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NTC ORLANDO
5090.3a

QUARTERLY GROUNDWATER SAMPLING STUDY AREA 52 WITH TRANSMITTAL LETTER
NTC ORLANDO FL
3/21/2003
TETRA TECH

TETRA TECH NUS, INC.
800 Oak Ridge Turnpike, A-600 ▪ Oak Ridge, Tennessee 37830
(865) 483-9900 ▪ FAX: (865) 483-2014 ▪ www.tetratech.com

0303-A016

March 21, 2003

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Ms. Barbara Nwokike, Code ES33
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0234

Subject: Quarterly Groundwater Sampling, December 2002 – OU 2, SA 2, and SA 52
Naval Training Center, Orlando, Florida

Dear Ms. Nwokike:

Enclosed are reports for the quarterly sampling conducted at OU 2, SA 2, and SA 52 in December 2002. The three reports are provided in hardcopy and CD formats.

If you have any questions, please contact me at (865) 220-4730.

Sincerely,

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

SBM:ckf

Enclosure

c: Ms. Barbara Nwokike, Southern Division (Orlando Office) (hardcopy and CD)
Mr. David Grabka, FDEP (hardcopy and CD)
Mr. Gregory Fraley, USEPA Region 4 (hardcopy and CD)
Mr. Steve Tsangaris, CH2M Hill (CD)
Mr. Mark Salvetti, MACTEC Engineering (CD)
Mr. Mike Campbell, Tetra Tech NUS (hardcopy)
Mr. J.E. Bentkowski, Gannett Fleming (hardcopy and CD)
Mr. Mark Perry, Tetra Tech NUS (unbound hardcopy)
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)
File/db

GROUNDWATER SAMPLING
at
STUDY AREA 52
DECEMBER 2002

Naval Training Center
Orlando, Florida

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0234

March 2003

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1 Water-Level Elevations Summary
2 Detections in Groundwater – December 2002
3 Historical Detections in Groundwater
4 Validated Groundwater Analytical Results – December 2002

GROUNDWATER SAMPLING AT STUDY AREA 52
NAVAL TRAINING CENTER, ORLANDO

Prepared for:	Ms. Barbara Nwokike, SOUTHDIV	
Prepared by:	Janice Johnson	
Period of Performance:	December 9-19, 2002	
Field Team:	Skip Barton, FTL Jason Bourgeois Gary Braganza Jeff Fournier	Janice Johnson Kevin Margetts Cher Morrison
TtNUS Task Order Manager:	Mr. Steven B. McCoy, P.E.	
Contract:	No. N62467-94-D-0888 Contract Task Order No. 0234	
Date:	March 21, 2003	

1. INTRODUCTION

Quarterly groundwater sampling was conducted at Study Area (SA) 52 in December 2002. The fieldwork was performed in accordance with the *Work Plan for Groundwater Sampling* (Tetra Tech NUS, 2002a), and the Project Operations Plan (POP) (ABB-ES, 1997).

2. FIELD ACTIVITIES

Tetra Tech NUS, Inc., mobilized to the field on December 9, 2002, to perform quarterly monitoring at SA 2, SA 52, Operable Unit (OU) 2, and OU 3. Work at SA 52 was performed on December 15, 2002, and included a water level survey and groundwater sampling.

2.1 Water Level Survey

Groundwater levels were measured in wells OLD-52-06, OLD-52-11, OLD-52-12, and OLD-52-13 on December 15, 2002. Groundwater elevations for this field event and previous events are summarized in Table 1.

2.2 Sampling

Groundwater sampling was conducted at SA 52 on December 15, 2002. Three wells (OLD-52-11, OLD-52-12, OLD-52-13) at SA 52 were purged and sampled with a peristaltic pump using the low-flow

method described in the POP. Purging of the wells consisted of removing groundwater at a rate of approximately 100 ml/min until field parameters, which include temperature, pH, conductivity, turbidity, dissolved oxygen, and oxygen-reduction potential, had stabilized. Water levels in the wells were continuously monitored to limit drawdown to less than 0.3 feet. Groundwater sample log sheets are included in Appendix A.

All groundwater samples were collected using the vacuum trap method to ensure that the sample water did not contact the non-inert tubing in the pump head. Groundwater samples from SA 52 were analyzed for pesticides using U.S. Environmental Protection Agency (USEPA) Method 8081A. All samples were refrigerated in ice-chilled coolers and shipped overnight to GPL Laboratories in Gaithersburg, Maryland, for analysis.

