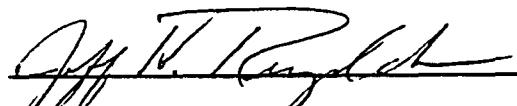


Report No. 6448/002/021/01F

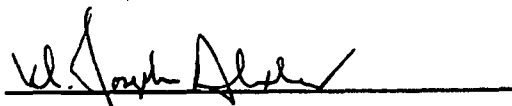
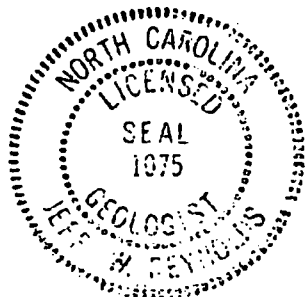
**Fourth Quarter 1997 Groundwater Monitoring Report
for the FMO/FMOX Building Area
General Electric Company**

June 15, 1998

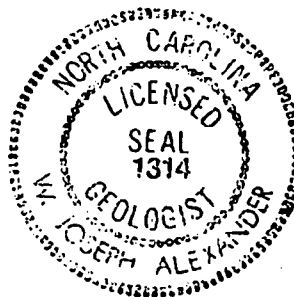
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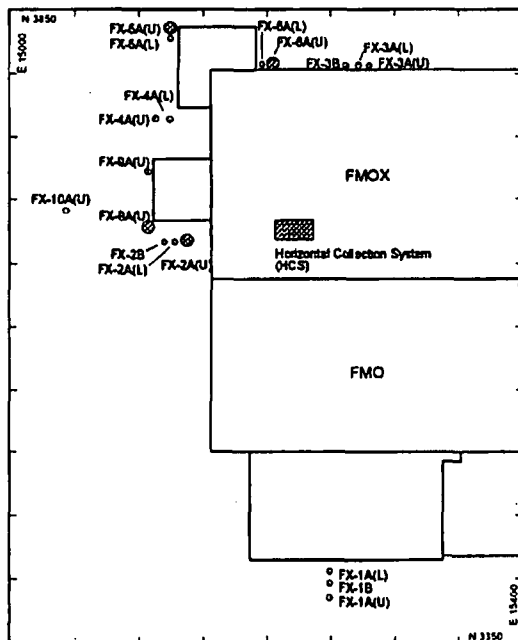
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Executive Summary

This report presents monitoring results for inorganic parameters in groundwater in the vicinity of General Electric's FMO/FMOX facility in Wilmington, NC for the fourth quarter of 1997. Three distinct aquifers layers underlie the fuel manufacturing facility. These are referred to (from top to bottom) as the upper surficial aquifer, lower surficial aquifer, and the principal aquifer. Water samples were collected in December 1997 from all three aquifers at the 19 sample locations shown in Exhibit ES-1. The groundwater samples were analyzed for

Exhibit ES-1. Locations Sampled During Fourth Quarter 1997 (Shading indicates locations where critical parameters were above threshold concentrations.)



three critical parameters (nitrate, fluoride, and total uranium). Prior groundwater monitoring has demonstrated that neither the lower surficial aquifer nor the principal aquifer have been impacted by these inorganic constituents.

Currently, the monitoring frequency for the FX-series wells and the horizontal collection system (HCS) is biannual (RTI Document No. 6448/004/01F, dated July 12, 1996). Therefore, monitoring of all wells in the FX-series monitoring network and also the HCS should be performed during the second quarter of 1998.

Fourth quarter monitoring results for the three critical parameters are summarized in Exhibit ES-2. The results indicate that shallow groundwater contamination present beyond the perimeter of the FMOX building remains predominantly in the upper surficial aquifer. All three critical parameters were detected at two wells locations (FX-2A(U) and FX-8A(U)) and uranium was detected in well FX-6A(U). Contamination has previously been detected in these three wells (Exhibit ES-1). Also an increase in nitrate concentration, from general background levels to levels significantly exceeding threshold concentrations, was detected in samples from FX-5A(U). The concentrations of critical parameters measured in the remaining monitoring wells during the fourth quarter are within the range of prior monitoring results.

Exhibit ES-2. Summary of Fourth Quarter 1997 Analytical Results (Upper Surficial Aquifer).

Sample Location	Critical Parameters*		
	Nitrate (as N) mg/L	Fluoride mg/L	Uranium mg/L
FX-1A(U)	<0.25	<0.02	<0.02
FX-2A(U)	13.50	4.46	0.46
FX-3A(U)	0.10	<0.02	<0.02
FX-4A(U)	0.41	<0.02	<0.02
FX-5A(U)	654.68	<0.02	<0.02
FX-6A(U)	<0.25	<0.02	0.04
FX-8A(U)	10.10	4.33	<0.02
FX-9A(U)	<0.25	<0.02	<0.02
FX-10A(U)	5.14	<0.02	<0.02
HCS	80.13	58.45	24.00

*Shaded values are above threshold concentrations.

1.0 Introduction

This report presents the results of groundwater monitoring for inorganic compounds around the FMO/FMOX facility, performed by Research Triangle Institute (RTI) for General Electric - Wilmington (GE). The results presented in this report are for samples that were collected from the upper surficial, lower surficial, and principal aquifers in December 1997. The purpose of this monitoring program is to determine changes in groundwater quality indicated by the concentrations of three critical parameters (nitrate, fluoride, and uranium) measured in monitoring wells along the western perimeter of the FMO/FMOX building. Groundwater samples are collected biannually (RTI reports Nos. 5230/007/01F and 5230/009/01F) from all FMO/FMOX monitoring locations. Previously this year (April 28, 1997) samples were also collected from these monitoring locations. These earlier monitoring results were presented to GE and the N.C. Department of Environment and Natural Resources (DENR) during a technical update meeting on October 30, 1997.

