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RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL
CONTROL COMMENTS ON DRAFT ZONE 1 RESOURCE CONSERVATION AND
RECOVERY ACT FACILITY INVESTIGATION REPORT DATED JANUARY 1996 CNC
CHARLESTON SC
3/1/1999
ENSAFE INC.

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA
CTO-029**



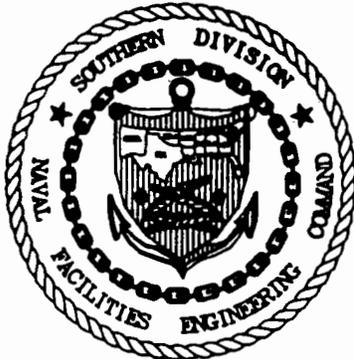
RESPONSE TO COMMENTS FOR

**DRAFT ZONE I
RCRA FACILITY INVESTIGATION REPORT
(Dated January 1996)**

Prepared for:

**Department of the Navy
Southern Division
Naval Facilities Engineering Command
Charleston, South Carolina**

**SOUTHDIV Contract Number:
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**March 1, 1999
Revision: 0**

**SCDHEC Comments on Risk Assessment Portion of The
Zone I RCRA Facility Investigation Report
(dated January 1996) NAVBASE Charleston**

Comment 1:

Section 7, page 7-18. Please explain the statement "...A large number (i.e. greater than 10) of constituents would have to be present at near RBC concentrations to substantiate a concern for cumulative effects". It is very difficult to determine the cumulative effect on human and ecological health from exposure to a mixture of chemicals. EPA is trying to determine how complex mixtures behave, how these interactions affect the overall toxicity of the mixture, and how to incorporate this information into risk assessments of chemical mixtures. There has been considerable effort in this area since the publication of the US Environmental Protection Agency's guidelines for risk assessment of chemical mixtures in 1986. Synergistic or antagonistic effects, not readily predicted from the mechanisms of action of the individual components, are possible when the mixture components are present at levels equal to or above their individual thresholds. For noncancer endpoints, adverse effects are unlikely to occur when the individual components in the mixture are present at levels well below their respective thresholds. *Synergistic carcinogenic effects have, however, been observed in animal studies of mixtures even at relatively low doses.* Epidemiological studies which have considered the simultaneous effect of *two chemical* carcinogens have been reviewed, and shown to provide examples of additivity, multiplicativity and interaction both intermediate between the two and greater than multiplicative.

Response 1:

RAGS suggests that risk and hazard quotients for individual chemicals be summed to provide a cumulative risk or hazard index for any given pathway of exposure. The Navy would require specific guidance from SCDHEC that provides alternatives to the RAGS solution for dealing with the health effects of chemical mixtures. The statement referenced in comment 1 stems from the screening process used to select COPCs. For noncarcinogenic chemicals, the screening concentrations used equate with a target hazard quotient of 0.1. This is done to prevent screening out chemicals whose individual hazard quotients may be below 1 but when assessed in the context of many chemicals whose hazard quotients are below 1 could ultimately translate into a cumulative hazard index above 1.

Comment 2:

Please explain why only 2 soil samples were used for ecological risk assessment (Section 8) in Zone I-1 (DMA) whereas 5 soil samples were considered for the human health risk assessment under the site specific evaluation (Section 10) for the same site.

Response 2:

Samples selected for inclusion in the human health risk assessment are determined on a site (AOC or SWMU) basis. Samples selected for the ERA are based on their occurrence in different habitats, called subzones, due to differences in potential ecological receptors. These

subzones do not necessarily parallel site boundaries such as the case with the DMA, which consists of both early- and mid-succession habitats. Therefore, the number of samples may differ between ecological and human health risk assessments. The number of samples used for both of these risk assessments remains the same.

Comment 3:

Please explain why the reference concentrations for inorganics used in the ecological risk assessment section (section 8) are different from the reference concentration for inorganics used for site specific evaluation section (section 10). Where the backgrounds for the ecological area of concern derived separately? if yes, was a part of the data set, that was used to determine the reference concentration for the entire site for site specific evaluation, was used to determine the reference concentration for the ecological risk assessment.

Response 3:

The reference concentrations for inorganics used in Section 8 have been updated.

Comment 4:

Section 8, page 8.14, table 8.3a. Please explain why Endrin is not an ECPC even though it was detected in more than 5% (4 out of 69) of the samples and met the selection criterion for an ECPC.

Response 4:

Endrin has been added as an ECPC and its associated HQ values added to both the lethal and sublethal HIs.

Comment 5:

The reference concentration for the inorganics have been revised according to the proposed background reference value for soil and groundwater of June 9, 1997. Please use the revised values for screening for COPCs.

Response 5:

The reference concentrations for inorganics used in Section 8 have been updated. The revised background reference values have been used for all screening comparisons in the final report.

Comment 6:

Since the reference concentrations for the inorganics has been changed, would not the results of Wilcoxon rank sum test change too? Please verify the results of Wilcoxon rank sum test for each site to make sure that all the COPCs are identified.

Response 6:

Where reference concentrations changed due to removal of high values from background data sets, results of the Wilcoxon rank sum test may have changed as well. Inclusion of values from recent site samples into the site data sets could also affect Wilcoxon results. Consequently, all Wilcoxon rank sum tests for surface soil and shallow groundwater were re-run where the test was justified (i.e., a minimum of four samples in each data set, with no more than approximately 80% nondetects). The Wilcoxon test was not run for subsurface soil results because those data are not used for risk assessment; it was not run for deep groundwater because the only deep wells in Zone I are grid wells.

Comment 7:

Section 10 AOC 671. Even though As is below the reference concentration, it is above the risk based concentration at 7 out of 8 sampling sites. The carcinogenic risk from the sum of all pathways to potential future residents from As alone is $1.12E-5$ which is considerably higher than the carcinogenic risk of $5E-6$ from combined sum of all pathway from all identified COCs. The COCs that were identified at AOC 671 are Benzo (a) pyrene and Nitroso-di-n-propylamine. In the calculation of the exposure term for As, the FI factor was conservatively assumed to be 0.5. The maximum detected concentration of As was 8.3 mg/kg and this was used as the exposure point concentration. Considering such high risk numbers from As, it should discussed separately in the uncertainties section of the risk assessment.

Response 7:

It is not unusual to find background levels of arsenic that are associated with relatively high risk estimates. A conservative process is used to separated arsenic concentrations that are associated with background conditions and those that are site related. These tests include direct comparisons maximum concentrations to background reference concentrations and Wilcoxon rank sum tests. Since the submittal of the Draft Zone I RFI, new background concentrations have been developed. Each Zone I site has been reevaluated based on these new background concentrations.

Comment 8:

Section 10 AOC 672 and 673 Table 10.2.5. Beta-BHC has been listed as NA under the column titled 'range of detection'. The detection of $3.2 \mu\text{g}/\text{kg}$ should be mentioned under this column.

Response 8:
Noted.

Comment 9:

Section 10 AOC 672 Table 10.2.9. The exposure pathway summary excludes groundwater as a possible exposure pathway on the basis that no groundwater sampling was performed at AOC 672, 673. A exposure pathway can not be excluded on this basis especially when an identified COPC (As) is present above its risk based concentration as well as above its reference concentration. The maximum concentration of As in soil was 42.9 mg/kg which is greater than the UTL of 21.6 mg/kg (proposed background reference value for soil and groundwater dated June 9, 1997). The maximum detected concentration of arsenic is also above 0.37 mg/kg which is the risk based concentration for residential soil ingestion.

Response 9:

The decision whether of not to sample groundwater at a given site is not made in the risk assessment. In the absence of groundwater data for AOCs 672 and 673, no risk assessment was performed for the groundwater pathways. Chemicals that exceed RBCs in the soil have no bearing on potential impacts to groundwater. However, should the fate and transport assessment indicate that soil concentrations of a given chemical are sufficient to cause an adverse impact to groundwater then modeling can be performed to provide data for evaluating the groundwater pathway in the risk assessment.

Comment 10:

Considering the possibility of As migration to groundwater (refer to comment 15) please carry out appropriate sampling and analysis procedure for arsenic and other inorganics and organics in groundwater at AOCs 672, 673.

Response 10:
See Response 9.

Comment 11:

Section 10.3. Though materials of concern at AOC 675 and 677 include residual fuel, diesel fuel and aviation gasoline (paragraph 2) analytical procedure for total petroleum hydrocarbon (TPH) was not included for soil and groundwater samples. Sampling for TPH is required especially at AOC 677, which is the site of a number of petroleum spills.

Response 11:

TPH analyses usually determine the total amount of hydrocarbons present as a single number and give little or no indication of the types of hydrocarbons present. These analyses are useful for site characterization, but are not suitable for risk assessments because the general measure of TPH does not provide sufficient information about the amounts of individual compounds present. Consequently, the risk assessment community has focused on assessing the impacts of a select group of indicator compounds that are inherently assumed to represent a significant fraction of the overall potential risk associated with petroleum hydrocarbons. These indicator compounds are included in the analysis for VOCs and SVOCs, and to a lesser extent, metals analysis. For additional discussion on this subject, please refer to the position paper titled "*Use of TPH and TIC Analytical Results for RFI Evaluation at CNC*" submitted as part of the Zone C work plan.

Comment 12:

Section 10.3.7.2. The concentration of dimethoate in shallow groundwater does exceed the risk based concentration for dimethoate in tap water (refer to table 10.3.10) therefore please correct your statement that "... combined AOC 675 shallow groundwater concentration did not exceed the tap water RBCs or the reference concentrations.

Response 12:

This statement has been corrected.

Comment 13:

Section 10 AOC 678. Though petroleum hydrocarbons are among the material of concern for this site, TPH analysis was not carried out at this site. Please provide an explanation.

Response 13:

Site specific discussion on AOC 678 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 14:

Section 10 Table 10.4.27. Aroclor has an oral RfD (refer to section 10.4.6.4). Why the HQ for this chemical has not been calculated (refer to table 10.4.22). Please explain how a hazard based remedial goal for Aroclor was derived (refer to table 10.4.27) in the absence of a hazard quotient for Aroclor.

Response 14:

As noted above, site specific discussion on AOC 678 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 15:

Section 10.6.5.1 AOC 681. When discussing the fate and transport of all the ten organic constituents detected above their RBCs, at this site, it will be helpful to include a discussion on soil type, groundwater depth and meteorological (weather) conditions. According to Section 8.4 the soil type is sandy and the soil is low in organic carbon. The above mentioned factors, beside the Koc value of each constituents, are important in determining the fate and transport of each constituents. The possibility of soil-to-groundwater cross-media transport should be carefully analyzed in the absence of groundwater sampling. On the other hand, groundwater samples could be collected to demonstrate that this media has not been impacted.

