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FINAL RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION
REPORT ZONE H WORK PLAN RESPONSE TO COMMENTS CNC CHARLESTON SC
10/27/1994
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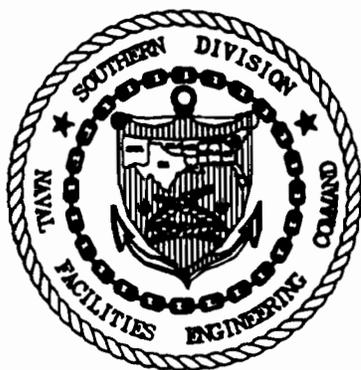
**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
NAVAL BASE CHARLESTON
CHARLESTON, SOUTH CAROLINA
CTO-029**

***FINAL RCRA FACILITY INVESTIGATION (RFI)
ZONE H WORK PLAN
RESPONSE TO COMMENTS***

Prepared for:

**DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA**

SOUTHDIV CONTRACT NUMBER: N62467-89-D-0318



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October 27, 1994

Release of this document requires the prior notification of the Commanding Officer of the Naval Base Charleston, Charleston, South Carolina.

**PART V
RCRA FACILITY
INVESTIGATION**

EPA COMMENTS

July 8, 1994, DRAFT
ZONE H RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
FACILITY INVESTIGATION (RFI) WORK PLAN, AND
JUNE 1994, DRAFT
FOCUSED FIELD INVESTIGATION (FFI) REPORT

BACKGROUND

Comment 1: Naval Base Charleston was issued a RCRA Permit, effective June 4, 1990. One of the conditions of the HSWA portion of the RCRA Permit is the requirement to conduct an RFI; one part of the RFI involves assessing the risk of contaminants to human health and the environment, i.e., conducting a risk assessment.

Response: The Navy agrees with this statement. The *Final Comprehensive RFI Work Plan* dated 30 August 1994 describes the overall strategy for conducting both the RFI and baseline risk assessment.

Comment 2: On August 9, 1994, EPA approved the Comprehensive RFI Work Plan for Naval Base Charleston with the agreement that separate zone specific RFI Work Plans would also be submitted to EPA for review and approval, according to the Corrective Action Management Plan (CAMP).

Response: The Navy agrees with this statement.

Comment 3: On November 24, 1993, I received a verbal complaint from an anonymous source regarding workers in the Base Exchange with adverse health effects potentially caused by the nearby landfills. I toured the area, interviewed some of the Base Exchange employees, and concluded that the complaint merited a thorough and expedient investigation.

I had input into the early stages of the development of a Focused Field Investigation (FFI) Work Plan. The original objective of the FFI was to determine what risk (if any) the landfills had on people living or working in their vicinity. The original strategy was: 1) to expedite the portion of the RFI which was scheduled to occur in that area anyway so the objective of the FFI could be expediently accomplished, and 2) so the information gathered in the FFI could fulfill some of the needs of the RFI (an issue of efficiency). I did not get the opportunity to review the FFI Work Plan before it was finalized on January 28, 1994, and distributed on February 7, 1994. Yet, the final FFI Work Plan prescribes, in general, activities which should allow the FFI objective to be accomplished.

Response: The first draft FFI "strategy" was presented for a collective review by Navy, USEPA, and Navy contractor personnel on 11 January 1994. The document was revised and resubmitted to USEPA for review on 12 January 1994. Changes made to the document between 12 January 1994 and preparation of the final strategy on 28 January were generally editorial in nature rather than technical. A revised strategy had been prepared and submitted as part of the Final Zone H RFI Work Plan. Revisions made to the strategy followed considerable negotiations with USEPA following a preliminary USEPA review of the Draft FFI Report, proposed revisions to the original strategy, and the Draft Final Zone H RFI Work Plan.

Comment 4: In June 1994, Naval Base Charleston released a draft FFI Report documenting the results of the FFI.

Response: The Navy agrees with this statement.

Comment 5: EPA has reviewed the June 1994, draft FFI Report and, in summary determined that the draft FFI Report:

- a. Does not indicate that the FFI Work Plan was followed in some places.
- b. Indicates that the FFI Work Plan was clearly not followed in some places.
- c. interprets some data generated incorrectly, and
- d. Draws conclusions with which EPA disagrees.

Response: The Draft Focused Field Investigation Report has not been submitted as an official document. Instead, the information obtained during this initial field work has been evaluated and condensed to information that is useable in pursuit of the original objective. The revised FFI strategy provides a mechanism for collecting the air quality data needed to determine if airborne concentrations of volatile or semivolatile contaminants are present in the breathing air zones within the buildings of interest. The risk to human health will be evaluated, using the latest version of Risk Assessment Guidance for Superfund (RAGS), based on the data collected. The source of the contaminant(s), if present, will be determined by additional air quality sampling in the void space created by soil subsidence created beneath the building.

Comment 6: The main justification for the FFI was to expediently address the health assessment concern of people living or working in the vicinity of the landfills several months before the RFI was scheduled to begin. However, the FFI did not expediently or effectively accomplish its intended objective. Negotiations are currently underway for approval of the Zone H RFI Work Plan. Most concerns about the Zone H RFI Work Plan (identified below) have already been resolved. Ironically, the FFI — an integral part of the RFI — is the major holdup for approval of the Zone H RFI Work Plan.

Response: As stated in response to Comment 3 above, the FFI has been revised per these negotiations. The FFI strategy, including an accelerated schedule for completion, has been

incorporated into the Final Zone H RFI Work Plan in order obtain the data necessary to fulfill the stated objective.

Comment 7: The July 8, 1994, Draft Zone H RFI Work Plan indicates that additional soil and groundwater samples will be taken, and then if necessary additional air samples will be taken. But, it does not fully and clearly indicate how the original FFI objective will be accomplished.

Many soil and groundwater samples have already been taken. Then air samples were taken. Now, more soil and groundwater samples are proposed. Then, if necessary, more air samples are proposed. EPA is concerned that there is no clear strategy for collecting enough of the right samples the first time, and there is no clear strategy for analyzing those samples and interpreting the data to accomplish the intended FFI objective. Rather, it appears to be "business as usual," i.e., to do sampling, to justify sampling, to justify sampling, ---. We need to become results oriented. We need to know what kind of samples are needed, where, how many, and under what conditions, and we then need to know what types of analyses will be performed on the data to accomplish the intended objective before any samples are taken.

Response: Refer to responses to Comments 3 and 6 above.

GENERAL

Comment 1: A legitimate concern has been verbally called to our attention regarding the potential for adverse health effects caused by the nearby landfills, a concern which merits expedited and serious attention.

Response: Refer to responses to Background Comments 3 and 6 above.

Comment 2: The FFI generated some useful information but did not accomplish its intended objective.

Response: Refer to the response to Background Comment 4 above.

Comment 3: The timing is such that we are overdue for accomplishing the objective of the FFI. This must not be further delayed.

Response: Refer to the response to Background Comment 6 above.

Comment 4: The timing is such that we are overdue for finalizing and approving the Zone H RFI Work Plan. But, since the FFI is an integral part of the RFI, the Zone H RFI Work Plan can not be approved apart from resolving the issues with the draft FFI Report.

Response: The Final Zone H RFI Work Plan has been approved.

Comment 5: The Zone H RFI Work Plan must include a strategy and expedited schedule for accomplishing the original FFI objective in concert with, and as an integral part of, the remainder of the Zone H RFI activities. The Zone H RFI activities and report must not delay the FFI activities and report. (See Condition II.G.1. in the HSWA portion of the RCRA Permit.)

Response: Refer to the response to Background Comment 6 above.

JUNE 1994, FOCUSED FIELD INVESTIGATION REPORT

Comment 1: Page 1 — The third sentence should read "--- areas of concern (AOCs) near the State ---."

Response: For the most part, responses to the comments specific to the FFI Report are not provided here since this document will be dramatically revised. It should be noted that all the specific comments along with the useable technical information provided in the Draft FFI Report were considered when the revised strategy was developed.

Comment 2: Page 3, second line — The word "building's" should be changed to "buildings'."

Response: Refer to the response to Comment 1.

Comment 3: Page 4, Section 3.0, Methodology

- a. A simplified diagram illustrating each method would be helpful.
- b. A section is needed in the Appendix which briefly explains the methods along with their strengths, weaknesses, collection efficiencies, and potential interferences. For example:
 1. The active sites on charcoal tend to be preferentially tied up with water when exposed to moisture thus reducing the collection efficiency of contaminants on the charcoal. Was humidity a factor in this sampling technique? Explain.
 2. While charcoal has good collection efficiency for some compounds, it does not have good collection efficiency for others. The collection efficiency of the charcoal needs to be identified for all potential contaminants.

3. It is difficult to completely desorb some compounds from charcoal. The method and efficiency of desorption need to be described.

There are two important points here:

1. Any contaminants identified by the charcoal method are actually present in the sampling environment in concentrations equal to or greater than those identified during the sample analyses.
 2. Any contaminants not identified by the charcoal method does not prove their absence from the sampling environment.
- c. Samples were collected in the soil around the buildings, and in the air "--- directly from partings in the buildings floors or walls ---," and at the breathing zone within the buildings. Mention is made of the existence of cavities underneath the buildings. However no mention is made of sampling the air in those cavities. This is a critical link between relating what is in the soil to what the people are breathing or could potentially breath. This information is critically needed.

Page 7 of the FFI Work Plan states that air samples will be collected at "Floor separations/penetrations --- with the objective of quantifying any sources of airborne contaminants within the buildings (sampling probes will be extended as far into the separation as practical and if possible, into any underlying voids)." It is not clear from the FFI Report that samples were collected in accordance with this part of the FFI Work Plan.

Response: The methodology used in passive soil gas sampling is a USEPA concern which has merited further discussion during revision of the FFI strategy. The method is acknowledged to be largely qualitative in nature and only somewhat quantitative in the respect that the measures of ion counts due correlate with concentrations of contaminants present. The reported ion counts values are used only to assess trends in data and are not to be construed as actual contaminant concentrations. The FFI strategy recognizes potential method interferences and limitations. Recognizing the limitations allows for appropriate use of the technique in providing focus for subsequent soil and groundwater sampling. The revised strategy addresses part C of this comment.

Comment 4: page 17, Section 4.1, Building Surveys

- a. The list of buildings with significant soil subsidence underneath their foundations s incomplete. For example, Building 655 (Base Commissary) is missing from the list; it should be included. This is a significant oversight.

- b. "The third major cause (responsible for subfloor-to-indoor air communication) is due to soil subsidence --" has two major categories.
1. Some of these buildings, e.g., Building 655 (Base Commissary), have had barriers constructed around the building between the foundation and the current ground surface which significantly limits the exchange of ambient air with air underneath the floor of the building.
 2. Some of the buildings, e.g., Building 656 (Base Exchange), have had barriers constructed part way around the building between the foundation and the current ground surface which partially limits the exchange of ambient air with air underneath the floor of the building.

In both cases, it does not "enhance the flow of air." On the contrary, it enhances the accumulation and concentration of gases (if any) emitted from the soil and limits their dispersion. For this reason, Comment 3.c. above is especially important.

Response: Refer to the response to Comment 1.

Comment 5: Page 7 of the FFI Work Plan states that "Personnel interviews in the study area will be conducted to determine any specific environmental or health concerns." The FFI Report is silent on this issue. Were the interviews conducted? If so, what were the results?

Response: Refer to the response to Comment 1.

