

N61165.AR.004528
CNC CHARLESTON
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TECHNICAL MEMORANDUMS PROPOSING NO FURTHER ACTION STATUS FOR AREAS
OF CONCERN 655 AND 656 AND 666 (AOC 655 AND 656 AND 666) WITH TRANSMITTAL
CNC CHARLESTON SC
4/5/1999
NAVFAC SOUTHERN



DEPARTMENT OF THE NAVY

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

5090/11
Code 18710
5 Apr 1999

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

Subj: SUBMITTAL OF TECHNICAL MEMORANDUMS PROPOSING NFA STATUS FOR
AOC 655, 656, AND 666

Dear Mr. Litton:

The purpose of this letter is to submit the enclosed Technical Memorandums for AOC 655, 656, and 666. These sites were placed in the CMS process based on the need for further evaluation to determine whether groundwater contamination exists. After completion of the additional investigation it is the opinion of the Navy and EnSafe that these AOCs should be considered NFA sites.

The Navy requests that the Department and the USEPA review and provide comment or approval whichever is appropriate. If you should have any questions please contact Billy Drawdy or myself at (843) 743-9985 and (843) 820-5543 respectively.

Sincerely,

DAVID P. DODDS
Remedial Project Manager
Installation Restoration III

Encl:

(1) Technical Memorandums for AOC 655, 656, and 666 dated 31 March 1999

Copy to:

SCDHEC (Paul Bergstrand, Johnny Tapia), USEPA (Dann Spariosu)
CSO Naval Base Charleston (Billy Drawdy), SOUTHNAVFACENGCOM [REDACTED]
SPORTENVDETCNASN (Bobby Dearhart)

TECHNICAL MEMORANDUM

To: Environmental Cleanup Project Team
Charleston Naval Complex
Charleston, South Carolina

From: Don Schroeder, P.E.
EnSafe, Nashville

Date: 31 March 1999

Re: AOC 655 Removal from the Zone H CMS

Objective

The purpose of this technical memorandum (tech memo) is to present the justification for removal of AOC 655 from the Zone H CMS. SCDHEC has agreed that Zone H Minor Site AOC 655, along with AOCs 656 and 666 and SWMU 136/AOC 663 are eligible for removal from the CMS process.

Site Description

AOC 655, which is behind Building 656 the former Base Exchange, is the site of a fuel line rupture in 1985 that released approximately 300 gallons of No. 2 fuel oil. The Site Map for AOC 655 is presented on Figure 1. The fuel line, which originated at a 5,800-gallon UST, supplied fuel to a boiler in Building 656. The majority of the site is covered with asphalt and concrete. There is a small area between Building 656 and the former UST which is covered with grass and gravel. There were no Navy DET ISMs completed at the site, but the UST and fuel lines have been removed.

Site Background

AOC 655 was included in the RFI at the request of the USEPA and SCDHEC. This AOC is not considered a hazardous material or waste treatment, storage or disposal area. The virgin petroleum products that were stored at this AOC are not classified as a hazardous material or waste and are typically regulated as a petroleum or special waste/material.

The CMS Work Plan summarized that the surface soil risk above background at the site is near the lower threshold of 1E-6 under the residential scenario, and is below this threshold under the industrial scenario. The primary contributor to risk in groundwater at the site is arsenic.

However, the groundwater arsenic concentration did not exceed the MCL of 50 $\mu\text{g/L}$ through four quarters of sampling at the three site monitoring wells. The groundwater data for arsenic concentrations at AOC 655 is summarized in Table 1.

The Project Team requested that AOC 655 be placed in the CMS process due to concerns over possible arsenic in the groundwater. Two more quarters of groundwater monitoring at the three site wells was required. This additional sampling would confirm or refute the presence of arsenic and would determine if any remedial action is required. In addition, the results of the Navy DET UST removal activities were also to be considered during the CMS process.

Navy DET Activities

The Navy DET removed the 5,800 gallon fuel oil UST and product piping from the site in October of 1996. The activities that were performed during tank removal are summarized in the Underground Storage Tank (UST) Assessment Report for UST 656 that is dated March 6, 1997. The 5,800 gallon fuel oil UST and all associated piping were excavated and removed. The tank and piping were removed from the site and disposed of properly.

Soil that was excavated from the tank pit and from over the piping lines was temporarily stockpiled adjacent to the tank pit. Samples were taken from the soil piles and from the remaining soil in the tank pit and trench lines. The samples were analyzed for 4 Volatile Organics (BTEX) and 16 Extractable Organics (PAHs). All soil samples were less than the residential RBC parameters for all of the BTEX and PAH constituents that were analyzed. All excavated soil was then returned to the tank pit and piping line trench area.

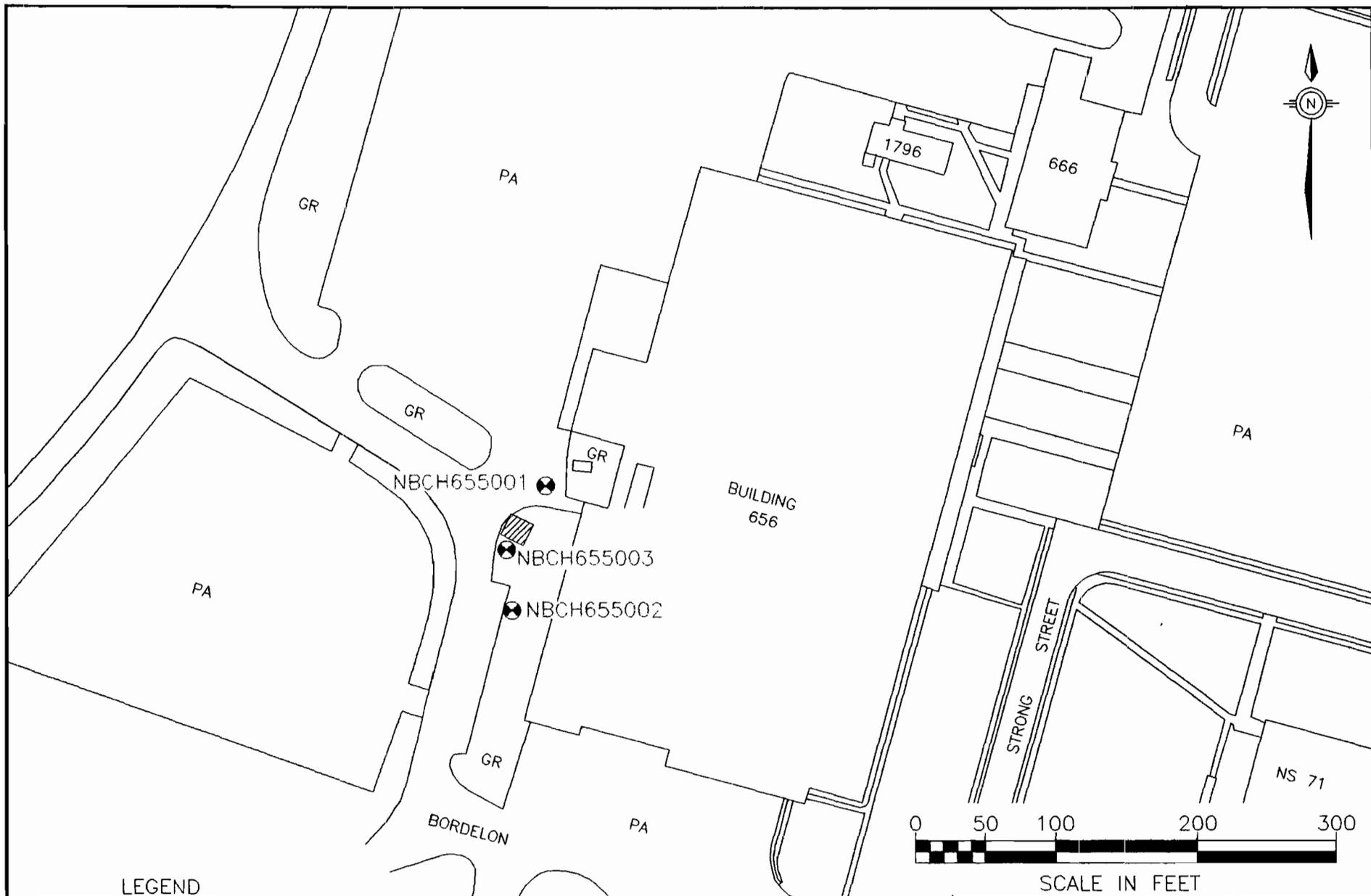
CMS Groundwater Sampling

Two additional rounds of groundwater sampling, as called for in the CMS Work Plan, were performed on the three site monitoring wells 655-01, 655-02 and 655-03. The arsenic results for the two additional rounds are summarized on Table 1. All additional sampling results were below the arsenic MCL of 50 $\mu\text{g/L}$. Five out of the six additional samples were also below the shallow groundwater background arsenic concentration of 21.5 $\mu\text{g/L}$. Only one sample, 655-G-W003-U6, was slightly above the background concentration at 23.5 $\mu\text{g/L}$. This sample represents an unfiltered sample of water from the monitoring well.

This same sample was also filtered and then analyzed for arsenic. After filtering, the arsenic concentration was reduced to 14.2 $\mu\text{g/L}$, which is well below the background reference concentration. This suggests that some of the arsenic concentration that is being reported in the sampling results is due to the presence of suspended solids in the sample, and is not an accurate reflection of the actual groundwater concentration. Both of these data points were qualified by noting that arsenic was also present in the method blank as well as the sample.

Recommendation

The UST Assessment Report does not indicate any residual soil risk from the confirmation sampling that was performed at the three site monitoring wells. The two additional rounds of groundwater monitoring, per CMS Work Plan requirements, do not show arsenic contamination above the MCL value. Given these facts, we believe that this site should be designated as a NFA site and be removed from the CMS altogether. If there are remaining regulatory issues associated with the Navy DET tank removal performed at the site, these should be handled by the appropriate UST/PST program.



LEGEND

- GR - GRASS
- PA - PAVEMENT
- ⊗ - MONITORING WELL
- ▨ - APPROX. EXCAVATED AREA FORMER UST



ZONE H
 CMS TECH MEMO
 CHARLESTON NAVAL COMPLEX
 CHARLESTON, S.C.

FIGURE 1
 AOC 655
 SITE MAP

Table 1
Groundwater Data for Arsenic at AOC 655

Sample Number	Date	Arsenic ($\mu\text{g/l}$)
MCL		50
Background		21.5
655-G-W001-01	10/28/94	9.4 U
655-G-W001-02	04/03/95	6.8 U
655-G-W001-03	09/21/95	6.8 J
655-G-W001-04	03/26/96	3.3 J
655-G-W001-05	06/01/98	2.9 UJ
655-G-W001-06	11/11/98	6.1 J
655-G-W002-01	10/27/94	22.9
655-G-W002-02	04/03/95	9.6 U
655-G-W002-03	09/20/95	15.9
655-G-W002-04	03/25/96	12.6
655-G-W002-05	06/01/98	9.2 J
655-G-W002-06	11/11/98	10.6
655-G-W003-01	10/27/94	42.3
655-G-W003-02	04/03/95	27.9
655-G-W003-03	09/20/95	38.3
655-G-W003-04	03/26/96	32.7
655-G-W003-05	06/01/98	10 J
655-G-W003-U6	01/12/99	23.5 J
655-G-W003-F6	01/12/99	14.2 J

Notes:

- U - The material was analyzed but not detected at the listed numerical quantitation limit.
- J - The associated numerical value is an estimated quantity.
- UJ - The material was analyzed for but not detected at the estimated numerical quantitation limit.

TECHNICAL MEMORANDUM

To: Environmental Cleanup Project Team
Charleston Naval Complex
Charleston, South Carolina

From: Don Schroeder, P.E.
EnSafe, Nashville

Date: 31 March 1999

Re: AOC 656 Removal from the Zone H CMS

Objective

The purpose of this technical memorandum (tech memo) is to present the justification for removal of AOC 656 from the Zone H CMS. SCDHEC has agreed that Zone H Minor Site 656, along with AOCs 655 and 666 and SWMU 136/AOC 663 are eligible for removal from the CMS process.

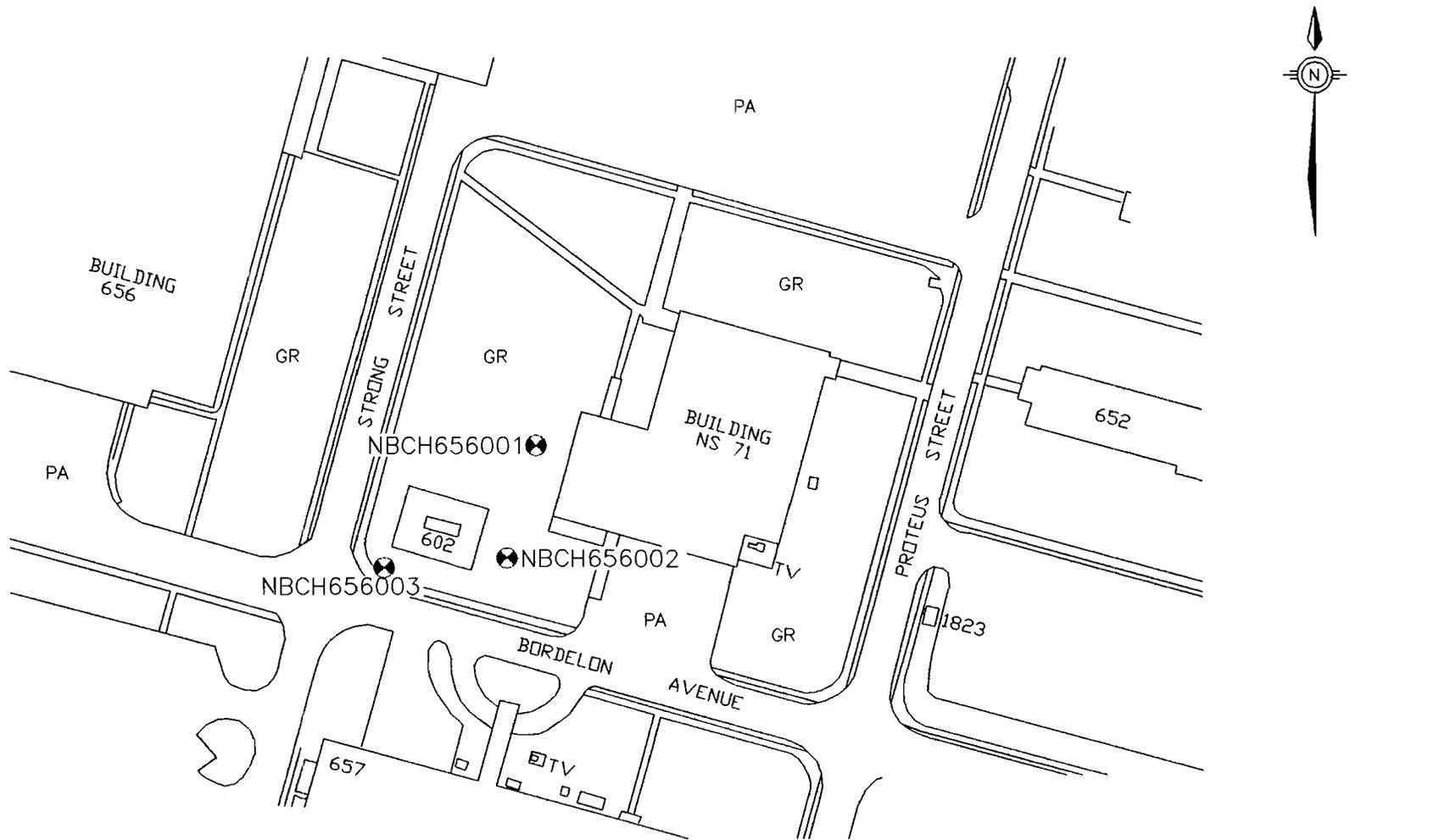
Site Description

AOC 656 is the site of a 1974 fuel oil release between Building NS 71 and AST 602. The Site Map for AOC 656 is presented on Figure 1. The release resulted from a ruptured underground line that connected the 8,000-gallon AST to a boiler located inside Building NS 71. Of the 285 gallons of fuel oil released during the incident, 275 gallons are reported to have been recovered.

The majority of the site area is covered with grass. At some point in time, AST 602 was removed from the site, and all that remains are the concrete support saddles inside an earthen berm area of secondary containment. No Navy DET ISMs were completed at the site and there is no written record available concerning any of the activities associated with the removal of AST 602.

Site Background

AOC 656 was included in the RFI at the request of the USEPA and SCDHEC. This AOC is not considered a hazardous material or waste treatment, storage or disposal area. The virgin petroleum products that were stored at this AOC are not classified as a hazardous material or waste and are typically regulated as a petroleum or special waste/material.



- LEGEND
- GR - GRASS
 - PA - PAVEMENT
 - ⊗ - MONITORING WELL



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 CHARLESTON, S.C.

FIGURE 1
 AOC 656
 SITE MAP

Table 1
Groundwater Data for Teqs at AOC 656

Sample Number	Date	TEQS-Dioxin (pg/L)
MCL		30
656-G-W001-01	10/27/94	NS
656-H-W001-01	10/27/94	1.747
656-G-W001-02	04/03/95	NS
656-H-W001-02	04/03/95	NS
656-G-W001-03	09/13/95	0.041
656-G-W001-04	03/19/96	0.114
656-G-W001-05	06/02/98	0
656-G-W001-06	11/12/98	0

Note:

NS - Not sampled.

TECHNICAL MEMORANDUM

To: Environmental Cleanup Project Team
Charleston Naval Complex
Charleston, South Carolina

From: Don Schroeder, P.E.
EnSafe, Nashville

Date: 31 March 1999

Re: AOC 666 Removal from the Zone H CMS

Objective

The purpose of this technical memorandum (tech memo) is to present the justification for removal of AOC 666 from the Zone H CMS. SCDHEC has agreed that Zone H Minor Site AOC 666, along with AOCs 655 and 656 and SWMU 136/AOC 663 are eligible for removal from the CMS process.

Site Description

AOC 666 is a former underground storage tank (UST), which supplied fuel oil to the adjacent heating plant (Building NS 44) when the base was in operation. The Site Map for AOC 666 is presented on Figure 1. The former fuel oil tank, NS 45, was 25,000 gallons in volume. Another UST was present next to NS 45 that received waste oil from an oil/water separator. This tank, NS 44A, was 550 gallons in volume.

The majority of the site area under consideration is covered with grass. Before the site was constructed in 1958, the surrounding area was an airstrip. There were no Navy DET ISMs completed at the site, but both USTs and associated fuel lines have been removed. The oil/water separator is still present as shown on Figure 1.

Site Background

AOC 666 was included in the RFI at the request of the USEPA and SCDHEC. This AOC is not considered a hazardous material or waste treatment, storage or disposal area. The virgin petroleum products that were stored at this AOC are not classified as a hazardous material or waste and are typically regulated as a petroleum or special waste/material.

