United States Environmental Protection Agency
One Congress Street, Suite 1100 (HBT)
Boston, MA 02114-2023

November 28, 2001

Mr. Ed Boyle
DoN, Northern Division - NAVFAC
10 Industrial Highway
Code 1811/EB - Mail Stop 82
Lester, PA 19113-2090

Re: *Draft Phase I Remedial Investigation Report of IR Program Site 16, Volumes 1 and 2, Draft Human Health Risk Assessment at IR Program Site 16 (Creosote Dip Tank and Fire Fighting Training Area),* and *Draft Screening Level Ecological Risk Assessment at IR Program Site 16 (Creosote Dip Tank and Fire Fighting Training Area),* all dated October 20001, at the former Naval Construction Battalion Center (NCBC) Davisville, RI

Dear Mr. Boyle:

Pursuant to § 7.6 of the Davisville Naval Construction Battalion Center Federal Facility Agreement dated March 23, 1992, as amended (FFA), the Environmental Protection Agency has reviewed the subject documents. The documents should be combined into one as the RI report generally includes a baseline human health and ecological risk assessment (40 CFR 300.430 (d)). Perhaps the Navy could re-name the documents to be separate volumes, if the Navy wants to save on the production costs of creating a combination document.

In general EPA disagrees with the Navy's limited assessment of the data set. The Navy has dismissed any potential contribution to the CVOC plume from the original site 16 location and concluded that the entire plume originated from building 41. While EPA agrees that the historical activities at building 41 may have contributed to the plume, EPA contends that there may be multiple sources contributing to the groundwater contamination. Source areas in need of further investigation include the stage 1 site 16 area, building 41 tank areas, building 41 loading dock areas, the railroad track areas south of building 41, and possibly the area near and beneath building E-319 where the same preservation activities took place. EPA welcomes the Navy's building 41 soil vapor study and has previously provided comments on the draft work plan.

Please evaluate the enclosed and previously sent comments and provide responses within the time period required by § 7.6 (e) (2) FFA (45 days) so that we may work together to scope out

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the source area investigations that are needed at this site.

If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

Enclosures

cc: Richard Gottlieb, RIDEM
Dave Barney, CSO
Bill Brandon, EPA
Steve DiMattei, EPA
Rick Sugatt, EPA
Marilyn Cohen, ToNK
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Anne Heffron, Enviro-Tech
Dinalyn Spears-Audette, Narragansett Tribe
Kathleen Campbell, CDW
Jim Shultz, EA Engineering, Science and Technology

EPA Comments on Draft Hydrolgeologic Report for Site 16

GENERAL COMMENTS

Overall, the document provides a significant amount of information obtained using a variety of investigative methods. The conclusion derived in the report that a potential source of the chlorinated volatile organic compound (CVOC) may exist beneath Building 41 has merit and the recommendation that additional investigative activities be conducted in that area is valid. However, the overall assessment of the nature and extent of groundwater contamination and the conceptual site model (CSM) that are presented do not appear to be thorough and complete. A review of the data and information provided suggests the Building 41 location may not be either the source or the only source of observed CVOC contamination in groundwater at Site 16.

1.0 Review of the information provided in the report suggests that contrary to the interpretation of the Phase I Report, there does exist the possibility that the central area of Site 16, specifically the suspected Former Fire Training Area (FFTA) may have contributed significant CVOC contamination to site groundwater. An additional potential CVOC source area is the former railroad spur to the south and/or southeast of Building 41. Past input of CVOC contamination from these locations may be the prime or a contributing source for the elevated concentrations of CVOC, primarily TCE, observed from just east of Building 41 throughout the central Site 16 area toward Allen's Harbor.

However, for all three of the potential source areas, there are data gaps that preclude a definitive evaluation of the contaminant source area for Site 16. Furthermore, the recommendations for additional work that are proposed in the Phase I Report will not likely provide sufficient information to resolve the two additional potential source areas. Specific areas of data deficiency include the lack of any intermediate groundwater monitoring wells, a lack of sufficient shallow groundwater monitoring wells, especially in the vicinity of Building 41, and an incomplete delineation of the weathered, fractured, bedrock zone. The lack of groundwater monitoring wells in the intermediate portion of the aquifer and lack of bedrock wells within the central portion of the Site 16 area is a data gap.

2.0 Each of the three potential CVOC source areas are briefly described below with the associated rational and data limitations.

2.1 ***Building 41 CVOC Source Potential***

The lack of certainty concerning a potential source beneath Building 41 relates to several variables. These include the time since probable release of contamination to the subsurface, the high contaminant transport velocity from the vicinity of Building 41, and the lack of resolution of groundwater flow patterns in the vicinity of Building 41,

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especially to the south and southeast. Also lacking is shallow groundwater sampling even though the Membrane Interface Probe (MIP) screening procedures indicated elevated Electron Capture Detector (ECD) readings (indicators of CVOC presence) in shallow or intermediate groundwater to the south and southeast of the building.

A review of the groundwater gradient for monitoring wells to the northeast of Building 41 and the hydraulic conductivity values for those wells indicates that the groundwater velocity is relatively fast (e.g., on the order of 3 to 5 feet per day at well MW16-14D). Additionally, a review of the total organic carbon in soil for the deep monitoring wells suggests that there is not likely to be appreciable retardation to contaminant migration from that source area. If a release had occurred prior to 1953 the bulk of the TCE should have been removed by flushing over a period of 48 years. This is based upon the solubility of TCE in water and the volume of groundwater moving through the potential release area. The observed concentrations of TCE noted in several wells, while high, appear to be significantly higher than that which might be expected if a release occurred prior to 1953. In the same breath, it must also be acknowledged that soils data is particularly lacking in the shallow and intermediate levels of the aquifer. As such, it still remains to be determined as to whether fine-grained deposits in the upper portions of the aquifer may have retained significant amounts of contaminants. Additional data (i.e., both soils and ground water data) are needed from these portions of the aquifer.

Additionally, the identified solvent use area is located in the western third of Building 41 on the north side. The interpreted groundwater contours shown for the shallow and deep monitoring wells shown on Figures 3-10 and 3-11 appear to present groundwater moving from that location to the south and/or southeast toward several other wells that are not presently exhibiting elevated levels of CVOC in groundwater. However, there is a limited number of groundwater monitoring wells in that direction to ascertain actual groundwater flow dynamics. This is especially true for shallow groundwater since there do not appear to be any shallow monitoring wells in the vicinity of Building 41. This makes it difficult to differentiate whether the deep groundwater is contaminated by a release from beneath the building, which should also contaminate shallow groundwater, or whether the contamination noted is contamination that has migrated along the weathered, fractured bedrock zone.

Also, a review of the interpreted bedrock contour map, Figure 2-2, shows the bedrock surface dipping to the west beginning at a location beneath the former solvent recovery still. If CVOC contamination had been released at that location there should be some indication of significant contamination in deep monitoring wells to the west of Building 41. That is, even in the absence of shallow monitoring wells at those locations, CVOC should be observed as it migrated down dip counter to general groundwater flow (if in a dense, non-aqueous form). However, the deep groundwater monitoring wells at those locations have not evidenced CVOC contamination.

Lastly, the screening methodology used (MIP) did not indicate significant, widespread elevated readings of (ECD) in shallow or intermediate elevations below the ground surface at potential up gradient locations from the two wells nearest the building with elevated CVOC concentrations in groundwater (MW 16-14D and MW16-15D). In the absence of shallow groundwater monitoring wells, these locations should have exhibited elevated readings at shallow soil column elevations if a significant source was present beneath the building (although the potential for 'false negatives' from the MIPs effort appears to be significant).

