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December 13, 2004

Ms. Jean Schumacher
United States Army Engineer District, Kansas City
601 East 12th Street
Kansas City, Missouri 64106-2896

**Re: Former Griffiss Air Force Base
Work Authorization Directive (WAD) 02: Feasibility Studies
Landfill 6 Groundwater Treatability Pilot Study Supplemental Sampling**

Dear Ms. Schumacher:

Ecology and Environment, Inc. (E& E) is pleased to provide the United States Army Corps of Engineers (USACE), Kansas City District with three copies and one CD of this Landfill 6 Groundwater Treatability Pilot Study Supplemental Sampling Report for the former Griffiss Air Force Base (GAFB) in Rome, New York. Ten copies and four CDs of this supplemental report was also submitted to the Air Force Base Conversion Agency (AFBCA).

The purpose of this summary letter is to provide the results of the supplemental sampling performed at Landfill 6 in August 2004 as part of the groundwater treatability study. A comprehensive final report (Final Treatability Report) for all phases of this study prior to this supplemental sampling was submitted on June 11, 2004.

INTRODUCTION

Under Contract Nos. DACW41-99-D-9005 Task Order 001 and DACW41-02-D-0009, Task Order 0007, to the USACE, Kansas City District, E & E conducted in-situ chemical oxidation (ISCO) bench-scale and field pilot-scale studies for groundwater contamination at the former GAFB in Rome, New York.

The main purpose of this investigation was to identify and collect data and operating parameters that are critical to a successful full-scale application of the ISCO technology.

This study included bench-scale studies for four Areas of Concern (AOCs): Landfill 6 (LF6), Building 775 (B775), Building 817/Weapons Storage Area (B817/WSA) (part of

the On-Base Groundwater AOC), and AOC 9; and field-scale pilot studies at LF6, B817/WSA, and AOC 9. The pilot studies included two permanganate injections at LF6, and one at B817/WSA; and two Fenton's Reagent injections at AOC 9.

This report presents the results of a supplemental sampling round (Round 6) performed nine months after completion of the second injection at LF6.

SUPPLEMENTAL SAMPLING AT LANDFILL 6

A supplemental post-injection sampling event was completed in August 2004, nine months after the second injection conducted in mid-November at LF6. Groundwater samples were collected from the six injection and six monitoring wells (see Figure 1) and were analyzed by E & E's Analytical Services Center (ASC) for the presence of volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 524.2. The complete analytical results for the groundwater samples are presented in Attachment A. In addition to laboratory analyses field measurements of pH, temperature, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity were also recorded during purging. Those parameters are presented in Attachment B.

Groundwater sampling and field analysis was performed using equipment and procedures outlined in the September 2002 Pilot Study work plan. A summary of the samples collected and analytical testing performed is presented in Table 1.

SUMMARY OF ROUND 6 RESULTS

Summary of Field Test Results

DO and ORP are the primary field parameters that indicate the presence of oxidant. An evaluation of the data collected did not provide significant trends regarding treatment; however, it did provide useful information during well purging regarding general groundwater conditions. ORP was expected to indicate the largest shift toward high values in response to ISCO. During Round 1 (first post-treatment round for first injection), ORP levels were higher than the baseline in injection wells LF6MW-01, -02, -04, and -06 and were decreased to the baseline levels by Round 3. During the second injection, a spike in ORP was noted in monitoring wells LF6MW-12 and -16 right before permanganate (purple color) was observed in the wells. While purging wells LF6MW-17 and -19 during Round 1, LF6MW-16 during Round 5, and LFMW-18, -19, and -20 during Round 6, ORP levels were initially higher than baseline levels in the injectors then decreased as the well stabilized. ORP levels in the remaining wells stayed relatively the same during purging. These increases followed by decreases in ORP levels are probably due to residual permanganate trapped in the pump discharge lines of the injectors. No trends in DO levels were observed in any of the wells (see Attachment B).

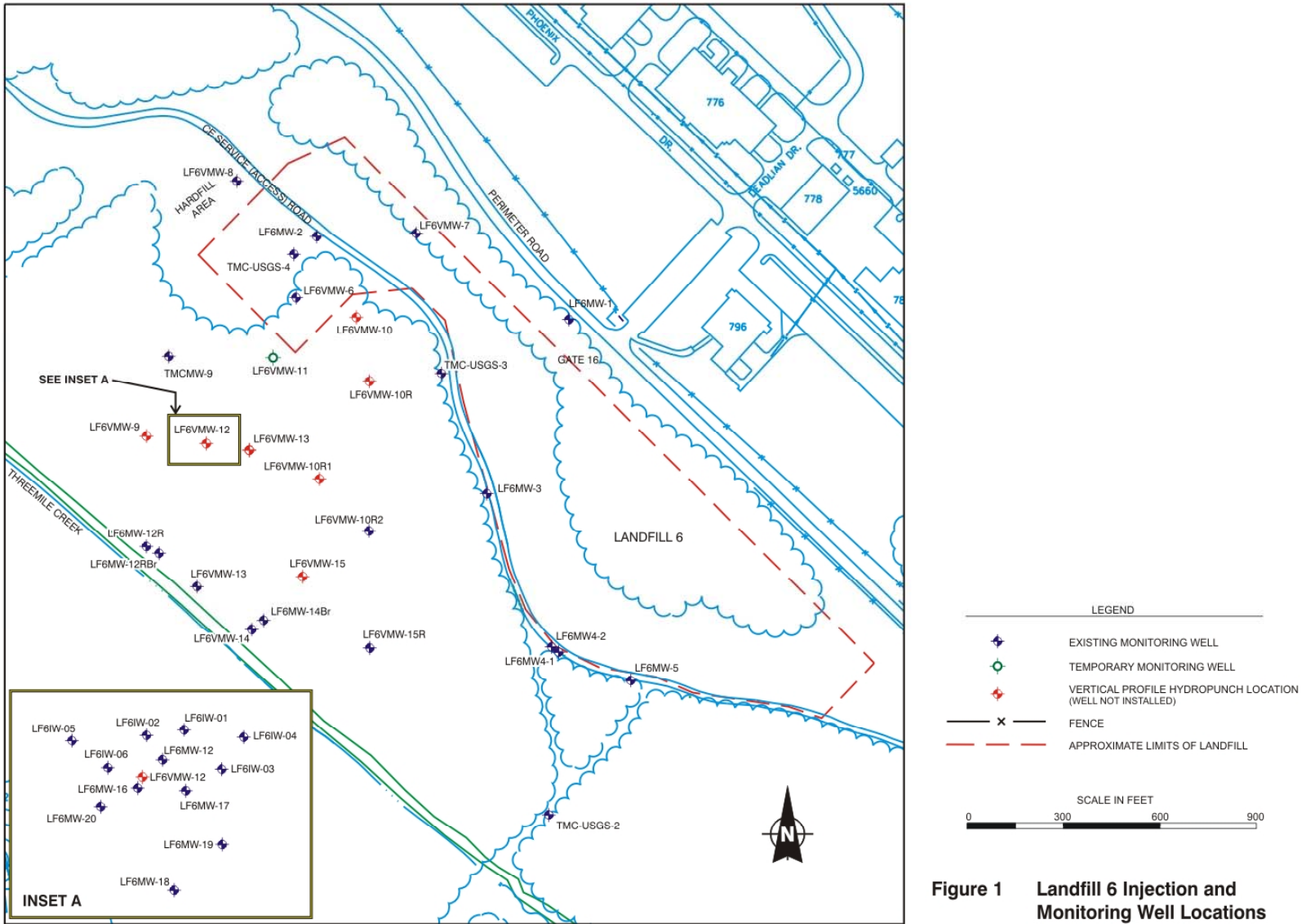


Figure 1 Landfill 6 Injection and Monitoring Well Locations

**Table 1 Landfill 6 Baseline and Performance Monitoring Sample Listing,
Former Griffiss Air Force Base, Rome, New York**

Location	Date	Sample Number	Lab	Sample Depth	Matrix	WP	Stat	Type	Analyses			
									VOCs - EPA524.2	TAL Metals - SW6010B	TAL Mercury - SW7470A	DOC - SW5310B
Landfill 6 Phase I	10/23/02	LF6IW-01	ASC	37 - 47	Groundwater	Y	T	N	X			
	12/04/02	LF6IW-01-R1	ASC	37 - 47	Groundwater	Y	T	N	X			
	01/08/03	LF6IW-01-R2	ASC	37 - 47	Groundwater	Y	T	N	X			X
	10/23/02	LF6IW-02	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/04/02	LF6IW-02-R1	ASC	45 - 55	Groundwater	Y	T	N	X			
	01/08/03	LF6IW-02-R2	ASC	45 - 55	Groundwater	Y	T	N	X			X
	10/23/02	LF6IW-03	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/03/02	LF6IW-03-R1	ASC	37 - 47	Groundwater	Y	T	N	X			
	01/08/03	LF6IW-03-R2	ASC	37 - 47	Groundwater	Y	T	N	X			X
	10/23/02	LF6IW-04	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	10/23/02	LF6IW-04 (MS/MSD)	ASC	45 - 55	Groundwater/QC Matrix	Y	T	MS	X	X	X	X
	12/04/02	LF6IW-04-R1	ASC	45 - 55	Groundwater	Y	T	N	X			
	12/04/02	LF6IW-04-R1 (MS/MSD)	ASC	45 - 55	Groundwater/QC Matrix	Y	T	MS	X			
	01/08/03	LF6IW-04-R2	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	01/08/03	LF6IW-04-R2 (MS/MSD)	ASC	45 - 55	Groundwater/QC Matrix	Y	T	MS	X	X	X	X
	10/23/02	LF6IW-05	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/03/02	LF6IW-05-R1	ASC	37 - 47	Groundwater	Y	T	N	X			
	01/08/03	LF6IW-05-R2	ASC	37 - 47	Groundwater	Y	T	N	X			X
	10/22/02	LF6IW-06	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/03/02	LF6IW-06-R1	ASC	45 - 55	Groundwater	Y	T	N	X			
	01/08/03	LF6IW-06-R2	ASC	45 - 55	Groundwater	Y	T	N	X			X
	10/23/02	LF6MW-12	ASC	41 - 51	Groundwater	Y	T	N	X	X	X	X
	12/04/02	LF6MW-12-R1	ASC	41 - 51	Groundwater	Y	T	N	X			
	01/08/03	LF6MW-12-R2	ASC	41 - 51	Groundwater	Y	T	N	X	X	X	X
	10/23/02	LF6MW-16	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/04/02	LF6MW-16-R1	ASC	37 - 47	Groundwater	Y	T	N	X			
	01/08/03	LF6MW-16-R2	ASC	37 - 47	Groundwater	Y	T	N	X			X
	10/23/02	LF6MW-17	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/04/02	LF6MW-17-R1	ASC	45 - 55	Groundwater	Y	T	N	X			
	01/08/03	LF6MW-17-R2	ASC	45 - 55	Groundwater	Y	T	N	X			X
	10/23/02	LF6MW-18	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/02/02	LF6MW-18-R1	ASC	37 - 47	Groundwater	Y	T	N	X			
	01/08/03	LF6MW-18-R2	ASC	37 - 47	Groundwater	Y	T	N	X			X
	10/23/02	LF6MW-19	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	10/23/02	LF6MW-19/D	ASC	45 - 55	Groundwater	N	T	FD	X	X	X	X
	10/23/02	LF6MW-19/S	ERDC	41 - 51	Groundwater	N	T	FR	X	X	X	X
	12/03/02	LF6MW-19-R1	ASC	45 - 55	Groundwater	Y	T	N	X			
	12/03/02	LF6MW-19/D-R1	ASC	45 - 55	Groundwater	N	T	FD	X			
	12/03/02	LF6MW-19/S-R1	ERDC	41 - 51	Groundwater	N	T	FR	X			
	01/07/03	LF6MW-19-R2	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
01/07/03	LF6MW-19/D-R2	ASC	45 - 55	Groundwater	N	T	FD	X	X	X	X	
01/07/03	LF6MW-19/S-R2	ERDC	41 - 51	Groundwater	N	T	FR	X	X	X	X	
10/22/02	LF6MW-20	ASC	41 - 51	Groundwater	Y	T	N	X			X	
12/02/02	LF6MW-20-R1	ASC	41 - 51	Groundwater	Y	T	N	X				
01/08/03	LF6MW-20-R2	ASC	41 - 51	Groundwater	Y	T	N	X			X	
01/08/03	LF6MW-20-R2 (MS/MSD)	ASC	41 - 51	Groundwater	Y	T	MS				X	
-	LF6MW-20/D	ASC	41 - 51	Groundwater	Y	S	FD	X	X	X	X	
-	LF6MW-20/S	ERDC	41 - 51	Groundwater	Y	S	FR	X	X	X	X	
10/04/02	LF6-DW1	ASC	-	Drilling Water	N	T	N	X				

Key at the end of Table

**Table 1 Landfill 6 Baseline and Performance Monitoring Sample Listing,
Former Griffiss Air Force Base, Rome, New York**

Location	Date	Sample Number	Lab	Sample Depth	Matrix	WP	Stat	Type	Analyses			
									VOCs - EPA524.2	TAL Metals - SW6010B	TAL Mercury - SW7470A	DOC - SM5310B
Landfill 6 Phase II	11/03/03	LF6IW-01-R3	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/08/03	LF6IW-01-R4	ASC	37 - 47	Groundwater	Y	T	N	X			
	03/30/04	LF6IW-01-R5	ASC	37 - 47	Groundwater	Y	T	N	X			X
	11/04/03	LF6IW-02-R3	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/08/03	LF6IW-02-R4	ASC	45 - 55	Groundwater	Y	T	N	X			
	03/30/04	LF6IW-02-R5	ASC	45 - 55	Groundwater	Y	T	N	X			X
	11/03/03	LF6IW-03-R3	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/09/03	LF6IW-03-R4	ASC	37 - 47	Groundwater	Y	T	N	X			
	03/30/04	LF6IW-03-R5	ASC	37 - 47	Groundwater	Y	T	N	X			X
	11/04/03	LF6IW-04-R3	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	12/09/03	LF6IW-04-R4	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	12/09/03	LF6IW-04-R4 (MS/MSD)	ASC	45 - 55	Groundwater/QC Matrix	Y	T	MS	X	X	X	X
	03/30/04	LF6IW-04-R5	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	11/03/03	LF6IW-05-R3	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/09/03	LF6IW-05-R4	ASC	37 - 47	Groundwater	Y	T	N	X			
	03/31/04	LF6IW-05-R5	ASC	37 - 47	Groundwater	Y	T	N	X			X
	11/03/03	LF6IW-06-R3	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/08/03	LF6IW-06-R4	ASC	45 - 55	Groundwater	Y	T	N	X			
	03/30/04	LF6IW-06-R5	ASC	45 - 55	Groundwater	Y	T	N	X			X
	11/04/03	LF6MW-12-R3	ASC	41 - 51	Groundwater	Y	T	N	X	X	X	X
	12/08/03	LF6MW-12-R4	ASC	41 - 51	Groundwater	Y	T	N	X			
	03/31/04	LF6MW-12-R5	ASC	41 - 51	Groundwater	Y	T	N	X	X	X	X
	03/31/04	LF6MW-12/D-R5	ASC	41 - 51	Groundwater	Y	T	FD	X	X	X	X
	03/31/04	LF6MW-12/S-R5	ASC	41 - 51	Groundwater	Y	T	FR	X	X	X	X
	11/04/03	LF6MW-16-R3	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/08/03	LF6MW-16-R4	ASC	37 - 47	Groundwater	Y	T	N	X			
	03/31/04	LF6MW-16-R5	ASC	37 - 47	Groundwater	Y	T	N	X			X
	11/04/03	LF6MW-17-R3	ASC	45 - 55	Groundwater	Y	T	N	X			X
	12/08/03	LF6MW-17-R4	ASC	45 - 55	Groundwater	Y	T	N	X			
	03/31/04	LF6MW-17-R5	ASC	45 - 55	Groundwater	Y	T	N	X			X
	11/04/03	LF6MW-18-R3	ASC	37 - 47	Groundwater	Y	T	N	X			X
	12/09/03	LF6MW-18-R4	ASC	37 - 47	Groundwater	Y	T	N	X			
	03/31/04	LF6MW-18-R5	ASC	37 - 47	Groundwater	Y	T	N	X			X
	11/04/03	LF6MW-19-R3	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
	11/04/03	LF6MW-19/D-R3	ASC	45 - 55	Groundwater	Y	T	FD	X	X	X	X
	11/04/03	LF6MW-19/S-R3	ERDC	41 - 51	Groundwater	Y	T	FR	X	X	X	X
	12/09/03	LF6MW-19-R4	ASC	45 - 55	Groundwater	Y	T	N	X			
	12/09/03	LF6MW-19/D-R4	ASC	45 - 55	Groundwater	Y	T	FD	X			
	12/09/03	LF6MW-19/S-R4	ERDC	41 - 51	Groundwater	Y	T	FR	X			
	03/31/04	LF6MW-19-R5	ASC	45 - 55	Groundwater	Y	T	N	X	X	X	X
03/31/04	LF6MW-19-R5 (MS/MSD)	ASC	45 - 55	Groundwater/QC Matrix	Y	T	MS	X	X	X	X	
11/04/03	LF6MW-20-R3	ASC	41 - 51	Groundwater	Y	T	N	X			X	
12/08/03	LF6MW-20-R4	ASC	41 - 51	Groundwater	Y	T	N	X				
03/31/04	LF6MW-20-R5	ASC	41 - 51	Groundwater	Y	T	N	X			X	

Key at the end of Table

**Table 1 Landfill 6 Baseline and Performance Monitoring Sample Listing,
Former Griffiss Air Force Base, Rome, New York**

