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Munitions and Explosives of Concern (MEC) Site Characterization at Vieques Island, Puerto Rico

QUALITY ASSESSMENT PROJECT PLAN

(QAPP)

Site: Vieques Island
Puerto Rico

MEC Site Characterization

March 09, 2003

Approval Signatures

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Part A. Project Management

This MEC Quality Assessment Project Plan covers the assessment requirements as they relate to the Vieques Island project efforts.

A 1.0 Quality Assessment Organization

Executing Organization – Atlantic Division, Naval Facilities Engineering Command

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MEC Quality Assessment

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A 2.0 Problem Definition / Background

Site Description
SWMU 4 was an inactive Open Burn/Open Detonation (OB/OD) site on the former Naval Ammunition Support Detachment (NASD) and encompasses approximately 40 acres located roughly 0.5 miles from the Caribbean Sea on the southwest corner of Vieques Island. The OB/OD unit was utilized for the thermal destruction of waste munitions, fuels, and propellants from 1969 to 1979. Records indicate that the site may have been used since the late 1940s.

The OB/OD site was also used for the disposal of excess and retrograde ammunition and, twice yearly, for disposal of unexploded munitions found around the targets on the

Eastern Maneuver Area (EMA). The EMA is located in the eastern portion of Vieques Island and is not part of the former NASD. Other explosive materials disposed at SWMU 4 included material from the rework of munitions (e.g., loose powder and primers) and ordnance items from the torpedo shop. Materials disposed at the site included flares and cartridge-activated devices. The range had a maximum blow limit of 4,000 pounds of TNT equivalent (Greenleaf/Telesca, 1984).

Previous Investigations at SWMU 4

Although no hazardous releases from the OB/OD site were documented, the Navy decided to investigate the site as part of the Installation Restoration (IR) program. The site was designated SWMU 4 at this time.

As part of the PA/Sl at SWMU 4, a MEC avoidance geophysical survey was completed to clear the locations of soil borings and monitoring wells of potential MEC. In addition, the access roads to the sampling locations were cleared of MEC. A Schonstedt fluxgate magnetometer was used to identify potential MEC near the soil boring and monitoring well drilling sites to a depth of 2 feet. A down-hole magnetometer was used during the drilling process to check for potential MEC every 2 feet to a depth of 10 feet. Additionally, transects were cut through the brush to identify the potential locations of the OB/OD pits. An EOD technician cleared the area in front of the bulldozer during the brush clearing for each transect. The technician performed a sweep with the Schonstedt magnetometer and identified MEC items. After the transects were cut, a conventional magnetometry survey was conducted along the transects and pads to identify potential areas of buried metal.

A total of 61 MEC items were found, 37 20-mm high explosive (HE) projectiles, 16 MK-230 fuses, and a 60 mm mortar fuse. Several of the MEC items were identified along a transect that extended along the center of the 40-acre area where the OB/OD area was suspected to be located. The MEC items detected were removed by the EOD technicians and disposed of by Navy EOD personnel.

The following shows a range of potential ordnance and explosive that have been identified and destroyed in the past.

Summary of Potential MEC Contamination Associated with Past Range Uses

OE Type
20mm HE
7.62 blank cartridges
Fuze, bomb MK 230
Primer, 81mm tail boom
Photoflash cartridge, M123A1
Rocket warhead, MK2

OE Type
Fuze, bomb MK 243
Booster Fuze
Projectile, MK 48
Fuze, time M25
Ballastite (propellant)
Pistol flare primer
Warhead piece, M2 mod 2
20mm incendiary
Hand illumination flare
CAD
Fuze, VT M517
20mm cartridge case
Photoflash cartridge, M112
Bomb, incendiary AN-M52
Rocket motor, 5" HVAR
Igniter, M23 WP

Reference Sources:

- Draft Interim Data Summary Report, Phase I and Phase II Investigations, SWMU 4, Former NASD, Vieques Puerto Rico, December 2002
- Unexploded Ordnance Detection Geophysical Work Plan Version II, February 5, 2002
- U.S. Navy Ammunition Support Detachment Unexploded Ordnance Investigation SWMU-4 Standard Operating Procedures Geophysical Prove out (GPO) Revision 1, January 22, 2001

A 3.0 Project Task / Description

A 3.1 Task Objectives

This QA effort was established to be consistent with CERCLA and the philosophy and approach contained in the Draft Interim Range Rule and Range Rule Risk Methodology (R3M – April 10, 2000). The QA effort is intended to assess the level to which the MEC detector-aided site characterization fulfills the contractual requirements.

