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CNC CHARLESTON  
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CONFIRMATORY SAMPLING WORK PLAN AREA OF CONCERN 726 (AOC 726) ZONE H  
CNC CHARLESTON SC  
6/8/2006  
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

# CONFIRMATORY SAMPLING WORK PLAN

## AOC 726, Zone H



***Charleston Naval Complex  
North Charleston, South Carolina***

SUBMITTED TO  
***U.S. Navy Southern Division  
Naval Facilities Engineering Command***

***CH2M-Jones***

***May 2006***

***Contract N62467-99-C-0960***



C. Earl Hunter, Commissioner

*Promoting and protecting the health of the public and the environment.*

June 8, 2006

Commander (Dudley Patrick)  
SOUTHNAVFACENGCOM  
2155 Eagle Drive  
North Charleston, SC 29406

RE: Approval  
Confirmatory Sampling Work Plan, AOC 726, Zone H, Revision 1  
Charleston Naval Complex (CNC)  
SC0 170 022 560

Dear Mr. Patrick:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced document, which was received on May 30, 2006. This review was based upon applicable State and Federal Regulations, and the CNC Hazardous Waste Permit, effective October 21, 2005. The Department hereby approves the above referenced document. The Department anticipated that this work plan will be implemented and the results reported as soon as possible.

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

Sincerely,

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

Attachment:

Memorandum from Don Hargrove to Jerry Stamps dated June 8, 2006

cc: Rick Richter, EQC Region 7, Charleston      Dann Spariosu, PhD, EPA Region 4  
Gary Foster, PE, CH2M-Jones                      Don Hargrove, Hydrogeology  
Dean Williamson, PE, CH2M-Jones                Ms. Susan Grantham



2600 Bull Street  
Columbia, SC 29201-1708

**MEMORANDUM**

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

**FROM:** Donald C. Hargrove, Hydrogeologist  
RCRA Hydrogeology Section I  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 8 June 2006

**RE:** Charleston Naval Complex (CNAV)  
Charleston County  
SC0170022560

Confirmatory Sampling Work Plan, AOC-726, Zone H  
Revision 1  
(May 2006)

The Division of Hydrogeology has reviewed the document listed above, dated 24 May 2006. The document was received by the Department on 30 May 2006. This document provides some historical background on AOC-726, discusses the environmental sampling and analyses that have taken place for Area of Concern (AOC)-726, and proposes soil and groundwater sampling as part of a Confirmatory Sampling effort. This document also contains responses to comments generated during reviews of the Rev.0 version, and incorporates said responses into this Rev. 1 version, by means of replacement pages.

This document was reviewed with respect to R.61-71 of the South Carolina Well Standards, R.61-79 of the South Carolina Hazardous Waste Management Regulations (SCHWMR), and appropriate guidance documents.

The Division of Hydrogeology has determined that the Navy has adequately addressed the comments, and incorporated them into this Rev. 1 version. It is therefore recommended that this document can be approved and implemented as written. Monitoring well Approval # HW-06-040 has been written, allowing for the installation of the monitoring wells proposed in this work plan (see attached).

If you have any questions concerning this decision, please contact me at (803) 896-4033.

Attachment: MWA #HW-06-040



2600 Bull Street  
Columbia, SC 29201-1708

## Temporary Monitoring Well Approval

### Approval is hereby granted to:

Commander (Dudley Patrick) SOUTHNAVFACENGCOM  
2155 Eagle Drive  
North Charleston, SC 29406

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

This approval is for the installation of nine (9) temporary groundwater-monitoring wells at AOC-726. The temporary monitoring wells are to be installed in the locations as illustrated on Figure 4-1 (attached), and per the proposed construction details provided in the AOC-726 Confirmation Sampling Work Plan (dated May 2006). The temporary monitoring wells are to be installed following all of the applicable requirements of R.61-71.

