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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
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March 13, 2006

Mr. Jeffrey Harlow  
Western Vieques Remedial Project Manager  
Commander Atlantic Division  
Naval Facilities Engineering Command  
6506 Hampton Boulevard  
Norfolk, VA 23508-1278

Re: Review of the Draft Engineering Evaluation/Cost Analysis for MEC Removal Solid Waste Management Unit 4 at the Former US Naval Ammunition Support Detachment (NASD) Vieques Island, Puerto Rico

Dear Mr. Harlow:

The U.S. Environmental Protection Agency (EPA) and the Puerto Rico Environmental Quality Board (EQB) have completed the review of the Draft Engineering Evaluation/Cost Analysis (EE/CA) for SWMU 4 dated December 2005. Enclosed you will find our comments.

If you have any questions or comments, please contact me at (787) 741-5201.

Sincerely yours,

A handwritten signature in black ink, appearing to read "D. Rodriguez".

Daniel Rodriguez  
Remedial Project Manager  
Response and Remediation Branch

Enclosures (2)

cc: Yarissa Martinez, EQB, w/ encl.  
Felix Lopez, FWS, w/ encl.  
Oscar Díaz, FWS, w/ encl.  
John Tomik, CH2M Hill, w/ encl.

**EPA comments on the  
Draft Engineering Evaluation/Cost Analysis (EE/CA) for  
MEC Removal Solid Waste Management Unit 4  
Former Naval Ammunition Support Detachment (NASD)  
Vieques, Puerto Rico  
December 2005**

**GENERAL COMMENTS**

1. A review of the EE/CA has revealed that the terms “projectile” and “round” appear to be used interchangeably. An example of this may be found in Section 2.7.1 Initial Assessment Study on page 2-7. Here, what appear to be 8-inch projectiles are described as “8-inch rounds fired in the EMA.” While a round was fired, the item that impacted downrange was a projectile (most likely with a fuze or fuzes), not a complete round (which includes all of the components required to fire the weapon one time).

While the term “round” does not appear to be fully defined in Navy publications, its technical use therein, when compared with the use of the term “projectile,” indicates that the two terms are not interchangeable. As a round contains all of the components necessary to fire the weapon one time, a round would include a primed cartridge case with powder or a primer and bag charge, depending on the weapon system employed. To describe an impacted projectile as a round is incorrect and may lead the reader to misinterpret the hazard presented by the item under discussion.

Please revise the EE/CA to confine the use of the term “round” to complete munitions assemblies containing all of the components necessary to fire the associated weapon one time. In addition, please revise the EE/CA to correct all incorrect uses of the term “round”.

2. The three Removal Action Alternatives provided in Section 4 of the EE/CA are:
  1. No Action
  2. Surface and subsurface munitions and explosives of concern (MEC) removal, demilitarization or detonation, off-site disposal, and site restoration to comply with proposed land use
  3. Site Wide Removal of Surface and Subsurface MEC

While these are the titles given the three alternatives, the titles of alternatives 2 and 3 are somewhat misleading and do not accurately describe the potential results of the two alternatives.

Alternative 2 would result in a surface removal throughout the site and a clearance of all detectable MEC to a depth of two feet in all Land Use Plan-consistent roads, planned trails, and the fence line. A 50-foot wide buffer would also be cleared on each side of these areas to a depth of two feet. In addition, the “sandy beach areas” would be cleared of detectable MEC to a depth of four feet. This alternative would leave the site with a significant area where no subsurface MEC has been removed. It would also leave an unknown quantity of MEC below the removal depths of the subsurface clearances in the above-listed areas.

Alternative 3 would result in a surface removal throughout the site and a clearance of the “sandy beach areas” of detectable MEC to a depth of four feet. The remainder of the site would be cleared of all detectable MEC to a depth of two feet. This alternative would leave the site with an unknown quantity of subsurface MEC on the beaches below the four-foot depth, and an unknown quantity of subsurface MEC in the remainder of the site below the two-foot clearance depth.

No alternative is provided that contains a clearance of the entire area to depth, with all anomalies above the selected detection threshold investigated until resolved. This alternative should be noted and included for consideration, as it provides the greatest measure of protection for humans and the environment, short of soil removal and screening which would be cost prohibitive. Please revise the EE/CA to include this alternative for evaluation.

