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STUDY AREA 39 PROJECT UPDATE SUMMARY WITH TRANSMITTAL LETTER NTC
ORLANDO FL
2/18/2000
TETRA TECH



TETRA TECH NUS, INC.

800 Oak Ridge

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00 261

0200-E041

February 18, 2000

Commanding Officer
SOUTHNAVFACENGCOM
ATTN: Ms. Barbara Nwokike, Code 1873
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29419-9010

Subject: Study Area 39 Project Update
McCoy Annex, NTC, Orlando

Dear Ms. Nwokike:

Enclosed is an interim report summarizing the work that Tetra Tech NUS has performed to date at SA 39. As indicated previously in the Environmental Site Screening Report (Harding Lawson, 1999), tetrachloroethene (PCE) is present at concentrations exceeding the Florida GCTLs. Unfortunately, the downgradient extent of the PCE contamination was not defined in the work completed last fall, and recommendations are provided in the report for a well cluster to be placed in the eastern portion of the site.

The well installation has been delayed a week by our drilling subcontractor and is now scheduled for the week of March 6, 2000. We are planning to sample the well during that mobilization and obtain quick turn analyses to determine if the plume has been adequately defined. It is not expected to be necessary, but additional wells could then be installed and sampled if exceedances are identified in the initial well cluster.

If you have any questions regarding the work at SA 39, please contact me at (863) 220-4730.

Sincerely,

Steven B. McCoy, P.E.
Task Order Manager

SBM:tko

Enclosure

cc: Mr. Rick Allen, Harding Lawson Associates
Mr. David Grabka, FDEP
Mr. Wayne Hansel, SOUTHNAVFACENGCOM
Ms. Nancy Rodriguez, USEPA Region IV
Mr. Steve Tsangaris, CH2M Hill
Mr. Michael Campbell, Tetra Tech NUS
Mr. Mark Perry, Tetra Tech NUS (unbound)
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)
File/db

PROJECT UPDATE REPORT – GROUNDWATER INVESTIGATION
STUDY AREA 39

Trip Dates: July 12-31, August 1-3, September 7-13, October 4-6, 1999

Site Name: Study Area 39
Main Base, Naval Training Center, Orlando, Florida

TO Manager: Steve McCoy

Prepared by: Enoch Barton

1.0 PURPOSE

During July – October 1999, Tetra Tech NUS, Inc. (Tt NUS) performed various field activities in order to assess the nature and extent of groundwater contamination at this study area. This interim report summarizes the activities performed and their results to date.

2.0 ACTIVITIES

Investigation activities have included groundwater sampling using direct-push technology (DPT), installation of new and replacement monitoring wells, and sampling of all SA 39 monitoring wells. The DPT investigation was performed in order to determine the optimum location for new (additional) monitoring wells. Once the locations were chosen, the wells were installed and all monitoring wells were sampled in order to define the nature and extent of groundwater contamination.

DPT Investigation – In July 1999 Tt NUS collected groundwater samples at 11 locations from multiple depths in order to assess the extent and concentration of an existing dissolved tetrachloroethene (PCE) groundwater plume. This information was used in selecting the optimum location and screened interval for additional monitoring wells intended to define the extent of the PCE plume. The samples were analyzed for volatile organic compounds (VOCs) using EPA Method SW 846 8260B. The sample locations are shown in Figure 1; the following table provides a listing of the sample locations and the corresponding sample depths.

Location	Sample Intervals (feet below ground surface)
NTC39P001	40 – 50 – 60
NTC39P002	50 – 60
NTC39P003	40 – 50 – 60 – 70
NTC39P004	40 – 50 – 60 – 70
NTC39P005	50 – 60 – (refusal)
NTC39P005A	70 (single push)
NTC39P005B	80 (single push)
NTC39P006	40 – 50 – 60 – 70
NTC39P007	40 – (refusal)
NTC39P008	40 – 50 – 60 – 70
NTC39P009	40 – 50 – 60 – 70
NTC39P010	40 – 50 – 60 – 70
NTC39P011	40 – 50 – 60 – 70

Seven samples collected from five locations contained analyte concentrations exceeding FDEP GCTLs. PCE is the most widespread contaminant. Figure 1 shows the spatial distribution of the GCTL exceedances; the following table summarizes the exceedances.

Analyte (µg/L)	GCTL (µg/L)	NTC39P001 40 ft	NTC39P005/005B				NTC39P007 40 ft	NTC39P008 70 ft	NTC39P009 70 ft
			50 ft	60 ft	80 ft				
Bromodichloromethane	0.6	4.0							
Chloroform	5.7	36							
Dibromochloromethane	0.4	0.47							
Methylene Chloride	5.0							18 BJ	
PCE	3.0		6.7	4.2	4.6	17	5.0		

Monitoring Well Installation – Twelve 2-in. diameter monitoring wells were installed at various depths. Of the 12, 6 are new wells and 6 replace existing wells destroyed by the installation of a new underground utility corridor along the southern boundary of the study area (Figure 2). All newly installed wells were pre-developed by swabbing during installation. Approximately 24 hours after installation, each well was developed by surging and pumping with a submersible pump until the effluent cleared. Between 50 and 150 gallons were removed from each well during development; all the effluent was drummed and disposed of by Tt NUS's waste subcontractor. The locations for the new wells were chosen based on the results of the DPT investigation. A table summarizing well construction details and location/construction rationale is provided on the following page.

