

**FORA ESCA REMEDIATION PROGRAM  
SEASIDE MRA, QC-2 APPROACH  
FORMER FORT ORD, CALIFORNIA  
JULY 28, 2008**

## **INTRODUCTION**

The FORA ESCA Remediation Program Team (the FORA ESCA RP Team) is completing the removal actions in Special Case Areas (SCA) in Munitions Response Sites (MRS) Seaside 1-4. SCAs are areas where munitions removal actions were not completed by the previous Army contractor (Parsons). Parsons conducted the majority of the Non-Time Critical Removal Action in MRS Seaside 1-4, with the exception of the SCAs.

This document provides a comparison of the QC-2 process as defined by Parsons to the revised approach that the FORA ESCA RP Team is taking for SCAs. The modified approach will result in a level of QC-2 that is greater than or equivalent to the approximately 16% QC-2 performed by Parsons during previous removal actions.

## **CURRENT PROCEDURE**

The current Quality Control (QC) procedure uses the same multiple step process (developed by Parsons) for the previous removal actions. This document describes a revised QC approach for removal actions in SCAs. The following text summarizes the multi-step QC process as currently specified in the Seaside Work Plan Addendum:

- QC-1: Verification of source item removal at each anomaly selected for excavation.
- QC 2: Resurvey a percentage of each grid and excavate selected anomalies.

**Step 1:** As a minimum, 5 percent of the grids (not less than 3 grids) in an MRS will receive a 100 percent geophysical QC survey. If any of the grids in the 5 percent fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one for each grid that fails) will receive a 100 percent QC survey. The process will be repeated until the original number of grids selected has passed the 100 percent QC survey.

**Step 2:** After step 1 is satisfied, the next 5 grids in an MRS selected for a geophysical QC survey will receive a 30 percent QC survey. If any of the 5 grids fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one for each grid that fails) will receive a 30 percent geophysical QC survey. The process will be repeated until 5 grids have passed the 30 percent QC survey.

**Step 3:** Once steps 1 and 2 have been satisfied, the next 5 grids selected for geophysical QC survey will receive a 20 percent QC survey. If any of the five grids fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one for each grid that fails) will receive a 20 percent QC survey. The process will be repeated until 5 grids have passed the 20 percent QC survey.

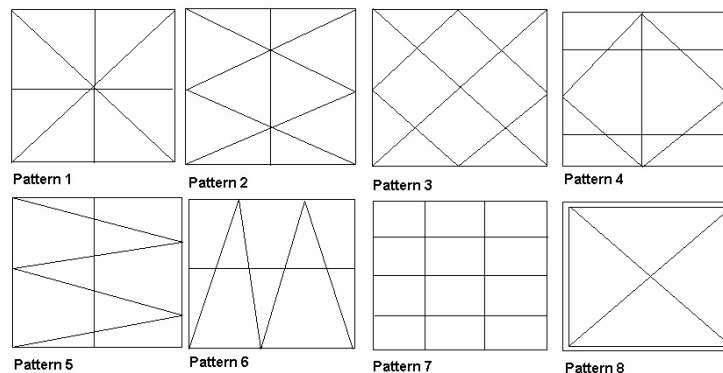
**Step 4:** Once steps 1, 2, and 3 have been satisfied, the remainder of the grids in the MRS will receive a 10 percent geophysical QC survey. If any grid fails the geophysical QC survey, the failed grid will be resurveyed.

- QC 3: Conduct analog survey of at least 10 percent of each grid (area).

A failure at any of the above steps will be constituted by the discovery of a UXO or UXO-like item, or five re-acquirable anomalies as a result of the QC survey, sufficient in size to represent a 37mm projectile or larger, or the discovery during the QC process of five non-selected anomalies that should have been selected during the initial survey.

Any grid that fails the QC Survey in any of the above steps and is subsequently resurveyed will require an additional 10 percent QC (QC-3) inspection and will have to pass prior to being released for QA.

Step-down quality control surveys will be performed with the instrument type used to initially survey the grid. The surveys will be performed in parallel contiguous lanes in the same manner as the initial survey or by pattern, using one of the patterns illustrated below.



## PROPOSED MODIFICATION OF THE QC PROCEDURE

The QC-1, 2, 3 process summarized above will be implemented by the FORA ESCA RP Team to complete the work in SCAs with revisions to the QC-2 process. The proposed revised approach for QC-2 considers the fact that only SCAs are addressed as part of this removal action and not entire grids. The proposed revised approach for QC-2 also considers that Parsons completed the majority of QC-2 during previous removal actions.

