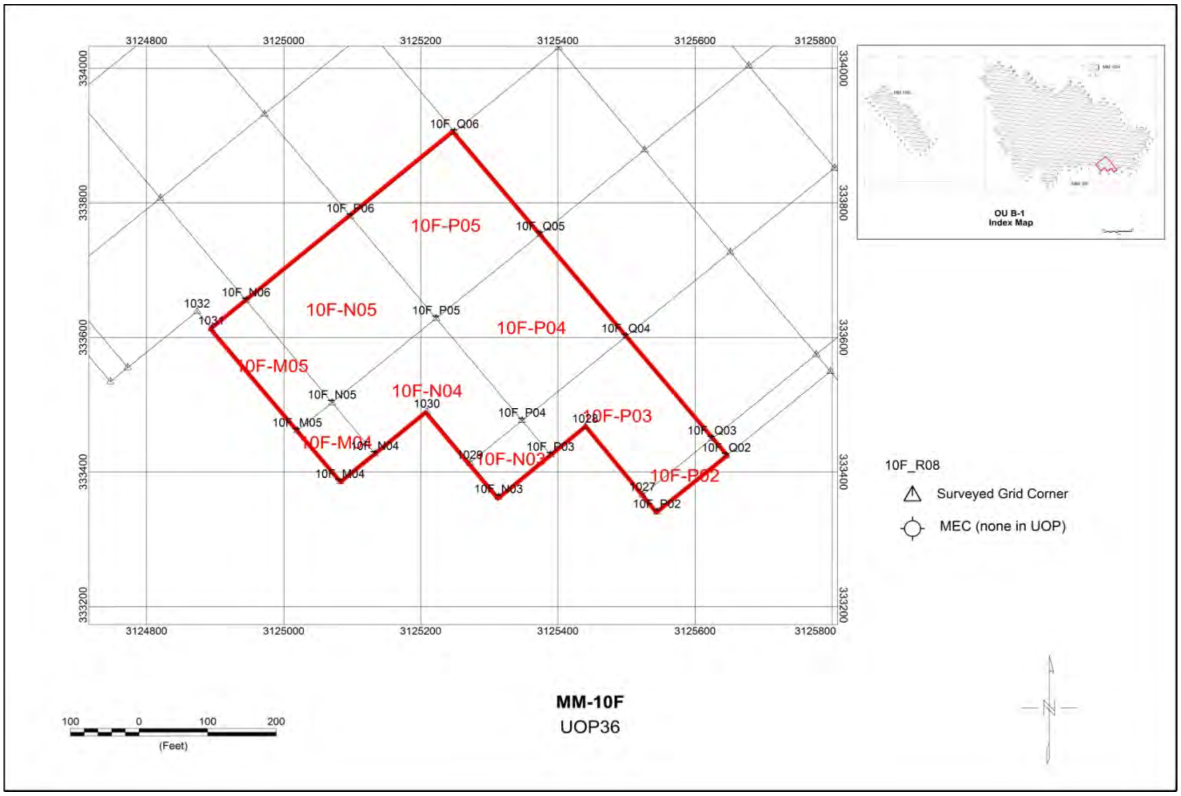

Figure 2-38. MM-10F, UOP36

Table 2-38 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-38. DGM and UXO Field Teams That Worked MM-10F: UOP36

Grid	DGM Crew	Date	UXO Team	Date
M04	GEO 4	8/8/2008	UXO2	7/6/2009
M05	GEO 4	6/28/2008	UXO2	7/6/2009
N03	GEO 4	6/24/2008	UXO1	7/15/2008
N04	GEO 4	6/25/2008	UXO1	7/162008
N05	GEO 4	6/27/2008	UXO1	7/16/2008
P02	GEO 4	6/23/2008	UXO1	7/11/2008
P03	GEO 4	6/23/2008	UXO1	7/12/2008
P04	GEO 4	6/26/2008	UXO1	7/14/2008
P05	GEO 4	6/27/2008	UXO1	7/12/2008

Additional discussion of Worksheet #36 for MM-10F: UOP36 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs associated with this UoP.

2.3.37 MM-10F: UOP 37. MM-10F: UOP 37 is comprised of nine grids as shown on Figure 2-39.

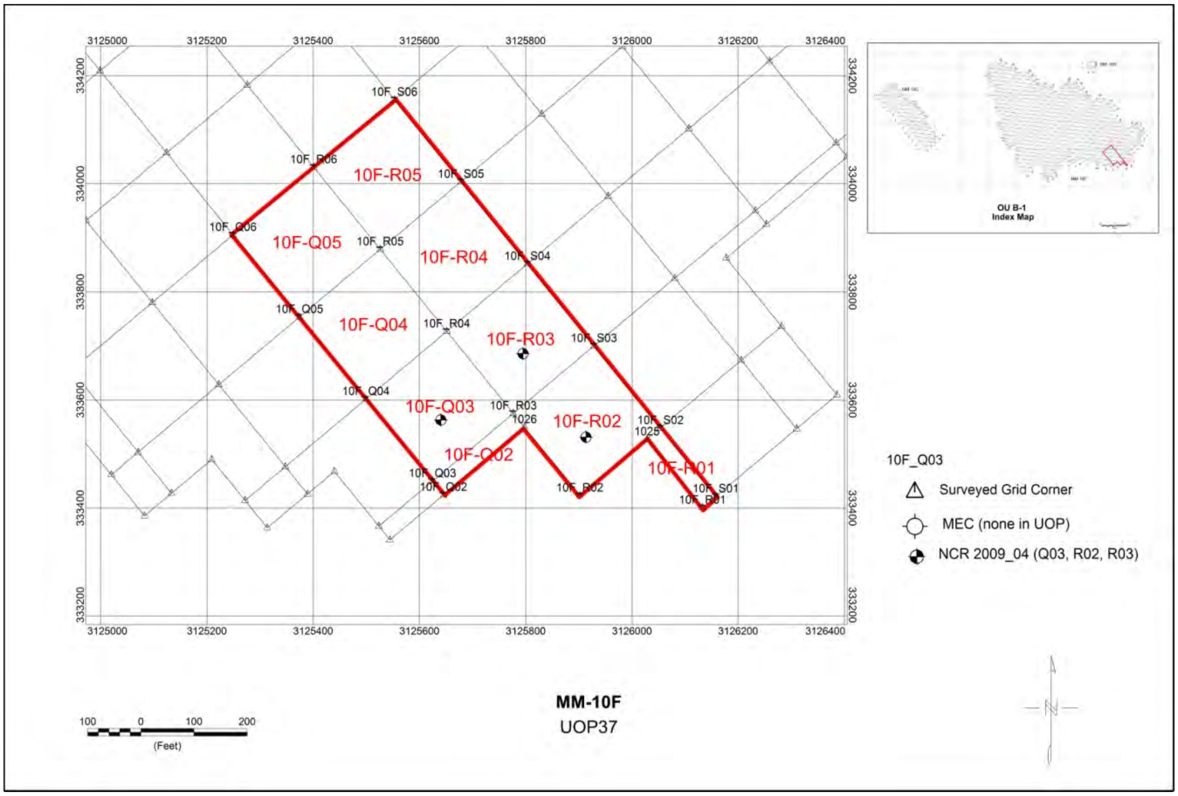

Figure 2-39. MM-10F, UOP37

Table 2-39 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-39. DGM and UXO Field Teams That Worked MM-10F: UOP37

Grid	DGM Crew	Date	UXO Team	Date
Q02	GEO 4	6/24/2008	UXO5	7/12/2008
Q03	GEO 1	6/30/2008	UXO2	6/29, 7/28/2009
Q04	GEO 4	8/14/2008	UXO5	7/29/2009
Q05	GEO 1	7/5/2008	UXO5	7/29/2009
R01	GEO 4	6/28/2008	UXO2	7/1/2009
R02	GEO 5	8/28/2008	UXO2	6/29, 7/28/2009
R03	GEO 5	8/28/2008	UXO2	6/29, 7/28/2009
R04	GEO 2	8/22/2008	UXO4	8/31/2009
R05	GEO 1	7/5/2008	UXO4	8/31/2009

Additional discussion of Worksheet #36 for MM-10F: UOP37 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids Q03, R02 and R03 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.38 MM-10F: UOP 38. MM-10F: UOP 38 is comprised of 10 grids as shown on Figure 2-40.

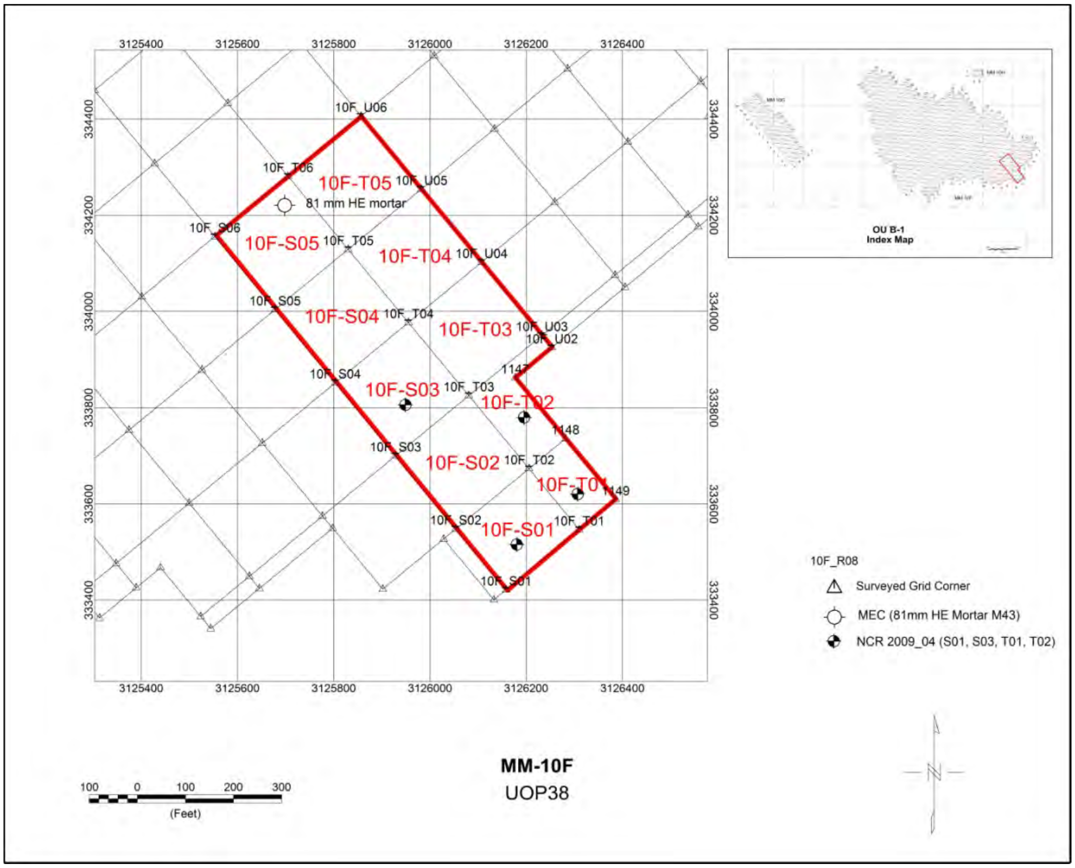

Figure 2-40. MM-10F, UOP38

Table 2-40 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-40. DGM and UXO Field Teams That Worked MM-10F: UOP38

Grid	DGM Crew	Date	UXO Team	Date
S01	GEO 5	8/28/2008	UXO2	7/1, 7/24/2009
S02	GEO 1	8/27/2008	UXO3	7/2/2009
S03	GEO 1	8/27/2008	UXO3	6/29, 6/30/2009
S04	GEO 1	8/21/2008	UXO4	8/28, 8/29/2009
S05	GEO 1	8/20/2008	UXO4	8/29/2009
T01	GEO 5	8/6/2008	UXO2	7/1, 7/24/2009
T02	GEO 5	8/6/2008	UXO3	6/30, 7/24/2009
T03	GEO 5	8/7/2008	UXO3	6/29/2009
T04	GEO 5	8/7/2008	UXO2	8/20/2009
T05	GEO 5	8/8/2008	UXO2	8/21/2009

Additional discussion of Worksheet #36 for MM-10F: UOP38 follows:

- QC Step IIg: One MEC item (81 mm HE Mortar M43) was found in Grid S05 in this UoP. This item was blown in place on September 3, 2009.
- Grids S01, S03, T01 and T02 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.3.39 **MM-10F: UOP 39.** MM-10F: UOP 39 is comprised of 11 grids as shown on Figure 2-41.

Table 2-41 shows the DGM and UXO field teams that conducted work on this UoP.

Additional discussion of Worksheet #36 for MM-10F: UOP39 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids V02, V03, W02, W03 and W04 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

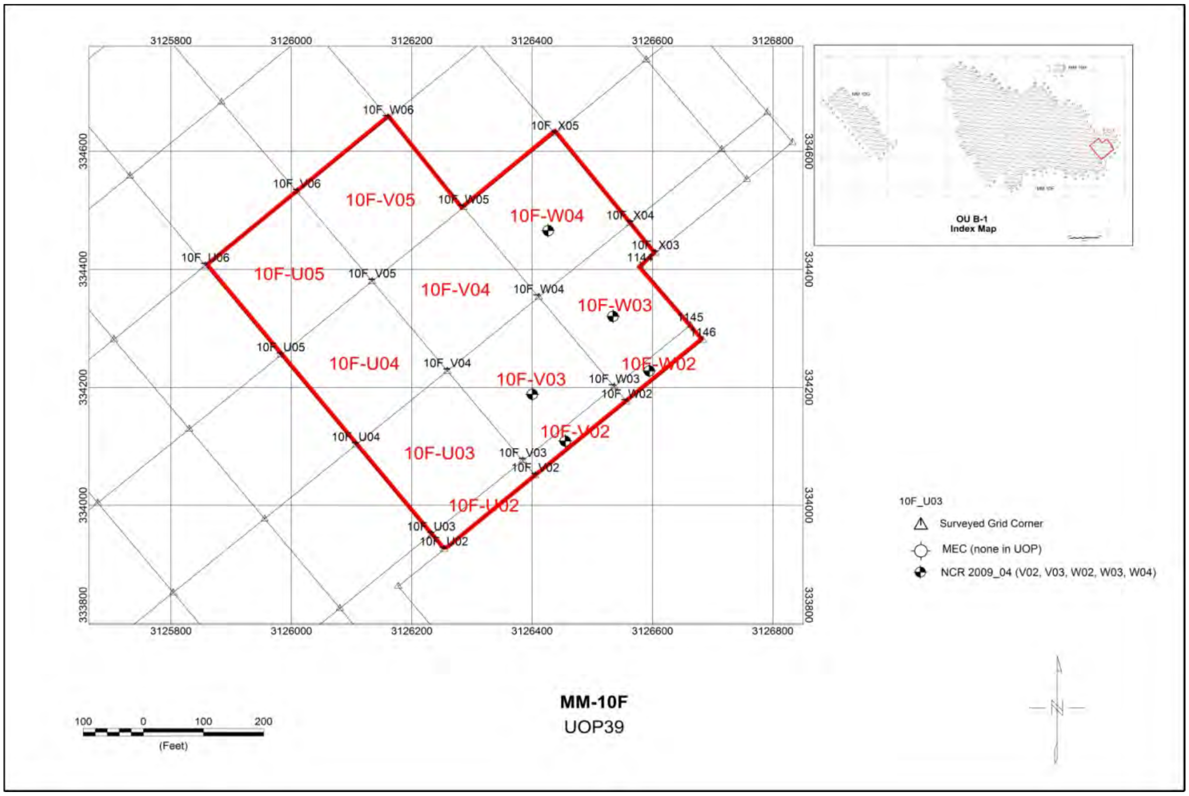

Figure 2-41. MM-10F, UOP39

Table 2-41. DGM and UXO Field Teams That Worked MM-10F: UOP39

Grid	DGM Crew	Date	UXO Team	Date
U02	GEO 3	7/2/2008	UXO3	6/30/2009
U03	GEO 5	8/6/2008	UXO2	8/20/2009
U04	GEO 5	8/7/2008	UXO2	8/20/2009
U05	GEO 5	8/7/2008	UXO2	8/20/2009
V02	GEO 3	7/2/2008	UXO3	6/30, 7/24/2009
V03	GEO 3	7/2/2008	UXO1	7/4, 7/24/2009
V04	GEO 3	7/3/2008	UXO5	7/7/2009
V05	GEO 3	7/15/2008	UXO5	7/7/2009
W02	GEO 3	7/2/2008	UXO3	6/30, 7/24/2009
W03	GEO 3	7/2/2008	UXO1	7/4, 7/24/2009
W04	GEO 3	6/30/2008	UXO2	7/6, 7/24/2009

2.3.40 MM-10F: UOP 40. MM-10F: UOP 40 is comprised of 10 grids as shown on Figure 2-42.

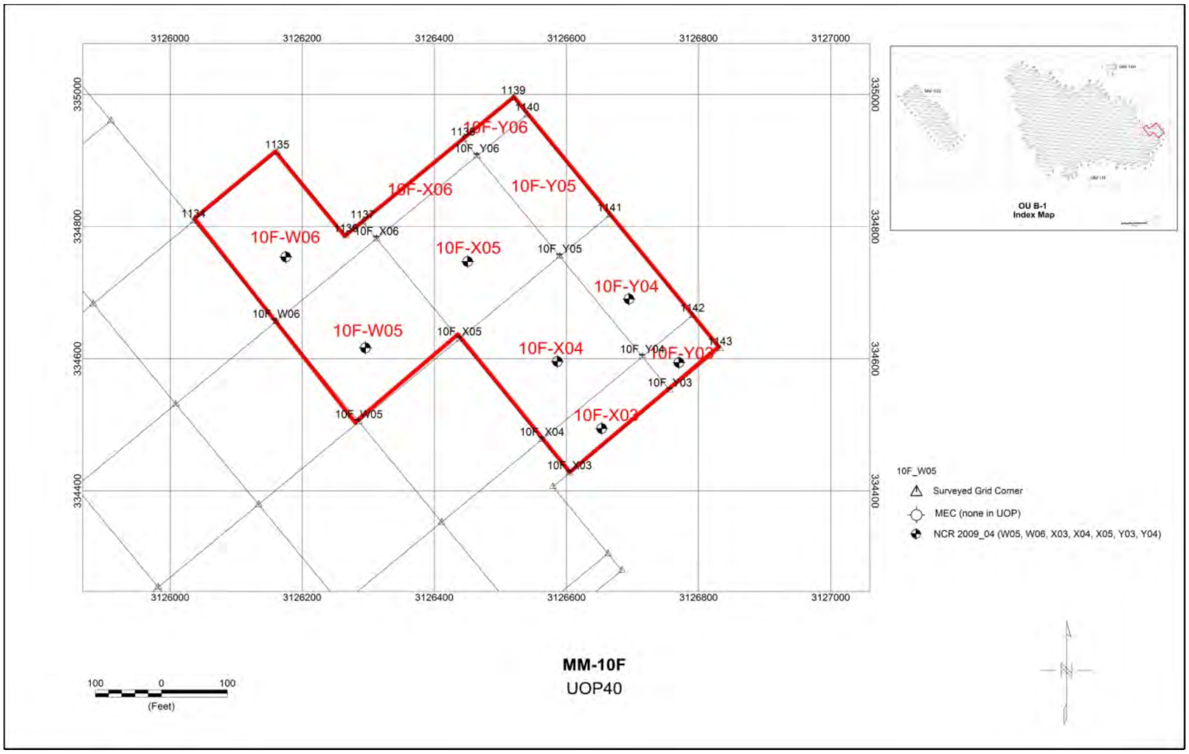

Figure 2-42. MM-10F, UOP40

Table 2-42 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-42. DGM and UXO Field Teams That Worked MM-10F: UOP40

Grid	DGM Crew	Date	UXO Team	Date
W05	GEO 3	6/24/2008	UXO2	7/6, 7/24/2009
W06	GEO 3	6/25/2008	UXO2	7/6, 7/24/2009
X03	GEO 3	6/28/2008	UXO2	7/4, 7/24/2009
X04	GEO 3	6/30/2008	UXO1	7/6, 7/24/2009
X05	GEO 3	6/26/2008	UXO1	7/6, 7/28/2009
X06	GEO 3	6/27/2008	UXO1	7/6/2009
Y03	GEO 3	6/28/2008	UXO1	7/4, 7/24/2009
Y04	GEO 3	6/27/2008	UXO1	7/4, 7/24/2009
Y05	GEO 3	6/27/2008	UXO2	7/31/2008
Y06	GEO 3	6/27/2008	UXO2	7/31/2008

Additional discussion of Worksheet #36 for MM-10F: UOP40 follows:

- QC Step IIg: No MEC items were found in this UoP.
- Grids W05, W06, X03, X04, X05, Y03 and Y04 were impacted by NCR 2009_04. This NCR was issued to correct failures between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as “Hot Geology”. However, during the QA hole inspections, QA observed that many of those

targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet. QC teams re-checked all targets previously recorded as hot geology in these grids during July 24-July 28, 2009. This action was sufficient to close this NCR. More detailed discussion of this NCR is provided in the NCR Resolution Document, Section 9.

2.4 AOC Certification (Worksheet #36 Compliance) for AOC MM-10G

AOC MM-10G is comprised of six UoPs (#1-6). The completed Worksheet #36 for this AOC is provided below. Additional information on the UOPs is provided in the sections following the worksheet.

Adak MM-10G WS#36 Compliance Matrix			UOP	UOP	UOP	UOP	UOP	UOP
QC Step	Items to be checked/verified	Reference Documents (Summary Spreadsheets)	1	2	3	4	5	6
QC Step I	a)Preparatory Phase Checklist for Training, Personnel Qualifications and Equipment status.	APPENDIX_A_2008-2010_Training Matrix.xls, APPENDIX_E_Preparatory QC Inspections.xls	√	√	√	√	√	√
	b)Geophysical and UXO field teams will be tested through the GPO prior to commencing actual field operations.	APPENDIX_B_GPO_Certifications.xls	√	√	√	√	√	√
QC Step II	a)Teams performing geophysical and intrusive UXO work at project field sites were successfully GPO certified for the entire time that they performed the field work leading to the completion of clearance activities in an AOC grid.	APPENDIX_B_GPO_Certifications.xls	√	√	√	√	√	√
	b)Grid corners are certified as being placed in the correct location(s).	APPENDIX_C_GRID_STAKE_Verification.xls and APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	c)QC surveillance forms for Geophysical and UXO field teams have documented that each team has followed the appropriate SOP for the fieldwork being conducted.	APPENDIX_F_Initial_FollowUP QC Inspection.xls	√	√	√	√	√	√
	d)The entire AOC grid has been geophysically surveyed by an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	e)All blind seeds were identified in the geophysical survey and properly reacquired.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	f)Inspection of UXO dig sheets to verify that all target anomalies have been investigated.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	g)All MEC items found in an AOC grid have been properly disposed.	Appendix F: 2008 MEC_Data.xls and 2009 MEC Accountability Log.pdf	√	√	√	√	√	√
	h)All grids within an AOC have been completed prior to submission of AOC documentation to the AOC Certification Board, which will certify completion of the RA objectives.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
QC Step III	a)Independent verification of the DGM target list.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	b)Additionally, the last lane of each grid will be recollected in the opposite direction to examine the precision of the geophysical data (signal strength) and to check for positional accuracy.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
QC Step IV	a)An SOP specific Follow-Up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting MEC clearance and MC-contaminated soil removal operations in accordance with the approved procedures. WS #35 of the MEC and MC QAPPs provides the frequency of inspection for the DFW.	APPENDIX_G_Initial_FollowUP QC Inspection.xls, APPENDIX H, File: DN Log.doc	√	√	√	√	√	√
QC Step V	a)The UXOQCS (or his designee) checks each no-find to ensure that no target was missed.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	b)Randomly select 5 percent of the identified geophysical anomalies within the grid for post-clearance verification. The UXOQCS and his/her team will physically reinvestigate each of these locations using a DGPS and Vallon to ensure that the anomaly has been completely removed.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√
	c)After 10 contiguous grids (or more grids if the combined area is 10 acres or less) have been completed, those grids (and any additional step-outs adjacent to the grids) will be designated a completed UoP. Based on the total number of anomalies in the UoP, and using Tables I and II from MIL-STD-1916, the desired number of QC samples will be determined. Initially Verification Level III will be used; this may be tightened or reduced based on site specific performance results.	APPENDIX_D_Grid Data QC_QA.xls	√	√	√	√	√	√

2.4.1 MM-10G: UOP 1. MM-10G: UOP 1 is comprised of 11 grids as shown on Figure 2-43.

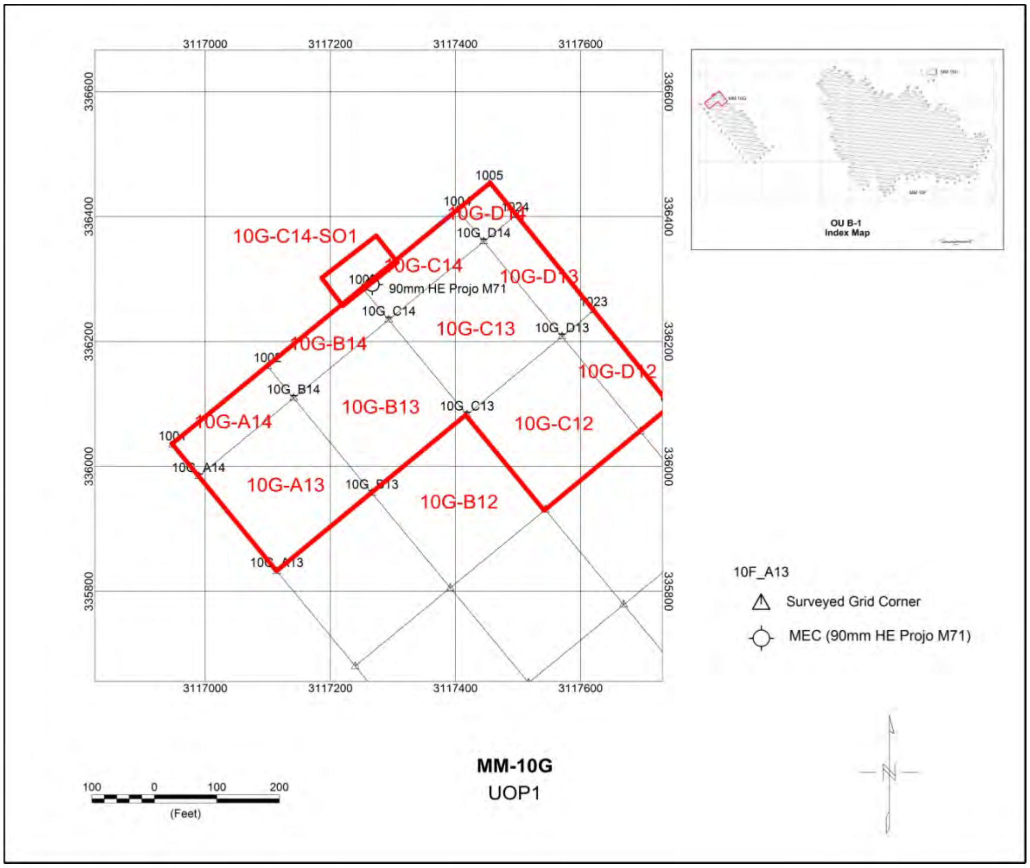

Figure 2-43. MM-10G, UOP1

Table 2-43 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-43. DGM and UXO Field Teams That Worked MM-10G: UOP1

Grid	DGM Crew	Date	UXO Team	Date
A13	GEO 4	8/4/2008	UXO1	8/10/2009
A14	GEO 4	8/4/2008	UXO3	8/28/2008
B13	GEO 4	8/5/2008	UXO3	9/1/2008
B14	GEO 4	8/5/2008	UXO3	9/1/2008
C12	GEO 4	8/1/2008	UXO3	9/2/2008
C13	GEO 4	8/7/2008	UXO1	8/10/2009
C14	GEO 4	8/6/2008	UXO3	9/2/2008
C14-SO1	GEO 1	8/8/2009	UXO1	8/19/2009
D12	GEO 3	7/29/2008	UXO2	8/8/2008
D13	GEO 3	7/29/2008	UXO2	8/8/2008
D14	GEO 3	7/29/2008	UXO2	8/8/2008

Additional discussion of Worksheet #36 for MM-10G: UOP1 follows:

- QC Step IIg: One MEC item (90 mm HE Projo M71) was found in Grid C14 in this UoP. This item was consolidated in Grid D11 and disposed on September 6, 2008. This MEC item triggered a step-out (C12-SO1) which was completed in the 2009 field season. No additional MEC was found in this step-out.
- There were no NCRs associated with this UoP.

2.4.2 MM-10G: UOP 2. MM-10G: UOP 2 is comprised of 11 grids as shown on Figure 2-44.

Table 2-44 shows the DGM and UXO field teams that conducted work on this UoP. Additional discussion of Worksheet #36 for MM-10G: UOP2 follows:

- QC Step IIg: Four MEC items were found in this UoP. In Grid A12, a 90 mm HE Projo M71 was found. In Grid B11, two 75 mm HE with fuze boosters were found. In Grid D11, a 90 mm HE Projo M71 was found. The 90 mm found in Grid A12 was blown in place on September 6, 2008. The two 75 mm found in Grid B11 were consolidated to Grid B02 and disposed on August 22, 2009. The 90 mm found in Grid D11 was blown in place on September 6, 2008. The 90 mm found in Grid D11 triggered a step-out (D11-SO1) which was completed in the 2009 field season. No additional MEC was found in this step-out.
- There were no NCRs associated with this UoP.

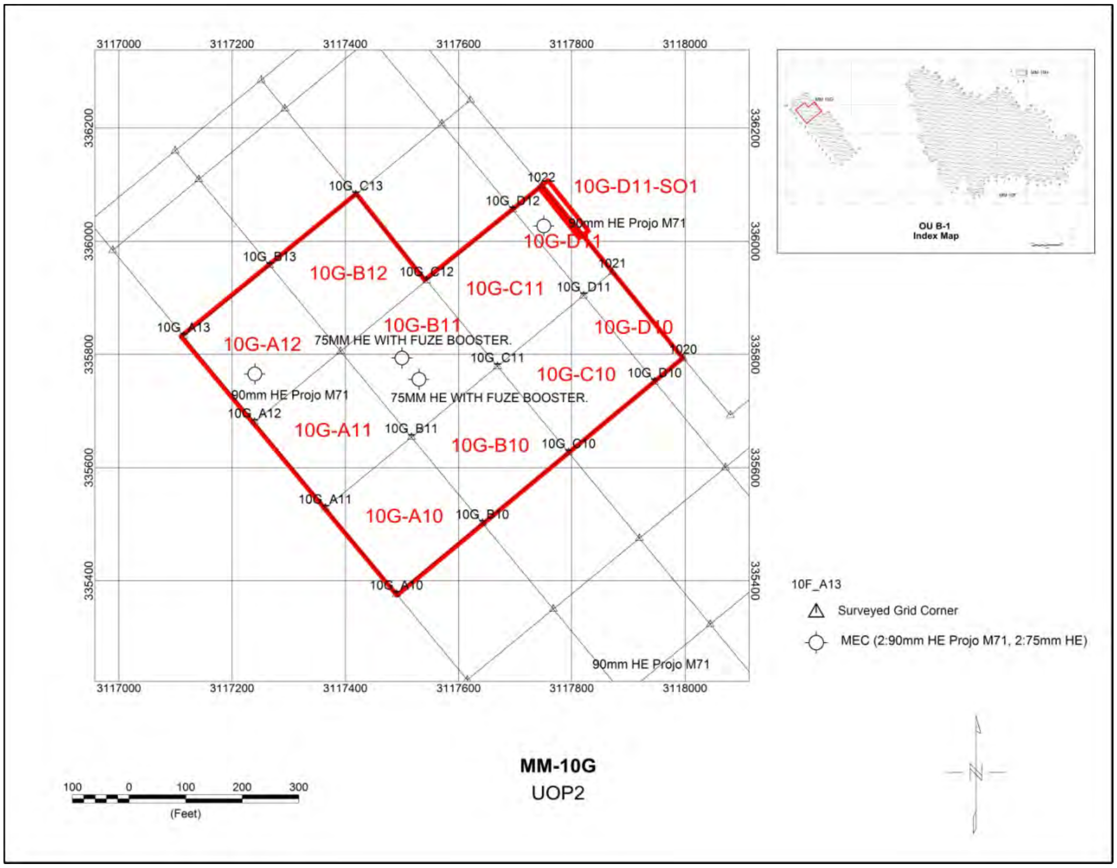

Figure 2-44. MM-10G, UOP2

Table 2-44. DGM and UXO Field Teams That Worked MM-10G: UOP2

Grid	DGM Crew	Date	UXO Team	Date
A10	GEO 1	8/14/2008	UXO2	8/10/2009
A11	GEO 1	8/13/2008	UXO2	8/10/2009
A12	GEO 4	8/5/2008	UXO3	8/28/2008
B10	GEO 6	8/16/2008	UXO1	8/18/2009
B11	GEO 4	8/11/2008	UXO2	8/13, 8/14, 8/15, 8/17, 8/18, 8/19/2009
B12	GEO 4	8/7/2008	UXO1	8/10/2009
C10	GEO 3	8/14/2008	UXO1	8/17/2009
C11	GEO 3	7/30/2008	UXO1	8/19/2009
D10	GEO 4	7/31/2008	UXO3	9/3/2008
D11	GEO 4	8/1/2008	UXO3	9/3/2008
D11-SO1	GEO 1	8/8/2009	UXO1	8/19/2009

2.4.3 MM-10G: UOP 3. MM-10G: UOP 3 is comprised of 10 grids as shown on Figure 2-45.

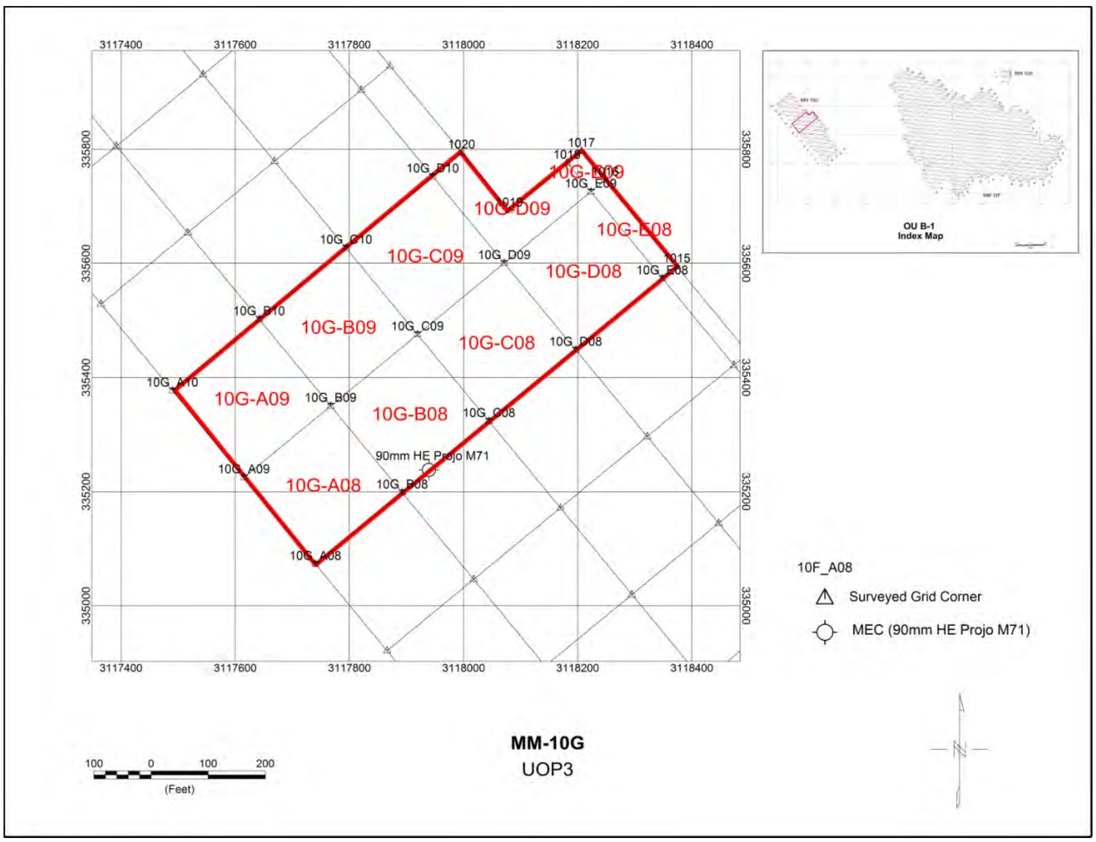

Figure 2-45. MM-10G, UOP3

Table 2-45 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-45. DGM and UXO Field Teams That Worked MM-10G: UOP3

Grid	DGM Crew	Date	UXO Team	Date
A08	GEO 1	8/14/2008	UXO1	8/12/2009
A09	GEO 1	8/14/2008	UXO2	8/10/2009
B08	GEO 6	8/6/2008	UXO3	9/4/2008
B09	GEO 6	8/5/2008	UXO1	8/17/2009
C08	GEO 6	8/4/2008	UXO3	9/4/2008
C09	GEO 6	8/5/2008	UXO3	9/3/2008
D08	GEO 6	8/4/2008	UXO3	9/4/2008
D09	GEO 6	8/13/2008	UXO3	9/3/2008
E08	GEO 6	8/4/2008	UXO3	9/4/2008
E09	GEO 4	8/13/2008	UXO1	8/15/2009

Additional discussion of Worksheet #36 for MM-10G: UOP3 follows:

- QC Step IIg: One MEC item was found in this UoP. In Grid B08, a 90 mm HE Projo M71 was found. This item was consolidated in Grid A12 and disposed on September 6, 2008.
- There were no NCRs associated with this UoP.

2.4.4 MM-10G: UOP 4. MM-10G: UOP 4 is comprised of 10 grids as shown on Figure 2-46.

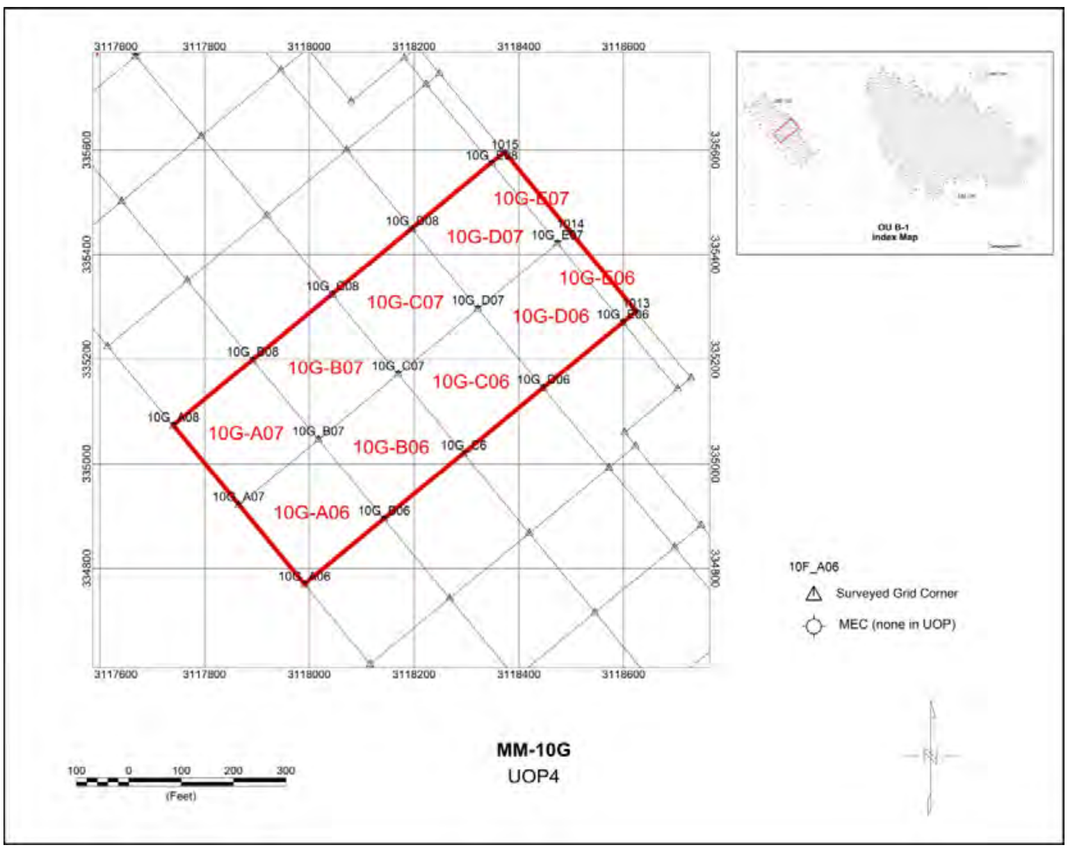

Figure 2-46. MM-10G, UOP4

Table 2-46 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-46. DGM and UXO Field Teams That Worked MM-10G: UOP4

Grid	DGM Crew	Date	UXO Team	Date
A06	GEO 1	8/16/2008	UXO1	8/14/2009
A07	GEO 1	8/15/2008	UXO1	8/12/2009
B06	GEO 6	8/16/2008	UXO4	9/3/2008
B07	GEO 6	8/12/2008	UXO1	8/14/2009
C06	GEO 3	7/28/2008	UXO2	8/5/2008
C07	GEO 6	8/2/2008	UXO3, UXO4	9/3, 9/4/2008
D06	GEO 6	7/31/2008	UXO4	9/2/2008
D07	GEO 6	8/1/2008	UXO3	9/4/2008
E06	GEO 6	7/31/2008	UXO1	8/15/2009
E07	GEO 6	8/1/2008	UXO1	8/15/2009

Additional discussion of Worksheet #36 for MM-10G: UOP4 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs associated with this UoP.

2.4.5 **MM-10G: UOP 5.** MM-10G: UOP 5 is comprised of 11 grids as shown on Figure 2-47.

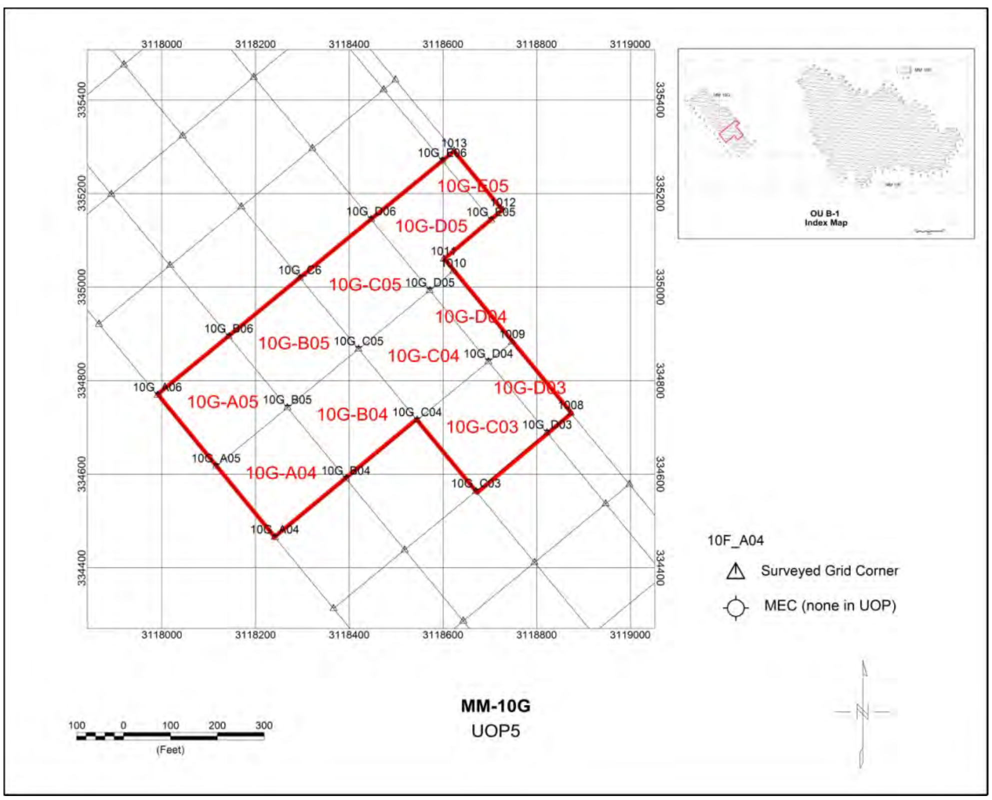

Figure 2-47. MM-10G, UOP5

Table 2-47 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-47. DGM and UXO Field Teams That Worked MM-10G: UOP5

Grid	DGM Crew	Date	UXO Team	Date
A04	GEO 6	7/21/2008	UXO3	8/29, 8/30/2008
A05	GEO 6	7/30/2008	UXO4	9/1/2008
B04	GEO 6	7/28/2008	UXO1	8/14/2009
B05	GEO 6	8/14/2008	UXO3	8/30/2008
C03	GEO 6	7/22/2008	UXO2	8/6/2008
C04	GEO 6	7/22/2008	UXO2	8/5/2008
C05	GEO 6	8/13/2008	UXO3	8/29/2008
D03	GEO 6	7/22/2008	UXO2	8/7, 8/8/2008
D04	GEO 6	7/22/2008	UXO2	8/8/2008
D05	GEO 6	7/31/2008	UXO1	8/15, 8/17/2009
E05	GEO 6	7/31/2008	UXO1	8/15/2009

Additional discussion of Worksheet #36 for MM-10G: UOP5 follows:

- QC Step IIg: No MEC items were found in this UoP.
- There were no NCRs associated with this UoP.

2.4.6 MM-10G: UOP 6. MM-10G: UOP 6 is comprised of 10 grids as shown on Figure 2-48.

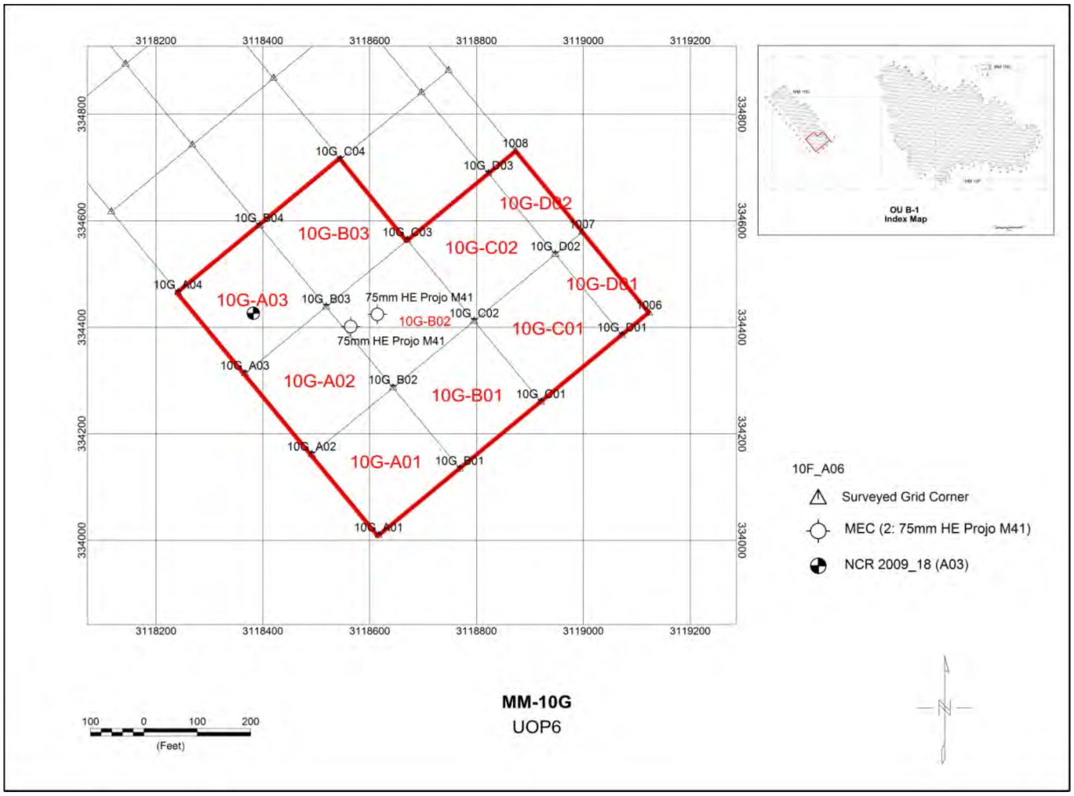

Figure 2-48. MM-10G, UOP6

Table 2-48 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-48. DGM and UXO Field Teams That Worked MM-10G: UOP6

Grid	DGM Crew	Date	UXO Team	Date
A04	GEO 6	7/21/2008	UXO3	8/29, 8/30/2008
A05	GEO 6	7/30/2008	UXO4	9/1/2008
B04	GEO 6	7/28/2008	UXO1	8/14/2009
B05	GEO 6	8/14/2008	UXO3	8/30/2008
C03	GEO 6	7/22/2008	UXO2	8/6/2008
C04	GEO 6	7/22/2008	UXO2	8/5/2008
C05	GEO 6	8/13/2008	UXO3	8/29/2008
D03	GEO 6	7/22/2008	UXO2	8/7, 8/8/2008
D04	GEO 6	7/22/2008	UXO2	8/8/2008
D05	GEO 6	7/31/2008	UXO1	8/15, 8/17/2009
E05	GEO 6	7/31/2008	UXO1	8/15/2009

Additional discussion of Worksheet #36 for MM-10G: UOP6 follows:

- QC Step IIg: Two MEC items were found in this UoP. Both MEC items were 75 mm HE Projo M41 and found in Grid B02. Both items were consolidated within Grid B02 and disposed on August 22, 2009.
- Grid A03 was the subject of NCR 2009_18. This NCR was issued because the grid failed QA in accordance with the failure criteria. Failure was attributed to the discovery of four pieces of frag (including one that measures 5.5 × 2 inches which is larger than a 37 mm projectile) found while investigating a QA DGM target which displayed a response of 36.29 mV (above the 4.4 mV GPO threshold). This location matches closely with the contractor grid Target 10G-A03-005 which had a mV amplitude of 59.37. This NCR was closed on its merits. A high percentage (35%) of the remaining targets was checked by QC/QA without additional failures, and both QC/QA seeds were detected and recovered. Additional discussion of this NCR is provided in Part Four (NCR Resolution Document), Section 23.

2.5 AOC Certification (Worksheet #36 Compliance) for AOC MM-10H

AOC MM-10H is comprised of one UoP (#1). The completed Worksheet #36 for this AOC is provided below. Additional information on the UoP is provided in the section following the worksheet.

Adak MM-10H WS#36 Compliance Matrix			UOP
QC Step	Items to be checked/verified	Reference Documents (Summary Spreadsheets)	1
QC Step I	a)Preparatory Phase Checklist for Training, Personnel Qualifications and Equipment status.	APPENDIX_A_2008-2010_Training Matrix.xls, APPENDIX_E_Preparatory QC Inspections.xls	√
	b)Geophysical and UXO field teams will be tested through the GPO prior to commencing actual field operations.	APPENDIX_B_GPO_Certifications.xls	√
QC Step II	a)Teams performing geophysical and intrusive UXO work at project field sites were successfully GPO certified for the entire time that they performed the field work leading to the completion of clearance activities in an AOC grid.	APPENDIX_B_GPO_Certifications.xls	√
	b)Grid corners are certified as being placed in the correct location(s).	APPENDIX_C_GRID_STAKE_Verification.xls and APPENDIX_D_Grid Data QC_QA.xls	√
	c)QC surveillance forms for Geophysical and UXO field teams have documented that each team has followed the appropriate SOP for the fieldwork being conducted.	APPENDIX_F_Initial_FollowUP QC Inspection.xls	√
	d)The entire AOC grid has been geophysically surveyed by an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.	APPENDIX_D_Grid Data QC_QA.xls	√
	e)All blind seeds were identified in the geophysical survey and properly reacquired.	APPENDIX_D_Grid Data QC_QA.xls	√
	f)Inspection of UXO dig sheets to verify that all target anomalies have been investigated.	APPENDIX_D_Grid Data QC_QA.xls	√
	g)All MEC items found in an AOC grid have been properly disposed.	Appendix F: 2008 MEC_Data.xls and 2009 MEC Accountability Log.pdf	√
	h)All grids within an AOC have been completed prior to submission of AOC documentation to the AOC Certification Board, which will certify completion of the RA objectives.	APPENDIX_D_Grid Data QC_QA.xls	√
QC Step III	a)Independent verification of the DGM target list.	APPENDIX_D_Grid Data QC_QA.xls	√
	b)Additionally, the last lane of each grid will be recollected in the opposite direction to examine the precision of the geophysical data (signal strength) and to check for positional accuracy.	APPENDIX_D_Grid Data QC_QA.xls	√
QC Step IV	a)An SOP specific Follow-Up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting MEC clearance and MC-contaminated soil removal operations in accordance with the approved procedures. WS #35 of the MEC and MC QAPPs provides the frequency of inspection for the DFW.	APPENDIX_G_Initial_FollowUP QC Inspection.xls, APPENDIX H, File: DN Log.doc	√
QC Step V	a)The UXOQCS (or his designee) checks each no-find to ensure that no target was missed.	APPENDIX_D_Grid Data QC_QA.xls	√
	b)Randomly select 5 percent of the identified geophysical anomalies within the grid for post-clearance verification. The UXOQCS and his/her team will physically reinvestigate each of these locations using a DGPS and Vallon to ensure that the anomaly has been completely removed.	APPENDIX_D_Grid Data QC_QA.xls	√
	c)After 10 contiguous grids (or more grids if the combined area is 10 acres or less) have been completed, those grids (and any additional step-outs adjacent to the grids) will be designated a completed UoP. Based on the total number of anomalies in the UoP, and using Tables I and II from MIL-STD-1916, the desired number of QC samples will be determined. Initially Verification Level III will be used; this may be tightened or reduced based on site specific performance results.	APPENDIX_D_Grid Data QC_QA.xls	√

2.5.1 MM-10H: UOP 1. MM-10H: UOP 1 is comprised of five grids (four initial grids with one step-out) as shown on Figure 2-49.

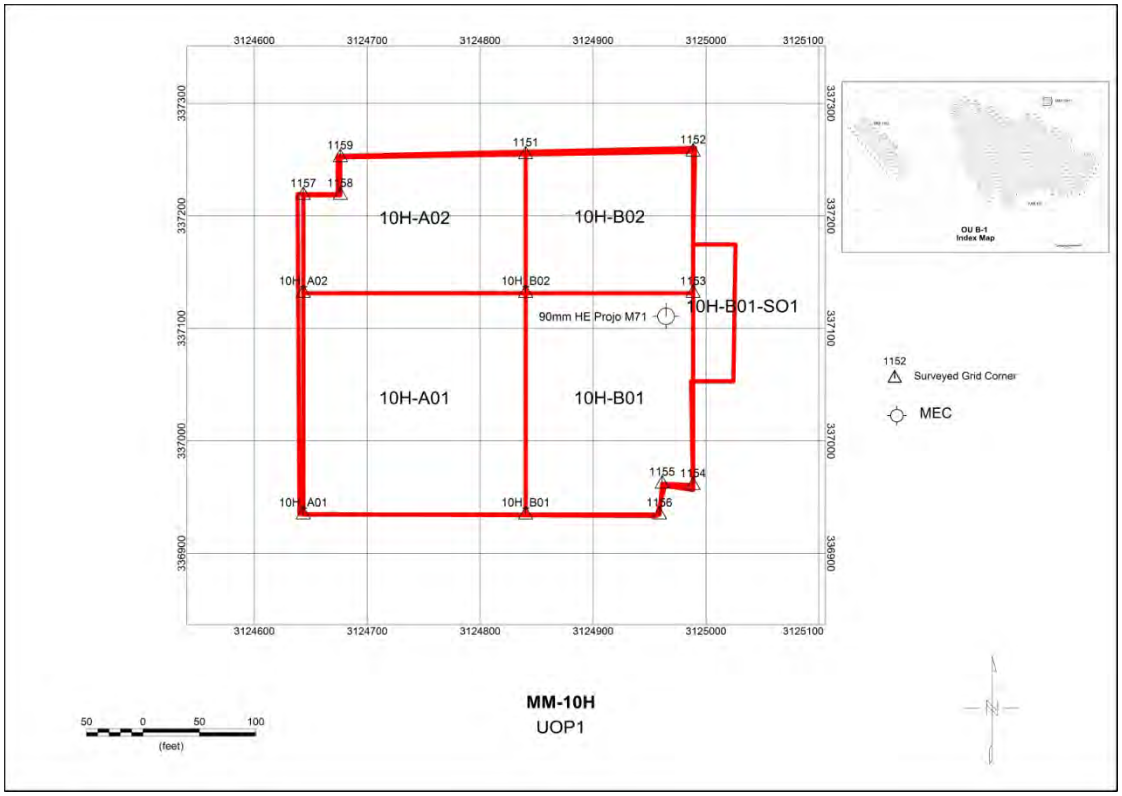

Figure 2-49. MM-10H, UOP1

Table 2-49 shows the DGM and UXO field teams that conducted work on this UoP.

Table 2-49. DGM and UXO Field Teams That Worked MM-10H: UOP1

Grid	DGM Crew	Date	UXO Team (Year)	Date
A01	GEO 6	6/23, 6/24/2008	UXO3 (2008)	7/10, 7/11, 7/12, 7/14/2008
A02	GEO 6	6/23, 6/24/2008	UXO1 (2008)	7/10, 7/11/2008
B01	GEO 6	6/23/2008	UXO2 (2008)	7/11, 7/12, 7/14/2008
B02	GEO 6	6/23/2008	UXO2 (2008)	7/9, 7/10/2008
B01-SO1	GEO 1	8/28/2009	UXO5 (2009)	8/11/2009

Additional discussion of Worksheet #36 for MM-10H: UOP1 follows:

- QC Step IIg: APPENDIX F, file 2008 MEC_Data.xls shows that one MEC item (90 mm HE Projo M71) was discovered in Grid B01. This MEC item was blown in place on July 22, 2008.
- There were no NCRs issued by QA for specific failures in this UoP.

2.6 Worksheet 37- (Usability Assessment-AOC Certification Checklist) for AOCs MM-10F, MM-10G and MM-10H

Worksheet #37, showing compliance with QC Steps I, II, III, IV, and V for AOCs MM-10F, MM-10G and MM-1H, is provided on the following pages. These worksheets show that the requirements in Worksheet #37 have been met and that AOC certification has been approved.

WS#37 Adak MM-10F AOC/UOP Certification Checklist

QC Step	Items to be checked/verified	UoP1	UoP2	UoP3	UoP4	UoP5	UoP6	UoP7	UoP8	UoP9	UoP10	UoP11	UoP12	UoP13	UoP14	UoP15	UoP16	UoP17	UoP18	UoP19	UoP20	UoP21	UoP22	UoP23	UoP24	UoP25	UoP26	UoP27	UoP28	UoP29	UoP30	UoP31	UoP32	UoP33	UoP34	UoP35	UoP36	UoP37	UoP38	UoP39	UoP40
QC Step I	Verified Qualifications/Training Checklist has been completed for all personnel.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have the TMP, MEC QAPP and APP been reviewed by UXO Teams during the preparatory phase?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have Personnel Certification Qualifications been documented for UXO teams?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies found in the Preparatory Phase checklist have been corrected prior to Initial Phase Inspections for UXO teams.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verified Preparatory Phase 1 Checklist has been completed for all DFWs/SOPs.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have the TMP, MEC QAPP and APP plan been reviewed by GEO teams during the preparatory phase?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have Personnel Certification Qualifications been documented for GEO teams?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies found in the Preparatory Phase 1 checklist have been corrected prior to initial Phase Inspections for GEO teams.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verification of UXO Team(s) GPO Certification.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verification of GEO Team(s) GPO Certification.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Signatures on appropriate documents (SOPs, forms, etc.)?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step II	Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the UXO team(s).	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have all personnel assigned to the UXO team been GPO Certified?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have all equipment assigned to the UXO team been GPO Certified?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verification that the initial and follow-up three-phase quality control checklists have been completed for GEO team(s).	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the GEO team(s).	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have all personnel assigned to the GEO team been GPO certified?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Have all equipment assigned to the GEO team been GPO certified?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step III	Verified that the GEOQCA re-processed random 5 percent of grid geophysical pick lists.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verified that the Project Geophysicist compared QC and GEO targets.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies have been investigated and the results have been documented.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Appropriate actions have been taken by the PQCM regarding the results of the QC Phase III investigation.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step IV	Verification of follow-up checklist or quality control surveillances have been completed for UXO teams.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies found in the follow-up three-phase quality control checklist or quality control surveillances have been corrected and documented.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Verify that surveillances in the MEC QAPP were completed?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
QC Step V	If non-conforming units were found, corrective actions followed the MEC QAPP.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies corrected and surveillances written.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	GEO Review sample population meets MIL STD 1916 VL III sample size.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	QA Phase V GEO Random Sampling inspection samples were identified and investigated.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Discrepancies have been investigated and the results have been documented for the Phase V surveillance.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

See Worksheets #36 in Section 2.3 for QC Step Verfication Details

WS#37 Adak MM-10G AOC/UOP Certification Checklist							
QC Step	Items to be checked/verified	UoP1	UoP2	UoP3	UoP4	UoP5	UoP6
QC Step I	Verified Qualifications/Training Checklist has been completed for all personnel.	√	√	√	√	√	√
	Have the TMP, MEC QAPP and APP been reviewed by UXO Teams during the preparatory phase?	√	√	√	√	√	√
	Have Personnel Certification Qualifications been documented for UXO teams?	√	√	√	√	√	√
	Discrepancies found in the Preparatory Phase checklist have been corrected prior to Initial Phase Inspections for UXO teams.	√	√	√	√	√	√
	Verified Preparatory Phase 1 Checklist has been completed for all DFWs/SOPs.	√	√	√	√	√	√
	Have the TMP, MEC QAPP and APP plan been reviewed by GEO teams during the preparatory phase?	√	√	√	√	√	√
	Have Personnel Certification Qualifications been documented for GEO teams?	√	√	√	√	√	√
	Discrepancies found in the Preparatory Phase 1 checklist have been corrected prior to initial Phase Inspections for GEO teams.	√	√	√	√	√	√
	Verification of UXO Team(s) GPO Certification.	√	√	√	√	√	√
	Verification of GEO Team(s) GPO Certification.	√	√	√	√	√	√
	Signatures on appropriate documents (SOPs, forms, etc.)?	√	√	√	√	√	√
QC Step II	Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).	√	√	√	√	√	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the UXO team(s).	√	√	√	√	√	√
	Have all personnel assigned to the UXO team been GPO Certified?	√	√	√	√	√	√
	Have all equipment assigned to the UXO team been GPO Certified?	√	√	√	√	√	√
	Verification that the initial and follow-up three-phase quality control checklists have been completed for GEO team(s).	√	√	√	√	√	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the GEO team(s).	√	√	√	√	√	√
	Have all personnel assigned to the GEO team been GPO certified?	√	√	√	√	√	√
	Have all equipment assigned to the GEO team been GPO certified?	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√
QC Step III	Verified that the GEOQCA re-processed random 5 percent of grid geophysical pick lists.	√	√	√	√	√	√
	Verified that the Project Geophysicist compared QC and GEO targets.	√	√	√	√	√	√
	Discrepancies have been investigated and the results have been documented.	√	√	√	√	√	√
	Appropriate actions have been taken by the PQCM regarding the results of the QC Phase III investigation.	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√
QC Step IV	Verification of follow-up checklist or quality control surveillances have been completed for UXO teams.	√	√	√	√	√	√
	Discrepancies found in the follow-up three-phase quality control checklist or quality control surveillances have been corrected and documented.	√	√	√	√	√	√
	Verify that surveillances in the MEC QAPP were completed?	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√
QC Step V	If non-conforming units were found, corrective actions followed the MEC QAPP.	√	√	√	√	√	√
	Discrepancies corrected and surveillances written.	√	√	√	√	√	√
	GEO Review sample population meets MIL STD 1916 VL III sample size.	√	√	√	√	√	√
	QA Phase V GEO Random Sampling inspection samples were identified and investigated.	√	√	√	√	√	√
	Discrepancies have been investigated and the results have been documented for the Phase V surveillance.	√	√	√	√	√	√
	Signatures on appropriate documents?	√	√	√	√	√	√
	See Worksheets #36 in Section 2.4 for QC Step Verfication Details						

WS#37 Adak MM-10H AOC/UOP Certification Checklist

QC Step	Items to be checked/verified	UoP1
QC Step I	Verified Qualifications/Training Checklist has been completed for all personnel.	√
	Have the TMP, MEC QAPP and APP been reviewed by UXO Teams during the preparatory phase?	√
	Have Personnel Certification Qualifications been documented for UXO teams?	√
	Discrepancies found in the Preparatory Phase checklist have been corrected prior to Initial Phase Inspections for UXO teams.	√
	Verified Preparatory Phase 1 Checklist has been completed for all DFWs/SOPs.	√
	Have the TMP, MEC QAPP and APP plan been reviewed by GEO teams during the preparatory phase?	√
	Have Personnel Certification Qualifications been documented for GEO teams?	√
	Discrepancies found in the Preparatory Phase 1 checklist have been corrected prior to initial Phase Inspections for GEO teams.	√
	Verification of UXO Team(s) GPO Certification.	√
	Verification of GEO Team(s) GPO Certification.	√
	Signatures on appropriate documents (SOPs, forms, etc.)?	√
QC Step II	Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the UXO team(s).	√
	Have all personnel assigned to the UXO team been GPO Certified?	√
	Have all equipment assigned to the UXO team been GPO Certified?	√
	Verification that the initial and follow-up three-phase quality control checklists have been completed for GEO team(s).	√
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the GEO team(s).	√
	Have all personnel assigned to the GEO team been GPO certified?	√
	Have all equipment assigned to the GEO team been GPO certified?	√
	Signatures on appropriate documents?	√
QC Step III	Verified that the GEOQCA re-processed random 5 percent of grid geophysical pick lists.	√
	Verified that the Project Geophysicist compared QC and GEO targets.	√
	Discrepancies have been investigated and the results have been documented.	√
	Appropriate actions have been taken by the PQCM regarding the results of the QC Phase III investigation.	√
	Signatures on appropriate documents?	√
QC Step IV	Verification of follow-up checklist or quality control surveillances have been completed for UXO teams.	√
	Discrepancies found in the follow-up three-phase quality control checklist or quality control surveillances have been corrected and documented.	√
	Verify that surveillances in the MEC QAPP were completed?	√
	Signatures on appropriate documents?	√
QC Step V	If non-conforming units were found, corrective actions followed the MEC QAPP.	√
	Discrepancies corrected and surveillances written.	√
	GEO Review sample population meets MIL STD 1916 VL III sample size.	√
	QA Phase V GEO Random Sampling inspection samples were identified and investigated.	√
	Discrepancies have been investigated and the results have been documented for the Phase V surveillance.	√
	Signatures on appropriate documents?	√
	See Worksheets #36 in Section 2.5 for QC Step Verfication Details	

Section 3.0: MUNITIONS CONSTITUENTS AOC DOCUMENTATION

3.1 Introduction

The following subsections provide documentation required by the approved MC QAPP (SAP) (Worksheets #35, #36 and #37) to satisfy certification of MC sampling in AOCs MM-10F and MM-10G. Worksheet #35 contains the Validation (Steps IIA and IIb) Process Table, Worksheet #36 contains the Validation (Steps II and IIb) Summary Table and Worksheet #37 provides the Usability Assessment. The following sections provide references to documentation validating compliance with each of the worksheets. These references are provided in the APPENDIX_I_MC_Data folder on the enclosed disk.

Section 3.2 provides some background information on the MC sampling conducted at the site. This background is necessary to understand the results in the subsequent sections, and this information was primarily extracted from the After Action Report (Part Two). Section 3.3 discusses Worksheet #35 Compliance and Deficiencies. Section 3.4 discusses Worksheet #36 Compliance and Deficiencies, and Section 3.5 discusses Worksheet #37 Compliance and Deficiencies.

3.2 Background

Two breeched munitions were found during this project (one in AOC MM-10F and one in AOC MM-10G), that required MC sampling as shown in Table 3-1.

Table 3-1. MC Sample Collection Locations at AOCs MM-10F and MM-10G

	Datum (NAD 1983 State Plane - Alaska 10, US ft) Northing	Easting	Sample ID	Medium	Sample Type	Sample Date	QC
MM-10F (grid E23, UOP06)	335393.25	3121596.75	MM-10F-SOIL-01	Soil	5-Point Composite	9/1/2009	
	335393.25	3121596.75	MM-10F-SOIL-02	Soil	5-Point Composite	9/1/2009	Field Duplicate
	Datum (NAD 1983 State Plane - Alaska 10, US ft) Northing	**Easting**	**Sample ID**	**Medium**	**Sample Type**	**Sample Date**	**QC**
MM-10G (grid B02, UOP06)	334401.8	3118565.77	MM-10G-SOIL-01	Soil	5-Point Composite	9/2/2009	
	(Conducted near the 5-point composite sample collected above)		MM-10G-SOIL-02	Excavated Soil	Grab	9/2/2009	

Field MC screening at the MM-10F location indicated that the soil surrounding the breeched munition was below the Soil Cleanup Levels (SCLs) specified in the MC QAPP. Two soil samples (shown above) were collected and sent to the laboratory for analysis to validate this finding.

Initial field MC screening at the MM-10G location showed trinitrotoluene (TNT) concentrations exceeding the SCL. This prompted soil excavation and re-screening until the field screening indicated that the in situ TNT concentration was below the SCL. Following the excavation and re-screening, soil samples were collected (shown above) and sent to the lab for analysis. These samples presumably would verify that all contaminated soil was removed and that remaining soils were below the SCL.

Laboratory results from the samples are provided in Table 3-2.

Table 3-2. Summary of Analytical Results

Sample ID	Medium	Sample Type	Action Level (mg/kg)	Concentration of Detected Analytes (mg/kg)
MM-10F-SOIL-01	Soil	5-Point Composite	Tetryl- 610	Tetryl – 0.24 J
MM-10F-SOIL-02	Soil	5-Point Composite	2,4,6 TNT- 18	2,4,6-TNT – 0.13 J
MM-10G-SOIL-01	Soil	5-Point Composite	1,3,5-trinitrobenzene – N/A 2,4,6-TNT – 18 2-amino-4,6-dinitrotoluene – 0.029 4-amino-2,6-dinitrotoluene – 0.029 Tetryl – 610	1,3,5-trinitrobenzene – 0.11 J 2,4,6-TNT – **53** 2-amino-4,6-dinitrotoluene – **0.27 J** 4-amino-2,6-dinitrotoluene – **0.38 J** Tetryl – 0.79 J
MM-10G-SOIL-02	Excavated Soil	Grab	1,3,5-trinitrobenzene – N/A 2,4,6-TNT – 18 2-amino-4,6-dinitrotoluene – 0.029 4-amino-2,6-dinitrotoluene – 0.029	1,3,5-trinitrobenzene – 0.12 J 2,4,6-TNT – **110** 2-amino-4,6-dinitrotoluene – **0.49 J** 4-amino-2,6-dinitrotoluene – **0.69 J**

J – estimated concentrations
mg/kg – milligrams per kilogram
Yellow highlighted values exceed the action level.

This table shows that the soil samples taken at the MM-10F breeched munition were confirmed to be below the action level defined in the MC QAPP. However, both soil samples taken at the MM-10G location (cleared during field sampling) exceeded action levels. After discussion between representatives of the contractor, Navy, U.S. Environmental Protection Agency (U.S. EPA), and Alaska Department of Environmental Conservation (ADEC), it was determined that additional sampling or soil excavation was not necessary at the MM-10G location. Worksheet #36 reflects this deficiency between the MC QAPP SCL and actual (exceeded) contamination level at the MM-10G site. To alleviate this deficiency, documentation is provided in Appendix I (ADEC EMAIL_28Sept2009.pdf) that shows the parties agreed to this deviation.

3.3 Worksheet #35 Compliance and Deficiencies

Worksheet #35 (Validation [Steps IIa and IIb] Process Table) describes and confirms the processes to be followed to validate project data. It is divided into two subparts:

- Step IIa assesses and documents compliance with methods, procedures and contracts.
- Step IIb assesses and documents a comparison with measurement performance criteria (MPC) in the QAPP.

Table 3-3 shows the Worksheet #35 components as listed in the MC QAPP. This table also shows QC (or other) documentation (Validation Documentation) that satisfies the Validation Input criteria in the table. Yellow shaded entries in this table (Validation Documentation) indicate deficiencies in QC (or other party) records.

This table shows that there are no QC records that validate a review of the on-site analytical work against the MC QAPP requirements (Validation Input: On-site analytic work). This deficiency is not serious as the follow-on components (Laboratory testing in Worksheet #36) were used to validate the onsite analytic data. Therefore, there is no impact to the data validation process.