### Please note that R.61-71 requires the following:

1. All wells shall be drilled, constructed, and abandoned by a South Carolina certified well driller per R.61-71.D.1.
2. That a minimum of (48) hours prior to initiation of drilling activities, notice shall be provided to Christine Sanford-Coker, District Hydrogeologist, at the EQC Region 7, Charleston Office (843-740-1590).  
All wells shall be drilled, constructed, and abandoned by a South Carolina certified well driller per R.61-71.D.1.
2. A Water Well Record Form or other form provided or approved by the Department shall be completed and submitted to Donald C. Hargrove, Division of Hydrogeology, South Carolina Department of Health and Environmental Control within 30 days after well completion or abandonment unless another schedule has been approved by the Department. The form should contain the "as-built" construction details and all other information required by R.61-71.H.1.f.
3. All analytical data and water levels obtained from each monitoring well shall be submitted to Donald C. Hargrove, Division of Hydrogeology, South Carolina Department of Health and Environmental Control within 30 days of receipt of laboratory results unless another schedule has been approved by the Department as required by R.61-71.H.1.d.
4. All temporary monitoring wells shall be abandoned within 5 days of borehole completion using appropriate methods as required by R.61-71.H.4.c. The appropriate method is: *A Temporary Direct Push Well that does not penetrate a confining layer shall be abandoned by forced injection of neat cement, bentonite-cement, or 20% high solids sodium bentonite grout through a tremie pipe after the sampling device has been removed.* R.61-71.H.4.c (3)

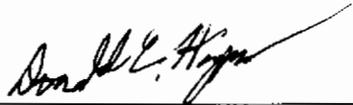
5. If any of the information provided to the Department changes, the Author (Donald C Hargrove) shall be notified a minimum of twenty-four hours prior to well construction as required by R.61-71.H.1.a.

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 April 26, 2002.

**Date of Issuance:** 8 May 2006

**Approval #:** HW-06-040

Approval granted by:

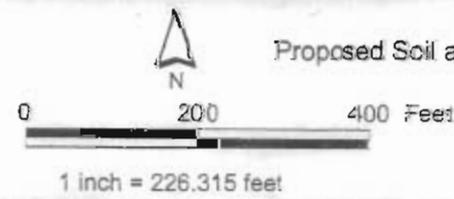
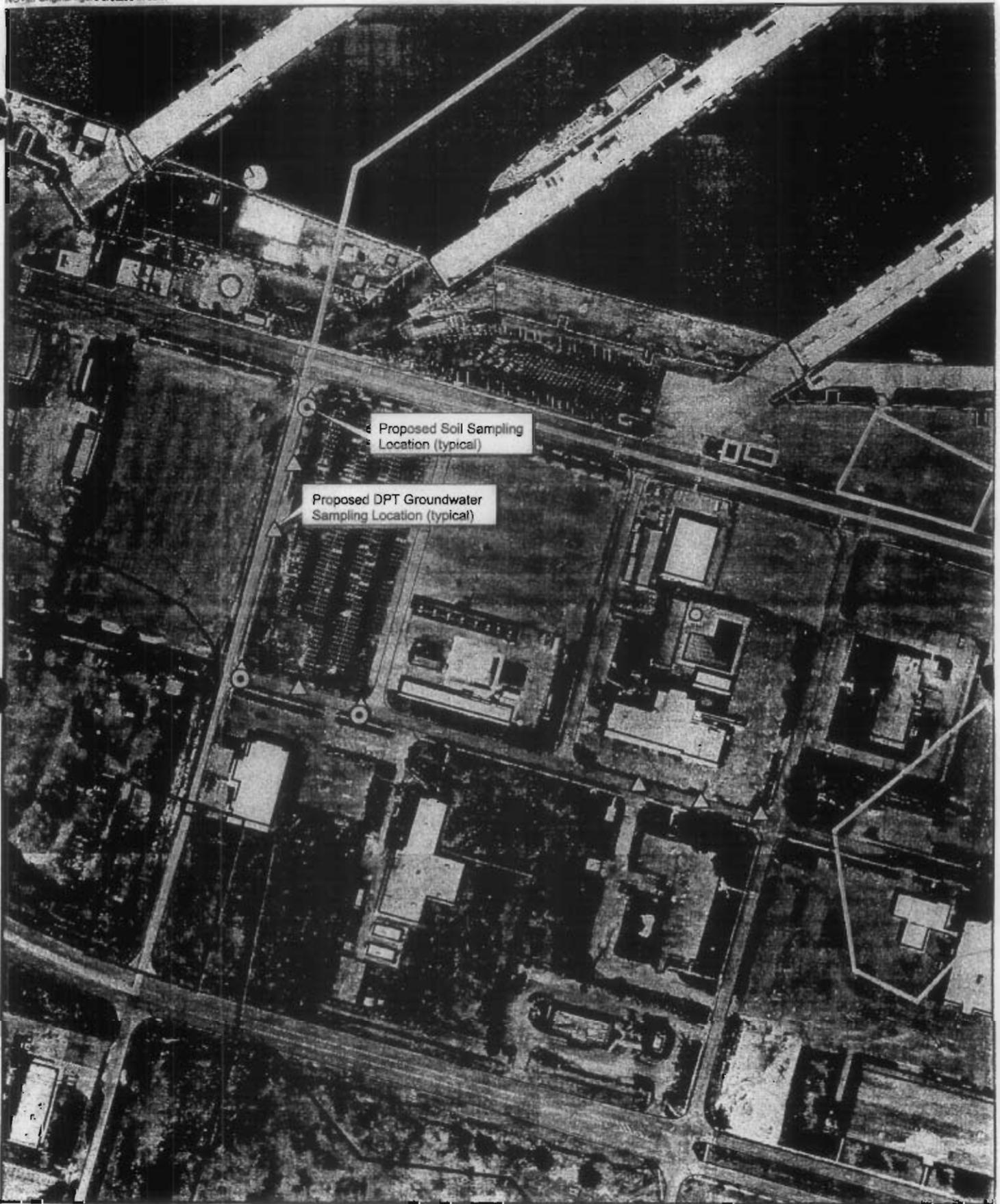
  