2.2 ***Railroad Spur Area CVOC Source Potential***

A potential source area not identified in the Phase I Remedial Investigation Report that may be a more likely potential CVOC source is the location further to the south and east of Building 41. A review of the rock coring logs indicates that the bedrock to the east and south of Building 41 is a part of the zone of weathered, highly fractured bedrock identified in the Report. Monitoring wells, MW 16-17D, MW 16-18D, and MW 16-25D had Rock Quality Designator (RQD) values of 19%, 46% and 20%, respectively. Also noted, is that the bedrock adjacent to Building E107 to the north of the central Site 16 Area, but west of the interpreted fracture direction, had the lowest RQD value of the investigation at 0%. These values along with the low RQD values to the east of Building 41 suggest that there is a potential preferential pathway in the shallow bedrock extending from the southeast of Building 41 through Site 16 to Building E107. The inferred bedrock elevations shown on Figure 2.2 coupled with the orientation of the bedrock fracture zone may indicate that the release of TCE occurred outside of Building 41. This source area may be possibly at a loading/unloading ramp adjacent to the railroad side spur at the southeast corner of the building.

Also, the MIP ECD responses summarized on Figure 2-4 indicated elevated readings for intermediate soil column elevations at locations to the east and southeast of Building 41. MIP 16-S10 is shown as having ECD response readings in the mid-range at depths from 28 to 50 feet below the ground surface, well above the bedrock surface. MIP 16-S21 had readings in the low-mid range at 16 to 22 feet below the ground surface and in the mid-range at 28 to 34 feet below the ground surface. MIP 16-S22 had very low response readings, but at a depth of only 10 to 11.5 feet below the ground surface. Since these soil column intervals are above the bedrock elevation, it does not appear that they are due to contamination migrating along the bedrock "trough" but may represent a surface release to the south of Building 41.

Several deep overburden wells were installed in the area to the south and east of Building

41 did not indicate elevated levels of CVOCs. However, there do not appear to have been any shallow or intermediate monitoring wells installed in this area or the vicinity of Building 41. This precludes a definitive evaluation of groundwater quality, flow dynamics in that area. Nonetheless, a plausible explanation for the observed TCE in the deep groundwater zone along the bedrock "trough" is that a spill occurred in the vicinity of the railroad spurs that migrated vertically and horizontally, moving in the presumed direction of shallow and deeper groundwater flow, i.e. to the northeast. That is, assuming a release at some location to the south and east of building 41, the highest concentrations may not be observed at depth in the vicinity of the release due to lateral movement of contaminants along lenses of low permeability soil until a more permeable soil unit is reached (e.g., the low permeability layer "pinches out"), at which point vertical migration to deeper levels within the aquifer is no longer constricted. Such a condition may be represented in the vicinity of MW 16- 14D, where the absence of a low permeability unit is depicted on Figure 3-8.

2.3 *Former Fire Training Area (and Vicinity) Source Potential*

An apparent deficiency of the Phase I RI Report is that it essentially dismisses the central Site 16 area as a source of the observed groundwater contamination (Section 5.5). The Phase I RI Reports directly attributes the source to a release beneath Building 41. However, a review of the data provided in the Phase I Remedial Investigation Report, and previous studies, do suggest that Site 16 shallow groundwater has been impacted by a past release of contamination, and may be a source of the observed deep groundwater contamination. However, previous data collected in 1999 and summarized in the Study Area 16 Comprehensive Report/Study Area Screening Evaluation does not appear to have been incorporated in the analyses. The limited shallow groundwater samples collected, analyzed and presented in this Phase I RI report lie either up gradient or significantly down gradient from the suspected former FFTA potential source.

The information presented in the 1999 Study Area 16 Report is relevant to this investigation and should be included in this RI Report. For instance, the 1999 Study Area 16 Report indicated that well 28-GW-03 had 4 micrograms per liter (μg/L) TCE, 7 μg/L 1,2 DCE, and 2 μg/L VC at the 7-9 foot depth (water table). Well 28-GW-04 had 1 μg/L TCE, 31 μg/L 1,2 DCE, and 10 μg/L VC at the 7-9 foot level. Wells, 28-GW-05, 28-GW-06, and 28-GW-07 had 3, 8, and3 μg/L of VC, respectively in the shallow groundwater well. The deeper components of these wells indicate elevated concentrations of TCE with 28-GW-04 indicating 570 μg/L. All of these wells are located either within, or down gradient (one direction only) of the suspected FFTA.

Nonetheless, even though the central area of Site 16 was not sampled during this remedial investigation, CVOC contamination in the shallow groundwater around the periphery was detected. Although CVOC contaminants were detected in shallow groundwater at relatively low levels during the Phase I RI, they were detected and cannot be ignored. Furthermore, the CVOC constituents found other than TCE such as cis 1,2-Dichloroethylene (DCE) and vinyl chloride (VC), which were detected in this and previous investigations, are degradation products of TCE. It should be noted that the presence of these degradation products most likely signifies the transformation of TCE that was released at this location.

Although TCE was the predominant CVOC detected at depth, and biodegradation was assumed not be occurring, this observation cannot be applied to the shallow groundwater. One of the reasons for lack of biodegradation of TCE at depth, even though the environmental conditions might be otherwise favorable, such as reducing or low, oxygen conditions, is that there may not be a carbon co-substrate. Degradation of TCE normally requires a carbon source other than TCE itself for microorganisms to use. At the shallow groundwater level, there were likely adequate alternative carbon sources. The carbon co-substrate most likely to have been the petroleum hydrocarbon compounds detected as being present in site soils and groundwater. Therefore, biodegradation of TCE at the shallow and/or intermediate groundwater intervals is likely to have occurred.

The fact that higher concentrations of TCE were not detected in the shallow groundwater or soils does not signify that a release did not occur. Consideration has to be given to the age of the release, infiltration, volatilization, etc. It should also be noted that while the present site is heavily vegetated it is not likely that this was the case in the 1960's. For instance, it was reported that the site surface was often reworked. Additionally, site operations would have precluded extensive development of vegetation. Under these circumstances, a larger fraction of annual precipitation would have infiltrated to the subsurface at the location of Site 16, including the FFTA. The present heavy vegetative cover has likely significantly increased transpiration and reduced infiltration. The Site 16 Area, at that time, may have been a significant area of recharge with altered groundwater flow patterns. Therefore, the present groundwater regime may not reflect past conditions. It is likely that past groundwater flow patterns in the central Site 16 area were substantially different with at least intermittent semi-radial flow to the east and south, and perhaps to the north and northwest as well. It may be necessary, therefore, to expand the investigation laterally from the central site 16 area into areas which are not presently 'down-gradient' of the FFTA (e.g., southwest, southeast, north, northwest).

It is likely that the groundwater column between the water table and that adjacent to the bedrock has concentrations of CVOC constituents that would reflect the downward migration of TCE and degradation products. Unfortunately, further evaluation of this assessment is limited by the absence of intermediate groundwater monitoring wells within the central Site 16 footprint, in particular, near and down gradient from the FFTA.

Also, there are no bedrock monitoring wells located within the Site 16 area near the suspected FFTA or immediately to the southeast, a possible past down gradient direction. However, there is another potential indicator of past downward migration of CVOC compounds into the subsurface and lateral migration to the southeast. The distribution of CVOC release at the surface or shallow groundwater at Site 16 is indicated by the MIP ECD survey results conducted during the Phase I Remedial Investigation.

