

N61165.AR.005484  
CNC CHARLESTON  
5090.3a

FINAL ASSESSMENT REPORT DATED 8 MARCH 2000 AND NO FURTHER ACTION (NFA)  
FOR ZONE B SITE 13 QUARTERS C WITH SOUTH CAROLINA DEPARTMENT OF HEALTH  
AND ENVIRONMENTAL CONTROL REVIEW LETTER CNC CHARLESTON SC  
04/03/2000  
NAVFAC SOUTHERN



3 April 2000

2600 Bull Street  
Columbia, SC 29201-1708

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Department of the Navy  
Southern Division NFEC  
P.O. Box 190010  
North Charleston, SC 29419-9010  
Attention: Mr. Gabriel Magwood

Re: Final Assessment Report dated 08 March 2000  
Zone B/Site 13-Quarters C (Site Identification # 00947)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

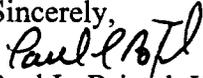
Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative describing previous assessment activities and analytical results from additional sampling conducted to determine the environmental fate of suspected contamination at the subject property. The analytical results provided indicate that reportable concentrations of BTEX and PAH compounds were not detected above established method detection limits in soil and/or groundwater samples obtained at the subject site. Based on the analytical results presented and description of site specific geology/hydrogeology, potential releases, if any, from previous activities at the subject site do not appear to present a significant threat to human health and/or the environment at the present time. In this regard, the employed assessment activities and sampling results appear to indicate that no additional endeavors for remedial actions and/or contaminant characterization is warranted for the Zone B/Site 13-Quarters C area at this time.

With consideration to the above comments, the Department has reviewed the referenced environmental data. Based on the information and analytical data submitted, the Department recognizes that the Department of the Navy and Charleston Naval Complex has adequately addressed the known environmental contamination identified on the property to date in accordance with the approved scope of work. Please note, this statement pertains only to the portion of the site addressed in the referenced report and does not apply to other areas of the site and/or any other potential regulatory violations. Further, the Department retains the right to request further investigation if deemed necessary.

Charleston Naval Complex/Charleston Naval Base  
3 April 2000  
page 2

Should you have any questions please contact me at (803) 898-3559.

Sincerely,  
  
Paul L. Bristol, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

  
Tom Knight, Manager  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC

15405(Gen) Li 5.12.97  
Δ = 00947

South Carolina Department of Health and Environmental Control (S.C.D.H.E.C.)  
Underground Storage Tank (UST) Assessment Report

**RECEIVED**

MAY 02 1997

Groundwater Assessment  
and Development Section

Date Received  
  
State Use Only

Submit Completed Form to:  
UST Regulatory Section  
SCDHEC  
2600 Bull Street  
Columbia, South Carolina 29201  
Telephone (803) 734-5331

**I OWNERSHIP OF UST(S)**

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office  
Mailing Address: P.O. Box 190010  
City: N. Charleston State: SC Zip Code: 29419-9010  
Area Code: 803 Telephone Number: 743-9985 Contact Person: LCDR Paul Rose

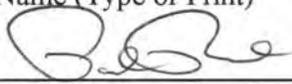
**II SITE IDENTIFICATION AND LOCATION**

Site I.D. #: Unregulated 00947  
Facility Name: Charleston Naval Base Complex, Quarters C  
Street Address: 300 Navy Way  
City: North Charleston, 29405-2413 County: Charleston

**III CLOSURE INFORMATION**

Closure Started: 12 Nov 96 Closure Completed: 19 Nov 96  
Number of USTs Closed: 1  
N/A Consultant SPORTENVDETCHASN UST Removal Contractor

**IV. CERTIFICATION (Read and Sign after completing entire submittal)**

I certify that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate and complete.  
LCDR Paul Rose  
Name (Type or Print)  
  
Signature

**V. UST INFORMATION**

- A. Product.....
- B. Capacity.....
- C. Age.....
- D. Construction Material.....
- E. Month/Year of Last Use.....
- F. Depth (ft.) To Base of Tank.....
- G. Spill Prevention Equipment Y/N.....
- H. Overfill Prevention Equipment Y/N.....
- I. Method of Closure Removed/Filled.....
- J. Visible Corrosion or Pitting Y/N.....
- K. Visible Holes Y/N.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Fuel Oil						
550						
Unk.						
Steel						
4/96						
6'						
N						
N						
R						
N						
N						

- L. Method of disposal for any USTs removed from the ground (attach disposal manifests)

UST Qtrs-C was removed, drained, cut open at both ends, and cleaned with a steam cleaner. It was then cut up for recycling as scrap metal. (See Attachment III.)

- M. Method of disposal for any liquid petroleum, sludges, or waste waters removed from the USTs (attach disposal manifests)

The residual fuel oil, waste water, and sludge were recycled.

- N. If any corrosion, pitting, or holes were observed, describe the location and extent for each UST

The UST was covered with a thin protective coating. No corrosion, pitting, or holes were found.

## VI. PIPING INFORMATION

- A. Construction Material.....
- B. Distance from UST to Dispenser.....
- C. Number of Dispensers.....
- D. Type of System P/S.....
- E. Was Piping Removed from the Ground? Y/N....
- F. Visible Corrosion or Pitting Y/N.....
- G. Visible Holes Y/N.....
- H. Age.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
copper						
50'						
1 See Note 1						
S						
Y						
N						
N						
Unk						

Note 1: The tank provided fuel oil for heating Quarters C.

- I. If any corrosion, pitting, or holes were observed, describe the location and extent for each line.

No corrosion, pitting, or holes were found.

## VII. BRIEF SITE DESCRIPTION AND HISTORY

Quarters C served as housing for Naval Officers and their families.

The sample at the northeast end of the tank (SPORT 0242-1) had high BTEX levels, so it was decided to excavate soil from that end of the tank pit to "chase" the contamination. The excavation was expanded three feet farther and two feet deeper from the area where the sample was taken (see Site Map 3). New samples showed significantly decreased BTEX readings under the tank (SPORT 0320-1) and contaminant levels below detectable levels at the end of the new excavation (SPORT 0320-2). No obvious holes or broken connections were noted during the tank removal, but the contamination was found at the end of the tank with the fill connection, therefore past spills and overfills is suspected.

## VIII. SITE CONDITIONS

Yes No Unk

	Yes	No	Unk
<p>A. Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells?</p> <p>If yes, indicate depth and location on the site map.</p>		X	
<p>B. Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells?</p> <p>If yes, indicate location on site map and describe the odor (strong, mild, etc.) <b>Strong petroleum odor at fill connection end of tank</b></p>	X		
<p>C. Was water present in the UST excavation, soil borings, or trenches?</p> <p>If yes, how far below land surface (indicate location and depth)?</p> <p>_____</p>		X	
<p>D. Did contaminated soils remain stockpiled on site after closure?</p> <p>If yes, indicate the stockpile location on the site map.</p> <p>Name of DHEC representative authorizing soil removal: See note 2. _____</p>	X		
<p>E. Was a petroleum sheen or free product detected on any excavation or boring waters?</p> <p>If yes, indicate location and thickness on the site map.</p>		N/A	

Note 2: The soil from the initial excavation was returned to the tank pit. The soil removed from the northeast end of the tank while chasing contamination was transported to building 1601 as part of a bioremediation pilot project. Per conversation with DHEC, Mr. Tim Mettlen, and SouthDiv, Mr. Gabriel Magwood, petroleum contaminated soil may be removed from the excavation and stockpiled for disposal or remediation.



## X. SAMPLING METHODOLOGY

Provide a detailed description of the methods used to collect and store (preserve) the samples.

After the removal of UST Quarters C, soil samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

The samples are identified as follows:

	Detachment Charleston		General Engineering Labs
Soil Sample	UST Qtrs C-1	=	SPORT -0242-1
Soil Sample	UST Qtrs C-2	=	SPORT -0242-2
Soil Sample	UST Qtrs C-3	=	SPORT -0242-3
Soil Sample	UST Qtrs C-4	=	SPORT -0242-4
Soil Sample	UST Qtrs C-5	=	SPORT -0242-5
Soil Sample	UST Qtrs C-6	=	SPORT -0242-6
VOA Trip Blank	UST Qtrs B & C	=	SPORT -0244-7
Soil Sample	UST Qtrs C-7	=	SPORT -0320-1
Soil Sample	UST Qtrs C-8	=	SPORT -0320-2
Soil Sample	UST Qtrs C-9	=	SPORT -0320-3
VOA Trip Blank	UST Qtrs C-10	=	SPORT -0320-4

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends. UST piping soil samples were taken under the piping at the mechanical connections. Biased composite samples were taken from the excavation dirt pile to characterize the soil for reuse or remediation.

The samples were marked, logged, and immediately placed in sample coolers packed with ice to maintain an approximate temperature of 4° C. Tools were thoroughly cleaned and decontaminated with organic-free soap and water after each sample.

The samples remained in the custody of SPORTENVDETCNASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

## XI. RECEPTORS

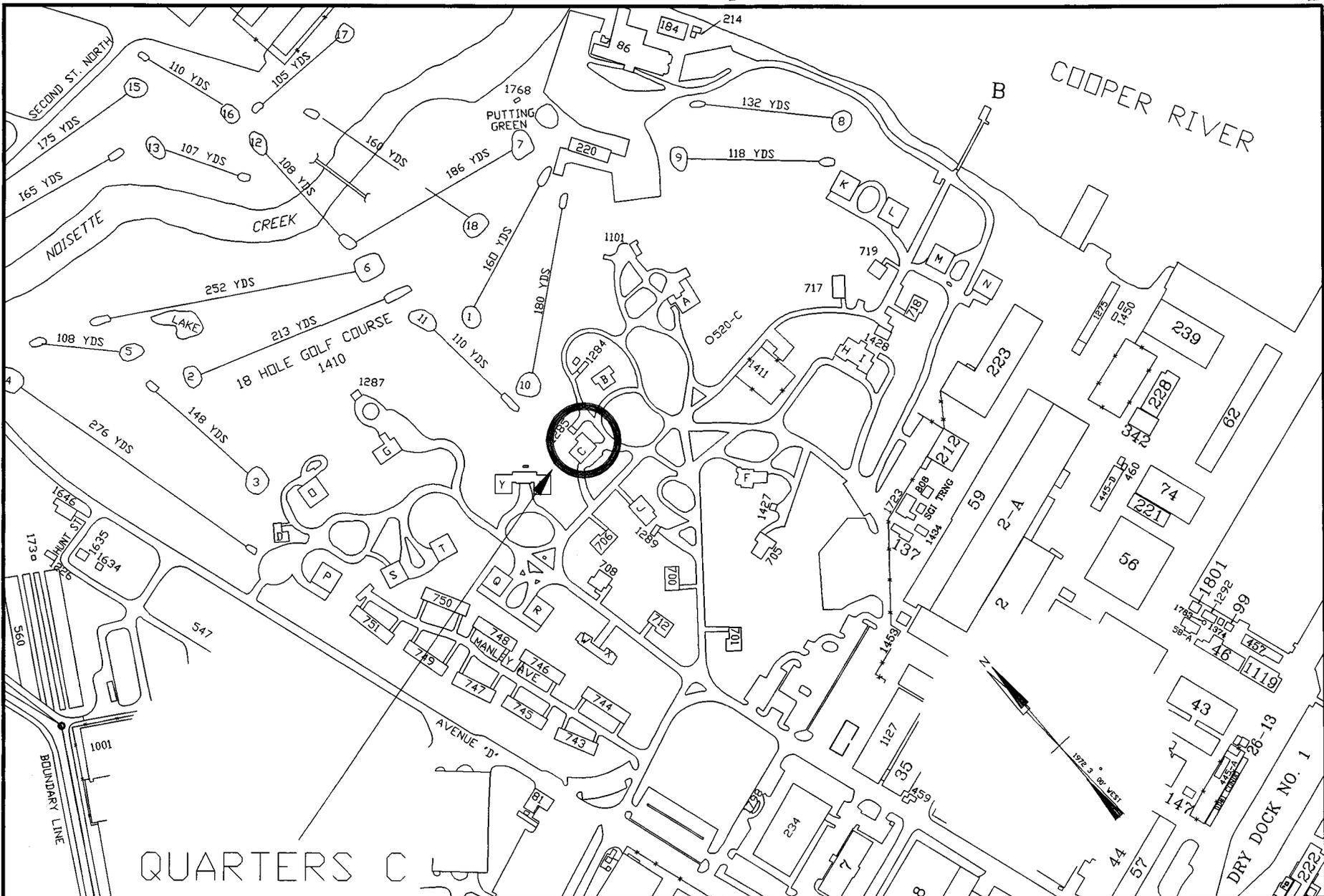
Yes    No

A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? <p style="text-align: center;">[Noisette Creek ~ 927']</p> If yes, indicate type of receptor, distance, and direction on site map.	X	
B.	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system?  If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the UST system? <p style="text-align: center;">[Qtrs C has a partial basement for the furnace and water heater]</p> If yes, indicate the type of structure, distance, and direction on site map.	X	
D.	Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination? <p style="text-align: center;">[water, electricity, storm drain]</p> If yes, indicate the type of utility, distance, and direction on the site map.	X	
E.	Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete?  If yes, indicate the area of contaminated soil on the site map.		X

**SITE MAP**

You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information.