Response 15:

Site specific discussion on AOC 681 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 16:

Section 10 AOC 681. Considering the fact that so many organic chemicals are detected above their soil water protection SSL and that Benzo (a) pyrene was recognized as a COPC, based on the result of Wilcoxon rank sum test, a groundwater sampling is recommended at this site with analysis for VOCs and SVOCs.

Response 16:

Site specific discussion on AOC 681 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 17:

Section 10.6.6.1. Please note that an USEPA report by Technical Review Workgroup for Lead (December 1996) provides recommendations for an interim approach to assessing risk associated with adult exposure to lead in soil. Under the light of above fact please reconsider the statement "...USEPA does not currently sanction any risk characterization model or approach for predicting the adverse health effects of lead in adults".

Response 17:

Site specific discussion on AOC 681 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 18:

Section 10.6.6.2. Under the 'COPC identification' section TPH is not mentioned as a COPC whereas table 10.6.10 identifies TPH as a COPC. TPH has not been discussed under exposure assessment and toxicity assessment. A qualitative risk discussion on TPH is required if TPH is recognized as a COPC.

Response 18:

Site specific discussion on AOC 681 will be provided as an addendum to the RFI report and as such, comments will be addressed and submitted with that addendum.

Comment 19:

Section 10.7 AOC 685. Please revise table 10.7.4 using the proposed reference concentration for inorganics (6.9.97). Beryllium exceeds its revised reference concentration of 0.95 mg/kg with a maximum detection of 1.2 mg/kg. If was not considered as a COPC before it should now.

Response 19:

Any changes in the background concentrations have been reflected in the Final RFI.

Comment 20:

Section 10.7.2 AOC 685. The last line under the paragraph titled 'Inorganics in Soil' is not clear. It is mentioned that 6 samples exceeded the reference concentration for 'Zinc' but the data (Appendix D) and Table 10.7.4 indicate that 6 samples exceed the reference concentration of nickel.

Response 20:

The reference concentrations have been revised for the final RFI report and there are no exceedances for nickel or zinc above the revised reference concentrations.

Comment 21:

Section 10.7 AOC 685 Table 10.7.9. Please explain why vanadium was recognized as a COPC. Vanadium has a frequency of detection of 9/15 but appears above its screening concentration in only one of the samples. The maximum detected concentration (55.5 mg/kg) of vanadium is less

than its reference concentration (113 mg/kg). Table 10.7.9 does not identify vanadium as a COPC by placing an asterisk beside it yet it is discussed under risk assessment.

Response 21:

The maximum vanadium concentration did not exceed its background concentration and therefore should not be considered a COPC. Changes in background concentrations are reflected in the Final RFI. The HHRA has been revised accordingly.

Comment 22:

Section 10.7 AOC 685 Table 10.7.9. This table identifies thallium as a COPC but thallium is not discussed under exposure assessment, toxicity assessment and risk characterization sections. No risk/hazard number was calculated for thallium.

Response 22:

The HHRA has been revised for the final RFI and thallium is discussed as applicable.

Comment 23:

Section 10.7 AOC 685 Table 10.7.10. Shallow groundwater ingestion and inhalation of contaminants can not be ruled out from a possible exposure pathway, without extensive sampling of groundwater or without sufficient evidence that support that groundwater is not impacted. Detection of number of inorganics and organics above their reference concentration and screening concentration in soil at this site warrants that groundwater sampling and monitoring at this site may be highly desirable.

Response 23:

See Response 9.

Comment 24:

Section 10.8.2 This section does not include all the inorganics that were detected above their reference concentration (refer table 10.8.3). Co, Pb, Mn, Va, Zn, Al, Ar and Be were detected above their proposed reference concentration (6.9.97) in the subsurface soil.

Response 24:

Section 10.8.2 and Table 10.8.3 have been revised to reflect the reference concentrations agreed on in June 1997.

Comment 25:

Section 10.8.7.2. Please state clearly what is meant by "qualitative screening identified arsenic's published AWQC".

Response 25:

The above referenced statement has been deleted and the text has been revised as applicable.

Comment 26:

Section 10.8.8.3. Please explain clearly the meaning of second paragraph of this section which states "...because surface soil samples collected around the combined AOC 687 failed to identify any COPCs, there is reason to expect widespread presence of BEQs, heptachlor epoxide or chlordane".

Response 26:

The section has been revised and the referenced statement is no longer applicable.

Comment 27:

Section 10.8.8.2. Since the new proposed reference concentrations of inorganics, for soil and groundwater (6.9.97), are considerably different from the previously used reference concentrations for inorganics, it is suggested that the Wilcoxon rank sum test analysis be carried out again for the inorganics in soil, groundwater and sediments. It is important since Al and Be exceeded their risk based concentrations at 3 out of 4 soil sampling sites and As and Mn exceed their risk based concentrations at all the 4 soil sampling sites.

Response 27:

Wilcoxon rank sum tests were re-run for all surface soil and shallow groundwater data sets where they were appropriate. Wilcoxon tests were not run on sediment data because background have not been established for sediment.

Comment 28:

Section 10.8 AOC 687 Table 10.8.18. If heptachlor epoxide is below its screening concentration how was it identified as a COPC.

Response 28:

Heptachlor epoxide should not have been identified as a COPC. This has been corrected in the Final RFI.

Comment 29:

Section 10.9.5.2 AOC 688. A minimum of 4 samples (sample size=4) are required for Wilcoxon rank sum test. Please explain how the Wilcoxon rank sum test carried on 2 sediment samples to identify COPCs.

Response 29:

This statement was in error. No Wilcoxon rank sum tests were carried out on sediment samples, as explained above in the response to Comment 27.

Comment 30:

Section 10.9 AOC 688 Table 10.9.5. The table does not have the column of UTLs and SSLs. No comparison was made between the maximum detected concentrations of organics and inorganics and their respective SSLs/UTLs.

Response 30:

Surface soil and subsurface soil samples were collected at two AOC 688 locations in April 1998. The revised versions of Table 10.9.5 include soil and sediment analytical results and comparisons of soil results to soil SSLs and background reference values (for inorganics). Sediment analytical results are compared qualitatively to soil results in revised Section 10.9.8. Sediment results were not compared to UTLs because no sediment background values were determined for Zone I.

Comment 31:

In spite of a RfD for Aroclor (refer section 10.9.5.4 - toxicity assessment) the noncarcinogenic risk (hazard) from this chemical was not derived under the risk characterization section.

Response 31:

The text has been clarified (note that the HHRA is now found in section 10.9.8). Only certain Aroclor congeners have RfDs, Aroclor 1260 does not. The hazard-based RGOs for Aroclor 1260 were calculated in error. This has been corrected in the Final RFI.

Comment 32:

Section 10 AOC 689 and 690. Table 10.10.10 (Exposure pathway summary) excludes groundwater as a possible exposure pathway on the basis that no groundwater sampling was performed at AOC 689 and 690. An exposure pathway can not be excluded on this basis especially when COPCs such as chromium and copper may have a marked potential to migrate to ground water. Provide an explanation.

Response 32:

See Response 9.

Comment 33:

Section 10 SWMU 12. Please revise table 10.11.4 using the proposed reference concentrations for inorganics dated 6.9.97. The frequency of detection of selenium above its reference concentration increases from 5 to 7 on considering the revised reference concentration for selenium. Does the increase on frequency of detection merit selenium to be a COPC?

Response 33:

Table 10.11.4 (now Table 10.11.3) has been revised as requested. Selenium has not been identified as a COPC because its maximum detected concentration of 1.8 mg/kg is below selenium's RBC of 39 mg/kg (THQ = 0.1).

Comment 34:

Section 10 SWMU 12. Please explain why TPH was not included in the list of analytes to be tested considering the fact that petroleum hydrocarbon figures as one of the materials of concern under Section 10.11.

Response 34:

See Response 11.

Comment 35:

Section 10 SWMU 12. Please revise Table 10.11.7 using the proposed reference concentrations for inorganics dated 6.9.97. Ba, Pb and Zn exceed their proposed reference concentrations.

Response 35:

Table 10.11.7 has been revised as requested.

Comment 36:

Section 10.13.4 RTC. Please explain why hazard quotient (HQ) for PCB Aroclors was not calculated even though a reference dose for PCB Aroclor is available and mentioned under Section 10.13.4.4.

Response 36:

Only certain Aroclor congeners have RfDs, Aroclor 1260 does not. The hazard-based RGOs for Aroclor 1260 were calculated in error. This has been corrected in the Final RFI.

Comment 37:

Section 10.14 DMA. Please explain why tables 10.14.2, 10.14.3, 10.14.5 and 10.14.6 did not have columns for 'RBC/UTL' and 'number of samples exceeding RBC/UTL'.

Response 37:

It would be inappropriate to compare chemical concentrations of recently dredged river-bottom sediments to RBCs and background reference values developed for in-place soils.

Comment 38:

Section 10.14 DMA Table 10.14.3. On comparison of surface and subsurface concentrations of inorganics with their respective UTLs, many inorganics exceed their reference concentrations. Al, Be, Cd, Co, Mn, Se and Va exceed their reference concentration in both surface and subsurface soil where as As, Ba, Cu, Pb, Ni and Zn exceed their subsurface reference concentrations. The inorganics were compared to their proposed reference concentrations for inorganics in soil and groundwater dated 6.9.97. The results of this comparison should be included under Section 10.14.2. Identify COPCs accordingly.

Response 38:

Table 10.13.3 (formerly Table 10.14.3) has been updated with revised reference concentrations. Inorganics in soil are compared to RBCs (upper-interval) and SSLs (lower-interval) and discussed as appropriate in Section 10.13.2.

Comment 39:

Section 10.14 DMA Table 10.14.6. Al, Be, Co, Mn and Se exceed their proposed reference concentrations in sediment.

Response 39:

See response 37.

Comment 40:

Section 10.14 DMA Table 10.14.3 and 10.14.6. The average concentration of As in soil and sediment at this site is 12.55 and 12.74 mg/kg respectively. These concentrations of As are considerably higher than the risk based number of 0.37 mg/kg. The frequency of detection of As

in soil and sediment is high. As also exceeds its risk based number (tap water RBC) in surface water (refer Table 10.14.16). The risk from exposure to high concentrations of As to humans should be considered at this site.

Response 40:

The risk from exposure to arsenic was considered at this site. However, arsenic was not identified as a COC for the DMA.

Comment 41:

Section 10.14 DMA Table 10.14.9. The maximum concentration of lead detected at this site (36.05 $\mu\text{g/L}$), exceeds 15 $\mu\text{g/L}$. 15 $\mu\text{g/L}$ is the action level for lead in water. Please note the above comment and include under appropriate section.