Figure 2-4, which shows MIP ECD responses clearly indicates that there were indications of CVOCs in the shallow and intermediate groundwater in addition to deep groundwater. MIP 16-12, for instance, is presented as having very low, to low-mid responses from 6 to 8 feet below the ground surface to 47 to 49 feet below the ground surface. This location is within the suspected FFTA. Other MIP locations to the north, east, and south of that location also show ECD responses ranging from trace to mid level extending from near the ground surface throughout the soil column to bedrock.

An additional indicator of past release of CVOC contaminants in the central area of the site includes the probe-collected groundwater sample results presented on Figure 2-6. These results clearly show the presence of CVOC contaminants at depths considered either shallow or intermediate compared to the contamination noted to be in the bedrock "trough" extending to the southwest. For instance, location MIP 16-15, just to the southeast of the suspected FFTA indicated the presence of cis-1,2 DCE at a concentration of 230 µg/L and VC at a concentration of 11 µg/L at a depth of only 17 feet below the ground surface. This suggests release of CVOC constituents, probably TCE, at the site with subsequent biodegradation and migration to the southeast.

Further to the southeast, location MIP 16-17 detected of cis-1,2 DCE and VC at 14 µg/L and 9 µg/L, respectively at 12 feet below the ground surface. At that same location, DCE and TCE were detected at 3 and 470 µg/L, respectively at a depth of 49 feet below the ground surface. Although this is a deeper elevation it is well above the depth to bedrock in that vicinity as indicated by MW 16-02D and MW 16-28D. Also in the same vicinity, another probe groundwater sample detected DCE and TCE at a depth of 47 feet below the ground surface at concentrations of 55 and 5300 µg/L, respectively. This strongly suggests that contaminants from the Site 16 central area have migrated in a southeastward direction and to depth. Therefore, while the distribution of TCE to the southwest appears to be counter to presently observed groundwater flow directions, it is likely that past groundwater flow patterns in the central Site 16 area were substantially different with at least intermittent semi-radial flow to the east and south.

Also, a review of the various soil boring, rock coring logs and cross section presented on Figures 3-1 through 3-7 indicate that the suspected FFTA appears to lie over bedrock and a gravelly sand layer that slopes to the east and south as well as to the north. Past release of TCE in high enough concentrations could also have resulted in migration up gradient as it flowed down slope under the effects of it's density, especially if released as a dense, non-aqueous phase liquid (DNAPL).

While there are areas beneath the site where silt and/or a silt/clay layers exist, these layers does not appear to be continuous. Furthermore, it is not likely that this layer would be impermeable enough to completely prevent downward migration of TCE. Past vertical migration of TCE from the vicinity of the former, suspected FFTA location could also have migrated into the weathered, fracture bedrock zone that appears to be located immediately beneath the Site 16 area. Although the weathered/fractured has been inferred to extend in a northeast to southwest strike, the RQD data suggests that this zone is wider and oriented in a more north to south direction than presented. DNAPL introduced into those fractures has the potential to migrate counter to the direction of groundwater flow. However, no bedrock monitoring wells exist directly beneath the central Site 16 area.

2.4 Shoreline area: A more comprehensive sampling effort needs to be directed to the shoreline environment so that sufficient sediment and ground water and surface water samples are collected so as to provide a clearer picture of the site-related impacts to the nearshore environment.

3. This report should be combined with the HHRA and the SLERA into one document as the RI report generally includes a baseline human health and ecological risk assessment (40 CFR 300.430 (d)). Perhaps the Navy could re-name the documents to be separate volumes of a remedial investigation, if the Navy wants to save on the production costs of creating a combination document.

SPECIFIC COMMENTS

Several specific comments are provided. Many of the comments reflect areas in the report that generate the concerns and interpretations reflected in the general comments noted above. Grammatical or typographical errors, etc. were not identified.

1. *Chapter 1, page 2 of 19,last paragraph:* It is difficult to evaluate the elevations noted in the paragraph since the figure 1-3 has no scale. Please clarify the figure.

2. *Chapter 1, Page 5 of 19, 1st paragraph:* No former floor drains were identified in Building 41, yet the asphalt floors are described as if they were a more recent modification. Is it possible that former floor drain locations have been covered by more recent asphalt ? Another detailed review of construction records and plans should be

done to address this issue, as the EBS review may not have been that thorough.

3. *Chapter 1, Page 5 of 19, 2st paragraph:* Building E-319 would appear to be an obvious potential source area. Future efforts should address this area in a thorough manner.

4. *Chapter 1, Page 5 and 6 of 19, and Figure 1-4:* Several USTs were removed in and around Building 41 as part of other programs. However, additional confirmatory work is now called for. A large area is presently covered with asphalt where former cosmolene tanks were removed. Also, a tank(s) associated with past solvent recovery operations was also removed, and is now covered with asphalt. Several soil borings are needed in each of these areas. Boring locations need to include and specifically target the former tank graves. Continuous split-spoon soil samples should be collected to the top of bedrock at all locations and analyzed for suspected contaminants. The former tanks located along the northern portion of the building, which acted as a cesspool (EBS RIA 81) may also bear further scrutiny as the sludge samples collected during the removal detected noteworthy TPH levels and work done under the EBS program was not as rigorous as work performed under the IR program.

5. *Chapter 2, Page 3 of 8, 2nd Paragraph, 4th and 5th Sentences:* This paragraph states that "The ECD responses in the shallow interval (less than 15 ft. bgs.) were only trace to low, suggesting that a historical area of CVOC releases to ground surface had not been identified." This does not appear to be a valid interpretation of the observed data. Review of the data in Appendix C and J and summarized on Figure 2-4 strongly indicate that a past release to the ground surface had occurred within the Site 16 Area. The MIP screening procedure has a lower detection limit of approximately 160 to 200 parts per billion of TCE according to the Appendix. This would imply that any detection, even in the trace to very low range in site groundwater should have concentrations at least in that range. Many, if not most, of the MIP locations within the Site 16 main area had MIP ECD responses in the very low to low range at very shallow depths. The responses increased with depth, but at depths still above the bedrock. This suggests that contaminants had been released at the surface and over time had likely migrated into the subsurface. Given the length of time that has transpired since may of the operations had occurred at the site, it is likely that the very shallow soil CVOC contamination will have volatilized, if it was not flushed into the subsurface by infiltration.

6. *Chapter 2, Page 3 of 8, 2nd Paragraph, 6th and 7th Sentences*: These sentences state that the observed ECD responses cannot be readily related to the site data and therefore, they must be due to an up-gradient, off-site source. However, several factors do not appear to have been considered during this assessment. The first is that in addition to an obvious past release of CVOC contaminants, the past groundwater flow patterns directly beneath the site may have been significantly different. Specifically, while the limited

groundwater elevation data (temporal) and to some extent spatial, suggest a groundwater flow pattern to the northeast, during operation of the site, the recharge to the site was likely significantly higher. Currently, the site is heavily vegetated with a significant cover of deep-rooted vegetation including mature trees. Precipitation over this area at the present time is likely to result in comparatively low infiltration values due to high evapotranspiration. It has been reported that the site has been extensively worked by heavy equipment during past site operations, and it is likely that during fire fighting training, creosote dipping operations, etc. that the ground surface was essentially devoid of vegetation. Those conditions would have eliminated transpiration, limited runoff, and promoted increased infiltration. Therefore, given the high annual precipitation for the site, there is a high probability that the site was an area of significantly higher groundwater recharge and that there was semi-radial groundwater flow from the site to the north, east, and south for at least portions of the year. This could have driven contaminants to the south and east in addition to the north.