2.3 Sample Turbidity

The turbidity reading in wells OLD-52-11 and OLD-52-13 were 168 NTU and 37.8 NTU respectively, which did not meet the goal of less than 10 NTU. The turbidity readings for the last twelve sampling events are shown below:

Sample Date	OLD-52-11	OLD-52-12	OLD-52-13
07/27/99	160 NTU	25 NTU	1.1 NTU
10/24/99	695 NTU	3.09 NTU	29.5 NTU
01/21/00	800 NTU	<1 NTU	50 NTU
04/12/00	616 NTU	8.63 NTU	11.2 NTU
07/16/00	230 NTU	0.35 NTU	75 NTU
10/25/00	240 NTU	0.65 NTU	77.5 NTU
01/28/01	603 NTU	3.42 NTU	43.2 NTU
04/29/01	200 NTU	3 NTU	29 NTU
07/16/01	290 NTU	1.98 NTU	36 NTU
03/24/02	728 NTU	0 NTU	26 NTU
06/25 & 26/02	140 NTU	1.42 NTU	9.8 NTU
09/13/02	160 NTU	0 NTU	9.4 NTU
12/15/02	168 NTU	3.6 NTU	37.8 NTU

As shown in the above data, turbidity has been excessively high in all samples collected from OLD-52-11 since July 1999.

2.4 Problems Encountered

The turbidity problem mentioned in the previous section was the only problem encountered during this sampling event.

3. RESULTS

3.1 Water Level Survey

Groundwater elevation data at SA 52 are presented in Table 1 and Figure 1. Current water level data are consistent with the general northeasterly groundwater flow direction presented in the SA 52 *Environmental Site Screening Report* (HLA, 1999) and the previous quarterly sampling reports (Tetra Tech NUS, 2001a, 2001b, 2001c, 2001d, 2002b, 2002c, and 2002d).

3.2 Data Validation

A limited data validation was performed using the *USEPA Contract Laboratory Program: National Functional Guidelines for Organic Data Review* (USEPA, 1999). The data validation evaluated data completeness, holding time compliance, calibration compliance, laboratory blank contamination, and detection limits. Qualifiers resulting from the validation process are shown with the analyte concentrations in Tables 2, 3, and 4.

3.3 Analytical Results

Table 2 presents a summary of the analytes detected during the December 2002 sampling event at SA 52. The historical detections are compiled in Table 3, and the validated analytical data for the December 2002 sampling event are included in Table 4. Shaded cells indicate concentrations equal to or greater than Florida Groundwater Cleanup Target Levels (GCTLs). The distribution of pesticides detected above the GCTLs is shown on Figure 2.

Pesticides have never been detected above GCTLs in OLD-52-11. Pesticides have not been detected in well OLD-52-12 since July 1999. The sample from OLD-52-13 and its duplicate both contained dieldrin at a concentration of 0.01 J µg/L, exceeding the GCTL of 0.005 µg/L.

The reporting limits for pesticides were reduced by a factor of 5 to 10 compared to previous sampling events. The reporting limits for aldrin, alpha-BHC, and dieldrin still slightly exceed the GCTLs for these compounds (Table 4).

4. REFERENCES

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. N62467-89-D-0317, August.

Harding Lawson Associates, 1999. *Base Realignment and Closure, Environmental Site Screening Report, Interim Remedial Action, Study Area 52.* Naval Training Center, Orlando, Florida, Unit Identification Code N65928, Navy CLEAN District 1, Contract No. N62467-89-D-0317/107, March.

TtNUS (Tetra Tech NUS, Inc), 2001a. *Groundwater Sampling at Study Area 52*. Document No. 470101008, January.

TtNUS, 2001b. *Groundwater Sampling at Study Area 52*. Document No. 470401001, May.

TtNUS, 2001c. *Groundwater Sampling at Study Area 52*. Document No. 470501007, August.

TtNUS, 2001d. *Groundwater Sampling at Study Area 52*. Document No. 470901002, October.

TtNUS, 2002a. *Work Plan for Groundwater Sampling, Rev. 4*. Document No. 4707995, March.

TtNUS, 2002b. *Groundwater Sampling at Study Area 52*. Document No. 470602004, June.

TtNUS, 2002c. *Groundwater Sampling at Study Area 52, June 2002*. Document No. 470802018, September.

TtNUS, 2002d. *Groundwater Sampling at Study Area 52, September 2002*. Document No. 471202005, December.

USEPA, 1999. Contract Laboratory Program: *National Functional Guidelines for Organic Data Review*. EPA/540/R-99/008, Office of Solid Waste and Emergency Response, Washington, D.C., October.

FIGURES

No.

