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RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL
CONTROL COMMENTS ON RESOURCE CONSERVATION AND RECOVERY ACT FACILITY
INVESTIGATION REPORT ZONE H CNC CHARLESTON SC

6/24/1997

ENSAFE/ ALLEN AND HOSHALL

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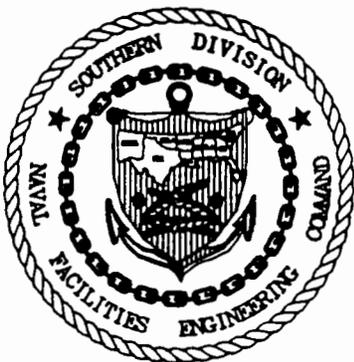
**RESPONSE TO COMMENTS FOR
FINAL RCRA FACILITY INVESTIGATION REPORT
FOR ZONE H
NAVAL BASE CHARLESTON
DATED JULY 5, 1996**



**CONTRACT N62467-89-D-0318
CTO-029**

Prepared for:

**Comprehensive Long-Term Environmental Action Navy
(CLEAN)
Charleston Naval Shipyard
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June 24, 1997

**NAVAL BASE CHARLESTON
RESPONSE TO SCDHEC COMMENTS
FINAL ZONE H RFI REPORT
July 5, 1996 Version**

SCDHEC Comments Dated January 3, 1997

GENERAL COMMENTS - Johnny Tapia

Comment 1:

The Department agrees with the statement made in the report that third and fourth groundwater sampling rounds should be included (where applicable) and used to determine if the presence of some constituents needs to be further considered and the possible impacts that these constituents may have on human health and ecology.

Response 1:

Agreed. Per the March 1997 Project Team meeting, consensus was reached that the Navy will provide the team with a summary of CMS recommendations which will include all the groundwater data for each zone. The CMS recommendations and groundwater data were provided to the team in preparation for the April 24-25, 1997 project team subcommittee meeting.

Comment 2:

There is a concern about the high values of the determined Upper Tolerance Limits (UTLs) for Arsenic. The UTL values for Arsenic are much higher than the RBCs which in the process of screening against RBCs first and then UTLs, could screen out sites with high Arsenic presence that will not be protective of human health and/or produce a very high risk.

The statistical approach used for the determination of background values at Zone H, raised two questions:

- The UTLs statistical approach is recommended by EPA for the analysis of groundwater monitoring data. Is this method adequate for use on analytical data of soils?
- Has EPA recommended this method for use in soils analytical data?

Response 2:

Past and continued use of UTLs was discussed in detail at a technical "subcommittee" meeting of Project Team members held on March 25, 1997. The group reached consensus that the UTL method will be used to calculate background for all zones. On April 22, 1997

SCDHEC agreed to revised values for Zone H arsenic background concentrations which are listed in the following table.

Zone H Revised Arsenic UTL Concentrations (ppm)		
Sample Population	Original UTL	Revised UTL
Soil (Upper Interval)	14.81	15.6
Soil (Lower Interval)	35.52	22.5
Groundwater (Shallow)	27.99	21.5
Groundwater (Deep)	14.98	8.2

The UTL revisions affected the following sites based on the data presented in the RFI report. SWMU 159 sediments would not be considered in the risk assessment. The maximum detected value of arsenic in soil and sediment at SWMU 159 was between 14.81 ppm and 15.6 ppm. Deep groundwater at SWMU 9 and shallow groundwater at AOC 660 had maximum arsenic detections between 14.98 ppm and 8.2 ppm. However, risk management decisions identified groundwater at AOC 660 as no further action. Arsenic in lower interval soil would now be considered in the fate and transport analysis at SWMU 17 and AOC 670. The effect of the arsenic UTL revisions has been considered as part of the risk management decision making process.

SPECIFIC COMMENTS:

Comment 1:

Previous Comment #10 made reference to the detection of BEHP above RBSLs in several monitoring wells during the first round of sampling. The response to this comment from NAVBASE still has not explained why the second round of sampling has not included SVOCs and why the variations from high detection (above RBSLs) to non-detect (ND) on the third round, and in the fourth round of groundwater sampling was detected at 740 ug/l, which is much higher than 4.8 ug/l.

Response 1:

SVOCs were inadvertently omitted from the list of analytical parameters for the second round of groundwater samples collected at SWMU 14.

