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LETTER TRANSMITTING COMMENTS ON DRAFT FINAL RESOURCE CONSERVATION
AND RECOVERY ACT FACILITY INVESTIGATION REPORT ZONE H DATED 31 JULY 1995
CNC CHARLESTON SC
10/13/1995
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

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October 13, 1995

John Litton, Manager
Hazardous Waste Section
South Carolina Department of
Health and Environmental Control
Division of Hazardous and
Infectious Waste Management
Bureau of Solid and Hazardous
Waste Management
2600 Bull Street
Columbia, SC 29201

RECEIVED

OCT 16 1995

S. C. Department of Health and Environmental
Control - Bureau of Solid and Hazardous
Waste Management

SUBJ: Zone H RFI Report

Dear Mr. Litton:

The U.S. Environmental Protection Agency (EPA) has reviewed the July 31, 1995, *Draft Final RCRA Facility Investigation Report for Zone H, Naval Base Charleston*. EPA's comments are enclosed. EPA recognizes the lead responsibility of the South Carolina Department of Health and Environmental Control (SCDHEC) in the Resource Conservation and Recovery Act (RCRA) and Hazardous Waste Amendments (HSWA). However, in consideration of the Community Environmental Response and Facilitation Act (CERFA) and the closure of Naval Base Charleston, EPA maintains an interest in working closely with the investigations and corrective action at Naval Base Charleston including but not limited to RCRA.

EPA is very concerned with the quality of the July 31, 1995, *Draft Final RCRA Facility Investigation Report for Zone H, Naval Base Charleston*. At best, EPA would categorize it as a rough, first-draft. In addition to numerous lesser but significant problems, this document:

1. States that the ecological risk assessment, identified as being required by the Comprehensive RFI Work Plan and the Zone H RFI Work Plan, has been deferred to be done in the Zone J RFI, and that the Zone J RFI has become the ecological risk assessment for the whole base and not the RFI for Zone J as required by the Comprehensive RFI Work Plan. Most important of all is the fact that these decisions were made without the approval of the Base Realignment And Closure (BRAC) Cleanup Team, EPA, or SCDHEC. EPA does not concur with these decisions. EPA expects all work plans to be followed exactly as written and approved. For the instance at hand, EPA expects the ecological risk assessment to be done for Zone H exactly as contained within

the approved Comprehensive RFI Work Plan and the Zone H RFI Work Plan, and the results to be incorporated into the Zone H RFI Report.

2. EPA spent considerable time and effort working with the Naval Base Charleston's contractor to develop a work plan for the human health risk assessment. The work plan was approved, but not followed. EPA expects the human health risk assessment to be re-done according to the approved work plan.
3. Entire Tables referred to in the narrative of Zone H RFI Report are missing. Other information in the Zone H RFI Report is too incomplete and too inaccurate to be reliable for decision making purposes.
4. There are a number of other problems in the Zone H RFI Report, such as data reported in a table or on a map without explanation, conclusionary statements without supporting documentation, superficial treatment of data needed to support the development of a Corrective Measures Study Work Plan, and a failure to clearly demonstrate the absence of a problem of soil-gas migrating into buildings in the vicinity of the old landfill (SWMU 9).
5. Although it does not affect EPA's ability to perform a technical review of the Zone H RFI Report, EPA is concerned that a document of this quality was submitted for review and comment with the number of misspelled words, incomplete sentences, and sentences with irrelevant words that this document has.

Please consider EPA's comments in your response to Naval Base Charleston on the subject document. If you have any questions, please call me at (803) 743-9985, or (404) 347-3555, VMX 2061.

Sincerely,



Doyle T. Brittain
Senior Remedial Project Manager

Enclosures (6)

1. EPA Comments on the Zone H RFI Report
2. Risk Assessment Issue Paper for: Derivation of a Provisional RfC for Trimethylbenzene (1,2,4 and 1,3,5), SHRTC, 8/02/93

3. Guidance on Estimating Exposure to VOCs During Showering, USEPA, July 10, 1991, Patton DE
 4. Risk Assessment Issue Papers for:
 - a. Derivation of a Provisional Subchronic Inhalation RfC for Chloroform.
 - b. Derivation of a Provisional Subchronic Inhalation RfC for Chloromethane.
 - c. Evaluation of the Carcinogenicity of 1,2,4-Trimethylbenzene
 - d. Derivation of a Provisional RfC for Trimethylbenzene (1,2,4 and 1,3,5).
 5. Risk Assessment Issue Paper for:
 - a. Subchronic Inhalation RfC for Benzene
 6. Risk Assessment Issue Papers for:
 - a. Derivation of a Provisional Oral RfD for Benzene
 - b. Derivation of a Provisional Chronic Inhalation RfC for Benzene
- cc: Ann Ragan, SCDHEC
Jeannie Alano, SCDHEC
Joe Bowers, SCDHEC

ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE
RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION
REPORT FOR ZONE H

BACKGROUND

1. The *Final Comprehensive Project Management Plan RCRA Facility Investigation*, Volume I, August 30, 1994, (henceforth the Comprehensive RFI Work Plan) says in part:

--- To effectively coordinate the conduct of the RFIs, while prioritizing those investigations as determined by the BCT, NAVBASE has been subdivided into discrete zones for investigation and potential transfer to nonfederal entities. Figure 2-2 illustrates the boundary of the zones. Appendix B contains enlarged versions of the zone maps which also include SWMU/AOC locations. Zone-specific work plans will identify the sites within each respective zone, provide a summary of historical information, identify presumptive remedies, data gaps, and outline the sampling plan (e.g., number and locations of soil borings, monitoring wells, soil-gas detection points, air monitoring stations). The identification of these elements of the plan will essentially define the objectives of the investigation. The ultimate goal of the investigation is to determine the nature and extent of contamination, assess risks posed to human health and the environment, and collect appropriate data to support a corrective measures study. --- (Page 2-5).

--- Locations that are sufficiently far away from any SWMU or AOC, to be agreed upon by consensus, will be used to estimate mean background level. If sufficient precision in this estimate cannot be achieved using these samples, supplemental tools, as outlined in the Baseline Risk Assessment (BRA), will be used to determine origins of environmental media onsite to facilitate the identification of comparable sampling sites offsite. Once a consensus decision regarding finalized background levels has been reached, they will be used to identify PRGs as mentioned above. These will be fed back into the site specific data collection process to assist in determination of endpoints for the RFI and CMS.

