

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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San Francisco, CA 94105

24 August 2005

Mr. Darren Newton  
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Base Realignment and Closure  
7040 Trabuco Road  
Irvine, California 92618

RE: Comment on the Draft Phase II Remedial Investigation (RI) Report, Installation Restoration Program (IRP) Site 1, Former Explosive Ordnance Disposal (EOD) Range, Former Marine Corps Air Station (MCAS) El Toro, California

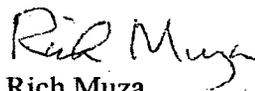
Dear Mr. Newton:

The EPA has reviewed the subject document. We present in the attachment a number of comments on the draft RI Report. Due to the nature of some comments -- in particular, those on the various risk assessments -- and to expedite delivery of the draft final submittal, we would recommend that a meeting or conference call be arranged to discuss these comments prior to delivery of the Navy's response to comments and the revised Draft Final RI Report.

One issue of concern resulting from our review and touched on in our comments is the IRP Site 1 perchlorate plume and its relationship to the detections at IRP Site 2. An evaluation of the data collected for both sites would indicate that the perchlorate detections in monitoring wells at Site 2 are part of the Site 1 plume being evaluated in this RI Report. The Navy should include the Site 2 ground-water quality data in determining the fate and transport of the perchlorate plume originating at Site 1, as this plume should be addressed in its entirety and not within the context of the individual IRP sites.

If you should have any questions, please feel free to contact me at 415-972-3349.

Sincerely,



Rich Muza  
Remedial Project Manager  
Federal Facility and Site Cleanup Branch

**received**  
8/29/05

cc Content Arnold, NFECSW SDIEGO  
Gorden Brown, NFECSW SDIEGO  
Frank Cheng, DTSC  
John Broderick, RWQCB  
Bob Woodings, RAB Co-Chair  
Marcia Rudolph, RAB Subcommittee Chair  
Gerry Hiatt, EPA  
Sonce De Vries, EPA

navistar

## **COMMENTS ON THE DRAFT PHASE II RI REPORT FOR IRP SITE 1, EOD RANGE, FORMER MCAS EL TORO, CALIFORNIA**

**1. GENERAL** – There are numerous comments provided below regarding incorrect citations to tables and figures within the text of the Draft RI Report. It is recommended that a thorough edit of the draft final version be performed prior to submittal to the agencies for their review.

**2. Executive Summary, Page vii** – “The location of the borehole B-1 is likely to be the only location where this contamination extends up to the depth of 20 feet bgs.” What is this conclusion based on? If no other borings had detections of contaminants with depth, then it is recommended that this supporting data be mentioned here.

**3. Executive Summary, Page vii** – “It is likely that borehole B-1 is the only location where low concentrations of explosives and perchlorate exist up to the depth of 35 feet bgs.” What is this conclusion based on? If no other borings had detections of contaminants with depth, then it is recommended that this supporting data be mentioned here.

**4. Executive Summary, Page ix** – “Cumulative incremental cancer risks for future offsite residents potentially residing near Site 1 are necessarily less due to groundwater mixing and potential biodegradation.” What is meant by this statement? As presented in this context, the statement does not fully explain the cause and effect described. It is recommended that further clarification be provided.

**5. Executive Summary, Page xi** -- Under question 3 – does the contamination extend beyond 10 feet bgs – mention is made of the one location “which is likely to be the only location where contamination has affected deeper soil”. What is this conclusion based on? If no other borings had detections of contaminants with depth, then it is recommended that this supporting data be mentioned here.

**6. Executive Summary, Page xi** -- Under question 5 -- is surface-water runoff an exposure pathway – an answer of “yes” is given “based on observations made during the winter 2004-2005 season”. However, within a number of discussions in Section 5 – Contaminant Fate and Transport – this pathway for migration is discredited due to the lack of detections of contaminants at levels of concern in this media. Which position is the Navy supporting regarding surface-water runoff as a potential exposure pathway? It is recommended that these discrepancies be addressed.

**7. Executive Summary, Page xii** -- Once again, mention is made of the one location cited in Comment 3 above “which is likely to be the only location where contamination has affected deep soil”. What is this conclusion based on? If no other borings had detections of explosives and perchlorate with depth, then it is recommended that this supporting data be mentioned here.

