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CNC CHARLESTON  
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CORRESPONDENCE FROM SOUTH CAROLINA DEPARTMENT OF HEALTH AND  
ENVIRONMENTAL CONTROL DISCUSSING MONITORING WELL REQUEST FOR ZONE H  
CNC CHARLESTON SC  
11/3/1999  
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL



2600 Bull Street  
Columbia, SC 29201-1708

HENRY  
JOHN  
BILL  
FILE

HKS 11/4  
P.L.

November 3, 1999

CERTIFIED MAIL

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
Naval Facilities Engineering Command, Southern Division  
1690 Turnbull Avenue, Building NH-51  
Charleston Naval Base  
Charleston, SC 29405

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

Monitoring Well Request for Zone H  
SWMU 17  
Revision 0 Dated October 22, 1999

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of twenty-six (26) primary and fourteen (14) contingent temporary groundwater monitoring wells at SWMU 17 to assess aquifer conditions of the surficial aquifer. The monitoring wells for SWMU 17 are anticipated to be completed to a maximum depth of 15 feet.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Additional assessment may be required at these sites. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,

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

Enclosures  
MWD/mwd  
MWA-HW-99-087

CC: Paul Bergstrand, P.G., Hazardous Waste, Division of Hydrogeology  
Mihir Mehta, Hazardous Waste Permitting Section  
Christine Sanford-Coker, Trident District EQC  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464



2600 Bull Street  
Columbia, SC 29201-1708

## Monitoring Well Installation Approval

Approval is hereby granted to: Mr. H.N. Shepard II, P.E. of Naval Base Charleston for

Zone H, SWMU 17  
Naval Base Charleston  
Charleston County

for the construction of twenty-six (26) primary and fourteen (14) continent monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on October 22, 1999 (Bayley to Danielsen) and as specified in the Zone H Corrective Measures Study Work Plan Addendum for SWMU 17, dated October 22, 1999. The wells will be constructed within the surficial aquifer to the maximum anticipated depth of 15 feet below the surface for the purpose of monitoring aquifer conditions.

### Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each monitoring wells be submitted to the Department within 30 days after installation of the last well.
3. All well construction and sampling derived wastes, including but not limited to, drill cuttings and fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
4. Considering the temporary nature of these installations, requirements R.61-71.11.C(1-7) for completing these DPTs as permanent monitoring wells are waived.
5. That all direct push sampling points will be abandoned as outlined in R.61-71.10.
6. Direct push field equipment, including sampling probes, must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation.
7. That notice be given to Christine Sanford-Coker, Charleston District EOC Hydrogeologist, during normal business hours at (843) 740-1590 a minimum of 48 hours before the initiation of drilling activities.

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

Date of Issue: November 3, 1999

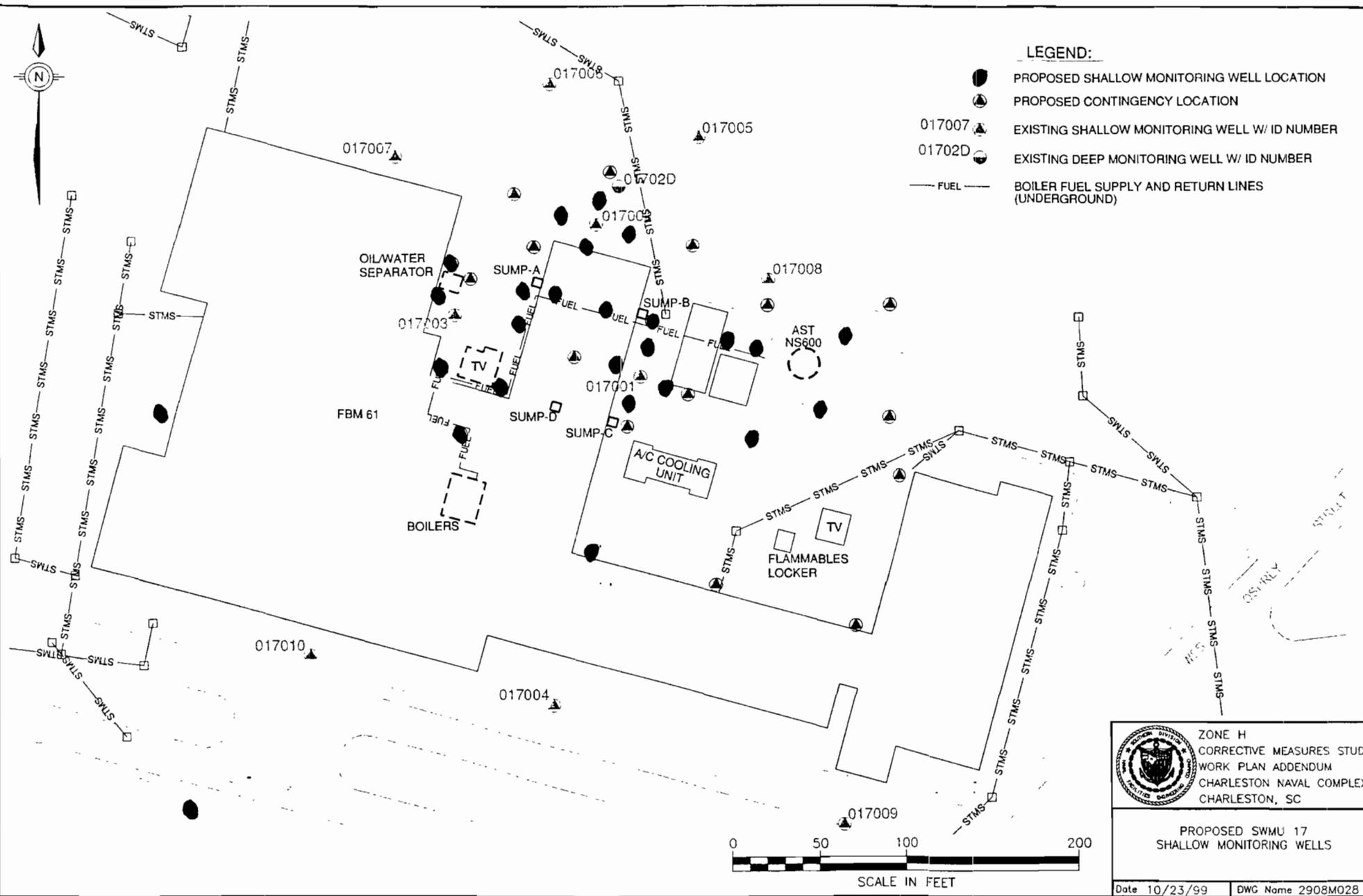
Approval Number: HW-99-087

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



**LEGEND:**

-  PROPOSED SHALLOW MONITORING WELL LOCATION
-  PROPOSED CONTINGENCY LOCATION
- 017007  EXISTING SHALLOW MONITORING WELL W/ ID NUMBER
- 01702D  EXISTING DEEP MONITORING WELL W/ ID NUMBER
-  FUEL BOILER FUEL SUPPLY AND RETURN LINES (UNDERGROUND)



ZONE H  
CORRECTIVE MEASURES STUDY  
WORK PLAN ADDENDUM  
CHARLESTON NAVAL COMPLEX  
CHARLESTON, SC

PROPOSED SWMU 17  
SHALLOW MONITORING WELLS

Date 10/23/99 DWG Name 2908M028



2600 Bull Street  
Columbia, SC 29201-1708

November 8, 1999

HENRY  
BILL  
JOHN  
FILE

HWS 11/12  
BL 11/12  
M

COMMISSIONER:  
Douglas E. Bryant

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

BOARD:  
John H. Burriss  
Chairman

William M. Hull, Jr., MD  
Vice Chairman

Roger Leaks, Jr.  
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Re: Underground Injection Control Permit #440  
Site SWMU 166, Zone K Facility  
Charleston County

Dear Mr. Shepard:

Enclosed is a Permit to Operate for six (6) Class VA-I (Aquifer Remediation) injection wells at Site SWMU 166, Zone K Facility, Charleston County, SC.

If you have any question, please call me at (803) 898-3549.

Sincerely,

Todd Adams, Hydrologist  
GroundWater Management Section  
Bureau of Water

cc: Paul Bergstrand, BLWM  
Todd Haverkost, EnSafe-Charleston



2600 Bull Street  
Columbia, SC 29201-1708

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Douglas E. Bryant

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Vice Chairman

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Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

## Water Monitoring Assessment & Protection Division

Injection Well Operating Approval  
for

Class II, III, and V.A. Injection Well(s)

Permit #440

Date of Issue: November 8, 1999

In accordance with the provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, and pursuant to receiving a Permit to Construct six (6) Class V.A.-I (Aquifer Remediation) injection wells, authorization is granted to Department of the Navy to operate six (6) Class V.A.-I injection wells located at the Site SWMU 166, Zone K Facility, Charleston County, SC, and are subject to the attached provisos noted for the operator.

The Class V.A.-I injection wells are a true diameter of two inches, and a total depth of approximately 40 feet.

Pursuant to Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, this authorization may be rescinded if these injection wells should, at any time, contaminate, pollute, or otherwise adversely affect other water in the vicinity or for any other conditions contained in R61-87, Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended.

Expires: November 8, 2001

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

November 8, 1999  
Date

DHEC 2104 (6/88)

Provisos to the Injection Well Operating Approval  
for  
Underground Injection Well Permit #440  
Site SWMU 166, Zone K Facility  
Charleston County, S.C.  
November 8, 1999

- 1) Construction of new or abandonment of existing wells must be reported to the Department within six (6) days of completion.
- 2) Only sucrose enhanced water and atmospheric air as described in the Corrective Action Plan may be injected into the subsurface. Any changes in the system operation other than as presented in the UIC Permit Application must be reported to the Department prior to implementation.



2600 Bull Street  
Columbia, SC 29201-1708

*Handwritten notes:*  
11/11/99  
bc  
SM  
mutt

November 9, 1999

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
Naval Facilities Engineering Command, Southern Division  
1690 Turnbull Avenue, Building NH-51  
Charleston Naval Base  
Charleston, South Carolina 29405

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

Monitoring Well Request for Zone F  
Site AOC 613/615 and SWMU 175  
Revision 0 Dated 4 November 1999

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of two shallow wells at the listed locations to complete an RFI study of the area.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitoring well approval form should be on site during well drilling operations. Additional assessment may be required at these sites. If you require additional information, please contact me at (803) 896-4045 or email: cathcaef@columb34.dhec.state.sc.us.

Sincerely,

Eric F. Cathcart, Hydro geologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

cc: Charles Watson, Corrective Action Permitting  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464  
Christine Sanford-Coker, Trident District EQC

DD990871.efc



2600 Bull Street  
Columbia, SC 29201-1708

## Monitoring Well Approval

Approval is hereby granted to: Mr. H.N. Shepard II, P.E. of the Naval Base Charleston for

Zone F, AOC 613/615 and SWMU 175  
Naval Base Charleston  
Charleston County

For the installation of two (2) permanent wells designated as 613007 and 613008. All wells are to be installed in accordance with the construction plans and specifications in the monitoring well approval request, dated 4 November 1999. The two wells are to be installed and screened in the uppermost aquifer/unit for the purpose of monitoring groundwater levels and chemistry.

### Conditions:

1. A driller certified to operate in the State of South Carolina should install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each wellpoint be submitted to the Department within 30 days after installation of the last wellpoint.
3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.
4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
5. That each wellhead be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide wellpoint identification number, date of construction, static water level, and driller name and state certification number.
6. That notice be given to Christine Sanford-Coker, Charleston District EOC Hydro geologist at (843) 740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

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

**Date of Issuance:** 9 November, 1999

**Approval #:** HW-99-089

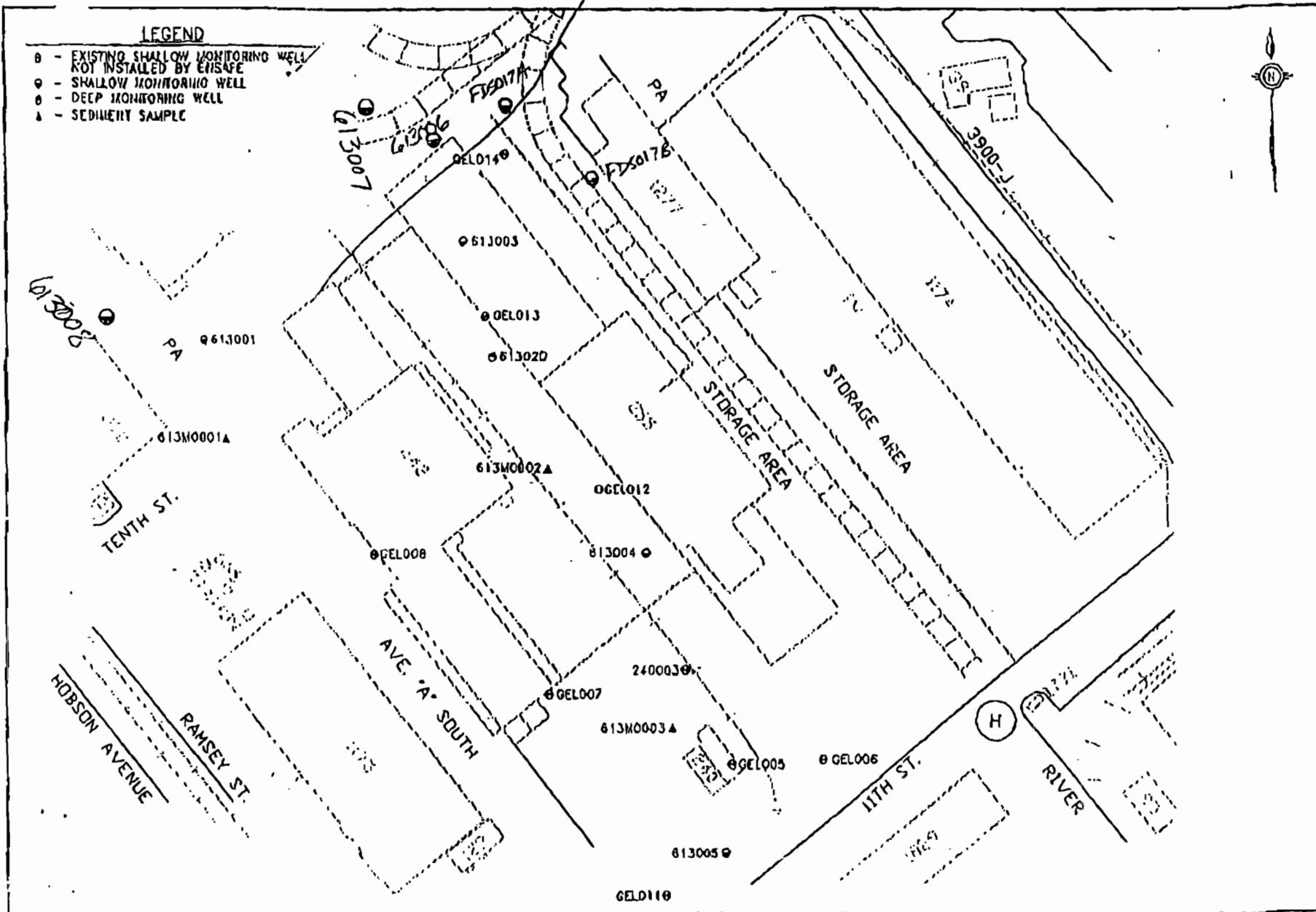
  
Eric F. Cathcart, Hydro geologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

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8504342288

LEGEND

- ⊖ - EXISTING SHALLOW MONITORING WELL NOT INSTALLED BY EHS&E
- ⊙ - SHALLOW MONITORING WELL
- ⊕ - DEEP MONITORING WELL
- ▲ - SEDIMENT SAMPLE



ZONE F  
 RCRA FACILITY  
 INVESTIGATION REPORT  
 NAVAL BASE CHARLESTON  
 CHARLESTON, S.C.