1 Groundwater Elevation Map, December 15, 2002

2 Groundwater Exceedances, December 2002

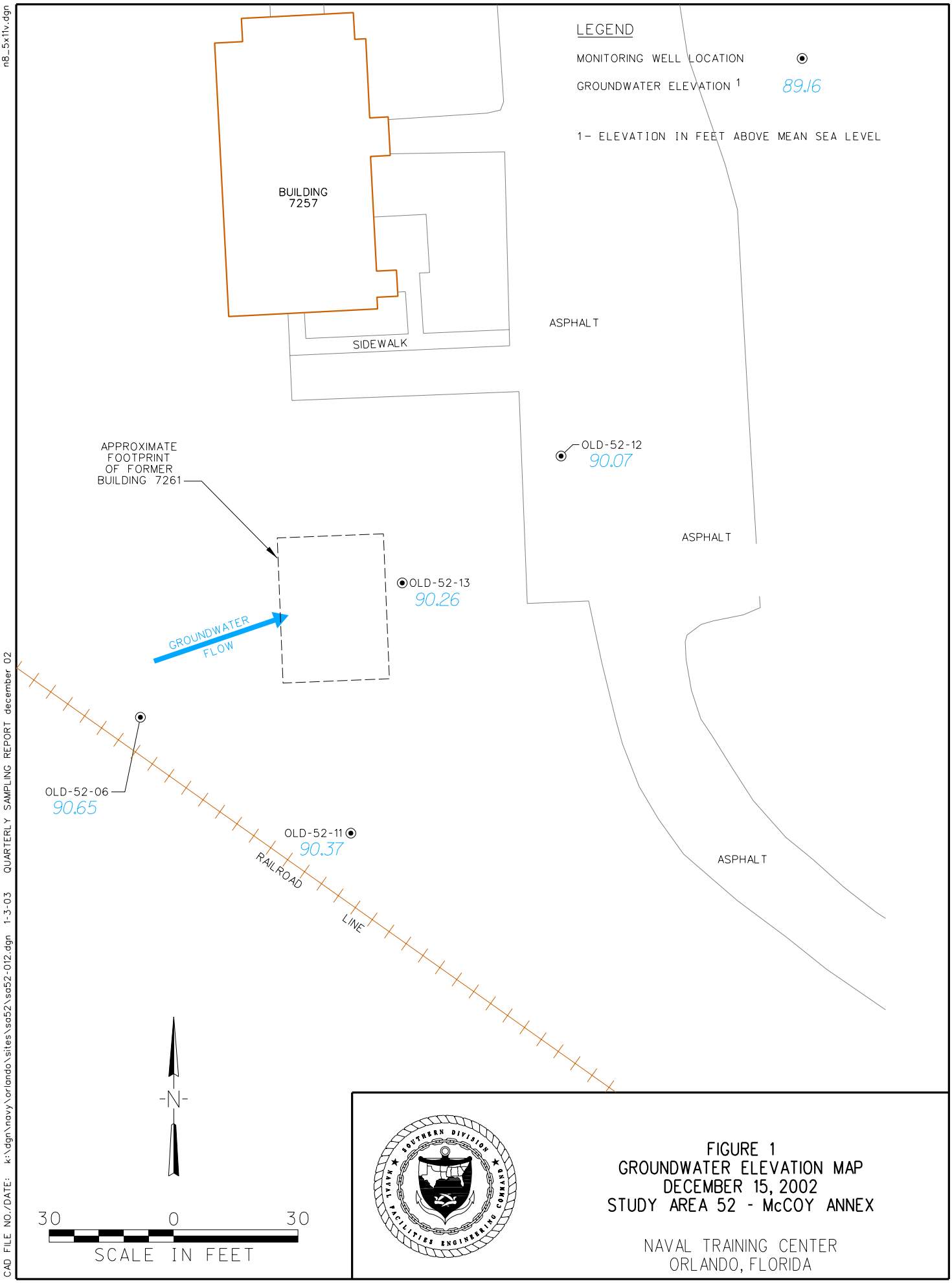
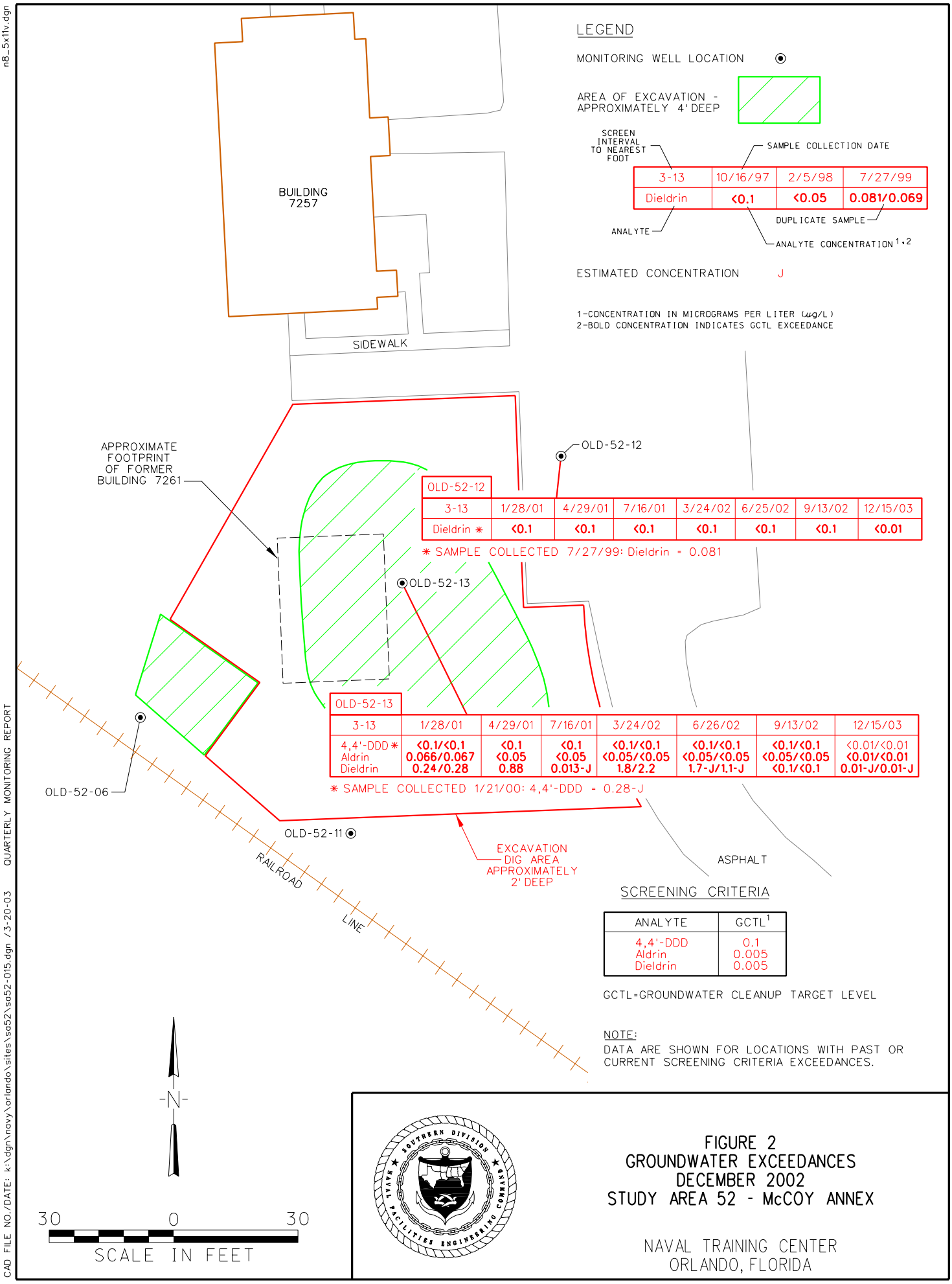