PRGs will help identify sampling endpoints, and their calculation will include information from initial analytical results, estimated background levels, historical data from the RFA, and any other pertinent data evaluated on the basis of estimated human health and ecological impacts. The EPA recommended residential scenario will be used as the default for establishing the PRGs. Later risk management decisions

will consider all available scenarios. The estimated risk/hazard projected for each chemical of potential concern will be used to develop a list of site specific chemicals of concern (COCs), with consideration also given to the human health and ecological concerns related to corresponding background constituent concentration. --- (Page 2-9).

A RFI report will be generated for each investigative zone upon completion of field work within the respective zone. One final, comprehensive report summarizing all of the zone reports and addressing NAVBASE as a single entity will be written upon completion and regulatory review of the final zone report. --- (Page 2-10).

2. The Comprehensive RFI Work Plan, Volume III, August 30, 1994, says in part:

--- As previously discussed, the RCRA Permit requires an Environmental Risk Assessment (ERA)¹ to determine if cause-effects relationships exist between onsite contaminant concentration and observed impacts to biological components. The ERA will be directed at NAVBASE as a whole but conducted on an individual SWMU/AOC basis. This method will focus efforts on site-specific contaminants along with relative biological receptors. --- (Page 3-1).

3. The *Final Zone H RFI Work Plan*, October 27, 1994, says in part:

--- The proposed investigative approach for each of the sites was developed in accordance with the overall investigative strategy presented in Section 2, Volume I of the *Final Comprehensive RFI Work Plan*, which places emphasis on the "Fast-track Cleanup" program. ---

In order to determine the necessity for additional sampling not specified in this Work Plan, data collected under this plan will be evaluated regarding potential human health impacts expressed as preliminary remedial goals, ecological risks, and technical requirements for a CMS. For some chemicals, additional information regarding background concentrations will be required, which may necessitate onsite and offsite data collection. Background migration pathways, human and ecological receptors, and preliminary remedial goals

¹ The term Baseline Risk Assessment (BRA) and Environmental Risk Assessment (ERA) are synonymous.

(PRGs) are discussed in Section 1, Volume III of the *Final Comprehensive RFI Work Plan*. --- (Page 1-5).

--- The zone-specific work plans outline the data collection process for each SWMU and AOC in the particular zones. The *Final Comprehensive RFI Work Plan* discusses how these data will be used to fulfill the goals of the investigation. An RFI report and Baseline Risk Assessment (BRA) will be generated at the conclusion of the investigation of each zone, and a final RFI report and final RFI BRA will address NAVBASE as a single entity once all zone investigations are completed. ---- (Page 1-6).

4. The *Final Zone H RFI Work Plan*, October 27, 1994, has a section for each hazardous waste site, entitled Potential Receptors, which says in substance:

--- Potential receptors of exposure to contaminants include current land users, such as NAVBASE workers, personnel using recreational facilities onsite, and any future users this area might support. Data will be generated during the RFI to support the determination of level of risk to the entire spectrum of current and potential users, including any highly sensitive individuals who might be exposed through invasive and non-invasive activities. The risk evaluation will also consider any ecological receptors which may be present. --- (e.g., Page 2.6).

5. The *Final Zone H RFI Work Plan*, October 27, 1994, has a section for each hazardous waste site, entitled Objectives, which says in substance:

--- The objective of the proposed field investigation is to fill the data gaps ---. Data collection efforts should support the technical evaluation of the identified treatment alternatives. --- (e.g., Page 2-6).

Appendix E identifies various potential treatment alternatives (corrective measures) for each hazardous waste site. The idea was that by identifying the treatment alternatives early in the RFI, and by preliminarily evaluating the treatment alternatives throughout the RFI, then determining the treatment alternatives of choice for the Corrective Measures Study (CMS) is facilitated and expedited.

GENERAL

1. The *Draft Final RCRA Facility Investigation Report for Zone H, Naval Base Charleston* (henceforth *Zone H RFI Report*) contains a number of misspelled words (including the Contractor's name on the front cover), incomplete sentences, and sentences with irrelevant words.
2. The *Zone H RFI Report* is missing some tables, e.g., 6.2.2-2, 6.2.2-4, 6.2.2-11, 6.2.8-2, and 6.2.8-4. The number for the first Table 6.2.10-12 is wrong. The Tables for AOC 656 and for 659, 660, 662 have duplicate numbers.
3. The *Zone H RFI Report* contains no discussion of the treatment alternatives, identified in Background Point 5 above. Yet, the field investigation was designed to consider, among other things, the treatment alternatives. See Page 2-1.
4. Executive Summary, Page 3; Page 3-37, Section 3.5; and throughout the *Zone H RFI Report*, the statement is made that the ecological risk assessment was not done as a part of the *Zone H RFI* but will be done as a part of the *Zone J RFI*. It must be noted that this is a significant and unapproved deviation from the Comprehensive RFI Work Plan and the *Zone H RFI Work Plan*, i.e., neither the Base Realignment And Closure (BRAC) Cleanup Team (BCT), SCDHEC, nor EPA has approved such a deviation from the approved work plans. See Background Points 1-4 above.
5. Nowhere in the *Zone H RFI Report* is there any discussion that the Comprehensive RFI Work Plan and the *Final Zone H RFI Work Plan* were followed as written, or of deviations which were made, if any, and the effects of these deviations on the outcome of the *Zone H RFI*. This is needed.
6. Page 2-4 and throughout the *Zone H RFI Report*, the statement is made that "Sample coolers were shipped by air for next-day delivery to Pace Laboratories, New Hampshire." No other laboratory is named, and no location for Pace Laboratories other than the one in New Hampshire is given, anywhere in the *Zone H RFI Report*. Appendix Volume II-H contains Data Validation Summary Reports prepared by Validata Chemical Services, Inc. of Pace Laboratories' data. No such Data Validation Summary Reports are contained within the *Zone H RFI Report* anywhere for any other laboratory. This type of information is needed for each laboratory at each location that conducted laboratory analyses in support of the *Zone H RFI*.

SPECIFIC, VOLUME 1

1. Acronym List.

- a. The Acronym List is different from each of the acronym lists in each of the previous documents submitted for EPA review. Why not standardize and adopt one Acronym List?
- b. Acronyms are used in the Zone H RFI Report which are not contained in the Acronym List.
- c. A number of terms are plural when they should be singular.
- d. LNAPLs are identified in the Acronym List and mentioned in the Zone H RFI Report, but DNAPLs aren't. DNAPLs should be identified in the Acronym List and discussed in the report.
- e. AWQC and AWQL. The Q stands for quality - not cooled.
- f. The correct acronym for milligrams per kilogram per day is mg/kg/day.
- g. OVA stands for organic vapor analyzer.
- h. PAH stands for polynuclear aromatic hydrocarbon.

