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INITIAL GROUNDWATER ASSESSMENT REPORT FOR SITE 43 BUILDING M82 ZONE C WITH TRANSMITTAL CNC CHARLESTON SC

3/30/2001

TETRA TECH

Initial Ground-Water Assessment Report for Site 43, Building M82

Zone C
Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0093

March 2001

TETRA TECH NUS, INC.
1401 Oven Park Drive • Suite 102 • Tallahassee, FL 32312
(850) 385-9899 • FAX (850) 385-9860 • www.tetratech.com

TTNUS/TAL-01-031/0164/3.2

March 30, 2001

Project Number 0164

Mr. Michael Bishop
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0093

Subject: Final Initial Ground-Water Assessment Report for Site 43, Building M82 and Final Deliverables CD
Zone C
SCDHEC Site ID # 01538
Charleston Naval Complex
Charleston, South Carolina

Dear Mr. Bishop:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, Tetra Tech NUS, Inc. is pleased to submit the Final Initial Ground-Water Assessment Report for Site 43, Buiding M82 and the Final Deliverables CD for Zone C at the Charleston Naval Complex. The CD contains the following documents in pdf format.

- Health and Safety Plan for Contamination Assessment, Zone C, Charleston Naval Complex
- Site Assessment Plan, Zone C UST, Charleston Naval Complex
- Rapid Assessment Report for Site 29, Building NH-46, Zone C, Charleston Naval Complex
- Rapid Assessment Report for Site 30, Building NH-46, Zone C, Charleston Naval Complex
- Rapid Assessment Report for Site 31, Building 760, Zone C, Charleston Naval Complex
- Rapid Assessment Report for Site 32, Building 54, Zone C, Charleston Naval Complex
- Rapid Assessment Report for Site 33, Building NH-62, Zone C, Charleston Naval Complex
- Standard Limited Assessment Report for Site 34, Building NH-1137, Zone C Charleston Naval Complex
- Initial Ground-Water Assessment Report for Site 43, Building M82, Zone C, Charleston Naval Complex

The enclosed CDs have been scanned using the anti-virus software Norton Anti-Virus 2000™ and Trend Anti-Virus™ and are free of detectable viruses. If you have any questions or require further information, please contact me at (850) 385-9899.

Very truly yours,

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

PC/dd

Enclosures (3) 2 documents
1 CDs

c: Mr. Gabriel Magwood, SOUTHDIV
Ms. D. Wroblewski (Cover Letter Only)
Mr. M. Perry/File (Unbound)

INITIAL GROUND-WATER ASSESSMENT REPORT
FOR
SITE 43, BUILDING M82

ZONE C, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0093

MARCH 2001

PREPARED UNDER THE SUPERVISION OF:

for PAUL CALLIGAN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment for Site 43 which included one aboveground storage tank (AST) system for Building M82 at Charleston Naval Complex (CNC) Zone C, in North Charleston, South Carolina. The AST provided fuel oil to the Building M82 emergency generator system. The 300-gallon steel AST was removed in August 1999. The Rapid Assessment was performed under the direction of the South Carolina Department of Health and Environmental Control Rapid Assessment guidance dated June 20, 1997, and approval letter dated September 25, 2000. After determining that laboratory analytical results for media sampled at the site were below the risk-based screening levels (RBSLs), the reporting format was reduced from a Rapid Assessment Report to an Initial Ground-Water Assessment (IGWA) report format.

TtNUS performed the following actions during the Rapid Assessment:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity of Building M82, including public and private potable wells, subsurface utility line areas, and nearby surface water bodies, and to determine surface hydrology and drainage pathways.
- Reviewed the previously prepared Aboveground Storage Tank Assessment Report for AST M82 to determine appropriate boring locations and monitoring well placement for the Rapid Assessment investigation.
- Conducted a site survey to identify and locate utilities and to prepare a site plan.
- Installed 4 shallow soil borings (18 feet below land surface [bls]) and one deep soil boring (28 feet bls) using direct push technology (DPT).
- Collected surface and subsurface soil samples and field screened using an organic vapor analyzer.
- Installed three temporary piezometers at three selected soil boring locations.
- Surveyed the top of casing elevations for each piezometer and collected depth to groundwater measurements to evaluate the groundwater flow direction.
- Collected soil and groundwater screening samples from the DPT borings for on-site mobile laboratory analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX); naphthalene; and diesel range organics.

- Collected soil samples from four DPT boring locations for laboratory analysis at a fixed-base analytical laboratory. The four soil samples were submitted for BTEX and naphthalene analysis (U.S. Environmental Protection Agency [USEPA] Method 8260) and polynuclear aromatic hydrocarbons (PAHs) analysis (USEPA Method 8270).
- Collected a soil sample from the background soil boring location for total organic carbon analysis using USEPA Method 415.1.
- Collected soil samples from the soil boring in the potential source area for grain size analysis and total recoverable petroleum hydrocarbon (TPH) analysis using USEPA Method 9071.
- Installed one shallow, permanent monitoring well to 19 feet bls using hollow stem auger.
- Collected one groundwater sample from the newly installed, permanent monitoring well for laboratory analysis at a fixed-base analytical laboratory.
- Analyzed the groundwater sample for BTEX, methyl tert-butyl ether, and naphthalene (USEPA Method 8260) and PAHs (USEPA Method 8270).
- Surveyed the location and top of casing elevation of the newly installed, permanent monitoring well.

Conclusions

Soil samples were collected from four confirmation soil borings on August 25, 2000, and analyzed for BTEX and PAHs by a fixed-base laboratory. One confirmation soil sample from the potential source area was analyzed for TPH. The concentrations of CoCs reported for the soil samples from Site 43 were below standard laboratory detection limits or RBSLs. A groundwater sample was collected from the permanent monitoring well at Site 43 on November 11, 2000, and analyzed for BTEX and PAHs by a fixed-base laboratory. The concentrations of CoCs reported for the groundwater sample from Site 43 were below standard laboratory detection limits and RBSLs.

Because the reported CoC concentrations from soil and groundwater samples collected during the Rapid Assessment field effort were below RBSLs, the IGWA format was chosen to report the findings of the Rapid Assessment investigation. An IGWA report includes the necessary information for evaluating a site where CoC concentrations in soil and groundwater are below RBSLs without requiring a site conceptual model and a Tier 2 evaluation, thereby greatly reducing the reporting effort.

Recommendation

No further action is requested for Site 43, Building M82, of Zone C, CNC because CoC concentrations were reported at levels below standard laboratory detection limits or RBSLs in the fixed-base soil and groundwater samples collected during the Rapid Assessment performed in 2000 and reported in the following IGWA.