FIGURE 10-7-3  
 SEDIMENT AND  
 GROUNDWATER LOCATIONS  
 AOC 613/615 AND SWMU 775



2600 Bull Street  
Columbia, SC 29201-1708  
16 November 1999

CERTIFIED MAIL

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

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

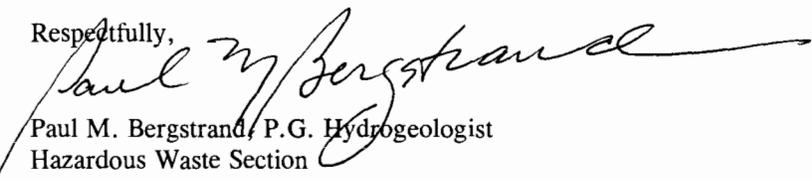
Monitoring Well Request for Zone K, AOCs 696 & 698  
Revision 0, Dated 8 November 1999

Dear Mr. Shepard:

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

A copy of the monitor well approval and this letter should be on site during drilling operations. The well installation procedures must follow R.61-71 of the South Carolina Well Standards and Regulations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,

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

Enclosures  
PMB/pmb  
HW-99-090

CC: Christine Sanford-Coker, Trident District EQC  
Paul Bristol, BOW  
Mihir Mehta, Hazardous Waste Permitting Section  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464

DD990881.MWA



2600 Bull Street  
Columbia, SC 29201-1708

## Monitoring Well Installation Approval

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

Zone K, AOCs 696 and 698, Naval Base Charleston, Charleston County

for the construction of monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 10 November 1999 (Bayley to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate twenty feet below the surface and screened for the purpose of monitoring aquifer conditions.

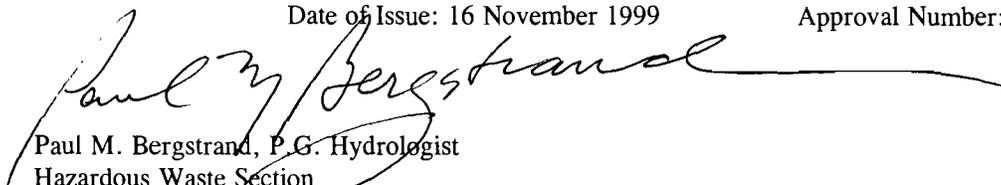
### Conditions:

1. A driller certified to operate in the State of South Carolina must install the well.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for the monitoring well be submitted to the Department within 30 days after installation of the last well.
3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the well. This log should be submitted along with the "as-built" construction details required by Condition 2 above.
4. All well construction and sampling derived wastes, including but not limited to, drill cuttings and fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
5. That the well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller name and state certification number.
6. Field equipment, including sampling probes, must be decontaminated by steam cleaning or other suitable methods before use and between sampling locations. Well screens and casing must be decontaminated before installation.
7. That notice be given to Christine Sanford-Coker, Charleston District EOC Hydrogeologist, during normal business hours at (803) 740-1590 a minimum of 48 hours before the initiation of drilling activities.

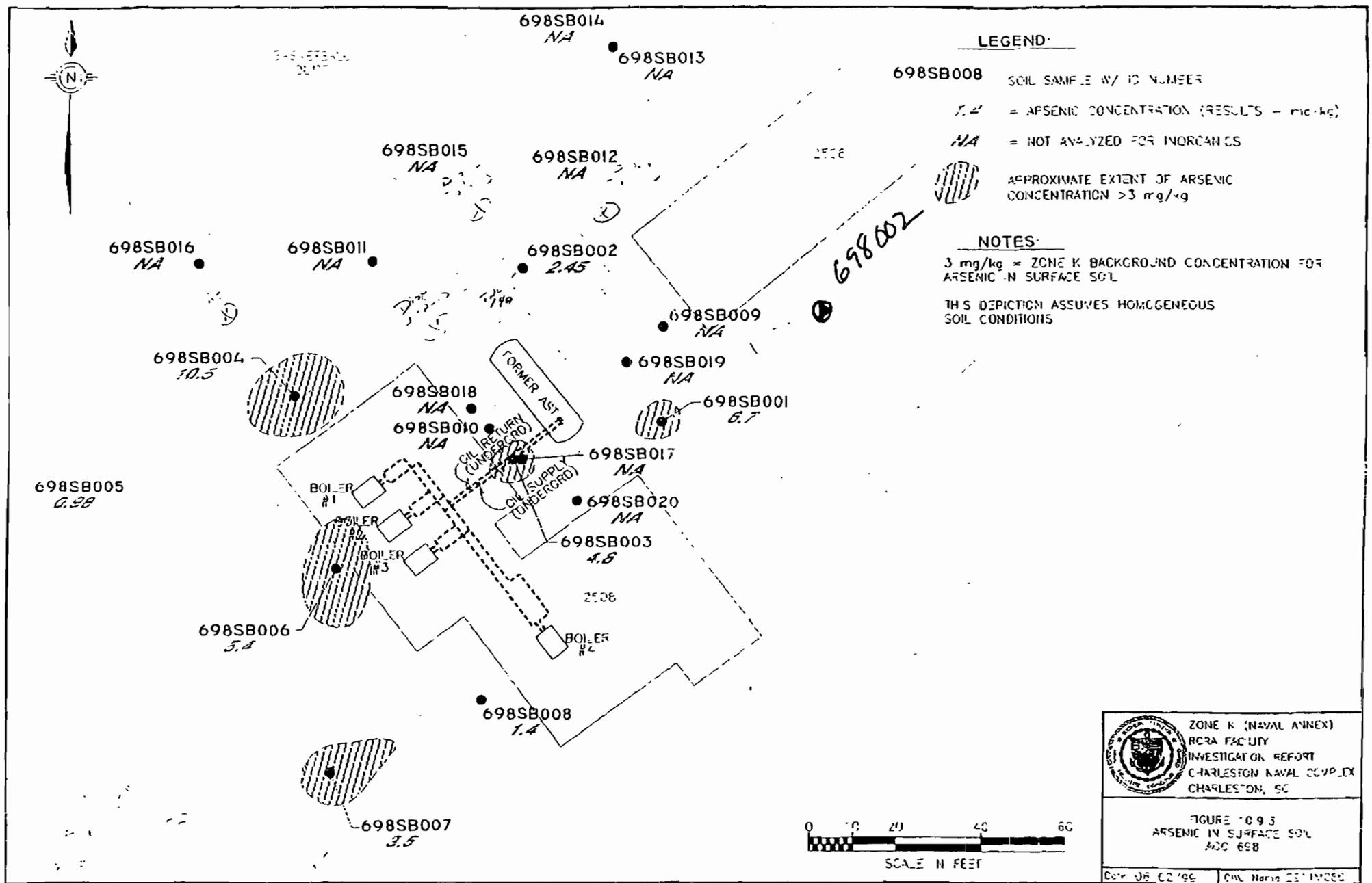
**This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Well Standards and Regulations, R.61-71.**

Date of Issue: 16 November 1999

Approval Number: HW-99-090

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

DD990881.MWA

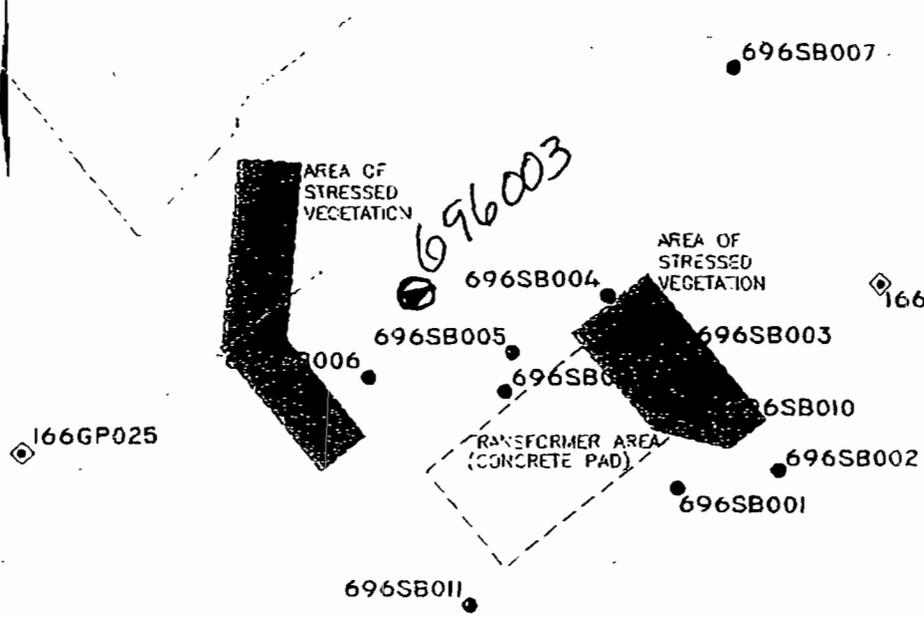


	ZONE K (NAVAL ANNEX) RCRA FACILITY INVESTIGATION REPORT CHARLESTON NAVAL COMPLEX CHARLESTON, SC
	FIGURE 1093 ARSENIC IN SURFACE SOIL ADC 698
Date: 06/02/96	Drawn: [Name]

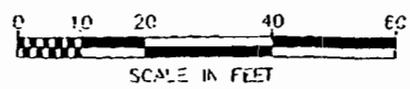
*Kate Payley*

LEGEND:

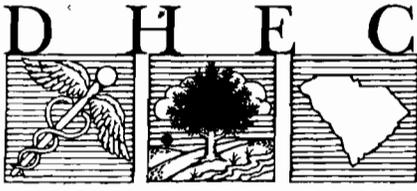
- 696SB004 ● SOIL SAMPLE W/ ID NUMBER
- 696GP030 ◊ OPT SAMPLE W/ ID NUMBER



2569



	ZONE K (NAVAL ANNEX) RCRA FACILITY INVESTIGATION REPORT CHARLESTON NAVAL COMPLEX CHARLESTON, SC
	FIGURE 10 B 1 SITE MAP ACC 696
Date: 06/02/99	FIG Name: 2210053



PROMOTE PROTECT PROSPER

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

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Larry R. Chewning, Jr., DMD

Henry Shepard II  
JOHN  
MATT  
FILE

November 17, 1999

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

Re: Corrective Measures Study Work Plan Addendum for SWMU 17; Located in Zone H of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated October 22, 1999, received October 26, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced document.

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

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

Sincerely,

*M. P. Mehta*

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

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated November 17, 1999.  
Memorandum from Michael W. Danielsen to Mihir Mehta dated November 3, 1999.

cc: Susan Peterson, Corrective Action Engineering  
Michael Danielsen, Hydrogeology  
Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV



South Carolina Department of Health  
and Environmental Control

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

**MEMORANDUM**

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

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

**DATE:** November 3, 1999

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

Zone H Corrective Measures Study Work Plan Addendum  
for SWMU 17  
CNC  
Revision 0, Dated October 22, 1999

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

Based on the results of that review, comments are attached.

## Zone H Corrective Measures Study for SWMU 17

CNC

November 3, 1999

1. **Figure 9**

This figure shows that a groundwater divide runs west-east under the building. Please explain the process and rationale used to place the groundwater divide in its present location.

Upon review of figures 3, 4, and 9, the contaminant plumes are depicted as crossing the groundwater divide in a north-south general direction. The Department does recognize that additional locations have been added, however, the number of locations may not be sufficient to properly characterize the contamination underneath the building.

The Department is willing to wait for the present sampling effort to return from the lab before suggesting additional sampling locations.

2. **Page 19-20 Table 2**

Table 2 shows proposed groundwater sample ID's and their respective analytical parameters. For the "T" samples, the tables list these parameters as being VOCs, and SVOCs. The text has not stated the history or use for this O/W separator and therefore these samples should be also analyzed for metals to confirm that no waste oil was introduced into this system.

For the "D" and "L" samples, the tables list these parameters as being "None". The Department does not recognize this method as a valid method for site characterization. (I.E. What color is TCE when seen in a bailer? How do you know the water is "clean" from a visual inspection? ) Therefore, in order for the Department to evaluate the delineation of nature and extent please propose acceptable analytical methods (per EPA guidance) for constituents in question.

Please reference the EPA Guide Document that accepts the None method for site characterization.

3. **Page 21 AST**

The text states that three locations will be advanced to determine if the AST is a source for either fuel oil or PCB contamination. Table 2 shows that the only analytical tests scheduled to be run on these samples are VOC and SVOC. Please explain why the test for PCB will not be done on these samples.

4. **Page 21 O/W Separator**

The text does not state the history or current usage for this O/W separator. If this O/W separator was ever used for waste oil disposal, then the samples from this area must be tested for metals.

5. **Page 25 Data Presentation**

The text states that the lithologic and well construction data for all new and existing wells will be included in the subsequent report. The SC Well Regs. stipulate that all well information is to be received by the Department within 30 days of installation of the final well. The Department is amenable to granting the Navy an extension on the well information if the Navy can give a reasonable expected date for document submittal to the State.



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

**MEMORANDUM**

BOARD:  
John H. Burriss  
Chairman  
  
William M. Hull, Jr., MD  
Vice Chairman

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

Roger Leaks, Jr.  
Secretary

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

Mark B. Kent  
  
Cyndi C. Mosteller  
  
Brian K. Smith  
  
Rodney L. Grandy

**DATE:** November 17, 1999

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

Zone H Corrective Measures Study Work Plan Addendum, SWMU 17  
Received October 26, 1999

The Department has reviewed this Addendum and has determined that all concerns are adequately expressed through the Division of Hydrogeology's attached comments.



Henry Shepard II  
JOHN  
MATT  
FILE

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

BOARD:  
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Vice Chairman

Mark B. Kent  
Secretary

Howard L. Brilliant, MD

Brian K. Smith

Rodney L. Grandy

Larry R. Chewning, Jr., DMD

November 18, 1999

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

Re: RCRA Facility Investigation (RFI) Work Plan Addendum for SWMU 196;  
Located in Zone H of the Charleston Naval Complex, SCO 170 022 560,  
Revision 0, dated October 22, 1999, received October 26, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced document.