Comment 6: Page 26 et. al. — Contaminants measured during this investigation have been compared to Occupational Safety and Health Administration (OSHA) and American Conference of Governmental Industrial Hygienists (ACGIH) standards. This may be appropriate for OSHA purposes but is not appropriate for EPA purposes. OSHA standards were written to protect the healthy worker in one environmental exposure scenario; EPA standards were written to protect the weaker, more sensitive persons in a different environmental exposure scenario. For EPA purposes, the risk of contaminants measured must be assessed using EPA approved guidance, e.g., Risk Assessment Guidance for Superfund.

Page 10 of the FFI Work Plan commits to performing a risk assessment for human health and the environment conforming to the Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Volume I, USEPA/540/1-89/002 and Environmental Evaluation Manual, Interim Final, Volume II, USEPA/540/1-89/001, December 1989 (RAGS). Further, it commits to a potential epidemiological study. These were not done. This is a significant deviation from the FFI Work Plan and a special concern to EPA.

Response: Refer to the response to Comment 1.

Comment 7: Page 26, third paragraph — It says:

Because methylene chloride was detected in 64 percent of the samples collected, an effort was made to identify potential sources of methylene chloride. Field personnel visually inspected materials that were stored and/or used in the areas where samples were collected. Also, field personnel reviewed the material safety data sheets (MSDS) for cleaning products used in the surveyed buildings. No potential source was found for methylene chloride, one of the most frequently used solvents in an organic chemistry laboratory. Although it was not detected in laboratory blank samples, it is possible that laboratory contamination played a role in the frequency of detection of this compound.

To put this paragraph into perspective, consider this paraphrased version:

An environmental investigation was conducted to determine the nature and extent of migration of soil-gas from two major landfills containing industrial wastes. Methylene chloride was found in 64 percent of the environmental samples, so an effort was made to identify its source. No potential source was found sometimes methylene chloride is a laboratory contaminant. However, no evidence was found of methylene chloride in the laboratory blank samples. Therefore, the methylene chloride in the environmental samples is a laboratory contaminant but not a landfill contaminant.

This paragraph is a serious concern to EPA.

- a. EPA is very concerned that the landfills were not identified as a potential source of the methylene chloride. Pending evidence to the contrary, EPA contends that the landfills are the likely source of the methylene chloride.
- b. EPA is very concerned that the speculation is made that the methylene chloride is a laboratory contaminant when the evidence indicates that it is not — without regard to the possibility that the investigation had accomplished its intended objective of identifying the migration of soil-gas from the landfills.

Response: Refer to the response to Comment 1.

Comment 8: Page 29, last paragraph — The first sentence says that carbon dioxide concentrations below 800 parts per million (PPM) are considered indicative of a well ventilated space. Carbon dioxide data are given for several buildings. All buildings except Building 202 have less than 800 PPM carbon dioxide; Building 202 has up to 1600 PPM of carbon dioxide. Then without explaining why, the conclusion is drawn that the results in the other areas are inconclusive and that there are insufficient data to determine whether these ventilation systems can adequately dilute/remove volatile compounds present in these areas. Then the FFI Report

dismisses the whole issue by saying: "However, this appears to be a minor point because --- very low concentrations of organic chemicals were detected."

- a. If a maximum of 800 PPM of carbon dioxide is considered indicative of a well ventilated space, and all of the spaces except Building 202 measured less than 800 PPM carbon dioxide, how can the data be inconclusive and insufficient? Was not the objective for collecting the data accomplished? Again, EPA is concerned that data are being collected which are not results oriented.
- b. EPA considers it to be a major point that people are exposed to even low concentrations of some chemicals, even in well ventilated areas. Again, EPA's Risk Assessment Guidance must be applied here.
- c. The primary objective of the FFI was to identify the risk of the soil-gas migration to people in the vicinity of the landfills (risk assessment) — not whether or not Naval base Charleston is adequately managing the exposure of people to these gases (risk management).

Response: Refer to the response to Comment 1.

Comment 9: Page 30, second paragraph — It identifies the presence of acetone, benzene, toluene, ethylbenzene/xylenes (BTEX), chloroform, dichlorobenzene (DCB), trichlorobenzene (TCB), oils, naphthalene, tetrachloroethene (PCE), and methylene chloride in the soil-gas. It concludes by saying that "These minimal responses will be treated as background until the confirmatory sampling of the anomously high response areas has been conducted." EPA seriously disagrees with this conclusion. Background is a complex issue to be determined and not an assumption to be made. Again, EPA's Risk Assessment Guidance must be applied here.

Response: Refer to the response to Comment 1.

Comment 10: Page 39, last sentence — If BTEX compounds "exhibit anomously high responses" under an impermeable cap such as asphalt, EPA contends that it is reasonable to consider that they might also exhibit anomously high responses in the cavities under buildings. This supports the need for collecting data in the cavities underneath foundations of the buildings with soil subsidence. See Comments 3.c. and 4.b. above. Better data interpretation is needed.

Response: Refer to the response to Comment 1.

Comment 11: Page 46, Conclusions, second paragraph — It says (Sentence numbers have been added by the EPA reviewer.):

1. No airborne concentrations of toxic chemicals were detected in the indoor air quality survey;
2. It appears that significant volatile organic chemical concentrations are not off-gassing into the building spaces surveyed.
3. Very low concentrations of organic compounds were detected in the buildings surveyed.
4. However, were chemicals to off-gas into these spaces, it is not conclusively known whether the ventilation systems in these buildings, as they are presently functioning, would adequately dilute/remove them.
 - a. Sentences 1 and 3 contradict each other.
 - b. Sentences 2 and 3 contradict each other.
 - c. Sentence 4 contradict the thesis presented in the last paragraph of Page 29. See Comment 8 above. In either case, the objective of this investigation was risk assessment — not risk management.

Response: Refer to the response to Comment 1.

Comment 12: Page 47, last paragraph — EPA disagrees that there is no imminent and substantial endangerment to workers due to air pathway contamination. The data are too fragmentary and the analyses too incomplete to support such a conclusion.

Response: Refer to the response to Comment 1.

Comment 13: Appendix A

- a. The columns need to be aligned.
- b. No mention is made of the space (if any) around where utilities enter/exit buildings, e.g., Building 655, or where the heating and air conditioning make-up air comes from.
- c. Building 656 (Base Exchange) — The survey summary says:
 1. "The air flow through these cracks is very noticeable, as is a musty odor, typical of any tight crawl space below a building. However, there are no gaseous vapors noticeable."

EPA disagrees. If the air flow (through the cracks in the floor) is very noticeable and has a must odor, then gaseous vapors obviously are noticeable.

2. "There is considerable air flow underneath the structure."

This conclusion should be clarified and its basis stated. If it means a good exchange of the air underneath the building with ambient air, EPA disagrees; if it means a good discharge of air into the building, EPA agrees.

Response: Refer to the response to Comment 1.

Comment 14: Appendix B — The title page has a place for the signature and date of the Manager of Environmental Operations but the signature is missing. The signature and date should be added.

Response: Refer to the response to Comment 1.

Comment 15: A bibliography should be added.

Response: Refer to the response to Comment 1.

Comment 16: For the purposes of the Zone H RFI, it can be concluded that:

- a. Buildings have been constructed top of ninety (90) years of fill material, and in close proximity to (if not on top of) landfills. The physical boundaries of those landfills are unknown.
- b. The rate and extent of migration of contaminants from those landfills is unknown.
- c. The source, transport, and fate of these anthropogenic compounds in the environment have not been fully characterized.
- d. Anthropogenic compounds are present in the soil-gas and in the air of buildings.
- e. Anthropogenic compounds are present in the soil-gas in elevated concentrations underneath an impermeable cap, thus indicating their movement through the environment.
- f. The exposure pathways of these anthropogenic compounds to people or the environment have not been fully characterized.
- g. People are breathing these anthropogenic compounds.

- h. The risk of these anthropogenic compounds to people has not been assessed according to EPA's Risk Assessment Guidance.

Response: Refer to the response to Comment 1.

RESPONSE TO EPA COMMENTS
Dated September 9, 1994

Doyle Brittain, Remedial Project Manager
U.S. Environmental Protection Agency

BACKGROUND and GENERAL

Response: To be made.

July 8, 1994, Zone H RFI Work Plan

Comment 1: Acronym List:

- a. AOC stands for Area of Concern.
- b. CFR stands for Code of Federal Regulations.
- c. Light Non-Aqueous Phase Liquid (LNAPL) should be added to the acronym list and investigated in the groundwater investigations along with the Dense Non-Aqueous Phase Liquid (DNAPL).
- d. PPE stands for Personal or Personnel Protective Equipment.
- e. ZHASP should be ZHHASP for Zone H Health and Safety Plan.
- f. VOA should be added to the acronym list. The Zone H RFI Work Plan needs to distinguish between VOC and VOA, and be consistent in their use throughout the Work Plan.

Response: Changes made as per comment. VOA and VOC are both currently used in the document in a consistent manner. The term VOA is used when a general reference is made to a laboratory analysis for volatile organics. The term VOC is used when a general reference is made to one or more of the volatile compounds which make up the VOA analyte list.

Comment 2: Page i, Table of Contents — Sections 4.14 - 4.23 are general and apply to all Zones. Therefore, they should be included in the Comprehensive RFI Work Plan. The purpose of the Comprehensive RFI Work Plan is to consolidate in one place all information which applies to two or more Zones. Each Zone Specific RFI Work Plan should contain only information unique to that Zone. It is a waste of time and money to include, and expect people to review, the same information in two or more Zone Specific RFI Work Plans.

Response: While these sections are of a general nature, the text is intended to supplement the site specific health and safety information presented in the zone plans. E/A&H places a premium on the safety of employees conducting the investigation and is of the opinion that employees should not have to seek a second document in a compromising situation. The cost associated with the minimal amount of time necessary to review this section of the work plan should in no way be construed as a waste or more important than the welfare of the site workers.

Comment 3: Page iv, List of Figures.

- a. Include Figures 2, 5-1 and 10. Check to ensure others have not also been inadvertently omitted.
- b. Figure 4-1 — Change Fuel to Full.

Response: The table of contents has been revised accordingly.

Comment 4: Page 1-1, Section 1.1, Geologic and Hydrogeologic Information — add a short section here which describes changes in this part of NAVBASE since 1902, i.e., it was a marsh which has been filled in with a wide variety of known and unknown materials, and subsequently has been developed for other uses. Include a map to show the fill area.

Response: Section 1-1 has been revised to include a narrative and a map which both describe and illustrate the filling activities.

Comment 5: Page 2-1, Section 2.0.

- a. The date of the Comprehensive Project Management Plan has changed.
- b. The investigative strategy and the Comprehensive Project Management Plan are based on the RCRA Facility Assessment.
- c. A specific investigatory approach has been identified for each Solid Waste Management Unit (SWMU) and Area of Concern (AOC); this is appropriate based on the best information available at this time. However, it must be recognized that the southern one-third of NAVBASE is fill material, some investigation is needed throughout the fill area to ensure that the SWMUs and AOCs are not simply active portions at one point in time of a much larger landfill and that other SWMUs and AOCs are not in other parts of the fill area. This sampling should be performed as a part of the grid based sampling described in Section 3.0.
- d. Previous investigations provided a lot of information. In the absence of their being collected according to an EPA and/or South Carolina Department of Health and Environmental Control (SCDHEC) approved RFI Work Plan, EPA considers the data as acceptable for Data Quality Objective (DQO) Level 1 or 2 (acceptable for screening purposes). However, if sufficient information can be provided to EPA to validate the data, EPA will evaluate the data for possible consideration as DQO Level 3 or 4 (acceptable for decision making purposes). Pending data validation, EPA requires that sufficient DQO Level 3 or 4 data be collected for decision making purposes.