The proposed revised approach to complete QC-2 step down was developed after analyzing Parsons Technical Information Paper for their work on MRS SEA1-4 and comparing the locations of SCAs. The modified approach will result in a level of QC-2 that is greater than or equivalent to the approximately 16% QC-2 performed by Parsons during previous removal actions.

- Maps 1-4 (attached) show the result of QC-2 DGM Resurvey coverage area as performed by Parsons.
- Maps 5-6 (attached) show SCAs and QC-2 as performed by Parsons.

The attached maps show that Parsons completed QC-2 Steps 1-3 for all of the munitions response site grids requiring QC-2 including some of the grids containing portions of SCAs. In addition the QC-2 Step 4 is also complete for the majority of all grids containing SCA polygons.

Therefore, the FORA ESCA RP Team proposes to complete the QC process by following the proposed approach:

- QC-1 will be performed as identified in the Work Plan Addendum (and re-stated above)
- QC-2 will include a modification of QC-2 Step 4 consisting of resurveying a percentage of SCAs and excavating selected anomalies, as follows:
  - Small Area SCAs (less than 1000 square feet) – A total of 30% of the small area SCAs identified within the Seaside MRA will undergo a DGM Resurvey of 100% of the total area of the selected SCAs (100% of the surface area of 30% of the number of small area SCAs)
  - Large Area SCAs (greater than 1001 square feet) – A total of 100% of the Large SCAs will undergo a DGM Resurvey on 10% of the area of each Large SCA (10% surface area of 100% of the Large SCAs)

(Size criteria for this step is based on an evaluation of the distribution of SCAs by area [provided in *Attachment 1*], along with the practicality of sampling a fraction of small areas.)

- QC-3 will be performed in SCAs as identified in the Work Plan Addendum (and restated above)

## **SUMMARY**

In accordance with this revised approach, the FORA ESCA RP Team will complete the QC-2 process by implementing a 10% survey for all SCAs with areas greater than 1000 square feet as shown on the attached Maps 7-8. Also shown on Maps 7-8 are the SCAs

with areas less than 1000 square feet. As shown on the maps, MRS Seaside 1-4 contains 103 SCAs with areas less than 1000 square feet. The FORA ESCA RP Team proposes to conduct QC-2 DGM of 30% of these SCAs (a minimum of 31 SCAs)

The California EPA Department of Substances Control (DTSC) requested that the selection of small SCA for QC-2 be initially biased towards areas where the majority of MEC items were found during previous investigations and removal actions. Over time areas selected for QC-2 surveys will be randomly distributed to demonstrate that quality is maintained throughout the duration of the project.

The grid survey patterns illustrated above will not be used for the 10% QC surveys as the SCAs are not regular grids. The actual pattern applied will depend on the SCA selected while maintaining a 10% geophysical resurvey within each SCA.

A failure will constitute the discovery of a UXO, or UXO-like item, or five anomalies reacquired as a result of the QC survey, sufficient in size to represent a 37mm projectile or larger ordnance, or the discovery during the QC process of five non-selected anomalies that should have been selected during the initial survey. Following are the prescribed corrective actions for a QC-2 failure:

- Small SCAs: If a failure occurs during QC-2, 100% of the area will be resurveyed and an additional Small SCA, similar size will undergo QC-2 100% resurvey.
- Large SCAs: If a failure occurs during QC-2, the area or grid (equivalent to ¼ acre or 100 x 100-ft) surrounding the failure within the boundaries of the SCA will be 100% resurveyed. To the extent possible, transects will be performed based on a biased random approach to maximize the sample distribution for the Large SCA's.

A failure occurring on an SCA will require a root cause analysis to determine the potential cause and an appropriate corrective action based on the cause for the failure. For Small SCAs, root cause analyses will be conducted for any single item meeting the failure criteria. Corrective actions will be implemented and may include: retraining, procedural change, evaluation of equipment, etc.

This proposed QC-2 approach for the completion of the SCA removal actions will address the QC-2 requirements for the Seaside SCAs while taking into the account the previous work already completed by Parsons.

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References:

Final Addendum to Final OE-15SEA.1-4 Site-Specific Work Plan Phase II Seaside MRA, Section 5.27, QC-2 Geophysical Step Down

Final Technical Information Paper, MRS-SEA.1-4, Time-Critical Removal Action and Phase I Geophysical Operations, prepared for U.S. Army Corps of Engineers, Sacramento District, Parsons, February 2006.

