

3/28/06-02704

MEMORANDUM

Response to Comments on *Time Critical Removal Action (TCRA) of unexploded munitions in the former Vieques Naval Training Range (VNTR)*

TO: Dr. Jorge L. Colón, Ph.D.
CH2M HILL

COPIES: Nilda Medina, Committee for the Rescue and Development of Vieques (CPRDV)
Judith Conde, Vieques Women Alliance (AMV)
Colleen McNamara, Community Group for the Decontamination of Vieques (GCDV)

FROM: NAVFAC, Atlantic

DATE: March 28, 2006

This memorandum compiles the Navy's responses to your comments received on the *Time Critical Removal Action (TCRA) of unexploded munitions in the former Vieques Naval Training Range (VNTR), Vieques Island, Puerto Rico* (CH2M HILL, April 2005). The comments have been reproduced, followed by the response in bold type.

1. The Navy should discontinue the removal of UXOs by BIP until it evaluates modern technological alternatives, such as the controlled detonation chamber, that protect better the environment and human health

Navy Response:

The Navy initially considers all methods of characterization, remediation and disposal when approaching each area of known or suspected contamination and then proceeds with the best approach for each individual situation. While technologies such as the controlled detonation chamber seem to offer desirable alternatives, the operational limitations to that system and others that are frequently considered significantly restrict their use at the former Vieques Naval Training Range. This concern is addressed in greater detail in response to other comments below.

2. Among the solid wastes or hazardous constituents contained in UXOs are: lead, RDX, TNT, DNT, 2,4,6 TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, N-nitrosodiphenylamine, picric acid, furans, dioxins, aluminum, magnesium, hexachlorobenzene, di-n-butylphthalate, pentachlorophenol, antimony, molybdenum, thallium, barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin, and arsenic. The open burning or detonation and BIP of munitions is a process that releases many of these known toxins into the air and eventually to the soil.

Navy Response:

This comment does not appear to be applicable to the TCRA at Vieques. In response to the broader issue raised, air monitoring is currently being conducted in the vicinity of the open detonations at TCRA site to assess potential

environmental impacts. The results to date have shown no detections of explosive compounds and only low level concentrations of common metals have been detected, which are well below levels that would pose an unacceptable risk to human health. In addition, previous soil analyses from the TCRA have shown that the soils do not pose an unacceptable risk to human health.

3. The United States General Accounting Office (GAO) has recently indicated that ranges contaminated with military munitions may have soil, groundwater, and surface water contamination for any of the over 200 chemical substances that are constituents of the munitions. The report states that humans potentially face long-term health problems, such as cancer and damage to heart, liver, and kidneys, when exposed to some of these constituents. Of the over 200 chemical constituents, there are 20 of greatest concern due to their potential environmental impact and widespread use. These munitions constituents of greatest concern are listed in Table 2 of Appendix 1 of the GAO report, [*Military Munitions: DOD Need to Develop a Comprehensive Approach for Cleaning Up Contaminated Sites* (GAO-04-147, Dec. 19, 2003)].

Navy Response:

It is not clear as to how this comment pertains to the TCRA. The air monitoring conducted during the TCRA and the previous soil sampling completed in the LIA has not demonstrated that detonations within the LIA have had an adverse impact on the environment. As agreed with the US Environmental Protection Agency, after the munitions removal actions are completed, additional environmental investigations of soil, sediment, surface water, and groundwater will be conducted to assess the environmental impacts from munitions sites at the former Vieques Naval Training Range.

4. According to the Environmental Protection Agency (EPA) Region 4 there are various ways to treat propellants, explosives and pyrotechnics (PEP), [www.trainex.org/web_courses/subpart_x/EPA%20CD%20Content/SubpartXUnits.htm, accessed on June 26, 2005.]

Navy Response:

This comment is not applicable to the TCRA. PEP typically refers to propellants, explosives and pyrotechnics that are not contained inside of the casing of military munitions. To date, virtually no loose PEP material has been encountered during the Site Investigation or TCRA effort at the Former Vieques Naval Training Range.