FIGURE 1
GROUNDWATER ELEVATION MAP
DECEMBER 15, 2002
STUDY AREA 52 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa52\sa52-012.dgn 1-3-03 QUARTERLY SAMPLING REPORT december 02

n8_5x11v.dgn


LEGEND
MONITORING WELL LOCATION
AREA OF EXCAVATION - APPROXIMATELY 4' DEEP
SCREEN INTERVAL TO NEAREST FOOT
SAMPLE COLLECTION DATE
3-13 | 10/16/97 | 2/5/98 | 7/27/99
Dieldrin | <0.1 | <0.05 | 0.081/0.069
ANALYTE
DUPLICATE SAMPLE
ANALYTE CONCENTRATION 1,2
ESTIMATED CONCENTRATION J
1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES GCTL EXCEEDANCE
BUILDING 7257
SIDEWALK
APPROXIMATE FOOTPRINT OF FORMER BUILDING 7261
OLD-52-12
OLD-52-12
3-13 | 1/28/01 | 4/29/01 | 7/16/01 | 3/24/02 | 6/25/02 | 9/13/02 | 12/15/03
Dieldrin * | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.01
* SAMPLE COLLECTED 7/27/99: Dieldrin = 0.081
OLD-52-13
OLD-52-13
3-13 | 1/28/01 | 4/29/01 | 7/16/01 | 3/24/02 | 6/26/02 | 9/13/02 | 12/15/03
4,4'-DDD * | <0.1/<0.1 | <0.1 | <0.1 | <0.1/<0.1 | <0.1/<0.1 | <0.1/<0.1 | <0.01/<0.01
Aldrin | 0.066/0.067 | <0.05 | <0.05 | <0.05/<0.05 | <0.05/<0.05 | <0.05/<0.05 | <0.01/<0.01
Dieldrin | 0.24/0.28 | 0.88 | 0.013-J | 1.8/2.2 | 1.7-J/1.1-J | <0.1/<0.1 | 0.01-J/0.01-J
* SAMPLE COLLECTED 1/21/00: 4,4'-DDD = 0.28-J
OLD-52-06
OLD-52-11
RAILROAD LINE
EXCAVATION DIG AREA APPROXIMATELY 2' DEEP
ASPHALT
SCREENING CRITERIA
ANALYTE | GCTL[1]
4,4'-DDD | 0.1
Aldrin | 0.005
Dieldrin | 0.005
GCTL=GROUNDWATER CLEANUP TARGET LEVEL
NOTE:
DATA ARE SHOWN FOR LOCATIONS WITH PAST OR CURRENT SCREENING CRITERIA EXCEEDANCES.
-N-
30 0 30
SCALE IN FEET
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
FIGURE 2
GROUNDWATER EXCEEDANCES
DECEMBER 2002
STUDY AREA 52 - McCOY ANNEX
NAVAL TRAINING CENTER
ORLANDO, FLORIDA
n8_5x11v.dgn
QUARTERLY MONITORING REPORT
CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa52\sa52-015.dgn /3-20-03

TABLES

No.