Donald C. Hargrove, Hydrogeologist  
Bureau of Land and Waste Management  
South Carolina Department of Health and  
Environmental Control

Attachment: Figure 4-1, Proposed Groundwater Sampling Locations

cc: Jerry Stamps, Corrective Action Engineering  
Christine Sanford-Coker, EQC, Region 7, Charleston  
Dann Spariosu, Federal Facilities Section, USEPA Region IV  
Gary Foster, P.E./ Ch2M Hill /ATL

Dean Williamson, P.E./ Ch2M Hill/ GNV  
File #50484

NOTE: Aerial Photo Date is 1997  
NOTE: Original figure created in color



**Figure 4-1**  
Proposed Soil and Groundwater Sampling Locations  
ADC 726 CS Work Plan  
Charleston Naval Complex



**CH2MHILL**

**CH2M HILL**  
3011 SW Williston Road  
Gainesville, FL  
32608-3928  
P.O. Box 147009  
Gainesville, FL  
32614-7009  
**Tel 352.335.7991**  
**Fax 352.335.2959**

May 24, 2006

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

Re: Confirmatory Sampling Work Plan (Revision 1) – AOC 726, Zone H

Dear Mr. Scaturo:

Enclosed please find two copies of the Confirmatory Sampling Work Plan (Revision 1) for AOC 726 in Zone H of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me at 352/335-5877, ext. 2280, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Dann Spariosu/USEPA, w/att  
Kathryn Stewart/Navy, w/att  
Gary Foster/CH2M HILL, w/att



C. Earl Hunter, Commissioner

*Promoting and protecting the health of the public and the environment.*

May 5, 2006

Commander (Dudley Patrick)  
SOUTHNAVFACENGCOM  
2155 Eagle Drive  
North Charleston, SC 29406

RE: Comments  
Confirmatory Sampling Work Plan, AOC 726, Zone H  
Charleston Naval Complex (CNC)  
SC0 170 022 560

Dear Mr. Patrick:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) have completed the review of the above referenced document, which was received on March 24, 2006. This review was based upon applicable State and Federal Regulations, and the CNC Hazardous Waste Permit, effective May 22, 2002. Please note that the Department received comments from Ms. Susan Grantham of Wyatt and Wyatt Construction Inc., on April 21, 2006. The Department took those comments pertaining to this work plan into consideration during the review of the above referenced document. As such, the Department has determined that the attached comments must be adequately addressed prior to receiving a final determination on the proposed fieldwork. Also, please find enclosed a copy of the comments from Ms. Grantham for your consideration.

Thank you for your cooperation in this matter. If you have any questions or concerns, please contact me at (803) 896-4285.

Sincerely,

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

Attachment:

Memorandum from Don Hargrove to Jerry Stamps dated January 19, 2006  
Comments from Ms. Susan Grantham regarding the Work Plan for AOC 726

cc: Rick Richter, EQC Region 7, Charleston  
Don Hargrove, Hydrogeology  
Dean Williamson, PE, CH2M-Jones

Dann Spariosu, PhD, EPA Region 4  
Gary Foster, PE, CH2M-Jones  
Ms. Susan Grantham

ENGINEERING COMMENTS  
Prepared by Jerry Stamps  
Charleston Naval Complex (CNC)  
May 5, 2006

---

1. Section 4.3

Per Ms. Grantham's comments (see attached), the Navy must sample near manholes 7 and 8, north of the sampling locations proposed on Halsey Street to ensure all areas of suspected contamination are adequately investigated.

2. Section 4.3

The Navy provides the rationale for limiting samples to DPT only; however, in order to minimize potential data gaps, the Navy must collect surface and subsurface soil samples from select DPT locations corresponding to areas of suspected contamination.