**8. Section 1.4, Page 1-8 to 1-17** – There appears to be some confusion within the text of this section regarding the tables. Table 1-2 is cited in the text here where it should be referring to

Table 1-1 and later in the text a non-existent Table 1-3 is mentioned instead of Table 1-2. It is recommended that these citations be corrected.

**9. Section 2.1, Page 2-1** – The last statement on the page indicates that a listing of Field Change Requests will follow, however, no items are provided. It is recommended that this omission be addressed.

**10. Section 2.2.4, Page 2-25** – Except for the general descriptions provided in the text, no locations are given for the surface-water samples collected during the Tier III-C investigations. In this section all other discussions of sampling approach for the various media include figures with sample locations depicted. It is recommended that a figure be included that shows the locations of the surface-water samples.

**11. Section 3.2.1, Page 3-1** – Figure 3-3 is cited in the first paragraph to identify the four stratigraphic units represented in the study area. However, as one continues with the geology discussion, it appears that Figure 3-1 should have been referred to here in the text as this figure has the four stratigraphic units being described highlighted. It is recommended that this discrepancy be addressed.

**12. Section 3.2.3, General** – This section is to cover the site hydrogeology. However, in the later pages the discussion goes into a thorough fate and transport analysis for perchlorate, citing Figure 4-7 in many places. Using the perchlorate results (Figure 4-7) to augment the discussion of the ground-water flow regime would be of value here but the full fate and transport evaluation is to be provided in a later section (Section 5) of the RI Report after the presentation of the analytical data results (Section 4). It is recommended that this section be edited to not include a full fate and transport discussion for perchlorate in ground water.

**13. Figures 3-11 & 3-12** – It is recommended that the ground-water elevations used to prepare these water-table maps be provided on the figures.

**14. Section 3.2.3, Page 3-14** – Figure 3-12, the ground-water equipotential map from March 2005, is cited in the first full paragraph on this page. However, the discussion involves depth to bedrock and the slope within the bedrock surface. It seems that the figure that should be referred to here is Figure 3-10. It is recommended that this discrepancy be addressed.

**15. Section 3.3.2, Page 3-36** – The discussion here regarding the sampling for the Riverside fairy shrimp is confusing. Are the results provided based on work in 1998 or is this information based on the findings of the 2005 sampling? It is recommended that this discrepancy be addressed.

**16. Section 3.3.3, Page 3-36** – Once again, the discussion here regarding the sampling for the Riverside fairy shrimp is confusing. The results and findings in the 2005 sampling should be presented. It is recommended that this discrepancy be addressed.

**17. Section 4.3.2.1, Page 4-16** – “2-Butanone was detected...(Table 4-15).” The citation here of Table 4-15 is incorrect as Table 4-15 provides results from the Tier II soil sampling. It is recommended that this error be corrected.

**18. Section 4.3.2.6, Page 4-51** – “Twenty six soil samples and three duplicates...(Table 4-12).” The citation of Table 4-12 in this statement is incorrect as Table 4-12 provides results from the Tier I soil sampling. The correct reference here is Table 4-15. It is recommended that this error be corrected.

**19. Table 4-29** – This table presents an analysis of detected metals for the Tier III-C investigation. However, no discussion of the Tier III-C efforts is provided anywhere within Section 4. It is recommended that this omission be corrected.

**20. Section 4.3.2.9, Page 4-68** – It is recommended that mention be made here to the fact that there are no preliminary remediation goals (PRGs) for the hydrocarbons that were detected at Site 1.

**21. Section 4.3.2.9, Page 4-68** – It is recommended that mention be made here to the fact that the industrial PRG for 2,3,7,8-TCDD was exceeded in one soil sample from Site 1.

**22. Section 4.4.7, Page 4-82 & Tables 4-31, 4-32, & 4-33** – “Concentrations of most metals were less than background values,...” No background metals data are provided in any of the referenced tables of sediment sampling data. It is recommended that either the background metals values be added to one of the tables or reference be made to another location where this information is presented in the RI Report.