Another consideration is that the stratigraphy beneath the site indicates that the FFTA, in particular, appeared to have been situated over a high where bedrock, and the permeable sand and gravel unit sloped to the east and south as well as the north. While a lower permeability silt unit appeared to overly the sand and gravel unit, the silt layer appears to be discontinuous, especially in the vicinity of MW 16-01 and MW-02. Also, to be considered, while the silt layer may retard downward migration of contaminants, it has not been shown that the unit is impermeable or even of relatively low permeability. A review of the rock coring logs and RQDs for bedrock throughout the site, also indicates that the interpreted highly weathered, fractured bedrock zone extends northward, directly through the central area of Site 16 including the suspected FFTA. MW 16-03D adjacent to Building E107 had the lowest RQD of all the rock cores, at 0%. The presentation of this data appears to have been ignored in the drawing of the shaded block areas on Figure 3-9. A line can be drawn from that location through the site including the FFTA location to MW 17D, which had an RQD of 19%. At a minimum, the highly fractured zone appears to be more of a wide, rectangular, area extending north to south rather than a linear northeast to southwest. However, the bedrock directly beneath the central area of Site 16, including the FFTA and area to the southeast lack any rock cores from this investigation. Nonetheless, given the data presented in the Phase I Remedial Investigation, it is likely that the bedrock is highly fractured at that location as well. Therefore, contaminants migrating vertically downward from the central area of the site are likely to be transported into the fractured rock zone at that location. It should also be noted that Table 3-3 shows a downward component of groundwater flow for well pairs located along this north to south zone including MW 16-03S/D; MW 16-02S/D and D/R; and MW 16-25D/R.

7. *Chapter 2, Page 5 of 8, 1st and 2nd Paragraph:* Slug tests should be conducted in

MW16-04S and compared with pre-existing results to confirm well function and to verify whether or not well redevelopment efforts were successful. Also, it is not clear whether or not wells at which "no water level rise or drawdown was measured"represents operator or equipment error or extremely large hydraulic conductivities. Please clarify.

8. *Chapter 2, Page 6 of 8, 1st and last Paragraphs:* The text lists several shortcomings of the MIP screening program (e.g.poor correlation with grain size data, inability to penetrate to target depths, etc.). Although the MIP effort was useful for screening, these deficiencies support the need for selective additional soil and/or ground water data to supplement the MIP data as requested in other comments on this document.

9. *Chapter 3, Page 4 of 12, Last Paragraph:* At least one additional cross section should have been prepared. That cross section should extend from MW 16-03 to MW 28-04 to MW 16-21 to MW 16-17. The cross sections presented lack adequate representation of a north to south presentation of the site geology. Although a rock core does not appear to have been taken at well location 28-04, and the well was installed during a prior investigation, the data from that well should be incorporated into the cross section since it represents a portion of the site that is lacking data from this investigation.

10. *Chapter 3, Page 5 of 12, First Paragraph:* This paragraph describes the fill material shown on the figures as being a reworked mix of silt, sand, and gravel with cobbles from construction and training activities. A review of Figure 3-3, Cross Section B-B', shows that this material comprises an extensive thickness along the area at which the former FFTA is located. The material is shown on other cross sections through the Site 16 area also. This material is likely to be highly permeable and promote infiltration, especially prior to establishment of a vegetation cover. Given the nature of the fill, a water balance including possible alteration of the groundwater elevations should be performed to assess possible changes to groundwater flow patterns during site operational activities.

11. *Chapter 3, Page 5 of 12, First Paragraph:* This paragraph describes the fill material shown on the figures as being a reworked mix of silt, sand, and gravel with cobbles from construction and training activities. A review of Figure 3-3, Cross Section B-B', shows that this material comprises an extensive thickness along the area at which the former FFTA is located. The material is shown on other cross sections through the Site 16 area also. This material is likely to be highly permeable and promote infiltration, especially prior to establishment of a vegetation cover. Given the nature of the fill and the past site history, an assessment of possible changes to groundwater flow patterns during site operational activities should be carried out and considered prior to finalizing specific recommendations for additional monitoring well coverage. Please see general comment above, additional monitoring well coverage.

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12. *Chapter 3, Page 6 of 12, 2nd Paragraph, 3rd Sentence from End:* This sentence describes a northeast to southwest trending zone of more highly weathered and fractured bedrock. However, a review of Figure 3-9 and the rock coring data provided in Appendix D suggests that the trend is north to south over a wider area than a narrow, linear feature extending from northeast to southwest. Figure 3-9 should include a shaded bar over the 0% RQD location at MW 16-03D.

13. *Chapter 3, Page 10 of 12, Shallow Ground Water Zone:* It is not clear that the shallow groundwater flow regime has been defined. A review of Figure 3-10 shows that there are data gaps to the south and east of Building 41. There appears to be a groundwater divide, somewhere to the north of Building 41. It is not clear where the present groundwater flow directions are. One interpretation is that shallow groundwater flow is to the southeast or possibly south across the footprint of Building 41 rather than to the east. Additional control points are needed to the south and east of building 41 (e.g., in the extensive "railroad" area generally between Ash and Elm Streets). Additionally, there is poor resolution of shallow groundwater flow up gradient and within the central area of Site 16. Control points are particularly needed in the central and southeastern portions of Site 16, and additional control would also be useful to the north and northwest. Please see also general comment above, additional monitoring well coverage.

14. *Chapter 3, Page 10 of 12, Deep Ground Water Zone:* The deep groundwater flow patterns do not appear to have been adequately delineated. A review of Figure 3-11 indicates that the deep groundwater flow in the vicinity of Building 41 is to the southeast, not necessarily to the northeast. This represents a significant data gap. Additional control points are needed to the south and east of building 41 (e.g., in the extensive "railroad" area generally between Ash and Elm Streets).

15. *Chapter 3, Page 11 of 12, Rock Ground Water Zone*: The presentation of groundwater flow direction shown on Figure 3-12 is of limited value. The few groundwater elevations presented lie in a roughly straight line. There is little information to assess whether groundwater in the bedrock flows to or away from any location along that line. Additional bedrock monitoring locations orthogonal to this line are needed to understand groundwater flow in the bedrock.

16. *Chapter 3, Page 11 of 12, Hydraulic Testing:* since the ranges in the hydraulic gradients are so large, please make sense of it for me. Is the gradient in the west steeper than the south? Perhaps a figure would best describe a pattern, if there is any.

17. *Chapter 4, Page 3 of 23, Section 4.5, Quality Control Summary:* The acenaphthene at MW16-07S differences cannot be reflective of not homogenizing VOC samples. Please

clarify.

18. *Chapter 4, Page 8 of 23, Section 4.6.1.4, Pesticides and Polychlorinated Biphenyls:* figure 4-11 is not consistent with figure 4-10, please reconcile the differences.

19. *Chapter 4, Page 10 of 23, Section 4.6.2, Sediment:* The RIDEM regulatory values are not used appropriately in this section and in the section 4.6.1. Risks should be evaluated in the risk assessments and referenced in this section. In addition, RIDEM regs. indicate that the values are to be used to evaluate soils above the vadose zone. Sediments are, by definition, within the saturated zone. If the Navy's purpose is to note regulatory exceedences and not risks, sediments are inappropriately being evaluated. Evaluation of soils (above the vadose zone) and groundwater for regulatory exceedences is appropriate in sections 4.6.1 and 4.7.

