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GROUNDWATER EXTRACTION REPORT WITH TRANSMITTAL FOR BUILDING 661 CNC  
CHARLESTON SC  
04/01/2000  
SOUTH CAROLINA RESEARCH AUTHORITY



1899 North Hobson Avenue  
North Charleston, SC 29405-2106  
TEL (843) 202-8000  
FAX (843) 202-8001  
<http://www.eeg-scra.org>

March 30, 2000

Gabriel Magwood  
Petroleum (UST) Branch  
Southern Division Naval Facilities  
Engineering Command

Re: Groundwater Extraction at Building 661  
Site ID #14437, PO#CHNP09922

Mr. Magwood

Please find enclosed a copy the Groundwater Extraction Report for Building 661, Site identification number 14437. The report details the relevant past findings with respect to petroleum contamination at Building 661 dating back its discovery in 1992, as well as the site conditions following the groundwater extraction event performed in June of 1999 with follow-up sampling completed January 2000.

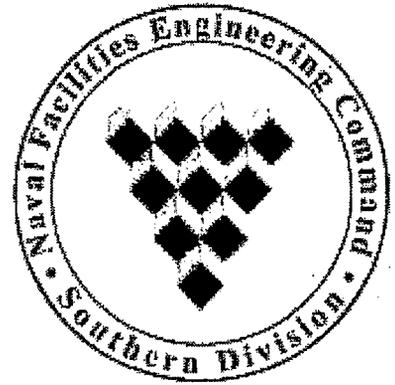
Questions concerning this report may be addressed to J. T. Amey at 202-8030.

Sincerely

A handwritten signature in black ink, appearing to read "E. R. Dearhart", with a long horizontal flourish extending to the right.

E. R. Dearhart  
Vice President  
South Carolina Research Authority  
Environmental Enterprise Group

Enc: Groundwater Extraction Report, Building 661



**Groundwater Extraction  
Building 661  
Site ID #14437**

**Contract  
PO#CHNP09922**

**April 2000**

**Submitted by:  
South Carolina Research Authority (SCRA)  
Environmental Enterprise Group (EEG)  
Trident Research Center  
5300 International Boulevard  
North Charleston, SC 29418**

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**Site Drawings  
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## 1.0 INTRODUCTION

In an effort to determine the source of petroleum contamination, a groundwater extraction pilot test was performed at Building 661, site identification # 14437. Previous assessments and sampling of the site indicate an area of consistent and persistent petroleum contamination centering at groundwater monitoring well MW-2 (NBCH/661-002).

## 2.0 BACKGROUND

### *2.1 Site Description and History*

Building 661 is currently being used by the Army for an Army Reserve Unit. During Naval Base operations, it served as the Navy Communications Center for Atlantic Fleet Operations. It is located at the end of Holland Street at the south end of the base in "Zone H" as designated by the Resource Conservation and Recovery Act (RCRA) Facilities Investigation (RFI). The immediate property is surrounded on two sides (South and West) by tidal marsh fed from Shipyard Creek and wooded/overgrown lowland to the North and East (See Attachment A Drawing 1).

The petroleum contamination was first discovered in February 1992 during the removal and replacement of a UST used to store diesel fuel for the building's emergency generator. Free product was found in the trench excavated to remove the tank's supply and return piping.

The surficial soils at the site consist largely of spoil material from the Cooper River basin. Borings from the well installations indicated that the spoil material is predominately clay and sandy clay. Potentiometric mapping indicates that the groundwater flow is in a westerly direction towards the marsh. Slug test data was used to determine hydraulic conductivity in the range of 0.336 ft/day and a calculated linear flow velocity of 0.017 ft/day or 6.13 ft/year (Final Environmental Assessment Report August 23, 1996).

***2.2 Previous Investigation***

During investigation subsequent to the tank removal and free product discovery, 17 temporary monitoring wells, 10 groundwater sample borings (using hand augers), and six permanent shallow groundwater monitoring wells (MW-1 through MW-6) were installed at the site. The permanent wells are constructed of 2 inch Schedule 40 PVC casing with 10 foot 0.010 inch slotted screen installed approximately 1 foot above groundwater. The wells are approximately 12 feet deep; groundwater at the site is normally about 2 feet below ground surface level.

Groundwater sampling indicated that the only appreciable contamination found was encountered at well MW-2. Field logs and analytical results reported a free product sheen and dissolved petroleum constituents as polynuclear aromatic hydrocarbons (PAH) totals at levels of 6852 parts per billion (ppb). The Final Assessment Report concluded that the contamination was localized to the area around monitoring well MW-2 and that due to the site's hydrogeologic conditions the hydrocarbon plume would not be expected to undergo extensive migrations (See Attachment A Drawing 2).

***2.3 Periodic Monitoring***

In an effort to verify the findings of the site's Final Assessment and track any ongoing migration of the contaminant plume, Southern Division, Naval Facilities Engineering Command initiated a quarterly monitoring program for the six permanent monitoring wells (MW-1 through MW-6, see Attachment A Drawing 2). The data from the quarterly monitoring supported the finding in the final assessment in that the only well with any significant petroleum constituents present was well MW-2.

**3.0 GROUNDWATER EXTRACTION**

After consideration of all data associated with the site, it was determined that a groundwater extraction test should be conducted at MW-2. The purpose of the test was to determine if the groundwater contamination was the result of petroleum product in the

soil around well MW-2 or if the petroleum constituents were migrating with groundwater from some other source.

### ***3.1 Operations***

The groundwater extraction was performed on June 3, 1999, it started at 0900 hours and was secured at 1700 hours. The groundwater extraction was performed using a 1000 gallon capacity vacuum rig to provide vacuum pressure for the removal any petroleum product, residuals, contaminated groundwater, and vapors into the vacuum tank. The vacuum rig was connected to well MW-2 through high pressure vacuum hose connected to a one inch PVC probe which was inserted into the well. The probe was fitted with a rubber "doughnut" which sealed it to the well under vacuum pressure. Approximately 200 gallons of groundwater were removed during the extraction.

### ***3.2 Water Level Monitoring***

Just prior to the event and on an hourly basis during the extraction, the groundwater levels at wells MW-3, MW-4, and MW-5 were sounded. Initial groundwater levels at the wells varied from 1.2 (MW-3) to 2.55 (MW-5) feet below the top of the well casing. Changes in groundwater level varied by less than a tenth of an inch during the extraction event. An incoming tide was noted during the morning in the adjacent marsh, with high tide for the harbor reported at 1142 hours on June 3, 1999.

### ***3.3 Sampling***

Along with the groundwater extraction test, monitoring wells MW-2, MW-3, MW-4, and MW-5 were sampled for BTEX (benzene toluene ethylbenzene and xylenes) and polynuclear aromatic hydrocarbons (PAH). These wells were chosen because MW-5 is up gradient and wells MW-3 and MW-4 are down gradient of MW-2. All four wells were sampled just before the extraction event, one week, one month, and six months after the extraction. The original plan was for the final sampling to be performed at three months, but because the group underwent organizational changes from a Navy

Detachment to a private organization under South Carolina Research Authority the final sampling was delayed. The sample reports are included in Attachment B.

### **3.4 Wastewater**

The groundwater removed during the extraction process (approximately 200 gallons) was transported to the Navy's oil water separator complex across from Building 1824. After settling and separation, oil is collected for recycling and wastewater is disposed through the North Charleston Sewer District under previous agreement (See Attachment C for correspondence and waste agreements).

## **4.0 DATA, ANALYSIS & CONCLUSIONS**

Examination of the sample data shows that there were no significant levels of dissolved petroleum chemicals in the wells (MW-3, MW-4, & MW-5) surrounding the source well (MW-2). The July 15<sup>th</sup> sample from well MW-3 did have naphthalene levels of 12.5 ug/l reported, but this was the only occurrence of a PAH constituent level above 10 ug/l observed from the surrounding wells. The data for MW-2 show that there was a considerable increase in the petroleum chemicals of concern, most notable of which is naphthalene, one week after the extraction event, but contaminant levels generally decreased over the next two sampling events. Table 1 shows a graphic representation the BTEX, Naphthalene, and total PAH constituents over the sampling period and the extraction process.

The data and the site configuration tends to confirm the hypothesis that the contamination at MW-2 is the result of contaminated soils and not due to contaminated groundwater migrating across the site. The contaminant levels increased markedly in the week after the extraction and have generally fallen off in the months following the vacuum event. If the contamination were instead due to a groundwater source alone, then the samples after the evacuation should be diluted by the recharge of less contaminated water drawn from the evacuated water column and surrounding soils. The contamination source is most

probably from leaks in old underground piping or connections either in the area near MW-2 or elsewhere with the product having migrated along the piping or piping trench.

An analysis of the general chemistry parameters for evidence that bioremediation has taken place is ambiguous. While bioremediation or natural attenuation is suspected based on the perceived containment of the contaminant plume over the last 8 years, further testing would be required to substantiate this suspicion. Therefore, the best and probably the most conservative course of action is to continue monitoring the source and boundary wells, MW-2 through MW-6, for any evidence of migration of the contaminant plume. It is recommended that semi-annual monitoring be performed to monitor this site for natural attenuation.

## 5.0 REFERENCES

*UNDERGROUND STORAGE TANK CLOSURE ASSESSMENT*

Charleston Naval Shipyard/Building 661  
Charleston, South Carolina  
GWPD ID #14437  
S&ME, Inc., Job 1134-92-063  
April 30, 1992

*PRELIMINARY ASSESSMENT REPORT/ASSESSMENT PLAN*

Charleston Naval Shipyard/Building 661  
Charleston, South Carolina  
GWPD ID #14437  
S&ME, Inc., Job No. 1134-94-315  
August 16, 1995

*FINAL ENVIRONMENTAL ASSESSMENT REPORT*

Charleston Naval Shipyard/Building 661  
Charleston, South Carolina  
GWPD ID #14437  
S&ME, Inc.,  
August 23, 1996

*FINAL COMPREHENSIVE SAMPLING AND ANALYSIS PLAN RCRA FACILITY  
INVESTIGATION*

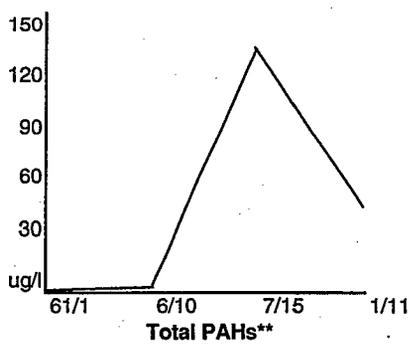
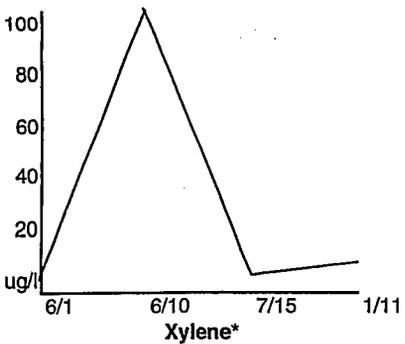
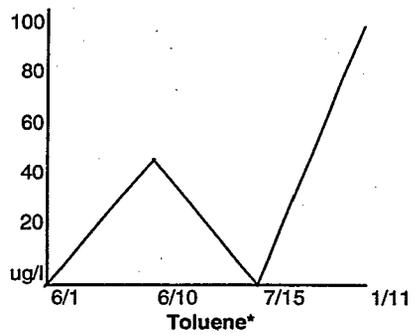
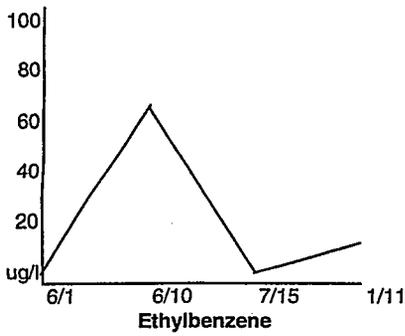
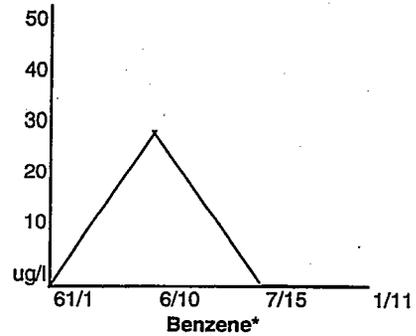
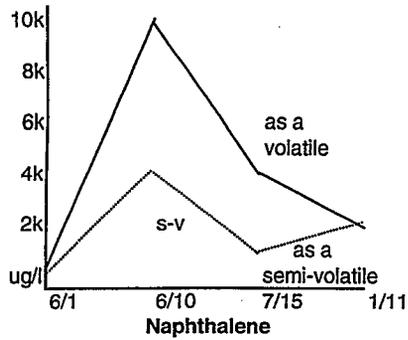
Ensafe/Allen & Hoshall  
July 30, 1996