**23. Section 4.5.1, Page 4-101 & Table 4-36** – “Therefore, based on the results of confirmation sampling conducted in February 2002 and sampling conducted in June 2002, it can be concluded that no or negligible VOC contamination exists at Site 1.” While no discernable TCE plume has been demonstrated at Site 1, a review of the data indicates that the detections of TCE exceeding the MCL occurred in January 2002 sampling and the confirmation sampling resulting in non-detections was conducted in February 2002. However, none of the monitoring wells that had the original detections of concern were sampled in the June 2002 monitoring round. Looking further at the data, it is apparent that no ground-water samples were collected from monitoring wells located downgradient of 01-MW207 in any of the sampling rounds cited above. If it is determined that TCE data do not definitively support the referenced statement, then additional sampling and analysis for TCE may be necessary. It is recommended that the issue of TCE detections in the January 2002 sampling be further clarified in the text based on the concerns raised above as this data leads to potential issues within the human health risk assessment.

**24. Section 4.5.5, Page 4-105** – “In the 1998 investigation (Column 1 of Table 4-42),...” The referenced table is incorrect and should be Table 4-41. It is recommended that this error be corrected.

**25. Section 4.5.7, Page 4-116** – “Table 4-42 presents a summary for metals analyses during these sampling rounds.” The referenced table is incorrect and should be Table 4-43. It is recommended that this error be corrected.

**26. Section 4.5.7, Page 4-116 & Table 4-43** – “Metals that exceeded MCLs...” No maximum contaminant levels (MCLs) are provided in the text or on Table 4-43 for the metals. It is recommended that either MCLs for metals be added to the tables or reference be made to another location where this information is presented in the RI Report.

**27. Section 4.5.7, Page 4-117** – “The metals detected in these samples include...(Table 4-43).” The data referred to in this discussion appears to be presented on Table 4-36 and the frequency of detections summary is presented on Table 4-44. It is recommended that this error be corrected.

**28. Section 4.5.8, Page 4-117** – A discussion of the results of analyses for general chemistry as part of the Stationwide Groundwater Sampling is provided here; however, none of the data is provided in a table nor is a reference given for the source of this data. It is recommended that either the background values be added to one of the tables or reference be made to another location where this information is presented in the RI Report.

**29. Section 4.5.9, Page 4-117** – The results and conclusions of radionuclide investigations is provided here; however, none of the data is provided in a table nor is a reference given for the source of this information. It is recommended that this omission be addressed.

**30. Section 4.6, General** – Here and throughout the subsections the results of surface-water sampling at Site 1 are discussed. In a number of these discussions Table 4-44 is cited, while in Section 4.6.8, Table 4-41 is cited. However, the analytical data for surface water are included on Table 4-45. It is recommended that these errors be corrected.

**31. Figure 4-7** – The text discusses a perchlorate concentration of 75 mg/l while the figure provides a concentration of 7.5 mg/l. It is recommended that this error be corrected.

**32. Section 5.1.2, Page 5-2** – “Additionally, limited historical information suggests that rocket motors or JATO units were disposed at Site 1.” What was the ultimate fate of such materials as results of the geophysical investigations at the site do not suggest the presence of such objects? It is recommended that this issue be further clarified in the text.

**33. Section 5.1.2.1, General** – Due to the physical properties of perchlorate, it has been shown at other sites where its use was historical in time that little or no source area contamination remains. It has been a number of years since activities that would have led to the release of perchlorate at IRP Site 1 were terminated and soil sampling indicated that low levels persist at selected locations. However, perchlorate is still present at relatively high concentrations in a number of monitoring wells in the “potential perchlorate source area” depicted on Figure 5-2. What mechanism(s) would lead to the levels of perchlorate present in ground water in this area years after the historical activities by the Marines that led to perchlorate releases to the environment were terminated? Secondly, what condition(s) would allow for the existence of the extensive

perchlorate plume that has been delineated downgradient from this area? It is recommended that potential hydrogeological scenarios that support these issues be further discussed in the text.

**34. Section 5.1.4, General** – An evaluation of the ground-water quality data presented here coupled with the ground-water quality data presented in the “Draft Technical Memorandum, Aquifer Test, IRP Site 2, Magazine Road Landfill” (November 2004) suggests that the source of the perchlorate present in ground water at Site 2 is the result of contaminant migration from Site 1. However, no compilation of the data from the field investigations for Sites 1 and 2 are provided in the RI. It is recommended that an additional subsection be added to address the perchlorate detections at Site 2 with respect to contaminant migration in the aquifer between Sites 1 and 2 and that a figure be developed to show the full extent of the perchlorate contamination in ground water at Sites 1 and 2.