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

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

Sincerely,

*M. P. Mehta*

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

Attachments: Memorandum from Susan Peterson to Mihir Mehta dated November 17, 1999.  
Memorandum from Michael W. Danielsen to Mihir Mehta dated November 10, 1999.

cc: Susan Peterson, Corrective Action Engineering  
Michael Danielsen, Hydrogeology  
Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

**MEMORANDUM**

BOARD:  
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William M. Hull, Jr., MD  
Vice Chairman

Roger Leaks, Jr.  
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

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

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

**DATE:** November 17, 1999

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

Final Zone H RFI Work Plan Addendum, SWMU 196  
Received October 26, 1999

The Department has reviewed this Addendum and has determined that all concerns are adequately expressed through the Division of Hydrogeology's attached comments.



South Carolina Department of Health  
and Environmental Control

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

## **MEMORANDUM**

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

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

**DATE:** November 10, 1999

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

Final Zone H RFI Work Plan Addendum  
for SWMU 196  
CNC  
Revision 0, Dated October 22, 1999

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

Based on the results of that review, comments are attached.

**Final Zone H RFI Work Plan Addendum  
for SWMU 196  
CNC  
November 10, 1999**

1. **Page 12 Spatial Distribution of Results, Groundwater**

The text states that the assumption of groundwater flow is reflective of the topography, but does not explain the method used to confirm this result. Please explain the method by which groundwater flow was determined and also include groundwater contour maps from this information.

2. **Page 15 Recommendations, Groundwater**

This section states that three shallow wells are proposed north of the building. However no deep wells are proposed and the contamination found at this site is heavier than water. The Navy needs to determine whether there is any evidence of contamination in the deep aquifer. Please install a deep well alongside a proposed shallow well #196001. This deep well should be completed to the top of the Ashley Formation and screened appropriately.

The deep well 00923D is stated to be 36.8 feet in depth. The text is not clear as to which geological formation this well terminates. Please provide the geological information and construction details for this well.

As shown from a map provided by Ensafe in the Zone G RFI Report, the Ashley Formation is depicted to be sloping to the northwest under building 1838. The Navy should complete a north-south and west-east trending cross-sectional study of the Ashley to ensure that no contamination has migrated to the top of the Ashley formation.

3. **Page 17 Recommendations, Soil**

The text states that a full suite of analytical parameters will be performed on all soil samples. Please clarify which parameters will be used. (I.E. formal headspace VOA, SVOC, Pest/PCB, cyanide, metals, etc.)

4. **Page 17 Recommendation, Sediment**

See comment #3.

5. **Page 18 Recommendation, Surface Water**

The text does not state which analytical parameters will be performed on the diffusion samples. Please see comment #3.

6. **Page 18 Recommendations, Surface Water**

The previous diffusion samples were incorrectly placed on top of the marsh thereby rendering them useless for analytical purposes. The text states that a proposed diffusion sampler will be utilized, but does not state the protocol for the execution of the diffusion sample process. Please provide the guidance document or describe the diffusion sampling protocol in detail that will be used to perform this sampling.

The Department also suggests that an additional diffusion sample be taken closer to the edge of Shipyard Creek, just east of GEL015.

7. **Page 26 Table 7**

The table references sample locations with existing well numbers. The well numbers 196GDF01, 02, 03 were not located on the proposed sample location map, figure 7. Please provide a revised location map or an explanation of the well numbers for verification of sample locations.



HENRY HNS 11/30  
MATT  
JOHN  
FILE

2600 Bull Street  
Columbia, SC 29201-1708

November 22, 1999

CERTIFIED MAIL

Mr. H.N. Shepard II, P.E.  
Caretakers Site Office  
Naval Facilities Engineering Command, Southern Division  
1690 Turnbull Avenue, Building NH-51  
Charleston Naval Base  
Charleston, SC 29405

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

Monitoring Well Request for Zone H  
Site: SWMU 196  
Revision 0 Dated November 16, 1999

Dear Mr. Shepard:

The above referenced request (Wertz to Danielsen) has been reviewed with respect to R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of three (3) permanent shallow monitoring wells at SWMU 196. The monitoring wells for SWMU 196 are anticipated to be completed to a the depth of 15 feet below ground surface.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Additional assessment may be required at these sites. Should there be any questions, please contact me at (803) 896-4194.

Please note, based on the Final Zone H RFI Work Plan Addendum for SWMU 196, the Navy may need to characterize the deep groundwater as well as further characterize the shallow groundwater.

Respectfully,

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

Enclosures  
MWD/mwd  
MWA-HW-99-094

CC: Paul Bergstrand, P.G., Hydrogeologist  
Mehir Mehta, Hazardous Waste Permitting Section  
Christine Sanford-Coker, Trident District EQC  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464



2600 Bull Street  
Columbia, SC 29201-1708

### Monitoring Well Approval

Approval is hereby granted to: Naval Base Charleston  
Attention: Mr. H.N. Shepard II, P. E.

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

for the installation of three (3) permanent monitoring wells at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Wertz to Danielsen*), dated November 16, 1999.

These wells are to be installed using hollow stem auger methods to the approximate depth of 15 feet and screened in the surficial aquifer for the purpose of defining the extent of contamination and to fill in data gaps for the RFI investigation of SWMU 196.

**Conditions:**

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each monitoring well must be submitted to the Department within 30 days after installation of the last well.
3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.
4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
5. That each well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller name and state certification number.
6. That notice be given to the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

7. All field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation.

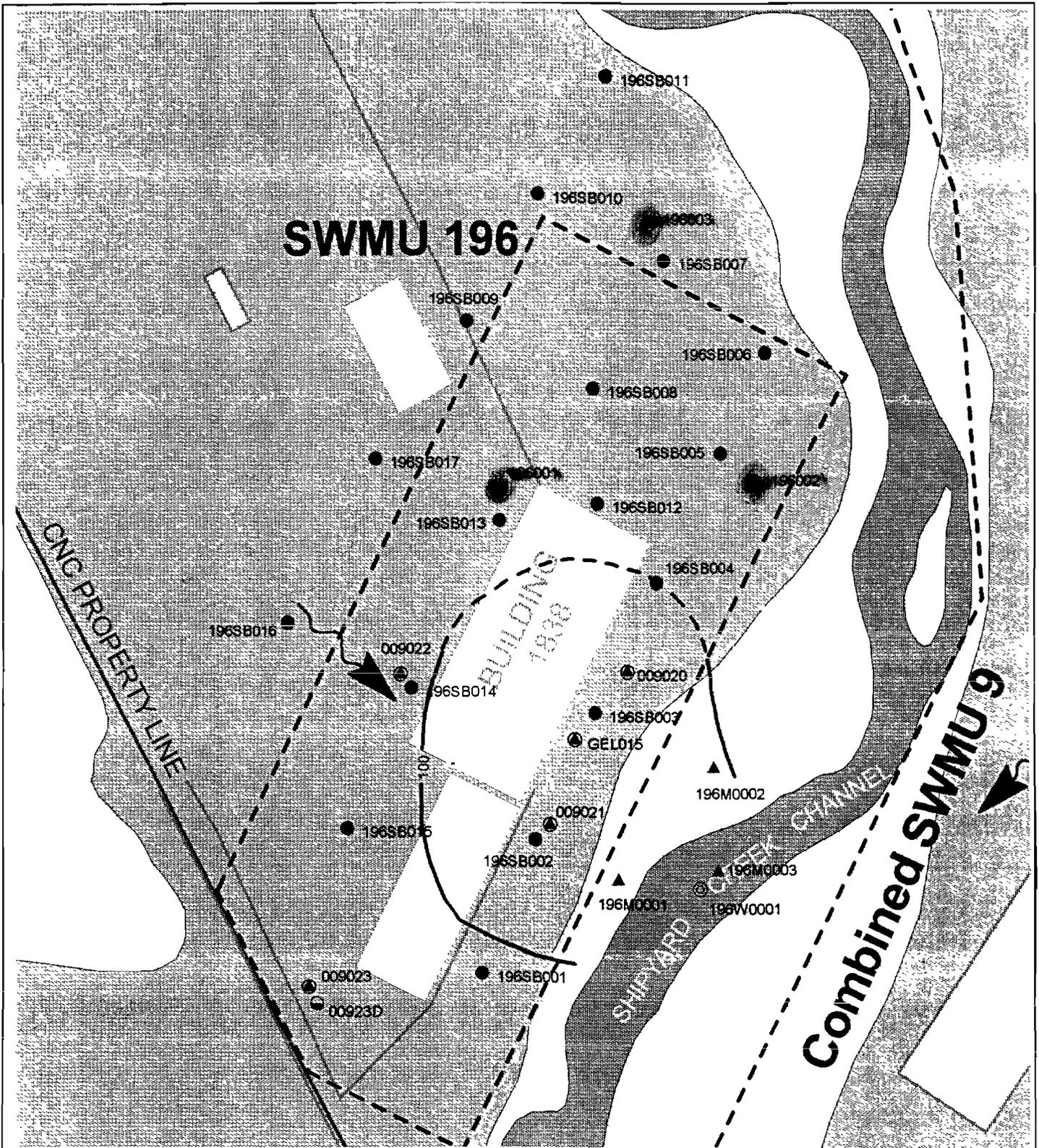
This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

**Date of Issuance:** November 22, 1999

**Approval #:** HW-99-094



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



**LEGEND**

- PROPOSED SHALLOW MONITORING WELL
- PROPOSED SOIL BORING
- ▲ PROPOSED CORE SEDIMENT SAMPLE
- ⊙ PROPOSED SURFACE WATER SAMPLE
- EXISTING SHALLOW MONITORING WELL
- EXISTING DEEP MONITORING WELL
- 100' APPROXIMATE PLUME BOUNDARY



ZONE H - SWMU 196  
 WELL PERMIT REQUEST  
 CHARLESTON NAVAL COMPLEX  
 CHARLESTON, SC

FIGURE 1  
 SWMU 196

PROPOSED SHALLOW  
 MONITORING WELL LOCATIONS

50 0 50 100 Feet



2600 Bull Street  
Columbia, SC 29201-1708  
16 November 1999

*Bl*  
*M*  
*nmw*

CERTIFIED MAIL

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

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

Temporary Monitoring Well Request for Zone K, SWMU 166  
Revision 0, Dated 11 November 1999

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of 12 DPT temporary monitoring wells and six piezometers to assess parameters of the surficial aquifer. The monitoring wells are anticipated to be completed to a maximum depth of approximately fifty feet.

Attached, please find a copy of the proposed well locations. A copy of the monitor well approval form and this letter should be on site during drilling operations. The temporary well abandonment procedures must follow R.61-71.10 (b5) of the South Carolina Well Standards and Regulations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,

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

Enclosures  
PMB/pmb  
HW-99-091

CC: Christine Sanford-Coker, Trident District EQC  
Paul Bristol, BOW  
Mihir Mehta, Hazardous Waste Permitting Section  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464

DD990882.TMW



2600 Bull Street  
Columbia, SC 29201-1708

## Temporary Monitoring Well Installation Approval

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

Zone K, SWMU 166  
Naval Base Charleston  
Charleston County

for the construction of monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 15 November 1999 (Kafka to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate fifty feet below the surface and screened for the purpose of monitoring aquifer conditions.

### Conditions:

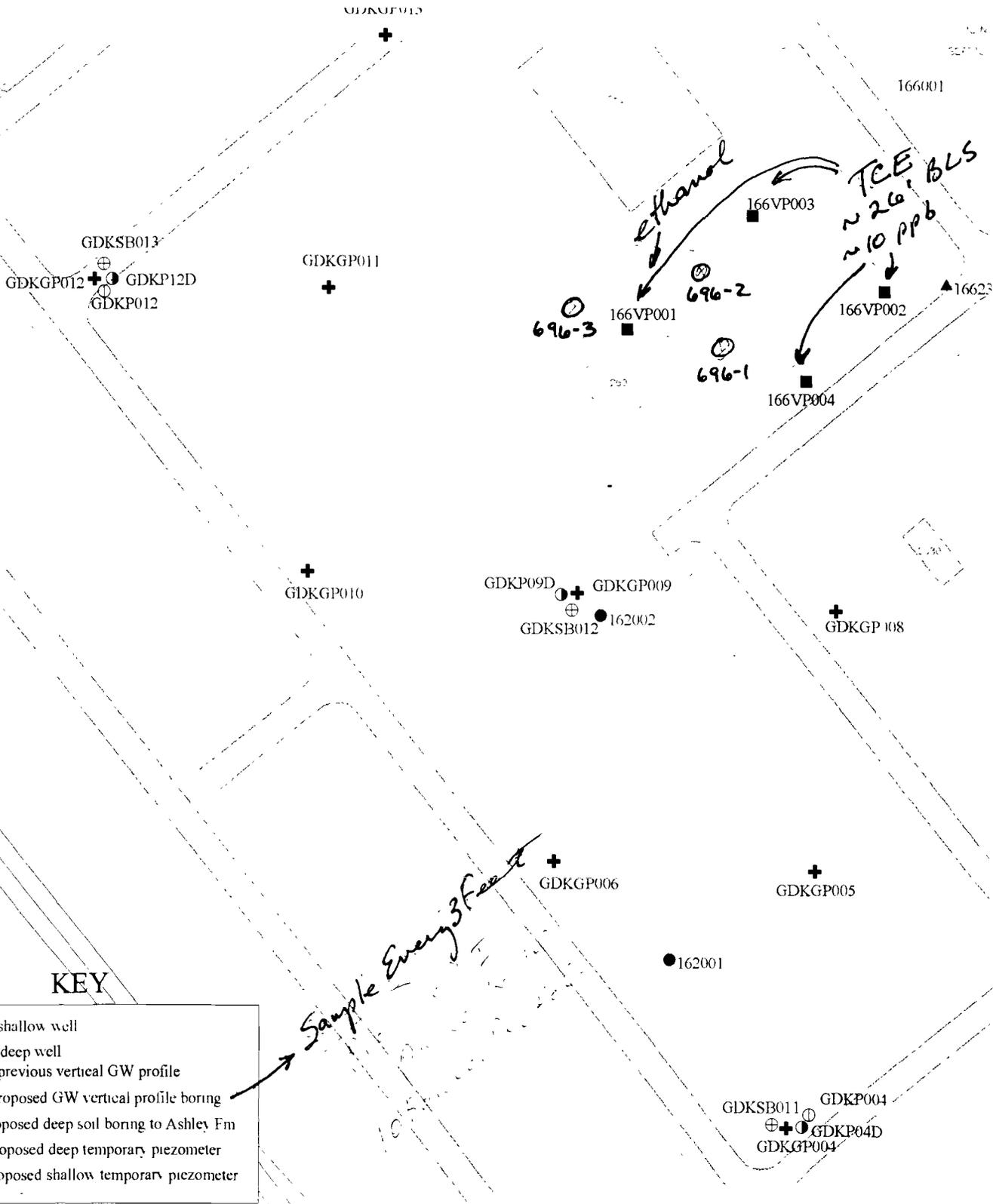
1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual construction details for each direct push well point be submitted to the Department within 30 days after installation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