Response 41:

Lead was considered under the HHRA. Please reference section 10.14.9 of the revised RFI.

Comment 42:

Section 10.14 DMA Table 10.14.11. Based on the proposed UTLs for inorganics (6.9.97), Al, Co and Mn exceed their respective UTLs and therefore have a potential to contaminate groundwater. Please revise Table 10.14.11 using the proposed reference concentrations for inorganics dated 6.9.97.

Response 42:

The tables have been revised to include the appropriate reference concentrations. The DMA discussion is now found in Section 10.13.

Comment 43:

Please correct the following typographical errors:

- Section 3.2.2.4, page 3-5. First line uses the word "tube" twice.
- Section 5.2.5, Tolerance-Interval or Reference Concentration Test, page 5-10. The line "... Where 50% > ND > 90%" is not clear. The sentence should be rewritten as "50% < ND < 90%" to fit the context.
- Section 6, page 6-18. The last line on this page can be written without the word "made" just before the word "determined" on the next page.

- Section 10.2 AOC 672. Please complete the last line in the 3rd paragraph by adding the word "sites" at the end.
- Section 10.3. Please rewrite the first line of the first paragraph to link each designated AOC with its respective location.
- Section 10. Figure 10.3.1 does not indicate the location of the tank NS-4. Please include it in the figure.
- AOC 685 Table 10.7.4. Please correct the upper range of detection for Barium. The upper range for barium is 47.7 instead of 126.
- Section 10.8 AOC 687 Line 20. Please correct the word 'were' at the beginning of the line.
- Section 10.13.2 RTC pg 10-7. Under the paragraph titled "Pesticides and PCBs in soil" please correct the RBC value for PCBs. The RBC value for PCBs is 83 $\mu\text{g}/\text{kg}$ and not 0.083 $\mu\text{g}/\text{kg}$ as mentioned under this section.

Response 43:

The revisions and changes as requested above have been made as applicable and appropriate.

Comment 44:

Please revise and update the following tables with the new approved background reference concentrations. Identify COPCs and carry through the risk assessment if applicable:

- Section 10 AOC 672. Please revise tables 10.2.3, 10.2.5 and table 10.2.8 to include the revised reference concentrations for inorganics.
- Section 10. Please revise tables 10.3.3, 10.3.6, 10.3.9, 10.3.10, 10.3.16 10.3.17 and 10.3.18 according to the revised reference concentrations for inorganics. Screening for COPCs, using the revised UTLs for inorganics, is recommended.
- Please revise tables 10.6.4, 10.6.7 and 10.6.10 by using the proposed background reference concentration for inorganics in soil and groundwater dated. 6.9.97.
- Section 10.7 AOC 685. Please revise tables 10.7.6 and 10.7.9 using the proposed reference concentration for the inorganics (6.9.97). According to the recently proposed reference concentration for inorganics, Al and Co should be included in the list of chemicals exceeding their reference concentration.

- Section 10.8 AOC 687. Please revise table 10.8.3 according to the proposed reference concentration for inorganics in soil and groundwater (6.9.97).
- Section 10.8 AOC 687 Table 10.8.10. On considering the proposed reference concentration for inorganics in soil and groundwater, dated 6.9.97, Al and Mn are additional chemicals that were detected above their reference concentration in groundwater. Please revise table 10.8.10 using the most recent proposed reference concentration for inorganics.
- Please revise tables 10.8.9, 10.8.12, 10.8.17 and 10.8.18 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97.
- Section 10.8 AOC 687 Table 10.8.6. Please revise table 10.8.6 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97. Mn and Zn exceed their new proposed reference concentrations and should be included as the inorganics detected above their reference concentration, besides nickel (Ni).
- Section 10.9 AOC 688. Please revise table 10.9.3 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97.
- Section 10 AOC 689 and 690. Please revise table 10.10.4 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97. As, Cd, Hg and Zn exceed their revised reference concentration.
- Section 10 AOC 689 and 690. Please provide a footnote for the abbreviations used in table 10.10.8.
- Section 10 AOC 689 and 690. Please revise table 10.10.9 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97. Considering the revised reference concentrations for inorganics, As appears above its screening and reference concentration. As should be designated as a COPC.
- Section 10 SWMU 12. Please revise table 10.11.8 using the proposed reference concentration for inorganics in soil and groundwater dated 6.9.97.
- Section 10 RTC. Please revise table 10.13.3 and 10.13.4 using the proposed reference concentration for inorganics dated 6.9.97.
- Section 10.14 DMA Table 10.14.10.2. Please identify COPCs for this site based on the proposed reference concentrations for inorganics dated 6.9.97.

Response 44:

All tables have been revised to reflect the modified background reference values. COPCs are identified and carried through the respective HHRAs.

**SCDHEC (Paul Bergstrand) Comments on The
Zone I RCRA Facility Investigation Report
(dated January 1996) NAVBASE Charleston
November 5, 1997**

General Comments

Comment 1:

This report deals with an area that was formerly used as a Naval Air Station. In fact, some tanks and structures remain from that former use. This report needs maps of the former Naval Air Station with the current base structures indicated in a light grey or provided as an overlay.

Response 1:

All engineering drawings and specifications (both old and new) that were available have been used to update the base maps and drawings used for figures in this report.

Comment 2:

RFI surface soil samples are collected from 0 to 1 foot. Surface soil samples collected at SWMUs or AOCs based on former base used must account for disruption or reworking during construction of subsequent structures. This is particularly important when sub-surface soil samples were not collected due to high water table.

Response 2:

During project team discussions regarding this comment, it was pointed out that the reason subsurface soil samples were not collected below the water table is the validity of the results becomes questionable in terms of whether the contamination detected is representative of soil conditions or if it is contamination associated with groundwater in the pore space. An agreement was reached for all remaining soil sampling to be performed during the RFI regardless of zone, subsurface soil samples would be collected regardless of depth to groundwater. In the instances where groundwater is encountered and there are no site monitoring wells, the analytical data can be used to make reasonable assumptions as to whether a shallow groundwater problem exists and if monitoring well installations are necessary.

Comment 3:

The RFI Work Plan included Grid well locations on SWMU and AOC site maps. The RFI report, however, apparently did not consider or discuss analytical results from those wells. The final report should include this data.

Response 3:

Grid well sampling data has been considered and is included in site specific discussions as applicable.

Comment 4:

The Zone I RFI Report should include data available from other nearby or adjoining sources such as Zone H grid wells and SWMUs and Zone K, Shipyard Creek soil, sediment and water samples.

Response 4:

The Zone I RFI Report will include, summarize, or reference validated and pertinent data from other zone investigations depending on the degree to which such data is addressed in the zone-specific RFI report it was generated for.

Comment 5:

Ground water flow maps based on the quarterly sampling events should be included on the final report.

Response 5:

Water level data were acquired at each well during quarterly sampling events; however, these data were not collected synoptically since the wells were sampled over a period of several weeks. As a result, these water level data are not suitable for developing quarterly groundwater flow maps.

A synoptic groundwater level event for the entire southern end of the peninsula (all wells in Zones H and I and a portion of those in Zone G) was conducted in mid summer 1998 as part of the Zone H CMS work. These data will be used for zone-wide groundwater flow maps as well as site-specific groundwater flow maps that may be included in the Zone I Final RFI Report.

Comment 6:

Sites such as RTC and DMA should be assigned a SWMU or AOC number.

Response 6:

The assignment of an AOC or SWMU number is a decision to be made by project team consensus. The 177/RTC site has been identified as a SWMU. The DMA has not been identified as either a AOC or a SWMU since it was created and regulated under the Clean Water Act.

Comment 7:

This RFI report must conclude if the vertical and horizontal extent of contamination has been detected and defined for each SWMU and AOC. This is very important before moving a site into the CMS process.

Response 7:

Acknowledged

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
671	Meter House, AvGas Concrete USTs (2)	a) Metals in Grid Well 17 & 17D > MCLs; b) Mercury in well 03 > MCL (37 ppb) c) Thallium in wells 17S, 17D, 01, 01 > MCL d) What is GW flow near the wall? e) Piping Runs are not indicated on the maps and may require sampling. f) Has site been addressed by UST Program? Where is the data? g) Dioxin "hot spots" in soils? Consider IM.

Response: Due to the unique format of these comments, a conference call was held by project team members on 20 January 1998 to clarify which specific comments required only text clarification and which comments identified data gaps requiring additional samples to be collected. In general it was agreed that this site was adequately characterized and no further sampling is required pending final risk management decisions.

Comments "a-c", the presence of metals in these wells is acknowledged and exceedances have been discussed with respect to whether the concentrations are suspected to be related to site operations or are more appropriately discussed as part of the basewide groundwater quality evaluation.

Comment "d", the impact of the quay wall on groundwater flow is not fully understood; however, sufficient data (Figures 2.11 through 2.14) is available to determine predominant groundwater flow direction is toward the Cooper River.

Comment "e", figures for all sites in Zone I have been revised as applicable and/or as data was available to show pertinent site features. As noted above, the project team agreed that no further sampling was required pending final risk management decisions.

Comment "f", This site is not currently included in the UST Program.

Comment "g", the method used by Ted Simon (Simon to Brittain, 2 March 1995) to calculate a theoretical hotspot was applied to the Zone I surface soil data set to determine a worst case scenario. Basically the maximum detection of each congener, regardless of sample location, is multiplied by the appropriate TCDD toxicity equivalency factor to determine a toxicity equivalent (TEQ). The TEQs are summed to calculate a total dioxin TEQ. The calculated values are well below respective screening levels. Based on this observation the Navy feels the risk posed by dioxins in Zone I are negligible and interim measures are not warranted.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
672	Electrical Substation	a) Metals, VOC & SVOC are in soils & Grid Well.
673	Storage Paint, Oils & Solvents	b) No site wells. c) No GW flow maps. d) What is GW flow near the wall? e) Thallium in Grid Well 18D (3 rounds of sampling) > MCL f) Grid Well data not incorporated into report. g) May need to address site contamination not directly attributed to the AOCs.

Response:

Comment "a", As discussed in the report, a number of organic and inorganic compounds were detected at these sites. Of those detected, arsenic is the sole COC and therefore, the primary risk driver. A review of the data collected prior to 20 January 1998 conference call indicated the extent of arsenic had not been defined in accordance with criteria provided in the Comprehensive RFI Work Plan. As a result, soil samples were collected at 4 additional locations in April, 1998.