**35. Section 5.1.4.1, Page 5-6** – “The piezometers 01-PZ01 and 01-PZ11, and borehole 01-HPA10...” The citation of 01-PZ01 in this statement is incorrect and should be 01-PZ10. It is recommended that this error be corrected.

**36. Section 6.5 & Section 6.6, General (MCL Exceedances)** -- The risk assessment does not present a discussion of the MCL exceedances for bis(2-ethylhexyl)phthalate and nitrate in groundwater. It is recommended that this information be added to the risk assessment.

**37. Section 6.5 & Section 6.6, General (Arsenic Issues)** -- In the current draft, excess lifetime cancer risks due to exposure to arsenic are evaluated using only EPA toxicity factors. It is the policy of Region 9 to incorporate California EPA (Cal/EPA) toxicity values into risk assessments at Superfund sites for any contaminants where the Cal/EPA value is significantly more conservative (ie., predicts higher risks) than corresponding EPA toxicity values. (In this context, “significantly” is functionally defined as greater than 4-fold.) This policy is reflected in the Region 9 PRG tables by incorporation of a “Cal-modified” PRG value for the appropriate contaminants. Accordingly, the Cal-modified PRGs (6.2E-2 mg/kg for residential soils and 7.1E-3 ug/l for drinking water) and Cal/EPA toxicity values (oral cancer slope factor {SFo} of 9.5 [mg/kg-d]<sup>-1</sup> and inhalation slope factor {SF<sub>i</sub>} of 12 [mg/kg-d]<sup>-1</sup>) for arsenic should be incorporated into the screening and site-specific risk assessments for Site 1. Additionally, since background arsenic concentrations in western soils and ground water are often significantly greater than their residential PRG levels, a discussion of how site-related arsenic concentrations compare to background levels should also be included. It would be appropriate within that discussion to present site-related risk values both with and without the contribution of background arsenic. Finally, for arsenic in ground water it would also be appropriate to discuss concentrations observed in ground water at Site 1 in the context of the MCL for arsenic. It is recommended that these issues for arsenic be addressed in the draft final report.

**38. Section 6.5 & Section 6.6, General (Dioxins Issues)** -- For risk assessment purposes, dioxins and furans are not single analytes but rather a suite of closely related congeners, many of which share a common mechanism of toxicity and carcinogenicity, albeit with varying potencies. The current draft risk assessment inherently makes the assumption that only one of the dioxin/furan congeners found at the site -- 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) -- contributes to cancer risk; this assumption is present in the risk assessment by virtue of the fact

that only the 2,3,7,8-TCDD concentrations are compared to risk-based screening levels. This assumption is unreasonable and runs counter to the risk assessment guidance and standard of practice for both EPA and Cal/EPA. It is also counter to the policy of the World Health Organization (WHO) and the consensus of the global scientific community. Regarding assessment of risks from the full spectrum of dioxin-like compounds, the standard of practice for Superfund risk assessment is to calculate a 2,3,7,8-TCDD-equivalent concentration using the WHO Toxicity Equivalence (TEQ) Factors, as endorsed by EPA, and to use this "TEQ concentration" when assessing risks or making comparisons to the dioxin PRG. This approach should be incorporated into the screening and site-specific risk assessments for Site 1. Fortunately, the approach used in the current draft document does not materially affect the conclusions of the risk screening process. Dioxin/furan congeners other than 2,3,7,8-TCDD made a significant contribution to the overall dioxin TEQ concentration in a number of surface soil samples (eg., in some samples 2,3,7,8-TCDD accounted for less than 10% of the total dioxin exposure point concentration as determined by the TEQ concentration). However, even taking the additional congeners into consideration via the TEQ concentration, there was only a single soil sample (ie., 01-T33, Table G-9) which exhibited a TEQ concentration (23.7 ng/kg) greater than the residential soil PRG of 3.9 ng/kg used for risk screening at the site; since this was a subsurface sample, it is not expected to indicate a potentially significant excess cancer risk. It is recommended that these issues be addressed for dioxins in revising the RI Report.