Well I.D	Total Depth (ft)	Screened Interval (ft)	Rationale for Installation
OLD-39-27D	84.5	79.5-84.5	Installed atop the Hawthorn Formation downgradient of the source area. This depth was chosen in order to characterize groundwater conditions at the base of the surficial aquifer.
OLD-39-28D	84.5	79.5-84.5	Same rationale as above, located further downgradient.
OLD-39-29C	40	35-40	Located downgradient of existing wells in order to define the groundwater plume in the "C" (deep-approx. 40 ft below ground surface) interval.
OLD-39-30B	30	25-30	Located downgradient of existing wells in order to define the groundwater plume in the "B" (intermediate-approx. 30 ft below ground surface) interval.
OLD-39-31A	18	8-18	Located downgradient of existing wells in order to define the groundwater plume in the "A" (shallow-approx. 20 ft below ground surface) interval.
OLD-39-32C	39.5	34.5-39.5	Replaced well OLD-39-19C.
OLD-39-33B	29.5	24.5-29.5	Replaced well OLD-39-18B.
OLD-39-34A	17.5	7.5-17.5	Replaced well OLD-39-17A.
OLD-39-35B	29	24-29	Replaced well OLD-39-21B.
OLD-39-36A	17.5	7.5-17.5	Replaced well OLD-39-20A.
OLD-39-37C	45	40-45	Replaced well OLD-39-22C.
OLD-39-38B	29	24-29	Installed in location of interest approximately 30 ft from the southwest corner of the former HAZMAT building. No previous data collected from this location.

Monitoring Well Sampling – Except well OLD-39-01A, which was not found, all SA 39 monitoring wells (28 total) were sampled using the low-flow or micro-purge technique for VOCs during September 1999. In October 1999, seven the wells were sampled for natural attenuation (NA) parameters. Before sampling, the static groundwater level in each well was measured and the well volume was calculated. Figures 3, 4, and 5 are potentiometric surface maps for the shallow (A), intermediate (B), and deep (C) aquifer zones, respectively. These maps are based on the static groundwater levels recorded prior to sampling. Each map shows the general direction of groundwater flow is from northwest to southeast across the study area. The A and B zone maps (Figures 3 and 4) are felt to be representative. Because of the need for additional control, the groundwater flow pattern in the C zone (Figure 5) is not as well defined.

Laboratory analysis of the September 1999 samples positively identified 10 analytes at concentrations ranging from 0.13 µg/L to 94 µg/l (Table 1). Of those 10 analytes, 3 (bromodichloromethane, chloroform,

and PCE) were identified at concentrations exceeding the FDEP GCTLs (Tables 1 and 2). PCE, identified in 15 samples, was the most widespread contaminant, and ranged in concentration from 0.43 (J) to $\mu\text{g/L}$ to 94 $\mu\text{g/l}$. Figure 2 shows the distribution of groundwater analyte exceedances, and shows PCE contamination to exist over most of the eastern portion of the study area, and in the A, B, and C aquifer zones. Note that in wells OLD-39-27D and OLD-39-28D, completed at the base of the surficial aquifer, PCE was absent, but bromodichloromethane was present.

To evaluate if naturally occurring bacteria and other conditions capable of attenuating the groundwater plume are present at the study area, seven wells (OLD-39-12A, -14A, -29C, -30B, -32C, -33B, and -38B) were sampled for NA parameters (Table 3). Preliminary analysis of the NA parameters results indicates the presence of current microbial activity and the potential for sustaining such activity.

3.0 RECOMMENDATIONS

PCE contamination above GCTLs was detected in downgradient monitoring well cluster OLD-39-04A, OLD-39-15B, and OLD-39-16C (located approximately 25 feet east of Building 137). PCE was detected in these wells at levels of 5.7, 4.5, and 11.0 $\mu\text{g/L}$, respectively. To confirm the downgradient extent of groundwater contamination, it is recommended that a new monitoring well cluster, comprised of a shallow, intermediate, and a deep aquifer well, be installed. The proposed location of the well cluster is approximately 175 feet due east of well cluster 04A, 15B, and 16C.