3.4 Worksheet #36 Compliance and Deficiencies

Worksheet #36 (Validation [Steps II and IIb] Summary Table) identifies the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data. It is divided into two subparts:

- Step IIa assesses and documents compliance with methods, procedures and contracts.
- Step IIb assesses and documents a comparison with MPC in the QAPP.

Table 3-4 shows the Worksheet #36 components as listed in the MC QAPP. This table also shows QC (or other) documentation (Validation Documentation) that satisfies the Validation Criteria in the table. Some of the Validation Criteria reference additional worksheets in the MC QAPP, and a brief discussion of these additional worksheets is provided below:

- Worksheet #11 is a text discussion of the PQOs in terms of type, quantity, and quality of data determined using a systematic planning process.
- Worksheet #12 is a Measurement Performance Criteria Table, and identifies the data quality indicators, MPC, and the QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems.
- Worksheet #15 is a Reference Limits and Evaluation Table and identifies the target analytes/contaminants of concern and project-required action limits.
- Worksheet #19 is an Analytic SOP Requirements Table and lists the analytical and preparation method/SOP and associated sample volume, container specifications, preservation requirements, and maximum holding time.
- Worksheet #24 is the Analytical Instrument Calibration Table and identifies all analytical instruments, calibration requirements, and the SOP reference for each.
- Worksheet #28 is the QC Samples Table and details the MPC and methods for Lab QC Samples for the appropriate analytical group.

Yellow shaded entries in this table (Validation Documentation) indicate deficiencies in validation criteria.

Table 3-3. Worksheet #35 Components and QC Validation Documentation

MC QAPP Worksheet #35-Validation (Steps IIa and IIb) Process Table

Validation Input	Description	Responsible for Validation (Name, Organization)	Validation Documentation
SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed and that any deviations were noted/approved.	EODT's Project Superintendent or designee	2009-08-31_Training_for_Clarus.pdf
SOPs	Determine potential impacts from noted/approved deviations, in regard to project requirements.	EODT's Program QC Officer and Project Chemist	2009-08-31_Training_for_Clarus.pdf
COC	Examine COC forms against project requirements (analytical methods, sample identification, etc.).	EODT's Project Chemist, data validation firm	DV Report_59703_Adak.pdf
On-site analytical work	All onsite analytical data will be reviewed against QAPP requirements for completeness and accuracy based on the field QC records. Second method results will be compared with on-site analytical results.	EODT's PQCM	No Record
Laboratory data package	Examine packages against project requirements and COC forms (holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	Data validation firm - TBD	DV Report_59703_Adak.pdf
Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to project requirements (e.g., precision/accuracy).	EODT's Project Chemist	DV Report_59703_Adak.pdf
Field duplicate results	Compare results of field duplicate sample analyses with RPD criteria.	Data validation firm	DV Report_59703_Adak.pdf

Table 3-4. Worksheet #36 Components and QC Validation Documentation

MC QAPP Worksheet #36-Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)	Validation Documentation
IIa/b	All	All	NA	QAPP Worksheets #11, 12, 19, and 28	To be determined	Adak_Total_Data_Package.pdf, DV Report_59703_Adak.pdf
IIa	Soil	Explosives and propellants by HPLC	Low	CLP Functional Guidelines Level III	To be determined	Adak_Total_Data_Package.pdf, DV Report_59703_Adak.pdf
IIa	Soil	TNT and RDX	Low	Verify the requirements of the manufacturers guidance document/SOP are met and SW 846 Methods 8515 and 8510	EODT PQCM	Adak_Total_Data_Package.pdf, DV Report_59703_Adak.pdf
IIb	Soil	Explosives and propellants by HPLC	Low	Verification of requirements in QAPP Worksheets #12, #15, #19, #24, and 28	To be determined	Adak_Total_Data_Package.pdf, DV Report_59703_Adak.pdf, ADEC EMAIL_28Sept2009.pdf
IIb	Soil	TNT and RDX	Low	Verification of requirements in QAPP Worksheets #12, #15, #19, #24, and 28	EODT PQCM	Adak_Total_Data_Package.pdf, DV Report_59703_Adak.pdf, ADEC EMAIL_28Sept2009.pdf

Table 3-4 shows that there are deficiencies noted for the following analytical groups: explosives and propellants by HPLC, and TNT and RDX. In both cases, there were discrepancies between the criteria in QAPP Worksheet #15 (Reference Limits and Evaluation Table) and the actual laboratory results for samples taken at the MM-10G location. Document EMAIL_28Sept2009.pdf in Appendix I shows that this deviation between the MC QAPP SCL and sample results was approved by the project team: excerpt from e-mail follows:

> *"Based on a review of this preliminary data ADEC does not feel additional soil removal and sampling is necessary. While the results indicate a slight exceedances of ADEC's 18 AAC 75.341 soil cleanup levels for TNT (53 ppm vs 36 ppm, Direct contact, over 40 inch zone). ADEC's Migration to Ground Water (MTGW) values are not applicable for this issue for various reasons. This slight exceedance does not indicate a threat to human health or the environment. The justification (isolated munition with finite explosive material, majority of explosives destroyed by detonation and some residual already removed, why MTGW is not applicable, etc.) for not conducting the additional sampling will need to be included in the report but we believe that this would be more efficient than remobilizing the sampling crew for additional removal and analysis."*

3.5 Worksheet #37 Compliance and Deficiencies

Worksheet #37 (Usability Assessment) determines the adequacy of the data based on the results of validation and verification for the decisions being made. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP. This Worksheet is provided in text discussions only in the MC QAPP and a table of the steps was not provided. To facilitate validation of this worksheet, the assessment categories were tabulated (Table 3-5) and references are provided to validate the worksheet.

This table shows that all QC components of Worksheet #37 Usability Assessment for MC have been approved.

Table 3-5. MC QAPP Worksheet #37-Usability Assessment Table

QC Category	Items to be Checked/Verified	MC Sampling MM-10F	MC Sampling MM-10G
Data Quality and Usability	Inspection of site/field logbooks	√	√
	Inspection of laboratory data packages and data validation reports	√	√
	Verify sampling and analytical results follow protocols and satisfy project requirements; and can be relied upon for attaining the project quality objectives.	√	√
	Assess data to determine effects of project requirement failures.	√	√
	Assess data to determine adequacy to fulfill site specific QA/QC requirements.	√	√
	Procedures used to assess QA/QC objectives are in accordance with the appropriate analytical methods which were originally selected to meet project goals.	√	√
Personnel Training and Experience	Data quality/usability and reconciliation evaluations performed by personnel with the appropriate training and/or experience.	√	√
	Evaluations performed by personnel with appropriate training and/or experience.	√	√

Table 3-5. MC QAPP Worksheet #37-Usability Assessment Table (Continued)

QC Category	Items to be Checked/Verified	MC Sampling MM-10F	MC Sampling MM-10G
Precision	Results of all laboratory duplicates presented separately in tabular format for each analysis.	√	√
	For each duplicate pair, the RPD will be calculated for each analyte whose original and duplicate values are either greater than or equal to the QL.	√	√
	The RPDs will be checked against the measurement performance criteria presented on Worksheet #12.	√	√
	The RPDs exceeding criteria will be identified on the tables. Additionally, the RPD of each analyte will be averaged across all duplicate pairs whose original and duplicate values are both greater than or equal to the QL, and the combined overall average RPD for each analysis will be calculated for the laboratory duplicates.	√	√
	A discussion will follow summarizing the results of the laboratory precision. Any conclusions about the precision of the analyses will be drawn and any limitations on the use of the data will be described.	√	√
Accuracy/Bias	Results for all laboratory method blanks and instrument blanks will be presented separately in tabular format for each analysis.	√	√
	The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12. Results for analytes that exceed criteria will be identified on the tables.	√	√
	A discussion summarizing the results of the laboratory accuracy/bias will be provided. Any conclusions about the accuracy/bias of the analyses based on contamination will be drawn and any limitations on the use of the data will be described.	√	√
Approvals:	Name:	Signature:	Date
	David Mayfield (EODT Project Manager)		
	John "Buddy" Murray (EODT Project Quality Control Manager)		
	Ashley Hansen (Clarus Chemical Sampling)		

Section 4.0: CONCLUSIONS AND RECOMMENDATIONS

The documentation provided in this AOC Certification Report (Part One) and supporting documents (Parts Two, Three, and Four) supports the conclusion that all detected MEC in accessible areas of AOCs MM-10F, MM-10G and MM-10H was removed to a depth of 4 ft below the mineral soil surface in accordance with the requirements of the OU B-1 ROD and project planning documents. All site performance criteria were completed and verified in accordance with Worksheets #36 and #37 of the MEC QAPP and Worksheets #35, #36 and #37 of the MC QAPP with only minor exceptions or exceedances (described below in Section 4.1) that did not impact the AOC certification process. All detected MEC was removed from accessible areas and a 15 m MEC-free buffer was established.

Supporting backup data are contained in the appendices to this report, the After Action Report (Part Two), the QA Summary Report (Part Three), and the NCR Resolution Document (Part Four). There were a total of 27 NCRs issued by Navy QA during the remedial action. Only five of these NCRs were due to failures defined in the QA Surveillance Plan (a MEC item or metal larger than a 37 mm and a DGM amplitude greater than 4.4 mV, or a missed QA seed). None of the NCRs were caused by discovery of a MEC item, and all of the NCRs were resolved, as discussed in the NCR Resolution Document (Part Four).

All site work met the remedial action requirements (stated in the OU B-1 ROD) as follows:

- Clearing the surface of metallic items for safety reasons and to minimize interference for the geophysical survey.
- Completing digital geophysical mapping on all accessible areas (i.e., areas except with standing water, areas with slopes greater than 30°, and areas with obstructions such as impassible rocks).
- Completing an intrusive investigation of all identified targets.
- Creating a 15 m safety buffer free of all MEC around the AOC.
- Properly managing and disposing of MEC and munitions debris from the project.

4.1 Evaluation of Remedial Action Effectiveness

An effective QC process was employed at the site. The Navy instituted a rigorous, independent QA process. All DGM data were first processed and targets picked by the contractor, then reviewed by an independent QC geophysicist, then independently, all DGM data were re-processed and targets re-picked by Navy QA. A total of 41,393 targets were selected in the 481 grids (476 primary grids plus five step-outs) comprising the primary AOCs. QC installed 476 QC blind seeds, and 473 (99%) were detected by the DGM survey teams, selected as target anomalies, reacquired in the field, and identified and recovered during intrusive investigation. The corrective actions for the three missed QC blind seeds are documented on the DN forms and logs discussed in this document and the AAR (Part Two).

Navy QA installed an additional 301 blind seeds and all of these seeds were also accounted for. Contractor QC re-checked 13,248 (32%) of the 41,393 targets selected and investigated at the site without finding any MEC. Navy QA re-checked more than 3,100 (7%) randomly selected targets of the 41,393 without finding any MEC. Statistical analysis using only the QA investigations at random targets (total of 3,101) indicates that there is an extremely low probability of any remaining MEC at the site.

This analysis shows a 99.999% certainty (confidence) that at least (a minimum of) 99.6% of all of the remaining DGM targets which have not been checked by QA do not contain MEC.

AOC certification was conducted in accordance with the MEC QAPP and MC QAPP and all requirements for final closeout of the site were completed. There were minor deficiencies noted in the MEC AOC certification process, mostly due to a few missed QC initial, preparatory and follow-up inspections. These deficiencies are not deemed significant to prohibit MEC certification. One deficiency was noted in the MC AOC certification process. Two breeched munitions were found at the site (one in MM-10F, and one in MM-10G) that required MC sampling: a discrepancy was noted between the criteria in QAPP Worksheet #15 (Reference Limits and Evaluation Table) and the actual laboratory results for samples taken at the MM-10G location. Documentation provided by ADEC shows that this deviation was approved by the project team (i.e., ADEC's Migration to Ground Water values are not applicable for this issue, as the remaining contamination does not indicate a threat to human health or the environment). The justification for this deviation was that this item was an "isolated munition with finite explosive material, majority of explosives destroyed by detonation and some residual already removed".

4.2 Evaluation of the Need for Further Action

All remedial activities in AOCs MM-10F, MM-10G and MM-10H have been completed and have met all the requirements of the OU B-1 ROD and NOSSAINST 8020.15A. This AOC certification document completes the remedial action for AOCs MM-10F, MM-10G and MM-10H required in the OU B-1 ROD.

4.3 Recommendations

Based on the AOC certifications provided in this document, no further action and close out is recommended for AOCs MM-10F, MM-10G and MM-10H. Information from this AOC certification document (and the other parts) will be added to the Remedial Action Completion Report for all OU B-1 AOCs, scheduled to begin upon stakeholder approval of this report.

FINAL

Adak OU B-1 Remedial Action Project Documentation

Part Two

Operable Unit B-1 AOCs MM-10F, MM-10G, and MM-10H Remedial Action Former Naval Air Facility Adak, Alaska

Contract No. N62473-07-D-4013
Task Order No. 023

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September 2012

CONTENTS

APPENDICES

(All appendices are included on DVD.)

FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

AAR	After Action Report
ADEC	Alaska Department of Environmental Conservation
AMNWR	Alaska Maritime National Wildlife Refuge
AOC	Area of Concern
AOPC	area of potential concern
APP	Accident Prevention Plan
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
ARAR	Applicable or Relevant and Appropriate Requirements
ATF	Bureau of Alcohol, Tobacco, and Firearms and Explosives
ATV	all-terrain vehicle
bgs	below ground surface
BIP	blow-in-place
BRAC	Base Realignment and Closure
BSI	Blind Seed Item
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CL	confidence level
COC	chain of custody
COPC	chemical of potential concern
CPR	Contractor Production Report
DDESB	Department of Defense Explosives Safety Board
DFW	definable feature of work
DGM	digital geophysical mapping
DGPS	differential global positioning system
DMM	discarded military munitions
DN	Deficiency Notice
DoD	Department of Defense
DQCR	Daily QC Report
DQO	data quality objective
ECC	Environmental Chemical Corporation
EDD	electronic data display
EOD	explosive ordnance disposal
EODT	EOD Technology, Inc.
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FCA	Function Check Area
FCR	Field Change Request
FFA	Federal Facilities Agreement
FTP	file transfer protocol
GIS	geographic information system
GPO	Geophysical Prove-out
GPS	global positioning system

HE	High Explosive
HPLC	High Performance Liquid Chromatography
LTA	Land Transfer Agreement
MC	munitions constituent
MD	munitions debris
MDAS	material documented as safe
MEC	munitions and explosives of concern
MedEvac	medical evacuation
MIS	multi-incremental sampling
MLLW	Mean Lower Low Water
MPPEH	material potentially presenting an explosive hazard
MRS	Munitions Response Site
MS/MSD	matrix spike/matrix spike duplicate
mV	millivolt
NAF	Naval Air Facility
NAS	Naval Air Station
NAVFAC NW	Naval Facilities Engineering Command Northwest
NCR	Non-Conformance Report
NMD	Non-Munitions Debris
NOSSA	Naval Ordnance Safety & Security Activity
NPL	National Priorities List
NSGA	Naval Security Group Activity
NTR	Navy Technical Representative
OAPC	observational approach and presumptive clearance
OE	Ordnance and Explosives
OU	Operable Unit
PA	Preliminary Assessment
Pd	probability of detection
PM	Project Manager
PPE	Personal Protective Equipment
PSE	Preliminary Source Evaluations
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCM	Quality Control Manager
QSM	Quality Systems Manual
RADWP	Remedial Action Design Work Plan
RAG	Remedial Action Goal
RAO	Remedial Action Objective
RDX	Hexahydro-1,3,5-Trinitro-1,3,5-trazine
RI/FS	Remedial Investigation/Feasibility Study
RLS	Registered Licensed Land Surveyor
ROD	Record of Decision
RPD	Relative Percent Difference

RPM	Remedial Project Manager
SAERA	State of Adak Environmental Restoration Agreement
SAP	Sampling and Analysis Plan
SCL	soil cleanup level
SI	Site Investigation
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TAC	The Aleut Corporation
TFU	Thermal Flashing Unit
TMP	Technical Management Plan
TNT	Trinitrotoluene
UoP	unit of production
USCGS	U.S. Coast and Geodetic Survey
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
WMP	Waste Management Plan
WP	Work Plan

Section 1.0: INTRODUCTION

This After Action Report (AAR) addresses the work performed by EOD Technology, Inc (EODT) at the Former Naval Air Facility (NAF) Adak, Alaska, between 2008 and 2010. This work was conducted under Contract Number N44255-08-C-6004 in accordance with the Technical Management Plan (TMP) for Munitions and Explosives of Concern (MEC) Clearance Operations, the Project's Environmental Protection Plan (EPP)/Waste Management Plan (WMP), MEC Quality Assurance Project Plan (QAPP), the Explosives Safety Submission (ESS) and the Accident Prevention Plan (APP)/Site Specific Safety and Health Plan (SSHP), and the Munitions Constituents (MC) QAPP (EODT, 2008). Specifically, these documents addressed work activities associated with the MEC Clearance Action for the specific Areas of Concern (AOCs) in Operable Unit (OU) B-1. This is Part Two of four parts.

1.1 Organization

This AAR is composed of the following chapters, which cover an introduction, major work activities, technical approach, field procedures and documentation, data management, and quality control (QC). This AAR includes a compilation of the findings and results based on the field work and data collected during the field seasons:

Section 1 – Introduction
Section 2 – Project Requirements
Section 3 – Definable Feature of Work (DFW)-Specific Procedures – Munitions and Explosives of Concern
Section 4 – DFW-Specific Procedures – Munitions Constituents
Section 5 – Overarching Project Quality Control Procedures
Section 6 – Production Results
Section 7 – Overarching Project Quality Control Results
Section 8 – References

1.2 Adak Characteristics and History

1.2.1 Climate and Weather. Adak Island has a polar maritime climate characterized by persistent overcast skies, high winds, frequent and often violent storms, and a relatively narrow range of temperature fluctuation throughout the year. Adak is located in the region of the polar front, the zone of convergence between temperate westerly winds (which actually blow from the southwest at this latitude) and the polar easterly winds. In the area of the Aleutian Islands, the interface of air masses creates a semi-permanent low-pressure zone, which is particularly strong in the winter and generates the frequent low-pressure (cyclonic) storms characteristic of the North Pacific region.

Weather on the island can be extremely localized; fog, low ceilings, precipitation, and clear weather can occur simultaneously within an expanse of only a few miles. Standard monthly temperatures range from a low of 33 degrees Fahrenheit (°F) in February to a high of 52°F in August. The highest recorded temperature for Adak Island is 75°F (recorded in August 1956), and the lowest recorded temperature is 3 °F (recorded in January 1963 and again in February 1964). Storms occur year round, with the most frequent and severe storms during the winter season. The average total annual precipitation for Adak Island (measured at the airport) is about 60 inches, most of which falls as rain in the lower elevations. Average monthly precipitation varies from a low of about 3 inches during June and July to a high of 7 to 8 inches during November and December.

Snowfall averages over 100 inches a year at sea level, but because of the relatively warm temperatures, snow depth rarely exceeds 1 to 2 feet (ft). The snow level, the elevation at which precipitation falls as snow instead of rain, varies with the temperature. Typically, snow falls on Adak Island between November and April, but melts somewhat quickly at elevations less than 1,000 ft above mean lower low water (MLLW). At elevations greater than 1,000 ft above MLLW, snow that falls between November and April generally remains as snowpack throughout the winter. Between May and October, snow rarely falls at sea level. From June through September, snow melts in the higher elevations augmenting streamflow and most precipitation falls as rain over the entire island. Permanent snowpack is not typical in the OU B-2 sites because most of them are at lower elevations.

Wind conditions are typified by local directional shifts and rapid changes in velocity. Average wind velocity is 12 knots, with gusts in excess of 100 knots recorded during winter storms. High winds, with gusts of more than 50 knots, are frequent during the summer months.

1.2.2 Surface Features and Topography. Adak Island is located approximately 1,200 air miles southwest of Anchorage, Alaska, in the Aleutian Island chain (Figure 1-1) and its geographic position is 176°42'W longitude and 51°55'N latitude. Adak is the largest of the Andreanof group of the Aleutian Islands with an area of 280 square miles (Figure 1-2). The former U.S. Naval Complex occupied 76,800 acres on the northern portion of the island and closed operationally on March 31, 1997. The U.S. Fish and Wildlife Service (USFWS) manages the southern portion (117,265 acres) of the island, which is a designated wilderness area within the Alaska Maritime National Wildlife Refuge (AMNWR) system.

Figure 1-1. Site Location – Adak, Alaska

Three steep, highly weathered volcanic peaks dominate the topography of Adak Island. These peaks are cut with deep valleys resulting from erosion by streams that also provide runoff to the coastal areas. Deltaic and tidal lagoon areas are found near the coastline in some portions of the island; however, steep rocky slopes or cliffs characterize most of the coastline. The terrain surrounding the former naval facility at Adak Island includes steep ridges, deep ravines, rolling hills, and some flatlands.

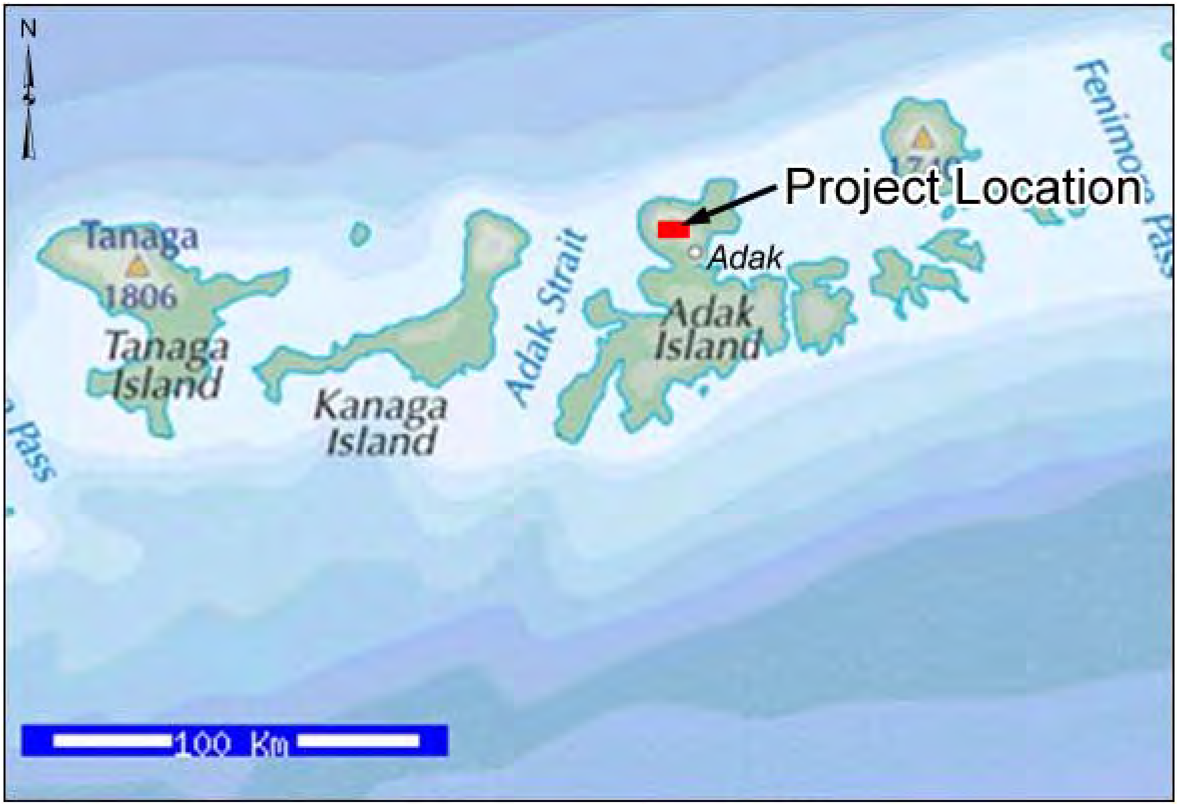

Figure 1-2. Project Location on Adak Island

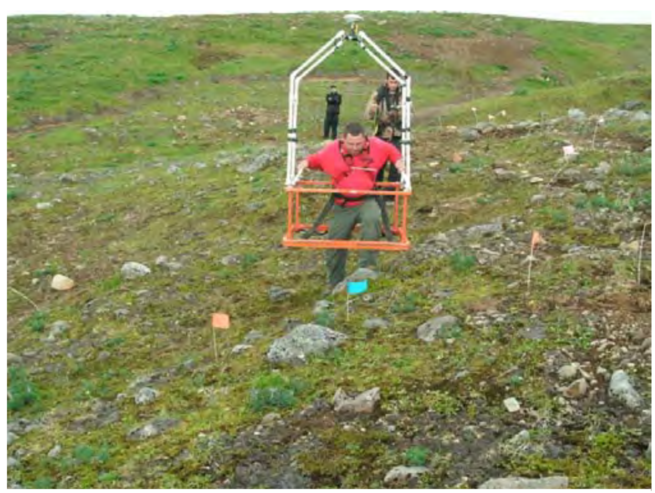
Figure 1-3. Typical Terrain and Vegetation

The tundra vegetation on Adak consists of grasses, lichens, mosses, and other species adapted to the wet, cold, and windy polar climate (Figure 1-3). Tundra tussocks referred to as "haystacks" are one of the most predominant features at lower elevations and are often interspersed with hollows or holes in the ground under the vegetation. Low-growing tundra is often thick and spongy, making access difficult, even on level terrain. Vegetative cover becomes increasingly sparse as elevation increases.

Development of Adak is limited to the northern portion of the island. The Adak Naval Complex had two main developed areas: former NAF Adak and Naval Security Group Activity (NSGA). Land uses at the former NAF Adak, located in the developed downtown area, include the airfield; port facilities; and light industrial, administrative, commercial/recreational, and residential areas. NSGA is located approximately 5 miles north of NAF Adak, at the northwestern corner of Clam Lagoon. NSGA ceased all operations in 1995. The area is no longer inhabited but the structures and road system remain.

1.2.3 Military History. Adak Island was reserved as part of the Aleutian Island National Wildlife Refuge by Executive Order in 1913. Adak remained largely unoccupied until August 1942, when U.S.

established an air base and staging area to support operations against Japanese installations on nearby Kiska and Attu Islands.

After World War II, the U.S. Air Force used these facilities until 1951, when they became the Naval Air Station (NAS) Adak under control of the U.S. Navy. The NAS Adak was re-designated as the NAF by the 1993 Base Realignment and Closure (BRAC) Commission, and was later selected for closure by the 1995 BRAC Commission. The military mission on Adak Island ended in March 1997. Since then, the Adak Island population has fluctuated between 100 and 1,000 persons. Currently, less than 70 to 150 people reside on Adak Island, depending on the time of year. An ordnance survey completed in 1996 by Navy Explosive Ordnance Disposal (EOD) Mobile Unit Eleven Detachment Whidbey Island personnel indicated that unexploded ordnance (UXO) was present in many areas of Adak Naval Complex.

1.2.4 Regulatory History. In October 1992, the former Adak Naval Complex was proposed for the National Priorities List (NPL), and officially placed on the list in May 1994. The Federal Facilities Agreement (FFA), an agreement among the Navy (as Lead Agency), the Environmental Protection Agency (EPA) (regulatory lead), and the State of Alaska, specified the scope, process, and overall schedule for environmental investigations to be completed under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process was signed in November 1993.

The FFA, which specifies the scope of work (SOW) for completion under the CERCLA process, initiated a series of studies: preliminary source evaluations (PSEs) of non-petroleum sites and studies of petroleum sites under the State of Adak Environmental Restoration Agreement (SAERA).

From 1993 through 1996, four rounds, or batches, of PSEs were conducted. The PSE process included a risk-based screening evaluation of human health and ecological risk at the PSE sites. Sites identified by this process as requiring additional evaluation were included in the base-wide Remedial Investigation/Feasibility Study (RI/FS) performed by URS. Fieldwork for the base-wide RI/FS began in the spring of 1996 and ended in the summer of 1996. The final RI/FS report was published in September 1997 (URS, 1997).

Data collected in 1999 (Draft Site Investigation [SI] Report; Foster Wheeler Environmental, 2000a), along with previously collected data and archival information, were used to prepare a Draft Preliminary Assessment (PA) Report (Foster Wheeler Environmental, 2000b). The PA Report identified areas of potential concern (AOPCs) that were screened against criteria developed by a Project Team composed of: the U.S. Environmental Protection Agency (U.S. EPA), the Alaska Department of Environmental Conservation (ADEC), the Navy, and consulting members. The screening criteria were used to evaluate the likelihood and density of contamination with an analysis of the supporting evidence. Results of the screening provided recommendations for moving some AOPCs to no further action status, and for moving other sites, now labeled AOC, forward into the RI/FS process.

Following the PA in 2000, an OU, known as OU-B, was created to manage the investigation and remediation of MEC contamination in the areas warranting further response (Foster Wheeler Environmental, 2000b). An RI/FS Work Plan (Foster Wheeler Environmental, 2000c) was developed to facilitate a consistent investigation of the identified AOCs within OU-B, allowing a determination of the nature and extent of MEC contamination in each area. This action also allowed for the collection of data needed to support hazard assessment and decision making with regard to the remediation of MEC.

The Navy began implementing this RI/FS Work Plan in 2000. By the end of the first field season, the Navy recognized that certain areas of the military reservation (primarily those in Parcel 4 areas), would require an extended period of time for assessment and remediation due to the nature of the contamination and/or the lack of an effective technical approach for remediation. In order to expedite the assessment and cleanup of those portions of the military reservation that could be transferred in a timely manner, OU-B was divided into two parts: OU B-1 and OU B-2. OU B-1 contained the AOCs slated for transfer to The Aleut Corporation (TAC) as part of the land transfer agreement (LTA).

These AOCs and surrounding buffer areas are contained in Land Transfer Parcel 4, which is slated for transfer once OU B-1 and OU B-2 remedial action is complete. The reasonably anticipated future land use for the parcel is wildlife management, subsistence, and recreation.

1.3 Site Characteristics and History

1.3.1 Site Characteristics. The AOCs (identified below) addressed under this remedial action are part of OU B-1 and were previously identified as target or impact areas used for training exercises conducted from a number of firing locations during World War II. A variety of munitions have been removed (e.g., 20 mm, 37 mm, and 105 mm projectiles; 81 mm mortars) from these AOCs. Referring to Figure 1-4, the three AOCs (MM-10F, MM-10G, MM-10H) for this action are located in the central portion of AOC MM-10E, on the southeastern flank of Mount Moffett at an elevation between 900 and 2,200 feet above sea level. These AOCs are generally characterized as: (1) heavily littered with non-explosive metallic items (on the order of approximately 100 anomaly locations per acre), (2) having relatively low densities of MEC in the areas investigated to date, and (3) having relatively high rates of “no finds” and “digs abandoned.” Under the Munitions Response Site (MRS) priority rating system, OU B-1 scored an Explosive Hazard Evaluation of 81 and an overall rating of “C” (on a scale ranging from a score of 100 and “A” rating as highest, and a score of 1 and “G” rating being lowest). The total project size is 366 acres, segmented into the three AOCs as follows:

- **AOC MM-10F -** 320 acres with elevations ranging from 900 to 2,200 feet above sea level. This AOC is centrally located in a bowl-shaped area near the upper flanks of Mount Moffett on the front (southeast) side. This AOC has steep terrain descending sharply to rolling hills along the southeastern flanks of Mount Moffett. A small portion of the area is characterized as inaccessible (having greater than 30 degree slopes). The vegetation is primarily upland tundra species at lower elevations, growing sparser with increasing height above sea level. There is access to the area only on foot, by all-terrain vehicle (ATV), or via helicopter.
- **AOC MM-10G -** 43 acres with elevations ranging from 1,700 to 2,200 feet above sea level. This site is located on the northwest side of Mount Moffett and encompasses an airplane impact site. AOC MM-10G has significant areas with greater than 30 degree slope. This AOC is sparsely vegetated due to its elevation.
- **AOC MM-10H -** 2.6 acres with elevations ranging from 1,220 to 1,300 feet above sea level. MM-10H was defined during the December AOC certification meeting following the 2004 field season and was created due to the discovery of three 90 mm projectiles at depths of 0, 6, and 18 inches below ground surface (during the 2004 field season).

This AAR also discusses work performed in AOC MM-10E. MM-10E covers 1,761 acres and surrounds all three of the other AOCs. The work performed within AOC MM-10E during this project comprises digital geophysical mapping (DGM) and intrusive investigation in 0.41 acres which are immediately adjacent to the OU B-1 geophysical prove-out (GPO) area to address MEC and munitions debris (MD) encountered during the installation of the GPO in 2008. The work in MM-10E was incidental to the work in the other AOCs and was not within the primary scope for this project.

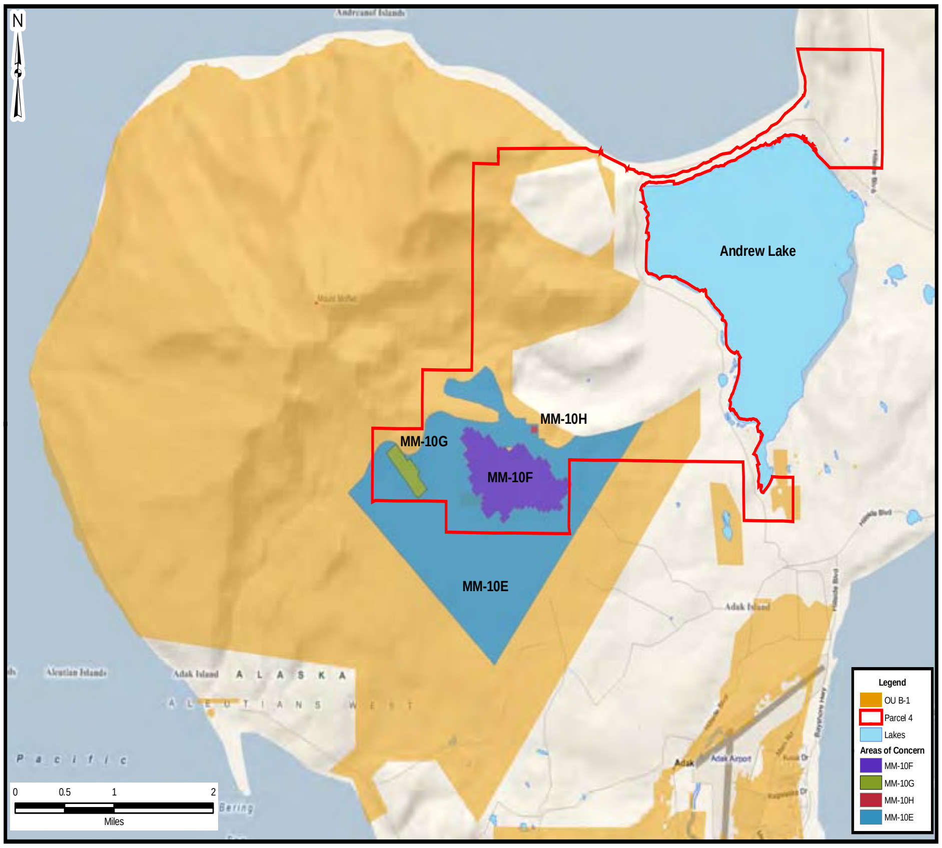

Figure 1-4. AOCs MM-10F, MM-10G, MM-10H

The nearest road access to these sites is approximately 30 minutes by truck from the downtown Adak lodging area. From this point it is approximately 1 mile to the nearest AOC (MM-10F). The AOCs are undeveloped and the terrain is rugged with no direct road access except by over-land surface travel. Access is possible in some areas of the AOCs by use of ATVs. However, there is a significant slope over much of the area plus extensive boulder cover and exposed bedrock. No fences or gates are present on the AOCs; therefore, there is no access control. During this field action, temporary barricades were placed to restrict human travel through the AOCs.

Snow cover exists on all or some portions of these sites from approximately mid-October through mid-July. Many streams run down the mountainside, cutting deep valleys. This landscape makes navigation a challenge, limiting routes available to travel either by foot or by ATV. The practical field season length is mid-July through November first. Some areas in the lower portions of the AOCs may be clear of snow and worked before mid-July. Adak Island is lushly vegetated from sea level to about 1,000 feet in elevation. Upland vegetation varies with environmental factors, including the presence of wetlands, altitude, and shelter from wind. The native vegetation is that of a terrestrial-maritime tundra ecosystem. Creek beds are covered with sedge-dominated plants intermixed with wet area plants such as red fescue and hairgrass. There are essentially no trees of value to wildlife in either the developed or the undeveloped areas.

Where present, vegetation consists of hummocky tundra, and thickness ranges from several inches to 2 feet. Longer grassy tundra is prevalent in the lower areas and cut drainages. Typically, the tundra growth becomes shorter as elevation increases. Boulders litter the ground surface around the shorter tundra and completely take over, leaving no vegetation visible at the highest elevations.

Because of its harsh climate conditions and relative lack of vegetative structure, the diversity of wildlife inhabiting Adak Island is relatively low. However, there are several species on-island. The Aleutian Canada goose is an occasional visitor but does not nest on Adak Island. The Aleutian goose was recently removed from the list of threatened and endangered species; however, USFWS is monitoring the species. The federally endangered shorttailed albatross is found offshore of Adak occasionally, but is unlikely to be found in near shore waters.

1.3.2 Site Military History and Munitions Use. Based on information in the Record of Decision (ROD), the three project AOCs could include ordnance disposal sites, impact areas, ammunition storage areas, firing points, training areas, or gun emplacements. Specific uses identified from prior investigations are as follows:

- Military use of MM-10F was part of a training area, primarily as an impact area. Munitions present in past investigations include 37 mm, 40 mm, and 75 mm projectiles, and 81 mm mortar rounds.
- Military use of MM-10G was part of a training area, primarily as an impact area. Munitions present in past investigations include 90 mm projectiles and various discarded military munitions (DMM). This AOC also contained an abundance of airplane wreckage (smaller pieces) from a World War II mission.
- The historical military use of AOC MM-10H is unclear, but discovery of several 90 mm projectiles there indicates its possible use as an impact area.

1.3.3 Site Regulatory History. A ROD was executed for the OU B-1 sites in 2001 (U.S. Navy et al., 2001). The work at most of these sites was completed in 2004, with a no further action determination provided by ADEC and the U.S. EPA Region 10. The scope of the planned remedial action activities in each AOC is to identify and dispose of MEC and its related debris in accordance with the OU B-1 ROD (U.S. Navy et al., 2001). The objective of the response is to clear all munitions to a depth of 4 feet below the top of the mineral layer. The current land use is military range with an anticipated future land use as a wildlife refuge. Additionally, the ROD calls for cleanup of any MC found in the area. The property, upon certification, is planned to be relinquished to the USFWS to become part of the AMNWR system.

1.4 Previous Site Work

In 2004, an RI was conducted in AOC MM-10E. The RI was performed using an ‘observational approach’ technique which was developed by the Adak Project Team for Mount Moffett. This approach was designed to allow the team to further define target area boundaries and allow selection of remedial action areas. The approach uses evaluation of existing target data and a combination of investigation approaches (100 percent survey, 5-meter [m] line spacing mini-grids, and expansion grids). Initial analysis of MM-10E involved investigation of 986 targets remaining from the 2002 field season (1,210 originally identified targets minus 224 that were eliminated for excavation in the northwest area to facilitate use of the observational approach as modified in March 2004). The munitions response criteria determined by the project team required that a 15-m MEC-free buffer area be established around all items of interest. This resulted in 100 percent geophysical coverage over UXO and abandoned ordnance items and 5-m line spacing coverage over revised ordnance and explosives (OE) scrap, which was defined to be OE scrap that did not include fragmentation or small arms debris (e.g., fuze components, tail fins, etc.). These items were agreed to be more indicative of potential impact areas than typical fragmentation. If additional items were found when establishing the 15-m MEC-free buffer, geophysical expansions would be conducted until the buffer was established.

Using the Mount Moffett observational approach, it was determined that two probable target areas within MM-10E were excessively littered by fragmentation and other metal debris to the extent that they could not be completely remediated during the 2004 field season. Accordingly, they were established as distinct AOCs and named MM-10F and MM-10G.

A third new AOC was established as MM-10H where, given the close proximity of three UXO items (90-millimeter [mm] projectiles), additional investigation was recommended nearby.

The Navy determined that employing a surface removal of ordnance-related items from as large an area as possible within the MM-10E AOC during the 2004 field season was the most effective use of available resources to reduce risk from potential explosive safety hazards within the AOC. For this reason, remedial action conducted within MM-10F during the 2004 field season was limited to a surface clearance. No significant remedial actions were conducted within MM-10G in 2004.

Summarizing previous investigations, approximately 57 of the 366 acres (16 percent) had been investigated in the areas of what is now AOCs MM-10F, MM-10G, and MM–10H. Summary results are included in Table 1-1.

Table 1-1. Investigation Results – 1999 to 2004

Investigation Results – 1999 to 2004	Surface	0-1 feet bgs	1-2 feet bgs	2-3 feet bgs	3-4 feet bgs	Total
Unexploded Ordnance	36	15	2	1	0	54
Discarded Military Munitions	0	0	0	0	0	0
MPPEH or Munitions Debris	1,556	2,527	282	55	4	4,424
Small Arms Related	8	77	0	0	0	85
Metal Waste	86	104	2	1	0	193
Hot Geology	41	60	3	0	1	105
Other	29	26	0	1	0	56
No Find	348	20	5	0	0	373
Dig Abandoned	12	2	1	0	0	15
Total	2,116	2,831	295	58	5	5,305

Based on geophysical surveys and intrusive investigations conducted on the AOCs, the Navy estimated that approximately 27,150 anomaly locations remained for clearance in the three project AOCs.

Section 2.0: PROJECT REQUIREMENTS

2.1 Remedial Action Objective

The Remedial Action Objective (RAO) for the three primary AOCs are derived from the OU B-1 ROD that was finalized in December 2001 (U.S. Navy et al., 2001). The objective is summarized as follows:

> *To reduce MEC and MC risk to an acceptable level and to the satisfaction of stakeholders for the reasonably anticipated future land use.*

2.2 Remedial Action Goals

The Remedial Action Goal (RAG) is to perform remedial actions in these AOCs in accordance with the project planning documents to support both the current and reasonably expected future (unrestricted) land use, and to protect human health and the environment. MEC clearance work was completed for this remedial action with a goal to meet the requirements of the OU B-1 ROD, including Applicable or Relevant and Appropriate Requirements (ARARs). For MEC, clearance goals were established to have remedial actions remove identified target anomalies equal to or greater than a 37 mm projectile to a maximum of 4 feet below the top of the mineral surface, or to bedrock if encountered first. For MC, the clearance goal was to remove soil contaminated above the action level at breached munition sites so remaining levels do not pose human health risk or impact to the environment, or to determine by investigation and analysis that there is no similar risk, with both resulting in no further action.

2.3 ROD Requirements

Alternative 3 was the selected remedy for the 24 observational approach and presumptive clearance (OAPC) sites in the OU B-1 ROD. Implementation of this remedy included final characterization to determine the extent of clearance required at these sites. This approach incorporated site reconnaissance, inspection, and geophysical investigation techniques consistent with those employed during the OU B-1 RI/FS to address concerns related to data gaps on specific portions of these sites. After final characterization, the requirement was to intrusively investigate 100 percent of all identified target anomalies to a depth of 4 ft below ground surface (bgs) and to clear all OE/UXO (MEC) through blow in place or consolidated detonations at approved Adak locations. The Mount Moffett sites were not specifically included in the ROD, Chapter 11 (Selected Remedy) but were mentioned in the ROD, Chapter 13 (Documentation of Significant Changes since the Proposed Plan) as follows:

> "*As a result of written and verbal comments provided by the EPA on the OU B-1 RI/FS Report and the OU B-1 Remedial Action Design Work Plan, the Navy agreed to include the Mt. Moffett AOCs in the scope of this ROD for cleanup decisions. At the time of the release of the Proposed Plan, the Navy had not made a final decision on whether to include Mt Moffett AOCs in OU B-1 or OU B-2 decision documents. A description of the Mt. Moffett AOCs, and the selected remedy is presented below.*
>
> *The Mt. Moffett AOCs identified through the PA, SI, and RI/FS process included combat ranges, impact areas (MM-01, -02, -03, -10, and -11), potential firing points (MM-04 and -22), an isolated fuze (MM-07), frag sites (MM-05, -06, -08, -09), and a chemical mortar training site (MM-23) (Figure 13-1). During the*

2000 field season, approximately 1,800 target anomalies were identified through the geophysical investigations and post-processing of data. Locations of these anomalies are recorded in the DGPS data system. These targets will be re-acquired and intrusively investigated. All OE/UXO will be addressed under Alternative 3, and the locations will be cleared to a depth of four feet. In this manner, these locations will be addressed in the same approach as the OAPC sites that will be subject to final characterization and clearance."

2.4 Project Scope

The scope of this project was to complete munitions clearance for three AOCs (MM-10F, MM-10G and MM-10H) on Mount Moffett in accordance with the OU B-1 ROD and receive determination from regulators that no further action is required at these sites. The work was subdivided into contract line item tasks as follows:

- Prepare and submit project plans
- Mobilization
- GPO – Completion and certification of all digital geophysical mapping and UXO removal teams.
- Grid digital geophysical mapping and data analysis – complete site preparation, vegetation clearance, surface clearance (for UXO avoidance and to minimize metal interference with geophysical instrumentation) and data analysis to identify anomalies and develop a target list for each grid in accordance with the approved project plans, site approval request and ESS. Each grid will be 60 meters by 60 meters and encompass the entire 366 acres (minus inaccessible areas) for approximately 412 grids. Accessible means areas that are less than a 30 degree slope.
- Grid subsurface clearance - Complete subsurface clearance of 100 percent of target anomalies to include reacquisition of targets, clearing each target of metallic items, and appropriate management and disposal of all project wastes in accordance with the approved project plans. Each grid will be 60 meters by 60 meters and encompass the entire 366 acres (minus any inaccessible areas) for approximately 412 grids.
- Demobilization
- Final Report

During the planning phase of the project, the requirements for the Contractor Quality Control Plan and GPO Installation and Certification Plans were deleted. The project team determined that the work could best be guided by using a comprehensive MEC QAPP with detailed MEC QAPP Standard Operating Procedures (SOPs) and a limited TMP. Table 2-1 shows the relationship between the ROD requirement, the project DFW, and the section in this report where the DFW is discussed.

Work performed on this project was controlled by a set of approved work plans. The documents are described in Table 2-2.

The work plans carried over all of the field seasons with minor modifications incorporated through Field Change Requests (FCRs). A total of 20 FCRs were prepared during the three field seasons.

Table 2-3 cross-references the DFWs and sub-tasks to where the procedures, documentation and QC requirements can be found in the approved work plans.

Table 2-1. Crosswalk from the ROD Requirements to the Project DFWs

ROD Requirement	Project DFW	Report Section(s)
Remove all metallic debris from the surface that could interfere with geophysical surveys	Surface Clearance	Section 3.3
Conduct geophysical mapping at the sites to find possible OE/UXO	Site Specific Training and GPO Certification Geophysical Survey	Section 3.2 Section 3.4
Identify locations to dig for possible OE/UXO (based upon geophysical data)	Geophysical data processing and Interpretation	Section 3.5
Re-locate and excavate (dig) identified targets to 4 feet bgs	Target Reacquisition Intrusive Operations	Section 3.6 Section 3.7
Dispose of OE/UXO by detonation in place or removal and treatment at a remote location	MEC Disposal MPPEH certification, Flashing and Disposal Donor Explosives Handling and Storage	Section 3.8 Section 3.9 Section 3.10
Test for explosives-related chemical contamination at suspected locations and manage any contaminated soil	MC Contaminated Soil Sampling, Excavation, and Disposal	Section 4.0

Note: DFWs for Planning and Mobilization (Section 3.1) and Step-Out Areas (Section 3.11) are discussed or mentioned in the ROD as general requirements

Table 2-2. Approved Planning Documents

Planning Document	Summary Description
Technical Management Plan	An overall description of project technical requirements
Environmental Protection Plan/Waste Management Plan	Established requirements for protection of natural resources and management of materials and waste products
Explosives Safety Submission	Established requirements to avoid the risk of a military munitions mishap
Site Safety and Health Plan/ Accident Prevention Plan	Described site hazards and requirements for overall project safety with a focus on accident prevention
GPO Installation Plan and GPO Certification Plan (prepared by others)	Described the requirements for meeting ROD-required geophysical investigation techniques
MEC QAPP	Established requirements and MEC QAPP SOPs for management of munitions and explosives of concern
MC SAP	Established requirements and MEC QAPP SOPs for management of munitions constituents (i.e., chemical contamination)

Table 2-3. Crosswalk from DFWs to Project Requirements

Definable Features of Work and Subtasks	TMP Section	MEC QAPP Worksheet	MEC QAPP SOP	Report Sections
Mobilization/Site Preparation	6.1	17.1	N/A	3.1/6.1.1
Project Plan Preparation	N/A			
Verify Personnel Qualifications	8.1.1			
Set up Administrative Offices	6.1.1			
Equipment Set-up and Checkout	7.2		MEC QAPP SOP-01, 02, 04, 07	
Installation of Thermal Flashing Unit	6.8		MEC QAPP SOP-06	
Installation of Explosives Storage Magazines	6.9		MEC QAPP SOP-08	
Grid Survey and Layout	6.1.2	17.1.2	MEC QAPP SOP-02	
Site Specific Training/GPO Certification	6.2	17.2	GPO Plan	3.2/6.1.2
Initial Orientation and Training		17.1, 17.2.1		
GPO Certification		17.2.2		
Surface Clearance Operations	6.3	17.3	MEC QAPP SOP-01	3.3/6.1.3
Surface Clearance of AOCs MM-10G and MM-10H		17.3		
Geophysical Survey	6.4	17.4	MEC QAPP SOP-02	3.4/6.1.4
Geophysical Survey		17.4		
Data download		N/A	MEC QAPP SOP-03	
Data upload to File Transfer Protocol (FTP) site		N/A		
Geophysical Data Processing/ Interpretation	6.4	17.5	MEC QAPP SOP-03	3.5/6.1.5
Data processing				
Initial Target Selection				
Independent QC				
Final Target Selection				
Quality Assurance (QA) Review by Navy QA Contractor				
Target Reacquisition	6.5	17.6	MEC QAPP SOP-04	3.6/6.1.6
Anomaly Reacquisition				
Anomaly Excavation				
MPPEH 5X Management			MEC QAPP SOP-05	
Non-munitions debris Management				
Intrusive Operations	6.6	17.7	MEC QAPP SOP-05	3.7/6.1.7
Excavation of Target				
Identification/Classification of MEC/MPPEH	6.7			
Transfer of MPPEH	6.8			
Erosion Control/Excavation	N/A		MEC QAPP	

Table 2-3. Crosswalk from DFWs to Project Requirements (Continued)

Definable Features of Work and Subtasks	TMP Section	MEC QAPP Worksheet	MEC QAPP SOP	Report Sections
Backfilling/Rut Repair			SOP-05 EPP/WMP	
MEC Disposal	6.7	17.8	MEC QAPP SOP-07	3.8/6.1.9
MEC blow-in-place (BIP)	6.7.1			
MEC Consolidation and Open Detonation	6.7.1			
MPPEH 1X and 3X Management/Disposal	6.8			
Site Restoration	N/A		MEC QAPP SOP-05, EPP/WMP	
MPPEH Certification, Flashing, and Disposal	6.8	17.9	MEC QAPP SOP-06	3.9/6.1.10
MPPEH Inspection and Certification				
MPPEH Flashing				
MPPEH Packaging and Transportation				
MPPEH 5X Demil and Recycling				
Donor Explosive Handling and Storage	6.9	17.10	MEC QAPP SOP-08	3.10/6.1.11
Explosive Storage				
Explosive Handling				
GPO Area Step-Outs	*	17.7	*	3.11/6.1.12
MC Contaminated Soil Sampling, Excavation, and Disposal**	6.10	17.11 (also see MC SAP)	FP-01, FP-10	4.0/6.2

*Procedures for addressing GPO Area Step-Outs (MM-10E) were added to the project under a separate GPO Step-Out Plan, which is located in Appendix T.

**This DFW was included in the MEC QAPP but refers the reader directly to the MC SAP. Although the MEC QAPP contains this DFW, it is not discussed in the MEC QAPP and refers the reader to the MC SAP. Section 4.0 contains the DFW's and requirements from the MC SAP.

Section 3.0: DFW-SPECIFIC PROCEDURES – MUNITIONS AND EXPLOSIVES OF CONCERN

The following subsections describe the procedures, documentation requirements, and QC measures that were required to be followed for each DFW and associated task. This section is organized according to MEC QAPP, Worksheet #14 which identifies each DFW and its supporting subtasks. Please refer to Table 2-3 which references the location of where to find more in-depth discussion of the procedures, documentation and quality control requirements related to the DFW on this project.

3.1 Mobilization and Site Preparation

Requirements for mobilization and site preparation included the following:

- Perform functional and operation checks of vehicles, support equipment, and field equipment prior to the main body's arrival to the site.
- Set up office space and performance of final coordination for lodging, maintenance facility, food service, and setup of a fuel account with the local vendor
- Conduct operational and functional checks of all equipment, including the setup and testing of the radio repeaters
- Confirm that all personnel have the proper training records and are under medical surveillance
- Coordinate medical evacuation (MedEvac) flights and medical support on Adak
- Install the Type II Explosive Magazine (for donor explosives storage)
- Install the thermal flashing unit (TFU) and security fence
- Grid survey and layout
- Coordinate project details with City of Adak personnel

The procedures for mobilizing and site preparation are found in standardized, corporate-level policies and procedures, SOPs (MEC QAPP SOP) or operators' manuals. Schedules and specific mobilization dates and activities are provided in the approved work plans.

Documentation for these activities is as follows:

- Functional and operational checks of vehicles and equipment are documented on forms provided in operator's manuals or MEC QAPP SOPs;
- Set up of office space, final coordination for lodging, maintenance facilities, food service, and setup of a fuel account with the local vendor is documented in the Senior UXO Supervisor (SUXOS) logbook;
- Operational and functional checks of all field equipment, including the setup and testing of the radio repeaters is documented on forms provided in operators' manuals and MEC QAPP SOPs;
- Confirmation that all personnel have the proper training records and are under medical surveillance is documented on corporate forms developed for that purpose;

- Coordination of MedEvac flights and medical support on Adak is documented through the appropriate contracting vehicle;
- Installation of the Type II Explosive Magazine (for donor explosives storage) is documented in the SUXOS logbook and by QC inspection form;
- Installation of the TFU and security fence is documented in the SUXOS logbook and by QC inspection form;
- Grid survey and layout was documented by a professional land surveyor (Appendix A)
- Coordination of project details with City of Adak personnel is documented in the SUXOS logbook

QC requirements for these activities are prescribed in the MEC QAPP.

3.2 Site-Specific Training and GPO Certification

3.2.1 Procedures. Personnel were required to be trained on accident prevention procedures and on the job performance requirements for each task they would be performing. Personnel who collected DGM data or reacquired anomalies for the UXO intrusive investigation teams were required to be certified in the GPO and show proficiency in proper instrument operation, data processing, selection of target anomalies from the data and reacquisition and positioning of anomalies from the approved target list. Teams had to meet a probability of detection (Pd) of 0.85 at a 90% confidence level (CL).

The GPO certification procedures are contained in the GPO Certification Plan (Tetra Tech, 2008). The GPO certification process was conducted by the independent Government quality assurance (QA). All of the procedures covered in site specific training are contained in MEC QAPP SOPs.

3.2.2 Documentation. Documentation of site-specific training is captured on training attendance sheets which list the training topics and the personnel providing and attending the training. For GPO certification, a formal submittal to the independent QA contractor was made after QC verified the data. The results of the GPO certifications are discussed in Chapter 6. A GPO Report was prepared and submitted.

3.2.3 Quality Control. QC of the site-specific training and GPO certification included audits to ensure that all personnel were properly trained for their assigned job. DGM and reacquisition teams were certified by QA. Before each GPO submittal to the independent QA contractor, QC reviewed the data package. QA issued a formal certification for each DGM and reacquisition team upon successful demonstration of their capabilities.

3.3 Surface Clearance

The purpose of surface clearance was to remove surface MEC and aboveground metal that would interfere with geophysical mapping or cause a safety hazard. Surface clearance was a requirement in all three AOCs.

3.3.1 Procedures. Surface clearance procedures are provided in MEC QAPP SOP-01. MEC QAPP SOP-01 required the surface removal team to navigate to a grid location and place a non-metallic pin flag in at each grid corner. Survey lanes were established by lining up UXO team personnel in sweep lines spaced at approximately 2 m intervals. The inboard member of the sweep line would align to the southwest corner flag and walk in a straight line to the northwest corner flag. The other sweep line members would then proceed as directed by the team leader guiding on the inboard member. The sweep line walked from one end of the grid to the other, maintaining interval and pace using a hand held detector when necessary. The sweep line was to make a wheel turn and repeat the process in a southerly direction. This process was repeated until the entire grid was searched. When MEC or material potentially presenting an explosive hazard (MPPEH) was found, the procedure required the UXO team leader to stop the sweep line and place a flag next to the item. MPPEH identified as 5X was required to be picked up and collected. When the grid was completed, the coordinates of the flagged items and their identification was recorded on the Trimble TSC-1 handheld controller unit and a digital picture was taken of the item(s). MEC was handled as discussed below in Section 3.8, MEC Disposal. MPPEH was removed from the grid and its approximate weight logged. At the end of each work day, the UXO team's PC card and digital photograph memory cards were returned to the database and geographic information system (GIS) Managers for downloading into the project database.

Figure 3-1. Personnel Performing Surface Clearance

3.3.2 Documentation. Surface clearance activities (Figure 3-1) were recorded in the respective Team Leader logbook. The SUXOS or his designated representative (QC or QC assistant) conducted periodic reviews of the logbooks. When MEC was encountered during a surface clearance, it was reported to the SUXOS and documented and managed according to the procedures in MEC QAPP SOP-01.

3.3.3 Quality Control. Inspections were required in accordance with the schedule in the MEC QAPP and documented on the QC checklist provided in MEC QAPP SOP-01.

3.4 Geophysical Survey

DGM was required to be performed over 100% of the accessible areas in all three AOCs by DGM teams certified in the GPO. DGM procedures were written in MEC QAPP SOP-02.

3.4.1 Procedures. The sensor deployed at Adak to record digital geophysical data was the EM61-MK2. The EM61-MK2 was to be configured in skirt-mode, where the operator stood inside of a 1 m ×1 m coil and an assistant walked behind carrying the instrument electronics and batteries. The GPS antenna was hard-mounted to the EM61-MK2 coils in a configuration called a 'dog house' which was composed of a rigid frame mounted to the upper EM-61 coil with the global position system (GPS) antenna affixed to the top center. Geophysical survey lanes were to be established at 0.75 m spacing.

3.4.2 Documentation. Several data files were generated for each grid surveyed. These data were stored on the data logger(s) and differential global positioning system (DGPS) receiver during data acquisition. At the end of each work day, the data were turned over to the on-site Data Manager who uploaded the files to the computer in the Adak Data Management Center.

Geophysical survey teams documented the geophysical digital survey data in their logbooks and field sheets. For each grid mapped, a field sheet was populated to include the grid number, grid characteristics, data file name, weather conditions, etc. All inaccessible areas were noted in team field books and locations noted on grid field sheets. Inaccessible areas were plotted on the grid maps.

At the end of each work day, field books and grid sheets were scanned and sent with the digital data to the contractor data processing center off-island. Data files and scanned field sheets were uploaded to the data management computer. These files were then uploaded to the project File Transfer Protocol (FTP) site. Survey files and field sheets were catalogued according to the AOC respective to each dataset. A digital and hard copy of these forms were kept on site.

3.4.3 Quality Control. The make, model, and serial number each geophysical instrument and DGPS unit used for field activities were recorded in the field logbook and in the digital data files. Daily quality control tests were conducted which included static/spike, latency, and repeat tests. A QC field sheet was filled out noting the filenames and results.

3.5 Geophysical Data Processing and Interpretation

Geophysics data were to be processed using Geosoft Oasis Montaj software with UX-Detect. Potential target locations were to be selected using a combination of two selection methods; automatic and manual. The automatic method utilizes the target selection algorithm within the Geosoft Oasis Montaj software which selects anomaly locations based solely on the signal intensity. The manual method utilizes a data interpreter who evaluates potential target locations using data characteristics such as the signal intensity from the top and bottom coil and different time gates, anomaly footprint, anomaly shape and trend, track line characteristics (i.e., spatial sample density), terrain, previous intrusive information, the GPO results, and comments entered by the data acquisition crew etc. The detailed data processing techniques are described in MEC QAPP SOP-03.

3.5.1 Procedures. Several files are generated by the geophysical and DGPS systems for each site surveyed. These data files are stored on the data logger(s) and DGPS receiver during data acquisition activities. The following file types were generated for each survey:

- Geophysical data file with signal intensity and position (relative or absolute) measurements and DGPS positioning coordinates
- Digital photo files (*.jpg)
- DGPS raw data containing code and carrier phase data, position data, and site identification.
- All EM61 data files were electronically logged upon receipt. The following items were recorded in an Excel spreadsheet for each EM61 file collected:
  - AOC
  - Grid or GPO, etc.
  - Geo Team designator
  - Date collected
  - EM61 file name

For each dataset, the following information was tracked on an Excel spreadsheet:

- Date the EM61 data was processed
- Initials of the data processor
- The grid file name

After the data was interpreted, the selected target anomaly locations were sent back to the Adak Data Management Center. The target anomaly locations were added to the project database and the following information was added to the Excel spreadsheet:

- Date anomaly file was received
- Number of anomalies
- Date anomaly data was added to project database.

In addition to the Excel tracking spreadsheet, all files were digitally tracked and uploaded to and downloaded from Adak. The processing parameters and results were documented in digital computer files so that the sequence of events could be reconstructed and analyzed at a later date, if necessary. This level of documentation assists in ensuring that the overall process is repeatable. Geophysical data interpretation parameters (i.e., picking threshold) were established from the Navy QA calibration lane. Parameters including anomaly mV selection threshold, signal to noise ratio, signal strength, response size and target size were evaluated and values determined.

The automatic target selector amplitude was set to a value that is determined during analysis of the data from the GPO. The smallest item of interest was a 37 mm projectile. The interpreter did not attempt to differentiate MEC items from non-MEC items. If the interpreter selected any anomalies that had a high probability of being an artifact of the data acquisition and/or data processing sequence, they entered a comment in the interpretation file (e.g., noise due to coil bump).

3.5.2 Documentation. Once processing of the geophysical data was completed, the results were reviewed by the Data Manager. All processing and validation of the geophysical data was entered into the Adak Grid Tracking sheet (Microsoft® Spreadsheet as described in Section 3.5.1). Geophysical data on the data management computer was archived daily. The archive disks were stored in a fireproof safe. Maintenance of the backup data was verified by the Site CQC Representative. All geophysical data was stored on a dedicated server where the data were backed up using a distributed daily/weekly backup protocol. A data security and disaster recovery plan was maintained for this project.

3.5.3 Quality Control. Once the initial geophysical anomaly analysis and interpretation was completed, the pre-processed data and initial dig sheet were delivered to an independent QC team for QC reprocessing. This QC was performed using the same procedures and the initial processing. Once the independent analysis was performed, the anomaly selections were compared to the initial dig sheets. The QC processors added any additional picks to the dig list annotating them as 700 series picks. Any anomalies that were in question were marked for re-evaluation and in consultation with the Project Geophysicist were removed from the dig list if appropriate. If the number of additions plus deletions were greater than ± 20 percent of the number of initial picks, the independent QC worked with the Project Geophysicist to perform a root-cause analysis and implement corrective actions. As the initial and QC dig sheet(s) were finalized, they were sent to the Government's QA contractor for concurrence on the anomaly picks. If differences were identified, a consensus was developed and any additional picks identified in the QA review were added to the dig sheet. The final approved dig sheets were forwarded to the Project Geophysicist and the Data Manager. Following data processing procedures, this information was sent back to the site for reacquisition procedures to commence.

All daily quality control tests (morning and afternoon static, latency test) required verification by the data processors on a daily basis. The results from the daily QC tests were evaluated against project data quality objectives (DQOs). All results from the QC tests were recorded and entered into the Adak Grid Tracking sheet. The QC procedures applied during the processing phase of the project were performed each day in the field to ensure the integrity of the data. Data that are not of sufficient quality and quantity to meet the project objectives were documented and recollected, if necessary.

3.6 Target Reacquisition

Procedures for UXO team target reacquisition and investigation are specified in MEC QAPP SOP-04.

3.6.1 Procedures. A target list with the DGPS coordinates would be provided to the reacquisition team leader at the beginning of each workday. Teams were to:

- Use the GPS to navigate and occupy the coordinate position provided from the DGM data;
- Place the DGPS over the interpreted location and record the coordinates;
- Mark the interpreted location using a pin flag;
- Interrogate the position using the reacquisition sensor (Vallon);
- If needed, search within a 2.5 foot radius of the interpreted location;
- Mark the reacquired location;
- If there was no instrument response from the Vallon, attempt to reacquire the anomaly using an EM61. If there still was no response from the EM61, mark the interpreted location and refer this location to the project geophysicist. If, after review by the geophysicist, the position was determined to be a no-find it was recorded as such.
- Post-excavation, the UXO team was required to store the coordinates of the reacquired location and then log the position of the material which was excavated from the position.

3.6.2 Documentation. The DGPS data logger was programmed to record the data and populate the feature attribute fields for each anomaly investigated. The anomaly information was downloaded electronically from each data logger at the end of each day.

3.6.3 Quality Control. The Data Manager generated an Intrusive Data/MPPEH/MEC Acquisition and Accountability Log Form (digital), daily for review by the SUXOS and the UXO Quality Control Specialist (UXOQCS) the following day. For each target reacquired, a GPS point was recorded in the DGPS and entered into the geo-database for verification that the proper anomaly was reacquired. Functionality of the EM-61 was also checked and recorded daily.

3.7 Intrusive Operations

3.7.1 Procedures. Intrusive investigation of target anomaly locations were conducted during the 2008 and 2009 field seasons only (Figure 3-2). No intrusive investigations occurred during the 2010 field season. UXO team assignments were scheduled and coordinated by the Project Superintendent and SUXOS.

Figure 3-2. Personnel Performing Intrusive Operations

During 2008, each UXO team performed its own anomaly reacquisition, therefore seven-person teams consisting of one UXO III, three UXO IIs, and three UXO Is were used. In 2009, two independent reacquisition teams were formed so the intrusive teams consisted of five-persons comprising one UXO III, two UXO IIs, and two UXO Is. These team configurations provided for either two or three, two-man dig teams, a team leader and, in the 2008 configuration, a two-man reacquisition team.

Dig sheet information was loaded into each UXO team's DGPS rover unit. Hard-copy grid maps accompanied the dig sheet information. Each UXO team performed a daily equipment function check at a designated Function Check Area (FCA) or at locations authorized in the MEC QAPP SOP. Radio communications were checked and maintained throughout the day, and the location and activity of each team was monitored at the contractor base. Access to the work sites was restricted and coordinated by radio through the contractor's base. Permanent exclusion zone (EZ) barricades and signage were positioned at key road intersections at the beginning of the field season and remained in place, as recommended by the City Council, and in all cases met or exceeded the safety requirements established in the ESS. All non-essential personnel remained outside the EZ during periods of intrusive activity, and UXO teams, working in the general vicinity of each other, maintained the required minimum separation distance.

The 2010 field season team consisted of one 12-man team, with a SUXOS for oversight. Work centered on verifying the effectiveness of erosion controls used in 2009, backfilling open excavations within the AOCs, final grading and reseeding all trails both inside and outside of the AOCs in accordance with MEC QAPP SOP 5 and the EPP/WMP

Conex box(es) were located adjacent to AOC MM-10F and MM-10G to store equipment and supplies needed for all the field production teams. Each field team would proceed to the conex location and, based on their work assignment, load their equipment into their Argos for the day's assigned tasks. The team verified that the EZ barricades were in place. At this time, the team proceeded to their assigned work area. Each team reported its commencement and termination of intrusive operations via radio notification. Adak emergency medical personnel were notified daily of field operations and provided a field radio to expedite medical response coverage/time.

The general intrusive investigation steps are outlined below.

- Establish the EZ.
- Each two-man dig team acquired a pin flag which was left by the reacquisition team and verified the target number on their data controllers. The reacquisition teams wrote the target number on the pin flags.
- Anomalies were pin-pointed using a hand-held detector (Vallon or White's) and investigated until the suspected target anomaly source was found.
- If no anomaly was detected with the handheld metal detector, then the EM-61 was used to verify that the anomaly location was a "No Find" and this information was entered into the data logger. All no finds were re-checked by QC using the same type instruments.
- Target anomaly removal verification was conducted using an EM-61. The operator confirmed a post-excavation response of less than the established milliVolt (mV) threshold. The EM-61 data were collected in analog mode by going over the anomaly location in multiple directions.

- Once the target anomaly was removed (or multiple target anomalies in one excavated target area removed), the Team Leader inspected the excavation to ensure that the target anomaly (or anomalies) present within the required dig area/depth had been removed.

- MPPEH was staged at a central location within the work area pending transportation to the storage area.

- If any of the anomalies discovered were identified as MEC, the identification was recorded and the item marked, and the SUXOS was notified.

- During the 2008 field season, upon completion of the intrusive investigations, all of the excavations were backfilled. In 2009, only about 30% of the excavations were backfilled following intrusive investigation. In 2010, all of the remaining 2009 excavations were backfilled.

All intrusive investigations were hand dug. At the end of each day, the UXO team leaders debriefed the SUXOS on their fieldwork accomplishments and returned their PC card and digital camera memory cards to the database and GIS manager for downloading into the project database and GIS.

3.7.2 Documentation. Team Leaders used checklists to ensure an appropriate review of all procedures and safety measures, and that necessary equipment was on-hand to perform operations safely and effectively. Checklists included:

- A daily team vehicle maintenance inspection checklist;
- A MEC equipment checklist;
- A tailgate safety briefing at the work site to detail safety and site-specific procedures.

The checklists were completed by each team each day, whether that team worked in one AOC or several during that period.

Anomaly data were either recorded on a PDA by the Team Leader, using pull-down menus or manually on data collection dig sheets. The Team Leader completed all fields in accordance with the pull-down menu instructions. At the end of each day, the Team Leader turned in the PDA to the Data Manager who reviewed the results with the Team Leader, checked the data for completeness and accuracy, and downloaded the data to the project database.

Anomaly information was tracked using a Grid Data Tracking Log and a MEC Log. The Grid Data Tracking Log is located in Appendix K and the MEC Log is located in Appendix M, Ordnance Accountability and Inventory Log. These logs were updated from UXO team documentation and from intrusive data recorded on PDAs. The data reported included target numbers (when applicable for DGM clearance), location, depth, orientation, and the item’s nomenclature. A grid anomaly matrix plan view map was maintained, which is shown per AOC in Appendix A

3.7.3 Quality Control. QC for intrusive investigations comprised the following activities (Figure 3-3):

- Verify that the intrusive teams investigated all targets provided on the dig lists;

- Verify that the investigation results were reported using the PDA or accountability log;

- Review of 100% of the intrusive investigation results by a geophysicist to compare the dig results with the geophysics data;

- Review of 100% of the no-finds by the geophysicist;
- Re-check of 100% of the no-find targets by the QC team;
- Nominal 5% re-check of all completed excavations by the QC team;
- Re-checks of additional completed excavations if the MilSTD 1916 criteria were in 'tightened' status (e.g., Verification Level IV);

Figure 3-3. Quality Control

In September 2009, additional QC checks above and beyond the MilStd requirement were added to address non-conformances. MEC QAPP SOP-11 was prepared and implemented. The results of the MEC QAPP SOP-11 work are presented in Chapter 7.

If no discrepancies existed or after all anomaly results were deemed complete and satisfactory, the data were submitted to the Quality Control Manager (QCM) for final review. The QCM generated a QC report for each completed grid and delivered the QC report, the final target map, and final dig list to the QA contractor.

During the 2010 field season, QC was conducted in real-time with 100% verification of restoration activities (Figure 3-4). QC maintained a separate GPS track log of the team activities and documented the work in a Daily Quality Control Report (DQCR).

Figure 3-4. Personnel Performing Site Restoration Activities in MM-10G

<u>Step Outs</u>: Per MEC QAPP SOP 5, if MEC was discovered within 15 m of the AOC boundary, the procedure for establishing a 15 m buffer was implemented as defined in the MEC QAPP 17-7. This procedure required establishing a new 30 m × 30 m mini-grid centered on the located MEC. The mini-grid was investigated exactly the same as the main body of the AOC (e.g., 100% DGM, intrusive investigation, etc.).

