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SUBJECT: Johnny Cake Farm Road Site Final Report

FROM: Diane Salkie, Environmental Scientist
DESA/Hazardous Waste Support Branch

TO: Andrew Confortini, On-Scene Coordinator
ERRD/Removal Action Branch

Attached please find the March 2006, ground water sampling report for the Johnny Cake Farm Road site in Danube, Herkimer County, New York. In an effort to save paper, the quality assurance project plan (QAPP) is not included, however, the QAPP amendment is attached as Appendix B. If you request a full QAPP, one can be furnished. If you have any questions, please contact me at (732) 321-4423.

Attachment

SUPERFUND CONTRACT SUPPORT TEAM

SAMPLING REPORT

for the

JOHNNY CAKE FARM ROAD SITE

in DANUBE, HERKIMER COUNTY, NEW YORK

March 07 – 09, 2006

Participating Personnel:	United States Environmental Protection Agency Diane Salkie, Project Manager Joseph Hudek, Superfund Contract Support Team Leader Pat Sheridan, Project Quality Assurance Officer
Report Prepared by:	____________________ Diane Salkie, Environmental Scientist
Date Prepared:	May 30, 2006
Approved for the Director by:	____________________ Robert Runyon, Chief, Hazardous Waste Support Branch

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APPENDIX E:	New York State Department of Environmental Conservation: 6 NYCRR Part 703 *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations*
APPENDIX F:	Johnny Cake Farm Road Trip Report
APPENDIX G:	Well Data Sheets

1.0 BACKGROUND

The Johnny Cake Farm Road site (site) is located in Danube, Herkimer County, New York. See Figure 1-1 of Appendix A. The site encompasses approximately 77 acres of farmland. A cocaine refining laboratory operated at the site during fourteen months. Throughout the operations, unknown amounts of solvents were spilled, dumped, or deposited onto the unpaved areas of the site or into the building septic system. Releases from drummed solvents inside the garage appeared to have occurred. The property was seized by the U.S. Marshals Service in 1987. Approximately 250 people live within three miles of the site and utilize private wells. The closest home is 500 feet from the site.

In April and May, 1990, C.T. Male Associates, P.C. conducted a preliminary site investigation on behalf of the U.S. Marshals Service. Six soil boring logs were collected, nine ground water monitoring wells were installed and surface water samples were taken. The results indicated that toluene, trichloroethene (TCE), tetrachloroethene (PCE) were present in the stream and the pond area on the east side of the property. PCE in the soil levels was as high as 34,000 ppb and the ground water indicated levels of PCE at 56,000 ppb and toluene at 25,400 ppb. The site has been listed in New York State's Registry of Inactive Hazardous Waste Sites as a Class 2 site. In 1990, the Registry reported "Toluene, trichloroethene, and tetrachloroethene (in the groundwater and surface water) are in excess of New York State Ambient Water Quality Standards and New York State Department of Health (NYSDOH) ground-water/drinking water standards and/or guidance values".

In August 1990, the U.S. Marshal's Service and U.S. Attorney's Office requested assistance from the U.S. EPA Region II Removal Action Branch for support to assess and re-dedicate the site. In September and November of 1990, the U.S. EPA Environmental Response Team (ERT) and its contractor, under the Response Engineering and Analytical Contract (REAC), conducted an investigation of the soil gas and ground water to assess the extent of contamination. A seismic refraction survey was also performed to identify possible preferential pathways for lateral contamination migration and potential vertical migration into the bedrock aquifer. The conclusion of the investigation demonstrated the following: one or two ground water plumes of target compounds originated in the areas adjacent to the garage and septic tank; contamination from these source areas appears to be migrating down-gradient; the septic system and garage appear to be the source areas; and the presence of potential preferential pathways exist in the form of buried channels draining the site.

In May 1991, ERT, with REAC assistance, ascertained the specific area of soil contamination for removal purposes and determined if there was migration into new areas. During the investigation, five overburden monitoring wells were installed, 22 shallow soil borings were collected and 18 surface water and sediment samples were collected. This investigation indicated that the contamination of the soil and groundwater is limited to close proximity of the spill areas as follows: the septic tank, in front of the two-bay garage, the driveway and the west side of the stall barn. Stream and drainage water directly down-gradient to the spill areas demonstrated relatively high levels of toluene, TCE, PCE and methylene chloride. Surface water samples collected 100 feet down-gradient of the site had no detectable concentrations of solvents.

The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) was requested by the EPA Emergency Remedial and Response Division (ERRD) Removal Action Branch, to conduct ground water sampling of existing wells and four recently installed wells at the Johnny Cake Farm Road site.

2.0 SAMPLING PROCEDURES

The sampling procedures were in accordance with the guidelines set forth in the Quality Assurance Project Plan (QAPP) which is located in Appendix B.

3.0 DESCRIPTION OF EVENTS

On March 07, 2006, a sampling team consisting of two (2) members from the U.S. EPA, DESA, HWSB, SCST began the sampling event at the Johnny Cake Farm Road site. The EPA first collected a trip blank sample, TB-01, at 1430 by pouring analyte-free deionized water directly into bottles for target compound list (TCL) – volatile organic compound (VOC) analysis. The EPA personnel began sampling the wells using the U.S. EPA Region 2, *Ground Water Sampling Procedure - Low Stress (Low Flow) Purging and Sampling* method. Figure 2 of Appendix A shows the locations of monitoring wells in the vicinity of the site. The on-scene coordinator (OSC) requested the team to sample the following monitoring wells: MW-1, MW-2R, MW-2RR, MW-3, MW-4R, MW-6R, MW-12A, MW-13, MW-14, MW-16, MW-17, MW-18, MW-19 and MW-20 for low level TCL - VOC analysis. A more detailed explanation of the sampling methodology can be found in the quality assurance project plan which is located as Appendix B. The following table summarizes the sampling conducted on March 07, 2006.

Monitoring Well	Depth to Water (ft)	Purge Time	Sample Time	Well Location
MW-2R	1.4	1404 - 1439	1440	New well on the south end of the site
MW-2RR	4.4	1446 - 1531	1533	New well on the south end of the site, , next to MW-2R
MW-19	7.39	1542 - 1612	1615	The southwest side of the site
MW-4R and duplicate, MW-5R	7.7	1625 - 1710	1712	New well on the north side of Johnny Cake Road

The well data sheets demonstrating the sampling purging results at each well and the meter calibration results can be found in Appendix G dated March 07, 2006. The EPA personnel held the VOC samples in a secure location on wet ice to give to the U.S. EPA Laboratory Branch at the conclusion of the sampling event.

On March 08, 2006, the EPA personnel continued sampling the monitoring wells. A rinsate blank was also collected at 1550 by running analyte-free deionized water through a submersible pump and tubing into sample bottles for VOCs analysis. The following table shows the sampling conducted on this day.

Monitoring Well	**Depth to Water (ft)**	**Purge Time**	**Sample Time**	**Well Location**
MW-3	5.25	0839 - 0959	1000	On the south side of the site
MW-12A	8.1	1026 - 1126	1130	Northwest of the site
MW-20	8.55	1144 - 1214	1215	North end of the site, east of MW-12A
MW-13	5.7	1413 - 1438	1440	North end of the site
MW-14	5.75	1453 - 1518	1520	Northeast end of the site
MW-6R	5.4	1541 - 1646	1648	New well in the center/east side of the site

The well data sheets demonstrating the sampling purging results at each well and the meter calibration results can be found in Appendix G dated March 08, 2006. The EPA personnel held the VOC samples in secure location, on ice overnight.

On March 09, 2006, the EPA personnel concluded the monitoring well sampling for this quarter. The following table shows the sampling conducted on this day.

Monitoring Well	**Depth to Water (ft)**	**Purge Time**	**Sample Time**	**Well Location**
MW-18	8.34	0813 - 0828	0830	Just south of Johnny Cake Road
MW-17	3.6	0843 - 0908	0910	South of Johnny Cake Road, east of MW-18
MW-16	9.55	0847 - 0945	0948	South of Johnny Cake Road, east of MW-17

The well data sheets demonstrating the sampling purging results at each well and the meter calibration results at each well can be found in Appendix G dated March 09, 2006. The water in monitoring well, MW-1, was frozen and the EPA personnel were not able to collect a sample from the well. At the conclusion of sampling the EPA personnel left the site and submitted the samples to the EPA Laboratory Branch on March 09, 2006 at 1600.

The trip report with sample information can be found as Appendix F. A description of the sampling procedure can be found in the Quality Assurance Project Plan in Appendix B. All samples collected for TCL-VOC analysis will be analyzed in accordance with Environmental Science and Assistance Team (ESAT) Analytical Contract for US. EPA Laboratory Branch, Standard Operating Procedure (SOP) *ESAT-SOP-123: Analysis of Volatile Organic Compounds in Drinking Water by Purge and Trap GC/MS*, dated August 2003. The results can be found in Table 2 on page 7 and Appendix C.

4.0 RESULTS

The trip blank was taken for quality control (QC) and to determine if any outside contamination was introduced to the samples. A rinsate blank sample was collected to ensure that none of the contamination found in the sample has originated from the sampling equipment. There were no volatile organic compounds were found in either the trip blank or the rinsate blank. A blind duplicate was collected for laboratory quality assurance and was found to be within EPA criteria. The Quality Assurance/Quality Control sample data can be found in Table 1 on page 6.

The volatile organic compound (VOC) results from the ground water monitoring well sampling were compared to the following state and federal applicable or relevant and appropriate requirements (ARARs): *National Primary Drinking Water Regulations* (Title 40 CFR - Part 141, 1997) which can be found as Appendix D and the NYSDEC *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations* (6 NYCRR Part 703) which can be found in Appendix E. As can be seen from the highlighted section of Table 2 on page 7, cis-dichloroethene, trichloroethene, tetrachloroethene and vinyl chloride exceeded either one or both of the ARARs in five ground water samples and the duplicate. Cis-dichloroethene exceeded the NY standard of 70 μg/l in monitoring wells MW-20 and MW -14. Cis-dichloroethene exceeded the state and federal ARARs in the new well, MW-4R, and its duplicate, MW-5R and the previously installed well, MW-13. Trichloroethene exceeded the state and federal ARARs in wells MW-4R, its duplicate, MW -5R, MW-3, and MW-20. Tetrachloroethene was found to be above the state and federal ARARs in wells MW-3, MW-4R, and its duplicate, MW-5R. Vinyl chloride was found above the ARARs in the duplicate sample, MW-5R only. Acetone was found in two wells, MW-12A and MW-17, but was not detected in the rinsate blank sample. Acetone is generally used during equipment decontamination, however, due to the frequency of acetone during previous sampling events, an alternate solvent was used during decontamination.

In the proper conditions, tetrachloroethene has been known to breakdown into trichloroethene which then breaks down into either cis-dichloroethene or trans-dichloroethene. Trans-dichloroethene was also found in the ground water, however, not above the ARARs. The final breakdown product is vinyl chloride which was detected in one well sample.

5.0 CONCLUSION:

Thirteen (13) ground water samples were collected from thirteen monitoring wells located in the vicinity of the Johnny Cake Farm Road site. The samples were analyzed for volatile organic compounds according to the U.S. EPA CLP Statement of Work *Multi-Media, Multi-Concentration Organic Analytical Serve for Superfund*, SOM 1.1, dated July 2005.

The organic contaminants of concern at this site are trichloroethene, tetrachloroethene and toluene. As can be seen from the results on Table 2 on page 7, trichloroethene tetrachloroethene, cis-dichloroethene, trans-dichloroethene and vinyl chloride were found in all but six wells. Trichloroethene, tetrachloroethene, and their breakdown products are present throughout the ground water beneath the Johnny Cake Farm Road site in Danube, New York. The results and the federal and NY standards can be found in Table 2 on page 7 and the raw data can be found as Appendix C.

TABLE 1
QA/QC SAMPLE DATA

TYPE OF SAMPLE	ANALYSIS	SAMPLE NUMBERS	CLP NUMBERS
Trip Blank	Low Conc. Organic	TB-01	B3PH4
Blind Duplicate	Low Conc. Organic	MW-5R is a duplicate of MW-4R	B3PH9 is a duplicate of B3PH8

TABLE 2
SAMPLE SUMMARY

Sample Location	CLP Number	Analysis	Organic Compounds & Concentrations (ug/L)			6 NYCRR Part 703 GWS (ug/L)[1]	Federal DW Standards (ug/L)[2]
			Compounds	Conc	QC		
TB-01 Trip Blank	B3PH4	Volatile Organic Compounds	Non-detect				
MW-2R	B3PH5	Volatile Organic Compounds	Non-detect				
MW-2RR	B3PH6	Volatile Organic Compounds	Methylene chloride	0.34	J	5.0	
MW-19	B3PH7	Volatile Organic Compounds	Chloroform	0.25	J	7.0	
MW-4R	B3PH8	Volatile Organic Compounds	trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	2.1 320 210 8.1		5.0 5.0 5.0 5.0	100 70 5.0 5.0
MW-5R Duplicate of MW-4R	B3PH9	Volatile Organic Compounds	Vinyl chloride cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	4.5 280 190 8.1		2.0 5.0 5.0 5.0	2.0 70 5.0 5.0
MW-3	B3PG0	Volatile Organic Compounds	Trichloroethene Tetrachloroethene	8.6 38	 J	5.0 5.0	5.0 5.0
MW-12A	B3PG1	Volatile Organic Compounds	Acetone	3.3	J		

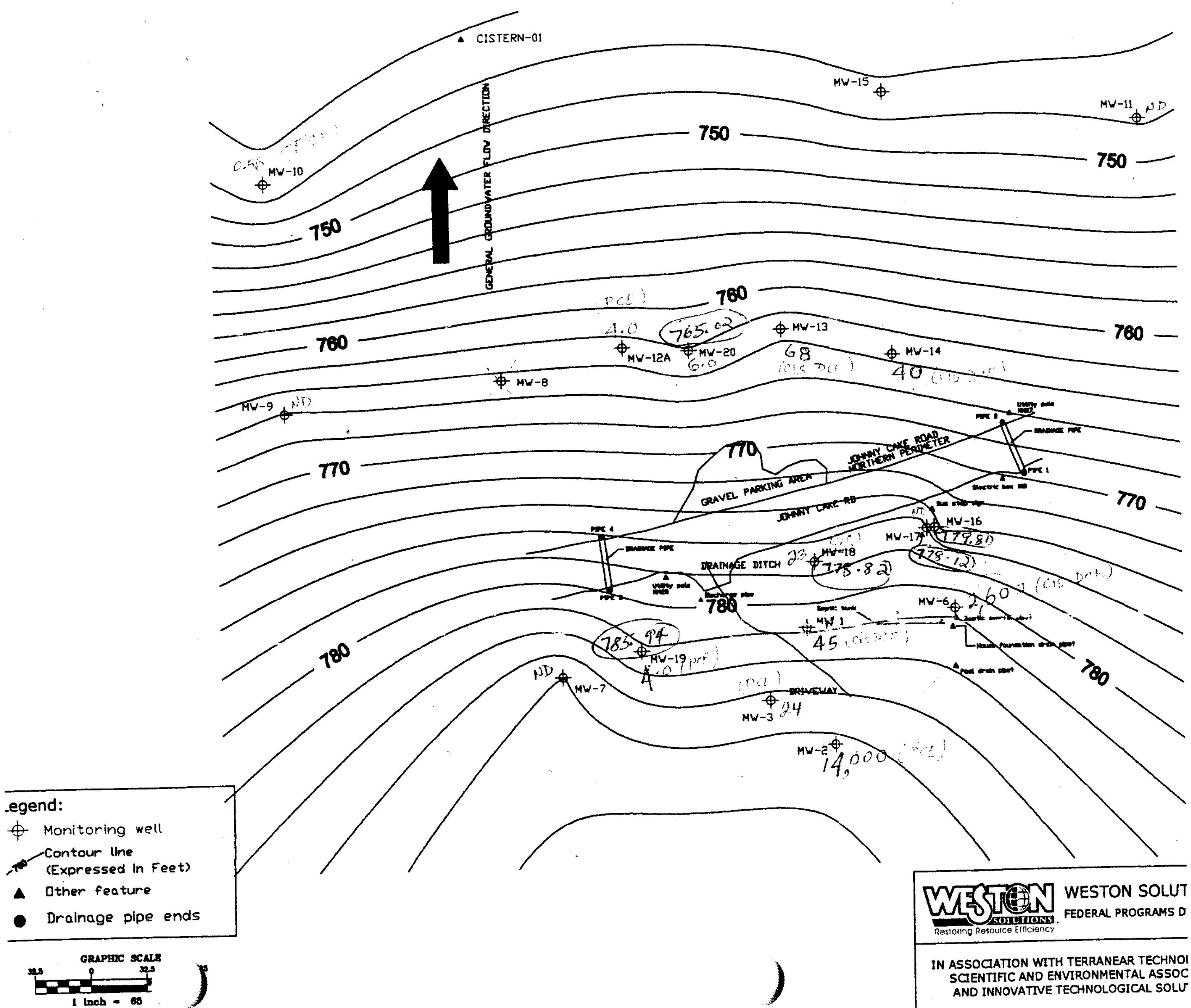
1 - NYSDEC, Division of Environmental Remediation - Rules and Regulations, Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703)
2 - US. Code of Federal Regulations (CFR). Title 40: Protection of Environment. Part 141: National Primary Drinking Water Regulations. Maximum Contaminant Levels. Section 61: Maximum Contaminant Levels for Organic Contaminants and Section 62: Maximum Contaminant Levels for Inorganic Contaminants. 7-1-97 Edition
K – The identification of the analyte is acceptable, the reported value may be biased high. The actual value is less than the reported value.

TABLE 2 SAMPLE SUMMARY							
Sample Location	**CLP Number**	**Analysis**	**Organic Compounds & Concentrations (ug/L)**			**6 NYCRR Part 703 GWS (ug/L)[1]**	**Federal DW Standards (ug/L)[2]**
			Compounds	**Conc**	**QC**		
MW-20	B3PG2	Volatile Organic Compounds	cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	34 8.6 0.24	 J	5.0 5.0 5.0	70 5.0 5.0
MW-13	B3PG3	Volatile Organic Compounds	cis-1,2-Dichloroethene Trichloroethene	100 1.2		5.0 5.0	70 5.0
MW-14	B3PG4	Volatile Organic Compounds	cis-1,2-Dichloroethene Trichloroethene	19 2.5		5.0 5.0	70 5.0
RB-01 Rinsate Blank	B3PG6	Volatile Organic Compounds	Non-detect			5.0	5.0
MW-6R	B3PG5	Volatile Organic Compounds	cis-1,2-Dichloroethene	2.1		5.0	70
MW-18	B3PG7	Volatile Organic Compounds	cis-1,2-Dichloroethene	2.6		5.0	70
MW-17	B3PG8	Volatile Organic Compounds	Acetone	3.4	J		
MW-16	B3PG9	Volatile Organic Compounds	Non-detect				

1 - NYSDEC, Division of Environmental Remediation - Rules and Regulations, Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703)
2 - US. Code of Federal Regulations (CFR). Title 40: Protection of Environment. Part 141: National Primary Drinking Water Regulations. Maximum Contaminant Levels. Section 61: Maximum Contaminant Levels for Organic Contaminants and Section 62: Maximum Contaminant Levels for Inorganic Contaminants. 7-1-97 Edition
K – The identification of the analyte is acceptable, the reported value may be biased high. The actual value is less than the reported value.

APPENDIX A

SITE MAPS



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APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

FOR THE

JOHNNY CAKE FARM ROAD SITE

AMENDMENT

AMENDMENT TO:

QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR THE

REMEDIAL INVESTIGATION

AT THE

JOHNNY CAKE FARM ROAD SITE

DANUBE, HERKIMER COUNTY, NEW JERSEY

Dated August 22, 2005

Project Officer's Signature: ____________ Date: 3/2/06

Project Officer's Name: Diane Salkie, Environmental Scientist

Project Quality Assurance Officer's Signature: Pat Sheridan Date: 3/2/06

Project Quality Assurance Officer's Name: Pat Sheridan, QA Officer

Date Prepared: March 02, 2006

Changes to the original QAPP are as follows:

1.2 Project/Task Description:

The purpose of this removal investigation is to collect valid data which are necessary and efficient to determine the presence of contamination in the on-site monitoring wells. The sampling event will use this data to determine whether or not a threat to human health or the environment exists. The scope of the remedial investigation is to:

- assess the extent of volatile organic compounds (VOCs) in the ground water from old and new monitoring wells

The purpose and scope of this QAPP is to specify the details related to the collection, analysis and validation of the ground water samples collected by the USEPA Region 2, Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) during the third round of quarterly monitoring which will be March 07 – 09, 2006.

Date of the request which initiates the project.	August 08, 2005
Review and Background information	August 11, 2005
Date by which the project plan amendment will be submitted to all interested parties.	March 02, 2006
Obtain site access	Prearranged by NJRB
Date by which comments on the plan are to be received by the project officer.	March 03, 2006
Date(s) of the field reconnaissance.	N/A
Date(s) of the field sampling activities.	March 07 – 09, 2006
Date(s) the samples will be submitted to the laboratory for analysis.	All samples will be hand delivered or sent to the EPA Laboratory within 48 hours of collection
Date(s) by which all analyses are to be completed and the data submitted to the project officer.	All samples have a 30 day turnaround time including data validation
Date of the completion of the draft interim/final project report. (Sampling Trip Report)	Within one week of the end of the sampling event
Date for the issuance of the final project report.	Protocol dictates within two weeks of receipt of validated analytical data.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 Project/Task Organization

The following is a list of key personnel and their corresponding responsibilities. Due to the work breakdown structure of the project, an organization list is provided instead of a concise organization chart.

[illegible]	[illegible]
Diane Salkie, Project Officer DESA/HWSB Superfund Contract Support Team	Project Management/ Sampling Operations
Christina Leung, Environmental Scientist DESA/HWSB Superfund Contract Support Team	Sampling Operations/ Field Support
Pat Sheridan, Project Quality Assurance Officer DESA/HWSB	Report QA
U.S. EPA Laboratory Branch (LABB)	Laboratory Analysis
	Laboratory QC
	Data Processing Activities
	Data Quality Review
Not Applicable	Performance Auditing
Not Applicable	Systems Auditing
DESA/Hazardous Waste Support Branch	Overall QA
Andrew Confortini, On-Scene Coordinator (OSC) ERRD/RAB	Overall Project Coordination

APPENDIX C

ORGANIC DATA PACKAGE

Functional Guidelines for Evaluating Organic Analysis

CASE No.: 35144
LABORATORY: ENVSYS
SAMPLER: USEPA

SDG No.: B3PG0
SITE: Johnny Cake Farm Road
ANALYSIS: 16W, Trace VOA

DATA ASSESSMENT

The current SOP HW-33A/VOA (Revision 0) April 2006, USEPA Region II Data Validation SOP for Statement of Work SOM01.1 for evaluating organic data has been applied.

All data are valid and acceptable except those analytes rejected "R"(unusable). Due to the detection of QC problems, some analytes may have the "J" (estimated), "N"(presumptive evidence for the presence of the material, "U" (non-detect) or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. All action is detailed on the attached sheets.

The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentration is unreliable.

Reviewer's Signature: D Rosenberg David Rosenberg

Date: May 15, 2006

Verified By: Maninfsheikh

Date: 5/17/2006

SDG#B3JF3

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.
The following action was taken in the samples and analytes shown due to excessive holding time.

No problems found for this qualification.

2. DMC's

All samples are spiked with surrogate compounds (DMC's) prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

DC-x The following volatile samples have DMC/SMC recoveries above the upper limit of the criteria window.
Hits are qualified "J" and non-detects are not flagged.

No problems found for this qualification.

DC-x The following volatile samples have DMC/SMC recoveries below the lower limit of the criteria window, but greater than 20%.
Hits are qualified "J" and non-detects are qualified "UJ".

No problems found for this qualification.

(**) Qualified "R" under a different criterion.

DC-x The following volatile samples have DMC/SMC recoveries below the lower limit of the criteria window, and less than 20%.
Hits are qualified "J" and non-detects are qualified **"R"**.

No problems found for this qualification.

3. **MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:**

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for additional qualification of data.

Not Applicable.

4. **BLANK CONTAMINATION:**

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 1 times the blank contaminant level (2 times for common contaminants), the analytes are qualified as non-detects, "U". The following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:

DC-x The following volatile samples have analyte concentrations reported below the CRQL. The associated method blank concentration is also below the CRQL. Reported sample concentrations have been elevated to the CRQL.
Hits are qualified "U" and non-detects are not flagged.

No problems found for this qualification.

B) Field or rinse blank contamination:

No problems found for this qualification.

C) Trip blank contamination for VOA aqueous samples:

No problems found for this qualification.

D) Storage Blank associated with VOA samples only

DC-x The following volatile samples have analyte concentrations reported below the CRQL and less than or equal to two times (2X) the associated storage blank concentration. Reported sample concentrations have been elevated to the CRQL.
Hits are qualified "U" and non-detects are not flagged.

No problems found for this qualification.

E) Tics "R" rejected:

The following Tics have been rejected "R". They have been identified in the blanks.

Unknowns at Retention time = 7.21, 9.98, 11.79

The following Tics have been rejected "R". They have been identified as Target Analytes from a different fraction.

No problems found for this qualification.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene.

If the mass calibration is in error, all associated data will be classified as unusable "R".

No problems found for this qualification.

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be ≥0.05, and ≥0.01 for the twenty-two analytes with poor response in both the initial and continuing calibrations. A value < 0.05, or < 0.01 for the poor performers indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

DC-x The following volatile samples are associated with an initial calibration relative response factor (RRF50) outside expanded criteria.
Hits are qualified "J" and non-detects are flagged "R".

Exception: 1,4-Dioxane is a "poor" responder whose RRF50 < 0.01. There were no hits and all non-detects iin all samples and blanks were qualified "UJ".

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 20%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. %D must be < 25%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria (> 90%), non-detects data may be qualified "R".

The following analytes in the sample shown were qualified for %RSD and %D:

VTC8	The following trace volatile samples are associated with an opening or closing CCV percent difference (%D) outside criteria. Detected compounds are qualified J. Nondetected compounds are qualified UJ.
	Trichlorofluoromethane VSTD005H6
	B3PG5 B3PG9 B3PH4 B3PH5 B3PH6 B3PH7 B3PH8 B3PH9
	Acetone VSTD005H7
	B3PG2DL B3PG3DL B3PG4DL B3PH8DL B3PH9DL VHBLKHG

8. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +200%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +200%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

DC-xx The following volatile samples have internal standard area counts exceeding the upper limits of the criteria window.
Hits are qualified "J", and non-detects are NOT flagged.

No problems found for this qualification

9. COMPOUND IDENTIFICATION:

A) **Volatile Fraction:**

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ± 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

No problems found for this qualification.

10. CONTRACT PROBLEMS NON-COMPLIANCE:

1,4-Dioxane - Average response factor (RRF) is below contractual criteria in **initial calibration**
1,4-Dioxane-d8 - Average response factor (RRF) is below contractual criteria in **initial**
1,4-Dioxane – Continuing response factor RF50 is below Contractual criteria in the following **opening** CCV calibrations:

1,4-Dioxane – Continuing response factor RF50 is below Contractual criteria in the following **closing** CCV calibrations:

It is not clear from the data that the 1,4-Dioxane was analyzed at the correct concentrations.

11. FIELD DOCUMENTATION:

No problems found.

12. OTHER PROBLEMS

No problems found.

13. This package contains reextractions, reanalyses or dilutions. Upon reviewing the QA results, the following Form 1(s) are identified NOT to be used.

B3PG2DL, B3PG3DL, B3PG4DL, B3PH8DL, B3PH9DL

RECEIVED
MAR 28 2006
HAZ. WASTE SUPPORT SEC.

SDG NARRATIVE

LABORATORY NAME: ENVIROSYSTEMS, INC.

CASE #: 35144 SDG #: B3PG0 REGION: 2

CONTRACT: EPW05033

DATE SAMPLES RECEIVED AT LABORATORY: 10 MARCH 2006

SAMPLE ANALYSES INCLUDED IN THIS REPORT:

EPA SAMPLE #	LAB ID #	ANALYSIS	MATRIX	VOA pH
BP3G0	0060310-01	TRACE	WATER	<2
BP3G0DL	0060310-01RE1	TRACE	WATER	<2
BP3G1	0060310-02	TRACE	WATER	<2
BP3G2	0060310-03	TRACE	WATER	<2
BP3G2DL	0060310-03RE1	TRACE	WATER	<2
BP3G3	0060310-04	TRACE	WATER	<2
BP3G4	0060310-05	TRACE	WATER	<2
BP3G4DL	0060310-05RE1	TRACE	WATER	<2
BP3G5	0060310-06	TRACE	WATER	<2
BP3G6	0060310-07	TRACE	WATER	<2
BP3G7	0060310-08	TRACE	WATER	<2
BP3G8	0060310-09	TRACE	WATER	<2
BP3G9	0060310-10	TRACE	WATER	<2
BP3H4	0060310-11	TRACE	WATER	<2
BP3H5	0060310-12	TRACE	WATER	<2
BP3H6	0060310-13	TRACE	WATER	<2
BP3H7	0060310-14	TRACE	WATER	<2
BP3H8	0060310-15	TRACE	WATER	<2
BP3H8DL	0060310-15RE1	TRACE	WATER	<2
BP3H9	0060310-16	TRACE	WATER	<2
BP3H9DL	0060310-16RE1	TRACE	WATER	<2

Matrix spike/matrix spike duplicate (MS/MSD) analysis was not required for this SDG.

Samples for this SDG were analyzed by EPA SOW SOM01.1 for multi-media multi-concentration organics.

The cooler temperature was measured to be 2 degrees C.

TRACE VOLATILES SECTION:

The trace volatile analysis was performed on an Agilent 5975 MSD using a Restek RTX-624 20 meter column with an inner diameter of 0.18 mm and a 1 micron film thickness. The trap used with the autosampler is a 30 cm EST K Trap (VOCARB 3000) packed with Carbopack B/Carboxen 1000 & 1001.

1,4-Dioxane and 1,4-Dioxane-d8 had response factors below 0.005 in all ✓ initial and continuing calibration standards.

All other QC requirements were met for all samples in this SDG.

All samples were analyzed using heated purge at 55 degrees C.

I CERTIFY THAT THIS SAMPLE DATA PACKAGE IS IN COMPLIANCE WITH THE TERMS AND CONDITIONS OF THE CONTRACT, BOTH TECHNICALLY AND FOR COMPLETENESS, FOR OTHER THAN THE CONDITIONS DETAILED ABOVE. RELEASE OF THE DATA CONTAINED IN THIS HARDCOPY SAMPLE DATA PACKAGE AND IN THE ELECTRONIC DATA DELIVERABLE HAS BEEN AUTHORIZED BY THE LABORATORY MANAGER OR THE MANAGER'S DESIGNEE, AS VERIFIED BY THE FOLLOWING SIGNATURE:

Steven L. Pruskin
Laboratory Manager

DATE: 3/24/06
24 March 2006

Contract Laboratory Program

RECEIVED
MAR 28 2006
HAZ. WASTE SUPPORT SEC.

Sample Delivery Group (SDG) Cover Sheet

SDG Number B3PG0

Laboratory Name ENVIROSYSTEMS, INC

Laboratory Code ENVSYS

Contract No. EP-W-05-033

Case No. 35144

Analysis Price

SDG Turnaround 21 DAYS

EPA Sample Numbers in SDG (Listed in Numerical Order)

1) B3PG0	7) B3PG6	13) B3PH6	19)
2) B3PG1	8) B3PG7	14) B3PH7	20)
3) B3PG2	9) B3PG8	15) B3PH8	21) 3/10/06
4) B3PG3	10) B3PG9	16) B3PH9	22)
5) B3PG4	11) B3PH4	17)	23)
6) B3PG5	12) B3PH5	18) 3/10/06	24)

First Sample in SDG: B3PG0

Last Sample in SDG: B3PH9

First Sample Receipt Date: 3/10/06

Last Sample Receipt Date: 3/10/06

Note: There are a maximum of 20 field samples (excluding PE samples) in an SDG. Attach TRs to this form in alphanumeric order (the order listed above on this form).

Signature Paul [illegible]

Date 3/10/06

004A

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG0

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-01

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1089.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PG0

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-01

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1089.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	8.6	
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	38	~~E~~ J
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG0

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ____ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-01

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1089.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ____ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.6	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG1

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-02

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1088.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	3.3	J
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

00036

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG1

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-02

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1088.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG1

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-02

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1088.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.3	JR
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PG2

Lab Name: Envirosystems, Inc.   Contract: EPW05033

Lab Code: ENVSYS   Case No.: 35144   Mod. Ref No.:   SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER   Lab Sample ID: 0060310-03

Sample wt/vol: 25.0 (g/mL) ML   Lab File ID: h75h1090.D

Level: (TRACE/LOW/MED) TRACE   Date Received: 03/10/2006

% Moisture: not dec.   Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	~~37~~ 34	~~E~~ *
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

* From B3PG2DL

00046

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PG2

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-03

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1090.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	8.6	
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.24	J
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B3PG2

Lab Name: Envirosystems, Inc.   Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144   Mod. Ref No.: ______   SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER   Lab Sample ID: 0060310-03

Sample wt/vol: 25.0 (g/mL) ML   Lab File ID: h75h1090.D

Level: (TRACE or LOW/MED) TRACE   Date Received: 03/10/2006

% Moisture: not dec. ______   Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L   Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.4	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG3

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-04

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1091.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	4.2	J
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	~~110~~ 100	~~E~~ *
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

* From B3PG3DL

00070

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG3

Lab Name: Envirosystems, Inc. Contract: EPWC5033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-04

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1091.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	1.2	
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B3PG3

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-04

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1091.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	60-29-7	Ethyl ether	3.37	1.9	JN
02	67-63-0	Isopropyl alcohol	3.80	1.4	JN
03	156-60-5	Ethene, 1,2-dichloro-, (E)-	4.21	0.59	JN
04	79-01-6	Trichloroethylene	6.37	1.0	JN
05		UNKNOWN	7.21	4.5	~~J~~ R
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

00072

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG4

Lab Name: Envirosystems, Inc.   Contract: EPW05033

Lab Code: ENVSYS   Case No.: 35144   Mod. Ref No.:   SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER   Lab Sample ID: 0060310-05

Sample wt/vol: 25.0 (g/mL) ML   Lab File ID: h75h1092.D

Level: (TRACE/LOW/MED) TRACE   Date Received: 03/10/2006

% Moisture: not dec.   Date Analyzed: 03/14/2006

GC Column: RTX-624   ID: .18 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	~~21~~ 19	~~E~~ *
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

* From B3PG4DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PG4

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-05

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1092.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	2.5	
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG4

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-05

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1092.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.2	~~J~~ R
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG5

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-06

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_6.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	UJ
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	2.1	
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	UJ

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG5

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-06

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_6.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG5

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-06

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_6.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	115-07-1	Propene	1.66	0.78	JN
02	60-29-7	Ethyl ether	3.37	0.57	JN
03		UNKNOWN	7.21	4.0	~~J~~ R
04		UNKNOWN	11.79	0.61	~~JB~~ R
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

00122

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG6 RB

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-07

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1094.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PG6 RB

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-07

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1094.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
B3PG6 RE

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-07

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1094.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.20	4.5	J~~B~~
02					
03					
04					
05					
06					
07					
08					
09					
10					
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12					
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18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

00135

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PG7

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-08

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1095.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	2.6	
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PG7

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-08

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1095.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG7

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-08

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1095.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	60-29-7	Ethyl ether	3.37	1.6	JN
02		UNKNOWN	7.20	4.4	~~J~~B R
03					
04					
05					
06					
07					
08					
09					
10					
11					
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13					
14					
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23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG8

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ____ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-09

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1096.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ____ Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	3.4	J
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG8

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-09

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1096.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG8

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-09

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: h75h1096.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/14/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.8	~~J~~ R
02	556-67-2	Cyclotetrasiloxane, octamethyl-	9.99	0.73	~~JN~~ R
03					
04					
05					
06					
07					
08					
09					
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14					
15					
16					
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20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PG9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-10

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_7.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

00164

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PG9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-10

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_7.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PG9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-10

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_7.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.2	J R
02		UNKNOWN	9.99	0.59	J R
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

EPA SAMPLE NO.

B3PH4 TB

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-11

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_8.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PH4 TB

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-11

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_8.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PH4 TB

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-11

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_8.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.4	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PH5

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ____ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-12

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_9.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ____ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

00183

EPA SAMPLE NO.

B3PH5

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-12

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_9.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PH5

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-12

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_9.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.2	JR
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

EPA SAMPLE NO.

B3PH6

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-13

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_10.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.34	J
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PH6

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-13

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_10.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
B3PH6

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-13

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_10.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.3	JR
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PH7

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-14

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_11.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.25	J
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PH7

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-14

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_11.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PH7

Lab Name: Envirosystems, Inc.   Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER   Lab Sample ID: 0060310-14

Sample wt/vol: 25.0 (g/mL) ML   Lab File ID: 0000040_11.D

Level: (TRACE or LOW/MED) TRACE   Date Received: 03/10/2006

% Moisture: not dec. ______   Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L   Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.21	4.2	~~J~~ R
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

SOM01.1 (5/2005)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B3PH8 DUP

Lab Name: Envirosystems, Inc.   Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144   Mod. Ref No.: ______   SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER   Lab Sample ID: 0060310-15

Sample wt/vol: 25.0 (g/mL) ML   Lab File ID: 0000040_12.D

Level: (TRACE/LOW/MED) TRACE   Date Received: 03/10/2006

% Moisture: not dec. ______   Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	UJ
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	2.1	
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	~~400~~ 320	*
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	UJ

* From B3PH8DL

00212

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PH8

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-15

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_12.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	~~250~~ 210	*
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	8.1	
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PH8

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-15

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_12.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	3.37	0.53	J
02		UNKNOWN	7.21	4.2	~~J~~ R
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

SOM01.1 (5/2005)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B3PH9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-16

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_13.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	4.5	
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	~~400~~ 280	*
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon Tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
123-91-1	1,4-Dioxane	20	U J

* From B3PH9DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: B3PH9
DUP B3PH9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: ______ SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-16

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_13.D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. ______ Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Purge Volume: 25.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	~~250~~ 190	*
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	8.1	
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: B3PH9

Lab Name: Envirosystems, Inc. Contract: EPW05033

Lab Code: ENVSYS Case No.: 35144 Mod. Ref No.: SDG No.: B3PG0

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0060310-16

Sample wt/vol: 25.0 (g/mL) ML Lab File ID: 0000040_13.D

Level: (TRACE or LOW/MED) TRACE Date Received: 03/10/2006

% Moisture: not dec. Date Analyzed: 03/16/2006

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) UG/L Purge Volume: 25.00 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	7.20	4.5	~~JB~~ R
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1] EPA-designated Registry Number.

APPENDIX D

U.S. CODE OF FEDERAL REGULATIONS (CFR)
TITLE 40: PROTECTION OF ENVIRONMENT
Part 141: NATIONAL PRIMARY DRINKING WATER REGULATIONS

SUBPART G: NATIONAL REVISED PRIMARY DRINKING WATER REGULATIONS: MAXIMUM CONTAMINANT LEVELS

SECTION 61: *MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CONTAMINANTS*

JULY 2002

U.S. Environmental Protection Agency

Ground Water & Drinking Water

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EPA Home > Water > Ground Water & Drinking Water > Current Drinking Water Standards

Drinking Water and Health Basics

Current Drinking Water Standards

EPA 816-F-02-01
July 200
Printable PDF versio

National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water. The table below divides these contaminants into:

Microorganisms | Disinfectants | Disinfection Byproducts | Inorganic Chemicals | Organic Chemicals | Radionuclides

For more information, see Setting Standards for Safe Drinking Water to learn about EPA's standard-setting process or look at a timeline that shows the order in which EPA regulated these contaminants. For copies of the complete regulations regarding these contaminants, follow these links:

- National Primary Drinking Water Regulations
- National Secondary Drinking Water Regulations

National Primary Drinking Water Regulations

Microorganisms	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Cryptosporidium	zero	TT [3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and fecal animal waste
Giardia lamblia	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Heterotrophic plate count	n/a	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment

Frequently Asked Questions

Local Drinking Water Information

Legionella	zero	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and *E. Coli*)	zero	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and *E. col* only come from human and animal fecal waste.
Turbidity	n/a	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff
Viruses (enteric)	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste

Drinking Water Standards

Disinfection Byproducts	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Bromate	zero	0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chlorite	0.8	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection
Haloacetic acids (HAA5)	n/a[6]	0.060	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	none[7] ---------- n/a[6]	0.10 ---------- 0.080	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection

List of Contaminants & MCLs

Disinfectants	MRDL[1] (mg/L)[2]	MRDL[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Chloramines (as Cl_2)	MRDLG=4[1]	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl_2)	MRDLG=4[1]	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO_2)	MRDLG=0.8[1]	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes

Inorganic Chemicals	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	0[7]	0.010 as of 01/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronicsproduction wastes
Asbestos (fiber >10 micrometers)	7 million fibers per liter	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits

Regulations & Guidance

Public Drinking Water Systems

Copper	1.3	TT[8]; Action Level=1.3	Short term exposure: Gastrointestinal distress Long term exposure: Liver or kidney damage People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	TT[8]; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (inorganic)	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Nitrate (measured as Nitrogen)	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Source Water Protection

Underground Injection Control

Nitrite (measured as Nitrogen)	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Organic Chemicals	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Acrylamide	zero	TT[9]	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment
Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene (PAHs)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines

Data & Databases

Drinking Water Academy

Carbofuran	0.04	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
4/o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
4/p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2-Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1,1-Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories
Dichloromethane	zero	0.005	Liver	Discharge from drug

Safe Drinking Water Act

National Drinking Water Advisory Council

			problems; increased risk of cancer	and chemical factories
1,2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl) adipate	0.4	0.4	General toxic effects or reproductive difficulties	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use
Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Liver problems	Residue of banned insecticide
Epichlorohydrin	zero	TT[9]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Ethylbenzene	0.7	0.7	Liver or kidneys problems	Discharge from petroleum refineries
Ethylene dibromide	zero	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk	Residue of banned termiticide

			of cancer	
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff
Styrene	0.1	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners
Toluene	1	1	Nervous	Discharge from

Water Infrastructure Security

Drinking Water For Kids

			system, kidney, or liver problems	petroleum factories
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories
Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories
Vinyl chloride	zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories

Radionuclides	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Alpha particles	none[7] ---------- zero	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none[7] ---------- zero	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none[7] ---------- zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Uranium	zero	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits

Notes

[1] Definitions:
Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed ir drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflec the benefits of the use of disinfectants to control microbial contaminants.
Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

[2] Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

[3] EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their wate or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- Cryptosporidium (as of1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.

- *Giardia lamblia:* 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella:* No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, turbidity may never exceed 1 NTU, an must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter.
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005): Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, Cryptosporidium removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling; The Filter Backwash Recycling Rule requires systems th recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

[4] more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for eithe fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E.coli* fecal coliforms, system has an acute MCL violation.

[5] Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

[6] Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L). Chloroform is regulated with this group but has no MCLG.
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L). Monochloroacetic acid, bromoacetic acid, and dibromoacetic acid are regulated with this group but have no MCLGs.

[7] MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. Therefore, there is no MCLG for this contaminant.

[8] Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, an for lead is 0.015 mg/L.

[9] Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
- Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
Sulfate	14808-79-8	250,000	5.0
Taste	-	None Objectionable	NA
TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin)	1746-01-6	$2X10^{-10}$	0.00001
1,1,1,2-Tetrachloroethane	630-20-6	0.01	NA
1,1,2,2-Tetrachloroethane	79-34-5	0.002	0.001
Tetrachloroethylene	127-18-4	0.0004	0.001
2,3,4,6-Tetrachlorophenol	58-90-2	NA	0.010
Thallium	7440-28-0	0.0005	0.010
Toluene	108-88-3	1.0	0.005
Total dissolved solids (TDS)	-	500,000	10,000
Toxaphene	8001-35-2	0.00003	0.003
',4,5-TP (Silvex)	93-72-1	0.05	0.005
1,2,4-Trichlorobenzene	120-82-1	0.009	0.001
1,1,1-Trichloroethane	71-55-6	0.03	0.001
1,1,2-Trichloroethane	79-00-5	0.003	0.002
Trichloroethylene	79-01-6	0.001	0.001
2,4,5-Trichlorophenol	95-95-4	0.7	0.010
2,4,6-Trichlorophenol	88-06-2	0.003	0.020
Vinyl chloride	75-01-4	0.00008	0.005
Xylenes (Total)	1330-20-7	0.04	0.002
m&p-Xylenes	NA	NA	0.002
o-Xylene	NA	NA	0.001
Zinc	7440-66-6	5.0	0.030
Microbiological criteria[m], Radionuclides & Turbidity		prevailing Safe Drinking Water Act Regulations (N.J.A.C. 7:10-1 et seq.)	

Explanation of Terms:

- Practical Quantitation Level as defined in N.J.A.C. 7:9-6.4
' not available for the constituent
Asbestos criterion is measured in terms of fibers/L longer than 10 micrometers (f/L > 10 um)
ug = micrograms, L = Liter, f = fibers, CU = Standard Cobalt Units
b = Odor Threshold Number, mg = milligrams, H = Hardness
m = Pursuant to prevailing Safe Drinking Water Act Regulations any positive result for fecal coliform is in violation of the MCL and is therefore an exceedance of the ground water quality standards.

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
Mirex	2385-85-5	0.00001	NA
Nickel (Soluble salts)	7440-02-0	0.1	0.010
Nitrate (as N)	14797-55-8	10.0	0.400
Nitrate and Nitrite (as N)	-	10.0	NA
Nitrite (as N)	14797-65-0	1.0	0.400
Nitrobenzene	98-95-3	0.003	0.010
N-Nitrosomethylamine	62-75-9	0.0000007	0.020
N-Nitrosodiphenylamine	86-30-6	0.007	0.020
N-Nitrosodi-n-propylamine	621-64-7	0.000005	0.020
Odor	-	3[b]	NA
Oil & Grease and Petroleum Hydrocarbons (PHC)	-	None Noticeable	NA
Oxamyl	23135-22-0	0.2	0.020
PCBs (Polychlorinated biphenyls)	1336-36-3	0.00002	0.0005
Pentachlorophenol	87-86-5	0.0003	0.001
pH	-	6.5-8.5	NA
Phenanthrene	85-01-8	NA	0.010
Phenol	103-95-2	4.0	0.010
Picloram	1918-02-1	0.50	0.001
Pyrene	129-00-0	0.20	0.020
Selenium (Total)	7782-49-2	0.05	0.010
Silver	7440-22-4	NA	0.002
Simazine	122-34-9	0.001	0.0008
Sodium	7440-23-5	50.0	0.400
Styrene	100-42-5	0.1	0.005

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
Fluorene	86-73-7	0.3	0.010
Fluoride	16984-48-8	2.0	0.500
Foaming agents (ABS/LAS)	-	0.5	0.0005
Glyphosate	1071-83-6	0.7	NA
Hardness (as $CaCO^3$)	-	250mg/l	10mg/l
Heptachlor	76-44-8	0.000008	0.0004
Heptachlor epoxide	1024-57-3	0.000004	0.0002
Hexachlorobenzene	118-74-1	0.00002	0.010
Hexachlorobutadiene	87-68-3	0.001	0.001
Hexachlorocyclopentadiene	77-47-4	0.05	0.010
Hexachloroethane	67-72-1	0.0007	0.010
Hydrogen sulfide	7783-06-4	0.02	NA
Indeno(1,2,3-cd)pyrene	193-39-5	NA	0.02
Iron	7439-89-6	0.3	0.10
Isophorone	78-59-1	0.1	0.010
Lead (Total)	7439-92-1	0.005	0.010
Malathion	121-75-5	0.2	0.005
Manganese	7439-96-5	0.050	0.006
Mercury (Total)	7439-97-6	0.002	0.005
Methoxychlor	72-43-5	0.04	0.010
Methyl bromide (bromomethane)	74-83-9	0.01	0.002
Methyl chloride (chloromethane)	74-87-3	0.03	0.002
Methyl ethyl ketone	78-93-3	0.3	NA
3-Methyl-4-chlorophenol	59-50-7	NA	0.020
Methylene chloride	75-09-2	0.002	0.002
4-Methyl-2-pentanone (MIBK)	108-10-1	0.4	NA

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
trans-1,3-Dichloropropene	10061-02-6	NA	0.007
1,3-Dichloropropene (cis and trans)	542-75-6	0.0002	NA
Dieldrin	60-57-1	0.000002	0.00003
Diethyl phthalate	84-66-2	5.0	0.010
2,4-Dimethylphenol	105-67-9	0.1	0.020
Dimethyl phthalate	131-11-3	-	0.010
4,6-Dinitro-o-cresol	534-52-1	NA	0.060
2,4-Dinitrophenol	51-28-5	0.010	0.040
2,4-Dinitrotoluene/2,6-Dinitrotoluene mixture	121-14-2	0.00005	0.010
2,6-Dinitrotoluene	606-20-2	NA	0.010
Di-n-octyl phthalate	117-84-0	0.1	NA
Dinoseb	88-85-7	0.007	0.002
1,2-Diphenylhydrazine	122-66-7	0.00004	NA
Diquat	85-00-7	0.02	NA
Endosulfan	115-29-7	0.0004	NA
alpha-Endosulfan (Endosulfan I)	959-98-8	0.0004	0.00002
beta-Endosulfan (Endosulfan II)	33213-65-9	0.0004	0.00004
Endosulfan sulfate	1031-07-8	0.0004	0.00008
Endothall	145-73-3	0.1	NA
Endrin	72-20-8	0.002	0.00004
Epichlorohydrin	106-89-8	0.004	NA
Ethylbenzene	100-41-4	0.7	0.005
Ethylene dibromide	106-93-4	0.0000004	0.00005
Fluoranthene	206-44-0	0.3	0.010

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
Chrysene	218-01-9	NA	0.020
Color	-	10 CU	20 CU
Copper	7440-50-8	1.0	1.0
Cyanide	57-12-5	0.2	0.040
2,4-D	94-75-7	0.07	0.005
Dalapon	75-99-0	0.2	0.010
4,4'-DDD (p,p'-TDE)	72-54-8	0.0001	0.00004
4,4'-DDE	72-55-9	0.0001	0.00004
4,4'-DDT	50-29-3	0.0001	0.00006
Demeton	8065-48-3	0.0003	NA
Dibenz(a,h)anthracene	53-70-3	NA	0.020
Dibromochloromethane (Chlorodibromomethane)	124-48-1	0.01	0.001
Dibromo-3-chloropropane(DBCP)	96-12-8	NA	0.002
Di-n-butyl phthalate	84-74-2	0.9	0.020
1,2-Dichlorobenzene	95-50-1	0.6	0.005
1,3-Dichlorobenzene	541-73-1	0.6	0.005
1,4-Dichlorobenzene	106-46-7	0.075	0.005
3,3'-Dichlorobenzidine	91-94-1	0.00008	0.060
1,1-Dichloroethane	75-34-3	0.07	NA
1,2-Dichloroethane	107-06-2	0.0003	0.002
1,1-Dichloroethylene	75-35-4	0.001	0.002
cis-1,2-Dichloroethylene	156-59-2	0.01	0.002
trans-1,2-Dichloroethylene	156-60-5	0.1	0.002
2,4-Dichlorophenol	120-83-2	0.02	0.010
1,2-Dichloropropene	78-87-5	0.0005	0.001
cis-1,3-Dichloropropene	10061-01-5	NA	0.005

TABLE 11 (CONTINUED)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2	NA	0.010
Benzo(ghi)perylene	191-24-2	NA	0.020
Benzo(k)fluoranthene	207-08-9	NA	0.002
Beryllium	7440-41-7	0.000008	0.020
alpha-BHC (alpha-HCH)	319-84-6	0.000006	0.00002
beta-BHC (beta-HCH)	319-85-7	0.0002	0.00004
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.0002	0.0002
Bis(2-chloroethyl) ether	111-44-4	0.00003	0.010
Bis(2-chloroisopropyl) ether	36638-32-9	0.3	0.010
Bis(2-ethylhexyl) phthalate	117-81-7	0.003	0.030
Bromodichloromethane (Dichlorobromomethane)	75-27-4	0.0003	0.001
Bromoform	75-25-2	0.004	0.0008
Butylbenzyl phthalate	85-68-7	0.1	0.020
Cadmium	7440-43-9	0.004	0.002
Carbofuran	1563-66-2	0.04	0.007
Carbon tetrachloride	56-23-5	0.0004	0.002
Chlorobenzene	108-90-7	0.004	0.002
Chlordane	57-74-9	0.00001	0.0005
Chloride	16887-00-6	250.0	2.0
Chloroform	67-66-3	0.006	0.001
4-Chloro-3-methyl (o-chloro-m-cresol)	59-50-7	NA	0.020
2-Chlorophenol	95-57-8	0.04	0.020
Chlorpyrifos	2912-88-2	0.02	0.0002
Chromium (Total)	7440-47-3	0.1	0.010

TABLE 11
NJ SPECIFIC GROUND WATER QUALITY CRITERIA
CLASS II-A & PRACTICAL QUANTITATION LEVELS
(N.J.A.C. 7:9-6, 1993)
All units are milligrams per liter (mg/l)

CONSTITUENT	CAS No.	GROUND WATER QUALITY CRITERIA	PRACTICAL QUANTITATION LEVELS (PQLs)
Acenaphthene	83-32-9	0.40	0.010
Acenapthylene	208-96-8	NA	0.010
Acetone	67-64-1	0.70	NA
Acrolein	107-02-8	NA	0.050
Acrylamide	79-06-1	0.000008	NA
Acrylonitrile	107-13-1	0.000060	0.050
Adipates (Di(ethylhexyl)adipate)	103-23-1	NA	0.006
Alachlor	15972-60-8	0.00043	0.002
[illegible]licarb sulfone	1646-88-4	0.0020	0.003
[illegible]drin	309-00-2	0.000002	0.00004
Aluminum	7429-90-5	0.200	0.200
Ammonia	7664-41-7	0.500	0.200
Anthracene	120-12-7	2.0	0.010
Antimony	7440-36-0	0.002	0.020
Arsenic (Total)	7440-38-2	0.00002	0.008
Asbestos	1332-21-4	7X10^{6}f/L>10um	10^{6}f/L>10um
Atrazine	1912-24-9	0.003	0.001
Barium	7440-39-3	2.0	0.200
Benzo(a)anthracene	56-55-3	NA	0.010
Benzene	71-43-2	0.0002	0.001
Benzidine	92-87-5	0.0000002	0.050
Benzyl Alcohol	100-51-6	2.0	NA
Benzo(a)pyrene (BaP)	50-32-8	NA	0.020

TABLE 10
NEW JERSEY SECONDARY DRINKING WATER STANDARDS
(N.J.A.C. 7:10-1 through 16.12, 1989)
All units are milligrams per liter (mg/l), unless noted otherwise

CONTAMINANT	SMCL
Aluminum	0.05-0.2
ABS/LAS (Foaming Agents)	0.5
Chloride	250.0
Color	10 color units (Standard Cobalt Scale)
Corrosivity	Within ±1.0 of the optimum pH as determined by the Langelier Index; or by another method acceptable to the NJDEPE
Fluoride	2.0
Hardness (as CaCO)	250 upper limit 50 lower limit
Iron	0.3
Manganese	0.05
Odor	3 Threshold odor number (TON)
pH	6.5 - 8.5
Silver	0.1
Sodium	50.0
Sulfate	250.0
Taste	No objectionable taste
Total Dissolved Solids (TDS)	500.0
Zinc	5.0

TABLE 8
NEW JERSEY DRINKING WATER STANDARDS
(N.J.A.C. 7:10-1 through 16.12, 1989)
RADIONUCLIDES
All units are picocuries per liter (pCi/l), unless noted otherwise

CONTAMINANT	CURRENT MCL	PROPOSED MCL
Gross alpha activity	15	15
Radium 226	-	20
Radium 228	-	20
Radium 226/228	5	-
Beta particle and photon radioactivity	4 millirem/year	4 mrem ede/yr
Uranium	-	30
Radon 222	-	300

TABLE 9
NEW JERSEY DRINKING WATER STANDARDS
(N.J.A.C. 7:10-1 through 16.12, 1989)
MICROBIOLOGICAL & TURBIDITY

CONTAMINANT	MCL
Coliform Bacteria	
For private home wells	Absence of bacteria/100 ml
For public water systems[2]	Presence or absence of Coliform bacteria based on system size
Turbidity	1 Turbidity Unit

[2] See 40 CFR (Code of Federal Regulations) for details.