Given the inconsistent occurrence of BEHP it is strongly suspected that BEHP is present as a laboratory artifact. Of the ten wells installed at SWMU 14 (5 shallow, 5 deep) BEHP was reported in nine of the wells during the first round of sampling. All except one of the detections were estimated. The one detection that was not qualified as estimated was only slightly above the other estimated values. The second round samples were not analyzed for SVOCs. The only BEHP detection in the third round was in NBCH01404D which happened to be the only well that was ND for BEHP in the first round. BEHP was detected in two wells in the fourth round. Each of these wells were ND for BEHP in the third round. One of the fourth-round samples with a BEHP detection was duplicated and the duplicate was ND for BEHP. This suggests that the BEHP was introduced through the sampling or analysis process. The following table presents all BEHP data for SWMU 14 wells. Continued groundwater monitoring will occur as part of the CMS process to determine the source of BEHP.

Presence of BEHP in SWMU 14 Groundwater Samples (parts per billion)				
Monitoring Well Identification	Sampling Round 1	Sampling Round 2	Sampling Round 3	Sampling Round 4
NBCH014001	2.2 J	-	U	U
NBCH014002	11.8	-	U	U
NBCH014003	5 J	-	U	2 J
NBCH014004	5.8 J	-	U	U
NBCH014005	1.8 J	-	U	220 (U)
NBCH01401D	1.7 J	-	U	U
NBCH01402D	11.2 UJ	-	U	U
NBCH01403D	7.5 J	-	U	U
NBCH01404D	U (U)	-	740	U
NBCH01405D	10 UJ	-	U	U

Notes:

- BEHP not analyzed for during the second round.
- J Estimated value.
- U Compound not detected above method detection limit.
- () Duplicate results.

Comment 2:

The third paragraph of the Executive Summary states that 31 SWMUs and AOCs were identified as needing further assessment. However in page 1-15, fourth paragraph is stated that only 30 sites were deemed as needing further investigation and only these 30 sites are described on Table 1.1 as requiring further investigation. This discrepancy should be clarified.

Response 2:

The executive summary has been corrected to list "30" as the number of sites deemed as needing further investigation. Please complete the page changes for the Executive Summary as instructed by the errata page directory attached to this response to comments.

Comment 3:

Table 4.1.2 SWMU 9, Trench Soil Samples, Organic Compounds in Soil:

- In a review of the April 19, 1996 EPA Region III Risk Based Concentration tables was found that the RBSLs for Aroclor 1242, Aroclor 1252 and Aroclor 1260 is 160 ug/Kg.
- The RBSL for Aroclor 1016 is 550 ug/Kg.
- These values should be modified in Table 4.1.2.

Response 3:

The EPA Region III RBC tables list a hazard based residential RBC for Aroclor 1254 and Aroclor 1016 of 1,600 ug/kg and 55,000 ug/kg, respectively. Adjusting to a target hazard quotient of 0.1 would yield 160 ug/kg and 5,500 ug/kg. All PCB congeners (Aroclors) are considered to be carcinogenic. The cancer-based residential RBC is 83 ug/kg for all PCB congeners. The screening process used the more conservative cancer-based RBC for all PCB congeners. The risk-based screening level provided for Aroclor 1016 on Table 4.1.2 should be changed to 83 ug/kg. Please complete the page change for Table 4.1.2 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 4:

Table 4.1.3:

- In a review of the April 19, 1996 EPA Region III Risk Based Concentration Tables.
- The RBSLs for Arsenic is 0.43 mg/Kg as a carcinogen; and 23 mg/Kg as a non-carcinogen under a residential scenario.
- The RBSL for Manganese is 1800 mg/Kg as a non-carcinogen, instead of 390 as used in Table 4.1.3.
- Table 4.1.3 should be modified to include the appropriate RBCs values.

Response 4:

Risk assessments are developed with the best available information at the time of preparation. Reference information such as the RBC tables are continually updated and have the potential to change with each six-month update. The RFI was current with the October 1995 Region III RBC Tables when it was submitted. The Navy proposes that in lieu of revising the report every time the RBCs change prior to completion of the review period, only the conclusions/recommendations section be updated. Project Team has agreed that when changes occur in a chemical's RBC between the time of RFI preparation and approval, appropriate consideration to the change will be provided in the risk management decision making process.

The arsenic risk-based screening level provided on Table 4.1.3 was taken from the March 1995 Region III RBC Tables. The RBC for arsenic changed between the March 1995 and October 1995 versions. The arsenic change was an increase in the RBC from 0.37 ppm to 0.43 ppm. Since the RBC used throughout the report (0.37 ppm) is more conservative than the more recent RBC (0.43 ppm), changing the value is not considered critical to the report. The manganese RBC provided on Table 4.1.3 is current with the October 1995 version and should remain unchanged at 39 mg/kg. The hazard-based RBC for manganese changed between the October 1995 and June 1996 versions.