The purpose of this MEC QA effort is to assess the quality of the work performed on Vieques Island during the detector-aided site characterization fieldwork from March 9, 2003 to March 19, 2003, to verify that the required activities are executed in accordance with contract requirements, and to ensure that the contractor's stated and actual results exhibit a high degree of confidence.

This plan details the QA activities to be conducted by the Navy MEC Quality Assessors during the site characterization. The QA activities will be conducted to ensure that the detector-aided site characterization, MEC identification, and data management executed by contracted organizations are in compliance with stated work plans and procedures, and conform to health and safety requirements, including the protection of floral and fauna species and their habitats, and cultural resources.

A 4.0 Quality Objectives and Criteria for Measurement Data

A 4.1 MEC Quality Assessment Project Plan Objectives

The overall quality objective of this plan is to provide a documented record of the results of MEC Quality Assessment activities to be performed, which will allow the Navy to certify with confidence the results of the contractor's assessment efforts.

A 4.2 Data Quality Objectives (DQOs)

The Data Quality Objectives (DQOs) for the detector-aided site characterization efforts determine the measurable quality elements for assessing compliance.

The site-specific actions at Vieques Island require the QA Team to:

- Establish an independent government QA test bed seeded with inert MEC items to assess the contractor's geophysical team to the contract specifications.
- Assess the contractor field teams utilizing the Automated Quality Assessment Program System Version 1.0.0, September 2002 for the Site Characterization/Remedial Investigation phase
- Assess the "cleared" grids as completed by the contractor geophysical and MEC teams using independent government geophysical equipment.

DQOs are categorized to clearly facilitate the identification, collection, verification and validation of data affecting the quality objectives, consistent with the process described in the R3M. This categorization is due to the different types

of data involved, the methods for collection and the data usage. These categories include:

- Legal and Regulatory – How legal and regulatory requirements are explicitly met, usually in the form of Work Instructions
- Administrative – How data is gathered for non-technical tasks
- Technical – How technical data is obtained for meeting requirements of decision analyses
- Remedial – How data is obtained for the actual site clean-up process to ensure that remedial goals are met.

The DQOs, associated contract and contractor documents and records serve as the basis for the evaluation criteria to be used by MEC Quality Assessors to monitor Contract performance.

DQOs have been established for the site characterization at Vieques Island. Each DQO is identified with a set of data elements describing the data to be acquired. Each data element addresses the measures to be used, and the error limits tolerated.

The DQOs for Vieques Island are shown in the table below:

Data Quality Objectives	
DQO #	Title
01	Work Plan for RI Phase
04	Data Collection
05	Ordnance Identification
06	Detection Data Management
07	Geophysical Search/Detection System Selection
08	Geophysical Equipment Performance
09	Survey/Location Equipment Performance
10	Operational Verification of Survey/Investigation Equipment
11	Detector Team Performance Evaluation
13	NOSSA Explosive Safety Submission (NOSSA REQUIRED)

A 4.3 MEC Quality Assessment Standard Operating Procedures (MEC QA-SOP) and Work Instructions

MEC QA activities are based on data quality objectives, data quality elements, and question sets, that applies to the site-specific MEC QA-SOPs or work

instructions and appropriate question sets. Where necessary, procedures and question sets will be developed in conjunction with field activities.

A 4.4 Assessment of Contractors' Plans, Procedures and Processes

The objective of reviewing all contractor plans, procedures and processes is to assess the quality of the processes to be used to obtain the results. The contractor documents shall meet or exceed the requirements of the contract Statement of Work (SOW) and its associated references. In reviewing these documents, safety shall be an overriding factor. Documents will be examined on a scheduled and timely manner for concurrence. Assessment will not be limited to the contractor, but the contractor's process for qualifying and monitoring subcontractors will also be the subject of a MEC QA. All examination and assessments will be documented on a government MEC Quality Assessment Record (QAR). The MEC QA Manager will ensure sufficient resources are available for each review and schedule resources accordingly.