The Project Team requested that AOC 666 be placed in the CMS process due to arsenic in the surface soil. The surface soil sampling data for arsenic is summarized in Table 1. The original soil samples were from locations 666SB001 through 666SB007. Since many of the original soil sample locations were disturbed due to Navy DET UST removal activities, additional sampling is needed to assess whether arsenic in surface soil remains a concern at this site.

Based on the concern of the Project Team about arsenic in the surface soil, the CMS work plan called for the completion of additional borings at the site to assess whether surface soil significantly exceeds background risk and hazard. This additional sampling would confirm or refute the presence of arsenic and would determine if any remedial action is required. In addition, the results of the Navy DET UST removal activities were also to be considered during the CMS process.

Navy DET Activities

The Navy DET removed the 550 gallon fuel oil UST and associated piping from the site in August of 1996. The activities that were performed during tank removal are summarized in the Underground Storage Tank Assessment Report for UST NS 44A that is dated November 26, 1996. Two soil samples were taken from the bottom of the UST excavation. The samples were analyzed for 4 Volatile Organics (BTEX) and 16 Extractable Organics (PAH). Both samples were less than the residential RBC parameters, with a Target Hazard Quotient of 0.1, for all of the BTEX and PAH constituents that were analyzed. The tank and piping were removed from the site and disposed of properly. After the completion of tank removal activities, all excavated soil was returned to the tank pit.

The 25,000 gallon fuel oil UST and all associated piping were excavated and removed from the site in October of 1996. The activities that were performed during tank removal are summarized in the Underground Storage Tank Assessment Report for UST NS 45 dated January 31, 1997. Four soil samples were taken from the bottom of the UST excavation. The samples were analyzed for 4 Volatile Organics (BTEX) and 16 Extractable Organics (PAH). All four samples were less than the residential RBC parameters, with a Target Hazard Quotient of 0.1, for all BTEX and PAH constituents that were analyzed. The tank and piping were removed from the site and disposed of properly. After completion of tank removal activities, all excavated soil was returned to the tank pit.

CMS Soil Sampling

The additional soil sampling called for in the CMS Work Plan has been performed. Additional surface soil samples were taken at seven locations and subsurface samples were also taken at five of the seven locations. The sample locations are numbered 666SB008 through 666SB014 as shown on Figure 1. The additional soil sampling results are presented in Table 1. Sampling results from

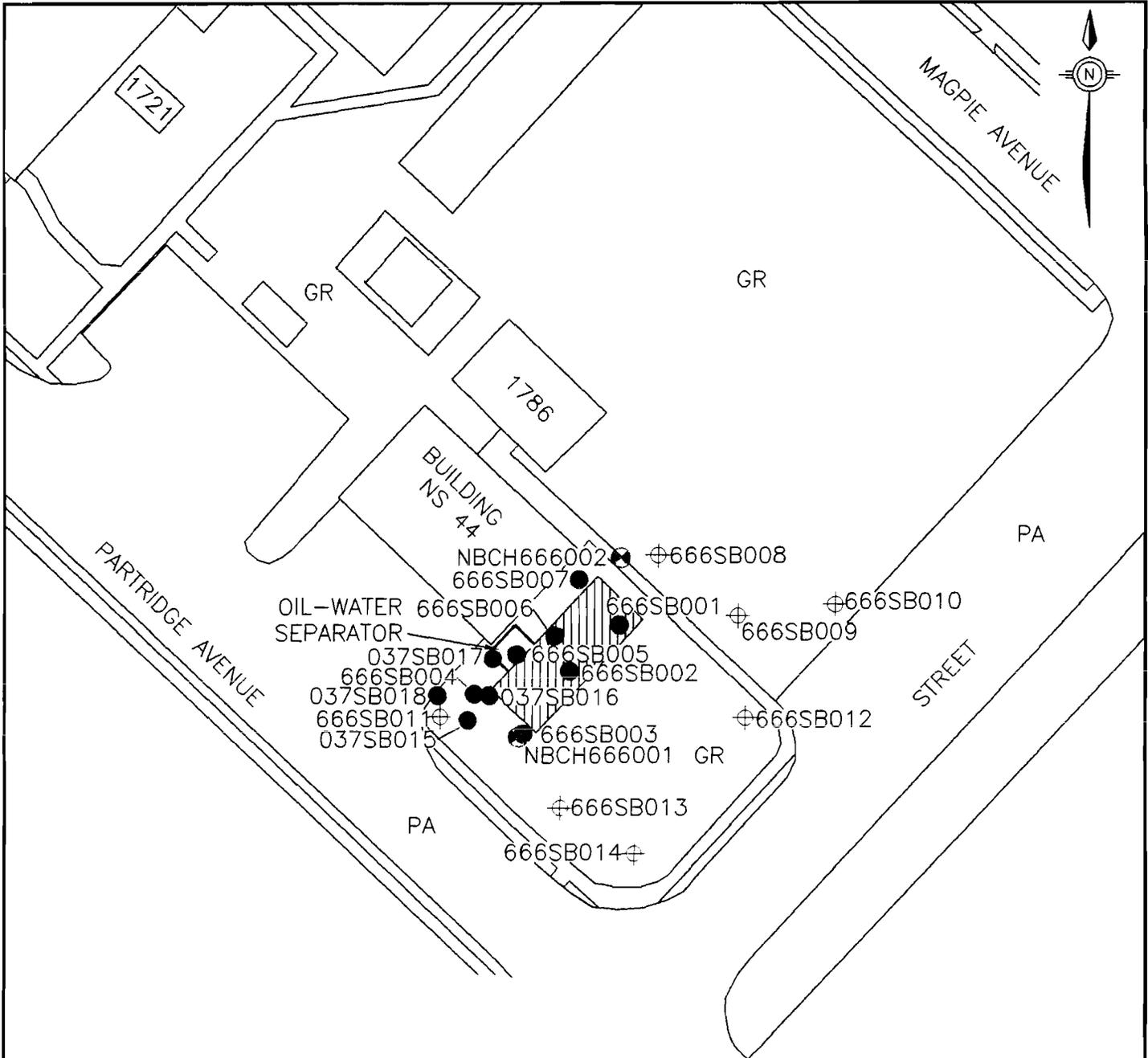
all 12 of the samples that were taken were below their respective background arsenic reference values.

Other Soil Sampling

Additional soil sampling was performed in 1977 as part of the SWMU 37 (Sanitary Sewer System) investigations. Some of this sampling was performed near SWMU 666 after the UST removal activities were completed. The sample locations are numbered 037SB015 through 037SB018 as shown on Figure 1. A surface and a subsurface sample were taken at each of the four locations. Table 2 presents the arsenic results for the eight soil samples that were taken. It should be noted that the four additional sample locations form a ring around the single risk driver hot spot for arsenic at location 666SB004. Sampling results from all eight of the samples that were taken around the former hot spot were below their respective background arsenic reference values.

Recommendation

The UST Assessment Reports do not indicate any residual soil risk from the confirmation sampling that was performed as part of the Navy DET tank removal activities. The additional CMS sampling conducted at the site, per the CMS Work Plan requirements, documents that the arsenic concentration of the remaining site soils does not exceed the background concentration. This finding was supported by the results of the eight soil samples that were taken for SWMU 37 in the area of AOC 666. This additional sampling documents that arsenic in the surface soil is not a concern for this site. Given these facts, we believe that this site should be designated as a NFA site and be removed from the CMS process. If there are remaining regulatory issues associated with the Navy DET tank removal performed at the site, these should be handled by the appropriate UST/PST program.



LEGEND

- - RFI SOIL SAMPLE
- ⊕ - CMS SOIL SAMPLE
- ⊗ - MONITORING WELL
- PA - PAVEMENT
- GR - GRASS
- ▨ - APPROXIMATE EXCAVATION AREA FORMER UST



ZONE H
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 CHARLESTON NAVAL COMPLEX
 CHARLESTON, S.C.

FIGURE 1
 AOC 666
 SITE MAP

Table 1
Soil Data for Arsenic at AOC 666

Sample Number	Arsenic (mg/kg)
Background Reference:	
Surface - 01 Suffix	15.6
Subsurface - 02 Suffix	22.5
666-S-B001-01	6 J
666-S-B001-02	4.7 J
666-S-B002-01	16.5 J
666-S-B002-02	1.6 J
666-S-B003-01	1 UJ
666-S-B003-02	1.3 UJ
666-S-B004-01	30.5 J
666-S-B004-02	4.5 J
666-S-B005-01	3.1 J
666-S-B005-02	4.7 U
666-S-B006-01	0.58 U
666-S-B007-01	5.6 U
666-S-B007-02	6.5 U
666-S-B008-01	3.2 J
666-S-B008-02	3.5
666-S-B009-01	3.2
666-S-B010-01	1.6 UJ
666-S-B010-02	5
666-S-B011-01	2.6 J
666-S-B012-01	2.1 UJ
666-S-B012-02	5.8
666-S-B013-01	1.4 J
666-S-B013-02	2.6 J
666-S-B014-01	2.7 J
666-S-B014-02	2.3 J

Notes:

- U - The material was analyzed but not detected at the listed numerical quantitation limit.
 - J - The associated numerical value is an estimated quantity.
 - UJ - The material was analyzed for but not detected. The sample quantitation limit is estimated.
- Boxed value indicates sample concentration exceeded background reference value.

Table 2
Soil Data for Arsenic at SWMU 37

Sample Number	Arsenic (mg/kg)
Background Reference:	
Surface - H1 Suffix	15.6
Subsurface - H2 Suffix	22.5
037-S-B015-H1	5
037-S-B015-H2	4.3
037-S-B016-H1	3.6
037-S-B016-H2	2.2
037-S-B017-H1	3.6
037-S-B017-H2	4.4
037-S-B018-H1	4.6
037-S-B018-H2	2.8



CSO FILE COPY

2600 Bull Street
Columbia, SC 29201-1708

April 12, 1999

COMMISSIONER.
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Henry N. Shepard
Department of the Navy Southern Division
Caretakers Site Office (CSO)
2155 Eagle Drive
North Charleston, SC 29419-9010

Re: Charleston Naval Annex (Remount Road)
SWMU 166 Treatability Study
Underground Injection Control Application dated February 9, 1999
Charleston County

Dear Mr. Shepard:

The Underground Injection Control (UIC) Program of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the referenced UIC permit to construct application. The application is incomplete and can not be approved as submitted: before further review of the application, the following items should be addressed.

The application for a permit to construct is for two (2) groundwater reinjection wells. The application shows two (2) additional Air Sparging wells. Air sparging wells are defined as injection wells by SC Underground Injection Control Regulations. These wells must receive a Permit to Construct and Operate from the UIC program prior to their installation and operation. Please revise the application to include the proposed air sparging wells and all attachments.

Attachment A:

The above ground waste water treatment unit proposed to be used to add chemical amendments to the recovered groundwater should be permitted by the Bureau of Water's Industrial Wastewater Division. Please submit a copy of the Permit to Construct.

The South Carolina UIC Regulations allow for corrective action wells used to inject groundwater associated with aquifer remediation, however, the regulations do not allow the injection of waste water. The proposal to extract and reinject contaminated groundwater without treating the contamination may be considered waste disposal. Injection wells used for waste disposal are prohibited by SC UIC Regulations. Even with treatment, the contaminant concentration in the injectate must be less than the contaminant concentration in the aquifer at the point of injection (UIC well).

Attachment B:

The proposed well construction diagram (Figure 5.2) is not approvable as submitted. The SC UIC Regulations require all injection wells to be constructed to comply with the SC Well Standards and Regulations R61.71. All water wells shall be grouted from a minimum of 20 feet below land surface. All monitor well shall be grouted from a distance of 2.5 times the largest borehole diameter above the screen to the surface.

Attachment C:

The concentration of carbon (sucrose) and ammonium phosphate to be added to the injectate must be submitted. Please submit the concentration in milligrams per liter.

Attachment H:

An isoconcentration map for each major contaminant should be submitted. This map should contain the name and location of each monitoring well. A table listing each monitoring well and concentration of contaminants should be attached .

A worst case well analysis from the monitoring well with the highest concentrations of contaminants should be submitted. The groundwater from the worst case well should be analyzed for EPA method 8260 and 8270 or equivalent.

If you have any questions, please feel free to call me at (803) 898-3798.

Sincerely,



Robert J Devlin, Hydrogeologist
Ground Water Management Section
Water Monitoring, Assessment & Protection Division
Bureau of Water

cc: Paul Bergstrand, BL&WM



2600 Bull Street
Columbia, SC 29201-1708

CERTIFIED MAIL

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Douglas E. Bryant

May 7, 1999

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Naval Facilities Engineering Command, Southern Division
Post Office Box 190010

Roger Leaks, Jr.
Secretary

North Charleston, South Carolina 29419-9019

Mark B. Kent

RE: Draft Zone K RCRA Facility Investigation Report (SWMU's 166 and 185)
December 1998

Cyndi C. Mosteller

Charleston Naval Complex

Brian K. Smith

Charleston County

Rodney L. Grandy

SC0 170 022 560

Dear Mr. Shepard:

The Department has reviewed the report according to applicable State and Federal regulations and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. Based on this review, the Department generated comments that have been included by attachment (April 29, 1999 Memorandum: Stamps to Mehta).

Should you have any questions concerning these comments, please contact Mr. Jerry Stamps at (803) 896-4285.

Sincerely,


Melissa J. King, DoD Site Coordinator
BLWM

attachment: April 29, 1999 Memorandum: Stamps to Mehta

cc: Mr. Paul Bergstrand, Project Hydrogeologist
Mr. Jerry Stamps, Corrective Action Engineer
Mr. Rick Richter, Trident EQC District
Mr. Dann Spariosu, EPA Region IV
Mr. David Dodds, SOUTHDIV
Mr. Todd Haverkost, EnSafe Environmental



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

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

FROM: Jerry Stamps, Engineer Associate
Corrective Action Engineering Section
Division of Hazardous and Infectious Waste
Bureau of Land and Waste Management

DATE: April 29, 1999

RE: Draft Zone K RCRA Facility Investigation Report (SWMUs 166 and 185)(12/98)
Charleston Naval Complex
Charleston County
South Carolina
SC0 170 022 560

Attached are the comments generated from the review of the above referenced document. Please feel free to add or eliminate comments as appropriate.

SWMU 185

1. Page 10.5.1, Paragraphs 3 and 4
The references to the sewer system as SWMU 166 should be changed to SWMU 185.
2. Page 10.5.1, Paragraph 3
Please describe what is meant by "invasive activities".
3. Page 10.5.7, Paragraph 4
Site-specific SSLs should be developed for dioxins to ensure that the potential for the leachability of the dioxins present in the subsurface soils to the groundwater does not exist.

4. Page 10.5.11, Paragraph 2
The Department suggests presenting data for filtered and non-filtered samples to determine if high metals concentrations in groundwater are simply due to turbid samples. Inadequate well development alone is not an acceptable justification for high metals concentrations in groundwater.
5. Table 10.5.3; Page 10.5.8, Paragraph 1
Elimination of Iron (Fe) as a COPC based on the fact that it is an essential nutrient is not acceptable. Iron is not included in the list of essential nutrients in the Human Health Risk Assessment Bulletins located on the EPA Region 4 website at:

(<http://www.epa.gov/region04/wastepgs/oftecser/otsguid.htm>)

Any references throughout the RFI Report to constituents as essential nutrients which are not included on this list must be revised accordingly.
6. Tables 10.5.7 and 10.5.8
Please incorporate MCLs for comparison purposes.
7. Table 10.5.9
It would be beneficial to have the background data for inorganics included in Table 10.5.9 along with the MCLs for constituents present in groundwater.
8. General Figures
Please incorporate groundwater flow direction in all figures describing groundwater conditions. Additionally, account for possible seasonal fluctuations in groundwater flow in these figures. Furthermore, please provide any data supporting the determination of groundwater flow directions.

SWMU 166

9. Table 10.10.3
Vinyl chloride appears to be present on-site at significant concentrations according to the on-site groundwater screening analytical results included in Table 10.10.2. However, Table 10.10.3 does not show any vinyl chloride analytical results from the off-site groundwater screening event. Please describe if this because there were not any detectable quantities of vinyl chloride off-site or if the analysis of this constituent was omitted from the screening event altogether.
10. General
Please state if there is any indication as to the source of contamination east of I-26.
11. Table 10.10.2 and 10.10.7
The groundwater screening events which took place over several phases has revealed extensive vinyl chloride contamination at a maximum concentration of 4435 ug/L (MCL =

2 ug/L). However, the groundwater samples obtained from installed monitoring wells have revealed very little vinyl chloride contamination (non-detectable concentrations in most cases). Please provide reasoning for such diminishing concentrations in vinyl chloride.

12. Page 10.10.53, Second Paragraph

It appears as though the assumptions used in modeling the discharge of contaminated groundwater throughout the sewer system and into the surface water are not completely valid. The empirical data does not closely match the results predicted by the model. As such, perhaps a monitoring system should be implemented to monitor the discharge to ensure that hazardous constituents are not released to the surface water (Turkey Creek).

13. Page 10.10.54, Second Paragraph

Sediment sampling should accompany the surface water sampling in an effort to fully determine the impact of the discharge to Turkey Creek.

14. Page 10.10.55, First Paragraph

Please include the depth below grade at which the sewer line is located.

15. Page 10.10.55, First Paragraph

Further evidence is warranted to determine if a mixing zone is created beneath the sewer line. It is entirely possible that a significant amount of groundwater from both plumes is commingling beneath the sewer line rather than entering the sewer line itself.

16. Page 10.10.55, First Paragraph

The Department does not agree with the statement that an end receptor does not exist for the migratory path to surface water. It is entirely possible that children may play within the creek, thus, validating this exposure route. As such, please incorporate the exposure to surface water contamination into the risk assessment or discuss what measures have been taken to eliminate access to Turkey Creek.

17. Table 10.10.12

Please include results of subsurface soils analysis in Table 10.10.12.

18. Page 10.10.58, Second Paragraph

The elimination of acetone and bromodichloromethane as COPCs is not appropriate at this time considering that the detections were significantly above Tap Water RBCs. The Department recognizes that these constituents have been detected infrequently; however, this reasoning alone does not justify the exclusion of these constituents from the formal Human Health Risk Assessment (HHRA). Additionally, the use of inadequately purged wells is not justification for the elimination of COPCs from further assessment. Historical data must be reviewed to determine if these are site related contaminants and, therefore, support the inclusion or exclusion of acetone and bromodichloromethane from the HHRA.

