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QUARTERLY MONITORING REPORT FOR OPERABLE UNIT 4 (OU 4) NTC ORLANDO FL  
10/13/2000  
CH2M HILL



[Redacted]

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October 13, 2000

**CCI NAVY RAC**

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Subject: Operable Unit 4 (OU-4) Quarterly Monitoring Report  
Naval Training Center, Orlando, Florida  
CTO 0017, Contract No. N62467-98-D-0995

Dear Ms. Nwokike:

Enclosed please find the Quarterly Monitoring Report for OU-4, Naval Training Center, Orlando. This report presents a summary of monitoring activities for third quarterly sampling event in 2000. Copies are also being distributed to members of the Orlando Partnering Team.

If you have any questions regarding this document, please call.

Sincerely,

CH2M HILL CONSTRUCTORS, Inc.

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Project Manager

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Rick Allen, HLA  
Steve McCoy, Tetra Tech NUS  
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## TECHNICAL MEMORANDUM

# Summary of Quarterly Monitoring Activities and Results, Operable Unit 4, Area C, Naval Training Center, Orlando, Florida

PREPARED FOR: **Orlando Partnering Team:**  
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CONTRACT: Navy Contract # N62467-98-D-0995

CTO: CTO 0017, Naval Training Center (NTC) Orlando

DATE: October 13, 2000

## Purpose

The purpose of this memorandum is to present the results of the quarterly groundwater monitoring and sampling event completed by CH2M HILL Constructors, Inc (CCI) at Operable Unit 4 (OU-4) in July 2000. The July 2000 sampling represents the eighth sampling event completed at OU-4 under the *Interim Remedial Action (IRA): Conceptual Design and Performance Specification, Operable Unit 4, Naval Training Center, Orlando, Florida* (ABB Environmental Services, May 1997). This is the third quarterly sampling event performed by CCI at OU-4.

Field activities were performed in accordance with the *Work Plan Addendum 1-A for the Operation and Maintenance of UVB Wells at OU-4 and Long Term Monitoring at OU-1* (CH2M HILL Constructors, Inc 1999), the *Basewide Work Plan* (CCI, 1999), the *Project Operations Plan (POP) for Site Investigations and Remedial Investigations* (ABB ES, 1997), and the *Performance Monitoring and Sampling Plan (PM&SP)* found in Appendix B of the IRA. A brief discussion on the site history and conditions at OU-4 can also be found in the IRA.

## Summary of Field Activities

Field tasks completed as part of quarterly monitoring activities at OU-4 included a round of groundwater level elevations and the collection and laboratory analysis of groundwater samples from 25 monitoring locations at the site. For the July 2000 sampling event, an

expanded list of monitoring wells (25 versus the normal 12) were selected to assist in delineating the outer limits of the 100 parts per billion (ppb) total volatile organic compound (VOC) plume at the site and to support system design upgrades.

Influent, effluent, and air emission samples, a component of the UVB remediation system O&M tasks ordinarily completed during quarterly sampling events, were not collected during this event since the UVB systems were disassembled in early May 2000 in preparation for the system design modifications and upgrades.

A comprehensive site visit was completed by CCI in late June 2000 to conduct aquifer tests on the two existing remediation wells. During this mobilization several drawdown "step tests" and a 24-hour pump test were conducted on the two UVB wells to evaluate the optimum sustainable pumping rates for the newly designed system. A detailed description of these field tasks is presented below.

### **Groundwater Level Elevation Measurements**

Groundwater level measurements were collected from each of the sampled monitoring points prior to sample collection. Each well was sounded for total depth and depth to groundwater level using an electronic water level indicator. Measurements were recorded on the data sheets included in Appendix A. A summary of the groundwater elevation measurements is included in Table 1.

### **Groundwater Sampling**

Monitoring well sampling at the site began on July 18, 2000, and was completed on July 21, 2000. A total of 25 monitoring points were sampled, including twenty-two (22 monitoring wells and three (3) drive points). The list of wells/drive points sampled during this sampling event at OU-4 is presented in Table 1. Sampling locations are presented on Figure 1.

Each well/drive point was purged and sampled with a peristaltic pump using the low-flow method described in the POP. Monitoring wells were purged a minimum of three well volumes prior to sampling. Conductivity, pH, temperature, turbidity, oxygen reduction potential, and dissolved oxygen readings were collected during well purging efforts. The wells were pumped until the column of water was free of visible sediment and the conductivity, pH, temperature, turbidity, oxygen reduction potential, and dissolved oxygen readings stabilized. Attempts were also made to purge wells so that turbidity remained below 10 NTU's for two consecutive readings. Appendix A contains the monitoring well/drive point purging information.

Following purging, groundwater samples from 12 monitoring locations were collected for TCL volatiles (Method 8260B), TAL metals (calcium, Iron, Manganese) (Method 6010A), and general chemistry including Alkalinity (Method 310.1), Hardness (Method 130.2), Iron Bacteria (Method 9240B), Total Plate Count (Method 9215B), Total Dissolved Solids (Method 160.1), Total Suspended Solids (Method 160.2), and Sulfate (Method 9056). Samples from the remaining 13 monitoring points were collected for VOC's only by EPA Method 8021. All samples were immediately placed on ice in coolers following collection, logged into the chain-of-custody, and subsequently hand delivered to Accutest Laboratories in Orlando, Florida for analysis.

## UVB System O&M/Hydraulic Performance

During the week of June 26, 2000, a comprehensive site visit was completed by CCI to evaluate aquifer characteristics and to determine the maximum sustainable pumping rates at the UVB wells. The following tasks were performed during the week for this effort including:

- Installation of rental pumps/wiring in UVB-1 and UVB-2.
- Plumbing from each UVB well to five 20,000-gallon frac tankers for temporary storage.
- Installation and plumbing of Neptune totalizer valves at UVB-1 and UVB-2.
- Completion of "step tests" to determine maximum sustainable pumping rate in each UVB well.
- Initiation of comprehensive 24 hour test pumping each of the UVB wells at their maximum sustainable rate (57 gallons per minute combined).
- Three (3) groundwater sample collection events from combined extracted water for groundwater quality analysis to be used in system upgrade designs.
- Temporary storage of 98,233 gallons of purge groundwater in the five frac tankers from the two UVB well pump tests.
- Discharge of temporarily stored purge water to the City of Orlando's sanitary sewer system following completion of the 24 hour pump test on July 1, 2000.

A detailed description of the above items completed as part of the June 2000 comprehensive site visit is provided in the *IRA Work Plan Addendum for the UVB Well Upgrade at Operable Unit 4, Naval Training Center, Orlando, Florida* (CCI, September 2000).

## Problems Encountered

Validation efforts on laboratory data from monitoring point OLD-13-07A identified unpredictable results for tetrachloroethene (PCE) and cis-1,2 dichloroethene (cis-1,2 DCE) following sample dilutions of 1:5 and 1:20. The 1:20 dilution resulted in measurements of cis-1,2 DCE and PCE less than the reporting limit; whereas, the 1:5 dilution had measurements above the instrument calibration range. Subsequent verification analysis of both VOA vials demonstrates that sample concentration differed significantly between the vials. Because the 1:5 responses for cis-1,2 DCE and PCE are not quantified within the instrument linear range, and the results differ significantly between the two vials, the results are qualified as rejected and flagged "R". No other problems were encountered during the monitoring activities

## Summary of Monitoring Results

### Comprehensive 24 Hour Aquifer Pump Test at the Two UVB Wells

An assessment was performed to evaluate the sole use of the two existing UVB wells for the proposed groundwater extraction system. Pump tests and groundwater modeling were conducted to evaluate the condition of the existing wells screens to produce water and affect the capture zone necessary for collection of the 100 ppb total VOC isoconcentration contour.

Results of these efforts formed the basis of design for the system upgrades and were incorporated into the *IRA Work Plan Addendum for the site as referenced above*.

## Water Level Elevations

Groundwater elevation data are presented in Table 1. Figures 2, 3, and 4 illustrate groundwater elevation data and contours for the shallow, intermediate, and deep zones of the surficial aquifer at the site, respectively.

Similar to data collected during previous sampling events, groundwater flow direction as interpreted from the July 2000 data indicates groundwater flow in the westerly direction towards Lake Druid in each of the monitored zones of the surficial aquifer.

## Data Validation

Independent data validation was completed on all sample analyses in accordance with USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review. The data were validated for completeness, holding time compliance, calibration compliance, laboratory blank contamination, surrogate spike recoveries, matrix spike recoveries, internal standard response, sample quantification, and detection limits. Qualifiers resulting from the validation process are shown with the analytical results provided in Tables 2 and 3.

## Analytical Results

A summary of detected analytical concentrations from the OU-4 July 2000 sampling event is presented on Table 2. A complete listing of the July 2000 data is presented in Table 3. Historical analytical data from the original 12 monitoring points is presented graphically in Appendix B.

For the July 2000 event, 13 additional monitoring points were sampled to assist in evaluating the horizontal limits of the 100 ppb total VOC plume at the site. Monitoring well OLD-13-30B and observation wells OLD-13-OW6A and OW7C were used for delineating the northern most points while data from points OLD-13-33A, 34B, and 35C were used to monitor groundwater quality in the shallow, intermediate, and deep surficial aquifer zones in the southern most portions of OU-4.

Analytical data from OLD-13-30B, located approximately 100 feet to the north of UVB-1, indicates a total VOC concentration of 17.6  $\mu\text{g}/\text{l}$  confirming that the 100 ppb plume has been delineated to the north in the intermediate surficial aquifer. Data from OLD-13-OW6A, situated approximately 50 feet north of UVB-1 and within the proposed system capture and treatment zone, indicates a total VOC concentration of 5,869  $\mu\text{g}/\text{l}$ . Data from OLD-13-OW7C which is located within the OW6A well cluster exhibited total VOC concentrations of 0.76  $\mu\text{g}/\text{l}$  indicating that significant downward migration has not occurred at this location.

Laboratory results for wells OLD-13-33A and 34B indicated total VOC concentrations of 3.26  $\mu\text{g}/\text{l}$  and 8.39  $\mu\text{g}/\text{l}$ , respectively. Results from well OLD-13-35C did not identify any VOC compounds above the laboratory method detection limits. These results indicate that the 100 ppb total VOC plume has been delineated in the shallow, intermediate, and deep surficial aquifer zones to the south of OU-4.

Monitoring wells OLD-13-07A and OLD-13-08C, situated hydraulically upgradient of the UVB wells within the suspected source area, were sampled to evaluate groundwater quality migrating westerly towards Lake Druid in both the shallow and deep surficial aquifer zones. Validation efforts completed on laboratory data from OLD-13-07A identified

unpredictable results for cis-1,2 DCE and PCE following sample dilutions of 1:5 and 1:20. Subsequent verification analysis demonstrated significant differences in results from the individual sample vials and based on this, laboratory results for cis-1,2 DCE and PCE were rejected and flagged as "R". Because of these rejections, groundwater quality comparisons to the previous sampling events is not possible. Laboratory data from future scheduled sampling events will be evaluated to discern upward or downward trends in constituent concentrations. Laboratory data from OLD-13-08C identified a total VOC concentration of 1.92 µg/l in the deep surficial aquifer indicating that the total VOC plume within the suspect source area is not migrating downward to any great extent.

Monitoring wells OLD-13-09A, OLD-13-10B, and OLD-13-11C, situated approximately 100 feet due west of UVB-1 near the edge of Lake Druid, were sampled to evaluate groundwater quality in the shallow, intermediate, and deep surficial aquifer zones near the lakes edge. Laboratory analytical results from OLD-13-09A indicate a total VOC concentration of 8,747 µg/l which is a slight decrease from the value of 9,080 µg/l observed in April 2000. The total VOC concentrations noted at OLD-13-09A have risen significantly over the last two sampling events when compared to historical data that indicated concentrations ranging from 718 µg/l to 3890 µg/l at this monitoring point. This trend can be observed graphically on the chart for this monitoring point provided in Attachment B. The marked increase in total VOC concentrations observed over the last two sampling events may be related to continued interruptions in service at UVB-1 and the subsequent shut down of the treatment wells in early May 2000. Analytical results from well OLD-13-10B indicate a total VOC concentration of 171.2 µg/l at this location. This result indicates that the plume is migrating downward to the intermediate surficial aquifer at this location near the lakes edge. Results from well OLD-13-11C did not identify total VOC concentrations above the laboratories instrument detection levels. This data indicates that the plume has not penetrated the deeper surficial aquifer at this monitoring location.

Monitoring well OLD-13-22B is located approximately 20 feet south of UVB-1, and is screened within the recirculation cell from 27 to 32 feet Bls. The total VOC concentration in this well increased from 1525 µg/l in April 2000 to 1794 µg/l for the July 2000 sampling event. The value observed during this event remains close to the concentrations observed during sampling events in 1998, 1999, and 2000 and provides no apparent upward or downward trend in groundwater quality.

Laboratory data from monitoring well OLD-13-15A, which is situated hydraulically between the suspect source area and the remediation wells, indicated a sharp decrease in total VOC concentrations from the previous sampling event in April 2000. The observed concentration of 286 µg/l total VOCs, significantly below values observed in January and April of this year, appear closer to values noted during the first five sampling events at the site from December of 1997 through March of 1998. The graph for OLD-13-15A provided in Appendix B illustrates this graphically.

Data from monitoring well OLD-13-23B, situated approximately 50 feet west and hydraulically downgradient of both UVB-1 and UVB-2 indicated a moderate decrease in total VOC concentrations from 848 µg/l in April 2000 to 325 µg/l in July 2000. The value of 325 µg/l observed at OLD-13-23B, although fairly stable when compared to the most recent three sampling events, is still far below levels observed at this sampling point in 1998.

Overall, a downward trend in total VOC concentrations is evident at this location and will continue to be evaluated over the next sampling events.

Laboratory analytical results from Lake Druid drive point well DP-2 indicates an increase in total VOC concentrations following three consecutive events with decreasing values. The value of 511  $\mu\text{g}/\text{l}$  observed in July 2000 appears to be moving back to values observed at this monitoring point in early 1999. Overall, total VOC concentrations at DP-2 do indicate a distinct downward trend in total VOC levels since 1997 as illustrated on the graph for this location in Appendix B.

Total VOC concentrations at drive point well DP-3 decreased slightly from 2699  $\mu\text{g}/\text{l}$  in April 2000 to 2526  $\mu\text{g}/\text{l}$  in July 2000, continuing a fluctuating trend in total VOC concentrations at this monitoring location. Total VOC concentrations at drive point well DP-1 also decreased during this event, but the overall trend as shown on the attached graph, indicates no clear upward or downward trend.

## Conclusions and Recommendations

Laboratory analytical data from the July 2000 sampling event indicate that the total VOC concentrations generally remained constant throughout the site from the previous sampling event. Select wells did exhibit slight increases or decreases in total VOC levels but no apparent upward or downward trend was evident from the new data as illustrated by the attached graphs in Appendix B. Additional monitoring points included in the July 2000 sampling event confirmed the horizontal extents of the 100 ppb plume in the shallow, intermediate, and deep zones of the surficial aquifer to the north and south of the UVB wells. This data was used in conjunction with pump test modeling efforts to determine design requirements for the proposed system to capture and treat the 100 ppb plume.

The next quarterly sampling event is scheduled for the week of October 23, 2000.

