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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CARIBBEAN ENVIRONMENTAL PROTECTION DIVISION
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May 23, 2006

Mr. Christopher Penny
Eastern Vieques Remedial Project Manager
Commander Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, VA 23508-1278

Re: Review of the Draft Expanded Range Assessment and Phase I Site Inspection Report for Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico

Dear Mr. Penny:

The U.S. Environmental Protection Agency (EPA) and the Puerto Rico Environmental Quality Board (EQB) have completed the review of the Draft Expanded Range Assessment and Phase I Site Inspection Report for Former Vieques Naval Training Range (VNTR) dated March 2006. Enclosed you will find our comments.

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

Sincerely yours,

A handwritten signature in black ink, appearing to read "Daniel Rodríguez".

Daniel Rodríguez
Remedial Project Manager
Enforcement and Superfund Branch

Enclosures (3)

cc: Doug Maddox, FFRRO, w/ encl.
Yarissa Martinez, EQB, w/ encl.
Felix Lopez, FWS, w/ encl.
Oscar Diaz, FWS, w/ encl.
Tom Hall, Tech Law, w/ encl.
Jim Pastorik, UXO Pro, w/encl.
John Tomik, CH2M Hill, w/ encl.

**EPA COMMENTS
DRAFT EXPANDED RANGE ASSESSMENT
AND PHASE I SITE ASSESSMENT REPORT
FORMER VIEQUES NAVAL TRAINING RANGE (VNTR)
VIEQUES, PUERTO RICO
March 2006**

GENERAL COMMENTS

1. The *Draft Expanded Range Assessment and Phase I Site Assessment Report* (hereinafter referred to as the Draft ERA&P1 SIR) contains a number of slang terms and misuses of munitions nomenclature describing the munitions items located on the VNTR. In at least two of the responses to comments found in Appendix A (Response to Comments on PRA), the explanations for these misuses include phrases similar to, "The terms ... are commonly used among military EOD personnel and civilian UXO contractors to describe ..." While this is obviously a correct statement of fact, it does not justify the continued misuse of munitions related terms in this and other documents related to this project simply because they are common usage in the EOD/UXO community. This document and others prepared during the execution of this project will be provided to individuals with no military or EOD/UXO background for their use and evaluation. Terms such as "grenade spoon," "slap flare," "40mm rifle grenade," and the use of the technical term "round" to describe both complete rounds and components thereof that do not meet the official military definition of the term will only add to the confusion of the laypersons reading these documents.

For example, "grenade spoons" should be referred to as grenade safety levers. "Slap flares" should be identified as signal, illumination, ground, (Type), (M-number). As was pointed out in EPA Specific Comment 18 found in Appendix A, the U.S. Military does not have a type classified 40 mm rifle grenade, so all references to such should be removed.

Review the use of munitions technical terms and slang throughout the document and correct as necessary. Replace all slang terms with the correct technical nomenclature for the munitions items represented. Please remove all references to impacted munitions as "round" or "rounds."

2. The Glossary of Terms included in Appendix A, Response to Comments on the Draft Preliminary Range Assessment Report, contains some reference citations that require correction. These include references to "DoD6055 1997" and "DoD 5154.4S." DoD 6055.9-STD, dated August 11, 1997, was cancelled by the issuance of DoD 6055.9-STD, dated July 1, 1999. That version was subsequently cancelled by the issuance of DoD 6055.9-STD, dated October 5, 2004, which is the current version. DoD 5154.4S, dated January 1978, was a predecessor to all of the subsequent versions of DoD 6055.9-STD, and it was cancelled by the issuance of DoD 6055.9-STD, dated July 31, 1984. That version was cancelled by the issuance of the next version, and cancellations have continued by each subsequent version until the correct citation would be DoD 6055.9-STD, dated October 5, 2004 (the current version).

On December 18, 2003, the Principal Assistant Under Secretary of Defense (Installations and Environment), issued a memorandum to the services concerning definitions related to munitions response actions. Attached to that memorandum were two sets of definitions; one set that was provided by this policy letter and the other that was extracted from 10 USC 101. In the memorandum, the Principal Assistant Under Secretary requested that the services use the attached definitions in munitions response actions. A copy of that memorandum and the attached definitions is provided for your information and use in correcting the definitions found in the Glossary of Terms included in Appendix A of the Draft ERA&P1 SIR.

Please correct the definitions and cited references as noted above.

3. In categorizing the munitions items found during the Range Assessment and Site Inspection, it appears that improved conventional munitions and grenades have been classed as a group with flares, and pyrotechnics. This is the case in some of the tables, as well as on the figures and maps provided in the Draft ERA&P1 SIR. While this may be convenient from a size and general type classification standpoint, from a hazard analysis perspective it is probably not a good combination. The submunitions from improved conventional munitions items often constitute the greatest hazard present in a particular area. This may also be the case with grenades, particularly as the 40mm grenade launcher/machinegun projectiles are often referred to as grenades. It would, therefore, seem logical to place these more hazardous items in a separate category from the pyrotechnics and flares, which are often the least hazardous of the live munitions present. This would also assist in identifying areas contaminated with these munitions on the maps/figures provided in the Draft ERA&P1 SIR. As the items are currently grouped, it is difficult to tell a submunitions area from one where flares and pyrotechnics only were found. Please consider revising the grouping of "ICMS/Grenades/Flares-Pyrotechnics" found in the tables, figures, and maps included in the Draft ERA&P1 SIR to provide a separate category/categories for submunitions and explosives or white phosphorous loaded grenades.

