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CORRESPONDENCE CONCERNING RCRA FACILITY INVESTIGATION REPORT  
ADDENDUM FOR SOLID WASTE MANAGEMENT UNITS 136 AND 138 AND 196 AND 17  
(SWMU 136 AND 138 AND 196 AND 17) AND AREAS OF CONCERN 663 AND 666 AND 667  
(AOC 663 AND 666 AND 667) CNC CHARLESTON SC

9/11/2000

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL



2600 Bull Street  
Columbia, SC 29201-1708

*Matt*  
*Rick*

*MAY 11 2000*

September 11, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: RCRA Facility Investigation (RFI) Report Addendum for SWMUs 136, 138, 196, & 17 and AOCs 663, 666, and 667 located in Zone H of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated May 5, 2000, received May 19, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document.

To facilitate the approval process of the Zone H RFI report the comments generated by engineer and hydrogeologist are attached. The Department will forward the comments based on the risk assessment review at a later date.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

*M P Mehta*

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated August 17, 2000.  
Memorandum from Michael Danielsen to Mihir Mehta dated September 8, 2000.  
Comments from Ted Simon, USEPA Region IV.

cc: Paul Bergstrand, Hydrogeology  
Michael Danielsen, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES  
Todd Haverkost, EnSafe



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

COMMISSIONER.  
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**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Susan Peterson, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** August 17, 2000

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Zone H RFI Addendum Report,  
SWMUs/AOCs 136, 663, 666, 138, 667, 196, 17  
Dated May 5, 2000

Upon review of this report, the Department has the following comments:

### General Comments

1. Site Close-out strategies to support NFA recommendation.  
At the May, 2000 meeting, the team discussed the need to include/evaluate Oil Water Separators, Zone J, Zone L, inorganics in groundwater, and indoor air quality issues when closing out a SWMU (recommending an NFA). As currently written, the Navy does not evaluate these issues to support their NFA recommendation. The Department will not concur with an NFA recommendation until these issues are addressed.

2. DET reports  
The Navy has used the completion of Interim Stabilization Measure (ISM) reports to support their RFI addendum recommendations. The Navy must

- a) Provide a copy of the ISM report to the Department
- b) Incorporate, as deemed appropriate, the necessary information from the ISM report to support the RFI addendum recommendations.

The Department is unable to concur with any recommendations until the Navy provides this information.

3. Changes in SWMUs/AOCs due to an ISM

The Navy has included figures in this RFI addendum report that do not represent the current conditions they claim to represent. An example of this is the area of surface soil at AOC 666 where arsenic exceeds the background calculations. The Charleston DET conducted an ISM following the initial RFI. The figure in the report however represents the conditions prior to the ISM. The referenced report should illustrate pre- and post-ISM conditions of the SWMU/AOC to support the proposed recommendation.

### **Specific Comments, per SWMU/AOC**

#### **SWMU 136/AOC 663**

##### **Navy recommends an NFA**

**Based on the information provided in the report, the Department is unable to concur with the Navy's recommendation. The following comment(s) support this decision:**

4. Close-out strategies

The Navy has not addressed the close-out strategies (see General comments).

5. Implied excavation of fuel lines

As per page 2-1-8, the Navy claims that the Charleston DET removed Building 851's 500-gallon gasoline UST, 500-gallon diesel UST, and associated piping from the site in June 1996. This claim is also graphically depicted by Figure 2.1.6. During the August 7, 2000 field visit, the Department saw no evidence that supported this claim. This leads the Department to question whether a source of contamination remains in place. Please revise the figures to show pre- and post-ISM conditions for the site. Please evaluate the confirmatory sampling results to determine whether the remaining contamination (if any) requires further characterization. Please also address General Comment #3.

6. RFI addendum objective

Navy has not met the objective of the RFI addendum. With regard to soil, the objective of the RFI addendum was to further evaluate arsenic, the primary contributors to the human health risk and hazard identified in the RFI.

From the previous RFI, Arsenic levels in subsurface soil did not exceed the subsurface background concentration of 22.5 mg/kg. However, two subsurface soil results from the RFI addendum activities did exceed the subsurface background concentration and the site-specific SSL value. The Navy is required to delineate the extent of arsenic exceedences in subsurface soil. As the Navy has not done this, they have not met the objective of the RFI addendum.

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Prepared by Susan Peterson  
August 17, 2000

7. The Navy's argument regarding samples 136SB010 and 136SB012  
The Navy, as per the text on page 2.1.28, believes "because (samples 136SB010 and 136SB012) are separated by approximately 130 feet and arsenic is absent in soil boring 136SB011, these two exceedances do not appear related." The Department does not refute that these could be two separate areas of contamination. The Navy is required to delineate the extent of arsenic exceedances in subsurface soil. This may involve sampling west of 136SB012 and in the area of 136SB004 and 136SB010.

8. Possible connection between 136SB004 and 136SB010  
Upon review of Figures 2.1.7 and 2.1.8, there appears to be a close proximity between 136SB004 and 136SB010. Thus the Department believes a connection may exist between 136SB004, a surface soil sample that contained arsenic (23.9 mg/kg) greater than the background concentration and 136SB010, the subsurface soil sample that contained arsenic (24.8 mg/kg) greater the background concentration and site-specific SSL. Please address this concern with respect to hot-spot area contamination and the possible connection stated above.

9. Content of the argument supporting the NFA recommendation  
The Department understands that collecting additional samples enabled the Navy to compute an Exposure Point Concentration that resulted in revised risk values. The Department believes these revised risk values support the recommendation of NFA, but believe there are other reasons (some are listed in previous sections, some should be included as close-out strategies) to substantiate the NFA recommendation. The Department recommends expanding on the section used to support the NFA recommendation to include additional information. Please consider this comment as it may be applicable to additional SWMUs/AOCs in these documents.

#### **AOC 666**

##### **Navy recommends an NFA**

**Based on the information provided in the report, the Department is unable to concur with the Navy's recommendation. The following comment(s) support this decision:**

10. Close-out strategies  
The Navy has not addressed the close-out strategies (see General comments).

11. Objective of the RFI addendum  
Navy has not met the objective of the RFI addendum. With regard to soil, the objective of the RFI addendum was to further evaluate arsenic (see Figure 2.2.6), one of the primary contributors to the human health risk and hazard identified in the RFI. However, the Charleston DET conducted an ISM prior to the RFI addendum activities. Thus the DET disturbed area of surface soil where arsenic exceeded background values. Please provide additional information or a proposal to address this concern.

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12. Oil/Water separator

An O/W separator is located adjacent to the footprint of the AOC. The Department requests that the Navy evaluate this O/W separator as part of AOC 666. Please propose the strategies to evaluate the potential release of contamination, evaluate the source of contamination via sampling the contents, and characterize the media that a potential source may have impacted.

13. Incorrect Figures

The Navy should explain the relevance of Figure 2.2.6 with respect to the ISM. The Department believes the figure to represent the area following the initial RFI, prior to the ISM. Please provide figures that show the pre- and post-ISM condition of the site. Please provide a figure that shows the location and results of the confirmatory sampling. Please evaluate whether residual contamination exists that would require further characterization.

**SWMU 138/AOC 667**

**Navy recommends an NFA**

**Based on the information provided in the report, the Department is unable to concur with the Navy's recommendation. The following comment(s) support this decision:**

14. Close-out strategies

The Navy has not addressed the close-out strategies (see General comments).

15. Clarification of risk values, Table 2.3.6

Please provide an explanation as to how the Navy calculated the risk values for 1,1-Dichloroethene and Chloroethane.

**SWMU 17**

**Navy recommends a CMS for surface soil and shallow groundwater**

**The Department concurs with this recommendation, but offers the following comment(s):**

16. Close-out strategies

Although the Navy has not requested an NFA for SWMU 17, the Navy should address the close-out strategies as listed in General Comment #3.

17. RFI addendum objective

Page 2-5-26 lists the objectives of the RFI addendum report. The Navy does not list subsurface soil contamination as a concern. However, the Navy was thorough in providing figures that show the delineation of contamination for 9 VOCs, 13 SVOCs, and 1 PCB. Please revise page 2-5-26 to include subsurface soil contamination.

**SWMU 196**

**Navy recommends a CMS**

**The Department concurs with this recommendation, but offers the following comment(s):**

18. Summary figures

The Navy has provided a single figure for each constituent (for example inorganics) that had hits that exceeded background values, SSLs, and/or other applicable screening criteria. The figures show inferred iso-contour lines depicting the general area that exceeded the criteria. The Department requests a single summary figure that shows these inferred iso-contour lines per media. This will draw attention to certain areas, for example sample 196SB004 for antimony, that seem to have consistently exceeded the screening criteria. Please provide similar summary figures for VOCs, SVOCs, pesticides.

19. Use of diffusion sampling results

The text states on p. 2-4-173 that “diffusion samples were used to sample the four temporary wells for VOCs to determine if the diffusion sampler technique would be feasible for future sampling.” Please state Navy’s determination regarding this technique. (Section 2.4.2.6 does not clarify this).

20. Use of conventional sampling results over the diffusion sampling results

Please justify the decision to use the results from the conventional sampling technique as opposed to the results from the diffusion sampling technique. The justification should include information other than the fact that the two methods produced different results, which would be expected. The Navy does not provide an evaluation of the inaccuracy of the technique to support its decision. The diffusion sampling method showed higher results for chlorobenzene and carbon disulfide than did the conventional sampling technique. From the information provided, the Department can only determine that the Navy did not want to evaluate risk values based on the higher results. The Navy should recalculate the risk using the results from the diffusion sampling technique.

21. Pathway validity, p. 2-4-333

Please explain the reasoning/criteria that makes a constituent’s pathway valid or invalid, with respect to Table 2.4.40.

22. Lack of soil sample information east of the site

Along the eastern portion of the site, the Navy (p. 2-4-136) has not determined the extent of inorganics in surface soil that exceed the screening criteria. For example, the Navy has determined a boundary along the north, west, and south of SWMU 196 for the antimony that exceeded the screening criteria. The text states “because Shipyard Creek is to the east, no soil borings could be taken to define surface soil contamination.” The Department does not agree with this argument for the following

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reasons: 1) the Navy was successful in installing 4 temporary wells in the marsh. The Navy could have collected soil samples while installing the wells. Those results could have been used to determine the extent of surface soil that exceeded the screening criteria. 2) The site visit showed a vertical slope between the eastern portion of the site and the marsh, but the Department did not believe the conditions would prevent collecting hand-augered surface soil samples.

The Navy should collect these soil/sediment samples to 1) meet the objective of the RFI which is to delineate the nature and extent of contamination (which at this stage are those constituents that exceed the screening criteria) and 2) support the ecological risk assessment requirements.

23. Lack of sediment information east of the site

Please review the above comment as it may also apply to other media, such as sediment and subsurface soil.

24. Concrete Pads

Figure 2.4.7 shows that concrete pads are located across Shipyard Creek between SWMU 196 and SWMU 121p. The Department believes that past operations conducted on these pads may have contributed to area contamination. The Department requests that the Navy evaluate and provide information about the concrete pads, in addition to proposing a path forward for the concrete pads with respect to the Zone H RFI report.



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SEP 08 2000  
Bureau of Land & Waste Management

**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**FROM:** Michael W. Danielsen, Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** September 8, 2000

**RE:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 170 022 560

Zone H RFI Report Addendum  
Revision 0, Dated May 5, 2000 (received May 19, 2000)

The document referenced above has been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996.

Based on the results of that review, the Department does not approve the RFI Report as written. Of note, the Department is amenable to discuss and resolve the comments:

**Zone H RFI Report Addendum,  
Charleston Naval Complex (CNC)  
Michael W. Danielsen**

**General Comments**

1. The quality of information provided on maps and figures is a huge improvement.
2. The Zone H document, as submitted for SWMU136/AOC 663, and AOC 666, does not include the recommendation/conclusion information from the rapid assessments completed for the UST sites. This information is crucial where tanks are an issue. The additional data would have been a tremendous help for the Department in making decisions and should have been included in this document.
3. This document references a South Carolina Risk Based Screening Level for Groundwater in several sections. The Department does not recognize **any** tables for groundwater except the MCL and Tap Water RBC for cleanup at CNC in RCRA. The Navy has yet to incorporate the correct terminology into all of the reports, rapid assessments, and other documents that discuss groundwater issues. It should be noted that the values noted in the SCRBSL are different from the values found in the MCLs and RBCs. Because of this fact the Department considers this document to be incomplete and cannot make decisions based on the information provided. Please revise all pertinent sections.
4. This document does not evaluate the sites as they pertain to Zone L issues associated with SWMU 136/AOC 663, AOC 666, SWMU 138/AOC 667. Therefore this document is incomplete.
5. This document does not evaluate the sites as they pertain to Zone J issues associated with SWMU 136/AOC 663, AOC 666, SWMU 138/AOC 667. Therefore this document is incomplete.
6. If this document is to be a stand-alone-document it is missing the site geology and hydrogeology sections. Without this information the Department cannot determine the K value, porosity, infiltration rate, and other geologic/hydrogeologic information needed to make proper site decisions. See comment 10 and 11.
7. This document does not define the nature and extent of contamination for indoor air in occupied buildings, the status of OWS, and inorganics in groundwater.
8. This document compares risk-based levels versus risk-based levels for sites that the Navy is recommending a NFA decision. The Department cannot grant a NFA for these areas. The Department also requires the comparison of concentration levels to make risk management decisions. Please revise to include all pertinent data.
9. The section on SWMU 17 provides adequate map production for the CNC project to date for the Navy. The geologic figures and maps are of high quality. The text is also well written in that it lists and explains the reasons for certain data interpretation and analytical results.

## **Specific Comments**

### **10. Page 4, Executive Summary, lines 11-14, 15-19,**

The text uses such terms as “nominally, essentially equal, slightly exceeded”, to describe analyte levels. Please provide the actual levels when making such references.

### **11. Page 1-6, Table 1.1, Zone H AOC and SWMU Summary**

This table shows that SWMU 196, 136/AOC 663, 138/AOC667, and AOC 666 have not previously been investigated. The text indicates otherwise. Please revise the document to clear up this discrepancy

### **12. Page 2-1, Section 2.0, Site Specific Evaluations, lines 6-13**

This sections states that discussions for the supplemental RFI sites include detailed summaries containing: site history and previous investigations, supplemental RFI sampling, revised risk evaluations, and conclusions and recommendations. This is contradictory to Table 1.1, which shows areas that have not been investigated. Furthermore the section describing previous investigations is sufficiently lacking of needed information from the previous work. See comment 6.

#### **Lines 14-17**

This paragraph references figure 2.1 which is supposed to show the AOCs and SWMUs that were investigated in the RFI Addendum. The copy of the document that the Hydrogeology Department received did not contain this figure. Please provide this figure in question.

#### **SMWU 136**

### **13. Page 2-1-2, Section 2.1.2, Previous Investigations**

This section contradicts the Table 1.1 found in Section 1 of this document. Please revise Table 1.1.

### **14. Page 2-1-25, UST Rapid Assessment –Structure 851, second paragraph**

The text states that naphthalene was the only groundwater COC to exceed the SCDHEC risk based screening level (RBSL). All groundwater in SC is classified as “GB” which is suitable for drinking. The Navy must show that the MCL has not been exceeded for any groundwater sample. If no MCL exists then the Tap Water RBC level should be used. See comment # 3. Of note, the MCL is not listed for naphthalene, and the April 1999 table Tap Water RBC is 6.5 ug/L.

The rapid assessment found the naphthalene in well NBCH663-001 at 29.9ug/L from the

March 17, 1999 sampling event. This suggests that the Navy should add this site to the groundwater monitoring plan for the base. The team must decide to continue with this site or, since contamination was found from the Rapid Assessment, be transferred to the UST program.

### **15. Page 2-1-27, Table 2.1.6, Soil Data for Arsenic at SWMU 136/AOC 663**

This table shows that two surface soil and several sub-surface soil samples were not taken. Please explain the reason why these soil samples were not taken.

**16. Page 2-1-28, Section 2.1.3.1, Soil Sampling, lines 18-23**

This text states that certain assumptions were made for risk management decisions, but is not clear if this was a decision the entire team made. Please clarify.

**17. Page 2-1-33, Section 2.1.3.2, Groundwater Sampling, lines 9-10**

The text states that the Navy has had two rounds of sampling showing ND for benzene. The Department will not decide for no further action at this well unless a third ND is found.

**18. Page 2-1-33, Section 2.1.3.2, Groundwater Sampling, Benzene in Groundwater, lines 15-17**

The text states that benzene was not detected in the soil. However in the Underground Storage Tank section there is no mention of soil samples taken from the soil that was used for backfill. Please revise.

**19. Page 2-1-33, Section 2.1.3.2, BEHP in Groundwater**

This section states that some wells adjacent to SWMU 136/AOC 663 have been found to contain BEHP. The text also states that wells associated with SWMU 136/AOC 663 have been found to show BEHP hits above MCL. The Navy must address the issue of contaminants in groundwater above MCL.

**20. Page 2-1-43, Section 2.1.5, COC Refinement, BEHP in Zone H Primary and Blank Samples**

This section explains the purpose of table 2.1.12, which is an attempt to explain the BEHP "hits" for the Zone H wells. The table does offer good information about BEHP found at other sites besides SWMU 136/AOC 663.

**21. Page 2-1-62, Event 3, lines 1-3**

The text states that well 178GW00103 had a detection of 290ug/L of BEHP and well 663GW00203 was validated to non-detect due to the 130ug/l of BEHP found in blank 009DW00703. However, in table 2.1.12, blank 009DW00703 for the third round, is shown to have only a 22ug/L hit of BEHP. Please explain and revise to clear up this discrepancy.

**22. Page 2-1-63, Recommendations/Conclusions**

The recommendation for a NFA does not concur with the Rapid Assessment's conclusion. The Department does not agree with the recommendation of NFA for this site. The Navy needs to address all instances where the MCL/Tap Water RBC has been exceeded.

In addition the Navy must install additional wells downgradient to complete site characterization of groundwater. The present wells are up and side gradient.

**AOC 666**

**23. Page 2-2-2, Section 2.2.2, Previous Investigative Activities**

See comment # 12.

**24. Page 2-2-23, Section 2.2.3.2, VOCs in Groundwater**

This paragraph states that the source of the vinyl chloride and chloromethane is not known.

The project team has speculated that the source may have been a leaky joint on the drain from the OWS. The Navy must sample the contents of the OWS to help to determine the source of vinyl chloride and chloromethane.

The Department requests the Navy to provide mechanical drawings of the current piping system of the OWS still in place.

**25. Page 2-2-35, Conclusions/Recommendations**

The Department does not agree with the recommendation of NFA. The Navy must address the OWS, and other site close out issues before this site can move forward. In addition, the Navy may need to install additional wells NE of well 666001 to ensure that no contaminants have migrated into the sewer ditch line. The present wells at AOC 666 do not properly characterize groundwater conditions SE of the former UST NS45.

**SWMU 138/AOC 667**

**26. Page 2-3-1, Section 2.3.1 Site description and Conceptual Model, lines 20-23**

The text states that the soil and groundwater were sampled to determine if releases associated with petroleum product storage and dispensing at the storage tank. The text is not clear if there were any samples conducted on the contents of the OWS or the surrounding areas to determine if there had been any releases associated with the OWS. Please explain/clarify.

**27. Page 2-3-9, Section 2.3.2, SWMU 138/AOC 667 Site History, lines 7-12**

The text states that a pathway for groundwater was not included in the human health risk assessment because no COPCs were identified in the screening process. There were constituents found above the Tap Water RBC so the risk evaluation should have been formally conducted. Future risk management decisions can be made for carrying the COPCs into the CMS. Please revise where needed.

**28. Page 2-3-23, Section 2.3.5, COC Refinement**

This section briefly mentions the process of hydrolysis and references a generalized flowchart of organic degradation. The Department requires more detailed data to support the site-specific hydrolysis process to determine the path forward.

**29. Page 2-3-23, Section 2.3.6, Conclusions**

The Department does not agree with the recommendation of NFA for this site. The Navy must provide more detailed information on the stated natural degradation process.

The Navy may also need to install additional wells to better characterize the groundwater downgradient and on the northeast side of the sewer line.

**SWMU 196**

**30. Page 2-4-2, Section 2.4, Site history, lines 18-20.**

The text states that chlorobenzene, methylene chloride, and 1,2-dichlorobenzene were detected above screening values in groundwater. The Department uses the MCL or Tap Water RBC table when referencing groundwater contamination. Please clarify which screening values were used for this comparison.

**31. Page 2-4-32, Section 2.4.1, Physical Setting and Geology, lines 18-19**

The text states that Shipyard Creek (surface water body) is the discharge point for groundwater. The Navy must act immediately to gain control of groundwater flow and/or initiate remediation at this site.

**32. Section 2.4, Physical Setting and Geology**

This section does not include any geological cross sections to help describe the site specific geology/hydrogeology. Please revise section to include all pertinent maps and figures.

**33. Page 2-4-36, Section 2.4.2.5, Temporary Monitoring Well Installation, lines 22-23**

The text states that 4 wells were installed. However a search of well approvals did not turn up an approval letter issued from the department. If the Navy did receive such approval, please provide a copy of the letter.

**34. Page 2-4-37, Section 2.4.2.5, Temporary Monitoring Well Installation, lines 9-10**

The text states that when the wells are abandoned, the boreholes will be filled with bentonite. This is a direct violation of the SC well Regulations. See SC Well Regulation 61-71.10.B.(5), which states that boreholes must be filled with bentonite grout. The Department would like to discuss this issue for further necessary action.

**35. Page 2-4-168, Section 2.4.9 Groundwater Sampling and Analysis, lines 11-12**

The text states that after sampling, the temporary well was abandoned and the borehole was filled with bentonite. See comment # 34.