Particularly, the Department is interested in soil samples near the manholes identified in the field notes provided by Ms. Grantham where odors were detected. The Department is willing to work with the Navy to identify these locations.

3. Section 4.3

As indicated in the work plan, the PID readings collected by PSC at locations 1, 2, and 4 were greater than 9,999 ppm; however, the samples collected from locations 1 and 4 for laboratory analysis did not indicate VOC concentrations which would substantiate such high PID readings. The Department is concerned that fuel range hydrocarbons may have caused the elevated readings. Therefore, the Department recommends analyzing samples for DRO and GRO to serve as indicators for the potential presence of petroleum contamination.



2600 Bull Street  
Columbia, SC 29201-1708

## MEMORANDUM

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

**FROM:** Donald C. Hargrove, Hydrogeologist   
RCRA Hydrogeology Section I  
Division of Hydrogeology  
Bureau of Land and Waste Management

**DATE:** 8 May 2006

**RE:** Charleston Naval Complex (CNAV)  
Charleston County  
SC0170022560

Confirmatory Sampling Work Plan, AOC-726, Zone H  
Revision 0  
(March 2006)

The Division of Hydrogeology has reviewed the document listed above, dated 22 March 2006. The document was received by the Department on 24 March 2006, and received by this reviewer on 1 May 2006. This document provides some historical background on AOC-726, discusses the environmental sampling and analyses that have taken place for Area of Concern (AOC)-726, and proposes soil and groundwater sampling as part of a Confirmatory Sampling effort.

This document was reviewed with respect to R.61-71 of the South Carolina Well Standards, R.61-79 of the South Carolina Hazardous Waste Management Regulations (SCHWMR), and appropriate guidance documents.

The Division of Hydrogeology has the following comments:

- 1) Section 4.1, Purpose and Objectives: This section should be revised to state that the purpose of this confirmatory sampling effort is to determine presence or absence of contamination. If contamination is determined to be present, a RCRA Facility Investigation (RFI) will then be required to delineate the nature and extent of contamination.

2) Section 4.2.5, Sampling Methodology: This section describes how the proposed temporary monitoring wells will be abandoned, but does not give adequate detail concerning the composition of the grout to be used. It has been the experience of this reviewer, that when DPT wells are typically installed, sampled, and subsequently abandoned, the drillers have, on occasion, abandoned the wells by filling the borehole with pure bentonite. This method of abandonment is not acceptable. The text in this section does specify that the wells will be abandoned using bentonite grout. However, in order to avoid improper abandonment issues, the grout composition should be expressly described. An acceptable grout mixture would specify that grout composed of Portland cement and clean, potable water will be used. Additionally, if bentonite is to be incorporated into the grout, it should be specified that the grout will contain not more than five (5) percent bentonite by weight. Please refer to the South Carolina Well Standards (R.61-71.H) for reference. The text should be revised to include the specifications for the composition of the grout.

3) Section 4.3, Proposed Sampling and Analysis:

A) This section proposes the collection of seven (7) groundwater samples at the locations shown on Figure 4-1. However, Figure 4-1 indicates eight (8) proposed locations. The Figure or the text should be revised to include the actual number of proposed sampling locations.

B) No groundwater samples are currently proposed in the area near Manhole 8. The proposed groundwater sampling locations should be revised to include sampling near Manhole 8, and Figure 4-1 should be revised to include these new locations.

4) Figures: The figures included in this work plan do not show the direction(s) of groundwater flow. Please revise the figures to include this information.

If you have any questions concerning these comments, please contact me at (803) 896-4033.

# CONFIRMATORY SAMPLING WORK PLAN

## AOC 726, Zone H



**Charleston Naval Complex  
North Charleston, South Carolina**

SUBMITTED TO  
**U.S. Navy Southern Division  
Naval Facilities Engineering Command**

PREPARED BY  
**CH2M-Jones**

*May 2006*

*Revision 1  
Contract N62467-99-C-09602  
258814.PM.13*

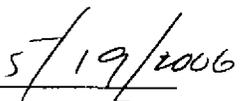
## Certification Page for Confirmatory Sampling Work Plan (Revision 1) – AOC 726, Zone H

I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

Permit No. 21428

  
\_\_\_\_\_  
Dean Williamson, P.E.