REFERENCES

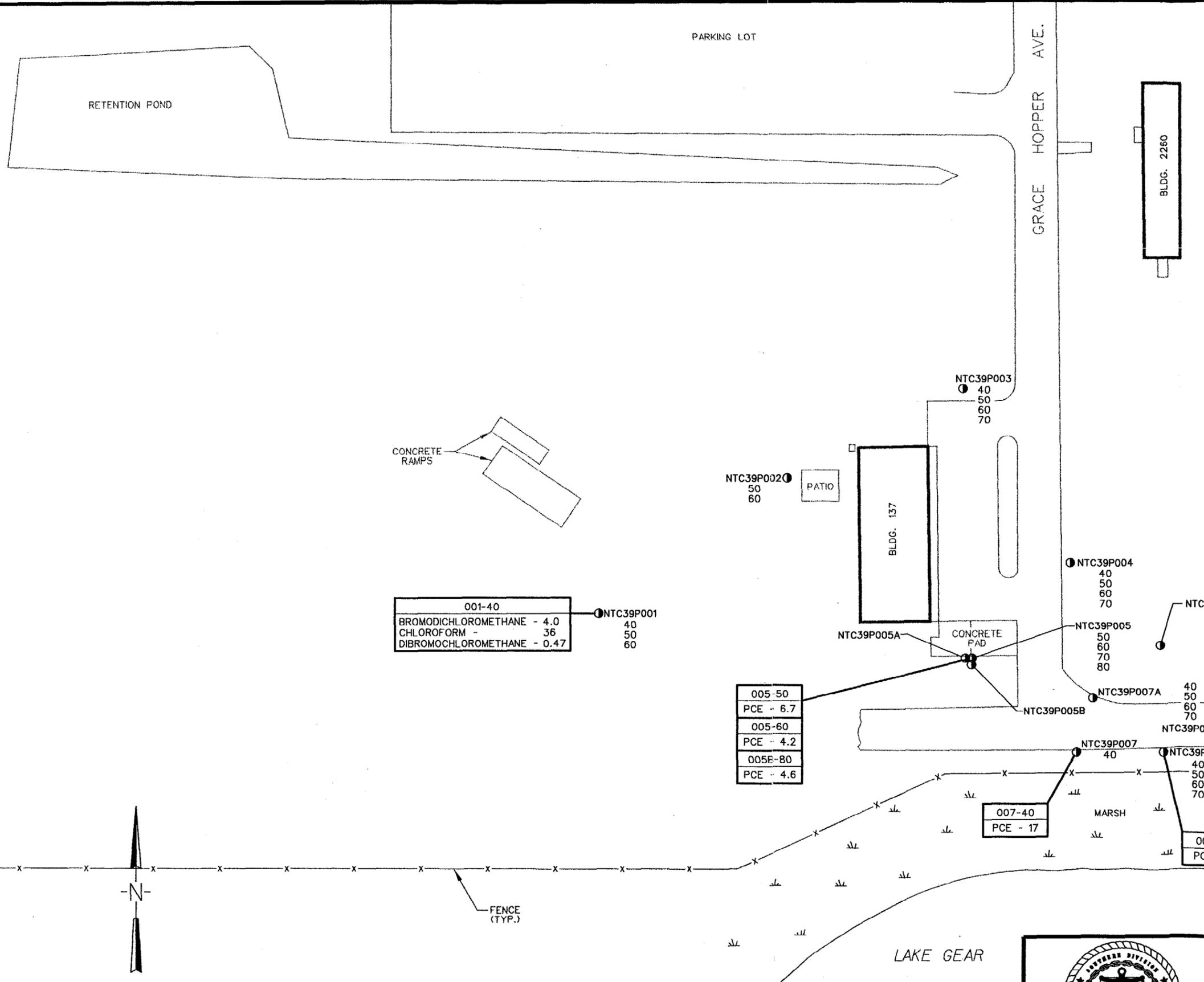
ABB-ES (ABB Environmental Services, Inc.), 1997. *Project Operations Plan for Site Investigations and Remedial Investigations*. Naval Training Center, Orlando, Florida, Unit Identification Code N65928, Navy CLEAN District 1, Contract No. N62476-89-D-0317, August.

FDEP (Florida Department of Environmental Protection), 1999. *Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C.* CEH/TR-99-01, May 26, 1999.

Tetra Tech NUS, Inc., 1999, *Work Plan for the Investigation of Contaminated Groundwater – Study Area 39*. Document No. R4707992. September 20, 1999.

FIGURES**No.**

- 1 DPT Exceedances, July 13-19, 1999, Study Area 39 – Main Base
- 2 Monitoring Well Exceedances, August/September, 1999, Study Area 39 – Main Base
- 3 Potentiometric Surface Map, Shallow Zone (0 to 20 Ft.), September 9-13, 1999,
Study Area 39 – Main Base
- 4 Potentiometric Surface Map, Intermediate Zone (25 to 30 Ft.), September 9-13, 1999,
Study Area 39 – Main Base
- 5 Potentiometric Surface Map, Deep Zone (35 to 40 Ft.), September 9-13, 1999,
Study Area 39 – Main Base



LEGEND

DPT GROUNDWATER SCREENING POINT W/ SAMPLE INTERVALS

● NTC39P006

40
50
60
70

SAMPLE DESIGNATION — DEPTH OF SAMPLE IN FEET

001-40	
BROMODICHLOROMETHANE	- 4.0
CHLOROFORM	- 36
DIBROMOCHLOROMETHANE	- 0.47

ANALYTE — ANALYTE CONCENTRATION¹

INDICATES ANALYTE WAS FOUND IN ASSOCIATED BLANK, WHICH INDICATES POSSIBLE BLANK CONTAMINATION

B

ESTIMATED CONCENTRATION

J

¹-CONCENTRATION IN MICROGRAMS PER LITER (ug/L)