Comment 5:

SWMU 17, Section 4.2.2.2, Semivolatile Organic Compounds in Groundwater:

- From the sampling of groundwater at SWMU 17, Benzidine was detected at well number NBCH017005 at a concentration of 56 ug/l which is more than 5 orders of magnitude greater than its RBSL(0.00029 ug/l). There was no second round of sampling done at this well nor analysis for benzidine. There is no justification provided for not conducting a second round of sampling at well NBCH017005. If constituents are detected above their respective RBSLs, then additional sampling and analysis for those constituents is warranted. It should be explained why the no action at this well after Benzidine was detected at high concentrations.

Response 5:

The first round of groundwater sampling at SWMU 17 involved 4 wells. Based on those results, two additional wells were installed. During the second round of sampling these two new wells were sampled for the first time and as such were labeled inappropriately "01" samples. Time-wise they are 02 samples. So, actually the benzidine was detected in the second round of sampling. In the third round of sampling benzidine was not detected. It was not analyzed for in the fourth round because it was screened out following the data evaluation procedures described in the *Comprehensive RFI Work Plan*. As agreed at the April 24-25, 1997 project team subcommittee meeting, additional groundwater monitoring will be performed during the CMS in an effort to further confirm benzidine is not a site constituent.

Comment 6:

Section 4.23, Other Impacted Areas:

Aroclor 1260 was identified in the vicinity of grid-based sample location GDH5B038. Figure 4.23.1 identify those locations and additional samples taken to confirm these findings. One of these locations was labeled G387SB001. This identification seems to be incorrect and the correct labeling should be G39SB001. There is also a soil sample location labeled as GDHSW04D07 which is not identified on Figure 4.23.2. All the previous observations on Figure 4.23.2 should be either corrected or clarified.

Response 6:

The correct label for G387SB001 is G38SB001. Please complete the page change for Figure 4.23.1 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

The soil sample GDHSW04D07 was collected from monitoring well NBCHGDH04D as explained in the text on page 4-347.

Comment 7:

Table 5.2.1:

- The values used for groundwater protection SSL or UTLs for Endosulfan I and Endosulfan II are 300 ug/Kg instead of 400 ug/Kg. The same observation is applicable to Endosulfan Sulfate.
- The tap water RBCs for 1,1,1-trichloroethane is 790 ug/l instead of 1,300 ug/l described in the table. Table 5.2 should be modified to included the above mentioned values.

Response 7:

The soil-to-groundwater migration screening level for endosulfan is incorrectly listed in the EPA Region III RBC Tables as 3,000 mg/kg (300 mg/kg based on a THQ of 0.1). The Zone H Final RFI is current with EPA's Draft Soil Screening Guidance which lists a SSL of 4,000 mg/kg using the default DAF of 10 (400 mg/kg based on a THQ of 0.1). The SSL for endosulfan was cross-assigned to endosulfan I, endosulfan II, and endosulfan sulfate. The tap water RBC for 1,1,1-trichloroethane (130 ug/L based on a THQ of 0.1) given on Table 5.2.1 was taken from the October 1995 RBC Tables. The tap water RBC for 1,1,1-trichloroethene changed to 790 ug/L (79 ug/L based on a THQ of 0.1) between the October 1995 and the June 1996 versions of the RBC Tables. The response to Comment 4 above describes the consensus agreement reached by the project team for dealing with RBC values which change during the report review process.

Comment 8:

Table 5.3.1 describes chemicals detected in soil at SWMUs 19, 20, 121 and AOCs 649, 650, 651, 654. The detected chemicals are compared to groundwater protection soil screening levels

and also are described if found in one or two rounds of sampling and if they exceeded Tap water RBCs in shallow groundwater.

Lead and Copper are chemicals that were found in surface soils and subsurface soils and during the two rounds of groundwater sampling. They also exceeded tap water RBCs. Based on this observation it is of concern that these two chemicals are not listed on Table 5.3.5 as being of concern and having a possible migration pathway from soil to groundwater. These two compounds should be included in the list of Table 5.3.5 and considered further.

Additionally, Table 5.3.2 lists the chemicals found in groundwater and surface water. From this table it is apparent that Vanadium should also be included in Table 5.3.5 for SWMU 9 as a possible groundwater migration pathway. Vinyl chloride was also found in very high concentrations (about 4 orders of magnitude higher than its tap water RBC 0.019 ug/l) as described in Table 5.3.2, and should also be included in Table 5.3.5 for SWMU 9.

