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CORRECTIVE MEASURES STUDY (CMS) WORK PLAN FOR ZONE I CNC CHARLESTON SC

02/01/2002

CH2M HILL

CORRECTIVE MEASURES STUDY WORK PLAN

Zone I

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

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Revision 0
Contract N62467-99-C-0960

4.0 CMS Work Plan for AOC 675, AOC 676 and AOC 677

This section summarizes the results and conclusions from the soil and groundwater investigations conducted in the area of AOCs 675/676/677, which were reported in the *Zone I RFI Report, Revision 0* (EnSafe, 1999), Section 10.3, as amended by the *Zone I RFI Report Addendum, Revision 1* (CH2M-Jones, 2001). Figure 4-1 presents the site features and RFI sample locations.

As part of the Zone I RFI, surface soil, subsurface soil and groundwater investigations were conducted at AOCs 675/676/677 in February and September 1995 and February 1999. The RFI report presented the results of the investigations and conclusions concerning contamination and risk, as summarized in Sections 4.1 and 4.2 of this CMS Work Plan. A further evaluation of COCs is provided in Section 4.3 of this work plan.

4.1 Background

AOC 675 is a 25,000-gallon UST (Facility NS-4) installed in 1952. A 495-gallon OWS is located north of this UST. This UST stored fuel oil for a boiler house (Building NS-2) built in 1958. No. 5 fuel oil was used until 1991. From 1991 until the present, the UST has stored No. 2 fuel oil. The AOC 675 area was also used to refuel seaplanes, and petroleum contamination may have resulted from this activity. Actual dates of seaplane operations are unknown, but this activity was discontinued in the mid-1950s.

Former UST NS-2A was an unregulated 560-gallon underground waste oil holding tank for an OWS. It was located in a grass-covered patch of ground between Buildings NS-2 and NS-3. This tank was closed by removal in April 1996. During removal it was noted that the tank was intact with no holes or pitting. The OWS which was associated with the waste oil UST is currently identified as NS-2A and is located immediately east of the former waste oil UST. The OWS was left in place and its lines were plugged and capped.

Former UST NS-3-1 was a 280-gallon waste oil holding tank and OWS located just north of Building NS-3. Building NS-3 is a former fuel pumping transfer station located just west of Facility NS-4. The fuel transfer area was diked and sloped towards a storm drain in the east corner. The storm drain was connected to the storm sewer by two sets of valves and piping. The valves directed the stormwater runoff directly to the storm sewer during normal

operations or through the OWS to the storm sewer in the event of a spill in the fuel transfer area.

AOC 676 is the location of a former incinerator which operated near the current location of Building NS-2. The incinerator was used during the 1940s and it is shown on base maps from 1947 to 1955. No records exist concerning its design, operation, or demolition. The materials burned in the incinerator are unknown but may have included flammable hazardous materials (paints, solvents, and waste oils), as well as paper, wood, and general trash.

AOC 677 consists of the grounds surrounding Building NS-2. The facility was built in 1958. In 1977, the boilers were replaced with newer ones. There is a documented history of fuel oil spills at this site, ranging in size from 3 to 500 gallons. Fuel for the boilers was stored in the nearby 25,000-gallon UST at Facility NS-4 (AOC 675) as described above. Prior to 1979, the sump pump for the boilers discharged to the base storm sewer system. After 1979, the sump pump discharged to the sanitary sewer system via an OWS. In 1990, the boilers were connected to the base-wide steam system to provide backup power for the central power plant.

The area is zoned for business use (B-2).

4.2 RFI Investigation Results

4.2.1 Soil Investigation Results

As part of the RFI field investigation, surface soil samples and collocated subsurface soil samples were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, metals, organotins and cyanide (see Table 4-1).

4.2.1.1 Surface Soils

Fourteen surface soil samples were collected for VOC, SVOC, pesticide/PCB, metals and cyanide analyses during the first sampling event. One surface soil sample was collected for physical parameters during the second sampling event, and three surface soil samples for dioxins were collected during the third sampling event (see Figure 4-1 and Table 4-1).

Surface soil sample results were evaluated relative to EPA Region III RBCs. Based on the analysis presented in the RFI report, five parameters [benzo(a)pyrene, antimony, chromium, manganese, and vanadium] exceeded the EPA Region III unrestricted land use RBCs in at least one sample. As a result of the screening process and subsequent risk

assessment in the RFI report, no COCs were identified for surface soils under unrestricted land use.