TABLE 7
NEW JERSEY DRINKING WATER STANDARDS
(N.J.A.C. 7:10-1 through 16.12, 1989)
INORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

CHEMICAL	CAS No.	MCL
Antimony	7440-36-0	0.006
Arsenic	7440-36-0	0.05
Asbestos	1332-21-4	7 MFL
Barium	7440-39-3	2.0
Beryllium	7440-41-7	0.004
Cadmium	7440-43-9	0.005
Chromium (total)	7440-47-3	0.1
Copper	7440-50-8	1.3 AL
Cyanide	57-12-5	0.2
Fluoride	-	4.0
Lead[1]	7439-92-1	0.015 AL
Mercury	7439-97-6	0.002
Nickel	7440-02-0	0.1
Nitrate (as N)	-	10.0
Nitrite (as N)	-	1.0
Total Nitrate/Nitrite (as N)	14797-55-8	10.0
Selenium	7782-49-2	0.05
Sulfate	-	deferred
Thallium	7440-28-0	0.002

Note: MFL Million Fibers per Liter with fiber length > 10 microns
AL Action Level requiring corrective measures

[1] Effective 12/7/92.

TABLE 6 (CONTINUED)

SYNTHETIC ORGANIC CHEMICALS

CHEMICAL	CAS No.	MCL
Benzo(a)pyrene	50-32-8	0.0002
Di(2-ethylhexyl)adipate	103-23-1	0.5
Di(2-ethylhexyl)phthalate	117-81-7	0.004
Hexachlorobenzene	118-74-1	0.001
Hexachlorocyclopentadiene (HEX)	77-47-4	0.05
PCBs	1336-36-3	0.5
2,3,7,8-TCDD (Dioxin)	1746-01-6	0.005

TREATMENT TECHNIQUES

CHEMICAL	CAS No.	MCL
Acrylamide	79-06-1	0.005% dosed at 1 mg/l
Epichlorohydrin	106-89-8	0.01% dosed at 20 mg/l

DISINFECTION BY-PRODUCTS

CHEMICAL	MCL	MCLG
Total Trihalomethanes (TTHMs)	0.10	-

TABLE 6 (CONTINUED)

PESTICIDES

CHEMICAL	CAS No.	MCL
Alachlor	15972-60-8	0.002
Aldicarb	116-06-3	0.010
Aldicarb sulfone	1646-88-4	0.002
Aldicarb sulfoxide	1646-87-3	0.004
Atrazine	1912-24-9	0.003
Carbofuran	1563-66-2	0.040
Chlordane	57-74-9	0.0005
Dalapon	75-99-0	0.200
Dibromochloropropane (DBCP)	96-12-8	0.0002
Dinoseb	88-85-7	0.007
Diquat	85-00-7	0.02
Endothall	145-73-3	0.1
Endrin	72-20-8	0.0002
Ethylene dibromide (EDB)	106-93-4	0.00005
Glyphosate	1071-83-6	0.7
Heptachlor	76-44-8	0.0004
Heptachlor epoxide	1024-57-3	0.0002
Lindane	58-89-9	0.0002
Methoxychlor	72-43-5	0.04
Oxamyl	23135-22-0	0.2
Pentachlorophenol	87-86-5	0.001
Picloram	1918-02-1	0.5
Simazine	122-34-9	0.001
Toxaphene	8001-35-2	0.003
2,4-D (2,4-Dichlorophenoxyacetic acid)	94-75-7	0.070
2,4,5-TP (Silvex)	93-72-1	0.050

TABLE 6
NEW JERSEY DRINKING WATER STANDARDS
(N.J.A.C. 7:10-1 through 16.12, 1989)
ORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

VOLATILE ORGANIC CHEMICALS

CHEMICAL	CAS No.	MCL
Benzene	71-43-2	0.001
Carbon tetrachloride	56-23-5	0.002
meta-Dichlorobenzene (1,3)	541-73-1	0.600
ortho-Dichlorobenzene (1,2)	95-50-1	0.600
para-Dichlorobenzene (1,4)	106-46-7	0.075
1,2-Dichloroethane	107-06-2	0.002
1,1-Dichloroethylene	75-35-4	0.002
1,2-Dichloroethylene (cis)	156-59-2	0.010
1,2-Dichloroethylene (trans)	156-60-5	0.010
Dichloromethane (Methylene chloride)	75-09-2	0.002
1,2-Dichloropropane	78-87-5	0.005
Ethylbenzene	100-41-4	0.700
Monochlorobenzene	108-90-7	0.004
Styrene	100-42-5	0.100
Tetrachloroethylene (TCA)	127-18-4	0.001
Toluene	108-88-3	1.00
Trichlorobenzene(s)	120-82-1	0.008
1,1,1-Trichloroethane	71-55-6	0.026
1,1,2-Trichloroethane	79-00-5	0.005
Trichloroethylene (TCE)	79-01-6	0.001
Vinyl Chloride	75-01-4	0.002
Xylene(s)	1330-20-7	0.044

TABLE 5
NATIONAL SECONDARY DRINKING WATER REGULATIONS
(Title 40 CFR - Part 143, 1992)
All units are in milligrams per liter (mg/l), unless noted otherwise

CONTAMINANT	SMCL
Aluminum#	0.05 to 0.2
Chloride	250.0
Color	15 color units
Copper	1.0
Corrosivity	non-corrosive
Fluoride	2.0
Foaming agents	0.5
Iron	0.3
Manganese	0.05
Odor	3 threshold odor number
pH	6.5 - 8.5 units
Silver#	0.1
Sulfate	250.0
Total Dissolved Solids (TDS)	500.0
Zinc	5.0

SMCL = Secondary Maximum Contaminant Level
#Final value. Published in *Federal Register* Jan. 30, 1991.

TABLE 3

NATIONAL PRIMARY DRINKING WATER REGULATIONS
(Title 40 CFR - Part 141, 1992)
RADIONUCLIDES
All units are picocuries per liter (pCi/l), unless noted otherwise

CONTAMINANT	MCL	PROPOSED MCL	PROPOSED MCLG
Radon 222‡	-	300	zero
Radium 226/228 (Total)	5	-	zero
Radium 226‡	-	20	zero
Radium 228‡	-	20	zero
Uranium‡	-	20 ug/l (30 pCi/l)	zero
Beta Particle & Photon emitters (excluding Ra-228)‡	4 mrem/yr	4 mrem ede\yr	zero
Gross Alpha‡	15	15	zero

Picocurie (pCi) - means the quantity of radioactive material producing 2.22 nuclear transformations per minute.

Rem - means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem (mrem)" is 1/1000 of a rem.

‡Proposed value. Published in *Federal Register*, July 18, 1991. Tentative date for promulgation is October 1991.

TABLE 4

NATIONAL PRIMARY DRINKING WATER REGULATIONS
(Title 40 CFR - Part 141, 1992)
MICROBIOLOGICAL CONTAMINANTS & TURBIDITY

CONTAMINANT	MCL	MCLG
Total coliforms*f*	The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density. For a system which collects at least 40 samples/month, if no more than 5.0 % of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliform. For a system which collects fewer than 40 samples/month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.	zero
Giardia lamblia, Viruses, *Legionella*, & Heterotrophic plate count bacteria*f*:	Treatment technique requirements in lieu of MCLs. See 40 CFR 141 Effective 12/31/90 subpart H - Filtration & Disinfection; also Federal Register Vol. 54, No. 124, Thursday June 29, 1989.	zero
Turbidity*f*	Performance standard 0.5 Nephelometric Turbidity Unit (NTU) -1.0 NTU	-

f Final value. Published in *Federal Register*, June 29, 1989.

TABLE 2
NATIONAL PRIMARY DRINKING WATER REGULATIONS
(Title 40 CFR - Part 141, 1992)
INORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

CHEMICAL	CAS #	MCL	MCLG
Antimony*	7440-36-0	0.006	0.006
Arsenic+	7440-38-2	0.05	-
Asbestos# (fibers/l > 10um)	1332-21-4	7 MFL	7 MFL
Barium†	7440-39-3	2.0	2.0
Beryllium*	7440-41-7	0.004	0.004
Cadmium#	7440-43-9	0.005	0.005
Chromium (total)#	7440-47-3	0.100	0.100
Copper°	7440-50-8	TT	1.300
Cyanide*	57-12-5	0.200	0.200
Fluoride‡	-	4.0	4.0
Lead (at tap)°	7439-92-1	TT	zero
Mercury#	7439-97-6	0.002	0.002
Nickel*	7440-02-0	0.1	0.1
Nitrate (as N)#	-	10.0	10.0
Nitrite (as N)#	-	1.0	1.0
Total Nitrate+Nitrite (as N)#	14797-55-8	10.0	10.0
Selenium#	7782-49-2	0.05	0.05
Sulfate*	-	deferred	deferred
Thallium*	7440-28-0	0.002	0.0005

MFL - Million Fibers per Liter
TT - Treatment Technique - Copper - action level 1.3 mg/l
Lead - action level 0.015 mg/l
+Final value. Published in *Federal Register*, Nov. 13, 1985.
‡Final value. Published in *Federal Register*, April 2, 1986.
#Final value. Published in *Federal Register*, Jan. 30, 1991.
°Final value. Published in *Federal Register*, June 7, 1991.
†Final value. Published in *Federal Register*, July 1, 1991.
*Final value. Published in *Federal Register*, July 17, 1992.

TABLE 1 (CONTINUED)

SYNTHETIC ORGANIC CHEMICALS

CHEMICAL	CAS No.	MCL	MCLG
Benzo(a)pyrene*	50-32-8	0.0002	zero
Di(2-ethylhexyl)adipate*	103-23-1	0.4	0.4
Di(2-ethylhexyl)phthalate*	117-81-7	0.006	zero
Hexachlorobenzene*	118-74-1	0.001	zero
Hexachlorocyclopentadiene (HEX)*	77-47-4	0.05	0.05
PCBs (as decachlorobiphenyl)#	1336-36-3	0.0005	zero
2,3,7,8-TCDD (Dioxin)*	1746-01-6	3E-08	zero

TREATMENT TECHNIQUES

CHEMICAL	CAS No.	MCL	MCLG
Acrylamide#	79-06-1	TT	zero
Epichlorohydrin#	106-89-8	TT	zero

DISINFECTION BY-PRODUCTS

CHEMICAL	MCL	MCLG
Total Trihalomethanes (TTHMs)‡	0.10	-

TT - Treatment Technique
Total Trihalomethanes (TTHMs) - the sum of the concentrations of bromodichloromethane, tribromomethane (bromoform), dibromochloromethane, and trichloromethane (chloroform).
‡Final value. Published in *Federal Register*, Nov. 29, 1979.
+Final value. Published in *Federal Register*, July 8, 1987.
#Final value. Published in *Federal Register*, Jan. 30, 1991.
†Final value. Published in *Federal Register*, July 1, 1991.
*Final value. Published in *Federal Register*, July 17, 1992.

TABLE 1 (CONTINUED)

PESTICIDES

CHEMICAL	CAS No.	MCL	MCLG
Alachlor♦	15972-60-8	0.002	zero
Aldicarb†	116-06-3	0.003	0.001
Aldicarb sulfone†	1646-88-4	0.002	0.001
Aldicarb sulfoxide†	1646-87-3	0.004	0.001
Atrazine♦	1912-24-9	0.003	0.003
Carbofuran♦	1563-66-2	0.04	0.04
Chlordane♦	57-74-9	0.002	zero
Dalapon*	75-99-0	0.2	0.2
Dibromochloropropane(DBCP)♦	96-12-8	0.0002	zero
Dinoseb*	88-85-7	0.007	0.007
Diquat*	85-00-7	0.020	0.02
Endothall*	145-73-3	0.1	0.1
Endrin*	72-20-8	0.002	0.002
Ethylene dibromide(EDB)♦	106-93-4	0.00005	zero
Glyphosate*	1071-83-6	0.7	0.7
Heptachlor♦	76-44-8	0.0004	zero
Heptachlor epoxide♦	1024-57-3	0.0002	zero
Lindane♦	58-89-9	0.0002	0.0002
Methoxychlor♦	72-43-5	0.04	0.04
Oxamyl(Vydate)*	23135-22-0	0.2	0.2
Pentachlorophenol†	87-86-5	0.001	zero
Picloram*	1918-02-1	0.5	0.5
Simazine*	122-34-9	0.004	0.004
Toxaphene♦	8001-35-2	0.003	zero
2,4-Dichlorophenoxypropionic acid♦	94-75-7	0.07	0.07
2,4,5-TP(Silvex)♦	93-72-1	0.05	0.05

TABLE 1
NATIONAL PRIMARY DRINKING WATER REGULATIONS
(Title 40 CFR - Part 141, 1992)
ORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

VOLATILE ORGANIC CHEMICALS

CHEMICAL	CAS No.	MCL	MCLG
Benzene[+]	71-43-2	0.005	zero
Carbon tetrachloride[+]	56-23-5	0.005	zero
ortho-Dichlorobenzene (1,2)[*]	95-50-1	0.6	0.6
para-Dichlorobenzene (1,4)[+]	106-46-7	0.075	0.075
1,2-Dichloroethane[+]	107-06-2	0.005	zero
1,1-Dichloroethylene[+]	75-35-4	0.007	0.007
cis-1,2-Dichloroethylene[*]	156-59-2	0.07	0.07
trans-1,2-Dichloroethylene[*]	156-60-5	0.1	0.1
Dichloromethane[*] (Methylene chloride)	75-09-2	0.005	zero
1,2-Dichloropropane[*]	78-87-5	0.005	zero
Ethylbenzene[*]	100-41-4	0.7	0.7
Monochlorobenzene[*]	108-90-7	0.100	0.1
Styrene[*]	100-42-5	0.1	0.1
Tetrachloroethylene[*] (PCE)	127-18-4	0.005	zero
Toluene[*]	108-88-3	1.0	1.0
1,2,4-Trichlorobenzene[*]	120-82-1	0.07	0.07
1,1,1-Trichloroethane[+]	71-55-6	0.2	0.2
1,1,2-Trichloroethane[*]	79-00-5	0.005	0.003
Trichloroethylene (TCE)[+]	79-01-6	0.005	zero
Vinyl chloride[+]	75-01-4	0.002	zero
Xylenes (total)[*]	1330-20-7	10.0	10.0

REGION II DRINKING AND GROUND WATER REGULATIONS
(As of May 1993)

LIST OF TABLES

National Secondary Drinking Water Regulations

National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards. For more information, read Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals.

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

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THIS DATA CURRENT AS OF THE FEDERAL REGISTER DATED JUNE 6, 2002

40 CFR - CHAPTER I - PART 141

View Part

§ 141.62 Maximum contaminant levels for inorganic contaminants.

(a) [Reserved]

(b) The maximum contaminant levels for inorganic contaminants specified in paragraphs (b) (2)-(6), (b)(10), and (b) (11)-(16) of this section apply to community water systems and non-transient, non-community water systems. The maximum contaminant level specified in paragraph (b)(1) of this section only applies to community water systems. The maximum contaminant levels specified in (b)(7), (b)(8), and (b)(9) of this section apply to community water systems; non-transient, non-community water systems; and transient non-community water systems.

Contaminant	MCL (mg/l)
(1) Fluoride	4.0
(2) Asbestos	7 Million Fibers/liter (longer than 10 μm).
(3) Barium	2
(4) Cadmium	0.005
(5) Chromium	0.1
(6) Mercury	0.002
(7) Nitrate	10 (as Nitrogen)
(8) Nitrite	1 (as Nitrogen)
(9) Total Nitrate and Nitrite	10 (as Nitrogen)
(10) Selenium	0.05
(11) Antimony	0.006
(12) Beryllium	0.004
(13) Cyanide (as free Cyanide)	0.2
(14) [Reserved]	....
(15) Thallium	0.002
(16) Arsenic	0.01

(c) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant levels for inorganic contaminants identified in paragraph (b) of this section, except fluoride:

BAT FOR INORGANIC COMPOUNDS LISTED IN SECTION 141.62(b)

Chemical Name	BAT(s)
Antimony	2,7
Arsenic\4\	1, 2, 5, 6, 7, 9, 12\5\
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6\2\,7
Cyanide	5,7,10
Mercury	2\1\,4,6\1\,7\1\
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2\3\,6,7,9
Thallium	1,5

\1\BAT only if influent Hg concentrations <ls-thn-eq>10μg/1.
\2\BAT for Chromium III only.
\3\BAT for Selenium IV only.
\4\BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
\5\To obtain high removals, iron to arsenic ratio must be at least 20:1.

Key to BATS in Table

1=Activated Alumina

2 = Coagulation/Filtration (not BAT for systems < 500 service connections)

2=Coagulation/Filtration

3=Direct and Diatomite Filtration

4=Granular Activated Carbon

5=Ion Exchange

6 = Lime Softening (not BAT for systems < 500 service connections)

7=Reverse Osmosis

8=Corrosion Control

9=Electrodialysis

10=Chlorine

11=Ultraviolet

12 = Oxidation/Filtration

(d) The Administrator, pursuant to section 1412 of the Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

Small System Compliance Technologies (SSCTs)\1\ for Arsenic\2\

Small system compliance technology	Affordable for listed small system categories\3\
Activated Alumina (centralized)	All size categories.
Activated Alumina (Point-of-Use)\4\	All size categories.
Coagulation/Filtration\5\	501-3,300, 3,301-10,000.
Coagulation-assisted Microfiltration	501-3,300, 3,301-10,000.
Electrodialysis reversal\6\	501-3,300, 3,301-10,000.
Enhanced coagulation/filtration	All size categories
Enhanced lime softening (pH> 10.5)	All size categories.
Ion Exchange	All size categories.
Lime Softening\5\	501-3,300, 3,301-10,000.
Oxidation/Filtration\7\	All size categories.
Reverse Osmosis (centralized)\6\	501-3,300, 3,301-10,000.
Reverse Osmosis (Point-of-Use)\4\	All size categories.

\1\Section 1412(b)(4)(E)(ii) of SDWA specifies that SSCTs must be affordable and technically feasible for small systems.
\2\SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
\3\The Act (ibid.) specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.
\4\When POU or POE devices are used for compliance, programs to ensure proper long-term operation, maintenance, and monitoring must be provided by the water system to ensure adequate performance.
\5\Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.
\6\Technologies reject a large volume of water--may not be appropriate for areas where water quantity may be an issue.
\7\To obtain high removals, iron to arsenic ratio must be at least 20:1.

[56 FR 3594, Jan. 30, 1991, as amended at 56 FR 30280, July 1, 1991; 57 FR 31847, July 17, 1992; 59 FR 34325, July 1, 1994; 60 FR 33932, June 29, 1995; 66 FR 7063, Jan. 22, 2001]

Electronic Code of Federal Regulations
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THIS DATA CURRENT AS OF THE FEDERAL REGISTER DATED JUNE 6, 2002

40 CFR - CHAPTER I - PART 141

View Part

§ 141.61 Maximum contaminant levels for organic contaminants.

(a) The following maximum contaminant levels for organic contaminants apply to community and non-transient, non-community water systems.

CAS No.	Contaminant	MCL (mg/l)
(1) 75-01-4	Vinyl chloride	0.002
(2) 71-43-2	Benzene	0.005
(3) 56-23-5	Carbon tetrachloride	0.005
(4) 107-06-2	1,2-Dichloroethane	0.005
(5) 79-01-6	Trichloroethylene	0.005
(6) 106-46-7	para-Dichlorobenzene	0.075
(7) 75-35-4	1,1-Dichloroethylene	0.007
(8) 71-55-6	1,1,1-Trichloroethane	0.2
(9) 156-59-2	cis-1,2-Dichloroethylene	0.07
(10) 78-87-5	1,2-Dichloropropane	0.005
(11) 100-41-4	Ethylbenzene	0.7
(12) 108-90-7	Monochlorobenzene	0.1
(13) 95-50-1	o-Dichlorobenzene	0.6
(14) 100-42-5	Styrene	0.1
(15) 127-18-4	Tetrachloroethylene	0.005
(16) 108-88-3	Toluene	1
(17) 156-60-5	trans-1,2-Dichloroethylene	0.1
(18) 1330-20-7	Xylenes (total)	10
(19) 75-09-2	Dichloromethane	0.005
(20) 120-82-1	1,2,4-Trichlorobenzene	.07
(21) 79-00-5	1,1,2-Trichloroethane	.005

(b) The Administrator, pursuant to section 1412 of the Act, hereby identifies as indicated in the Table below granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in paragraphs (a) and (c) of this section:

BAT for Organic Contaminants Listed in Sec. 141.61 (a) and (c

CAS No.	Contaminant
15972-60-8	Alachlor
116-06-3	Aldicarb
1646-88-4	Aldicarb sulfone
1646-87-3	Aldicarb sulfoxide
1912-24-9	Atrazine
71-43-2	Benzene
50-32-8	Benzo[a]pyrene
1563-66-2	Carbofuran
56-23-5	Carbon tetrachloride
57-74-9	Chlordane
75-99-0	Dalapon
94-75-7	2,4-D
103-23-1	Di (2-ethylhexyl) adipate
117-81-7	Di (2-ethylhexyl) phthalate
96-12-8	Dibromochloropropane (DBCP)
95-50-1	o-Dichlorobenzene
106-46-7	para-Dichlorobenzene
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethylene
156-59-2	cis-1,2-Dichloroethylene
156-60-5	trans-1,2-Dichloroethylene
75-09-2	Dichloromethane
78-87-5	1,2-Dichloropropane
88-85-7	Dinoseb
85-00-7	Diquat
145-73-3	Endothall
72-20-8	Endrin
100-41-4	Ethylbenzene
106-93-4	Ethylene Dibromide (EDB)
1071-83-6	Gylphosate
76-44-8	Heptachlor
1024-57-3	Heptachlor epoxide
118-74-1	Hexachlorobenzene
77-47-3	Hexachlorocyclopentadiene
58-89-9	Lindane
72-43-5	Methoxychlor
108-90-7	Monochlorobenzene
23135-22-0	Oxamyl (Vydate)
87-86-5	Pentachlorophenol
1918-02-1	Picloram
1336-36-3	Polychlorinated biphenyls (PCB)
122-34-9	Simazine
100-42-5	Styrene
1746-01-6	2,3,7,8-TCDD (Dioxin)
127-18-4	Tetrachloroethylene
108-88-3	Toluene
8001-35-2	Toxaphene
93-72-1	2,4,5-TP (Silvex)
120-82-1	1,2,4-Trichlorobenzene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethylene
75-01-4	Vinyl chloride
1330-20-7	Xylene

(c) The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:

	CAS No.	Contaminant	MCL (mg/l)
(1)	15972-60-8	Alachlor	0.002
(2)	116-06-3	Aldicarb	0.003
(3)	1646-87-3	Aldicarb sulfoxide	0.004
(4)	1646-87-4	Aldicarb sulfone	0.002
(5)	1912-24-9	Atrazine	0.003
(6)	1563-66-2	Carbofuran	0.04
(7)	57-74-9	Chlordane	0.002
(8)	96-12-8	Dibromochloropropane	0.0002
(9)	94-75-7	2,4-D	0.07
(10)	106-93-4	Ethylene dibromide	0.00005
(11)	76-44-8	Heptachlor	0.0004
(12)	1024-57-3	Heptachlor epoxide	0.0002
(13)	58-89-9	Lindane	0.0002
(14)	72-43-5	Methoxychlor	0.04
(15)	1336-36-3	Polychlorinated biphenyls.	0.0005
(16)	87-86-5	Pentachlorophenol	0.001
(17)	8001-35-2	Toxaphene	0.003
(18)	93-72-1	2,4,5-TP	0.05
(19)	50-32-8	Benzo[a]pyrene	0.0002
(20)	75-99-0	Dalapon	0.2
(21)	103-23-1	Di(2-ethylhexyl) adipate.	0.4
(22)	117-81-7	Di(2-ethylhexyl) phthalate.	0.006
(23)	88-85-7	Dinoseb	0.007
(24)	85-00-7	Diquat	0.02
(25)	145-73-3	Endothall	0.1
(26)	72-20-8	Endrin	0.002
(27)	1071-53-6	Glyphosate	0.7
(28)	118-74-1	Hexacholorbenzene	0.001
(29)	77-47-4	Hexachlorocyclopentadiene.	0.05
(30)	23135-22-0	Oxamyl (Vydate)	0.2
(31)	1918-02-1	Picloram	0.5
(32)	122-34-9	Simazine	0.004
(33)	1746-01-6	2,3,7,8-TCDD (Dioxin)	3 x 10⁻⁸

[56 FR 3593, Jan. 30, 1991, as amended at 56 FR 30280, July 1, 1991; 57 FR 31846, July 17, 1992; 59 FR 34324, July 1, 1994]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: JUL 20 1993

SUBJECT: Region II Drinking and Ground Water Standards Update

FROM: Dore LaPosta, Chief
Ground Water Management Section

TO: Addressees

Attached is an updated revised listing of tables of Drinking and Ground Water Standards for Region II. These tables replace the previous ones that were attached to my March 1992 memo of Federal and State MCL Tables update. In this new set of tables, we have included the New Jersey Ground Water Quality Standards, the NYSDEC Water Quality Regulations for Ground Waters, and the Commonwealth of Puerto Rico Water Quality Standards Regulation. Please note that the New Jersey Proposed Soil and Ground Water Cleanup Standards that were in the our previous tables have been removed and are no longer in use.

Please distribute this information to the appropriate people.

If you have any questions or comments, please call me or Manuel Arbizu of my staff at extension 5718. Please let us know if you would like us to put these tables in the LAN.

Attachments

Addressees

Robert McKnight
Charles Tenerella
Donald Lynch
Kim O'Connell
Janet Feldstein
Damien Duda
Joel Singerman
Dennis Santella
Pat Evangelista
Kevin Lynch
Melvin Hauptman
Robert Wing
Nicki Di Forte
Ray Basso
Doug Blazey
Delmar Karlen
Eric Schaaf
Warren Llewellyn
Ruth Izraeli
Galeena Tsoukanova
Linda Ross

cc: Walt Andrews - WMD
Paul Molinari - WMD

REGION II FORM 1320-1 (9/85)

TABLE 12
NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
ORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

GENERAL ORGANIC CHEMICALS

PRINCIPAL ORGANIC CHEMICAL (POC)°	CAS No.	MCL
Benzene	71-43-2	0.005
Bromobenzene	108-86-1	0.005
Bromochloromethane	74-97-5	0.005
Bromomethane	74-83-9	0.005
n-butylbenzene	104-51-8	0.005
sec-butylbenzene	135-98-8	0.005
tert-butylbenzene	98-06-6	0.005
Carbon tetrachloride	56-23-5	0.005
Chloroethane	75-00-3	0.005
2-chlorotoluene	95-49-8	0.005
4-chlorotoluene	106-43-4	0.005
Dibromomethane	74-95-3	0.005
o-Dichlorobenzene (1,2)	95-50-1	0.005
m-Dichlorobenzene (1,3)	541-73-1	0.005
p-Dichlorobenzene (1,4)	106-46-7	0.005
Dichlorodifluoromethane	75-71-8	0.005
1,1-Dichloroethane	75-34-3	0.005
1,2-Dichloroethane	107-06-2	0.005
1,1-Dichloroethylene	75-35-4	0.005
cis-1,2-Dichloroethylene	156-59-2	0.005
trans-1,2-Dichloroethylene	152-60-5	0.005
Dichloromethane (Methylene chloride)	75-09-2	0.005
1,2-Dichloropropane	78-87-5	0.005
1,3-Dichloropropane	142-28-9	0.005
2,2-Dichloropropane	594-20-7	0.005
1,1-Dichloropropene	563-58-6	0.005
cis-1,3-Dichloropropene	10061-01-5	0.005
trans-1,3-Dichloropropene	10061-02-6	0.005
Ethylbenzene	100-41-4	0.005
Hexachlorobutadiene	87-68-3	0.005
Isopropylbenzene	98-82-8	0.005

TABLE 12 (CONTINUED)

PRINCIPAL ORGANIC CONTAMINANT (POC)[a]	CAS No.	MCL
p-Isopropyltoluene	99-85-6	0.005
Monochlorobenzene	108-90-7	0.005
n-Propylbenzene	103-65-1	0.005
Styrene	100-42-5	0.005
1,1,1,2-Tetrachloroethane	630-20-6	0.005
1,1,2,2-Tetrachloroethane	79-34-5	0.005
Tetrachloroethylene	127-18-4	0.005
Toluene	108-88-3	0.005
1,2,3-Trichlorobenzene	87-61-6	0.005
1,2,4-Trichlorobenzene	120-82-1	0.005
1,1,1-Trichloroethane	71-55-6	0.005
1,1,2-Trichloroethane	79-00-5	0.005
Trichloroethylene (TCE)	79-01-6	0.005
Trichlorofluoromethane	75-69-4	0.005
1,2,3-Trichloropropane	96-18-4	0.005
1,2,4-Trimethylbenzene	95-63-6	0.005
1,3,5-Trimethylbenzene	108-67-8	0.005
Xylenes (total)	1330-20-7	0.005

UNSPECIFIED ORGANIC CHEMICAL (UOC)	MCL
Any organic chemical compound not otherwise specified in Chapter I of the New York Sanitary Code Part 5, Subpart 5-1.	0.05

TOTAL POCs and UOCs	MCL
	0.1

TABLE 12 (CONTINUED)

SPECIFIC ORGANIC CHEMICALS

CHEMICAL	CAS No.	MCL
Alachlor	15972-60-8	0.002
Aldicarb	116-06-3	0.003
Aldicarb sulfone	1646-88-4	0.002
Aldicarb sulfoxide	1646-87-3	0.004
Atrazine	1612-24-9	0.003
Carbofuran	1563-66-2	0.015
Chlordane	57-74-9	0.002
Dibromochloropropane (DPCP)	96-12-8	0.0002
Endrin	72-20-8	0.0002
Ethylene dibromide (EDB)	106-93-4	0.00005
Heptachlor	76-44-8	0.0004
Heptachlor epoxide	1024-57-3	0.0002
Lindane	58-89-9	0.0002
Methoxychlor	72-43-5	0.04
Pentachlorophenol	87-86-5	0.001
Polychlorinated biphenyls (PCBs)	1336-36-3	0.0005
Toxaphene	8001-35-2	0.003
2,4-D	94-75-7	0.050
2,4,5-TP (Silvex)	93-72-1	0.010
Vinyl Chloride	9003-22-9	0.002

TRIHALOMETHANES

TOTAL TRIHALOMETHANES	MCL
The sum of the concentrations of bromodichloromethane, tribromomethane (bromoform), dibromochloromethane, and trichloromethane (chloroform).	0.10

°Principal organic contaminant (POC) means any organic chemical compound belonging to the following classes, <u>except for</u> Total Trihalomethanes, vinyl chloride, and regulated Pesticides:

1) Halogen alkane
2) Halogenated ether
3) Halobenzenes and substituted halobenzenes
4) Benzene and alkyl- or nitrogen-substituted benzenes
5) Substituted, unsaturated hydrocarbons
6) Halogenated nonaromatic cyclic hydrocarbons

TABLE 13
NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
INORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

CHEMICAL	CAS No.	MCL
Arsenic	7440-38-2	0.05
Asbestos (Longer than 10 microns)	1332-21-4	7.0 MFL
Barium	7440-39-3	2.00
Cadmium	7440-43-9	0.005
Chromium	7440-47-3	0.10
Fluoride	-	2.2
Nitrate (as N)	-	10.0
Nitrite (as N)	-	1.0
Total Nitrate/Nitrite	14797-55-8	10.0
Lead	7439-92-1	0.05
Mercury	7439-97-6	0.002
Selenium	7782-49-2	0.01
Silver	7440-22-4	0.05

MFL - Million Fibers per Liter

TABLE 14
NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
RADIONUCLIDES
All units are in picocuries per liter (pCi/l), unless noted otherwise

Contaminant	MCL
Combined radium 226 and radium 228	5
Gross alpha activity (including radium 226 but excluding radon and uranium)	15
Beta particle and photon radioactivity from manmade radionuclides	Four millirems per year as the annual dose equivalent to the total body or any internal organ. The department shall determine the concentration capable of producing four millirems per year.

TABLE 15
NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
MICROBIOLOGICAL CONTAMINANTS & TURBIDITY

CONTAMINANT	MCL	DETERMINATION OF MCL VIOLATION
COLIFORM BACTERIA	Any positive sample	A violation occurs at systems collecting 40 or more samples per month when more than 5.0 percent of the total coliform samples are positive. A violation occurs at systems collecting less than 40 samples per month when two or more samples are total coliform positive.
E coli	Any positive sample	A violation occurs when a total coliform positive sample is positive for Escherichia coli (E. coli) and a repeat total coliform sample is positive or when a total coliform positive sample is negative for Escherichia coli (E. coli) but a repeat total coliform sample is positive and the sample is also positive for Eschericia coli.
Giardia lamblia, Viruses, Legionella, & Heterotrophic plate count bacteria:	Treatment technique requirements in lieu of MCLs. New York State filtration rule in effect 3/31/91.	—
Entry point turbidity (surface water only)	1 Nephelometric Turbidity Units (NTUs) (Monthly average) 5 NTUs (Two-consecutive-day average)	A violation occurs when the average of all daily entry point analyses for the month exceeds the MCL rounded off to the nearest whole number. A violation occurs when the aberage of two consecutive daily entry point analyses exceeds the MCL rounded off to the nearest whole number.
Distribution System Turbidity	5 NTUs (Monthly average)	A violation occurs when the monthly average of the results of all distribution samples collected in any calendar month exceeds the MCL rounded off to the nearest whole number.

TABLE 16
NEW YORK SECONDARY MAXIMUM CONTAMINANT LEVELS
(10 NYCRR Part 5, subpart 5-1, 1992)
All units are milligrams per liter (mg/l), unless noted otherwise

CHEMICAL	SMCL
Chloride	250.0
Copper	1.0
Corrosivity	Noncorrosive
Iron*	0.3
Manganese*	0.3
Sodium♦	No Designated Limits
Sulfate	250.0
Zinc	5.0
Color	15 units
Odor	3 units

*If iron and manganese are present, the total concentration of both should not exceed 0.5 mg/l. Higher levels may be allowed when justified by the supplier of water.

♦Water containing more than 20 mg/l of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/l of sodium should not be used for drinking by people on moderately restricted sodium diets.

TABLE 17
NYSDEC CLASS GA GROUND WATER QUALITY AND EFFLUENT STANDARDS
(6 NYCRR Part 703.5 and 703.6, 1991)
All units are mg/l unless stated otherwise

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Alachlor	15972-60-8	0.035	0.035
Aldicarb & Methomyl	116-06-3; 16752-77-5	0.00035	0.00035
Aldrin	309-00-2	ND	ND
Aluminum	7429-90-5	-	2.0
Ametryn	834-12-8	0.050	-
Aminocresols	95-84-1; 2835-95-2; 2835-99-6	0.001	-
Ammonia and Ammonium ($NH_3+NH_4^+$ as N)	7664-41-7; 12125-02-9	2.0	-
Arsenic	7440-38-2	0.025	0.050
Atrazine	1912-24-9	0.0075	0.0075
Azinphosmethyl	86-50-0	0.0044	0.0044
Barium	7440-39-3	1.0	2.0
Benefin	1861-40-1	0.035	0.035
Benzene	71-43-2	0.0007	0.0007
Benzo(a)pyrene	50-32-8	ND	ND
Bis(2-chloroethyl)ether	111-44-4	0.001	0.001
Bis(2-ethyhexyl)phthalate	117-81-7	0.050	4.2
Boron	7440-42-8	1.0	-
Bromacil	314-40-9	0.0044	0.0044
Butachlor	23184-66-9	0.0035	0.0035
Butylate	2008-41-5	0.050	-
Cadmium	7440-43-9	0.010	0.020
Captan	133-06-2	0.018	0.018
Carbaryl	63-25-2	0.029	0.029
Carbon tetrachloride	56-23-5	0.005	0.005
Carboxin	5234-68-4	0.050	-
Chloramben	NA	0.050[1]	0.088[1]
Chlordane	57-74-9	0.0001	0.0001

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Chloride	7647-14-5	250.0	500.0
Chloroform	67-66-3	0.007	0.007
Chromium	NA	0.050	-
Chromium (hexavalent)	NA	0.050	0.1
Copper	NA	0.2	1.0
Cyanide	NA	0.1	0.4
Dalapon	NA	0.050	-
DDT, DDD, DDE	50-29-3; 72-54-8; 72-55-9	ND	ND
Diazinon	333-41-5	0.0007	0.0007
Di-n-butylphthalate	84-74-2	0.050	0.770
Dicamba	1918-00-9	0.00044	0.00044
(1,4-) and (1,2-) Dichlorobenzenes	106-46-7; 541-73-1	0.0047	0.0047
2,4-Dichlorophenoxyacetic acid	94-75-1	0.0044	0.0044
Dieldrin	60-57-1	ND	ND
Dimethyl tetrachloro-terephthalate	1861-32-1	0.050	-
Diphenamid	957-51-7	0.050	-
Diphenylhydrazines	122-66-7; 530-50-7	ND	ND
Endrin	72-20-8	ND	ND
Ethylenethiourea	96-45-7	ND	ND
Ferbam	14484-64-1	0.0042	0.0042
Fluometuron	2164-17-2	0.050	-
Fluoride	NA	1.5	3.0
Foaming Agents	NA	0.5	1.0[4]
Folpet	133-07-3	0.050	0.056
Gross Alpha Radiation	NA	15 pCi/l	-

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Gross Beta Radiation	NA	1000 pCi/l	-
Heptachlor and Heptachlor epoxide	76-44-8; 1024-57-3	ND	ND
Hexachlorobenzene	118-74-1	0.00035	0.00035
Hexachlorocyclohexanes	58-89-9; 319-84-6; 319-85-7; 319-86-8; 6108-10-7;608-73-1	ND	ND
Hexachlorophene	70-30-4	-	0.007
Hexazinone	51235-04-2	0.050	-
Iron	NA	0.300	0.6
Iron and Manganese	NA	0.500	-
Kepone	143-50-0	ND	ND
Lead	NA	0.025	0.050
Malathion	121-75-5	0.0070	0.007
Mancozeb	8018-01-7	0.0018	0.0018
Maneb	12427-38-2	0.0018	0.0018
Manganese	NA	0.300	0.6[5]
Mercury	NA	0.002	0.004
Methoxychlor	72-43-5	0.035	0.035
2-Methyl-4-chlorophenoxyacetic acid	94-74-6	0.00044	0.00044
Methyl methacrylate	80-62-6	0.050	0.7
Metribuzin	21087-64-9	0.050	-
Nabam	142-59-6	0.0018	0.0018
Nickel	NA	-	2.0
Nitralin	4726-14-1	0.035	0.035
Nitrate (expressed as N)	NA	-	20.0
Nitrate and Nitrite (expressed as N)	NA	10.0	-
Nitrilotriacetic acid	NA	0.003[2]	0.003[2]
Nitrite	NA	10.0	-
Oil and Grease	NA	-	15.0

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Oxamyl	23135-22-0	0.050	-
Paraquat	4685-14-7	0.0030	0.003
Parathion and Methyl parathion	56-38-2; 298-00-0	0.0015	0.0015
Pentachloronitrobenzene	82-68-8	ND	ND
Pentachlorophenol	87-86-5	0.001	-
pH	NA	-	See Note 6
Phenol	108-95-2	0.001	-
Phenolic compounds (total phenols)	NA	0.001	0.002
Phenols, total chlorinated	NA	0.001	-
Phorate and Disulfoton	298-02-2; 298-04-4	ND	ND
Picloram	NA	0.050[1]	-
Polychlorinated biphenyls	NA	0.0001	0.0001
Principal organic contaminant	NA	0.005	-
Prometon	1610-18-0	0.050	-
Propachlor	1918-16-7	0.035	0.035
Propanil	709-98-8	0.007	0.007
Propazine	139-40-2	0.016	0.016
Propham	122-42-9	0.050	-
Radium 226	NA	3 pCi/l	-
Radium 226 & 228	NA	5 pCi/l	-
Selenium	NA	0.010	0.040
Silver	NA	0.050	0.1
Simazine	122-34-9	0.050	0.075
Sodium	NA	20.0	-
Styrene	100-42-5	0.050	0.930
Sulfate	NA	250.0	500.0
Sulfide	NA	-	1.0
Tebuthiuron	34014-18-1	0.050	-

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Terbacil	5902-51-2	0.050	-
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3.5×10^{-8}	3.5×10^{-8}
Tetrachlorotere-phthalic acid	2136-79-0	0.050	-
Thiram	137-26-8	0.0018	0.0018
Toxaphene	8001-35-2	ND	ND
Trichloroethylene	79-01-6	-	0.010
2,4,5-Trichlorophenoxyacetic acid	93-76-5	0.035	0.035
2,4,5-Trichlorophenoxypropionic acid	93-72-1	0.00026	0.00026
Trifluralin	1582-09-8	0.035	0.035
Uranyl ion	NA	5.0	-
Vinyl chloride	75-01-4	0.002	0.005
Zinc	NA	0.3	5.0
Zineb	12122-67-7	0.0018	0.0018
Ziram	137-30-4	0.0042	0.0042

NA = Not Available

NOTES.

1 Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.

2 Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less.

3 This standard applies to any and every individiual substance that is in the principal organic contaminant classes, except any substance that has a standard for class GA waters listed elsewhere in this table. A less stringent guidance value for an individual substance may be substituted for this standard. If so determined by the Commissioner of the New York State Department of Health, pursuant to 10 NYCRR section 5-1.51(g).

4 Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.

5 Combined concentration of iron and manganese shall not exceed 1000 ug/L.

6 pH shall not be lower than 6.5 or the pH of the natural ground water, whichever is lower, nor shall be greater than 8.5 or the pH of the natural ground water, whichever is greater.

TABLE 18
PUERTO RICO GROUND WATER QUALITY STANDARDS
(1990)
All units are milligrams per liter (mg/l)

CONTAMINANT	CAS No.	STANDARD
Arsenic	7440-36-0	0.000022
Azinphos-methyl	563-12-2	0.00001
Benzene	71-43-2	0.005
Cadmium	7440-43-9	0.005
Carbon tetrachloride	56-23-5	0.005
Chlorpyrifos	2921-88-2	0.000041
Coumaphos	56-72-4	0.00001
2,4-D	94-75-7	0.1
Demeton	8065-48-3	0.0001
Dichlorobenzenes	95-50-1; 106-46-7	0.075
1,2-Dichloroethane	67905-86-6	0.005
1,1-Dichloroethylene	75-35-4	0.007
Endosulfan	115-29-7	0.000056
Endrin	72-20-8	0.0000023
Fenthion	56-38-2	0.0004
Lead	7439-92-1	0.050
Malathion	121-75-5	0.0001
Methoxychlor	72-43-5	0.000020
Mirex	67-66-3	0.000001
Naled	300-76-5	0.0004
Parathion	56-38-2	0.000013
Pentachlorophenol	87-86-5	0.00007
Perthane	72-55-9	0.00007
Phenolic substances	-	0.001
Tetrachloroethylene	127-18-4	0.005
Toxaphene	8001-35-2	0.0000002
2,4,5-TP (Silvex)	93-72-1	0.010
1,1,1-Trichloroethane	71-55-6	0.2
Trichloroethylene	79-01-6	0.005
Vinyl chloride	75-01-4	0.002

National Primary and Secondary Drinking Water Regulations: Analytical Methods for Chemical and Microbiological Contaminants and Revisions to Laboratory Certification Requirements.

Published in Federal Register: Friday, December 1, 1999 (64 FR 67450).

Effective Dates: Except for the delayed withdrawal of some EPA methods, the actions in this rule are effective on January 3, 2000. The EPA methods will be withdrawn on June 1, 2001. This delay provides a 17-month overlap between the old and the new EPA methods.

III. Summary of Final Rule

A. This rule amends the regulations at 40 CFR Part 141 to:

1. Allow use of newer versions of 25 methods published by the American Society for Testing and Materials (ASTM). The new versions are published in the 1996 Annual Book of ASTM Standards, Vols. 11.01 and 11.02.
2. Allow use of newer versions of 54 methods published by the Standard Methods Committee. The new versions are published in Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.
3. Allow use of 13 of the 14 compliance monitoring methods published by EPA in the document, Methods for the Determination of Organic Compounds in Drinking Water - Supplement III, EPA/600/R-95/131, August 1995. These 13 methods replace the previous versions of these methods. The compliance method published in Supplement III that is not approved in today's rule is EPA Method 515.1, Rev. 4.1; the previous version, Rev. 4.0, continues to be the approved version.
4. Approve a new method for the determination of lead under the Lead and Copper Rule, Palintest Method 1001.
5. Approve six new methods for the determination of magnesium, EPA Method 200.7, ASTM D-511-93 versions A and B, and SM 3500-Mg versions B, C and E under the DBP Rule.
6. Approve two additional methods for the determination acid herbicides, EPA Method 515.3 and ASTM D5317-93.
7. Replace EPA Method 549.1 for determination of Diquat with EPA Method 549.2.
8. Approve use of a new membrane filter medium, MI (4-Methylumbelliferyl-Beta-D-galactopyranoside - Indoxyl-Beta-D-glucuronide) Agar, for the simultaneous determination of the presence of total coliforms and *E. coli.* in drinking water under the Total Coliform Rule (TCR). MI Agar is also approved for the enumeration of total coliforms in source water under the Surface Water Treatment Rule (SWTR).
9. Approve two new methods, E*Colite Test and m-ColiBlue24 Test, for the simultaneous determination of the presence of total coliforms and E. coli. in drinking water under the TCR.
10. Require that microbiological samples collected for the determination of coliforms or fecal coliforms in source water under the SWTR or for determination of heterotrophic bacteria in distribution system samples be shipped and held below 10°C.
11. Reduce the minimum incubation time for reading the Colisure Test, for determination of total coliforms, from 28 hours to 24 hours in drinking water under the TCR.
12. Require that a PE sample for chemical contaminants be successfully analyzed at least once each year using each method used to report compliance monitoring results. Additional methods used for confirmation testing, however, would not require PE proficiency testing.
13. Clarify that the acceptance limits for successfully measuring chemical analytes in a PE sample apply only if that analyte has been added to the PE sample.

14. Increase the maximum holding time from 48 hours to 14 days for chlorinated, unacidified drinking water samples collected for determination of nitrate.

15. Promote safe handling of acids by clarifying that acidification of samples for determinations of metals can be conducted in the laboratory rather than in the field and allowing use of dilute (1:1) solutions of acid to preserve samples collected for the determination of metals or nitrate (including total nitrate).

16. Provide an option for field/ laboratory determinations of alkalinity, calcium, conductivity, orthophosphate and silica in drinking water samples by any person acceptable to the State to conduct these determinations. Previously a laboratory had to be certified to conduct these determinations.

B. This rule amends the regulations at 40 CFR Part 143 to:

1. Add methods for the determination of chloride to the table of methods recommended for the optional monitoring of secondary drinking water contaminants. The new recommended methods for chloride are ASTM D 512-89B and SM 4500-Cl^- B.

2. Add methods for the determination of sulfate to the table of methods recommended for the optional monitoring of secondary drinking water contaminants. The new recommended methods for sulfate are ASTM D 516-90 and SM 4500-$SO42^-$ E.

III. Summary of Final Rule

A. <u>This rule modifies the regulations at 40 CFR Parts 141 to:</u>

1. Allow use of newer versions of 25 methods published by the American Society for Testing and Materials (ASTM). The new versions are published in the 1996 <u>Annual Book of ASTM Standards</u>, Vols. 11.01 and 11.02.
2. Allow use of newer versions of 54 methods published by the Standard Methods Committee. The new versions are published in <u>Standard Methods for the Examination of Water and Wastewater</u>, 19th edition, 1995.
3. Allow use of 13 of the 14 compliance monitoring methods published by EPA in the document, <u>Methods for the Determination of Organic Compounds in Drinking Water - Supplement III</u>, EPA-600/R-95-131, August 1995. These 13 methods replace the previous versions of these methods. The compliance method published in Supplement III that is not approved in today's rule is EPA Method 515.1, Rev. 4.1; the previous version, Rev. 4.0, continues to be the approved version.
4. Approve a new method for the determination of lead under the Lead and Copper Rule, Palintest Method 1001.
5. Approve six new methods for the determination of magnesium, EPA Method 200.7, ASTM D-511-93 versions A and B, and SM 3500-Mg versions B, C and E under the DBP Rule.
6. Approve two additional methods for the determination acid herbicides, EPA Method 515.3 and ASTM D5317-93.
7. Replace EPA Method 549.1 for determination of Diquat with EPA Method 549.2.
8. Approve use of a new membrane filter medium, 4-methylumbelliferyl-beta-D-galactopyranoside indoxyl-beta-D gluconoride (MI) agar, for the simultaneous determination of total coliforms and *E. coli.* in drinking water under the Total Coliform Rule (TCR) and source water under the Surface Water Treatment Rule (SWTR).
9. Approve two new methods for determination of total coliforms, EColite™ Test and m-ColiBlue24™ Test in source water under the SWTR.
10. Require that microbiological samples collected for the determination of coliforms or fecal coliforms in source water under the SWTR or for determination of heterotrophic bacteria in distribution system samples be shipped and held below 10°C.
11. Reduce the minimum incubation time for reading the Colisure Test, for determination of total coliforms, from 28 hours to 24 hours in drinking water under the TCR.
12. Require that a PE sample for chemical contaminants be successfully analyzed at least once each year using each method used to report, not confirm, compliance monitoring results.
13. Clarify that the acceptance limits for successfully measuring chemical analytes in a PE sample apply only if that analyte has been added to the PE sample.
14. Increase the maximum holding time from 48 hours to 14 days for chlorinated, unacidified drinking water samples collected for determination of nitrate.
15. Promote safe handling of acids by clarifying that acidification of samples for determinations of metals can be conducted in the laboratory rather than in the field and allowing use of dilute (1:1) solutions of acid to preserve samples collected for the determination of metals or nitrate (including total nitrate).
16. Provide an option for field/ laboratory determinations of alkalinity, calcium, conductivity, orthophosphate and silica in drinking water samples by any person acceptable to the State to conduct these determinations. Previously a laboratory had to be certified to conduct these determinations.

United States
Environmental Protection Agency
Office of Water
4607
EPA 815-F-99-013
December 1999

EPA

NATIONAL PRIMARY AND SECONDARY DRINKING WATER REGULATIONS: ANALYTICAL METHODS FOR CHEMICAL AND MICROBIOLOGICAL CONTAMINANTS AND REVISIONS TO LABORATORY CERTIFICATION REQUIREMENTS - FINAL RULE

Fact Sheet

Under the Safe Drinking Water Act, Environmental Protection Agency (EPA) approves analytical methods to be used in compliance monitoring of drinking water. Periodically, the Agency revises or replaces compliance methods based on user suggestions, changing regulatory needs and improvements in technology.

This rule, which was promulgated on December 1, 1999 (64 FR 67450), approves the use of updated versions of 14 EPA methods, 25 American Society for Testing and Materials (ASTM) methods, and 54 Standard Methods for Examination of Water and Wastewater (SM) for compliance with drinking water standards and monitoring requirements. Compared to the currently approved versions, the new versions contain primarily editorial, technical or other changes that make the method easier to conduct or safer. EPA will withdraw earlier versions of the 14 EPA methods on June 1, 2001. Earlier versions of approved methods published by ASTM and SM are not withdrawn and continue to be approved for compliance monitoring. In addition, EPA is approving two new methods, EPA 515.3 and ASTM D5317-93, for acid herbicides. EPA is not withdrawing approval of EPA 515.1 or 515.2 for determination of acid herbicides because these methods are not obsolete.

EPA is approving the use of a new membrane filter medium, MI Agar, for the determination of the presence of total coliforms and *E. Coli* in drinking water under the Total Coliform Rule (TCR). MI Agar is also approved for the enumeration of total coliforms in source water under the Surface Water Treatment Rule (SWTR). EPA is approving two new tests, m-ColiBlue24® and E*Colite®, for the simultaneous detection of total coliform and *E. coli* in drinking water under the TCR. The rule requires that microbiological source water samples collected under the SWTR for the determination of coliform and fecal coliform or for determination of heterotrophic bacteria in distribution system samples be held below 10°C during transit and storage.

EPA is allowing a choice of six methods (ASTM D 511-93 A and B, EPA 200.7, and SM 3111 B, SM 3120 B and 3500 Mg E) for determination of magnesium. Magnesium determinations will be required of systems that elect to use the magnesium control alternative to the total organic carbon removal requirements of the 1998 Stage One Disinfection By-Products Rule.

APPENDIX E

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

6 NYCRR PART 703

SURFACE WATER AND GROUNDWATER QUALITY STANDARDS AND GROUNDWATER EFFLUENT LIMITATIONS

6 NYCRR Part 703

Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations

(Statutory authority: Environmental Conservation Law, §§ 3-0301[2][m], 15-0313, 17-0301, 17-0809)

[Effective Date: 1967]
[Amended last on August 1999]
[page 1 of 1]

Contents:

Historical Note

Part (§§ 703.1-703.4) filed March 20, 1967; repealed, new filed April 28, 1972; repealed, new (§§ 703.1 -703.11) filed Aug. 2, 1978; repealed, new (§§ 703.1-703.7) filed Aug. 2, 1991; amd. filed July 16, 1999 eff. Aug. 4, 1999. Amended Part title.

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§703.1 Substance form

A water quality standard, guidance value or groundwater effluent limitation includes all (total) forms of the substance, unless indicated otherwise. Where a standard or guidance value is for a specific form of the substance, water quality-based effluent limitations for SPDES permits may include other forms of the substance to account for changes in the substance that occur in the receiving water.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; Aug. 2, 1991; amd. filed July 16, 1999 eff. Aug. 4, 1999.

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§703.2 Narrative water quality standards

Narrative standards for specific water classes are provided in this section. Narrative standards for classes N and AA-Special are provided in Part 701 of this Title.

Parameter	*Classes*	*Standard*
Taste-, color-, and toxic and other deleterious substances	AA, A, B, C, D, SA, SB, SC, I, SD, A-Special, GA, GSA, GSB	None in amounts that will adversely affect the taste, color or odor thereof, or impair the waters for their best usages.
Turbidity	AA, A, B, C, D, SA, SB, SC, I, SD	No increase that will cause a substantial visible contrast to natural conditions.
Suspended, colloidal and settleable solids	AA, A, B, C, D, SA, SB, SC, I, SD, A-Special	None from sewage, industrial wastes or other wastes that will cause deposition or impair the waters for their best usages.
Oil and floating substances	AA, A, B, C, D, SA, SB, SC, I, SD, A-Special	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
Garbage, cinders, ashes, oils, sludge and other refuse	SA, SB, SC, I, SD	None in any amounts.
Phosphorus and nitrogen	AA, A, B, C, D, SA, SB, SC, I, SD, A-Special	None in amounts that will result in growths of algae, weeds and slimes that will impair the waters

		for their best usages.
Radioactivity	A-Special	Should be kept at the lowest practicable levels, and in any event should be controlled to the extent necessary to prevent harmful effects on health.
Thermal discharges	GA, GSA, GSB	None in amounts that will impair the waters for their best usages.
Thermal discharges	AA, A, B, C, D, SA, SB, SC, I, SD, A-Special	See Part 704 of this Title.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; Aug. 2, 1991 eff. 30 days after filing.

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§703.3 Water quality standards for pH, dissolved oxygen, dissolved solids, odor, color and turbidity

Standards for specific classes are provided in this section.

Parameter	*Classes*	*Standard*
pH	AA, A, B, C, AA-Special, A-Special, GA	Shall not be less than 6.5 nor more than 8.5.
	D	Shall not be less than 6.0 nor more than 9.5.
	SA, SB, SC, I, SD	The normal range shall not be extended by more than one-tenth (0.1) of a pH unit.
Dissolved oxygen (DO)	A-Special	In rivers and upper waters of lakes, not less than 6.0 mg/L at any time. In hypolimnetic waters, it should not be less than necessary for the support of fishlife, particularly cold water species.
	AA, A, B, C, AA-	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0

	Special	mg/L from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/L, and at no time shall the concentration be less than 5.0 mg/L. For nontrout waters, the minimum daily average shall not be less than 5.0 mg/L, and at no time shall the DO concentration be less than 4.0 mg/L.
	D, SD	Shall not be less than 3.0 mg/L at any time.
	SA, SB, SC	Shall not be less than 5.0 mg/L at any time.
	I	Shall not be less than 4.0 mg/L at any time.
Dissolved solids	A-Special AA, A, B, C, AA-Special, GA	Shall not exceed 200 mg/L. Shall be kept as low as practicable to maintain the best usage of waters but in no case shall it exceed 500 mg/L.
Odor	GA	Shall not exceed a threshold odor number of 3.
Color	GA	Shall not exceed 15 color units (platinum-cobalt method).
Turbidity	GA	Shall not exceed 5 nephelometric units.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; Aug. 2,1991 eff. 30 days after filing.

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§703.4 Water qualify standards for coliforms

Total and fecal coliform standards for specific classes are provided in this section.

(a)Total coliforms (number per 100 ml).

Classes	*Standard*
AA	The monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 50 and 240, respectively.