SPECIFIC COMMENTS

1. **Acronyms and Abbreviations, page x:** The acronym "LAW" is defined here as "Light Anti-Armor Weapons." While this definition may logically be used here, it is necessary to note that the Single Manager For Conventional Ammunition classes both the M72 series of Light Antitank Weapons (LAW) and the M136 AT4 Light Antiarmor Weapon in the category of Light Antiarmor Weapons. Because of this double use of the acronym "LAW," it would probably be best if the definition of LAW were restricted to the M72 series Light Antitank Weapon. The reasoning behind this is apparent in Table 2-1 of the Draft ERA&P1 SIR, where both the LAW and the AT4 are listed in that manner in the table. As the definition of the term "LAW" as provided in the Acronyms and Abbreviations section of the Draft ERA&P1 SIR includes both the M72 and the M136 AT4, the repetition of the AT4 in the list is redundant. In addition, in lines 9 and 10 of Section 2.2.1.1 Eastern Maneuver Area (MRA-EMA) on page 2-6, the acronym LAW is redefined as "light anti-craft weapons." This gives the acronym "LAW" three interpretations in the Draft ERA&P1 SIR. Please revise the cited sections to properly and consistently define the acronym "LAW" and to omit any existing conflict between the

Draft ERA&P1 SIR definition of “LAW,” the M72 LAW series of weapons, and the M136 AT4 weapon systems.

2. **Acronyms and Abbreviations, page x:** The acronym “MPPEH” is defined as “Material Potentially Presenting Explosive Hazard.” This should read “Material Potentially Presenting an Explosive Hazard.” Please make this correction.
3. **Table 2-1, Types of Ordnance used on the former VNTR, 1983-2003, page 2-3:** The acronym “SMALS” is used here without being defined in the table or in the Acronyms and Abbreviations Section. Please correct this omission.

In addition, a number of ordnance items are listed by their “Mark” (MK) designations without any additional information being provided as to what size/type they represent. In a number of instances, these MK numbers may represent more than one size/type of ordnance. For example, a MK 20 can be a 6-inch common projectile or a 14-inch armor-piercing projectile. A MK 77 can be a 500-pound or a 750-pound firebomb. This multiplicity of identities also applies to the MK 81. Please expand the description portion of Table 2-1 to include the identity of each of the listed MK items.

4. **Table 2-2, Marine Ordnance Expended Annually by Type (number of items), page 2-4:** This table lists the ordnance in sizes from 76mm through 175mm that were fired by the Marines during the period 1974-1998. There is no listing for 8-inch munitions in the table. However, Section 2.2.1.1 Eastern Maneuver Area (MRA-EMA) lists the 8-inch as having been fired in line 6 of page 2-4. In addition, Section 3.3.1.2, Findings, notes on page 3-4 that an 8-inch projectile (type unstated) was found on the beach of the southeast MRA-SIA. Please determine if the 8-inch howitzer was fired during the listed timeframe and include the expenditures in Table 2-2 as necessary. If the 8-inch howitzer was not fired, remove it from the listing on line 6 of page 2-4, and provide the suspected source (i.e., 8-inch naval gun) of the unidentified type of 8-inch projectile noted in Section 2.2.1.1.
5. **Section 2.7, Summary of Previous Investigations, page 2-19:** The last sentence in the second paragraph of the section states that, “Figure 2-9 shows these soil sample locations.” These locations are 39 places where soil was sampled in the Live Impact Area (LIA). However a careful review of Figure 2-9 shows no such locations noted on the map. Inspection of the list of figures found on page vii of the Contents section reveals that Figure 2-11 is the correct identity of the figure that displays the soil sampling locations. Please correct this listing in Section 2.7.
6. **Figure 2-2, Former VNTR Site Map:** This figure has a red box in the legend which has a “1” in its center. It is labeled “MRA-LIA-SIA (C).” It is unclear what the “(C)” represents. It is also uncertain what is intended by the “MRA-LIA-SIA” label and why the EMA has been omitted. Please clarify this and correct/explain as necessary.
7. **Section 3.3.2.2, Findings, page 3-6:** In line 3 of this section the acronym “ICMs” appears with no explanation as to its meaning. A search of the Acronyms and Abbreviations Section does not find it listed there. The acronym appears to be used in two forms (ICMs and ICMS) in numerous locations in the document with no definition provided with its use. Please define the acronym “ICMs” in the Acronyms and Abbreviations Section. If the acronym “ICMS” has a different definition, provide it also.