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

Date of Issue: 16 November 1999

Approval Number: HW-99-091

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



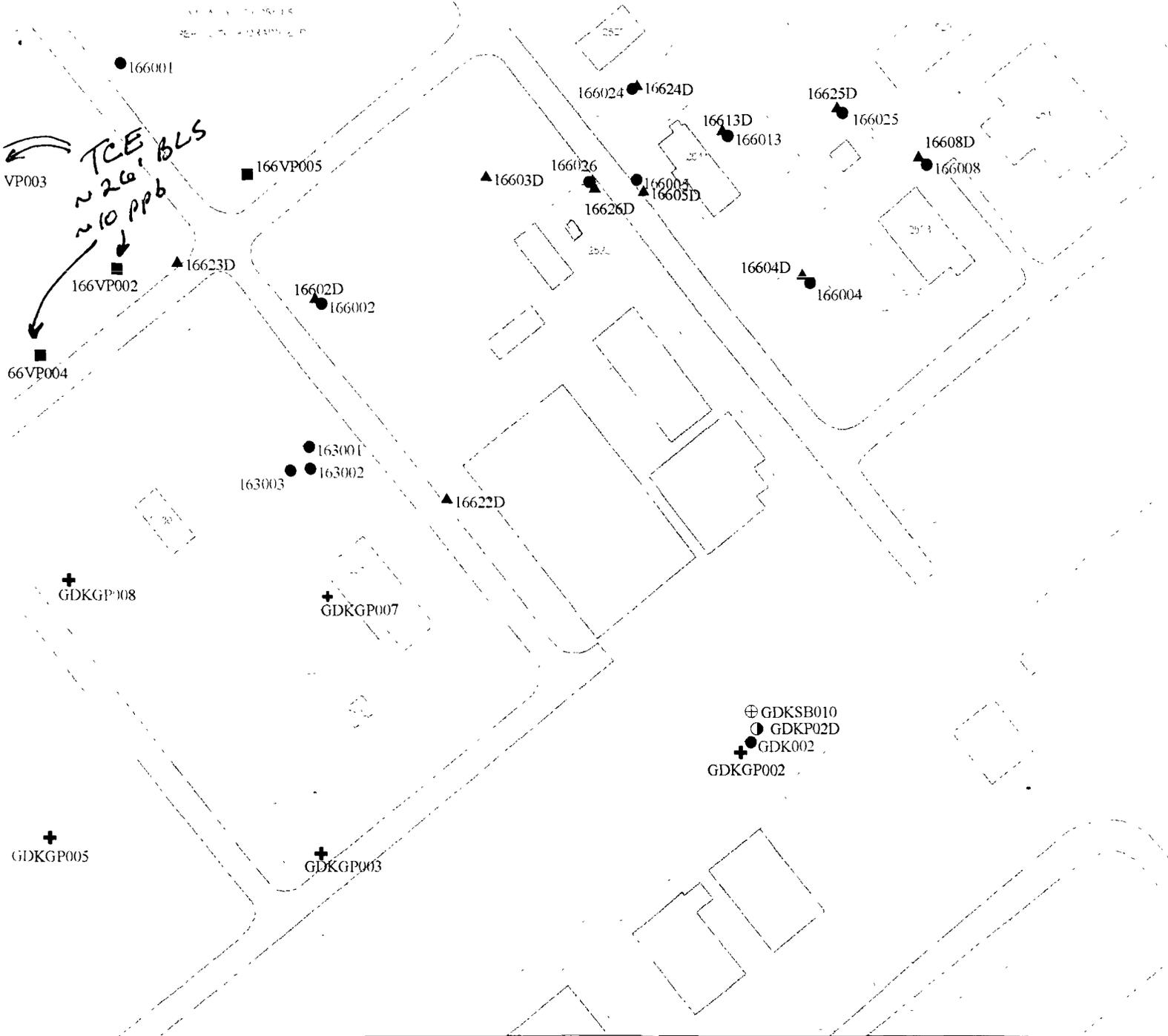
**KEY**

- shallow well
- ▲ deep well
- previous vertical GW profile
- + Proposed GW vertical profile boring
- ⊕ Proposed deep soil boring to Ashley Fm
- ⊙ Proposed deep temporary piezometer
- ⊖ Proposed shallow temporary piezometer



SCALE: 1" = 200'  
DATE: 11/14/2011

VP003  
TCE  
~26' BLS  
~10 PPb  
166VP002  
166VP005  
66VP004



ZONE K GRID-BASED VERTICAL PROFILE LOCATIONS



2600 Bull Street  
Columbia, SC 29201-1708

6 December 1999

CERTIFIED MAIL

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

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

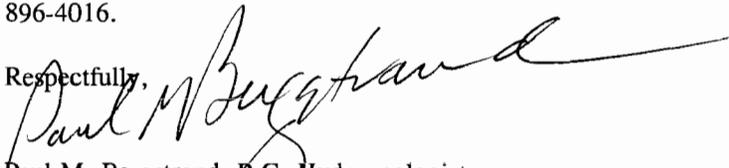
Temporary Monitoring Well Request for Zone K, AOC 694  
Revision 0, Dated 29 November 1999

Dear Mr. Shepard:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of 7 temporary monitoring wells to assess parameters of the surficial aquifer. The monitoring wells are anticipated to be completed to a maximum depth of approximately twelve feet and will be without a permanent well pad.

Because of the unique location and nature of the site, it is requested that the Navy include photographs of each well in the completion report. Attached, please find a copy of the proposed well locations. A copy of the monitor well approval form and this letter should be on site during drilling operations. The temporary well abandonment procedures must follow R.61-71.10 (b5) of the South Carolina Well Standards and Regulations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,

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

Enclosures  
PMB/pmb  
HW-99-098

CC: Christine Sanford-Coker, Trident District EQC  
Paul Bristol, BOW  
Mihir Mehta, Hazardous Waste Permitting Section  
Tony Hunt, Southern Division, Charleston  
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464

DD990937.TMW



2600 Bull Street  
Columbia, SC 29201-1708

## Temporary Monitoring Well Installation Approval

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

Zone K, AOC 694  
Naval Base Charleston  
Charleston County

for the construction of monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 29 November 1999 (Parker to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate twelve feet below the surface and screened for the purpose of monitoring aquifer conditions.

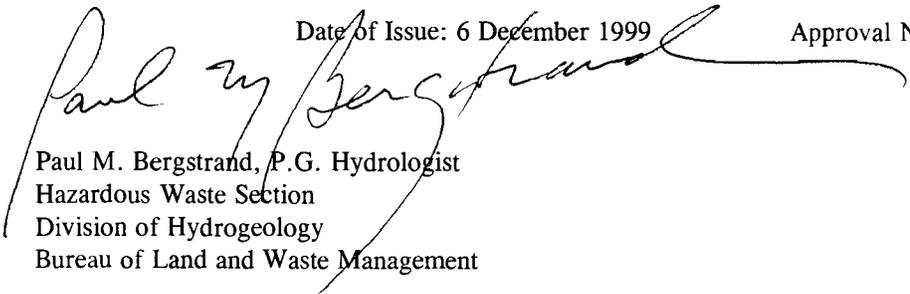
### Conditions:

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

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

Date of Issue: 6 December 1999

Approval Number: HW-99-098

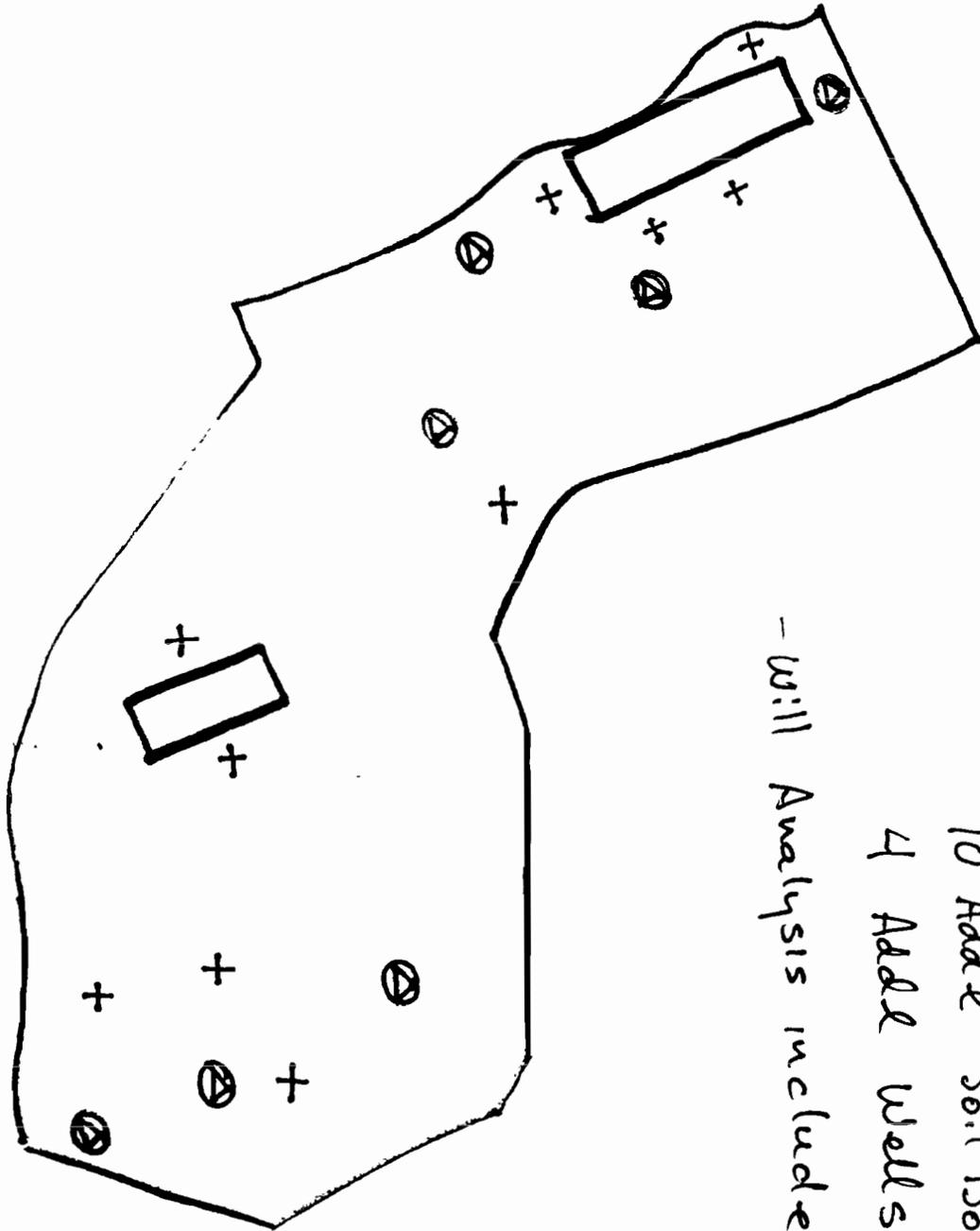
  
Paul M. Bergstrand, P.G. Hydrologist  
Hazardous Waste Section  
Division of Hydrogeology  
Bureau of Land and Waste Management

DD990937.TMW

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

270-744-6508 Attn. Steve PARKER

Fr. Paul Bergstrand  
803-896-4016



- Will Analysis include explosives?

10 Addl Soil Boerings: +  
4 Addl Wells : ⊗



HENRY #NIS 12/15  
MATT  
JOHN  
FILE

2600 Bull Street  
Columbia, SC 29201-1708

December 10, 1999

**Certified Mail**  
7 453 652 743

COMMISSIONER:  
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Mr. Henry N. Shepard, II  
Department of the Navy  
Southern Division - Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29419-9010

Re: Letter of June 24, 1999

Dear Mr. Shepard:

The Department has reviewed your letter concerning the possible violation of Federal and State asbestos regulations by one of your former tenants (Mental Health Association of the Low Country). Your reporting of this finding is appreciated and did lead to an investigation of the incident by Department personnel. However, based upon my discussion with you on December 9, 1999, and a review of available information, the Department has decided not to pursue this matter any further.

Please continue to inform and encourage the tenants of the Charleston Naval Base Complex to comply with all asbestos regulations. If I can be of any assistance you may E-mail me at [phillimh@columb31.dhec.state.sc.us](mailto:phillimh@columb31.dhec.state.sc.us) or call me at (803) 898-4115.

Sincerely,

Henry Phillips  
Enforcement Section  
Air Compliance Management Division  
Bureau of Air Quality

cc: J.Hayes, BAQ  
B.Hennessee, Trident District EQC  
Asbestos File  
ec: D.Ellenwood



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
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Larry R. Chewning, Jr., DMD

HENRY HNS 12/17  
MATT Wood  
John JA  
FILE

December 13, 1999

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

Re: RCRA Facility Investigation (RFI) Report Addendum for AOCs 678, 679, 680, and 681, Located in Zone I of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated June 30, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced RFI Report Addendum (6/30/1999) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced document.

Further, the CNC should submit, to the Department, the comment responses and proposals to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and help to determine the submittal date for the revised RFI report for review and approval.

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

Sincerely,

*M. P. Mehta*

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

Attachments:

1. Memorandum from Susan Peterson to Mihir Mehta dated November 9, 1999.
2. Memorandum from Mike Danielsen to Mihir Mehta dated October 28, 1999.
3. Memorandum from Susan Byrd to Mihir Mehta dated November 24, 1999

cc: Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Paul Bergstrand, Hydrogeology  
Mike Danielsen, Hydrogeology  
Susan K. Byrd, Corrective Action Engineering  
Susan Peterson, Corrective Action Engineering



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

**MEMORANDUM**

BOARD:  
John H. Burriss  
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Vice Chairman  
  
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Secretary  
  
Mark B. Kent  
  
Cyndi C. Mosteller  
  
Brian K. Smith  
  
Rodney L. Grandy

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

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

**DATE:** November 9, 1999

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

Zone I addendums for AOCs 678/679, 680 and 681  
Revision 0, Dated June 30, 1999

The Department is unable to issue a decision on this RFI addendum as currently written. The Department requests additional information in order to do that. The information needed can be determined from my comments/questions/requests and Michael Danielsen's comments.

1. Sample locations on Figure 10.4.1, AOCs 678/679

No samples were collected west of the former firefighter school. Without this information, questions of potential contamination arise. Especially since this is the area of the wash rack. Please collect samples to meet the objective of the RFI.

2. Figures, AOCs 678/679

Figures 10.4.2 through 10.4.8 show Zone I exceedences for Beta-BHC, Chromium, Lead, Mercury, BEQs, Benzo(a)anthracene, and Fluoranthene in that order. Upon review of Table 10.4.11 it appears that Phorate and Isodrin also exceeded residential RBC values. Please create Figures to show those exceedences. The Navy's recommendation of CMS is based on Isodrin.