**39. Section 6.5, General (Lead Issues)** -- In accordance with the Region 9 policy on Cal/EPA toxicity values (see Comment 37 above), the screening assessment for lead at Site 1 should be based on the Cal-modified PRG value of 150 mg/kg for residential exposures, instead of the EPA value of 400 mg/kg. It would be appropriate to note that the surface soil exposure point concentration (EPC) for lead at the site only marginally exceeds the Cal-modified PRG and that the ground-water EPC is below the MCL of 15 ug/l. It is recommended that this issue for lead be addressed in the risk assessment.

**40. Section 6.5 & Section 6.6, General (Naphthalene Issues)** -- In accordance with the Region 9 policy on Cal/EPA toxicity values (see Comment 37 above), the screening and site-specific risk assessments for naphthalene at Site 1 should be based on the Cal-modified PRGs (1.7 mg/kg for residential soils and 4.2 mg/kg for industrial soils), which incorporate Cal/EPA's determination that naphthalene is a carcinogen. Also, in the risk characterization discussion, it would be appropriate to discuss the very low frequency of detection observed for naphthalene at Site 1. It is recommended that these issues be addressed for naphthalene in the draft final report.

**41. Section 6.5 & Section 6.6, General (TCE Issues)** -- It is noted in the current draft that the TCE toxicity values developed by EPA in 2001, which have been reviewed and supported by the Science Advisory Board, are still considered provisional and are scheduled for further independent peer review. It should also be noted that Cal/EPA's Office of Environmental Health Hazard Assessment has developed cancer slope factors for use in assessing risks from TCE exposure. Rather than choose between the two sets of toxicity values, risk managers would be better informed by seeing a range of potential cancer risks calculated using both the provisional EPA values and the current Cal/EPA values. Relatively high TCE concentrations were observed in ground-water sampling during the mid-1990's (Table 4-35) and similar concentrations were observed again during Tier I sampling early in 2001 (Table 4-36). Sampling in between these

periods and afterwards did not detect TCE, however, relatively few samples were analyzed for TCE at these times. It appears that the TCE in ground-water situation might deserve some additional investigation to clarify the extent of TCE contamination in ground water and to develop accurate ground-water concentration data. (See Comment 23 above.) Since the presence of TCE was demonstrated in two early rounds of sampling, TCE concentrations from subsequent sampling should, consistent with Superfund risk assessment guidance and the standard of practice, be assumed to equal one-half the appropriate detection limits. Thus TCE, at these levels, should be incorporated into the future residential scenario for the site-specific risk-based evaluation. In addition, the risk assessment should present a discussion of the MCL exceedances observed for TCE in ground water during the initial sampling event. It is recommended that these issues regarding TCE be addressed in revising the RI Report.

**42. Section 6.6, General --** The initial risk-based screening evaluation in the current draft is performed using PRGs developed to assess residential exposures; this is appropriate and consistent with EPA and Cal/EPA policy and guidance. However, the more detailed site-specific risk-based evaluation, conducted on those contaminants remaining from the PRG screening, considered only construction worker, trespasser, and range officer exposure scenarios; it specifically did not address risks for any potential future residential exposures on the site. Due to the extreme population pressure and rapidly appreciating real estate values in this area, it is reasonable to assume that this property could eventually be considered for future residential development. In this respect the current draft itself notes that "continued urbanization has brought housing developments to within one-half mile to the northeast of the site." Therefore, a future residential exposure scenario should be included in the site-specific risk-based evaluation. Consistent with California water policy and Superfund risk assessment standard of practice and guidance, use of ground water as a potential future source of drinking water should be included in the future residential scenario risk assessment. Alternatively, since this property is a former EOD Range, if Department of Defense (DoD) regulations or policy prohibit future residential development this condition should be discussed within the risk assessment and DoD should assure that the proper land-use restrictions are in place to prevent consideration for future residential development (see Comment 46 below). It is recommended that these issues be addressed in a revised risk assessment.

**43. Section 6.6, General (Perchlorate Issues) --** The perchlorate ground-water plume extends downgradient beyond the boundaries of Site 1 to impact other areas of MCAS El Toro (see Comment 34 above). The risk evaluation should discuss the possibility for "off-site" impacts and give some consideration to potential risks created by them. It is recommended that this issue be addressed in the Draft Final RI Report.

