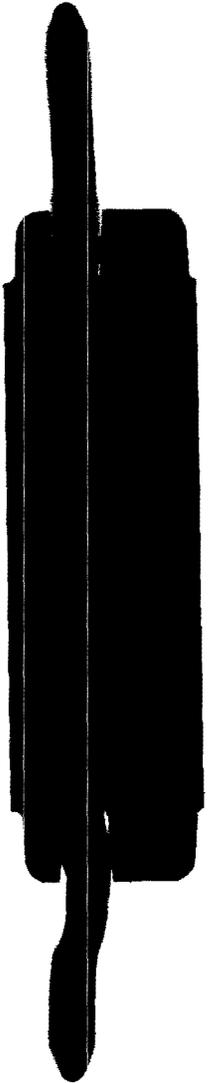


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CNC CHARLESTON
5090.3a

MISCELLANEOUS CORRESPONDENCE REGARDING CORRECTIVE MEASURES STUDY
SEPTEMBER 2001
9/01/2001
CNC CHARLESTON

Correspondence Sep 01
Charlotte Rural Complex (CRC)





2600 Bull Street
Columbia, SC 29201-1708

September 18, 2001

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

RE: CMS Investigation Report Addendum
SWMU 159/AOC 653, Zone H, (Request for NFA)
Charleston Naval Complex
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) received a CMS Investigation Report Addendum for SWMU 159/AOC 653 on August 10, 2001. The Department reviewed the CMS Investigation Report Addendum with respect to applicable sections of the Charleston Naval Complex (CNC) Hazardous Waste Management Permit (the Permit) and has determined it to be technically adequate.

Based on details and analytical data presented in the CMS Investigation Report Addendum for SWMU 159/AOC 653, the Department concurs with the recommendation for no further action (NFA). Please note that the Department's concurrence is based on information provided by CNC to date. Any new information found to be contradictory may require further investigation.

Thank you for your cooperation in this matter. If you have any questions regarding this issue, please contact me at (803) 896-4185.

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 Mansour Malik to David Scaturo dated September 18, 2001.

cc: Tony Hunt, P.E., SOUTH DIV
Dean Williamson, P.E., CH2M-Jones
Gary Foster, P.E., CH2M-Jones
Dann Spariosu, Ph.D., EPA Region 4
Rick Richter, Trident EQC District

015AFB03.SLP

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL



2600 Bull Street
Columbia, SC 29201-1708

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

Memorandum:

To: David Scaturo, Environmental Engineering Manager
Corrective Action Engineering Section
Division Of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management

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

Date: 9/18/01

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

SWMU 159/AOC 653 Corrective Measure Investigation Report Addendum.

Dated August 2001, Received 08/17/2001

DD010708

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 Division of Hydrogeology recommends the approval of the above mentioned corrective measure study investigation report addendum as written. However, the following concerns should be observed for future similar documents.

Observations:

1. AOC 653, Section 3.2.3 CMS Investigation, Lines 29+: Sampling and correlation of the Grid monitoring wells HGDHGW003/03D and HGDHGW006/06D to correlate arsenic in groundwater as linked to AOC 653 is not practical at all. Monitoring well 003/03D is exactly 600 feet from the AOC's center. Monitoring well 006/06D is 650 feet from the same exact point. The groundwater flow direction from the depicted shallow and deep groundwater contour lines is generally to the East and the correlated wells are obviously side-gradient.
2. Typographic error: Page 3.2, line 19: Units for BEQs concentration in soil should be in mg/Kg and not $\mu\text{g/L}$.
3. Discussions for resolution of the workplan changes suggested by CH2M-Jones for SWMU 159 and the correspondence between the Department and the Hill/Navy in this regard should be brought in as part of this document. It has to be attached to the text body or the Appendix.

DD010708



CH2M HILL
3011 S.W. Williston Road
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32608-3928
Mailing address:
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32614-7009
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September 20, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 0) – AOC 638, Zone G

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0) for AOC 638 in Zone G of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is David Lane. Please contact him at 352/335-5877, extension 2320, if you have any questions or comments.

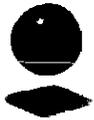
Sincerely,

CH2M HILL

A handwritten signature in black ink that reads "Dean Williamson".

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att



CH2MHILL

September 26, 2001

CH2M HILL

3011 S.W. Williston Road

Gainesville, FL

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Mailing address:

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Mr. David Scaturro
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 1) – SWMU 162, Zone K

Dear Mr. Scaturro:

The RFI Report Addendum (Revision 0) – SWMU 162, Zone K of the Charleston Naval Complex (CNC) was submitted to you in June of this year. Enclosed we are submitting four copies of the set of pages which will serve as the Revision 1 for this RFI Report Addendum. Below you will find a list of the items which have been revised, as well as a brief summary characterizing the nature of this revision. This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

- Revision of page 2-2
- Revision of page 5-4

The revisions on these two pages of text reflect responses to comments made by SCDHEC in reference to the RFI Report Addendum (Revision 0) for SWMU 162, Zone K. These pages have been 3-hole drilled for your convenience.

The principal author of this document is Jim Edens. Please contact him at 352/335-5877, extension 2491, if you have any questions or comments.



ENSAFE INC.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

313 Wingo Way • Mt. Pleasant, South Carolina 29464 • Telephone 843-884-0029 • Facsimile 843-856-0107 • www.ensafe.com

September 25, 2001

Mr. Robert A. Harrell, Jr., P.E.
Southern Division Naval Facilities
Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, SC 29419-9010

Re: Draft Zone J Point of Entry Effluent Sampling Work Plan Addendum, Page Changes

Dear Rob:

The purpose of this letter is to submit the page changes that comprise the Draft Zone J Point of Entry Effluent Sampling Work Plan Addendum. These changes are contained in the enclosure. Included in the enclosure is a summary of the changes and filing instructions to assist in making necessary page changes. If you should have any questions, please feel free to call me at (843) 884-0029.

Sincerely,

Charles A. Vernoy
Task Order Manager

enclosure

cc: File
Matthew A. Hunt



CH2MHILL

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
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September 26, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Groundwater Supplemental Sampling Plan for AOC 559, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the Groundwater Supplemental Sampling Plan for AOC 559 in Zone E of the Charleston Naval Complex (CNC). This Sampling Plan has been prepared to gain further information for evaluating the nature and extent of chlorobenzenes (CB/DCB) present at the site. This information will be used to complete RFI activities at the site.

The principal author of this Sampling Plan is David Lane. Please contact him at 352/335-5877, extension 2320, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att
Darryl Gates/CH2M HILL, w/att



CH2MHILL

CH2M HILL

3011 S.W. Williston Road

Gainesville, FL

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Mailing address:

P.O. Box 147009

Gainesville, FL

32614-7009

Tel 352.335.7991

Fax 352.335.2959

September 26, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Soil Sampling Plan for Combined SWMU 14, Zone H

Dear Mr. Scaturo:

Enclosed please find four copies of the Soil Sampling Plan for Combined SWMU 14 in Zone H of the Charleston Naval Complex (CNC). This Sampling Plan has been prepared to confirm the required extent of soil excavation for benzo(a)pyrene equivalents (BEQs) in soils at the site. This information will be used to complete RFI activities at the site.

The principal author of this Sampling Plan is Sam Naik. Please contact him at 770/604-9182, extension 255, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att
Darryl Gates/CH2M HILL, w/att



2600 Bull Street
Columbia, SC 29201-1708

September 28, 2001

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

RE: Corrective Measures Study (CMS) Work Plan SWMUs 1 and 2, Zone A,
(Request for NFA) – Conditional Approval
Revision 0, June 2001
Charleston Naval Complex
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) received a CMS Work Plan for SWMUs 1 and 2 on June 21, 2001. The Department reviewed the CMS Work Plan with respect to applicable sections of the Charleston Naval Complex (CNC) Hazardous Waste Management Permit (the Permit).

Based on details and analytical data presented in the CMS Work Plan for SWMUs 1 and 2, and "hot spot" removal at sample location A002SB020, the Department concurs with the recommendation for no further action (NFA). This approval is conditioned on the removal of surface soil in the immediate vicinity of RFI Sample ID A002SB020, where the lead concentration was reported at 3,870 mg/kg. Please note that the Department's concurrence is based on information provided by CNC to date. Any new information found to be contradictory may require further investigation.

Please be advised that groundwater contamination from other SWMUs in Zone A, specifically SWMU 38 and/or SWMU 39, may be impacting property within the footprint of SWMUs 1 and 2. The Department would not concur with transfer of property at SWMUs 1 and 2 until either: (1) it is shown that the extent of groundwater contamination is not impacting property at SWMUs 1 and 2, or (2) groundwater contamination within the footprint of SWMUs 1 and 2 is remediated as part of the corrective action at SWMUs 38 and/or 39.

CMS Work Plan SWMUs 1 and 2
September 28, 2001
Page 2 of 2

Thank you for your cooperation in this matter. If you have any questions regarding this issue, please contact me at (803) 896-4185.

Sincerely,

A handwritten signature in cursive script that reads "David Scaturo".

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

Attachment

cc: Tony Hunt, P.E., SOUTHDIV
Dean Williamson, P.E., CH2M-Jones
Gary Foster, P.E., CH2M-Jones
Dann Spariosu, Ph.D., EPA Region 4
Rick Richter, Trident EQC District



MEMORANDUM

1 October 2001

2600 Bull Street
Columbia, SC 29201-1708

TO: Susan Peterson, Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: John R. Gelting, P.G., Manager 
RCRA Hydrogeology Section 1
Division of Hydrogeology
Bureau of Land and Waste Management

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

Corrective Measures Study Workplan, Revision 0, dated June 2001
Rationale for No Further Action
DRMO Storage and Lead Contamination Areas
SWMU 1 and 2, Zone A

As requested, the document 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, CERCLA 120(h) as amended.

Solid waste management unit (SWMU) 1 was located in Building 1617 (razed) in Zone A and used by the Defense Reutilization Marketing Office (DRMO) to store excess military property. The property identified as hazardous waste was stored in the covered storage shed at Building 1617. SWMU 2 in Zone A includes salvage bin No.3 and the paved ground surface at the DRMO facility. As SWMU 2 encompasses SWMU 1, these units have been grouped together for purposes of the RCRA Facility Investigation and subsequent corrective measures.

The referenced CMS Workplan includes an Interim Measure Completion Report for the field activities conducted by the Environmental Detachment Charleston (DET). The DET delineated the impact of lead to surface soil, subsurface soil, sediment and groundwater in the approximately 6-acre area of SWMU 2. The Navy concludes that surface soil has been remediated as a result of the DET's extensive excavation (interim measure). The Navy states that no constituents of concern were identified in subsurface soil.

dd010749.jco

During the RFI, manganese was identified as a chemical of concern in groundwater at SWMU 1 while arsenic, manganese and silver were identified as chemicals of concern in groundwater at SWMU 2. The Navy states that the chemicals of concern in groundwater are either in concentrations below their respective maximum contaminant levels (MCLs), below applicable tap water risk-based concentrations (RBCs), or are consistent with background concentrations. The Navy provides rationale for no further action for SWMUs 1 and 2 and recommends unrestricted land use for this area of the base. While the Division of Hydrogeology concurs with the Navy's no further action (NFA) recommendation for groundwater at SWMUs 1 and 2, it is important to note that this NFA decision should not be interpreted to mean that this property is available for "future unrestricted land use". This NFA decision for groundwater at SWMUs 1 and 2 means that the Navy has adequately completed the groundwater portion of the RFI at these units and that based on available data, no groundwater corrective action is being required at SWMUs 1 and 2. A decision regarding the suitability of this property to be leased or transferred with/without restrictions will be undertaken when the Navy has submitted a Finding of Suitability to Lease/Transfer (FOSL/FOST). The potential for releases from upgradient sources that may be impacting groundwater underlying SWMUs 1 and 2 will be addressed under the appropriate investigations.

The Division of Hydrogeology has reviewed the subsurface soil and groundwater data included in the Corrective Measures Study Workplan, Revision 0, dated June 2001, referenced above. Based on the information and analytical data submitted, the Division of Hydrogeology recognizes that the Navy has adequately addressed the known environmental contamination identified on the property to date in accordance with the approved scope of work. Please note, this statement pertains only to releases from SWMUs 1 and 2 of the site addressed in the referenced report and does not apply to other areas of the site and/or any other potential regulatory violation. Further, the Division of Hydrogeology retains the right to request further investigation if deemed necessary.

cc: Jo Cherie Overcash, Hydrogeologist, BLWM
David Scaturo, P.E., P.G., Manager, Corrective Action Engineering Section, BLWM
Joe Bowers, P.G., Manager, RCRA Hydrogeology Section 2, BLWM



2600 Bull Street
Columbia, SC 29201-1708

September 28, 2001

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

RE: Phase III Interim Measure Work Plan Addendum, AOC 607, Zone F,
Electrical Resistance Heating,
Perimeter Groundwater and Soil Vapor Monitoring
Revision 00, Dated September 2001 – Conditional Approval
Charleston Naval Complex (CNC)
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) has reviewed the above referenced document with respect to applicable State and Federal Regulations, the CNC Hazardous Waste Permit, effective September 17, 1998. Based on this review, the Department grants a conditional approval of this document. The approval of the Work Plan is conditioned upon the Navy addressing the attached Comments from the Division of Hydrogeology (Memorandum from Bergstrand to Peterson, September 27, 2001) as specified.