# TABLES

**NO.**

- 1**      **OU-4 Groundwater Level Elevations, July, 2000**
- 2**      **Summary of Detected Contaminants – July 2000 Sampling Results**
- 3**      **Summary of Analytical Results – July 2000 Sampling Event**

**TABLE 1**

OU-4 Groundwater Level Elevations, July, 2000

*Summary of Third Quarter 2000 Monitoring Activities and Results, Naval Training Center, Orlando, Florida*

Well Identifier	Well Depth (ft bls)	Screened Interval Elevation <sup>1</sup> (ft msl)	Top-of-Casing Elevation <sup>1</sup> (ft msl)	Depth to water (ft btoc)	Water-Level Elevation <sup>1</sup> (ft msl)
OLD-13-OW6A	11.3	94.2 to 99.2	108.07	6.36	101.71
OLD-13-07A	18.5	90.5 to 105.5	108.71	6.22	102.49
OLD-13-OW7C	45.0	60.5 to 65.5	107.83	6.07	101.76
OLD-13-08C	62.0	46.9 to 51.9	108.67	6.23	102.44
OLD-13-09A	11.0	92.5 to 102.5	105.99	4.76	101.23
OLD-13-10B	21.0	82.5 to 87.5	105.87	4.65	101.22
OLD-13-11C	62.0	41.1 to 46.1	105.98	4.61	101.37
OLD-13-12A	11.5	93.4 to 103.4	107.17	5.47	101.70
OLD-13-OW12A	NA	NA	NA	6.76	NA
OLD-13-OW13C	NA	NA	NA	6.88	NA
OLD-13-14C	62.0	42.7 to 47.7	107.93	6.37	101.56
OLD-13-15A	12.5	93.7 to 103.7	108.74	6.66	102.08
OLD-13-17C	63.0	42.9 to 47.9	109.08	7.04	102.04
OLD-13-21B	32	74.4 to 79.4	108.67	6.59	102.08
OLD-13-22B	32	72.8 to 77.8	107.05	5.31	101.74
OLD-13-23B	31	73.2 to 78.2	106.37	4.96	101.41
OLD-13-24A	12.7	92.2 to 102.2	106.85	5.76	101.09
OLD-13-25B	23.5	81.3 to 86.3	107.00	5.75	101.25
OLD-13-30B	34.0	74.1 to 79.1	110.57	8.47	102.10
OLD-13-33A	12.5	92.6 to 102.6	108.35	7.13	101.22
OLD-13-34B	25.0	80.1 to 85.1	108.27	6.98	101.29
OLD-13-35C	56.0	49.2 to 54.2	108.34	7.03	101.31
OLD-13-DP1	NA	98.0 to 99.0	104.01	2.97	101.04
OLD-13-DP2	NA	98.8 to 99.8	104.78	4.20	100.58
OLD-13-DP3	NA	99.2 to 100.2	105.15	4.53	100.62

<sup>1</sup> U.S. Geological Survey, North American Datum, 1929

Notes: btoc = below top-of-casing

Bls = below land surface

Ft = feet

Msl = mean sea level

**Table 2**  
**Summary of Detected Contaminants - July 2000 Sampling Results**  
**OU-4, NTC Orlando**

	Station ID:	OLD-13-07A	OLD-13-08C	OLD-13-09A	OLD-13-10B	OLD-13-12A	OLD-13-14C
	Client Sample ID:	017-OLD-13-07A-Q3-00	017-OLD-13-08C-Q3-00	017-OLD-13-09A-Q3-00	017-OLD-13-10B-Q3-00	017-OLD-13-12A-Q3-00	017-OLD-13-14C-Q3-00
	Lab Sample ID:	F7077-1	F7077-2	F7102-1	F7102-2	F7089-1	F7077-7
	Date Collected:	07/18/2000	07/18/2000	07/20/2000	07/20/2000	07/19/2000	07/18/2000
Parameter	Units						
<b>Inorganic/Misc Parameters</b>							
<b>Metals</b>							
Calcium	ug/l	25000		7860		12500	
<b>Miscellaneous</b>							
Alkalinity, Total	mg/l	976		22.5		30.4	
Hardness, Total	mg/l	67.5		26.8		36.4	
Iron Bacteria	organ						
Plate Count, Total	CFU/m	144		26		18	
Solids, Total Dissolved	mg/l	1660		78		65	
Solids, Total Suspended	mg/l	7					
Sulfate	mg/l					5.7	
<b>Volatile Organic Constituents</b>							
1,1-Dichloroethylene	ug/l			1.5 J			2.5 J
Carbon disulfide	ug/l						
cis-1,2-Dichloroethylene	ug/l		1.1	1620 J	77.4 J	17	1870
Tetrachloroethylene	ug/l		0.82 J	2700 J	21.5		68.4 J
trans-1,2-Dichloroethylene	ug/l			12.8	2.8		23.1
Trichloroethylene	ug/l	306		4410 J	69.5 E		1650
Vinyl chloride	ug/l			2.2 J			

Note:

- No values indicate that parameter was not detected
- "J" qualifier indicates an estimated value.
- "U" qualifier indicates a non-detection

**Table 2**  
**Summary of Detected Contaminants - July 2000 Sampling Results**  
**OU-4, NTC Orlando**

	StationID:	OLD-13-15A	OLD-13-17C	OLD-13-21B	OLD-13-22B	OLD-13-23B	OLD-13-24A
	Client Sample ID:	017-OLD-13-15A-Q3-00	017-OLD-13-17C-Q3-00	017-OLD-13-21B-Q3-00	017-OLD-13-22B-Q3-00	017-OLD-13-23B-Q3-00	017-OLD-13-24A-Q3-00
	Lab Sample ID:	F7077-3	F7077-6	F7077-4	F7089-2	F7102-5	F7089-11
	Date Collected:	07/18/2000	07/18/2000	07/18/2000	07/19/2000	07/20/2000	07/19/2000
<b>Parameter</b>	<b>Units</b>						
<b>Inorganic/Misc Parameters</b>							
<b>Metals</b>							
Calcium	ug/l	31200		3150	3500		13400
<b>Miscellaneous</b>							
Alkalinity, Total	mg/l	66.6					31.8
Hardness, Total	mg/l	84.8		13.1	13.2	13.2	37.5
Iron Bacteria	organ					POSITIVE	
Plate Count, Total	CFU/m	68		46	2	14	18
Solids, Total Dissolvec	mg/l	122		43	70	64	73
Solids, Total Suspendec	mg/l						
Sulfate	mg/l				16.6		7.5
<b>Volatile Organic Constituents</b>							
1,1-Dichloroethylene	ug/l						
Carbon disulfide	ug/l			3.5 J			
cis-1,2-Dichloroethylene	ug/l	2.3	3.5	1530	1600	230 J	32.9
Tetrachloroethylene	ug/l	277	1450 J	28.2	3.9	2.5	
trans-1,2-Dichloroethylene	ug/l			11.5	17.6	1.4 J	
Trichloroethylene	ug/l	6.7	1540 J	333	172	90.6	15.4
Vinyl chloride	ug/l						

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**Table 2**  
**Summary of Detected Contaminants - July 2000 Sampling Results**  
**OU-4, NTC Orlando**

Station ID	OLD-13-25B	OLD-13-30B	OLD-13-33A	OLD-13-34B	OLD-13-DP1	OLD-13-DP2
Client Sample ID	017-OLD-13-25B-Q3-00	017-OLD-13-30B-Q3-00	017-OLD-13-33A-Q3-00	017-OLD-13-34B-Q3-00	017-OLD-13-DP1-Q3-00	017-OLD-13-DP2-Q3-00
Lab Sample ID	F7089-12	F7089-6	F7112-1	F7112-2	F7102-7	F7102-8
Date Collected	07/19/2000	07/19/2000	07/21/2000	07/21/2000	07/20/2000	07/20/2000
Parameter	Units					
<b>Inorganic/Misc Parameters</b>						
<b>Metals</b>						
Calcium	ug/l	4060				
<b>Miscellaneous</b>						
Alkalinity, Total	mg/l	4.9			30.8	
Hardness, Total	mg/l	14.1				4.9
Iron, Bacteria	organ					
Plate Count, Total	CFU/m				26	116
Solids, Total Dissolved	mg/l	138			65	57
Solids, Total Suspended	mg/l					4
Sulfate	mg/l	61.8				
<b>Volatile Organic Constituents</b>						
1,1-Dichloroethylene	ug/l					
Carbon disulfide	ug/l					
cis-1,2-Dichloroethylene	ug/l	47.4		0.73 J	1.5	713 J
Tetrachloroethylene	ug/l	33.8	15.8	1.7	6	17.1
trans-1,2-Dichloroethylene	ug/l	1.2 J				1.3 J
Trichloroethylene	ug/l	34.6	1.8	0.83 J	0.89 J	0.97 J
Vinyl chloride	ug/l					24.2
						9.3

Note

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**Table 2**  
**Summary of Detected Contaminants - July 2000 Sampling Results**  
**OU-4, NTC Orlando**

	Station ID	OLD-13-DP3	OLD-13-OW6A	OLD-13-OW12A	OLD-13-OW7C	OLD-13-OW13C
	Client Sample ID:	017-OLD-13-DP3-Q3-00	017-OLD-13-OW6A-Q3-00	017-OLD-13-OW12A-Q3-00	017-OLD-13-OW7C-Q3-00	017-OLD-13-OW13C-Q3-00
	Lab Sample ID:	F7102-9	F7089-4	F7089-8	F7089-5	F7089-9
	Date Collected:	07/20/2000	07/19/2000	07/19/2000	07/19/2000	07/19/2000
Parameter	Units					
<b>Inorganic/Misc Parameters</b>						
<b>Metals</b>						
Calcium	ug/l					
<b>Miscellaneous</b>						
Alkalinity, Total	mg/l	12.2				
Hardness, Total	mg/l	7.9				
Iron Bacteria	organ					
Plate Count, Total	CFU/m	42				
Solids, Total Dissolved	mg/l	78				
Solids, Total Suspended	mg/l	10				
Sulfate	mg/l					
<b>Volatile Organic Constituents</b>						
1,1-Dichloroethylene	ug/l	1.2 J				
Carbon disulfide	ug/l					
cis-1,2-Dichloroethylene	ug/l	2500 J	98.3		0.76 J	
Tetrachloroethylene	ug/l		4660 J	1.7		
trans-1,2-Dichloroethylene	ug/l	18.4	0.66 J			7.7
Trichloroethylene	ug/l	6.8	1110			
Vinyl chloride	ug/l					

Note:

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- "J" qualifier indicates an estimated value.
- "U" qualifier indicates a non-detection

**Table 3**  
**Summary of Analytical Results July 2000 Sampling Event**  
**OU-4, NTC Orlando**

Station ID: Client Sample ID: Lab Sample ID: Date Collected	OLD-13-07A 017-OLD-13-07A-Q3-00 F7077-1 07/18/2000	OLD-13-08C 017-OLD-13-08C-Q3-00 F7077-2 07/18/2000	OLD-13-09A 017-OLD-13-09A-Q3-00 F7102-1 07/20/2000	OLD-13-10B 017-OLD-13-10B-Q3-00 F7102-2 07/20/2000	OLD-13-11C 017-OLD-13-11C-Q3-00 F7102-3 07/20/2000	OLD-13-12A 017-OLD-13-12A-Q3-00 F7089-1 07/19/2000	OLD-13-14C 017-OLD-13-14C-Q3-00 F7077-7 07/18/2000
Parameter	Units						
<b>Inorganic/Misc Parameters</b>							
<b>Metals</b>							
Calcium	ug/l	25000		7860			12500
Iron	ug/l	130 U		142 U			232 U
Manganese	ug/l	0.98 U		0.63 U			8 U
<b>Miscellaneous</b>							
Alkalinity, Total	mg/l	976		22.5			30.4
Hardness, Total	mg/l	67.5		26.8			36.4
Iron Bacteria	organ	NEGATIVE		NEGATIVE			NEGATIVE
Plate Count, Total	CFU/m	144		26			
Solids, Total Dissolved	mg/l	1660		78			18
Solids, Total Suspended	mg/l	7		4 U			4 U
Sulfate	mg/l	50 U		50 U			6.7
<b>Volatile Organic Constituents</b>							
1,1,1-Trichloroethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,1-Dichloroethylene	ug/l	10 UJ	1 U	1.5 J	1 U	1 U	2.5 J
1,2-Dibromoethane	ug/l		1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/l		1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/l		1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/l		1 U	1 U	1 U	1 U	1 U
2-Chloroethylvinyl ether	ug/l		1 R		1 R		1 R
2-Hexanone	ug/l	50 UJ		10 U			10 UJ
4-Methyl-2-pentanone	ug/l	50 UJ		10 U			10 UJ
Acetone	ug/l	250 U		60 U			50 U
Benzene	ug/l	5 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
Bromoform	ug/l	10 UJ	1 U	2 UJ	1 U	1 U	1 U
Carbon disulfide	ug/l	50 UJ		10 U			10 UJ
Carbon tetrachloride	ug/l	10 UJ	1 U	2 UJ	1 U	1 U	1 U
Chlorobenzene	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
Chloroethane	ug/l	25 UJ	1 U	5 UJ	1 U	1 U	5 UJ
Chloroform	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
cis-1,2-Dichloroethylene	ug/l	1450 R	1.1	1620 J	77.4 J	17	1870
cis-1,3-Dichloropropene	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
Dibromochloromethane	ug/l	10 UJ	1 U	2 U	1 UJ	1 UJ	1 UJ
Dichlorodifluoromethane	ug/l		1 UJ				
Ethylbenzene	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
Methyl bromide	ug/l	25 UJ	1 U	5 UJ	1 U	1 U	5 UJ
Methyl chloride	ug/l	25 UJ	1 UJ	5 UJ	1 UJ	1 UJ	5 UJ
Methyl ethyl ketone	ug/l	50 U		10 U			10 U
Methyl Tert Butyl Ether	ug/l		1 U		1 U		1 U
Methylene chloride	ug/l	25 UJ	5 U	5 U	5 U	5 U	5 U
Styrene	ug/l	10 U		2 U			2 U
Tetrachloroethylene	ug/l	1220 R	0.82 J	2700 J	21.5	2 U	68.4 J
Toluene	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
trans-1,2-Dichloroethylene	ug/l	10 U	1 U	12.8	2.8	2 U	23.1
trans-1,3-Dichloropropene	ug/l	10 U	1 U	2 U	1 U	1 U	1 U
Trichloroethylene	ug/l	306	1 U	4410 J	69.5 E	2 U	1650
Trichlorofluoromethane	ug/l		1 U		1 U		1 U
Vinyl chloride	ug/l	5 UJ	1 U	2.2 J	1 U	1 UJ	1 U
Xylene (total)	ug/l	30 U	3 U	6 U	3 U	6 U	3 U

- Note:
- Values in shaded cells indicate detections
  - No values indicate that parameter was not analyzed for
  - "J" qualifier indicates an estimated value.
  - "U" qualifier indicates a non-detection
  - "R" qualifier indicates rejected data.

**Table 3**  
**Summary of Analytical Results July 2000 Sampling Event**  
**OU-4, NTC Orlando**

StationID	Client Sample ID	OLD-13-15A	OLD-13-17C	OLD-13-21B	OLD-13-22B	OLD-13-23B	OLD-13-24A
Lab Sample ID	Date Collected	017-OLD-13-15A-Q3-00	017-OLD-13-17C-Q3-00	017-OLD-13-21B-Q3-00	017-OLD-13-22B-Q3-00	017-OLD-13-23B-Q3-00	017-OLD-13-24A-Q3-00
Parameter	Units	F7077-3	F7077-6	F7077-4	F7089-2	F7102-5	F7089-11
		07/18/2000	07/18/2000	07/18/2000	07/19/2000	07/20/2000	07/19/2000
<b>Inorganic/Misc Parameters</b>							
<b>Metals</b>							
Calcium	ug/l	31200		3150	3500	2450 U	13400
Iron	ug/l	33.5 U		492 U	438 U	696 U	212 U
Manganese	ug/l	0.83 U		2 U	1.7 U	1.6 U	0.99 U
<b>Miscellaneous</b>							
Alkalinity, Total	mg/l	66.6		5 U	5 U	5 U	31.8
Hardness, Total	mg/l	84.8		13.1	13.2	13.2	37.5
Iron Bacteria	organ	NEGATIVE		NEGATIVE	NEGATIVE	POSITIVE	NEGATIVE
Plate Count, Total	CFU/m	68		46	2	14	18
Solids, Total Dissolved	mg/l	122		43	70	64	73
Solids, Total Suspended	mg/l	4 U		4 U	4 U	4 U	4 U
Sulfate	mg/l	50 U		50 U	16.6	50 U	7.5
<b>Volatile Organic Constituents</b>							
1,1,1-Trichloroethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,1,2,2-Tetrachloroethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,1,2-Trichloroethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,1-Dichloroethylene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	ug/l		1 U				2 U
1,2-Dichlorobenzene	ug/l		1 U				
1,2-Dichloroethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,2-Dichloropropane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
1,3-Dichlorobenzene	ug/l		1 U				
1,4-Dichlorobenzene	ug/l		1 U				
2-Chloroethylvinyl ether	ug/l		1 R				
2-Hexanone	ug/l	10 U		10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	ug/l	10 U		10 U	10 U	10 U	10 U
Acetone	ug/l	50 U		50 U	50 U	50 U	50 U
Benzene	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Bromoform	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Carbon disulfide	ug/l	10 U		3.5 J	10 U	10 U	10 U
Carbon tetrachloride	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Chlorobenzene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Chloroethane	ug/l	5 U	1 U	5 U	5 U	5 U	5 U
Chloroform	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethylene	ug/l	2.3	3.5	1530	1600	230 J	32.9
cis-1,3-Dichloropropene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Dibromochloromethane	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Dichlorodifluoromethane	ug/l		1 U				
Ethylbenzene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Methyl bromide	ug/l	5 U	1 U	5 U	5 U	5 U	5 U
Methyl chloride	ug/l	5 U	1 U	5 U	5 U	5 U	5 U
Methyl ethyl ketone	ug/l	10 U		10 U	10 U	10 U	10 U
Methyl Tert Butyl Ether	ug/l		1 U				
Methylene chloride	ug/l	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	ug/l	2 U		2 U	2 U	2 U	2 U
Tetrachloroethylene	ug/l	277	1450 J	28.2	3.9	2.5	2 U
Toluene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
trans-1,2-Dichloroethylene	ug/l	2 U	1 U	11.5	17.6	1.4 J	2 U
trans-1,3-Dichloropropene	ug/l	2 U	1 U	2 U	2 U	2 U	2 U
Trichloroethylene	ug/l	6.7	1540 J	333	172	90.6	16.4
Trichlorofluoromethane	ug/l		1 U				
Vinyl chloride	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)	ug/l	6 U	3 U	6 U	6 U	6 U	6 U

Note

- Values in shaded cells indicate detection
- No values indicate that parameter was n
- "J" qualifier indicates an estimated value.
- "U" qualifier indicates a non-detection
- "R" qualifier indicates rejected data.