5. According to the Environmental Protection Agency (EPA) Region 4 there are various

2

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

ways to treat propellants, explosives and pyrotechnics (PEP):

- Open Burning/Open Detonation (and BIP)
- Controlled Detonation Chamber (e.g., Donovan Blast Chamber)
- Blast Containment Structure
- Hurd Burn Units
- Confined Burn Facility
- Carbon and Catalyst Regeneration Units
- Thermal Desorption Units
- Vitrification Units
- Ex-situ and In-situ Vitrification
- Rotary Metal Parts Treatment Unit

Other modern technologies are:

- a) tent and foam (used at Fort Ord, California)
- b) Water jets
- c) German-produced HL-21 shape charge (tested at Aberdeen Proving Grounds)
- d) Earth coverings of controlled explosions

Navy Response:

The reviewer has prepared a list (above) of treatment methods and engineering controls that are designed and intended for a variety of different applications and scenarios but do not all apply to the TCRA on Vieques. Each method and control, other than open detonation, would have limitations if applied to the TCRA. The limitations associated with the use of the controlled detonation chamber on Vieques are discussed in greater detail in responses to Comments 6, 7, and 8 below. The other treatment methods/controls listed above are either not suitable for many of the same reasons described for the controlled detonation chamber, or else they are treatments for raw explosives or explosive soils and are not used for cased military munitions such as those found on the former VNTR.

The reviewer's suggested list is repeated below, with a brief reason why each one is or is not appropriate as a disposal method for the former Vieques Naval Training Range.

- *Open Burning/Open Detonation (and BIP)* - Currently the MEC disposal alternative
- *Controlled Detonation Chamber (e.g., Donovan Blast Chamber)* - chamber use limited by sensitivity to movement and explosive weight of many munitions being encountered
- *Blast Containment Structure* - this is merely an engineering control used to reduce

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

the effects of blast and fragmentation; potential releases are not contained.

- *Hurd Burn Units* – burn units are limited to small arms and raw (loose) Propellants, Explosives, and Pyrotechnics.
- *Confined Burn Facility* - Same as above
- *Carbon and Catalyst Regeneration Units* – used for the treatment of media (such as soil) that has been contaminated with explosives, not for munition items
- *Thermal Desorption Units* – same as above
- *Vitrification Units* – same as above
- *Ex-situ and In-situ Vitrification* – same as above
- *Rotary Metal Parts Treatment Unit* - thermal unit used to flash Munitions and Range Related Debris to remove explosive residue. A similar technology is part of the proposed management plan for scrap metal remaining after open detonation at VNTR.
- *tent and foam (used at Fort Ord, California)*- an engineering controlled employed when the area can not withstand a high order detonation; contamination is not contained.
- *Water jets* – cutting system used to demilitarize large inert ordnance items. This system can be operated remotely if the items can not be confirmed to be inert, but is extremely slow.
- *German-produced HL-21 shape charge (tested at Aberdeen Proving Grounds)* – an option for the type of donor explosive used to initiate the open detonation of an ordnance item. This product is reported to have less contamination than other types of demolition material. Unfortunately, little benefit would be recognized by its use at VNTR, because the vast majority of the potential explosive compounds come from the explosive in the ordnance item itself and not the donor charge.
- *Earth coverings of controlled explosions* - this is merely an engineering control used to reduce the effects of blast and fragmentation; potential releases are not contained.

The above listed containment methods/controls, are usually necessary for project sites where Munitions and Explosives of Concern are found in close proximity to residential areas, or areas with natural and/or cultural resource concerns.

To address the potential that destruction of munitions by Open Detonation can release contaminants into the air and could affect the Municipality of Vieques, the Navy has installed three separate air monitoring stations, positioned to monitor any air-borne contamination moving from the Live Impact Area toward the Municipality of Vieques. The current air monitoring data demonstrates that the open detonations have not had an adverse impact on the air quality.

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

6. For Vieques, even upon considering these factors, it is impossible to determine that ALL munitions encountered in Vieques are fuzed and armed and so dangerous to EOD personnel that they need to be disposed by BIP. At the Restoration Advisory Board (RAB) meeting that took place in Vieques on May 12, 2005 and in which we were present, the Navy claimed that UXOs had to be disposed using BIP because ALL bombs that have been found and those that will be found during the TCRA, the explosives personnel are declaring them too dangerous to be moved before detonating them. However, the person reporting on the emergency removal action that took place from February until April 2005 admitted that some UXOs were transported and gathered at the former OB/OD site at the LIA. If the UXOs can be transported to the OB/OD site, then they can as well be transported to an area where the Donovan Blast Chamber can be located and the bombs can be detonated there inside the chamber.

Navy Response:

During the early stages of the Site Inspection most of the bombs that were identified were unsafe to move. However, in the LIA, where the TCRA is being conducted, that assessment varies depending on the specific target location where specific types of UXO were used.

As previously stated, the use of containment methods/controls such as the Donovan Blast Chamber, are usually required for project sites where the fragmentation of Munitions and Explosives of Concern can potentially impact nearby residential areas, or where the potential release of constituents could potentially impact natural and/or cultural resources. The LIA is not located in the close proximity of residential areas. In addition, the current air monitoring data demonstrates that the open detonations have not had an adverse impact on the air quality. Furthermore, previous soil analyses have not shown there has been an adverse impact to the environment.