1 Water-Level Elevations Summary

2 Detections in Groundwater – December 2002

3 Historical Detections in Groundwater

4 Validated Groundwater Analytical Results – December 2002

TABLE 1

WATER-LEVEL ELEVATIONS SUMMARY
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screen Interval (BGS)	TOC Elevation (AMSL)	7/27/99		10/24/99		1/21/00		4/12/00		7/16/00	
				Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-52-06	0.5" well	6 - 10	94.22	NM	NM	NM	NM	6.39	87.83	7.50	86.72	6.47	87.75
OLD-52-11	2" well	4 - 14	93.14	NM	NM	4.07	89.07	5.70	87.44	6.70	86.44	5.50	87.64
OLD-52-12	2" well	3 - 13	91.73	2.89	88.84	2.92	88.81	4.42	87.31	5.40	86.33	4.10	87.63
OLD-52-13	2" well	3 - 13	91.36	3.35	88.01	2.37	88.99	3.95	87.41	4.95	86.41	3.77	87.59

TABLE 1

WATER-LEVEL ELEVATIONS SUMMARY
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screen Interval (BGS)	TOC Elevation (AMSL)	10/25/00		1/28/01		4/29/01		7/16/01		3/20/02	
				Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-52-06	0.5" well	6 - 10	94.22	NM	NM	NM	NM	6.77	87.45	3.33	90.89	6.78	87.44
OLD-52-11	2" well	4 - 14	93.14	5.90	-1.08	6.66	86.48	6.03	87.11	2.58	90.56	6.02	87.12
OLD-52-12	2" well	3 - 13	91.73	4.58	-1.41	5.35	86.38	4.70	87.03	1.48	90.25	4.74	86.99
OLD-52-13	2" well	3 - 13	91.36	4.14	-0.37	4.89	86.47	4.27	87.09	0.89	90.47	4.29	87.07

TABLE 1

WATER-LEVEL ELEVATIONS SUMMARY
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screen Interval (BGS)	TOC Elevation (AMSL)	6/21/02		9/13/02		12/15/02	
				Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-52-06	0.5" well	6 - 10	94.22	3.76	90.46	4.51	89.71	3.57	90.65
OLD-52-11	2" well	4 - 14	93.14	2.82	90.32	3.77	89.37	2.77	90.37
OLD-52-12	2" well	3 - 13	91.73	1.73	90.00	2.57	89.16	1.66	90.07
OLD-52-13	2" well	3 - 13	91.36	0.95	90.41	2.03	89.33	1.1	90.26

Notes:
*All measurements are in units of feet.
AMSL - Above mean sea level
BGS - Below ground surface
BTOC - Below top of casing
NM - Not measured
TOC - Top of casing

TABLE 2

DETECTIONS IN GROUNDWATER - DECEMBER 2002
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-11	OLD-52-12	OLD-52-13	
Sample ID		Florida	NTC52G01122	NTC52G01222	NTC52G011322	NTC52G011322-D
Sample Date		GCTL[(a)]	12/15/02	12/15/02	12/15/02	12/15/02
Pesticides (µg/L)						
Dieldrin	60-57-1	0.005			0.010 J	0.010 J
Heptachlor	76-44-8	0.4	0.010		0.010	

Notes:

[(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.

Values in shaded cells are equal to or exceed the GCTL.

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-11									
Sample ID		Florida GCTL[a]	52G01101	52G01102	NTC52G01110	NTC52G1111	NTC52G01112	NTC52G01113	NTC52G01114	NTC52G01115	NTC52G01116	NTC52G01117
Sample Date			10/16/97	2/5/98	7/27/99	10/24/99	1/21/00	4/12/00	7/16/00	10/25/00	1/28/01	4/29/01
Pesticides (µg/L)												
4,4'-DDD	72-54-8	0.1										
4,4'-DDE	72-55-9	0.1										
Aldrin	309-00-2	0.005										
alpha-Chlordane[b]	5103-71-9	2										
Dieldrin	60-57-1	0.005										
Endosulfan I[b]	959-98-8	42										
Endrin Aldehyde	7421-93-4	*			0.03J							
Endrin Ketone	53494-70-5	*										
gamma-Chlordane[b]	5103-74-2	2										
Heptachlor	76-44-8	0.4										
Heptachlor Epoxide	1024-57-3	0.2										