  
\_\_\_\_\_  
Date

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27		<i>AOC 726, Zone H</i> (CH2M-Jones, 2006)	

## 2.5 Location of AOC 726

Based on the available data, the location of AOC 726 is assumed to include the general route of the new sewer line along Dyess Avenue, starting at the approximate location of PSC soil sampling Location 1, extending up Dyess Avenue to Halsey Street, then extending up Halsey Street to the entrance to the Coast Guard long term parking lot. The general alignment of the new sewer line that was installed in this area is shown on **Figure 2-2**.

Areas of particular interest include PSC soil sampling Locations 1 and 4, at which detections of VOCs were reported. In addition, according to the Wyatt and Wyatt "daily log," obtained from SCDHEC (see **Appendix C**), the workers' reported symptoms were indicated to be particularly significant during work between manholes 6 and 5, and between manholes 6 and 7. The approximate manhole locations are shown on **Figure 2-2**.

Shallow groundwater gradients in the vicinity of AOC 726 are shown in **Figure 2-3**. The general direction of flow is towards the Cooper River.

NOTE: Aerial Photo Date is 1997  
NOTE: Original figure created in color



 inferred  
known



0 200 400 Feet

1 inch = 241.745 feet

**Figure 2-3**  
Shallow Groundwater Contours  
AOC 726 CS Work Plan  
Zone H, Charleston Naval Complex

# 4.0 Confirmatory Sampling Work Plan for AOC 726

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## 4.1 Purpose and Objectives

This CSWP is intended to determine the presence or absence of contamination in the vicinity of the area identified as AOC 726. General requirements for the WP are presented first, followed by specific soil and groundwater sampling recommendations.

## 4.2 General Requirements

### 4.2.1 Data Quality Assurance Requirements

The fieldwork and laboratory work conducted as part of this CSWP will be performed in accordance with the requirements of the CNC Comprehensive Sampling and Analysis Plan (CSAP) (EnSafe Inc. [EnSafe], 1996) and the EPA Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual* (ESDSOPQAM, 1996).

The overall data quality objectives for the RFI are EPA Data Quality Objective (DQO) Level III for contaminant identification and quantification. Required field and laboratory QA/QC samples will be collected as required by the CSAP. Subcontractor data will be validated by the CH2M-Jones project chemist prior to final interpretation and submittal.

### 4.2.2 Data Management Requirements

The CS field data documentation procedures and laboratory data deliverables will be in accordance with the approved CSAP (EnSafe, 1996) and the ESDSOPQAM (EPA, 1996a). Field documentation includes site photographs, field sampling logbooks, sample shipping chain of custody forms, soil boring logs, well construction forms and diagrams. Laboratory documentation includes raw data, instrument calibration logs, sample custody forms, validation summary reports, and final data deliverables.

### 4.2.3 Reporting Requirements

After completion of the fieldwork, the laboratory analysis of samples, and the screening of analytical results, CH2M-Jones will submit a CS Report (Revision 0) to the BRAC Cleanup Team (BCT) for review and comment. BCT comments will be addressed in writing, and

1 revised document pages or a full Revision 1 document will be prepared and submitted for  
2 review. Reports will be submitted in both electronic and hard copy format.

### 3 **4.2.4 Health and Safety Requirements**

4 CH2M-Jones places significant emphasis on the health and safety of our personnel,  
5 subcontractors, and the local community. All fieldwork completed as part of this RFI will be  
6 performed in accordance with the CH2M-Jones *Site-Specific Health and Safety Plan (HSP)*  
7 (CH2M-Jones, 2000). Personnel working at the site will be required to comply with EPA  
8 Level D personal protective equipment (PPE) requirements, as specified in the HSP, with  
9 provisions to upgrade to Level C, if appropriate. Once all personnel have arrived at the site  
10 as part of the mobilization for this work, a project briefing and health and safety orientation  
11 meeting will be held. Daily "tailgate" safety meetings will be conducted to address any site-  
12 specific issue encountered during work.

### 13 **4.2.5 Sampling Methodology**

14 Sampling locations will be marked or staked in the field prior to the initiation of field work,  
15 and the necessary agencies and departments will be notified regarding activities planned at  
16 these locations. Clearance and marking of existing underground water, natural gas,  
17 telephone, electrical and other utility lines, which are potential hazards at the site, will be  
18 performed. Once utilities are marked and identified, sampling locations will be adjusted as  
19 needed.