This addendum contains no figures (for any of the contaminants that exceeded the criteria) that delineate the area of contamination for media. The Department is unable to issue a decision until this information is provided.

3. Tables, AOCs 678/679

Per Table 10.4.11, Benzo(a)pyrene (not Benzo(a)anthracene) exceeded residential RBCs. If this

was an oversight, please create the required figure(s) for Benzo(a)pyrene.

4. Site visit requested, AOCs 678/679

Michael Danielsen and I briefly visited these AOCs in October 1999. We had difficulty verifying the location of the soil samples (soil borings). According to the data packages, soil samples were collected in 1995. Please state the approximate year this site was paved. The Department would like to revisit these AOCs (with someone from Navy or Ensafe that would be able to answer our questions) prior to issuing decisions.

5. Question on sampling dates, AOCs 678/679

On page 26 of the data package for AOC 678 soils, the sample extraction date was 2/24/94, the sample analysis date was 2/24/95, and the sample (collection) date was 2/22/95. Please explain what extraction means (if I had not seen a separate entry for sample date I would have assumed it was the day you collected the sample) and please explain the discrepancy in dates (1994 vs. 1995).

6. Figures

Any constituent that exceeded its respective screening criteria is a COPC. No figures are included (AOC 678/679) that delineate the area of contamination for media. The Department is unable to issue a decision until this information is provided. Please provide appropriate maps and figures to illustrate the nature and extent of contamination with respect to each media (as discussed in recent team meetings). If these figures are absent from AOCs 680 and 681, please provide them for those sections also.

7. Clarification needed, AOC 680

In the Groundwater Pathways section on page 10.5.57, CNC states the "exposure to groundwater onsite was evaluated under both residential and site worker scenarios." And that "the ingestion and inhalation exposure pathways were evaluated assuming the site groundwater will be used for potable and/or domestic purposes and that an unfiltered well drawing from the corresponding water bearing zone, will be installed." However, on page 10.5.2 CNC states that "potential receptors, include future site workers who may be involved in invasive activity that might bring them in direct contact with subsurface contaminants." Explain why there was no mention of the future resident on page 10.5.2.

8. Additional surface soil samples

CNC states that the Charleston Detachment "was tasked with collecting additional surface soil samples adjacent to and inside Building 681." This was "in addition to the samples collected as part of the RFI effort." Please explain the purpose of the samples, how were they incorporated in the RFI report, if at all.

9. SVOCs (PAHs) were high at 681SB009. The total BEQs were 3445 ug/kg. For that reason "the Charleston Detachment collected 6 additional samples adjacent to and/or inside Building 681 in the vicinity of boring 681SB009. Please include all data and analysis necessary to complete the RFI for this AOC. (The Navy claims that a copy of the report (by DET) was submitted. At the time of this review, the Department did not have a copy of this report. This report was not submitted along with these addendums).

10. From review of analytical data, the soil boring at SB009 had many SVOC exceedences.

The Department does not understand how no SVOCs were selected as COPCs. As the CNC reports on page 10.6.28 "Twenty-one SVOCs were detected in AOC 681 surface soil samples. The following PAHs exceeded their respective RBCs: benzo(a)anthracene (2,900 ug/kg), benzo(a)pyrene (2,300 ug/kg), benzo(b)fluoranthene (2,700 ug/kg), dibenzo(a,h)anthracene (407 ug/kg), and indeno(1,2,3-cd)pyrene (880 ug/kg)." Each of these exceedances occurred at boring 681SB00901. Please provide a detailed explanation for the omittance of these COPCs.

11. The statement "the proximity of the Cooper River and the groundwater flow direction indicate that the river is a potential receptor of groundwater discharge, but attenuation along the flowpath and dilution upon discharge to the river will likely reduce concentrations of these constituents to insignificant levels" (page 10.6.50) seems more conjecture than substantiated fact. The Department expects the CNC to provide more justification to support that reasoning.

12. Table 10.6.21

The acronym ND is defined in the key as "not determined." ND is well known as non-detect with regard to laboratory analysis. Please revise the key to select an alternative acronym. Apply this comment to other tables that contain this acronym in this manner.

13. Unsubstantiated conclusions

Section 10.4.5.4, line 13

The CNC states that "because the site history does not include the use of potential mobilizing agents for metals, it is expected that these trends with depth represent natural variations within the site." The Department believes this statement to be illogical, given that the "there is no information regarding the type of structure that existed, operating practices or other activities conducted at these sites" as stated in Section 10.4.6.1, lines 10 and 11. If the Navy chooses to assume, it is best to assume on the side of caution.

14. SWMUs 12 and AOC 687

The Department issued some decisions on the initial Zone I RFI report AOCs and SWMUs in May, 1999. The Department determined that SWMUs 12 and AOC 687 required an RFI for groundwater. No addendum was submitted in conjunction with AOCs 678/679, 680, and 681. The Department is unable to approve the Zone I RFI report until all information is received and reviewed.



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

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

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

DATE: November 24, 1999

RE: Charleston Naval Base  
South Carolina  
SC 0170022560

Document:  
Zone I RCRA Facility Investigation Report Addendum  
AOCs 678-681  
NavBase Charleston

The Department has reviewed the above referenced document completed by Ensafé Inc. Specific and general comments are listed below.

### GENERAL COMMENTS:

- 1.) As discussed in recent team meetings, a site specific DAF and site specific SSLs should be calculated for Zone I instead of using a DAF value of 10. All detected lower interval soil samples should be compared to the site specific SSLs. COPC selection may have to be modified after the new comparisons.
- 2.) No ecological issues were discussed in the addendum. Ecological risk was mentioned in the Zone I RFI, however, information regarding AOCs 679-681 was not available at that time. Please revise the Zone I RFI to include an ecological review of AOCs 679-681

3.) As discussed in the team meetings, the maps and figures should be revised to the agreed upon format.

**SPECIFIC COMMENTS:**

1.) AOC 679, Section 10.4.5.1 Soil-to-Groundwater Cross-Media Transport, Page 10.4.47, Paragraph 2: The text states that a mobilizing agent with a relatively low pH (which is not likely directly associated with site activities) would be required in order for lead and mercury to be enriched with depth. Operating practices at the site are unknown; therefore, this assumption should be deleted from the text. If the statement remains in the text, additional supporting hydrogeologic information should be included such as metals concentration over time with respect to pH and groundwater parameters from well logs.

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



South Carolina Department of Health  
and Environmental Control

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

**MEMORANDUM**

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

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

**DATE:** October 28, 1999

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

Zone I RCRA Facility Investigation (RFI) Report for Charleston Naval  
Complex (CNC) Sections 10.4 and 10.5 (Page Changes March 28, 1999)  
Section 10.6. (Page Changes August 9, 1999)  
Revision 0, Dated March 1, 1999

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

Based on the results of that review, comments are attached.

**Zone I RCRA Facility Investigation (RFI) Report for  
Charleston Naval Complex (CNC)**

**Section 10.4**

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1. **Page 10.4.37 Table 10.4.7, Inorganic Analytical Results for Groundwater**  
Selenium is listed as having a mean value of 301ug/L after a detection of 3.1ug/L in the fourth round. Which number is correct? The MCL for selenium is 50ug/L. Please revise to include the correct value and recalculate any risk equations if needed.
  
2. **Page 10.4.38, Table 10.4.8, Analytes Detected in Shallow Groundwater**  
The table shows that chlorobenzene, benzo(a)pyrene equivalents, benzo(a)anthracene were all found to be above the tap water RBC in the fifth round of sampling. Information from the table indicates that a sixth round of sampling was conducted but shows that nothing was analyzed for in the 6th round . Please clarify and revise as needed. Additional samples may be needed to complete delineation of the nature and extent .
  
3. **Page 10.4.42 Inorganics in Groundwater, lines 14-15**  
This text is not clear as to whether groundwater analytical results were compared to the MCL's or not. Groundwater must also be compared to the MCL tables first and if an entry is not listed, then the RBC tables can be used. Please clarify if the results were compared to the MCL values and revise as needed for all pertinent sections of this document.
  
4. **Page 10.4.43 Section 10.4.5.1, Soil-to-Groundwater Cross-Media Transport**  
This paragraph states that a DAF of 10 was used. This paragraph does not indicate that the selected DAF is site specific or chosen as a generic figure. Please recalculate based on a recent Team meeting (I.E. Using site specific DAF) and revise where needed for all pertinent sections of this document.
  
5. **Page 10.4.63, Section 10.4.5.4, Fate and Transport Summary, lines 17-21**  
The paragraph states that certain BEQ's were found above their respective RBC's and states that "the pathway is valid but not significant due to non-use of the resource."The State considers ALL groundwater in the State of South Carolina to be suited for drinking purposes and therefore must be as clean as the promulgated MCL/RBC tables for drinking water (See Water classifications & Standards-R.61-68, Classified Waters-R.61-

69). Please revise this, as well as, future documents to reflect the fact that the idea of “no contact or use of the groundwater” is not a valid point to ignore the responsibility of the Navy to fully assess the groundwater.

6. **Page 10.4.85 Section 10.4.6.6, Risk Uncertainty, Characterization of Exposure of Setting and Identification of Exposure Pathways, Lines 11-16**

The Navy, in this paragraph states that the groundwater is not expected to be used at this site. See comment number 5.

7. **Page 10.4.87 Section 10.4.6.6 Groundwater, lines 13-15**

These lines state that arsenic and manganese were found in concentrations above their respective RBC's, but not above the background concentrations. Please revise and provide the detection levels for arsenic and manganese.

Please see comment # 3.

## **GENERAL COMMENTS**

### **AOC 678/679**

8. There are six groundwater monitoring wells at this site, which should have been enough to establish seasonal and general groundwater flow directions. The groundwater flow direction for dry, wet, and general conditions has not been provided for this AOC. Please revise and provide the appropriate maps or drawings depicting the site specific groundwater flow.
9. The data for GDSB014 should be included in the text and tables for this site. Please include, in this document as well as future documents, all pertinent information relating to the particular site that is being addressed. If an appendix is referenced please state which section of appendix the information can be found. The appendixes are very large and also should be tabbed or marked by sample or AOC indication. Please revise as needed.
10. The data for GD114D was not found in the text. See comment #9.
11. The number of samples taken at AOC 679 are inadequate to properly characterize the contamination found at this site. The site needs additional samples to fill in data gaps and

to complete the RFI. All samples should be analyzed for a full scan of contaminants because the full operational history of the this site is not known.

Groundwater: There needs to be a monitoring well down gradient from the location of the former UST's to look for possible contamination from the UST's.

Soils: There needs to be additional samples taken between 679SB011 and 678SB002. There also needs to be a sample west of 678SB013. Samples should be added, as close as possible, in the center of the suspected wash rack area as well as the opposite corner from sample number 679SB015.

12. The text is not clear if there was an O/W separator used in conjunction with the wash rack activities or the effluent was drained directly into the Cooper River. Please clarify.
13. During a recent site visit the grouted DPT locations were not located in the parking lot. Please provide an explanation as to whether these points were grouted and/or paved over.

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**Zone I RCRA Facility Investigation (RFI) Report for  
Charleston Naval Complex (CNC)  
Section 10.5**

14. **Page 10.5.1, Section 10.5, AOC 680, Building NS-26 and Grinding Room/Brake Grinding Area, lines 7-9**

The paragraph states that there were three dip tanks in the west part of the building. The text does not state the size of the dip tanks and the site map does not show the dip tanks in relation to the building. Please show the locations of these tanks on the drawing/map that is used in the report and indicate the size of the tanks on the map or in the text.
15. **Page 10.5.14, Section 10.5.3, Groundwater Sampling and Analysis, lines 1-3**

The paragraph states that three shallow and one deep well were installed. The three wells were described in detail including which formation they ended. The deep well was not described in any detail . Please clarify the depth of the deep well, which formation that it was terminated and why the deep well was only sampled once. Please revise as needed.

16. **Page 10.5.17, Table 10.5.8**

The table shows that acetone and 2-butanone (MEK) were found to be above the tap water RBC in the first round. These analytes were not tested for in the second or third rounds to verify that the contaminants were in fact representative of the site. Please include these constituents as COCs into the CMS or additional samples maybe necessary deny the previous results. Please revise as needed.

17. **Page 10.5.16, Table 10.5.6 and Page 10.5.17, Table 10.5.8**

The results from table 10.5.6 and 10.5.8 show two different results for BEHP. Table 10.5.6 states that BEHP was not detected and Table 10.5.8 state that the test for BEHP was not taken. Please revise to the correct terminology and clarify which statement is correct. Additional samples for BEHP may be needed for clarification.

18. **Page 10.5.40 Section 10.5.16 Human Health Risk Assessment, lines 15-16**

This sentence states that three shallow wells were installed to characterize the zone groundwater. Part of groundwater characterization includes determining groundwater flow direction over a period of 2-3 quarters to assess the dry and wet groundwater flow directions. Please provide this information and revise as needed.

## **General Comments**

### **AOC 680**

19. The number of samples taken at AOC 680 are inadequate to properly characterize the contamination found at this site. The site needs additional samples to fill in data gaps and to complete the RFI. All samples should be analyzed for a full scan of contaminants. Samples need to be taken from the area beneath the building in the area of the dip tanks to determine the source for the contamination found in 680GP005. Samples are also needed outside the building on the west and south sides.

20. Acetone was found at 6800ug/L which is well over the Tap Water RBC. However this chemical was not found in Table 10.5.33 as a target for potential corrective measures. Please explain the process and rational in which chemicals, such as arsenic, can be found to exceed the RBC or MCL promulgated levels and not be included for corrective measures.

21. The text and site map show that the 200 gallon waste oil UST was removed. The sampling information including sampling location and analytical results from the removal of the 200 gallon waste oil UST should have been included in this report.
22. The text states that the O/W separator (shown on the site map as being in the center of the building) was not found. The text further states that this O/W separator has been used by pouring oil down the pump-out pipe. Since this tank has been used for waste oil disposal, and appears that it may be continued to be used. The Navy must take steps to locate and ensure that a spill/leak has not occurred from this O/W separator under the building. Additional samples maybe necessary. When sampling a O/W separator the analysis should be made for a full scan of contaminants.
23. There are four groundwater monitoring wells at this site, which should have been enough to establish seasonal and general groundwater flow directions. The groundwater flow direction for dry, wet, and general conditions has not been provided for this AOC. Please revise and provide the appropriate maps or drawings depicting the site specific groundwater flow.

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**Zone I RCRA Facility Investigation (RFI) Report for  
Charleston Naval Complex (CNC)  
Section 10.6**

24. **Page 10.6.1 Section 10.6, AOC 681, Building 681 Blast Booth, lines 20-22**

These lines state that dip tanks were used at this site. The text does not state the size of the dip tanks and the site map does not show the dip tanks in relation to the building. Please show the locations of these tanks on the drawing/map that is used in the report and indicate the size of the tanks on the map or in the text.