8. **Section 3.3.4.1, EMA MRSs1 through 5 (Rocket and Grenade Ranges), page 3-9:** In line 30 of this section the acronym “SMAW” appears with no explanation as to its meaning. A search of the Acronyms and Abbreviations Section does not find it listed. Please define the acronym “SMAW” in the Acronyms and Abbreviations Section, or at its first use in the document.
9. **Section 5.1.4, MRA-EMA, page 5-2:** The sentence in lines 7 and 8 of this section is poorly worded and difficult to understand. It is assumed that the intent of the sentence is that the explosives hazards in these MRSs are relatively low and the limited access presented by these MRSs restricts their accessibility by unauthorized individuals. This is not clearly stated as the sentence is currently composed. Please rewrite the sentence to better express the information intended.
10. **Section 5.2, Recommendations, page 5-2:** The sentence in lines 22 and 23 of this section (the third bullet) is incomplete, and it is unclear whether it is a statement of fact or a recommendation for further investigation of surface MEC in the MRA-SIA. Please rewrite the sentence to better express its intent.
11. **Section 5.2.1, Other Recommendations, page 5-2:** Lines 32 through 36 of this section (the entire first bullet) read, “Several PI and PAOC sites were identified in the Preliminary Range Assessment (CH2M HILL, April 2003) and Draft RCRA Facility Investigation Report (CH2M HILL, June 2004) as potentially containing munitions and explosives of concern (MEC). These include sites: PI 2, PI 3, PI 13, PI 14, PI 17, PI 18, PAOC Y, PAOC Z, PAOC EE, and PAOC FF.” As this currently reads, it is a statement of fact, and no action is recommended therein. Please revise this recommendation to include a statement of the action recommended.
12. **Section 5.2.1, Other Recommendations, page 5-2:** Line 37 of this section (the second bullet) introduces the acronym “AOIs” with no definition of its meaning. Although it is eventually identified in the Acronyms and Abbreviations Section of Appendix E, LiDar/High Resolution Orthophotography Report, it should also be defined at its first use in the document if that occurs prior to the Acronyms and Abbreviations listing. Please define “AOIs” in the cited bullet or provide a reference to the location of the definition in the Draft ERA&P1 SIR.
13. **Appendix A, Responses to Comments on PRA, third page:** The response to EPA General Comment 3 states that, “Section 7, Glossary of Terms has been revised in the ERA/Phase I SI to address the responses to comments.” This would appear to indicate that section 7 of the Draft ERA&P1 SIR has been corrected in accordance with the cited General Comment 3. However, a review of the Draft ERA&P1 SIR Contents Section reveals no Section 7 present in the document. There is a Glossary of Terms attached to Appendix A, and it is assumed that this is what is referenced as Section 7. Review the cited response to EPA General Comment 3 and determine if the Glossary of Terms attached to Appendix A is the intended Section 7. If this is the case, revise the definitions as requested in General Comment 2 above and place them in the correct location in the document. Please revise the Contents Section to reflect the addition of Section 7. If this is not the case, explain the intent of the revised Glossary of Terms attached to Appendix A.



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

DEC 1 8 2003

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS & ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS & ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT & LOGISTICS)

SUBJECT: Definitions Related to Munitions Response Actions

In the past two years, the Department of Defense (DoD) has developed policies and guidance to establish and implement a Military Munitions Response Program (MMRP). DoD's Management Guidance for the Defense Environmental Restoration Program (DERP), dated September 28, 2001, was DoD's initial effort in this regard.

To further this effort, and to promote understanding, provide clarity and consistency in both internal and external discussions, a commonly understood set of terms is required. Key among these new definitions is "munitions response" and "munitions and explosives of concern" (MEC). Along with "munitions constituents" (MC), a term defined in 10 U.S.C. § 2710, these definitions also help to clarify DoD's intent to integrate both the explosives safety (i.e., responses to MEC) and environmental (i.e., responses to MC that do not present an explosive hazard) aspects of a munitions response.

The use of accurate, descriptive terminology is important in our on-going efforts to engage other Federal agencies, American Indian Tribes, Alaska Native Entities, the States, and the public in our efforts to address issues related to munitions responses. I therefore request that you begin now to use these terms. Please note however, that as these definitions that are not based on existing statute, regulation, or DoD directive, they should be considered interim. In particular, this memorandum is not intended to limit or to foreclose public comment on these terms during the forthcoming rulemaking for the Military Munitions Response Site Prioritization Protocol.

Use of this terminology does not infer any specific funding authority nor does it alter the program eligibility criteria for munitions responses or building demolition/debris removals found in the DERP Management Guidance. Guidance for funding a munitions response is provided in the DERP Management Guidance.



In addition to the definitions contained in this memorandum, there are also relevant general statutory definitions contained in section 101 of title 10, United States Code. That section provides authoritative definitions for the following five terms: military munitions, operational range, range, range activities, and unexploded ordnance.

My points of contact for these definitions are Colonel John Selstrom, (703) 604-1529 (john.selstrom@osd.mil), and Mr. Kurt Kratz, (703) 697-5372 (kurt.kratz@osd.mil).

A handwritten signature in black ink, appearing to read "Philip W. Grone", with a long horizontal line extending to the right.

