



Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

(423) 743-9141 **21G-96-0088**
GOV-01-60
ACF-96-152

Mr. G. Alan Farmer, Chief
RCRA Branch
Waste Management Division
Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365

Mr. Thomas Tiesler, Director
Division of Solid Waste Management
TN Department of Environment
and Conservation
Fifth Floor, L&C Tower
401 Church Street
Nashville, TN 37243-1535

July 2, 1996

REFERENCE: *HSWA Permit for 1984 RCRA Amendments*
Nuclear Fuel Services, Inc., Erwin, TN
EPA ID: TND 003 095 635

Dear Messrs. Farmer and Tiesler:

As required by the above reference, Condition II.E.3.a. and Condition II.F.3.a., Nuclear Fuel Services, Inc. (NFS) is enclosing the quarterly RCRA Facility Investigation (RFI) and Interim Measures (IM) Progress Reports as Attachments I and II. The next quarterly RFI/IM Progress Reports will be submitted by September 30, 1996.

If you have any questions or need further information, please contact me or Ms. Marie Moore, Environmental Safety Manager, at (423) 743-1737. Please reference our unique document identification number (21G-96-0088) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

Andrew M. Maxim
Vice President
Safety and Regulatory

BMM/rcy

Enclosure

xc: **Regional Administrator**
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW
Suite 2900
Atlanta, GA 30323

Mr. Robert C. Pierson, Chief
Licensing Branch, NMSS
U. S. Nuclear Regulatory Comm.
Mail Stop T 8-D-14
Washington, D. C. 20555-0001

Ms. Debra Shults
Technical Services Section
Division of Radiological Health
L&C Annex, Third Floor
401 Church Street
Nashville, TN 37243-1532

Mr. Bill Gloersen
Project Inspector
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW
Suite 2900
Atlanta, GA 30323

JE07

21G-96-0088
GOV-01-60
ACF-96-152

ATTACHMENT I

*To Letter Dated July 2, 1996
A. M. Maxin to Mr. G. Alan Farmer and Mr. Thomas Tiesler*

RFI Progress Report

23 pages to follow

**RFI PROGRESS REPORT
NUCLEAR FUEL SERVICES, INC.
EPA ID NO. TND 00 309 5635**

1.0 SWMUs 13 (Building 111 Bulk Chemical Storage Area) and 14 (Well 72 LNAPL)

1.1 Work Completed

RFI soil and groundwater sampling for SWMUs 13 and 14 was conducted in March 1994 and May 1995. The results of these investigations did not fully define the horizontal extent of tributyl phosphate (TBP), kerosene, beryllium, and mercury soil contamination from SWMU 13 (RFI Report for SWMUs 13 and 14, Dec. 1995). Follow-up sampling to determine the horizontal extent of soil contamination began May 29 and was completed May 30, 1996. Eight soil samples were obtained from four boreholes for the analysis of tributyl phosphate (TBP), kerosene/diesel range organics, and metals. Analytical results will be included in the next progress report.

1.2 Work Projected (July 2, 1996 - September 30, 1996)

Data validation and evaluation will be completed in the next reporting period.

2.0 SWMU 16 (Radiological Incinerator)

2.1 Work Completed

An initial draft of the RFI Report for SWMU 16 was completed during this reporting period.

2.2 Work Projected (July 2, 1996 - September 30, 1996)

The RFI Report for SWMU 16 is tentatively scheduled for completion and regulatory submittal in the fourth quarter of 1996.

3.0 SWMU 20/Well 103A Investigation

3.1 Work Completed

The SWMU 20/Well 103A Investigation was conducted to determine the extent of groundwater contamination attributable to SWMU 20 and to determine the source of contamination in Well 103A. The scope of work for this investigation included the installation of nine monitoring wells, soil sampling and groundwater sampling. The SWMU 20 monitoring well locations are presented in Figure 1, Attachment. Results

from analyses of 15 soil samples and 14 groundwater samples retrieved in the vicinity of SWMU 20 and Well 103A were received, tabulated, and validated by NFS. Soil and groundwater samples were analyzed for 40 CFR Part 264, Appendix IX volatiles, TAL/HSW metals, petroleum hydrocarbons, aroclor-1254, and isotopic uranium and thorium. Borehole soil samples obtained from two locations (114A and 115A) were analyzed for Appendix IX volatiles and radionuclides only and two locations (108A and 111A) were also sampled for tributyl phosphate. Analytical results are presented in Section 3.2.

Additional sampling to determine the source of PCE contamination in Well 103A began May 30, 1996, and was completed June 3, 1996. Sixteen soil samples were obtained from 14 boreholes in the vicinity of Buildings 111, 130 and 120/131 and analyzed for PCE and radionuclides. These results will be presented in the next progress report.

3.2 Findings and Observations

Soil. Preliminary review of SWMU 20/Well 103A data indicates volatile organics were not detected in soil at concentrations at or above health based action levels. Diesel range organics were detected in one of the soil samples at a concentration above a State of Tennessee Underground Storage Tank (UST) cleanup level. Benzo(a)pyrene was detected in one sample at a concentration above the health based action level. Arsenic, beryllium, and chromium were detected in soil at concentrations above the action level and total uranium and natural thorium were detected in soil at concentrations above NRC Option 1 criteria. A brief discussion of SWMU 20/Well 103A soil results is provided below.

With the exception of one constituent, volatile organics were not detected in soil in the vicinity of SWMU 20/Well 103A at concentrations above 1 mg/kg. Total 1,2-dichloroethene was detected in the surface soil sample obtained from Well 111A at a concentration of 1.6 mg/kg, which is well below the action level of 800 mg/kg. The highest PCE (0.62 mg/kg) and TCE (0.088 mg/kg) concentrations were also detected in the Well 111A soil sample; the PCE and TCE concentrations detected in this sample are significantly below the health based action levels of 10 mg/kg and 60 mg/kg, respectively.

Evaluation of the volatile organic results for soil indicates the source of contamination in Well 103A has not yet been determined. Volatile organic results are presented in Table 1, Attachment.

Diesel range organics (DROs) were detected in SWMU 20/Well 103A soil samples at concentrations ranging from 1 mg/kg (estimated) to 530 mg/kg. An action level does not exist for DROs; however, a State of Tennessee UST cleanup standard exists for total petroleum hydrocarbons (TPHs) in soil. The State cleanup levels for TPHs in "non drinking water" soil are 500 mg/kg (10^{-4} to 10^{-6} permeability) and 1,000 mg/kg (10^{-6} permeability). The surface soil sample obtained from Well 108A exceeds the State level (10^{-4} to 10^{-6} permeability) with a concentration of 530 mg/kg. All other DRO results were well below the State levels with the highest detect in surface soil from Well 111A (74 mg/kg).

Benzo(a)pyrene was detected in one of the SWMU 20/Well 103A soil samples (Well 111A, 1'-4') at a concentration of 0.72 mg/kg which exceeds the health based action level of 0.1 mg/kg. Analysis for benzo(a)pyrene was not performed on the remaining soil samples.

Arsenic was detected in 12 of 15 SWMU 20/Well 103A soil samples at concentrations greater than the 0.5 mg/kg action level (based on slope factor of 1.5/risk level of E^{-6}) but less than the 20 mg/kg action level (based on oral reference dose of $3E^{-4}$). Arsenic concentrations ranged from 0.5 mg/kg to 14 mg/kg with a mean of 4 mg/kg. Arsenic concentrations in background soil samples obtained from the NFS softball field ranged from 5.3 mg/kg to 13.2 mg/kg. The concentrations of arsenic detected in SWMU 20/Well 103A soil are consistent with background concentrations of arsenic and are not indicative of contamination. Arsenic concentrations are presented in Table 2, Attachment.

Beryllium was detected in ten of fifteen SWMU 20/Well 103A soil samples at concentrations greater than the 0.2 mg/kg action level. Beryllium concentrations ranged from 0.6 mg/kg to 2.0 mg/kg with a mean concentration of 0.9 mg/kg. The mean concentration of beryllium in background soil is 0.92 mg/kg. Beryllium concentrations in SWMU 20/Well 103A soil are consistent with background concentrations and are not indicative of contamination. Beryllium concentrations are presented in Table 2, Attachment.

Chromium was detected in one of fifteen SWMU 20/Well 103A soil samples at a concentration (490 mg/kg) greater than the 400 mg/kg action level. The mean concentration of chromium in SWMU 20/Well 103A soil is 96 mg/kg which is below the action level. Chromium concentrations are presented in Table 2, Attachment.

Uranium-234, -235, and -238 activities were summed to arrive at a total uranium activity. Total uranium was detected in all 15 soil samples obtained during the SWMU 20/Well 103A investigation. Concentrations in nine of the fifteen samples were greater than the 30 pCi/g NRC Option 1 Limit. The mean total uranium concentration (168 pCi/g) was also greater than the NRC Option 1 Limit. Total uranium concentrations are presented in Table 3, Attachment.

Thorium-228 and -232 were summed to arrive at natural thorium activity. Natural thorium was detected in all 15 soil samples obtained during the SWMU 20/Well 103A investigation. Concentrations in five of the fifteen soil samples were greater than the NRC Option 1 Limit of 10 pCi/g. The mean soil concentration for natural thorium (15 pCi/g) also exceeded the Option 1 Limit. Natural thorium concentrations are presented in Table 3, Attachment.

With the exception of one sample location, uranium and thorium concentrations decreased with depth. Samples obtained from borehole 112A had higher concentrations of both total uranium and natural thorium at the one to four feet interval. The higher concentration in the subsurface interval may be because the surface interval (0 - 1') is fill material and the subsurface zone was once surface soil.

Groundwater. Preliminary review of SWMU 20/Well 103A data indicates the following constituents were detected in groundwater at concentrations greater than EPA drinking water MCLs: tetrachloroethylene (PCE), trichloroethylene (TCE), 1,2-Dichloroethylene (1,2-DCE), vinyl chloride, tributyl phosphate, and total uranium. Analytical results for diesel, gasoline, kerosene, and varsol are also presented.

Tetrachloroethylene was detected in ten of fourteen monitoring wells. Wells 97A, 108A, 109A, 110A, 111A, 112A, 113A, 114A, 114B, and 115A contained PCE at concentrations greater than the 0.005 mg/L action level. Detected concentrations of PCE ranged from 0.0089 mg/L to 8.400 mg/L. PCE results are presented in Table 4, Attachment.

Trichloroethylene was detected in five of fourteen monitoring wells. Wells 52 (background), 93, 109A, 112A, and 114B contained TCE at concentrations greater than the 0.005 mg/L action level. Detected concentrations (excluding background) ranged from 0.013 mg/L to 0.160 mg/L. TCE results are presented in Table 4, Attachment.

1,2-Dichloroethylene was detected in seven of fourteen monitoring wells. Wells 93, 109A, and 111A contained 1,2-DCE at concentrations greater than the 0.07 mg/L MCL. Detected concentrations ranged from 0.0061 mg/L to 2.500 mg/L. 1,2-DCE results are presented in Table 4, Attachment.

Vinyl chloride was detected in two of fourteen monitoring wells. Wells 93 and 109A contained vinyl chloride at concentrations of 0.670 mg/L and 0.030 mg/L, respectively, which are greater than the 0.002 mg/L MCL. Vinyl chloride was not detected in the remaining wells at concentrations greater than the PQL; however, the PQL (0.010 mg/L) is greater than the MCL. Vinyl chloride results are presented in Table 4, Attachment.

Tributyl phosphate was detected in two of ten monitoring wells. Wells 93 and 108A contained TBP at concentrations of 110 mg/L and 0.550 mg/L, respectively, which are greater than the provisional health based action level of 0.2 mg/L. TBP results are presented in Table 4, Attachment.

Diesel and varsol were not detected in any of the wells sampled at concentrations above PQLs. Gasoline was detected in six of the ten wells sampled at concentrations ranging from 0.065 mg/L to 0.43 mg/L. Gasoline was not detected in the remaining wells. Kerosene was detected in one of the ten wells at a concentration of 15 mg/L. Kerosene was not detected in the remaining nine wells at concentrations above the PQL (0.50 mg/L). Diesel, gasoline, kerosene, and varsol results are presented in Table 5, Attachment.

Uranium-234, -235, and -238 activities were summed to arrive at a total uranium activity. Uranium was detected in each of the nine wells sampled. Uranium concentrations ranged from approximately 0.34 pCi/L to 1,099 pCi/L. Concentrations of total uranium in Wells 108A, 109A, and 111A are greater than the proposed MCL of 30 pCi/L. Uranium concentrations in Wells 112A, 113A, 114A, 114B, and 115A are consistent with background levels. Uranium results are presented in Table 6, Attachment.

The results of the SWMU 20/Well 103A groundwater investigation are consistent with descriptions of the extent of groundwater contamination at the NFS plant site as presented in the RCRA Facility Groundwater Investigation and Risk Assessment Workplan and in the final Groundwater Modeling Report. These documents were submitted to the EPA and NRC in May 1996. One exception is the groundwater investigation result indicating the presence of PCE in newly installed Well 114B, a bedrock well. The groundwater modeling results did not predict the presence of PCE at this location.

3.3 Work Projected (July 2, 1996 - September 30, 1996)

Outstanding soil results will be received, validated, and tabulated by NFS. Data evaluation will be performed to determine if the source of volatile organic contamination in Well 103A has been identified.

4.0 **Areas of Concern 2 (Building 111 Boiler Blowdown/Backwash) and 4 (Plant Drainage System)**

4.1 Work Completed

The remaining surface water samples for AOCs 2 and 4 were collected on April 26, 1996. The samples were obtained from the three locations depicted on Figure 2, Attachment, for the analysis of Appendix IX constituents and radionuclides. The analytical results were received and tabulated by NFS; data validation is not yet complete. Preliminary evaluation of the surface water data has begun and a brief summary is provided in Section 4.2

Efforts have begun to develop the RFI Report for AOCs 2 and 4.

4.2 Preliminary Findings and Observations

Three surface water samples were collected from the plant drainage system (AOC 4) during a rainfall event. Sample AOC2/4-SW-001 represents surface water entering the drainage ditch from the west side of the plant. An undetermined amount of surface water from offsite also enters the drainage ditch. Surface water from the drainage ditch enters Martin Creek directly. Sample AOC2/4-SW-002 represents a portion of the surface water that enters Martin Creek via Banner Spring Branch. Sample AOC2/4-SW-003 represents surface water entering the plant site from the southwest (background).

Water samples were not collected from Banner Spring Branch or Martin Creek during this investigation. During previous investigations samples were collected from Banner Spring Branch and Martin Creek. Results have been reported in RFI Reports and Quarterly RFI Progress Reports.

For this investigation constituent concentrations in Martin Creek were estimated by applying a dilution factor of 7,500 to results from the sample collected from the drainage ditch that empties directly into Martin Creek. Constituent concentrations in Banner Spring Branch attributed to the portion of the drainage system represented by sample

AOC2/4-SW-002 were estimated by applying a dilution factor of 25. Constituent concentrations in Martin Creek were estimated from Banner Spring Branch (estimated) results by applying a dilution factor of ten. The dilution factors represent the volume dilutions occurring as the plant drainage enters Banner Spring Branch and/or Martin Creek. Estimated concentrations of nonradiological constituents in Banner Spring Branch were compared to Tennessee Water Quality Criteria for fish and aquatic life. Estimated concentrations of nonradiological constituents in Martin Creek were compared to Tennessee Water Quality Criteria for fish and aquatic life and recreational use. Water quality criteria were not available for all constituents detected. In these cases, EPA health based action levels or drinking water MCLs were used.

Arsenic, lead, zinc, bis(2-ethylhexyl)phthalate, sulfate, and fluoride were the only nonradiological constituents detected in surface water runoff samples at concentrations above background levels. Considering dilution, estimated concentrations of nonradiological constituents in Banner Spring Branch and Martin Creek resulting from plant drainage are below water quality criteria. Nonradiological results are presented in Table 7, Attachment.

Uranium and thorium were detected in surface water runoff samples at concentrations above background levels. Radionuclides were not detected in surface water samples at concentrations above the effluent concentration limits in 10 CFR Part 20. Estimated concentrations of radionuclides in Banner Spring Branch and Martin Creek were calculated using the dilution factors described previously for nonradiological constituents and are shown in Table 8, Attachment. Estimated concentrations are below the effluent concentration limits.