Response 8:

Copper and lead were both identified as exhibiting the potential for soil to groundwater migration on Table 5.3.5. Copper for SWMU 121 and lead for SWMU 121 and AOCs 649 and 650. Vanadium detections in groundwater were isolated to monitoring well NBCH0012. Inorganics are not generally amenable to transport with in an aquifer's matrix. Based on the isolated nature of vanadium in the groundwater and the resistance to movement in the aquifer, surface water concentrations are more likely due to surface soil to sediment migration rather than groundwater migration. Vinyl chloride detections were found to be isolated to monitoring well NCBH009007. Travel time analysis predicted travel times from this area of SWMU 9 to surface soil to be close to 100 years, not taking into account the attenuative capacity of the aquifer. Vinyl chloride was not detected in surface water. The data have shown that vinyl chloride is not a significant groundwater migration concern.

Comment 9:

Table 5.3.4 is labeled as "Chemicals Detected in Soil And Sediment". It should be clarified in a footnote that all sediment samples collected, related to SWMU 9, were collected in relation with the impact that surrounding units (SWMUs 19,20, 121 and AOC 654) are likely to have on sediments.

Response 9:

This point is explained in the text on page 5-36; first paragraph.

Comment 10:

SWMU 17, Section 5.6:

- This section identifies in the text and in Table 5.6.1 Aroclor 1260 as able of impacting shallow groundwater. This contaminant was found in very high concentrations at both, surface and subsurface soils and above groundwater protection soil screening levels. Aroclor 1260 should be considered as having a significant potential for migration from soils to groundwater in Table 5.6.3.

Response 10:

Aroclor 1260 was detected above the SSL in surface and subsurface soil samples but not in groundwater samples. However, since the detection limit for Aroclor 1260 in groundwater is above the tap water RBC, the potential exists for there to be non-detectable concentrations of Aroclor 1260 in SWMU 17 groundwater above the tap water RBC. Aroclor 1260 will be added to Table 5.6.3. Please complete the page change for Table 5.6.3 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 11:

AOC 655, Section 5.10, Table 5.10.1:

- The groundwater maximum concentration of Arsenic was found to exceed tap water RBC or UTLs. This was identified in the text, however in the last column of Table 5.10.1 is not shown that Arsenic concentration in groundwater of 42.3 ug/l exceeded the screening level of 27.99 ug/l. Table 5.10.1 should be corrected.

Response 11:

Table 5.10.1 will be corrected. Please complete the page change for Table 5.10.1 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 12:

Section 6.2.1.5, Risk Characterization for SWMU 19, states that from Tables 6.2.1.43 and 6.2.1.44 was concluded that Arsenic is the primary contributor to Increment Lifetime Cancer Risk (ILCR), with an ingestion ILCR value of 4.6 E-5. This values is different from the value found at Table 6.2.1.43, which is 3.7 E-5. In the same section the dermal contact and ingestion pathway ILCR for Hypothetical Site Workers are switched according to the values presented on the corresponding tables.

Response 12:

The text will be corrected. Please complete the page changes for pages 6-81 and 6-82 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 13:

Page 6-119, Deep Groundwater for Hypothetical Site Residents:

- In the first paragraph for the First Quartile sitewide, is it stated that the Hazard Index (HI) for the ingestion pathway for the adult resident is 55. From the review of Table 6.2.1.59 it was observed that this value was 59, not 55. This page should be corrected.

Response 13:

The text will be corrected. Please complete the page change for 6-119 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 14:

Section 6.2.1.8 RGOs. Pages 6-127 and 6-128 typographical errors:

- When describing the tables that contain calculated RGOs for SWMUs 20, 121, and AOCs 649 and 650; all the paragraphs make reference to SWMU 19 when it should make reference to SWMU 9. This pages should be corrected.

Response 14:

The text will be corrected. Please complete the page change for 6-127 and 6-128 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 15:

Section 6.2.2.8, RGOs, page 6-259:

- The header for the text that describes the Remedial Goal Options (RGOs) for soil and groundwater are switched. The headers or the paragraphs should be changed.