4.2.1.2 Subsurface Soils

Eight subsurface soil samples, collocated with the surface soil sample locations (see Figure 4-1 and Table 4-1) were collected for VOC, SVOC, pesticide/PCB, metals and cyanide analyses during the first sampling event. During the third sampling event, one subsurface soil sample was taken for dioxin analysis.

Subsurface soil sample results were evaluated relative to EPA Region III unrestricted and industrial RBCs and SSLs with a DAF=10. Based on the analysis presented in the RFI report, no COCs were identified for subsurface soils under the unrestricted land use scenario.

4.2.2 Groundwater

A small localized groundwater mound appears to be present in the immediate vicinity of these units (Figure 3-2). However, shallow groundwater at this site ultimately flows north to northeastward toward the Cooper River.

Four shallow monitoring wells were installed as part of the RFI investigation (see Figure 4-1). During the first sampling event[3], the groundwater samples obtained from these wells, plus samples collected at an existing shallow and deep grid monitoring well pair (GDI015/GDI15D), were analyzed for VOCs, SVOCs, pesticides/PCBs, metals, cyanide, chlorides, sulfates, and TDS (see Table 4-2). During subsequent sampling events, analytical criteria were modified based on data needs.

Constituents detected in the groundwater samples were evaluated relative to MCLs, tap water RBCs, and Zone I groundwater BRCs.

The following sections set out the findings presented in the RFI report.

4.2.2.1 Shallow Groundwater

Analytes detected in shallow groundwater samples were evaluated in the RFI report. As a result of the screening process and subsequent risk assessment, the following constituents were identified in the RFI report as COCs for shallow groundwater:

- **Thallium,** at a concentration of 4.6 $\mu g/L$, exceeded its reported tap water RBC (0.26 $\mu g/L$) in one groundwater sample (I677GW002) collected during the fourth

[3] Grid sample data were not included in the unit specific data, but are used to investigate the unit and the data are included in the Grid Base section of Section 10 in the Zone I RFI.

sampling event. Thallium also exceeded its MCL (2 μg/L) in a sample collected during the fourth sampling event.

- **Dimethoate** was detected at a concentration of 2 μg/L which exceeded the tap water RBC of 0.73 μg/L in one groundwater sample (I675GW002) collected during the first sampling event.

4.2.2.2 Deep Groundwater

Analytes detected in deep groundwater samples were evaluated in the RFI report. As a result of the screening process and subsequent risk assessment, no constituents were identified as COCs for deep groundwater.

4.2.3 RFI Risk Summary

Based on a unrestricted land use scenario, the following COCs were identified:

Shallow Groundwater: Dimethoate and thallium.

No COCs were identified for the industrial receptor.

4.2.4 Recommendations from *Zone I RFI Report, Revision 0*

4.2.4.1 Soils

NFA was recommended for soil in the RFI report.

4.2.4.3 Shallow Groundwater

Groundwater contaminant treatment was recommended in the RFI report.

4.2.4.4 Deep Groundwater

Continued monitoring was recommended in the RFI report.

4.3 COPC/COC Refinement

The COCs identified in the RFI include dimethoate and thallium in shallow groundwater. These COCs are further evaluated in the following sections. In addition, concentrations of VOCs detected in soils were rescreened using an SSL based on a DAF=1.

4.3.1 Surface Soil

4.3.1.1 Rescreening of Surface Soil VOC Data Based on SSL (DAF=1)

At AOCs 675/676/677, the VOCs detected in the surface soils were rescreened against the SSL with a DAF=1 (Table 4-3). The only VOC that was detected in surface soil at a concentration that exceeded its SSL was acetonitrile. Acetonitrile was detected in 1 of 14

surface soil samples and in 2 of 8 subsurface soil samples. Acetonitrile was not detected in groundwater at AOCs 675/676/677. Given the low frequency of detection in both surface and subsurface soil and the fact that it was not detected in site groundwater, acetonitrile is not considered a COC for the surface soils.

4.3.2 Subsurface Soils

No subsurface soil COCs were identified in the RFI report.