4.3 Work Projected (July 2, 1996 - September 30, 1996)

Surface water sample data validation and evaluation will be completed in the next reporting period. Work will continue on the draft RFI Report. Submittal of the report to regulatory agencies is tentatively scheduled for fourth quarter 1996.

5.0 General Information

NRC Plant North Characterization: Evaluation and tabulation of data continued in the second quarter of 1996. Approximately 50 additional soil samples were submitted for isotopic radiochemical analyses. Analyses of these additional samples and validation, tabulation, and evaluation of remaining data will be completed in the third quarter of 1996.

Posted data and contour maps depicting radiological isotope concentrations in Northsite soils were completed. Preparation of the North Site Characterization Project (NSCP) Report has begun and is tentatively scheduled for completion the fourth quarter of 1996.

SWMU 9 (Radiological Waste Burial Ground): A Remediation Plan for excavating waste, debris, and contaminated soil from the Northsite Burial Ground was submitted to the NRC, EPA, and State in June 1996. This Remediation Plan was submitted as Addendum 1 to the Pond 4 Decommissioning/Interim Measures Workplan. Additionally, a categorical exclusion from NEPA requirements for an environmental assessment or environmental risk assessment was requested from the NRC.

SWMU 16 (Radiological Incinerator): The radiological incinerator is currently not operational due to a fire that occurred on April 2, 1996 in the duct work exiting the incinerator facility. NFS is currently assessing the costs and preparing plans for replacement of the damaged duct work and repairs for operation of the scrubber system. The radiological incinerator is not scheduled to return to operation during 1996.

Groundwater Modeling: The final groundwater modeling report was completed April 25, 1996. The final report was submitted to the EPA, NRC, and State on May 2, 1996.

RCRA Facility Groundwater Investigation and Risk Assessment Workplan: The RCRA Facility Groundwater Investigation and Risk Assessment Workplan was submitted to the EPA and TDEC for review and approval on May 2, 1996. A copy was also mailed to the NRC as information. Regulatory approvals are expected in June.

Nuclear Fuel Services
RFI Progress Report
July 2, 1996

ATTACHMENT
(14 pages to follow)

A-1

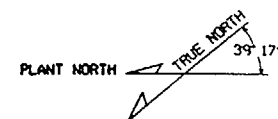
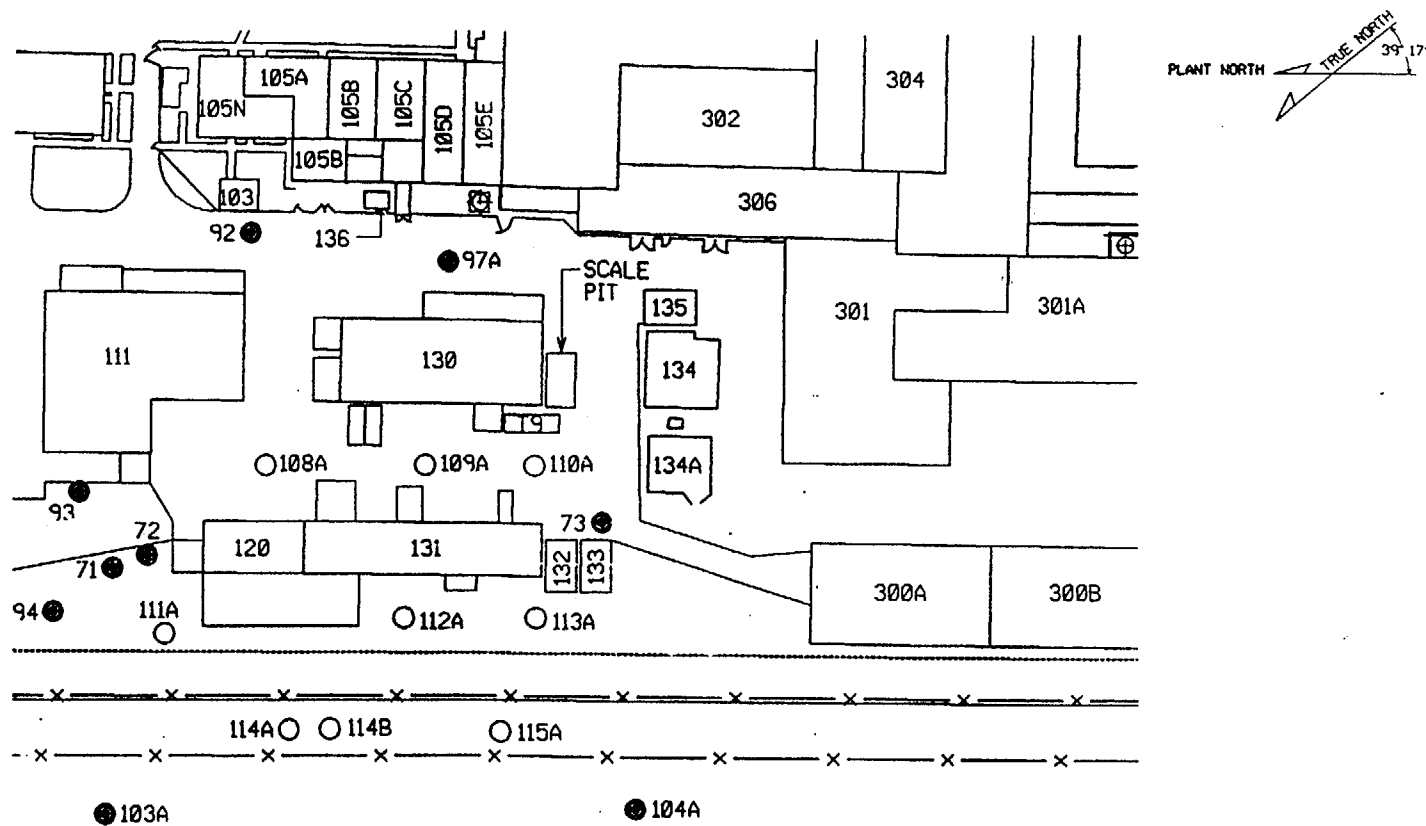


Figure 1

FOR INFORMATION ONLY

LEGEND

- PROPOSED MONITORING WELL
- EXISTING MONITORING WELL

				NUCLEAR FUEL SERVICES, INC. ERWIN, TENNESSEE	
				DRAWING TITLE SWMU 20 MONITORING WELL LOCATIONS	
NOTED BY <i>[Signature]</i>	PROPOSED U CONSTRUCTION DATE <i>Nov 18 '15</i>	DRAFTER T.E. BLEVINS		DRAFTER	SCALE 1" = 60' DATE 10-24-15
ORIGINAL ISSUE	BY	DATE	REVISION	LET	AS-BUILT APPROVALS DGC VERIFIER
<small>THIS DRAWING AND ALL INFORMATION CONTAINED HEREIN IS THE PROPERTY OF NUCLEAR FUEL SERVICES, INC. AND SHALL NOT BE USED OR DISCLOSED FOR ANY PURPOSES OTHER THAN THAT FOR WHICH IT WAS BEING FURNISHED WITHOUT THE EXPRESS WRITTEN CONSENT OF NFS.</small>				VERIFIER	DRAWING NO. 000-C0255-B

SWMU 20 & Well 103A - Analytical Results for Appendix IX Volatiles (Soil) (mg/kg)

Client ID	Well / Depth	Collection Date	1,1,1-Trichloroethane	1,2-Dichloroethene (total)	2-Butanone	3-Chloropropene	Acetone	Acetonitrile
20-S-108A-001	108A / 5'-1'	11/20/95	< 0.006	UJ 0.004	0.060	< 0.006	B< 0.060	< 0.11
20-S-108A-002 / Dup	108A / 1'-4'	11/20/95	< 0.006	< 0.006	UJ 0.037	< 0.006	B< 0.060	< 0.13
20-S-109A-001	109A / 5'-1'	11/21/95	< 0.006	< 0.006	< 0.058	< 0.006	B< 0.060	< 0.12
20-S-109A-002	109A / 1'-4'	11/21/95	< 0.006	UJ 0.002	UJ 0.006	0.008	B< 0.060	< 0.12
20-S-109A-003	109A / 4'-7'	11/21/95	< 0.006	UJ 0.002	< 0.060	< 0.006	B< 0.060	< 0.12
20-S-110A-001	110A / 5'-1'	11/21/95	< 0.006	UJ 0.002	< 0.056	< 0.006	B< 0.060	< 0.11
20-S-110A-002	110A / 1'-4'	11/21/95	< 0.007	< 0.007	< 0.066	< 0.007	B< 0.060	< 0.13
20-S-110A-003	110A / 4'-7'	11/21/95	< 0.007	< 0.007	< 0.066	< 0.007	B< 0.060	< 0.13
20-S-111A-001	111A / 0'-1'	11/21/95	< 0.032	1.6	< 0.32	< 0.032	< 0.32	< 0.64
20-S-111A-002	111A / 1'-4'	11/21/95	< 0.020	0.52	< 0.20	< 0.020	0.062	< 0.41
20-S-111A-003	111A / 4'-7'	11/21/95	< 0.005	0.17	< 0.054	< 0.005	< 0.054	B< 0.06
20-S-112A-001	112A / 0'-1'	11/21/95	< 0.006	< 0.006	< 0.063	< 0.006	< 0.063	< 0.13
20-S-112A-002	112A / 1'-4'	11/21/95	< 0.007	< 0.007	< 0.069	< 0.007	< 0.069	< 0.14
20-S-113A-001	113A / 0'-1'	11/22/95	B< 0.006	< 0.006	< 0.060	< 0.006	B< 0.060	< 0.12
20-S-113A-002	113A / 1'-4'	11/22/95	< 0.006	< 0.006	< 0.064	< 0.006	< 0.064	< 0.13
Statistics								
Mean			< 0.009	0.157	< 0.083	< 0.009	0.078	< 0.17
Standard Deviation			0.007	0.408	0.074	0.007	0.065	0.15
No. of Observations			15	15	15	15	15	15
t-value			1.345	1.356	1.345	1.345	1.345	1.345
90% Upper Conf. Limit			0.011	0.299	0.108	0.011	0.101	0.22
Action Level			2800 P,C	800	80000	4000 C	8000	500
Client ID	Benzene	Carbon disulfide	Ethylbenzene	Methylbenzene (toluene)	Tetrachloroethylene	Trichloroethylene	Vinyl Chloride	Xylenes (total)
20-S-108A-001	< 0.006	< 0.006	< 0.006	< 0.006	0.068	0.019	< 0.011	0.009
20-S-108A-002 / Dup	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.013	< 0.006
20-S-109A-001	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.012	< 0.006
20-S-109A-002	< 0.006	< 0.006	< 0.006	UJ 0.002	< 0.006	< 0.006	UJ 0.006	< 0.006
20-S-109A-003	< 0.006	< 0.006	< 0.006	< 0.006	UJ 0.004	< 0.006	< 0.012	< 0.006
20-S-110A-001	< 0.006	< 0.006	< 0.006	< 0.006	0.006	UJ 0.002	< 0.011	< 0.006
20-S-110A-002	< 0.007	< 0.007	UJ 0.001	UJ 0.006	0.010	< 0.007	< 0.013	UJ 0.004
20-S-110A-003	< 0.007	< 0.007	< 0.007	B< 0.006	UJ 0.002	< 0.007	< 0.013	B< 0.006
20-S-111A-001	< 0.032	UJ 0.003	< 0.032	< 0.032	0.62	0.088	< 0.064	< 0.032
20-S-111A-002	< 0.020	UJ 0.010	< 0.020	< 0.020	0.039	UJ 0.006	< 0.041	< 0.020
20-S-111A-003	< 0.005	< 0.005	< 0.005	0.006	0.029	UJ 0.004	< 0.011	< 0.005
20-S-112A-001	< 0.006	< 0.006	< 0.006	0.017	< 0.006	< 0.006	< 0.013	UJ 0.004
20-S-112A-002	< 0.007	< 0.007	UJ 0.001	0.014	< 0.007	< 0.007	< 0.014	UJ 0.005
20-S-113A-001	UJ 0.001	< 0.006	0.006	0.040	UJ 0.002	< 0.006	< 0.012	0.026
20-S-113A-002	< 0.006	< 0.006	UJ 0.003	0.020	< 0.006	< 0.006	< 0.013	0.011
Statistics								
Mean	< 0.008	0.006	< 0.008	0.013	0.054	0.012	< 0.017	0.010
Standard Deviation	0.007	0.001	0.008	0.011	0.152	0.021	0.015	0.008
No. of Observations	15	15	15	15	15	15	15	15
t-value	1.345	1.345	1.345	1.345	1.345	1.345	1.345	1.345
90% Upper Conf. Limit	0.011	0.007	0.010	0.017	0.107	0.019	0.022	0.013
Action Level	20	8000	8000	20000	10	60	0.400	200000

Analyses performed by Halliburton NUS Laboratory, located in Pittsburgh, PA.

Dup Duplicate; Sample results averaged.

B Analyte found in associated blank (trip or method)

UJ Estimated Values Below the Detection Limit

< Less than the detection limit

P Provisional

C Based on EPA contact Kevin Coporec.

Table 1

SWMU 20 / Well 103A Investigation Analytical Results for Metals Detected in Soil Above Action Levels

Client ID	Well / Depth	Collection Date	Arsenic (mg/kg)	Beryllium (mg/kg)	Chromium (mg/kg)
20-S-108A-001	108A / .5'-1'	11/20/95	4.5	< 0.6	13
20-S-108A-002 / Dup	108A / 1'-4'	11/20/95	2	1	29.6
20-S-109A-001	109A / .5'-1'	11/21/95	< 2	0.9	320
20-S-109A-002	109A / 1'-4'	11/21/95	2.0	0.8	130
20-S-109A-003	109A / 4'-7'	11/21/95	< 2	< 0.6	120
20-S-110A-001	110A / .5'-1'	11/21/95	6.4	2.0	490
20-S-110A-002	110A / 1'-4'	11/21/95	3.6	1.2	31
20-S-110A-003	110A / 4'-7'	11/21/95	5.0	0.9	35
20-S-111A-001	111A / 0-1'	11/21/95	6.9	0.8	55
20-S-111A-002	111A / 1'-4'	11/21/95	4.3	0.9	35
20-S-111A-003	111A / 4'-7'	11/21/95	0.5	< 0.5	16
20-S-112A-001	112A / 0-1'	11/21/95	8.9	< 0.6	20
20-S-112A-002	112A / 1'-4'	11/21/95	0.7	< 0.7	28
20-S-113A-001	113A / 0-1'	11/22/95	14	1.0	55
20-S-113A-002	113A / 1'-4'	11/22/95	3.4	0.6	55
Statistics					
Mean			4.4	0.9	96
Standard Deviation			3.4	0.4	130
No. of Observations			15	15	15
t-value			1.341	1.341	1.341
90% Upper Conf. Limit			5.6	1.0	140
Action Level (mg/kg)			0.5 / 20	0.2	400

Analyses performed by Halliburton NUS Laboratory, located in Pittsburgh, PA.

Dup Duplicate; sample results averaged.

< Less than the detection limit

A-3

Table 2

RFIMET.WK1

Sample ID	Depth	Collection Date	Uranium-234 (pCi/g) (+/-)		Uranium-235 (pCi/g) (+/-)		Uranium-238 (pCi/g) (+/-)		Total Uranium (pCi/g)
20-S-108A-001	6"-1'	11/20/95	J 240	30	J 8.1	1.1	J 80	8	J 328
20-S-108A-002/002D	1'-4'	11/20/95	J 60.5	7	J 2.2	0.5	J 18	2	J 81
20-S-109A-001	6"-1'	11/21/95	J 46	5	J 1.7	0.4	J 34	4	J 82
20-S-109A-002	1'-4'	11/21/95	11	2	0.45	0.25	7.9	1.2	19
20-S-109A-003	4'-5.5'	11/21/95	5.5	0.9	0.24	0.17	4.0	0.8	9.7
20-S-110A-001	6"-1'	11/21/95	330	40	12	2	79	8	421
20-S-110A-002	1'-4'	11/21/95	20	2	0.91	0.31	5.5	0.8	26
20-S-110A-003	4'-5.17'	11/21/95	12	2	0.47	0.26	8.2	1.2	21
20-S-111A-001	0-1'	11/21/95	280	30	11	2	34	4	325
20-S-111A-002	1'-4'	11/21/95	15	2	0.63	0.30	2.0	0.6	18
20-S-111A-003	4'-5'	11/21/95	7.9	1.2	< 0.3		1.5	0.4	9.7
20-S-112A-001	0-1'	11/21/95	92	10	2.4	0.6	11	2	105
20-S-112A-002	1'-4'	11/21/95	300	30	8.7	1.2	32	4	341
20-S-113A-001	0-1'	11/22/95	410	50	15	2	100	10	525
20-S-113A-002	1'-4'	11/22/95	130	20	4.4	0.8	74	8	208
Mean			131		4.6		33		168
Standard Deviation			141		5.0		34		175
No. of Observations			15		15		15		15
t-value			1.345		1.345		1.345		1.345
90% Upper Conf. Limit			180		6.3		44		229
NRC Option 1 Limit¹									30
NOTES:									
J Estimated value									
D Duplicate; sample results averaged.									
¹ NRC Branch Technical Position (NRC 1981)									
--Alpha spectroscopy contracted to Halliburton NUS Corporation, NUS Laboratory (Pittsburgh, PA).									
--Total Uranium is the sum of the analytical results for U-234, U-235, and U-238.									