19. **Table 10.10.13**
Please include MCLs for comparison purposes.
20. **Table 10.10.5**
Please identify if the SSLs included in Table 10.10.5 are site-specific or generic. If they are site-specific, indicate what DAFs were used in deriving such SSLs.
21. **Table 10.10.5**
The elimination of 1,1,2,2-Tetrachloroethane as a COC in terms of the groundwater migration pathway is not appropriate at this time. The Department recognizes that this constituent has been detected infrequently in the subsurface soils above SSLs; however, this reasoning alone does not justify the exclusion of this constituent as a COC. Historical data must be reviewed to determine if this is a site related contaminant and, therefore, support the inclusion or exclusion of 1,1,2,2-Tetrachloroethane as a COC.
22. **Tables 10.10.15 and 10.10.16**
Please include sample calculations for Exposure Point Concentrations.
23. **Page 10.10.73, First Full Paragraph, Second Sentence**
The acronym "TCE" should be changed to "PCE".
24. **Section 10.10.6.5 Risk Characterization**
Please discuss any COCs identified, if any, in the surface water and sediment of Turkey Creek.
25. **Table 10.10.33**
Additional soil removal should be identified as a potential corrective measure should the confirmatory sampling results following the initial phase of soil removal reveal concentrations of TCE above the determined remedial goals.
26. **Figure 10.11.1**
This figure was left blank. Therefore, the reviewer was not able to determine the background sampling locations utilized for the purposes of this RFI. Please incorporate a revised figure.
27. **Table 10.11.2**
It appears as though generic SSLs with a DAF of 1 were used for comparison of background data with the exception of butylbenzylphthalate which used a DAF of 20. The butylbenzylphthalate appears to be an anomaly; therefore, please correct for the sake of consistency.
28. **Table 10.11.2**
Please describe how the SSLs were derived, including what DAF was used and justification for the use of the selected DAF.

29. **Table 10.11.3**
Please identify the source of the RBC for TCDD TEQ.

30. **Page 10.11.8**
The presence of SVOCs, PCBs, TPH, and pesticides in background soil samples may indicate the need for additional background soil sampling farther away from areas of potential soil contamination. The requirement for additional background sampling will be determined upon submittal of a revised Figure 10.11.1 (background sample locations). Additionally, the list of COPCs for soils may be revised based upon the validity of the background soil sampling locations.

31. **General**
The revised Section 2.0 (Zone K Physical Setting) dated December 7, 1998 will be reviewed upon submittal of the final RFI Report.



2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
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Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

May 7, 1999

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

Re: Response to Comments/Page Changes, dated 12/23/1998, and
Page Changes dated 2/16/1999 to the
Draft Corrective Measures Study Work Plan dated June 23, 1998
Zone C
Charleston Naval Complex
SC0 170 022 560

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced responses and page changes for the draft Corrective Measures Study Work Plan for Zone C according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit effective September 17, 1998. The US EPA has not provided written comments at this time.

Based on this review, the Department believes that the Charleston Naval Complex still has to adequately answer several comments that were submitted on October 22, 1998. The final Zone C CMS work plan should be an approvable document that includes additional responses, changes made, and the location of the changes.

Upon receipt of this letter and within thirty (30) days please make the specified changes and resubmit the above referenced document to the Department and U.S. EPA for review. The revisions can be submitted as page changes or as a new document.

Further, the Department is available to clarify any of the attached comments before the final document is submitted.

King to Shepard

5/7/99

Page 2

Should you have any questions regarding this issue, please contact me at (803) 896-4218 or Paul Bergstrand at (803) 896-4016.

Sincerely,



Melissa J. King, DOD Site Coordinator
Corrective Action Engineering Section
Bureau of Land & Waste Management

Attachments

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, NAVFACENGCOM
Dann Spariosu, EPA Region IV
Larry Bowers, ENSAFE

**SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL
CONTROL (SCDHEC) REPLY TO RESPONSES DATED 12/23/98
DRAFT ZONE C CORRECTIVE MEASURES STUDY (CMS) WORK PLAN
Dated June 23, 1998.**

Johnny Tapia

General Comment 4:

During the review of the work plan it was observed that the information presented as part of the Nature and Extent of contamination summary, is written in a context that tries to justify the presence of every contaminant, by using averages, speculating in the contaminant distribution, and reaching conclusions on the unit by looking at irrelevant information. This section, in some cases, fails to include detections that exceed standards which in the first place are the basis for a Corrective Measures Study. The Risk Assessment Summary section should also include all relevant information. Comparison with other zones background values or twice these values serves no purpose but confuses the issue. These sections of the work plans should present a summary of the contaminants found, their extent and risk associated. The Work Plan should be a reflection of the RFI report in every sense, plus additional data collected since the report was produced.

Navy Response 4:

Please clarify. The Navy questions which detections that exceed standards were not included. It is the Navy's understanding that for soils, cleanup goals (or standards) are risk levels for industrial and residential reuse scenarios (i.e., 1E-06). For groundwater, the goal or standard is MCLs, or risk-based standards for constituents without MCLs. The Navy has attempted to use these values for determination of remedial action.

Reply 4:

As an example, Nickel on SWMU 44 exceeded MCL. Well 11 on SWMU 47 exceeded the MCL value for As. The comment was related with nature and extent identification not with risk or cleanup levels.

SPECIFIC COMMENTS:

SWMU 44

Comment 10:

Section 5.5.1, page 5-7:

This section does not include a discussion on contaminated sediments found on Noisette Creek. This should be included in the work plan. Sediments must be addressed as part of the CMS.

Navy Response 10:

Sediments in Noisette Creek are scheduled to be addressed during the Zone J RFI/CMS. The need for corrective action at the Noisette Creek and SWMU 44 interface will be best determined by project team consensus after completion of the Zone J RFI. Results of Zone J RFI sediment sampling will be evaluated during the Zone C CMS for potential impacts from Zone C to Noisette Creek. Remedial alternatives for Noisette Creek sediment will be identified, screened and evaluated if it is determined that former coal storage operations at SWMU 44 have adversely impacted the creek.

Reply 10:

Section 5.5.2 compares sediment detections to SSL for the protection of groundwater. This is not a doable comparison. SSV from Region IV should be used.

Comment 14:

Section 5.8, Pages 5-13 to 5-18:

The Department agrees with the approach of collecting more soil samples to determine current exposure to Infaunal Invertebrates, Terrestrial Wildlife and Vegetation, due to the implementation of the interim removal action at the site. However, the current risk to aquatic receptors has not changed. The previously identified contamination in sediments remain. Further sampling to determine risk to aquatic receptors should be also proposed. Additionally, the risk numbers presented in this section need clarification.

Navy Response 14:

The Navy does not agree that the current risk to aquatic receptors has not changed. Based on the removal, potential for impact from sediments has changed. The risk numbers for pre-interim measure sampling results that have been presented in CMS work plan are from the approved RFI Report. Data for post-interim measure samples were determined based on pre-interim measure risk calculation methods excluding the background contribution. The request for further sampling was addressed in the last sentence of the text in Section 5.8 and the first bullet under Surface Water and Sediment in Section 5.11 indicating the need for sampling sediments to address environmental impacts.

Reply 14:

Contaminants that migrated to Noisette creek before and during the IM remain in place (at the creek), therefore current risk still remains. It is possible that the potential (future) risk has changed (reduced) since the source of contaminants have been removed. The Navy missed the point of this comment.

SWMU 47/AOC 516

Comment 18:

Section 6.5.1, Page 6-5:

The Department does not agree with the statement made that BEQs levels found at SWMU 47/AOC 516 are indicative of naturally occurring levels. According to the locations of these samples, they could be influenced by asphalt applications, however this fact is not natural nor is the fact that these units were used for incineration operations in the past. Therefore BEQ levels may very well be the result of Navy activities. This statement should be changed.

- It is not appropriate for comparative purposes, to use mean concentrations or to eliminate the highest concentrations that ultimately would be used to conclude that an area is clean. All these is speculation and should be avoided in the work plan, it does not serve any purpose.

- The second paragraph in this same page is in the least speculative. Only facts should be reported. TPH hits referred as “hot spots” are located within the area of SWMU 47. The distance between them can not be used to justify that there are not present in a wider area or “discontinuous spatial distribution” as referred to in the work plan. Again, averages mean nothing at all when we have detection exceeding accepted levels. Please rewrite this paragraph to report only the facts without speculation. See general comment # 4.

- The same section on page 6-6, first paragraph, should be corrected. The lead detection was on soil boring 047-SB-007 instead of 047-SB-001 and should be clarified that surface and subsurface soil exceeded 400 ppm. If this area, as reported, has the potential to be used as a residential area, there is the possibility that a localized and direct action is needed in this area for this concern.

Navy Response 18:

First paragraph: The text has been modified to include the potential for asphalt applications as the source of BEQ detections and distinguish these potential impacts from naturally occurring or background contributions. In addition, please see the first paragraph of the response to Mr. Paul Bergstrand’s Comment 22.

Reply 18:

The intention of the comment by SCDHEC was not to provide justification (asphalt) for the presence of BEQs. The Navy seems that misinterpreted the comment as the justification to be included in the work plan, without really acknowledging the concern that past site activities at SWMU 47 may have been the cause of the presence of BEQs and other organics.

Comment 21:

Section 6.7.2, “Groundwater Risk”, Page 6-12:

- The phrase “... the unlikely potential that the residential reuse scenario at zone C would occur,..” contradicts previous statements where it is admitted that the Redevelopment Authority has planned Zone C to be reused as a residential area. Please rectify this.

- The second paragraph on this section is very confusing. Although the information contained here is technically true, it fails to mention information that is important for a complete

understanding of environmental problems. It should be clarified that arsenic, although decreasing in concentration during the last three quarters of sampling, they still are above the MCL value. In addition, it is not understood how could be statistically defended that MCL for arsenic is not exceeded in the groundwater at the unit, nor how can it be stated that this contamination is attenuating naturally if there is no proof of it, and then concluding that it does not need to be addressed. Please revise this paragraph thoroughly. This problem does need consideration.

Navy Response 21:

First paragraph: The references to non-residential reuse have been removed from the text.

Second paragraph: Please see the second paragraph of the response to Mr. Paul Bergstrand's Comment 8.

Reply 21:

This response does not answer the basic question or concerns:

- Arsenic is present at levels exceeding MCLs.
- How statistics is going to show that is not really exceeding MCLs.
- On what basis is stated that there is naturally attenuating? and isn't this a potential remedial measure?, which could be only used if there is contamination present.

AOC 512

Comment 29:

Section 8.9, "Remedial Objectives":

This section needs to be modified. Remedial objectives for AOC 512 soil, need to be re-evaluated based on BEQs and beryllium detections. Please revise.

Navy Response 29:

The project team has agreed that soil cleanup objectives will be based on risk (or hazard if applicable). The calculated risk and hazard above background did not produce risk greater than 1E-06 or a hazard index greater than 1, therefore remedial objectives for surface soil are not warranted at AOC 512. In addition, and as previously stated, beryllium is well below its RBC of 160 mg/kg.

Reply 29:

Add statement before section that answers AOC 512 comments to acknowledge the December 1998 NFA decision. Answers to comments can be left as is.

AOC 518

Comment 31:

Section 9.5, "Contaminant Nature and Extent Summary":

- Again this section makes comparisons that serve no purpose. Beryllium is compared to a “base-wide reference concentration”. There is no such value that has been approved or discussed with the Department. Also lead is compared to “twice the reference concentration”. This is not acceptable. Please revise.

- This section fails to mention important information such as: there are 4 additional surface soil samples which SQL exceeded the RBC.

- The Department does not agree with the conclusion reached that the site was not impacted by previous activities. The detection of inorganics proves it. In addition, about 50% of the samples taken failed to sample the subsurface soil, which could also be considered a data gap and therefore any conclusion reached would be premature. The work plan and this section should acknowledge this facts. Please revise.

Navy Response 31:

First paragraph: Please refer to the second half of the response to General Comment 4. Beryllium concentrations did not exceed the RBC of 160 mg/kg and risk calculations were only above the residential 1E-06 risk threshold at one point due to chlordane.

Second paragraph: Please clarify. The Navy does not understand the purpose of this comment in the context of the CMS Work Plan.

Third paragraph: The conclusion is from the RFI Report indicating that the only soil COC is chlordane. Lead has been deleted from Section 9.9. The Navy disagrees that only 50% of the samples locations included subsurface samples. This comment appears to contradict the information provided in the RFI Report (Table 10.6.5.3, page 10.6.5.5) showing five of seven subsurface soil samples acquired. Therefore, approximately 70% of available subsurface samples were obtained for subsequent analysis. The conclusion regarding site impact is based on the fact that only one sample point resulted in a residential risk estimate above 1E-06, and as previously stated the risk is being driven by chlordane and not inorganics.

Reply 31:

The comment on the third paragraph made reference to the conclusion reached on the site-related impact and the definition of **contaminant nature and extent**. In total (two rounds) ten samples were collected from the surface soil, but only five from the subsurface soil. Copper and lead did exceed RBCs and UTLs in surface soil. Can we say the same about the subsurface soil with the same degree of certainty??

Comment 32:

Section 9.6.1, Page 9-4:

One of the main concerns at AOC 518 remains. There were no groundwater samples taken and the subsurface soil samples for the constituents with potential for soil-to-groundwater

migration is very limited. The work plan should acknowledge this fact and propose additional sampling to fulfill the RFI investigation, specially for organic compounds. The work plan and the conclusion reached at the end of this section should be revised.

Navy Response 32:

The Navy disagrees. Per the SCDHEC approved RFI Report, no fate and transport issues were identified for subsurface soil. This report includes a thorough discussion of fate and transport processes and issues at AOC 518. In addition, subsurface samples were taken at the five locations where two rounds of surface samples were collected.

Reply 32:

Limited subsurface data and no gw data give a poor F &T evaluation. Duplicates, which are usually taken at 10% of the samples in surface soil, are analyzed for appendix IX parameters. From this limited # of samples conclusions are reached on nature and extent and F & T. If the parameters detected are only analyzed for in these duplicate samples, then the conclusion reached is premature and presents a gap of knowledge.

Comment 33:

Section 9.11, "CMS Data Needs":

This section should be modified in accordance with comment # 32, to fill the mentioned data gaps.

Navy Response 33:

Please see the response to Comment 32.

Reply 33:

If there is a data gap, then CMS data needs are present. Look at response to comment # 32.

AOC 700

Comment 34:

Section 10.5.1, Page 10-1:

This section failed to report detections of inorganics in soil, such as chromium and beryllium in excess of both, RBCs and reference concentrations. Additionally, the fact that groundwater will be addressed as part of SWMU 44 should not preclude this section from presenting the summary of findings at AOC 700. Please revise and include appropriate information.

Navy Response 34:

Based on the approved RFI report, there were no fate and transport issues for soil and groundwater in AOC 700. These results were based on comparison to groundwater data from the nearest down gradient well (NBCC-044-MW-008). A summary of soil detections has been added to the work plan. In addition, beryllium did not exceed its RBC of 160 mg/kg. Furthermore, the project team agreed by consensus on 16 October

1997 that soil at AOC 700 was designated as “no further action” and that groundwater in its proximity would be addressed as part of the SWMU 44 CMS groundwater unit.

Reply 34:

There were two parts to this comment:

1. Detections not reported. Based on the RFI data, Cr exceeded both, RBC and reference concentration. This was noted in the RFI report but not in the CMS WP, and also was not included in the risk assessment calculations. This was an oversight on the review by the Department that needs to be corrected.
2. The reference to GW tries to bring up the concern that because GW at AOC 700 may be addressed in conjunction with SWMU 44 does not mean that the soil impacts are the same. The response mixes this concern with F & T issues.

The use of well 044-gw-008 to determine groundwater contamination a this unit is in question. There is no recollection of the mentioned agreement on October 1997, specially since the RFI data for AOCs 522 and 700 was seen first in the final RFI report dated Nov. 1997. This later fact and any previous agreement is irrelevant if there is contamination present that needs to be addressed.

In summary the final Zone C RFI report had several oversights (nature and extent, F & T and risk assessment) that now are more clear. In addition, AOC 700 was designated for CMS in the letter approving the RFI report. Cr and Ni exceeded SSLs and RC.

Comment 35:

Section 10.6.1, “Contaminant Fate and Transport”:

The department was under the understanding that any groundwater contamination at AOC 700 would be addressed as part of the SWMU 44 groundwater contamination, however, this section in relation to Soil-to Groundwater potential migration still should evaluate potential threats as identified in the RFI report for the AOC 700 area. For example, chromium, cobalt, cooper, dieldrin, all were identified as having potential for soil to groundwater migration, which are not necessarily the same identified for SWMU 44. This information should be included and considered for further evaluation as appropriate.

Navy Response 35:

Please clarify. Based on the RFI comparisons of soil data to groundwater data at the nearest down gradient well to AOC 700, no fate and transport issues were identified.

Reply 35:

GW was not really evaluated. Well used is questionable. See response to comment # 34.

Comment 36:

Section 10.7, Page 10-4:

The last paragraph of this section states that concentrations of contaminants in soil were below

background reference concentrations. This statement is erroneous. Chemicals as chromium exceeded both, reference concentrations and SSLs. This paragraph and its conclusion needs to be revised.

Navy Response 36:

While inorganic detections in soils were identified in the RFI, the risk assessment did not result in a residential hazard greater than one or a residential risk greater than 1E-06. The sentence containing the comparison to reference concentrations has been deleted. In addition, please refer to the last sentence of the response to Specific Comment 34.

Reply 36:

Chromium was not in the risk assessment. See response to comment # 34.

Comment 37:

Section 10.9, "Remedial Objectives":

This section should be revised as appropriate, to account for comments # 34, and 36 related to AOC 700. The remedial objectives should address these concerns.

Navy Response 37:

Please see the response to Specific Comments 34 and 36.

Reply 37:

This comment should be answered in accordance with comments for AOC 700.

Comment 38:

Section 10.10, "Potential Remedial Alternatives":

Potential remedial alternatives for soil should be considered based on previous comments for the findings at AOC 700 soil. Please revise.

Navy Response 38:

Please see the response to Specific Comments 34 and 36.

Reply 38:

This comment should be answered in accordance with comments for AOC 700.

Comment 39:

Section 11, "Zone-wide Groundwater":

- Page 11-1: This section states that a zone-wide monitoring well network (six shallow and two deep) are depicted on Figure 4.1. This is not the case, please revise the figure as appropriate.

- Section 11.1, "Zone-wide COC Detections": It is the first time the Department sees this

proposal on paper, therefore it should be justified appropriately with tables, figures, etc., that show iso-concentration maps for the contaminants that seem to be present zone-wide. Current information on groundwater flow direction is imperative, and proposed points of compliance for specific contaminants is required. Please revise.

- Section 11.3, “ Zone-Wide Groundwater CMS Recommendations”: The sampling strategy proposed in this section should be more comprehensive. It is the Department’s understanding that the uncertainty in groundwater contamination is the driver behind this proposal, therefore wells to be sampled should consider the presence of nearby units, possible contamination (site-specific and zone-wide), etc., as well as potential problems. This section should be expanded to the measure that all parties understand its purpose and the means to obtain it.

Navy Response 39:

First paragraph: The figure reference has been changed to Figures 4.7 and 4.8.

Second paragraph: The sporadic detections do not provide for the development of iso-concentration maps. Representative groundwater flow direction is shown in Figure 4.4. Assessment of proposed points of compliance is not feasible based on the sporadic detections and inability to develop iso-concentration maps of impact to groundwater. Furthermore, it was agreed upon by project team consensus on 16 October 1997 to address groundwater as a single entity at AOCs 510, 512, 513, 517, 518, 520, and 523. With the exception of AOC 518, the project team agreed by consensus to designate the soils at these seven sites as “no further action.” Groundwater at SWMU 44 and SWMU 47/AOC 516 were to be addressed as site-specific entities. Interestingly though, AOC 508/AOC 511 was designated as “no further action” for both soil and groundwater during the same project team meeting. AOC 508/AOC 511 is included in the CMS work plan at the recent request of SCDHEC. Please see the second paragraph of the response to Mr. Paul Bergstrand’s Comment 8 and the response to Paul Bergstrand’s Comment 43.