4.3.2.1 Rescreening of Subsurface Soil VOC Data Based on SSL (DAF=1)

As discussed above, VOCs detected in subsurface soil were rescreened against an SSL with a DAF=1 (Table 4-4). Acetonitrile was the only VOC in subsurface soils detected at concentrations greater than its SSL. Acetonitrile was detected in 2 of 8 subsurface soil samples, but was not detected in groundwater at AOCs 675/676/677. Given the low frequency of detection in both surface and subsurface soil and the fact that it was not detected in site groundwater, acetonitrile is not considered a COC for subsurface soils.

4.3.3 Groundwater

Groundwater samples at AOCs 675/676/677 were collected from four shallow wells in four sampling events, for a total of 16 samples analyzed. Thallium and dimethoate were identified in the RFI report as COCs in groundwater for the unrestricted land use scenario at AOCs 675/676/677. These COCs are discussed below.

4.3.3.1 Thallium in Shallow Groundwater

Of the 16 groundwater analyses, thallium was detected only once in a single well. The single detection (4.6 μg/L) exceeded the MCL of 2 μg/L (see Table 4-5); there is no established background range for thallium in Zone I. However, the observed concentrations of thallium in shallow groundwater at this site are consistent with the occurrences of thallium observed in Zone I grid wells. Thallium was detected intermittently in shallow grid wells at concentrations ranging from 3J μg/L to 7.5J μg/L (see Appendix A-1). Given that the concentrations of thallium in shallow groundwater are consistent with grid well background conditions in Zone I and that the occurrences were not duplicated in subsequent sampling events, thallium is not considered a COC in groundwater at AOCs 675/676/677.

4.3.3.2 Dimethoate in Shallow Groundwater

Dimethoate was detected in one of two wells sampled for organophosphorous pesticides. It was detected at a concentration of 2 μg/L in the first sampling event, but it was not detected in either well during the second sampling event. Although the RFI report indicates

that this detected concentration exceeded its reported tap water RBC of 0.73 $\mu g/L$, this compound does not appear in the current EPA MCLs or the EPA Region III RBC Table. Given that it was detected only once in groundwater, that its presence was never reconfirmed, that it was never detected in surface or subsurface soils, and that it is not associated with past activities at these sites, dimethoate is not considered a COC in groundwater.

4.3.4 COPC/COC Refinement Summary

There are no COCs requiring further action in surface soils, subsurface soils, or groundwater at AOCs 675/676/677. Therefore, these sites are recommended for NFA.

4.4 Summary of Information Related to Site Closeout Issues

4.4.1 RFI Status

The RFI report, as amended by the RFI Report Addendum, is complete.

4.4.2 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable MCL, preceded or followed by detection of these same metals below the MCL or below the practicable quantitation limit. This is discussed in Section 4.3.

4.4.3 Potential Linkage to SWMU 37, Investigated Sanitary Sewers at the CNC

Data indicate that AOCs 675/676/677 were never connected to the sanitary sewer system. Therefore, there are no concerns regarding connections to the sanitary sewer. No COCs requiring further evaluation are present at the site. Further evaluation of this issue is not warranted.

4.4.4 Potential Linkage to AOC 699, Investigated Storm Sewers at the CNC

No direct connections of AOCs 675/676/677to the storm sewer are known to exist. No COCs requiring further evaluation are present at the site. Further evaluation of this issue is not warranted.

4.4.5 Potential Linkage to AOC 504, Investigated Railroad Lines at the CNC

The closest railroad line to AOCs 675/676/677 is located approximately 4,200 feet southwest. There is no known linkage between these AOCs and the investigated railroad lines of AOC 504, and further evaluation of this issue is not warranted.

4.4.6 Potential Migration Pathways to Surface Water Bodies at the CNC

The nearest surface water body to AOCs 675/676/677 is the Cooper River, which lies approximately 65 feet north of the unit. The only potential migration pathway from the site to surface water is via overland flow via stormwater runoff. Since the entire site is covered with buildings and pavement, which eliminates contact of surface soil with stormwater, and no COCs were identified at the site, further evaluation of a potential pathway for contaminant migration via stormwater runoff is not warranted. Similarly, runoff directed to the storm sewer system, which discharges to the Cooper River, does not contact the surface soil.