Site Maps 1, 2, 3, and 4  
Photographs 1 and 2



QUARTERS C



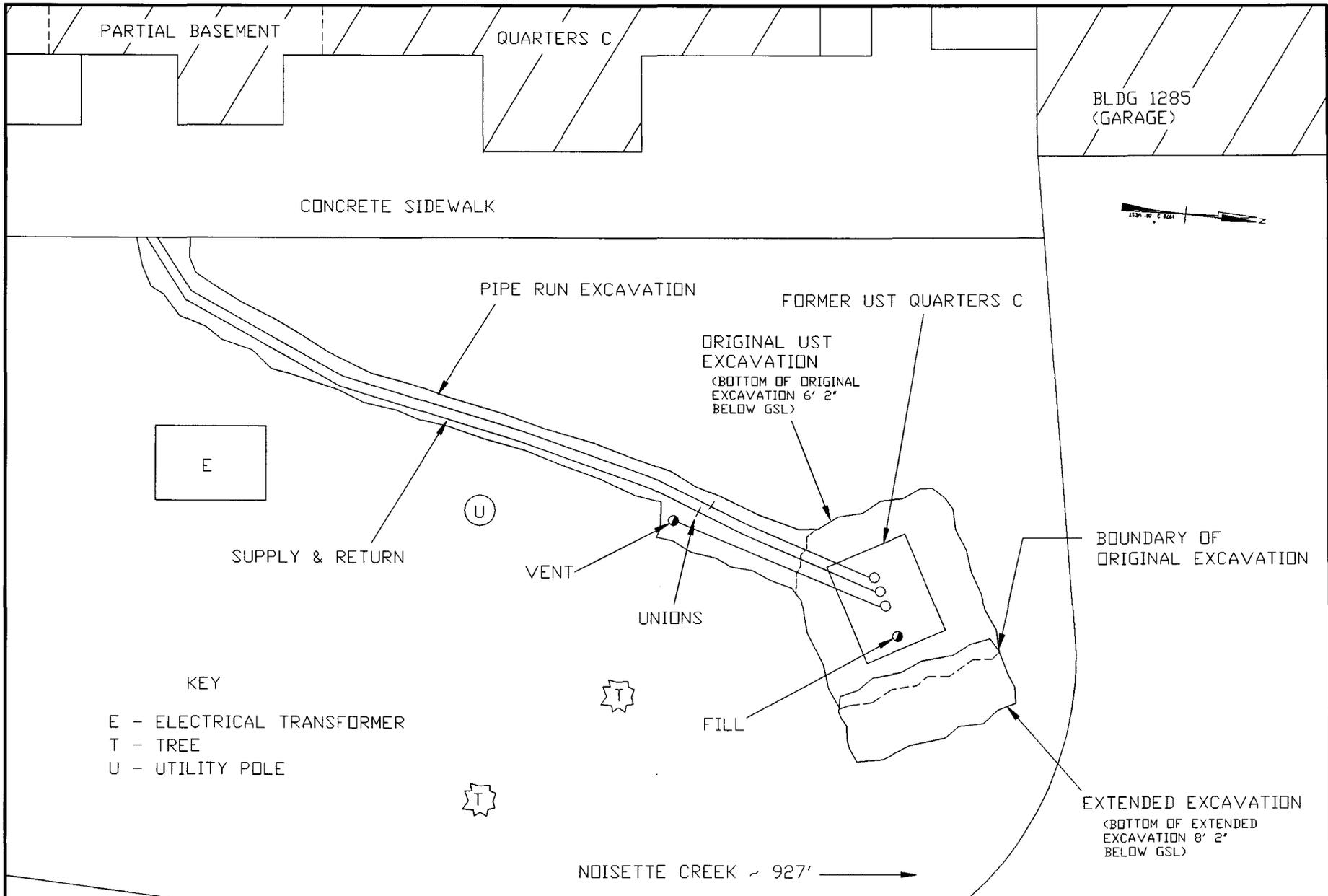
GRAPHIC SCALE

Site Map 1  
 UST QUARTERS C  
 Charleston Naval Base  
 Charleston, SC

SPORTENVDETHASN  
 1899 North Hobson Avenue  
 North Charleston, SC 29405-2106

DWG DATE: 3 MAR 97

DWG NAME: QTRS\_C1



E

U

T

T

- KEY
- E - ELECTRICAL TRANSFORMER
  - T - TREE
  - U - UTILITY POLE

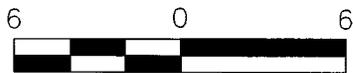
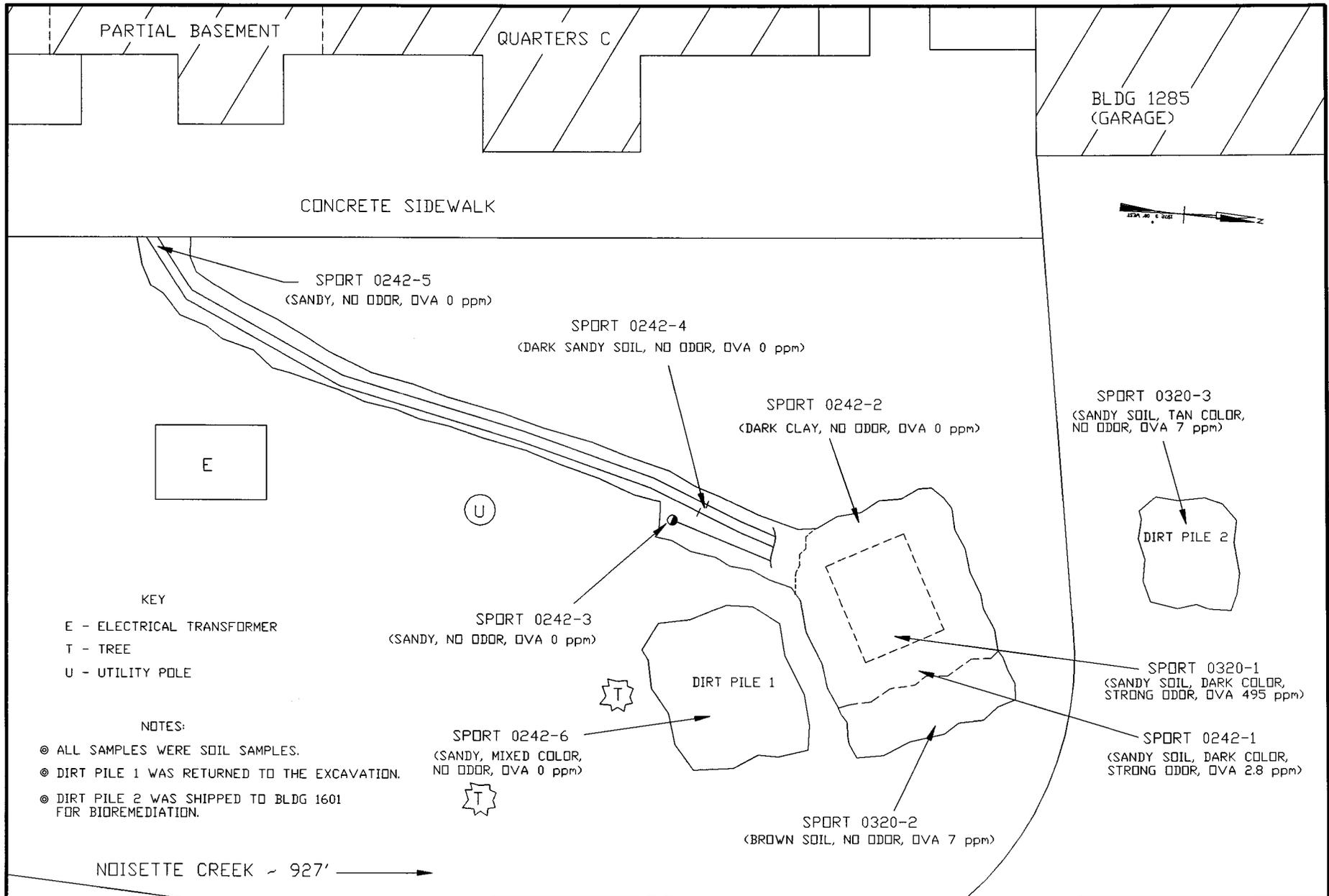


GRAPHIC SCALE

Site Map 2  
 UST QUARTERS C  
 Charleston Naval Base  
 Charleston, SC

SPORTENVDETHASN  
 1899 North Hobson Avenue  
 North Charleston, SC 29405-2106

DWG DATE: 5 MAR 97      DWG NAME: QTRS\_C2

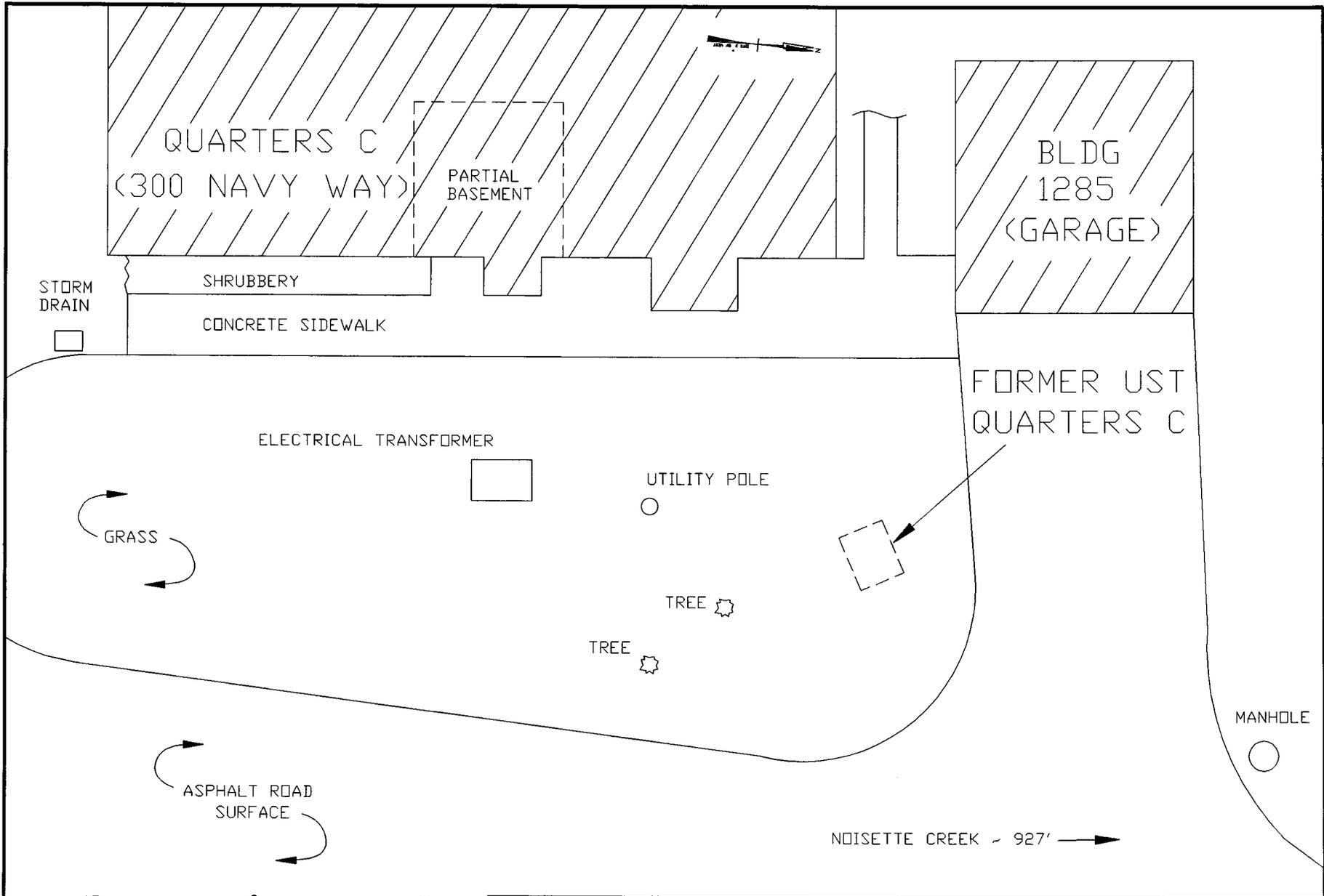


GRAPHIC SCALE

Site Map 3  
UST QUARTERS C  
Charleston Naval Base  
Charleston, SC

SPORTENVDETHASN  
1899 North Hobson Avenue  
North Charleston, SC 29405-2106

DWG DATE: 8 MAR 97      DWG NAME: QTRS\_C3



GRAPHIC SCALE

Site Map 4  
UST QUARTERS C  
Charleston Naval Base  
Charleston, SC

SPORTENVDETCHASN  
1899 North Hobson Avenue  
North Charleston, SC 29405-2106

DWG DATE: 4 MAR 97	DWG NAME: QTRS_C4
--------------------	-------------------

## UST Quarters C



Photo 1: UST Quarters C prior to removal from the excavation.

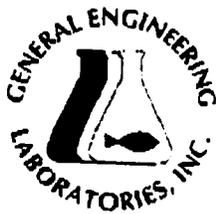


Photo 2: UST Quarters C during cutting and cleaning operations.

**ANALYTICAL RESULTS**

You must submit the laboratory report and chain-of-custody form for the samples. These samples must be analyzed by a South Carolina certified laboratory.