*FIRST QUARTER 1998 MONITORING REPORT FOR BUILDING # 661*

Supervisor of Shipbuilding, Conversion, and Repair, United States Navy, Portsmouth  
VA, Environmental Detachment Charleston, SC, Letter (with Enclosures), Ser. 443  
May 12, 1998

Table 1

MW-2 BTEX Naphthalene and PAHs



\* For samples with non-detect (ND) reporting and increased dilutions factors (DF), the detection level (DL) was entered in lieu of zero

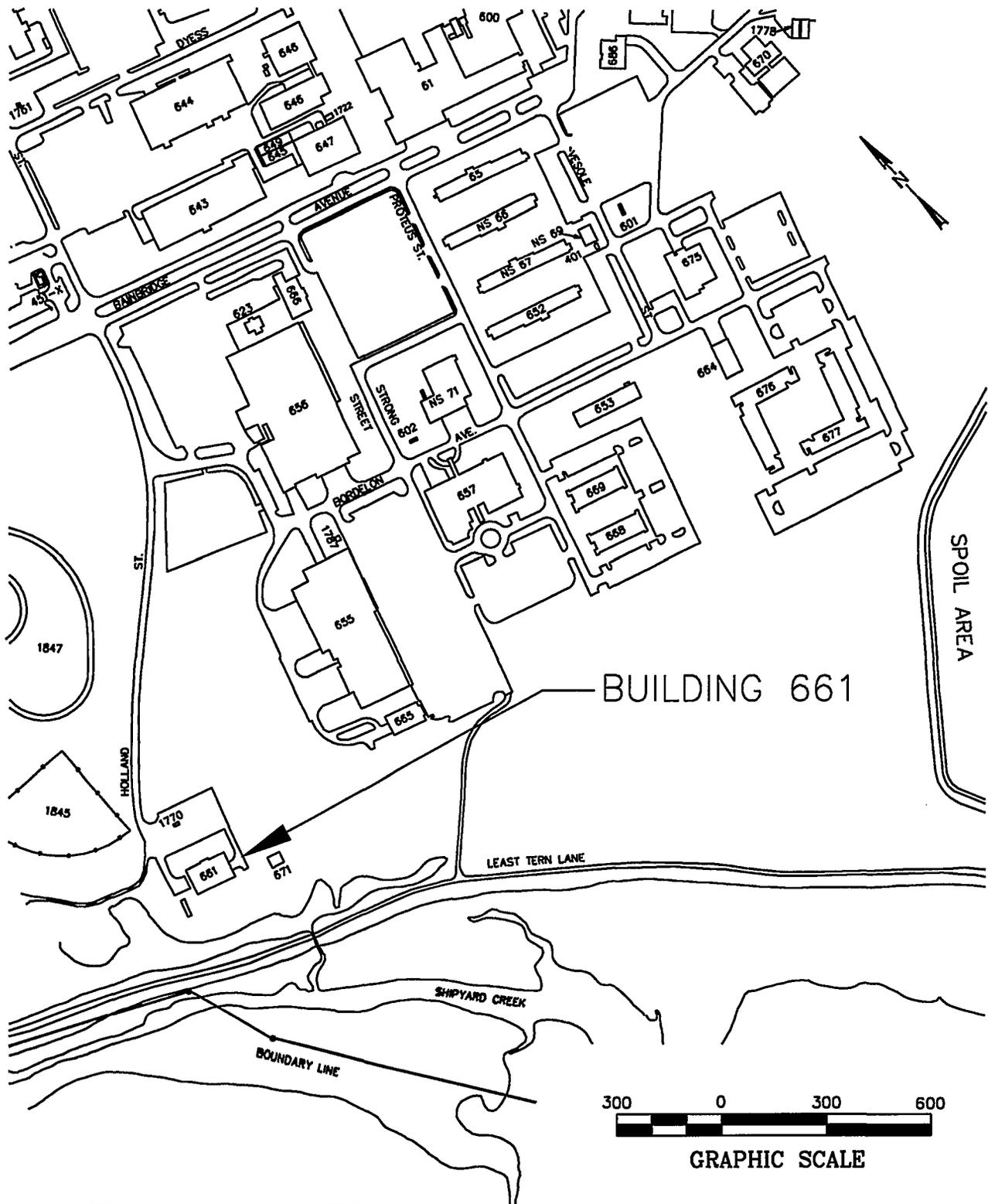
\*\* Total PAHs without Naphthalene [Benzo(a)anthracene, Benzo(b)flouranthene, Benzo(k)flouranthene, Chrysene, Dibenzo(a,h) anthracene]

**Groundwater Extraction**

**Building 661  
March, 2000**

**ATTACHMENT A**

**DRAWINGS**

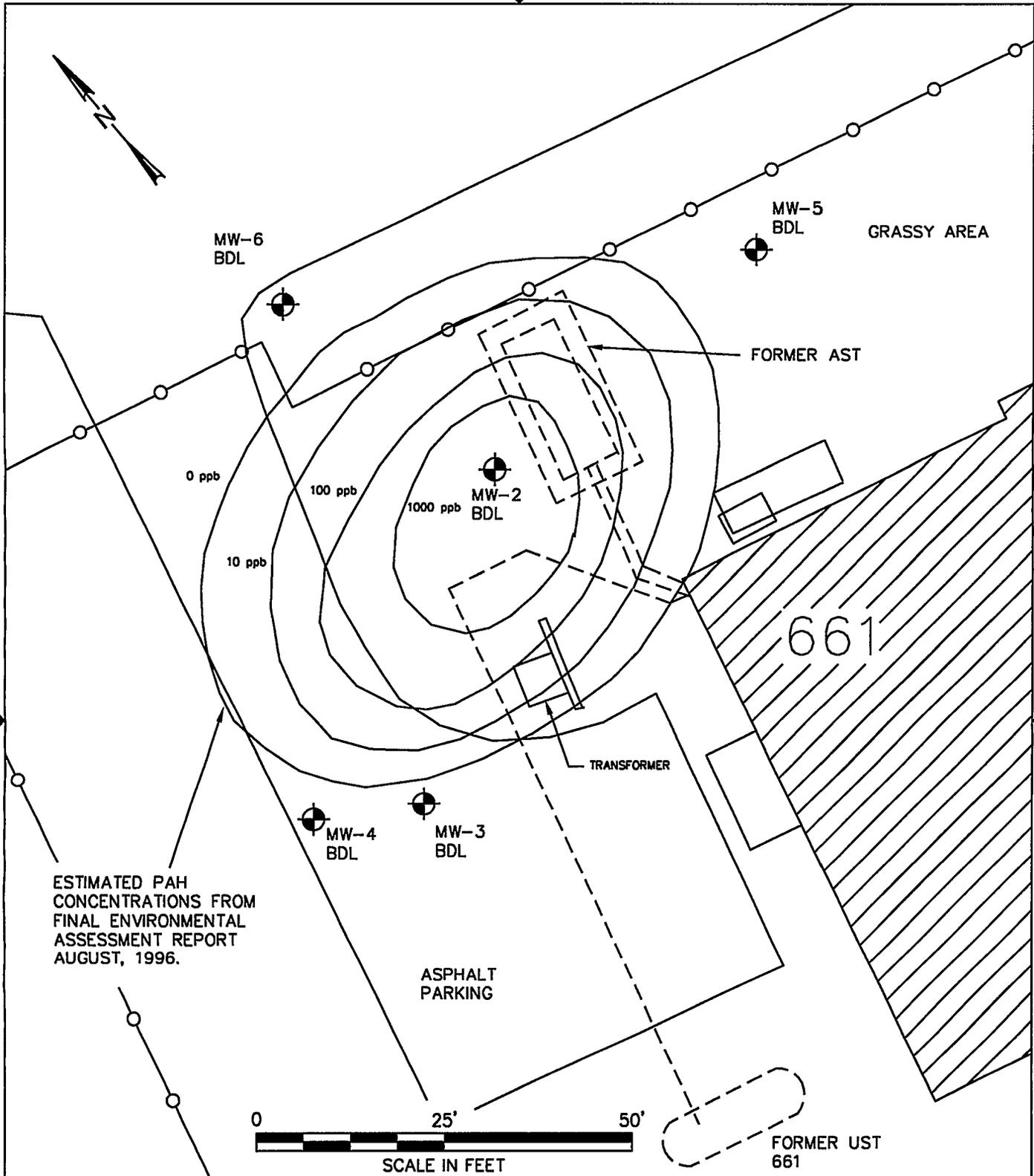


**DWG 1 - BUILDING 661  
GROUNDWATER EXTRACTION**

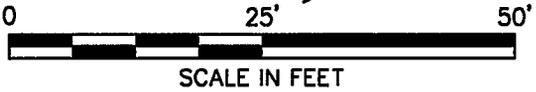
Groundwater Isoconcentration Map  
Building 661  
Charleston Naval Base  
Charleston, South Carolina



SIZE A	DWG NO. 661-ISO_1	REV -
SCALE AS INDICATED		DATE: 27 MARCH 2000



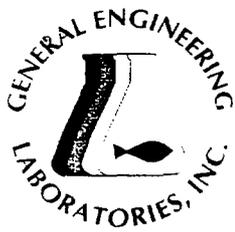
ESTIMATED PAH  
CONCENTRATIONS FROM  
FINAL ENVIRONMENTAL  
ASSESSMENT REPORT  
AUGUST, 1996.



	<b>DWG 2 - BUILDING 661 GROUNDWATER EXTRACTION</b>		
	Groundwater Isoconcentration Map Building 661 Charleston Naval Base Charleston, South Carolina		
SIZE A	DWG NO. 661-ISO_2	REV -	
SCALE AS INDICATED		DATE: 27 MARCH 2000	

**ATTACHMENT B**

**SAMPLE RESULTS**



# GENERAL ENGINEERING LABORATORIES

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## Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 1 of 3

Sample ID : 99SPORT0198-01  
 Lab ID : 9906026-01  
 Matrix : GroundH2O  
 Date Collected : 06/01/99  
 Date Received : 06/01/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	TCL	06/02/99	1226	150507	1
Ethylbenzene		4.31	0.300	1.00	ug/l	1.0					
Naphthalene		741	12.0	20.0	ug/l	20.	TCL	06/03/99	1220	150507	1
Toluene	U	ND	0.500	1.00	ug/l	1.0	TCL	06/02/99	1226	150507	1
Xylenes (TOTAL)		4.97	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 18 items</i>											
Acenaphthene		155	2.00	5.00	ug/l	4.0	JCB	06/03/99	2248	150470	2
Acenaphthylene	U	ND	2.50	5.00	ug/l	4.0					
Anthracene		9.21	2.00	5.00	ug/l	4.0					
Benzo(a)anthracene	U	ND	2.00	5.00	ug/l	4.0					
Benzo(a)pyrene	U	ND	1.00	5.00	ug/l	4.0					
Benzo(b)fluoranthene	U	ND	1.50	5.00	ug/l	4.0					
Benzo(ghi)perylene	U	ND	2.00	5.00	ug/l	4.0					
Benzo(k)fluoranthene	U	ND	1.50	5.00	ug/l	4.0					
Chrysene	U	ND	2.50	2.50	ug/l	4.0					
Dibenzo(a,h)anthracene	U	ND	2.00	5.00	ug/l	4.0					
Fluoranthene		25.5	2.50	5.00	ug/l	4.0					
Fluorene		86.5	2.00	5.00	ug/l	4.0					
Indeno(1,2,3-c,d)pyrene	U	ND	31.0	31.0	ug/l	4.0					
Naphthalene		542	3.00	5.00	ug/l	4.0					
Phenanthrene		135	2.00	5.00	ug/l	4.0					
Pyrene		16.6	2.00	5.00	ug/l	4.0					
<b>General Chemistry</b>											
Ferrous Iron		0.573	0.100	0.100	mg/l	1.0	JEN	06/02/99	1500	150485	3
Nitrogen, Nitrate		0.534	0.0127	0.0500	mg/l	1.0	RWS	06/01/99	1706	150428	4
Sulfate as SO4		4.03	0.0380	0.200	mg/l	1.0					

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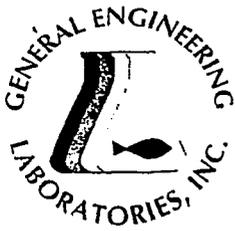
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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

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: NPWC00197

Report Date: June 09, 1999

Page 2 of 3

Sample ID : 99SPORT0198-01

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		39.6	1.10	5.00	mg/l	10. LS		06/04/99	1430	150674	5

**The following prep procedures were performed:**

GC/MS Base/Neutral Compounds

JPB 06/02/99 1200 150470 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-5972	57.9	(41.2 - 107.)
Nitrobenzene-d5	M610-5972	59.2	(35.3 - 108.)
p-Terphenyl-d14	M610-5972	0.00*	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	86.9	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	92.3	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	83.1	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

**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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Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: June 09, 1999

Page 3 of 3

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Sample ID : 99SPORT0198-01

---

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, Elise Hanson at 843-556-8171.