Table 3

Sample ID	Depth	Collection Date	Uranium-230 (pCi/g) (+/-)	Uranium-238 (pCi/g) (+/-)	Thorium-232 (pCi/g) (+/-)	Natural Thorium (pCi/g)
20-S-108A-001	6"-1'	11/20/95	0.64 0.26	1.7 0.5	0.54 0.24	2.2
20-S-108A-002/002D	1'-4'	11/20/95	0.79 0.27	1.1 0.4	0.56 0.21	1.7
20-S-109A-001	6"-1'	11/21/95	1.7 0.5	3.2 0.7	2.4 0.6	5.6
20-S-109A-002	1'-4'	11/21/95	1.3 0.4	0.91 0.32	1.9 0.5	2.8
20-S-109A-003	4'-5.5'	11/21/95	0.58 0.28	0.81 0.35	1.1 0.36	1.9
20-S-110A-001	6"-1'	11/21/95	9.5 1.3	20 2	25 3	45
20-S-110A-002	1'-4'	11/21/95	2.0 0.5	2.0 0.5	2.9 0.6	4.9
20-S-110A-003	4'-5.17'	11/21/95	J 1.4 0.41	0.90 0.37	1.5 0.4	2.4
20-S-111A-001	0-1'	11/21/95	J 9.6 1.9	34 5	35 5	69
20-S-111A-002	1'-4'	11/21/95	J 1.1 0.3	1.3 0.4	1.8 0.4	3.1
20-S-111A-003	4'-5'	11/21/95	J 0.97 0.31	1.2 0.4	1.6 0.4	2.8
20-S-112A-001	0-1'	11/21/95	J 2.1 0.5	3.3 0.7	4.4 0.8	7.7
20-S-112A-002	1'-4'	11/21/95	J 3.1 0.6	8.0 1.1	7.6 1.0	15.6
20-S-113A-001	0-1'	11/22/95	J 9.0 1.2	25 3	27 3	52
20-S-113A-002	1'-4'	11/22/95	J 2.9 0.6	6.6 1.0	6.4 1.0	13.0
Mean			3.1	7	8	15
Standard Deviation			3.3	10	11	22
No. of Observations			15	15	15	15
t-value			1.345	1.345	1.345	1.345
90% Upper Conf. Limit			4.3	11	12	27
NRC Option 1 Limit¹						10
NOTES:						
J Estimated value						
D Duplicate; sample results averaged.						
--Alpha spectroscopy contracted to Halliburton NUS Corporation, NUS Laboratory (Pittsburgh, PA).						
--Natural Thorium is the sum of the analytical results for Th-228 and Th-232.						

Table 3, cont.

SWMU 20 / Well 103A Investigation Analytical Results for Organics Detected in Groundwater Above Action Levels

Client ID	Well	Collection Date		Tetrachloroethylene (mg/L)	Trichloroethylene (mg/L)		1,2-Dichloroethylene (mg/L)		Vinyl Chloride (mg/L)		Tributyl Phosphate (mg/L)	
20-GW-52	52	2/29/96	<	0.005			0.0067	<	0.005	<	0.010	ND
20-GW-92	92	3/04/96	<	0.005	<		0.005	<	0.005	<	0.010	ND
20-GW-93	93	3/07/96	<	0.005			0.160		2.500		0.670	110.000
20-GW-94	94	3/06/96	<	0.005	<		0.005	<	0.005	<	0.010	ND
20-GW-97A	97A	2/29/96		0.017	<		0.005		0.0082	<	0.010	ND
20-GW-108A/Dup	108A	2/26/96		4.800	<		0.005	<	0.005	<	0.010	0.550
20-GW-109A	109A	3/04/96		0.340			0.077		0.220		0.030	>
20-GW-110A	110A	2/27/96		0.110	<		0.005		0.0061	<	0.010	>
20-GW-111A	111A	2/29/96		8.400	<		0.005		0.600	<	0.010	>
20-GW-112A	112A	2/28/96		0.099			0.013		0.010	<	0.010	>
20-GW-113A	113A	2/28/96		0.063	<		0.005		0.005	<	0.010	>
20-GW-114A	114A	3/05/96		0.0089	<		0.005		0.005	<	0.010	>
20-GW-114B	114B	3/05/96		0.920			0.073		0.059	<	0.010	>
20-GW-115A	115A	3/05/96		0.027	<		0.005		0.005	<	0.010	>
Statistics												
Mean				1.057			0.027		0.246		0.059	11.063
Standard Deviation				2.374			0.044		0.645		0.170	32.979
No. of Observations				14			14		14		14	10
t-value				1.350			1.350		1.350		1.350	1.393
90% Upper Conf. Limit				1.914			0.043		0.478		0.120	25.591
Action Level (mg/L)				0.005			0.005		0.07		0.002	0.2 *

Analyses performed by Industrial & Environmental Analysts, Inc. (IEA), located in Cary, NC.

Dup Duplicate; Sample results averaged.

ND No Data

< Less than the detection limit

* Provisional Action Level

9-6

Table 4

RFIORGAN WK1

Nuclear Fuel Services
RFI Progress Report
July 2, 1996

SWMU 20 / Well 103A Investigation Analytical Results for Diesel, Gasoline, Kerosene, and Varsol in Groundwater

Client ID	Well	Collection Date	Diesel (mg/L)	Gasoline (mg/L)	Kerosene (mg/L)	Varsol (mg/L)
20-GW-93	93	3/07/96	< 2.0	< 0.10	15	< 2.0
20-GW-108A/Dup	108A	2/26/96	< 0.50	0.098	< 0.50	< 0.50
20-GW-109A	109A	3/04/96	< 0.50	0.43	< 0.50	< 0.50
20-GW-110A	110A	2/27/96	< 0.50	0.10	< 0.50	< 0.50
20-GW-111A	111A	2/29/96	< 0.50	0.076	< 0.50	< 0.50
20-GW-112A	112A	2/28/96	< 0.50	< 0.050	< 0.50	< 0.50
20-GW-113A	113A	2/28/96	< 0.50	< 0.050	< 0.50	< 0.50
20-GW-114A	114A	3/05/96	< 0.50	< 0.050	< 0.50	< 0.50
20-GW-114B	114B	3/05/96	< 0.50	0.092	< 0.50	< 0.50
20-GW-115A	115A	3/05/96	< 0.50	0.065	< 0.50	< 0.50
Statistics						
Mean			< 0.65	0.11	2.0	< 0.65
Standard Deviation			0.45	0.11	4.4	0.45
No. of Observations			10	10	10	10
t-value			1.383	1.383	1.383	1.383
90% Upper Conf. Limit			0.85	0.16	3.9	0.85

Analyses performed by Industrial & Environmental Analysts, Inc. (IEA), located in Cary, NC.

Dup Duplicate; Sample results averaged.

< Less than the detection limit

Table 5

RFITPHS WK1

Sample ID	Date	Radium-226		Uranium-235		Uranium-238		Total Uranium (pCi/L)
		(pCi/L)	(±)	(pCi/L)	(±)	(pCi/L)	(±)	
Filtered Samples								
20-GW-108A/17	2/26/96	548.90	40.90	27.27	2.59	251.00	18.99	827.17
20-GW-109A	3/4/96	384.80	27.16	20.79	3.03	693.90	47.38	1099.49
20-GW-110A	2/27/96	4.59	0.42	0.19	0.08	1.89	0.24	6.67
20-GW-111A	2/29/96	48.19	2.84	1.79	0.26	6.34	0.53	56.32
20-GW-112A	2/28/96	0.54	0.12	< 0.02		0.21	0.08	0.77
20-GW-113A	2/28/96	0.60	0.12	0.02	0.03	0.25	0.07	0.87
20-GW-114A	3/5/96	J 0.51	0.13	< 0.08		J 0.32	0.10	J 0.91
20-GW-114B	3/5/96	0.19	0.06	< 0.05		0.10	0.05	0.34
20-GW-115A	3/5/96	0.39	0.10	0.06	0.04	0.50	0.11	0.95
Statistics								
Mean		109.86		5.59		106.06		221.50
Standard Deviation		207.09		10.60		235.40		426.43
No. of Observations		9		9		9		9
t-value		1.397		1.397		1.397		1.397
90% Upper Conf. Limit		206.29		10.52		215.68		420.07
Notes:								
"J" indicates that result is estimated.								
"B <" indicates that the result was qualified as less than the indicated MDA due to significant activity in the method blank.								
< " indicates result was less than the indicated MDA.								
Sample 20-GW-17 is a duplicate of 20-GW-108A; sample result averaged.								
Alpha spectroscopy (U-234, U-235, U-238) and Liquid Scintillation Counting (Tc-99) contracted to IEA (Cary, NC).								
"Total Uranium" is the sum of the analytical results for U-234, U-235, and U-238.								

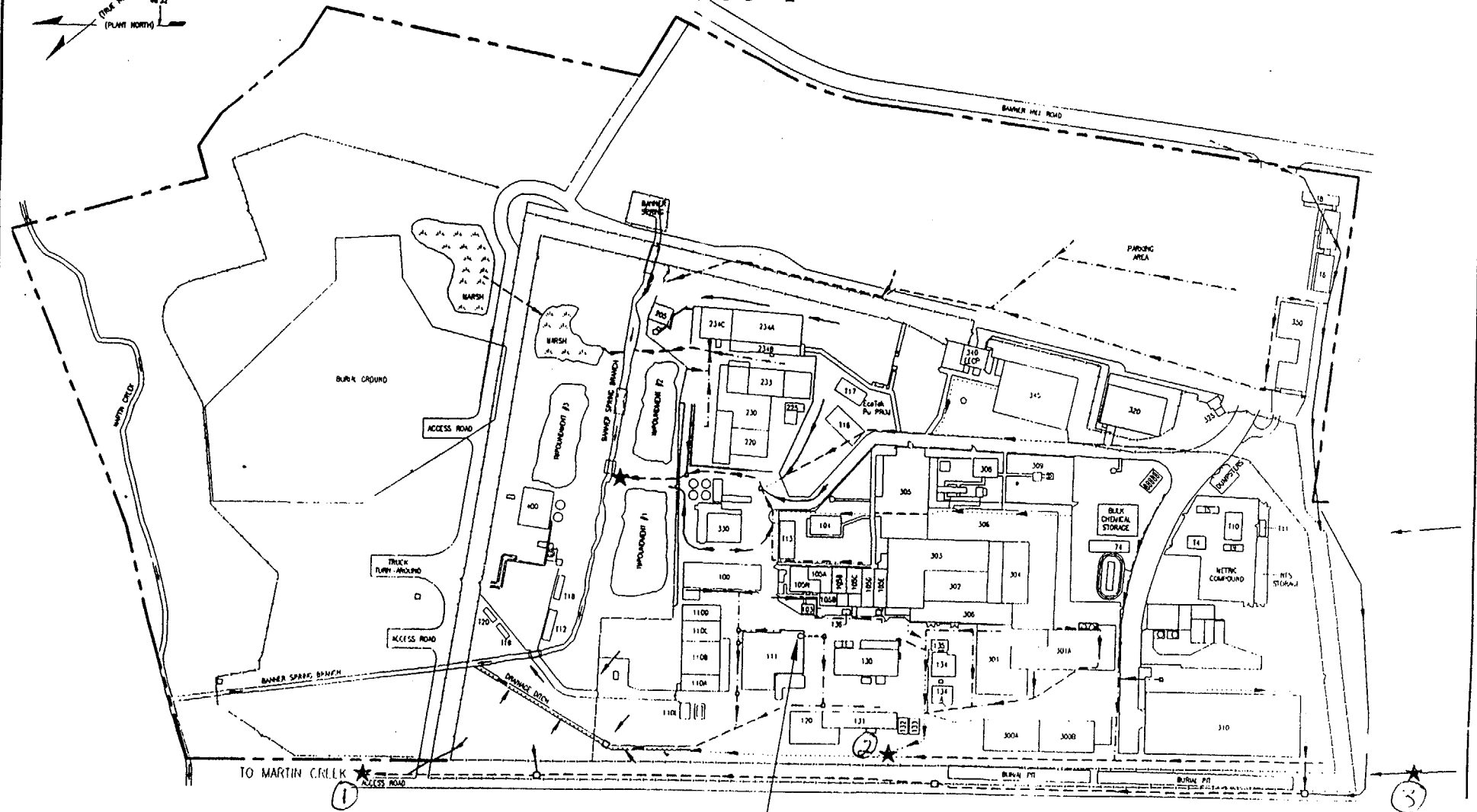
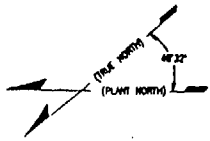
Table 6

Sample ID	Collection Date	Uranium-234 (pCi/L) (+/-)	Uranium-235 (pCi/L) (+/-)	Uranium-238 (pCi/L) (+/-)	Total Uranium (pCi/L)
Unfiltered Samples					
20-GW-108A/17	2/26/96	545.35	39.96	26.39	816.84
20-GW-109A	3/4/96	361.80	25.22	21.36	1047.76
20-GW-110A	2/27/96	5.70	0.48	0.24	8.20
20-GW-111A	2/29/96	52.27	2.99	1.70	60.70
20-GW-112A	2/28/96	0.74	0.14	0.07	1.18
20-GW-113A	2/28/96	0.89	0.15	< 0.02	1.33
20-GW-114A	3/5/96	J 0.23	0.10	< 0.09	J 0.49
20-GW-114B	3/5/96	0.24	0.08	< 0.02	0.50
20-GW-115A	3/5/96	0.66	0.13	0.06	1.69
Statistics					
Mean		107.54		5.55	215.41
Standard Deviation		202.17		10.48	410.97
No. of Observations		9		9	9
t-value		1.397		1.397	1.397
90% Upper Conf. Limit		201.69		10.43	406.79
Notes					
"J" indicates that result is estimated.					
"B <" indicates that the result was qualified as less than the indicated MDA due to significant activity in the method blank.					
<" indicates result was less than the indicated MDA.					
Sample 20-GW-17 is a duplicate of 20-GW-108A; sample result averaged.					
Alpha spectroscopy (U-234, U-235, U-238) and Liquid Scintillation Counting (Tc-99) contracted to IEA (Cary, NC).					
"Total Uranium" is the sum of the analytical results for U-234, U-235, and U-238.					

Table 6, cont.