20. *Chapter 4, Page 12 of 23, Section 4.7.1.1, Last Sentence:* The data suggests that this statement is not correct. As discussed in comments to Chapter 2, Page 3, there is evidence that a source area exists/existed within the Site 16 Stage 1 Area, shallow groundwater zone. The MIP ECD results, probe groundwater sample results, and the previous groundwater results within the Site 16 central area obtained during the Study Area 16 investigation, 1999, indicate a release of CVOC contaminants occurred within this area.

21. *Chapter 4, Page 12 and 13 of 23, Section 4.7.1.2, Paragraph 2:* The interpretations provided in this section are not conclusively supported, especially to the exclusion of a source within the Site 16 central area or to the south/southeast of Building 41. This section states that the highest CVOC concentrations in groundwater were detected at MW 16-14D and MW 16-15D, near Building 41. However, that ignores the probe groundwater sample taken to the southeast of the FFTA (MIP 16-24) where TCE was detected at a concentration of 5,300 µg/L at a depth of 47 feet below the ground surface. This section presumes that the observed CVOC contamination in the deep overburden wells originates from a source beneath Building 41 where it migrated vertically to the underlying sand and gravel layer and from there toward the northeast. However, as discussed in previous comments, the contamination could just as well have originated from the central Site 16 area with the same vertical migration into the weathered, fractured rock and deep overburden. Contaminants including DNAPL previously lost to the weathered, fractured bedrock zone may manifest itself in the overlying, deep overburden groundwater. This inferred plume may exist in the deep, overburden and/or fractured bedrock beneath the central portion of Site 16; however, there is an absence of deep and bedrock monitoring wells within this area.

22. *Chapter 4, Page 12 and 13 of 23, Section 4.7.1.2, Paragraph 3:* This paragraph states

that it has been 50 years since the potential release of CVOC beneath Building 41. A review of the hydraulic gradients and hydraulic conductivity values for the deep, overburden wells shown on Tables 3-2 and 3-4 suggest that the groundwater velocity along the presumed preferential direction of groundwater flow from beneath Building 41 is very high, approximately 3 feet, or more, per day. Since there is also very little organic carbon in those deposits as indicated by the results shown on Table 4-2, there appears to be little potential for retardation of the released contaminants. Therefore, given the solubility of TCE and the groundwater flushing velocity, and the elapsed time of almost 50 years, a significantly large mass of TCE as DNAPL would likely have had to have been released beneath Building 41 in order to support the observed concentrations. If this were the case, evidence of that contamination should be observable at other locations including the down slope bedrock direction to the west and northwest of Building 41 and shallow groundwater. Another scenario which is perhaps more likely would be that a more recent release of TCE has occurred south or southeast of Building 41, or within the central Site 16 area, that may have migrated to and spread along the identified bedrock fracture zone. All of these scenarios (and perhaps others) are still possible given the current data. Future data collection efforts should be designed such as to further refine the conceptual model of the location, nature and extent of the release(s).

23. *Chapter 4, Page 15 of 23, Section 4.7.2.1 & 4.7.3.1, Shallow (S) Groundwater Zone:* Please evaluate the apparent discrepancy of widespread contamination in soils but low values in groundwater in the Site 16 Stage 1 area.

24. *Chapter 4, Page 20 of 23, Section 4.9.1, First Paragraph:* The data presented in this report does not support the interpretations made that a significant past release of CVOC contamination has not occurred within the FFTA, and/or is overshadowed by a CVOC plume migrating from beneath Building 41. The MIP ECD results and prior groundwater sampling results (Study Area 16-1999) strongly indicate the past release of TCE at the surface/shallow groundwater within the Site 16 Stage 1 area.

25. *Chapter 4, Page 20 of 23, Section 4.9.1, 3rd Paragraph:* Although elevated concentrations of CVOCs were detected in groundwater near Building 41, the information presented does not strongly support that interpretation. There may be a source beneath Building 41. However, the groundwater flow patterns shown, MIP ECD results for the vicinity, groundwater flushing potential, and the highly fractured bedrock zone that likely extends north to south beneath the central Site 16 area, suggests that there are other possible source areas. These include a release at the former railroad spur area, or the vicinity of the suspected FFTA.

26. *Chapter 4, Page 22 and 23 of 23, Section 4.9.3:* This interpretation of CVOC release is, at best, incomplete. Data provided in this report does not rule out other potential source

areas, and does not strongly support the interpretation of a release beneath Building 41. The more likely release may have occurred to the south of Building 41. At that location, depending upon the actual delineation of shallow and deep groundwater flow directions, the contamination migrated to the east and northeast, subsequently migrating downward at the location noted above where there is an absence of the silt layer. This would account for the elevated MIP ECD readings noted at the shallow to intermediate soil elevations, and the elevated TCE noted in the deep, overburden wells. The release most likely occurred long after 1953 and may explain the continued observation of the contaminants given the observed groundwater velocity. Additionally, it is just as likely that the observed CVOC contamination originally was generated from the central Site 16 area. During past site operations, the likely highly infiltration rates would have driven contamination to depth that may have allowed migration into/along the highly fracture bedrock zone that appears to be present beneath the central portion of the Site 16 area. DNAPL contamination in the bedrock would likely result in observed contamination in the deep overburden groundwater above the zone of fractured rock.

27. *Chapter 5, Page 6 of 11, Section 5.3; Nature and Extent of Contamination in Soil:* EPA is concerned with the amount of CVOC daughter products that have been found in the shallow groundwater and seep. The Navy may want to evaluate the removal of a limited amount of PAH and Lead contaminated soils to reduce the possibility that the TCE in groundwater would biodegrade. In addition, EPA welcomes the Navy's commitment to evaluate possible sources in building 41 that may be contributing to the TCE and its daughter products found across the site. Surface and sub-surface soil samples will be required to be evaluated for human health risk and compliance with standards, since contamination is suspected in areas other than the Creosote Dip Tank area where the only risk related soil samples were gathered.

28. *Chapter 5, Page 6 of 11, Section 5.4, Nature and Extent of Contamination in Sediment:* EPA believes that the Navy should evaluate the possible future human health risk due to exposure to sediments, as the area will be used for recreation. The ERA concluded that there are possible ecological risks. Therefore, additional sediment tests and possibly toxicity tests will be required to fully evaluate the human health and ecological risks from site contamination. Please change the recommendations.

29. *Chapter 5, Page 6 of 11, Section 5.4, Nature and Extent of Contamination in Groundwater:* This section ignores the data gathered in previous investigations and therefore paints a distorted picture of the site contamination. Please incorporate the data, at least in a qualitative manner.

30. *Figure 3-2, Geologic Cross Section A-A':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking in

the MW16-26D and MW16-28D/R areas. Also, soil and ground water data is not available in the mid-level portion of the overburden aquifer in the key shoreline location at MW16-04D/S.

31. *Figure 3-3, Geologic Cross Section B-B':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking in the MW16-26D, MW16-29D, and MW16-27D/R areas.

32. *Figure 3-4, Geologic Cross Section C-C':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking in the MW16-13D, MW16-11D,MW16-08D and MW16-20D areas. Also, soil and ground water data is not available in the mid-level portion of the overburden aquifer in the MW16-02 D/S/R area where the overburden aquifer is particularly thick as well as complex.