2. Page xviii, Table Of Contents. The footnotes indicated for Tables 5.2 - 5.8 are missing.

3. Page 1-8, Section 1.2. The Baseline Risk Assessment is not mentioned as an integral part of an RFI.

4. Page 1-11, Section 1.4. The terms No Further Investigation (NFI), Confirmatory Sampling Investigation (CSI), and RCRA Facility Investigation (RFI) are incompletely and inaccurately defined. Definitions in the Comprehensive RFI Work Plan, Volume I, Page 2-1, Section 2.0, should be used.

5. Page 2-5, Section 2.2.4, and elsewhere throughout the Zone H RFI Report. The statement is made that

Approximately 10 percent of the soil samples collected at Zone H were duplicated and also submitted for Appendix IX analytical parameters.

See also Page 2-17, Section 2.4.4. This is incomplete and potentially misleading. A brief discussion of Appendix IX, SW-846, and Data Quality Objectives as applied in this RFI is needed.

6. Page 2-15, Section 2.4.2, Number 7. The technique described for the collection of groundwater samples is not acceptable. Tygon is not an acceptable material for sampling, and samples should not be passed through a peristaltic pump. This procedure may have had the effect of lowering the apparent concentration of contaminants (especially volatiles) in the sample, resulting in incorrect data interpretation or false negatives. These data should be flagged accordingly. This sampling technique should be corrected prior to further field work being performed.
7. Page 2-15, Section 2.4.2. Turbidity measurements were not reported for the temporary wells. The final document should have this information. Temporary wells should also be purged with peristaltic pumps to reduce turbidity to a minimum.
8. Page 2-20, Section 2.5.4
 - a. Were sediment samples analyzed for grain size, or will this be done in Phase II of the investigation?
 - b. Were field parameters (e.g., temperature, pH, dissolved oxygen, salinity, etc.) measured for the surface water samples, or will this be done in Phase II?
9. Figure 3.11
 - a. Either here or on another large Zone H map, show the locations of all of the Zone H Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs), to help in determining possible contaminant migration pathways from the SWMUs and AOCs to the Areas of Ecological Concern (AECs).
 - b. Label West Road in this Figure, since it is mentioned in the text (e.g., Page 3-37, Section 3.5).
10. Page 3-41, Section 3.5. The last paragraph states that

The previous Zone H samples at these sites were collected to determine if there was a potential for risk; however, the number of samples was insufficient to quantify risk ---.

One of the reasons for conducting the BRA (human health and ecological) concurrently with all of the sampling and analysis is to ensure that all data needed for the BRA is collected. (See also Page 6-6, Section 6.1.2.3). Thus, too few samples is not acceptable. (See also Page 6-32, Section 6.1.6.5.) A mechanism is needed to determine whether sources might need to be remediated and whether contaminant

migration pathways to AECs need to be cut off, prior to completion of the Zone J ecological risk assessment. (See above comments.)

11. Page 4-1, Section 4.0

- a. Paragraph 1 should mention that the analytical data are also compared to ecological screening values (e.g., Page 4-35, Section 4.1.3).
- b. Paragraph 2 focuses on human health risk as a driver for remedial action. While human health risk is very important, ecological risk as a potential driver for remedial action should not be discounted. Such statements should be revised.
- c. It would help to include a summary table for surface water and sediment samples and their analytical parameter suites, similar to Table 4.1 for soils and ground water.

12. Figure 4.0

- a. Although this Figure is entitled "Soil and Groundwater Sample Location Map," it also shows the locations of surface water and sediment samples. It would help to modify the title accordingly.
- b. Explain the three unlabeled sediment sample locations shown in the bottom half of this Figure (i.e., near the EnSafe field office, Building 1787, and the picnic area).

13. Page 4-8, Section 4.0. The definition of "EMPC" used to annotate dioxin data does not agree with the definition found in Method 8290, Section 7.9.5.2.1. Clarify whether the definition used in the RFI report is unique to this document or is intended to reflect the criteria in Method 8290.

14. Page 4-12, Section 4.0. Clarify the statement,

Because field-derived blanks are used with method blanks to assess potential cross-contamination of field investigative samples, no action was taken if contamination was detected in the method blanks associated with the field derived blanks.

Does this mean that if the same contaminants were found in both field and method blanks that no action would be taken?

15. Page 4-21, Section 4.1. For the ecological assessment, surface water and sediment sample data should not be combined unless they are from the same surface water body or wetland. For example, for SWMU 9, sediment samples should be divided into the two types of wetland samples (i.e., estuarine intertidal wetland and forested palustrine wetland) and Shipyard Creek samples, rather than combining all wetland and creek samples. This distinction is necessary, since the potential receptors can differ in these different habitats. This approach should be followed for all applicable SWMUs/AOCs.
16. Page 4-22, Section 4.1.1, Soil Sampling and Analysis. The Zone H RFI Work Plan presented a discussion that the landfill contents at SWMU 9 had been sufficiently characterized so as not to need soil borings. This reasoning should have been included in the RFI; the source of this information needs to be provided and explained. Also, see General Comment 6 above.
17. Page 4-23. There were many instances of incorrect or missing numbers in the tables throughout the document. EPA did not attempt to identify all of these. Here the risk-based screening leveled for 3-methylphenol and 4-methylphenol are reputed to be "Not Listed." In fact, these levels are 3900 mg/Kg and 390 mg/Kg respectively according to the Region 3 Risk-Based Concentration Table, March 7, 1995.
18. Page 4-25, Table 4.1.2. A value for the number of antimony detections appears to be missing from the table.
19. Page 4-25. Antimony should be included as a COPC in soil at SWMU 9.
20. Page 4-26, Section 4.1.1.4. The statement was made that

No analyses for other organic compounds (Appendix IX) were conducted on soil samples from SWMU 9.

The significance of this statement is not apparent. It needs to be explained.
21. Page 4-26, Section 4.1.1.5. In addition to the four metals listed, antimony also appears to exceed the RBSL in Table 4.1.2.
22. Page 4-35, Section 4.1.3. This section states that 15 sediment samples (plus two duplicates) were collected. Yet Figure 4.1.1 shows only 12 sediment sampling locations. Where were the additional samples collected?