<u>Failure Criteria</u>: The failure criteria for OU B-1 were locating, during QC, any MEC item, a piece of metal equivalent to or larger in size than a 37-mm MEC item, or failure to detect and recover a Blind Seed Item (BSI).

The QCM prepared a report for each grid which accepted the grid as complete and documented the results from the QC checks. The reports, prepared by grid, list the following information:

- The number of targets investigated by the MEC team
- The number of targets, by target number, the QC staff inspected
- The number of "no finds" or false positives, if any, encountered
- The targets, by number and mV reading, inspected because the anomaly type (items recovered) did not match what would have been expected because of the mV reading
- The number of recovered MEC, if any, that required disposal
- Any inaccessible areas encountered in the grid
- Verification that sloped areas initially labeled to be 30 degrees or more were correctly identified.

3.8 MEC Disposal

All MEC or MPPEH that contained explosives or MPPEH that could not be positively determined not to contain explosives were disposed of by detonation using an explosive donor charge. Disposal techniques included blow-in-place (BIP) of individual items or consolidated detonation of multiple items (Figure 3-5).

Figure 3-5. Setup for a Blow in Place MEC Disposal

3.8.1 Procedures. The explosives were shipped to Adak via barge (2008) and by air shipment (2009). While on Adak, the explosives were stored in an approved and sited explosives magazine located adjacent to Power Plant #5. Personnel maintained the explosives in accordance with the requirements in NAVSEA (2001). Tasks included initial inventory and accounting for the explosives shipped, regular inventory once on Adak, creation and maintenance of magazine data cards, and secured storage in the magazine. Explosives for operations consisted of jet perforators, detonating cord, and electric blasting caps.

All technicians assigned to, or working with, disposal teams attended a site-specific orientation to review MEC disposal and emergency response procedures. The demolition team conducted checks of the demolition equipment and the vehicle used for transporting the donor explosives.

Weather permitting, disposal operations were conducted on a weekly basis. All demolition operations were conducted in accordance with MEC QAPP SOP-07, and coordinated with the Navy QA and local authorities.

In 2010, two items were found. One item was located outside of AOC MM-10G, and the other inside AOC MM-10F. U.S. Navy EOD personnel (EOD Detachment NW) were on Adak at the time these were found and the items were turned over to them for disposal.

3.8.2 Documentation. Documentation for disposal operations included checklists and explosive receipts; accountability records; and magazine inspection results.

3.8.3 Quality Control. The SUXOS and QC staff verified that all MEC disposal operations were conducted in accordance with MEC QAPP SOP-07 and approved procedures.

3.9 MPPEH Certification, Flashing, and Disposal

The term MPPEH includes all material that may also be categorized as 1X, 3X, or 5X scrap, or non-MD.

3.9.1 Procedures. As described in Section 5.5 of MEC QAPP SOP-05, all items classified as MPPEH or non-MD underwent a (minimum) four-step inspection process to certify/verify its condition (Figure 3-6). The four steps are summarized as follows:

Figure 3-6. MPPEH Certification and Verification

(1) Items will be inspected by the person(s) locating the item.

(2) A second team member verified the identification and determined the items initial classification (1X, 3X, 5X).

(3) The UXO Team Leader inspected the material and verified the assigned classification (1X, 3X, 5X).

(4) The SUXOS performed an inspection of the material and made the final certification and verification.

The UXO team leader inspected 100% of all items removed to ensure that the materials contained no energetic material. The approximate weight and general description of scrap metal was recorded in the data controller as items were uncovered. Scrap was gathered at frequent intervals and transported to a designated collection point at the end of each day.

At least weekly, the SUXOS and one other field management person (Site Supervisor, UXOSO, or UXOQCS), along with a QA representative, conducted a 100% inspection of all MPPEH. The QA representative verified that all certified 5X materials were free and clear of explosives prior to TFU operations. During any of these inspections if a high explosive (HE) was encountered, the requirements of MEC QAPP SOP-05 for MPPEH handling were applied and the material was transported to the magazine.

MPPEH scrap and non-MD scrap were placed in separate containers to prevent accidental co-mingling. The materials were secured in a locked facility pending processing. Fifty pounds of 5X-certified metal were processed at a time. The metal was heated and held at temperature for the required duration (15 minutes). Using the EXSPRAY test kit, a minimum of five flashed MPPEH items from each batch were checked to verify that they were free of explosives. If the test sample indicated that trace explosives were present, the batch was re-processed. When the material passed the EXSPRAY test, it was weighed, re-barreled and sealed. A final inspection of each barrel was conducted with a QA representative prior to the placement of seals. The QA representative verified that all of the materials were properly flashed and that the containers were properly sealed.

3.9.2 Documentation. The TFU Team Leader conducted pre-operational checks of the TFU, personal protective equipment (PPE) and safety equipment at least daily, and documented the results of the checks in the TFU Team Leader logbook.

3.9.3 Quality Control. QC verified that the TFU was operated in accordance with MEC QAPP SOP-07, and that post-burn inspections were properly performed and documented on the checksheets.

3.10 Donor Explosive Handling and Storage

3.10.1 Procedures. In accordance with Section 6.9 of the TMP, the ESS, and MEC QAPP SOP-08, a Bureau of Alcohol, Tobacco, and Firearms (BATF) Type 2 explosive magazine was utilized for storage of donor explosives.

At a minimum, the SUXOS, along with a different UXO-qualified individual conducted a weekly inspection of the magazine to ensure its security. Withdrawals from the magazine were conducted by authorized personnel on an ‘as needed’ basis to support operations.

3.10.2 Documentation. Documentation included certification that the magazine was installed and grounded correctly, explosives issue and turn-in documents, and weekly magazine inventory and inspection results.

3.10.3 Quality Control. The SUXOS and QC staff inspected operations to ensure that all explosives handling-related operational activities were conducted in accordance with the prescribed requirements. QC was required to perform weekly explosives inventories with the SUXOS and another person in accordance with MEC QAPP SOP-08.

3.11 GPO Area Step-Outs

Step-out grids were placed in AOC MM-10E, adjacent to the GPO because MEC and MPPEH were found during GPO installation. A GPO step-out plan (dated August 14, 2009) was prepared and approved for the DGM collection and the intrusive investigation procedures.

3.11.1 Procedures. The Adak Project Team decided that since the MEC and MPPEH were found in MM-10E and that all of the previous MM-10E work was conducted in accordance with the Remedial Action Design Work Plan (RADWP) prepared by Environmental Chemical Corporation (ECC, 2004) then the work should follow the RADWP procedures vice the procedures in effect for OU B-1 MM-10F, -10G and -10H. However, the GPO Step-Out Plan incorporated elements from both the RADWP and the OU B-1 MEC QAPP and SOPs in its final version.

Under the RADWP approach, a 30 m × 30 m mini-grid was established, centered on the item (37 mm projectiles) and a geophysical survey was performed with the lanes spaced 5 m apart. The DGM was conducted following MEC QAPP SOP-02. Intrusive investigation of anomalies from the DGM data was performed in accordance with MEC QAPP SOP-05. Disposal of MEC/MPPEH was in accordance with MEC QAPP SOP-07.

3.11.2 Documentation. Geophysical survey team personnel documented their various field activities according to the procedures outlined in MEC QAPP SOP-02, Attachment 1. For each grid mapped, a field sheet was filled out that included the grid ID, grid characteristics, file name used to collect the grid, weather, etc. At the end of the day, field books and grid sheets were scanned and forwarded with the digital data for processing. Both a digital and a hard copy of these forms were kept on site.

3.11.3 Quality Control. Geophysical survey teams performed a set of quality control tests each day of field collection in accordance with MEC QAPP SOP-02, Attachment 1. QC for the intrusive investigations was performed in accordance with MEC QAPP SOP-05.

Section 4.0: DFW-SPECIFIC PROCEDURES – MUNITIONS CONSTITUENTS

Table 4-1 cross-references the DFWs to where they can be found in the approved work plans and where the performance requirements can be found in this report.

Table 4-1. Crosswalk from DFWs to Project Requirements

Definable Features of Work and Subtasks	MC SAP Worksheet	MC SAP MEC QAPP SOP	AAR Section
Sampling	14, 17, 18, 19, 20, 21	FP-01, FP-02	4.1
Documentation	22, 29	FP-03	4.2
Analysis	23, 24, 25, 26, 27, 28, 29,30	FP-10	4.3
Assessment/Audit	31, 32, 33		4.4
Data Review	34, 35, 36, 37		4.5
Data Management	11, 12, 29		4.6

4.1 Sampling

Sampling locations for MC were chosen based on the presence of breached munitions and/or visual observation stained soil in the vicinity of the breached munitions as required by Worksheet #14.

4.1.1 Procedures. The procedures in FP-01, Soil Sampling, describe the safety requirements, techniques, methods, equipment, and instruments that shall be employed to conduct soil sampling activities for MC. Safety precautions required an employee or subcontractors' entrance into the area be approved by the SUXOS, due to the inherent danger of unexploded munitions and partial detonation of ordnance. The sampling team was escorted by a UXO technician to ensure the MEC avoidance using a handheld metal detector to scan the sample area. The sampling techniques were determined based upon the location and number of items determined to be breached as explained in Table 1 Multi-incremental Sampling (MIS) Scenarios in the MC Sampling and Analysis Plan (SAP).

Soil sampling was performed using three different basic methods:

- Biased grab: Biased grab samples were collected in areas determined to have the greatest release of MC.
- Five-point composite: Five-Point was used for subsurface breached munitions locations and for post excavation confirmatory sampling.
- MIS: MIS samples were taken from the top 3 inches of soil after clearing the debris however vegetation was included in the sample.

Any visible chunks of explosives were collected by the UXO personnel; consolidated with other munitions for weekly disposal. The sampling team surveyed the area for visible staining, if observed a sample was collected to determine if explosive soils were present. Explosive soils are considered to be soils with explosives concentrations in excess of 10 percent. The field test kits EnSys® (Method 8515 and 8510) testing for trinitrotoluene (TNT), and hexahydro-1,3,5-trinitro-1,3,5-trazine (RDX) were used to determine soil concentration percentage. Soil samples were analyzed in a Navy-approved laboratory by U.S. EPA Method 8330B. Upon receipt of validated analytical data, the results were compared with cleanup levels to determine if additional excavation was necessary. MC QAPP MEC QAPP SOP FP-02 established the safe packing, preservation and shipping of samples associated with the soil sampling activities. The site was restored after sampling activities were completed.

4.1.2 Documentation. The requirement for documenting sampling is outlined in FP-01 and MC SAP Worksheet 29. The requirements include chain of custody (COC) forms, sample labels, and the field logbook entries taken during the field activities in accordance with procedures listed in the Work Plan. The documentation included recording the sampling point or sampling grid corners, records of the broken munitions and/or stained areas were photographed and the digital photograph referenced to its DGPS positions by the UXO team. The immediate surroundings were documented and added to the field logs. The information was forwarded to the Navy for review and made a decision determining whether sampling were necessary of the area. Whenever subsurface sampling activities were necessary documentation, after excavation and confirmatory samples analytical results from Method 8330B were determined to be below the cleanup levels, a photo-document and description of the area was added in the field log book. Samples prepped for shipping were noted in the field log book for shipping records. The COC form was placed in a sealed zip-lock bag and placed in the cooler. COC forms and sample data are located in the Data Validation Package in Appendix N.

4.1.3 Quality Control. The sampling QC requirements included collecting rinsate and source blank samples. The frequencies of the source blanks were included for each source of water, and one rinsate for each type of sampling activities performed. The samples were analyzed for the same parameters as the associated samples. Sample volumes were taken for matrix spike/matrix spike duplicate (MS/MSD) at a frequency of one set per 20 samples; MIS triplicate samples were collected at a frequency of one per 10 samples and field duplicate samples were taken at a frequency of one per 20 samples for the five-point composite method used. The analyses were performed in accordance with method requirements and as specified in the Department of Defense (DoD) Quality Systems Manual (QSM) Final Version 3.0. The coolers and the lids were wrapped twice with tape, affixed sign custody seal over the edge at the front and rear.

4.2 Documentation

The site logbook was a controlled document that recorded all major on-site activities. The logbook became part of the permanent project file maintained in the project office. The information contained in the site logbook may be admitted as evidence in legal proceedings, therefore this document has been properly maintained.

4.2.1 Procedures. FP-03 dictates the activities/events kept in the controlled site logbook. The logbook was defined as a bound notebook with consecutively numbered pages that cannot be removed. The logbook was initiated at the start of the first on-site activity. Upon entry if data, the logbook required the signature by the responsible site leader. Photographs taken at the site for documentation was recorded in the site logbook or a field logbook. The name of the photographer, date, time, site location, site description and weather conditions as the photographs are taken. The accepted standard for the Adak project is a digital photography. A series entry was acceptable for rapid-sequence photographs. Electronic files of photos were named in a manner to allow easy reference to the logbook entries. A DGPS was used to document the coordinates of each sample location. Each sample had a unique identification and photographs were taken of each sample location. The Project Chemist completed the packaging and COC documentation for the collected MC samples. The samples were then labeled and packaged for shipment off-island.

4.2.2 Documentation. The cover of each site logbook included the project name, Navy project number, contractor charge number, site personnel names, and sequential book number, start and end date. Daily entries included at the beginning of the day were the date, start time, weather conditions, and field personnel present. During the day the following activities was recorded in the site logbooks; arrival/departure of visitors, major site equipment, sample and waste shipment information including but not limited to shipping manifests, COC form numbers, carrier, air bill numbers, and time. A summary of activities, level of personal protection equipment, log sheet numbers, start and completion times of individual activities, health and safety issues. All entries was made in waterproof black pen, any corrections needed were crossed out with a single line, initial and dated. COC forms, sample labels, field forms, and field logbook entries were completed during the field event. Upon the completion of entries the logbook was signed.

4.2.3 Quality Control. The logbook was reviewed by a quality representative (Project QCM or designee) at the end of each day.

4.3 Analysis

The samples were analyzed by an off-site laboratory (Agriculture and Priority Pollutants Laboratories, Inc. [APPL]) to determine if chemicals of potential concern (COPCs) were present above action levels. All soil samples were analyzed for explosives by U.S. EPA SW 846 Test Method 8330b at the laboratory (APPL). Once the samples were analyzed, they were properly disposed by the laboratory.

4.3.1 Procedures. Analytical MEC QAPP SOPs used in the remedial activities included both screening and definitive methods. The screening methods used during the field efforts included both SW 846 Methods 8515 and 8510 determining the presence of TNT and RDX with a spectrophotometer instrument. The definitive method SW 846 Method 8330B, Nitroaromatics, Nitroamines, and nitrate esters analyzed for explosives and propellants using the instrument high performance liquid chromatography (HPLC) at the off-site laboratory APPL. The calibration procedures for the spectrophotometer were performed according to Adak FP-01, and the HPLC was performed according to Method 8330B.

4.3.2 Documentation. As specified by the MC SAP Worksheet #29, the Sample Run Logs and Sample Analysis results forms, as part of a definitive data package, were required documentation for this DFW. COC forms, inspection logs, sample data, calibration data, raw data etc., are located in the Data Validation Package for U.S. EPA 83330B Explosives in Appendix N.

4.3.3 Quality Control. In accordance with the MC SAP Worksheet #28, laboratory QC samples and field QC samples were performed for MC sampling which included collection and analysis of a duplicate sample and analysis of a MS/MSD sample, as described below.

- **Field Duplicate Samples -** The purpose of field duplicates is to gauge the variability in laboratory-reported sample results from a single sample location and interval. Field duplicates were collected at a frequency of one set per 20 samples. Extra sample volume was collected at the designated field duplicate location. The volume was then divided equally between sample containers, with one set of containers marked with the actual sample identification number and the second, field duplicate sample set marked with a different sample identification number.
- **MS/MSD Samples -** The purpose of MS/MSD samples is to evaluate the quality of laboratory analytical methods. Extra volumes of samples are typically required for MS/MSD protocols. However, because of the volumes of soil that were required for the Method 8830B, no extra volume was required to make up the MS/MSD samples for soil. MS/MSDs were evaluated by the laboratory at a rate of one set per 20 samples.

Dedicated and disposable sampling equipment was used to collect the five-point sample (one sample from bottom of excavation and four from sidewalls) and follow-up samples. Therefore, no source or equipment blanks were collected. Each sample was individually identified and labeled after collection, then sealed with custody seals and enclosed in a plastic cooler. The sample information was recorded on chain-of-custody forms, and the samples were shipped to the laboratory (APPL) via express delivery service. The project chemist completed the packaging and COC documentation for the collected MC samples.

4.4 Assessment/Audit

4.4.1 Procedures. There were various assessments completed throughout the project including an Operational Readiness Review, Field Observations/Deviation from TMP, On-site Laboratory Readiness Assessment, and Laboratory Technical Systems/Performance Audits according to the QAPP Worksheet #31 Planned Project Assessment Table. The following audit objectives and procedures were followed for MC sampling:

- Ensured that the sampling methods/procedures outlined in the MC SAP were followed, and that any deviations were noted / approved.
- Determined potential impacts from noted/approved deviations, in regard to project requirements.
- Examined COC forms against project requirements (analytical methods, sample identification, etc.).
- Examined packages against project requirements and COC forms (holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).
- Determined potential impacts from noted/approved deviations, in regard to project requirements (e.g., precision/accuracy).
- Compared results of field duplicate sample analyses with relative percent difference (RPD) criteria.
- Field notes were reviewed periodically to determine completeness, appropriateness, ease of understanding, etc., of information recorded. Upon completion of fieldwork, logbooks were placed in the project files.
- COC forms were reviewed against the samples packed in the specific cooler prior to shipment. Original COC forms were sent with the samples to the laboratory, while a copy was retained for the project files.
- Sample receipt and log-in summaries were reviewed to determine potential receipt issues that may impact data quality and for consistency with the COC forms.

4.4.2 Documentation. The documentation of any deficiencies found during the assessments was handled within the timeframe for response according to the MC SAP Worksheet #32 Assessment Finding and Corrective Action Responses with the required response documentation listed on the QAPP Worksheet #32 also. The consequences of the correction action ranged from a checklist, logbook, field change page, corrective action matrix or corrective action report.

4.4.3 Quality Control. In accordance with MC SAP Worksheet #32, the individuals were notified of the specific findings, with an expected response timeframe from the assigned personnel.

4.5 Data Review

The analytical data were reviewed in accordance with QAPP Worksheets #34 through #37 by the laboratory prior to release to the selected contractor. Third-party Level III data validation was performed by an independent data validation firm using data validation procedures and guidance specified in Naval Facilities Engineering Command Northwest's (NAVFAC NW's) *Standard Operating Procedure (MEC QAPP SOP) for Navy Environmental Information Transfer, Version 4.0* (per Data Validation

Procedures in the Field Standard Operating Procedures section) (U.S. Navy, 2008), *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA 1999), and *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (U.S. EPA, 2004).

4.5.1 Procedures. The data review processes entailed two steps and the data usability assessment processes. The following data review objectives and procedures were followed for MC sampling:

- Data packages were reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.
- Data packages were reviewed by the validation firm.
- Data validation reports were reviewed by the Project Chemist.
- Electronic laboratory data and field data were reviewed for consistency with the hardcopy information.
- The validated analytical results were compiled in a tabulated summary. Entries were reviewed/verified against hardcopy information.

4.5.2 Documentation. As stated on MC SAP Worksheet #34, copies of all audit reports were placed in the project file. The data validation report is also required to be placed in the project files.

4.5.3 Quality Control. The third party validation was determined to be a more stringent data review compared to filling in ADEC-required checklists; therefore the third party validation reports replaced the ADEC checklist. The validation criteria consisted of items with the following: MC SAP Worksheets #11, #12, #15, #19, #24, #28, CLP Functional Guidelines Level III, and requirements of the manufacturers guidance document/SOPs are met and SW 846 Methods 8515 and 8510.

4.6 Data Management

Data management included maintaining field logbooks, COC forms, sample labels, and shipping records and storage of the hardcopies of data both field-and/or laboratory-related. There were five established data managing categories for documents and records consisting of sampling collection, on-site analysis, off-site analysis, data assessment and other. The various documents and records are listed on MC QAPP Worksheet #29.

4.6.1 Procedures. Hardcopy data (field-and/or laboratory-related) will be stored in the project files after undergoing processing/review. As specified in QAPP Worksheets #11 and #12 NAVFAC NW's *Standard Operating Procedure (MEC QAPP SOP) for Navy Environmental Information Transfer, Version 4.0*, a copy of the hardcopy laboratory data packages was sent to NAVFAC NW's designee for temporary storage and processing. The hardcopy will then be submitted to the National Archive and Records Administration for 50-year storage. The laboratory-generated Naval EDD containing analytical results was submitted by the contractor to URS, Inc., who archives electronic data in the Navy's database, the Navy Installation Restoration Information Solution.

4.6.2 Documentation. No specific documentation is required for this DFW.

4.6.3 Quality Control. No specific QC is specified for this DFW.

Section 5.0: PROJECT QUALITY CONTROL

Presented in this section is a discussion of the overarching QC procedures used during the OU B-1 remedial action. They are discussed in the following subsections:

- Project QC Methods and Documentation
- DFW Documentation and QC Cross Walk
- Regulatory and Naval Ordnance Safety and Security Activity (NOSSA) Audits
- AOC Certification Process

5.1 Project QC Methods and Documentation

5.1.1 Three Phases of Control Methodology. QC was implemented using the three phases of control methodology which incorporates inspections at critical points in the work process. The inspections are Preparatory, Initial and Follow-up.

- A preparatory phase inspection was performed prior to beginning each DFW. The purpose for this inspection was to review applicable specifications and verify the necessary resources, conditions, and controls were in place and compliant before the start of work activities.
- An initial phase inspection was performed at the beginning of each DFW. The purpose of this inspection was to observe/review the application of procedures to ensure their adequacy, ensure that adequate resources were applied to the activity and that a clear understanding existed as to the quality control requirements of the DFW.
- Follow-up inspections were conducted to ensure that procedures were being correctly performed, no changed conditions existed which may have impacted the quality of work, and lessons learned were being applied as they were identified.

A Three-Phase Inspection Checklist was developed for each DFW. The Three-Phase QC Checklist incorporated the Preparatory, Initial, and Follow-up QC inspection phases into one combined form. This QC checklist documented that all the pre-operational actions delineated on Worksheets #34 and #35 had been met and that each field team was prepared to conduct field MEC clearance operations.

Whenever deficiencies were identified, a “Deficiency Notice” was developed, and provided to the Site Superintendent. Site Geophysicist, and the SUXOS (as appropriate) for corrective action. A record of the completed checklists was maintained in the site QC file, reported in the DQCR, and discussed in the Weekly QC Meeting.

5.1.2 Daily Production and Quality Control Reports. The Site Superintendent prepared a daily Contractor Production Report (CPR) of site activities that included data provided by the UXO teams, the Project Geophysicist, the UXOQCS, the QCM, the SUXOS, and the UXO Safety Officer (UXOSO). These reports, which provided real-time updates of project status, summarized the following information:

- CPR details on weather, man-hours, production activities, MEC encountered, etc.
- Locations and descriptions of the work being performed (e.g., DGM, intrusive operations, etc.)
- Numbers of personnel onsite
- Summary of the work being performed.

The UXOQCS developed a DQCR that summarized the daily production activities and the QC activities conducted, any tests performed, materials or equipment that received inspections, and any deficiencies noted with proposed or implemented corrective actions. These reports are archived in Appendix E.

These reports were provided daily to the Navy Technical Representative (NTR) and posted to the project shared Web site for review and information.

5.1.3 Weekly Summaries and QC Meetings. Throughout the field effort, weekly QC meetings were conducted to discuss current operations, issues, and other general information. The teleconferences were attended by various U.S. Navy, contractor, QA, ADEC and U.S. EPA stakeholders (see Appendix F, for copies of the minutes of these teleconferences, including a list of attendees). Each week prior to the teleconference, an agenda and read-ahead documents were provided to all stakeholders; this documentation included pertinent information to update all participants on the current status of field operations and possible issues that might have required stakeholder input and/or approvals.

5.1.4 Blind Seeds. To measure data collection quality, a blind seeding program was implemented. Prior to DGM, the QC team buried representative inert or simulant items in the grids at a rate of one per grid (476) in the primary AOCs. No QC blind seeds were place in the step-out grids. The geophysical mapping team did not know where or how deep these items were placed. During data processing QC review, the known locations of the seed items was evaluated. If any seed item was not selected as a target for reacquisition, a root cause analysis was performed, and the unit of production (UoP) was subject to rework. Details of the blind seed program can be found in SOP-02.

5.1.5 Intrusive Investigation QC Process. Worksheet #36, Section 36.5.2 of the MEC QAPP required QC inspections after each grid or step-out was completed. Three categories of intrusive results were checked: (1) no finds; (2) comparisons of dig results to amplitude and, (3) random target inspections. The requirement was for all no finds to be checked. Reported dig results were compared to the DGM amplitudes and inconsistencies were selected for re-inspection. An across-the-board 5% of the geophysical anomalies in each grid were checked. The coordinates for targets selected for QC check were loaded into the QC team's DGPS controller. The results of the QC checks were recorded digitally in the same controller. At the end of each day the information from the controller was downloaded and integrated into the project GIS.

The number of random checks required in each grid was determined based on MilSTD 1916 (DoD Test Method Standard). MilSTD 1916 requires a specific number of random inspections of product (e.g., completed excavations) based on the desired verification level (e.g., normal, tightened or reduced) and the total number of units (e.g., excavations) in the inspection lot. For this project, Verification Level (VL) III (normal) was selected as the beginning point and the MEC QAPP (Worksheet #17) specifies criteria for moving to either the tightened (VL IV) or relaxed (VL II) schedule.

5.1.6 Change Control Management. Change control management is defined in Worksheet #32 of the MEC QAPP. The FCR form was used to request and document changes identified as a result of unanticipated field conditions or errors in the work planning documents. Field personnel were responsible for forwarding a request for change/revision to an existing document to the Project Manager (PM). The Project QCM determined the validity of the change/revision recommendation and, if deemed valid, forwarded the recommendation expeditiously to the SUXOS and Site Superintendent, who in turn forwarded the request through the PM for review and approval. A request for a change or revisions to an existing document followed a review and approval process that incorporated the various sections or departments to determine the validity of the request and ensure that authorized, appropriate personnel agreed to and signed the approval form for a change or revision to be completed.

The PM was the final arbiter of the validity for the recommendation within the contractor organizational chain. If deemed valid, the PM forwarded the FCR to the NTR and requested that the change be incorporated into field procedures. Documents generated were drafted, reviewed, finalized, and approved for use by the appropriate sections, to include Safety, QC, and Operations.

Once a change or revision was accepted and implemented, outdated or obsolete documents were removed from use and the change or revision disseminated and briefed to affected personnel, sections, or departments. Changes or revisions that affect other documents were briefed as well ensuring continuity between the various documents. If training was required by a change or revision, site management addressed the requirement and scheduled the necessary training, as appropriate.

Each FCR is discussed in Section 7.1.7; all FCRs generated during the field effort are located in Appendix P. FCRs were discussed weekly during the weekly QC meetings.

An FCR Log was prepared and maintained by the Site Superintendent. All FCRs were entered on the FCR Log when submitted into the approval process. The FCR Log was updated to track the approval process and to annotate the date the NTR or Remedial Project Manager (RPM) gave final approval of the request.

5.1.7 Deficiency Notices and Log. Deficiency Notices (DNs) are defined in MEC QAPP Worksheet #32 as a tool "used to document the failure to develop, document, or implement effectively any applicable element of approved plans or to follow established procedures." For the MEC removal at OU B-1, the QC team prepared DNs when problems were identified in the execution or implementation of the project plans. DNs prepared during the project provided an analysis for the cause of the deficiency. The DN and causal analysis were provided to the Site Superintendent, Project Geophysicist and SUXOS (as appropriate) for corrective actions by the production team. The Project QCM tracked the DNs through the completion of the corrective actions.

All deficiencies were documented on the Deficiency Log maintained by the Project QCM. The DNs, Deficiency Log, and causal analyses are located in Appendix P.

5.1.8 Non-Conformance Reports. Non-conformance reports (NCRs) were generated by the Navy/QA organization as a result of their surveillances and inspections. An NCR documents a deficiency that renders the quality of an item, process, or product that has been defined in the specifications or drawings as unacceptable or indeterminate. The discussion of the results/findings of the NCRs is located in NCR Resolution Document, Part 4.

5.2 DFW Documentation and QC Crosswalk

This AAR includes extensive electronic appendices containing pertinent and relevant documentation for the project. The DFW documentation and QC cross walk, are presented as matrices for each DFW discussed in Sections 3 and 4 of this report. These matrices summarize the project data collected and the party responsible for reviewing the data for completeness, incorporating it into the project files, and uploading it into the data management system. The frequency of QC audits for each DFW is also presented.

Worksheet #36 of the MEC QAPP specifies a five-step QC process for the project. These five-steps outline the requirements for verifying that the overall quality control objectives of the project were met. Table 5-1 is a summary of the five QC steps and a summary of the requirements.

Table 5-1. Summary of Five QC Steps and Requirements

QC Step	Summary of Requirements
QC Step 1 – Pre-operational team training and GPO certification	Verification of training, personnel qualifications, GPO Certification DGM and UXO teams and equipment. Preparatory Phase QC Inspections for all DFWs.
QC Step 2 – Initial and Follow-up Phase of QC Inspection and Surveillance	Initial and follow-up phase QC inspections of the project's DFWs.
QC Step 3 – Pre-intrusive operations and QC of geophysical sampling	Independent verification of the DGM target list.
QC Step 4 – Intrusive MEC Clearance and Soil Removal Operations	Follow-up QC inspection of the MEC Clearance and MC soil removal. QC surveillances and documentation.
QC Step 5 – Final Grid/UoP Inspection under MilSTD 1916	Final Grid/UOP inspection, including target checks at a frequency to meet MIL-STD 1916 requirements.

The approved TMP and QAPPs (both MEC and MC) outlined the QC management plan for the MEC clearance of OU B-1. A Quality Assurance Surveillance Plan, separate from the project documentation, was also developed that controls government surveillance, inspection and oversight of the project. The QC staff implemented the plan through the Tier 1 and 2 QC process prescribed by QAPP (MC and MEC) Worksheets #34 and #35, verified the Measurement Performance Criteria outlined in QAPP Worksheet #12, and audited the Field Equipment Calibration, Maintenance, Testing and Inspection from Worksheet #22. The QC staff documented these QC actions by completing the QC Management Reports in QAPP Worksheet #33.

Although not defined as a specific DFW, demobilization and erosion control measures are included as project requirements. However, MEC QAPP SOP-05 and the EPP/WMP were modified through FCR #19 and #20 and the SOP-05 Three-Phase QC Checklist was modified to reflect QC checkpoints for the erosion control activities.

Section 6.0: PRODUCTION RESULTS

This section of the OU B-1 AAR presents the combined results for all three field seasons. Results are presented as both narrative and in summary tables detailing each DFW, with each table indicating the reference to documentation that the requirements specified in Section 3.0 were met for the DFW.

Work was performed in all of the work elements except MC sampling during the 2008 field season. All of the surface clearance work element was completed. All of the initial DGM was completed (476 grids) and approximately 30% of the intrusive investigations were performed. MPPEH was inspected, certified, verified and processed through the TFU and stored. All MEC discovered during surface clearance or intrusive investigations were destroyed by detonation.

The remaining approximately 70% of intrusive investigations were completed during the 2009 field season. DGM, limited to step-outs, was performed. MPPEH was inspected, certified, verified and processed through the TFU and shipped off-island for recycling. All MEC discovered during intrusive investigations were destroyed by detonation. MC testing was performed at the site of two breached munitions.

The 2010 work included inspecting the dig spoils and completing the backfilling from the 2009 excavations, conducting a final walk-through of the site to remove any surface metal (3 inches or larger in any dimension), conducting an assessment of any down-stream siltation resulting from project activities and providing a written report on same, restoration of the site from project activities (vehicle-caused erosion, etc.) and final demobilization.

6.1 Munitions and Explosives of Concern

Section 6.1 presents the results of MEC removal. MC sampling and analysis results are presented in Section 6.2. Table 6-1 summarizes the documentation and QC requirements for each DFW and indicates the location of the required documentation in the appendices:

Table 6-1. Crosswalk from DFWs to Project Documentation

Definable Features of Work and Subtasks	Report Documentation Location
Mobilization/Site Preparation	
Project Plan Preparation	No documentation for Project Plan Preparation, Personnel Qualifications or Administrative Office set-up. Appendix S – QC Documentation
Verify Personnel Qualifications	
Set up Administrative Offices	
Equipment Set-up and Checkout	
Installation of Thermal Flashing Unit	
Installation of Explosives Storage Magazines	
Grid Survey and Layout	
Site Specific Training/GPO Certification	
Initial Orientation and Training	Appendix B- Training Records
GPO Certification	Appendix G- GPO Report and QA Certification
Surface Clearance Operations	
Surface Clearance of AOCs MM-10G and MM-10H	Appendix E- MEC Daily Appendix J- Logbooks and Journals; Appendix L- Ordnance Accountability and Inventory Log

Table 6-1. Crosswalk from DFWs to Project Documentation (Continued)

Definable Features of Work and Subtasks	Report Documentation Location
Geophysical Survey	
Geophysical Survey	Appendix H Geophysical Data
Data download	
Data upload to File Transfer Protocol (FTP) site	
Geophysical Data Processing/ Interpretation	
Data processing	Appendix H Geophysical Data
Initial Target Selection	
Independent QC	
Final Target Selection	
Quality Assurance (QA) Review by Navy QA Contractor	
Target Reacquisition	
Anomaly Reacquisition	Appendix B – Training; Appendix E – Daily Activities checklist for Target Reacquisition Appendix M -Explosives and MD Disposal Documentation
Anomaly Excavation	
MPPEH 5X Management	
Non-munitions debris Management	
Intrusive Operations	
Excavation of Target	Appendix B- Training Appendix M -Explosives and MD Disposal Documentation Appendix E – Daily Activities checklist for Intrusive Operations Appendix K – Grid Data
Identification/Classification of MEC/MPPEH	
Transfer of MPPEH	
Erosion Control/Excavation Backfilling/Rut Repair	
MEC Disposal	
MEC blow-in-place (BIP)	Appendix B- Training Appendix M -Explosives and MD Disposal Documentation
MEC Consolidation and Open Detonation	
MPPEH 1X and 3X Management/Disposal	
Site Restoration	
MPPEH Certification, Flashing, and Disposal	
MPPEH Inspection and Certification	Appendix M -Explosives and MD Disposal Documentation
MPPEH Flashing	
MPPEH Packaging and Transportation	
MPPEH 5X Demil and Recycling	
Donor Explosive Handling and Storage	
Explosive Storage	Appendix M -Explosives and MD Disposal Documentation
Explosive Handling	
GPO Area Step-Outs*	Appendix T – GPO Area Step-Out Data
MC Contaminated Soil Sampling, Excavation, and Disposal**	Appendix N – MC Sampling Data

*Procedures for addressing GPO Area Step-Outs (MM-10E) were added to the project under a separate GPO Step-Out Plan, which is located in Appendix T.
**This DFW was included in the MEC QAPP but refers the reader directly to the MC SAP. Although the MEC QAPP contains this DFW, it is not discussed in the MEC QAPP and refers the reader to the MC SAP. Section 4.0 contains the DFW's and requirements from the MC SAP.

The work was performed in accordance with the following project plans. Plan approval dates and revision dates, where applicable, are provided in Table 6-2.

Table 6-2. Project Planning Documents

Plan Name	Document Date	Revision Date
GPO Installation Plan and GPO Certification Plan	4/14/08 and 4/14/08	None
SHSP/APP	5/14/08	7/31/08
Technical Management Plan	5/31/08	None
MEC QAPP and MEC QAPP SOPs (except as noted)	5/31/2008	SOP-02 revised 7/17/08
EPP/WMP	5/31/08	Revised August 2010
ESS	June 2008	None
MC SAP	7/31/08	None
MEC QAPP SOP-11	8/10/09	None
GPO Step-Out Plan	Undated	None

6.1.1 Mobilization/Site Preparation. Project personnel mobilized to and from Adak on the following schedule shown in Table 6-3.

Table 6-3. OU B-1 MM-10F, MM-10G and MM-10H Field Season Dates

Field Season	Mobilization Date	Demobilization Date
2008	11 May 2008	14 September 2008
2009	7 June 2009	18 October 2009
2010	8 August 2010	19 September 2010

In 2008 and 2009, the contractor's field office was established at Bob Reeves High School. In 2010, a unit in the Sandy Cove Housing Area was utilized for this purpose. Prior to mobilization, a review of prospective field personnel qualifications and interviews by the contractor resulted in selecting qualified field personnel to staff the project. Staffing, including the superintendent, SUXOS, QC and Safety for the three field seasons fluctuated some but was roughly as follows:

- 2008 – 63
- 2009 – 28
- 2010 – 13

The number of days worked each field seasons was:

- 2008 – 96
- 2009 – 106
- 2010 – 25

In 2008, the magazine was set up on May 16, and the grounding was certified by the electrician, Jim Northcutt. The TFU was placed on May 14, but was not used to flash/verify metal that year, other than a brief training. In 2009, the magazine was set up on June 10-12, and was inspected by Jim Northcutt on June 13. The TFU was set up and inspected on July 17. Neither the magazine nor the TFU was used in 2010. A map of the location for the magazine and the TFU location is provided in Appendix A.

Civil surveying for grid layout was begun in June 2008 and was not completed until July 2008 because the field team was hindered by the snow remaining in the higher elevation portions of the project site. Survey accuracy was verified by comparing the known coordinates for the base station which was located on the schoolhouse roof (Alaska State Plane Zone 10, N 317716.769, E 3136136.106, U.S. Survey Feet) to the known coordinates for the U.S. Coast and Geodetic Survey (USCGS) Monument UW 7919, also known as "Tidal Bench Mark 18." A DGPS rover unit was used in an RTK stakeout mode to establish the grid corners. RTK stakeout mode involves navigating to a list of coordinates of the known (grid corner) points. The RTK function allowed continuous transmission of differential corrections via radio link from the GPS base station to the rover unit which allowed for a repeatable, highly accurate and precise position.

Four-hundred seventy six (476) grids were installed in the main AOCs (MM-10F, -10G and -10H). Five step-outs were installed in the main AOCs, three step-outs and three transects were installed around the GPO areas (MM-10E). Civil surveys were performed under the direction of a registered licensed land surveyor (RLS). Appendix I contains a table of all grid, step-out, and AOC boundary coordinates.

For the 2010 field season, formal civil survey of the work areas was not performed. Handheld mapping-grade (e.g., meter-accurate) GPS units were used to reacquire grid corner points. To overcome the inherent inaccuracy in the handheld units, boundaries were placed at least 10 feet beyond the coordinate locations indicated on the GPS.

6.1.2 Site Specific Training/GPO Certification. All personnel received training on the operational, health and safety and equipment operations within the first three days of their arrival on site. The training included classroom and outdoor practical exercises. Additionally, personnel training records, and certifications, were reviewed and verified. This was completed by the Program QCM. GPO testing and certifications were completed during the second and third weeks on site. Initial training was performed in 2008 on May 25, 2008 (Advance team), June 6, 2008 (Main crew) and periodically thereafter as new personnel mobilized to the work site. The Advance team was comprised of the senior managers of the UXO and Geophysics disciplines, as well as office staff. This team performed initial office set-up, and other preparations for the subsequent field crews. Initial training was performed in 2009 on June 24, 2009 for the Main crew and periodically thereafter as new personnel mobilized to the work site. Initial training was performed in 2010 on August 17, 2010. Copies of all initial training sign-in forms are provided in Appendix B.

Table 6-4 shows the teams and relevant dates of GPO certification for the DGM and reacquisition teams for the 2008 and 2009 field seasons. No GPO certifications were required for the 2010 field work (no DGM or reacquisition was conducted). GPO certification for the DGM teams required that they achieve a Pd of 0.85 at a 90% CL. Reacquisition teams were required to re-position an anomaly from the DGM data to within a 2.5 ft radius of its actual position. DGM teams collected data in the Calibration Grid (known items and coordinates) prior to testing in the blind grids. Because of the varying terrain in OU B-1, two separate GPO areas required data collection for certification.

A summary of all GPO activities, procedures, and results is outlined in the GPO report. The GPO report and QA certifications are listed in Appendix G.

6.1.3 Surface Clearance. Surface clearance was conducted in MM-10G and MM-10H, plus five step-out grids off the primary AOCs. The work was conducted using handheld metal detectors to assist the UXO field personnel in locating metal on or near the surface that could adversely impact the geophysical surveys or cause a safety hazard.

Table 6-4. Team GPO Certification Dates

Team	# of Team Members	Field Season	Survey Type	Data Collected	Dated QA Approved
QC	3	2008	DGM	6/12,14/2008	8/11/2008
Geo #1	3	2008	DGM	6/12,14/2008	8/11/2008
Geo #2	3	2008	DGM	6/12,13/2008	8/11/2008
Geo #3	3	2008	DGM	6/13,14,16/2008	8/11/2008
Geo #4	4	2008	DGM	6/13,14,16/2008	8/11/2008
Geo #5	4	2008	DGM	6/13,16/2008	8/11/2008
Geo #6	4	2008	DGM	6/13,14/2008	8/11/2008
Geo #7	4	2008	DGM	7/10/2008	8/11/2008
UXO #1	7	2008	REAC	7/5, 7/8/2008	7/9/2008
UXO #2	7	2008	REAC	7/3, 7/5/2008	7/7/2008
UXO #3	5	2008	DGM	7/17/2008	8/11/2008
Mobile #1	3	2008	DGM	6/25,26/2008	8/11/2008
Mobile #2	3	2008	DGM	6/25,26,27/2008	8/11/2008
Geo #1	3	2008	REAC	8/25/2008	8/29/2008
Geo #2	3	2008	REAC	8/21/2008	8/26/2008
Geo #3	3	2008	REAC	8/22/2008	8/26/2008
Geo #4	5	2008	REAC	8/13/2008	8/15/2008
Geo #7	6	2008	REAC	8/7,8/2008	8/13/2008
Reac #1	4	2008	REAC	8/19/2008	8/22/2008
Geo #1	4	2009	DGM	6/19/2009	6/24/2009
Geo #1	3	2009	REAC	6/16/2009	6/16/2009
Reac #1	2	2009	REAC	6/16/2009	6/17/2009
QC	2	2009	REAC	6/16/2009	6/16/2009
UXO #1	4	2009	REAC	6/29/2009	6/30/2009
UXO #2	4	2009	REAC	6/30/2009	7/2/2009
UXO #3	4	2009	REAC	7/1/2009	7/2/2009
UXO #4	4	2009	REAC	7/1/2009	7/2/2009
UXO #5	4	2009	REAC	6/30/2009	7/2/2009

AOC MM-10F received a verification surface walk to confirm that the surface clearance performed by another contractor in 2004 left the AOC in acceptable condition for DGM surveys. A combination of contractor and QA personnel performed a random-path walk in MM-10F covering approximately 2.19 miles in length (~15.05 man-miles) and observed no MEC or MPPEH 1X or 3X. Some metal was observed, however, it was so small it would not interfere with the DGM and posed no hazard to personnel. Because the contract SOW called for a surface clearance in all of the AOCs, FCR-06 was submitted to amend the plans to cover the walk-through. Areas which met the definition as inaccessible were not subjected to the surface clearance. Maps of the inaccessible areas are provided in Appendix A.

On AOC 10G significant amounts of metal debris was located and removed from the surface clearance. This debris was categorized as coming from an aircraft crashing into the AOC several years prior to the 2008 RA. There were areas identified in AOC 10F and AOC 10G as having slopes greater than 30 degrees (see Appendix A) which prevented safe clearance; however, there were no visual indications of debris or MEC on the surface.

Table 6-5 lists the areas where surface clearance was performed and a tally of the materials removed. No MEC was found during surface clearance.

Table 6-5. Surface Clearance

Location	Date	Material removed
MM-10F (confirmation sweep)	6/18/2008	None
MM-10G & H	6/13/2008 to 7/29/2008	3,459 lbs of non-munitions debris and 61 lbs of 5X
Step Out MM-10F D23-S01	7/8/2008	None
Step Out MM-10F N22-S01	8/15/2009	3.5 lbs 5X
Step Out MM-10G C14-S01	8/8/2009	5.25 lbs 5X
Step Out MM-10G D11-S01	8/8/2009	None
Step Out MM-10H B01-S01	7/28/2008	None
Step Out GPO OE TGPO	9/1/2009	One MEC Item (Japanese 2” mortar)
Step Out GPO OE S02	9/1/2009	None
Step Out Calibration Grid	9/22/2009	None

6.1.4 Geophysical Survey. The geophysics data were collected in accordance with MEC QAPP SOP-02, using GPO certified personnel and equipment. DGM in the individual AOCs was completed as follows:

- 476 grids in MM-10F, MM-10G and MM-10H
- Five step-out grids in the primary AOCs

DGM surveying was performed from June 23 through August 29, for the 2008 field season, and from August 8 through September 22, for the 2009 field season. DGM survey for the 2008 field season was conducted by the following field teams: Geo Teams #1, 2, 3, 4, 5, 6, 7, UXO Teams #3, and Mobile Teams #1, #2. DGM survey for the 2009 field season was conducted by a single team (Geo Team #1).

Figure 6-1. EM-61 with GPS Mounted to Coil

The DGM equipment was initially configured with the GPS antenna mounted to the operator's back (in hoop skirt mode). With this configuration, the GPS antenna (providing system positioning) could move independently from the EM61-MK2 sensor (coils), resulting in a mis-location of the sensor data. The DGM system was re-configured with the GPS antenna hard-mounted to the sensor to eliminate this mis-location error. Figure 6-1 illustrates the hard-mounted GPS and sensor configuration used to collect the data. Figure 6-1 illustrates the hard-mounted GPS and sensor configuration used to collect the data.

DGM was completed in all accessible areas using the hoop-skirt configuration. Inaccessible areas are defined as areas with greater than 30 degree slope or areas with physical features such as rock outcrops, boulders, crevasses, ponds, and swiftly moving water which prevent safely collecting data. All of the site, not exhibiting one of the inaccessible-area characteristics, was surveyed. Appendix A contains the figures that show areas which were inaccessible to the DGM teams. Appendix H contains all of the DGM-related data files

6.1.5 Geophysical Data Processing and Interpretation. Geophysical data were processed in accordance with MEC QAPP SOP-03. Production target selection began on June 23, 2009 using a threshold (sum of Channels 2, 3 and 4) of 2.9 mV. This threshold was changed to 4 mV on approximately July 28 and finally to 4.4 mV on approximately August 11. The contractor submitted target lists to QA chronologically as the grids were mapped with DGM and passed contractor QC. Thus, QA returned QA Certification Reports (and QA Additional Target lists) in the sequence dictated by the contractor submittals. However, as the different contractor target picking thresholds were approved, the contractor was allowed to apply this retroactively to grids that had not yet been intrusively investigated. Consequently, for many grids there are multiple QA Certification Reports (i.e., target list concurrences) corresponding to the different picking thresholds. QA began target concurrence using a 3 mV (Ch 1) target picking threshold and increased this threshold as the contractor threshold was elevated and confirmed to be appropriate by intrusive results. Table 6-6 shows the chronology of changes in picking threshold by team for 2008.

Table 6-6. Chronology of GPO Threshold Valuations

Month	**June**				**July**				**August**			
TEAM/WEEK	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
QC			2.9									
1				2.9						4.4		
2				2.9						4.4		
3				2.9						4.4		
4				2.9						4.4		
5				2.9						4.4		
6			2.9							4.4	4.4	
7											4.4	
Mobile #1					2.9			4			4.4	
Mobile #2						2.9		4			4.4	
UXO #3							2.9	4				
QA			3							4		

At the conclusion of the 2008 DGM processing, 24 grids were finalized using the 2.9 mV threshold, 203 grids were finalized using the 4 mV threshold and 249 grids were finalized using the 4.4 mV threshold. Finalized, in this case, means that the DGM data underwent contractor QC, were submitted for QA, and underwent and passed the QA DGM process. Thus, Blocks 1 through 9 on the QA Certification Report were completed.

All of the 2009 DGM data were processed using the 4.4 mV threshold level. All of the step-outs and transects in MM-10E were processed using the 4.4 mV threshold.

Following the initial data processing of the DGM data which developed the base number of picks, each DGM dataset was sent to a second party QC. The second party QC re-processed the data and added additional target anomaly picks (noted as 700 series picks for identification purposes) as they believed necessary. After the QC review the data was submitted to QA for review and concurrence where they added additional target anomaly picks (900 series picks) as they believed necessary. The specific number of target anomalies added by QC and QA varied per grid, and the number of target anomalies per grid is listed in the Adak Status Sheet available in Appendix H, (Geophysical Data Tracking Log.) Table 6-7 shows the distribution of target anomaly picks for the primary AOCs surveyed in 2008 plus the step-outs in the primary AOCs surveyed in 2009.

Table 6-7. Count of Geophysical Anomalies by Area

AOC	Base Picks	QC	QA	Total
MM-10F Grids	28,859	2,373	5,564	36,796
MM-10G Grids	3,045	216	482	3,743
MM-10H Grids	759	79	16	854
Primary Area Totals	**32,663**	**2,668**	**6,062**	**41,393**

The numbers in Table 6-8 show that the second party QC added about 8% and QA added about 17% to the final target list.

Table 6-8. Summary of Anomaly Types per AOC and Step-Outs

AOC	3X	5X	Dig Abandoned	Hot Geology	Hot Soil*	No Find	Non Munitions Debris***	Not Dug**	Other	QA Seed	QC Seed	Survey Pin	MEC	Grand Total Anomaly
10F	3	29,747	4	489	2	3,476	140	1	643	255	417	1,590	29	36,796
10G		1,891		59		894	531	1	50	44	60	205	8	3,743
10H		313	2	3		502	4		4		3	22	1	854
Grand Total Type	3	31,951	6	551	2	4,872	675	2	697	299	480	1,817	38	41,393

*Targets designated with hot soil encountered mineral soil with elevated millivolt readings rather than a single "Hot Rock.

**Targets designated as not dug were either underwater or underneath an immovable rock.

***Does not include material collected during surface clearance.

6.1.6 Target Reacquisition. Reacquisition was conducted in accordance with MEC QAPP SOP-04. In 2008, the reacquisition team personnel were physically attached to the UXO intrusive investigation teams. Based on lessons learned that year, in 2009, the reacquisition teams operated independently of the UXO intrusive investigation teams. Reacquisition teams proceeded to the assigned grid and reacquired and marked the targets, using GPO certified equipment and personnel. In 2008, reacquisition activities started on July 10, 2008, and completed on September 9, 2008. In 2009, reacquisition began on June 18, 2009 and completed on September 9, 2009. All step-outs were reacquired between August 11, 2009 and September 1, 2009.

Reacquisition teams were responsible for identifying No-Finds. A no-find is defined as no reading on the reacquisition metal detector. Approximately 11% (4,877) of the reacquired target locations were classified as no-finds by the reacquisition teams. Any problems with the reverification of the no-finds was inspected and documented as part of the QC inspection of this grid. An example is DN-04, in which a target designated as a no-find in grid MM-10F-P05 actually contained a target.

One DN was written relating to reacquisition activities. DN-001 was written in June 2008 to correct a deficiency noted when the reacquisition data were reviewed. In part, the DN stated:

"During UXO Team 1's Reacquisition of the GPO, the coordinates of the interpreted location were not recorded in the GPS Data Collector in accordance with the SOP. Reoccupation of the interpreted location within 3 inches is an important step in the process to ensure that the actual anomaly mapped in the DGM data was reacquired."

Analysis of the deficiency identified the need to re-write portions of the SOP and provide updated training to make it more clear to the operator how to be sure to get the coordinates logged into the data logger.

6.1.7 Intrusive Investigations. A total of 41,393 targets were investigated in the primary AOCs and primary AOC step-outs. In the 2008 field season, 12,823 target excavations were conducted, with the balance of excavations (28,570) completed in 2009. A total of 31,972 targets (77%) were characterized as MPPEH 5X, weighing 4.1 tons, which were inspected, certified, verified and processed through a thermal flashing unit and shipped offsite for demilitarization and recycling. Thirty-eight (38) MEC items were found (about 0.1% of the targets investigated) in the primary AOCs and primary AOC step-outs. All target excavations conducted in 2008 were backfilled in 2008. Some of the target excavations in 2009 were backfilled, however, many were left unfilled at the end of the 2009 field season. These remaining excavation locations were backfilled during the 2010 field season.

The following text and Tables 6-9 and 6-10 summarize the results of the production and QC intrusive investigations:

- 38 targets were classified as MEC; these items were destroyed using donor explosives. MEC consisted primarily of fired projectiles (Appendix L).
- After each target was removed, the target location was verified as being below the GPO-established threshold. The EM-61 readings were captured electronically in the data collector, and are included in the database provided in Appendix I. In a small number of instances (1% of the targets), the post-dig EM-61 reading was a negative number. The reason why the response was negative can be attributed to either (1) the target hole was not backfilled and the effective distance from the coil to the ground was increased, or (2), the instrument was not properly nulled.
- Three targets were classified as MPPEH 3X items. These items were expended fuses, target practice munitions, or items without fuses. These items were treated with donor explosives, and then their remnants were included with the MPPEH 5X material.
- 31,972 targets, with an estimated weight of 8,255 lb were classified as MPPEH 5X, which was typically fragmentation. These items were inspected, certified "material documented as safe (MDAS)" and processed through the TFU.
- Non-munitions debris weighing approximately 11,025 lb were removed from the AOCs.

Table 6-9. Breakdown of Target Depths per AOC

AOC	Upper 6 inches	> 6 inches to 1 foot	>1-2 feet	>2-3 feet	>3 feet	AOC Total
10F	31,442 (85%)*	4,176 (11%)	1052 (3%)	105 (0.3%)	21 (0.06%)	36,796
10G	3,543 (95%)	138 (3%)	55 (1%)	6 (0.2%)	1 (0.03%)	3,743
10H	787 (92%)	54 (6%)	5 (0.6%)	4 (0.5%)	4 (0.5%)	854
Depth Total	35,772 (86%)	4,368 (10%)	1112 (3%)	115 (0.3%)	26 (0.07%)	41,393

*Percentages rounded up.

- 4,872 targets were classified as no-finds. All no-finds were re-inspected by QC personnel. It should be noted that the rate of no-finds found by the UXO teams decreased dramatically as the project progressed and the mV threshold was increased.

The following MEC were recovered during intrusive investigation:

- 12 ea – 37 mm MkII
- 1 ea – 37 mm Shell, Fixed, H.E., M63,w/fuze, BD
- 2 ea – 40 mm Cartridge, HE-T (SD MKII or MK.II-Mod 2)
- 1 ea – 60 mm Shell, H.E., M49A2
- 9 ea – 75 mm Shell, H.E., M41A1
- 4 ea – 81 mm Shell, H.E., M43A1
- 3 ea – 81 mm US Cartridges, 81 mm, Illuminating, M301A1
- 6 ea – 90 mm Shell, fixed, H.E., M71

Table 6-10. Depth of Recovery for MEC

Depth in Inches	# of MEC Items Encountered
0-6”	5
6-12”	14
12-18”	10
18-24”	4
24-30”	2
30-36”	3
36+”	1

6.1.8 Site Restoration Activities. Site restoration activities were performed during the 2010 field season. Those activities involved:

- Conducting a siltation survey to determine the extent, if any, of erosion siltation in standing bodies of water both inside and outside the AOCs. Figure 6-2 illustrates the process;
- Breakup and inspection of dirt clods and excavation spoils to locate and remove any metal objects 3-inches or larger in any dimension in those excavations not backfilled from the 2009 work (FCR #20);

Figure 6-2. Siltation Survey

- Backfilling of all of the open excavations from the 2009 work (FCR #20);
- Repair of all ruts and roads, Argo tracks and such in all of the AOCs (FCR #19). Figure 6-3 shows individuals performing this task.

A Site Siltation Survey was conducted prior to the start of field activities on August 13 and 14, 2010. All streams were investigated at the point where the water flowed out of the AOC to determine if any siltation existed from the previous seasons' field activities, and was tracked to the nearest standing bodies of water that the streams entered. Some minor siltation was found in the streams near vehicle crossing points, but did not extend into any standing bodies of water, or was overshadowed by areas of natural erosion further downstream that was significantly more substantial than that caused by production activities. The report recommended no further actions were required and no erosion controls were needed to be installed. Figure 6-4 shows the areas traveled during the siltation surveys.

Figure 6-3. Before Road Repair

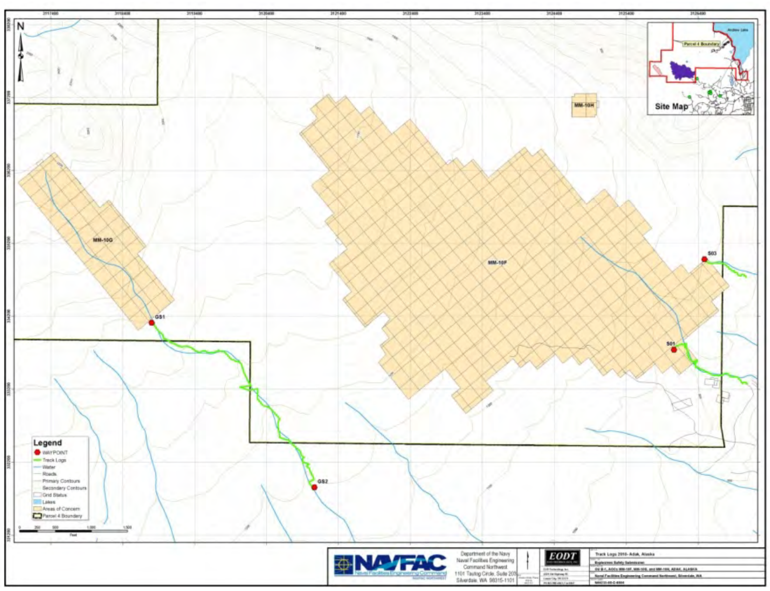

Figure 6-4. Tracklog of Siltation Survey *(Survey Routes Shown in Green)*

Between August 18, 2010 and September 14, 2010, a complete surface sweep was conducted, checking all excavation spoils for ordnance fragments over three inches in any dimension, with none being found. All open excavations were backfilled. If insufficient spoils material was available to completely fill the holes, the sides were sloped to match the surrounding land contours. Areas requiring vegetation were fertilized and reseeded with an approved seed mixture for the Adak area. All roads, ATV trails and access points to the AOCs were mapped and repaired, with reseeding as required. A map showing the grids which were backfilled and the trails that were repaired is located in Appendix A.

A daily safety briefing was held with all attendees signing in, and topics covered notated. When the team started operations in the AOC, the Team Leader navigated to the grid corners using an Archer mapping grade hand held GPS unit. The grid corner points were stored under a separate named point to ensure accuracy of +/- 3 m, downloaded and sent daily for verification. Grids were surface swept, with all dirt clods broken up, ordnance fragments greater than three-inches in any dimension removed, and open excavation holes backfilled. Activities were documented in the Team Leaders log book. Handheld GPS track logs were run throughout the day to document grid coverage. Representative photos were taken to show the conditions encountered and the corrections made. Access roads that were not inside the AOC boundaries were annotated with a running track log and documented on the AOC maps to show their locations with a 20 foot boundary on each side of the track. QC verified 100% of the work and reported the progress with a DQCR (Appendix E). Figure 6-6 is an example map showing the GPS tracks of the backfilling teams coverage for one day during the 2010 field season.

Figure 6-5. After Road Repair

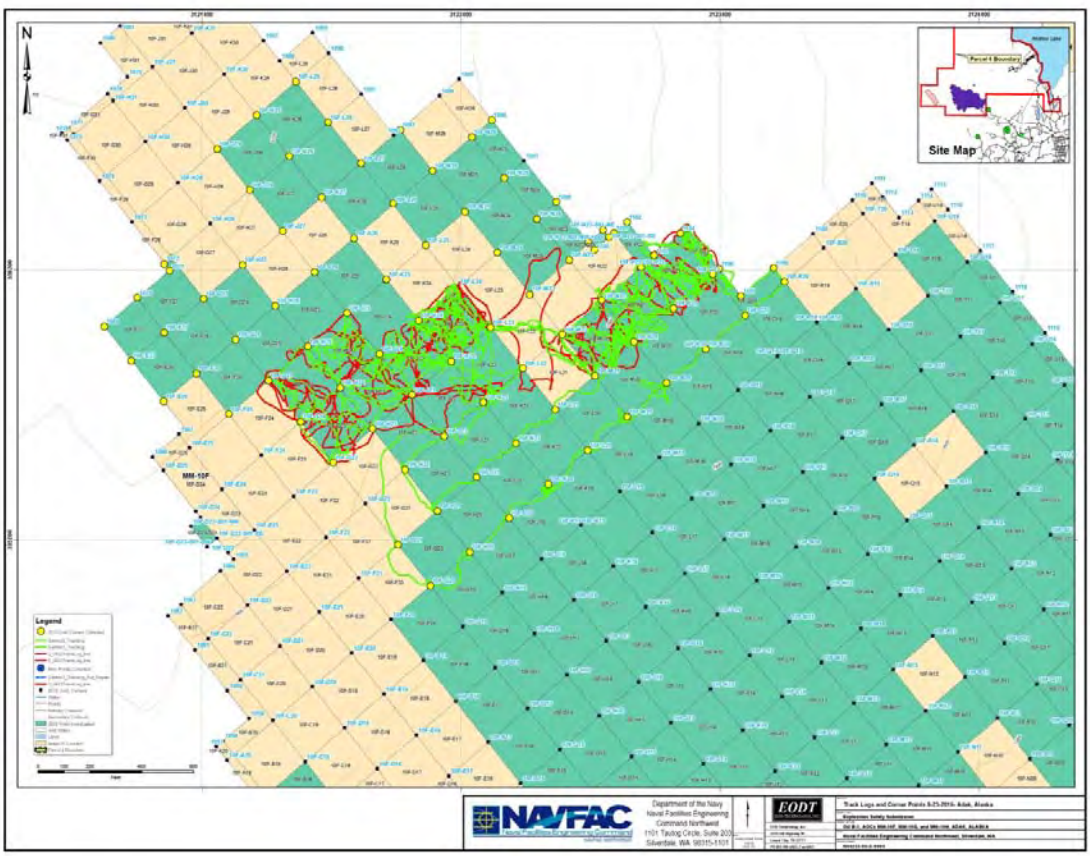

Figure 6-6. Example Tracklog Showing Coverage During 2010 Site Restoration Activities

6.1.9 MEC Disposal. Disposal of MEC was performed by detonation, using donor explosives shipped to Adak for each field season. During the clearance operations, 38 MEC were located and disposed by detonation, and three items categorized as 3X MPPEH were explosively vented. Items were destroyed or vented using either the BIP methodology or by consolidating the items into a single detonation event. In 2008, there were two BIPs and three consolidated shots. In 2009, there were no BIPs and four consolidated shots. Documentation of the location, date and explosives documentation is provided in Appendix A, Maps and Appendix M, Explosives and MD Disposal Documentation.

During the 2010 field season, two MEC were found that required disposal. An unfuzed 75mm projectile was found 160 feet outside of the MM-10G AOC, near grid A06, and an unfuzed 37mm projectile containing some explosives residue was located in grid K16 of AOC MM-10F. Both munitions were turned over to Navy EOD Detachment NW for disposal.

During the QA post intrusive hole checks in grids E14, E15, D14 and D15, QA discovered expended perforators on the surface. The demolition team had destroyed an 81 mm mortar in grid C-16, Target 8, along with their excess explosive inventory on September 10, 2008, prior to departure from Adak Island, AK. Following the demolition operation, the area was partially cleared of demo debris about ten feet around the hole; however, QA found the hole still contained expended perforators and a tail boom of the 81 mm mortar. Additionally, expended perforators were found in several other adjacent grids. No live items were found, however, QA did place a hold on grids C/D/E 14 through 18 (15 grids), until corrective actions were completed and issued NCR 2008-04. The subject grids were surface swept at the beginning of the 2009 field season, QA re-inspected the site, the NCR was closed and final QA grid certification was issued for the subject grids.

In 2009, the demolition shot to destroy the excess munitions (commonly referred to as a ‘clean-up’ shot) was conducted outside AOC MM-10F (in MM-10E) and very close to the OU B-1 GPO areas. NCR 2009-21 was issued because it was believed that the disposal shot was a violation of the work plans process for conducting disposal operations. Upon further discussion, the Navy determined that the location for the disposal operation was acceptable, however, since it was not conclusive that no metallic items may have travelled into and contaminated the GPO blind test grid, a surface clearance of that area was conducted on August 26, 2010 No metallic items were found and the issue was closed.

6.1.10 MPPEH Certification, Flashing, and Disposal. UXO intrusive team members inspected all MPPEH at the time of removal in the grids. A second inspection was performed by the team leader who ensured MD and Non-Munitions Debris (NMD) were separated and live MEC or MPPEH was not present. UXO teams transported the MD and NMD items daily to former Power Station 5 (PS5). PS5 was the TFU operating location and scrap storage area. All items were inspected a third time by the SUXOS and/or QC person, placed in a 55 gal holding drum and locked in a secure caged area. Weekly, QA personnel and QC personnel conducted a joint inspection of the items in the holding drum, certified them as 5X and placed a numbered seal on the drum in preparation for TFU operations. New holding drums were utilized for incoming MD and NMD as inspected drums were sealed. QA was off island during the final MPPEH certification/verification. The Navy authorized QC to perform the final inspection of items not previously completed and verified by QA. Figure 6-7 shows an example the post-flashing material condition.

No production TFU operations were performed in 2008. Between August 3 and October 15, 2009, the TFU was operated in accordance with MEC QAPP SOP 6. During MPPEH inspection, no HE contaminated items were found. The inspection of 8,255 pounds of MPPEH scrap metal was certified explosives-free by the SUXOS and Navy QA inspectors; flashed; and shipped off-island to a Squak Mountain Materials, Inc., in Issaquah, Washington. In 2010 a single 55-gallon barrel of MD (which had been flashed in the TFU in 2009) was taken off the island and disposed of at Allen Scrap Metal, Loris, SC. The Certificate of Demilitarization for 2009 was received on October 9, 2009, stating all items had been demilitarized in accordance with DoD 4160 M-1. The TFU was operated from August 3 to October 15, 2009, with 211 batches completed in the 2009 season to flash MPPEH. One batch failed on August 12, 2009. The associated EXPRAY test showed a positive reading on one item. The batch was successfully re-processed on the same day. Appendix M contains the database of batch runs in the TFU, including the single drum recycled in 2010.

Figure 6-7. TFU Post Flashing

An additional 177 lb of MPPEH were fully processed after the above material was shipped off-island in mid-September 2009 (see Appendix M for the Batch Processing Log). This partial barrel was sealed and shipped at the end of the 2010 season's demobilization and was disposed at Allen Scrap Metal, Loris, SC. The Certificate of Demilitarization was received on November 19, 2010 for the 2010 scrap metal. Non-munitions scrap, mostly aircraft residue, was secured in a 10-foot container and shipped off island along with the original shipment in September 2009.

6.1.11 Donor Explosive Handling and Storage. Demolition materials were transported to Adak via barge in 2008. A chartered aircraft transported donor explosives to Adak for the 2009 field season. No explosives were shipped to Adak for the 2010 field season. The donor explosives used on the RA included electric blasting caps, detonating cord and pre-formed shape charges (perforators). Table 6-11 provides a summary of donor explosives used for MEC clearance for the 2008 and 2009 field seasons.

Table 6-11. Summary of Donor Explosives used for MEC Clearance

Item	Shipped 2008 Field Season*	Used for 2008 Field Season	Shipped 2009 Field Season	Used 2009 Field Season
Electric Detonators (ea)	450	10	250	24
Detonating Cord (ft)	4,000	105	2,000	1,000
Perforator (ea)	500	40	250	50

*More demolition operations were anticipated at the beginning of the 2008 season based on available historical data. After the data from the 2008 season was reviewed, the amount of donor explosives was reduced for the 2009 season.

The magazine was installed and used in accordance with MEC QAPP SOP-08 and OP 5 Volume 1. The magazine was installed at the location specified in the ESS. The grounding system was inspected and certified by a licensed electrician (May 16, 2008 and June 13, 2009). The magazine was kept locked behind a chain linked fence. Keys for the fence and the magazine were kept in a safe at the field office. Key control was the responsibility of the SUXOS and the Site Superintendent.

An inventory of the magazine's contents was conducted weekly and documented on the Magazine Inventory Card located in MEC QAPP SOP 08, Magazine Inspections and Security, Attachment 1. The inventory was performed by the SUXOS and QCM, together with another UXO-qualified individual, who was not the same person on subsequent inspections. Explosives issues and turn-ins were performed by the SUXOS and UXOSO or other designated UXO qualified personnel. Magazine Inventory Cards were kept in both the magazine and in the site office with inspection, issue, and receipt transactions annotated on both forms following transactions. Commercial donor explosives received and stored in the magazine were accounted for from the date of receipt until the date of destruction or transfer. All explosives were destroyed prior to demobilizing from the site each of the field seasons, therefore no explosives were left unattended.

QC performed follow-on inspections and surveillances of the donor explosive handling storage operations, totaling 16 in 2008, and 30 in 2009.

6.1.12 GPO Area Step-Outs. When QA installed the GPO areas for the OU B-1 work, they performed DGM over the prospective test areas and intrusively investigated all the targets selected from the data. Among those targets were two 37 mm AP-T projectiles and an 81 mm mortar fin. This section describes the actions taken as a result of those finds.

A supplement to the MEC QAPP was prepared and is presented here in Appendix T. The work plan supplement required DGM with lanes at 5 m intervals and intrusive investigation of all selected target anomalies. The selection criteria were the same as for the MM-10F, -10G and -10H project (4.4 mV).

In accordance with the observational approach described in the RADWP, step-out grids were established at the MM-10E sites. The step-out 'mini' grids (30 m × 30 m) were centered on the two 37 mm projectiles. The exact layout of the grids is on maps provided in Appendix A. One step-out mini-grid was placed in the east GPO Area and one step-out mini-grid in the GPO calibration grid. DGM was conducted along individual lanes (transects), 1-meter wide at 5-meter spacing.

Work in MM-10E was performed following the MEC QAPP and SOPs used in MM-10F, -10G, and -10H. Surface clearance, DGM mapping and processing, intrusive investigation, and MEC disposal were performed in MM-10E. A summary of project DFWs and how they apply to work in MM-10E is as follows:

- **Mobilization/Site Preparation.** This DFW was included in the same DFW as MM-10F, -10G, and -10H.
- **Site Specific Training/GPO Certification.** This DFW was included in the same DFW as MM-10F, -10G, and -10H.
- **Surface Clearance.** Surface clearance was required in MM-10E before the geophysical survey. Results of the surface clearance are located in Appendix J.
- **Geophysical Survey.** Requirements for geophysical survey are the same as MM-10F, -10G, and -10H. Results of the geophysical survey are located in Appendix H.
- **Geophysical Data Processing and Interpretation.** Requirements for geophysical data processing and interpretation are the same as MM-10F, -10G, and -10H. Results of the geophysical data processing and interpretation are located in Appendix H.
- **Target Reacquisition.** Results from target reacquisition were collected the same as MM-10F, -10G, and -10H and are located in Appendix S.
- **Intrusive Operations.** Intrusive Operations results for MM-10E are located in Appendix S.

- **MEC Disposal.** MEC Disposal records for MM-10E are located in Appendix M.
- **MPPEH Certification, Flashing, and Disposal.** The MPPEH from MM-10E was combined with the MMPEH from MM-10F, -10G, and -10H.
- **Donor Explosive Handling and Storage.** Operations in MM-10E used the same donor explosives as MM-10F, -10G, and -10H.
- **MC Contaminated Soil Handling.** No breached munitions were encountered; no MC sampling was performed.

Survey and surface clearance for the transects were performed in conjunction with DGM collection which started on August 15, 2009. DGM data were collected in accordance with MEC QAPP SOP-02 and were processed in accordance with MEC QAPP SOP-03. DGM resulted in 78 targets selected for intrusive investigation. Reacquisition was performed in accordance with MEC QAPP SOP-04 and intrusive investigation of the target anomalies was conducted in accordance with MEC QAPP SOP-05. Reacquisition and intrusive investigation of both sites were conducted on September 1, 2009. The results are as follows:

- In the east GPO area, the September 1 intrusive investigation produced one MEC item, a Japanese 2 inch NI mortar. Demolition was conducted in conformance with the Work Plan. Following the Work Plan, an additional step-out grid was placed with 100% DGM data collection on September 22, 2009. During intrusive investigation on September 30, no MEC was found, a discussion with the project team occurred and it was decided no further step-out field work was required.
- In the calibration grid area, MEC 5X fragments were found on 1 September but no MEC. Following the plan, an additional set of transects were placed on 22 September and no MEC or additional 5X was found. A project team discussion occurred and it was decided no further step-out field work was required.