Assessment activities near the FMO/FMOX building began in November 1991 after it was determined that process fluids had been released beneath the floor of the FMOX slab tank room by seepage through a construction joint. The horizontal collection system (HCS) was installed and has been in operation since March 1992 to remediate contaminants from the shallow aquifer in the area below the slab tank room. Routine monitoring of groundwater quality along the perimeter of the FMO/FMOX building began in September 1992 after initial hydrogeologic assessments were performed. The project history and previous monitoring results are presented in RTI reports issued to GE since October 1991.

2.0 Methodology

Specific procedures used to collect groundwater samples from monitoring wells are specified in detail in General Electric's Environmental Protection Instructions (EPI) (GE document No. 0-8.0, Rev. 27) and RTI's *Quality Assurance Project Plan - Groundwater Quality Monitoring for Fuel Manufacturing Operation Building (QAPjP)* (RTI document no. 5230/004/01D, Rev. 6). Analytical procedures are also presented in the QAPjP.

Due to declining groundwater levels in the upper surficial aquifer, alternate procedures were implemented to collect samples from monitoring wells FX-1A(U), FX-4A(U) and FX-5A(U). The height of the water column was inadequate to allow sample collection with the dedicated bladder pump installed in these wells. The bladder pumps were removed and samples were collected using a peristaltic pump. New flexible Tygon tubing and stainless steel tubing weights were dedicated to each well. Other sampling and handling procedures for these wells are consistent with those followed for the remaining monitoring locations as described in the guidance documents (i.e., QAPjP and EPI).

The bladder pumps removed from the FX-A(U) wells were decontaminated and were securely stored onsite. Further decontamination will be performed at RTI's laboratory (Research Triangle Park) and new bladders precleaned by the manufacturer will be installed. After laboratory analysis confirms that the pumps are adequately cleaned, reinstallation can be considered in an existing or new well. The analyte list for the confirmatory analysis will include the three critical parameters and also other target analytes as necessary that are specific to the monitoring location where the pumps will be installed.

3.0 Sample Locations

A total of 19 monitoring locations were sampled during the fourth quarter 1997. There are 18 sample locations around the perimeter of the FMO/FMOX building. Samples were also collected inside the FMOX building from the HCS. Maps of the GE-Wilmington plant site, and a map of the project area that show the locations of the FX-series monitoring wells are included in Appendix A.

3.1 Monitoring Wells

Monitoring wells are screened in both the surficial and principal aquifers around the FMO/FMOX building. During the original phased assessment, the FX-series monitoring well network included 20 monitoring wells. The expansion of the FMOX building necessitated the abandonment of the FX-7A well cluster in 1995 (RTI memo of 3/13/1995). Currently, fifteen wells are screened in the surficial aquifer (FX-A series wells) and three wells monitor the principal aquifer (FX-B series wells). A semiconfining sandy clay layer separates the surficial and principal aquifers.

An upper clayey sand layer divides the surficial aquifer into upper and lower sections. Currently, nine wells are used to monitor the upper surficial aquifer (FX-A(U) series wells), and six wells are used to monitor the lower surficial aquifer (FX-A(L) series wells). The hydrogeology of the project area is described in more detail in RTI report No. 5230/007/01F (February 16, 1995) and other prior assessment reports.

3.2 Horizontal Collection System

Currently, samples of the effluent pumped from the HCS are collected by RTI during routine groundwater monitoring. Additional samples from the HCS are collected by GE. The HCS serves as the remedial method for recovery of nitrate, fluoride, and uranium in the source area by intercepting groundwater from the upper surficial aquifer beneath the slab tank room. The contaminated groundwater recovered from the upper surficial aquifer is treated onsite by GE's process wastewater treatment facility.

3.3 Storm Drains

Three storm drain inverts and the spillway for the storm drain system were added to the monitoring network as sample locations during the first quarter of 1995, as recommended in the 1994 annual assessment report (RTI report No. 5230/007/01F). Since the third quarter of 1996, these locations have been monitored more frequently (RTI Document No. 6448/004/01F) and independently of the monitoring wells. Samples are collected from the spillway monthly and drainage inverts are sampled quarterly in this area of the site. Water quality data for the FMOX storm drain are reported separately. Technical updates to GE and the N.C. DENR present the results of storm drain monitoring in relation to other FMO/FMOX monitoring and assessment activities.

4.0 Results

The environmental samples are analyzed by GE's Environmental Laboratory for three critical parameters (nitrate, fluoride, and uranium). RTI performs analyses for these parameters on split samples. The analyses performed by RTI are used for general comparison with the GE Environmental Laboratory's measurements as part of the quality assurance (QA) program for this project.

4.1 Quality Control Samples

Quality control (QC) samples are included in the analysis sequence to determine the accuracy and precision of the sample collection procedures and analytical methods. The quality of the analytical results is based on established performance criteria specified in the QAPjP. A summary of the analytical performance criteria for QC samples is provided in Appendix B. Tabulated results for these samples are also provided in Appendix B (Table B-2). The analytical performance achieved for QC samples collected during this quarter is summarized in Table 4-1 and Appendix C provides nonconformance statements for samples that did not meet specified performance criteria.