Location	Date	Sample Number	Lab	Sample Depth	Matrix	WP	Stat	Type	Analyses				
									VOCs - EPA524.2	TAL Metals - SW6010B	TAL Mercury - SW7470A	DOC - SM5310B	
LF6 Round 6	08/31/04	LF6IW-01-R6	ASC	37 - 47	Groundwater	Y	T	N	X				
	08/30/04	LF6IW-02-R6	ASC	45 - 55	Groundwater	Y	T	N	X				
	08/30/04	LF6IW-03-R6	ASC	37 - 47	Groundwater	Y	T	N	X				
	08/30/04	LF6IW-04-R6	ASC	45 - 55	Groundwater	Y	T	N	X				
	08/30/04	LF6IW-05-R6	ASC	37 - 47	Groundwater	Y	T	N	X				
	08/31/04	LF6IW-06-R6	ASC	45 - 55	Groundwater	Y	T	N	X				
	08/31/04	LF6MW-12-R6	ASC	41 - 51	Groundwater	Y	T	N	X				
	08/31/04	LF6MW-12/D-R6	ASC	41 - 51	Groundwater	Y	T	FD	X				
	08/31/04	LF6MW-16-R6	ASC	37 - 47	Groundwater	Y	T	N	X				
	08/31/04	LF6MW-17-R6	ASC	45 - 55	Groundwater	Y	T	N	X				
	08/31/04	LF6MW-18-R6	ASC	37 - 47	Groundwater	Y	T	N	X				
08/31/04	LF6MW-19-R6 (MS/MSD)	ASC	45 - 55	Groundwater	Y	T	N	X					
08/31/04	LF6MW-20-R6	ASC	41 - 51	Groundwater	Y	T	N	X					
All Sites	10/04/02	ASC-TB01	ASC	-	DI Water	Y	T	TB	X				
	10/22/02	ASC-TB03	ASC	-	DI Water	Y	T	TB	X				
	10/23/02	ASC-TB04	ASC	-	DI Water	Y	T	TB	X				
	12/03/02	ASC-TB07	ASC	-	DI Water	Y	T	TB	X				
	12/04/02	ASC-TB08	ASC	-	DI Water	Y	T	TB	X				
	01/07/03	ASC-TB10	ASC	-	DI Water	N	T	TB	X				
	01/08/03	ASC-TB11	ASC	-	DI Water	N	T	TB	X				
	10/23/02	ERDC-TB01	ERDC	-	DI Water	Y	T	TB	X				
	01/07/03	ERDC-TB03	ERDC	-	DI Water	Y	T	TB	X				
	11/04/03	ERDC-Trip Blank	ERDC	-	DI Water	Y	T	TB	X				
	12/09/03	ERDC-TB-01	ERDC	-	DI Water	Y	T	TB	X				
	11/03/03	TB110303	ASC	-	DI Water	Y	T	TB	X				
	11/04/03	TB110403	ASC	-	DI Water	Y	T	TB	X				
	12/08/03	ASC-TB120803	ASC	-	DI Water	Y	T	TB	X				
	03/30/04	ASC-TB033004	ASC	-	DI Water	Y	T	TB	X				
	03/31/04	ASC-TB033104	ASC	-	DI Water	Y	T	TB	X				
	03/31/04	ERDC-TB033104	ERDC	-	DI Water	Y	T	TB	X				
	08/30/04	ASC-TB083004	ASC	-	DI Water	Y	T	TB	X				
	08/31/04	ERDC-TB083104	ERDC	-	DI Water	Y	T	TB	X				

Key:

- | | |
|---|---|
| ASC = E & E's Analytical Services Center. | MW = Monitoring well. |
| /D = Duplicate. | MS/MSD = Matrix spike/matrix spike duplicate. |
| Depth = Depth interval at which sample will be collected. | N = Original sample. |
| DI = Deionized water. | QC = Quality control sample. |
| DOC = Dissolved organic carbon. | /S = Split. |
| DW = Drilling water sample. | Stat = Status (T= Taken, S= Skipped). |
| ERDC = United States Army Engineer Research and Development Center. | TAL = Target Analyte List. |
| FD = Field duplicate. | TB = Trip blank. |
| FR = Field split/replicate. | TCL = Target compound list. |
| IW = Injection well. | VOCs = Volatile organic compounds. |
| LF6 = Landfill 6. | WP = Sample in work plan (Y= yes, N=no). |

Key at the end of Table

Summary of Round 6 Analytical Test Results

Round 6 samples collected in late August 2004 exhibited total VOC concentrations of approximately 260 to 2,448 micrograms per liter ($\mu\text{g/L}$), of which the contaminants of concern (COCs) (trans- and cis-1,2-dichloroethene [DCE], trichloroethene [TCE], and vinyl chloride [VC]), ranged from approximately 256 to 2,444 $\mu\text{g/L}$ (98 to 100% of the total VOCs) (see Table 2). In 11 of the 12 wells, as with the preinjection baseline and the four previous performance monitoring rounds, the predominant compound was TCE, with concentrations ranging from approximately 165 to 2,140 $\mu\text{g/L}$ (29 to 91% of the total VOCs). cis-1,2-DCE was the predominant compound in well LF6IW-04. As observed in previous sampling events, injection well LF6IW-05 yielded a much lower total VOC concentration than the other wells. The highest concentration of COCs and total VOCs was found in well LF6MW-16, similar to the baseline results. Other VOCs detected were 1,1-DCE, 1,2-dichloroethane (DCA), acetone, benzene, carbon disulfide, chloromethane, methylene chloride, and trihalomethanes.

During Round 6, spent permanganate (as indicated by the orange color) was still present in all six injection wells (see Table 3). The following changes in COC concentrations occurred between Round 5 (four months after the second injection) and Round 5 (nine months after the second injection):

- Despite the presence of spent permanganate, COC concentrations increased in injection wells LF6IW-02, -04 and -05. COC concentrations also increased in downgradient monitoring wells LF6MW-18, -19, and -20. Since injection wells LF6IW-02, -04 and -05 are the most upgradient in the injection grid, the increase in COCs in these injection wells may be due to the influx of contaminated water from upgradient of the treatment area. The increase in COCs in the downgradient monitoring wells may be due to the flushing of contaminated water from the area immediately downgradient of the injector wells towards these monitoring wells; and
- Overall total COC reduction of 57 to 95% between the initial baseline in 2002 and Round 6 levels was observed in LF6IW-02, LF6IW-03, and LF6IW-04. However, COC levels in wells LF6IW-02 and LF6IW-04 concentrations continued to rise since the major reduction that was recorded two weeks after the second injection. Again, this is probably due to the influx of contaminated water from upgradient of the injection grid.

Overall Effectiveness and Mass Removal

The comparison between pre- and six-week post-treatment analytical results from the first injection did not provide conclusive information relative to reduction of contamination due to treatment. However, contaminant reduction was observed one year after injection. The second injection showed complete reduction within the injection

Table 2 Summary of Positive Analytical Results for Landfill 6 Performance Monitoring Round 6 Groundwater Samples, Former Griffiss Air Force Base, Rome, New York

Analyte	NYSDEC Standards ¹	EPA Standards ²	Sample ID:	LF6IW-01- R6	LF6IW-02- R6	LF6IW-03- R6	LF6IW-04- R6	LF6IW-05- R6	LF6IW-06- R6	LF6MW-12-R6	LF6MW-12-R6/D	LF6MW-16-R6	LF6MW-17-R6	LF6MW-18-R6	LF6MW-19-R6	LF6MW-20-R6
			Date:	08/31/04	08/30/04	08/30/04	08/30/04	08/30/04	08/31/04	08/31/04	08/31/04	08/31/04	08/31/04	08/31/04	08/31/04	08/31/04
VOCs by Method 524.2 (µg/L)																
1,1-Dichloroethene	5	7		0.647	0.524	0.61	0.88	0.500 U	1.01	0.777	0.792	0.704	1.12	0.595	5.00 U	0.715
1,2-Dichloroethane	0.6	5		0.500 U	0.564	0.500 U	0.435 J	0.154 J	0.118 J	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U
Acetone	50 g	NA		3.8 J	2.99 J	3.82 J	2.95 J	3.14 J	3.66 J	6.61	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Benzene	1	5		0.962	0.531	0.573	3.21	0.116 J	1.01	0.769	0.79	0.642	0.733	0.392 J	0.238 J	1.59
Carbon disulfide	60 g	NA		0.500 U	0.500 U	0.500 U	0.500 U	0.209 J	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform	7	80		0.5	0.452 J	0.259 J	0.346 J	0.653	1.14	0.268 J	0.25 J	0.636	1.91	0.500 U	0.500 U	0.811
Chloromethane	5	NA		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.193 J	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
cis-1,2-Dichloroethene	5	70		330	262	359	353	18.2	339	315	315	307	487	344	340	287
Methylene chloride	5	5		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.186 J
trans-1,2-Dichloroethene	5	100		26	6.12	7.56	45.5	0.224 J	40.9	15.8	17.2	4.3	8.29	3.61	6.22	10.9
Trichloroethene	5	5		1250	671	783	165	237	1100	1330	1340	1640	657	839	416	2140
Vinyl chloride	2	2		5.43	3.37	3.32	0.987 J	0.481 J	6.82	6.24	6.06	6.11	2.12	3.85	1.9	6.19
Trihalomethanes, Total	NA	80		0.5 J	0.452 J	0.259 J	0.346 J	0.653 J	1.14 J	0.268 J	0.25 J	0.636 J	1.91 J	2.00 U	2.00 U	0.811 J
Tentatively Identified Compounds by Method 524.2 (µg/L)																
1-Pentene	NA	NA		-	-	-	-	-	-	-	-	1 J	-	-	-	1 J
2-Butene, (Z)-	NA	NA		-	-	-	-	-	-	-	-	-	-	1 J	-	-
Butane, 2-methyl-	NA	NA		3 J	2 J	3 J	NS	NS	1 J	7 J	7 J	11 J	-	-	-	2 J
Cyclopentane	NA	NA		-	-	-	-	-	-	1 J	-	-	-	-	-	-
Cyclopropane, ethyl-	NA	NA		-	-	-	-	-	-	-	1 J	-	-	-	-	-

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998.

(2) EPA National Primary and Secondary Drinking Water Standards, 2002.

(g) Guidance value used.

Key:

EPA = Environmental Protection Agency.
 IW = Injection well.
 J = Estimated value.
 LF6 = Landfill 6.
 MCL = Maximum Contaminant Level.
 mg/L = Milligrams per liter.
 MW = Monitoring well.
 NA = No criteria available.

NYSDEC = New York State Department of Environmental Conservation.
 R6 = Sixth round of performance monitoring sampling.
 U = Not detected (practical quantitation limit listed).
 VOC = Volatile organic compound.
 µg/L = Micrograms per liter.

0.88	Result (shaded and bolded) exceeds the NYSDEC standard.
<u>1250</u>	Result (shaded, bolded, and underlined) exceeds both the NYSDEC standard and the EPA MCL.

**Table 3 Visual Observations of Groundwater from Injection and Monitoring Wells at Landfill 6
Former Griffiss Air Force Base, Rome, New York**

2002 Injection													
Well ID	Screen Interval (ft BGS)	Total Volume of Injection Media (gal)	Injection 1				Post Injection ¹	Fitts Injection Performance Monitoring ²					
			11/12/02 (Day 1)	11/13/02 (Day 2)	11/14/02 (Day 3)	11/15/02 (Day 4)	11/22/02 (Day 11)	Round 1			Round 2		Round 3
								12/02/02 (Day 21)	12/03/02 (Day 22)	12/04/02 (Day 23)	01/07/02 (Day 57)	01/08/03 (Day 58)	11/03/03 (Day 357)
LF6IW-01	37- 47	1,893	Purple	Purple	Purple	Purple	Purple	NA	Purple	Light Purple then Orange	NA	Orange	Orange
LF6IW-02	45 - 55	1,897	Purple	Purple	Purple	Purple	Purple	NA	Burnt Orange	Purple then Orange	NA	Burnt Orange	Orange
LF6IW-03	37- 47	1,898	Purple	Purple	Purple	Purple	Purple	NA	Purple then Light Orange	NA	NA	Purple then Orange	Orange
LF6IW-04	45 - 55	1,897	Purple	Purple	Purple	Purple	Purple	NA	Purple then Orange	Purple then Clear	NA	Orange	Orange
LF6IW-05	37- 47	1,906	Purple	Purple	Purple	Purple	Purple	NA	Purple	NA	NA	Purple then Burnt Orange	Orange
LF6IW-06	45 - 55	1,910	Purple	Purple	Purple	Purple	Purple	NA	Orange then Light Yellow	NA	NA	Burnt Orange	Orange
LF6MW-12	41-51	0	Clear	Clear then Pink ³	Pink	Purple	Orange then Purple	NA	NA	Clear	NA	Clear	Orange
LF6MW-16	37- 47	0	Clear	Clear	Clear	Clear	Clear	NA	NA	Clear	NA	Clear	Orange
LF6MW-17	45 - 55	0	Clear	Clear	Clear	Clear	Clear then Orange	NA	NA	Clear	NA	Purple ⁴ then Clear	Clear
LF6MW-18	37- 47	0	Clear	Clear	Clear	Clear	Clear	Clear	NA	NA	NA	Clear	Clear
LF6MW-19	45 - 55	0	Clear	Clear	Clear	Clear	Clear	NA	Clear	NA	Clear	NA	Clear
LF6MW-20	41-51	0	Clear	Clear	Clear	Clear	Clear	Clear	NA	NA	NA	Clear	Orange

¹ Approximately 5 to 25 gallons of groundwater was purged from each injector/well during Post-Injection monitoring to observe color changes.

² Approximately 2 to 10 gallons of groundwater was purged from each injector/well during Performance Monitoring prior to sampling.

³ Pink color noted in LF6MW-12 at 0951 hours on 11/13/02.

⁴ Purple color was noted in LF6MW-17 at 0905 on 01/08/03.

Notes: 1) Injection began on 11/12/02 at 0805 and was completed on 11/14/02 at 1510 hours. Injection was only performed during daytime hours.
2) Approximately 11,400 gallons of 0.6% potassium permanganate was injected.

Key: BGS = Below ground surface. gal = Gallon. IW = Injection well. MW = Monitoring well.
ft = Feet. ID = Identification. LF6 = Landfill 6. NA= Not available.

**Table 3 Visual Observations of Groundwater from Injection and Monitoring Wells at Landfill 6
Former Griffiss Air Force Base, Rome, New York**

2003 Injection												
Well ID	Screen Interval (ft BGS)	Total Volume of Injection Media (gal)	Injection 2				Second Injection Performance Monitoring					
							Round 4		Round 5		Round 6	
			11/18/03 (Day 1)	11/19/03 (Day 2)	11/20/03 (Day 3)	11/21/03 (Day 4)	12/08/03 (Day 20)	12/09/03 (Day 21)	03/30/04 (Day 133)	03/31/04 (Day 134)	08/30/04 (Day 286)	08/31/04 (Day 287)
LF6IW-01	37- 47	6,258	Purple	Purple	Purple	Purple	Purple	Purple	Purple to Orange	NA	NA	Light Brown
LF6IW-02	45 - 55	6,245	Purple	Purple	Purple	Purple	Purple	Purple	Purple to Orange	NA	Orange	NA
LF6IW-03	37- 47	6,181	Purple	Purple	Purple	Purple	Purple	Purple	Purple to Orange	NA	Red to Orange	NA
LF6IW-04	45 - 55	4,994	Purple	Purple	Purple	Purple	Purple	Purple	Purple to Orange	NA	Orange	NA
LF6IW-05	37- 47	6,871	Purple	Purple	Purple	Purple	Purple	Purple	NA	Purple to Orange	Orange	NA
LF6IW-06	45 - 55	5,392	Purple	Purple	Purple	Purple	Purple	Purple	Purple to Orange	NA	NA	Brown
LF6MW-12	41-51	0	Pink	Pink	Purple	Purple	Purple	Purple	NA	Purple to Orange	NA	Clear
LF6MW-16	37- 47	0	Clear	Clear	Purple	Purple	Purple	Purple	NA	Purple to clear	NA	Clear
LF6MW-17	45 - 55	0	Clear	Pink	Purple	Purple	Purple	Purple	NA	Purple to clear	NA	Clear
LF6MW-18	37- 47	0	Clear	Clear	Clear	Clear	Clear	Clear	NA	Clear	NA	Clear
LF6MW-19	45 - 55	0	Clear	Clear	Clear	Clear	Clear	Clear	NA	Clear	NA	Clear
LF6MW-20	41-51	0	Clear	Clear	Clear	Clear	Clear	Clear	NA	Clear	NA	Clear

Notes: 1) Injection began on 11/18/03 at 0900 and was completed on 11/21/03 at 1706 hours. Injection was only performed during daytime hours.
2) Approximately 38,800 gallons of 1.5% potassium permanganate was injected.

Key: BGS = Below ground surface. gal = Gallon. IW = Injection well. MW = Monitoring well. MW = Monitoring well.
ft = Feet. ID = Identification. LF6 = Landfill 6. NA= Not available. NA= Not available.

wells two weeks following the second injection and complete rebound four months following the injection. Rebound was still evident in all the wells nine months after the second injection. However, four wells maintained COC levels below the initial baseline levels (although they were still rebounding), and rebound reversing was observed in four other wells (levels still above baseline but reduced since the previous sampling round) see Figures 4-1 to 4-12 in Attachment C. The possible causes of these results are discussed in the final Treatability Study Report (June 2004).

SUMMARY

The primary COC at this site is TCE. The highest concentration of TCE at the site detected in baseline sampling prior to the first injection is 1,220 parts per billion (ppb).

Secondary COCs include cis-1,2-DCE, trans-1,2-DCE, and VC. Pre-treatment, total VOC concentrations ranged from approximately 124 to 1,671 $\mu\text{g/L}$, of which the COCs (TCE, cis- and trans-1,2-DCE, and VC) ranged from approximately 120 to 1,670 $\mu\text{g/L}$ (97 to 100% of the total VOCs). The data collected during the initial field pilot-scale study, in which 12,000 gallons of 0.6% potassium permanganate solution was injected, did not indicate a reduction in TCE concentration within the initial six-week performance-monitoring period. In fact, levels of TCE increased after treatment. This increase is believed to be a combination of desorption of contaminants from contaminated soils in the treatment area, and advective transport of untreated groundwater from areas that normally have low diffusion. The poor response of the oxidant is believed to have been the result of a higher natural oxygen demand (NOD) beneath the site than anticipated (based on the bench-scale testing), which consumed most of the oxidant before it could reduce the COCs. However, a 30 to 50% reduction of the COCs in the injection and monitoring wells was observed one year after the first injection. The delay in the response of the oxidant may have been due to a low diffusion rate resulting from the very low groundwater gradient and groundwater flow.

Primary information collected during chemical oxidation pilot studies is the degree of mass contaminant reduction relative to the mass of oxidant delivered. This information is used to assess the amount of oxidant needed to overcome the NOD as well as the amount of oxidant required to treat the contamination. In order to determine whether groundwater geochemistry (in addition to NOD) was also a principal factor for the initially poor chemical reduction, jar tests (i.e., the treatment of groundwater within a sample container) were performed on contaminated water from the site. The results of the jar tests exhibited full reduction of the contaminants. Therefore, the second injection was designed to increase the mass of oxidant per injector. An increased time interval between performance monitoring rounds was implemented. The results of the second injection, in which 39,000 gallons of 1.5 % potassium permanganate solution was injected, exhibited a full reduction of COCs within two-weeks of the second injection, followed by rebound four to nine months after the second injection. Nine months after

the second injection, four wells exhibited a sustained overall reduction of COCs; however in three of these wells, COC levels continued to rise. In four different wells, rebound effects were observed to have started to reverse nine months after the second injection; however, COC levels in these wells remained higher than the initial 2002 baseline levels. Rebound, which has been documented to occasionally occur (based on site conditions) in the treatment process, especially on the pilot-scale, was noted at LF6 because of desorption processes and re-contamination of the treated area by migration of untreated groundwater back into the area. The radial effects of each injector was estimated to be 10 feet within the first two weeks of the first injection and 10 feet within two days of the second injection.

If you have any questions regarding this summary of the Groundwater Treatability Pilot Study Program, please contact me at 716-684-8060.