A breakdown of geophysical anomalies included 66 base picks, 1 QC pick and 11 QA picks. A summary of all items located during the intrusive investigation of these step-outs is as follows:

- UXO (1)
- Survey Pin (50)
- QA Seed (2) (one per mini-grid)
- MPPEH 5X (21)
- Non-munitions debris (1)
- Other (2)
- Not Dug (1) (seed item in the Calibration Grid)

Target depths for the MM-10E grids are:

- < 6-inches (73)
- 6-inches > 1 foot (3)
- > 1 foot (2)

There were no target excavations deeper than 2 feet in MM-10E.

6.2 Munitions Constituents Results

During excavation breached munitions were found at two locations that required MC sampling –AOC MM-10F, Grid E23 and AOC MM-10G, Grid B02. MC sampling at both locations was performed in accordance with the MC SAP. There were no FCRs or deviations from the plan. A map showing the location of the two breached munitions can be found in Appendix A.

Figure 6-8. Breached HE75 Round in AOC MM-10F, Grid E23

6.2.1 Sampling. During excavations, the following two locations were found with breached munitions that met the requirements for MC sampling:

- AOC MM-10F, Grid E23 – A breached HE 75 item excavated on August 29, 2008 (see Figure 6-8)
- AOC MM-10G, Grid B02 – Also breached HE 75 item, excavated on August 18, 2009 (see Figure 6-9)

Figure 6-9. Breached HE75 Round in AOC MM-10G, Grid B02

MC sampling was performed at the two locations on September 1-2, 2009, in accordance with the MC SAP. A UXO technician had previously removed the breached munitions and associated explosive materials, including visible chunks and pieces of explosives, and the removed MEC was handled, secured, and staged for disposition in accordance with the MEC QAPP. Although the sample areas were cleared of MEC before soil samples for MC were taken, a UXO technician escorted the samplers for safety reasons. In addition, it was important to remove any MEC before sampling so that potentially explosive soils were not shipped to the laboratory for analysis. For each sampling event, QC provided oversight of the sampling to ensure compliance with the plans.

To conduct the TNT field screening, personnel collected five-point composite samples (Figure 6-10) from both AOCs to confirm TNT concentrations were not above the cleanup levels stated in the MC SAP. The field test kit used was the EnSys® TNT Field Test Kit Model 7002000. The sample location in AOC MM-10F did not require additional field screening because the samples reflected no detection of TNT; however, in accordance with the MC-QAPP, a confirmatory fixed-based sample was collected in MM-10F, Grid E-23. The results confirmed that no additional soil removal was necessary.

Since the TNT concentration in the soil collected from AOC MM-10G exceeded the cleanup level, additional excavation and field screening was performed in accordance with the MC SAP. Field-screening guided the excavation activities. Because the field-screening indicated that the TNT concentration of the newly excavated area was below the cleanup levels established in the MC SAP, a five-point composite confirmation sample was collected and homogenized in a 1-gallon zip-lock bag. The soil was then transferred into a clean, 8-oz, amber glass jar with the appropriate sample label. The jar was then placed in a 1-gallon zip-lock bag and placed in a refrigerator before shipment to the laboratory. Two 5-gallon containers of soil were collected and shipped to the contractor's office in Tennessee. A solid waste disposal permit was received from the State and the waste profile has been accepted by the Chestnut Ridge Landfill in Heiskell, Tennessee. The material was subsequently disposed of at the landfill.

Figure 6-10. MC Sampling in MM-10G

Samples were collected, packaged, and shipped to Agriculture and Priority Pollutants Laboratories, Inc. (APPL), Clovis, CA, for analysis using the procedures specified in the MC SAP. Sample collection information is summarized in Tables 6-12 and described below. The COC, analytical results, and field engineer's notes for the MC samples are provided in Appendix N, Munitions Constituent Sampling Analytical Results.

Table 6-12. MC Sample Collection Data at AOC MM-10F and MM-10G

	Datum (NAD 1983 State Plane - Alaska 10) Northing	**Easting**	**Sample ID**	**Medium**	**Sample Type**	**Sample Date**	**QC**
MM-10F	335393.25	3121596.75	MM-10F-SOIL-01	Soil	5-Point Composite	9/1/2009	
	335393.25	3121596.75	MM-10F-SOIL-02	Soil	5-Point Composite	9/1/2009	Field Duplicate
	Datum (NAD 1983 State Plane - Alaska 10) Northing	**Easting**	**Sample ID**	**Medium**	**Sample Type**	**Sample Date**	**QC**
MM-10G	334401.8	3118565.77	MM-10G-SOIL-01	Soil	5-Point Composite	9/2/2009	
	(Conducted near the 5-point composite sample collected above)		MM-10G-SOIL-02	Excavated Soil	Grab	9/2/2009	

6.2.2 Documentation. The MC field sampling was conducted on September 1, 2009, and completed on September 2, 2009. Four samples, including one field duplicate sample, were collected and submitted to the laboratory. The sampling records, field notes, photographs, laboratory reports for the samples, and other relevant sample documentation are provided in Appendix N.

6.2.3 Analysis. All samples were analyzed for trace explosives and propellant residue by U.S. EPA Method 8330B. Table 6-13 provides a summary of the analytical results.

Table 6-13. Summary of Analytical Results

Sample ID	Medium	Sample Type	Action Level (mg/kg)	Concentration of Detected Analytes (mg/kg)
MM-10F-SOIL-01	Soil	5-Point Composite	Tetryl- 610	Tetryl – 0.24 J
MM-10F-SOIL-02	Soil	5-Point Composite	2,4,6 TNT- 18	2,4,6-TNT – 0.13 J
MM-10G-SOIL-01	Soil	5-Point Composite	1,3,5-trinitrobenzene – N/A 2,4,6-TNT – 18 2-amino-4,6-dinitrotoluene – 0.029 4-amino-2,6-dinitrotoluene – 0.029 Tetryl – 610	1,3,5-trinitrobenzene – 0.11 J 2,4,6-TNT – **53** 2-amino-4,6-dinitrotoluene – **0.27 J** 4-amino-2,6-dinitrotoluene – **0.38 J** Tetryl – 0.79 J
MM-10G-SOIL-02	Excavated Soil	Grab	1,3,5-trinitrobenzene – N/A 2,4,6-TNT – 18 2-amino-4,6-dinitrotoluene – 0.029 4-amino-2,6-dinitrotoluene – 0.029	1,3,5-trinitrobenzene – 0.12 J 2,4,6-TNT – **110** 2-amino-4,6-dinitrotoluene – **0.49 J** 4-amino-2,6-dinitrotoluene – **0.69 J**

J – Estimated concentrations
mg/kg – milligrams per kilogram
bold-exceeded the cleanup level

6.2.4 Assessment/Audit. This section describes the assessment of the laboratory analysis and summarizes the potential risk to human and ecological receptors as required by the ROD. Analytical results for sample MM-10G-SOIL-01, collected from AOC MM-10G, indicated that the detected TNT concentration was 53 mg/kg, which was above the action level ADEC soil cleanup level (SCL) for the Over-40-Inch Zone, Migration-to-Groundwater Pathway of 0.49 mg/kg, the ADEC SCL for the Over-40-Inch Zone, Direct Contact Pathway of 36 mg/kg, and the EPA SCL of 18 mg/kg. Also in sample MM-10G-SOIL-01, 2-amino-4,6-dinitrotoluene was detected at an estimated concentration of 0.27 mg/kg, which was above the ADEC Over-40-Inch Zone, Migration-to-Groundwater Pathway SCL of 0.029 mg/kg. 4-Amino-2,6-dinitrotoluene was also detected in sample MM-10G-SOIL-01 at an estimated concentration of 0.38 mg/kg, which was above the ADEC Over-40-inch Zone, Migration-to-Groundwater Pathway SCL of 0.029 mg/kg. The SCLs established in the MC SAP for TNT was 18 mg/kg. No SCLs were established for either 2-amino-4,6-dinitrotoluene or 4-Amino-2,6-dinitrotoluene in the MC SAP. However, the MC SAP was approved in July 2008, prior to the establishment of new ADEC cleanup levels for TNT, 2-amino-4,6-dinitrotoluene, and 4-amino-2,6-dinitrotoluene.

Although the MM-10G location contained MC concentrations above the action level after excavation, the Adak project team determined that remaining contaminant concentrations were not high enough to cause unacceptable risk to human health or the environment.

Therefore, additional excavation and testing was not required. This was confirmed in an e-mail from the Navy on 1 October 2009 (Appendix M). Text from ADEC on September 28, 2009 states: "We have reviewed the summary of the preliminary lab results provided via e-mail on 9/23/09. Based on a review of this preliminary data ADEC does not feel additional soil removal and sampling is necessary. While the results indicate a slight exceedance of ADEC's 18 AAC 75.341 soil cleanup levels for TNT (53 ppm vs 36 ppm, Direct contact, over 40 inch zone). ADEC's Migration to Ground Water (MTGW) values are not applicable for this issue for various reasons. This slight exceedance does not indicate a threat to human health or the environment." The two buckets of contaminated soil that were removed were secured on the barge during demobilization for shipment to Seattle and transported by road to the contractor's warehouse in Tennessee (Figure 6-11). A solid waste profile sheet was completed and accepted by the Tennessee Department of Environment and Conservation. The solid waste and buckets were disposed of in the Chestnut Ridge Landfill in Heiskell, Tennessee. Appendix M contains MC disposal certification documentation.

Figure 6-11. Two Buckets of Contaminated Soil

6.2.5 Data Review. The analytical data were reviewed by APPL, prior to release. Independent data validation firm *Pyron Environmental* performed third-party Level III validation using procedures and guidance specified in NAVFAC NW's *Standard Operating Procedure (MEC QAPP SOP) for Navy Environmental Information Transfer, Version 4.0* (per Data Validation Procedures in the Field MEC QAPP SOP section), *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA 1999), and *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (U.S. EPA, 2004). Results of the data validation indicated that the data was of known quality and acceptable for use, and no data qualifiers were assigned to any sample results because of QC outliers.

6.2.6 Data Management. Data management included field logbooks, COC forms, sample labels, and shipping records. Copies are included in Appendix N. Field and analytical data will be provided to the Navy Installation Restoration Information Solution in electronic data display (EDD) format. Hard copy data will be submitted to the National Archives and Records Administration at the conclusion of this project.

6.2.7 Quality Control. QC was performed as required by Worksheets #32 and #33 of the MC-QAPP. Specific QC records are located in Appendix N. A summary of the QC requirements and the results are located in Tables 6-14, 6-15, and 6-16. From the results of the QC assessment, there were no impacts on the data quality or usability of the collected data.

6.3 Demobilization

In 2008 and 2009, site work was not complete. During these seasons personnel were demobilized, the site office was decommissioned and a portion of the site equipment was transported off-island.

In September 2010, final demobilization was completed with all personnel off-island. All equipment and materials were sold, given away to on-island residents or shipped off-island.

Table 6-14. Assessment of QC Results, MC Sampling

Assessment Type	Nature of Deficiencies Documentation	QC Result
Operational Readiness Review	Checklist or logbook entry	No deficiency noted
Field Observations/Deviations from TMP	Logbook or Field Change Request	No deviation from TMP noted
On-site Laboratory Readiness Assessment	Checklist or logbook entry	No deficiency noted during assessment
Laboratory	E-mail followed	No laboratory deficiency noted
Technical Systems/Performance Audits	By report	No deficiency noted

Table 6-15. Location of QC Records

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	QC Report location
Data validation report	As performed	Appendix N
Laboratory Technical	As per Navy QSM	Appendix N
FCR	As required per field change	No FCRs for MC sampling generated
RA Final Report	One report at completion of site work	Contained Herein

Table 6-16. Summary of QC Validation Data

Description	Result
Ensure that the sampling methods/procedures outlined in the QAPP were followed and that any deviations were noted/approved.	No deviations were noted.
Determine potential impacts from noted/approved deviations, in regard to project requirements	No deviations noted
Examine COC forms against project requirements (analytical methods, sample identification, etc.).	No problems noted
completeness and accuracy based on the field QC records. Second method results will be compared with on-site analytical results.	No problems noted
Examine packages against project requirements and COC forms (holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	No data validation issues noted
Determine potential impacts from noted/approved deviations, in regard to project requirements (e.g., precision/accuracy).	No deviations noted
Compare results of field duplicate sample analyses with RPD criteria.	No problems noted

6.4 NOSSA 8020.15 After Action Report and Concurrence

The production contractor, EODT, prepared an AAR compliant with NOSSA 8020.15C (NOSSA, 2011). The AAR (EODT, 2012) was submitted to NOSSA who approved the document (NOSSA, 2012) and forwarded it to the Department of Defense Explosives Safety Board (DDESB). DDESB approved the document (DDESB 2012). The AAR and concurrence letters are provided in Appendix T.

Section 7.0: PROJECT QUALITY CONTROL RESULTS

A three-phases of control program was applied to the remedial action at the three OU B-1 primary AOCs to assess quality performance. While the results of each DFW are discussed throughout Section 6, this section focuses on the overall QC program, deficiencies and/or non-conforming conditions, QC inspections, surveillances, and sampling. To assist in comprehending the project QC results and the status of findings (i.e., audit findings, deficiency notices, non-conformance reports), Table 7-1 provides a matrix of the QC activities for each DFW. More detailed discussions of QC activities and findings are provided in the following subsections:

- Section 7.1 presents results of the QC performed on the project, including discussion of deviations from the plans and the impact on the project as a result of those deviations.
- Section 7.2 compiles the results of the QC inspection and provides a crosswalk from those requirements to the 5-Step QC Process required by the MEC QAPP.
- Section 7.3 provides a discussion on the findings from audits conducted by regulators and NOSSA.

7.1 Project QC Results and Documentation

7.1.1 Three Phases of Control. Project quality was administered using the three-phases of control methodology. Table 7-1 shows the total number of inspections performed for each DFW during each field season and provides a snapshot of the level of QC activities performed. Preparatory inspections and GPO certification was performed at the beginning of each field season. The 2010 season field effort was limited to site restoration activities and did not require GPO Certification. General site specific training and applicable MEC QAPP SOP training were conducted prior to the start of field activities each year. Initial and follow-up inspections were performed in accordance with the schedule in the MEC QAPP.

Table 7-1. QC Inspection Totals

Definable Feature of Work	2008			2009			2010			
	Prep	Initial	Follow Up	Prep	Initial	Follow Up	Prep	Initial	Follow Up	Totals
Surface Clearance	2(*)	1	8	5	1	0	0	0	0	17
Geophysical Survey	7	5	66	3	1	3	0	0	0	85
Geophysical Data Processing	1	1	6	1	1	3	0	0	0	13
Target Reacquisition	3	11	9	3	14	22	0	0	0	62
Intrusive Operations	2	3	51	2	5	63	3	2	17	148
MEC Disposal	2	1	4	1	1	3	0	0	0	12
MPPEH Certification, Flashing, and Disposal	2	1	2	3	2	22	0	0	0	32
Donor Explosive Handling and Storage	2	1	16	2	2	15	0	0	0	38
Totals	21	24	162	20	27	131	3	2	17	407

*****Additionally, a preparatory inspection was performed on the grid staking survey work.

Three phase QC inspection was an important part of the five-step QC process used at OU B-1; results of the Preparatory, Initial, and Follow-on phase inspections, and their role in the five-step QC process, is discussed in Section 7.2.

Table 7-2 provides a summary of QC activities performed for each of the three field seasons.

Table 7-2. Summary of QC Activities

Activity	Quantity
Production DGM QC Support	
• Independent QC Targets added	2669
• DGM Seeds Planted	476
• DGM Seeds detected in the DGM data	474
• Issued DN for DGM or Civil Survey work	2
Field QA Activities	
• Random Anomaly Checks (VLIII)	746
• Random Anomaly Checks (VLIV)	3751
• Biased QC Anomaly Checks	4893
• No-finds Checked	4428
• Issued DN for Intrusive Investigation	8
Production DGM QC Support	
• Independent QC Targets added	2669
• DGM Seeds Planted	476
• DGM Seeds detected in the DGM data	474
• Issued DN for DGM or Civil Survey work	2
Field QA Activities	
• Random Anomaly Checks (VLIII)	746
• Random Anomaly Checks (VLIV)	3751
• Biased QC Anomaly Checks	4893
• No-finds Checked	4428
• Issued DN for Intrusive Investigation	8

7.1.2 Daily Production and Quality Control Reports. Each day that work occurred at the project site, two reports were developed. The first was CPR that summarized the day's work, personnel onsite, work location, and safety-related information. The second report was a DQCR that summarized the day's QC activities, as well as results of inspections and tests. The numbering scheme of the DQCRs and CPRs was kept consistent across all field seasons, and provided a chronological sequence of all field activities on the project. Copies of the DQCRs and CPRs are provided in Appendix E.

7.1.3 Weekly Summaries and QC Meetings. During the field seasons, weekly meetings were held to discuss project operations, concerns, and schedule. The Weekly Summary and QC Meetings were generally held weekly. A total of 18 meetings were held in 2008, 12 in 2009, and three in 2010.

7.1.4 Blind Seeds. Four hundred and seventy six (476) QC blind seeds were placed in the primary AOCs. None of the step-out grids or the GPO-area work (MM-10E) were seeded. The results of the blind seed program, including coordinates of the seeds as placed and recovered, are located in Appendix H. Of the 476 QC blind seeds placed in the field, 473 were detected by DGM survey teams, selected as target anomalies, reacquired in the field, and identified and recovered during intrusive investigation. Resolution of the three missing seeds is as follows:

- Two were not mapped in the DGM data. Of these, one was the subject of DN-03 where the DGM team did not map close enough to an inaccessible area to pick up the seed. One was discovered to be in an inaccessible area during the missed seed investigation.
- One was placed and found in the DGM but was never reported recovered in the dig data and is classified as missing.

A quality performance result of over 99% success rate was achieved for QC acceptance sampling during the blind seed program.

7.1.5 Intrusive Investigation QC Process. QC personnel performed and documented final inspection sampling (independently re-surveying target anomaly locations) of approximately 32% of the target anomaly locations (13,248 target anomaly locations). The results of the inspections indicate successful inspection of over 99% of the selected locations. Six of the inspections failed and are reported in DNs 4,6,7,9 and 10 (2 targets). The corrective actions for the six locations that failed verification sampling are documented on the DN forms and logs discussed in Section 7.1.6.2.

- MM-10F - 11,204 inspections (30% of targets)
- MM-10G - 1,633 inspections (44% of targets)
- MM-10H - 393 inspections (46% of targets)
- MM-10E - 33 inspections (42% of targets)

Included in these percentages are the additional inspections implemented as a result of NCR 2009-06 which was issued on August 19, 2009. The additional inspections were implemented to reduce uncertainty and to aid QC in determining whether a systemic issue existed with regard to the complete removal of residue from target locations in accordance with the project plans. In order to accomplish this, a tightened inspection criteria was instituted according to Table 36-1 of the MEC QAPP and as specified in Worksheet #35. The effect of this was to subject all UoPs that had not yet received final QC certification to the tightened standard. In many cases, individual grids that had already been QC certified had additional inspection performed. Table 7-3 lists the UoPs that were subject to the tightened MILSTD inspection.

Table 7-3. UoPs Subjected to Tightened MILSTD

AOC MM-10F		
10F-UOP-03	10F-UOP-20	10F-UOP-30
10F-UOP-04	10F-UOP-22	10F-UOP-31
10F-UOP-05	10F-UOP-23	10F-UOP-32
10F-UOP-06	10F-UOP-24	10F-UOP-33
10F-UOP-08	10F-UOP-25	10F-UOP-34
10F-UOP-10	10F-UOP-26	10F-UOP-35
10F-UOP-13	10F-UOP-27	10F-UOP-37
10F-UOP-16	10F-UOP-28	10F-UOP-38
10F-UOP-17	10F-UOP-29	10F-UOP-39
AOC MM-10G		
10G-UOP01	10G-UOP03	10G-UOP05
10G-UOP02	10G-UOP04	10G-UOP06
AOC MM-10H		
10H-UOP01		

The tightened QC inspections did not find any items meeting the failure criteria of either MEC QAPP SOP-05 or the MEC QAPP.

In September 2009, additional QC checks were added again in an attempt to verify that the changes in procedures as listed in the SOPs did not have an adverse effect on the quality of the work being performed. MEC QAPP SOP-11 was generated to support this additional QC work. In MEC QAPP SOP-11, the following tasks were prescribed:

- Additional targets from the 2009 dataset comprising 2% (~451 randomly selected targets) that were investigated prior to Aug 20, 2009 (and not QC or QA seeds or grid corner marker nails) would be re-investigated specifically with a Vallon instrument set to Normal-8 or Mineral-8 (if hot rock were encountered). Any metal within the project critical radius (Rcrit) of 2.5-feet of the original, reacquired point would be removed.
- Additional targets from the entire 2009 dataset comprising 2% (~524 randomly selected targets and no QC or QA seeds or grid corner marker nails) would be re-investigated specifically with an EM61 Mk2 as follows:
    - EM61 coil set up with GPS in accordance with SOP-02 with the instrument tested (e.g., static, cable shake, standardization, etc.), warmed up and nulled;
    - Data would be collected over the target location in an “X” pattern collecting both sensor and GPS data;
    - Data would be collected in two directions perpendicular to one another over the entire 5-foot diameter clearance area;
    - Data would be processed and reported for each target.
- Failure criteria for the Vallon QC checks was:
    - No ferrous metal encountered with the size of a 37 mm projectile or larger at any depth to 4-feet bgs within the 2.5 foot Rcrit.
- Failure criteria for the EM61 checks was:
    - No ferrous metal encountered with the size of a 37 mm projectile or larger at any depth to 4-feet bgs within the 5-foot clearance radius.
    - Any anomalies with readings over 4.4 mV in the intrusive investigation spoil piles would be treated as anomalies and investigated.

Between September 29, 2009 and October 2, 2009, 451 target locations were re-checked using a Vallon VMH-3CS, and between October 1-5, 2009, 524 targets were re-checked using a EM61-MKII. Under MEC QAPP SOP-11, 975 targets were re-checked for verification work, and no MEC items were found. The results of these checks are included in Appendix P. None of the checked target locations discovered any failing items identified in the MEC QAPP or MEC QAPP SOP-11.

7.1.6 Change Control Management. When plans and procedures as written were inaccurate, inconsistent, ambiguous, or otherwise were unable to be implemented, FCRs were utilized. When deviations from the project plans were identified then a deficiency notice (for failures that were identified by QC) or a NCR (for failures that were identified by QA) were utilized. A discussion of the project’s FCRs, DNs, and NCRs is provided in the following paragraphs:

7.1.6.1 FCRs and Log. A total of 20 FCRs were generated during the project. The FCRs were developed to clarify the plans, remove conflict between the various plans, enhance the plans in response to DNs/NCRs, or to implement more efficient procedures. FCRs were discussed weekly at the CQC conference call. A summary of the implemented FCRs is presented in Table 7-4. See Section 5.1.6 for details of the FCR process. All FCRs were approved before implementing the revised procedure. One exception to this is FCR-18, where work was started based on an interim version of the FCR. Once the final FCR was approved, the changes between the interim and final version required EODT to re-do all previously performed FCR-18-related work.

7.1.6.2 Deficiency Notices and Log. Ten Deficiency Notices were generated during the project. DNs were issued by the QC team when deficiencies in the work were identified. Table 7-5 is a list of the DNs generated during and their resolution. Copies of the DNs, along with the root cause and corrective action, are located in Appendix P.

7.1.7 Non-Conformance Reports. A total of 27 NCRs were generated by QA, four in 2008 and 23 in 2009. The reader is referred to Part Four for a description, root cause analysis, corrective action, and resolution of the NCRs.

7.2 DFW Documentation and QC Crosswalk

The QC performed for the OU B-1 Project followed the requirements of the MEC-QAPP, which specified a five-step process and the MC QAPP which specified a usability assessment. All of the project's MEC-related DFWs were captured in the five-step process. A summary of the QC Requirements for this process, as well as the location where documentation of the QC inspection is presented is included in Table 7.6.

7.3 ADEC and NOSSA Audits

Over the course of the 2008 through 2010 field seasons, the remedial action at OU-B-1 was subject to several external audits. These audits were performed by both regulatory agencies and NOSSA to check compliance with the project plans and to check that expectations were being met. During site operations in OU B-1, ADEC (June and August 2008, and June 2009) and NOSSA (July 2008) conducted site visits to audit the field procedures for compliance with the approved plans. Although there were some findings, all of these findings were adequately addressed, and as a result, did not adversely impact this project. Specific information on the audit findings and the responses to the findings is provided in Appendix Q (ADEC) and Appendix R (NOSSA).

Table 7-4. Implemented FCRs, OU B-1 Munitions Removal

FCR #	Reason for Change	Date Initiated	Plan(s) Updated	Status	Date Approved
1	Incorporate ADEC comments into MEC QAPP and Technical Management Plan	6/4/2008	TMP MEC-QAPP	Navy Approved	6/16/2008
2	Administrative changes to allow for delegation of responsibilities for explosive storage magazine inspection.	6/5/2008	MEC QAPP SOP-08	Navy Approved	6/16/2008
3	Administrative Change – Make photo requirements in MEC QAPP consistent with SOW, MEC QAPP SOP-05	6/11/2008	MEC-QAPP, MEC QAPP SOP-05	Navy Approved	6/16/2008
4	Administrative Change – Makes TMP and MEC QAPP consistent on frequency of QC Follow-up Inspections.	6/13/2008	TMP MEC-QAPP	Navy Approved	6/16/2008
5	Approval to begin Geophysical Investigation pending interim GPO approval.	6/16/2008	Not implemented	Withdrawn	6/17/2008
6	To address surface clearance in MM-10F	6/19/2008	TMP MEC-QAPP	Navy Approved	7/8/2008
7	To clarify requirements for DGPS antennas	6/23/2008	MEC QAPP SOP-02	Navy Approved	7/7/2008
8	To update the project org chart	7/11/2008	MEC-QAPP	Navy Approved	7/16/2008
9	To update project MEC QAPP SOPs to correct errors and eliminate inconsistencies.	7/11/2008	MEC QAPP SOP-01, -03, -04, and -05	Navy Approved	7/24/2008
10	To correct inconsistency in MEC QAPP SOP-04	7/30/2008	MEC QAPP SOP-04	Navy Approved	8/04/2008
11	To allow for certification/verification of MPPEH 5X for the 2008 field season	9/10/2008	ESS, MEC-QAPP	Navy Approved	9/11/2008
12	To add GPS verification of a known point during the reacquisition to the 3-Phase inspection.	9/2/2008	MEC QAPP SOP-04	Navy Approved	9/11/2008
13	To address changes in site personnel for the 2009 field season.	6/9/2009	ESS, APP/SSHP, MC-SAP, MEC-QAPP, TMP	Navy Approved	6/23/2009
14	De-conflicts personnel requirements for TFU between ESS and MEC QAPP SOP-06	6/15/2009	MEC QAPP SOP-06	Navy Approved	6/16/2009
15	Updates stakeholders and attendees for the weekly QC and Project Update meetings.	6/16/2009	TMP	Navy Approved	6/18/2009
16	Revise magazine siting requirement in MEC QAPP SOP 08 to OP-5 requirements	7/7/2009	MEC QAPP SOP-08	Navy Approved	8/6/2009
17	Deconflict MEC QAPP SOP-06 and the ESS regarding MPPEH Certification/Verification documents	8/6/2009	MEC QAPP SOP-06	Navy Approved	8/7/2009
18	Submit MEC QAPP SOP-11 requiring additional target verification.	9/28/2009	MEC QAPP SOP-11	Navy Approved	10/12/2009
19	Clarify EPP/WMP for site restoration	8/12/2010	EPP/WMP	Navy Approved	8/18/2010
20	Clarify MEC QAPP SOP-05 for site restoration	8/12/2010	MEC QAPP SOP-05	Navy Approved	8/18/2010

Copies of the FCRs are located in Appendix P.

Table 7-5. List of Deficiency Notices and Their Resolution

DN #	Date	Description	Resolution
001	7/7/2008	The offset anomaly location was not being stored in the data logger.	FCR-03 was generated and additional training was provided to clarify SOP-04 on how to operate the data logger. Resolution Date: 7/24/2008
002	7/24/2008	Excavations were not being backfilled in accordance with the plans.	Teams were re-educated on the requirements to backfill all excavations immediately upon completion. Resolution Date: 7/26/2008
003	8/24/2008	QC seed was not found in the DGM data.	A 'best practices' for collecting data next to ravines was developed. Grid DGM was re-collected. Resolution Date: 9/2/2008
004	8/28/2008	QC inspection of a reported 'no-find' found a 37mm projectile.	Investigation revealed that both the EM61 and the Vallon had been miss-used by the team and bad information had been loaded into the data logger. Team leader was disciplined, team was re-trained and the grid was re-investigated. Resolution Date: 6/27/009
005	9/6/2008	QC inspection discovered excavations not backfilled.	Teams were re-educated on the requirements to backfill all excavations immediately upon completion. Resolution Date: 10/9/2008
006	9/6/2008	QC inspection of a grid revealed munitions debris remaining in a demolition hole after a disposal shot.	The team leader was disciplined, the team was re-trained and restricted from performing disposal operations for the remainder of the field season. Resolution Date: 6/27/2009
007	8/4/2009	QC inspection of a grid revealed an excavation with a residual mV reading > threshold value and intrusive investigation recovered a fuze component.	A corrective action from this deficiency was to re-check all targets within the grid, and to change to a 5-man (versus 4-man) UXO team. This change allowed the team leader to more effectively oversee the work being performed. Resolution Date: 8/19/2009
008	8/13/2009	During QC review of the post-clearance data, it was noted that the results indicated that 1) the vast majority of targets were 0.1, 0.3, or 1.0 lbs (consistent with each team) 2) the team leaders were not reviewing the pre-dig mV readings, and 3) the post-dig mV readings were not being consistently entered.	Site leadership, from the UXO Team Leaders, through the SUXOS and Site Superintendent, were disciplined, and subsequent data was much improved. Resolution Date: 8/19/2009
009	8/14/2009	During QC grid inspection, a target with residual EM readings of 30mV was discovered. It also noted that many targets with MPPEH recorded as being removed had no holes dug at that location.	A re-work of the grid did not note any additional targets that were improperly cleared. An additional corrective action was implemented that required the use of a Vallon to "clear" all targets before verification with the EM-61 for all future grids. Resolution Date: 8/19/2009
010	8/25/2009	During QC inspection of a grid, 2 targets were encountered with residual mV readings over 4.4mV. Additional issues with data logging procedures were also identified, but noted as resolved as part of the corrective action for DN-08.	Subsequent re-investigation of the grids did not identify any further anomalies with issues, dug either before or after the grids where the failure occurred. In order to verify that no underlying instrumentation or personnel training issues existed, the UXO team returned to the GPO and reacquired 10 targets per team member (at least 50 targets) with the DGPS, and recorded the Vallon response and EM-61 MK2 (for each target) response as was performed in the GPO certification process. This was performed and no further issues with the team were noted. Resolution Date: 8/19/2009

Table 7-6. Documentation for Each of the 5 QC-Steps

QC Step	Summary of Requirements	Location of QC documentation.
QC Step 1	Includes verification of training, personnel qualifications, and GPO Certification testing of geophysical and UXO teams and equipment.	Verification of Training/Personnel Qualifications: Appendix B, also Appendix S – Folder "QC Step 1 - Preparatory and GPO" GPO Certification – Personnel and Equipment - Appendix G
QC Step 2	Includes initial and follow-up phase QC inspections of the project's DFWs.	Appendix S – folder "QC Step 2 - Initial and Follow on Phase Inspection"
QC Step 3	Includes independent verification of the DGM target list. A independent QC geophysicist verified 100% of the DGM targets	See Appendix S – folder "QC Step 3 - DGM Process and ReProcess Data". Each grid was independently evaluated for the DGM pick list, and any additional targets selected by QC were designated as "700" Series Targets. The QC geophysicist certified each grid as passing QC, documentation of that certification is in Appendix S, "Grid&UOP Certification Package", within the folder for each grid.
QC Step 4	Includes Follow-up QC inspection of the MEC Clearance and MC soil removal.	See Appendix S, Folder "QC Step 4 - Follow-on Phase Inspection"
QC Step 5	Includes final Grid/UOP inspection, including target checks at a frequency to meet MIL-STD 1916 requirements.	See Appendix S, Folder "QC Step 5 - Grid, UOP and MILSTD 1916 Inspection." Also, each UOP contains both a QC and QA verification of MIL-STD 1916 acceptance, these are located within each UOP directory in Appendix S, directory "Grid&UOP Certification Package"

Table 7-7. MC QAPP Usability Assessment

MC QAPP Worksheet #35-Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)	Validation Documentation
IIa	SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed and that any deviations were noted/approved.	Project Superintendent or designee	2009-08-31_Training_for_Clarus.pdf
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to project requirements.	Program QC Officer and Project Chemist	2009-08-31_Training_for_Clarus.pdf
IIa	COC	Examine COC forms against project requirements (analytical methods, sample identification, etc.).	Project Chemist, data validation firm	DV Report_59703_Adak.pdf
IIb	On-site analytical work	All onsite analytical data will be reviewed against QAPP requirements for completeness and accuracy based on the field QC records. Second method results will be compared with on-site analytical results.	PQCM	No Record
IIb	Laboratory data package	Examine packages against project requirements and COC forms (holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	Data validation firm - TBD	DV Report_59703_Adak.pdf
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to project requirements (e.g., precision/accuracy).	Project Chemist	DV Report_59703_Adak.pdf
IIb	Field duplicate results	Compare results of field duplicate sample analyses with RPD criteria.	Data validation firm	DV Report_59703_Adak.pdf

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FINAL

Adak OU B-1 Remedial Action Project Documentation

Part Three

Munitions Quality Assurance Summary Report for the 2008, 2009 and 2010 Field Seasons Operable Unit B-1, Adak Island, Alaska

Contract No. N62473-07-D-4013
Task Order No. 023

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EXECUTIVE SUMMARY

The remedial action (RA) of Operable Unit (OU) B-1 (Areas of Concern [AOCs] MM-10F, MM-10G and MM-10H) occurred over the 2008, 2009 and 2010 field seasons. The production contractor for all three seasons was EOD Technology, Inc. (EODT). In the 2008 and 2010 field seasons, Battelle provided independent quality assurance (QA) for the Navy. In the 2009 field season, CDM/Zapata provided the independent QA for the Navy. For each of the field seasons, QA prepared a detailed, stand-alone QA report that was delivered to the Navy. The contractor experienced failures during QA inspection of their work in both the 2008 and 2009 field seasons. There were no failures noted by QA during the 2010 field season. The QA/Navy response to a failure was to issue a non-conformance report (NCR) in accordance with the Quality Assurance Surveillance Plan (QASP). In response to the NCR, the contractor was to conduct a root cause analysis for the failure and propose a corrective action. The Navy would review the proposed corrective action and, when in agreement upon successful implementation of the corrective action, QA would verify the action and the NCR would be closed.

During the 2008 field season, QA installed the Geophysical Prove Out (GPO) grids, prepared a QASP, and provided QA on contractor operations in OU B-1. In this field season, the contractor finished digital geophysical mapping (DGM) over all primary grids (476) at the site and began intrusive operations. QA installed 301 blind seeds in the AOCs, provided GPO certifications of all contractor DGM and reacquisition teams (20), QA of the DGM data and target picks (476 grids, 41,301 targets), field surveillances of the DGM and intrusive teams (357), QA of munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) operations (2), independent QA investigation of targets (1,678 targets) and QA approval documentation of a portion of the grids (122) in OU B-1. In the 2008 field season, QA issued four NCRs to the production contractor. All of these NCRs were successfully resolved either during the 2008 field season or by early in the following (2009) field season.

During the 2009 field season, the contractor finished DGM mapping over five step-out grids and finished all intrusive operations at the site. QA provided GPO certifications for one DGM and eight reacquisition teams, QA of the DGM data and target picks (five grids, 92 targets), field surveillances of the DGM and intrusive teams (80), QA of MEC and MPPEH operations (5), independent QA investigation of targets (4,615 targets) and QA documentation for the remainder of the grids (359) in OU B-1. In the 2009 field season, QA issued 23 NCRs to the production contractor. However, only four of the NCRs issued during the 2009 field season (2009-01 through 2009-04) were closed during the 2009 field season. Nineteen NCRs from 2009 remained open. Project Team meetings were conducted in 2010, and the parties agreed that a stand-alone NCR Resolution Document would be prepared, and that additional work would be required to meet project requirements (and to help satisfy deficiencies found in NCRs) in the 2010 field season. Two Field Change Requests (FCRs) were written by QA with critical review by the Navy, regulators and the contractor. These FCRs are discussed in detail in the 2010 QA Report (Battelle, 2010) and are summarized below:

- FCR#19: provided modifications to the Environmental Protection Plan/Waste Management Plan (EPP/WMP) to address management of storm water runoff caused by field activities associated with the remedial action. This required an evaluation/assessment report (siltation survey). In addition, this FCR addressed repairing damage to the landscape caused by off-road vehicles (ATVs) and seeding of damaged areas with a specific seed mixture for the area.
- FCR# 20: provided modifications to contractor Standard Operating Procedure (SOP)-05, Intrusive Operations, to address backfill of target excavations in grids that were

intrusively investigated in 2009. Some criteria of this FCR were: ensuring the filled excavation conformed to the natural contour of the terrain, investigating clods/clumps for MEC and metal fragments, removing metal from the surface spoils near target excavations (metal with dimensions of 3 inches or greater was removed from the grid and treated, with smaller metal buried inconspicuously in backfilled excavations), and seeding backfilled excavations.

During the 2010 field season, the contractor completed all FCR 19 and 20 work. QA provided field surveillances of these activities, QA of MEC and MPPEH operations, independent QA verification of all backfilled excavations in the 2009 field season grids, and QA documentation for road and rut repair, and erosion/siltation assessment. In the 2010 field season, QA found all work to be sufficient and did not issue any NCRs to the production contractor.

Discrepancies (failures) in the contractor work are documented in the NCRs issued by QA. A separate NCR Resolution Document has been prepared (Part Four) to specifically address outstanding NCRs from the 2009 field season. It should be noted that none of the NCRs issued by QA were due to discovery of a MEC item, and the extensive independent QA investigations (more than 6,000 targets) also did not discover any MEC items. A total of 41,393 targets were investigated at OU B-1, and only 38 MEC were found (about 0.1% of the total). Statistical analysis using only the QA investigations at random targets (total of 3,101) indicates that there is an extremely low probability of any remaining MEC at the site. This analysis shows a 99.999% certainty (confidence) that at least (a minimum of) 99.6% of all of the remaining DGM targets which have not been checked by quality control (QC) or QA do not contain MEC.

CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AOC	area of concern
APT	armor piercing projectiles with tracer
BIP	blow in place
CL	confidence level
DCN	design change notice
DGM	digital geophysical mapping
DGPS	differential global positioning system
DQO	data quality objective
EOD	Explosive Ordnance Disposal
EODT	EOD Technology, Inc.
FCR	Field Change Request
FFP	firm-fixed price
GPO	geophysical prove out
GPS	global positioning system
LJ	Lake Jean
mV	millivolt
MD	munitions debris
MEC	munitions and explosives of concern
MM	Mount Moffett
MPPEH	material potentially presenting an explosive hazard
MRS	munitions response site
NCR	nonconformance report
NMD	Non-Munitions Debris
NOSSA	Naval Ordnance Safety and Security Activity
NTR	Naval Technical Representative
OU	operable unit
Pd	probability of detection
QA	quality assurance
QAPP	quality assurance project plan
QASP	quality assurance surveillance plan
QC	quality control
Rcrit	critical radius
RG	Rifle Grenade
ROD	Record of Decision

TDL	technical direction letter
TFU	thermal flashing unit
TTECI	Tetra Tech EC, Inc.
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
UOP	Unit of Production
UXO	unexploded ordnance
VDS	Validation of Detection Systems

Section 1.0: GENERAL QUALITY ASSURANCE PROJECT INFORMATION

1.1 Introduction

This Quality Assurance (QA) Summary Report provides a summary of all of the activities performed by the QA contractors for the Navy during the Adak 2008-2010 Operable Unit (OU) B-1 field seasons. This summary draws from QA work accomplished by Battelle during the 2008 and 2010 field seasons, and CDM/Zapata during the 2009 field season. For each of the field seasons, the QA contractor prepared a detailed, stand-alone QA report that was delivered to the Navy.

This report is presented in three sections:

- Section 1 – General Quality Assurance Project Information
- Section 2 – Quality Assurance at Operable Unit B-1(MM-10F, -10G and -10H)
- Section 3 – QA Summary

1.2 Scope and Objective

The objectives for the project are specified in a Quality Assurance Surveillance Plan (QASP) prepared for and delivered to the Navy on June 13, 2008 (Battelle, 2008a). In general, the project objectives were to:

- Identify to the Government any contractor work that deviates from the approved project plans or is not completed, in whole or in part, as required by the approved project plans;
- Evaluate contractor work against the pre-work performance measures, including, but not limited to, personnel qualifications and the successful completion of a geophysical prove out (GPO);
- Conduct QA audits of digital geophysical mapping (DGM) and munitions and explosives of concern (MEC) removal activities including, but not limited to:
    - daily field audits of the DGM process;
    - daily field audits of the MEC dig/removal/disposal process;
    - QA verification of no-finds; and,
    - QA review of contractor quality control (QC) documentation to evaluate whether there is an excessive no-find rate or other circumstance that would support a changed condition.
- Conduct QA testing of the contractor DGM data by reprocessing contractor production and QC data, picking targets and matching the QA target picks against contractor target picks. The objective was to reach concurrence with the target picks and provide this concurrence in writing to the Navy and the contractor.
- Conduct QA testing to determine the completeness of grids in accordance with the approved project plans. QA tasks included in this objective comprised QA DGM re-mapping of selected areas within selected grids, data processing and evaluation, and reacquisition and testing of randomly selected contractor-cleared targets within grids to verify clearance in accordance with contract requirements.
- Provide an end of field season QA report that includes, at a minimum, methodologies, findings, conclusions and recommendations for each project. The purpose of this report

is to memorialize the independent government determination of whether the project met all of the QC requirements specified in the approved project plans.

1.3 Organization of the Quality Assurance Teams

The QA team configuration was adapted over the three field seasons, depending upon the focus of the contractor work in the area of concern (AOC) for that field season. Table 1-1 provides an overview of the personnel assigned to the QA teams.

Table 1-1. QA Team Assignments, Duties and Responsibilities

Field Season	Primary Contractor Field Activities	QA Project Manager	Field QA Lead	Field UXO QA Personnel	Field Geophysical QA	Off-site Geophysical QA	Total Primary QA Personnel
2008	DGM and some Intrusive	✓	✓	✓ 5	✓ 2	✓ 2	11
2009	Intrusive with some minor DGM	✓	✓	✓ 4	✓ 2	✓ 1	9
2010	Excavation Backfilling, Site Restoration	✓	✓	✓ 3			5

1.4 Geophysical Prove Out Installation

The GPO areas for OU B-1 were installed by Battelle in May 2008 in compliance with the GPO Installation Plan (Tetra Tech EC, Inc. [TTECI], 2008).

At the OU B-1 GPO site, both Calibration and Blind Grids were installed. The purpose for installing a GPO was to provide the geophysical contractor with an area where they could test their equipment and procedures over buried targets where the identification and precise location, depth and orientation of the seed items were known. This information was provided to the contractor for seed items planted in the Calibration Grid. Information about the Blind GPO Grid was withheld from the contractor. The purpose for installing the Blind GPO Grid was to test the contractor's ability to meet the specific detection data quality objectives (DQOs) established for the project. The DQOs were: Probability of detection (Pd) = 0.85, with a confidence level (CL) = 90%. The contractor (EOD Technology, Inc. [EODT]) utilized EM61-MK2 electromagnetic geophysical sensors coupled with differential global positioning systems (DGPSs). Specifications of the contractor's systems and procedures were provided in the contractor's Standard Operating Procedures (SOPs) and other plans.

A GPO Installation Report (Battelle, 2008b) was provided to the Navy in June 2008. The GPO installation report contained all of the details of the GPO installation, including logistics, the locations and type of the installed targets, DGM data taken by the QA geophysics team over both GPOs, and a summary discussion of the results of the DGM data. These details are not repeated here. Much of this information was handled as "restricted" data, was password protected and was provided only to the Navy.

Information about the OU B-1 Calibration Grid was provided to the contractor as Appendix D (OU B-1 Calibration Grid) to the GPO Installation Report. Included in the appendix are: Land Survey Information, Pre-seed Emplacement DGM Data, Seed Item Data Tables and Documentation, and Final DGM Survey Data. Table 1-2 provides the general summary information for the Calibration Grid in the OU B-1 GPO.

Table 1-2. Summary Information for OU B-1 GPO Calibration Area

	OU B-1 Cal Grid
# of Targets Buried	27
Approximate Area (acres)	0.2

The calibration area was intended to be a self-testing area for the contractor. Consequently, the contractor was not required to deliver any DGM data or results from the calibration tests to the Navy or to QA. It should be noted that the appendix delivered to the contractor contained salient information such as:

- Coordinates for survey control monuments and targets, and the mathematical formulas to transform the positioning data into the proper coordinate system used in this project.
- Photographs of the DGM sensor configurations (e.g., hoop skirt) used in the QA DGM mapping of the GPO for OU B-1. The photographs also illustrate the traditional, acceptable methods for mounting global positioning system (GPS) equipment on the sensors.
- Sample data processing parameters and picking threshold for successful detection of the Calibration Grid targets.

Table 1-3 provides a summary of the basic parameters of the Blind GPO Grids.

Table 1-3. Summary Information for OU B-1 GPO Blind Test Areas

	OU B-1 GPO (Grids Only)
# of Targets Buried	East=69 West=53 Total=122
Approximate Area (acres)	East=0.23 West=0.65 Total=0.88

The contractor was required to perform 100% DGM coverage of all three AOCs: MM-10F, -10G and -10H. In order to accurately represent the terrain and vegetation in these AOCs, two separate grid areas were established within the OU B-1 GPO site. The contractor collected DGM data and certification was based on the combined (East and West) OU B-1 GPO Grid DGM data. In these combined GPO grids, there are a total of 122 targets; to pass the GPO and meet the DQOs, no more than 12 targets may be missed.

Figure 1-1 shows the location and layout for the OU B-1 GPO. This figure was extracted directly from Battelle's GPO Installation Report (Battelle, 2008b).

Contractor reacquisition teams were also required to certify their capabilities within their respective GPO. The reacquisition DQO requires that each reacquisition team reacquire the target position to within a critical radius (Rcrit) of 2.5 ft. To demonstrate this ability, each reacquisition team:

- Used GPS to relocate the coordinate point for the target in the GPO blind test area or transect. The coordinate point was taken from the contractor's DGM data for that test area;
- Used a metal detector (EM61 or hand-held Vallon) to pinpoint the anomaly within the grid (based on an analog [audio] signal), and placed a pin flag over that point;
- Recorded the coordinates for the reacquired anomaly (pin flag) with GPS.

The GPS data were processed through a target matching algorithm integral to the Geosoft Oasis Montaj UX-Detect software to determine if the reacquired point was within the critical radius of the previously loaded known target coordinates.

1.5 General Methodology for the Geophysical Prove Out Certification of Contractor Teams

Contractor DGM and reacquisition teams were required to be certified in the GPO areas prior to being authorized for production work. A detailed description of the DQOs, certification process and contractor deliverables are provided in the GPO Certification Plan (TTECI, 2008). These topics are also discussed in the Appendix (Appendix A-Contractor's Information) to the QASP (Battelle, 2008a). Both of these documents were provided to the contractors.

The following provides a brief summary of the critical topics in the above referenced plans.

The geophysical DQOs established for this project are:

- Achieve a 0.85 Pd with a 90 percent CL at the GPO plots for items at or above the 11x (11 times diameter of the test item) detection line;
- Achieve a false positive rate which is appropriate and reasonable for the site (false positive is defined as no metal identified that is consistent with the geophysical sensor response for the anomaly);
- Interpret the position of an anomaly (x-y) within 2.5 ft of the item(s) creating the anomalous response;
- Reacquire the interpreted (digsheet) location within 2.5 ft;
- Ensure processing and interpretation parameters are automated (e.g., scripts) and all parameters digitally recorded for each file are processed, analyzed and interpreted.

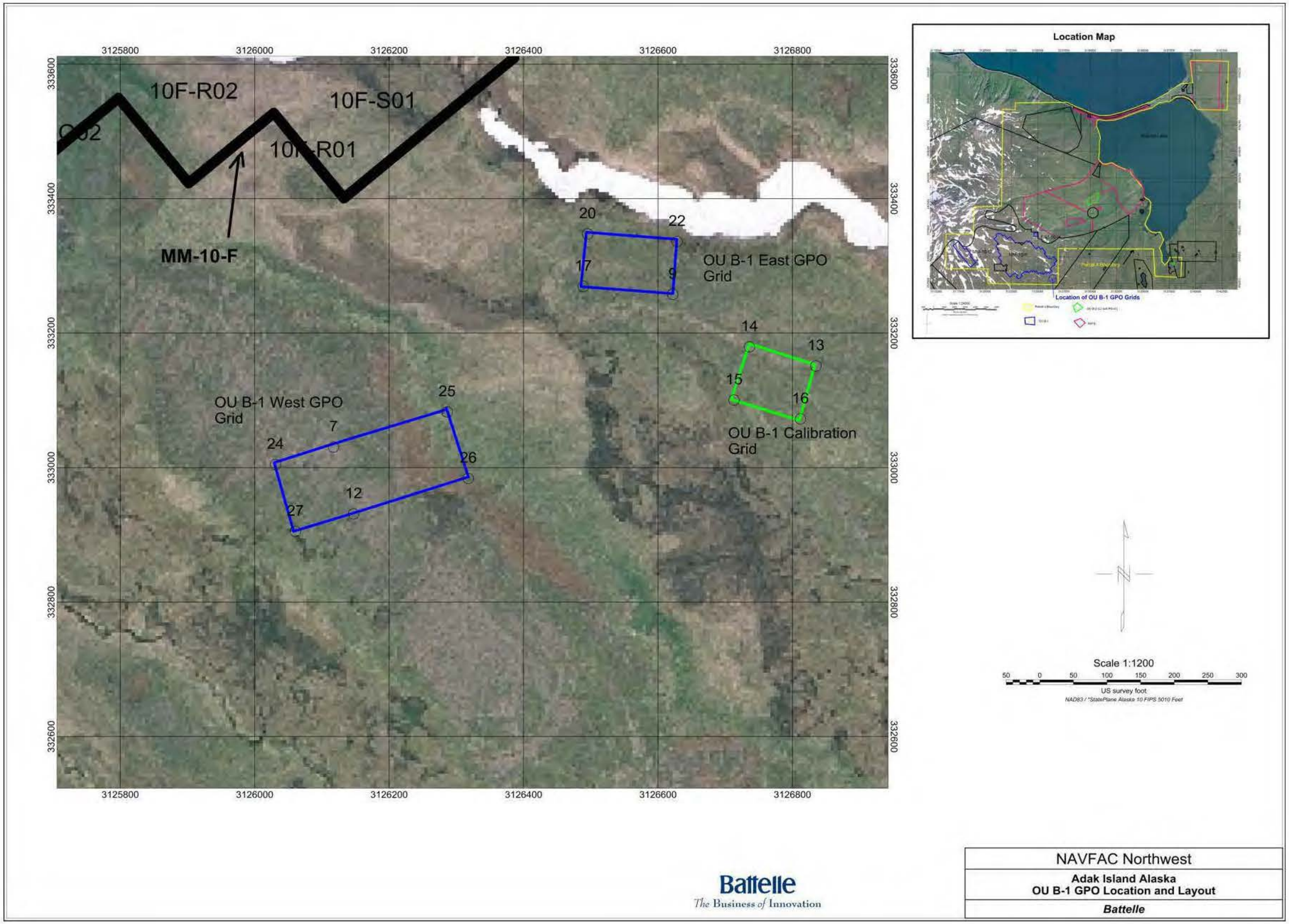


Figure 1-1. OU B-1 GPO Location and Layout

A GPO recertification was required for the following circumstances:

- New member(s) of geophysical or reacquire teams that are required to operate geophysical or reacquire systems are added; or,
- Major equipment replacement (e.g., GPS receiver, change in GPS receiver antenna type, EM61 MK2 backpack or coils).

The general process for certifying contractor DGM and reacquisition teams comprises the following steps:

- Beginning with the DGM teams, the contractor performed its normal geophysical system tests, in accordance with their approved SOP, to validate that the systems are performing correctly. Then, they conducted geophysical surveys over the GPO blind test area(s). QA conducted surveillance of the contractor equipment tests and data collection methods. At the conclusion of the contractor GPO geophysical survey, the contractor provided QA with raw positioning and geophysical data files. The required format of these data is specified in the GPO Certification Plan (TTECI, 2008). QA held these files, without action, until they were acknowledged as acceptable and the processed GPO data were received from the contractor's QC.
- The contractor performed data analysis and QC on the GPO geophysical survey data. If these data passed contractor QC, the contractor provided a target list to QA. If these data failed contractor QC, the contractor was free to schedule with QA to re-test the geophysical system tests and GPO survey until acceptable data were acquired.
- The contractor's target list was compared to the known locations for the GPO items. QA verified the contractor met the project DQOs. If the contractor failed the target comparison, a report was generated for the Navy and contractor. Contractor QC may decide to re-process the geophysical data (Step 2 above) or re-test the GPO (Step 1 above).
- After the contractor passed the target comparison, QA evaluated the data from the contractor geophysical system tests and processed the approved contractor GPO data set. If these data passed QA, the contractor was issued a Final Approval (Certification) of the GPO. If these data failed QA, a report was generated for the Navy. Contractors were not allowed to use that DGM system. A technical direction letter (TDL) authorizing the contractor to commence production of DGM was issued by the Navy once the contractor passed the GPO.
- After the contractor passed target comparison (Step 3) with one DGM team, the contractor target list was made available to their reacquire team(s) (unexploded ordnance [UXO]) for target reacquisition testing. The contractor reacquisition team performed its normal GPS and relocation detector setup tests in accordance with their approved SOP(s). The reacquire team re-located each of the targets from the target coordinate list, pinpointed the anomaly source using the metal detector and adjusted the positioning of the anomaly from the original coordinates, if desired. The reacquisition team would 'shoot' a GPS position for the relocated anomaly. The contractor provided QA with the relocation coordinate file upon completion of the reacquisition exercise for scoring in accordance with the project DQOs. If the reacquire team passed, it was approved for production work. If the reacquire team failed, it was required to repeat the target reacquisition task.

QA performed GPO target comparison using the Oasis Montaj software, UX Detect Module. The known target locations and contractor target picks were loaded into separate databases, and the software automatically compared the targets within a specified radius (in this case Rcrit = 2.5 ft). The output of the program was a GPO comparison map and data table. Both of these outputs were retained solely by QA in order to maintain the confidentiality of the GPO. These outputs were based on the combined (East and West) GPO grids in OU B-1

Figure 1-2 shows an example "contractor deliverable" GPO certification form that was provided to the contractor. This form shows details about the contractor team members and equipment serial numbers but does not provide the number of targets in each category. This form was uploaded to the contractor SharePoint site; the contractor (and Navy) was notified via e-mail upon upload.

Adak, AK 2008

GPO DGM Certification Form (OU B-1Grid) CONTRACTOR DELIVERABLE

Reference DGM Field Audit QA Form (provide digital form name): GEO1_GPO_Form.pdf

Test Information			
Date Geophysical data collected:		6/12 and 14/2008	
Geophysical Team:	EODT Team #1	Frank Bynum	
		Mark Dalton	
		Ed Asabere	
Equipment: EM 61 (1m by 1m) Hoop Skirt Mode			
EM61 1x1m Coil	8200	DGPS Base Station Receiver	4811K31733
EM61 Mk2 Backpack	82817	DGPS Base Station Antenna	
Trimble Antenna	30882823	DGPS Radio (PDL)	8046000
Trimble Receiver	4749K31315		
Allegro Data Logger	60898		
Geophysical Data interpreter:		EODT/Haolei Ge	
Interp. Data file name:	Team 1_East(West)_GPO_Targets.csv		
Comments:	Final Approval based on target list above. QC'ed data received on 6/21/08, 2:30 PM MST.		

Test Criteria	
Required Pd	0.85
Required CL (%)	90
Test Results	
Percent Detected	97.50
Number of Missed Targets	3

Passed

Summary by Target Type	
Target Type	*% Detected*
Large	100.0
Medium	100.0
Small	95.7
Totals	97.5

Preliminary Authorization to Proceed	Approved	Denied
Final Authorization Certification	Approved	Denied

Battelle Geophysical QA: Mark Blohm   Date: June 21, 2008

Figure 1-2. Example GPO DGM Certification Form

1.6 Quality Assurance Procedures

Figure 1-3 illustrates the QA process as it was applied to this project. The responsibility for the successful completion of the work resides with the respective contractors' QC organizations.

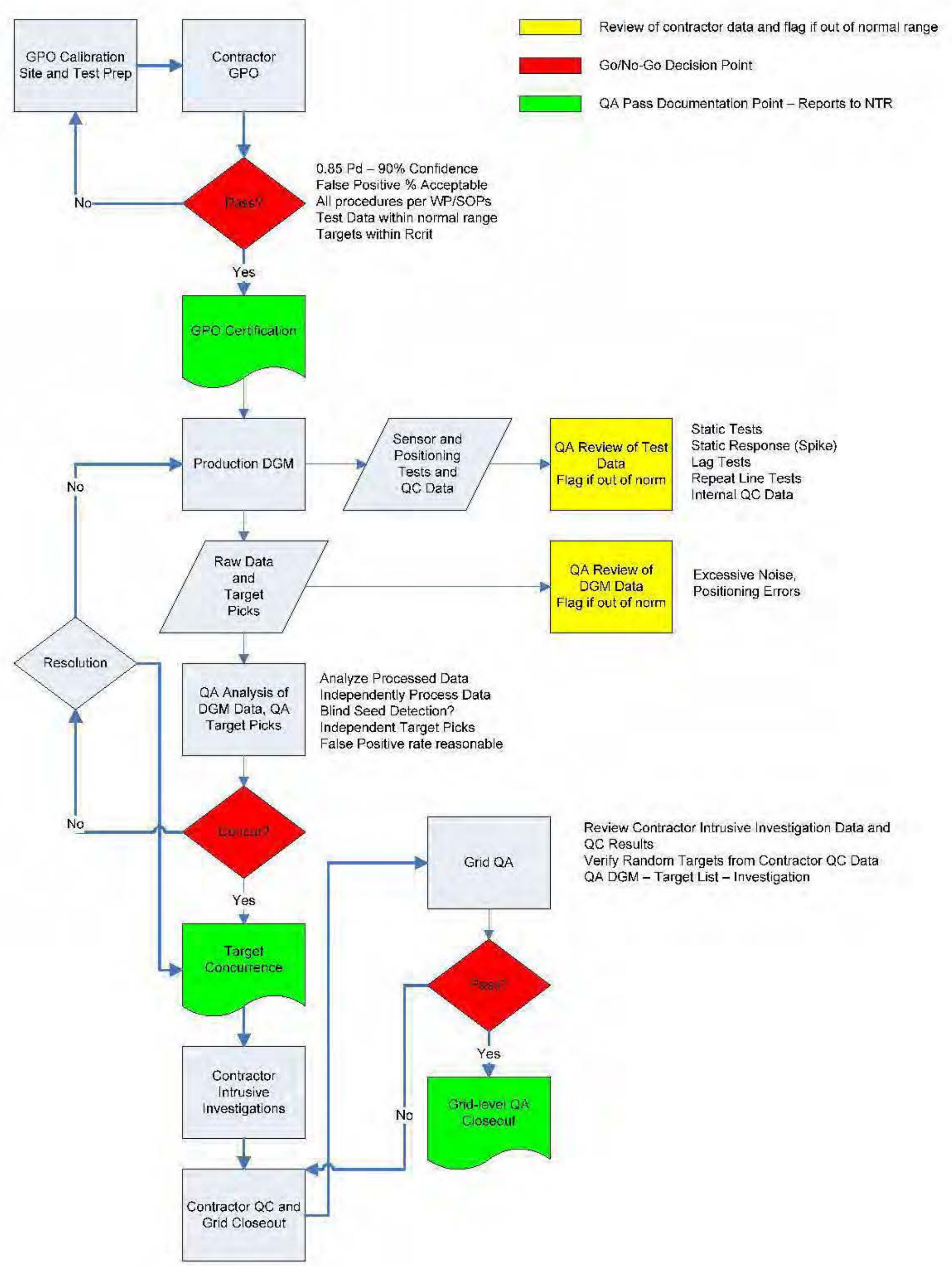


Figure 1-3. General QA Process as Applied on Adak Island during the 2008-2010 Field Seasons

QA evaluated four critical-path decision points. They were:

- GPO
- Production DGM target picks for all three projects
- Final grid acceptance inspection for the Mount Moffett munitions response site (MRS).
- Verification that the contractor completed the work in accordance with the project plans and the work was free of deficiencies, errors and/or omissions; if not, these were identified to the Navy as soon as possible.

QA did not evaluate contractors on any of these decision points until notified by the respective contractor QC that the team, data or area was acceptable to them and ready for QA. During production field activities, QA utilized a process incorporating QC document review and field surveillances of contractor activities to verify and then record that the work was done in accordance with the approved plans and SOPs.

1.6.1 Digital Geophysical Mapping Data Validation and Target Concurrence. QA followed the procedures outlined in the QASP (Battelle, 2008a) to perform DGM data validation and target concurrence of contractor data. The basic steps to this process are:

- Surveillance of contractor DGM field procedures
- Re-processing of 100% of contractor production DGM surveys
- Selection of targets and comparing them to contractor target lists
- Resolve/concur with contractor to provide a “final” target list.

Figure 1-4 illustrates the process used for QA contractor production to achieve target list concurrence.

Re-processing of 100% of contractor production DGM surveys included performing the following tasks:

- Receipt and verification of completeness of contractor geophysical system QC data, raw and processed DGM data, QC checklists, geophysical maps, and target lists. QA did not evaluate any contractor data until it was approved in writing (typically via e-mail) that it was approved by the contractors’ QC.
- Re-evaluation of contractor geophysical system tests (latency, static-standard and repeat line test) for consistency and adherence to contractor SOPs and project DQOs.
- Complete re-processing (from raw data to final target maps) of the contractor DGM data. Re-processing followed the procedures outlined in the GPO Installation Report (Battelle, 2008b) (and also provided to contractors in the Calibration Grid/Transect Appendix) and typically included: latency corrections, de-median filtering, and gridding using a 0.5 ft grid cell size with 1.65 ft grid cell extension. At this stage, the data were evaluated for data sample alignment, sample separation (down line and across line), repeatability (repeat line test) and overall data quality.

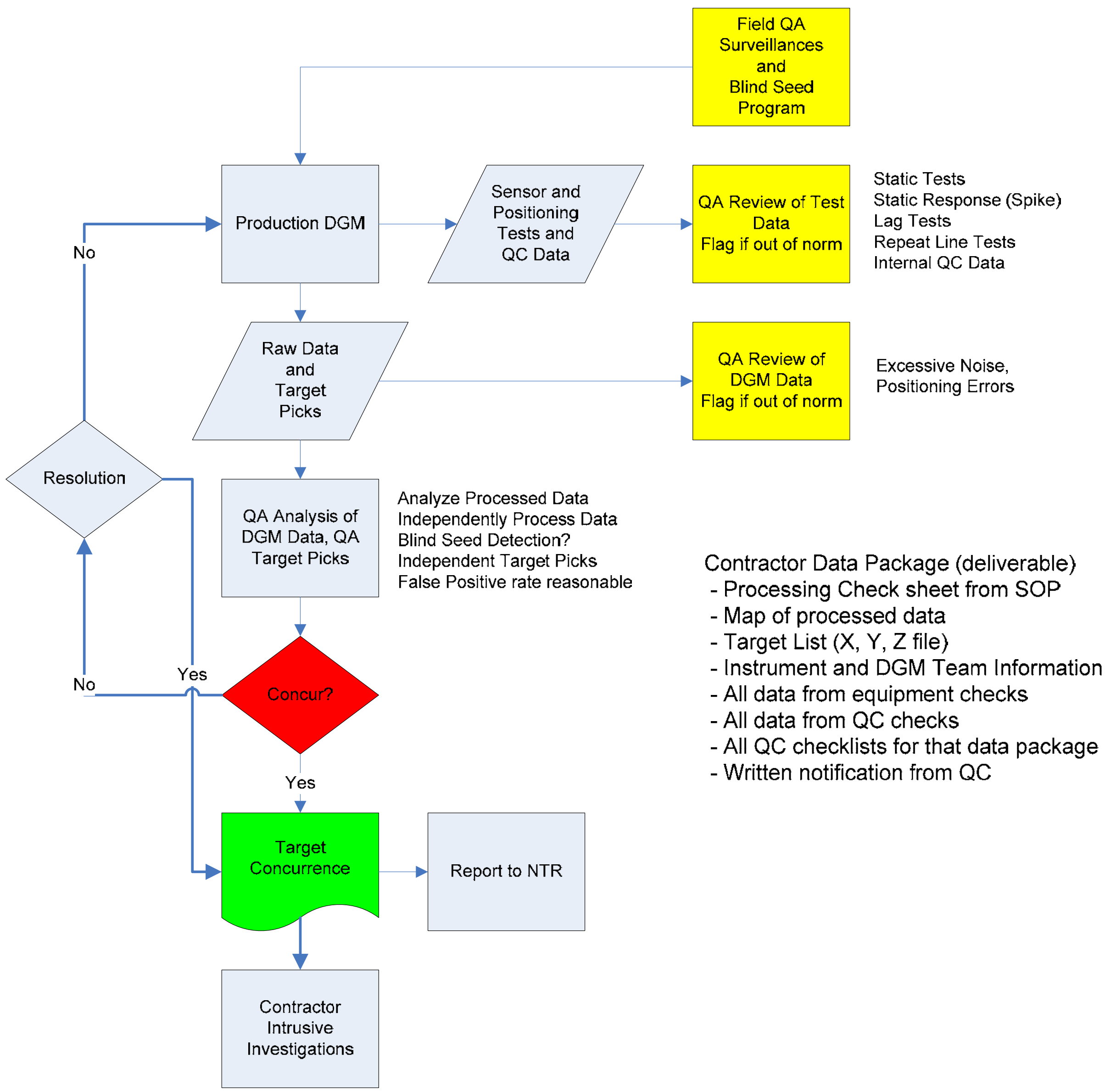


Figure 1-4. QA of Contractor Production Process to Achieve Target List Concurrence

Target selection and comparison with contractor target lists was performed using the Oasis UX Detect module as follows:

- Re-processed DGM data were loaded into the software, and QA targets were selected using the Blakely method and 3 mV threshold on Channel 1. This QA picking threshold was the initial threshold applied to all contractor data; this was modified as the contractor thresholds changed. Note that the 3 mV threshold (Channel 1) was determined as optimum from QA analysis of both (OU B-1 and OU B-2) GPO QA DGM data sets and was also provided to the contractors in the Calibration Grid/Transect Appendix.
- The contractor target list was loaded into a separate database in the program.

- The software was used to compare the “known” or QA target list to the contractor target list. The software was set to “look” a distance of 2.5 ft (Rcrit) from the QA target position to find a corresponding contractor target. QA targets that did not have a match in the contractor target list were denoted as “QA Additional Targets”, and added to the contractor target list. These targets were designated as “900” series targets (i.e., a “900” was included in the target number) so that they could be identified later as a QA added target anomaly. Note that contractor targets that did not match with QA targets were left in the final target list (e.g., QA did not remove any targets identified by the contractor).

QA provided the contractor with a digital file and listing in the QA Certification Report of the “QA Additional Targets” for each grid or transect. It was the contractor’s responsibility to add these targets to their original target list for that grid or transect. In all cases, the contractor agreed to the addition of the “QA Additional Targets” without any need for negotiation.

The QA Certification Report blocks 1 through 9 were filled in by the QA Geo Lead once the contractor DGM data were validated, re-processed and “QA Additional Targets” had been selected. The “QA Additional Targets” were included on this report and also delivered (via contractor SharePoint) in digital format. The QA Certification Report was signed by the QA Geo Lead, and then uploaded to the contractor SharePoint site for Naval Technical Representative (NTR) signature. Upon NTR signature, the contractor was authorized to begin intrusive investigations on the final target list (contractor target list plus “QA Additional Targets”).

QA utilized EM61 Channel 1 for QA target selection. The contractor utilized the sum of Channels 2, 3 and 4. Thus, there is a difference between the QA target picking method and the contractor picking method in OU B-1. A brief technical discussion of this difference is provided in Appendix V in the GPO Installation Report (Battelle 2008b). To summarize, there is not an established “optimum” method for target selection from EM61 DGM data. QA decided to utilize Channel 1, because it provided excellent results in DGM data collected over the Calibration and Blind GPO Grids and this method is commonly used on MEC detection projects. The method of summing Channels 2, 3 and 4 should be appropriate, but has potential pitfalls if the data processing is not performed correctly. From evaluation of contractor Blind GPO Grid DGM data, the amplitude of Channel 1 is approximately 0.75 of the sum of Channels 2, 3 and 4 over an anomaly. Thus, a QA target selection threshold of 3 mV in Channel 1 is approximately equivalent to 4 mV in the Sum Channel. Note that all DGM data used in this Data Validation and Target Concurrence process were contractor acquired (and QC’ed).

1.6.2 Quality Assurance of Intrusive Investigations and Final Grid Certification. Figure 1-5 describes how the QA for intrusive investigations and final grid certification was conducted.

QA of the intrusive investigations and final grid certification was the responsibility of the QA field element. The makeup, qualifications, responsibilities and assignments for the QA field element comprised, generally, the QA Lead and Administrative, UXO QA and Geo QA Teams.

The UXO QA Teams were responsible for both field observation and QA documentation. Observations included the contractors’ grid location surveys, vegetation removal teams, surface clearance/debris removal teams, DGM teams, anomaly reacquisition teams, UXO intrusive teams and QC teams. Additionally, the UXO QA Teams performed post-QC intrusive target checks, conducted QA DGM target investigations and issued QA grid certification reports for grids which passed QA.

The Geo QA Teams observed grid DGM operations, anomaly reacquisition teams, emplaced QA blind seeds in grids, setup and maintained the GPS base station, tracked snow melt progress using GPS and performed DGM in selected grids.