Response:

- a. Section 6 which lists the reference documents has been revised to include the correct date.
- b. The revised text in Section 2.0 acknowledges that the investigatory approach is based on the RFA.
- c. Section 2.0 is intended to discuss SWMU and AOC specific concerns. Section 3 addresses additional concerns posed by the fill area and a grid based sampling approach.

- d. The Navy acknowledges the potential limitations of the data collected prior to submittal of the Final Comprehensive RFI Work Plan. However, as previously discussed, the Navy intends to submit this data to EPA and SCDHEC for validation.

Comment 6: Page 2-1, Table 2.1 — Potential pathways identified for SWMU 9 are Soil, Sediment, Soil Gas, Surface Water, and Groundwater. Yet, some of these potential pathways are missing from other SWMUs and AOCs without strong justification. Unless there is strong, clear justification, each of these potential pathways should be investigated in conjunction with all SWMUs and AOCs. Ambient air must also be investigated unless there is good justification to the contrary.

Response: The Navy believes the text has been revised so that the reader can follow the logic used in determining which pathways warrant consideration given based on the site operations, materials used, and potential migration pathways.

Comment 7: Page 2-3, Section 2.1.1 — Information is needed which clearly and concisely summarizes what has been determined during previous investigations. Sufficient information should be provided to lead the reader to independently recognize the data gaps. This should be followed by the section which summarizes the data gaps.

Response: Information on previous investigations is summarized in a table specific for this information (Table 2-2 for this section) throughout the document.

Comment 8: Page 2-5, Section 2.1.3.

- a. LNAPLs should be investigated along with DNAPLs.
- b. Data need to be collected and an analysis performed to determine the correlation of contamination in the soil, sediment, soil gas, ambient air, surface water, and groundwater.

Response:

- a. Change made as per comment.
- b. This comment implies that data analysis techniques, in this case a correlational analysis, should be identified before data collection in the Zone H Work Plan. It is felt that any statistical analysis undertaken should be problem specific and based upon a need in risk assessment or determination of corrective measures, and that it is inappropriate to choose a data analysis methodology *a priori*. Characterization of all pathways within Zone H will be completed within the Zone H RFI Report, and characterization of all pathways throughout the base in the Final RFI Report.

Comment 9: Page 2-6, Section 2.1.4.

- a. Gases is misspelled.
- b. A change in philosophical approach is needed. This section, and similar sections throughout the Work Plan, assume:
 - 1) There is sufficient information to demonstrate that there is no risk to personnel performing "daily occupational activities and some recreational activities such as jogging and softball."
 - 2) Land use will remain unchanged.
 - 3) Exposure will be to only those workers who perform invasive activities, i.e., healthy personnel who have been medically monitored for job related fitness, who have personal protective equipment (PPE), and who have some knowledge of the contaminants present and the risks they pose.

EPA disagrees with this philosophy

- a. Data must be generated to demonstrate there is no unacceptable risk to the weaker and more sensitive personnel who could potentially be exposed to contaminants in the area, both inclusive and exclusive of invasive activities.
- b. Land use will change. The RFI must identify what contaminants are present, their sources, the horizontal and vertical extent of contamination, their rates and paths of migration, their potential receptors (not limited to current NAVBASE personnel), and the risk they pose to those receptors.
- c. As mentioned in a and b immediately above, the risks to potential receptors must be determined, including but not limited to NAVBASE personnel, in the soil, sediment, soil gas, ambient air, surface water, and groundwater.

Response:

- a. The word gases is not included in the revised text.
- b. Section 2.1.4 has been revised to basically state that all current and future users of the site are potential receptors. Additionally, the text mentions an equal concern for ecological which may be present.

Comment 10: Page 2-6, Section 2.1.5, Objectives — The first sentence should read "--vertical extent and rate of migration of any ---." This same change should be made in the Objectives Section for each of the other SWMUs and AOCs.

Response: The text has been revised accordingly where applicable. At the sites where only a CSI has been the proposed the text more appropriately states that the primary objective is to identify whether or not a release has even occurred.

Comment 11: Page 2-11, Section 2.2.7 — Line 6 should read "In addition, there are two ---."

Response: Change made as per comment.

Comment 12: Page 2-15, Table 2.6 — Information in each of the SWMU and AOC Site Description Tables must completely and accurately summarize the information in the RCRA Facility Assessment (RFA). For SWMU 14, this would include the chemical warfare decontaminating agents as well as all types of industrial wastes including "Asbestos, varnish sludge, mercury, electroplating wastes, paint wastes, PCBs, medical waste." See page 4-7, Section 4.5.

Response: The information in the site description tables for all sites was derived from the RFA and preliminary field activities where applicable. For SWMU 14, none of the materials listed above are referenced in the RFA or in any of the materials researched during the RFA or EBS. If the EPA is aware of another source of information that specifically states those materials are or were present the Navy would like to request that the source be identified.

Comment 13: Page 2-15, Table 2.6 — For AOC 670, brass should be added.

Response: Change made as per comment.

Comment 14: Page 2-20, Section 2.3.4 — Gases is misspelled.

Response: The word gases is no longer used in the revised text.

Comment 15: Page 2-20, Section 2.3.5 — Line 3 should read "--- industrial chemical wastes and chemical warfare decontaminating agents."

Response: Change made as per comment.

Comment 16: Page 2-21, Section 2.3.7, Line 10 — Water is misspelled.

Response: Change made as per comment.

Comment 17: Page 4-31 - 4-51 — This section belongs in the Comprehensive RFI Work Plan.

Response: See response to Comment 2 above.

Comment 18: Page 6-1 — Update the information for items 2-5. Items 6 and 7 should be identified as drafts.

Response: Change made as per comment.

Comment 19: Appendix A — The Investigative Approach approved by EPA is identified in the RFA. The information contained herein is dependent upon that information.

Response: The following note was attached to the Appendix A title page
Source: EnSafe/Allen & Hoshall. June 13, 1994. Draft RCRA Facility Assessment for Naval Base Charleston, Volumes I and II.

Comment 20: Appendix B, Figure 2 — It lacks recognizable landmarks which limits its usefulness.

Response: Since this drawing was produced by a subcontractor and E/A&H does not have the AUTOCAD file, it cannot be changed. However, E/A&H shall use Kroy or a similar lettering system to stencil building numbers on those buildings which appear in the Figure in order to assist the reader orienting the drawing.

Comment 21: Appendix E — It must be stated in the introduction that the presumptive remedies identified here are strictly for preliminary evaluation leading to a Corrective Measures Study where tentative presumptive remedies will be identified.

Response: Similar language has been included on the cover page for Appendix E.

Joe Bowers, Hydrogeologist
South Carolina Department of Health and Environmental Control

Comment 1: In work plans, reports, correspondence, etc., when listing SWMUs and AOCs, SWMUs should be listed first, followed by AOCs. Numbers should proceed from lowest to highest. Also, due to the large number of SWMUs and AOCs, it is suggested that SWMUs and AOCs be referred to by both the SWMU/AOC number, followed by its description. For example, SWMU 94 would be referred to as *SWMU 94 (Building 13 SAA #45)*. Referring to SWMUs and AOCs using both the number and a description should reduce the chances of inadvertently referring to the incorrect site.

Response: The document is currently structured (from lowest number to highest number) by SMWUs requiring RFI, the AOCs requiring RFI, then the same order for sites requiring CSI. The idea was to present the sites in an order relating to the degree of information known about the sites. To facilitated location of sites within the document, and to provide a quick cross reference from site number to location or identification, Table A in Appendix A has been provided for this purpose. The structure of remaining zone documents will be examined to improve the order of presentation if this approach is unworkable.

Comment 2:The names of the SWMUs and AOCs should be included along with the numbers in the tables of site descriptions contained in the work plan.

Response: Change made as per comment.

Comment 3:Many comments which are specific to SWMUs 1 through 36 have been generated from review of previous versions of the RFI work plan. NAVBASE should refer to these comments to insure that the concerns raised are properly addressed in this zone specific work plan, as well as in subsequent zone-specific work plans.

Response: Many of the previous work plan comments have been incorporated in the current Zone H Work Plan and are being reviewed for their relevance to the current document and to insure their inclusion into the additional zone specific work plans.

Comment 4: Figures in the work plan should be revised to indicate the approximate boundaries of SWMUs and AOCs. Also, the SWMU/AOC names on the figures should be highlighted, or somehow made to stand out more. They are difficult to locate on some figures.

Response: Figures have been revised per this comment to show the approximate site boundaries.

Comment 5: The work plan notes in Section 2.5.7 (Sampling and Analysis Plan) in discussing AOC 503 (Unexploded Ordnance Site South of Building 665) that a subcontractor will be hired to locate the ordnance and to deal with it appropriately when found. Since unexploded ordnance is suspected to be located in four other locations at the base (AOCs 500, 501, and 502), it may be advisable to have the subcontractor search for all other known unexploded ordnance, including those within other zones.

Response: The Navy agrees to investigation of UXOs concurrently and has entered into discussion with Navy EOD teams to locate and remove ordnance at the four sites in question. Additionally, areas which have a high probability of containing unknown UXO, such as areas where ordnance was known to be stored or handled, will be investigated via geophysical techniques in addition and prior to soil and groundwater sampling to determine presence/absence. These investigations will be done by experienced environmental personnel.

Comment 6: The Presumptive Remedies information included in Appendix E should be summarized in a section in the text. As it is now, the paragraph describing Presumptive Remedies is too cryptic, and is of limited usefulness.

Response: The term presumptive remedies has now been replaced with the term treatment alternatives which more appropriately describes the information presented. The identification of treatment alternatives at the beginning of the investigation was requested by EPA and is valid provided sufficient information is known about the site to predict the probable contaminants and the physical setting. For those sites where little or no information exists, treatment alternatives have not been specified at this time.

Comment 7: The north arrows on the page sized figures included in the work plan do not point in the same direction as the north arrow on the large scale maps provided in the work plan. For example, compare the north arrow on Figure 2-7 (SWMU #17 Previous Sample Locations) with the north arrow on Figure 3-1 (Grid Sample Location Map — Zone H).

Response: Changes made as per comment.

Comment 8: The text of the work plan states on page 2-11 that actual soil boring and monitoring well locations will be dependent on the ability to access a site and the location of utilities. I agree that the locations of utilities will in some circumstances influence the locations at which samples can be collected. In an effort to speed the assessment process, the Department is willing to allow NAVBASE discretion in choosing supplementary sampling locations, in addition to the minimum number proposed in the zone-specific work plans. However, NAVBASE must be aware that the sampling locations that are chosen must, ultimately, be acceptable to the Department and to the EPA.

Response: The sampling locations shown have been selected based on both site contaminant and geologic/hydrogeologic conditions. The locations will be modified or supplemented as necessary during field work based upon information on subsurface conditions, such as the presence of subsurface utilities, discovered through geophysical means or during the actual execution of field tasks. The distances involved in sampling location changes for avoidance of subsurface interferences should be relatively small, and should prove to be inconsequential to the overall site characterization. Where possible, these changes will be noted and the SCDHEC and EPA made aware of the circumstances necessitating the changes.