7. Before the RAB meeting, at a meeting with the Puerto Rico's Environmental Quality Board (EQB) that took place on April 7, 2005, the EQB argued that this controlled detonation chamber (T-10 model) could not be used because it can only be used to detonate small bombs (less than 105 mm). However, the community has found documents that indicate that CH2MHill currently has much larger models (T-30, T-60, D-60, D-100 and D-200) which could be used in Vieques, [*Evolution of Blast Chamber Technology for Demilitarization*, Mark S. Morris, President DeMil International, Inc., 30th Environmental and Energy Symposium & Exhibition, www.dtic.mil/ndia/2004enviro/sessions/session3/morris.ppt accessed May 1, 2005].

Navy Response:

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

Use of a Controlled Detonation Chamber or CDC is limited to 1) munitions that can be safely moved into the chamber and 2) munitions that are at or below the explosive limit for that particular chamber. Most of the UXO items identified during the TCRA do not meet both of these criteria.

While many of the ordnance items now being found in the Munitions Response Sites in the Live Impact Area are safe to move, the high explosive weight of those items would prohibit them from going into even the largest mobile controlled detonation chamber, which is limited to a Net Explosive Weight of 16 lbs. As an example, there are 191 lbs. of explosives for one MK 82 GPLD Bomb. On the other hand, roughly 90% of those that do meet these criteria contain very small amounts of explosives (for example, less than 1 ounce of explosive for one 30mm projectile). Using a detonation chamber for a limited number of items with very small amounts of explosives is not cost-effective and would not do much to minimize the possible effects of open detonation.

The largest model of CDC that is currently being transported to sites to destroy conventional munitions is the T-30. This model can safely contain the detonation of a 155mm High Explosive projectile or its equivalent. The reviewer cites the T-60, which should actually read TC-60. This chamber is outfitted with air treatment equipment and to date has been used solely for the testing and destruction of chemical munitions. While it is constructed to contain the detonation of larger munitions than the T-30 (155mm), the design limitation trials and required Department of Defense Explosives Safety Board approval for the TC-60 have not been completed for the larger munitions. The other chambers, referenced above, are fixed systems (D-100 and D-200). Fixed systems are constructed at the site where they will be used and they will remain there following their use.

8. The Navy itself has decided to use as an alternative to BIP, the combined use of BIP and the Donovan Blast Chamber. At the Mare Island Naval Shipyard in California. At a RAB meeting there the Navy officer explained the benefits of using the Blast Chamber, [MARE ISLAND NAVAL SHIPYARD RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES HELD THURSDAY DECEMBER 11, 2003, www.efds.w.navy.mil/environmental/Pages/mi031211.htm accessed on June 30, 2005].

Navy Response:

The Navy uses the technologies, including controlled detonation chambers, that are determined to be appropriate for each individual situation.

As discussed in the previous comments, only a small number of items being recovered from the former VNTR meet the criteria (both safe to move and amount

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

of explosives) to allow for their destruction in the controlled detonation chamber. Several ordnance items cannot be destroyed in a CDC because they exceed the design limitation for explosive weight (for example, 191 lbs. of explosives for one MK 82 GPLD Bomb). Using a detonation chamber for a limited number of items with very small amounts of explosives is not cost-effective and would not do much to minimize the possible effects of open detonation.

To limit the number of open detonations and the amount of demolition material (donor explosive) used, the field crew will continue to combine the items which can be moved with those that cannot be moved.

9. A section detailing which other alternatives were considered for disposition of UXOs should be included. Considering that in the Emergency Response Action (ERA) that occurred between January and April 2005, on just 10 acres surveyed in the LIA, the density of UXOs found was 185/acre, then for the 400 acres, if the density is the same (unlikely, since the ERA only surveyed the beaches), then we can calculate that a total of more than 74,000 UXOs might be encountered [Restoration Advisory Board Meeting, PHASE I Expanded Range Assessment/Site PHASE I Expanded Range Assessment/Site Inspection Status Inspection Status Update, May 2005, public.lantops-ir.org/sites/public/vieques/Public%20Review/RAB%20Documents/RAB%20Presentations/May%202005%20RAB%20Presentation%20ERA-SI%20English.pdf, accessed June 30, 2005.]. This would mean that many BIP events would be performed. Alternatives to BIP must be evaluated and discussed in the *TCRA Plan*.

Navy Response:

See responses to comments 6, 7, and 8.