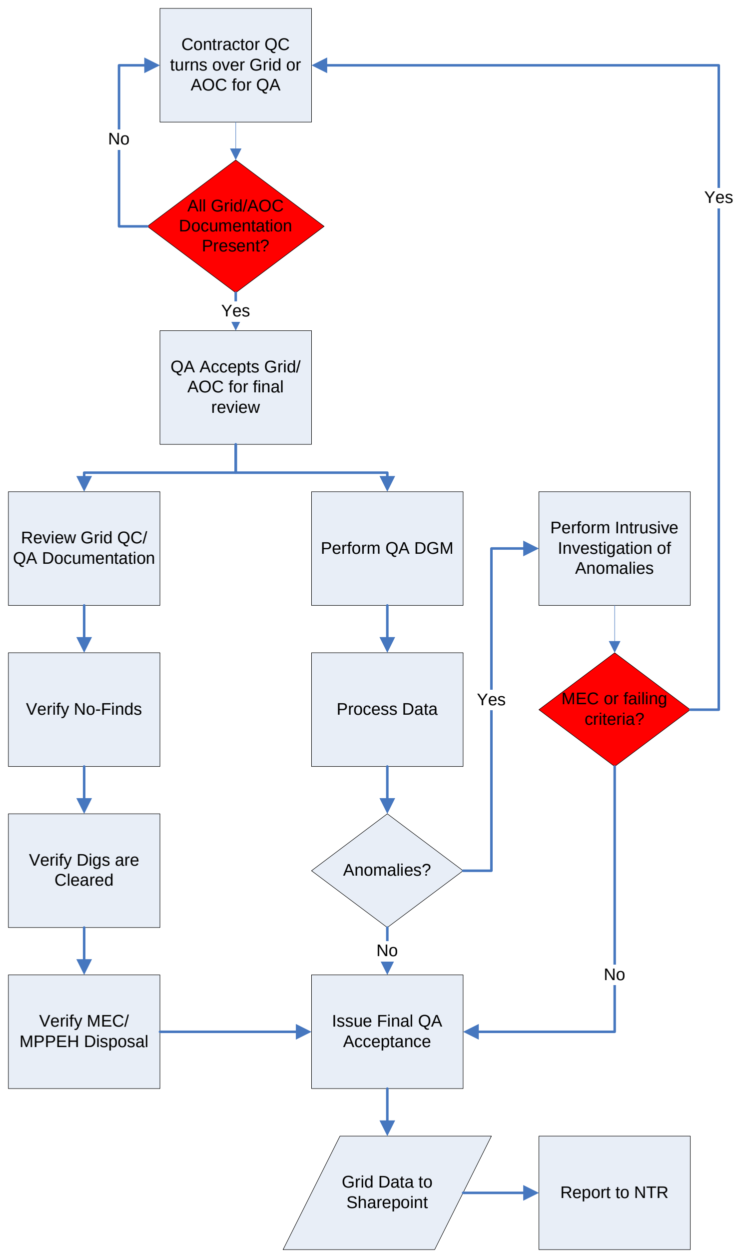
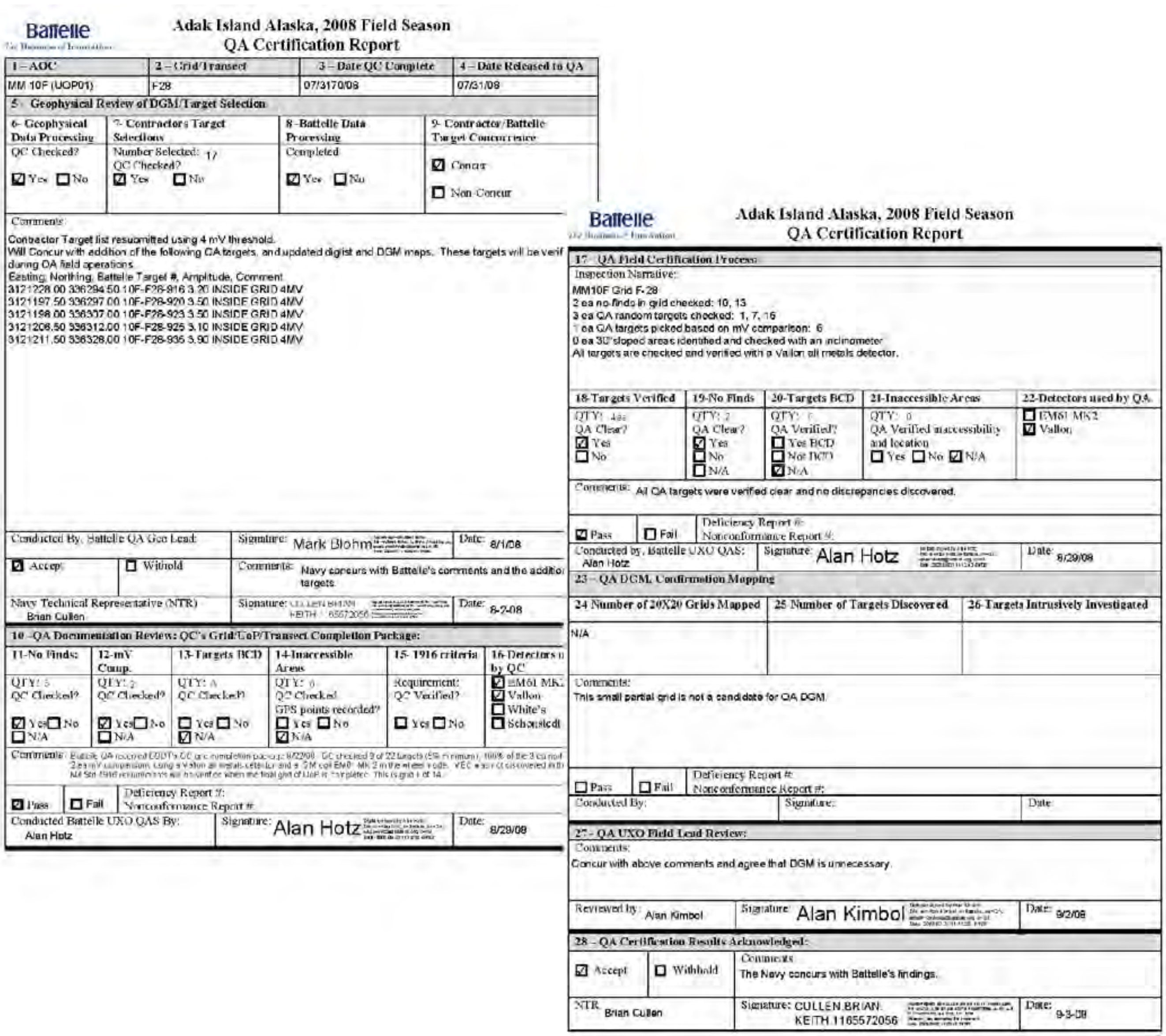


Figure 1-5. Process for QA of Grids/AOC and Final Certification

The final activity for the field QA element was to issue the QA Certification Report. Figure 1-6 provides an example of a completed report. The top section (1 through 9) was filled in by the QA geophysicist doing the target concurrence and included those targets to be added to the contractor's target list. The remainder was completed by the field QA personnel. The NTR signed the form at both milestones (target concurrence and final QA).



Battelle

Adak Island Alaska, 2008 Field Season
QA Certification Report

1 – AOC	2 – Grid/Transect	3 – Date QC Complete	4 – Date Released to QA
MM 10F (UOP01)	F28	07/3170/08	07/31/08

5 – Geophysical Review of DGM/Target Selection

6 - Geophysical Data Processing	7 - Contractors Target Selections	8 - Battelle Data Processing	9 - Contractor/Battelle Target Concurrence
QC Checked? ☑ Yes ☐ No	Number Selected: 17 QC Checked? ☑ Yes ☐ No	Completed ☑ Yes ☐ No	☑ Concur ☐ Non Concur

Comments:
Contractor Target list resubmitted using 4 mV threshold.
Will Concur with addition of the following QA targets, and updated digist and DGM maps. These targets will be verif during QA field operations.
Easting, Northing, Battelle Target #, Amplitude, Comment
3121228.00 336294.50 10F-F28-916 3.20 INSIDE GRID 4MV
3121197.50 336297.00 10F-F28-920 3.50 INSIDE GRID 4MV
3121198.00 336307.00 10F-F28-923 3.50 INSIDE GRID 4MV
3121206.50 336312.00 10F-F28-925 3.10 INSIDE GRID 4MV
3121211.50 336328.00 10F-F28-936 3.90 INSIDE GRID 4MV

Conducted By, Battelle QA Geo Lead:	Signature: Mark Blohm	Date: 8/1/08
☑ Accept ☐ Withold	Comments: Navy concurs with Battelle's comments and the additional targets.	
Navy Technical Representative (NTR) Brian Cullen	Signature: CULLEN.BRIAN KEITH.1165572056	Date: 8-2-08

10 – QA Documentation Review: QC's Grid/UoP/Transect Completion Package:

11-No Finds	12-mV Comp.	13-Targets BCD	14-Inaccessible Areas	15-1916 criteria	16-Detectors used by QC
QTY: 5 QC Checked? ☑ Yes ☐ No ☐ N/A	QTY: 2 QC Checked? ☑ Yes ☐ No ☐ N/A	QTY: A QC Checked? ☐ Yes ☐ No ☑ N/A	QTY: 0 QC Checked GPS points recorded? ☐ Yes ☐ No ☑ N/A	Requirement: QC Verified? ☐ Yes ☐ No	☑ EM61 MK2 ☑ Vallon ☐ White's ☐ Schonstedt

Comments: [illegible]

☑ Pass ☐ Fail	Deficiency Report #: Nonconformance Report #:	
Conducted Battelle UXO QAS By: Alan Hotz	Signature: Alan Hotz	Date: 8/28/08

Battelle

Adak Island Alaska, 2008 Field Season
QA Certification Report

17 – QA Field Certification Process:
Inspection Narrative:
MM10F Grid F-28
2 ea no-finds in grid checked: 10, 13
3 ea QA random targets checked: 1, 7, 16
1 ea QA targets picked based on mV comparison: 6
0 ea 30°sloped areas identified and checked with an inclinometer
All targets are checked and verified with a Vallon all metals detector.

18-Targets Verified	19-No Finds	20-Targets BCD	21-Inaccessible Areas	22-Detectors used by QA
QTY: 4ea QA Clear? ☑ Yes ☐ No	QTY: 2 QA Clear? ☑ Yes ☐ No ☐ N/A	QTY: 0 QA Verified? ☐ Yes BCD ☐ Not BCD ☑ N/A	QTY: 0 QA Verified inaccessibility and location ☐ Yes ☐ No ☑ N/A	☐ EM61 MK2 ☑ Vallon

Comments: All QA targets were verified clear and no discrepancies discovered.

☑ Pass ☐ Fail	Deficiency Report #: Nonconformance Report #:	
Conducted by, Battelle UXO QAS: Alan Hotz	Signature: Alan Hotz	Date: 8/29/08

23 – QA DGM Confirmation Mapping

24 Number of 20X20 Grids Mapped	25 Number of Targets Discovered	26 Targets Intrusively Investigated
N/A		

Comments:
This small partial grid is not a candidate for QA DGM.

☐ Pass ☐ Fail	Deficiency Report #: Nonconformance Report #:	
Conducted By:	Signature:	Date:

27 – QA UXO Field Lead Review:
Comments:
Concur with above comments and agree that DGM is unnecessary.

Reviewed by: Alan Kimbol	Signature: Alan Kimbol	Date: 9/2/08

28 – QA Certification Results Acknowledged:

☑ Accept ☐ Withhold	Comments: The Navy concurs with Battelle's findings.	
NTR Brian Cullen	Signature: CULLEN.BRIAN.KEITH.1165572056	Date: 9-3-08

Figure 1-6. Sample QA Certification Report

1.7 Quality Assurance Reporting

QA documented its field activities using the reports described in Table 1-4.

Table 1-4. Reports Documenting Field Activities

Report Name	Description
Daily QA Report	This report was given to the NTR daily and posted to the QA and Navy SharePoint sites. The report included the contract number, a report tracking number and contained the following information: • Daily safety topics from LJ/RG, RIFS and EODT morning safety meeting • Local weather conditions/forecast • QA field surveillances conducted • QA DGM grids completed • Grid/UOP QA certifications completed • QA scheduled activities with team assignments • Safety incidents/NCR/DNRs • Comments block that summarized daily activities • Contractor safety meeting attendance roster • A Battelle man-hour accountability log
Weekly QA Report	The report included a tracking number, summary of the weekly QA activities and a cumulative project man hour total. A copy was provided to the NTR and was posted to the QA, Navy and Regulator's SharePoint sites.
QA Field Surveillance Reports	Daily observations of field activities in OU B-1 were documented on this form. QA field teams observed each contractor's operational teams daily with findings documented in the QA's log book. Weekly, a formal QA field surveillance report was completed, documenting what was observed at the time of the QA visit. The reports were reviewed and signed by the NTR and then posted to the QA and Navy SharePoint sites.
Non-Conformance and Deficiency Notification Reports (NCR/DNR)	These reports were completed when an unsatisfactory condition was identified or discovered. The report was initiated by the QA team making the discovery. It identified the problem encountered, referenced the work plan/SOP and contained suggested corrective actions. It was reviewed and signed by the NTR then delivered to the contractor for action. NCR/DNRs were posted to the QA, Navy and specific contractors' SharePoint sites.
GPO Certification Report	This report was completed in two steps. Step One: A field surveillance form was completed by the QA specialists following surveillance of the contractors' team conducting DGM or reacquisition certification in the blind GPO or transect. Step Two: The contractor's geophysical system tests were reviewed for accordance with the WP/SOPs. The contractor's DGM data were reviewed for consistency, coverage and noise characteristics. The contractor target lists were compared to "known" target locations and a GPO Certification Report was generated. Criterion for passing the GPO were Pd = 0.85, with CL of 90%, without excessive False Positives. This report was posted to the Battelle, Navy and specific contractors' SharePoint sites, with an e-mail notification.
QA Grid Certification Report	This is a multi-part process for documenting the QA activities performed for each specific grid. Part One: Initiated following DGM surveys in production grids, data processing, target selection and contractor's QC of data. Following a QA review and approval of the contractors' geophysical system test data, 100% of the contractor DGM data were re-processed, evaluated for noise and coverage, and a QA target list was independently developed. The contractor target list and QA target list were compared, and QA Additional targets (if any) were submitted electronically (via the SharePoint) to the contractor for addition to their original target list. This information was documented on the QA Certification Report (blocks 1-9) and delivered (via the SharePoint) to the NTR for signature approval.

Table 1-4. Reports Documenting Field Activities (Continued)

<table>
<tr><th>Report Name</th><th>Description</th></tr>
<tr><td>QA Grid Certification Report (Continued)</td><td>Part Two: This was a continuation of the initial QA Certification Report (target concurrence). It was completed following contractors' QC inspection of production grids. QA field teams verified that QC conducted a thorough inspection of grids to ensure anomalies were removed, inaccessible areas checked, no-finds verified, targets below clearance depth (BCD) were checked, QC/QA blind seeds recovered and Mil Std 1916 requirements were met for UoP certifications. Information documented on the form:

Review of QC inspection documentation package:

Verify a minimum percentage (5% EODT and 10% USAE) of total targets were selected, checked and documented.
Verify that 100% of no-finds were checked and documented
Review intrusive dig sheets and select targets to field check based on an abnormal mV response compared to the anomaly recovered.
Check if any targets were identified as BCD and verify during field inspection.
Verify MIL STD 1916 requirements were met for UoP completion.
Check if inaccessible areas were identified and documented, and then verify during field inspection.

QA field certification procedures completed during grid inspections:

Check a minimum 10% of targets investigated (other than no finds).
Check all targets selected during QC documentation review that had an abnormal mV response compared to anomaly recovered.
Verify targets BCD or inaccessible due to water in hole
Verify 10% of no-finds listed on intrusive dig sheets.
Verify documented inaccessible areas with an inclinometer.

QA DGM surveys: Grids were reviewed and selected for QA DGM surveys based on: size, anomaly count, anomaly density, MEC finds, blind seed status, number of no-finds recorded and inaccessible areas visible on DGM maps (data gaps).

2 – 3, 20 ft × 20 ft or one 20 ft × 40 ft mini grid(s) were DGM surveyed within selected grids.
Data was processed on site into x,y,z files to transfer to the QA Geo Lead for further processing and target selection.
Data was processed and targets selected by QA Geo Lead
DGM maps with target locations were developed by QA Geo Lead.
QA DGM targets were intrusively investigated by QA UXO team and results documented.

QA Field Lead review
NTR review and sign

Post to contractor specific, Navy and QA's SharePoint site</td></tr>
</table>

1.8 Data Management

One critical task QA assumed for this project was data management as it was not only important to have a means of simply transferring data from Adak to the QA geophysics personnel in Denver but to provide a larger service of data storage and access for the contractor. With that goal in mind, SharePoint sites were set up to provide access to the Navy, contractors, their subcontractors and regulators. In 2008, Battelle set up a SharePoint site as illustrated in Figure 1-7.

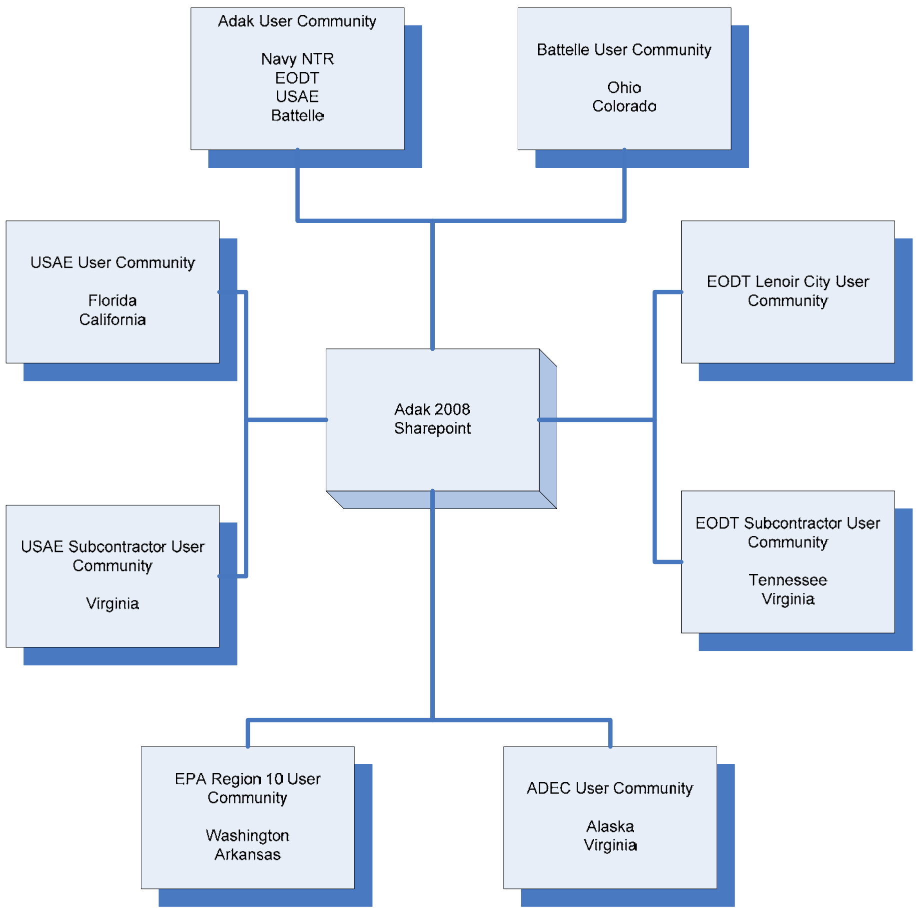
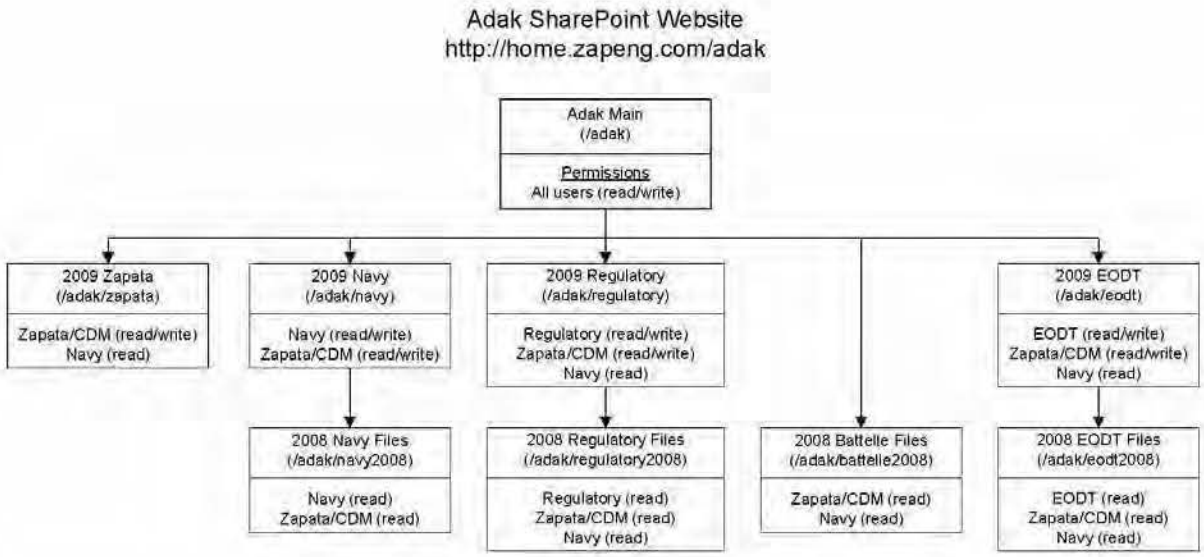


Figure 1-7. Adak 2008 SharePoint User Community (Battelle)

The 2009 SharePoint structure was modeled after the 2008 SharePoint established by Battelle. In fact the entire 2008 SharePoint pertaining to OU B-1 was included (as a read only link) to the 2009 CDM/ZAPATA SharePoint as shown on Figure 1-8. Data acquired during the 2010 field season were uploaded to an independent SharePoint site created by Battelle. All SharePoint data are included in the QA reports for the different seasons. The SharePoint site provided seamless and unlimited access to users across multiple time zones and geographic locations. The SharePoint helped assure data integrity and security considering that some information (i.e., Blind GPO targets) was proprietary.



2009 CDM/Zapata Document Libraries
- ZAPATA_QA_Reports_Daily
- ZAPATA_QA_Reports_Weekly
- Design Change Notice (DCN)
- DGM_QA_DATA
- DGM_QA_REMAPPING
- EZ Access Letters
- Field Change Requests (FCR)
- GPO Certifications
- GPO Installation
- GPO Surveys
- QA_Deliverables_EODT
- QA Final Report
- QA_Grid_Certifications_EODT
- QA_Grid_Certifications_EODT_4.4mV
- QA_Grid_Certifications_EODT_4mV
- QA Surveillance Plan
- QA_Surveillance_Reports_ EODT
- QA_UXO_Grid_UoP_Certification_Complete_EODT
- Weekly QC Meeting Minutes, EODT

2009 Regulatory Document Libraries
- Contractor's Information Appendix A to QA Surveillance Plan
- Design Change Notices (DCN's)
- EODT UoP QA Completions
- Field Change Requests (FCR's)
- Final Plans
- GPO Information
- NCR-DN
- QA Weekly Reports
- Weekly_QC_Meeting_Minutes_EODT

2009 Navy Document Libraries
- Design Change Notice (DCN)
- EZ Access Letter (Battelle)
- Field Change Requests (FCR)
- GPO Certifications
- GPO Installation
- NCR – DN
- QA Surveillance Plan (QASP)
- QA_Daily_Reports
- QA_Grid_Certifications_EODT
- QA_Grid_Certifications_EODT_4.4mV
- QA_Grid_Certifications_EODT_4mV
- QA_UXO_Grid_UoP_Certification_Complete_EODT
- QA_Weekly_Reports
- Weekly_QC_Meeting_Minutes_EODT

2009 EODT Document Libraries
- 3-phase Inspection Results + Surveillances
- Battelle2EODT
- Calibration_Grid
- Contractor's Information Appendix A to the QA Surveillance Plan
- Daily Reports
- EODT Weekly QC Meeting Minutes
- FCRs - DCNs
- Geo data QC
- Geo Data Submittal
- GPO
- MM-10H
- NCR - DN
- QA_Grid_Certifications
- QA_Grid_Certifications_4.4mV
- QA_Grid_Certifications_4mV
- QA_UXO_Grid_UoP_Certification_Complete
- QC Records
- QC_Grid_Certification Packages
- SOPs (Current Version)
- MM-10F
- MM-10G

Figure 1-8. 2009 SharePoint Users' Data Flow Diagram and Document Libraries (CDM/Zapata)

The Navy was provided with read-only access to all sites for supervisory personnel for verification and data audit. Each contractor established its own folder structure within their SharePoint site which made it convenient for them to find and exchange important documents and data. SharePoint was particularly useful as a data warehouse where the Navy could readily and easily verify the status of the work of the contractor for invoicing purposes.

The contractors' SharePoint site contains folders for project plans and procedures (SOPs), QC inspection results and surveillances, Daily Reports, Weekly Meeting Minutes, QC Records, field change requests (FCRs) and Design Change Notices (DCNs), and DGM data upload folders (i.e., Calibration Grid, GPO, and specific AOCs). Within the contractor's SharePoint site, QA created several folders (i.e., Contractor's Information Appendix A to the QA Surveillance Plan, QA Grid Certifications, and QA UXO Grid UoP Certification Complete) to transfer QA information (such as GPO certifications, NCRs, etc.) to the contractor. The QA SharePoint Site contains QA reports, re-processed DGM data (and results), QA DGM remapping data (and results), and other pertinent information regarding the project. The Navy and Regulatory SharePoint sites contain a distillation of the most critical aspects of the project(s) such as final plans, final QA certifications, and so forth.

Section 2.0: QUALITY ASSURANCE AT OPERABLE UNIT B-1

2.1 Introduction

This section presents a summary of the work QA performed in support of the OU B-1 Mount Moffett (MM-10F, -10G and -10H) remediation. This remediation work was performed by EODT contracted to NAVFAC Northwest under a firm-fixed price (FFP) contract. The work was accomplished during the 2008, 2009 and 2010 field seasons and is considered completed. Information presented here is mainly drawn from QA reports submitted to the Navy:

- 2008 and 2010 field seasons: Battelle (Battelle, 2009; Battelle, 2010)
- 2009 field season: CDM/Zapata (CDM/Zapata, 2010).

The 2008 field season comprised all of the DGM and the intrusive investigation of 165 of the total 476 grids. QA issued four Non Conformance Reports (NCRs) in the 2008 field season and these were all successfully resolved either in 2008 or by early in the 2009 field season.

The 2009 field season focused on completing the intrusive work begun in 2008. The contractor DGM team also collected data for five step-out grids identified from the 2008 intrusive work. The contractor intrusively investigated the 316 remaining grids, which includes the step-out grids. At the end of the 2009 field season, there were numerous (19) unresolved NCRs submitted by QA for contractor deficiencies/failures.

The 2010 field season comprised completing excavation backfilling, road and rut repairs and a siltation survey as prescribed in FCRs 19 and 20. This work was designed to bring closure to the outstanding 2009 NCRs and bring the project to completion. There were no NCRs issued during the 2010 field season by QA.

Most of the discussions in the following sections focus on the QA work accomplished during the 2008-2009 field seasons, as most of the production field work was accomplished in this period. Also, all of this work was guided by the extensive planning documents developed and approved by all parties prior to field work. The work accomplished during the 2010 field season was based on FCRs developed during the project, and QA of this work is mainly discussed in Section 2.4.5. More detailed discussion of the FCRs and NCRs are provided in Section 2.6.

2.1.1 Project Location. The OU B-1 project location is shown in Figure 2-1. It comprises three AOCs, totaling approximately 366 acres, designated MM-10F, -10G and -10H, which are located within Parcel 4 at the 900 ft-level and higher on Mount Moffett, Adak Island, Alaska.

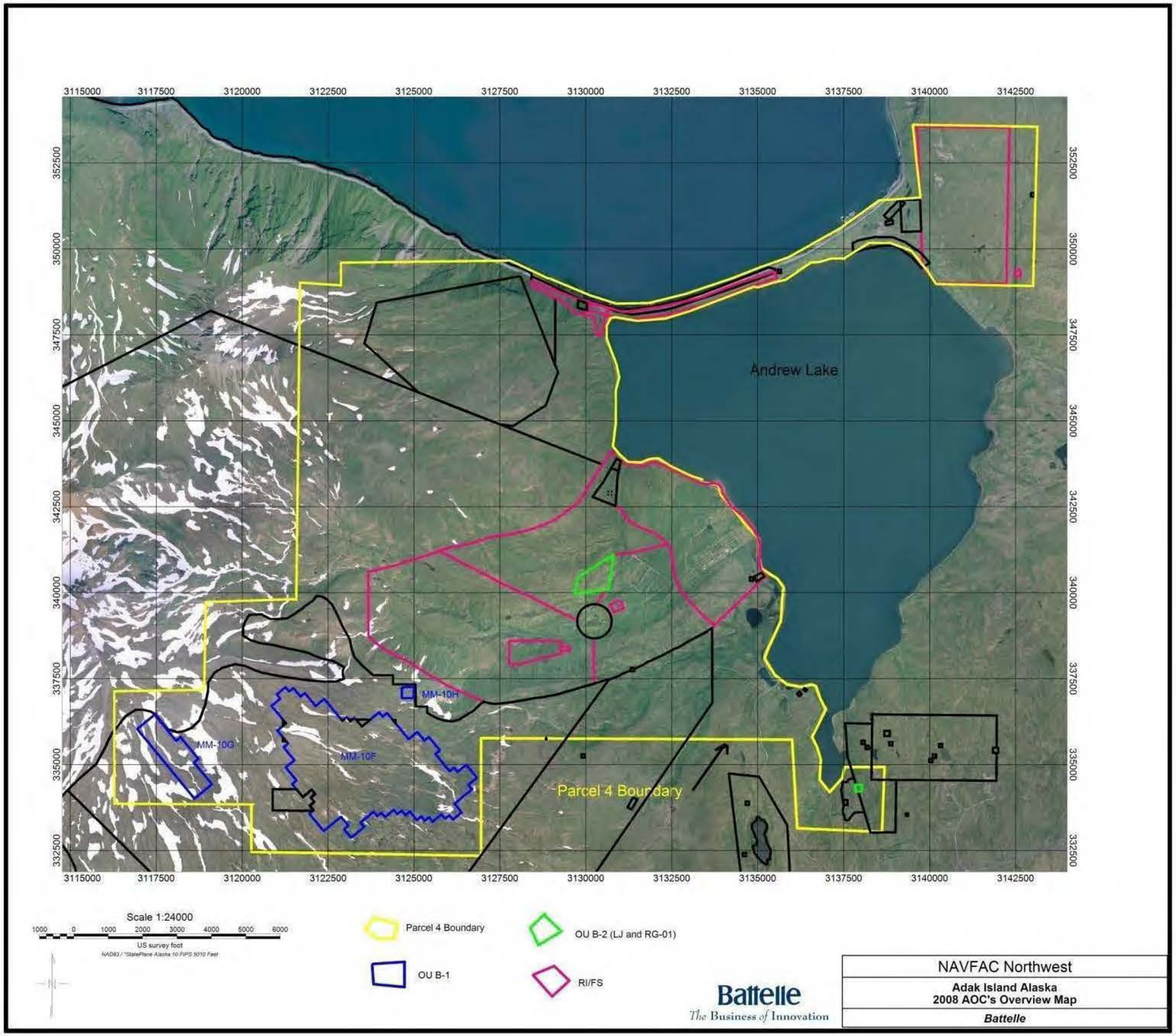


Figure 2-1. Location of the OU B-1 Project Area

2.1.2 Scope and Objective. The scope for the OU B-1 remediation project was to complete munitions clearance for three AOCs (MM-10F, MM-10G and MM-10H) on Mount Moffett in accordance with the OU B-1 Record of Decision (ROD) and receive determination from regulators that No Further Action is required at these sites. The ROD requires 100% clearance of munitions from the surface to a level of 4 ft below the mineral surface layer. To accomplish this, the project objectives were to:

- Mobilize personnel and equipment to the site;
- Qualify all of the DGM and anomaly reacquisition teams in GPO to a standard of 0.85 Pd at a 90% CL;
- Perform DGM over 100% of the accessible area within the three AOCs and receive concurrence from the Navy's QA contractor with the target lists generated from the DGM;
- Reacquire and investigate 100% of the target anomalies identified from the DGM data;
- Dispose of all MEC;
- Inspect, certify, verify and process all material potentially presenting an explosives hazard (MPPEH) through a thermal flashing unit (TFU) and package the MPPEH for shipment off Adak Island for recycling.
- Perform and document QC on all definable features of work.
- Demobilize personnel and equipment from the site;
- Prepare project reports in accordance with the approved work plans.

2.2 Geophysical Prove Out Certification of Digital Geophysical Mapping and Reacquisition Teams

As mentioned above, all primary production DGM surveys were completed in MM-10F, -10G and -10H and passed by QA in 2008. Thus, in 2009, the contractor fielded only one DGM team since only step-out geophysical work was required/anticipated. The contractor did not field a DGM team in the 2010 field season. All contractor DGM teams utilized an EM61 MK2 with DGPS and acquired data in accordance with their SOPs, the GPO certification Plan (TTECI, 2008) and the QASP (Battelle, 2008a).

The contractor completed the first DGM GPO surveys with their QC DGM team on June 17, 2008. After that, the contractor utilized the GPO numerous times during the 2008 (and 2009) field season to certify additional crews, certify modifications to their equipment and to adjust their target picking threshold. During the course of the 2008 field season, the contractor certified 11 DGM crews in the GPO. During the 2009 field season, the contractor certified one DGM crew in the GPO. The contractor did not certify any DGM crews in the GPO in the 2010 field season, as no DGM data were acquired. Table 2-1 provides a chronology of the contractors DGM team's certifications in the GPO in 2008 and 2009.

GPO certification (both "restricted" and "contractor deliverable") forms for these teams are provided in the QA reports for the 2008 and 2009 field seasons. Further description and analysis of the contractor DGM GPO surveys, as well as surveillance forms are also given in the QA reports.

The contractor changed the DGM target picking threshold for production DGM surveys three times during the 2008 field season by re-picking the targets in the GPO grids as shown in Table 2-1.

Table 2-1. Chronology of GPO Certifications for Contractor DGM Teams

	Target Picking Threshold			
	2008			2009
Team	**2.9 mV**	**4 mV**	**4.4 mV**	**4.4 mV**
QC	June 17		October 3	
#1	June 21		August 11	June 24
#2	June 21		August 11	
#3	June 21		August 11	
#4	June 21		August 11	
#5	June 21	July 28	August 11	
#6	June 21		August 11	
#7	July 18		August 11	
Mobile #1	July 2	July 28	August 11	
Mobile #2	July 7	July 28	August 11	
UXO #3	July 22	July 28		

The first team to submit a blind GPO target list was the QC team (on June 17, 2008). This team passed the GPO certification using a target picking threshold less than 2.9 mV and the contractor was notified that this threshold produced excessive false alarms. It should be noted that the contractor utilized a threshold that was based on the sum of EM61 Channels 2, 3, and 4 throughout all GPO and production work in OU B-1, whereas QA utilized a threshold based solely on Channel 1. Subsequently, the contractor resubmitted the GPO target lists for the QC team and Teams 1 through 6 at a threshold of 2.9 mV and all of these teams passed the GPO certification. The contractor did not re-run the DGM surveys at the blind GPO. Instead, they resubmitted the targets using the new threshold. This process (re-picking of existing DGM data) was used for all subsequent threshold changes. Because the contractor had multiple teams in the field, all teams had to pass the GPO certification before the Navy would authorize the revised threshold being applied on field data. On July 14, 2008, the contractor resubmitted GPO target lists for Teams 1 through 5 at a target threshold of 7 mV. None of the teams passed GPO certification at this threshold, and the contractor was informed of this failure. On July 23, 2008, the contractor resubmitted most of the Team's GPO target lists (all except Team #3) at a target threshold of 4.5 mV. Five of these teams passed at this level and the remaining five failed. Thus, this threshold was also not approved. The final target threshold of 4.4 mV, which was the highest value for which all the contractor teams would pass the GPO, was determined by QA analysis of the GPO data and provided to the Navy, Naval Ordnance Safety and Security Activity (NOSSA) and the contractor for approval. This threshold (4.4 mV, Sum of Channels 2, 3 and 4) was also used for the one contractor DGM team in 2009. (It was NOSSA policy to only approve a picking threshold that is based on GPO data, not on field data.)

The contractor certified nine reacquisition teams through the GPO during the 2008 field season, and eight reacquisition teams in 2009. The contractor did not certify any reacquisition crews in the GPO in the 2010 field season, as no reacquire operations were required. These teams utilized Vallon hand-held sensors as the detector. Table 2-2 provides a chronology of the contractor reacquire team's certifications in the GPO. GPO certification and QA surveillance forms for these teams are provided in the respective QA reports.

2.3 Digital Geophysical Mapping for OU-B1

2.3.1 Quality Assurance Data Processing and Target Concurrences. The contractor collected DGM data from all primary grids in OU B-1 during the 2008 field season as shown on Figure 2-2.

Table 2-2. Chronology of GPO Certifications for EODT Reacquire Teams

Team	2008	2009
UXO Team 1	July 9	June 30
UXO Team 2	July 7	July 2
UXO Team 3	July 7	July 2
UXO Team 4		July 2
UXO Team 5		July 2
UXO QC Team	July 16	June 16
Geo Team 1	August 29	June 16
Geo Team 3	August 26	
Geo Team 4	August 15	
Geo Team 7	August 13	
Reac Team 1	August 22	June 17

There are a total of 476 grids in OU B-1, AOCs 10F, 10G and 10H. AOC 10F has 411 grids, AOC 10G has 61 grids and AOC 10H has four grids. Full grids are 60 m by 60 m in size (~0.9 acre). During 2008, all of these grids were processed completely through QA DGM target concurrence and were at various stages of the remediation, QC and QA process. In 2008 and 2009, the contractor acquired DGM data on five step-outs, based on MEC finds from the 2008 field season. The DGM data and targets from these step-outs were passed by QA early in the 2009 field season as shown in Table 2-3.

Table 2-3. Step-out DGM Data Processed through QA in 2009 (Step-outs)

AOC	Location/Nomenclature	DGM Acquisition Date	Date Submitted to QA	Date Approved by QA	Total Number of DGM Targets
MM-10F	UOP06_D23_SO1	8/15/09	8/20/09	8/20/09	18
	UOP08_N22_SO1	8/28/08	6/17/09	6/17/09	35
MM-10G	UOP01_C14_SO1	8/8/09	8/12/09	8/12/09	17
	UOP02_D11_SO1	8/8/09	8/12/09	8/12/09	7
MM-10H	UOP01_B01_SO1	8/28/08	6/17/09	6/17/09	15

Figure 2-3 shows the locations of the step-outs as well as the locations of the MEC that prompted the step-out.

As shown in the previous section, the contractor utilized several target picking thresholds in the GPO in 2008. The various target picking thresholds were also applied to contractor production DGM data and in turn the QA of those data. EODT began production target selection on June 23 using a threshold (Sum Channels) of 2.9 mV. This threshold was changed to 4 mV on approximately July 28 and finally to 4.4 mV on approximately August 11. The contractor submitted target lists to QA chronologically as the grids were mapped with DGM and passed contractor QC. QA was allowed 2 working days to provide target concurrence. Thus, QA returned QA Certification Reports (and QA Additional Target lists) in the sequence dictated by the contractor submittals. However, as the different contractor target picking thresholds were approved, the contractor was allowed to apply this retroactively to grids that had not yet been intrusively investigated. Consequently, for many grids there are multiple QA Certification Reports corresponding to the different picking thresholds. QA began target concurrence

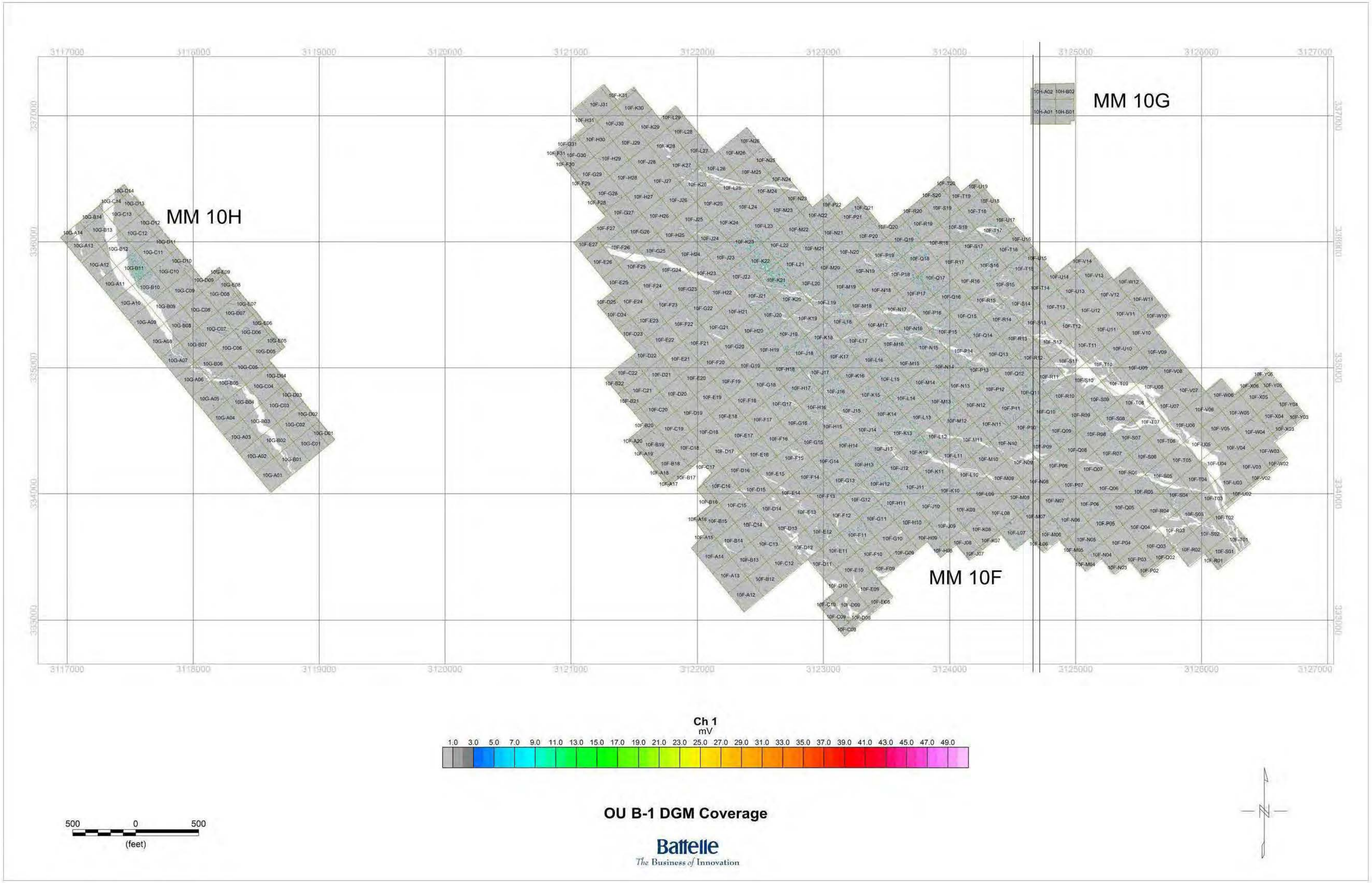


Figure 2-2. Contractor DGM Data Coverage in OU B-1

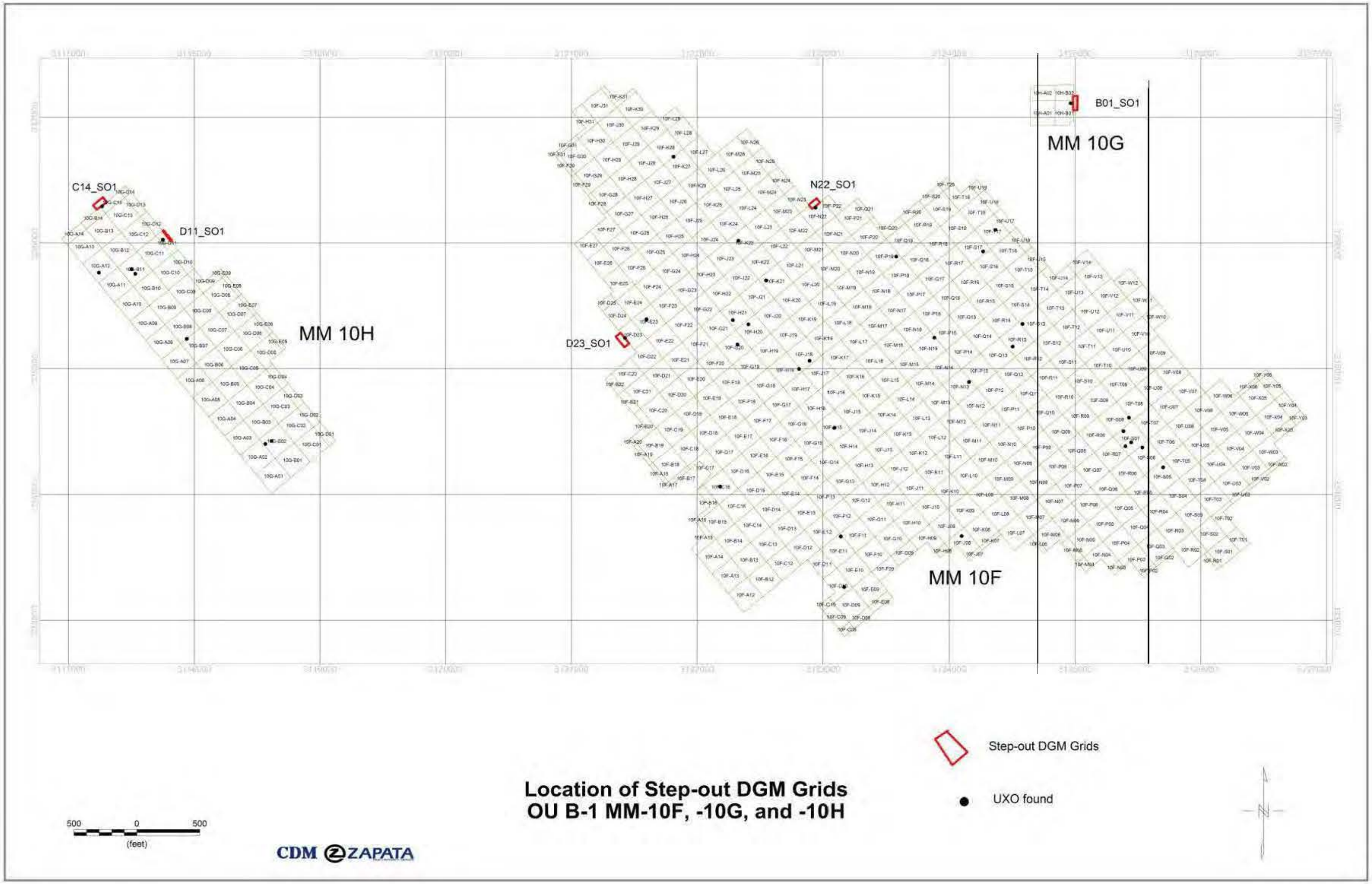


Figure 2-3. Locations of DGM Step-out Grids and MEC

using a 3 mV (Ch 1) target picking threshold and increased this threshold as the contractor threshold was elevated and confirmed to be appropriate by intrusive results. Table 2-4 shows the chronology of changes in picking threshold by team.

The contractor QC team did not collect production DGM data or submit data for target concurrence to QA; therefore, the contractor did not need to certify this team in the GPO. However, this team obtained GPO certification at 4.4 mV by the end of the 2008 field season (October 3). The QA team utilized a target picking threshold of 3 mV (Channel 1) from the beginning of field work until August 6, 2008, and then raised the threshold to 4 mV.

Due to the variable target picking threshold used in OU B-1 at the end of the QA DGM processing, 24 grids were finalized using the 2.9 mV threshold, 203 grids were finalized using the 4 mV threshold and 249 grids were finalized using the 4.4 mV threshold. However, due to reprocessing of multiple threshold values (and repeats of failed grids), QA submitted a total of 159 grids at 2.9 mV, 204 grids at 4 mV, and 253 grids at 4.4 mV, for a total of 616 submittals. *Finalized, in this case, means that the DGM data underwent contractor QC, were submitted for QA, and underwent and passed the QA DGM process. Thus, Blocks 1 through 9 on the QA Certification Report were completed.*

Figure 2-4 graphically illustrates the target picking threshold(s) utilized by the contractor for grids in OU B-1. Although the contractor certified 11 teams through the GPO, only Teams 1 through 6 acquired DGM data submitted to QA. Ultimately, QA approved a total of 41,393 DGM targets in OU B-1 (including step-outs). Figure 2-5 shows the locations of the DGM targets, and the 38 MEC items found in OU B-1.

Table 2-4. Chronology of Contractor and QA Target Picking Thresholds (mV), 2008

Month	**June**				**July**				**August**			
TEAM/WEEK	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
QC			2.9									
1				2.9						4.4		
2				2.9						4.4		
3				2.9						4.4		
4				2.9						4.4		
5				2.9						4.4		
6			2.9							4.4	4.4	
7											4.4	
Mobile #1					2.9			4			4.4	
Mobile #2						2.9		4			4.4	
UXO #3							2.9	4				
QA			3							4		

2.3.2 Quality Assurance of Contractor DGM Surveys in OU B-1. During the 2008 field season, there were several QA issues related to contractor DGM surveys in OU B-1. The most significant QA issues are described below in chronological order. A more detailed discussion of these issues is provided in the 2008 QA Report (Battelle, 2008a).

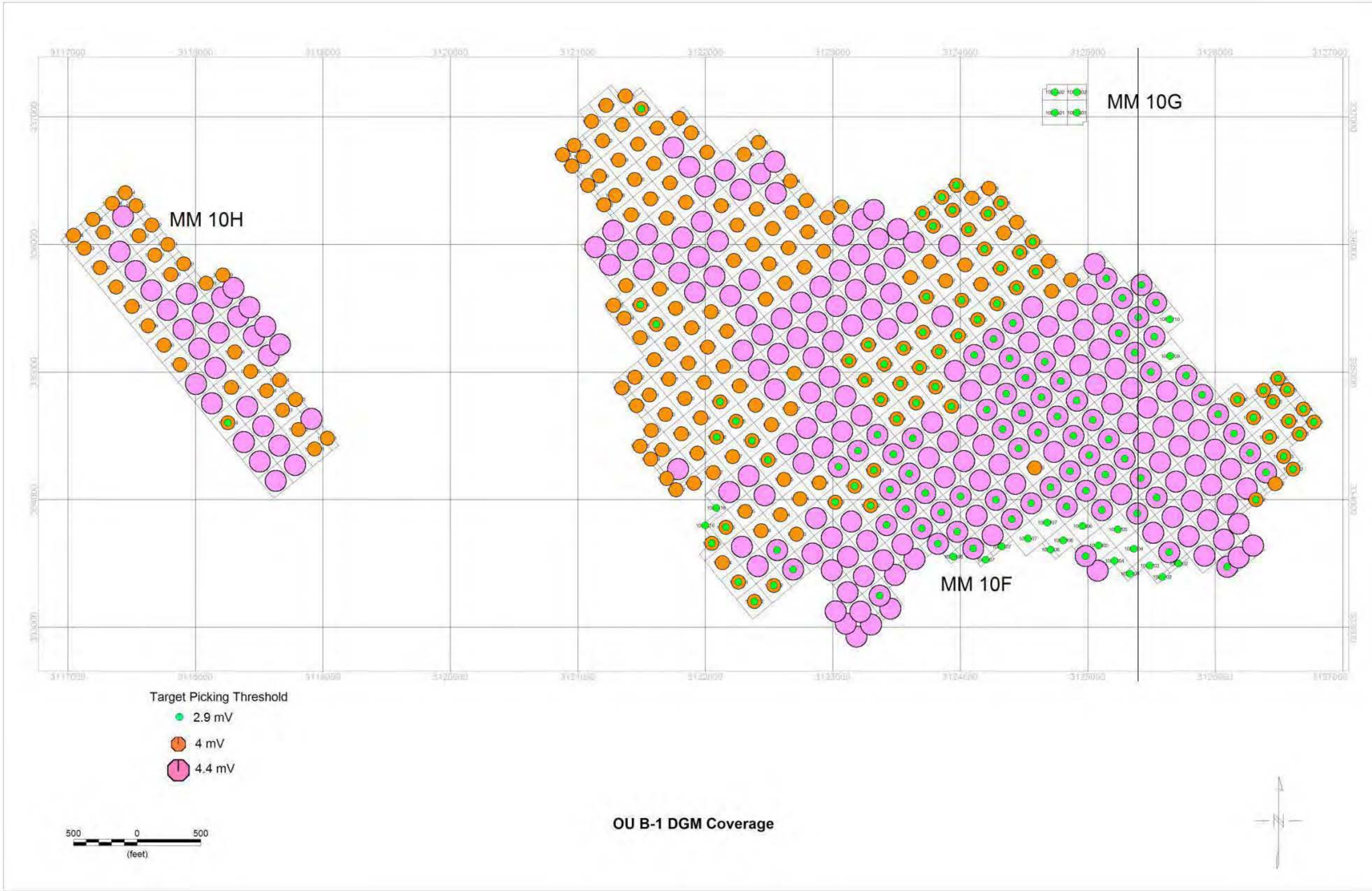


Figure 2-4. Illustration of Target Picking Thresholds

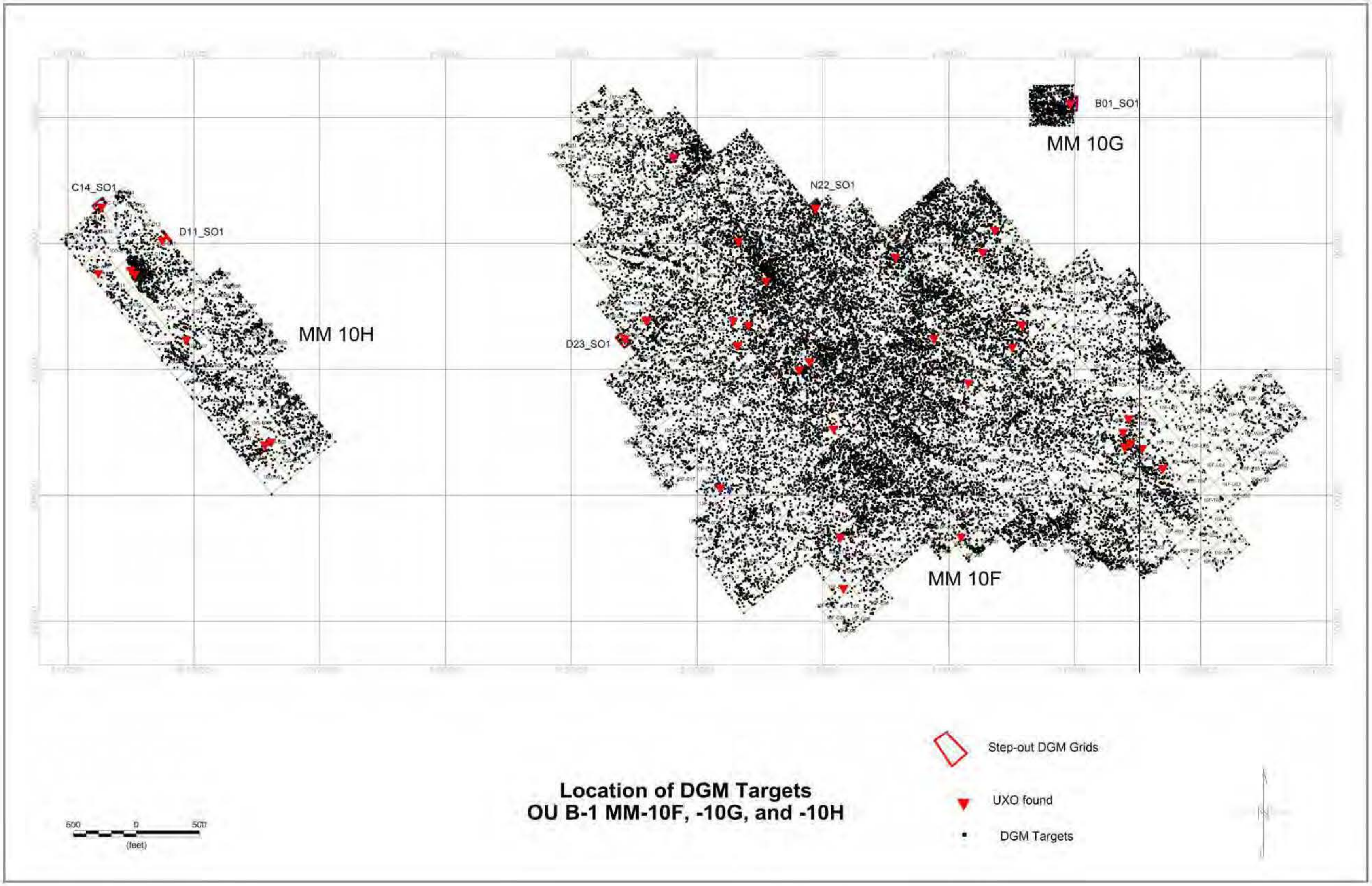


Figure 2-5. DGM Targets in OU B-1

- The contractor began DGM data collection at the OU B-1 GPO (~June 18, 2008) using a GPS mounted to the operator rather than fixed to the EM61 system. This configuration was evaluated by QA and shown to cause small, but unnecessary positioning errors. Ultimately, the contractor agreed to change the GPS configuration to the fixed configuration, similar to that shown in the GPO Calibration Grid contractor deliverable document, and used in previous surveys in OU B-1.
- In the first production DGM packages submitted by the contractor, QA noted that the contractor was not picking anomalies/targets on the edges of the grids. In discussions with the contractor, it was found that the contractor windowed (trimmed) the DGM data to the grid boundaries prior to target selection. Thus, targets that were evident in the un-windowed data on the grid edges/boundaries were not always selected in the windowed data. It is possible that these targets would have been detected in the windowed DGM data in the adjacent grid; however, QA decided to include these anomalies in the QA additional target list. The contractor never modified their picking process (by using un-windowed data) during the project; instead they relied on QA to select targets occurring on the edge of grids. The contractor should have implemented a remedy to this error on their own, which they did not.
- The contractor's SOPs and the project Quality Assurance Project Plan (QAPP) specify the frequency and DQOs for DGM system tests. During the first month of the project, the contractor failed to provide QA with all the QC test data from their EM61s, and failed to evaluate their own QC test data (static-standard test) correctly. This resulted in an NCR being issued to the contractor. Ultimately, the contractor modified their process and deliverables to address this issue.
- QA discovered that contractor Team 6 had failed static-standard tests from July 24 to 30 (contractor QC did not recognize this failure). Upon further investigation, QA determined that the contractor's geophysical equipment had a likely failure. An NCR was issued to the contractor to address both the static-standard failures and suspected geophysical equipment failure. The contractor determined that the failure was due to an incorrect data logger setting during static-standard tests and subsequent field data acquisition. The contractor was able to re-process the data, and provide revised DGM data files and target lists that passed QC and QA without any grid rework.
- Shortly after production DGM surveys began in 2008, QA requested information regarding contractor documentation and tracking of inaccessible areas in the production areas. This issue was important because there are significant areas within OU B-1 where DGM could not be acquired (inaccessible), and these areas needed to be differentiated from areas where DGM data were not acquired due to improper procedures (i.e., data gaps due to excessive line spacing or data drop-outs). Contractor field notes for inaccessible areas did not provide detailed information (i.e., inclinometer readings, GPS coordinates, etc.) regarding the inaccessible area. The contractor was found to be in basic (but minimal) accordance with their own (approved) SOP. The end result is that inaccessible areas in OU B-1 are evident in the final DGM data maps as "blank" or "white" regions where DGM data were not acquired. This is illustrated on Figure 2-2. Areas where DGM data could not be acquired are shown as gaps (white background) within the AOCs. This figure shows that there were significant gaps in DGM data coverage related to stream drainages in the AOCs. To help ensure that the contractor obtained DGM data over all accessible areas, QA performed field surveillances to check these areas. Note, however, that QA did not verify all inaccessible areas.

Part of the QA target concurrence was the successful detection of QA seeds that were randomly installed in OU B-1. These seeds were comprised of 6 inch long nails (example shown on Figure 2-6) that were installed prior to contractor DGM surveys.

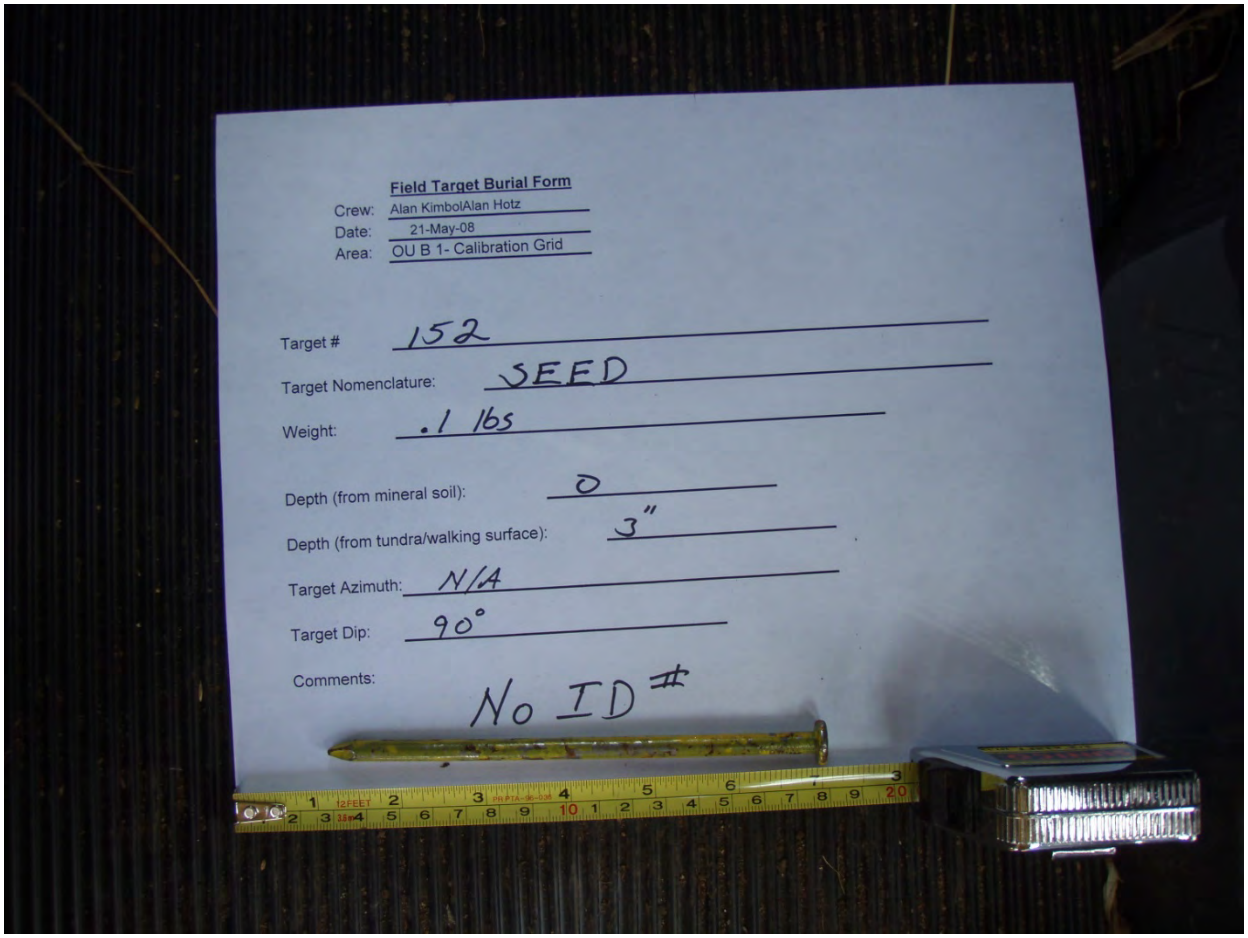


Figure 2-6. Example QA Seed (6-inch Spike/Nail) Used in OU B-1

A total of 301 QA seeds were installed in OU B-1 in 2008 as shown on Figures 2-7 and 2-8. A listing of the coordinates for these seeds is provided in the 2008 QA Report. These figures also show the division of the AOCs into Units of Production (UOPs). MM-10F was subdivided into 40 UOPs (1-40), MM-10H was subdivided into one UOP (1), and MM-10G was subdivided into six UOPs (1-6). Most UOPs are comprised of about eight to 10 grids or approximately 8 acres.

In MM-10F there were 253 QA seeds installed in the 411 grids. In MM-10G there were 44 QA seeds installed in the 61 grids. In MM-10H there were four seeds installed in the four grids. Contractor millivolt values ranged from 4.2 to 82 mV, with most seeds ranging from 20 to 30 mV. Three QA seeds in MM-10F were not detected in the contractor DGM data:

- UOP15, Grid C17: Seed C17
- UOP15, Grid D17, Seed D17
- UOP18, Grid T17, Seed T17

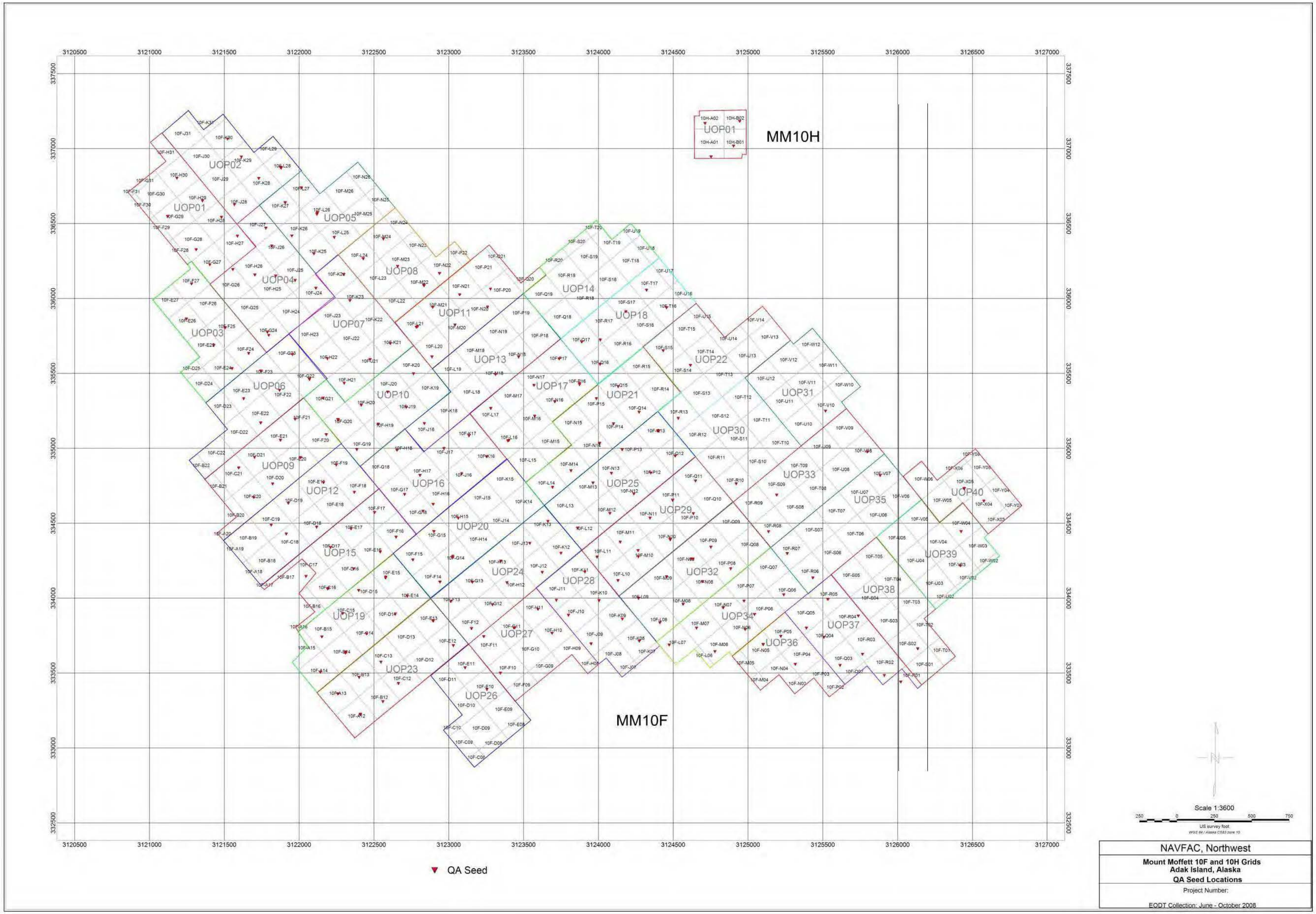


Figure 2-7. QA Seed Locations in MM-10F and MM-10H

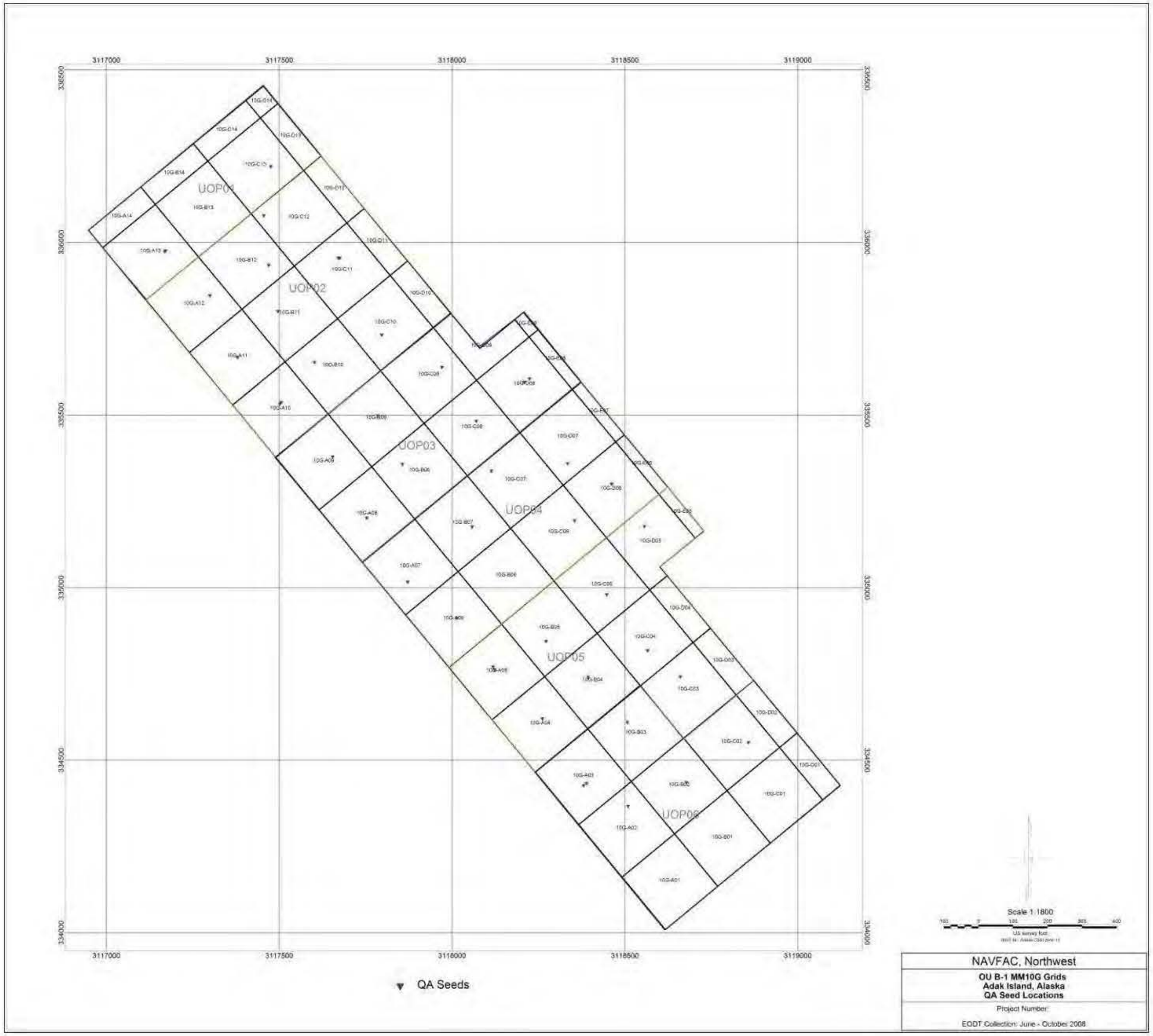


Figure 2-8. QA Seed Locations in MM-10G

All of these missed QA seeds were located in gaps (inaccessible areas) or outside of the boundary of the AOC and thus were appropriately accounted for. In 2009, QA installed six seeds (primarily in the step-out grids), and all seeds were identified in the DGM mapping.

2.4 Quality Assurance Field Surveillances and Checks

2.4.1 Digital Geophysical Mapping Surveillances. Figure 2-9 illustrates an example of a DGM field surveillance report.

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QA Field Surveillance Report
Adak Island, Alaska 2008 Field Season

1 –Definable Feature of Work (DFW) **Report # MM063008_001** **Contractor: EODT**

☐ Surface Clearance ☐ Area Preparation/Vegetation Removal ☐ UXO Survey Support
☒ Geophysical Data Collection ☐ Geophysical Data Processing ☐ Anomaly Reacquisition
☐ Intrusive Investigation ☐ Data Management ☐ MPPEH/MD/NMD/RRD Inspect/Cert.

2 – Phase :

☒ Weekly ☐General/Other

3 – References:

EODT SOP-2, Geophysical Surveying

4- Location/Team Information:

MM10F-Q03, GEO Team 1, 1000 hrs, 4 personnel using an EM-61 Skirt

5 – Observations/Comments:

- Used EM-61 in skirt mode to acquire geophysical data for grid Q03
- Team consisted of 4 personnel
- All PPE worn
- Safety barricades establishing exclusion zones were in place
- Hourly radio contact was maintained
- No non-essential personnel on site
- **NOTE: Snow on east side of grid. Team stated that they would map over the snow but log that portion of the grid as a problem area. After snow melts they would remap the portion covered by snow field.**

6 - Results of Surveillance

☒ Acceptable	☐ Unacceptable	Deficiency Report #: Non-Conformance Report #:

Conducted By: UXO QAS Alan W Hotz	Signature: Alan W Hotz	Date: 30 June 2008

7 - Quality Assurance Certification Statement:

"I certify that the above report is complete and correct and that I, or my authorized representatives, have inspected the work performed this day by EODT/USAE (and each subcontractor) and have determined that all materials, equipment, and workmanship are in strict conformance with the plans and specifications. Exception/deviations are noted in section 5 above."