**36. Page 2-4-173, Section 2.4.9 Groundwater Sampling and Analysis, lines 5-8**

The text states that in May 1999, the four temporary wells were installed in the marsh adjacent to the to Shipyard Creek and sampled. Wells 196DF01, 02, 03, 04 are identified in Table 2.4.22 as being temporary wells sampled in June 1999. Please provide the well ID numbers to verify their locations on a site-specific map.

**Lines 8-11**

This portion of the text states that a comparison of sampling techniques was made but does not provide the conclusion of that experiment. The reference made to Section 2.4.2.6 does not provide that explanation. Please provide the results and conclusions of the conventional and diffusion sampling techniques and determine if which method (or both) is recommended for future sampling.

**37. All figures, Section 2.4.10**

The figures showing groundwater contours and contaminants provided in this section are an example of excellent work for interpretation of groundwater nature and extent.

However, some figures for soil and groundwater do show large areas of data gaps. The Navy should make plans to initiate further delineation of contaminants to facilitate quick groundwater control and remediation.

**38. Page 2-4-177, Section 2.4.10, Nature and Extent of Contamination in Groundwater, lines 17-19**

The text states that the results from the conventional method of diffusion sampling will be used for nature and extent evaluation, fate and transport assessment, human health risk assessment, and ecological risk assessment. Please explain why all diffusion sample results were not used for the nature and extent evaluation, fate and transport assessment, human health risk assessment, and ecological risk assessment.

**39. Page 2-4-194, Section 2.4.10, Nature and Extent of Contamination in Groundwater, lines 3-4**

The text states that acetone was the only VOC found in deep groundwater and did not exceed the tap water RBCs. While this fact may be true, acetone is not naturally occurring in this area. The Navy should offer some explanation as to how/why acetone was found in the deep groundwater.

**40. Page 2-4-336, Section 2.4.15.2 Groundwater Migration and Groundwater-to-Surface Water Cross-Media Transport, Deep Groundwater, lines 1-5**

The text states that the groundwater pathway has merit because of the close proximity of site wells GEL015, 009020, and 009021 to Shipyard Creek and groundwater flows toward the Creek. Because the wells are down gradient from well 009022, any upgrade exceedances that are not also exceedances in the three downgradient wells are not considered significant. The Department reminds the Navy that any exceedance over MCL or Tap Water RBC and would warrant appropriate attention to properly address regardless of the location of the well.

**41. Page Section 2.4.18, Conclusions and Recommendations**

This section recommends a CMS for surface soil and shallow groundwater. The Department conditionally agrees with this recommendation, but also reminds the Navy that the RFI Report for SWMU 196 is not complete. The Navy must complete the nature and extent and site characterization before the RFI can be considered as complete. Please revise current RFI information to include all pertinent information.

Previous investigations have found chlorobenzene at SWMU 9 and SWMU 121. The Navy may want to look at this area in the bigger picture to help with source characterization.

**SWMU 17**

**42. Page 2-5-7, Section 2.5.1 Site History/Conceptual Model, lines 5-6**

This text states that it is not known if PCB contaminated soils have been removed. If this statement is still true then the nature and extent for the present time is not complete. The sampling to date should be an indication as to whether the contamination is still in place or not. Please revise to reflect the present conditions.

**43. Page 2-5-92, Section 2.5.5.1 Subsurface soil, lines 22-23**

The text states that some locations were not sampled due to the fact that there were no obvious sign of contamination such as odor or staining. The Department does not recognize this as acceptable and points out that a data gap may exist at these locations where visual acuity deselected samples for analysis. Please provide a list of all sample locations that were not completed because of visual observations.

**44. Page 2-5-105, lines 12-24**

The statement is made that no “obvious signs of contamination “ were found, and the sample was not analyzed for VOCs. See comment above (43)

**45. Page 2-5-106, lines 10-11, 19-20**

See comment 43.

**46. Page 2-5-115, lines 1-5, 13-14, 23-24**

See comment 43.

**47. Page 2-5-116, lines 11-12**

See comment 43.

**48. Page 2-5-128, lines 17-18**

See comment 43.

**49. Page 2-5-226, Section 2.5.5.2 Volatile Organic Compounds in Groundwater, lines 18-21**

The text states that benzene contamination has been delineated in all directions by no-detects. However, Figure 2.5.33 shows open-ended contours for benzene west of 017003. Please propose a plan to correct this data gap.

**50. Page 2-5-242, Volatile Organic Compounds in Groundwater, lines 1-7**

The text states that chlorobenzene plume was delineated in all directions by non-detects at 017W02 and 107W01. However the figure 2.5.35 shows open-ended contour lines. This suggests data gaps exist. Please revise the figure or propose a plan to correct this data gap.

**51. Figure 2.5.38**

The figure shows methylene chloride above MCLs and RBCs with open-ended contour lines. Please propose a plan to correct data gap and/or address this exceedance.

**52. Figure 2.5.39**

See comment # 50.

**53. Page 2-5-253, Section 2.5.5.2, Semivolatile Organic Compounds in Groundwater, lines 5-11**

The text states that it is believed that the occurrence of benzidine is a one time anomalous detection. This detection is 5 orders of magnitude above the RBC and will not be ignored as anomalous hit. The Navy must properly address this issue. Please propose a plan to address this exceedance and correct the data gap shown in figure 2.5.40.

**54. Page 2-5-254, Semivolatile Organic Compounds in Groundwater, lines 17-21**

The text states that dibenzofuran remains undefined to the northwest and southwest, and is shown on figure 2.5.45. See comment #50.

**55. Figure 2.5.49**

See comment #50.

**56. Page 2-5-282, Section 2.5.5.2, Semivolatile Organic Compounds in Groundwater, lines 10-26**

The text states that 1,2,4-trichlorobenzene was found to exceed the MCLs and RBCs in all pre-1999 samples, and if 017002 had been sampled in 1999 an expected MCL exceedance would have made it possible to close the contaminant contour lines. This text and the figure 2.5.5.1 indicate a data gap exists. Please propose a plan to correct data gap.

**57. Figure 2.5.51**

See comment #50.

**58. Figure 2.5.55**

This figure indicates open-ended contour lines for naphthalene west of 017B08. This suggests a data gap in this area. Please propose a plan to correct data gap.

**59. Figure 2.5.55**

This figure indicates open-ended contour lines for naphthalene west of 017B08. This suggests a data gap in this area. Please propose a plan to correct data gap.

**60. Figure 2.5.61**

See comment #50.

**61. Page 2-5-413, Section 2.5.8, Groundwater, lines 11-15**

The text states that benzidine should not be considered as a COC for SWMU 17. The detection of benzidine was so substantial that it should be addressed in some fashion.

**62. Page 2-5-415, Section 2.5.9, Conclusions and recommendations, lines 21-23**

The text refers to RBCs without mention of MCLs. See comment # 60.

**63. Page 2-5-421, Section 2.5.9, Conclusions and recommendations, lines 18-21**

The Navy recommends that a CMS be done for surface soil and shallow groundwater at SWMU 17. The Department agrees with this recommendation, but reminds the Navy to apply all previous comments to future investigations to close data gaps and not leave out any important contaminants. This may include additional contaminants being added to the CR list and closing contour lines to make risk management decisions easier for the Team to make.

# **Risk Review Comments: Human Health Risk Aspects, AOC 666, 667, SWMU 138 Charleston Naval Complex Zone H**

From: Ted Simon, PhD, DABT, Toxicologist  
Office of Technical Services  
USEPA, Region 4

## ***Major Comments:***

### **AOC 667/SWMU 138**

The reason for revisiting this risk assessment was the change in the groundwater risk -based concentration for chlorethane. The current RBC is 3.6  $\mu\text{g/L}$  based on a revision of the oral cancer slope factor based on results from the National Toxicology Program of a rodent inhalation study of chlorethane.<sup>1</sup> NTP concluded that evidence of carcinogenicity was presented for female mice displaying uncommon carcinomas of the uterus and liver tumors. Data for male mice were considered by the investigators to be inadequate to assess carcinogenic activity due to decreased survival not related to carcinogenic effects, although increased incidence of alveolar/bronchiolar tumors were observed in exposed male mice. NTP reported that equivocal evidence was found for male and female rats displaying skin neoplasms and uncommon malignant astrocytomas of the brain, respectively. The oral slope factor was based on uterine tumors in female mice.

The most recent round of sampling showed a concentration of 240  $\mu\text{g/L}$  chlormethane in groundwater. The lifetime risk from consuming this water under a residential scenario would be 1.4E-04. This number includes exposure from ingestion and inhalation during showering. The risk assessment presented in the document wrongly eliminated inhalation during showering as an exposure pathway for chlorethane.

I do not agree with the no further action recommendation presented for AOC 667/SWMU 138. I do recommend that a hydrogeologist determine whether natural attenuation may be a reasonable remedial alternative.

---

<sup>1</sup>NTP (National Toxicology Program). 1989. *Toxicology and carcinogenesis studies of chlorethane in F344/N rats and B6C3F1 mice. Inhalation studies*. NTP Technical Report No. 346. National Toxicology Program. Research Triangle Park, NC.

## **AOC 666**

Recent groundwater sampling events have revealed a reduction in vinyl chloride and chlormethane concentrations to nondetect levels. Hence, groundwater is no longer a concern. Seven additional surface and subsurface soil samples were obtained and the exposure point concentrations for arsenic recalculated using the Land method based on these additional samples was 15.5 mg/kg. I calculated the 95% UCL with the Land method as 16.5 mg/kg.

Region 4 has chosen to recommend that arsenic be regulated considering both the carcinogenic and noncarcinogenic endpoints of this chemical. 16.5 mg/kg is below the noncancer residential RBC for arsenic and falls below a 1E-04 risk considering a residential scenario. Therefore, I concur with the no further action recommendation for AOC 666.

## ***Minor Comments:***

### **Clarity of Expression and Writing Style**

This is one of the most poorly written documents I have encountered during my tenure at EPA. The services of a competent technical editor should be secured to review future submissions to the Agency.



**DEPARTMENT OF THE NAVY**

SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 190010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-9010

5090/11  
Code 18B1  
14 September, 2000

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: SUBMITTAL OF CORRECTIVE MEASURES STUDY WORK PLAN FOR SOLID  
WASTE MANAGEMENT UNIT 43

Dear Mr. Litton,

The purpose of this letter is to submit the Corrective Measures Study Work Plan for Solid Waste Management Unit (SMWU) 43 located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

This document and the proposed rationale for no further action were discussed at the September Project Team meeting. The document has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

A handwritten signature in cursive script that reads "Matthew A. Hunt".

Matthew A. Hunt, P.E.  
Environmental Engineer  
BRAC Division

Copy to:  
SCDHEC (4),  
USEPA (Dann Spariosu)  
CSO Naval Base Charleston (Matt Humphrey)  
CH2M-Hill (Dean Williamson)



**DEPARTMENT OF THE NAVY**

SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 190010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-9010

5090/11  
Code 1877  
18 September, 2000

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: NOTIFICATION OF AREAS OF CONCERN ASSOCIATED WITH OIL/WATER  
SEPARATORS AND WASTE OIL TANKS

Dear Mr. Litton,

The purpose of this letter is to provide notification of additional Areas of Concern that are associated with Oil/Water Separators and Waste Oil Tanks at the Charleston Naval Complex. The notification is required by condition II.B.1 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

The AOCs identified under this notification are;

<u>Site</u>	<u>Description</u>	<u>Investigative Zone</u>
AOC 711	Oil/Water Separator at Facility 200	Zone I
AOC 712	Waste Oil Tank at Facility 240	Zone F
AOC 713	Oil/Water Separator at Facility 241	Zone F
AOC 714	Waste Oil Tank at Facility 242	Zone F
AOC 715	Waste Oil Tank at Facility 681	Zone I
AOC 716	Oil/Water Separator at Facility 1024	Zone E

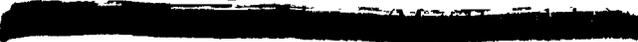
The investigative approach (i.e., NFA, RFI, CSI, etc.) will be determined through discussion with the Charleston Naval Complex Project Team. This investigative approach and the RCRA Facility Assessment will be submitted within 90 days of this notification as required by permit condition II.B.2.

If you should have any questions please contact Matthew Humphries or myself at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

*M. A. Hunt*

M.A. HUNT, P.E.  
Environmental Engineer  
Installation Restoration III

Copy to:  
SCDHEC (4)  
USEPA (Dann Spariosu)  
  
CH2M Hill (Dean Williamson)



2600 Bull Street  
Columbia, SC 29201-1708

September 19, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Damaged and Compromised Monitoring Wells at the Charleston Naval Complex, SCO 170  
022 560, Noted during the August 7 & 9, 2000 Site Visits.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) conducted a scheduled site visit at SWMU 14, AOC 542, and SWMU 196 of the Charleston Naval Complex on August 7 & 9, 2000. The attached memorandum provides text and visual photographs of the damaged and compromised groundwater monitoring wells observed during the site visit.

The Department recommends that the Navy schedule the field work to rectify the noted discrepancies with the groundwater monitoring wells within thirty (30) calendar days of the receipt of this letter.

Should you have any questions regarding this letter, please contact me at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

cc: Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Dean Williamson, CH2M HILL  
Todd Haverkost, EnSafe

**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Paul M. Bergstrand, P.G., Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 28 August 2000

**RE:** Charleston Naval Base (CNAV)  
Charleston County, South Carolina  
SC0-170-022-560

Damaged and Compromised Monitoring Wells  
Noted during two Site Visits  
7 and 9 August 2000

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERFA 120(h) as amended.

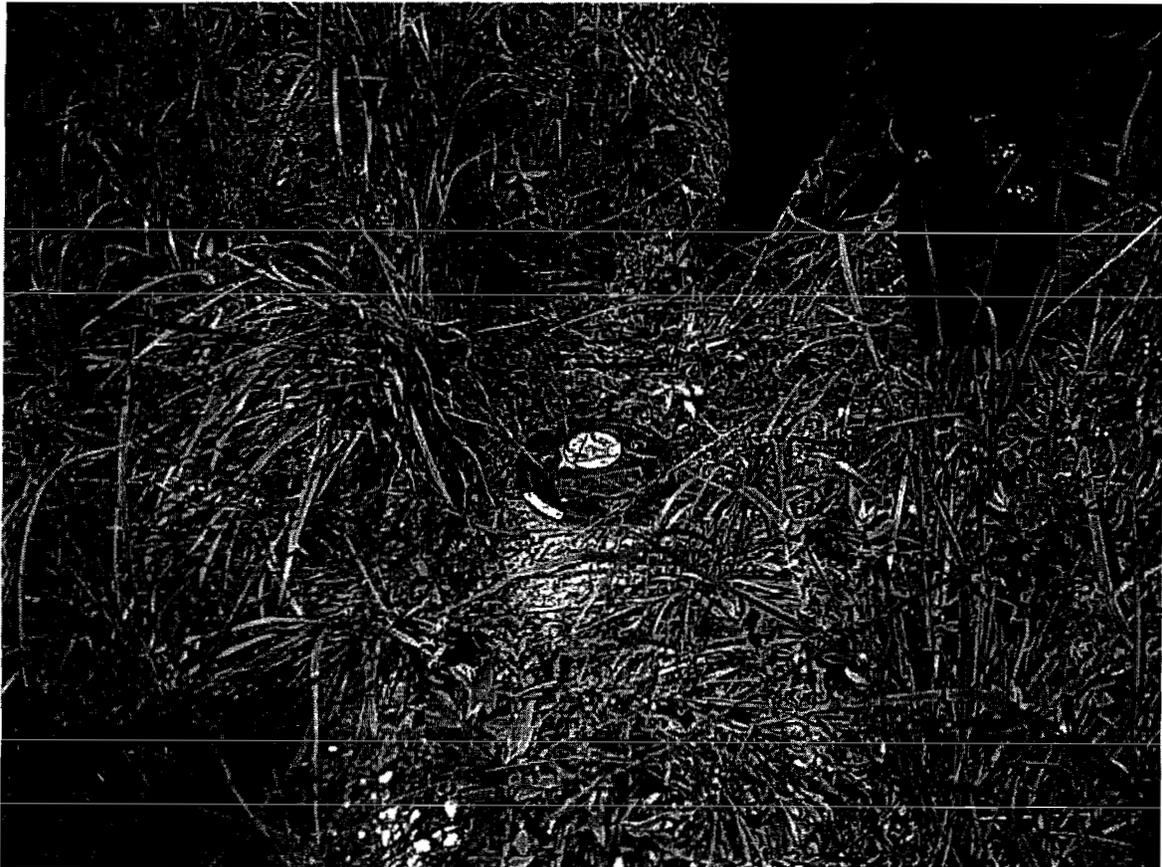
## Wells at Charleston Naval Complex

Paul M. Bergstrand

28 August 2000

### 1. WELL GEL-15, SWMU 196

During a site visit on 7 August 2000 it appeared the monitoring well GEL 15 was installed without a pad. This installation appears to contradict the proposed construction plans as described in the 30 May 1996 monitoring well request. The relevant sections of that request are included with this memo. This monitoring well should be brought up to standards by having a suitable pad constructed around the well cover within the next thirty days.



## Wells at Charleston Naval Complex

Paul M. Bergstrand

28 August 2000

### 2. SWMU 14, Well 014GW002

This monitoring well has had the pad and posts sink around the PVC well. Because of this the steel protective cover of the well cannot be closed. The cap to this well was not secured or locked. This provides unrestricted access to the well. This well had previously reported low levels of contamination. This monitoring well should be brought up to standards then resurveyed within the next thirty days.



Wells at Charleston Naval Complex

Paul M. Bergstrand

28 August 2000

3. AOC 542, Well 542GW001

This monitoring well has been severely compromised. The cap to this well was not secured or locked. This provides unrestricted access to the well including runoff. This monitoring well should be brought up to standards within the next thirty days.



Richard L. Tapp, Jr., Esquire  
May 24, 1996  
Page 6

Sum 196

The second lease parcel includes only one building, 1838, which is a single story structure built in 1979. The area surrounding building 1838 was formerly marsh land which has been filled with a variety of materials, potentially including waste products. Since being filled, the land has been used for storage of transformers, paint, lube oil, battery acid, scrap metal, and solvents. In addition, a potassium chromate AST and several scrap tanks were previously located on the site. The site presently has two shallow and one deep groundwater monitoring wells. To obtain adequate data to evaluate baseline conditions, we will sample the two existing shallow wells, install up to three additional wells around the periphery of the site, and collect and analyze up to five shallow soil samples.

**Task 3:** Upon completion of all field activities and analyses, we will provide you with a verbal report of our findings and conclusions. Following your approval, we will prepare a final report of our findings. The report will document the presence or absence of environmental degradation on the parcels that CPW plans to lease.

We are assuming that you will be the ultimate recipient of the report and we will not distribute the report to any other party without prior approval from you. Additionally, all findings will be held in confidence by us and not disclosed to any person without your approval. However, as required by SC Well Standards and Regulations 61-71, groundwater analytical data, monitoring well schematics, and lithologic logs will be submitted to DHEC.

**CLOSURE**

If, in your judgment, the scope discussed above needs to be modified to better meet your needs, please inform us and we will adjust the scope of services accordingly. We anticipate that the report can be submitted to you within six weeks of your approval. If a quicker schedule is needed, please let us know, and we will make every effort to meet your schedule.

We appreciate the opportunity to submit this workplan and assure you we will provide you with high quality, cost effective services performed by knowledgeable and experienced personnel. If you have any questions or need additional information, please call us at (803) 769-7378.

Sincerely,  
*Tracy D. Jones*  
Tracy D. Jones  
Hydrogeologist II

*Tom Hutto*  
Thomas D.W. Hutto, P.G.  
Senior Hydrogeologist

Approval for Execution:

Mr. Richard L. Tapp, Jr.

fc: cpwc00196.wkpln.052396

**ATTACHMENT****PROPOSED PERMANENT GROUNDWATER  
MONITORING WELL INSTALLATION PROCEDURES****Proposed Commissioners of Public Works Lease Areas  
Naval Base Charleston  
North Charleston, South Carolina**

Permanent groundwater monitoring wells MW-1 through MW-17 will be installed into the uppermost aquifer by a South Carolina Certified Well Driller at the locations shown on Figures 1 and 2. These wells will be installed with a drill rig equipped with 4 1/4-inch inside diameter hollow stem augers to depths approximately 8 to 10 feet below the water table, which is anticipated to be approximately 5 feet below land surface (bls). Therefore, the wells will be approximately 15 feet in total depth. Equipment used in the installation process will be steam-cleaned prior to use at the site and in between each well installation. In addition, a photo-ionization detector (PID) or flame ionization detector (FID) will be used during the well installation activities to monitor environmental conditions at the site.