SURFACE WATER SAMPLING LOCATIONS

AOC 4



- LEGEND**
- ★ SURFACE H₂O SAMPLE
 - - - - - UNDERGROUND
 - OPEN TRENCH
 - - - - - CORRUGATED METAL PIPE (CMP)- SLOTTED DRAIN OR "AOC" CHANNEL
 - SURFACE ROOFTOP

SCALE 1/1"

Figure 2



A-10

AOCs 2 & 4 Analytical Results for Constituents Detected in Surface Water

Client ID	Collection Date	ORGANICS				METALS					GENERAL CHEMISTRY			
		Bis(2-ethylhexyl) phthalate (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Nitrate/Nitrite (mg/L)	Sulfate (mg/L)	Fluoride (mg/L)	Oil/Grease (mg/L)	
AOC2/4 Surface Water														
AOC2/4-SW-001	4/26/96	0.023	0.004	0.028	< 0.01	0.003	< 0.0001	0.01	0.05	0.9	18	0.2	< 3	
AOC2/4-SW-002	4/26/96	< 0.010	< 0.003	0.010	< 0.01	0.009	0.0002	< 0.01	0.17	0.6	6	< 0.1	3	
Background														
AOC2/4-SW-003	4/26/96	< 0.010	< 0.003	0.10	0.01	0.008	0.0002	0.03	0.05	1.0	12	< 0.1	3	
Estimated value for Banner Spring	A	4.0E-04	1.2E-04	4.0E-04	4.0E-04	3.6E-04	8.0E-06	4.0E-04	6.8E-03	2.4E-02	2.4E-01	4.0E-03	1.2E-01	
Water criteria for Banner Spring	B	ND	1.9E-01	2.0E+00 *	1.2E-02	3.2E-03	1.2E-05	2.0E-01 *	1.1E-01	1.0E+01	5.0E+02	4.0E+00	ND	
Estimated value for Martin Creek (direct)	C	3.1E-06	5.3E-07	3.7E-06	1.3E-06	4.0E-07	1.3E-08	1.3E-06	6.7E-06	1.2E-04	2.4E-03	2.7E-05	4.0E-04	
Estimated value for Martin Creek (via BSB)	D	4.0E-05	1.2E-05	4.0E-05	4.0E-05	3.6E-05	8.0E-07	4.0E-05	6.8E-04	2.4E-03	2.4E-02	4.0E-04	1.2E-02	
Water Criteria for Martin Creek	E	5.9E-02	1.4E-03	2.0E+00 *	ND	ND	1.5E-04	2.0E-01 *	ND	1.0E+01	5.0E+02	4.0E+00	ND	

Notes:

- A. Estimated value derived by dividing result for sample AOC2/4-SW-002 by a dilution factor of 25.
 - B. Water criteria based on Tennessee Water Quality Criteria for fish and aquatic life.
 - C. Estimated value derived by dividing result for sample AOC2/4-SW-001 by 7500.
 - D. Estimated value for Banner Spring Branch was divided by 10.
 - E. Water criteria based on Tennessee Water Quality Criteria for fish and aquatic life and recreational use.
- Analyses performed by Halliburton NUS Laboratory, located in Pittsburgh, PA.
- < Less than the detection limit
 - * EPA health based action level or drinking water MCL is used since water quality criteria is not available.

II-V

Table 7

AOCs 2 & 4 Analytical Results for Radiological Constituents Detected in Surface Water

Client ID	Collection Date	U-234			U-235			U-238			Am-241		
		Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)
AOC2/4 Surface Water													
AOC2/4-SW-001	4/26/96	5	0.5	0.02	0.36	0.09	0.02	3.1	0.4	0.02	<0.2524	NA	0.2524
AOC2/4-SW-002	4/26/96	21	2	0.02	0.84	0.16	0.02	3.9	0.4	0.02	<0.2666	NA	0.2666
Background													
AOC2/4-SW-003	4/26/96	0.3	0.08	0.05	< 0.04	NA	0.04	0.26	0.08	0.04	<0.2359	NA	0.2359
Estimated value for Banner Spring	A	2E-01			1E-02			1E-01			1E-02		
Estimated value for Martin Creek (direct)	B	3E-03			1E-04			5E-04			4E-05		
Estimate value for Martin Creek (via BSB)	C	2E-02			1E-03			1E-02			1E-03		
Action Level *		300			300			300			20		

Notes:

- A. Estimated value derived by dividing result for sample AOC2/4-SW-002 by a dilution factor of 25.
 - B. Estimated value derived by dividing result for sample AOC2/4-SW-001 by 7500.
 - C. Estimated value for Banner Spring Branch was divided by 10.
- Analyses performed by Nuclear Fuel Services, Inc. located in Erwin, TN.
- < Less than the detection limit
 - NA Not applicable
 - * Effluent Concentration Limit (10 CFR Part 20)

AOC24RAD WK4

AOCs 2 & 4 Analytical Results for Radiological Constituents Detected in Surface Water

Client ID	Collection Date	Th-228			Th-230			Th-232			TC-99		
		Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)
AOC2/4 Surface Water													
AOC2/4-SW-001	4/26/96	0.13	0.06	0.07	0.12	0.05	0.02	0.11	0.05	0.02	< 2	NA	2
AOC2/4-SW-002	4/26/96	0.15	0.07	0.08	0.07	0.04	0.05	0.3	0.08	0.05	< 2	NA	2
Background													
AOC2/4-SW-003	4/26/96	0.14	0.07	0.07	0.14	0.06	0.02	0.09	0.05	0.02	< 2	NA	2
Estimated value for Banner Spring	A	5E-03			5E-03			4E-03			8E-02		
Estimated value for Martin Creek (direct)	B	2E-05			9E-06			4E-05			3E-04		
Estimated value for Martin Creek (via BSB)	C	5E-04			5E-04			4E-04			8E-03		
Action Level *		200			100			30			60,000		

Notes:

- A. Estimated value derived by dividing result for sample AOC2/4-SW-002 by a dilution factor of 25.
 - B. Estimated value derived by dividing result for sample AOC2/4-SW-001 by 7500.
 - C. Estimated value for Banner Spring Branch was divided by 10.
- Analyses performed by Nuclear Fuel Services, Inc. located in Erwin, TN.
- < Less than the detection limit
 - NA Not applicable
 - * Effluent Concentration Limit (10 CFR Part 20)

AOC24RAD.WK4

AOCs 2 & 4 Analytical Results for Radiological Constituents Detected in Surface Water

Client ID	Collection Date	Pu-238			Pu-239/240			Pu-241		
		Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Error (pCi/L)	MDA (pCi/L)
AOC2/4 Surface Water										
AOC2/4-SW-001	4/26/96	< 0.1	NA	0.1	< 0.2	NA	0.2	< 5.22	NA	5.22
AOC2/4-SW-002	4/26/96	< 0.1	NA	0.1	< 0.1	NA	0.1	< 5.02	NA	5.02
Background										
AOC2/4-SW-003	4/26/96	< 0.1	NA	0.1	0.36	0.09	0.04	< 5.60	NA	5.60
Estimated value for Banner Spring	A	4E-03			8E-03			2E-01		
Estimated value for Martin Creek (direct)	B	1E-05			1E-05			7E-04		
Estimated value for Martin Creek (via BSB)	C	4E-04			8E-04			2E-02		
Action Level *		20			20			1000		

Notes:

- A. Estimated value derived by dividing result for sample AOC2/4-SW-002 by a dilution factor of 25.
 - B. Estimated value derived by dividing result for sample AOC2/4-SW-001 by 7500.
 - C. Estimated value for Banner Spring Branch was divided by 10.
- Analyses performed by Nuclear Fuel Services, Inc. located in Erwin, TN.
- < Less than the detection limit
 - NA Not applicable
 - * Effluent Concentration Limit (10 CFR Part 20)

AOC24RAD WK4

ATTACHMENT II

*To Letter Dated July 2, 1996
A. M. Maxin to Mr. G. Alan Farmer and Mr. Thomas Tiesler*

Interim Measures Progress Report

20 pages to follow

INTERIM MEASURES (IM) PROGRESS REPORT
SWMUs 2 ,4, AND 6
NUCLEAR FUEL SERVICES, INC.
EPA ID. NO. TND 00 309 5635

1.0 Work Completed

Since the last IM Progress Report dated April 3, 1996, excavation has progressed both inside and outside of Building 410.

Inside the building, approximately 21,000 square feet have been excavated for waste and debris removal. This brings the work to 83% completion (See Attachment 1). Of the area excavated inside the building since April 3, approximately 14,000 cubic feet of waste has been processed and packaged for off-site disposal. Another 17,520 cubic feet of contaminated soil has been packaged as well.

Excavation outside of Building 410 resumed near the end of May and approximately 1,830 square feet have been excavated, yielding about 7,490 cubic feet of debris, waste and soil to be processed. This work brings the outside excavation total to 59% complete.

Excavated areas, inside and out, have been visually examined and surveyed with metal detection equipment prior to backfilling to verify waste and debris removal.

Through June 30, 1996, 3,970,425 gallons of groundwater have been treated and discharged in accordance with applicable regulations to the Erwin POTW in the 675 days since start-up. The combined well output has averaged 4.08 gallons per minute.

2.0 Findings and Observations

Current generation rates indicate that waste and debris comprise approximately 33 percent of the total volume excavated. The groundwater elevation data indicates that levels are being maintained at a point sufficiently low enough to support excavation. Charts of the observed groundwater levels are attached, along with a diagram of the well locations relative to the building (Attachments 2-9).

All wastes continue to be below the applicable TCLP and PCB regulatory levels this quarter.

INFLUENT DATA

Pond 4 groundwater influent has been sampled and analyzed monthly since August 1994, prior to treatment, for the following constituents: 1,2 dichloroethylene (1,2 DCE), tetrachloroethylene (PCE), trichloroethylene (TCE), vinyl chloride, tributyl phosphate (TBP), bis(2-ethylhexyl)phthalate (BEHP), and di-n-octyl phthalate (DOP). In July 1995 the influent sampling frequency increased from monthly to weekly. Pond 4 groundwater influent data for constituents detected in samples collected August 1994 through May 1996 are presented in Attachment 10 and are discussed below.

1,2 Dichloroethylene - 1,2 DCE was detected in all influent samples at concentrations ranging from 0.100 mg/L to 1.406 mg/L. The lowest concentration of 1,2 DCE (0.100 mg/L) was detected August 16, 1994 and the highest concentration (1.406 mg/L) was detected December 26, 1995. Samples obtained during this reporting period contained concentrations of 1,2 DCE ranging from 0.245 mg/L (May 7, 1996) to 1.048 mg/L (April 22, 1996). Attachment 11 is a graph depicting 1,2 DCE concentrations. 1,2 DCE concentrations are consistent with concentrations in previous reporting periods.

Tetrachloroethylene - PCE was detected in all influent samples at concentrations ranging from 0.290 mg/L to 13.293 mg/L. The lowest concentrations of PCE (0.290 mg/L) was detected August 16, 1994 and the highest concentration (13.293 mg/L) was detected January 9, 1996. Concentrations of PCE in this reporting period ranged from 0.367 mg/L (May 7, 1996) to 1.940 mg/L (April 30, 1996). PCE data are graphed in Attachment 12. Concentrations of PCE decreased in early 1996 and have remained steady in this reporting period.

Trichloroethylene - TCE was detected in all influent samples at concentrations ranging from 0.019 mg/L to 4.101 mg/L. The lowest concentration of TCE (0.019 mg/L) was detected on March 3, 1995 and the highest concentration (4.101 mg/L) was detected on January 3, 1995. Concentrations of TCE in this reporting period ranged from 0.398 mg/L (May 7, 1996) to 1.782 mg/L (April 30, 1996.) TCE data are graphed in Attachment 13. TCE concentrations generally rose through the period March 17, 1996 through May 13, 1996 and decreased thereafter.

Vinyl Chloride - Vinyl chloride was detected in 14 of 53 (26%) samples at concentrations ranging from 0.020 mg/L to 0.432 mg/L. The lowest concentration (0.020 mg/L) was detected December 5, 1994 and the highest concentration (0.432 mg/L) was detected January 27, 1996. Vinyl chloride was not detected in the remaining influent samples at concentrations greater than the Practical Quantitation Limit (PQL); however, the PQL (<0.005 mg/L) is greater than the 0.002 mg/L MCL. Vinyl chloride was detected in 4 of 12 (33%) samples obtained during this reporting period at concentrations ranging from 0.090 mg/L to 0.167 mg/L. Vinyl chloride data are graphed in Attachment 14.

Tributyl Phosphate - Tributyl phosphate was detected in 46 of 51 (90%) samples at concentrations ranging from 0.043 mg/L (March 29, 1996) to 30.00 mg/L (September 1, 1994). Analysis for TBP was not conducted on August 16, 1994 and August 8, 1995 groundwater samples. TBP was detected in 9 of 12 (75%) samples obtained during this reporting period at concentrations ranging from 0.043 mg/L to 0.178 mg/L. TBP data are graphed in Attachment 15. TBP concentrations dropped in January 1996 and have remained low through the end of May 1996.

Bis(2-ethylexyl)phthalate - BEHP was detected in 2 of 52 (4%) influent samples at concentrations of 0.0061 mg/L (August 16, 1994) and 2.598 mg/L (July 12, 1995). The August 8, 1995 influent sample was not analyzed for BEHP. BEHP was not detected in samples obtained during this reporting period.

Di-n-octyl phthalate - DOP has not been detected in influent samples. The August 8, 1995 influent sample was not analyzed for DOP. Detection limits ranged from <0.010 mg/L to <0.030 mg/L.

GROUNDWATER DATA

Monitoring Wells #26 and #28 are located in the Pond 4 area and are sampled monthly for PCE, vinyl chloride, and TBP as an indicator of groundwater quality in the Pond 4 area. Wells #101A and #102A are located along the western perimeter of the NFS site and are downgradient of the Pond 4 area. Wells #101A and #102A were sampled quarterly for PCE, vinyl chloride, and tributyl phosphate through June 1995. In June 1995, the sampling frequency increased to monthly. Analytical results are presented in Attachment 16, and are summarized below.

Tetrachloroethylene - PCE was detected in 21 of 22 (95%) groundwater samples obtained from Well #26. Concentrations of PCE were greater than the 0.005 mg/L MCL in 4 of 22 (18%) of samples. Concentrations of PCE above the MCL ranged from 0.0060 mg/L to 0.0240 mg/L. PCE was detected at concentrations greater than MCL in 100% of the samples obtained from Well #28. Concentrations ranged from 0.2935 mg/L to 2.1725 mg/L.

PCE was detected in 13 of 16 (81%) of samples obtained from Well 101A. Concentrations of PCE were greater than the MCL in 12 of 16 (75%) of the samples. Concentrations of PCE above the MCL in Well #101A ranged from 0.0056 mg/L to 0.1550 mg/L. PCE was detected at concentrations greater than the MCL in 100% of the samples obtained from Well #102A. Concentrations ranged from 0.2363 mg/L to 1.5342 mg/L.

Vinyl Chloride - Vinyl chloride has not been detected in Well #26. Vinyl chloride was detected in 18 of 20 (90%) samples obtained from Well #28. Concentrations of vinyl chloride in these samples were greater than the 0.002 mg/L MCL.

Vinyl chloride was detected in 7 of 16 (44%) of samples obtained from Well #101A. Concentrations of vinyl chloride in these samples were greater than the MCL. Vinyl chloride was detected in 1 of 14 (7%) of samples obtained from Well #102A. The concentration of vinyl chloride in this sample was greater than the MCL.

Tributyl Phosphate - TBP was not detected in Wells #26, #28, #101A, or #102A at concentrations greater than the 0.2 mg/L provisional action level.

Additional data are needed to determine if groundwater in the vicinity of Pond 4 has improved. Wells #26, #28, #101A, #102A, and #103A will continue to be monitored monthly.

3.0 Deviations from Workplan

There have been no deviations from the workplan during this quarter.

4.0 Problems and Solutions

Treatment of the groundwater drawdown wells in February apparently did not solve problems experienced with iron bacteria. Well yields after treatment fell off dramatically within 3 to 5 weeks after the process was completed. Further treatment of the wells is not planned at this time. To supplement the groundwater drawdown wells, water from the adjacent ponds has been pumped directly to the wastewater treatment facility to reduce the hydraulic loading near the project. To date, this has been successful and groundwater levels continue to be low enough to support full excavation of waste and debris.