**Table 3**  
**Summary of Analytical Results July 2000 Sampling Event**  
**OU-4, NTC Orlando**

StationID: Client Sample ID: Lab Sample ID: Date Collected:	OLD-13-25B 017-OLD-13-25B-Q3-00 F7089-12 07/19/2000	OLD-13-30B 017-OLD-13-30B-Q3-00 F7089-6 07/19/2000	OLD-13-33A 017-OLD-13-33A-Q3-00 F7112-1 07/21/2000	OLD-13-34B 017-OLD-13-34B-Q3-00 F7112-2 07/21/2000	OLD-13-35C 017-OLD-13-35C-Q3-00 F7112-3 07/21/2000	OLD-13-DP1 017-OLD-13-DP1-Q3-00 F7102-7 07/20/2000
Parameter	Units					
<b>Inorganic/Misc Parameters</b>						
<b>Metals</b>						
Calcium	ug/l	4060				155 U
Iron	ug/l	60.3 U				132 U
Manganese	ug/l	0.32 U				1.4 U
<b>Miscellaneous</b>						
Alkalinity, Total	mg/l	4.9				30.8
Hardness, Total	mg/l	14.1				4 U
Iron Bacteria	organ	NEGATIVE				NEGATIVE
Plate Count, Total	CFU/m	1 U				NEGATIVE
Solids, Total Dissolved	mg/l	138				26
Solids, Total Suspended	mg/l	4 U				65
Sulfate	mg/l	61.8				4 U
						50 U
<b>Volatile Organic Constituents</b>						
1,1,1-Trichloroethane	ug/l	2 U	1 U	1 U	1 U	2 U
1,1,2-Tetrachloroethane	ug/l	2 U	1 U	1 U	1 U	2 U
1,1,2-Trichloroethane	ug/l	2 U	1 U	1 U	1 U	2 U
1,1-Dichloroethane	ug/l	2 U	1 U	1 U	1 U	2 U
1,1-Dichloroethylene	ug/l	2 U	1 U	1 U	1 U	2 U
1,2-Dibromoethane	ug/l		1 U	1 U	1 U	2 U
1,2-Dichlorobenzene	ug/l		1 U	1 U	1 U	2 U
1,2-Dichloroethane	ug/l	2 U	1 U	1 U	1 U	2 U
1,2-Dichloropropane	ug/l	2 U	1 U	1 U	1 U	2 U
1,3-Dichlorobenzene	ug/l		1 U	1 U	1 U	2 U
1,4-Dichlorobenzene	ug/l		1 U	1 U	1 U	2 U
2-Chloroethylvinyl ether	ug/l		1 R	1 R	1 R	2 U
2-Hexanone	ug/l	10 U				10 U
4-Methyl-2-pentanone	ug/l	10 U				10 U
Acetone	ug/l	50 U				50 U
Benzene	ug/l	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/l	2 U	1 U	1 U	1 U	2 U
Bromoform	ug/l	2 U	1 U	1 U	1 U	2 U
Carbon disulfide	ug/l	10 U				10 U
Carbon tetrachloride	ug/l	2 U	1 U	1 U	1 U	2 U
Chlorobenzene	ug/l	2 U	1 U	1 U	1 U	2 U
Chloroethane	ug/l	5 U	1 U	1 U	1 U	5 U
Chloroform	ug/l	2 U	1 U	1 U	1 U	2 U
cis-1,2-Dichloroethylene	ug/l	47.4	1 U	0.73 J	1.5	713 J
cis-1,3-Dichloropropene	ug/l	2 U	1 U	1 U	1 U	2 U
Dibromochloromethane	ug/l	2 U	1 U	1 U	1 U	2 U
Dichlorodifluoromethane	ug/l		1 U	1 U	1 U	2 U
Ethylbenzene	ug/l	2 U	1 U	1 U	1 U	2 U
Methyl bromide	ug/l	5 U	1 U	1 U	1 U	5 U
Methyl chloride	ug/l	5 U	1 U	1 U	1 U	5 U
Methyl ethyl ketone	ug/l	10 U				10 U
Methyl Tert Butyl Ether	ug/l		1 U	1 U	1 U	2 U
Methylene chloride	ug/l	5 U	5 U	5 U	5 U	5 U
Styrene	ug/l	2 U				2 U
Tetrachloroethylene	ug/l	33.8	15.8	1.7	6	2 U
Toluene	ug/l	2 U	1 U	1 U	1 U	2 U
trans-1,2-Dichloroethylene	ug/l	1.2 J	1 U	1 U	1 U	1.3 J
trans-1,3-Dichloropropene	ug/l	2 U	1 U	1 U	1 U	2 U
Trichloroethylene	ug/l	34.6	1.8	0.83 J	0.89 J	0.97 J
Trichlorofluoromethane	ug/l		1 U	1 U	1 U	2 U
Vinyl chloride	ug/l	1 U	1 U	1 U	1 U	1 U
Xylene (total)	ug/l	6 U	3 U	3 U	3 U	6 U

Note:

- Values in shaded cells indicate detection
- No values indicate that parameter was n
- "J" qualifier indicates an estimated value.
- "U" qualifier indicates a non-detection
- "R" qualifier indicates rejected data.

**Table 3**  
**Summary of Analytical Results July 2000 Sampling Event**  
**OU-4, NTC Orlando**

StationID	OLD-13-DP2	OLD-13-DP3	OLD-13-OW6A	OLD-13-OW12A	OLD-13-OW7C	OLD-13-OW13C
Client Sample ID	017-OLD-13-DP2-Q3-00	017-OLD-13-DP3-Q3-00	017-OLD-13-OW6A-Q3-00	017-OLD-13-OW12A-Q3-00	017-OLD-13-OW7C-Q3-00	017-OLD-13-OW13C-Q3-00
Lab Sample ID	F7102-8	F7102-9	F7089-4	F7089-8	F7089-5	F7089-9
Date Collected	07/20/2000	07/20/2000	07/19/2000	07/19/2000	07/19/2000	07/19/2000
Parameter	Units					
<b>Inorganic/Misc Parameters</b>						
<b>Metals</b>						
Calcium	ug/l	1440 U	2130 U			
Iron	ug/l	385 U	415 U			
Manganese	ug/l	2.3 U	1.2 U			
<b>Miscellaneous</b>						
Alkalinity, Total	mg/l	5 U	12.2			
Hardness, Total	mg/l	4.9	7.9			
Iron Bacteria	organ	NEGATIVE	NEGATIVE			
Plate Count, Total	CFU/m	116	42			
Solids, Total Dissolved	mg/l	57	78			
Solids, Total Suspended	mg/l	4	10			
Sulfate	mg/l	50 U	50 U			
<b>Volatile Organic Constituents</b>						
1,1,1-Trichloroethane	ug/l	2 U	2 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	ug/l	2 U	2 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/l	2 U	2 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/l	2 U	2 U	1 U	1 U	1 U
1,1-Dichloroethylene	ug/l	2 U	1.2 J	1 U	1 U	1 U
1,2-Dibromoethane	ug/l			1 U	1 U	1 U
1,2-Dichlorobenzene	ug/l			1 U	1 U	1 U
1,2-Dichloroethane	ug/l	2 U	2 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/l	2 U	2 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/l			1 U	1 U	1 U
1,4-Dichlorobenzene	ug/l			1 U	1 U	1 U
2-Chloroethylvinyl ether	ug/l			1 R	1 R	1 R
2-Hexanone	ug/l	10 U	10 U			
4-Methyl-2-pentanone	ug/l	10 U	10 U			
Acetone	ug/l	50 U	50 U			
Benzene	ug/l	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/l	2 U	2 U	1 U	1 U	1 U
Bromoform	ug/l	2 UJ	2 UJ	1 U	1 U	1 U
Carbon disulfide	ug/l	10 U	10 U			
Carbon tetrachloride	ug/l	2 UJ	2 UJ	1 U	1 U	1 U
Chlorobenzene	ug/l	2 U	2 U	1 U	1 U	1 U
Chloroethane	ug/l	5 U	5 U	1 U	1 U	1 U
Chloroform	ug/l	2 U	2 U	1 U	1 U	1 U
cis-1,2-Dichloroethylene	ug/l	457 J	2500 J	98.3	0.76 J	1 U
cis-1,3-Dichloropropene	ug/l	2 U	2 U	1 U	1 U	1 U
Dibromochloromethane	ug/l	2 U	2 U	1 U	1 U	1 U
Dichlorodifluoromethane	ug/l			1 UJ	1 UJ	1 UJ
Ethylbenzene	ug/l	2 U	2 U	1 U	1 U	1 U
Methyl bromide	ug/l	5 UJ	5 UJ	1 U	1 U	1 U
Methyl chloride	ug/l	5 U	5 U	1 UJ	1 UJ	1 UJ
Methyl ethyl ketone	ug/l	10 U	10 U			
Methyl Tert Butyl Ether	ug/l			1 U	1 U	1 U
Methylene chloride	ug/l	5 UJ	5 UJ	5 U	5 U	5 U
Styrene	ug/l	2 U	2 U			
tetrachloroethylene	ug/l	17.1	2 U	4660 J	1.7	7.7
Toluene	ug/l	2 U	2 U	1 U	1 U	1 U
trans-1,2-Dichloroethylene	ug/l	2.9	18.4	0.66 J	1 U	1 U
trans-1,3-Dichloropropene	ug/l	2 U	2 U	1 U	1 U	1 U
Trichloroethylene	ug/l	24.2	6.8	1110	1 U	1 U
Trichlorofluoromethane	ug/l			1 U	1 U	1 U
Vinyl chloride	ug/l	9.3	1 U	1 U	1 U	1 U
Xylene (total)	ug/l	6 U	6 U	3 U	3 U	3 U

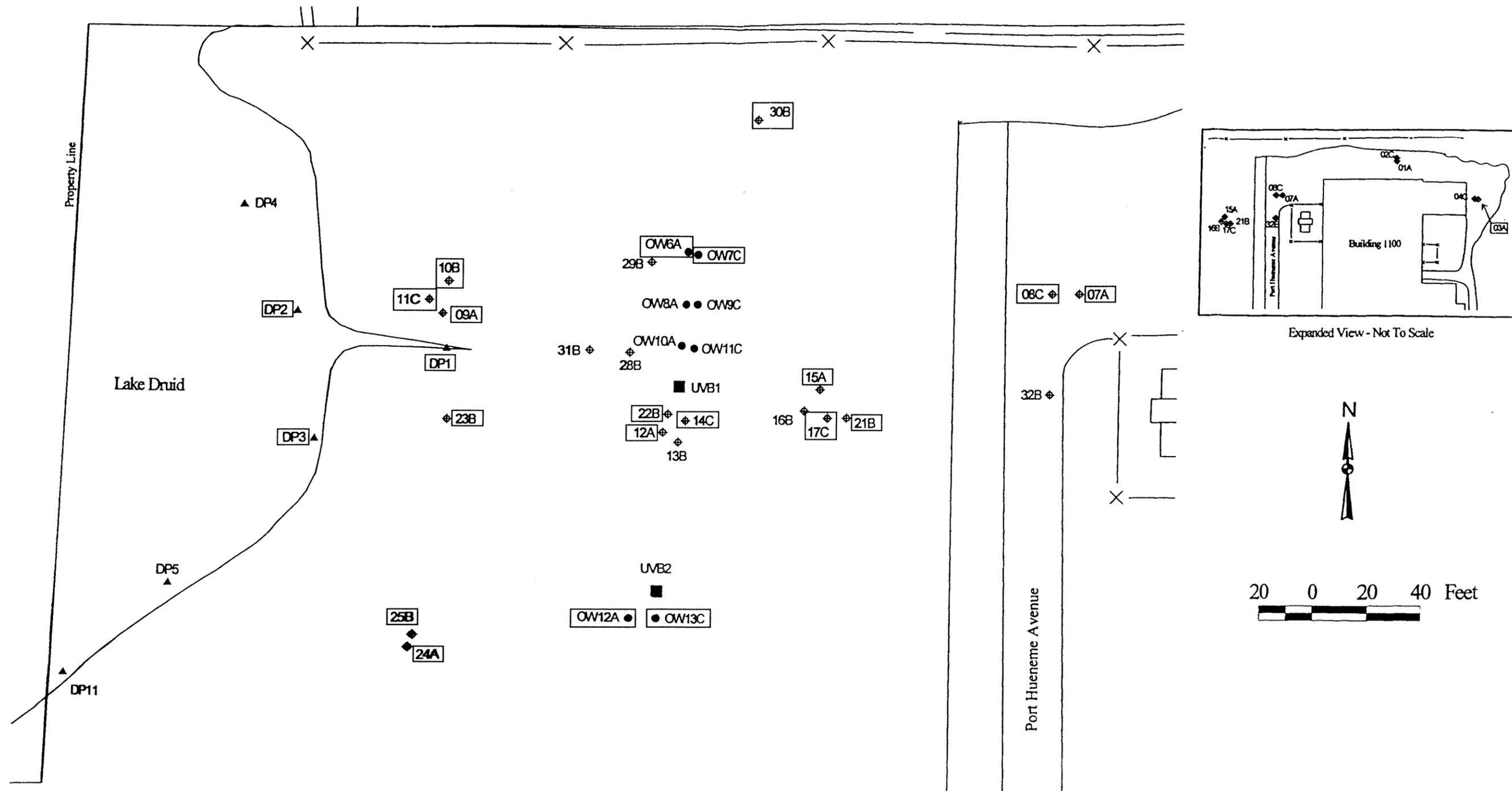
Note

- Values in shaded cells indicate detection
- No values indicate that parameter was n
- "J" qualifier indicates an estimated value.
- "U" qualifier indicates a non-detection
- "R" qualifier indicates rejected data.

# FIGURES

## NO.

- 1 OU-4 Site Map
- 2 OU-4 Groundwater Flow (Shallow Zone)
- 3 OU-4 Groundwater Flow (Intermediate Zone)
- 4 OU-4 Groundwater Flow (Deep Zone)



**LEGEND**

- ⊕ Monitoring Well Location and Designation
- Observation Well Location and Designation
- ▲ Drive Point Well Location and Designation
- Recirculation Well Location and Designation
- 24A Groundwater Sample Collected During July 2000 Sampling Event

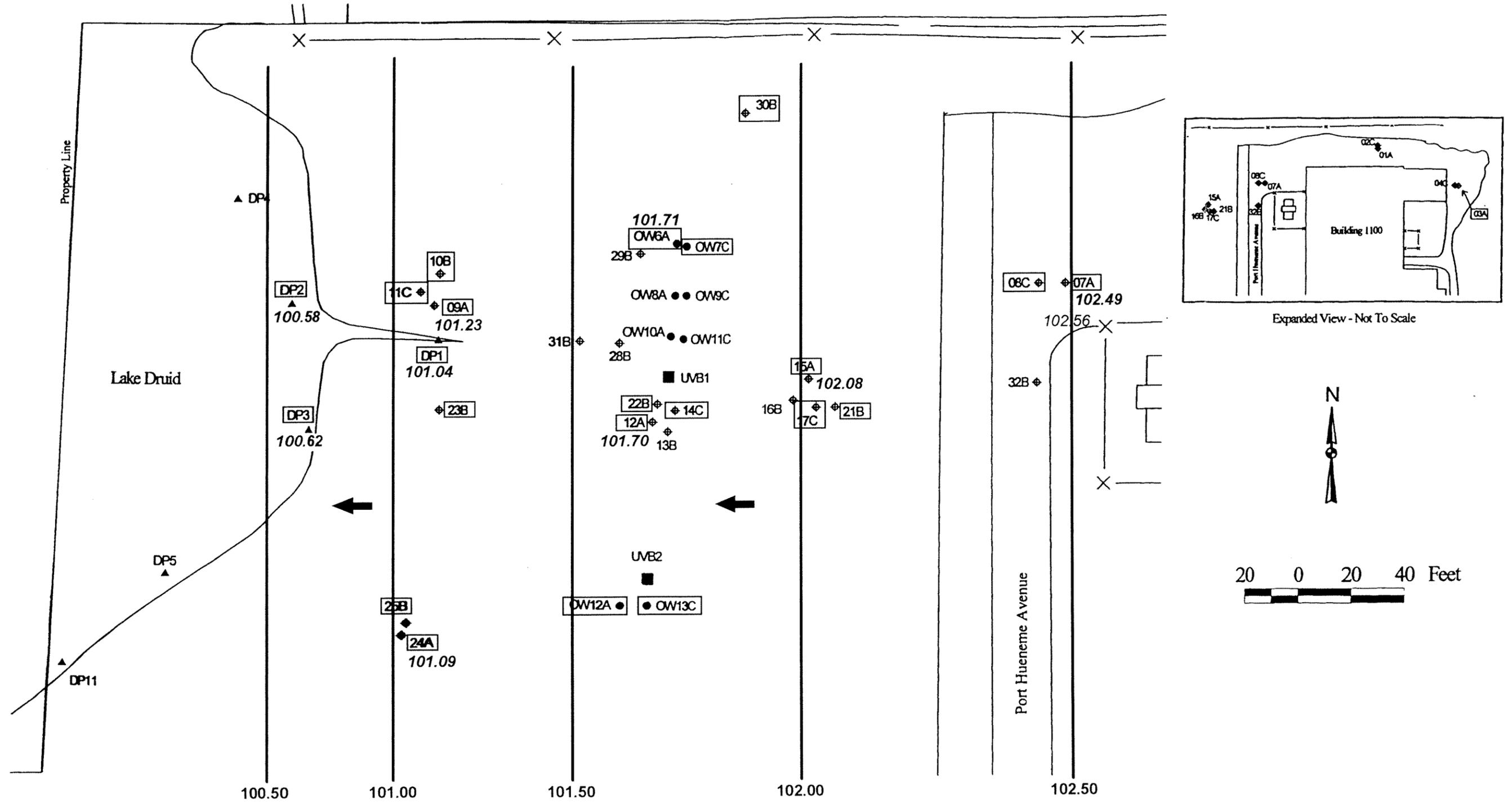
Well Cluster located approx. 55' to S-SW

- ⊕ 33A
- ⊕ 34B
- ⊕ 35C

**FIGURE 1**  
OU-4 Site Map

INTERIM REMEDIAL ACTION,  
PERFORMANCE MONITORING  
AND SAMPLING PLAN.  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA



**LEGEND**

- ◆ Monitoring Well Location and Designation
- Observation Well Location and Designation
- ▲ Drive Point Well Location and Designation
- Recirculation Well Location and Designation
- 24A Monitoring Wells Included in Current Monitoring Program
- 101.09 Groundwater Elevation (MSL, USGS North American Datum, 1929)
- 101.00 Groundwater Contour Line (MSL, USGS North American Datum, 1929)
- ← Groundwater Flow Direction

Well Cluster located approx. 55' to S-SW

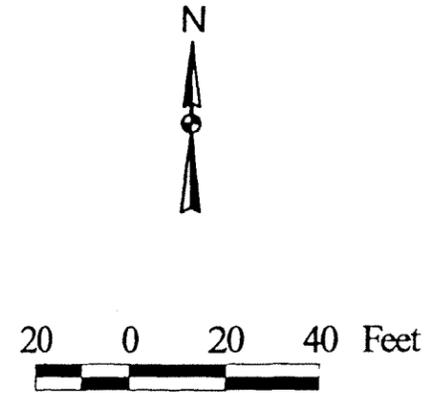
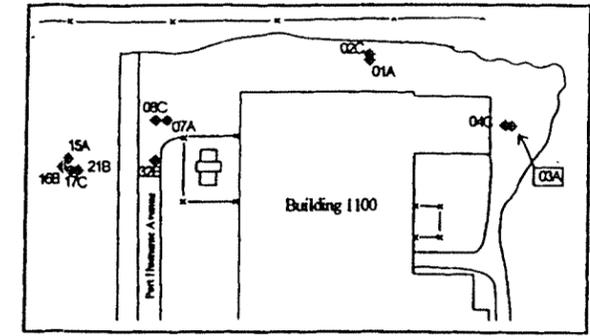
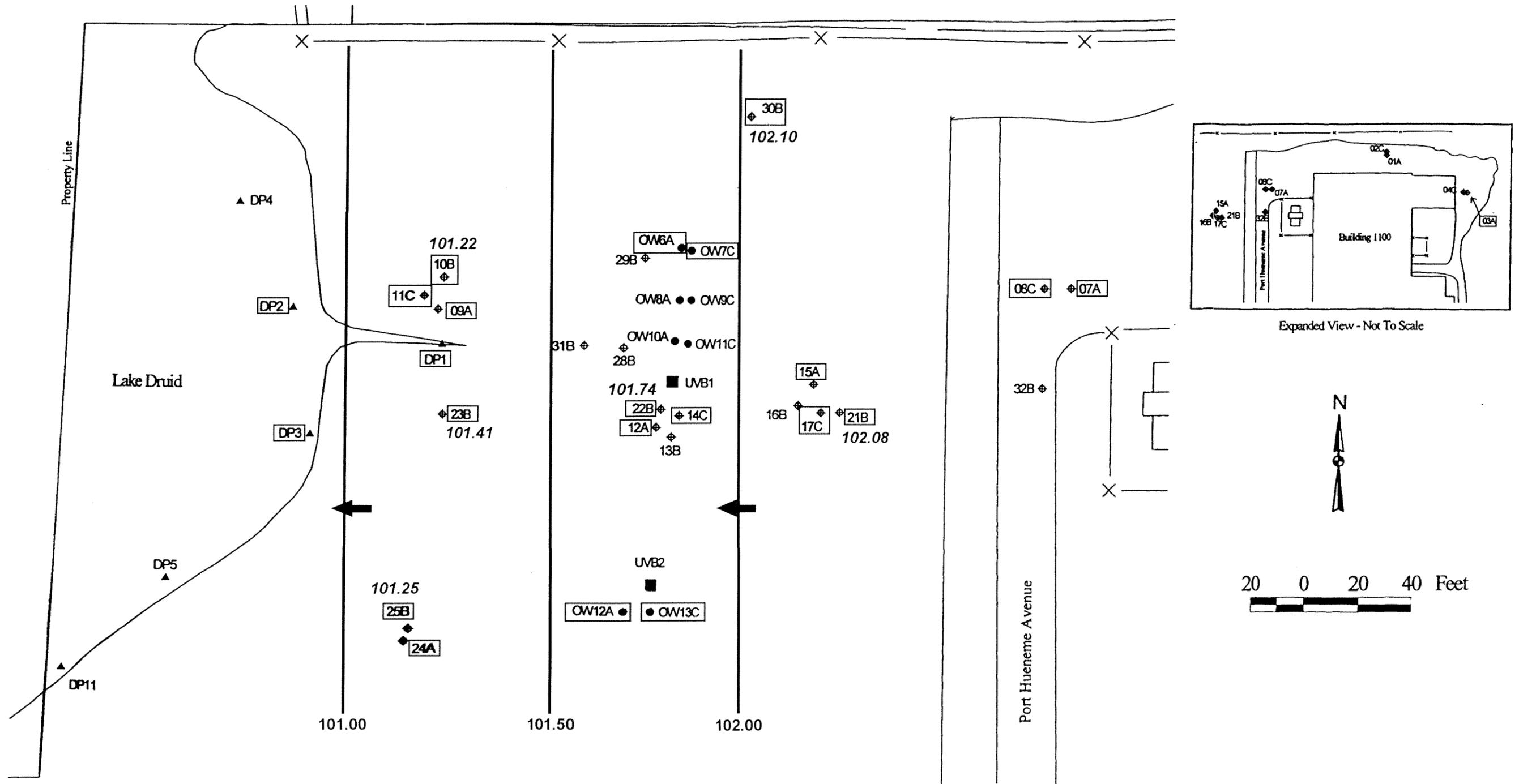
101.22

- ◆ 33A
- ◆ 34B
- ◆ 35C

**FIGURE 2**  
 OU-4 Groundwater Flow (Shallow Zone)

INTERIM REMEDIAL ACTION,  
 PERFORMANCE MONITORING  
 AND SAMPLING PLAN,  
 OPERABLE UNIT 4

NAVAL TRAINING CENTER  
 ORLANDO, FLORIDA



**LEGEND**

- ⊕ Monitoring Well Location and Designation
- Observation Well Location and Designation
- ▲ Drive Point Well Location and Designation
- Recirculation Well Location and Designation
- 25B Monitoring Wells Included in Current Monitoring Program
- 101.26 Groundwater Elevation (MSL, USGS North American Datum, 1929)
- 101.00 Groundwater Contour Line (MSL, USGS North American Datum, 1929)
- ← Groundwater Flow Direction

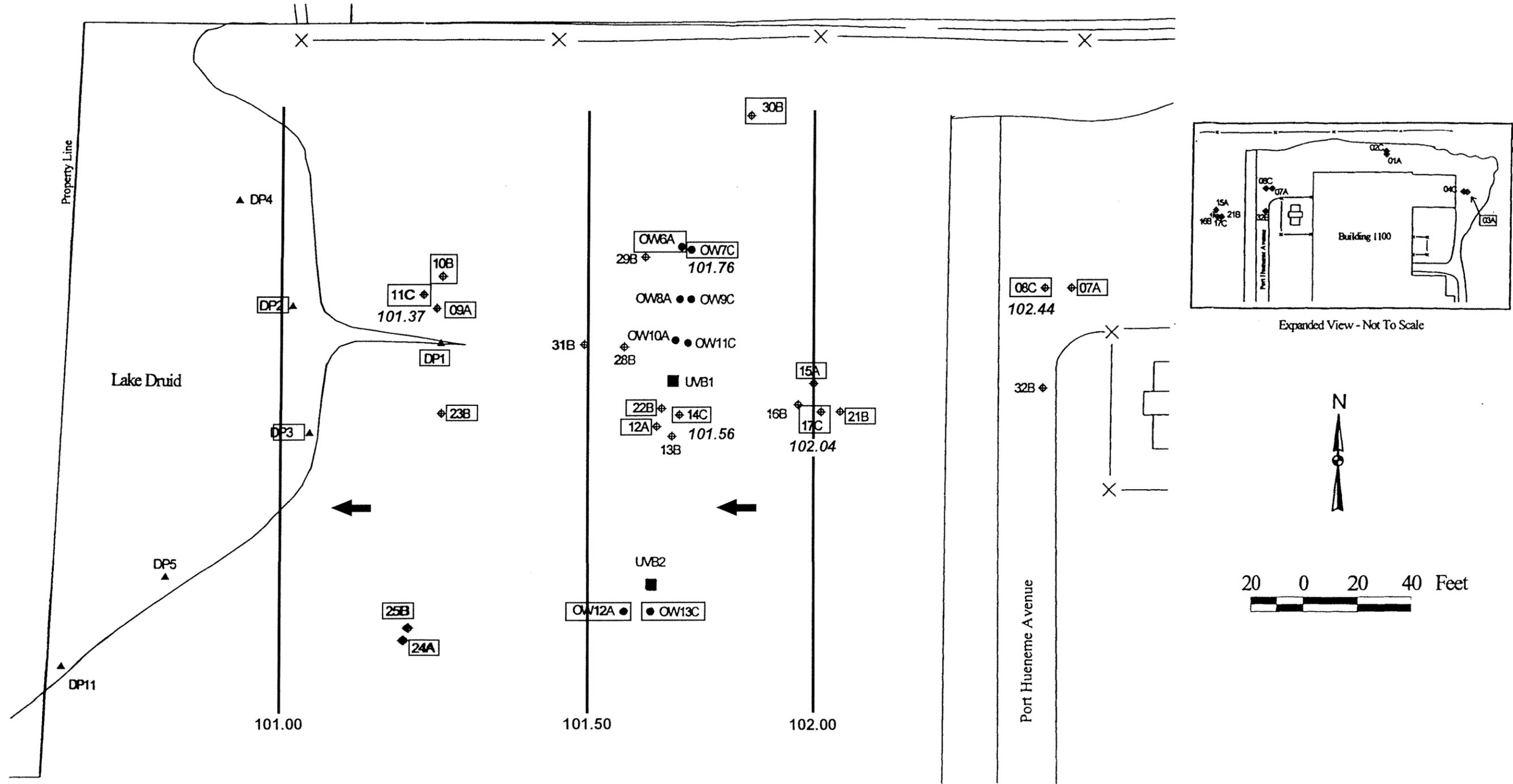
Well Cluster located approx. 55' to S-SW

101.29

- ⊕ 33A
- ⊕ 34B
- ⊕ 35C

**FIGURE 3**  
 OU-4 Groundwater Flow (Intermediate Zone)


 INTERIM REMEDIAL ACTION,  
 PERFORMANCE MONITORING  
 AND SAMPLING PLAN.  
 OPERABLE UNIT 4  
 NAVAL TRAINING CENTER  
 ORLANDO, FLORIDA



**LEGEND**

- ⊕ Monitoring Well Location and Designation
- Observation Well Location and Designation
- ▲ Drive Point Well Location and Designation
- Recirculation Well Location and Designation
- 25B Monitoring Wells Included in Current Monitoring Program
- 101.26 Groundwater Elevation (MSL, USGS North American Datum, 1929)
- 101.00 Groundwater Contour Line (MSL, USGS North American Datum, 1929)
- ← Groundwater Flow Direction

Well Cluster located approx. 55' to S-SW

101.31

- ⊕ 33A
- ⊕ 34B
- ⊕ 35C

**FIGURE 4**  
OU-4 Groundwater Flow (Deep Zone)

INTERIM REMEDIAL ACTION,  
PERFORMANCE MONITORING  
AND SAMPLING PLAN,  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Appendix A

# WELL SAMPLING FIELD SHEET

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## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-15A</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b> <span style="float: right;">(leave blank if on previous page)</span>					
DEPTH TO WATER (FT):	6.66	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	15.05	<b>2 IN.</b>		<b>0.1632</b>	
WATER COLUMN (FT):	8.39	<b>4 IN.</b>		<b>0.6528</b>	
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>	
CASING VOLUME (GAL)	1.369248	<b>8 IN.</b>		<b>2.611</b>	
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>	
PURGE VOLUME (GAL) =	4.107744	<b>12 IN.</b>		<b>5.8748</b>	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 10:40AM		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS:
PUMP TIME (min): 40		VOL. PURGED (gals):
VOL. PURGED (gals): 5		OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS						WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	6th	
VOL. (gal)	2	4	5				
pH (s.units)	6.7	6.69	6.7				
TEMP.(C)	25.5	25.6	25.6				
COND.(mshos/cm)	0.151	0.15	0.15				
Turbidity (ntu's)	8	7	6				
DO (mg/l)	0.29	0.22	0.2				
ORP (mv)	-8	-9	-8				

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ):

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER : OLD-13-DUP1-Q3-00 collected

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/18/00 / @ 1120

**SIGNED/SAMPLER:** F. J. Ferreira

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-21B</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)			
DEPTH TO WATER (FT):	6.59	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	35.21	<b>2 IN.</b>		<b>0.1632</b>	
WATER COLUMN (FT):	28.62	<b>4 IN.</b>		<b>0.6528</b>	
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>	
CASING VOLUME (GAL)	4.670784	<b>8 IN.</b>		<b>2.611</b>	
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>	
PURGE VOLUME (GAL) =	14.012352	<b>12 IN.</b>		<b>5.8748</b>	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 10:50		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.25		REQUIRED PULLS: _____
PUMP TIME (min): 60		VOL. PURGED (gals): _____
VOL. PURGED (gals): 15		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	5	10	15			
pH (s.units)	4.55	4.52	4.54			
TEMP.(C)	25.3	25.3	25.3			
COND.(mshos/cm)	0.125	0.12	0.12			
Turbidity (ntu's)	5.8	4.9	6.3			
DO (mg/l)	0.37	0.31	0.3			
ORP (mv)	-101	-112	-114			

SAMPLE PARAMETERS ( **GRAB** OR **COMPOSITE** ) :

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/18/00 / @ 1150

**SIGNED/SAMPLER:**

*F. J. Ferreira*





## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-12A</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>					(leave blank if on previous page)
DEPTH TO WATER (FT):	5.47	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	13.98	2 IN.		0.1632	
WATER COLUMN (FT):	8.51	4 IN.		0.6528	
GAL/FT OF CASING	0.1632	6 IN.		1.4688	
CASING VOLUME (GAL)	1.388832	8 IN.		2.611	
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797	
PURGE VOLUME (GAL) =	4.166496	12 IN.		5.8748	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER :</b> TEFLON, SS ,OTHER:
TIME ON: 8:39AM		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS: _____
PUMP TIME (min): 36		VOL. PURGED (gals): _____
VOL. PURGED (gals): 4.5		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	1.5	3	4.5			
pH (s.units)	6.32	6.26	6.25			
TEMP.(C)	24.6	24.4	24.4			
COND.(mshos/cm)	0.084	0.082	0.084			
Turbidity (ntu's)	18.8	6	2.1			
DO (mg/l)	0.4	0.39	0.38			
ORP (mv)	-34	-17	-19			

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ): \_\_\_\_\_  
 FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER: \_\_\_\_\_

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:** \_\_\_\_\_

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS ,WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER : OLD-13-DUP3-Q3-00 collected

**Q.C. PARAMETERS:** \_\_\_\_\_

**SAMPLE DATE/ TIME:** 7/19/00 / @ 0915

**SIGNED/SAMPLER:** F. Ferreira

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-22B</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>				
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)				
DEPTH TO WATER (FT):	5.31	CASING DIA.		GAL/FT OF CASING		
WELL DEPTH (FT):	34.66	<b>2 IN.</b>		<b>0.1632</b>		
WATER COLUMN (FT):	29.35	<b>4 IN.</b>		<b>0.6528</b>		
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>		
CASING VOLUME (GAL)	4.78992	<b>8 IN.</b>		<b>2.611</b>		
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>		
PURGE VOLUME (GAL) =	14.36976	<b>12 IN.</b>		<b>5.8748</b>		
<b>METHOD OF PURGING (circle one)</b>						
<b>PUMP:</b> SUB. CENT. PERIST.		<b>OTHER:</b>		<b>BAILER:</b> TEFLON, SS, OTHER:		
TIME ON:	0940 AM			BAILER VOL.. (gal)	.25 / .33	
FLOW RATE (ga/min):	0.25			REQUIRED PULLS:		
PUMP TIME (min):	60			VOL. PURGED (gals):		
VOL. PURGED (gals):	15			OTHER:		
<b>FIELD PARAMETERS</b>	<b>FIELD MEASUREMENTS</b>					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	6th
VOL. (gal)	5	10	15			
pH (s.units)	4.71	4.7	4.7			
TEMP.(C)	24.3	24.4	24.4			
COND.(mshos/cm)	0.133	0.131	0.128			
Turbidity (ntu's)	5.1	9.6	8.2			
DO (mg/l)	0.48	0.41	0.4			
ORP (mv)	-67	-79	-82			
SAMPLE PARAMETERS ( <b>GRAB</b> OR <b>COMPOSITE</b> ) :						
FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER:						
<b>OBSERVATIONS</b>						
COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: <b>CLEAR</b>						
ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN						
TURBIDITY: low						
COMMENTS:						
OTHER: PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.						
Q.C. SAMPLE TYPE: DUPLICATE , EQUIPMENT BLANK , OTHER :						
Q.C. PARAMETERS:						
SAMPLE DATE/ TIME: 7/19/00 / @ 0940						