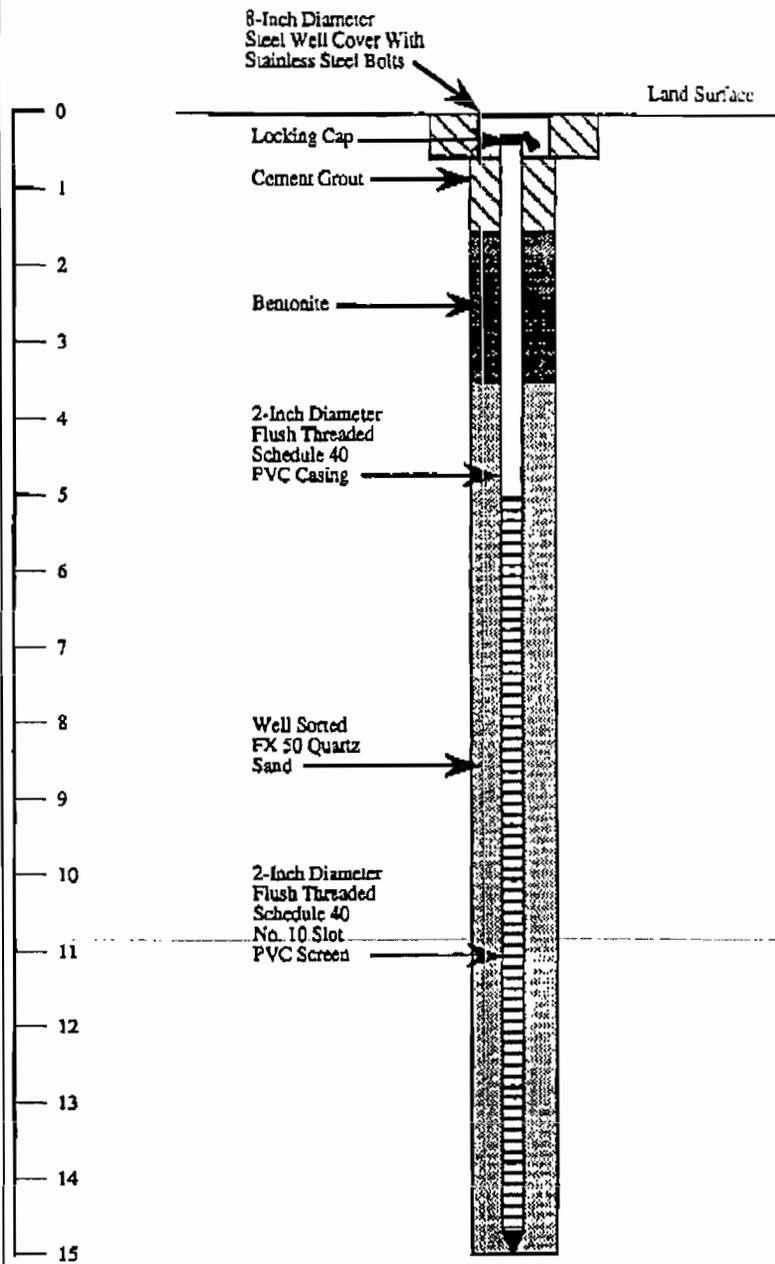
To construct the wells, 2-inch diameter, flush threaded, PVC well casing and a 10-foot, No. 10 slot screen will be placed in the borehole. After placement of the PVC casing and screen in the borehole, a medium-grained sand will be used for the sand pack and will extend approximately 18 inches above the top of the screen. A hydrated bentonite plug, at least 2-feet thick, will then be emplaced above the sand pack to seal the borehole.

[REDACTED] ] 196 WORK PLAN

As an option of CPW, an above-grade protective well cover may be used to protect the well casing. A generalized well schematic is included as Figure 3. The monitoring wells will be developed after installation by pumping and surging and/or bailing until relatively sediment free water is produced.

Sample collection procedures and field measurements will be conducted in accordance with accepted United States Environmental Protection Agency and South Carolina Department of Health and Environmental Control (DHEC) protocols. The monitoring wells will be sampled no sooner than two days following well installation. After measuring the depth to groundwater, each well will be evacuated to remove stagnant water. If the well has a sufficient yield, it will be evacuated by removing a minimum of three casing volumes and until pH and specific conductivity measurements have stabilized. If the well is evacuated to dryness prior to removing three casing volumes, it will be sampled as soon as an adequate volume of water has recharged the well casing.

After evacuation of the monitoring wells is complete, a set of laboratory-cleaned, pre-preserved, pre-labeled bottles will be removed from a cooler. Each well will be sampled using a pre-cleaned Teflon™ bailer. Fresh sample will be poured into each container directly from the bailer. Laboratory quality PVC gloves will be worn by sampling personnel throughout the sampling process. Full sample containers will be placed on ice in a pre-cleaned cooler. A Chain of Custody Record will be maintained



GENERAL ENGINEERING LABORATORIES, INC.



Environmental consulting and analytical services

P.O. Box 25712  
CHARLOTTE, NC 28227  
(704) 354-8771

PROJECT: 09-001196

EVALUATION OF BASELINE ENVIRONMENTAL CONDITIONS PROPOSED CPW LEASE AREAS NAVAL BASE CHARLESTON CHARLESTON, SOUTH CAROLINA

PERMANENT DESIGNATED MONITORING WELL

DATE: May 25, 1996

DRAWN BY: KFL

APPROV. BY: TDJ



2600 Bull Street  
Columbia, SC 29201-1708

26 September 2000

CERTIFIED MAIL

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
1690 Turnbull Avenue, Building NH-51  
Charleston Naval Base  
Charleston, SC 2940

RE: Naval Base Charleston (CNAV)  
Charleston, South Carolina  
SC0-170-022-560

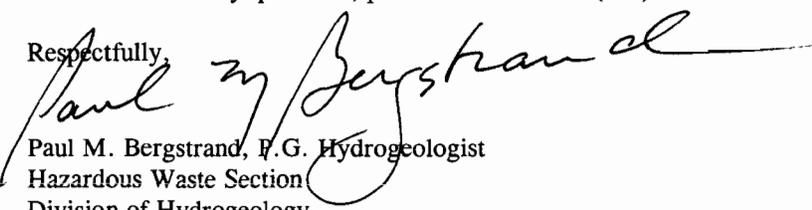
Temporary Monitoring Well Request for Zone K,  
Off-Site Study  
Revision 0, Dated 27 July 2000

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of ten Direct Push Temporary (DPT) monitoring wells to assess the conditions within the surficial aquifer. The DPT wells should be completed to a maximum depth of approximately fifty feet.

Attached, please find a copy of the proposed well locations. A copy of the well approval form and this letter should be on site during drilling operations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,

  
Paul M. Bergstrand, F.G. Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

Enclosures  
PMB/pmb  
HW-00-062

CC: Christine Sanford-Coker, Trident District EQC  
Paul Bristol, BOW  
Tim Hornosky, BLWM  
Mihir Mehta, Hazardous Waste Permitting Section  
Al Urrutia, CES, Charleston  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464  
Casey Hudson, CH2M Hill, 225 E. Robinson St, Suite 505, Orlando FL 32801-4322

DD000602.TMW



2600 Bull Street  
Columbia, SC 29201-1708

## Temporary Well Installation Approval

Approval is hereby granted to: Mr. Shepard of Naval Base Charleston for

Zone K  
Naval Base Charleston  
Charleston County

for the construction of ten DPT monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 27 July 2000 (Haverkost to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate fifty feet below the surface to assess the conditions of the surficial aquifer.

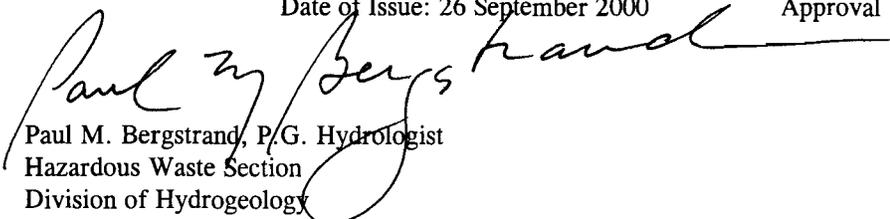
### Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual construction details for each direct push well point be submitted to the Department within 30 days after installation of the last well point. The collection of GPS data is encouraged.
3. All well construction and sampling derived wastes, including but not limited to, drill cuttings and fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
4. That requirements R.61-71.11.C(1-7) for completing these borings as permanent monitoring wells are waived.
5. That all sampling points will be abandoned as outlined in R.61-71.10.
6. Field equipment, including sampling probes, must be decontaminated by steam cleaning or other suitable methods before use and between sampling locations. Well screens and casing must be decontaminated before installation.
7. That notice be given to Christine Sanford-Coker, Charleston District EQC Hydrogeologist, during normal business hours at (803) 740-1590 a minimum of 48 hours before the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Well Standards and Regulations, R.61-71.

Date of Issue: 26 September 2000

Approval Number: HW-00-062

  
Paul M. Bergstrand, P.G. Hydrologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

# DPT Wells

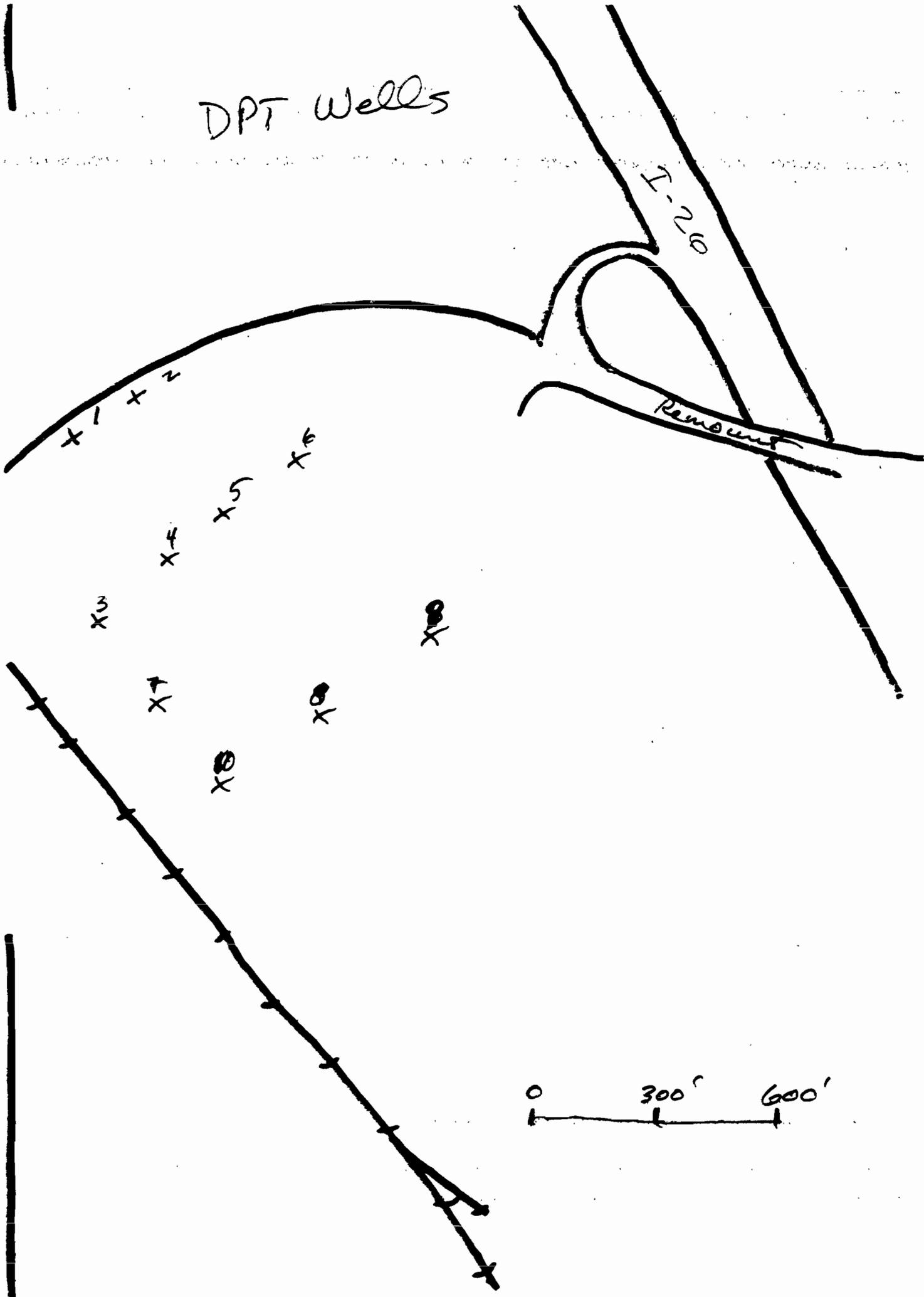


Figure 1  
Zone K Proposed Offsite DPT Locations



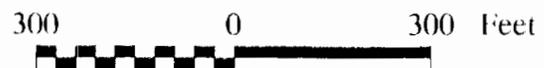
**LEGEND**

● Shallow/Deep GW Sampling Locations  
for VOCs

✚ Proposed DPT Boring Location/GW  
Sampling Point

Air Force Property Boundary

Aerial Photograph - June 1998





2600 Bull Street  
Columbia, SC 29201-1708

26 September 2000

CERTIFIED MAIL

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
1690 Turnbull Avenue, Building NH-51  
Charleston Naval Base  
Charleston, SC 2940

RE: Naval Base Charleston (CNAV)  
Charleston, South Carolina  
SC0-170-022-560

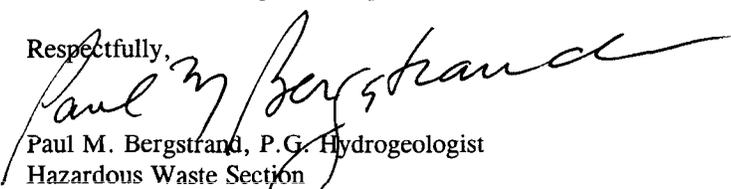
Piezometer Monitoring Well Request for Zone K,  
Off-Site Sutdy  
Revision 0, Dated 27 July 2000

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of four piezometer wells to assess the conditions within the surficial aquifer. The piezometer wells should be completed to a maximum depth of approximately fifty feet.

Attached, please find a copy of the proposed well locations. A copy of the well approval form and this letter should be on site during drilling operations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,

  
Paul M. Bergstrand, P.G. Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

Enclosures  
PMB/pmb  
HW-00-061

CC: Christine Sanford-Coker, Trident District EQC  
Paul Bristol, BOW  
Tim Hornosky, BLWM  
Mihir Mehta, Hazardous Waste Permitting Section  
Al Urrutia, CES, Charleston  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464  
Casey Hudson, CH2M Hill, 225 E. Robinson St, Suite 505, Orlando FL 32801-4322

DD000601.MWA



2600 Bull Street  
Columbia, SC 29201-1708

## Piezometer Well Installation Approval

Approval is hereby granted to: Mr. Shepard of Naval Base Charleston for

Zone K  
Naval Base Charleston  
Charleston County

for the construction of monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 27 July 2000 (Haverkost to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate fifty feet below the surface to assess the conditions of the surficial aquifer.

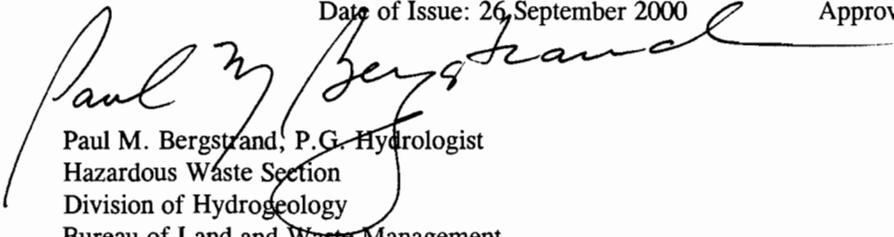
### Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual construction details for each direct push well point be submitted to the Department within 30 days after installation of the last well point. The collection of GPS data is encouraged.
3. All well construction and sampling derived wastes, including but not limited to, drill cuttings and fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
4. That the wells are labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide the monitoring well identification number, date of construction, static water level and driller name and state certification number.
5. Field equipment, including sampling probes, must be decontaminated by steam cleaning or other suitable methods before use and between sampling locations. Well screens and casing must be decontaminated before installation.
6. That notice be given to Christine Sanford-Coker, Charleston District EQC Hydrogeologist, during normal business hours at (803) 740-1590 a minimum of 48 hours before the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Well Standards and Regulations, R.61-71.

Date of Issue: 26 September 2000

Approval Number: HW-00-061

  
Paul M. Bergstrand, P.G. Hydrologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

DD000601.MWA

Piezo

I-26

Remount

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3

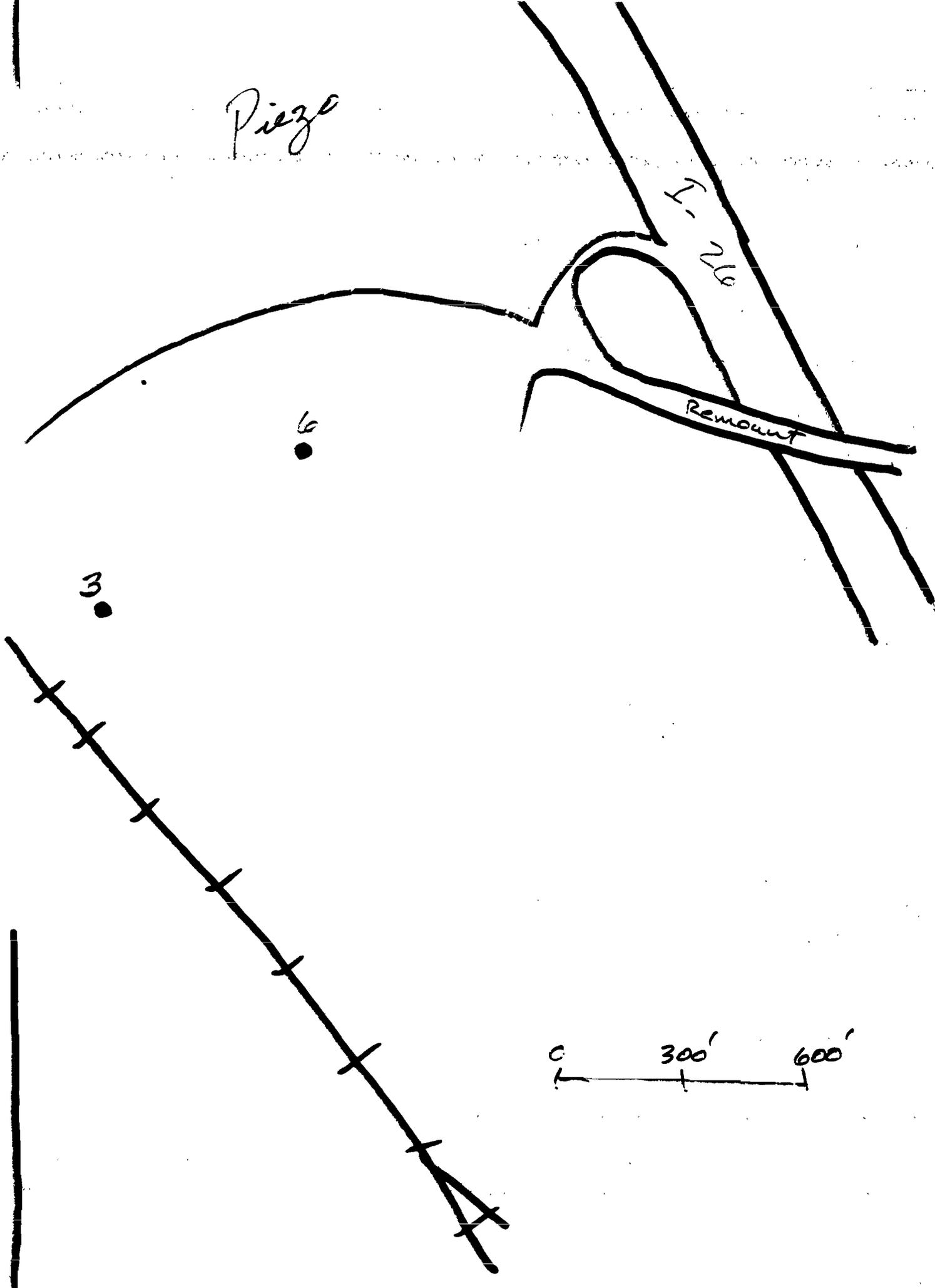
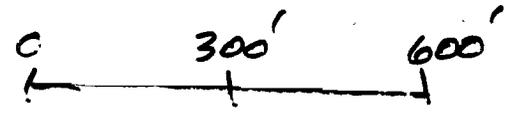
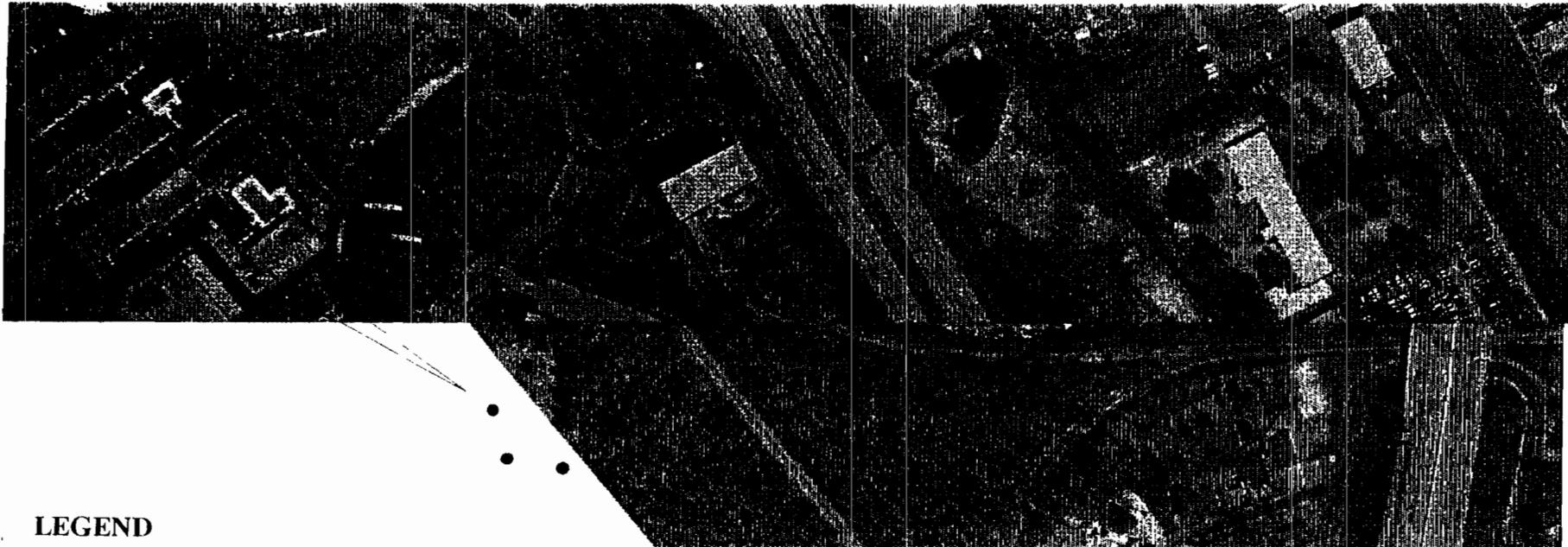


Figure 1  
Zone K Proposed Offsite DPT Locations



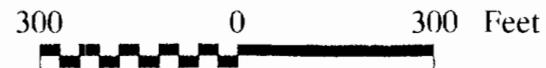
**LEGEND**

Shallow/Deep GW Sampling Locations  
for VOCs

✚ Proposed DPT Boring Location/GW  
Sampling Point

Air Force Property Boundary

Aerial Photograph - June 1998





2600 Bull Street  
Columbia, SC 29201-1708

September 27, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan (Rational for No Further Action) for SWMU 43 located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated September 2000, received September 7, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated September 20, 2000.  
Memorandum from Mansour Malik to Mihir Mehta dated September 19, 2000.

cc: Paul Bergstrand, Hydrogeology  
Mansour Malik, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

COMMISSIONER:  
Douglas E. Bryant

BOARD:  
John H. Burriss  
Chairman

William M. Hull, Jr., MD  
Vice Chairman

Roger Leaks, Jr.  
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Susan Peterson, Environmental Engineer Associate *Susan Peterson*  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** September 20, 2000

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Corrective Measures Study Work Plan,  
Rationale for No Further Action  
Solid Waste Management (SWMU) 43  
Dated September 2000

Upon review of this report, the Department has the following comments:

### Comments

1. SWMU 43 boundary

As per the RFA, the boundary of SWMU 43 included Building 1628 and the outside storage area. The RFI investigation for SWMU 43 focused on the eastern portion of the SWMU (outside storage area). This portion is where a corrugated metal shed formerly stored hazardous wastes and materials that accumulated as the result of SWMU 43 operations. Since the entire area around SWMU 43 was not investigated as part of this RFI, the Department would like to discuss and agree upon an appropriate path forward with respect to the proposed NFA.