23. Page 4-41, Section 4.1.4. This section states that four surface water samples were collected. Yet Figure 4.1.1 shows only three surface water sampling locations. Where was the additional sample collected?
24. Page 4-55, Section 4.3.1. There is a discussion of Appendix I analyses. Is Appendix IX intended here?
25. Page 4-77, Section 4.3.4. Show the location of the surface water sample on Figure 4.3.1 and/or Figure 4.0.
26. Page 4-88, Sections 4.4.2.3 and 4.4.2.4, and many other places throughout the Zone H RFI Report. Statements are made, without explanation, that certain specific contaminants were not reported. Why were they not reported?
27. Page 4-102, Sections 4.6.1.3, 4.6.1.4, and 4.6.1.5. Statements are made, without explanation, that samples were not analyzed for pesticides, PCBs, TPH, herbicides, organophosphates, or inorganic elements. Why were these analyses not performed?
28. Page 4-102, Section 4.6.1.5. Any future soil sampling at SWMU 20 should include inorganic analyses, since batteries were stored at this SWMU (Page 4-98, Section 4.6).
29. Page 4-108, Section 4.7.1.4. The statement is made, without explanation, that

No herbicides and organophosphate pesticides were reported in the duplicate analysis.

Why were these not reported?

30. Page 4-125, Section 4.9.1.4. The statement is made, without explanation, that

No other samples were analyzed for TPH.

Why were they not analyzed for TPH?

31. Figure 4.12.1. The term Shipyard River is used when Shipyard Creek is intended.
32. Page 4-156, Section 4.13.1.1. The statement is made that

Acetone and methylene chloride, two common laboratory contaminants, ---.

Unless evidence is presented to demonstrate that this is relevant to the situation discussed here, this statement should be deleted.

33. Page 4-210, Section 4.20. The last three lines on this page are duplicated at the top of the next page.
34. Page 5-9, Section 5.1.3 and elsewhere in the *Zone H RFI Report*. This section says in part (emphasis added):

Cooper River, Shipyard Creek, and adjacent wetlands presumably receive groundwater discharge from these aquifers beneath NAVBASE. Based on this assumption, these surface water bodies could be impacted by the groundwater contaminants at SWMU 9. Shipyard Creek is probably the most vulnerable of the bodies to contaminants from SWMU 9 because of its closer proximity to known source locations. The potential impacts to the area surface water bodies and wetlands will be addressed during the Zone J RFI.

This raises two points:

- a. This is highly speculative and provides no additional information beyond what is in the RCRA Facility Assessment (RFA) and *Zone H RFI Work Plan*. The purpose of the *Zone H RFI Report* is to present and interpret results of the RFI, conducted in support of the RFA and RFI Work Plan.
- b. See General Comment 4 above.
35. Page 5-1, Section 5.0. Contaminant Fate and Transport. This section is generic and redundant. It does not give a thorough explanation of the fate and transport of hazardous wastes in the environment. Fate and transport of hazardous wastes is critical to any interpretation of the severity of the nature and extent of contamination, and to facilitate development of the Corrective Measures Study Work Plan.
36. Page 5-1, Section 5.0. The discussion of potential ecological receptors in the subsections must address both terrestrial and aquatic receptors, where applicable.
37. Page 5-9, Section 5.1.3. Expand the discussion of contaminant transport by comparing the types of contaminants found in the soils and the ground water to those found in sediments and surface water of Shipyard Creek and the wetlands. Is there any apparent correlation, especially any indication of an ongoing contaminant migration pathway? (This should be done for all SWMUs and AOCs and should also address sediment samples from migration pathways such as drainage ditches.)

Volume IIGENERAL

1. Page 6-1, Section 6.0. As mentioned above, an ecological risk assessment must be included for this zone.
2. Page 1-5, Section 1.2, of the Draft Final Zone J RFI Work Plan states that

Central to the Zone J investigative strategy is a phased approach to ecological data collection that will ultimately be used to determine if cause-effect relationships exist between onsite contaminant concentrations and observed impacts to biological components.

This raises an important issue. A zone-specific ecological risk assessment should be used to help determine whether sources at SWMUs/AOCs need to be remediated or contaminant migration pathways to Areas of Ecological Concern need to be cut off. If an ecological risk assessment is not generated for each zone and included within the RFI Report, decisions on the possible need for corrective measures within individual zones would have to be deferred until after the Zone J Baseline Risk Assessment is completed.

The Phase I (Preliminary Site Assessment) information should be provided in the ecological risk assessment section of the Draft Final RFI Report for each individual zone (e.g., Section 6 for Zone H). Although this Draft Final RFI Report for Zone H currently summarizes the Phase I information for Zone H in various sections, the information needs to be tied together with respect to data from the different SWMUs and AOCs. Also, some important information was left out. For example, it would help to include Figures 3-8, 3-9, and 3-10 of the Draft Final Zone J RFI Work Plan, since they show the relationship between the SWMUs/AOCs, the sampling locations, and the AECs. This should also be discussed in the text (e.g., samples collected at source areas and along possible contaminant migration pathways). The Draft Final Zone J RFI Work Plan mentions that part of AEC V-3 is included in Zone H, yet the Draft Final RFI Report for Zone H does not address that area. Table 3-2 of the Draft Final Zone J RFI Work Plan attempts to relate Zone H sediment contaminant concentrations to nearby SWMUs/AOCs for three different areas of ecological concern - headwaters of Shipyard Creek, intertidal wetlands, and palustrine forested wetland. This is a great step that needs to be taken further, by discussing possible contaminant migration pathways from the SWMUs/AOCs to those AECs and whether there appears to be a correlation between contaminants found at the SWMUs/AOCs

(i.e., in soils, ground water) and the AECs. A similar approach could be used for the other media. Soil data would be discussed in relation to possible exposure for terrestrial biota, if there are appropriate onsite or nearby habitats. The comparison of analytical data to media screening values or ecological toxicity benchmarks would be summarized, and the text would give a qualitative indication of the potential for ecological risk.

3. Page 1-11, third paragraph. It says:

A complete characterization of the site is needed to determine the nature and extent of contamination, identify migration pathways, identify actual and potential receptors, and evaluate the ecological and human health risks posed by the site.

Hazardous waste sites are never completely characterized. There is not enough time or money to do that. Rather sites are adequately or inadequately characterized depending on the uses the data will serve. EPA believes that the SWMUs and AOCs in Zone H have been adequately characterized to support risk assessments and remedial decisions. The risk assessors should consult *Guidance for Data Useability in Risk Assessment (Part A) Final*, OERR 9285.7-09A, April 1992 and *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA540-R-63-071.

4. Chapter 4 presented descriptions of the Nature of Contamination at the various SWMUs and AOCs in approximately numerical order. Chapter 6 presented the risk assessments for these sites in approximately but not quite the same order. The EPA reviewer read the portion of Chapter 4 that dealt with a given site first, then the appropriate portion of Chapter 6. When Chapter 6 was missing a risk assessment, it made the correspondence confusing and difficult.