Reviewed By

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TN	02934	02934

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 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: June 09, 1999

Page 1 of 3

Sample ID : 99SPORT0198-02  
 Lab ID : 9906026-02  
 Matrix : GroundH2O  
 Date Collected : 06/01/99  
 Date Received : 06/01/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	TCL	06/03/99	1049	150507	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 18 items</i>											
Acenaphthene		1.94	0.444	1.11	ug/l	1.0	JCB	06/03/99	1636	150470	2
Acenaphthylene	U	ND	0.555	1.11	ug/l	1.0					
Anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.222	1.11	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Chrysene	U	ND	0.555	1.00	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Fluoranthene	U	ND	0.555	1.11	ug/l	1.0					
Fluorene	U	ND	0.444	1.11	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.88	6.88	ug/l	1.0					
Naphthalene		4.94	0.666	1.11	ug/l	1.0					
Phenanthrene		1.39	0.444	1.11	ug/l	1.0					
Pyrene	U	ND	0.444	1.11	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron	U	ND	0.100	0.100	mg/l	1.0	JEN	06/02/99	1500	150485	3
Nitrogen, Nitrate		0.521	0.0127	0.0500	mg/l	1.0	RWS	06/01/99	1815	150428	4
Sulfate as SO4		6.15	0.0380	0.200	mg/l	1.0					

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\*9906026-02\*



# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 2 of 3

Sample ID : 99SPORT0198-02

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		50.5	1.10	5.00	mg/l	10.	LS	06/04/99	1430	150674	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

JPB 06/02/99 1200 150470 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-5972	69.3	(41.2 - 107.)
Nitrobenzene-d5	M610-5972	68.0	(35.3 - 108.)
p-Terphenyl-d14	M610-5972	44.8	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	86.6	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	92.8	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	85.3	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

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.

L 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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\*9906026-02\*



# GENERAL ENGINEERING LABORATORIES

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## Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 3 of 3

Sample ID : 99SPORT0198-02

**M = Method**

**Method-Description**

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Reviewed By



# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 1 of 3

Sample ID : 99SPORT0198-03  
 Lab ID : 9906026-03  
 Matrix : GroundH2O  
 Date Collected : 06/01/99  
 Date Received : 06/01/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	TCL	06/02/99	1327	150507	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene		1.26	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 18 items</i>											
Acenaphthene	U	ND	0.400	1.00	ug/l	1.0	MKP	06/05/99	0130	150686	2
Acenaphthylene	U	ND	0.500	1.00	ug/l	1.0					
Anthracene	U	ND	0.400	1.00	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.400	1.00	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.200	1.00	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.300	1.00	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.400	1.00	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.300	1.00	ug/l	1.0					
Chrysene	U	ND	0.500	1.00	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.400	1.00	ug/l	1.0					
Fluoranthene	U	ND	0.500	1.00	ug/l	1.0					
Fluorene	U	ND	0.400	1.00	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.20	6.20	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Phenanthrene	U	ND	0.400	1.00	ug/l	1.0					
Pyrene	U	ND	0.400	1.00	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		0.296	0.100	0.100	mg/l	1.0	JEN	06/02/99	1500	150485	3
Nitrogen, Nitrate		0.568	0.0127	0.0500	mg/l	1.0	RWS	06/01/99	1829	150428	4
Sulfate as SO4		3.28	0.0380	0.200	mg/l	1.0					

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FL	E87156/87294	E87472/87.
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 2 of 3

Sample ID : 99SPORT0198-03

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		21.3	1.10	5.00	mg/l	10.	LS	06/04/99	1430	150674	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

HDB 06/04/99 1400 150686 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-5972	26.6*	(41.2 - 107.)
Nitrobenzene-d5	M610-5972	26.7*	(35.3 - 108.)
p-Terphenyl-d14	M610-5972	19.6*	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	87.1	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	91.9	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	87.3	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

Notes:

The qualifiers in this report are defined as follows:

- D indicates that the analyte was not detected at a concentration greater than the detection limit.
- DL 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.
- QC indicates that a quality control analyte recovery is outside of specified acceptance criteria.



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STATE	GEL	EPI
FL	E87156/87294	E87472A
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 3 of 3

Sample ID : 99SPORT0198-03

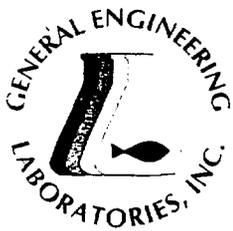
M = Method

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, Elise Hanson at 843-556-8171.

Reviewed By





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STATE	GEL	EPI
FL	E87156/87294	E87472/87
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 1 of 3

Sample ID : 99SPORT0198-04  
 Lab ID : 9906026-04  
 Matrix : GroundH2O  
 Date Collected : 06/01/99  
 Date Received : 06/01/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	TCL	06/02/99	1357	150507	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 18 items</i>											
Acenaphthene	U	ND	0.444	1.11	ug/l	1.0	JCB	06/03/99	1736	150470	2
Acenaphthylene	U	ND	0.555	1.11	ug/l	1.0					
Anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.222	1.11	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Chrysene	U	ND	0.555	1.00	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Fluoranthene	U	ND	0.555	1.11	ug/l	1.0					
Fluorene	U	ND	0.444	1.11	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.88	6.88	ug/l	1.0					
Naphthalene	U	ND	0.666	1.11	ug/l	1.0					
Phenanthrene	U	ND	0.444	1.11	ug/l	1.0					
Pyrene	U	ND	0.444	1.11	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		5.46	2.00	2.00	mg/l	20.	JEN	06/02/99	1500	150485	3
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	06/01/99	1842	150428	4
Sulfate as SO4		208	0.380	2.00	mg/l	10.	RWS	06/01/99	1910	150428	4

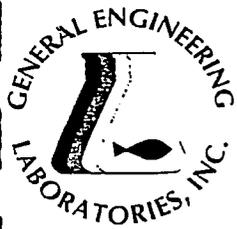
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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

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: NPWC00197

Report Date: June 09, 1999

Page 2 of 3

Sample ID : 99SPORT0198-04

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		35.4	1.10	5.00	mg/l	10.	LS	06/04/99	1430	150674	5

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

JPB 06/02/99 1200 150470 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-5972	70.8	(41.2 - 107.)
Nitrobenzene-d5	M610-5972	71.4	(35.3 - 108.)
p-Terphenyl-d14	M610-5972	47.5	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	81.0	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	89.0	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	81.1	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

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.  
 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
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NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 3 of 3

Sample ID : 99SPORT0198-04

M = Method

Method-Description

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# GENERAL ENGINEERING LABORATORIES

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### Laboratory Certifications

STATE	GEL	EPI
FL	E8715687294	E8747287
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

Page 1 of 2

Sample ID : 99SPORT0198-05  
 Lab ID : 9906026-05  
 Matrix : GroundH2O  
 Date Collected : 05/26/99  
 Date Received : 06/01/99  
 Priority : Routine  
 Collector : Client

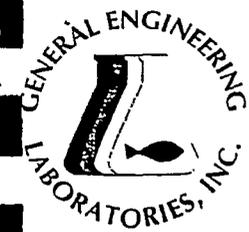
Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	TCL	06/02/99	1427	150507	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	BTEX+NAP-8260B	80.3	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	85.9	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	79.5	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B

Notes:  
 The qualifiers in this report are defined as follows:  
 D 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).  
 ND indicates that the analyte was not detected at a concentration greater than the detection limit.  
 R indicates that a quality control analyte recovery is outside of specified acceptance criteria.





# GENERAL ENGINEERING LABORATORIES

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## Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/8.
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 09, 1999

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Sample ID : 99SPORT0198-05

### M = Method

### Method-Description

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Reviewed By

NPWC00197

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 Charleston, South Carolina 29407  
 P.O. Box 30712  
 Charleston, South Carolina 29417  
 (803) 556-8171

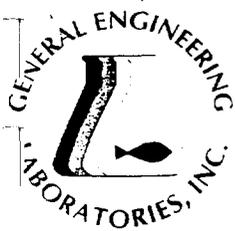
# CHAIN OF CUSTODY RECORD

Page 1 of 1

99060267

Client Name/Facility Name		SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods												Remarks								
Collected by/Company		pH, conductivity	TOC/DOC	TOC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	FERRUS / ARSENIC METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables		FAH	Cyanide	Coliform - specify type	NITRATE	SULFATE	STEX PAKS	NAPATHALERS	
SAMPLE ID	DATE													TIME								WELL
SPORTENUDETCHASN																						
SPORTENUDETCHASN																						
01	99SPORT0198-01	6/1/99	1142	X				8	X											X	X	NRCH/66/GW002PI
02	99SPORT0198-02	6/1/99	1234	X				8	X											X	X	NRCH/66/GW003PI
03	99SPORT0198-03	6/1/99	1332	X				8	X											X	X	NRCH/66/GW004PI
04	99SPORT0198-04	6/1/99	0951	X				8	X											X	X	NRCH/66/GW005PI
05	99SPORT0198-05	5/24/99	1000					3													X	NRCH/66/TW005PI
<i>Handwritten signature</i>																						
Relinquished by: <i>[Signature]</i>		Date: 6/1/99	Time: 1400	Received by: <i>W.R. Hiers, Jr.</i>		Relinquished by: _____		Date: _____	Time: _____	Received by: _____												
Relinquished by: <i>W.R. Hiers, Jr.</i>		Date: 6/1/99	Time: 1518	Received by lab by: <i>[Signature]</i>		Date: 6/1/99	Time: 1518	Remarks:														

White = sample collector    Yellow = file    Pink = with report



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STATE	GEL	EPI
FL	E87156/87294	E87472/874
NC	233	
NJ	79002	79002
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

Project ID: NPWC00197

Report Date: June 17, 1999

Page 1 of 3

Sample ID : 99SPORT0212-01  
 Lab ID : 9906386-01  
 Matrix : GroundH2O  
 Date Collected : 06/10/99  
 Date Received : 06/10/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>TEX + NAPTH. - 5 items</i>											
Benzene	U	ND	30.0	100	ug/l	100	JEB	06/11/99	1812	151220	1
Ethylbenzene	J	70.0	30.0	100	ug/l	100					
Naphthalene		10300	60.0	100	ug/l	100					
Toluene	U	ND	50.0	100	ug/l	100					
Xylenes (TOTAL)	U	ND	110	200	ug/l	100					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene		284	8.48	21.2	ug/l	20.	MKP	06/16/99	0040	151424	2
Acenaphthylene	U	ND	0.530	1.06	ug/l	1.0	JPA	06/16/99	0109	151424	2
Anthracene		7.72	0.424	1.06	ug/l	1.0	MKP	06/16/99	0109	151424	2
Benzo(a)anthracene	J	0.796	0.424	1.06	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.212	1.06	ug/l	1.0	JPA	06/16/99	0109	151424	2
Benzo(b)fluoranthene	U	ND	0.318	1.06	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.424	1.06	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.318	1.06	ug/l	1.0					
Chrysene	J	0.598	0.530	1.06	ug/l	1.0	MKP	06/16/99	0109	151424	2
Benzo(a,h)anthracene	U	ND	0.424	1.06	ug/l	1.0	JPA	06/16/99	0109	151424	2
Fluoranthene		13.0	0.530	1.06	ug/l	1.0	MKP	06/16/99	0109	151424	2
Fluorene		103	0.424	1.06	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.57	6.57	ug/l	1.0	JPA	06/16/99	0109	151424	2
Naphthalene		4540	25.4	42.4	ug/l	40.	MKP	06/16/99	0923	151424	2
Phenanthrene		107	0.424	1.06	ug/l	1.0	MKP	06/16/99	0109	151424	2
Pyrene		8.00	0.424	1.06	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		8.40	1.00	1.00	mg/l	10.	JEN	06/11/99	1200	151218	3
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	06/11/99	1044	151169	4
Sulfate as SO4		2.42	0.0380	0.200	mg/l	1.0					

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\*9906386-01\*



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STATE	GEL	EPI
FL	E87156/87294	E87472/8749
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 17, 1999

Page 2 of 3

Sample ID : 99SPORT0212-01

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		36.8	1.10	5.00	mg/l	10.	LS	06/15/99	1230	151386	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

GMS 06/15/99 1300 151424 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	33.8*	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	36.8	(35.3 - 108.)
p-Terphenyl-d14	M610-NPWC	33.3*	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	116.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	112.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	111.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

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.

L 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.