SCREENING CRITERIA

ABBREVIATION	ANALYTE	GCTL ¹
	Bromodichloromethane	0.6
	Chloroform	5.7
	Dibromochloromethane	0.4
	Methylene Chloride	5.0
PCE	Tetrachloroethene	3.0

GCTL-GROUNDWATER CLEANUP TARGET LEVEL

001-40	
BROMODICHLOROMETHANE	- 4.0
CHLOROFORM	- 36
DIBROMOCHLOROMETHANE	- 0.47

NTC39P001

40
50
60

NTC39P002

50
60

PATIO

005-50
PCE - 6.7
005-60
PCE - 4.2
005E-80
PCE - 4.6

NTC39P005A

NTC39P003

40
50
60
70

NTC39P004

40
50
60
70

NTC39P005

50
60
70
80

NTC39P011

40
50
60
70

NTC39P006

40
50
60
70

009-70	
METHYLENE CHLORIDE	- 18-BJ

NTC39P007A

40
50
60
70

NTC39P005B

40

NTC39P007

40

NTC39P008

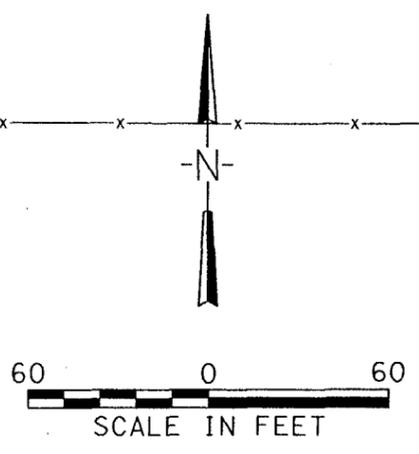
40
50
60
70

NTC39P010

40
50
60
70

007-40	
PCE	- 17

008-70	
PCE	- 5



SOURCE:
BASE MAP TAKEN FROM SURVEY BY DONALDSON, GARRET & ASSOCIATES OF MACON, GEORGIA DURING SEPT. 1999.



FIGURE 1

DPT EXCEEDANCES
JULY 13-19, 1999
STUDY AREA 39 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

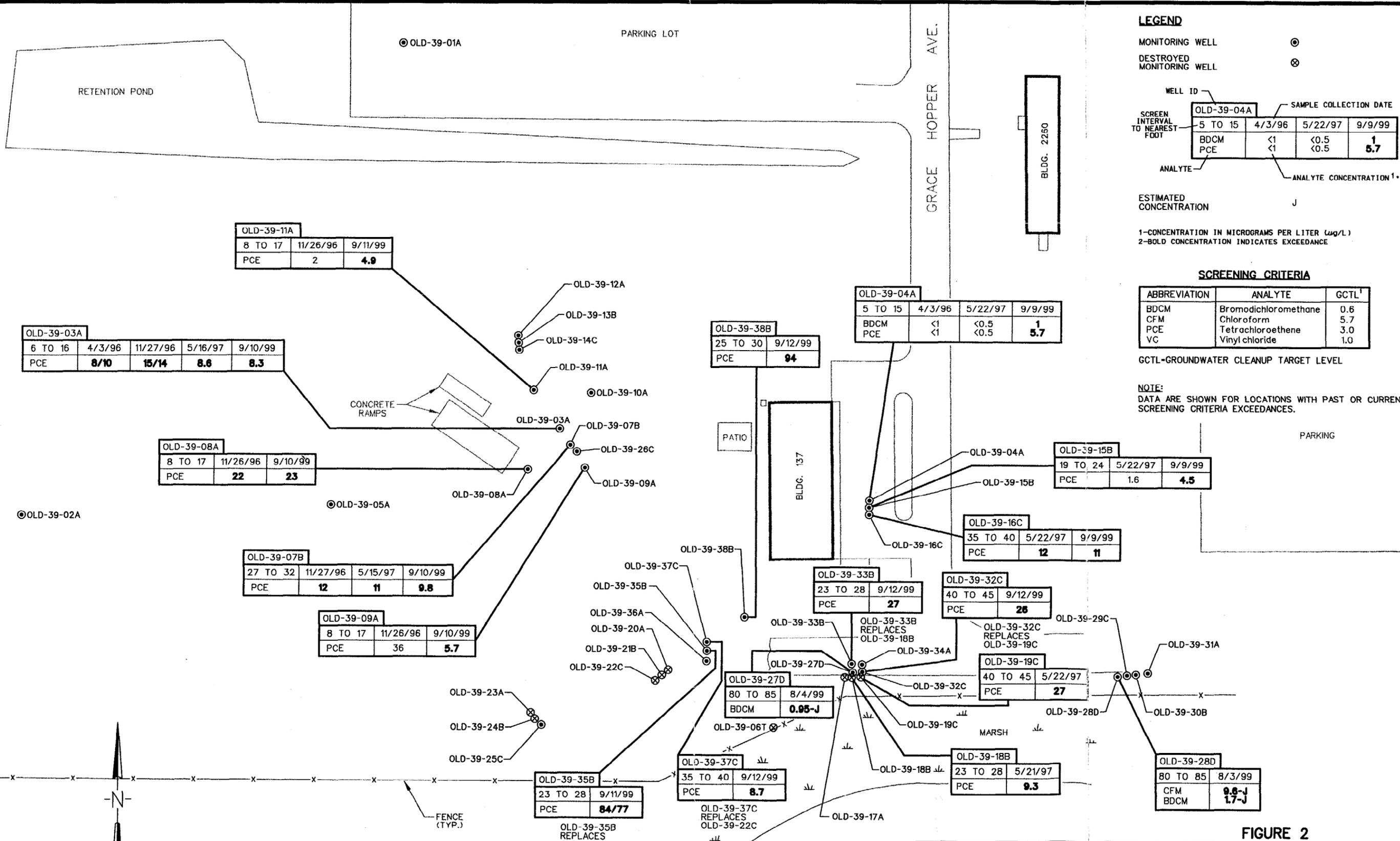
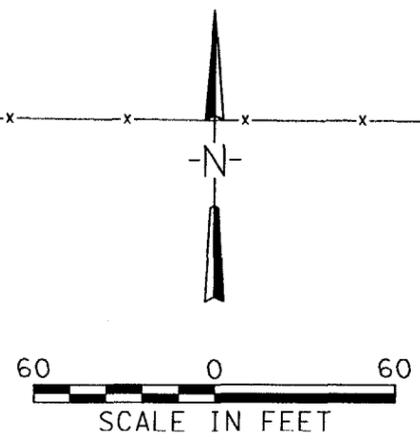