4.4.7 Potential Contamination in Oil/Water Separators (OWSs)

AOC 675 had a 495-gallon OWS associated with it. The OWS was located north of a 25,000-gallon UST. The OWS was removed and the lines were capped.

AOC 677 has an OWS associated with it. The OWS was associated with boilers located in NS-4. Boiler discharge was removed by a sump pump through the OWS into the sanitary sewer system.

Based on the discussion presented in Section 4.3, there are no concerns regarding environmental releases from these units. In addition, this area was investigated during the SWMU 37 investigation (Zone L - Sanitary Sewer System) regarding OWS connections to the sanitary sewer, and no areas of concern were identified in the vicinity of AOCs 675/676/677. Further evaluation of this issue is not warranted.

4.4.8 Land Use Control Management Plan

The COC refinement did not identify any COCs at AOCs 675/676/677. This evaluation was based on a unrestricted land use classification. Therefore, land use controls are not necessary.

4.5 CH2M-Jones Recommendations

Evaluation of the primary media of concern (surface soils, subsurface soils, and groundwater) indicated that there were no issues associated with the historical operation of,

or releases from, this unit. Based on a review of COPCs/COCs in Section 4.3, no COCs were identified in any investigated media.

The RFI report concluded that a CMS was necessary for groundwater. However, CH2M-Jones has re-evaluated the risks posed by the identified COCs and determined that no COCs exist at AOCs 675/676/677. Therefore, these sites are recommended for NFA.

TABLE 4-1
RFI Soil Sampling Summary
CMS Work Plan, AOCs 675/676/677, Zone I, Charleston Naval Complex

Sampling Event	Sampling Date	Samples Collected	Sample Analyses	Comments
1	02/21/95 02/27/95 02/28/95	Upper - 14 (13)	Standard Suite, Organotins	Organotins were collected on nine upper-interval samples (677SB00201 through 677SB01001) for site characterization.
		Lower - 8 (13)	Standard Suite, Organotins	Six lower-interval samples were not collected due to a water table at less than 5 feet bgs. Organotins were collected on six lower-interval samples (677SB00202, 677SB00302, 677SB00402, 677SB00602, 677SB00702, and 677SB00902) for site characterization.
		Duplicate - 3	Appendix IX	677CB00101/677CB00201/677CB01001*
2	09/07/95	Upper - 1	Physical Parameters	Sample for physical parameters collected at boring location 677SB01001.
3	02/02/99	Upper - 3	Dioxins	Dioxins were collected on 3 upper-interval samples 677SB011, 677SB012, and 677SB013
		Lower - 1	Dioxins	One low-interval sample (677SB011) was collected for dioxins

Notes:
( ) = Parenthesis indicate number of samples proposed in the RFI work plan.
* = 677CB01001 was not analyzed for cyanide.
Standard Suite = VOCs, SVOCs, metals, cyanide, pesticides, and PCBs at DQO Level III.
Appendix IX = Standard Suite, plus hex-chrome, dioxins, herbicides, and OP pesticides at DQO Level IV.
Physical parameters analyses included CEC, chloride, sulfur, ammonia, nitrate/nitrite, phosphorus, TOC and total moisture.

TABLE 4-2
RFI Groundwater Sampling Summary
CMS Work Plan, AOCs 675/676/677, Zone I, Charleston Naval Complex

Sampling Event	Sampling Date	Wells Sampled	Sample Analyses	Comments
1	06/01/95	675001	Standard Suite, organotins, chloride, TDS, sulfate	677002 also sampled for herbicides, dioxin, hex-chrome, and OP pesticides
		675002		
	06/05/95	676001		
	06/06/95	677002		
2	01/15/96	675001	Metals, cyanide, pesticides, PCBs, SVOCs	
		675002	Metals, cyanide, pesticides, PCBs, SVOCs, TPH-DRO, TPH-GRO	
		676001	Metals, cyanide, pesticides, PCBs	
		677002	Metals, cyanide, pesticides, PCBs, dioxin	
3	06/03/96	675001	Metals, cyanide, pesticides, PCBs, SVOCs	
		675002	Metals, cyanide, pesticides, PCBs, SVOCs, TPH-DRO, TPH-GRO	
	06/04/96	676001	Metals, cyanide, pesticides, PCBs	
	06/06/96	677002	Metals, cyanide, pesticides, PCBs, dioxin	
4	09/13/96	675001	Metals, cyanide, pesticides, PCBs, SVOCs, TPH-DRO, TPH-GRO	
		675002	Metals, cyanide, pesticides, PCBs, SVOCs, TPH-DRO, TPH-GRO	
	09/12/96	676002	Metals, cyanide, pesticides, PCBs	
	09/10/96	677002	Metals, cyanide, pesticides, PCBs, dioxin, herbicides, chloride, sulfate, TDS	

Note:
Standard Suite = VOCs, SVOCs, metals, cyanide, pesticides, and PCBs at DQO Level III.