Please be advised that ultimately, the Navy is responsible for ensuring that this Interim Measure does not result in any adverse impacts to human health. Additionally, the Department requests a list of the Restoration Advisory Board (RAB) meetings and other public meetings that were held in order to share information and solicit public involvement and comment regarding this Interim Measure. Please submit this list to the Department within thirty (30) days.

Phase III Interim Measure Work Plan, AOC 607
September 28, 2001
Page 2 of 2

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4185.

Sincerely,



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

Attachment: Memorandum from Paul Bergstrand to Susan Peterson dated September 27, 2001

cc: Tony Hunt, PE, SOUTHDIV
Rob Harrell, PE, SOUTHDIV
Dean Williamson, PE, CH2M-Jones
Gary Foster, PE, CH2M-Jones
Dann Spariosu, PhD, EPA Region 4
Rick Richter, Trident EQC District
CNC File

8. Ongoing SV Monitoring

Section 2.2.2 of the Addendum describes a weekly soil vapor monitoring process to observe elevated VOCs using a PID. That process states that *"If sustained PID reading of greater than 5 ppm are measured in a monitoring location for a period of 5 minutes, soil gas samples will be collected from that location and analyzed for the presence of target VOCs using the same analytical procedures that were used during the baseline sampling described above."* The Navy has not provided any reference or justification for the selection of 5 ppm as an *"elevated VOC"* reading. Also, it is not clear what useful information will result from a single analytical soil gas sample in light of the operating ERH heating and vacuum system. Furthermore, the Department has noted that plotting the stabilized soil gas PID data on Figure 2-1 of the IM Report provides some correlation with the extent of PCE contamination in groundwater shown on Figure 3-2 of the same document. Finally, it was observed in the March 2001 IM Report for Building 225 that the maximum stabilized PID reading of soil gas was only 0.18 ppm and that reading was detected over the maximum groundwater detection of 3800 ppb PCE. The Navy should implement the following approach for soil gas monitoring with a PID. Record the full five minutes of PID data to demonstrate stabilization. Compare all weekly soil gas PID data to all data collected from that monitoring location, including baseline data collected prior to ERH System operation. Compare site wide soil gas data to monitor trends. Decide upon appropriate actions to maintain site control and prevent human exposure based upon reproducible site data.



CH2MHILL

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September 28, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum (Revision 1) – AOC 696, Zone K

Dear Mr. Scaturo:

The RFI Report Addendum (Revision 0) – AOC 696, Zone K of the Charleston Naval Complex (CNC) was submitted to you in April of this year. Enclosed we are submitting four copies of the set of pages which will serve as the Revision 1 for this RFI Report Addendum. Below you will find a list of the items which have been revised, as well as a brief summary characterizing the nature of this revision. This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

- Revision of Table 4-1, pages 4-4 and 4-14
- Revision of Figure 4-3
- Appendix D Insert

The revisions on pages of text reflect responses to comments made by SCDHEC in reference to the RFI Report Addendum (Revision 0) for AOC 696, Zone K. The actual responses are provided in letter format, attached to this transmittal letter. The replacement pages have been 3-hole drilled, for insertion into the original binder.

The principal author of this document is David Lane. Please contact him at 352/335-5877, extension 2320, if you have any questions or comments.

Page 2
September 28, 2001

Sincerely,

CH2M HILL

A handwritten signature in cursive script, appearing to read "Dean Williamson".

Dean Williamson, P.E.

cc: ✓ Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

September 25, 2001

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

RE: RFI Report Addendum - AOC 696, Zone K, (Request for NFA)
Charleston Naval Complex
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) received a RFI Report Addendum for AOC 696. The Department reviewed the RFI Report Addendum with respect to applicable sections of the Charleston Naval Complex (CNC) Hazardous Waste Management Permit (the Permit) and has determined it to be technically adequate.

Based on details and analytical data presented in the RFI Report Addendum for AOC 696, the Department concurs with the recommendation for no further action (NFA). However, the attached minor General and Specific Comments should be addressed before the Report is finalized. Please note that the Department's concurrence is based on information provided by CNC to date. Any new information found to be contradictory may require further investigation.

Thank you for your cooperation in this matter. If you have any questions regarding this issue, please contact me at (803) 896-4185.

Sincerely,

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

Attachment

cc: Tony Hunt, P.E., SOUTHDIV
Dean Williamson, P.E., CH2M-Jones
Gary Foster, P.E., CH2M-Jones
Dann Spariosu, Ph.D., EPA Region 4
Rick Richter, Trident EQC District

**RFI REPORT ADDENDUM
AOC 696, ZONE K
REQUEST FOR NO FURTHER ACTION
REVISION 0, DATED APRIL 2001**

OVERALL TECHNICAL COMMENT

The RFI Addendum for Area of Concern (AOC) 696, Zone K, Charleston Naval Complex (CNC), Revision 0, is well written, organized and documented.

From the Report review, it is understood that AOC 696 consists of an area where five older type transformers were located on a concrete slab to support a United States Navy radar station housed in the north adjacent structure, Building 2509. Intensive sampling and analysis of surface soils, subsurface soils and ground water were conducted during the RFI at AOC 696. Fifty cubic yards of polychlorinated biphenyls (PCBs), arsenic and, apparently, beryllium contaminated soils were removed as an Interim Measure (IM). Further, a 1000-gallon underground storage tank (UST) was removed as part of the IM. The UST removal and soil sampling associated with the UST removal resulted in a clean closure for the UST removal at AOC 696.

Confirmatory sampling associated with the IM indicated that arsenic is the only inorganic chemical of concern (COC) in surface soils above the adopted screening criteria for AOC 696. These elevated analytical results for this COC are above the average background concentrations for arsenic. However, the IM confirmatory soil sampling analysis indicated that the detected arsenic was within the range of background arsenic concentrations in area soils. Additionally, the confirmatory sampling analysis indicated that the PCBs in soils associated with AOC 696 had been removed and that the remaining traces of the PCBs were below the IM cleanup goal. One IM subsurface soil sample analysis, for sample 536-8, indicated a 12.8 milligram per kilogram (mg/kg) detection. However the adjacent sample, subsurface sample 560-4, indicated a non-detect when analyzed.

Three shallow groundwater monitoring wells were installed in AOC 696. No COCs were found above screening criteria with the exception of iron, in monitoring well K696GW002. Iron, however, is a naturally occurring inorganic analyte in groundwater within the Charleston Naval Complex and in other sections of the Coastal Plain.

Based on the data provided in the Report, a No Further Action (NFA) recommendation appears to be supported for AOC 696.

The following minor General and Specific Comments should be addressed before the Report is finalized.

General Comment

1. In the Appendices that contain laboratory analytical results some of the analytical data has been marked through, and different results have been hand written adjacent to the printed results. These markings should be explained.

CH2M-Jones Response: This comment is referring to annotated tables in the data validation packages. The hand markings were made during the validation process and represent required revisions to data results and qualifiers as a result of the validation process. The data reported in Appendix A and in the GIS database are the result of this validation process. The following explanatory statement will be inserted on a new page at the beginning Appendix D: “Annotated forms contain handwritten marks that indicate required revisions as a result of the data validation process.”

2. A localized potentiometric surface map should be provided for AOC 696. RFI Figure 2.7, Shallow Groundwater Potentiometric Contours, provided in Appendix E, does not specifically indicate the AOC 696 site and does not provide sufficient detail of the localized groundwater movement within AOC 696.

CH2M-Jones Response: The localized groundwater movement based on water level readings in site wells on January 12, 2000 has been added to Figure 4-3. A revised figure is attached.

Specific Comment

1. **Page IV, Contents.** A list of Tables and Figures is not provided in the Contents. A list of Tables and Figures should be provided in the Contents.

CH2M-Jones Response: Within the Contents, all Tables and Figures are listed following their respective Sections.

2. **Page 4-4, Table 4-1, Subsurface Soil, Sample Concentration.** Table 4-1 shows inorganic contaminant values above average background contaminant concentration values in bold print and enclosed. The analytical result for Subsurface Soil Sample K9696SB014 is 5.4 mg/kg for arsenic. This result is above the 3 mg/kg background concentration and should be in bold print and enclosed. The discrepancy in Table 4-1 should be corrected.

CH2M-Jones Response: The “3 mg/kg” background concentration applies to surface soil samples. The subsurface soil sample K9696SB014 result of 5.4 mg/kg for arsenic was compared to the SSL of 15 mg/kg and the background

concentration of 1.98 mg/kg. Since it does not exceed the SSL, it is correctly not shown in bold print and enclosed in a box. Thus, no revision is necessary.

3. **Figure 4-2.** Figure 4-1 indicates that several soil samples analyzed non-detect (ND) for arsenic. However, Table 4-1 shows these same samples as Not Analyzed/Not Available/Not Applicable (NA). The correct notations should be provided on both Figure 4-4 and Table 4-1. These discrepancies should be corrected.

CH2M-Jones Response: The Figure 4-1 referred to in the first line and Figure 4-4 referred to in the last line of the comment are assumed to mean Figure 4-2. Figure 4-2 is correct. Table 4-1 has been corrected to show the samples as ND for non-detect, and revised Table pages are attached.



2600 Bull Street
Columbia, SC 29201-1708

September 28, 2001

Ms. Amy Daniell
Charleston Naval Complex
CSO 1895 Ave. F
North Charleston, SC 29405

Re: NOTI
AOC 609 Zone F, RFI Report Addendum
Charleston Naval Complex
SCO 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (The Department) received the above referenced work plan on June 21, 2001. The Department reviewed the work plan according to applicable State and Federal Regulations and the Charleston Naval Complex Hazardous Waste Permit (the Permit), effective September 17, 1998. Based on this review, the Department has determined the RFI Report Addendum to be technically insufficient.

Please refer to the attached engineering comments and memoranda from Jo Cherie Overcash and Susan Byrd. The response to these comments may be addressed by submitting revised pages to be inserted into the original document, or by submitting another document. If new or revised pages are submitted, please indicate whether each submitted page is a revision to an existing page in the original document or a new page not contained in the original document. Each revised page should be coded; for example, 2-1(R-9/10/88) would be page 2-1, revised 9/10/88. In addition to revisions, please provide a summary of the comment responses

If you have any questions regarding this issue, please contact me at (803) 896-4872.

Sincerely,

Jamelle H. Ellis
Corrective Action Engineering Section
Waste Management Division
Bureau of Land and Waste Management

Attachments

cc: David Scaturo, Corrective Action Engineering
Rick Richter, Trident EQC
Tony Hunt, SOUTHDIV
Rob Harrell, SOUTHDIV
Dann Spariosu, EPA Region 4
Gary Foster, CH2MHILL/Jones
Dean Williamson, CH2MHILL/Jones
Michael Bishop, DHEC (UST Program)



ENGINEERING COMMENTS

The U.S. Navy Southern Division &
Naval Facilities Engineering Command
RFI Report Addendum
AOC 609

Dated July 2001

Prepared by:
Janelle H. Ellis, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
September 28, 2001

General Comments

1. Section 7.0 Recommendations, p. 7-1

Lines 4-6, p.7-1, recommend No Further Action (NFA) for AOC 609. The Department does not concur with the No Further Action Recommendation for the following reason:

Site 24, addressing petroleum products under the Department's RCRA Subtitle I program (UST Program), has been NFA'd. Site 25 is also being handled by the UST Program and is an open/active site. There is currently monitoring being conducted on Site 25. The Department cannot fully assess AOC 609 until investigations and subsequent recommendations regarding Site 25 have been made. The Department generally defers an NFA determination for this type of site until after the investigation under RCRA Subtitle I program is complete. The *Recommendations* section of the document should be revised to state that the final corrective action for AOC 609 will be selected subsequent to selection of remedial action at Site 25.

All references to NFA within the referenced document should be removed.

6. Appendix B

In this Appendix, the Navy has included portions of documents that have been submitted to the Department's Bureau of Water. Specifically, the appendices to the *Initial Ground-Water Assessment Report for Site 24, Building NS1346*, dated February 2000, and the appendices to the *Rapid Assessment Report for Site 25, Building 1346*, dated November 1999, have not been included. The Navy should provide these appendices.

7. Appendix D

The tables included in Appendix D are entitled "Data Summary". This document is an "Addendum" to the RFI Report and a complete set of data should be provided. All historical and new data for each monitoring well (soil location) should be presented on tables to include the date of sample collection. The organization of the table should be such that the reviewer can readily determine groundwater quality at each location and whether trends are present. Although a portion of the RFI Report is reproduced in this Addendum, the Navy should incorporate old and new data for ease of review.