Philip W. Grone
Principal Assistant Deputy Under Secretary of Defense
(Installations and Environment)

Attachment:
As stated

Attachment A
Definitions provided by this Policy Letter

Defense Sites. Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))

Discarded Military Munitions (DMM). Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Explosives or Munitions Emergency Response. All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency. An explosives or munitions emergency response may include in-place render-safe procedures, treatment or destruction of the explosives or munitions, and/or transporting those items to another location to be rendered safe, treated, or destroyed. Any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency. Explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at RCRA facilities. (Military Munitions Rule, 40 CFR 260.10)

Munitions Constituents (MC). Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710 (e)(4))

Munitions and Explosives of Concern (MEC). This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means:

- (A) Unexploded Ordnance (UXO), as defined in 10 U.S.C. 2710 (e) (9);
 - (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710 (e) (2);
- or

(C) Munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Response. Response actions, including investigation, removal and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC).

Munitions Response Area (MRA). Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS). A discrete location within a MRA that is known to require a munitions response.

Attachment B
Definitions provided by 10 USC 101
(FY 2004 National Defense Authorization Act)

Military Munitions. Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4))

Operational Range. A range that is under the jurisdiction, custody, or control of the Secretary of Defense and—

- (A) that is used for range activities; or
 - (B) although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities.
- (10 U.S.C. 101(e)(3))

Range. The term 'range,' when used in a geographic sense, means a designated land or water area that is set aside, managed, and used for range activities of the Department of Defense. Such term includes the following:

- (A) Firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas.
 - (B) Airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration.
- (10 U.S.C. 101(e)(3))

Unexploded Ordnance (UXO). Military munitions that:

- (A) have been primed, fused, armed, or otherwise prepared for action;**
 - (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and**
 - (C) remain unexploded whether by malfunction, design, or any other cause.**
- (10 U.S.C. 101(e)(5))**

**EQB Comments on the
Expanded Range Assessment and Phase I Site Inspection Report
Former Vieques Naval Training Range
Vieques, Puerto Rico
March 2006**

Cmt. No.	Page/Section	Line No.	Comment/Recommendation
1	2-3/Table 2-1	N/A	<p>Table 2-1 can be improved by addressing the following issues:</p> <ol style="list-style-type: none"> 1. Identify the type of munitions listed by grouping together into categories. Examples of useful categories are: <ol style="list-style-type: none"> a. Projectiles b. Bombs c. Rockets d. Missiles e. ICMs f. Grenades g. Flares and pyrotechnics <p>This will help readers identify and understand the information that is being presented in the table. For example, a reader of this table doesn't know if the notation for "40mm" refers to a 40-mm anti-aircraft projectile or a 40-mm projected grenade. The reader also doesn't know if the entry for "Grenade" is for a hand grenade, rifle grenade or 40-mm projected grenade.</p> 2. Revise the nomenclature presented for projectiles by giving only the projectile diameter. For example, list "3-in. projectile" instead of "3" 50" and "5-in projectile" instead of "5" 38" and "5" 54". This is because there is no practical difference between a "5" 38" and a "5" 54" from our perspective. The term "5" 38" and "5" 54" refer to the diameter of the projectile (in this case 5-in.) and the length of the gun barrel from which it was fired (in this case either 5-in. X 38 or 190-in. (15.8-ft.) or 5-in. X 54 or 270-in. (22.5-ft.)). Information on the length of the gun barrel from which the projectile was fired is not relevant to readers of this document. Therefore, it is recommended that all 5-in. diameter, 3-in. diameter and 16-in. diameter projectiles be referred to by their diameters only without reference to the superfluous information on gun barrel length.

Cmt. No.	Page/ Section	Line No.	Comment/Recommendation
			<p>3. It is not known what the listings “Tank”, “SMALS”, “MK-20”, and “MK-77” mean. Please explain.</p> <p>4. It is recommended that the heading “Small Caliber” be changed to “Small Arms”. This is a more precise definition of what is listed in the column.</p> <p>5. The listing “Mine” under the “Other” column is not specific enough to provide information. It is possible that this should be “Anti-tank Mine” and that it should be listed under the “Inert” column instead of “Other”.</p> <p>6. It is not clear why some ordnance has been selected for additional information in the section “Description of Select Ordnance Terminology”. Also the accuracy of some of this terminology is in question. For example:</p> <ul style="list-style-type: none"> a. The notation “5” 54 – 5” 54 caliber projectile” doesn’t add much information and indicates this is more than a 5-in projectile (it gives no indication of the meaning of the “54” designation). b. It is not known what is meant by the notation “5” 541 Caliber Projectile” since this designation is not known. c. The NEW for the Zuni rocket appears to be incorrect. The only HE warhead listed on ORDATA is the MK 24 which has 4.3-kg (9.5-lb.) NEW, far less than the 54.4-lbs. listed in the table. This may be a combination of the HE warhead and the rocket motor, but it is not likely that the rocket motor will have propellant remaining in it when it is found on the VNTR range. Listing the NEW of the warhead only is more appropriate. d. The information on 105-mm and 155-mm projectiles is intuitively incorrect because the NEW presented for the significantly smaller 105-mm projectile is greater than the larger 155-mm projectile. Review of ORDATA for these two projectiles demonstrates that the NEW information provided is not correct and that it would be more accurate to list the 105-mm HE as approximately 5-lbs. (instead of 15.7-lbs.) and the 155 HE as 15.5-lbs. (instead of 14.6-lbs.). <p>7. The table isn’t up to date. Review of Appendix D, Photos, demonstrates that some types of MEC are being found on VNTR which are not listed in the table. For example, TOW missiles (51a) and British submunitions (69a) are not listed.</p> <p>In summary, there are many questions and inaccuracies in the table that should be corrected.</p>
2	2-7/Table 2-4	N/A	<p>The headings on this table aren’t the most useful for the following reasons:</p> <ul style="list-style-type: none"> 1. As explained in comment #1 above, the columns for “5”/54” and “5”/38” should be combined. These are all 5-in. projectiles and the length of the barrel that fired the projectile is not relevant. The issue also applies to the