Comment 9: Is it necessary to have the potential receptors section in the zone-specific work plan? These receptors will be assessed in the Baseline Risk Assessment. If this section is kept in the zone-specific work plans, then it needs to be complete and accurate.

Response: The potential receptors identified in the BRA are base-wide, and there is a need to identify out of the whole list which of the possible pathways might be impacted by a particular SWMU or AOC to guide data collection efforts. The potential receptor section has been rewritten (see comment 1.1.10), to address this comment.

Comment 10: According to the RFA Report dated June 13, 1994, AOC 669 (Building 1888 Indoor Pistol Range) is recommended for No Further Investigation. Apparently, this is incorrect since AOC 669 is included in the work plan. Thus, assuming AOC 669 requires investigation, then it should be included in Table A.2 (Zone H AOC Summary) of this work plan.

Response: AOC 669 has been revised to receive a CSI designation. This will be included in the Final RFA.

Comment 11: The RFA Report dated June 13, 1994 states in Table 1.1 that SWMU 124 (Bldg. 1508 SAA #60) will be investigated along with AOC 653 (Building 1508 MWR Hobby Shop). However, SWMU 124 is not included in this work plan. SWMU 124 should be included in the Zone H work plan.

Response: SWMU 124 is an SAA located in close proximity to the automobile lift at the hobby shop. This area is used in a large part for automotive oil changes and general maintenance work and has been the victim of poor housekeeping. The poor conditions noted at the SWMU location are due to releases related to AOC 653 activities, rather than SWMU 124 releases (none of which are known to have occurred). It was suggested during the site visit of NFI sites that this SWMU be accepted as NFI provided the AOC investigation area included the area where the SWMU was located. Understanding that due to the site classifications it appears we are proposing less of an investigation on a site that by definition had an apparent release, it must be understood that all SAA's were listed as SWMUs regardless of site history. The investigation of the AOC 653 will include investigation of SWMU 124 area. The RFA should be revised to reflect this approach.

Comment 12: Justification is provided for the proposed sampling locations in some sections of the text but not in others. This justification should be provided in each Sampling and Analysis section of the work plan. This justification should include:

- A. The type of samples (sediment, soil, monitoring well, etc.) to be collected and why.
- B. The number of sampling locations chosen and how this number was determined.
- C. Why the particular sample locations were chosen, and a description of the thought process that went into choosing the locations.
- D. The analyses to be performed and why. Justification should be provided for exclusion of parameters.

Response: Sampling and Analysis Plan text **has been** revised where this justification was not provided.

Comment 13: The symbol on Figure 1-1 (SWMU/AOC Location Map) for AOC 503 (UXO South of Building 665) is wrong. This AOC requires a Confirmatory Sampling Investigation (CSI); the symbol on the map is a circle, which according to the legend represents No Further Investigation (NFI).

Response: Change made as per comment.

Comment 14: This sentence appears on page 2-6, Section 2.1.4 (Potential Receptors): "There is no reason to suspect human exposure would extend beyond site workers since there are no known users of shallow groundwater at NAVBASE." This sentence may be misleading since this exposure scenario will be considered during the baseline risk assessment.

Response: This sentence was removed as all Potential Receptor sections have been rewritten.

Comment 15: This sentence appears under the "Data Gaps" sections of the work plan: "There are no available measures of potential contaminants or their concentrations." What does this sentence mean? It needs to be clarified.

Response: The words "measures of potential" have been replaced with "measurements of the presence of".

Specific Comments

Section 2.1 — SWMU 9, Closed Landfill (Includes SWMUs 19, 20, 121, and AOCs 649, 650, and 654).

Comment 16: Some the symbols used on Figure 2-2 — Proposed Sampling Locations for SWMU 9 are not explained in the legend.

Response: Change made as per comment.

Comment 17: Collection of soil samples from 24 locations at SWMU 9 (Closed Landfill) appears insufficient. There are too many SWMUs and too much area to cover with only 24 locations.

Response: The methodology governing the sampling effort in relation to the landfill is to define the perimeter for purposes of containment (i.e. the presumptive remedy for installation of an impermeable cap). Previous sampling efforts have already identified a broad range of COPCs and additional sampling within the landfill would probably be of limited use with one exception. Groundwater sampling may identify offsite migration which may require location and removal of individual hot spots. In this case, groundwater data will be used to locate probable hot spots and additional soil samples will be collected.

Section 2.2 — SWMU 13, Current Fire Fighting Training Area.

Comment 18: Figure 2-3 (SWMU 13 and AOC 658 Proposed Sample Locations) indicates the proposed sampling locations for SWMU 13 and AOC 658. According to the RFA Report dated June 13, 1994, AOC 658 (Building 203 Gas Storage) requires NFI. If AOC 658 requires NFI, then it shouldn't appear on this figure. Additional soil samples should be proposed.

Response: Reference to AOC 658 has been removed from Figure 2-3.

Comment 19: Tables 2.5 (SWMU 13 Sampling Plan) and 2.6 (SWMU 13 and Associated Sites Site Descriptions) should be exchanged with one another, so that the site description appears before the proposed sampling strategy in the work plan.

Response: Table 2-6 refers to SWMU 14. Introductory material has been added to avoid confusion.

Section 2.3 — SWMU 14, Chemical Disposal Area (Includes SWMU 15, AOCs 684, 670, and 669)

Comment 20: Several comments have been generated from review of the proposed investigation of SWMU 14 (Chemical Disposal Area)

- A. "SWMU 14" should appear in parenthesis below the description of "General Area of Abandoned Subsurface Chemical Disposal Area". The SWMU or AOC numbers appear on the other areas depicted in this figure, but not for SWMU 14.

Response: Figure heading now reads: "General Area of SWMU 14 - Abandoned Subsurface Chemical Disposal Area"

- B. The text of the work plan in Section 2.3 (SWMU 14 Chemical Disposal Area, including SWMU 15, AOCs 669, 670, and 684) does not include verbiage justifying the concentrated Appendix IX sampling locations. Are these Appendix IX samples being collected in the suspected area of SWMU 14 (chemical disposal area)? If the location of SWMU 14 is truly unknown, then the spacing of the Appendix IX samples should be expanded to cover the entire area in which SWMU 14 may be located.

Response: This grid was located because the high number of geophysical targets in this area made it the most probable candidate. The figure which locates the geophysical targets has been revised to the same scale as the proposed sampling location figure. The figure also references as the proposed sampling locations. Reference to these geophysical targets is included in the text for 2.3.7.

- C. Four wells should be installed at the Chemical Disposal Area, instead of the proposed three. This are requires sufficient coverage with monitoring wells, particularly since it is suspected of being one of the more serious SWMUs at NAVBASE.

Response: After further discussion with SCDHEC, a total of five shallow/deep well pairs shall be located relative to previously identified targets with one pair located upgradient.

- D. Why is the number 38 located above the scale? What is its significance?

Response: The number appeared on the base map from which all the CAD drawings are being generated and is not related to the RFI. As a result the number was removed.

Section 2.4 — SWMU 17, Oil Spill Area

Comment 21: There is no legend on Figure 2-7 (SWMU #17 Proposed Sample Locations). Where exactly is SWMU 17 on this figure? Where did the spill occur? Where were the previous samples collected?

Response: The oil spill called SWMU 17 occurred underneath the building and cannot be precisely located. The exact location will be determined during the investigation. Sampling points on Figure 2-7 are from a previous sampling effort.

Comment 22: The work plan notes that there is a potential for this SWMU to discharge to the Cooper River via a storm drain beneath Building FBM 61. Thus, this storm drain should be sampled as part of this investigation.

Response: Sampling at the outfall of the storm drain will be conducted. As noted previously, the Zone J investigation will fully consider impacts to the Cooper River, and sampling at this outfall will be included in this investigation.

Section 2.6 — AOC 653, Hobby Shop

Comment 23: The work plan is unclear exactly why this AOC is being investigated. Is it due to suspected releases from the hydraulic tank located on the east side of the building, or from other releases?

Response: Known leakage from a hydraulic tank is a major reason for investigation of this site. Clarification was added to the Work Plan in Section 2.6.1.

Comment 24: Table 2.13 (AOC 653 Site Description) states that various paints, solvents, thinners and petroleum products have been used and stored at the site. Is this relevant to the planned investigation? If so, then this relevancy should be explained in the work plan.

Response: This list is meant to imply that other contaminants may be present besides the hydraulic oil. Samples will be analyzed for a wide variety of contaminants, and high levels of a chemical associated with these materials might be a signature contaminant from an as yet undetected point source from AOC 653. Clarification was added to Section 2.6.1 and Table 2.15 (previously 2.13).

Comment 25: Table 2.15 (AOC 653 Sampling Plan) indicates that one monitoring well will be installed at this AOC. Figure 2-9 (AOC 653 Proposed Sample Locations) indicates two monitoring wells will be installed. Which is correct?

Response: Figure 2-9 is correct. Table 2.15 has been changed.

Comment 26: Section 2.6.4 First sentence. There are no other associated sites with AOC 653.

Response: This sentence was removed.

Section 2.7 — AOC 656, Between Buildings 602 and NS-71 and AOC 655 behind the Navy Exchange

Comment 27: The text is vague regarding the proposed work at AOCs 655 and 656. Apparently, Buildings 71 and 602 contain boiler rooms, which adds to the confusion. The text should be revised to indicate clearly which area is being discussed, and the number and type of samples planned for collection at each AOC.

Response: Figure 2.10 was in error, failing to distinguish AOC 655/656. In addition, the text did not mention the number of AOC 655 in Section 2.7.7. These changes should clarify this discussion. Text was added to 2.7.7 regarding sampling locations.

Comment 28: The text is unclear as to how many monitoring wells will be installed at what I assume is AOC 655 (near Building 656). In Section 2.7.7 (Sampling and Analysis Plan), the text states "Two soil borings will be constructed outside of Building 656 and converted into monitoring wells." Figure 2-10 (AOC 655/656 Proposed Sample Locations) indicates that three monitoring wells will be installed near Building 656.

Further, Table 2.18 (AOC 655 and AOC 656 Sampling Plan) indicates three wells will be installed around AOC 656. However, Figure 2-10 (AOC 655/656 Proposed Sample Locations) indicates only two monitoring wells will be installed. Which is correct?

Response: Figure 2-10 is in error. AOC 655 is near Building 656. AOC 656 is near Building 602. Three monitoring wells will be located at each AOC, as indicated in Table 2.18. Text and figures will be changed to be consistent with this table.

Comment 29: Both AOCs are labeled as AOC 656 in Figure 2-10 (AOC 655/656 Proposed Sample Locations). Further, the outline of Building 656 is undiscernible in this figure. This figure should be revised to clearly indicate the outline of Building 656.

Response: AOC 655 appears on the left of this figure but is mismarked. The scale necessary to show both AOCs left Building 656 incomplete on the drawing. It takes up the center portion of the figure.

Section 2.8 — AOC 662, Former Gas Station

Comment 30: Where is AOC 662 in Figure 2-11 (AOC 662 Proposed Sample Locations)? Where are the suspected locations of the USTs?

Response: This figure will be clarified in the final document.

Section 2.10 — AOC 667, Vehicle Maintenance (Includes SWMU 138)

Comment 31: The work "separator" is misspelled in Figure 2-13 (AOC 667 and SWMU 138 Proposed Sample Locations).

Response: Change made as per comment.

Section 2.11 — Other Sites Designated CSI (Includes AOCs 659, 660, 661, 665, 666, and SWMU 178)

Comment 32: There is no figure for AOC 661 (Explosives Storage south of Building 601) indicating sampling locations.