10. Only surface UXOs are being considered in the removal action

Recently, the Congressional Research Service (CRS) published a report on the environmental cleanup at Vieques and Culebra [*Environmental Cleanup at Vieques Island and Culebra Island*, Congressional Research Service, and (Memorandum to Honorable José Serrano, Congressional Research Service, and Aug. 4, 2004)]. This report says that the DOD standards for the removal of ordnance at former training ranges indicate that excavation and removal must be done down to ten (10) feet, if the area will be used in the future as a commercial or residential area, but just one (1) foot if the area will have limited public access uses, such as a wildlife refuge. We have also seen information that for agriculture at least a four (4) feet depth must be excavated and UXO be removed. These standards do not establish how deep to excavate and remove UXO for areas where no public presence will be allowed, or what are the standards for removing UXO in underwater areas.

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

Although we understand that this is a TCRA, we believe that the Navy's objective is to excavate and sweep for UXO in Vieques down to one (1) foot below the surface, if at all, in designated areas of the wildlife refuge, while not doing any subsurface cleanup at the LIA.

Navy Response:

The Live Impact Area is currently classified as a "Wilderness Area", which prohibits access to the public. The Navy is conducting an interim remedial action to reduce the risk from explosive hazards associated with the munitions found on the surface of the ground in the LIA.

The final remedy will be dependent upon several factors, including: explosive hazards of munitions, the final land use plan for the Refuge, and environmental impacts. Additional investigations will be needed to assess the explosive hazards and environmental impacts. The land use plan is currently being developed by Fish & Wildlife Service. The extent and the depths of the final remedies cannot be determined until these tasks are completed.

11. The Navy must not forget that contamination can not be contained by putting up fences. First, run-off from rainwater can carry contaminants to the sea and to other areas on the LIA or outside of the LIA. Secondly, the contamination of the groundwater and aquifers has not been ruled out by any comprehensive study. Third, there is hydraulic connection between the highly contaminated lagoons of the LIA (where hundreds, if not thousands, of UXO remain) and the sea, and that when floods occur, the whole LIA gets submerged and connected to the sea. Therefore, existing contamination will migrate to the sea, contaminating the environment and the habitat of many species, some of which are endangered species. In addition, contaminated marine plants will result in an unacceptable risk of contamination to other animals and to the population from the bioaccumulation through the food chain. This migration of contamination from the LIA to other zones in Vieques has existed for a long time; it currently exists; and it will continue to exist in the future. Any cost estimate that is based on the false assumption that such migration does not occur is unacceptable. Recently, Tropical Storm Jeanne provoked that at least one bomb hit surface at one of the beaches in eastern Vieques where the U.S. Fish and Wildlife Service allows public access. The USFWS proceeded to close the three beaches in the area. If we consider that Jeanne was not a hurricane when it passed through Vieques, there is a real possibility that natural events may extrude UXO from land and water open to public access. Therefore, removal of UXO must be as complete as possible. Simply erecting fences around an area will not rule out these possibilities. There is a clear and present risk of contamination from the LIA, and the people of Vieques should not have to live with that risk for the rest of their lives. A high

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

standard of cleanup should be reached. The lessons from the cleanup of Kaho'olawe, Hawaii should be learned.

Navy Response:

As previously stated, the current interim remedial action is to remove munitions that pose an immediate risk from exposure to explosive hazards. Following the munitions removal, additional environmental investigations of soil, sediment, surface water, and groundwater will be conducted, to assess the environmental impacts from munitions sites at the former Vieques Naval Training Range. Where contamination is detected at levels that pose an unacceptable risk to human health or the environment, remedial alternatives will be evaluated to determine the most cost-effective method for treatment that meets the goals of reducing health and environmental risks.

12. EPA monitoring

On a community meeting on April 7, 2005 the EPA admitted that they did not monitor the emergency removal activities that occurred from January to April 2005 on East Vieques, because the Navy did not give them a permit to observe the removal activities. Nor had the EPA obtained a permit to monitor the TCRA. We believe that it is necessary that the current TCRA under CERCLA is monitored by the EPA in this Superfund site.

Navy Response:

Under the Superfund program, the US EPA is the lead regulatory agency for the munitions and environmental cleanup of the former Vieques Naval Training Range. As a result, they have the authority to monitor the progress of the munitions removal activities. Additionally, EPA and its subcontractor have performed site visits to monitor progress and perform audits of MEC clearance activities.

13. No analysis of soil (or air monitoring) before and after a BIP event is included

Such an analysis will help determine the amount of explosives that are deposited on the ground after a BIP event and can be included to assess how much contamination the BIP event is adding.

Navy Response:

In response to community concerns, air monitoring is being conducted (since August 2005). The results of the air monitoring program have been submitted to the regulatory agencies (EPA, EQB). Once the regulatory comments on the reports have been addressed, the reports will be submitted to the RAB for review. As previously stated, after the munitions are removed, additional soils investigations

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

will be completed to assess the environmental impacts from the previous bombing activities and from the BIP actions.

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.