Rev. 1
03/29/01

INITIAL GROUND-WATER ASSESSMENT REPORT

Facility Name: Charleston Naval Base, Zone C, Site 43, Building M82

Site ID Number: DHEC Site Identification # 01538

UST Owner or Operator's Name: U.S. Navy Southern Division (SouthDiv) Naval Facilities Engineering Command (NAVFAC)

Address: 2155 Eagle Drive, North Charleston, South Carolina 29406

Phone Number: 843-820-7307

Contractor: Tetra Tech NUS, Inc., Gary Gunter, P.G. Cert. # 25

Address: 900 Trail Ridge Road, Aiken, SC 29803

Phone Number: (803) 649-7963

Well Driller: Michael Sturdevant, Geotek – Hollow Stem Auger. Cert. # 794

Sammy McDaniel, ESN Southeast - Direct Push. Cert. # 1485

Receptor and Site Data
Please place a check in the appropriate answer block for each question:

Receptor Survey Questions	No	Yes*
Is there a drinking water supply well (public or private) or surface water supply intake within 1,000 feet of the UST?	X	
Are irrigation or other non-drinking water wells located within 1,000 feet of the UST?		X
Are there other potential receptors (i.e., utilities, surface waters, wetlands) less than 500 feet from the UST?		X

* If "yes" provide additional information:
There are monitoring wells at additional sites within 1,000 feet of the former UST location.
Site Vicinity Map in Appendix D shows underground utility lines within 500-foot radius of Site 43.

Initial Ground-Water Assessment Report SCDHEC Site ID # 01538
Page 2

Were any water wells within 250 ft radius sampled? _____ Yes **X** No

Is the current use of the site and surrounding properties commercial, residential, agricultural, or industrial?

Site: Commercial & Industrial Adjacent Properties: Commercial & Industrial

Soil and Monitoring Well Data

Primary Soil Type: Sand, Silty sand

Well Installation Method and Date: Hollow-stem auger; November 10, 2000

Development Method: Surge and purge using submersible pump

Soil Samples Obtained at 0 to 2, 8 to 10 feet

NOTE: ***Soil samples were collected from four soil borings. A duplicate sample was collected from one of the soil borings.***

SOIL ANALYTICAL DATA

Sample	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	Naphthalene (ug/kg)
43SLB0110	<5.3	<5.3	<5.3	<5.3	<5.3
43SLB0210	<5.6	<5.6	<5.6	<5.6	<5.6
43SLB0310	<5.6	<5.6	<5.6	<5.6	<5.6
43SLB0402	<5.2	0.29J	<5.2	<5.2	<5.2

Sample	Benzo(a)-anthracene (ug/kg)	Benzo(b)-fluoranthene (ug/kg)	Benzo(k)-fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenz(a,h)-anthracene (ug/kg)
43SLB0110	<713	<713	<713	<713	<713
43SLB0210	<706	<706	<706	<706	<706
43SLB0310	<714	<714	<714	<714	<714
43SLB0402	<2810	<2810	<2810	<2810	<2810

Ground-Water Data

Depth to Ground Water: 10.65 feet

Well Purging/Sampling Method: Low flow using peristaltic pump

Date Sampled: 11/11/00

Free Product Thickness: None

Soil/Water Disposal Method: Soil cuttings and purge water were containerized, labeled, and moved to a temporary staging area. The IDW was later disposed of offsite by a certified disposal contractor.

GROUND-WATER ANALYTICAL DATA

Sample	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Naphthalene (ug/L)
43GLM0101	<5	<5	<5	<5	<5

Sample	Benzo(a)-anthracene (ug/L)	Benzo(b)-fluoranthene (ug/L)	Benzo(k)-fluoranthene (ug/L)	Chrysene (ug/L)	Dibenz(a,h)-anthracene (ug/L)
43GLM0101	<9.8	<9.8	<9.8	<9.8	<9.8

Sample	EDB (ug/L)	MTBE (ug/L)			
43GLM0101	<5	<40			

Appendices

The appendices required for this report are as follows:

Appendix A. Well Construction and Soil Boring Logs

Appendix B. Laboratory Data

Appendix C. Topographic Map With Site Location

Appendix D. Site Base Maps

NOTE: ***Because they are not needed, Appendices E and F are not included.***

Report Completed By: _____ Cert. # 25
(signature)

Date: 3/29/01

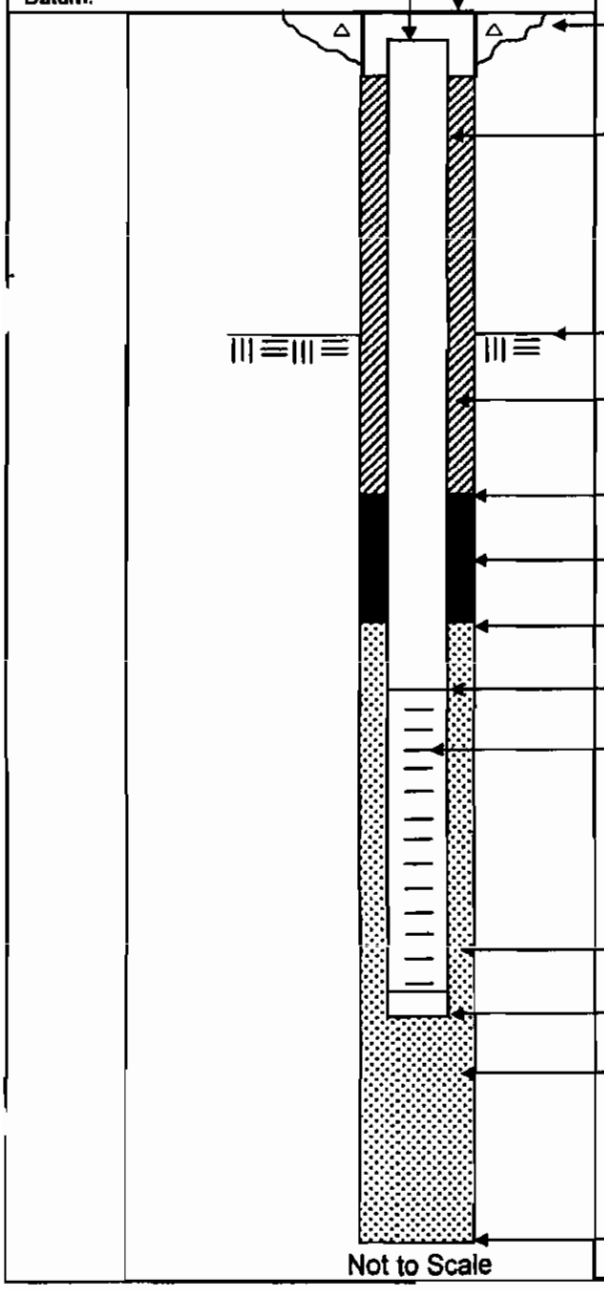
APPENDIX A
WELL CONSTRUCTION AND SOIL BORING LOGS

Tetra Tech NUS, Inc.