Reply 39:

Not true. Agreement was based on the presentation and review of Navy’s proposal. Nothing to date. The Department has maintained that NFA is only for the unit as a whole, not by-media.

Third paragraph: Please see the response to Mr. Paul Bergstrand’s Comment 42.

Reply 39:

The response to Mr. Bergstrand’s comment # 42 does nothing to do with this comment.



2600 Bull Street
Columbia, SC 29201-1708

CERTIFIED MAIL

COMMISSIONER:
Douglas E. Bryant

May 7, 1999

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Brian K. Smith

Rodney L. Grandy

Henry Shepard II, P.E.
Caretaker Site Office
Naval Facilities Engineering Command, Southern Division
P.O. Box 190010
North Charleston, SC 29419-9019

Re: Zone I Response to Comments and
Final RCRA Facility Investigation (RFI) Report, Revision 0
Dated March 1, 1999
Charleston Naval Complex
SC0 170 022 560

Dear Mr. Shepard:

Within Zone I are Areas of Concern (AOCs) 671, 672, 673, 675, 676, 677, 678, 679, 680, 681, 685, 687, 688, 689, 690, RTC/177, DMA and solid waste management units (SWMUs) 12 and 16. The Navy has submitted to the Department an RFI report for Zone I that does not address AOCs 678, 679, 680, and 681. Thus the Department's decisions are based on the information contained in the above submitted report.

The Department has reviewed the report according to applicable State and Federal Regulations and the Charleston Naval Complex Hazardous Waste Permit effective September 17, 1998. The report presented recommendations on the next step in the corrective action process for the AOCs and SWMUs. The Department, after this review and according to permit condition II.E.8., believes that the units at Zone I should be classified as follows:

AOC 671	CMS for surface soil and shallow groundwater
AOC 672, 673	CMS for surface soil
AOC 675, 676, 677	Corrective action should be addressed under RCRA Subtitle I authority
AOC 685	CMS for surface soil
AOC 687	RFI for groundwater
AOC 688	NFA
AOC 689, 690	CMS for surface soil
SWMU 12	RFI for groundwater
RTC/177	CMS for surface soil
DMA	NFA

The Navy should refer to Michael Danielsen's comments (April 30, 1999 memorandum Danielsen to Peterson) for more detail as to the Navy's requirements with AOCs 675, 676, 677, 687, and SWMU 12. The Navy should also address the comments prepared by the Department's Risk Assessor (March 29, 1999 memorandum Byrd to Peterson) as well as the comments prepared by Susan Peterson.

As noted above, the Department believes that the corrective action status of AOC 688 and the DMA are "No Further Action" (NFA). The Department's concurrence is based on the information provided by the Navy to date. Any new information contradicting the basis for this concurrence may require further investigation or action. It should be noted that the permit shall be modified pursuant to R.61-79.270.41 to change the status on these units.

The nature of the comments generated do not preclude the Department from giving conditional approval of the RFI report in order to expediate the proposed CMS activities. However, upon receipt of this letter, please make the specified changes and resubmit a Final Zone I RFI Report, Revision 1 to the Department and U.S. EPA for a final review and approval. Revised pages to be inserted into the original document are acceptable. If revised pages are submitted, each page should be coded; for example, 32(R-6/13/99) would be page 32, revised 6/13/99. In addition to the revisions or new document, please provide a summary of the responses.

Should you have any questions regarding this issue, please contact me at (803) 896-4182 or Michael Danielsen at (803) 896-4194.

Sincerely,



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

attachment: memorandum: Byrd to Peterson, March 29, 1999

attachment: memorandum: Danielsen to Peterson, April 30, 1999

attachement: comments prepared by Peterson, May 3, 1999

cc: Michael Danielsen, Hydrogeology
Dann Spariosu, EPA Region IV
David Dodds, SOUTHDIV
Todd Haverkost, EnSafe Environmental
Rick Richter, Trident EQC District
Paul Bristol, DHEC Bureau of Water



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Comments prepared by Susan Peterson, May 3, 1999
Zone I Final RFI Report, Revision 0, dated March 1999

1. Iron as an Ecological and Human Health Chemical of Potential Concern

Sections 7 and 8

The Navy did not assess iron as a COPC (human health or ecological) based on their belief that it is a naturally occurring nutrient.

Please note the following:

Supplemental Guidance to RAGS, Region IV Bulletins lists nutrients that can be excluded from consideration as a COPC in Risk Assessments. Only calcium, chloride, iodine, magnesium, phosphorus, potassium, and sodium are listed as compounds that may be eliminated but must be evaluated if detected at levels that may pose a risk to human health or the environment. Iron is no longer listed as an essential nutrient and should therefore be evaluated throughout the Human Health and Ecological Risk Assessments.

EPA Region IV's Ecological Screening Value for iron in soil is 200 mg/kg and a RBC value has been established at 2.3E 04. Since the iron values detected at CNC are elevated, it would not be appropriate to eliminate iron as a COPC or ECPC from the investigation.

Region IV Ecological Screening Values are derived from the December 22, 1998 Memorandum from Ted Simon of EPA regarding Ecological Risk Assessments at Military Bases.

Please revise sections 7 and 8 to include iron as a COPC.

2. SWMU 12

A review of aerial photographs and analytical results causes the Department to question whether the Fire Fighting Area existed in the area noted as SWMU 12. The Department will continue to investigate this and may require the Navy to conduct an investigation on the area the Department believes may have been the Fire Fighting Area. This concern does not alter the decision that an RFI for groundwater is required for "SWMU 12."

**Zone I RCRA Facility Investigation (RFI) Report for
Charleston Naval Complex (CNC) Sections 1 to 11
Michael W. Danielsen April 30, 1999**

1. **AOC 675/ 676/ 677**

The Navy, in the Response, states that "this area is already being addressed by the tank program." The Department contacted Paul Bristol of the Tank Program who explained he reviewed a closure report for "NS-2A" and "NS-4". The Department agrees that the Tank Program is the most appropriate program to address environmental concerns at AOC 675/676/677. However, the Navy must submit to the Department a request to transfer AOC's 675/676/677 from RCRA Subtitle C to RCRA Subtitle I authority.

Upon reading Mr. Bristol's correspondence with the Navy, the Department realizes there has been a break in communications. No investigative work has been completed since the issuance of the letters in October, 1996 and March 1997. Please contact Paul Bristol at (803) 898-3559 to resume this work.

2. **Page 10.4.1 AOC 678/ 679**

The addendum to the revised RFI Report was not available for review. This information must be provided before the Department can complete the review of this work.

3. **Page 10.5.1 AOC 680**

See comment #2.

4. **Page 10.6.1 AOC 681**

See comment #2.

5. **AOC 687**

Well 687GW002 is a permanent well that has been sampled 6 times from 1995 to 1998. The maximum contaminant level(mcl) for Arsenic is 50ug/L. Arsenic concentrations have exceeded the MCL in 3 rounds of sampling. The levels were: 73.7 ug/L (round2), 131 ug/L (round 5), and 58.3 ug/L (round 6). It is clear that these hits are not random and

indicates that contamination exists.

Contamination can not be delineated from a single monitoring well (arsenic does not exceed its MCL in the other three wells at AOC 687 (687GW001, 003, and 004)). The Navy must delineate the horizontal and vertical extent of arsenic contamination in groundwater. If the Navy believes the detection of arsenic is site related or is the result of a naturally occurring geologic condition, the Department is amenable to reviewing additional information that substantiates that claim.

6. **SWMU 12**

Well 012002 is a permanent well that has been sampled 4 times from 1995 to 1998. The maximum contaminant level (mcl) for Arsenic is 50ug/L. Arsenic concentrations have exceeded the MCL in all 4 rounds of sampling. The levels were: 177 ug/L (round 1), 220ug/L (round 2), 188 ug/L (round 3), and 253 (round 4). It is clear that these hits are not random and indicates that contamination exists.

Contamination can not be delineated from a single monitoring well (arsenic does not exceed MCL's in the other three wells at SWMU 12 (012001, 012003, GD1003 and GD 103D)). The Navy must delineate the horizontal and vertical extent of arsenic contamination in groundwater. If the Navy believes the detection of arsenic is site related or is the result of a naturally occurring geologic condition, the Department is amenable to reviewing additional information that substantiates that claim.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

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

DATE: March 29, 1999

RE: Charleston Naval Shipyard
South Carolina
SC 0170022560

Document:
Zone I RCRA Facility Investigation Report Revision
NavBase Charleston
Volumes I-VI
March 1, 1999

The Department has reviewed the above referenced document completed by Ensafe Inc as well as the attached Response to Comments dated January 1996. The following comments pertain to the Human Health and Ecological Risk Assessments:

- 1.) Section 7, Page 7.10, Line 7 and Page 7.14, Line 17: The text lists iron as one of the essential nutrients that will be eliminated from the human health risk assessment. EPA Region IV Human Health Risk Assessment Bulletin Number 2 (Data Collection and Evaluation) lists essential nutrients that may be eliminated. Iron is not listed as an essential nutrient that may be eliminated; therefore, its risk due to environmental exposure should be evaluated where necessary.
- 2.) Section 10.3.6, Tables 10.3.10 and 10.3.11: The tables list the organic and inorganic results for sediment samples collected at AOCs 675/676/677. Since no background sediment samples were collected at this site, screening values such as sediment screening values or RBCs should be listed in the table for comparison to the levels detected.

3.) Section 10.7.6.3, Page 10.7.87, Line 15: The text states that “Groundwater is not currently used the future as potable or process water, nor is such use anticipated in the future.” It appears that the text contains a typographical error and the words “the future” should be deleted from the text.

4.) Table 10.9.18, Page 10.9.47: The table used the abbreviation ERR; however, no description of the meaning was given in the notes or abbreviation/acronyms listing in the front of Volume I. The notes portion of the table should be modified to include the meaning of ERR.

5.) Section 10.2, Page 10.12.1, Line 10: A typographical error is present. “ Rhe” should be changed to “the”.

6.) Page 12, Response 37, SCDHEC Comments on Risk Assessment Portion of Zone I:

The response states that chemical concentrations were not compared to RBC’s or reference values in the DMA area because the soils are recently dredged river- bottom sediments. In order to appropriately use the information provided regarding compounds detected in the DMA “soils”, a reference value is needed. A comparable background value from another area that received river-bottom sediments (up gradient of potential CNC influence) may need to be collected. From a risk perspective, the river-bottom sediments should be compared to RBC’s if the target population would come into contact with sediments in the same manner as surface soils. A common scenario is when intermittent stream sediments are treated as surface soils during times of drought when the sediments are exposed.

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



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Columbia, SC 29201-1708

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May 24, 1999

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

Re: Interim Measures Work Plan for SWMU 25, Dated April 9, 1999, Located in
Zone E Charleston Naval Complex SCO 170 022 560.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Interim Measures Work Plan (4/9/99) 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 field implementation of the above referenced interim measure.

Further, the Department is available to clarify any of the attached comments before the submittal of the comment responses and the revised document in order to expedite the resolution of these issues.

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

Sincerely,

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

Attachments: Memorandum from Paul M. Bergstrand to Mihir Mehta dated 20 May 1999.

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV

South Carolina Department of Health and Environmental Control comments on: Interim Measures Work Plan for SWMU 25, Dated April 9, 1999, Located in Zone E Charleston Naval Complex SCO 170 022 560.

Comments by Mihir Mehta.

1. Section 3. Work Plan Implementation; page 2.
The third bullet states that approximately one foot of soil beneath the vault will be excavated. This being an interim measure with the goal of excavating the “source term”(i.e., the vault 7A and associated electrical cable conduit(s)) and the nature and extent of contamination has not been delineated in the media(s) associated with this SWMU, it is prudent to understand the objective for excavating one foot of soil and backfilling the excavation to grade. Therefore, please explain the rationale for soil excavation and what criteria were used to decide on one foot depth.

2. Section 4. Sampling; page 2.
This section states that a composite sample will be taken after the one foot of soil excavation and prior to backfilling to grade. Please clarify the term “composite sample” to understand whether it is composting of the actual samples into one sample and then conducting the analysis or composting the data during analysis from the samples that are analyzed discretely. Also, define the use or objective for the composite sample.

Also, provide information regarding the soil depths for the composite sample, number of discrete samples used to get a composite sample, and show the locations and rationale for their selection. This will help to understand whether we have adequate information to move into RFI phase.

3. Appendix A; Section 1. page A-1.
Please provide adequate information on the concentration of chromium that is considered a source from vault 7A.

4. Appendix D; Site Map.
Please provide adequate figures/maps/photographs to illustrate the details of the referenced SWMU, the area associated with the excavation (vault and soils), and other details that are laid out in the text of the referenced document.



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: 20 May 1999

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

Interim Measure Workplan
Zone E, SWMU 25
Dated 09 April 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.

Comments are attached.

DD990436.PMB

Zone E, SWMU 25 Work Plan
Paul M. Bergstrand
20 May 1999

1. Page 1, Section 3, Work Plan Implementation

The groundwater in this area is very shallow and the excavation is likely to be inundated with water. Please describe how groundwater infiltration will be controlled and how water removed from the pit will be disposed.

2. Page 2, Section 3, Work Plan Implementation

The fifth bullet describes the excavation and removal of the electrical cable concrete conduit from the vault. It is not clear how extensive this excavation will be. Please describe the limits of the conduit excavation and include this information on a figure. See comment seven.

3. Page 2, Section 4, Sampling

A composite sample from the soils beneath the vault is not sufficient to document the environmental conditions after the interim measure. At a minimum, samples should be collected at the edges of the excavation, at the center of the pit and along the concrete conduit if more than 10 feet from the vault. Please revise.

4. Page 2, Section 4, Sampling

Sample analysis for RCRA Metals is not sufficient to document the environmental conditions after the interim measure. Sample analysis should include RCRA Metals and VOC analysis. Groundwater contaminated with VOC has been reported at nearby sites and the rehabilitation of the sewer lines may have altered groundwater flow towards this SWMU. Please revise.

5. Page 2, Section 6, Final Report

The final report site photographs should include photographs taken during the excavation. Revision of the work plan is not required.

6. Appendix B, Site Specific Health and Safety Plan

Review of this section is deferred.

7. Appendix D, Site Map

The site map provided in Appendix D is suitable for orientation but does not define the dimensions of the vault or electrical cable concrete conduits. A separate figure should be provided for this information. Please revise.



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COMMISSIONER:
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May 24, 1999

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Re: Design Document for Anaerobic-Aerobic Sequential Treatability System for Zone K (SWMU 166), dated April 16, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Design Document (4/16/99) 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 above referenced document.

Further, the Department is available to clarify any of the attached comments before the submittal of the comment responses and the revised document in order to expedite the resolution of these issues.

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

Sincerely,

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

Attachments:

1. Memorandum from Paul M. Bergstrand to Mihir Mehta dated May 19, 1999.

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
Todd Haverkost, EnSafe
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV
Rob Devlin; UIC Control
Tim Eleazer, EQC-Waste Water

South Carolina Department of Health and Environmental Control comments on: Design Document for Anaerobic-Aerobic Sequential Treatability System for Zone K (SWMU 166), dated April 16, 1999.

Comments by Mihir Mehta

1. The referenced document should have an introduction section describing the overall goals and objective of the design document. It should also reference previous document leading to the development of the referenced document. This will help the reviewer to understand the issue at hand in an appropriate fashion. Please revise the document accordingly.
2. From the review of the referenced document it appears that the area indicated for the field implementation of the referenced treatability study has been changed from the review of the Zone K (SWMU 166) Revision 0 Treatability Study Work Plan dated December 16, 1998. The current field location for the treatability study is associated with the area of low contaminant concentration. Please provide the rational, discussion, and the consequences as a result of this change.

Also, note that the previous document has not been revised consistent with the comment discussion during conference call.

3. Section I; Groundwater Well System; page A-18.
The referenced document has only two maps that are of poor quality and difficult for the reviewer to interpret and correlate them the text and the design. Please provide appropriate maps and figures that illustrates groundwater flow directions, current groundwater contamination, groundwater monitoring wells in the vicinity of the groundwater plume, groundwater aquifer system, and other physical features as deemed appropriate.

1.0 System Elements

It states that the groundwater well system to be installed will consist of three treatability study monitoring wells and the location maps shows the well placement. The referenced document has two maps and none of them shows the location of these three wells. Please revise the maps to show the locations.

4. Section 2.1; Monitoring Equipment & Observation Wells; page C-2.
Please show the locations of the “six nearby observation wells” on a map with respect to the groundwater flow direction, contaminant plume, and other well locations.
5. Section 2.0 and 3.0 describes what tests have been conducted in order to

Zone K, SWMU 166 Design Document Work Plan

Paul M. Bergstrand

19 May 1999

1. Page A-14, Section 1.1 Pump Design

The third bullet in this section calls for pumps that are “Top-loading for total fluid recovery.” It is not clear how top loading pumps will be an advantage when pumping water contaminated with a chlorinated solvent. Please address.

2. Page A-14, Section 1.1 Pump Design

The seventh bullet in this section calls for the pumps to “Know when they are full or empty and therefore, automatically through on or off, using air only on demand during discharge cycle.” This statement is not clear. Please revise.

3. Page A-18, Groundwater well system

All proposed wells are specified as 4 inches in diameter. The well proposal dated 3 May 1999 specifies the Monitoring and Sparging wells will be 2 inches in diameter. Please clarify.

4. No Page Numbers, Tab B

Most of the diagrams represent wells and recovery systems for free product hydrocarbons. If only portions of the illustrated systems are intended for use in this project the applicable sections should be highlighted in some manner or the non-applicable sections removed. Please clarify.

5. Page C-5, Drawdown Corrections

This section regarding correlation with barometric pressure and ambient water level trends is not clear. Please explain.

6. Page C-5, Data Reduction and Compilation

The drawdown model used was for a leaky confined aquifer. It is possible this model does not represent conditions at SWMU 166. Please address.

7. Page C-7, Conceptual Model

This paragraph is contradictory. The first sentence describes a “mosaic of fluvial and shallow marine deposits containing mostly sands with minimal amounts of clays and silts.” The different depositional environments and grain sizes would have vastly different effects on groundwater flow. Yet the model used “treated the aquifer as a single isotropic and homogeneous layer,” While it is clear the treatability study is intended to refine our understanding of the natural system at SWMU 166, the following concerns should be noted:

- A. The flow of groundwater and contaminated groundwater at SWMU 166 is not uniform. The use of this model does not address the major and minor flow paths which are presented in the second MNA Report.
- B. The distribution of contamination is not uniform across the site. Drastic differences in contaminant levels exist from well to well over the space of 100 feet but have not been explained. The use of this model implies the distribution of contaminants is controlled only by groundwater flow.
- C. This model does not address how small scale flow variability within the aquifer may exert significant control of contamination migration during the treatability study. An example of this would be when a fine well sorted sand becomes a barrier rather than a conduit to groundwater flow.
- D. The effects of the sparging wells should be included in the groundwater flow model. The sparging wells could become a barrier to groundwater flow into the pumping wells.