Cmt. No.	Page/ Section	Line No.	Comment/Recommendation
			<p>designation of the "3"/50".</p> <p>2. The designation "4.5"/38 is not known or understood. Please explain.</p>
3	2-8/Table 2-5	N/A	<p>The data for MK-77, MK-78 and MK-16 is not very relevant and it is recommended that it be deleted from this table and replaced by a notation that small quantities of these munitions were known to have been dropped on Vieques, for the following reasons:</p> <ol style="list-style-type: none"> 1. The MK-77 and MK-78 are fire bombs and finding remnants of this munition (the munition functions by being destroyed on impact) is nearly nonexistent. 2. It is not known what the MK-16 is. Please explain what this munition is if it is going to be kept on this table. 3. The numbers of these three munitions that were dropped on Vieques is so small that it makes them not very important to the overall analysis of contamination on Vieques. The information on these three weapons distracts from the large number of MK 80 Series bombs presented in the other columns. 4. This table is missing data for years 1978 through 1981. However, even though data for four years is missing the statement is made on page 2-6, line 39 that, "The average for the 24-year period from 1974 to 1998 was 1,947 rounds per year. How can this statement of a per/year average be accurate if four years of important data are missing? Also, how can one know that the statement "... peak usage of 5,943 rounds in 1977" (page 2-6, line 38) is accurate if data from 1978 through 1981 is not available?
4	2-8/2.2.1.3	2 and 3	<p>This sentence says, "Figures 2-5 and 2-6 illustrate live ATG densities and NGFS impact densities within the LIA respectively for 1979 (Tippets, et al., 1979). The following comments apply to this statement and Figures 2-5 and 2-6:</p> <ol style="list-style-type: none"> 1. The reference (Tippets, et al.) cannot be found on the Vieques Web Site. Please indicate where this reference can be found or post the reference if it is not already posted. 2. Section 6, References, lists one reference for "Tippetts" (lines 3 and 4 on Page 6-2). However, this reference says the document was by Ecology and Environment while Figures 2-5 and 2-6 say the source is the consulting company TAMS. Are these the same documents? Is one of these references incorrect? 3. The text quoted above says the densities are for 1979. However the information on Figures 2-5 and 2-6 say the densities are for 1978. Please correct whichever reference is wrong. 4. It is peculiar that these two figures provide impact densities for either 1978 or 1979 while table 2-4 doesn't provide NGFS expenditure data and table 2-5 doesn't provide ATG expenditure data for either of those two years. In other words, we seem to know the specific densities of NGFS and ATG ordnance which landed in various locations in the LIA but we don't know overall how much NGFS and ATG ordnance was fired into the

Cmt. No.	Page/ Section	Line No.	Comment/Recommendation
			<p>LIA as a whole. Please explain.</p> <p>5. The density data provided on these two figures may be misleading since it is only based on one year (either 1978 or 1979). Presenting this data implies the assumption that these density values are applicable for ATG and NGFS impacts throughout the history of the VNTR. Unless it has been established otherwise, it is recommended that the text and the figures explicitly note that these impact densities and distributions are based on data from one year only and that impact densities and distributions for other years may be very different than that which is presented in these two figures.</p>
5	2-9/2.2.1.4	11	This section describes "Offshore Ordnance in the vicinity of the LIA". However, there is offshore MEC elsewhere on VNTR that is not covered. It is recommended that other sites with offshore MEC (PI-9, for example) be added to this section.
6	2-9/2.2.1.4	20, 21	This sentence says that 2,526 rounds of Naval gunfire were fired at VNTR in 2001. However, Table 2-4, showing NGFS expended annually, doesn't have any information for the year 2001. Please update Table 2-4 to show this and any other new information for years after 1998.
7	2-9/2.2.1.4	20, 21	<p>This text says that the data shown in Figure 2-7 is for the year 2001. However, Figure 2-7 doesn't say the data represented is only for one year. It is recommended that Figure 2-7 be modified to specify the data is for year 2001 only.</p> <p>Also, the lined and cross-hatched areas shown on this figure are not explained. According to the legend they are "Non Explosive Ordnance Locations (Dept. of Navy 2001)" and "Concentrations of Non Explosive Ordnance Locations (Dept. of Navy 2001)". What document is the source reference for this information? Also, what is the difference between "Non Explosive Ordnance Locations" and "Concentrations of Non Explosive Ordnance Locations"? Please explain in the text.</p>
8	2-9/2.2.1.4	20 - 24	This paragraph establishes that 13.4% of NGFS fired at VNTR either landed or skipped into the surrounding waters. What is the purpose of this paragraph? 13.4% of rounds landing in the water is a very large number if applied to all of the NGFS fired into VNTR during its years of operation. Using only data on Table 2-4 (recognizing that there are many missing years of data), 13.4% of 156,204 total rounds is 20,931 rounds in the water: a huge amount of MEC. Is this the intended result of presenting this paragraph of information? It is recommended that this paragraph be modified to include some analysis of the data that is presented to help guide the reader to appropriate conclusions.
9	2-9/2.2.1.4	25	This line references a 1980 EIS. However there are no documents from 1980 listed in the references in Chapter 6.