A, B, C, D, SB, SC	The monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 2,400 and 5,000, respectively.
SA	The median most probable number (MPN) value in any series of representative samples shall not be in excess of 70.
I	The monthly geometric mean, from a minimum of five examinations, shall not exceed 10,000.
A-Special	The geometric mean, of not less than five samples, taken over not more than a 30-day period shall not exceed 1,000.
GA	The maximum allowable limit is 50.

(b) Fecal coliforms (number per 100 ml).

Classes	***Standard***
A, B, C, D, SB, SC	The monthly geometric mean, from a minimum of five examinations, shall not exceed 200
I	The monthly geometric mean, from a minimum of five examinations, shall not exceed 2,000.
A-Special	The geometric mean, of not less than five samples, taken over not more than a 30-day period shall not exceed 200.

(c) The total and fecal coliform standards for classes B, C, D, SB, SC and I shall be met during all periods when disinfection is practiced.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; amd. filed Nov. 5, 1984; repealed, new filed Aug. 2, 1991; amd. filed Dec. 10, 1993 eff. 30 days after filing. Amended (a).

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§703.5 Water quality standards for taste-, color- and odor-producing, toxic and other deleterious substances

(a) Water quality standards for specific substances or groups of substances are listed in Table 1 of subdivision (f) of this section for the applicable water classes. The substance name is listed with the associated Chemical Abstract Service Registry Number (CAS No.) where applicable. For entries in Table 1 of subdivision (f) of this section that refer to chemical groups, congeners or other expressions of multiple substances, the standard applies to the sum of the substances, unless otherwise indicated.

(b) Standards are Health (Water Source), Health (Fish Consumption), Aquatic (Chronic), Aquatic (Acute), Wildlife or Aesthetic based and are respectively designated as H(WS), H(FC), A(C), A(A), W or E in the column headed "Type." Where more than one Type of standard is listed for a water class, the most stringent applies.

(c) The "Basis Code" in Table 1 of subdivision (f) of this section provides a further description of the basis of the standard. A list of basis codes is found in Table 2 of subdivision (f) of this section.

(d) The standard is the maximum allowable concentration in micrograms per liter (ug/L), unless otherwise noted. A standard defined by the symbol "ND" means not detectable by the analytical tests specified or approved pursuant to Part 700 of this Title.

(e) Special interpretive remarks are provided as necessary.

(f) *Tables*.

Table 1 (cf. section 703.5)
WATER QUALITY STANDARDS SURFACE WATERS AND GROUNDWATER

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	TYPE	BASIS CODE
Acenaphthene (83-32-9)	A, A-S, AA, AA-S	20	E	U
Acrolein (107-02-8)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Acrylamide (79-06-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Acrylonitrile	GA	*	H(WS)	J

(107-13-1)				
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Alachlor (15972-60-8)	A, A-S, AA, AA-S GA	0.5 0.5	H(WS) H(WS)	A A
Aldicarb (116-06-3)	A, A-S, AA, AA-S GA	7 *	H(WS) H(WS)	B
Remark: * Refer to standards for "Aldicarb and Methomyl."				
Aldicarb and Methomyl (116-06-3; 16752-77-5)	GA	0.35*	H(WS)	F
Remark: * Applies to the sum of these substances.				
Aldrin (309-00-2)	GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, SD	ND * *	H(WS) H(FC) H(FC)	F
Remark: * Refer to standards for "Aldrin and Dieldrin."				
Aldrin and Dieldrin (309-00-2; 60-57-1)	A, A-S, AA, AA-S, B, C, D SA, SB, SC, SD	0.001 0.001	H(FC) H(FC)	
Remark: * Applies to the sum of these substances.				
Alkyldimethyl benzyl ammonium chloride	A, A-S, AA, AA-S, B, C	*	A(C)	

(68391-01-5)				
Remark: * Refer to standards for "Quaternary ammonium compounds."				

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	TYPE	BASIS CODE
Allyl chloride (107-05-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Aluminum, ionic (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	100*	A(C)	
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Ametryn (834-12-8)	GA	50	H(WS)	J
4-Aminobiphenyl (92-67-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Aminocresols (95-84-1; 2835-95-2; 2835-99-6)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C D	* * ** **	E E E E	
Remarks: * Refer to standards for "Phenolic compounds (total phenols)." ** Refer to standards for "Phenols, total unchlorinated."				
3-Aminotoluene (108-44-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

4-Aminotoluene (106-49-0)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Ammonia and Ammonium (7664-41-7; CAS No. Not Applicable)	A, A-S, AA, AA-S	2,000*	H(WS)	H
	GA	2,000*	H(WS)	H
	A, A-S, AA, AA-S, B, C	**	A(C)	
	D	**	A(A)	
Remarks: * NH3 + NH4+ as N. ** Un-ionized ammonia as NH3; tables below provide the standard in ug/L at varying pH and temperature for different classes and specifications. Linear interpolation between the listed pH values and temperatures is applicable.				

Classes A, A-S, AA, AA-S, B, C with the (T) or (TS) Specification

pH	0C	5C	10C	15-30C
6.50	0.7	0.9	1.3	1.9
6.75	1.2	1.7	2.3	3.3
7.00	2.1	2.9	4.2	5.9
7.25	3.7	5.2	7.4	11
7.50	6.6	9.3	13	19
7.75	11	15	22	31
8.0-9.0	13	18	25	35

Classes A, A-S, AA, AA-S, B, C with the (T) or (TS) Specification

pH	0C	5C	10C	15C	20-30C
6.50	0.7	0.9	1.3	1.9	2.6
6.75	1.2	1.7	2.3	3.3	4.7
7.00	2.1	2.9	4.2	5.9	8.3

7.25	3.7	5.2	7.4	11	15
7.50	6.6	9.3	13	19	26
7.75	11	15	22	31	43
8.0-9.0	13	18	25	35	50

Class D

pH	0C	5C	10C	15C	20C	25-30C
6.50	9.1	13	18	26	36	51
6.75	15	21	30	42	59	84
7.00	23	33	46	66	93	131
7.25	34	48	68	95	140	190
7.50	45	64	91	130	180	260
7.75	56	80	110	160	220	320
8.0-9.0	65	92	130	180	260	370

Table 1
(cf. section 703.5)
(Continued)
WATER QUALITY STANDARDS SURFACE WATERS AND GROUNDWATER

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	TYPE	BASIS CODE
Aniline	A, A-S, AA, AA-S	5	H(WS)	I
(62-53-3)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Antimony	A, A-S, AA, AA-S	3	H(WS)	B
(CAS No. Not Applicable)	GA	3	H(WS)	B
Arsenic	A, A-S, AA, AA-S	50	H(WS)	G
(CAS No. Not Applicable)	GA	25	H(WS)	F
	A, A-S, AA, AA-S, B, C	150*	A(C)	
		340*	A(A)	

	A, A-S, AA, AA-S, B, C, D SA, SB, SC SD	63* 120*	A(C) A(A)	
Remark: * Dissolved arsenic form.				
Asbestos (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	* *	H(WS) H(WS)	G G
Remark: * 7,000,000 fibers (longer than 10 um)/L				
Atrazine (1912-24-9)	GA	7.5	H(WS)	F
Azinphosmethyl (86-50-0)	GA A, A-S, AA, AA-S, B, C SA, SB, SC	4.4 0.005* 0.01	H(WS) A(C) A(C)	F
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Azobenzene (103-33-3)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Barium (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	1,000 1,000	H(WS) H(WS)	G F
Benefin (1861-40-1)	GA	35	H(WS)	F
Benzene (71-43-2)	A, A-S, AA, AA-S GA	1 1	H(WS) H(WS)	A A

	A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	10 10	H(FC) H(FC)	A A
Benzidine (92-87-5)	GA A, A-S, AA, AA-S, B, C D	* 0.1** 0.1**	H(WS) A(C) A(A)	J
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance. ** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Benzo(a)pyrene (50-32-8)	GA	ND	H(WS)	F
Beryllium (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	*	A(C)	
Remark: * 11 ug/L, when hardness is less than or equal to 75 ppm; 1,100 ug/L when hardness is greater than 75 ppm. * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. Aquatic Type standards apply to acid-soluble form.				
1,1'-Biphenyl (92-52-4)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bis(2-chloroethoxy) methane (111-91-1)	GA	*	H(WS)	J

Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bis(2-chloroethyl) ether (111-44-4)	GA	1.0	H(WS)	F
Bis(chloromethyl)ether (542-88-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bis(2-chloro-1-methylethyl)ether (108-60-1)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bis(2-ethylhexyl) phthalate (117-81-7)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C	5 5 0.6	H(WS) H(WS) A(C)	A A
Boron (CAS No. Not Applicable)	GA A, A-S, AA, AA-S, B, C SA, SB, SC	1,000 10,000* 1,000	H(WS) A(C) A(C)	H
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. Aquatic Type standards apply to acid-soluble form.				
Bromacil (314-40-9)	GA	4.4	H(WS)	F
Bromobenzene (108-86-1)	GA	*	H(WS)	J

Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bromochloromethane (74-97-5)	A, A-S, AA, AA-S GA	5 *	H(WS) H(WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Bromomethane (74-83-9)	A, A-S, AA, AA-S GA	5 *	H(WS) H(WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Butachlor (23184-66-9)	GA	3.5	H(WS)	F
cis-2-Butenal (15798-64-8)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-2-Butenal (123-73-9)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
cis-2-Butenenitrile (1190-76-7)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-2-Butenenitrile (627-26-9)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Butylate (2008-41-5)	GA	50	H(WS)	J

n-Butylbenzene (104-51-8)	A, A-S, AA, AA-S GA	5 *	H(WS) H(WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
sec-Butylbenzene (135-98-8)	A, A-S, AA, AA-S GA	5 *	H(WS) H(WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
tert-Butylbenzene (98-06-6)	A, A-S, AA, AA-S GA	5 *	H(WS) H(WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Cadmium (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D SA, SB, SC, I SD	5 5 * ** 7.7 21	H(WS) H(WS) A(C) A(A) A(C) A(A)	B,G B,G
Remarks: * (0.85) exp(0.7852 [ln (ppm hardness)] - 2.715) ** (0.85) exp(1.128 [ln (ppm hardness)] - 3.6867) Aquatic Type standards apply to dissolved form.				
Captan (133-06-2)	GA	18	H(WS)	F

Carbaryl (63-25-2)	GA	29	H(WS)	F
Carbofuran (1563-66-2)	A, A-S, AA, AA-S A, A-S, AA, AA-S, B, C D	15 1.0* 10*	H(WS) A(C) A(A)	B
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Carbon tetrachloride (56-23-5)	GA	5	H(WS)	F
Carboxin (5234-68-4)	GA	50	H(WS)	J
Chloramben (CAS No. Not Applicable)	GA	50*	H(WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.				
Chloranil (118-75-2)	GA	*	H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Chlordane (57-74-9)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.05 0.05 2 x 10-5 2 x 10-5	H(WS) H(WS) H(FC) H(FC)	A A A A
Chloride	A, A-S, AA,	250,000	H(WS)	H

(CAS No. Not Applicable)	AA-S GA	250,000	H(WS)	H
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans (CAS No. Not applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	7 x 10-7* 7 x 10-7* 6 x 10-10* 6 x 10-10* 3.1 x 10-9** 3.1 x 10-9**	H(WS) H(WS) H(FC) H(FC) W W	A A A A

Remarks: * Value is for the total of the chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans that are listed in the table below as equivalents of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

The 2,3,7,8-TCDD equivalent for a congener for the H(WS) standards is obtained by multiplying the concentration of that congener by its Toxicity Equivalency Factor (TEF) from the table below.

The 2,3,7,8-TCDD equivalent for a congener for the H(FC) standards is obtained by multiplying the concentration of that congener by its TEF and its Bioaccumulation Equivalency Factor (BEF) from the table below.

** Applies only to 2,3,7,8-TCDD

CONGENER	TEF	BEF
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1	1
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.5	0.9
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1	0.3
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1	0.1
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1	0.1
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1	0.1

1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		0.01	0.05		
Octachlorodibenzo-p-dioxin		0.001	0.01		
2,3,7,8-Tetrachlorodibenzofuran		0.1	0.8		
1,2,3,7,8-Pentachlorodibenzofuran		0.05	0.2		
2,3,4,7,8-Pentachlorodibenzofuran		0.5	1.6		
1,2,3,4,7,8-Hexachlorodibenzofuran		0.1	0.08		
1,2,3,6,7,8-Hexachlorodibenzofuran		0.1	0.2		
2,3,4,6,7,8-Hexachlorodibenzofuran		0.1	0.7		
1,2,3,7,8,9-Hexachlorodibenzofuran		0.1	0.6		
1,2,3,4,6,7,8-Heptachlorodibenzofuran		0.01	0.01		
1,2,3,4,7,8,9-Heptachlorodibenzofuran		0.01	0.4		
Octachlorodibenzofuran		0.001	0.02		
Chlorine, Total Residual (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C D SA, SB, SC, I SD	5 19 7.5 13	A(C) A(A) A(C) A(A)		
2-Chloroaniline (95-51-2)	GA	*	H (WS)	J	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Chloroaniline (108-42-9)	GA	*	H (WS)	J	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chloroaniline (106-47-8)	GA	*	H (WS)	J	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chlorobenzene	A, A-S,	5	H	I	

(108-90-7)	AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA,SB, SC, I, SD A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S D	* 400 400 5 20 50	(WS) H (WS) H (FC) H (FC) A(C) E E	J B B U V
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Chlorobenzotrifluoride (98-56-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1-Chlorobutane (109-69-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Chloroethane (75-00-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Chloroform (67-66-3)	A, A-S, AA, AA-S GA	7 7	H (WS) H	A A

			(WS)	
Chloromethyl methyl ether (107-30-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2-Chloronaphthalene (91-58-7)	A, A-S, AA, AA-S	10	E	U
2-Chloronitrobenzene (88-73-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Chloronitrobenzene (121-73-3	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Chloronitrobenzene (100-00-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Chloroprene (126-99-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Chlorothalonil (1897-45-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2-Chlorotoluene (95-49-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of				

5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Chlorotoluene (108-41-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Chlorotoluene (106-43-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
R[illegible] * The principal organic contaminant standard for groundwater of 5 [illegible] described elsewhere in this Table) applies to this substance.				
4-Chloro-o-toluidine (95-69-2)	GA	*	H (WS)	J
R[illegible] * The principal [illegible]ganic contaminant standard for groundwater of [illegible]escribed elsew[illegible]re in this Table) applies to this substance.				
5-Chloro[illegible]dine [illegible]	GA	*	H (WS)	J
[illegible]: * [illegible]rincipal [illegible]ganic contaminant standard for groundwater of [illegible] u[illegible] [illegible]ibed el[illegible]ere in this Table) applies to this substance.				
[illegible]o[illegible]uoropropane (460-35-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * [illegible]ipal organic contaminant standard for groundwater of [illegible] ug/L (desc[illegible]where in this Table) applies to this substance.				
Ch[illegible] (CAS No. Not [illegible]icable)	A, A-S, AA, AA-S GA [illegible] A-S, [illegible]A-[illegible]	50 50 * **	H (WS) H (WS) A(C) A(A)	G G

	A, A-S, AA, AA-S, B, C, D		
Remarks: * (0.86) exp(0.819 [ln (ppm hardness)] + 0.6848) ** (0.316) exp(0.819 [ln (ppm hardness)] + 3.7256) Aquatic Type standards apply to dissolved form and do not include hexavalent chromium.			
Chromium (hexavalent) (CAS No. Not Applicable)	GA	50	(V)
	A, A-S, AA, AA-S, B, C	11* 16*	A A(
	A, A-S, AA, AA-S, B, C, D	54** 1,200**	A
	SA, SB, SC		
	SD		
Remarks: * Applies to dissolved form. ** Applies to acid-soluble form.			
Cobalt (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	5	
Remark: * For the waters of the Great Lakes System, the de substitute a guidance value for the aquatic Type standarc under section 702.15 (c) of this Title. Aquatic Type standards apply to acid-soluble for			
Copper (CAS No. Not Applicable)	A, A AA,		

	AA, AA-S, B, C, D SA, SB, SC, I SA, SB, SC, I, SD	****	A(C) A(A)	
Remarks: * (0.96) exp(0.8545 [ln (ppm hardness)] - 1.702) ** (0.96) exp(0.9422 [ln (ppm hardness)] - 1.7) *** Standard is 3.4 ug/L except in New York/New Jersey Harbor where it is 5.6 ug/L. **** Standard is 4.8 ug/L except in New York/New Jersey Harbor where it is 7.9 ug/L. Aquatic Type standards apply to dissolved form.				
Cyanide (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D SA, SB, SC SD	200 200 9,000 9,000 5.2* 22* 1.0* 1.0*	H (WS) H (WS) H (FC) H (FC) A(C) A(A) A(C) A(A)	B B B B
Remark: * As free cyanide: the sum of HCN and CN- expressed as CN.				
Cyanogen bromide	GA	*	H (WS)	J

(506-68-3)				
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Cyanogen chloride (506-77-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Dalapon (CAS No. Not Applicable)	GA	50*	H (WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.				
p,p'-DDD (72-54-8)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.3 0.3 8 x 10-5 8 x 10-5 * *	H (WS) H (WS) H (FC) H (FC) W W	A A A A
Remark: * See standard for p,p'-DDT.				
p,p'-DDE (72-55-9)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D	0.2 0.2 7 x 10-6 7 x 10-6	H (WS) H (WS) H (FC)	A A A A

	SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	* *	H (FC) W W	
Remark: * See standard for p,p'-DDT.				
p,p'-DDT (50-29-3)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.2 0.2 1 x 10-5 1 x 10-5 1.1 x 10-5* 1.1 x 10-5*	H (WS) H (WS) H (FC) H (FC) W W	A A A A
Remark: * Applies to the sum of p,p'-DDD, p,p'-DDE and p,p'-DDT				
Dechlorane Plus (13560-89-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Demeton (8065-48-3; 298-03-3;126-75-0)	A, A-S, AA, AA-S, B, C	0.1* 0.1	A(C) A(C)	

	SA, SB, SC			
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. Standards apply to the sum of these substances.				
Diazinon (333-41-5)	GA A, A-S, AA, AA-S, B, C	0.7 0.08*	H (WS) A(C)	F
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
1,2-Dibromobenzene (583-53-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,3-Dibromobenzene (108-36-1)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,4-Dibromobenzene (106-37-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2-Dibromo-3-chloropropane (96-12-8)	A, A-S, AA, AA-S GA	0.04 0.04	H (WS) H (WS)	A A

Dibromodichloromethane (594-18-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Dibromomethane (74-95-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Di-n-butyl phthalate (84-74-2)	GA	50	H (WS)	J
Dicamba (1918-00-9)	GA	0.44	H (WS)	F
Dichlorobenzenes (95-50-1; 541-73-1; 106-46-7)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S D	3* 3* 5** 20***/30**** 50**	H (WS) H (WS) A(C) E E	A A U V
Remarks: * Applies to each isomer (1,2-,1,3- and 1,4-dichlorobenzene) individually. ** Applies to the sum of 1,2-, 1,3- and 1,4-dichlorobenzene. For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. *** Applies to 1,3-dichlorobenzene only. **** Applies to 1,4-dichlorobenzene only.				

3,3'-Dichlorobenzidine (91-94-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,4-Dichlorobenzotrifluoride (328-84-7)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
cis-1,4-Dichloro-2-butene (1476-11-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-1,4-Dichloro-2-butene (110-57-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Dichlorodifluoromethane (75-71-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,1-Dichloroethane (75-34-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2-Dichloroethane (107-06-2)	A, A-S, AA, AA-S GA	0.6 0.6	H (WS) H (WS)	A A
1,1-Dichloroethene	GA	*	H (WS)	J

(75-35-4)				
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
cis-1,2-Dichloroethene (156-59-2)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-1,2-Dichloroethene (156-60-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Dichlorofluoromethane (75-43-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4-Dichlorophenol (120-83-2)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D	0.3* ** ***	E E E	U
Remarks: * Also see standards for "Phenolic compounds (total phenols)." ** Refer to standards for "Phenolic compounds (total phenols)." *** Refer to standards for "Phenols, total chlorinated."				
2,4-Dichlorophenoxyacetic acid	A, A-S, AA, AA-S GA	50 50	H (WS) H	G G

(94-75-7)			(WS)	
1,1-Dichloropropane (78-99-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2-Dichloropropane (78-87-5)	A, A-S, AA, AA-S GA	1 1	H (WS) H (WS)	A A
1,3-Dichloropropane (142-28-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,2-Dichloropropane (594-20-7)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,3-Dichloropropene (542-75-6)	A, A-S, AA, AA-S GA	0.4* 0.4*	H (WS) H (WS)	A A
Remark: * Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.				
2,3-Dichlorotoluene (32768-54-0)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J

Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4-Dichlorotoluene (95-73-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,5-Dichlorotoluene (19398-61-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,6-Dichlorotoluene (118-69-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,4-Dichlorotoluene (95-75-0)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,5-Dichlorotoluene (25186-47-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Dieldrin (60-57-1)	A, A-S, AA, AA-S GA	0.004 0.004	H (WS) H	A A

	A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D	6 x 10-7 6 x 10-7 0.056 0.24	(WS) H (FC) H (FC) A(C) A(A)	A A
Di(2-ethylhexyl)adipate (103-23-1)	A, A-S, AA, AA-S GA	20 20	H (WS) H (WS)	A A
1,2-Difluoro-1,1,2,2-tetrachloroethane (76-12-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2-Diisopropylbenzene (577-55-9)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,3-Diisopropylbenzene (99-62-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,4-Diisopropylbenzene (100-18-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

N,N-Dimethylaniline (121-69-7)	A, A-S, AA, AA-S GA	1 1	H (WS) H (WS)	A A
2,3-Dimethylaniline (87-59-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4-Dimethylaniline (95-68-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,5-Dimethylaniline (95-78-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,6-Dimethylaniline (87-62-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,4-Dimethylaniline (95-64-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,5-Dimethylaniline (108-69-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,3'-Dimethylbenzidine (119-93-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

4,4'-Dimethylbibenzyl (538-39-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4,4'-Dimethyldiphenylmethane (4957-14-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha, alpha-Dimethyl phenethylamine (122-09-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4-Dimethylphenol (105-67-9)	A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S GA B, C, D	1,000 1,000 * * **	H (FC) H (FC) E E E	B B
Remarks: * Refer to standards for "Phenolic compounds (total phenols)." ** Refer to standard for "Phenols, total unchlorinated."				
Dimethyl tetrachloroterephthalate (1861-32-1)	GA	50	H (WS)	J
1,3-Dinitrobenzene (99-65-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

2,4-Dinitrophenol (51-28-5)	A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S GA B, C, D	400 400 * * **	H (FC) H (FC) E E E	B B
Remarks: * Refer to standards for "Phenolic compounds (total phenols)." ** Refer to standards for "Phenols, total unchlorinated."				
2,3-Dinitrotoluene (602-01-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4-Dinitrotoluene (121-14-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,5-Dinitrotoluene (619-15-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,6-Dinitrotoluene (606-20-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,4-Dinitrotoluene (610-39-9)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of				

5 ug/L (described elsewhere in this Table) applies to this substance.				
3,5-Dinitrotoluene (618-85-9)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Diphenamid (957-51-7)	GA	50	H (WS)	J
Diphenylamine (122-39-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Diphenylhydrazines (122-66-7; 530-50-7)	GA	ND*	H (WS)	F
Remark: * Applies to the sum of 1,1- and 1,2-diphenylhydrazine, CAS Nos. 530-50-7 and 122-66-7, respectively.				
Diquat (2764-72-9)	A, A-S, AA, AA-S GA	20* 20*	H (WS) H (WS)	B B
Remark: * Applies to the concentration of diquat ion whether free or as an undissociated salt.				
Disulfoton (298-04-4)	GA	*	H (WS)	
Remark: * Refer to standards for "Phorate and Disulfoton."				
Dyphylline (479-18-5)	A, A-S, AA, AA-S	50	H (WS)	B
Endosulfan (115-29-7)	A, A-S, AA, AA-S, B, C D SA, SB, SC	0.009 0.22* 0.001 0.034	A(C) A(A) A(C) A(A)	

	SD			
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (d) of this Title.				
Endrin (72-20-8)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, SD A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D	0.2 ND 0.002 0.002 0.036 0.086	H (WS) H (WS) H (FC) H (FC) A(C) A(A)	G F
Endrin aldehyde (7421-93-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Endrin ketone (53494-70-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Ethylbenzene (100-41-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

Ethylene dibromide (106-93-4)	A, A-S, AA, AA-S GA	6 x 10-4 6 x 10-4	H (WS) H (WS)	A A
Ethylenethiourea (96-45-7)	GA	ND	H (WS)	F
Ferbam (14484-64-1)	GA	4.2	H (WS)	F
Fluometuron (2164-17-2)	GA	50	H (WS)	J
Fluoride (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C D	1,500 1,500 * **	H (WS) H (WS) A(C) A(A)	H F
Remarks: * (0.02) exp(0.907 [ln (ppm hardness)] + 7.394) ** (0.1) exp(0.907 [ln (ppm hardness)] + 7.394) For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Foaming agents (CAS No. Not Applicable)	GA	500*	E	U
Remark: * Determined as methylene blue active substances (MBAS) or by other tests as specified by the Commissioner.				
Folpet (133-07-3)	GA	50	H (WS)	J
Gross alpha radiation (CAS No. Not Applicable)	A, A-S, AA, AA-S	* *	H (WS)	G G

	GA		H (WS)	
Remark: * 15 picocuries per liter, excluding radon and uranium.				
Gross beta radiation (CAS No. Not Applicable)	A, AA GA	* *	H (WS) H (WS)	H H
Remark: * 1,000 picocuries per liter, excluding strontium-90 and alpha emitters.				
Heptachlor (76-44-8)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.04 0.04 2 x 10-4 2 x 10-4	H (WS) H (WS) H (FC) H (FC)	A A A A
Heptachlor epoxide (1024-57-3)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.03 0.03 3 x 10-4 3 x 10-4	H (WS) H (WS) H (FC) H (FC)	A A A A
Hexachlorobenzene (118-74-1)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D	0.04 0.04 3 x 10-5 3 x 10-5	H (WS) H (WS) H (FC)	A A A A

	SA, SB, SC, I, SD		H (FC)	
Hexachlorobutadiene (87-68-3)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C D SA, SB, SC SD	0.5 0.5 0.01 0.01 1.0* 10* 0.3 3.0	H (WS) H (WS) H (FC) H (FC) A(C) A(A) A(C) A(A)	B B B B
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
alpha-Hexachlorocyclohexane (319-84-6)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.01 0.01 0.002 0.002	H (WS) H (WS) H (FC) H (FC)	A A A A
beta-Hexachlorocyclohexane (319-85-7)	A, A-S, AA, AA-S	0.04 0.04	H (WS)	A A

	GA	0.007	H (WS)	A
	A, A-S, AA, AA-S, B, C, D	0.007	H (FC)	A
	SA, SB, SC, I, SD		H (FC)	
delta-Hexachlorocyclohexane (319-86-8)	A, A-S, AA, AA-S	0.04	H (WS)	A
	GA	0.04	H (WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008	H (FC)	A
	SA, SB, SC, I, SD	0.008	H (FC)	A
epsilon-Hexachlorocyclohexane (6108-10-7)	A, A-S, AA, AA-S	0.04	H (WS)	A
	GA	0.04	H (WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008	H (FC)	A
	SA, SB, SC, I, SD	0.008	H (FC)	A
gamma-Hexachlorocyclohexane (58-89-9)	A, A-S, AA, AA-S	0.05	H (WS)	A
	GA	0.05	H (WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008	H (FC)	A
		0.008		A
		0.95		
	SA, SB, SC, I, SD		H (FC)	

	A, A-S, AA, AA-S, B, C, D		A(A)	
Hexachlorocyclopentadiene (77-47-4)	GA A, A-S, AA, AA-S, B, C D SA, SB, SC SD A, A-S, AA, AA-S	* 0.45** 4.5** 0.07 0.7 1.0	H (WS) A(C) A(A) A(C) A(A) E	J U
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance. ** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Hexachloroethane (67-72-1)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	5 * 0.6 0.6	H (WS) H (WS) H (FC) H (FC)	A, I J A A
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Hexachlorophene (70-30-4)	GA A, A-S, AA, AA-S	* **	H (WS) E	

	GA B,C,D	** ***	E E	
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance. ** Refer to standards for "Phenolic compounds (total phenols)." *** Refer to standards for "Phenols, total chlorinated."				
Hexachloropropene (1888-71-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Hexazinone (51235-04-2)	GA	50	H (WS)	J
Hydrazine (302-01-2)	A, A-S, AA, AA-S, B, C D	* **	A(C) A(A)	
Remarks: * 5 ug/L at less than 50 ppm hardness and 10 ug/L at greater than or equal to 50 ppm hardness. ** 50 ug/L at less than 50 ppm hardness and 100 ug/L at greater than or equal to 50 ppm hardness. For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Hydrogen sulfide (7783-06-4)	A, A-S, AA, AA-S, B, C SA, SB, SC	2.0* 2.0	A(C) A(C)	
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. Aquatic Type standards apply to undissociated form.				

Hydroquinone (123-31-9)	A, A-S, AA, AA-S, B, C	2.2**	A(C)	
		4.4**	A(A)	
	D	*	E	
	A, A-S, AA, AA-S GA	*	E	

Remarks: * Refer to standards for "Phenolic compounds (total phenols)."

** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.

Iron (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	300**	A(C)	G
		300**	A(A)	F
	D	300	E	
	A, A-S, AA, AA-S GA	300*	E	

Remarks: * Also see standard for "Iron and Manganese."

** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.

Iron and Manganese (CAS No. Not Applicable)	GA	500*	E	F

Remark: * Applies to the sum of these substances; also see individual standards for "Iron" and "Manganese."

Isodecyl diphenyl phosphate (29761-21-5)	A, A-S, AA, AA-S, B, C	1.7*	A(C)	
	D	22*	A(A)	

Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.

Isodrin (465-73-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Isopropalin (33820-53-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Isopropylbenzene (98-82-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2-Isopropyltoluene (527-84-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Isopropyltoluene (535-77-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Isopropyltoluene (99-87-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Isothiazolones, total (isothiazolinones)	A, A-S, AA, AA-S, B, C D	1* 10*	A(C) A(A)	

(includes 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one) (CAS No. Not Applicable)				
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title. Standards apply to the sum of these substances.				
Kepone (143-50-0)	GA	ND	H (WS)	F
Lead (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D SA, SB, SC, I SA, SB, SC, I, SD	50 25 * ** 8 204	H (WS) H (WS) A(C) A(A) A(C) A(A)	G F
Remark: * {1.46203 - [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] - 4.297) ** {1.46203 - [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] - 1.052) Aquatic Type standards apply to dissolved form.				
Linear alkyl benzene	A, A-S,	40*	A(C)	

sulfonates (LAS) (CAS No. Not Applicable)	AA, AA-S, B, C			
Remark: * LAS with side chains greater than 13 carbons only; applies to the sum of these substances. * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Magnesium (CAS No. Not Applicable)	A, A-S, AA, AA-S	35,000	H (WS)	B
Malathion (121-75-5)	GA A, A-S, AA, AA-S, B, C SA, SB, SC	7.0 0.1* 0.1	H (WS) A(C) A(C)	F
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Mancozeb (8018-01-7)	GA	1.8	H (WS)	F
Maneb (12427-38-2)	GA	1.8	H (WS)	F
Manganese (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	300 300*	E E	G F
Remark: * Also see standards for "Iron and Manganese."				
Mercury (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-	0.7 0.7 7 x 10-4*	H (WS) H (WS) H	B B B

	S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	7 x 10-4* 0.77* 1.4* 0.0026* 0.0026*	(FC) H (FC) A(C) A(A) W W	B
Remark * Applies to dissolved form.				
Methacrylonitrile (126-98-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Methomyl (16752-77-5)	GA	*	H (WS)	
Remark: * Refer to standard for "Aldicarb and Methomyl."				
Methoxychlor (72-43-5)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C SA, SB,	35 35 0.03* 0.03	H (WS) H (WS) A(C) A(C)	H F

	SC			
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
N-Methylaniline (100-61-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Methyl chloride (74-87-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2-Methyl-4-chloro-phenoxyacetic acid (94-74-6)	GA	0.44	H (WS)	F
4,4'-Methylene-bis-(2-chloroaniline) (101-14-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4,4'-Methylene-bis-(N-methyl)aniline (1807-55-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4,4'-Methylene-bis-(N,N'-dimethyl) aniline (101-61-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Methylene bisthiocyanate (6317-18-6)	A, A-S, AA, AA-S, B, C	1.0*	A(C)	

Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Methylene chloride (75-09-2)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA,SB, SC, I, SD	5 * 200 200	H (WS) H (WS) H (FC) H (FC)	I J A A
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Methyl iodide (74-88-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Methyl methacrylate (80-62-6)	GA	50	H (WS)	J
Methyl parathion (298-00-0)	GA A, A-S, AA, AA-S, B, C	* *	H (WS) A(C)	
Remark: * Refer to standards for "Parathion and Methyl parathion."				
alpha-Methylstyrene (98-83-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2-Methylstyrene (611-15-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H	I J

			(WS)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Methylstyrene (100-80-1)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Methylstyrene (622-97-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Metribuzin (21087-64-9)	GA	50	H (WS)	J
Mirex (2385-85-5)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C D SA, SB, SC	0.03 0.03 1 x 10-6 1 x 10-6 0.001* 0.001* 0.001	H (WS) H (WS) H (FC) H (FC) A(C) A(A) A(C)	A A A A
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined				

under section 702.15 (c) and (d) of this Title.				
Nabam (142-59-6)	GA	1.8	H (WS)	F
Naphthalene (91-20-3)	A, A-S, AA, AA-S	10	E	U
Niacinamide (98-92-0)	A, A-S, AA, AA-S	500	H (WS)	B
Nickel (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D SA, SB, SC, I SA, SB, SC, I, SD	100 100 * ** 8.2 74	H (WS) H (WS) A(C) A(A) A(C) A(A)	
Remarks: * (0.997) exp (0.846 [ln (hardness)] + 0.0584)** (0.998) exp (0.846 [ln (hardness)] + 2.255) Aquatic Type standards apply to dissolved form.				
Nitralin (4726-14-1)	GA	35	H (WS)	F
Nitrate (expressed as N) (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	10,000* 10,000*	H (WS) H (WS)	G G
Remark: * Also see standards for "Nitrate and Nitrite."				

Nitrate and Nitrite (expressed as N) (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	10,000* 10,000*	H (WS) H (WS)	G G
Remark: * Applies to the sum of these substances; also see individual standards for "Nitrate" and "Nitrite."				
Nitrilotriacetic acid (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C	3* 3* 5,000**	H (WS) H (WS) A(C)	A A
Remarks: * Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less. ** Applies to nitrilotriacetate. ** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Nitrite (expressed as N) (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C	1,000* 1,000* **	H (WS) H (WS) A(C)	G G
Remarks: * Also see standards for "Nitrate and Nitrite." ** Standard is 100 ug/L for warm water fishery waters and 20 ug/L for cold water fishery waters. ** For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
2-Nitroaniline (88-74-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of				

5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Nitroaniline (99-09-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Nitroaniline (100-01-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Nitrobenzene (98-95-3)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S	0.4 0.4 30	H (WS) H (WS) E	A A U
2-Nitrotoluene (88-72-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Nitrotoluene (99-08-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
4-Nitrotoluene (99-99-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
5-Nitro-o-toluidine (99-55-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Octachlorostyrene	A, A-S, AA, AA-S	0.2	H (WS)	B

(29082-74-4)	GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	0.2 6 x 10-6 6 x 10-6	H (WS) H (FC) H (FC)	B B B
Oxamyl (23135-22-0)	GA	50	H (WS)	J
Paraquat (4685-14-7)	GA	3.0	H (WS)	F
Parathion (56-38-2)	GA A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D	* * 0.065	H (WS) A(C) A(A)	
Remark: * Refer to standards for "Parathion and Methyl parathion."				
Parathion and Methyl parathion (56-38-2; 298-00-0)	GA A, A-S, AA, AA-S, B, C	1.5* 0.008**	H (WS) A(C)	F
Remarks: * Applies to the sum of these substances. ** Applies to the sum of these substances. For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Pendimethalin (40487-42-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

Pentachlorobenzene (608-93-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Pentachloroethane (76-01-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Pentachloronitrobenzene (82-68-8)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Pentachlorophenol (87-86-5)	A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D A, A-S, AA, AA-S GA B, C, D	* ** *** *** ****	A(C) A(A) E E E	
Remarks: * exp [1.005 (pH) - 5.134] ** exp [1.005 (pH) - 4.869] *** Refer to standards for "Phenolic compounds (total phenols)." **** Refer to standards for "Phenols, total chlorinated."				
Phenol (108-95-2)	A, A-S, AA, AA-S GA B, C, D	* * **	E E E	
Remarks: * Refer to standards for "Phenolic compounds (total phenols)."				

** Refer to standards for "Phenols, total unchlorinated."				
Phenolic compounds (total phenols) (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	1* 1*	E E	U U
Remark: * Applies to the sum of these substances.				
Phenols, total chlorinated (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D	* * 1.0**	E E E	V
Remarks: * Refer to standards for "Phenolic compounds (total phenols)." ** Applies to the sum of these substances.				
Phenols, total unchlorinated (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D	* * 5.0**	E E E	V
Remarks: * Refer to standards for "Phenolic compounds (total phenols)." ** Applies to the sum of these substances.				
1,2-Phenylenediamine (95-54-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,3-Phenylenediamine (108-45-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

1,4-Phenylenediamine (106-50-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Phenyl ether (101-84-8)	A, A-S, AA, AA-S	10	E	U
Phenylhydrazine (100-63-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3-Phenyl-1-propene (637-50-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
cis-1-Phenyl-1-propene (766-90-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-1-Phenyl-1-propene (873-66-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Phorate (298-02-2)	GA	*	H (WS)	
Remark: * Refer to standards for "Phorate and Disulfoton."				

Phorate and Disulfoton (298-02-2; 298-04-4)	GA	ND*	H (WS)	F
Remark: * Applies to sum of these substances.				
Picloram (CAS No. Not Applicable)	GA	50*	H (WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.				
Polybrominated biphenyls (CAS No. Not Applicable)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each congener individually.				
Polychlorinated biphenyls (CAS No. Not Applicable)	A, A-S, AA, AA-S	0.09*	H (WS)	A
	GA	0.09*	H (WS)	A
	A, A-S, AA, AA-S, B, C, D	1 x 10-6*	H (FC)	A
	SA, SB, SC, I, SD	1 x 10-6*	H (FC)	A
	A, A-S, AA, AA-S, B, C,D	1.2 x 10-4*	W	
	SA, SB, SC, I, SD	1.2 x 10-4*	W	
Remark: * Applies to the sum of these substances.				
Principal organic contaminant (CAS No. Not Applicable)	GA	5	H (WS)	J
Remarks: This standard applies to any and every individual substance, whether listed in this Table or not, that is in one of the principal organic contaminant classes as defined in section 700.1 of this Title except any				

substance that has a H(WS) Type standard for class GA waters (other than 5 ug/L with Basis Code J) listed elsewhere in this Table.

For the convenience of the reader, the principal organic contaminant standard of 5 ug/L (Basis Code J), is listed in this Table for some but not all substances regulated by this standard.

A less stringent guidance value for an individual substance may be substituted for this standard if so determined by the Commissioner of the New York State Department of Health.

Prometon (1610-18-0)	GA	50	H (WS)	J
Propachlor (1918-16-7)	GA	35	H (WS)	F
Propanil (709-98-8)	GA	7.0	H (WS)	F
Propazine (139-40-2)	GA	16	H (WS)	F
Propham (122-42-9)	GA	50	H (WS)	J
n-Propylbenzene (103-65-1)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Quaternary ammonium compounds (including dimethyl benzylammonium chloride & dimethylethyl benzyl ammonium chloride) (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	10*	A(C)	
Remarks: * Applies to the sum of these substances. * For the waters of the Great Lakes System, the department will substitute				

a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Radium 226 (CAS No. Not Applicable)	A, AA GA	* *	H (WS) H (WS)	H H
Remark: * 3 picocuries per liter; also see standards for "Radium 226 and Radium 228."				
Radium 226 and Radium 228 (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	* *	H (WS) H (WS)	G G
Remark: * 5 picocuries per liter; Applies to the sum of these substances.				
Radium 228 (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	* *	H (WS) H (WS)	
Remark: * Refer to standards for "Radium 226 and Radium 228."				
Selenium (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C	10 10 4.6*	H (WS) H (WS) A(C)	G G
Remark: * Aquatic Type standard applies to dissolved form.				
Silver (CAS No. Not Applicable)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C D	50 50 0.1* **	H (WS) H (WS) A(C)	G F

	SD	2.3	A(A) A(A)	
Remarks: * Applies to ionic silver. ** exp (1.72 [ln (ppm hardness)] - 6.52).Standards for D and SD Classes apply to acid-soluble form. For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Simazine (122-34-9)	A, A-S, AA, AA-S GA	0.5 0.5	H (WS) H (WS)	A A
Sodium (CAS No. Not Applicable)	GA	20,000	H (WS)	H
Strontium 90 (CAS No. Not Applicable)	A, A-S, AA, AA-S	*	H (WS)	G
Remarks: * 8 picocuries per liter. If two or more radionuclides are present, the sum of their doses shall not exceed an annual potential dose of 4 millirems per year.				
Styrene (100-42-5)	GA A, A-S, AA, AA-S	* 50	H (WS) E	J U
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Sulfate (CAS No. Not Applicable)	A, A-S, AA, AA-S GA	250,000 250,000	H (WS) H (WS)	G F
Sulfite	A, A-S, AA, AA-S, B, C	200*	A(C)	

(CAS No. Not Applicable)				
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title.				
Tebuthiuron (34014-18-1)	GA	50	H (WS)	J
Terbacil (5902-51-2)	GA	50	H (WS)	J
Tetrachlorobenzenes (634-66-2; 634-90-2;95-94-3; 12408-10-5)	GA A, A-S, AA, AA-S	* 10**	H (WS) E	J U
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each isomer (1,2,3,4-, 1,2,3,5-, and 1,2,4,5-tetrachlorobenzene) individually. ** Applies to the sum of 1,2,3,4-, 1,2,3,5- and 1,2,4,5-tetrachlorobenzene.				
1,1,1,2-Tetrachloroethane (630-20-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,1,2,2-Tetrachloroethane (79-34-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Tetrachloroethene (127-18-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Tetrachloroterephthalic acid (2136-79-0)	GA	50	H (WS)	J
alpha, alpha, alpha, 4-Tetrachloro-toluene	GA	*	H (WS)	J

(5216-25-1)				
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Thallium (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C D	8* 20	A(C) A(A)	
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title. Aquatic Type standards apply to acid-soluble form.				
Theophylline (58-55-9)	A, A-S, AA, AA-S	40	H (WS)	B
Thiram (137-26-8)	GA	1.8	H (WS)	F
Toluene (108-88-3)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	5 * 6,000 6,000	H (WS) H (WS) H (FC) H (FC)	I J B B
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Toluene-2,4-diamine (95-80-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Toluene-2,5-diamine	GA	*	H	J

(95-70-5)			(WS)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Toluene-2,6-diamine (823-40-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
o-Toluidine (95-53-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Toxaphene (8001-35-2)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD A, A-S, AA, AA-S, B, C D SA, SB, SC	0.06 0.06 6 x 10-6 6 x 10-6 0.005 1.6* 0.005	H (WS) H (WS) H (FC) H (FC) A(C) A(A) A(C)	A A A A
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic standard if so determined under section 702.15 (d) of this Title.				
1,2,4-Tribromobenzene (615-54-3)	A, A-S, AA, AA-S GA	5 *	H (WS)	I J

			H (WS)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,6-Trichloroaniline (634-93-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Trichlorobenzenes (87-61-6; 120-82-1; 108-70-3; 12002-48-1)	GA A, A-S, AA, AA-S, B, C SA, SB, SC A, A-S, AA, AA-S D SD	* 5** 5** 10** 50** 50**	H (WS) A(C) A(C) E E E	J U V V
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each isomer (1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene) individually. ** Applies to the sum of 1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene. For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) of this Title				
1,1,1-Trichloroethane (71-55-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,1,2-Trichloroethane	A, A-S, AA, AA-S	1	H (WS)	A

(79-00-5)	GA	1	H (WS)	A
Trichloroethene (79-01-6)	A, A-S, AA, AA-S GA A, A-S, AA, AA-S, B, C, D SA, SB, SC, I, SD	5 * 40 40	H (WS) H (WS) H (FC) H (FC)	I J A A
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Trichlorofluoromethane (75-69-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,5-Trichlorophenoxy-acetic acid (93-76-5)	GA	35	H (WS)	F
2,4,5-Trichlorophenoxy-propionic acid (93-72-1)	A, A-S, AA, AA-S GA	10 0.26	H (WS) H (WS)	G F
1,1,2-Trichloropropane (598-77-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J

Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2,3-Trichloropropane (96-18-4)	A, A-S, AA, AA-S GA	0.04 0.04	H (WS) H (WS)	A A
cis-1,2,3-Trichloropropene (13116-57-9)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
trans-1,2,3-Trichloropropene (13116-58-0)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha,2,4-Trichlorotoluene (94-99-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha,2,6-Trichlorotoluene (2014-83-7)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha,3,4-Trichlorotoluene	A, A-S, AA, AA-S	5	H (WS)	I

(102-47-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha,alpha,2-Trichlorotoluene (88-66-4)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
alpha,alpha,4-Trichlorotoluene (13940-94-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,3,4-Trichlorotoluene (7359-72-0)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,3,5-Trichlorotoluene (56961-86-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,3,6-Trichlorotoluene (2077-46-5)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,5-Trichlorotoluene (6639-30-1)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of				

5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,6-Trichlorotoluene (23749-65-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,1,1-Trichloro-2,2,2-trifluoroethane (354-58-5)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Trifluralin (1582-09-8)	GA	35	H (WS)	F
1,2,3-Trimethylbenzene (526-73-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,2,4-Trimethylbenzene (95-63-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				

1,3,5-Trimethylbenzene (108-67-8)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
sym-Trinitrobenzene (99-35-4)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,3,4-Trinitrotoluene (602-29-9)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,3,6-Trinitrotoluene (18292-97-2)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,5-Trinitrotoluene (610-25-3)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
2,4,6-Trinitrotoluene (118-96-7)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
3,4,5-Trinitrotoluene (603-15-6)	GA	*	H (WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Triphenyl phosphate	A, A-S, AA, AA-	4*	A(C)	

(115-86-6)	S, B, C D	 40*	 A(A)	
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title.				
Tritium (CAS No. Not Applicable)	A, A-S, AA, AA-S	*	H (WS)	G
Remark: * 20,000 picocuries per liter; if two or more radionuclides are present, the sum of their annual dose equivalent to the total body or any organ shall not exceed 4 millirems per year.				
Uranyl ion (Cas No. Not Applicable)	GA	5,000	H (WS)	H
Vanadium (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C D	14* 190*	A(C) A(A)	
Remark: * For the waters of the Great Lakes System, the department will substitute a guidance value for the aquatic Type standard if so determined under section 702.15 (c) and (d) of this Title. Aquatic Type standards apply to acid-soluble form.				
Vinyl chloride (75-01-4)	GA	2	H (WS)	G
1,2-Xylene (95-47-6)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,3-Xylene (108-38-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J

Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
1,4-Xylene (106-42-3)	A, A-S, AA, AA-S GA	5 *	H (WS) H (WS)	I J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
Zinc (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C A, A-S, AA, AA-S, B, C, D SA, SB, SC, I SD	* ** 66 95	A(C) A(A) A(C) A(A)	
Remarks: Aquatic Type standards apply to dissolved form. * exp(0.85 [ln(ppm hardness)] + 0.50) ** 0.978 exp(0.8473 [ln(ppm hardness)] + 0.884)				
Zineb (12122-67-7)	GA	1.8	H (WS)	F
Ziram (137-30-4)	GA	4.2	H (WS)	F

Table 2
BASIS OF STANDARDS
(cf.703.5)

BASIS CODE	BASIS
A	Oncogenic, Human Health
B	Non-oncogenic, Human Health

F	Former Groundwater Regulations,6 NYCRR 703.5(a)(3), Human Health or Aesthetics
G	Specific MCL, Human Health or Aesthetics
H	Former Use of or Reference to 10 NYCRR Part 170, Human Health or Aesthetics
I	Principal Organic Contaminant Classes, Human Health
J	Former Groundwater Reference to 10 NYCRR Subpart 5-1, General Standards, Human Health
U	Potable Water, Aesthetics
V	Aquatic Life, Aesthetics

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978, amd. filed Nov. 5, 1984; repealed, new filed Aug. 2, 1991; amds. filed: Dec. 10, 1993; Feb. 10, 1998; Mar. 22, 1999 eff. April 7, 1999. Amended (f), Table (1).

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§703.6 Groundwater effluent limitations for discharges to Class GA waters

(a) The groundwater effluent limitations in Table 3 of subdivision (e) of this section and effluent limitations as established by section 702.16(c)(1) of this Title apply to a discharge from a point source or outlet or any other discharge within the meaning of the Environmental Conservation Law, section 17-0501 that will or may enter the waters of the State. Unless a demonstration is made to the contrary, it shall be presumed that a discharge to the ground or unsaturated zone is a discharge to groundwater. The groundwater effluent limitation is the maximum allowable concentration in micrograms per liter (ug/L), unless otherwise noted.

(b) In addition to the chemical characteristics provided in subdivision (a) of this section, coliform or pathogenic organisms shall not be discharged in amounts sufficient to render groundwaters detrimental to public health, safety or welfare.

(c) The department may establish additional groundwater effluent limitations as set forth in Part 702 of this Title.

(d) The groundwater effluent limitations shall be incorporated in SPDES permits (under Part 750 *et seq.* of this Title) for discharges to groundwaters, where applicable.

Tables

TABLE 3
(cf. section 703.6)
GROUNDWATER EFFLUENT LIMITATIONS
CLASS GA

Substance	CAS No.	Maximum Allowable Concentration (ug/L)
Alachlor	15972-60-8	0.5
Aldicarb and Methomyl	116-06-3; 16752-77-5	0.35
Aldrin	309-00-2	Not Detectable
Aluminum	Not Applicable	2,000
Antimony	Not Applicable	6
Arsenic	Not Applicable	50
Asbestos (fibers 10um)	Not Applicable	1.4 x 107 (fibers/L)
Atrazine	1912-24-9	7.5
Azinphosmethyl	86-50-0	4.4
Barium	Not Applicable	2,000
Benefin	1861-40-1	35
Benzene	71-43-2	1
Benzo(a)pyrene	50-32-8	Not Detectable
Bis(2-chloroethyl)ether	111-44-4	1.0
bis(2-ethylhexyl)phthalate	117-81-7	5
Bromacil	314-40-9	4.4
Butachlor	23184-66-9	3.5
Cadmium	Not Applicable	10
Captan	133-06-2	18
Carbaryl	63-25-2	29
Carbon tetrachloride	56-23-5	5
Chlorinated dibenzo-p-dioxins and	Not Applicable	7×10^{-7} equivalents of 2, 3, 7, 8 - TCDD

Chlorinated dibenzofurans[7]		
Chloramben[1]	Not Applicable	50
Chlordane	57-74-9	0.05
Chloride	Not Applicable	500,000
Chloroform	67-66-3	7
Chromium (Hexavalent)	Not Applicable	100
Copper	Not Applicable	1,000
Cyanide	Not Applicable	400
p,p'-DDD	72-54-8	0.3
p,p'-DDE	72-55-9	0.2
p,p'-DDT	50-29-3	0.2
Diazinon	333-41-5	0.7
1,2-Dibromo-3-chloropropane	96-12-8	0.04
Di-n-butylphthalate	84-74-2	50
Dicamba	1918-00-9	0.44
1,2-Dichlorobenzene	95-50-1	3
1,3-Dichlorobenzene	541-73-1	3
1,4-Dichlorobenzene	106-46-7	3
1,2-Dichloroethane	107-06-2	0.6
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	50
1,2-Dichloropropane	78-87-5	1
1,3-Dichloropropene (sum of cis- and trans-isomers)	542-75-6 (sum of 10061-01-5 and 10061-02-6)	0.4
Dieldrin	60-57-1	0.004
Di(2-ethylhexyl)adipate	103-23-1	20
N,N-Dimethylaniline	121-69-7	1
Diphenylhydrazine	122-66-7	Not Detectable
Diquat	2764-72-9	20
Endrin	72-20-8	Not Detectable
Ethylene dibromide	106-93-4	6 x 10-4

Ethylenethiourea	96-45-7	Not Detectable
Ferbam	14484-64-1	4.2
Fluoride	Not Applicable	3,000
Foaming agents[2]	Not Applicable	1,000
Folpet	133-07-3	50
Heptachlor	76-44-8	0.04
Heptachlor epoxide	1024-57-3	0.03
Hexachlorobenzene	118-74-1	0.04
Hexachlorobutadiene	87-68-3	0.5
alpha-Hexachlorocyclohexane	319-84-6	0.01
beta-Hexachlorocyclohexane	319-85-7	0.04
delta-Hexachlorocyclohexane	319-86-8	0.04
epsilon-Hexachlorocyclohexane	6108-10-7	0.04
gamma-Hexachlorocyclohexane	58-89-9	0.05
Hexachlorophene	70-30-4	See Note 3
Iron4	Not Applicable	600
Kepone	143-50-0	Not Detectable
Lead	Not Applicable	50
Malathion	121-75-5	7.0
Mancozeb	8018-01-7	1.8
Maneb	12427-38-2	1.8
Manganese[4]	Not Applicable	600
Mercury	Not Applicable	1.4
Methoxychlor	72-43-5	35
2-Methyl-4-chlorophenoxyacetic acid	94-74-6	0.44
Methylene chloride (Dichloromethane)	75-09-2	5
Methyl methacrylate	80-62-6	50
Mirex	2385-85-5	0.03
Nabam	142-59-6	1.8
Nickel	Not Applicable	200

Nitralin	4726-14-1	35
Nitrate (expressed as N)	Not Applicable	20,000
Nitrate and Nitrite (expressed as N)	Not Applicable	20,000
Nitrilotriacetic acid[5]	Not Applicable	3
Nitrite (expressed as N)	Not Applicable	2,000
Nitrobenzene	98-95-3	0.4
Octachlorostyrene	29082-74-4	0.2
Oil and Grease	Not Applicable	15,000
Paraquat	4685-14-7	3.0
Parathion and Methyl parathion	56-38-2; 298-00-0	1.5
Pentachloronitrobenzene	82-68-8	Not Detectable
pH	Not Applicable	See Note 6
Phenolic compounds (total phenols)	Not Applicable	2
Phorate and Disulfoton	298-02-2; 298-04-4	Not Detectable
Polychlorinated biphenyls	Not Applicable	0.09
Propachlor	1918-16-7	35
Propanil	709-98-8	7.0
Propazine	139-40-1	16
Selenium	Not Applicable	20
Silver	Not Applicable	100
Simazine	122-34-9	0.5
Styrene	100-42-5	930
Sulfate	Not Applicable	500,000
Sulfide	Not Applicable	1,000
Thiram	137-26-8	1.8
Toxaphene	8001-35-2	0.06
1,1,2-Trichloroethane	79-00-5	1
Trichloroethene	79-01-6	5
2,4,5-Trichlorophenoxyacetic acid	93-76-5	35

2,4,5-Trichlorophenoxypropionic acid	93-72-1	0.26
1,2,3-Trichloropropane	96-18-4	0.04
Trifluralin	1582-09-8	35
Vinyl chloride	75-01-4	2
Zinc	Not Applicable	5,000
Zineb	12112-67-7	1.8
Ziram	137-30-4	4.2

1. Includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.

2. Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.

3. Refer to groundwater effluent limitation for "Phenolic compounds (total phenols)".

4. Combined concentration of iron and manganese shall not exceed 1000 ug/L.

5. Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less.

6. pH shall not be lower than 6.5 or the pH of the natural groundwater, whichever is lower, nor shall be greater than 8.5 or the pH of the natural groundwater, whichever is greater.

7. Value is for the total of the chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans as equivalents of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) as specified by the Class GA H(WS) standard in Table 1 of section 703.5 of this Part.

In addition to the effluent limitations above, the following also apply in the counties of Nassau and Suffolk:

SUBSTANCE	**MAXIMUM ALLOWABLE CONCENTRATION IN mg/L**
(1) Dissolved solids, total	1,000
(2) Nitrogen, total (as N)	10

Historical Note

Sec. filed Aug. 2, 1978; repealed, new filed Aug. 2, 1991; amds. filed: Feb. 10, 1998; March 3, 1998; March 22, 1999 eff. April 7, 1999. Amended (e), (Table 3).

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§703.7 Severability

Historical Note

Secs. filed Aug. 2, 1978; repealed, filed Aug. 2, 1991 eff. 30 days after filing.