FIGURE 2
MONITORING WELL EXCEEDANCES
AUGUST/SEPTEMBER, 1999
STUDY AREA 39 - MAIN BASE



NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

SOURCE:
 BASE MAP TAKEN FROM SURVEY BY DONALDSON, GARRET & ASSOCIATES OF MACON, GEORGIA DURING SEPT. 1999.



TABLES

No.

- 1 Positive Detections in Groundwater – September 1999
- 2 Validated Groundwater Analytical Results – September 1999
- 3 Natural Attenuation Parameter Results in Groundwater

TABLE 1

POSITIVE DETECTIONS IN GROUNDWATER - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 1 OF 3

WELL DESIGNATION	GCTL ^a	OLD-39-2A	OLD-39-3A	OLD-39-4A	OLD-39-5A	OLD-39-7B	OLD-39-8A	OLD-39-9A	OLD-39-10A	OLD-39-11A	OLD-39-12A
SAMPLE ID		NTC39G02A10	NTC39G03A10	NTC39G04A10	NTC39G05A10	NTC39G07B10	NTC39G08A10	NTC39G09A10	NTC39G10A10	NTC39G11A10	NTC39G12A10
LAB ID		A91150121003	A91110147007	A91100197006	A91150121004	A91110147006	A91100197003	A91110147004	A91100197007	A91150121002	A91110147003
SAMPLE DATE		9/11/99	9/10/99	9/9/99	9/11/99	9/10/99	9/9/99	9/10/99	9/9/99	9/11/99	9/10/99
Volatiles (µg/L)											
BENZENE	1										
BROMODICHLOROMETHANE	0.6			1							
CARBON DISULFIDE	700										
CHLOROFORM	5.7										
CHLOROMETHANE	2.7										
CIS-1,2-DICHLOROETHENE	70										
DIBROMOCHLOROMETHANE	0.4										
TETRACHLOROETHENE	3		8.3	5.7		9.8	23	5.7	0.43 J	4.9	
TOLUENE	40										
TRICHLOROETHENE	3		0.39 J	0.29 J		0.17 J	0.35 J	0.29 J			

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TABLE 1

POSITIVE DETECTIONS IN GROUNDWATER - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 2 OF 3

WELL DESIGNATION	GCTL ^a	OLD-39-13B	OLD-39-14C	OLD-39-15B	OLD-39-16C	OLD-39-25C	OLD-39-26C	OLD-39-27D	OLD-39-28D	OLD-39-29C	OLD-39-30B
SAMPLE ID		NTC39G13B10	NTC39G14C10	NTC39G15B10	NTC39G16C10	NTC39G25C10	NTC39G26C10	NTC39G27D01	NTC39G28D01	NTC39G29C10	NTC39G30B10
LAB ID		A9I110147002	A9I110147008	A9I100197004	A9I100197005	A9I100197002	A9I110147005	A9H050124003	A9H050124002	A9I150121018	A9I150121016
SAMPLE DATE		9/10/99	9/10/99	9/9/99	9/9/99	9/9/99	9/10/99	8/4/99	8/3/99	9/13/99	9/13/99
Volatiles (µg/L)											
BENZENE	1								0.33 J		
BROMODICHLOROMETHANE	0.6							0.05 J	1.7 J		
CARBON DISULFIDE	700								0.38 J		
CHLOROFORM	5.7			2.2				5.3	9.6 J		
CHLOROMETHANE	2.7								0.22 J		
CIS-1,2-DICHLOROETHENE	70						1.3				
DIBROMOCHLOROMETHANE	0.4							0.13 J	0.29 J		
TETRACHLOROETHENE	3			4.5	11						
TOLUENE	40								0.14 J		
TRICHLOROETHENE	3			0.35 J	0.31 J		2.1		0.14 J		