SIGNED/SAMPLER: \_\_\_\_\_

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-OW6A</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>		
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)		
DEPTH TO WATER (FT):	6.36	CASING DIA.		GAL/FT OF CASING
WELL DEPTH (FT):	14.04	<b>2 IN.</b>		<b>0.1632</b>
WATER COLUMN (FT):	7.68	<b>4 IN.</b>		<b>0.6528</b>
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>
CASING VOLUME (GAL)	1.253376	<b>8 IN.</b>		<b>2.611</b>
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>
PURGE VOLUME (GAL) =	3.760128	<b>12 IN.</b>		<b>5.8748</b>

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER :</b> TEFLON, SS ,OTHER:
TIME ON: 945		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS: _____
PUMP TIME (min): 30		VOL. PURGED (gals): _____
VOL. PURGED (gals): 3.75		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	2	3	4			
pH (s.units)	6.24	6.23	6.23			
TEMP.(C)	24.9	24.9	24.9			
COND.(mshos/cm)	0.126	0.218	0.219			
Turbidity (ntu's)	6.3	1.2	3.5			
DO (mg/l)	0.44	0.38	0.35			
ORP (mv)	-24	-16	-16			

SAMPLE PARAMETERS ( **GRAB** OR **COMPOSITE** ) : \_\_\_\_\_  
 FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER: \_\_\_\_\_

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** none

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/19/00 / @ 1015

**SIGNED/SAMPLER:** F. Ferreira



## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-30B</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>		
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)		
DEPTH TO WATER (FT):	8.47	CASING DIA.		GAL/FT OF CASING
WELL DEPTH (FT):	37.47	2 IN.		0.1632
WATER COLUMN (FT):	29	4 IN.		0.6528
GAL/FT OF CASING	0.1632	6 IN.		1.4688
CASING VOLUME (GAL)	4.7328	8 IN.		2.611
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797
PURGE VOLUME (GAL) =	14.1984	12 IN.		5.8748

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 10:30		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.25		REQUIRED PULLS:
PUMP TIME (min): 60		VOL. PURGED (gals):
VOL. PURGED (gals): 15		OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	5	10	15			
pH (s.units)	4.6	4.6	4.59			
TEMP.(C)	25.3	25.4	25.3			
COND.(mshos/cm)	0.213	0.21	0.208			
Turbidity (ntu's)	6.3	1.7	1.9			
DO (mg/l)	0.38	0.3	0.29			
ORP (mv)	-52	-60	-72			

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ) :

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER : OLD-13-DUP2-Q3-00

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/19/00 / @ 1130

**SIGNED/SAMPLER:** F. Ferreira





# CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

WELL NUMBER: OLD-13-24A      SITE: OU-4, Study Area 13, Area C, NTC ORL

FIELD CREW: FJ Ferreira, CPG, JJ Ottoson (leave blank if on previous page)

DEPTH TO WATER (FT):	5.76	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	15.01	2 IN.		0.1632	
WATER COLUMN (FT):	9.25	4 IN.		0.6528	
GAL/FT OF CASING	0.1632	6 IN.		1.4688	
CASING VOLUME (GAL)	1.5096	8 IN.		2.611	
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797	
PURGE VOLUME (GAL) =	4.5288	12 IN.		5.8748	

**METHOD OF PURGING (circle one)**

PUMP: SUB. CENT. PERIST.	OTHER:	BAILER : TEFLON, SS ,OTHER:
TIME ON: 13:25 PM		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS:
PUMP TIME (min): 40		VOL. PURGED (gals):
VOL. PURGED (gals): 5		OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	2	4	5			
pH (s.units)	5.7	5.75	5.78			
TEMP.(C)	24.1	24.1	24.1			
COND.(mshos/cm)	0.11	0.114	0.113			
Turbidity (ntu's)	32	22	18			
DO (mg/l)	0.38	0.31	0.33			
ORP (mv)	-50	-71	-74			

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ): FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS ,WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/19/00 / @ 1405

**SIGNED/SAMPLER:** F. J. Ferreira

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-25B</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>					(leave blank if on previous page)
DEPTH TO WATER (FT):	5.75	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	24.75	<b>2 IN.</b>		<b>0.1632</b>	
WATER COLUMN (FT):	19	<b>4 IN.</b>		<b>0.6528</b>	
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>	
CASING VOLUME (GAL)	3.1008	<b>8 IN.</b>		<b>2.611</b>	
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>	
PURGE VOLUME (GAL) =	9.3024	<b>12 IN.</b>		<b>5.8748</b>	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 13:20 PM		BAILER VOL. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS:
PUMP TIME (min): 80		VOL. PURGED (gals):
VOL. PURGED (gals): 10		OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	3	6	10			
pH (s.units)	5.28	5.39	5.36			
TEMP.(C)	24.5	24.4	24.4			
COND.(mshos/cm)	0.255	0.242	0.239			
Turbidity (ntu's)	41	21	14			
DO (mg/l)	0.47	0.41	0.35			
ORP (mv)	-29	-16	-15			

SAMPLE PARAMETERS ( **GRAB** OR **COMPOSITE** ):

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/19/00 / @ 1430

**SIGNED/SAMPLER:**

*F. Ferreira*

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-09A</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>				
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)				
DEPTH TO WATER (FT):	4.76	CASING DIA.		GAL/FT OF CASING		
WELL DEPTH (FT):	13.81	2 IN.		0.1632		
WATER COLUMN (FT):	9.05	4 IN.		0.6528		
GAL/FT OF CASING	0.1632	6 IN.		1.4688		
CASING VOLUME (GAL)	1.47696	8 IN.		2.611		
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797		
PURGE VOLUME (GAL) =	4.43088	12 IN.		5.8748		
<b>METHOD OF PURGING (circle one)</b>						
<b>PUMP:</b> SUB. CENT. PERIST.		<b>OTHER:</b>		<b>BAILER:</b> TEFLON, SS ,OTHER:		
TIME ON:	9:00AM			BAILER VOL.. (gal)	.25 / .33	
FLOW RATE (ga/min):	0.125			REQUIRED PULLS:		
PUMP TIME (min):	40			VOL. PURGED (gals):		
VOL. PURGED (gals):	5			OTHER:		
<b>FIELD PARAMETERS</b>	<b>FIELD MEASUREMENTS</b>					WITHIN10% Y / N
	1st	2nd	3rd	4th	5th	6th
VOL. (gal)	2	4	5			
pH (s.units)	6.32	6.31	6.29			
TEMP.(C)	24.2	24.2	24.3			
COND.(mshos/cm)	0.105	0.108	0.111			
Turbidity (ntu's)	18	14	7			
DO (mg/l)	0.29	0.27	0.26			
ORP (mv)	-35	-49	-56			
SAMPLE PARAMETERS ( <b>GRAB</b> OR <b>COMPOSITE</b> ) :						
FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER:						
<b>OBSERVATIONS</b>						
COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: <b>CLEAR</b>						
ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN						
TURBIDITY: low						
COMMENTS:						
OTHER: PLEASE USE BACK OF SHT.FOR SKETCHING MAPS ,WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.						
Q.C. SAMPLE TYPE: DUPLICATE , EQUIPMENT BLANK , OTHER : OLD-13-09A (MS/MSD) Collected						
Q.C. PARAMETERS:						
SAMPLE DATE/ TIME: 7/20/00 / @ 0940						

SIGNED/SAMPLER: \_\_\_\_\_



## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-11C</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)			
DEPTH TO WATER (FT):	4.61	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	65.3	2 IN.		0.1632	
WATER COLUMN (FT):	60.69	4 IN.		0.6528	
GAL/FT OF CASING	0.1632	6 IN.		1.4688	
CASING VOLUME (GAL)	9.904608	8 IN.		2.611	
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797	
PURGE VOLUME (GAL) =	29.713824	12 IN.		5.8748	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 9:45AM		BAILER VOL. (gal) .25 / .33
FLOW RATE (ga/min): 0.33		REQUIRED PULLS: _____
PUMP TIME (min): 120		VOL. PURGED (gals): _____
VOL. PURGED (gals): 39.6		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS						WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	6th	
VOL. (gal)	10	20	30	35	40		
pH (s.units)	9.66	9.1	7.91	7.6	7.57		
TEMP.(C)	24.7	24.9	24.9	24.9	24.9		
COND.(mshos/cm)	0.334	0.327	0.335	0.338	0.337		
Turbidity (ntu's)	27	15	16	11	13		
DO (mg/l)	0.53	0.44	0.39	0.38	0.38		
ORP (mv)	-88	-118	-194	-188	-179		

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ): \_\_\_\_\_  
 FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER: \_\_\_\_\_

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:** \_\_\_\_\_

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:** \_\_\_\_\_

**SAMPLE DATE/ TIME:** 7/20/00 / @ 1145

**SIGNED/SAMPLER:** F. J. Ferreira

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-23B</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Ottoson</b>		(leave blank if on previous page)			
DEPTH TO WATER (FT):	4.96	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	33.55	2 IN.		0.1632	
WATER COLUMN (FT):	28.59	4 IN.		0.6528	
GAL/FT OF CASING	0.1632	6 IN.		1.4688	
CASING VOLUME (GAL)	4.665888	8 IN.		2.611	
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797	
PURGE VOLUME (GAL) =	13.997664	12 IN.		5.8748	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 1150 AM		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.25		REQUIRED PULLS:
PUMP TIME (min): 60		VOL. PURGED (gals):
VOL. PURGED (gals): 15		OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	5	10	15			
pH (s.units)	4.77	4.74	4.73			
TEMP.(C)	24.3	24.5	24.5			
COND.(mshos/cm)	0.106	0.107	0.109			
Turbidity (ntu's)	24	16	6			
DO (mg/l)	0.33	0.28	0.28			
ORP (mv)	-45	-65	-74			

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ):

FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER:

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:**

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS , WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER : OLD-13-DUP4-Q3-00 Collected

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/20/00 / @ 1250

**SIGNED/SAMPLER:**

*F. Ferreira*





## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

WELL NUMBER: OLD-13-DP3      SITE: OU-4, Study Area 13, Area C, NTC ORL

FIELD CREW: FJ Ferreira, CPG, JJ Ottoson (leave blank if on previous page)

DEPTH TO WATER (FT):	4.53	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	10.52	2 IN.		0.1632	
WATER COLUMN (FT):	5.99	4 IN.		0.6528	
GAL/FT OF CASING	0.1632	6 IN.		1.4688	
CASING VOLUME (GAL)	0.977568	8 IN.		2.611	
NO. OF VOLUMES min.(3)	3	10 IN.		4.0797	
PURGE VOLUME (GAL) =	2.932704	12 IN.		5.8748	

**METHOD OF PURGING (circle one)**

PUMP: SUB. CENT. PERIST.	OTHER:	BAILER : TEFLON, SS ,OTHER:
TIME ON: 14:26 PM		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS: _____
PUMP TIME (min): 24		VOL. PURGED (gals): _____
VOL. PURGED (gals): 3		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	3					
pH (s.units)	5.43					
TEMP.(C)	25.1					
COND.(mshos/cm)	0.12					
Turbidity (ntu's)	31					
DO (mg/l)	0.38					
ORP (mv)	-22					

SAMPLE PARAMETERS ( GRAB OR COMPOSITE ): \_\_\_\_\_  
 FILTERED METALS COLLECTED: Y / N 1.0um,0.45um, OTHER: \_\_\_\_\_

**OBSERVATIONS**

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: CLEAR

ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

TURBIDITY: low

COMMENTS: \_\_\_\_\_

OTHER: PLEASE USE BACK OF SHT.FOR SKETCHING MAPS ,WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

Q.C. SAMPLE TYPE: DUPLICATE , EQUIPMENT BLANK , OTHER :

Q.C. PARAMETERS:

SAMPLE DATE/ TIME: 7/20/00 / @ 1450

SIGNED/SAMPLER: F. Ferreira

## CH2M HILL WELL SAMPLING FIELD SHEET

PROJECT: OU-4 Quarterly Groundwater Sampling Event

<b>WELL NUMBER: OLD-13-33A</b>		<b>SITE: OU-4, Study Area 13, Area C, NTC ORL</b>			
<b>FIELD CREW: FJ Ferreira, CPG, JJ Offoson</b>		(leave blank if on previous page)			
DEPTH TO WATER (FT):	7.13	CASING DIA.		GAL/FT OF CASING	
WELL DEPTH (FT):	14.85	<b>2 IN.</b>		<b>0.1632</b>	
WATER COLUMN (FT):	7.72	<b>4 IN.</b>		<b>0.6528</b>	
GAL/FT OF CASING	0.1632	<b>6 IN.</b>		<b>1.4688</b>	
CASING VOLUME (GAL)	1.259904	<b>8 IN.</b>		<b>2.611</b>	
NO. OF VOLUMES min.(3)	3	<b>10 IN.</b>		<b>4.0797</b>	
PURGE VOLUME (GAL) =	3.779712	<b>12 IN.</b>		<b>5.8748</b>	

**METHOD OF PURGING (circle one)**

<b>PUMP:</b> SUB. CENT. PERIST.	<b>OTHER:</b>	<b>BAILER:</b> TEFLON, SS, OTHER:
TIME ON: 9:23		BAILER VOL.. (gal) .25 / .33
FLOW RATE (ga/min): 0.125		REQUIRED PULLS: _____
PUMP TIME (min): 32		VOL. PURGED (gals): _____
VOL. PURGED (gals): 4		OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					WITHIN 10% Y / N
	1st	2nd	3rd	4th	5th	
VOL. (gal)	2	3	4			
pH (s.units)	5.76	5.79	5.79			
TEMP.(C)	24.6	24.6	24.6			
COND.(mshos/cm)	0.157	0.159	0.159			
Turbidity (ntu's)	19	11	12			
DO (mg/l)	0.41	0.37	0.37			
ORP (mv)	-96	-108	-111			

SAMPLE PARAMETERS ( **GRAB** OR **COMPOSITE** ) : \_\_\_\_\_  
 FILTERED METALS COLLECTED: Y / N 1.0um, 0.45um, OTHER: \_\_\_\_\_