2. Need for additional information, Section 2.3.

The Navy provides a well-written statement on lines 22 through 26 on page 2-1 that describes the inorganics in groundwater issue for the purpose of site close-out documentation. However, this section lacks information to support the Navy's recommendation of no further evaluation. The Navy should provide a summary of the inorganics in groundwater in order to support their recommendation. This may include, but is not limited to a) a figure (such as Figure 2-1) that shows the location of

Comments  
CMS Work Plan, Rationale for NFA at SWMU 43  
Prepared by Susan Peterson  
September 20, 2000

the monitoring wells b) statements describing the frequency of monitoring and c) a summary of the analytical results (that may support the general statement of intermittent detections, no exceedences, trends etc.).

3. Justification for recommendation needed, Section 2.5

The Navy states that the nearest investigated stormwater sewer is located a significant distance away, and bases its recommendation of no further evaluation of linkage on that statement. The Navy should revise this section to support that recommendation. The Navy should justify that the distance would prevent contamination at SWMU 43 from impacting the stormwater sewer. The justification may include, but is not exclusive of information on groundwater flow direction, topography, migration pathways etc.

4. Types of lines

Please revise Figure 2-3 to differentiate the sanitary sewer system and the stormwater system lines. In addition, more lines exist that are not included on this figure. Please revise figure 2-3 to include all lines.

5. Samples collected to support linkage to sewer and stormwater lines

It appears that too great a distance exists between samples collected (037SP010) to establish or refute a linkage between SWMU 43 and the sewer/storm lines. The Department would like to discuss the issue of horizontal distance and vertical depth of these samples with the BCT prior to concurring on an NFA recommendation.

6. Justification for recommendation needed, Section 2.6

The Navy states that the nearest investigated railroad line to SWMU 43 is approximately 350 feet to the west and 350 feet to the northeast, and bases its recommendation of no further evaluation of linkage to that statement. The Navy should revise this section to support that recommendation. The Navy should justify that the distance would prevent contamination at SWMU 43 from impacting the railroad line. This justification may include, but is not exclusive of information on groundwater flow direction, topography, migration pathways, etc.

7. Issues to be addressed in Section 2.7

The Navy should state whether or not a sewer or stormwater line connecting the source (SWMU 43) to a surface water body exists. The Navy also needs to state the existence or absence of hits in the surface water body near the connection. If such hits exist, the Navy needs to prove that the hits are related or not related to the source (SWMU 43).

8. Need for additional information, Section 2.8

Please revise this section to support the statement "No OWSs were identified near SWMU 43." This may include providing information regarding the following: a) the date the Navy conducted a site walk-through b) the fact (or approximate dates) that

Comments  
CMS Work Plan, Rationale for NFA at SWMU 43  
Prepared by Susan Peterson  
September 20, 2000

the Navy reviewed site maps, drawings, and records for the presence of OWS and c) whether the site walk-through and records search indicated the presence of any OWS near or within the boundary of SWMU 43.

9. Recommendation for additional information, Section 2.9

The Navy should state that they have addressed all site close-out issues. In addition to negating the need for land-use controls, the Navy may add a sentence that summarizes that the apparent path forward would be for unrestricted use of property at the portion of SWMU 43 that has been investigated.

10. Inclusion of a an additional section

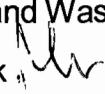
The Navy may use this section to recommend a modification to the existing Permit. The Navy should note their intention to submit appropriate Public Noticing paperwork (such as Fact Sheet, Statement of Basis) in the future.



*Division of Hydrogeology  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002*

**Memorandum:**

**To:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division Of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**From:** Mansour N. Malik   
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**Date:** 9/19/00

**Re:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 1 70 022 560

---

Corrective Measure Study Work Plan

Rationale for No Further Action

Solid Waste Management Unit (SWMU) 43

Revision 0, Dated September, 2000

The Document referenced above has been reviewed with respect to the requirement of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERCLA 120(h) as amended.

**Prior to an NFA and based on the results of the current review, the Navy must resolve the following comments. The Department is amenable to discuss and help in resolving those comments:**

---

**General Comments:**

1. This CMS-WP, submitted as a stand-alone document, is very generalized. The Department would like to see a comprehensive document with detailed substantiated evidence to support an NFA.
2. The Zone A RFI Report shows SWMU 43 as building 1628, the Publication and Printing Plant. The sampling conducted seems to encompass only the small shed storage area behind Building 1628. The Navy should properly delineate the SWMU boundaries.

**Specific Comments:**

3. Section 1.3, line 23+, the text claims provision of additional information to support the decision for a NFA. The Department was unable to identify any additional information in this document other than those included in the referenced Zone A RFI Report. This CMS-WP does not suggest any additional work to support an NFA. The Navy should submit a plan for additional, work or otherwise a proper use of the available information as in support of an NFA.
4. Section 2.2, line 16: This document referred to the Section 10.6 Zone A RFI (April 14, 1999) report. Fig 10.6.2 (in the RFI Report) doesn't link the geoprobe locations and that of the shallow monitoring well to the stormwater and sanitary sewer system and Noisette Creek. Please be advised to incorporate pertinent information on the figures in this CMS-WP Report.
5. Section 2.3: As referenced in the CNC Meeting's minutes (06/10/1997), the team was in favor of an NFA pending resolution of the Thallium issue in the groundwater. The issue of inorganics has yet to be addressed.
6. Figure 2.3 (in this CMS-WP) lacks the surface runoff and the groundwater flow directions. Please revise and include information.

7. Section 2.4: Potential linkages to Sanitary Sewers (SWMU 37): The text, lines 8+, pointed out the usage of groundwater samples to assess the potential linkage of the sanitary sewer to SWMU 43. The text failed to present what kind of data and how does it establish a linkage. Please clarify and submit relevant data and correlation.
8. Section 2.4: The stormwater and sanitary sewer systems are not adequately represented. The Navy should develop a pattern of sampling around those systems that takes into consideration a reasonable sample distance and depth from the sewer lines. This task is essential to rule out any potential leak and build up a proper connection to the SWMU.
9. Section 2.4 lines 15+: The text refers to the impracticability of comparing the metals results from all the DPT groundwater samples collected from Zone L to the RBCS and MCLs as due to the high suspended solids contents in the samples. A different sampling technique might serve a better result. The Navy should support the claim of impracticability or conduct additional sampling.
10. Section 2.7, lines 6&7: Ensafe Zone A RFI report April 14,1998 (Section 10.6 2<sup>nd</sup> paragraph). SVOCs hits were recorded in the creek water directly south of SWMU 43. The Navy should thoroughly investigate whether the stormwater and sewer systems passing through SWMU 43, have any role as potential contaminant migration pathways to the creek.



**DEPARTMENT OF THE NAVY**

SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 180010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-9010

5090/11  
Code 18B1  
29 September, 2000

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: SUBMITTAL OF ZONE K RCRA FACILITY INVESTIGATION WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit the RCRA Facility Investigation Work Plan Addendum for Zone K located at Naval Station Annex in Charleston, SC. The work plan addendum is submitted to fulfill the requirements of condition II.C.1 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

This document has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process and has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

A handwritten signature in cursive script that reads "Matthew A. Hunt".

Matthew A. Hunt, P.E.  
Environmental Engineer  
BRAC Division

Copy to:  
SCDHEC (4),  
USEPA (Dann Spariosu)  
[REDACTED]  
CH2M-Hill (Dean Williamson)



DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 190010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-9010

5090/11  
Code 18B1  
29 September, 2000

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: SUBMITTAL OF PHASE I SOURCE AREA DELINEATION FOR SOLID WASTE  
MANAGEMENT UNIT 196 INTERIM MEASURE WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Work Plan for Solid Waste Management Unit (SMWU) 196 located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

This document has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process and has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

Matthew A. Hunt, P.E.  
Environmental Engineer  
BRAC Division

Copy to:  
SCDHEC (4),  
USEPA (Dann Spariosu)  
[REDACTED]  
CH2M-Hill (Dean Williamson)

18 OCT 2000

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: NOTIFICATION OF NAME CHANGE TO HAZARDOUS WASTE PERMIT  
EPA ID# SC 017 0022 560 and EPA ID# SC 000 0328 906

Dear Mr. Litton,

Please make the changes noted on the enclosed Department of Health and Environmental Control (DHEC) form 2701 to the subject EPA ID numbers.

If additional information is needed please contact Matthew Humphrey at the Caretaker Site Office , (843) 743-2062.

Sincerely,

**T. F. BERSSON**  
CAPT, CEC, USN  
Acting Commander

~~R. E. CELLON~~  
Commander, CEC, USN

Encl: (1) DHEC form 2701 EPA ID# SC 017 0022 560  
(2) DHEC form 2701 EPA ID#SC 000 0328 906

Copy to (w/encl):  
CSO Naval Base Charleston (Matthew Humphrey, Code 062/CSO),  
→ SOUTHNAVFACENGCOM (Tony Hunt, Code 18B1)

2000  
18 OCT 2000  
DHEC  
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18 31A  
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**DEPARTMENT OF THE NAVY**

SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 190010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-9010

5090/11  
Code 18B1

**18 OCT 2000**

Mr. John Litton, P.E.  
Director, Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, SC 29201

Subj: NOTIFICATION OF NAME CHANGE TO HAZARDOUS WASTE PERMIT  
EPA ID# SC 017 0022 560 and EPA ID# SC 000 0328 906

Dear Mr. Litton,

Please make the changes noted on the enclosed Department of Health and Environmental Control (DHEC) form 2701 to the subject EPA ID numbers.

If additional information is needed please contact Matthew Humphrey at the Caretaker Site Office, (843) 743-2062.

Sincerely,

A handwritten signature in black ink, appearing to be "T. F. Bersson", written over a horizontal line.

**T. F. BERSSON  
CAPT, CEC, USN  
Acting Commander**

Encl: (1) DHEC form 2701 EPA ID# SC 017 0022 560  
(2) DHEC form 2701 EPA ID#SC 000 0328 906

Enclosure (1)



**Notification of Regulated Waste Activity**  
**Bureau of Land & Waste Management**  
**Compliance Monitoring Section**  
**2600 Bull Street, Columbia, SC 29201**

**(Official Use Only)**

KEY ID: \_\_\_\_\_

N-RCRIS: \_\_\_\_\_

District: \_\_\_\_\_

HWTS: \_\_\_\_\_

Refer to the INSTRUCTIONS. **Important Note:** This form will supersede all previous forms submitted by your company. Provide information on all current activities at your company.

Company's EPA ID Number: S C 0 1 7 0 0 2 2 5 6 0

**I. First Notification or Subsequent Notification:** Mark "X" in the appropriate box to indicate whether this is your company's First Notification of regulated waste activity or a Subsequent Notification.

**A. First Notification:** This is the first notification of hazardous waste activity for this location.

**B. Subsequent Notification:**

Business Closed at this location (EPA ID number will be deactivated)

Date of closure \_\_\_\_\_

Change in generator status (i.e. CESQG, SQG, LQG)

Company name change

Adding wastes codes/waste activity

Change contact person

Other changes

**II. Name of Company (Include company specific site name)**

CSO SOUTHERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

**III. Location of Company (Physical address not P.O. Box or Route #)**

Street: 895 Avenue F

City: Charleston State: SC Zip Code: 29405

County: Charleston

**IV. Company's Mailing Address:**

Street: CSO SOUTHERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND  
P.O. Box 190010

City: North Charleston State: SC Zip Code: 29419-9010

**V. Company's Contact Person (Person to be contacted regarding waste activities)**

Last: Humphrey First: Matthew

Title: Supervisory Environmental Engineer Phone: (843) 743-2062

Street: P.O. Box 190010

City: North Charleston State: SC Zip Code: 29419-9010

Land Type: F

**VI. Name of Company's Legal Owner**

COMMANDER, SOUTHNAVFACENCOM

Street: P.O. Box 190010 Phone: (843) 820-5700

City: North Charleston State: SC Zip Code: 29419-9010

Owner Type: F Change of Owner:  Yes  No Date Changed: \_\_\_\_\_



Enclosure (2)



**Notification of Regulated Waste Activity**  
**Bureau of Land & Waste Management**  
**Compliance Monitoring Section**  
**2600 Bull Street, Columbia, SC 29201**

**(Official Use Only)**

KEY ID: \_\_\_\_\_

N-RCRIS: \_\_\_\_\_

District: \_\_\_\_\_

HWTS: \_\_\_\_\_

Refer to the INSTRUCTIONS. **Important Note:** This form will supersede all previous forms submitted by your company. Provide information on all current activities at your company.

Company's EPA ID Number: S C 0 0 0 0 3 2 8 9 0 6

**I. First Notification or Subsequent Notification:** Mark "X" in the appropriate box to indicate whether this is your company's First Notification of regulated waste activity or a Subsequent Notification.

**A. First Notification:** This is the first notification of hazardous waste activity for this location.

**B. Subsequent Notification:**

Business Closed at this location (EPA ID number will be deactivated)

Date of closure \_\_\_\_\_

Change in generator status (i.e. CESQG, SQG, LQG)

Company name change

Adding wastes codes/waste activity

Change contact person

Other changes

**II. Name of Company** (Include company specific site name)

CSO SOUTHERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

**III. Location of Company** (Physical address not P.O. Box or Route #)

Street: 895 Avenue F

City: Charleston State: SC Zip Code: 29405

County: Charleston

**IV. Company's Mailing Address:**

Street: CSO SOUTHERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

P.O. Box 190010

City: North Charleston State: SC Zip Code: 29419-9010

**V. Company's Contact Person** (Person to be contacted regarding waste activities)

Last: Humphrey First: Matthew

Title: Supervisory Environmental Engineer Phone: (843) 743-2062

Street: P.O. Box 190010

City: North Charleston State: SC Zip Code: 29419-9010

Land Type: F

**VI. Name of Company's Legal Owner**

COMMANDER, SOUTHNAVFACENCOM

Street: P.O. Box 190010 Phone: (843)820-5700

City: North Charleston State: SC Zip Code: 29419-9010

Owner Type: F Change of Owner:  Yes  No Date Changed: \_\_\_\_\_

**Company's EPA ID Number**

S	C	0	0	0	0	3	2	8	9	0	6
---	---	---	---	---	---	---	---	---	---	---	---

**VII. Type of Regulated Waste Activity** (Mark "X" in the appropriate boxes. Refer to instructions).

**A. Hazardous Waste Activity**

1. Generator (See Instructions)
  - a. Greater than 1000 kg/mo (2,200 lbs.)
  - b. 100 to 1000 kg/mo (220-2, 200 lbs.)
  - c. Less than 100 kg/mo (220 lbs.)

**B. Used Oil Activities**

1.  UO Marketer to Burner
2.  Specification UO Marketer
3.  UOF Burner
4.  UO Transporter
5.  UO Processor/Re-finer

2.  Treater, Storer, Disposer (at Company)

NOTE: A permit is required for this activity; see instructions.

3. Transporter

- a. Air     b. Rail     c. Highway     d. Water

4.  Recycler

**VIII. Comments**

---



---



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**IX. Description of Regulated Waste** (Use additional sheets if necessary)

**A. Characteristics of Nonlisted Hazardous Wastes.** Mark "X" in the boxes corresponding to the characteristics of nonlisted hazardous wastes your company handles.

1. Ignitable (D001)	2. Corrosive (D002)	3. Reactive (D003)	4. Toxicity Characteristic (D000)	(List specific EPA hazardous waste number(s) for the Toxicity Characteristic contaminant(s). Continue in Section B if necessary).											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D	0	4	0	D	0	0	8				

**B. Listed Hazardous Wastes.** (See instructions if you need to list more than 12 waste codes).

1	2	3	4	5	6
F 0 0 1					
7	8	9	10	11	12

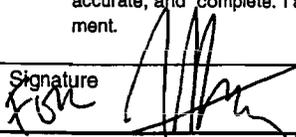
**C. Other Wastes.** (State or other wastes requiring an I.D. number. See instructions).

1	2	3	4	5	6

**X. Certification**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature



Name and Official Title (type or print)

R.E. Cellon, Capt. USN

Date Signed

10/18/00



2600 Bull Street  
Columbia, SC 29201-1708

October 23, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: RCRA Facility Investigation (RFI) Report Addendum for SWMUs 136, 138, 196, 17 and AOC 663 and the Corrective Measures Study (CMS) Report for SWMU 159 located in Zone H of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated May 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on the review of the risk assessments for the above referenced SWMUs and AOC. These comments must be addressed prior to the approval of the above referenced document.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Byrd to Mihir Mehta dated October 9, 2000.

cc: Paul Bergstrand, Hydrogeology  
Susan Byrd, Corrective Action Engineering  
Rick Richter, Trident EQC  
~~Tom Hunt, SOUTHCO~~  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES  
Todd Haverkost, EnSafe



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

TO: Mihir P. Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Hazardous and Infectious Waste  
Bureau of Land and Waste Management

FROM: Susan K. Byrd, Risk Assessor *Susan Byrd*  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

DATE: October 9, 2000

RE: Charleston Naval Base  
Charleston, South Carolina  
SC 0170022560

### Documents:

Zone H Draft RCRA Facility Investigation Report  
Dated May 5, 2000  
And Zone H, SWMU 159 Correctives Measures Study Report  
Dated May 23, 2000  
NavBase Charleston

Below are SCDHEC's comments relating to the risk assessments for SWMUs 159, 196, 17, 138, and 136/AOC 663:

### GENERAL COMMENTS:

1. The figures presented in the document are much improved from those submitted in previous reports. Based on SWMU specific maps, it is unclear what criteria are used for the "inferred areas of contamination" in areas where no samples were collected. Please explain the difference between the blue and the red contour lines, "inferred cumulative areas" and the "inferred area above screening criteria" respectively.
2. Please note that the Department concurs with EPA's comment that the RFI report was poorly edited and difficult to review. However, the new risk assessment format is much improved from the previous RFI submittals. Even though the Department

recommends more thorough editing in the future prior to document submittal, no revisions to the existing document, based on this comment, are needed.

3. The Zone H Characterization of Background Datasets tables and discussions should include a soil types for both surface and subsurface soil samples. As stated in comments for previously submitted documents, background samples should be compared only to similar on-site soil samples.

**SWMU 159:**

Analysis of surface and subsurface soil samples did not detect methylene chloride; however methylene chloride was identified as a COPC in groundwater. Please provide information in Section 5 regarding the potential source of the methylene chloride contamination.

**SWMU 136/AOC 663:**

The text states that the Navy's Environmental Detachment removed building 851's USTs and associated piping. During the August 7, 2000, Zone H site visit, evidence of the tank removal was visible. No visible evidence of the underground piping removal was observed. Please provide additional information to clarify if the piping excavation was completed.

**SWMU 138/AOC 667:**

During the August 7, 200 site visit, a drainage ditch which contained wetland vegetation and flowing water was observed on the western edge of SWMU 138/AOC 667 outside of the fence. Based on the information provided on Figure 2.3.3, no samples were collected from this drainage feature. Please evaluate the potential for overland surface runoff, contaminated soil transport, and groundwater to surface water discharge to this adjacent drainage feature.

**SWMU 17:**

The discussion of subsurface soil contamination on page 2-5-344 states that the soil to groundwater pathway was considered valid but not significant when SSLs are exceeded in subsurface soil samples but screening levels are not exceeded in groundwater. The Department feels that the soil to groundwater pathway is significant especially if no monitoring well is located in areas of contaminated surface soil samples. It is recommended that this topic be discussed further among members of the CNC Team.

The text does not include a discussion of indoor air quality for the buildings at SWMU 17. Please revise the document to include this evaluation.

If you have any further questions or comments, feel free to contact me at (803) 896-4188.



2600 Bull Street  
Columbia, SC 29201-1708

October 26, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Phase I Interim Measures Work Plan – Source Delineation for SWMU 196, located in Zone H of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated September 2000, received September 27, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document.