Site Related Documents Referenced:

March 31, 1999 Zone F RCRA Facility Investigation Report, Revision 0

cc: Jack Gelting, P.G., Manager, RCRA Hydrogeology Section 1
Joe Bowers, P.G., Manager, RCRA Hydrogeology Section 2
David Scaturo, P.E., Manager, Corrective Action Engineering Section



2600 Bull Street
Columbia, SC 29201-1708

September 27, 2001

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

RE: Corrective Measures Study (CMS) Work Plan (WP) for Combined SWMU 9, Zone H,
Revision 0, Dated February 2001 – Conditional Approval
Charleston Naval Complex (CNC)
SCO 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) has reviewed the above referenced document with respect to applicable State and Federal Regulations, the CNC Hazardous Waste Permit, effective September 17, 1998, and has determined it to be technically adequate. However, the approval of the Work Plan is conditioned upon addressing the attached Comments when the CMS Report is finalized.

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4185.

Sincerely,

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

Attachment

cc: Tony Hunt, PE, SOUTHDIV
Rob Harrell, PE, SOUTHDIV
Dean Williamson, PE, CH2M-Jones
Gary Foster, PE, CH2M-Jones
Dann Spariosu, PhD, EPA Region 4
Rick Richter, Trident EQC District

**CORRECTIVE MEASURES STUDY WORK PLAN
COMBINED SWMU 9, REVISION 0, DATED FEBRUARY 2001
CHARLESTON NAVAL COMPLEX**

Overall Technical Comment

The combined CMS WP provides a general methodology for the identification, evaluation, and selection of corrective measures technologies to be used to remediate contaminated media at the combined SWMU 9 site. Chemicals of Concern (COC) at the combined SWMU 9 site have been identified and include the following:

- Organic Compounds: Benzo(a)pyrene equivalents (BEQs) and polychlorinated Biphenyls (PCBs).
- Inorganic Compounds (Metals): Arsenic and Lead.

A reasonable project schedule is provided in the CMS WP, however, the review of this CMS WP was conducted after the last scheduled event proposed in the project schedule was to be completed.

Section 2.1.2 Surface Soil Remedial Action Objectives, page 2-2

Lines 28-31 indicate that a soil cover is present over the landfill area. According to information available to the Department, there is no engineered soil cover present on the landfill area, and during past site visits, the Department has observed areas within the landfill boundary with no soil cover present.

Section 2.1.5 Groundwater Remedial Action Objectives, page 2-4

Lines 7-13 indicate that a marsh clay layer (about 24-40 ft bls) provides a barrier to downward migration of contaminants. The CMS Report should provide information that illustrates the continuity and integrity of the confining layer.

Section 3.1.2 Identification and Screening of Technologies, page 5-2

Lines 25-28 state that no additional cap is necessary for the landfill area. Please be advised that, in order for the Department to concur with this statement, information regarding the existing soil cover (i.e., depth and characteristics) must be provided. The term "cap" implies a RCRA Subtitle C or D cap.



313 Wingo Way
Mt. Pleasant, SC 29464

Phone: (843) 884-0029
Fax: (843) 856-0107

LETTER OF TRANSMITTAL

DATE	9/27/01	JOB NO.	0154-001-07-100-00
ATTENTION			
RE			

TO Rob Harrell - South Div
2155 Eagle Drive
N. Charleston SC 29418

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

- Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1	9-26-01	<input checked="" type="checkbox"/>	Completed Draft Zone J Point of Entry Effluent Sampling Work Plan Addendum * Including page changes

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ 20 _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

Please note that page changes are included and do not need to be added

COPY TO file

SIGNED: Rob Harrell



2600 Bull Street
Columbia, SC 29201-1708

September 26, 2001

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

RE: RFI Report Addendum for SWMU 164, Zone K
Rational for No Further Action, Revision 0, Dated June 2001
Charleston Naval Complex (CNC)
SC0 170 022 560

Dear Ms. Daniell:

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

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4185.

Sincerely,

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

Attachment

cc: Tony Hunt, PE, SOUTHDIV
Rob Harrell, PE, SOUTHDIV
Dean Williamson, PE, CH2M-Jones
Gary Foster, PE, CH2M-Jones
Dann Spariosu, PhD, EPA Region 4
Rick Richter, Trident EQC District

**COMMENTS ON
RFI REPORT ADDENDUM FOR SWMU 164, ZONE K
RATIONAL FOR NO FURTHER ACTION
CHARLESTON NAVAL COMPLEX ANNEX
REVISION 0, DATED JUNE 2001**

GENERAL COMMENTS

1. Several sections are concluded with sweeping statements which suggest there is no need for further action. These statements are not always supported. See the specific comments below for the specific examples. Until these comments are resolved, the recommendation for no further action can not be supported.

SPECIFIC COMMENTS

1. **Page 3-1, Section 3.1.** The depth range for the surface soil samples and the subsurface soil samples should be stated somewhere in this section.
2. **Page 3-3, Section 3.1.1.** The text cites an evaluation criteria saying that no surface sample (of aluminum) exceeded the greater of the risk based criteria (RBC) or the background reference concentration (BRC). In Section 5.1 RFI Status, the report recommends No Further Action for this site because "no chemical detections at this site exceeded risk-based criteria and background reference concentrations". For programmatic consistency, one set of evaluation criteria should be employed. Revise text and evaluations as appropriate.
3. **Page 3-3, Section 3.1.3.** This discussion of subsurface soil thallium concentrations does not include any comparison to background concentrations. The later discussion regarding thallium on Page 4-3 goes through a lengthy discussion stating that no Zone K background value is available due to the fact that all samples reported thallium below detection limits. For added clarity, this statement should be included in this earlier discussion.
4. **Page 3-3, Section 3.3.** This section discusses background soil sampling. The collection of only six surface soil samples seems a low number for a data set for background value calculation. The collection of three samples for subsurface soils is too few samples for a data set for background value calculation. These values would be more appropriately called reference values and their use under the same rules as background values (i.e. ok if less than 2x background) should be a matter for discussion for the BRAC Cleanup Team.

5. **Page 4-2, Section 4.2.2.** This section discusses the subsurface occurrence of arsenic. The single detected concentration is from sample K164SB002. The argument put forth in the text regarding a set of background samples (surface soil and subsurface soil) in which the arsenic value decreases by two orders of magnitude with depth and therefore indicates that leaching is not occurring is not valid. The arsenic value from samples 164SB002T1 and T2 clearly shows that sample T2 clearly exceeds the background (reference) value, both values are above the screening criteria and, taken together, indicate a trend that increases with depth. The data presented point more towards a lack of delineation of arsenic concentrations in soil rather than support of the statement that "arsenic in subsurface soil does not warrant further investigation or action at SWMU 164."

While the inclusion of information (no arsenic detections in five sampling events) from the closest downgradient well is good evidence for the non-leachability of arsenic, the inclusion of sidegradient direct push technology (DPT) wells is of considerably less value. In the following section, 4.3 Groundwater, two DPT wells are discussed: 166GP018 and 166GP072. The text states that metals were not detected in a filtered groundwater sample from 166GP018. The use of filtered samples is not generally allowed by Region 4 EPA. There are no metals analytical results stated for location 166GP072. These items in Section 4.3 do not support the blanket conclusion in Section 4.2.2 that "the groundwater in the area is not affected by arsenic." The information presented is insufficient to draw that conclusion.

6. **Page 4-3, Section 4.3.** The value for arsenic in the subsurface soil sample for sample number 164SB002T2 is reported as 38.5 mg/kg while the soil-to-groundwater soil screening level is reported to be to be 14.5 mg/kg. So, the reported arsenic concentration is more than twice the concentration suggested as a screening value which would provide protection from compounds leaching into the groundwater. The statement on lines 10 and 11 on page 4-4 which states that 'no chemical were found in soil at concentrations that would indicate a potential soil-to-groundwater pathway' is clearly not supported by the arsenic values reported and should be removed.



2600 Bull Street
Columbia, SC 29201-1708
September 25, 2001

CERTIFIED MAIL

Ms. Amy Daniell
Caretakers Site Office
Naval Facilities Engineering Command, Southern Division
1895 Avenue F
Charleston Naval Base
Charleston, SC 29405

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

Temporary Monitoring Well Request for SWMU 25/70, Zone E

Dear Ms. Amy Daniell

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 two (02) temporary monitoring wells (Geoprobes) to collect groundwater and soil samples. These wells should be completed to a maximum depth of approximately 30 feet tapping the top of the clay unit of the Ashley Formation.

Attached, please find a Temporary Monitoring Well Approval Form, a copy of the proposed well locations, and a copy of Water Well Record SCDHEC 1903. 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 Mansour Malik (803) 896-4169.

Respectfully,
Mansour Malik
Mansour Malik,
Project Hydrogeologist,
Hazardous Waste Section
Division of Hydrogeology, BLWM.

DD010732.MNM



CH2MHILL
Constructors, Inc.

CH2M HILL
115 Perimeter Center Place NE
Suite 700
Atlanta, GA
30346-1278
Tel 770.604.9095
Fax 770.604.9282

September 25, 2001

158814.ZH.EX.03

Mr. Paul Bergstrand, P. G.
Hydrogeologist
South Carolina Department of Health and Environmental Control
Bureau of Land & Waste Management
Division of Hydrogeology
8901 Farrow Road
Columbia, SC 29203

Subject: Request for the Installation of Groundwater Monitoring Wells
SWMU 196, Zone H, Interim Measures Phase IIA and IIB
Charleston Naval Complex, North Charleston, South Carolina

Dear Paul:

On behalf of the U.S. Navy Southern Division Naval Facilities Engineering Command, CH2M-Jones requests the installation of 13 groundwater monitoring wells at SMWU 196 to assist with monitoring the performance of the planned interim measures work.

The 13 wells will be installed to a depth of approximately 12 to 17 feet and will have 10 foot screens. The wells will be constructed of stainless steel to withstand the high temperatures associated with selected technology. Well installation will be performed in accordance with the South Carolina Well Standards and Regulations (R.61-71). Figure 1 presents the location of the proposed monitoring wells. Table 1 presents the required detailed information for monitoring well installation approval.

Mr. Paul Bergstrand, P.G.

Page 2

September 25, 2001

158814.ZH.EX.0

CH2M-Jones has scheduled to start this work in October 15, 2001. If you have any questions, comments, or require additional information please do not hesitate to contact us.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read 'Tom Beisel', written over a horizontal line.

Tom Beisel, P.G.

Project Geologist

(770) 604-9182 ext 367

enclosures

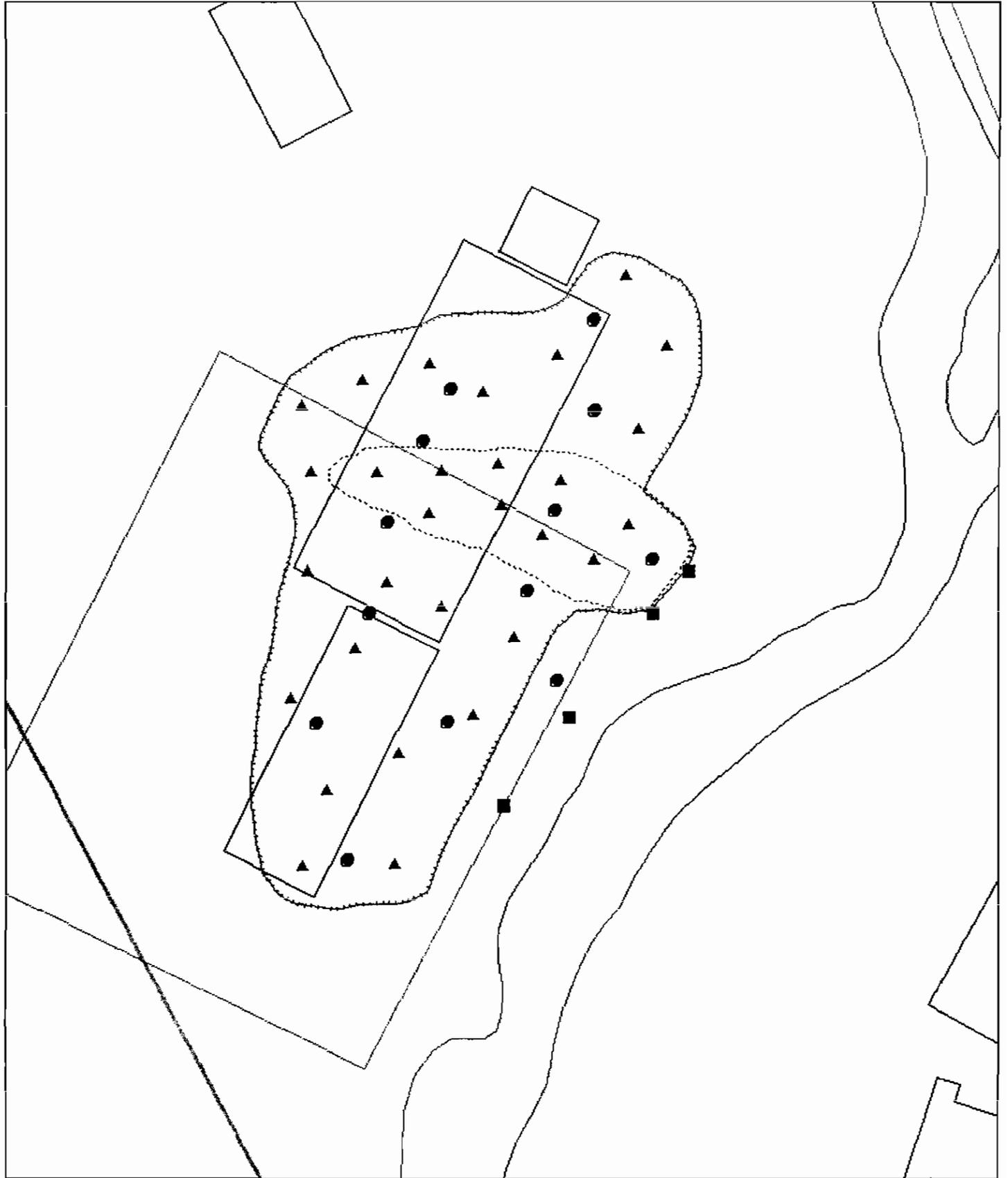
cc:

Tony Hunt, P.E./SOUTHDIV

Rob Harrell/SOUTHDIV

Dean Willamson, P.E./CH2M HILL/GNV

NOTE: Original figure created in color



- IM Phase 2B
- IM Phase 2A
- IM Monitoring Wells
- Barrier Wells
- Injection Wells
- Shoreline
- AOC Boundary
- SW MU Boundary
- Buildings

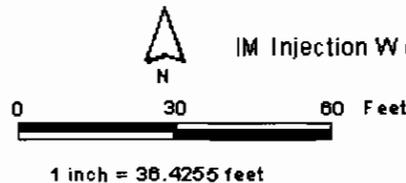


Figure 1
IM Injection Wells, Monitoring Wells, and Barrier Wells
Phase 2 IM for SWMU 196
Charleston Naval Complex

CH2MHILL



ENSAFE INC.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

313 Wingo Way • Mt. Pleasant, South Carolina 29464 • Telephone 843-884-0029 • Facsimile 843-856-0107 • www.ensafe.com

September 25, 2001

Mr. Matthew A. Hunt, P.E.
Southern Division Naval Facilities
Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, SC 29419-9010

Re: Draft Zone J Point of Entry Effluent Sampling Work Plan Addendum, Page Changes

Dear Tony:

The purpose of this letter is to submit the page changes that comprise the Draft Zone J Point of Entry Effluent Sampling Work Plan Addendum. These changes are contained in the enclosure. Included in the enclosure is a summary of the changes and filing instructions to assist in making necessary page changes. If you should have any questions, please feel free to call me at (843) 884-0029.

Sincerely,

Charles A. Vernoy
Task Order Manager

enclosure

cc: File
Robert A. Harrell, Jr.

September 25, 2001

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

RE: RFI Report Addendum - AOC 696, Zone K, (Request for NFA)
Charleston Naval Complex
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) received a RFI Report Addendum for AOC 696. The Department reviewed the RFI Report Addendum with respect to applicable sections of the Charleston Naval Complex (CNC) Hazardous Waste Management Permit (the Permit) and has determined it to be technically adequate.

Based on details and analytical data presented in the RFI Report Addendum for AOC 696, the Department concurs with the recommendation for no further action (NFA). However, the attached minor General and Specific Comments should be addressed before the Report is finalized. Please note that the Department's concurrence is based on information provided by CNC to date. Any new information found to be contradictory may require further investigation.

Thank you for your cooperation in this matter. If you have any questions regarding this issue, please contact me at (803) 896-4185.

Sincerely,

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

Attachment

cc: Tony Hunt, P.E., SOUTHDIV
Dean Williamson, P.E., CH2M-Jones
Gary Foster, P.E., CH2M-Jones
Dann Spariosu, Ph.D., EPA Region 4
Rick Richter, Trident EQC District



CH2MHILL

CH2M HILL

3011 S.W. Williston Road

Gainesville, FL

32608-3928

Mailing address:

P.O. Box 147009

Gainesville, FL

32614-7009

Tel 352.335.7991

Fax 352.335.2959

September 24, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Interim Measure Work Plan (Revision 0) – AOC 633, Zone G

Dear Mr. Scaturo:

Enclosed please find four copies of the Interim Measure Work Plan (Revision 0) for AOC 633 in Zone G of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Bill Elliott. Please contact him at 352/335-5877, extension 2477, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att



CH2MHILL

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

September 21, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Phase I Interim Measure Work Plan (Revision 0) – AOC 620/SWMU 36, Zone F

Dear Mr. Scaturo:

Enclosed please find four copies of the Phase I Interim Measure Work Plan (Revision 0) for AOC 620/SWMU 36 in Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Louise Palmer. Please contact her at 704/329-0073, extension 296, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att



CH2MHILL

CH2M HILL

3011 S.W. Williston Road

Gainesville, FL

32608-3928

Mailing address:

P.O. Box 147009

Gainesville, FL

32614-7009

Tel 352.335.7991

Fax 352.335.2959

September 21, 2001

Mr. David Scaturo
Corrective Action Engineering Section
Bureau of Land and Waste Management
Department of Health and Environmental Control
8901 Farrow Road
Columbia, SC 29223

Re: RFI Addendum Sampling Plan for Previously Uninvestigated Sites – Zone E

Dear Mr. Scaturo:

Enclosed are four copies of the RFI Addendum Sampling Plan for Previously Uninvestigated Sites (Revision 0) in Zone E of the Charleston Naval Complex (CNC). This sampling plan has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

All six of the previously uninvestigated sites—SWMU 181, SWMU 188, AOC 537, AOC 575, AOC 701, and AOC 704—have been included in the sampling plan. However, during discussions at the September 2001 BCT meeting, SCDHEC agreed to evaluate the necessity of conducting investigations at several of the sites originally designated for confirmatory sampling investigations (CSIs), in particular, SWMUs 181 and 188.

The principal author of this document is Kris Garcia. Please contact Ms. Garcia at 770/604-9182, extension 476, or me, at 352-335-5877, extension 2280, if you have any questions or comments.

Sincerely,

CH2M HILL

c: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

Received 7/19/01
w/o Forwarding Hh

Sampling Plan

AOC 642, Zone G

**Charleston Naval Complex
North Charleston, SC**

Prepared for
**U.S. Navy Southern Division
Naval Facilities Engineering Command**

Prepared by

CH2M-Jones

September 2001

Contract N62467-99-C-0960



CH2MHILL

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

September 18, 2001

Mr. David Scaturo
Corrective Action Engineering Section
Bureau of Land and Waste Management
Department of Health and Environmental Control
8901 Farrow Road
Columbia, SC 29223

Re: RFI Report Addendum (Revision 0) – AOC 611, Zone F

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum (Revision 0) for AOC 611 in Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Since I am the principal author of this document, please contact me at 352/335-7991, extension 2208, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

c: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att



2600 Bull Street
Columbia, SC 29201-1708

September 18, 2001

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

RE: Phase II Interim Measure Work Plan for SWMU 196, Zone H, dated August 2001
Charleston Naval Complex (CNC)
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) has reviewed the above referenced document with respect to applicable State and Federal Regulations, the CNC Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments do not appear to alter the proposed field activities and therefore, the Department is granting approval for the Navy to initiate field implementation of the proposed work. The attached comments should be addressed in the subsequent Interim Measure Report.

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4185.

Sincerely,

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

Attachment: Memorandum from Paul Bergstrand to David Scaturo dated August 27, 2001.

cc: Tony Hunt, PE, SOUTHDIV
Rob Harrell, PE, SOUTHDIV
Dean Williamson, PE, CH2M-Jones
Gary Foster, PE, CH2M-Jones
Dann Spariosu, PhD, EPA Region 4
Rick Richter, Trident EQC District



2600 Bull Street
Columbia, SC 29201-1708

RECEIVED
AUG 28 2001
SC DHEC - Bureau of
Land & Waste Management

MEMORANDUM

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

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

DATE: 27 August 2001

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

Phase II Interim Measure Workplan
SWMU 196, Zone H
Revision 00, Dated 7 August 2001

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, Environmental Protection Agency (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 goal of this workplan is a 90% reduction of the contaminant chlorobenzene in the groundwater above the clay aquaclude. The clay aquaclude is reported to be about 15 feet below the surface. The MCL of chlorobenzene is 100 parts per billion (ppb).

Comments on the referenced document have been provided. Any responses and/or revisions to this report should be provided to the Department. This workplan is approvable provided that adequate responses and/or revisions are made.

Comments by Paul M. Bergstrand
27 August 2001
Interim Measure Workplan
SWMU196, Zone H
Revision 00, Dated 7 August 2001

GENERAL

1. Chapter 2, Figures 2-2 through 2-7

This workplan discusses plans to implement an interim measure and includes a report of the December 2000 DPT sample data. While other data previously collected may have been used to delineate the southwest portion of the site, that data and the sample locations were not included in this workplan. The workplan should demonstrate how the extent of contamination in the southwest portion of the site has been defined.

2. Chapter 2, Figures 2-2 through 2-7

This workplan includes a report of the December 2000 DPT sample data. There were no isocontours of contamination provided in this workplan. Isocontour maps of contamination are a fundamental component used to review and approve workplans such as this. The workplan should provide contaminant isocontour maps before the IM workplan is approved.

3. Chapter 2

When Isocontours of 100, 1000, and 10,000 ppb are drawn for the DPT sample data provided, a trend is revealed between the 13 foot and 15 foot samples. That trend indicates a mass of free product migrating to the west from GP001 and GP005 to GP022. There are no sample points to close off or define this concern. The Department would like to discuss this concern and how it will be addressed.

4. Chapter 2

This workplan fails to provide cross sections of contamination or the clay aquitard. Cross section maps are a fundamental tool used to review and approve workplans such as this. Cross section figures must be provided before the IM workplan is approved. Please see the table below as an example.

CROSS SECTION DATA (Rounded values, >10k IN **BOLD**)

Southwest

Northeast

	GP 6	GP 5	GP 1	GP 2	GP 3	GP 4	GP 14
5'	1700	1000	159	7900	10900	250	ND
7'	2000	500	23800	11100	10000	90	ND
9'	5000	7000	48500	52000	31600	200	ND
11'	2000	1500	33600	15000	7000	1600	ND
13'	1000	33000	35300	11000	3000	650	ND
15'	130	3000	3500	600	600	126	ND

5. Chapter 2

This workplan appears to rely on the clay aquitard as containing or confining the contamination. However there was no map, figure, or discussion regarding the thickness, extent or orientation of this clay aquitard. Also, the spatial relationship of the clay aquitard to Shipyard Creek should be defined. All information about the clay aquitard must be provided before the IM workplan is approved.

6. Chapter 2

This workplan discusses plans to implement an interim measure. There were no groundwater flow maps provided in this workplan. Groundwater flow maps are a fundamental component of workplans and are used to review and approve documents such as this. Furthermore, the interaction of the surficial groundwater flow, the clay aquitard and Shipyard Creek was not address in this workplan. Groundwater flow maps must be provided in the final workplan and in IM Reports.

SPECIFIC

7. Chapter 2, Figure 2-1

This figure represents sample locations 50, 51, and 52. There is not a discussion or explanation of these sample locations or of any data results. Please explain the purpose and details of these sample locations.

8. Chapter 3, Page 3-6

This section describes using a PID to monitor the "barrier injection wells". This topic was discussed with Mr. Paul Favara of CH2M Hill. The sampling and calibration protocols for the PID or FID will be provided to the Department.



2600 Bull Street
Columbia, SC 29201-1708

September 18, 2001

COMMISSIONER:
Douglas E. Bryant

Ms. Amy Daniell, Environmental Engineer
Caretaker Site Office 1895, Avenue F
North Charleston, SC 29405

BOARD:
Bradford W. Wyche
Chairman

Re: Conditional Approval
CMS WP for SWMU 17, Zone H, dated May 2001
Removal of pcb-contaminated soil and NAPL
Charleston Naval Complex
SC0 170 022 560

William M. Hull, Jr., MD
Vice Chairman

Mark B. Kent
Secretary

Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above CMS WP, dated May 2001 according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit (Permit), effective September 17, 1998.

The Department approves the CMS WP under the condition that the Department of Hydrogeology's concerns (memo: Overcash to Peterson, August 30, 2001) are addressed.

If you have any questions about this issue, please contact Susan Peterson at (803) 896-4182 or Jo Cherie Overcash at (803) 896-4169.