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APPENDIX F

JOHNNY CAKE FARM ROAD SITE
TRIP REPORT

SAMPLING TRIP REPORT

Site Name: Johnny Cake Road Farm
CERCLIS ID Number: NYD986927697
Sampling Date: March 7 – 9, 2006
CLP Case Number: 35144

1. Site Location:

Danube Twp, New York

2. Sample Descriptions:

Refer to Table 1 for CLP samples.

3. Laboratories Receiving Samples:

Case Number	Sample Type	Laboratory Code	Name and Address of Laboratory
35144	TCL - VOC Low Concentration Water (Groundwater)	ENVSYS	Envirosystems, Inc 9200 Rumsey Road, Suite B102 Columbia, MD 21045

4. Sample Dispatch Data:

All organic samples were sent to a Contract Laboratory Program (CLP) laboratory to be analyzed for Target Compound List (TCL) fractions - Volatile Organics Compounds (VOCs) analysis. On March 7, 2006, five (5) ground water samples, including one field duplicate, and one (1) quality assurance/quality control sample, i.e. trip blank were collected. The samples were held in a secure location overnight on ice. On March 08, 2006, six (6) additional ground water samples were collected and one (1) quality assurance/quality control sample, i.e. rinsate blank sample was taken. Once again, the samples were held in a secure location overnight on ice. On March 09, 2006, three (3) additional ground water samples were collected. The water in monitoring well, MW-1 was found to be frozen, so EPA personnel were not able to sample the well.

A total of sixteen (16) aqueous samples for TCL organic analysis were shipped in one cooler on wet ice to Envirosystems, Inc. on March 09, 2006 at 1600 via United Parcel Service (UPS) under air bill number A5491379831. The sixteen (16) samples included thirteen (13) field samples, one (1) duplicate sample and two (2) quality control (QC) samples (i.e., trip blank and rinsate blank). The Organic Chain of Custody Records are presented in Appendix A.

5. Sampling Personnel:

Name	Organization	Site Duties
Diane Salkie	USEPA Region II DESA/HWSB Superfund Contract Support Team	Project Manager/Sample Management
Christina Leung	USEPA Region II DESA/HWSB Superfund Contract Support Team	Field Personnel
Pat Sheridan	USEPA Region II DESA/HWSB Superfund Contract Support Team	Quality Assurance Officer

6. Additional Comments:

The number of samples includes:

- 14 ground water samples including 1 field duplicate (laboratory quality control sample)
- 1 trip blank (field quality control sample)
- 1 rinsate blank (field quality control sample)

The following Sample Numbers were used for laboratory and/or field quality control:

Standard Operating Procedure (SOP)	Field Quality Control (QC) Samples	
	Field Duplicate	Trip Blank And Rinsate Blank
SOM0 1.1	MW5R/B3PH9 is a duplicate of MW4R/B3PH8	TB-01/B3PH4 RB-01/B3PG6

Report Prepared By: Diane Salkie Date March 13, 2006 3/13/06

TABLE 1
SAMPLE DESCRIPTIONS
JOHNNY CAKE FARM ROAD SITE
DANUNEM, HERKIMER COUNTY, NEW YORK

Sample Location Identifier	Sample Type	Sample Collection		Analysis Requested		Sample Container	Required Sample Volume	Sample Preservation
		Date	Time	Parameter	Fraction			
TB-01	Trip Blank	3/7/06	1430	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-2R	Ground Water	3/7/06	1440	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-2RR	Ground Water	3/7/06	1533	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-19	Ground Water	3/7/06	1615	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-4R	Ground Water	3/7/06	1712	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-5R Duplicate of MW-4R	Ground Water	3/7/06	1712 (1730)	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-3	Ground Water	3/8/06	1000	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-12A	Ground Water	3/8/06	1130	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-20	Ground Water	3/8/06	1215	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-13	Ground Water	3/8/06	1440	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-14	Ground Water	3/8/06	1520	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	240 ml.	1:1 HCl to pH < 2 Cool to 4°C
RB-01	Rinsate Blank	3/8/06	1550	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-6R	Ground Water	3/8/06	1648	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C

TABLE 1 - CONTINUED
SAMPLE DESCRIPTIONS
JOHNNY CAKE FARM ROAD SITE
DANUNEM, HERKIMER COUNTY, NEW YORK

Sample Location Identifier	Sample Type	Sample Collection		Analysis Requested		Sample Container	Required Sample Volume	Sample Preservation
		Date	Time	Parameter	Fraction			
MW-18	Ground Water	3/9/06	0830	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-17	Ground Water	3/9/06	0910	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C
MW-16	Ground Water	3/9/06	0948	TCL Low Conc.	VOC	(2) 40 ml vials with Teflon-lined septum	120 ml.	1:1 HCl to pH < 2 Cool to 4°C

APPENDIX A

ORGANIC TRAFFIC REPORT & CHAIN OF CUSTODY RECORDS

(TCL ANALYSIS)

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

Case No: 35144
DAS No:

R

Region:	2
Project Code:	
Account Code:	,
CERCLIS ID:	NYD986927697
Spill ID:	6M
Site Name/State:	Johnny Cake Farm Road/NY
Project Leader:	Diane Salkie
Action:	
Sampling Co:	EPA

Date Shipped:	3/9/2006
Carrier Name:	UPS
Airbill:	A5491379831
Shipped to:	Envirosystems, Inc. 9200 Rumsey Rd. Suite B102 Columbia MD 21045 (410) 964-0330

Chain of Custody Record

Sampler Signature:

Relinquished By	(Date / Time)	Received By	(Date / Time)
1	3/9/06 1600	UPS A5491379831	3/9/06 1600
2			
3			
4			

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	QC Type
B3PG0	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL), 100 (HCL) (2)	MW-3	S: 3/8/2006	10:00		--
B3PG1	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-12A	S: 3/8/2006	11:30		--
B3PG2	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-20	S: 3/8/2006	12:15		--
B3PG3	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-13	S: 3/8/2006	14:40		--
B3PG4	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-14	S: 3/8/2006	15:20		--
B3PG5	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-6R	S: 3/8/2006	1648		--
B3PG6	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	RB-01	S: 3/8/2006	15:50		Rinsate
B3PG7	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-18	S: 3/9/2006	8:30		--
B3PG8	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-17	S: 3/9/2006	9:10		--
B3PG9	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-16	S: 3/9/2006	0948		--
B3PH4	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	TB-01	S: 3/7/2006	14:30		Trip Blank

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC: ~~B3PH3~~ B3PG5	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: VOA = CLP TCL Volatiles	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? ______

TR Number: 2-043013577-030906-0001

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PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

Case No: 35144

DAS No:

R

Region:	2	Date Shipped:	3/9/2006
Project Code:		Carrier Name:	UPS
Account Code:		Airbill:	A5491379831
CERCLIS ID:	NYD986927697	Shipped to:	Envirosystems, Inc. 9200 Rumsey Rd. Suite B102 Columbia MD 21045 (410) 964-0330
Spill ID:	6M		
Site Name/State:	Johnny Cake Farm Road/NY		
Project Leader:	Diane Salkie		
Action:			
Sampling Co:	EPA		

Chain of Custody Record

Sampler Signature: [signature]

	Relinquished By	(Date / Time)	Received By	(Date / Time)
1	[signature]	3/9/06 1600	UPS A5491379831	3/9/06 1600
2				
3				
4				

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No.	QC Type
B3PH5	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-2R	S: 3/7/2006 14:40		--
B3PH6	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-2RR	S: 3/7/2006 15:33		--
B3PH7	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-19	S: 3/7/2006 16:15		--
B3PH8	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-4R	S: 3/7/2006 17:12		~~Field Duplicate~~ DS
B3PH9	Ground Water/ Diane Salkie	L/G	VOA (21)	(HCL) (2)	MW-5R	S: 3/7/2006 17:30		Field Duplicate

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC: ~~B3PH9~~ DS	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: VOA = CLP TCL Volatiles	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced?

[redacted]-30906-0001

[redacted] will increase analytical costs.

[redacted] Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax [redacted]

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APPENDIX G

WELL DATA SHEETS

WELL DATA SHEET

Site Name Johnny Cake Farm Road   Date 03/07/06   Well # MW-2R

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/07/06 1400   Method Redi-Flo2, Grundfos pump (low flow)   Total Depth 24.2 ft

Well Casing Type/Diam. Tall, 3"   Top of Casing to Water Level 1.4 ft. bgs   Well Vol. 8.41 gal

Water Column Height 22.8 ft.   Total Volume Evacuated 2.0 gal.   Screen Location 15 - 25 ft.

Pump placement 21 ft.   Flow 400 ml/min

Meter Calibration:

Date/Time 03/07/06 1350

Meters pH(s.u.) 4.01 (4) ,7.00 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.7 (0.1), 20 (20), 99.4 (100) D.O. 116 % slope

Sampling Information:

Date/Time 03/07/06 1440   Method Grundfos pump (low flow)   Sample/Lab Number B3PH5

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1404	0.2	2.3	7.8	455	7.00	0.36	52.9
1409	0.4	2.4	8.0	452	7.00	0.22	51.7
1414	0.6	2.4	7.7	449	7.00	0.42	35.1
1419	1.0	2.4	7.0	453	7.00	0.34	36.2
1424	1.3	2.4	6.7	453	7.00	0.34	27.6
1429	1.5	2.4	6.8	453	7.01	0.32	25.7
1434	1.8	2.4	6.9	454	7.01	0.18	25.4

Weather/Comments/Observations/Sample Charac. Cold and Sunny ~30°F

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/07/06 Well # MW-2RR

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/07/06 1420 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 25.75 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 4.4 ft. bgs Well Vol. 14.01 gal

Water Column Height 21.35 ft. Total Volume Evacuated 3.5 gal. Screen Location 10 - 25 ft.

Pump placement 22.0 ft. Flow 100 ml/min

Meter Calibration:

Date/Time 03/07/06 1350

Meters pH(s.u.) 4.01 (4) ,7.00 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.70 (0.1), 20.0 (20), 99.4(100) D.O. 116 % slope

Sampling Information:

Date/Time 03/07/06 1533 Method Grundfos pump (low flow) Sample/Lab Number B3PH6

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen	Turbidity (NTU)
1446	1.0	4.6	5.1	374	7.01	0.92	12.9
1451	1.2	4.6	2.5	380	7.01	0.54	9.29
1456	1.4	4.6	1.5	383	7.01	0.51	7.75
1501	1.6	4.6	5.0	383	7.01	0.35	6.82
1506	2.0	4.7	3.8	376	7.01	0.29	7.03
1511	2.3	4.9	2.4	389	7.01	0.27	5.17
1516	2.5	5.0	2.1	395	7.01	0.25	4.75
1521	2.8	5.1	2.1	400	7.01	0.24	3.65
1526	3.0	5.2	2.5	404	7.01	0.26	3.91
1531	3.3	5.2	2.1	402	7.01	0.39	3.33

Weather/Comments/Observations/Sample Charac. Cold and Sunny ~30°F

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/07/06 Well # MW-19

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/07/06 1540 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 26.75 ft

Well Casing Type/Diam. Tall, 2" Top of Casing to Water Level 7.3 ft. bgs

Well Vol. 3.19 gal Water Column Height 19.45 ft. Total Volume Evacuated 1.0 gal.

Screen Location 15 - 25 ft. Pump placement 21.0 Flow 200 ml/min

Meter Calibration:

Date/Time 03/07/06 1530

Meters pH(s.u.) 4.01 (4) ,7.00 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.7(0.1), 20 (20), 99.4 (100) D.O. 116 % slope

Sampling Information:

Date/Time 03/07/06 1615 Method Grundfos pump (low flow) Sample/Lab Number B3PH7

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen	Turbidity (NTU)
1542	0.2	7.4	3.5	432	7.01	4.02	8.86
1547	0.3	7.7	3.0	438	7.01	3.96	7.19
1552	0.4	7.8	2.9	433	7.01	3.94	8.38
1557	0.5	7.9	2.3	428	7.01	3.86	8.42
1602	0.7	8.1	1.7	436	7.01	3.99	9.22
1607	0.8	8.2	1.6	431	7.01	3.98	5.45
1612	1.0	8.2	1.0	433	7.01	3.99	6.59

Weather/Comments/Observations/Sample Charac. Cold and Sunny ~30°F

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/07/06 Well # MW-4 and Duplicate MW-5R

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/07/06 1623 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 25.7 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 7.7 ft. bgs Well Vol. 11.81 gal

Water Column Height 18.00 ft. Total Volume Evacuated 2.2 gal. Screen Location 15 - 25 ft.

Pump placement 24.0 ft. Flow 200 ml/min

Meter Calibration:

Date/Time 03/07/06 1350

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/07/06 1712 Method Grundfos pump (low flow) Sample/Lab Number B3PH8, B3PH9

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen	Turbidity (NTU)
1625	0.2	8.1	6.1	872	7.02	9.92	7.42
1630	0.4	8.3	7.0	861	7.03	8.89	5.52
1635	0.6	8.4	7.1	858	7.03	8.43	4.54
1640	1.0	8.6	6.6	863	7.03	8.18	4.15
1645	1.4	8.65	5.7	864	7.03	7.86	4.47
1650	1.6	8.67	5.0	860	7.03	7.75	4.74
1655	1.8	8.7	4.1	875	7.03	7.66	3.73
1700	2.1	8.7	3.3	883	7.04	7.57	3.37
1705	2.3	8.71	2.7	888	7.03	7.57	3.19
1710	2.5	8.71	2.5	889	7.04	7.42	5.59

Weather/Comments/Observations/Sample Charac. Cold, sunny, and windy

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-3

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 12.1 ft

Well Casing Type/Diam. Tall, 3" Top of Casing to Water Level 5.25 ft. bgs Well Vol. 2.53 gal

Water Column Height 6.85 ft. Total Volume Evacuated 1.5 gal. Screen Location 10 - 25 ft.

Pump placement 20 ft. Flow 100 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/08/06 1000 Method Grundfos pump (low flow) Sample/Lab Number B3PG0

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen	Turbidity (NTU)
0839	0.2	6.3	3.0	515	7.00	1.95	72.0
0844	0.3	6.5	2.9	517	7.00	1.37	45.6
0849	0.35	6.5	3.1	523	7.00	1.47	17.0
0854	0.35	6.6	3.0	526	7.00	1.46	7.89
0859	0.35	6.6	3.3	524	7.00	1.13	5.12
0904	0.35	6.5	2.4	536	7.00	1.29	7.17
0909	0.35	6.6	3.2	527	7.00	1.71	22.9
0914	0.35	6.6	5.4	513	7.00	1.06	17.2
0919	0.35	6.6	5.2	518	7.00	1.42	16.1
0924	0.35	6.6	4.8	522	7.00	1.26	11.7
*0939	1.0	7.4	12.3	521	7.00	1.37	89.6
0944	1.0	7.5	10.6	519	7.00	0.95	81.1
0949	1.3	7.5	9.7	521	7.00	1.60	54.2
0954	1.4	7.4	9.7	517	7.00	1.11	40.5
0959	1.5	7.2	9.6	508	7.00	1.63	37.1

Weather/Comments/Observations/Sample Charac. *Pump flushed, sample was taken at 1000 because it began to loose flow and if flow rate continued to increase, the temperature would also.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-12A

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 1023 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 21.23 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 8.1 ft. bgs Well Vol. 8.61 gal

Water Column Height 13.13 ft. Total Volume Evacuated 1.6 gal. Screen Location 15 - 25 ft.

Pump placement 24.5 ft. Flow 100 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/08/06 1130 Method Grundfos pump (low flow) Sample/Lab Number B3PG1

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1026	0.3	6.65	6.6	1032	7.00	0.91	96.3
1031	0.4	6.70	6.8	1018	7.00	0.70	96.8
1036	0.5	6.71	7.0	1026	7.00	0.60	85.3
1041	0.6	6.75	7.4	1021	7.00	0.85	85.3
1046	0.7	6.75	7.6	1018	7.00	0.97	79.2
1051	0.8	6.75	7.1	1022	7.00	0.95	76.2
1056	0.9	6.77	6.9	1030	7.00	0.90	71.7
1101	1.0	6.77	6.8	1031	7.00	0.80	69.4
1106	1.1	6.76	7.1	1030	7.00	0.75	67.7
1111	1.2	6.78	7.2	1029	7.00	0.72	63.8
1116	1.3	6.80	7.9	1010	7.00	0.74	60.6
1121	1.4	6.82	8.5	1003	7.00	0.65	58.3
1126	1.5	6.82	8.7	999	7.00	0.71	60.2

Weather/Comments/Observations/Sample Charac. Cold and Sunny ~30°F, sample began yellow/orange color

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-20

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 1142 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 25.4 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 8.55 ft. bgs Well Vol. 11.05 gal

Water Column Height 16.85 ft. Total Volume Evacuated 1.0 gal. Screen Location 15 - 25 ft.

Pump placement 24.5 ft. Flow 100 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/08/06 1215 Method Grundfos pump (low flow) Sample/Lab Number B3PG2

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1144	0.1	9.45	9.1	728	7.00	0.86	72.1
1149	0.2	9.70	8.6	721	7.00	0.75	49.7
1154	0.3	9.92	8.6	729	7.00	0.69	41.6
1159	0.4	9.97	9.1	72.1	7.00	0.67	38.2
1204	0.5	10.17	8.9	720	7.00	0.62	36.6
1209	0.6	10.22	8.4	729	7.00	0.63	35.9
1214	0.7	10.23	8.4	728	7.00	0.53	36.0

Weather/Comments/Observations/Sample Charac. Cold, sample had a yellow tint, no odor.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-13

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 1410 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 16.75 ft

Well Casing Type/Diam. Tall, 3" Top of Casing to Water Level 5.7 ft. bgs Well Vol. 4.08 gal

Water Column Height 11.05 ft. Total Volume Evacuated 1.0 gal. Screen Location 5 - 15 ft.

Pump placement 14 ft. Flow 200 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/08/06 1440 Method Grundfos pump (low flow) Sample/Lab Number B3PG3

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1413	0.3	6.25	8.2	785	7.03	2.22	9.72
1418	0.4	6.25	7.9	791	7.04	2.16	8.15
1423	0.5	6.25	7.5	806	7.04	2.10	6.36
1428	0.7	6.25	7.6	808	7.04	2.14	4.73
1433	0.8	6.26	7.1	817	7.04	2.37	3.40
1438	0.9	6.25	7.5	812	7.04	2.24	3.31

Weather/Comments/Observations/Sample Charac. Sunny and warmer ~32°F, began with a black/gray tint.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-14

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 1450 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 21.45 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 5.75 ft. bgs Well Vol. 10.30 gal

Water Column Height 15.7 ft. Total Volume Evacuated 1.5 gal. Screen Location 15 - 25 ft.

Pump placement 24.5 ft. Flow 200 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/08/06 1520 Method Grundfos pump (low flow) Sample/Lab Number B3PG4

Field Measurement Data:

Time	Depth to Water (Ft.)	Flow Reading (ml)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1453	0.1	8.05	7.9	581	7.03	269	4.91
1458	0.3	8.10	7.8	579	7.03	2.76	4.23
1503	0.5	6.71	7.8	584	7.03	1.39	1.87
1508	0.6	6.71	7.4	587	7.04	1.40	1.83
1513	1.0	6.61	7.8	587	7.05	1.03	1.25
1518	1.5	6.63	7.8	584	7.05	0.93	1.45

Weather/Comments/Observations/Sample Charac. Cloudy, sunny, and warm ~36°F.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/08/06 Well # MW-6R

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/08/06 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 24.95 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 5.4 ft. bgs Well Vol. 12.82 gal

Water Column Height 19.55 ft. Total Volume Evacuated 4.5 gal. Screen Location 10 - 20 ft.

Pump placement 18 ft. Flow 200 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 4.01 (4) ,7.00 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.67 (0.1), 22.7 (20), 116 (100) D.O. 103 % slope

Sampling Information:

Date/Time 03/08/06 1618 Method Grundfos pump (low flow) Sample/Lab Number B3PG5

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
1541	0.2	6.25	8.3	1398	7.04	2.32	53.9
1546	0.25	6.40	8.7	1412	7.03	0.94	56.6
1551	0.3	6.81	8.1	1417	7.03	0.62	65.3
1556	0.35	6.92	9.1	1408	7.03	0.38	141
1601	0.4	6.99	9.4	1412	7.03	0.41	107
1606	0.5	7.09	8.8	1408	7.03	0.34	79.2
1611	0.8	7.16	8.0	1412	7.03	0.30	61.5
1616	1.3	7.45	8.7	1400	7.03	0.35	62.9
1621	1.8	7.67	8.6	1407	7.03	0.46	56.3
1626	2.6	7.86	8.3	1402	7.03	0.48	41.9
1631	3.1	8.0	7.8	1407	7.03	0.43	45.3
1636	3.9	8.28	7.6	1411	7.02	0.55	42.0
1641	4.2	8.50	7.6	1410	7.02	0.52	36.9
1646	4.4	8.60	7.6	1413	7.02	0.58	35.3

Weather/Comments/Observations/Sample Charac. Cold, sample was cloudy and cleared up minutely.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/09/06 Well # MW-18

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/09/06 0810 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 25.4 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 8.34 ft. bgs Well Vol. 11.19 gal

Water Column Height 17.06 ft. Total Volume Evacuated 0.7 gal. Screen Location 15 - 25 ft.

Pump placement 24 ft. Flow 300 ml/min

Meter Calibration:

Date/Time 03/08/06

Meters pH(s.u.) 4.01 (4) ,7.00 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.67 (0.1), 22.7 (20), 116 (100) D.O. 103 % slope

Sampling Information:

Date/Time 03/9/06 0830 Method Grundfos pump (low flow) Sample/Lab Number B3PG7

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
0813	02	8.34	7.4	580	7.01	4.30	6.54
0818	0.5	8.93	7.8	582	7.02	3.42	4.78
0823	0.5	8.93	7.6	583	7.02	3.53	4.69
0828	0.7	8.95	7.6	585	7.02	3.39	4.88

Weather/Comments/Observations/Sample Charac. Rain, cool, clear, no odor.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/09/06 Well # MW-17

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/09/06 0835 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 41.0 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 3.6 ft. bgs Well Vol. 24.53 gal

Water Column Height 37.4 ft. Total Volume Evacuated 1.5 gal. Screen Location 15 - 25 ft.

Pump placement 24 ft. Flow 100 ml/min

Meter Calibration:

Date/Time 03/09/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/09/06 0910 Method Grundfos pump (low flow) Sample/Lab Number MW-17

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
0843	0.3	5.30	6.8	3.67	7.02	3.81	12.2
0848	0.5	5.65	5.3	362	7.02	2.71	11.5
0853	0.7	5.90	4.7	365	7.03	2.99	10.6
0858	0.9	6.11	4.4	366	7.03	3.03	10.1
0903	1.3	6.34	4.4	367	7.03	3.10	10.1

Weather/Comments/Observations/Sample Charac. Steady rain and cold. Sample clear, no odor.

WELL DATA SHEET

Site Name Johnny Cake Farm Road Date 03/09/06 Well # MW-16

Sampling Personnel D. Salkie, C. Leung

Evacuation Information:

Date/Time 03/09/06 0847 Method Redi-Flo2, Grundfos pump (low flow) Total Depth 25 ft

Well Casing Type/Diam. Tall, 4" Top of Casing to Water Level 10.36 ft. bgs Well Vol. 9.61 gal

Water Column Height 14.65 ft. Total Volume Evacuated 4.2 gal. Screen Location 15 – 25 ft.

Pump placement 22 ft. Flow 400 ml/min

Meter Calibration:

Date/Time 03/09/06

Meters pH(s.u.) 3.90 (4) ,6.91 (7) Conductivity(mSm): 12.88 Turbidity(NTU): 1.51 (0.1), 21.4 (20), 98.8 (100) D.O. 101 % slope

Sampling Information:

Date/Time 03/09/06 0948 Method Grundfos pump (low flow) Sample/Lab Number B3PG9

Field Measurement Data:

Time	Volume Evacuated (gal)	Depth to Water (Ft.)	Temp (°C)	Specific Conductance (mS/cm)	pH (su)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
0915	1.0	11.02	7.0	617	7.02	2.11	4.33
0920	2.0	11.68	7.2	628	7.02	2.99	4.14
0925	2.5	12.18	6.5	623	7.02	2.68	3.48
0930	3.0	12.26	6.0	629	7.02	2.68	1.83
0935	3.5	12.32	5.5	631	7.02	2.75	1.66
0940	4.0	12.32	5.0	635	7.02	2.67	1.39
0945	4.2	12.32	5.0	635	7.03	2.69	1.32

Weather/Comments/Observations/Sample Charac. Steady rain, clear, no odor.

TABLE 1
ƆHNNY CAKE ROAD SITE
:, Herkimer County, New York

Septic Tank Excavation

Sample Number Sample Depth (ft) Date Sampled Dilution Factor	NYSDEC TAGM* (ppm)	ST-01 17.0-17.5 07/06/2005 1.02	ST-01 17.0-17.5 07/06/2005 3.68	ST-02 17.0-17.5 07/06/2005 1.01	ST-02 17.0-17.5 07/06/2005 4.27	ST-03 17.0-17.5 07/06/2005 1.01	ST-03 17.0-17.5 07/06/2005 4.42	ST-04 17.0-17.5 07/06/2005 1.02	ST-04 17.0-17.5 07/06/2005 4.31	ST-05 17.0-17.5 07/06/2005 500	ST-05 17.0-17.5 07/06/2005 2000
VOLATILE ORGANICS (ppm)											
Acetone	0.11	0.032	0.065	0.022	0.051	0.025	0.059	0.028	0.055	ND	ND
Carbon disulfide	2.7	0.0012 J	ND	0.00068 J	ND	0.0017 J	ND	0.039	0.073	ND	ND
Cis-1,2-dichloroethene	0.2	0.046	0.004 J	ND	ND	0.014	0.0082 J	0.0057	0.004 J	37 E	60
Methylene Chloride	0.1	0.00087 J	0.0033 J	0.0084 J	0.0037 J	0.0012 J	0.0044 J	0.0018 J	0.0034 J	ND	ND
Trans-1,2-dichloroethene	0.2	0.00067 J	ND	ND	ND	ND	ND	ND	ND	0.3 J	0.48 J
Vinyl Chloride	0.12	0.0092	ND	ND	ND	0.01	0.0038 J	0.0029 J	ND	3.1	1.9 J
Tetrachloroethene	1.4	ND	ND	ND	ND	0.0038	0.0043 J	ND	ND	0.53 J	1 J
Trichloroethene	0.7	ND	ND	ND	ND	0.00078 J	ND	0.00087 J	ND	1.1 J	2.2 J
Toluene	1.5	ND	ND	ND	ND	ND	ND	ND	ND	14	26
2-Butanone	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes(total)	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Sample Number Sample Depth (ft) Date Sampled Dilution Factor	NYSDEC TAGM* (ppm)	ST-06 8.0-8.5 07/06/2005 1	ST-07 6.0-6.5 07/06/2005 1.02	ST-08 7.5-8.0 07/06/2005 9.8	ST-08 7.5-8.0 07/06/2005 10.2	ST-08 7.5-8.0 07/06/2005 500	ST-09 7.5-8.0 07/06/2005 500
VOLATILE ORGANICS (ppm)							
Acetone	0.11	0.0094 J	0.0042 J	0.84 J	0.084 J	ND	ND
Carbon disulfide	2.7	ND	ND	0.049	0.02 J	ND	ND
Cis-1,2-dichloroethene	0.2	0.11	0.035	2.1	5.7 E	5.2	12
Methylene Chloride	0.1	ND	ND	0.006 J	0.0066 J	ND	ND
Trans-1,2-dichloroethene	0.2	0.0027	0.00054 J	0.0065 J	0.059	ND	ND
Vinyl Chloride	0.12	0.077	ND	0.18	0.09	ND	0.59 J
Tetrachloroethene	1.4	0.00083 J	0.062	ND	0.047	ND	ND
Trichloroethene	0.7	0.0032	0.057	0.0013 J	0.2	0.22 J	0.16 J
Toluene	1.5	0.007	ND	ND	ND	ND	ND
2-Butanone	0.3	0.0016 J	ND	ND	ND	ND	ND
Ethylbenzene	5.5	0.00055 J	ND	ND	ND	ND	ND
Xylenes(total)	1.2	0.0013 J	ND	ND	ND	ND	ND

NOTES:
* - Soil Cleanup Objectives to Protect GW Quality
ppm - parts per million
ND - not detected
J - Analyte Detected Below Quantitation Limits
E - Value Above Quantitation Range
Shading - result exceed cleanup criteria

TABLE 2
JOHNNY CAKE ROAD SITE
Danube, Herkimer County, New York

GARAGE AREA EXCAVATION

Sample Number Sample Depth (ft) Date Sampled Dilution Factor	NYSDEC TAGM* (ppm)	GAR-01 1.5-2.0 07/06/2005 0.99	GAR-02 1.5-2.0 07/06/2005 1.01	GAR-02 1.5-2.0 07/06/2005 10.2	GAR-03 1.5-2.0 07/06/2005 1.01	GAR-04 1.5-2.0 07/06/2005 1	GAR-05 5.5-6.0 07/06/2005 9.61	GAR-06 5.5-6.0 07/06/2005 1	GAR-06 5.5-6.0 07/06/2005 10	GAR-07 5.5-6.0 07/06/2005 1.01	GAR-08 6.5-7.0 07/07/2005 1	GAR-08 6.5-7.0 07/07/2005 10	GAR-09 16.0-16.5 07/06/2005 1	GAR-09 16.0-16.5 07/06/2005 4.54
VOLATILE ORGANICS (ppm)														
Acetone	0.11	0.0052 J	0.0066 J	0.079 J	0.0061 J	0.0058 J	0.068 J	0.0078 J	0.058 J	0.014	0.011 J	0.066 J	0.022	0.061
Carbon disulfide	2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.085	ND	0.002 J	0.0058 J
Cis-1,2-dichloroethene	0.2	0.0008 J	0.0075	0.0074 J	0.0048	0.0027 J	0.022 J	0.075	0.053	0.0034	0.074	0.018 J	0.0032	ND
Methylene Chloride	0.1	ND	ND	ND	ND	ND	ND	0.0006 J	ND	ND	ND	ND	0.0013 J	0.0047 J
Trans-1,2-dichloroethene	0.2	ND	ND	ND	ND	ND	ND	0.0024 J	ND	0.0013 J	0.0037	ND	ND	ND
Vinyl Chloride	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022 J	ND
Tetrachloroethene	1.4	0.038	1 E	1.9	0.2	0.063	0.61	0.98 E	1.3	0.0084	0.41 E	0.22	0.0019 J	ND
Trichloroethene	0.7	0.0015 J	0.085	0.083	0.11	0.039	0.38	0.5 E	0.48	0.063	0.61 E	0.23	0.001 J	ND
Toluene	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	0.3	ND	ND	ND	ND	ND	ND	ND	ND	0.0028 J	0.0023 J	ND	ND	ND
2-hexanone	1.2	ND	ND	ND	ND	ND	ND	ND	ND	0.0013 J	0.0033 J	ND	ND	ND

NOTES:
* - Soil Cleanup Objectives to Protect GW Quality
ppm - parts per million
ND - not detected
J - Analyte Detected Below Quantitation Limits
E - Value Above Quantitation Range
Shading - result exceed cleanup criteria

TABLE 3
JOHNNY CAKE ROAD SITE
Danube, Herkimer County, New York

ROAD SIDE DITCH SAMPLES

Sample Number Sample Depth (ft) Date Sampled Dilution Factor	NYSDEC TAGM* (ppm)	RSD-01 0.0-0.5 07/12/2005 1.01	RSD-02A 0.0-0.5 07/12/2005 1	RSD-02B 1.0-1.25 07/12/2005 0.99	RSD-03 0.0-0.5 07/12/2005 0.99	RSD-04A 0.0-0.5 07/12/2005 1	RSD-04B 1.0-1.25 07/12/2005 0.99	RSD-05 0.0-0.5 07/12/2005 0.99	RSD-06A 0.0-0.5 07/12/2005 1.01	RSD-06B 1.0-1.25 07/12/2005 1.01
VOLATILE ORGANICS (ppm)										
Acetone	0.11	0.0069 J	0.018	0.016	0.065	0.0068 J	0.0068 J	0.005 J	0.011	0.024
Carbon disulfide	2.7	ND	ND	0.033	0.001 J	ND	ND	ND	0.0046	0.065
Cis-1,2-dichloroethene	0.2	0.0018 J	0.0018 J	0.039	0.002 J	0.017	0.0034	0.00084 J	0.0013 J	0.0036
Methylene Chloride	0.1	0.001 J	ND	ND	0.00084 J	0.00088 J	0.0079 J	0.00089 J	ND	ND
Trans-1,2-dichloroethene	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.12	ND	0.0035 J	0.052	ND	0.00074 J	ND	ND	0.001 J	0.022
Tetrachloroethene	1.4	0.004	ND	0.0015 J	ND	0.0053	0.013	0.00075 J	0.00089 J	ND
Trichloroethene	0.7	0.0051	ND	0.001 J	0.0033	0.0098	0.029	0.0016 J	ND	0.00087 J
Toluene	1.5	ND	0.0024 J	ND	ND	ND	ND	ND	ND	0.00011 J
2-Butanone	0.3	ND	0.0052 J	0.0047 J	0.16	ND	ND	ND	0.0026 J	0.0088 J
2-hexanone	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenxene	5.5	ND	0.00088 J	0.0033	ND	ND	ND	ND	ND	ND
Xylenes (total)	1.2	ND	0.0021 J	0.016	ND	ND	ND	ND	ND	ND

NOTES:
* - Soil Cleanup Objectives to Protect GW Quality
ppm - parts per million
ND - not detected
J - Analyte Detected Below Quantitation Limits
E - Value Above Quantitation Range
Shading - result exceed cleanup criteria

TABLE 4
JOHNNY CAKE FARM ROAD SITE
GROUNDWATER SUMMARY-POST SOIL REMEDIATION

Contaminant----->ppb	Acetone	carbon disulfide	cis-1,2-dichloroethene	trans-1,2-dichloroethene	2-butanone	trichloroethene	tetrachloroethene	vinyl chloride	dichlorofluoromethane
DEC 703 Standard			5	5		5	5	2	5
Fed. DW Standard			70	100		5	5	2	
MW-1 (Aug. 29, 2005)	1.6	ND	4.3	ND	ND	2.4	0.67	ND	ND
MW-1 (Nov. 29, 2005)	1.5	ND	8.4	ND	ND	1	ND	18	0.56
MW-1 (March 07, 2006)	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-1 (June 08, 2006)	1.6	ND	11	ND	ND	4.3	ND	4.5	0.53
MW-2R (Aug. 29, 2005)	1.6	ND	6.6	ND	3.7	1.3	1.3	ND	ND
MW-2R (Nov. 29, 2005)	1	ND	4.8	ND	ND	0.84	ND	ND	ND
MW-2R (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2R (June 08, 2006)	0.74	ND	4.5	ND	ND	ND	ND	3.2	ND
MW-2RR (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (June 08, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3 (Aug. 29, 2005)	6.2	ND	12	ND	ND	11	16	18	ND
MW-3 (Nov. 29, 2005)	ND	ND	0.6	ND	ND	1.7	11	ND	ND
MW-3 (March 07, 2006)	ND	ND	ND	ND	ND	8.6	38 J	ND	ND
MW-3 (June 08, 2006)	ND	ND	2.5	ND	ND	5.5	27	ND	ND
MW-4R (Aug. 29, 2005)	1.6	ND	57	0.91	ND	35	0.69	0.65	0.96
MW-4R (Nov. 29, 2005)	1.6	ND	50	ND	ND	20	1.3	3	0.78
MW-4R (March 07, 2006)	ND	ND	280/320	2.1/4.5	ND	190/210	8.1/8.1	ND	ND
MW-4R (June 08, 2006)	ND	ND	170	1.8	ND	110	7.3	5.4	0.8
MW-6R (Aug. 29, 2005)	3.3/3.7 (Dupl)	ND	1.6	ND	ND	ND	ND	1.3	ND
MW-6R (Nov. 29, 2005)	1.1	ND	1.5/4.8 (dupl)	ND	ND	0.84 (Dupl.)	ND	ND	ND
MW-6R (March 07, 2006)	ND	ND	2.1	ND	ND	ND	ND	ND	ND
MW-6R (June 08, 2006)	ND	ND	2.4	ND	ND	ND	ND	12	ND
MW-12A (Aug. 29, 2005)	1.2	ND	0.83	ND	ND	ND	ND	2.5	ND
MW-12A (Nov. 29, 2005)	1.6	ND	ND	ND	ND	ND	ND	0.77	ND
MW-12A (March 07, 2006)	3.3 J	ND	ND	ND	ND	ND	ND	ND	ND
MW-12A (June 08, 2006)	ND	ND	ND	ND	ND	ND	Nd	1.5	ND
MW-13 (Aug. 29, 2005)	ND	ND	35	0.57	ND	0.63	ND	ND	ND
MW-13 (Nov. 29, 2005)	ND	ND	19	ND	ND	1.3	ND	ND	ND
MW-13 (March 07, 2006)	ND	ND	100	ND	ND	1.2	ND	ND	ND
MW-13 (June 08, 2006)	2.7	ND	31	ND	ND	2.2	ND	ND	ND
MW-14 (Aug. 29, 2005)	ND	ND	30	0.71	ND	4.3	ND	ND	ND
MW-14 (Nov. 29, 2005)	ND	ND	96	ND	ND	2.8	ND	ND	ND
MW-14 (March 07, 2006)	ND	ND	19	ND	ND	2.5	ND	ND	ND
MW-14 (June 08, 2006)	ND	ND	20	ND	ND	3.4	ND	ND	ND

Contaminant----->ppb	Acetone	carbon disulfide	cis-1,2-dichloroethene	trans-1,2-dichloroethene	2-butanone	trichloroethene	tetrachloroethene	vinyl chloride	dichlorofluoromethane
DEC 703 Standard			5	5		5	5	2	5
Fed. DW Standard			70	100		5	5	2	
MW-16 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (Nov. 29, 2005)	9.2	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (June 08, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (March 07, 2006)	3.4 J	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (June 08, 2006)	4.6	ND	ND	ND	ND	ND	ND	ND	ND
MW-18 (Aug. 29, 2005)	ND	ND	34	ND	ND	ND	ND	43	1.1
MW-18 (Nov. 29, 2005)	ND	ND	5.6	ND	ND	ND	ND	14	ND
MW-18 (March 07, 2006)	ND	ND	2.6	ND	ND	ND	ND	ND	ND
MW-18 (June 08, 2006)	3.1	ND	2.1	ND	ND	ND	ND	6	ND
MW-19 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (June 08, 2006)	0.59	ND	ND	ND	ND	ND	ND	ND	ND
MW-20 (Aug. 29, 2005)	2	ND	42	ND	ND	7.4	ND	2.5	ND
MW-20 (Nov. 29, 2005)	ND	ND	35	ND	ND	10	0.78	2.4	ND
MW-20 (March 07, 2006)	ND	ND	34	ND	ND	8.6	0.24 J	ND	ND
MW-20 (June 08, 2006)	1.7	ND	22	0.81	ND	4.9	ND	2.1	ND

result exceeds 6 NYCRR Part 703 GWS

result exceeds Federal DW Standards

NS - no sample collected due to well water being frozen.

J - Below method detection limit, estimated concentration.

APPENDIX 1

Weston Solutions, Inc.
Federal Programs Division
Suite 201
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REMOVAL SUPPORT TEAM
EPA CONTRACT 68-W-00-113

SOIL BORING SAMPLING AND ANALYSIS REPORT

JOHNNY CAKE ROAD SITE
JOHNNY CAKE ROAD
DANUBE, HERKIMER COUNTY, NEW YORK

Prepared by

Removal Support Team, Federal Programs Division
Weston Solutions, Inc.
Edison, New Jersey 08837

Prepared for

U.S. Environmental Protection Agency
Region II - Removal Action Branch
Edison, New Jersey 08837

DCN #: RST-02-F-01257
TDD #: 02-03-08-0026
EPA Contract No.: 68-W-00-113

Approved by:

RST

M. Mahnkopf
Michael Mahnkopf - Site Project Manager Date: 06/01/04

RST

John Brennan - Group Leader Date: 6/1/04

USEPA

James Haklar - On-Scene Coordinator Date: 6/2/04

an employee-owned company

In Association with Scientific and Environmental Associates, Inc.
Innovative Technological Solutions, Inc., and Terranear Technologies Group

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REMOVAL SUPPORT TEAM
EPA CONTRACT 68-W-00-113

June 1, 2004

James Haklar, On-Scene Coordinator
U.S. Environmental Protection Agency, Region II
Removal Action Branch
2890 Woodbridge Avenue
Edison, NJ 08837

EPA CONTRACT NO: 68-W-00-113
TDD NO: 02-03-08-0026
DOCUMENT CONTROL NO: RST-02-F-01257
SUBJECT: JOHNNY CAKE ROAD SITE
SOIL BORING SAMPLING AND ANALYSIS REPORT

Dear Mr. Haklar:

Enclosed please find the Soil Boring Sampling and Analysis Report pertaining to the September and October, 2003 soil investigation at the Johnny Cake Road site located in Danube, Herkimer County, New York. If you have any questions or comments, please call me at (732) 225-6116, ext. 213.

Very truly yours,

WESTON SOLUTIONS, INC.

M. Mahnkopf
Michael Mahnkopf
Project Manager

Enclosure

cc: TDD No. 02-03-08-0026

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REMOVAL SUPPORT TEAM
EPA CONTRACT 68-W-00-113

SOIL BORING SAMPLING AND ANALYSIS REPORT

JOHNNY CAKE ROAD SITE
JOHNNY CAKE ROAD
DANUBE, HERKIMER COUNTY, NEW YORK

Prepared by

Removal Support Team, Federal Programs Division
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Edison, New Jersey 08837

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Approved by:

RST

M. Mahnkopf
Michael Mahnkopf - Site Project Manager

Date: 06/01/04

RST

John Brennan - Group Leader

Date: 6/1/04

USEPA

James Haklar - On-Scene Coordinator

Date: 6/2/04

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LIST OF APPENDICES

1.0 BACKGROUND

The Johnny Cake Road Site consists of farmland property located along Johnny Cake Road in the town of Danube, Herkimer County, New York (see Figure 1). During the 14-month operation of an illicit cocaine refining laboratory operated on the site, unknown quantities of solvents were spilled in various locations on the property. On at least one occasion, individuals were observed spilling those liquids on the site driveway. Other means of disposal included dumping on the unpaved garage floor, dumping into the site septic tank through the house drains or sinks and runoff from the house basement floor to the driveway surface. Additional spills may have included releases of drummed solvents in the garage drum storage area. In 1987, the U.S. Marshals Service (USMS) seized the property.

In August of 1990, EPA received a verbal request from the USMS and U.S. Attorney's Office to conduct a removal assessment. Since that time, EPA has performed various removal activities including the following: removal of the contents of the septic tank and a 55-gallon drum; sampling of the site and six nearby residences to determine the nature and extent of contamination and installation of groundwater monitoring wells and/or point-of-entry treatment systems at the aforementioned six residences in order to provide a source of potable water.

Previous sampling of the soil and water at the site by EPA has confirmed contamination with volatile organic compounds including: tetrachloroethene, trichloroethene, vinyl chloride, toluene and 1,2-dichloroethene (cis- and trans- isomers).

In September & October of 2003, EPA installed an additional five groundwater monitoring wells in order to facilitate the long term delineation of the groundwater contamination plume. EPA also installed 27 soil borings and collected 167 subsurface soil samples at the site. These samples were collected and analyzed to determine the current concentrations of volatile organic compounds in the soil.

This report discusses the following:

1. Soil samples collected and analyzed during the installation of the above mentioned groundwater monitoring wells;

2. Installation of the above-mentioned soil borings and subsequent soil sample collection and analytical results.

2.0 GENERAL SCOPE OF WORK

The objective of this soil assessment was to determine the horizontal and vertical extent of VOC contaminated soils in excess of their respective Recommended Soil Cleanup Objectives, which are listed in the New York State Department of Environmental Conservation (NYSDEC), Technical And Administrative Guidance Memorandum (TAGM) #4046, Determination of Soil Cleanup Objectives and Cleanup Levels (See Appendix 1).

2.1 Groundwater Monitoring Wells

Five soil borings associated with the installation of groundwater monitoring wells (MW-16 through MW-20) and an additional 27 soil borings (JCRS-0029 through JCRS-0055) were installed utilizing a CME-850 track mounted drill rig supplied and operated by SJB Services, Inc., Ballston Spa, New York, 12020. Soil borings associated with the groundwater monitoring wells were installed between 09/23/03 and 09/30/03.

Four of the five soil borings associated with the groundwater monitoring wells (MW-16, MW-18 through MW-20) were installed to depths of 24' - 26'. During the installation, continuous two foot split spoon soil samples were collected. One soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-20'; 20'-24' and 24'-26'.

One of the five borings associated with the groundwater monitoring wells (MW-17) was installed to a depth of 40'. Because of the close proximity to groundwater monitoring well MW-16, continuous two foot split spoon soil samples were collected starting at the 24' depth and extending to 40'. One soil sample for laboratory analysis was collected from each of the following depth intervals: 24'-28'; 28'-32' and 32'-36'. As explained later in this report, two soil samples were collected from the 36'-40' depth interval.

Each depth interval was field screened for volatile organic vapor concentrations every six inches utilizing a calibrated photoionization detector (PID). The six inch increment exhibiting the highest PID reading was sampled. If none of the six inch increments within the depth interval exhibited PID readings, the deepest six inch increment was sampled. This was not the case, however, for all samples collected from soil boring MW-18. Certain six inch increments exhibiting the highest PID readings could not be collected by the En Core Sampler because they were either wet to saturated or due to poor recovery. In these situations, another six inch increment within the same depth interval was sampled. See the Test Boring Logs included as Appendix 2.

Soil samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs) by Compu Chem, 501 Madison Avenue, Cary, NC, 27513, (919) 379-4100, New York State Department of Health (NYSDOH) Certification No. 10065. It should also be noted that based on data validation results, analyte concentrations, where applicable, are reported as estimated (J), exceeds calibration range (E), quantitated on a diluted sample (D), and/or detected in the laboratory blank (B).

2.2 Soil Borings

Twenty-seven soil borings were installed at the site between 10/01/03 and 10/14/03. For the purpose of this report, the soil borings have been grouped according to the approximate locations in which they were installed. These groupings are described below.

a. East Drainage Ditch

Three soil borings were installed in this area. One soil boring (JCRS-0037) was installed to a depth of 12' below ground surface and two soil borings (JCRS-0036, JCRS-0038) were installed to a depth of 40' below ground surface.

b. Septic System

Four soil borings were installed in this area. All four soil borings (JCRS-0043, JCRS-0053, JCRS-0054, JCRS-0055) were installed to a depth of 12' below ground surface.

c. Groundwater Monitoring Wells MW-1, MW-2 & MW-6

Three soil borings were installed in this area. All three soil borings (JCRS-0039, JCRS-0041, JCRS-0042) were installed to a depth of 40' below ground surface.

d. Western Side of Driveway

Three soil borings were installed in this area. All three soil borings (JCRS-0047, JCRS-0048, JCRS-0049) were installed to a depth of 12' below ground surface.

e. Pool Area

Two soil borings were installed in this area. Both soil borings (JCRS-0044, JCRS-0045) were installed to a depth of 12' below ground surface.

f. Northern Drainage Ditch

Three soil borings were installed in this area. One soil boring (JCRS-0040) was installed to a depth of 40' below ground surface and two soil borings (JCRS-0051, JCRS-0052) were installed to a depth of 12' below ground surface.

g. Stable Area

Three soil borings were installed in this area. One soil boring (JCRS-0035) was installed to a depth of 40' below ground surface and two soil borings (JCRS-0030, JCRS-0031) were installed to a depth of 12' below ground surface.

h. Drainage Pipe

Two soil borings were installed in this area. One soil boring (JCRS-0046) was installed to a depth of 40' below ground surface and one soil boring (JCRS-0050) was installed to a depth of 12' below ground surface.

i. Northern Boundary of Johnny Cake Road

Four soil borings were installed in this area. Two soil borings (JCRS-0029, JCRS-0032) were installed to a depth of 12' below ground surface and two soil borings (JCRS-0033, JCRS-0034) were installed to a depth of 40' below ground surface.

During the installation of each 12' soil boring, continuous two foot split spoon soil samples were collected. One soil sample for laboratory analysis was collected from each the following depth intervals: 0-4'; 4'-8' and 8'-12'.

During the installation of each 40' soil boring, continuous two foot split spoon soil samples were collected. One soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'.

Each depth interval was field screened for volatile organic vapor concentrations every six inches utilizing a calibrated photoionization detector (PID). The six inch increment exhibiting the highest PID reading was sampled. If none of the six inch increments within the depth interval exhibited PID readings, the deepest six inch increment was sampled. This was not the case, however, for all samples collected from soil borings JCRS-0032, JCRS-0035, JCRS-0046, JCRS-0053 and JCRS-0054. Certain six inch increments exhibiting the highest PID readings could not be collected by the En Core Sampler because they were either wet to saturated or due to poor recovery. In these situations, another six inch increment within the same depth interval was sampled. See the Test Boring Logs included as Appendix 2.

Soil samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs) by Compu Chem, 501 Madison Avenue, Cary, NC, 27513, (919) 379-4100, New York State Department of Health (NYSDOH) Certification No. 10065. It should also be noted that based on data validation results, analyte concentrations, where applicable, are reported as estimated (J), exceeds calibration range (E), quantitated on a diluted sample (D), and/or detected in the laboratory blank (B).

3.0 GROUNDWATER MONITORING WELLS

Five soil borings associated with the installation of groundwater monitoring wells (MW-16 through MW-20) were installed by SJB Services, Inc. between 09/23/03 and 09/30/03. The Test Boring Logs are included as Appendix 2.

3.1 Groundwater Monitoring Well MW-16

Soil boring MW-16 was installed on 09/23/03 to a depth of 26' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.1, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-20'; 20'-24' and 24'-26'. Based on PID readings, the following soil samples were submitted for laboratory analysis: MW-16A (2.5'), MW-16B (7.0'), MW-16C (9.5'), MW-16D (13.0'), MW-16E (20.0'), MW-16F (22.0') and MW-16G (25.5').

Quality Assurance/Quality Control (QA/QC) samples included the collection of one field duplicate sample (MW-21B duplicate of MW-16B) and one matrix spike/matrix spike duplicate sample (MW-16C MS/MSD). A total of eight soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples MW-16A through MW-16D, MW-16F and MW-21B exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 0.37 ppm DJ, 1.9 ppm BJD, 3.3 ppm BJD, 0.23 ppm BJD, 0.41 ppm JB and 4.7 ppm D. Analytical results are summarized in Table 1 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

3.2 Groundwater Monitoring Well MW-17

Soil boring MW-17 was installed on 09/24/03 and 09/25/03 to a depth of 40' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.1, one soil sample for laboratory analysis was collected from each of the following depth intervals: 24'-28'; 28'-32' and 32'-36'. Two soil samples were collected from the 36'-40' depth interval. This was done so the deepest interval (40') could be sampled along with the interval (38') exhibiting the highest PID reading. Based on PID readings, the following soil samples were submitted for laboratory analysis: MW-17F (26.0'), MW-17G (31.5'), MW-17H (33.5'), MW-17I (38.0'), MW-17J (40.0').

QA/QC samples included the collection of two field duplicate samples (MW-21G duplicate of MW-17G; MW-21J duplicate of MW-17J) and two matrix spike/matrix spike duplicate samples (MW-17F MS/MSD; MW-17I MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples MW-17G, MW-17H and MW-21G exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 1.2 ppm JB, 0.68 ppm B and 0.52 ppm B. Analytical results are summarized in Table 1 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

3.3 Groundwater Monitoring Well MW-18

Soil boring MW-18 was installed on 09/26/03 to a depth of 24' below ground surface. Groundwater was encountered at 9.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.1, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-20' and 20'-24'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: MW-18A (4.0'), MW-18B (8.0'), MW-18C (8.5'), MW-18D (13.5'), MW-18E (19.0') and MW-18F (24.0').

QA/QC samples included the collection of one field duplicate sample (MW-21Ba duplicate of MW-18B) and one matrix spike/matrix spike duplicate sample (MW-18A MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample MW-18C exhibited an acetone concentration (0.45 ppm D) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 1 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

3.4 Groundwater Monitoring Well MW-19

Soil boring MW-19 was installed on 09/29/03 to a depth of 24' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.1, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-20' and 20'-24'. Based on PID readings, the following soil samples were submitted for laboratory analysis: MW-19A (2.0'), MW-19B (6.0'), MW-19C (8.0'), MW-19D (14.0'), MW-19E (18.0') and MW-19F (24.0').

QA/QC samples included the collection of one field duplicate sample (MW-21Bb duplicate of MW-19B) and one matrix spike/matrix spike duplicate sample (MW-19A MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample MW-19A exhibited an acetone concentration (0.24 ppm B) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 1 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

3.5 Groundwater Monitoring Well MW-20

Soil boring MW-20 was installed on 09/30/03 to a depth of 24' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.1, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-20' and 20'-24'. Based on PID readings, the following soil samples were submitted for laboratory analysis: MW-20A (4.0'), MW-20B (8.0'), MW-20C (9.5'), MW-20D (15.0'), MW-20E (19.0') and MW-20F (24.0').

QA/QC samples included the collection of one field duplicate sample (MW-21C duplicate of MW-20C) and one matrix spike/matrix spike duplicate sample (MW-20B MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples MW-20D and MW-20E exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 0.97 ppm J and 0.89 ppm J. Analytical results are summarized in Table 1 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

4.0 EAST DRAINAGE DITCH

Three soil borings were installed in this area by SJB Services, Inc. between 10/06/03 and 10/08/03. The Test Boring Logs are included as Appendix 2.

4.1 Soil Boring JCRS-0036

Soil boring JCRS-0036 was installed on 10/06/03 and 10/07/03 to a depth of 40' below ground surface. Groundwater was encountered at 1.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0036A (0.5'), JCRS-0036B (7.0'), JCRS-0036C (8.5'), JCRS-0036D (16.0'), JCRS-0036E (18.5'), JCRS-0036F (31.5') and JCRS-0036G (32.5').

QA/QC samples included the collection of two field duplicate samples (JCRS-0080D duplicate of JCRS-0036C; JCRS-0080E duplicate of JCRS-0036F). A total of nine soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0036A, JCRS-0036E, JCRS-0036F, JCRS-0036G and JCRS-0080E exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 3.4 ppm DJ, 0.74 ppm DJ, 1.8 ppm DJ, 8.1 ppm DJ and 2.0 ppm D. Analytical results indicated that soil samples JCRS-0036B and JCRS-0080D exhibited trichloroethene concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.7 ppm. Respective trichloroethene concentrations were 1.1 ppm DJ and 0.73 ppm DJ.

Analytical results also indicated that soil samples JCRS-0036E, JCRS-0036G and JCRS-0080E exhibited 2-butanone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.3 ppm. Respective 2-butanone concentrations were 0.5 ppm DJ, 0.85 ppm DJ and 0.46 ppm DJ. Analytical results are summarized in Table 2 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

4.2 Soil Boring JCRS-0037

Soil boring JCRS-0037 was installed on 10/07/03 to a depth of 12' below ground surface. Groundwater was encountered at 2.0' below ground surface.

During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0037A (0.5'), JCRS-0037B (8.0') and JCRS-0037C (12.0').

QA/QC samples included the collection of one matrix spike/matrix spike duplicate sample (JCRS-0037B MS/MSD). A total of three soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0037A exhibited an acetone concentration (18 ppm DJ) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 2 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

4.3 Soil Boring JCRS-0038

Soil boring JCRS-0038 was installed on 10/07/03 and 10/08/03 to a depth of 40' below ground surface. Groundwater was encountered at 1.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'.

Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0038A (2.0'), JCRS-0038B (6.5'), JCRS-0038C (9.5'), JCRS-0038D (15.0'), JCRS-0038E (19.5'), JCRS-0038F (32.0') and JCRS-0038G (38.0').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080F duplicate of JCRS-0038F). A total of eight soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0038B, JCRS-0038C, JCRS-0038D, JCRS-0038F and JCRS-0038G exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 4.4 ppm DJ, 0.3 ppm J, 1.8 ppm DJ, 0.76 ppm J and 7.3 ppm DJ. Analytical results indicated that soil samples JCRS-0038B and JCRS-0038D exhibited 2-butanone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.3 ppm. Respective 2-butanone concentrations were 0.7 ppm DJ and 0.5 ppm DJ.

Analytical results also indicated that soil sample JCRS-0038F a exhibited methylene chloride concentration (0.31 ppm JB) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.1 ppm. Analytical results are summarized in Table 2 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

5.0 SEPTIC SYSTEM

Four soil borings were installed in this area by SJB Services, Inc. between 10/10/03 and 10/14/03. The Test Boring Logs are included as Appendix 2.