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

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NJ	79002	79002
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: NPWC00197

Report Date: June 17, 1999

Page 3 of 3

Sample ID : 99SPORT0212-01

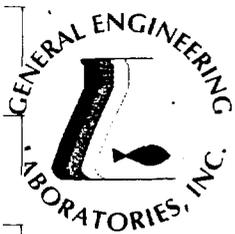
M = Method

Method-Description

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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

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Page 1 of 3

Sample ID : 99SPORT0212-02  
 Lab ID : 9906386-02  
 Matrix : GroundH2O  
 Date Collected : 06/10/99  
 Date Received : 06/10/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>TEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	06/14/99	1317	151220	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	J	0.630	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	ND	0.456	1.14	ug/l	1.0	MKP	06/16/99	0011	151424	2
Acenaphthylene	U	ND	0.570	1.14	ug/l	1.0					
Anthracene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.228	1.14	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.342	1.14	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.342	1.14	ug/l	1.0					
Chrysene	U	ND	0.570	1.14	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.456	1.14	ug/l	1.0					
Fluoranthene	U	ND	0.570	1.14	ug/l	1.0					
Fluorene	U	ND	0.456	1.14	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	7.07	7.07	ug/l	1.0					
Naphthalene	U	ND	0.684	1.14	ug/l	1.0					
Phenanthrene	U	ND	0.456	1.14	ug/l	1.0					
Pyrene	U	ND	0.456	1.14	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		0.235	0.100	0.100	mg/l	1.0	JEN	06/11/99	1200	151218	3
Nitrogen, Nitrate		0.0920	0.0127	0.0500	mg/l	1.0	RWS	06/11/99	1218	151169	4
Sulfate as SO4		19.8	0.0380	0.200	mg/l	1.0					

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TN	02934	02934

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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Sample ID : 99SPORT0212-02

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		110	0.550	2.50	mg/l	5.0	LS	06/15/99	1230	151386	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

GMS 06/15/99 1300 151424 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	53.9	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	54.1	(35.3 - 108.)
1,2,4-Terphenyl-d14	M610-NPWC	53.2	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	113.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	110.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	118.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

Notes:

The qualifiers in this report are defined as follows:

- D indicates that the analyte was not detected at a concentration greater than the detection limit.
- DL 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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TN	02934	02934

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Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Sample ID : 99SPORT0212-02

M = Method

Method-Description

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any questions to your Project Manager, Elise Hanson at 843-556-8171.

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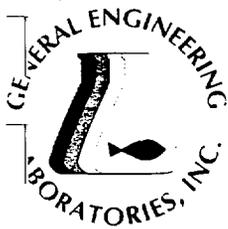
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Page 1 of 3

Sample ID : 99SPORT0212-03  
 Lab ID : 9906386-03  
 Matrix : GroundH2O  
 Date Collected : 06/10/99  
 Date Received : 06/10/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>TEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	06/11/99	1554	151220	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Aromatics (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	ND	0.444	1.11	ug/l	1.0	MKP	06/15/99	2342	151424	2
Acenaphthylene	U	ND	0.555	1.11	ug/l	1.0					
Anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.222	1.11	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.444	1.11	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.333	1.11	ug/l	1.0					
Chrysene	U	ND	0.555	1.11	ug/l	1.0					
Dibenz(a,h)anthracene	U	ND	0.444	1.11	ug/l	1.0					
Fluoranthene	U	ND	0.555	1.11	ug/l	1.0					
Fluorene	U	ND	0.444	1.11	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.88	6.88	ug/l	1.0					
Phenanthrene	U	ND	0.666	1.11	ug/l	1.0					
Phenanthrene	U	ND	0.444	1.11	ug/l	1.0					
Pyrene	U	ND	0.444	1.11	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		0.467	0.100	0.100	mg/l	1.0	JEN	06/11/99	1200	151218	3
Nitrogen, Nitrate		0.706	0.0127	0.0500	mg/l	1.0	RWS	06/11/99	1258	151169	4
Sulfate as SO4		4.29	0.0380	0.200	mg/l	1.0					

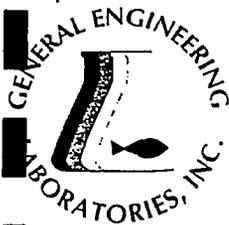
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SC	10120	10582
TN	02934	02934

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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Sample ID : 99SPORT0212-03

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		62.0	1.10	5.00	mg/l	10.	LS	06/15/99	1230	151386	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

GMS 06/15/99 1300 151424 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	36.4*	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	37.4	(35.3 - 108.)
1-Terphenyl-d14	M610-NPWC	33.4*	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	121.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	116.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	110.	(73.0 - 122.)

M = Method Method-Description

M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

Notes:

The qualifiers in this report are defined as follows:

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

L 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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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

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

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: June 17, 1999

Page 3 of 3

Sample ID : 99SPORT0212-03

M = Method

Method-Description

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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Report Date: June 17, 1999

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Sample ID : 99SPORT0212-04  
 Lab ID : 9906386-04  
 Matrix : GroundH2O  
 Date Collected : 06/10/99  
 Date Received : 06/10/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>TEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	06/11/99	1622	151220	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	U	ND	0.472	1.18	ug/l	1.0	JPA	06/14/99	1852	151156	2
Acenaphthylene	U	ND	0.590	1.18	ug/l	1.0					
Anthracene	U	ND	0.472	1.18	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.472	1.18	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.236	1.18	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.354	1.18	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.472	1.18	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.354	1.18	ug/l	1.0					
Chrysene	U	ND	0.590	1.18	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.472	1.18	ug/l	1.0					
Fluoranthene	U	ND	0.590	1.18	ug/l	1.0					
Fluorene	U	ND	0.472	1.18	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	7.32	7.32	ug/l	1.0					
Naphthalene		1.53	0.708	1.18	ug/l	1.0					
Phenanthrene	U	ND	0.472	1.18	ug/l	1.0					
Pyrene	U	ND	0.472	1.18	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		6.98	2.00	2.00	mg/l	20.	JEN	06/11/99	1200	151218	3
Nitrogen, Nitrate	U	ND	0.0127	0.0500	mg/l	1.0	RWS	06/11/99	1312	151169	4
Sulfate as SO4		175	0.380	2.00	mg/l	10.	RWS	06/11/99	1832	151169	4

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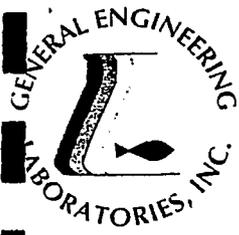
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NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

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Page 2 of 3

Sample ID : 99SPORT0212-04

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		7.40	0.550	2.50	mg/l	5.0	LS	06/15/99	1230	151386	5

The following prep procedures were performed:

GC/MS Base/Neutral Compounds

HDB 06/11/99 1300 151156 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	51.2	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	57.4	(35.3 - 108.)
p-Terphenyl-d14	M610-NPWC	54.4	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	118.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	113.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	109.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

Notes:

The qualifiers in this report are defined as follows:

- D indicates that the analyte was not detected at a concentration greater than the detection limit.
- DL 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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NJ	79002	79002
SC	10120	10582
TN	02934	02934

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Project Description: SUPSHIP-Portsmouth Detachment

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Sample ID : 99SPORT0212-04

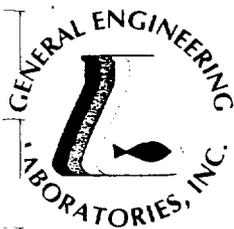
M = Method

Method-Description

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SC	10120	10582
TN	02934	02934

Client: Supervisor of Ship Building & Conversion  
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Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

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Sample ID : 99SPORT0212-05  
 Lab ID : 9906386-05  
 Matrix : GroundH2O  
 Date Collected : 06/09/99  
 Date Received : 06/10/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	06/11/99	1649	151220	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					

Surrogate Recovery	Test	Percent%	Acceptable Limits
Bromofluorobenzene	BTEX+NAP-8260B	120.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	113.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	112.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B

**Notes:**

The qualifiers in this report are defined as follows:

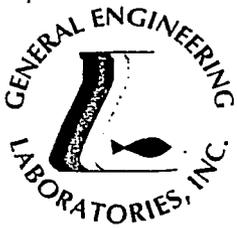
**D** indicates that the analyte was not detected at a concentration greater than the detection limit.

**I** 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.

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





# GENERAL ENGINEERING LABORATORIES

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## Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/874
NC	233	
NJ	79002	79002
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: NPWC00197

Report Date: June 17, 1999

Page 2 of 2

Sample ID : 99SPORT0212-05

M = Method

Method-Description

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Reviewed By

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407

(843) 556-8171 • Fax (843) 766-1178



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\*9906386-05\*

FWC 199

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

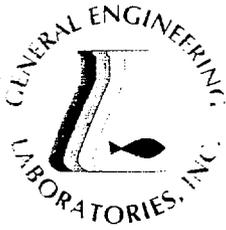
# CHAIN OF CUSTODY RECORD

9906386 Y.

Page 1 of 1

Client Name/Facility Name SPORT ENV DETCHASN				SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods															Remarks								
Collected by/Company SPORT ENV DETCHASN				# OF CONTAINERS	pH, conductivity	TOC/DOC	TOC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method Required	PERFECTS - LTRA METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	BN Extractables	PAH	Cyanide		Coliform - specify type	NITRATE	SULFATE	STEX PLUS	NAPHTHALENE			
SAMPLE ID	DATE	TIME	WELL SOIL COMP GRAB																								
01	99SPORT0212-01	6/10/99	1152	X	X	8		X		X							X			X	X			NBCH\661GW002 P2	.1		
02	99SPORT0212-02	6/10/99	0920	X	X	8		X		X							X			X	X			NBCH\661GW003 P2	.1		
03	99SPORT0212-03	6/10/99	0925	X	X	8		X		X							X			X	X			NBCH\661GW004 P2	.1		
04	99SPORT0212-04	6/10/99	1125	X	X	8		X		X							X			X	X			NBCH\661GW005 P2	.1		
05	99SPORT0212-05	6/9/99 6/10/99	1000		X	3																X		NBCH\661TW005 P2	.2		
<i>gibbs</i>																											
Relinquished by: <i>[Signature]</i>				Date: 6/10/99	Time: 1450	Received by: <i>[Signature]</i>				Date: 6/10/99	Time: 1450	Relinquished by:				Date:	Time:	Received by:									
Relinquished by: <i>[Signature]</i>				Date: 6/10/99	Time: 1536	Received by lab by: <i>[Signature]</i>				Date: 6/10/99	Time: 1536	Remarks:															

White = sample collector    Yellow = file    Pink = with report



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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 1 of 2

Sample ID : 99SPORT0231-01  
 Lab ID : 9907501-01  
 Matrix : GroundH2O  
 Date Collected : 07/13/99  
 Date Received : 07/15/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	07/19/99	1338	153679	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					

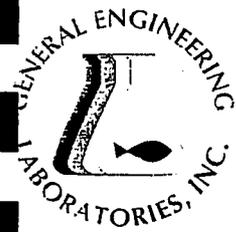
Surrogate Recovery	Test	Percent %	Acceptable Limits
Bromofluorobenzene	BTEX+NAP-8260B	108.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	107.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	112.	(73.0 - 122.)

M = Method	Method-Description
M I	SW846 8260B

**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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1899 North Hobson Ave.  
North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 2 of 2

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Sample ID : 99SPORT0231-01

---

**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, Elise Hanson at 843-556-8171.

  
Reviewed By





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 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

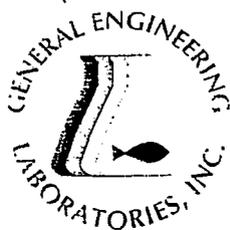
Report Date: July 23, 1999

Page 1 of 3

Sample ID : 99SPORT0231-02  
 Lab ID : 9907501-02  
 Matrix : GroundH2O  
 Date Collected : 07/15/99  
 Date Received : 07/15/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	07/20/99	1219	153679	1
Ethylbenzene		5.13	0.300	1.00	ug/l	1.0					
Naphthalene		4410	30.0	50.0	ug/l	50.	JEB	07/21/99	1504	153679	1
Toluene	U	ND	0.500	1.00	ug/l	1.0	JEB	07/20/99	1219	153679	1
Xylenes (TOTAL)		5.77	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene		471	9.12	22.8	ug/l	20.	JPA	07/20/99	1528	153551	2
Acenaphthylene		2.28	0.570	1.14	ug/l	1.0	JPA	07/19/99	1942	153551	2
Anthracene		75.2	9.12	22.8	ug/l	20.	JPA	07/20/99	1528	153551	2
Benzo(a)anthracene		55.3	0.456	1.14	ug/l	1.0	JPA	07/19/99	1942	153551	2
Benzo(a)pyrene		16.7	0.228	1.14	ug/l	1.0					
Benzo(b)fluoranthene		17.8	0.342	1.14	ug/l	1.0					
Benzo(ghi)perylene		3.45	0.456	1.14	ug/l	1.0					
Benzo(k)fluoranthene		17.3	0.342	1.14	ug/l	1.0					
Chrysene		47.3	0.570	1.14	ug/l	1.0					
Dibenzo(a,h)anthracene		4.49	0.456	1.14	ug/l	1.0					
Fluoranthene		2.45	0.570	1.14	ug/l	1.0					
Fluorene		323	9.12	22.8	ug/l	20.	JPA	07/20/99	1528	153551	2
Indeno(1,2,3-c,d)pyrene	U	ND	7.07	7.07	ug/l	1.0	JPA	07/19/99	1942	153551	2
Naphthalene		1300	13.7	22.8	ug/l	20.	JPA	07/20/99	1528	153551	2
Phenanthrene		812	9.12	22.8	ug/l	20.					
Pyrene		205	9.12	22.8	ug/l	20.					
<b>General Chemistry</b>											
Ferrous Iron		0.672	0.100	0.100	mg/l	1.0	JEN	07/21/99	1600	153968	3
Nitrogen, Nitrate		1.08	0.0127	0.0500	mg/l	1.0	RWS	07/16/99	0019	153489	4
Sulfate as SO4		12.9	0.0380	0.200	mg/l	1.0					





