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U S NAVY RESPONSE TO NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL
QUALITY AND THE U S EPA REGION IV COMMENTS ON THE DRAFT EXPANDED SITE
INVESTIGATION REPORT MILITARY MUNITIONS RESPONSE PROGRAM SITE
UNEXPLODED ORDNANCE 22 (UXO 22) FORMER MUNITIONS DISPOSAL AREA MCB
CAMP LEJEUNE NC
04/19/2016
CH2M HILL

Response to Comments
Draft Site UXO-22 ESI
Marine Corps Base Camp Lejeune, North Carolina

PREPARED FOR: Dave Cleland, NAVFAC Mid-Atlantic
Charity Delaney, MCB Camp Lejeune
Thomas Richard, MCB Camp Lejeune
Jennifer Tufts, EPA Region 4
Randy McElveen, NCDEQ

PREPARED BY: CH2M HILL

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Introduction

The purpose of this document is to address comments on the Draft Site UXO-22 ESI, Marine Corps Base Camp Lejeune (MCB Camp Lejeune), North Carolina. The North Carolina Department of Environmental Quality (NCDEQ) and United States Environmental Protection Agency (USEPA) comments are listed below. Responses to comments are provided in bold. The Site UXO-22 ESI will be updated and finalized to address these comments.

NCDEQ Comments (dated January 6, 2016)

1. Please include depth dimensions in the third sentence of the last paragraph on page 2-1.

The exact dimensions of waste disposal activities, other than where previous investigations or excavations have taken place, are unknown. The areas of disturbances include evidence of buried waste in the former DRMO lot, test pit excavations during the Remedial Investigation (Baker, 2003), Time Critical Removal Action excavations (Baker and OHM, 1997), test pitting during the Potential Source Investigation (Rhea, 2011), and excavations for the Site 6 chlorobenzene investigation (CH2M HILL, 2012) that are shown on Figure 2-1. This will be clarified in the text.

2. Table 2-1 on pages 2-3 and 2-5 lists 3 Mark II hand grenades and 4 Mark II hand grenades respectively for different investigation phases. Figure 2-1 only shows 3 Mark II hand grenades and no other figure in the report shows any different locations of Mark II hand grenades. The same 3 are shown on another figure. Please make appropriate corrections or include an additional figure to include all 7 locations of the Mark II hand grenade.

Multiple Mark II hand grenades were found at two of the locations shown on Figure 2-1. The legend and symbols for Figure 2-1 will be updated to specify the quantity of MEC items found at each location.

3. The third paragraph on page 3-5 selection of anomalies to be intrusively investigated. I understand the concept for the 95 percentile selection but I would think that it would be better to

choose anomalies that have the geophysical characteristics of munitions. Does the EM-61 not provide good data for anomaly selection?

The EM-61 does provide good data for anomaly selection but does not provide information regarding the nature of the metallic debris. Based on the widespread presence of buried metallic debris, a large number of anomalies were identified by the EM-61. In order to identify a sufficient quantity of anomalies to characterize the nature of the sources of the anomalies, statistical methods were used to select a representative population of anomaly targets to be added to the dig list.

4. Should we confirm the approximate volume of the thick black liquid material as discussed on page 3-9? Please provide a brief discussion of this in the report.

Further information regarding the observed area of the black liquid was added to Section 3.3.2. The volume of the black liquid was not determined in the field at the time of sampling because the site is within a waste disposal area, the black liquid material has been found previously (Potential Source Investigation, Rhea 2011), and the objectives of the Battery Disposal Area Investigation was to evaluate the horizontal and vertical extent of the batteries disposed within the ephemeral drainage and to characterize the soil beneath the disposed batteries. Further characterization of the waste disposal area should be addressed as part of the re-evaluation of OU 2 investigation.

5. In the conclusions and recommendations section of the report we should include backfilling of any visible UXO or DMM during the proposed surface clearance in the wooded areas of the site. As we discussed in partnering there are buried UXO or DMM located within the wooded area that is exposed due to erosion.