Certified Analytical Results  
Chain-of-Custody



# GENERAL ENGINEERING LABORATORIES

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QTR C ✓  
303

### Laboratory Certifications

STATE	GEL	EPI
FL	587156/87294	587472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2105

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-1  
 Lab ID : 9611320-01  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene		676									
Ethylbenzene		2690	20.0	40.0	ug/kg	20.	JAC	11/25/96	2005	94179	1
Toluene		1060	40.0	80.0	ug/kg	40.	JAC	11/26/96	1424	94179	1
Xylenes (TOTAL)		4680	20.0	40.0	ug/kg	20.	JAC	11/25/96	2005	94179	1
Naphthalene		3920	40.0	80.0	ug/kg	40.	JAC	11/26/96	1424	94179	1
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	41600	83100	ug/kg	100	RLC	11/27/96	0114	93916	2
Acenaphthylene	U	0.00	41600	83100	ug/kg	100					
Anthracene	U	0.00	41600	83100	ug/kg	100					
Benzo(a)anthracene	U	0.00	41600	83100	ug/kg	100					
Benzo(a)pyrene	U	0.00	41600	83100	ug/kg	100					
Benzo(b)fluoranthene	U	0.00	41600	83100	ug/kg	100					
Benzo(ghi)perylene	U	0.00	41600	83100	ug/kg	100					
Benzo(k)fluoranthene	U	0.00	41600	83100	ug/kg	100					
Chrysene	U	0.00	41600	83100	ug/kg	100					
Dibenzo(a,h)anthracene	U	0.00	41600	83100	ug/kg	100					
Fluoranthene	U	0.00	41600	83100	ug/kg	100					
Fluorene	U	0.00	41600	83100	ug/kg	100					
Indeno(1,2,3-c,d)pyrene	U	0.00	41600	83100	ug/kg	100					
Naphthalene	U	0.00	41600	83100	ug/kg	100					
Phenanthrene	J	50700	41600	83100	ug/kg	100					
Pyrene	U	0.00	41600	83100	ug/kg	100					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

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\*9611320-01\*

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P. 002

TEL: 803-852-5812

DEC. -05.96 (THU) 10:06 GEN. ENGINEERING



# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	EM756/R7294	EW7472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 2 of 3

Sample ID : SPORT0242-1

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
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#### Comments:

A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	0.00*	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	0.00*	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	110.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	78.0	(74.0 - 128.)
Toluene-d8	BTEX-8260	108.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	110.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	78.0	(74.0 - 128.)
Toluene-d8	NAP-8260	108.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

#### Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

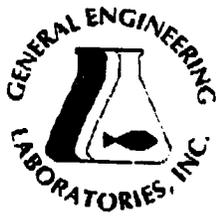
\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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\*9611320-01\*





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### Laboratory Certifications

STATE	GEL	EPI
FL	087156/87294	EE7472/87458
NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 3 of 3

Sample ID : SPORT0242-1

M = Method	Method-Description
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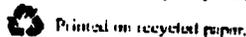
This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

*Karen Blakeney*  
 Reviewed By

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### Laboratory Certifications

STATE	GEL	EPI
FL	587156/87294	587472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWCD00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-2  
 Lab ID : 9611320-02  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00									
Ethylbenzene	U	0.150	1.00	2.00	ug/kg	1.0	JAC	11/26/96	1152	94179	1
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.650	1.00	2.00	ug/kg	1.0					
Naphthalene	J	1.80	1.00	4.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	662	1320	ug/kg	4.0	RLC	11/27/96	0151	93916	2
Acenaphthylene	U	0.00	662	1320	ug/kg	4.0					
Anthracene	U	0.00	662	1320	ug/kg	4.0					
Benzo(a)anthracene	U	0.00	662	1320	ug/kg	4.0					
Benzo(a)pyrene	U	0.00	662	1320	ug/kg	4.0					
Benzo(b)fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Benzo(ghi)perylene	U	0.00	662	1320	ug/kg	4.0					
Benzo(k)fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Chrysene	U	0.00	662	1320	ug/kg	4.0					
Dibenzo(a,h)anthracene	U	0.00	662	1320	ug/kg	4.0					
Fluoranthene	U	0.00	662	1320	ug/kg	4.0					
Fluorene	U	0.00	662	1320	ug/kg	4.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	662	1320	ug/kg	4.0					
Naphthalene	U	0.00	662	1320	ug/kg	4.0					
Phenanthrene	U	0.00	662	1320	ug/kg	4.0					
Pyrene	U	0.00	662	1320	ug/kg	4.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

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\*9611320-02\*

P. 005

TEL: 803-852-5812

DEC. 05 96 (THU) 10:07 GEN ENGINEERING



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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/R7294	E87472/R7458
NC	233	
SC	10120	10582
IN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 2 of 3

Sample ID : SPORT0242-2

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
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**Comments:**

Volatile Organics contained matrix interferences.  
 A dilution was required for Extractable Organics due to matrix interference. As a result, the detection limits are elevated.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	40.9	(30.0 - 115.)
Nitrobenzene-d5	M610	0.00*	(23.0 - 120.)
p-Terphenyl-d14	M610	61.7	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	108.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	81.2	(74.0 - 128.)
Toluene-d8	BTEX-8260	102.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	108.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	81.2	(74.0 - 128.)
Toluene-d8	NAP-8260	102.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

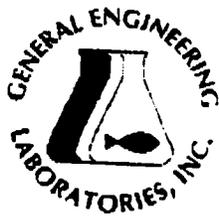
The qualifiers in this report are defined as follows:  
 ND indicates that the analyte was not detected at a concentration greater than the detection limit.  
 J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).  
 U indicates that the analyte was not detected at a concentration greater than the detection limit.  
 \* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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\*9611320-02\*





# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 3 of 3

Sample ID	Method-Description
: SPORT0242-2	

M = Method

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*Karen Blakeney*  
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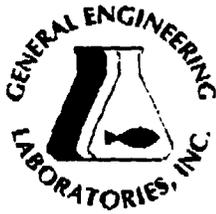
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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/E7294	E87472/E7458
NC	233	
SC	10120	10562
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-3  
 Lab ID : 9611320-03  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	11/25/96	2106	94179	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	J	1.90	1.00	2.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	166	332	ug/kg	1.0	JCB	11/26/96	1932	93916	2
Acenaphthylene	U	0.00	166	332	ug/kg	1.0					
Anthracene	U	0.00	166	332	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	166	332	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	166	332	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	166	332	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	166	332	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	332	ug/kg	1.0					
Chrysene	U	0.00	166	332	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	332	ug/kg	1.0					
Fluoranthene	J	299	166	332	ug/kg	1.0					
Fluorene	U	0.00	166	332	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	332	ug/kg	1.0					
Naphthalene	U	0.00	166	332	ug/kg	1.0					
Phenanthrene	U	0.00	166	332	ug/kg	1.0					
Pyrene	J	176	166	332	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

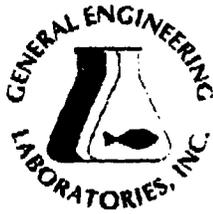
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### Laboratory Certifications

STATE	OEL	EPI
FL	ED7156/17294	ED7472/17458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 2 of 3

Sample ID : SPORT0242-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
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**Comments:**

Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	69.0	(30.0 - 115.)
Nitrobenzene-d5	M610	50.6	(23.0 - 120.)
p-Terphenyl-d14	M610	84.0	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	125.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	85.6	(74.0 - 128.)
Toluene-d8	BTEX-8260	124.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	125.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	85.6	(74.0 - 128.)
Toluene-d8	NAP-8260	124.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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### Laboratory Certifications

STATE	GEL	EPI
FL	EA7156/A7294	EA7472/87438
NC	233	
SC	1U120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Report Date: December 04, 1996

Page 3 of 3

Sample ID : SPORT0242-3

M = Method	Method-Description
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### Laboratory Certifications

STATE	GEL	KPI
FL	EF7156/87294	ES7472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-4  
 Lab ID : 9611320-04  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00									
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	11/25/96	2136	94179	1
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	2.00	ug/kg	1.0					
Naphthalene	U	0.710	1.00	4.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	JCB	11/26/96	2005	93916	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	J	286	167	333	ug/kg	1.0					
Benzo(a)pyrene	J	183	167	333	ug/kg	1.0					
Benzo(b)fluoranthene		386	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene		360	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene		473	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	0.00	167	333	ug/kg	1.0					
Pyrene		533	167	333	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

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STATE	GEL	EPI
FL	EE7156/87294	EE7472/87458
NC	239	
SC	10120	10582
TN	82934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

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Sample ID : SPORT0242-4

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
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**Comments:**

Volatile Organics contained matrix interferences.

Surrogates Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	68.9	(30.0 - 115.)
Nitrobenzene-d5	M610	49.1	(23.0 - 120.)
p-Terphenyl-d14	M610	98.6	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	126.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	86.4	(74.0 - 128.)
Toluene-d8	BTEX-8260	121.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	126.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	86.4	(74.0 - 128.)
Toluene-d8	NAP-8260	121.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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STATE	GEL	EPI
FL	EB7156/87294	EB7472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 3 of 3

Sample ID	Method-Description
: SPORT0242-4	

M = Method

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	223	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-3  
 Lab ID : 9611320-05  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	IAC	11/25/96	2207	94179	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.300	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.280	1.00	2.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	164	330	ug/kg	1.0	JCB	11/26/96	2038	93916	2
Acenaphthylene	U	0.00	164	330	ug/kg	1.0					
Anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	164	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	164	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	164	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	164	330	ug/kg	1.0					
Chrysene	U	0.00	164	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	164	330	ug/kg	1.0					
Fluoranthene	U	0.00	164	330	ug/kg	1.0					
Fluorene	U	0.00	164	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	164	330	ug/kg	1.0					
Naphthalene	U	0.00	164	330	ug/kg	1.0					
Phenanthrene	U	0.00	164	330	ug/kg	1.0					
Pyrene	U	0.00	164	330	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

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### Laboratory Certifications

STATE	GEL	EPI
FL	BS7156/87294	BS7472/87438
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 2 of 3

Sample ID : SPORT0242-5

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
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**Comments:**

Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	70.7	(30.0 - 115.)
Nitrobenzene-d5	M610	59.3	(23.0 - 120.)
p-Terphenyl-d14	M610	91.3	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	123.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	86.4	(74.0 - 128.)
Toluene-d8	BTEX-8260	112.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	123.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	86.4	(74.0 - 128.)
Toluene-d8	NAP-8260	112.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

The qualifiers in this report are defined as follows:  
 ND indicates that the analyte was not detected at a concentration greater than the detection limit.  
 J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).  
 U indicates that the analyte was not detected at a concentration greater than the detection limit.  
 \* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	239	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

or: NPWC00196

Report Date: December 04, 1996

Page 3 of 3

Sample ID : SPORT0242-5

M = Method	Method-Description
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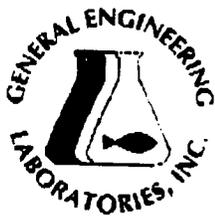
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### Laboratory Certifications

STATE	GEL	EPI
FL	BB7156/87294	BB7472/87458
NC	233	
SC	10120	10382
TN	02934	02834

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 1 of 3

Sample ID : SPORT0242-6  
 Lab ID : 9611320-06  
 Matrix : Soil  
 Date Collected : 11/18/96  
 Date Received : 11/18/96  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatiles Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	11/26/96	1354	94179	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	162	330	ug/kg	1.0	JCB	11/26/96	2111	93916	2
Acenaphthylene	U	0.00	162	330	ug/kg	1.0					
Anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	162	330	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	162	330	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	162	330	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	162	330	ug/kg	1.0					
Chrysene	U	0.00	162	330	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	162	330	ug/kg	1.0					
Fluoranthene	U	0.00	162	330	ug/kg	1.0					
Fluorene	U	0.00	162	330	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	162	330	ug/kg	1.0					
Naphthalene	U	0.00	162	330	ug/kg	1.0					
Phenanthrene	U	0.00	162	330	ug/kg	1.0					
Pyrene	U	0.00	162	330	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

TNF 11/20/96 1100 93916 3

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### Laboratory Certifications

STAT#	CEL	BPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 2 of 3

Sample ID		: SPORT0242-6									
Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M

**Comments:**  
 Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	85.4	(30.0 - 115.)
Nitrobenzene-d5	M610	74.8	(23.0 - 120.)
p-Terphenyl-d14	M610	98.7	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	119.	(59.7 - 159.)
Dibromofluoromethane	BTEX-8260	84.4	(74.0 - 128.)
Toluene-d8	BTEX-8260	111.	(53.4 - 163.)
Bromofluorobenzene	NAP-8260	119.	(59.7 - 159.)
Dibromofluoromethane	NAP-8260	84.4	(74.0 - 128.)
Toluene-d8	NAP-8260	111.	(53.4 - 163.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**  
 The qualifiers in this report are defined as follows:  
 ND indicates that the analyte was not detected at a concentration greater than the detection limit.  
 J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).  
 U indicates that the analyte was not detected at a concentration greater than the detection limit.  
 \* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	ORL	EPI
FL	E87156/87294	E87472/87458
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Erv.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: December 04, 1996

Page 3 of 3

Sample ID	: SPORT0242-6
-----------	---------------

M = Method

Method-Description

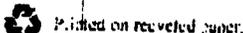
This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

*Karen Blakeney*  
 Reviewed By

PO Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(803) 556-8171 • Fax (803) 766-1178

\*9611320-06\*



WC 00196

General Engineering Services, Inc  
 2040 Savage Road  
 Charleston, South Carolina 29414  
 P.O. Box 30712  
 Charleston, South Carolina 29417  
 (803) 556-8171

CHAIN OF CUSTODY RECORD

9611320 KBB

Page 1 of 1

Client Name/Facility Name SPORT ENVDETCHASN						SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods																Remarks	
Collected by/Company SPORT ENVDETCHASN						pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX AND NAPHTHALENE		PAH
SAMPLE ID	DATE	TIME	WELL SOIL	COMP	GRAB	# OF CONTAINERS																	
SPORT 242-1	11/18/96	1115	X	X	Z																X	X	QTRS UST-C-1 soil
SPORT 242-2	11/18/96	1126	X	X	Z																X	X	QTRS UST-C-2 soil
SPORT 242-3	11/18/96	1130	X	X	Z																X	X	QTRS UST-C-3 soil
SPORT 242-4	11/18/96	1149	X	X	Z																X	X	QTRS UST-C-4 soil
SPORT 242-5	11/18/96	1138	X	X	Z																X	X	QTRS UST-C-5 soil
SPORT 242-6	11/18/96	1158	X	X	Z																X	X	QTRS UST-C-6 soil
Relinquished by: <i>W.R. Hiern, Jr.</i>						Date: 11/18/96	Time: 1315	Received by: <i>W.R. Hiern, Jr.</i>						Date: 11/18/96	Time: 1452	Received by: <i>Phil Lockman</i>							
Relinquished by: <i>Phil Lockman</i>						Date: 11/18/96	Time: 1520	Received by: <i>Queen Blakeney</i>						Date: 11/18/96	Time: 1520	Remarks:							

White = sample collector    Yellow = file    Pink = with report

IPWC 00196

General Engineering  
 2040 Savage Road  
 Charleston, South Carolina 29414  
 P.O. Box 30712  
 Charleston, South Carolina 29417  
 (803) 556-8171