Response: AOC 661 is to be investigated by an EOD subcontractor in order to confirm/deny the presence of ordnance and if necessary facilitate removal. A figure indicating it's approximate location will be included in the final document.

Comment 33: Table 2.25 (Site Descriptions) notes that three USTs have been reported at AOC 665 (Building 159 Pyrotechnic Storage), but their location and status are unknown. The work plan does not propose measures to locate these USTs. These USTs should be located and properly assessed. The work plan should be revised accordingly.

Response: Review of the RFA (June 13, 1994) revealed no reference to UST's; therefore, reference to USTs at AOC 665 has been deleted from Table 2.26 (formerly Table 2.25).

Comment 34: Where is AOC 666 in Figure 2-17?

Response: AOC 666 is the same as NS 45 in this figure. This will be marked in final figures.

Comment 35: There is no legend on Figure 2-18 (SWMU 178 Proposed Sample Locations).

Response: This will be included in final figures.

Section 3.0 Systematic (Grid Based) Sampling Plan

Comment 36: This section proposes to collect groundwater samples from the grid wells for one quarter only. Groundwater samples should be collected from grid wells for one year, to establish a data base. Further, collection of water levels over this period will determine if there are seasonal fluctuations in groundwater flow directions at the base.

Response: This wording was inadvertently included from a previous version. This sentence should be the same as in all other tables: "Sampling of groundwater monitoring wells will be conducted on a quarterly basis." Actual number of times a well will be sampled is unknown at this point of the investigation. There are many reasons for the grid based monitoring wells, and the number of samples taken from them will depend upon what is found in them. It is unlikely that any of these wells will be used as background wells as they are downgradient from a major landfill. They will be used to ensure that any unknown point sources that have caused major groundwater contamination are detected. They will help detect extent of contamination if signature contaminants are identified in a grid based well that are associated with a particular SWMU/AOC. They may help detect rate of migration. Wells that have no contamination will help pinpoint possible extent of migration of contaminants. Therefore there is no way to know the number of times that a particular well will be sampled. Any wells that are used for background will be sampled quarterly for a year. Uses of the grid based wells has been clarified in the text in a similar manner to the above, and as mentioned in the following comment.

Comment 37: It is unclear in the work plan how the groundwater data from grid monitoring wells will be utilized. Are all of the analytical results from all grid wells going to be combined to create one data base? The details of how the data from grid wells will be handled need to be determined.

Response: Groundwater conditions will be described for Zone H and basewide. Grid based wells, as mentioned above, will serve a variety of purposes depending upon analytical results of the wells. An RFI report will be published for Zone H, which will describe groundwater conditions for this zone, particularly with regards to specific SWMUs/AOCs. Overall condition of groundwater at NAVBASE using data from all zones will be described in a final RFI report.

Comment 38: "Previously" is misspelled in the legend of Figure 3-1 (Grid Sample Location Map — Zone H) under "Previously Installed Monitoring Well" — No Soil Sample Collected".

Response: Change made as per comment.

Appendices

Comment 39: The key at the beginning of Table C.4 (Summary table for data collected previously) indicates that " μ " means the compound was analyzed for but not detected, while "J"

indicates estimated value. However, U and J sometimes appear in the same data box in the table along with an analytical result. How can a compound be analyzed for, but not detected, and at the same time, its value is estimated? Also, the meaning of the dashes in the boxes is not explained.

Response: The estimated value here refers to the estimated detection limit, not the actual value. This is now clarified in the legend to this table.

Comment 40: There is no page break between tables C.4 and C.5. Further, these data have no meaning without a figure indicating the locations from which the samples were collected. Apparently, Table C-5 lists analytical results from monitoring wells located around SWMU 9 (Old Landfill), however, the correspondence between the sample identification number and the monitoring well the sample was collected from is unclear. This should be clarified.

Response: Sample ID is now included in this table, and Fig. 2-1 was revised to show the sample ID more clearly.

Comment 41: The monitoring well inventory for Zone H included in Appendix D should also include a column that indicates the date (or the approximate date) that the monitoring well was installed.

Response: Dates are available in the construction details.

Comment 42: Several comments were generated from review of the information included in Appendix D — [Monitoring Well] Construction Details.

A. The text states on page 2-4 that "the construction details for the monitoring wells previously installed and still intact, which are proposed to be used for sample collection during upcoming RFI field activities, are included in Appendix D." This is incorrect. Appendix D includes a listing of all wells in Zone H, not just the ones proposed for use. In fact some of the wells listed in Appendix D apparently can't be located. Further, the construction details of the pre-existing wells must be verified before the Department will accept analytical data of samples collected from these wells.

Response: The wording on page 2-4 was changed to reflect this comment.

B. A figure should be prepared which indicates the locations of pre-existing wells, wells installed for investigation of releases from Underground Storage Tanks (USTs), and abandoned/lost monitoring wells. Please note that it is unnecessary to include the locations of abandoned/lost monitoring wells on figures that are part of an active work plan.

Response: Figures that include previous well locations are marked as former sample locations in each section where they are relevant. When analytical data is available from these wells, even when it is of relatively poor quality, the well locations should be marked in the text so that the significance of this data can be understood.

- C. Appendix D also includes construction details of wells installed at the Fleet Mine Warfare Training Center. These wells were apparently installed for the investigation of a UST under the direction of the Ground Water Protection Division of the Department. It should be indicated in the work plan that these wells were installed to investigate a release from a UST and are not part of the RFI proper.

Response: Reference to these wells has been removed from this document.

Jane D. Settle
South Carolina Wildlife and Marine Resources Department

Comment 1: The Draft Zone H Work Plan (Work Plan) is basically well organized and easy to use in referencing both maps and tables containing information regarding previous sampling efforts and proposed sampling locations for various Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). While some of the detail of the symbols used to identify the various types of samples is lost on the large comprehensive maps such as Figure 2-2, the presentation of this information in the smaller localized maps within the text accommodates, for the most part, for this shortcoming. There are a number of other concerns, however, related to this document and to the proposed activities in Zone H.

The issue of background was not addressed at all in this document. There should be some discussion of this difficult issue and how background will be used in the determination of cleanup levels.

Response: This issue is now addressed in Sections 1.2 and 1.3. (See Comments 1.5 and 1.1.2)

Comment 2: Also, it was somewhat perplexing to note the limited number of locations in which ecological receptors of any type were identified in the various sections addressing Potential Receptors. Only for a few SWMU's and AOC's were wetlands and adjacent waters identified as potential receptors and the groups of organisms which could possibly be impacted were not even listed. Also, nowhere were any terrestrial or avian receptors identified. These omissions should be addressed.

Response: This omission is now explained in Sections 1.2 and 1.3 (see Comment 1.2.2).

Comment 3: A related concern which arose when reviewing the Potential Receptors sections throughout the Work Plan was that of levels of groundwater contamination and degree of movement. Given the limited information which is apparently available for this entire site with respect to direction and rate of movement of groundwater, the potential for contamination of surface waters and the resultant exposure to biological receptors within the adjacent wetlands and waters from such movement is very possible. It is, therefore, our opinion that, for each SWMU and AOC where groundwater contamination has been documented or is likely, in each of the sections addressing Potential Receptors, this potential pathway should be identified and likely receptors included. This at least acknowledges that such exposure to biological receptors is a possibility which can then be either verified or denied by the further sampling proposed for these sites.

Response: This comment has been addressed in Sections 2.14 and 2.3.4.

Comment 4: Another concern associated with several sections of the Work Plan is that of what analytes will be required for various media at SWMUs and AOCs. For those locations where contamination by petroleum hydrocarbons is documented, suspected, or a possibility, if analysis for volatile organic compounds (VOC's) and semivolatile organic compounds (SVOC's) analyzed does not include the complete list of polynuclear aromatic hydrocarbons (PAH's), any remaining ones should be incorporated into the analytical scheme. Especially for waters and sediments where existing criteria and/or screening values are available, this information is necessary to enable determinations to be made as to potential impacts to trust resources. Also, it must be specified that detection limits should be low enough to enable comparisons with these values to be made. For at least SWMU #9, it is our opinion that analysis for dioxins and furans should be conducted on a percentage of the samples.

Response: Considering the site is being investigated under RCRA guidelines, analysis of samples for the TCL/TAL list using CLP methods is not appropriate. However, even though SW-846 methods are being used, the initial phase of samples will still be analyzed for the same set of parameters (volatile organics, semivolatile organics, pesticides/PCBs, inorganics including cyanide) that used define the TCL/TAL list even though the compound lists differ slightly. The sampling w Dioxins and furans are included in the list of Appendix IX compounds which will be analyzed in 10% of samples. A reference to the location of the complete list of Appendix IX compounds in CSAP is now included in the footnote section of the Sampling Plan tables.

Comment 5: We would like some further clarification in several areas as to the rationale behind the selection of sample locations. This is especially applicable where sediment sample locations are identified but little to no description of the locations of these samples is provided (SWMU's 9, 20) and at locations where wetlands of some type appear to be present but no sample locations are indicated in them (SWMU's 14 and 15, AOC's 669, 670, and 684). Also, clarification is requested regarding proposed sampling strategy at SWMU 17. It is indicated in the text of the Work Plan that a storm drain which discharges to the Cooper River exists under Building FBM 61 where the oil spill resulting in this SWMU occurred, yet there is no proposed attempt to sample at any point in this storm drain.

Response: Better sampling location rationale has been provided in most sections. See Comment 2.1.12.

Comment 6: The Climatology section (page 1-1) references Volume II, Section 1.6 of the Comprehensive RFI Work Plan. This section does not exist.

Response: The Final Comprehensive RFI Work Plan dated August 30, 1994 contains this section.

RESPONSE TO EPA COMMENTS
Dated September 9, 1994

Doyle Brittain, Remedial Project Manager
U.S. Environmental Protection Agency

BACKGROUND and GENERAL

Response: To be made.

July 8, 1994, Zone H RFI Work Plan

Comment 1: Acronym List:

- a. AOC stands for Area of Concern.
- b. CFR stands for Code of Federal Regulations.
- c. Light Non-Aqueous Phase Liquid (LNAPL) should be added to the acronym list and investigated in the groundwater investigations along with the Dense Non-Aqueous Phase Liquid (DNAPL).
- d. PPE stands for Personal or Personnel Protective Equipment.
- e. ZHASP should be ZHHASP for Zone H Health and Safety Plan.
- f. VOA should be added to the acronym list. The Zone H RFI Work Plan needs to distinguish between VOC and VOA, and be consistent in their use throughout the Work Plan.

Response: Changes made as per comment. VOA and VOC are both currently used in the document in a consistent manner. The term VOA is used when a general reference is made to a laboratory analysis for volatile organics. The term VOC is used when a general reference is made to one or more of the volatile compounds which make up the VOA analyte list.

Comment 2: Page i, Table of Contents — Sections 4.14 - 4.23 are general and apply to all Zones. Therefore, they should be included in the Comprehensive RFI Work Plan. The purpose of the Comprehensive RFI Work Plan is to consolidate in one place all information which applies to two or more Zones. Each Zone Specific RFI Work Plan should contain only information unique to that Zone. It is a waste of time and money to include, and expect people to review, the same information in two or more Zone Specific RFI Work Plans.

Response: While these sections are of a general nature, the text is intended to supplement the site specific health and safety information presented in the zone plans. E/A&H places a premium on the safety of employees conducting the investigation and is of the opinion that employees should not have to seek a second document in a compromising situation. The cost associated with the minimal amount of time necessary to review this section of the work plan should in no way be construed as a waste or more important than the welfare of the site workers.