WELL No.: CWC 43M01

MONITORING WELL SHEET

PROJECT:	CWL	DRILLING Co.:	Geotek	BORING No.:	CWC43M01
PROJECT No.:	N0164	DRILLER:	Paul Gibson	DATE COMPLETED:	11-10-00
SITE:	43	DRILLING METHOD:	HSA	NORTHING:	376632.21
GEOLOGIST:	W.D.Olson	DEV. METHOD:	Sub. Pump	EASTING:	2315004.84



Elevation / Depth of Top of Riser: 15.38 / 1

Elevation / Height of Top of Surface Casing: 15.63 / 0

I.D. of Surface Casing: 8"

Type of Surface Casing: Bolt Down

Type of Surface Seal: PAD

I.D. of Riser: 2"

Type of Riser: PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: N/A

Type of Backfill: Neat Cement grout

Elevation / Depth of Seal: 15'

Type of Seal: Bentonite Pellet

Elevation / Depth of Top of Filter Pack: 17'

Elevation / Depth of Top of Screen: 19'

Type of Screen: PVC

Slot Size x Length: 0.010" x 10'

I.D. of Screen: 2"

Type of Filter Pack: #2 well gravel Pack

Elevation / Depth of Bottom of Screen: 119'

Elevation / Depth of Bottom of Filter Pack: 119'

Type of Backfill Below Well:

Elevation / Total Depth of Borehole: 117'

BASE: Charleston Naval Complex, Zone C	**SITE ID:** CNC43, Building M82	**PROJECT NO.:** N0164
BORING ID: CNC43-B 02	**WELL ID:** NA	**PIEZOMETER ID:** PØ3 (3½")
CONTRACTOR: ESN	**COMPLETION DATE:** 8-24-00	**LOGGED BY:** G. Sisco 1½" PZ Casing
METHOD: DPT	**BORING DIAMETER (in):** 1¾"	**TOTAL DEPTH (ft bls):** 17.8 ft.
TOC ELEVATION (ft msl): NA	**SCREEN INTERVAL (ft bls):** 8'-18'	**DEPTH TO GW (ft bls):** 13.1

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
0–1		5	Ø	5			DRY	No.	Brown to Lt. gray silty sand	SW		
1–2		5	Ø	5								
2–3		6	Ø	6								
3–4		–	–	–		34						
4–5		7	0	7			Sl. Moist	No.	Gray sand	SW		
5–6		–	–	–								
6–7		6	0	6								
7–8	43-SFBØ2-Ø8	8	Ø	8		36						
8–12							Sl. Moist / Wet	No.	Gray to lt. orange sand	SW	▽ (11)	SCREEN
12–18							SAT.	No.				

BASE: Charleston Naval Complex, Zone C	SITE ID: CNC43, Building M82	PROJECT NO.: N0164
BORING ID: CNC43-B~~#~~Ø3	WELL ID: NA	PIEZOMETER ID: ~~#~~ PØ1 (3½" 1¼" PVC)
CONTRACTOR: ESN	COMPLETION DATE: 8-24-00	LOGGED BY: G. Sisco
METHOD: DPT	BORING DIAMETER (In): 1¾"	TOTAL DEPTH (ft bls): 17.8 ft.
TOC ELEVATION (ft msl): NA	SCREEN INTERVAL (ft bls): ~~#~~ 8'-18'	DEPTH TO GW (ft bls): 12.3 ft bls

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED ~~48~~	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
0												
1		4	Ø	4			Dry ?	No.	Tan to brown to orange silty sand		SW	
2		6	Ø	6								
3		8	Ø	8		36						
4		—	—	—								1¼" PVC
	43-SFBØ3-Ø6	—	—	—			Sl. M Dk. ft.	No.	Very loose to loose Lt. orange to gray fine sand		SW	
6		10	Ø	10								
7		6	Ø	6		24						
8		—	—	—								
9							Moist	No.	Tan to lt. orange well graded fine sand		SW	.01" screen 8 to 18 ft.
10												
11						28						
12							Wet					
13	43-GFBØ3-18											
14												
18	EOB								EOR			

BASE: Charleston Naval Complex, Zone C	**SITE ID:** CNC43, Building M82	**PROJECT NO.:** N0164
BORING ID: CNC43-B01	**WELL ID:** NA	**PIEZOMETER ID:** ~~PØ1~~ PØ2
CONTRACTOR: ESN	**COMPLETION DATE:** 8-24-00	**LOGGED BY:** G. Sisco
METHOD: DPT	**BORING DIAMETER (in):** 1¾"	**TOTAL DEPTH (ft bls):** 17.0 ft
TOC ELEVATION (ft msl): NA	**SCREEN INTERVAL (ft bls):** ~~NA~~ 7'-17'	**DEPTH TO GW (ft bls):** 11.9 ft.

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
0												
1		-	-	-			Dry	No,	Hand augered.			
2		-	-	-					Brown to tan silty sand		SW	
3		5	Ø	5		N/A			(large rock at 3ft.)			
4		-	-	-			SL. Mo	No,	Lt. brown to Lt. gray silty sand (orange streaks)			
5		3	Ø	3			ist				SW	
6		-	-	-								
7		-	-	-		36						SCREEN 0.01" slot 7' to 17'
8	43-SFB01-09											
9		5	Ø	5			Moist		Tan to Lt. gray silty sand		SW	
10		-	-	-								
11		-	-	-		40	Wet					
12							SAT.					
13	43-GFB01-17											
14												
15												

EOB EOB

BASE: Charleston Naval Complex, Zone C	**SITE ID:** CNC43, Building M82	**PROJECT NO.:** N0164
BORING ID: CNC43-B~~#~~ Ø4	**WELL ID:** NA	**PIEZOMETER ID:** ~~NA~~ NA
CONTRACTOR: ESN	**COMPLETION DATE:**	**LOGGED BY:** G. Sisco
METHOD: DPT	**BORING DIAMETER (in):** 1 3/4"	**TOTAL DEPTH (ft bls):** 15.0 ft
TOC ELEVATION (ft msl): NA	**SCREEN INTERVAL (ft bls):** NA	**DEPTH TO GW (ft bls):** ≈ 10 ft.

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED 48	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
0	43-SFB04-01	19	Ø	19			DRY	NO	Brown to tan fine sandy silt		ML	
1		10	Ø	10			DRY	NO	some small gravel, brick		SW	
2		18	Ø	18			SL. MOIST	NO	Lt. orange silty sand			
3						36						
4		18	Ø	18			SL. MOIST	No.	Lt. orange to tan fine silty sand		SW	
6		17	Ø	17					Live Oak root frag.			
7		16	Ø	16		28						
8		12	Ø	12			Moist	No.	Tan to Lt. orange silty sand		SW	
9							Wet					
10							Sat.					
11						28						
12	43-GFB04-15											
15												

EOB EOR

BASE: Charleston Naval Complex, Zone C	**SITE ID:** CNC43, Building M82	**PROJECT NO.:** N0164
BORING ID: CNC43-B~~#~~ 05	**WELL ID:** NA	**PIEZOMETER ID:** NA
CONTRACTOR: ESN	**COMPLETION DATE:** 8-23-00	**LOGGED BY:** G. Sisco
METHOD: DPT	**BORING DIAMETER (in):** 1 3/4"	**TOTAL DEPTH (ft bls):** 28.0 ft.
TOC ELEVATION (ft msl): NA	**SCREEN INTERVAL (ft bls):** NA	**DEPTH TO GW (ft bls):** ≈ 12 ft.

BACKGROUND

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED (48")	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
0							DRY	No.	Brown sandy silt to Lt. orange		ML	
1												
2									Lt. orange sand		SW	
3						36	Sl. Moist					
4								No.	Sl. moist Tan sand			
5												
6									Med. loose		SW	
7						26						
8							Moist	No.	Moist Lt. orange to tan (gray streaks) sand		SW	
9												
10												
11						34						
12							Wet	No.	Lt. gray (some black streaks) to		SC	
13												
14							Sat.		Lt. orange sand some clay			
15												

BASE: Charleston Naval Complex, Zone C	**SITE ID:** CNC43, Building M82	**PROJECT NO.:** N0164
BORING ID: CNC43-B~~#~~ Ø5	**WELL ID:** NA	**PIEZOMETER ID:** NA
CONTRACTOR: ESN	**COMPLETION DATE:** 8-23-00	**LOGGED BY:** G. Sisco
METHOD: DPT	**BORING DIAMETER (in):** 1 3/4"	**TOTAL DEPTH (ft bls):** 28.0 ft.
TOC ELEVATION (ft msl): NA	**SCREEN INTERVAL (ft bls):** NA	**DEPTH TO GW (ft bls):** ≈ 12 ft.