Response 15:

The text will be corrected. Please complete the page change for 6-259 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 16:

Section 6.2.3.5, Risk Characterization:

- This section on page 6-303 states that the Hazard Index (HI) for the adult resident is 0.15 for the soil ingestion pathway for SWMU 14. Table 6.2.3.32 shows the hazard index as 0.13 instead. On the same fashion, the HI for the child ingestion pathway is said to be 1.0. From a review of Table 6.2.3.32 it was found that the HI adds up to 1.2 instead.
- On page 6-304 the computed HI for adult residents is described to be 0.38 for the soil ingestion pathway, however Table 6.2.3.34 the HI value for this pathway is 0.2.
- On page 6-307, the hypothetical site workers HI for dermal contact is 0.04 instead of 0.06.
- Section 6.2.3.5 "Risk Characterization" for SWMUs 14 and 15 should be revised such that the values of HI described in the text reflect the values that the corresponding tables have.

- It should be explained how/why these values are approximated and if there will be any effect of using this approach in the final values of risk and/or hazard. As stated in a previous comment for the Zone B Draft RFI Report, the values of risk and hazard should not be approximated until risk or hazard is added up by chemical of concern, pathway, etc. Describing values or risk and hazard that do not match between the text and the results of the tables shows inconsistency and can cause confusion.

Response 16:

First bullet; the text on page 6-303 will be corrected. The cumulative HI is appropriately rounded to reflect the level of certainty. Second bullet; the text on page 6-304 will be corrected. Third bullet; the text on page 6-307 will be corrected. Fourth bullet; the corrections in the text will be made. Discrepancies between text and tables will be corrected. Final bullet; by risk assessment convention, cumulative risk and hazard values are rounded to one significant digit and to the nearest whole number, respectively, to reflect the level of certainty (or uncertainty) in the estimations. Please complete the page change for 6-303, 6-304, 6-307 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 17:

Sections 6.2.3, 6.2.4 and 6.2.5 for SWMUs 14, 17 and 159, AOC 655 detected the presence of an indeterminate lubricant oil in soils at concentrations above the screening levels and with high frequency of detection. The text of any of these SWMUs and AOC does not contain an explanation for the presence of this oil and/or its possible source. Additionally, this lubricant oil is considered a COPC but is eliminated from the risk assessment without explanation of any sort. All the above concerns should be addressed and included in the Report.

Response 17:

TPH do not, as a group, have sufficient toxicological data to perform risk/hazard evaluations. As a result, TPH were screened using the NAVBASE action level of 100 mg/kg. This is explained on page 6-13.

Comment 18:

Section 6.2.82, COPC Identification:

- There is a typographical error in these section. It is stated that the concentrations of TPH ranges between 75 - 120 mg/Kg. This should be corrected to 75 - 150 mg/Kg.

Response 18:

The text will be corrected. Please complete the page change for 6-560 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 19:

This Department agrees with the proposed inclusion of SWMU 9, shallow and deep groundwater media, in the Corrective Measures Study (CMS) phase. For this purpose, the results of third and fourth rounds of sampling will be considered in the CMS phase.

Response 19:

Comment noted.

Comment 20:

Appendix J, the technical background document, was reviewed according to the text and following the process to calculate background values for inorganics for Zone H. From this review, specifically for **Arsenic**, it is apparent that the sample sizes for soils (surface and subsurface), as stated in the text, does not coincide with the number of samples presented in Appendix M "Grid-Based Analytical Data for Zone H NAVBASE Charleston". This Appendix lists 58 samples for the subsurface soils level and 94 for the surface soils level. One of the samples for the subsurface level could be considered as an outlier, which will leave the sample size of 57.

In addition, the **Arsenic** background value for subsurface soils (level 2) seems to be to high. It is asked from the navy to review the analytical data for arsenic background determination and provide a detailed response, including but no limited to calculations of all parameters, i.e. std. deviation, sample sizes, etc. and provide a comprehensive response to this concern.

Response 20:

Please refer to response to general Comment 2 above.

GENERAL ISSUES - Paul Bergstrand:

Comment 1:

The first issue is that risk levels are being used to determine chemicals of potential concern before the extent of contamination has been defined. This issue has been discussed in the Zone B RFI Report and will be an issue in upcoming RFI Report reviews.

Response 1:

The process by which CPSSs are reduced to COPCs was established earlier in the Comprehensive Work Plan.

In an environment such as NAVBASE it is impractical to define the extent of every CPSS, particularly since most of the CPSSs are not present as a result of the past site activities for which the site was sampled. Numerous compounds, particularly polyaromatic hydrocarbons, are present across NAVBASE as a result of being in an industrial area. These are often detected in samples collected during a SWMU or AOC investigation. E/A&H considers the reduction of CPSSs to COPCs through comparison to risk-based screening concentrations and upper tolerance limits to be a practical approach to identifying areas that may present unacceptable risk, and as such, be considered in the risk assessment process.