The surface clearance recommended in the report was intended to remove munitions debris on the ground surface within the wooded areas. Based on the Partnering Meeting in March 2016, the Team agreed to surface clearance for the munitions debris and solid waste within the wooded areas at UXO-22 and Site 82. If the debris/waste is visible, it will be removed, and if it is below grade, then it will be backfilled.

USEPA Comments (dated February 29, 2016)

1. Section 3.1.1, Surface Clearance, Pages 3-1 and 3-2: It is assumed that the ESI focused surface clearance efforts on the former DRMO area because of the large debris piles observed throughout this area and the potential that this part of the Site may be used more frequently by site workers. It is unclear why surface clearance was not performed in other higher use areas of the Site, such as near the truck scales and the groundwater treatment building. Please clarify why other high use areas were not evaluated to the same degree as the former DRMO area.

The “high use” areas within Site UXO-22 are clean gravel parking lots with no surface debris present; therefore, no surface clearance was proposed for these areas. The rationale for clearance efforts within the former DRMO lot is as follows: From 2001 to 2012, Lot 203, covering approximately 20 acres, was used by the DRMO as a temporary scrap and surplus storage lot. Following DRMO’s demobilization from the site, metallic debris and munitions items were

identified on the ground surface, including a large volume concentrated in an approximately 2-acre area in the northwest corner of the site. To facilitate DGM and intrusive investigation to further characterize subsurface MEC/MPPEH within Lot 203, surface clearance was conducted and funding was provided by the Defense Logistics Agency. This will be clarified in the text.

2. Section 3.1.1, Surface Clearance, Page 3-2: Following surface clearance activities, 34 postholes were excavated to evaluate the nature and depth of buried debris and potential MEC/MPPEH. Section 3.1.1 should include a brief description of any items encountered during excavation and the depths/locations at which they were encountered.

Posthole excavations were conducted within the northwest corner of the former DRMO lot to assess the feasibility of soil screening activities. The posthole excavations were intended to evaluate for the presence of wire or other material that might foul the soil screen. The MPPEH items found during the posthole activities are included in Table 3-1.

3. Section 3.1.2, Soil Screening, Page 3-3: The ESI should provide rationale for soil screening the two acres of the 75-acre site. Also, describe how the lateral and vertical boundaries for soil screening were determined.

Soil screening activities within a 2-acre section of the northwest corner of the former DRMO lot were conducted to remove a large volume of metallic debris and potential munition items remaining after DRMO demobilized from the site. The goal of this activity was to reduce potential surface hazards from metallic debris, possibly including MPPEH that was heavily concentrated in this section of the former DRMO lot. Six inches was selected as a sufficient depth for soil screening to reduce the potential risk from surface debris. This will be clarified in the text.

4. Section 3.2.2, Intrusive Investigation, Page 3-6: The information presented in Section 3.2.2 regarding disposition of found batteries differs from that presented in Table E-1, MEC Investigation Intrusive Results, in Appendix E. The fourth bullet of Section 3.2.2 states that various non-munitions debris (approximately 1,500 pounds) was recovered and recycled offsite, including batteries, wire, scrap metal and vehicle parts. Table E-1 of Appendix E identifies the 14 batteries noted in Section 3.2.2, but it also notes that each of the identified batteries was “left in place.” Table E-1 further classifies the batteries as a “battery pit.” Please revise Section 3.2.2 to address these discrepancies. The text should clarify if the batteries were removed or left in place.

The 1,500 pounds of non-munitions debris mentioned in the fourth bullet of section 3.2.2 was included in the surface clearance section 3.1.1 and was removed from this bullet. The section 3.2.2 text will be clarified to reflect that the batteries identified during the intrusive investigation were left in place.