# CHAIN OF CUSTODY RECORD

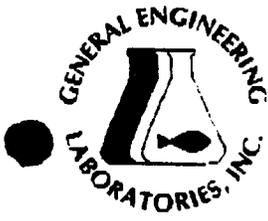
Page 1 of     

*KBB*      *9611319*

Client Name/Facility Name			SAMPLE ANALYSIS REQUIRED (X) - use remarks area to specify specific compounds or methods														Use F or P in the boxes to indicate whether sample was filtered and/or preserved						
SPORTENY DETCHASN			# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX FWD	MAP/HAZEN	PAH	Remarks	
Collected by/Company																							
SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB																	
<i>01</i> SPORTΦ244-1	<i>11/18/96</i>	<i>1Φ1Φ</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-1 Soil</i>	<i>.1</i>
<i>02</i> SPORTΦ244-2	<i>11/18/96</i>	<i>1Φ22</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-2 Soil</i>	<i>.1</i>
<i>03</i> SPORTΦ244-3	<i>11/18/96</i>	<i>1Φ35</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-3 Soil</i>	<i>.1</i>
<i>04</i> SPORTΦ244-4	<i>11/18/96</i>	<i>1Φ46</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-4 Soil</i>	<i>.1</i>
<i>05</i> SPORTΦ244-5	<i>11/18/96</i>	<i>1Φ59</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-5 Soil</i>	<i>.1</i>
<i>06</i> SPORTΦ244-6	<i>11/18/96</i>	<i>111Φ</i>	<i>X</i>	<i>X</i>		<i>Z</i>														<i>X</i>	<i>X</i>	<i>QTRS UST-B-2-6 Soil</i>	<i>.1</i>
<i>07</i> SPORTΦ244-7	<i>11/18/96</i>	<i>Φ8ΦΦ</i>				<i>X</i>	<i>3</i>													<i>X</i>		<i>QTRS UST-C, UST-B-1, UST-B-2 VOA TRIP BLANK</i>	<i>.2</i>
Relinquished by:			Date:	Time:	Received by:			Relinquished by:			Date:	Time:	Received by:										
<i>W.R. Hiers, Jr.</i>			<i>11/18/96</i>	<i>1425</i>	<i>W.R. Hiers, Jr.</i>			<i>W.R. Hiers, Jr.</i>			<i>11/18/96</i>	<i>1452</i>	<i>Bob Lohr</i>										
Relinquished by:			Date:	Time:	Received by lab by:			Date:	Time:	Remarks:													
<i>Bob Lohr</i>			<i>11/18/96</i>	<i>1520</i>	<i>Karen Blakemey</i>			<i>11/18/96</i>	<i>1520</i>														

White = sample collector    Yellow = file    Pink = with report

CT



# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	EE7156/87294	EE7472/87436
NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 1 of 3

Sample ID : SPORT0320-1  
 Lab ID : 9701486-01  
 Matrix : Soil  
 Date Collected : 01/24/97  
 Date Received : 01/27/97  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	10.0	20.0	ug/kg	10.	JAC	01/31/97	1854	97209	1
Ethylbenzene	U	0.00	10.0	20.0	ug/kg	10.					
Toluene		43.0	10.0	20.0	ug/kg	10.					
Xylenes (TOTAL)		356	10.0	20.0	ug/kg	10.					
Naphthalene		301	10.0	20.0	ug/kg	10.					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	16600	33100	ug/kg	100	RLC	01/30/97	1416	96986	2
Acenaphthylene	U	0.00	16600	33100	ug/kg	100					
Anthracene	U	0.00	16600	33100	ug/kg	100					
Benzo(a)anthracene	U	0.00	16600	33100	ug/kg	100					
Benzo(a)pyrene	U	0.00	16600	33100	ug/kg	100					
Benzo(b)fluoranthene	U	0.00	16600	33100	ug/kg	100					
Benzo(ghi)perylene	U	0.00	16600	33100	ug/kg	100					
Benzo(k)fluoranthene	U	0.00	16600	33100	ug/kg	100					
Chrysene	U	0.00	16600	33100	ug/kg	100					
Dibenzo(a,h)anthracene	U	0.00	16600	33100	ug/kg	100					
Fluoranthene	U	0.00	16600	33100	ug/kg	100					
Fluorene	U	0.00	16600	33100	ug/kg	100					
Indeno(1,2,3-c,d)pyrene	U	0.00	16600	33100	ug/kg	100					
Naphthalene	U	0.00	16600	33100	ug/kg	100					
Phenanthrene	U	0.00	16600	33100	ug/kg	100					
Pyrene	U	0.00	16600	33100	ug/kg	100					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

MS 01/28/97 1530 96986 3

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\*9701486-01\*

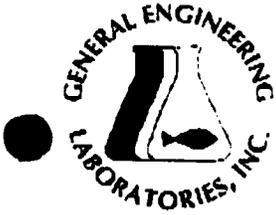
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TEL: 803-852-5812

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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E17472/17438
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 3 of 3

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Sample ID : SPORT0320-1

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M = Method	Method-Description
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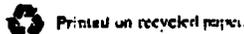
This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

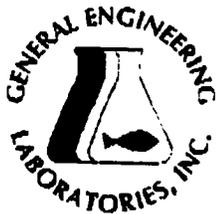
*Karen Blakeney*  
 \_\_\_\_\_  
 Reviewed By

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\*9701486-01\*





# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	EB7156/17294	EB7472/87451
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 1 of 2

Sample ID : SPORT0320-2  
 Lab ID : 9701486-02  
 Matrix : Soil  
 Date Collected : 01/24/97  
 Date Received : 01/27/97  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	02/01/97	1138	97209	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	167	333	ug/kg	1.0	JCB	01/29/97	2032	96986	2
Acenaphthylene	U	0.00	167	333	ug/kg	1.0					
Anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)anthracene	U	0.00	167	333	ug/kg	1.0					
Benzo(a)pyrene	U	0.00	167	333	ug/kg	1.0					
Benzo(b)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	167	333	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	167	333	ug/kg	1.0					
Chrysene	U	0.00	167	333	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	167	333	ug/kg	1.0					
Fluoranthene	U	0.00	167	333	ug/kg	1.0					
Fluorene	U	0.00	167	333	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	167	333	ug/kg	1.0					
Naphthalene	U	0.00	167	333	ug/kg	1.0					
Phenanthrene	U	0.00	167	333	ug/kg	1.0					
Pyrene	U	0.00	167	333	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

MS 01/28/97 1530 96986 3

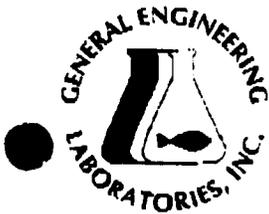
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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	EE7156/87294	EE7672/87458
NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 2 of 2

Sample ID : SPORT0320-2

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	95.6	(30.0 - 115.)
Nitrobenzene-d5	M610	81.6	(23.0 - 120.)
p-Terphenyl-d14	M610	93.4	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	100.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	100.	(63.4 - 136.)
Toluene-d8	BTEX-8260	106.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	100.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	100.	(63.4 - 136.)
Toluene-d8	NAP-8260	106.	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakemey at (803) 769-7386.

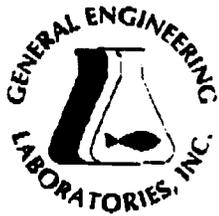
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 Reviewed By

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\*9701486-02\*





# GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87431
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 1 of 3

Sample ID : SPORT0320-3  
 Lab ID : 9701486-03  
 Matrix : Soil  
 Date Collected : 01/24/97  
 Date Received : 01/27/97  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	01/31/97	1951	97209	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	0.00	166	332	ug/kg	1.0	JCB	01/29/97	2106	96986	2
Acenaphthylene	U	0.00	166	332	ug/kg	1.0					
Anthracene	U	0.00	166	332	ug/kg	1.0					
Benzo(a)anthracene	J	259	166	332	ug/kg	1.0					
Benzo(a)pyrene	J	229	166	332	ug/kg	1.0					
Benzo(b)fluoranthene		392	166	332	ug/kg	1.0					
Benzo(ghi)perylene	U	0.00	166	332	ug/kg	1.0					
Benzo(k)fluoranthene	U	0.00	166	332	ug/kg	1.0					
Chrysene	J	289	166	332	ug/kg	1.0					
Dibenzo(a,h)anthracene	U	0.00	166	332	ug/kg	1.0					
Fluoranthene		644	166	332	ug/kg	1.0					
Fluorene	U	0.00	166	332	ug/kg	1.0					
Indeno(1,2,3-c,d)pyrene	U	0.00	166	332	ug/kg	1.0					
Naphthalene	U	0.00	166	332	ug/kg	1.0					
Phenanthrene		369	166	332	ug/kg	1.0					
Pyrene		511	166	332	ug/kg	1.0					

The following prep procedures were performed:  
 GC/MS Base/Neutral Compounds

MS 01/28/97 1530 96986 3

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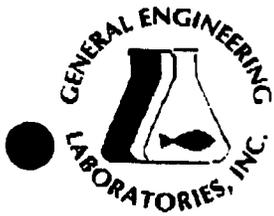
\*9701486-03\*

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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	267156/87294	B47472/87458
NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 2 of 3

Sample ID : SPORT0320-3

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyt	Date	Time	Batch	M
-----------	-----------	--------	----	----	-------	----	--------	------	------	-------	---

**Comments:**

Volatile Organics contained matrix interferences.

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610	98.7	(30.0 - 115.)
Nitrobenzene-d5	M610	83.9	(23.0 - 120.)
p-Terphenyl-d14	M610	99.3	(37.3 - 128.)
Bromofluorobenzene	BTEX-8260	108.	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	100.	(63.4 - 136.)
Toluene-d8	BTEX-8260	118.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	108.	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	100.	(63.4 - 136.)
Toluene-d8	NAP-8260	118.	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260
M 2	EPA 8270
M 3	EPA 3550

**Notes:**

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

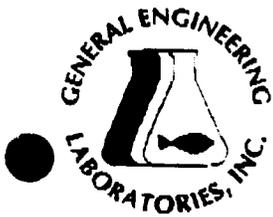
\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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\*9701486-03\*

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NC	273	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
SUPSHIP-Portsmouth Detachment-Env.  
1899 North Hobson Ave.  
North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers  
**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 3 of 3

Sample ID : SPORT0320-3

M = Method Method-Description

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakency at (803) 769-7386.

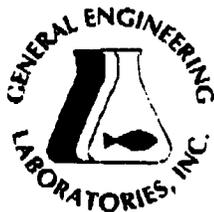
Karen Blakency  
Reviewed By

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NC	233	
SC	10120	10582
TN	02934	02934

**Client:** Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

**Contact:** Mr. Bill Hiers

**Project Description:** SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 1 of 2

Sample ID : SPORT0320-4  
 Lab ID : 9701486-04  
 Matrix : Soil  
 Date Collected : 01/24/97  
 Date Received : 01/27/97  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX - 4 items</i>											
Benzene	U	0.00	1.00	2.00	ug/kg	1.0	JAC	01/31/97	2019	97209	1
Ethylbenzene	U	0.00	1.00	2.00	ug/kg	1.0					
Toluene	U	0.00	1.00	2.00	ug/kg	1.0					
Xylenes (TOTAL)	U	0.00	1.00	4.00	ug/kg	1.0					
Naphthalene	U	0.00	1.00	2.00	ug/kg	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX-8260	93.6	(53.5 - 154.)
Dibromofluoromethane	BTEX-8260	82.0	(63.4 - 136.)
Toluene-d8	BTEX-8260	104.	(72.1 - 137.)
Bromofluorobenzene	NAP-8260	93.6	(53.5 - 154.)
Dibromofluoromethane	NAP-8260	82.0	(63.4 - 136.)
Toluene-d8	NAP-8260	104.	(72.1 - 137.)

M = Method	Method-Description
M 1	EPA 8260

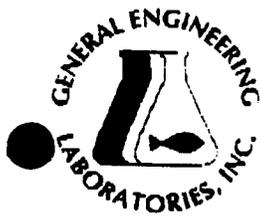
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\*9701486-04\*





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FL	EA7156/87294	E87472/E7451
NC	233	
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
 SUPSHIP-Portsmouth Detachment-Env.  
 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00196

Report Date: February 04, 1997

Page 2 of 2

Sample ID : SPORT0320-4

M = Method	Method-Description
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#### Notes:

The qualifiers in this report are defined as follows:

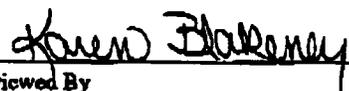
ND indicates that the analyte was not detected at a concentration greater than the detection limit.

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\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Karen Blakeney at (803) 769-7386.

  
 Reviewed By

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NF ● C 00196

General Engineering  
2040 Savage Road  
Charleston, South C  
P.O. Box 30712  
Charleston, South Ca. 29417  
(803) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1

9701486

Client Name/Facility Name				SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods													Use F or P in the boxes to indicate whether sample was filtered and/or preserved						
SPORTENVDETCHASN				# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX PLUS NAPHTHALENE	PAH	Remarks	
SAMPLE ID	DATE	TIME	WELL SOIL																				COMP
01 SPORTΦ32Φ-1	1/24/97	1315	X	X	2															X	X	UST-C-7 Soil	-1
02 SPORTΦ32Φ-2	1/24/97	1340	X	X	2															X	X	UST-C-8 Soil	-1
03 SPORTΦ32Φ-3	1/24/97	1420	X	X	2															X	X	UST-C-9 Soil DIRT Pile	-1
04 SPORTΦ32Φ-4	1/24/97	1305	X		1															X		UST-C VOA Soil TRIP Blank	-2
Relinquished by: <i>W. R. Hiers, Jr.</i>				Date: 1/24/97	Time: 1436	Received by: <i>W. R. Hiers, Jr.</i>				Date: 1/27/97	Time: 1507	Relinquished by: <i>Raymond Reed</i>											
Relinquished by: <i>Raymond Reed</i>				Date: 1-27-97	Time: 1530	Received by lab by: <i>Douglas Francis</i>				Date: 1/27/97	Time: 1530	Remarks:											

CCL 25331

White = sample collector    Yellow = file    Pink = with report

**Attachment III**

Certificate of Disposal (tank)

# UST Certificate of Disposal

## CONTRACTOR

Supervisor of Shipbuilding, Conversion and Repair, USN  
Portsmouth, VA  
Environmental Detachment Charleston  
1899 North Hobson Avenue  
North Charleston 29405-2106

Telephone (803) 743-6482

## TANK ID & LOCATION

UST Quarters C; Charleston Naval Base, Quarters C, 300 Navy Way, N. Charleston, SC

## DISPOSAL LOCATION

Bldg. 1601 Tank Cleaning  
& Disposal Area  
Charleston Naval Complex

### TYPE OF TANK

Fuel Oil

### SIZE (GAL)

550 gal.