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TABLE 1

POSITIVE DETECTIONS IN GROUNDWATER - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 3 OF 3

WELL DESIGNATION	GCTL ^a	OLD-39-30B	OLD-39-31A	OLD-39-32C	OLD-39-33B	OLD-39-34A	OLD-39-35B		OLD-39-36A	OLD-39-37C	OLD-39-38B
SAMPLE ID		NTC39G30B10-D	NTC39G31A10	NTC39G32C10	NTC39G33B10	NTC39G34A10	NTC39G35B10	NTC39G35B10-D	NTC39G36A10	NTC39G37C10	NTC39G38B10
LAB ID		A9I150121017	A9I150121010	A9I150121014	A9I150121012	A9I150121006	A9I150121007	A9I150121008	A9I150121005	A9I150121011	A9I150121013
SAMPLE DATE		9/13/99	9/12/99	9/12/99	9/12/99	9/11/99	9/11/99	9/11/99	9/11/99	9/12/99	9/12/99
Volatiles (µg/L)											
BENZENE	1										
BROMODICHLOROMETHANE	0.6										
CARBON DISULFIDE	700										
CHLOROFORM	5.7									1.2 J	
CHLOROMETHANE	2.7										
CIS-1,2-DICHLOROETHENE	70										
DIBROMOCHLOROMETHANE	0.4										
TETRACHLOROETHENE	3			26	27		84	77	1.1	6.7	94
TOLUENE	40									1.4 J	
TRICHLOROETHENE	3			0.46 J	1.6		1.1 J	1.1 J			1.5 J

Footnotes:

(a) – Groundwater Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

"J" qualifier indicates an estimated value.

Empty cells indicate non-detects.

Monitoring well data only

Only chemicals detected in at least one sample are shown.

Values in shaded cells meet or exceed the screening criteria.

VALIDATED GROUNDWATER ANALYTICAL RESULTS - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

R4702004

WELL DESIGNATION	GCTL ^a	OLD-39-2A	OLD-39-3A	OLD-39-4A	OLD-39-5A	OLD-39-7B	OLD-39-8A	OLD-39-9A	OLD-39-10A	OLD-39-11A	OLD-39-12A
SAMPLE ID		NTC39G02A10	NTC39G03A10	NTC39G04A10	NTC39G05A10	NTC39G07B10	NTC39G08A10	NTC39G09A10	NTC39G10A10	NTC39G11A10	NTC39G12A10
LAB ID		A91150121003	A91110147007	A91100197006	A91150121004	A91110147006	A91100197003	A91110147004	A91100197007	A91150121002	A91110147003
SAMPLE DATE		9/11/99	9/10/99	9/9/99	9/11/99	9/10/99	9/9/99	9/10/99	9/9/99	9/11/99	9/10/99
Volatile Organics (µg/L)											
1,1,1-TRICHLOROETHANE	200	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	0.2	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,1,2-TRICHLOROETHANE	5	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,1-DICHLOROETHANE	70	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,1-DICHLOROETHENE	7	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,2-DICHLOROETHANE	3	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
1,2-DICHLOROPROPANE	5	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
2-BUTANONE	4200	10 UJ	10 UR	10 UR	10 UJ	10 UR	20 UR	10 UR	25 UR	10 UJ	10 UR
2-HEXANONE	280	10 UJ	10 U	10 U	10 UJ	10 U	20 U	10 U	25 U	10 UJ	10 U
4-METHYL-2-PENTANONE	560	10 U	20 U	10 U	25 U	10 U	10 U				
ACETONE	700	10 UJ	10 UR	10 UR	10 UJ	10 UR	20 UR	10 UR	25 UR	10 UJ	10 UR
BENZENE	1	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
BROMODICHLOROMETHANE	0.6	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
BROMOFORM	4.4	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
BROMOMETHANE	9.8	1 UJ	1 U	1 U	1 UJ	1 U	2 U	1 U	2.5 U	1 UJ	1 U
CARBON DISULFIDE	700	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
CARBON TETRACHLORIDE	3	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
CHLOROETHANE	12	1 UJ	1 U	1 U	1 UJ	1 U	2 U	1 U	2.5 U	1 UJ	1 U
CHLOROFORM	5.7	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
CHLOROMETHANE	2.7	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	*	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
DIBROMOCHLOROMETHANE	0.4	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
ETHYLBENZENE	30	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
METHYLENE CHLORIDE	5	1.3 U	1 U	1 U	1.3 U	1 U	2 U	1 U	2.5 U	1.3 U	1 U
STYRENE	100	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
TETRACHLOROETHENE	3	1 U	8.3	5.7	1 U	9.8	23	5.7	0.43 J	4.9	1 U
TOLUENE	40	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	*	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
TRICHLOROETHENE	3	1 U	0.39 J	0.29 J	1 U	0.17 J	0.35 J	0.29 J	2.5 U	1 U	1 U
VINYL CHLORIDE	1	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U
XYLENES, TOTAL	20	1 U	1 U	1 U	1 U	1 U	2 U	1 U	2.5 U	1 U	1 U