Comments "b-d", As indicated in the Zone I RFI work plan, the objective of the investigation was to perform confirmatory soil sampling to determine if a release had occurred. A grid-based well pair were installed down gradient of the subject site and the result of samples collected from these wells is discussed. The impact of the quay wall on groundwater flow is not fully understood; however, sufficient data (Figures 2.11 through 2.14) is available to determine predominant groundwater flow direction is toward the Cooper River.

Comments "e-f", grid wells 18 and 18D are approximately 60 feet down gradient of the sites. The data from these wells has been discussed with respect to aiding in the characterization of groundwater in the vicinity of these sites. The presence of thallium in the grid well is acknowledged and will be discussed with respect to whether the concentrations are suspected to be related to site operations or are more appropriately discussed as part of the basewide groundwater quality evaluation.

Comment "g", the risk assessment evaluates CPSSs irrespective of whether or not it is known that the compounds detected can be attributed to historical site activities.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
675	OWS NS-4	a) 675 is actually a Oil Water Separator (OWS).
676	Incinerator NS-2	b) Where does the OWS drain? Storm water or Sewer?
677	Grounds	c) Need to show OWS pipe runs (in and out). d) Describe the system that feeds into OWS. e) What process generated the need for the OWS? f) How old is the OWS? g) What is GW flow near the wall? h) What is the source of gas and naphtha contamination in Grid Well at 675-02? i) 676 only has one monitoring well. j) What is the groundwater flow near the wall? k) SB 03 and 06 have high SVOC < RBC. l) Grid Well 15D has Thallium > MCL. m) MW-02 has Thallium > MCL. n) SB03 has Thallium > SSL of 400. NOTE! Is this the only soil sample on base > SSL for Thallium? o) SBs 03, 06, 09 and 10 have high SVOC < RBC. p) What is the source? q) What is the full extent?

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
		<p>Response: During the 20 January 1998 conference call it was discussed that these sites are being addressed by the petroleum program and that USTs have been removed. Team members agreed with the recommendation that no further sampling occur under the RFI.</p>
		<p>Comments "a-f", The RFA, EBS, and historical base maps will be reviewed and a more detailed description of historical site operations provide in the revised report as available and/or appropriate.</p>
		<p>Comments "g and j", the impact of the quay wall on groundwater flow is not fully understood; however, sufficient data (Figures 2.11 through 2.14) is available to determine predominant groundwater flow direction is toward the Cooper River.</p>
		<p>Comment "h", the source of gasoline and naphtha is likely former UST NS-4 which was closed by removal in September 1996. These constituents were only detected in one sampling round and in the same time frame as the UST removal. No detections of naphtha or gasoline was noted in the monitoring well located downgradient of the former UST.</p>
		<p>Comment "i", only one well has the "676" prefix however, there are a total of 6 wells at these sites which were investigated as one contiguous site.</p>
		<p>Comments "k, o-q", the presence of SVOCs is acknowledged and discussed with respect to protocol established in the Comprehensive RFI Work Plan.</p>
		<p>Comments "l-n", Thallium has been identified as a COC for this site. Additionally, the presence of thallium in groundwater (and potential sources) is being address as part of a basewide groundwater quality evaluation.</p>

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
678	Fire Fighting School	a) Provide air photos to locate former structures.
679	Wash Rack	b) Figures in report must show site in relation to sample locations and monitoring wells. c) No GW flow maps. What is GW flow near the wall? d) Grid well 14 reported Aroclor > MCL and pentachlorophenol = MCL e) Grid well 14D reported chloroethane at 200 ppb which is a breakdown product of TCA. Is this a result of the Fire Fighting School or the Washrack? f) Monitoring well 002 reported Methylene Chloride < MCL. Is this the leading edge, the training edge or the center of contamination? g) Was a OWS used at the wash rack? If so where did the piping run to OWS? If so where did the OWS discharge, into the sanitary sewer or the Cooper River? h) Other questions as in 678.

Response: Site specific discussion on this combined AOC will be provided as an addendum to the revised RFI report and as such response to comments will be addressed and submitted with the addendum.

680	Grinding Room	a) No data was submitted for this AOC. b) What was former use of building? The last use was an Administration Office. (NS 26) c) What other mechanical repair besides brake work occurred in this building? NOTE. Nearby buildings 680 and 681 are studied in this report as sandblasting and Fleet service. d) Was an OWS associated with this site? e) Was degreasing a part of a former activity? Brakes are always very clean. f) Was liquid waste discharged to sewer?
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Response: Site specific discussion on this AOC will be provided as an addendum to the revised RFI report and as such response to comments will be addressed and submitted with the addendum.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
681	Blast Booth & Cyclone	<ul style="list-style-type: none"> a) Soils: PAH, TPH (no 2nd interval samples taken), b) Lead 2nd interval > background. c) Was an OWS a part of this site? d) No wells at this AOC.

Response: Site specific discussion on this combined AOC will be provided as an addendum to the revised RFI report and as such response to comments will be addressed and submitted with the addendum.

685	Smoke Drum	<ul style="list-style-type: none"> a) Second round soil samples reported higher values than the first round. The extent of the surface soil contamination has not been defined. b) No subsurface soil samples were collected due to high water table. c) Provide air photos during period of operation 1941 - 1953. d) What is ground water flow? What is the ditch flow? e) DEHP levels in soil increased to the east. f) Grid well 10S reports Lead, MEK, DDT, DDE, CI Pesticides and Dioxins in Shallow GW. g) Grid Well 10D reports Lead, Thallium > MCL and mercury < MCL in deep GW.
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Response:

Comment "a, b, and e", per the 20 January 1998 conference call, twenty-one surface and eighteen subsurface soil samples were collected from an additional 21 locations during March and April, 1998 to further define the extent of COPCs.

Comment "c", No aerial photos from the specified time period were available for inclusion in the revised RFI report. **Comment "d"**, groundwater flows easterly or toward the Cooper River. Surface water in the ditch flows to the south.

Comment "e", While DEHP does increase in detection level towards the east side of the site, all detections are well below respective guidance levels. Further, DEHP was not identified as a COC as a result of the HHRA.

Comments "f and g", the groundwater data from grid well pair 10 will be used along with a qualitative assessment of the subsurface soil samples (which were all collected from below the water table) to evaluate whether AOC 685 is a source of groundwater contamination. The significance of the groundwater data will be evaluated using frequency of detection, concentration vs. MCLs, etc.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
687	Ammo Storage Bunker	a) Were explosives analyzed in soil or GW?
16	Paint Storage	b) Figures of 687/16 show GW 7 & 7D. Should be Grid Well 8 & 8D. Navy did not include grid well data in report discussion. NOTE! Values > MCL in GW 8 & 8D.
		c) Where is sediment analytical data?
		d) What is the direction of water flow in ditch?
		e) What is GW flow? How does it interact with the river?
		f) Provide GW flow maps for the four quarters of data.
		g) RFI WP states SWMU 16 had paint, paint thinner and other haz material LIKE.....
		h) Air photos should be provided.
		i) Navy must explain VOCs in GW. Is it the leading edge, the trailing edge or the center?
		j) Is the Arsenic above background. How is this addressed?
		k) Who made the personal statement that "No paint was ever stored at 16"? Were they in the Navy since 1942 and working at this bunker the entire time?
		l) Based on the maps, the area west of X-55 where paint, solvents and other hazardous materials were stored were not sampled. This area should be sampled for soils and groundwater.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
		<p>Response:</p> <p>Comment "a", The soil and groundwater were not analyzed for explosives since this area was used for storage, not disposal and there is no indication that explosives were spilled or released from this facility.</p> <p>Comment "b", The figure has been corrected and the text has been revised to include a discussion of the grid well results as they relate to the results from the 4 site wells.</p> <p>Comment "c", The sediment results are discussed in Section 10.8.5 of the report.</p> <p>Comment "d", surface water flow in the ditch is toward the south.</p> <p>Comment "e", Groundwater flows easterly or toward the Cooper River. As for interaction, the river serves as a discharge boundary and due to the fine grain nature of the shallow sediments in which the monitoring wells are screened, it is unlikely the flow direction is significantly influenced by the changing tides. There have been several "tidal influence" studies at various locations around the base to confirm this hypothesis.</p> <p>Comment "f", groundwater flow maps have been prepared over time on a larger basewide scale (using the vast majority of wells across the base as data points) rather than for a small number of wells at individual sites. Figures 2.11 through 2.14 provide groundwater flow maps for two different time periods.</p> <p>Comment "g", this comment lacks specificity therefore the Navy is unsure exactly what was meant. The materials of concern listed in the work plan were a "best guess" by project team members at that time. The analyses performed for confirmation purposes included all compounds on the USEPA TCL/TAL list.</p> <p>Comment "h", No aerial photos are available which provide additional information.</p> <p>Comments "i and j", per the 20 January 1998 conference call it was agreed that 2 additional quarters of groundwater samples would be collected for VOCs and metals. VOCs were not detected in subsequent sampling rounds. No VOCs were identified as COCs as a result of the HHRA. Arsenic detections are addressed in full in the HHRA and is identified as a COC.</p> <p>Comments "k and l", It is the Navy's position that the empty paint containers found at AOC 687 represented a one time storage and were not</p>

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
688	Ammo Bunker, Paint Storage	<ul style="list-style-type: none">a) NOTE. Use GW 7 & 7D.b) Grid wells GW 7S reports Lead and Thallium > MCL. Grid well 7D reports DEHP > MCL. Grid well hits were not addressed in report.c) No shallow wells associated with site.d) How long was 3420 gallons of paint stored during 1987?e) Air photos should be provided for the paint storage period.f) Was RDX included in analysis of soils and GW?g) Where is the Sed data?h) 2-Butanone (MEK) is associated with paint and paint solvents. RFI calls this a common laboratory contaminant. Navy must prove CLC.i) Aroclor is in seds at 98 ppb. The RBC is 88. What is the source of PCBs. What is the extent of the PCBs?j) Soil sample should be collected at this site.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
Response:		
Comments "a-c"		The data from grid well pair 7 has been incorporated into this site discussion as appropriate. Per the 20 January 1998 conference call it was agreed that 2 more quarters of groundwater samples would be collected and analyzed for SVOCs and metals. The additional sampling was accomplished and the resulting data has been included in the report as appropriate.
Comment "d"		No data is available regarding the length of time paint was stored at the facility. There is no available data that indicates that any of the stored paint was spilled or released from the bunker.
Comment "e"		There are no aerial photos available that will provide additional information regarding this site.
Comment "f"		analysis for explosives was not included during the work plan scoping since it is highly unlikely disposal of these types of material ever occurred since this unit was used for storage of live ammunition.
Comments "g, i, and j"		discussions regarding these sites during the 20 January 1998 conference call focused primarily on the sediment data and the presence of PCBs. Because the ditch only contains water intermittently, it was felt the samples are more indicative of soil than sediment. It was agreed that 2 more soil samples would be collected from within the ditch at locations topographically upgradient and downgradient. The results of these samples (only analyzed for pest/PCBs as agreed) are presented in the revised RFI report.
Comment "h"		statements referring to these types of compounds as common laboratory artifacts have been deleted from the revised RFI report.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
689	Marina Parking	<ul style="list-style-type: none"> a) The parking area was included because of suspected unauthorized disposal. However only 3 surface soil samples were collected for the entire area. Subsurface samples were not collected. The surface would be the would be the area most disrupted by construction of the parking lot. Only one well pair GD 19 is associated with this site. Could this be representative? What is the groundwater flow for this area? b) Provide air photos of this area over a wide time period. c) Additional samples may be required.