Comment 3: Page iv, List of Figures.

- a. Include Figures 2, 5-1 and 10. Check to ensure others have not also been inadvertently omitted.
- b. Figure 4-1 — Change Fuel to Full.

Response: The table of contents has been revised accordingly.

Comment 4: Page 1-1, Section 1.1, Geologic and Hydrogeologic Information — add a short section here which describes changes in this part of NAVBASE since 1902, i.e., it was a marsh which has been filled in with a wide variety of known and unknown materials, and subsequently has been developed for other uses. Include a map to show the fill area.

Response: Section 1-1 has been revised to include a narrative and a map which both describe and illustrate the filling activities.

Comment 5: Page 2-1, Section 2.0.

- a. The date of the Comprehensive Project Management Plan has changed.
- b. The investigative strategy and the Comprehensive Project Management Plan are based on the RCRA Facility Assessment.
- c. A specific investigatory approach has been identified for each Solid Waste Management Unit (SWMU) and Area of Concern (AOC); this is appropriate based on the best information available at this time. However, it must be recognized that the southern one-third of NAVBASE is fill material, some investigation is needed throughout the fill area to ensure that the SWMUs and AOCs are not simply active portions at one point in time of a much larger landfill and that other SWMUs and AOCs are not in other parts of the fill area. This sampling should be performed as a part of the grid based sampling described in Section 3.0.
- d. Previous investigations provided a lot of information. In the absence of their being collected according to an EPA and/or South Carolina Department of Health and Environmental Control (SCDHEC) approved RFI Work Plan, EPA considers the data as acceptable for Data Quality Objective (DQO) Level 1 or 2 (acceptable for screening purposes). However, if sufficient information can be provided to EPA to validate the data, EPA will evaluate the data for possible consideration as DQO Level 3 or 4 (acceptable for decision making purposes). Pending data validation, EPA requires that sufficient DQO Level 3 or 4 data be collected for decision making purposes.

Response:

- a. Section 6 which lists the reference documents has been revised to include the correct date.
- b. The revised text in Section 2.0 acknowledges that the investigatory approach is based on the RFA.
- c. Section 2.0 is intended to discuss SWMU and AOC specific concerns. Section 3 addresses additional concerns posed by the fill area and a grid based sampling approach.

- d. The Navy acknowledges the potential limitations of the data collected prior to submittal of the Final Comprehensive RFI Work Plan. However, as previously discussed, the Navy intends to submit this data to EPA and SCDHEC for validation.

Comment 6: Page 2-1, Table 2.1 — Potential pathways identified for SWMU 9 are Soil, Sediment, Soil Gas, Surface Water, and Groundwater. Yet, some of these potential pathways are missing from other SWMUs and AOCs without strong justification. Unless there is strong, clear justification, each of these potential pathways should be investigated in conjunction with all SWMUs and AOCs. Ambient air must also be investigated unless there is good justification to the contrary.

Response: The Navy believes the text has been revised so that the reader can follow the logic used in determining which pathways warrant consideration given based on the site operations, materials used, and potential migration pathways.

Comment 7: Page 2-3, Section 2.1.1 — Information is needed which clearly and concisely summarizes what has been determined during previous investigations. Sufficient information should be provided to lead the reader to independently recognize the data gaps. This should be followed by the section which summarizes the data gaps.

Response: Information on previous investigations is summarized in a table specific for this information (Table 2-2 for this section) throughout the document.

Comment 8: Page 2-5, Section 2.1.3.

- a. LNAPLs should be investigated along with DNAPLs.
- b. Data need to be collected and an analysis performed to determine the correlation of contamination in the soil, sediment, soil gas, ambient air, surface water, and groundwater.

Response:

- a. Change made as per comment.
- b. This comment implies that data analysis techniques, in this case a correlational analysis, should be identified before data collection in the Zone H Work Plan. It is felt that any statistical analysis undertaken should be problem specific and based upon a need in risk assessment or determination of corrective measures, and that it is inappropriate to choose a data analysis methodology *a priori*. Characterization of all pathways within Zone H will be completed within the Zone H RFI Report, and characterization of all pathways throughout the base in the Final RFI Report.

Comment 9: Page 2-6, Section 2.1.4.

- a. Gases is misspelled.
- b. A change in philosophical approach is needed. This section, and similar sections throughout the Work Plan, assume:
 - 1) There is sufficient information to demonstrate that there is no risk to personnel performing "daily occupational activities and some recreational activities such as jogging and softball."
 - 2) Land use will remain unchanged.
 - 3) Exposure will be to only those workers who perform invasive activities, i.e., healthy personnel who have been medically monitored for job related fitness, who have personal protective equipment (PPE), and who have some knowledge of the contaminants present and the risks they pose.

EPA disagrees with this philosophy

- a. Data must be generated to demonstrate there is no unacceptable risk to the weaker and more sensitive personnel who could potentially be exposed to contaminants in the area, both inclusive and exclusive of invasive activities.
- b. Land use will change. The RFI must identify what contaminants are present, their sources, the horizontal and vertical extent of contamination, their rates and paths of migration, their potential receptors (not limited to current NAVBASE personnel), and the risk they pose to those receptors.
- c. As mentioned in a and b immediately above, the risks to potential receptors must be determined, including but not limited to NAVBASE personnel, in the soil, sediment, soil gas, ambient air, surface water, and groundwater.

Response:

- a. The word gases is not included in the revised text.
- b. Section 2.1.4 has been revised to basically state that all current and future users of the site are potential receptors. Additionally, the text mentions an equal concern for ecological which may be present.

Comment 10: Page 2-6, Section 2.1.5, Objectives — The first sentence should read "--vertical extent and rate of migration of any ---." This same change should be made in the Objectives Section for each of the other SWMUs and AOCs.

Response: The text has been revised accordingly where applicable. At the sites where only a CSI has been the proposed the text more appropriately states that the primary objective is to identify whether or not a release has even occurred.

Comment 11: Page 2-11, Section 2.2.7 — Line 6 should read "In addition, there are two ---."

Response: Change made as per comment.

Comment 12: Page 2-15, Table 2.6 — Information in each of the SWMU and AOC Site Description Tables must completely and accurately summarize the information in the RCRA Facility Assessment (RFA). For SWMU 14, this would include the chemical warfare decontaminating agents as well as all types of industrial wastes including "Asbestos, varnish sludge, mercury, electroplating wastes, paint wastes, PCBs, medical waste." See page 4-7, Section 4.5.

Response: The information in the site description tables for all sites was derived from the RFA and preliminary field activities where applicable. For SWMU 14, none of the materials listed above are referenced in the RFA or in any of the materials researched during the RFA or EBS. If the EPA is aware of another source of information that specifically states those materials are or were present the Navy would like to request that the source be identified.

Comment 13: Page 2-15, Table 2.6 — For AOC 670, brass should be added.

Response: Change made as per comment.

Comment 14: Page 2-20, Section 2.3.4 — Gases is misspelled.

Response: The word gases is no longer used in the revised text.

Comment 15: Page 2-20, Section 2.3.5 — Line 3 should read "--- industrial chemical wastes and chemical warfare decontaminating agents."

Response: Change made as per comment.

Comment 16: Page 2-21, Section 2.3.7, Line 10 — Water is misspelled.

Response: Change made as per comment.

Comment 17: Page 4-31 - 4-51 — This section belongs in the Comprehensive RFI Work Plan.

Response: See response to Comment 2 above.

Comment 18: Page 6-1 — Update the information for items 2-5. Items 6 and 7 should be identified as drafts.

Response: Change made as per comment.

Comment 19: Appendix A — The Investigative Approach approved by EPA is identified in the RFA. The information contained herein is dependent upon that information.

Response: The following note was attached to the Appendix A title page
Source: EnSafe/Allen & Hoshall. June 13, 1994. Draft RCRA Facility Assessment for Naval Base Charleston, Volumes I and II.

Comment 20: Appendix B, Figure 2 — It lacks recognizable landmarks which limits its usefulness.

Response: Since this drawing was produced by a subcontractor and E/A&H does not have the AUTOCAD file, it cannot be changed. However, E/A&H shall use Kroy or a similar lettering system to stencil building numbers on those buildings which appear in the Figure in order to assist the reader orienting the drawing.

Comment 21: Appendix E — It must be stated in the introduction that the presumptive remedies identified here are strictly for preliminary evaluation leading to a Corrective Measures Study where tentative presumptive remedies will be identified.

Response: Similar language has been included on the cover page for Appendix E.

Joe Bowers, Hydrogeologist
South Carolina Department of Health and Environmental Control

Comment 1: In work plans, reports, correspondence, etc., when listing SWMUs and AOCs, SWMUs should be listed first, followed by AOCs. Numbers should proceed from lowest to highest. Also, due to the large number of SWMUs and AOCs, it is suggested that SWMUs and AOCs be referred to by both the SWMU/AOC number, followed by its description. For example, SWMU 94 would be referred to as *SWMU 94 (Building 13 SAA #45)*. Referring to SWMUs and AOCs using both the number and a description should reduce the chances of inadvertently referring to the incorrect site.

Response: The document is currently structured (from lowest number to highest number) by SMWUs requiring RFI, the AOCs requiring RFI, then the same order for sites requiring CSI. The idea was to present the sites in an order relating to the degree of information known about the sites. To facilitated location of sites within the document, and to provide a quick cross reference from site number to location or identification, Table A in Appendix A has been provided for this purpose. The structure of remaining zone documents will be examined to improve the order of presentation if this approach is unworkable.

Comment 2:The names of the SWMUs and AOCs should be included along with the numbers in the tables of site descriptions contained in the work plan.

Response: Change made as per comment.

Comment 3:Many comments which are specific to SWMUs 1 through 36 have been generated from review of previous versions of the RFI work plan. NAVBASE should refer to these comments to insure that the concerns raised are properly addressed in this zone specific work plan, as well as in subsequent zone-specific work plans.

Response: Many of the previous work plan comments have been incorporated in the current Zone H Work Plan and are being reviewed for their relevance to the current document and to insure their inclusion into the additional zone specific work plans.

Comment 4: Figures in the work plan should be revised to indicate the approximate boundaries of SWMUs and AOCs. Also, the SWMU/AOC names on the figures should be highlighted, or somehow made to stand out more. They are difficult to locate on some figures.

Response: Figures have been revised per this comment to show the approximate site boundaries.

Comment 5: The work plan notes in Section 2.5.7 (Sampling and Analysis Plan) in discussing AOC 503 (Unexploded Ordnance Site South of Building 665) that a subcontractor will be hired to locate the ordnance and to deal with it appropriately when found. Since unexploded ordnance is suspected to be located in four other locations at the base (AOCs 500, 501, and 502), it may be advisable to have the subcontractor search for all other known unexploded ordnance, including those within other zones.

Response: The Navy agrees to investigation of UXOs concurrently and has entered into discussion with Navy EOD teams to locate and remove ordnance at the four sites in question. Additionally, areas which have a high probability of containing unknown UXO, such as areas where ordnance was known to be stored or handled, will be investigated via geophysical techniques in addition and prior to soil and groundwater sampling to determine presence/absence. These investigations will be done by experienced environmental personnel.

Comment 6: The Presumptive Remedies information included in Appendix E should be summarized in a section in the text. As it is now, the paragraph describing Presumptive Remedies is too cryptic, and is of limited usefulness.