DEPTH (FT)	SAMPLE INTERVAL/ SAMPLE ID	FID (PPM) UNFILTERED	FID (PPM) FILTERED	FID (PPM) CORRECTED	SPT BLOWS PER FT	FT RECOVERED	MOISTURE	ODOR	LITHOLOGIC DESCRIPTION	LITHOLOGIC SYMBOLS	USCS	WELL CONSTRUCTION
15												
16						28	Sat.	No.	Clayey Sand		SC	
17							Sat.	No.	Lt. orange to gray sand (clay decreases w/ depth)			
18												
19						34						
20							Sat.	No.	Gray Sand		SW	
21									Bright Orange			
22									Gray Sand			
23						35			Dark gray sand some clay at bottom		SC	
24							Sat.	No.	Dark gray to lt. gray sand interposed with some clay		SW	
25												
26											SC	
27												
28						48						
									EOB			

APPENDIX B
LABORATORY DATA

CASE NARRATIVE
for
Tetra Tech NUS, Inc.
Naval Weapons Station (NWS)
Charleson, SC
SDG# 30170

September 22, 2000

Laboratory Identification:

General Engineering Laboratories, Inc. (GEL)

Mailing Address:

PO Box 30712
Charleston, SC 29417

Express Mail Delivery and Shipping Address:

2040 Savage Rd
Charleston, SC 29414

Telephone Number:

(843) 556-8171

Summary:

Sample receipt

The samples arrived at General Engineering Laboratories, Inc. Charleston, SC on June 22, 2000, for environmental analyses. All sample containers arrived without any visible signs of tampering or breakage. All samples were delivered with chain of custody documentation and signatures.

The following samples were received by the laboratory:

Laboratory Identification	Sample Description
30170001	43SLB0510
30170002	42SLB1103
30170003	43SLB0110
30170004	43SLB0310
30170005	43SLB0310D
30170006	43SLB0210

30170007	42SLB0203
30170008	42SLB0303
30170009	42SLB0502
30170010	42SLB0602
30170011	42SLB0102
30170012	42SLB1203
30170013	42SLB1203D
30170014	43SLB0402
30170015	43SLB0410
30170016	42IDW00101
30170017	42SLB1603
30170018	42SLB0803
30170019	42SLB0502M

Case Narrative:

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are listed below by analytical parameter.

Internal Chain of Custody:

Custody was maintained for all samples.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Qualifier Flag Definitions, Chain of Custody, Cooler Receipt Checklist, and GC/MS Volatiles and GC/MS Semivolatile Analysis, DRO, Inorganic Analysis and Geotechnical Analysis.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Valerie Davis
Project Manager

fc:tetr30170%

GENERAL ENGINEERING LABORATORIES
PO Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(803) 556-8171 • Fax (803) 766-1178

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

Page 1 of 1

Client Name/Facility Name: TetraTech NUS (CNC)

Collected by/Company: Jeff Alexander/Greg Sisco TtNUS

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	PAH's	TOC/DOC	8015 TRPH	Chloride, Fluoride, Sulfide	Nitrate/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliforms - specify type		Grain size	Remarks
435LB051ϕ	82500	1230		X			1		1																
435LB011ϕ	"	1240		X			4	1					3												* ensures 8260B (meth... BTEX & Naphthalene ...
435LB042	"	1255		X			5	1		1			3												
435LB041ϕ	"	1255		X			1																	1	
435LB031ϕ	"	1315		X			4	1					3												
435LB031ϕD	"	1315		X			4	1					3												
43ELϕϕ1ϕ1	"	1430		X			5	1					3												TRPH unpreserved!
43TLBϕ1ϕ1	82200	0855		X			3						3												ip blanks
421DWϕϕ1ϕ1	82500	1450		X			5	1		1			3	1											* Lead 6010B RCRA metals + Hg
435LB021ϕ	"	1345		X			4	1					3												

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
	82500	1600					
Relinquished by:	**Date:**	**Time:**	**Received by lab by:**	**Date:**	**Time:**	**Remarks:**	
				8/25/00	1600		

White = sample collector Yellow = file Pink = with report

General Engineering
Soils Testing Laboratory

GRAIN-SIZE ANALYSIS

Sample No. 435LB 0410 Project No. Tetr 00400
Boring No. 30170015 Location
Depth
Description of Sample
Tested By C. Sandel Date 9/10/00

(19) (1) Weight of air dried sample 102.02 g, Can no. 62

Hygroscopic Moisture Determination

(2) Can no. 62
(3) Can weight 6.97 g
(4) Weight of can & air-dried soil 26.30 g
(5) Weight of can & oven dried soil 26.11 g

Sieve Analysis of Fine Aggregate

Sieve Size	Weight Retained (g)
No. 10	0.07
No. 20	0.10
No. 40	0.37
No. 60	6.19
No. 100	70.92
No. 200	17.75

Sieve Analysis of Coarse Aggregate

Sieve Size	Weight Retained (g)
3 in.	
2 in.	
1 1/2 in.	
1 in.	
3/4 in.	
3/8 in.	
No. 4	

Date	Time	Elapsed Time, T, min.	Actual Hydrometer Reading	Temperature, ℃
9/11/00	0721	0	--	--
	0723	2	1,007	22
	0726	5	1.006	22
	0736	15	1.006	22
	0751	30	1,006	22
	~~1131~~ 0821	60	1.006	22
	1131	250	1.005	22
9/12/00	0721	1440	1.005	22

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Lab File ID: 1Y505B Lab Sample ID: 1000098272

Date Analyzed: 09/01/00 Time Analyzed: 1215

GC Column: DB-624 ID: 0.25 (mm) Heated Purge: (Y/N) Y

Instrument ID: VOA1

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBLK01LCS	1000098273	1Y503B	1111
02	43SLB0110	30170003	1Y511	1503
03	43SLB0310	30170004	1Y512	1530
04	43SLB0310D	30170005	1Y513	1556
05	43SLB0210	30170006	1Y514	1623
06	42SLB0203	30170007	1Y515	1649
07	42SLB0303	30170008	1Y516	1716
08	42SLB0502	30170009	1Y517	1743
09	42SLB0602	30170010	1Y518	1809
10	42SLB0102	30170011	1Y519	1836
11	42IDW00101	30170016	1Y522	1955
12				
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0110

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170003

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 1Y511

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: not dec. 7 Date Analyzed: 09/01/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.3	U
108-88-3	Toluene	5.3	U
100-41-4	Ethylbenzene	5.3	U
1330-20-7	Xylenes (total)	5.3	U
91-20-3	Naphthalene	1.9	JB