As the referenced work plan proposes to inject DI water into the groundwater during the groundwater sampling process, the Navy should note that the approval and field implementation of the referenced work plan is contingent upon receiving an underground injection control (UIC) permit or official waiver from the Bureau of Water, SCDHEC. Please contact Mr. Todd Adams of the UIC program at (803) 898-3549 for addressing this issue.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated October 16, 2000.  
Memorandum from Michael Danielsen to Mihir Mehta dated October 23, 2000.

cc: Paul Bergstrand, Hydrogeology  
Michael Danielsen, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
████████████████████  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES  
Todd Haverkost, EnSafe



2600 Bull Street

Columbia, SC 29201-1708 **MEMORANDUM**

**COMMISSIONER:**  
Douglas E. Bryant

**BOARD:**  
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Secretary

Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Susan Peterson, Environmental Engineer Associate  
*Susan Peterson*  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** October 16, 2000

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Interim Measure Work Plan, Revision 0  
Phase I—Source Area Delineation for SWMU 196 in Zone H  
Dated September 2000

### Comments

1. October 16, 2000 conference call  
The Navy's contractor has clarified the following issues to the Department's satisfaction:
  - a) The Navy intends to place the initial 4 borings (line 24 of Section 2.2) in the vicinity of GELGW015.
  - b) The yellow groundwater well symbols (shown on Figures 1-2 and 2-1) are not defined in the Key. These symbols represent previously installed groundwater wells.
  - c) The three additional groundwater samples proposed for the marsh area (line 1 of Section 2.2 on page 2-5) will not be subject to the same sampling scheme as proposed for the initial 4 borings (described in Section 2.2).
  
2. Modification of Figures 1-2 and 2-1  
If the Navy plans to issue revised pages to this work plan, please address Comment 1-b by either deleting the symbols from the figures or including the symbols in the Key, noting the applicable report.

Comments  
Interim Measure Work Plan  
Phase I—Source Area Delineation  
SWMU 196, Zone H  
Prepared by Susan Peterson  
October 16, 2000

3. Groundwater sampling in marsh, Section 2.2, page 2-5

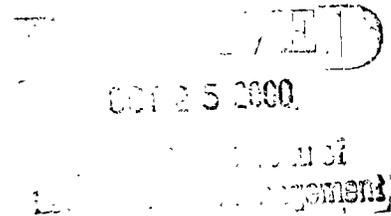
Please explain the estimated number of groundwater samples to be collected from each marsh boring, in addition to the proposed depths of each groundwater sample. Please revise this section to provide more detail (similar to the sampling scheme of the 4 initial borings on page 2-3). The text states that the groundwater will be sampled by hand-advancing the profiler and collecting samples as described above. As currently written, the Department does not understand what is meant by “as described above.”

Given that these comments are not substantial in nature, the Department would like to resolve these comments as quickly as possible in order to implement the work plan.



South Carolina Department of Health  
and Environmental Control

DIVISION OF  
HYDROGEOLOGY  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002



**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Michael W. Danielsen, Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** October 23, 2000

**RE:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 170 022 560

Interim Measure Work Plan Phase I, Source Area Delineation  
for SWMU 196  
CNC  
Revision 0, Dated September 2000

The document referenced above has been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, R.61-71 of the South Carolina Well Standards and Regulations, The Environmental Protection Agencies (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996.

Based on the results of this review, the attached comments were generated. The Department is amenable to discuss and resolve the comments to expedite the approval process.

**Interim Measure Work Plan Phase I**  
**Source Area Delineation**  
**for SWMU 196**  
**CNC**  
**October 23, 2000**  
Michael W. Danielsen

**1. Page 2-1, Section 2.0, lines 8-11**

The text states that the sampling will begin in the vicinity of GEL 15 and proceed outward until the extent is defined. This plan does not specify if any contingent locations are proposed if the grid points are completed and delineation is not completed. Please clarify if contingent locations will be proposed.

**2. Page 2-3, Section 2.1, lines 7-9**

The text states that DI water will be pumped through the ports to prevent clogging, and after each sample to purge the left over water from the previous sample. The text does not state the following:

- i.) Once the sample has been taken, the purging will be done in the same location that the sample was taken. It is assumed that the probe will be purged as it is being driven down to the next sampling location, which would create a smear zone and make subsequent samples non-representative for the formation the Navy is trying to delineate.
- ii.) The minimum distance from the previous sample location/purging to the next sample to avoid drag down.
- iii.) Because DI water will be injected into the sampler to prevent clogging, an underground injection permit may be required. Please contact Todd Adams at 803-898-3549 to verify this issue. The approval of the IM Work Plan and field implementation is contingent upon an UIC permit or official waiver from the Bureau of Water.

Please revise to clarify these issues.

**3. a.) Page 2-3, Section 2.2, lines 16-17**

The text states that the borings will be advanced to a depth of 15 feet bls. The text is not clear if this is the expected depth of the nearest confining unit. Please clarify.

**b.) Page 2-3, lines 17-19**

The text states that acetate sleeves will be brought up and visually classified. The text does not state how the soil will be handled after classification. Please clarify.

**c.) Page 2-3, lines 19-20**

The text states that upon completion the soil boring will be pressure grouted with bentonite grout. The text does not state if a plug can be knocked out and the boring will be grouted on removal of the probe or re-entry will be needed to grout. Please clarify.

**4. Page 2-5, Section 2.3**

This section does not mention if a South Carolina Certified well driller will be used to install and abandon the borings, or whether the onsite lab will be South Carolina certified lab. Please clarify.

Note. A South Carolina certified well driller is required to install and abandon the proposed temporary wells, and if the sampling analysis results will be used to make risk management decisions, the lab must be South Carolina certified as well.

**5. Page 2-5, Section 2.3, lines 11-14**

The text states that the profiler will be advanced into the groundwater formation to predetermined depths. This is contradictory with section 2.1, page 2-3, lines 6-7, that state sampling depths could be any given distance below the previous depth, but typically range between 2 and 5 feet deeper than the initial depth. Please clarify.



2600 Bull Street  
Columbia, SC 29201-1708

October 31, 2000

Mr. Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

RE: Finding of Suitability for Early Transfer (FOSET) for the Charleston Naval Complex, dated August 2000.

Dear Mr. Shepard,

The South Carolina Department of Health and Environmental Control (DHEC) has completed its review of the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. Based on this review, the Department has serious concerns regarding the timing and usefulness of the early transfer of the entire Charleston Naval Complex (CNC) facility at this time. Although early transfers of Federal Facilities are allowed by law, the Department believes the implementation of such an undertaking at this time is fraught with numerous complications that could adversely impact the speed at which we select and implement cleanup decisions at the CNC. In addition, the Department sees no obvious benefit to the Navy or the CNC Redevelopment Authority (RDA) to transfer property for which cleanup decisions are still being evaluated, because the use of the property would have to be seriously restricted to ensure all investigations and cleanup activities would not be impeded.

The Department is working closely with the Navy and CH2M-Jones on transferring all property for which no additional remedial action will be necessary. This process will put the majority of property at the CNC back into redevelopment for the surrounding communities without having an adverse impact on the speed and progress of selecting and implementing remedies for all sites for which remedies will be necessary.

In conclusion, the Department believes that the early transfer of the CNC at this time is not the most beneficial administrative path forward for any of the parties involved. We believe that the most efficient use of all our combined resources is to pursue final transfer of all properties where no additional remedial actions are necessary, and limit the use of properties where investigations and remediation are necessary as to not impede the progress of achieving final cleanup of CNC as quickly as possible.

In addition to our formal position regarding our belief that early transfer of CNC is not the best path forward at this time, several technical comments were generated as a

result of the review of the referenced FOSET. The attached comments must be addressed before final approval/concurrence can be given for the above referenced document. If you should have any questions, please contact me at (803) 898-3973.

Sincerely,



Keith Collinsworth, P.G.  
Federal Facility Liaison  
Environmental Quality Control

Cc: Mihir Mehta, BLWM  
Paul Bergstrand, BLWM  
Rick Richter, Trident EQC  
Paul Bristol, BOW  
Tony Hunt, Navy Southern Division  
Dann Spariosu, EPA Region IV  
Robert Ryan, South Carolina Redevelopment Authority (RDA)  
Dean Williamson, CH2M Hill

**South Carolina Department of Health and Environmental Control comments on: Draft Finding of Suitability for Early Transfer (FOSET) for Charleston Naval Complex (CNC), dated August 2000, received August 11, 2000.**

**General Comment**

1. The document should be revised to adequately provide the information in order for the Department to evaluate the suitability for the property to be transferred with respect to environment conditions and protection. The Department believes that the referenced document should be a “stand alone” document for understanding the environmental condition of the property that would aid in making sound decisions by future owners or potential developers. The Department believes that adequate figures, maps, and text should be provided to understand the potential use of the property for the early transfer (covenant deferral) period, nature and extent of contamination associated with the SWMUs or AOCs, human health/ecological risk analysis for the period of intended use, land use controls for the period of intended use, and other administrative issues such as deed language and the RCRA permit.

**Specific Comments:**

2. Section 2.0. Description of the Property to Transferred. Page 2.  
This section falls short in describing the property with respect to its past operations and known or suspected releases and exact areas under intended use restrictions and/or land use controls. It should also provide the figures or maps illustrating the area of contaminant release or investigation and the area under land use restriction. This information is critical for the future owner(s) of the property in evaluating the economic benefits and also in understanding the restriction placed on the intended use of the property.
3. Section 3.0. Nature and Extent of Hazardous Substance Contamination. Page 2.  
This section should clearly indicate what areas have not been fully investigated and what areas information has been reviewed and approved by the regulators. This section should also elaborate on every SWMU or AOC associated with the property transfer indicating the most current environmental conditions. Appropriate maps and figures illustrating the extent of contamination in applicable media and other relevant information should be provided. The reference to Zone specific RFI reports is not appropriate as those documents are extensive and do not provide the information in succinct format for the future owners or potential developers to make sound decision for the property use during the early transfer period.
4. Section 4.0. Analysis of Intended Future Land Use. Page 6.  
The CNC base development plan-final report (March 1998) developed by CNCRA was not reviewed by the Department and was intended for the

development of the property after all corrective action work has been completed and the property has been cleaned up at a minimum for that intended use. As stated, the above referenced plan also provides general land use objectives/categories for the optimal redevelopment of the property. This information is very general and does not take into account the environmental contamination with the reuse goals at the CNC. The main objective for this document (FOSET) is to provide the information for the intended use of the property during the early transfer period and its relation to the final land use categories. Please revise the referenced section to address this concern.

5. Section 5.0. Risk Analysis. Page 7.

This section states that, ".....the Navy believes there to be no immediate threats to human health and the environment, which could preclude transfer and interim reuse of the ET parcel." The referenced documents should provide adequate risk analysis to substantiate the above statement. The goal is to provide appropriate information related to contaminant release and risk associated with it for the future owners and developers to make adequate decisions for the property in consideration.

6. Section 6.0. Response/Corrective Action and Operation and Maintenance Requirements. Page 7.

It should be noted that the issues of the RCRA permit for the Navy or CNCRA or Future property owners have not been resolved. The projected timeline for the selection and completion of all necessary remedial measures is a dynamic process and changes as the CNC project moves along. The current document can only predict the overall timeline and the approval of this document does not constitute the approval or agreement by the Department of any timeline schedule attached.

7. Section 7.0. Contents of Deed and/or Transfer Agreement.

The resolution of the comments generated by the Department and the EPA-IV will result in extensive revisions to the referenced document and therefore, the review of this section is deferred until all other issues are resolved.

8. Draft Land Use Control Implementation Plan for the CNC; Dated September 20, 2000.

The referenced document discusses the land use controls for the final land use and property development. For the early transfer process the intent is to develop land use controls associated with the intended time period and the property use that are consistent with final land use controls. As the final corrective action plans are not developed nor approved, the land use controls should be developed for the interim time period and interim use of the transferred property. The referenced LUCIP is deficient in providing appropriate land use controls associated with the intended use of the property. Land use control goals should be revised to address this concern. The

Department recommends that the LUCIP should be scoped in detail during the development of the referenced document.

The Navy should be reminded that the RCRA Permit for CNC will be modified as deemed appropriate to address the issues related to land use controls. Prior to implementing any planned or unplanned change, alterations, or use of the property within the SWMU or AOC boundary will require appropriate approvals and/or permit modifications by the Department



2600 Bull Street  
Columbia, SC 29201-1708

December 5, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan (Rationale for No Further Action) for SWMU 43 located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 1.0, dated November 2000, received November 28, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on this review and the information provided the referenced CMS Work Plan is approved as written.

Further, the CNC should note that the Department's approval is based on the information provided to date. Any new information found to be contradictory may require further action.

Should you have any questions regarding this issue, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated December 5, 2000.  
Memorandum from Mansour Malik to Mihir Mehta dated November 30, 2000.

cc: Paul Bergstrand, Hydrogeology  
Mansour Malik, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
T. [REDACTED], [REDACTED]  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES

# D H E C



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

COMMISSIONER:  
Douglas E. Bryant

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Larry R. Chewning, Jr., DMD

**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Susan Peterson, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** December 5, 2000

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Corrective Measures Study Work Plan, Revision 1  
Rationale for No Further Action  
Solid Waste Management (SWMU) 43  
Dated November 2000

The Navy has submitted the above document that incorporates responses to the Department's comments on Revision 0, dated September 2000. Upon review of this document, the Department supports the approval of the NFA recommendation.



Division of Hydrogeology  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002

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L...

**M m r a n d u m:**

**To:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division Of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**From:** Mansour N. Malik   
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**Date:** 11/30/00

**R :** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 1 70 022 560

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Corrective Measure Study Work Plan  
Rationale for No Further Action  
Solid Waste Management Unit (SWMU) 43

Revision 01, Dated November, 2000

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The Document referenced above has been reviewed with respect to the requirement of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERCLA 120(h) as amended.

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The Department upon reviewing the revision 01 of this CMS – Rationale for No Further Action for SWMU 43 finds that this document is adequate to grant this site a an NFA.



2600 Bull Street  
Columbia, SC 29201-1708

November 21, 2000

CERTIFIED LETTER  
RETURN RECEIPT REQUESTED

Matthew A. Hunt, PE  
BRAC Environmental Coordinator  
NAVFACENGCOCM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Requirement for Interim Measures (IM) Work Plan  
AOC 607/Bldg. 225  
Charleston Naval Complex  
SC0 170 022 560

Dear Mr. Hunt:

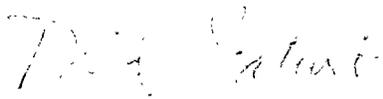
Based on discussions at the most recent Tier I Team meeting (November 14, 2000, Charleston, SC), it is the understanding of the South Carolina Department of Health and Environmental Control (Department) that Charleston Naval Complex (CNC) may not be able to relocate the occupants of Building 225 by January 15, 2001. The relocation was a part of an Interim Measure (IM) at Area of Concern (AOC) 607 involving six-phase heating technology. Based on this change, the Department feels it is necessary to require that the Navy submit an IM Work Plan for AOC 607, in accordance with permit condition II.F.1, to assess human health risk to occupants of Building 225 from the indoor air exposure pathway.

The IM Work Plan should include specific actions necessary to assess the potential for vapor intrusion into Building 225 via the indoor air pathway of exposure and the associated human health risk. In order to accomplish this, it will be necessary to delineate in further detail the nature and extent of contamination in the immediate vicinity of Building 225. In addition to this, the IM Work Plan should include the information specified in permit condition II.F.1(b), and a detailed schedule to implement the IM work. Please note that an IM Work Plan must be approved by the Department prior to implementation, pursuant to permit condition II.F.1(c). The IM Work Plan must be submitted within thirty (30) days of receipt of this letter.

Thank you for your cooperation and assistance in this matter. If you have any questions regarding this issue, please do not hesitate to contact me at (803) 896-4185 or by e-mail at [scaturdm@columb34.dhec.state.sc.us](mailto:scaturdm@columb34.dhec.state.sc.us).

Mr. Matthew A. Hunt, PE  
November 21, 2000  
page 2 of 2

Sincerely,

A handwritten signature in cursive script, appearing to read "David Scaturo".

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

cc: Keith Collinworth, PG, Federal Facilities Liaison  
Joe Bowers, PG, Manager, Hydrogeology Section  
Dean Williamson, PE, CH2M Hill - JA Jones  
Dann Spariosu, PhD, USEPA Region 4  
Rick Richter, Trident EQC District  
BLWM File No. 50484

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Columbia, SC 29201

D. Scaturro/P. Marvin

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## 1. Article Addressed to:

Matthew A Hunt P E  
 BRAC Env Coordinator  
 NAVFACENCOM, STHDIV  
 P O Box 190010  
 North Charleston, SC  
 29419-9010

## 2. Article Number (Copy from service label)

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PS Form 3811, July 1999

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MATTHEW A. HUNT 11/27/00

C. Signature

X Matthew A. Hunt  Agent  Addressee

D. Is delivery address different from item 1?  Yes

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November 21, 2000

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

Mr. M.A. Hunt, P.E.  
BRAC Environmental Coordinator  
Southern Division, NAVFACENGCOM  
PO Box 190010  
2155 Eagle Drive  
North Charleston, SC 29419-9010

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Rodney L. Grandy

Larry R. Chewning, Jr., DMD

Re: Underground Injection Control Permit Application  
RCRA Facility Investigation - Waterloo Profiler  
Charleston Naval Annex  
Charleston County, South Carolina

Dear Mr. Hunt:

The Department has reviewed the application received November 20, 2000. After observing the Waterloo Profiler at Charleston Naval Annex - Zone K and further review of pertinent literature, the Department has determined that this procedure will not require an Underground Injection Control (UIC) permit. It should be noted that all purge water extracted cannot be injected, but must be containerized and properly disposed. However, these temporary points are monitoring wells, and will require a monitoring well construction permit from the appropriate Department project manager.

If you have any questions, please feel free to call me at (803) 898-3549.

Sincerely,

Todd Adams, Hydrogeologist  
Groundwater Management Section  
Water Monitoring, Assessment & Protection Division  
Bureau of Water

cc: Mihir Mehta, BL&WM  
Paul Bergstrand, BL&WM  
Christine Sanford Coker, Trident District EQC  
Casey Hudson, CH2M Hill  
225 E. Robinson Street, Suite 505  
Orlando, FL 32801-4322



2600 Bull Street  
Columbia, SC 29201-1708

December 5, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Interim Measure Work Plan (Phase I Source Area Delineation) for SWMU 196 located in Zone H of the Charleston Naval Complex, SCO 170 022 560, Revision 1.0, dated November 2000, received November 22, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on this review and the information provided the referenced Interim Measures Work Plan is approved as written.

Further, the CNC should note that the approval of the referenced work plan does not constitute completion of the RFI for SWMU 196. The SWMU 196 is currently incorporated with the Zone H RFI and therefore, the nature and extent delineation of all media for this site should be a part of ongoing Zone H RFI process.

Should you have any questions regarding this issue, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated December 5, 2000.  
Memorandum from Michael Danielsen to Mihir Mehta dated December 5, 2000.

cc: Paul Bergstrand, Hydrogeology  
Michael Danielsen, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
~~XXXXXXXXXXXX~~  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES

# D H E C



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

**COMMISSIONER:**  
Douglas E. Bryant

**BOARD:**  
Bradford W. Wyche  
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Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Susan Peterson, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**DATE:** December 5, 2000

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Interim Measure Work Plan, Revision 1  
Phase I—Source Area Delineation for SWMU 196 in Zone H  
Dated November 2000

The Navy has submitted the above document that incorporates responses to the Department's comments on Revision 0, dated September 2000. Upon review of this document, the Department recommends its approval as written.



DIVISION OF  
HYDROGEOLOGY  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002

**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**FROM:** Michael W. Danielsen, Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** December 5, 2000

**RE:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 170 022 560

Interim Measures Work Plan for  
Phase 1-Source Area Delineation for SWMU 196, Zone H  
CNC  
Revision 01, Dated November, 2000 (received November 22, 2000)

The document referenced above has been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996.

Based on the results of that review, and the implementation of past comments, the Department recommends approval for the IM Work Plan as written.



2600 Bull Street  
Columbia, SC 29201-1708

December 5, 2000

CERTIFIED MAIL

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
1690 Turnbill Avenue, Building NH-51  
Charleston Naval Base  
Charleston, SC 29405

RE: Naval Base Charleston (CNAV)  
Charleston, South Carolina  
SC0-170-022-560

Monitoring Well Request for Zone H  
SWMU 196

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of up to 30 temporary wells to assess chlorobenzene and dichlorobenzene contamination in the groundwater within the surficial aquifer. These temporary wells are anticipated to be completed to the top of the first confining unit, which is expected to be a maximum depth of approximately thirteen feet bgs. These temporary wells will be installed by Direct Push Technology (DPT). The specific sampling technique will be either by Waterloo profiler or other DPT technology decided in the field and dependent on field conditions.

Approximately 8 locations for the temporary well points will be located in the marsh. These 8 points will be installed by hand-auger drilling methods and advanced to the top of the first confining unit. The maximum expected depth will be eight feet bgs. Sampling will be completed by hand advancement of the sampling tool.

Attached, please find a Monitoring Well Approval Form, a copy of the proposed well locations, and a copy of the letter; Adams to Hunt dated 11-21-00, concerning the UIC permit. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,



Michael W. Danielsen, Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

Enclosures  
MWD/mwd  
MWA: HW-00-71

CC: Paul Bergstrand, P.G., Hydrogeologist  
Mihir Mehta, Hazardous Waste Permitting Section  
Christine Sanford-Coker, Trident District EQC  
~~Tony Hunt, South Carolina, Charleston~~  
Paul Favara, CH2MHill, 3011, SW Williston Road, Gainesville, FL, 32608-3928



2600 Bull Street  
Columbia, SC 29201-1708

## Monitoring Well Approval

Approval is hereby granted to:                      Naval Base Charleston  
Attention:    Tony Hunt

**Facility:**            Naval Base Charleston  
                            SC0-170-022-560  
                            Charleston County

for the installation of up to 30 DPT points at the locations specified and in accordance with the construction plans and specifications in the *Interim Measure Work Plan, Phase I Source Area Delineation, SWMU 196, Zone H (CH2M-Jones, November 2000)* and the well request (*Favara to Bergstrand*), dated 11-22-2000.