5. Section 3.3.1, Phase I, Page 3-8: The second bulleted item on this page states that the investigation included “collection of subsurface soil samples from base of test pits containing batteries.” However, Figure 3-9, Phase I Soil Sample Locations, shows that none of the soil samples was collected from within any of the five test pits. Please provide soil sample results from the base of the test pits or rationale for not collecting the samples.

Soil samples were collected from representative post holes and test pits, all of which contained batteries, for initial characterization purposes. One of the soil samples (SB99) was collected from

test pit #2 and the figure will be corrected accordingly. Additional soil samples were collected from the bottom of three posthole locations as shown on Figure 3-9. Table 3-4 provides the results of these soil samples. Upon completion of the Phase I activities, further characterization was recommended to delineate the extent of the battery disposal area and was implemented as the Phase II test-pitting, which resulted in removal of the soil encompassing the Phase I test pits and postholes. This will be clarified in the text.

6. **Section 3.3.1, Phase I, Page 3-8:** A DGM survey of the battery disposal area was conducted prior to test pit activities, but the ESI does not discuss any additional details of this survey as it did for the larger site DGM survey (transect spacing, quality control, etc.). Please provide additional details on the DGM survey conducted for the battery disposal.

The DGM activities within the battery disposal area used an EM-31 and a magnetometer with a line spacing of five feet to identify potential disposal areas; whereas, the DGM used for munitions response activities utilized an EM-61 to identify anomalies representing potential individual MEC or MPPEH items which requires a more robust quality control process. The text will be updated for clarification.

7. **Section 3.3.1, Phase I, Page 3-8:** The Phase I investigation included test pits and postholes but the ESI does not present the results of these activities. It is unclear if batteries, MEC or MPPEH were observed in all of the test pits and postholes, only a few of them or none at all. The ESI does not indicate if items were removed from the test pits for disposal. Please include observations from the testpit/posthole activities and include a summary table of results for each test pit, posthole and depth of items encountered in order to support the conceptual understanding of site conditions.

Batteries and some metallic debris were found within each posthole and test pit location; however, material was not removed during the Phase I activities. This will be clarified in the text.

8. **Section 3.3.2, Phase II, Page 3-9:** The ESI does not adequately describe the location of the black liquid material observed on the side of the excavation. As this information is likely relevant to future investigations within OU2, please describe the location and approximate areal extent of the black material more definitively (possibly in relation to a sample location) and identify the location of this potential source material on a figure.

The location of the sample collected from the black liquid material will be added to Figure 3-10 and the text will be updated to clarify that the liquid was observed within a 1 foot by 1 foot area along the sidewall of the excavation.

9. **Table 2-1, Previous Investigations and Removal Actions, Page 2-4:** The description of the 2011 IRP Site 82 Potential Source investigation states that a black tar-like substance was observed below and within cardboard boxes during this investigation. As indicated on Page 3-9, a “thick black liquid material” was observed in the during the test pit activities. Please clarify if these materials are thought to be the same substance, and if they were identified in proximity to one another. Also, please clarify if the substance in the cardboard boxes in the 2011 investigation was removed.

It is unknown if the thick black liquid found during the battery disposal investigation activities at Site UXO-22 is the same as that found during the Site 82 Potential Source Investigation (Rhea, 2011). The Site 82 Potential Source Investigation report does not indicate if the material was

removed; therefore, it is believed that the material was left in place. The location of the black substance will be added to Figure 2-2.

10. Section 3.3.3, Human Health Risk Screening (HHRS), Page 3-10: An HHRS was conducted using data collected from the Phase II battery disposal area investigation only despite the availability of data from previous investigations at the Site. Please clarify why additional data sets were not considered in this HHRS. If data collected from the ephemeral drainage during prior investigations was not removed as part of the test pit activities, it should be included in the HHRS.

Section 3.3.3 will be revised to acknowledge the limitations mentioned in the comment above. Any further assessment of the waste disposal area should be addressed as part of the re-evaluation of OU 2.