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			<p>Please correct this error (either the Chapter 6 references, line 25 of this section, or both).</p> <p>The Vieques Web Site has a 1979 EIS listed under “Documents”, “Project Files”, “Vieques”, “East Vieques”, Facility-Wide Files”. However, when one attempts to view this file the document is not available and the web site responds with: “There are no items so show in this view of the document library”. This is also the response when attempting to view the document referenced on Line 25 as the “1986 EA”. Please make these documents available on the web site for review. EQB reserves the opportunity to comment on this paragraph of the Phase I ERA/SI after these documents are made available on the Vieques Web Site.</p>
10	2-9/2.2.1.4	27	This line references a coral reef study done by Antonius and Weaver and dated 1978. There is a study by these authors on this subject available on the Vieques Web Site, however it is dated 1982. If this is the same study please correct the text on this line and the reference in Chapter 6.
11	2-9/2.2.1.4	27	The Antonius and Weiner coral reef study referenced in this line was performed in 1978. Review of the NGFS and ATG ordnance firing data presented in Tables 2-4 and 2-5 indicate that there was a large amount of live and inert weapons firing into VNTR after this study was performed. Moreover, the previous paragraph presents data that in 2001 alone there were 338 NGFS rounds deposited into the water. It is recommended that this section of the report be modified to add some analysis of the Antonius study. Are their conclusions, based on data collected in 1978, expected to still be valid? If so, why? The implication of this paragraph of the report is that there is no significant damage to coral reefs surrounding NVTR. However, is this implication supportable based only on a study performed in 1978?
12	2-9/2.2.1.5	39	This line references Figure 2-1 as showing the location of the OB/OD site. However, this figure does not have this information. Possibly the reference should be to Figure 2-8. Please correct this reference.
13	2-11, 2-12 /Table 2-6	N/A	This table lists several ordnance types that have been found on VNTR which are not listed in the table of the “Types of Ordnance Used on the former VNTR” (Table 2-1). Ordnance found that is not listed in the table of ordnance used include the BLU-77 bomblet, BLU-63/86 bomblet, BLU-97 bomblet, 83-mm HEAT warhead, 69-mm HE mortar, and the 40-mm HE grenade. It is recommended that Table 2-1 be updated to include the ordnance documented to have been found on VNTR.
14	2-13/2.2.2	15 – 21	This text describes the accidental firing of DU projectiles. It is recommended that the text be modified to show the location of the impact of the DU projectiles and that a map showing the location be added to the document. Note this is a repeat comment from the PRA. The response to the PRA comment (Appendix A) says that the location of the DU incident will be identified in subsequent documents.

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15	2-19/2.7	39	This line references Figure 2-9 as showing soil sampling locations. Figure 2-9 is a topo map and doesn't show any soil sampling locations. Please correct this reference.
16	2-20/2.8.1	38	This text references Section 1.4.3 for information on the NPL listing of Vieques. However, Section 1.4.3 doesn't exist. Please correct this reference.
17	2-21/2.8.2	14	This text says Figure 1-5 shows the sites to be assessed under the NPL. However, Chapter 1 doesn't have any figures. Please correct this reference.
18	3-6/Table 3-4	N/A	It is recommended that the title of the second column of this table be modified to note that it shows the number of MEC located on the surface only.
19	3-7/Table 3-5	N/A	<p>This table contains the category "ICMS/Grenades/Flares/Pyrotechnics". This category has never made sense and it is less useful now that this document is going to attempt to determine the hazard of the various MRS for priority ranking. The hazard presented by ICMs is very different than that for grenades. But, ICMs and grenades are high explosive ordnance and putting these in the same category with flares and pyrotechnical is unprecedented. It is recommended that ICMs, grenades and flares/pyrotechnics be considered to be three separate categories of MEC.</p> <p>Also, what is meant by "grenades"? Are these hand grenades, rifle grenades or 40-mm projected grenades? There are also significant differences in the potential shock sensitivity of these three types of munitions. Because of this it is recommended that the term "grenades" never be used alone without a modifier describing what specific type of ordnance is being discussed.</p>
20	3-8 – 3-10/ 3.3.4.1 – 3.3.4.4	N/A	These sections describe the results at the various EMA MRS. It is recommended that the maps for these MRS (Figures 3-9 through 3-12 be modified to show the locations of the areas inspected or transects that were surveyed.
21	3-9/3.3.4.1	4	<p>Is there a Range number for EMA MRS 2? It is believed that EMA MRS 2 is Range 4. This is important because Appendix C lists the MEC found by Range Number, not MRS number. Please add the range number to the description of this site since it is the only MRS in this section that isn't identified as a former numbered range.</p> <p>This comment also highlights the need for consistent references to locations in VNTR. Each site should be consistently called the same thing in all reports and data bases. Either a site is Range 4 or it is EMA MRS 2. Since the project is still in the early stages there is still time to standardize the names of sites and correct databases that contain errors or incorrect nomenclatures for sites.</p>