5.1 Soil Boring JCRS-0043

Soil boring JCRS-0043 was installed on 10/10/03 to a depth of 12' below ground surface. Groundwater was encountered at 5.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'.

Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0043A (3.0'), JCRS-0043B (7.0') and JCRS-0043C (12.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0043A exhibited an acetone concentration (0.32 ppm J) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results also indicated that soil sample JCRS-0043B exhibited trichloroethene (2.0 ppm D) and tetrachloroethene (4.4 ppm D) concentrations in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives of 0.7 ppm and 1.4 ppm.

Analytical results are summarized in Table 3 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

5.2 Soil Boring JCRS-0053

Soil boring JCRS-0053 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0053A (2.0'), JCRS-0053B (5.0') and JCRS-0053C (8.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0053A through JCRS-0053C did not exhibit VOCs in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 3 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

5.3 Soil Boring JCRS-0054

Soil boring JCRS-0054 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 5.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0054A (3.5'), JCRS-0054B (8.0') and JCRS-0054C (10.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0054A through JCRS-0054C did not exhibit VOCs in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 3 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

5.4 Soil Boring JCRS-0055

Soil boring JCRS-0055 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 5.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0055A (0.5'), JCRS-0055B (4.5') and JCRS-0055C (11.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations. It should be noted that during the installation of soil boring JCRS-0055, it was observed that fill, wood, plastic containers and a petroleum odor (PID = 0.5) existed in the 0-2' depth interval (see Test Boring Log in Appendix 2).

Analytical results indicated that soil sample JCRS-0055A exhibited an acetone concentration (0.26 ppm J) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 3 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

6.0 GROUNDWATER MONITORING WELLS MW-1, MW-2 & MW-6

Three soil borings were installed by SJB Services, Inc. between 10/08/03 and 10/10/03. The Test Boring Logs are included as Appendix 2.

6.1 Soil Boring JCRS-0039 (Near MW-6)

Soil boring JCRS-0039 was installed on 10/08/03 to a depth of 40' below ground surface. Groundwater was encountered at 7.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0039A (3.0'), JCRS-0039B (6.0'), JCRS-0039C (12.0'), JCRS-0039D (13.0'), JCRS-0039E (23.0'), JCRS-0039F (24.5') and JCRS-0039G (33.0').

QA/QC samples included the collection of one matrix spike/matrix spike duplicate sample (JCRS-0039B MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0039D exhibited an acetone concentration (0.21 ppm J) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results indicated that soil sample JCRS-0039F exhibited a trichloroethene concentration (3.9 ppm D) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.7 ppm. Analytical results indicated that soil sample JCRS-0039D exhibited a vinyl chloride concentration (4.3 ppm DJ) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results also indicated that soil sample JCRS-0039D exhibited a cis-1,2-dichloroethene concentration (52 ppm DJ) in excess of the NYSDEC TAGM #4046 Recommended Soil Cleanup Objective for total VOCs (10 ppm). Since a Recommended Soil Cleanup Objective for cis-1,2-dichloroethene has not been established, the TAGM #4046 total VOC limit of 10 ppm (in any individual sample) is being used. Analytical results are summarized in Table 4 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

6.2 Soil Boring JCRS-0041 (Near MW-1)

Soil boring JCRS-0041 was installed on 10/09/03 to a depth of 40' below ground surface. Groundwater was encountered at 8.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0041A (2.5'), JCRS-0041B (6.0'), JCRS-0041C (9.5'), JCRS-0041D (14.5'), JCRS-0041E (19.0'), JCRS-0041F (31.0') and JCRS-0041G (35.0'). A total of seven soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0041A through JCRS-0041G did not exhibit VOCs in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 4 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

6.3 Soil Boring JCRS-0042 (Near MW-2)

Soil boring JCRS-0042 was installed on 10/10/03 to a depth of 40' below ground surface. Groundwater was encountered at 8.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0042A (3.5'), JCRS-0042B (7.0'), JCRS-0042C (12.0'), JCRS-0042D (16.0'), JCRS-0042E (22.5'), JCRS-0042F (32.0') and JCRS-0042G (39.0').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080H duplicate of JCRS-0042B) and one matrix spike/matrix spike duplicate sample (JCRS-0042E MS/MSD). A total of eight soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0042 B and JCRS-0042D exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 12 ppm DJ and 17 ppm DJ. Analytical results indicated that soil samples JCRS-0042B, JCRS-0080H and JCRS-0042D exhibited trichloroethene concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.7 ppm. Respective trichloroethene concentrations were 17 ppm DJ, 11 ppm DJ and 1.2 ppm DJ. Analytical results indicated that soil samples JCRS-0042A, JCRS-0042B, JCRS-0080H and JCRS-0042D exhibited tetrachloroethene concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 1.4 ppm. Respective tetrachloroethene concentrations were 1.7 ppm D, 330 ppm D, 190 ppm D and 5.6 ppm DJ. Analytical results indicated that soil samples JCRS-0042B and JCRS-0080H exhibited methylene chloride concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.1 ppm. Respective methylene chloride concentrations were 7.7 ppm DJB and 8.7 ppm DJB. Analytical results are summarized in Table 4 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

7.0 WESTERN SIDE OF DRIVEWAY

Three soil borings were installed in this area by SJB Services, Inc. on 10/13/03 and 10/14/03. The Test Boring Logs are included as Appendix 2.

7.1 Soil Boring JCRS-0047

Soil boring JCRS-047 was installed on 10/13/03 to a depth of 12' below ground surface. Groundwater was encountered at 9.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0047A (3.5'), JCRS-0047B (6.5') and JCRS-0047C (12.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0047C exhibited acetone (0.51 ppm DJ) and methylene chloride (0.39 ppm DJB) concentrations in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives of 0.2 ppm and 0.1 ppm. Analytical results are summarized in Table 5 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

7.2 Soil Boring JCRS-0048

Soil boring JCRS-0048 was installed on 10/13/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0048A (2.5'), JCRS-0048B (7.5') and JCRS-0048C (12.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0048A exhibited acetone (1.8 ppm D) and methylene chloride (0.31 ppm DJB) concentrations in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives of 0.2 ppm and 0.1 ppm. Analytical results are summarized in Table 5 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

7.3 Soil Boring JCRS-0049

Soil boring JCRS-0049 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 9.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0049A (3.5'), JCRS-0049B (8.0') and JCRS-0049C (12.0').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080J duplicate of JCRS-0049C) and one matrix spike/matrix spike duplicate sample (JCRS-0049B MS/MSD). A total of four soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that VOCs were not detected (U) in soil samples JCRS-0049A through JCRS-0049C. Analytical results also indicated that soil sample JCRS-0080J did not exhibit VOCs in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 5 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

8.0 POOL AREA

Two soil borings were installed in this area by SJB Services, Inc. on 10/10/03. The Test Boring Logs are included as Appendix 2.

8.1 Soil Boring JCRS-0044

Soil boring JCRS-0044 was installed on 10/10/03 to a depth of 12' below ground surface. Groundwater was encountered at 5.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0044A (3.5'), JCRS-0044B (7.5') and JCRS-0044C (12.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0044B exhibited a tetrachloroethene concentration (1.9 ppm D) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 1.4 ppm. Analytical results are summarized in Table 6 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

8.2 Soil Boring JCRS-0045

Soil boring JCRS-0045 was installed on 10/10/03 to a depth of 12' below ground surface.

Groundwater was encountered at 5.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0045A (0.5'), JCRS-0045B (7.0') and JCRS-0045C (11.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0045B exhibited a trichloroethene concentration (17 ppm D) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.7 ppm. Analytical results are summarized in Table 6 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

9.0 NORTHERN DRAINAGE DITCH

Three soil borings were installed in this area by SJB Services, Inc. on 10/09/03 and 10/14/03. It should be noted that the borings were not actually installed in the ditch (due to the presence of utilities), but were installed just south of the ditch. The Test Boring Logs are included as Appendix 2.

9.1 Soil Boring JCRS-0040

Soil boring JCRS-0040 was installed on 10/09/03 to a depth of 40' below ground surface. Groundwater was encountered at 8.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0040A (3.0'), JCRS-0040B (8.0'), JCRS-0040C (10.5'), JCRS-0040D (14.5'), JCRS-0040E (19.0'), JCRS-0040F (29.0') and JCRS-0040G (40.0').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080G duplicate of JCRS-0040C) and one matrix spike/matrix spike duplicate sample (JCRS-0040A MS/MSD). A total of eight soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0040A through JCRS-0040G and JCRS-0080G did not exhibit VOC concentrations in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 7 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

9.2 Soil Boring JCRS-0051

Soil boring JCRS-0051 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0051A (2.5'), JCRS-0051B (7.5') and JCRS-0051C (10.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0051A exhibited an acetone concentration (5.7 ppm DJ) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 7 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

9.3 Soil Boring JCRS-0052

Soil boring JCRS-0052 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 7.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0052A (3.5'), JCRS-0052B (6.5') and JCRS-0052C (10.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0052A through JCRS-0052C did not exhibit VOCs in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives. Analytical results are summarized in Table 7 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

10.0 STABLE AREA

Three soil borings were installed in this area by SJB Services, Inc. on 10/01/03, 10/02/03, 10/03/03, 10/06/03 and 11/03/03. The Test Boring Logs are included as Appendix 2.

10.1 Soil Boring JCRS-0030

Soil boring JCRS-0030 was installed on 10/01/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0030A (4.0'), JCRS-0030B (6.5') and JCRS-0030C (12.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0030A exhibited an acetone concentration (8.1 ppm J) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 8 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

10.2 Soil Boring JCRS-0031

Soil boring JCRS-0031 was installed on 10/02/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0031A (1.5'), JCRS-0031B (8.0') and JCRS-0031C (12.0').

QA/QC samples included the collection of one matrix spike/matrix spike duplicate sample (JCRS-0031C MS/MSD). A total of three soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0031A exhibited an acetone concentration (1.0 ppm BJ) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results indicated that soil sample JCRS-0031C exhibited a 2-butanone concentration (0.35 DJ ppm) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.3 ppm. Analytical results are summarized in Table 8 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

10.3 Soil Boring JCRS-0035

Soil boring JCRS-0035 was installed on 10/03/03 and 10/06/03 to a depth of 40' below ground surface. Groundwater was encountered at 8.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0035A (3.0'), JCRS-0035B (8.0'), JCRS-0035C (12.0'), JCRS-0035D (12.5'), JCRS-0035E (18.5'), JCRS-0035F (29.5') and JCRS-0035G (40.0'). Due to holding time issues, soil samples JCRS-0035A, JCRS-0035B, JCRS-0035C, JCRS-0035D and JCRS-0035E were not analyzed and discarded. Soil boring JCRS-0035 was re-installed adjacent to the original boring location on 11/03/03 and the following samples were collected and submitted for laboratory analysis: JCRS-0035A-1 (3.0'), JCRS-0035B-1 (8.0'), JCRS-0035C-1 (12.0'), JCRS-0035D-1 (12.5') and JCRS-0035E-1 (18.5').

QA/QC samples included the collection of one matrix spike/matrix spike duplicate sample (JCRS-0035G MS/MSD). A total of seven soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0035B-1 exhibited a trichloroethene (0.93 ppm J) concentration in excess its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.7 ppm. Analytical results also indicated that soil sample JCRS-0035E-1 exhibited an acetone concentration (1.8 ppm) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 8 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

11.0 DRAINAGE PIPE

Two soil borings were installed in this area by SJB Services, Inc. on 10/13/03 and 10/14/03. The Test Boring Logs are included as Appendix 2.

11.1 Soil Boring JCRS-0046

Soil boring JCRS-0046 was installed on 10/13/03 to a depth of 40' below ground surface. Groundwater was encountered at 21.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0046A (1.0'), JCRS-0046B (6.5'), JCRS-0046C (9.0'), JCRS-0046D (15.0'), JCRS-0046E (18.5'), JCRS-0046F (30.5') and JCRS-0046G (36.0').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080I duplicate of JCRS-0046A) and one matrix spike/matrix spike duplicate sample (JCRS-0046F MS/MSD). A total of eight soil samples, plus the MS/MSD, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results also indicated that soil samples JCRS-0046C and JCRS-0046E exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 0.76 ppm DJ and 0.75 ppm DJ. Analytical results are summarized in Table 9 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

11.2 Soil Boring JCRS-0050

Soil boring JCRS-0050 was installed on 10/14/03 to a depth of 12' below ground surface. Groundwater was encountered at 7.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'.

Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0050A (3.0'), JCRS-0050B (4.5') and JCRS-0050C (10.5'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results also indicated that soil sample JCRS-0050B exhibited an acetone concentration (13 ppm DJ) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 9 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

12.0 NORTHERN BOUNDARY OF JOHNNY CAKE ROAD

Four soil borings were installed in this area by SJB Services, Inc. on 10/01/03, 10/02/03, 10/03/03 and 11/03/03. The Test Boring Logs are included as Appendix 2.

12.1 Soil Boring JCRS-0029

Soil boring JCRS-0029 was installed on 10/01/03 to a depth of 12' below ground surface. Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0029A (2.5'), JCRS-0029B (8.0') and JCRS-0029C (9.0'). A total of three soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil sample JCRS-0029C exhibited an acetone concentration (0.29 ppm BD) in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Analytical results are summarized in Table 10 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

12.2 Soil Boring JCRS-0032

Soil boring JCRS-0032 was installed on 10/02/03 to a depth of 12' below ground surface.

Groundwater was encountered at 6.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8' and 8'-12'. Based on PID readings and/or soil descriptions (wet to saturated), the following soil samples were submitted for laboratory analysis: JCRS-0032A (4.0'), JCRS-0032B (7.5') and JCRS-0032C (11.5').

QA/QC samples included the collection of one field duplicate sample (JCRS-0080A duplicate of JCRS-0032A). A total of four soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results also indicated that soil samples JCRS-0032A through JCRS-0032C and JCRS-0080A exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 1.7 ppm DB, 1.5 ppm DB, 1.1 ppm DJ and 0.76 ppm DJ. Analytical results are summarized in Table 10 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

12.3 Soil Boring JCRS-0033

Soil boring JCRS-0033 was installed on 10/02/03 to a depth of 40' below ground surface. Groundwater was encountered at 4.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'.

Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0033A (4.0'), JCRS-0033B (8.0'), JCRS-0033C (9.0'), JCRS-0033D (16.0'), JCRS-0033E (17.5'), JCRS-0033F (29.0') and JCRS-0033G (37.5'). A total of seven soil samples were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results also indicated that soil samples JCRS-0033A through JCRS-0033G exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 0.34 ppm J, 5.6 ppm DJB, 3.3 ppm DJB, 7.6 ppm DB, 16 ppm DJ, 1.5 ppm DJ and 4.4 ppm D. Analytical results indicated that soil sample JCRS-0033G exhibited methylene chloride (0.2 ppm DJ) and 2-butanone (0.53 ppm DJ) concentrations in excess of their respective NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives of 0.1 ppm and 0.3 ppm.

Analytical results are summarized in Table 10 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

12.4 Soil Boring JCRS-0034

Soil boring JCRS-0034 was installed on 10/02/03 and 10/03/03 to a depth of 40' below ground surface. Groundwater was encountered at 4.0' below ground surface. During the installation, continuous two foot split spoon soil samples were collected. In accordance with the procedures discussed in Section 2.2, one soil sample for laboratory analysis was collected from each of the following depth intervals: 0-4'; 4'-8'; 8'-12'; 12'-16'; 16'-24'; 24'-32' and 32'-40'. Based on PID readings, the following soil samples were submitted for laboratory analysis: JCRS-0034A (0.5'), JCRS-0034B (8.0'), JCRS-0034C (11.0'), JCRS-0034D (16.0'), JCRS-0034E (23.5'), JCRS-0034F (30.5') and JCRS-0034G (40.0'). Due to holding time issues, soil samples JCRS-0034C, JCRS-0034D, JCRS-0034E, JCRS-0034F and JCRS-0034G were not analyzed and discarded. Soil boring JCRS-0034 was re-installed adjacent to the original boring location on 11/03/03 and the following samples were collected and submitted for laboratory analysis: JCRS-0034C-1 (11.0'), JCRS-0034D-1 (16.0'), JCRS-0034E-1 (23.5'), JCRS-0034F-1 (30.5') and JCRS-0034G-1 (40.0').

QA/QC samples included the collection of two field duplicate samples (JCRS-0080B duplicate of JCRS-0034A; JCRS-0080C-1 duplicate of JCRS-0034E-1) and two matrix spike/matrix spike duplicate sample (JCRS-0034B MS/MSD; JCRS-0034G-1). A total of nine soil samples, plus the MS/MSDs, were analyzed for TCL VOCs. See Figure 2 for soil boring locations.

Analytical results indicated that soil samples JCRS-0034A, JCRS-0034E-1, JCRS-0034F-1 and JCRS-0080C-1 exhibited acetone concentrations in excess of its NYSDEC TAGM #4046 Recommended Soil Cleanup Objective of 0.2 ppm. Respective acetone concentrations were 0.86 ppm D, 0.69 ppm D, 0.61 ppm D and 0.86 ppm J. Analytical results are summarized in Table 10 (Appendix 3) and shown on Figure 2. The analytical results (Form I's) and data validation reports are included in Appendix 4.

13.0 SITE SPECIFIC QUALITY ASSURANCE/QUALITY CONTROL PLAN

The objective of the QA/QC plan is to provide analytical results which are legally defensible in a court of law. The QA/QC plan incorporated procedures for field sampling, chain of custody, laboratory analyses, and reporting to assure generation of sound analytical results. Sampling procedures were conducted in accordance with the "Sampling Quality Assurance Project Plan", DCN RST-02-F-01059, dated 09/18/03 and prepared by Weston Solutions, Inc.'s Removal Support Team.

13.1 Sampling Equipment and Methods

Samples were collected at the locations and depths as described in Sections 3.0 through 12.0 above. Equipment utilized for this project were galvanized steel split spoon samplers and dedicated 5 gram En Core Samplers.

All samples were transferred immediately after collection into sample containers selected by parameter as listed below. The type of sample containers required for this investigation were as follows:

a. TCL Volatile Organic Compounds - 3 - 5 gram En Core Samplers;
b. Percent Moisture - 1 - 4 oz. glass jar.

All soil samples were packed on ice immediately following collection. All samples were labeled with the following information:

a. sample number;
b. date and time of collection;
c. site name;

d. sample collector's initials;
e. analyses required.

Accurate field notes were maintained which included the information listed above. Additional information included, but was not limited to:

a. sample location sketch;
b. sample method;
c. general comments, including any modification from the sample plan.

13.2 Equipment Decontamination

All of the galvanized steel split spoon samplers utilized in the collection of soil samples were decontaminated in the following manner:

c. physical removal of remaining soil;
d. non-phosphate (Alconox) detergent wash;
e. tap water rinse;
f. deionized water rinse;
g. isopropanol rinse*;
h. air dry;
i. deionized water rinse.

* Isopropanol was used as the solvent rinse because based on previous sampling results, acetone was a contaminant of concern.

Decontamination liquids were not containerized and were disposed on-site.

13.3 Chain of Custody

Chain of custody was maintained for all samples. Chain of custody originated with the collection of the samples and was maintained until the samples were relinquished to the laboratory.
The chain of custody form detailed the following information:

a. sample identification number;
b. sample collection date and time;
c. sample matrix;
d. expected contaminant concentration (low, medium, high);
e. sample type (grab or composite);
f. sample preservation;
g. analytical parameters;
h. name(s) and signatures(s) of sampler(s);
i. signatures(s) of individual(s) with control over samples.

13.4 Quality Assurance/Quality Control Samples

The matrices for samples included in this investigation were soil and water. QA/QC samples included the collection of one field duplicate and one matrix spike/matrix spike duplicate sample at the frequency of one per 20 samples. Extra volume was submitted to allow the laboratory to perform matrix spike sample analysis. This analysis provides information about the effect of sample matrix digestion and measurement methodology. Field duplicate samples provide an indication of sample homogeneity and were not identified to the laboratory.

Field rinsate blanks were also collected on a daily basis. The purpose of the field blanks was to place a mechanism of control on equipment decontamination, sample handling, storage and shipment. Field blanks were used to indicate potential contamination from ambient air and from sampling equipment used to collect and transfer samples from point of collection into their appropriate sample containers. Analytical results for the field blanks are summarized in Table 11 (Appendix 3). The analytical results (Form I's) and the data validation reports are included in Appendix 4.

13.5 Sample QA/QC Data

A CLP Format QA/QC package was provided for all samples submitted for analysis.

14.0 DATA VALIDATION

Data was evaluated according to criteria contained in the Removal Program Data Validation Procedures that accompany OSWER Directive number 9360.4-1 and in accordance with Region II guidelines using the following data validation SOP: SOP HW-13, "USEPA Region II Data Validation SOP for Statement of Work OLCO 2.1, Rev.2". Laboratory analytical results were assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

Data validation was performed by RST in accordance with Level QA-2 criteria. Data validation results indicate that the analytical results are valid and acceptable. For specific comments, see the Data Validation Reports included as Appendix 4.

15.0 GPS LOCATIONAL DATA

In order to document the locations of the soil borings, locational data was obtained using a global positioning system (GPS) unit. See Table 12 in Appendix 5 for tabulated locational data.

APPENDIX 1

NYSDEC, TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM (TAGM) # 4046, DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

New York State Department of Environmental Conservation

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4046

DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

TO: Regional Haz. Waste Remediation Engineers, Bureau Directors, and Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM: DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

DATE: JAN 24, 1994

Michael J. O'Toole, Jr. (signed)

Appendix A - Recommended Soil Cleanup Objectives | Appendix B - Total Organic Carbon (TOC)
- Table 1 - Volatile Organic Contaminants
- Table 2 - Semi-Volatile Organic Contaminants
- Table 3 - Organic Pesticides / Herbicides and PCBs
- Table 4 - Heavy Metals

The cleanup goal of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. INTRODUCTION:

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment ofthese generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. Project Managers should use these cleanup objectives in selecting alternatives in the Feasibility Study (FS). Based on the proposed selected remedial technology (outcome of FS), final site specific soil cleanup levels are established in the Record of Decision (ROD) for these sites.

It should be noted that even after soil cleanup levels are established in the ROD, these levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. BASIS FOR SOIL CLEANUP OBJECTIVES:

The following alternative bases are used to determine soil cleanup objectives:

a. Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

b. Human health based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

c. Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;

d. Background values for contaminants; and

e. Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

3. DETERMINATION OF SOIL CLEANUP GOALS FOR ORGANICS IN SOIL FOR PROTECTION OF WATER QUALITY

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

PART A: PARTITION THEORY MODEL

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration $Cs = f \times Koc \times Cw \ldots. (1)$

Where: f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be estimated by the following equation:

$\log Koc = 3.64 - 0.55 \log S$

S = water solubility in ppm
Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual should be used for the purpose. If the Koc value for a contaminant is not listed, it should be estimated using the above mentioned equation.

PART B: PROCEDURE FOR DETERMINATION OF SOIL CLEANUP OBJECTIVES

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1. Total VOCs ≤ 10 ppm.
2. Total Semi VOCs ≤ 500 ppm.
3. Individual Semi VOCs ≤ 50 ppm.
4. Total Pesticides ≤ 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. <u>DETERMINATION OF FINAL CLEANUP LEVELS:</u>

Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the preferred remedial action must be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

TAGM 4046 Footnotes:

1. Class A are proved human carcinogens
2. Class B are probable human carcinogens
3. Class C are possible human carcinogens

APPENDIX A

TABLE 1
Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Acetone	2.2	50	0.0011	0.11	N/A	8,000	10	0.2
Benzene	83	0.7	0.0006	0.06	24	N/A	5	0.06
Benzoic Acid	54 *	50	0.027	2.7	N/A	300,000	5	2.7
2-Butanone	4.5 *	50	0.003	0.3	N/A	4,000	10	0.3
Carbon Disulfide	54 *	50	0.027	2.7	N/A	8,000	5	2.7
Carbon Tetrachloride	110 *	5	0.006	0.6	5.4	60	5	0.6
Chlorobenzene	330	5	0.017	1.7	N/A	2,000	5	1.7
Chloroethane	37 *	50	0.019	1.9	N/A	N/A	10	1.9
Chloroform	31	7	0.003	0.30	114	800	5	0.3
Dibromochloromethane	N/A	50	N/A	N/A	N/A	N/A	5	N/A
1,2-Dichlorobenzene	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	310 *	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,1-Dichloroethane	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1-Dichloroethene	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene (trans)	59	5	0.003	0.3	N/A	2,000	5	0.3
1-3 dichloropropane	51	5	0.003	0.3	N/A	N/A	5	0.3
Ethylbenzene	1,100	5	0.055	5.5	N/A	8,000	5	5.5
113 Freon (1,1,2 Trichloro-1,2,2 Trifluoroethane)	1,230 *	5	0.060	6.0	N/A	200,000	5	6.0
Methylene chloride	21	5	0.001	0.1	93	5,000	5	0.1
4-Methyl-2-Pentanone	19 *	50	0.01	1.0	N/A	N/A	10	1.0

TABLE 1 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin- ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Tetrachloroethene	277	5	0.014	1.4	14	800	5	1.4
1,1,1-Trichloroethane	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	118	5	0.006	0.6	35	N/A	5	0.6
1,2,3-trichloropropane	68	5	0.0034	0.34	N/A	80	5	0.4
1,2,4-trichlorobenzene	670 *	5	0.034	3.4	N/A	N/A	330	3.4
Toluene	300	5	0.015	1.5	N/A	20,000	5	1.5
Trichloroethene	126	5	0.007	0.70	64	N/A	5	0.7
Vinyl chloride	57	2	0.0012	0.12	N/A	N/A	10	0.2
Xylenes	240	5	0.012	1.2	N/A	200,000	--	1.2

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 2
Recommended soil cleanup objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin- ogens	USEPA Health Based (ppm) Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Acenaphthene	4,600	20	0.9	90.0	N/A	5,000	330	50.0 ***
Acenaphthylene	2,056 *	20	0.41	41.0	N/A	N/A	330	41.0
Aniline	13.8	5	0.001	0.1	123	N/A	330	0.1
Anthracene	14,000	50	7.00	700.0	N/A	20,000	330	50.0 ***
Benzo(a)anthracene	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.224 or MDL
Benzo (a) pyrene	5,500,000	0.002 (ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Benzo (b) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo (g,h,i) perylene	1,600,000	5	8.0	800	N/A	N/A	330	50.0 ***
Benzo (k) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
bis(2-ethylhexyl)phthalate	8,706 *	50	4.35	435.0	50	2,000	330	50.0 ***
Butylbenzylphthlate	2,430	50	1.215	122.0	N/A	20,000	330	50.0 ***
Chrysene	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
4- Chloroaniline	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL
4-Chloro-3-methylphenol	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2-Chlorophenol	15 *	50	0.008	0.8	N/A	400	330	0.8

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Dibenzofuran	1,230 *	5	0.062	6.2	N/A	N/A	330	6.2
Dibenzo(a,h)anthracene	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	380	1	0.004	0.4	N/A	200	330	0.4
2,4-Dinitrophenol	38	5	0.002	0.2	N/A	200	1,600	0.200 or MDL
2,6 Dinitrotoluene	198*	5	0.01	1.0	1.03	N/A	330	1.0
Diethylphthlate	142	50	0.071	7.1	N/A	60,000	330	7.1
Dimethylphthlate	40	50	0.020	2.0	N/A	80,000	330	2.0
Di-n-butyl phthalate	162*	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	2,346 *	50	1.2	120.0	N/A	2,000	330	50.0 ***
Fluoranthene	38,000	50	19	1900.0	N/A	3,000	330	50.0 ***
Fluorene	7,300	50	3.5	350.0	N/A	3,000	330	50.0 ***
Hexachlorobenzene	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Indeno (1,2,3-cd)pyrene	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
Isophorone	88.31 *	50	0.044	4.40	1,707	20,000	330	4.40
2-methylnaphthalene	727 *	50	0.364	36.4	N/A	N/A	330	36.4
2-Methylphenol	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	17	50	0.009	0.9	N/A	4,000	330	0.9
Naphthalene	1,300	10	0.130	13.0	N/A	300	330	13.0
Nitrobenzene	36	5	0.002	0.2	N/A	40	330	0.200 or MDL

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin- ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
2-Nitroaniline	86	5	0.0043	0.43	N/A	N/A	1,600	0.430 or MDL
2-Nitrophenol	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
4-Nitrophenol	21	5	0.001	0.1	N/A	N/A	1,600	0.100 or MDL
3-Nitroaniline	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
Pentachlorophenol	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Phenanthrene	4,365 *	50	2.20	220.0	N/A	N/A	330	50.0 ***
Phenol	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pyrene	13,295 *	50	6.65	665.0	N/A	2,000	330	50.0 ***
2,4,5-Trichlorophenol	89 *	1	0.001	0.1	N/A	8,000	330	0.1

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available
MDL is Method Detection Limit

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm., Total Semi- VOCs < 500ppm. and Individual Semi-VOCs < 50 ppm.

**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels...... EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'MAIN'.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 3
Recommended soil cleanup objectives (mg/kg or ppm)
Organic Pesticides / Herbicides and PCBs

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin- ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041
alpha- BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'- DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (< 0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0
Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10

TABLE 3 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin-ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - BHC (Lindane)	1,080	ND (<0.05)	0.0006	0.06	5.4	20	8	0.06
gamma - chlordane	140,000	0.1	0.14	14.0	0.54	5	80	0.54
Heptachlor	12,000	ND (<0.01)	0.0010	0.1	0.16	40	8	0.10
Heptachlor epoxide	220	ND (<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Methoxychlor	25,637	35.0	9.0	900	N/A	400	80	***
Mitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parathion	760	1.5	0.012	1.2	N/A	500	8	1.2
PCBs	17,510 *	0.1	0.1	10.0	1.0	N/A	160	1.0 (Surface) 10 (sub-surf)
Polychlorinated dibenzo-furans (PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silvex	2,600	0.26	0.007	0.7	N/A	600	330	0.7
2,4,5-T	53	35	0.019	1.9	N/A	200	330	1.9

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB Guidance Document), and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 4
Recommended soil cleanup objectives (mg/kg or ppm)
Heavy Metals

Contaminants	Protect Water Quality (ppm)	Eastern USA Background (ppm)	* CRDL (mg/kg or ppm)	***** Rec. Soil Cleanup Objective (ppm)
Aluminum	N/A	33,000	2.0	SB
Antimony	N/A	N/A	0.6	SB
Arsenic	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	15-600	2.0	300 or SB
Beryllium	N/A	0-1.75	0.05	0.16 (HEAST) or SB
Cadmium	N/A	0.1-1	0.05	1 or SB
Calcium	N/A	130 - 35,000 ***	50.0	SB
Chromium	N/A	1.5 - 40 **	0.1	10 or SB
Cobalt	N/A	2.5 - 60 **	0.5	30 or SB
Copper	N/A	1 - 50	0.25	25 or SB
Cyanide	N/A	N/A	0.1	***
Iron	N/A	2,000 - 550,000	1.0	2,000 or SB
Lead	N/A	****	0.03	SB ****
Magnesium	N/A	100 - 5,000	50.0	SB
Manganese	N/A	50 - 5,000	0.15	SB
Mercury	N/A	0.001 - 0.2	0.002	0.1
Nickel	N/A	0.5 -25	0.4	13 or SB
Potassium	N/A	8,500 - 43,000 **	50.0	SB
Selenium	N/A	0.1 - 3.9	0.05	2 or SB
Silver	N/A	N/A	0.1	SB
Sodium	N/A	6,000 - 8,000	50.0	SB
Thallium	N/A	N/A	0.1	SB
Vanadium	N/A	1-300	0.5	150 or SB
Zinc	N/A	9-50	0.2	20 or SB

Note: Some forms of metal salts such as Aluminum Phosphide, Calcium Cyanide, Potassium Cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

SB is site background
N/A is not available

* CRDL is contract required detection limit which is approx. 10 times the CRDL for water.

** New York State background

*** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

**** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

***** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

APPENDIX B

TOTAL ORGANIC CARBON (TOC)

USE AND LIMITATIONS

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

FIELD PROCEDURES

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples.

LABORATORY PROCEDURES

Analytical Procedures

- Equipment
  - Induction furnace
    e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106
  - Analytical balance
    0.1 mg accuracy
  - Desiccator
  - Combustion boats
  - 10 percent hydrochloric acid (HCL)
  - Cupric oxide fines (or equivalent material)
  - Benzoic acid or other carbon source as a standard.

- Equipment preparation

- Clean combustion boats by placing them in the induction furnace at 950° C. After being cleaned, combustion boats should not be touched with bare hands.
- Cool boats to room temperature in a desiccator.
- Weigh each boat to the nearest 0.1 mg.

- Sample preparation
  - Allow frozen samples to warm to room temperature.
  - Homogenize each sample mechanically, incorporating any overlying water.
  - Transfer a representative aliquot (5-10 g) to a clean container.

- Analytical procedures
  - Dry samples to constant weight at 70 ± 2°C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
  - Cool dried samples to room temperature in a desiccator.
  - Grind sample using a mortar and pestle to break up aggregates.
  - Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
  - Determine sample weight to the nearest 0.1 mg.
  - Add several drops of HCL to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCL atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
  - Dry the HCL-treated sample to constant weight at 70 ± 2° C.
  - Cool to room temperature in a desiccator.
  - Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
  - Combust the sample in an induction furnace at a minimum temperature of 950 ± 10° C.

- Calculations
  - If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

$$\text{Percent carbon} = \frac{A\,(0.2729)\,(100)}{B}$$

Where:

A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion

B = dry weight (g) of the unacidified sample in the combustion boat

0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

- If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

DATA REPORTING REQUIREMENTS

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).

APPENDIX 2

TEST BORING LOGS

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER MW-16
PROJECT NAME Johnny Cake Road	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 3
NAME OF DRILLER Bill Bosworth	SITE LOCATION Herkimer County, NY	
NAME OF GEOLOGIST R. Moult	HOLE LOCATION North - 4757246.377 (m); East – 511679.797 (m)	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	SIGNATURE OF GEOLOGIST	
	DATE STARTED 9/23/03	DATE COMPLETED 9/23/03
	SURFACE ELEVATION 237.748 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 6 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 26.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	MW-16

TES BORING LOG (CONTINUATION SHE

PROJE: Johnny Cake Road
GEOLOG: R. Moult
HOLE NUMBER: 3
SHEET: 2 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		1 3 25 25			Colluvium; CL, clay, silty, low plasticity, brown, soft to firm, v. moist, small angular gravels (10 % + 4) to cobbles	4.5 4.2		
2		4 4 3 5				11.2 5.7 4.4		Sample MW-16A
4		3 5 4 4			Wet to saturated	1.4 0.4 0.5		
6		10 12 15 25				12.8 5.2		Sample MW-16B
8		3 11 12 10			Till; CL, clay, silty, low to moderate plasticity, firm to stiff, wet to saturated	22.3 36.8 5.0		Sample MW-16C
10		22 9 9 14				5.4 2.7		
12		8 12 12 15			Fine sand lenses	3.5 3.9 1.8 1.4		Sample MW-16D
14		21 18 19 22						
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-16

TE BORING LOG (CONTINUATION SH

PROJE…E:

GEOLOGIST:

HOLE NUMBER: MW-16

SHEET: 3 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		12 14 14 15			hard, grey, moist	0 0 0 0		
18 ---		12 15 14 15				0 0 0		
20 ---		21 18 16 20				3.4 4.4 11.1		Sample MW-16E
22 ---		18 25 25 30/0				2.5 3.0 2.9 1.7		Sample MW-16F
24 ---		22 24 25 43						
26 ---					Total Depth 26 ft.; groundwater at 6 ft.	0.1 0		Sample MW-16G
28 ---								
30 ---								
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-16

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
HOLE NUMBER	MW-17
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bill Bosworth
HOLE LOCATION	North - 4757246.271 (m); East – 511679.367 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	9/24/03
DATE COMPLETED	9/25/03
SURFACE ELEVATION	237.233 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

TES ORING LOG (CONTINUATION SHE

PROJE Johnny Cake Road | GEOLOG R. Moult | HOLE NUMBER | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		Auger to 24'			Colluvium; CL, clay, silty, low plasticity, brown, soft to firm, v. moist, small angular gravels (10 % + 4) to cobbles			
2 ---								
4 ---								
					Wet to saturated			
6 ---								
8 ---								
					Till; CL, clay, silty, low to moderate plasticity, firm to stiff, wet to saturated			
10 ---								
12 ---								
					Fine sand lenses			
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-17

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: | GEOLOGIST: | HOLE NUMBER: MW-17 | SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
					hard, grey, moist			
18 ---								
20 ---								
22 ---								
24 ---					Same as above; rock fragments			
		10 18 15 17				0 0		Sample MW-17F
26 ---								
		10 17 22 30				0 0		
28 ---								
		2 7 11 15				0 0		
30 ---								
		9 25 31 28				0.9 0		Sample MW-17G
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-17

TE BORING LOG (CONTINUATION SHE

PROJECT NAME:

GEOLOGIST:

HOLE NUMBER: MW-17

SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		10			hard, grey, moist			
		26				0		
		33				0		
		21				0.3		
34 ---						0		Sample MW-17H
		9						
		35						
		34				0		
		28				0		
36 ---						0		
		14						
		37						
-		29						
		32				0		
38 ---						0.1		Sample MW-17I
		12						
		42				0		
		48				0		
		37				0		
40 ---					Total Depth 40 feet; groundwater at 6 ft.	0		Sample MW-17J
42 ---								
44 ---								
46 ---								
48 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-17

TEST BORING LOG

COMPANY NAME: Weston Solutions	AGENCY	HOLE NUMBER: MW-18
PROJECT NAME: Johnny Cake Road	DRILL SUBCONTRACTOR: SJB Services	SHEET: 1 of 3
NAME OF DRILLER: Bill Bosworth	SITE LOCATION: Herkimer County, NY	
NAME OF GEOLOGIST: R. Moult	HOLE LOCATION: North – 4757240.290 (m); East – 511657.038 (m)	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT: CME 850 track mount	SIGNATURE OF GEOLOGIST	
	DATE STARTED: 9/26/03	DATE COMPLETED: 9/29/03
	SURFACE ELEVATION: 237.444 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER: 9 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE: 25.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	MW-18

TES ORING LOG (CONTINUATION SHE

PROJE : Johnny Cake Road | GEOLOG R. Moult | HOLE NUMBER 3 | SHEET: 2 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		2 3 3 3			Colluvium; CL, clay, silty, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4) to cobbles	0 0 0 0		
2		3 3 4 4				0 0 0 0		
4		2 2 2 2			Wet	0 0 0		Sample MW-18A
6		1 1 2 2				0 0 0 0		
8		2 6 8 13			Colluvium; CL, clay, silty, low plasticity, mottled, brown to black, stiff to hard, moist gravels (10 % + 4)	4.5 1.5 0.4 0.6		Sample MW-18B Sample MW-18C
10		4 22 22 25				2.6 0.7 0.7 0.7		
12		3 11 12 11			Till; ML, silt, low plasticity, fine sand Lenses, firm to stiff, saturated	0.3 1.3 0.7		Sample MW-18D
14		11 13 14 13				0 0 0		
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-18

TE(BORING LOG (CONTINUATION SHE

PROJECT NAME:

GEOLOGIST:

HOLE NUMBER: MW-18

SHEET: 3 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		11 12 12 14			hard, grey, wet to saturated			
18 ---						0 0		
		8 12 11 14				0 0 0		Sample MW-18E
20 ---								
		9 14 18 18						
22 ---						0 0		
		16 20 16 22						
24 ---						0 0		Sample MW-18F
26 ---					Total Depth 25 ft.; groundwater at 9 ft.			
28 ---								
30 ---								
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-18

TEST BORING LOG

AGENCY		HOLE NUMBER MW-19
COMPANY NAME Weston Solutions	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 3
PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY	
NAME OF DRILLER ill Bosworth	HOLE LOCATION North – 4757224.257 (m); East – 511624.344 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 9/29/03	DATE COMPLETED 9/29/03
	SURFACE ELEVATION 239.616 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 6 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 24.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	MW-19

TE( )BORING LOG (CONTINUATION SH(…)

PROJ(…): Johnny Cake Road | GEOLOG(…): R. Moult | HOLE NUMBER: (…)9 | SHEET: 2 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		1 2 2 3			Colluvium; CL, clay, silty, low plasticity, brown, soft to firm, v. moist, small angular gravels (10 % + 4)	0 0 0 0		
2 ---		2 4 4 5				0 0 0 0		Sample MW-19A
4 ---		1 1 2 2				0 0 0 0		
6 ---		2 2 3 3				0 0 0		Sample MW-19B
8 ---		5 8 11 12			Till; CL, clay, silty, low to moderate plasticity, firm to stiff, wet to saturated	0 0 0 0		Sample MW-19C
10 ---		7 8 7 10				0 0		
12 ---		10 8 11 13				0 0		
14 ---		5 12 15 9				0		Sample MW-19D
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-19

TE[illegible] BORING LOG (CONTINUATION SH[illegible]

PROJEC[illegible] [illegible]ME: GEOLOGIST:

HOLE NUMBER: MW-19

SHEET: 3 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		15			hard, grey, moist			
		14						
		13						
		16						
18 ---						0		Sample MW-19E
		8						
		8				0		
		5				0		
		12				0		
20 ---								
		10						
		19				0		
		18				0		
		17						
22 ---						0		
		12						
		15				0		
		22				0		
		25				0		
24 ---					Total Depth 24 feet; groundwater at 6 ft.	0		Sample MW-19F
26 ---								
28 ---								
30 ---								
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-19

TEST BORING LOG

AGENCY	
HOLE NUMBER	MW-20
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 3
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bill Bosworth
HOLE LOCATION	North – 4757280.234 (m); East – 511634.312 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	9/30/03
DATE COMPLETED	10/01/03
SURFACE ELEVATION	233.239 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	24.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	MW-20

TES BORING LOG (CONTINUATION SHE

PROJ E: Johnny Cake Road | GEOLO R. Moult | HOLE NUMBER .0 | SHEET: 2 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		1 2 3 3			Colluvium; CL, clay, silty, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0 0		
2		3 3 4 5				0 0		Sample MW-20A
4		3 3 3 3				0 0		
6		4 3 3 3				0 0 0 0		
8		1 4 4 4			Thin sand lense, micaceous, saturated	0 3.0 3.4 1.7		Sample MW-20B Sample MW-20C
10		1 3 4 5			Till; CL, clay, silty, low to moderate plasticity, firm to stiff, wet to saturated	0 0.5 0.8		
12		14 15 17 21				0 0 0 0		
14		5 9 9 8				5.3 5.0 5.2		Sample MW-20D
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-20

TE BORING LOG (CONTINUATION SH

PROJECT NAME: | GEOLOGIST: | HOLE NUMBER: MW-20 | SHEET: 3 of 3

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		22 22 13 15			hard, grey, moist , rock fragments			
18 ---		18 16 15 12				3.8 1.3 0		Sample MW-20E
20 ---		95 25 33 53			Cobbles at 20 ft.			
22 ---		31 31 49 52				0 0		
24 ---					Total Depth 24 feet; groundwater at 6 ft.			Sample MW-20F
26 ---								
28 ---								
30 ---								
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: MW-20

TEST BORING LOG

AGENCY:

HOLE NUMBER: JCRS-0029

SHEET: 1 of 2

COMPANY NAME: Weston Solutions

DRILL SUBCONTRACTOR: SJB Services

PROJECT NAME: Johnny Cake Road

SITE LOCATION: Herkimer County, NY

NAME OF DRILLER: Bill Bosworth

HOLE LOCATION: North – 4757255.629 (m); East – 511618.363 (m)

NAME OF GEOLOGIST: R. Moult

SIGNATURE OF GEOLOGIST:

TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT: CME 850 track mount

DATE STARTED: 10/1/03

DATE COMPLETED: 10/1/03

SURFACE ELEVATION: 234.399 (m)

DEPTH TO FIRST ENCOUNTERED WATER: 6 ft.

OVERBURDEN THICKNESS/ DEPTH TO BEDROCK:

DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:

DEPTH DRILLED INTO BEDROCK:

OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

TOTAL DEPTH OF HOLE: 12.0'

TOTAL FLUID LOSSES:

GEOTECHNICAL SAMPLES: | SAMPLE DEPTH: | UNDISTURBED/DISTURBED: | TOTAL NUMBER OF CORE BOXES:

ENVIRONMENTAL SAMPLES: | SAMPLE DEPTH: | ANALYTES: | TOTAL CORE RECOVERY %:

DISPOSITION OF HOLE: | BACKFILLED: | MONITORING WELL: | CASING TYPE: | WELL DEPTH: | SCREENED INTERVAL:

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS

SCALE: Not To Scale

See Soil Boring Location Map

PROJECT: Johnny Cake Road

HOLE NO. JCRS – 0029

TE[illegible] BORING LOG (CONTINUATION SHE[illegible]

PROJ[illegible]: Johnny Cake Road | GEOLOG[illegible]: R. Moult | HOLE NUMBER: [illegible] - 0029 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		2						
		4			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0		
		3				0		
		4						
2 ---								
		7						
		6				0.1		Sample JCRS-0029A
		5						
		4						
4 ---								
		2						
		3						
		3				0		
		4				0		
6 ---						0		
		1						
		2				0		
		2				0		
		3				0		
8 ---						0		
		4						Sample JCRS-0029B
		4				1.3		
		8			Till; ML, silt, low plasticity, grey, hard, wet	0.9		
		8				0.6		Sample JCRS-0029C
10 ---						0.4		
		10						
		15				0.3		
		16				0.4		
		18				0.3		
12 ---						0.1		
					Total Depth 12 ft. Groundwater @ 6 ft.			
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0029

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
HOLE NUMBER	JCRS-0030
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 2
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bill Bosworth
HOLE LOCATION	North – 4757260.770 (m); East – 511637.922 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/1/03
DATE COMPLETED	10/1/03
SURFACE ELEVATION	235.899 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	12.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0030

TES ƆORING LOG (CONTINUATION SHEE

PRO... E: Johnny Cake Road | GEOL R. Moult | HOLE NUMBER - 0030 | SHEET: 2 of 2

DEP...	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0					Fill; sand and gravel			
		2 2 2 3			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)			
2		5 5 6 7						
4		7 5 3 4				2.8 6.4		Sample JCRS-0030A
6		1 1 3 4				2.9 0.6 1.3		
						2.9 2.1 0.6 1.6		Sample JCRS-0030B
8		1 5 6 10						
10		10 15 16 30				1.3 1.4		
						0.4 0 1.4 1.8		
12					Total Depth 12 ft. Groundwater @ 6 ft.			Sample JCRS-0030C
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0030

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0031
PROJECT NAME Johnny Cake Road			SHEET 1 of 2
NAME OF DRILLER Bill Bosworth		SITE LOCATION Herkimer County, NY	
NAME OF GEOLOGIST R. Moult		HOLE LOCATION North – 4757263.007 (m); East – 511645.359 (m)	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount		SIGNATURE OF GEOLOGIST	
		DATE STARTED 10/2/03	DATE COMPLETED 10/2/03
		SURFACE ELEVATION 235.906 (m)	
		DEPTH TO FIRST ENCOUNTERED WATER 7 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK		DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK		OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 12.0'		TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0031

TE(BORING LOG (CONTINUATION SH(

PROJ(E: Johnny Cake Road | GEOLOG(R. Moult | HOLE NUMBER (- 0031 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---					Fill; sand and gravel			
		1 2 3 2			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0.3 0.5 0		Sample JCRS-0031A
2 ---		2 2 3 3						
4 ---		2 3 4 6				0 0.3		
6 ---		4 4 4 4			Wet to saturated			
8 ---		2 2 1 2				0 1.4 0 0.5 0 1.6		Sample JCRS-0031B
10 ---		8 11 11 15				0.7 1.2 1.1 2.2		
12 ---					Total Depth 12 ft. Groundwater @ 7 ft.			Sample JCRS-0031C
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS – 0031

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
DRILL SUBCONTRACTOR	SJB Services
HOLE NUMBER	JCRS-0032
SHEET	1 of 2
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bill Bosworth
HOLE LOCATION	North – 4757291.190 (m); East – 511675.318 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/2/03
DATE COMPLETED	10/2/03
SURFACE ELEVATION	230.511 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	12.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0032

TE[illegible] BORING LOG (CONTINUATION SHE[illegible]

PROJE[illegible]: Johnny Cake Road | GEOLOG[illegible]: R. Moult | HOLE NUMBER: [illegible] - 0032 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
	1 2 2 2				Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)			
2 ---						1.8 1.8		
	5 10 4 4							
4 ---						5.8		
	4 18 11 11				Thin sand lense, micaceous	2.3 2.2 2.0		Sample JCRS-0032A
6 ---						2.0		
	11 10 14 17				Wet to saturated	2.0 1.4 15.4		
8 ---						5.1		Sample JCRS-0032B
	15 14 18 20				Till; ML, silt, low plasticity, grey, hard, wet to saturated	11.0 2.7		
10 ---						3.8		
	12 20 20 50							
12 ---					Total Depth 12 ft. Groundwater @ 6 ft.	4.2 1.2		Sample JCRS-0032C
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road | HOLE NO.: JCRS - 0032

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
DRILL SUBCONTRACTOR	SJB Services
HOLE NUMBER	JCRS-0033
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	ill Bosworth
HOLE LOCATION	North – 4757277.829 (m); East – 511681.285 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/2/03
DATE COMPLETED	10/2/03
SURFACE ELEVATION	232.276 (m)
DEPTH TO FIRST ENCOUNTERED WATER	4 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0033

TES[illegible] BORING LOG (CONTINUATION SH[illegible]

PROJ[illegible]: Johnny Cake Road | GEOLO[illegible]: R. Moult | HOLE NUMBER: [illegible] - 0033 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---		0 1 2 1			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0 0 0.1		
2 ---		2 3 4 4			Wet to saturated	2.2 1.6 2.3		
4 ---		4 5 8 9				0 0		Sample JCRS-0033A
6 ---		10 12 12 15						
8 ---		7 7 7 7			Till; ML, silt, low plasticity, grey, hard, wet to saturated	0 10.4 2.2 2.0		Sample JCRS-0033B Sample JCRS-0033C
10 ---		2 4 6 12				3.3 4.7 1.4		
12 ---		7 11 15 22				3.4 0.5 0.3 0.3		
14 ---		11 16 14 13						
16 ---						6.6 8.2		Sample JCRS-0033D

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS – 0033

TE BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

HOLE NUMBER: JCRS-0033

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		15 11 11 9			Till; ML, silt, low plasticity, grey, hard, wet to saturated			
18 ---		18 12 3 5				10.4 1.6 0 0		Sample JCRS-003E
20 ---		1 5 5 5				0		
22 ---		5 14 13 13			Fine grained sand lenses			
24 ---		5 11 14 10				0 0 0 0 0		
26 ---		9 15 19 22				0 0		
28 ---		2 5 5 10				0 0		Sample JCRS-0029F
30 ---		5 8 9 8						
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0033

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: -RS-0033 | SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
34 ---		7 7 10 8				0 0 0		
36 ---		8 10 23 23				0 0 0 0		
38 ---		15 25 24 27			Fine grained sand lense (6 in.)	0 0 0.9 0		Sample JCRS-0033G
40 ---		8 15 22 30				0 0 0 0		
					Total Depth 40 feet Groundwater at 4 feet			
42 ---								
44 ---								
46 ---								
48 ---								

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0034
PROJECT NAME	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 4

PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY
AME OF DRILLER ill Bosworth	HOLE LOCATION North – 4757266.103 (m); East – 511668.529 (m)
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/2/03 / DATE COMPLETED 10/3/03 SURFACE ELEVATION 235.858 (m) DEPTH TO FIRST ENCOUNTERED WATER 4 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 40.0'	TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

KETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Iohnny Cake Road	JCRS – 0034

TES BORING LOG (CONTINUATION SHE

PROJE: Johnny Cake Road | GEOLOG: R. Moult | HOLE NUMBER: - 0034 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		1 2 2 3			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	2.0 1.6		Sample JCRS-0034A
2		2 2 2 3			Wet to saturated	1.2 1.4 1.2 1.4		
4		3 3 3 5				0 0 0		
6		4 5 6 8				0 0 0 0		Sample JCRS-0034B
8		10 10 11 12			Till; SM, sand, fine grained, well sorted, silty, grey, medium dense, saturated	0 0 0 0		
10		6 11 10 14			CL/ML; clay, silty, low plasticity, grey, wet to saturated	0.1 0.3 0 0.1		Sample JCRS-0034C-1
12		8 13 12 11				0 0		
14		1 10 12 16				0 0 0		Sample JCRS-0034D-1
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS – 0034

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

HOLE NUMBER: RS-0034

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
18 ---		8 10 12 14				0 0 0 0		
20 ---		14 15 14 14				1.2 0.9 1.2		
22 ---		8 12 14 13			Gravel lense (22 – 23 ft.)	1.1 1.4 1.1		
24 ---		18 16 25 30				1.8 0.5 3.1 1.4		Sample JCRS-0034E-1
26 ---		15 32 49 45				0 32.5		
28 ---		33 32 30 38			CL; clay, low to moderate plasticity, grey, Hard, moist	1.4 1.1 1.1 0		
30 ---		18 22 22 30				5.5 10.2 2.5 0		
32 ---		19 8 9 11				41.0 11.4 5.3 0.9		Sample JCRS-0034F-1

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0034

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road
GEOLOGIST: R. Moult
HOLE NUMBER: .RS-0034
SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		14 21 33 32				0 0 0 0		
34 ---		13 21 32 60			Sand lense, micaceous	0 0		
36 ---		25 25 50 52			CL; clay, moderate plasticity, grey to black	0 0 0 0		
38 ---		15 20 15 12						
40 ---					Total Depth 40 feet Groundwater at 4 feet	0		Sample JCRS-0034G-1
42 ---								
44 ---								
46 ---								
48 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0034

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0035
PROJECT NAME Johnny Cake Road	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 4
NAME OF DRILLER ill Bosworth	SITE LOCATION Herkimer County, NY	
NAME OF GEOLOGIST R. Moult	HOLE LOCATION North – 4757256.340 (m); East – 511641.826 (m)	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	SIGNATURE OF GEOLOGIST	
	DATE STARTED 10/3/03	DATE COMPLETED 10/6/03
	SURFACE ELEVATION 235.969 (m)	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO FIRST ENCOUNTERED WATER 8 ft.	
DEPTH DRILLED INTO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
TOTAL DEPTH OF HOLE 40.0'	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

KETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Iohnny Cake Road	JCRS - 0035

TES BORING LOG (CONTINUATION SHE

PROJE Johnny Cake Road | GEOLOG R. Moult | HOLE NUMBER - 0035 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		7 8 9 10			Fill; Sand and Gravel	0		
2 ---		7 5 5 7			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0 0 0		Sample JCRS-0035A-1
4 ---		2 5 5 7				0 0 0 0		
6 ---		2 4 2 4			Wet to saturated	0 0 0		Sample JCRS-0035B-1
8 ---		3 4 2 3				0 0 0 0		
10 ---		1 2 4 3				0 0 0 0		
12 ---		3 3			SC; sand, clayey, loose, yellow-brown, saturated	1.5 0.7		Sample JCRS-0035C-1 Sample JCRS-0035D-1
-		3 4				0.3		
14 ---		3 5 5 5			CL, clay, silty, sandy, brown, soft to firm, saturated	1.1 1.3 0.5		
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0035

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: ·RS-0035 | SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		4						
		4				1.9		
		7			Till; CL/ML, clay, silty, low to moderately	0.5		
18 ---		7			Plastic, grey, sand lenses	0.5		
						0.3		
		4						
		12				0.7		Sample JCRS-0035E-1
		17				0.5		
		17				0.1		
20 ---						0.3		
		10						
		12				0		
		12				0.3		
		15				0.1		
22 ---								
		17						
		21				0		
		22				0.1		
		26						
24 ---								
		3						
		6				2.4		
		13				2.5		
		19				1.8		
26 ---						0.8		
		10						
		17				1.0		
		30				3.1		
		50				3.5		
28 ---						1.0		
		15						
		13						
		25						
		22				9.6		
30 ---						0		Sample JCRS-0035F
		9						
		11			Sand lense	0		
		16				0		
		20				0		
32 ---						0		

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0035

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: .S-0035 | SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		10 12 17 21				0 0		
34 ---		10 21 22 25				0 0		
36 ---		25 21 20 20			ML; silt, low plastic, grey, hard, moist, Gravel lense (36-37')	0 0		
38 ---		11 18 25 25				0 0		
40 ---					Total Depth 40 feet Groundwater at 8 feet			Sample JCRS-0035G
42 ---								
44 ---								
46 ---								
48 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0035

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0036
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bill Bosworth
HOLE LOCATION	North – 4757242.478 (m); East – 511692.323 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/6/03
DATE COMPLETED	10/7/03
SURFACE ELEVATION	236.805 (m)
DEPTH TO FIRST ENCOUNTERED WATER	1 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS

SCALE: **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0036

TE[illegible] BORING LOG (CONTINUATION SHE[illegible]

PROJEC[illegible]: Johnny Cake Road | GEOLOG[illegible]: R. Moult | HOLE NUMBER: [illegible] – 0036 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1 1 2 2			Colluvium; SC, sand, clayey, low plasticity, yellow brown, angular to sub-angular, loose, saturated	0.3 0		Sample JCRS-0036A
2								
		2 3 5 6			Colluvium; CL, clay, sandy, low plasticity, brown, firm, saturated, organics	0 0 0		
4								
		7 8 11 12				0 0		
6								
		11 12 13 15				0 0		Sample JCRS-0036B
8								
		7 14 12 7				0.5 0.2 0 0		Sample JCRS-0036C
10								
		7 7 8 6			SM, sand, silty, micaceous, green-brown, medium dense, saturated	0 0 0.1 0.1		
12								
		10 14 15 12			Till; CL/ML, clay, silty, low plasticity, grey, very stiff, wet	0 0 0		
14								
		22 24 23 23				0.4 0.1 0.1 0.1		Sample JCRS-0036D
16								

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: ꞦS-0036 | SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		25			Till; CL/ML, clay, silty, low plasticity, grey hard, wet, gravels to cobbles (5% + 4, 4" Max.)	0.2		
		31				0.2		
		35				0.1		
		48						
18 ---								
		20				0.3		Sample JCRS-0036E
		25				0.9		
		30						
		35						
20 ---								
		2			Wet to saturated	0		
		6						
		6						
		6						
22 ---								
		4			Till; CL, clay, silty, moderate plasticity, hard, moist to wet			
		6						
		7						
		10				0		
24 ---						0		
		24						
		25				0		
		29				0		
		27				0		
26 ---						0		
		38			Till: CL/CH, clay, moderate to high plasticity, grey, hard, v. moist			
		25				0		
		35				0		
		30						
28 ---								
		22				1.4		
		25				2.9		
		25				1.8		
		27				2.2		
30 ---								
		12				2.9		
		19				2.2		
		22				3.8		
		38				1.6		Sample JCRS-0036F
32 ---								

TE BORING LOG (CONTINUATION SHE

HOLE NUMBER: ꞮS-0036

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		28 40 48			Till: CL, clay, low plasticity, grey, hard, moist to wet	7.7		Sample JCRS-0036G
34 ---								
		25 35 30 20				2.0		
36 ---								
		35 49 60 48				2.0 0.9 0.5 0.5		
38 ---								
		35 40 60 50/10"			SM, sand, silty, fine grained, grey, saturated	0 0 0 0		
40 ---								
					Total Depth 40 feet Groundwater at 1 foot			
42 ---								
44 ---								
46 ---								
48 ---								

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0037 SHEET 1 of 2

PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY
NAME OF DRILLER ll Bosworth	HOLE LOCATION North – 4757236.415 (m); East – 511694.202 (m)
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/7/03 — DATE COMPLETED 10/7/03 SURFACE ELEVATION 237.907 (m) DEPTH TO FIRST ENCOUNTERED WATER 2 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0037

TE BORING LOG (CONTINUATION SH

PROJ... E: Johnny Cake Road | GEOLO... R. Moult | HOLE NUMBER ... - 0037 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		1 2 1 2			Colluvium; CL, clay, sandy, low plasticity, Green-brown, soft, saturated, organics	0.3		Sample JCRS-0037A
2		3 4 4 7				0 0 0		
4		10 10 13 13			SM; sand, silty, fine grained, subround, Green-brown, loose, saturated	0 0 0		
6		10 13 15 16				0 0 0		
8		35 20 75 50				0 0 0 0		Sample JCRS-0037B
10		30 45 45 45				0 0 0 0		
12					Total Depth 12 ft. Groundwater @ 2 ft.			Sample JCRS-0037C
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0037

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0038
	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 4
PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY	
NAME OF DRILLER Bosworth	HOLE LOCATION North – 4757225.848 (m); East – 511692.692 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/7/03	DATE COMPLETED 10/8/03
	SURFACE ELEVATION 239.362 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 1 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 40.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0038

BORING LOG (CONTINUATION SHEET)

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

HOLE NUMBER: - 0038

SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1			Colluvium; SC, sand, clayey, low plasticity, mottled, brown to grey, v. loose to medium dense, organics, saturated			
		1				0		
		1				0		
		1						
2						0		
		1			Colluvium; CL, clay, sandy, low plasticity, brown, firm, saturated, organics			
		4						
		11						
		15						
4						0		
		6						Sample JCRS-0038A
		7				0		
		8				0		
		9				0		
6						0		
		10						
		12				8.1		Sample JCRS-0038B
		14			Cobbles			
		11						
8								
		16			Till; clay, silty, low plasticity, grey, stiff to hard, moist to wet			
		17				0		
		18				0		
		30				2.5		Sample JCRS-0038C
10						0.3		
		10						
		16						
		12				0		
		12				0		
12						0		
		10						
-		8				0.3		
						0		
		15						
		12				0		
14						0		
		12						
		20				0		
		25				1.2		Sample JCRS-0038D
		23				0		
16						0		

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0038

TE BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: ,RS-0038 | SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		12 23 45 50			Till; CL/CH, clay, moderately to highly plastic, grey, hard, damp	0 0 0 0		
18 ---		38 50 48 50				0 0 0.1 0		Sample JCRS-0038E
20 ---		50 50 50/3"				0		
22 ---		40 40 50 60				0 0 0 0		
24 ---		36 55 61 88				0 0 0		
26 ---		31 33 35 31				0 0 0 0		
28 ---		14 27 24 20				0.4		
30 ---		40 50 55 59				1.0 2.3 2.5 2.7		Sample JCRS-0038F
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0038

TE BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: ·RS-0038 | SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		22 27 33 35			Till: CL/ML, clay, silty, low plasticity, grey, hard, moist	0 0 0		
34		40 80 51 42				1.5 13.1		
36		30 25 45 40						
38		25 35 61 76				16.1		Sample JCRS-0038G
40					Total Depth 40 feet Groundwater at 1 foot	0		
42								
44								
46								
48								

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0039
	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 4

PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY	
NAME OF DRILLER ll Bosworth	HOLE LOCATION North – 4757232.055 (m); East – 511681.332 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/8/03	DATE COMPLETED 10/8/03
	SURFACE ELEVATION 239.301 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 7 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 40.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0039

TE BORING LOG

(CONTINUATION SH

PRO IE: Johnny Cake Road	GEOL R. Moult	HOLE NUMBER	- 0039
		SHEET:	2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		4 8 9 7			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0 0		
2		6 12 7 6				0 0		Sample JCRS-0039A
4		11 6 5 6				0 0 0 0		Sample JCRS-0039B
6		4 5 2 1			Wet to saturated			
8		1 4 3 4						
10		9 14 12 13			Till; clay, silty, low plasticity, grey, stiff to Hard, wet	0.2 0.8 0.9 1.0		Sample JCRS-0039C
12		12 16 15 17			Sand lense	2.2 4.5		Sample JCRS-0039D
14		21 20 23 21			Cobbles	3.7		
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0039

TE BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

HOLE NUMBER: RS-0039

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		25 30 31 35						
18 ---						0		
		22 14 12 15				0 0 0 0		
20 ---								
		12 24 25 23				0		
22 ---								
		15 51 42 31				4.3 2.0		Sample JCRS-0039E
24 ---								
		20 27 22 23				7.9 2.7		Sample JCRS-0039F
26 ---								
		35 31 21 21				0.1 0.1		
28 ---								
		32 52 48 37			Till; CL, clay, silty, moderately plastic, Grey, hard, damp to moist, rock fragments	3.1		
30 ---								
		20 35 42 32				4.4 0.6 0.1		
32 ---								

T BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: ;RS-0039 | SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		20 24 43 44			Till; CL, clay, silty, moderately plastic, Grey, hard, damp to moist, rock fragments	0.2 0.7		Sample JCRS-0039G
34 ---		10 12 19 21				0 0.8 0.1		
36 ---		15 12 19 20				0 0.2 0.4		
38 ---		16 14 12 22				0 0 0 0		
40 ---					Total Depth 40 feet Groundwater at 7 feet			
42 ---								
44 ---								
46 ---								
48 ---								

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0040
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	ill Bosworth
HOLE LOCATION	North – 4757243.501 (m); East – 511666.606 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/9/03
DATE COMPLETED	10/9/03
SURFACE ELEVATION	237.493 (m)
DEPTH TO FIRST ENCOUNTERED WATER	8 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0040

TE[illegible] BORING LOG (CONTINUATION SH[illegible]

PROJ[illegible]E: Johnny Cake Road | GEOLO[illegible] R. Moult | HOLE NUMBER [illegible] - 0040 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1			Colluvium; CL, clay, sandy, low plasticity,	0		
		1			brown, soft to firm, v. moist, small angular	0		
		1			gravels (5 % + 4)	0		
		2						
2								
		1				0		
		3				0		Sample JCRS-0040-A
		4						
		9						
4								
		12						
		10				0		
		15						
		20						
6								
		10				0		
		15				0		
		12				0		
		16			Wet to saturated	0		Sample JCRS-0040-B
8								
		22				0		
		23				0		
		21				0		
		24						
10								
		40				6.6		Sample JCRS-0040-C
		44			Till; CL/ML, clay, silty, low plasticity, grey,	2.2		
		50			Hard, moist	1.3		
		41				0.8		
12								
		40						
		46						
		43				0.5		
		60				0.6		
14					ML; silt, sandy, low plasticity, grey, stiff,			
		14			saturated	1.4		Sample JCRS-0040-D
		15				0.7		
		12				0.4		
		11				0.2		
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0040

TE BORING LOG (CONTINUATION SH

PROJECT NAME: Johnny Cake Road	GEOLOGIST: R. Moult	HOLE NUMBER: RS-0040	SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
16								
		8			ML; silt, sandy, low plasticity, grey, stiff, saturated			
		12						
		10				1.0		
		9				2.1		
18								
		21						
		30				2.4		Sample JCRS-0040-E
		32				1.0		
		30				1.1		
20								
		33						
		34						
		36				0		
		30				1.8		
22								
		25						
		26						
		37				0.1		
		29				0.3		
24					CL/ML; clay, silty, low to moderate plasticity, hard, wet			
		41				0.4		
		36			Sand lense 25.5' – 26'; SM, sand, silty, poorly graded, dense, saturated			
		34						
		25						
26								
		17				1.1		
		26				0.4		
		39						
		54						
28								
		15			Till; CL, clay, silty, moderately plastic, Grey, hard, damp to moist, rock fragments	0		
		24				3.5		Sample JCRS-0040-F
		36				1.4		
		44						
30								
		18						
		25				0		
		38				0.5		
		52				0.3		
32								

TL BORING LOG (CONTINUATION SH

HOLE NUMBER: ;RS-0040

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
32		30 21 34 33			Till; CL, clay, silty, moderately plastic, Grey, hard, damp to moist, rock fragments	0 0		
34		30 25 35 32				0 0 0.2		
36		25 35 30 29				0.1 0.3		
38		31 45 71 77				0.6 0.7		
40					Total Depth 40 feet Groundwater at 8 feet			Sample JCRS-0040-G
42								
44								
46								
48								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0040

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0041
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
`ME OF DRILLER	I Bosworth
HOLE LOCATION	North – 4757233.112 (m); East – 511653.415 (m)
ME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/9/03
DATE COMPLETED	10/9/03
SURFACE ELEVATION	238.946 (m)
DEPTH TO FIRST ENCOUNTERED WATER	8 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0041

T BORING LOG (CONTINUATION SH

PROJ. NAME: Johnny Cake Road | GEOLO.: R. Moult | HOLE NUMBER: - 0041 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		4 4 3 4			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular gravels (5 % + 4)	0.1 0.1 0.1		
2		9 7 7 6				0.3 0.1 0.1 0		Sample JCRS-0041-A
4		4 4 3 7				0.2 0 0.4		Sample JCRS-0041-B
6		4 3 5 8			Wet to saturated	0		
8		5 7 6 7				3.3 1.7 8.4 10.5		Sample JCRS-0041-C
10		4 7 6 5				1.4 2.8 0.3		
12		4 9 16 18			Sand lense from 12' – 13.5' Till; CL/ML, clay, silty, low plasticity, grey, Hard, moist	0.3 0.3 0.3 0.1		
14		15 14 20 19				1.5 0.7		Sample JCRS-0041-D
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0041

T[illegible] BORING LOG (CONTINUATION S[illegible]

HOLE NUMBER: [illegible]RS-0041

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
16								
		13			Till: ML, silt, sandy, low plasticity, grey, saturated	0		
		21				0		
		22				0		
		23				0		
18								
		13			Cobbles	1.4		
		25				1.6		Sample JCRS-0041-E
		17				1.4		
		17				0.3		
20								
		9				0		
		11				0.1		
		12				0.1		
		12				0		
22					Till; CL/ML, clay, silty, low to moderate plasticity, hard, wet			
		15				0		
		10				0.1		
		14				0.1		
		15				0		
24								
		14				0.1		
		16				1.5		
		17				0		
		12				0		
26								
		17				0		
		22						
		23						
		27						
28								
		24						
		29				0		
		30				0		
		35						
30								
		37				4.0		
		50				5.6		Sample JCRS-0041-F
		100						
		75						
32								

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road	GEOLOGIST: R. Moult
HOLE NUMBER	S-0041
SHEET:	4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
32		34 29 34 23			Till; CL, clay, silty, moderately plastic, Grey, hard, damp to moist, rock fragments	0.2 0.4 0.3		
34		24 20 15 12				0.5 0.7 0.5 0.1		Sample JCRS-0041-G
36		20 25 19 14				0.1		
38		13 13 15 16				0.2 0.1		
40					Total Depth 40 feet Groundwater at 8 feet			
42								
44								
46								
48								

PROJECT NAME: Johnny Cake Road HOLE NO.: JCRS-0041

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0042
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
NAME OF DRILLER	Bosworth
HOLE LOCATION	North – 4757213.058 (m); East – 511657.582 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/10/03
DATE COMPLETED	10/10/03
SURFACE ELEVATION	240.514 (m)
DEPTH TO FIRST ENCOUNTERED WATER	8 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0042

TES BORING LOG (CONTINUATION SHEE

PROJECT NAME: Johnny Cake Road GEOLOGIST: R. Moult

HOLE NUMBER: - 0042

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		2			Colluvium; CL, clay, sandy, low plasticity, brown, firm to stiff, moist to wet	0		
		6						
		9						
		9						
2								
		2						
		6				11.0		
		12				14.9		Sample JCRS-0042-A
		12				14.5		
4								
		9				1.4		
		7				1.1		
		8						
		9			Colluvium; SC, sand, clayey, low plasticity, small angular gravels, medium dense, wet to saturated			
6								
		5				14.2		
		10				300		Sample JCRS-0042-B
		32				98		
		61						
8								
		15				0		
		20				0		
		13						
		18						
10								
		5				0		
		11				0		
		9			Till; CL/ML, clay, silty, low plasticity, grey, very stiff, wet	0		
		13				0		Sample JCRS-0042-C
12								
		11				0		
		12				0		
		11				0		
		13				0		
14								
		10				0		
		15				0		
		14						
		10						
16								Sample JCRS-0042-D

PROJECT NAME: Johnny Cake Road HOLE NO.: JCRS - 0042

TES BORING LOG (CONTINUATION SHE

HOLE NUMBER: S-0042

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
16		10 8 25 10			Till; CL/ML, clay, silty, low plasticity, grey hard, wet, gravels (5% + 4, 4")	0 0 0		
18		5 9 16 14				0 0		
20		6 9 12 17				0		
22		14 15 12 20			Sand lenses; fine grained, poorly graded, Saturated from 23 to 29 feet	0		Sample JCRS-0042-E
24		10 12 14 17				0 0 0 0		
26		15 14 20 10				0 0 0 0		
28		11 10 14 22			Till: CL, clay, silty, low to moderate plasticity, grey, hard, v. moist to wet	0 0 0 0		
30		8 6 9 20				0 0 0 0		Sample JCRS-0042-F
32								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0042

TE BORING LOG (CONTINUATION SHE

PROJECT NAME: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: S-0042 | SHEET: 4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
32		15 12 20 24			Till: CL/ML, clay, silty, as described	0 0 0 0		
34		6 12 20 32				0 0 0 0		
36		10 15 30 35				0 0 0		
38		9 19 24 35				0 0		Sample JCRS-0042-G
40					Total Depth 40 feet Groundwater at 8 feet			
42								
44								
46								
48								

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0043 SHEET 1 of 2

PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY
NAME OF DRILLER Bill Bosworth	HOLE LOCATION North – 4757220.914 (m); East – 511671.142 (m)
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/10/03 DATE COMPLETED 10/10/03 SURFACE ELEVATION 240.336 (m) DEPTH TO FIRST ENCOUNTERED WATER 5 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

SKETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0043

TE BORING LOG (CONTINUATION SHE

PROJE: Johnny Cake Road | GEOLO: R. Moult | HOLE NUMBER: - 0043 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		2 2 2 3			Colluvium; clay, sandy, low plasticity, soft to firm, gravels (5% + 4); v. moist to wet	0 0 0		
2		4 5 5 4				0 0		Sample JCRS-0043-A
4		9 10 13 12			Angular gravels (15 – 20% + 4, 2" max)	0 0 0 0		
6		10 25 13 5			Wet to saturated	0 0		Sample JCRS-0043-B
8		1 2 5 9				0 0		
10		23 22 15 18			Till; CL/ML; clay, silty, low plasticity, grey, Hard, v. moist to wet	0 0 0 0		Sample JCRS-0043-C
12					Total depth 12.0 feet Groundwater at 5 feet			
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0043

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0044
	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 2

PROJECT NAME ohnny Cake Road	SITE LOCATION Herkimer County, NY
OF DRILLER Bosworth	HOLE LOCATION North – 4757223.306 (m); East – 511677.379 (m)
OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/10/03 — DATE COMPLETED 10/10/03
	SURFACE ELEVATION 241.069 (m)
	DEPTH TO FIRST ENCOUNTERED WATER 5 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

ETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

T Johnny Cake Road	HOLE NO. JCRS - 0044

TE[illegible] BORING LOG (CONTINUATION SHE[illegible])

PROJEC[illegible]: Johnny Cake Road | GEOLOGIS[illegible]: R. Moult | HOLE NUMBER: 0044 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		2 4 4 5			Fill; Sand, gravels and cobbles in a clay Matrix, soft to firm, v. moist to saturated	0 0 0		
2		4 5 4 7				0 0 0		Sample JCRS-0044-A
4		4 3 4 3			Wet to saturated	0 0 0 0		
6		4 5 8 16			Colluvium; CL, clay, sandy, low plasticity, Mottled grey to brown, soft, saturated	0 0 0		Sample JCRS-0044-B
8		4 18 11 13				0 0 0 0		
10		4 7 9 10			Till; CL/ML, clay, silty, low plasticity, grey, stiff, wet to saturated	0 0 0		Sample JCRS-0044-C
12								
					Total depth 12.0 feet Groundwater at 5 feet			
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0044

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0045 SHEET 1 of 2
PROJECT NAME ohnny Cake Road		SITE LOCATION Herkimer County, NY
F DRILLER osworth		HOLE LOCATION North – 4757219.372 (m); East – 511681.715 (m)
OF GEOLOGIST R. Moult		SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount		DATE STARTED 10/10/03 — DATE COMPLETED 10/10/03
		SURFACE ELEVATION 240.481 (m)
		DEPTH TO FIRST ENCOUNTERED WATER 5 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK		DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK		OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 12.0'		TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

T	HOLE NO.
Johnny Cake Road	JCRS – 0045

TE[illegible] BORING LOG (CONTINUATION SHE[illegible]

PROJECT NAME: Johnny Cake Road
GEOLOGIST: R. Moult
HOLE NUMBER: - 0045
SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1						
		1			Fill; Sand, gravels and cobbles in a clay	0		Sample JCRS-0045-A
		4			Matrix, soft to firm, v. moist to saturated			
		7						
2								
		8						
		8						
		32						
		7						
4								
		1						
		1				0		
					Wet to saturated			
		3						
		3						
6					Colluvium; CL, clay, sandy, low plasticity,			
		4			Mottled grey to brown, soft, saturated			
		8				0		
		9				0		Sample JCRS-0045-B
		8						
8								
		9						
		13				0		
		14				0		
		15				0		
10						0		
		10						
		9				0		
		13				0		
		12				0		
12					Total depth 12.0 feet			Sample JCRS-0045-C
					Groundwater at 5 feet			
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0045

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
HOLE NUMBER	JCRS-0046
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 4
PROJECT NAME	Johnny Cake Road
SITE LOCATION	Herkimer County, NY
ME OF DRILLER	ll Bosworth
HOLE LOCATION	North – 4757220.856 (m); East – 511626.582 (m)
AME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/13/03
DATE COMPLETED	10/13/03
SURFACE ELEVATION	239.908 (m)
DEPTH TO FIRST ENCOUNTERED WATER	21 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	40.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

KETCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

PROJECT	HOLE NO.
Johnny Cake Road	JCRS - 0046

TES BORING LOG (CONTINUATION SHE

PROJE: Johnny Cake Road | GEOLO: R. Moult | HOLE NUMBER - 0046 | SHEET: 2 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		3 5 6 11			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm, v. moist, small angular Gravels to cobbles (5 % + 4, 6" max.)	0 2.1		Sample JCRS-0046A
2								
		4 16 85 11			cobbles	0.5		
4								
		4 8 9 8				0.7		
6					Same as above; gravels in tip of sampler			
		10 16 22 10				0.9		Sample JCRS-0046B
8								
		10 37 15 16				1.7 1.9 1.2		Sample JCRS-0046C
10								
		2 5 5 9				1.2		
12								
		8 9 12 10			Till; CL/ML, clay, silty, low plasticity, grey, very stiff, wet	0.7 0.9 0.7 0.2		
14								
		4 8 11 17				1.2 0.4 0.4 1.2		Sample JCRS-0046D
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS – 0046

TE[…] BORING LOG (CONTINUATION SHE[…]

PROJECT NAME: Johnny Cake Road

GEOLOGIST: R. Moult

HOLE NUMBER: […]S-0046

SHEET: 3 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
		10 18 28 19			Till; CL/ML, clay, silty, low plasticity, grey hard, wet, gravels to cobbles (5% + 4, 4" Max.)	0.9 0.9 0.7		
18 ---		17 30 34 32				1.2		Sample JCRS-0046E
20 ---		18 64 50 24			Wet to saturated	1.9 1.9 0.9 0.4		
22 ---		15 21 40 31			Till; CL, clay, silty, moderate plasticity, hard, moist to wet	0.2 0		
24 ---		22 24 37 39				0 0.5 0.2 0.4		
26 ---		17 35 40 38			Till: CL/CH, clay, moderate to high plasticity, grey, hard, v. moist	0 0 0 0		
28 ---		13 18 23 32				0 0.2 0.4 0.4		
30 ---		12 18 26 40				0.7 0.4 0 0		Sample JCRS-0046F
32 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS-0046

TES BORING LOG (CONTINUATION SHE

PROJECT NAME:	Johnny Cake Road	GEOLOGIST:	R. Moult	HOLE NUMBER	S-0046
				SHEET:	4 of 4

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	REMARKS
34 ---		24 21 31 50			Till: CL/CH, clay, moderate to high plasticity, grey, hard, v. moist	0 0 0		
36 ---		14 14 22 30				0 0.2 0.2 0.2		Sample JCRS-0046G
38 ---		22 35 42 45				0 0		
40 ---		25 37 52 56				0 0		
					Total Depth 40 feet Groundwater at 21 feet			
42 ---								
44 ---								
46 ---								
48 ---								

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0047
	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 2
PROJECT NAME Johnny Cake Road	SITE LOCATION Herkimer County, NY	
OF DRILLER osworth	HOLE LOCATION North – 4757196.919 (m); East – 511639.273 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/13/03	DATE COMPLETED 10/13/03
	SURFACE ELEVATION 242.446 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 9 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

T	HOLE NO.
Johnny Cake Road	JCRS - 0047

TES(ORING LOG (CONTINUATION SHEET)

PROJECT NA: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: 0047 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		1 2 3 3			Colluvium; CL, clay, sandy, low plasticity, brown, soft to firm v. moist, small gravels to cobbles (5% + 4, 6" max.)	0 0		
2 ---								
		3 6 5 6				0 0 0		Sample JCRS-0047A
4 ---								
		7 5 5 5				0 0		
6 ---								
		6 5 6 50			cobbles Till: CL/ML, clay, silty, grey, stiff, wet to Saturated, cobble at 8'	0		Sample JCRS-0047B
8 ---								
		10 10 11 15				0 0 0 0		
10 ---								
		10 6 14 15				0 0 0 0		Sample JCRS-0047C
12 ---								
-					Total depth 12.0 feet Groundwater at 9 feet			
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road | HOLE NO.: JCRS - 0047

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0048
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 2
PROJECT NAME	ny Cake Road
SITE LOCATION	Herkimer County, NY
F DRILLER	Bosworth
HOLE LOCATION	North – 4757207.043 (m); East – 511630.653 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/13/03
DATE COMPLETED	10/13/03
SURFACE ELEVATION	241.245 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	12.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

:T	HOLE NO.
Johnny Cake Road	JCRS - 0048

TES ORING LOG (CONTINUATION SHEET)

PROJECT: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: 0048 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		1 2 4 4			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels to cobbles (5% + 4)	0		
2 ---								
		8 6 5 5				1.4		Sample JCRS-0048A
4 ---								
		3 3 4 4				0 0		
6 ---					Wet to saturated			
		3 5 7 20				0 0 0		Sample JCRS-0048B
8 ---								
		6 5 4 5				0		
10 ---								
		10 12 15 15			Till; CL/ML, clay, silty, low to moderate plasticity, hard, wet	0 0 0 0		Sample JCRS-0048C
12 ---								
-					Total depth 12.0 feet Groundwater at 6 feet			
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0048

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0049 SHEET 1 of 2

PROJECT NAME ··nny Cake Road	SITE LOCATION Herkimer County, NY
··F DRILLER ··osworth	HOLE LOCATION North – 4757218.021 (m); East – 511638.173 (m)
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/14/03 — DATE COMPLETED 10/14/03 SURFACE ELEVATION 239.711 (m) DEPTH TO FIRST ENCOUNTERED WATER 9 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

··TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

··T	HOLE NO.
Johnny Cake Road	JCRS - 0049

TES ORING LOG (CONTINUATION SHEE

PROJECT: Johnny Cake Road | GEOLOGIS: R. Moult | HOLE NUMBER: - 0049 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1 2 3 5			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels to cobbles (5% + 4, 2" max)	0 0		
2								
		4 4 4 5				0.2 0.4 0.4		
4								Sample JCRS-0049A
		6 7 6 7				0 0 0 0		
6								
		6 8 12 10				0 0 0 0		
8								Sample JCRS-0049B
		6 6 12 10			Wet to saturated	0 0 0 0		
10								
		10 10 10 10				2.1 1.2 0.7 0		
12								Sample JCRS-0049C
					Total depth 12.0 feet Groundwater at 9 feet			
14								
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0049

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0050 SHEET 1 of 2
PROJECT NAME …nny Cake Road	SITE LOCATION Herkimer County, NY	
…F DRILLER …osworth	HOLE LOCATION North – 4757230.261 (m); East – 511631.242 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/14/03	DATE COMPLETED 10/14/03
	SURFACE ELEVATION 239.024 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 7 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

…TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS SCALE: Not To Scale

See Soil Boring Location Map

…CT	HOLE NO.
Johnny Cake Road	JCRS - 0050

TES ORING LOG (CONTINUATION SHEE

PROJECT N.: Johnny Cake Road | GEOLOGIST: R. Moult | HOLE NUMBER: · 0050 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0		1 1 9 8			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels to cobbles (5% + 4)	0 0		
2		5 6 5 5				6.2 6.2		Sample JCRS-0050A
4		2 3 3 2				7.2 3.3 2.6 0.4		Sample JCRS-0050B
6		3 5 12 18			Cobbles	0.7 0.2 0.2 0.7		
8		32 28 13 18			Wet to saturated	0		
10		12 20 15 23				0		Sample JCRS-0050C
12								
14					Total depth 12.0 feet Groundwater at 7 feet			
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0050

TEST BORING LOG

COMPANY NAME: Weston Solutions	AGENCY	HOLE NUMBER: JCRS-0051
	DRILL SUBCONTRACTOR: SJB Services	SHEET: 1 of 2
PROJECT NAME: ·~nny Cake Road	SITE LOCATION: Herkimer County, NY	
·F DRILLER: ·osworth	HOLE LOCATION: North – 4757238.427 (m); East – 511650.488 (m)	
NAME OF GEOLOGIST: R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT: CME 850 track mount	DATE STARTED: 10/14/03	DATE COMPLETED: 10/14/03
	SURFACE ELEVATION: 237.840 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER: 6 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE: 12.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

·TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS SCALE: Not To Scale

See Soil Boring Location Map

·T	HOLE NO.
Johnny Cake Road	JCRS - 0051

TES ,ORING LOG (CONTINUATION SHEE

PROJECT Johnny Cake Road GEOLOGIS R. Moult

HOLE NUMBER 0051

SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		1 1 2 3			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels (5% + 4)	0 0		
2 ---								
		3 4 5 5				1.2 0.7		Sample JCRS-0051A
4 ---								
		1 5 3 2			Wet to saturated	0 0 0 0.2		
6 ---								
		3 4 5 6				0 0 0		
8 ---								Sample JCRS-0051B
		6 10 12 17				1.6 1.6 3.1 0.4		
10 ---								
		25 35 50 48				7.2		Sample JCRS-0051C
12 ---								
14 ---					Total depth 12.0 feet Groundwater at 6 feet			
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0051

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY DRILL SUBCONTRACTOR SJB Services	HOLE NUMBER JCRS-0052 SHEET 1 of 2
PROJECT NAME …hnny Cake Road	SITE LOCATION Herkimer County, NY	
…F DRILLER …osworth	HOLE LOCATION North – 4757246.121 (m); East – 511673.339 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/14/03	DATE COMPLETED 10/14/03
	SURFACE ELEVATION 236.580 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 7 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

…TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

…T	HOLE NO.
Johnny Cake Road	JCRS - 0052

TES[...]ORING LOG (CONTINUATION SHE[...]

PROJEC[...]: Johnny Cake Road | GEOLOGIS[...]: R. Moult | HOLE NUMBER: [...]0052 | SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		1 1 2 2			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels (5% + 4)	0 0 0 0		
2 ---								
		1 2 5 5				0 0 0		
4 ---								Sample JCRS-0052A
		1 2 5 6				0 0 0		
6 ---								
		20 26 25 50			Wet to saturated	0		Sample JCRS-0052B
8 ---					Cobbles			
		16 65 23 15				0 0 0		
10 ---								
		15 14 16 20				0 0 0 0		Sample JCRS-0052C
12 ---								
14 ---					Total depth 12.0 feet Groundwater at 7 feet			
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS – 0052

TEST BORING LOG

COMPANY NAME	Weston Solutions
AGENCY	
DRILL SUBCONTRACTOR	SJB Services
HOLE NUMBER	JCRS-0053
SHEET	1 of 2
PROJECT NAME	~hnny Cake Road
SITE LOCATION	Herkimer County, NY
~F DRILLER	~osworth
HOLE LOCATION	North – 4757235.710 (m); East – 511666.784 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/14/03
DATE COMPLETED	10/14/03
SURFACE ELEVATION	240.079 (m)
DEPTH TO FIRST ENCOUNTERED WATER	6 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	12.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

~TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

~T	HOLE NO.
Johnny Cake Road	JCRS - 0053

TES[illegible] ,ORING LOG (CONTINUATION SHEE[illegible]

PROJEC[illegible]: Johnny Cake Road
GEOLOGIS[illegible]: R. Moult
HOLE NUMBER: 0053
SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		2			Colluvium; CL, clay, sandy, low plasticity,	0		
		2			soft to firm, brown, v. moist, small gravels	0		
		3			(5% + 4)	0		
		4				0		
2 ---								Sample JCRS-0053A
		3						
		4				0		
		4				0		
		5						
4 ---						0		
		6				0		
		6				0		
		4			Wet to saturated	0		Sample JCRS-0053B
		5				3.6		
6 ---								
		3				0.2		
		3				0.9		
		3				0		
		6				13.7		
8 ---								
		5				3.1		
		12				1.4		
		5				2.4		
		19				7.8		
10 ---								
		20				8.4		
		34			Till; CL/ML; clay, silty, low plasticity, firm,	5.8		Sample JCRS-0053C
		37			grey, v. moist, small angular gravels	2.1		
		17						
12 ---								
-								
					Total depth 12.0 feet			
14 ---					Groundwater at 6 feet			
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0053

TEST BORING LOG

COMPANY NAME Weston Solutions	AGENCY	HOLE NUMBER JCRS-0054
	DRILL SUBCONTRACTOR SJB Services	SHEET 1 of 2
PROJECT NAME ohnny Cake Road	SITE LOCATION Herkimer County, NY	
F DRILLER osworth	HOLE LOCATION North – 4757229.994 (m); East – 511668.049 (m)	
NAME OF GEOLOGIST R. Moult	SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT CME 850 track mount	DATE STARTED 10/14/03	DATE COMPLETED 10/14/03
	SURFACE ELEVATION 239.792 (m)	
	DEPTH TO FIRST ENCOUNTERED WATER 5 ft.	
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE 12.0'	TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

T	HOLE NO.
Johnny Cake Road	JCRS - 0054

TES ORING LOG (CONTINUATION SHEE

PROJECT: Johnny Cake Road

GEOLOGIS: R. Moult

HOLE NUMBER: 0054

SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0 ---								
		2 2 3 4			Colluvium; CL, clay, sandy, low plasticity, soft to firm, brown, v. moist, small gravels (5% + 4)	0 0 0 0		
2 ---								
		4 5 5 6				0 0 0 0		Sample JCRS-0054A
4 ---								
		2 2 4 4			Wet to saturated	0 0 0 0		
6 ---								
		4 3 2 2				0 0 0		
8 ---								Sample JCRS-0054B
		4 6 12 10				2.4 0 0 0		
10 ---								
		5 7 9 8			Till; CL/ML; clay, silty, low plasticity, firm, grey, v. moist, small angular gravels	0		Sample JCRS-0054C
12 ---								
-					Total depth 12.0 feet Groundwater at 5 feet			
14 ---								
16 ---								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0054

TEST BORING LOG

AGENCY	
HOLE NUMBER	JCRS-0055
COMPANY NAME	Weston Solutions
DRILL SUBCONTRACTOR	SJB Services
SHEET	1 of 2
PROJECT NAME	...hnny Cake Road
SITE LOCATION	Herkimer County, NY
...OF DRILLER	...Bosworth
HOLE LOCATION	North – 4757224.643 (m); East – 511665.811 (m)
NAME OF GEOLOGIST	R. Moult
SIGNATURE OF GEOLOGIST	
TYPE AND SIZE OF DRILLING AND SAMPLING EQUIPMENT	CME 850 track mount
DATE STARTED	10/14/03
DATE COMPLETED	10/14/03
SURFACE ELEVATION	240.161 (m)
DEPTH TO FIRST ENCOUNTERED WATER	5 ft.
OVERBURDEN THICKNESS/ DEPTH TO BEDROCK	
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
DEPTH DRILLED INTO BEDROCK	
OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
TOTAL DEPTH OF HOLE	12.0'
TOTAL FLUID LOSSES	

GEOTECHNICAL SAMPLES	SAMPLE DEPTH	UNDISTURBED/DISTURBED	TOTAL NUMBER OF CORE BOXES

ENVIRONMENTAL SAMPLES	SAMPLE DEPTH	ANALYTES	TOTAL CORE RECOVERY %

DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	CASING TYPE	WELL DEPTH	SCREENED INTERVAL

DATE	START TIME	FINISH TIME	DRILLING DEPTH	DESCRIPTION

...TCH OF DRILLING LOCATION/ADDITIONAL COMMENTS **SCALE:** **Not To Scale**

See Soil Boring Location Map

...CT	HOLE NO.
Johnny Cake Road	JCRS - 0055

TES ORING LOG (CONTINUATION SHEE

PROJECT: Johnny Cake Road
GEOLOGIST: R. Moult
HOLE NUMBER: 0055
SHEET: 2 of 2

DEPTH	INTERVAL/ RECOVERY/ TIME	BLOW COUNT	USCS SYMBOL	MUNSELL COLOR	DESCRIPTION OF MATERIALS	PID READINGS	LITHOLOGY	DRILLING REMARKS
0								
		1 2 2 4			Fill; Wood, plastic containers, petroleum odor	0.5		Sample JCRS-0055A
2								
		2 4 6 28			Colluvium; clay, sandy, low plasticity, Angular gravels (5% +4, 1 inch max.) Wet to saturated	0.0		
4								
		14 12 10 21				13.0 5.3		Sample JCRS-0055B
6								
		14 17 8 8				2.6 2.1		
8								
		4 7 10 12				0.7		
10								
		12 10 16 19				0.4 0.4 0.7		
12								Sample JCRS-0055C
14					Total depth 12.0 feet Groundwater at 5 feet			
16								

PROJECT NAME: Johnny Cake Road

HOLE NO.: JCRS - 0055

APPENDIX 3

SOIL SAMPLE RESULTS TABLES

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-16A	09/23/03	2.5'	**Acetone** 2-Butanone Trichloroethene Tetrachloroethene	**0.37 DJ** 0.005 J 0.002 J 0.009 J	Groundwater Monitoring Well No. MW-16
MW-16B	09/23/03	7.0'	**Acetone** Carbon Disulfide cis-1,2-Dichloroethene 2-Butanone Trichloroethene 4-Methyl-2-Pentanone Tetrachloroethene	**1.9 BDJ** 0.0008 J 0.002 J 0.01 J 0.024 0.001 J 0.046	Groundwater Monitoring Well No. MW-16
MW-16C	09/23/03	9.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** cis-1,2-Dichloroethene Toluene 1,2-Dichlorobenzene	0.008 JB **3.3 JBD** 0.016 J 0.02 JB 0.005 JB	Groundwater Monitoring Well No. MW-16
MW-16D	09/23/03	13.0'	**Acetone** Carbon Disulfide	**0.23 JDB** 0.0005 J	Groundwater Monitoring Well No. MW-16
MW-16E	09/23/03	20.0'	Methylcyclohexane Total Xylenes	0.001 J 0.0004 J	Groundwater Monitoring Well No. MW-16
MW-16F	09/23/03	22.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Benzene Toluene	0.004 JB **0.41 JB** 0.017 J 0.046 JB	Groundwater Monitoring Well No. MW-16

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-16G	09/23/03	25.5'	Acetone Carbon Disulfide	0.19 JDB 0.0004 J	Groundwater Monitoring Well No. MW-16
MW-21B	09/23/03	7.0'	**Acetone** Carbon Disulfide cis-1,2-Dichloroethene 2-Butanone Trichloroethene Tetrachloroethene	**4.7 D** 0.0005 J 0.0009 J 0.012 J 0.012 J 0.023	Duplicate of MW-16B
MW-17F	09/24/03	26.0'	Dichlorodifluoromethane Methylcyclohexane Total Xylenes	0.0004 J 0.0006 J 0.002 J	Groundwater Monitoring Well No. MW-17
MW-17G	09/24/03	31.5'	**Acetone** Carbon Disulfide Methylcyclohexane Benzene Total Xylenes	**1.2 JB** 0.002 J 0.0009 J 0.002 JB 0.004 J	Groundwater Monitoring Well No. MW-17
MW-17H	09/24/03	33.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Methylene Chloride	0.011 J **0.68 B** 0.031 JB	Groundwater Monitoring Well No. MW-17
MW-21G	09/24/03	31.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Methylene Chloride Toluene	0.012 J **0.52 B** 0.04 JB 0.011 JB	Duplicate of MW-17G

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-17I	09/25/03	38.0'	Methylcyclohexane Total Xylenes	0.0005 J 0.002 J	Groundwater Monitoring Well No. MW-17
MW-17J	09/25/03	40.0'	Carbon Disulfide Total Xylenes	0.0006 J 0.002 J	Groundwater Monitoring Well No. MW-17
MW-21J	09/25/03	40.0'	VOCs	UJ	Duplicate of MW-17J
MW-18A	09/26/03	4.0'	Dichlorodifluoromethane cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.0005 J 0.008 J 0.049 0.036	Groundwater Monitoring Well No. MW-18
MW-18B	09/26/03	8.0'	Dichlorodifluoromethane Chloromethane Vinyl Chloride cis-1,2-Dichloroethene Cyclohexane Trichloroethene Methylcyclohexane Tetrachloroethene	0.001 J 0.0006 J 0.002 J 0.009 J 0.0005 J 0.027 0.0005 J 0.03	Groundwater Monitoring Well No. MW-18

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-18C	09/26/03	8.5'	Vinyl Chloride **Acetone** Carbon Disulfide trans-1,2-Dichloroethene cis-1,2-Dichloroethene Cyclohexane Trichloroethene Methylcyclohexane Tetrachloroethene	0.005 J **0.45 D** 0.0004 J 0.0007 J 0.081 0.0006 J 0.19 0.0005 J 0.1	Groundwater Monitoring Well No. MW-18
MW-18D	09/26/03	13.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride cis-1,2-Dichloroethene	0.01 DJ 0.12 DB 0.022 DJB 0.001 J	Groundwater Monitoring Well No. MW-18
MW-18E	09/26/03	19.0'	Acetone	0.14 JB	Groundwater Monitoring Well No. MW-18
MW-18F	09/26/03	24.0'	Carbon Disulfide	0.0005 J	Groundwater Monitoring Well No. MW-18
MW-21BA	09/26/03	8.0'	cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.004 J 0.026 0.048	Duplicate of MW-18B

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-19A	09/29/03	2.0'	Chloromethane 1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Methyl Acetate	0.0004 J 0.0009 J **0.24 B** 0.023	Groundwater Monitoring Well No. MW-19
MW-19B	09/29/03	6.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Carbon Disulfide	0.0007 J 0.083 B 0.0005 J	Groundwater Monitoring Well No. MW-19
MW-19C	09/29/03	8.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone	0.0009 J 0.14 B	Groundwater Monitoring Well No. MW-19
MW-19D	09/29/03	14.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone	0.0006 J 0.15 B	Groundwater Monitoring Well No. MW-19
MW-19E	09/29/03	18.0'	1,1,2-Trichloro-1,2,2-trifluoroethane	0.001 J	Groundwater Monitoring Well No. MW-19
MW-19F	09/29/03	24.0'	VOCs	UJ	Groundwater Monitoring Well No. MW-19
MW-21Bb	09/29/03	6.0'	1,1,2-Trichloro-1,2,2-trifluoroethane	0.001 J	Duplicate of MW-19B

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-20A	09/30/03	4.0'	1,1,2-Trichloro-1,2,2-trifluoroethane cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene Styrene	0.0008 J 0.004 J 0.039 B 0.002 J 0.047 0.0008 J	Groundwater Monitoring Well No. MW-20
MW-20B	09/30/03	8.0'	1,1,2-Trichloro-1,2,2-trifluoroethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.0007 J 0.0007 J 0.05 0.13 B 0.064	Groundwater Monitoring Well No. MW-20
MW-20C	09/30/03	9.5'	1,1-Dichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene	0.0006 J 0.0006 J 0.0009 J 0.11 0.062 B 0.0006 J 0.002 J	Groundwater Monitoring Well No. MW-20
MW-20D	09/30/03	15.0'	Chloromethane Bromomethane **Acetone** Methylene Chloride	0.057 J 0.067 J **0.97 J** 0.068 J	Groundwater Monitoring Well No. MW-20

TABLE 1

SOIL SAMPLE RESULTS
GROUNDWATER MONITORING WELLS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
MW-20E	09/30/03	19.0'	Chloromethane Bromomethane **Acetone** Methylene Chloride	0.056 J 0.053 J **0.89 J** 0.086 J	Groundwater Monitoring Well No. MW-20
MW-20F	09/30/03	24.0'	VOCs	U	Groundwater Monitoring Well No. MW-20
MW-21C	09/30/03	9.5'	trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.0007 J 0.059 0.035 0.003 J	Duplicate of MW-20C

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

3LE 2

SOIL SAMPLE RESULTS
EAST DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0036A	10/06/03	0.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone** Methylene chloride cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene	0.003 J **3.4 DJ** 0.011 JB 0.006 J 0.005 J 0.004 J 0.005 J	Soil Boring No. JCRS-0036
JCRS-0036B	10/06/03	7.0'	Vinyl Chloride 1,1-Dichloroethene 1,1,2-Trichloro- 1,2,2-trifluoroethane Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Cyclohexane **Trichloroethene** Tetrachloroethene	0.018 0.003 J 0.001 J 0.19 0.011 J 0.51 DJ 0.005 J **1.1 DJ** 0.24	Soil Boring No. JCRS-0036
JCRS-0036C	10/06/03	8.5'	Vinyl Chloride 1,1-Dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene Cyclohexane Trichloroethene Tetrachloroethene	0.02 0.002 J 0.013 0.14 DJ 0.005 J 0.24 DJ 0.26 DJ	Soil Boring No. JCRS-0036
JCRS-0080D	10/06/03	8.5'	Vinyl Chloride 1,1-Dichloroethene 1,1,2-Trichloro- 1,2,2-trifluoroethane cis-1,2-Dichloroethene Cyclohexane **Trichloroethene** Tetrachloroethene	0.02 0.003 J 0.0009 J 0.36 DJ 0.005 J **0.73 DJ** 0.85 DJ	Duplicate of JCRS-0036C

BLE 2

SOIL SAMPLE RESULTS
EAST DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0036D	10/06/03	16.0'	Trichloroethene Tetrachloroethene	0.002 J 0.003 J	Soil Boring No. JCRS-0036
JCRS-0036E	10/06/03	18.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone** cis-1,2-Dichloroethene **2-Butanone** Trichloroethene Tetrachloroethene	0.11 DJ **0.74 DJ** 0.093 DJ **0.5 DJ** 0.19 DJ 0.2 DJ	Soil Boring No. JCRS-0036
JCRS-0036F	10/07/03	31.5'	**Acetone**	**1.8 DJ**	Soil Boring No. JCRS-0036
JCRS-0080E	10/07/03	31.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone** **2-Butanone** Toluene	0.098 D J **2.0 D** **0.46 DJ** 0.004 J	Duplicate of JCRS-0036F
JCRS-0036G	10/07/03	32.5'	**Acetone** **2-Butanone** Toluene	**8.1 DJ** **0.85 DJ** 0.14 J	Soil Boring No. JCRS-0036
JCRS-0037A	10/07/03	0.5'	**Acetone** cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	**18 DJ** 0.002 J 0.001 J 0.001 J	Soil Boring No. JCRS-0037
JCRS-0037B	10/07/03	8.0'	Trichloroethene Tetrachloroethene	0.0006 J 0.0007 J	Soil Boring No. JCRS-0037
JCRS-0037C	10/07/03	12.0'	VOCs	UJ	Soil Boring No. JCRS-0037
JCRS-0038A	10/07/03	2.0'	Acetone Carbon Disulfide	0.15 0.001 J	Soil Boring No. JCRS-0038

3LE 2

SOIL SAMPLE RESULTS
EAST DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0038B	10/07/03	6.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** **2-Butanone**	0.1 J **4.4 DJ** **0.7 DJ**	Soil Boring No. JCRS-0038
JCRS-0038C	10/07/03	9.5'	**Acetone**	**0.3 J**	Soil Boring No. JCRS-0038
JCRS-0038D	10/07/03	15.0'	**Acetone** **2-Butanone** Toluene	**1.8 DJ** **0.5 DJ** 0.12 DJB	Soil Boring No. JCRS-0038
JCRS-0038E	10/07/03	19.5'	VOCs	UJ	Soil Boring No. JCRS-0038
JCRS-0038F	10/08/03	32.0'	**Acetone** **Methylene Chloride**	**0.76 J** **0.31 JB**	Soil Boring No. JCRS-0038
JCRS-0080F	10/08/03	32.0'	VOCs	U	Duplicate of JCRS-0038F
JCRS-0038G	10/08/03	38.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Tetrachloroethene	0.001 J **7.3 DJ** 0.0007 J	Soil Boring No. JCRS-0038

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

,LE 3

SOIL SAMPLE RESULTS
SEPTIC SYSTEM
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0043A	10/10/03	3.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene	0.001 J **0.32 J** 0.002 J 0.011 0.002 J 0.015 B	Soil Boring No. JCRS-0043
JCRS-0043B	10/10/03	7.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene **Trichloroethene** Toluene **Tetrachloroethene**	0.002 J 0.01 J 0.004 J 0.15 **2.0 D** 0.003 J **4.4 D**	Soil Boring No. JCRS-0043
JCRS-0043C	10/10/03	12.0'	1,1,2-Trichloro-1,2,2-trifluoroethane	0.0006 J	Soil Boring No. JCRS-0043
JCRS-0053A	10/14/03	2.0'	VOCs	U	Soil Boring No. JCRS-0053
JCRS-0053B	10/14/03	5.0'	Acetone Tetrachloroethene	0.058 0.003 J	Soil Boring No. JCRS-0053
JCRS-0053C	10/14/03	8.0'	Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	2 DJ 0.004 J 0.012 0.017	Soil Boring No. JCRS-0053
JCRS-0054A	10/14/03	3.5'	Acetone	0.063	Soil Boring No. JCRS-0054
JCRS-0054B	10/14/03	8.0'	Trichloroethene Tetrachloroethene	0.004 J 0.016	Soil Boring No. JCRS-0054

LE 3

SOIL SAMPLE RESULTS
SEPTIC SYSTEM
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0054C	10/14/03	10.5'	Acetone	0.026	Soil Boring No. JCRS-0054
JCRS-0055A	10/14/03	0.5'	**Acetone**	**0.26 J**	Soil Boring No. JCRS-0055
JCRS-0055B	10/14/03	4.5'	Dichlorodifluoromethane Vinyl Chloride Acetone Carbon Disulfide cis-1,2-Dichloroethene Cyclohexane Benzene Trichloroethene Methylcyclohexane Toluene Tetrachloroethene Ethylbenzene Total Xylenes	0.047 0.05 0.058 0.043 0.006 J 0.003 J 0.005 J 0.019 0.012 0.031 0.084 0.017 0.063	Soil Boring No. JCRS-0055
JCRS-0055C	10/14/03	11.5'	Acetone cis-1,2-Dichloroethene	0.008 J 0.027	Soil Boring No. JCRS-0055

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

3LE 4

SOIL SAMPLE RESULTS
SOIL MONITORING WELLS MW-1, MW-2 & MW-6
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0039A	10/08/03	3.0'	Trichloroethene Tetrachloroethene	0.005 J 0.029	Soil Boring No. JCRS-0039
JCRS-0039B	10/08/03	6.0'	Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.074 B 0.002 J 0.014 0.018	Soil Boring No. JCRS-0039
JCRS-0039C	10/08/03	12.0'	Vinyl Chloride 1,1,2-Trichloro-1,2,2-trifluoroethane cis-1,2-Dichloroethene Trichloroethene	0.007 J 0.0008 J 0.019 J 0.003 J	Soil Boring No. JCRS-0039
JCRS-0039D	10/08/03	13.0'	**Vinyl Chloride** 1,1-Dichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Carbon Disulfide trans-1,2-Dichloroethene **cis-1,2-Dichloroethene**	**4.3 DJ** 0.001 J 0.0007 J **0.21 J** 0.0004 J 0.002 J **52 DJ**	Soil Boring No. JCRS-0039
JCRS-0039E	10/08/03	23.0'	cis-1,2-Dichloroethene	0.95 DJ	Soil Boring No. JCRS-0039
JCRS-0039F	10/08/03	24.5'	cis-1,2-Dichloroethene **Trichloroethene** Tetrachloroethene	2.9 D **3.9 D** 1.1 D	Soil Boring No. JCRS-0039
JCRS-0039G	10/08/03	33.0'	VOCs	U	Soil Boring No. JCRS-0039

BLE 4

SOIL SAMPLE RESULTS
SOIL MONITORING WELLS MW-1, MW-2 & MW-6
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0041A	10/09/03	2.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.001 J 0.037 0.003 J 0.018 0.047	Soil Boring No. JCRS-0041
JCRS-0041B	10/09/03	6.0'	Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.071 0.005 J 0.002 J 0.007 J	Soil Boring No. JCRS-0041
JCRS-0041C	10/09/03	9.5'	Dichlorodifluoromethane Vinyl Chloride 1,1-Dichloroethene Acetone cis-1,2-Dichloroethene Cyclohexane Trichloroethene Methylcyclohexane Tetrachloroethene Ethylbenzene Total Xylenes	0.0004 J 0.015 0.003 J 0.14 1.6 D 0.011 0.74 DJ 0.009 0.067 0.003 J 0.001 J	Soil Boring No. JCRS-0041
JCRS-0041D	10/09/03	14.5'	Dichlorodifluoromethane Vinyl Chloride Acetone cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene	0.0005 J 0.004 J 0.13 0.081 0.053 0.025 B 0.053	Soil Boring No. JCRS-0041
JCRS-0041E	10/09/03	19.0'	VOCs	U	Soil Boring No. JCRS-0041

3LE 4

SOIL SAMPLE RESULTS
SOIL MONITORING WELLS MW-1, MW-2 & MW-6
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0041F	10/09/03	31.0'	VOCs	U	Soil Boring No. JCRS-0041
JCRS-0041G	10/09/03	35.0'	VOCs	U	Soil Boring No. JCRS-0041
JCRS-0042A	10/10/03	3.5'	Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene **Tetrachloroethene**	0.011 J 0.001 J 0.1 0.62 D **1.7 D**	Soil Boring No. JCRS-0042
JCRS-0042B	10/10/03	7.0'	**Acetone** **Methylene Chloride** **Trichloroethene** **Tetrachloroethene**	**12 DJ** **7.7 DJB** **17 DJ** **330 D**	Soil Boring No. JCRS-0042
JCRS-0080H	10/10/03	7.0'	**Methylene Chloride** **Trichloroethene** **Tetrachloroethene**	**8.7 DJB** **11 DJ** **190 D**	Duplicate of JCRS-0042B
JCRS-0042C	10/10/03	12.0'	Dichlorodifluoromethane 1,1-Dichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon Disulfide cis-1,2-Dichloroethene Cyclohexane Trichloroethene Methylcyclohexane Tetrachloroethene	0.0009 J 0.0005 J 0.002 J 0.0006 J 0.007 J 0.0006 J 0.003 J 0.0005 J 0.007 J	Soil Boring No. JCRS-0042

.BLE 4

SOIL SAMPLE RESULTS
SOIL MONITORING WELLS MW-1, MW-2 & MW-6
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0042D	10/10/03	16.0'	Vinyl Chloride	0.025	Soil Boring No. JCRS-0042
			1,1-Dichloroethene	0.006 J	
			Acetone	**17 DJ**	
			Carbon Disulfide	0.002 J	
			Methyl Acetate	1.6 DJ	
			cis-1,2-Dichloroethene	1.9 DJ	
			Cyclohexane	0.03 J	
			Benzene	0.001 J	
			Trichloroethene	**1.2 DJ**	
			Toluene	0.03 BJ	
			Tetrachloroethene	**5.6 DJ**	
JCRS-0042E	10/10/03	22.5'	VOCs	U	Soil Boring No. JCRS-0042
JCRS-0042F	10/10/03	32.0'	Tetrachloroethene	0.001 J	Soil Boring No. JCRS-0042
JCRS-0042G	10/10/03	39.0'	1,1,2-Trichloro-1,2,2-trifluoroethane	0.002 J	Soil Boring No. JCRS-0042
			Acetone	0.068 J	
			Trichloroethene	0.001 J	
			Toluene	0.004 J	

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

TABLE 5

SOIL SAMPLE RESULTS
WESTERN SIDE OF DRIVEWAY
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0047A	10/13/03	3.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Toluene	0.003 J 0.24 J	Soil Boring No. JCRS-0047
JCRS-0047B	10/13/03	6.5'	VOCs	UJ	Soil Boring No. JCRS-0047
JCRS-0047C	10/13/03	12.0'	**Acetone** **Methylene Chloride**	**0.51 DJ** **0.39 DJB**	Soil Boring No. JCRS-0047
JCRS-0048A	10/13/03	2.5'	**Acetone** **Methylene Chloride**	**1.8 D** **0.31 DJB**	Soil Boring No. JCRS-0048
JCRS-0048B	10/13/03	7.5'	VOCs	UJ	Soil Boring No. JCRS-0048
JCRS-0048C	10/13/03	12.0'	VOCs	UJ	Soil Boring No. JCRS-0048
JCRS-0049A	10/14/03	3.5'	VOCs	U	Soil Boring No. JCRS-0049
JCRS-0049B	10/14/03	8.0'	VOCs	U	Soil Boring No. JCRS-0049
JCRS-0049C	10/14/03	12.0'	VOCs	U	Soil Boring No. JCRS-0049