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-11						OLD-52-12			
Sample ID		Florida GCTL[a]	NTC52G01118	NTC52G01119	NTC52G01120	NTC52G01121	NTC52G01121-F[c]	NTC52G01122	52G01201	52G01202	NTC52G01210	NTC52G01210-D
Sample Date			7/16/01	3/24/02	6/25/02	9/13/02	9/13/02	12/15/02	10/16/97	2/5/98	7/27/99	7/27/99
Pesticides (µg/L)												
4,4'-DDD	72-54-8	0.1										
4,4'-DDE	72-55-9	0.1	0.012J									
Aldrin	309-00-2	0.005										
alpha-Chlordane[b]	5103-71-9	2										
Dieldrin	60-57-1	0.005									0.081	0.069
Endosulfan I[b]	959-98-8	42										
Endrin Aldehyde	7421-93-4	*										0.018J
Endrin Ketone	53494-70-5	*										
gamma-Chlordane[b]	5103-74-2	2									0.011J	0.007J
Heptachlor	76-44-8	0.4						0.010				
Heptachlor Epoxide	1024-57-3	0.2										

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-12									
Sample ID		Florida GCTL[a]	NTC52G1211	NTC52G01212	NTC52G01213	NTC52G01213-D	NTC52G01214	NTC52G01215	NTC52G01216	NTC52G01217	NTC52G01218	NTC52G01219
Sample Date			10/24/99	1/21/00	4/12/00	4/12/00	7/16/00	10/25/00	1/28/01	4/29/01	7/16/01	3/24/02
Pesticides (µg/L)												
4,4'-DDD	72-54-8	0.1										
4,4'-DDE	72-55-9	0.1										
Aldrin	309-00-2	0.005										
alpha-Chlordane[b]	5103-71-9	2										
Dieldrin	60-57-1	0.005										
Endosulfan I[b]	959-98-8	42										
Endrin Aldehyde	7421-93-4	*										
Endrin Ketone	53494-70-5	*										
gamma-Chlordane[b]	5103-74-2	2										
Heptachlor	76-44-8	0.4										
Heptachlor Epoxide	1024-57-3	0.2										

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-12				OLD-52-13					
Sample ID		Florida GCTL[a]	NTC52G01220	NTC52G01221	NTC52G01221-F[c]	NTC52G01221	52G01301	52G01302	NTC52G01310	NTC52G1311	NTC52G01312	NTC52G01313
Sample Date			6/25/02	9/13/02	9/13/02	12/15/02	10/16/97	2/5/98	7/27/99	10/24/99	1/21/00	4/12/00
Pesticides (µg/L)												
4,4'-DDD	72-54-8	0.1									0.28 J	
4,4'-DDE	72-55-9	0.1										
Aldrin	309-00-2	0.005									0.021 J	
alpha-Chlordane[b]	5103-71-9	2									0.044 J	
Dieldrin	60-57-1	0.005					5.6 J	0.2		0.027 J	0.19	0.43 J
Endosulfan I[b]	959-98-8	42									0.032 J	
Endrin Aldehyde	7421-93-4	*										
Endrin Ketone	53494-70-5	*										
gamma-Chlordane[b]	5103-74-2	2										
Heptachlor	76-44-8	0.4										
Heptachlor Epoxide	1024-57-3	0.2									0.044 J	

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-13									
Sample ID		Florida GCTL[a]	NTC52G01314	NTC52G01314-D	NTC52G01315	NTC52G01316	NTC52G01316-D	NTC52G01317	NTC52G01318	NTC52G01319	NTC52G01319-D	NTC52G01320
Sample Date			7/16/00	7/16/00	10/25/00	1/28/01	1/28/01	4/29/01	7/16/01	3/24/02	3/24/02	6/26/02
Pesticides (µg/L)												
4,4'-DDD	72-54-8	0.1										
4,4'-DDE	72-55-9	0.1										
Aldrin	309-00-2	0.005				0.066	0.067					
alpha-Chlordane[b]	5103-71-9	2				0.092	0.092 J			0.2	0.27	0.052
Dieldrin	60-57-1	0.005	0.072 J	0.068 J	0.14	0.24	0.28	0.88	0.013J	1.8	2.2	1.7 J
Endosulfan I[b]	959-98-8	42										
Endrin Aldehyde	7421-93-4	*										
Endrin Ketone	53494-70-5	*				0.052 J		0.08 J		0.17	0.21	
gamma-Chlordane[b]	5103-74-2	2										
Heptachlor	76-44-8	0.4										
Heptachlor Epoxide	1024-57-3	0.2										

TABLE 3

HISTORICAL DETECTIONS IN GROUNDWATER
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-13						
Sample ID		Florida GCTL[a]	NTC52G01320-D	NTC52G01321	NTC52G01321-F[c]	NTC52G01321-D	NTC52G01321-D-F[c]	NTC52G01322	NTC52G01322-D
Sample Date			6/26/02	9/13/02	9/13/02	9/13/02	9/13/02	12/15/02	12/15/02
Pesticides (µg/L)									
4,4'-DDD	72-54-8	0.1							
4,4'-DDE	72-55-9	0.1							
Aldrin	309-00-2	0.005							
alpha-Chlordane[b]	5103-71-9	2							
Dieldrin	60-57-1	0.005	1.1 J					0.010 J	0.010 J
Endosulfan I[b]	959-98-8	42							
Endrin Aldehyde	7421-93-4	*							
Endrin Ketone	53494-70-5	*							
gamma-Chlordane[b]	5103-74-2	2							
Heptachlor	76-44-8	0.4							0.010
Heptachlor Epoxide	1024-57-3	0.2							

Notes:

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

[b] GCTL substitution: Chlordane for alpha- and gamma-Chlordane and Endosulfan for Endosulfan I.