8. Page C-7, Data Compilation

This paragraph indicates the saturated thickness of the aquifer to be 25 feet. The AQTESOLVE program for the drawdown tests used a saturated thickness of 8 feet. Please resolve the contradiction.

9. Page D-1, Baseline analytical Sampling

This section states “Samples will be collected fromtreatability monitoring wells and existing monitoring wells located within the area of influence of the treatability study.”

Given the area of influence from the drawdown test, this study should include wells 14D, 11 D and an additional treatability monitoring well. Please revise.

10. Page D-1, Baseline analytical Sampling

Because the distribution of metals may change and precipitation of metals may result from the treatability test, metals should be sampled at the same frequency as VOC and Biochemical parameters. Please revise.

11. Page D-4, Hydrogeological Monitoring

The treatability study monitoring wells should be included in this measurement effort. Please revise.

12. Page D-4, Chemical Feed System.

Please describe how decisions to augment chemical feed or to modify flow rates will be made.

13. General

The Underground Injection Control Application dated February 9, 1999 has not been approved and as of 17 May 1999 has not been updated or resubmitted. The reply letter dated 12 April 1999 clearly states “ Air sparging wells are defined as injection wells.....” and that “These wells (i.e., all injection wells) must receive a Permit to Construct and Operate from the UIC Program prior to their installation and operation.” Please address.



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May 24, 1999

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Rodney L. Grandy

Re: RCRA Facility Investigation (RFI) Report, Volumes I-VI, Revision 0, for
Zone G NAVBASE Charleston, dated February 20, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced RFI Report (2/20/99) 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 Department is available to clarify any of the attached comments before the submittal of the comment responses in order to expedite the resolution of these comments/issues.

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

Sincerely,

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

Attachments:

1. Engineering comments prepared by Stacey French, dated April 5, 1999.
2. Memorandum from Susan K. Byrd, Risk Assessor to Stacey French, Environmental Engineering associate, dated March 5, 1999.

3. Memorandum from Michael W. Danielsen, Hydrogeologist to Stacey French, Environmental Engineering associate, dated May 20, 1999.

cc: Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV
Paul Bergstrand, Hydrogeology
Michael W. Danielsen, Hydrogeology
Susan K. Byrd, Corrective Action Engineering
Stacey French, Corrective Action Engineering

D H E C



PROMOTE PROTECT PROSPER

South Carolina Department of Health
and Environmental Control

ENGINEERING COMMENTS
Zone G RCRA Facility Investigation Report
NAVBASE Charleston
Dated February 20, 1998

Prepared by:

Stacey French, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Hazardous and Infectious Waste
Bureau of Land and Waste Management
April 5, 1999

General Comments

1. The notes at the end of the Site Specific Evaluation tables indicate that Residential RBCs were used for comparisons for upper interval samples. Please revise this note to indicate the publication date of the RBC table used. Please indicate the publication date.
2. This report includes numerous figures which present shaded areas of contamination exceeding relevant screening values. The shaded areas are somewhat unclear, as they seem to identify an area of contamination based on only a few sample locations. In some instances the extent of contamination is based on one sample. In order to clarify these figures, an explanation of the methods used to identify the shaded area should be included in the report.
3. This report includes figures which present the point risk estimates and point hazard estimates for the various SWMUs and AOCs. Many of these figures have little detail about the location of the risk and hazard points. In order to clarify the figures surrounding building numbers and street names should be provided. This will allow the Department to better interpret the risk assessment for the sites.
4. The potential corrective measures for many of the sites in Zone G include the excavation or soil removal. However there is no clarification as to the extent of soil removal. It is important for the Department to know this, especially if the removal is part of the selected remedy. Please outline the extent of contamination removal.

Specific Comments

1. Abbreviations, Acronyms, and Symbols for NAVBASE Zone G, Page a.4
The definition for msl was omitted from this list. Please revise the list to include this definition.

2. Section 1.0 Introduction, Page 1.1, Lines 11 & 12
This sentence references the Part B permit issued by SCDHEC in 1990. The permit has since been renewed by the Department in 1998. Please revise the sentence to reference the new permit.
3. Figure 1-2 Zone G AOC and SWMU Location Map
This is the only figure provided as a reference for the proximity of the SWMUs and AOCs, and the detail is not adequate to address some concerns that are presented in later comments. There is a boundary that separates AOC 646 from the other SWMU/AOCs in Zone G. It is unclear what boundary line this is. Please revise the figure to clarify if this is the Base boundary or a different boundary and to provide more detail.
4. Section 5.0 Data Evaluation and Background Comparison, Page 5.1, Second Paragraph
This paragraph outlines the comparison criteria for detected analytes. However, discussion of comparison to SSLs is not mentioned. Please revise the paragraph to discuss the comparison to SSLs.
5. Section 5.0 Data Evaluation and Background Comparison, Page 5.1, Line 11
This sentence states that detected concentrations were compared to corresponding RBCs. However, it does not specify if the detected concentrations were compared to residential or industrial RBCs. Please revise the sentence to make this distinction.
6. Section 5.2.5 Reference Concentration Test, Page 5.1, Lines 22 & 23
These sentences indicate that the sample analytical results were compared to background concentrations to identify samples with concentrations significantly higher than background. The meaning of “significantly higher than background” is vague and should be clarified.
7. Section 10.1.1 Site Geology, Page 10.1.1, Line 9
The sentence states that geologic and hydrogeologic data gathered from the immediately adjacent AOC 620 in Zone F is presented. However, the proximity of AOC 620 to AOC 628 is unknown. To clarify the location of AOC 620 should be included on the figures.
8. Section 10.2.4.1 Nature of Contamination in Sediment, Page 10.2.19, Line 7
This sentence states that Figure 1.2-4 presents bis(2-ethylhexyl)phthalate concentrations detected in sediment at AOC 643. This AOC number is incorrect and should be changed to AOC 633. The detection of bis(2-ethylhexyl)phthalate and its relationship to AOC should be discussed.
9. Section 10.2.5.2 Soil-to-Sediment Cross-Media Transport, Page 10.2.41, Line 5
This sentence states that two of the sediment sampling locations are “clearly associated with other sites in Zone G.” However, there is no map showing the “other sites” and their relationship with AOC 633, which makes this statement unclear to the Department. In order to clarify, please include a figure labeling the “other sites” and showing their proximity to AOC 633.

10. Section 10.2.5.2 Soil-to-Sediment Cross-Media Transport, Page 10.2.41, Line 15 & 16
This sentence states that it is most likely that the pesticide detections in sediment represent residuals from routine pesticide application around and near the drainage paths. In order to support this theory, records documenting the use of the detected pesticides and their method of application at the Base should be researched and provided.
11. Section 10.3 AOC 634, Flammable Material Storage, Page 10.3.1
This section provides a description of AOC 634. Please indicate whether there are any records of spills. If there are no records of spills, please indicate.
12. Table 10.4.18 Summary of Risk and Hazard AOC 638
The acronym ND is used in the table, however it is not defined in the notes portion of the table. Please revise the notes to include a definition of ND.
13. Section 10.5 AOC 642, Former Pistol Range, Page 10.5.1
This section provides a description of AOC 642 and indicates that the site is currently an asphalt paved parking area. Providing construction drawings of the parking lot, or any investigations to provide the amount of cover over the AOC would be helpful. This would document the presence or absence of cover over the bullets.

This section also states that it is unknown if any spent bullets were removed from the site. Has an investigation of the vertical extent of the bullets been conducted? This question is important in determining if the entire area affected by the Former Pistol Range has been covered (capped) by the asphalt parking area. Please include the response to this comment in the text of the document.
14. Figure 10.5-1 Sampling Locations AOC 642
The extent of the asphalt paved parking lot should be indicated on the figure in order to clarify the extent of the site. Additionally, the fence referenced in section 10.5 should be shown on the figure. Please revise the figure. This comment also applies to the other figures of AOC 642 in this section of the RFI.
15. Section 10.5.3 Soil Sampling and Analyses, Page 10.5.3, Lines 9 & 10
This sentence indicates that nine of the ten borings were limited to the upper interval only due to the shallow groundwater interval. The depth that groundwater was encountered should be included in this section. The shallow groundwater table suggests that a groundwater investigation should be conducted. Knowing the origin and amount of cover placed during construction of the asphalt parking area and the buildings on top of the AOC is important in determining the affect that AOC 642 had on the soils and groundwater.
16. Section 10.6 SWMU 8 Oil Sludge Pit; AOC 636 Torpedo Magazine, Page 10.6.1, Line 9-11
This sentence states that subsurface disposal of unused torpedoes and munitions allegedly occurred prior to 1944. Has an investigation been conducted to determine if there are any unexploded ordnance (UXO) located at this site? This is important when considering that

subsurface construction activities could occur at this site after transfer. Please include the response to this comment in the text of the document.

17. Figure 10.6-1 Soil Sampling Location Map SWMU 8 and AOC 636

This figure lacks enough detail to draw any conclusions about the sample locations and the impact of SWMU 8 and AOC 636. The location of the Oil Sludge Pit (SWMU 8) and the Torpedo Magazine (AOC 636) should be shown on the map. The location of the gravel parking area should also be indicated on the map. Please revise the figure in order for the Department to draw conclusions. This comment also applies to the other figures in this section of the RFI.

18. Figure 10.6-3 Shallow Groundwater Low Tide Potentiometric Map SWMU 8 and AOC 636

There are two shaded excavated pits shown on this map, however they are not described in the text of the report. These pits should be defined in the Legend and discussed in the text of the report. The pits were included on Figures 10.6-3 and 10.6-4, however they were not included on Figures 10.6-1 and 10.6-2. Please explain the discrepancies and revise the figures as appropriate.

19. Section 10.7 AOC 637, Dump Area Building 161 Area, Page 10.7.1

This section provides a description of AOC 637 and specifically states that the site is a former burning dump. A better description of the site, to include site operations from the late 1940's to the early 1950's. This would aid the Department in its review.

20. Section 10.7.1 Site Geology and Hydro geology, Page 10.7.1, Lines 14 & 15

This sentence states that based on monitoring well bores, the stratigraphy consists of fill material including gravel, sand, silt, wood, plastic, and other debris. Please include the depth at which the fill was encountered in this section. This will approximate the depth of cover over the dump. Based on the Department's Decision Flowchart for Landfills that are SWMUs, additional information and possible investigation is needed prior to selection of a remedy for this site. If the amount of cover is inadequate, a cap may have to be designed for AOC 637 in order to protect human health and the environment after closure of the site. Please refer to the attached Decision Flow chart for Landfills that are SWMUs.

21. Figure 10.7-1 Sampling Locations AOC 637

This figure shows the locations of sediment and surface water samples. Section 10.7.4 indicates the samples were taken in the surface water drainage pathway from the site. Please revise the figure to include this designation and specify if the sample location was in a ditch, creek, etc. Additionally please revise the figure to indicate the extent of the gravel parking lot.

22. Section 10.7.3.1 Nature of Contamination in soil, Page 10.7.28 Lines 19-21

This section states that hydrazine was detected in surface and subsurface soil in concentrations exceeding both the RBC and SSL. The exceedances occurred in one soil sample. Hydrazine is the risk driver for this site, therefore the detections should be discussed further. The Department's position is that this area should have been investigated, and that

there was not sufficient delineation at the site.

23. Section 10.8 SWMU 11 Caustic Pond, Page 10.8.1
This section provides a description of SWMU 11. It is unclear from this section whether the pond is still filled, or if it is dry. Please revise this section to provide this information.
24. Section 10.8.4.1 Nature of Contamination in Soil, Page 10.8-18, Lines 7-9
This section states that the surface soil samples had a mean pH of “slightly” above neutral and that the mean pH of the subsurface soil samples was “slightly” below neutral. The word “slightly” is vague and should be clarified. Please include the actual pH instead of using the term slightly.
25. Section 10.9 SWMU 120 Pier M Laydown, Page 10.9.1
This section provides a description of SWMU 120, however, the Department has noted some deficiencies. There is no indication of the dates of operation or the access control to the site. Additionally, there is no description of the ground covering (ie. Is the area paved with asphalt?). Please revise this section accordingly.
26. Figure 10.9-1 Sampling Locations SWMU 120
Section 10.9 states that pelletized lead bricks and shielding were stored at the site. The location of the pelletized storage is not noted on Figure 10.9-1. Please revise the figure to include the storage area. If the storage area is unknown, that fact should be stated in Section 10.9.
27. Section 10.9.4.1 Nature of Contamination in Sediment, Page 10.9.25, Lines 7 & 8
This sentence states that the potential for surface soil erosion and sediment transport from the immediate site area is limited because most of SWMU 120 is paved. The Department would better understand the relevance of this statement if the paved area was indicated on Figure 10.9-1. Also, please indicate if the area was paved prior to, during, or after the storage began. Please revise Figure 10.9-1 and the appropriate sections of the report.
28. Section 10.10 AOC 643 Substation Building 125, Page 10.10.1
This section provides a description of AOC 643, however, the dates of operation are not provided. The last sentence of this section states that a dielectric fluid spill/cleanup was documented, but the date of the spill and cleanup is not indicated. Please revise this section accordingly.
29. Figure 10.10-1 Sampling Locations AOC 643
Section 10.10 states that at one time, PCB transformers, inactive DC generators, switches, and circuit breakers were stored in a wooden shed adjacent to Building 125. Figure 10.10-1 shows a structure adjacent to Building 125, however, it is not identified. If this is the above mentioned wooden shed, please revise the figure to include this designation.
30. Table 10.10.2 AOC 643 Organic Compound Analytical Results for Soil
Dieldrin in subsurface soil exceeded the SSL, however, the table indicates that no samples

exceeded the SSL for dieldrin. Please revise the table. Additionally, the text of the report should be revised to include a discussion of the exceedance and the need to further delineate the extent of dieldrin contamination.

31. Section 10.11 SWMU 3 Pesticide Mixing Area, Page 10.11.1

This section should be revised to include a discussion of the activities outlined in the Interim/Stabilization Measure Report dated September 24, 1998, and their effects on the RFI. Other applicable sections of the RFI should also be revised pursuant to this comment.

32. Figure 10.11-1 Sampling Locations SWMU 3

This figure shows the former concrete slab and its relationship to Building 249 and the surrounding sampling locations. Samples were only taken north east of the concrete slab. The rationale for not sampling every side of the concrete slab is unclear. The south side of the pad was not sampled. The Department's position is that this area should have been investigated, and that there was not sufficient delineation at the site. Please revise section 10.11.12 to clearly indicate the rationale.

33. Section 10.12 SWMU 6, SWMU 7, and AOC 635, Page 10.12.1

This section provides a description of SWMUs 6, 7, and AOC 635, however the dates of operation for SWMU 6 are not provided. Please revise this section to include the dates of operation of SWMU 6.

34. Figure 10.12-1 Sampling Locations SWMU 6, 7, and AOC 635

This figure shows a structure north east of Building 3902, however, this structure is not labeled. It appears that this structure is the paint and oil storehouse (AOC 635). If this is AOC 635 please revise the figure to include this designation.

35. Figures 10.12-4 through 10.12-19

These figures represent the soil contamination at SWMUs 6, 7, and AOC 635. The figures are unacceptable due to the lack of detail. In order to maintain consistency and allow the Department to interpret the figures, more detail is needed. Please revise the figure to include, at a minimum, Building 3902 and the paint and oil storehouse.

36. Figures 10.12-20 through 10.12-29

See comment # 36 and revise the figures accordingly.

37. Section 10.14 AOC 706 Area Behind Building 246, Page 10.14.1

This section provides a description of AOC 706, however, it is unclear why this site was identified as needing a RFI. It appears that this area was impacted by waste handling activities associated with the former Hazardous Waste Storage and Transit Facility. This section should be revised to indicate if there were any spills at AOC 706 that would give insight into the types of wastes that might have contaminated the site. Please revise this section to provide more information about the use of AOC 706.

38. Figure 10.14-1 Sampling Locations AOC 706

This figure includes the sediment sample locations taken from AOC 633. The area of the sediment samples appears to be a wetland, however this is unclear from the figure. If this is a wetland, the legend should define the area. Please revise the figure to include this designation.

39. Section 10.15 SWMU 24 Waste Oil Reclamation Facility, Page 10.15.1

This section states that SWMU 24 was originally investigated under the petroleum program, however, there is no discussion of the results of that investigation. Please revise this section to include a discussion of the findings of previous investigations. In addition to revising this section, please include any sample data collected in previous investigations in the RFI Report. This section should include any discussion about investigations of any piping associated with the tanks.

40. Figure 10.15-1 Soil and Groundwater Sampling Locations SWMU 24

This figure shows the locations of samples taken during the RFI at SWMU 24. This figure should be modified to include any samples taken in previous investigations handled under the petroleum program. Section 10.15 indicates that this area includes SWMU 3. Please revise the figure to include the location of SWMU 3. This figure should also include the location of any piping associated with the tanks.

41. Section 10.15.3 Soil Sampling and Analysis, Page 10.15.5, Lines 15 & 16

This sentence states that ten CPT and four hand auger soil samples were collected during the screening investigation. Figure 10.15-1 shows the locations of 11 CPT and 3 hand auger soil samples. Please revise this section and Figure 10.15-1 to clarify this discrepancy.

The location of the soil samples shown on Figure 10.15-1 indicates that all sides of tank 39-D were sampled during the RFI. If the sample locations provided are correct only two sides of tank 39-A appear to be adequately sampled. The rationale for not sampling every side of tank 39-A is unclear. The Department's position is that this area should have been investigated, and that there was not sufficient delineation at the site. Please revise section 10.11.12 to clearly indicate the rationale.

42. Table 11.1 Site Conclusions and Zone G Preliminary Recommendations

AOC 633 The Department does not agree with the no further action recommendation for this site. Section 10.2 suggests that additional sediment samples be taken in order to determine the attribution of sediment constituents to a particular site. This should be discussed in Section 11.2.

AOC 642 The Department does not agree with the recommendation presented for this site. See comment number 15. Based on the nature of the site, the fact that it is unknown if any spent lead bullets were removed, and the shallow groundwater table, a subsurface soil and groundwater investigation is warranted. This should be discussed in Section 11.5.

AOC 637 The Department does not agree with the recommendation presented for

this site. Section 10.7.3.1 indicates that hydrazine was detected in a soil sample exceeding its SSL, however there is no further discussion of this exceedance. This should be discussed in Section 11.7.

SWMU 3 The Department does not agree with the recommendation presented for this site. See comment number 32. Additional investigation is needed prior to selection of a remedy for this site. This should be discussed in Section 11.11.

SWMU 24 The Department does not agree with the recommendation presented for this site. See comment number 41. Additional investigation is needed prior to selection of a remedy for this site. This should be discussed in section 11.14.

43. Section 11.16 Ecological Risk Summary, Page 11.21

This section and subsequent sections (11.16.1-11.16.3) should be modified as necessary with respect to comments provided by the Department (Byrd to French 3/5/99).