Sincerely,

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

Gene Florentino, P.G.
WAD Manager

cc: M. Wojnas (AFRPA)

Attachments

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Attachment A
Complete Analytical Results

Table A-1 Summary of Complete Analytical Results for Landfill 6 Performance Monitoring Round 6 Groundwater Samples, Former Griffiss Air Force Base, Rome, New York

Analyte	Sample ID:	LF6IW-01-	LF6IW-02-	LF6IW-03-	LF6IW-04-	LF6IW-05-	LF6IW-06-	LF6MW-12-
	Date:	R6 8/31/04	R6 8/30/04	R6 8/30/04	R6 8/30/04	R6 8/30/04	R6 8/31/04	R6 8/31/04
VOCs by Method 524.2 (µg/L)								
1,1,1,2-Tetrachloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,1-Trichloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene		0.647	0.524	0.61	0.88	0.500 U	1.01	0.777
1,1-Dichloropropene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichloropropane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trimethylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromoethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane		0.500 U	0.564	0.500 U	0.435 J	0.154 J	0.118 J	0.500 U
1,2-Dichloropropane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3,5-Trimethylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2,2-Dichloropropane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2-Butanone		5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
2-Chlorotoluene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2-Hexanone		5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
4-Chlorotoluene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
4-Isopropyltoluene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
4-Methyl-2-pentanone		5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Acetone		3.8 J	2.99 J	3.82 J	2.95 J	3.14 J	3.66 J	6.61
Benzene		0.962	0.531	0.573	3.21	0.116 J	1.01	0.769
Bromobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromoform		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromomethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Carbon disulfide		0.500 U	0.500 U	0.500 U	0.500 U	0.209 J	0.500 U	0.500 U
Carbon tetrachloride		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform		0.5	0.452 J	0.259 J	0.346 J	0.653	1.14	0.268 J
Chloromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.193 J
cis-1,2-Dichloroethene		330	262	359	353	18.2	339	315
cis-1,3-Dichloropropene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Dibromochloromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Dibromomethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Ethylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Hexachlorobutadiene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Isopropylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
m,p-Xylene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Methyl tert-butyl ether		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Methylene chloride		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Naphthalene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
n-Butylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
n-Propylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
o-Xylene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
sec-Butylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Styrene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
tert-Butylbenzene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Tetrachloroethene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Toluene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
trans-1,2-Dichloroethene		26	6.12	7.56	45.5	0.224 J	40.9	15.8
trans-1,3-Dichloropropene		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichloroethene		1250	671	783	165	237	1100	1330
Trichlorofluoromethane		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Vinyl chloride		5.43	3.37	3.32	0.987 J	0.481 J	6.82	6.24
Xylenes, Total		0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U

Table A-1 Summary of Complete Analytical Results for Landfill 6 Performance Monitoring Round 6 Groundwater Samples, Former Griffiss Air Force Base, Rome, New York

Analyte	LF6MW-12-	LF6MW-16-	LF6MW-17-	LF6MW-18-	LF6MW-19-	LF6MW-20-	TB-083004
	Sample ID: R6/D Date: 8/31/04	R6 8/31/04	R6 8/31/04	R6 8/31/04	R6 8/31/04	R6 8/31/04	
VOCs by Method 524.2 (µg/L)							
1,1,1,2-Tetrachloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,1,1-Trichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,1,2-Trichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,1-Dichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,1-Dichloroethene	0.792	0.704	1.12	0.595	5.00 U	0.715	0.500 U
1,1-Dichloropropene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2,3-Trichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2,4-Trimethylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2-Dibromoethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2-Dichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2-Dichloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,2-Dichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,3,5-Trimethylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,3-Dichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,3-Dichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
1,4-Dichlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
2,2-Dichloropropane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
2-Butanone	5.00 U	5.00 U	5.00 U	5.00 U	50.0 U	5.00 U	5.00 U
2-Chlorotoluene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
2-Hexanone	5.00 U	5.00 U	5.00 U	5.00 U	50.0 U	5.00 U	5.00 U
4-Chlorotoluene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
4-Isopropyltoluene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
4-Methyl-2-pentanone	5.00 U	5.00 U	5.00 U	5.00 U	50.0 U	5.00 U	5.00 U
Acetone	5.00 U	5.00 U	5.00 U	5.00 U	50.0 U	5.00 U	5.00 U
Benzene	0.79	0.642	0.733	0.392 J	5.00 U	1.59	0.500 U
Bromobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Bromochloromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Bromodichloromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Bromoform	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Bromomethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Carbon disulfide	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Carbon tetrachloride	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Chlorobenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Chloroethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Chloroform	0.25 J	0.636	1.91	0.500 U	5.00 U	0.811	0.500 U
Chloromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
cis-1,2-Dichloroethene	315	307	487	344	340	287	0.500 U
cis-1,3-Dichloropropene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Dibromochloromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Dibromomethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Dichlorodifluoromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Ethylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Hexachlorobutadiene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Isopropylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
m,p-Xylene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Methyl tert-butyl ether	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Methylene chloride	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.186 J	0.500 U
Naphthalene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
n-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
n-Propylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
o-Xylene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
sec-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Styrene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
tert-Butylbenzene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Tetrachloroethene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Toluene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
trans-1,2-Dichloroethene	17.2	4.3	8.29	3.61	6.22	10.9	0.500 U
trans-1,3-Dichloropropene	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Trichloroethene	1340	1640	657	839	416	2140	0.500 U
Trichlorofluoromethane	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U
Vinyl chloride	6.06	6.11	2.12	3.85	10.0 U	6.19	1.00 U
Xylenes, Total	0.500 U	0.500 U	0.500 U	0.500 U	5.00 U	0.500 U	0.500 U

**Table A-1 Summary of Complete Analytical Results for Landfill 6 Performance Monitoring Round 6 Groundwater Samples,
Former Griffiss Air Force Base, Rome, New York**

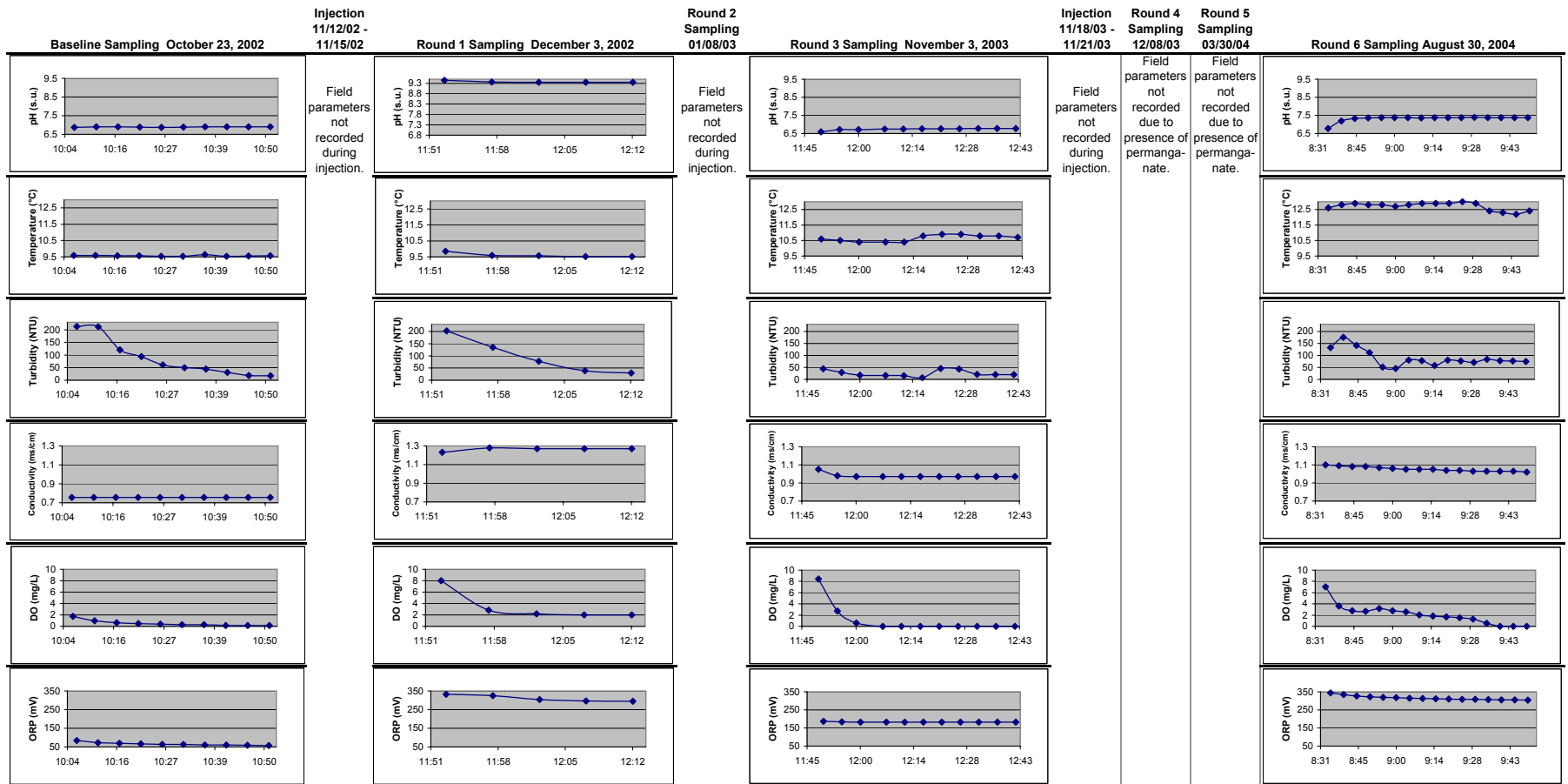
⁽¹⁾New York State Department of Environmental Conservation, Technical and Operational Guidance #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998.

Key:

- J = Estimated value.
- MW = Monitoring well.
- MW = Injection well.
- TB = Trip blank.
- U = Non detected.
- VOC = Volatile organic compound.
- µg/L = Micrograms per liter.

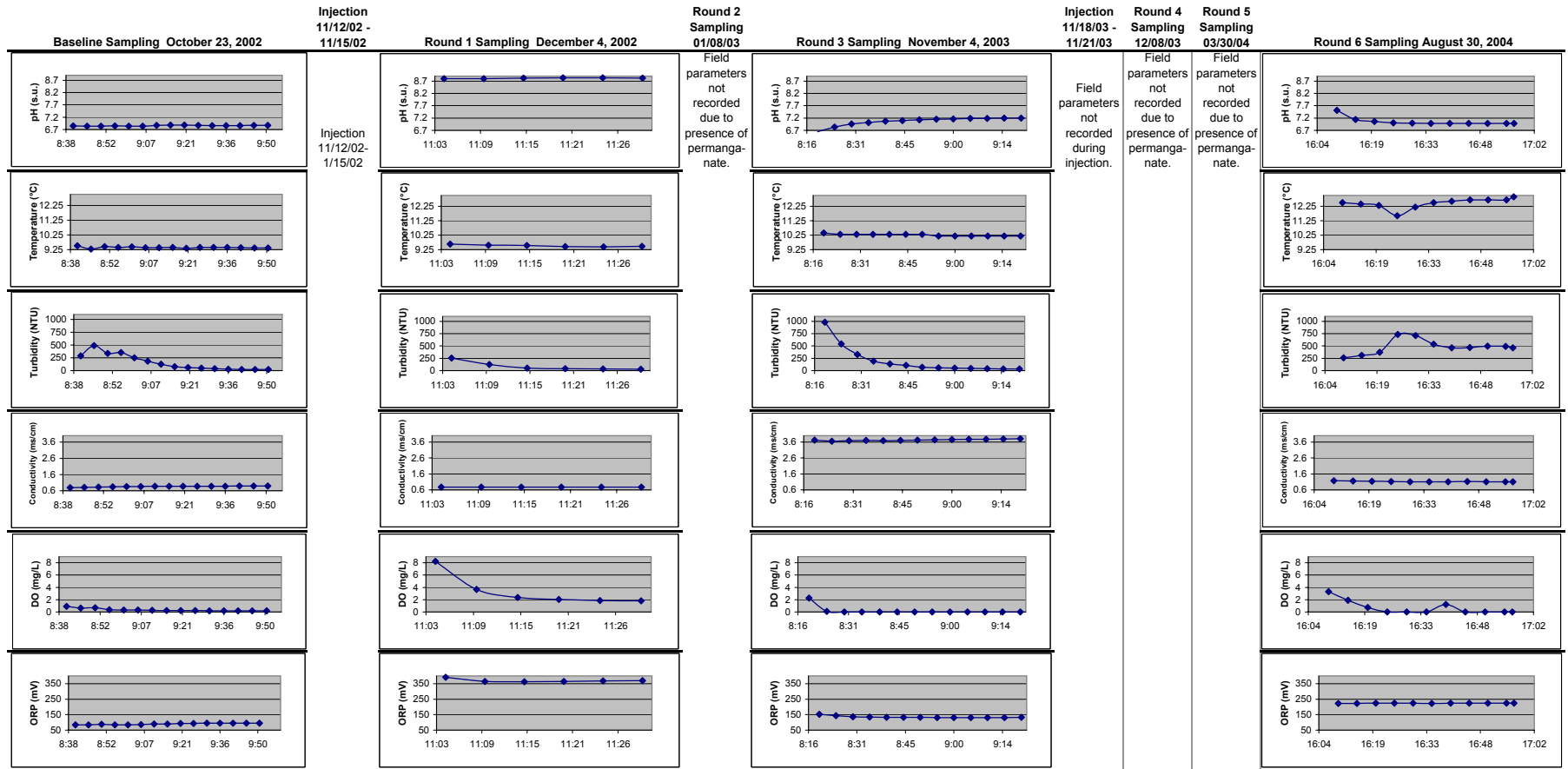
Attachment B
Groundwater Quality Monitoring Graphs

Figure I-1 Injection Well LF6IW-01 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



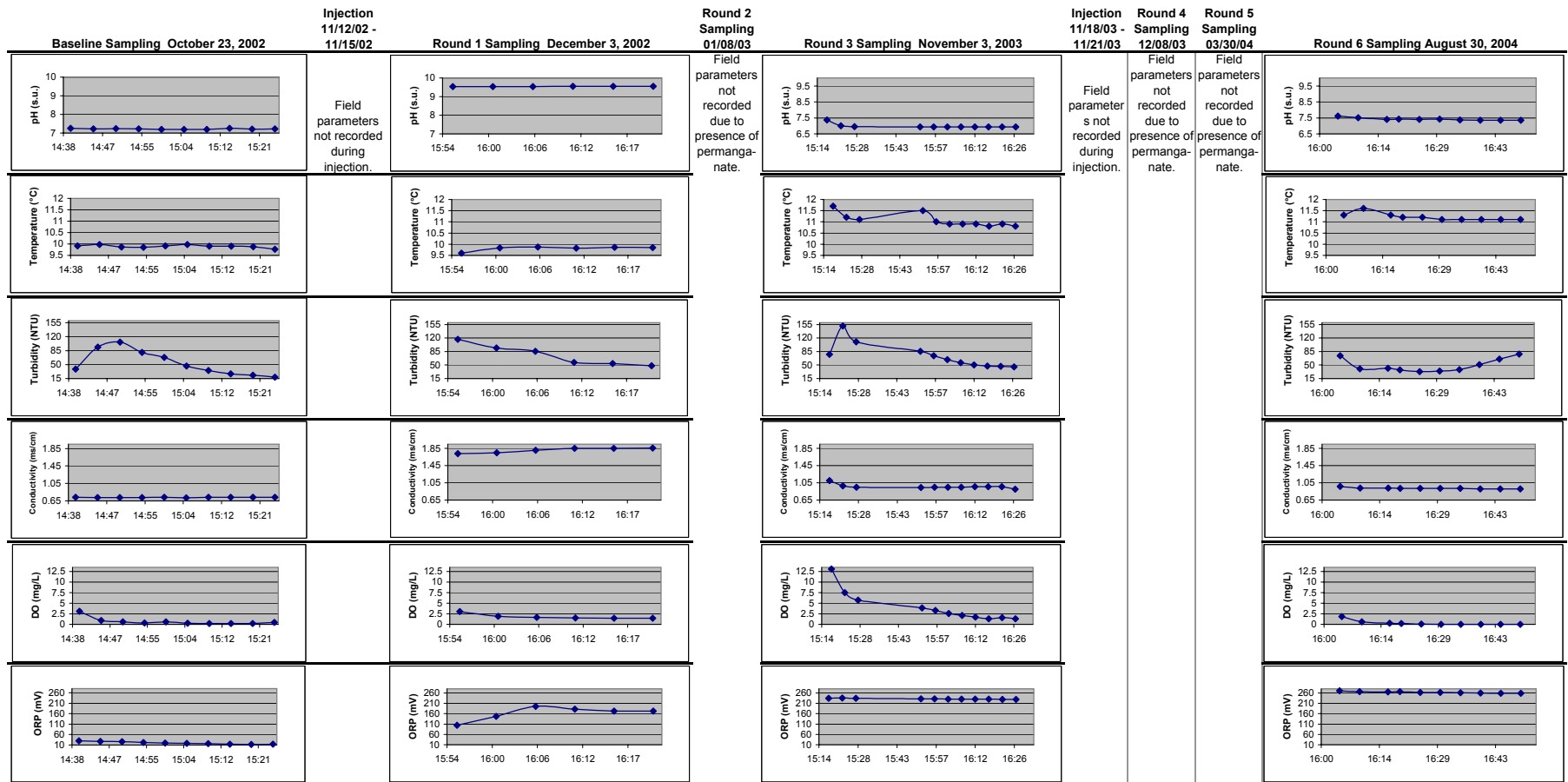
Note: Horizontal axis on all graphs is time.

Figure I-2 Injection Well LF6IW-02 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



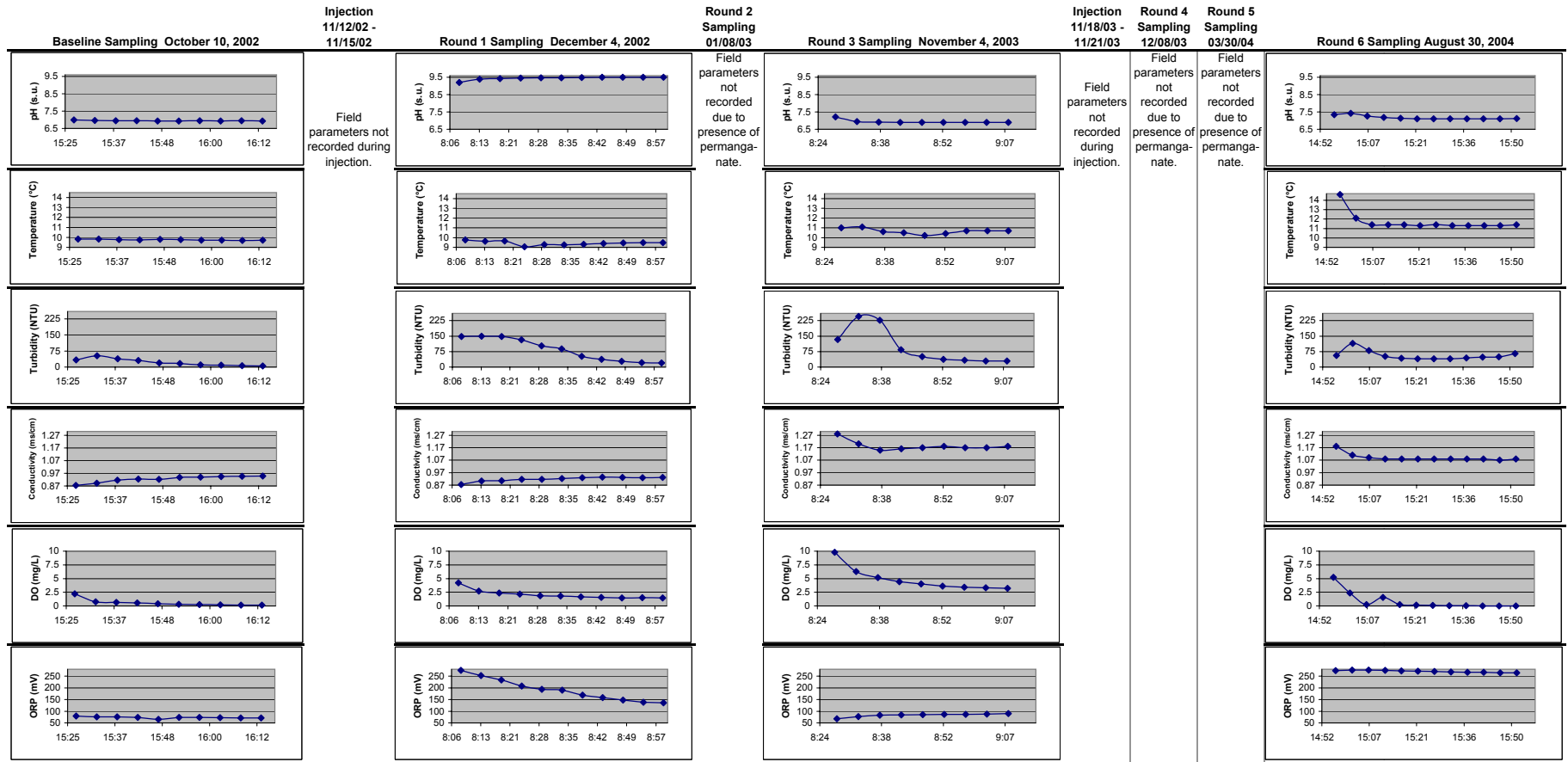
Note: Horizontal axis on all graphs is time.