A 4.5 Assessment of Contractor In-Process Activities

The purpose of the in-process MEC Quality Assessment activities is to ensure that the plans, practices, procedures and processes are implemented as written, and to monitor contractor adherence to the contractually specified requirements. MEC Quality Assessors will document in-process assessments on the government MEC Quality Assessment Record (QAR).

A 4.6 MEC Quality Assessment Recording and Reporting of Contractor Nonconcurrence

If, during the course of a contractor document review or in-process assessment, concurrence is withheld or findings indicate a failure to follow plans, practices, procedures or processes, or to meet specifications or requirements, these findings shall be documented on the QAR. These finding(s) will be entered into the government Corrective Action System using a Corrective Action Report (CAR) form. The contractor will also be notified in writing. Recommendations will be made to the contractor on a case-by-case basis. QA recommendations are to be considered suggestions in nature and not contractual direction. Contractual direction can only be given under the authority of the Contracting Officer. Issues regarding contractual direction will be the responsibility of the Remedial Project Manager. The MEC QA Manager may provide input or data to support such contractual directions.

A 4.7 Contractor-Responsibility to Rectify Nonoccurrence/Findings

The contractor will notify the Remedial Project Manager and Contracting Officer in writing within 10 working days of receiving the non-concurrence or finding. This notification will include action(s) to be taken by the contractor, the projected

and actual date of correction and the root cause of the non-concurrence or finding, if appropriate. After corrective action, the Remedial Project Manager will schedule a review of the action taken to rectify the deficiency, practice or process in question. Failure to notify the Remedial Project Manager and Contracting Officer of action or projected actions will be addressed at the Program Manager level.

A 5.0 Special Training Requirements / Certifications

The requirements for the training and certifications of the MEC QA personnel are listed below. This includes, to the extent possible, that training and/or certification necessary for compliance with OSHA and industry standards. Whenever feasible, the MEC QA Team members will have training/certification equivalent to or greater than that required of the MEC Remediation Contractors personnel. Members of the MEC QA Team who are subject matter experts and certified in their specialty areas, will be expected to keep their certifications current, e.g.: Certified Safety Professional (CSP), Certified Quality Engineer (CQE).

All team members will read and sign the MEC Quality Assessor's Statement, for each MEC QASOP or Work Instructions. Signature indicates that the MEC Quality Assessor has reviewed each operational step contained in the MEC QA-SOP or Work Instructions and acknowledges that he/she understands and can perform the operation completely, competently, safely and efficiently, using the target MEC QA-SOP or Work Instructions and supporting contractor SOPs, as applicable.

A 5.1 Training Records

Copies of all training records, and certificates will be maintained by the MEC QA Manager and made available for inspection. Copies of selected records will be maintained on site. Training records will be maintained for the life of the contract.

A 5.2 Required Training and Certifications

The following training is required for QA Team members prior to an assessment. Records of training will be considered part of the training records and controlled and retained for inspection. Training includes:

- HAZWOPER Initial Training (40 hours) IAW 29.CFR 1910.120 (or equivalent)
- HAZWOPER Refresher Training (8 hours annually) IAW 29.CFR 1910.120 (or equivalent)

- Body of Knowledge Training in Certified Quality Engineer or Certified Quality Technician: (40 hours.)
- Body of Knowledge Training for Certified Safety Professionals (recommended, but not required)
- Geo-positioning Satellite (GPS) Equipment Usage (Classroom and Field Training, for the GPS employed for QA)
- MEC Detector Training, Certification on Government QA Range (Classroom and Field, for the detectors used on the contract and for QA)
- Cardio-Pulmonary Resuscitation (CPR) Training (American Red Cross or equivalent)
- First- Aid Training (American Red Cross or equivalent)
- MEC Familiarization Training, MEC Hazards, Explosives Safety
- Data Recording, Handling and Maintenance Briefing
- Vehicle Driver Training (where applicable)
- Other Site-specific Requirements Briefing (where applicable)