In order to provide reviewers with more detail regarding all organic CPSSs, a set of tables has been prepared and delivered to SCDHEC on February 3, 1997. These tables list every organic chemical detection for every soil sample collected in the Zone H RFI. Also, to aid in the review of the document, a set of four maps depicting all organic chemical detections in Zone H groundwater samples for the first two rounds of sampling have been prepared and were sent to SCDHEC for delivery on February 14, 1997.

Comment 2:

At most sites, the full extent of contamination has not been defined.

Response 2:

This comment is closely related to the concern raised in comment 1 since there appears to have been a difference in opinion of first defining what constitutes "contamination" and secondly, is it defined by concentration or risk levels. The Navy is under the impression that the project team will define contamination as described in the *Comprehensive RFI Work*

Plan. The project team has also agreed that the “full” extent of contamination does not mean sampling to non-detect levels so the real question becomes whether the site is “adequately” characterized to make CMS or no further action decisions. The Navy believes the sites have been adequately characterized to make decisions as evidenced by the recent efforts of the project team at the April 24-25, 1997 meeting.

Comment 3:

There is an absence of sample or site specific contaminant tables showing analytical detects only and contaminant maps showing separate or groups of analytical detects only in this document. These tables and contaminant maps are strongly recommended in the EPA RFI Guidance and should be included in this document. Because the RFI does not provide these items it becomes very difficult and time consuming for a reviewer to comprehend and independently confirm site conditions.

Response 3:

See Response 1, second paragraph.

Comment 4:

Site maps provided do not show the boundaries of SWMUs or AOCs. In addition, important site features such as pipelines, tanks, drainage ditches are not represented.

Response 4:

The RFA and the zone-specific RFI work plans included figures with approximated site boundaries. The intent of the RFI was to define site boundaries based on the results of sample analyses. As discussed in previous Project Team meetings, the distribution of site-related compounds at most of the SWMUs and AOCs does not lend itself to mapping. Instead, mapping of chemical risk/hazard was proposed as a viable alternative to mapping chemical concentrations. The resulting risk/hazard contours provide the best approximation of site boundaries relative to human health or ecological risk/hazard.

Where site features are considered critical to the investigation, they will be presented on the figures. Two figures (Figures 4.10.1 and 4.16.1) have been modified and provided to SCDHEC for review.

As discussed in the January 1997 project team meeting, future RFI reports will contain an appendix of RFI Work Plan and RFA maps which depict the approximate boundaries of each site.

Comment 5:

Sample analysis was limited in second round samples from SWMUs, AOCs and grid based monitoring wells even though low levels of contaminants might have been detected. This is contradictory to EPA RFI Guidance.

Response 5:

The practice of limiting analytical parameters has been the subject of previous SCDHEC comments which were resolved in previous Project Team meetings. As a result of these meetings, Section 2 of the Comprehensive Project Management Plan was revised July 30, 1996 to explicitly describe the procedure. These revisions were reviewed and approved by both EPA and SCDHEC personnel. The 30%, 60%, and 90% progress meetings have served as the forum for analyte reduction discussion.

Comment 6:

A detailed review and comments on this report will be provided once the general issues are addressed and resolved.

Response 6:

Comment noted.

SITE SPECIFIC ISSUES

Comment 7:

SWMU 9

- The extent of contamination is not defined.
- The source of groundwater contamination is unknown.
- SWMU 8 does not appear to be upgradient on Figures 3.6 and 3.7.

Response 7:

The extent of contamination has largely been defined with respect that the landfill boundary has been defined through review of historic aerial photos, a geophysical survey, and soil borings. The source of groundwater contamination in SWMU 9 is not known other than the general landfill area. Rather than identification of specific sources, the objectives of the SWMU 9 groundwater investigation were focused toward determining what was leaching from the landfill and providing data to support the presumptive remedies being considered. Maps identifying all organic chemicals detected in groundwater and tables listing all organic chemicals detected in soil have been prepared and submitted to SCDHEC to aid in the review of the RFI report.

Agreed. SWMU 8 is not upgradient of SWMU 9 given the depiction of the potentiometric surface as shown on Figure 3.6. The text has been corrected. Please complete the page changes for pages 9-19, 9-20, 9-21, and 9-22 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 8:

SWMU 13

- The extent of contamination is not defined.
- Fuel lines and drain lines were not indicated on any maps.
- The oil water separator was not included on any maps.
- The TPH values at soil boring 18 increased with depth but were not addressed.
- The risk results for soil borings SB004/3-5 and SB005/3-5 were not on the figure.