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22	3-8, 3-9/ 3.3.4.1		It is recommended that a table be added summarizing the MEC found at EMA MRS 1 – 5. This will make it easier to understand the findings.
23	3-10/ 3.3.4.4		It is recommended that the MEC known to exist in shallow water at PI-9 be described in this section.
24	4-1/4.1.1	17	<p>This section references Figure 4-2. The following are comments on this figure:</p> <ol style="list-style-type: none"> 1. The EOD Range is identified in the legend as “small arms/artillery range”. This is not correct. 2. The category of ranges listed as “small arms/artillery ranges” is not correct. Some of these ranges are small arms ranges and some are direct-fire weapons ranges such as 3.5-in rocket ranges or 40-mm projected grenade ranges. These are neither small arms nor artillery ranges. And this legend color (light brown rectangle) isn’t used to identify the artillery ranges which are shown as range fans. <p>It is recommended that this map be revised to more accurately depict the types of ranges on VNTR.</p>
25	4-5/4.2.1	All	<p>The categories of explosive hazard severity presented here are cumbersome, difficult to understand, and not very useful for the purposes of Vieques projects. The following comments refer to the explosive hazard severity categories presented in this section:</p> <ol style="list-style-type: none"> 1. An entire category is devoted to “Riot Control”. However, there is a very small chance that an entire MRS will be found to only contain riot control munitions. There is no known range on Vieques that meets this definition. Although riot control munitions were probably used on Vieques, they would have been fired or disposed of on ranges that were also used for other more hazardous types of munitions. It is unlikely that this category will be used making it not relevant to the Vieques project. 2. All DMM are included in the “Sensitive” category. It is difficult to determine this, but from reading the text one finds that this category is applicable to “5) All DMM containing HE filler that have: a) been damaged by burning or detonation or b) deteriorated to the point of instability” and “6) All DMM containing HE filler that: a) have not been damaged by burning or detonation or b) deteriorated to the point of instability”. This is a very complex way of saying “all DMM” since both damaged and deteriorated and undamaged and not deteriorated DMM are included. This is not technically correct since undamaged and not deteriorated DMM should not be considered to be “sensitive”. 3. “All hand grenades containing energetic filler” are considered to be “Sensitive”. This is not technically correct since hand grenades are designed to be carried on troops into battle. An unarmed hand grenade should not be

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			<p>considered to be “Sensitive”.</p> <ol style="list-style-type: none"> 4. The category “Bulk secondary high explosives, pyrotechnics, or practice” includes references to “sensitive fuze”. Please define the term “sensitive fuze” or provide a list of fuzes that meet this definition. 5. These categories are a technically incorrect combination of the multiple categories included in the actual SPP. The EHE classification table from the SPP is included as an attachment to these comments. <p>In summary, these hazard classifications are so complex that they are contradictory in many instances, some of which are described above. A more simplified approach is appropriate for a preliminary hazard screening process. An example of a more simplified explosive hazard severity classification system, that has been successfully used on both Navy and Army Corps of Engineers projects, follows:</p> <p><u>Category 1: Catastrophic Hazard</u> – High hazard MEC including MEC with sensitive fuzing, such as 40-mm projected grenades and Improved Conventional Munitions (ICMs). This category also includes emplaced minefields and chemical warfare material (CWM).</p> <p><u>Category 2: Critical Hazard</u> - All UXO and also DMM that have been subjected to attempted disposal by detonation or burning.</p> <p><u>Category 3: Marginal Hazard</u> – DMM and other energetic items that have not been deployed as designed or subjected to attempted disposal by detonation or burning. Hazards in this category include MEC and energetic material that has been improperly disposed of by discarding or burial.</p> <p><u>Category 4: Negligible Hazard</u> – Complete and ready to fire small arms ammunition (including blanks) less than 20-mm in diameter and including the projectile, case, powder and primer.</p> <p><u>Category 5- No Explosive Hazard</u> – Non-energetic objects including ordnance debris and practice ordnance without explosives material and/or spotting charges which present no explosive hazard in the event of disturbance or exposure.</p> <p>It is recommended that a more simplified method of determining the hazard category of MEC, such as the example above, be adopted.</p>
25	4-5/4.2.1		<p>It is recommended that this section state that on MRS with mixed types of MEC hazards the most severe MEC hazard will be used for the hazard assessment.</p>