20 The soil sample collection and analysis will follow the procedures described in the  
21 approved Comprehensive Sampling and Analysis Plan (CSAP) portion of the *Final*  
22 *Comprehensive RCRA Facility Investigation (RFI) Work Plan* published by EnSafe/ Allen &  
23 Hoshall (1994). The CSAP outlines all monitoring procedures to be performed during the  
24 investigation to characterize the environmental setting, source, and releases of hazardous  
25 constituents. In addition, the CSAP includes the Quality Assurance Plan (QAP) and Data  
26 Management Plan (DMP) to verify that all information and data are valid and properly  
27 documented. Sample analyses will be performed in accordance with the guidance in EPA's  
28 *Test Methods for Evaluating Solid Waste, SW-846, Revision 4* (1996), Office of Solid Waste and  
29 Emergency Response (OSWER), and in the EPA Environmental Services Division *Laboratory*  
30 *Operations and Quality Control Manual (ESDLOQCM)* (1997).

31 Consistent with previous soil sampling activities at the CNC, surface soil samples will be  
32 collected from 0 to 1 ft bls and the target depth for subsurface soil samples will be from 3 to

1 5 ft bls. If groundwater is encountered at a depth less than 5 ft bls, the subsurface soil  
2 sample will be collected from 2 ft above groundwater down to the top of groundwater.  
3 Groundwater samples will be collected using a Geoprobe® or similar DPT equipment.  
4 Standard DPT procedures will be used to collect a discrete groundwater sample from the  
5 target sample depth. Upon completion of sampling, DPT borings will be filled to the land  
6 surface with bentonite grout, in accordance with Rule 61-71.10.B of the South Carolina Well  
7 Standards and Regulations. The bentonite grout will be comprised of Portland cement and  
8 clean potable water with no more than 5 percent bentonite. Boring locations will be marked  
9 with the station ID for the survey team to establish horizontal location coordinates.

#### 10 **4.2.6 Investigation-Derived Waste Management and Disposal**

11 The investigation-derived waste (IDW) that is expected to be generated as part of this  
12 investigation includes soil cuttings, purge water, equipment decontamination wastes, and  
13 used PPE. As it is generated, IDW will be containerized in labeled 55-gallon drums and  
14 characterized in accordance with South Carolina Hazardous Waste Management  
15 Regulations (SCDHEC R.61-79.261). Filled containers will be transported to the less-than-90-  
16 day storage facility located at Building 1824. After the analytical results have been received  
17 and reviewed, the containers will be transported to a permitted and licensed facility for  
18 proper treatment/disposal.

#### 19 **4.2.7 Sample Handling and Chain of Custody**

20 Sample collection procedures and site conditions at the time of sampling will be  
21 documented in a field logbook by the field team leader. Samples will be collected in  
22 prepared containers supplied by the laboratory vendor, using preprinted chain of custody  
23 logsheets and coolers for transport of the samples. Samples will be iced as appropriate and  
24 transported by the sampling team to the laboratory for analysis, maintaining the chain of  
25 custody at all times after sampling occurs until analysis is complete. Sample handling  
26 procedures will adhere to the standard procedures in the approved CSAP portion of the  
27 CNC RFI Work Plan (EnSafe/ Allen & Hoshall, 1994).

#### 28 **4.2.8 Analysis of Samples**

29 Samples will be delivered to a subcontracted laboratory for chemical analysis by EPA  
30 methods and/or standard operating procedures (SOPs) for screening methods to achieve  
31 Level II EPA DQOs. The subcontracted laboratory will meet the EPA DQO Level II criteria  
32 specified in the approved CNC CSAP (EnSafe, 1996). Sample analysis will be performed in  
33 accordance with the guidance in EPA's *Test Methods for Evaluating Solid Waste, SW-846*,

1 *Revision 4 (1996b), Office of Solid Waste and Emergency Response (OSWER) and in the EPA*  
2 *Environmental Services Division Laboratory Operations and Quality Control Manual*  
3 *(ESDLOQCM) (1997).*

### 4 **4.3 Proposed Sampling and Analysis**

5 Previous sampling efforts by PSC and General Engineering included collection and analysis  
6 of soil samples from the saturated zone as well as analysis of groundwater samples and  
7 ambient air monitoring. A variety of PID readings recorded elevated readings. Such  
8 readings are caused by VOCs. Two soil samples collected by PSC indicated the presence of  
9 VOCs (including bromomethane and iodomethane) at a depth of approximately 15 ft bls.  
10 The depth to groundwater in this part of the CNC is typically less than about 5 ft bls.  
11 Therefore, it can be concluded that these soil samples were collected from the saturated  
12 zone of the shallow aquifer.