33. *Figure 3-5, Geologic Cross Section D-D':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking for the upper 50 feet or so of overburden aquifer over the majority of the area represented by the section line (e.g., MW16-10D/R, MW16-12D, MW16-14D, MW16-15D/R, MW16-21D, MW-16-23D, MW16-29D, MW16-28D/R areas). Also, soil and ground water data is not available in the mid-level portion of the overburden aquifer in the MW16-02 D/S/R area where the overburden aquifer appears to be particularly thick as well as complex.

34. *Figure 3-6, Geologic Cross Section E-E':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking for the upper 50 feet or so of overburden aquifer over the majority of the area represented by the section line (e.g., MW16-17D/R, MW16-18D, MW16-19D, MW16-20D, MW16-27D/R, MW16-28D/R areas). Also, soil and ground water data is not available in the mid-level portion of the overburden aquifer in the MW16-17D area where the overburden aquifer appears to be complex as well as potentially proximal to a potential release area. Additional coverage, including the bedrock aquifer, would be particularly useful here.

35. *Figure 3-7, Geologic Cross Section F-F':* The cross section illustrates a number of areas where basic data gaps exist. For example, shallow soil/ground water data is lacking for the upper 50 feet or so of overburden aquifer over the majority of the area represented by the section line (e.g., MW16-26D, MW16-22D, MW16-21D, MW16-25D/R, MW16-19D areas).

36. *Figures 4-12 and 4-19:* Shallow soils data as well as sediment data suggest an

association of arsenic and beryllium, both of which are locally elevated with respect to standards. What is the suspected cause and implications of this occurrence ?

EPA Comments on the Site 16 Draft Screening Level ERA

General Comments:

1. The ecological risk assessment is generally sound and follows appropriate EPA guidance. The problem formulation is well-based, benchmarks are generally appropriate, exposure assumptions are protective for the most part, etc. The conclusions that risk to wildlife receptors exposed to contaminants in surface soil may not be significant are sound but may need to be revised based on any changes in the report stemming from the following comments. Risk to aquatic biota is demonstrated in the report and needs to be further evaluated, as discussed in the November 8, 2001 meeting.

2. The assumption that the exposure point concentration for wildlife receptors is the soil concentration is adequately protective for chemicals which have BCFs less than one. This is generally the case in this report. The one exception may be dioxins/furans (see the Specific Comment for Table 11). If, based on the specific chemical(s) detected at the site, a BCF greater than one is used, it will no longer be conservative to assume that the dietary concentration equals the soil concentration.

3. While the potential exposure of wildlife to contaminants in surface soil is addressed in the ecological risk assessment, the potential pathway from shoreline sediments or seeps to wildlife receptors is not addressed. Please discuss the potential for chemicals in shoreline sediments and seeps to be ingested by wildlife foraging in these areas (shorebirds, gulls, small mammals, etc.), either through the food chain and via incidental ingestion of sediments.

4. Although not included in the final work plan, the relatively high levels of COPCs found in the few sediment samples during the investigation suggests that wading birds may be at risk through the sediment food web. Further it is unknown whether these COPCs are related to the site or reflect ubiquitous contamination in the harbor. Therefore, EPA recommends that risk of ingestion of benthic organisms be evaluated for one or more species of wading bird, using predicted concentrations of COPCs in benthic organisms based on literature bioaccumulation factors. In lieu of predicted tissue concentrations, Navy could measure tissue concentrations in benthic organisms collected from the area or use data collected previously from the Harbor. This would not be necessary if the Navy can demonstrate that the sediments adjacent to the site do not have elevated COPC concentrations relative to elsewhere in the harbor that has not been impacted by Navy activities.

5. Although the conceptual model did not include exposure of terrestrial organisms to sediment, it is recommended that the potential risk of this pathway to semi-aquatic mammals (e.g. racoon, mink) be addressed qualitatively in the uncertainty section.

6. Please explain in the text, the basis for estimating the soil ingestion rate of terrestrial

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receptors as a percentage (i.e. 3 to 10%, Table 6) of the food ingestion rate..

7. The basis for the exposure point concentrations used in the conservative and Tier 3a food web modeling should be explained in the text. For instance, the maximum concentration of chromium in surface soil is 11.6 mg/kg (Table 3), and this concentration is used in the conservative food web model (e.g. Table 8). However, the exposure point concentration for surface soil in the Tier 3a model is 9.164 mg/kg. Presumably, this concentration is the average surface soil concentration, but this is not explained in text or table. It is recommended that the average concentrations in each media be compiled in Table 3 and supported with data tables in an appendix.

8. Screening of sediment concentrations against ERLs is appropriate for a screening level assessment, and the results indicate concentrations of many COPCs are higher than ERLs. However, no conclusions can be made concerning the likelihood of adverse effects if ERLs are exceeded. Many of the COPCs did not exceed ERM values, suggesting that adverse effects may be unlikely. Analogous to the Tier 3a process for food web modeling, it would be useful to discuss the likelihood of adverse effects based on ERL and ERM exceedances in the uncertainty section (see Long et al 1998 and Long and MacDonald 1998). Such an analysis, combined with comparison of sediment concentrations elsewhere in the harbor, may indicate that additional risk assessment activities (e.g. sediment toxicity tests, benthic community survey, etc.) are not warranted. Currently, exceedance of ERLs in the screening level assessment indicates that remediation will be necessary unless higher tier risk assessment supports the conclusion that risks are acceptable.

9. Some clarification on the samples collected for this ecological risk assessment is needed in the report. The number of soil samples, locations, and individual sample results are needed to help determine adequacy of sampling and whether or not the site has been delineated. Similarly, please state how many water samples were collected from the seeps.

Specific Comments:

10 **Section 1.1.1, Environmental Setting of Site 16, Page 2.** The third sentence of the second paragraph states, "Non-hydric plants dominated in the rip rap area, and site-visit participants agreed that the area lacked wetland characteristics." The fourth sentence states, "A small area of *Spartina alterniflora* marsh existed in the northeast portion of the site abutting Allen Harbor." Without further clarification, these two sentences appear contradictory. Please clarify.

11 Further, please state who conducted the site visit and made these determinations regarding the habitat at the site.

EPA Comments on the Site 16 Draft Screening Level ERA

12 3. **Section 1.2.2, COPC-Screening Results: Exposure and Risk Characterization for Lower Trophic Level Terrestrial Organisms and Aquatic Organisms, Page 4.** The fourth sentence states that COPCs included three metals. Please change this to "four metals" to account for copper, which exceeded its benchmark.

13 4. **Section 1.3, Summary of Site 16 Screening Level Ecological Risk Assessment, Page 12, top of page.** The final sentence states that it has not been determined whether seep sediment areas represent localized concentrations of COPC, or whether data reflect general sediment conditions throughout the Site 16 shoreline area. Please discuss how this issue will be determined.

14 5. **Figure 3.** This figure does not clearly show the sample locations relative to source areas. Please provide a clearer figure so that the suitability of sampling locations can be determined.

15 6. **Table 2.** The soil screening benchmark for mercury is listed as 2.2 ppm, from RIVM (1997). This value is higher than the available value in Efroymson (1997), which is 0.3 ppm. Please use the more protective value for this screening level risk assessment.