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0210

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170006

Sample wt/vol: 4.7 (g/mL) G Lab File ID: 1Y514

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: not dec. 6 Date Analyzed: 09/01/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.6	U
108-88-3	Toluene	5.6	U
100-41-4	Ethylbenzene	5.6	U
1330-20-7	Xylenes (total)	5.6	U
91-20-3	Naphthalene	5.6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0310

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170004

Sample wt/vol: 4.8 (g/mL) G Lab File ID: 1Y512

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: not dec. 7 Date Analyzed: 09/01/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.6	U
108-88-3	Toluene	5.6	U
100-41-4	Ethylbenzene	5.6	U
1330-20-7	Xylenes (total)	5.6	U
91-20-3	Naphthalene	5.6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0310D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170005

Sample wt/vol: 4.8 (g/mL) G Lab File ID: 1Y513

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: not dec. 7 Date Analyzed: 09/01/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.6	U
108-88-3	Toluene	5.6	U
100-41-4	Ethylbenzene	5.6	U
1330-20-7	Xylenes (total)	5.6	U
91-20-3	Naphthalene	5.6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170014

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 1Z208

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: not dec. 5 Date Analyzed: 09/05/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.2	U
108-88-3	Toluene	0.29	J
100-41-4	Ethylbenzene	5.2	U
1330-20-7	Xylenes (total)	5.2	U
91-20-3	Naphthalene	5.2	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 1000098272

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 1Y505B

Level: (low/med) LOW Date Received: 09/01/00

% Moisture: not dec. _____ Date Analyzed: 09/01/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	1.9	J

Semi-Volatile Case Narrative
Tetra Tech NUS, Inc. (TETR)
SDG 30170

Method/Analysis Information

Procedure:	**Semivolatile Analysis by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW846 8270C
Prep Method:	SW846 3550B
Analytical Batch Number:	42426
Prep Batch Number:	42313

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8270C:

Sample ID	Client ID
30170003	43SLB0110
30170004	43SLB0310
30170005	43SLB0310D
30170006	43SLB0210
30170007	42SLB0203
30170008	42SLB0303
30170009	42SLB0502
30170010	42SLB0602
30170011	42SLB0102
30170012	42SLB1203
30170013	42SLB1203D

30170014	43SLB0402
30170016	42IDW00101
30170017	42SLB1603
30170018	42SLB0803
30170019	42SLB0502M
1000097380	SBLK01 (Blank)
1000097381	SBLK01LCS (Laboratory Control Sample)
1000097382	42SLB0502MMS (Matrix Spike)
1000097383	42SLB0502MMSD (Matrix Spike Duplicate)

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Due to the limited capacity of software we do not display all of the current initial calibration files here. If necessary, a calibration history will be inserted in the package prior to the appropriate Form 6.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, show that they not only coelute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

When calibrations are performed for Appendix IX compounds some of the compounds may not be calibrated exactly according to the criteria in Method 8270C. If the %RSD is greater than 15% or the correlation coefficient is less that 0.99 then the analyte is quantitated using the response factor. If the analyte is detected then the sample is reanalyzed for that analyte on an instrument that is compliant with the criteria in the method.

Initial Calibration
All initial calibration requirements have been met for this SDG.

CVS Requirements
All calibration verification standard (CVS) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
The following samples were analyzed at a dilution. As a result, the surrogates were diluted below recoverable levels.
30170010 (42SLB0602)
30170012 (42SLB1203)
30170013 (42SLB1203D)
30170016 (42IDW00101)
30170017 (42SLB1603)
30170018 (42SLB0803)

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
The laboratory control sample spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
The following sample analyzed with this SDG was chosen for matrix spike analysis:
30170019 (42SLB0502M).

MS Recovery Statement
The matrix spike recoveries were within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate recoveries were within the established acceptance limits.

MS/MSD RPD Statement
The relative percent differences between each MS and MSD were within the required acceptance limits.

Internal Standard (ISTD) Acceptance
The internal standard responses were within the required acceptance criteria for all samples and QC.

Technical Information:

Holding Time Specifications
All samples in this SDG met the specified holding time requirements.

GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The following sample was diluted due to internal standard(s) failure, caused by matrix interference:

30170008 (42SLB0303)
30170010 (42SLB0602)
30170011 (42SLB0102)
30170012 (42SLB1203)
30170013 (42SLB1203D)
30170014 (43SLB0402)
30170016 (42IDW00101)
30170017 (42SLB1603)
30170018 (42SLB0803)

Sample Reextract/Reanalysis
The following sample was reextracted due to failing surrogates. It was reextracted out of holding. The reextract was within the acceptable surrogate recovery limit. Both sets of data are reported. 30170009(42SLB0502).

Miscellaneous Information:

Nonconformance (NCR) Documentation
The following nonconformance report was generated due to failing surrogate(s) in sample 30170009 (42SLB0502):

GEL-AS-OA-3731.

Manual Integrations
No manual integrations were required for any data file in this SDG.

System Configuration

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with the electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Columns

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25mm ID and 0.18mm film):

Column ID	Column Description
J&W	DB-5.625(5% Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromatograms)
J&W DB-5MS	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS designation)
Alltech	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a HP-5MS designation)
HP	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex	ZB-5 5% Phenyl Polysiloxane (identified by a ZB-5 designation)
J&W DB-5MS2	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS2 designation)

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below:

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	ZB-5
MSD4	HP6890/HP5973	DB-5.625
MSD5	HP6890/HP5973	ZB-5
MSD7	HP6890/HP5973	ZB-5
MSD8	HP6890/HP5973	ZB-5

Method/Analysis Information

Procedure:	**Semivolatile Analysis by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW846 8270C
Prep Method:	SW846 3550B
Analytical Batch Number:	45674
Prep Batch Number:	45218

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8270C:

Sample ID	Client ID
30170009	42SLB0502RE
1000106076	SBLK02 (Blank)
1000106077	SBLK02LCS (Laboratory Control Sample)

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Due to the limited capacity of software we do not display all of the current initial calibration files here. If necessary, a calibration history will be inserted in the package prior to the appropriate Form 6.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, show that they not only coelute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

When calibrations are performed for Appendix IX compounds some of the compounds may not be calibrated exactly according to the criteria in Method 8270C. If the %RSD is greater than 15% or the correlation coefficient is less that 0.99 then the analyte is quantitated using the response factor. If the analyte is detected then the sample is reanalyzed for that analyte on an instrument that is compliant with the criteria in the method.

Initial Calibration
All initial calibration requirements have been met for this SDG.

CVS Requirements
All calibration verification standard (CVS) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
All the surrogate recoveries were within the established acceptance criteria for this SDG.

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
The laboratory control sample spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
A sample of similar matrix not in this analytical batch was chosen for method QC.

MS Recovery Statement
The matrix spike recoveries for this SDG were within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate recoveries for this SDG were within the established acceptance limits.

MS/MSD RPD Statement
The relative percent differences between each MS and MSD were within the required acceptance limits.

Internal Standard (ISTD) Acceptance
The internal standard responses were within the required acceptance criteria for all samples and QC.

Technical Information:

Holding Time Specifications
The following sample was reextracted out of holding due to surrogate failures. The reextract did not confirm the failure, so both sets of data will be reported.

30170009 (42SLB0502RE).

GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
None of the samples analyzed in this SDG required a dilution.

Sample Reextract/Reanalysis
None of the samples in this SDG were reextracted or reanalyzed for reasons other than dilution.