Sincerely,

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

Attachments:

Memorandum from Jo Cherie Overcash to Susan Peterson dated September 6, 2001

cc: CNC reading file
Rick Richter, Trident EQC
Dean Williamson and Gary Foster, CH2M-Hill
Dann Spariosu, EPA Region IV
Rob Harrell and Tony Hunt, SOUTHDIV



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

28 August 2001

TO: Susan Peterson, 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

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

RECEIVED

AUG 30 2001

SC DHEC - Bureau of
Land & Waste Management

*Interim Measure Workplan Soil and NAPL Removal
Solid Waste Management Unit 17, Zone H,
Revision 0, dated June 2001*

Teleconference Call August 20, 2001, with Rebecca Caravalano and Vijaya Mylavaram of CH2M-Hill and Susan Peterson of the Department

August 27, 2001, Meeting with Tom Beisel of CH2M-Hill

As requested, the document 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, CERCLA 120(h) as amended.

This document outlines the Navy's proposed interim measure for surficial soils and groundwater in the vicinity of solid waste management unit (SWMU) 17, located in Zone H. This review is divided into a five sections. The comments included under General Comments are not limited to review of the IM Workplan but include concerns identified during review of site related documents.

GENERAL COMMENTS

1. In order to avoid confusion throughout the numerous documents, the Navy should adopt one measurement for reporting the concentration of contaminants in soils and groundwater. For example, the reported concentrations should all be in milligrams per kilogram or micrograms per kilogram.

dd010656,jco

2. In order to avoid confusion in the field and during the review process, at least one figure in each document should identify the monitoring wells by their designated numbers.
3. In order to expedite review, each document should not only contain a list of acronyms but a list of the contaminants of concern with their respective agreed upon cleanup standard. A reference or date of the agreement should also be provided. For example, on Page 2-5-399 of the RFI Addendum Report, the Navy states that a cleanup level has already been agreed upon for TEQs (no acronym list nor cleanup level is provided).
4. In order to expedite review, each document of substantial size, for example the RFI Addendum Report, should include a Table of Contents specific to that volume or document, etc.
5. According to Figure 2.5.32 of the RFI Addendum Report, monitoring well 017D02 is north north-east of monitoring well 017002. However, these wells appear to be labeled in reverse on the Geologic Cross Sections Figures 2.5.5A and 2.5.5B of the same Report. Please verify and correct.

GENERAL COMMENTS ON THE INTERIM MEASURES WORKPLAN

6. At the 017SB001 location depicted on Figure 3 of the Zone H Corrective Measures Study Workplan Addendum, SWMU 17, the concentration of Aroclor-1260 is recorded as 1800 micrograms per kilogram (ug/kg). However the August 1994 concentration of Aroclor-1260 at the 017SB001 location depicted on Figure 1-2 of the IM Workplan is recorded as 1.86J milligrams per kilogram (mg/kg). Please clarify whether these are the same sample.

SURFACE SOILS – INTERIM MEASURES WORKPLAN

7. In Section 1.3, Site Setting and Extent of Contamination Targeted by IM, the Navy states that the industrial land use MCS [media cleanup standard] for Aroclor-1260 is 10 milligrams per kilogram (mg/kg). However, according to the EPA Region III Risk-Based concentration (RBC) Table, the Industrial Soil RBC for Aroclor-1260 is 2.9E+000 mg/kg. In Section 2.1, Statistical Analysis of Aroclor-1260 Extent, the Navy has identified four locations with concentrations greater than the stated MCS of 10 mg/kg. The Navy has proposed surface soil excavation in these areas. However, the author has recently been made aware that a component of the U.S. Border Patrol training conducted at Building FBM61 may expose trainees directly to surface soil. A component of the training program involves the trainees lying prostrate on the ground, which exposes them directly to surface soil (dermal and possible ingestion). During this training exercise, surface soil may also be disturbed resulting in the potential for an inhalation pathway. While the exposure may be infrequent and of short duration, exposure to surface soil with concentrations known to exceed an established risk based concentration is a concern to the Department. In the interim measures report, the Navy should fully address this concern.
8. According to Table 2-1, Statistical Exposure Point Concentrations in the Paved Area and Grass Courtyard, the Navy has identified sampling location H017SWT02 with an

Aroclor-1260 concentration of 180.00 mg/kg. On Figure 2-1, Extent of Aroclor-1260 in Surface Soils at Concentrations > than MCS (10 mg/kg), this sampling location is depicted to the southwest of the AST NS600. However, according to the below referenced RFI Addendum Report, this sampling location is identified on Figure 2.5.4B as 017SB020, while groundwater sampling location 017GWT02 is located southeast of AST NS600. See RFI Addendum Report Line 24 of Page 2-5-399. Please clarify this discrepancy and verify the proposed location for excavation.

9. In Section 2.2, Pre-excavation Sampling and Aroclor-1260 Delineation, the Navy states that pre-excavation sampling will eliminate the need for post-excavation sampling. The Navy further states that the vertical extent of excavation at each location would be determined by the analytical results of the sample collected from the 1 to 2 foot depth interval. The depth of excavation was discussed during the August 20, 2001, teleconference call. It is still unclear as to whether, based on the analytical data, the Navy will extend excavation to greater depth. The IM Workplan should have clearly stated how the data from the 1 to 2 foot depth interval will be utilized. Moreover, in order to verify that the contaminated soil has been removed to a sufficient depth, the Navy should collect at least one soil sample from each excavation area from a depth that is beneath the excavated "hot spot" sampling location. Analysis should be for Aroclor-1260 at a minimum. The Navy may backfill the excavated area with clean soil, as proposed.

Upon clarification of the issues outlined above and the inclusion of confirmatory sampling below the excavation, the Division of Hydrogeology is amenable to an approval of the surface soil interim measure.

GROUNDWATER – INTERIM MEASURES WORKPLAN

On Monday, August 27, 2001, the following concerns were discussed with Mr. Tom Beisel of CH2M-Hill. These concerns are noted here for the record .

10. There is insufficient number of current groundwater samples to accurately delineate the non-aqueous phase liquid (NAPL) plume. According to Appendix C of the *Interim Measures Report for Groundwater Monitoring Fiscal year 2000*, dated February 2001, only two wells (017GW005 and 017GW010) were actually sampled during the July 2000 sampling event. Navy states that monitoring wells 017GW001 and 017GW002 were not sampled due to the presence of free product. Moreover, the most current groundwater data available from most of the monitoring wells at SWMU 17, is for samples collected during December 1999 through January 2000 indicating that the current plume boundaries are not defined.
11. Throughout the IM Workplan, the Navy refers to the groundwater contaminants as non-aqueous phase liquid (NAPL). The Navy has not identified the separate contaminants that make up the NAPL; therefore, the Navy has not included a full characterization of the contaminants of concern. Reference is made to either a light and/or dense NAPL but the contaminants of concern are not identified. The sources of groundwater contamination are identified on Figure 1-1 of the IM Workplan as Contamination Source A, B, C, and D. While the source of LNAPL is expected to have been the fuel line from AST NS600, the Navy should confirm this with analytical data.

12. The presence of LNAPL or DNAPL in a well does not preclude laboratory analysis of a groundwater sample. The identification of LNAPL and/or DNAPL in a well affords the Navy the opportunity to characterize the contaminants. A full characterization of the NAPL is warranted.
13. Table 1-1, NAPL Thicknesses at SWMU 17, of the IM Workplan lists seven (7) wells including 017GW001 and 017GW002. However, this table should be expanded to include monitoring well 017L02 since either LNAPL or DNAPL was measured in this well at 0.17 feet prior to the December 1999 sampling event. The Navy should verify / clarify the discrepancy on Figure 2.5.8A and 2.5.8C of the RFI Addendum Report with regard to the presence of NAPL in monitoring well 017L02.
14. There is concern that a DNAPL may be present in monitoring well 017B05 due to the elevated concentration of chlorobenzene at 2700 micrograms per liter (ug/L) as depicted on Figure 2.5.36 of the RFI Addendum Report. The Navy should employ technology to aid in the delineation of the DNAPL plume.
15. A groundwater divide trending west to east beneath FBM 61 was identified in September 1998. However, on Page 2-5-40 of the referenced RFI Addendum Report, Navy states that pumping of the monitoring wells during the December 1999 groundwater sampling event resulted in the presence of two groundwater depressions. The previously defined groundwater divide and newly formed depressions are depicted on Figures 2.5.7A and 2.5.7B.

Of the wells listed on Table 1-1 of the IM Workplan, 017002 appears to be north of the groundwater divide identified in 1998 while 017D04 and 017B03 are located south of that divide. Moreover, monitoring wells 017001, 017L03, 017L04 and 017L07 are located south of the 1998 divide but are also in proximity to a second divide identified during the 1999 RFI activities.

It is unclear as to what effect "aggressive" pumping of wells on either side of the flexible groundwater divide at SWMU 17 may have. The Navy should monitor the effects of pumping by collecting groundwater elevation data from all the wells at SWMU 17 prior to and following each extraction event.

16. In the IM Workplan, the Navy states that a vacuum truck will be used to extract NAPL. The Navy states that the frequency of vacuum truck extraction will depend upon the volumes recovered and extraction rate. Of concern is that the volume of LNAPL and/or DNAPL to be extracted has not been calculated.
17. That the IM Workplan focuses on the thickness of the LNAPL and DNAPL rather than on the concentration of the contaminants. The IM Workplan states that the goal is to reduce the NAPL to less than 0.1 inch. This goal is questionable and subject to variable conditions. The thickness of the NAPL is not the primary concern. The concern is the presence of contaminants in concentrations greater than established maximum contaminant levels (MCLs) and/or risk-based concentration values (RBCs).

RECOMMENDATIONS

The groundwater Interim Measure Workplan for SWMU 17 may be approved with the following conditions:

18. Within thirty (30) days of receipt of this conditional approval, the Navy shall submit a plan to delineate the present lateral and vertical extent of DNAPL and LNAPL at SWMU 17 using a viable technology.
19. The interim measures report include a full characterization of the LNAPL and DNAPL at SWMU 17.
20. The Navy immediately begin quarterly sampling of all groundwater monitoring wells at SWMU 17 in order to delineate the present groundwater plume. Quarterly sampling should be conducted until an appropriate groundwater corrective action is in place (See Scaturo to Shepard, 3/7/00). The samples should be analyzed for volatile organic compounds and for polychlorinated biphenyls at a minimum.

After a clear picture of the groundwater plume at SWMU 17 has been determined, and an historical database has been established, then the Navy may propose an alternate sampling schedule.

-end-

Reference:

- | | |
|-------------------|---|
| October 22, 1999 | Zone H corrective Measures Study Workplan Addendum, SWMU 17, Revision 0 |
| February 15, 2000 | Response to South Carolina Department of Health and Environmental Control Comments on Draft Corrective Measures Study Zone H SWMU 17 Workplan Addendum Dated October 22, 1999 |
| May 5, 2000 | Zone H RCRA Facility Investigation Report RFI Addendum, Volume II of V, Sections 2.5 to 4.0, Revision 0 |
| February 2001 | Interim Measures Report for Groundwater Monitoring Fiscal year 2000, Revision No. 00 |
| May 2001 | Corrective Measures Study Workplan, SWMU 17, Zone H, Revision 1 |

cc: Jack Gelting, P.G., Manager, RCRA Hydrogeology Section 1
Joe Bowers, P.G., Manager, RCRA Hydrogeology Section 2
David Scaturo, P.E., P.G., Manager, Corrective Action Engineering Section



2600 Bull Street
Columbia, SC 29201-1708

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Larry R. Chewning, Jr., DMD

Susan Peterson
September 17, 2001

COMMENTS:

CMS WP for SWMU 17, dated May 2001
Removal of pcb-contaminated soil and NAPL
Charleston Naval Complex
SC0 170 022 560

The Department supports the comments as written by the Department of Hydrogeology.



2600 Bull Street
Columbia, SC 29201-1708

September 18, 2001

Ms. Amy Daniell
Charleston Naval Complex
CSO 1895 Ave. F
North Charleston, SC 29405

Re: Approval (Rationale for NFA)
SWMU 162, RFI Report Addendum
Charleston Naval Complex
SCO 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (The Department) received the above referenced RFI Report Addendum on June 26, 2001. The Department reviewed the work plan according to applicable State and Federal Regulations and the Charleston Naval Complex Hazardous Waste Permit (the Permit), effective September 17, 1998. The Department has reviewed the referenced environmental data. Based on the information and analytical data submitted, the Department recognizes that the Navy has adequately addressed the known environmental contamination identified on the property to date in accordance with the approved scope of work. Please note, this statement pertains only to the portion of the site addressed in the referenced report and does not apply to other areas of the site and/or any other potential regulatory violations. Further, the Department retains the right to request further investigation if deemed necessary.