**44. Section 6.6.2, Page 6-36 --** This site-specific risk evaluation makes the assumption that a construction/utility worker's exposure duration is 3 years for the reasonable maximum exposure (RME) scenario and 1 year for the central tendency exposure (CTE) scenario. By using these exposure duration values, the risk assessment inherently assumes that MCAS El Toro is the only contaminated property that a construction/utility worker receptor will ever work on; this assumption is unrealistic. Given the general paucity of previously undeveloped land in Southern California and the recent emphasis by municipalities and government agencies to redevelop brownfields-type properties, it would be more reasonable to assume that construction/utility

workers routinely encounter contaminated properties. Therefore, in order to generate a soil PRG which achieves a given target risk level over a construction/utility worker's career it would be more appropriate to assume that 50% (RME) to 25% (CTE) of that career involves work at contaminated properties. Over a 25-year working career, the corresponding exposure durations would be 12.5 years (RME) and 6.25 years (CTE). It is recommended that these issues be addressed in a revised risk assessment.

**45. Section 7 & Appendix H, General** -- The Screening Ecological Risk Assessment (SERA) and Baseline Ecological Risk Assessment (BERA) presented in Appendix H and summarized in the main document text appear to be responsive to the major comments made by the agencies in 2003 in reviewing the "Draft SERA, Phase II RI, IRP Site 1, EOD Range, Former MCAS El Toro" (February 2003). EPA agrees with the Navy's conclusions that potential risk does exist to biota on site. However, as noted in the comments made on this draft SERA by Dr. Regina Donohoe, California Department of Fish and Game - Office of Spill Prevention and Response dated 11 August 2005, some of the methods used to assess the risk were not those suggested in her comments of 4 June 2005 on the February 2003 draft cited above. EPA concurs with her present comments and strongly recommends that the Navy make the changes that she suggests in a revision of the SERA.

**46. Section 8.0, General** -- In reading the supporting documents related to Section 8 -- Munitions and Explosives of Concern Risk Assessment -- it was noted that IRP Site 1 does not meet the current DoD criteria for an EOD Proficiency Range, where munitions other than bare explosives are detonated/functioned. According to the first paragraph of Section 8, the EOD Range is to be transferred to another federal agency and will continue to be used in the same manner as it has previously been used. This transfer would, therefore, be conducted under the provisions of "Chapter 12 -- Real Property Contaminated with Ammunition, Explosives or Chemical Agents -- of DoD 6055.9-STD -- Department of Defense Ammunition and Explosives Safety Standards" (October 5, 2004). Section C12.3.2.5 of this standard reads as follows: "Limited use land transfers may be arranged with other federal agencies for compatible use of contaminated real property such as wildlife refuges, safety zones for federal power facilities, or other purposes not requiring entry except for personnel authorized by the DoD component concerned. These land transfers shall include all restrictions and prohibitions concerning use of the real property to ensure appropriate protection of both operating personnel and the general public." As "appropriate protection" within the DoD is defined in DoD 6055.9-STD, this appears to indicate that the explosives safety and quantity/distance provisions of DoD 6055.9-STD will continue to apply to the property after transfer. Section 1.3 of Appendix E -- Munitions and Explosives of Concern Range Evaluation -- states that "training for EOD and demolition of munitions has been conducted at Site 1 since 1952 (BNI 1995)". Review of Attachment C -- Munitions and Explosives of Concern Investigation Results -- of Appendix E reveals that munitions fragments were found on-site. This discovery confirms that fragment producing munitions items other than bare charges have been used or disposed of on the EOD Range. Paragraph C9.8.4.3.4 -- EOD Proficiency Training Ranges -- of DoD 6055.9-STD states the following in subparagraph C9.8.4.3.4.3: "EOD proficiency training ranges used with other than bare charges or non-fragment producing items shall meet the requirements of subparagraph C9.8.4.1". That subparagraph contains the following requirement for separating nonessential personnel from intentional detonations which may produce fragments: "The distance determined from the equation  $d = 328W^{1/3}$  but not less than 1,250 ft". This would require the installation

boundary to be a minimum of 1,250 feet from any detonation on the range that produces fragments to ensure that any off-base individuals at or near the boundary were protected as nonessential personnel. As the northwestern boundary of the installation and the current northwestern boundary of the EOD range and its buffer area are the same, it is obvious from a review of Figure 1-2 of Appendix E that the required separation distance cannot be met for any off-base individuals in close proximity to the cited boundary fences. The requirements noted above should be understood by all involved in the transfer of the EOD Range and the receiving agency should be aware that compensatory measures are necessary to preclude undue risk to off-base personnel during range operations involving items which may produce fragments. In addition, there is a slight potential that munitions items may have been ejected (ie., kickouts) from the "demolition of munitions" activities noted in Section 1.3 of Appendix E. Some of these kickouts may have landed off the installation and this potential hazard should also be addressed. It is recommended that the Navy address these issues as applied to the transfer and future uses of IRP Site 1 in the Draft Final RI Report.