The split sample from the HCS for total uranium did not meet performance criteria. Reanalysis by GE yielded results that successfully met specified criteria for this sample. The reduced accuracy of the analysis method at high concentration (possibly due to sample dilution) is a possible explanation for the initial discrepancy. All other duplicate and split sample analyses met the specified QA criteria. GE and RTI received performance evaluation (PE) samples to evaluate each laboratory's accuracy. The results for the PE samples met the performance criteria (percent recoveries of 80 - 120% for nitrate and 85 - 115% for fluoride and uranium) for both the low-end and high-end samples.

Table 4-1. Quality Control Samples

Certified performance evaluation (PE) samples were prepared by:
High Purity Standards, Charleston, SC

Percent recovery between known and measured concentrations met performance criteria (QAPjP) for:

GE: High End/Nitrate yes ___¹ no; Fluoride yes ___¹ no; Uranium yes ___¹ no
 Low End/Nitrate yes ___¹ no; Fluoride yes ___¹ no; Uranium yes ___¹ no
 RTI: High End/Nitrate yes ___¹ no; Fluoride yes ___¹ no; Uranium yes ___¹ no
 Low End/Nitrate yes ___¹ no; Fluoride yes ___¹ no; Uranium yes ___¹ no

Field Blanks were collected at 2 locations. Concentrations of the critical parameters:
 were not detected in the field blank sample(s).
 ___¹ were detected at levels that suggest possible introduction of ambient contamination into samples collected at sample location(s).

Duplicate sample results for samples analyzed by the same laboratory:
 Duplicate 1 (location FX-2A(U)): met specified performance criteria (GE and RTI).
 ___¹ did not meet performance criteria for samples analyzed by: ___ GE, ___ RTI.
 Duplicate 2 (location FX-9A(U)): met specified performance criteria (GE and RTI).
 ___¹ did not meet performance criteria for samples analyzed by: ___ GE, ___ RTI.

N/S Trip Blank(s) prepared by _____ accompanied samples shipped from GE
 ___ results indicate that contamination of samples did not occur during shipment.
 ___¹ analysis results indicate that contamination of the samples may have occurred during shipment to: ___ RTI.

Split sample results between laboratories were within established control limits except for the following locations: HCS (Total U)
¹ Noncompliance samples were reanalyzed within acceptable limits for location(s): HCS (Total U)
 ___¹ Resolution of variance between sample results was not achieved for location(s): _____

¹ See Appendix C for noncompliance statements for quality control samples that do not meet quality control criteria as specified in the QAPjP.

4.2 Environmental Water Samples

Environmental water samples were collected from 19 monitoring locations during this quarter, including 18 monitoring wells and the HCS. The measured concentrations of the three critical parameters were compared with threshold concentration limits developed during the 1994 annual comprehensive assessment (RTI report No. 5230/007/01F, February 16, 1995). Threshold concentration limits have been determined based on established baseline groundwater quality at the site, North Carolina's Class GA groundwater standards, and proposed maximum contaminant levels in drinking water (Appendix D). Concentrations of the critical parameters measured in environmental samples relative to threshold concentration levels are presented in Table 4-2.

Concentrations of the three critical parameters were not detected above baseline levels in the six wells that monitor the lower surficial aquifer or in the three wells screened in the principal aquifer. The following summarizes the occurrence of the three critical parameters in the upper surficial aquifer with respect to threshold levels for the environmental samples obtained in December 1997.

- **Nitrate Concentrations.** Nitrate levels were below baseline levels in the upgradient well FX-1A(U) and in wells FX-6A(U), and FX-9A(U). Threshold level I concentrations (≥ 0.25 but < 5 mg/L) were detected in samples from well FX-3A(U). Threshold level II concentrations (≥ 5 but < 10 mg/L) were detected in samples from wells FX-4A(U) and FX-10A(U). Threshold level III concentrations (≥ 10 mg/L) were detected in samples from wells FX-2A(U), FX-5A(U), FX-8A(U), and the HCS (Table 4-2).
- **Fluoride Concentrations.** Baseline levels (< 0.2 mg/L) were noted in all but three water samples. Samples from wells FX-2A(U), FX-8A(U), and from the HCS exceed threshold level III concentrations (≥ 2 mg/L groundwater) (Table 4-2).
- **Uranium Concentrations.** Baseline levels (< 0.02 mg/L) were noted in 16 of the monitoring wells. Uranium was detected above the baseline level of 0.02 mg/L in samples from sample locations FX-2A(U), FX-6A(U), and the HCS (Table 4-2).

The pH of the groundwater and the HCS effluent was measured in the field during sample collection. A range of pH values from 5.2 to 6.5 (average 5.9) were measured in wells monitoring the upper surficial aquifer. The pH values of the water at monitoring locations where one or more of the critical parameters exceeded baseline concentrations were within normal ranges (5.2 - 6.5). The range of pH for groundwater samples collected from the lower surficial aquifer ranged between 2.8 to 6.8 (average 4.6). The pH of water sampled from the principal aquifer was

also variable, ranging from 5.6 to 6.8 for the three monitoring locations. A pH of 6.8 was measured for the effluent collected from the HCS.