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 1899 North Hobson Ave.  
 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 2 of 3

Sample ID : 99SPORT0231-02

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		41.1	0.550	2.50	mg/l	5.0	JMB	07/20/99	1030	153664	5

**The following prep procedures were performed:**

GC/MS Base/Neutral Compounds

AEJ 07/16/99 1400 153551 N

Surrogate Recovery	Test	Percent%	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	51.5	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	59.7	(35.3 - 108.)
p-Terphenyl-d14	M610-NPWC	44.4	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	107.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	113.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	115.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

**Notes:**

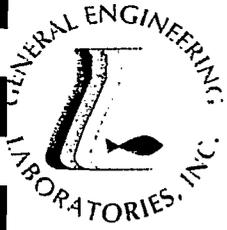
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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



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Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

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Sample ID : 99SPORT0231-02

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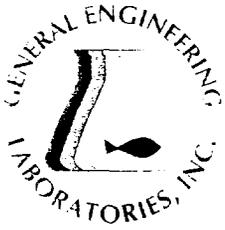
**M = Method**

**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, Elise Hanson at 843-556-8171.

  
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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

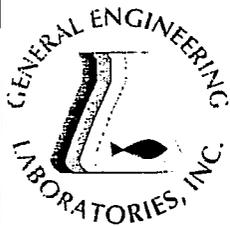
Page 1 of 3

Sample ID : 99SPORT0231-03  
 Lab ID : 9907501-03  
 Matrix : GroundH2O  
 Date Collected : 07/15/99  
 Date Received : 07/15/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	07/21/99	1418	153679	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene		4.70	0.400	1.00	ug/l	1.0	JPA	07/19/99	2010	153551	2
Acenaphthylene	U	ND	0.500	1.00	ug/l	1.0					
Anthracene	J	0.811	0.400	1.00	ug/l	1.0					
Benzo(a)anthracene	J	0.582	0.400	1.00	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.200	1.00	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.300	1.00	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.400	1.00	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.300	1.00	ug/l	1.0					
Chrysene	U	ND	0.500	1.00	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.400	1.00	ug/l	1.0					
Fluoranthene		3.46	0.500	1.00	ug/l	1.0					
Fluorene		3.22	0.400	1.00	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	6.20	6.20	ug/l	1.0					
Naphthalene		12.5	0.600	1.00	ug/l	1.0					
Phenanthrene		8.01	0.400	1.00	ug/l	1.0					
Pyrene		1.92	0.400	1.00	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron	U	ND	0.100	0.100	mg/l	1.0	JEN	07/21/99	1600	153968	3
Nitrogen, Nitrate		0.250	0.0127	0.0500	mg/l	1.0	RWS	07/16/99	0101	153489	4
Sulfate as SO4		33.9	0.0380	0.200	mg/l	1.0					







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North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 3 of 3

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Sample ID : 99SPORT0231-03

---

**M = Method**

**Method-Description**

---

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 North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 1 of 3

Sample ID : 99SPORT0231-04  
 Lab ID : 9907501-04  
 Matrix : GroundH2O  
 Date Collected : 07/15/99  
 Date Received : 07/15/99  
 Priority : Routine  
 Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<i>BTEX + NAPTH. - 5 items</i>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	07/20/99	1320	153679	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<i>Polynuclear Aromatic Hydrocarbons - 16 items</i>											
Acenaphthene	J	0.974	0.464	1.16	ug/l	1.0	JPA	07/19/99	2039	153551	2
Acenaphthylene	U	ND	0.580	1.16	ug/l	1.0					
Anthracene	U	ND	0.464	1.16	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.464	1.16	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.232	1.16	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.348	1.16	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.464	1.16	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.348	1.16	ug/l	1.0					
Chrysene	U	ND	0.580	1.16	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.464	1.16	ug/l	1.0					
Fluoranthene	J	0.709	0.580	1.16	ug/l	1.0					
Fluorene	J	0.600	0.464	1.16	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	7.19	7.19	ug/l	1.0					
Naphthalene		2.29	0.696	1.16	ug/l	1.0					
Phenanthrene		1.60	0.464	1.16	ug/l	1.0					
Pyrene	U	ND	0.464	1.16	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		0.179	0.100	0.100	mg/l	1.0	JEN	07/21/99	1600	153968	3
Nitrogen, Nitrate		0.109	0.0127	0.0500	mg/l	1.0	RWS	07/16/99	0115	153489	4
Sulfate as SO4		4.38	0.0380	0.200	mg/l	1.0					





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Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

Page 2 of 3

Sample ID : 99SPORT0231-04

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		38.3	0.550	2.50	mg/l	5.0	JMB	07/20/99	1030	153664	5

**The following prep procedures were performed:**

GC/MS Base/Neutral Compounds

AEJ 07/16/99 1400 153551 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	49.1	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	51.0	(35.3 - 108.)
p-Terphenyl-d14	M610-NPWC	55.0	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	110.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	113.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	115.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

- 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.
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cc: NPWC00197

Report Date: July 23, 1999

Page 3 of 3

Sample ID : 99SPORT0231-04

**M = Method**

**Method-Description**

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North Charleston, South Carolina 29405-2106

Contact: Mr. Bill Hiers

Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

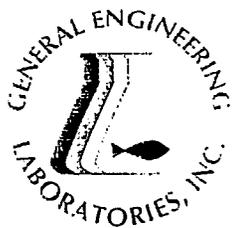
Report Date: July 23, 1999

Page 1 of 3

Sample ID : 99SPORT0231-05  
Lab ID : 9907501-05  
Matrix : GroundH2O  
Date Collected : 07/15/99  
Date Received : 07/15/99  
Priority : Routine  
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
<b>Volatile Organics</b>											
<b>BTEX + NAPTH. - 5 items</b>											
Benzene	U	ND	0.300	1.00	ug/l	1.0	JEB	07/19/99	1406	153679	1
Ethylbenzene	U	ND	0.300	1.00	ug/l	1.0					
Naphthalene	U	ND	0.600	1.00	ug/l	1.0					
Toluene	U	ND	0.500	1.00	ug/l	1.0					
Xylenes (TOTAL)	U	ND	1.10	2.00	ug/l	1.0					
<b>Extractable Organics</b>											
<b>Polynuclear Aromatic Hydrocarbons - 16 items</b>											
Acenaphthene	U	ND	0.456	1.14	ug/l	1.0	JPA	07/19/99	2107	153551	2
Acenaphthylene	U	ND	0.570	1.14	ug/l	1.0					
Anthracene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(a)anthracene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(a)pyrene	U	ND	0.228	1.14	ug/l	1.0					
Benzo(b)fluoranthene	U	ND	0.342	1.14	ug/l	1.0					
Benzo(ghi)perylene	U	ND	0.456	1.14	ug/l	1.0					
Benzo(k)fluoranthene	U	ND	0.342	1.14	ug/l	1.0					
Chrysene	U	ND	0.570	1.14	ug/l	1.0					
Dibenzo(a,h)anthracene	U	ND	0.456	1.14	ug/l	1.0					
Fluoranthene	U	ND	0.570	1.14	ug/l	1.0					
Fluorene	U	ND	0.456	1.14	ug/l	1.0					
Indeno(1,2,3-c,d)pyrene	U	ND	7.07	7.07	ug/l	1.0					
Naphthalene		1.36	0.684	1.14	ug/l	1.0					
Phenanthrene	J	0.977	0.456	1.14	ug/l	1.0					
Pyrene	U	ND	0.456	1.14	ug/l	1.0					
<b>General Chemistry</b>											
Ferrous Iron		0.280	0.100	0.100	mg/l	1.0	JEN	07/21/99	1600	153968	3
Nitrogen, Nitrate		0.0830	0.0127	0.0500	mg/l	1.0	RWS	07/16/99	0129	153489	4
Sulfate as SO4		393	0.760	4.00	mg/l	20.	RWS	07/16/99	1403	153489	4





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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: NPWC00197

Report Date: July 23, 1999

Page 2 of 3

Sample ID : 99SPORT0231-05

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Total Organic Carbon		15.0	0.550	2.50	mg/l	5.0	JMB	07/20/99	1030	153664	5

**The following prep procedures were performed:**

GC/MS Base/Neutral Compounds

AEJ 07/16/99 1400 153551 N

Surrogate Recovery	Test	Percent %	Acceptable Limits
2-Fluorobiphenyl	M610-NPWC	53.5	(41.2 - 107.)
Nitrobenzene-d5	M610-NPWC	55.0	(35.3 - 108.)
p-Terphenyl-d14	M610-NPWC	57.3	(36.6 - 110.)
Bromofluorobenzene	BTEX+NAP-8260B	107.	(73.0 - 129.)
Dibromofluoromethane	BTEX+NAP-8260B	108.	(66.0 - 117.)
Toluene-d8	BTEX+NAP-8260B	109.	(73.0 - 122.)

M = Method	Method-Description
M 1	SW846 8260B
M 2	EPA 8270C
M 3	SM 17 3500-FE D Mod.
M 4	EPA 300.0
M 5	EPA 415.1

**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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Project Description: SUPSHIP-Portsmouth Detachment

cc: NPWC00197

Report Date: July 23, 1999

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Sample ID : 99SPORT0231-05

---

**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, Elise Hanson at 843-556-8171.

Reviewed By

199000197

# CHAIN OF CUSTODY RECORD

99075019

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								
SPORT ENUDET CHASIN		pH, conductivity	TOC/DOC	TDC	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	FAH	Cyanide	Coliform - specify type	N.Y.K. / S.D.N. / P.S.	BTX PAH	Naphthalene	Remarks	
Collected by/Company	SAMPLE ID																		DATE	TIME
SPORT ENUDET CHASIN																				
SPORT ENUDET CHASIN																				
1	99SPORT0231-01	7/13/99	2300																	NBCH/661 TW 002 P3
2	99SPORT0231-02	7/15/99	1200	X									X		X					NBCH/661 GW 002 P3
3	99SPORT0231-03	7/15/99	0940	X									X		X					NBCH/661 GW 003 P3
4	99SPORT0231-04	7/15/99	0907	X									X		X					NBCH/661 GW 004 P3
5	99SPORT0231-05	7/15/99	1055	X									X		X					NBCH/661 GW 005 P3
<i>Handwritten signature</i>																				
Relinquished by:		Date:	Time:	Received by:		Relinquished by:		Date:	Time:	Received by:										
<i>[Signature]</i>		7/15/99	1217	<i>[Signature]</i>		<i>[Signature]</i>		7/15/99	12:17	<i>[Signature]</i>										
Relinquished by:		Date:	Time:	Received by lab by:		Date:	Time:	Remarks:												
<i>[Signature]</i>		7/15/99	1300	<i>[Signature]</i>		7/15/99	1300													

White : ple collector    Yellow = file    Pink = with report



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## Certificate of Analysis

Company : Environmental Enterprise Group  
 Address : 1899 N. Hobson Avenue  
 Charleston, SC 29405