These DPT points are to be installed and screened in the upper and lower portions of the surficial aquifer/unit for the purpose of characterizing the nature and extent of chlorobenzene and dichlorobenzene in groundwater.

### Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each DPT point be submitted to the Department within 30 days after installation of the last point.
3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.
4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity. **Note.** Please see attached letter from Todd Adams of the UIC permitting group. If the Waterloo profiler is used, the Department will not allow all purge water to be injected. The purge water should be containerized and disposed of properly.

5. That notice be given to the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.
6. Considering the temporary nature of these installations, requirements R.61-71.11.C(1-7) for completing these DPTs as permanent monitoring wells are waived.
7. That all DPT sampling points will be abandoned as outlined in R.61-71.10.B. **Note.** The temporary wells installed in the marsh may be abandoned by using a tremie pipe to fill the borehole with bentonite pellets or chips instead of a bentonite grout. This allowance is for these wells in the marsh at this site only.
8. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

**Date of Issuance:** 12-05-00  
**Approval #:** HW-00-71

  
Michael W. Danielsen, Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management



November 21, 2000

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER  
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Larry R. Chewing, Jr., DMD

Mr. M.A. Hunt, P.E.  
BRAC Environmental Coordinator  
Southern Division, NAVFACENGC  
PO Box 190010  
2155 Eagle Drive  
North Charleston, SC 29419-9010

RECEIVED

NOV 27 2000

HYDROGEOLOGY

Re: Underground Injection Control Permit Application  
RCRA Facility Investigation - Waterloo Profiler  
Charleston Naval Annex  
Charleston County, South Carolina

Dear Mr. Hunt:

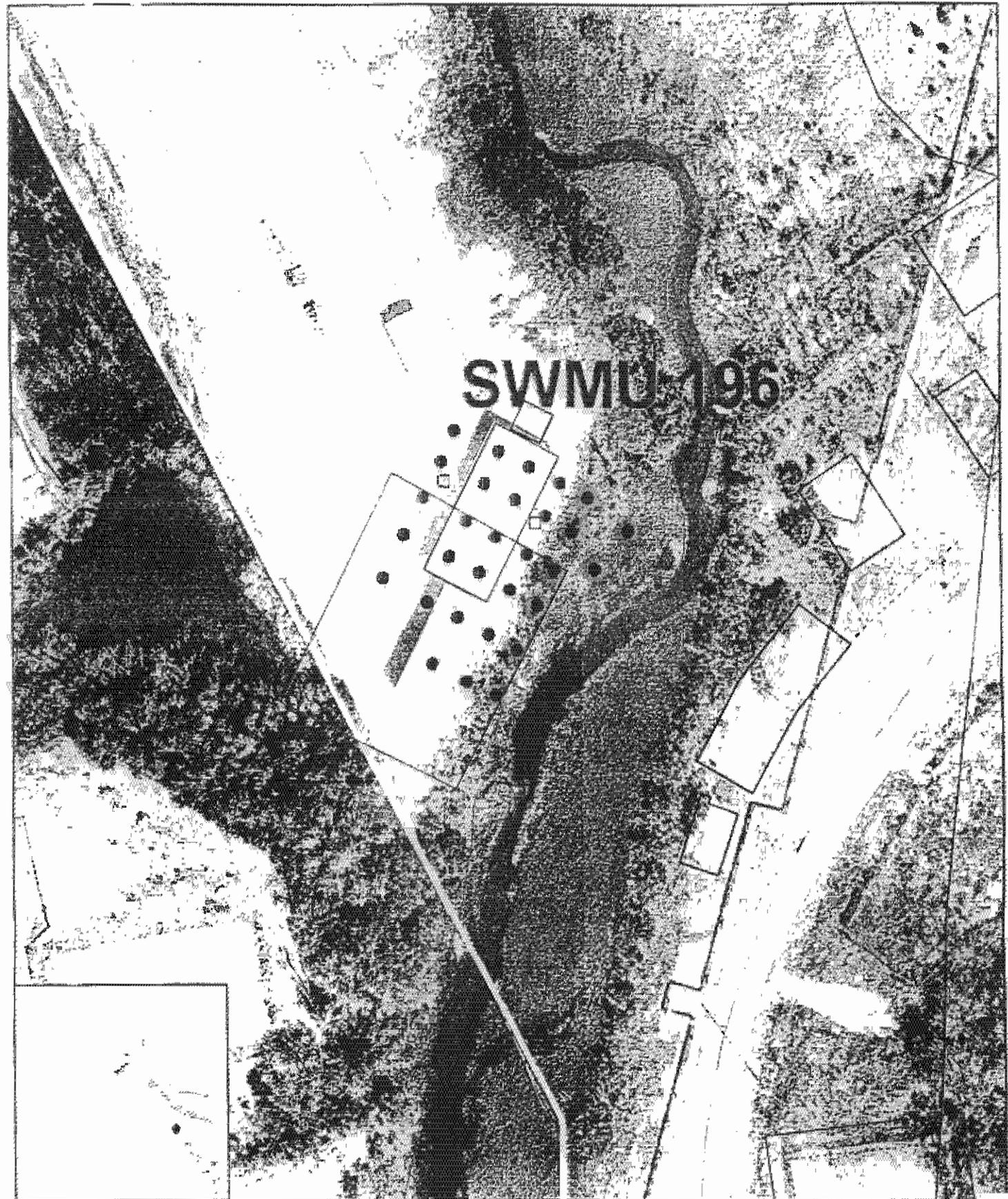
The Department has reviewed the application received November 20, 2000. After observing the Waterloo Profiler at Charleston Naval Annex - Zone K and further review of pertinent literature, the Department has determined that this procedure will not require an Underground Injection Control (UIC) permit. It should be noted that all purge water extracted cannot be injected, but must be containerized and properly disposed. However, these temporary points are monitoring wells, and will require a monitoring well construction permit from the appropriate Department project manager.

If you have any questions, please feel free to call me at (803) 898-3549.

Sincerely,

Todd Adams, Hydrogeologist  
Groundwater Management Section  
Water Monitoring, Assessment & Protection Division  
Bureau of Water

cc: Mihir Mehta, BL&WM  
Paul Bergstrand, BL&WM  
Christine Sanford Coker, Trident District EQC  
Casey Hudson, CH2M Hill  
225 E. Robinson Street, Suite 505  
Orlando, FL 32801-4322



**SWMU 196**

- Vertical Groundwater Profile
- Vertical Groundwater Profile (Marsh)
- Railroads
- Roads
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary N
- Buildings



**Figure 1**  
 Proposed Sampling Locations  
 SWMU 196, Building 1838, Zone H  
 Charleston Naval Complex



2600 Bull Street  
Columbia, SC 29201-1708

December 6, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOCM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan (Enhanced In Situ Biodegradation-HRC Pilot Test) for SWMU 39 located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated October 2000, received October 17, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document and the field implementation of the proposed work.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

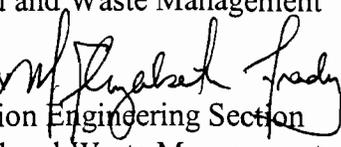
Attachments: Memorandum from Elizabeth Frady to Mihir Mehta dated December 5, 2000.  
Memorandum from Mansour Malik to Mihir Mehta dated December 4, 2000.





## MEMORANDUM

TO: Mihir Mehta  
Corrective Action Engineering Section  
Bureau of Land and Waste Management

FROM: Elizabeth Frady   
Corrective Action Engineering Section  
Bureau of Land and Waste Management

DATE: December 5, 2000

RE: Charleston Naval Complex  
Enhanced In Situ Biodegradation Pilot Test for SWMU 39, Zone A  
Dated October 2000

The above referenced document has been reviewed with regard to the requirements of the SRS Hazardous Waste Permit and the South Carolina Hazardous Waste Management Regulations. As a result of this review, the following comments have been generated:

### **Specific Comments:**

1. According to the last sentence of Section 2.1, Current Nature and Extent of Contamination, "At well A039GW023D...compounds are now being detected...indicating either a diffuse local source or arrival of the leading edge of the groundwater plume..." Please clarify how this uncertainty will affect the understanding of results obtained from HRC injection in this area.
2. The term "source" is used in several contexts throughout the document. "Source" is typically understood by the Department to be an original release mechanism (such as an underground tank, buried waste or highly contaminated soil that continues to leach to groundwater). The statement beginning on Line 8, Section 3.1 reads, "Because no discrete VOC sources were identified in soils during the RFI, groundwater contaminant source control is expected to be the primary remedial action required to reduce VOC concentrations..." This implies that the groundwater itself is a source, which is inaccurate. Contamination in groundwater may be uncontrolled, however no additional contamination is being introduced into the system. Clarity with regard to the concept of "source" will help a great deal with delineation of the site condition

and will facilitate document review.

3. The addition of the most recent plume interpretation included in all of the Figures in Section 5 would help to illustrate the rationale for placing the injection locations. Please amend the Figures to show this information.
4. The symbols for wells A039GW023 and A039GW023D are different from the symbol listed in the legend and those depicting other wells in Figures 5-1, 5-4 and 5-5. Please either include this symbol in the legend with an appropriate explanation or change the symbol to be consistent with the other wells.
5. Section 5.2 notes that CH2M Hill will coordinate with the appropriate DHEC personnel to arrange for UIC Permits. This individual is Todd Adams, Hydrogeologist, Groundwater Management Section, Bureau of Water, SCDHEC.
6. The Periodic Performance Monitoring plan laid out in Tables 5-1 and 5-2 illustrates dissimilar sampling parameters for injection well clusters near GW012 and GW013. Due to the fact that both clusters were laid out with a similar purpose and that this is a pilot study designed to provide information on future remedial action, the Department recommends consistent sampling parameters for both clusters.
7. Although it is stated in Section 5.3 that the “new wells will be used to fill data gaps in downgradient water quality in the plume interior” and “wells will be installed, developed, and sampled for aquifer geochemical baseline and VOC parameters prior to initiating the actual HRC injections,” no sampling schedule other than that for new wells GW24I and 24D has been proposed. Please propose a sampling schedule including analytical parameters for the new wells.
8. Please clarify the anticipated zone of influence of the HRC over time. Also, please include a brief description of the particular geochemical/chemical changes that indicate the HRC system is “active” and the parameters that show it is “working.”



Division of Hydrogeology  
2600 Bull Street  
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Fax (803) 896-4002

DEC 10 2000  
Land and Waste Management

**M morandum:**

**T :** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division Of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**From:** Mansour N. Malik   
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**Date:** 12/4/00

**Re:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 1 70 022 560

---

Corrective Measures Study Work Plan

Enhanced In Situ Biodegradation Pilot Test for SWMU 39, Zone A

Revision 0, Dated October, 2000

The Document referenced above has been reviewed with respect to the requirement of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERCLA 120(h) as amended.

**Based on the results of the current review, the Department approves the CMS Work Plan pending resolution of the following comments:**

---

*Comments:*

1. *Section 2.1*, Line 9: For developing a pattern to show the pace with which the natural attenuation is taking place, the Department recommends that this CMS-WP should include of a sequence of timed -isopach geochemical contour maps to support the natural biodegradation process and to link that with how efficiently will the HRC enhance the process. This approach also should include a current count of the present microbes in relation with the natural biodegradation process.
2. *Section 2.2: Hydrogeology Overview and Contaminant Fate and Transport Summary*. A block 3D-geologic diagram would have served to set a very clear picture of the site lithological strata. The department recommends including such a diagram in this CMS-WP especially to delineate carefully the boundaries between the lower and the upper aquifers and the predictable pathway that the HRC will follow.
3. *Section 2.2 Line 29+*: From the geologic sections generated for the site so far, it is apparent that the surficial aquifer/aquifers is highly heterogeneous due to the random distribution of the clay beds. Also the boundary between the upper and the lower aquifers, as crucial as it appears for the HRC injection, is not clearly established. The aquifer testing for determining the flow velocity should take into consideration the variation in each stratum separately. Horizontal flow velocity is more likely to be greater than the vertical in this situation. The Department is concerned because of the importance of understanding the hydrogeological setting of the site in regard to the HRC injection plans. Please demonstrate control of the HRC.
4. *Section 5.3 Monitor Well Installation*: Line 12: In pointing to a plume boundary the Department recommends that this document should show on a map the current detailed plume boundary in conjunction with the existing monitoring wells. This will give a clear picture to where the injection wells and the post injection monitoring wells should be located.

5. The impact or lack of impact of the HRC on the surface water bodies, the Noisette Creek, the Cooper River and the wetland southwest of the contaminated site should be explained. The Department would like to see that included in this CMS-WP.
6. *Section 5.3 Line 4+*: The Department is concerned whether using PVC will have any impact or reaction with the HRC in a VOC - contaminated area. Please clarify if that would matter in any way.
7. *Table5-2: Dissolved Gases*: As methane is a final byproduct from the reductive-dechlorination of the VC and the DCE, the Department recommends the periodic performance monitoring should also watch for methane as well.
8. A well request is required for placement of injection of monitoring wells. These requests should be reviewed and approved by the Department prior to field implementation.



2600 Bull Street  
Columbia, SC 29201-1708

December 6, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan (Phase I Source Area Delineation) for SWMU 70 located in Zone E of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 2000, received November 13, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document and the field implementation of the proposed work.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated November 30, 2000.  
Memorandum from Mansour Malik to Mihir Mehta dated December 4, 2000.

cc: Paul Bergstrand, Hydrogeology  
Mansour Malik, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
████████████████████  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



2600 Bull Street  
Columbia, SC 29201-1708 **MEMORANDUM**

**COMMISSIONER:**  
Douglas E. Bryant

**TO:** Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**BOARD:**  
Bradford W. Wyche  
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Vice Chairman

**FROM:** Susan Peterson, Environmental Engineer Associate *Susan Peterson*  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

Mark B. Kent  
Secretary

Howard L. Brilliant, MD

**DATE:** November 30, 2000

Brian K. Smith

**RE:** Charleston Naval Complex (CNC)  
Charleston, South Carolina  
SC 170 022 560

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

Corrective Measures Study Work Plan,  
Phase 1—Source Area Delineation  
Solid Waste Management (SWMU) 70, Zone E  
Dated November 2000

### Comments

#### 1. VOCs

The Department understands that the Navy plans to analyze monitoring wells for VOCs to evaluate the change in concentrations that has occurred since the last data collection in February 1997. Given that the primary objective of this CMS WP is to more clearly determine the distribution of chromium in groundwater, the Department requests that the Navy limit the CMS content to chromium.

The VOC concentrations, listed in Appendix A of this document, exceed MCLs. Thus noted, complete source and release characterization of VOCs is required to complete the RFI at this site.

#### 2. Rationale to justify proposed sampling locations needed

During the November 2000 BCT meeting, the Navy discussed a figure (Figure 1) that listed the concentrations of chromium > 10 ppb. The Department requests that the Navy incorporate Figure 1 into this document and transpose the proposed sampling locations (CMS WP Figure 2-1) onto Figure 1. The Department requires a rationale in order to evaluate the proposed sampling locations. The rationale should at a minimum consist of the figure described above, a figure showing existing chromium contamination plume(s), and more descriptive text.

#### 3. Note

This document references information from the Zone E RFI report, which the Department has not yet approved. Please note that the approval of this CMS WP does not constitute approval of the Zone E RFI report.



Division of Hydrogeology  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002

**M m r a n d u m:**

**T :** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division Of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**From:** Mansour N. Malik *MN*  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**Date:** 11/20/00

**Re:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 1 70 022 560

---

Corrective Measure Study Work Plan

SWMU 70, Zone E

Revision 0, Dated November, 2000

The Document referenced above has been reviewed with respect to the requirement of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERCLA 120(h) as amended.

**The Department would like to see resolution of the following comments before approving this CMS-WP:**

---

**Comments:**

1. The title for this CMS-WP is Phase 1- Source Area Delineation. It indicates delineating all the impacted media in SWMU 70. Section 1.1.1 set the primary and the only goal as to determine the extent and spatial distribution of the high concentration source areas of chromium in the shallow and deep groundwater. If the Navy is investigating only this issue, the title for this CMS-WP should then be more specific.
2. Section 1.2 Site Background and RFI Summary, Lines 3-6: The text mentioned a NFA was recommended for the soil media for the SWMU 70. The Department has not yet approved the referenced RFI. If this CMS-WP is meant to target source area delineation for the SWMU as a whole, the Department recommends investigating the soil media as well or else deleting all references to other media.
3. Fig 2-1: Some of the proposed groundwater probe locations 005,006,013,008,012,010,011 lie within the footprints of the surrounding buildings. The Department in viewing non-predictable surface obstructions that might lead to change of proposed locations would like to reiterate that dislocation of more than 10 feet diameter away from the proposed locations would not be permissible without the Department approval prior to field implementation.
4. Section 2.1.1 Waterloo Profiler, Line 8: Choosing sampling depth at regular intervals of 11, 22 and 33 feet will only be beneficial if we are dealing with a uniform homogenous aquifer. Given the facies inhomogeneity in this area, vertical profiling will be more of a value if it is selective of each distinctive aquifer layer. Given that geophysical electric conductivity can help in delineating the lithological units, please verify if it is possible to apply the profiler in the way described.
5. Appendix A: The appendix includes tables that show historical results for VOCs. As it appears that the VOCs are not part of this CMS-WP study, please clarify why this information is presented in this document. The Department recommends in bringing up such data, comments relevant to what the data is brought in for, is required.



2600 Bull Street  
Columbia, SC 29201-1708

December 7, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan (Dig and Haul for Soils contaminated with Arsenic and Rationale for No Further Action) for AOC 700, Building 1646, located in Zone C of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated October 2000, received October 31, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on this review the following comments were generated. In order to expedite the field implementation of the proposed interim measures, the Department approves the referenced document provided the comments are adequately addressed in the interim measures report.

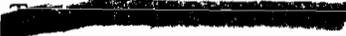
Further, the CNC should note that the Department's approval is based on the information provided to date. Any new information found to be contradictory may require further action.

Should you have any questions regarding this issue, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturro, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management

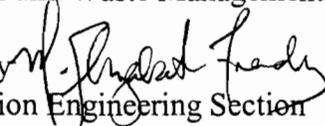
Attachments: Memorandum from Elizabeth Frady to Mihir Mehta dated December 7, 2000.

cc: Paul Bergstrand, Hydrogeology  
Mansour Malik, Hydrogeology  
Elizabeth Frady, Corrective Action Engineering  
Rick Richter, Trident EQC  
  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



## MEMORANDUM

TO: Mihir Mehta  
Corrective Action Engineering Section  
Bureau of Land and Waste Management

FROM: Elizabeth Frady   
Corrective Action Engineering Section  
Bureau of Land and Waste Management

DATE: December 7, 2000

RE: Charleston Naval Complex  
AOC 700, Building 1646, Zone C  
Interim Measure Work Plan, Revision 0  
Dated October 2000

The above referenced document has been reviewed with regard to the requirements of the SRS Hazardous Waste Permit and the South Carolina Hazardous Waste Management Regulations. As a result of this review, the following comments have been generated and should be addressed in the Interim Measures Report. Remediation work may proceed as described in the above-referenced Plan.

1. Section 2.1.1, Line 18 states, "SCDHEC approval of the *Zone C Final RFI Report* indicates SCDHEC concurrence with NFA for this site (Ensafe 1997)." That approval was based on information in the Zone C report, with the understanding that full characterization of the area would be completed with the Zone J and Zone L investigations. Obviously the additional sampling associated with SWMU 37 (Zone L) indicates that characterization for AOC 700 was not complete. Despite the Department's initial approval, any additional sampling and analysis for this or any other SWMU or AOC that reveals previously undetected contamination will supersede any prior conclusions. Please include a follow-up statement to the above-noted language that expresses this policy.
2. Section 2.1.1 notes that Arsenic and PAHs represent the largest risks to human health for AOC 700. By the time the IM Report is issued, the BCT should hopefully have an agreed-upon value for BEQs which will allow for a conclusive discussion of allowable remaining levels in soils. Please include any such information as part of the

IM Report discussion.

3. Figure 2-3 should more clearly show the extent of the IM performed for SWMU 44. As it is currently drawn, there is only one line which does not clearly define the limits of removal.
4. Please confirm in the Interim Measures Report that a visual survey of the entire AOC showed absolutely no presence of an Oil/Water Separator.



2600 Bull Street  
Columbia, SC 29201-1708

December 7, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOCM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan for Phase II Membrane Interface Probe (MIP) Pilot Study for SWMU 166 located in Zone K Annex of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated October 2000, received November 3, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced work plan.

Further, the Department is available to discuss any of the attached comments and the path forward in order to expedite the approval of the referenced document.