100 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

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Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

TO: User

FROM: Development Group (J. Litton, A. Coffey, J. Tapia, S. Zafar)

DATE: November 1997

RE: Corrective Action Engineering and Operations Engineering Sections
Decision Flowchart for Landfills that are SWMUs

The attached decision flowchart is not intended to be formal guidance, but rather an introduction to the decision making process. It is intended for use by section staff when determining the logical path forward for investigation and remediation of SWMUs that were landfills. The landfills that served as the models for preparation of this flowchart were thought to be primarily for domestic type wastes; however, industrial activities were conducted at these sites and inadvertent disposal of industrial wastes must be considered.

This methodology may be appropriate for other land based units such as surface impoundments, waste piles, etc.

**CORRECTIVE ACTION ENGINEERING AND OPERATIONS ENGINEERING
SECTIONS
DECISION FLOWCHART
for
LANDFILLS that are SWMUs
11/97**

- I. Groundwater monitoring results may show indications of a release from a landfill.
- II. **No Groundwater Contamination**
 - A. It may still be appropriate to continue monitoring groundwater. Some of the factors to consider include:
 - 1. The period of operation of the landfill;
 - 2. The underlying geology and hydrogeology;
 - 3. The amount of monitoring data available;
 - 4. The availability of records indicating the type of waste that was placed in the landfills; and,
 - 5. Information regarding the design and operation of the landfill.
 - B. The existing landfill cover and any other engineering controls should be evaluated to ensure that it provides a barrier to physical (human/ecological) intrusion.
- III. **Indications of Groundwater Contamination**
 - A. Contaminated groundwater must be addressed.
 - B. Minimizing the amount of groundwater to be remediated is cost effective. This may include the installation of an engineered cap, or other engineered measure, that will prevent infiltration.
 - C. In order to determine the need for a cap, an engineering study should be performed that includes the following information:
 - 1. A characterization of the existing cover system;
 - 2. The depth of waste in the landfill. Non-intrusive methods preferred;
 - 3. The distance between the bottom of the waste and groundwater;
 - 4. A model of predicted infiltration through the existing cover system;
 - 5. The chemical/physical characteristics of the waste in the landfill;
 - 6. An assessment of soil gas migration;
 - 7. A prediction of contaminant leaching;
 - 8. Future land use considerations; and,
 - 9. A risk assessment including both current and future use scenarios.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Stacey French, 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: March 5, 1999

RE: Charleston Naval Shipyard
South Carolina
SC 0170022560

Document:
Zone G RCRA Facility Investigation Report
NavBase Charleston
Volumes I-VI
February 20, 1998

The Department has reviewed the above referenced document completed by Ensafe Inc. Much of the area within Zone G is currently being leased to private industries. The 1996 Draft Zone A RFI Report details the description and background history of the base as well as the base closure process for environmental cleanup.

Based on the review of this document, I have the following comments relating to the human health and ecological risk assessments:

GENERAL COMMENTS:

The general comments may include specific examples from the text; however, the comment should apply to the whole report and may require revisions to each individual unit.

1.) Section 6.2, Page 6.15, Line 13: The text states that the soil to groundwater pathway was assessed using generic SSLs that assume a DAF of 20, rather than site specific SSLs. In the

nearby Zone E, a DAF value of 10 was utilized. A justification of the differing DAF values used throughout the various base zones should be provided.

2.) Section 6.2., Page 6.15, Lines 22-25: The text states that the greater of the background reference values for surface soil and subsurface soil was used as the screening alternatives to SSLs for inorganics. Using the highest background reference value does not seem to be a conservative approach for background comparison. An explanation should be given to support the statement that the higher background value is always relevant. Also, the approach of comparing surface soils to subsurface soils is not supported due to the influence to “naturally occurring” surface soils from the Naval activities such as land covering with dredge materials. To resolve comparing “apples to oranges”, surface soil background levels should be compared only to “comparable” surface soil samples (of similar soil types and depths) and subsurface soil background levels to “comparable” subsurface samples.

3.) Section 10, Sample Locations Figures for each AOC or SWMU: The maps provided for each AOC or combined AOC and SWMU show each sample location within each specific AOC. It would be very helpful to also include a map showing each AOC’s location within Zone G. This map should be placed before the sample locations map so that the reader can get a general idea of which AOC’s are nearby, how overland run-off might flow, etc. The maps provided in Volume I of the report provide general information about the entire Zone G; however, overland run-off and sediment sample locations within Zone G are hard to visualize.

4.) The text refers to the elimination of iron as a COPC because it is listed as an essential element. “Supplemental Guidance to RAGS: Region IV Human Health Bulletin No. 1” does not list iron as an essential nutrient for exclusion from evaluation. Elevated levels of iron detected throughout Zone G should be evaluated quantitatively throughout each site investigation. In order to adequately evaluate the potential concerns due to iron levels detected above residential RBCs, background reference values for iron should be determined. If iron is determined to be elevated above reference concentrations and RBCs, then it should be retained as a COPC and incorporated in the Risk Assessment portions of each site investigation.

SPECIFIC COMMENTS:

1.) Section 8.2, Page 8.7, Lines 19-21: The text states that the Least terns are expected to forage in the nearby Cooper River and Shipyard Creek, and rear their young on the roof of Building 224 without ever contacting contaminated sources in the zone. A further explanation should be given as to why the birds would not forage or drink from the pond mentioned in subzone G-1. Unless it can be proven, the statement that the birds would never contact contaminated sources in the zone should be deleted.

2.) Section 8.3, Figure 8-3 : The contaminant pathway model for ecological receptors should be modified. The Legend should also state that the triangle symbol represents receptors that will be included in the quantitative evaluation , and the circle represents the species that will be evaluated only qualitatively. The blank spaces should be defined as incomplete pathways.

- 3.) Section 8.10, Table 8.9, Pages 8.44 and 8.45: Row 6, Column 5 has the letter “N” which is not represented as one of the symbols used in the table. If this is a typographical error, “N” should be changed to “NC”. The HI values at the bottom of page 8.45 should be changed to reflect the proper values of 5.00E-02 instead of 5.00E+02 and 3.86E-01 instead of 3.86E+01.
- 4.) Section 10.1.5.4, Page 10.1.37, Line 22: The text states that the uncertainty factor was 500 and the modifying factor was 1. An explanation should be given as to how these figures were derived.
- 5.) Section 10.2.4, Page 10.2.10, Line 4 : The text states that six sediment samples were collected during the investigation of AOC 633. However, Figure 10.2-1, Sampling Locations Map of AOC #663 Substation, contained only two sediment sample locations. Other maps presented later in the AOC 633 section showed all 6 sediment locations and the contaminants detected at each location. Figure 10.2-1 should be modified to show all sample locations, or it should be retitled to reflect the locations of soil samples only. If the figure is retitled then an additional map should be provided immediately following Figure 10.2-1 to show the locations of all 6 sediment samples.
- 6.) Section 10.2.5.2, Page 10.2.41, Lines 4 and 5: The text states that locations 633M005 and 633M006 are clearly associated with other sites in Zone G. Based on Figure 10.2-12, it appears that 633M006 could potentially be located “downgradient” of 633M004. It may also receive influence from other sites within Zone G, but this is not clearly presented in the figures nor the text. A clarification should be given for this statement.
- 7.) Section 10.2.7, Page 10.2.62: This section recommends no corrective measures at this time for AOC 633. Since contamination was detected in the sediment, additional sampling is needed to determine the source of the sediment contamination.
- 8.) Section 10.6.6.3, Page 10.6.149, Lines 10 and 11: The residential adult exposure duration used in the CDI calculations was 24 years, and 25 years was used for the site worker exposure duration. Please explain why the residential duration is less than the worker duration.
- 9.) Section 10.7.7.1, Page 10.7.97, Line 14: The text states that “hydrazine was detected in AOC 637 in surface and surface soil”. The text should be revised to say “surface and sub-surface soil”.
- 10.) Table 10.12.5, Page 10.12.23: The upper interval soil reference concentration for dioxin was listed as 1000 ug/kg in Table 10.12.5. According to the October 1998 Region III RBC Tables, 2,3,7,8- TCDD has a residential RBC of 4.3E-03 ug/kg. Text should be included (in the form of a footnote to the table) to show how the value of 1000 ug/kg was derived. If this value is an error, it should be revised in all other applicable tables.
- 11.) Section 10.12.5.1, Page 10.12.150, Line 22: The text refers to storage of various types of wastes which likely resulted in unavoidable surface releases. The term “unavoidable” tends to diminish the importance of spill prevention. Since all types of releases of contaminants to the environment should be avoided, this statement should be eliminated from the text.

12.) Section 10.15.3, Other Organic Compounds in Soil, Page 10.15.22: The text states that VOC and SVOC analytical results will be used to evaluate TPH since no RBC is available for TPH. Supplemental Guidance to RAGS, Human Health Bulletin No.2 states that a surrogate compound such hexane can be used to obtain toxicity values. Therefore, the TPH detected at SWMU 24 should not be eliminated as a COPC, and should be evaluated in the Human Health Risk Assessment.

If you have any questions or comments regarding information within this memo, please contact me at (803)896-4188.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Stacey French, 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 *MWD*
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

DATE: May 20, 1999

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

Zone "G" RCRA Facilities Investigation (RFI) Report for Navbase Charleston
(CNC) Sections 1 to 9
Revision 0, Dated February 20, 1998

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 “G” RCRA Facilities Investigation (RFI) Report for
Navbase Charleston (CNC) Sections 1 to 9
Michael W. Danielsen May 20, 1999**

1. Page 2.34 Upper Tertiary Undifferentiated, lines 17-18

This sentence states that the *Tu* layer “was unobtainable”. The geologic cross sections and well logs show that several wells were put in that penetrated this layer. Please explain what circumstances prevented the collection of samples from the *Tu* formation.

2. AOC 633 Section 10.2.4 Sediment Sampling and Analysis

After reading the report and making a site visit, the areas AOC 633/634/706 and SWMU 11 may all be interrelated with regard to sediment contaminants. The sediment sampling results show that lead and mercury have been found above the RBC. These contaminants are not directly attributable to the known wastes at AOC 633/634. The contaminants, however, must be addressed. This could be done as a new SWMU/AOC or under an existing SWMU/AOC. See comment #13 B.

3. Page 10.2.1 AOC 633 Section 10.2.2 Field Investigation Approach

A) The text states that the purpose of the field investigation is to confirm or deny the presence of contamination, however there were no subsurface soil or groundwater samples taken. The sampling in this area does not adequately address the presence or absence of contamination in the groundwater or subsurface soil. Therefore these media need to be investigated with the addition of monitoring wells and sampling.

B) Grid wells or other wells close-by might be used for information for this site. This information should be reviewed by the Navy, if available, otherwise additional wells should be proposed.

4. Page 10.5.1 AOC 642, Former Pistol Range, Present Parking Lot

A) See comment #3A.

B) Since “It is unknown if any spent lead bullets were removed from this site.”, the groundwater and subsurface soil needs to be addressed at this location to confirm or deny the presence of metals (lead). This area was obviously graded as needed for a parking lot, therefore the surface soil tested may not contain the expected lead. Therefore these media need to be investigated with the addition of monitoring wells and sampling.

- C) This site should remain in RFI status until further investigation has been completed.
5. **SWMU 8 / AOC 636**
There is an Interim Measure in process at this site to remove free petroleum product from the soil. From a recent site visit (5-13-99) it is obvious that the subsurface soil has also been impacted from the contamination. The CMS that is planned for the surface soil and groundwater in this area needs to include the subsurface soil as well.
6. **AOC 637**
Based on the recent site visit to SWMU 8/ AOC 636 (5-13-99), this area may need to have a small trench cut near 637SB003 to confirm or deny the presence of petroleum (like the trench across the street). If this trench test shows petroleum contamination like SWMU 8 then the subsurface soil is also impacted and should be added to the CMS investigation for a full scan of contaminants.
7. **SWMU 11**
A) The text states that the purpose of the field investigation is to confirm or deny the presence of contamination. The sampling in this area does not adequately address the presence or absence of contamination in the groundwater. Therefore this medium needs to be further investigated with the addition of monitoring wells and sampling.

B) Additional wells need to be installed on the eastern edge of the SWMU as well as across the road, to the east, to confirm or deny that the contamination has not migrated in this direction. This will also help to better define the groundwater contamination on the eastern and northeastern side of the SWMU.
8. **SWMU 11 Page 10.8.34 Surface Soil-to-Sediment Cross-Media Transport, lines 22-25.**
A) The text suggest that additional sampling is needed in this immediate area to resolve the question of the contaminate source or of the engineered effectiveness of the drain. This also supports the need for additional sampling to determine if the contaminants are in a sink and if they are present in the groundwater.

B) This site should remain in RFI status until further investigation has been completed.
9. **AOC 643**
A) See comment #7A.

B) This site should remain in RFI status until further investigation has been completed.

10. **SWMU 3**

A) The text states that the purpose of the field investigation is to confirm or deny the presence of contamination. The sampling in this area does not adequately address the presence or absence of contamination in the soils and groundwater for the areas in front of the present building (Building 249). Therefore this media needs to be further investigated with the addition of monitoring wells and sampling.

B) The additional wells, based on the groundwater flow maps, need to be located between 003SB004 and 003SB005, and northwest of 003SB004 locations to better complete the survey of groundwater.

C) This site should remain in RFI status until further investigation has been completed.

11. **AOC 646**

A) The text states that “this area is already being addressed by the tank program.” The Department contacted Paul Bristol of the Tank Program who explained that work is still ongoing in this area and therefore a final decision for the RFI is pending the completion of current work. The decision on further action will come from Mr. Bristol.

B) The Department agrees that the Tank Program is the most appropriate program to address petroleum related environmental concerns at AOC 646. However, the Navy must submit to the Department a request to transfer AOC 646 from RCRA Subtitle C to RCRA Subtitle I authority.

12. **AOC 706**

A) See comment #3A.

B) The groundwater can not be adequately characterized by only one well. More wells are needed to sufficiently show the presence or absence of contamination. Therefore this medium needs to be further investigated with the addition of monitoring wells and sampling. Additional wells may be placed northeast, south, and east from the present well.

C) This site should remain in RFI status until further investigation has been completed.

13. **Page 10.14.53 AOC 706, second paragraph**

A) This paragraph suggests that the vertical extent of contamination can be somewhat explained, but does not delineate the horizontal extent of contamination. Additional soil samples are needed to delineate the extent of contamination northwest and southeast of the present sample locations.

B) The contaminants (chromium, copper, lead, and mercury) found in the sediment samples (633M0003, 0004, 0005, 0006) may be more attributable to the various hazardous materials handled and stored at AOC 706 rather any other surrounding AOC. See comment #2.

C) This site should remain in RFI status until further investigation has been completed.

14. **General Comment**

Please see the following table for a review of decisions.



2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

May 26, 1999

BOARD:
John H. Burriss
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Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Henry N. Shepard
Department of the Navy Southern Division
Caretakers Site Office (CSO)
2155 Eagle Drive
North Charleston, SC 29419-9010

Re: Charleston Naval Annex (Remount Road)
SWMU 166 Treatability Study
Underground Injection Control Application dated February 9, 1999
Charleston County

Dear Mr. Shepard:

Enclosed is an Permit to Construct for six (6) Class VA-I (Aquifer Remediation) injection wells at the Charleston Naval Annex SWMU 166 as per your application dated February 9, 1999. An inspection of the UIC system must be conducted by the Department prior to operation. The Department will schedule an inspection after receipt of Notice of Completion of Construction. The Notice of Completion of Construction should include a site map, boring logs and as built well construction details on SCDHEC well record forms or equivalent. After completion of the inspection an Approval to Operate will be issued. Please call my office to schedule a time and date for the inspection.

If you have any questions, please feel free to call me at (803) 898-3798.

Sincerely,

Robert Devlin, Hydrogeologist
Groundwater Management Section
Water Monitoring, Assessment & Protection Division
Bureau of Water

cc: Paul Bergstrand, BL&WM
Christine Sanford-Coker, Trident District EQC



2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

WATER MONITORING ASSESSMENT & PROTECTION DIVISION

BOARD:
John H. Burriss
Chairman

Injection Well Construction Permit for

William M. Hull, Jr., MD
Vice Chairman

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

Roger Leaks, Jr.
Secretary

Mark B. Kent

Permit #440

Date Issued: May 26, 1999

Date Expired: May 26, 2000

Cyndi C. Mosteller

Brian K. Smith

For (Operator): Department of the Navy
Southern Division

Rodney L. Grandy

In accordance with provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, permission is granted for construction of six (6) Class V.A.-I injection wells located at the Charleston Naval Annex SWMU 166, Charleston, South Carolina with the following provisions:

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

Robert Devlin, Hydrogeologist
Underground Injection Control
Water Monitoring, Assessment & Protection Division
Bureau of Water

May 26, 1999
Date

DHEC 2104 (6/88)

STATEMENT OF BASIS - UIC DRAFT PERMIT #440

In accordance with the South Carolina Underground Injection Control Regulations, Section R61-87.12,J., this "Statement of Basis" has been prepared for Charleston Naval Annex SWMU 166 Underground Injection Control permit application dated February 9, 1999.

Ownership of the proposed injection well(s) is Department of the Navy Southern Division, South Carolina. The permit (UIC #440) is for the construction of six (6) injection wells for a corrective action system at Charleston Naval Annex SWMU 166. The intent of the injection well is to inject ammended waste water back into the plume of the contaminants. The waste water will be ammended with carbon (sucrose) and ammonium phosphate and injected into two injection wells. Ambient air will be injected into the other four air sparging wells. The permit for the underground injection proposal has been prepared based on staff review and the application of the Pollution Control Act of South Carolina and the Underground Injection Control Regulations of South Carolina.

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



CSO FILE COPY

2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

May 27, 1999

BOARD:
John H. Burriss
Chairman

Henry Shepard II, P.E.
Caretaker Site Office
NAVFACENGCOM, Southern Division
P. O. Box 190010

William M. Hull, Jr., MD
Vice Chairman

North Charleston, SC 29419-9010

Roger Leaks, Jr.
Secretary

Mark B. Kent

Re: Zone A RFI Conditional Approval, AOC 506 Benzo(a)pyrene SSL
Evaluation, Memorandum dated March 23, 1999.

Cyndi C. Mosteller

Brian K. Smith

Dear Mr. Shepard:

Rodney L. Grandy

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced memorandum (3/23/99) 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 Department is available to clarify any of the attached comments before the submittal of the comment responses and the revised pages in order to expedite the resolution of these issues.

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:

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV

South Carolina Department of Health and Environmental Control comments on: Zone A RFI Conditional Approval, AOC 506 Benzo(a)pyrene SSL Evaluation, Memorandum dated March 23, 1999.

Comments Generated By Mihir Mehta:

1. The analysis and the conclusions as presented in the referenced memorandum for calculating the soil screening levels (SSLs) for benzo(a)pyrene equivalents (BEQs) are acceptable provided the dilution attenuation factor (DAF) used in these calculations are developed for the site. Currently, DAF of 10 and 20 (generic EPA default values) are used in the calculation and therefore, resulting in two different SSL values for the same contaminant. In order to reduce the uncertainty and as proposed in this memorandum, the Department recommends additional data collection for the development of site specific DAF.
2. Figure 10.7.1; Soil Sample Locations.
Please provide the rational for selecting $66' \times 66' = 0.1$ acre area for the SSL evaluations.