Figure I-3 Injection Well LF6IW-03 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



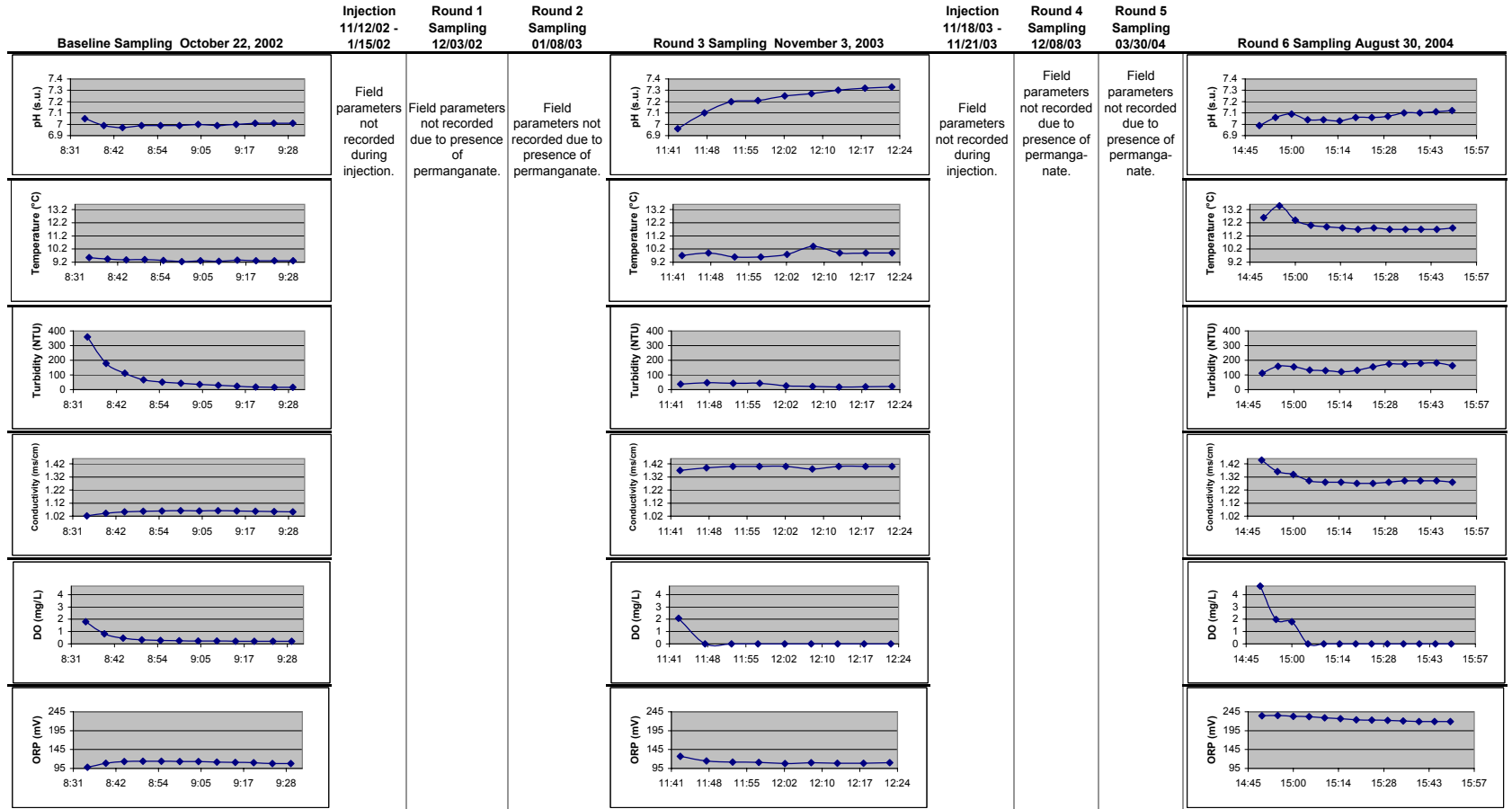
Note: Horizontal axis on all graphs is time.

Figure I-4 Injection Well LF6IW-04 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



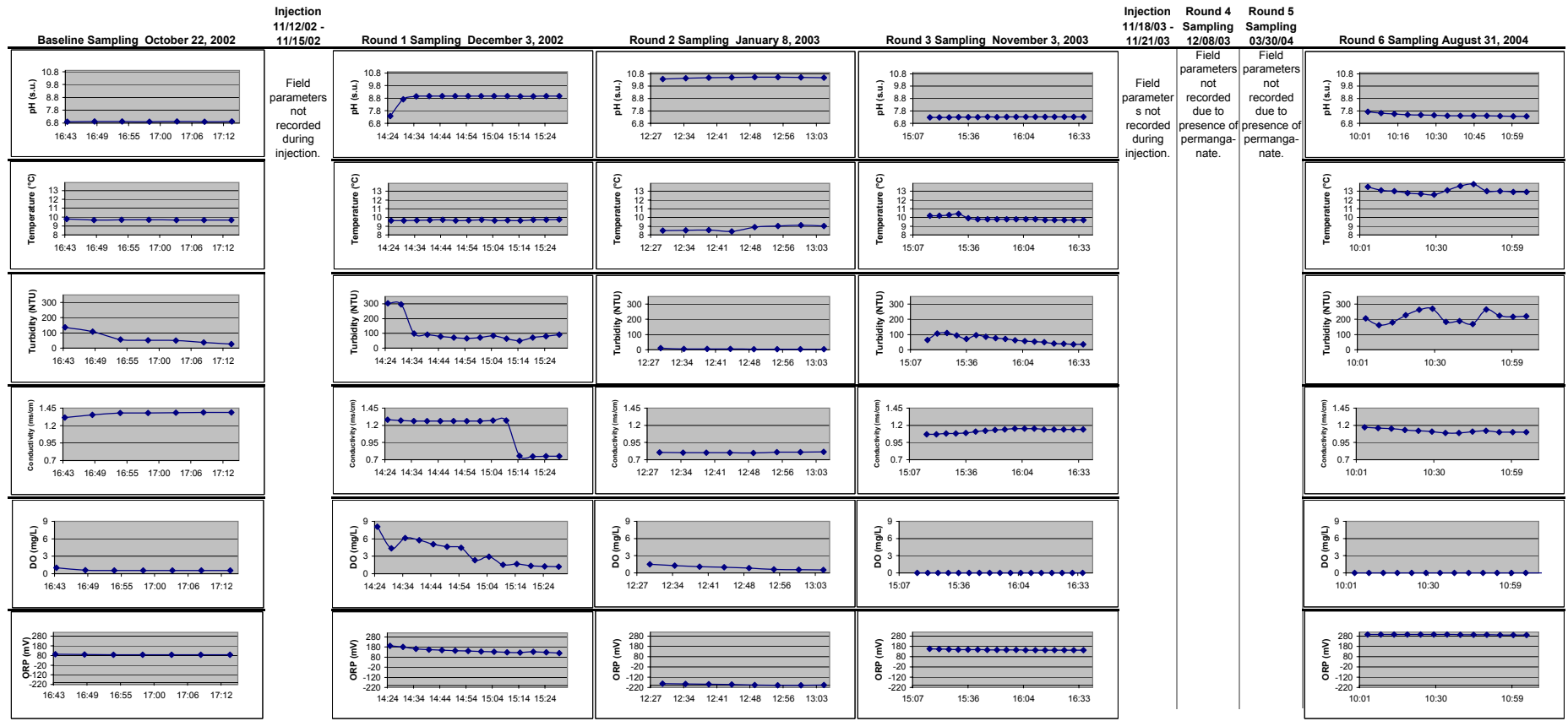
Note: Horizontal axis on all graphs is time.

Figure I-5 Injection Well LF61W-05 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



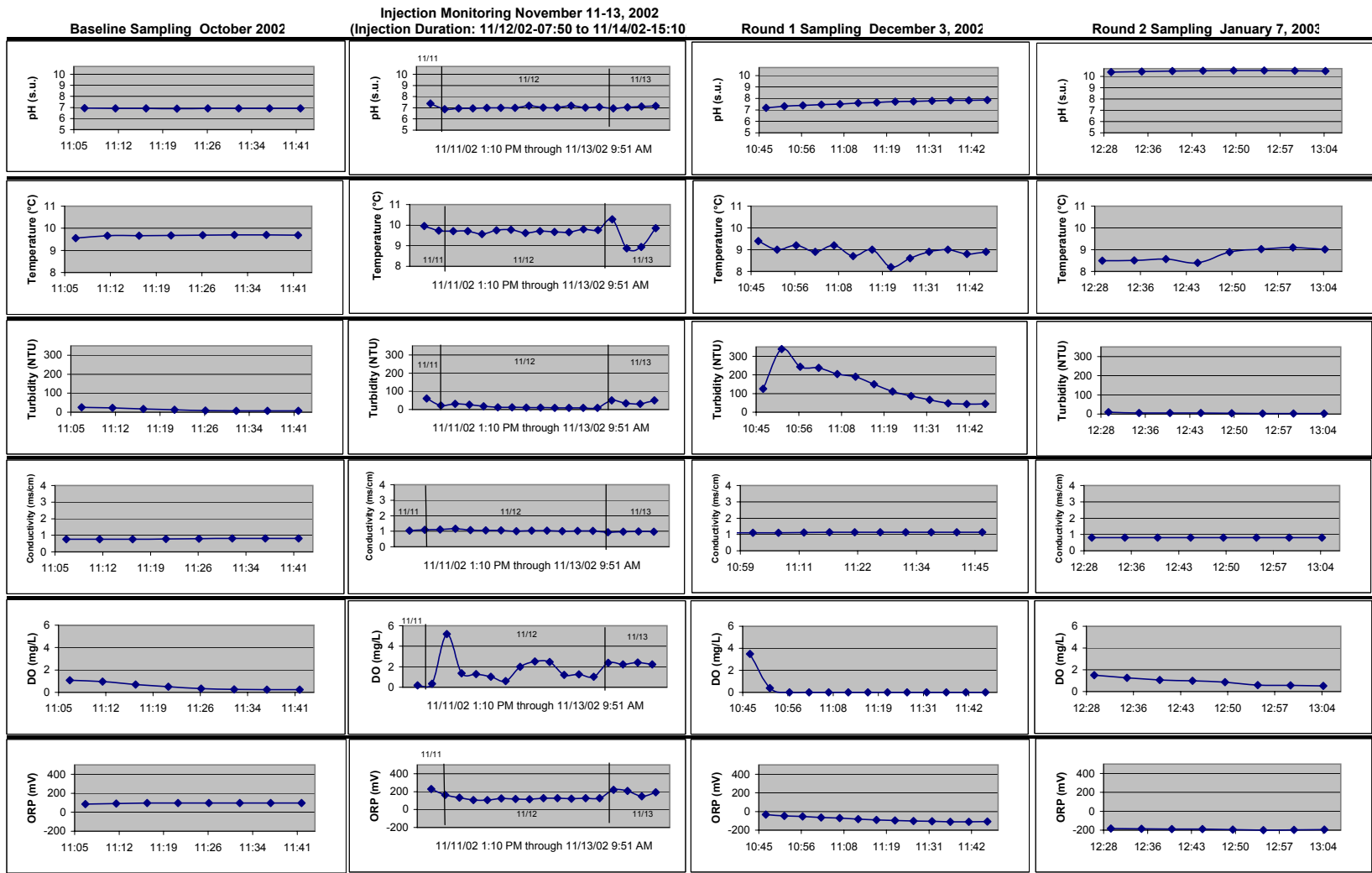
Note: Horizontal axis on all graphs is time.

Figure I-6 Injection Well LF6IW-06 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



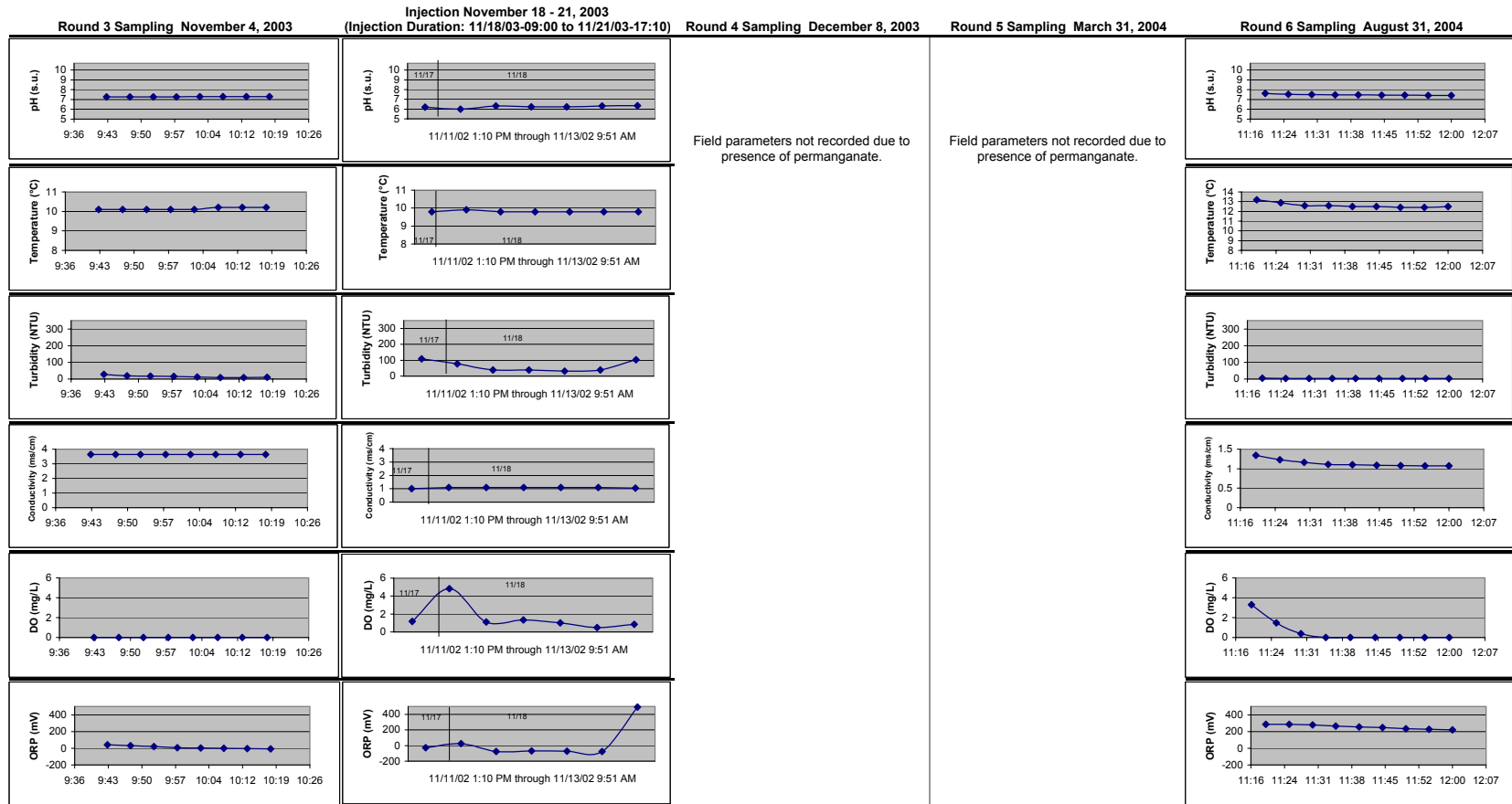
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-7 Monitoring Well LF6MW-12 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



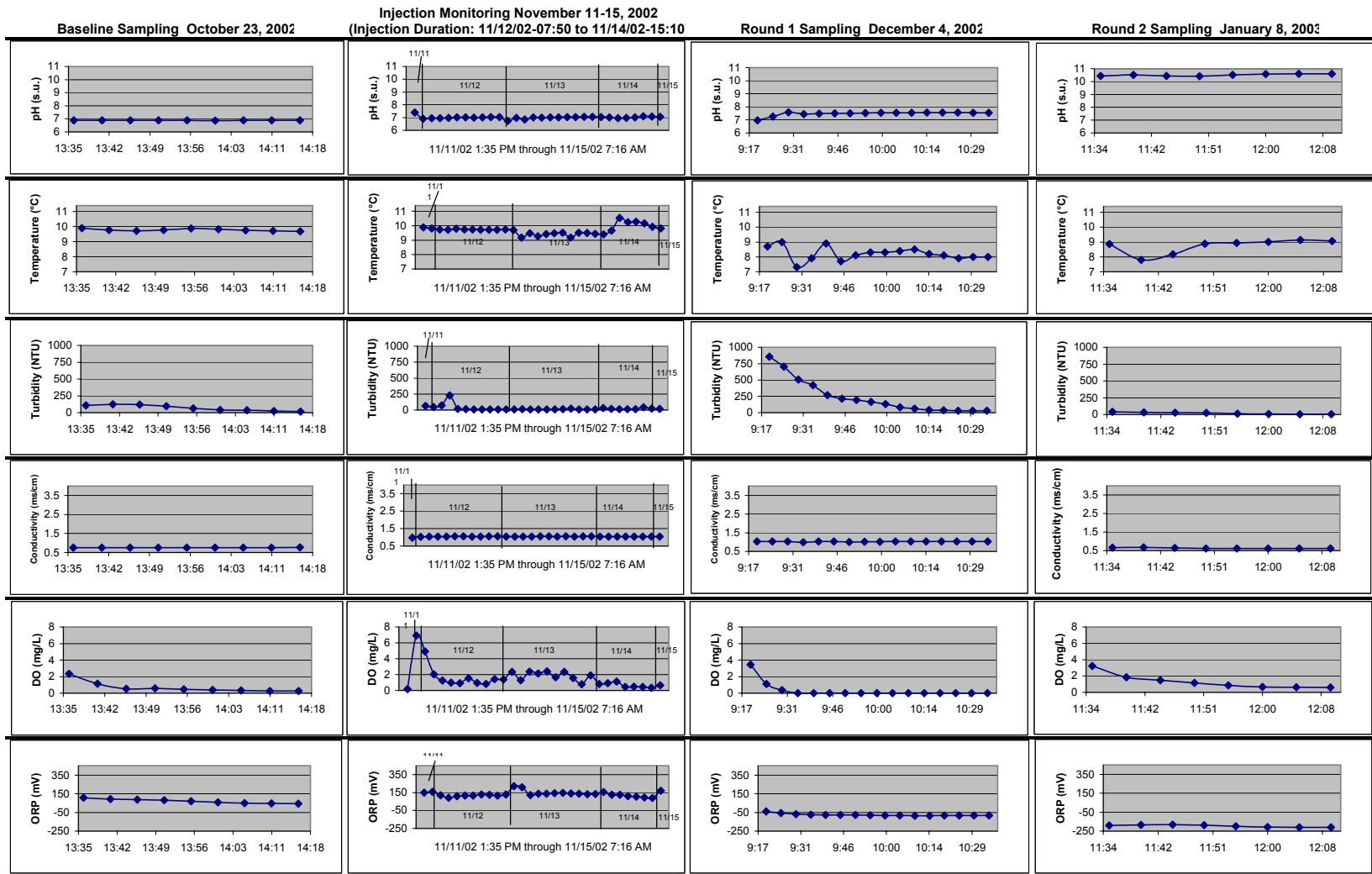
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-7 Monitoring Well LF6MW-12 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