TABLE 5

SOIL SAMPLE RESULTS
WESTERN SIDE OF DRIVEWAY
JOHNNY CAKE ROAD, DANUBE, NEW YORK

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

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SOIL SAMPLE RESULTS
POOL AREA
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0044A	10/10/03	3.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Trichloroethene Tetrachloroethene	0.001 J 0.006 J 0.017	Soil Boring No. JCRS-0044
JCRS-0044B	10/10/03	7.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Toluene **Tetrachloroethene**	0.001 J 0.01 0.0006 J 0.031 0.14 0.001 J **1.9 D**	Soil Boring No. JCRS-0044
JCRS-0044C	10/10/03	12.0'	VOCs	U	Soil Boring No. JCRS-0044
JCRS-0045A	10/10/03	0.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Trichloroethene Toluene Tetrachloroethene	0.002 J 0.13 0.016 0.001 J 0.068 B	Soil Boring No. JCRS-0045
JCRS-0045B	10/10/03	7.0'	Vinyl Chloride 1,1-Dichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Cyclohexane Benzene **Trichloroethene** Toluene Tetrachloroethene	0.054 0.002 J 0.002 J 0.015 0.015 2.0 D 0.003 J 0.0005 J **17 D** 0.007 J 0.084 B	Soil Boring No. JCRS-0045

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SOIL SAMPLE RESULTS
POOL AREA
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0045C	10/10/03	11.5'	Dichlorodifluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane cis-1,2-Dichloroethene	0.0004 J 0.001 J 0.001 J	Soil Boring No. JCRS-0045

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

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SOIL SAMPLE RESULTS
NORTHERN DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0040A	10/09/03	3.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Trichloroethene Tetrachloroethene	0.001 J 0.014 0.0009 J 0.001 J	Soil Boring No. JCRS-0040
JCRS-0040B	10/09/03	8.0'	Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.003 J 0.003 J 0.02 0.026	Soil Boring No. JCRS-0040
JCRS-0040C	10/09/03	10.5'	Vinyl Chloride 1,1,2-Trichloro-1,2,2-trifluoroethane Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.002 J 0.0005 J 0.03 0.001 J 0.042 0.094 0.067	Soil Boring No. JCRS-0040
JCRS-0080G	10/09/03	10.5'	VOCs	U	Duplicate of JCRS-0040C
JCRS-0040D	10/09/03	14.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.0008 J 0.15 0.011 0.022 0.0025	Soil Boring No. JCRS-0040
JCRS-0040E	10/09/03	19.0'	Vinyl Chloride 1,1,2-Trichloro-1,2,2-trifluoroethane Acetone cis-1,2-Dichloroethene	0.003 J 0.0007 J 0.093 0.02	Soil Boring No. JCRS-0040
JCRS-0040F	10/09/03	29.0'	VOCs	U	Soil Boring No. JCRS-0040

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SOIL SAMPLE RESULTS
NORTHERN DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0040G	10/09/03	40.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone cis-1,2-Dichloroethene	0.0009 J 0.058 0.0008 J	Soil Boring No. JCRS-0040
JCRS-0051A	10/14/03	2.5'	**Acetone** cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	**5.7 DJ** 0.024 0.06 0.038	Soil Boring No. JCRS-0051
JCRS-0051B	10/14/03	7.5'	Vinyl Chloride Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.01 J 0.027 0.13 0.11 0.01 J	Soil Boring No. JCRS-0051
JCRS-0051C	10/14/03	10.5'	Dichlorodifluoromethane Vinyl Chloride 1,1-Dichloroethene Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.006 J 0.011 J 0.002 J 0.081J 0.009 J 3.2 D 0.011 J 0.002 J	Soil Boring No. JCRS-0051
JCRS-0052A	10/14/03	3.5'	Acetone cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.026 0.003 J 0.022 0.083	Soil Boring No. JCRS-0052
JCRS-0052B	10/14/03	6.5'	Acetone Trichloroethene Tetrachloroethene	0.11 0.019 0.064	Soil Boring No. JCRS-0052

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SOIL SAMPLE RESULTS
NORTHERN DRAINAGE DITCH
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0052C	10/14/03	10.5'	Acetone cis-1,2-Dichloroethene Trichloroethene	0.18 J 0.12 0.022	Soil Boring No. JCRS-0052

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

TABLE 8

SOIL SAMPLE RESULTS
STABLE AREA
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0030A	10/01/03	4.0'	**Acetone** Tetrachloroethene	**8.1 J** 0.0009 J	Soil Boring No. JCRS-0030
JCRS-0030B	10/01/03	6.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone cis-1,2-Dichloroethene Trichloroethene Toluene Tetrachloroethene	0.0006 J 0.046 B 0.02 0.045 0.0007 J 0.039	Soil Boring No. JCRS-0030
JCRS-0030C	10/01/03	12.0'	Vinyl Chloride 1,1-Dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene Benzene Trichloroethene Tetrachloroethene	0.001 J 0.001 J 0.002 J 0.028 DJ 0.0008 J 0.074 0.001 J	Soil Boring No. JCRS-0030
JCRS-0031A	10/02/03	1.5'	**Acetone** cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	**1.0 JB** 0.002 J 0.029 0.023	Soil Boring No. JCRS-0031
JCRS-0031B	10/02/03	8.0'	Acetone trans-1,2-Dichloroethene cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.045 JB 0.002 J 0.18 0.23 J 0.030	Soil Boring No. JCRS-0031

TABLE 8

SOIL SAMPLE RESULTS
STABLE AREA
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0031C	10/02/03	12.0'	Bromomethane Acetone Methyl Acetate cis-1,2-Dichloroethene **2-Butanone**	0.0056 DJ 0.2 J 0.088 DJ 0.21 DJ **0.35 J**	Soil Boring No. JCRS-0031
JCRS-0035A-1	11/03/03	3.0'	Acetone	0.14 J	Soil Boring No. JCRS-0035
JCRS-0035B-1	11/03/03	8.0'	cis-1,2-Dichloroethene **Trichloroethene** Tetrachloroethene	0.31 J **0.93 J** 0.45 J	Soil Boring No. JCRS-0035
JCRS-0035C-1	11/03/03	12.0'	Acetone Methylene Chloride cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.14 J 0.002 J 0.088 0.19 0.09	Soil Boring No. JCRS-0035
JCRS-0035D-1	11/03/03	12.5'	Dichlorodifluoromethane Acetone cis-1,2-Dichloroethene	0.003 J 0.052 J 0.039	Soil Boring No. JCRS-0035
JCRS-0035E-1	11/03/03	18.5'	**Acetone**	**1.8**	Soil Boring No. JCRS-0035
JCRS-0035F	10/06/03	29.5'	cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	0.003 J 0.004 J 0.002 J	Soil Boring No. JCRS-0035

TABLE 8

SOIL SAMPLE RESULTS
STABLE AREA
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0035G	10/06/03	40.0'	1,1,2-Trichloro- 1,2,2-trifluoroethane Acetone Toluene 1,2-Dichlorobenzene	0.0008 J 0.18 0.003 J 0.0003 J	Soil Boring No. JCRS-0035

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

TABLE 9

SOIL SAMPLE RESULTS
DISCHARGE PIPE
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0046A	10/13/03	1.0'	Dichlorodifluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methylcyclohexane Toluene Tetrachloroethene	0.0006 J 0.003 J 0.0006 J 0.001 J 0.0007 J	Soil Boring No. JCRS-0046
JCRS-0080I	10/13/03	1.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Toluene	0.002 J 0.0009 J	Duplicate of JCRS-0046A
JCRS-0046B	10/13/03	6.5'	1,1,2-Trichloro-1,2,2-trifluoroethane Toluene	0.002 J 0.001 J	Soil Boring No. JCRS-0046
JCRS-0046C	10/13/03	9.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Toluene	0.002 J **0.76 DJ** 0.0009 J	Soil Boring No. JCRS-0046
JCRS-0046D	10/13/03	15.0'	1,1,2-Trichloro-1,2,2-trifluoroethane Carbon Disulfide	0.0007 J 0.0003 J	Soil Boring No. JCRS-0046
JCRS-0046E	10/13/03	18.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Carbon Disulfide Toluene	0.002 J **0.75 DJ** 0.001 J 0.001 J	Soil Boring No. JCRS-0046
JCRS-0046F	10/13/03	30.5'	Dichlorodifluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon Disulfide Methylcyclohexane Toluene	0.0009 J 0.003 J 0.0006 J 0.0005 J 0.002 J	Soil Boring No. JCRS-0046
JCRS-0046G	10/13/03	36.0'	Carbon Disulfide Tetrachloroethene	0.0004 J 0.0009 J	Soil Boring No. JCRS-0046

TABLE 9

SOIL SAMPLE RESULTS
DISCHARGE PIPE
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0050A	10/14/03	3.0'	Acetone	0.15	Soil Boring No. JCRS-0050
JCRS-0050B	10/14/03	4.5'	**Acetone**	**13 DJ**	Soil Boring No. JCRS-0050
JCRS-0050C	10/14/03	10.5'	Acetone	0.016	Soil Boring No. JCRS-0050

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

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SOIL SAMPLE RESULTS
NORTHERN BOUNDARY OF JOHNNY CAKE ROAD
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0029A	10/01/03	2.5'	Styrene	0.0004 J	Soil Boring No. JCRS-0029
JCRS-0029B	10/01/03	8.0'	cis-1,2-Dichloroethene	0.0009 J	Soil Boring No. JCRS-0029
JCRS-0029C	10/01/03	9.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** cis-1,2-Dichloroethene Trichloroethene	0.001 JB **0.29 BD** 0.002 J 0.0006 J	Soil Boring No. JCRS-0029
JCRS-0032A	10/02/03	4.0'	**Acetone**	**1.7 BD**	Soil Boring No. JCRS-0032
JCRS-0080A	10/02/03	4.0'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone**	0.0005 J **0.76 DJ**	Duplicate of JCRS-0032A
JCRS-0032B	10/02/03	7.5'	**Acetone** cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	**1.5 BD** 0.039 0.057 0.008 J	Soil Boring No. JCRS-0032
JCRS-0032C	10/02/03	11.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** Toluene	0.0004 J **1.1 DJ** 0.001 J	Soil Boring No. JCRS-0032
JCRS-0033A	10/02/03	4.0'	**Acetone** cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	**0.34 J** 0.016 0.009 J 0.0007 J	Soil Boring No. JCRS-0033

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SOIL SAMPLE RESULTS
NORTHERN BOUNDARY OF JOHNNY CAKE ROAD
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0033B	10/02/03	8.0'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** cis-1,2-Dichloroethene Trichloroethene Toluene	0.0006 J **5.6 DJB** 0.009 J 0.001 J 0.0006 J	Soil Boring No. JCRS-0033
JCRS-0033C	10/02/03	9.0'	**Acetone** Toluene	**3.3 DJB** 0.002 J	Soil Boring No. JCRS-0033
JCRS-0033D	10/02/03	16.0'	**Acetone** Toluene	**7.6 DB** 0.001 J	Soil Boring No. JCRS-0033
JCRS-0033E	10/02/03	17.5'	1,1,2-Trichloro-1,2,2-trifluoroethane **Acetone** 2-Butanone	0.48 DJ **16 DJ** 0.25 DJ	Soil Boring No. JCRS-0033
JCRS-0033F	10/02/03	29.0'	**Acetone** 2-Butanone	**1.5 DJ** 0.26 DJ	Soil Boring No. JCRS-0033
JCRS-0033G	10/02/03	37.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone** Methyl Acetate **Methylene chloride** **2-Butanone**	0.12 DJ **4.4 D** 0.64 DJ **0.2 DJ** **0.53 DJ**	Soil Boring No. JCRS-0033
JCRS-0034A	10/02/03	0.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane **Acetone**	0.001 J **0.86 D**	Soil Boring No. JCRS-0034
JCRS-0080B	10/02/03	0.5'	1,1,2-Trichloro- 1,2,2-trifluoroethane Acetone Tetrachloroethene	0.001 J 0.066 DJ 0.001 J	Duplicate of JCRS-0034A
JCRS-0034B	10/02/03	8.0'	VOCs	U	Soil Boring No. JCRS-0034

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SOIL SAMPLE RESULTS
NORTHERN BOUNDARY OF JOHNNY CAKE ROAD
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
JCRS-0034C-1	11/03/03	11.0'	Methylene Chloride	0.002 J	Soil Boring No. JCRS-0034
JCRS-0034D-1	11/03/03	16.0'	VOCs	U	Soil Boring No. JCRS-0034
JCRS-0034E-1	11/03/03	23.5'	**Acetone**	**0.69 D**	Soil Boring No. JCRS-0034
JCRS-0080C-1	11/03/03	23.5'	**Acetone** 2-Butanone	**0.86 J** 0.2 J	Duplicate of JCRS-0034E-1
JCRS-0034F-1	11/03/03	30.5'	**Acetone** Methylene Chloride	**0.61 D** 0.002 J	Soil Boring No. JCRS-0034
JCRS-0034G-1	11/03/03	40.0'	VOCs	U	Soil Boring No. JCRS-0034

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

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QA - FIELD BLANK SAMPLE RESULTS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
RB092303	09/23/03	N/A	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride Chloroform Toluene	0.0006JB 0.008 JB 0.002 JB 0.0006 J 0.0004 JB	Field Blank
RB092403	09/24/03	N/A	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride cis-1,2-Dichloroethene Chloroform Trichloroethene Toluene 1,2-Dichlorobenzene	0.0008 JB 0.004 JB 0.003 JB 0.001 J 0.0009 J 0.0003 J 0.0004 JB 0.001 JB	Field Blank
RB092503	09/25/03	N/A	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride Chloroform Toluene	0.0009 JB 0.003 JB 0.003 JB 0.0007 J 0.0004 JB	Field Blank
RB092603	09/26/03	N/A	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride Chloroform Toluene	0.0008 JB 0.002 JB 0.002 JB 0.0006 J 0.0004 JB	Field Blank
RB092903	09/29/03	N/A	Acetone Methylene Chloride 2-Butanone Chloroform	0.004 J 0.001 JB 0.004 JB 0.001 J	Field Blank

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QA - FIELD BLANK SAMPLE RESULTS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
RB093003	09/30/03	N/A	Acetone Methylene Chloride 2-Butanone Chloroform	0.01 J 0.002 BJ 0.005 BJ 0.0008 J	Field Blank
RB100203	10/02/03	N/A	Acetone Methylene Chloride 2-Butanone	0.004 J 0.002 JB 0.002 JB	Field Blank
RB100303	10/03/03	N/A	Acetone Methylene Chloride 2-Butanone	0.005 J 0.001 JB 0.002 JB	Field Blank
RB110303	11/03/03	N/A	Acetone 2-Butanone Toluene	0.004 J 0.003 J 0.001 J	Field Blank
RB100603	10/06/03	N/A	Acetone Methylene Chloride 2-Butanone Toluene	0.01 0.003 JB 0.005JB 0.0009 J	Field Blank
RB100703	10/07/03	N/A	1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Methylene Chloride 2-Butanone Toluene	0.001 J 0.007 J 0.002 JB 0.005 JB 0.006 J	Field Blank
RB100803	10/08/03	N/A	VOCs	U	Field Blank
RB100903	10/09/03	N/A	VOCs	U	Field Blank
RB101003	10/10/03	N/A	Methylene Chloride	0.004 JB	Field Blank

T LE 11

QA - FIELD BLANK SAMPLE RESULTS
JOHNNY CAKE ROAD, DANUBE, NEW YORK

Sample ID	Date	Depth (below grade)	Analytical Parameters	Results (ppm)	Location
RB101303	10/13/03	N/A	Methylene Chloride	0.004 JB	Field Blank
RB101403	10/14/03	N/A	Methylene Chloride	0.004 JB	Field Blank

J: Indicates an estimated value.
D: Identifies all compounds identified in an analysis of a diluted sample.
B: Analyte found in the associated blank as well as in the sample.
U: Indicates that the compound was analyzed for but not detected.
E: Identifies compounds whose concentrations exceed the calibration range of the instrument.

Compounds in **bold** indicate results above NYSDEC TAGM #4046 Recommended Soil Clean-Up Objective.

APPENDIX 5

GPS DATA TABLE

TABLE 12 - GPS DATA

JOHNNY CAKE ROAD SITE
DANUBE, NY

October 14, 2003

Table Reference North/East Coordinates for Universal Transverse Mercator, 18 North, WGS 1984 Datum

LOCATION ID	NORTH (m)	EAST (m)	ALTITUDE (m) (MSL)	COMMENTS
MW-16	4757246.377	511679.797	238.113*	Groundwater monitoring well
MW-17	4757246.271	511678.367	238.046*	Groundwater monitoring well
MW-18	4757240.290	511657.038	238.890*	Groundwater monitoring well
MW-19	4757224.257	511624.344	240.069*	Groundwater monitoring well
MW-20	4757280.234	511634.312	234.510*	Groundwater monitoring well
JCRS-029	4757255.629	511618.363	234.399	Soil boring
JCRS-030	4757260.770	511637.922	235.899	Soil boring
JCRS-031	4757263.007	511645.359	235.906	Soil boring
JCRS-032	4757291.190	511675.318	230.511	Soil boring
JCRS-033	4757277.829	511681.285	232.276	Soil boring
JCRS-034	4757266.103	511668.529	235.858	Soil boring
JCRS-035	4757256.340	511641.826	235.969	Soil boring
JCRS-036	4757242.478	511692.323	236.805	Soil boring
JCRS-037	4757236.415	511694.202	237.907	Soil boring
JCRS-038	4757225.848	511692.692	239.362	Soil boring
JCRS-039	4757232.055	511681.332	239.301	Soil boring
JCRS-040	4757243.501	511666.606	237.493	Soil boring
JCRS-041	4757233.112	511653.415	238.946	Soil boring
JCRS-042	4757213.058	511657.582	240.514	Soil boring
JCRS-043	4757220.914	511671.142	240.336	Soil boring

TABLE 12 - GPS DATA

JOHNNY CAKE ROAD SITE
DANUBE, NY

October 14, 2003

Table Reference North/East Coordinates for Universal Transverse Mercator, 18 North, WGS 1984 Datum

LOCATION ID	NORTH (m)	EAST (m)	ALTITUDE (m) (MSL)	COMMENTS
JCRS-044	4757223.306	511677.379	241.069	Soil boring
JCRS-045	4757219.372	511681.715	240.481	Soil boring
JCRS-046	4757220.856	511626.582	239.908	Soil boring
JCRS-047	4757196.919	511639.273	242.446	Soil boring
JCRS-048	4757207.043	511630.653	241.245	Soil boring
JCRS-049	4757218.021	511638.173	239.711	Soil boring
JCRS-050	4757230.261	511631.242	239.024	Soil boring
JCRS-051	4757238.427	511650.488	237.840	Soil boring
JCRS-052	4757246.121	511673.339	236.580	Soil boring
JCRS-053	4757235.710	511666.784	240.079	Soil boring
JCRS-054	4757229.994	511668.049	239.792	Soil boring
JCRS-055	4757224.643	511665.811	240.161	Soil boring

m = meters

MSL = Mean Sea Level

* = top of well casing

United States Environmental Protection Agency
REGION 2 New Jersey, New York, Puerto Rico & U.S. Virgin Islands

SUPERFUND CONTRACT SUPPORT TEAM

SAMPLING REPORT

August 14-15, 2000
JOHNNY CAKE FARM ROAD SITE
Danube, New York

Participating Personnel: United States Environmental Protection Agency
Keith C. Glenn, Environmental Scientist
Pat Sheridan, Quality Assurance Officer

Report Prepared By: ______________________________
Keith C. Glenn, Environmental Scientist

Approved for the Director By: ______________________________
Robert Runyon, Chief, Hazardous Waste Support Branch

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TABLES

APPENDICES

1.0 BACKGROUND

The Johnny Cake Farm Road site is located in Danube, Herkimer County, New York. The site encompasses approximately 377 acres of farmland. During a 14-month period, an illicit cocaine refining laboratory was operating on the site. Throughout the operation, unknown amounts of solvents were spilled, dumped or deposited into the unpaved areas of the site or into the building septic system. Additional spills appear to have included releases from drummed solvents within the garage. The property was seized by the U.S. Marshal's Service in 1987. Approximately 250 people live within three miles of the site and get their drinking water from private wells. The closest home is 500 feet from the site.

In April and May 1990, C.T. Male Associates, P.C. conducted a preliminary site investigation on behalf of the U.S. Marshal's Office. Six soil borings were completed, nine groundwater monitor wells were installed, and surface water samples were taken. The results indicated that toluene, trichloroethene (TCE) and tetrachloroethene (PCE) were present in both the stream and in the pond area along the east of the property. Soil levels were as high as 34,000 ppb PCE. Groundwater contamination was found to include 25,400 ppb toluene and 56,000 ppb PCE.

The site has been listed in New York State's Registry of Inactive Hazardous Waste Sites as a Class 2 site. In 1990, the Registry reported that: "Toluene, trichloroethene, and tetrachloroethene (in the groundwater and surface water) are in excess of New York State Ambient Water Quality Standards and NYSDOH ground-water/drinking water standards and/or guidance values."

In August 1990, the U.S. Marshal's Office and U.S. Attorney's Office requested assistance from the U.S. EPA Region II Removal Action Branch for support to assess and rededicate the site. In September and November, 1990, the U.S. EPA Environmental Response Team (ERT) and its contractor, Response Engineering and Analytical Contract (REAC), conducted an extent of contamination investigation by soil gas methods and analysis of groundwater samples. A seismic refraction survey was also performed to identify possible preferential pathways for lateral contamination migration and potential vertical migration of contamination into the bedrock aquifer. The investigation concluded that: (1) one or two groundwater plumes of the target compounds originated in the areas adjacent to the garage and septic tank, (2) contamination from these source areas appeared to be migrating down-gradient as suggested by distribution of contamination and the apparent down-gradient decrease in concentrations, (3) the garage and septic system appeared to be source areas of contaminants, and (4) the presence of potential preferential pathways exist in the form of buried channels (incised in till) draining the site.

In May of 1991, ERT/REAC returned to the site to ascertain the specific area of soil contamination for removal purposes, and to determine whether contamination is migrating beyond those areas identified in previous investigations. During this investigation, five overburden monitor wells were installed (two deep borings and five shallow borings were made), 22 shallow soil borings were made, and 18 surface water and stream sediment samples were collected. The analytical findings of this investigation indicate that contamination of soil and groundwater is limited to the close proximity of the spill areas: the septic tank, the area in front of the two-bay garage, the driveway, and the area on the west side of the stall barn. The stream and drainage water flow located directly down-gradient of the spill areas contain relatively high levels of the target compounds: toluene, trichloroethene, tetrachloroethene, and methylene chloride. Surface water samples collected 100 feet down-gradient of the Johnny Cake Farm Road property indicate no detectable concentrations of solvents above the detection limits of 5 ppb.

A relatively thick (at least 90 feet) impervious layer of ground material, consisting of till and clay lies below the perched overburden aquifer. It does not appear likely that downward contaminant migration into the bedrock aquifer will occur. Instead, contamination probably will be released into the east side stream and the drainage ditch along Johnny Cake Farm Road when the water table rises to sufficient levels. The water table is relatively shallow with water levels being recorded at 0.5 to 9.75 feet deep on November 15, 1990 and 1.61 to 7.77 feet deep on May 22, 1991. In addition, it appears that the contamination will migrate down-gradient towards the stream valley in the shallow perched overburden aquifer at a rate upwards to 1.0 foot per day.

The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) was requested by the Environmental Remedial and Response Division (ERRD) to conduct a soil, residential water, and aqueous coliform sampling event of the Johnny Cake Farm Road Site. The purpose of this activity was to further investigate the migration and extent of contamination in the soil and residential water located at the Johnny Cake Farm Road Site and surrounding properties.

2.0 SAMPLING PROCEDURES

The sampling procedures were conducted in accordance with the guidelines set forth in the Quality Assurance Project Plan (QAPP). The QAPP is located in Appendix A of this document.

3.0 DESCRIPTION OF EVENTS

On August 14, 2000, a sampling team from EPA Region II conducted a soil sampling event as part of the Johnny Cake Farm Road Site activities. This team consisted of Keith Glenn, Environmental Scientist, of the U.S. EPA Region II, Division of Environmental Science and Assessment. Sample SS-01 was taken from the drainage swale located between two residential properties. Sample SS-02 was collected from the drainage swale located approximately 65 feet from the roadway. Sample SS-03 was collected along the embankment by the roadway. A blind field duplicate was taken from this location, presented as SS-04.

August 15, 2000 was dedicated towards the residential water sampling event. RS-01 was collected from the kitchen sink inside the property owner's home. This sample was lost during shipment of samples to the designated laboratory. However, a blind field duplicate of this sample was taken and analyzed. Sample RS-03 was collected from a spring located in the back of the property within the farm fields. All samples including laboratory Quality Control samples are listed in Table 1 of this document.

Samples collected from all soil location points and residential well points, with the exception of aqueous coliform, were sent to MITKEM Corporation located at 175 Metro Center Blvd. In Warwick, RI. All residential water samples to be analyzed for Coliform - Total and Fecal, were sent to the United States Environmental Protection Agency, Region II Laboratory located at 2890 Woodbridge Avenue in Edison, New Jersey. See the Sampling Trip Report for more information (Appendix D).

4.0 RESULTS

Contaminants were found in all soil samples collected at the Johnny Cake Farm Road Site. These contaminants, however, did not exceed neither New York State nor Federal Maximum Contaminant Levels. Total coliform was detected in all residential tap water samples. Levels for total coliform and fecal coliform found in sample RS-03 were determined "too numerous to count".

The summary of analytical results can be found in Table 2. The CLP Data Sheets are attached as Appendix B.

5.0 CONCLUSION

Elevated levels of Coliform - Total and Fecal, were found in residential tap water samples collected from the Johnny Cake Farm Road Site.

TABLE 1: QA/QC SAMPLE TABLE		
TYPE OF SAMPLE	**SAMPLE NUMBERS**	**SAMPLE LOCATION**
Tap Water	BZD40	RS-01
Tap Water	BZD41	RS-02 (Blind Duplicate of RS-01)
Tap Water	BZD42	RS-03 (MS/MSD)
Trip Blank 1	BZD43	N/A
Trip Blank 2	BZD44	N/A
Equipment Blank	BZL38	N/A
Soil	BZD36	SS-01
Soil	BZD37	SS-02
Soil	BZD38	SS-03 (MS/MSD)
Soil	BZD39	SS-04 (Blind Duplicate of SS-03)
Aqueous Coliform	JCRS01	RS-01
Aqueous Coliform	JCRS02	RS-02 (Blind Duplicate of RS-01)
Aqueous Coliform	JCRS03	RS-03 (MS/MSD)

N/A - The location is not applicable

TABLE 2 : ANALYTICAL RESULTS		
SAMPLE LOCATION / NUMBERS	**COMPOUNDS & CONCENTRATIONS (ug/L)**	
	Compound	**Concentration (ug/L)**
SS-01/ BZD36	Acetone	80
SS-02/ BZD37	Acetone	53
SS-03/ BZD38	Acetone	37
	cis-1,2-Dichloroethene	13
	Trichloroethene	4
SS-04/ BZD39 Sample is a blind field duplicate of SS-03.	Acetone	110
	cis-1,2-Dichloroethene	11
	1,1,1-Trichloroethane	4
	Trichloroethene	7
	Toluene	4
	Tetrachloroethene	5
RS-01/ BZD40/ JCRS01	Total Coliform	34 CFU/100mL
RS-02/ BZD41/ JCRS02 Sample is a blind field duplicate of RS-01.	Total Coliform	43 CFU/100mL
	Fecal Coliform	2 MPN/100mL
RS-03/ BZD42/ JCRS03	Total Coliform	Too numerous to count
	Fecal Coliform	Present

TABLE 2 *(CONTINUED)* : ANALYTICAL RESULTS		
SAMPLE LOCATION / NUMBERS	**COMPOUNDS & CONCENTRATIONS (ug/L)**	
	Compound	**Concentration (ug/L)**
Trip Blank 1/ BZD43	Chloroform	7
	Bromodichloromethane	0.7 J
Trip Blank 2/ BZD44	Chloroform	7
	Bromodichloromethane	0.6 J
Equipment Blank/ BZL38	Carbon Disulfide	2
	Chloroform	6
	Bromodichloromethane	0.6 J

* - Above the Federal and/or New York State MCL for drinking water
J - Estimated Value

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

APPENDIX B

LABORATORY DATA SHEETS

APPENDIX C

WELL DATA SHEETS

FIELD DATA SHEET

SOIL SAMPLING

****

SITE NAME: JOHNNY CAKE FARM ROAD DATE OF SAMPLE COLLECTION: 08/14/00

SAMPLE LOCATION/DESCRIPTION: SS-01
SAMPLE TAKEN WITHIN DRAINAGE SWALE BETWEEN PROPERTIES. SAMPLE COLLECTED 12 FEET EAST OF LARGE PINE TREE. SOIL CONSIST OF BROWN SILT AND ROOT MASS. STANDING WATER PRESENT.

PERSONNEL: Keith Glenn

LAB NUMBERS: BZD36

SAMPLE TYPE (C,G,H): G,H
(Composite, Grab, Homogenized)

DEPTHS TAKEN: Surface

SAMPLE ANALYSIS: VOAs

BOTTLE SIZE USED: En Core™

QC (IF TAKEN): ______

EQUIPMENT USED: En Core™ Sampler

SAMPLE CHARACTERISTICS: Brown silt and root mass and standing water

COMMENTS/WEATHER: ______

****

XRF USED: Y__ N ✔

CALIBRATION: ______ METHOD USED: ______

DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___

COMMENTS: ______

****

FIELD DATA SHEET

SOIL SAMPLING

****
****

SITE NAME: JOHNNY CAKE FARM ROAD DATE OF SAMPLE COLLECTION: 08/14/00

SAMPLE LOCATION/DESCRIPTION: SS-02
SAMPLE TAKEN WITHIN DRAINAGE SWALE. SAMPLE COLLECTED ~70 FEET DOWN SWALE FROM SS-01. SAMPLE LOCATION IS ~65 FEET FROM ROADWAY.

PERSONNEL: Keith Glenn

LAB NUMBERS: BZD37

SAMPLE TYPE (C,G,H): G,H
(Composite, Grab, Homogenized)

DEPTHS TAKEN: Surface

SAMPLE ANALYSIS: VOAs

BOTTLE SIZE USED: En Core™

QC (IF TAKEN): ________

EQUIPMENT USED: En Core™ Sampler

SAMPLE CHARACTERISTICS: Brown silt and root mass,

COMMENTS/WEATHER: ________

****
****

XRF USED: Y__ N ✔

CALIBRATION: ________ METHOD USED: ________

DEPTH: ___ INITIAL WEIGHT: ____ FINAL WEIGHT: ____ RESULT: ____
DEPTH: ___ INITIAL WEIGHT: ____ FINAL WEIGHT: ____ RESULT: ____
DEPTH: ___ INITIAL WEIGHT: ____ FINAL WEIGHT: ____ RESULT: ____

COMMENTS: ________

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****

FIELD DATA SHEET

SOIL SAMPLING

****
****

SITE NAME: JOHNNY CAKE FARM ROAD DATE OF SAMPLE COLLECTION: 08/14/00

SAMPLE LOCATION/DESCRIPTION: SS-03
SAMPLE TAKEN DOWNGRADIENT OF OTHER LOCATIONS. SAMPLE LOCATION IS IN EMBANKMENT ALONG THE ROADWAY.

PERSONNEL: Keith Glenn

LAB NUMBERS: BZD38

SAMPLE TYPE (C,G,H): G,H
(Composite, Grab, Homogenized)

DEPTHS TAKEN: Surface

SAMPLE ANALYSIS: VOAs

BOTTLE SIZE USED: En Core™

QC (IF TAKEN): ____

EQUIPMENT USED: En Core™ Sampler

SAMPLE CHARACTERISTICS: Brown silt

COMMENTS/WEATHER: ____

****
****

XRF USED: Y__ N ✔

CALIBRATION: ____

METHOD USED: ____

DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___

COMMENTS: ____

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****

FIELD DATA SHEET

SOIL SAMPLING

****

SITE NAME: JOHNNY CAKE FARM ROAD DATE OF SAMPLE COLLECTION: 08/14/00

SAMPLE LOCATION/DESCRIPTION: SS-04
SAMPLE TAKEN DOWNGRADIENT OF OTHER LOCATIONS. SAMPLE LOCATION IS IN EMBANKMENT ALONG THE ROADWAY.

PERSONNEL: Keith Glenn

LAB NUMBERS: BZD38

SAMPLE TYPE (C,G,H): G,H
(Composite, Grab, Homogenized)

DEPTHS TAKEN: Surface

SAMPLE ANALYSIS: VOAs

BOTTLE SIZE USED: En Core™

QC (IF TAKEN): This is a blind field duplicate of SS-03.

EQUIPMENT USED: En Core™ Sampler

SAMPLE CHARACTERISTICS: Brown silt

COMMENTS/WEATHER: ______

****

XRF USED: Y_ N ✔

CALIBRATION: ______ METHOD USED: ______

DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___
DEPTH: ___ INITIAL WEIGHT: ___ FINAL WEIGHT: ___ RESULT: ___

COMMENTS: ______

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APPENDIX D

SAMPLING TRIP REPORT

APPENDIX 2

THIS INDENTURE made this ____day of _________, 20 __, between ***Name of title owner(s) of the site*** residing at (or having an office at) ***Title owner's address - no PO Boxes***, (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("brownfield sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of environmental easements as an enforceable means of ensuring the performance of maintenance, monitoring or operation requirements and of ensuring the potential restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to be effective, or which requires groundwater use restrictions; and

WHEREAS, the Legislature of the State of New York has declared that environmental easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a brownfield site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and;

WHEREAS, Grantor, is the owner of real property located in the City/Town/Village of ___________, _________County, New York known and designated on the tax map of the _________ of ____________ as ***insert tax map information***, being the same as that property conveyed to Grantor by deed on _______, and recorded in the Land Records of the __________ County Clerk at ***insert Liber and page or computerized system tracking/ identification number***, comprised of approximately # acres, and hereinafter more fully described in Schedule A attached hereto and made a part hereof (the " Controlled Property"); and;
Attach an adequate legal description of the property subject to the easement, or reference a recorded map. If the easement is on only a part of a parcel of land which is not subdivided into encumbered and unencumbered portions, a legal description needs to be created by a survey bearing the seal and signature of a licensed land surveyor with reference to a metes and bounds description.

WHEREAS, the Commissioner does hereby acknowledge that the Department accepts this

Environmental Easement in order to ensure the protection of human health and the environment and to achieve the requirements for remediation established at this Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36;and

NOW THEREFORE, in consideration of the covenants and mutual promises contained herein and the terms and conditions of **(STRIKE INAPPROPRIATE REFERENCE) Brownfield Cleanup Agreement Number__________/State Assistance Contract Number________/Order on Consent Number___________**, Grantor grants, conveys and releases to Grantee a permanent Environmental Easement pursuant to Article 71, Title 36 of the ECL in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of maintenance, monitoring or operation requirements; and to ensure the potential restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The following controls apply to the use of the Controlled Property, run with the land are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees, and any person using the Controlled Property:

A. The Controlled Property may be used for **STRIKE INAPPROPRIATE LANGUAGE residential/commercial/industrial use as long as the following the long-term engineering controls are employed:**

STATE THE CONTROLS. FOR EXAMPLE:

(i) any soil on the property must be covered by a demarcation layer and a barrier layer approved by NYSDEC such as concrete, asphalt or structures or must be covered with a ________layer of clean soil and this demarcation layer and barrier layer must be maintained; and

(ii) any proposed soil excavation on the property below the ______ cover or below the demarcation layer requires prior notification and prior approval of NYSDEC in accordance with the Site Management Plan approved by NYSDEC for this Controlled Property and the excavated soil must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives.

B. The Controlled Property may not be used for a higher level of use such as **STRIKE INAPPROPRIATE LANGUAGE residential/commercial use** and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant of Title 36 to Article 71 of the Environmental Conservation Law.

C. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

D. Grantor covenants and agrees that it shall annually, or such time as NYSDEC may allow, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury that the controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls employed at the Controlled Property were approved by the NYSDEC, and that nothing has occurred that would impair the ability of such control to protect the public health and environment or constitute a violation or failure to comply with any Site Management Plan for such controls and giving access to such Controlled Property to evaluate continued maintenance of such controls.

3. <u>Right to Enter and Inspect.</u> Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. <u>Reserved Grantor's Rights</u>. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Controlled Property, including:

1. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

2. The right to give, sell, assign, or otherwise transfer the underlying fee interest to the Controlled Property by operation of law, by deed, or by indenture, subject and subordinate to this

Environmental Easement;

5. Enforcement.

A. This environmental easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this environmental easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person intentionally violates this environmental easement, the Grantee may revoke the Certificate of Completion provided under ECL Article 27, Title 14, or the Satisfactory Completion of Project provided under ECL Article 56, Title 5 with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach. Grantor shall then have a reasonable amount of time from receipt of such notice to cure. At the expiration of said second period, Grantee may commence any proceedings and take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement in accordance with applicable law to require compliance with the terms of this Environmental Easement.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar its enforcement rights in the event of a subsequent breach of or noncompliance with any of the terms of this Environmental easement.

6. Notice. Whenever notice to the State (other than the annual certification) or approval from the State is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the its County tax map number or the Liber and Page or computerized system tracking/ identification number and address correspondence to:

Division of Environmental Enforcement
Office of General Counsel
New York State Department of Environmental Conservation
625 Broadway
Albany New York 12233-5500

Such correspondence shall be delivered by hand, or by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. This environmental easement may be amended only by an amendment executed by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This environmental easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Costs and Liabilities. Grantor shall retain all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including but not limited to the obligation to maintain adequate liability insurance coverage.

12. Taxes. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority.

13. Successors. The term "Grantor", wherever used herein, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns.

14. Compliance with Law. This Environmental easement shall not remove the necessity of Grantor to obtain any permit and/or approval from any governmental agency having jurisdiction over any activity conducted or to be conducted on the Controlled Property.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor's Name

By:______________________________

Title:______________________________

Date:______________________________

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Thriugh the Department of Environmental Conservation

By: ______________________________________
Erin M. Crotty, Commissioner

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the _______ day of _________, in the year 200_, before me, the undersigned, personally appeared ________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

____
Notary Public - State of New York

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the _______ day of _________, in the year 200_, before me, the undersigned, personally appeared ________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

____

Notary Public - State of New York

APPENDIX 3

Soils Management Plan
Johnny Cake Road Site
Danube, Herkimer County, New York

1. Overview and objectives

The site encompasses a total of 37.9-acres, of which, 4.02-acre has been impacted by subsurface contaminants. The impacted area addressed by this Soil Management Plan (SMP) includes those areas affected by both soil and groundwater contamination. The extent of the affected area is depicted in Attachment E, Site Survey, of the Removal Action Report. Currently, the vacant farmland property is owned by the United States Marshal's Service (USMS). The location of the property is shown on Figure 1. In the late 1980's, the USMS seized the property in connection with on-site cocaine manufacturing. The site has been characterized during several previous investigations. The user should refer to the previous investigation reports for more detail, as needed.

The objective of this SMP is to set guidelines for management of site soil during any future activities which would breach the cover system at the site. This SMP addresses environmental concerns related to soil management and has been reviewed and approved by the New York State Department of Environmental Conservation (NYSDEC).

2. Nature and extent of contamination

Based on data obtained from previous investigations and the remediation conducted at the site, a Final Removal Action Report (RAR) - dated October 2006 was developed by the United States Environmental Protection Agency (EPA).

The constituents of potential concern (COPC) for soil consist of volatile organic compounds (VOCs), primarily cis-1,2-dichloroethene, vinyl chloride, trichloroethene, tetrachloroethene, toluene and trans-1,2-dichloroethene. As summarized on tables provided in the RAR, the concentrations of individual contaminants only slightly exceed their associated cleanup criteria under most circumstances. Results of ground water sampling indicate that constituents in the soil have impacted ground water quality slightly with regard to the compounds provided above. However, toluene has not been identified within Site groundwater samples collected to date. As a result of the presence of VOCs within the groundwater, treatment will be necessary prior to use. The contaminant properties and possible persistence in the environment can be found in Appendix 5 (Natural Attenuation of Site Contaminants Report) of the RAR.

In the 12-months following the source removal program, EPA has monitored the groundwater in the vicinity of remediated areas. Overall, contaminant concentrations have decreased, in some cases to below Federal and State guidelines. However, residual concentrations continue to exist within soil and groundwater which may represent or pose a future risk. In the case of soils, residual contamination above State guideline was documented at a depth of 1.5 to 2.0-feet below grade along the north side of the Area 2 excavation (see Table 2/Figure 3.2 of the RAR). This sample location represents the closest sample location to the ground surface and where contaminants might be encountered during Site soil disturbance. The next depth to which contaminants may be encountered is at 7.5 to 8.0-feet below grade along the western and northern perimeter of the Area 1 excavation (see Table 1/Figure 3.1 of the RAR).

In each area, potential exposure risks may exist should excavation within these areas occur. Possible excavation activities could include installation of building footings and/or building basement, in-ground swimming pool, underground utilities (i.e. piping, electrical, sewer) and septic system and associated leach field.

3. Contemplated use

As part of any redevelopment project, the property has been identified for residential/farmland uses. Specific uses for this zoning category are as follows

-agricultural; and
-residential;

Use of on-site groundwater within the area affected by Site contaminants may represent a potential exposure risk. Actual exposure will depend on the physical location of the well (up or down gradient), its depth and anticipated use (i.e. irrigation, human consumption or livestock watering). The actual exposure risk will need to be evaluated in consultation with local Department of Health representatives before consumption.

Should the area affected by Site contaminants be used for the construction of a residential dwelling, engineering controls may be necessary in order to prevent subsurface vapors from entering the structure. Actual exposure will depend on the physical location of the dwelling, construction method (i.e. slab on grade, basement or crawl-space). The actual exposure risk will need to be evaluated in consultation with local Department of Health representatives before occupancy.

4. Purpose and description of surface cover system

The purpose of the surface cover system is to eliminate the potential for human contact with fill material and eliminate the potential for contaminated runoff from the property.

In its current condition, no contaminated materials are located upon the ground surface. The closest identified contaminated material is located 1.5 to 2.0-feet below grade. Should the material above 1.5-feet be removed, a cover system consisting of one of the following types of clean material by be placed upon the affected area:

- Soil: 12-inches of vegetated soil cover underlain by a demarcation layer, in outdoor vegetated areas.

· Asphalt: a minimum of 6 inches of material (asphalt and sub-base material) in areas that will become roads, sidewalks, and parking lots. Actual cross sections will be determined based on the intended use of the area.

· Concrete: a minimum of 6 inches of material (concrete and sub-base material) in areas that will become slab-on-grade structures or for roads, sidewalks, and parking lots in lieu of asphalt. For slab-on-grade structures, an 8-mil polyethylene vapor barrier will be placed beneath the concrete (for sites impacted by VOC contamination only). Actual cross sections will be determined based on the intended use of the area.

5. Management of soils/fill and long term maintenance of cover system

The purpose of this section is to provide environmental guidelines for management of subsurface soils/fill and the long-term maintenance of the cover system during any future intrusive work which breaches the cover system.

The SMP includes the following conditions:

- Any breach of the cover system, including for the purposes of construction or utilities work, must be replaced or repaired using an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. The repaired area must be covered with clean soil and reseeded or covered with impervious product such as concrete or asphalt, as described in Section 4, to prevent erosion in the future.

- Control of surface erosion and run-off of the entire property at all times, including during construction activities. This includes proper maintenance of the vegetative cover established on the property.

- Site soil that is excavated and is intended to be removed from the property must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives.

- Soil excavated at the site may be reused as backfill material on-site provided it contains no visual or olfactory evidence of contamination, and it is placed beneath a cover system component as described in Section 4.

- Prior to any construction activities, workers are to be notified of the site conditions with clear instructions regarding how the work is to proceed. Invasive work performed at the property will be performed in accordance with all applicable local, state, and federal regulations to protect worker health and safety.

- The Owner shall complete and submit to the Department an annual report by January 15th of each year. Such annual report shall contain certification that the institutional controls put in place, pursuant to _name of legal document_, are still in place, have not been altered and are still effective; that the remedy and protective cover have been maintained; and that the conditions at the site are fully protective of public health and the environment.

If the cover system has been breached during the year covered by that Annual Report, the owner of the property shall include the following in that annual report:

- A certification that all work was performed in conformance with this SMP.

5.1. Excavated and stockpiled soil/fill disposal

Soil/fill that is excavated as part of development which can not be used as fill below the cover system will be further characterized prior to transportation off-site for disposal at a permitted facility. For excavated soil/fill with visual evidence of contamination (i.e., staining or elevated PID measurements), one composite sample and a duplicate sample will be collected for each 100 cubic yards of stockpiled soil/fill. For excavated soil/fill that does not exhibit visual evidence of contamination but must be sent for off-site disposal, one composite sample and a duplicate sample will be collected for 2000 cubic yards of stockpiled soil, and a minimum of 1 sample will be collected for volumes less than 2000 cubic yards.

The composite sample will be collected from five locations within each stockpile. A duplicate composite sample will also be collected. PID measurements will be recorded for each of the five individual locations. One grab sample will be collected from the individual location with the highest PID measurement. If none of the five individual sample locations exhibit PID readings, one location will be selected at random. The composite sample will be analyzed by a NYSDOH ELAP-certified laboratory for pH (EPA Method 9045C), Target Compound List (TCL) SVOCs, pesticides, and PCBs, and TAL metals, and cyanide. The grab sample will be analyzed for TCL VOCs.

Soil samples will be composited by placing equal portions of fill/soil from each of the five composite sample locations into a pre-cleaned, stainless steel (or Pyrex glass) mixing bowl. The soil/fill will be thoroughly homogenized using a stainless steel scope or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars will then be labeled and a chain-of-custody form will be prepared.

Additional characterization sampling for off-site disposal may be required by the disposal facility. To potentially reduce off-site disposal requirements/costs, the owner or site developer may also choose to characterize each stockpile individually. If the analytical results indicate that concentrations exceed the standards for RCRA characteristics, the material will be considered a hazardous waste and must be properly disposed off-site at a permitted disposal facility within 90 days of excavation. If the analytical results indicate that the soil is not a hazardous waste, the material will be properly disposed off-site at a non-hazardous waste facility. Stockpiled soil cannot be transported on or off-site until the analytical results are received.

5.2. Sub-grade material

Sub-grade material used to backfill excavations or placed to increase site grades or elevation shall meet the following criteria.

- Excavated on-site soil/fill which appears to be visually impacted shall be sampled and analyzed. If analytical results indicate that the contaminants, if any, are present at concentrations below the Technical and Administrative Guidance Memoradum #4046 (TAGM).

- Any off-site fill material brought to the site for filling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination.

- Off-site soils intended for use as site backfill cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).

- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.

- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the SSALs.

- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet SSALs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the SSALs.

APPENDIX 4

JOHNNY CAKE ROAD MONITORING WELLS

Conc.in BOLD exceed TAGM Value

PCE-ppb

Sample Date	TAGM Standard **5ppb**	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	MW 19	MW 20
Nov. 1990		**25.1**	**40000**	**6000**	**30000**	0 ND	0 ND	0 ND	0 ND	NS		NS	NS	NS	*	*	*	*	*
May 1991		0 ND	**470**	**730**	**28000**	0 ND	0 ND	0 ND	0 ND	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Oct. 1993		**140**	**19000**	**510**	**13000**	NS	NS	NS	NS	0 ND		NS	NS	0 ND	*	*	*	*	*
Nov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Nov.29,1993		0 ND	**39000**	NS	**18000**	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Aug. 1995		NS	**1300**	**620**	**<6200**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
April 2000		**10**	**34000**	4	**620**	NS	NS	NS	NS	3		0 ND	0 ND	**6**	*	*	*	*	*
May 2001		**1**	**5200**	**40**	**210**	NS	NS	NS	NS	0 ND	NS	0 ND	0 ND	0 ND	*	*	*	*	*
May 2002		**9.8**	**5300**	**23**	**680**	NS	NS	NS	NS	0 ND		0.4	0 ND	0 ND	*	*	*	*	*
Dec. 2003		2.4	**12000**	**17**	**240**	NVD	NS-frozen	0 ND	0.56	NVD	2.7	1.1	**5.4**	0 ND	NVD	0 ND	0 ND	4	4.6
Mar. 2005		0.9	**5400**	NS-frozen	**67**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	1.1	0.9	0 ND	NVD	NVD	NVD	0 ND	NVD	0 ND

TCE-ppb

Sample Date	TAGM Standard **5ppb**	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	MW 19	MW 20
Nov. 1990		**51.2**	**870**	**360**	**6600**	0 ND	0 ND	0 ND	0 ND	NS		NS	NS	NS	*	*	*	*	*
May 1991		**26**	**1200**	**150**	**8300**	**0 ND**	**0 ND**	0 ND	0 ND	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Oct. 1993		**190**	**5400**	**58**	**13000**	NS	NS	NS	NS	0 ND		NS	NS	0 ND	*	*	*	*	*
Nov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Nov.29,1993		NS	**4700**	NS	**24000**	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Aug. 1995		NS	**620**	**170**	**5300**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
April 2000		**28**	**4900**	0 ND	**290**	NS	NS	NS	NS	0 ND		0 ND	2	0 ND	*	*	*	*	*
May 2001		**11**	**710**	**21**	**300**	NS	NS	NS	NS	0 ND		1	**11**	0 ND	*	*	*	*	*
May 2002		**14**	**1900**	**5.2**	**1200**	NS	NS	NS	NS	0 ND		2.1	**7.6**	0 ND	*	*	*	*	*
Dec. 2003		**8.1 J**	**1500**	4.6	**650**	NVD	NS-frozen	0 ND	0 ND	NVD	0 ND	1.9	**5.1**	0 ND	NVD	0 ND	0 ND	0.4	0.56
Mar. 2005		**8.4**	**710**	NS-frozen	**360**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	0 ND	2.7	4.6	NVD	NVD	NVD	0 ND	NVD	0.9

Vinyl Chloride-ppb

Sample Date	TAGM Standard **2ppb**	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18 NEW	MW 19	MW 20
Nov. 1990		0 ND	0 ND	0 ND	**3.4**	NS	NS	NS	NS	NS		NS	NS	NS	*	*	*	*	*
May 1991		0 ND	0 ND	0 ND	0 ND	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Oct. 1993		0 ND	0 ND	0 ND	**44**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Nov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Nov.29,1993		NS	0 ND	0 ND	**28**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Aug. 1995		NS	0 ND	0 ND	**3000**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
April 2000		**65**	0 ND	0 ND	**7**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
May 2001		**30**	0 ND	0 ND	**16**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
May 2002		**8.5**	0 ND	0.3	**26**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Dec. 2003		**4.6**	0 ND	0.88	**350 D**	NVD	NS-frozen	0 ND	0 ND	NVD	1	0 ND	0 ND	0 ND	NVD	0 ND	**16**	0 ND	0 ND
Mar. 2005		**30**	0 ND	NS-frozen	**72**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	0 ND	0 ND	0 ND	NVD	NVD	NVD	**11**	NVD	0.6

Toluene-ppb

Sample Date	TAGM Standard 5ppb	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	MW 19	MW 20
Nov. 1990		**28**	**13000**	**49.2**	**34000**	0 ND	0 ND	0 ND	0 ND	NS		NS	NS	NS	*	*	*	*	*
May 1991		0 ND	**36**	0 ND	**31000**	0 ND	0 ND	0 ND	0 ND	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Oct. 1993		0 ND	**3100**	0 ND	**11000**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Nov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Nov.29,1993		NS	**3700**	NS	**16000**	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Aug. 1995		NS	0 ND	0 ND	**<6200**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
April 2000		0 ND	**53**	0 ND	**8**	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
May 2001		0 ND	0 ND	0 ND	1	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
May 2002		0 ND	1	0 ND	2	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Dec. 2003		0 ND	0 ND	0 ND	**12**	0 ND	NS-frozen	2.9	0 ND	NVD	0 ND	0 ND	0 ND	0 ND	NVD	0.31	0 ND	0.57	0 ND
Mar. 2005		0 ND	0 ND	NS-frozen	**8.3**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	0 ND	0 ND	0 ND	NVD	NVD	NVD	0 ND	NVD	0 ND

cis-1,2-Dichlorethylene-ppb

Sample Date	TAGM Standard 5ppb	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	MW 19	MW 20
Nov. 1990		0 ND	0 ND	0 ND	0 ND	0 ND	NA	NA	NA	NS		NS	NS	NS	*	*	*	*	*
May 1991		0 ND	0 ND	0 ND	0 ND	0 ND	0 ND	0 ND	0 ND	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
Oct. 1993		**2200**	**3200**	**13**	**23000**	NS	NS	NS	NS	0 ND		NS	NS	0 ND	*	*	*	*	*
Nov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Nov.29,1993		NS	**3400**	NS	**32000**	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
Aug. 1995		NS	**TOT 400**	**TOT 37**	TOT ND	NS	NS	NS	NS	0 ND		**TOT 14**	**TOT 88**	0 ND	*	*	*	*	*
April 2000		**98**	**495**	0 ND	**190**	NS	NS	NS	NS	0 ND		**86**	**29**	0 ND	*	*	*	*	*
May 2001		**38**	**110**	4	**280**	NS	NS	NS	NS	0 ND		**57**	**60**	0 ND	*	*	*	*	*
May 2002		**27**	**180**	2.1	**660**	NS	NS	NS	NS	0 ND		**39**	**48**	0 ND	*	*	*	*	*
Dec. 2003		**16**	**440**	1.4	**1600**	NVD	NS-frozen	0 ND	0 ND	NVD	0.59	**64**	**29**	0 ND	NVD	0 ND	**6.2**	0 ND	1
Mar. 2005		**36**	**210**	NS-frozen	**670**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	0 ND	**44**	**33**	NVD	NVD	NVD	4.6	NVD	**16**