**47. Section 8.0, General --** The statement is made a number of times in Section 8 that the munitions and explosives of concern (MEC) items recovered on the EOD Range are unfuzed (low sensitivity). While this appears to be correct, this does not necessarily mean that all of the MEC potentially present and unrecovered on the EOD Range is unfuzed and, therefore, of low sensitivity. This is of concern because of the presence of a number of the items noted in Attachment C -- Munitions and Explosives of Concern Investigation Results -- of Appendix E which seems to indicate that the range was used to destroy unserviceable/hazardous munitions as well as to conduct EOD proficiency training. This activity could have resulted in fuzed munitions remaining on the EOD Range. In addition, with the continued use of the range for the same general purpose by another agency, the probability that fuzed MEC is present can only increase, unless periodic clearance is undertaken by its new tenants. While this potential does not require a revision of the risk assessment, it should be communicated to all future users of the EOD Range, unless it can be definitively stated that no destruction of unserviceable/hazardous munitions with fuzes was/will be done on the EOD Range. It is recommended that the Navy address these issues as applied to future uses of IRP Site 1 in revising the RI Report.

**48. Section 8.1, Page 8-1 --** Reference is made here to "...two 40mm cartridges with primer..." As the term "cartridge" refers to a complete round (ie., everything necessary to fire the related weapon one time), a 40mm cartridge would include the primer, propellant, cartridge case, projectile, fuze, and filler. It appears from a review of Attachment C of Appendix E that the item of concern should be described as two 40mm cartridge "cases" with primer. It is recommended that the text be revised to correct this discrepancy.

**49. Section 8.1, Page 8-1 --** It is stated here that "MD is inert (nonhazardous) and does not pose a safety risk". This may not be a valid assumption depending on the nonexplosive (physical and chemical) characteristics of the munitions debris (MD). This sentence would better express the relative hazard of MD if it were revised to read: "MD is inert (nonenergetic) and does not pose an explosives safety risk." It is recommended that the text be revised to correct this discrepancy.

**50. Section 8.1, Page 8-1 --** "The sensitivity of the types of MEC recovered is low (unfuzed) and the explosive fillers were in small quantities (less than 0.5-pound each). The hazard score, based

on the explosives safety risk tool (Attachment E of Appendix E), is 5 on a scale of 1 to 5 (lowest to highest).” This is somewhat confusing as the statement emphasizes the low sensitivity and the small amount of explosive fillers but then states that the hazard score is the highest achievable. This would be better understood if the last sentence were changed to read: “However, the hazard score, based on the explosives safety risk tool (Attachment E of Appendix E), is 5 on a scale of 1 to 5 (lowest to highest). This is due to the presence of a Class/Division 1.1 explosives (mass explosion).” It is recommended that the text be revised to either clarify the current statement or to correct the language as recommended.

**51. Section 8.2, Page 8-2 --** Reference is made here to the presence of cartridges by the qualifying statement that reads “...(i.e., 20mm and 40mm cartridges)...” As the term “cartridge” refers to a complete round (ie., everything necessary to fire the related weapon one time), 20mm and 40mm cartridges would include the primer, propellant, cartridge case, projectile, fuze, and filler. It appears from a review of Attachment C of Appendix E that the items should be described as 20mm and 40mm expended cartridge “cases”. It is recommended that the text be revised to correct this discrepancy.

**52. Section 8.3, Page 8-3 –** It is stated that “MD is inert (nonhazardous) and does not pose a safety risk”. This may not be a valid assumption depending on the nonexplosive characteristics of the MD. This sentence would better express the relative hazard of MD if it were revised to read: “MD is inert (nonenergetic) and does not pose an explosives safety risk.” It is recommended that the text be revised to correct this discrepancy.