For example, the risk assessments for AOCs 654, 659, 660 and 662 were grouped together with no explanation as to why. EPA considered that they might be co-located to form a single exposure unit. However, AOC 654 was geographically as far away from the other three as possible. It turns out they were grouped together because no COPCs were selected for any of them. A simple sentence in the text indicating the reason that these sites were assessed together would have helped.

5. The problems with the risk assessments in this RFI are sufficiently varied and multitudinous that EPA recommends they be completely redone.
6. The risk assessment appeared to be written as an after-thought to the RFI. It was patently clear that no senior

scientist had performed an internal review of the document before shipping it out for external review. There were a multitude of mistakes in the text and tables that someone who felt responsible for the document would have caught before it went out. One example of a mistake in the risk assessment - Table 6.2.2.4 showing COPC screening for groundwater at SWMU 13 was missing.

Another example occurs regarding dioxin sample numbers. The table below indicates the number of surface soil samples analyzed for dioxin as indicated at various locations in the document.

NUMBER OF DIOXIN SAMPLES IN SURFACE SOIL	Chapter 4 - Nature of Contamination	Chapter 6 - Risk Assessment	Appendix I - Validated Data
SWMU 13	8	7	3
SWMU 14	52	52	53
SWMU 17	11	10	3

EPA believes that the onus should be on Naval Base Charleston to ensure that projects of this importance be given the appropriate priority, resources, time, and attention to produce a quality product. This would facilitate the production of quality documents requiring less review effort and would ultimately save time. It is not appropriate to use EPA reviewers for quality control!

7. No risk assessment was performed for AOCs 649, 650 and 651 (grouped together in Chapter 4). PCBs, PAHs and mercury were above screening levels. No reason was given for the omission of these risk assessments.
8. The portion of the RFI that presents the sampling data seems adequate.

SPECIFIC

1. Page 6-1, Section 6.1.1. Guidelines were mentioned with the intention of listing them, but the list is missing.
2. Page 6-16, Table 6-1. The soil ingestion rates for the resident child and resident adult receptors are incorrect, apparently reversed. In addition, the rationale for the determination of the dermal contact area should be provided.
3. Page 6-24. The appropriate guidance for exposure to VOCs during showering is from EPA's Office of Research and

Development (ORD). A copy is enclosed. The reference for using 2 l/day ingestion-equivalents should be changed.

4. Page 6-26. The hierarchy of sources for toxicological values is as follows:

- 1) IRIS
- 2) HEAST
- 3) Values from ECAO/NCEA

The Region III Risk-Based Concentration Table is not an appropriate source for toxicity values.

5. Pages 6-30 - 6-31, Sections 6.1.6.1, 6.1.6.2, and 6.1.6.3. Titles are provided for the subsections but the narrative for those subsections is missing.
6. Page 6-32, Section 6.1.6.5. This section says in part:

In addition to the standard tabular presentation of risk and hazard, risk and hazard contour maps were plotted for applicable environmental media to provide a visual supplement. Maps were constructed for each SWMU/AOC and medium for which sufficient data were available to produce relevant contours. In cases where spatial sampling gaps exist or samples were too few, a narrative discussion of the extent of medium impacts is provided. ---

- Page 6-6, Section 6.1.2.3. This section says in part:

As part of each investigation, soil, groundwater, surface water, sediment and/or other environmental media samples were collected and analyzed to delineate the sources, nature, magnitude, and extent of any contamination associated with current or past site operations. The data used in the BRA for each SWMU or AOC were obtained from the results of the RFI and associated sampling activities. ---

This raises two points.

- a. One of the reasons for conducting the BRA (human health and ecological) concurrently with all of the sampling and analysis is to ensure that all data needed for the BRA is collected, i.e., Page 6-6, Section 6.1.2.3. Thus, sampling gaps and too few samples are not acceptable, i.e., Page 6-32, Section 6.1.6.5. above.
- b. The boundary of each hazardous waste site needs to be identified. This is foundational to the development of a Corrective Measures Study Work Plan.

See also Volume I, Specific Comment 10, above.

7. Page 6-35, Section 6.1.7.3. The statement is made that

An evaluation of the Zone H surface soil data determined that volatile organic compounds were not present.

Data to support this statement need to be presented and explained.

8. Page 6-42, Risk contour diagrams. These are presented without discussion. If the risk assessment were done correctly, they could provide valuable information. They should be explained.

9. Page 6-51, Section 6.2.1.5. Hazard indices are identified, but they are not explained. Tables present the risk and hazard of contamination, but they are not explained. This limits the utility of this information by non-toxicologists. This information needs to be explained in plain English.

10. Page 6-55, Section 6.2.1.4. The statement is made that

As previously mentioned Surfer[®] was used to contour the risk and/or hazard posed by COCs (where applicable). It was not possible to develop surface soil risk/hazard contours for SWMU 9 soils because the contours were generally flat (i.e., the maps would each be one single color).

SWMU 9 is one of the most important hazardous waste sites at Naval Base Charleston. Use of Surfer[®] was Naval Base Charleston's choice - not an EPA constraint. EPA does expect that some acceptable technique be used to graphically display the boundaries of SWMU 9 and the risks involved.

This statement is made in substance elsewhere in the Zone H RFI Report, and needs to be addressed there also.

11. Page 6-59, Section 6.2.1.4. The statement is made that

The risk/hazard posed by the remaining groups of compounds did not lend themselves to mapping, and these groups were not presented in map format.

Yet, no alternative narrative or visual information is provided, which is inconsistent with information provided on Page 6-32, Section 6.1.6.5.

12. Page 6-67, Section 6.2.2.3. The first two paragraphs on this page are the same as the information at the bottom of Page 6-64 and top of Page 6-65.
13. Page 6-180, Section 6.2.13.7. Mention is made of a list, but that list is missing from the Zone H RFI Report.
14. Page 7-16, Section 7.21. This section says in part:

During the construction of deep monitoring well NBCHGDH04D, which is located approximately 70 feet south of the intersection of Hobson Avenue and West Osprey Street, a piece of treated timber (possibly old piling) was removed from the borehole. Analytical results for the soil sample collected from this borehole reflected significant quantities of SVOCs. Additional soil samples collected in the vicinity of the borehole did not reflect the degree of contamination identified in the borehole. However, the soil samples were not collected at the same depth as the sample from the borehole.

This raises two points.