8- Battelle QA Field Lead:

☒ Concur	☐ Non-Concur	Comments: We will add the snow covered portion of the grid to our remapping area for this grid. I will also forward this to Geo Lead to review the data when processing. He can check date stamp to see if it was remapped after snow melt?

Reviewed By: Terry R. Rutherford Sr.	Signature:	Date: 07/02/08

9- Navy Technical Representative:

☒ Accept	☐ Withhold	Comments

Printed Name: John Pittz	Signature: John Pittz	Date: 7-03-08

Figure 2-9. QA Field Surveillance Report for DGM

Reviews were conducted of DGM team logbooks and inspections of the team and equipment were conducted to ensure compliance with contractor SOPs. DGM teams were observed daily and a surveillance form was filled out weekly. As shown in Table 1-4, a total of 292 QA DGM surveillances were conducted by QA.

2.4.2 Intrusive Investigation Surveillances. Figure 2-10 is an example of an intrusive investigation surveillance.

Battelle
The Business of Innovation

QA Field Surveillance Report
Adak Island, Alaska 2008 Field Season

1 –Definable Feature of Work (DFW) **Report # MM082608-002** **Contractor: EODT**

☐ Surface Clearance ☐ Area Preparation/Vegetation Removal ☐ UXO Survey Support
☐ Geophysical Data Collection ☐ Geophysical Data Processing ☒ Anomaly Reacquisition
☒ Intrusive Investigation ☐ Data Management ☐ GPO Reacquisition Certification

2 – Phase :
☒ Weekly ☐ General/Other

3 – References:
EODT SOP-4 and SOP-5

4- Location/Team Information:
MM10F-L22 / UXO Team 2 / 9 Personnel / Trimble GPS, EM 61 & Vallon metal detectors

5 – Observations/Comments:
Details of work observed at time of visit:
Observed UXO Team 2 perform REAC and Intrusive investigations in grid MM10F-L22. Team comprised of nine personnel, one team leader, six performing intrusive operations and two performing REAC in a different grid. Grid was rocky with a mild slope and small ridges.

- Level D PPE worn
- No Non-essential personnel on site
- Team Leader maintained control of the site

6 - Results of Surveillance

☒ Acceptable	☐ Unacceptable	Deficiency Report #: Non-Conformance Report #:	
Conducted By: UXO QAS Stormy A Baird	Signature:		Date: 08-26-08

7 - Quality Assurance Certification Statement:
"I certify that the above report is complete and correct and that I, or my authorized representatives, have inspected the work performed this day by EODT/USAE (and each subcontractor) and have determined that all materials, equipment, and workmanship are in strict conformance with the plans and specifications. Exception/deviations are noted in section 5 above."

8- Battelle QA Field Lead:

☒ Concur	☐ Non-Concur	Comments:	
Reviewed By: Alan Kimbol		Signature:	Date: 08/27/08

9- Navy Technical Representative:

☒ Accept	☐ Withhold	Comments	
Printed Name: Brian Cullen		Signature: Brian Cullen	Date: 8/29/08

Figure 2-10. QA Field Surveillance Report for Intrusive Investigation

The UXO intrusive teams were observed on a daily basis and a formal surveillance was completed weekly. In the beginning of 2008, EODT formed two UXO teams (Mobile Teams 1 and 2) to conduct intrusive investigations. The majority of EODT personnel were engaged in performing DGM.

As the DGM neared completion, a third UXO team was formed. In 2009, the contractor initially formed five four-personnel (including the team leader) UXO teams. Later in the 2009 season, the contractor disbanded the fifth team to form four five-personnel teams to enable the Team Leaders to focus on supervising their teams and record data accurately.

In the 2008 field season, the contractor intrusive teams backfilled the excavations immediately after approval from the team leader, prior to QC and QA investigations. This process was dictated by the contractor plans. When QC and QA performed their investigations, they often had to re-excavate the anomaly, which proved to be time consuming and inefficient. In 2009, the contractor intrusive teams left the excavations open to facilitate QC and QA intrusive investigations. This change in procedures was not formally documented by an FCR. The ramifications of this change are discussed in the OU B-1 Remedial Action Documentation_Part Four_NCR Resolution document.

During QA surveillances, the teams were checked for compliance with work plan specifications outlined in their respective SOPs and QC checklists. The teams were observed operating White’s and Vallon all-metal detectors to clear targets and verifying anomaly removal using the EM61 in wheel mode. As shown in Table 1-4, a total of 145 QA intrusive surveillances were conducted by QA.

A few key observations from these surveillances are:

- Surface clearance in MM-10G and -10H was completed prior to DGM surveys. In MM-10G, the remains of a crashed WWII aircraft were removed during the surface clearance. The Navy requested a joint surface survey be competed in MM-10F to determine if additional surface clearance was necessary or whether the 2004 surface clearance was sufficient. The joint EODT QC/Battelle QA inspection was conducted on June 17, 2008 and the team recommended to the Navy that no additional surface clearance was necessary.
- Intrusive investigations in 2008 were slowed initially due to insufficient GPS equipment. Initially, only one Trimble controller per team was available. Eventually, a second controller per team was procured and the reacquisition teams could stay ahead of the intrusive teams, and when finished with reacquisition duties, rejoin the team performing intrusive investigations.
- On July 15, 2009, NCR 2009_003 was issued based on surveillances that EODT teams were not using the Vallons as required by the Work Plans.
- On July 15, 2009, NCR 2009_004 was issued based on improper documentation of target investigations listed on the target digsheets (Hot Geology).
- On July 21, 2009, QA surveillance found discrepancies in contractor target digsheets (i.e., all targets listed as 0.5 lb).
- On August 4, 2009, six QC Certifications were posted to the SharePoint site that listed QA seeds on the wrong target numbers. The QA UXO team verified that all QA seeds were removed from the correct target locations. However, it was determined that the root cause for this discrepancy and the inaccurate target digsheet entries described above was due to contractor team leaders attempting to complete admin requirements at the end of the day.

2.4.3 Quality Assurance Digital Geophysical Mapping. As part of the final QA certification of contractor DGM and intrusive work in OU B-1, a subset of the QC approved grids was selected for QA DGM remapping. QA remapping is comprised of the following steps:

- A subset (i.e., 20 ft by 20 ft or 20 by 40 ft area[s]) was selected within the approved grid. This subset was semi-randomly selected, partly based on intrusive results obtained from the grid.
- The QA DGM team re-mapped the subset area(s) with DGM.
- This remapping data were processed by QA and any targets were intrusively investigated by the QA UXO team.
- If the target source was MEC or a metallic item similar in size and amplitude to MEC, QA would issue an NCR.

A typical example of the QA DGM remapping data for MM-10F, grid P04, is shown on Figures 2-11 through 2-13. Figure 2-11 shows the original contractor DGM data and target picks, overlain with QA DGM remapping subset areas. The tracks of the QA DGM data acquisition are also shown on this figure. In this grid, two subset QA DGM grids (both approximately 30 ft by 30 ft in size) were acquired. Note the high amplitude geophysical anomaly in the southwest corner of the southern QA DGM grid (Target # 10F-P04-026) found in the original contractor DGM data. Figure 2-12 shows the QA DGM remapping data, original contractor DGM target picks, along with QA DGM remapping target picks and table. These QA DGM remapping data show that the high amplitude anomaly has been successfully remediated; however, there are two anomalies (#3 and 4) found in the QA DGM remapping data that might be of interest. Figure 2-13 shows the location of the QA remapping subset areas and these two remapping targets (with location table). These two targets were investigated by the QA UXO team and found to be non-MEC and smaller than any MEC item of interest. A summary of the entire QA DGM remapping (or confirmation mapping) process is provided in Blocks 23 through 26 of the QA Certification Report document for this grid.

Figures 2-14 and 2-15 show the locations of all QA DGM remapping grids acquired in 2008-2009 field seasons in MM-10F/10H and MM-10G, respectively. These maps also show:

- Locations of all MEC found in the AOCs (2008 and 2009);
- Locations of grids with unresolved NCRs issued in 2009;
- Locations of QA Vallon (Hole) Checks.

Typical area covered in each grid by QA DGM remapping was about 1,200 sq. ft. No QA DGM surveys were conducted in the 2010 field season.

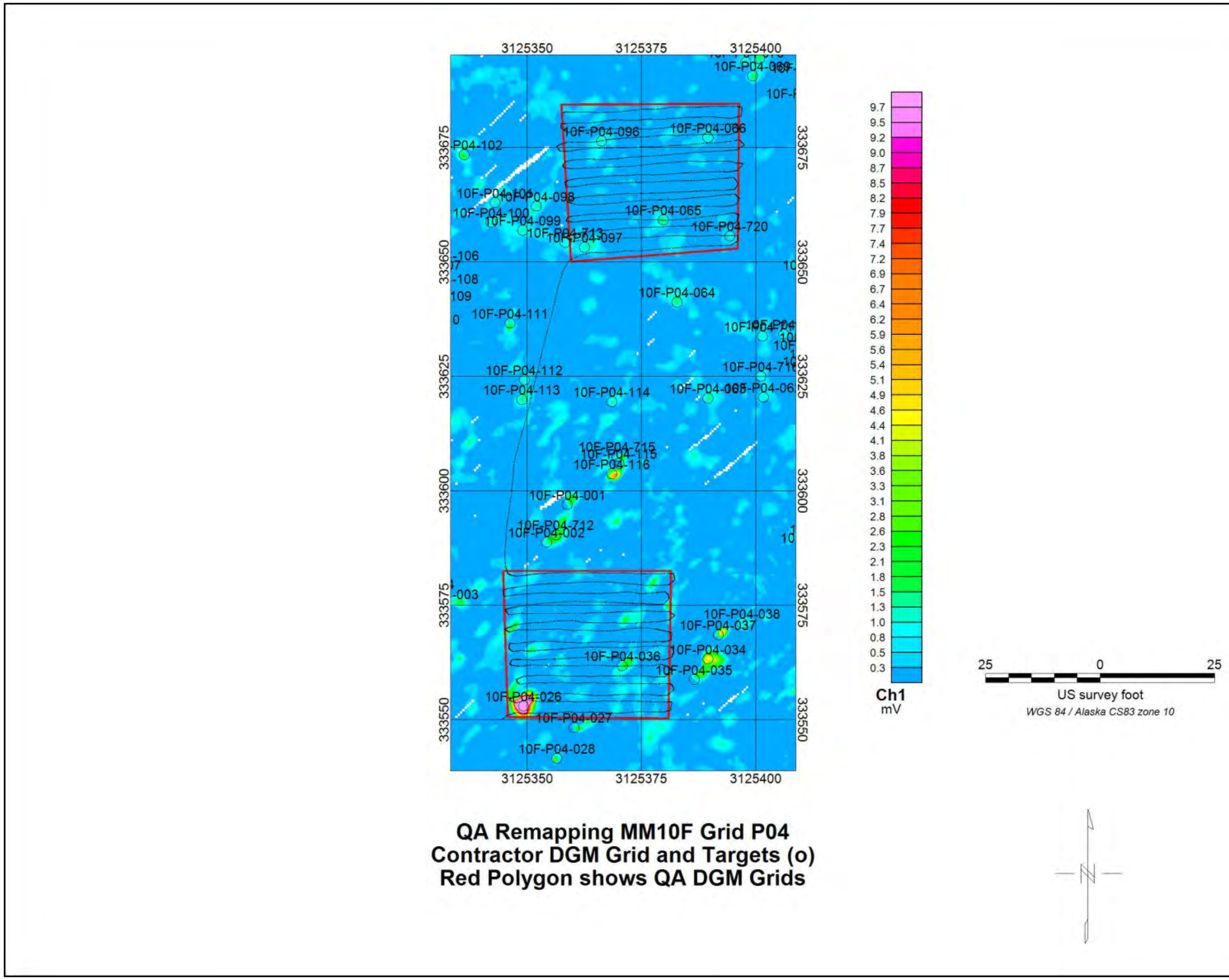
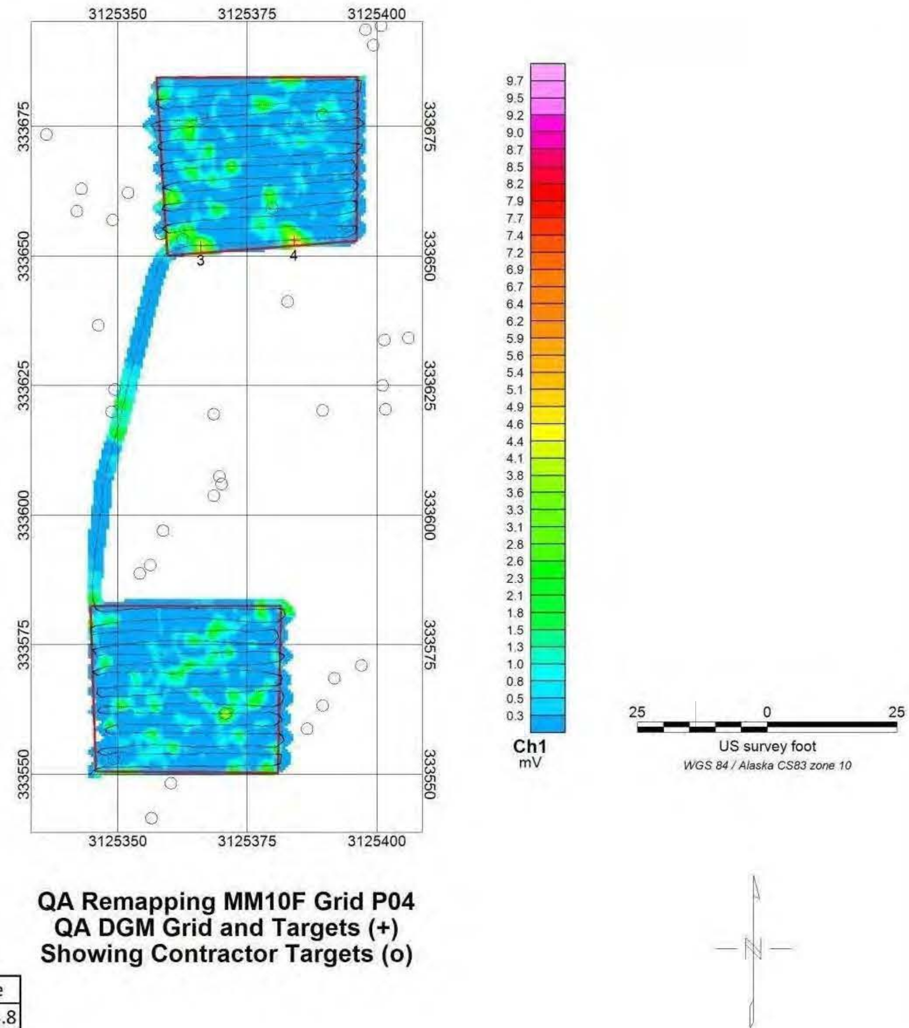
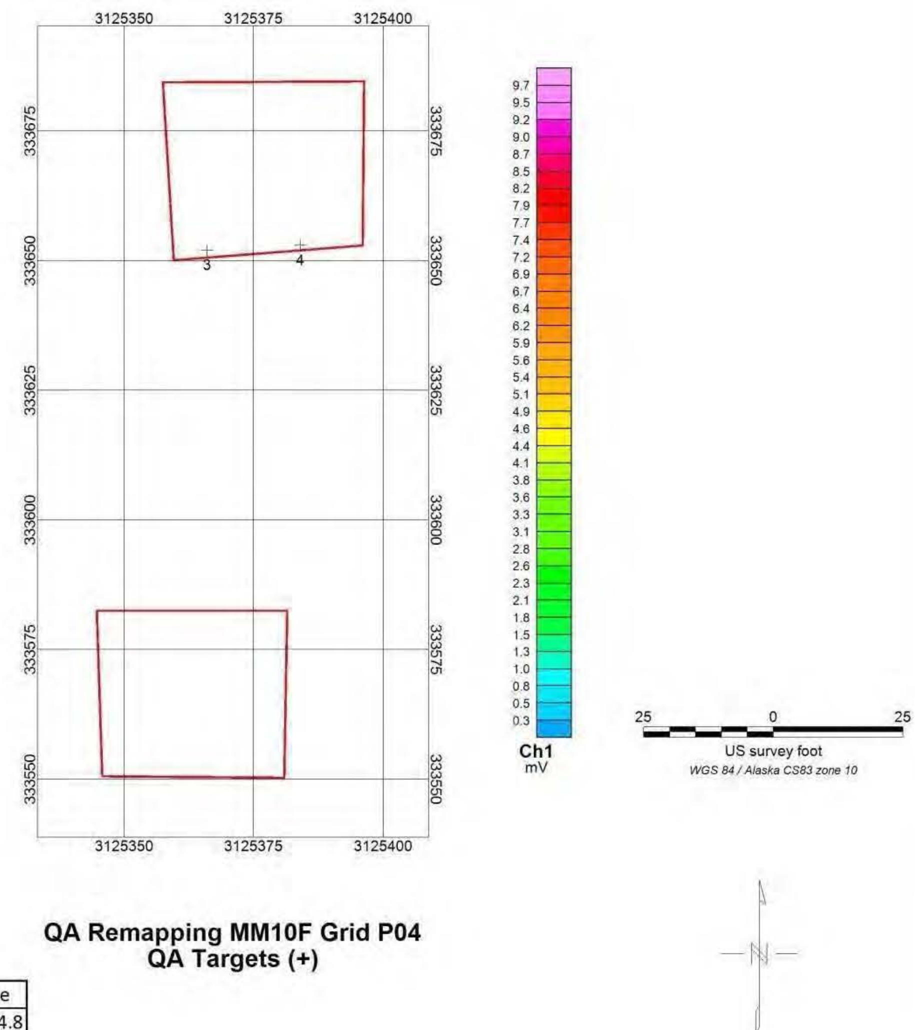


Figure 2-11. Example of QA DGM Remapping Data for MM-10F, Grid P04
(Figure shows Original Contractor DGM Data and Target Picks, along with QA DGM Remapping Areas/Tracks.)



EASTING	NORTHING	Target_ID	Grid_value
3125366	333652	QAR_10F_P04_3	4.8
3125384	333653	QAR_10F_P04_4	5.8

Figure 2-12. Example of QA DGM Remapping Data for MM-10F, Grid P04
(Figure shows QA DGM Remapping Data, Original Contractor DGM Target Picks, along with QA DGM Remapping Target Picks and Table.)



EASTING	NORTHING	Target_ID	Grid_value
3125366	333652	QAR_10F_P04_3	4.8
3125384	333653	QAR_10F_P04_4	5.8

Figure 2-13. Example of QA DGM Remapping Data for MM-10F, Grid P04
(Figure shows QA DGM Remapping Subset areas, along with QA DGM Remapping Target Picks and Table.)

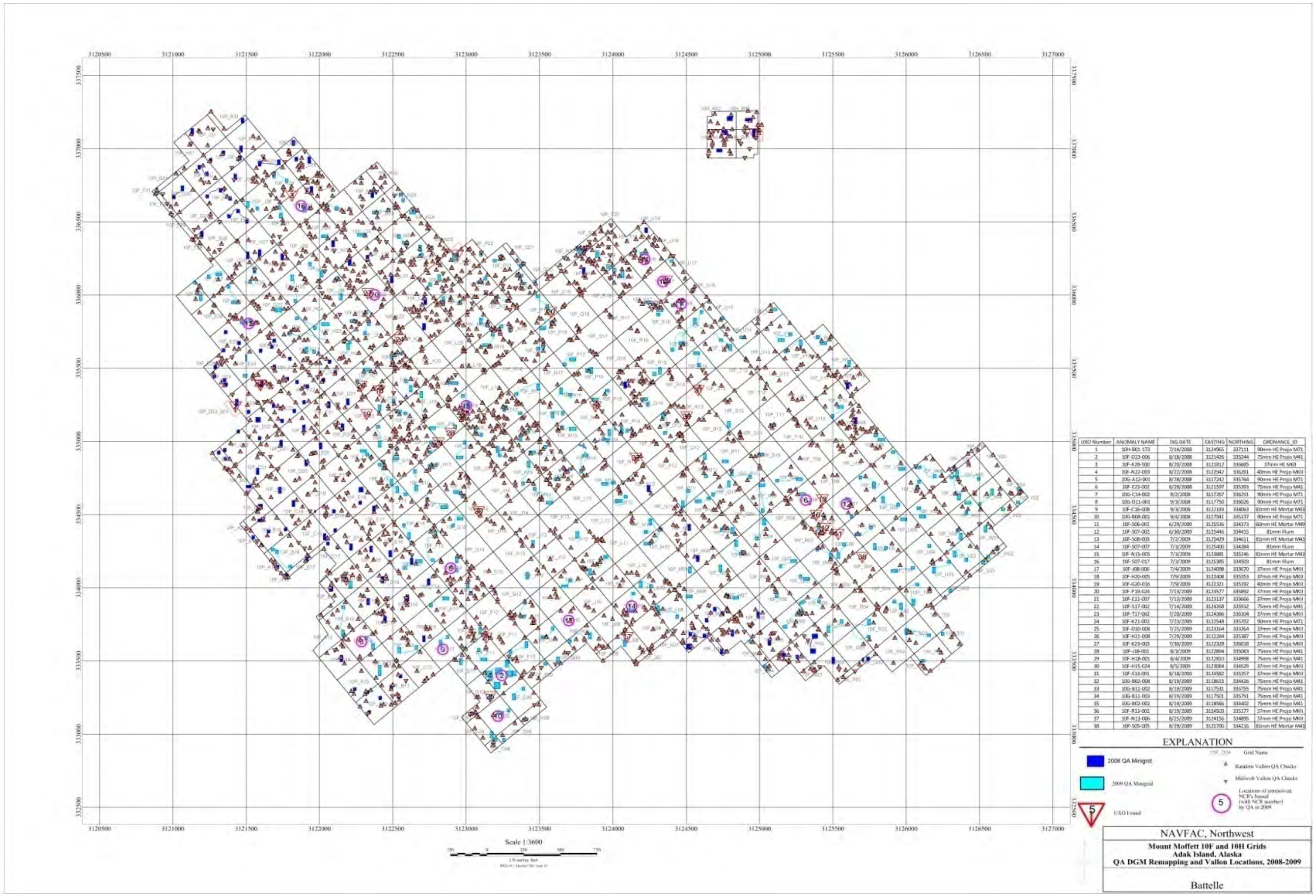


Figure 2-14. QA DGM Remapping and Vallon Locations, MM-10F and MM-10H, 2008-2009

Figure 2-15. QA DGM Remapping and Vallon Locations, MM-10G, 2008-2009

Table 2-5 presents the summary of the 2008-2009 QA DGM remapping efforts at OU B-1.

Table 2-5. Summary of QA DGM Remapping at OU B-1, 2008-2009

	AOC MM-10F			AOC MM-10G			AOC MM-10H		
Field Season	**Grids covered with QA DGM**	**Total # of Targets Detected from QA DGM**	**# of Targets Detected from QA DGM at Original Target location**	**Grids covered with QA DGM**	**Total # of Targets Detected from QA DGM**	**# of Targets Detected from QA DGM at Original Target location**	**Grids covered with QA DGM**	**Total # of Targets Detected from QA DGM**	**# of Targets Detected from QA DGM at Original Target location**
2008	93	606	78	0	0	0	4	36	8
2009	213	1,993	345	32	215	43	0	0	0
Totals	**306**	**2,599**	**423**	**32**	**215**	**43**	**4**	**36**	**8**

Figures 2-14 and 2-15, and Table 2-5 show the following:

- QA DGM remapping was accomplished in a high percentage (71%) of grids in OU B-1, (342 of 481).
- A total of 2,850 QA DGM targets were investigated (2,599 in F + 215 in G + 36 in H) in OU B-1, an average of about eight QA DGM targets per grid. A relatively small number of the total DGM remapping targets (474 [423 in F + 43 in G + 8 in H] or about 17%) were located coincident to the original DGM target location. The remaining DGM remapping targets (2,376) were located outside of the 2.5 ft critical radius. The relative high percentage (83%) of DGM remapping targets located outside the critical investigation radius infers that metal found in the excavation by the intrusive teams was left in spoils (or on the surface) away from the excavation.
- There were 10 NCRs from 2009 (#5, 6, 7, 8, 9, 11, 12, 13, 14, and 18) based primarily on the QA DGM remapping investigations, however it should be noted that none of the NCRs were due to MEC finds. NCRs are discussed in Section 2.6 of this report and in Part Four, NCR Resolution Document. There were no NCRs from 2008 resulting from QA DGM remapping investigations.

2.4.4 Quality Assurance Vallon Hole (Excavation) Checks. As part of the final QA certification of contractor DGM and intrusive work in OU B-1, a subset of the QC approved targets were selected for QA hole checks. Most of the QA hole checks were selected semi-randomly (termed as QA random), based on the physical location of targets within a grid, ensuring a wide dispersion of QA hole checks within the grid. Some QA hole checks were based on comparison of original DGM amplitude versus the reported excavation results (termed QA mV comparisons), and a small percentage of the reported “No-Finds” (termed No-Finds) were also inspected by QA. QA generally selected a minimum of 10% of the total excavations in a grid for QA hole checks. The QA hole checks were comprised of the following steps:

- A list of QA hole check targets were determined and the coordinates for these targets were uploaded into the Trimble before the QA UXO team departed into the AOC.

- The QA UXO team would reacquire selected targets and proceed to sweep a 2.5-ft radius around the plotted target location. Existing excavation sites by the contractor were located and inspected as well as any other responses within the target location. Spoils from the contractor's excavations were checked.
- The results of the QA intrusive inspections were recorded and provided to the QA Lead at the end of the day for QA reports and files.
- All anomalies excavated by the QA UXO team that met failure criteria were photographed and the location recorded by GPS.

Figures 2-14 and 2-15 show the locations of the QA hole checks at MM-10F/10H and MM-10G, respectively. Table 2-6 provides a summary of the QA hole checks at OU B-1.

Table 2-6. Summary of QA Vallon Hole Checks (QA VHCs) at OU B-1, 2008-2009

AOC	# of Random QA VHCs	# of mV Comparison QA VHCs	# of No-Find QA VHCs
MM-10F	2,373	251	426
MM-10G	221	26	67
MM-10H	33	12	34
Totals	**2,627**	**289**	**527**

Figures 2-13 and 2-14, and Table 2-6 show the following:

- QA Vallon hole checks were accomplished in all grids in OU B-1.
- A total of 3,443 QA Vallon hole check targets were investigated in OU B-1, an average of about seven QA Vallon hole checks per grid.
- There were six NCRs from 2009 (#10, 15, 16, 17, 19 and 20) based primarily on the QA Vallon hole check investigations, however it should be noted that none of the NCRs were due to MEC finds. NCRs are discussed in Section 2.6 of this report. There were no NCRs from 2008 issued because of the results of QA Vallon hole check investigations.

2.4.5 Quality Assurance of 2010 Excavation Backfilling (FCR#20) and Road/Rut Repairs (FCR#19). At the conclusion of the field effort in 2009, QA had issued a total of 27 NCRs (four in 2008 and 23 in 2009). All of the NCRs issued in 2008 and four of the NCRs issued in 2009 were closed during the 2009 field season. Thus, 19 NCRs were unresolved at the end of the 2009 field season. In 2010 (prior to the field season), the Navy, regulators, contractor and QA coordinated to write FCRs #19 and #20 to address most of the outstanding NCRs from 2009. NCRs not addressed by these FCRs were resolved by other means. A complete report is provided in the NCR Resolution Document (Part Four) to this document.

FCR #19 was written to address road/rut repairs in affected areas of OU B-1 and assess siltation (runoff) caused by their activities. FCR #20 was written to address the backfilling of excavations in all 314 grids excavated during the 2009 field season. Note that excavations completed in the 2008 field season were not part of this work as they were backfilled during 2008, and this work was verified by QA. Another aspect of FCR#20 was the inspection of the backfill materials (spoils and clods) prior to placing them back in the excavation. This aspect required breaking up of all excavation spoils (clods/clumps) larger than 37 mm to confirm that there is no MEC remaining in spoils. As part of this aspect, all metal (regardless of type) with any dimension greater than 3 inches was to be removed from the site. A more detailed description of the FCRs and QA results is provided in the 2010 QA report (Battelle, 2010).

During the 2010 field season, the contractor completed all FCR #19 and #20 field work. The contractor generally performed both FCR #19 and #20 work simultaneously as they worked through the AOCs. The QA team performed a walkthrough of all grids/areas associated with this work as shown on Figure 2-16.

Note that during the FCR #20 work (backfill inspections) the QA team also verified that roads/ruts in the grids were addressed.

During the 2010 field season, the QA team performed the following tasks:

- Observed all contractor QC preparatory briefings conducted by the QC Manager, Senior UXO Supervisor (SUXOS) and Safety. All personnel certifications were checked and verified, resulting in all contractor personnel qualified for the position.
- Verified that the contractor had selected all appropriate grids for backfill.
- Performed a daily surveillance of the contractor teams and completed a weekly QA surveillance form for each contractor team.
- Verified that the AOC boundary grids were visually examined a minimum of 10 ft outside the grid boundary line for excavated spoil materials and clods.
- Verified excavations were backfilled on a grid-by-grid basis using existing spoils and the repaired land surface matched the surrounding contour as much as possible.
- Verified if insufficient spoils remained that natural materials were used for backfill and excavation sides beveled to match the surrounding land's contour.
- Verified that clods/clumps greater than the size of a 37 mm projectile were broken up and inspected for MEC and metal fragments.
- Verified grid surfaces were visually inspected (not by instrument) and metal 3 inches or larger in any dimension was removed from the grid and treated.
- Verified that metal suspected of containing an explosive hazard was removed from the grid and disposed of appropriately.
- Verified that metal found in clods and on the surface, that was less than 3 inches in any dimension, was backfilled in excavations so the surface appearance was acceptable.
- Verified the correct grass seed mixture was used and excavations and off-road (ATV) trail ruts were seeded in areas where vegetation damage was present.
- Conducted surveillance of siltation survey and management of storm water runoff caused by field activities associated with the remedial action.
- Verified repairs to the landscape caused by off-road vehicles (ATVs) and seed areas where vegetation is damaged with a specific seed mixture for the area.

All contractor work was completed satisfactorily, and no deficiencies or NCRs were issued by QA. No metal containing explosive residue or with dimensions of 3 inches or greater was discovered with the exception of a 37 mm projectile found in MM-10F, Grid K-16 (see Section 2.5).

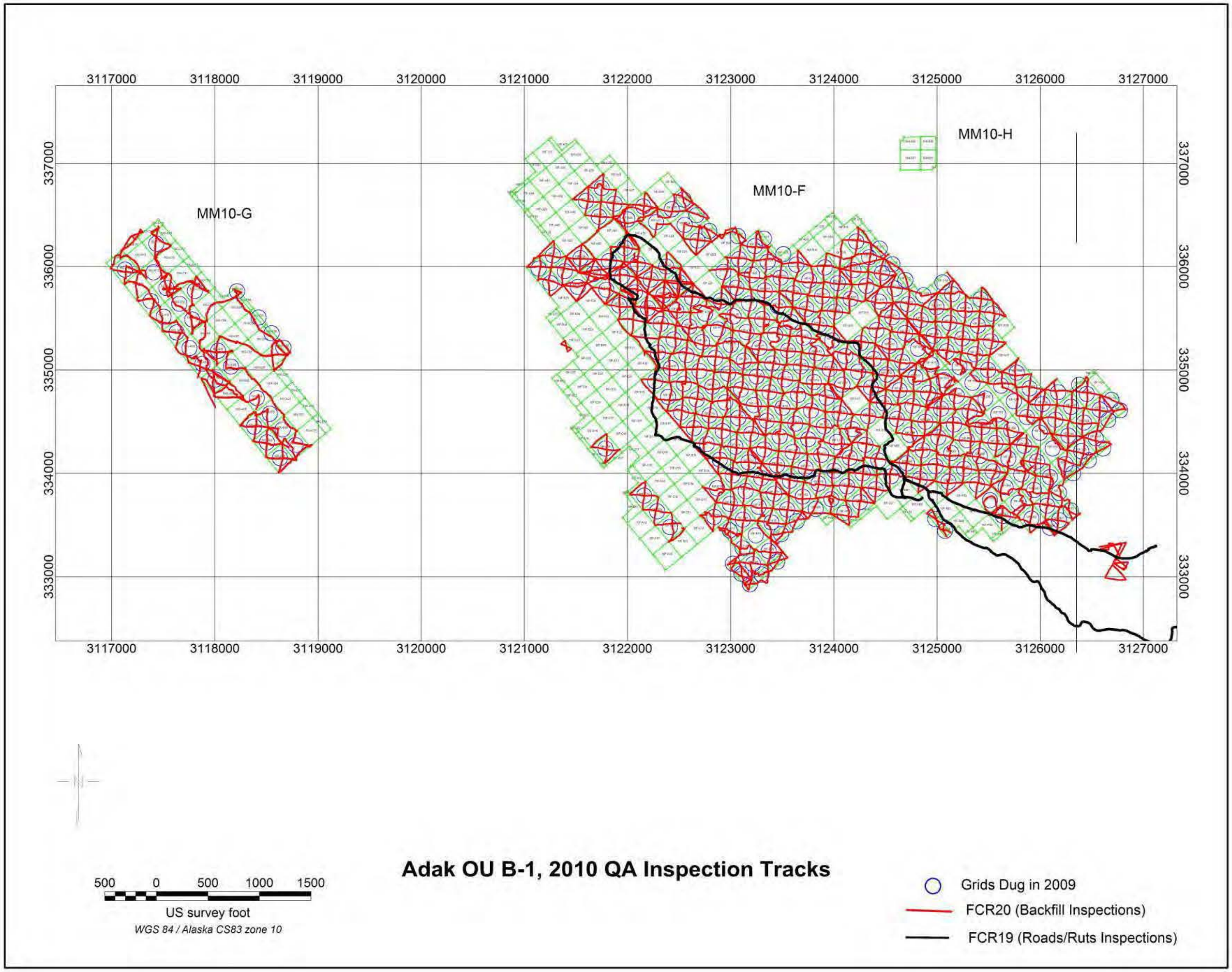


Figure 2-16. 2010 QA GPS Inspection Tracks for FCR19 and 20 Work

2.5 MEC Disposal and Certification and Verification of Material Potentially Presenting an Explosives Hazard (All Field Seasons)

The contractor conducted a limited amount of demolition operations in OU B-1. Most were completed using “blow in place” (BIP) procedures, thereby destroying the MEC item where found.

In the 2008 field season, two operations were conducted when the items that could be moved were consolidated within a single disposal procedure.

- One operation in Grid K28 consolidated one unfuzed 75 mm projectile and 11, 37 mm AP projectiles and one 37 mm HE projectile discovered during DGM grid preparation.
- One operation was conducted in zzgrid C-16 where the excess demolition materials (perforators and detonation cord) were consolidated with an 81 mm high explosive mortar. See NCR-#4 for further details of this event.

In the 2009 field season, QA documented/observed:

- The initial explosives inventory and magazine inspection.
- Explosives issue and transportation from the magazine, and all demolition operations.

The QA UXO team also inspected all demolition shot holes and adjacent grids to ensure the contractor cleaned up after each shot.

In the 2010 field season, the contractor sweep personnel conducting site restoration work in AOC MM-10F discovered a 37 mm projectile in Grid K16. The contractor evacuated the exclusion area and notified QA of the find and its location. A discussion was held between the NTR, QA and the contractor SUXOS to determine available options. The Navy Explosive Ordnance Disposal (EOD) Team from Detachment NW was still on island for their annual Andrew Lake seawall sweep. The decision was made to keep contractor non-UXO personnel out of AOC MM-10F until the Navy EOD team could examine the item and either remove it or blow it in place. The Navy EOD personnel determined that the item was safe to move, packaged it and transported it to a portable magazine in the OU B-2 AOC and safely secured it. The 37 mm was destroyed later at a safe disposal site by the Navy EOD Team.

The contractor’s UXO intrusive team members inspected all MPPEH at the time of removal in the grids. A second inspection was performed by the team leader who ensured munitions debris (MD) and non-munitions debris (NMD) were separated and live MEC or MPPEH was not present. UXO teams transported MD and NMD items daily to former power station five (PS5). The contractor used PS5 as its TFU operating location and scrap storage area. All items were inspected a third time by the SUXOS and/or QC person, placed in a 55 gal holding drum and locked in a secure caged area. QA personnel and contractor QC conducted a weekly joint inspection of the items in the holding drum, certified them as 5X and placed a numbered seal on the drum in preparation for TFU operations. QA personnel physically observed several TFU operations. QA TFU operational surveillance procedures included:

- Verifying the holding drum’s seal number
- Observation of the flashing process to verify compliance with SOP/Technical Management Plan
- Verifying explosive test spray kit results
- Observing placement of processed MD back into a 55 gal drum

- Verifying sealing of the drum and recording of the seal serial number
- Verifying that only authorized personnel inspected processed materials
- Applying a signature on shipping documentation stating: "All thermally flashed material was inspected 100% by EODT personnel and verified by Battelle QA personnel, then sealed in 55 gal drums. To the best of our knowledge and belief, the contents of this container are inert and/or free of explosives or other hazardous materials". The seal and container numbers are recorded on the document.

The seal number was also documented on the QA surveillance report. These procedures were repeated throughout the 2008-2009 field seasons. Filled drums were marked (EODT-#) and segregated from other drums inside the caged area and prepared for off island shipment.

QA was off island during the final MPPEH certification/verification. The Navy authorized contractor QC to perform the final inspection of items not previously completed and verified by QA. Authorizing the contractor QC to conduct the final verification inspection was within the guidelines of NAVSEA OP 5, Volume 1 (NAVSEA, 2001). All personnel performing certification or verification were authorized, by name, by the Commanding Officer, NAVFAC NW (Battelle, 2008c).

2.6 Non-Conformance Reports and Field Change Requests

NCRs are discussed in detail in the NCR Resolution Document (Part Four). FCRs are discussed in detail in the After Action Report (Part Two).

2.7 Quality Assurance Studies and Analyses

During the course of the 2008-2009 field seasons, QA provided several memos and studies of technical issues to the Navy. Many of these memos and studies pertained to questions or issues posed by the NCRs. Table 2-7 summarizes several pertinent QA studies and analyses. Details of these can be found in (or are summarized in) the 2008 and 2009 QA reports. Section 2.7.1 provides a new study that has not been provided to the Navy previously.

Table 2-7. Summary of QA Studies/Analyses from 2008-2009 QA Reports

QA Report	Type of Study/Analysis	Subject of Study/Analysis
2008	Separate memos and summarized in QA report.	Target picking thresholds for GPO and production DGM.
2008	Summarized in QA report.	Spatial target distribution in OU B-1
2008	Summarized in QA report.	Comparison of OU B-1 GPO with validation of detection system (VDS) test area.
2009	Separate report and summarized in QA report	Investigation of selected seed targets in OU B-1 GPO grids.
2009	Separate memos and summarized in QA report	Comparison of contractor and QA DGM equipment and data.
2009	Separate memos and summarized in QA report	Analysis of contractor SOP 11 work.
2009	Separate memo and summarized in QA report	End of 2009 field season QA surveillance walkthrough.

2.7.1 Statistical Analysis of QA DGM and Vallon Hole Checks at Target Locations. At the end of the primary field effort in 2009, QA had issued a total of 27 NCRs (four in 2008 and 23 in 2009). However, none of the NCRs was due to MEC discovered by QA. In fact, none of the 6,293 QA checks (DGM plus Vallon Hole Checks) found any MEC. A total of 41,393 targets were selected from the DGM data in OU B-1 (MM-10F, G and H) and only 38 MEC items were found. Thus, the OU B-1 site had an extremely low percentage of MEC (about 0.1%) compared to the total number of DGM targets. Previous work at OU B-1, including reconnaissance DGM/excavation and surface sweeps likely contribute to this overall low percentage of MEC.

A statistical analysis of the independent QA intrusive data (DGM targets and Vallon hole checks) can help provide a quantitative measure of the remaining risk of MEC at OU B-1. There were 474 QA DGM anomalies at the original DGM target locations, and 2,627 QA Vallon hole checks conducted at random target locations. If these 3,101 targets are considered to be a random sampling of the original DGM targets, then there is a 99.999% certainty (confidence) that at least (a minimum of) 99.6% of all of the remaining DGM targets do not contain MEC. Figure 2-17 graphically illustrates the number of random samples required to achieve a desired percentage of acceptable (not MEC) finds.

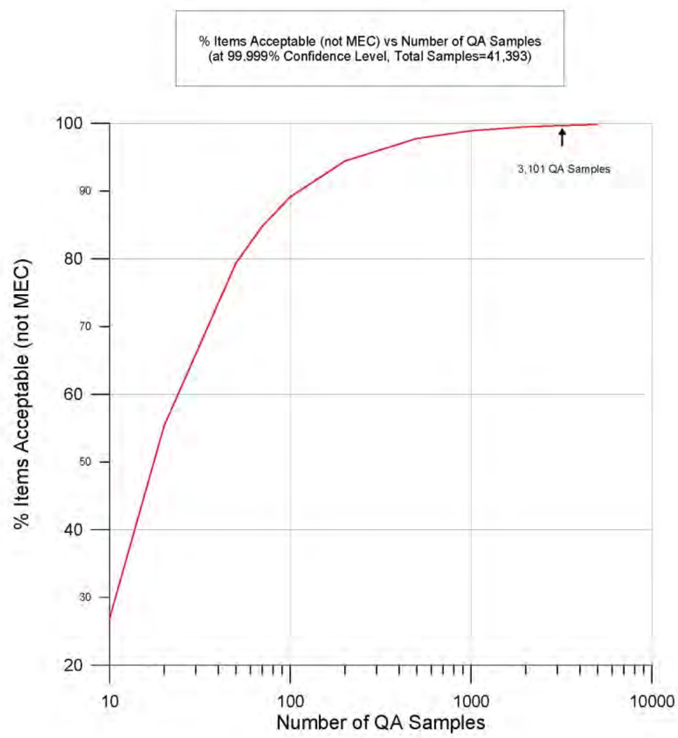


Figure 2-17. Statistical Analysis of QA Sampling (DGM Remapping and QA Vallon Checks)

These calculations are based on 41,393 total samples (DGM targets), using a 99.999% confidence level. This figure shows that if no MEC are found in the samples (QA DGM and Vallon checks), then the percent acceptable approaches 100% after about 2,000 samples, and additional samples result in minor improvement in the percent acceptable. Thus, the 3,101 targets sampled by QA are more than adequate to ensure that more than 99% of the total targets do not contain MEC. Note that to achieve 100% confidence that 100% of all targets do not contain MEC requires QA sampling of 100% of the targets. These calculations were made using the Item Sampling module of the Visual Sample Plan software which is geared towards analysis of MEC and chemically contaminated sites. It should be noted that the computed confidence (based on QA sampling) greatly exceeds the target detection criteria in the GPO (85% probability of detection with a confidence level of 90%).

There are additional quantitative and qualitative data that support the extremely low risk of remaining MEC at the site, such as:

- A total of 301 QA seeds were installed in OU B-1, and all QA seeds were accounted in the DGM mapping, and subsequent intrusive operations.
- Contractor QC teams checked/investigated at total of 13,019 targets in OU B-1, about 31% of the total, without finding any MEC.

Section 3.0: GPO STEP-OUT

Table 3-1 shows the QA work accomplished during the 2009 field season for the MM-10E GPO step-out project area.

Table 3-1. Summary of QA Work Accomplished in MM-10E

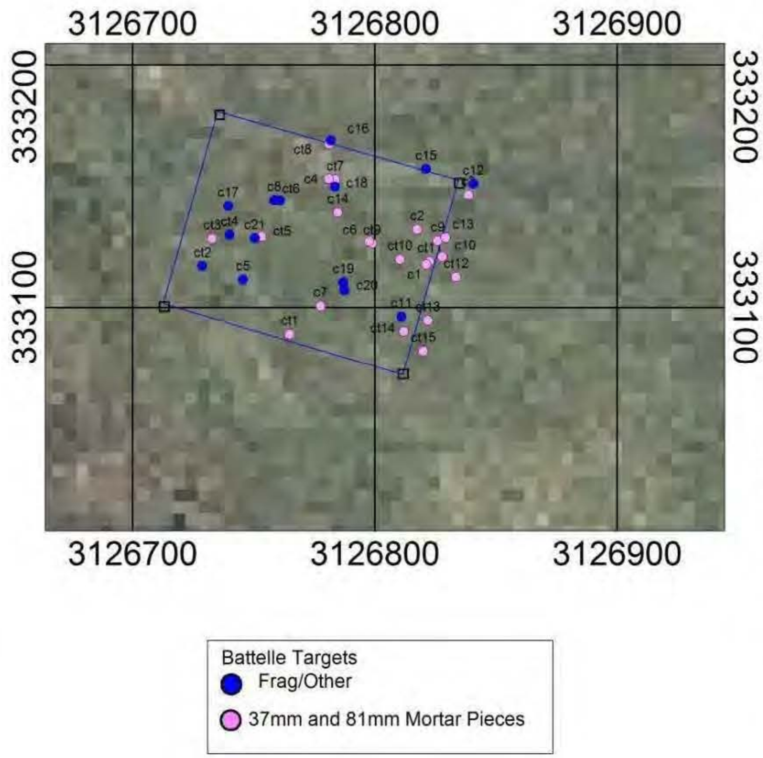
Contractor Production Activity	QA Activity Completed
MM-10E	
DGM of four grids in MM-10E. Approximately 1 acre. Process geophysical data and generate target lists Compare target list with QA selections Resolve/concur with QA target lists	Surveillance of DGM field procedures – conducted no surveillances of DGM field data collection Process 100% of production geophysics data – processed production DGM data for one step-out grid submittal Select targets and compare to production target list Resolve/concur with a total of four production target lists - total of 78 targets concurred by QA.
Intrusive investigation of anomalies from target lists Unknown number of no-finds MEC disposal MPPEH inspection and removal for flashing	Surveillance of field intrusive investigation procedures – QA conducted 100% visual surveillance of field intrusive investigations Verification of MEC disposal and site restoration – verified one MEC disposal actions and site restoration in one step-out grid Verify areas determined inaccessible or holes that cannot be cleared due to water, depth of anomaly, etc. – documented 0 inaccessibility verifications
Post clearance activities	Documented grid pass in one step-out grid submittal one step-out grid submittal passed QA; zero step-out grid submittals failed QA

3.1 Introduction

During the installation of the OU B-1 GPO grids in OU B-1 in 2008 (Battelle, 2008b), two 37 mm armor piercing projectiles with tracer (APT) were found. One of the 37 mm APTs was found in the Calibration Grid and the other was found in the East GPO. Also found were 81 mm mortar fragments (i.e., tail fins and booms), most of which were found in the Calibration Grid. The GPO grids are located in a previously cleared AOC, MM-10E, which had specific requirements for step-out and mini-grids to investigate “revised OE scrap” which definition encompasses the GPO finds. Thus, DGM surveys and subsequent intrusive investigations were performed in 2009 in the GPO Calibration and GPO East Grid areas.

The general location and arrangement of the GPO grids is shown in Figure 1-1 (see Section 1.0 of this report) in the southwest portion of Parcel 4, southeast of AOC MM-10F. Figures 3-1 and 3-2 show the locations of the GPO installation finds in the Calibration Grid and East GPO Grid, respectively (from Battelle, 2008b).

Figure 3-1 shows that there were numerous 81 mm mortar pieces recovered along with one 37 mm APT (target ct1). Figure 3-2 shows that there was one 37 mm APT recovered (target e1). There were several communications between the Navy and the Regulatory Agencies and an agreement was made to perform DGM surveys on 5 m spacing transects to achieve a 30 m buffer around “revised OE scrap”. The proposed areas to cover at the Calibration and East GPO Grids (from Navy communications) are shown on Figures 3-3 and 3-4.



Battelle GPO Install Digs

Targets	x	y	Digs	Priority
ct1	3126765	333089	37mm	1
ct2	3126729	333117.1	Frag	2
ct3	3126733	333128.4	WP Body	1
ct4	3126740	333129.9	Metal	2
ct5	3126753	333129.3	81 Boom	1
ct6	3126761	333144.1	Frag	2
ct7	3126784	333152.7	81 Boom	1
ct8	3126781	333167.3	81 Boom	1
ct9	3126799	333126.4	81 Boom	1
ct10	3126810	333119.8	81 Fin	1
ct11	3126823	333119	81 Fin	1
ct12	3126834	333112.6	81 Fin	1
ct13	3126822	333094.6	81 Boom	1
ct14	3126812	333090.2	81 Boom	1
ct15	3126820	333082	81 Fin	1
c1	3126821	333117.7	81boom Frx6	1
c2	3126818	333132.2	Finx2 Frx2	2
c3	3126839	333146.4	Boom Fin Frx2	1
c4	3126781	333153.1	81boom Frx5	1
c5	3126746	333111.5	Frx5	2
c6	3126798	333127.2	Boom Fx4	1
c7	3126778	333100.6	Boom	1
c8	3126759	333144.2	Frx1	2
c9	3126826	333127.5	Boom	1
c10	3126828	333120.9	Boom	1
c11	3126811	333096.2	Frx4	2
c12	3126841	333150.9	Frx2	2
c13	3126829	333128.8	Fin	1
c14	3126785	333139.2	Fin	1
c15	3126821	333157.1	Frx1	2
c16	3126782	333168.8	Frx4	2
c17	3126740	333141.8	Frx1	2
c18	3126784	333149.8	Frx3	2
c19	3126787	333110.3	Fuze Ring	2
c20	3126788	333107	Frx1	2
c21	3126751	333128.5	Frx1	2

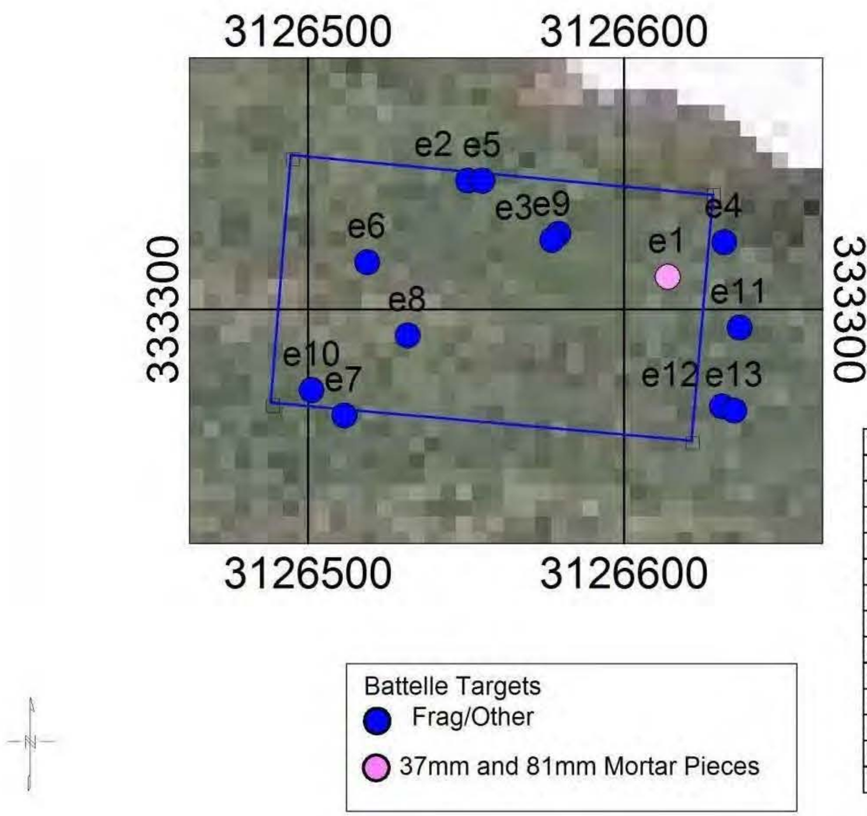
Battelle
The Business of Innovation

NAVFAC Northwest

Adak Island Alaska
OU B-2 GPO Calibration Grid: Pre-seed Battelle Digs

Battelle

Figure 3-1. MM-10E Calibration Grid, Targets Found during Seed Installation (Battelle, 2008b)



Battelle GPO Install Digs

Targets	x	y	Digs	Priority
e1	3126614	333310.3	37mm 12 inches	1
e2	3126551	333340.7	50 cal	2
e3	3126579	333323.9	Frx1	2
e4	3126632	333321.2	50 cal	2
e5	3126555	333340.7	50 cal	2
e6	3126519	333314.9	50 cal	2
e7	3126511	333266.4	30 cal x2	2
e8	3126532	333291.8	Frx1	2
e9	3126577	333322	Frx1	2
e10	3126501	333274.5	Frx1	2
e11	3126637	333294.2	Frx1	2
e12	3126631	333269.4	Frx2	2
e13	3126635	333268	Frx1	2

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OU B-2 East GPO: Pre-seed Battelle Digs
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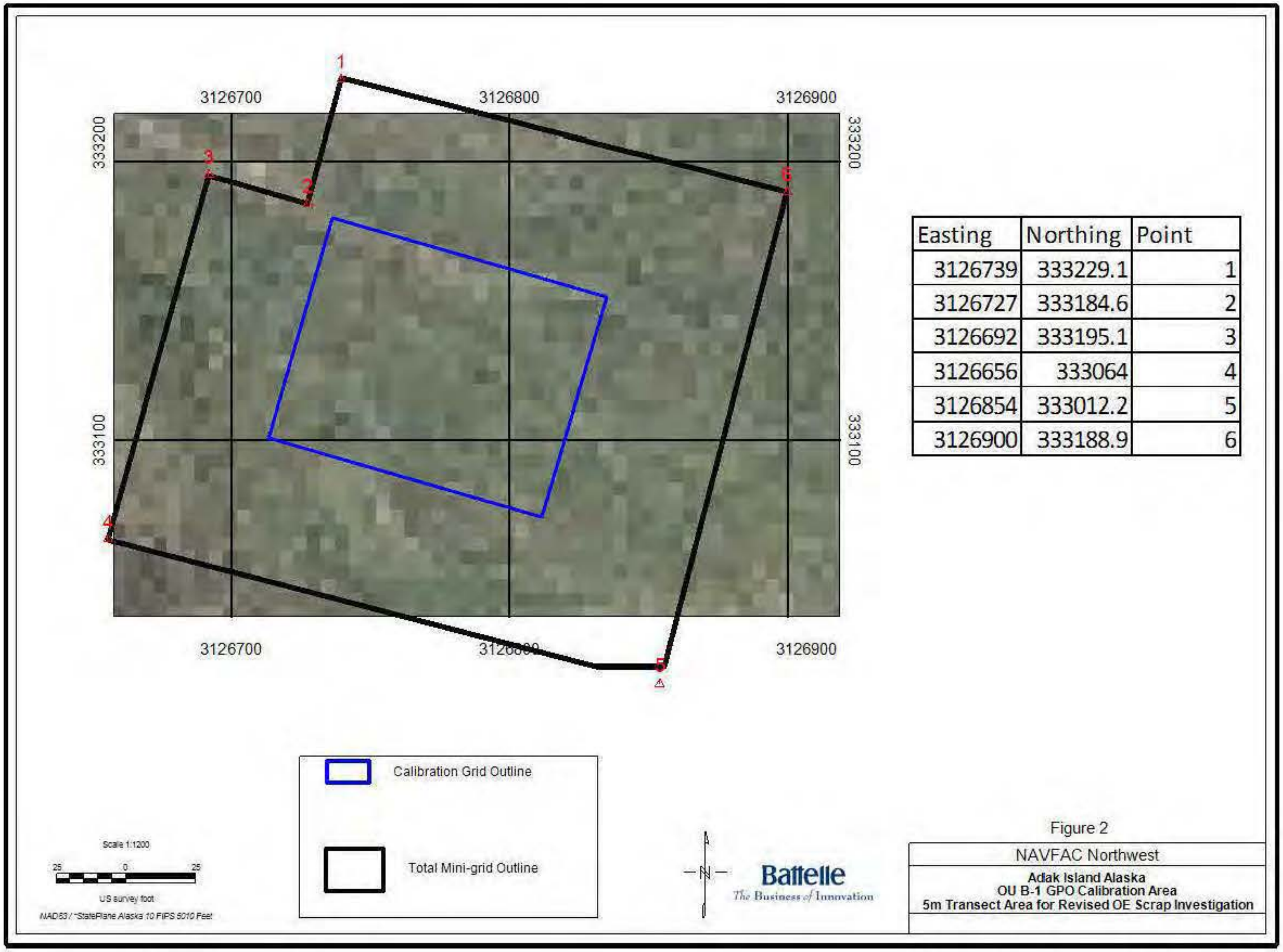
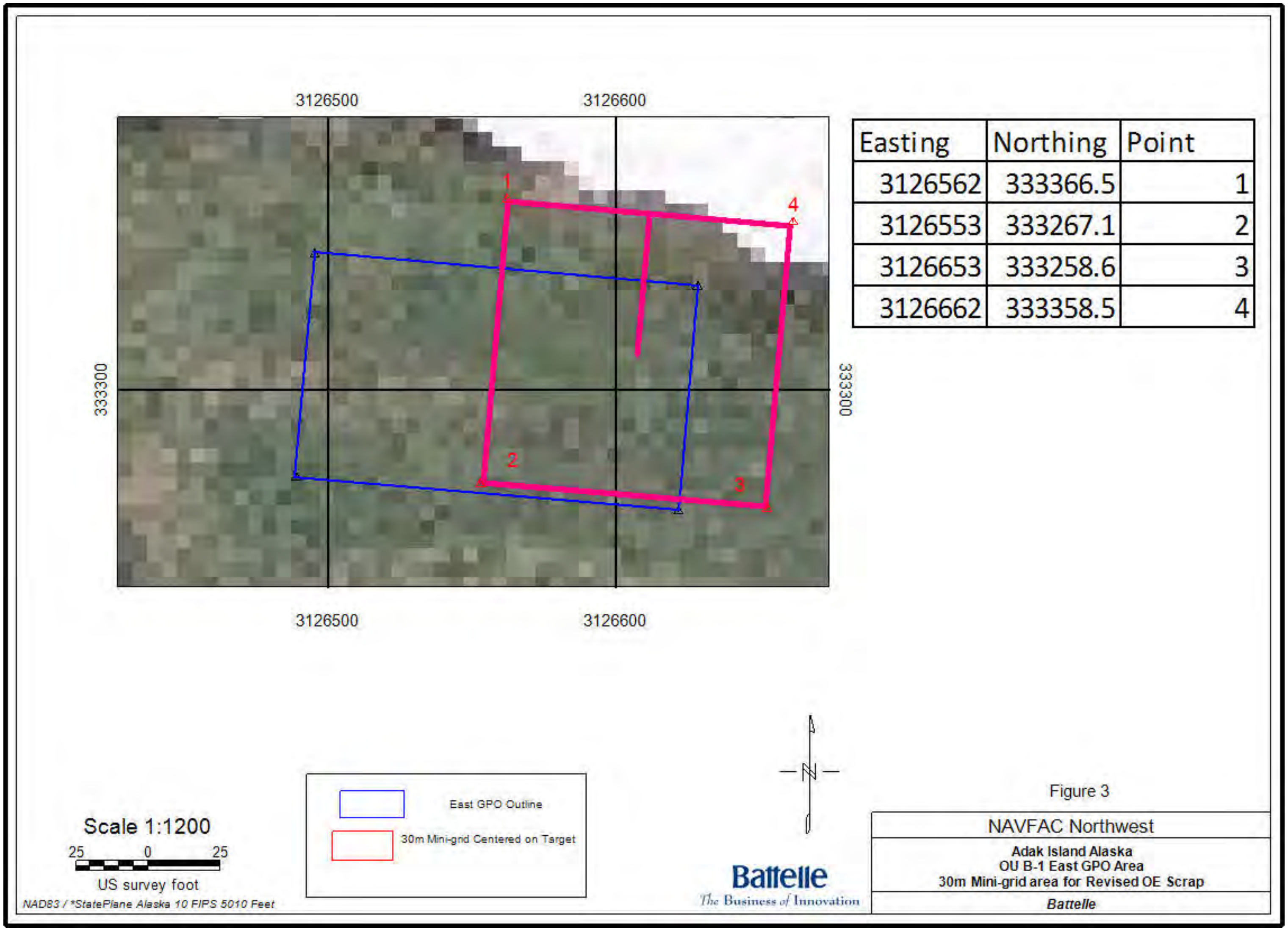
Figure 3-2. MM-10E East GPO Grid, Targets Found during Seed Installation (Battelle 2008b)



Easting	Northing	Point
3126739	333229.1	1
3126727	333184.6	2
3126692	333195.1	3
3126656	333064	4
3126854	333012.2	5
3126900	333188.9	6

Figure 3-3. MM-10E Calibration Grid, 5 m Transect Area (from Navy Communications)



Easting	Northing	Point
3126562	333366.5	1
3126553	333267.1	2
3126653	333258.6	3
3126662	333358.5	4

Figure 3-4. MM-10E East GPO Grid, 30 m Transect Area (from Navy Communications)

3.2 Data Acquisition and Results

The specific procedures for performing the step-out work were outlined in a GPO Step-Out Plan provided in Appendix T of Part Two.

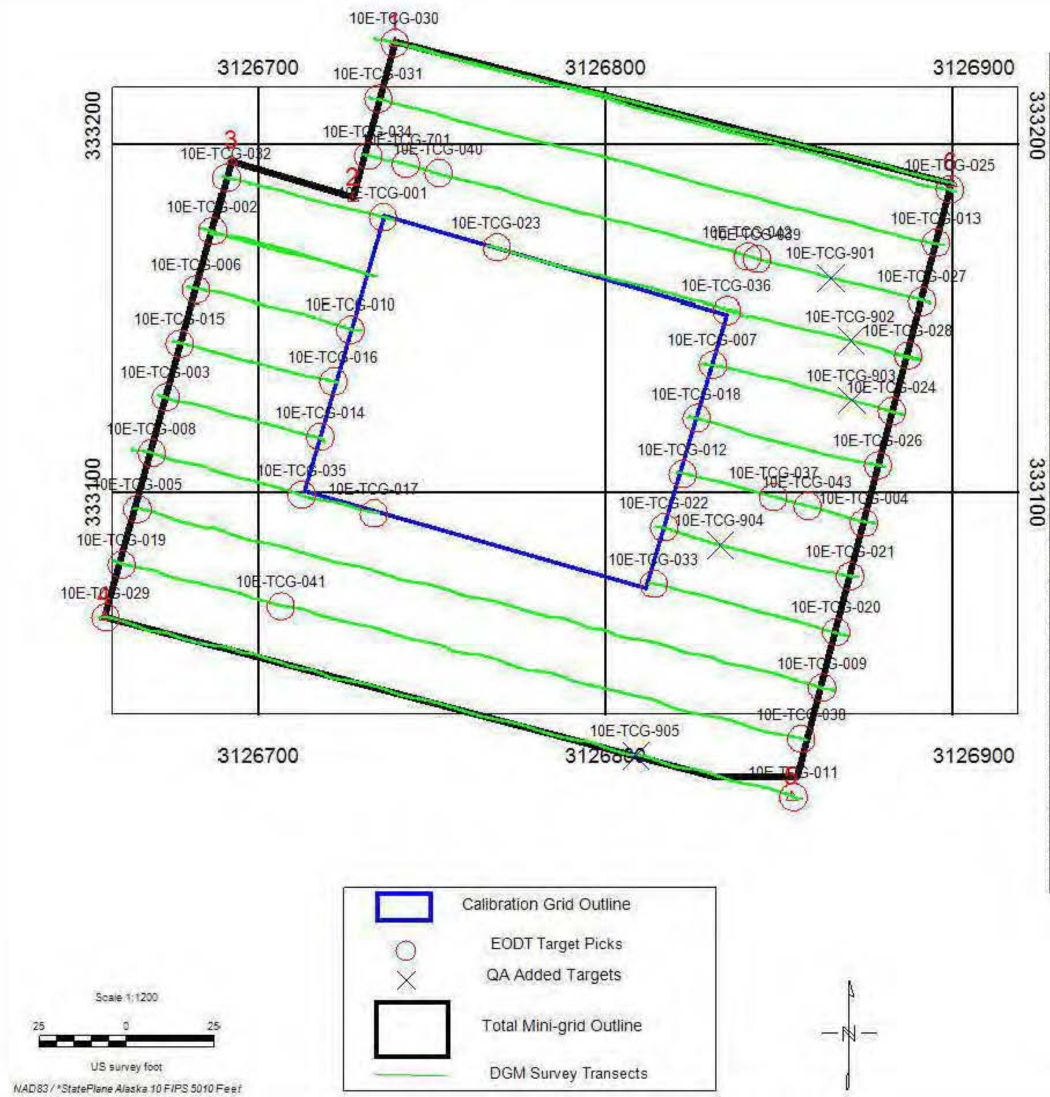
The initial DGM surveys over these step-outs were performed on August 15, 2009. The data were collected by DGM team Geo Team 1. This team received prior GPO certification on June 16, 2009 (Reference Section 2.2) as part of their procedures for DGM work in OU B-1. Figures 3-5 and 3-6 show the DGM coverage over the step-out transects, the DGM targets selected and a listing of the excavated targets.

Targets were selected using the threshold (4.4 mV, Sum of channels 2, 3 and 4) approved for 2008 and 2009 work and also utilized in GPO certification in 2009. In both of these step-out transect areas, there were numerous targets attributed to "Survey Pin: Nail", as the contractor used metallic nails to mark the ends of the transects. QA requested (and received) written verification from the contractor that these locations were pre-screened with a Vallon to ensure that the nails were not placed over subsurface metal/anomalies. Note that a DGM transect was not collected on the northern step-out boundary of the East GPO Grid area, due to a very steep slope.

In the Calibration Step-outs, one target (10E-TCG-041, Fuze Part) was found that triggered additional step-out transects centered on this target. In the East GPO Step-outs a MEC item was found (10E-TGPO-13, Japanese 2 inch "NI" Mortar) which triggered a 30 m by 30 m grid centered on this target. Maps showing the locations and results of these additional transects/grids for the Calibration and East GPO grid areas are shown on Figures 3-7 and 3-8, respectively.

The results of the second step-out transects/grid were evaluated by the Navy and the regulators and these investigations were considered to be completed as no additional "revised OE scrap" was found.

Due to the limited extent of the DGM work conducted in MM-10E, QA did not install any blind seeds. All DGM data taken in MM-10E were reviewed and passed with only a few targets added. QA conducted 100% visual inspection of contractor intrusive operations on MM-10E. QA DGM remapping (mini-grids) was not utilized in MM-10E due to the limited scope of the DGM work. Table 3-2 summarizes QA activities for the MM-10E investigation.