The sample ID's on the figure do not correspond to the sample ID's in the text and "Analytes Detected" tables. (IE. Can not locate 681GW003, or DET samples) Please clarify.

25. **Page 10.6.2 Section 10.6, AOC 681, Building 681 Blast Booth, lines 1-2**

The text indicates that the O/W separator is still in use and serves both buildings 680 and 681. Please clarify if in fact it is still being used and whether samples have been taken in this area. This system is not currently on the site map provided in this report. Please revise to include this system on the site map.

**Lines 3-5**

The text states that an additional UST and associated O/W separator was located on a former site map. Please clarify what this system was used for and whether or not it is still in place and/or operational or not.

26. **Page 10.6.3 Figure 10.6.1**

The figure shows a location for an earlier AST before the current Building 681 was constructed. This AST is not mentioned in the text and therefore the previous contents and history of this tank is unknown. Please revise with this information.

The sample ID's on the figure do not correspond to the sample ID's in the text and "hits" tables. (IE. Can not locate 681GW003, or DET samples) Please clarify.

27. **Page 10.6.6, Section 10.6.1, Soil Sampling and Analysis, lines 1-2**

These lines state that the DET collected some samples for this location but does not state the sample numbers and does not represent sample locations found on the site map, figure 10.6.1. Please clarify and revise where needed.

**Lines 2-4**

The text states that sample 681SB00501 was only analyzed for SVOC's, TPH, and VOCs. Usually O/W separators were sampled as though they were part of a virgin petroleum system, however O/W separators generally received other products than petroleum products. Metals are usually also found to be associated with O/W separators and this sample should have been analyzed for a full scan of contaminants. Additional samples maybe necessary.

The text does not also state whether or not this O/W separator has been removed or that the breached line was capped. Please clarify if the separator is still in place and if the lines were properly capped.

**Lines 13-17**

These lines state that metals were analyzed for when another O/W separator was thought to be present. Please explain why some O/W separators were sampled for metals while others were not. Additional samples maybe needed.

28. **Page 10.6.30, Section 10.6.3, Groundwater Sampling and Analysis**  
This section states that the geoprobe samples were only analyzed for VOC, and SVOC's, but do not offer an explanation as to why other analyses were not conducted. Additional samples maybe needed to be taken and be analyzed for a full scan of contaminants to complete the delineation of nature and extent. Please clarify and revise where needed.
29. **Page 10.6.36 Section 10.6.4, Nature and Extent of Contamination in Groundwater, Inorganics in Groundwater**  
This subsection states that no inorganics exceeded RBC or MCL levels. However, Table 10.6.6 shows Thallium to have been found 2.4ug/l. This level exceeds the MCL of 2.4ug/l. Please revise as needed.
30. **Page 10.6.42 Section 10.6.5.2, Groundwater Migration to Surface Water Cross-Media Transport, lines 15-18**  
Please see comment #5.
31. **Page 10.6.49 Section 10.6.5.2, Groundwater Migration to Surface Water Cross Media Transport, lines 6-17**  
This paragraph states that Cu, Hg, Ag, were present in groundwater above screening values, and that upon discharge to the Cooper river, the concentrations of these metals will be diluted to insignificant levels. The idea of dilution alone is not a valid process to rely on for contaminant remediation. These contaminants must be addressed with more aggressive corrective action measures. Please re-evaluate this situation and revise/clarify as needed.
32. **Page 10.6.84 Section 10.6.6.6, Risk Uncertainty, Characterization of Exposure Setting and Identification of Exposure of Exposure Pathways, Groundwater, lines 8-13**  
Please see comment #5.
33. **Page 10.6.107 Section 10.6.7, Corrective Measures Consideration, Table 10.6.33**  
This table does not include Thallium or Dibenzofuran as contaminants for possible CMS consideration. These contaminants were found to be above their respective RBC/MCL levels and must be addressed. Please clarify and revise.

## **General Comments**

### **AOC 681**

34. There are seven groundwater monitoring wells at this site, which should have been enough to establish seasonal and general groundwater flow directions. The groundwater flow direction for dry, wet, and general conditions has not been provided for this AOC. Please revise and provide the appropriate maps or drawings depicting the site specific groundwater flow.
35. The UST removal records were not provided or referenced. Please provide all information regarding the UST removals including sampling locations as well as analytical results.
36. The lack of information for the environmental conditions beneath the building is a major data gap. The Navy needs to define the conditions of all media underneath the building.
37. There were no samples taken around the AST. Additional samples maybe needed to complete the delineation of nature and extent in this area.
38. The site map depicts four storage tank locations. However the fuel line locations are not indicated on this map. Please provide a map that shows all fuel line locations.
39. The number of samples taken at AOC 681 are inadequate to properly characterize the contamination found at this site. The site needs additional samples to fill in data gaps and to complete the RFI. All samples should be analyzed for a full scan of contaminants. Samples need to be taken from the area beneath the building. Additional groundwater samples may be needed when the groundwater flow directions for this site are provided.



2600 Bull Street  
Columbia, SC 29201-1708

*Henry* *11/18*  
*Bill*  
*11/19*  
*File*

**CERTIFIED MAIL/RETURN RECEIPT REQUESTED**

November 15, 1999

Mr. H. N. Shepard II  
Caretaker Site Officer  
Department of the Navy  
Naval Facilities Engineering Command  
P. O. Box 190010  
North Charleston, SC 29419-9010

Re: NPDES Permit No. SC0003816  
USN/Charleston Naval Shipyard  
Charleston County

Dear Mr. Shepard

We have received notification that the permit for the above-referenced facility is no longer necessary. Since there is no longer a point source discharge from this facility, NPDES Permit No. SC0003816 is hereby cancelled effective thirty (30) days from the date of this letter.

If your operations change in any manner which will result in a point source discharge, you must apply for a National Pollutant Discharge Elimination System (NPDES) permit 180 days prior to commencement of the discharge. Application forms for a NPDES permit are available upon request from this office

Sincerely,

Betty Lou Foster  
NPDES Administration

cc: EPA  
Heather Stafford, WP Enforcement  
Wayne Fanning, Trident  
Water Quality Modeling Section  
Terry Knight, EQC Administration  
Charleston EQC Lab  
NPDES Administration



2600 Bull Street  
Columbia, SC 29201-1708

December 13, 1999

COMMISSIONER:  
Douglas E. Bryant

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

BOARD:  
Bradford W. Wyche  
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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

Re: Draft Corrective Measures Study (CMS) Report for SWMU 159 and AOC 653; Located in Zone H of the Charleston Naval Complex, SCO 170 022 560, dated June 17, 1999, received June 24, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced draft CMS Report (6/17/99) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comments were generated based on this review. These comments must be addressed prior to the final approval of the referenced document.

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

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

Sincerely,  
*m. p. mehta*

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

Attachments: Memo. from Paul Bergstrand to Mihir Mehta dated December 3, 1999.

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

*Henry d/NS 12/20*  
*MATT*  
*John*  
*FILE*

**South Carolina Department of Health and Environmental Control comments on: Draft Corrective Measures Study (CMS) Report for SWMU 159; Located in Zone H of the Charleston Naval Complex, SCO 170 022 560, dated June 17, 1999, received June 24, 1999.**

**Comments by Mihir Mehta:**

1. The contents of the referenced report appears to achieve the goals and objective of RFI report (i.e., delineate nature and extent and develop final COCs for further evaluation) and not the CMS report where the problem/characterization is already defined and applicable technologies are evaluated. The Department acknowledges the previous decision of the project team to complete the RFI work during the CMS process. Please reference this concept in the introduction section of the document.
2. The entire report should be revised to provide appropriate maps and figures to illustrate the pre and post interim measure contaminant condition and how it relates to the applicable remedial goals (residential goals for no further action). This will allow the reviewer to understand whether there is any residual contamination left in place or not, which is very important in granting the no further action (NFA) decision. (For example the figures should indicate SWMU boundary, groundwater flow direction, and other pertinent information). As presented, the Department can not conclude whether the contamination has been completely delineated nor evaluate the post interim measure conditions.

Please establish, as deemed appropriate, that the existing contaminant concentration (if any) does not pose a threat to human health and the environment (i.e., show that the risk is below remedial goal for surficial risk and ecological benchmarks, no leachability concern, and no groundwater risk). It appears that the referenced report tried to demonstrate the above stated issues but the information is incomplete or not formatted in a manner which the Department could interpret in order to agree or not with the proposed no further action. With appropriate maps, figures, and explanatory text, necessary information from interim measure completion reports, and the remedial goal illustration the stated concern could be addressed. Please revise all pertinent sections of the referenced document.

3. Section 2.1. General; page 2-1.  
The last line indicates that there is a presence of tidal marsh land adjacent to the referenced SWMU. The referenced report does not evaluate the ecological concerns for the marsh land as they could be impacted by the release of contamination from this unit. Please revise the document to address this concern.
4. Section 2.2.1. Soil; page 2-1.  
Please define the "upper-interval" and "lower-interval" samples with respect to source term and exposure pathway analysis.
5. Section 2.2.4. Surface Water; page 2-8.  
The last line states that, "Surface water risk was not formally assessed at SWMU 159. Surface water will not be further evaluated in the CMS." Please provide justification for not

conducting this analysis. Ecological impacts from the SWMU 159 on the adjacent surface water bodies are considered a part of the RFI process and therefore, should be evaluated during the RFI for SWMU 159. Please revise the document to address this concern.

6. Section 2.3. Interim Stabilization Measures; page 2-10.  
The referenced section should provide more detail information and illustration of the post interim action to understand how much contamination has been excavated with respect to the remedial goal for the proposed no further action. Please revise the referenced section to address this concern.
7. Section 7.0; Public Involvement Plan; page 7-1.  
The referenced section does not conclude or suggest the administrative pathforward for SWMU 159. The Department believes that a public notice and public comment period is necessary as the RCRA permit would be modified to change the status and document the corrective action decision for this SWMU. A public hearing could be arranged if there is a request from the public during the public comment period. Please revise the referenced section to clarify the proposed pathforward.

The statement of basis public involvement plan should be scoped (for its format and content) with the Department prior to its submittal in order to expedite the review and approval time.

**South Carolina Department of Health and Environmental Control comments on: Draft Corrective Measures Study (CMS) Report for AOC 653; Located in Zone H of the Charleston Naval Complex, SCO 170 022 560, dated June 17, 1999, received June 24, 1999.**

**Comments by Mihir Mehta:**

1. Please revise this portion of the referenced document to reflect the changes due to the comments generated for SWMU 159.
2. Briefly discuss the conclusions that were approved during the RFI Report approval process that would facilitate the understanding of all media being cleaned up for the proposed no further action decision.
3. Section 2.2.3 Sediment and Section 2.2.4 Surface water; page 2-8.  
Line one states that "Sediment was not sampled at AOC 653" and "Surface water was not sampled at AOC 653". Please clarify whether these media were evaluated previously during the RFI process or they are not evaluated because they are not present in the vicinity of AOC 653. For granting no further action decision the Department has to verify that all impacted media are cleaned up to acceptable residential remedial goals. Please revise the document to address this concern.



2600 Bull Street  
Columbia, SC 29201-1708

**MEMORANDUM**

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

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

**DATE:** 3 December 1999

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

Draft CMS Report  
Zone H, SWMU 159 and AOC 653  
Dated 17 June 1999, Revision 0

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

The documentation submitted to date does not support the request for "No Further Action".  
Comments on the Draft CMS Report are provided.

Zone H, Draft CMS Report Comments  
Paul M. Bergstrand  
3 December 1999

GENERAL COMMENTS

1. The Project Team agreed to finalize the RFI Document and complete the delineation of contamination in the CMS process. Three new wells were installed and 8 additional wells were sampled at both sites after the Zone H RFI process was complete. The Navy, however, has not included the analytical data reports and chain of custody forms in this CMS Report. This CMS Report cannot be considered a complete document without the submittal of all data. The CMS Report without the supporting data could be considered to be a technical inadequacy as pertaining to the Appendix C, II. B of the Permit.
  
2. The interim measures performed at these two sites did not follow the 16 July 1996 Department recommendation regarding confirmation sampling. In addition, the "Soil/Groundwater Remediation Guidance" document referenced in the IM Reports was not followed regarding confirmation sampling. This results in severe limitations on the use of the IM Report to support the conclusions of the CMS Report. A copy of the Department correspondence is attached. Additional sampling, revision of figures, data evaluation and data sheet submittals may be necessary to resolve these issues for the CMS.

SPECIFIC COMMENTS

SWMU 159

3. Page 2-1; GENERAL

The boundaries of the satellite accumulation area (SAA) are not indicated on any Map/Figure of this CMS Report. Furthermore, there are no figures representing the location of the AST, the can crusher, the debris pile, the surficial topography, the direction of surficial runoff, groundwater flow or the marsh. This CMS Report cannot be considered a complete document without the submittal of this information. Please revise.

4. Page 2-1; GENERAL

This CMS Report does not include an adequate history of the SWMU or the period of operation. This CMS Report cannot be considered a complete document without the submittal of this basic information. Please revise.

5. Page 2-1; RFI/CMS RESULTS

The TCE soil contamination increases from soil boring 11 towards soil boring 10. The ground surface slopes towards the marsh and no additional downgradient soil samples were collected or proposed. Grid soil sample 90, which is in the marsh, reported detections of toluene and TCE. These contaminant detections of Grid soil sample 90 were not incorporated in the data evaluation. This CMS Report has not determined the source or extent of the TCE or Lube oil contamination. This CMS Report cannot be considered a complete document. Please revise.

6. Page 2-5; Table 2

The sample ID code for 159-G-WC01-01 is not understood and is not explained in this report. Please explain.

7. Page 2-6

This section of the Report discussed the detection of Methylene Chloride (MC) in groundwater and attempts to determine if the detection was a lab artifact or was a actual contaminant. The text states that “a possible source was not located.....”. Because this site was a SAA and the CMS Report introduction of the site clearly stated that paints were accumulated at this SWMU, this means the SAA is the possible source. Please revise.

8. Page 2-6

The fact that MC was not detected in any of 19 SWMU soil samples (only 3 were subsurface) is not conclusive proof that MC was not released at the site. Please note, a spill of MC from the SWMU would be able to flow into the marsh. Marsh samples downgradient of the SWMU were not collected. Additional soil samples or diffusion samples in the marsh may help clarify this issue.

9. Page 2-6

The CMS Report then evaluated data from eight Zone H grid soil samples to look for the “possible source”. The problem with these grid soil samples is that they are all from 300 to 500 feet away from the SWMU and seven of the eight are upgradient to side gradient of the SWMU. Please revise. Additional soil samples or diffusion samples in the marsh may help clarify this issue.

10. Page 2-6

This section of the Report discussed the detection of Methylene Chloride (MC) in groundwater and attempts to determine if the detection was a lab artifact or was an actual contaminant. Data from four grid wells was reviewed for this purpose. The main problem with these grid well samples is that three of the four wells are from 300 to 400 feet away from the SWMU and the hydrologic connection to the SWMU has not been proven. These wells, however, may be useful to characterize background conditions. Please revise. Additional wells may help clarify this issue.