16 7. **Table 3.** Table 3 lists a few chemical in surface soil for which no screening benchmarks are provided (e.g., dioxin). Please indicate in the final column that these chemicals are carried through as COPC. Please add these chemicals to the discussion in Section 1.2.2. as well.

17 8. **Table 3.** The maximum concentration of copper in soil (40.2 mg/kg) exceeds the surface soil benchmark (40 mg/kg). In the final column of this table please indicate that copper is a COPC. Further, copper should be carried through the food chain modeling as a COPC.

18 9. **Table 5.** Table 5 lists a few chemical in sediment for which no screening benchmarks are provided (e.g., cobalt and vanadium). Please indicate in the final column that these chemicals are carried through as COPC. Please add these chemicals to the discussion in Section 1.2.2. as well.

19 10. **Table 6.** This table provides exposure factors for ecological receptors. Please provide explanations for the values pulled out of EPA (1993). Were values based on means of available values? In the case of the food ingestion rate for the robin, if one used the most conservative value available, the food ingestion rate would be around 0.12 kg/d, not 0.098 kg/d, as used in this report.

20 11. **Table 6.** Please correct the definition of the abbreviation Ha. It should be hectares, not

Health Advisory.

21 ~~12.~~ **Table 7.** Please provide rationale for using the avian TRV for lead which is based on metallic lead rather than the more conservative value for lead acetate.

22 ~~13.~~ **Table 11.** A value of 1.0 is provided for dioxin toxicity equivalent as a default value, assumed to be conservative. This value may not be adequately conservative; it is possible that the BCF could be greater than one. There are BCFs available for several dioxin/furan compounds in EPA's document *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Peer Review Draft*, dated November, 1999 (www.epa.gov/epaoswer/hazwaste/combust/ecorisk.htm). If the report specified which specific dioxins were detected in surface soil, an appropriate BCF might be selected. Please review.

23 ~~14.~~ **Table 11.** The soil-plant BCFs for the inorganic COPCs were calculated using a regression equation from Bechtel and Jacobs (1998). Please explain which equation was used from the source document and explain how the equation was used to derive the BCF values.

24 ~~15.~~ **Table 11.** The mammal BCFs for the inorganic COPCs were calculated using a regression equation from Sample *et al.*(1998). Please explain which equation was used from the source document and explain how the equation was used to derive the BCF values.

25 ~~16.~~ Please clarify if the BCFs are soil-mammal BCFs, plant-mammal BCFs, invertebrate-mammal BCFs, etc.

26 ~~17.~~ **References**

Long, E. R. and D. D. MacDonald. 1998. Recommended uses of empirically derived sediment quality guidelines for marine and estuarine ecosystems. Human and Ecological Risk Assessment 4(5): 1019-1039.

Long, E. R., L. J. Field, and D. D. MacDonald. 1998. Predicting toxicity in marine sediments with numerical sediment quality guidelines. Environ. Toxicol. Chem. 17(4): 714-727.

EPA Comments on Draft Site 16 HHRA

General Comments

1. The raw analytical data used in the risk assessment were not provided in the Human Health Risk Assessment but were available in the RI. If the HHRA is to be a stand alone document the analytical data will need to be included in the document in order for the risk assessment to be complete.

2. It appears that the screening value for Phenanthrene is actually the benchmark for pyrene. Please confirm whether pyrene was used as a surrogate for phenanthrene.

3. Both cis-1,2-DCE and total 1,2-DCE are identified as COPCs. This would seem to "double count" the risks from cis-1,2-DCE except that total 1,2-DCE concentrations were sometimes lower than cis-1,2-DCE. Where two different analytical methods used to detect these compounds? Some explanation of the treatment of these compounds would be useful for interpreting the results presented.

4. The Navy used a background screen to screen out possible contaminants of concern at the initial stage of the HHRA. This is unacceptable to EPA. The Navy has been informed of the EPA's position in several previous correspondence the most recent being the Site 16 RI Workplan RTC letter dated: March 3, 2000, which I quote below:

   "**EPA Comment #19** Under Section 6.1 of the Federal Facility Agreement (FFA) for the Naval Construction Battalion Center (NCBC), Davisville, RI the Navy agrees to "perform the tasks, obligations and responsibilities described in this Agreement in accordance with CERCLA, applicable CERCLA guidance and policy (emphasis added), the NCP..." At issue is whether EPA New England's Risk Updates are "applicable CERCLA guidance and policy." What constitutes a guidance or policy is quite broad. In an attached August 25, 1999 EPA memorandum, entitled *Distinguishing Guidance Documents from Interpretive and Legislative Rules,* a policy statement or guidance document is defined as an announcement of EPA's intended future course or areas for exploration with respect to how EPA will interpret or enforce a statutory or regulatory provision, which leaves EPA free to exercise administrative discretion in carrying out the policy[1] .

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[1] The memo discusses the difference between binding legal requirements (substantive rules) and non-binding guidance. As published, EPA New England's Risk Updates are non-binding. However, under section 6.1 of the FFA the Navy has agreed to make non-binding CERCLA policy and guidance binding upon its actions under the Agreement.

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The Region's Risk Updates are published notices of CERCLA policy and provide guidance as to procedures and processes used by the Region's risk assessors. Each Update clearly states on its first page that it is "a periodic bulletin prepared by EPA Region 1 New England risk assessors to provide information on new regional guidance"(emphasis added). In particular, Risk Update #5 discusses the Region's updating its process for evaluating chemicals of potential concern (COPC) and clarifying the role of background data. The Risk Update is clear in stating that it is the Region's current policy that background levels (either naturally occurring or anthropogenic) may not be used to eliminate any COPC from the risk evaluation process. It explicitly states on page two (2) that this policy is intended as an update to "the guidance presented in the 8/95 region 1 Risk Update #3 Newsletter" (emphasis added). It is important that all COPC be retained to at least make a characterization of site risk. Once site risks are determined then the information may be used to determine what risk management measures must be taken under CERCLA, (Navy may decide they want to provide an additional risk calculation to describe how much of the overall risk is due to background contamination which would required a rigorous statistical background study).

Since under Section 6.1 the Navy is obligated to act in accordance to applicable CERCLA guidance and policy, the Region's current risk assessment policies, as described within the Risk Updates need to be complied with (see also RTC for #15 where Navy quotes the Risk Update #2 and 5)."

Therefore, the Navy must change the HHRA to be in compliance with the FFA. EPA agrees that the RAGs part A allows chemicals to be dropped out due to low frequency of detection when sufficient samples have been collected. Therefore, the Navy must change the tables and text to indicate that the rationale for dropping arsenic in groundwater out of consideration as a COPC is due to low frequency of detection. EPA MAY agree with such a compromise, **IF tables 2-6 and 2-7 from the hydrogeologic evaluation can be reconciled with table 2-6 of the HHRA. Only 27 field samples are indicated as being taken during the RI, however, arsenic was detected in 2 of 42 groundwater samples used in the HHRA.** Where did the extra analytical information come from? As has been requested twice before, please provide the lab data sheets so that EPA can evaluate the lab data, (Appendix N: 1 copy to EPA and 1 copy to CDW).

5. The risks associated with dermal exposure and incidental ingestion of seep sediment should be evaluated for the recreational receptor, and combined with the risks associated with incidental ingestion of seep water by the recreational receptor.

6. The existence of relatively high concentrations of vinyl chloride in one monitoring well and the occurrence of shallow groundwater suggests that migration of volatile organic chemicals to indoor air from shallow groundwater may be a potentially significant future

exposure pathway if buildings are constructed in the future. EPA recommends that this exposure pathway be evaluated using the Johnson and Ettinger model or equivalent, followed by risk assessment of the modeled indoor air concentrations.