5.0 Work Projected

Work projected for the third quarter of 1996 includes:

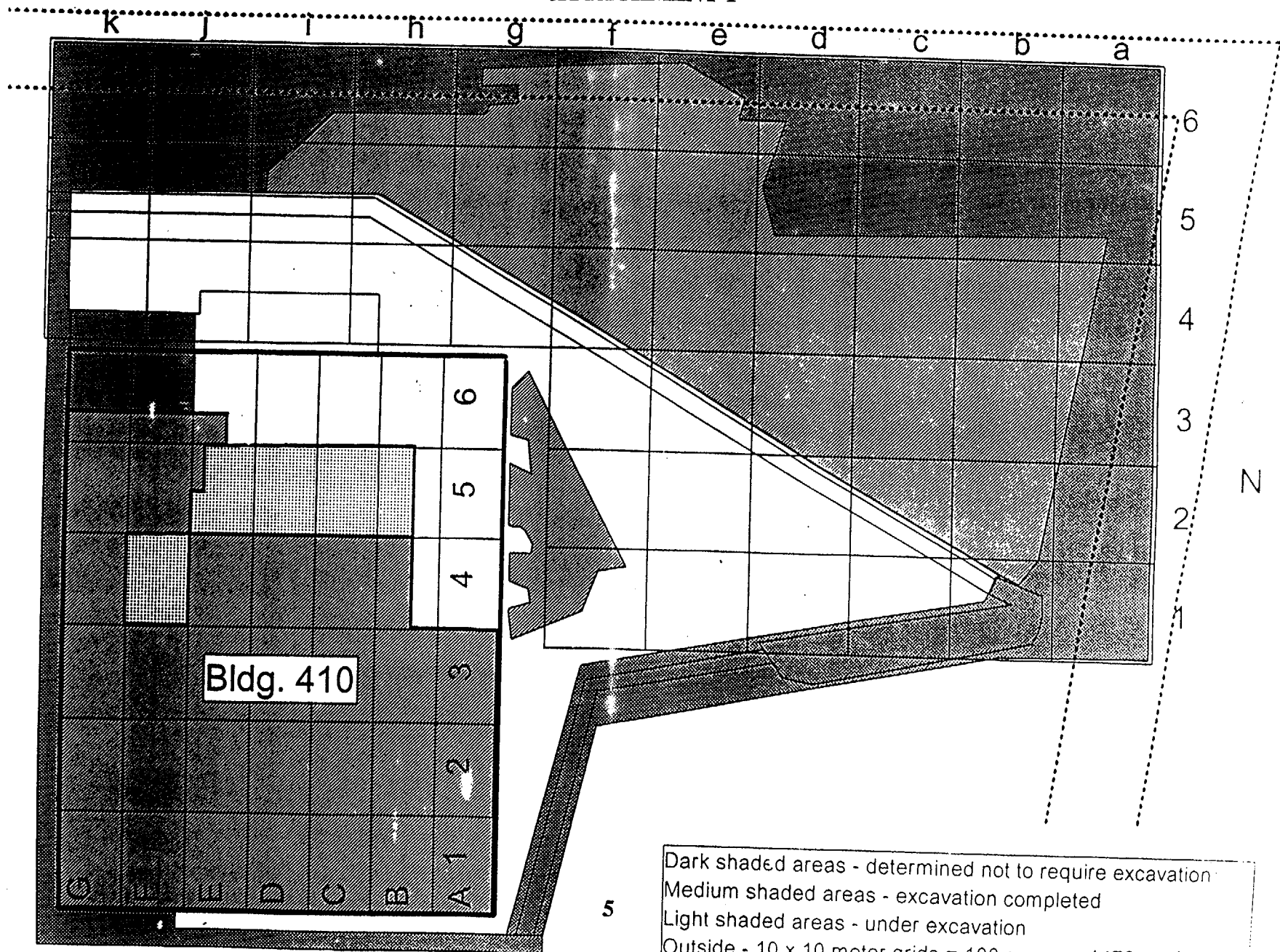
Continue groundwater drawdown and treatment.

Continue operation of the soil sorting and separation process.

Continue excavation of waste materials.

Continue generation of burial boxes of excavated debris.

ATTACHMENT 1

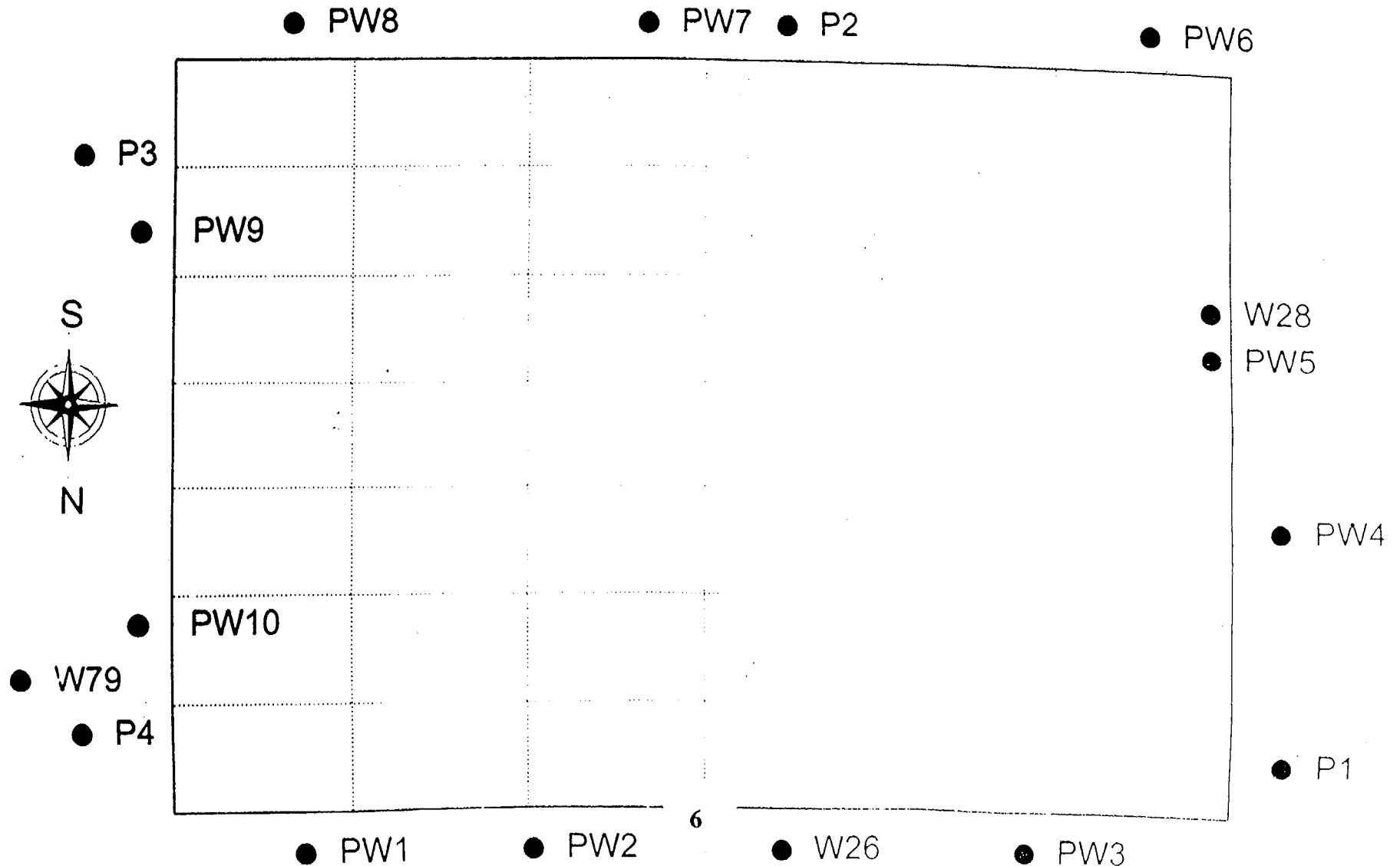


5

Dark shaded areas - determined not to require excavation
Medium shaded areas - excavation completed
Light shaded areas - under excavation
Outside - 10 x 10 meter grids = 100 sq. m. = 1076 sq. ft
Inside - 20 x 30 foot grids = 600 sq. ft