Table 4-2. Concentrations of Critical Parameters Measured in Environmental Samples Relative to Threshold Concentration Levels¹

	Nitrate as N (mg/L)				Fluoride (mg/L)				Uranium (mg/L)	
	Threshold Level				Threshold Level				Threshold Level	
	Baseline Levels ²	I	II	III	Baseline Levels ²	I	II	III	Baseline Levels ²	III
Sample Location	<0.25	≥0.25	≥5	≥10	0.02	≥0.2	≥1	≥2	<0.02	≥0.02
<i>Upper Surficial Aquifer</i>										
FX-1A(U)	<0.25				<0.02				<0.02	
FX-2A(U) ³				13.50				4.46		0.46
FX-3A(U)		0.41			<0.02				<0.02	
FX-4A(U)			6.56		<0.02				<0.02	
FX-5A(U)				654.68 ⁴	<0.02				<0.02	
FX-6A(U)	<0.25				<0.02					0.04
FX-8A(U)				10.10				4.33	<0.02	
FX-9A(U) ³	<0.25				<0.02				<0.02	
FX-10A(U)			5.14		<0.02				<0.02	
HCS				80.13				58.45		24.00
<i>Lower Surficial Aquifer</i>										
FX-A(L) Series Wells	Concentrations of the critical parameters were below GE's method detection limits for all wells.									
<i>Principal Aquifer</i>										
FX-B Series Wells	Concentrations of the critical parameters were below GE's method detection limits for all wells.									

HCS = Horizontal collection system.

¹ Descriptions of the threshold levels are provided in Appendix D.

² Baseline levels based on analyses by RTI. Results above baseline concentrations (threshold levels I, II, and III) based on measurements by GE's Environmental Laboratory.

³ Average of duplicate results.

⁴ Result was confirmed by reanalysis of samples collected during routine monitoring and also by resampling and analysis on January 14, 1998 (876.2 mg/L as N).

5.0 Summary and Recommendations

The following is based on the results of the fourth quarter 1997 analyses of groundwater samples obtained from the FX-series wells and the HCS for the three critical parameters:

1. Consistent with previous monitoring results, all three critical parameters were detected above threshold level III concentrations at monitoring location FX-2A(U) and the HCS. Monitoring location FX-2A(U) is currently the only monitoring well location where the occurrence of all three critical parameters has been persistent since monitoring was initiated.
2. In addition to uranium detected in groundwater samples from monitoring well FX-2A(U), uranium was also detected in samples from monitoring well FX-6A(U), located along the northern perimeter of the FMOX building area. However, consistent with previous monitoring results, nitrate and fluoride remain below background concentrations in samples collected from FX-6A(U).
3. An abrupt change in the groundwater quality of the upper surficial aquifer has occurred at monitoring location FA-5A(U). Nitrate concentrations in FA-5A(U) had been below or near established baseline levels (0.25 mg/L as N) during previous monitoring periods. Nitrate levels now significantly exceed threshold level III concentrations. The high concentration of nitrate (654.7 mg/L as N) detected during routine monitoring (December 12, 1997) was confirmed after resampling and analysis (January 14, 1998).
4. Elevated concentrations of nitrate (threshold level II and III) were detected in samples collected from other monitoring wells also located along the western perimeter of the FMOX building area, specifically FX-4A(U), FX-8A(U), and FX-10A(U).
5. Fluoride was measured at levels that exceeded threshold level III concentrations only at monitoring locations FX-2A(U), FX-8A(U), and the HCS. Fluoride was not detected in samples from other FX-A(U) series monitoring well locations above GE's method detection limit (0.2 mg/L).
6. High concentrations of all three critical parameters continues to be measured in the HCS inside the FMOX building. The HCS should continue to be pumped to help hydraulically contain and recover the contamination in the source area. Samples of the effluent from the HCS should continue to be collected in order to monitor the effects of the remedial action.
7. Monitoring should continue to be performed twice each year for all FX-series groundwater sample locations. Weekly monitoring at FX-5A(U) was initiated immediately after the confirmation analyses were completed. A geochemical assessment is planned to evaluate the source of the nitrate detected in samples from FX-5A(U).

Appendix A

Project Area Maps

Figure A-1	Site Map Indicating Location of FMO/FMOX Project Area	A-2
Figure A-2	Location of Monitoring Wells (West Side of FMO/FMOX Building Area)	A-3