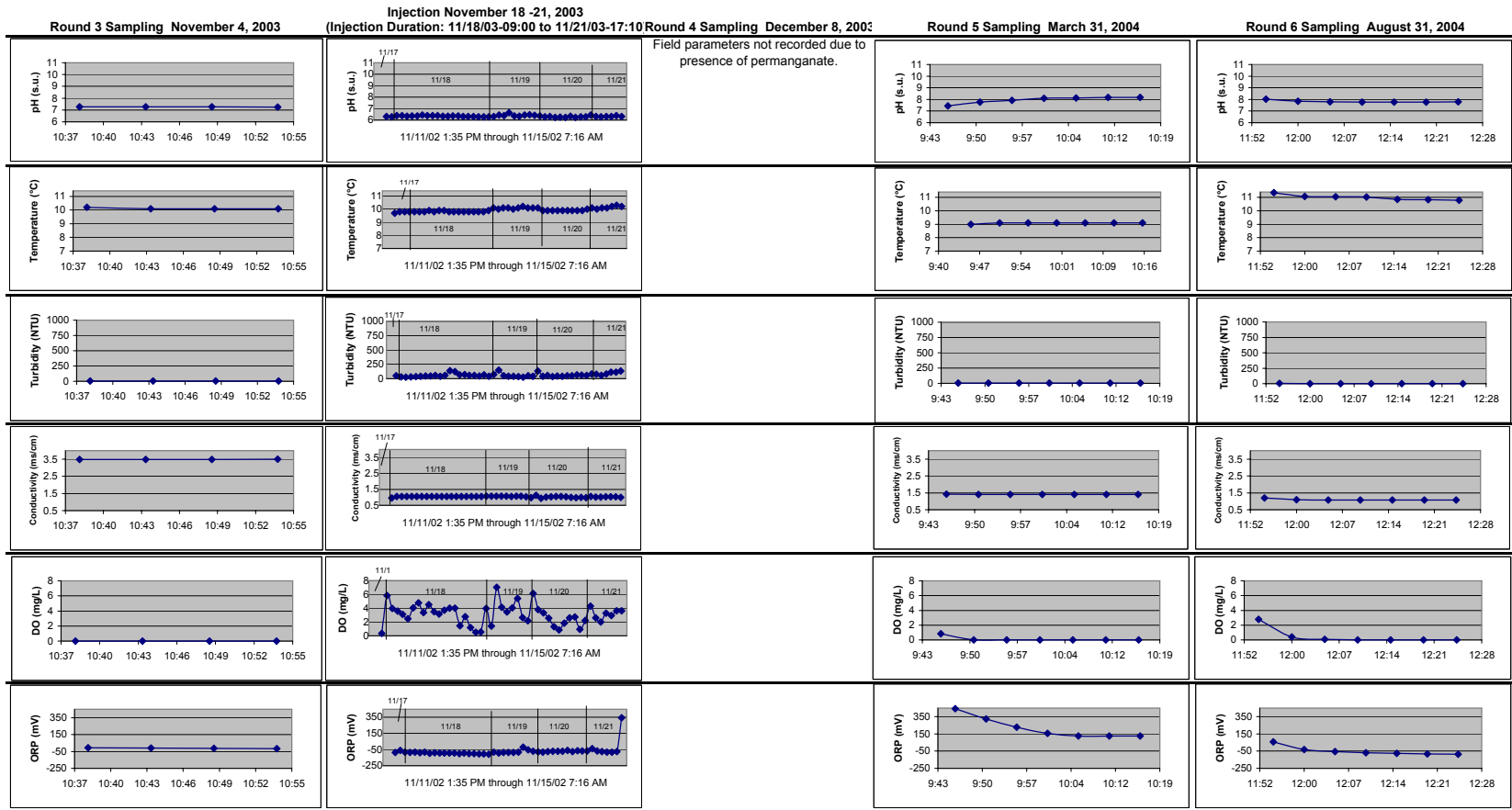
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-8 Monitoring Well LF6MW-16 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



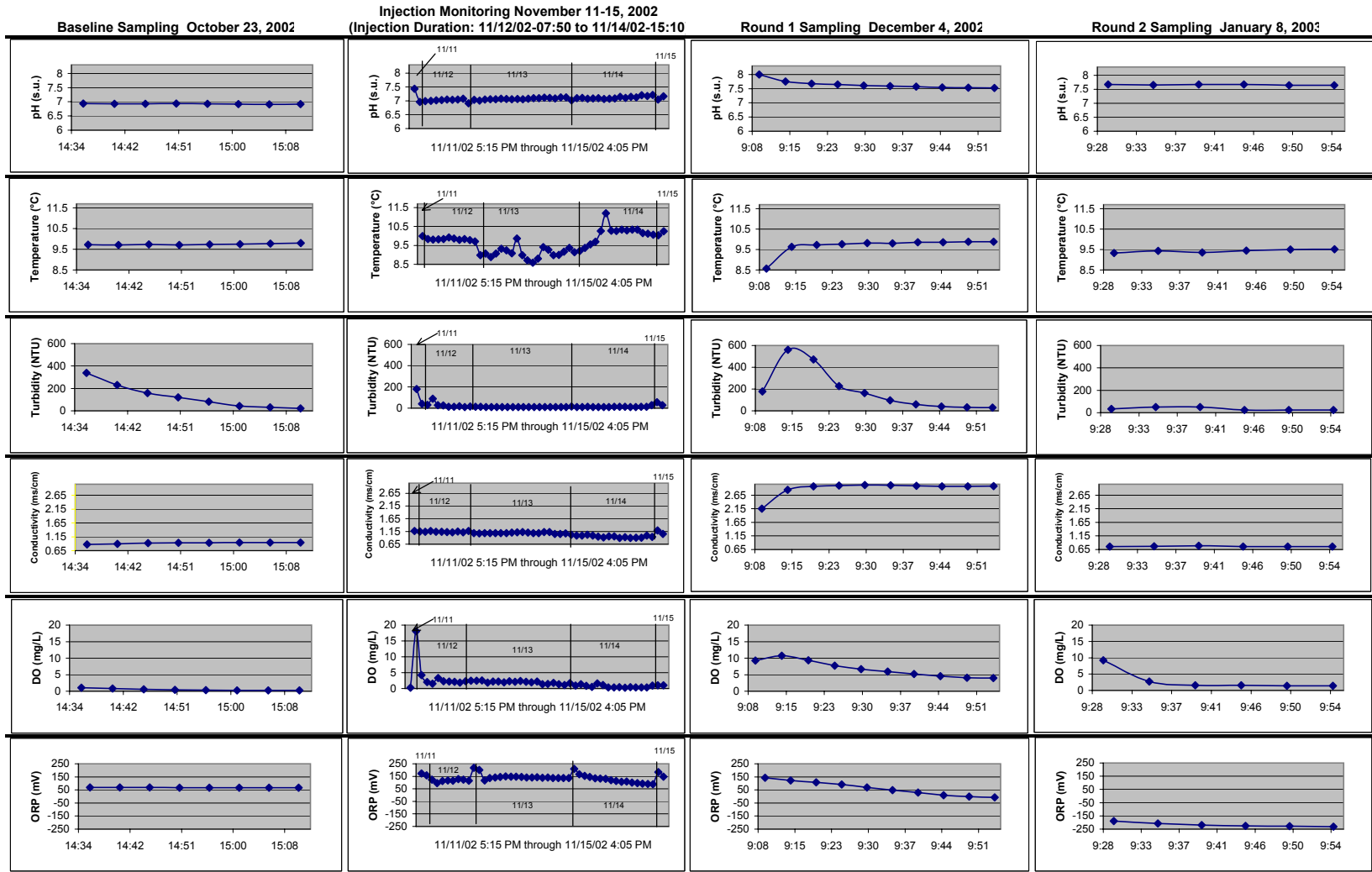
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-8 Monitoring Well LF6MW-16 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



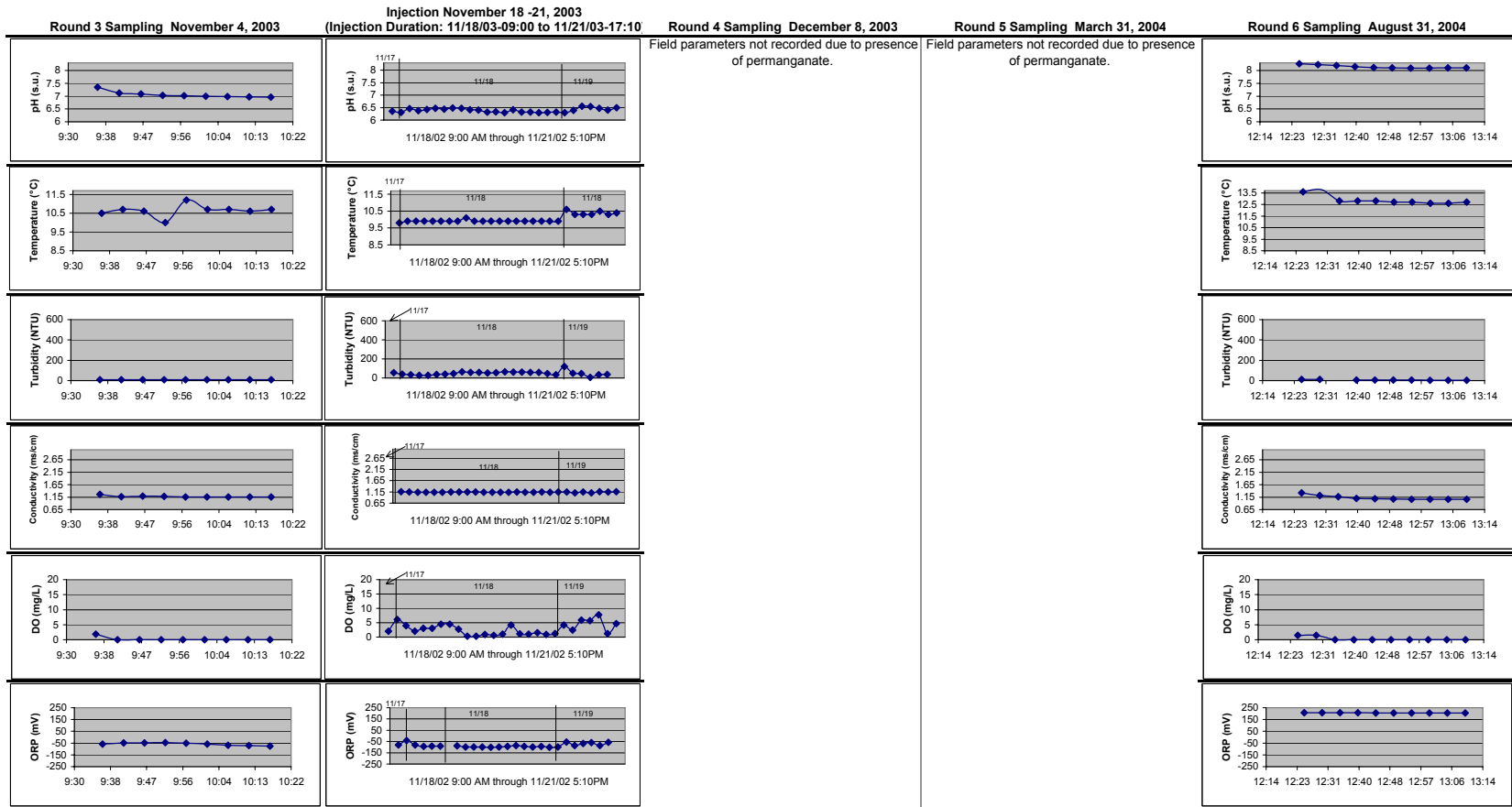
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-9 Monitoring Well LF6MW-17 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



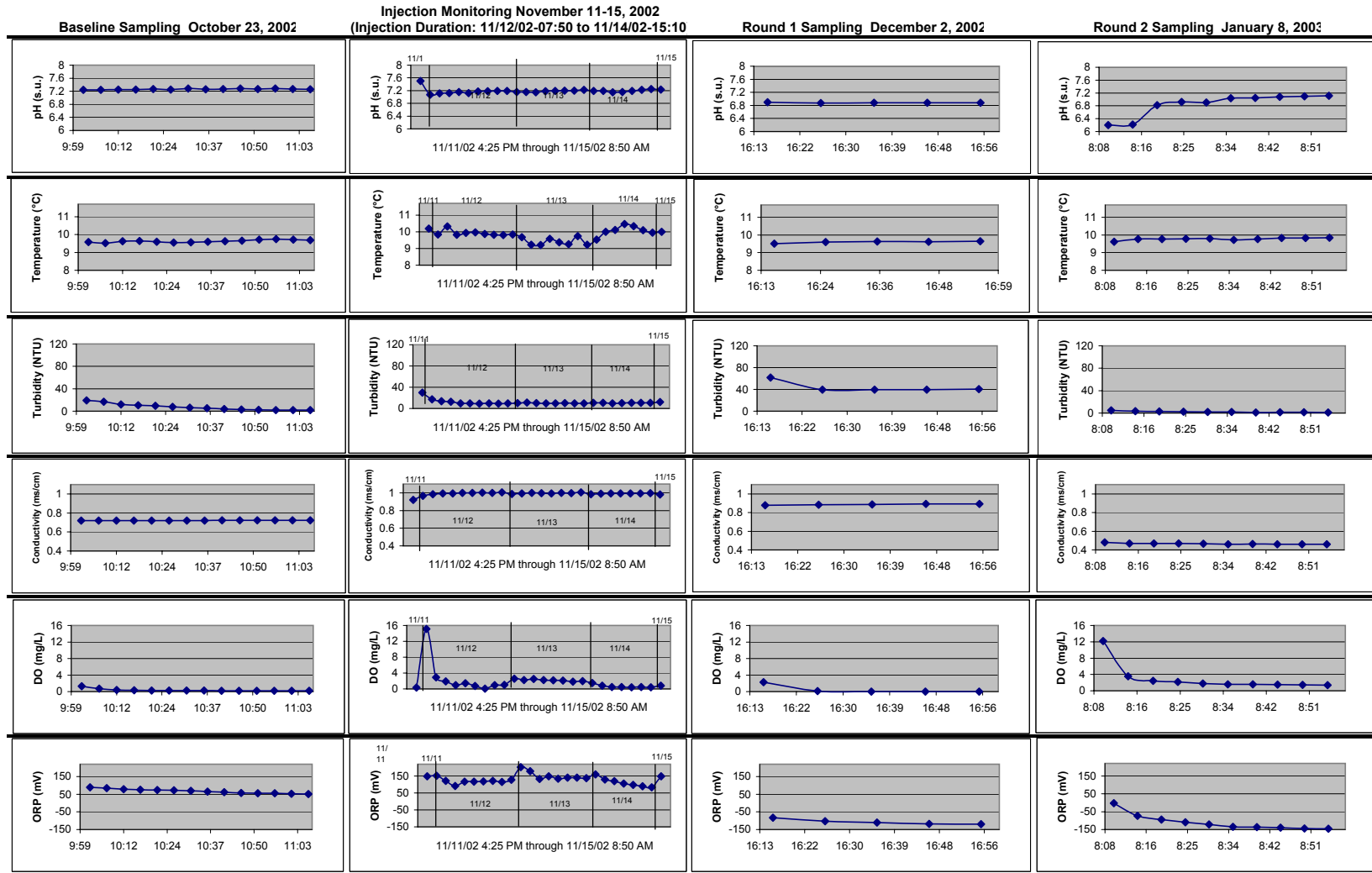
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-9 Monitoring Well LF6MW-17 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