Pursuant to the Permit condition II.H.1, the date of this letter will serve as the approval for NFA of SWMU 162. The Navy should note that the CNC RCRA Permit has not been modified to document the above stated decision for SWMU 162. The Department will work with the Navy to make the necessary changes to the CNC RCRA Permit during the next Permit Modification to document the NFA decision for SWMU 162. Please refer to the attached memoranda from Paul Bergstrand and Susan Byrd. If you have any questions regarding this issue, you may contact Janelle H. Ellis at (803) 896-4872.

Sincerely,

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

cc: Jamelle H. Ellis, Corrective Action Engineering
Rick Richter, Trident EQC
Tony Hunt, SOUTHDIV
Rob Harrell, SOUTHDIV
Dann Spariosu, EPA Region 4
Gary Foster, CH2MHILL/Jones
Dean Williamson, CH2MHILL/Jones



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Jamelle Ellis, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
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: September 18, 2001
RE: Charleston Naval Base
Charleston, South Carolina
SC 0170022560

Document:
SWMU 162, Zone K
RFI Report Addendum
Prepared by CH2M-Jones
Dated June 2001

Per our conversation on September 14, 2001, below are SCDHEC's comments relating to risk issues for SWMU 162:

GENERAL COMMENT:

On page 5-4 during the discussion of the constituents of potential concern, the text states that EPA Region IX PRGs were selected as the screening criteria; however, Table 5-1 lists Region III RBCs as the screening value used. As discussed in previous CNC Team meetings, all RFI Addendums should continue to use the same screening values that were used in the original corresponding RFIs (Region III RBCs) because it was not productive or cost effective to re-screen the numerous SWMUs and AOCs to the newly recommended Region IX PRGs. All future COPC screening should continue to be conducted using Region III RBCs. If COPCs have previously been selected at a SWMU/AOC during the RFI, the same RBC table should be used for evaluating any new data which may have been collected for delineation or risk purposes. Please be sure to reference the date of the RBC table used in each report.

SPECIFIC COMMENT:

Page 2-2, Section 2.1, Line 10: Please revise the typographical error to read 10^6 instead of 10^6 .

I concur with the recommendation of NFA for SWMU 162, and request only revision pages for comments listed above. If you have any further questions or comments, feel free to contact me at (803) 896-4188.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Jamelle H. Ellis
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

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

DATE: 24 August 2001

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

RFI Report Addendum
SWMU 162, Zone K
Revision 00, Dated 19 June 2001

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, Environmental Protection Agency (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.

This document is approvable.



2600 Bull Street
Columbia, SC 29201-1708

September 18, 2001

Ms. Amy Daniell
Charleston Naval Complex
CSO 1895 Ave. F
North Charleston, SC 29405

Re: Approval
AOC 619/SWMU 4 Zone F, RFI Report Addendum
Charleston Naval Complex
SCO 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (The Department) received the above referenced RFI Report Addendum on June 21, 2001. The Department reviewed the work plan according to applicable State and Federal Regulations and the Charleston Naval Complex Hazardous Waste Permit (the Permit), effective September 17, 1998. The Department has reviewed the referenced PAH data and the changes made based on the Department's comments (8/21/01). Based on the information and analytical data submitted, the Department recognizes that the Navy has adequately addressed the known environmental contamination identified on the property to date in accordance with the approved scope of work. Please note, this statement pertains only to the portion of the site addressed in the referenced report and does not apply to other areas of the site and/or any other potential regulatory violations. Further, the Department retains the right to request further investigation if deemed necessary.

Pursuant to Permit condition II.H.1, the date of this letter will serve as the approval for NFA of AOC 619/SWMU 4. The Navy should note that the CNC RCRA Permit has not been modified to document the above stated decision for AOC 619/SWMU 4. The Department will work with the Navy to make the necessary changes to the CNC RCRA Permit during the next Permit Modification to document the NFA decision for AOC 619/SWMU 4. Please refer to the attached memorandum from Mansour Malik. If you have any questions regarding this issue, you may contact Jamelle H. Ellis at (803) 896-4872.

Sincerely,

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

Attachment

cc: Jamelle H. Ellis, Corrective Action Engineering
Rick Richter, Trident EQC
Tony Hunt, SOUTHDIV
Rob Harrell, SOUTHDIV
Dann Spariosu, EPA Region IV
Gary Foster, CH2MHILL/Jones
Dean Williamson, CH2MHILL/Jones

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 Division of Hydrogeology concurs with the findings in this document and recommends the approval of this document as written and NFA (No Further Action) the combined sites AOC 619/SWMU 4 in Zone F.



2600 Bull Street
Columbia, SC 29201-1708
September 13, 2001

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

RE: Corrective Measures Study Work Plan
Rationale for NFA – AOCs 517 and 523
Charleston Naval Complex
SC0 170 022 560

Dear Ms. Daniell:

The South Carolina Department of Health and Environmental Control (the Department) received the above referenced work plan on July 23, 2001. The Department reviewed this document with respect to the approved Zone C RFI Report and applicable sections of the CNC Hazardous Waste Management Permit (the Permit). Based on this review, the Department has determined that the document requires revisions. Please refer to the attached engineering comments.

The response to these comments may be addressed by submitting revised pages to be inserted into the original document, or by submitting another document. If new or revised pages are submitted, please indicate whether each submitted page is a revision to an existing page in the original document or a new page not contained in the original document. Each revised page should be coded; for example, 32(R-9/10/88) would be page 32, revised 9/10/88. In addition to revisions, please provide a summary of the comment responses. If you have any questions regarding this issue, please contact me at (803) 896-4255.

Sincerely,

Stacey French, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

Attachment

cc: Tony, Hunt, P.E., SOUTHDIV
Rob Harrell, P.E., SOUTHDIV
Dann Sparioso, USEPA Region 4
Rick Richter, Trident EQC District



South Carolina Department of Health
and Environmental Control

ENGINEERING COMMENTS

Corrective Measures Study Work Plan
Rationale for No Further Action
AOC 517 and AOC 523, Zone C

Prepared by:

Stacey French, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Hazardous and Infectious Waste
Bureau of Land and Waste Management
September 11, 2001

Specific Comments

AOC517

1. Section 2.8 Relevance or need for land use controls at the site, page 1-4
The first sentence states that no land use controls (LUCs) are required. However, Appendix B, Completion Report Process Closure for AOC 517 recommends that the painted surfaces be maintained to ensure the encapsulation of lead dust. The Department interprets this as an engineering control, thus a LUC. Therefore, the Department does not concur with the statement that no LUCs are required. This section should be revised to be consistent with the Navy's recommendations in Appendix B.

Additionally, this section goes on to state that the corrective action for the lead dust is in consistent with HUD guidelines. Based on the following sentence, the Department assumes that this is a typographical error and that the corrective action was consistent with the HUD guidelines. Please revise this typographical error to eliminate confusion in the administrative record.

2. Section 3.0 Conclusions and Recommendations, page 1-4
The last sentence of the section recommends No Further Action (NFA) for SWMU. See specific comment #1 for discussion of LUCs. Based on this information, the Department does not concur with the NFA recommendation for AOC 517. This section should be revised in accordance with specific comment #1.

AOC 523

1. Section 1.0 Introduction, page 2-1, fourth paragraph
The second sentence states that the former gas station (building M-1234) is within the footprint of building 198, which is still in use. There is no discussion of the use of building 198. This information is needed for the Department to determine if current practices have the potential to impact the decision for AOC 523 and to clarify the administrative record. This section should

be revised to state the use of building 198.

2. Section 1.0 Introduction, page 2-1, fifth paragraph

The first sentence states that Figure 1 shows the approximate location of building M-1234 in relation to building 198. Please note that Figure 1 was not included in the document.

3. Section 1.0 Introduction, page 2-2, first paragraph

The last sentence of the paragraph states that an issue of inorganics in groundwater concentrations to identify samples with concentrations significantly higher than background. The meaning of "significantly higher than background" is vague and should be clarified.

4. Section 1.1 Background and Summary for Corrective Measures Study Work Plan, page 2-2

The third sentence states that the Department's approval letter for the RFI suggests additional investigation under the RCRA Subtitle C (UST) program. Please note that RCRA Subtitle C regulates hazardous waste. The correct reference is the RCRA Subtitle I program. Please revise accordingly.

Additionally, it should be noted that the Department's approval letter states that a decision is pending verification that the UST program has or will address the unit, and the base wide thallium study by the RCRA Subtitle C program. No verification has been provided in the CMS Work Plan that the RCRA Subtitle I program will investigate petroleum related contamination at AOC 523. Based on discussions with Michael Bishop of the SCDHEC Bureau of Water, there is no record of Subtitle I investigation for buildings M-1234 or building 198. Please clarify and provide the appropriate verification.

5. Section 2.1 Status of the RFI, page 2-3

The third sentence states that there are no constituents to address under the Subtitle C (UST) program. This sentence should be revised in accordance with specific comment #4.

6. Section 3.0 Conclusions and Recommendations, page 2-4

The last sentence of this paragraph states that the Navy recommends a No Further Action (NFA) for AOC 523. However, the Department does not concur with the No Further Action Recommendation for the following reasons:

- The fourth paragraph of Section 1.0 Introduction, page 2-1 states that the site was identified as an AOC because of the potential for waste oil, solvents, or petroleum releases to the environment. The CMS Work Plan does not provide adequate information regarding number and location of samples for the Department to concur with a NFA determination.
- No verification has been provided in the CMS Work Plan that the RCRA Subtitle I program will investigate petroleum related contamination at AOC 523. Based on discussions with Michael Bishop of the SCDHEC Bureau of Water, there is no record of Subtitle I investigation for buildings M-1234 or building 198. Additionally, the Department generally defers a NFA determination for these sites until after the investigation under the RCRA Subtitle I program is complete.



CH2MHILL

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Tel 352.335.7991
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September 13, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Phase III Interim Measure Work Plan Addendum – Perimeter Groundwater and Soil
Vapor Monitoring- Electrical Resistance Heating (Revision 0) – AOC 607, Zone F

Dear Mr. Scaturo:

Enclosed please find four copies of the Phase III Interim Measure Work Plan Addendum–
Perimeter Groundwater and Soil Vapor Monitoring– Electrical Resistance Heating (Revision
0) for AOC 607 in Zone F of the Charleston Naval Complex (CNC). This report has been
prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the
RCRA Corrective Action process.

The principal author of this document is Casey Hudson. Please contact him at 407/423-0001,
extension 251, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att



2600 Bull Street
Columbia, SC 29201-1708

September 10, 2001

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

RE: Interim Measures Report – Groundwater Monitoring
Charleston Naval Complex (CNC)
SC0 170 022 560

Dear Ms. Daniell:

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

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4185.

Sincerely,

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

Attachment: Memorandum from Paul Bergstrand to David Scaturo dated August 24, 2001.

cc: Tony Hunt, PE, SOUTHDIV
Rob Harrell, PE, SOUTHDIV
Dean Williamson, PE, CH2M-Jones
Gary Foster, PE, CH2M-Jones
Dann Spariosu, PhD, EPA Region 4
Rick Richter, Trident EQC District



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

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

Joe Bowers, P.G.
Manager, RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

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

DATE: 24 August 2001

RE: Charleston Naval Base (CNAV)
Charleston County, South Carolina
SC0-170-022-560
Interim Measure Report for Groundwater Monitoring
Fiscal Year 2000
Revision 00, Dated 20 February 2001

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, Environmental Protection Agency (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 goal to be accomplished by the groundwater monitoring plan is to assess and monitor the movement of groundwater and groundwater contamination migrating off the CNC property, impacting surface water bodies, and/or impacting the uncontaminated groundwater on the base property. Groundwater monitoring must continue while the RCRA Facility Investigation is being completed and until the selection of appropriate corrective action is in place.

Comments on the referenced document have been provided. Any responses and/or revisions to this report should be provided within 30 days of receipt of this correspondence.

DD010647.PMB

Comments by Paul M. Bergstrand
24 August 2001
Interim Measure Report for Groundwater Monitoring FY 2000
Revision 00, Dated February 2001

GENERAL

1. All air photos used should include the date of the photograph. Please include the date of the photograph in all future documents submitted to the Department.
2. The figures representing groundwater contours were taken from ENSAFE RFI documents which are several years old. Though groundwater elevations were collected during the Interim Measure sampling, there is no evaluation or discussion to confirm how groundwater contour patterns have or have not changed. The first component of the goal of the Interim Measure is to “assess and monitor the movement of groundwater and groundwater contamination”. It is not clear that the goal was accomplished. An evaluation of groundwater contours over time should be included in future groundwater monitoring reports.
3. The figures representing basewide groundwater contours and the figures representing individual SWMU and/or AOC groundwater contours have unusual discrepancies. The discrepancies involve both flow directions and groundwater elevations. For example, contours presented for the individual SWMUs 8, 9 and 39 contradict the figures representing basewide groundwater contours. This information should be reconciled in all future groundwater reports.
4. There were no plume maps, either plan or cross sectional, used in this report to show the extent of contamination, how contamination has changed over time, or that the Navy has control over the contamination. This type of information should be included in future groundwater monitoring work.
5. Data tables do not include MCLs and/or RBCs. In order for the Department to interpret the data, the data tables should include the appropriate MCL and/or RBC in future documents.
6. Data tables could be provided on a CD in place of the tables printed on paper in this report. The Department would like to discuss this option for future documents.
7. The sample Station ID numbers are not directly coded or linked to Monitoring Wells. In order for the Department to interpret the data presented, the coding should be included in future reports.