Should you have any questions regarding these comments, please contact me at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,  
*M. P. Mehta*

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments:

1. Memorandum from Paul M. Bergstrand to Mihir Mehta dated December 7, 2000.

cc: Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Dean Williamson, CH2MHILL  
Dann Spariosu, EPA Region IV  
Tony Hunt, SOUTH DIV

**South Carolina Department of Health and Environmental Control comments on: Corrective Measures Study (CMS) Work Plan for Phase II Membrane Interface Probe (MIP) Pilot Study for SWMU 166 located in Zone K Annex of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated October 2000, received November 3, 2000.**

**Comments by Mihir Mehta:**

1. Section 1.3. Organization of the CMS Work Plan. Page 1-2.  
This section does not mention a subsection that details the schedule for field implementation (time and associated activities) of the proposed action. The schedule should also present the time period for the development and submittal of the CMS report. This information is required in accordance to the CNC Hazardous Waste Permit Condition II.G.1. "Corrective Measures Study (CMS) Work Plan. Please revise the document to adequately address this comment.
2. Section 2.3. Confirmatory Groundwater Sampling. Page 2-3.  
Lines 26-29 states that MIP investigation will be summarized in a report as an appendix to the proposed Interim Measures Work Plan. The CMS report for the proposed CMS Pilot Study should be developed and submitted as a separate document. The report should, at a minimum, describe the MIP field activities, interpret the MIP data, correlate the MIP, Geoprobe, and groundwater monitoring well data, and illustrate the vertical and horizontal extent of the target DNAPL source area. Please revise the text accordingly.
3. Figure 2-1. Proposed MIP Locations.  
The legend for the figure fails to provide the information that describes the solid pink triangular symbol. Please revise the figure.
4. Figure A-3. Comparison of MIP Results with Vertical Profile Water Samples.  
The figure fails to indicate what sample location(s) were used to illustrate the comparison of MIP results with vertical profile water samples.

Also, the Department recommends the Navy to provide similar illustrative figure for comparing results from groundwater well 166GW25D, vertical profile water sample 166VP009, and MIP boring 166MP001. The text on pages A-2 and A-3 describes the results for these sample locations.



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Paul M. Bergstrand, P.G., Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 7 December 2000

**RE:** Charleston Naval Base (CNAV)  
Charleston County, South Carolina  
SC0-170-022-560

Zone K, SWMU 166; Corrective Measures Study Work Plan  
Membrane Interface Probe (MIP) Phase II Pilot Study  
Dated October 2000, Received 3 November 2000

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERFA 120(h) as amended.

The proposed sample locations and methodology are suitable for this investigation. A monitoring well request will be addressed separately. As a result of the document review, the following comments need to be addressed prior to the approval of the work plan

## Zone K, SWMU 166 CMS Work Plan Comments

Paul M. Bergstrand

7 December 2000

### 1. Figures 1-1 and 1-2

The figures use different colors to represent total chlorinated VOCs in ug/l in groundwater, however the colors between 10 to 1000 and 1000 to > 10000 are indistinguishable. Different shapes to represent different analytical results would improve the readability of these figures. Revision to this document is not necessary however future workplans and reports should be improved.

It must be noted that numerous groundwater samples were collected by direct push technology (DPT). A large number of DPT samples did not report any contamination. The DPT analytical data, especially the non-detect data, must be used with caution since the samples were collected from a 6 inch screen at a fixed depth.

It must also be noted that monitoring wells installed more than five feet above the top of the Ashley Formation are likely NOT to detect groundwater contaminants which are present. An example of this can be found at well 166GW05D. It is imperative to understand the effect of the proximity to the top of the Ashley Formation on all samples and monitoring wells. The top of the Ashley Formation should be represented in future workplans and reports.

### 2. Section 2.0, Page 2-1

This sections states that "A groundwater profiler boring will be advanced to within 12 to 18 inches of approximately 10 percent of the MIP locations." Please explain in the revised workplan the criteria used to select the groundwater profiler locations.

### 3. Section 2.3, Page 2-3

This section states that the vertical profiler well screen will be selected in the field based on well purging yields. Please explain in the revised workplan the criteria used to select the well screen length.

### 4. Section 3.0, Page 3-1

This section states "Once the analytical results have been reviewed, the 55-gallon drum with the groundwater contents will be hauled by the U.S. Naval Detachment (AKA EEG) for offsite treatment." It is not clear in the text what analytical results are being referred to. In a 7 December 2000 telephone conversation, Mr Casey. Hudson confirmed that a sample from the drum be run through the onsite gas chromatograph/mass spectrometer (GC/MS). Please include this information and the analytical parameters in the revised workplan.

5. Appendix, Groundwater Profiling Results, Pages A-3 and A-4

Two items in this section discussed findings but failed to include the information in the appendix. Lines 13 - 24 on page A-3 discussed purge yields but only partial data in table A-2 was provided. Lines 1 - 3 on page A-4 state that analysis for methane, ethane and ethene are provided in Table A-1. This analytical information could not be located. Revisions to this document are not necessary however future workplans and reports should include all relevant data.

6. Figures A-2a through A-2d

It is not clear on these figures if the well and sample elevations are from Mean Sea Level or have been measured from the surface at that location. This could have significant impact on data interpretation. Revisions to this document are not necessary, however future workplans and reports should clearly reference the elevation datum.

7. VOC Method Blank Results

It is noted that Trichloroethylene was detected in method blanks at 4 parts per billion. These detections and the implications of the detections were not addressed in the document. Please explain the effects of blank contamination on this data and how blank contamination during field implementation will be addressed in the revised workplan



December 13, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan (Building 225 Indoor Air Pathway Assessment) for AOC 607 located in Zone F of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated December 2000, received December 8, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on this review and the proposed comment responses provided in the e-mail (from Dean Williamson to Mihir Mehta dated 12/13/2000), the referenced Interim Measures Work Plan is approved provided the Navy submits the revised document by 12/30/2000.

In order for the Department to observe the field activities, the Navy should provide the Department the details of field implementation schedule.

Further, the CNC should note that the Department's approval is based on the information provided to date. Any new information found to be contradictory may require further action.

Should you have any questions regarding this issue, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

*M. P. Mehta for,*

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management



December 18, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan (Soil Excavation and Rational for NFA) for AOC 516, Building 233, located in Zone C of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 2000, received November 22, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document and the field implementation of the proposed work.

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments: Memorandum from Elizabeth Frady to Mihir Mehta dated December 18, 2000.  
Memorandum from Paul Bergstrand to Mihir Mehta dated December 15, 2000.

cc: Paul Bergstrand, Hydrogeology  
Elizabeth Frady, Corrective Action Engineering  
Rick Richter, Trident EQC  
~~██████████~~  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



## MEMORANDUM

TO: Mihir Mehta  
Corrective Action Engineering Section  
Bureau of Land and Waste Management

FROM: Elizabeth Frady *Elizabeth Frady*  
Corrective Action Engineering Section  
Bureau of Land and Waste Management

DATE: December 18, 2000

RE: Charleston Naval Complex  
AOC 516, Building 233, Zone C  
Interim Measure Work Plan, Revision 0  
Dated November 2000

The above referenced document has been reviewed with regard to the requirements of the SRS Hazardous Waste Permit and the South Carolina Hazardous Waste Management Regulations. As a result of this review, the following comments have been generated and should be addressed in the Interim Measures Report. Remediation work may proceed as described in the above-referenced Plan.

1. Section 2.1.1, Page 2-3 discusses the issue of BEQs as a Contaminant of Concern for AOC 516. The Department and CH2M Hill are currently reviewing documentation to establish background values for BEQs but have not yet reached a consensus on this matter. At this time the Department will not rule out BEQs as a COC for AOC 516 and suggests that this discussion be revisited as part of the IM Report.
2. In order to expedite the work proposed in the IM Work Plan, the Department has reviewed only that portion of this document which pertains to the soil removal action. Full documentation and discussion of close-out issues should be included in the IM Report.



2600 Bull Street  
Columbia, SC 29201-1708

**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Paul M. Bergstrand, P.G., Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 15 December 2000

**RE:** Charleston Naval Base (CNAV)  
Charleston County, South Carolina  
SC0-170-022-560

Zone C IM Workplan  
Soil Excavation Strategy  
Dated November 2000 Received 22 November 2000

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERFA 120(h) as amended.

The following comments should be addressed before the workplan can be approved.

Zone C IM Workplan Strategy Comments  
Paul M. Bergstrand  
15 December 2000

1. Page 2-3, BEQ

This section references a mean Zone C BEQ value of 613 ppb and concludes that BEQs are no longer considered to be a COC in surface soils at AOC 516. The discussions on the BEQ anthropogenic background values has not been finalized. The conclusion that BEQs are no longer considered to be a COC in surface soils at AOC 516 may be premature. This IM may be allowed to proceed based on lead and arsenic with the understanding that the Navy may be required to conduct additional sampling and possibly soil excavation for BEQs at this site.

2. Page 3-1, Interim Measure Work Plan

The proposed excavation will require the removal of monitoring well C-047GW007. There is no discussion of monitoring well abandonment in this document. This IM workplan should be modified to reference appropriate well abandonment protocols.

3. Page 3-4, Excavation

This section states that confirmation samples will not be collected prior to backfilling the excavation as soil samples previously collected and the two delineation samples are expected to adequately define the extent of contamination requiring cleanup. This approach is not acceptable. The IM workplan should be modified to include adequate confirmation samples.



December 19, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOCM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan (Soil Excavation and Rational for NFA) for AOC 516, Building 233, located in Zone C of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 2000, received November 22, 2000. Comment Responses (via e-mail) and Figure 3-1 (faxed) received on December 19, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on the review of the referenced document, the comment responses (via e-mail), and Figure 3-1 (faxed) received on December 19, 2000 the Department approves the field implementation of the referenced interim measures. The Department considers these comment responses as a part of the document and therefore, revision to the referenced document is not necessary.

It should be noted that the review and approval of the site close out issues and rational for no further action is deferred to a later date. All necessary information justifying the NFA for this site should be detailed in the Interim Measures completion report.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management

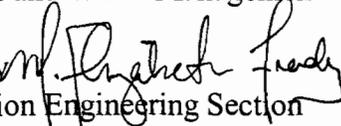
Attachments: Memorandum from Elizabeth Frady to Mihir Mehta dated December 19, 2000.  
Memorandum from Paul Bergstrand to Mihir Mehta dated December 19, 2000.

cc: Paul Bergstrand, Hydrogeology  
Elizabeth Frady, Corrective Action Engineering  
Rick Richter, Trident EQC  
**[REDACTED]**  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



## MEMORANDUM

TO: Mihir Mehta  
Corrective Action Engineering Section  
Bureau of Land and Waste Management

FROM: Elizabeth Frady   
Corrective Action Engineering Section  
Bureau of Land and Waste Management

DATE: December 19, 2000

RE: Charleston Naval Complex  
AOC 516, Building 233, Zone C  
Response to Comments on the Interim Measure Work Plan, Revision 0  
Dated November 2000

The above referenced comment responses (via fax and e-mail on Dec. 19, 2000) have been reviewed with regard to the requirements of the Charleston Naval Complex Hazardous Waste Permit and the South Carolina Hazardous Waste Management Regulations. As a result of this review, the Interim Measure portion of the Work Plan is approved.



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Paul M. Bergstrand, P.G., Hydrogeologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 19 December 2000

**RE:** Charleston Naval Base (CNAV)  
Charleston County, South Carolina  
SC0-170-022-560

Zone C, AOC 516; Interim Measures Work Plan  
Response to Comments  
Dated 18 December 2000

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERFA 120(h) as amended.

The responses to the comments are suitable for this investigation. The IM WP may be approved.



2600 Bull Street  
Columbia, SC 29201-1708

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BOARD:  
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Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

*Jimmy Copy sent to  
CH2M 1/3/01  
Sub*

December 19, 2000

DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION NFEC  
GABRIEL MAGWOOD  
2155 EAGLE DRIVE  
N. CHARLESTON SC 29406

RE: Zone I / Site 35 – Building NS28 (Former 10K Heating Oil UST)  
**BOW Site ID # 00964**  
Sampling and Analysis Plan received December 19, 2000  
Charleston County

Dear Mr. Magwood:

The Department has completed technical review of the referenced document. As submitted, the plan provides for additional investigative activities to determine the extent and severity of contamination, if any, associated with a suspected release from the referenced UST. Based on the information provided, the proposal to perform soil and groundwater sampling is approved for implementation.

Installation and/or abandonment of all temporary and permanent sampling points will be in accordance with the technical specifications and descriptions provided and/or referenced in the submittal or as approved by the Department. Upon completion of investigative activities, the Department shall be provided with a report of findings.

Should you have any questions please contact me at 803-898-3553 (office phone), 803-898-3795 (fax) or by e-mail [bishopma@columb32.dhec.state.sc.us](mailto:bishopma@columb32.dhec.state.sc.us).

Sincerely,

Michael A. Bishop, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC  
Technical File



December 27, 2000

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: RCRA Facility Investigation (RFI) Work Plan Addendum for Zone K Naval Station Annex of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated September 2000, received September 29, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced work plan.

Further, the Department is available to discuss any of the attached comments and the path forward in order to expedite the approval of the referenced document.

Should you have any questions regarding these comments, please contact me at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

*M.P. Mehta*

Mihir Mehta, Project Manager  
Corrective Action Engineering Section  
Bureau of Land & Waste Management

Attachments:

1. Memorandum from Paul M. Bergstrand to Mihir Mehta dated December 20, 2000.

cc: Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Dean Williamson, CH2MHILL  
Dann Spariosu, EPA Region IV  
~~Tony Hunt, SOUTH DIV~~

**South Carolina Department of Health and Environmental Control comments on:  
RCRA Facility Investigation (RFI) Work Plan Addendum for Zone K Naval Station  
Annex of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated  
September 2000, received September 29, 2000.**

**Comments by Mihir Mehta:**

1. Section 2.0. Scope of Work. Page 2-1.  
Please note that the CNC-CAFB off site groundwater contamination/source investigation is currently ongoing. The area of investigation is W-NW boundary of the Zone K-Annex. Based on this evaluation additional field investigation may be necessary to characterize the groundwater contamination at Zone K Annex.
2. Section 2.1.1. Historic Groundwater Investigation Summary. Page 2-2.  
Please provide adequate figures to illustrate the text description in this section. The Department recommends that the figures used during the Zone K Annex scoping meeting illustrating the known groundwater plume boundaries be included this work plan. Figures presented in this work plan should also indicate the road names as they are used in the text as landmarks for sample identification. This information will be very useful in understanding the data gaps and rationale for additional field investigation. Please revise the work plan accordingly.
3. Figure 2.1.3. Sampling and Analysis Plan. Page 2-5.  
The referenced section identifies some of the wells as "166GP0105, 166GP0108, etc". Please clarify the labeling rationale especially with the "0" between P and 105. Also, some of the well numbers do not correspond with the wells shown on Figure 2-1 and Figure 2-2. Please revise the figures and text as necessary.
4. Section 2.2.2. Groundwater Data Gaps. Page 2-7.  
Lines 3-5 state that the Northwest corner of the Naval Annex is characterized. This does not accurately reflect the current status of groundwater characterization (refer to comment # 1). Please change the referenced section to address this concern.
5. Section 2.3. SWMU 161, Vehicle Maintenance Shop. Page 2-10.  
Lines 1-3 recommend not taking sample of the OWS contents as it would not be representative of the life span of the OWS. This is not an acceptable justification. It is considered as a primary source that could have released contamination into the environment through time. The Department recommends that the Navy obtain the referenced sample in order to understand the current use of the OWS and the possibilities of correlation with the past release at this SWMU. Please revise the document accordingly.
6. Section 2.3.2. Groundwater Data Gaps. Page 2-11.  
It would be beneficial to reference the figures in the text that describe the data gaps in this section. It would facilitate and expedite the review.

7. Section 2.4.3. Sampling and Analysis Plan, SWMU 163. Page 2-14.  
Lines 25-32 discuss the approach for the PAH contamination at this site. It should be noted that the CNC BCT is currently developing the site wide background and reference values. Zone K Annex background values should be developed and approved expeditiously in order to agree upon the characterization strategy for this site. In absence of the background PAH numbers the nature and extent of PAH contamination should be characterized to residential RBCs. Please revise all pertinent sections of the referenced document to address this comment adequately.
8. Section 2.5. SWMU 162, Former Sludge Drying Field. Page 2-16.  
Lines 3-14 discuss the site specific SSLs for chromium and its leaching potentials. There were three subsurface sample where chromium was detected above the site specific SSL of 4.2 mg/kg. Additional field investigation is not recommended based on SPLP analysis. The Department has not evaluated nor approved this information and therefore, it should be noted that after a detailed review of the RFI report additional work may be necessary.
9. Section 2.8. AOC 696, Transformer Area Near Building 2509. Page 2-19.  
Lines 23-27 indicate that the Navy will conduct the post interim measures evaluation of this site at a later date. Please revise this section to clearly state the RFI report for Zone K Annex will provide current condition of this site and show that the risk in all media are below acceptable levels for justifying the path forward.
10. The referenced work plan clearly describes the decision rules necessary to conduct expedited field investigation and provides more flexibility during the field implementation. Overall the format of the referenced work plan was appropriate. The Department acknowledges that the Navy and its contractor incorporated the recommendations that were discussed during the Zone K Annex work plan scoping meeting.



2600 Bull Street  
Columbia, SC 29201-1708

**MEMORANDUM**

**TO:** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Paul M. Bergstrand, P.G., Hydrogeologist *AMB*  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 20 December 2000

**RE:** Charleston Naval Base (CNAV)  
Charleston County, South Carolina  
SC0-170-022-560

Zone K, RFI Work Plan Addendum  
Dated September 2000, Received 29 September 2000

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERFA 120(h) as amended.

The proposed sample locations and methodology are suitable for this investigation. A monitoring well request will be addressed separately. As a result of the document review, the following comments need to be addressed prior to the approval of the work plan

Zone K, RFI Work Plan Addendum Comments

Paul M. Bergstrand  
20 December 2000

1. General Comment

This document should include cross section representation compiled from all core and vertical profile data collected to date.

2. Page 2-11, Lines 18 – 28

This section describes the numerical decrease of analytical data from the anaerobic/aerobic sequencing treatability study. Please note that follow up analysis, which was part of the study has not been conducted. Follow up analysis is important to document the rebound effect after a system such as this is switched off. This important data has not been collected.



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
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Vice Chairman

Mark B. Kent  
Secretary

Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

December 28, 2000

*Jeremy Copy Ser - 1/3/01*  
*CH2M*  
*Kelly*

DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION NAVAL FEC  
GABRIEL MAGWOOD  
2155 EAGLE DRIVE  
N. CHARLESTON SC 29406

Re: **Building 864**  
**Site Identification # 15412**  
Monitoring Well Installation request received December 7, 2000  
Charleston County

Dear Mr. Magwood:

The Department has received your request to install four additional monitoring wells at this location. Installation activities are approved for immediate implementation; a monitoring well installation permit is enclosed. Please note that all monitoring wells must be installed in accordance with South Carolina Well Standards and Regulations R. 61-71.

Upon completion of site activities, please provide the Department with a report detailing the installation activities.

Should you have any questions please contact me at (803) 898-3553 (office phone), (803) 898-3795 (fax) or by e-mail [bishopma@columb32.dhec.state.sc.us](mailto:bishopma@columb32.dhec.state.sc.us). Please reference Site ID # 15412 on all future correspondence.

Sincerely,

Michael A. Bishop, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

Enc: **Monitoring Well Approval**  
  
cc: **Trident District EQC (w/enc)**  
**Technical File (w/enc)**



2600 Bull Street  
Columbia, SC 29201-1708

Date of Issue: 12/28/2000  
Approval No: 982

COMMISSIONER:  
Douglas E. Bryant

### Monitoring Well Installation Approval

BOARD:  
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William M. Hull, Jr., MD  
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Brian K. Smith

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Larry R. Chewning, Jr., DMD

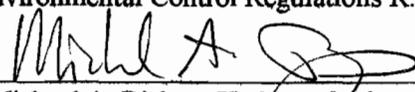
Approval is hereby granted to: Department of the Navy - CNB  
Site ID#: 15412  
County: Charleston

This approval is for the construction of monitoring wells designated in accordance with the construction plans and technical specifications submitted to the Department in the correspondence dated November 7, 2000 and South Carolina Well Standards and Regulations R. 61-71. The well(s) are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to the Department with the completed report.
2. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
3. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to the project manager, Michael A. Bishop at (803) 898-3553 or e-mail [bishopma@columb32.dhec.state.sc.us](mailto:bishopma@columb32.dhec.state.sc.us).
4. Please provide groundwater quality analytical data (chemical analyses and/or water level(s)) and associated measurements (i.e., *in-situ* field measurements) with the completed assessment report.
5. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.
6. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification number.
7. Wells shall be abandoned per R.61-71.10.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

Approved by:

  
Michael A. Bishop, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water



2600 Bull Street  
Columbia, SC 29201-1708

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December 28, 2000

*Similar copy sent to  
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tbs*

DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION NAVAL FEC  
GABRIEL MAGWOOD  
2155 EAGLE DRIVE  
N. CHARLESTON SC 29406

Re: Building 350  
**Site Identification # 15413**  
Monitoring Well Abandonment request received December 7, 2000  
Charleston County

Dear Mr. Magwood:

The Department has received your request to abandon the monitoring wells at this location. Abandonment activities are approved for immediate implementation. Please note that all monitoring wells must be abandoned in accordance with South Carolina Well Standards and Regulations R. 61-71.

Upon completion of site activities, please provide the Department with a report detailing the abandonment activities.

Should you have any questions please contact me at (803) 898-3553 (office phone), (803) 898-3795 (fax) or by e-mail [bishopma@columb32.dhec.state.sc.us](mailto:bishopma@columb32.dhec.state.sc.us). Please reference Site ID # 15413 on all future correspondence.

Sincerely,

Michael A. Bishop, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC  
Technical File



December 29, 2000

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

Mr. M.A. Hunt, P.E.  
BRAC Environmental Coordinator  
Southern Division, NAVFACENGCOM  
PO Box 190010  
2155 Eagle Drive  
North Charleston, SC 29419-9010

BOARD:  
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Re: Underground Injection Control Permit #538  
Charleston Naval Complex, Zone A-SWMU 39  
Charleston County, South Carolina

Dear Mr. Hunt:

Enclosed is a Permit to Construct for sixty-three (63) Class VA-I injection wells at the Charleston Naval Complex, Zone A-SWMU 39 as requested in the UIC application received December 27, 2000. An inspection of the UIC System must be conducted prior to issuance of Approval to Operate. As there will be no wells to inspect prior to injection, I need to be onsite the day of injection to observe procedures. Please coordinate scheduling of the drilling with this office. After completion of the inspection, Approval to Operate #538 will be issued.