Miscellaneous Information:

Nonconformance (NCR) Documentation

The following nonconformance report has been generated due to sample 30170009 (42SLB0502RE) surrogate recovery failure and the sample being reextracted out of holding : GEL-AS-OA-3731.

Manual Integrations
No manual integrations were required for any data file in this SDG.

System Configuration

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with the electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Columns

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25mm ID and 0.18mm film):

Column ID	Column Description
J&W	DB-5.625(5% Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromatograms)
J&W DB-5MS	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS designation)
Alltech	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a HP-5MS designation)

HP	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex	ZB-5 5% Phenyl Polysiloxane (identified by a ZB-5 designation)
J&W DB-5MS2	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS2 designation)

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below:

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	ZB-5
MSD4	HP6890/HP5973	DB-5.625
MSD5	HP6890/HP5973	ZB-5
MSD7	HP6890/HP5973	ZB-5
MSD8	HP6890/HP5973	ZB-5

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

Reviewer: Herbert M Mauer **Date:** 091700

FID Case Narrative
Tetra Tech NUS, Inc. (TETR)
SDG 30170

Method/Analysis Information

Procedure:	**Non-Volatile Total Petroleum Hydrocarbons by Flame Ionization Detector**
Analytical Method:	SW846 8015A/B
Prep Method:	SW846 3550B
Analytical Batch Number:	43462
Prep Batch Number:	43311

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8015A/B:

Sample ID	Client ID
30170014	43SLB0402
30170016	42IDW00101
30170017	42SLB1603
30170018	42SLB0803
1000100300	DBLK01 (Method Blank)
1000100301	DBLK01LCS (Laboratory Control Sample)
1000100302	43SLB0402MS (Matrix Spike)
1000100303	43SLB0402MSD (Matrix Spike Duplicate)

System Configuration

Chromatographic Columns

Column ID	Column Description
J&W1	DB-WAX(0.53mm x 0.5u x 30m)

J&W2	DB-624(0.53mm x 3.0u x 30m)
J&W3	DB-1(0.53mm x 1.5u x 30m)
J&W4	DB-608(0.53mm x 0.83u x 30m)
J&W5	GS-Q(0.53mm x 30m)

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below.

Instrument ID	System Configuration	Chromatographic Column
FIDa	HP 5890 Series II GC/FID	J&W1/J&W3/J&W4
FID2a	HP 5890 Series II GC/FID	J&W2/J&W5

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Initial Calibration
All initial calibration requirements have been met for this SDG.

CVS Requirements
All calibration verification standard(s) (CVS) requirements have been met for this SDG.

Surrogate Recovery
All recoveries were not within the required acceptance criteria. Samples 30170016, 30170017, and 30170018 failed to meet acceptance criteria due to dilutions.

Quality Control (QC) Information

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
The LCS spike recoveries for this SDG were within the established acceptance limits.

MS Recovery Statement
The matrix spike recoveries for this SDG were within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate recoveries for this SDG were not within the established acceptance limits due to the presence of the target analyte in the parent sample.

MS/MSD RPD Statement
The relative percent differences (RPD) between each MS and MSD were within the required acceptance limits.

Technical Information:

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Time Specifications
All samples in this SDG met the specified holding time requirements.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The following samples required dilutions due to the presence of over-ranged target analytes:
30170016
30170017
30170018

Sample Re-prep/Re-analysis
The following samples were re-analyzed due to a previous sample being over-ranged:
30170014

Miscellaneous Information:

Nonconformance (NCR) Documentation
No nonconformance reports (NCR's) have been generated for this SDG.

Manual Integrations
Manual integrations were performed on all of the data files in this batch.

Additional Comments
The following samples contained hydrocarbons heavier than diesel:
1000100304
1000100305

30170014
30170016
30170017
30170018

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The data presented in this sample group has been verified by the following qualified person:

Reviewer: _____ **Date:** 9/20/06

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO

MBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Lab File ID: 003F0301 Lab Sample ID: 1000100300

Instrument ID: FIDA Date Extracted: 09/07/00

Matrix: (soil/water) SOIL Date Analyzed: 09/08/00

Level: (low/med) LOW Time Analyzed: 1148

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	MBLK01LCS	1000100301	004F0401	09/08/00
02	43SLB0402MS	1000100302	005F0501	09/08/00
03	43SLB0402MSD	1000100303	006F0601	09/08/00
04	43SLB0402	30170014	006F0601	09/11/00
05	42IDW00101	30170016	007F0701	09/11/00
06	42SLB1603	30170017	008F0801	09/11/00
07	42SLB0803	30170018	009F0901	09/11/00
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FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 1000100300

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 003F0301

Level: (low/med) LOW Date Received: 09/07/00

% Moisture: 0 decanted: (Y/N) N Date Extracted: 09/07/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/08/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
	----------Diesel Range Organics	0.96	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0110

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170003

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 2L509

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 7 decanted: (Y/N) N Date Extracted: 08/30/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/15/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	713	U
91-57-6	2-Methylnaphthalene	713	U
90-12-0	1-Methylnaphthalene	713	U
56-55-3	Benzo(a)anthracene	713	U
218-01-9	Chrysene	713	U
205-99-2	Benzo(b)fluoranthene	713	U
207-08-9	Benzo(k)fluoranthene	713	U
53-70-3	Dibenz(a,h)anthracene	713	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0210

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170006

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 2L512

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 6 decanted: (Y/N) N Date Extracted:08/30/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/15/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	706	U
91-57-6	2-Methylnaphthalene	706	U
90-12-0	1-Methylnaphthalene	706	U
56-55-3	Benzo(a)anthracene	706	U
218-01-9	Chrysene	706	U
205-99-2	Benzo(b)fluoranthene	706	U
207-08-9	Benzo(k)fluoranthene	706	U
53-70-3	Dibenz(a,h)anthracene	706	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0310

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170004

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 2L510

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 7 decanted: (Y/N) N Date Extracted: 08/30/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/15/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	714	U
91-57-6	2-Methylnaphthalene	714	U
90-12-0	1-Methylnaphthalene	714	U
56-55-3	Benzo(a)anthracene	714	U
218-01-9	Chrysene	714	U
205-99-2	Benzo(b)fluoranthene	714	U
207-08-9	Benzo(k)fluoranthene	714	U
53-70-3	Dibenz(a,h)anthracene	714	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0310D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170005

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 2L511

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 7 decanted: (Y/N) N Date Extracted: 08/30/00

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 09/15/00

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	713	U
91-57-6	2-Methylnaphthalene	713	U
90-12-0	1-Methylnaphthalene	713	U
56-55-3	Benzo(a)anthracene	713	U
218-01-9	Chrysene	713	U
205-99-2	Benzo(b)fluoranthene	713	U
207-08-9	Benzo(k)fluoranthene	713	U
53-70-3	Dibenz(a,h)anthracene	713	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

43SLB0402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170014

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 2L709

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 5 decanted: (Y/N) N Date Extracted: 08/30/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/17/00

Injection Volume: 1.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	2810	U
91-57-6	2-Methylnaphthalene	2810	U
90-12-0	1-Methylnaphthalene	2810	U
56-55-3	Benzo(a)anthracene	2810	U
218-01-9	Chrysene	2810	U
205-99-2	Benzo(b)fluoranthene	2810	U
207-08-9	Benzo(k)fluoranthene	2810	U
53-70-3	Dibenz(a,h)anthracene	2810	U