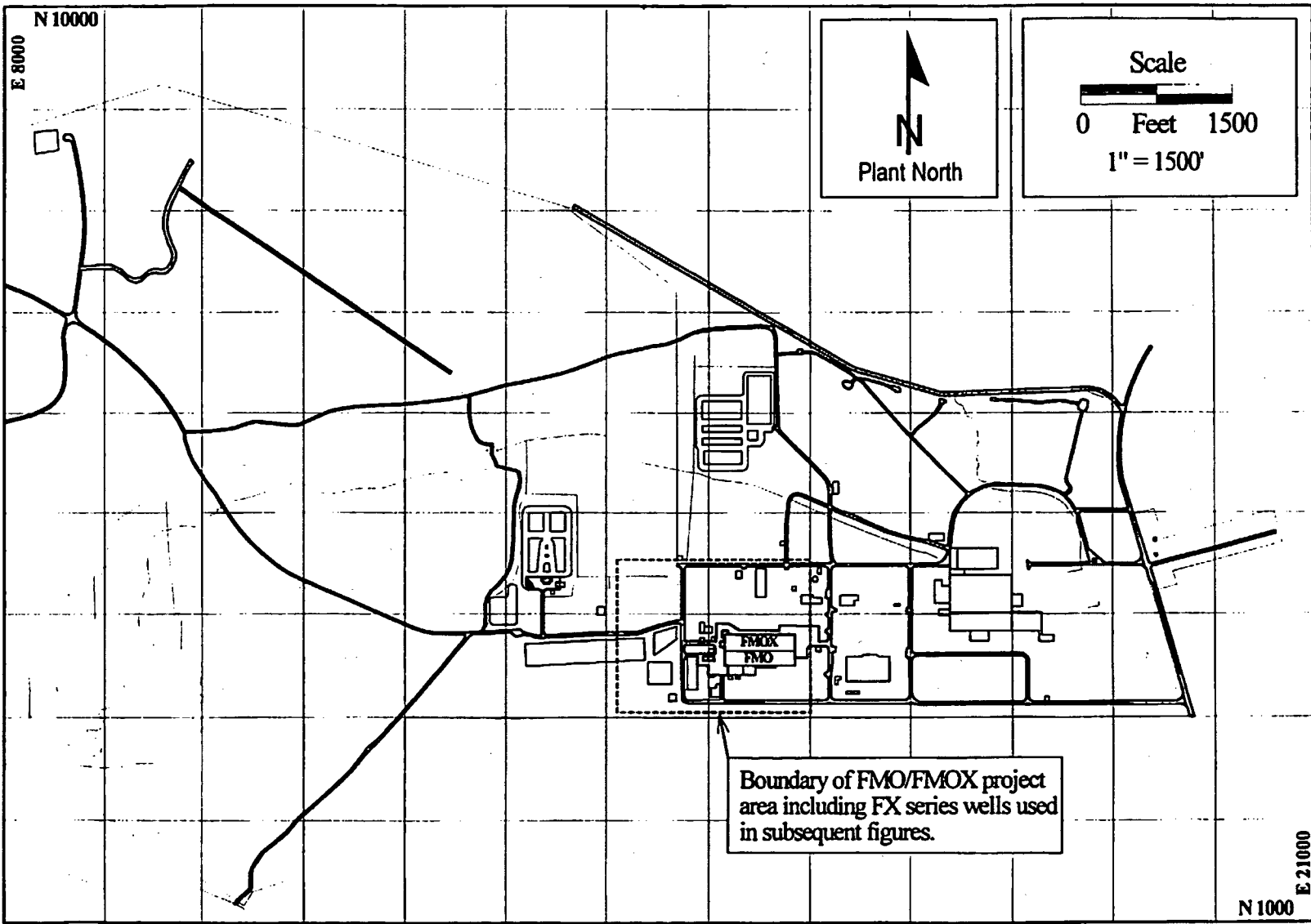
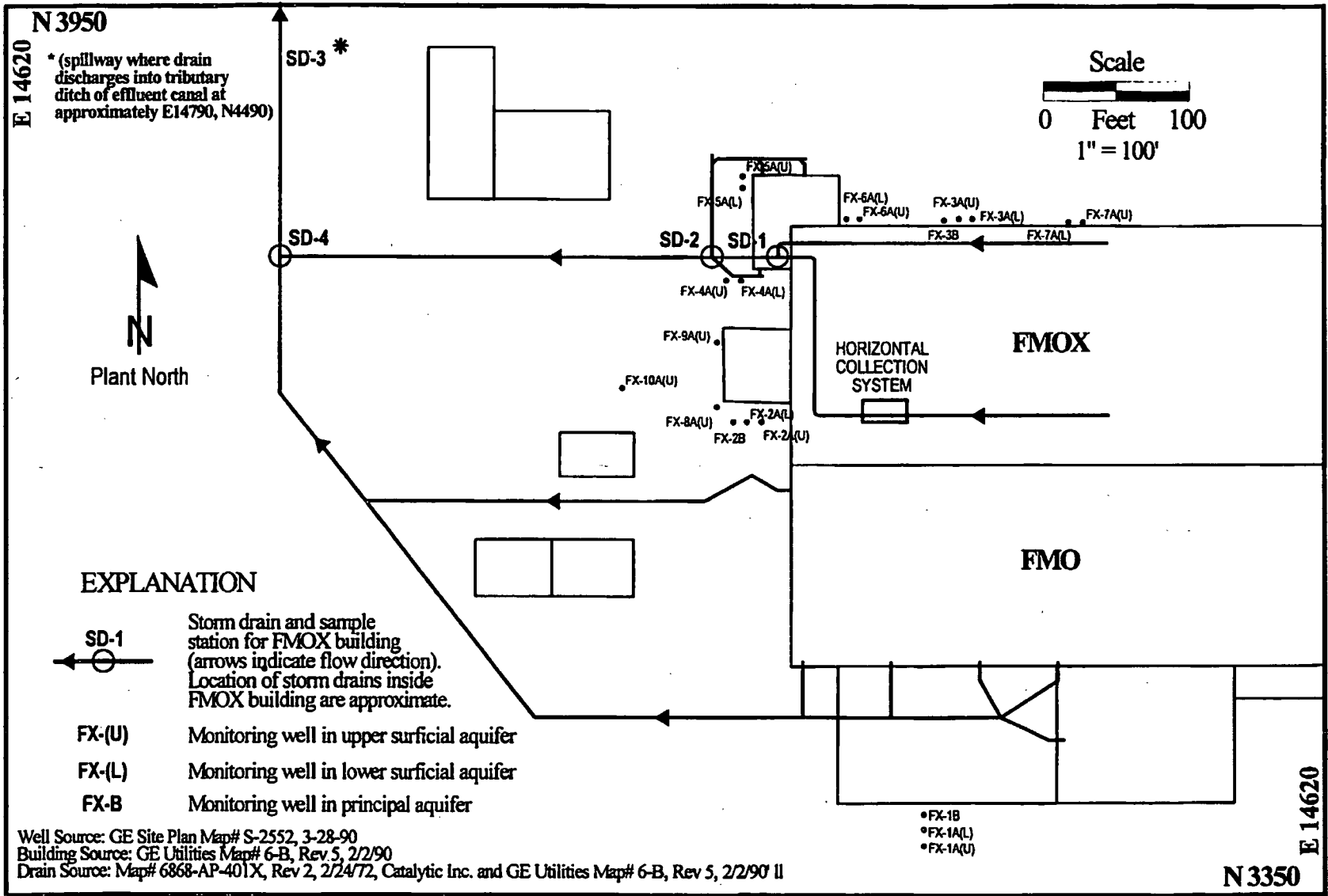