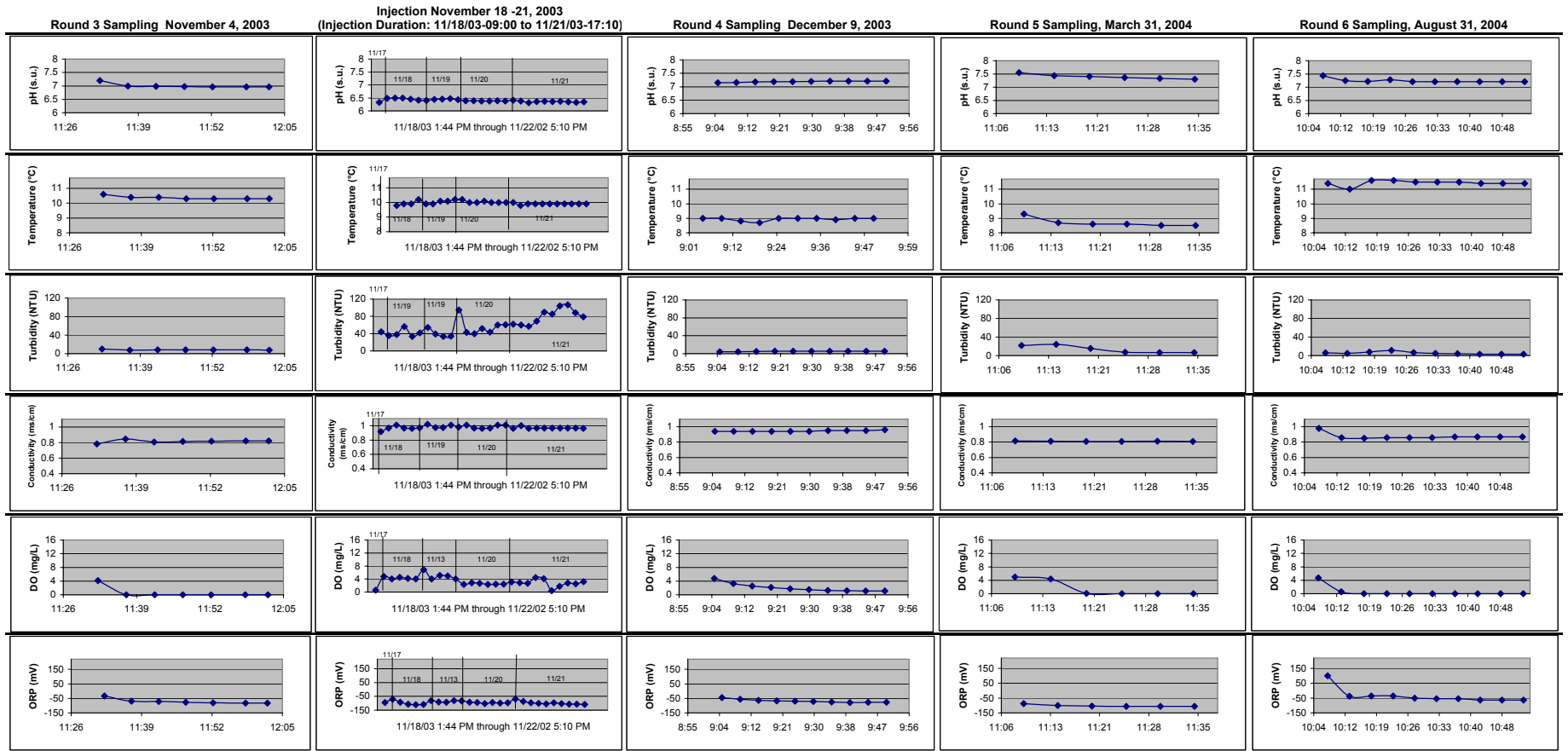
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-10 Monitoring Well LF6MW-18 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



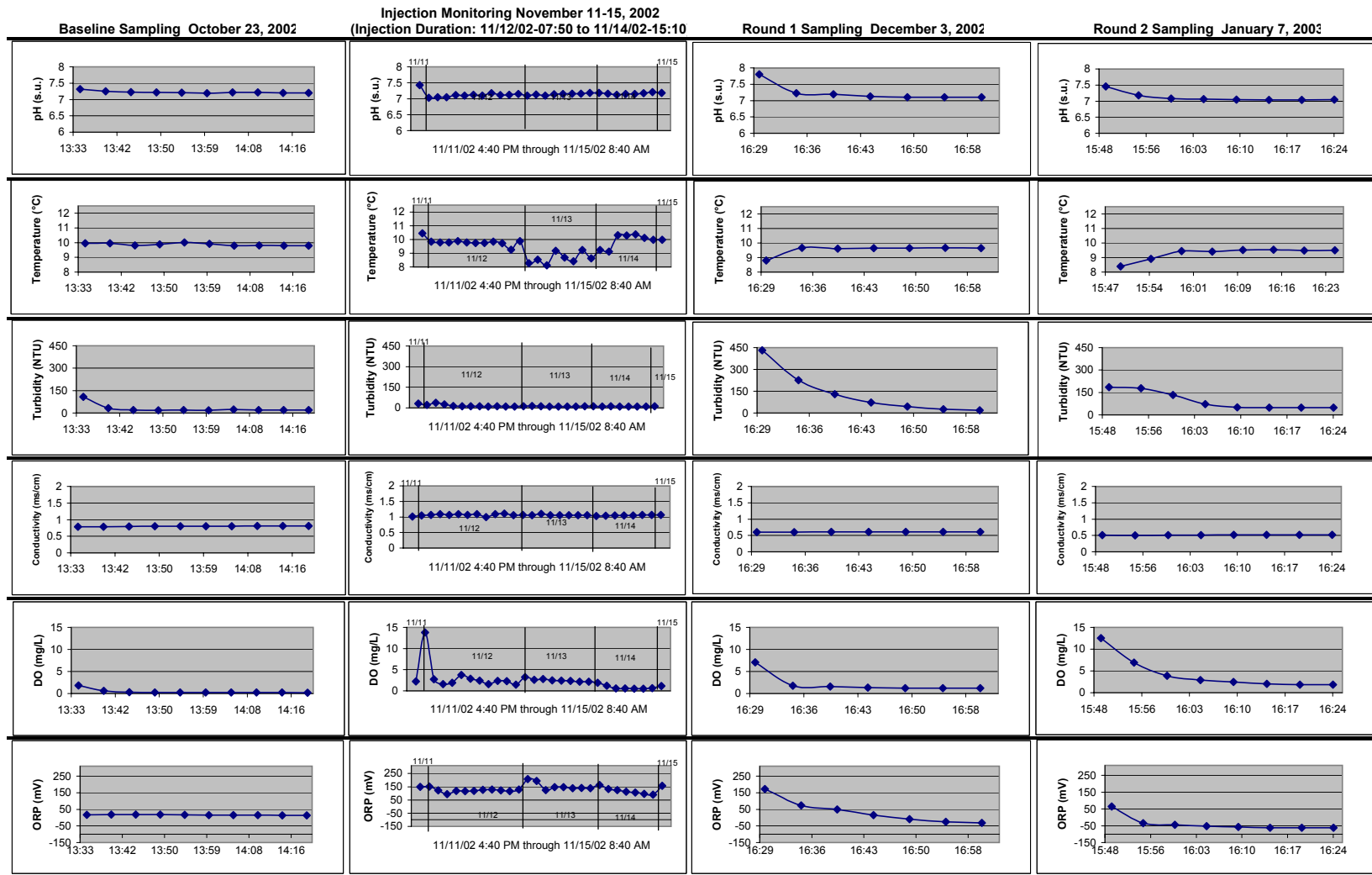
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-10 Monitoring Well LF6MW-18 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



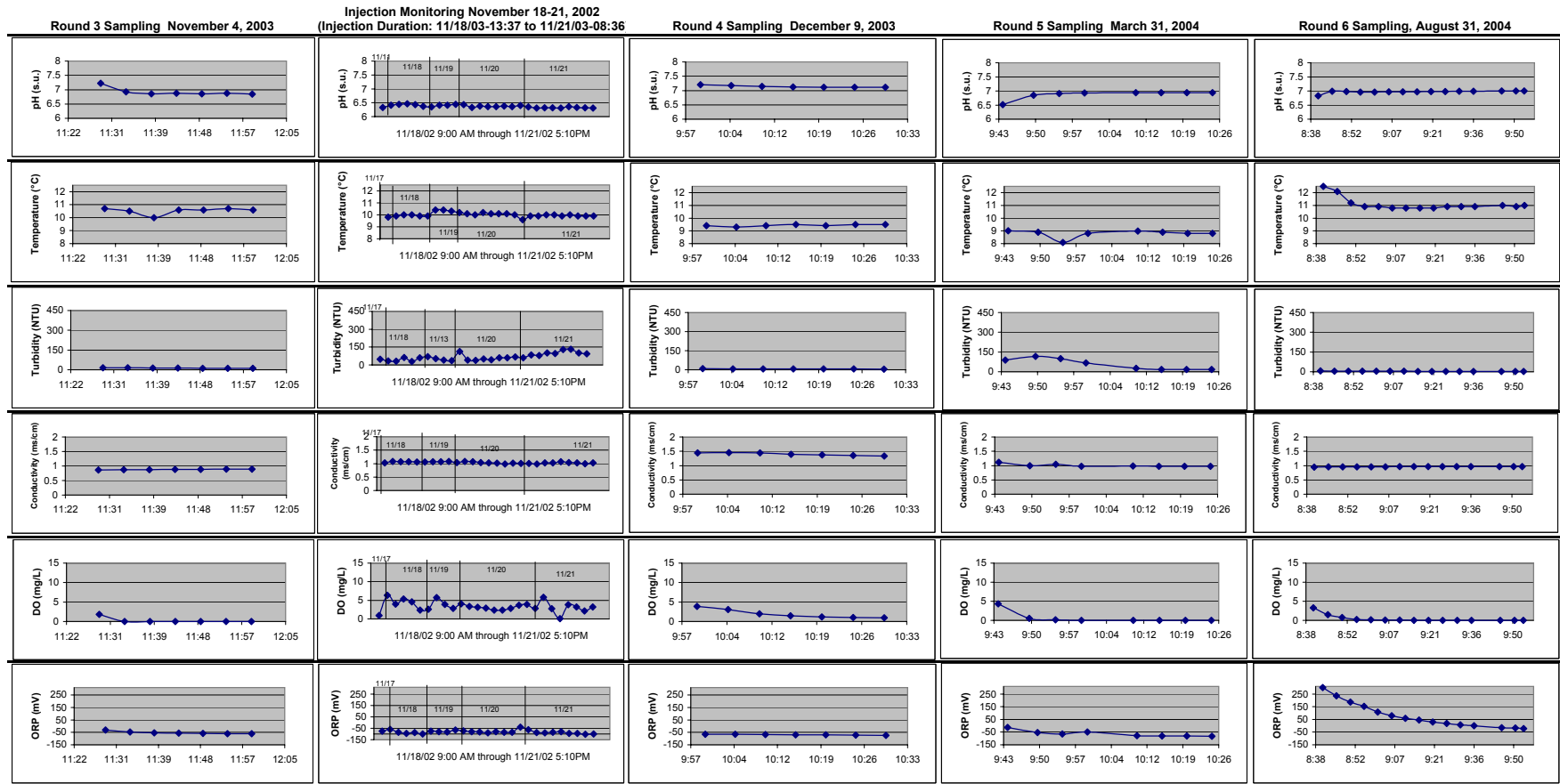
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-11 Monitoring Well LF6MW-19 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



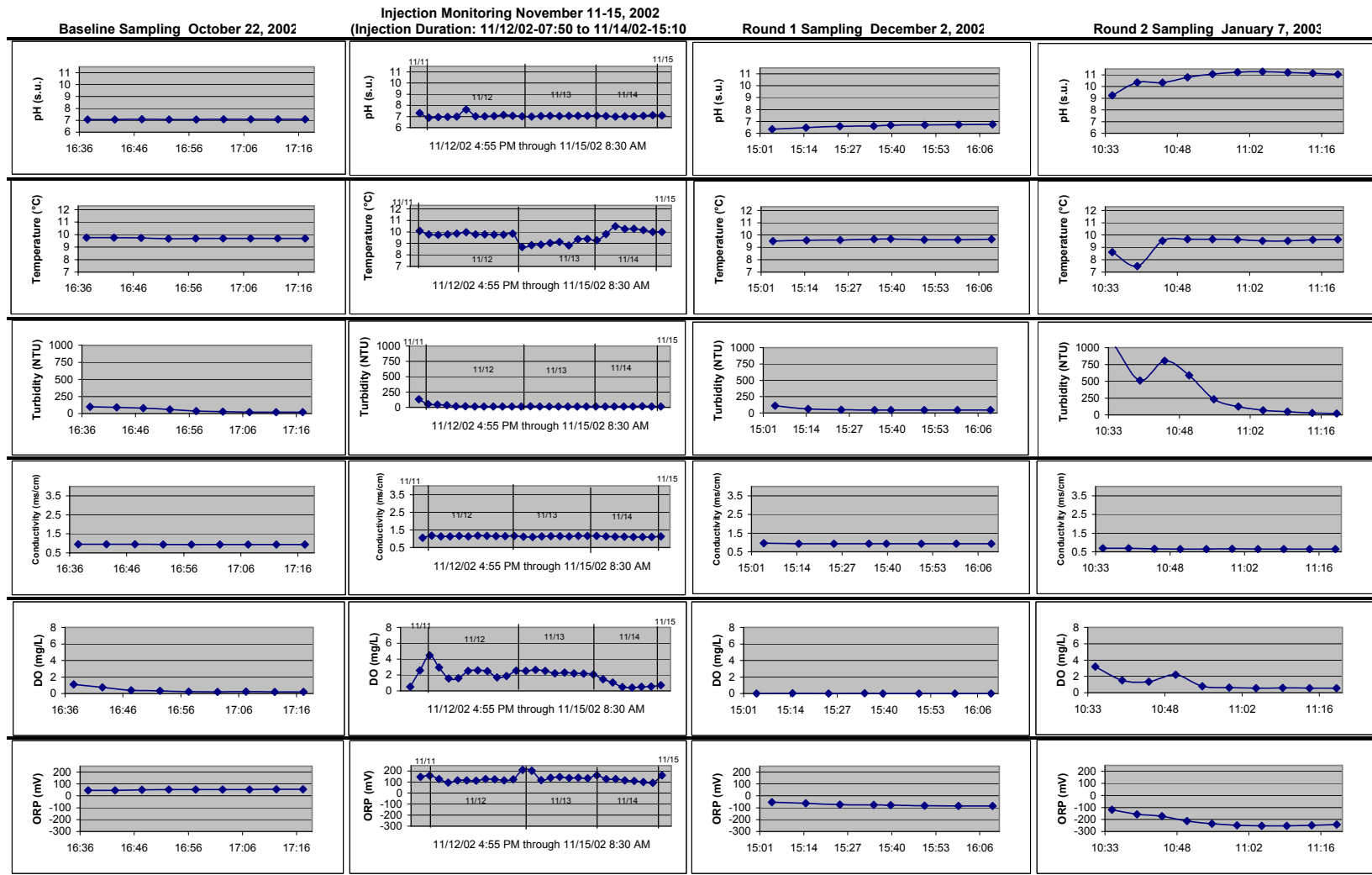
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-11 Monitoring Well LF6MW-19 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



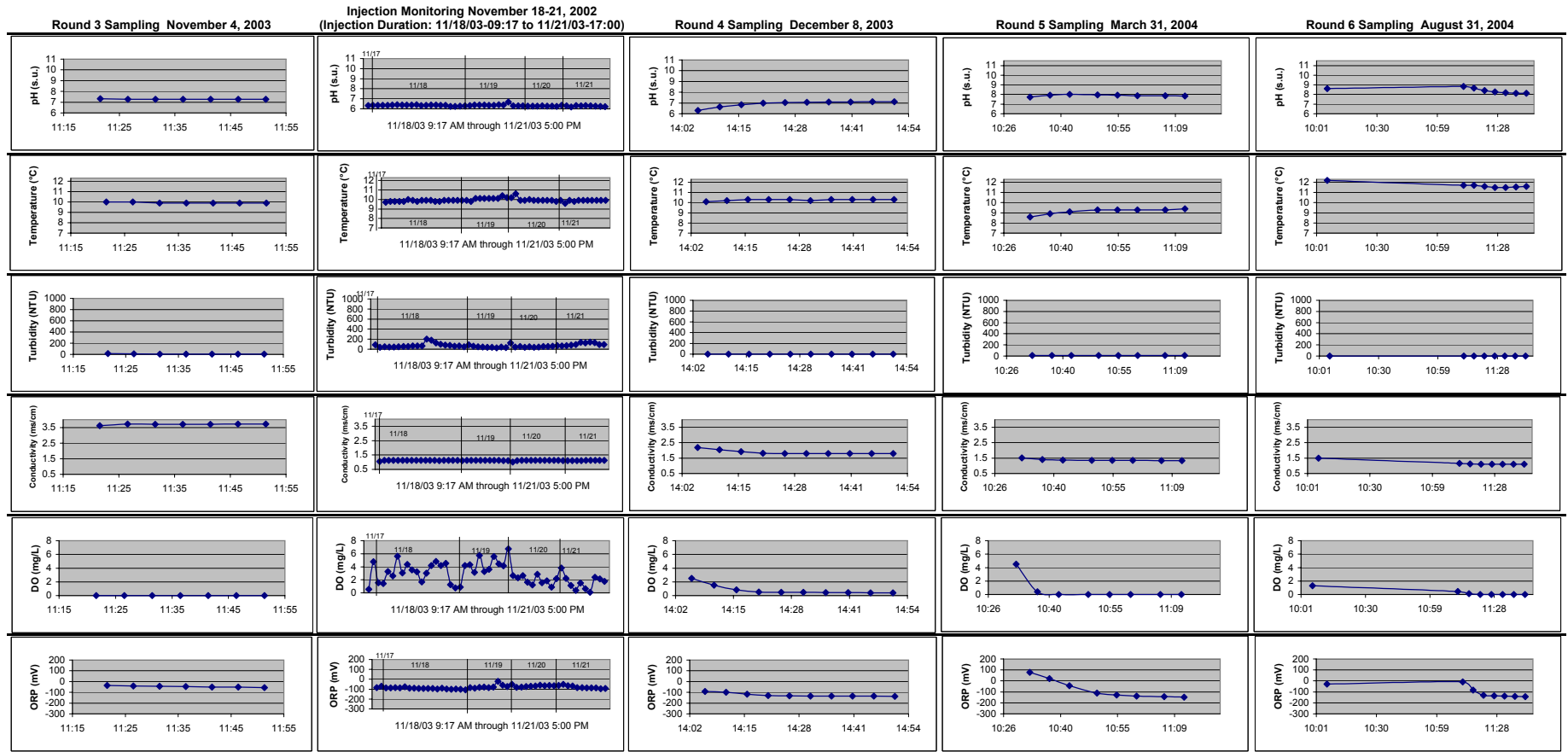
Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-12 Monitoring Well LF6MW-20 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York



Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

Figure I-12 Monitoring Well LF6MW-20 Groundwater Quality Parameters, Former Griffiss Air Force Base, Rome, New York (continued)



Note: Horizontal axis on all graphs is time. Time not to scale on Injection Monitoring graphs.