## CLEANING/DISPOSAL METHOD

The tank was cut open on both ends, cleaned with a steam cleaner, cut into sections, and disposed of as recyclable scrap metal.

## DISPOSAL CERTIFICATION

I certify that the above tank has been properly cleaned and disposed of as recyclable scrap metal.



Sidney C. Ladson

102-19-97

(Date)



2600 Bull Street  
Columbia, SC 29201-1708

Mr. Gabriel L. Magwood  
Southern Division NFEC  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, South Carolina 29419-9010

Re:       Underground Storage Tank Assessment Report dated April 29, 1997  
          Quarters "C" Housing (Site Identification # 00947)  
          Charleston Naval Complex/Charleston Naval Base  
          Charleston, SC  
          Charleston County

Date:     October 22, 1997

Dear Mr. Magwood:

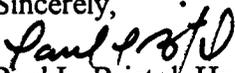
The author has completed technical review of the referenced document. As submitted, the report provides analytical results of environmental sampling conducted to determine if releases have occurred from operation of the referenced vessel and/or associated piping system. The results presented indicate elevated levels of PAH (polynuclear aromatic hydrocarbons) and VOC (aromatic volatile organic compounds) were detected in soil grab samples obtained from the original tank pit excavation. Subsequent excavation was conducted with additional clearance sampling performed. These results demonstrated a marked decrease in VOC concentrations with PAH compounds reported as BDL (below detection limits), although the detection limits for these samples were elevated due to matrix interference. As identified in previous correspondence (Bristol to Amey, September 2, 1997), when detection limits are elevated and CoC's (contaminants of concern) are reported as zero (0) or BDL it will be assumed that the chemical constituent is equal to the elevated detection limit. With this consideration, these results approach or exceed levels proposed in the Soil Corrective Action Plan (amended July 30, 1997) for the Charleston Naval Complex and appear to indicate that additional endeavors for remedial actions (soils removal) and contamination characterization are warranted at the referenced site. In this regard, assessment/corrective action activities provided in the Tank Management Plan (dated October 18, 1996) should be implemented in an appropriate and timely manner. The employed activities should be technically sufficient and reasonable to determine the extent and severity (including horizontal and vertical delineation) of suspected contamination. Please be reminded that groundwater sampling (if necessary) will require construction of sampling points and will

Charleston Naval Base  
Quarters "C" (#00947)  
October 22, 1997  
page 2

need to be submitted for prior review and approval, as appropriate.

Should you have any questions, please contact me at (803) 734-5328.

Sincerely,

  
Paul L. Bristol, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC



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

Li 5.12.97  
 Lo

5090  
 Code 1849  
 29 Apr 1997

**RECEIVED**  
 MAY 02 1997

Groundwater Assessment  
 and Development Section

Mr. Paul Bristol  
 South Carolina Department of Health  
 and Environmental Control  
 Ground-Water Protection Division  
 2600 Bull Street  
 Columbia, SC 29201

**UST ASSESSMENT REPORTS FOR CHARLESTON NAVAL COMPLEX,  
 CHARLESTON, SC**

Dear Mr. Bristol:

Enclosed is the Assessment Reports for the closure of storage tanks AST 2524A and AST 2524B, UST H, AST 2556, UST C, UST NH 62, AST NH 62 and UST 38-1 located at the Charleston Naval Complex, Charleston, SC.

If you have any questions please contact me at (803) 820-7307.

Sincerely,

U1462-00946 draft 10.21  
 qtrsc 00947 draft 10.21  
 qtr H/E 00948 draft 10.21  
 Bldg 2556 00949 draft 10.21  
 Bldg 2524 00950 draft 10.22  
 Bldg 80 to Donna Owens 10.22

Final  
 10.22

*Gabriel L. Magwood*  
 GABRIEL L. MAGWOOD  
 Petroleum/UST

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RECEIVED

MAY 20 1998

MAY 20 1998

DIVISION OF UNDERGROUND  
STORAGE TANK MGMT.

Water Monitoring, Assessment &  
Protection Division

# SAMPLING AND ANALYSIS PLAN

**UST QUARTERS C  
(SCDHEC GWPD SITE ID # 00947)  
NAVAL BASE CHARLESTON  
CHARLESTON SC**



**Prepared for:**

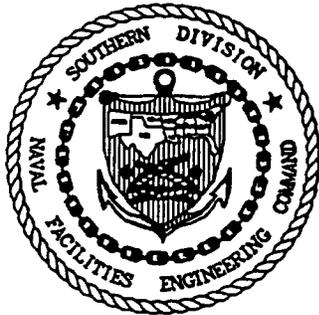
DEPARTMENT OF THE NAVY  
SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
CHARLESTON, S.C.



**Prepared by:**

ENVIRONMENTAL DETACHMENT CHARLESTON  
1899 NORTH HOBSON AVE.  
NORTH CHARLESTON, S.C. 29405-2106

May 11, 1998



## FORWARD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (UST) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The Program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirement for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 281 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This plan was prepared to satisfy the requirements of South Carolina R.61-92, Part 280 (*Underground Storage Tank Control Regulations*), Section 280.65 to determine the extent and location of soils contaminated by a release from a UST system.

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4.2	PREPARATION OF REPORTS	4-2
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2-2	QTRS C UST ARRANGEMENT	2-5
2-3	UST QUARTERS C SAMPLES	2-6
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## ACRONYMS, ABBREVIATIONS AND SYMBOLS

AST	Above-ground Storage Tank
bgs	below the ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
BTEX+Naphthalene	Benzene, Toluene, Ethylbenzene and Xylene plus Naphthalene
CFR	Code of Federal Regulations
CHASP	Comprehensive Health and Safety Plan
CIA	Controlled Industrial Area
CSAP	Comprehensive Sampling and Analysis Plan
DET	Environmental Detachment Charleston
DL	Detection Level
USEPA	U.S. Environmental Protection Agency
ft/day	feet per day
ft <sup>2</sup> /day	square feet per day
gpm	gallons per minute
GWPD	Ground Water Protection Division
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSWA	Hazardous and Solid Waste Amendments
IDW	Investigative Derived Wastes
MSDS	Material Safety Data Sheet
NAVBASE	former Charleston Naval Base
ova	organic vapor analyzer
PAH	Polynuclear Aromatic Hydrocarbon
RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SOPQAM	<i>Standard Operating Procedures and Quality Assurance Manual</i>
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSHSP	Site-Specific Health and Safety Plan
SWDA	Solid Waste Disposal Act
UST	Underground Storage Tanks

## 1.0 INTRODUCTION

**1.1 GENERAL.** An UST located beside the former Charleston Naval Base Quarters Building C was removed by Environmental Detachment Charleston (DET). Soil samples taken from the final walls of the excavation contained matrix interferences which elevated detection levels (DL) for Polynuclear Aromatic Hydrocarbons (PAHs) above South Carolina Department of Health and Environmental Control (SCDHEC) Risk Based Screening Levels (RBSLs). The Sampling and Analysis Plan (SAP) outlines a field investigation and sampling program that will assess the source(s) of soil contamination at the site of the removed tanks, determine if contamination in fact exceeds RBSLs and evaluate the horizontal and vertical extent of the petroleum contamination detected. The field investigation will also determine if contamination has entered groundwater at the Quarters C UST site. The following report presents the site location and develops the rationale for the proposed field investigation.

**1.2 USE OF RFI DATA.** The former Charleston Naval Base is the site of an ongoing RCRA Facility Investigation (RFI); the former Quarters C UST site is in Zone B of the RFI. Data taken as part of the RFI, including geological information, hydrogeological information, well drilling logs and groundwater sampling data was used in the preparation of this SAP.

## 2.0 BACKGROUND

**2.1 SITE DESCRIPTION.** The former Charleston Naval Base (NAVBASE) is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. The developed portion of the NAVBASE occupies the west bank of the Cooper River starting at a boundary 2300 feet upstream of Noisette Creek and ending at Shipyard Creek. The northern section of the NAVBASE (RFI Zones A, B, C and D) contains a mixture of warehouses, offices and former Navy housing areas. The central section of the NAVBASE (RFI Zones E and F) was occupied primarily by the controlled industrial area (CIA) of the former Naval shipyard and its associated offices and warehouses. The southern section of the NAVBASE (RFI Zones G, H and I) along the Cooper River is occupied by piers, barracks, training buildings, offices, storehouses and fuel tanks which formerly supported naval vessels homeported at Charleston. The north bank of Shipyard Creek in the southern part of the base is largely undeveloped and consists of recreational areas and a large dredge spoil area.

The removed UST supplied fuel oil to Quarters C, which is located in the northern section of the NAVBASE at 300 Navy Way south of the former NAVBASE golf course. Quarters C is former Navy housing and is unoccupied as of 22 April 1998. Viewed from Navy Way, the former UST location is in the yard on the near side of the driveway leading to garage building 1285.

**2.2 SITE HISTORY.** The UST at Quarters C (SCDHEC Ground Water Protection Division (GWPD) Site Identification Number 00947) was a 550 gallon unregulated fuel oil tank installed prior to 1976 and used until April 1996. The tanks were constructed of steel and connected to Quarters C by copper supply and return lines. Between 12 November 1996 and 19 November 1996, the UST was removed, drained, cleaned and cut up for recycling as scrap. The copper fuel piping and tank vent piping were removed at the same time.

There were no recorded releases while the UST at Quarters C was in service and no corrosion or damage was observed when the tank was removed. However, soil sample SPORT0242-1 taken from the east end of the excavation contained concentrations of Benzene, Toluene, Ethylbenzene and Xylene (BTEX) and Naphthalene above RBSLs; matrix interferences elevated PAH DLs for this sample above RBSLs. Even after additional soil was excavated, soil sample SPORT0320-1 taken from the base of the excavation still contained Naphthalene above RBSLs and had PAH DLs elevated above RBSLs. PAH DLs were also elevated above RBSLs in soil sample SPORT0242-2 from the west end of the excavation where no additional excavation was performed. Figure 2-3 shows sample locations and results.

A new aboveground storage tank (AST) has been installed at Quarters C in a location away from the former UST site. Two underground electric power cables run close by the former UST Quarters C location (see Figure 2-4).

**2.3 GEOLOGY.** Charleston South Carolina is located in the southern Atlantic Coastal Plain. The surficial geology of the region consists of the Quaternary-age sands, silts and clays of the Wando Formation. Below the Wando Formation are the Oligicene-age Ashley Formation and the Eocene-age Parkers Ferry and Harleyville Formations, known collectively as the Cooper Group. Below the Cooper Group is the Eocene-age Santee Limestone.

At the NAVBASE, the upper surface of the Ashley Formation is an erosional surface ranging from 35 feet to 77 feet below the ground surface (bgs). Overlaying the Ashley Formation is the Wando Formation which at the NAVBASE typically consists of upper and lower sand layers divided by a layer of "marsh clay". The surface contours of the NAVBASE area were extensively changed by fill operations during the base's life, particularly in the lower portion of the NAVBASE, which was originally tidal marsh.

## **2.4 HYDROGEOLOGY.**

**2.4.1 Regional.** (Excerpted from Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996.) Groundwater occurs under water table or poorly confined conditions within the Pleistocene deposits overlying the Ashley Formation. Transmissivities in the Pleistocene aquifer are generally less than 1,000 square feet per day (ft<sup>2</sup>/day) and well yields are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depth (Park, 1985).

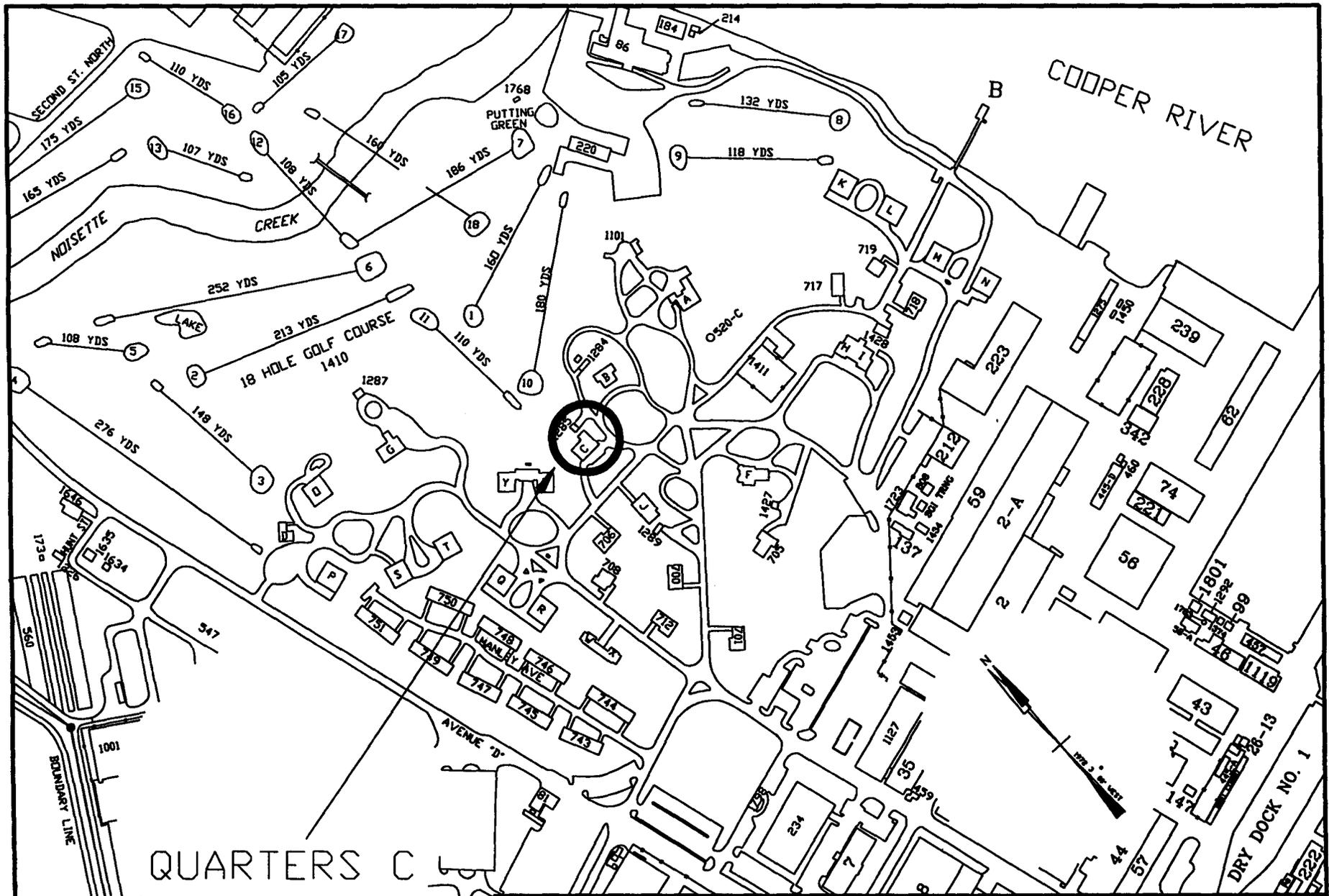
The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestones produce little or no water and act as confining material that produces artesian condition in the underlying Santee Limestone.