3. The EE/CA contains a discussion of the clearance of Munitions and Explosives of Concern (MEC) to a depth of four feet on the “sandy beach areas.” It further states that this clearance would be, “...conducted from the water line to the vegetation line.” It is unclear as to what water level is meant by the term “water line,” and this should be identified. In addition, the clearance of the beach areas to the specified depth could be a somewhat temporary measure in the areas where beach erosion and restructuring due to both normal and abnormal wave action may occur, uncovering and/or repositioning any MEC not removed by the four-foot clearance. Please revise the EE/CA to clarify the term “water line”. In addition, please revise the EE/CA to include a discussion of any measures deemed necessary to deal with the potential exposure of residual MEC due to wave action.
4. The EE/CA presents an Alternative 3 entitled “Site Wide Removal of Surface and Subsurface MEC.” This title would seem to indicate that all detected MEC would be removed from the site regardless of depth. However, Section 4.1.3 states that Alternative 3 would consist of the “...location and removal of all MEC to a depth of 2 ft inland across the entire site.” It further states that, “Along the beaches, a clearance to 4 ft would be conducted.” The issue is further complicated by the statement in Section 4.2.1 that describes Alternative 3 as “...the complete removal of all on-site MEC to contamination depth...” and then states that “...this alternative would eliminate the explosive safety risk to humans and the environment by eliminating all explosive hazards.” In addition, the discussion of Alternative 3 in Section 4.3 states that, “Once the removal action is complete, no LUCs or ICs will be required...” This is obviously incorrect if the stated 2 and 4-foot clearances are conducted, as intrusive actions below these clearance depths would risk contact with residual MEC.

Alternative 3 is either a clearance of anomalies to the stated depths, or it is a clearance of anomalies to the depth at which they were detected. It cannot be both. Please revise the EE/CA (specifically all references to Alternative 3) to present a consistent description of the alternative. In addition, as no clearance action can ensure complete removal of all MEC (including removal and sifting of the soil), please revise the statement that Alternative 3 will eliminate all explosive hazards to reflect the fact that residual MEC will likely remain on the site.

## SPECIFIC COMMENTS

5. **Section 1.1, Purpose and Objectives, page 1-1:** The last sentence in this section appears to be misworded, with a portion of the sentence reading, “removal of MEC in to meet projected land use...” As this is difficult to understand as written, please revise the EE/CA to better express the last sentences intent.
6. **Figure 1-3, DOI FWS Land Use Plan, page unnumbered:** The previously undefined term “ROTHR Site” is displayed on the figure with no explanation as to what it represents. Please provide a definition on the figure (or elsewhere in the EE/CA) of the term “ROTHR Site”.
7. **Section 2.2, Site History, page 2-4:** The last sentence in the third paragraph of this section found on page 2-4 reads, “Munitions scheduled for disposal would have been placed on a solid surface within these depressions, wired with explosives, primed electronically utilizing a radio-controlled firing device, and detonated non-electronically from a safe distance using a time-delayed detonating cord system.” There are a number of technical inaccuracies presented in this sentence, including the phrase “wired with explosives,” and the phrase “primed electronically utilizing a radio-controlled firing device, and detonated non-electronically from a safe distance using a time-delayed detonating cord system.” Also, it is unclear whether this sentence is describing one integrated process for destroying munitions, or is a presentation of both the electrical and non-electrical systems used to detonate explosives. Please revise the EE/CA to correct this sentence.
8. **Section 2.7.6, Risk Evaluation, page 2-12:** The last sentence in the section cites a Table 1-1 and a Figure 2-3 as containing information concerning the risk evaluation. Review of the EE/CA does not reveal a table numbered as 1-1, nor does it present a Figure 2-3, although both are listed in the Table of Contents. Please revise the EE/CA to include all referenced tables and figures, and to clarify why Table 1-1 and figure 2-3 were omitted from the EE/CA.
9. **Section 4.4, Cost, page 4-9:** The last bullet on this page contains an assumption which reads: “The maximum depth of MEC contamination is 2 ft bgs inland and 4 ft bgs on the beaches.” No basis is presented here or elsewhere for the assumption of these depths as the maximum depths for MEC on the specified portions of the site. The remedial investigation of the site determined that “Approximately 97% of the MEC items identified were found to occur within 7 inches of the ground surface.” It also noted, however, that, “Over 95 percent of these [items detected during the remedial investigation] were small munitions items, consisting of either 20-millimeter (MM) projectiles or small arms ammunition.” As these items are difficult to detect below the 6 to 8 inch level depending upon their specific size, the statement that 97% of the MEC items detected were found within 7 inches of the ground surface is acceptable. This does not mean that 97% of the MEC actually present on the site is located in the first 7 inches, as the small items noted are difficult or impossible to detect if they are located below that depth. It only means that 97% of the detected MEC were found in the first 7 inches of the soil.