If you have any questions, please feel free to call me at (803) 898-3549.

Sincerely,

Todd Adams, Hydrogeologist  
Groundwater Management Section  
Water Monitoring, Assessment & Protection Division  
Bureau of Water

cc: Mihir Mehta, BL&WM  
Trident District, EQC  
Bill Elliott, CH2M HILL  
3011 S.W. Williston Road  
Gainesville, FL 32608-3928



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

## WATER MONITORING ASSESSMENT & PROTECTION DIVISION

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Larry R. Chewning, Jr., DMD

### Injection Well Construction Permit for Class II, III, and V.A. Injection Well(s)

Permit #538

Date Issued: December 29, 2000  
Date Expired: December 29, 2001

For (Operator): NAVFACENGCOM

In accordance with provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, permission is granted for construction of sixty-three (63) Class V.A.-I injection wells located at the Charleston Naval Complex, Zone A-SWMU 39, Charleston County, SC with the following provisions:

- 1) The operator shall submit completed SCDHEC well record forms to the Department's Water Monitoring, Assessment & Protection Division after completion of the injection wells.
- 2) Upon completion of construction, injection activities shall not commence prior to receiving approval from the Department to operate the injection wells.
- 3) When the injection wells are no longer in use, or upon request by the Department, within sixty (60) days all injection wells must be permanently abandoned in accordance with the South Carolina Well Standards and Regulations (R.61-71.10).
- 4) Injection wells must be installed and grouted in accordance with the South Carolina Well Standards and Regulations (R.61-71.10).

  
\_\_\_\_\_  
Todd Adams, Hydrologist  
GroundWater Management Section  
Bureau of Water

December 29, 2000  
Date

DHEC 2104 (6/88)

## **STATEMENT OF BASIS - UIC DRAFT PERMIT #538**

In accordance with the South Carolina Underground Injection Control Regulations, Section R61-87.12,J., this "Statement of Basis" has been prepared for the Underground Injection Control permit application received December 27, 2000.

Ownership of the proposed injection wells is Southern Division, NAVFACENGCOM, PO Box 190010, 2155 Eagle Drive, North Charleston, SC 29419-9010. The permit (UIC #538) is for the construction of sixty-three (63) injection wells for ground water remediation at the Charleston Naval Complex, Zone A-SWMU 39. The intent of the injection wells is to dechlorinate volatile organic compounds by injection of a non-toxic, food grade polylactate ester, hydrogen releasing compound (HRC) into the subsurface as described in UIC application. The draft permit for the underground injection proposal has been prepared based on staff review and the application of the Pollution Control Act of South Carolina and the Underground Injection Control Regulations of South Carolina.

Conditions of the permit issuance include the submittal of well records for all injection wells installed and the inspection of well construction by the Department prior to injection.



January 8, 2001

Henry Shepard II, P.E.  
Caretaker Site Office  
NAVFACENGCOM, Southern Division  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: Corrective Measures Study (CMS) Work Plan (Phase I Groundwater Delineation) for SWMU 70 located in Zone E of the Charleston Naval Complex, SCO 170 022 560, Revision 1.0, dated December 2000, received December 27, 2000.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on the review of this document, comment responses, and conference call with CH2M-Jones (Paul Favara) on January 5, 2001 the above referenced document is approved as written. The Department should be notified about the field implementation schedule in order to assist in the "real time" decision making process for selecting groundwater sample depths.

The CNC should submit to the Department the revised Figure 2-1 to reflect the agreement reached on January 5, 2001, phone call (i.e., add boring to accompany soil conductivity for all four proposed locations) within thirty (30) calendar days of the receipt of this letter.

Further, the CNC should note that the Department's approval is based on the information provided to date. Any new information found to be contradictory may require further action.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

*M. P. Mehta For,*

David Scaturo, PE, PG  
Manager, Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land & Waste Management

Attachments: Memorandum from Mansour Malik to Mihir Mehta dated January 5, 2001.

cc: Paul Bergstrand, Hydrogeology  
Mansour Malik, Hydrogeology  
Susan Peterson, Corrective Action Engineering  
Rick Richter, Trident EQC  
[REDACTED]  
Rob Harrell, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Dean F. Williamson, CH2MHILL/JONES



*Division of Hydrogeology  
2600 Bull Street  
Columbia, SC 29201  
Telephone (803) 896-4010  
Fax (803) 896-4002*

**M m r a n d u m:**

**T :** Mihir Mehta, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division Of Hazardous and Infectious Waste Management  
Bureau of Land and Waste Management

**From:** Mansour N. Malik *Mn*  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**Date:** 01/05/01

**Re:** Navbase Charleston (CNC)  
Charleston, South Carolina  
SC 1 70 022 560

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Corrective Measure Study Work Plan

SWMU 70, Zone E

Revision 01, Dated December, 2000

The Document referenced above has been reviewed with respect to the requirement of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Assessment Guidance Document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, CERCLA 120(h) as amended.

**The Department approves this document as written pending on already agreed upon on a conference call with CH2M-Jones (Engineer: Paul Favara) on Jan the 5<sup>th</sup> at 10:30 a.m. The agreement reached included adding boring to accompany soil conductivity for the proposed four locations depicted on Figure 2-1. Those locations are E070GP011, E070GP002, E070GP003 and E070GP07. A hydrogeologist from DHEC team will attend the fieldwork to assist in the decision making process of selecting groundwater samples in the field.**

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2600 Bull Street  
Columbia, SC 29201-1708

May 9, 2002

Ms. Amy Daniell  
Caretaker Site Office  
Charleston Naval Complex  
CSO 1895 Avenue F  
North Charleston, SC 29405

RE: Approval for NFA for AOCs 602, 604, and SWMU 106/AOC 603  
Responses to comments on the RFI Report Addendum, Revision 0, AOC 602, AOC 604,  
and SWMU 106/AOC 603, Zone E (12/01)

Responses to comments on the RFI Report Addendum, Revision 0, AOC 602, AOC 604,  
and SWMU 106/AOC 603, Zone E (3/02)  
Charleston Naval Complex (CNC)  
SC0 170 022 560

Dear Ms. Daniell:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced documents, which were received via email on December 10, 2002 and via mail delivery on March 29, 2002, respectively. The Department has determined that No Further Action is necessary for AOCs 602, 604, and SWMU 106/AOC 603. Please be advised that this determination is based upon currently available data. Additional investigation may be necessary in the future should information become available warranting such action.

Please see the attached memorandum from the Division of Hydrogeology concerning the rationale for this decision with respect to groundwater conditions.

If you have any questions or concerns, please contact Jerry Stamps at (803) 896-4285.

Sincerely,

David Scaturo, P.E., P.G., Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

Attachment

Memorandum from Jo Cherie Overcash to Jerry Stamps dated May 9, 2002

cc:

~~\_\_\_\_\_~~  
Rob Harrell, PE, SOUTHDIV  
Dean Williamson, PE, CH2M-Jones  
Gary Foster, PE, CH2M-Jones

Rick Richter, Trident EQC District  
Dann Spariosu, PhD, EPA Region 4  
Jo Cherie Overcash, Hydrogeology



2600 Bull Street  
Columbia, SC 29201-1708

MEMORANDUM

**TO:** Jerry Stamps, Engineer Associate  
Corrective Action Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Jo Cherie Overcash, Hydrogeologist  
RCRA Hydrogeology Section  
Division of Hydrogeology *JCO*  
Bureau of Land and Waste Management

**DATE:** 9 May 2002

**RE:** Charleston Naval Complex (Navy)  
SC0 170 022 560  
Charleston County

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MAY 09 2002  
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Land & Waste Management

CH2M-Jones' Response to Comments, dated March 29, 2002  
SWMU 106/AOC 603, AOC 602, and AOC 604, Zone E  
RFI Report Addendum, dated August 2001

As requested, the Response to Comments referenced above has been reviewed with respect to the requirements of R.61-79.264 Subpart F of the South Carolina Hazardous Waste Management Regulations (SCHWMRs), the Environmental Protection Agency's (EPA) RCRA Facility Assessment guidance document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, and CERCLA 120(h) as amended.

**History**

SWMU 106 - Blast Area Dry Dock #3;  
AOC 602 - Former Electrical Substation at Building 95;  
AOC 603 - Burning Dump;  
AOC 604 - Former Electrical Substation at Building 96.

On October 30, 2001, the Department forwarded to the Navy a review of the RFI Report Addendum for AOC 602, AOC 604, and SWMU 106/AOC 603, Zone E. On December 10, 2001, the Navy provided a Response to Comments in an electronic format. The Navy's response did not wholly address the concerns of the Division of Hydrogeology. Specifically, the Navy had not fully addressed the elevated concentration of arsenic in groundwater at grid well

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EGDEGW002 within AOC 603 Burning Dump. Arsenic has been consistently detected in grid well EGDEGW002 in concentrations greater than the Drinking Water Standards and Health Advisories maximum contaminant level (MCL) of 50 micrograms per liter ( $\mu\text{g/L}$ ). Arsenic has ranged from 249.00 to 316.00  $\mu\text{g/L}$  in grid well EGDEGW002. Therefore, on January 16, 2002, the Department forwarded to the Navy the remaining outstanding issues. In reply, the Navy provided the March 29, 2002, Response to Comments referenced above.

#### **Division of Hydrogeology Response to the Navy's March 29, 2002, Submittal**

The Navy provided Historic Engineering Drawings from 1909 - 1998 in response to the Division of Hydrogeology's request for additional information regarding the date of and pertinent construction details of Dry Dock #3 and #4 as well as information regarding the "channelized area" that was filled. It is the author's understanding that the Burning Dump shifted location over time and that construction of Dry Dock #4 (outside AOC 603 but closest to grid well EGDEGW002) began after cessation of the use of the Burning Dump. It should be noted here that the Navy cannot provide details regarding the activities at AOC 603 Burning Dump nor the source of the fill material used in the "channelized area".

In the March 2002 Response to Comments the Navy also provided "some additional information regarding the geochemical characteristics of groundwater at SWMU 106/AOC 603" stating that the requested information "is unnecessary for understanding what the predominant geochemical processes are at this site". However, the Division of Hydrogeology had requested that the Navy substantiate their conclusion that the consistently elevated concentration of arsenic in groundwater from grid well EGDEGW002 is attributable to the dredge material used to fill the channelized area and/or geochemical processes. The Division of Hydrogeology expected the Navy to demonstrate the hypothesis outlined in *An Overview of Arsenic Geochemistry, TEA Processes in Groundwater Systems, and Implications for the CNC Hydrogeologic Environment*, dated August 2001.

In response the Navy provided a comparison of the concentration of arsenic to the concentration of iron at certain wells within SWMU 106/AOC 603. A result of comparison among these wells is that the higher concentrations of arsenic in EGDEGW002 are associated with lower concentrations of iron. While geochemical processes may be occurring at SWMU 106/AOC 603, the data do not conclusively support the Navy's deduction that geochemical processes are the source of the arsenic in grid well EGDEGW002. A separate source of arsenic to groundwater is suspected. Navy activities at the Burning Dump cannot be eliminated as a potential source of arsenic to subsurface soil and/or groundwater at this unit.

However, the Department has evaluated other water quality data from this area specifically with regard to total dissolved solids (TDS). Based on this review (see discussion below), the Division of Hydrogeology recommends "no further action" for groundwater at SWMU 106/AOC 603, AOC 602 and AOC 604. This decision is based on the following rationale:

The Department identified arsenic as a groundwater constituent of concern because it was consistently detected in grid well EGDEGW002 in concentrations above the MCL. The grid well cluster EGDEGW002 is located less than (50) feet from the Cooper River and within AOC 603.

The groundwater in grid well cluster EGDEGW002 does not naturally meet the definition of an underground source of drinking water (USDW) as defined in R.61-68 Water Classifications & Standards. For example, the reported values for the total dissolved solids for the deeper aquifer well EGDEGW02D, at approximately 35 feet below land surface, have been consistently greater than 12,000 milligrams per liter (mg/l). According to the definition of USDW, groundwater with concentrations of total dissolved solids that exceed 10,000 mg/l would not be considered a source of drinking water. Therefore it follows that the MCL standard does not apply to groundwater in the immediate vicinity of this grid well cluster. This rationale for NFA is only applicable for SWMU 106/AOC 603, AOC 602 and AOC 604 because ingestion was the primary exposure pathway of concern instead of the inhalation and direct contact pathways.

If you have any questions, please discuss them with me.

cc: Susan Byrd, Risk Assessor, Corrective Action Engineering Section  
G. Kendall Taylor, P.G., Director, Division of Hydrogeology  
Jack Gelting, P.G., Manager, RCRA Hydrogeology Section  
Paul Bergstrand, P.G., RCRA Hydrogeology Section  
Mansour Malik, Hydrogeologist, Hydrogeology Section



2600 Bull Street  
Columbia, SC 29201-1708

May 13, 2002

Ms. Amy Daniell  
Caretaker Site Office  
Charleston Naval Complex  
CSO 1895 Avenue F  
North Charleston, SC 29405

RE: Approval for No Further Action for AOCs 508 and 511  
Draft Zone C, Combined Minor Sites, Corrective Measures Study Report  
Charleston Naval Complex (CNC)  
SC0 170 022 560

Dear Ms. Daniell:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced document, which was received on April 30, 2002. This review was based upon applicable State and Federal Regulations, and the CNC Hazardous Waste Permit, effective September 17, 1998. The Department has determined that No Further Action is necessary for AOCs 508 and 511. Please be advised that this determination is based upon currently available data. Additional investigation may be necessary in the future should information become available warranting such action.

If you have any questions or concerns, please contact Jerry Stamps at (803) 896-4285.

Sincerely,

David Scaturro, P.E., P.G., Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

Attachment:

Memorandum from Jo Cherie Overcash to Gilbert Rennhack dated May 6, 2002

cc: ~~Tony Hunt, PE, SOUTH DIV~~  
Rob Harrell, PE, SOUTH DIV  
Dean Williamson, PE, CH2M-Jones  
Gary Foster, PE, CH2M-Jones

Rick Richter, Trident EQC District  
Dann Spariosu, PhD, EPA Region 4  
Jo Cherie Overcash, Hydrogeology



MEMORANDUM

2600 Bull Street  
Columbia, SC 29201-1708

**TO:** Gilbert Rennhack, Engineer Associate  
Corrective Action Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Jo Cherie Overcash, Hydrogeologist  
RCRA Hydrogeology Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 6 May 2002

**RE:** Charleston Naval Complex (Navy)  
SC0 170 022 560  
Charleston County

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Land & Waste Management

Draft Zone C  
Combined Minor Sites  
Corrective Measures Study Report (CMS Report)  
Dated December 22, 1999; Hand Delivered April 30, 2002

As requested, a review of the applicable Sections for area of concern (AOC) 508 and AOC 511 of the above referenced document has been conducted with respect to the requirements of R.61-79.264 Subpart F of the South Carolina Hazardous Waste Management Regulations (SCHWMRs), the Environmental Protection Agency's (EPA) RCRA Facility Assessment guidance document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, and CERCLA 120(h) as amended. It should be noted that this CMS Report also includes solid waste management unit (SWMU) 47 / AOC 516 and AOC 518.

AOC 508 is the location of former "Incinerator 19" and is approximately 240 feet north of residence NY-762 while AOC 511 is the area at former Building 16 adjacent to residence NH-762. AOC 511 has been identified as an oil storehouse. These units are between Avenue H and the Charleston Naval Complex western property boundary at St. Johns Avenue. The RFI at these units consisted of three soil sampling events and a 1997 collection of groundwater samples from two temporary shallow monitoring wells. Groundwater analysis included pesticides and polychlorinated biphenyls (PCB) at both sampling locations. Polyaromatic hydrocarbon (PAH)

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and BTEX (benzene, toluene, ethylbenzene, and xylene) analysis was conducted at temporary well 511GW002 prior to removal of the heating fuel oil underground storage tank in 1998 by the Naval Environmental Detachment. Based on the available data, the Division of Hydrogeology has no concerns regarding groundwater quality at this time in the vicinity of AOC 508 and AOC 511. A "no further action" (NFA) for groundwater is recommended for these units.

If you have any questions, please discuss them with me.



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

TO: Jerry Stamps, Environmental Engineer Associate  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

FROM: Susan K. Byrd, Risk Assessor *Susan K. Byrd*  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

DATE: May 9, 2002  
RE: Charleston Naval Base  
Charleston, South Carolina  
SC 0170022560

Document:  
Draft Zone C, Combined Minor Sites  
Corrective Measures Study Report  
Document Date: December 22, 1999

After review of the above referenced document, the Department has no comments with regards to risk assessment issues. If you have any further questions or comments, feel free to contact me at (803) 896-4188.



2600 Bull Street  
Columbia, SC 29201-1708

May 13, 2002

Ms. Amy Daniell  
Caretaker Site Office  
Charleston Naval Complex  
CSO 1895 Avenue F  
North Charleston, SC 29405

RE: Approval for No Further Action for SWMU 44  
Corrective Measures Work Plan / Interim Measure Completion Report (Revision 1) –  
SWMU 44, Zone C  
Charleston Naval Complex (CNC)  
SC0 170 022 560

Dear Ms. Daniell:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced document, which was received on May 6, 2002. This review was based upon applicable State and Federal Regulations, and the CNC Hazardous Waste Permit, effective September 17, 1998. The Department has determined that the responses to the comments are adequate. Therefore, No Further Action is necessary for SWMU 44. Please be advised that this determination is based upon currently available data. Additional investigation may be necessary in the future should information become available warranting such action.

If you have any questions or concerns, please contact Jerry Stamps at (803) 896-4285.

Sincerely,

David Scaturo, P.E., P.G., Manager  
Corrective Action Engineering Section  
Division of Waste Management  
Bureau of Land and Waste Management

Attachment:

Memorandum from Jo Cherie Overcash to Jerry Stamps dated May 9, 2002

cc:   
Rob Harrell, PE, SOUTHDIV  
Dean Williamson, PE, CH2M-Jones  
Gary Foster, PE, CH2M-Jones

Rick Richter, Trident EQC District  
Dann Spariosu, PhD, EPA Region 4  
Jo Cherie Overcash, Hydrogeology



MEMORANDUM

2600 Bull Street  
Columbia, SC 29201-1708

**TO:** Jerry Stamps, Engineer Associate  
Corrective Action Section  
Division of Waste Management  
Bureau of Land and Waste Management

**FROM:** Jo Cherie Overcash, Hydrogeologist  
RCRA Hydrogeology Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 9 May 2002

**RE:** Charleston Naval Complex (Navy)  
SC0 170 022 560  
Charleston County

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MAY 09 2002

SC DHEC - Bureau of  
Land & Waste Management

Draft Comment Responses (Favara to Stamps, 4/1/02) Regarding the March 5, 2002, Department Review of the *CMS Workplan / IM Completion Report* Solid Waste Management Unit 44, Zone C  
Dated January 2002, Received January 15, 2002

Data for SWMU 42 and 44, Electronic Mail from Favara, dated April 19, 2002

*Revision 1 to CMS Workplan / IM Completion Report*, dated May 2, 2002;  
Received May 6, 2002

As requested, the Navy's Response to Department comments (Peterson to Daniell, 3/5/02) and Revision 1 to the document referenced above have been reviewed with respect to the requirements of R.61-79.264 Subpart F of the South Carolina Hazardous Waste Management Regulations (SCHWMRs), the Environmental Protection Agency's (EPA) RCRA Facility Assessment guidance document dated October 1988, and the revised EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994, and CERCLA 120(h) as amended.

As you are aware, the Navy's response was thoroughly discussed during the April 2002 BCT Team Meeting in Columbia. At that time, the Navy informed the Department that additional groundwater samples had been collected from monitoring wells C044GW001, C044GW004, and C044GW007. The results of that sampling event were the subject of the April 19, 2002,

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electronic mail referenced above. The following agreements were reached during the BCT Team Meeting:

1. Beryllium If the concentration of beryllium in the most recent groundwater sample collected from monitoring well C044GW001 is greater than the maximum contaminant level (MCL) of 4 micrograms per liter ( $\mu\text{g/L}$ ), then the Navy would investigate upgradient to determine a potential source. Conversely, if the concentration of beryllium in the most recent groundwater sample from C044GW001 is less than the MCL, then the Navy's April 1, 2002, response will stand.
2. Surface Water The relationship between SWMU 44 Coal Storage Yard and newly identified area of concern (AOC) 721 will be further considered during investigation of AOC 721, thereby allowing completion of the RFI process at SWMU 44. Surface water runoff and drainage patterns from SWMU 44 to AOC 721 will be considered when assessing the potential for coal storage at SWMU 44 to adversely impact surface soil and groundwater quality at AOC 721.
3. Groundwater There is no groundwater contaminant plume at SWMU 44 to migrate to AOC 721. Therefore, groundwater quality (arsenic, antimony) at monitoring well C044GW007 located within AOC 721 will be evaluated during the RFI of AOC 721.

As you are also aware, the property designated as SWMU 44 and AOC 721 were both included for transfer on Figure 3.1 of the Environmental Baseline Survey Transfer Phase III Parcels, dated March 2002. With a "no further action" (NFA) decision for groundwater at SWMU 44, transfer of that property may be appropriate. However, as the investigation of AOC 721 is incomplete, that portion of land should not be considered for property transfer at this time.

With these understandings, the Navy has adequately addressed the concerns of the Division of Hydrogeology with regard to SWMU 44. It is recommended that this *CMS Workplan / IM Completion Report for SWMU 44* be approved and that a "no further action" decision for groundwater be granted.

If you have any questions, please discuss them with me.

. . .