**2.4.2 Site Specific.** Typically, above the Ashley Formation at the entire NAVBASE are two sand layers divided by a clay layer described as "marsh clay" in the RFI Reports. The vertical hydraulic conductivity of the Ashley Formation beneath the NAVBASE is 0.0027 feet per day (ft/day), based on measurements taken during the Zone H RFI. The vertical hydraulic conductivity of the marsh clay layer is 0.001 ft/day, based on measurements taken during the Zone I RFI. The Ashley Formation acts as a lower confining layer, while the marsh clay functions as an aquitard separating the upper and lower sand layers. At the NAVBASE, rainwater absorbed into the ground will flow downward to the marsh clay and then flow toward a discharge point into a body of surface water.

Parts of the southern portion of NAVBASE are drained by Shipyard Creek while some northern areas are drained by Noisette Creek. The drainage basins of both waterways include areas other than NAVBASE. These waterways are tributaries of the Cooper River. Surface Drainage Over the remainder of NAVBASE flows directly into the Cooper River, which discharges into Charleston Harbor.

The former Quarters C UST site is located in the northern portion of the NAVBASE in Zone B. Based on potentiometric maps included in the final Zone B RFI Report dated November 21, 1996, groundwater beneath the UST location flows east toward the Cooper River. Because no groundwater was encountered during UST removal, the depth to groundwater is greater than the 6 foot bgs depth of the tank base.

2-4



QUARTERS C

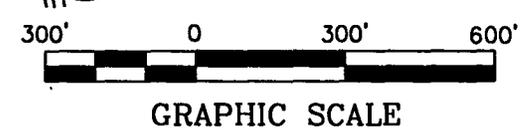
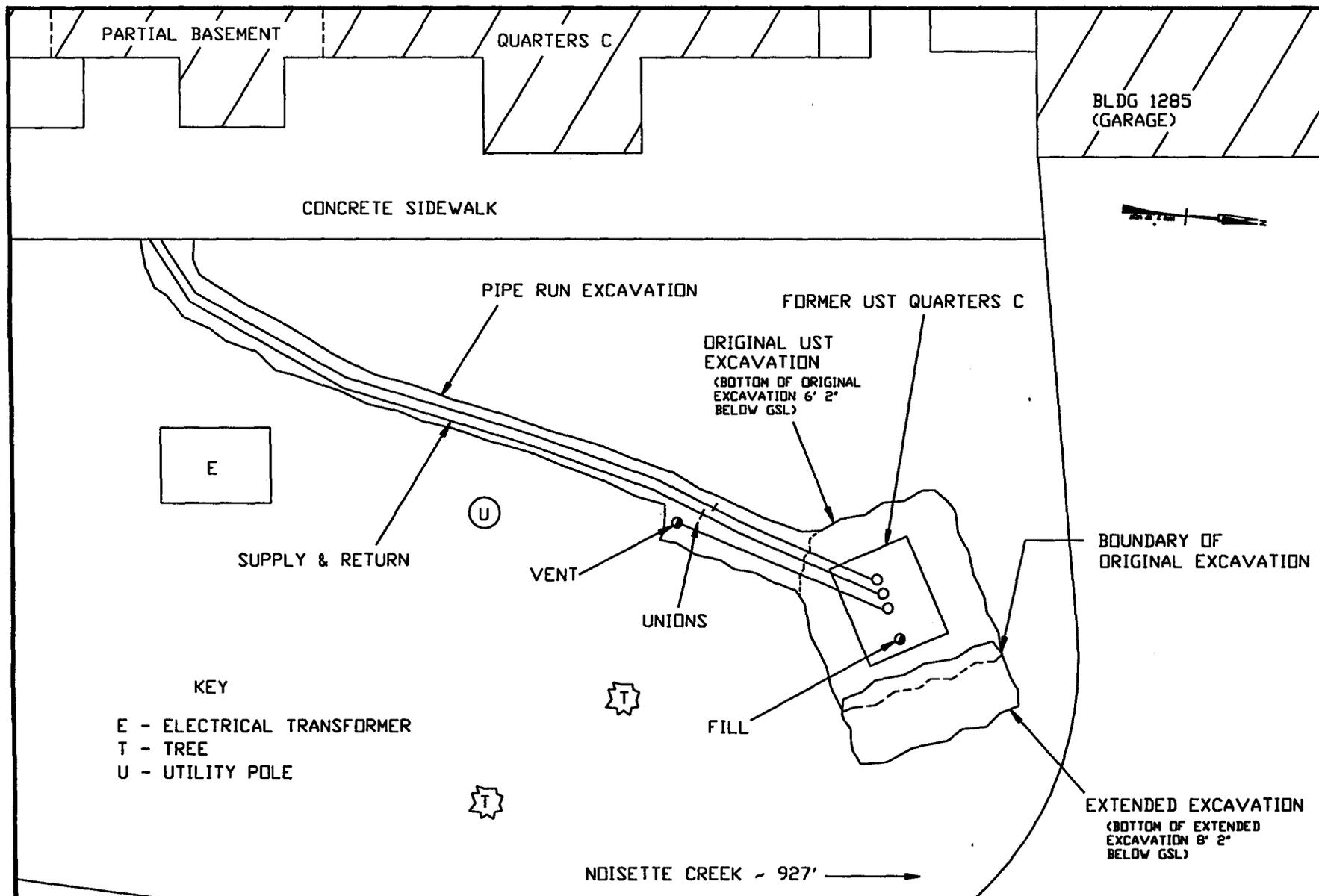


Figure 2-1  
 UST QUARTERS C  
 Charleston Naval Base  
 Charleston, SC

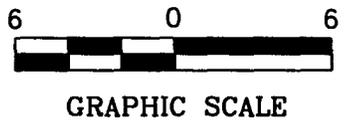
SPORTENVDECHASN  
 1899 North Hobson Avenue  
 North Charleston, SC 29405-2106

DWG DATE: 3 MAR 97      DWG NAME: QTRSC\_21

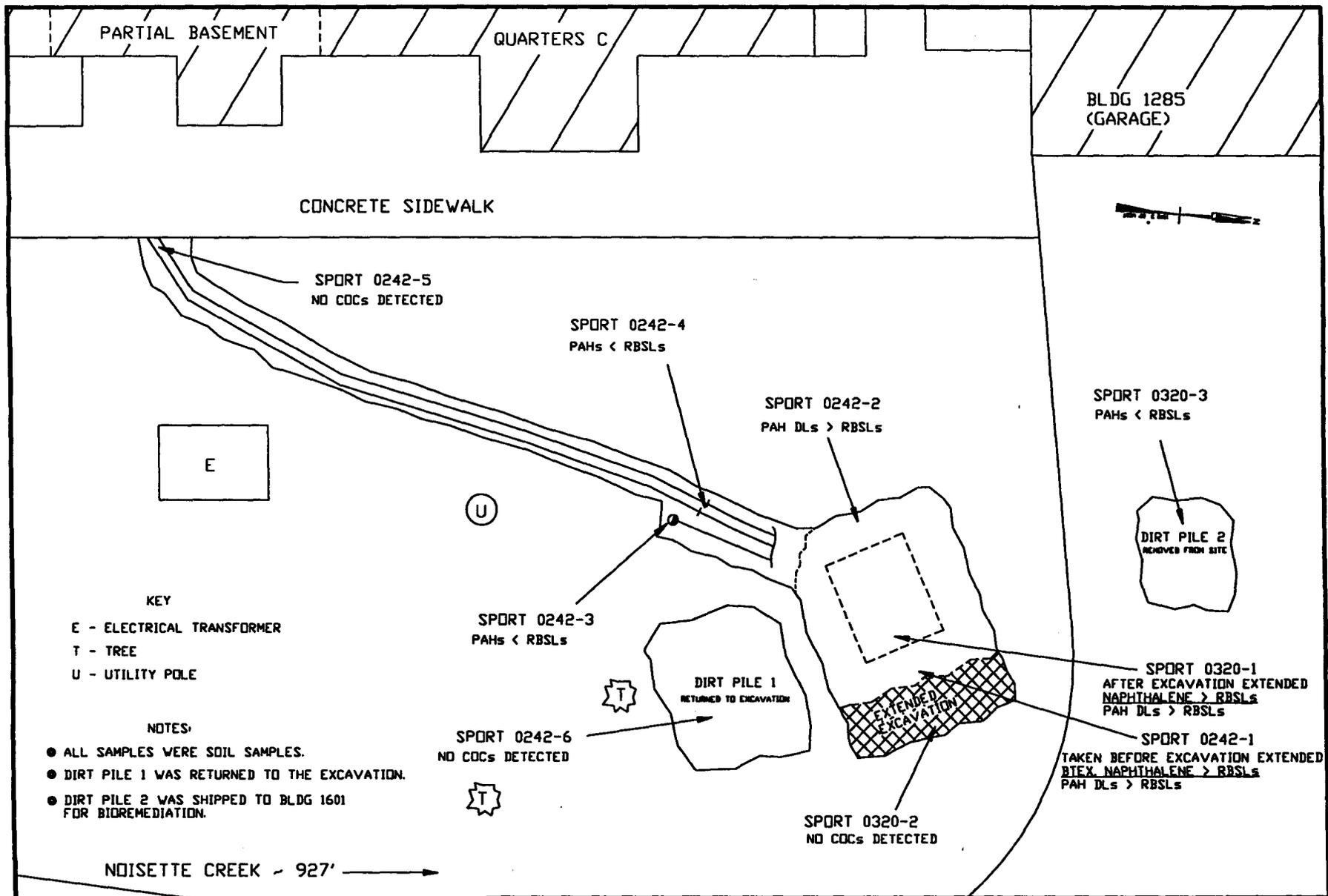
2-5



KEY  
 E - ELECTRICAL TRANSFORMER  
 T - TREE  
 U - UTILITY POLE



<b>Figure 2-2</b> <b>QTRS C UST ARRANGEMENT</b> Charleston Naval Base Charleston, SC		<b>SPORTENVDETHASN</b> 1899 North Hobson Avenue North Charleston, SC 29405-2106	
		DWG DATE: 5 MAR 97	DWG NAME: QTRSC_22



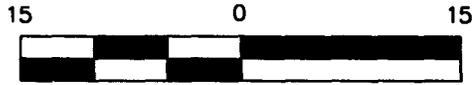
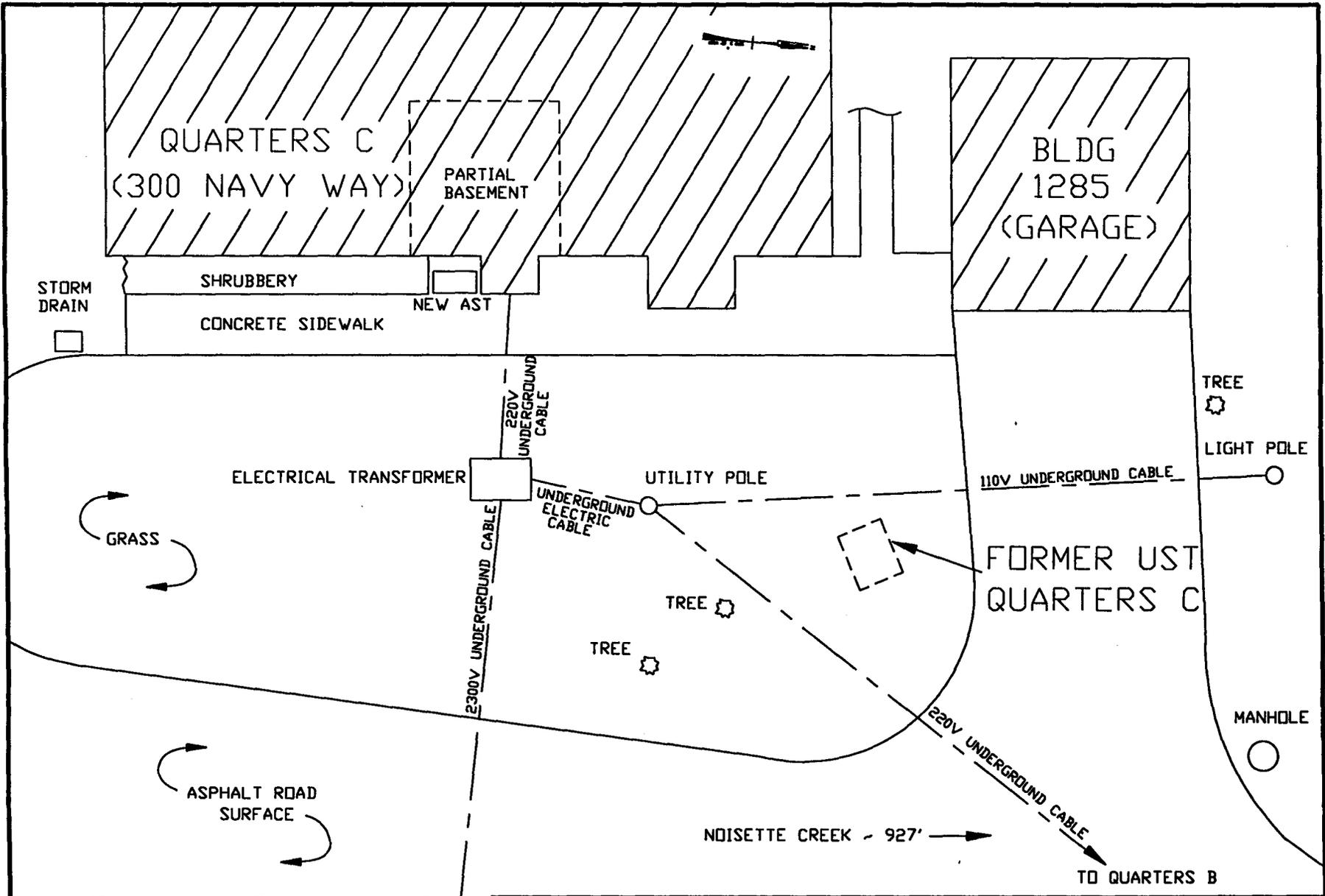
**Figure 2-3**  
**UST QUARTERS C SAMPLES**  
 Charleston Naval Base  
 Charleston, SC