**OBSERVATIONS**

**COLOR:** CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: **CLEAR**

**ODOR:** NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

**TURBIDITY:** low

**COMMENTS:** \_\_\_\_\_

**OTHER:** PLEASE USE BACK OF SHT.FOR SKETCHING MAPS ,WELL LOCATION NOTES ECT. SEE BACK OF SHT Y / N.

**Q.C. SAMPLE TYPE:** DUPLICATE , EQUIPMENT BLANK , OTHER :

**Q.C. PARAMETERS:**

**SAMPLE DATE/ TIME:** 7/21/00 / @ 0955

**SIGNED/SAMPLER:** F. Ferreira



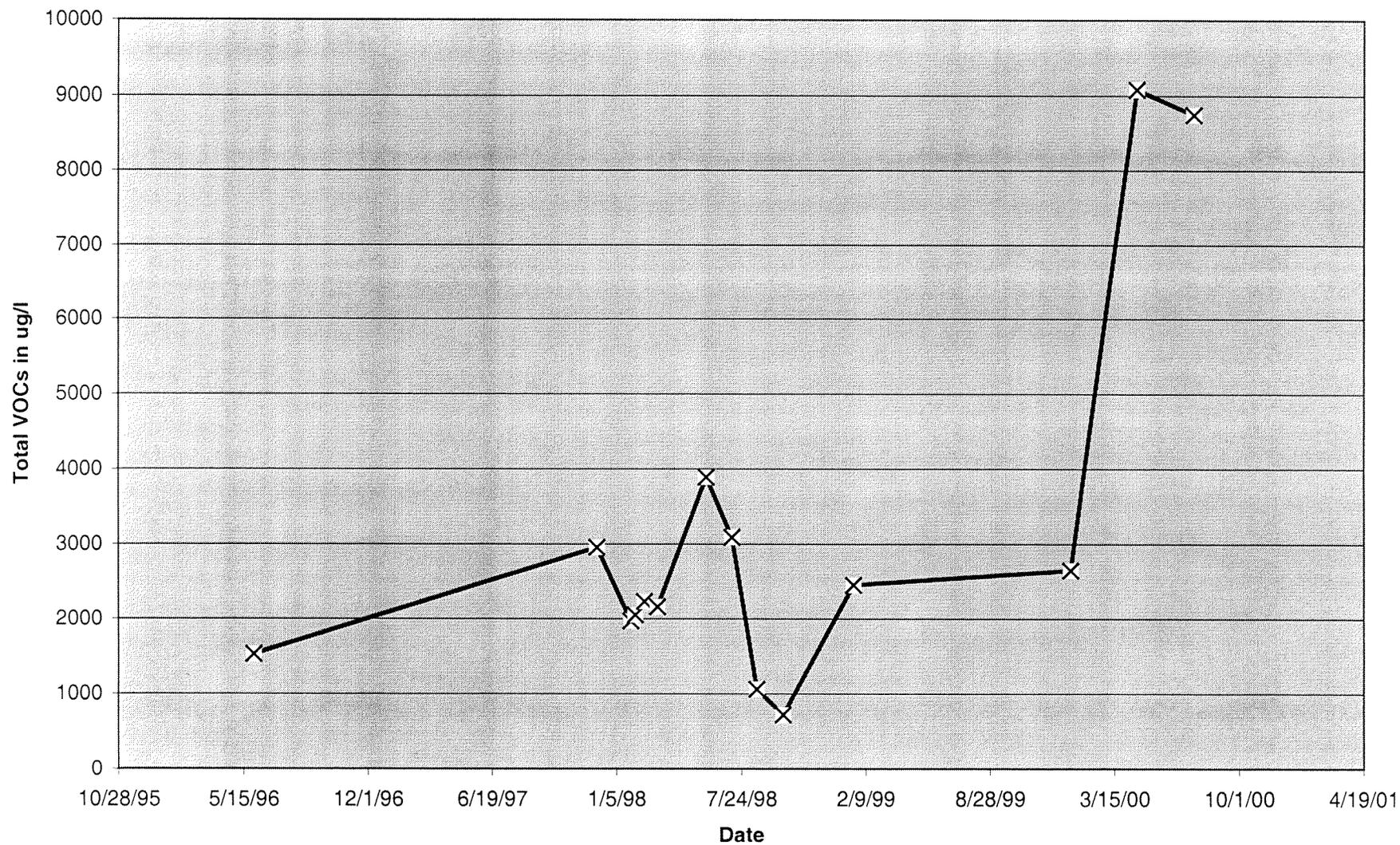


Appendix B

# **ANALYTICAL RESULTS**

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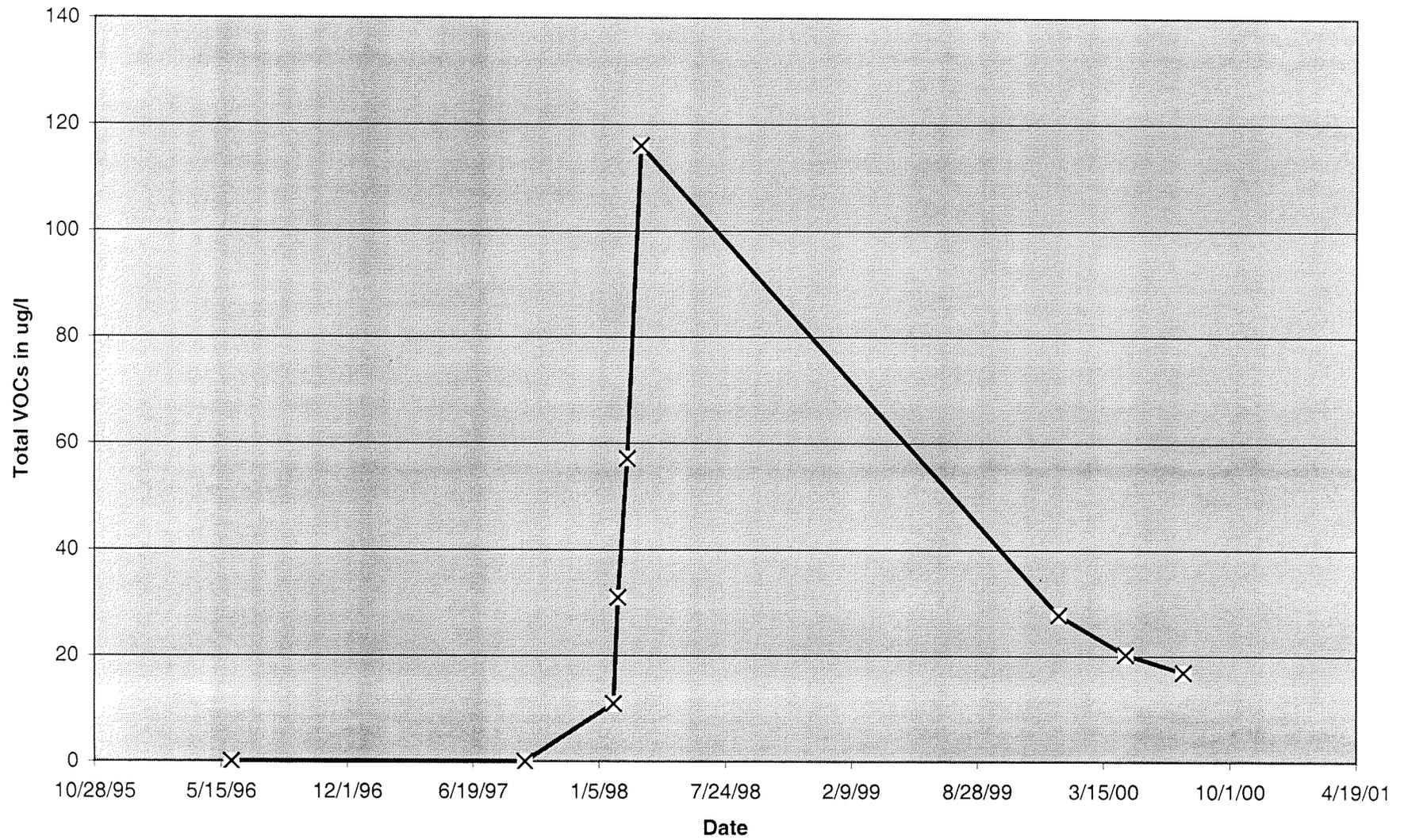
Total VOCs (ug/l) Well OLD-13-09A



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-09A**

	UNITS		Baseline	Week 1	Week 2	Week 4	Week 7	Week 18	Week 24	Week 30	Week 36	Week 52	Week 100		
Sample ID		U4G00901	U4G00902	U4G00903	U4G00904	U4G00905	U4G00906	U4G00908	U4G00909	U4G00910	U4G00911	U4G00912			
Date Sampled		06/01/96	12/05/97	01/28/98	02/04/98	02/19/98	03/12/98	05/29/98	07/09/98	08/18/98	09/29/98	01/20/99	01/05/00	4/20/00	7/20/00
Source		offsite	offsite	offsite											
PCE	ug/l	N/D	<5	<50	<50	<50	270.0	<100	< 50	< 50	<20	<50	ND	3230	2700
TCE	ug/l	680.0	360.0	370.0	550.0	530.0	590.0	690.0	490.0	160.0	38.0	450.0	467	3220	4410
C-1,2-DCE	ug/l	850.0	2500.0	1600.0	1500.0	1700.0	1300.0	3200.0	2600.0	900.0	680.0	2000.0	2130	2600	1620
T-1,2-DCE	ug/l	N/D	26.0	<50	<50	<50	<20	<100	< 50	< 50	<20	<50	25.9	29.8	12.8
1,1-DCE	ug/l	N/D	<5	<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	1.5
VC	ug/l	N/D	69.0	<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	2.2
BENZENE	ug/l	N/D		<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	ND
TOLUENE	ug/l	N/D		<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	ND
ETHYLBENZ.	ug/l	N/D		<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	ND
m/p XYLENE	ug/l	N/D		<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	ND
O XYLENE	ug/l	N/D		<50	<50	<50	<20	<100	< 50	< 50	<20	<50	ND	ND	ND
total VOCs	ug/l	1530.0	2955.0	1970.0	2050.0	2230.0	2160.0	3890.0	3090.0	1060.0	718.0	2450.0	2647	9079.8	8746.5

Total VOCs (ug/l) Well OLD-13-12A



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-12A**

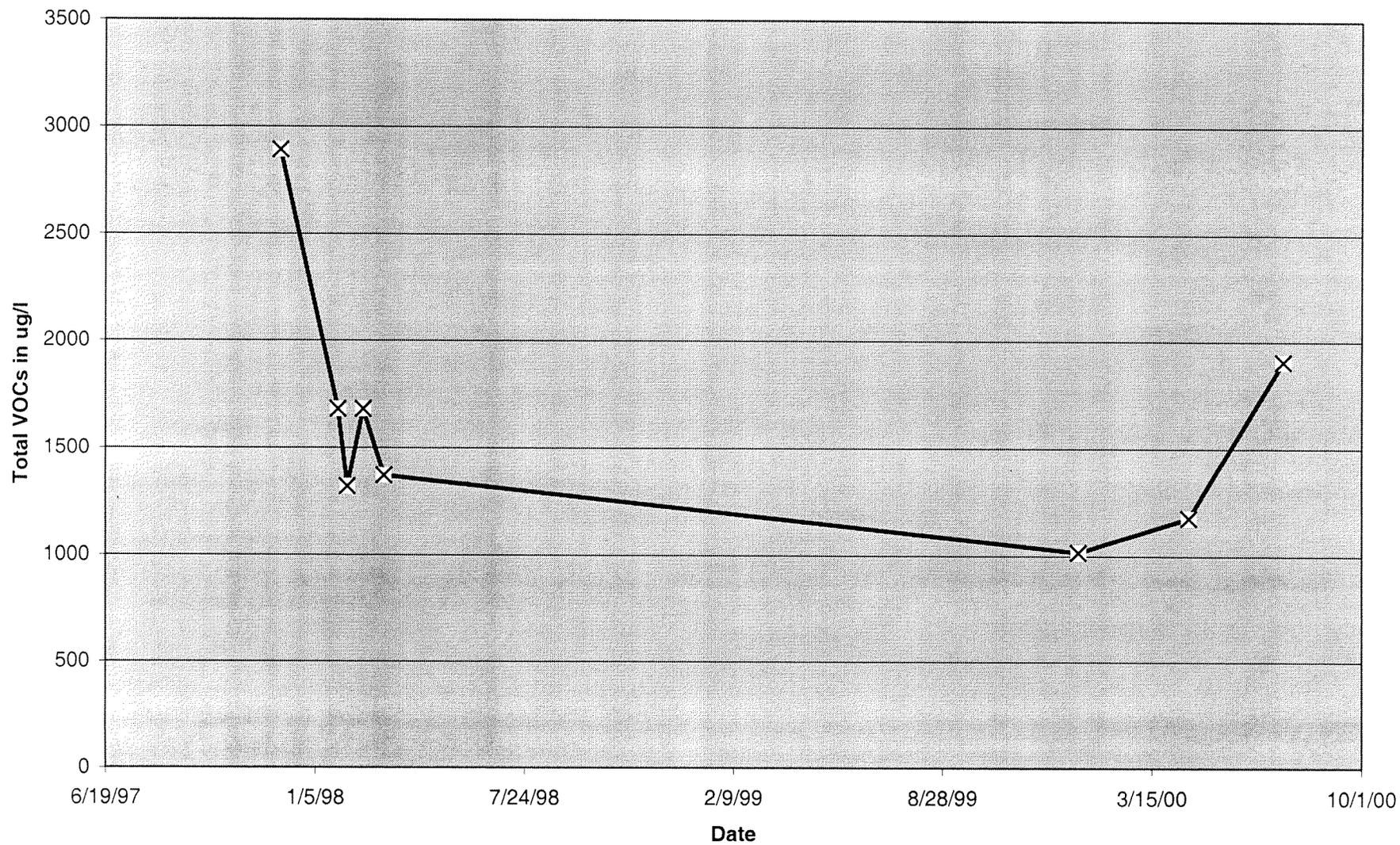
	UNITS		Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G01201	U4G01202	U4G01203	U4G01204	U4G01205	U4G01206					
Date Sampled		06/01/96	09/10/97	01/28/98	02/04/98	02/19/98	03/12/98	01/04/00	4/19/00	7/19/00		
Source		offsite	offsite	offsite								
PCE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
TCE	ug/l	N/D	<.5	<1	<1	5.1	26.0	2.7	ND	ND		
C-1,2-DCE	ug/l	N/D	<.5	11.0	31.0	52.0	90.0	25.0	20.3	17		
T-1,2-DCE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
1,1-DCE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
VC	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
BENZENE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
TOLUENE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
ETHYLBENZ.	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
m/p XYLENE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
O XYLENE	ug/l	N/D	<.5	<1	<1	<2.5	<2	ND	ND	ND		
total VOCs	ug/l	0.0	0.0	11.0	31.0	57.1	116.0	27.7	20.3	17		



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-15A**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G01501	U4G01502	U4G01503	U4G01504	U4G01505					
Date Sampled		12/3/97	1/27/98	2/5/98	2/20/98	3/12/98	1/5/00	4/19/00	7/18/00		
Source		offsite	offsite	offsite	offsite	offsite	ooffsite	offsite	offsite		
PCE	ug/l	7.0	65.0	35.0	<1	2.2	19000.0	ND	277.0		
TCE	ug/l	35.0	<5	<2.5	<1	<1	332.0	65.3	6.7		
C-1,2-DCE	ug/l	42.0	<5	<2.5	<1	<1	67.8	3250.0	2.3		
T-1,2-DCE	ug/l	<5	<5	<2.5	<1	<1	1.4	41.1	ND		
1,1-DCE	ug/l	<5	<5	<2.5	<1	<1	ND	2.8	ND		
VC	ug/l	<5	<5	<2.5	<1	<1	1.4	ND	ND		
BENZENE	ug/l		<5	<2.5	<1	<1	ND	ND	ND		
TOLUENE	ug/l		<5	<2.5	<1	<1	ND	ND	ND		
ETHYLBENZ.	ug/l		<5	<2.5	<1	<1	ND	ND	ND		
m/p XYLENE	ug/l		<5	<2.5	<1	<1	ND	ND	ND		
O XYLENE	ug/l		<5	<2.5	<1	<1	ND	ND	ND		
total VOCs	ug/l	84.0	65.0	35.0	<1	2.2	19403.0	3359.2	286.0		

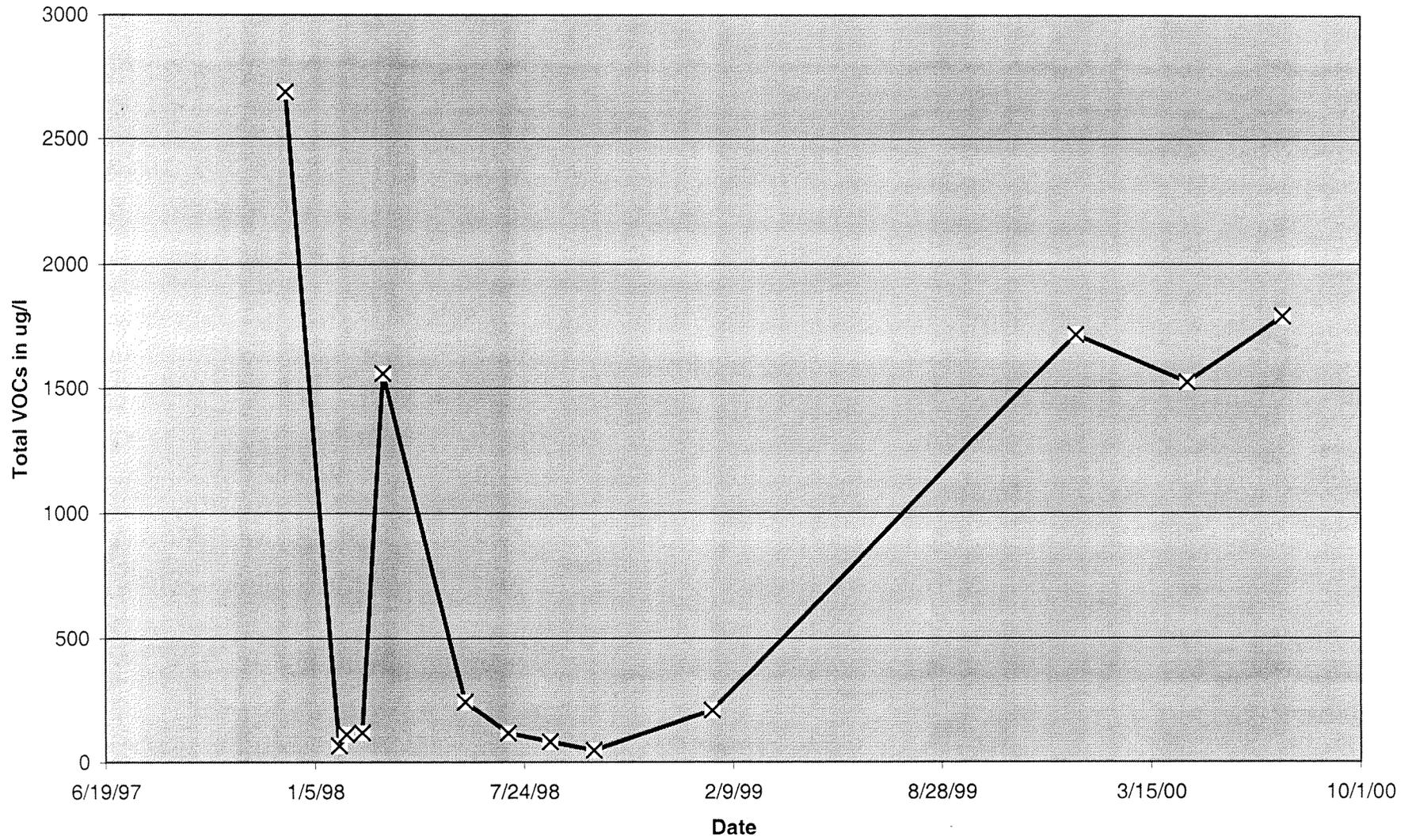
Total VOCs (ug/l) Well OLD-13-21B



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-21B**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G02101	U4G02102	U4G02103	U4G02104	U4G02105					
Date Sampled		12/3/97	1/27/98	2/5/98	2/20/98	3/12/98	1/5/00	4/19/00	7/18/00		
Source		offsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite		
PCE	ug/l	20.0	<20	<20	<50	<20	10.4	15.4	28.2		
TCE	ug/l	1200.0	690.0	530.0	680.0	600.0	296.0	428.0	333		
C-1,2-DCE	ug/l	1640.0	990.0	790.0	1000.0	770.0	700.0	725.0	1530		
T-1,2-DCE	ug/l	31.0	<20	<20	<50	<20	9.1	8.1	11.5		
1,1-DCE	ug/l	<5	<20	<20	<50	<20	ND	ND	ND		
VC	ug/l	<5	<20	<20	<50	<20	ND	ND	ND		
BENZENE	ug/l		<20	<20	<50	<20	ND	ND	ND		
TOLUENE	ug/l		<20	<20	<50	<20	ND	ND	ND		
ETHYLBENZ.	ug/l		<20	<20	<50	<20	ND	ND	ND		
m/p XYLENE	ug/l		<20	<20	<50	<20	ND	ND	ND		
O XYLENE	ug/l		<20	<20	<50	<20	ND	ND	ND		
total VOCs	ug/l	2891.0	1680.0	1320.0	1680.0	1370.0	1016.0	1176.5	1906.2		