Figure A-1. Site Map Indicating Location of FMO/FMOX Project Area



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Figure A-2. Location of Storm Drain System and Monitoring Wells (West Side of FMO/FMOX Building Area)

Appendix B

Results of Quality Control Sample Analyses

Table B-1	Performance Criteria for Evaluation of Data Quality	B-2
Table B-2	Results of Performance Evaluation Analysis	B-2
Table B-3	Comparison of Duplicate Analyses	B-3
Table B-4	Results of Field Blank Analyses	B-4
Table B-5	Comparison of Split Sample Results	B-5
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Table B-1. Performance Criteria for Evaluation of Data Quality

QC Sample	Critical Measurement	Method of Evaluation	Performance Criteria
Performance Evaluation	NO ₃ ⁻ (N)	Percent Recovery ¹	80-120%
	F		85-115%
	U		85-115%
Duplicate and Split Samples	NO ₃ ⁻ (as N)	Control Limit Ratio ²	2.0 below 10 ppm; 1.6 above 10 ppm ³
	F		1.3 ³
	U		1.25 ³

¹ Percent Recovery = (measure value + certified value) X 100.

² Control Limit Ratio = larger concentration + smaller concentration.

³ Performance criteria was determined by a statistical analysis of historical data. This value will be re-evaluated as needed.

Table B-2. Results of Performance Evaluation Analyses

Laboratory	Parameter	Measured Concentration (mg/L)	Certified Concentration (mg/L)	Perfect Recovery (%R) ²	Established Performance Criteria (%R)
<i>High-End Concentrations</i>					
GE	Nitrate	79.67	90	88.5	80-120%
	Fluoride	38.42	40	96.1	85-115%
	Uranium	30.00	26	115	85-115%
RTI	Nitrate	20.1x4.43=89	82	109	80-120%
	Fluoride	59.3	58	102	85-115%
	Uranium	25.3	22	115	85-115%
<i>Low-End Concentrations</i>					
GE	Nitrate	21.81	20	109	80-120%
	Fluoride	1.45	1.6	90.6	85-115%
	Uranium	0.041	0.040	103	85-115%
RTI	Nitrate	3.07x4.43=13.6	16	85	80-120%
	Fluoride	1.14	1.2	95	85-115%
	Uranium	0.0362	0.038	95	85-115%

¹ High Purity Standards (HPS) Certified Values are "as nitrate." For comparison to values reported as nitrogen, divide the HPS concentration by 4.43. RTI nitrate (N) concentrations are multiplied by 4.43 to obtain nitrate values as NO₃.

² If %R exceeds established performance criteria, complete nonconformance statement.

Table B-3. Comparison of Duplicate Analyses

Laboratory	Parameter	Measured Concentrations (mg/L)		Control Limit Ratio ¹		Measured Concentrations (mg/L)		Control Limit Ratio ¹		Measured Concentrations (mg/L)		Control Limit Ratio ¹	
		FX-2A(U)	FX-2A(U) dup.	Calculated	Control Limit	FX-9A(U)	FX-9A(U) dup.	Calculated	Control Limit	FX-5A(U)	FX-5A(U) dup.	Calculated	Control Limit
GE	Nitrate (as N)	13.50	13.50	1.00	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm	0.07	0.06	1.17	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm	659.67	654.68	1.01	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm
	Fluoride	4.47	4.46	1.00	< 1.3	< 1	< 1	--	< 1.3	< 1	< 1	--	< 1.3
	Uranium	0.456	0.456	1.00	< 1.25	< 0.02	< 0.02	--	< 1.25	< 0.02	< 0.02	--	< 1.25
RTI	Nitrate (as N)	20.0	19.8, 19.5	1.02	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm	< 1	< 1	--	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm	1050	1052	1.00	< 2.0 if below 10 ppm; < 1.6 if above 10 ppm
	Fluoride	4.64	4.73	1.02	< 1.3	< 0.02	< 0.02	--	< 1.3	0.06	0.05	1.20	< 1.3
	Uranium	0.408	0.414	1.01	< 1.25	0.000166	< 0.00015	--	< 1.25	0.00268	0.00269	1.00	< 1.25

¹ If the control limit is exceeded, a nonconformance statement should be completed.