Report Date: March 2, 2000

Contact: Mr. Bill Hiens  
 Project: Environ. Enterprise Group

Page 1 of 3

Client Sample ID: 00EEG0006-01  
 Sample ID: 20385001  
 Matrix: Ground Water  
 Collect Date: 11-JAN-00  
 Receive Date: 11-JAN-00  
 Collector: Client  
 Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
EPA 300.0 Nitrate in Liquid											
Nitrate	U	ND	0.02	0.05	mg/L	1	RWS	01/12/00	1432	6613	1
EPA 300.0 Sulfate in Liquid											
Sulfate		441	1.58	4	mg/L	20	RWS	01/13/00	1005	6613	2
<b>Semi-Volatiles-GC/MS</b>											
<b>510/8270 PAH STD LIST IN LIQ.</b>											
2,4-Dinitrotoluene	U	ND	0.17	10.6	ug/L	1	GWL	01/14/00	1942	6760	3
Acenaphthene	U	ND	0.17	1.06	ug/L	1					
Acenaphthylene	U	ND	0.149	1.06	ug/L	1					
Anthracene	U	ND	0.117	1.06	ug/L	1					
Benzo(a)anthracene	U	ND	0.106	1.06	ug/L	1					
Benzo(a)pyrene	U	ND	0.0745	1.06	ug/L	1					
Benzo(b)fluoranthene	U	ND	0.181	1.06	ug/L	1					
Benzo(ghi)perylene	U	ND	0.277	1.06	ug/L	1					
Benzo(k)fluoranthene	U	ND	0.298	1.06	ug/L	1					
Chrysene	U	ND	0.106	1.06	ug/L	1					
Dibenzo(a,h)anthracene	U	ND	0.191	1.06	ug/L	1					
Fluoranthene	U	ND	0.0957	1.06	ug/L	1					
Fluorene	U	ND	0.0745	1.06	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.277	1.06	ug/L	1					
Naphthalene	U	ND	0.138	1.06	ug/L	1					
Phenanthrene	U	ND	0.128	1.06	ug/L	1					
Pyrene	U	ND	0.0851	1.06	ug/L	1					
<b>Spectrometric Analysis</b>											
SM 3500 Fe D Modified In Liqu											
Ferrous Iron	U	ND	0.1	0.1	mg/L	1	JEN	01/24/00	1300	8430	4
<b>TOC Analysis</b>											
EPA 415.1 Total Organic Carbon											
Total Organic Carbon		15.8	0.662	1	mg/L	2	JB1	01/18/00	1045	7417	5
<b>olatile Organics</b>											
<b>5035/8260B BTX Extended List</b>											
Benzene	U	ND	0.149	2	ug/L	1	JEB	01/12/00	1415	6604	6
Ethylbenzene	U	ND	0.051	2	ug/L	1					
Naphthalene	U	ND	0.306	1	ug/L	1					
Toluene	U	ND	0.262	2	ug/L	1					
Xylenes (total)	U	ND	0.437	6	ug/L	1					
m,p-Xylenes	U	ND	0.289	4	ug/L	1					

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Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
 Project: Environ. Enterprise Group

Page 2 of 3

Client Sample ID: 00EEG0006-01      Project: NPWC00199  
 Sample ID: 20385001      Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>											
<i>35/8260B BTEX Extended List</i>											
m-Xylene	U	ND	0.148	2	ug/L	1					
tert-Butyl methyl ether	U	ND	0.088	2	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SM 3500-Fe-D	SM 4500 Fe D Ferrous Iron	JEN	01/24/00	1300	8430
SW846 3510C	3510C BNA Liq. Prep-8270C Analysis	JMA	01/12/00	1857	6587
SW846 8260	8260B Volatiles In Liquid	JEB	01/12/00	1415	6604

The following Analytical Methods were performed

Method	Description
1	EPA 300.0
2	EPA 300.0
3	SW846 8270C
4	SM 3500-Fe-D
5	EPA 415.1
6	SW846 8260

Surrogate recovery	Test	Recovery %	Acceptable Limits
2-Fluorobiphenyl	3510/8270 PAH STD LIST IN LIQ	67%	(41%-107%)
Fluorobenzene-d5	3510/8270 PAH STD LIST IN LIQ	67%	(35%-108%)
Fluorophenyl-d14	3510/8270 PAH STD LIST IN LIQ	76%	(37%-110%)
Bromofluorobenzene	5035/8260B BTEX Extended List	90%	(73%-129%)
Dibromofluoromethane	5035/8260B BTEX Extended List	80%	(66%-117%)
Fluorocac-d8	5035/8260B BTEX Extended List	89%	(73%-122%)

Notes:

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- \*\* Indicates the analyte is a surrogate compound.
- U Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- J Indicates the compound was analyzed for but not detected above the detection limit

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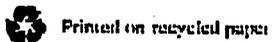
Client Sample ID: 00EEG0006-01      Project: NPWC00199  
Sample ID: 20385001      Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analysis Date	Time	Batch	Method
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Elise Hanson at 843-556-8171 Ext. 4409.

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 Project: Environ. Enterprise Group

Page 1 of 2

Client Sample ID: 00EEG0006-02  
 Sample ID: 20385002  
 Matrix: Ground Water  
 Collect Date: 11-JAN-00  
 Receive Date: 11-JAN-00  
 Collector: Client

Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>											
<i>5035/8260B BTEX Extended List</i>											
Benzene	U	ND	0.149	2	ug/L	1	JEB	01/12/00	1448	6604	1
Ethylbenzene	U	ND	0.051	2	ug/L	1					
Naphthalene	U	ND	0.306	1	ug/L	1					
Toluene	U	ND	0.262	2	ug/L	1					
Xylenes (total)	U	ND	0.437	6	ug/L	1					
m,p-Xylenes	U	ND	0.289	4	ug/L	1					
o-Xylene	U	ND	0.148	2	ug/L	1					
tert-Butyl methyl ether	U	ND	0.088	2	ug/L	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8260	8260B Volatiles In Liquid	JEB	01/12/00	1448	6604

**The following Analytical Methods were performed**

Method	Description
1	SW846 8260

**Surrogate recovery**

Test	Recovery %	Acceptable Limits
Bromofluorobenzene 5035/8260B BTEX Extended List	87%	(73%-129%)
Bromofluoromethane 5035/8260B BTEX Extended List	80%	(66%-117%)
luene-d8 5035/8260B BTEX Extended List	88%	(73%-122%)

**Notes:**

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Project: Environ.Enterprise Group

Report Date: March 2, 2000

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Client Sample ID: 00EEG0006-02  
Sample ID: 20385002

Project: NPWC00199  
Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Contact: Mr. Bill Hiers  
 Project: Environ. Enterprise Group

Page 1 of 3

Client Sample ID: 00EEG0006-03  
 Sample ID: 20385003  
 Matrix: Ground Water  
 Collect Date: 11-JAN-00  
 Receive Date: 11-JAN-00  
 Collector: Client

Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<i>EPA 300.0 Nitrate in Liquid</i>											
Nitrate		0.7	0.02	0.05	mg/L	1	RWS	01/12/00	1446	6613	1
<i>EPA 300.0 Sulfate in Liquid</i>											
Sulfate		78.5	0.158	0.4	mg/L	2	RWS	01/13/00	1100	6613	2
<b>Semi-Volatiles-GC/MS</b>											
<i>10/8270 PAH STD LIST IN LIQ.</i>											
4-Dinitrotoluene	U	ND	0.17	10.6	ug/L	1	GWL	01/14/00	2014	6760	3
Acenaphthylene		1.9	0.149	1.06	ug/L	1					
Anthracene		38.6	0.117	1.06	ug/L	1					
Benzo(a)anthracene		18.8	0.106	1.06	ug/L	1					
Benzo(a)pyrene		5.99	0.0745	1.06	ug/L	1					
Benzo(b)fluoranthene		7.13	0.181	1.06	ug/L	1					
Benzo(g,h)perylene	J	0.956	0.277	1.06	ug/L	1					
Benzo(k)fluoranthene		6.03	0.298	1.06	ug/L	1					
Chrysene		15.6	0.106	1.06	ug/L	1					
Dibenz(a,h)anthracene	U	ND	0.191	1.06	ug/L	1					
Fluoranthene		108	0.0957	1.06	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.277	1.06	ug/L	1					
Phenanthrene		272	0.128	1.06	ug/L	1					
Pyrene		86.8	0.0851	1.06	ug/L	1					
Acenaphthene		559	6.81	42.6	ug/L	40	GWL	01/24/00	1703	6760	4
Fluorene		330	2.98	42.6	ug/L	40					
Naphthalene		2540	5.53	42.6	ug/L	40					
<b>Spectrometric Analysis</b>											
<i>SM 3500 Fe D Modified In Liqui</i>											
Ferrous Iron		0.533	0.1	0.1	mg/L	1	JEN	01/24/00	1300	8430	5
<b>TOTC Analysis</b>											
<i>EPA 415.1 Total Organic Carbon</i>											
Total Organic Carbon		100	16.6	25	mg/L	50	JB1	01/18/00	1045	7417	6
<b>Little Organics</b>											
<i>035/8260B BTEX Extended List</i>											
Benzene	U	ND	3.73	50	ug/L	25	JEB	01/12/00	1840	6604	7
Ethylbenzene	J	16.8	1.28	50	ug/L	25					
Toluene		103	6.55	50	ug/L	25					
Xylenes (total)	U	ND	10.9	150	ug/L	25					
m,p-Xylenes	U	ND	7.23	100	ug/L	25					
o-Xylene	U	ND	3.7	50	ug/L	25					
tert-Butyl methyl ether	U	ND	2.2	50	ug/L	25					

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Client Sample ID: 00EEG0006-03 Project: NPWC00199  
 Sample ID: 20385003 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>											
5035/8260B BTEX Extended List											
Naphthalene		2330	15.3	50	ug/L	50	JEB	01/13/00	1127	6604	8

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SM 3500-Fe-D	SM 4500 Fe D Ferrous Iron	JEN	01/24/00	1300	8430
SW846 3510C	3510C BNA Liq. Prep-8270C Analysis	JMA	01/12/00	1857	6587
SW846 8260	8260B Volatiles In Liquid	JEB	01/12/00	1840	6604
SW846 8260	8260B Volatiles In Liquid	JEB	01/13/00	1127	6604

**The following Analytical Methods were performed**

Method	Description
1	EPA 300.0
2	EPA 300.0
3	SW846 8270C
4	SW846 8270C
5	SM 3500-Fe-D
6	EPA 415.1
7	SW846 8260
8	SW846 8260

Surrogate recovery	Test	Recovery %	Acceptable Limits
Fluorobiphenyl	3510/8270 PAH STD LIST IN LIQ	81%	(41%-107%)
Nitrobenzene-d5	3510/8270 PAH STD LIST IN LIQ	74%	(35%-108%)
Terphenyl-d14	3510/8270 PAH STD LIST IN LIQ	108%	(37%-110%)
Monofluorobenzene	5035/8260B BTEX Extended List	89%	(73%-129%)
Dibromofluoromethane	5035/8260B BTEX Extended List	80%	(66%-117%)
Toluene-d8	5035/8260B BTEX Extended List	89%	(73%-122%)

**Notes:**

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- Indicates the analyte is a surrogate compound.
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- U Indicates the compound was analyzed for but not detected above the detection limit.

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Client Sample ID: 00EEG0006-03  
Sample ID: 20385003

Project: NPWC00199  
Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Elise Hanson at 843-556-8171 Ext. 4409.

  
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## Certificate of Analysis

Company : Environmental Enterprise Group  
 Address : 1899 N. Hobson Avenue  
 Charleston, SC 29405

Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
 Project: Environ. Enterprise Group

Page 1 of 3

Client Sample ID: 00EEG0006-04  
 Sample ID: 20385004  
 Matrix: Ground Water  
 Collect Date: 11-JAN-00  
 Receive Date: 11-JAN-00  
 Collector: Client  
 Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Chromatography</b>											
<i>EPA 300.0 Nitrate in Liquid</i>											
Nitrate		0.401	0.02	0.05	mg/L	1	RWS	01/12/00	1500	6613	1
<i>EPA 300.0 Sulfate in Liquid</i>											
Sulfate		22.8	0.079	0.2	mg/L	1	RWS	01/12/00	1500	6613	2
<b>Semi-Volatiles-GC/MS</b>											
<i>610/8270 PAH STD LIST IN LIQ.</i>											
2,4-Dinitrotoluene	U	ND	0.17	10.6	ug/L	1	GWL	01/14/00	2047	6760	3
Acenaphthene	J	0.856	0.17	1.06	ug/L	1					
Acenaphthylene	U	ND	0.149	1.06	ug/L	1					
Anthracene	U	ND	0.117	1.06	ug/L	1					
Benzo(a)anthracene	U	ND	0.106	1.06	ug/L	1					
Benzo(a)pyrene	U	ND	0.0745	1.06	ug/L	1					
Benzo(b)fluoranthene	U	ND	0.181	1.06	ug/L	1					
Benzo(g,h,i)perylene	U	ND	0.277	1.06	ug/L	1					
Benzo(k)fluoranthene	U	ND	0.298	1.06	ug/L	1					
Chrysene	U	ND	0.106	1.06	ug/L	1					
Dibenz(a,h)anthracene	U	ND	0.191	1.06	ug/L	1					
Fluoranthene	U	ND	0.0957	1.06	ug/L	1					
Fluorene	J	0.655	0.0745	1.06	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.277	1.06	ug/L	1					
Naphthalene	U	ND	0.138	1.06	ug/L	1					
Phenanthrene		1.23	0.128	1.06	ug/L	1					
Pyrene	U	ND	0.0851	1.06	ug/L	1					
<b>Spectrometric Analysis</b>											
<i>SM 3500 Fe D Modified In Liqu</i>											
Ferrous Iron	U	ND	0.1	0.1	mg/L	1	JEN	01/24/00	1300	8430	4
<b>C Analysis</b>											
<i>EPA 415.1 Total Organic Carbon</i>											
Total Organic Carbon		53.8	16.6	25	mg/L	50	JB1	01/18/00	1045	7417	5
<b>Volatile Organics</b>											
<i>8035/8260B BTEX Extended List</i>											
Benzene	U	ND	0.149	2	ug/L	1	JEB	01/12/00	1516	6604	6
Ethylbenzene	U	ND	0.051	2	ug/L	1					
Naphthalene	U	ND	0.306	1	ug/L	1					
Toluene	U	ND	0.262	2	ug/L	1					
Xylenes (total)	U	ND	0.437	6	ug/L	1					
m,p-Xylenes	U	ND	0.289	4	ug/L	1					
o-Xylene	U	ND	0.148	2	ug/L	1					