Please revise the EE/CA to provide a rationale for assuming that the maximum depth of MEC contamination on the site is 2 feet below ground surface (bgs) inland and 4 feet bgs on the beaches.

10. **Appendix B, ARARs:** The first (unnumbered) page of Table A-4, Federal Action-Specific ARARs, has no entries. Please revise the EE/CA to correct this or remove the cited page.
11. **Appendix D, Risk Assessment Matrix:** The item located in Appendix D appears to be a slide entitled “Explosive Safety Hazard Screening.” The Munitions Explosive Hazard categories and the Accessibility categories listed on the slide/chart are not defined. Also, the word “Accessibility” is misspelled on the chart. Please revise the EE/CA to correct the cited issues on the slide/chart.

**UXO Pro, Inc. Comments on the  
Draft Engineering Evaluation/Cost Analysis for  
MEC Removal at Solid Waste Management Unit 4  
Former Naval Ammunition Support Detachment  
Vieques Island, Puerto Rico  
Dated December 2005**

**Comments Developed December 15, 2005**

Cmt. No.	Pg.	Sec.	Comment/Recommendation
1	2-10	2.7.4	This section doesn't mention the large subsurface anomalies that do not correspond to surface depressions (former detonation pits) which were not investigated. It is recommended that these large subsurface anomalies be described in this section and that the risk evaluation include an analysis of the potential consequences of leaving them in place without investigation.
2	2-11	2.7.6	<p>These comments are on the risk evaluation:</p> <ol style="list-style-type: none"> <li>1. This section discusses the EHE module of the Site Prioritization Protocol. But the risk evaluation used in this EE/CA doesn't reflect any of the criteria contained in the EHE except for the "munitions explosive hazard" classification upon which the munitions hazard used in the EE/CA risk evaluation is loosely based. It is confusing to reference the SPP and then use only this one aspect of it from the EHE. It is recommended that either the EHE should be used more completely, or eliminate any references to it and develop a site-specific hazard evaluation method.</li> <li>2. The "risk level" results contained on Table 2-1 don't match the outcomes required by the "Explosive Safety Hazard Screening" matrix in Appendix D. Examining the matrix, one sees that all "Category 4 and 5" hazards (it is assumed that Category 5 is selected based on the text statement that, "The "Munitions Explosive Hazard" is classified as "high" for the entire site ...") result in a final hazard assessment of "high" regardless of the "accessibility" determination. This is in conflict with the "Risk Level" outcome contained in Table 2-1 for subsurface risk for "other</li> </ol>

Cmt. No.	Pg.	Sec.	Comment/Recommendation
			<p>areas with no proposed use by population”. Either Table 2-1 needs to be changed or the “risk assessment matrix” needs to be revised. Note that the inputs for both surface and subsurface risk for “other areas” are the same but the outcome is different. This is a sign that the hazard screen is not consistent and contains errors.</p> <p>3. The hazard screen in Appendix D also doesn’t offer the selected outcome as a possibility. The red blocks are all indicative of “MEC surface time critical removal action”, but this is not one of the possible three remedies identified in the EE/CA (no action, surface and 2-ft. clearance where needed for access, and complete clearance to depth are the identified possible actions).</p> <p>Also, the red block in the matrix in appendix D indicates TCRA but, according to the text, all of the actions being considered are non-time critical.</p> <p>Also, the yellow and green blocks offer other actions that are not identified as possible actions in the text (further assessment and further assessment for surface removal).</p> <p>Also, note that the references to Table 1-1 and Figure 2-3 in the last line of this section should be to Table 2-1 and Figure 1-3.</p> <p>It is recommended that the hazard screen be revised and corrected.</p>
3	4-1	4.1.2	None of these alternatives address the large subsurface anomalies noted in comment #1. It is recommended that these large anomalies be addressed in the alternatives.