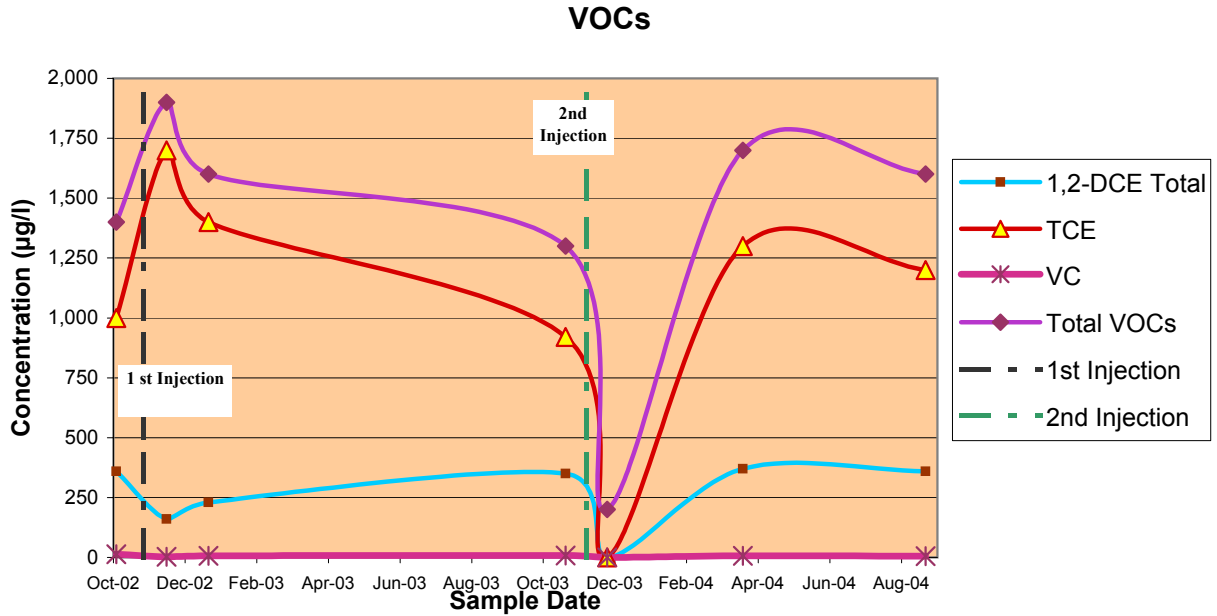
Attachment C

Graphical Summary for VOCs in Landfill 6 Wells

Figure 4-1: Graphical Summary for VOCs in well LF6IW-01

Well ID: LF6IW-01 Total Depth: 49 feet TOIC
 Type: Overburden injection well Sand Pack Interval: 35 to 47 feet BGS
 Installation Date: 10/7/2002 Screen Interval: 37 to 47 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	360	1,000	13	1,400	NA	NA
Round 1	12/04/02	160	1,700	3.3	1,900	-	-
Round 2	01/08/03	230	1,400	6.4	1,600	-	-
Round 3	11/03/03	350	920	8.6	1,300	7%	8%
Round 4	12/08/03	ND	ND	ND	200	86%	100%
Round 5	03/31/04	370	1,300	7.2	1700	-	-
Round 6	08/31/04	360	1,200	5.4	1600	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

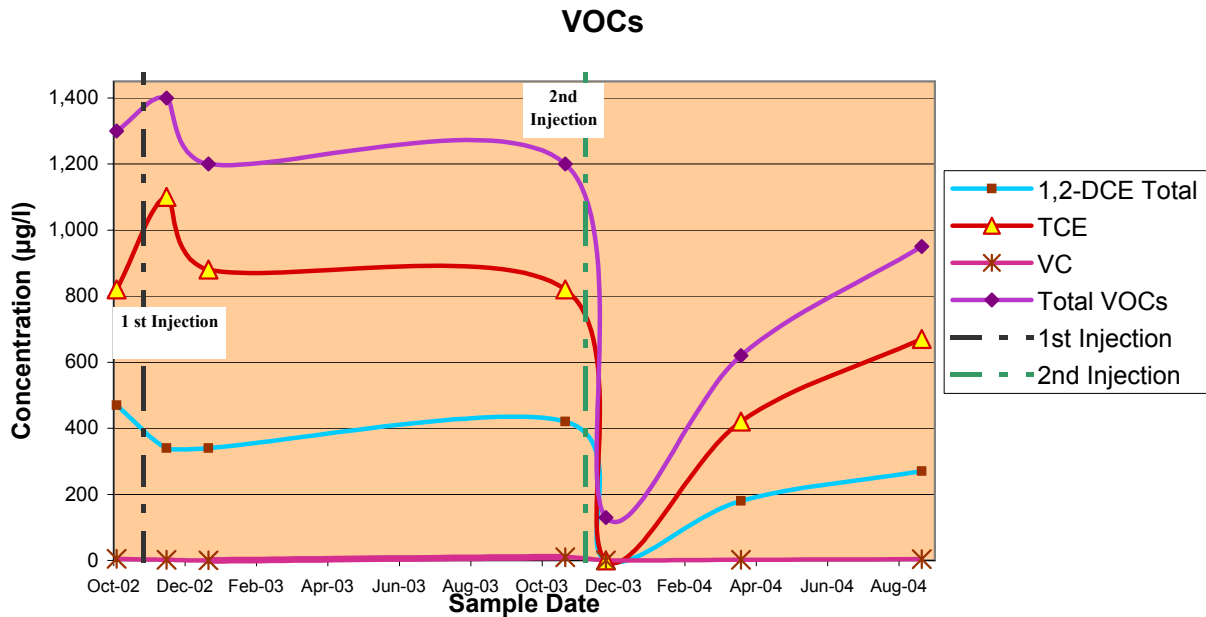
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-2: Graphical Summary for VOCs in well LF6IW-02

Well ID: LF6IW-02 Total Depth: 56.5 feet TOIC
 Type: Overburden injection well Sand Pack Interval: 43 to 55 feet BGS
 Installation Date: 10/1/2002 Screen Interval: 45 to 55 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	470	820	4.8	1,300	NA	NA
Round 1	12/04/02	340	1,100	2.2	1,400	-	-
Round 2	01/08/03	340	880	ND	1,200	8%	-
Round 3	11/04/03	420	820	9.4	1,200	8%	0%
Round 4	12/08/03	ND	ND	ND	130	90%	100%
Round 5	03/31/04	180	420	2.2	620	52%	49%
Round 6	08/30/04	270	670	3.4	950	27%	18%

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

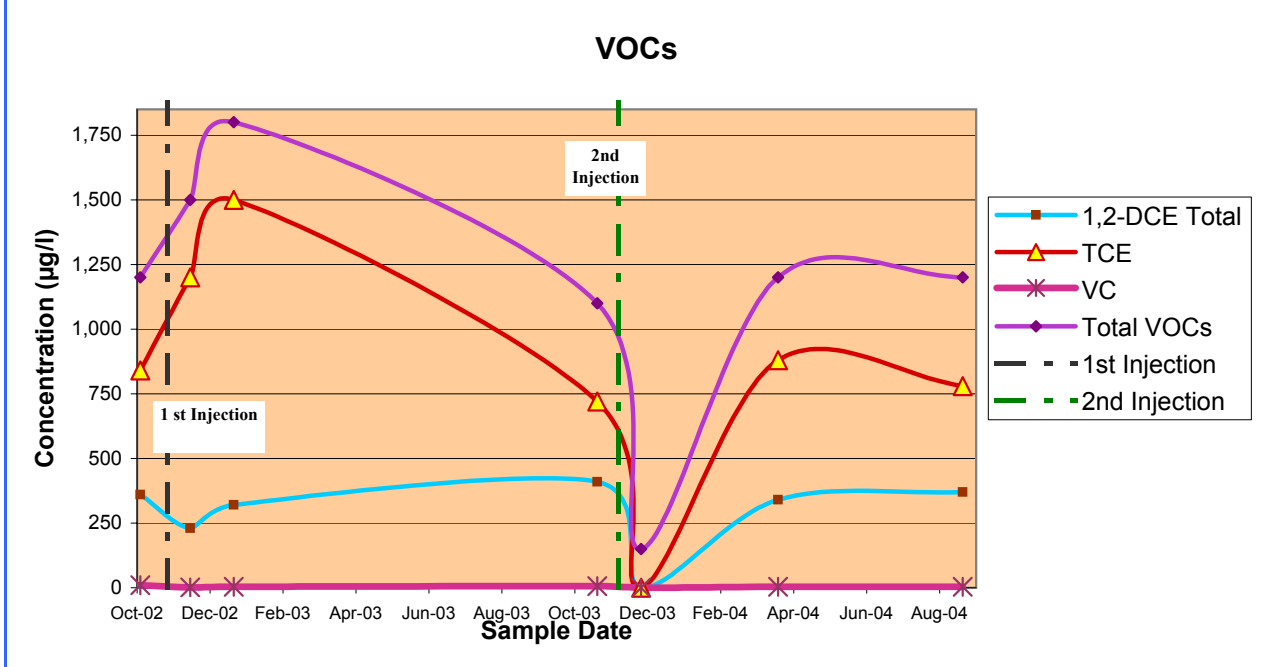
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-3: Graphical Summary for VOCs in well LF6IW-03

Well ID: LF6IW-03 Total Depth: 49.2 feet TOIC
 Type: Overburden injection well Sand Pack Interval: 34.7 to 55 feet BGS
 Installation Date: 10/7/2002 Screen Interval: 37 to 47 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	360	840	9.9	1,200	NA	NA
Round 1	12/03/02	230	1,200	1.2	1,500	-	-
Round 2	01/08/03	320	1,500	3.7	1,800	-	-
Round 3	11/03/03	410	720	5.9	1,100	8%	14%
Round 4	12/09/03	ND	ND	ND	150	88%	100%
Round 5	03/31/04	340	880	3.3	1,200	0%	-
Round 6	08/30/04	370	780	3.3	1,200	0%	7%

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

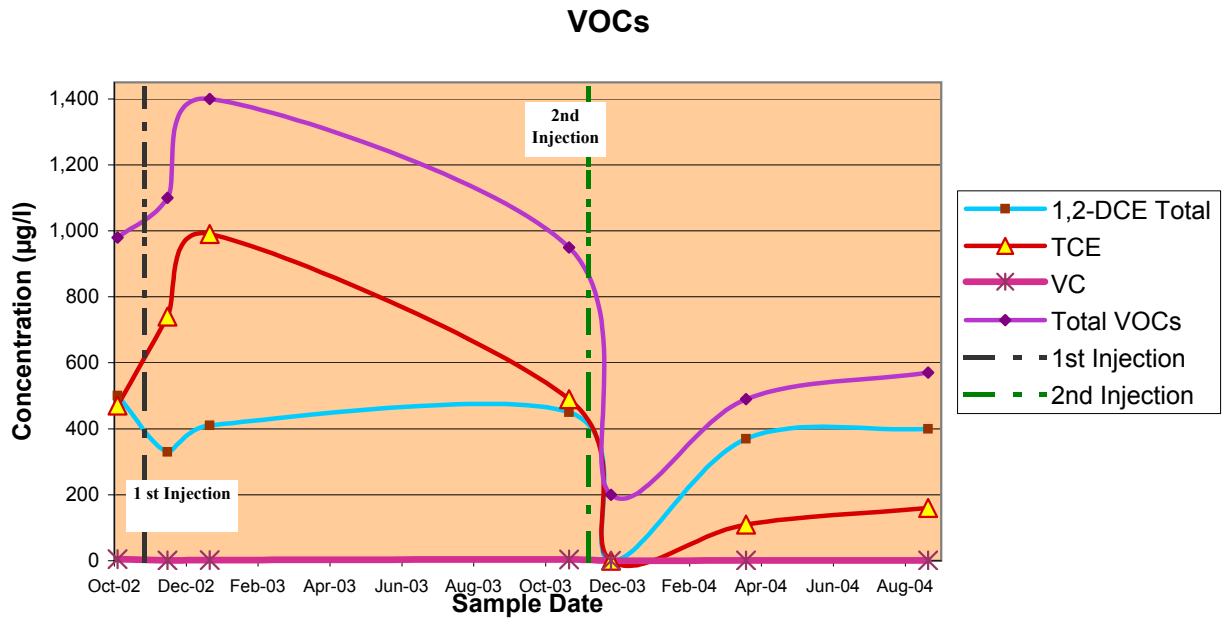
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-4: Graphical Summary for VOCs in well LF6IW-04

Well ID: LF6IW-04 Total Depth: 56.5 feet TOIC
 Type: Overburden injection well Sand Pack Interval: 42.7 to 55 feet BGS
 Installation Date: 10/8/2002 Screen Interval: 45 to 55 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	500	470	4.8	980	NA	NA
Round 1	12/04/02	330	740	1.3	1,100	-	-
Round 2	01/08/03	410	990	2.4	1,400	-	-
Round 3	11/04/03	450	490	3.5	950	3%	-
Round 4	12/09/03	ND	ND	ND	200	80%	100%
Round 5	03/31/04	370	110	0.6	490	50%	77%
Round 6	08/30/04	400	160	1.0	570	42%	66%

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

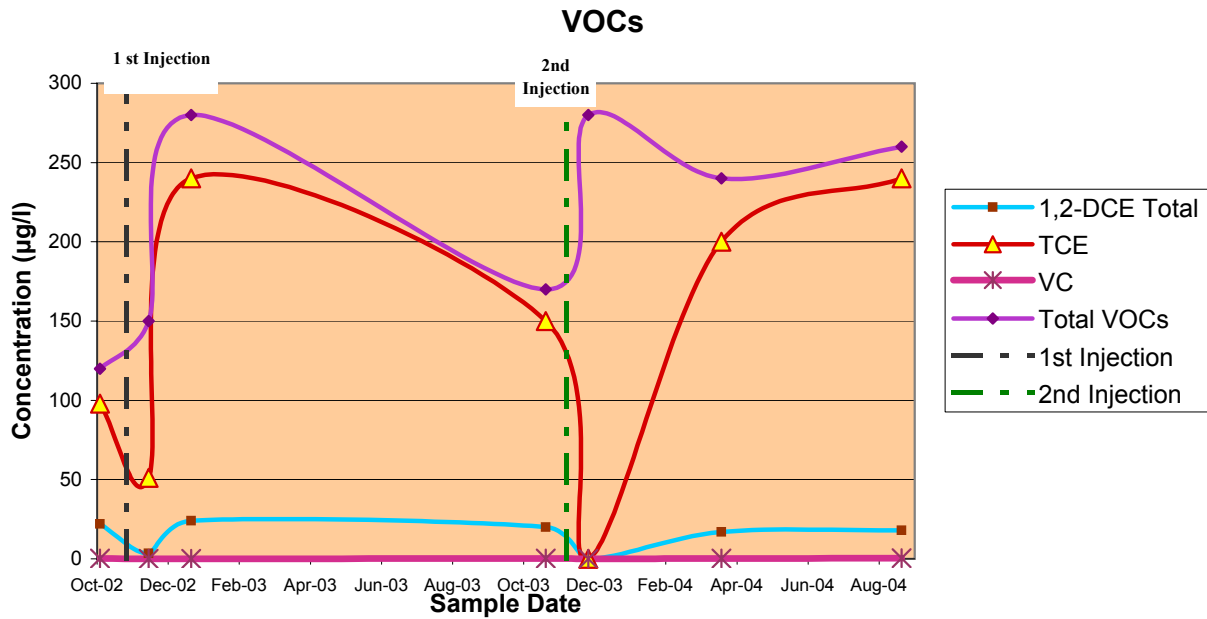
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-5: Graphical Summary for VOCs in well LF6IW-05

Well ID: LF6IW-05 **Total Depth:** 49.35 feet TOIC
Type: Overburden injection well **Sand Pack Interval:** 34.2 to 47 feet BGS
Installation Date: 10/2/2002 **Screen Interval:** 37 to 47 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	22	98	0.22	120	NA	NA
Round 1	12/03/02	3.5	51	ND	150	-	48%
Round 2	01/08/03	24	240	ND	280	-	-
Round 3	11/03/03	20	150	0.29	170	-	-
Round 4	12/09/03	ND	ND	ND	280	-	100%
Round 5	03/31/04	17	200	0.22	240	-	-
Round 6	08/30/04	18	240	0.48	260	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
DCE = Dichloroethene. TOIC = Top of inner casing.
IW = Injection well. U = Not detected (practical quantitation limit listed).
LF6 = Landfill 6. VOC = Volatile organic compound.
MW = Monitoring well. µg/L = Micrograms per liter.
NA = Not applicable. VC = Vinyl chloride.
ND = Not detected. - = No reduction in VOC concentration.

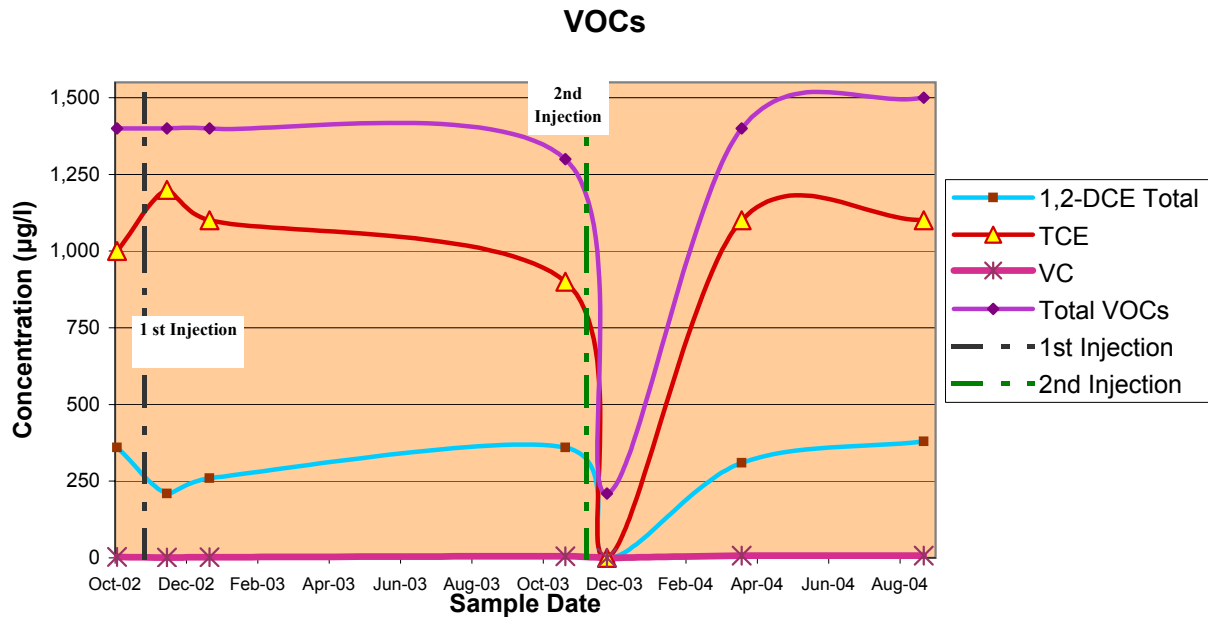
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-6: Graphical Summary for VOCs in well LF6IW-06

Well ID: LF6IW-06 Total Depth: 56.5 feet TOIC
 Type: Overburden injection well Sand Pack Interval: 42.7 to 55 feet BGS
 Installation Date: 10/1/2002 Screen Interval: 45 to 55 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/22/02	360	1,000	2.9	1,400	NA	NA
Round 1	12/03/02	210	1,200	1.1	1,400	-	-
Round 2	01/08/03	260	1,100	2.4	1,400	-	-
Round 3	11/03/03	360	900	5.5	1,300	7%	10%
Round 4	12/08/03	ND	ND	ND	210	85%	100%
Round 5	03/31/04	310	1,100	6.9	1,400	0%	-
Round 6	08/31/04	380	1,100	6.8	1,500	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

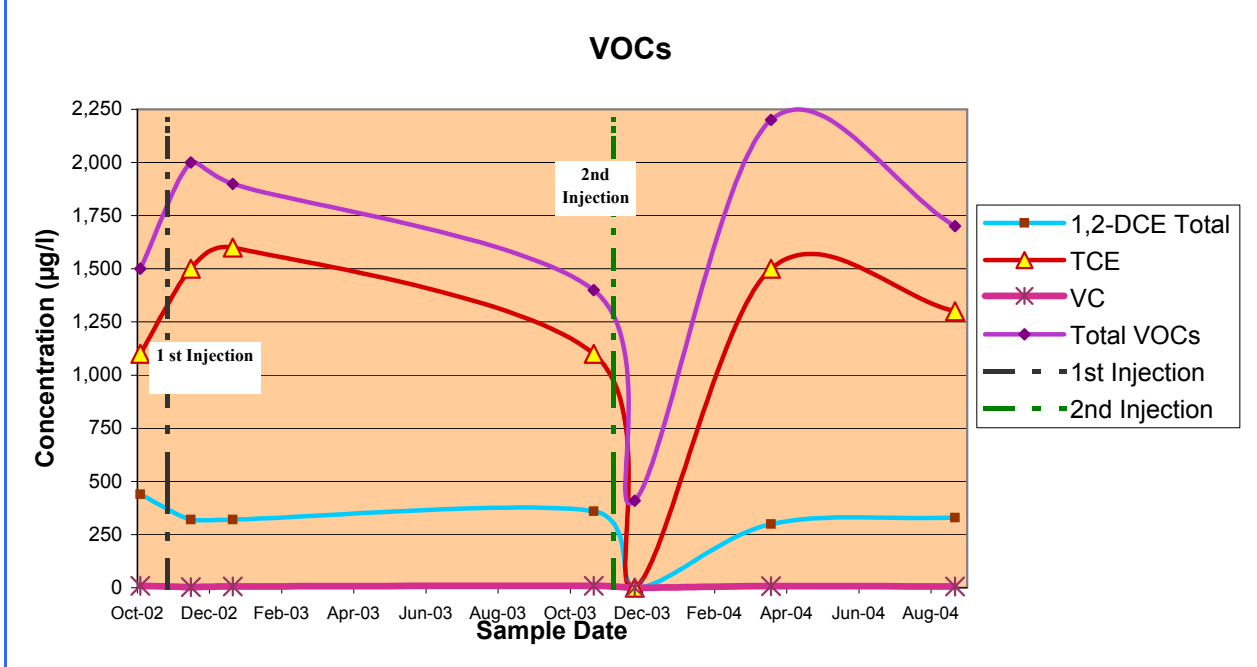
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-7: Graphical Summary for VOCs in well LF6MW-12

Well ID: LF6MW-12 Total Depth: 52.98 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 38 to 53 feet BGS
 Installation Date: 2/22/2002 Screen Interval: 41 to 51 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	440	1,100	8.6	1,500	NA	NA
Round 1	12/04/02	320	1,500	3.5	2,000	-	-
Round 2	01/08/03	320	1,600	5.9	1,900	-	-
Round 3	11/04/03	360	1,100	8.6	1,400	7%	0%
Round 4	12/08/03	ND	ND	ND	410	73%	100%
Round 5	03/31/04	300	1,500	7.5	2,200	-	-
Round 6	08/31/04	330	1,300	6.2	1,700	-	-

Key:

- BGS = Below ground surface.
- DCE = Dichloroethene.
- IW = Injection well.
- LF6 = Landfill 6.
- MW = Monitoring well.
- NA = Not applicable.
- ND = Not detected.
- TCE = Trichloroethene.
- TOIC = Top of inner casing.
- U = Not detected (practical quantitation limit listed).
- VOC = Volatile organic compound.
- µg/L = Micrograms per liter.
- VC = Vinyl chloride.
- = No reduction in VOC concentration.