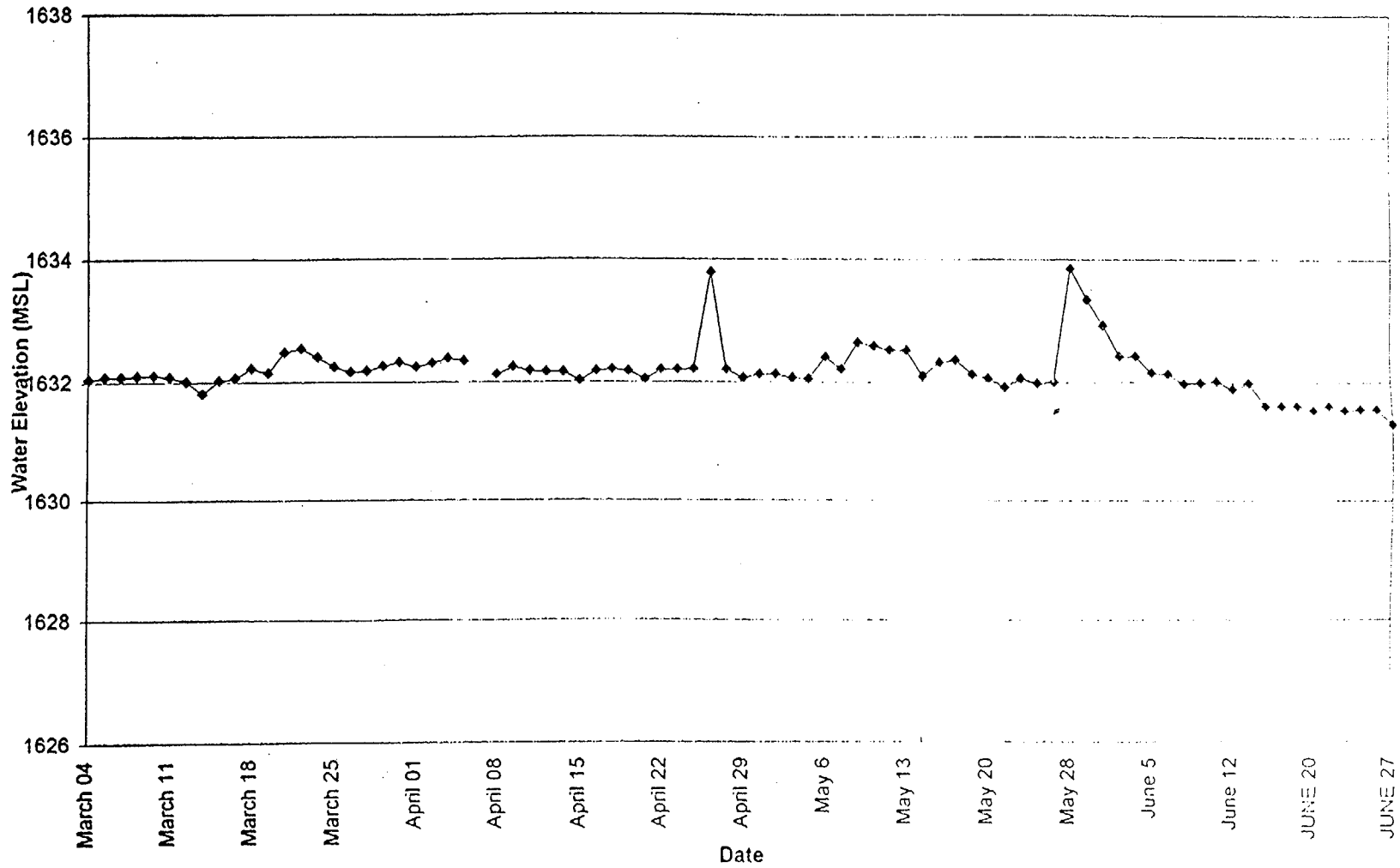
ATTACHMENT 2

WELL LOCATIONS - BUILDING 410



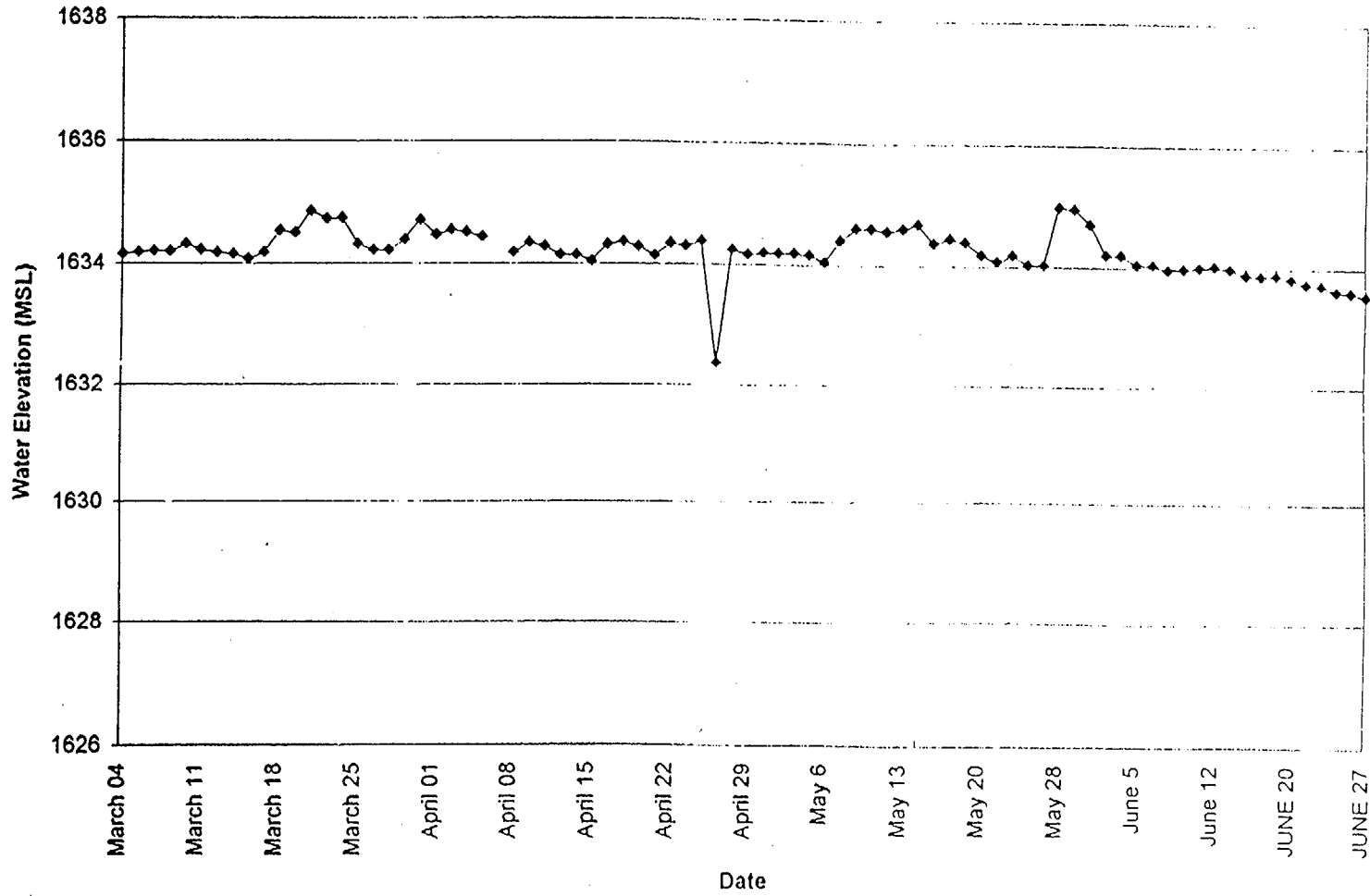
ATTACHMENT 3

Pond 4 Groundwater Elevations
Piezometer P-1



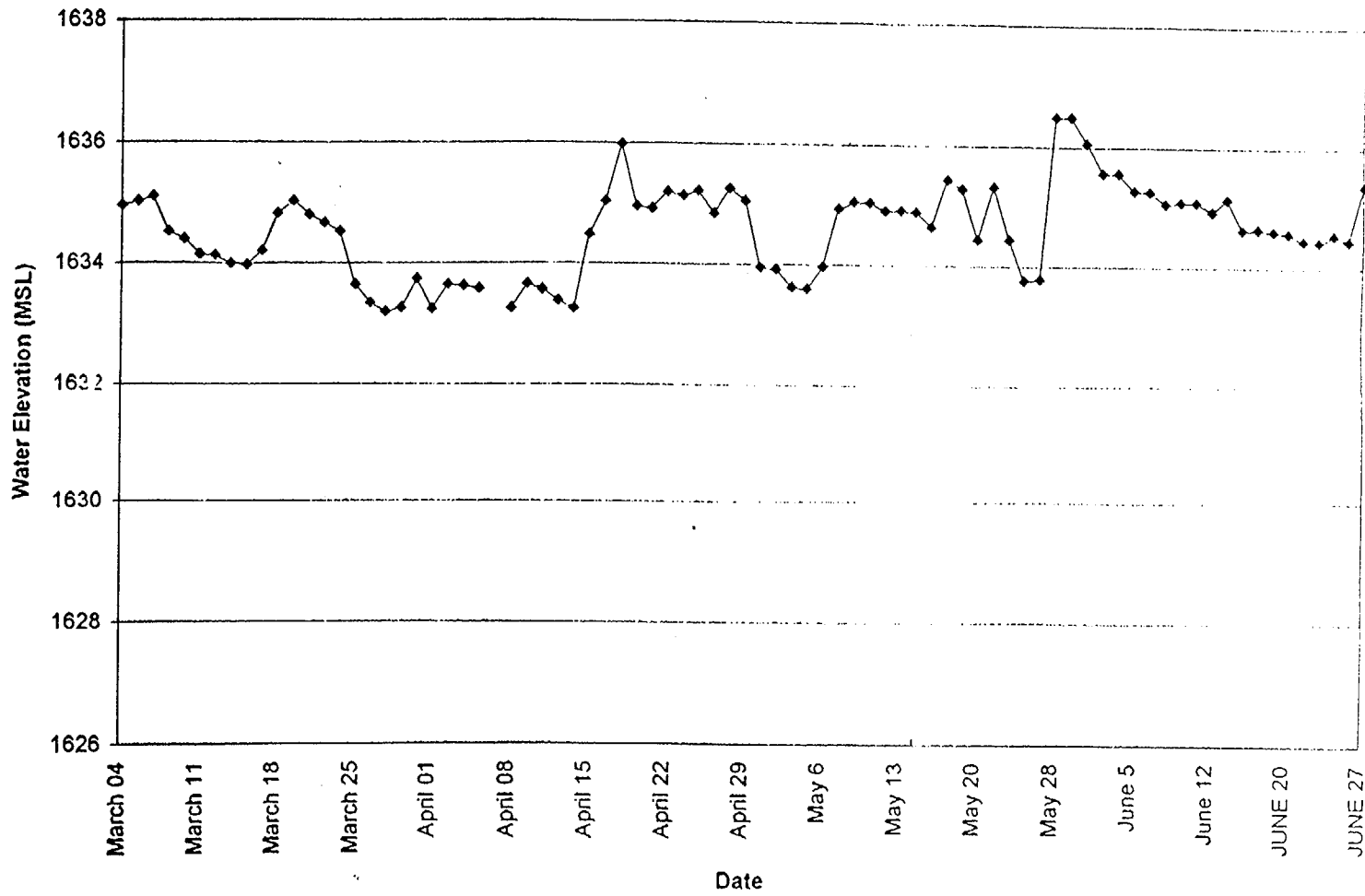
ATTACHMENT 4

Pond 4 Groundwater Elevations
Piezometer P-2



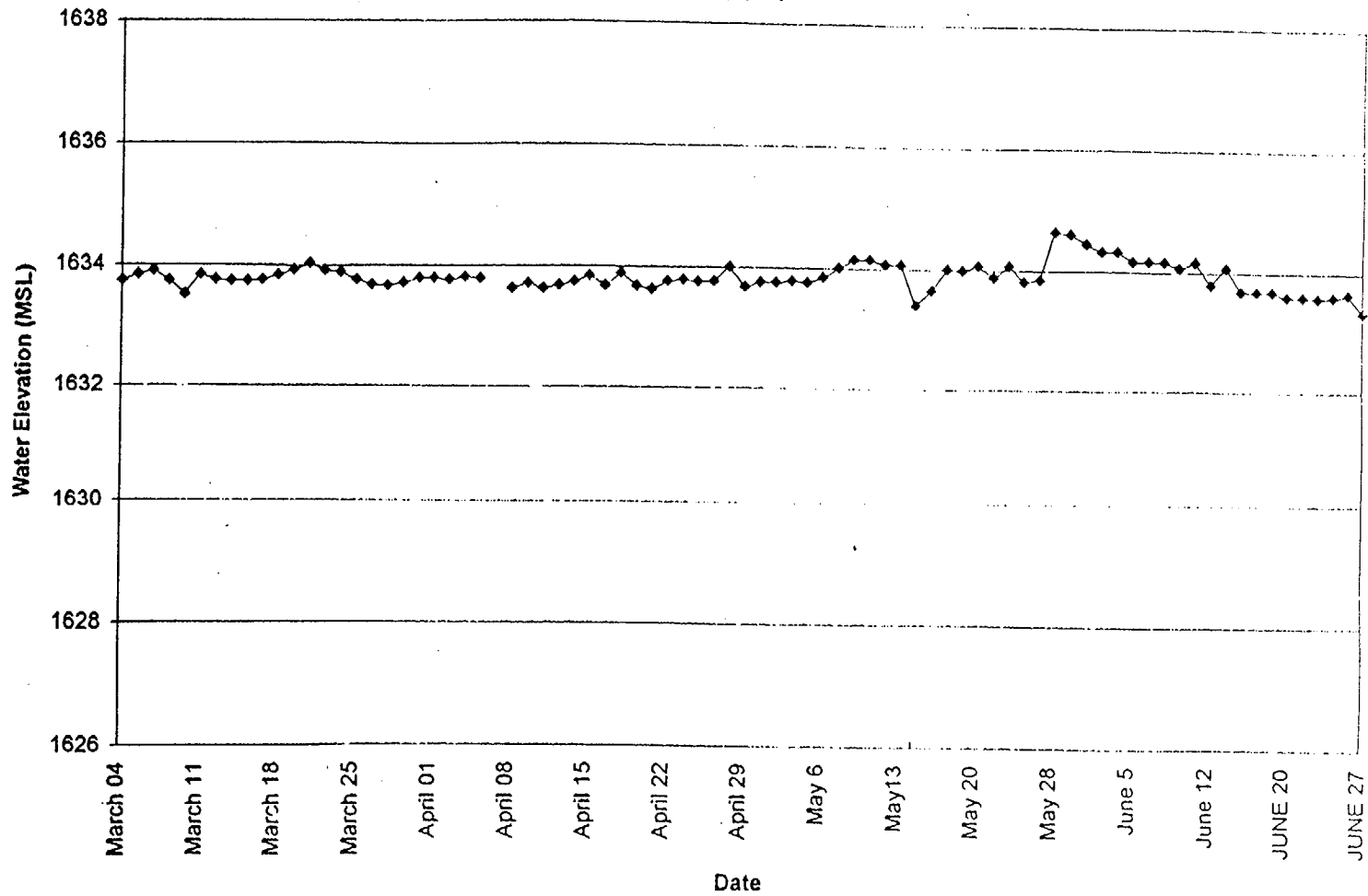
ATTACHMENT 5

Pond 4 Groundwater Elevations
Piezometer P-3



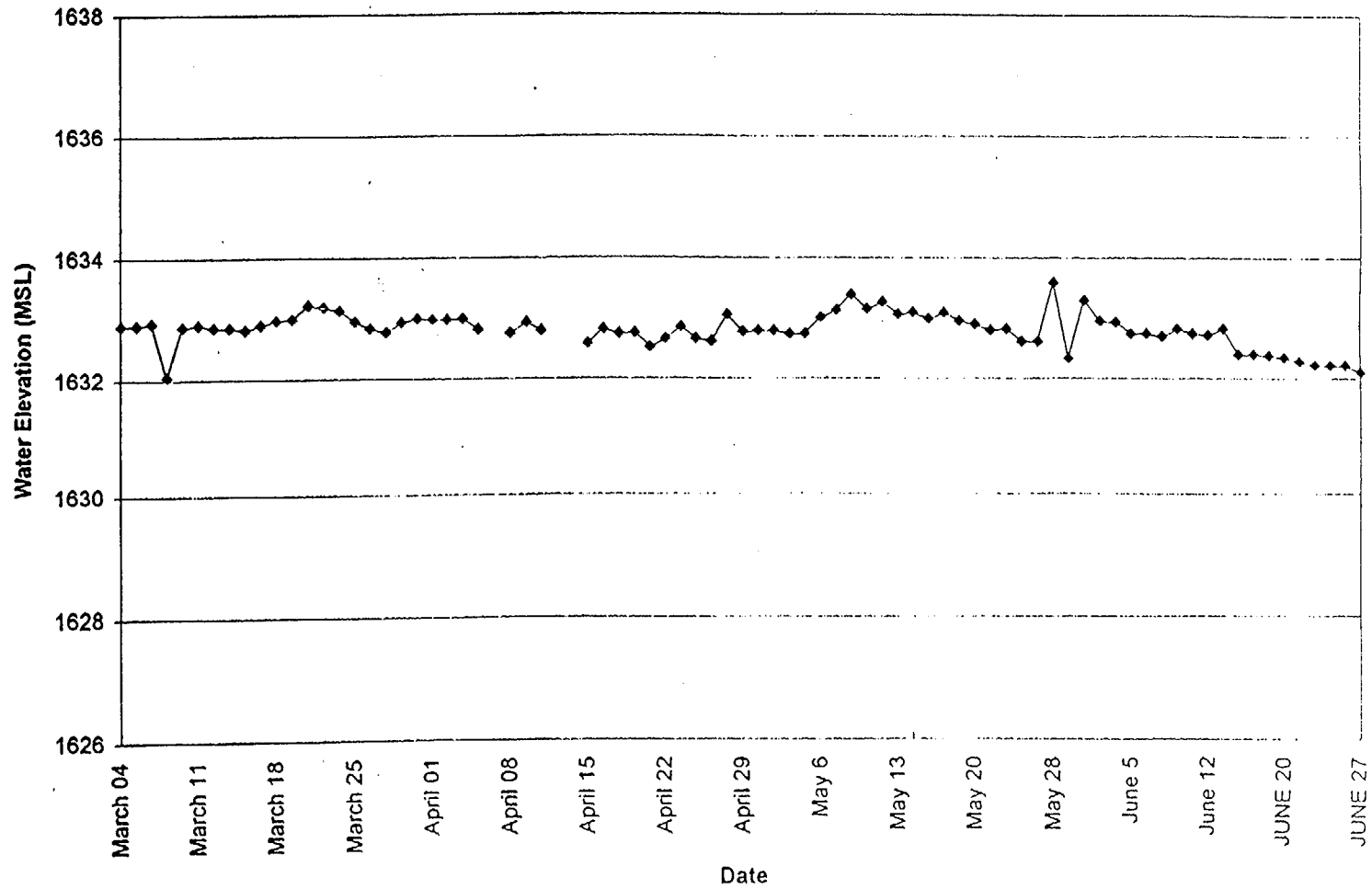
ATTACHMENT 6

Pond 4 Groundwater Elevations
Piezometer P-4



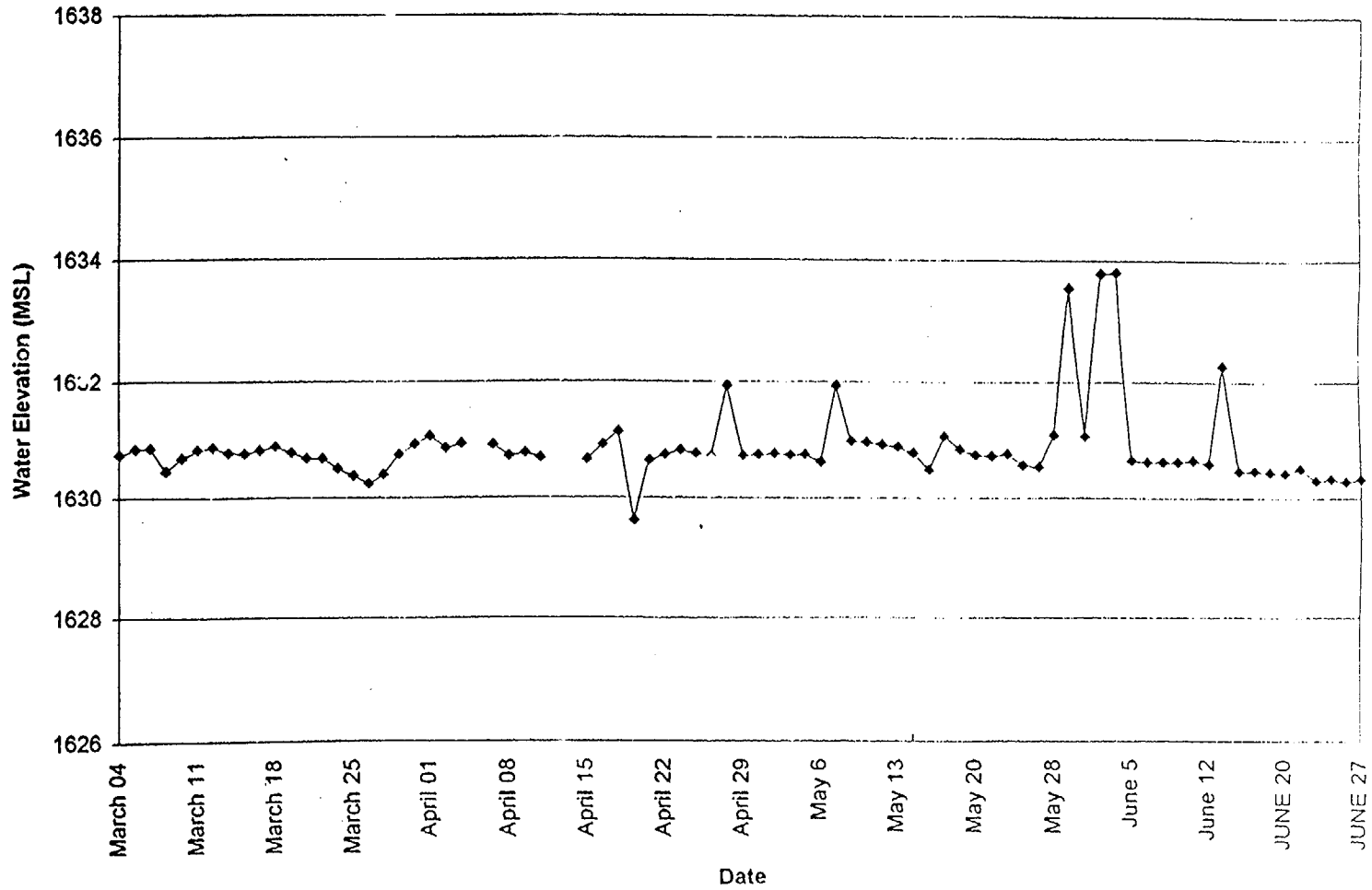
ATTACHMENT 7

Pond 4 Groundwater Elevations
Well 26



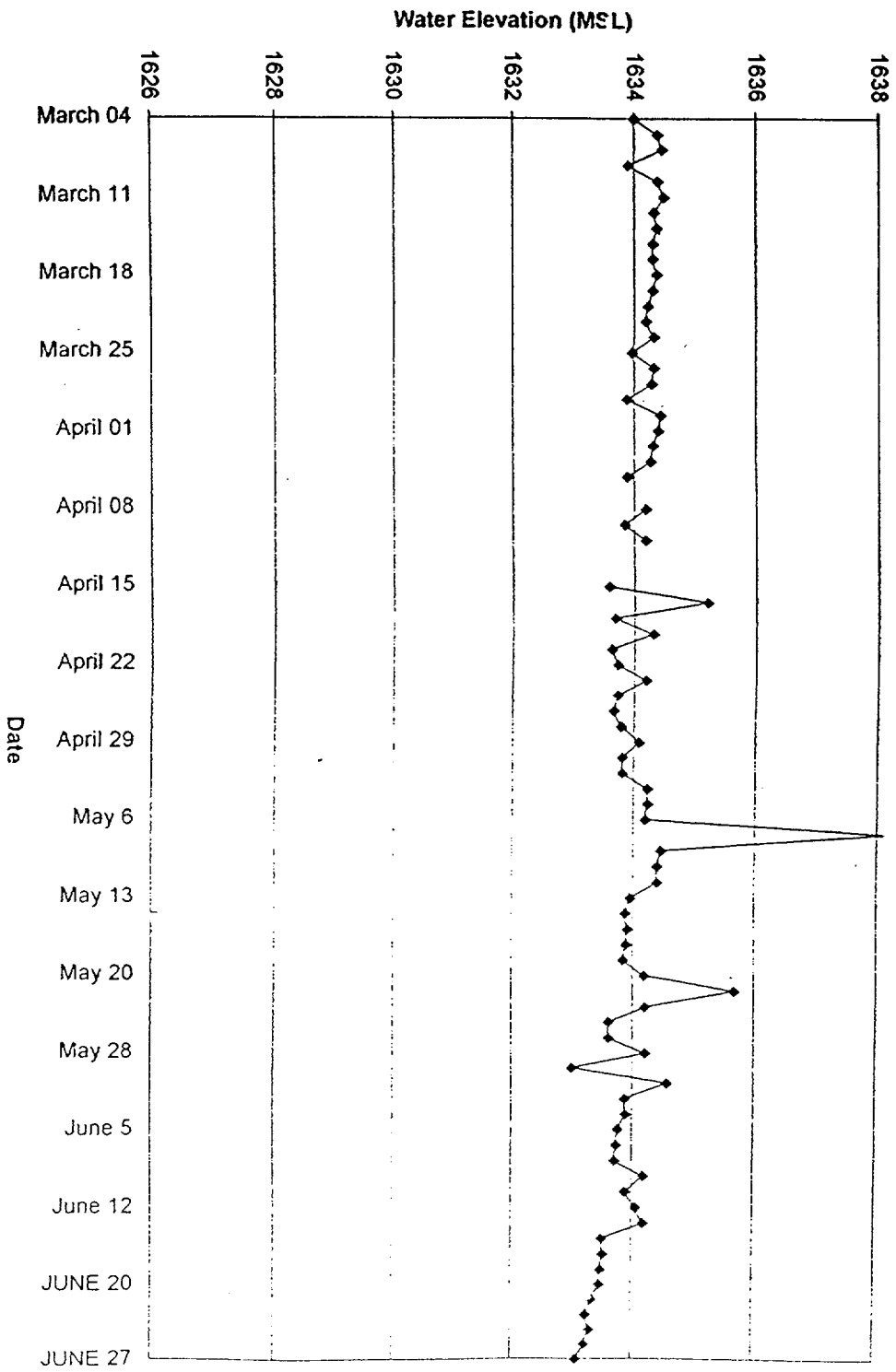
ATTACHMENT 8

Pond 4 Groundwater Elevations
Well 28



ATTACHMENT 9

Pond 4 Groundwater Elevations
Well 79



ATTACHMENT 10

Analytical Results For Constituents Detected in Pond 4 Groundwater Influent

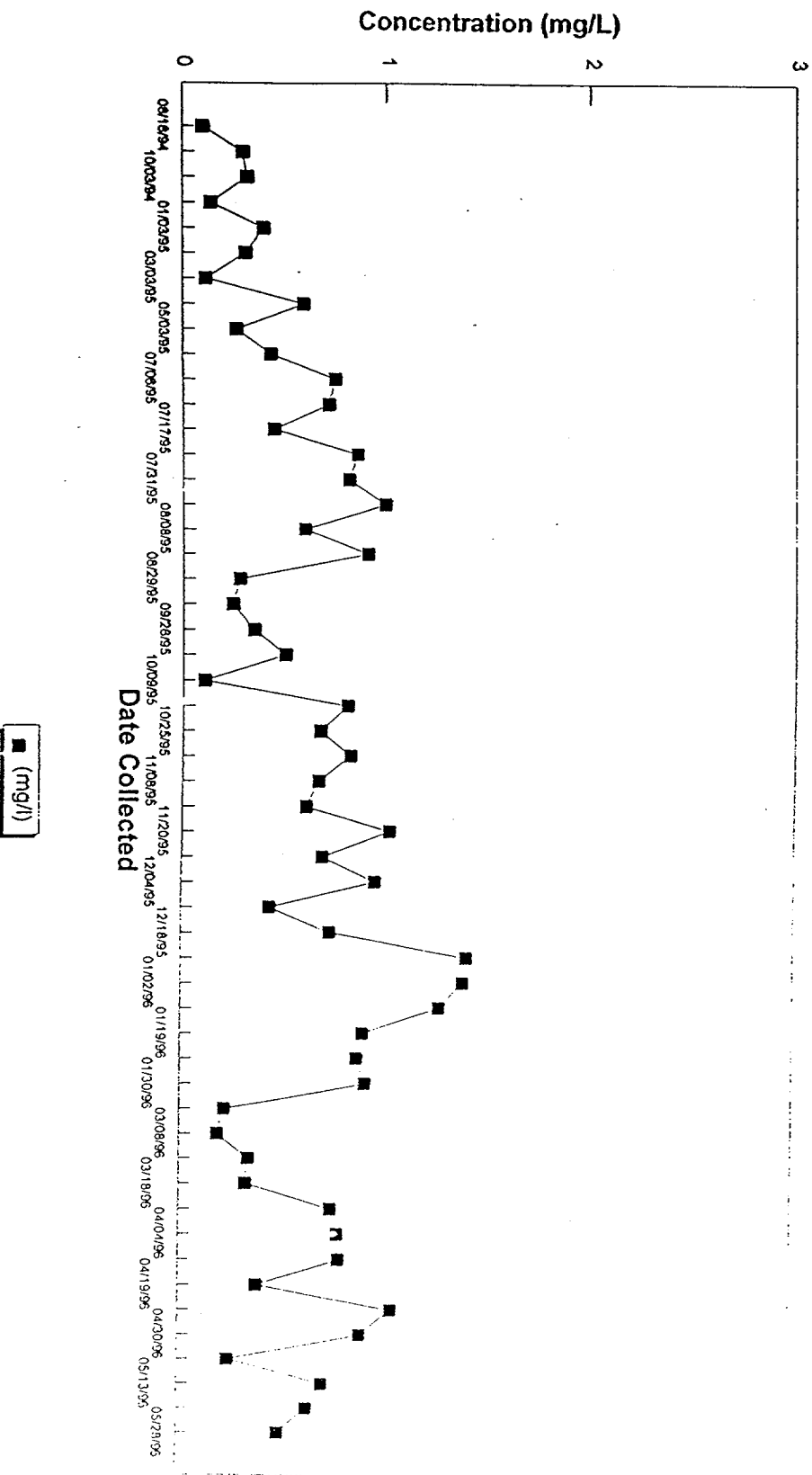
Date Collected	1,2 Dichloro-ethylene (mg/l)	Tetrachloro-ethylene (mg/l)	Trichloro-ethylene (mg/l)	Vinyl Chloride (mg/l)	Tributyl Phosphate (mg/l)	Bis(2-ethylhexyl) phthalate (mg/l)	Di-n-octyl phthalate (mg/l)
08/16/94	0.100	0.290	0.098	< 0.025	ND	0.006	< 0.010
09/01/94	0.293	2.814	0.261	0.065	30.000	< 0.030	< 0.030
10/03/94	0.312	2.517	0.309	0.087	12.187	< 0.030	< 0.030
12/05/94	0.138	1.789	0.280	0.020	8.016	< 0.030	< 0.030
01/03/95	0.389	1.221	4.101	0.072	15.000	< 0.030	< 0.030
02/03/95	0.304	4.813	0.790	0.036	1.053	< 0.030	< 0.030
03/03/95	0.114	1.915	0.019	< 0.005	8.386	< 0.030	< 0.030
04/03/95	0.584	5.087	0.409	< 0.005	0.100	< 0.030	< 0.030
05/03/95	0.259	0.782	0.209	0.126	0.130	< 0.030	< 0.030
06/04/95	0.421	4.477	0.322	< 0.005	0.108	< 0.030	< 0.030
07/06/95	0.740	7.277	0.837	0.109	20.972	< 0.030	< 0.030
07/12/95	0.708	2.598	0.318	< 0.005	2.746	< 2.598	< 0.030
07/17/95	0.439	2.435	0.358	< 0.005	0.498	< 0.030	< 0.030
07/24/95	0.850	10.609	1.782	< 0.005	13.741	< 0.030	< 0.030
07/31/95	0.809	5.713	0.678	< 0.005	6.088	< 0.030	< 0.030
08/06/95	0.990	11.214	2.159	< 0.005	23.027	< 0.030	< 0.030
08/08/95	0.588	7.419	0.997	< 0.005	ND	ND	ND
08/14/95	0.904	7.473	1.303	< 0.005	< 0.030	< 0.030	< 0.030
08/29/95	0.273	2.427	0.242	< 0.005	0.904	< 0.030	< 0.030
09/19/95	0.241	2.471	0.305	< 0.005	8.700	< 0.030	< 0.030
09/26/95	0.341	2.740	0.265	< 0.005	< 0.030	< 0.030	< 0.030
10/03/95	0.493	4.505	0.260	< 0.005	0.396	< 0.030	< 0.030
10/09/95	0.106	1.499	0.069	< 0.005	1.498	< 0.030	< 0.030