TABLE 4-3
VOCs in Surface Soils
CMS Work Plan, AOC 675/676/677, Zone I, Charleston Naval Complex

Sample Station	ID	Date		Acetone Result (mg/kg)	Qualifier	Acetonitrile Result (mg/kg)	Qualifier	Naphthalene Result (mg/kg)	Qualifier	Toluene Result (mg/kg)	Qualifier
			IND RBC	20,000.00		NA		4,100.00		4,1000.00	
			RES RBC	780.00		NA		160.00		1,600.00	
			SSL	0.80		NA		4		0.60	
			SS BKGD	NA		NA		NA		NA	
I675SB001	675SB00101	02/21/95		0.1100	U	0.2400	U	0.7900	U	0.0030	J
I675SB002	675SB00201	02/21/95		0.1100	U	0.2400	U	0.8000	U	0.0180	U
I676SB001	676SB00101	02/21/95		0.1000	U	0.2300	UJ	0.7400	U	0.0010	J
I676SB002	676SB00201	02/28/95		0.1000	UJ	0.0230	UJ	0.7500	U	0.0170	U
I677SB001	677SB00101	02/21/95		0.1100	UJ	0.2400	UJ	0.7700	U	0.0010	J
I677SB002	677SB00201a	02/21/95		0.0320	J	0.2300	UJ	0.7400	U	0.0050	J
I677SB003	677SB00301	02/28/95		0.0990	UJ	0.0220	UJ	0.7200	U	0.0020	J
I677SB004	677SB00401	02/28/95		0.1000	UJ	0.0220	UJ	0.7300	U	0.0170	U
I677SB005	677SB00501	02/28/95		0.1100	U	0.0240	UJ	0.6600	U	0.0180	U
I677SB006	677SB00601	02/27/95		0.0720	J	0.1000	J	0.0520	J	0.0030	J
I677SB007	677SB00701	02/28/95		0.0990	U	0.0220	UJ	0.7300	U	0.0160	U
I677SB008	677SB00801	02/28/95		0.1000	UJ	0.0610	UJ	0.7400	U	0.0020	J
I677SB009	677SB00901	02/28/95		0.0230	UJ	0.0630	UJ	0.7500	U	0.0020	J
I677SB010	677SB01001a	02/28/95		0.1000	UJ	0.0230	UJ	2.1000	=	0.0020	J

=	Chemical is detected at concentration shown.
NA	not applicable
J	Chemical is detected at concentration below the method detection limit; the concentration is not known.
U	Samples were analyzed for this analyte, but it was not detected above the method detection limit (MDL).
UJ	Not detected; analytical detection limit is estimated.
mg/kg	Milligrams per kilogram

TABLE 4-4
VOCs in Subsurface Soil
CMS Work Plan, AOC 675/676/677, Zone I, Charleston Naval Complex

Sample Station	ID	Date		Acetone Result (mg/kg)	Qualifier	Acetonitrile Result (mg/kg)	Qualifier	Naphthalene Result (mg/kg)	Qualifier	Toluene Result (mg/kg)	Qualifier
			SSL	0.8000		NA		4		0.6000	
			SS BKGD	NA		NA		NA		NA	
I676SB001	676SB00102	02/21/95		0.0170	J	0.2400	U	0.8000	U	0.0190	=
I676SB002	676SB00202	02/28/95		0.1200	UJ	0.0200	UJ	0.6600	U	0.0210	U
I677SB002	677SB00202b	02/21/95		0.0260	J	0.2900	U	0.9300	U	0.0230	=
I677SB003	677SB00302	02/28/95		0.0290	UJ	0.0280	UJ	0.9100	U	0.0210	U
I677SB004	677SB00402b	02/28/95		0.0640	J	0.0810	J	0.8700	U	0.0020	J
I677SB006	677SB00602	02/27/95		0.2000	J	0.1500	J	1.1000	U	0.0060	J
I677SB007	677SB00702	02/28/95		0.0350	UJ	0.1000	UJ	0.8200	U	0.0190	U
I677SB009	677SB00902	02/28/95		0.0230	UJ	0.0400	UJ	5.9000	=	0.0040	J