Response: The term presumptive remedies has now been replaced with the term treatment alternatives which more appropriately describes the information presented. The identification of treatment alternatives at the beginning of the investigation was requested by EPA and is valid provided sufficient information is known about the site to predict the probable contaminants and the physical setting. For those sites where little or no information exists, treatment alternatives have not been specified at this time.

Comment 7: The north arrows on the page sized figures included in the work plan do not point in the same direction as the north arrow on the large scale maps provided in the work plan. For example, compare the north arrow on Figure 2-7 (SWMU #17 Previous Sample Locations) with the north arrow on Figure 3-1 (Grid Sample Location Map — Zone H).

Response: Changes made as per comment.

Comment 8: The text of the work plan states on page 2-11 that actual soil boring and monitoring well locations will be dependent on the ability to access a site and the location of utilities. I agree that the locations of utilities will in some circumstances influence the locations at which samples can be collected. In an effort to speed the assessment process, the Department is willing to allow NAVBASE discretion in choosing supplementary sampling locations, in addition to the minimum number proposed in the zone-specific work plans. However, NAVBASE must be aware that the sampling locations that are chosen must, ultimately, be acceptable to the Department and to the EPA.

Response: The sampling locations shown have been selected based on both site contaminant and geologic/hydrogeologic conditions. The locations will be modified or supplemented as necessary during field work based upon information on subsurface conditions, such as the presence of subsurface utilities, discovered through geophysical means or during the actual execution of field tasks. The distances involved in sampling location changes for avoidance of subsurface interferences should be relatively small, and should prove to be inconsequential to the overall site characterization. Where possible, these changes will be noted and the SCDHEC and EPA made aware of the circumstances necessitating the changes.

Comment 9: Is it necessary to have the potential receptors section in the zone-specific work plan? These receptors will be assessed in the Baseline Risk Assessment. If this section is kept in the zone-specific work plans, then it needs to be complete and accurate.

Response: The potential receptors identified in the BRA are base-wide, and there is a need to identify out of the whole list which of the possible pathways might be impacted by a particular SWMU or AOC to guide data collection efforts. The potential receptor section has been rewritten (see comment 1.1.10), to address this comment.

Comment 10: According to the RFA Report dated June 13, 1994, AOC 669 (Building 1888 Indoor Pistol Range) is recommended for No Further Investigation. Apparently, this is incorrect since AOC 669 is included in the work plan. Thus, assuming AOC 669 requires investigation, then it should be included in Table A.2 (Zone H AOC Summary) of this work plan.

Response: AOC 669 has been revised to receive a CSI designation. This will be included in the Final RFA.

Comment 11: The RFA Report dated June 13, 1994 states in Table 1.1 that SWMU 124 (Bldg. 1508 SAA #60) will be investigated along with AOC 653 (Building 1508 MWR Hobby Shop). However, SWMU 124 is not included in this work plan. SWMU 124 should be included in the Zone H work plan.

Response: SWMU 124 is an SAA located in close proximity to the automobile lift at the hobby shop. This area is used in a large part for automotive oil changes and general maintenance work and has been the victim of poor housekeeping. The poor conditions noted at the SWMU location are due to releases related to AOC 653 activities, rather than SWMU 124 releases (none of which are known to have occurred). It was suggested during the site visit of NFI sites that this SWMU be accepted as NFI provided the AOC investigation area included the area where the SWMU was located. Understanding that due to the site classifications it appears we are proposing less of an investigation on a site that by definition had an apparent release, it must be understood that all SAA's were listed as SWMUs regardless of site history. The investigation of the AOC 653 will include investigation of SWMU 124 area. The RFA should be revised to reflect this approach.

Comment 12: Justification is provided for the proposed sampling locations in some sections of the text but not in others. This justification should be provided in each Sampling and Analysis section of the work plan. This justification should include:

- A. The type of samples (sediment, soil, monitoring well, etc.) to be collected and why.
- B. The number of sampling locations chosen and how this number was determined.
- C. Why the particular sample locations were chosen, and a description of the thought process that went into choosing the locations.
- D. The analyses to be performed and why. Justification should be provided for exclusion of parameters.

Response: Sampling and Analysis Plan text **has been** revised where this justification was not provided.

Comment 13: The symbol on Figure 1-1 (SWMU/AOC Location Map) for AOC 503 (UXO South of Building 665) is wrong. This AOC requires a Confirmatory Sampling Investigation (CSI); the symbol on the map is a circle, which according to the legend represents No Further Investigation (NFI).

Response: Change made as per comment.

Comment 14: This sentence appears on page 2-6, Section 2.1.4 (Potential Receptors): "There is no reason to suspect human exposure would extend beyond site workers since there are no known users of shallow groundwater at NAVBASE." This sentence may be misleading since this exposure scenario will be considered during the baseline risk assessment.

Response: This sentence was removed as all Potential Receptor sections have been rewritten.

Comment 15: This sentence appears under the "Data Gaps" sections of the work plan: "There are no available measures of potential contaminants or their concentrations." What does this sentence mean? It needs to be clarified.

Response: The words "measures of potential" have been replaced with "measurements of the presence of".

Specific Comments

Section 2.1 — SWMU 9, Closed Landfill (Includes SWMUs 19, 20, 121, and AOCs 649, 650, and 654).

Comment 16: Some the symbols used on Figure 2-2 — Proposed Sampling Locations for SWMU 9 are not explained in the legend.

Response: Change made as per comment.

Comment 17: Collection of soil samples from 24 locations at SWMU 9 (Closed Landfill) appears insufficient. There are too many SWMUs and too much area to cover with only 24 locations.

Response: The methodology governing the sampling effort in relation to the landfill is to define the perimeter for purposes of containment (i.e. the presumptive remedy for installation of an impermeable cap). Previous sampling efforts have already identified a broad range of COPCs and additional sampling within the landfill would probably be of limited use with one exception. Groundwater sampling may identify offsite migration which may require location and removal of individual hot spots. In this case, groundwater data will be used to locate probable hot spots and additional soil samples will be collected.

Section 2.2 — SWMU 13, Current Fire Fighting Training Area.

Comment 18: Figure 2-3 (SWMU 13 and AOC 658 Proposed Sample Locations) indicates the proposed sampling locations for SWMU 13 and AOC 658. According to the RFA Report dated June 13, 1994, AOC 658 (Building 203 Gas Storage) requires NFI. If AOC 658 requires NFI, then it shouldn't appear on this figure. Additional soil samples should be proposed.

Response: Reference to AOC 658 has been removed from Figure 2-3.

Comment 19: Tables 2.5 (SWMU 13 Sampling Plan) and 2.6 (SWMU 13 and Associated Sites Site Descriptions) should be exchanged with one another, so that the site description appears before the proposed sampling strategy in the work plan.

Response: Table 2-6 refers to SWMU 14. Introductory material has been added to avoid confusion.

Section 2.3 — SWMU 14, Chemical Disposal Area (Includes SWMU 15, AOCs 684, 670, and 669)

Comment 20: Several comments have been generated from review of the proposed investigation of SWMU 14 (Chemical Disposal Area)

- A. "SWMU 14" should appear in parenthesis below the description of "General Area of Abandoned Subsurface Chemical Disposal Area". The SWMU or AOC numbers appear on the other areas depicted in this figure, but not for SWMU 14.

Response: Figure heading now reads: "General Area of SWMU 14 - Abandoned Subsurface Chemical Disposal Area"

- B. The text of the work plan in Section 2.3 (SWMU 14 Chemical Disposal Area, including SWMU 15, AOCs 669, 670, and 684) does not include verbiage justifying the concentrated Appendix IX sampling locations. Are these Appendix IX samples being collected in the suspected area of SWMU 14 (chemical disposal area)? If the location of SWMU 14 is truly unknown, then the spacing of the Appendix IX samples should be expanded to cover the entire area in which SWMU 14 may be located.

Response: This grid was located because the high number of geophysical targets in this area made it the most probable candidate. The figure which locates the geophysical targets has been revised to the same scale as the proposed sampling location figure. The figure also references as the proposed sampling locations. Reference to these geophysical targets is included in the text for 2.3.7.

- C. Four wells should be installed at the Chemical Disposal Area, instead of the proposed three. This requires sufficient coverage with monitoring wells, particularly since it is suspected of being one of the more serious SWMUs at NAVBASE.

Response: After further discussion with SCDHEC, a total of five shallow/deep well pairs shall be located relative to previously identified targets with one pair located upgradient.

- D. Why is the number 38 located above the scale? What is its significance?

Response: The number appeared on the base map from which all the CAD drawings are being generated and is not related to the RFI. As a result the number was removed.

Section 2.4 — SWMU 17, Oil Spill Area

Comment 21: There is no legend on Figure 2-7 (SWMU #17 Proposed Sample Locations). Where exactly is SWMU 17 on this figure? Where did the spill occur? Where were the previous samples collected?

Response: The oil spill called SWMU 17 occurred underneath the building and cannot be precisely located. The exact location will be determined during the investigation. Sampling points on Figure 2-7 are from a previous sampling effort.

Comment 22: The work plan notes that there is a potential for this SWMU to discharge to the Cooper River via a storm drain beneath Building FBM 61. Thus, this storm drain should be sampled as part of this investigation.

Response: Sampling at the outfall of the storm drain will be conducted. As noted previously, the Zone J investigation will fully consider impacts to the Cooper River, and sampling at this outfall will be included in this investigation.

Section 2.6 — AOC 653, Hobby Shop

Comment 23: The work plan is unclear exactly why this AOC is being investigated. Is it due to suspected releases from the hydraulic tank located on the east side of the building, or from other releases?

Response: Known leakage from a hydraulic tank is a major reason for investigation of this site. Clarification was added to the Work Plan in Section 2.6.1.

Comment 24: Table 2.13 (AOC 653 Site Description) states that various paints, solvents, thinners and petroleum products have been used and stored at the site. Is this relevant to the planned investigation? If so, then this relevancy should be explained in the work plan.

Response: This list is meant to imply that other contaminants may be present besides the hydraulic oil. Samples will be analyzed for a wide variety of contaminants, and high levels of a chemical associated with these materials might be a signature contaminant from an as yet undetected point source from AOC 653. Clarification was added to Section 2.6.1 and Table 2.15 (previously 2.13).

Comment 25: Table 2.15 (AOC 653 Sampling Plan) indicates that one monitoring well will be installed at this AOC. Figure 2-9 (AOC 653 Proposed Sample Locations) indicates two monitoring wells will be installed. Which is correct?

Response: Figure 2-9 is correct. Table 2.15 has been changed.

Comment 26: Section 2.6.4 First sentence. There are no other associated sites with AOC 653.

Response: This sentence was removed.

Section 2.7 — AOC 656, Between Buildings 602 and NS-71 and AOC 655 behind the Navy Exchange

Comment 27: The text is vague regarding the proposed work at AOCs 655 and 656. Apparently, Buildings 71 and 602 contain boiler rooms, which adds to the confusion. The text should be revised to indicate clearly which area is being discussed, and the number and type of samples planned for collection at each AOC.

Response: Figure 2.10 was in error, failing to distinguish AOC 655/656. In addition, the text did not mention the number of AOC 655 in Section 2.7.7. These changes should clarify this discussion. Text was added to 2.7.7 regarding sampling locations.