[c] "F" in Sample ID indicates sample filtered in the field.

* Indicates that the GCTL is not available.

Empty cells indicate non-detects.

"J" qualifier indicates an estimated value.

Only chemicals detected in at least one sample are shown.

Values in shaded cells are equal to or exceed the GCTL.

TABLE 4

VALIDATED GROUNDWATER ANALYTICAL RESULTS - DECEMBER 2002
STUDY AREA 52

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS NUMBER	Screening Criteria	OLD-52-11	OLD-52-12	OLD-52-13	
Sample ID		Florida	NTC52G01122	NTC52G01222	NTC52G01322	NTC52G01322-D
Sample Date		GCTL[a]	12/15/02	12/15/02	12/15/02	12/15/02
Pesticides (µg/L)						
4,4'-DDD	72-54-8	0.1	0.01 U	0.01 U	0.01 U	0.01 U
4,4'-DDE	72-55-9	0.1	0.01 U	0.01 U	0.01 U	0.01 U
4,4'-DDT	50-29-3	0.1	0.01 U	0.01 U	0.01 U	0.01 U
Aldrin	309-00-2	0.005	0.01 U	0.01 U	0.01 U	0.01 U
alpha-BHC	319-84-6	0.006	0.01 U	0.01 U	0.01 U	0.01 U
alpha-Chlordane	5103-71-9	2	0.01 U	0.01 U	0.01 U	0.01 U
beta-BHC	319-85-7	0.02	0.01 U	0.01 U	0.01 U	0.01 U
delta-BHC	319-86-8	2.1	0.01 U	0.01 U	0.01 U	0.01 U
Dieldrin	60-57-1	0.005	0.01 U	0.01 U	0.01 J	0.01 J
Endosulfan I	959-98-8	42	0.01 U	0.01 U	0.01 U	0.01 U
Endosulfan II	33213-65-9	42	0.01 U	0.01 U	0.01 U	0.01 U
Endosulfan Sulfate	1031-07-8	*	0.01 U	0.01 U	0.01 U	0.01 U
Endrin	72-20-8	2	0.01 U	0.01 U	0.01 U	0.01 U
Endrin Aldehyde	7421-93-4	*	0.01 U	0.01 U	0.01 U	0.01 U
Endrin Ketone	53494-70-5	*	0.01 U	0.01 U	0.01 U	0.01 U
gamma-BHC (Lindane)	58-89-9	0.2	0.01 U	0.01 U	0.01 U	0.01 U
gamma-Chlordane	5103-74-2	2	0.01 U	0.01 U	0.01 U	0.01 U
Heptachlor	76-44-8	0.4	0.01	0.01 U	0.01	0.01 U
Heptachlor Epoxide	1024-57-3	*	0.01 U	0.01 U	0.01 U	0.01 U
Methoxychlor	72-43-5	40	0.01 U	0.01 U	0.01 U	0.01 U
Toxaphene	8001-35-2	3	0.1 U	0.1 U	0.1 U	0.1 U

Notes:

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

[b] "F" in Sample ID indicates sample filtered in the field.

[c] GCTL substitutions: Chlordane for alpha-Chlordane and gamma-Chlordane; and Endosulfan for Endosulfan I and Endosulfan II.

* Indicates that the GCTL is not available.

"J" qualifier indicates an estimated value.

"U" qualifier indicates analyte not detected.

Values in shaded cells are equal to or exceed the GCTL.

APPENDIX A

GROUNDWATER SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Page ____ of ____

Project Name: NTC Orlando
Site: SA 52
Weather Conditions: Sunny 45°
Tidally Influenced: Yes ___ No X

Project No.: 4206
Personnel: Jason Bourgeois
Measuring Device: W.L.I.
Remarks:

Well or Piezometer Number	Date	Time Well Cap Removed	Total Well Depth (feet)*	First Water Level Reading		Second Water Level Reading		Final Water Level Reading		Comments
				Time	Depth to Water (feet)*	Time	Depth to Water (feet)*	Time	Depth to Water (feet)*	
13	12/15/02	0908	13.41	0940	1.09	1022	1.10			
6	"	0909	9.55	0941	3.57	1023	3.57			
11	"	0910	14.00	0942	2.78	1024	2.77			
12	"	0911	13.39	0947	1.65	1025	1.66			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 12/15/02

Project Site Name:
Project No.: 4206

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: Horiba\U-22DX

Serial Nos.:

Sample Location: OLD-52-11

Sample ID No.: NC52G01122

Sampled By: GB

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	12:10	6.06	6.2	20.90	190	6.86	82	2.86	100
1	0.041 / 0.155	12:15	6.13	6.2	20.92	180	6.87	92	2.86	100
2	0.163 / 0.617	12:20	6.12	6.3	20.90	180	6.99	107	2.86	100
4	0.653 / 2.47	12:25	6.11	6.3	20.97	175	6.92	113	2.86	100
6	1.469 / 5.56	12:30	6.10	6.2	21.01	170	8.47	125	2.86	100
8	2.611 / 9.88	12:35	6.08	6.2	21.35	160	8.16	136	2.86	100
10	4.08 / 15.44	12:40	6.08	6.2	21.01	160	8.20	141	2.86	100
	[1 gal. = 3.785 L]	12:45	6.08	6.2	21.05	160	8.04	144	2.86	100
		12:50	6.08	6.2	21.11	160	8.12	146	2.86	100
PID Reading (ppm): —		12:55	6.08	6.2	21.08	165	8.10	149	2.86	100
		13:00	6.08	6.2	21.08	167	8.15	150	2.86	100

Well Casing Diameter: 2"
Total Well Depth: 14.00
Static Water Level: 2.77
Tube Intake Depth: 9.00
Well Volume: 6.92 liters
Tubing/Cell Volume: 505.5

Start Purge (hr): 12:00
End Purge (hr): 13:00
Total Purge Time (min): 60
Total Vol. Purged: 6500

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 12/15/02									
Time: 13:05	light brown	6.08	6.2	21.09	168	8.16	153	2.86	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	3 ~~2~~	1-liter	amber glass	✓
Herbicides	8151	None	2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[✓] Polyethylene
[ ] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Gary Bragg

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 12/15/02

Project Site Name:
Project No.: 4206

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: Horiba\U-22DX

Serial Nos.:

Sample Location: OLD-52-12

Sample ID No.: NTC52G01222

Sampled By: GB

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	11:00	6.41	16.1	24.26	4.0	7.26	-212	1.84	100
1	0.041 / 0.155	11:05	6.43	16.0	23.22	3.7	7.50	-211	1.84	100
2	0.163 / 0.617	11:10	6.40	16.0	22.44	3.7	7.05	-205	1.84	100
4	0.653 / 2.47	11:15	6.41	16.0	22.21	3.5	7.01	-204	1.84	100
6	1.469 / 5.56									
8	2.611 / 9.88									
10	4.08 / 15.44									
	[1 gal. = 3.785 L]									

PID Reading (ppm):

Well Casing Diameter: 2"
Total Well Depth: 13.39
Static Water Level: 1.66
Tube Intake Depth: 8.39
Well Volume: 7200 ml
Tubing/Cell Volume: 505 ml

Start Purge (hr): 10:50
End Purge (hr): 11:15
Total Purge Time (min): 20
Total Vol. Purged: 3000 ml

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 12/15/02									
Time: 11:20	clear	6.41	16.0	22.18	3.6	7.08	-200	1.84	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	3	1-liter	amber glass	✓
Herbicides	8151	None	2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[✓] Polyethylene
[ ] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Gary Bergeron

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 12/15/02

Project Site Name: NTC Orlando/SA 52
Project No.: 4206

Sample Location: OID-52-13

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: NTC52G01322

[X] Monitoring Well Data

Serial Nos.: 1104 2013

Sampled By: SB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1050	3.96	.462	18.92	38.1	7.75		1.15	100
1	0.041	0.155	1000	5.84	.480	19.57	38.7	9.44		1.15	"
2	0.163	0.617	1110	6.02	.380	19.16	38.1	9.74		1.18	"
4	0.653	2.47	1120	6.07	.340	18.29	37.7	9.86		1.15	"
6	1.469	5.56	1130	6.12	.340	18.36	38.2	7.56		1.15	"
8	2.611	9.88	1140	6.10	.330	18.69	38.8	4.77		1.15	"
10	4.08	15.44	1150	6.11	.340	18.39	37.8	9.56		1.15	"
	[1 gal. = 3.785 L]										

PID Reading (ppm): 0.0

Well Casing Diameter: 2"

Total Well Depth: 13.41

Static Water Level: 1.10

Tube Intake Depth: ~11'

Well Volume: 2.0 gal

Tubing/Cell Volume: ~420 mL

Start Purge (hr): 1046

End Purge (hr): 1150

Total Purge Time (min): 64

Total Vol. Purged: ~7 L

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 12/15/02									
Time: 1156	clear	6.11	.340	18.39	37.8	9.56	204	1.15	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	3	1-liter	amber glass	✓
Herbicides	8151	None	2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
Duplicate

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[✓] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[✓] Polyethylene
[ ] Teflon
[ ] Teflon-lined Polyethylene

QA/QC SAMPLES

MS/MSD:

Duplicate ID No.: NTC52D1000

Signature(s):