Table B-4. Results of Field Blank Analyses

Sample Area	Nitrate (as N) (mg/L)		Fluoride (mg/L)		Uranium (mg/L)	
	GE	RTI	GE	RTI	GE	RTI
FB-1	<0.05	<1	<1	<0.02	<0.02	<0.00015
FB-2	<0.05	<1	<1	<0.02	<0.02	<0.00015

¹ If there is any detection of fluoride, nitrate or uranium, a nonconformance statement should be completed.

Table B-5. Comparison of Split Sample Results

Well	RTI Sample No.	RTI Nitrate-N (ppm)	GE Nitrate-N (ppm)	Control Limit Ratio	RTI Fluoride (ppm)	GE Fluoride (ppm)	Control Limit Ratio	RTI Uranium	GE Uranium	Control Limit Ratio
FX-1B	136321	<1.0	<0.05		0.48	<1		<0.00015	<.02	
FX-1A(L)	136323	<1.0	<0.05		<0.02	<1		<0.00015	<.02	
FX-1A(U)	136325	<1.0	<0.05		<0.02	<1		<0.00015	<.02	
FX-5A(L)	136327	<1.0	<0.05		<0.02	<1		0.000154	<.02	
FX-5A(U)	136329	1050	659.67	1.59	0.06	<1		0.00268	<.02	
FX-5A(U)	136331	1052	654.68	1.61	0.05	<1		0.00269	<.02	
FX-3A(L)	136333	<1	<0.05		0.09	<1		0.000164	<.02	
FX-3A(U)	136335	<1	0.41		<0.02	<1		0.00108	<.02	
FX-3B	136337	<1	<0.05		0.09	<1		<0.00015	<.02	
FX-2A(L)	136339	<1	0.13		<0.02	<1		<0.00015	<.02	
Blank	136341	<1	<0.05		<0.02	<1		<0.00015	<.02	
FX-2B	136345	<1	<0.05		0.03	<1		0.000312	<.02	
FX-6A(L)	136347	<1	0.17		<0.02	<1		0.00115	<.02	
FX-4A(L)	136349	<1	<0.05		<0.02	<1		<0.00015	<.02	
FX-9A(U)	136351	<1	0.07		<0.02	<1		0.000166	<.02	
FX9A(U)	136353	<1	0.06		<0.02	<1		<0.00015	<.02	
FX-4A(U)	136355	7.59	6.56	1.16	<0.02	<1		0.000405	<.02	
X-10A(U)	136357	6.71/6.56	5.14	1.29	<0.02	<1		0.00262	<.02	
Blank	136359	<1	<0.05		<0.02	<1		<0.00015	<.02	
FX-6A(U)	136363	<1	0.05		<0.02	<1		0.0467	0.042	1.11
FX-8A(U)	136365	15.7/15.6	10.10	1.55	4.77	4.33	1.10	0.0172	<.02	

Well	RTI Sample No.	RTI Nitrate-N (ppm)	GE Nitrate-N (ppm)	Control Limit Ratio	RTI Fluoride (ppm)	GE Fluoride (ppm)	Control Limit Ratio	RTI Uranium	GE Uranium	Control Limit Ratio
FX-2A(U)	136367	20.0	13.50	1.48	4.64	4.47	1.04	0.408	0.456	1.12
FX-2A(U)	136369	19.8/19.5	13.50	1.46	4.73	4.46	1.06	0.414	0.456	1.10
HCS	136371	94.4/89.4	80.13	1.15	49/55.8	58.45	1.19,1.05	20.8	28.80, 24 ¹	1.385, 1.15 ¹
FX-5A(U) ²	136381	750	1174.14	1.57	<0.02	<1				

¹Reanalysis result

²Confirmation sample due to high nitrate result

**Table B-6. Sample/Analysis Sequence Control List - Fourth Quarter 1997
RTI Project 6448-002**

RTI Sample Sequence No.	Well ID	Parameter	RTI Sample ID No.	GE Sample ID No	Concentration Range (ppm) NO ₃ as N
1	FX-9A(U)	fluoride nitrate	136321	136373	BDL-0.50 BDL-0.40 BDL
		uranium	136322	136374	
2	FX-9A(U) Duplicate	fluoride nitrate	136323	136375	BDL-0.5 BDL BDL
		uranium	136324	136376	
3	FX-1A(U)	fluoride nitrate	136325	136377	BDL-0.08 BDL-0.13 BDL-0.003
		uranium	136326	136378	
4	FX-5A(U)	fluoride nitrate	137381 136327	137383 136379	BDL BDL BDL
		uranium	136328	136380	
5	FX-3A(U)	fluoride nitrate	136329	136381	BDL-0.05 BDL-0.15 BDL-0.0004
		uranium	136330	136382	
6	PE Sample (Low)	fluoride nitrate	136331	136383	BDL-0.05 BDL-0.15 BDL-0.0004
		uranium	136332	136384	
7	Field Blank	fluoride nitrate	136333	136385	BDL-0.14 BDL BDL
		uranium	136334	136386	
8	FX-4A(U)	fluoride nitrate	136335	136387	BDL-0.07 BDL-1.29 BDL-0.004
		uranium	136336	136388	
9	FX-10A(U)	fluoride nitrate	136337	136389	BDL-0.12 BDL-0.09 BDL
		uranium	136338	136390	
10	FX-6A(U)	fluoride nitrate	136339	136391	BDL BDL BDL
		uranium	136340	136392	
11	FX-8A(U)	fluoride nitrate	136341	136393	BDL BDL BDL
		uranium	136342	136394	