ANOMALY_NAME	EASTING	NORTHING	ANOMALY_TYPE	NARRATIVE
10E-TCG-001	3126735.9	333178.94	Non Muntions De*	SURVEY PIN; Cal Grid Corne
10E-TCG-002	3126686.99	333174.92	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-003	3126673.59	333127.35	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-004	3126874.59	333091.17	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-005	3126665.42	333095.1	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-006	3126682.3	333158.17	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-007	3126831.04	333136.73	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-008	3126669.57	333111.27	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-009	3126862.53	333043.6	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-010	3126726.52	333146.78	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-011	3126854.21	333012.09	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-012	3126822.33	333105.24	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-013	3126895.36	333171.57	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-014	3126717.81	333115.96	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-015	3126677.61	333142.76	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-016	3126721.59	333131.85	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-017	3126733.22	333093.85	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-018	3126826.35	333121.32	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-019	3126660.86	333079.11	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-020	3126866.55	333059.68	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-021	3126870.57	333075.76	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-022	3126816.97	333089.83	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-023	3126768.73	333170.23	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-024	3126882.63	333123.33	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-025	3126899.38	333186.98	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-026	3126878.63	333107.71	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-027	3126891.34	333154.82	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-028	3126887.32	333139.41	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-029	3126656.25	333063.88	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-030	3126739.25	333229.19	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-031	3126734.56	333213.11	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-032	3126691.01	333190.33	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-033	3126813.96	333073.52	Non Muntions De*	SURVEY PIN; Cal Grid Corne
10E-TCG-034	3126731.64	333196.61	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-035	3126712.45	333099.21	Non Muntions De*	SURVEY PIN; Cal Grid Corne
10E-TCG-036	3126835.06	333152.14	Other	SURVEY PIN; Cal Grid Corne
10E-TCG-037	3126848.46	333098.54	SX	Projectile Frag
10E-TCG-038	3126856.5	333028.86	Non Muntions De*	SURVEY PIN; Nail
10E-TCG-039	3126843.77	333166.88	SX	Projectile Frag
10E-TCG-040	3126751.98	333191.67	SX	Projectile Frag
10E-TCG-041	3126706.42	333067.05	SX	FUZE PART
10E-TCG-042	3126841.09	333167.55	SX	Projectile Frag
10E-TCG-043	3126858.36	333095.97	Non Muntions De*	RUSTY NAIL
10E-TCG-701	3126742.5	333194.3	SX	Projectile Frag
10E-TCG-901	3126864.86	333161.46	SX	Projectile Frag
10E-TCG-902	3126870.77	333143.65	SX	Projectile Frag
10E-TCG-903	3126870.95	333126.58	SX	Projectile Frag
10E-TCG-904	3126833.11	333084.7	SX	Projectile Frag
10E-TCG-905	3126808.76	333024.11	SX	Projectile Frag

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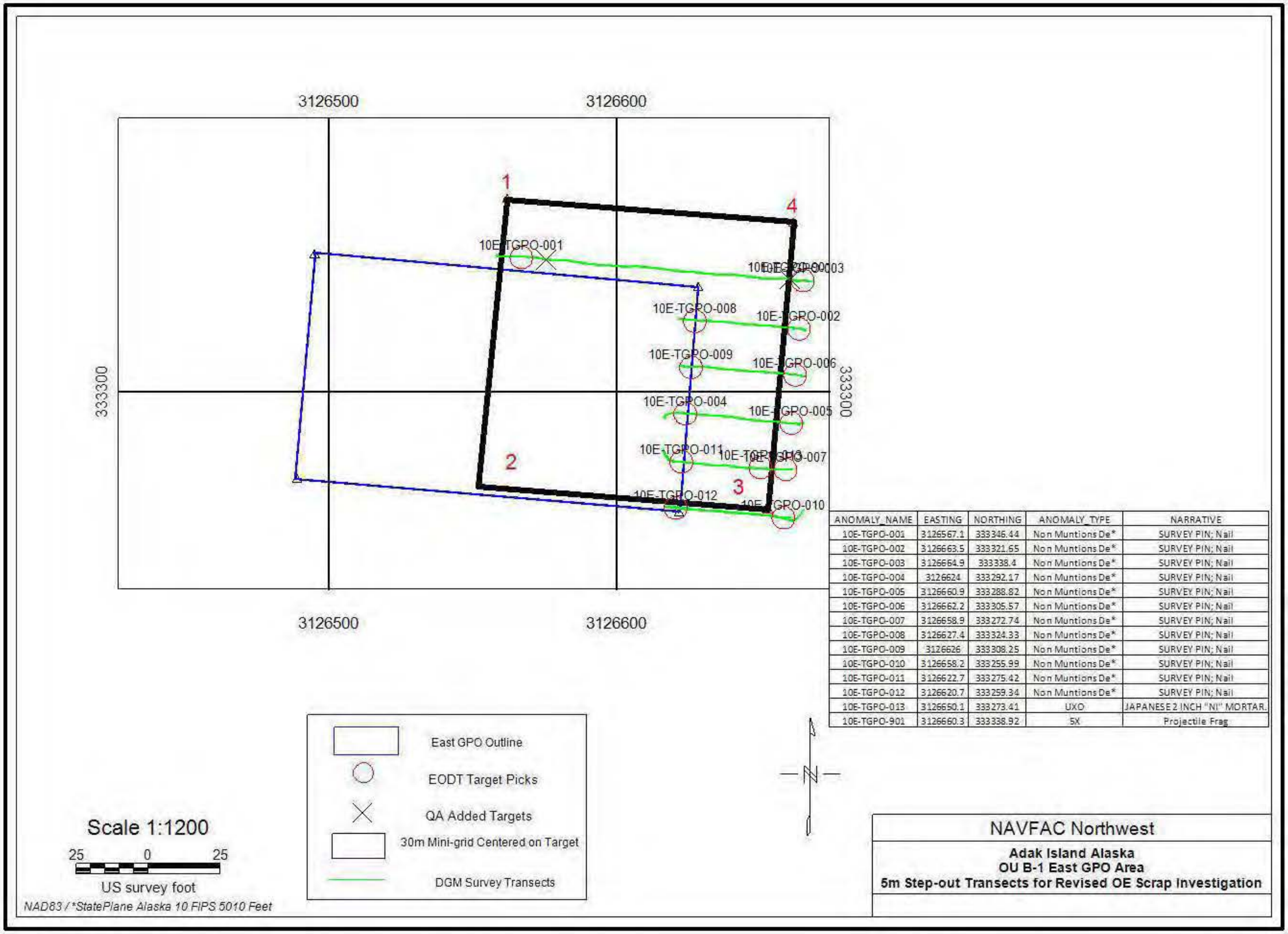
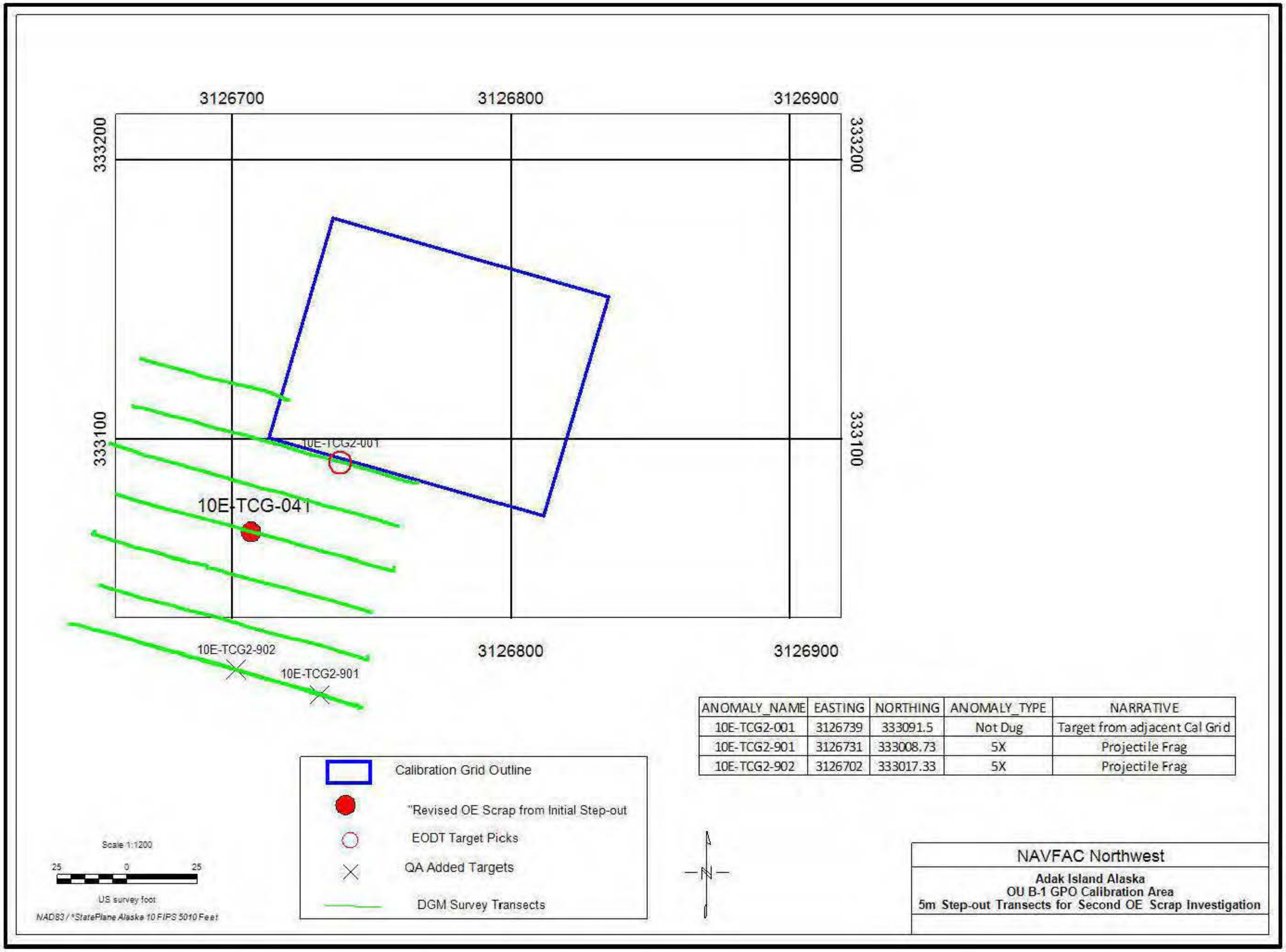
OU B-1 GPO Calibration Area
5m Step-out Transects for Revised OE Scrap Investigation

Figure 3-5. MM-10E Calibration Grid, 5 m Transect Results



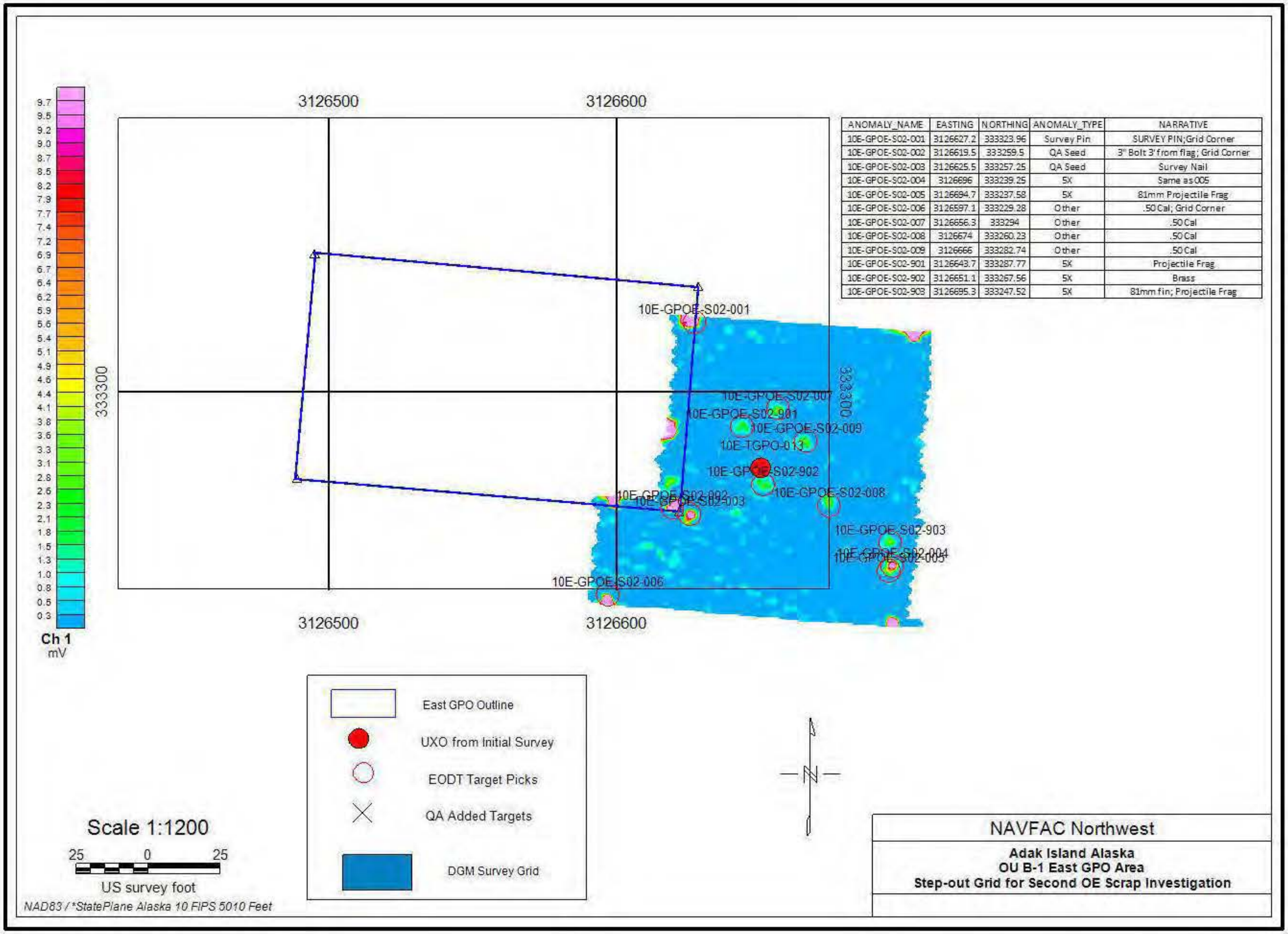
ANOMALY_NAME	EASTING	NORTHING	ANOMALY_TYPE	NARRATIVE
10E-TGPO-001	3126567.1	333346.44	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-002	3126663.5	333321.65	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-003	3126664.9	333338.4	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-004	3126624	333292.17	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-005	3126660.9	333288.82	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-006	3126662.2	333305.57	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-007	3126658.9	333272.74	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-008	3126627.4	333324.33	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-009	3126626	333308.25	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-010	3126658.2	333255.99	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-011	3126622.7	333275.42	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-012	3126620.7	333259.34	Non Muntions De*	SURVEY PIN; Nail
10E-TGPO-013	3126650.1	333273.41	UXO	JAPANESE 2 INCH "NI" MORTAR.
10E-TGPO-901	3126660.3	333338.92	5X	Projectile Frag

Figure 3-6. MM-10E East GPO Grid, 5 m Transect Results



ANOMALY_NAME	EASTING	NORTHING	ANOMALY_TYPE	NARRATIVE
10E-TCG2-001	3126739	333091.5	Not Dug	Target from adjacent Cal Grid
10E-TCG2-901	3126731	333008.73	5X	Projectile Frag
10E-TCG2-902	3126702	333017.33	5X	Projectile Frag

Figure 3-7. MM-10E Calibration Grid, Second 5 m Step-out Transect Results



ANOMALY_NAME	EASTING	NORTHING	ANOMALY_TYPE	NARRATIVE
10E-GPOE-S02-001	3126627.2	333323.96	Survey Pin	SURVEY PIN;Grid Corner
10E-GPOE-S02-002	3126619.5	333259.5	QA Seed	3" Bolt 3' from flag; Grid Corner
10E-GPOE-S02-003	3126625.5	333257.25	QA Seed	Survey Nail
10E-GPOE-S02-004	3126696	333239.25	5X	Same as 005
10E-GPOE-S02-005	3126694.7	333237.58	5X	81mm Projectile Frag
10E-GPOE-S02-006	3126597.1	333229.28	Other	.50 Cal; Grid Corner
10E-GPOE-S02-007	3126656.3	333294	Other	.50 Cal
10E-GPOE-S02-008	3126674	333260.23	Other	.50 Cal
10E-GPOE-S02-009	3126666	333282.74	Other	.50 Cal
10E-GPOE-S02-901	3126643.7	333287.77	5X	Projectile Frag
10E-GPOE-S02-902	3126651.1	333267.56	5X	Brass
10E-GPOE-S02-903	3126695.3	333247.52	5X	81mm fin; Projectile Frag

Figure 3-8. MM-10E East GPO Grid, Second 30 m Grid Step-out Results

Table 3-2. Summary of QA Activities for MM-10E

Activity	Quantity
Production DGM QA Support	
• DGM Data Sets 100% Reprocessed (4 Step Out transects and grids at MM 10E)	4
• Issued DGM Target List Concurrence Documents	4
• Number of QA-added Targets	11
• Acres QA DGM Performed	0
• Issued NCR/DNR for DGM work	0
Field QA Activities	
• Blind seed items planted	0
• Surveillances conducted	1
• Randomly selected targets checked	0
• mV comparison to target find check	0
• Verified no-finds	0
• Verified MEC disposal operations and site restoration	1
• Documented grid/transect submittal pass	1
• Documented grid/transect submittal fail	0
• Inspections of MPPEH and verified TFU operations	1
• Issued NCR/DNR for field intrusive and disposal work	0

Section 4.0: REFERENCES

Battelle. 2010. *Draft Munitions Quality Assurance Report, 2010 Field Season*. Prepared for the Engineering Field Activity Northwest, Silverdale, Washington.

Battelle. 2009. *Draft Munitions Quality Assurance Report, 2008 Field Season*. Prepared for the Engineering Field Activity Northwest, Silverdale, Washington.

Battelle. 2008a. *Final Quality Assurance Surveillance Plan, Adak Island 2008 Munitions Field Season*. Prepared for the Engineering Field Activity Northwest, Silverdale, Washington.

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Tetra Tech EC, Inc. (TTECI). 2008. *Final Geophysical Prove-out Certification Plan, Operable Unit B-2 Remedial Investigation, Former Naval Air Facility, Adak, Alaska*. Prepared for Department of the Navy, Engineering Field Activity Northwest, Silverdale, Washington.

FINAL

Adak OU B-1 AOC MM-10F, MM-10G and MM-10H Remedial Action Project Documentation

Part Four

Non-Conformance Report Resolution Document

Contract No. N62473-07-D-4013
Task Order No. 023

Prepared for:

Naval Facilities Engineering Command, Northwest
1101 Tautog Circle
Silverdale, WA 98315

Prepared by:

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The Business of Innovation

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September 2012

CONTENTS

APPENDICES

TABLES

ACRONYMS AND ABBREVIATIONS

AAR	After Action Report
AOC	area of concern
DGM	digital geophysical mapping
DN	Deficiency Notice
EODT	EOD Technology, Inc.
EPP	Environmental Protection Plan
FCR	Field Change Request
GPO	Geophysical Prove-out
MEC	munitions and explosives of concern
NCR	Non-Conformance Report
NTR	Navy Technical Representative
OU	Operable Unit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QASP	Quality Assurance Surveillance Plan
QC	quality control
QCA	Quality Control Assistant
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
TMP	Technical Management Plan
UOP	Unit of Production
UXO	unexploded ordnance
WMP	Waste Management Plan

Section 1.0: INTRODUCTION

The remedial action for Operable Unit (OU) B-1 sites MM-10F, -10G and -10H has spanned three field seasons, 2008, 2009 and 2010. The 2008 field season comprised all of the digital geophysical mapping (DGM) and the intrusive investigation of 165 out of the 476 primary grids. To accomplish the DGM, the contractor, EOD Technology, Inc. (EODT) obtained certification for 25 DGM teams and nine reacquisition teams in the geophysical prove-out (GPO), collected and processed DGM data for all of the grids and turned those data and target lists over to quality assurance (QA) in accordance with the work plans. QA reprocessed 100% of the contractor DGM data, and after negotiating the addition of targets to most all of the grids, provided concurrence with the final target anomaly lists for each grid. The 2009 field season focused on completing the intrusive work begun in 2008. In 2009, the contractor obtained certification of one DGM team and eight reacquisition teams through the GPO. The DGM team collected data for five step-out grids identified from the 2008 intrusive work. The contractor intrusively investigated the 316 remaining grids, which included the step-out grids. The 2010 field season comprised completing excavation backfilling, road and rut repairs and a siltation survey as prescribed in Field Change Requests (FCRs) #19 and #20.

The contractor experienced failures and/or deficiencies during QA inspection of their work in both the 2008 and 2009 field seasons. There were no failures or deficiencies noted by QA during the 2010 field season. QA inspections were guided by the Quality Assurance Surveillance Plan (QASP). In the QASP, the specific criteria for a QA grid failure were provided as follows:

- Failure to recover QA-placed blind seed items, or
- A MEC item, or
- Metal larger than a 37mm <u>and</u> a DGM amplitude greater than 4.4 mV.

In addition, QA was responsible for assuring that the contractor adhered to a broader spectrum of contractor work, including:

- Assurance that the contractor followed approved project plans and procedures
- Assurance that the work was completed, in whole or in part, as required by the approved project plans;
- Assurance that each grid was complete in accordance with the approved project plans;
- Concurrence with the contractor DGM target selections.

There were no specific metrics for failures in this QA inspection category, and these plans/procedures failures are termed “deficiencies” in this report.

The QA/Navy response to a failure or deficiency was to issue a non-conformance report (NCR). In response to the NCR, the contractor was to conduct a root cause analysis for the failure and propose a corrective action. The Navy would review the proposed corrective action and, when in agreement upon successful implementation of the corrective action, QA would verify the action and the NCR would be closed. Four NCRs were issued to the contractor during the 2008 field season. Twenty-three NCRs were issued to the contractor during the 2009 field season. The corrective actions for the four NCRs issued in 2008 were acceptable to the Navy and those NCRs were closed. However, only four of the NCRs issued during the 2009 field season (2009-01 through 2009-04) were closed during the field season. Nineteen NCRs from 2009 remained open. Of the 19 open NCRs from 2009, the Navy determined it appropriate to close eight of them without additional field work, based on additional data derived from sources other than just the contractor production data (e.g., quality control [QC] and QA results and analysis). The remaining 11 of the open 2009 NCRs were recommended to be closed based on the field work that was successfully completed in 2010.

The purpose of this document is to present the Navy's rationale for closing the NCRs. Each NCR is presented as a stand-alone section (e.g., Section 2.0 is NCR 2008_01, Section 3.0 is NCR 2008_02, etc.). The paragraphs within sections present the details about the NCR (for example, relevant dates, version information, a summary of the NCR, a summary of the root cause analysis and corrective action presented by the contractor, a summary of QA actions and the justification for the Navy's decision to close the NCR). Within each section are the file names of the supporting documents for that NCR. Each supporting document is presented as an appendix. For example, Appendix 2-A is the pdf copy of the NCR; Appendix 2-B is an FCR which was generated in response to the NCR and so on for each document. All of the supporting documents are provided in Appendix 29-A in the format described above.

The NCRs were generated in Adobe pdf with the intention that all parties involved in processing the NCR would use the Adobe 'forms' capability to fill in their respective sections and then would use the Adobe electronic signature capability to sign and date the document. For a variety of reasons, this was not followed, so in some cases, there are multiple copies of the same NCR. For example, the QA contractor filled out, signed and issued the NCR in pdf. The production contractor then converted the document to Word and used the Word version to fill in the root cause and corrective action and then converted that document into pdf. When this happened, the signatures and, in some cases the text from the originally-issued NCR, were lost during the conversion. The reader will see cases where there are two and sometimes three appendices showing the NCR in its various iterations (issue, root cause/corrective action and final acceptance and signature). In some of the examples, the Naval Technical Representative (NTR) signature was handwritten because the NTR did not have an electronic signature and when the conversion was made, the NTR's handwritten and scanned signature were lost. Section 10.0 (NCR 2009-005) is an example of this. The completed NCR (minus the NTR signature) is presented as Appendix 10-A, and the front section of the NCR with the NTR signature is presented as Appendix 10-B.

There are eight 2009 NCRs that did not need additional field data (NCRs 2009_05 and 13 to 19). Each NCR section where this is the case has an additional form attached. The original NCR was left open at the conclusion of the 2009 field season because of unresolved issues, some of which could not be directly reconciled. In these cases, the Navy performed a review of all available data (i.e., including QA data) and reached the conclusion that these data support closing the NCR even though the root cause analysis and/or the corrective action were insufficient by themselves. In these instances, the Navy may not accept the contractor's root cause and/or corrective action and therefore did not sign to accept and close the NCR using the contractor's information only. The additional form provides the capability to document review of the NCR and supporting data, and a signature block to signify that, after reviewing all of the available data, the Navy has determined that the grid did not require any additional action and the NCR is closed.

There were 11 2009 NCRs (NCRs 2009_06 to 12, and 20 to 23) that required additional field work or data gathering. This work was accomplished during the 2010 field season. Each of these NCRs has an additional form attached indicating that closure is completed. The closure of these NCRs is based on a review of previously acquired data (including QA data), plus the additional field data acquired in 2010, but does not infer that the Navy accepts the contractors root cause and/or corrective action stated in the NCR.

Most of the open NCRs from 2009 were based on failures or deficiencies in a specific (single) grid, and thus these grids had not been approved by QA as of the end of the 2009 field season.

To provide final approval of these grids, an additional 2010 QA report was generated as a cover to the original QA report from 2009.

The unresolved NCRs from the 2009 field season can generally be classified into the following categories:

- Non-conforming subsurface target resolution (excavations) (e.g., there are an unknown number of target anomaly excavation locations with residual amplitude values above the GPO threshold) (NCRs 5, 6, 10 through 19).
- Non-conforming subsurface target resolution (spoils) (e.g., there are an unknown number of target anomaly excavation locations where the spoils (clods/clumps) have not been replaced into the excavation (backfill), nor were they sufficiently broken up to verify they were inspected and determined whether they contained munitions and explosives of concern (MEC) or material potentially presenting an explosives hazard (NCRs 7, 8, 9 and 20).
- Non-conforming disposal operation (detonation) (e.g., unused donor explosives) were detonated outside the area of concern (AOC) boundaries (MM-10F) and were close enough to the OU B-1 GPO areas that debris may have contaminated the GPO (NCR 21).
- Non-conforming (incomplete) erosion control and rut repair (e.g., there are an unknown number of target anomaly excavations from the 2009 field season which had not been backfilled, or the backfill was inadequate). There were an unspecified number of areas with unrepaired ruts and terrain damage caused by vehicle traffic at the site. In addition, there may have been erosion that occurred as a result of this non-finished work that needed assessment and correction (NCRs 22 and 23).

The 2010 field work was geared to specifically address these categories of NCRs. Two FCRs, #19 and #20, were written in coordination with the Navy, QA, the contractor and the regulators. FCR #19 addresses changes to the Environmental Protection Plan/Waste Management Plan (EPP/WMP) to complete the repair of ruts and other damage to the site caused by activities related to the performance of the remedial actions. This work addressed the fourth category above. FCR #20 addressed changes to the MEC Quality Assurance Project Plan (QAPP), Standard Operating Procedure (SOP) 5. The revised SOP 5 detailed the field activities necessary to complete backfilling of open target investigation excavations and the break up and inspection of dirt clods (excavation spoils) used as the backfill material. This work addresses the second category above. A separate plan was written to perform a surface sweep of the OU B-1 GPO areas to address the third category above, and additional QA inspections were conducted at several grids to help address the first bullet above.

A recurring theme throughout the 2009 NCRs was that the production contractor deviated from the approved project plans. The Navy's expectation, based on the language in the approved plans, was that the contractor would excavate and remove the metal from the target anomaly investigation until there was no analog signal from a hand-held metal detector (Vallon) placed into the excavation, effectively investigating every possible anomaly source and all the metal in the hole. Then, the contractor was to verify that the excavation was below the GPO picking threshold (4.4 mV) using an EM61 before backfilling the hole.

The contractor's procedure, however, was to remove a subset of the metal from the excavation location and then see whether the remaining metal provided an amplitude reading on an EM61 above or below the picking threshold. If the reading was determined to be below the threshold, the dig was considered completed and the team moved to the next anomaly location. All the indications are that in 2008, the contractor followed the ‘expected’ procedures in the grids where they conducted intrusive investigations. The Navy believes this to be the case for 2008 because all of the QA observations and documented surveillances reflect that the UXO intrusive teams were following the procedures as expected and according to the SOPs.

In 2009, however, QA identified deviations from the SOPs as early as NCR 2009-03 (Vallon not used to clear anomalies in MM-10F_T18). Instead the EM61 was used as the primary clearance tool and the Whites detector was used incorrectly. QA traced many of the subsequent NCRs in 2009 back to incomplete or insufficient excavation or to uninvestigated metal in either the primary excavation or in the dig spoils, which were not immediately backfilled (in 2009) in accordance with the SOPs. Several problems resulted from this change in procedures. One, the documentation for the verification that the excavation was below threshold could not be verified (i.e., no digital data from the EM61 were logged) and in at least one instance, there was an NCR and a grid failure where the QA-derived EM61 millivolt reading over the excavation was several factors above the picking threshold and, this particular excavation had undergone specific QC by the contractor. The QA data were logged (digital data with global positioning system positioning), processed and a target was selected for QA investigation. The EM61 system used by QA also was certified in the GPO and underwent daily instrument checks. The contractor millivolt reading was taken on-the-fly (no positioning) with the instrument in analog mode (no digital data logged). Thus, reliable (reproducible) backup data to verify the readings was not available. Other targets were selected from the QA DGM data which were also considerably above the threshold. These turned out to be uninvestigated metal in the un-backfilled dig spoils and, in many cases, NCRs were issued to address these non-conforming conditions.

The project plans allow, and even anticipate, change for a variety of reasons such as addressing unexpected site conditions, identifying more efficient ways of performing the work (i.e., process improvement) and others. Changes in the approved processes may be major or minor. The approved plans described the means for identifying and justifying the need for change, describing the change and gaining Project Team approval for implementing the change. In some cases, these approved change management processes were not followed. Some of the consequences of not following these procedures are discussed below:

- The Project Team relies on the production contractor to follow the approved project plans and thoroughly document this fact. The assumption was that the plans describe the best practices for accomplishing the project objectives. Regulatory agencies rely on being able to verify the plans were meticulously followed, using project documentation (e.g., contractor production reports and quality control documentation) as verification that the work, as described in the approved plans, has been accomplished. In this project, the contractor deviated from these approved plans. This left the site in a condition which did not pass Navy QA inspection (a process outside of the approved plans). The result was issuance of multiple NCRs by QA.
- Contractor QC inspected the work using methods designed to evaluate the results expected from work that followed the approved plans. However, when processes deviated from the approved plans, these inspections were either not focused on the correct inspection points or the correct methods to verify, validate and document the results of the changed work process(es). In these cases, the contractor did not collect sufficient stand-alone defensible data,; either production or QC, to independently certify the AOCs met the required standard for no-further action.
- Because no change to the production process was requested (i.e., via FCR), QA was left with no alternative but to inspect the work according to the Quality Assurance

Surveillance Plan (QASP) and the approved plans, and when deficient work was identified, NCRs were the result.

An OU B-1 Project Team meeting held on June 21-22, 2010, concluded that a stand-alone document to address resolution of the many NCRs from the 2009 field season was needed. At that meeting, it was noted there were inconsistencies in many of the NCRs presented in the 2008-2009 After Action Report (AAR), such as apparent multiple versions of the same NCR, missing signatures and missing attachments. Consequently, the Project Team decided these inconsistencies should be addressed in this same document. During this meeting, the failure criteria stated in the QASP was reiterated as: a MEC item or metal larger than a 37mm <u>and</u> a DGM amplitude greater than 4.4 mV.

Each NCR is presented as an independent paragraph (section) in this Part 4 document, with the following subsections:

- Date of NCR/Date Resolved. This paragraph provides the date the original NCR was issued, and the date the Navy accepted the corrective action as complete and sufficient to resolve the problem.
- Document (NCR) Version Control. As mentioned above, there are often multiple versions of an NCR. This paragraph provides a chronology of the versions (if applicable).
- Summary of NCR. This paragraph summarizes the reason that the NCR was issued.
- Summary of the Root Cause Analysis and the contractor Corrective Action. This section summarizes the contractor's root cause analysis and the contractor corrective action implemented to resolve the non-conformance. In some cases, the contractor did not acknowledge that a non-concurrence exists. In these cases, this is discussed in this paragraph also.
- Summary of QA Actions. This paragraph summarizes the QA actions in response to the contractor's implementation of a corrective action (or inaction in cases of disagreement).
- Justification for Further Action/No Further Action. This paragraph provides the rationale for the Navy's decision to accept the NCR as resolved and closed.

When applicable, these paragraphs cite the specific documents, and copies of those documents are provided in the Appendices. Additional documentation, such as maps and data generated independently by QA, are also included in the Appendices when they are cited as justification for a specific action, or to support a no further action determination.

Table 1-1 provides a listing of the NCRs. The table contains a brief narrative of the reason for the NCR, the status of the NCR at the end of the 2009 field season, any additional actions deemed necessary to address the NCR at the end of the 2009 field season, the current status of those actions and NCR, and the Appendix section that provides the discussion and documentation for the NCR. Table 1-1 shows that the NCRs fall into four status categories:

1. NCRs that had previously been completed and received final QA/NTR signatures: NCRs 2008_03, 2008_04, 2009_2, 2009_03 and 2009_04. These final NCR documents are attached in their original form to an appendix in the respective NCR sections.
2. NCRs that had been previously approved by QA in either 2008 or 2009, but were missing signatures (typically final QA and NTR signatures): NCRs 2008_01, 2008_02, and 2009_01. These missing signatures were obtained during the writing of this document.

These final NCR documents are attached (with all signatures) to an appendix for the respective NCR sections.

3. NCRs that had not been approved by QA in 2009 (missing QA and NTR signatures), but could be closed based on evidence (i.e., QC and QA data, etc.) acquired during the 2008 and 2009 field seasons: NCRs 2009_05 and 2009_13 to 2009_19. For these NCRs, a Final NCR Closeout Form has been attached to the original (unsigned) NCR document(s). The NCR Closeout Form has been approved by current QA and NTR representatives. This combined document is attached to an appendix for the respective NCR sections.

4. NCRs that had not been approved by QA in 2009 (missing QA and NTR signatures), and were approved based on 2010 field work: NCRs 2009_06 to 2009_12, and 2009_20 to 2009_23. For these NCRs, a Final NCR Closeout Form has been attached to the original (unsigned) NCR document(s). The NCR Closeout Form has been approved by current QA and NTR representatives. This combined document is attached to an appendix for the respective NCR sections.

Table 1-1. NCRs Issued for the 2008 and 2009 Field Seasons

Date of Issue of NCR	NCR (OUB1_ADAK_)	QA Reason for Report	QA Status of NCR at end of 2009 Field Season	Additional Actions Required to Resolve NCR	Action(s) Completed, NCR Status	Crosswalk to Further Discussion
7/1/2008	2008_01	GPO Reacquisition certification deliverables are deficient.	Approved ~7/9/2008, but QA and NTR signatures are missing.	Obtain QA and Navy Final Signatures.	Signatures Obtained, NCR Closed.	Section 2.0
8/7/2008	2008_02	DGM QC tests and data do not meet contract requirements. DGM Team 6 failed QC tests repeatedly over a 3 week period of time.	Approved ~8/25/2008 but QA and NTR signatures are missing.	Obtain QA and Navy Final Signatures.	Signatures Obtained, NCR Closed.	Section 3.0
8/19/2008	2008_03	DGM team missed a QA seed item.	Approved 8/29/08.	None	N/A, NCR Closed.	Section 4.0
10/1/2008	2008_04	Possible unexpended jet perforators scattered over several grids. Perforators were scattered during the final demolition shot of the 2008 season.	Approved 6/29/09.	None	N/A, NCR Closed.	Section 5.0
6/29/2009	2009_01	75 mm HE projectile frag found around demo shot in MM-10G_C11.	Not signed.	Obtain QA and Navy Final Signatures.	Signatures Obtained, NCR Closed.	Section 6.0
7/3/2009	2009_02	M43A1 MT fuze found during QA hole checks from QA DGM Remapping Anomaly (12.5 mV). MM-10F_E10. Target was not selected from DGM data at 4.4 mV threshold.	Approved 7/28/09.	None	N/A, NCR Closed.	Section 7.0
7/15/2009	2009_3	Vallon not used to clear anomalies in MM-10F_T18. Instead the EM61 was used as the primary clearance tool. Whites detector used incorrectly.	Approved 8/3/09.	None	N/A, NCR Closed.	Section 8.0

Table 1-1. NCRs Issued for the 2008 and 2009 Field Seasons (Continued)

Date of Issue of NCR	NCR (OUB1_ADAK_)	QA Reason for Report	QA Status of NCR at end of 2009 Field Season	Additional Actions Required to Resolve NCR	Action(s) Completed, NCR Status	Crosswalk to Further Discussion
7/15/2009	2009_4	Anomalies less than 4.4 mV were all classified as "Hot Geology" without any investigation. MM-10F_P10 and Q10.	Approved 11/24/09.	None	N/A, NCR Closed.	Section 9.0
8/4/2009	2009_05	An unexcavated metal item larger than the failure criteria (37 mm) was detected by QA digital geophysical remapping (16.9 mV) in MM-10F_F14 target 011.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 10.0
8/14/2009	2009_6	An unexcavated 81 mm tail boom and fin assembly was detected by QA digital geophysical remapping (27.99 mV) in MM-10F_S08 target 010.	Not Approved.	Finish QA investigations after completion of FCR#20 work planned for 2010 field season.	FCR#20 work completed and accepted by QA/Navy. Additional QA inspections completed without failure. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 11.0
8/20/09	2009_07	An unexcavated metal item was found in a large dirt clump, and multiple unexcavated metal items were found in a previous excavation. Both targets detected by QA digital geophysical remapping (37.93 and 15.93 mV) in MM-10F_T16 targets 021 and 017.	Not Approved.	FCR #20 work and Approved Completion of that work.	FCR#20 work completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 12.0

Table 1-1. NCRs Issued for the 2008 and 2009 Field Seasons (Continued)

Date of Issue of NCR	NCR (OUB1_ADAK_)	QA Reason for Report	QA Status of NCR at end of 2009 Field Season	Additional Actions Required to Resolve NCR	Action(s) Completed, NCR Status	Crosswalk to Further Discussion
9/1/2009	2009_08	Multiple (8) unexcavated metal items were detected by QA digital geophysical remapping in a dirt clump (20.16 mV) in MM-10F_B14 target 030.	Not Approved.	Finish QA investigations after completion of FCR#20 work planned for 2010 field season.	FCR#20 work completed and accepted by QA/Navy. Additional QA inspections completed without failure. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 13.0
9/1/2009	2009_09	An unexcavated metal item larger than the failure criteria (37 mm) was detected by QA digital geophysical remapping in a dirt clump (12.55 mV) in MM-10F_D12.	Not Approved.	Finish QA investigations after completion of FCR#20 work planned for 2010 field season.	FCR#20 work completed and accepted by QA/Navy. Additional QA inspections completed without failure. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 14.0
9/1/2009	2009_10	Multiple (13) unexcavated metal items were detected by QA inspections (Vallon) in MM-10F_D09 target 013.	Not Approved.	Finish QA investigations after completion of FCR#20 work planned for 2010 field season.	FCR#20 work completed and accepted by QA/Navy. Additional QA inspections completed without failure. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 15.0
9/11/2009	2009_011	Multiple unexcavated metal items including a M48 PD fuze were detected by QA digital geophysical remapping (6.7 mV) and hole inspections (Vallon) in MM-10F_T18 target 023.	Not Approved.	Finish QA investigations after completion of FCR#20 work planned for 2010 field season.	FCR#20 work completed and accepted by QA/Navy. Additional QA inspections completed without failure. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 16.0

Table 1-1. NCRs Issued for the 2008 and 2009 Field Seasons (Continued)

Date of Issue of NCR	NCR (OUB1_ADAK_)	QA Reason for Report	QA Status of NCR at end of 2009 Field Season	Additional Actions Required to Resolve NCR	Action(s) Completed, NCR Status	Crosswalk to Further Discussion
9/12/2009	2009_012	An unexcavated metal item larger than the failure criteria (37 mm) was detected by QA digital geophysical remapping 2 ft from nearest excavation (39 mV) in MM-10F_T07 target 025.	Not Approved.	FCR #20 work and Approved Completion of that work.	FCR#20 work completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 17.0
9/12/2009	2009_013	Multiple (25+) unexcavated metal items were detected by QA digital geophysical remapping (16.4 mV) and hole inspections (Vallon) in MM-10F_F25 target 008.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 18.0
9/16/2009	2009_014	Multiple (50+) unexcavated metal items were detected by QA digital geophysical remapping (11.65 mV) approximately 4 ft from nearest Target (032) in MM-10F_K09.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 19.0
9/17/2009	2009_015	Multiple fuze fragments (unexcavated) found by QA inspections (Vallon) in MM-10F_K18, Target 087.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 20.0
9/18/2009	2009_016	M48 fuze (unexcavated) found by QA inspections (Vallon) in MM-10F_K27 Target 077.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 21.0
10/02/09	2009_017	Multiple (9) pieces of frag were found by QA inspections (Vallon) at MM-10F_H10 Target 062.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 22.0

Table 1-1. NCRs Issued for the 2008 and 2009 Field Seasons (Continued)

Date of Issue of NCR	NCR (OUB1_ADAK_)	QA Reason for Report	QA Status of NCR at end of 2009 Field Season	Additional Actions Required to Resolve NCR	Action(s) Completed, NCR Status	Crosswalk to Further Discussion
10/08/09	2009_18	Multiple (4) unexcavated frag items were detected by QA digital geophysical remapping (36.29 mV) at Target (005) in MM-10G_A03.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 23.0
10/09/09	2009_19	Multiple pieces of frag (up to 8 inches by 1.5 inches) were detected by QA inspections (Vallon) on MM-10F_T17 Target 084.	Not Approved.	None recommended per this document.	NCR Closeout Document Signatures Obtained, NCR Closed.	Section 24.0
10/12/09	2009_20	During document review of MM-10F_K23, the QA seed was not listed. Seed was found in uninvestigated soil clump about 3 ft from seeded location.	Not Approved.	FCR #20 work and Approved Completion of that work.	FCR#20 work completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 25.0
10/14/09	2009_21	Final demo shot of 2009 was conducted outside of AOCs 10F, G and H.	Not Approved.	Completion of work specified in Section 26.	Contractor and QA inspections completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 26.0
11/23/2009	2009_22	During the final walkthrough inspection of MM-10F and MM-10G numerous excavations were located that were not backfilled or the backfill was inadequate.	Not Approved.	FCR#20 and Approved Completion of that work.	FCR#20 work completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 27.0
11/23/2009	2009_23	During the final walkthrough inspection of MM-10F and MM-10G numerous ATV ruts were located that had not been repaired.	Not Approved.	FCR#19 and Approved Completion of that work.	FCR#19 work completed and accepted by QA/Navy. NCR Closeout Document Signatures Obtained, NCR Closed.	Section 28.0

During the course of the 2009 field season, there were many attempts to resolve underlying disagreements between the contractor and Navy QA. These resolution attempts included comparative DGM field equipment tests and numerous conference calls and meetings. An overarching issue with the NCRs was that, in some cases, the plans contained procedures that were inconsistent, ambiguous and/or did not contain enough detail. As discussed, FCRs should have been written in a timely manner so the project team could have agreed upon a resolution of the issues with the plans, but identification of this overarching issue was not fully determined or understood until late in the 2009 field season or after the season was over. Timeliness of NCR resolution and QC certification package submittal exacerbated the problem. Consequently, a number of unresolved NCRs resulted from differences in interpretation of the plans by the contractor and QA, and failure criteria used by QA.

The Navy called a meeting with all parties on September 5, 2009 to address the NCR issues. During the meeting, the project team identified the need for validation of selected contractor processes which were not being documented through the normal QC process. To address this need, the contractor submitted a new SOP 11, which described the methods to be used to collect the additional data. SOP 11 required the contractor to re-check 2% of previously investigated targets and clear the targets of metal completely using a hand-held detector and document that no MEC were left behind. The SOP 11 work began immediately and was completed on about October 9, 2009. The SOP 11 work comprised revisiting approximately 524 randomly selected targets to collect DGM data to validate and document that the contractor excavation teams were correct in reporting that the excavations were being verified as below the GPO threshold following intrusive investigation. In addition, the contractor re-investigated 451 randomly selected targets with the Vallon sensor. The DGM data and Vallon re-investigations the contractor acquired were not conclusive and therefore not adequate to resolve the NCRs. However, no MEC was found.

The SOP 11 data, along with QC and QA checks, and 2010 field work are used in this report to support the decision to close the NCRs. It is important to note that none of the NCRs issued in 2008-2009 were due to the discovery of a MEC item. Moreover, there is a large body of evidence (QA and QC checks, etc.) indicating that the OU B-1 site has an extremely low probability of any MEC remaining. This body of evidence is discussed in the AOC Certification Report and is summarized below:

- There were a total of 41,393 targets dug in the 476 primary grids and five step outs in OU B-1. QA installed 301 blind seeds in these grids and all were successfully resolved, except for the QA seed in MM-10F Grid K23 (NCR 2009_20) which was resolved with the successful completion of the 2010 field work (FCR#20). Contractor QC installed 478 blind seeds and all were successfully resolved.
- The contractor utilized several target picking thresholds for the DGM data, starting with 2.9 mV, then 4 mV, and finally 4.4 mV (based on the sum of channels 2, 3 and 4). Compared to previous DGM conducted on OU B-1 (at ~7 to 8 mV threshold), these thresholds are much lower, resulting in a more conservative (thorough) investigation of DGM targets and further reinforcing the conclusion that there is a very low probability of any MEC remaining. At the end of QA DGM processing, 23 grids were finalized using the 2.9 mV threshold, 203 grids were finalized using the 4 mV threshold and 249 grids were finalized using the 4.4 mV threshold.
- QA performed post-production checks of 2,627 targets with a Vallon detector and intrusive investigation on 467 targets based on QA digital geophysical remapping. No MEC were found in these investigations.

- QA investigated 2,383 QA digital geophysical remapping targets that were outside of the original target location (presumed to be due to metal in spoils piles), and no MEC were found in these investigations.
- QC investigated about 13,248 targets without finding any MEC.
- SOP 11 work caused the re-investigation of 975 targets without finding MEC.

The QA intrusive investigations were very rigorous, with the targets pursued to completion. If the QA investigations at the target locations (3,094) were considered to be a random sampling of the total targets (41,393), and these QA investigation did not find MEC, then statistically there is 99% confidence at least 99.61% of the total targets do not contain MEC. This percentage sampling (QA investigations) is about 7.5% of the total targets. Note that there are an additional 16,606 targets that were checked by QA and QC without finding MEC (2,383 QA digital geophysical remapping targets outside of original target location, 13,248 QC investigations, and 975 SOP 11 investigations) or about 40% of the total targets not used in this statistical calculation. It is important to note that no MEC at all was found in any of the QC or QA inspections. No failures occurred wherein MEC was found in an investigation location by the QC or QA inspectors.

Documentation provided in the following sections supports closure of all four of the 2008 NCRs, and all 23 of the 2009 NCRs without any additional field work. Thus, all NCRs related to field work in OU B-1 have been satisfactorily closed. All supporting documentation referenced in this report is provided on the disc provided in Appendix 29-A.

Section 2.0: NCR 2008_01

2.1 Date of NCR/Date Resolved

This NCR was issued by QA on July 1, 2008 and was resolved by QA on about July 9, 2008. Final signatures on the NCR were obtained from QA and Navy NTR during the preparation of this document.

2.2 Document (NCR) Version Control

This NCR is attached in Appendix 2-A, as posted to the 2008 SharePoint site. The document file name is "NCR_OUB1_ADAK_2008_01.pdf". Note that the contractor corrective action was attached to the document rather than inserted into Block 6 of the form.

2.3 Summary of NCR

This NCR was issued due to missing or incomplete deliverables for contractor MEC reacquisition team (Teams 1, 2 and 3) certifications in GPO grids.

2.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause was identified by the contractor as "the requirements for the GPO Reacquisition Package were not defined to the Project Data Manager". The reason for this was explained that the Data Manager didn't read the GPO Certification Plan to see what was required to be submitted.

The contractor submitted the missing and/or incomplete data to QA. The contractor retrained the Data Manager and Reacquisition Teams, formalized/reiterated the requirement that all submittals need to be approved by QC, and prepared an FCR to provide a better definition of the roles and responsibilities of its team. The FCR (FCR Adak 08.pdf) is attached in Appendix 2-B.

2.5 Summary of QA Actions

After receiving missing and/or incomplete information, QA re-evaluated the GPO test data and provided approved GPO certifications for the affected reacquisition teams (OUB1_GPO_Reacq1_Final_Cert.pdf, OUB1_GPO_Reacq2_Final_Cert.pdf, OUB1_GPO_Reacq3_Final_Cert.pdf) attached in Appendix 2-C.

2.6 Justification for Further Action/No Further Action

This NCR does not require further action. Proof of the successful resolution of this NCR is documented in the approved GPO certification documents for these reacquisition teams. The missing and incomplete information was received and the teams were certified. The final NCR with QA and NTR signatures obtained during preparation of this document is attached in Appendix 2-D (file name: NCR_OUB1_ADAK_2008_01_FINAL_073010.pdf).

Section 3.0: NCR 2008_02

3.1 Date of NCR/Date Resolved

This NCR was issued by QA on August 7, 2008 and the correction was approved on about August 25, 2008. Through an administrative error, final signatures were not obtained in 2008. Final signatures on the NCR were obtained from QA and Navy NTR during preparation of this document and this NCR is closed.

3.2 Document (NCR) Version Control

This NCR is attached in Appendix 3-A, as posted to the 2008 SharePoint site. The document file name is "NCR_OUB1_ADAK_2008_02.pdf".

3.3 Summary of NCR

This NCR identified two plans or procedures deficiencies associated with DGM Team 6. One was failures of QC tests (static tests exceeding the permissible variance). The other was DGM data that appeared to indicate intermittent equipment failure. Static tests failed on July 7, 9, 19, 24, 26, 28 and 29, 2008. Production DGM data collected between July 25 and July 30, 2008 appeared deficient.

3.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor explained that the static test variances (failures) were noted but were not discussed with QC or QA with an explanation. Investigation into the cause for the static tests identified a modification to the equipment (addition of foam padding) which changed the test parameters and, hence, the results. The contractor further explained that the apparent intermittent equipment failure indications in the data were the result of improper setting in the EM61MK2 program on the Team 6's Allegro (data logger). The improper settings were attributed to a training failure (the team leader training an alternate).

The data were corrected (without additional field data reacquisition) and resubmitted to QA. In addition, a different team (Team 5) recollected DGM data in one of the affected grids (MM-10G-B05). Analysis of this comparison data shows that the corrections were effective.

3.5 Summary of QA Actions

After receiving corrected data, QA re-processed the data and provided approved QA Certification Reports for the affected grids, MM-10G-B03, B04 and B05 (MM10G_UOP05_B03_final.pdf, MM10G_UOP05_B04_final.pdf, MM10G_UOP05_B05_final.pdf) attached in Appendix 3-B. These certification reports show that the DGM data were approved (Blocks 1-6) by about August 22, 2008.

3.6 Justification for Further Action/No Further Action

This NCR does not require further action. Proof of the successful resolution of this NCR is documented in the approved QA Certification Reports for the affected grids. The final NCR with QA and NTR signatures (obtained during preparation of this document) is attached in Appendix 3_C (file name: NCR_OUB1_ADAK_2008_02_FINAL_073010.pdf).

Section 4.0: NCR 2008_03

4.1 Date of NCR/Date Resolved

This NCR was issued by QA on August 19, 2008 and the correction was accepted by QA and the Navy NTR on August 29, 2008.

4.2 Document (NCR) Version Control

This NCR is attached in Appendix 4-A, as posted to the 2008 SharePoint Site. The document file name is "NCR_OUB1_ADAK_2008_03_FINAL_073010.pdf". This NCR references Appendices A through E which were apparently intended to be attached to the NCR. These appendices could not be located on the SharePoint. The NCR indicates that they are most likely DGM coverage maps and photos. The NCR was accepted by QA at the time and therefore, it is believed the appendices had been reviewed by QA and found to be technically supportive of the close-out of the NCR.

4.3 Summary of NCR

This NCR was issued due to failure of the contractor to detect a blind QA seed located in MM-10F-T17 at coordinates 3124322.41E, 336057.08N.

4.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor identified the cause of the failure to be that the seed item was located on the edge of a steep gully exceeding 30 degrees, and no data were collected over that location. The contractor determined that due to safety concerns, not mapping this seed was acceptable and not an indication of substandard data collection procedures. No corrective action was recommended.

4.5 Summary of QA Actions

QA reviewed the site, the data submitted with the NCR response and accepted the explanation. QA provided final approval of the NCR as shown on Block 9 of the QA NCR document.

4.6 Justification for Further Action/No Further Action

This NCR does not require further action. The NCR was completely finalized (including all signatures) during the 2008 field season. The final NCR is provided in Appendix 4-A as referenced above in Section 4.2.

Section 5.0: NCR 2008_04

5.1 Date of NCR/Date Resolved

This NCR was issued by QA at the end of the 2008 field season (October 1, 2008) and was approved by QA and the Navy NTR during the 2009 field season (June 29, 2009).

5.2 Document (NCR) Version Control

This NCR is attached in Appendix 5-A. The document file name is "NCR_OUB1_ADAK_2008_04_FINAL_073010.pdf". This document was completely approved (including all signatures) during the 2009 field season.

5.3 Summary of NCR

This NCR was issued due to failure of the contractor to contain the final demolition shot of the 2008 field season (MM-10F-C16). The shot hole still contained expended jet perforators and a tail boom of an 81 mm mortar. Additionally, expended perforators were found in several other adjacent grids.

5.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor identified the root cause as failure to comply with the approved post-demolition procedures.

The contractor cleared the blow hole and backfilled it, conducted an instrument-assisted surface sweep of grids C/D/E 14 through 18, and conducted a visual surface sweep of an area 300 ft radius (from the blow hole) outside of the AOC. Documentation of the surface sweep is provided in the contractor Quality Control Reports for June 25 and 26 (files: DQCR_062509_110.pdf and DQCR_062609_111.pdf, respectively) provided in Appendix 5-B.

5.5 Summary of QA Actions

QA accepted the corrective action conducted, the contractor's own post-cleanup inspections and provided final approval of the NCR as shown on Block 9 of the QA NCR document.

5.6 Justification for Further Action/No Further Action

This NCR does not require further action. Proof of the successful resolution of this NCR is documented in the approved NCR document.

Section 6.0: NCR 2009_01

6.1 Date of NCR/Date Resolved

This NCR was issued by QA on June 29, 2009. A reply from the contractor QC Specialist was not obtained until December 13, 2009. Final signatures on the NCR by QA and Navy NTR were obtained during preparation of this document and this NCR is closed.

6.2 Document (NCR) Version Control

This final version of this NCR (as of the end of the 2009 field season) is attached in Appendix 6-A (file name: NCR_2009_001_062210.pdf). This version of the NCR is missing final QA and NTR approval signatures. This NCR was discussed during the 2008-2009 AAR meeting on June 21-22, 2010.

6.3 Summary of NCR

This NCR was issued because large pieces of fragmentation were found on the surface during QA hole inspections of the grid. On-site investigations with contractor staff revealed additional large fragmentation in other areas of the grid, probably kicked out from a demolition shot.

6.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor identified the root cause as improper demolition procedures, which allowed the kick-out materials and a secondary cause as not properly clearing the shot hole and surrounding area.

The contractor cleared this shot hole and all shot holes used for demolition activities in 2008 that had not already been re-surface cleared. In addition, grids MM-10G B10, B11, and C10 were surface cleared. The contractor QC daily report from August 11, 2009 (Appendix 6-B, file name: DQCR_081109_150.pdf) documents that contractor QC performed a surface sweep check of the affected grids with no discrepancies found.

6.5 Summary of QA Actions

Table 6-1 summarizes the QA actions performed on the affected grids. These actions are documented in Appendix 6-C in the QA Certification Reports for the respective grids (files: MM10G_UOP2_B10_final.pdf, MM10G_UOP2_B11_final.pdf, MM10G_UOP2_C10_final.pdf, and MM10G_UOP2_CB11_final.pdf). All of the affected grids were approved by QA and Navy NTR.

Table 6-1. Summary of QA Actions on Grids Affected by NCR2009_01

Grid	Verification of QC checks	QA field Checks			
		Random Vallon Hole Checks	mV checks	QA DGM Remapping Target Investigations	No Find Checks
B10	18 (of 172 total)	4	0	0	0
B11	40 (of 383 total)	4	0	0	0
C10	11 (of 105 total)	4	0	0	0
C11	8 (of 71 total)	4	0	17	0
Totals	77 (of 731 total)	16	0	17	0

6.6 Justification for Further Action/No Further Action

This NCR does not require further action. Proof of the successful resolution of this NCR is documented: (1) in the contractor QC report showing the work was accomplished and verified, (2) the approved QA Certification Reports showing the grids had adequate QC checks (77 of a total of 731 targets, or about 10%). Sixteen QA random hole checks and 17 QA digital geophysical remapping targets were investigated without any failures. The final signed NCR is provided in Appendix 6-D (NCR_OUB1_ADAK_2009_01_FINAL_073010.pdf). QA grid certification activities were conducted <u>after</u> all of the contractor corrective action and QC were performed.

Section 7.0: NCR 2009_02

7.1 Date of NCR/Date Resolved

This NCR was issued by QA on July 3, 2009 and was signed (closed) by QA and Navy NTR on July 28, 2009.

7.2 Document (NCR) Version Control

This NCR is attached in Appendix 7-A. During the AAR meeting, the latest version of this NCR (from the AAR report) was discussed and was renamed to signify it as the final working version. The document file name is “NCR_2009_002_062210.pdf”.

During the AAR meeting, it was pointed out that documents and maps referenced in Block 5 (Describe Condition) were not attached, and the Root Cause Analysis (Block 6 in NCR) was illegible. The documents and maps referenced in Block 5 are: original Geo map (10F-E10_4.4mV-Team3.pdf), the dig sheet (10F-E10_QC_digsheet.pdf), the dig map (10F-E10_QC_digmap.pdf), and QA’s Geophysical remapping results (QAR_10F_E10_2.pdf). These documents are provided in Appendix 7-B herein. The text from Block 6 was extracted from an earlier version of the NCR and is provided in Appendix 7-C, herein (NCR_2009_002_final.signed 1.pdf).

7.3 Summary of NCR

This NCR was issued because there appeared to be a possible significant discrepancy in the original DGM and target selection for this grid. The discrepancy was brought to light when QA digital geophysical remapping produced a 12.5 mV anomaly which, upon investigation, turned out to be an uninvestigated (buried) M43A1 MT projectile fuze. A review of the original DGM data show that this particular target was not selected for investigation.

7.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor stated in the root cause analysis that this target had been picked at the original 2.9 mV threshold (with a millivolt reading of 4.1) but when the target picking threshold was raised to 4.4 mV, the target was dropped. In an attempt to explain how QA got a 12.5 mV reading and the original data only got a reading of 4.1 mV, the contractor postulated that part of the reason was that they were using the sum of Channels 2, 3 and 4 to derive the reading and QA was using a straight Channel 1 reading. The contractor also postulated the discrepancy may have been related to data collection techniques (e.g., coil height, line orientation, data collection speed, weather conditions and orientation of the target).

The contractor did not recommend corrective action for this NCR, as they determined this to be an isolated incident.

7.5 Summary of QA Actions

QA did not perform any specific additional actions with regards to this NCR; however, during routine grid certification (Appendix 7-D, File: MM10F_UOP26_E10_final.pdf), QA verified four QC checks, performed five random Vallon hole checks, one no-find check, and checked 12 QA digital geophysical remapping targets. No other failures were observed, and the grid (and NCR) was approved by QA and Navy NTR.

7.6 Justification for Further Action/No Further Action

This NCR does not require further action. This appears to be an isolated incident. Proof of the successful resolution of this NCR is documented in the NCR (Block 9) and in the QA Certification Report (Block 28) with QA and Navy NTR approval.

Section 8.0: NCR 2009_03

8.1 Date of NCR/Date Resolved

This NCR was issued by QA on July 15, 2009 and the corrective action was accepted (and NCR closed) by QA and Navy NTR on August 3, 2009.

8.2 Document (NCR) Version Control

This NCR is attached in Appendix 8-A. During the AAR meeting, the latest version of this NCR (from the AAR report) was discussed and was renamed to signify it as the final working version. The document file name is “NCR_2009_003_062210.pdf”.

8.3 Summary of NCR

This NCR was issued to remedy observed deficiencies in the application of metal detection equipment used to clear target anomalies. QA observed and documented that the procedures provided in the QAPP, SOP-04 and SOP-05 were not being followed in MM-10F_T18. In this specific instance, only an EM61 was being used during intrusive investigation with the observed objective being to remove enough metal from the hole to reduce the millivolt reading with the EM61 to below the GPO threshold. This is a discrepancy because the referenced documents specify that the EM61 was to be deployed as a verification instrument to be used <u>after</u> the hole was investigated and the investigation was to be conducted with a Vallon detector.

The NCR also documented the observation that a White’s detector was being used to re-align target anomaly pin flags and questioned the efficacy of this since the use of a White’s rather than a Vallon could cause the team to position the flag over a smaller, shallower target which was not the source for the anomaly in the data causing them to completely miss the target anomaly source.

8.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor stated in the root cause that they partially concur with the NCR. (This is also the first NCR where the contractor makes a statement about concurring/non-concurring with an NCR.) The contractor cites the Explosives Safety Submission as authority to use “<u>either</u> the Vallon or the EM61 to clear anomalies/excavations”. Further, the contractor acknowledged that the White’s should be used to <u>supplement</u> the Vallon and note that the point about relocating the pin flag to a shallower target ‘is taken’. Finally, the contractor makes a statement that “all anomalies must be cleared with a Vallon or EM61 to below the project threshold.”

For corrective action, the contractor performed crew re-training on the Technical Management Plan (TMP) and MEC QAPP on July 16, 2009, and re-emphasized on July 22, 2009 in the on-site collaboration with QA. Senior Unexploded Ordnance Supervisor (SUXOS) logs for July 16 and 22, 2009 are attached in Appendix 8-B (SUXOS 2009 Log_p10.pdf and SUXOS 2009 Log_p12.pdf). These logs documented the training was conducted and re-emphasized.

8.5 Summary of QA Actions

QA personnel attended all contractor daily briefings (where the corrective action re-training was discussed) and performed field surveillances on the intrusive teams subsequent to the re-training referenced above. No failures were noted on the surveillance forms. For the purpose of future fieldwork, the Navy position that the QAPP and SOPs are the primary procedural documents and the ESS is required to conform to the QAPP and SOPs and ensure explosive safety is addressed will be enforced with the contractor.

8.6 Justification for Further Action/No Further Action

This NCR does not require further action. The corrective actions implemented were accepted and the NCR was closed on August 3, 2009 as shown in the NCR (Block 9) showing QA and Navy NTR approval.

Section 9.0: NCR 2009_04

9.1 Date of NCR/Date Resolved

This NCR was issued by QA on July 15, 2009 and was approved (and NCR closed) by QA and Navy NTR on November, 25, 2009.

9.2 Document (NCR) Version Control

This NCR is attached in Appendix 9_A. This NCR was discussed during the AAR meeting. The final NCR document file name is "NCR_OUB1_ADAK_2009_004_062210.pdf".

9.3 Summary of NCR

This NCR was issued to correct discrepancies between the recorded anomaly type (hot geology) versus the QA hole check results (no find, rust layer, small frag or .50 Cal bullets). Multiple targets listed in grids MM-10F_P10/Q10 were shown on the dig sheet as "Hot Geology". However, during the QA hole inspections, QA observed that many of those targets had not been dug at all. Not digging the target should have meant that the production team should have recorded the target as a No Find rather than Hot Geology. Further, QA did dig the target locations and found an anomaly source (rust layer, small frag, etc.) which meant that there had to have been some kind of detector indication of metal and so the targets should have been dug and the contents recorded correctly on the dig sheet.

This discovery in MM-10F prompted QA to do additional research into the QC Grid Certifications for the rest of the project field work where it was discovered that in 2009, zero targets were listed as No Find, whereas in 2008, multiple targets were listed as No Finds. Based on the QA findings in the targets when QA did intrusive investigation and the actions observed which prompted the previous NCR, QA Certifications for all the grids with similar dig results were withheld until QC did proper inspections on all the Hot Geology-listed anomalies.

9.4 Summary of Contractor Root Cause and Corrective Action

The contractor stated that they concurred with NCR and identified the root cause since there was no acceptable way to label those anomalies which, once reacquired, had a definitive response, but which were below the project threshold of 4.4 mV. The contractor stated that in 2008, most of those occurrences were labeled as No Finds, which was also not entirely accurate since an anomaly was identified. In 2009, the contractor decided to label them all as Hot Geology, which they acknowledged was also inaccurate since the response may have been due to rust, small fragmentation and so forth, not attributable to geology.

This root cause analysis is missing several salient points. One, how would the production team know the anomaly was below the 4.4mV threshold before excavating the spot if the contractor were following the approved QAPP/SOPs? If the amplitude was below 4.4 mV, the spot would not have been selected as a target to begin with. If the production team followed the SOP and searched for the anomaly with a Vallon, then the small frag and other material would have caused a ring-off which should have prompted intrusive investigation as to the source. The small frag, etc. would have been identified and should have been logged on the dig sheet. The real root cause was apparently the dig teams were checking the spots with the EM61 prior to doing any excavations and if the on-the-fly sum of Channels 2, 3 and 4 amounted to less than 4.4 mV, the teams logged the hole as Hot Geology (or No Find) and moved on.

The contractor's corrective action was to instruct all teams to intrusively investigate all target locations exhibiting an instrument response, and to revisit all targets previously classified as "Hot Geology" and intrusively investigate them to determine the exact source of the anomaly.

The contractor re-checked 60 grids in MM-10F (S01, S03, T01, T02, V02, V03, V06, V08, W02, W03, W04, W05, W06, X03, X04, X05, Y03, Y04, C09, D08, E08, E09, F09, G09, P10, P11, Q10, Q11, R10, B15, B18, E26, E27, F16, F17, F19, G09, G20, H19, H20, J08, M19, M20, M21, N15, N16, N21, P09, P18, P21, Q20, R18 P08, Q03, Q08, R02, R03, R14, V10 and X05). QC reports documenting these re-checks (during July 24-28, 2008) are attached in Appendix 9_B (DQCR_072409_135.pdf, DQCR_072509_136.pdf, DQCR_072709_137.pdf, and DQCR_072809_138.pdf). The QC report of July 24, 2009 indicates completion of the re-checks.

Following the re-checks, the contractor updated the dig sheets for these grids and resubmitted grid packages to QA. An example updated dig sheet for 10F-P10 is provided in Appendix 9-C (10F-P10_QC_digsheet.pdf). This example shows that all "no-finds" and "Hot Geology" targets were re-inspected by QC.

9.5 Summary of QA Actions

QA performed field surveillances of the re-checks over a four week period from July 12 to August 8, 2009. QA weekly reports documenting this activity are attached in Appendix 9-D (QA_WeeklyReport_071809_05.pdf, QA_WeeklyReport_072509_06.pdf, QA_WeeklyReport_080109_07.pdf, and QA_WeeklyReport_080809_08.pdf). The weekly report of August 8, 2009 indicates the completion of the QA surveillances of the re-checks. No failures were noted in these surveillances.

After QA received the updated grid packages from QC on the subject grids, the normal QA verification process was followed for each grid. This included verification of QC checks, random QA Vallon hole checks, QA "no-find" checks and investigation of QA digital geophysical remapping targets. An example QA Certification Report for 10F-P10 (MM10F_UOP29_P10_final.pdf) is provided in Appendix 9-E. This report shows that QA checked three "no-finds", seven random Vallon hole checks, and 10 QA digital geophysical remapping targets with no failures discovered. The remaining grids impacted by NCR2009_04 were also found to have no failures related to the deficiencies noted in this NCR.

9.6 Justification for Further Action/No Further Action

This NCR does not require further action. Proof of the successful resolution of this NCR is documented in the approved NCR and information provided in the sections above and Appendices. QA's re-investigation of these target locations, identifying that the initial digs had not been done properly and then documenting the contractor's own dig results probably prevented a potentially serious process deficiency from continuing.

Section 10.0: NCR 2009_05

10.1 Date of NCR/Date Resolved

This NCR was issued by QA on August 4, 2009. This NCR was not approved by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

10.2 Document (NCR) Version Control

During the AAR meeting, the latest version of this NCR (from the 2008-2009 AAR report) was discussed and was renamed to signify it as the final working version. The NCR document file name is "NCR_2009_005_062210.pdf". This NCR is attached in Appendix 10-A. This version of the NCR does not show the signature for the NTR in Block 5 or final QA/NTR signatures in Block 9. An earlier version of this NCR (NCR_2009_005.pdf, Appendix 10-B) shows that the NTR had originally signed Block 5 in handwriting and that was lost in the digital signature version.

10.3 Summary of NCR

This NCR was issued because the grid failed according to the failure criteria: 1) an anomaly greater than the GPO threshold (16.9 mV during digital geophysical remapping) and a piece of metal equivalent or larger than the size of a 37 mm projectile. The 16.9 mV anomaly came from the QA DGM data. The location of the anomaly coincided with the original target number 10F-F14-011 (original amplitude of 22 mV).

10.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor reported the root cause to be failure to follow Sections 5.3 and 5.4 of MEC QAPP SOP 5, which requires the use of the Vallon to define the boundary of the anomaly, and to identify the source of the anomaly. The contractor implemented a modified anomaly clearance approach on August 20, 2009 as follows: "The anomaly location is initially investigated with the White's XLT all metal detector. Once all surface and/or near surface anomalies have been identified and removed the Vallon will be used to ensure that all anomalies within the radius of anomaly location will be located and removed. Once the anomaly area has been sufficiently cleared with a Vallon, the EM61 will be used to verify that the anomaly location is below the GPO established threshold." This appears to suggest a 'clearance in depth' approach, using the White's for shallow metal, the Vallon to see if anything is deeper and finally the EM61 to verify removal below the GPO threshold. This approach, if implemented and followed to the letter, would be in compliance with the spirit of MEC QAPP SOP 5 if not exactly in compliance with the procedure. The contractor corrective action was to reinforce the procedures provided in SOP 5, and thus an FCR was not warranted.

Contractor Team 4 re-checked anomalies in MM-10F-F14 on August 8, 2009 as shown on the MEC Daily Activities Checklist (MEC Daily Activities Checklist-Team 4 36.pdf) attached in Appendix 10-C. Quality Control Assistant (QCA) inspected and approved these re-checks on August 14, 2009 (2009 QCA Logbook 2 21.pdf) attached in Appendix 10-D. Retraining of the teams on August 21, 2009 is documented in the Training Attendance Roster (2009-08-20_Revised_field_procedures.pdf) given in Appendix 10-E. On September 1, 2009, QC returned to this grid to perform additional QC checks in support of the tightened QC inspection state, as shown on the Grid QC Inspection/Certification Form (F-F14 Grid Certification.pdf) in Appendix 10-F.

10.5 Summary of QA Actions

QA did not monitor the contractor re-work of 10F-F14, as this re-work occurred prior to contractor submittal of root cause and corrective actions. However, during QA field checks as part of the QA Certification Report (file: MM10F_UOP20_F14_withhold.pdf, Appendix 10-G), QA investigated 12 random Vallon hole checks, two mV comparison checks and 10 QA digital geophysical remapping targets. As mentioned above, the basis for the NCR was metal found from one of the QA digital geophysical remapping targets. The remaining QA investigations did not reveal any failures.

10.6 Justification for Further Action/No Further Action

The Navy does not recommend further action to resolve this NCR. The NCR was written for a specific failure in MM-10F-F14, and the contractor re-worked this entire grid. Contractor QC also re-evaluated this grid after re-work. In addition, the contractor retrained their personnel, and instituted a "tightened" MILSTD 1916 QC sampling. This non-conformance was discovered by QA investigations during certification (via QA digital geophysical remapping); however, there were an additional 23 QA investigations in this grid that did not show any failures.

Note that this NCR was issued on August 4, 2009 and the corrective action, i.e., the 'modified' approach, was implemented on August 20, 2009 with team training on August 21, 2009, a considerable delay. The corrective action for NCR 2009-03 (failure to follow procedures, NCR issued July 15, 2009) was not implemented until August 21, 2009, also a considerable delay. This grid failure may very easily have occurred because of an NCR 2009-03 process failure since the grid was dug on July 13, 2009, two days before NCR 2009-03 was issued. The significance of this is that it demonstrates that the QA process (DGM, investigation of the anomalies, and hole clearance verification) uncovers the consequences of process errors committed by the production contractor and requires the re-work to correct for those errors. Therefore, although the NCRs document that the production contractor deviated from the approved plans, they also document that when the work product was found to be deficient, corrective actions which do comply with the approved plans were instituted and verified and the post-corrective-action results were checked again by QA and found to meet the project standards.

The signed NCR Closeout Form is provided in Appendix 10-H (file name: NCR_OUB1_ADAK_2009_05_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the Form in Appendix 29-A. A completed 2010 QA Certification Report for this grid (MM10F_UOP20_F14_Final_UOP_Complete.pdf) is provided in Appendix 10-I. This report provides QA approval of the grid underlying this NCR.

Section 11.0: NCR 2009_06

11.1 Date of NCR/Date Resolved

This NCR was issued by QA on August 14, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

11.2 Document (NCR) Version Control

This NCR was discussed during the AAR meeting. The latest version of this NCR (from the 2009 AAR report) was discussed and was renamed to signify it as the final working version. The NCR document file name is "NCR_2009_06_062210.pdf". This NCR is attached in Appendix 11-A.

11.3 Summary of NCR

This NCR was issued because the grid failed according to the failure criteria: (1) an anomaly greater than the GPO threshold (27.99 mV during digital geophysical remapping) and a piece of metal larger than the size of a 37 mm projectile (81 mm tail boom). The location of the anomaly coincided with the original Target 10F-S08-010 (original amplitude of 17.14 mV). Note: The production team did the work on July 2, 2009. QC inspected the grid on August 4, 2009. QA conducted the inspection on August 12, 2009 (DGM) and August 14, 2009 (intrusive and hole checks) at which time the NCR was issued.

11.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor's QC investigation stated that this anomaly was mistakenly identified as a "hot rock" since QA reported it found next to a large rock. (Note: The dig sheet for this grid lists this target as 5x Projectile Frag, weighing 0.1 lb, 12 inches deep and offset 1.34 feet from the pin flag. It also lists this target as having undergone QC check on August 4, 2009. There is no mention of hot rock except in the NCR response). The contractor identified the root cause as similar to NCR2009_05, in that the Vallon was not utilized in all cases to investigate anomalies, indicating that the team used a White's to remove surface and near surface anomalies and then brought in the EM61. In addition, the UXO Team failed to utilize the mineral discrimination feature of the Vallon.

The contractor agreed to re-check all originally selected targets in MM-10F-S08, along with a QC surveillance and QC spot-check. The contractor proposed re-training all personnel (with documentation of this training) on the modified clearance approach similar to NCR2009_05. Additionally, the contractor raised the MILSTD 1916 sampling frequency from normal to tightened for QC anomaly clearance for ongoing UOP certification.

Contractor Team 4 re-checked anomalies in MM-10F-S08 on August 22, 2009 as shown on the contractor MEC Daily Activities Checklist (MEC Daily Activities Checklist-Team 4 48.pdf) attached in Appendix 11-B. Retraining of the teams on August 21, 2009 is documented in the Training Attendance Roster (2009-08-20_Revised_field_procedures.pdf) given in Appendix 10-E (previous section of this report). On September 14, 2009, QC returned to this grid to perform additional QC checks in support of the tightened QC inspection state, as shown on the Grid QC Inspection/Certification Form (F-S08 Grid Certification.pdf) in Appendix 11-C.

11.5 Summary of QA Actions

In 2009, QA did not perform specific activities to monitor the re-work of 10F-S08, as this re-work occurred prior to the submittal of root cause and corrective actions (re-work was on 8/22/2009, the NCR response was submitted on 8/25/2009). During 2009 QA field checks as part of the QA Certification Report (file: MM-10F_UOP20_SO8_withhold.pdf, Appendix 11-D) QA investigated two random Vallon hole checks and four QA digital geophysical remapping targets. As mentioned above, the basis for the NCR was metal found from one of the QA digital geophysical remapping targets. The remaining 2009 QA investigations were halted when the grid failure was found.

In the 2010 field season, QA inspected an additional six Vallon hole checks and eight digital geophysical remapping targets with no failure items discovered. Based on these findings, a final QA Certification Report was completed for this grid (file: MM-10F_UOP33_S08_Final_UOP_Complete.pdf, Appendix 11-E).

11.6 Justification for Further Action/No Further Action

The Navy does not believe that this NCR requires any further action. The NCR was written for a specific failure in MM-10F-S08, and the contractor re-worked this entire grid with no additional reported issues. The contractor QC also performed additional checks in this grid as part of the tightened QC inspection state. This non-conformance was discovered by QA investigations during certification (via QA digital geophysical remapping); however, there were an additional 19 QA investigations (five in 2009 and 14 in 2010) in this grid that did not show any failures. Also, both the blind QA seed and QC seed in this grid were detected in the DGM data and recovered by the UXO Team (reference Appendix 11-C).

The signed NCR Closeout Form is provided in Appendix 11-F (file name: NCR_OUB1_ADAK_2009_06_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 12.0: NCR 2009_07

12.1 Date of NCR/Date Resolved

This NCR was issued by QA on August 20, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

12.2 Document (NCR) Version Control

During the AAR meeting, the latest version of this NCR (from the AAR report) was discussed and was renamed to signify it as the final working version. The document file name is "NCR_2009_007_062210.pdf". This NCR is attached in Appendix 12-A. In this document, signatures for QA and the Navy NTR are missing in Block 5. These signatures were provided in the original NCR that QA delivered to the contractor (file: NCR_2009_007.pdf, Appendix 12-B), and were apparently dropped when the contractor replied to the NCR.

12.3 Summary of NCR

This NCR was issued for two incidents of the same non-conformance:

1. A target was found during QA digital geophysical remapping with a response of 37.93 mV. QA determined the source as uninvestigated metal (six pieces of frag) which was found in a spoils pile on the surface in MM-10F-T16, near original DGM Target 10F-T16-021. The original DGM target amplitude was 15.17 mV.
2. A second target was found during QA digital geophysical remapping with a response of 15.93 mV. QA identified the source for this anomaly as uninvestigated metal (15 pieces of frag) which was found in the excavation at original DGM Target 10F-T16-017. The original DGM target amplitude was 16.53 mV.