11. Page 2-6

The fourth well, 037-G-WHC2, is about 100 feet upgradient of the SWMU. Furthermore, it is not clear what program area well 037-G-WHC2 was installed under, the well construction details or the type and frequency of analysis that was performed. The hydrologic connection of this well to the SWMU has not been proven, however, the well may be useful to characterize background conditions. Please revise and provide this information.

12. Page 2-6

The sample ID code for 037-G-WC2 is not understood and is not explained in this report. Please revise.

13. MC Detections

A review of other Zone H documents reveals the detections of MC in Grid wells 01D at 6 ppb and 11D at 5 ppb in first round. These detections were not included in this report and were not utilized as part of the data review to evaluate the MC detection in well 159-G-W001. Table 4 of this report implies that MC was not detected in any of the "area" wells. This appears to be a highly selective use of well data by the Navy. Please revise.

14. Page 2-7

The CMS Report conclusion on Page 2-7 is that MC is only a Lab related artifact. The data review of MC has failed to include any of the Lab QC analysis in this document to support this argument. The explanation for the presence of MC is unsupported. Additional wells may help clarify this issue. Please revise.

15. CMS and the Interim Measures Reports

The Draft CMS Report relies heavily on the IM Report to draw conclusions . There are, however, fundamental problems in using this IM report.

- The confirmation samples did not analyze for VOC, SVOC, Metals Etc. as recommended in the 19 July 1996 Department comments on the Draft Interim Measure Work Plans.
- The data sheets in the IM Report state matrix interference in three confirmation samples. The data sheets also indicate a increased dilution factor for PAH in 15 of the 24 samples. The matrix interference and the increased dilution factor has not been addressed in the IM Report. It is possible the interference was from TCE, MC or related daughter products. This can only be addressed by additional soil confirmation samples.

The end result is that the IM Confirmation Sampling is not conclusive and calls to question whether or not the IM has remediated the SWMU. Additional sampling and data submittals may be necessary to resolve these issues for the CMS.

16. Figure B-1A

The excavated area shown on Figure B-1A in the Draft CMS Report does not match the SWMU SSA area as shown on Figure A-2 of the IM Report. According to these figures it is not clear that the IM was able to excavate the “Hot spot”. Please confirm and revise as necessary.

17. Page 3-1; Remedial Soil Objectives

This section of the CMS Report states “Since this point (159SB011) has been removed from the site, there is no longer any surface soil point risk above background in excess of 1E-06.” Without the appropriate data, accurate maps and figures, this conclusion is premature. Please confirm and revise as necessary.

18. Page 3-1; Groundwater Remedial Objectives

This section of the CMS Report states “Since MCLs have been met for all parameters at the site, further groundwater remedial objectives are not required.” Without the appropriate data, the evaluation of available data, accurate maps and figures, this conclusion is premature. Additional sampling, revision of figures, data evaluation and data sheet submittals may be necessary to demonstrate that the Navy has meet adequate clean-up goals and has remediated the SWMU for the proposed NFA conclusion.

AOC 653

## SPECIFIC COMMENTS

### 19. Wells

The original wells were destroyed during the IM Excavation. A new well, 653-003 was installed and Grid Wells 3, 3D, 6 and 6D were monitored for arsenic and VOCs. A review of the map shows wells 6 and 6D to be 600 feet away and wells 3 and 3D are 675 feet away. The wells at this extreme distance from the AOC have not been shown to be representative or hydrologically connected to this AOC. The grid wells may, however, be used as background data wells. There are monitoring wells near this AOC that were installed by other programs that may be utilized if they represent groundwater conditions at this AOC. If this is not the case additional wells may also be installed.

### 20. Page 2-8

Acetone was detected below the RBC in wells 03 shallow and 06 deep. The detection, however, was not addressed. Please revise.

### 21. Page 3-1

This section of the Draft CMS Report states that "Arsenic was not present exceeding MCL." Without the appropriate laboratory data sheets and CoC forms in the Draft CMS Report, the detection of arsenic in groundwater cannot be compared to the Zone specific background or MCL values. Please revise.

### 22. CMS and the Interim Measures Reports

The Draft CMS Report relies heavily on the IM Report to draw conclusions . There are, however, fundamental problems in using this IM report.

- The IM confirmation sampling was only for petroleum constituents (BTEX and 16 PAHs) and metals. The confirmation samples did not analyze for VOC, SVOC, Etc. as recommended in the 19 July 1996 Department comments on the Draft Interim Measure Work Plans. Additional samples may be necessary.
- Sample data sheets were included in the IM report, however the corresponding sample location could not be identified.
- The data sheets in the IM Report state matrix interference in three confirmation samples. The data sheets also indicate a increased dilution factor for metals 16 of the 16 samples. The matrix interference and the increased dilution factor for metals has not been

addressed in the IM Report. It is possible the interference was from solvents related daughter products. This can only be addressed by additional soil confirmation samples.

- The Trip blank data sheets were not included in the IM Report. This information should be provided.

The end result is that the IM Confirmation Sampling is not conclusive and calls to question whether or not the IM has remediated the AOC. Additional sampling, revision of figures, data evaluation and data sheet submittals may be necessary to demonstrate that the Navy has meet adequate clean-up goals and has remediated the AOC for the proposed NFA conclusion.



Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman  
William M. Hull, Jr., MD, Vice Chairman  
Roger Leaks, Jr., Secretary

Richard E. Jabbour, DDS  
Cyndi C. Mosteller  
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*Promoting Health, Protecting the Environment*

CERTIFIED MAIL  
Return Receipt Requested

July 19, 1996

Commander Phil Dalby  
Officer in Charge, Caretaker Site office  
Naval Facilities Engineering Command, Southern Division  
Bldg NH-45  
Charleston Naval Base  
Charleston, SC 29408-2020

RE: Draft Interim Measure Workplans for  
SWMU 7, 159 and AOC 653  
Submitted June 7, 1996  
Charleston Naval Shipyard  
SC0 170 022 560

Dear Commander Dalby:

The South Carolina Department of Health and Environmental Control (Department) and the Environmental Protection Agency (EPA) have received and reviewed the above referenced documents. Comments generated accompany this letter. The Department believes that the comments generated do not compromise any technical aspect of the proposed Interim Measures Workplans for SWMU 159 and AOC 653 and by virtue of this the Charleston Naval Base is conditionally authorized to start working on the two above mentioned units that are the subject of the Interim Measures. However, the IM Workplan for SWMU 7 has to be revised and re-submitted for review previous to start any work on the unit.

This authorization should not be considered as an approval of the proposed Workplans and does not release Charleston Naval Shipyard from its responsibility of respond to all comments, make the suggested changes and send a revised copy of the Workplans for final approval.

If you have any questions please contact Johnny Tapia (803)896-4179 or Paul Bergstrand at (803)896-4126.

RECEIVED

JUL 22 1996

HYDROGEOLOGY

**COMMENTS ON DRAFT INTERIM MEASURE WORK PLANS FOR  
SWMU 7, SWMU 159 AND AOC 653  
SUBMITTED JUNE 7, 1996**

Johnny Tapia

SWMU 7

1. In Section 2a., should be stated the specific Zone where SWMU 7 is located. In this case should be Zone G.
2. In Section 2b. An explanation should be included of why Zone's H screening values are being used as a reference, for a site that is located in Zone G.
3. Section b., table 1, shows that contaminants concentrations at SWMU 7 are being compared to Zone H background levels. If so, the reason to make this comparison should be clearly stated in the text of this section.
4. Section 3a., reads: "... and to clean PCB contaminated concrete that exceeds 10 ug/cm2." Is this sentence referring to the concrete pad and/or to the concrete floor of building 3902? This sentence is not specific. Also should be clarified where the threshold level of 10 ug/cm2 comes from and why it is used as the baseline for the cleanup of the concrete. In addition, should be explained in the text the reason for not addressing the area of sample location B21 and others, as part of the IM Work Plan. In this Section and several others throughout this Work Plan, soils are proposed for removal in an area "immediately adjacent" to the building and/or the concrete pad. This term is vague and should be defined or else changed in the text.  
Why lead and pesticides present at the site will not be addressed as part of the IM? The answer to all these questions should be present in the text of this section.
5. Section 3c., Soil Excavation paragraph. This paragraph states that soil screening will be used to determine the extent and depth of excavation. If the depth of excavation and the lateral extent of contamination is not known, it seems improbable that an amount of soil to be removed could be estimated.  
Same Section, in the Concrete Floor paragraph. Should be noted that if after implementing the proposed IM Work Plan and PCBs removal from the concrete cannot be attained, SCDHEC and EPA should be consulted before implementing a different approach from that of the Work Plan.
6. Section 4b., SCDHEC does not agree with the use of composite samples for Confirmatory Sampling purposes. Instead, discrete samples should be used.

ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT  
INTERIM MEASURES WORK PLANS FOR AREA OF CONCERN 653,  
AND SOLID WASTE MANAGEMENT UNITS 7 AND 159

GENERAL COMMENTS

1. EPA is concerned that, even though the South Carolina Department of Health and Environmental Control (SCDHEC) and EPA have requested to be allowed to participate in a Scoping Meeting before all Interim Measures Work Plans are prepared, we were not afforded this opportunity for these three Work Plans.
2. Mention continues to be made in these Work Plans regarding backfilling after excavation. Since these Interim Measures are being conducted voluntarily, backfilling is certainly within the prerogative of Naval Base Charleston. However, Naval Base Charleston should be aware that any backfilling after excavation is done at their own risk. SCDHEC and/or EPA might later determine that additional cleanup is required, and therefore any "clean" material backfilled into the excavated area might possibly have become contaminated. Both SCDHEC and EPA have made this same comment previously. While EPA will maintain this concern, EPA will not continue to make this same comment on future Interim Measure Work Plans. It is suggested that SCDHEC and EPA concurrence be obtained before any excavated area is backfilled.
3. In each of these Interim Measures Work Plans, the statement is made that "--- this IM is consistent with the ultimate clean up of this site ---." EPA agrees with this concept. However, for the understanding of all readers, it is suggested that one or two sentences be added here which states one or two examples of likely and reasonable cleanup alternatives for such a site. In so doing, it should be made clear this does not constitute a commitment to limit cleanup alternatives to these specific examples.
4. Each of these Work Plans describes past investigations but lacks a conclusion. It would be very helpful to have a brief paragraph in the Past Investigations section which summarizes and indicates the significance of all data collected during the past investigations and which leads to the need for the Interim Measures being taken for the proposed parameters and not others.
5. In slightly different but very similar ways, each of these Work Plans discusses either testing for metals or polychlorinated biphenyls (PCBs) if required by the disposal facility. It should be noted that Naval Base Charleston is responsible for determining whether all waste is a hazardous waste and disposing of it accordingly, independent from and regardless of the requirements of a disposal facility. Therefore, Naval Base Charleston should determine whether or

**MEMORANDUM**

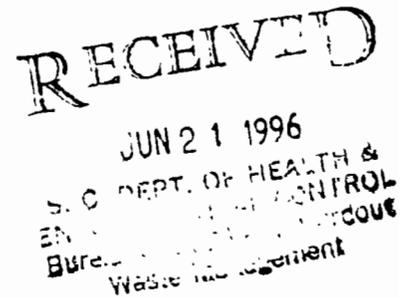
**TO:** Johnny Tapia P., Environmental Engineer Associate  
Hazardous Waste Permitting Section  
Bureau of Solid and Hazardous Waste Management

**FROM:** Paul M. Bergstrand, Hydrogeologist  
Division of Hydrogeology  
Bureau of Solid and Hazardous Waste Management

**DATE:** 20 June 1996

**RE:** Draft Interim Measure Work Plans for Naval Base Charleston at the following sites:

- A) Solid Waste Management Unit (SWMU) 7
- B) SWMU 159
- C) Area of Concern 653



**GENERAL COMMENTS**

1) There are three primary concerns which involves all three plans and must be addressed.

**A) SCREENING**

The screening methods must adequately reflect site contaminants. For example, an OVA does not work well with oils and does not correlate with TPH levels in the soil.

**B) CONFIRMATION SAMPLES**

The confirmation samples must accurately document all site contaminants at the extent of the excavation. There must be enough confirmation data to allow site closure at a later date without additional sampling.

Destructive sampling methods should be described in the report.

8) Page 12 3e. WASTE MANAGEMENT

This section states that "All wastes shall be characterized as hazardous or non-hazardous and disposed of accordingly." This Work Plan should state that all wastes will be handled as hazardous wastes until proven to be non-hazardous. Once characterized, hazardous and non-hazardous wastes will be disposed of accordingly.

9) Page 13 CONSTRUCTION EQUIPMENT

This section states that "The backhoe and other equipment will be cleaned with brooms. ....If the equipment is not clean of PCBs.....(it) will be decontaminated in accordance with Section 7.0 of the CHASP." The proposed method of decontamination (i.e., brooms) does not appear to be suitable for equipment which has been in contact with PCB contaminated soils. Furthermore, Section 7 of the CHASP only describes equipment recommended for heavy equipment decontamination and not methods or procedures. This section should be revised.

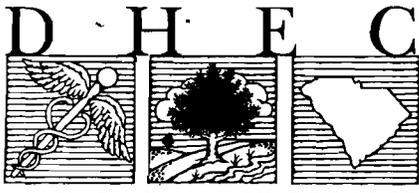
SWMU 159

10) See general comments.

AOC 653

11) Page 11 Well Abandonment

The proposed monitoring well abandonment request has not been received by this office. The work plan did not show the well locations on any of the site maps and was unclear which program area the wells were installed under (RCRA or UST). These issues must be resolved before the wells are abandoned.



PROMOTE PROTECT PROSPER

2600 Bull Street  
Columbia, SC 29201-1708

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Henry Shepard II  
MATT  
John  
FILE  
ANS 12.17  
*[Signature]*

December 15, 1999

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

Re: Interim Measure Final Completion Report for SWMU 25, Located in Zone E of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 17, 1999.

Interim Measure Final Completion Report for SWMU 8, Located in Zone G of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 17, 1999.

Interim Measure Final Completion Report for SWMU 2, Located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated November 29, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) acknowledges the receipt of the above referenced documents in November 1999. The Department believes that appropriate information should be summarized in the RFI or CMS Reports to discern the residual contamination left in place and its associated risk. This will help to determine what path forward (i.e., no further action, limited action, or active remedial action) will be necessary to achieve the final corrective action goals for the referenced SWMUs. Therefore, the Department defers the review and approval of these documents (as supplemental documents) with the review of respective RFI or CMS Report.