SWMU 14

15. The fourth and last round of RFI sampling for monitoring well 014GW002 recorded four chlorinated solvents and two petroleum compounds. Methylene Chloride was reported at 10 ppb which is above the MCL of 5 ppb. Trichloroethylene was reported just below the MCL at 4 ppb. Monitoring well 014GW002 has not been sampled since the last round of RFI sampling. This well is more than 250 feet from the nearest monitoring well (014GW001) and there are no other downgradient monitoring wells as shown on the attached map. Wells 014GW002 and 014GW02D should be sampled one time for the same analytical parameters in place of sampling monitoring well 14GW006. A decision on continued monitoring will be made based upon the results.

SWMU 17

16. Figures 3-1 and 3-12 reported NAPL from 1-6-2000 and 12-16-1999 respectively. Wells H017GW001 and H017GW002 reported free product during the 7-19-2000 sampling event. The appropriate surrounding wells, including sumps, should be sampled for NAPL in all subsequent sampling events in order to monitor for possible migration.

17. According to the data provided, monitoring well H017GW002 recorded 0.10 inches of product on 1-6-2000 and 12.0 inches of product on 7-19-2000. This dramatic increase of product thickness was not discussed in the report. Changes in the horizontal and vertical dimensions of NAPL should be addressed in all subsequent monitoring reports.

18. There were no figures representing the dissolved contaminant plume and how that contamination has changed over time. The dissolved contaminant plume should also be addressed, including plume maps, in all subsequent monitoring reports.

19. There was no discussion or sampling of PCB contamination and how that contamination has changed over time. The PCB contaminant plume should be addressed, including plume maps, in all subsequent monitoring reports.

20. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 25/70

21. SWMU 25 was a chrome plating shop and utilized acid baths as part of the chrome plating process. This monitoring report did not address pH sampling or results. Due to the nature of the site, pH must be addressed in all subsequent monitoring reports.
22. This report did not address VOC sampling as agreed upon during the development of the IM Workplan. VOCs are present in groundwater at levels above MCLs and are attributable to Navy operations. The VOC contaminant plume should be addressed in all subsequent monitoring reports.
23. This report only addressed hexavalent chrome contamination in groundwater. Other metal contamination is present in groundwater at levels above MCLs and are attributable to Navy operations. All inorganic contaminants in groundwater should be addressed in all subsequent monitoring reports.
24. Groundwater contours from 10/16/1996 are represented in Figure 3-13. It has been suspected that sewer infiltration is the reason groundwater is flowing away from the Cooper River towards the northwest. That sewer line has since been repaired. The direction of groundwater flow should be verified in the next monitoring report.
25. Wells from SWMU 25 were not included in this sampling event. A review of analytical data implies a larger contaminant plume extending from 025GW003 to GEDGW18D. Monitoring wells 025GW 001, 025GW002 025GW003, 539GW01D, 549GW001, 549GW003, GDEGW18D, and GDEGW28D should be sampled in all subsequent sampling events.
26. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Previous Interim Measure data should be incorporated into the next monitoring report. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 38

27. According to the chain of custody form water samples were analyzed for Pesticides/PCBs and Metals. Table A-5, however, only indicates metals analysis. Please revise this section of the report to address the sampling data for Pesticides/PCBs.

28. The GIS reports a detection of the pesticides Decachlorobiphenyl and 2,4,5,6 Tetrachloro-meta-xylene from samples collected 7-21-2000. Please revise this section of the report to address these pesticides in regards to origins, uses, breakdown constituents, MCLs and RBCs.

29. Monitoring at this site should be conducted and reported for the next quarter. The report will be evaluated for additional quarterly sampling. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 39

30. Please show the horizontal and vertical extent of contamination in the shallow, intermediate, and deep portions of the aquifer and how the contamination has or has not changed over time.

31. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial decision is made and a remedial system is in place. Future sampling should include monitoring wells 8D, 16D, 21D, 22D and 23D. Future analysis should include MTBE because of the potential influence from the HESS contamination. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU163

32. Only well 163GW001 was sampled and this well is upgradient of the SMWU. Please explain the selection of an upgradient well and how it was determined in this report that the contaminant plume has not migrated.

33. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Future monitoring should include wells 163GW 001, 002 and 003. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 166

34. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 607

35. Future reports should include a figure representing the Top of the Ashley Formation as it directly relates to the contamination at this site.

36. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

ZONE G GRID WELL 11

37. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial decision has been made and a remedial system, if necessary, is in place. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

SWMU 196

38. Monitoring at this site should be conducted and reported on a quarterly basis until a remedial system is in place. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

ZONE E GRID WELLS

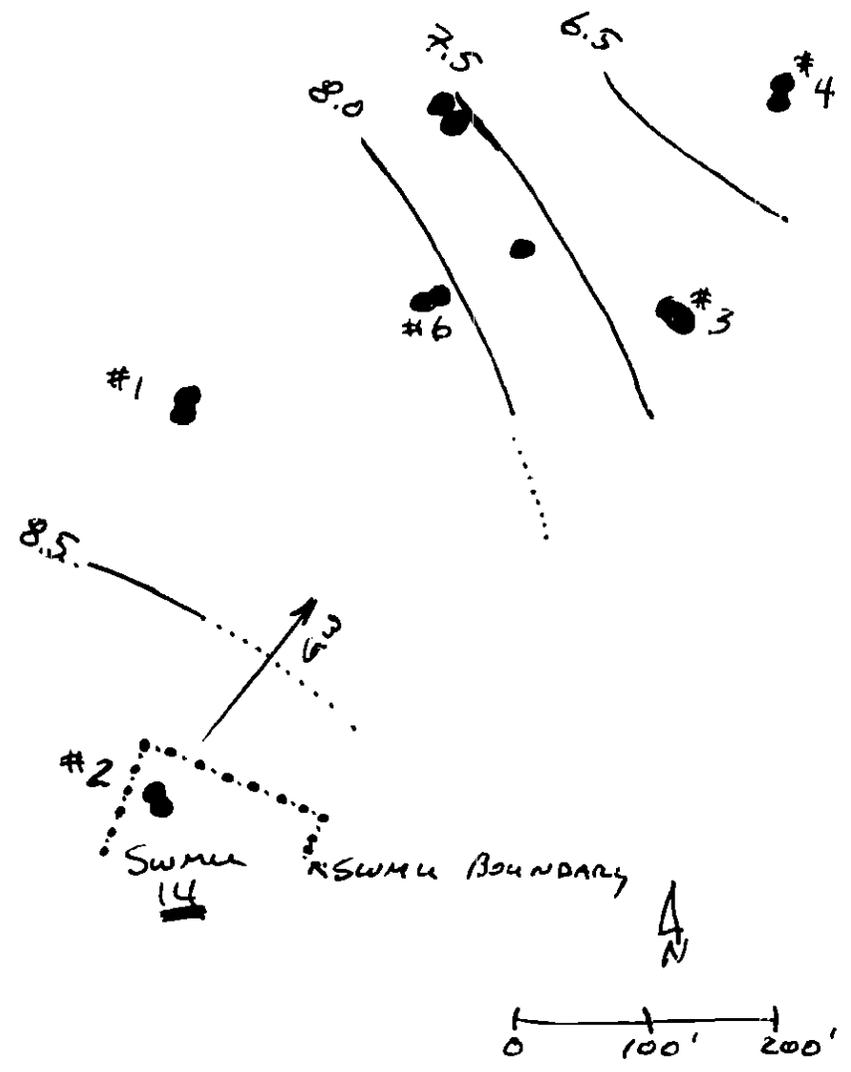
39. There were no Grid Wells included in the sampling event. Monitoring at the following wells should be conducted and reported on a quarterly basis until a remedial system, if necessary, is in place. Analysis should include VOC, SVOC, and inorganics. Any groundwater analytical sampling conducted on the site as part of an interim measure or similar action may be incorporated into the quarterly monitoring report in lieu of collecting duplicate samples.

065GW04D	GDE020	GDE022D	GDE023D
172001	57602D	55102D	GDE17D
GDE26D	563003	559005	569001
56901D			

SUMMARY

SWMU/AOC	FUTURE SAMPLING	ANALYSIS
8	Quarterly	Hydrazine, VOC, SVOC, Pesticides, PCBs, Inorganics
9	Quarterly	VOC, SVOC, Pesticides, PCBs, Inorganics
14	Next Quarter + Decision	VOC & SVOC
17	Quarterly	NAPL, VOC, SVOC, PCBs
25/70	Quarterly	pH, VOC, Inorganics + Hexavalent Chrome
38	Next Quarter + Decision	Pesticides, VOC & SVOC
39	Quarterly	VOC, MTBE
163	Quarterly	VOC
166	Quarterly	VOC
607	Quarterly	VOC
Grid Well G 11	Quarterly	VOC
Zone E Grid Wells	Quarterly	VOC, SVOC, Inorganics

⊗ = Summit Wells.
FROM Figure 3-7
GW Contours.
GWMR.





313 Wingo Way
Mt. Pleasant, SC 29464

Phone: (843) 884-0029
Fax: (843) 856-0107

LETTER OF TRANSMITTAL

DATE	JOB NO.
ATTENTION	
RE <u>0154-001-07-100-00</u>	

TO Rob Harrell - SouthDiv

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

- Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order Draft WP

COPIES	DATE	NO.	DESCRIPTION
<u>1</u>	<u>9/15/01</u>		<u>Point of Entry Effluent Sampling Work Plan - Zone J</u>

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ 20 _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Charles A. Vermoy

If enclosures are not as noted, kindly notify us at once.



CH2MHILL

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

September 5, 2001

Mr. David Scaturo
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: RFI Report Addendum - Zone I

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum for Zone I of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

This submittal is divided into the following three sections:

1. The first section contains CH2M-Jones' responses to SCDHEC comments concerning the *Zone I RFI Report, Revision 0* (EnSafe, 1997).
2. The second section contains replacement pages, per CH2M-Jones' responses to comments, which are to be replaced according to page number in the *Zone I RFI Report, Revision 0*. Each page itemized in the Table of Contents for this report shows the changes that were made, and are represented by the blue page[s]. The white pages immediately following are the actual replacement pages, which have have been 3-hole drilled for your convenience.
3. The third section of this report contains material that is referenced in CH2M-Jones' response to SCDHEC comments.

The principal author of this document is Kris Garcia. Please contact her at 770/604-9182, extension 476, if you have any questions or comments.

Page 2
September 5, 2001

Sincerely,

CH2M HILL

A handwritten signature in cursive script, appearing to read "Dean Williamson".

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att
General Distribution



CH2MHILL

CH2M HILL

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P.O. Box 147009

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32614-7009

Tel 352.335.7991

Fax 352.335.2959

September 5, 2001

158814.ZF.PR.05

Mr. Kevin Clark
Manager of Air Modeling Section
South Carolina Department of Health and Environmental Control
Bureau of Air Quality
2600 Bull Street
Columbia, SC 29201

Subject: Request for the Air Quality Permit Variance
Interim Measure PCE Source Area Groundwater Treatment
AOC 607, Zone F
Charleston Naval Complex, North Charleston, South Carolina

Dear Mr. Clark:

On behalf of the U.S. Navy Southern Division Naval Facilities Engineering Command, CH2M-Jones has proposed electrical resistance heating (ERH) coupled with soil vapor extraction (SVE) as an interim measure for source area treatment at Area of Concern (AOC) 607 in Zone F of the Charleston Naval Complex (CNC). Figure 1 presents a CNC site location map. CH2M-Jones, in conjunction with its subcontractor Thermal Remediation Services (Thermal), will design, construct, and operate the full-scale ERH system for a duration of approximately 124 days. Construction activities began in August 2001 and are anticipated to be completed the first week of October, with a scheduled start-up date of October 3, 2001.

CH2M-Jones understands that a permit variance for the discharge of a contaminant air stream can be approved by the Bureau of Air Quality, provided that documentation is provided to support a contaminant discharge of less than 1,000 pounds per month. The BAOC UST Modeling Information form has been completed and is enclosed with this letter. The information provided in this letter documents the anticipated mass rate of contaminant that will be discharged during SVE system operation. This information includes site background information, an estimate of tetrachloroethene (PCE) mass, PCE vapor recovery and an estimated PCE mass emission rate, and the SVE effluent sampling and reporting.