Response:

Comments "a and c", During the 20 January 1998 conference call it was pointed out that soil samples were collected from 10 locations (actually 11) instead of 3 as stated in the comment. There are also 2 grid well pairs within the boundary of the site. The conference call participants agreed no further sampling was needed at this time.

Comment "b", No aerial photos are available which provide additional information for the subject site.

Comment "c", As noted above, the project team agreed that no further sampling was required for the marina parking area.

690	DMA Roads	<ul style="list-style-type: none"> a) Which areas are proposed for CMS? Were any contaminated areas identified? b) SB 02 and SB 10 had a high number of low level hits. This may indicate dumping areas. Additional sampling is necessary at these and possibly other areas to determine if the edge or the center of contamination has been discovered. c) Metals were not analyzed for soil samples 1-10. Please explain why. d) The Naval Detachment found and removed drums along the perimeter road. The description of the drums indicated waste solvents. Samples were analyzed only for TCLP metals. Additional full scan sampling is necessary at this location. e) Samples collected in Shipyard Creek for Zone J should be considered for a big picture view of this AOC.
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SPECIFIC COMMENTS

S/A Number	Site Name	Notes
Response:		
Comment "a" , Several areas with risk estimates above guidance levels were identified in the combined AOC 689/690. Also, a number of COCs were identified as a result of the HHRA. This information is provided in the revised RFI report.		
Comments "b and d" , two additional samples were collected at both the SB 02 and SB 10 locations. Five confirmation samples were collected at the drum removal site. The text has been revised to include the new data.		
Comment "c" , the subject samples were analyzed for metals. The data tables and text in Section 10 include the data; however, it appears the complete data set printouts for these samples were not included in the appendices. The complete data set can be found in Appendix D of the revised report.		
Comment "d" , As noted above, five additional samples were collected from the drum removal site. These samples were analyzed for VOCs, SVOCs, and metals. The results of these additional samples has been included in the revised RFI report.		
Comment "e" , this type of evaluation will be performed as part of Zone J RFI which has not be completed. Any hot spots identified along the road will be noted as potential point sources for sediment/surface water contamination and any required assessment will be performed in the Zone J RFI. However, due to the large number of variables potentially influencing Zone J, it would be premature to speculate on the significance of the upland samples from this one area.		
SWMU 12	Fire Fighter Training	<ul style="list-style-type: none"> a) Need air photos from the time this area was used for fire training. b) Need quarterly GW flow maps. c) Note no 2nd interval soil samples were collected. d) DEHP was reported above the MCL in well #3. e) Arsenic was reported above the MCL for four quarters in well #2. f) Thallium was reported above the MCL in well #3. g) No site deep wells were installed. h. Dioxins were reported in shallow groundwater.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
Response:		
Comment "a" , Preparation of the work plan included a review of air photos, base maps, and a site visit with the USEPA RPM. There are no aerial photos that provide any additional information on the subject site.		
Comment "b" , groundwater flow maps have been prepared over time on a larger basewide scale (using the vast majority of wells across the base as data points) rather than for a small number of wells at individual sites. Figures 2.11 through 2.14 provide basewide GW flow maps for two separate time periods.		
Comment "c" , no second interval soil samples were collected due to the shallow water table.		
Comments "d-f, h" , all CPSSs were evaluated relative to the completion of the HHRA for the subject site and is included in the revised RFI report.		
Comment "g" , one grid-based deep well (GDI03D) is located adjacent to SWMU 12 and results from sampling of this well are discussed in the revised RFI report.		
RTC	Reserve Training Center	<ul style="list-style-type: none"> a) NOTE! Not in Work Plan b) This site needs a SWMU or AOC number. c) What guided the sampling protocol? d) No wells on site. e) Across from Fire Training S-13. Is this site influenced by S-13? f) What was site history before RTC? g) Upper soils reworked to build RTC etc. which may influence surface soil complex. h) Navy must prove Acetone & DEHP are Common Laboratory Contaminants (CLC). i) Pest & Dioxin hot spots at 10, 3, 5, & 8. How does this affect risk? An IM may be useful here. j) Grid wells GW16 & 16D adjacent to site. Was data from these wells included in the discussion? k) Methylene Chloride > MCL. Explain. l) Need deeper soil and GW samples.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
Response:		
Comments "a-l", This was never identified or designated as a site and samples were collected at the urging of USEPA simply as a precautionary measure because NOAA was performing site improvements prior to completion of the RFI at nearby sites. The team already rendered an opinion once that the concentrations of what was detected were insignificant and that no further action was warranted.		
177	RTC Storage Building	<ul style="list-style-type: none"> a) Presently Bldg. RTC #4, for NOAA use. b) No site map. No sample locations. c) No wells on the site. d) What direction does groundwater flow? e) How does the wall affect groundwater flow? f) Surface soils: Dioxins, Pest, VOC, SVOCs g) Subsurface Soils: Dioxins SVOCs h) Navy must prove Acetone & DEHP are CLC. i) Three surface soils with TCE and two with breakdown products. j) This site needs a closer look and wells on site.
Response:		
Comments "a-j", this site was inadvertently omitted from the original RFI work plan and was addressed by an addendum that was submitted later. Consequently a draft RFI report for this site was not submitted. Soil samples have been collected from 19 locations and 2 monitoring wells were recently installed at this site per the 20 January 1998 conference call. The revised RFI report will include a full evaluation of this site which should address the comments noted above.		
DMA	Dredge Materials Area	<ul style="list-style-type: none"> a) This site needs a SWMU or AOC number. b) What guided the sampling protocol? c) No wells on site. d) Dike relocated? Show how has it changed over time and explain the significance. e) Five samples collected. 1 outside dike, 3 inside dike, 2, 4, & 5 on the dike. Were the dike sample on top, on the side or inside the dike? 1, 3, & 5 did not collect subsurface samples. Explain why. f) Explain or define any interaction with SWMU 12. g) Wells surrounding the DMA were not included in any discussion. h) This site needs a closer look and possible wells on the site.

SPECIFIC COMMENTS

S/A Number	Site Name	Notes
Response:		Comments "a-h" , at the time the work plan was written the project team members agreed that this area should not be assigned a site number since it was created and regulated under the Clean Water Act. The team agreed it would be appropriate to simply extend the base wide grid pattern over the areas and collect soil, sediment, and/or surface water samples. In addition, there are nine shallow/deep grid well pairs that surround the DMA which should provide sufficient data to, at a minimum, detect any significant groundwater contamination in the area. The RFI report has been revised to further explain the rationale for why/where samples were collected and to evaluate the data with respect to screening against the appropriate risk thresholds. The DMA discussion is being completely re-written to address the concerns listed in the comments. This discussion is provided in the revised RFI report.

**Zone I
Summary Sheet**

S/A #	Site Name	SCDHEC	EPA	Navy	Final
671	Meter House, AvGas Concrete USTs (2)	CMS Surface Soils + GW		CMS Surface Soils	
672	Electrical Substation	CS 2		CMS S Soils	
673	Storage Paint Oils & Solvents	CS 2		CMS S Soils	
675	OWS NS-4	CS 2 GW		NFA	
676	Incinerator NS-2	CS 2 GW		NFA	
677	Grounds	CS 2 S Soils, GW		NFA	
678	Fire Fighting School	*CMS		CMS S Soil + Shallow GW	* = CS 2 Soils + Shallow and Deep GW
679	Wash Rack	*CMS		CMS S Soils + Shallow GW	* = CS 2 Soils + Shallow and Deep GW
680	Grinding Room	INFO		NFA	
681	Blast Booth & Cyclone	CS 2		NFA	
685	Smoke Drum	CS 2 Soils + Sh/Deep GW		CMS Seds + Shallow GW	
687	Ammo Bunker	INFO		CMS Seds + Shallow GW	
16	Paint Storage	CS 2			
688	Ammo Bunker Paint Storage	INFO CS 2		NFA	
689	Marina Parking	CS 2		CMS S Soils	
690	DMA Roads	CS 2		CMS S Soils	

Response to SCDHEC (Paul Bergstrand) Comments
 Draft RCRA Facility Investigation Zone I
 Dated January 26, 1996

**Zone I
 Summary Sheet**

S/A #	Site Name	SCDHEC	EPA	Navy	Final
S 12	Fire Fighting Training	CS 2		CMS Shallow GW	
RTC	Reserve Training Center	CS 2		NFA	
177	RTC Storage Building	CS 2			
DMA	Dredge Materials Area	CS 2		NFA	

**Zone I RFI
 Comment Resolution for Additional Field Work**

Site Name	Proposed Recommendations	Rationale
AOC 671, Meter House, AvGas Concrete USTs	NFI - CMS	The site is adequately characterized to tentatively recommend CMS. Due to the relative low risk posed by the site of 5E-06, the team should make a risk management decision to determine if further action is even warranted. Metals in GW should be discussed on a larger scale.
AOC 672, Electrical Substation AOC 673, Storage - Paint, oils, and solvents	Collect 3 additional SS samples for arsenic analysis.	At AOC 673, arsenic concentrations exceed background at 5 of 6 locations. Even though exceedances are marginal, samples from AOC 672 are lower and provide contrast. Based on a risk of 1E-04, CMS will be recommended and the lack of arsenic extent definition will be a data gap.