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

Sincerely,

*m. p. mehta*

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

cc: Rick Richter, Trident EQC  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV  
Paul Bergstrand, Hydrogeology  
Ann Clark, EQC Administration



2600 Bull Street  
Columbia, SC 29201-1708

December 21, 1999

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

Re: Zone F Final RCRA Facility Investigation (RFI) Work Plan Addendum, Charleston Naval Complex, SCO 170 022 560, dated November 3, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced RFI Work Plan Addendum (11/3/1999) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document. Further, the CNC should submit, to the Department, the comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

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

Sincerely,

*M. P. Mehta*

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

Attachments:

1. Comments from Charles Watson to Mihir Mehta dated December 21, 1999.
2. Comments from Paul Bergstrand to Mihir Mehta dated December 17, 1999.

cc: Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Charles Watson, Corrective Action Engineering  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV

## **MEMORANDUM**

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

From: Charles B. Watson  
Corrective Action Engineering Section  
Division of Hazardous & Infectious Waste Mgt.  
Bureau of Land and Waste Management

Date: December 21, 1999

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

### **Comments**

Final Zone F RFI Work plan Addendum  
Dated November 3, 1999

The above referenced document completed by Ensafé Inc. has been reviewed.

If you require additional information, please contact me at 896-4212.

### **General Comments**

The Zone F RFI Work plan Addendum document addressed additional work needed to address nature and extent for the following sites:

SWMU 4 and AOC 619  
SWMU 36 and AOC 620  
SWMU 109  
AOC 609  
AOC 611  
AOC 613, AOC 615, and SWMU 175

1. Throughout the text of the document there are references to data that was used to determine the need for additional sampling locations to fill data gaps. A range of sampling result data was given instead of providing a table of all results. All data should have been included in the text.

2. It is proposed that the soil data be reevaluated with respect to site specific SSL which may indicate that there are additional soil data gaps. This should have been evaluated prior to this document being finalized.

3. The document indicates that additional screening results should be completed by mid-November. This information should have been completed and incorporated into this document in order that a final determination of appropriate sampling could be more closely achieved.

Site Specific Comments:

#### **SWMU 36 and AOC 620**

The location of the proposed soil sampling location 620SB010 is not shown on the map. This is one of the proposed eastern sampling points from 620SB004.

#### **SWMU 109**

Some of the contaminants exceeded RBC and/or background by very marginal amounts. Therefore, it is proposed that no additional sampling be done. No sampling data was provided. It is felt that further sampling should be made at these locations based upon the information as presented.

#### **AOC 609**

As previously mentioned, the document states that soil sampling results would be reevaluated with respect to site-specific SSL's. This should have been done prior to the submittal of the document.

#### **AOC 611**

There was PCB contamination present at 611SB007. There is no further mention of this contamination. Did the interim removal address this and was this confirmed through sampling? The area of interim removal should have been indicated on the map.

### **AOC 613**

There were slight exceedances of contaminant levels at 613SP008 and 613SP0036. The work plan does not propose additional sampling at these locations. Based on the information as presented, additional sampling is needed at these locations and any others in a similar situation.

BEQ's were indicated in the area of sampling locations 613 02D and GEL013. Therefore, soil sampling should be proposed between these locations.

**MEMORANDUM**

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

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

**DATE:** 17 December 1999

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

Final RFI Workplan Addendum  
Zone F  
Dated 3 November 1999, Revision 0

Completion Report; Interim Measure for AOC 611  
Zone F  
Dated 29 January 1998

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

The Addendum document is not approvable. General comments are provided.

Zone F, Final Zone F RFI Workplan Addendum  
Paul M. Bergstrand  
17 December 1999

**GENERAL COMMENTS**

1. The Workplan addendum is, as submitted, does not provide the current and complete characterization of Zone F SWMUs and AOCs. The workplan refers to the Draft RFI Report to present the known extent of contamination. The Draft RFI Report does not present this information in a comprehensive manner. Also, the soil exceedences in the Draft RFI Report were based upon a SSL-DAF of 20 which has since been changed to a site specific SSL. It is not known how the revision of SSL will change the known extent of contamination from the Draft RFI Report. Furthermore, analytical data from subsequent RFI assessments, previous and ongoing Petroleum UST assessments, Sanitary and Storm Water Sewer assessments was not evaluated in this workplan. All this additional data is reportedly being re-evaluated during the end of November 1999. This addendum sampling effort is intended to complete the characterization of contamination. Only a comprehensive review of all data will tell if this effort was successful.
2. Figures in this workplan describe COC exceedences with generic symbols such as VOC, SVOC or METALS. This method of presentation of the nature and extent of contamination fails to relay the known levels of contamination.
3. In an RFI investigation where the release mechanism is not known, analytical data to define the nature and extent of contamination should be presented on maps or figures before comparing the data to screening values. This is significant when multiple contaminant detections below screening values may provide cumulative evidence of a release. Screening values are not based upon their cumulative effect. The Navy must adequately define the nature and extent of contamination.
4. The Figures in this workplan represent groundwater flow with an arrow. It is not clear if the representation of groundwater flow in this document is from a single seasonal sample event or an average. This representation of groundwater flow is often at odds with other data previously presented by the Navy. In a workplan such as this, the variability of the seasonal or average groundwater flow can influence proposed monitoring well locations. The Navy must indicate how the groundwater flow was determined.

5. Figures of buildings should include pertinent information as it relates to the nature of the SWMU or AOC. An example of this is SWMU 4, Pest Control. *"SWMU 4 consists of Building 381 which was built in 1980 to store various insecticides and rodenticides. Building 381 has a formulation and mixing room, equipment wash area, and sink and floor drains connected to the base sanitary sewer system. Pesticide storage at the facility was discontinued after 1985, and after this date the building was used for miscellaneous storage."* Upon close inspection of the workplan, it is apparent that only two soil samples have been taken close to the building. There is one side gradient monitoring well. Providing figures showing the layout of the building, the connection to the sanitary sewer system, where mixing and washing occurred, etc., is critical to understanding the assessment to date and the adequacy of the proposed assessment. The Navy should include pertinent information as it relates to the nature of each SWMU or AOC.

6. Building 1824 is described in the 29 April 1994 Draft EBS as being the Flammable and Hazardous Waste Storage Facility. There is no evidence that Building 1824 has been listed as a SWMU or an AOC. The Navy should address the status of this facility.

7. There appears to be a break in the Sewer line near the Zone F boundary along side SWMU 4/AOC 619 and SWMU 36/AOC 620. The Navy should anticipate the effect of Sewer line repairs on groundwater flow in this area.

8. An Interim Measure was conducted at AOC 611 (former Hobby Shop). There are several issues regarding this IM that will need to be addressed before a final determination can be made.

- A. Confirmation sample analysis was only for PAH and RCRA Metals and not for the full range of potential contamination. This limited suite of analysis will complicate the use of the IM data in the RFI Report.
- B. PCB was determined to be a COC in the Draft RFI Report, however there were no reports of PCB analysis during the IM confirmation samples or in the waste characterization.
- C. PAH Confirmation samples 1, 2 and 3 were diluted (10x, 40x and 10x) as a result of matrix interference. How these elevated detection levels may compare with the RBC was not addressed in the Report.
- D. Confirmation sample location 2 (611-004) reported strong petroleum odor and the TPH analysis confirmed 28,500 ppm at the site.
- E. Maps and figures from the IM Report and the Workplan Addendum of the excavated area do not agree.

9. The workplan stated that Tetra Tech NUS will be performing a “Rapid Assessment” under supervision of the UST Program. UST programs typically work with virgin petroleum products. The Navy and contractor must be aware of the hazardous constituents present and conduct an adequate analytical assessment. Incomplete or partial analysis during the “Rapid Assessment” will require additional assessment.

10. The status and environmental conditions of all Oil Water Separators in this Zone must be considered. OWS have typically been assessed assuming virgin petroleum contaminants. The Navy must conduct an adequate analytical assessment of all OWS. Incomplete or partial analysis will require additional assessment.

11. Data collected as part of the assessment of SWMU 37, AOC 699 and AOC 709 should be included in the data presentation.



2600 Bull Street  
Columbia, SC 29201-1708

December 22, 1999

HENRY HHS 1/7/00  
MATT mm  
JOHN JH  
FILE \_\_\_\_\_

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

Re: Zone K Draft Final RCRA Facility Investigation (RFI) Work Plan Addendum, Charleston Naval Complex, SCO 170 022 560, dated November 16, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced RFI Work Plan Addendum (11/16/1999) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comments were generated based on this review. These comments must be addressed prior to the approval of the above referenced document. Further, the CNC should submit, to the Department, the comment responses to address these comments within thirty (30) calendar days of the receipt of this letter. This would facilitate the comment resolution meeting and expedite the review and approval process.

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

Sincerely,

*M. P. Mehta*

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

Attachments:

1. Approval from Susan Peterson to Mihir Mehta dated December 22, 1999.
2. Comments from Mike Danielsen to Mihir Mehta dated December 22, 1999.

cc: Paul Bergstrand, Hydrogeology  
Rick Richter, Trident EQC  
Susan Peterson, Corrective Action Engineering  
Mike Danielsen, Hydrogeology  
Tony Hunt, SOUTHDIV  
Dann Spariosu, EPA Region IV



2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

**MEMORANDUM**

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

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

**DATE:** December 22, 1999

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

Zone K RFI, Work Plan Addendum, Revision 0  
Dated November 16, 1999

The Department issued comments on the Zone K RFI report September 30, 1999. The CNC has responded to the Department's comments through submittal of the above work plan addendum. The Department has reviewed the work plan addendum and believes it to be approvable as written.



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

**MEMORANDUM**

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

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

**DATE:** December 22, 1999

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

Draft Final Zone K RFI Work Plan Addendum  
Revision 0, Dated November 16, 1999

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

Based on the results of that review, comments are attached. The Department will be amenable to discuss and resolve these comments.

## **Zone K RFI Work Plan Addendum for Charleston Naval Complex (CNC)**

### **General Comments**

1. Several pump test wells and other type wells were not indicated on the figures. Please revise this information and include in the final report.
2. Please note, the Navy should summarize the extent of contamination for all SWMUs. This must be done on maps and figures with the use of hatching, coloring, or by contours.
3. The Department suggests that all samples be analyzed for the full scan of contaminants to better enhance the data for each site. Where unusual constituents were historically located (i.e. explosives, fuel, pesticides, etc.) the analytical analysis should reflect these constituents in the test run on the samples.
4. Based on the proposed sample locations and the subsequent results, the Navy may need to propose additional sampling locations to complete the characterization of the nature and extent of contamination for some SWMUs. The Department would like to reiterate that characterization of the nature and extent of contamination must be completed up to or below the MCL for all SWMUs and AOCs.

### **SWMU 161**

5. **Figure 2.1**

The pump test wells observed during the field visit are not shown on map. Please revise the figure for the report.

### **SWMU 162**

6. **Page 2.2.4 Section 2.2.2 Data Gaps, Surface Soils, lines 1-2**

This section states that Hg and As were found exceeding screening criteria but are not shown as such on figure 2.2. Please revise in report.

7. The table proposes sample 162003 as a shallow groundwater sample. This sample number cannot be found on the figure.

### **SWMU 163**

8. **Figure 2.3**

This figure does not show SWMU boundaries. Please revise in the report.

9. **Page 2.3.4 Section 2.3.1 previous Field Work, Groundwater, lines 6-10**

This states that additional samples were taken in September of 1999. The figure does not illustrate these sampling locations. Please revise this information in the report.

10. **Page 2.3.5 Section 2.3.2 Data Gaps, Shallow Groundwater, lines 14-16.**  
States that shallow groundwater has been defined, This is not correct. There are no shallow or deep groundwater monitoring wells down gradient of the SWMU. Shallow and deep wells must be added to properly characterize the groundwater at this SWMU.
11. The Department suggests that additional monitoring wells be added to the proposed sampling effort to fill in data gaps and complete the nature and extent investigation for groundwater at this site.

#### **SWMU 164**

12. **Figure 2.4**  
This figure does not indicate the groundwater flow direction. Please revise the figure for the report.
13. **Page 2.4.4 Section 2.4.2 Data Gaps, Groundwater, lines 22-23.**  
The text states that the decision to install monitoring wells will be made on the results of the pending soil investigation. Please explain the rationale to justify this line of thought. Monitoring wells will be needed before soil analytical results are received to characterize the groundwater at this site. The Navy must also determine site-specific groundwater flow direction to properly characterize the site.

#### **SWMU 693/694**

14. **Page 2.5.1 Section 2.5 AOC 693, Fuse and Primer House, Former Building 117 and AOC 694, Former Naval Ammunition Depot, Clouter Island, lines 13-15**  
These lines state that the northern most structure is building 106, when in fact the building is labeled 108 on figure 2.5. Please revise in the report.
15. Historically, this area was used as an ammunition depot. Therefore all samples taken from this SWMU must have the analysis for explosives added to the analytical tests.
16. The Department suggests that additional monitoring wells and additional soil samples be added to the proposed sampling effort to fill in data gaps and complete the nature and extent investigation for this site. (This information has been previously addressed when the well permit was requested.)

#### **SWMU 696**

17. **Page 2.6.1 Section 2.6, lines 13-15**  
These lines state that the Navy is not sure if the 1000gallon UST is still in place or not. The Navy must determine if the UST is still in place. If the tank is still in place and not in use, then the Navy must properly abandon the UST and associated piping. Please address this in the report.
18. **Page 2.6.3 Data gaps, Surface Soil, lines 9-12**  
These lines state that PCB contaminated soil was removed during an IM. It is also stated that no further delineation of PCB is required because the area is surrounded by data

points. This rationale would explain the horizontal extent, but it is not clear if vertical extent confirmation samples taken after the IM was completed. Please provide an explanation as to whether or not vertical confirmation samples were taken. If no samples were taken to confirm the vertical extent the Navy must take additional samples to delineate the vertical extent.

19. **Figure 2.6**

This figure does not show the piping runs associated with the 1000 gallon UST. Please revise the figure to indicate the piping runs in the report.

**SWMU 698**

20. **Figure 2.7**

This figure does not indicate groundwater flow direction for this site. The Department cannot be sure proposed wells are up or down gradient unless the groundwater direction is shown. Please revise the figure for the report.

21. **Page 2.7.1 AOC 698, Building 2508, Boiler House, Naval Annex, lines 5-10**

This text explains that this area was designated as an AOC because of the lead based paint peeling from the building. The previous sample locations are too far from the building to get a more accurate reading of the lead content in the soil. The Navy should propose additional samples to better characterize the lead content in the soil adjacent to the building.

22. **Page 2.7.5 Section 2.7.2 Data Gaps, Shallow Groundwater, lines 7-12**

These lines state that analytes exceeded their respective screening values and will be listed under the sample locations of which they were found. However figure 2.7 does not list any analytes for any sample location. Please revise the figure in the report.

23. **Page 2.7.5 Sampling and Analysis Plan, lines 20-22**

These lines propose the location of a well down gradient of well 698001. However the figure 2.7 does not indicate which direction groundwater flows. See comment 30.

**Groundwater Strategy**

24. **Page 2.8.1 Section 2.8, lines 14-16**

Stratigraphic control is only considered useful for vertical control not horizontal control. Please explain the rationale where by stratigraphic control is considered.