10/17/95	0.801	0.801	1.098	< 0.005	10.783	< 0.030	< 0.030
10/25/95	0.668	6.950	1.239	0.117	10.242	< 0.030	< 0.030
10/31/95	0.817	8.424	1.333	< 0.005	13.489	< 0.030	< 0.030
11/08/95	0.662	6.872	0.876	< 0.005	13.658	< 0.030	< 0.030
11/14/95	0.600	5.287	0.829	< 0.005	5.794	< 0.030	< 0.030
11/20/95	1.016	8.551	1.423	< 0.005	6.208	< 0.030	< 0.030
11/28/95	0.680	5.783	1.034	0.104	5.507	< 0.030	< 0.030
12/04/95	0.943	9.075	1.353	< 0.005	12.042	< 0.030	< 0.030
12/11/95	0.427	2.930	0.462	< 0.005	0.577	< 0.030	< 0.030
12/18/95	0.720	6.452	1.184	< 0.005	9.244	< 0.030	< 0.030
12/26/95	1.406	12.295	2.372	< 0.005	2.704	< 0.030	< 0.030
01/02/96	1.389	12.809	1.458	< 0.005	28.572	< 0.030	< 0.030
01/08/96	1.274	13.293	1.736	< 0.005	19.626	< 0.030	< 0.030
01/19/96	0.888	8.365	0.136	< 0.005	21.486	< 0.030	< 0.030
01/27/96	0.859	4.595	0.773	0.432	22.746	< 0.030	< 0.030
01/30/96	0.904	5.481	1.019	< 0.005	9.837	< 0.030	< 0.030
03/01/96	0.219	1.040	0.201	< 0.005	0.079	< 0.030	< 0.030
03/08/96	0.186	0.815	0.207	< 0.005	0.356	< 0.030	< 0.030
03/17/96	0.338	0.962	0.458	< 0.005	0.060	< 0.030	< 0.030
03/18/96	0.325	0.914	0.465	< 0.005	0.060	< 0.030	< 0.030
03/29/96	0.740	0.958	0.769	< 0.005	0.043	< 0.030	< 0.030
04/04/96	0.774	1.138	0.821	< 0.005	0.045	< 0.030	< 0.030
04/10/96	0.781	1.130	0.844	< 0.005	0.055	< 0.030	< 0.030
04/19/96	0.380	0.671	0.473	< 0.005	0.046	< 0.030	< 0.030
04/22/96	1.048	0.655	0.551	< 0.005	0.058	< 0.030	< 0.030
04/30/96	0.893	1.940	1.782	0.167	0.178	< 0.030	< 0.030
05/07/96	0.245	0.367	0.398	< 0.005	< 0.030	< 0.030	< 0.030
05/13/96	0.706	1.497	1.431	0.122	0.048	< 0.030	< 0.030
05/22/96	0.632	0.817	0.997	0.097	< 0.030	< 0.030	< 0.030
05/28/96	0.492	0.638	0.820	0.090	< 0.030	< 0.030	< 0.030
Mean	0.608	4.256	0.847	0.035	6.809	0.079	0.030
Standard Deviation	0.324	3.593	0.716	0.069	8.326	0.353	0.003
No. of Observations	53	53	53	53	51	52	52
t-value	1.303	1.303	1.303	1.303	1.303	1.303	1.303
90% Upper Confidence	0.666	4.899	0.976	0.048	8.328	0.143	0.030
Action Level	0.07	0.005	0.005	0.002	0.2	0.003	0.7

NOTES:

The contracted laboratory was EcoTek, LSI, located in Atlanta, Georgia for the sample collected on 8/16/95, all other samples were analyzed by NFS' on-site laboratory.
 Action Levels based on US EPA Maximum Contaminant Levels (MCL) for drinking water (May 1995).
 < Less than detection limit
 ND No data