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 #	S5 #	S6 #	TOT OUT
01	SBLK01	86	91	106				0
02	SBLK01LCS	83	88	93				0
03	42SLB0502MMS	77	86	98				0
04	42SLB0502MMSD	77	85	96				0
05	42SLB0502M	82	92	103				0
06	43SLB0110	84	87	95				0
07	43SLB0310	78	87	94				0
08	43SLB0310D	81	86	100				0
09	43SLB0210	73	82	97				0
10	42SLB0203	84	91	115				0
11	42SLB0602	83	97	125D				0
12	42SLB0102	67	76	106				0
13	42SLB1203	134D	176D	240D				0
14	42SLB1203D	113D	142D	223D				0
15	43SLB0402	76	86	113				0
16	42IDW00101	83	109	147D				0
17	42SLB1603	165D	220D	299D				0
18	42SLB0803	0D	0D	531D				0
19	42SLB0502	75	84	126*				1
20	42SLB0303	87	108	103				0
21	SBLK02	74	80	93				0
22	SBLK02LCS	80	86	95				0
23	42SLB0502RE	78	89	104				0
24								
25								
26								
27								
28								
29								
30								

	QC LIMITS
S1 (NBZ) = Nitrobenzene-d5	(47-110)
S2 (FBP) = 2-Fluorobiphenyl	(48-110)
S3 (TPH) = Terphenyl-d14	(65-116)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

43SLB0402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 30170

Matrix: (soil/water) SOIL Lab Sample ID: 30170014

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 006F0601

Level: (low/med) LOW Date Received: 08/25/00

% Moisture: 5 decanted: (Y/N) N Date Extracted: 09/07/00

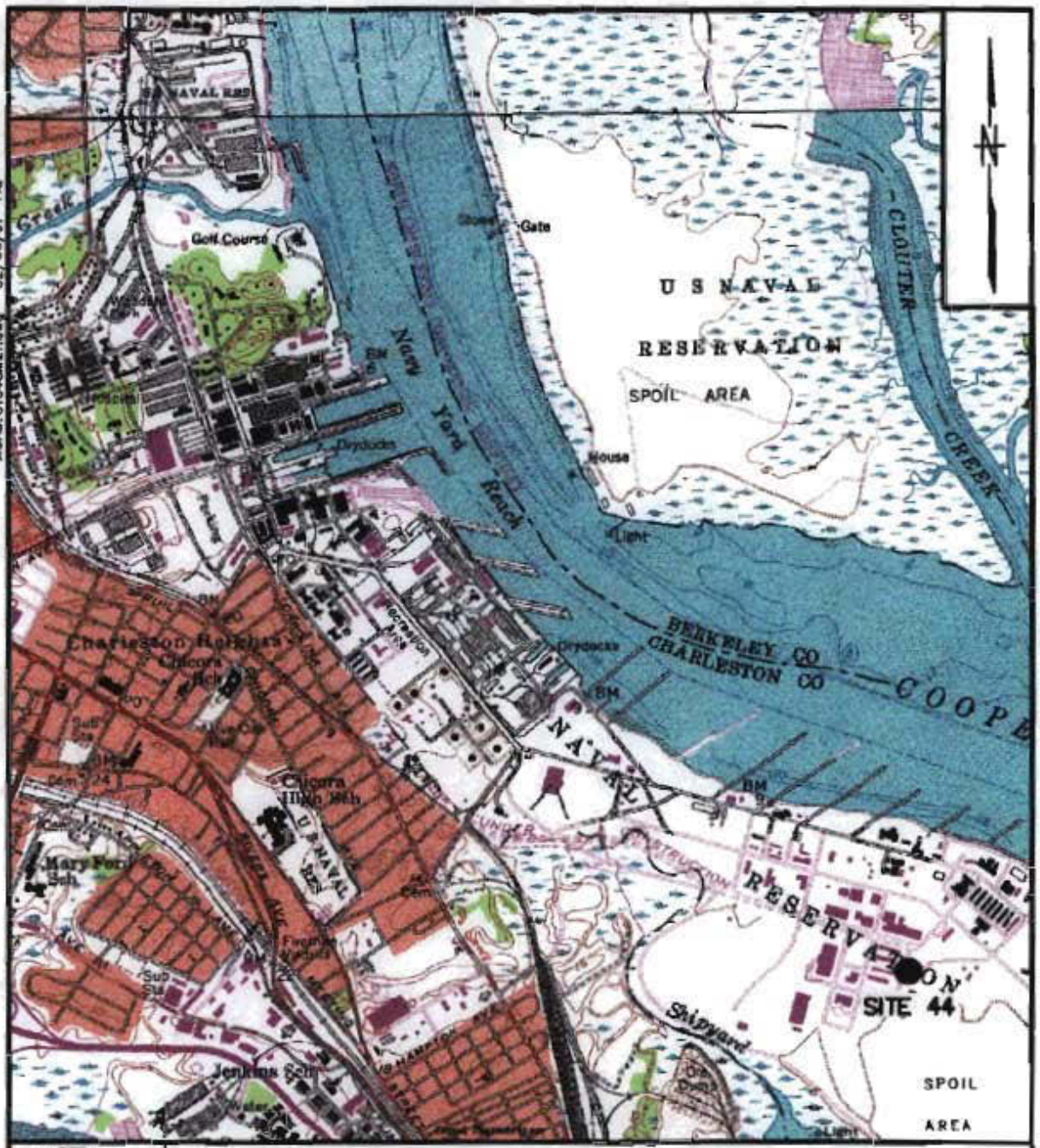
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 09/11/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
	----------Diesel Range Organics	1.2	JB