Response 8:

As discussed in the January 1997 Project Team Meeting, no further action with respect to RCRA concerns are necessary at the site. Table 9.22 has been modified to recommend SWMU 13 inclusion into the UST program. Please complete the page change for Table 9.22 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 9:

SWMU 14

- The extent of contamination is not defined.

Response 9:

While the Navy agrees that some data gaps exist, the site has been adequately characterized to determine that a CMS is needed. Per the April 24-25, 1997 project team subcommittee meeting, the CMS will also include SWMU 15, AOC 670, and AOC 684 which are located within the presumed boundary of SWMU 14. Interim measures are planned for SWMU 14 to excavate geophysical anomalies in hopes of finding the buried canisters. Also, the possibility exists that an interim measure will be performed to remove the lead shot from the ground surface.

Comment 10:

SWMU 17

- The extent of contamination is not defined.

Response 10:

The Navy agrees that data gaps exist; however, the site has been adequately characterized to determine that a CMS is warranted. The existing data gaps will be addressed during the CMS.

Comment 11:

SWMU 19

- The extent of contamination is not defined.

Response 11:

SWMU 19 is encompassed by the larger SWMU 9, and contaminants detected in SWMU 19 samples are not necessarily related solely to SWMU 19 activities. The decision to terminate sampling was made after three sampling events were conducted and no apparent contaminant concentration gradient was identified. The decision was based on the presumption that the compounds were either attributable to the larger SWMU 9 or part of what appears to be a widespread occurrence of organic compounds such as PAHs. Since

it is safe to assume SWMU 9 will be the subject of some type of corrective action it is logical to assume SWMU 19 will be addressed by the SWMU 9 actions. Additional sampling of the smaller sites within the larger sites would therefore have little, if any, added value.

Comment 12:

SWMU 20

- The extent of contamination is not defined.

Response 12:

Same as response 11 above.

Comment 13:

SWMU 121

- The extent of contamination is not defined.
- High levels of chlorinated solvents were discovered in a monitoring well next to Building 1838. The well was installed by GEL for the Commissioners of Public Works.

Response 13:

Same as response 11 above.

Comment 14:

SWMU 178

- The extent of contamination is not defined.

Response 14:

As discussed in the April 24-25, 1997 project team subcommittee meeting, the site has been transferred to the UST program and no further action is required at the site with respect to the RFI and soil. Groundwater will continue to be monitored during the CMS in conjunction with SWMU 136 and AOC 663. Table 9.22 has been modified to recommend the additional groundwater monitoring.

Comment 15:

AOCs 649, 650, 651

- This site was used to store various unknown supplies.
- TPH was detected at 980 parts per million (ppm) in the soil
Chlorinated solvents were detected in the soils.
- There were no wells installed at this site.

Response 15:

The sites in question are all physically located on top of the SWMU 9 landfill. Groundwater in the vicinity of AOCs 649, 650, and 651 was investigated as part of the SWMU 9 groundwater investigation. Due to the location of the sites, soil sample data will be considered during the SWMU 9 CMS.

Comment 16:

AOC 656

- The extent of contamination is not defined.
- The pipeline was not indicated on any figures.

Response 16:

AOC 656 is proposed to be the subject of an interim measure to address petroleum contaminated soil at the site. The site will be carried forward into the CMS with a requirement to monitor groundwater for a period of time yet to be specified.

The AOC 656 site map has been revised to depict the location of the pipeline. A copy of this map was provided in a February 5, 1997, letter to SCDHEC. Please complete the page change for Figure 4.10.1 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 17:

AOC 653

- The extent of TPH contamination is not defined.
- It is unclear if TPH analysis was performed during the second round of sampling.

Response 17:

This site was the subject of an interim measure to mitigate the contamination that was present due to the operation of a hydraulic lift. The interim measure has been completed. As agreed during the May 13-14, 1997 project team subcommittee meeting, no further action is required at this site for soils; however, the site is to enter the CMS for groundwater.

Comment 18:

AOC 654

- The extent of VOC contamination is not defined.
- There were no monitoring wells at this site.
- The nearest wells, 009004 and 009004D, are over 400 feet away from this site. Downgradient monitoring wells 009004 and 009004D both reported Carbon Disulfide.

Response 18:

The VOC “contamination” referred to was methylene chloride. At the April 24-25, 1997 project team subcommittee meeting, quality assurance data was presented to support the belief that the methylene chloride was a laboratory artifact. The team agreed by consensus that no further action is required for soil but, as a precautionary measure, AOC 654 will be included in the SWMU 9 groundwater monitoring network due to it’s close proximity to the landfill.