7. The exposure point concentrations for groundwater were the 95% UCL or maximum for both the RME and CTE conditions (Table 3.6). Per EPA Region I guidance (Risk Update No. 2, page 2), the RME exposure point concentration for groundwater should be the maximum detected concentration of each contaminant in any well, or the highest average concentration of each contaminant across several rounds in the same well if there is more than one round of data. The CTE exposure point concentration for groundwater should be the average plume concentration.

Specific Comments

8. <u>**Page ES-2**</u>. The last paragraph on the page indicates that the CTE lifetime cancer risk for the residential receptor's exposure to ground water is $6.1X10^{-5}$. Table 9.1, however, lists this value as $4.5X10^{-5}$. Please correct this apparent discrepancy.

9. **Page ES-2**. The last sentence on this page which is completed on page ES-3 does not indicate that the RME lifetime residential cancer risk due to TCDD-TEQ in soil exceeds $1X10^{-5}$ (Table 9.6). Please correct the text.

<u>**10.**</u> <u>**Page 2-21, and 2-22, Sections 2.5.6.1 and 2.5.6.2**</u>. These sections summarize the results of the IEUBK lead model runs for the residential child and the recreational child. The summaries correctly note that the proportion of children with blood lead levels in excess of 10 ug/dL is less than or equal to approximately 1%, far below EPA's threshold of no more than 5% of children with blood lead levels in excess of 10 ug/dL. However, on page 2-21, last paragraph of section 2.5.6.1, the text gives the average blood lead level as 7.93 ug/dL. This value is actually the total lead uptake of the 6 to 7 year old, not the average blood lead level. The actually average blood lead level for the resident child should be listed as 3.03 ug/dL. Similarly, the average blood lead estimates for the recreational receptor should be corrected to 3.248 ug/dL in the first paragraph on page 2-22 rather than the 8.76 ug/dL value listed. The value of 8.76 is also the total lead uptake of the 6 to 7 year old. In order to avoid confusion over final model results, it would be useful if the distribution curve output of the model were included with the results. These curves clearly show that the results for both the residential and recreational child are well within the accepted risk range.

11. <u>**Page 2-5, Section 2.1.5.3.**</u> The first paragraph in this section indicates that background levels for inorganics in ground water are "provided in Table 2.7. However, Table 2.7 has not been provided.

12. **Page 2-6, Section 2.2.1.2.** The second paragraph in this section indicates that medium specific data for each parameter were evaluated to determine whether the distributions were normally distributed or lognormally distributed. Please indicate how data whose distributions were found to be neither normal nor lognormal were handled.

13. **Page 2-18, Section 2.5.1.** The last paragraph in this section lists the ground water CTE cancer risk for the lifetime residential receptor as $4.7X10^{-5}$. This value corresponds to the cancer risk summed across all media. The value for ground water, according to Table 9.1, is $4.5X10^{-5}$. Please correct this apparent discrepancy.

14. **Page 2-18, Section 2.5.1.** The last sentence of the last paragraph in this section indicates that the lifetime residential cancer risk for arsenic in soil exceeded $1X10^{-6}$. However, according to Table 9.6, other parameters measured in soil also exceeded this risk level (TCDD-TEQ, benzo(a)pyrene and dibenz(a,h)anthracene). For clarity, please indicate this in the text.

15. **Page 2-18, Section 2.5.2**. The second paragraph in this section states that the RME cumulative HI for the adult recreational user is 0.002. The correct value according to Table 9.7 is 0.02. Please correct this apparent discrepancy.

16. **Tables 2.1 - 2.6.** These tables do not define the qualifiers listed. Additionally, since the "U" qualifier typically means the parameter was not detected it is unclear why these qualifiers are listed sometimes for the maximum and minimum detected concentrations.

17. **Table 2.2.** The screening value used for beryllium is the carcinogenic based Region 9 PRG. However, as is indicated in the PRG table, when the noncarcinogenic screening value is adjusted downward by a factor of ten it is lower than the carcinogenic screening value and should be used. Please correct the table accordingly.

18. **Table 2.6.** The screening value used for chloroform is the carcinogenic based Region 9 PRG. However, as is indicated in the PRG table, when the noncarcinogenic screening value is adjusted downward by a factor of ten it is lower than the carcinogenic screening value and should be used. Please correct the table accordingly.

19. **Tables 3.1 - 3.6.** The CTE EPC values listed are not the arithmetic means as stated in the text and used in the calculations. In addition, the median EPC statistics which are listed for the CTE EPCs are incorrect. Please review and revise the tables accordingly.

20. **Table 5.1.** The oral RfD for 1,1-dichloroethene does not agree with the value provided in IRIS. Please verify and correct.

21. **Table 5.1.** This table does not list a primary target organ, uncertainty factor or modifying factor for dieldrin. However, IRIS listing for dieldrin identifies the liver as the primary target organ and also provides uncertainty and modifying factors. Please verify and correct.

14. **Tables 5.1 - 5.2.** The lists of semivolatiles listed in Tables 5.1 and 5.2 are not identical. It appears that a few of the semivolatile compounds listed in Table 5.2 are not COPCs. Please verify and correct as necessary.

15. **Table 5.2.** This table does not provide a reference for the inhalation RfD listed for 1,2-dichloroethane. Please verify and correct.

16. **Table 5.2.** This table identifies IRIS as the source of the inhalation RfD for chloroform. IRIS, however, does not provide an inhalation RfD for chloroform. Please verify and correct.

17. **Table 6.1.** This table identifies dieldrin as a Class D carcinogen. IRIS, however, lists dieldrin as a Class B2 carcinogen. Please verify and correct.

18. **Table 6.1.** This table does not list an oral RfD or carcinogenic class for 1,1-dichloroethene. These values are listed in IRIS. Please verify and correct.

19. **Table 6.1.** The column heading for dermal cancer slope factors is not clearly labeled. Please enter a more descriptive column heading.

20. **Table 6.2.** This table does not list an inhalation cancer slope factor or carcinogenic class for 1,1-dichloroethene. IRIS, however, provides both of these values. Please verify and correct.

21. **Table 6.2.** The reference provided for the inhalation cancer slope factor for 1,4-dichlorobenzene is IRIS. However, IRIS does not list an inhalation cancer slope factor for 1,4-dichlorobenzene. Please verify and correct.

22. **Attachment B.** A number of the central tendency intake calculations cannot be verified. For example, the cancer intakes provided in Table B-41 appears to be incorrect based on the exposure parameters and equation provided in the table. Other tables showing discrepancies include B-51, B-53, B-55 and B-57. Sometimes the problem seems to affect only cancer intakes, other times it seems to affect only noncancer intakes and sometimes it seems to impact both sets of values. In some instances at least, the problem appears to be related to a discrepancy between the exposure parameters provided in the

Table 4s and the exposure parameters given in Attachment B. Please carefully review these risks calculations and correct the tables as necessary.

23. **Table B-42.** This table presents the RME risk calculations for the inhalation of volatiles from Groundwater pathway. The Non-Cancer Averaging time used in this table is 3,285 days which is the CT averaging time. The correct value to be used for the RME is the ED * 365 or 8760 days. This input value should be corrected and the noncancer hazards should be recalculated in this table. This change will result in decreasing noncancer hazards from this pathway.