- a. This area has been reported to be a former waste disposal area similar to SWMU 9, containing construction debris, batteries, and a variety of other wastes. So, finding old piling here is no surprise.
 - b. Collecting additional samples under different conditions than those under which significant quantities of SVOCs were detected is totally unacceptable. The vicinity of the point where the SVOCs were detected must be re-sampled at the same depth as well as at higher and lower soil depths. The area must be adequately characterized.
15. Page 8-1, Section 8.0. Draft RCRA Facility Assessments are referenced, while it is the final RFAs that should be referenced.
 16. Prior to submission of this document, effort was expended by EPA, SCDHEC, Naval Base Charleston, and EnSafe to determine a method for comparison of levels of inorganic chemicals with background. EPA was presented a Technical Memorandum dated June 8, 1995, discussing the methods to be used. Briefly, the method consisted of two statistical tests - the tolerance interval test discussed in *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance*, EPA 1530-WS-89-026 and the Wilcoxon rank sum test discussed in *Statistical Methods for Environmental*

Pollution Monitoring, Gilbert, R.O. 1987. The last paragraph in this Technical Memorandum says in part:

and (3) the use of two complementary tests increases the likelihood that any contamination will be identified and addressed further, since a positive result from either test can trigger a detailed risk assessment.

This language is repeated in the *Zone H RFI Report*, Appendix Volume I, Appendix G.

Both the Technical Memorandum and Appendix G made very clear that both statistical tests would be applied for each inorganic chemical. If either test indicated that a chemical should be included as a COPC, it would be.

In Chapter 4 of the *Zone H RFI Report*, Nature of Contamination, the use of the tests was not discussed, but it appeared from the tables that only the tolerance interval test was used. However, in Chapter 6 of the *Zone H RFI Report*, the risk assessments, the Wilcoxon rank sum test was discussed in the text. In summary, the body of the document never made clear what was actually done with the two tests.

EPA's Toxicologist telephoned the Naval Base Charleston's contractor to ask about this and was told that the tolerance interval test was applied and, if a chemical was included as a COPC based on this, it was tested with the Wilcoxon rank sum test. Hence, the chemicals that were excluded based on the tolerance interval test were never checked with the Wilcoxon test. This is NOT the method presented in either the Technical Memorandum or Appendix G and agreed to by EPA.

In general, EPA Region IV prefers the use of the twice background criterion for determining if inorganic chemicals are present at levels above background. Briefly, this criterion states: inorganic chemicals should be selected for evaluation in the risk assessment if their maximum concentrations do exceed twice the average background levels for that medium. This is a conservative screen, appropriate to this stage in the risk assessment.

On Page 6-35 of the document, the text indicates that the Wilcoxon test was used as a "secondary" screen. To reiterate, this is not what EPA agreed to and is not in accord with the Technical Memorandum. EPA agreed to abandon use of the twice background criterion in favor of statistical evaluation of background based on the Technical Memorandum. EPA is very concerned that, after making a concession, the agreed-upon procedure was not followed.

Apparently, background comparisons were not performed for groundwater nor were background levels developed. This may be reasonable based on the fact that with the overall level of contamination at Naval Base Charleston surrounded by private sector hazardous waste sites, there may be no way to obtain groundwater samples representative of background. Background data is only important if it is used to eliminate chemicals as COPCs. However, what was done should be made clear in a document rather than leaving the reader guessing.

17. The selection procedure for COPCs in the risk assessments dealt with (1) carcinogenic PAHs and (2) chlorinated dibenzo-p-dioxins and chlorinated dibenzo-p-furans in an incorrect fashion.

Let us consider carcinogenic PAHs first. All the members of this chemical class are carcinogens of varying potency. All act via the same mechanism - the production of a diol epoxide by the Cytochrome P-450 enzyme system. Please see Casarett and Doull's *Toxicology, Fourth Edition*, Pages 175-176 for further information. Because of this similarity of mechanism, all cPAHs should be included as COPCs if there is indication that their additive levels might pose a concern.

The Toxicity Equivalence Factors (TEFs) of the cPAHs are used as multipliers for the concentrations (correctly done in the RFI) to arrive at Toxic Equivalents (TEQs) of benzo(a)pyrene. The values of the various TEFs reflect that particular cPAHs propensity to be metabolized by the Cytochrome P-450 system to a carcinogenic metabolite. Because all cPAHs have the same mechanism of toxicity, they should all be included in the risk assessment if the total TEQ of any cPAH (expressed as benzo(a)pyrene equivalents) is above the risk-based screening level in any sample.

In this regard, RAGS, Page 5-22 states:

...it may be useful to group data for such a class of chemicals (e.g., according to structure-activity relationships or other similarities) for consideration in later sections of the risk assessment. For example, the concentrations of only one group of chemicals (e.g., carcinogenic PAHs) would be considered rather than concentrations of each of the seven carcinogenic PAHs currently on the TCL.

EPA interprets this to mean that if one cPAH is selected as a COPC, then all cPAHs should be included.

Let us now consider dioxin. The term "dioxin" refers to 2,3,7,8-tetrachlorodibenzodioxin (TCDD) and its various

chlorinated congeners. TCDD is a potent animal carcinogen. It also appears to act as an endocrine disrupter. Presently, EPA believes that exposure to soils containing dioxin at greater than 1 ppb, when combined additively with dietary and other daily exposures, will pose an unacceptable risk to humans. The level of 1 ppb is considered protective based on a peer-reviewed scientific paper, Kimbrough RD, Falk H, Stehr P Fries G (1984) Health Implications of 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) Contamination of Residential Soil. *J. Tox. Env. Health* 14:47-93.

Dioxin exerts its effects by combining with the aryl hydrocarbon (AH) receptor on the surface of most cells in the body. The AH receptor normally combines with steroids and mediates their passage to the cell's nucleus where they exert effects on growth and development by activation of specific genes.

Like cPAHs, dioxin congeners have been assigned a TEF relating each to an equivalent concentration of 2,3,7,8-TCDD. The various TEF values reflect the AH receptor's affinity for the individual congeners. Similar to the cPAHs, dioxin congeners have a similar mechanism of toxicity and all detected congeners at a site should be selected as COPCs if a single one is selected.

18. EPA has prepared short summaries of the conditions at all the sites. If a site poses an unacceptable risk considering a hypothetical Industrial Use Scenario, it has been so indicated. EPA has also determined whether dioxin and its congeners are present at or above levels of concern. The risk assessments for dioxin were inadequate. Recall that the level of concern for dioxin in soil is 1 ppb TEQ based on the cleanup level at the Times Beach Superfund site.
19. The use of the term "ARARs." ARARs are promulgated values. This term is misused throughout the document. For example, on Page 6-63, the text refers to the "dioxin ARAR set by the USEPA (1.0 $\mu\text{g}/\text{Kg}$).". This level is NOT an ARAR. There is no soil ARAR for dioxin. Rather 1 $\mu\text{g}/\text{Kg}$ is the cleanup level used at the Times Beach Superfund Site. Please see the dioxin discussion above.
20. SWMU 9 (includes SWMUs 19, 20 and 121 and AOCs 649, 650 and 651)

SWMU 9 is a landfill. Shallow groundwater presents unacceptable risk to an occupational worker, primarily due to vinyl chloride.