13 Both soil and groundwater samples will be collected. The locations for soil and groundwater  
14 sampling are as follows:

15 CH2M-Jones proposes to collect surface and subsurface soil at three sampling locations.  
16 These sampling locations are at locations where significant odors were reported by the Wyatt  
17 and Wyatt construction team, (as described in their "Daily Log;" see **Appendix C**). **Figure**  
18 **4-1** shows these proposed locations (as green circles), at Manholes 5, 6, and 8. Each sample  
19 will be analyzed for VOCs, GRO and DRO.

20 CH2M-Jones proposes to collect nine groundwater samples located along the alignment of  
21 AOC 726 using DPT methods. The proposed sample locations are shown (as green triangles)  
22 in **Figure 4-1**. These sampling locations are considered the locations most likely to detect  
23 contamination based on the previous sampling conducted at the site by others (as described  
24 in Section 2.0 of this WP) and based on the locations at which Wyatt and Wyatt worker  
25 symptoms were reported to be most significant (see **Appendix C**).

26 At each location, a discrete groundwater sample will be collected from approximately 12 to  
27 15 ft bls. A DPT well screen with a length of approximately 3 ft will be used to collect the  
28 groundwater samples. Each sample will be analyzed for VOCs, GRO, and DRO.

29 A State of South Carolina-certified well driller will be utilized for DPT boring installation.  
30 The driller will be supervised by a CH2M-Jones field hydrogeologist or engineer who will  
31 be responsible for the conduct of all field activities. DPT boring logs will be prepared to  
32 document the details of DPT sample collection for submittal to SCDHEC.

### 1 **4.3.3 SCDHEC Well Installation Request**

2 In accordance with Rule R.61-79.265, Subpart F of the South Carolina Hazardous Waste  
3 Management Regulations and R.61-71 of the South Carolina Well Standards and  
4 Regulations, a request for the advancement of the DPT groundwater sampling locations is  
5 required to be submitted to SCDHEC two weeks prior to the scheduled activity. The written  
6 request describes the purpose of the sampling activity and presents a figure showing  
7 proposed locations and proposed abandonment techniques.

### 8 **4.3.4 Data Analysis and Screening**

9 Initial screening of analytical results will be conducted as soon as final unvalidated results  
10 are available from the laboratory to determine which chemicals may be indicated as  
11 chemicals of potential concern (COPCs) and which locations may be affected. After data  
12 validation is completed, flagged/corrected results will then be electronically downloaded  
13 into a screening database to determine COPCs for each affected media, using current  
14 screening criteria.

15 An evaluation and presentation of COPC screening against current criteria, as well as the  
16 COPC/chemical of concern (COC) refinement analysis, will be presented in a CS Report  
17 after completion of the sampling and analysis proposed herein.

### 18 **4.3.5 Project Schedule**

19 The fieldwork for this site is expected to be conducted no later than May 2006 (pending  
20 SCDHEC review and approval of this CSWP) with a duration of approximately one week.  
21 The laboratory turnaround schedule for producing data reports is expected to be  
22 approximately 4 to 6 weeks from the time of sampling. Data quality review, flagging of  
23 data, and data validation are expected to require approximately two weeks after receipt of  
24 the electronic data deliverable (EDD) from the lab. Data analysis and report preparation are  
25 expected to require approximately 45 days after receipt of final validated data, placing an  
26 approximate report submittal date in July 2006.

NOTE: Aerial Photo Date is 1997  
NOTE: Original figure created in color



0 200 400 Feet

1 inch = 226.315 feet

**Figure 4-1**  
Proposed Soil and Groundwater Sampling Locations  
AOC 726 CS Work Plan  
Charleston Naval Complex

APPENDIX F

**Responses to SCDHEC Comments on the  
Revision 0 CSWP**

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This document presents CH2M-Jones' responses to the South Carolina Department of Health and Environmental Control's (SCDHEC's) comments on the *Confirmatory Sampling Report, AOC 726, Zone H, Revision 0* (CH2M-Jones, 2006).

### **Engineering Comments Made by Jerry Stamps**

1. **Section 4.3**

Per Ms. Grantham's comments (see attached), the Navy must sample near manholes 7 and 8, north of the sampling locations proposed on Halsey Street to ensure all areas of suspected contamination are adequately investigated.

**CH2M-Jones Response:**

**Groundwater samples will be added at manholes 7 and 8. These samples will be collected in the same manner and at the same depths as the other groundwater samples.**

2. **Section 4.3**

The Navy provides the rationale for limiting samples to DPT only; however, in order to minimize potential data gaps, the Navy must collect surface and subsurface soil samples from select DPT locations corresponding to areas of suspected contamination.

Particularly, the Department is interested in soil samples near the manholes identified in the field notes provided by Ms. Grantham where odors were detected. The Department is willing to work with the Navy to identify these locations.