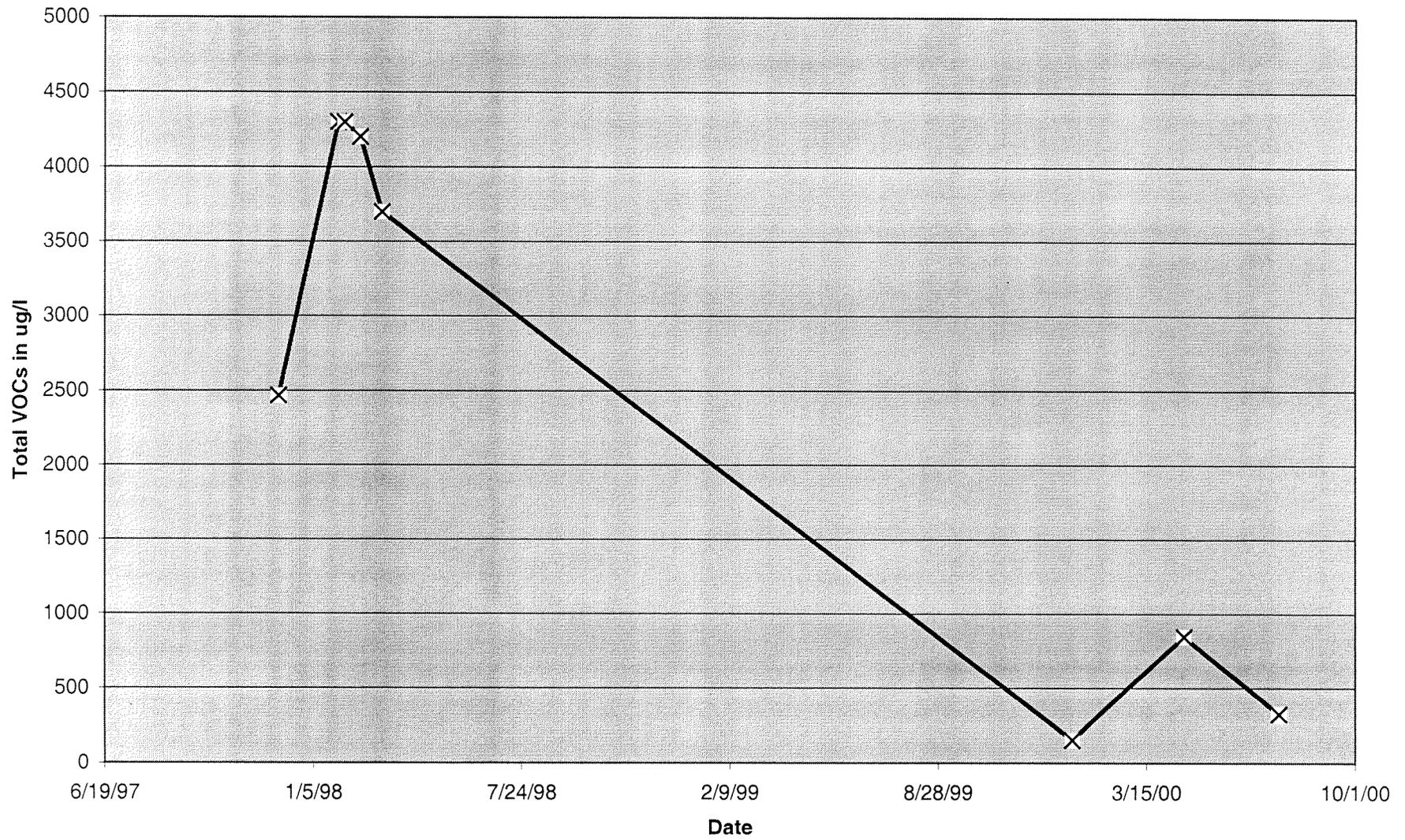
Total VOCs (ug/l) Well OLD-13-22B



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-22B**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7	Week 18	Week 24	Week 30	Week 36	Week 52			
Sample ID		U4G02201	U4G02202	U4G02203	U4G02205	U4G02206	U4G02207	U4G02208	U4G02209	U4G02210	U4G02211			
Date Sampled		12/9/97	1/28/98	2/4/98	2/19/98	3/12/98	5/29/98	7/9/98	8/18/98	9/29/98	1/20/99	1/4/00	4/19/00	7/19/00
Source		offsite	offsite	offsite	offsite									
PCE	ug/l	<94	<2.5	<5	<2.5	<20	6.6	22.0	21	10	42	8.1	8.6	3.9
TCE	ug/l	690.0	11.0	21.0	24.0	360.0	56.0	22.0	54	26	36	226	263	172
C-1,2-DCE	ug/l	2000.0	55.0	90.0	94.0	1200.0	180.0	72.0	6.7	12	130	1470	1240	1600
T-1,2-DCE	ug/l	<94	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	14.3	13.6	17.6
1,1-DCE	ug/l	<94	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	1	ND	ND
VC	ug/l	<120	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
BENZENE	ug/l	<94	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
TOLUENE	ug/l	<94	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
ETHYLBENZ.	ug/l	<62	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
m/p XYLENE	ug/l	<62	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
O XYLENE	ug/l	<62	<2.5	<5	<2.5	<20	<5	< 2	< 2.5	<1	<5	ND	ND	ND
total VOCs	ug/l	2690.0	66.0	111.0	118.0	1560.0	242.6	116.0	81.7	48.0	208.0	1719	1525.2	1793.5

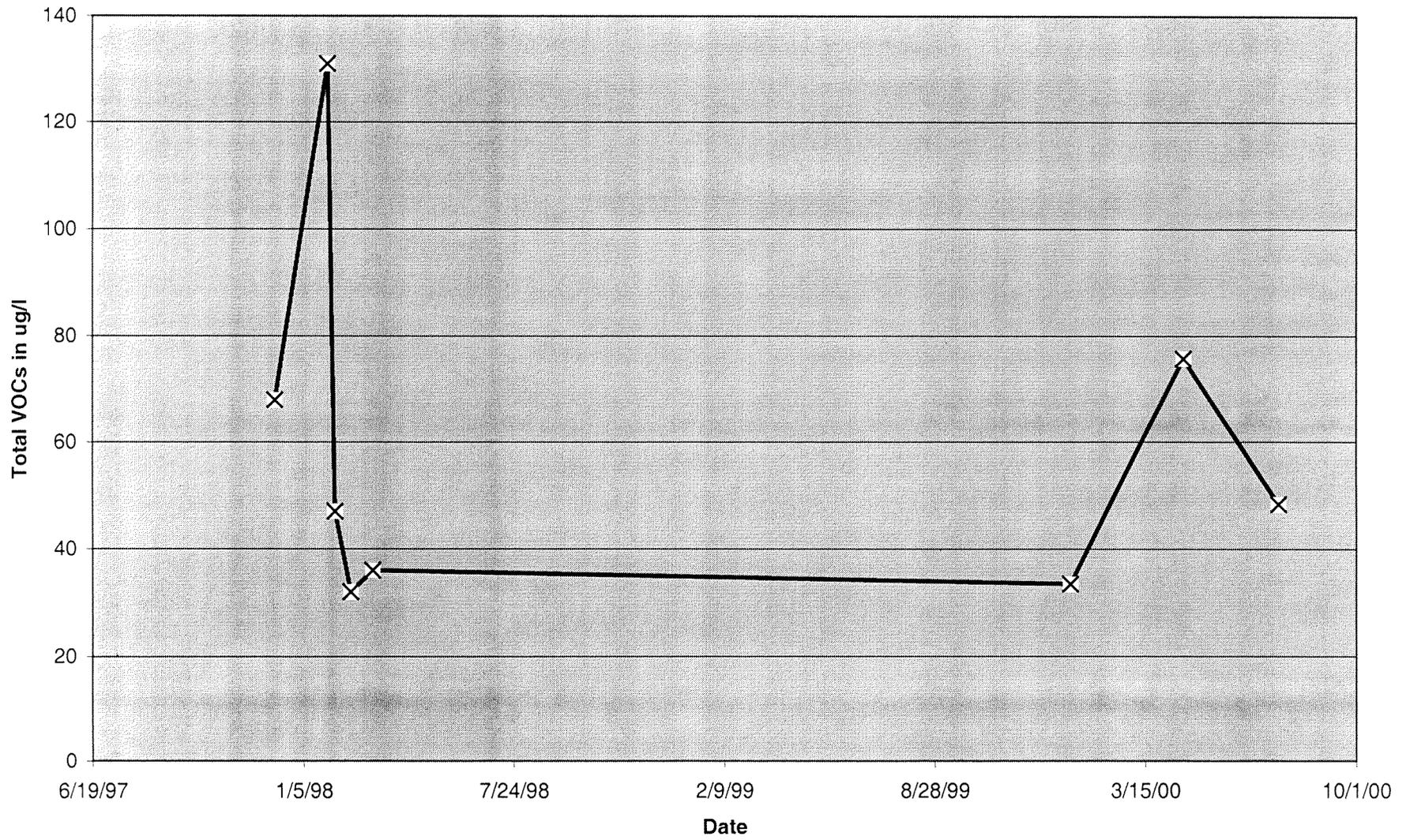
Total VOCs (ug/l) Well OLD-13-23B



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-23B**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G02301	U4G02302	U4G02303	U4G02304	U4G02305					
Date Sampled		12/3/97	1/29/98	2/4/98	2/19/98	3/12/98	1/4/00	4/20/00	7/20/00		
Source		offsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite		
PCE	ug/l	23.0	<200	<50	<200	<50	9.0	ND	2.5		
TCE	ug/l	1900.0	3000.0	2400.0	2500.0	2000.0	25.4	142.0	90.6		
C-1,2-DCE	ug/l	520.0	1300.0	1900.0	1700.0	1700.0	119.0	698.0	230		
T-1,2-DCE	ug/l	24.0	<200	<50	<200	<50	ND	7.5	1.4		
1,1-DCE	ug/l	<5	<200	<50	<200	<50	ND	ND	ND		
VC	ug/l	<5	<200	<50	<200	<50	ND	ND	ND		
BENZENE	ug/l		<200	<50	<200	<50	ND	ND	ND		
TOLUENE	ug/l		<200	<50	<200	<50	ND	ND	ND		
ETHYLBENZ.	ug/l		<200	<50	<200	<50	ND	ND	ND		
m/p XYLENE	ug/l		<200	<50	<200	<50	ND	ND	ND		
O XYLENE	ug/l		<200	<50	<200	<50	ND	ND	ND		
total VOCs	ug/l	2467.0	4300.0	4300.0	4200.0	3700.0	153.4	847.5	324.5		

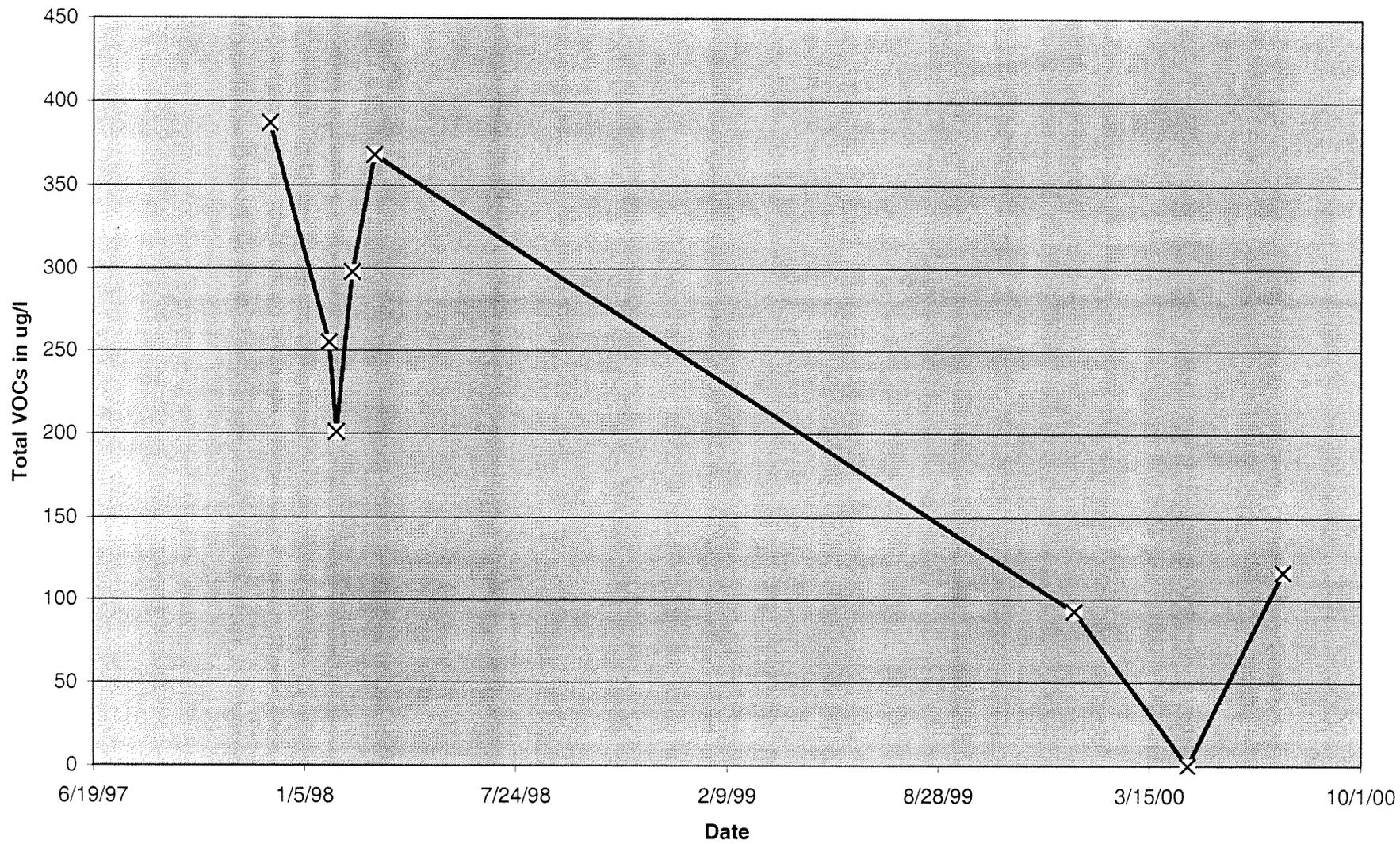
Total VOCs (ug/l) Well OLD-13-24A



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-24A**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G02401	U4G02402	U4G02403	U4G02404	U4G02405					
Date Sampled		12/9/97	1/28/98	2/4/98	2/19/98	3/12/98	1/4/00	4/20/00	7/19/00		
Source		offsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite		
PCE	ug/l	<2	<10	<1	<1	<1	ND	ND	ND		
TCE	ug/l	22.0	35.0	14.0	11.0	14.0	13.4	28.6	15.4		
C-1,2-DCE	ug/l	46.0	96.0	33.0	21.0	22.0	20.1	45.7	32.9		
T-1,2-DCE	ug/l	<1	<10	<1	<1	<1	ND	1.2	ND		
1,1-DCE	ug/l	<2	<10	<1	<1	<1	ND	ND	ND		
VC	ug/l	<2	<10	<1	<1	<1	ND	ND	ND		
BENZENE	ug/l	<2	<10	<1	<1	<1	ND	ND	ND		
TOLUENE	ug/l	<2	<10	<1	<1	<1	ND	ND	ND		
ETHYLBENZ.	ug/l	<1	<10	<1	<1	<1	ND	ND	ND		
m/p XYLENE	ug/l	<1	<10	<1	<1	<1	ND	ND	ND		
O XYLENE	ug/l	<1	<10	<1	<1	<1	ND	ND	ND		
total VOCs	ug/l	68.0	131.0	47.0	32.0	36.0	33.5	75.7	48.3		