Site Background

AOC 607 consists of a former dry cleaning facility, Building 1189, that supported the former local seamen's housing from 1942 to 1986. Building 225, a former Naval Lodge, is located immediately west of AOC 607. Building 1189 is a single-story structure approximately 115 feet long and 90 feet wide, with an elevation of approximately 22 feet at its summit. Building 225 is a two-story structure approximately 170 feet long, 80 feet wide, and 30 feet in height.

PCE, a typical dry-cleaning solvent, was one of the primary materials that was used, stored, disposed of, and accidentally released at the site. Trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride, which are sequential dechlorination products of PCE, were also detected in soil and groundwater samples collected at AOC 607 during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI).

PCE appears to have migrated vertically downward as a dense non-aqueous phase liquid (DNAPL) through fill and shallow subsurface soils, until it encountered a clay unit at approximately 8.5 to 13.5 feet below land surface (ft bls). The PCE DNAPL has accumulated on top of and within the clay layer, and is a residual source for the dissolved phase chlorinated solvents that contaminate the shallow groundwater. The ERH system is designed to treat this potential DNAPL located on the clay unit. Figure 2 presents the target treatment areas and the proposed location of the ERH equipment in relation to Buildings 1189 and 225. The proposed location of the stack will be immediately adjacent to the SVE blower.

PCE Mass Estimate

Determining the precise amount or mass of solvents at sites such as AOC 607 can be difficult since the potential presence of residual or pooled DNAPL areas, which impacts the mass estimate, can be difficult to determine. One of the advantages of the ERH technology is that it is highly robust in its ability to accommodate a wide variation in the amount of solvent mass present at a site. During ERH application, the volatile organic compounds (VOCs) boil off over an extended period of time (i.e., months) at a controllable rate. This allows the presence of a greater amount of solvent than originally estimated to be accommodated by extending the duration of ERH system operation and by providing additional activated carbon to the vapor phase treatment system, as needed.

PCE mass estimates were developed by Thermal to support the granular activated carbon (GAC) system design. Thermal estimated the potential presence of approximately 800 pounds of the PCE within the 16,525 ft² target treatment area. While this estimate may prove to be accurate, CH2M-Jones has estimated that up to approximately 5,000 pounds of PCE could be present within the target treatment area if a 3-inch DNAPL pool of PCE were located within approximately three percent of the target treatment area. The mass

calculation is presented in Table 1. The actual amount of PCE being recovered during ERH operation will be tracked, and the actual rate of VOC removal from the surface will be controlled to ensure that the extraction rate will not exceed the capacity of the vapor phase treatment system to provide adequate treatment of off-gas vapors. In addition, additional activated carbon will be supplied to the vapor phase treatment unit to as required to provide appropriate off-gas treatment.

TABLE 1
 Calculation of PCE Mass Estimate
Phase III IM Work Plan, Electrical Resistance Heating, AOC 607, Zone F

Parameter	Value
Target Treatment Area	16,525 ft ²
Estimated Thickness of PCE DNAPL	3 inches
Estimated Areal Extent of PCE DNAPL within Target Treatment Area	3 percent
Estimated Soil Porosity	0.4
Density of PCE	101.76 lb/ft ³ (1.63 g/cm ³)
Conversion Factor	1 g/cm ³ = 62.43 lb/ft ³
PCE Mass Calculation: (16,525 ft ²)(0.25 ft)(0.03)(0.4)(1.63 g/cm ³)(62.43 lb/ft ³ /1g cm ³)	5,045 lbs

PCE Vapor Recovery and Estimated PCE Mass Emission Rate

Vapor and steam accumulated during the ERH operation will be recovered using an SVE system. The vapor and steam mixture will be conveyed to a condenser and the water and vapor will be separated. Approximately 99.7 percent of the PCE contaminant mass will be in the vapor phase. This separated vapor phase effluent will be sent to a water-cooled heat exchanger prior to treatment using GAC adsorption. The water-cooled heat exchanger will lower the temperature to approximately 15 to 20 degrees Fahrenheit below the ambient temperature, and reduce the relative humidity to 50 to 70 percent. Reduction in temperature and relative humidity increases GAC adsorption efficiency. Two sets of two 1,800-pound vessels placed in series will be used to treat the PCE vapor. GAC bed life or capacity is estimated using inlet PCE loading, inlet temperature, and inlet relative humidity.

Mr. Kevin Clark
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158814.ZF.PR.05

The estimated duration of ERH operation is 124 days. Using the conservative estimate of 5,000 pounds of PCE within the target treatment area and the estimated duration of ERH operation, an average of approximately 40.3 pounds of PCE vapor will be generated each day. With an estimated 99 percent mass removal efficiency of PCE using GAC, approximately 0.017 pounds of PCE vapor per hour or 12 pounds per month will be emitted to the atmosphere.

SVE Effluent Sampling and Reporting

During the first two months of system operation one sample of the treated SVE effluent will be collected every two weeks. Following the first two months of operation, one sample of the SVE effluent will be collected on a monthly basis. With an expected ERH system start-up date of October 3, 2001, the anticipated sample collection dates are October 3, 17, and 31; November 14 and 29; December 27, 2001; and January 30, 2002. Each sample will be analyzed using a 14-day turn-around time.

The SVE samples will be collected using 850-milliliter Summa canisters. Sample collection protocol used in the field will follow the EPA guidance document *Standard Operating Procedure (SOP) #: 1704 Summa Canister Sampling* (1995). Each Summa canister will be analyzed for PCE, trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride using EPA method TO-14A. These chlorinated solvents will be analyzed using the mass spectrometer (MS) in the selective ion monitoring (SIM) mode. By using the SIM mode, the detector focuses on specific ions that are characteristic of the target compounds. This increases sensitivity and reduces interference. The method detection limit for the five chlorinated solvents using the SIM mode will be 0.05 parts per billion by volume (ppbv).

The analytical results from each of the seven sampling events validated by the CH2M-HILL project chemist and a summary table of the contaminant mass flow rate since system start-up will be sent to the South Carolina Department of Health and Environmental Control Bureau of Air Quality once they become available.

Mr. Kevin Clark
Page 5
September 5, 2001
158814.ZF.PR.05

If you have any questions, comments, or require additional information please do not hesitate to contact us.

Sincerely,

CH2M HILL

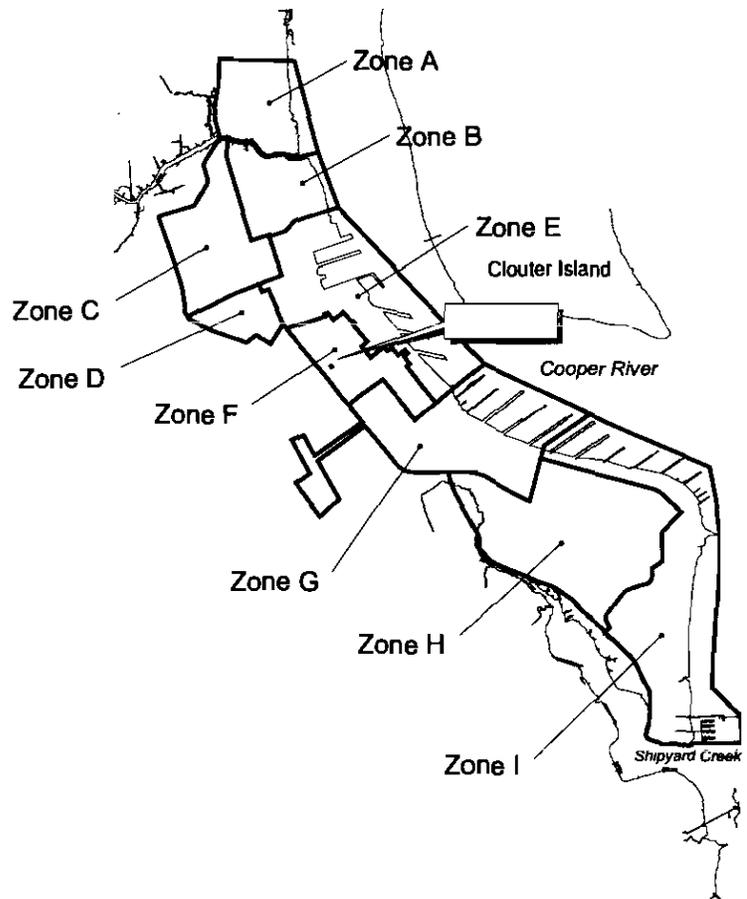
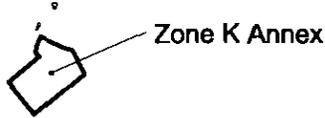
Casey E. Hudson
(SV)

Casey E. Hudson, P.E.
Project Engineer
(407) 423-0030 ext. 251

enclosure

cc: Paul Bergstrand, P.G./SCDHEC
David Scaturo, P.E./SCDHEC
Tony Hunt, P.E./SOUTHDIV
Rob Harrell/SOUTHDIV
Dean Williamson, P.E./CH2M HILL/GNV
Tom Beisel, P.G./CH2M HILL/ATL

NOTE: Original figure in color



∩ Shoreline
□ Zone Boundary

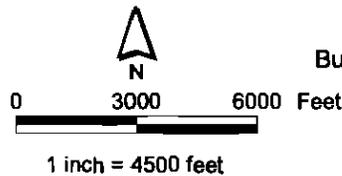


Figure 1
Site Location Map
Building 1189 Former Dry Cleaner Facility
Phase III Interim Measures Work Plan
Zone F - AOC 607
Charleston Naval Complex

CH2MHILL



- Groundwater Monitoring Wells
- Proposed Groundwater Monitoring Wells
- ~ Fence
- ~ Railroads
- ~ Roads - Lines
- ~ Bridges
- ~ Sidewalk
- ~ STORM-OUTFALL-ID
- ~ STORM-LINE/MANHOLE
- ~ STORM-LINE/MANHOLE-NS
- ~ STORM-FLOW-ARROW
- ~ SEWER-LINE/MANHOLE-NS
- ~ SEWER-LINE/MANHOLE
- ~ SEWER-FLOW-ARROW
- ~ AOC Boundary
- ~ SWMU Boundary
- ~ Buildings
- ~ Zone Boundary

- Target Areal Extent of Electrical Resistance Heating Groundwater
Treatment Total Chlorinated Solvent
Concentration > 1,000ug/L
(Approximate Size = 16,525 sq. ft.)
- Target Areal Extent of Electrical Resistance Heating Groundwater
Treatment Total Chlorinated Solvent
Concentration > 5,000ug/L
(Approximate Size = 7,935 sq. ft.)

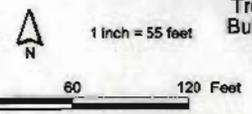
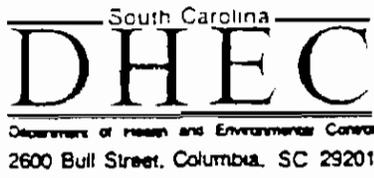


Figure 2
 Proposed Electrical Resistance Heating Target
 Treatment Area and Equipment Location
 Building 1189 Former Dry Cleaner Facility
 Phase III Interim Measures Work Plan
 Zone F - AOC 607
 Charleston Naval Complex
CH2MHILL



Commissioner: Michael D. Jarrett
Board: William E. Applegate, III, Chairman
John H. Burns, vice Chairman
Richard E. Jabbour, DDS, Secretary

Promoting Health. Protecting the Environment

Toney Graham, Jr., MD
Sandra J. Moulder
John B. Pate, MD
Robert J. Simpson, Jr.

BAOC UST MODELING INFORMATION

PLEASE FILL OUT COMPLETELY

SITE/COMPANY NAME: AOC GO7-Building 1189/U.S. Navy GWPID#: _____

CLEANUP LOCATION: Building 1189 Former Dry Cleaning Facility
Charleston Naval Complex, Charleston, South Carolina

TYPE OF OPERATION (i.e. AIR STRIPPER): Soil Vapor Extraction

CONTACT: Mr. Tony Hunt PHONE: 843)743-2082
(843)820-5563

SITE MAPS

Please include a scaled plot plan of the site location that clearly shows distances from the stack to the property boundaries. All buildings and/or structures within a radius of 5 stack heights (measured from the stack/vent) shall be incorporated on this plot plan and information on each building and/or structure's height, width, and length shall also be included.

STACK INFORMATION

HEIGHT ABOVE GROUND 10 FEET; DIAMETER 0.25 FEET
TEMPERATURE 80 F; VELOCITY 17.83 FEET/SECOND

AIR TOXIC INFORMATION

AIR TOXIC EMITTED (i.e. BENZENE)	CHEMICAL ABSTRACT SERVICE (CAS) NUMBER	EMISSION RATE LB/HR
A) <u>Tetrachloroethene</u>	<u>127-18-4</u>	<u>0.017</u>
B) _____	_____	_____
C) _____	_____	_____
D) _____	_____	_____
E) _____	_____	_____

Please submit this completed sheet with scaled site maps to the appropriate SCDHEC project manager at the Ground-Water Protection Division, 2600 Bull Street, Columbia, SC 29201.