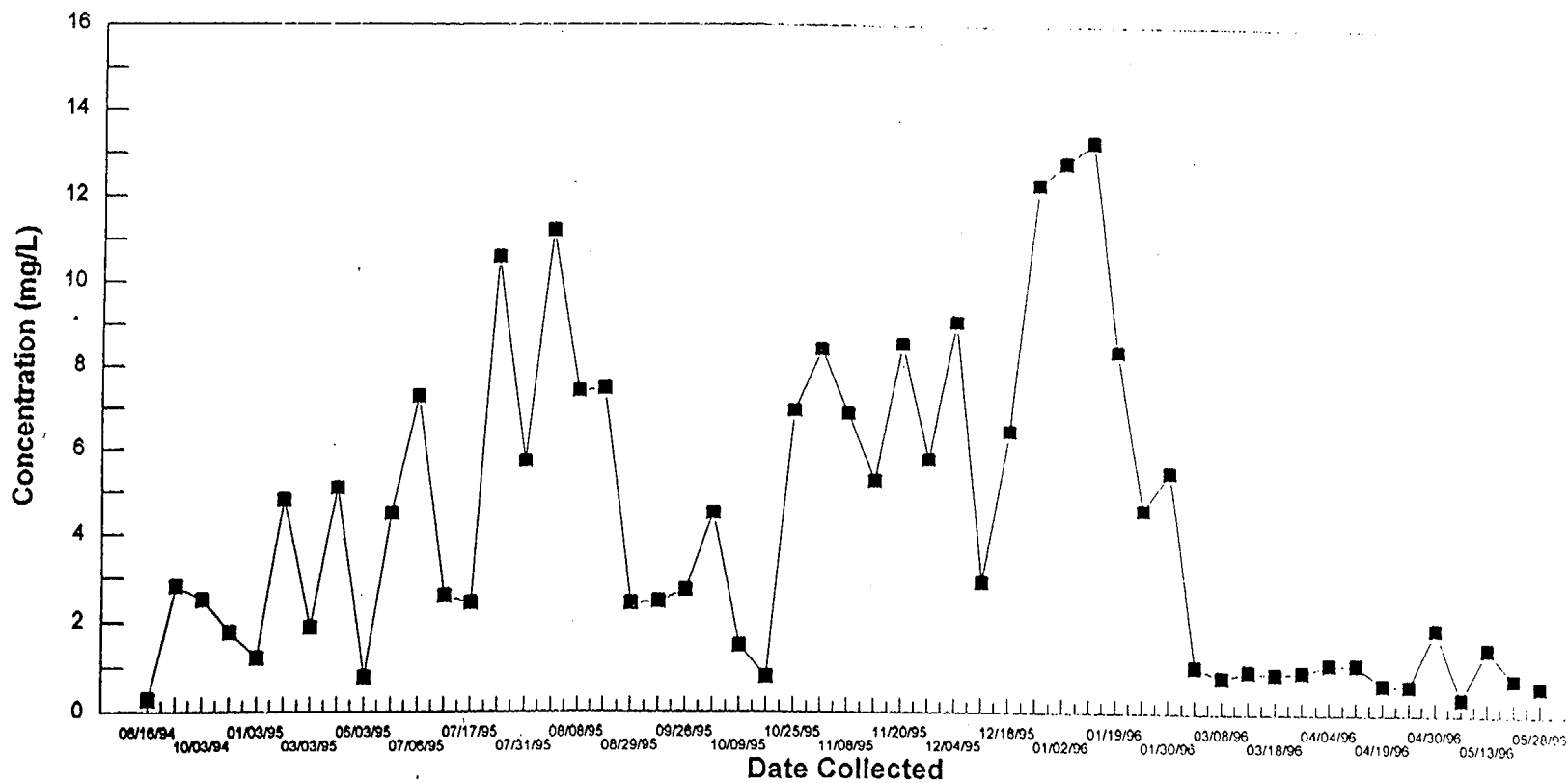
ATTACHMENT II

1,2 DCE Results for Pond 4
Groundwater Influent



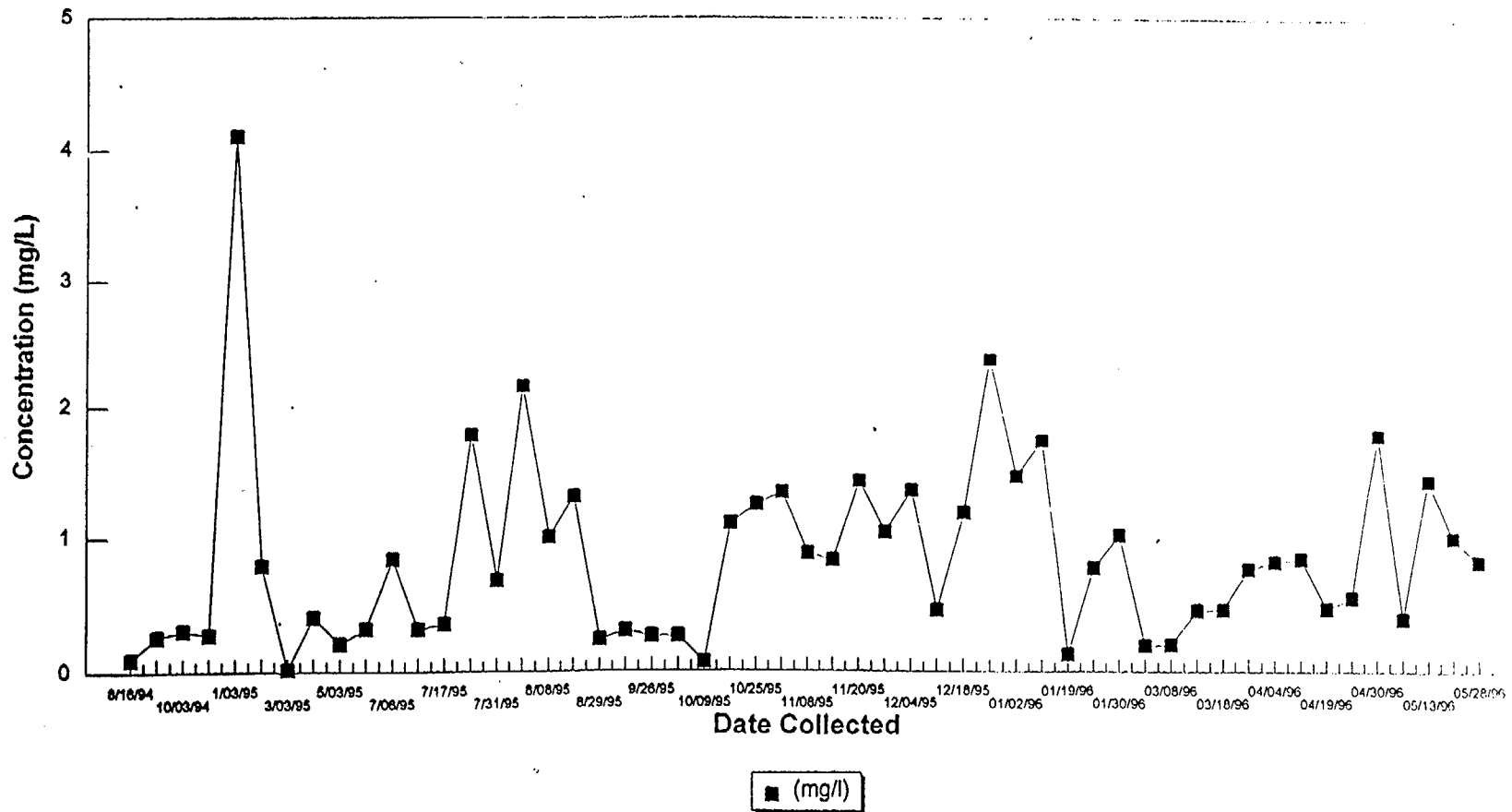
ATTACHMENT 12

PCE Results for Pond 4
Groundwater Influent



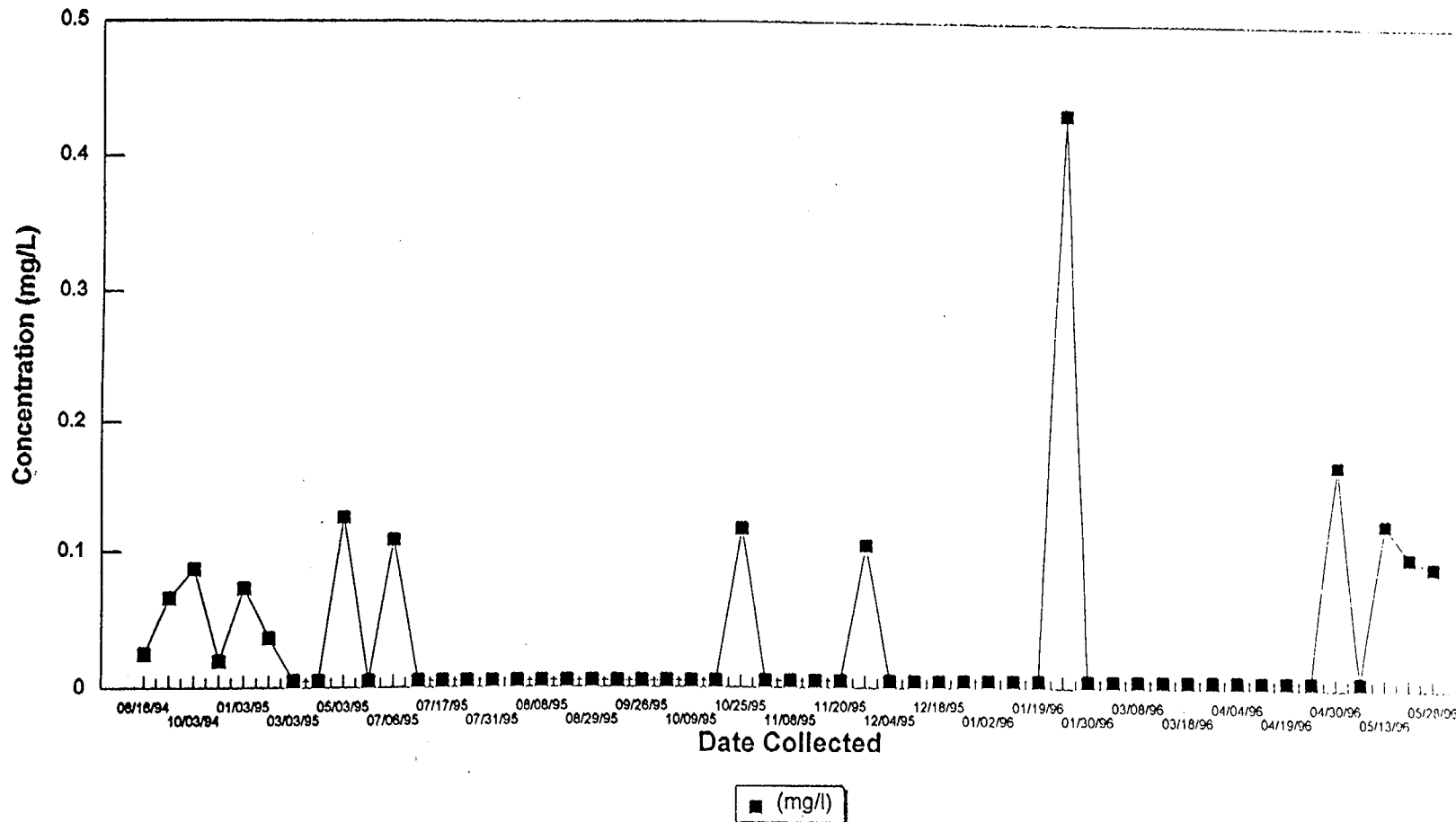
ATTACHMENT 13

TCE Results for Pond 4
Groundwater Influent



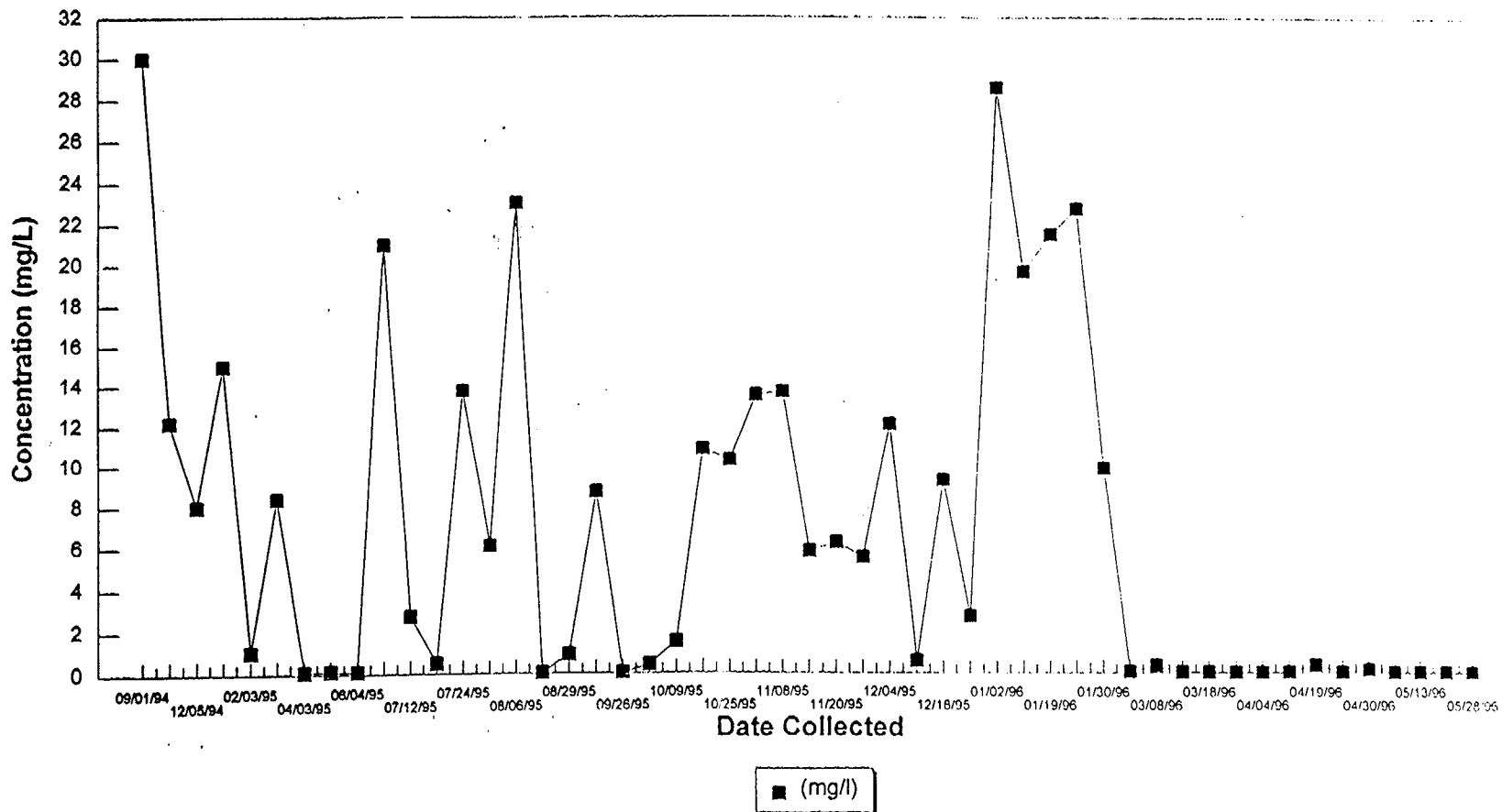
ATTACHMENT 14

Vinyl Chloride Results for Pond 4
Groundwater Influent



ATTACHMENT 15

TBP Results for Pond 4
Groundwater Influent



ATTACHMENT 16

Analytical Results Wells 26, 28, 101A and 102A

Date Collected	Tetrachloroethylene (mg/L)				Vinyl Chloride (mg/L)				Tributyl Phosphate (mg/L)			
	Well 26	Well 28	Well 101A	Well 102A	Well 26	Well 28	Well 101A	Well 102A	Well 26	Well 28	Well 101A	Well 102A
7/29/92	...	0.5900	...	...	...	J 0.0060	...	...	...	< 0.0100	...	...
11/93	...	...	0.1140	...	...	...	0.054	...	...	...	< 0.005	...
2/94	...	...	0.1550	...	...	...	0.047	...	...	...	< 0.1180	...
5/94	...	...	...	...	...	...	...	...	...	...	...	< 0.035
7/94	0.0006	...	...	...	< 0.005	...	...	...	0.0049	...	...	...
8/94	0.0002	0.4407	...	...	< 0.005	0.1324	...	...	0.0100	0.1400	...	...
9/94	0.0020	...	0.0056	0.3990	< 0.005	...	0.008	< 0.005	...	...	...	...
10/94	0.0032	0.6608	0.0035	0.6290	< 0.005	0.0263	< 0.005	< 0.005	< 0.0050	0.0270	0.0354	< 0.030
11/94	0.0024	0.2935	...	...	< 0.005	0.0183	...	< 0.005	< 0.0175	0.0463	< 0.030	< 0.030
12/94	0.0016	0.9516	...	...	< 0.005	0.0371	...	...	0.0196	0.1230	...	...
1/95	0.0240	1.3089	...	...	< 0.005	0.0996	...	...	< 0.030	< 0.030	...	...
2/95	0.0010	1.2872	0.0152	0.8972	< 0.005	0.0429	0.0072	< 0.005	< 0.030	< 0.030	0.0780	< 0.030
3/95	0.0013	2.1725	...	...	< 0.005	0.1884	...	...	< 0.030	< 0.030	...	...
4/95	0.0060	1.6670	...	...	< 0.005	0.1830	...	...	< 0.030	< 0.030	...	...
5/95	0.0040	1.5450	0.0110	0.8793	< 0.005	0.1400	< 0.005	< 0.005	< 0.030	0.1280	...	...
6/95	0.0020	1.4380	< 0.0001	0.8093	< 0.005	0.0970	< 0.005	< 0.005	< 0.030	0.1160	0.0510	< 0.030
7/95	0.0030	1.4110	0.0158	1.0540	< 0.005	< 0.0050	< 0.005	< 0.005	< 0.030	0.0730	0.0360	< 0.030
8/95	0.0020	1.4850	0.0124	0.9247	< 0.005	0.1370	< 0.005	< 0.005	< 0.030	0.0360	0.0340	< 0.030
9/95	0.0024	1.0114	0.0425	1.1948	< 0.005	0.1007	< 0.005	< 0.005	< 0.030	< 0.030	0.0310	< 0.030
10/95	0.0028	1.7980	0.0107	1.2033	< 0.005	0.2037	< 0.005	< 0.005	< 0.030	0.0640	0.0360	< 0.030
11/95	0.0038	1.6046	0.0236	0.9979	< 0.005	0.1919	< 0.005	< 0.005	< 0.030	0.1050	0.0320	< 0.030
12/95	0.0018	...	0.0588	0.6224	< 0.005	...	0.031	< 0.005	< 0.030	0.1350	0.0520	< 0.030
1/96	0.0040	1.9221	0.0524	0.2363	< 0.005	< 0.005	0.083	< 0.005	< 0.030	< 0.030	0.0900	< 0.030
2/96	...	...	...	...	...	...	...	...	< 0.030	< 0.030	0.0680	< 0.030
3/96	< 0.0001	1.7608	...	...	< 0.005	0.1561	...	...	< 0.030	0.074	...	...
4/96	0.0063	1.9627	< 0.0001	1.2063	< 0.005	0.3155	< 0.005	< 0.005	< 0.030	0.154	0.0480	< 0.030
5/96	0.0057	1.8598	< 0.0001	1.5342	< 0.005	0.1365	0.026	0.024	< 0.030	0.168	0.0440	< 0.030
Mean	0.0036	1.3585	0.0325	0.8991	0.0050	0.1111	0.0188	0.0063	0.0256	0.0775	0.0500	0.0267
Standard Deviation	0.0048	0.5251	0.0430	0.3338	0.0000	0.0814	0.0228	0.0048	0.0085	0.0497	0.0275	0.0085
No. of Observations	22	20	16	14	22	20	16	14	21	20	16	15
t-value	1.323	1.328	1.341	1.350	1.323	1.328	1.341	1.350	1.325	1.328	1.341	1.345
90% Conf. Limit	0.005	1.514	0.047	1.020	0.005	0.135	0.026	0.008	0.028	0.092	0.059	0.030
Action Level	0.005	0.005	0.005	0.005	0.002	0.002	0.002	0.002	0.2	0.2	0.2	0.2

NOTES:

Action Levels based on US EPA Maximum Contaminant Levels (MCL) for drinking water (May 1993).

< Less than detection limit

... No sample collected

Analysis performed by NFS