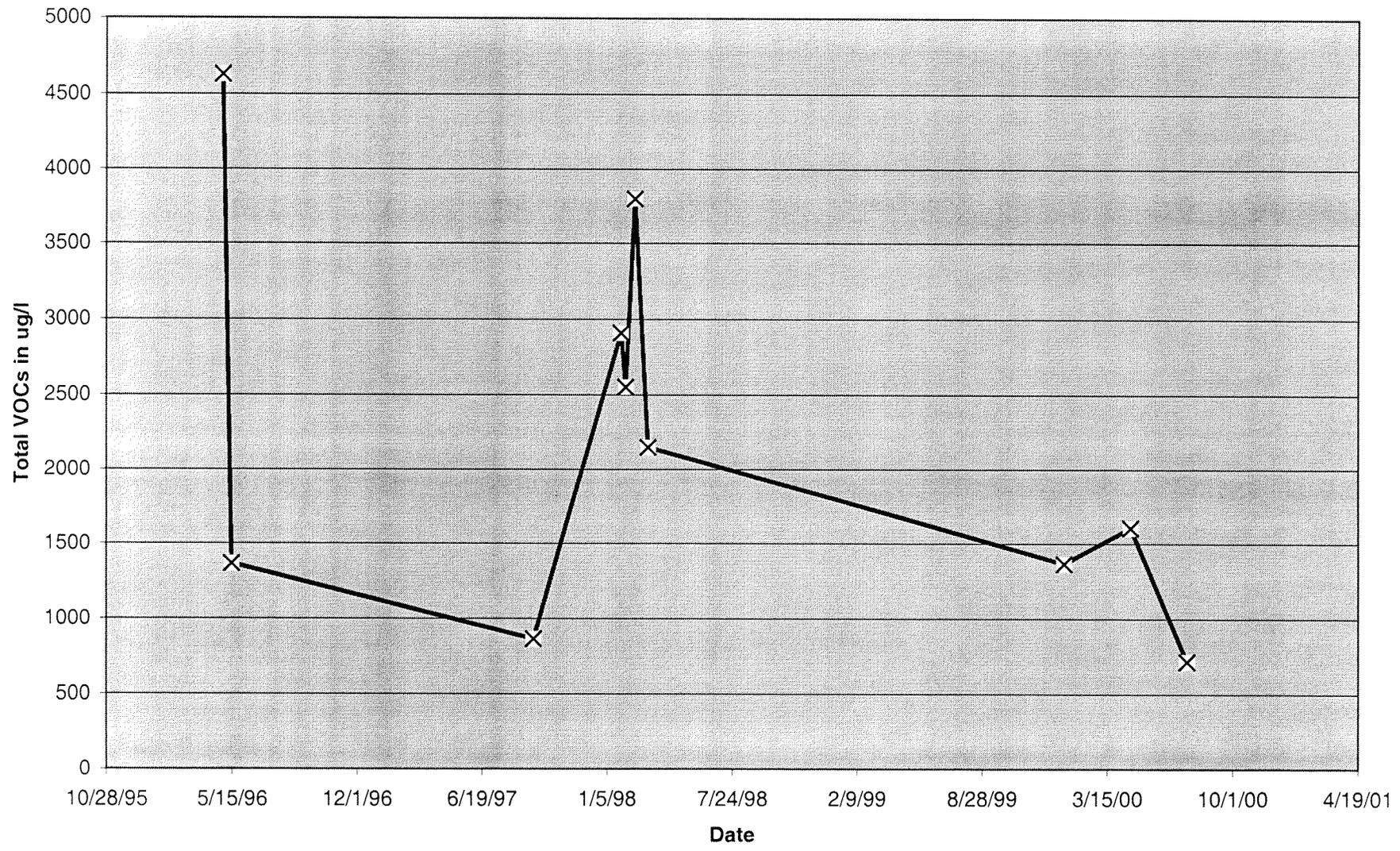
Total VOCs (ug/l) Well OLD-13-25B



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - OLD-13-25B**

	UNITS	Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G02501	U4G02502	U4G02503	U4G02504	U4G02505					
Date Sampled		12/3/97	1/28/98	2/4/98	2/19/98	3/12/98	1/4/00	4/20/00	7/19/00		
Source		offsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite		
PCE	ug/l	280.0	240.0	180.0	270.0	320.0	69.4	ND	33.8		
TCE	ug/l	71.0	15.0	21.0	28.0	32.0	17.3	ND	34.6		
C-1,2-DCE	ug/l	36.0	<10	<10	<10	16.0	6.2	ND	47.4		
T-1,2-DCE	ug/l	<5	<10	<10	<10	<5	ND	ND	1.2		
1,1-DCE	ug/l	<5	<10	<10	<10	<5	ND	ND	ND		
VC	ug/l	<5	<10	<10	<10	<5	ND	ND	ND		
BENZENE	ug/l		<10	<10	<10	<5	ND	ND	ND		
TOLUENE	ug/l		<10	<10	<10	<5	ND	ND	ND		
ETHYLBENZ.	ug/l		<10	<10	<10	<5	ND	ND	ND		
m/p XYLENE	ug/l		<10	<10	<10	<5	ND	ND	ND		
O XYLENE	ug/l		<10	<10	<10	<5	ND	ND	ND		
total VOCs	ug/l	387.0	255.0	201.0	298.0	368.0	92.9	ND	117.0		

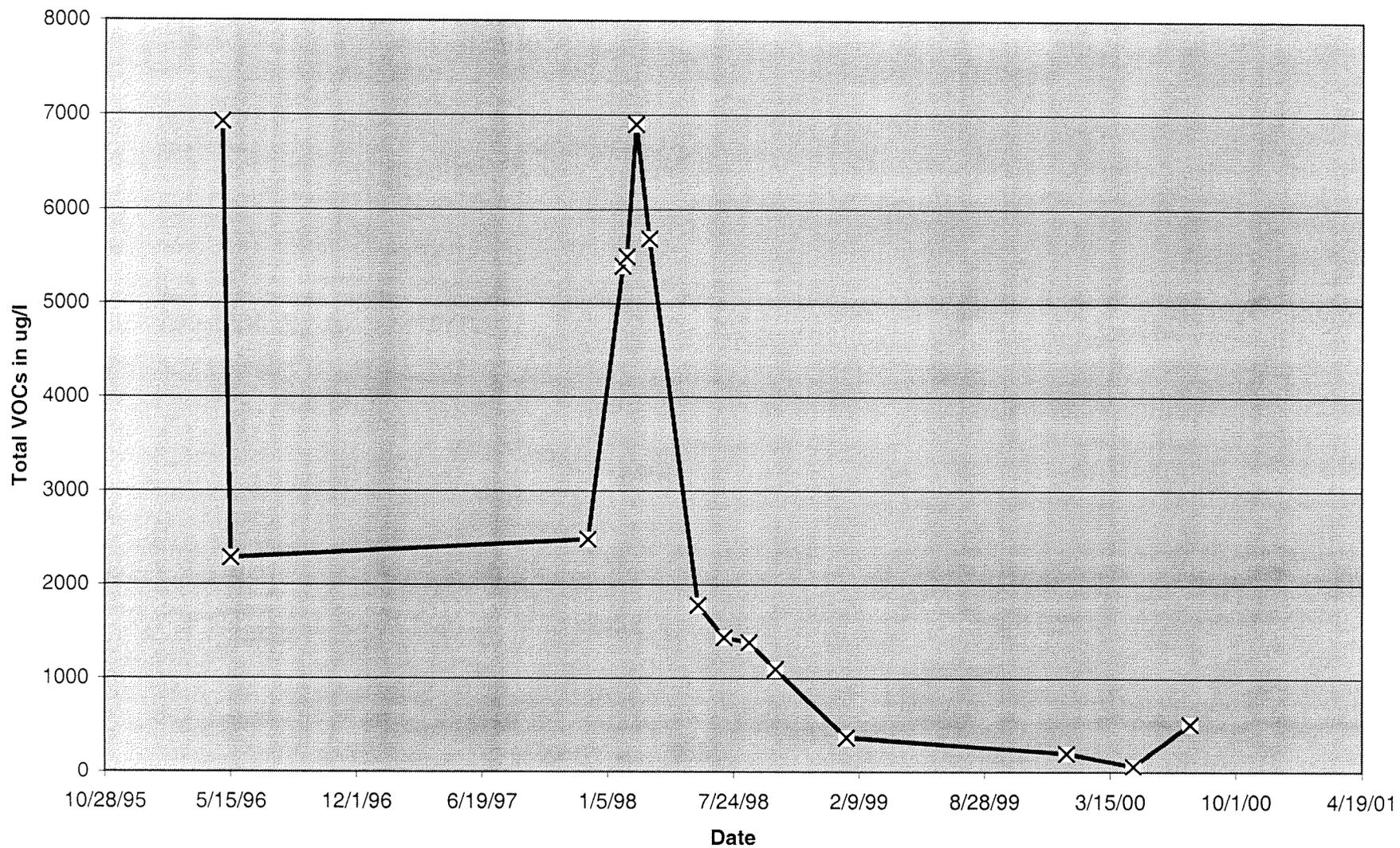
Total VOCs (ug/l) Well OLD-13-DP1



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - DP-1**

	UNITS			Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G00101F	U4G00102F	U4G00103	U4G00104	U4G00105	U4G00106	U4G00107					
Date Sampled		05/01/96	05/15/96	09/10/97	01/28/98	02/04/98	02/19/98	03/12/98	01/06/00	4/21/00	7/20/00		
Source		onsite	onsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite		
PCE	ug/l	6.4	1.5	<.5	<50	<50	<200	<20	ND	ND	ND		
TCE	ug/l	3000.0	450.0	69.6	310.0	150.0	<200	150.0	62.6	ND	1.0		
C-1,2-DCE	ug/l	1600.0	880.0	776.0	2600.0	2400.0	3800.0	2000.0	1240.0	1590.0	713.0		
T-1,2-DCE	ug/l	25.0	32.0	9.4	<50	<50	<200	<20	ND	12.2	1.3		
1,1-DCE	ug/l	N/D	N/D	0.7	<50	<50	<200	<20	ND	0.9	ND		
VC	ug/l	N/D	1.0	7.8	<50	<50	<200	<20	62.3	1.2	ND		
BENZENE	ug/l	N/D	N/D	<.5	<50	<50	<200	<20	ND	ND	ND		
TOLUENE	ug/l	N/D	N/D	<.5	<50	<50	<200	<20	ND	ND	ND		
ETHYLBENZ.	ug/l	N/D	N/D	<.5	<50	<50	<200	<20	ND	ND	ND		
m/p XYLENE	ug/l	N/D	N/D	<.5	<50	<50	<200	<20	ND	ND	ND		
O XYLENE	ug/l	N/D	N/D	<.5	<50	<50	<200	<20	ND	ND	ND		
total VOCs	ug/l	4631.4	1364.5	863.5	2910.0	2550.0	3800.0	2150.0	1365.0	1604.3	715.3		

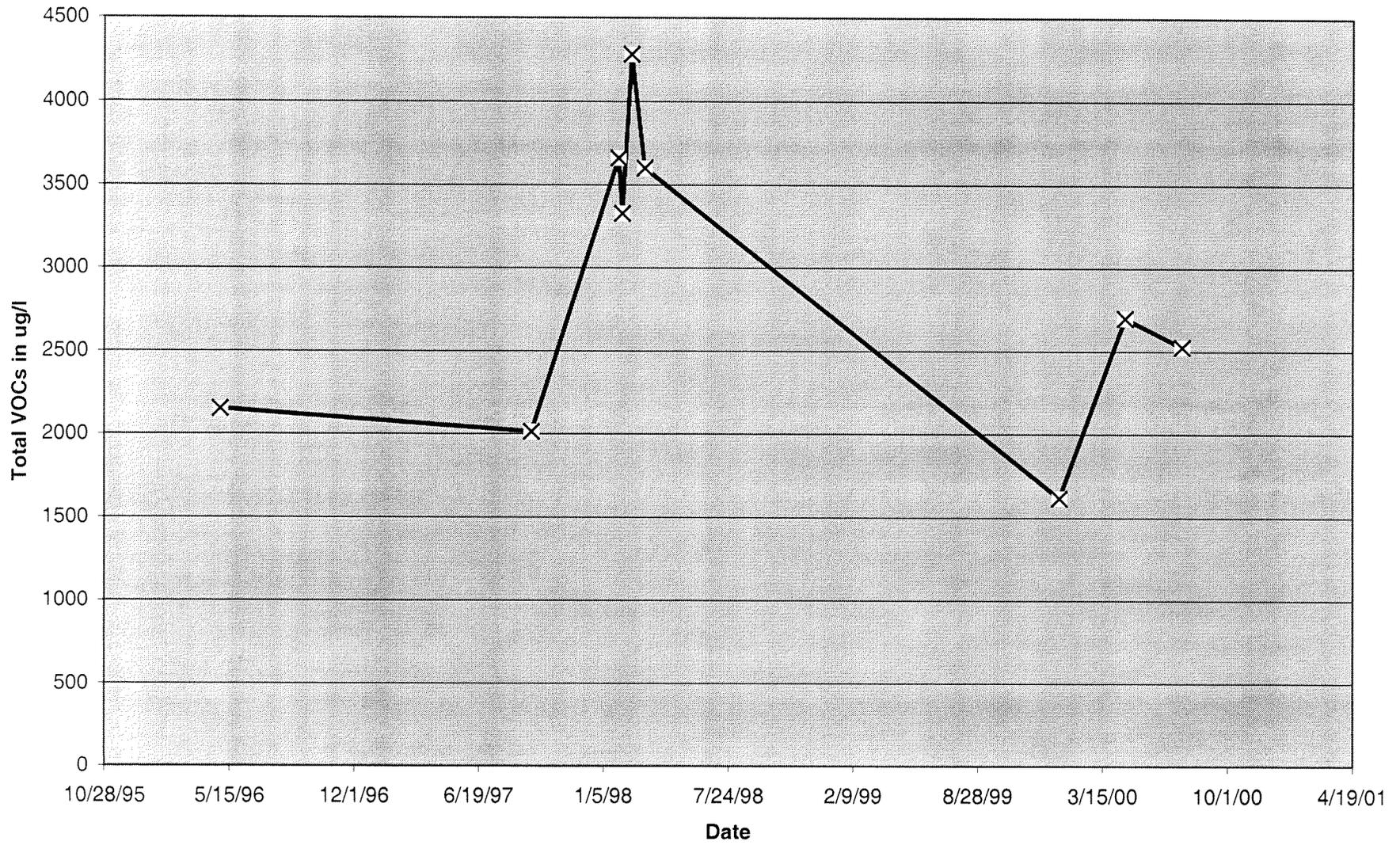
Total VOCs (ug/l) Well OLD-13-DP2



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - DP-2**

	UNITS			Baseline	Week 1	Week 2	Week 4	Week 7	Week 18	Week 24	Week 30	Week 36	Week 52			
Sample ID		U4G00201F	U4G00202F	U4G00205	U4G00206	U4G00207	U4G00208	U4G00209	U4G00210	U4G00211	U4G00212	U4G00213	U4G00214			
Date Sampled		5/1/96	5/15/96	12/5/97	1/29/98	2/4/98	2/19/98	3/12/98	5/29/98	7/9/98	8/18/98	9/29/98	1/20/99	1/6/00	4/21/00	7/20/00
Source		onsite	onsite	offsite	offsite	offsite	offsite									
PCE	ug/l	590.0	120.0	10.0	<100	<100	<200	<100	<100	< 50	< 50	<20	<10	4.3	13.5	17.1
TCE	ug/l	5800.0	1300.0	2400.0	1300.0	1300.0	1300.0	790.0	180.0	230.0	180.0	97.0	66	43.7	33.1	24.2
C-1,2-DCE	ug/l	530.0	840.0	<5	4100.0	4200.0	5600.0	4900.0	1600.0	1200.0	1200.0	1000.0	300	147	ND	457
T-1,2-DCE	ug/l	5.0	25.0	75.0	<100	<100	<200	<100	<100	< 50	< 50	<20	<10	1.9	0.67	2.9
1,1-DCE	ug/l	N/D	1.1	<5	<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
VC	ug/l	N/D	0.4	<5	<100	<100	<200	<100	<100	< 50	< 50	<20	<10	1.6	15.9	9.3
BENZENE	ug/l	N/D	N/D		<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
TOLUENE	ug/l	N/D	N/D		<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
ETHYLBENZ.	ug/l	N/D	N/D		<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
m/p XYLENE	ug/l	N/D	N/D		<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
O XYLENE	ug/l	N/D	N/D		<100	<100	<200	<100	<100	< 50	< 50	<20	<10	ND	ND	ND
total VOCs	ug/l	6925.0	2286.5	2485.0	5400.0	5500.0	6900.0	5690.0	1780.0	1430.0	1380.0	1097.0	366.0	198.5	61.17	510.5

Total VOCs (ug/l) Well OLD-13-DP3



**PERFORMANCE MONITORING AND SAMPLING PLAN - ANALYTICAL RESULTS  
GROUNDWATER RESULTS - DP-3**

	UNITS		Baseline	Week 1	Week 2	Week 4	Week 7					
Sample ID		U4G00301F	U4G00302	U4G00303	U4G00304	U4G00305	U4G00306					
Date Sampled		5/1/96	9/12/97	1/29/98	2/4/98	2/19/98	3/12/98	1/6/00	4/20/00	7/20/00		
Source		onsite	offsite	offsite	offsite	offsite	offsite	offsite	offsite			
PCE	ug/l	22.0	<.5	<50	<50	<200	<50	ND	ND	ND		
TCE	ug/l	1400.0	110.0	360.0	330.0	680.0	700.0	98.0	24.8	6.8		
C-1,2-DCE	ug/l	710.0	1870.0	3300.0	3000.0	3700.0	2900.0	1500.0	2640.0	2500.0		
T-1,2-DCE	ug/l	19.0	30.7	<50	<50	<200	<50	18.0	32.2	18.4		
1,1-DCE	ug/l	N/D	1.5	<50	<50	<200	<50	ND	1.8	1.2		
VC	ug/l	N/D	1.3	<50	<50	<200	<50	ND	ND	ND		
BENZENE	ug/l	N/D	<.5	<50	<50	<200	<50	ND	ND	ND		
TOLUENE	ug/l	N/D	<.5	<50	<50	<200	<50	ND	ND	ND		
ETHYLBENZ.	ug/l	N/D	<.5	<50	<50	<200	<50	ND	ND	ND		
m/p XYLENE	ug/l	N/D	<.5	<50	<50	<200	<50	ND	ND	ND		
O XYLENE	ug/l	N/D	<.5	<50	<50	<200	<50	ND	ND	ND		
total VOCs	ug/l	2151.0	2013.5	3660.0	3330.0	4280.0	3600.0	1616.0	2698.8	2526.4		