# Attachment 1

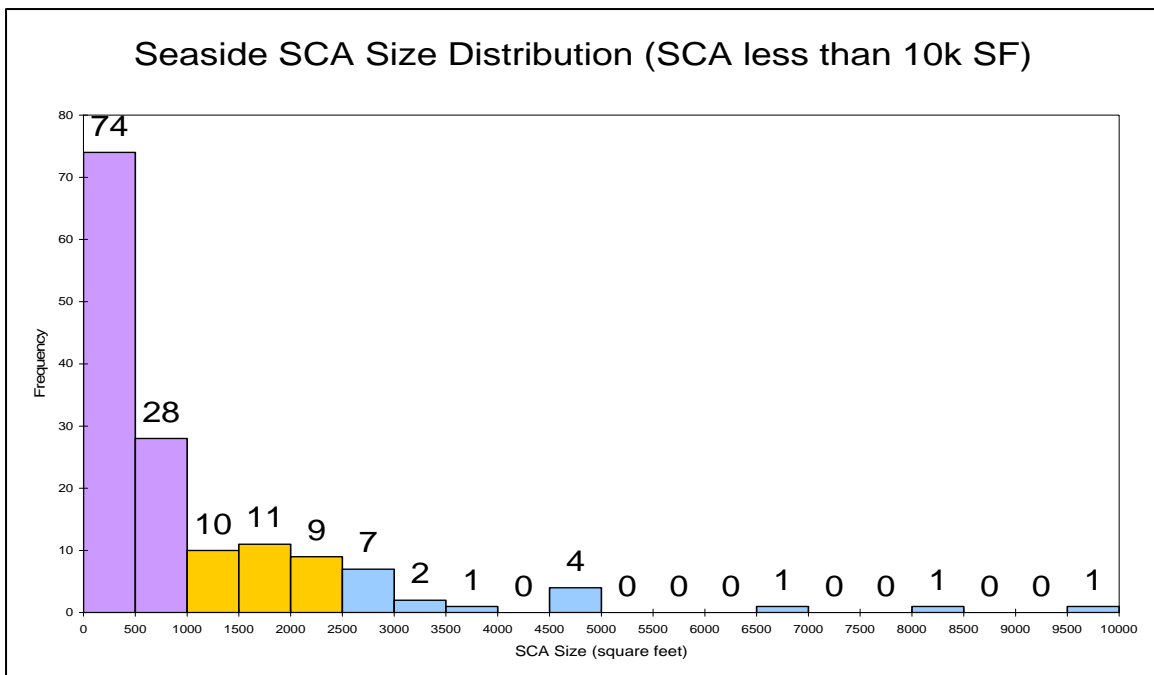
## Size Distribution of Small SCAs in the MRS Seaside 1-4

The FORA ESCA RP Team is proposing to modify the QC-2 Approach by resurveying a percentage of SCAs and excavating selected anomalies in MRS Seaside 1-4, as follows:

- Small SCAs (less than 1000 square feet) – A total of 30% of the Small SCAs will undergo a digital geophysical mapping (DGM) resurvey of 100% of the total area of the selected SCAs (100% of the surface area of 30% of the number of small SCAs)
- Large SCAs (greater than 1000 square feet) – A total of 100% of the Large SCAs will undergo a DGM resurvey on 10% of the area of each Large SCA (10% surface area of 100% of the Large SCAs)

The Small SCA size criterion of 1,000 sq-ft was selected based on an evaluation of the distribution of SCAs by size along with the practicality of sampling a fraction of small areas. The grids used for previous MEC removal actions in MRS Seaside 1-4 are 10,000 sq-ft. (i.e. 100-ft by 100-ft). A Small SCA was originally defined in the work plan addendum as a quarter-grid or 2,500 sq.-ft. On evaluation of the SCA distribution and per recommendation taken from the regulatory meeting (on 20, June) the criteria has been revised to 1,000 sq.-ft.

The 169 SCAs in MRS Seaside 1-4 range in size from 2 sq.-ft to 400,000 sq-ft and are biased heavily toward smaller SCAs. There are 150 SCAs having an area less than 10,000 sq-ft and 103 of those are less than 1,000 sq-ft. The distribution of SCAs is illustrated in histogram and bar charts (linear and log scales) below. The histogram does not include the 19 SCAs having an area greater than 10,000 sq-ft.



There appears to be significant shifts in the distribution of SCAs at 1,000 sq-ft and 2,500 sq-ft. The SCAs smaller than 1,000 sq-ft appear to be equally distributed across that size range, thus there is no indication of a logical “small” size below 1,000 sq-ft. There are 30 SCAs distributed evenly, but at less frequency in the 1,000 to 2,500 sq-ft range. Above 2,500 sq-ft the frequency drops quickly and is dominated by the very Large SCAs.