APPENDIX C
TOPOGRAPHIC MAP WITH SITE LOCATION



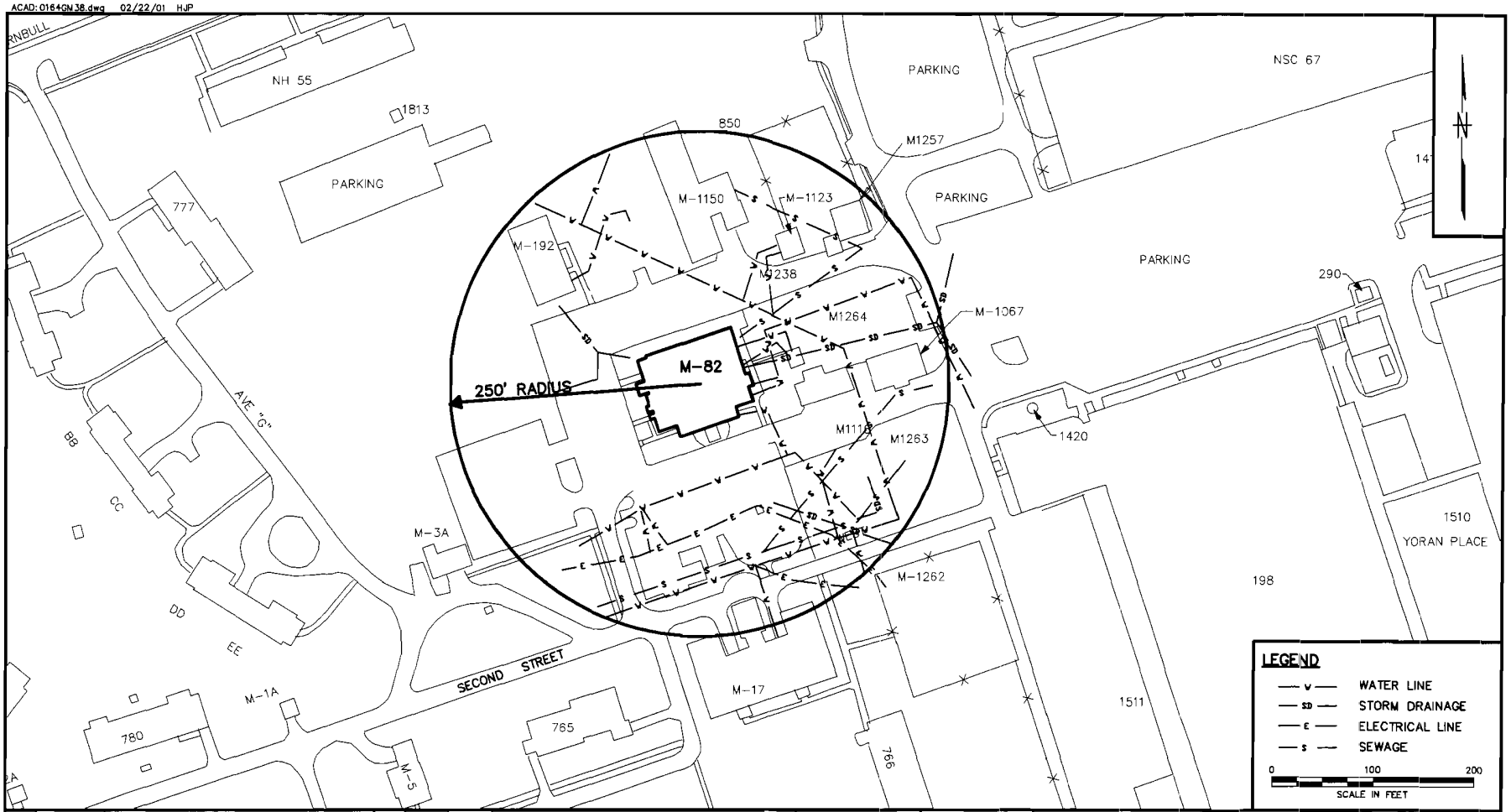
DRAWN BY HJP DATE 2/5/01		SITE LOCATION MAP SITE 44, AST 601 ZONE H, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SC	CONTRACT NO. 0164
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED--AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

ACAD: 0164CN21.dwg 02/08/01 HJP

FORM CADD NO. ZDIV_AV.DVG - REV 0 - 1/20/98

APPENDIX D
SITE BASE MAPS

ACAD: 0164GN38.dwg 02/22/01 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

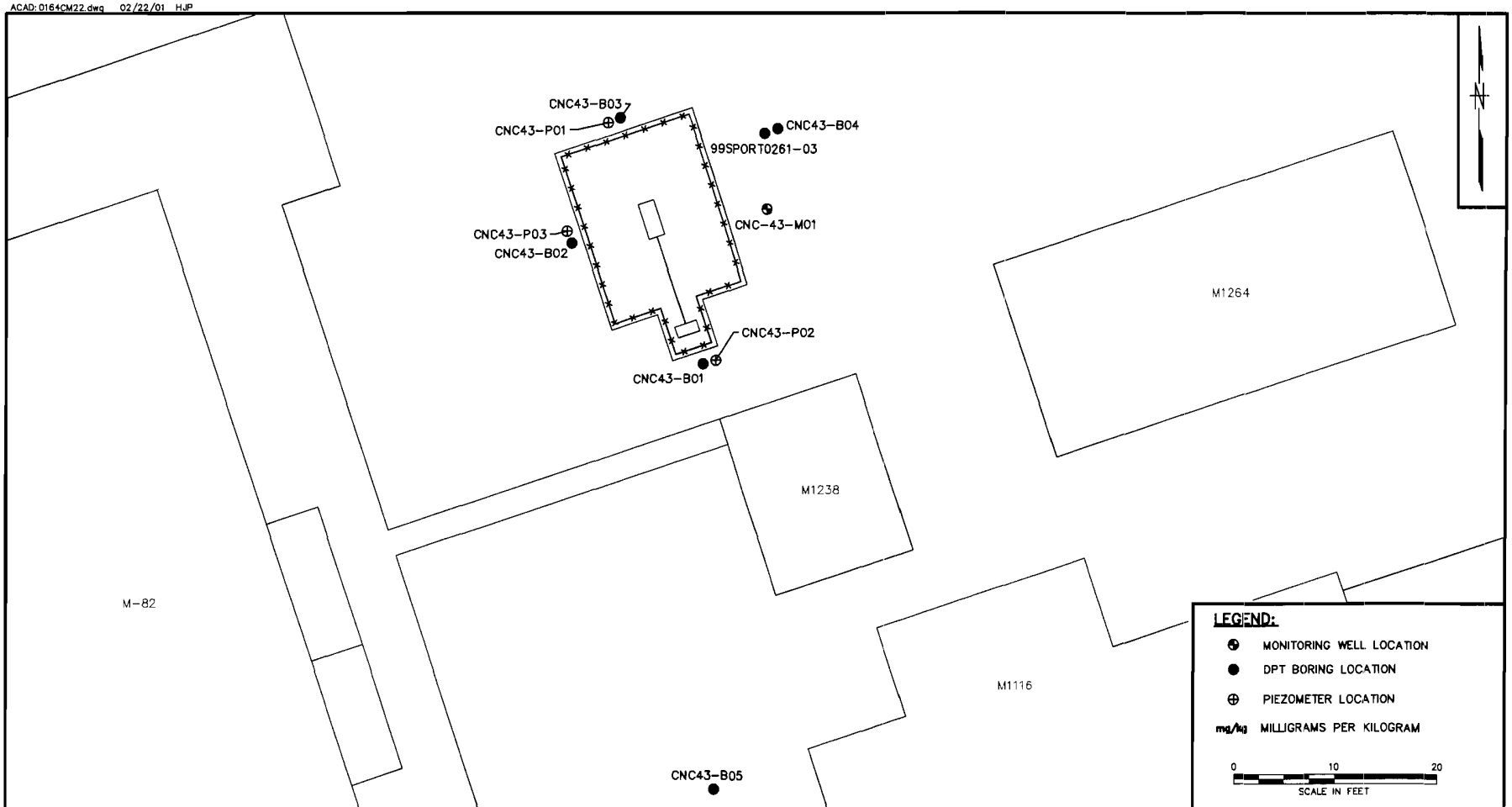
DRAWN BY HJP DATE 2/6/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE VICINITY MAP
SITE 43, BUILDING M82
ZONE C, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0164
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 1
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

ACAD: 0164CM22.dwg 02/22/01 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF DATE 9/14/00
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY · NAVAL FACILITIES ENGINEERING COMMAND

MONITORING WELL AND SOIL BORING
LOCATION MAP
SITE 43, AST M82
ZONE C, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0164
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

FORM CADD NO. SOIV_BH.DWG - REV 0 - 1/20/98