It appears that the area selected has only one soil sample location near the far left corner. The Department believes that additional soil samples are necessary to delineate the extent of BEQ contamination within the selected area. Also, provide the rational for identifying the boundary of the selected area.



CSD FILE COPY

2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

May 27, 1999

BOARD:
John H. Burriss
Chairman

Henry Shepard II, P.E.
Caretaker Site Office
NAVFACENGCOM, Southern Division
P. O. Box 190010

William M. Hull, Jr., MD
Vice Chairman

North Charleston, SC 29419-9010

Roger Leaks, Jr.
Secretary

Mark B. Kent

Re: Interim Measures Removal Work Plan for SWMU 2 Located in Zone A of the
Charleston Naval Complex, SCO 170 022 560, dated April 23, 1999.

Cyndi C. Mosteller

Brian K. Smith

Dear Mr. Shepard:

Rodney L. Grandy

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Interim Measures Removal Work Plan (4/23/99) 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 field implementation of the above referenced interim measure.

Further, the Department is available to clarify any of the attached comments before the submittal of the comment responses and the revised document (revised pages as deemed appropriate) in order to expedite the resolution of these issues.

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: Memorandum form Paul Bergstrand to Mihir Mehta dated May 20,
1999.

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV

South Carolina Department of Health and Environmental Control comments on: Interim Measures Removal Work Plan for SWMU 2 Located in Zone A of the Charleston Naval Complex, SCO 170 022 560, dated April 23, 1999.

Comments by Mihir Mehta.

1. As the objective for the proposed interim measure is to excavate the lead contaminated soils for unrestricted residential land use, have the sampling results/events been compared to ecological risk threshold numbers in order to understand the ecological risk concerns. The excavation/clean-up goal for lead should address both human health and ecological concerns. Please address this concern.
2. Section 2.0; Work Plan Objective; page 2.
This section stated that the clean-up objectives are targeted for residential land use. The section also states that the proposed interim measure may not be the final remedial action for the site. This concept is contradicting. If the clean-up goals are residential then the proposed remedial action has to be capable of meeting these goals and the goals have to be the final remedial goals. The decision to clean-up the site is based on risk-based decision (i.e., future industrial or residential land use). Please revise this section to be consistent with concept of final verses interim remedial goals for the referenced SWMU.
3. Section 4.2.1; General Requirements; page 6.
Bullet number 6 states that, "Engineering controls will be required to control spillage during transfers from the excavation to the truck." Please clarify what these engineering controls entail. Also, provide information regarding necessary engineering controls to prevent surface runoff and infiltration into groundwater of lead in an event rainfall occurs during the implementation phase for the proposed interim measure.
4. Section 4.3; Phase III: Confirmation Sampling; page 6.
The confirmation sampling as presented in the referenced document does not meet the Departments expectations for the proposed clean-up to the residential land use. The confirmatory sampling strategy should have two distinct objectives: one to verify the clean-up goals for the vertical extent and second the verify the clean-up goals for the horizontal extent. The referenced document should be revised to address this concern and revise the figures to distinguish between the locations for the two sampling strategies as stated above.



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: 20 May 1999

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

Interim Measure Workplan
Zone A, SWMU 2
Dated 23 April 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.

Several comments have been provided, however revisions are not necessary.

DD990438.PMB

Zone A, SWMU 2 Work Plan

Paul M. Bergstrand

20 May 1999

1. Page 3, Section 2.1, Sequence of Operations

Remedial action phases II, III, IV and V, listed in this section, do not match the phases described in the text. This is typographical only and revisions are not required.

2. Page 5, Section 4, Work Plan Implementation

The groundwater in this area is very shallow and the excavation is likely to be inundated with water. Please describe how groundwater infiltration would be controlled and how water removed from the pit would be disposed. This information request should not impede the approval of the work plan, however, the description should be provided before the initiation of field work.

3. Page 5, Section 4, Work Plan Implementation

Subsection c) describes methods to be taken to preserve the integrity of the railroad runs which are present within SWMU 2. Per a 12 May 1999 telephone conversation with Mr. Jed Heames of EDC, the railroad track within SWMU 2 is to be removed along with concrete and asphalt in excavation areas. This change in the scope of the work plan was made by the Charleston Redevelopment Authority. Revision is not required.

4. Page 6, Section 4.3, Phase III: Confirmation Sampling

This section states "All sampling phases will be conducted in accordance with the Environmental Detachment Charleston Sampling Plan, Reference E." This sampling plan has not been reviewed. However, if the sampling procedures are equal to or exceed the EPA SOP-QAM, revisions are not required.

5. Page 7, Section 4.4, Demobilization

This paragraph states “Decontamination of tools and equipment will be conducted in a designated area using the guidelines specified in the CHASP.” The Detachment Comprehensive Health and Safety Plan has not been reviewed. The use of the CHASP for the decontamination of tools and equipment is not clear. However, if the decontamination procedures are equal to or exceed the EPA SOP-QAM, revisions are not required.

6. Page 7, Section 5, Submittals

The final report site photographs should include photographs taken during the excavation. Revision of the work plan is not required.

7. Page 7, Section 6, Emergency Procedures

Review of this section is deferred.

8. Appendix C, Site Specific Health and Safety Plan

Review of this section is deferred.



2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

June 18, 1999

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NAVFACENCOM, Southern Division
P. O. Box 190010
North Charleston, SC 29419-9010

William M. Hull, Jr., MD
Vice Chairman

Roger Leaks, Jr.
Secretary

Mark B. Kent

Re: Interim Measures Removal Work Plan for SWMU 2 Located in Zone A of the Charleston Naval Complex, SCO 170 022 560, dated April 23, 1999; Revision received June 11, 1999.

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Interim Measures Removal Work Plan (4/23/99) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. The attached comment was generated based on this review, however revisions are not necessary. The above referenced interim measure is approved provided CNC-Navy addresses the attached comment during field implementation.

Should you have any questions regarding this comments, please contact me at (803) 896-4185 or Paul Bergstrand at (803) 896-4016 or Mihir Mehta at (803) 896-4088.

Sincerely,

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

Attachments: Memorandum form Paul Bergstrand to Mihir Mehta dated June 17, 1999.

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV



2600 Bull Street
Columbia, SC 29201-1708

RECEIVED
JUN 17 1999
SC DHEC - Bureau of
Land & Waste Management

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 June 1999

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

Interim Measure Workplan
Zone A, SWMU 2
Revisions received 11 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.

One reply has been provided, however revisions are not necessary.

DD990515.PMB

Zone A, SWMU 2 Work Plan

Paul M. Bergstrand

17 June 1999

1. Page 6, Section 4.2.1 c) General Requirements

ORIGINAL COMMENT

The groundwater in this area is very shallow and the excavation is likely to be inundated with water. Please describe how groundwater infiltration would be controlled and how water removed from the pit would be disposed. This information request should not impede the approval of the work plan, however, the description should be provided before the initiation of field work.

RESPONSE

If groundwater is encountered, the excavation will stop at the depth of groundwater encroachment. Further excavating will proceed at a depth to prevent further groundwater infiltration. A groundwater sample will be collected and analyzed for documentation purposes. If water is required to be removed from the pit, the water will be tested prior to release to the local Publicly Owned Treatment Works (POTW) with their permission.

REPLY

The excavation does not have to stop at groundwater encroachment. The stated goal of the Interim Measure is to remove soils containing lead greater than 400 parts per million, whether found above or below the water table. The original comment asked *how groundwater infiltration would be controlled and how water removed from the pit would be disposed*. The last sentence of the response is sufficient to answer the comment. Revision of the workplan is not required.



2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

June 18, 1999

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

William M. Hull, Jr., MD
Vice Chairman

Roger Leaks, Jr.
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Re: Zone A RFI Conditional Approval, AOC 506 Benzo(a)pyrene SSL
Evaluation, Memorandum dated March 23, 1999 and comment responses
dated May 27, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced memorandum (3/23/99) and comment responses (5/27/99) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. Based on this review the referenced document is approved.

Further, provide a revised copy of the referenced document for the administrative record file within thirty (30) days of the receipt of this letter.

Should you have any questions regarding this comments, please contact me at (803) 896-4185 or Mihir Mehta at (803) 896-4088.

Sincerely,

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

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV



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Columbia, SC 29201-1708

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Brian K. Smith

Rodney L. Grandy

June 21, 1999

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

Re: Interim Measures Work Plan for SWMU 25, Dated April 9, 1999, Located in Zone E Charleston Naval Complex SCO 170 022 560. Comment Responses Faxed on June 18, 1999.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Interim Measures Work Plan (4/9/99) and the faxed comment responses (6/18/99) according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. Based on the review of the comment responses the Interim Measure Work Plan is conditionally approved for initiating the field implementation/activities.

Further, please forward three copies of referenced Interim Measure Work Plan in its entirety to the Department for its final approval within thirty (30) days of the receipt of this letter.

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

Sincerely,

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

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV



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Columbia, SC 29201-1708

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June 21, 1999

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North Charleston, SC 29419-9010

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Vice Chairman

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Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Re: Technical Memorandums Proposing No Further Action (NFA) for AOC 655, AOC 656, and AOC 666; Dated March 31, 1999; Located in Zone H Charleston Naval Complex SCO 170 022 560.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced technical memorandums according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1999. Based on this review the Department concurs with the NFA decision for AOC 655 and AOC 656 and therefore, approves the referenced technical memorandums for AOC 655 and AOC 656.

Further, the Department has additional concerns for AOC 666 at this time and therefore, does not concur with NFA.

Should you have any questions, please contact me at (803) 896-4185 or Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Attachment: Memorandum from Paul Bergstrand to Mihir Mehta dated June 18, 1999.

Sincerely,

A handwritten signature in cursive script that reads 'David M. Scaturo'.

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

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



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: 18 June 1999

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

Technical Memorandums for NFA Status
Zone H, AOCs 655, 656, and 666
Received 06 April 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.

Data from additional sampling was not included with the Technical Memorandums and should be presented.

Some notes and a comment has been provided.

DD990519.PMB

Zone H, AOCs 655, 656, and 666

Paul M. Bergstrand

18 June 1999

1. AOC 655

This AOC may be removed from the CMS process and may proceed with NFA. Please note that page 1 states "This AOC is not considered a hazardous material or waste treatment, storage or disposal area." However, the presence of chlorinated solvents in surface and subsurface soil samples, reported in the RFI, does not support this statement. The cause for the presence of the chlorinated solvents in soil was not determined. Chlorinated solvents were not reported in groundwater samples.

2. AOC 656

This AOC may be removed from the CMS process and may proceed with NFA.

3. AOC 666

This AOC should not be removed from the CMS process at this time. Subsequent to the CMS workplan, the project team learned of the presence of the oil water separator (OWS) at this AOC. The OWS may explain the presence of vinyl chloride and chloromethane in groundwater. A brief review of the DET UST closure report indicates a loose mechanical joint in the drain line from the OWS to the waste oil UST NS-44-A, a oil sheen on groundwater in the excavation and groundwater contamination. Unfortunately, the DET groundwater samples were only analyzed for BTEX and PAHs. Additional investigation may be required at this site.



2600 Bull Street
Columbia, SC 29201-1708

June 21, 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 F
Site AOC 607
Revision 0 Dated June 2, 1999

Dear Mr. Shepard:

The above referenced request (Bayley to Bergstrand) 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) deep monitoring wells at AOC 607. The monitoring wells for AOC 607 are anticipated to be completed to the top of the Ashley Formation.

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 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. Daniels, Hydrogeologist
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA-HW-99-055

CC: Paul Bergstrand, P.G., Hydrogeologist
Mehir Mehta, Hazardous Waste Permitting Section
Christine Sanford-Coker, Trident District EQC
David Dodds, 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:
Attention:

Naval Base Charleston
Mr. H.N. Shepard II, P. E.

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

for the installation of three (3) monitoring wells at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Bayley to Bergstrand*), dated June 2, 1999.

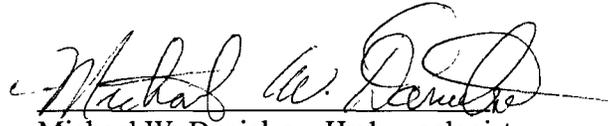
Conditions:

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.

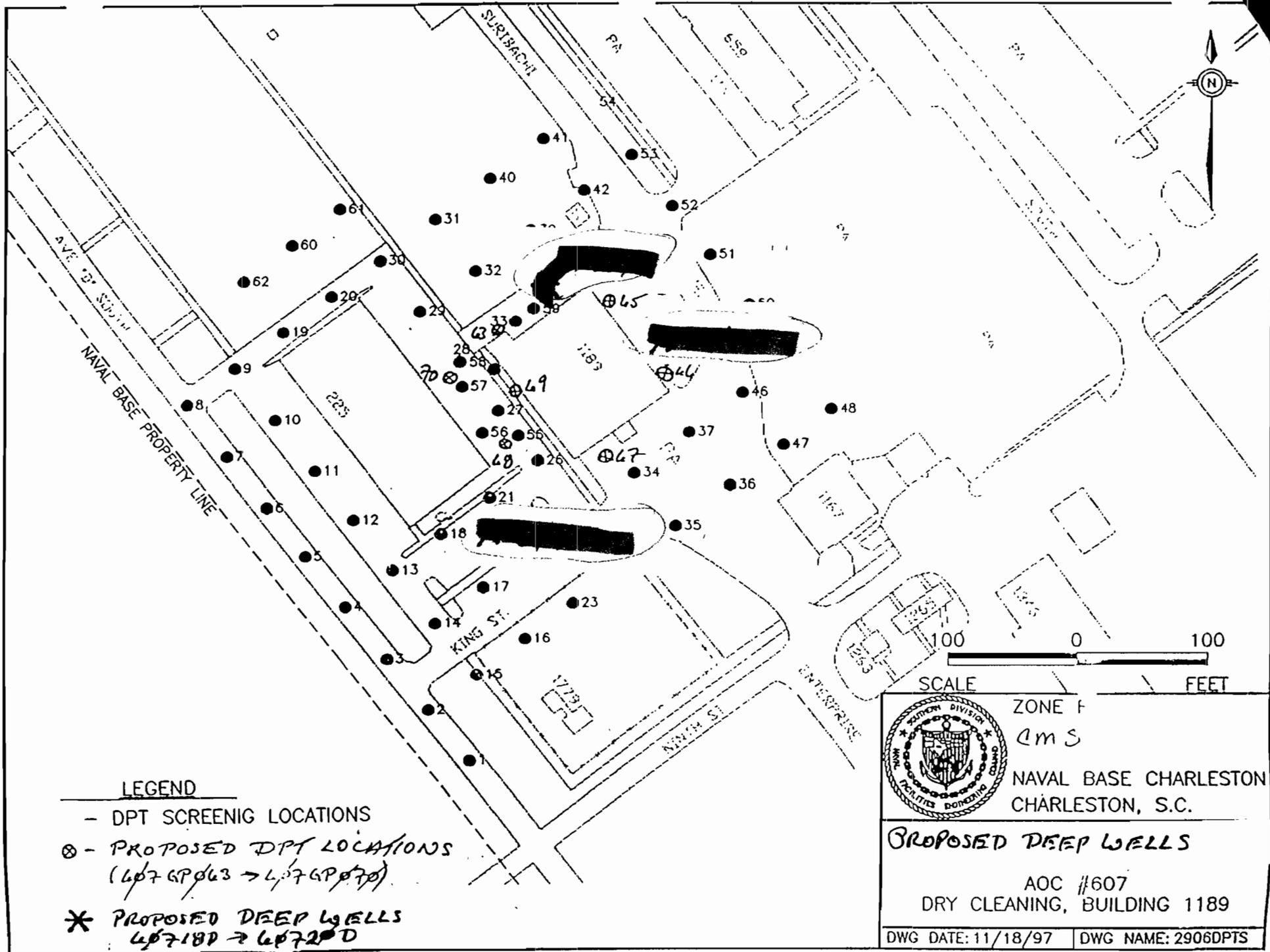
This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and

R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

Date of Issuance: June 21, 1999
Approval #: HW-99-050

A handwritten signature in black ink, appearing to read "Michael W. Danielsen", written over a horizontal line.

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



LEGEND

- DPT SCREENING LOCATIONS
- ⊗ - PROPOSED DPT LOCATIONS
(LP7 GP063 → LP7 GP070)
- * PROPOSED DEEP WELLS
LP718P → LP720D



ZONE F
 CMS
 NAVAL BASE CHARLESTON
 CHARLESTON, S.C.

PROPOSED DEEP WELLS

AOC #607
 DRY CLEANING, BUILDING 1189

DWG DATE: 11/18/97 DWG NAME: 2906DPTS



CSD
FILE COPY

2600 Bull Street
Columbia, SC 29201-1708

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Rodney L. Grandy

June 29, 1999

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

Re: Draft Zone L RCRA Facility Investigation (RFI) Report (Volumes 1-12),
Charleston Naval Complex, dated December 18, 1998.

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced RCRA Facility Investigation Report 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 above referenced document

Navy should note that the Department has performed a cursory review of the referenced document and found to be deficient and inadequate in satisfying the requirements of an RFI Report. The Navy should also note that the Department defers detailed review and comments of the referenced document to a later date upon resolution of the attached comments and subsequent revisions to the referenced document. All pertinent sections of the referenced document should be revised, as deemed appropriate, based on the attached comments.

Further, the CNC should submit, to the Department, the comment responses and proposals to address these comments within forty five (45) 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 & Michael Danielson to Mihir Mehta dated June 21, 1999.
2. Memorandum from Eric F. Cathcart to Mihir Mehta dated June 29, 1999.
3. Memorandum from Charles B. Watson to Mihir Mehta dated June 29, 1999.
4. Memorandum from Susan K. Byrd to Charles Watson dated April 28, 1999.
5. Memorandum from Paul M. Bergstrand to Mihir Mehta dated June 29, 1999.

cc: Rick Richter, Trident EQC
David Dodds, SOUTHDIV
Dann Spariosu, EPA Region IV
Charles Watson, Corrective Action Engineering
Susan Peterson, Corrective Action Engineering
Susan Byrd, Corrective Action Engineering
Paul Bergstrand, Hydrogeology
Mike Danielson, Hydrogeology
Eric Cathcart, Hydrogeology



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Brian K. Smith

Rodney L. Grandy

MEMORANDUM

TO: Mihir Mehta, Environmental Engineer Associate
DHEC Project Manager at the Charleston Naval Complex

FROM: Susan Peterson, Environmental Engineer Associate
Michael Danielsen, Hydrogeologist

DATE: June 21, 1999

SUBJECT: RFI Report for Zone L

The review of Zone L RFI report has been delegated such that our review focuses on the Data Evaluation and Background Comparison (Section 5.0) and the Sanitary Sewer System in Subzones G, H, and I.