**Zone I RFI
Comment Resolution for Additional Field Work**

Site Name	Proposed Recommendations	Rationale
AOC 675, OWS NS-4 AOC 676, Incinerator NS-2 AOC 677, Grounds	NFI	Petroleum contamination was detected in groundwater; however, the DET has performed a tank removal which was the likely source. The EBS identified the following tanks in this area: AOC 676, 2 - 25,000 fuel, 1- 495 gallon waste oil; AOC 677, near NS-3 were 2 of unknown capacity. Cumulative risk 8E-07. This area already being addressed by the tank program.
AOC 678, Fire Fighting School AOC 679, Wash Rack	Collect 3 additional GW samples using DPT. Resample grid 14 & 14D	Consistent detections of petroleum compounds and random detections of other compounds (primarily VOCs). No USTs or ASTs are listed at NS-1 so there is currently insufficient data to identify source.
AOC 680, Grinding Room	Confirmation sampling for both soil & GW (DPT)	NFI with respect to asbestos based on detect results. However, the EBS states the site historical operations included seaplane refueling, oil storage, parts cleaning, and a 6000 gallon oil/sludge UST associated with an OWS. None of this info was cited in the RFA and therefore appears to have been over looked during work plan scoping.
AOC 681, Blast Booth and Cyclone	NFI	Cumulative risk for surface soil is 3E-07. For Zone L RFI, 3 GW samples were collected nearby in association with an OWS and piping. The VOC results were non-detect. Only CMS concern (may more appropriately be a process closure type concern) appears to be lead residue on interior walls.
AOC 685, Smoke Drum	Additional surface soil sampling	The site will be recommended for CMS based on a 4E-05 cumulative risk. Data gap concern will be the fact COCs are fairly ubiquitous across area sampled and a boundary cannot be defined.

**Zone I RFI
 Comment Resolution for Additional Field Work**

Site Name	Proposed Recommendations	Rationale
AOC 687, Ammo Bunker SWMU 16, Paint Storage	NFI	The site will be recommended for CMS based on a 9E-04 cumulative risk. Primary driver is arsenic in shallow GW (8.7E-04). Arsenic was detected in one well, one time above MCL (73.7 ug/L). Otherwise, the maximum hit is 39.3 ug/L. The hits in grid wells 08 & 08D are very minor and an MCL was only exceeded once - thallium in 08D at 5.5 ug/L.
AOC 688, Ammo Bunker, Paint Storage	NFI	The relative significance of metals hits in grid wells is more appropriate to address on a larger scale. The hits of metals and DEHP above MCL were all a one time occurrence.
AOC 689, Marina Parking	NFI	The site is adequately characterized to tentatively recommend CMS. DHEC comments only refer to 3 sample locations when 10 were sampled. Due to the relative low risk posed by the site of 7E-06, the team should make a risk management decision to determine if further action is even warranted
AOC 690, DMA Roads	Confirmation sampling at drum removal locations.	If confirmation samples were not already collected at ISM locations they should be.
SWMU 12, Fire Fighter Training	NFI	This site is tentatively recommended for CMS on the basis arsenic in shallow groundwater drives a 4E-3 risk. The arsenic concentrations in the problem well were consistently very high but no down gradient locations came close to exceeding MCLs. Maximum arsenic concentrations in soil is 14.2 ppm.

**Zone I RFI
Comment Resolution for Additional Field Work**

Site Name	Proposed Recommendations	Rationale
RTC, Reserve Training Center	NFI	This was never a site and samples were collectively at the urging of EPA simply as a precautionary measure because NOAA was performing site improvements prior to completion of the RFI at nearby sites. The team already rendered an opinion once that the concentrations of what was detected were insignificant.
SWMU 177, RTC Storage Building	Collect 4 additional soil samples - both intervals	The subsurface sample collected from boring location 07 contained elevated levels of SVOCs. The extent of these compounds should be delineated further and sampling may need to be expanded to include groundwater screening.
DMA, Dredge Materials Area	NFI	Data to characterize the site currently exists but was never compiled in a format to easily allow a thorough review by the team.

Notes:

- CMS = Corrective measures study
- CS = Confirmatory sampling
- ISM = Interim stabilization measure
- NFA = No further action
- NFI = No further investigation

Response to SCDHEC (Paul Bergstrand) Comments
Draft RCRA Facility Investigation Zone I
Dated January 26, 1996

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**Environmental Protection Agency Comments On
Draft RCRA Facility Investigation Report for Zone I
Dated January 26, 1996**

GENERAL

Comment 1:

Human health risk assessment comments specific for the Zone I RFI Report are identified below. General human health risk assessment comments, which EPA submitted on the procedure in conjunction with the Zone H RFI Report, are not repeated here but should be considered herein.

Response 1:

Acknowledged

Comment 2:

Throughout the Zone I RFI Report the statement is made that various chemicals:

--- are considered a common lab artifact by the USEPA National Functional Guidelines, February 1994.

Examples include:

Site	Page	Chemical(s)
AOC 671	10-9	Acetone
AOCs 675, 676, 677	10-17	Acetone
AOCs 678, 679	10-9 10-14	Acetone, Freon - 113 Methylene Chloride
AOC 687, SWMU 16	10-6 10-10 10-16 10-52	Acetone, Methylene Chloride Acetone, Methylene Chloride Methylene Chloride Methylene Chloride
SWMU 12	10-13	Methylene Chloride, Phthalates
GRID	10-8 10-16	Acetone Acetone, Methylene Chloride
RTC	10-6	Acetone
DMA	10-6 10-10 10-14	Acetone, Toluene Acetone, 2-butanone Acetone

This raises three points:

- a. Good laboratory practice has ways of avoiding, or at least minimizing, lab artifacts.
- b. Good laboratory practice has ways of identifying when a chemical in a sample is a true sample ingredient and when it is a laboratory artifact.
- c. Simply identifying that a chemical is sometimes found as a lab artifact does not explain the chemical in the samples collected at Naval Base Charleston. Should such a lab artifact question arise, EPA would expect the laboratory to identify and resolve the issue or the Contractor to collect additional samples for analysis in a different laboratory. Fact rather than conjecture is needed here.

Response 2:

A comprehensive site-by-site discussion of all problems/deficiencies found in the laboratory and field blank data will be included in Section 4.0. Compounds detected in blanks will be grouped by analytical methods and sampling events and will be discussed as requested. In addition, the subject statement has been deleted from the site specific discussions.

Comment 3:

The format used for Sections 5.0 (Nature and Extent of Contamination) and 10.0 (Site-Specific Evaluations) makes the text difficult to follow. Except for a discussion of data related to background comparisons, the actual nature and extent of contamination are not presented until Section 10.0, after the presentation of the risk assessments. It would be better to incorporate Section 10.0 in Section 5.0 for the Final Zone I RFI Report.

Response 3:

The title of Section 5 has been changed to "Data Evaluation and Background Comparison" to more accurately reflect the contents. Section 10 includes all of the site-specific data and analysis: nature and extent, fate and transport, human health risk assessment, and corrective measures considerations, in that order. Ecological risk is discussed earlier, in Section 8, because it is more appropriately addressed zonewide.

Comment 4:

In the context of ecological risk assessment, receptors are considered to be the potentially affected biota - not surface water bodies such as the Cooper River. For Section 10.1, Page 10-1, and similar sections for all SWMUs and AOCs, revise the references to potential receptors accordingly.

Response 4:

References to the surface water bodies as receptors have been revised as requested.

SPECIFIC

Comment 1:

Page vii, List of Tables, Table 2.5 - The footnote is missing.

Response 1:

The List of Tables has been revised and the reference to footnote for Table 2.5 has been deleted. The footnote will remain with Table 2.5 in the body of the report where it is intended.

Comment 2:

Page 2-1, Section 2.1.1 - Add a figure showing the locations of the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) in Zone I.

Response 2:

This figure has been added to the report. However, it is believed this figure is better suited for Section 1.0 and will be inserted in Section 1.4 (Figure 1.3) under the paragraph discussing the field investigation scope.

Comment 3:

Page 3-1, Section 3.0 - The statement is made that field work was conducted in accordance with the *Final Comprehensive Sampling and Analysis Plan* but no mention is made of the Zone I RFI Work Plan. The Zone RFI Work Plan should be reference also.

Response 3:

Reference to the Zone I RFI Work Plan was made in Section 3.1. However, it has been added to the statement in Section 3.0 as well.

Comment 4:

Page 3-2, Section 3.2.2.1, and Page 5-1, Sections 5.0 and 5.1 - In the text, clarify that the comparison of detected chemical concentrations to the USEPA Region 3 Risk-Based Concentration (RBC) Table pertains only to the protection of human health and does not address protection of ecological receptors.

Response 4:

The above clarifying statement will be added to the appropriate sections of the Report.

Comment 5:

Page 6-1, Section 6.0 - The theory and application of Fate and Transport are discussed. The discussion leads up to, but stops short of, making a conclusion. The questions that need to be answered here are:

- a. What is the contamination, where is it coming from, where is it going, and how is it getting there? And,
- b. What is the horizontal and vertical extent of contamination?

Response 5:

Section 6 is a general discussion of fate and transport matters. The questions above are addressed on a site-by-site basis in Section 10, in the fate and transport portion of each site's subsection.

Comment 6:

Page 6-18, Section 6.2.2 - In Paragraph 2, modify Sentence 3 to read as follows:

If concentrations of chemicals present in ground water do not exceed published AWQC, it is assumed that those chemicals present no risk to ecological receptors resulting from ground water discharge to surface water.

Response 6:

The sentence has been modified as requested in Section 6.2.2.

Comment 7:

Page 6-20, Section 6.2.4 - Check the wording in the second bullet and revise as needed.

Response 7:

The wording has been corrected.

Comment 8:

Page 8-1, Section 8.0

- a. Describe the nature of Area of Ecological Concern AEC V-3, since it is not shown in Figure 8.1, Page 8-2, or in Figure 8.2, Page 8-3.
- b. Under "Zone Rationale," revise the last sentence of Paragraph 2 to indicate that the Zone I RFI Report will include an evaluation of Zone I SWMU and AOC contaminants with respect to their potential for migration to aquatic areas outside Zone I, at concentrations that might result in adverse effects to ecological receptors. If this initial valuation indicates a potential risk, further evaluation of those aquatic areas will be conducted during the Zone J investigation.

Response 8:

- a. **AEC V-3 consists of all three subzones listed for Zone I as well as contiguous habitats located in Zone H. No ecological risk-based determinations have been made based on the AEC designations. Instead, AECs were evaluated for habitats containing similar biota within each zone's boundary and likely receptors from these habitats (subzones) were identified to assess ecological risk. Rather than adding a description of AEC V-3, which would be both repetitious and unrelated to the goals of the zone-specific ERA, the text has been revised to clarify the relation of AECs to subzones.**
- b. **The text has been revised to reference Section 10, the site-specific fate and transport assessments, as well as a brief summary of the conclusions of Section 10 dealing with groundwater to surface water cross media transport.**

Comment 9:

Page 8-1, Section 8.0 - The statement is made that "This methodology is described in detail in the *Final Zone J RFI Work Plan* (submitted November 22, 1995)." This raises two points:

- a. A Comprehensive RFI Work Plan has been developed and approved for work to be done at two or more zones. Each Zone Work Plan is intended to be specific for that zone. Thus, any reference to a more detailed description of this methodology should be to either the Comprehensive RFI Work Plan or a Section in the Zone I RFI Work Plan.
- b. The Zone J RFI Work Plan is still draft and should be referred to accordingly.