Although in both cases, the metal comprising the source for these anomalies in the QA DGM data comprise smaller pieces which, individually, are not larger than a 37 mm projectile (failure criteria), because they were uninvestigated, there is no way for production personnel to know that they did not meet the clearance standard and therefore, when combined with the amplitude above the GPO threshold, comprise the criteria for a grid failure.

12.4 Summary of Contractor Root Cause Analysis and Corrective Action

For the first criteria, the contractor determined the root cause was that the UXO Teams had not properly investigated spoils piles (clumps) properly.

For the second incident, the contractor stated QC re-checked the metal that QA removed, did not get a millivolt reading higher than the GPO threshold and concluded that no non-conformance occurred.

For corrective action related to the first non-conformance, the contractor agreed to re-check 100% of all grids investigated during the 2009 field season to ensure that "all spoil clumps large enough to contain a 37 mm projectile were inspected and broken up to ensure that no ferrous metal the same size or larger than a 37 mm projectile was present."

The contractor recommended no corrective action for the second part of the non-conformance cited.

It should be noted that the production work in grid T16 was performed on July 18 and July 20, 2009 and that QC was conducted on July 23, 2009. The QC inspection form was filled out on August 3, 2009. The QA check of the grid records was conducted on August 11, 2009. The QA random hole checks were conducted on August 20, 2009. QA DGM was performed on August 7, 2009 and the intrusive investigation of those targets was conducted on August 20, 2009. The grid was failed and the NCR was issued on August 20, 2009. The NCR was responded to on October 16, 2009.

NCR 2009-03, for not following procedures with the metal detectors, was issued on July 15, 2009 and corrective action was not implemented until July 31, 2009. These failures could easily be related to NCR 2009-03 non-conformances.

Contractor Production Reports indicate that spoil clump investigations took place on August 15, September 16, 17 and 18, 2009 in MM-10F grids. However, during the AAR meeting, all parties agreed that not all clods had been adequately addressed during the 2009 field season. According to the contractor, all clumps were inspected with an instrument, but the contractor did not break up all of the clumps larger than the size of 37 mm, which was a requirement of the corrective action. The contractor agreed to break up all spoil clumps larger than the size of 37 mm during the 2010 field work. An approved FCR (#20) was written to MEC QAPP SOP 5 (Intrusive Operations) to guide the spoil clump investigations. The final FCR #20, cover page for SOP 5, and three-phase QC checklist for this activity are provided in Appendices 12-C, D and E (files: Final FCR20 081210.pdf, Final SOP-05 Revisions 081210.pdf, and Final 3-phase QC checklist SOP5 and EPP Revisions 081210.pdf, respectively). The complete SOP 5 is provided in digital format in Appendix 29-A in folder 2009_07. On August 30, 2010, the contractor performed spoils inspections and excavation backfilling in Grid T16. The contractor daily production report (file: Daily_CPR_083010-219.pdf, Appendix 12-F) shows that contractor field crews performed the work and that no failure items were found in this grid. The contractor performed QC surveillance/inspection of this work using the three-phase QC checklist on the same day and indicated that all work was performed in accordance with SOP 05, the EPP/WMP, FCRs 19 and 20, and that no failures were indicated (file: 3-phase QC checklist SOP5 083010.pdf, Appendix 12-G).

For the second issue, the contractor did not perform any corrective action. However, the grid QC Inspection/Certification Form (file: F-T16 Grid Certification.pdf, Appendix 12-H) indicates that QC inspected five random targets and 25 mV comparison targets in this grid in 2009 without any critical discrepancies noted.

12.5 Summary of QA Actions

QA did not perform specific activities to monitor the contractor spoil clump investigations during 2009, as these investigations occurred prior to QA's receipt of the root cause and corrective actions. However, during QA field checks as part of the QA Certification Report (file: MM10F_UOP18_T16_withhold.pdf, Appendix 12-I), QA investigated 10 random Vallon hole checks and 20 QA digital geophysical remapping targets. As mentioned above, the basis for the NCR was metal found from two of the QA digital geophysical remapping targets. The remaining QA investigations did not reveal any failures.

In 2010, QA performed an inspection of the contractor spoils inspection and excavation backfilling operations on August 31, 2010 (file: Battelle Adak QA Report 083110_019.pdf, Appendix 12-J). These QA inspections do not indicate any failures.

12.6 Justification for Further Action/No Further Action

This NCR was written for two deficiencies in MM-10F-T16: (1) metal found in an uninvestigated spoil clump and (2) uninvestigated metal found in an excavation.

The metal found in an uninvestigated clump was a system-wide deficiency, as defined in the MEC QAPP Worksheet #36. Spoils investigations and backfilling operations on a system-wide scale were addressed in NCR 2009_022 discussions (Section 27 of this report). In this specific grid (MM-10F-T16), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. The work completed (and approved) in 2010 is adequate to document no further action on this portion of the NCR.

The Navy recommends that no additional actions need to be taken in regard to the second criteria. This appears to be a case where material was removed from the excavation, the EM61 was brought in and the millivolt reading was mis-read by the Team Leader (process non-conformance addressed in NCR 2009-03 and this grid was intrusively investigated prior to instituting the corrective action for this NCR). Additional rationales for recommending no further action on this NCR are:

- Although multiple pieces of frag were discovered by QA, none of the individual pieces were identified as a size equivalent, or greater than 37 mm. During the AAR meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4 mV), <u>and</u> produced a piece of metal larger than 37 mm. (Note: this was always in the QASP as failure criteria, not just established at the AAR meeting.)
- This second deficiency was discovered by QA investigations during certification (via QA digital geophysical remapping); in addition to the items which failed, there were an additional 29 QA investigations (10 random Vallon hole checks, and 19 QA digital geophysical remapping targets) in this grid that did not show any failures.
- QC checked a total of 30 targets in this grid (five random targets and 25 mV comparison targets) without any discrepancies noted.
- Both the blind QA seed and QC seed in this grid were detected in the DGM data and recovered by the UXO Team.

The signed NCR Closeout Form is provided in Appendix 12-K (file name: NCR_OUB1_ADAK_2009_07_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A. A completed 2010 QA Certification Report for this grid (MM10F_UOP18_T16_Final.pdf) is provided in Appendix 12-L. This report provides QA approval of the grid underlying this NCR.

Section 13.0: NCR 2009_08

13.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 1, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

13.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted (on September 4, 2009) is document file name "NCR_2009_008.pdf". This NCR is attached in Appendix 13-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_008_final.pdf" as shown in Appendix 13-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

13.3 Summary of NCR

This NCR was issued for a grid failure resulting from a QA DGM target with a millivolt response (20.16 mV) exceeding the GPO threshold criteria (4.4 mV) and the source of the anomaly was determined to be eight pieces of frag (including one larger than 37 mm) in an uninvestigated spoil clump in MM-10F-B14, near original DGM Target 10F-B14-030.

Grid 10F-B14 was dug on July 27 and July 28, 2009, which is prior to the contractor initiating the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 7, 2009. QA conducted the records check on August 28, 2009, did the DGM on August 28, 2009 and the intrusive investigation on September 1, 2009. The NCR was issued on September 4, 2009.

13.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor's Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) mirror those of the previous NCR (NCR2009_07) as follows:

- The contractor determined that the UXO Teams had not investigated spoils clumps properly. The contractor agreed to re-check 100% of all grids investigated during the 2009 field season to ensure that all spoil clumps large enough to contain a 37 mm projectile were inspected and broken up to ensure that no ferrous metal the same size or larger than a 37 mm projectile was present. The contractor stated that they had production teams accompanied by a QC representative inspect all grids worked during the 2009 field season, and that the work was completed between August 15, 2009 and September 27, 2009.

The contractor stated the corrective actions initiated and completed in response to NCR2009_07 were appropriate corrective action for this NCR (NCR2009_08) as well. During the AAR meeting, the Project Team agreed that the corrective action, as implemented, was not adequate and that re-work was required. FCR#20 to MEC QAPP SOP 5 (Intrusive Investigation) was written providing specific directions, and the re-work was completed in 2010 to address the NCR. The final FCR#20, cover page for SOP 5, and three-phase QC checklist for this activity are discussed and provided previously in this report (Section 12:Appendices 12-C, D and E, respectively).

On September 4, 2010, the contractor performed spoils inspections and excavation backfilling in Grid B14. The contractor daily production report (file: Daily_CPR_090410-224.pdf, Appendix 13-C) shows that contractor field crews performed the work and that no failure items were found in this grid. The contractor performed QC surveillance/inspection of this work using the three-phase QC checklist on the same day and indicated that all work was performed in accordance with SOP 05, the EPP/WMP, FCRs 19 and 20, and that no failures were indicated (file: FI-090410-1.pdf, Appendix 13-D).

13.5 Summary of QA Actions

QA did not perform specific activities to monitor the spoils (clod) investigations during 2009, as these investigations occurred prior to QA's receipt of the root cause and corrective actions. During QA field checks for QA Certification Report for this grid (file: MM10F_UOP19_B14_withhold.pdf, Appendix 13-E), QA investigated only one of the QA digital geophysical remapping targets and none of the random hole checks. The grid failure was found from the QA digital geophysical remapping target, and the remaining 2009 QA investigations were halted when the grid failure was found.

In the 2010 field season, QA inspected an additional six Vallon hole checks and eight digital geophysical remapping targets with no failure items discovered. Based on these findings, a final QA Certification Report was completed for this grid (file: MM10F_UOP19_B14_Final_UOP_Complete.pdf, Appendix 13-F). QA also performed an inspection of the contractor spoils inspection and excavation backfilling operations on September 6, 2010 (file: Battelle Adak QA Report 090610_024.pdf, Appendix 13-G) in grid B14. These QA inspections do not indicate any failures in this grid.

13.6 Justification for Further Action/No Further Action

The metal found in an uninvestigated clump is a systemic issue, as defined in the MEC QAPP Worksheet #36. Spoils investigations and backfilling operations on a system-wide scale are addressed in NCR 2009_022 discussions (Section 27 of this report). In this specific grid (MM-10F-B14), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. In addition, QA completed the remaining target inspections (six Vallon hole checks and eight digital geophysical remapping target inspections) without any failures noted. The work completed (and approved) in 2010 is adequate to recommend no further action on this NCR.

A Final NCR Closeout Form is provided in Appendix 13-H (file name: NCR_OUB1_ADAK_2009_08_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 14.0: NCR 2009_09

14.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 1, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

14.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on September 4, 2009) is document file name "NCR_2009_009.pdf". This NCR is attached in Appendix 14-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_009_final.pdf" as shown in Appendix 14-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

14.3 Summary of NCR

This NCR was issued under the failure criteria of an anomaly amplitude (12.55 mV) which was above the GPO threshold (4.4 mV) and a piece of metal larger than a 37 mm projectile (8.5 inches long and 2.75 inches wide). The item was found in an uninvestigated soil clump in MM-10F-D12, near original DGM Targets 10F-D12-016 and 703.

Grid 10F-D12 was dug on August 10, 2009, which is prior to the contractor initiating the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 17, 2009. QA conducted the records check on August 31, 2009, did the DGM on August 28, 2009 and the intrusive investigation on September 1, 2009. The NCR was issued on September 4, 2009.

14.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor's Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) mirror those of NCR2009_07 and are as follows:

- The contractor determined that the UXO Teams had not properly investigated spoil clumps properly. The contractor agreed to re-check 100% of all grids investigated during the 2009 field season to ensure that all spoil clumps large enough to contain a 37 mm projectile were inspected and broken up to ensure that no ferrous metal the same size or larger than a 37 mm projectile was present. The contractor stated that they had production teams accompanied by a QC representative inspect all grids worked during the 2009 field season, and that the work was completed between August 15, 2009 and September 27, 2009.

The contractor stated the corrective actions initiated and completed in response to NCR2009_07 were appropriate corrective action for this NCR (NCR2009_09) as well. During the AAR meeting, the Project Team agreed that the corrective action, as implemented, was not adequate and that re-work was required. FCR#20 to MEC QAPP SOP 5 (Intrusive Investigation) was written providing specific directions and the re-work was completed in 2010 to address the NCR. The final FCR#20, cover page for SOP 5, and three-phase QC checklist for this activity are discussed and provided previously in this report (Section 12:Appendices 12-C, D and E, respectively).

On September 4, 2010, the contractor performed spoils inspections and excavation backfilling in Grid D12. The contractor daily production report (file: Daily_CPR_090410-224.pdf, Appendix 14-C) shows that contractor field crews performed the work and that no failure items were found in this grid. The contractor performed QC surveillance/inspection of this work using the three-phase QC checklist on the same day and indicated that all work was performed in accordance with SOP 05, the EPP/WMP, FCRs 19 and 20, and that no failures were indicated (file: FI-090410-1.pdf, Appendix 14-D).

14.5 Summary of QA Actions

QA did not perform specific activities to monitor the spoils (clod) investigations during 2009, as these investigations occurred prior to QA's receipt of the root cause and corrective actions. During QA field checks for QA Certification Report for this grid (file: MM10F_UOP23_D12_withhold.signed.pdf, Appendix 14-E), QA investigated only one of the QA digital geophysical remapping targets and none of the random hole checks. The grid failure was found from the QA digital geophysical remapping target, and the remaining 2009 QA investigations were halted when the grid failure was found.

In the 2010 field season, QA inspected an additional five Vallon hole checks and nine digital geophysical remapping targets with no failure items discovered. Based on these findings, a final QA Certification Report was completed for this grid (file: MM-10F_UOP23_D12_Final_UOP_Complete.pdf, Appendix 14-F). QA also performed an inspection of the contractor spoils inspection and excavation backfilling operations on September 6, 2010 (file: Battelle Adak QA Report 090610_024.pdf, Appendix 14-G) in Grid D12. These QA inspections do not indicate any failures in this grid.

14.6 Justification for Further Action/No Further Action

The metal found in an uninvestigated clump is a systemic issue, as defined in the MEC QAPP Worksheet #36. Spoils investigations and backfilling operations on a system-wide scale are addressed in NCR 2009_022 discussions (Section 27 of this report). In this specific grid (MM-10F-D12), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. In addition, QA completed the remaining target inspections (five Vallon hole checks and nine digital geophysical remapping target inspections) without any failures noted. The work completed (and approved) in 2010 is adequate to recommend no further action on this NCR.

A Final NCR Closeout Form is provided in Appendix 14-H (file name: NCR_OUB1_ADAK_2009_09_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 15.0: NCR 2009_010

15.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 1, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed based upon QA field work completed during the 2010 field season as documented below.

15.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The latest version of this NCR is named “NCR_2009_010.pdf”. This NCR is attached in Appendix 15-A. In this document, signatures for all parties were obtained for Blocks 5-8. However, only the contractor QC Specialist had signed Block 9 (Closeout Action).

15.3 Summary of NCR

This NCR was issued for unexcavated anomalies found during QA Vallon hole checks at Target 10F-D09-013. At this location, QA found 13 pieces of frag varying in size up to 2 inches long and 2 inches wide. The Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5, which required the contractor to ‘clear’ the excavation with a Vallon detector (same as NCR 2009-03, which when this grid was investigated, had not had corrective action applied.)

Grid 10F-D09 was dug on July 25, 2009, which is prior to initiating the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 12, 2009. QA conducted the records check on September 1, 2009, conducted the DGM on August 28, 2009 and the intrusive investigation on September 11, 2009. The NCR was issued on September 1, 2009.

15.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause analysis stated that all items (individually) were smaller than a 37 mm and, therefore, no failure occurred and the contractor did not recommend any specific corrective action.

The contractor did not perform any specific corrective action on this NCR. However, the contractor implemented additional checks with SOP 11 to holistically address project quality concerns. One of the random SOP 11 checks was located in this grid. QC checks in this grid, documented in the Grid QC Inspection/Certification Form (file: F-D09 Grid Certification.pdf, Appendix 15-B), indicates that the contractor QC inspected eight random targets and two mV comparison targets in this grid without any discrepancies noted.

15.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR in 2009 since the contractor did not conduct any corrective actions. During QA field checks as part of the QA Certification Report (file: MM10F_UOP26_D09_withhold.pdf, Appendix 15-C), QA investigated one random Vallon hole check and nine of 10 QA digital geophysical remapping targets. As mentioned above, the basis for the NCR was metal found from the random Vallon hole check. However, the remaining QA investigations in 2009 from QA digital geophysical remapping did not reveal any failures. Note that only three of the QA digital geophysical remapping targets were coincident with the original target locations. The remaining seven QA digital geophysical remapping targets were likely caused by minor metal in spoils piles away from the original target location (possible NCR 2009-03 related).

In the 2010 field season, QA inspected an additional three Vallon hole checks and 10 digital geophysical remapping targets with no failure items discovered. Based on these findings, a final QA Certification Report was completed for this grid (file: MM10F_UOP26_D09_Final_UOP_Complete.pdf, Appendix 15-D).

15.6 Justification for Further Action/No Further Action

Based upon the successful completion of the 2010 QA field work (three random hole checks and 10 digital geophysical remapping targets) the Navy recommends that no further action is necessary on this NCR. Additional rationale includes:

- Although multiple pieces of frag were discovered by QA, none of the individual pieces were identified as a size equivalent, or greater than 37 mm. During the AAR meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4 mV), <u>and</u> produced a piece of metal larger than 37 mm.
- This failure was discovered by QA investigations during certification (via QA Vallon hole checks); however, there were an additional nine QA investigations (QA digital geophysical remapping targets) in this grid that did not show any failures.
- QC checked a total of 10 targets in this grid (eight random targets and two mV comparison targets) without any discrepancies noted. One target in this grid was investigated as part of the SOP 11 work, and the contractor did not note any discrepancies with this target.
- The QC seed in this grid was detected in the DGM data and recovered by the UXO Team. There were no QA seeds located in this grid.

Appendix 15-E shows the distribution of original targets selected in MM-10F-D09, as well as the location of 2009 QC checks (including SOP 11), 2009 QA checks, and QC/QA seeds. Also shown on this figure are the locations of the 2010 QA checks. In this grid there were a total of 23 targets picked in the original data. Six of these targets were survey pins, and one was the QC seed. Of the remaining 16 (unknown) targets, a very high percentage (12 targets or 75% of the unknown targets) was checked by either QC or QA. However, it should be noted that the NCR failure target (D09-013) was also a previous QC check. No MEC or 3X items were recovered in this grid.

A Final NCR Closeout Form is provided in Appendix 15-F (file name: NCR_OUB1_ADAK_2009_10_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 16.0: NCR 2009_011

16.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 11, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

16.2 Document (NCR) Version Control

This NCR was not discussed during the After-Action meeting. The latest version of this NCR is named “NCR_2009_011.pdf”. This NCR is attached in Appendix 16-A. In this document, signatures for all parties were obtained for Blocks 5-8. However, only the contractor QC Specialist had signed Block 9 (Closeout Action).

16.3 Summary of NCR

This NCR was issued because QA found unexcavated metal (fuze parts and an M48 PD fuze) as the source to a QA DGM target (amplitude 11.03 mV) above the GPO threshold (4.4 mV). The anomaly was located about 2 ft from Target 10F-T18-023. The M48 PD fuze exceeds the failure criteria.

Grid 10F-T18 was dug on July 14 and July 15, 2009, which is prior to initiating the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on July 23, 2009. QA conducted the records check on August 7, 2009, conducted the DGM on August 28, 2009 and the intrusive investigation on September 11, 2009. The NCR was issued on September 11, 2009.

16.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor stated that the deficiency was due to improper hole clearing techniques, and that when the QC team reinvestigated this target, a reading of 14.3 mV was obtained. The contractor recommended re-work of the entire grid and recording of all items larger than a 37 mm or mV reading above 4.4 mV. There was no additional discussion or analysis of why the improper techniques or how the threshold verification process failed to detect that this anomaly was still above the threshold.

The contractor stated that the grid was re-worked on September 28, 2009 and that no items were discovered larger than 37 mm or with amplitudes greater than 4.4 mV. QC re-work of this grid is documented in the contractor Quality Control Report (file: DQCR_092809_191.pdf, Appendix 16-B) and the daily Contractor Production Report on September 28, 2009 (file: Daily_CPR_092809-191.pdf, Appendix 16-C). These documents indicate that QC performed a complete re-work of MM-10F-T18 with approximately 2 lb of 5x recovered.

16.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR in 2009 since the contractor performed corrective actions prior to submitting the recommended corrective actions. The NCR was based on a QA digital geophysical remapping target investigation as shown on the QA Grid Certification Report for this grid (file: MM10F_UOP14_T18_withhold.pdf, Appendix 16-D). In 2009, QA investigated zero of 13 random Vallon hole checks and only one of 14 DGM targets in this grid, pending resolution of the NCR.

In the 2010 field season, QA inspected an additional 13 Vallon hole checks and 13 digital geophysical remapping targets with no failure items discovered. Based on these findings, a final QA Certification Report was completed for this grid (file: MM10F_UOP14_T18_Final_UOP_Complete.pdf, Appendix 16-E).

16.6 Justification for Further Action/No Further Action

The Navy recommends that this NCR be closed based on the successful completion of the QA inspections (13 Vallon and 13 digital geophysical remapping checks) conducted during the 2010 field season. Additional support to this conclusion includes:

- The NCR describes a deficiency specific to grid MM-10F-T18. The contractor re-work of this entire grid without finding an additional failure item is adequate to address this specific deficiency.
- QC checked at total of 10 targets in this grid (eight random targets and two mV comparison targets) in this grid without any discrepancies noted.
- The QC seed in this grid was detected in the DGM data and recovered by the UXO Team. There were no QA seeds installed in this grid.

A Final NCR Closeout Form is provided in Appendix 16-F (file name: NCR_OUB1_ADAK_2009_11_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 17.0: NCR 2009_012

17.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 12, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. The Navy recommends that this NCR be closed at the time of this report, based on information provided below.

17.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The latest version of this NCR is named "NCR_2009_012.pdf". This NCR is attached in Appendix 17-A. In this document, signatures for all parties were obtained for Blocks 5-8. However, only the contractor QC Specialist had signed Block 9 (Closeout Action).

17.3 Summary of NCR

This NCR was issued for a grid failure where the failure criteria were exceeded. The failure was caused from unexcavated metal found during intrusive investigation of a QA DGM target. A DGM anomaly with an amplitude of 39 mV, well above the GPO threshold (4.4 mV), was detected about 2 ft from Target 10F-T07-025. Upon investigation, QA found a shallow (about 3 inches deep) piece of metal measuring 6 inches by 1.5 inches, which exceeds the size of a 37 mm projectile. The amplitude of the original DGM target was 6.08 mV.

Grid 10F-T07 was dug on August 21, 2009, the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 30, 2009. QA conducted the records check on September 4, 2009, conducted the DGM on September 4, 2009 and the intrusive investigation on September 5, 2009. The NCR was issued on September 12, 2009.

17.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause stated that the metal was smaller than 37 mm (an obvious misstatement) and since the item was not provided by QA a formal root cause could not be performed. The contractor stated the item was likely found by the dig teams and not properly removed. The contractor attributes the much higher QA DGM amplitude compared to the original target amplitude to this cause. Finally, the contractor stated the original site was investigated to 2 ft deep over a 5 ft diameter area, which is inconsistent with the dig sheet that shows the original target as several pieces of metal (15) weighing approximately 1 lb at a depth of 12 inches. None of the targets in this grid match the 2-ft, 5-ft criteria. The contractor stated they did a QC validation in accordance with SOP 11; although, no SOP 11 investigations were conducted in this grid.

Although not part of QC re-work of this grid, QC documented eight random targets and five mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-T07 Grid Certification.pdf, Appendix 17-B). This document also shows that the QC seed in this grid was successfully located and retrieved.

Since the contractor stated that the failure item was likely found but not properly removed (located in spoils), the activities specified in FCR#20 (examination of clumps and spoils) that was conducted in 2010 is germane. The final FCR#20, cover page for SOP 5, and three-phase QC checklist for this activity are discussed and provided previously in this report (Section 12:Appendices 12-C, D and E, respectively).

On September 10, 2010, the contractor performed spoils inspections and excavation backfilling in Grid T07. The contractor daily production report (file: Daily_CPR_091010-229.pdf, Appendix 17-C) shows that contractor field crews performed the work and that no failure items were found in this grid. The contractor performed QC surveillance/inspection of this work using the three-phase QC checklist on the same day and indicated that all work was performed in accordance with SOP 05, the EPP/WMP, FCRs 19 and 20, and that no failures were indicated (file: FI-091010-1.pdf, Appendix 17-D).

17.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR in 2009 since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA digital geophysical remapping target investigation, the QA Certification Report for this grid (file: MM10F_UOP35_T07_withhold.pdf, Appendix 17-E) shows that QA investigated an additional five random Vallon hole checks and 12 QA digital geophysical remapping targets that did not reveal any failures. Note that only one of the QA digital geophysical remapping targets was coincident with the original target locations. The remaining 11 QA digital geophysical remapping targets were likely caused by minor metal in spoils piles away from the original target location.

In the 2010 field season, QA performed an inspection of the contractor spoils inspection and excavation backfilling operations on September 11, 2010 (file: Battelle Adak QA Report 091110_029.pdf, Appendix 17-F) in grid T07. These QA inspections do not indicate any failures in this grid.

17.6 Justification for Further Action/No Further Action

The Navy recommends closing the NCR based on the successful completion of the FCR #20 field work during the 2010 field season.

The explanation given by the contractor is certainly possible and is entirely likely since the excavation was identified in the dig sheet as a fragmentation pit. In addition,

- This failure was discovered by QA investigations during certification (via QA digital geophysical remapping investigations); however, there were an additional 17 QA investigations (five QA Vallon hole checks and 12 QA digital geophysical remapping targets) in this grid that did not show any failures.
- QC checked a total of 13 targets in this grid (eight random targets and five mV comparison targets) in this grid without any discrepancies noted.
- The QC seed in this grid was detected in the DGM data and recovered by the UXO Team. There were no QA seeds installed in this grid.

Appendix 17-G shows the distribution of original targets selected in MM-10F-T07, as well as the location of 2009 QC checks, QA checks and QC/QA seeds. In this grid there were a total of 53 targets picked in the original data. Two of these targets were survey pins, and one was the QC seed. Of the remaining 50 (unknown) targets, 19 targets (or 38% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

A Final NCR Closeout Form is provided in Appendix 17-H (file name: NCR_OUB1_ADAK_2009_12_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

A completed 2010 QA Certification Report for this grid (MM10F_UOP35_T07_Final_UOP_Complete.pdf) is provided in Appendix 17-I. This report provides QA approval of the grid underlying this NCR.

Section 18.0: NCR 2009_013

18.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 12, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

18.2 Document (NCR) Version Control

This NCR was not discussed during the After-Action meeting. The latest version of this NCR is named “NCR_2009_013.pdf”. This NCR is attached in Appendix 18-A. In this document, signatures for all parties were obtained for Blocks 5-8. However, only the contractor QC Specialist had signed Block 9 (Closeout Action).

18.3 Summary of NCR

This NCR was issued for unexcavated metal found during intrusive investigation of a QA DGM target. A QA DGM anomaly was detected with an amplitude of 16.4 mV (above the 4.4 mV GPO threshold). Upon intrusive investigation, QA found 25+ pieces of unexcavated metal, all of which were less than the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to ‘clear’ the excavation with a Vallon detector. The QA target was approximately 2 ft from Target 10F-F25-008, which showed an amplitude of 16.09 mV. The obvious site of the original excavation was clean but because the QA anomaly was within the 2.5 ft radius and was undisturbed, QA determined this was a quality deficiency.

Grid 10F-F25 was dug on August 20, 2009, prior to initiating the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 30, 2009. QA conducted the records check on September 12, 2009, conducted the DGM on September 9, 2009 and the intrusive investigation on September 12, 2009. The NCR was issued on September 12, 2009.

18.4 Summary of Contractor Root Cause Analysis and Corrective Action

For a root cause analysis, the contractor stated that the metal was found at 32 inches from the original DGM target location, not within the 30 inch search requirement. Further, the contractor attempted to show that when consolidated, the response of the items was 7.6 mV, not 16 mV, and therefore when dispersed as was found by QA, could not have exceeded the 4.4 mV GPO threshold. The contractor concluded that no failure had occurred, and thus did not recommend any corrective action.

The contractor did not dispute that the material had been found in the location specified by QA, nor did the contractor attempt to offer any discussion and analysis whether a 16+mV anomaly should have been targeted from the data and investigated or why.

Although not part of contractor corrective action, QC documented 10 random targets and seven mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-F25 Grid Certification.pdf, Appendix 18-B). This document also shows that the QC and QA seeds in this grid were successfully located and retrieved.

18.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA digital geophysical remapping target investigation, the QA Certification Report for this grid (MM10F_UOP03_F25_withhold.pdf, Appendix 18-C) shows that QA investigated an additional 10 random Vallon hole checks and seven QA digital geophysical remapping targets that did not reveal any failures. Note that only four of the QA digital geophysical remapping targets were coincident with the original target locations. The remaining three QA digital geophysical remapping targets were likely caused by minor metal in spoils piles away from the original target location.

18.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- QA did not identify the frag as a size equivalent, or greater than 37 mm. During the AAR meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4 mV), and produced a piece of metal larger than 37 mm.
- This deficiency was discovered by QA investigations during certification (via QA digital geophysical remapping investigations); however, there were an additional 17 QA investigations (10 QA Vallon hole checks and seven QA digital geophysical remapping targets) in this grid that did not show any failures.
- The contractor QC checked at total of 17 targets in this grid (10 random targets and seven mV comparison targets) in this grid without any failures noted.
- Both of the QC and QA seeds in this grid were detected in the DGM data and recovered by the UXO Team.

Appendix 18-D shows the distribution of original targets selected in MM-10F-F25, as well as the location of QC checks, QA checks and QC/QA seeds. In this grid there were a total of 98 targets picked in the original data. Three of these targets were survey pins, and three were QC/QA seeds. Of the remaining 92 (unknown) targets, 30 targets (or 32% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form is provided in Appendix 18-E (file name: NCR_OUB1_ADAK_2009_13_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder 2009_13. A completed 2010 QA Certification Report for this grid (MM10F_UOP03_F25_Final_UOP_Complete.pdf) is provided in Appendix 18-F. This report provides QA approval of the grid underlying this NCR.

Section 19.0: NCR 2009_14

19.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 16, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

19.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on September 18, 2009) is document file name “NCR_2009_014.pdf”. This NCR is attached in Appendix 19-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to them from QA. The contractor responded to this NCR on about October 20, 2009 with version “NCR_2009_014_final jam.pdf” as shown in Appendix 19-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

19.3 Summary of NCR

This NCR was issued for the discovery of 50+ pieces of frag found with QA DGM with a response of 11.65 mV. None of this frag exceeded the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5, which required the contractor to ‘clear’ the excavation with a Vallon detector. This location is 4 ft from the nearest grid Target 10F-K09-032.

Grid 10F-K09 was dug on August 20 and August 21, 2009, the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 30, 2009. QA conducted the records check on September 4, 2009, conducted the DGM on September 10, 2009 and the intrusive investigation on September 16, 2009. The NCR was issued on September 17, 2009.

19.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause for this deficiency was that the QA DGM target was located outside (>2.5 ft radius) of the original selected target location and that all original target locations had been evaluated by the contractor, QC and QA. Also, the contractor stated that none of the items met the failure criteria of greater than the mass/size of 37 mm. As a result, no failure had occurred and no corrective action was recommended for this NCR.

Although not part of contractor corrective action, QC documented investigation of 12 random targets, eight mV comparisons and 21 No Finds in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-K09 Grid Certification.pdf, Appendix 19-C). This document also shows that one QC and one QA seeds in this grid were successfully located and retrieved. In addition, four targets were investigated as part of the SOP 11 investigations with no noted discrepancies.

19.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA digital geophysical remapping target investigation, the QA Certification Report for this grid (MM10F_UOP28_K09_withhold.pdf, Appendix 18-D) shows that QA investigated an additional 11 random Vallon hole checks, three QA digital geophysical remapping targets and two No Finds that did not reveal any failures. Note that only one of the QA digital geophysical remapping targets was coincident with an original target location.

19.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- QA did not identify the frag as a size equivalent, or greater than 37mm. During the After-Action meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4mV), and produced a piece of metal larger than 37 mm.
- This deficiency was discovered by QA investigations during certification (via QA digital geophysical remapping investigations); however, there were an additional 16 QA investigations (11 QA Vallon hole checks, three QA digital geophysical remapping targets and two No Finds in this grid that did not show any failures.
- Contractor QC checked at total of 41 targets in this grid (12 random targets, eight mV comparison targets and 21 No Finds) in this grid without any discrepancies noted. The contractor also investigated four targets as part of the SOP 11 work without any discrepancies noted.
- The QC and QA seeds in this grid were detected in the DGM data and recovered by the UXO Team.

Appendix 19-E shows the distribution of original targets selected in MM-10F-K09, as well as the location of QC checks, QA checks and QC/QA seeds. In this grid there were a total of 112 targets picked in the original data. Three of these targets were survey pins, and two were QC/QA seeds. Of the remaining 107 (unknown) targets, 59 targets (or 55% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form (referenced in Section 19.2 above) is provided in Appendix 19-F (file name: NCR_OUB1_ADAK_2009_14_071610F.pdf).

The documents referenced in the Form (early NCR versions) are linked to the digital version of the form in Appendix 29-A. A completed 2010 QA Certification Report for this grid (MM10F_UOP28_K09_Final_UOP_Complete.pdf) is provided in Appendix 19-G. This report provides QA approval of the grid underlying this NCR.

Section 20.0: NCR 2009_15

20.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 17, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

20.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on September 18, 2009) is document file name "NCR_2009_015.pdf". This NCR is attached in Appendix 20-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_015_final jam.pdf" as shown in Appendix 20-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

20.3 Summary of NCR

This NCR was issued to address insufficient clearance of a target location. The evidence is the discovery of multiple fuze fragments found during QA Vallon hole checks at Target 10F-K18-087. None of the fuze fragments was greater than the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector. The fuze fragments were found at a depth of about 20 inches, about 4 inches deeper than the target dig sheet indicated the anomaly was investigated. Although not associated with a DGM anomaly amplitude, the fuze itself is larger than the size of a 37 mm projectile.

Grid 10F-K18 was dug on July 24, 2009, prior to the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on July 31, 2009. QA conducted the records check on August 22, 2009, did the DGM on September 7, 2009 and the intrusive investigation on September 17, 2009. The NCR was issued on September 18, 2009.

20.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor did not perform a root cause analysis for this deficiency. The contractor's position was that the items were non-ferrous, free of explosives, and when checked by QC, showed a maximum EM61 reading of 2.8 mV (below the project threshold of 4.4 mV). Therefore, the item did not meet the project threshold as a failure and the contractor did not recommend any specific corrective action for this NCR. It is reasonable to assume that because this grid was intrusively investigated prior to the corrective action for NCR 2009-03 (process non-conformance), the UXO team was removing material and then checking the hole frequently with the EM 61 to get it below the GPO threshold. It is entirely possible that while excavating Target 087, which was documented as six pieces of projectile frag weighing approximately 3 lb, the team reached the amplitude number below the 4.4 mV value prior to finding the fuze and simply abandoned the dig.

SOP 11 was developed and implemented to address project quality in a holistic manner. Nine of the random SOP 11 investigations were located in this grid. Although not part of contractor corrective action, QC documented investigation of 22 random targets and 66 mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-K18 Grid Certification.pdf, Appendix 20-C). This document also shows that the QC seed in this grid was successfully located and retrieved.

20.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA Vallon hole check, the QA Certification Report for this grid (file: MM10F_UOP13_K18_withhold[1].pdf, Appendix 20-D) shows that QA investigated an additional 17 random Vallon hole checks, three mV comparisons and 12 QA digital geophysical remapping targets that did not reveal any failures. Note that only two of the QA digital geophysical remapping targets were coincident with the original target locations. The remaining 10 QA digital geophysical remapping targets were likely caused by minor metal in spoils piles away from the original target location.

20.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- QA did not identify the frag as a size equivalent, or greater than 37 mm. During the After-Action meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4mV), and produced a piece of metal larger than 37 mm.
- This deficiency was discovered by QA investigations during certification (via QA Vallon hole checks); however, there were an additional 32 QA investigations (17 QA Vallon hole checks, three mV comparisons and 12 QA digital geophysical remapping targets) in this grid that did not show any failures.
- QC checked at total of 88 targets in this grid (22 random targets and 66 mV comparison targets) in this grid without any discrepancies noted. In addition, the contractor investigated nine targets as part of the SOP11 work, without any noted discrepancies.
- The QC seed in this grid was detected in the DGM data and recovered by the UXO Team. There were no QA seeds installed in this grid.

Appendix 20-E shows the distribution of original targets selected in MM-10F-K18, as well as the location of QC checks, QA checks and QC/QA seeds. In this grid there were a total of 204 targets picked in the original data. Four of these targets were survey pins, and one was a QC seed. Of the remaining 199 (unknown) targets, approximately 119 targets (or 59% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form is provided in Appendix 20-F (file name: NCR_OUB1_ADAK_2009_15_071610F.pdf). The documents referenced in the Form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder 2009_15. A completed 2010 QA Certification Report for this grid (MM10F_UOP13_K18_Final_UOP_Complete.pdf) is provided in Appendix 20-G. This report provides QA approval of the grid underlying this NCR.

Section 21.0: NCR 2009_16

21.1 Date of NCR/Date Resolved

This NCR was issued by QA on September 18, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. However, this NCR is recommended to be closed at the time of this report, based on information provided below.

21.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on September 21, 2009) is document file name "NCR_2009_016.pdf". This NCR is attached as Appendix 21-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_016_final jam.pdf" as shown in Appendix 21-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

21.3 Summary of NCR

This NCR was issued to address insufficient clearance of a target location. The evidence is the discovery of a M48 projectile fuze found during QA Vallon hole checks at Target 10F-K27-077. The fuze was found at a depth of about 19 inches, about 3 inches deeper than the target dig sheet indicated the anomaly was investigated. The Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5, which required the contractor to 'clear' the excavation with a Vallon detector.

Grid 10F-K27 was dug on July 27, 2009, prior to the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 12, 2009. QA conducted the records check on August 22, 2009, conducted the DGM on September 14, 2009 and the intrusive investigation on September 18, 2009. The NCR was issued on September 18, 2009.

21.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor did not perform a root cause analysis for this deficiency. The contractor position is that the item was found at a depth of 22 inches which exceeds the 11x diameter depth of clearance. Also, the contractor stated that the fuze, when checked by QC, showed a maximum EM61 reading of 3.5 mV which is below the project threshold of 4.4 mV. It is reasonable to assume that because this grid was intrusively investigated prior to the corrective action for NCR 2009-03 (process non-conformance), the UXO Team was removing material and then checking the hole frequently with the EM 61 to get it below the GPO threshold. It is entirely possible that while excavating Target 077, which was documented as 20 small pieces of projectile frag weighing approximately 0.7 lb, the team reached the amplitude number below the 4.4 mV value prior to finding the fuze and simply abandoned the dig.

The contractor stated that the item did not meet the project threshold as a failure and did not recommend any specific corrective action for this NCR.

SOP 11 was developed and implemented to address project quality in a holistic manner. Seven targets were investigated in this grid as part of the SOP 11 work and no discrepancies were noted. Although not part of contractor corrective action, QC documented investigation of 16 random targets and nine mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-K27 Grid Certification.pdf, Appendix 21-C). This document also shows that the QC and QA seeds (one each) in this grid were successfully located and retrieved.

21.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA Vallon hole check, the QA Certification Report for this grid (file: MM10F_UOP05_K27_withhold.pdf, Appendix 21-D) shows that QA investigated two additional random Vallon hole checks and five QA DGM targets that did not reveal any failures. Note that only one of the QA digital geophysical remapping targets was coincident with an original target location. The remaining four QA digital geophysical remapping targets were likely caused by minor metal in spoils piles away from the original target locations.

21.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- QA did not identify the frag as a size equivalent, or greater than 37 mm. During the After-Action meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4 mV), and produced a piece of metal larger than 37 mm.
- This deficiency was discovered by QA investigations during certification (via QA Vallon hole checks); however, there were an additional seven QA investigations (two QA Vallon hole checks and five QA digital geophysical remapping targets) in this grid that did not show any failures.
- QC checked at total of 25 targets in this grid (16 random targets and nine mV comparison targets) in this grid without any discrepancies noted. In addition, the contractor investigated seven targets as part of the SOP 11 work, and did not note any discrepancies in these investigations.
- The QC and QA seeds (one each) in this grid were detected in the DGM data and recovered by the UXO Team.

Appendix 21-E shows the distribution of original targets selected in MM-10F-K27, as well as the location of QC checks, QA checks and QC/QA seeds. In this grid there were a total of 147 targets picked in the original data. Four of these targets were survey pins, and two were QC/QA seeds. Of the remaining 141 (unknown) targets, approximately 38 targets (or 26% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form is provided in Appendix 21-F (file name: NCR_OUB1_ADAK_2009_16_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder

2009_16. A completed 2010 QA Certification Report for this grid (MM10F_UOP05_K27_Final_UOP_Complete.pdf) is provided in Appendix 21-G. This report provides QA approval of the grid underlying this NCR.

Section 22.0: NCR 2009_17

22.1 Date of NCR/Date Resolved

This NCR was issued by QA on October 6, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on the information provided below.

22.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on October 6, 2009) is document file name "NCR_2009_017.pdf". This NCR is attached in Appendix 22-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_017_final.pdf" as shown in Appendix 22-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

22.3 Summary of NCR

This NCR was issued to address insufficient clearance of a target location. The evidence to support the NCR was the discovery of nine pieces of frag found during QA Vallon hole checks at Target 10F-H10-062. None of this frag exceeded the failure criteria. However, the Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met, based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector. The frag was found at a depth of about 11 inches, about 3 inches deeper than the excavation depth.

Grid 10F-H10 was dug on August 13 and August 14, 2009, after the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on September 12, 2009. QA conducted the records check on October 2, 2009. QA performed random Vallon target checks on October 2, 2009, but did no DGM on this grid. The NCR was issued on October 6, 2009.

22.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor did not conduct a root cause analysis. The contractor indicated that since the items were smaller than a 37 mm projectile and there was no supporting anomaly amplitude, then these items do not constitute a failure and no analysis is required.

No corrective action was recommended for this NCR. SOP 11 was developed and implemented to address project quality in a holistic manner. Two of the random SOP 11 checks were located in this grid. Although not part of contractor corrective action, QC documented investigation of 10 random targets and six mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-H10 Grid Certification.pdf, Appendix 22-C). This document also shows that the QC and QA seeds (one each) in this grid were successfully located and retrieved.

22.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA Vallon hole check, the QA Certification Report for this grid (file: MM10F_UOP27_H10_withhold.pdf, Appendix 22-D) shows that QA investigated an additional four random Vallon hole checks that did not reveal any failures. QA did not conduct QA digital geophysical remapping surveys in this grid.

22.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- QA did not identify the frag as a size equivalent, or greater than a 37 mm projectile. During the After-Action meeting, the criteria for grid failure for QA digital geophysical remapping anomalies was reiterated as an anomaly that exceeded the GPO threshold (>4.4 mV), and produced a piece of metal larger than 37 mm.
- This deficiency was discovered by QA investigations during certification (via QA Vallon hole checks); however, there were an additional four QA Vallon hole checks in this grid that did not show any failures.
- QC checked at total of 16 targets in this grid (10 random targets and six mV comparison targets) without any discrepancies noted. In addition, the contractor investigated two random SOP 11 checks in this grid without any discrepancies noted.
- The QC and QA seeds (one each) in this grid were detected in the DGM data and recovered by the UXO Team.

Appendix 22-E shows the distribution of original targets selected in MM-10F-H10, as well as the location of QC checks, QA checks and QC/QA seeds. In this grid there were a total of 89 targets picked in the original data. Four of these targets were survey pins, and two were QC/QA seeds. Of the remaining 83 (unknown) targets, approximately 32 targets (or 38% of the unknown targets) were checked by either QC or QA. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form is provided in Appendix 22-F (file name: NCR_OUB1_ADAK_2009_17_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder 2009_17. A completed 2010 QA Certification Report for this grid (MM10F_UOP27_H10_Final_UOP_Complete.pdf) is provided in Appendix 22-G. This report provides QA approval of the grid underlying this NCR.

Section 23.0: NCR 2009_18

23.1 Date of NCR/Date Resolved

This NCR was issued by QA on October 9, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report based on the information provided below.

23.2 Document (NCR) Version Control

This NCR was not discussed during the After-Action meeting. The NCR version initially submitted to the contractor (on October 9, 2009) is document file name "NCR_2009_018.pdf". This NCR is attached in Appendix 23-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_018_final.pdf" as shown in Appendix 23-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QCM signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

23.3 Summary of NCR

This NCR was issued because the grid failed QA in accordance with the failure criteria. Failure was attributed to the discovery of four pieces of frag (including one that measures 5.5 × 2 inches which is larger than a 37 mm projectile) found while investigating a QA DGM target which displayed a response of 36.29 mV (above the 4.4 mV GPO threshold). This location matches closely with the contractor grid Target 10G-A03-005 which had a mV amplitude of 59.37.

Grid 10G-A03 was dug on August 13, 2009. After this date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on August 20, 2009. QA conducted the records check on October 8, 2009, performed DGM on October 1, 2009 and completed the intrusive investigations on October 7, 2009. QA performed random target checks on October 7, 2009. The NCR was issued on October 9, 2009.

23.4 Summary of Contractor Root Cause Analysis and Corrective Action

The contractor did not conduct or report a root cause analysis for this failure. The contractor did not accept QA's evaluation of the amplitude of the anomaly or the location without being allowed review of the QA DGM data, which QA did not provide. Instead, the contractor contention was that, based on the available data, the recovered items were: a) over 4 feet from the original target, and b) this target did not produce metal meeting the project failure criteria, therefore no failure occurred.

The contractor did not recommend any corrective action for this NCR. Although not part of contractor corrective action, QC documented investigation of 10 random targets and 12 mV comparisons as shown on the contractor Grid QC Inspection/Certification Form (file: G-A03 Grid Certification.pdf, Appendix 23-C). This document also shows that the QC and QA seeds (one each) in this grid were successfully located and retrieved. In addition, the contractor investigated five targets as part of the SOP 11 work, and did not report any deficiencies in these investigations.

23.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor did not recommend or perform any corrective actions. Although the NCR was based on a QA digital geophysical remapping target investigation, the QA Certification Report for this grid (file: MM10G_UOP06_A03_withhold.pdf, Appendix 23-D) shows that QA investigated an additional four random Vallon hole checks and one QA DGM target that did not reveal any failures.

23.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- This failure was discovered by QA during certification (via QA DGM intrusive investigations); however, there were an additional five QA investigations (four QA Vallon hole checks and one QA digital geophysical remapping target) in this grid that did not show any failures.
- The contractor QC checked a total of 22 targets in this grid (10 random targets and 12 mV comparison targets) in this grid without any discrepancies noted. In addition, the contractor investigated five targets as part of the SOP 11 work without any discrepancies noted.
- The QC and QA seeds (one each) in this grid were detected in the DGM data and recovered by the UXO Team.

Appendix 23-E shows the distribution of original targets selected in MM-10G-A03, as well as the location of QC checks (including SOP11), QA checks, and QC/QA seeds. In this grid there were at total of 97 targets picked in the original data. Four of these targets were survey pins, and three were QC/QA seeds. Of the remaining 90 (unknown) targets, about 32 (35% of the unknown targets) were checked by either QC or QA. However, it should be noted that the NCR failure target (10G-A03-005) was also a previous QC check. No MEC or 3X items were recovered in this grid.

This NCR is recommended to be closed. The signed NCR Closeout Form is provided in Appendix 23-F (file name: NCR_OUB1_ADAK_2009_18_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder 2009_18. A completed 2010 QA Certification Report for this grid (MM10G_UOP06_A03_Final_UOP_Complete.pdf) is provided in Appendix 23-G. This report provides QA approval of the grid underlying this NCR.

Section 24.0: NCR 2009_19

24.1 Date of NCR/Date Resolved

This NCR was issued by QA on October 9, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report based on the information provided below.

24.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on October 10, 2009) is document file name "NCR_2009_019.pdf". This NCR is attached in Appendix 24-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_019_final.pdf" as shown in Appendix 24-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QCM signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

24.3 Summary of NCR

This NCR was issued because QA found that the size failure criteria was exceeded during QA random hole checks. QA found multiple pieces of frag (one measuring 8 inches × 1.5 inches, which is larger than the 37 mm projectile) during QA hole checks at Target 10F-T17-084. The Navy and QA made the decision to issue the NCR, even though the grid failure criteria were not strictly met (i.e., the mV value was not known), based on the failure to follow the procedures in MEC QAPP SOP 5 which required the contractor to 'clear' the excavation with a Vallon detector. The frag was found in the sidewall of the excavation. The dig sheet indicates that the depth to the top of the anomaly that the contractor recovered was 14 inches.

Grid 10F-T17 was dug on July 20 and July 21, 2009, prior to the date the contractor initiated the corrective action for NCR 2009-03 (process non-conformance). The contractor performed QC inspection on September 4, 2009. QA conducted the records check on October 10, 2009, performed no DGM or intrusive investigations. QA performed random target checks on October 9, 2009. The NCR was issued on October 9, 2009.

24.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause analysis for this failure showed that improper hole clearing techniques were used by the intrusive team. The large fragment should have been removed.

The contractor recommended the corrective action of a re-check of all targets in grid T-17 and reporting all findings. The contractor Quality Control Report for October 13, 2009 (file: DQCR_101309_204.pdf, Appendix 24-C) shows that contractor QC re-checked the targets and found: 107 No Finds and 18 targets with 5X (54 small pieces of fragments were found near and around target anomalies). One target listed as "Other" due to being under running water. All holes in T17 were backfilled.

Although not part of contractor corrective action, QC documented investigation of seven random targets and 33 mV comparisons in this grid as part of the contractor Grid QC Inspection/Certification Form (file: F-T17 Grid Certification.pdf, Appendix 24-D). This document also shows that the QC and QA seeds (one each) in this grid were successfully located and retrieved.

24.5 Summary of QA Actions

QA did not perform specific activities to address contractor actions on this NCR since the contractor performed the corrective actions prior to submitting the response to the NCR. Although the NCR was based on a QA Vallon hole check, the QA Certification Report for this grid (file: MM10F_UOP18_T17_withhold.pdf, Appendix 24-E) shows that QA investigated one additional random Vallon hole checks that did not reveal any failures.

24.6 Justification for Further Action/No Further Action

The Navy recommends no further action on this NCR for the following reasons:

- The NCR describes a deficiency specific to grid MM-10F-T17. The contractor re-work of this entire grid without finding an additional failure item is adequate to address this specific failure.
- This deficiency was discovered by QA investigations during certification (via QA Vallon hole checks); however, there was one additional QA Vallon hole check in this grid that did not show any failure.
- The QC and QA seeds (one each) in this grid were detected in the DGM data and recovered by the UXO Team.

This NCR is recommended to be closed. The signed NCR Closeout Form (referenced in Section 24.2 above) is provided in Appendix 24-F (file name: NCR_OUB1_ADAK_2009_19_071610F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A, folder 2009_19. A completed 2010 QA Certification Report for this grid (MM10F_UOP18_T17_Final_UOP_Complete.pdf) is provided in Appendix 24-G. This report provides QA approval of the grid underlying this NCR.

Section 25.0: NCR 2009_20

25.1 Date of NCR/Date Resolved

This NCR was issued by QA on October 12, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. The Navy recommends closure of this NCR based on field work that was successfully completed in 2010 as discussed below.

25.2 Document (NCR) Version Control

This NCR was not discussed during the AAR meeting. The NCR version initially submitted to the contractor (on October 12, 2009) is document file name "NCR_2009_020.pdf". This NCR is attached in Appendix 25-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about October 20, 2009 with version "NCR_2009_020_final.pdf" as shown in Appendix 25-B. In this version, signatures of QA and Navy NTR in Block 5 had been dropped from the document, but the contractor UXO QC Manager signature (Block 5) had been inserted and the Root Cause, Recommended Corrective Action and Corrective Actions Completed (Blocks 6-8) had been completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR, although the contractor had signed this block.

25.3 Summary of NCR

This NCR was issued for the discovery of a QA seed found in a clump that was not investigated in the vicinity of Targets 10F-K23-060/084/151. This target was found by QA checks of the grid. Missing a QA seed is an automatic grid failure.

25.4 Summary of Contractor Root Cause Analysis and Corrective Action

The root cause analysis stated that the item was laying on the surface, but not in an uninvestigated spoil clump. This does not address the issue as to why it was missed. The contractor stated that the seed was recovered from the target anomaly, but was not placed in the bucket or recorded in the data logger. The contractor noted that this grid was originally dug prior to the implementation of Deficiency Notice (DN)-08, and this was symptomatic of the types of problems that were addressed in that DN. The contractor stated that implementation of the CA for DN-08 addressed this type of error and, thus, no specific corrective action was initiated for this grid/NCR.

DN-08 is attached in Appendix 25-C (ADAK-DN-008_Final.pdf). This DN addresses failures of the contractor UXO crews to properly enter information into the Trimble Controller. This DN was dated August 13, 2009 about 2 months prior to the issue of the NCR.

Although not part of the contractor corrective action on this grid/NCR, QC performed 11 random target checks and 12 mV comparisons on this grid (file F-K23 Grid Certification.pdf, Appendix 25-D) without any noted deficiencies.

Since QA stated that the seed was found in an uninvestigated clump, the work completed in 2010 under FCR#20 (spoils investigations and backfilling) apply to this NCR/grid. The final FCR#20, cover page for SOP 5, and three-phase QC checklist for this activity are discussed and provided previously in this report (Section 12:Appendices 12-C, D and E, respectively).

On August 23, 2010, the contractor performed spoils inspections and excavation backfilling in grid K23. The contractor daily production report (file: Daily_CPR_082310-213.pdf, Appendix 25-E) shows that contractor field crews performed the work and that no failure items were found in this grid. The contractor performed QC surveillance/inspection of this work using the three-phase QC checklist on the same day and indicated that all work was performed in accordance with SOP-05, the EPP/WMP, FCRs 19 and 20, and that no failures were indicated (file: 3-phase QC checklist SOP5 082310.pdf, Appendix 25-F).

25.5 Summary of QA Actions

QA did not perform specific activities to monitor the contractor corrective actions in 2009 as the contractor did not perform any specific corrective actions regarding this grid/NCR.
During QA field checks as part of the QA Certification Report for this specific grid (file: MM10F_UOP07_K23_withhold.pdf, Appendix 25-G), four random Vallon checks were conducted without any failures discovered.

In the 2010 field season, QA performed an inspection of the contractor spoils inspection and excavation backfilling operations on August 25, 2010 (file: Battelle Adak QA Report 082510_014.pdf, Appendix 25-H) in grid K23. These QA inspections did not indicate any failures in this grid.

25.6 Justification for Further Action/No Further Action

The metal found in an uninvestigated clump is a system-wide failure, as defined in the MEC QAPP Worksheet #36. Spoils investigations and backfilling operations on a system-wide scale are addressed in NCR 2009_022 discussions (Section 27 of this report). In this specific grid (MM-10F-K23), the contractor field work, contractor QC and independent QA performed in 2010 show that all spoils were inspected and backfilled into existing excavations, with no failures noted. The work completed (and approved) in 2010 is adequate to recommend no further action on this portion of the NCR.

A Final NCR Closeout Form is provided in Appendix 25-I (file name: NCR_OUB1_ADAK_2009_20_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A. A completed 2010 QA Certification Report for this grid (MM10F_UOP07_K23_Final_UOP_Complete.pdf) is provided in Appendix 25-J. This report provides QA approval of the grid underlying this NCR.

Section 26.0: NCR 2009_21

26.1 Date of NCR/Date Resolved

This NCR was issued by QA on October 14, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

26.2 Document (NCR) Version Control

This NCR was discussed during the AAR meeting. The NCR version initially submitted to the contractor (on October 14, 2009) is document file name "NCR_2009_021.pdf". This NCR is attached in Appendix 26-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the Navy NTR or the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor responded to this NCR on about November 4, 2009 with version "NCR_2009_021 EODT final.pdf" as shown in Appendix 26-B. In this version, QA and Navy NTR signatures in Block 5 had been dropped from the document, but Blocks 6 through 8 (Root Cause Analysis, Recommended Corrective Action and Corrective Actions Completed) had been mostly completed by the contractor. As mentioned above, the Closeout Action (Block 9) had not been signed by QA or Navy NTR. This block was also not signed by the contractor, and there was no narrative for Block 8 (Corrective Actions Completed).

26.3 Summary of NCR

This NCR was discussed during the After-Action meeting. This NCR was issued for the detonation of the final demo shot of the 2009 field season in a location that was outside of the AOCs where the primary work was conducted. The demo shot took place in AOC MM-10E, whereas the primary work was conducted in AOCs MM-10F, 10G and 10H. The root cause stated that the work plans were applicable to AOC MM-10E; therefore, the last demolition shot was conducted in accordance with the plans.

Following the issuance of the NCR, the contractor provided additional evidence the detonation and post-detonation activities were performed in accordance with the plans, and the Navy determined that the location of the demo shot was acceptable. The contractor also provided information that the final demo shot contained only donor explosives and no munitions or munitions constituents were included. However, the Navy requested additional work by the contractor to assure that debris was not scattered over the nearby GPO grids. During the After-Action meeting, the parties agreed that the contractor would perform a surface sweep of the west GPO area to remove demo debris during the 2010 field season. Following the After-Action meeting QA provided the Navy with the following recommended action:

> *"Since there is no independent verification that the West GPO has been looked at to see if any demo materials from this operation were kicked out in that direction, EODT is directed to have their QC make a walk-through of the West GPO looking for surface metallic debris from this disposal shot. If debris are present, EODT is directed to perform a surface sweep, to locate and remove the debris, and QC is directed to conduct a final re-check and then certify the work finished. At that time, QA will sign off and close the NCR as completed."*

This work was scheduled to be conducted during the 2010 field season using MEC QAPP SOP 1 procedures. A brief report will document the findings and be attached to the OU B-1 AAR.

26.4 Summary of Contractor Corrective Action

In 2009, the contractor stated that post demo operations were conducted to ensure that minimal damage to the area had occurred and remnants of the demolition operations were removed from the AOC. Therefore, no corrective action was deemed necessary.

On August 26, 2010, the contractor performed a surface sweep of the GPO and surrounding areas as shown on the contractor production report (Daily_CPR_082610-216.pdf, Appendix 26-C). No failure items were noted. On this same day, contractor QC inspected and approved this work (DQCR_082610_216.pdf, Appendix 26-D).

26.5 Summary of QA Actions

In 2009, QA did not perform specific activities to monitor the corrective actions as the contractor did not perform any specific corrective actions regarding this NCR in 2009.
On August 26, 2010, QA inspected the contractor work, finding no failure items (Battelle Adak QA Report 082610_015.pdf, Appendix 26-E).

26.6 Justification for Further Action/No Further Action

This contractor and QA work conducted during the 2010 field season is adequate to support closure of this NCR. The contractor included a discussion in Part 2 AAR on this matter.

A Final NCR Closeout Form is provided in Appendix 26-F (file name: NCR_OUB1_ADAK_2009_21_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 27.0: NCR 2009_22

27.1 Date of NCR/Date Resolved

This NCR was issued by QA on November 23, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

27.2 Document (NCR) Version Control

This NCR was discussed during the AAR meeting. The NCR version initially submitted to the contractor (on November 23, 2009) is document file name "NCR_2009_022.pdf". This NCR is attached in Appendix 27-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the Navy NTR or the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor had not completed their portion of the NCR as of the time of this report.

27.3 Summary of NCR

This NCR was discussed during the After-Action meeting. This NCR was issued because numerous excavations were not backfilled in 2009. These observations were made by QA during a walkthrough of the MM-10F and MM-10G AOCs at the end of the 2009 field season. During the AAR meeting, the parties determined that FCR#20 should be written to MEC QAPP SOP 5 to address the backfilling of the excavations. The final FCR#20, cover page for SOP 5, and three-phase QC checklist for this activity are provided previously in this report as Appendices 12-C, D and E, respectively. The complete SOP 5 is provided in digital format in Appendix 29-A in folder 2009_07.

According to the contractor, some number of excavations had been backfilled in the 2009 field season. However, the contractor could not provide documentation on the locations of the backfilled excavations. Since the locations of backfilled excavations were unknown (undocumented), the backfilling activities specified in FCR#20 were applied to all grids excavated during the 2009 field season. Note that excavations completed in the 2008 field season are not part of this work as they were backfilled during 2008, and this work was verified by QA.

Another aspect of FCR#20 was the inspection of the backfill materials (spoils and clods) prior to placing them (backfilling) back in the excavation. This aspect required breaking up of all excavation spoils (clods/clumps) larger than a 37 mm projectile to confirm that there was no MEC remaining in spoils. As part of this aspect, all metal (regardless of type) with any dimension greater than 3 inches was to be removed from the site. This aspect of FCR#20 addresses the systemic issue of uninspected spoils that was evidenced in NCRs 2009_007, 008, 009, 012 and 020.

27.4 Summary of Contractor Corrective Action

The contractor indicated that some (unknown) number of excavations had been backfilled during the 2009 field season; however, details of this work were not reported to QA or presented in the draft After Action report.

In 2010 the contractor performed spoils inspections and backfilling of all excavations dug during the 2009 field season. Evidence of this work is provided in the daily contractor production reports and daily contractor quality control reports. These reports are numerous, and thus not provided in this report. The contractor did not provide a summary report listing the backfilled grids at the time of this report; however, the contractor provided a map showing the backfilled grids (file:Adak_field_status_map_09112010.pdf, Appendix 27-B).

27.5 Summary of QA Actions

In 2009, QA did not perform specific activities to monitor the contractor corrective actions as the contractor did not perform any specific corrective actions regarding this NCR.

In 2010, QA verified that all grids that had been excavated in 2009 were selected by the contractor and then performed inspections of all contractor backfill (and spoils inspection) activities related to FCR#20. A spreadsheet listing the grids that were affected was created from the contractor daily production and QC reports and is provided in Appendix 27-C (file: FCR20_Backfill Grids in 2010.pdf). This spreadsheet lists the dates of contractor field work, contractor QC, and independent QA of the specific grids that were backfilled. A total of 284 grids (including two step-outs) were backfilled in AOC MM-10F, a total of 29 grids (including two step-outs) were backfilled in AOC MM-10G, and one step-out grid in AOC MM-10-H was backfilled. Evidence of the successful QA of grids in AOC MM-10F is provided in a QA field surveillance report (File: MM091410-001_AOC_MM10F_Final.pdf, Appendix 27-D). Evidence of the successful QA of grids in AOC MM-10-G is provided in a QA field surveillance report (file: MM091110-001_MM10G_Final.pdf, Appendix 27-E). Evidence of the successful QA of the step-out grid in AOC MM10-H is provided in a weekly QA report (file: Adak Weekly Battelle QA Report, 2010-005.pdf, Appendix 27-F).

27.6 Justification for Further Action/No Further Action

The contractor and QA work conducted during the 2010 field season is adequate to support closure of this NCR. The contractor included a discussion in Part 2 AAR on this matter.

A Final NCR Closeout Form is provided in Appendix 27-G (file name: NCR_OUB1_ADAK_2009_22_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 28.0: NCR 2009_23

28.1 Date of NCR/Date Resolved

This NCR was issued by QA on November 23, 2009. This NCR was not approved/signed by QA or Navy NTR as of the end of the 2009 field season. This NCR is recommended to be closed at the time of this report, based on information provided below.

28.2 Document (NCR) Version Control

This NCR was discussed during the AAR meeting. The NCR version initially submitted to the contractor (on November 23, 2009) is document file name "NCR_2009_023.pdf". This NCR is attached in Appendix 28-A. In this initial document, QA and Navy NTR signatures are present in Block 5. There are no responses or signatures from the Navy NTR or the contractor in Block 5 or subsequent blocks as this is the initial NCR submittal to the contractor from QA. The contractor had not completed their portion of the NCR as of the time of this report.

28.3 Summary of NCR

This NCR was discussed during the After-Action meeting. This NCR was issued for numerous ATV ruts that were not backfilled or the backfill was inadequate. These observations were made by QA during the final walkthrough of the MM-10F and MM-10G AOCs at the end of the 2009 field season.

During the AAR meeting, the parties determined that FCR#19 should be written to the EPP/WMP to address work required to repair ruts and other damage to the site caused by activities related to the performance of the remedial actions during the 2008 and 2009 field seasons. The final FCR#19, cover page for the revised EPP/WMP, and three-phase QC checklist for this activity are provided in Appendices 28-B, C and D, respectively. The complete EPP/WMP is provided in digital format in Appendix 29-A, in folder 2009_23.

28.4 Summary of Contractor Corrective Action

The contractor performed some (unknown) amount of repairs during the 2009 field season. However, the particulars of this work were not reported to QA.

In 2010, the contractor performed rut and terrain repairs in all affected areas in MM-10F, G and H. These repairs were primarily conducted in parallel with the FCR#20 (excavation backfilling) operations discussed previously in Section 27 of this report. Evidence of this work is provided in the daily contractor production reports and daily contractor quality control reports. These reports are numerous, and thus not provided in this report. The contractor did not provide a summary report showing the entire scope and extent of the repairs at the time of this report; however, the contractor provided a map showing the location of backfilled grids (reference Appendix 27-B, previous section) which presumably mirrors the rut repairs done for FCR#19. The contractor daily production report for September 13, 2010 (file: Daily_CPR_091310-231.pdf, Appendix 28-E) documents that all road/rut repairs were completed in MM-10F. The contractor daily production report for August 23, 2010 (file: Daily_CPR_082310-213.pdf, Appendix 28-F) documents that all road/rut repairs were completed in MM-10F. The contractor QC report for August 25, 2010 (file: DQCR_082510_215.pdf, Appendix 28-G) documents that road/rut repairs (FCR#19) were completed in the vicinity of MM-10H.

As part of the FCR#19 work, the contractor completed an assessment of siltation (runoff) caused by their activities in the AOCs. This report concludes that "no standing waters have been impacted by sediment caused by either EODTs prior hand excavation activities or off-road vehicle use." The text from this report is provided in Appendix 28-H (file: Siltation Assessment Report.pdf). The full report (including maps and photographs) is provided in Appendix 29-A, folder 2009_23.

28.5 Summary of QA Actions

In 2009, QA did not perform specific activities to monitor the contractor corrective actions as the contractor did not notify QA of any specific corrective actions regarding this NCR in 2009.

In 2010, QA inspected and approved all FCR#19 road/rut repairs in AOCs MM-10F, MM-10G and MM-10H. The daily QA report for September 14, 2010 (file: Battelle Adak QA Report 091410_031.pdf, Appendix 28-I) shows QA approval of FCR#19 work in AOC MM-10F. The QA field surveillance report of September 13, 2010 (file MM091119-001_MM10G_Final.pdf, Appendix 28-J) shows QA approval of FCR#19 work in AOC MM-10G. The daily QA report for August 25, 2010 (file: Battelle Adak QA Report 082510_014.pdf, Appendix 28-K) shows QA inspection of FCR#19 work in MM-10H.

QA also provided surveillance and approval of the contractor siltation survey as documented in the QA field surveillance of August 14, 2010 (file: MM081410-001_Siltation Survey.pdf, Appendix 28-L).

28.6 Justification for Further Action/No Further Action

The contractor and QA work conducted during the 2010 field season is adequate to support closure of this NCR. The contractor included a discussion in Part 2 – AAR on this matter.

A Final NCR Closeout Form is provided in Appendix 28-M (file name: NCR_OUB1_ADAK_2009_23_093010F.pdf). The documents referenced in the form (early NCR versions) are linked to the digital version of the form in Appendix 29-A.

Section 29.0: CONCLUSIONS AND RECOMMENDATIONS

During the 2008-2009 field seasons, a total of 27 NCRs were issued to the contractor on the OU B-1 project. All of these NCRs have been closed through various processes:

- Five of the NCRs (2008_03, 2008_04, 2009_02, 2009_03, and 2009_04) had been completed and approved in total during the 2008-2009 field seasons.
- Three of the NCRs (2008_01, 2008_02 and 2009_01) had been verbally approved by QA during the 2008-2009 field seasons, but did not have final QA/NTR signatures during these field seasons. Signatures have been obtained for these NCRs and they are now closed.
- Eight of the NCRs (see Table 29-1 below) were either incomplete (typically missing final signatures from the QA and Navy NTR personnel that were responsible for the 2008-2009 work) or required additional analysis of data that had previously been collected in the 2008-2009 field seasons to close. To provide final closure of these NCRs, a "QA NCR, FINAL RESOLUTION DOCUMENT" was prepared as a cover to the original incomplete NCR. In this Final Resolution Document, signatures from QA and Navy representatives are provided. The completed Final Resolution Documents for the affected NCRs are provided in the Appendices to specific NCR sections as referenced in Table 29-1.
- Eleven of the 2009 NCRs (see Table 29-2) required additional field work that was completed during the 2010 field season to resolve. Five of these NCRs were closed via successful completion of work outlined in FCRs (#19 and #20). Five of the NCRs were closed via completion of QA investigations that were not completed in 2009. One of the NCRs (2009_21) was closed via separate direction provided in this document (Section 26 of this document). To provide final closure of these NCRs, a "QA NCR, FINAL RESOLUTION DOCUMENT" was prepared as a cover to the original incomplete NCR. In this Final Resolution Document, signatures from QA and Navy representatives are provided. The completed Final Resolution Documents for the affected NCRs are provided in the Appendices to specific NCR sections as referenced in Table 29-2.

Most of the NCRs listed in Tables 29-1 and 29-2 were based on failures and/or deficiencies in a specific (single) grid, and thus these grids had not been approved by QA as of the end of the 2009 field season. To provide final approval of these grids, an additional 2010 QA report was generated as a cover to the original (withheld) QA report from 2009. Tables 29-1 and 29-2 also list (where appropriate) the grids that were approved using the 2010 QA reports.

With all 2010 field work having been completed and approved by QA and Navy NTR, Final Resolution Documents have been approved and signed, closing all NCRs issued by QA during the 2008-2009 field season. Also, all grids associated with the NCRs have been approved. The contractor included a discussion of work performed in regards to FCRs #19 and #20 and resolving NCR 2009_21 (Detonation) in Part 2 AAR.

All documents referenced in this report are provided in digital format in Appendix 29-A (follows) on disk.

Table 29-1. NCRs Closed Using Data from 2008-2009 Field Seasons

Original NCR (OUB1_ADAK_)	Final Resolution Document (FRD) File Name.	FRD Appendix	Grid(s) Associated with NCR, Approved via 2010 QA Report
2009_005	NCR OUB1_ADAK_2009_05_ 071610F.pdf	10-H	MM-10F F14
2009_013	NCR OUB1_ADAK_2009_13_ 071610F.pdf	18-E	MM-10F F25
2009_014	NCR OUB1_ADAK_2009_14_ 071610F.pdf	19-F	MM-10F K09
2009_015	NCR OUB1_ADAK_2009_15_ 071610F.pdf	20-F	MM-10F K18
2009_016	NCR OUB1_ADAK_2009_16_ 071610F.pdf	21-F	MM-10F K27
2009_017	NCR OUB1_ADAK_2009_17_ 071610F.pdf	22-F	MM-10F H10
2009_018	NCR OUB1_ADAK_2009_18_ 071610F.pdf	23-F	MM-10G A03
2009_019	NCR OUB1_ADAK_2009_19_ 071610F.pdf	24-F	MM-10F T17

Table 29-2. NCRs Closed Using Data Acquired during the 2010 Field Season

Original NCR (OUB1_ADAK_)	Final Resolution Document (FRD) File Name.	FRD Appendix	Grid(s) Associated with NCR, Approved via 2010 QA Report
2009_006	NCR OUB1_ADAK_2009_06_ 093010F.pdf	11-E	MM-10F S08
2009_007	NCR OUB1_ADAK_2009_07_ 093010F.pdf	12-E	MM-10F T16
2009_008	NCR OUB1_ADAK_2009_08_ 093010F.pdf	13-D	MM-10F B14
2009_009	NCR OUB1_ADAK_2009_09_ 093010F.pdf	14-D	MM-10F D12
2009_010	NCR OUB1_ADAK_2009_10_ 093010F.pdf	15-E	MM-10F D09
2009_011	NCR OUB1_ADAK_2009_11_ 093010F.pdf	16-F	MM-10F T18
2009_012	NCR OUB1_ADAK_2009_12_ 093010F.pdf	17-E	MM-10F T07
2009_020	NCR OUB1_ADAK_2009_20_ 093010F.pdf	25-F	MM-10F K23
2009_021	NCR OUB1_ADAK_2009_21_ 093010F.pdf	26-C	N/A
2009_022	NCR OUB1_ADAK_2009_22_ 093010F.pdf	27-C	N/A
2009_023	NCR OUB1_ADAK_2009_23_ 093010F.pdf	28-D	N/A

Appendix 29-A

Data Disk

(provided upon request)