Dioxin in groundwater is above the risk-based concentration about sixfold. It was not found in the trench soil samples.

This seems a curious situation. Dioxin is fairly insoluble so its presence in groundwater is disturbing. Therefore, the soil and groundwater must be resampled. (See also Volume I, General Comment 6, above.)

In the risk assessment, SWMU 19 (part of SWMU 9) was shown to have dioxin present in surface soils. However, nowhere in Chapter 4 of the *Zone H RFI Report, Nature and Extent of Contamination*, nor anywhere in the analytical data could these data be found.

The tables below are shaded in places to indicate possible media of concern.

SWMU 9		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	N	
Shallow Groundwater	Y, CR = 2×10^{-4} , HI = 18	Vinyl Chloride Benzene Hexachloropentadiene
Deep Groundwater	Y, HI = 20	Thallium
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin in groundwater	Y	0.0000017 - 0.0000025 $\mu\text{g}/\ell$
Dioxin in Surface Soil (SWMU 19)	N	0.0005 - 0.045
Dioxin in Surface Soil (SWMU 20)	N	0.0013 - 0.0062
Dioxin in Surface Soil (SWMU 121)	N	0.0013 - 0.194

21. SWMU 13

SWMU 13 is a fire training area. There were no chemicals present in either soil or groundwater above levels of concern.

SWMU 13		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	N	
Shallow Groundwater	N	
Deep Groundwater	N	
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin in Surface Soil	N	0.0005 - 0.43

22. SWMU 14

SWMU 14 includes SWMU 15 and AOCs 670 and 684 - a chemical disposal area, a former propane-fueled incinerator and three firing ranges. Heptachlor epoxide is present in 1 out of 5 wells in the deep aquifer. This single detect drives the risk at the site. Dioxin levels are not of concern.

SWMU 14		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	N	
Shallow Groundwater	N	
Deep Groundwater	Y, CR = 1×10^{-4} , HI = 3	Heptachlor epoxide
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin in Surface Soil	N	0.0008 - 0.022

23. SWMU 17

SWMU 17 resulted from a 14,000 gallon spill of diesel fuel. There are also PCBs reported in the soil.

SWMU 17		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	N	
Shallow Groundwater	Y, CR = 3×10^{-4}	1,4-Dichlorobenzene
Deep Groundwater	N	
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin	N	0.0009 - 0.13

24. SWMU 19

This risk assessment was combined with that for SWMU 9. The dioxin levels were not of concern.

25. SWMU 178

There were no risks at this site above levels of concern. In one sample, dioxin was present at 0.0003 ppb.

26. AOC 649, 650 and 651

This area was used for sandblasting and metal work. Risks at this site were not assessed. EPA has roughly estimated the total carcinogenic risk as 3.5×10^{-5} for a residential scenario; there would be less risk, of course, for an industrial scenario. Carcinogenic PAHs, PCBs and gamma-chlordane were present in soil at levels for which the risk should be assessed. Dioxin was present at levels from 0.0009 to 0.0083 ppb.

27. AOC 656 (Note: AOC 656 and Bldg. 656 are NOT the same.)

This was the site of a 1974 oil spill. Risks at this site were not assessed. Carcinogenic PAHs and gamma-chlordane were present in soil above risk-based screening levels, indicating the need for evaluation of risks. Dioxin was present in soil at levels from 0.001 to 0.0046 ppb. Dioxin was also present in groundwater at 0.0017 $\mu\text{g}/\ell$. Similar to

SWMU 9, additional soil and groundwater sampling are needed to determine the source of the dioxin in groundwater.

28. AOC 653

This site is near a hydraulic fluid storage tank suspected of leaking.

AOC 653		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	Y, CR = 3×10^{-4}	Dioxin, PCBs, cPAHs
Shallow Groundwater	N	
Deep Groundwater	N	
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin in soil	Y	unknown, may be greater than 1 ppb

EPA added up the dioxin levels from the various parts of the document and was unable to find agreement. The risk assessment (Chapter 6) claims that dioxin is present in soil at 4.4 ppb above the regulatory level of 1 ppb. EPA was unable to confirm this based on the discussion in Chapter 4 or the sampling data in Appendix I. There were different numbers of samples presented in different places in the document.

29. AOC 654

This area contains an abandoned septic tank. Raw sewage has been released in the past. There were no chemicals at this site above levels of concern. A risk assessment was not performed. Dioxin was present at 0.0007 ppb TEQ. This site should not present a concern.

30. AOC 655 (includes Building 656)

This is the site of a 1985 diesel fuel spill. Groundwater is the sole medium that poses a risk to the site worker. This sole risk driver is arsenic, and it is present below the MCL. Dioxin is present at 0.0013 TEQ in surface soil. This site should not present a concern.

The results of the indoor air risk assessment in the Focused Field Investigation (FFI) are discussed below. Based on data reported, Building 644 is the only building for which indoor air may be a concern.

31. AOC 659

This is the former location of an AST used to store diesel fuel until 1990. No COPCs were selected at this site, and there is no risk above levels of concern. Dioxin TEQ were 0.0007 ppb.

32. AOC 660

This is a pesticide mixing area associated with previous mosquito control efforts. No COPCs were selected at this site, and there is no risk above levels of concern. Dioxin TEQ were 0.0026 ppb.

33. AOC 662

This is the site of a former gas station. No COPCs were selected at this site, and there is no risk above levels of concern. Dioxin TEQ were 0.0007 ppb.

34. AOC 663 and SWMU 136

This is a diesel pumping station with USTs and satellite accumulation area. The risk assessment indicates that the current site worker is not at risk above levels of concern. Dioxin is present in both the soil and groundwater at the site but somehow managed to escape being in the risk assessment. Particular attention should be paid to this site to determine if extant levels of chemicals pose a concern. Dioxin was present in soil at 0.005 ppb and in groundwater at 0.0013 $\mu\text{g}/\ell$.

AOC 663 and SWMU 136		
	Unacceptable Risks in Industrial Scenario (Y/N)	Chemicals Driving the Risk
Soil	Possibly	cPAHs, PCBs, Arsenic, DDE
Groundwater	Possibly	Risk not assessed
	Above Levels of Concern (Y/N)	Total TEQ (ppb)
Dioxin in Groundwater	Y	0.00133 $\mu\text{g}/\text{l}$
Dioxin in Surface Soil	N	0.0005 - 0.43

35. AOC 665

This site was a shed used to store pyrotechnics until 1943. There is no risk at this site above levels of concern for the worker scenario. Dioxin was present in soil at 0.0006 ppb TEQ.