Response 9:

The text has been revised to read: "This survey methodology, which is used in conjunction with the Zone I RFI Report, is also described in the Zone J RFI Work Plan."

Comment 10:

Page 8-3, Figure 8.2.

- a. In the legend, include a brief descriptive phrase for the each of the designated ecological sub-zones.
- b. Show the locations of all SWMUs and AOCs in Zone I, as listed in Table 1.1, Pages 1-12 to 1-13.

Response 10:

For Figure 8.3, the legend has been revised to include a brief description of each ecological subzone and the location of all AOCs and SWMUs located in Zone I ecological subzones. The location of all SWMUs and AOCs is more appropriately shown on Figure 1.3 (Section 1.0).

Comment 11:

Page, 8-4, Section 8.1 - Clarify whether the species noted have been observed in Sub-Zone I-1 or are just expected to occur there, based upon the nature of the habitat present.

Response 11:

The text has been revised to clearly indicate which species have been observed and those which may occur within this habitat as stated in literature.

Comment 12:

Page 8-9, Section 8.2 and 8.3 - Mention that a preliminary evaluation of ground water contaminants will be conducted with respect to potential migration and discharge to surface water bodies.

Response 12:

The text has been revised to reference Section 10, the site-specific fate and transport assessments, as well as a brief summary in Section 8.3 of the conclusions of Section 10 dealing with groundwater to surface water cross media transport.

Comment 13:

Page 8-9, Section 8.3 - The last sentence in Paragraph 2 (concerning depth to ground water and ecological impacts) is true. However, considering the location of Zone I adjacent to the Cooper River and Shipyard Creek, Zone I ground water contaminants must be evaluated with respect to their potential to migrate and discharge into those water bodies at concentrations presenting a potential risk to aquatic receptors.

Response 13:
See Response 12.

Comment 14:
Page 8-12, Table 8.2b - Since the maximum surface soil concentration of iron (216,000 mg/kg) exceeds the upper tolerance limit of background (30,910 mg/kg), include iron as an Ecological Chemical of Potential Concern (ECPC) for Sub-Zone I-1.

Response 14:
Since iron is a naturally occurring nutrient, there are no known toxicity benchmarks for iron in soil and it has been excluded from the current UTL list (11/97) for Zone I. This information has been added to the text.

Comment 15:
Pages 8-27 to 8-31, Section 8.4 - Although this section on "Stressor Characteristics" is under the heading "Contaminant Fate and Transport," it includes some information on ecological effects. In future RFI reports for other zones, it would be better to include all of the effects information in the same section.

Response 15:
The text of the Zone I RFI and the ERA format have been revised so section headings are more consistent with the text provided below them.

Comment 16:
Page 8-31, Section 8.5.1 - Revise the last line to read "measured by comparing literature data on toxic effects to actual soil concentrations."

Response 16:
The text has been revised as requested.

Comment 17:
Page 8-34, Section 8.6.2 - although Sub-Zone I-3 "lacks significant terrestrial habitat," wetland contaminants should be evaluated for risks to bird and mammal species, which feed in the wetland.

Response 17:
The lack of terrestrial habitat in Subzone I-3 very much limits the exposure potential of contaminants in sediment to foraging terrestrial wildlife. However, as noted in the text, the

terrestrial wildlife which may forage in Subzone I-3 would likely forage in Subzone I-2 and risk estimates from Subzone I-2 could potentially apply to terrestrial species which occur in Subzone I-3.

Comment 18:

Page 8-35, Section 8.7

- a. The point made in Paragraph 1 about the use of different concentration units is understandable.

However, since the analytical data are presented in units of ug/kg or mg/kg (for example), rather than in ppb or ppm, it is preferred that the former units be used in future discussions.

- b. If ecological effects data are not available for particular ECPCs, say so in the text. The lack of effects data is an uncertainty with respect to the risk characterization, as mentioned in Page 8-64, Section 8.8.

Response 18:

- c. The units have been converted as requested. The statement regarding different concentration units has been deleted since a "standardized" convention is now being used.
- b. Those ECPCs lacking ecotoxicological benchmarks have been identified and this benchmark deficiency will be included as an uncertainty which may underestimate potential risk.

Comment 19:

Page 8-35, Section 8.7; Pages 8-36 to 8-41; Section 8.7.1; Pages 8-59 to 8-61, Section 8.7.3 - Most of the information in these sections pertain to ecological effects and, therefore, would be more appropriate in Section 8.6 (Ecological Effects Assessment), beginning on Page 8-34. Risk characterization actually begins on Page 8-41 for terrestrial infaunal invertebrates and Page 8-62 for terrestrial vegetation.

Response 19:

This format discrepancy is noted and revisions have been made to Section 8 as requested.

Comment 20:

Pages 8-41 to 8-42, Section 8.7.1 - For the three sub-zones, be consistent in stating the locations of the chemical concentrations (e.g., Tables 8.2a and 8.2b) and the effects data (e.g., Table 8.9 or text?) used to characterize risk to terrestrial infaunal invertebrates.

Response 20:

The format in which sample locations, concentrations, and effects data are presented have been revised to be more consistent and easier to reference and review.

Comment 21:

Page 8-43, Section 8.7.2 - See the comment given above concerning evaluation of Sub-Zone I-3 with respect to terrestrial wildlife.

Response 21:

See Response 17.

Comment 22:

Pages 8-51 and 8-52, Tables 8.13a and 8.13b.

- a. Include the Volatile Organic Chemicals (VOCs) shown as ECPCs in Page 8-11, Table 8.2a, or explain why they are not included in the evaluation.
- b. Include iron in the evaluation, based upon the comment given above.

Response 22:

- a. The omission of the VOC concentrations is noted. However, there are no data available to calculate the effects or potential dietary uptake of the three VOCs detected at this site to terrestrial receptors. Acetone evaporates very quickly in the environment (vapor pressure 231 mm Hg at 25°C) and is subject to biodegradation under both aerobic and anaerobic conditions. Tetrachloroethene will also evaporate fairly rapidly due to its high vapor pressure (18.49 mm Hg at 25°C). Toluene, with a vapor pressure of 28.4 mm Hg at 25°C, also evaporates very quickly and will biodegrade as well. K_{oc} values for toluene in sandy soils have been reported at 178, indicating high mobility and high potential to leach to groundwater, away from potential receptors (*Handbook of Environmental Fate and Exposure Data*, Sage et al., 1990). Based on these factors, the VOCs detected at the site are not expected to stress ecological receptors and will not be incorporated into the risk assessment. This information has been added to the report.
- b. As stated earlier, iron is a naturally occurring nutrient and will not be included as an ECPC.

Comment 23:

Page 8-54, Table 8.14a - Check the series of U.S. Fish and Wildlife Service Contaminant Hazard Reviews by Ronald Eisler for reference toxicity values (RTVs) for the inorganics for birds (e.g., Eisler, Ronald. 1988. Arsenic Hazards to Fish, Wildlife, and Invertebrates: A synoptic Review. USFWS Contaminant Hazard Reviews, Report, Report No. 12.)

Response 23:

Additional ecotoxicological benchmarks has been reviewed, including Eisler's RTVs, and have been included in the Zone I RFI as appropriate.

Comment 24:

Page 8-59, Section 8.7.2 - Food chain calculations based upon maximum surface soil contaminant concentrations show a potential risk (sublethal effects) for terrestrial wildlife. Therefore, it is recommended that mean contaminant concentrations also be used in determining potential dietary exposure, to give a risk range and to determine whether risk is related to localized vs widespread areas of high contaminant concentrations. This would help determine the need for collecting site-specific ecological data.

Response 24:

For those parameters which, when using the maximum concentration, indicates risk, the potential dietary exposure and risk range has been calculated using both the maximum and mean concentration.

Comment 25:

Page 8-62, Section 8.7.3

- a. Include a statement indicating how risk to terrestrial vegetation was characterized (e.g., comparison of chemical concentrations to effects data in Page 8-60, Table 8.15, and in the text).
- b. For Sub-Zone I-2, explain why "Effects from organic concentrations could not be assessed."

Response 25:

- a. **Text has been added to explain how risk to terrestrial vegetation was characterized.**
- b. **Text has been added to explain why effects from organic concentrations could not be assessed.**

Comment 26:

Page 8-62, Section 8.7.4

- a. In Paragraph 1, last line, change "surface water quality" to "aquatic receptors."
- b. For surface water, include a reference to Table 8.4, Pages 8-17 to 8-18.

Response 26:

- a. The text has been revised as requested.
- b. The text has been revised as requested.

Comment 27:

Page 8-63, Section 8.7.4 - For Sub-Zone I-2, also include 4,4'-DDE since it has a hazard quotient (HQ) of 80 (Page 8-23, Table 8.6).

Response 27:

The omission of this compound is noted. The text will be revised to indicate 4,4'-DDE is an ECPC.

Comment 28:

Pages 8-64 to 8-65, Section 8.9

- a. As written, the ecological risk assessment does not present sufficient information to make a decision concerning the possible need for corrective action at different AOCs or SWMUs. Several data gaps are mentioned in the text of the draft Zone I RFI Report and related EPA comments. These data gaps must be addressed in order to finalize the ecological risk assessment. This again points out the apparent lack of a mechanism for proceeding from Phases I and II to Phase III of the ecological risk assessment prior to submission of a draft RFI Report.
- b. Revise this section, based upon EPA comments given above.
- c. Risk was not evaluated for terrestrial wildlife in Sub-Zone I-3. (See Page 8-34, Section 8.6.2). Therefore, change the statement about no risk potential for terrestrial wildlife species within Sub-Zone I-3.

Response 28:

- a. **With the revisions requested, the Zone I ecological risk assessment provides sufficient information to adequately support risk management decisions.**
- b. **Section 8.9 has been revised as per regulatory comments.**
- c. **This statement regarding risk to terrestrial wildlife has been revised.**

Comment 29:

Pages 9-1 and 9-3, Sections 9.0 and 9.1; and Page 9-7, Section 9.4. The wording in these sections erroneously implies that only human health concerns will be the basis for determining the need for a Corrective Measures Study. While EPA is concerned about human health, EPA is also concerned with other life forms. Depending upon the final outcome of the Ecological Risk Assessment, ecological concerns might also need to be addressed through corrective action.

Response 29:

The basis for which a site is determined to be included as part of the Corrective Measures Study (CMS) will include risk and hazard, both from the human health and ecological perspective. In addition, a CMS may be warranted for sites where contaminant fate and transport pose significant concerns. However, sites with significant fate and transport issues typically pose a risk threat as well, and thus are included in the CMS from the onset. The RFI Report has been amended to reflect this.