The goal of an RFI report is to show the Nature and Extent of Contamination. The RFI report should include interpretation of the data, and adequate provision of maps, figures, and tables. This information should support remedial recommendations. We have determined from a cursory review that this document does not meet the goals of an RFI report. Thus we are unable to approve or disprove any of the recommendations associated with this document.

The CNC should revise the document to meet the objectives of an RFI report.

Below is a list of comments (in no order of importance) that should assist in the preparation of an RFI report. The CNC should not rely on these comments solely as a prescription to fix this document. There are numerous smaller comments (inaccuracies in tables, text, missing information) that are not listed in this memorandum.

COMMENTS

1) Comparison of analytical results

Nature and Extent of contamination should be delineated based on Zone-Specific background concentrations. This report compares samples to established comparison criteria tables such as EPA RBC tables. The CNC has developed background concentration values for Subzones G, H and I, however there is no comparison of the results to this data in the document.

2) Turbidity and the inclusion or exclusion of DPT sample results

The report extensively lists the results of the turbidity study. The report does not explain why turbidity is studied.

The report states (p. 10.0.1) that “Metals detections from DPT groundwater have not been compared to MCLs or RBCs due to the sampling method used to obtain the DPT samples.” The report does not provide a reason for this. Please include all data sets collected as part of the RFI in this report. This information is needed to support your evaluation of the nature and extent of contamination, fate and transport, and risk associated with the SWMUs in Zone G, H, and I.

If CNC excludes samples due to turbidity, this exclusion affects the evaluation of the nature and extent of contamination. The report fails to provide any connection to the effect turbidity would have on the analytical results. Thus the most accurate site characterization has not been determined. CNC should modify their sampling techniques so that turbidity is not an issue. CNC should resample and/or provide justification regarding the turbidity issues.

3) Interpretation of analytical results

Nature of Contamination in SWMU 37, Subzone H, DPT Groundwater is a title of one of the sections. The report states that 45 DPT samples were collected and analyzed for various constituents. The report immediately refers the reader to Tables to view the results. This is one of many examples where the report offers no interpretation of analytical results.

An RFI report should state (in the text) what the contamination is, why it is significant or insignificant, etc. As currently written, the report contains no conclusions to support the recommendations contained in Volume VII. The CNC must interpret the data and include that interpretation in the report in order for the Department to agree or disagree with the conclusions/recommendations.

4)

The report contains figures that show where the CNC believes the Sanitary Sewer System lines exist. The Department believes these lines are not complete, based on their belief that restroom facilities exist in most all buildings. Please revise the figures to show the complete sanitary sewer line system and other features associated with it.

5)

The Department was unable to determine DPT sample depths due to the document's exclusion of the soil boring logs. The Department was unable to determine the relationship between the depths of the DPT samples and the depths of the Sanitary Sewer System lines. Please provide this information. The

Department is unable to concur or refute the report's conclusions/recommendations until this information is provided.

6)

The Department believes that there is too great a distance between some of the sample points along the Sanitary Sewer System lines. One example is the area around building 249. Building 249 was previously used as a pesticide mixing area. There is a good possibility that pesticides were spilled/dumped in or around the storm drain that exists at this location. The CNC should sample around joints, manholes, curves at appropriate distances that would delineate nature and extent of contamination along the sewer system.

7)

The Department did not locate any DPT well logs as part of their review. These well logs contain information such as samples depths, lithological features, etc. The CNC should provide this information upon resubmittal of the RFI report.

8)

One of the requirements associated with a monitoring well installation request is that the depths of the wells must be surveyed after installation. The Department did not locate this information during their review. The CNC should provide this information upon resubmittal of the RFI report.

9)

No explanation was provided regarding the further separation of groundwater results in Subzone H. Separation exists through Subzones H-1 to H-5. The Department would like to know the reasoning behind the presentation of this data.

MEMORANDUM

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

From: Eric F. Cathcart, GIT, Hydro geologist *efc*
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

Date: 29 June 1999

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

Cursory Review

RCRA Facility Investigation (RFI) Draft Report
Zone L [Dated 18 December 1998, 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 comments contained in this memorandum only pertain to information on subzones D, E, and F. These comments will support additional DHEC team member comments on the remaining subzones that make up Zone L.

If you require additional information, please contact me at 896-4045.

Zone L
Cursory Review
Eric Cathcart, SCDHEC
29 June 1999

General Comments

1. All soil samples should be compared to residential RBC values, as well as industrial RBC values.
2. DPT groundwater samples should be compared to RBC and MCL values for inorganic parameters.
3. The Navy did not sample sediments at storm sewer discharge outfalls numbered 32, 33, 34, 37 and 38. The Navy should sample these areas to identify if contamination exists in the sediments of the Cooper River. Sample 699M001 was not collected near the pipe outfall for number 23. The Navy should resample closer to the outfall for number 23.
4. The report states that an MCL does not exist for chlorobenzene. The Department has informed the Navy in previous RFI reviews that an MCL of 100 ug/L has been established for Monochlorobenzene. The report should be revised to reflect the proper information.
5. The report lists the incorrect tap water RBC value for 1,1-Dichloroethane as 81.0 ug/L. The correct tap water RBC value is 800 ug/L. Please make the necessary corrections.
6. The report list the incorrect tap water RBC value for Cis-1,2-Dichloroethene as 6.10 ug/L. The correct tap water RBC value is 61.0 ug/L. Please make the necessary corrections.

Specific Evaluation, Subzone E (AOC 699)

7. The report states that sediment sample results will be discussed in section 8 of the RFI report. The Department recommends including the sediment results in this section in the revised report.
8. The analytical tests for AOC 699 should include PCBs.

*Fate and Transport for SWMU 37, AOC 504 and AOC 699 in Subzone E
(Section 10.5.4)*

9. Zone E RFI reported free product in 065SB006 and historical accounts of pickling solution being poured down the storm drain. 699GP085 reveals an exceedance for TCE. Additional sampling should be performed around the storm sewer line between 699GP085 and the river.

10. Groundwater samples from DPT 037GP055 exhibited levels above the tap water RBC. According to Figure 10.5.5, an insufficient number of soil/groundwater samples have been collected in this area. The Department recommends additional sampling to define the horizontal and vertical extent of contamination.

Subzone F (Section 10.6.1)

11. DPT groundwater samples should be analyzed for SVOCs?

12. The sample locations did not include the entire railroad system for Zone F. An adequate sampling strategy should be proposed for this AOC to delineate the nature and extent of contamination.

13. Concentrations of benzene and ethylbenzene detected in groundwater samples from 037GP017 and 037GP018 were above their MCL. These wells are immediately downgradient of AOC 609, a former service station. The Zone F RFI revealed a plume of petroleum contaminated groundwater emanating from AOC 609 in the direction of the two previously mentioned wells. The sanitary sewer line is directly downgradient of this plume source and may be acting as a conduit for contaminant migration. The Navy must identify the horizontal and vertical extent of petroleum contamination along the sewer system in this area.

Nature of contamination in Subzone F, AOC 699, DPT groundwater (Section 10.6.2.2)

14. This section identifies cis-1,2-dichloroethene in groundwater from DPT sample 699SP007F at 9.97 ug/L, exceeding the tap water RBC and vinyl chloride in groundwater from DPT sample 699SP007F at 7.84 ug/L, exceeding both the tap water RBC and the MCL. The report fails to identify the horizontal and vertical extent or source of these contaminants. The Navy must identify the horizontal and vertical extent of chlorinated solvent contamination along this area.

Subzone F, (Section 10.10.3)

15. Second round DPT groundwater samples were collected for areas exhibiting high detections during initial sampling; however, second round samples were not collected for 037GP017 or 037GP018, both above their RBC values. Please explain the deficiency.

16. The investigation of the fuel distribution system is inadequate. Additional sampling points are necessary along the lines and should be proposed.

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
Hazardous & Infectious Waste Management
Bureau of Land and Waste Management

Date: 29 June 1999

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

Cursory Review
RCRA Facility Investigation (RFI) Draft Report
Zone L [Dated December 18, 1998, Revision 0]

The above referenced document completed by Ensafe Inc. has been reviewed. If you require additional information, please contact me at 896-4212.

Zone L Draft RFI Report

29 June 1999

Charles B. Watson

General Comments

1. The Zone L RFI submittal uses industrial RBCs as part of the determination of contamination. Soil sampling results must also be compared to residential RBC values. Therefore, it is requested that all sampling results be re-evaluated to include residential RBCs from the latest EPA Region III RBC Table.
2. The number of soil samples collected should be compared to the number that was proposed in the workplan. Any deviations in location and number should be discussed in a narrative.
3. It appears that soil sampling locations along sanitary and storm sewer systems may be spaced too far apart and in some cases too far from the lines in order to properly characterize any possible contaminant release. Additional soil samples should be collected in these locations.
4. There appears to be some discrepancy between the workplan and the RFI as to the locations of the sanitary sewer lines. This may be the result of discovery during sampling. This should be discussed in the text. Revisions of this document must represent the correct locations of the sewer lines.
5. Soil sampling for AOC 544 in Zone F does not appear to be consistent with the workplan in location and number, i.e. according to sheet 1 of 1 figure 10.6.14, no samples were collected near SWMU 109 as designated in the workplan. Any deviations in location and number should be discussed in a narrative. Additional soil samples may be necessary in these locations.



2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Charles Watson, Project Engineer
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: April 28, 1999

RE: Charleston Naval Shipyard
South Carolina
SC 0170022560

Document:
Zone L RCRA Facility Investigation Report
NavBase Charleston
Volumes I-XII
December 18, 1998

The above referenced document completed by Ensafe Inc. has been reviewed. Zone L consists of three sites: SWMU 37 (the sanitary sewer system), AOC 699 (the storm sewer system), and AOC 504 (the railroad system). Each site is evaluated within each of the previously investigated zones referred to as Subzones A-I in this investigation.

Based on the review of this document, SCDHEC has the following comments relating to the human health risk assessment:

GENERAL COMMENTS:

The general comments may include specific examples from the text; however, the comment should apply to the whole report and may require revisions to each individual unit.

1.) Section 7.3.4, Page 7.10, Elimination of Essential Elements: The text refers to the elimination

of iron as a COPC because it is listed as an essential element. "Supplemental Guidance to RAGS: Region IV Human Health Bulletin No. 1" does not list iron as an essential nutrient for exclusion from evaluation. Elevated levels of iron detected throughout Zone L should be evaluated quantitatively throughout each subzone investigation. In order to adequately evaluate the potential concerns due to iron levels detected above residential RBCs, background reference values for iron should be determined. If iron is determined to be elevated above reference concentrations and RBCs, then it should be retained as a COPC and incorporated in the Risk Assessment portions of each subzone investigation.

2.) Samples collected in each subzone of Zone L are compared to geographically similar samples points in the zone specific RFI reports (Zones A-I). COPCs to be evaluated further and the reference document locations are provided in tables in each subzone section of the Zone L RFI. It would be helpful to see the levels of the COPCs detected in the referenced RFI reports for each zone so that comparisons can be made to the detections in the SWMU 37, AOC 699, or AOC 504 subzone sampling.

3.) Several of the subzones evaluated did not require an evaluation of each AOC or SWMU. Please include a brief explanation why the AOC or SWMU was not evaluated. If the determination was based on a team decision, then briefly mention in the text how this decision was derived.

SPECIFIC COMMENTS:

1.) Section 7.3.3, Management of Site-Related Data, Page 7.7 : The text states that the lesser of the two values ($\frac{1}{2} U$ or $\frac{1}{2} J$) was used as the best estimate of the concentration that was potentially below the estimated quantitation limit. The greater of the two values is a more conservative value; therefore, an explanation should be given why the lesser conservative value was selected.

2.) Figure 7.1, Formulae for Calculating CDI for Soil, Page 7.20: The soil dermal contact pathway CDI equation is the noncarcinogens-child-residential-scenario. However, the BW value is listed as average adult body weight instead of average child body weight. Please correct accordingly.

3.) Figure 8.1, Subzone E Sediment and Surface Water Sample Locations: The map serves as a useful tool in showing all of the sediment and surface water locations collected from within Zone E; however, the map would be better clarified if outfalls and other areas were labeled for reference points.

4.) Section 8.3, Conceptual Model, Page 8.12 and Figure 8.7: The figure should be explained more thoroughly in the conceptual model discussion. An explanation should be given why the "possible receptors" were not evaluated and what types of information were insufficient.

5.) Table 8.4a, Page 8.16: Antimony is not listed as an ECPC even though its HQ value is greater than one. Please explain or revise the text if necessary.

6.) Section 8.8.1, Discussion of Findings, Page 8.34: The text lists several lines of evidence indicating that the PAH contamination may have originated upriver from the Navy Base. The information provided does suggest that an upriver source or sources likely exist; however, the text fails to mention that elevated levels of PAH were found at various sites throughout the CNC. Therefore, CNC should not be eliminated as a potential source of PAH contamination in the Cooper River.

7.) Table 10.1.9, Page 10.1.23: The table lists the concentrations of beryllium ranging from 0.240-0.310 mg/kg. The residential RBC listed is 16.0 mg/kg and the number listed as exceeding RBC is 5. None of the levels detected exceed RBC; therefore, the table and any relevant text should be revised accordingly.

8.) Subzone A, Table 10.1.13, Pages 10.1.30 and 10.1.31: Sample 504SB008A2 exceeded the RBC value for arsenic. The RBC value for iron was exceeded in all samples listed on page 10.1.31. Please revise the table and any text if necessary to reflect these changes.

9.) Subzone B, Table 10.2.3, Page 10.2.9: Samples 037SP001, 037SP004, 037SP005, and 037SP007 all exceeded the SSL value of 5.0 mg/kg for arsenic. The table and text should be revised accordingly.

10.) Subzone B, Table 10.2.7, Page 10.2.17: Sample 504SP011E1 was detected below its respective SSL value of 29 mg/kg. Please revise the table and text as necessary.

11.) Subzone B, Table 10.2.10, Page 10.2.24: Arsenic was detected above its respective SSL value in samples 504SB002B1, 504SB003B1, 504SB005B1, 504SB006B1, and 504SB008B1. Chromium was detected above RBC in samples 504SB005SB2 and 504SB008B2 and thallium was detected above its respective SSL in 504SB006B1. Please revise the table and any relevant text.

12.) Subzone B, Table 10.2.15, Page 10.2.33: The current and future site users portion of the table states that no COPCs were identified for groundwater. It should be mentioned that no groundwater monitoring wells were sampled as part of the investigation; therefore, no COPCs could be identified.

13.) Subzone B, Exposure Unit Area, Page 10.2.34, Line 2: The text states that the risk assessment focuses on the area along the western boundary of Zone B. Please provide a brief explanation in the text as to why this area is the focus of the risk assessment.

14.) Subzone C, Section 10.3.2, Subzone C, AOC 699, Page 10.3.20, Line 2: The text states that in accordance with the approved work plan, no samples were collected in Subzone C for AOC 699. Please provide a brief explanation in the text why the work plan recommended that no samples be collected from this AOC.

- 15.) Subzone C, Table 10.3.17, Page 10.3.33 & 34: Sample 504SB008 was detected above its respective SSL for arsenic. All of the concentrations listed for chromium were above the RBC value of 39 mg/kg and the SSL value of 38 mg/kg. Samples 504SB007, 504SB008, and 504SB014 were above their SSL value for iron. All of the concentrations listed for thallium were above respective RBC and SSL values. Please revise the table and text accordingly.
- 16.) Subzone E, Section 10.5.1, Metals/Cyanide Detected in DPT Soil, Page 10.5.1, Line 25: The text and table within subzone E compare soil detections to industrial RBCs. According to EPA Region 4 Bulletin No. 1, the comparison should be made to residential RBCs instead of industrial. Please revise the text, corresponding tables, COPC identifications and risk calculations accordingly.
- 17.) Subzone F, Table 10.6.3, Page 10.6.15: Samples 037SP001F1 and 037SP014F1 were detected above the SSL value for thallium. Please revise the table and any text as necessary.
- 18.) Subzone F, Table 10.6.12, Page 10.6.36: Dibenz(a,h)anthracene was detected at concentrations exceeding the residential RBC value. Please revise the table and text as necessary.
- 19.) Subzone F, Table 10.6.14, Page 10.6.40: Arsenic, chromium, lead, and thallium were detected at concentrations either exceeding RBC or SSL values but were incorrectly represented in the table. Please revise the RBC Exceeded and the SSL exceeded columns of the table and any relevant text. Also, the DAF value in the "Soil to GW" footnote of Table 10.6.14 lists a DAF value of 10; however, the Zone F RFI indicated that the DAF value is 20. Please revise accordingly.
- 20.) Subzone G, Table 10.7.3, Page 10.7.12: Antimony was detected in sample 037SP010G1 at a level above its respective SSL. Please revise the table accordingly.
- 21.) Subzone G, Table 10.7.8, Page 10.7.22: Aluminum was detected at concentrations above the S.L., and nickel and thallium were detected at concentrations above their respective RBC values. Please revise the table and text as necessary.
- 22.) Subzone H, Table 10.8.6, Page 10.8.20: Dibenz(a,h)anthracene was detected at a concentration exceeding RBC. Please revise the table and any text as necessary.
- 23.) Subzone I, Section 10.9.2, Page 10.9.17, Line 15: The text states that the soil to air and soil to sediment cross media fate and transport were determined not to be a concern. In a brief statement in this section of the text, please explain how this determination was made.
- 24.) Section 10.11, Tables 10.11.1 and 10.11.2: Please provide the units for each compound detected in table 10.11.1 and a key for each table explaining what "ND" represents.

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



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: 29 June 1999

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

Draft RFI Report
Zone L
Dated 18 December 1998, 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.

Some notes and a comment has been provided.

DD990543.PMB

Zone L, Draft RFI Report Comments

Paul M. Bergstrand

29 June 1999

GENERAL COMMENTS

1. The Objectives Section, page 2-15, of the Zone L RFI Work Plan described the investigation of the Sanitary Sewer, Septic Tanks and Oil Water Separators (OWS). OWS commonly received waste solvents as well as oils and grease. The Draft RFI Report appeared to have removed OWS investigations from the document. Please provide an explanation for the removal of OWS from this report. Additional sampling at all OWS may be required.
2. Please include an explanation why SVOC analysis was not included in the DPT analysis.
3. The maps and figures in this document do not indicate flow of the sewer lines. This is important when comparing sample locations to a possible contaminant source. The revised document should indicate flow of the sewer lines on all appropriate maps and figures .
4. The maps and figures in this document do not indicate the location of OWS. This is important when comparing sample locations to a possible contaminant source. The revised document should indicate the locations of all OWS on all appropriate maps and figures .
5. The maps and figures in this document do not indicate the location of septic tanks and drain fields. This is important when comparing sample locations to a possible contaminant source. The revised document should indicate the locations of all septic tanks and drain fields on all appropriate maps and figures .
6. Chapter 10 repeatedly describes the detection of volatile organic compound in soil borings but routinely dismissed the detections because none of the detections exceeded RBCs or SSLs. This approach might be appropriate if the exact source of the contamination was known, however the source of the VOCs typically cannot be determined. The detections below RBCs or SSLs should be re-evaluated in light of a known source. If a known source is not evident, additional samples may be required at those sites.