CTO 0024

02/18/00

TABLE 2

VALIDATED GROUNDWATER ANALYTICAL RESULTS - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 2 OF 4

WELL DESIGNATION	GCTL ^a	OLD-39-13B	OLD-39-14C	OLD-39-15B	OLD-39-16C	OLD-39-25C	OLD-39-26C	OLD-39-27D	OLD-39-28D	OLD-39-29C	OLD-39-30B
SAMPLE ID		NTC39G13B10	NTC39G14C10	NTC39G15B10	NTC39G16C10	NTC39G25C10	NTC39G26C10	NTC39G27D01	NTC39G28D01	NTC39G29C10	NTC39G30B10
LAB ID		A91110147002	A91110147008	A91100197004	A91100197005	A91100197002	A91110147005	A9H050124003	A9H050124002	A91150121018	A91150121016
SAMPLE DATE		9/10/99	9/10/99	9/9/99	9/9/99	9/9/99	9/10/99	8/4/99	8/3/99	9/13/99	9/13/99
Volatile Organics (µg/L)											
1,1,1-TRICHLOROETHANE	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,1,2-TETRACHLOROETHANE	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,1,2-TRICHLOROETHANE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,1-DICHLOROETHANE	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,1-DICHLOROETHENE	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,2-DICHLOROETHANE	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,2-DICHLOROPROPANE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
2-BUTANONE	4200	10 UR	10 UJ	10 UJ							
2-HEXANONE	280	10 U	10 UJ	10 UJ	10 UJ						
4-METHYL-2-PENTANONE	560	10 U	10 UJ	10 U	10 U						
ACETONE	700	10 UR	10 UJ	10 UJ							
BENZENE	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.33 J	1 U	1 U
BROMODICHLOROMETHANE	0.6	1 U	1 U	1 U	1 U	1 U	1 U	0.95 J	1.7 J	1 U	1 U
BROMOFORM	4.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
BROMOMETHANE	9.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ
CARBON DISULFIDE	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.38 J	1 U	1 U
CARBON TETRACHLORIDE	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
CHLOROBENZENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
CHLOROETHANE	12	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ
CHLOROFORM	5.7	1 U	1 U	2.2	1 U	1 U	1 U	5.3	9.6 J	1 U	1 U
CHLOROMETHANE	2.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.22 J	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	1.3	1 U	1 UJ	1 U	1 U
CIS-1,3-DICHLOROPROPENE	*	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
DIBROMOCHLOROMETHANE	0.4	1 U	1 U	1 U	1 U	1 U	1 U	0.13 J	0.29 J	1 U	1 U
ETHYLBENZENE	30	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
METHYLENE CHLORIDE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
STYRENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
TETRACHLOROETHENE	3	1 U	1 U	4.6	11	1 U	1 U	1 U	1 UJ	1 U	1 U
TOLUENE	40	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.14 J	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	*	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
TRICHLOROETHENE	3	1 U	1 U	0.35 J	0.31 J	1 U	2.1	1 U	0.14 J	1 U	1 U
VINYL CHLORIDE	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
XYLENES, TOTAL	20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U

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VALIDATED GROUNDWATER ANALYTICAL RESULTS - SEPTEMBER 1999
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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WELL DESIGNATION SAMPLE ID LAB ID SAMPLE DATE	GCTL ^a	OLD-39-30B	OLD-39-31A	OLD-39-32C	OLD-39-33B	OLD-39-34A	OLD-39-35B		OLD-39-36A	OLD-39-37C	OLD-39-38B
		NTC39G30B10-D	NTC39G31A10	NTC39G32C10	NTC39G33B10	NTC39G34A10	NTC39G35B10	NTC39G35B10-D	NTC39G36A10	NTC39G37C10	NTC39G38B10
		A9150121017	A9150121010	A9150121014	A9150121012	A9150121006	A9150121007	A9150121008	A9150121005	A9150121011	A9150121013
		9/13/99	9/12/99	9/12/99	9/12/99	9/11/99	9/11/99	9/11/99	9/11/99	9/12/99	9/12/99
Volatile Organics (µg/L)											
1,1,1-TRICHLOROETHANE	200	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,1,2,2-TETRACHLOROETHANE	0.2	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,1,2-TRICHLOROETHANE	5	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,1-DICHLOROETHANE	70	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,1-DICHLOROETHENE	7	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,2-DICHLOROETHANE	3	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
1,2-DICHLOROPROPANE	5	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
2-BUTANONE	4200	10 UJ	10 UJ	12 UJ	10 UJ	10 UJ	33 UJ	33 UJ	10 UJ	50 UJ	33 UJ
2-HEXANONE	280	10 UJ	10 UJ	12 UJ	10 UJ	10 UJ	33 UJ	33 UJ	10 UJ	50 UJ	33 UJ
4-METHYL-2-PENTANONE	560	10 U	10 U	12 U	10 U	10 U	33 U	33 U	10 U	50 U	33 U
ACETONE	700	10 UJ	10 UJ	12 UJ	10 UJ	10 UJ	33 UJ	33 UJ	10 UJ	75 UJ	33 UJ
BENZENE	1	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
BROMODICHLOROMETHANE	0.6	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
BROMOFORM	4.4	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
BROMOMETHANE	9.8	1 UJ	1 UJ	1.2 UJ	1 UJ	1 UJ	3.3 UJ	3.3 UJ	1 UJ	5 UJ	3.3 UJ
CARBON DISULFIDE	700	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CARBON TETRACHLORIDE	3	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CHLOROBENZENE	100	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CHLOROETHANE	12	1 UJ	1 UJ	1.2 UJ	1 UJ	1 UJ	3.3 UJ	3.3 UJ	1 UJ	5 UJ	3.3 UJ
CHLOROFORM	5.7	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CHLOROMETHANE	2.7	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
CIS-1,3-DICHLOROPROPENE	*	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
DIBROMOCHLOROMETHANE	0.4	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
ETHYLBENZENE	30	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
METHYLENE CHLORIDE	5	1 U	1 U	3.6 U	1.5 U	1.5 U	10 U	12 U	1.5 U	6 U	7.1 U
STYRENE	100	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
TETRACHLOROETHENE	3	1 U	1 U	26	27	1 U	84	77	1.1	8.7	94
TOLUENE	40	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	1.4 J	3.3 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
TRANS-1,3-DICHLOROPROPENE	*	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
TRICHLOROETHENE	3	1 U	1 U	0.46 J	1.6	1 U	1.1 J	1.1 J	1 U	5 U	1.5 J
VINYL CHLORIDE	1	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U
XYLENES, TOTAL	20	1 U	1 U	1.2 U	1 U	1 U	3.3 U	3.3 U	1 U	5 U	3.3 U