**CH2M-Jones Response:**

**Surface and subsurface samples will be collected near the locations of Manholes 5, 6, and 8. These locations correspond to areas where the strongest odors were reportedly encountered during installation of the sewer line, according to the Wyatt and Wyatt daily log provided to CH2M-Jones.**

**Soil sampling will be conducted in accordance with the overall soil sampling procedures previously used at the CNC. Surface samples will be collected from 0 to 1 foot below land surface (ft bls). Subsurface samples will be collected from 3 to 5 ft bls. However, if groundwater is found to be present at less than 5 ft bls, the subsurface soil sample will be moved up such that the saturated zone is not sampled. Soil samples will be analyzed for volatile organic compounds (VOCs), diesel range organics (DRO), and gasoline range organics (GRO).**

3. **Section 4.3**

As indicated in the work plan, the PID readings collected by PSC at locations 1, 2, and 4 were greater than 9,999 ppm; however, the samples collected from locations 1 and 4 for laboratory analysis did not indicate VOC concentrations which would substantiate such high PID readings. The Department is concerned that fuel range hydrocarbons may have caused the elevated readings. Therefore, the Department recommends analyzing samples for DRO and GRO to serve as indicators for the potential presence of petroleum contamination.

**CH2M-Jones Response:**

**DRO and GRO will be added to the analytical list for soil and groundwater samples.**

## **Hydrogeology Comments Made by Don Hargrove**

### **1. Section 4.1, Purpose and Objectives**

This section should be revised to state that the purpose of this confirmatory sampling effort is to determine presence or absence of contamination. If contamination is determined to be present, a RCRA Facility Investigation (RFI) will then be required to delineate the nature and extent of contamination.

#### **CH2M-Jones Response:**

**The requested revision will be made.**

### **2. Section 4.2.5, Sampling Methodology**

This section describes how the proposed temporary monitoring wells will be abandoned, but does not give adequate detail concerning the composition of the grout to be used. It has been the experience of this reviewer, that when DPT wells are typically installed, sampled, and subsequently abandoned, the drillers have, on occasion, abandoned the wells by filling the borehole with pure bentonite. This method of abandonment is not acceptable. The text in this section does specify that the wells will be abandoned using bentonite grout. However, in order to avoid improper abandonment issues, the grout composition should be expressly described. An acceptable grout mixture would specify that grout composed of Portland cement and clean, potable water will be used. Additionally, if bentonite is to be incorporated into the grout, it should be specified that the grout will contain not more than five (5) percent bentonite by weight. Please refer to the South Carolina Well Standards (R.61-71.H) for reference. The text should be revised to include the specifications for the composition of the grout.

#### **CH2M-Jones Response:**

**The grout used for abandoning the boreholes will be a bentonite grout meeting the South Carolina Well Standards (R.61-71.H). The text will be modified to clarify this.**

### **3. Section 4.3, Proposed Sampling and Analysis:**

A) This section proposes the collection of seven (7) groundwater samples at the locations shown on Figure 4-1. However, Figure 4-1 indicates eight (8) proposed locations. The Figure or the text should be revised to include the actual number of proposed sampling locations.

B) No groundwater samples are currently proposed in the area near Manhole 8. The proposed groundwater sampling locations should be revised to include sampling near Manhole 8, and Figure 4-1 should be revised to include these new locations.

#### **CH2M-Jones Response:**

**Groundwater sampling locations will be added at manholes 7 and 8. A total of 9 groundwater samples will be collected and analyzed.**

**Figure 4-1 inadvertently included an extra groundwater sampling location along Halsey Street between manhole 6 and the entrance to the U.S. Coast Guard long-term parking lot. The figure will be revised to show the new sampling locations.**

4. **Figures:**

The figures included in this work plan do not show the direction(s) of groundwater flow. Please revise the figures to include this information.

**CH2M-Jones Response:**

**Groundwater flow at the site is generally towards the Cooper River. A groundwater contour map will be included in Section 2.0.**



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May 24, 2006

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

Re: Confirmatory Sampling Work Plan (Revision 1) - AOC 726, Zone H

Dear Mr. Scaturo:

Enclosed please find two copies of the Confirmatory Sampling Work Plan (Revision 1) for AOC 726 in Zone H of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me at 352/335-5877, ext. 2280, if you have any questions or comments.

Sincerely,

CH2M HILL

A handwritten signature in black ink that reads "Dean Williamson". The signature is written in a cursive style and is positioned above a vertical dashed line.

Dean Williamson, P.E.

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