= Chemical is detected at concentration shown.
NA not applicable
J Chemical is detected at concentration below the method detection limit; the concentration is not known.
U Samples were analyzed for this analyte, but it was not detected above the method detection limit (MDL).
UJ Not detected; analytical detection limit is estimated.
mg/kg Milligrams per kilogram

Table 4-5
Thallium in Groundwater
CMS Work Plan, AOCs 675/676/677, Zone I, Charleston Naval Complex

Sample Station	ID	Date		Thallium Result (ug/L)	Qualifier
			MCL	2	
			RBC	0.26	
			Shallow	8	
			Deep	15	
Shallow Groundwater					
I675GW001	675GW00101	06/01/1995		4.5	U
	675GW00102	01/15/1996		5	U
	675GW00103	06/03/1996		5	U
	675GW00104	09/13/1996		2.7	U
I675GW002	675GW00201	06/01/1995		4.5	U
	675GW00202a	01/15/1996		5	U
	675GW00203	06/03/1996		5	U
	675GW00204	09/13/1996		2.7	U
I676GW001	676GW00101	06/05/1995		4.5	U
	676GW00102	01/15/1996		5	U
	676GW00103	06/04/1996		5	U
	676GW00104	09/12/1996		4	U
I677GW002	677GW00201b	06/06/1995		4.5	U
	677GW00202	01/15/1996		5	U
	677GW00203b	06/06/1996		5	U
	677GW00204	09/10/1996		4.6	J
IGDIGW015	GDIGW01501	05/23/1995		4.5	U
	GDIGW01502	12/15/1995		5	UJ
	GDIGW01503	05/23/1996		5	U
	GDIGW01504	08/23/1996		2.7	UJ
Deep Groundwater					
IGDIGW15D	GDIGW15D01	05/23/1995		4.5	U
	GDIGW15D02	12/15/1995		5	UJ
	GDIGW15D03	05/24/1996		7.1	J
	GDIGW15D04	08/23/1996		2.7	UJ

J Chemical is detected at concentration below the method detection limit; the concentration is not known.
U Samples were analyzed for this analyte, but it was not detected above the method detection limit (MDL).
UJ Not detected; analytical detection limit is estimated.
µg/L Micrograms per liter

TABLE 4-6
Dimethoate in Groundwater
CMS Work Plan, AOC 675/676/677, Zone I, Charleston Naval Complex

Sample Station	ID	Date		Dimethoate Result (µg/L)	Qualifier
			MCL	NA	
			RBC	NA	
			Shallow	NA	
Shallow Groundwater					
I675GW001	675GW00101	06/01/95		15.0000	UJ
I675GW002	675GW00201	06/01/95		2.0000	J
I676GW001	676GW00101	06/05/95		15.0000	U
I677GW002	677GW00201b	06/06/95		15.0000	U
	677GW00201b	06/06/95		0.5000	U
IGDIGW015	GDIGW01501	05/23/95		15.0000	U
Deep Groundwater					
IGDIGW15D	GDIGW15D01	05/23/95		15.0000	U

NA Not applicable
J Chemical is detected at concentration below the method detection limit; the concentration is not known.
U Samples were analyzed for this analyte, but it was not detected above the method detection limit (MDL).
UJ Not detected; analytical detection limit is estimated.
µg/L Micrograms per liter

NOTE: Aerial Photo Date is 1997

Surface Soil Sample
Subsurface Soil Sample
Groundwater Sample
Roads
Shoreline
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 50 100 Feet

1 inch = 50 feet

Figure 4-1
Sample and Test Location Map
AOC 675, AOC 676, and AOC 677
Zone I
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_I\AOC675and676and677\Aprs\aoc675and676and677.apr, Date: 21 Jan 2002 6:23, User: NMOUDRY, Figure 4-1 Sample and Test Location Map