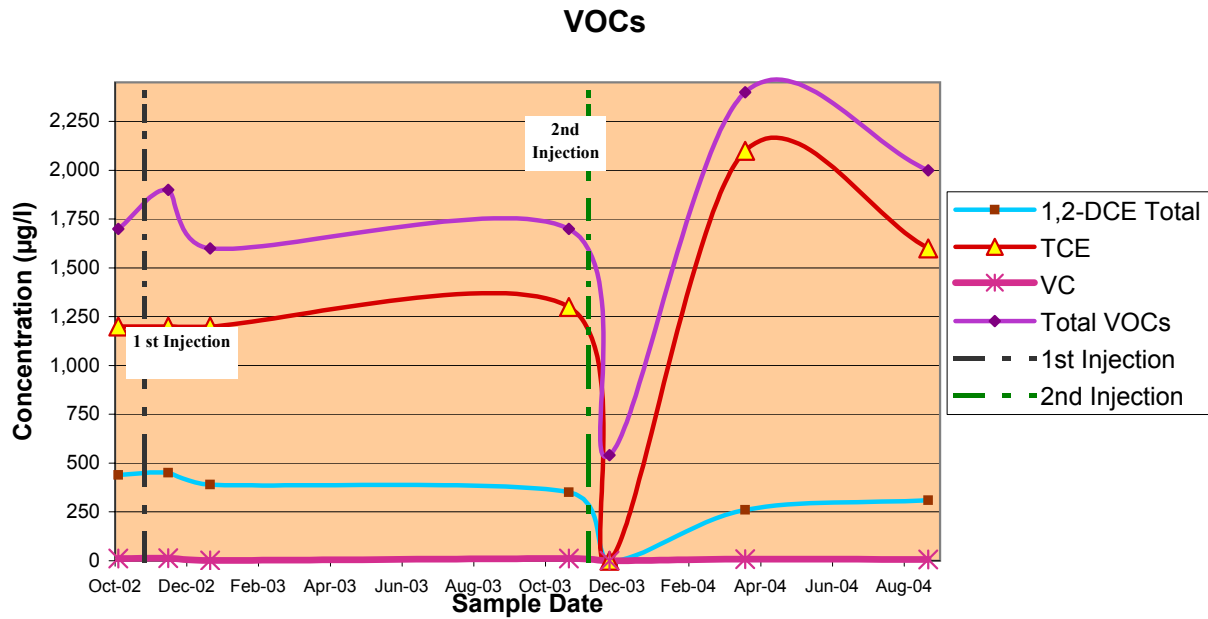
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-8: Graphical Summary for VOCs in well LF6MW-16

Well ID: LF6MW-16 Total Depth: 48.9 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 35 to 47 feet BGS
 Installation Date: 10/3/2002 Screen Interval: 37 to 47 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	440	1,200	11	1,700	NA	NA
Round 1	12/04/02	450	1,200	13	1,900	-	-
Round 2	01/08/03	390	1,200	2.2	1,600	6%	0%
Round 3	11/04/03	350	1,300	11	1,700	0%	-
Round 4	12/08/03	ND	ND	ND	540	68%	100%
Round 5	03/31/04	260	2,100	7.4	2,400	-	-
Round 6	08/31/04	310	1,600	6.1	2,000	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

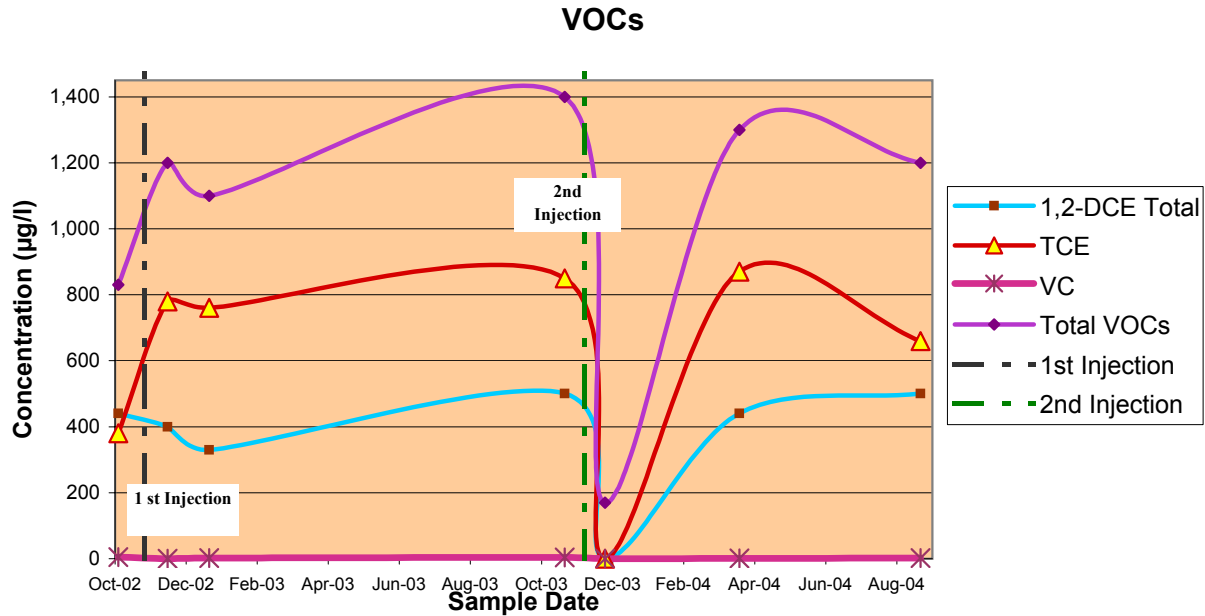
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-9: Graphical Summary for VOCs in well LF6MW-17

Well ID: LF6MW-17 Total Depth: 56.3 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 43 to 55 feet BGS
 Installation Date: 10/4/2002 Screen Interval: 45 to 55 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	440	380	4.4	830	NA	NA
Round 1	12/04/02	400	780	ND	1,200	-	-
Round 2	01/08/03	330	760	1.9	1,100	-	-
Round 3	11/04/03	500	850	4.2	1,400	-	-
Round 4	12/08/03	ND	ND	ND	170	80%	100%
Round 5	03/31/04	440	870	1.3	1,300	-	-
Round 6	08/31/04	500	660	2.1	1,200	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

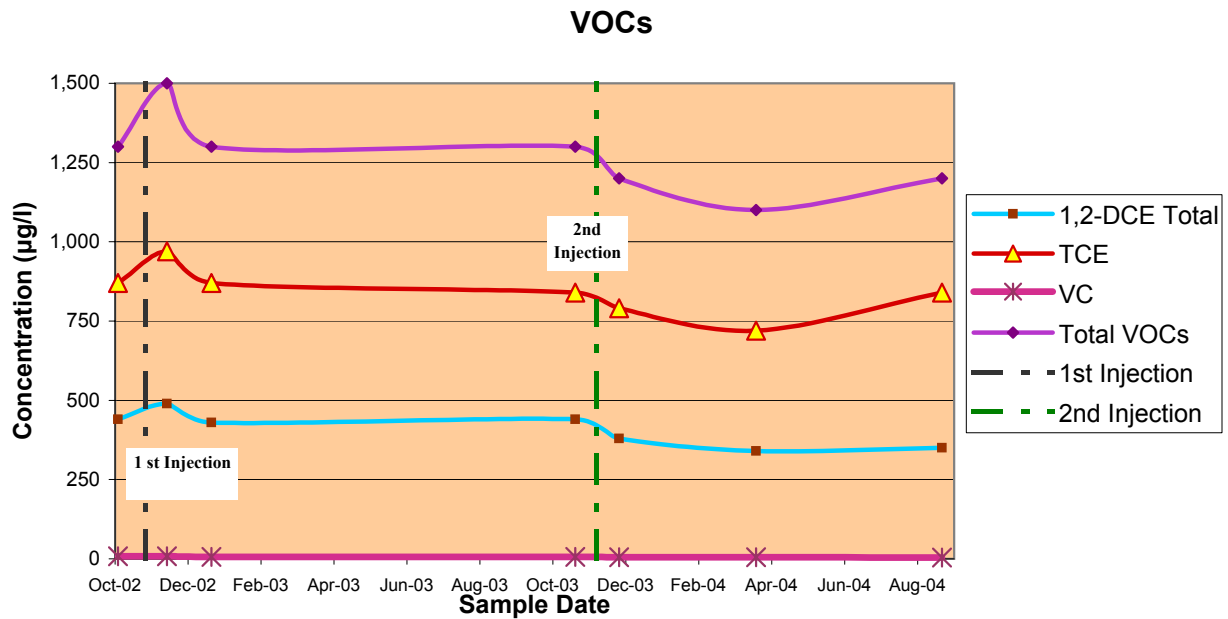
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-10: Graphical Summary for VOCs in well LF6MW-18

Well ID: LF6MW-18 Total Depth: 49.1 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 34.9 to 47 feet BGS
 Installation Date: 10/3/2002 Screen Interval: 37 to 47 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	440	870	8.5	1,300	NA	NA
Round 1	12/02/02	490	970	7.8	1,500	-	-
Round 2	01/08/03	430	870	5.8	1,300	-	-
Round 3	11/03/03	440	840	6.5	1,300	0%	3%
Round 4	12/09/03	380	790	5.4	1,200	8%	9%
Round 5	03/31/04	340	720	5.5	1,100	15%	17%
Round 6	08/31/04	350	840	3.8	1,200	8%	3%

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

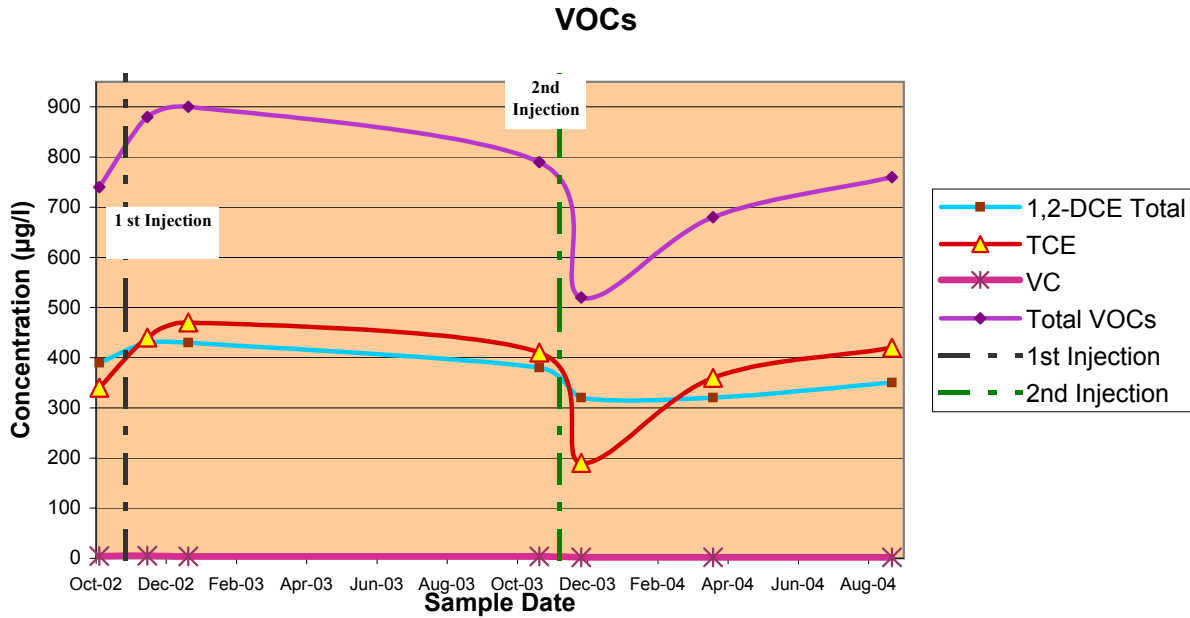
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-11: Graphical Summary for VOCs in well LF6MW-19

Well ID: LF6MW-19 Total Depth: 56.4 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 42.8 to 55 feet BGS
 Installation Date: 10/4/2002 Screen Interval: 45 to 55 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/23/02	390	340	4.4	740	NA	NA
Round 1	12/03/02	430	440	5.4	880	-	-
Round 2	01/07/03	430	470	4.0	900	-	-
Round 3	11/03/03	380	410	4.0	790	-	-
Round 4	12/09/03	320	190	1.9	520	30%	44%
Round 5	03/31/04	320	360	2.1	680	8%	-
Round 6	08/31/04	350	420	1.9	760	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

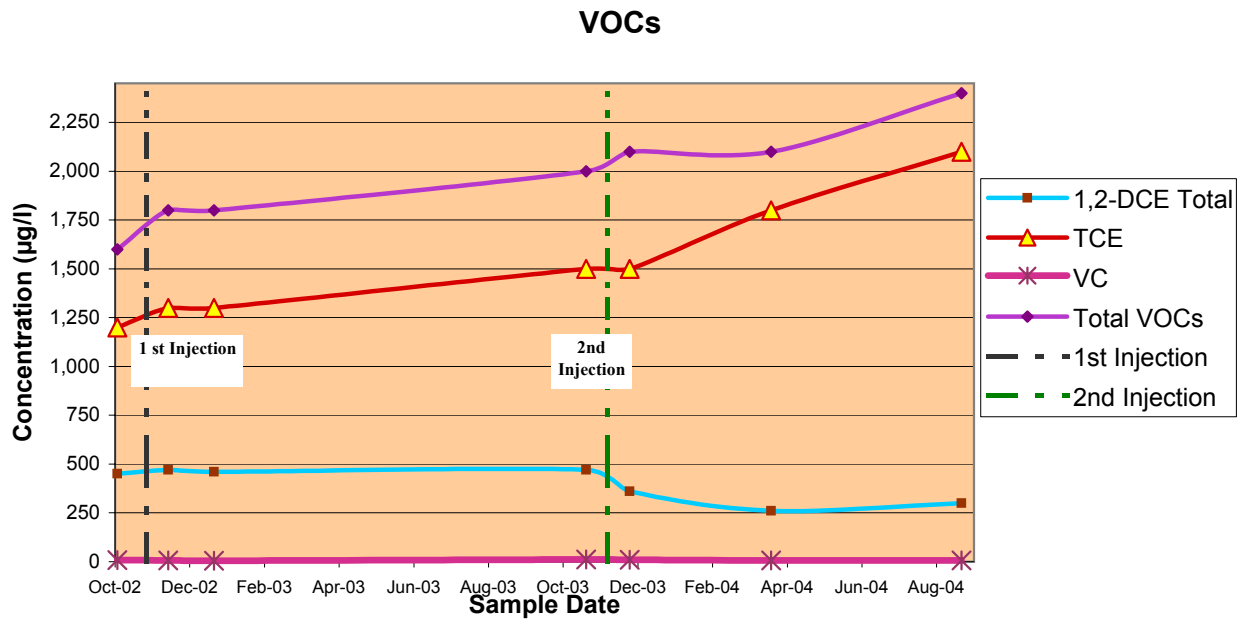
Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.

Figure 4-12: Graphical Summary for VOCs in well LF6MW-20

Well ID: LF6MW-20 Total Depth: 52.75 feet TOIC
 Type: Overburden monitoring well Sand Pack Interval: 38.6 to 51 feet BGS
 Installation Date: 10/2/2002 Screen Interval: 41 to 51 feet BGS

VOC Results (µg/l)



Sampling Round	Date	1,2-DCE Total	TCE	VC	Total VOCs	Total VOC Percent Reduction	TCE Percent Reduction
Baseline	10/22/02	450	1,200	8.8	1,600	NA	NA
Round 1	12/02/02	470	1,300	6.3	1,800	-	-
Round 2	01/08/03	460	1,300	5.0	1,800	-	-
Round 3	11/03/03	470	1,500	11	2,000	-	-
Round 4	12/08/03	360	1,500	10	2,100	-	-
Round 5	03/31/04	260	1,800	7	2,100	-	-
Round 6	08/31/04	300	2,100	6	2,400	-	-

Key:

BGS = Below ground surface. TCE = Trichloroethene.
 DCE = Dichloroethene. TOIC = Top of inner casing.
 IW = Injection well. U = Not detected (practical quantitation limit listed).
 LF6 = Landfill 6. VOC = Volatile organic compound.
 MW = Monitoring well. µg/L = Micrograms per liter.
 NA = Not applicable. VC = Vinyl chloride.
 ND = Not detected. - = No reduction in VOC concentration.

Notes

The first injection was between Baseline and Round 1, and the second injection was between Rounds 3 and 4. Bold values exceed NYSDEC Class GA groundwater standards.