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Page 2 of 3

Client Sample ID: 00EEG0006-04  
 Sample ID: 20385004  
 Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatiles Organics</b>											
<i>5035/8260B BTEX Extended List</i>											
tert-Butyl methyl ether	U	ND	0.088	2	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SM 3500-Fe-D	SM 4500 Fe D Ferrous Iron	JEN	01/24/00	1300	8430
SW846 3510C	3510C BNA Liq. Precp-8270C Analysis	JMA	01/12/00	1857	6587
SW846 8260	8260B Volatiles In Liquid	JEB	01/12/00	1516	6604

The following Analytical Methods were performed

Method	Description
1	EPA 300.0
2	EPA 300.0
3	SW846 8270C
4	SM 3500-Fe-D
5	EPA 415.1
6	SW846 8260

Surrogate recovery	Test	Recovery%	Acceptable Limits
2,4-Difluorobiphenyl	3510/8270 PAH STD LIST IN LIQ	67%	(41%-107%)
Nitrobenzene-d5	3510/8270 PAH STD LIST IN LIQ	63%	(35%-108%)
Terphenyl-d14	3510/8270 PAH STD LIST IN LIQ	90%	(37%-110%)
Bromofluorobenzene	5035/8260B BTEX Extended List	88%	(73%-129%)
Dibromofluoromethane	5035/8260B BTEX Extended List	81%	(66%-117%)
Toluene-d8	5035/8260B BTEX Extended List	90%	(73%-122%)

**Notes:**

The Qualifiers in this report are defined as follows :

- U Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
  - # Indicates the analyte is a surrogate compound.
  - J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
  - U Indicates the compound was analyzed for but not detected above the detection limit
- The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc.

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Address : 1899 N. Hobson Avenue  
Charleston, SC 29405

Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
Project: Environ. Enterprise Group

Page 3 of 3

Client Sample ID: 00EEG0006-04      Project: NPWC00199  
Sample ID: 20385004      Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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standard operating procedures. Please direct any questions to your Project Manager, Elise Hanson at 843-556-8171 Ext. 4409.

Reviewed by

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 Address : 1899 N. Hobson Avenue  
 Charleston, SC 29405

Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
 Project: Environ. Enterprise Group

Page 1 of 3

Client Sample ID: 00EEG0006-05  
 Sample ID: 20385005  
 Matrix: Ground Water  
 Collect Date: 12-JAN-00  
 Receive Date: 11-JAN-00  
 Collector: Client

Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	KL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography</b>											
<i>EPA 300.0 Nitrate in Liquid</i>											
Nitrate		0.073	0.02	0.05	mg/L	1	RWS	01/13/00	1558	6901	1
<i>EPA 300.0 Sulfate in Liquid</i>											
Sulfate		62	0.158	0.4	mg/L	2	RWS	01/19/00	1106	7669	2
<b>Semi-Volatiles-GCMS</b>											
<i>510/8270 PAH STD LIST IN LIQ.</i>											
2,4-Dinitrotoluene	U	ND	0.168	10.5	ug/L	1	EH1	01/19/00	1216	7524	3
Acenaphthene	U	ND	0.168	1.05	ug/L	1					
Acenaphthylene	U	ND	0.147	1.05	ug/L	1					
Anthracene	U	ND	0.116	1.05	ug/L	1					
Benzo(a)anthracene	U	ND	0.105	1.05	ug/L	1					
Benzo(a)pyrene	U	ND	0.0737	1.05	ug/L	1					
Benzo(b)fluoranthene	U	ND	0.179	1.05	ug/L	1					
Benzo(ghi)perylene	U	ND	0.274	1.05	ug/L	1					
Benzo(k)fluoranthene	U	ND	0.295	1.05	ug/L	1					
Chrysene	U	ND	0.105	1.05	ug/L	1					
Dibenzo(a,h)anthracene	U	ND	0.189	1.05	ug/L	1					
Fluoranthene	U	ND	0.0947	1.05	ug/L	1					
Fluorene	U	ND	0.0737	1.05	ug/L	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.274	1.05	ug/L	1					
Naphthalene	U	ND	0.137	1.05	ug/L	1					
Phenanthrene	U	ND	0.126	1.05	ug/L	1					
Pyrene	U	ND	0.0842	1.05	ug/L	1					
<b>Spectrometric Analysis</b>											
<i>SM 3500 Fe D Modified in Liqui</i>											
Ferrous Iron		0.111	0.1	0.1	mg/L	1	JEN	01/24/00	1300	8430	4
<b>DC Analysis</b>											
<i>EPA 415.1 Total Organic Carbon</i>											
Total Organic Carbon		135	16.6	25	mg/L	50	JB1	01/18/00	1045	7417	5
<b>Volatiles Organics</b>											
<i>5035/8260B BTEX Extended List</i>											
Benzene	U	ND	0.149	2	ug/L	1	JEB	01/12/00	1547	6604	6
Ethylbenzene	U	ND	0.051	2	ug/L	1					
Naphthalene	U	ND	0.306	1	ug/L	1					
Toluene	U	ND	0.262	2	ug/L	1					
Xylenes (total)	U	ND	0.437	6	ug/L	1					
m,p-Xylenes	U	ND	0.289	4	ug/L	1					
o-Xylene	U	ND	0.148	2	ug/L	1					

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Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
 Project: Environ. Enterprise Group

Page 2 of 3

Client Sample ID: 00EEG0006-05  
 Sample ID: 20385005  
 Project: NPWC00199  
 Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>											
<i>035/8260B BTEX Extended List</i>											
tert-Butyl methyl ether	U	ND	0.088	2	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SM 3500-Fe-D	SM 4500 Fe D Ferrous Iron	JEN	01/24/00	1300	8430
SW846 3510C	3510C BNA Liq. Prep-8270C Analysis	ES	01/18/00	1256	7365
SW846 8260	8260B Volatiles In Liquid	JEB	01/12/00	1547	6604

The following Analytical Methods were performed

Method	Description
2	EPA 300.0
2	EPA 300.0
3	SW846 8270C
3	SM 3500-Fe-D
3	EPA 415.1
6	SW846 8260

Surrogate recovery	Test	Recovery %	Acceptable Limits
2-Fluorobiphenyl	3510/8270 PAH STD LIST IN LIQ	63%	(41%-107%)
Nitrobenzene-d5	3510/8270 PAH STD LIST IN LIQ	53%	(35%-108%)
Terphenyl-d14	3510/8270 PAH STD LIST IN LIQ	97%	(37%-110%)
Mono-fluorobenzene	5035/8260B BTEX Extended List	88%	(73%-129%)
Dibromofluoromethane	5035/8260B BTEX Extended List	81%	(66%-117%)
Chlorobenzene-d8	5035/8260B BTEX Extended List	89%	(73%-122%)

Notes:

The Qualifiers in this report are defined as follows :

- \* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- \*\* Indicates the analyte is a surrogate compound.
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- U Indicates the compound was analyzed for but not detected above the detection limit

The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc.

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Address : 1899 N. Hobson Avenue  
Charleston, SC 29405

Report Date: March 2, 2000

Contact: Mr. Bill Hiers  
Project: Environ.Enterprise Group

Page 3 of 3

Client Sample ID: 00EEG0006-05  
Sample ID: 20385005

Project: NPWC00199  
Client ID: NPWC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Standard operating procedures. Please direct any questions to your Project Manager, Elise Hanson at 843-556-8171 Ext. 4409.

Reviewed by

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NPWC 00199

General Engineering Laboratories, Inc.  
 2040 Savage Road  
 Charleston, South Carolina 29407  
 P.O. Box 30712  
 Charleston, South Carolina 29417  
 (843) 556-8171

# CHAIN OF CUSTODY RECORD

20385

Page 1 of 1

Client Name/Facility Name				SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods													Remarks									
Collected by/Company				WELL	SOIL	COMPR	GRAB	# OF CONTAINERS	pH, conductivity	EPA TOC/DOC/MS.1	Chloride, Fluoride, Sulfide	Nitrate/Nitrite	VOC - Specify Method	METALS - Specify	Pesticide	Herbicide		Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX/NAPHA		
NS 101 Zone H																										
SCRA - Environmental Enterprise Group																	NBCH   101 GW 005 P4									
001	00EE600010-01	1-12-00	10:00	X				8	X	X		X	X											X		
002	00EE600010-02	1-12-00	0845	X				3				X											X			TRIP BLANK
003	00EE600010-03	1-12-00	11:10	X				8	X	X		X	X										X			NBCH   101 GW 002 P4
004	00EE600010-04	1-12-00	12:39	X				8	X	X		X	X										X			NBCH   661 GW 003 P4
005	00EE600010-05	1-12-00	13:15	X				8	X	X		X	X										X			NBCH   661 GW 004 P4
Relinquished by: <i>William Morris</i>				Date: 01-11-00	Time: 13:40	Received by: <i>[Signature]</i>				Relinquished by:				Date:	Time:	Received by:										
Relinquished by: <i>[Signature]</i>				Date: 1/11/00	Time: 1728	Received by lab by: <i>[Signature]</i>				Date: 1-11-00	Time: 17:28	Remarks: <i>[Signature]</i>														

**ATTACHMENT C**

**CORRESPONDENCE**



4 November 1998

7600 Bull Street  
Columbia, SC 29201-1708

COMMISSIONER:  
Douglas E. Bryant

BOARD:  
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Rodney L. Grandy

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

Re: First Quarter 1998 Monitoring Report dated 27 August 1998  
Building # 661 (Site Identification # 14437)  
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 presents analytical results of environmental sampling conducted to determine the fate of groundwater contamination previously documented at the subject site. Monitoring data generated to date appears to indicate a reasonable delineation and understanding of the extent and severity of groundwater contamination has been developed for this site. As the contaminant plume has remained relatively stable, the facility proposes to implement a short duration groundwater extraction test to further evaluate an appropriate and cost effective remedial alternative for the site.

With consideration to the above, the author concurs with the recommendations as presented in the report and the additional assessment activities are approved for implementation. Please be reminded that extracted groundwater is considered a wastewater and must be handled and disposed in an appropriate manner and in accordance with all applicable regulations. In this regard, it is recommended that generated wastewater be disposed at a POTW or other permitted treatment facility designed to accept and treat this type of wastewater. An appropriate proposal containing the following information must be submitted to the Department for review and approval, as necessary:

- estimated volume of wastewater to be generated
- acceptance letter by the receiving treatment facility

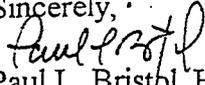
All disposal manifests are required to be submitted with the final evaluation report.

It is recognized that the facility may pursue a risk-based corrective action for this site. The

Charleston Naval Complex/Charleston Naval Base  
4 November 1998  
page 2

Department may consider intrinsic biodegradation/attenuation (natural attenuation) as a reasonable remedial strategy when demonstrated to be a viable and effective mechanism for restoration of groundwater quality. As groundwater of the State is currently classified as Class GB (underground source of drinking water), the appropriate remedial goals for this site will be the quality standards established in R.61-68 (Water Classifications and Standards), if reasonably and technically attainable, utilizing available technology. In this regard, the facility must provide appropriate and relevant technical justification to demonstrate natural attenuation as a reasonable and effective alternative and demonstrate the groundwater environment's assimilative capacity to provide for natural attenuation through time. Appropriate quantitative fate and transport calculations should be incorporated to demonstrate potential current risk (exposure) and potential future risk (exposure) to contaminants originating from the site. Appropriate environmental monitoring must be implemented to demonstrate the rate and effectiveness of the suspected biodegradation process and demonstrate the validity of the assumptions employed in predictive modeling.