A 5.3 As-Needed / Required Training

The following training will be provided on an as-needed basis. Records of training will be considered part of the training records and controlled and retained for inspection. Training includes:

- HAZWOPER- IAW 29.CFR 1910.120: 8 Hr. Supervisor Training.
- Explosives Certification
  - MEC Team Supervisor level
  - MEC Team Worker Level

A 6.0 Documentation and Records

A 6.1 MEC Quality Assessment Recording (QAR)

The results of MEC Quality Assessments will be documented in a QAR and reported to appropriate Navy project management. The MEC Quality Assessment Record is used by Government MEC Quality Assessors to record all quality assessment activities, findings and actions. The form provides a format for consistent data collection as well as a documented record of an assessment. A QAR serves as the basis for trend analysis, management and contractor reporting, as well as input into the corrective action system. This form, combined with objective evidence and data, will be retained for the life of the project.

At a minimum, the MEC Quality Assessment Record will contain:

- MEC Quality Assessment Record identifier;
- Name of the MEC Quality Assessor (s);
- Date(s) of the assessment;

- Activity assessed;
- MEC Quality Assessment Question Sets used to conduct the assessment;
- Documents or activities assessed;
- Measuring and Test Equipment used during the assessment (if applicable);
- Personnel contacted during the assessment;
- Results of the assessment;
- Corrective Action Reports issued as a result of the assessment;
- Approval signature of the MEC QA Manager; and
- Distribution, including the record management center.

It is the responsibility of the MEC Quality Assessor to ensure that documentation generated during or following a MEC Quality Assessment are annotated to provide traceability to the MEC Quality Assessment Record.

A 6.2 Other MEC Quality Assessment Documentation

QA meeting minutes and contractor correspondence, such as the QAR, will be controlled with limited data accessibility. Any data collected to substantiate a finding will remain with the QAR. All MEC QA records will be retained throughout the life of the contract and archived at the conclusion of the contract to ensure that a permanent record exists. Any data captured and/or retained in automated format databases will be subject to random periodic reviews and archival requirements.

Part B Measurement / Data Acquisition

B 1.0 Sampling Process Design

Sampling is primarily designed to verify detection and clearance processes. However, the same sampling techniques can be used to assess documents and research material. Should the MEC Quality Assessor determine that data sampling will provide an adequate level of confidence, the Attribute Acceptance Sampling Tables for Lot or Batch Inspection as defined in *Mil-Std-1916, DOD Preferred Method for Acceptance of Product* will be used.

B2.0 Sampling Methods Requirements

Sampling methods will include inspection of records for completeness, review of standard operating procedures for adequacy, visual surveillance of field data collection for compliance, and review and analysis of ordnance identification data for completeness and accuracy. Sampling will employ standard methods and standardized Work Instructions to the maximum extent possible.

B3.0 Quality Control Requirements

Contractor quality control will be assessed for completeness, accuracy, and compliance with contract requirements and the published quality control plan. Assessment will include review of quality control reports, and visual surveillance of the field work and quality control operations to ensure that standard operating procedures and the work plan are followed. Additionally, the QC deficiency reporting and corrective action processes will be examined to assess the extent to which they are improving the affected processes.

B4.0 Instrument / Equipment Testing, Inspection, and Maintenance Requirements

If global positioning systems, detection equipment or other measurement, testing or inspection instruments and equipment are used, the manufacturer's prescribed preventive maintenance and calibration will be performed, documented and monitored. Any measurement instrument, requiring repair will be appropriately calibrated before being returned to service. Inoperable or inaccurate instruments will be tagged for repair and segregated to prevent inadvertent use.

B5.0 Instrument Calibration and Frequency

Any device, instrument, or equipment used for QA measurement or QA data generation that can adversely affect "critical" data will be calibrated, certified through testing, or otherwise proven to exhibit the capabilities for which it was intended. Records of the results or outcomes of these verification activities will be retained in the QA files. If supplied by the manufacturer, the MEC QA Manager will maintain copies of all new equipment calibration certificates. Calibration of measurement instrumentation will be performed using the methods and frequency recommended by the manufacturer. In the absence of manufacturer-specified calibration methods or standards, a set of measuring standards and standard methods will be established and applied by the MEC QA Manager. Calibration frequencies can be adjusted to occur more often, based on the results of calibrations; in no instance will they be adjusted to occur less often than recommended. Changes in method or adjustments in calibration frequency shall be documented.