11. Section 3.3.3.6, Human Health Risk Screening Summary, Page 3-12: This section states that the HHRS for soil within the battery disposal area indicates that potential current and future exposures to soil at this area of UXO-22 are within acceptable levels for potential receptor populations. However, the assessment may underestimate risks to these populations. The assessment only evaluated metals data in subsurface soil collected during the Phase II investigation. Risks associated with the black source material observed within the test pit, a sample of which contained elevated detections of total petroleum hydrocarbons (TPH), naphthalene and lead, were not evaluated. Additionally, no surface soil samples were collected around the test pit areas to determine potential impacts on the surface and most exposed area. Also data from prior investigations was not included in the assessment. Please revise section 3.3.3.6 to acknowledge the limitations of the assessment and include recommendations for addressing those limitations.

Section 3.3.3.6 will be revised to acknowledge the limitations mentioned in the comment above. Any further assessment of the waste disposal area should be addressed as part of the re-evaluation of OU 2.

12. Section 4.2, Methods for the Evaluation of Explosive Hazards, Page 4-2: This section heading indicates that methodology used for evaluating explosives hazards is discussed. However, the section only lists site, human and ordnance factors considered without describing how the factors were used to determine that the overall explosive hazard at the site is “low.” Without providing specific methodology on how the various factors were used to arrive at an explosive hazard conclusion, the overall conclusion that the explosive hazard is “low” is not clearly supported. To reduce the uncertainty in the overall hazard conclusion, it is recommended that the hazard level be quantified using the MEC Hazard Assessment methodology.

In lieu of a MEC HA, a qualitative method was used to assess the explosive hazards for MEC/MPPEH potentially present at Site UXO-22. The MEC HA was not used at this site because it is designed to determine relative reductions in hazards under various alternatives during an RI/FS. The Partnering Team determined that an RI/FS was not needed because the MEC/MPPEH identified at Site UXO-22 is based on waste disposal activities at OU 2 and not a result of range activities. LUCs to prevent exposure to MEC/MPPEH are being added as part of the existing OU 2 remedy.

13. Section 4.2.2 Human Factors, Page 4-3: This section indicates that the potential exists for trespassers, site visitors or site workers who venture beyond their typical work areas or gravel road areas to encounter and potentially contact MEC/MPPEH, especially in the wooded areas where MEC surface clearance has not been conducted. Based on this statement, it is unclear that a “low” overall explosive hazard ranking is appropriate for this site. It is recommended that the hazard level be quantified using the MEC Hazard Assessment methodology.

Please see the response to comment #12 above.

14. Section 4.2.3 Ordnance Factors, Page 4-3: This section indicates that a preponderance of the munitions found at the Site were practice rounds or inert items yet the tables listing the munitions found do not specify which ones were practice rounds or inert and which were possibly live. For example Table 4-1 indicates that 7 Mark II Hand Grenades were found as well as a projectile with a fuze; Table 4-2 indicates a rocket warhead was found as well as rifle grenades. Section 4.2.3 further explains that the probability of an unintentional detonation of a Mark II Hand Grenade by casual contact such as accidentally stepping on it is high and more aggressive contact, such as striking the grenade or putting it in a fire, would raise the probability of detonation to even higher. This section further states that the Mark II Hand Grenade has a somewhat unique hazard associated with the explosive filler whereby an attempt to loosen or tighten the grenade fuze may cause enough friction to detonate the TNT in the grenade. Additionally one 81-mm HE mortar shell and one 3.5-inch M28 HEAT rocket was recovered with an explanation that both of these munitions have a high probability of an unintentional detonation by casual contact such as accidentally stepping on them. Based on this information, and the fact that some areas of the Site have not been surveyed does not support a conclusion that the explosive hazard is low. These observations support the need to conduct a more thorough hazard level analysis using the MEC Hazard Assessment methodology.

Throughout the report, clarifications were made that MPPEH items were classified as MDAS upon proper inspection and were determined not to present an explosive hazard.