Comment 30:

Page 9-1, Section 9.0 - It says in part that:

--- the RFI Report should discuss whether the extent of contamination has been defined, and propose recommended actions for the SWMUs and AOCs, such as collection of additional samples, proceed into a Corrective Measures Study, or No Further Investigation, whichever is appropriate.

EPA agrees with this former SCDHEC comment. Yet, Section 9.0 does not fully satisfy this comment. This section summarizes what is contained in the USEPA guidance document *RCRA Corrective Action Plan* (USEPA 1994) rather than dealing with the site specific CMS issues. Section 9.0 is a very important section which should serve as a focal point for the rest of the Zone I RFI Report. It should summarize which areas are clean and require No Further Investigation, which areas need additional samples (how many, where, what type, etc.), and which areas should proceed into the Corrective Measures Study. Further, it should identify the

boundaries of each site ("the extent of contamination"). The extent of contamination is critical to designing a CMS.

Response 30:

Section 9.0 has been written in general terms to describe the overall CMS process proposed for NAVBASE. Potential remedial technologies based on impacted media are discussed in a general sense as well. Section 11.0 is a new portion of the RFI which was not developed at the time of this comment generation. This new section summarizes and presents recommendations for sites warranting a CMS. The reasons for including or excluding a site from the CMS process are listed as well. Site-specific CMS issues such as which areas need additional samples (how many, where, what type, etc.), proposed remedial objectives, and potential remedial alternatives will be included as part of the zone-specific CMS work plan.

Comment 31:

Page 9-27, Section 9.8 - A discussion is presented of a system for ranking the corrective measure alternatives. The statement is made that:

The ranking system will apply a weighing factor selected by the Navy to determine the importance of each corrective measure criterion.

However, the use to be made of that information is not provided. It should be noted that RCRA corrective action includes a public participation process. Specifically, while the Navy can recommend corrective measure alternatives, public input will be actively solicited and weighed heavily in the decision which will be made by the RCRA Permitting Authority (i.e., SCDHEC) as to which actual corrective measure is selected for each site. This emphasizes the importance of getting and keeping the Restoration Advisory Board informed and actively involved in the decision making process throughout the RFI and CMS.

Response 31:

The weighing factor the Navy will use during the ranking process to determine the importance of each corrective measure criterion will be provided to the Restoration Advisory Board (RAB). The reasons for its development and application will be explained to the RAB. In addition, Volume I of the Comprehensive Corrective Measures Study Project Management Plan, June, 1997 contains Section 7.0, Community Involvement. This section references the Community Relations Plan (CRP) and explains the process of and the benefits that can be obtained from a CRP. Active involvement of the RAB and the local community will be sought throughout the CMS as it currently is for the RFI.

Comment 32:

Section 10 - These discussions need to conclude with a discussion of the horizontal and vertical extent of contamination which is critical to the design of a Corrective Measures Study (CMS) where a CMS is needed and to the transfer of property where an area is demonstrated to be "environmentally clean." Maps which EPA has reviewed subsequent to the submission of this RFI Report would satisfy this concern if incorporated.

Response 32:

A discussion of the horizontal and vertical extent of contamination for each SWMU and AOC will be included in Section 10.

Comment 33:

Page 10-1, DMA - The statement is made that:

Sample locations may have been changed due to inaccessibility of proposed locations.

Since the investigation has been completed, this statement can be re-worded to say that the sample locations either were or were not changed thus eliminating any uncertainty. If they were changed, say so and explain why.

Response 33:

This discussion has been revised as appropriate.

Comment 34:

Pages 10-1 to 10-2, Section 10.0, and Page 10-3, Section 10.10.1 - State that the comparison of soil analytical data to the USEPA Region 3 RBC Table pertains only to the protection of human health and does not address protection of ecological receptors.

Response 34:

The text has been revised as appropriate. In addition, this text has been revised to include discussion of ecological receptors as well.

Comment 35:

Pages 10-1 and 10-2, Section 10.14.1, and Figure 10.14.1 - According to Page 10-1, Section 10.14, the purpose of the Dredged Materials Area (DMA) soil samples was to "characterize background conditions from dredged material deposits." However, Figure 10.14.1 show that only two soil samples were collected within the dike, while one was collected on the

dike and two were collected outside the dike. Thus it is questionable whether this limited number of soil samples adequately characterize the dredged material deposits. Address this point.

Response 35:

This statement is no longer included in the discussion.

Comment 36:

Page 10-10, Section 10.8.5 - Indicate the nature of the sediment sampling locations (i.e., drainage ditch?).

Response 36:

The samples were collected from a drainage ditch immediately east of the site. The text has been revised to reflect this.

Comment 37:

Page 10-17, Section 10.14.8 - The first sentence is unsupported. Add a table summarizing the ground water analytical data.

Response 37:

No wells were specifically installed to characterize groundwater at the DMA. The final RFI work plan proposed eight grid-based well pairs (GDI001/1D through GDI008/8D) to be installed along the eastern and western boundaries of the DMA to characterize the zone perimeter groundwater. Results of these analyses are discussed in the nature and extent section and are included in Appendix H of the RFI report.

Comment 38:

Page 10-17, Section 10.14.9.1 - Since the last two sentences (about sediment and surface water) do not apply to soil-to-ground water cross-media transport, it is recommended that they be separated into a new section.

Response 38:

This section has been revised as appropriate.

Comment 39:

Page 10-18, Section 10.8.7.4, and Page 10-7, Section 10.9.4 - Explain why sediment is not expected to migrate from the sampled drainage.

Response 39:

The statement has been removed from the text and the sections have been revised accordingly.

Comment 40:

Page 10-17, Section 10.11.5.2.

- a. Check the end of Line 3 to see if it should read "to have exceeded the published AWQCs."
- b. Include a table showing the comparison of ground water data to the AWQC, to support the statement concerning arsenic and nickel.

Response 40:

The fate and transport has been revised and the screening tables have been modified to include comparisons of groundwater analytical results to corresponding AWQCs (also known as saltwater surface water chronic screening values).

Comment 41:

Page 10-15, table 10.12.6 - Check the second line for arsenic, to see if it should read "Deep" rather than "Shallow."

Response 41:

The second line was correct as written. The first line should have read "Aluminum - Shallow" rather than "Arsenic - Shallow." The table has been corrected.

Comment 42:

Page 10-21, Section 10.3.7.4. - The statement is made that:

The significance of constituents detected in AOC 675 sediment with respect to ecological receptors will be addressed as necessary in the Zone I ERA or Zone J RFI.

This needs to be worded better to identify specifically where in the Zone I RFI Report this is more fully discussed and what part will be addressed as a part of the Zone J RFI.

Response 42:

The statement has been removed from the subject text and the section revised as applicable.

Comment 43:

Page 10-56, Section 10.3.9 - The statement is made that:

Therefore, a corrective measures study was not performed.

This needs to be re-worded to reflect what is recommended for future activities rather than stating this is something that has already happened.

Response 43:

This section has been revised and the subject sentence has been deleted.

Comment 44:

Page 11-6, Section 11.9.1 - The statement is made that:

--- risk to infaunal communities from organic ECPCs appears to be low or absent.

Fact rather than conjecture are needed here.

Response 44:

Noted.

Comment 45:

Dioxin - In the description of the risk assessment, the cleanup number of 1 ppb used at Times Beach is based on the work of Kimbrough and cited. In EPA's comments on the Zone H RFI, it was indicated that the slope factor approach is now more in favor and derived a cleanup number of 1 ppb based on this approach for workers. The Navy should be aware of this distinction and should refer to EPA's most recent comments on the draft Zone H RFI Report.

Response 45:

The derivation of the 1 ppb cleanup level for dioxin, which is now based on the slope factor approach, has been included in the final RFI Report.

Comment 46:

PAHs - These chemicals are present throughout Zone I. As would be expected, PAHs would wash from land sources (asphalt, oil, cars, etc.) by surface runoff to sediment. The sediment was then dredged and used as fill material so the PAHs occur in fairly low concentrations ubiquitously.

Response 46:

Other nearby PAH sources include power plants, the municipal incinerator, cooking, and general urban activities. At the February 1997 project team meeting, EnSafe presented proposed background reference values for carcinogenic PAHs in soil, expressed as $\mu\text{g}/\text{kg}$ of BEQs. Project team members agreed that the proposed reference values would not be used to identify site COPCs, but as risk management tools, as possible sampling endpoints, and as guidelines for handling IDW. The proposed reference value for Zone I soil was $160\mu\text{g}/\text{kg}$ BEQs.

Comment 47:

AOC 678 and 679 - The PCB Arochlor 1260 was detected in groundwater at levels of concern but not in soil. A possible disconnect exists here. It is present in 1 hit out of 3 and drives risk at the site.

Response 47:

Discussion of these combined sites is not included in the revised RFI but will be submitted as an addendum to that report. The comments regarding these sites will be addressed in the addendum submittal.

Comment 48:

SWMU 12 - The groundwater risk at SWMU 12 is driven by arsenic. It is possible that the sample was turbid because metals and dioxin, all generally entrained as fines, were selected as Chemicals Of Potential Concern (COPCs). This may become important in a risk management decision regarding groundwater.

Response 48:

The Final RFI report will evaluate all four quarters of groundwater data. Any trends in the groundwater data over time perhaps will confirm or refute the presence of these constituents in the groundwater.

Comment 49:

Dredge Spoils Area - A few samples of soil, sediment and surface water were taken in the Dredge Spoils area (referred to in the draft Zone I RFI Report as the DMA). Of the data reported, the soil and sediment were clean. Surface water had only metals contamination. The document claims that a risk assessment is unwarranted under RCRA because the area is a Clean Water Act (CWA) permitted dredge spoils area. Aluminum and manganese will probably drive any estimated risk from surface water.

This issue is a "Pandora's Box" which EPA does not see the benefit of opening at Naval Base Charleston. Rather, the environmental investigation and cleanup at Naval Base Charleston is

proceeding under the Community Environmental Response and Facilitation Act (CERFA) which is multimedia including but not limited to RCRA. Accordingly, EPA will not concur with the transfer of property until it is determined to be "CERFA clean." Therefore, EPA recommends that a sufficient number and types of samples be collected to identify the nature and extent of any contamination present, and that a risk assessment be conducted.

Response 49:

The subject statement has been removed from the text. A HHRA was conducted for the DMA and is included in the revised RFI report.

*Response to Comments From the
Environmental Protection Agency on the
Draft Zone I RCRA Facility Investigation
Dated January 26, 1998*

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