B6.0 Inspection/Acceptance Requirements for Supplies and Consumables

Supplies, equipment, and consumables that are used for gathering data in the field and used during field operations will be inspected to meet all established acceptance and safety requirements. Analysis will be performed on all radio frequency and electromagnetic radiating equipment to assure that appropriate procedures, restrictions and constraints are placed to preclude Hazards of Electromagnetic Radiation to Ordnance (HERO). Such equipment includes

communication radios, navigation repeaters, and geophysical detection equipment. The accuracy and repeatability of global positioning system equipment will be verified by specification review and/or verified by testing.

B7.0 Data Acquisition Requirements / Data Management

Data acquisition for this project consists primarily of assessing data collection according to the data collection sections of the Work Instructions. When automated data loggers or other electronic data collection means are used, compatibilities and communication protocols of any software will be verified prior to use by the MEC QA team. Data verification shall be performed for accuracy and completeness. Periodic checks for reasonableness-of-results will also be performed. For example, Global Positioning System (GPS) location data will be conducted, using a benchmark or known point as a reference; then plotted on a map and visually verified.

All data regarding the scheduling of activities and results of QA assessments will be entered and maintained in electronic format with hardcopy objective evidence. Contents of these databases will become part of the project Quality Records.

Part C. Assessment / Oversight

C 1.0 Assessments and Response to Actions

C 1.1 Independent Oversight of the contractor's MEC Quality Control (QC) Program

Government QA of the contractor MEC QC program will be provided by PACNAVFACENGCOM and NAVEODTECHDIV, with technical assistance as required.

C 1.2 Corrective Action System

The Corrective Action Report (CAR) form is the formal means to be used to document contractor problems, issues, conditions or findings that can adversely affect attainment of MEC clearance objectives. The CAR will be the input criteria for the Government Corrective Action Process. Government MEC Quality Assessors will use the CAR to document any noteworthy finding that may result from an assessment, and will monitor the CAR process to ensure that open items are dispositioned and verified. MEC Quality Assessors shall periodically assess the effectiveness of the CAR process.

Deficiencies noted during a MEC Quality Assessment will be documented on a CAR form and presented to appropriate Navy project management for resolution. At a minimum, the following information will be reported on a CAR:

- MEC Quality Assessment Report identifier;
- Date of issue;
- Name of the assessor;
- A complete description of the finding or deficiency, including reference to associated documents, procedures and/or equipment;
- Person or organization responsible for the corrective action; and
- MEC Quality Assessor's verification and disposition of corrective action.

The organization or person(s) responsible for resolving a CAR will define any immediate corrective action(s) needed to eliminate a problem, concern or issue, and will then be expected to identify the measure(s) to prevent recurrence. The MEC QA Manager will review and concur with the intended immediate corrective action(s) and remedial action(s) to ensure that they are appropriate and that the root cause analysis has been properly conducted.

The MEC QA Manager will verify and document that corrective action(s) and remedial action(s) have been properly and completely accomplished prior to closing the CAR. Status of open CARs will be reported to Navy project management as part of MEC Quality Assessment Status Reporting.

C 1.3 Continuous Improvement Program

The MEC QA Team will implement an approach toward continuous improvement that includes management reviews, preventive and corrective actions, analyses of data, and assessment results, as well as searching out new opportunities for program improvements.

Continuous improvement is approached through the use of performance measurements to determine which organizational aspects require more attention or resources focused on them. The development of project-specific goals will incorporate the principle of continuous improvement.

Continuous improvement may be demonstrated through the implementation of Lessons Learned and employee involvement programs, which provide the opportunity to learn from past performance and incorporate constructive suggestions. In addition, the MEC QA team will seek comparison and guidance with other project-specific MEC QA teams who are considered to be performing at the highest level.