36. AOC 666

This site is a UST supplying a heating plant. The risks at this site were below levels of concern for the worker scenario. Vinyl chloride was present in the shallow aquifer, albeit at low levels (risk between 1E-05 and 1E-06). That vinyl chloride is present suggests a source of chlorinated solvents. However, chlorinated solvents (TCE, PCE, etc.) were not present in the soil. Dioxin was present in soil at 0.005 ppb TEQ.

37. AOC 667 and SWMU 138

This site is a vehicle maintenance building and attached oil water separator. SWMU 138 is the associated satellite accumulation area at which hazardous waste was stored in drums. There are no risks at this site above levels of concern for either the worker or residential scenarios. Dioxin was present in soil at 0.007 ppb TEQ.

General Comments, FOCUSED FIELD INVESTIGATION

1. AOC 655 contains building 656, the Base Exchange. EPA produced a memorandum dated September 23, 1994 regarding the need for additional air sampling within the building and a subsequent evaluation of risk. This memorandum and other

related memorandae were attached to the September 28, 1994, letter to Commander Naval Base Charleston; ATTN: Bobby Dearhart; SUBJ: Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plans.

The risk assessment for the indoor air in buildings 36, 643, 644, 656 and 657 were well done in contrast with the other risk assessments. The writing style was also different. EPA suggests that the individual who wrote this risk assessment be detailed as the internal reviewer for the other risk assessments prior to resubmission to EPA.

2. The oral RfD was used as a surrogate for the inhalation RfD for 1,2,4-trimethylbenzene. Attached is a document from EPA's National Center for Environmental Assessment giving a provisional RfC for 1,2,4-trimethylbenzene. This provisional RfC is $6E-03$ mg/m³. From this value, an inhalation RfD can be determined to be $1.7E-03$. Trimethylbenzene is the risk driver for building 644 and is above levels of concern for the current worker scenario. The correct toxicity value should definitely be used. Note that it will reduce the calculated HI at the site by a factor of approximately 10.

It is appropriate to use the oral SF for the inhalation SF in the case of 1,4-dichlorobenzene. Administration of 1,4-dichlorobenzene by gavage resulted in liver tumors in mice. Presumably, the chemical entered the general circulation via the oral route as it would via the inhalation route. EPA Region IV sanctions this route-to-route extrapolation as a conservative procedure.

All toxicity values had too many significant figures. The number of significant figures is a reflection of the confidence in the value.

3. On Page 5-64, it says:

Principle activities are centered around Zone H offices, classrooms and exchange, and the time of military service would not be expected to last 25 years.

It would be interesting to determine if current workers were at risk based on the subchronic toxicity values. Enclosed are issue papers giving provisional chronic values for benzene, chloroform and chloromethane where available and will forward these to Naval Base Charleston's contractor. The remaining subchronic RfDs are in HEAST. Naval Base Charleston's risk assessment contractor should make an effort to find out the reasonable maximum exposure duration

for a worker and, if this value is less than 7 years, use it in a risk evaluation with subchronic toxicity values.

4. The discussion of background presented on Page 5-62 of the Focused Field Investigation should be removed. It is a distraction, adding nothing to this document.

5. Page iii, Table of Contents.

- a. The footnotes are missing.

- b. Table 3-1 should be 3-11.

6. Page 3-4, Section 3.2.3. It says in part

--- Therefore, there were likely to be other sub-slab locations where VOC could reach higher concentrations. ---

EPA agrees with this; this is why a sufficient number of samples should be taken in these locations to determine these maximum concentrations.

7. Page 3-30, Section 3.2.3.7. This section says in part

--- The largest cracks, which were observed in the warehouse, are one-half inch in width and run north to south the length of the warehouse area. Inside the store, only minor cracking was observed with no cracks wide enough to permit SS_{int} to be collected. ---

Compared with Appendix A, it is apparent that some of the cracks present in December 1994, had been covered or sealed. Thus, the conditions monitored during Phase II of the Focused Field Investigation are different than those present during Phase I.

8. Page 3-32, Section 3.2.4. Subsequent to receipt of the Zone H Report, EPA requested additional information to clarify part of the Focused Field Investigation portion of the Zone H Report. This information was provided along with a letter dated August 28, 1995, from Matthew A. Hunt to Doyle T. Brittain. One of the questions raised concerned the representativeness of the sample in the Summa Canister to that in the air sampled. Specifically, how much sample was lost due to sorption/reaction in the sampling system (before it enters the Summa Canisters)? In the supplemental information, Attachment 3 provides the method used; Section 11.2.3 provides the procedure to determine sample representativeness; but the data have not been provided to answer this question. Questions not addressed by this (Quality Assurance and Quality Control) Section are:

- a. Were known concentrations of known contaminants introduced through the same length and type of sampling probe and regulator, and into a SUMMA Canister, and
- b. then were the contents of the SUMMA Canister sampled to determine percent sample recovery? If so, these data need to be presented and explained.

The statement is made that

The analytical laboratory had its own set of QA/QC procedures including sample spikes. The laboratory calibrated the gas chromatograph before and after sample analysis and computed percent recovery of known standards.

These laboratory procedures need to be provided just as has been done for the Comprehensive RFI Work Plan. The QA/QC validation information for these data need to be provided. See Volume I, General Comment 6, above.

9. Page 5-63, Section 5.6.4. The statement is made that
 - Considerable uncertainty (i.e., spanning perhaps orders of magnitude) exists with respect to the list of COPC and the resulting risk projections based on the DQO level of data collected and the number of chemicals eliminated or qualified as part of data validation. ---

Such uncertainty does not eliminate EPA's concern for the likelihood of subsoil gases migrating into buildings.
10. This Focused Field Investigation has been conducted in two phases (two separate sampling events). Yet, the fate and transport of soil gas in the vicinity of SWMU 9 has not been resolved. EPA recommends that the sampling effort be re-done by personnel with specialized air monitoring expertise.

APPENDIX VOLUME I - A THROUGH G

1. Why are all of the monitoring well logs stamped draft?

FINAL TECHNICAL MEMORANDUM PRELIMINARY RFI FIELD ACTIVITY SOIL-GAS AND GEOPHYSICS SURVEYS SWMU 9 AND SWMU 14

1. This appears to be a stand-alone document. How does the information generated during this investigation fit into the RFI? What use was made of the data generated during this investigation?