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26	4-6/4.2.2	4 – 7	Please explain what is meant by this statement: “The hazard accessibility provides a qualitative measure of personnel exposure to MEC that takes into consideration the probability that a hazard has been, or will be, created due to the presence and other related factors (frequent, probably, occasional, remote, improbable) of UXO on a MEC”.
27	4-7/Table 4-3	N/A	The following comments refer to Table 4-3: <ol style="list-style-type: none"> 1. The “Munitions Explosive Hazard Severity” column for EMA MRS 6 is not correct. The table says category 1 (no evidence of munitions). However, Table 3-6 shows that practice bombs, flares, illumination projectiles and rocket motors were found there during the SI. Please correct this error and reevaluate the prioritization of this MRS. 2. EMA MRS 12 is assigned a “Munitions Explosive Hazard Severity” of 1 (no evidence of munitions). However two expended projectiles were found there, subsurface anomalies have been identified there during the SI (see 3.3.4.4), and there is documented MEC or MEC debris in the near-shore water at this site. Since MEC debris exists in the water near this site and has been found on the site it is not appropriate to assign Hazard Severity classification 1 (no evidence of munitions) to this site. Please reevaluate the hazard severity classification of this MRS and reevaluate the prioritization of this site.
28	5-1/5.1.4 5-2/5.1.4	34 7	It is recommended that EMA MRS 6 be added to this list of MRSs with MEC present (see comment 27(1) above).
29	5-2/5.1.4	11	It is recommended that the near-shore MEC debris at EMA MRS 12 be mentioned and documented in this sentence.
30	5-2/5.2	24 29	<ol style="list-style-type: none"> 1. It is recommended that EMA MRS 6 be added to this list of MRSs with MEC present (see comment 27(1) above). 2. It is recommended that an evaluation of the near-shore MEC debris at EMA MRS 12 be added to this recommendation.
31	6-2	11	Please provide EQB a copy or a source for this document, “U.S. Navy, Standard Operating Procedures for Unexploded Ordnance (UXO) Clearances and Retrograde Ordnance Disposal”, May 7, 1993.
32	Appendix C	N/A	The classification “ICMS/Grenades/flares-pyrotechnics” should be revised because of the very different hazards associated with ICMS, grenades and flares/pyrotechnics. See Comment 19 above for additional justification.
33	Appendix E	N/A	There are no results presented in the LiDAR Report. Table 14 notes that there were 1,406 crater features, 41 ground features, 13 structures and 9 targets identified. Are any of these features and structures previously unknown? Were there any new potential MRS identified during the LiDAR survey? Are the map deliverables available for inclusion in

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			the ERA Phase 1 SI Report? Please provide additional information on the results of the LiDAR survey.

Attachment 1: EHE Module from the SPP

Table 1 Classifications Within the EHE Module Munitions Type Data Element		
Classification	Description	Score
Sensitive	<ul style="list-style-type: none"> All UXO that are considered likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). All hand grenades containing energetic filler. Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard. 	30
High explosive (used or damaged)	<ul style="list-style-type: none"> All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." All DMM containing a high-explosive filler that have: <ul style="list-style-type: none"> Been damaged by burning or detonation Deteriorated to the point of instability. 	25
Pyrotechnic (used or damaged)	<ul style="list-style-type: none"> All UXO containing pyrotechnic fillers other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). All DMM containing pyrotechnic fillers other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: <ul style="list-style-type: none"> Been damaged by burning or detonation Deteriorated to the point of instability. 	20
High explosive (unused)	<ul style="list-style-type: none"> All DMM containing a high explosive filler that: <ul style="list-style-type: none"> Have not been damaged by burning or detonation Are not deteriorated to the point of instability. 	15
Propellant	<ul style="list-style-type: none"> All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., rocket motor). All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., rocket motor) that are: <ul style="list-style-type: none"> Damaged by burning or detonation Deteriorated to the point of instability. 	15
Bulk secondary high explosives, pyrotechnics, or propellant	<ul style="list-style-type: none"> All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., rocket motor), that are deteriorated. Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard. 	10

Table 1 Classifications Within the EHE Module Munitions Type Data Element		
Classification	Description	Score
Pyrotechnic (not used or damaged)	<ul style="list-style-type: none"> All DMM containing a pyrotechnic fillers (i.e., red phosphorus), other than white phosphorus filler, that: <ul style="list-style-type: none"> Have not been damaged by burning or detonation Are not deteriorated to the point of instability. 	10
Practice	<ul style="list-style-type: none"> All UXO that are practice munitions that are not associated with a sensitive fuze. All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: <ul style="list-style-type: none"> Been damaged by burning or detonation Deteriorated to the point of instability. 	5
Riot control	<ul style="list-style-type: none"> All UXO or DMM containing a riot control agent filler (e.g., tear gas). 	3
Small arms	<ul style="list-style-type: none"> All used munitions or DMM that are categorized as small arms ammunition. [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.] 	2
Evidence of no munitions	<ul style="list-style-type: none"> Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present. 	0
Notes: <ul style="list-style-type: none"> <i>Former</i> (as in "former military range") means the MRS is a location that was (1) closed by a formal decision made by the Component with administrative control over the location, or (2) put to a use incompatible with the presence of UXO, DMM, or MC. <i>Historical evidence</i> means the investigation: (1) found written documents or records, (2) documented interviews of persons with knowledge of site conditions, or (3) found and verified other forms of information. <i>Physical evidence</i> means: (1) recorded observations from on-site investigations, such as finding intact UXO or DMM, or munitions debris (e.g., fragments, penetrators, projectiles, shell casings, links, fins); (2) the results of field or laboratory sampling and analysis procedures; or (3) the results of geophysical investigations. <i>Practice munitions</i> means munitions that contain an inert filler (e.g., wax, sand, concrete), a spotting charge (i.e., a small charge of red phosphorus, photoflash powder, or black powder used to indicate the point of impact), and a fuze. The term <i>small arms ammunition</i> means ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns. 		