**SPORTENVDETHASN**  
 1899 North Hobson Avenue  
 North Charleston, SC 29405-2106

DWG DATE: 30 APR 98

DWG NAME: QTRSC\_23

2-7



GRAPHIC SCALE

Figure 2-4  
 FORMER UST QUARTERS C  
 Charleston Naval Base  
 Charleston, SC

SPORTENVDETHASN  
 1899 North Hobson Avenue  
 North Charleston, SC 29405-2106

DWG DATE: 30 APR 98

DWG NAME: QTRSC\_24

### **3.0 INVENTORY OF PROXIMATE POTABLE WATER WELLS**

There are no potable water wells on the NAVBASE. Groundwater in the surficial aquifer at the NAVBASE discharges into the Cooper River and its tributaries and so flows away from any potable water wells in residential areas nearby.

## **4.0 PROPOSED SAMPLING PLAN**

**4.1 FIELD INVESTIGATION.** Prior to the beginning of the field investigation, a pre-work briefing will be held. All DET personnel associated with the investigation will review the scope of work in the SAP and the Site Specific Health and Safety Plan (SSHSP). Scheduling, logistics and special precautions will be discussed.

The field investigation has three objectives. The first objective is to evaluate the horizontal and vertical extent of the petroleum soil contamination at the overall site. The second objective is to determine whether contamination has entered groundwater and determine the areal extent of the petroleum contaminant plume in groundwater if one exists. The final objective is to collect site-specific background information required to prepare the contamination assessment report.

Ten soil borings will be made, which will be used to determine the locations for two temporary monitoring wells. The proposed soil boring locations are shown in Figure 4-1. Actual locations of soil borings and monitoring wells will be determined by the field team as more information is obtained about the contaminant plume during soil sampling. All sampling will be performed in accordance with the NAVBASE Charleston RFI Comprehensive Sampling and Analysis Plan (CSAP). All monitoring wells will be installed in accordance with South Carolina R. 61-71, *Well Standards and Regulations*.

Soil borings at the former Quarters C UST site will be made at the edge of the tank excavation and around a perimeter outside the suspected extent of contamination to determine the limits of contamination. Soil borings will be advanced with a hand auger. Soil samples will be collected in 2-foot intervals in each boring until the water table is reached. Field screening of soil samples will be performed using an organic vapor analyzer (ova) and the headspace method. Laboratory analysis will be performed on the sample from each boring with the greatest ova headspace analysis. Soil samples will be analyzed for PAHs and Benzene, Toluene, Ethylbenzene and Xylene plus Naphthalene (BTEX + Naphthalene).

Because this former UST site is located in a residential area and COCs were detected in the tank excavation (see Figure 2-3), three surficial soil samples will be collected outside the limits of the backfilled tank excavation. Surficial soil samples will be analyzed for PAHs.

The temporary monitoring well will be advanced using a portable drill rig. After the wells have been developed, groundwater samples will be collected from each well for laboratory analysis. Groundwater samples will be analyzed for PAHs and BTEX + Naphthalene. Detailed information including lithologic descriptions, split-spoon samples, groundwater elevations and other pertinent data for each monitoring well will be presented in the Assessment Report. Soil will be classified in accordance with the Unified Soil Classification System.

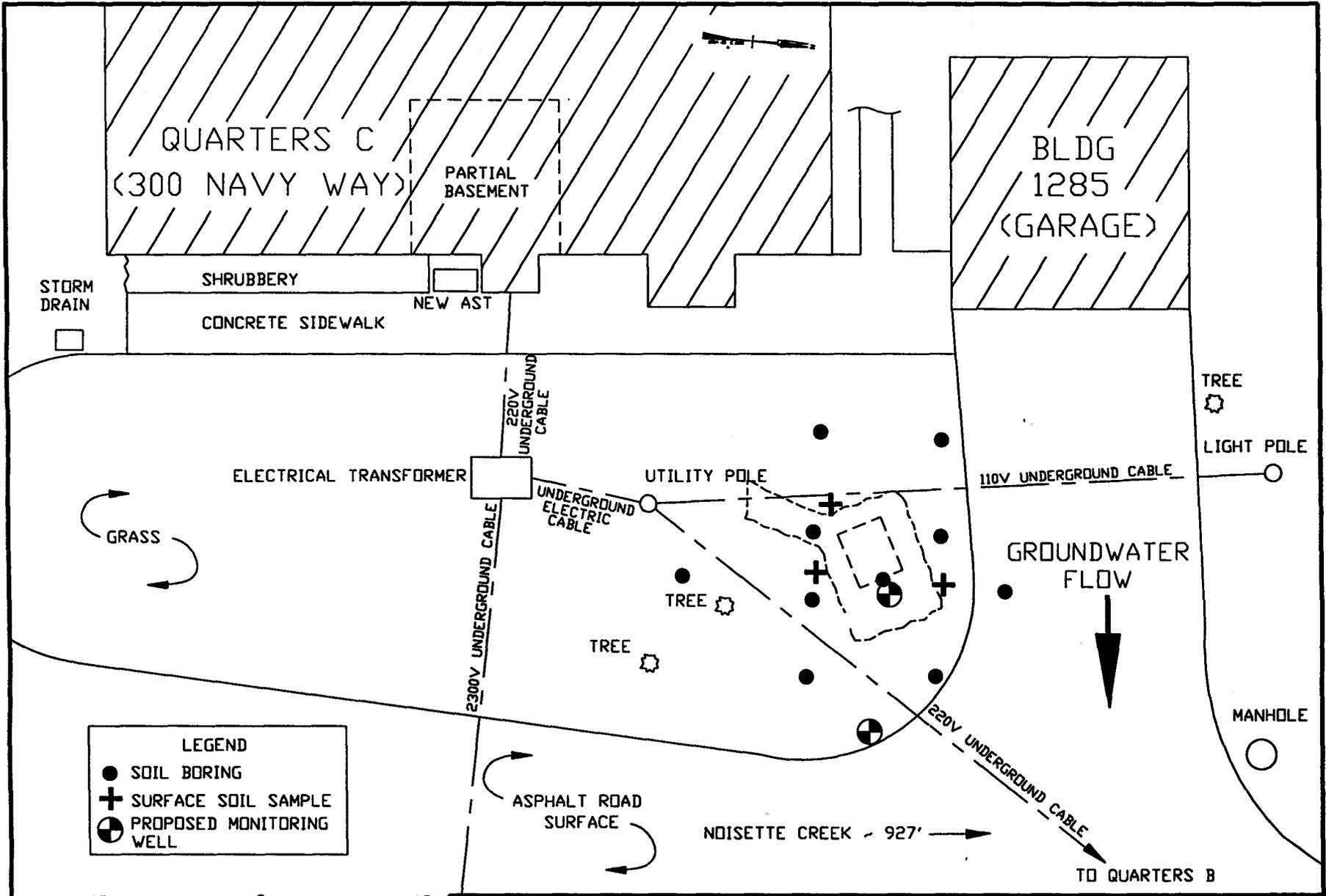
Where the initial ten soil borings are not sufficient to define the extent of soil and groundwater contamination, SCDHEC will be notified that the sampling grid needs to be extended in those directions where the plume is undefined. Any additional soil borings will be advanced using the same methods as the initial borings.

Once the extent of soil and groundwater contamination has been determined, a background soil boring will be made in nearby uncontaminated soil.

All wastes shall be disposed of in accordance with the Investigation Derived Waste (IDW) procedures included in Section 16 of the RFI CSAP.

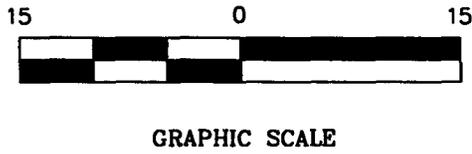
**4.2 PREPARATION OF REPORTS.** After completion of the field investigation, an assessment report will be prepared and submitted to Southern Division Naval Facilities Engineering Command (SOUTHDIV) for review and approval. The report will discuss site background information, site conditions, findings and recommendations for the former UST site at Quarters C. Recommendations will also be made as to the need for any follow-up investigations. Site location maps, locations of soil borings and soil contamination delineation maps will be included with the report.

4-3



**LEGEND**

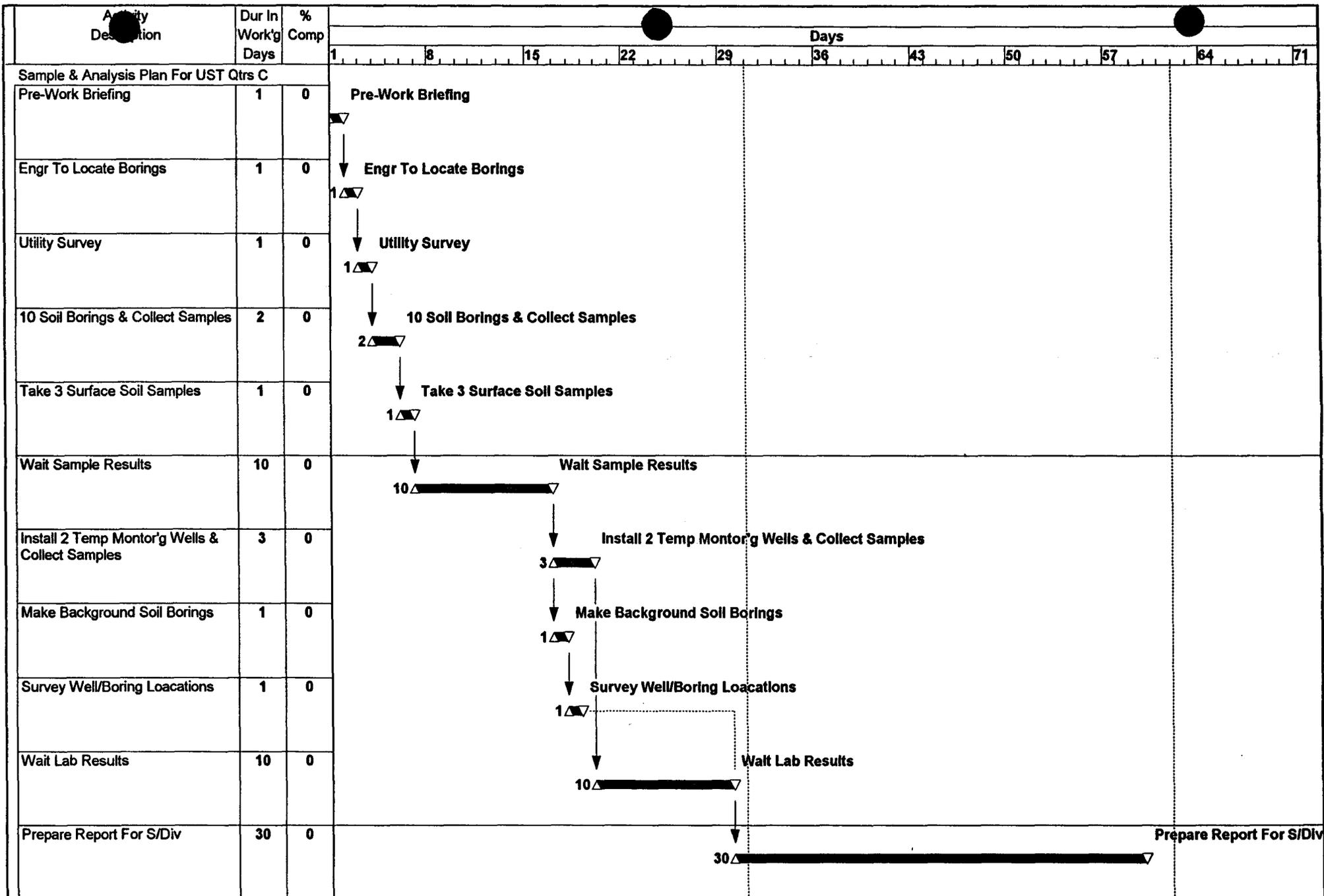
- SOIL BORING
- ⊕ SURFACE SOIL SAMPLE
- ⊕ (in circle) PROPOSED MONITORING WELL



<p><b>Figure 4-1</b>  <b>QUARTERS C SAMPLING PLAN</b>          Charleston Naval Base          Charleston, SC</p>	<p><b>SPORTENVDETHASN</b>          1899 North Hobson Avenue          North Charleston, SC 29405-2106</p>	
	<p>DWG DATE: 30 APR 98</p>	<p>DWG NAME: QTRSC_41</p>

## **5.0 SCHEDULE**

A projected schedule to complete the SAP field investigation at the Quarters C UST site is approximately 4 weeks (see Figure 5-1). This includes mobilization, drilling, sampling, surveying and demobilization. An Assessment Report for the site is scheduled for delivery to SOUTHDIV 30 days after completion of field investigation.