The MEC QA team will continue to search for opportunities to improve MEC activities. Appropriate methods to address continuous improvement will include any or all of the following:

- Additions, corrections or modifications of work instructions or Standard Operating Procedures to address the root cause of current deficiencies and prevent future deficiencies;
- A Lessons Learned program to educate personnel;
- Comparison of the Navy MEC CIP to similar projects elsewhere;
- A trend analysis program to identify and address positive and negative trends;
- Encouraging suggestions for improvement from all personnel;
- Conducting periodic reviews of procedures;
- Providing a mechanism to incorporate identified improvements into the next planning cycle; and
- Periodically reporting on the progress and effectiveness of improvement activities.

C 1.4 Trend Analysis

The MEC QA Team will periodically analyze CARs, corrective and preventive actions, MEC Quality Assessment Reports, management reviews, analyses of data, and other appropriate sources for trends. Both positive and negative trends in MEC activities will be identified and reported to appropriate management for implementation.

C 2.0 Reports to Management

C 2.1 Summary Reporting

The summarized results of all MEC Quality Assessments will be compiled at the conclusion of the assessment and reported to the Remedial Project Manager.

C 2.2 Management Quality Alerts

During the execution of MEC Quality Assessment activities, if a safety hazard or mission failure is detected, the MEC QA Manager will be notified immediately. The MEC QA Manager will document the issue, confirm its criticality and notify the contractor Project Manager and the Remedial Project Manager. All management alerted will be entered into the Government Corrective Action System and managed accordingly.

Part D. Data Validation and Usability

All data will be validated by periodic review for compliance with the MEC Quality Assessment Requirements of this QAPP. Where MEC QA data results in

continued contractor deficiencies or rework, the data, methods, and instrumentation will all be revalidated.

A systematic data evaluation process will be used to review data to assure that the required data quality objectives have been met. Deficiencies found during the review may require that qualifiers be placed on the use of the data.

All applicable data collected will be validated. The validation process will include:

- Documentation of the results,
- Relevant documentation reviewed to evaluate the technical adequacy, suitability for intended use, and adequacy of the QA record, and
- A reviewer independent of the collection activities.

Data validation will be controlled, so as to permit independent reproduction by another qualified individual.

Data considered to be established fact by the scientific and engineering community, such as data derived from engineering handbook, critical tables, etc., will not require validation.

Part E. Appendices

Index

E.1 – References

E.2 – MEC Quality Assessment Activity Schedule

E.3 - Vieques Island, Puerto Rico Data Quality Objectives

E.1 References

1. Range Rule (Draft -1997)

2. Range Rule Risk Methodology (R3M) (Draft -April 10, 2000)

3. ANSI/ASQC E-4, Specification and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Program

4. NAVSEA OP-5, Volume 1, Chapter 13, Disposal of Ammunition and Explosives

5. Mil-Std-1916, Attribute Acceptance Sampling Tables for Lot or Batch Inspection

E.2 MEC Quality Assessment Activity Schedule

MEC Quality Assessment will be conducted on March 9 through 19, 2003. Field assessment activities will be scheduled to coincide with the detector-aided site characterization, MEC identification, data collection and management, and detector equipment and GPS check and calibration. Additional assessments of field activities may be scheduled based upon adverse findings or significant corrective action issues.

The QA schedule is as follows:

9 – 19 March 2003

Vieques Island onsite QA

- Design and Building of QA test bed seeded with inert MEC items
- QA of field plans
- QA of standard operating procedures
- QA of administrative documentation
- QA of data collection
- QA of detector system check
- QA of GPS system check, reference locations, and data recording
- QA of cleared grids

E.3 Data Quality Objectives

Data Quality Objectives	
DQO #	**Title**
01	Work Plan for RI Phase
04	Data Collection
05	Ordnance Identification
06	Detection Data Management
07	Geophysical Search/Detection System Selection
08	Geophysical Equipment Performance
09	Survey/Location Equipment Performance
10	Operational Verification of Survey/Investigation Equipment
11	Detector Team Performance Evaluation
13	NOSSA Explosive Safety Submission (NOSSA REQUIRED)