Please provide a schedule for implementation of the assessment activities at your earliest convenience. 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

5090  
Code 1803  
20 February 1999

From: Commanding Officer, Southern Division Naval Facilities Engineering Command  
(SOUTHNAVFACENGCOM)  
To: Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, Environmental Detachment,  
Charleston (SPORTENVDETHASN)  
Subj: REQUEST FOR PROJECT EXECUTION PACKAGE FOR BUILDING 661 PUMP TEST AND  
MONITORING, CHARLESTON NAVAL COMPLEX  
Encl: (1) Statement of Work (SOW) for Building 661 Pump Test and Monitoring, Project No. C99006  
Ref: (a) Memorandum of Agreement Between Commander, Naval Sea Systems Command and  
Commander, Naval Facilities Engineering Command dated 17 June 1994.  
(b) Cooperative Agreement Between Southern Division, Naval Facilities Engineering Command  
and Supervisor of Shipbuilding, Conversion and Repair, USN, Portsmouth, Environmental  
Detachment, Charleston dated 7 May 1996.  
(c) Project Execution Package (PEP) Preparation for Installation Restoration Work, Project  
C99002

1. In accordance with references (a) and (b), SOUTHNAVFACENGCOM wishes to issue a request for a Project Execution Package (PEP) for accomplishment of Building 661 pump test and monitoring as described by enclosure (1). The PEP shall include all elements of a standard PEP as described in the Installation Restoration PEP preparation SOW, project C99001. We consider this PEP to be a Level I PEP funded through reference (c). An original and one copy should be submitted to this office, Attn: Hayes Patterson, Code 1803.

2. This work will be assigned project number C99006. Please submit your PEP by 12 March 1999.

3. You are reminded that this memorandum does not constitute authority to proceed with any work other than preparation of the PEP. Issuance of a work request to begin project execution will occur after validation of your PEP.

4. **Release of Information.** SOUTHNAVFACENGCOM is the releasing authority for all information/documents regarding this project. Therefore, SPORTENVDETHASN shall obtain approval before publicizing, discussing or releasing any documents or information concerning this or any other project with anyone other than government personnel associated with the project in question.

5. Inquires should be directed to Hayes Patterson, Code 1803 at (843) 820-5658.

C.D. BLACK  
By direction



**DEPARTMENT OF THE NAVY**

SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR, USN  
PORTSMOUTH, VIRGINIA, ENVIRONMENTAL DETACHMENT CHARLESTON  
1899 NORTH HOBSON AVENUE, BUILDING 30  
NORTH CHARLESTON, SOUTH CAROLINA 29405-2106

IN REPLY REFER TO:  
Ser 416  
May 21, 1999

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

Re: Groundwater extraction test at Building 661 (Site Identification #14437)

Dear Mr. Bristol,

In accordance with the Navy recommendation in the First Quarter 1998 Monitoring Report for Building #661 and the DHEC acceptance letter dated 4 November 1998, Environmental Detachment Charleston submits the following information concerning the upcoming groundwater extraction test at Building 661.

It is estimated that during the groundwater extraction test approximately 400 gallons of wastewater will be generated. The wastewater will be collected in a vacuum truck and at the end of the test, transported to the DET O/W Separator for processing and disposal at the local POTW. Enclosed is a copy of the acceptance letter by the receiving treatment facility.

Initial sampling of monitoring wells MW-2, MW-3, MW-4 & MW-5 is scheduled for May 27, 1999. The groundwater extraction test is scheduled for June 2, 1999 and the sampling events will follow 7 days after completion of groundwater extraction test and 30 and 90 days thereafter.

If there are any questions or if more information is needed, please contact Jack Amey at (843) 743-6777 ext. 217.

Sincerely,

for  
E. R. Dearhart  
Director  
Supervisor of Shipbuilding, Conversion and Repair, USN,  
Portsmouth VA, Environmental Detachment Charleston, SC

cc: Gabriel Magwood, Southern Division

## North Charleston Sewer District

7225 STALL ROAD / P.O. BOX 63009

NORTH CHARLESTON, SC 29419

Telephone (803) 764-3072  
Fax (803) 764-2655

November 18, 1997

Supervisor of Shipbuilding, Conversion, and Repair,  
USN, (SUPSHIP) Portsmouth, Virginia  
Environmental Detachment Charleston  
1899 N. Hobson Ave.  
N. Charleston, SC 29405-2106

Attn: Mr. Todd Dailey

RE: Disposal of Wastewater

Dear Mr. Dailey:

The North Charleston Sewer District can accept wastewater generated during groundwater remediation, No. 2 fuel oil tank cleaning, and other Investigatively Derived Waters (IDW) under the following conditions:

1. Samples will be collected monthly for pH, O&G or TPH, and BTEX.
2. As necessary, samples will be collected for MTBE or other compounds of concern.
3. Analytical results will be reported to the District via telephone and kept on file at the Environmental Detachment office for review by the District.
4. Acceptable limits for the above parameters are:  
pH: 6.5 - 9.5 su      O&G or TPH: 150 mg/l  
BTEX: 5 mg/l      MTBE: 5 mg/l
5. The District reserves the right to cancel this approval anytime for just cause.
6. All Federal, State, and Local Regulations will be followed at all times, including any additional requirements by SCDHEC.

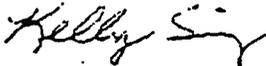
If you have any questions, please call me at (803) 764-3072. Please acknowledge acceptance of these requirements by signing page two (2) and returning one copy of that page.

Dailey, IDW

11/18/97

Page 2

Sincerely,



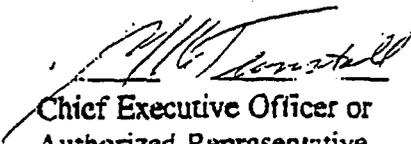
Kelly Singer

Industrial Pretreatment Supervisor

cc: Jimmy Green

Kendall Johnson

I agree to comply with the conditions listed on page one. Failure to comply will result in a violation and possible revocation of the approval.

 *DEPUTY DIRECTOR*  
Chief Executive Officer or  
Authorized Representative

18 NOV 97  
Date

J. N. K. TUNSTALL  
Print Name

**PART I**  
**EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

During the period beginning on the effective date of this permit and lasting through the expiration date, discharge shall be limited and monitored by the permittee as follows:

**OUTFALL**

**Naval Base Pump Station**

<u>Parameters</u>	<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
	<u>Daily Maximum mg/l (lbs/day)</u>	<u>Monthly Average mg/l (lbs/day)</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
<u>Chromium</u>	<u>3.0 (55.04)</u>	<u>2.0 (36.70)</u>	<u>Monthly</u>	<u>CP</u>
<u>Copper</u>	<u>0.75 (13.76)</u>	<u>0.5 (9.17)</u>	<u>Monthly</u>	<u>CP</u>
<u>Cyanide</u>	<u>1.5 (27.52)</u>	<u>1.0 (18.35)</u>	<u>Monthly</u>	<u>GR</u>
<u>Lead</u>	<u>0.3 (5.50)</u>	<u>0.2 (3.67)</u>	<u>Monthly</u>	<u>CP</u>
<u>Mercury</u>	<u>0.005 (0.09)</u>	<u>NA</u>	<u>Monthly</u>	<u>CP</u>
<u>Nickel</u>	<u>6.0 (110.09)</u>	<u>4.0 (73.39)</u>	<u>Monthly</u>	<u>CP</u>
<u>Silver</u>	<u>0.15 (2.75)</u>	<u>0.1 (1.83)</u>	<u>Monthly</u>	<u>CP</u>
<u>Thallium</u>	<u>0.01 (0.18)</u>	<u>NA</u>	<u>Monthly</u>	<u>CP</u>
<u>Zinc</u>	<u>15.0 (275.22)</u>	<u>10.0 (1835.0)</u>	<u>Monthly</u>	<u>CP</u>
<u>Oil &amp; Grease</u>	<u>150 (2752.0)</u>	<u>100 (1835.0)</u>	<u>Monthly</u>	<u>GR</u>
<u>Chlordane</u>	<u>0.0001(0.0018)</u>	<u>NA</u>	<u>Quarterly</u>	<u>CP</u>
<u>Lindane</u>	<u>0.01 (0.18)</u>	<u>NA</u>	<u>Quarterly</u>	<u>CP</u>
<u>TTO*</u>	<u>2.13 (39.08)</u>	<u>NA</u>	<u>Quarterly</u>	<u>GR/CP</u>
<u>Hydrazine</u>	<u>15.0 (NA)</u>	<u>15.0 (NA)</u>	<u>1-1/2 Event</u>	<u>CP</u>
<u>Chlorides</u>	<u>M&amp;R (M&amp;R)</u>	<u>M&amp;R (M&amp;R)</u>	<u>Monthly</u>	<u>CP</u>
<u>Daily Flow</u>	<u>2,200,000 gpd</u>	<u>NA</u>	<u>Continuous</u>	<u>Meter</u>

The pH of the discharge shall not be less than 6.5 su nor greater than 8.5 su and shall be monitored monthly by grab sample. A pH above 8.5 standard units may result in a surcharge as outlined in the District's Rate Resolution.

\*TTO- Total Toxic Organics as defined in 40 CFR Part 433.11(e). Volatile Organics are to be collected by grab. All others are to be composited.

NORTH CHARLESTON SEWER DISTRICT  
PRETREATMENT LIMITS

<u>METALS</u>	<u>LIMIT MG/L</u>	<u>VOLATILES</u>	<u>LIMIT MG/L</u>
ARSENIC	0.10	ACRYLONITRILE	0.10
ANTIMONY	2.00	BENZENE	5.00
BARIUM	2.00	BENZENE, ETHYL	5.00
BERYLLIUM	0.20	CARBON TETRACHLORIDE	1.00
CADMIUM	1.00	CHLOROFORM	10.00
CHROMIUM +6	3.00	ETHANE, 1,2-DICHLORO	1.00
CHROMIUM (T)	5.00	ETHANE, CHLORO	1.00
COPPER	2.00	ETHANE, 1,1,1-TRICHLORO	1.00
LEAD	0.30	ETHANE, 1,1,2-TRICHLORO	1.00
MERCURY	0.0005	ETHANE, 1,1-DICHLORO	1.00
NICKEL	2.00	ETHANE, 1,2-t-DICHLORO	1.00
SELENIUM	1.00	ETHYLENE, TETRACHLORO	1.00
SILVER	0.40	ETHYLENE, TRICHLORO	1.00
THALLIUM	0.01	ETHYLENE, 1,1-DICHLORO	1.00
ZINC	5.00	ETHYLENE, 1,2-t-DICHLORO	1.00
		METHANES, HALO	1.00
		METHYL CHLORIDE	1.00
		METHYLENE CHLORIDE	1.00
		PROPANE, 1,2-DICHLORO	1.00
		PROPYLENE, 1,3-DICHLORO	1.00
		TOLUENE	5.00
		VINYL CHLORIDE	1.00
		*XYLENE	5.00

\*TELCON WITH KELLY SINGER OF NCLSD ON 1/3/97

-LIMITS FOR BTEX CONSTITUENTS IS 5PPM

USE 5PPM FOR XYLENE

NORTH CHARLESTON SEWER DISTRICT  
PRETREATMENT LIMITS CON'T.

<u>BNA'S</u>	<u>LIMIT MG/L</u>	<u>P/H/PCB</u>	<u>LIMIT MG/L</u>
BENZENE, CHLORO	5.00	BHC (DELTA)	0.01
BENZENE, HEXACHLORO	0.003	CHLORDANE	0.0001
BENZENE, NITRO	5.00	DDT	0.0001
BENZENE, 1,2,4-TRICHLORO	5.00	LINDANE	0.01
BENZENE, 1,2-DICHLORO	5.00	ALDRIN	0.001
BENZENE, 1,3-DICHLORO	5.00		
BENZENE, 1,4-DICHLORO	5.00	<u>GEN CHEM</u>	<u>LIMIT MG/L</u>
BUTADIENE, HEXACHLORO	1.00	CYANIDE	0.30
CRESOL, 4,6-DINITRO-o	5.00	FORMALDEHYDE	10.0
ETHANE, HEXACHLORO	1.00	OIL & GREASE	150/100
ETHER, PHENYL(4-CHLOROPHENYL)	1.00		
ISOPHORONE	10.0		
NAPHTHALENE	5.00	TOTAL TOXIC ORGANICS	2.13
PHENOL	4.00		
PHENOL, 2,4,6-TRICHLORO	5.00		
PHENOL, 2,4-DINITRO	5.00		
PHENOL, 2-NITRO	5.00		
PHENOL, 4-NITRO	5.00		
PHENOL, DIMETHYL	5.00		
PHENOL, PENTACHLORO	5.00		
PHTHALATE, bis(2-ETHYLHEXYL)	1.00		
PHTHALATE, DI-n-OCTYL	5.00		
HYDRAZINE	15.0		
*PHENANTHRENE	5.00		
*ACENAPHTHENE	5.00		
*2-METHYLNAPHTHALENE	5.00		

\* PER TELCON WITH KELLY SINGER ON 1/3/97  
THE NCS'D LIMITS FOR PHENANTHRENE,  
ACENAPHTHENE, AND 2-METHYLNAPHTHALENE  
SHALL BE THE SAME AS NAPHTHALENE - 5PPM