**53. Section 8.4, Page 8-4 --** The frequency of entry into the Range Perimeter (Outside the Fence) area is described as “occasional (2 to 8 entries per month)”. This is the same entry rate as the EOD Range itself, which has a fence to prevent or discourage entry along its perimeter. The EOD Range is also inside the installation fence as well on the east and south which further deters off-installation entry. The close proximity of what may be a major highway on the northeast boundary of the EOD Range would appear to provide easy access to that portion of the range perimeter outside of the range and installation fences (ie., up to 1,250 feet from the point of detonation). This area is where a potential residual hazard from kickouts and a potential continuing hazard from the similar use of munitions items by the new landowner/user may exist. It is recommended that the analysis of the frequency of entry be reviewed to determine either if it is appropriately estimated at 2 to 8 entries a month or if the estimate should be increased due to the potential for access to the hazard area in the north and western off-base quadrants. It is recommended that the Navy address these issues in a revising the RI Report.

**54. Section 9.1.1.2, Page 9-2 –** “It is likely that borehole B-1 is the only location where low concentrations of explosives and perchlorate exist up to the depth of 35 feet bgs.” What is this conclusion based on? If no other borings had detections of explosives and perchlorate with depth, then it is recommended that this supporting data be mentioned here.

**55. Section 9.1.2.3, Page 9-4 –** “Cumulative incremental cancer risks for future offsite residents potentially residing near Site 1 are less due to groundwater mixing and potential biodegradation.” What is meant by this statement? As presented in this context, the statement does not fully explain the cause and effect described. It is recommended that further clarification be provided.

**56. Section 9.1.2.5, Page 9-5** – The citations for the tables in this summary are incorrect. The tables that should be referenced are Table 9-1 and Table 9-2. It is recommended that this error be corrected.

**57. Section 9.2, Page 9-10** – Under question 3 – does the contamination extend beyond 10 feet bgs – mention is made of the one location cited in Comment 54 above “which is likely to be the only location where contamination has affected deeper soil”. What is this conclusion based on? If no other borings had detections of explosives and perchlorate with depth, then it is recommended that this supporting data be mentioned here.

**58. Section 9.2, Page 9-10** – Under question 5 -- is surface-water runoff an exposure pathway – an answer of “yes” is given “based on observations made during the winter 2004-2005 season”. However, within a number of discussions in Section 5 – Contaminant Fate and Transport – this pathway for migration is discredited due to the lack of detections of contaminants at levels of concern in this media. Which position is the Navy supporting regarding surface-water runoff as a potential exposure pathway? It is recommended that these discrepancies be addressed.

**59. Section 9.2.1, Page 9-11** – Once again, mention is made of the one location cited in Comment 54 above “which is likely to be the only location where contamination has affected deeper soil”. What is this conclusion based on? If no other borings had detections of explosives and perchlorate with depth, then it is recommended that this supporting data be mentioned here.

**60. Appendix E, Figure 2-1, Figure 2-3, & Figure 2-5** -- Each of these figures has a box in the legend with solid lines making up all four sides of the box. The description of these boxes is similar on each of the figures and each reads as follows: “1-acre grid selected for intrusive investigation of all anomalies within grid (only grids shown with solid lines required to be intrusively sampled for MEC)” [Figure 2-1]; “1-acre grid selected for intrusive investigation of all anomalies within grid (only grids shown with solid lines were intrusively sampled for MEC)” [Figure 2-3]; and “1-acre grid selected for intrusive investigation of all anomalies within grid (only grids shown with solid lines were intrusively sampled for MEC)” [Figure 2-5]. Careful inspection of the three figures reveals: 1) no grid on Figure 2-1 with all sides constructed of solid lines, 2) what appears to be five grids on Figure 2-3 with all sides constructed of solid lines, and 3) only one grid which has all four sides constructed of solid lines on Figure 2-5. It is recommended that the figures be reviewed and revised as necessary to consistently display the correct number of intrusively sampled grids.

**61. Appendix E, Attachment A, Page 8** -- Photograph 11-OE and OE Scrap has a 3-inch naval projectile which is incorrectly labeled as a 3-inch naval round. Since it does not have a cartridge case attached, it cannot by definition be a 3-inch round. It is recommended that this erroneous labeling be corrected.

**62. Appendix E, Attachment C, Page 1 of 3** -- In Table C-1, the line labeled PH015 describes the item as a “40mm casing (BOFERS)”. The correct term is “Bofors”. It is recommended that this erroneous labeling be corrected.