Comment 19:

AOC 655

- The extent of contamination is not defined.
- PCE was discovered in soils.
- How the PCE would be associated with a boiler was not addressed.

Response 19:

The “contamination” referred to in the comment was primarily methylene chloride. At the April 24-25, 1997 project team subcommittee meeting, quality assurance data was presented to support the belief that the methylene chloride was a laboratory artifact. The team agreed by consensus. The team also felt as though any remaining contamination would have been removed during the interim measure undertaken at the site. Consensus was reached that no further action is needed at this site.

Comment 20:

AOC 659

- The extent of contamination is not defined.
- Soils near the pipelines from the AST were not sampled.
- The TPH values increase with depth.
- Groundwater was not sampled.

Response 20:

Based on high levels of TPH, AOC 659 was recommended for inclusion into the UST program to address soil contamination issues. DHEC has expressed a concern of the reported presence of methylene chloride in subsurface at concentrations exceeding the SSL. In addition, the methylene chloride could not be dismissed as laboratory artifact during the data validation process. As a result, at the April 24-25, 1997 project team subcommittee meeting, consensus was reached to install temporary wells within the bermed area to assess whether methylene chloride is present as well as possible petroleum contamination. Table 9.22 of the RFI report reflects the decision to collect groundwater samples and that the final results and CMS recommendation be submitted in an addendum to the RFI report.

Comment 21:

AOC 662

- The USTs were not located on the maps.
- There were no downgradient wells at this AOC based on figures 3.65 and 3.7.

Response 21:

The map was revised and submitted in a February 5, 1997, letter to SCDHEC. An interim action tank removal and subsequent soil and groundwater sampling have been completed. The project team has agreed no further action is warranted at this site. Please complete the page change for Figure 4.16.1 of the Zone H RFI as instructed by the errata page directory attached to this response to comments.

Comment 22:

AOC 663 and SWMU 136

- The extent of contamination is not defined.

Response 22:

Per the April 24-25, 1997 project team subcommittee meeting, consensus was reached to include SWMU 136 and AOC 663 in the CMS. The compounds of primary interest were identified as benzene and bis (2-ethylhexyl) phthalate.

Comment 23:

AOC 665

- The extent of contamination is not defined.
- High TPH values were reported.
- How TPH would be associated with Pyrotechnics storage was not addressed.

Response 23:

As a result of continued map review by SCDHEC, another area has been identified as the probable location of the pyrotechnics shed. Soil samples from three soil borings in this area have been proposed for collection. The samples will be analyzed for pyrotechnics by Method 8330. Table 9.22 of the RFI report reflects the decision to collect additional soil samples and that the final results and CMS recommendation will be submitted in an addendum to the RFI report.

Comment 24:

AOC 667 and SWUM 138

- The extent of contamination is not defined.
- TPH is reported at 1,800 ppm.
- Chlorinated solvents are reported in shallow monitoring wells.
- There are no deep monitoring wells at this site.
- The chlorinated solvents exceeded the MCLs but only risk levels were discussed.

Response 24:

Maps identifying all organic chemicals detected in groundwater and tables listing all organic chemicals detected in soil have been prepared and submitted to SCDHEC to aid in the review of the RFI report. The project team has agreed that, DPT sampling, completed in conjunction with the current Zone L RFI, will be used to define the source and extent of contamination. This data will be considered in the CMS.

Comment 25:

AOC 666

- The extent of contamination is not defined.
- The UST pipelines were not shown on the maps.

Response 25:

The risk assessment for this site was correct. However, the residential risk map and Appendix Q table were wrong. These have been revised and submitted with a March 11, 1997, letter to SCDHEC. This site was the subject of an interim measure to remove the UST and the project team has agreed that the site will be included in the CMS process. Please completed the page changes for Figure 9.37 and the Appendix Q table as instructed by the errata page directory attached to this response to comments.

Comment 26:

SWMU 159

- Trichloroethene was the most commonly detected VOC in the soil samples.
- There are no monitoring wells at this site.
- Groundwater is shallow.
- The nearest wells, GRD011 and GRD011D, are over 300 feet away from the site.
- Both wells are downgradient and have unexplained VOA hits.

Response 26:

Per agreement reached at the April 24-25, 1997 project team subcommittee meeting, SWMU 159 will be carried forward into the CMS. This will require the installation of wells at the site. Table 9.22 of the Zone H RFI has been modified to reflect the decision to conduct groundwater monitoring.