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TABLE 2

**VALIDATED GROUNDWATER ANALYTICAL RESULTS – SEPTEMBER 1999
STUDY AREA 39**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

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Footnotes:

"J" qualifier indicates an estimated value.

"U" qualifier indicates that the analyte was not detected.

"R" qualifier indicates a rejected value.

Value in shaded cells meet or exceed the screening criterion.

* No established screening criterion.

TABLE 3

NATURAL ATTENUATION PARAMETER RESULTS IN GROUNDWATER
STUDY AREA 39

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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WELL DESIGNATION	OLD-39-12A	OLD-39-14C	OLD-39-29C	OLD-39-30B	OLD-39-32C	OLD-39-33B	OLD-39-33B			
SAMPLE ID	NTC39G12A11	NTC39G14C11	NTC39G29C11	NTC39G30B11	NTC39G32C11	NTC39G33B11	NTC39G33B11-D	NTC39G38B11	NTC39U391620	NTC39U393640
LAB ID	NTC3912A11	NTC39G14C11	NTC39G29C11	NTC3930B11	NTC39G32C11	NTC39G33B11	A9J070133004	NTC39G38B11	A9J070133005	A9J070133006
SAMPLE DATE	10/4/99	10/5/99	10/5/99	10/5/99	10/6/99	10/6/99	10/6/99	10/6/99	10/6/99	10/6/99
Inorganics (µg/L)										
IRON (Dissolved)	16.4 U	227 U	378	498	970	82.9 U	71.8 U	1020	NA	NA
MANGANESE (Dissolved)	6.5 U	1.5 U	1.5 U	8.9 U	25.9 U	4.2 U	6.5 U	14 U	NA	NA
Non-Gaseous (mg/L)										
CHLORIDE	3	1.4	4.4	4.7	6.7	8.6	7.8	10.1	NA	NA
DISSOLVED ORGANIC CARBON	5	NA	5	5	3	4	5	3	NA	NA
NITRATE	12.3	0.5 U	0.52	NA	NA					
NITRITE	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
ORTHOPHOSPHATE	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
SULFATE	8.2	4.6	8.6	12.5	22	52	49.8	24	NA	NA
TOTAL ALKALINITY	71	5 U	32	5.1	12	5 U	5 U	17	NA	NA
TOTAL ORGANIC CARBON	NA	3	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Gases										
CARBON DIOXIDE (mg/L)	20.3	74.7	84.7	101.6	95.3	186.9	NA	114.1	NA	NA
ETHANE (µg/L)	0.001 U	0.002	0.013	0.006	0.023	0.001	NA	0.004	NA	NA
ETHENE (µg/L)	0.003	0.016	0.059	0.15	0.072	0.009	NA	0.067	NA	NA
HYDROGEN (nm/L)	0.8	0.6	2	0.9	0.8	0.8	NA	0.8	NA	NA
METHANE (µg/L)	0.31	5.59	5.28	10.03	5.36	3.11	NA	0.87	NA	NA
NITROGEN (mg/L)	14.7	16.1	14.9	14.7	15.5	14	NA	14.7	NA	NA
OXYGEN (mg/L)	6.74	2.16	4.5	4.4	2.93	4.16	NA	4.16	NA	NA
Volatile Solids (%)										
TOTAL VOLATILE SOLIDS	NA	NA	1.5	0.22						

Footnotes:

nm/L – nanomoles per liter.

NA – Not Analyzed.

"U" qualifier indicates that the analyte was not detected.

Values in shaded cells meet or exceed the screening criteria.