Project Start 01-APR-06  Early Bar  
 Project Finish 26-JAN-08  Progress Bar  
 Data Date 01-APR-06  Critical Activity  
 Plot Date 13-MAY-08

(c) Primavera Systems, Inc.

Sample & Analysis Plan For UST At  
 Qtrs C Figure 5-1  
 Environmental Detachment Charleston

Sheet 1 of 1



## **REFERENCES**

Ensafe/Allen & Hoshall, Final Comprehensive Sampling and Analysis Plan (CSAP) RCRA Facility Investigation dated August 30, 1994

Ensafe/Allen & Hoshall, Final RFI Report CTO-0029, Zone B dated November 21, 1996

Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996

Ensafe/Allen & Hoshall, Final RCRA Facility Investigation Report for Zone H Naval Base Charleston dated July 5, 1996

SCDHEC Underground Storage Tank Assessment Guidelines for Permanent Closure, Change-in Owner and Change-in-Service dated June 1995

SCDHEC Risk-Based Corrective Action for Petroleum Releases

South Carolina R. 61-71 South Carolina Well Regulations and Standards

SUPSHIP Portsmouth Va., Environmental Detachment Charleston, Base Realignment and Closure Tank Management Plan

United States Environmental Protection Agency (USEPA) Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual (SOPQAM)*

## **SITE SPECIFIC HEALTH AND SAFETY PLAN**

### **1.0 Purpose**

This plan provides supplemental site specific information and is to be used with the Detachment Comprehensive Health and Safety Plan.

### **2.0 Work Location**

Former petroleum oil underground storage tank locations.

### **3.0 Work Scope Brief (refer to the work document for full details)**

The work scope is to perform a sampling program that will evaluate the horizontal and vertical extent of petroleum contamination in soil and determine the extent of ground water contamination.

### **4.0 Hazards**

The primary health hazard is from petroleum oils which are a primary irritant. Dermatitis, a defatting of the skin, can result from continued skin contact. Some individuals develop hypersensitivity.

Safety hazards include the personal injury hazards of heavy equipment operation, and the dangers of underground and above ground utility installations.

### **5.0 Personal Protective Equipment**

Gloves and coveralls (either tyvek or cloth). If oil soaked soil is encountered, shoe covers or boots should be worn. At the employee's option an organic vapor respirator may be worn, although it is not required.

### **6.0 Special Personnel Training Qualifications**

Hazwoper training.

## **7.0 Occupational Safety and Health Precautions**

Prior to the start of work the area must be checked for the presence of above or below ground utilities, and they must be marked and secured by lockout tagout if they will be endangered. Follow the detachment policy and procedures for location and evaluation of these utilities.

Wash hands before eating or smoking.

If work requires entry into a confined space, contact the project engineer for additional instructions, as a confined space entry permit and gas testing may be required.

Work that involves sewage exposure (e.g. standing sewage liquid or broken sewer pipes), will require the use of workers who are in the NavHospChas C5 medical surveillance program. These workers shall avoid skin exposure by using appropriate protective equipment such as aprons, tyvek suits, boots, and latex or plastic gloves worn under heavier protective gloves. If splashing is a hazard, wear face shields over goggles. Sewage wetted clothing should be removed promptly and the person should then wash with soap and water. Wet clothing should be bagged and then washed separately with hot soap and water and one cup of bleach per wash load. Sewage contaminated equipment should be washed with soap, water, and bleach. Wash hands and face after any contact or sewage work and prior to eating, smoking or going home.

Sewage work also has a risk of fire, explosion, and oxygen deficiency due to the possibility of gases. Cutting of sewer pipes, or the repair of accidentally damaged pipes, should be done only after an assessment of the work by the team leader or project engineer. Typically, gas testing and the use of a confined space entry permit will be required.

## **8.0 Material safety data sheets**

A typical MSDS for fuel oil is included as part of the official folder.

## **9.0 Medical Surveillance**

Hazardous waste worker, (B27,711). This code refers to a NAVHOSPCHASN Medical Surveillance Classification



14 July 1998

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

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Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Department of the Navy  
Southern Division NFEC  
P.O. Box 190010  
North Charleston, SC 29419-9010  
Attn: Mr. Gabriel Magwood

Re: Sampling and Analysis Plan (SAP) dated 19 May 1998  
Quarters "C" Housing (Site Identification # 00947)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the SAP provides for additional investigative endeavors to determine the extent and severity of soil and groundwater contamination, if any, associated with a suspected release at the subject site. It is recognized that the initial tasks (i.e., soil borings, piezometers/temporary monitoring wells, etc.) are generically designed to allow for field modifications/adjustments, as necessary. Based on the foregoing review, the proposal to perform soil borings, piezometer/temporary monitoring well installation and appropriate sampling is approved for implementation. It is recognized that the Final Comprehensive Sampling and Analysis Plan (30 August 1994) provides detailed technical specifications regarding environmental assessments/investigations to be conducted at the Charleston Naval Complex and will be incorporated into the submitted SAP by reference.

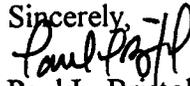
With regard to Section 4.1 (Field Investigation), the facility may use best professional judgement to install additional temporary monitoring points to define the extent and severity of free phase petroleum product and/or significant dissolved phase contamination if identified during initial field activities. Temporary monitoring wells may be converted to permanent wells at the time of installation in the presence of free phase petroleum product, as appropriate.

Please find enclosed monitoring well approval # 0208 for the proposed temporary monitoring wells. Abandonment of all intrusive sampling points will be in accordance with the technical specifications and descriptions provided and/or referenced in the SAP or as approved by the Department.

Charleston Naval Complex/Charleston Naval Base  
14 July 1998  
page 2

Should you have any questions please contact me at (803) 734-5328.

Sincerely,



Paul L. Bristol, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC



2600 Bull Street  
Columbia, SC 29201-1708

Date of Issue: 14 July 1998  
Approval No: 0208

### Monitoring Well Installation Approval

COMMISSIONER:  
Douglas E. Bryant

Approval is hereby granted to: Charelston Naval Complex/Charelston Naval Base  
(on behalf of): Quarters "C" Housing  
Site ID#: 00947  
County: Charleston

BOARD:  
John H. Burriss  
Chairman

William M. Hull, Jr., MD  
Vice Chairman

Roger Leaks, Jr.  
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

This approval is for the construction of two (2) temporary groundwater monitoring point(s) designated (no designation) in accordance with the construction plans and technical specifications submitted to the Department on 20 May 1998. The temporary monitoring point(s) are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to within thirty (30) days of completion (of last well(s) installed). (to be submitted with Assessment Report)
2. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
3. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Trident District EQC Office (803-740-1590).
4. Please provide groundwater quality analytical data (chemical analyses and/or water level(s)) and associated measurements (i.e., field measurements) to Paul L. Bristol within thirty (30) days of receipt from laboratory. (to be submitted with Assessment Report)
5. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.
6. Each well shall 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 I.D.#, date of construction, static water level, and driller name and state certification number. (for permanent wells, only)

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

Approved by:

  
\_\_\_\_\_  
Paul L. Bristol, P.G.  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC



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

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 RECEIVED

MAY 20 1998  
 MAY 20 1998

DIVISION OF UNDERGROUND  
 STORAGE TANK MGMT.

5090 Li 5.28.98  
 Code 1849 407.9.98  
 19 May 1998

Mr. Paul Bristol  
 South Carolina Department of Health  
 And Environmental Control  
 Division of Underground Storage Tank  
 2600 Bull Street  
 Columbia, SC 29201

**SAMPLING AND ANALYSIS PLAN FOR ADDITIONAL ASSESSMENT  
 AT UST SITES AT THE FORMER CHARLESTON NAVAL BASE**

Dear Mr. Bristol:

*correct*

Attached is the Sampling and Analysis Plan (SAP) for additional assessment at UST Quarters C (SCDHEC GWPD SITE ID #00947) located at the former Naval Base, Charleston, SC. The Comprehensive Sampling and Analysis Plan (CSAP) previously submitted would be followed during the additional assessment.

If you have any questions regarding the SAP feel free to contact me at (843) 820-7307.

Sincerely,

*Gabriel L. Magwood*  
 GABRIEL L. MAGWOOD  
 Petroleum/UST Branch

Encl  
 (1) Sampling and Analysis Plan (SAP)



7 April 1999

2600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

BOARD:  
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Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

Department of the Navy  
Southern Division NFEC  
P.O. Box 190010  
North Charleston, SC 29419-9010  
Attention: Mr. Gabriel Magwood

Re: Site Assessment Plan dated 26 February 1999  
Zone B/Site 13-Quarters C (Site Identification # 00947)  
Charleston Naval Complex/Charleston Naval Base  
Charleston, SC  
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the SAP (site assessment plan) provides for additional investigative endeavors to determine the extent and severity of soil and groundwater contamination, if any, associated with a suspected release at the subject site. It is recognized that the initial tasks (i.e., soil borings, piezometers, etc.) are generically designed to allow for field modifications/adjustments, as necessary. Based on the foregoing review, the proposal to perform soil borings, piezometer installation (Phase I) and monitoring well installation (Phase II) and appropriate sampling is approved for implementation. Permanent monitoring well installation (Phase II), with the exception(s) noted below, will be conducted after appropriate consultation with the Department concerning Phase I analytical results.

The facility may use best professional judgement to install additional temporary monitoring points to define the extent and severity of free phase petroleum product and/or significant dissolved phase contamination if identified during Phase I field activities. Temporary monitoring wells may be converted to permanent wells at the time of installation in the presence of free phase petroleum product, as appropriate.

Please find enclosed monitoring well approval # 0430 for the proposed piezometers, soil borings and monitoring wells. Abandonment of all intrusive sampling points will be in accordance with the technical specifications and descriptions provided and/or referenced in the SAP or as approved by the Department.

Please be reminded that the Department retains the authority to request additional assessments and/or remedial endeavors, as appropriate, if future conditions or information warrant and are

Charleston Naval Complex/Charleston Naval Base  
7 April 1999  
page 2

deemed necessary.

Should you have any questions please contact me at (803) 898-3559.

Sincerely,  
  
Paul L. Bristol, Hydrogeologist  
Groundwater Quality Section  
Bureau of Water

enc.: Monitoring Well Approval # 0430  
cc: Trident District EQC



Date of Issue: 7 April 1999  
Approval No: 0430

2600 Bull Street  
Columbia, SC 29201-1708

## Monitoring Well Installation Approval

COMMISSIONER:  
Douglas E. Bryant

Approval is hereby granted to: Charleston Naval Complex/Charleston Naval Base  
(on behalf of): Zone B/Site 13-Quarters C  
Site ID#: 00941  
County: Charleston

BOARD:  
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Chairman

William M. Hull, Jr., MD  
Vice Chairman

Roger Leaks, Jr.  
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

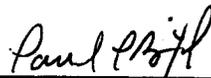
Rodney L. Grandy

This approval is for the construction of DPT (direct push technology) piezometers and monitoring wells (number to be field determined) in accordance with the construction plans and technical specifications submitted to the Department on 10 March 1999. The piezometers and monitoring wells are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to within thirty (30) days of completion (of last well(s) installed).  
(to be submitted with Assessment Report)
2. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
3. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Trident District EQC Office (843-740-1590).
4. Please provide groundwater quality analytical data (chemical analyses and/or water level(s)) and associated measurements (i.e., field measurements) to Paul L. Bristol within thirty (30) days of receipt from laboratory.  
(to be submitted with Assessment Report)
5. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.
6. Each well shall 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 I.D.#, date of construction, static water level, and driller name and state certification number.  
(for permanent wells, only)

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

Approved by:

  
\_\_\_\_\_  
Paul L. Bristol, P.G.  
Groundwater Quality Section  
Bureau of Water

cc: Trident District EQC



**TETRA TECH NUS, INC.**

1311 Executive Center Drive, Ellis Building. ■ Suite 220 ■ Tallahassee, FL 32031  
(850) 656-5458 ■ FAX (850) 656-7403 ■ www.tetrattech.com

Li 3.15.99  
Lw 4.7.99

TTNUS/TAL-99-017/0141/3.2

26 February, 1999

Project Number 0141

Site #s 00941  
00947  
~~001~~  
01088  
01089

Mr. Paul Bristol  
South Carolina Department of Health and Environmental Control  
Groundwater Quality Section  
Bureau of Water  
2600 Bull Street  
Columbia, South Carolina 29201-1708

Reference: Clean Contract No. N62467-94-D0888  
Contract Task Order No. 0092

Subject: Site Assessment Plan for  
Charleston Naval Complex - Zone B  
Charleston, South Carolina

Dear Mr. Bristol:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, Tetra Tech NUS, Inc. is pleased to submit for your review and approval, the Site Assessment Plan for the referenced zone at the Charleston Naval Complex.

If you have any questions regarding this plan or require further information, please contact me at (850) 656-5458.

Very truly yours,

Paul E. Calligan, P.G.  
Task Order Manager

/pc

Enclosures (1)

- c: Ms. D. Evans-Ripley, SOUTHDIV (w/o enclosure)
- Mr. G. Magwood, SOUTHDIV
- Ms. D. Wroblewski, TtNUS (w/o enclosure)
- Ms. R. Baur (w/o enclosure)
- Mr. A. Kendrick, TtNUS
- file

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**MAR 10 1999**

**Water Monitoring, Assessment &  
Protection Division**