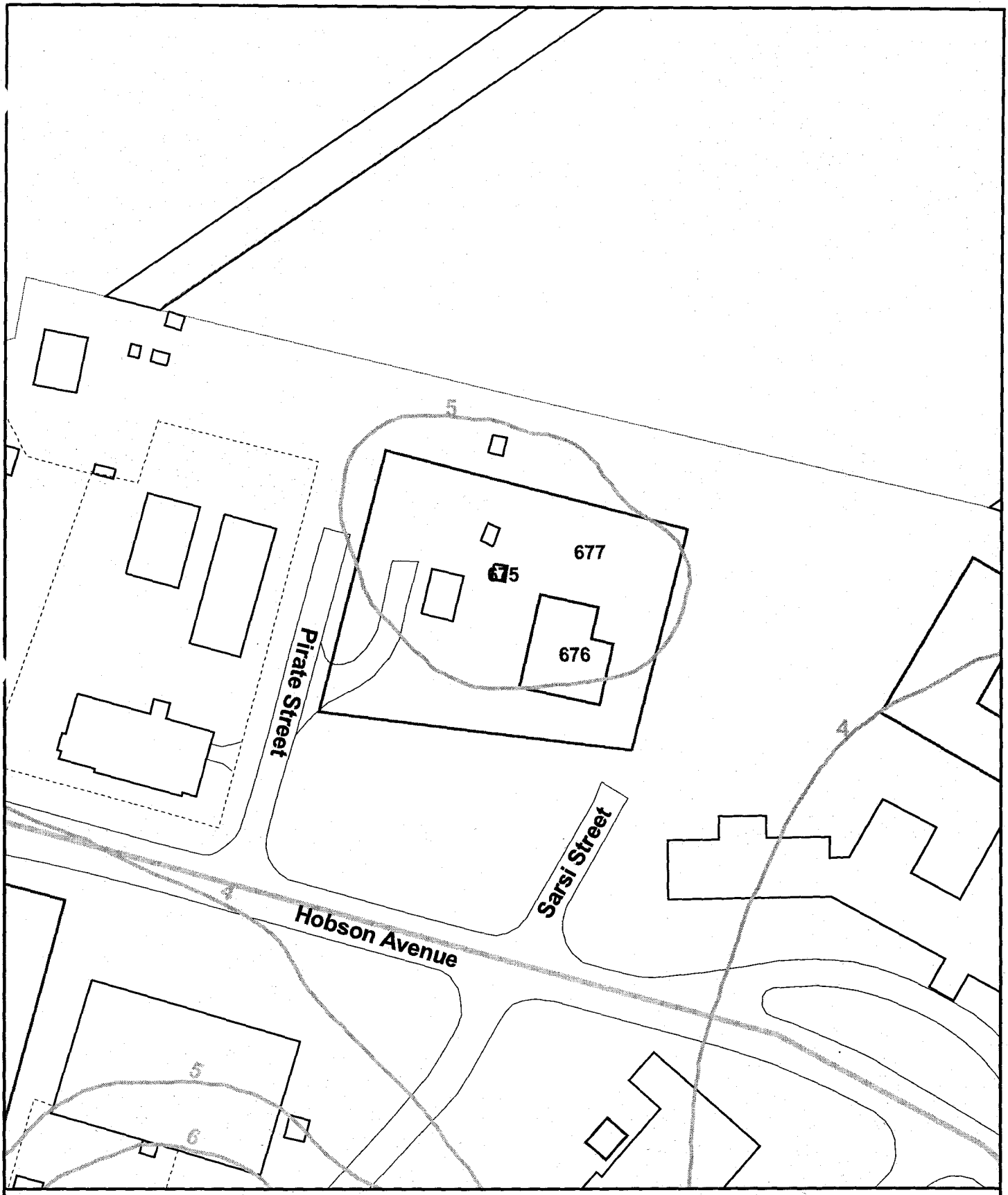

Figure 4-2
Shallow Groundwater Contour Map
AOC 675, AOC 676, and AOC 677, Zone I
Charleston Naval Complex

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File Path: c:\18gis\projects\zone_i\groundwaterfigs\zoneigroundwater_figures.apr, Date: 27 Dec 2001 7:20, User: NMOUDRY, Figure 4-2 Shallow Groundwater Contour Map