**Table B-6. Sample/Analysis Sequence Control List - Fourth Quarter 1997
RTI Project 6448-002**

RTI Sample Sequence No.	Well ID	Parameter	RTI Sample ID No.	GE Sample ID No	Concentration Range (ppm) NO ₃ as N
12	FX-2A(U)	fluoride nitrate	136343	136395	1.0 - 2.0 10 - 20 0.035 - 0.06
		uranium	136344	136396	
13	FX-2A(U) Duplicate	fluoride nitrate	136345	136397	BDL - 0.10 BDL - 0.14 BDL
		uranium	136346	136398	
14	PE Sample (High)	fluoride nitrate	136347	136399	BDL - 0.05 BDL - 0.05 BDL - 0.003
		uranium	136348	136400	
15	Field Blank	fluoride nitrate	136349	136401	BDL - 0.05 BDL - 0.08 BDL
		uranium	136350	136402	
16	Horizontal Collection System	fluoride nitrate	136351	136403	BDL - 0.06 BDL - 5.54 BDL
		uranium	136352	136404	
17	FX-9A(U) duplicate	fluoride nitrate	136353	136405	BDL - 0.06 0.24 - 5.54 BDL
		uranium	136354	136406	
18	FX-4A(U)	fluoride nitrate	136355	136407	BDL - 0.03 2.41 - 11.73 BDL - 0.0009
		uranium	136356	136408	
19	FX-10A(U)	fluoride nitrate	136357	136409	BDL - 0.07 1.86 - 3.96 BDL - 0.006
		uranium	136358	136410	
20	Field Blank	fluoride nitrate	136359	136411	BDL BDL BDL
		uranium	136360	136412	
21	Performance Evaluation (high)	fluoride nitrate	136361	136413	40 - 60 80 - 120 20 - 30
		uranium	136362	136414	
22	FX-6A(U)	fluoride nitrate	136363	136415	BDL - 0.08 BDL - 0.25
		uranium	136364	136416	

**Table B-6. Sample/Analysis Sequence Control List - Fourth Quarter 1997
RTI Project 6448-002**

RTI Sample Sequence No.	Well ID	Parameter	RTI Sample ID No.	GE Sample ID No	Concentration Range (ppm) NO ₃ as N
23	FX-8A(U)	fluoride nitrate	136365	136417	4.07 - 4.97 8.96 - 28.11 BDL - 0.11
		uranium	136366	136418	
24	FX-2A(U)	fluoride nitrate	136367	136419	3.72 - 5.73 14.78 - 126.6 0.19 - 1.24
		uranium	136368	136420	
25	FX-2A(U) duplicate	fluoride nitrate	136363	136421	3.72 - 5.73 14.78 - 126.6 0.19 - 1.24
		uranium	136370	136422	
26	Horizontal Collection System	fluoride nitrate	136371	136423	3.70 - 143 19.2 - 119.6 0.5 - 55.5
		uranium	136372	136424	

Appendix C

Nonconformance Statements for Results Violating QC Criteria

Appendix D

Definition of Critical Parameter Threshold Levels for Environmental Sample Results

Table D-1 Critical Parameter Threshold Levels and Guidelines D-2

Table D-1. Critical Parameter Threshold Levels and Guidelines

Critical Parameter	Basis for Establishment	Threshold Level	Threshold Concentration (mg/L)	Proposed Monitoring Action
Nitrate	Above Background Concentration	I	≥ 0.25 to < 5	If established background levels are exceeded, the impacted monitoring well should be resampled during the following monitoring period. If concentrations remain above established background levels, the sampling frequency in the single, impacted monitoring well should be increased to twice a year to accumulate sufficient data to evaluate concentration trends.
Fluoride			≥ 0.2 to < 1	
Uranium			$< 0.02^1$	
Nitrate	One-half the State Groundwater Standard	II	≥ 5 to < 10	If one-half the State Groundwater Standard is exceeded for these two indicator parameters in any one monitoring well installed in any one aquifer unit, the impacted monitoring well should be resampled (i.e., 1 to 3 days following receipt of analytical results). If the resampling confirms the presence of elevated concentrations of one or more critical parameters, the single, impacted monitoring well should be monitored quarterly. Quarterly monitoring should be continued in the impacted well until sufficient data are accumulated to support an evaluation of concentration trends (a minimum of one year).
Fluoride			≥ 1 to < 2	
Nitrate	Relevant Standard	III	≥ 10	If the relevant standard is exceeded in any one monitoring well installed in any one aquifer unit, the monitoring frequency should be changed to quarterly and all wells installed in the impacted unit should be monitored on this basis. Monitoring should be continued quarterly until the concentration is found to be less than the relevant standard for no less than 1 year (4 monitoring periods).
Fluoride			≥ 2	
Uranium			$\geq 0.02^2$	

¹ Represents the reporting limit of the GE Environmental Laboratory.

² Based on proposed (1991) maximum contaminant levels in drinking water for the total mass of uranium ($20 \mu\text{g/L}$) in a sample (Federal Register; National Primary Drinking Water Regulations; Radionuclides; Proposed Rule: Vol. 56, No. 138, Sec. 141.64, p. 333126). No State standard currently exists for uranium in groundwater.

Note: These guidelines were originally developed as a part of the 1994 annual groundwater assessment (RTI Report No. 5230/007/01F) and modified during the first quarter, 1995 report.