Comment 28: The text is unclear as to how many monitoring wells will be installed at what I assume is AOC 655 (near Building 656). In Section 2.7.7 (Sampling and Analysis Plan), the text states "Two soil borings will be constructed outside of Building 656 and converted into monitoring wells." Figure 2-10 (AOC 655/656 Proposed Sample Locations) indicates that three monitoring wells will be installed near Building 656.

Further, Table 2.18 (AOC 655 and AOC 656 Sampling Plan) indicates three wells will be installed around AOC 656. However, Figure 2-10 (AOC 655/656 Proposed Sample Locations) indicates only two monitoring wells will be installed. Which is correct?

Response: Figure 2-10 is in error. AOC 655 is near Building 656. AOC 656 is near Building 602. Three monitoring wells will be located at each AOC, as indicated in Table 2.18. Text and figures will be changed to be consistent with this table.

Comment 29: Both AOCs are labeled as AOC 656 in Figure 2-10 (AOC 655/656 Proposed Sample Locations). Further, the outline of Building 656 is undiscernible in this figure. This figure should be revised to clearly indicate the outline of Building 656.

Response: AOC 655 appears on the left of this figure but is mismarked. The scale necessary to show both AOCs left Building 656 incomplete on the drawing. It takes up the center portion of the figure.

Section 2.8 — AOC 662, Former Gas Station

Comment 30: Where is AOC 662 in Figure 2-11 (AOC 662 Proposed Sample Locations)? Where are the suspected locations of the USTs?

Response: This figure will be clarified in the final document.

Section 2.10 — AOC 667, Vehicle Maintenance (Includes SWMU 138)

Comment 31: The work "separator" is misspelled in Figure 2-13 (AOC 667 and SWMU 138 Proposed Sample Locations).

Response: Change made as per comment.

Section 2.11 — Other Sites Designated CSI (Includes AOCs 659, 660, 661, 665, 666, and SWMU 178)

Comment 32: There is no figure for AOC 661 (Explosives Storage south of Building 601) indicating sampling locations.

Response: AOC 661 is to be investigated by an EOD subcontractor in order to confirm/deny the presence of ordinance and if necessary facilitate removal. A figure indicating it's approximate location will be included in the final document.

Comment 33: Table 2.25 (Site Descriptions) notes that three USTs have been reported at AOC 665 (Building 159 Pyrotechnic Storage), but their location and status are unknown. The work plan does not propose measures to locate these USTs. These USTs should be located and properly assessed. The work plan should be revised accordingly.

Response: Review of the RFA (June 13, 1994) revealed no reference to UST's; therefore, reference to USTs at AOC 665 has been deleted from Table 2.26 (formerly Table 2.25).

Comment 34: Where is AOC 666 in Figure 2-17?

Response: AOC 666 is the same as NS 45 in this figure. This will be marked in final figures.

Comment 35: There is no legend on Figure 2-18 (SWMU 178 Proposed Sample Locations).

Response: This will be included in final figures.

Section 3.0 Systematic (Grid Based) Sampling Plan

Comment 36: This section proposes to collect groundwater samples from the grid wells for one quarter only. Groundwater samples should be collected from grid wells for one year, to establish a data base. Further, collection of water levels over this period will determine if there are seasonal fluctuations in groundwater flow directions at the base.

Response: This wording was inadvertently included from a previous version. This sentence should be the same as in all other tables: "Sampling of groundwater monitoring wells will be conducted on a quarterly basis." Actual number of times a well will be sampled is unknown at this point of the investigation. There are many reasons for the grid based monitoring wells, and the number of samples taken from them will depend upon what is found in them. It is unlikely that any of these wells will be used as background wells as they are downgradient from a major landfill. They will be used to ensure that any unknown point sources that have caused major groundwater contamination are detected. They will help detect extent of contamination if signature contaminants are identified in a grid based well that are associated with a particular SWMU/AOC. They may help detect rate of migration. Wells that have no contamination will help pinpoint possible extent of migration of contaminants. Therefore there is no way to know the number of times that a particular well will be sampled. Any wells that are used for background will be sampled quarterly for a year. Uses of the grid based wells has been clarified in the text in a similar manner to the above, and as mentioned in the following comment.

Comment 37: It is unclear in the work plan how the groundwater data from grid monitoring wells will be utilized. Are all of the analytical results from all grid wells going to be combined to create one data base? The details of how the data from grid wells will be handled need to be determined.

Response: Groundwater conditions will be described for Zone H and basewide. Grid based wells, as mentioned above, will serve a variety of purposes depending upon analytical results of the wells. An RFI report will be published for Zone H, which will describe groundwater conditions for this zone, particularly with regards to specific SWMUs/AOCs. Overall condition of groundwater at NAVBASE using data from all zones will be described in a final RFI report.

Comment 38: "Previously" is misspelled in the legend of Figure 3-1 (Grid Sample Location Map — Zone H) under "Previously Installed Monitoring Well" — No Soil Sample Collected".

Response: Change made as per comment.

Appendices

Comment 39: The key at the beginning of Table C.4 (Summary table for data collected previously) indicates that "μ" means the compound was analyzed for but not detected, while "J"

indicates estimated value. However, U and J sometimes appear in the same data box in the table along with an analytical result. How can a compound be analyzed for, but not detected, and at the same time, its value is estimated? Also, the meaning of the dashes in the boxes is not explained.

Response: The estimated value here refers to the estimated detection limit, not the actual value. This is now clarified in the legend to this table.

Comment 40: There is no page break between tables C.4 and C.5. Further, these data have no meaning without a figure indicating the locations from which the samples were collected. Apparently, Table C-5 lists analytical results from monitoring wells located around SWMU 9 (Old Landfill), however, the correspondence between the sample identification number and the monitoring well the sample was collected from is unclear. This should be clarified.

Response: Sample ID is now included in this table, and Fig. 2-1 was revised to show the sample ID more clearly.

Comment 41: The monitoring well inventory for Zone H included in Appendix D should also include a column that indicates the date (or the approximate date) that the monitoring well was installed.

Response: Dates are available in the construction details.

Comment 42: Several comments were generated from review of the information included in Appendix D — [Monitoring Well] Construction Details.

A. The text states on page 2-4 that "the construction details for the monitoring wells previously installed and still intact, which are proposed to be used for sample collection during upcoming RFI field activities, are included in Appendix D." This is incorrect. Appendix D includes a listing of all wells in Zone H, not just the ones proposed for use. In fact some of the wells listed in Appendix D apparently can't be located. Further, the construction details of the pre-existing wells must be verified before the Department will accept analytical data of samples collected from these wells.

Response: The wording on page 2-4 was changed to reflect this comment.

B. A figure should be prepared which indicates the locations of pre-existing wells, wells installed for investigation of releases from Underground Storage Tanks (USTs), and abandoned/lost monitoring wells. Please note that it is unnecessary to include the locations of abandoned/lost monitoring wells on figures that are part of an active work plan.

Response: Figures that include previous well locations are marked as former sample locations in each section where they are relevant. When analytical data is available from these wells, even when it is of relatively poor quality, the well locations should be marked in the text so that the significance of this data can be understood.

- C. Appendix D also includes construction details of wells installed at the Fleet Mine Warfare Training Center. These wells were apparently installed for the investigation of a UST under the direction of the Ground Water Protection Division of the Department. It should be indicated in the work plan that these wells were installed to investigate a release from a UST and are not part of the RFI proper.

Response: Reference to these wells has been removed from this document.

Jane D. Settle
South Carolina Wildlife and Marine Resources Department

Comment 1: The Draft Zone H Work Plan (Work Plan) is basically well organized and easy to use in referencing both maps and tables containing information regarding previous sampling efforts and proposed sampling locations for various Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). While some of the detail of the symbols used to identify the various types of samples is lost on the large comprehensive maps such as Figure 2-2, the presentation of this information in the smaller localized maps within the text accommodates, for the most part, for this shortcoming. There are a number of other concerns, however, related to this document and to the proposed activities in Zone H.

The issue of background was not addressed at all in this document. There should be some discussion of this difficult issue and how background will be used in the determination of cleanup levels.

Response: This issue is now addressed in Sections 1.2 and 1.3. (See Comments 1.5 and 1.1.2)

Comment 2: Also, it was somewhat perplexing to note the limited number of locations in which ecological receptors of any type were identified in the various sections addressing Potential Receptors. Only for a few SWMU's and AOC's were wetlands and adjacent waters identified as potential receptors and the groups of organisms which could possibly be impacted were not even listed. Also, nowhere were any terrestrial or avian receptors identified. These omissions should be addressed.

Response: This omission is now explained in Sections 1.2 and 1.3 (see Comment 1.2.2).

Comment 3: A related concern which arose when reviewing the Potential Receptors sections throughout the Work Plan was that of levels of groundwater contamination and degree of movement. Given the limited information which is apparently available for this entire site with respect to direction and rate of movement of groundwater, the potential for contamination of surface waters and the resultant exposure to biological receptors within the adjacent wetlands and waters from such movement is very possible. It is, therefore, our opinion that, for each SWMU and AOC where groundwater contamination has been documented or is likely, in each of the sections addressing Potential Receptors, this potential pathway should be identified and likely receptors included. This at least acknowledges that such exposure to biological receptors is a possibility which can then be either verified or denied by the further sampling proposed for these sites.

Response: This comment has been addressed in Sections 2.14 and 2.3.4.

Comment 4: Another concern associated with several sections of the Work Plan is that of what analytes will be required for various media at SWMUs and AOCs. For those locations where contamination by petroleum hydrocarbons is documented, suspected, or a possibility, if analysis for volatile organic compounds (VOC's) and semivolatile organic compounds (SVOC's) analyzed does not include the complete list of polynuclear aromatic hydrocarbons (PAH's), any remaining ones should be incorporated into the analytical scheme. Especially for waters and sediments where existing criteria and/or screening values are available, this information is necessary to enable determinations to be made as to potential impacts to trust resources. Also, it must be specified that detection limits should be low enough to enable comparisons with these values to be made. For at least SWMU #9, it is our opinion that analysis for dioxins and furans should be conducted on a percentage of the samples.

Response: Considering the site is being investigated under RCRA guidelines, analysis of samples for the TCL/TAL list using CLP methods is not appropriate. However, even though SW-846 methods are being used, the initial phase of samples will still be analyzed for the same set of parameters (volatile organics, semivolatile organics, pesticides/PCBs, inorganics including cyanide) that used define the TCL/TAL list even though the compound lists differ slightly. The sampling w Dioxins and furans are included in the list of Appendix IX compounds which will be analyzed in 10% of samples. A reference to the location of the complete list of Appendix IX compounds in CSAP is now included in the footnote section of the Sampling Plan tables.

Comment 5: We would like some further clarification in several areas as to the rationale behind the selection of sample locations. This is especially applicable where sediment sample locations are identified but little to no description of the locations of these samples is provided (SWMU's 9, 20) and at locations where wetlands of some type appear to be present but no sample locations are indicated in them (SWMU's 14 and 15, AOC's 669, 670, and 684). Also, clarification is requested regarding proposed sampling strategy at SWMU 17. It is indicated in the text of the Work Plan that a storm drain which discharges to the Cooper River exists under Building FBM 61 where the oil spill resulting in this SWMU occurred, yet there is no proposed attempt to sample at any point in this storm drain.

Response: Better sampling location rationale has been provided in most sections. See Comment 2.1.12.

Comment 6: The Climatology section (page 1-1) references Volume II, Section 1.6 of the Comprehensive RFI Work Plan. This section does not exist.

Response: The Final Comprehensive RFI Work Plan dated August 30, 1994 contains this section.