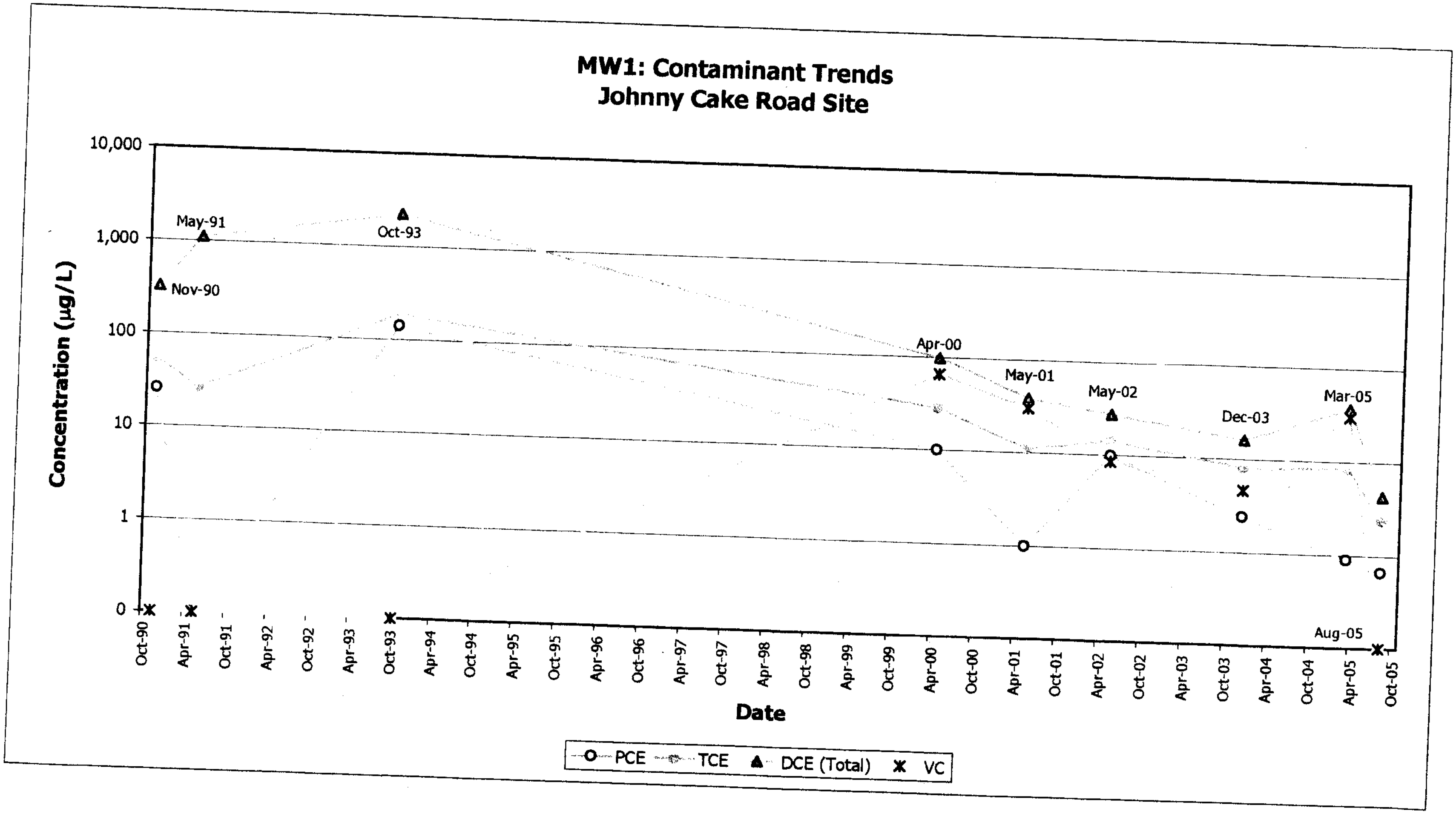
rans-1,2-Dichlorethylene-ppb

ample ate	TAGM Standard 5ppb	MW 1	MW 2	MW 3	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11	MW 12A	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	MW 19	MW 20
ov. 1990		**320**	**980**	0 ND	**6400**	NS	NS	NS	NS	NS		NS	NS	NS	*	*	*	*	*
ay 1991		**1100**	**630**	**80**	**10000**	NS	NS	NS	NS	0 ND		0 ND	3.5	0 ND	*	*	*	*	*
ct. 1993		**9.8**	**32**	0 ND	**1200**	NS	NS	NS	NS	0 ND		NS	NS	0 ND	*	*	*	*	*
ov.12,1993		NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
ov.29,1993		NS	**31**	NS	0 ND	NS	NS	NS	NS	NS		NS	NS	0 ND	*	*	*	*	*
ıg. 1995		NS	**TOT 400**	**TOT 37**	TOT ND	NS	NS	NS	NS	0 ND		**TOT 14**	**TOT 88**	0 ND	*	*	*	*	*
ril 2000		0 ND	0 ND	0 ND	0 ND	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
ay 2001		0 ND	0 ND	0 ND	0 ND	NS	NS	NS	NS	0 ND		0 ND	0 ND	0 ND	*	*	*	*	*
ay 2002		0.3	3.8	0 ND	4.6	NS	NS	NS	NS	0 ND		0 ND	1	0 ND	*	*	*	*	*
c. 2003		0 ND	**11**	0 ND	0 ND	NVD	NS-frozen	0 ND	0 ND	NVD	0 ND	0.41	0 ND	0 ND	NVD	0 ND	0 ND	0 ND	0 ND
r. 2005		0.6	**12**	NS-frozen	**16**	NS-frozen	NS-frozen	NVD	NVD	NS-frozen	0 ND	1.1	0.7	NVD	NVD	NVD	0 ND	NVD	0 ND

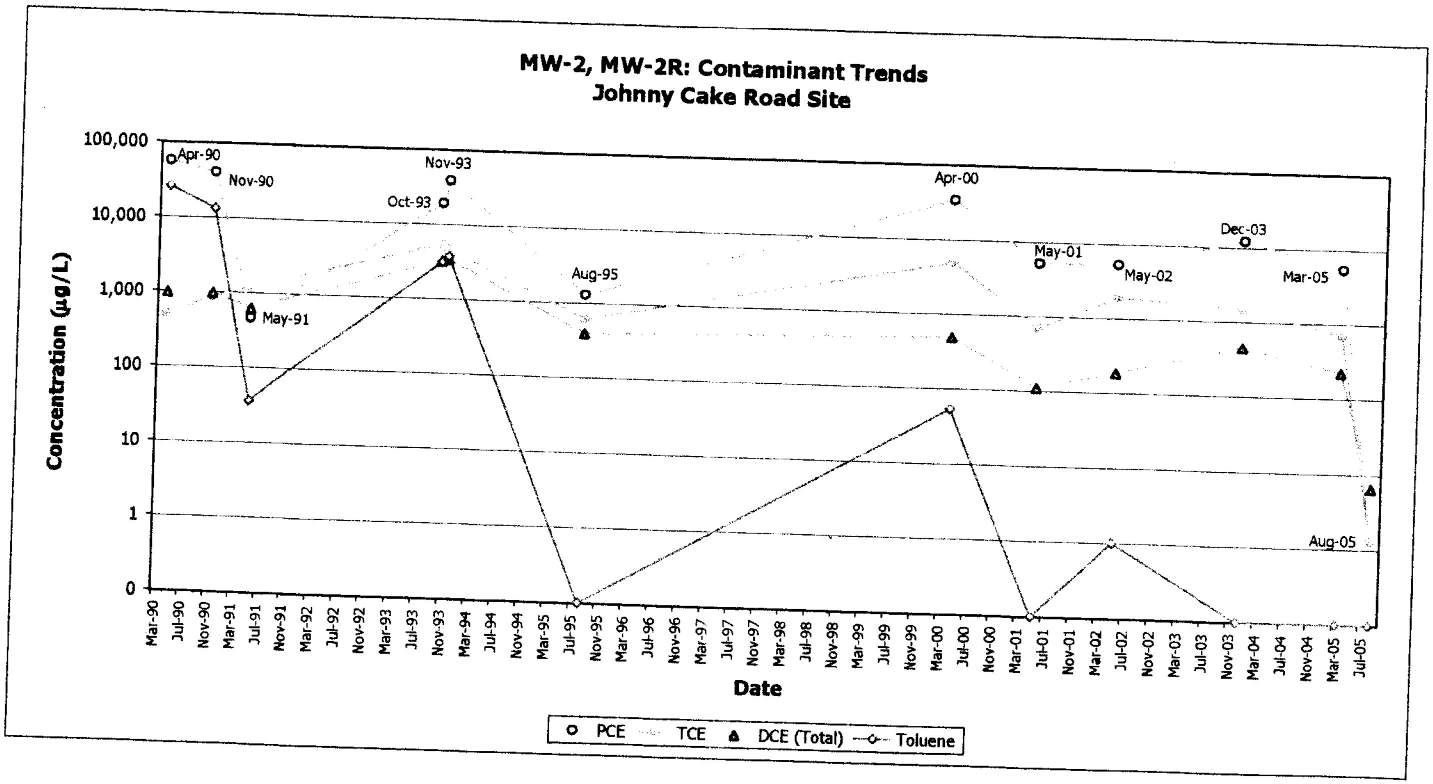
D-No volatile detected
ew well, not installed at time of sampling
-Not sampled

ND-Not detected

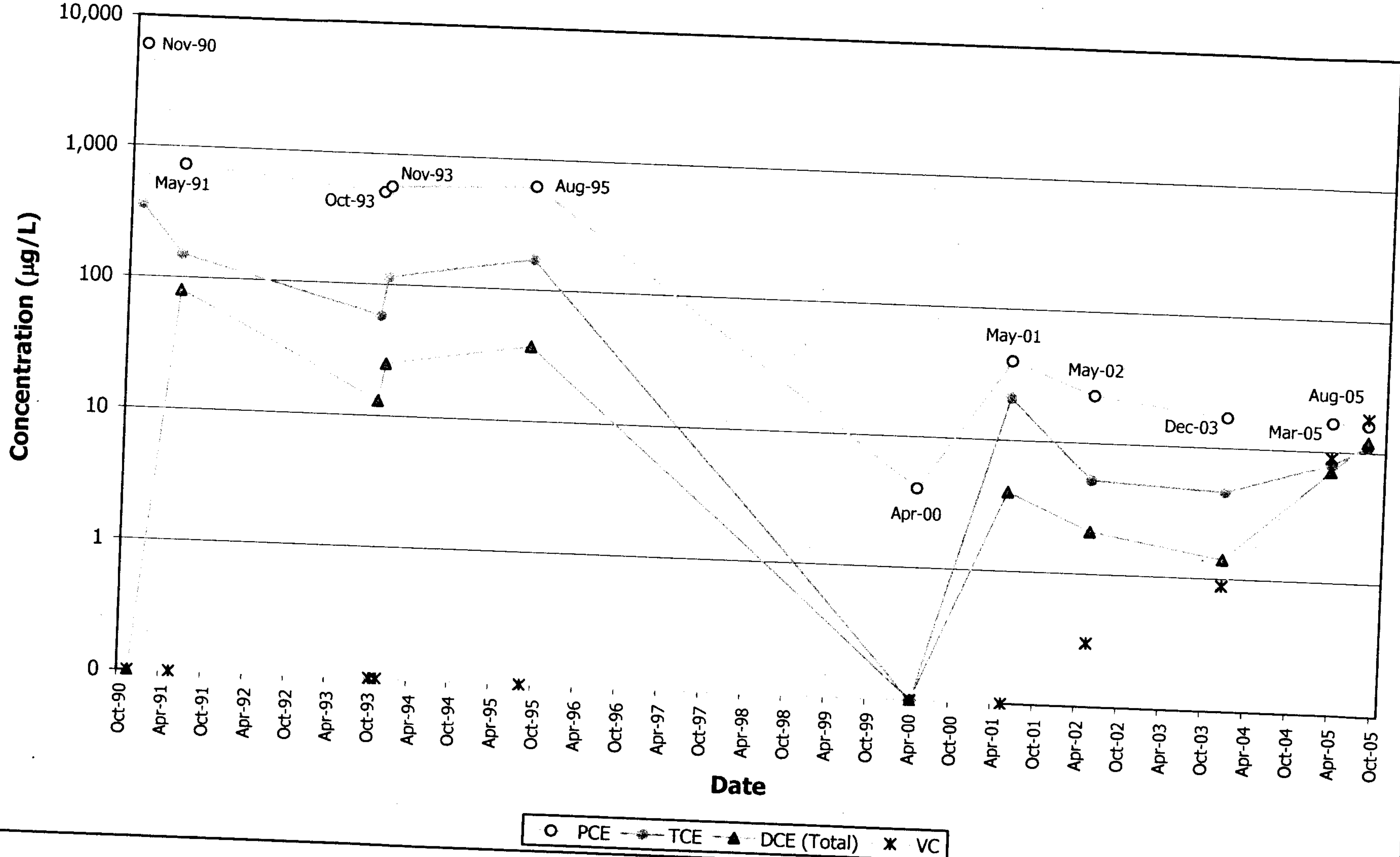
Date	PCE	TCE	DCE (Total)	VC
Nov-90	25.1	51.2	320	0
May-91	0.1	26	1,100	0
Oct-93	140	190	2,210	0
Apr-00	10	28	98	0
May-01	1	11	38	65
May-02	9.8	14	27.3	30
Dec-03	2.4	8.1	16	8.5
Mar-05	0.9	8.4	36.6	30
Aug-05	0.67	2.4	4.3	0



Date	PCE	TCE	DCE (Total)	Toluene
Apr-90	56,000	490	980	25,400
Nov-90	40,000	870	980	13,000
May-91	470	1,200	630	36
Oct-93	19,000	5,400	3,232	3,100
Nov-93	39,000	4,700	3,431	3,700
Aug-95	1,300	620	400	0
Apr-00	34,000	4,900	495	53
May-01	5,200	710	110	0
May-02	5,300	1,900	184	1
Dec-03	12,000	1,500	451	0
Mar-05	5,400	710	222	0
Aug-05	1.3	1.3	6.6	0

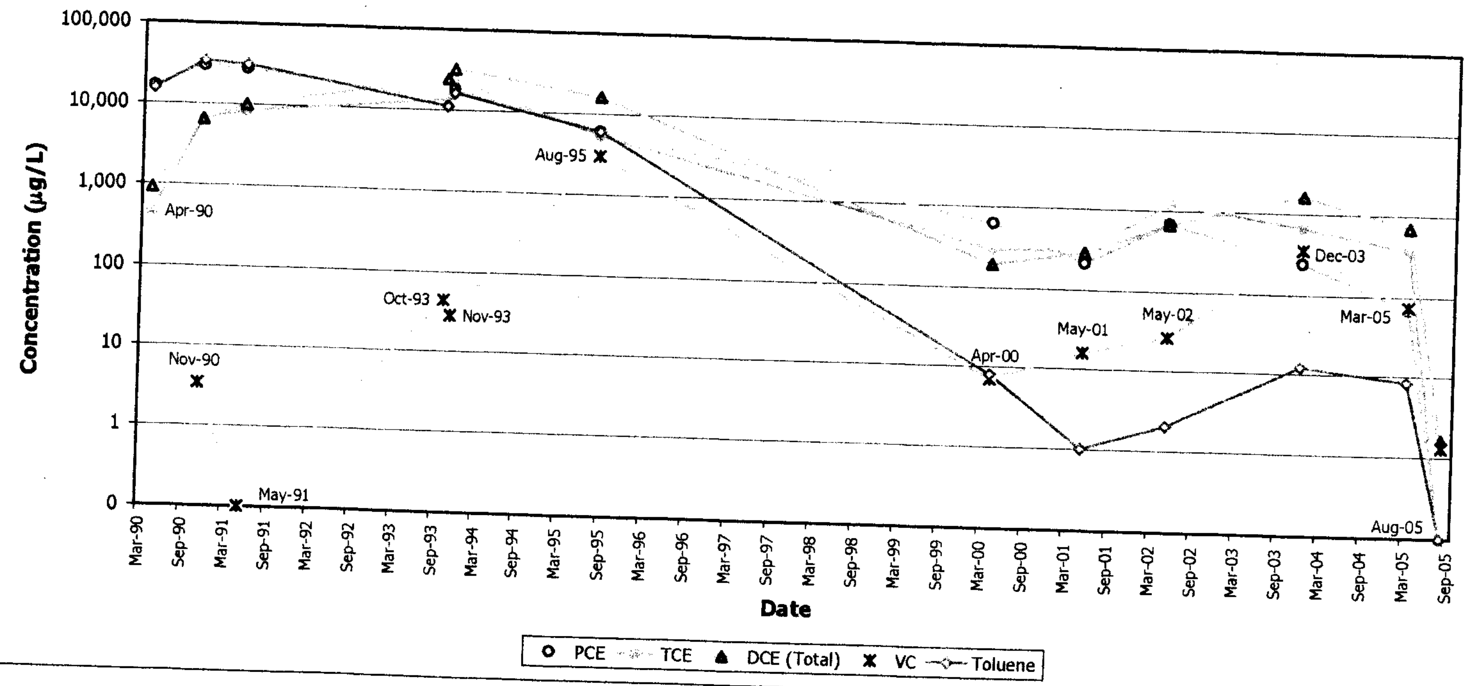


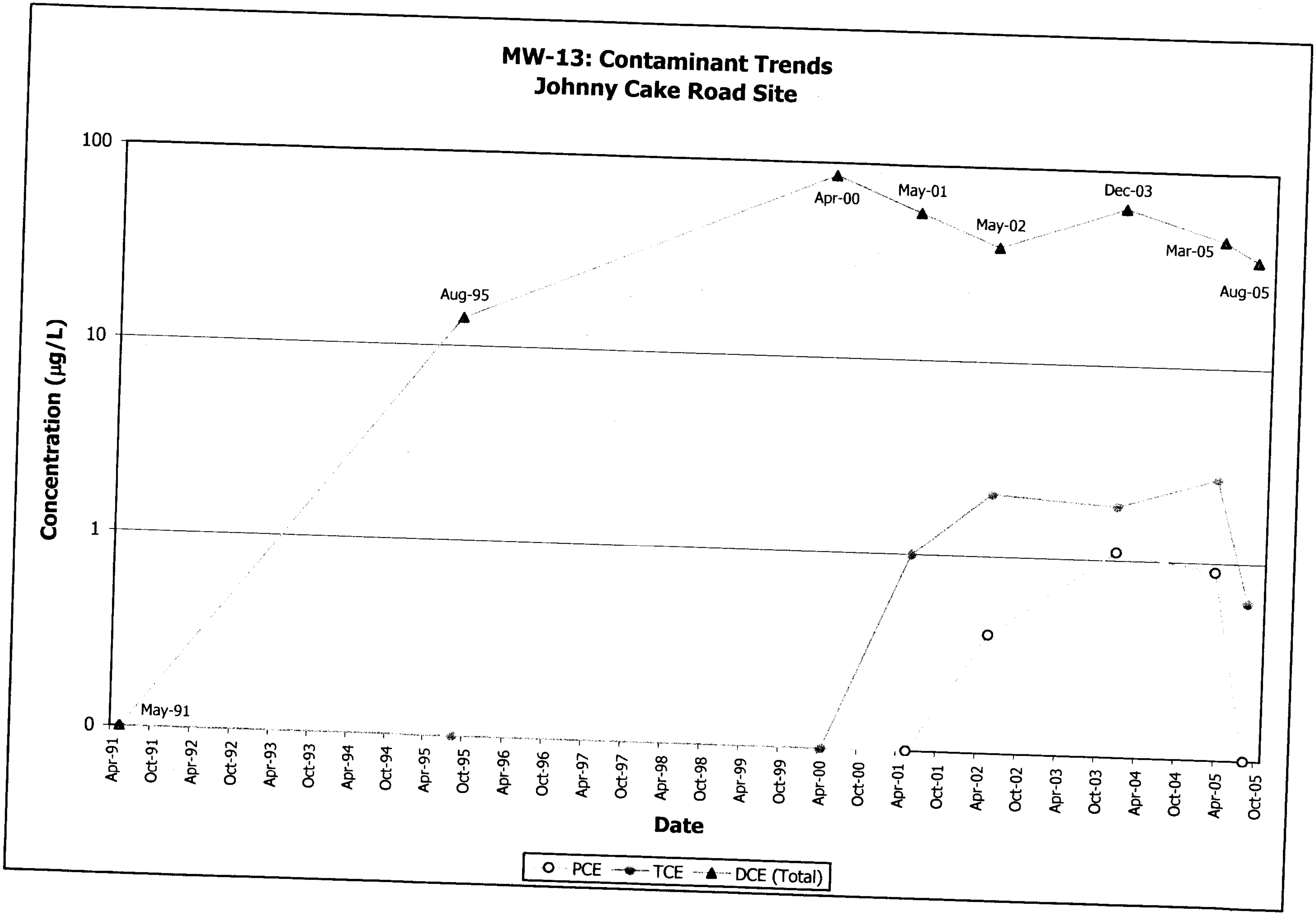
MW-3: Contaminant Trends
Johnny Cake Road Site



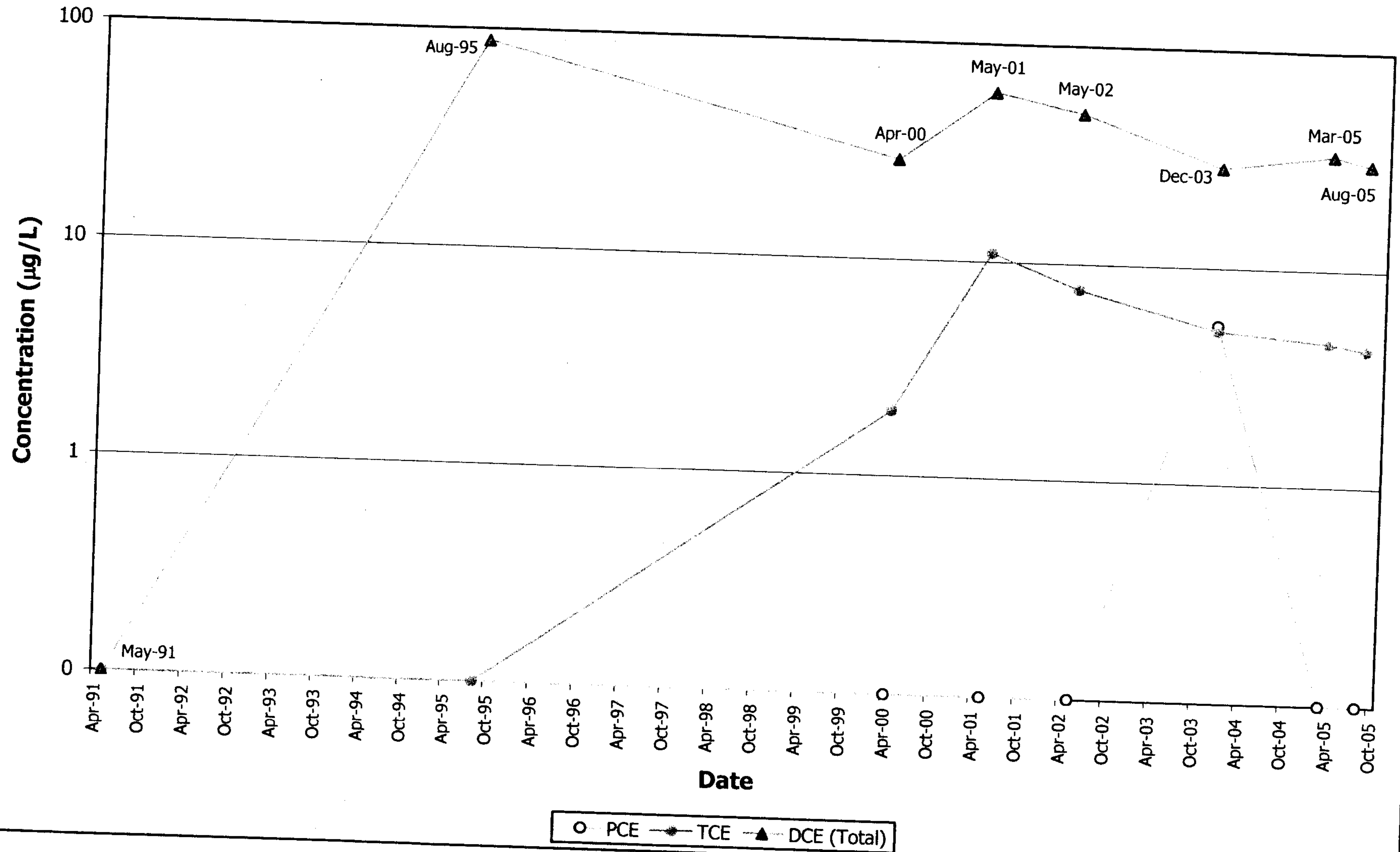
Date	PCE	TCE	DCE (Total)	VC	Toluene
Apr-90	16,300	450	900		15,200
Nov-90	30,000	6,600	6,400	3.4	34,000
May-91	28,000	8,300	10,000	0	31,000
Oct-93	13,000	13,000	24,200	44	11,000
Nov-93	18,000	24,000	32,000	28	16,000
Aug-95	6,000	5,300	16,000	3,000	6,000
Apr-00	620	290	190	7	8
May-01	210	300	280	16	1
May-02	680	1,200	665	26	2
Dec-03	240	650	1,600	350	12
Mar-05	67	360	686	72	8.3
Aug-05	0	0	1.6	1.3	0

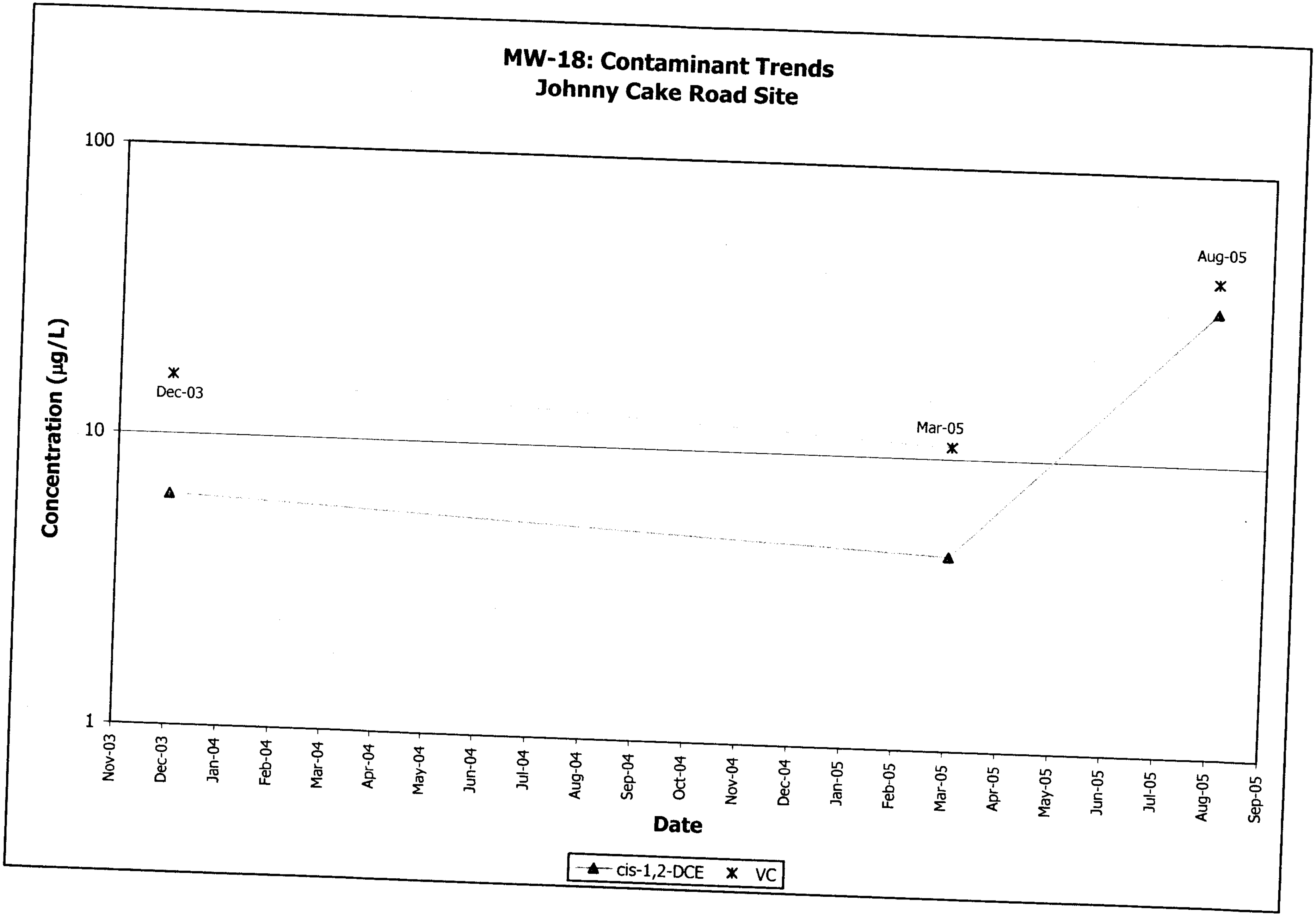
MW-6, MW-6R: Contaminant Trends
Johnny Cake Road Site

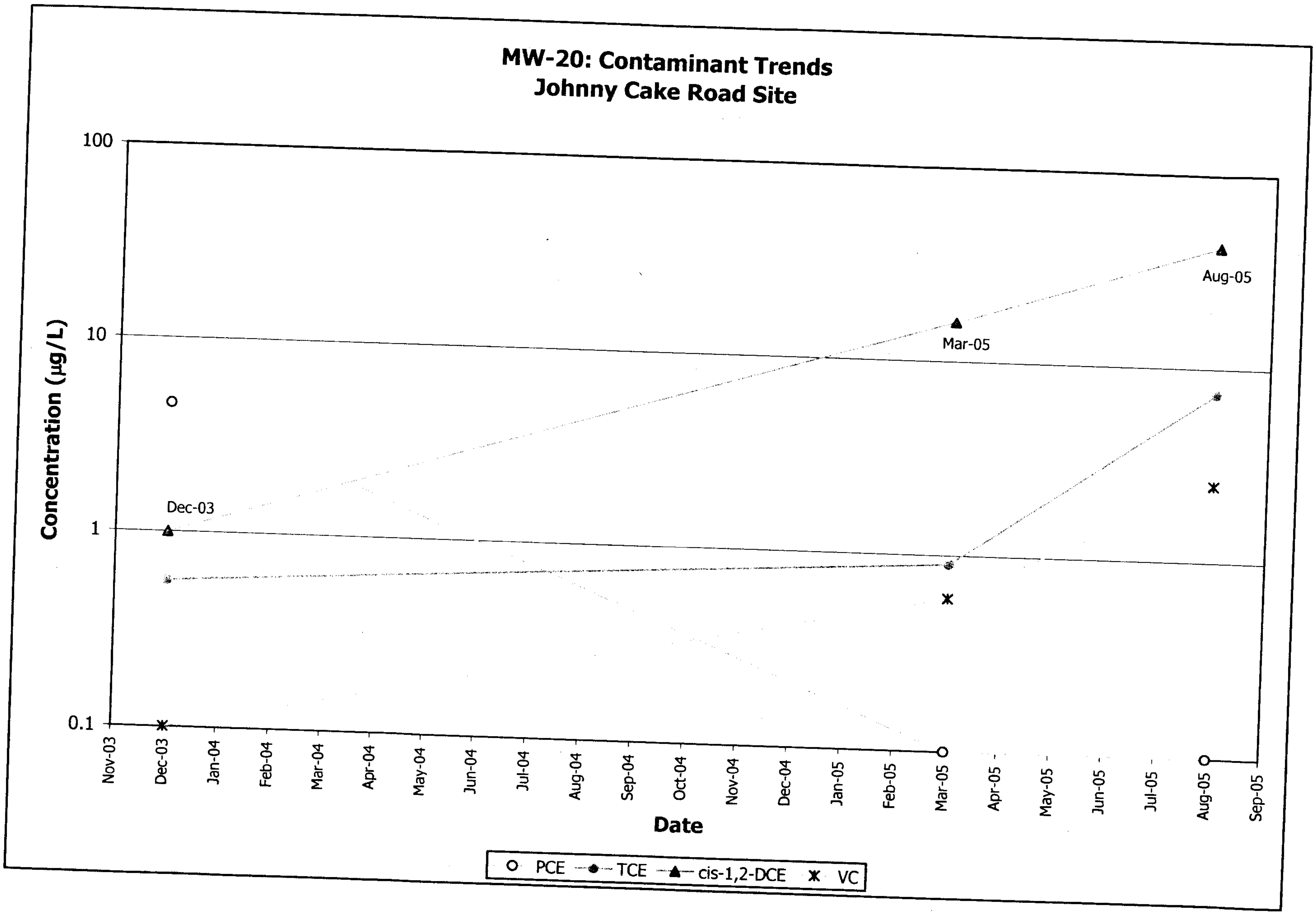



MW-13: Contaminant Trends
Johnny Cake Road Site
Concentration (µg/L)
100
10
1
0
May-91
Aug-95
Apr-00
May-01
May-02
Dec-03
Mar-05
Aug-05
Apr-91
Oct-91
Apr-92
Oct-92
Apr-93
Oct-93
Apr-94
Oct-94
Apr-95
Oct-95
Apr-96
Oct-96
Apr-97
Oct-97
Apr-98
Oct-98
Apr-99
Oct-99
Apr-00
Oct-00
Apr-01
Oct-01
Apr-02
Oct-02
Apr-03
Oct-03
Apr-04
Oct-04
Apr-05
Oct-05
Date
PCE
TCE
DCE (Total)

MW-14: Contaminant Trends
Johnny Cake Road Site




MW-18: Contaminant Trends
Johnny Cake Road Site
Concentration (µg/L)
100
10
1
Dec-03
Mar-05
Aug-05
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Date
cis-1,2-DCE
VC


MW-20: Contaminant Trends
Johnny Cake Road Site
100
10
1
0.1
Concentration (µg/L)
Dec-03
Mar-05
Aug-05
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Date
PCE
TCE
cis-1,2-DCE
VC

APPENDIX 5

REAC

Response Engineering and Analytical Contract

TECHNICAL MEMORANDUM:
NATURAL ATTENUATION ASSESSMENT OF SITE CONTAMINANTS
JOHNNY CAKE ROAD
DANUABE, NEW YORK
OCTOBER 2006

U.S. EPA Work Assignment No.: 0-084
Lockheed Martin Work Order No.: EAC00084
U.S. EPA Contract No.: EP-C-04-032

UNITED STATES ENVIRONMENTAL RESPONSE EPA TEAM ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF EMERGENCY AND REMEDIAL RESPONSE

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DATE: October 26, 2006

TO: Andre Zownir, EPA/ERT Work Assignment Manager

THROUGH: Parry Bhambra, REAC Operations Section Leader KW for PB

FROM: Dave Aloysius, REAC Task Leader

SUBJECT: NATURAL ATTENUATION ASSESSMENT OF SITE CONTAMINANTS
JOHNNY CAKE ROAD, DANUBE, NEW YORK
WORK ASSIGNMENT 0-084: TECHNICAL MEMORANDUM

INTRODUCTION

This technical memorandum presents the results of a preliminary assessment of the fate and transport of chlorinated solvent contaminants at the Johnny Cake Road Site. At the request of the Environmental Protection Agency (EPA) Region II, the EPA/Environmental Response Team (ERT) tasked the Response Engineering and Analytical Contract (REAC) to perform this assessment in support of post-soil excavation groundwater monitoring activities at the site. The results of this study expand on data previously generated by the EPA/ERT, REAC, EPA Region II, and the Region II Removal Support Team (RST) contractor.

Background

The Johnny Cake Road site (Figure 1) is located on approximately 377 acres of farmland along the north and south sides of Johnny Cake Road in the towns of Stark, Danube, and Little Falls, New York (NY). The site was a former dairy farm that became contaminated with organic solvents from illegal cocaine manufacturing processes (Weston, 1991).

The site slopes moderately downward to the north across Johnny Cake Road and further downward to Nowadaga Creek. The creek is approximately 365 feet north of Johnny Cake Road and is topographically downgradient from known spill (source) areas. The topographic relief from the road to the creek is approximately 60 feet.

During September/October 2003, a number of soil borings were drilled at the site (Weston, 2004a) to characterize the nature and extent of solvent contamination in subsurface soils. Within the known source areas (south of Johnny Cake Road), a number of contaminants were detected in subsurface soil samples at concentrations above soil cleanup levels, as established by the New York State Department of Environmental Conservation (NYSDEC). The primary contaminants included tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC). Soil cleanup levels for these four volatile organic compounds (VOCs) are as follows:

- PCE 1,400 parts per million (ppm)
- TCE 700 ppm
- DCE 300 ppm
- VC 200 ppm

Although a total of 19 soil borings were drilled within the known source areas, the lateral and vertical extent of contamination within subsurface soils remained questionable. In May 2005, nine additional boreholes were drilled at the site under the supervision of ERT and REAC personnel to further define the extent of residual contamination in subsurface soils (Lockheed Martin REAC, 2005). Borehole depths ranged from 17 to 24 feet below ground surface (bgs). The results of this investigation further defined the limits of residual contamination in subsurface soils at the site. In June/July 2005, excavation and off-site removal of contaminated soils from known source areas proceeded under the direction of EPA Region II.

At present, a total of 20 groundwater monitor wells are located throughout the entire site, both to the north and south of Johnny Cake Road (Figure 2). Well depths range from approximately 12.5 feet (MW-1) to 101 feet (MW-15) bgs and are constructed with either 2-inch or 4-inch inside diameter PVC pipe with 10 slot (0.010 inch) screens (refer to Table 1). A number of the wells (MW-1, 2, 3, 4, and 6) have been sampled and monitored since 1990 for contaminants of concern (including PCE, TCE, DCE, and VC) and the historical data indicated that concentrations for all contaminants were decreasing over time. Subsequent to soil excavation and removal activities during June/July 2005, contaminant concentrations in selected wells that were being monitored (14 of the 20 wells) showed further decreases; however, contaminant concentrations in a number of wells remain above site clean-up standards (refer to Table 2).

Site Hydrogeology

Observations of soil samples collected during the ERT/REAC investigation in May 2005 revealed the presence of a surficial layer (ablation till) of brown silt and clay, with minor amounts of sand and gravel, averaging 10 feet in thickness (Lockheed Martin REAC, 2005). Beneath this layer, harder or stiffer material was encountered (gray lodgement till), comprised primarily of silt and clay with varying amounts of angular gravel. Additionally, minor permeable lenses or layers (wet to saturated) were encountered at depths greater then 10 feet bgs in a number of the borings, containing appreciable amounts of sand and/or gravel. In May 2005, the average depth to groundwater was approximately three feet bgs (north of Johnny Cake Road).

The average groundwater gradient across the site is approximately 0.115 foot per foot (ft/ft) as derived from previously constructed groundwater contour maps (Weston, 2004b). Based on groundwater inflow data from an interceptor trench that was constructed to divert seepage during soil excavation, an average hydraulic conductivity for subsurface materials (within a 3- to 12-foot interval bgs) was estimated to be approximately 1.37 feet per day (ft/d). Using an estimated porosity of 0.35, an average groundwater flow velocity was calculated to be approximately 0.45 ft/d or 164 feet per year (ft/yr). Note: Previous slug tests performed in a limited number of monitor wells (MW-12A, MW-13, MW-17, MW-19, and MW-20) indicated that the mean hydraulic conductivity of overburden materials within an average 15- to 25-foot depth interval bgs was approximately 0.37 ft/d (Weston, 2004b).

METHODOLOGY

Calculations were performed for deriving first-order rate constants to evaluate natural attenuation of contaminants of concern in groundwater at the site. The methodology is described in Appendix A, pages 9 and 10 (EPA, 2002).

Degradation rate constants (k_{point}) were derived by using contaminant concentration vs. time data to estimate how long it would take for remediation goals to be met at the site. A number of monitor wells and contaminants were evaluated as follows:

MW-4R:	PCE, TCE, and DCE	(November 1990 – June 2006)
MW-6R:	VC	(December 2003 – June 2006)
MW-13:	DCE	(April 2000 – June 2006)
MW-14:	DCE	(August 1995 – June 2006)
MW-18:	VC	(August 2005 – June 2006)

Bulk attenuation rate constants (k) were derived by using contaminant concentration vs. distance data to estimate if current contaminant plumes are expanding, showing relatively little change, or shrinking due to the combined effects of dispersion, biodegradation, and other attenuation processes. Two contaminants of concern were investigated: DCE and VC.

For DCE, the former septic tank area was used as a source location because post-excavation samples within this area indicated the presence of DCE (up to 60 ppm) at approximately 17 feet bgs. A concentration in groundwater was estimated using historical data (i.e., pre-soil excavation) from MW-6, positioned approximately 12 feet northeast of the former septic tank. The concentration of DCE in MW-6 in December 2003 was 1,600 parts per billion (ppb) and in March 2005, the concentration was 686 ppb. A conservative average of 1,200 ppb was therefore used as an estimated recent concentration of DCE in groundwater around the former septic tank area (considered to be an overestimated value). In addition, recent average DCE concentrations (refer to Table 2) in MW-4R and MW-20 were used along with the 1,200 ppb source concentration to construct a DCE concentration vs. distance graph. Wells MW-4R and MW-20 are located hydraulically downgradient of the former septic tank area, as shallow groundwater generally flows from south to north toward Nowadaga Creek.

For VC, recent average concentrations in MW-18, MW-4R, and MW-20 were used to construct a concentration vs. distance graph. In this case, MW-18 was used as an upgradient source location (Figure 2), because it currently has the highest average VC concentration compared to other monitor wells.

For calculating k, retardation factors (R) also needed to be estimated for the contaminants of interest in the groundwater using the following equation (EPA, 2000):

$$R = 1 + [(Koc)(foc)(\rho)/n]$$

where

Koc = organic carbon:water partitioning coefficient for the contaminant (milliliters per gram)
n = subsurface material porosity (assumed to be 0.35)
ρ = subsurface material density (assumed to be 1.75 grams per cubic centimeter)
foc = fraction organic carbon in subsurface materials (assumed to be 0.001 [low])

Values that were used for Koc are as follows: DCE = 45; VC = 19 (EPA, 1996).

Finally, a contaminant velocity was estimated by using the following equation:

$$V_c = V/R$$

where

V = groundwater flow velocity (164 ft/yr, which is considered to be a conservative number)
R = retardation factor for the contaminant of interest

RESULTS

All calculations were based on the following groundwater cleanup standards: PCE, TCE, and DCE – 5 ppb; VC – 2 ppb.

Concentration vs. Time

Contaminant concentration vs. time graphs are presented in Appendix B. Note: All DCE concentrations refer to total DCE (i.e., *cis*-1,2 DCE + *trans*-1,2 DCE).

An example calculation and final results are presented below for MW-4/4R using historical DCE concentrations in groundwater:

A graph was constructed by plotting natural log concentrations of DCE vs. time. Time data were converted to years using January as an arbitrary starting point (in this case, January 1990 since the first data were from November 1990). An exponential trend line was fitted to the data using a spreadsheet program and an equation was generated that mathematically describes the line. The equation indicates that the slope of the line is -0.2541. Therefore, the degradation rate constant (k_{point}) is +0.2541 per year. The y-intercept at time zero equals 6,529.8 ppb. The time (t) it would take for DCE concentrations to reach 5 ppb at this location was determined as follows:

$$t = -\ln[5 \text{ ppb}/6529.8 \text{ ppb}]/0.2541 = 28 \text{ years (from 1990 = approximately 2018)}$$

Similar calculations were performed for the remaining data sets and the results are summarized below:

MW-4R:	PCE	18 years (from 1990 = approximately 2008)
MW-4R:	TCE	27 years (from 1990 = approximately 2017)
MW-6R:	VC	5 years (from 2003 = approximately 2008)
MW-13:	DCE	28 years (from 2000 = approximately 2028)
MW-14:	DCE	32 years (from 1995 = approximately 2027)
MW-18:	VC	2 years (from 2005 = approximately 2007)

A couple of points are noted in reference to the data sets in Appendix B and the resulting time estimates: 1) in a number of cases, the data are either widely scattered (especially for MW-13 and MW-14) or very limited (MW-18), which can have a significant impact on the calculated estimates. 2) Because most of the contaminated soils have since been removed from the identified sources, some of the time estimates could be high (especially for DCE and TCE).

Concentration vs. Distance

Contaminant concentration vs. distance graphs for DCE and VC are presented in Appendix C. As an example, calculations and final results are presented below for DCE concentrations vs. distance:

A graph was constructed by plotting natural log concentrations of DCE vs. distance. Distances from MW-4R and MW-20 to the former septic tank area were scaled on a site map. An exponential trend line was fitted to the data using a spreadsheet program and an equation was generated that mathematically describes the line. The equation indicates that the slope of the line is -0.0156. Therefore, the degradation rate constant (k_{point}) is +0.0156 per year. The y-intercept at distance zero equals 1,209.7 ppb.

The retardation factor (R) for DCE was calculated to be 1.225 with a transport velocity (V_c) of 134 ft/ yr.

The bulk attenuation rate (k) for DCE = 134 ft/yr x 0.0156 = 2.1 per year.

The travel time (T) to reach 5 ppb at the downgradient margin of the DCE plume was determined as follows:

$$T = -\ln[5 \text{ ppb}/1{,}200 \text{ ppb}]/2.1 = 2.6 \text{ years}$$

where 1,200 ppb is the DCE concentration at the source location (i.e., the former septic tank area).

The maximum distance (x) that DCE should extend from the source is:

$$x = 134 \text{ ft/yr} \times 2.6 \text{ years} = 350 \text{ feet}$$

Based on the above distance (x), the leading edge of the DCE plume (i.e., at a concentration of 5 ppb) would extend to approximately 125 feet <u>south</u> of Nowadaga Creek.

Similar calculations for VC vs. distance resulted in the following values:

R = 1.1
V_c = 149 ft/yr
k = 1.97 per year
T = 1.2 years
x = 180 feet (from MW-18)

Based on the above distance (x), the leading edge of the VC plume (i.e., at a concentration of 2 ppb) would extend to approximately 240 feet south of Nowadaga Creek. Since the previous calculations suggested that the DCE plume would extend to some greater distance to the creek, it is reasonable to assume that the VC plume would also have to extend to at least the same distance because VC is a breakdown product of DCE. The combined results thus suggest that VC could extend to some closer distance to the creek; however, the concentrations would likely be less than 2 ppb.

Due to limited VC data and the low to non-detect recent concentrations of VC in most wells (refer to Table 2), no further analysis can reasonably be made at this time regarding the long-term migration of VC in site groundwater. Nevertheless, because most of the contaminated soils have since been removed from the identified sources, it is believed that plume migration should be very limited over time.

CONCLUSIONS

An evaluation of site groundwater monitoring data indicates that contaminant concentrations are generally decreasing over time in most of the monitor wells. The general decrease in concentrations can be attributed to the combined effects of dispersion, biodegradation, and other natural attenuation processes. Rough estimates suggest that contaminant concentrations could persist for at least another ten years and that contaminant plumes may be slowly migrating northward. However, concentrations above groundwater cleanup standards are not expected to reach Nowadaga Creek. The prior removal of contaminated soils from source areas should greatly assist in further limiting the migration of contaminants in groundwater at the site.

REFERENCES

Environmental Protection Agency (EPA), 2002. Ground Water Issue: Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies. National Risk Management Research Laboratory. EPA/540/S-02/500. November 2002.

Environmental Protection Agency (EPA), 2000. Biochlor: Natural Attenuation Decision Support System, User's Manual, Version 1.0. Office of Research and Development. EPA/600/R-00/008. January 2000.

Environmental Protection Agency (EPA), 1996. Soil Screening Guidance: Technical Background Document, Part 5: Chemical-Specific Parameters. Office of Solid Waste and Emergency Response (OSWER). EPA/540/R-96/018. July 1996, second edition.

Lockheed Martin REAC, 2005. Trip Report: Extent of Contamination Investigation, Johnny Cake Road, Danube, New York. August 9, 2005.

Roy F. Weston, Inc., 1991. Extent of Contamination Investigation: Groundwater, Surface Water, and Soil, Johnny Cake Road Site, Danube Township, Herkimer County, New York. EPA Contract No. 68-03-3482. Response Engineering and Analytical Contract (REAC). November 1991.

Weston Solutions, Inc., 2004a. Johnny Cake Road Site, Soil Boring Sampling and Analysis Report. EPA Contract No. 68-W-00-113. Federal Programs Division. June 1, 2004.

Weston Solutions, Inc., 2004b. Johnny Cake Road Site, Groundwater Sampling and Analysis Report - December 2003. EPA Contract No. 68-W-00-113. Federal Programs Division. March 29, 2004.

Table 1
Monitor Well Information
Johnny Cake Road
October 2006

Monitor Well	Ref. Point Elevation (feet-AMSL)	Diameter (inches)	Screen Interval (feet-bgs)
MW-1	782.49	2	2 - 12
* MW-2 *	793.01	2	3 - 13
MW-2R	NA	2	3 - 23
MW-2RR	NA	2	4.5 - 24.5
MW-3	791.16	2	3 - 13
* MW-4 *	NA	NA	NA
MW-4R	NA	2	3.5 - 23.5
* MW-6 *	789.55	2	3 - 13
MW-6R	NA	2	3 - 23
MW-7	791.27	NA	4 - 24
MW-8	768.87	NA	NA
MW-9	769.27	NA	2 - 12
MW-10	752.25	NA	2.5 - 17.5
MW-11	750.29	4	5 - 20
MW-12A	768.91	4	10 - 20
MW-13	768.25	4	5 - 15
MW-14	768.91	4	6 - 21
MW-15	746.65	2	91 - 101
MW-16	781.21	4	15 - 25
MW-17	780.99	4	30 - 40
MW-18	783.76	4	15 - 25
MW-19	787.63	4	15 - 25
MW-20	769.39	4	14 - 24

AMSL - above mean sea level
bgs - below ground surface
NA - data not available
MW-15 - sand packed to 83 feet bgs

* Note: MW-2 and MW-6 no longer exist. They were removed during soil excavation activities in June/July 2005. MW-4 could not be found. The preceding wells were replaced with the "R" series wells in July 2005.

TABLE 4
JOHNNY CAKE FARM ROAD SITE
GROUNDWATER SUMMARY-POST SOIL REMEDIATION

Contaminant----->ppb	Acetone	carbon disulfide	cis-1,2-dichloroethene	trans-1,2-dichloroethene	2-butanone	trichloroethene	tetrachloroethene	vinyl chloride	dichlorofluoromethane
DEC 703 Standard			5	5		5	5	2	5
Fed. DW Standard			70	100		5	5	2	
MW-1 (Aug. 29, 2005)	1.6	ND	4.3	ND	ND	2.4	0.67	ND	ND
MW-1 (Nov. 29, 2005)	1.5	ND	8.4	ND	ND	1	ND	18	0.56
MW-1 (March 07, 2006)	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-1 (June 08, 2006)	1.6	ND	11	ND	ND	4.3	ND	4.5	0.53
MW-2R (Aug. 29, 2005)	1.6	ND	6.6	ND	3.7	1.3	1.3	ND	ND
MW-2R (Nov. 29, 2005)	1	ND	4.8	ND	ND	0.84	ND	ND	ND
MW-2R (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2R (June 08, 2006)	0.74	ND	4.5	ND	ND	ND	ND	3.2	ND
MW-2RR (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2RR (June 08, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-3 (Aug. 29, 2005)	6.2	ND	12	ND	ND	11	16	18	ND
MW-3 (Nov. 29, 2005)	ND	ND	0.6	ND	ND	1.7	11	ND	ND
MW-3 (March 07, 2006)	ND	ND	ND	ND	ND	8.6	38 J	ND	ND
MW-3 (June 08, 2006)	ND	ND	2.5	ND	ND	5.5	27	ND	ND
MW-4R (Aug. 29, 2005)	1.6	ND	57	0.91	ND	35	0.69	0.65	0.96
MW-4R (Nov. 29, 2005)	1.6	ND	50	ND	ND	20	1.3	3	0.78
MW-4R (March 07, 2006)	ND	ND	280/320	2.1/4.5	ND	190/210	8.1/8.1	ND	ND
MW-4R (June 08, 2006)	ND	ND	170	1.8	ND	110	7.3	5.4	0.8
MW-6R (Aug. 29, 2005)	3.3/3.7 (Dupl)	ND	1.6	ND	ND	ND	ND	1.3	ND
MW-6R (Nov. 29, 2005)	1.1	ND	1.5/4.8 (dupl)	ND	ND	0.84 (Dupl.)	ND	ND	ND
MW-6R (March 07, 2006)	ND	ND	2.1	ND	ND	ND	ND	ND	ND
MW-6R (June 08, 2006)	ND	ND	2.4	ND	ND	ND	ND	12	ND
MW-12A (Aug. 29, 2005)	1.2	ND	0.83	ND	ND	ND	ND	2.5	ND
MW-12A (Nov. 29, 2005)	1.6	ND	ND	ND	ND	ND	ND	0.77	ND
MW-12A (March 07, 2006)	3.3 J	ND	ND	ND	ND	ND	ND	ND	ND
MW-12A (June 08, 2006)	ND	ND	ND	ND	ND	ND	Nd	1.5	ND
MW-13 (Aug. 29, 2005)	ND	ND	35	0.57	ND	0.63	ND	ND	ND
MW-13 (Nov. 29, 2005)	ND	ND	19	ND	ND	1.3	ND	ND	ND
MW-13 (March 07, 2006)	ND	ND	100	ND	ND	1.2	ND	ND	ND
MW-13 (June 08, 2006)	2.7	ND	31	ND	ND	2.2	ND	ND	ND
MW-14 (Aug. 29, 2005)	ND	ND	30	0.71	ND	4.3	ND	ND	ND
MW-14 (Nov. 29, 2005)	ND	ND	96	ND	ND	2.8	ND	ND	ND
MW-14 (March 07, 2006)	ND	ND	19	ND	ND	2.5	ND	ND	ND
MW-14 (June 08, 2006)	ND	ND	20	ND	ND	3.4	ND	ND	ND

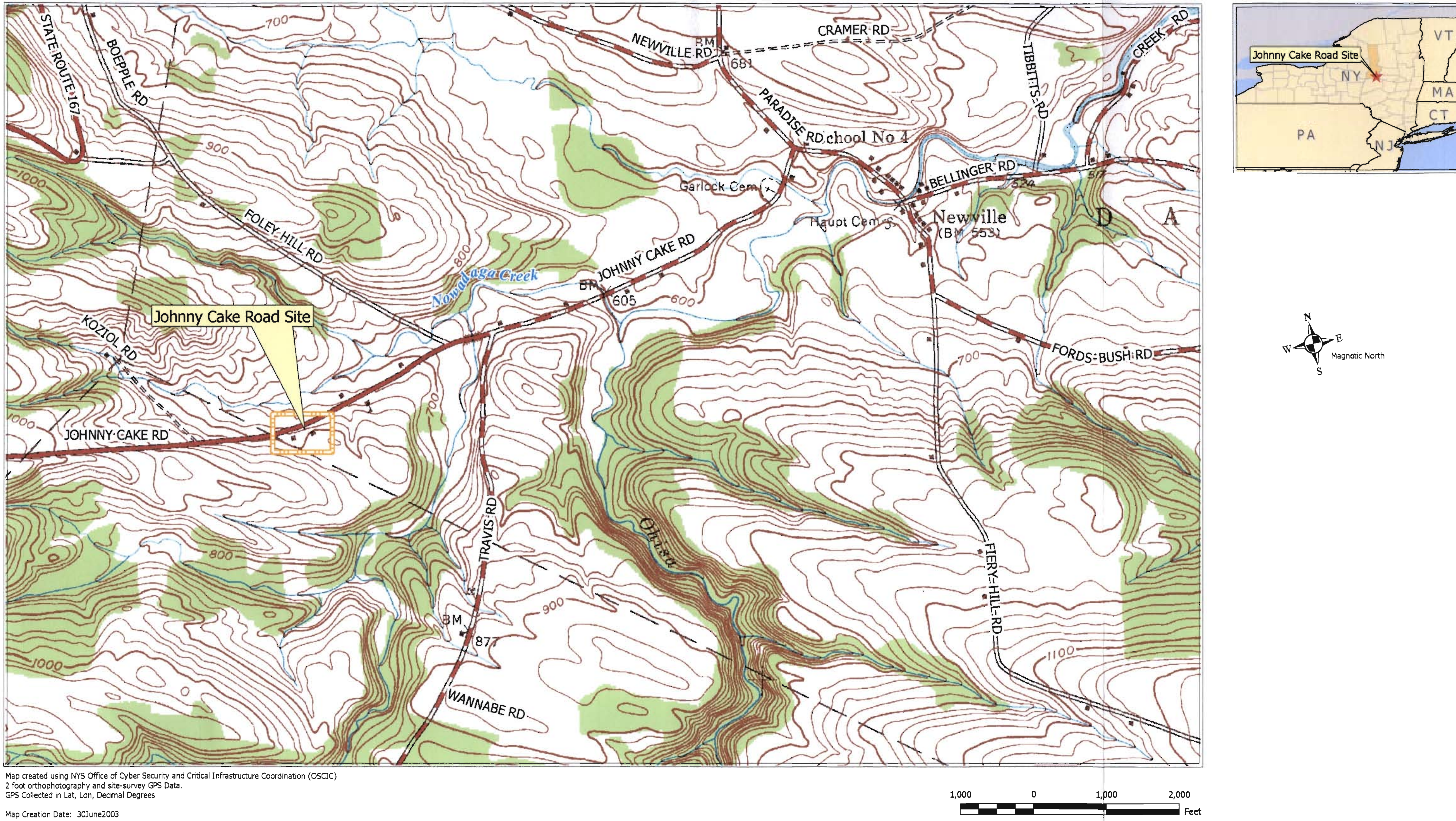
Contaminant----->ppb	Acetone	carbon disulfide	cis-1,2-dichloroethene	trans-1,2-dichloroethene	2-butanone	trichloroethene	tetrachloroethene	vinyl chloride	dichlorofluoromethane
DEC 703 Standard			5	5		5	5	2	5
Fed. DW Standard			70	100		5	5	2	
MW-16 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (Nov. 29, 2005)	9.2	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-16 (June 08, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (March 07, 2006)	3.4 J	ND	ND	ND	ND	ND	ND	ND	ND
MW-17 (June 08, 2006)	4.6	ND	ND	ND	ND	ND	ND	ND	ND
MW-18 (Aug. 29, 2005)	ND	ND	34	ND	ND	ND	ND	43	1.1
MW-18 (Nov. 29, 2005)	ND	ND	5.6	ND	ND	ND	ND	14	ND
MW-18 (March 07, 2006)	ND	ND	2.6	ND	ND	ND	ND	ND	ND
MW-18 (June 08, 2006)	3.1	ND	2.1	ND	ND	ND	ND	6	ND
MW-19 (Aug. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (Nov. 29, 2005)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (March 07, 2006)	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-19 (June 08, 2006)	0.59	ND	ND	ND	ND	ND	ND	ND	ND
MW-20 (Aug. 29, 2005)	2	ND	42	ND	ND	7.4	ND	2.5	ND
MW-20 (Nov. 29, 2005)	ND	ND	35	ND	ND	10	0.78	2.4	ND
MW-20 (March 07, 2006)	ND	ND	34	ND	ND	8.6	0.24 J	ND	ND
MW-20 (June 08, 2006)	1.7	ND	22	0.81	ND	4.9	ND	2.1	ND

result exceeds 6 NYCRR Part 703 GWS

result exceeds Federal DW Standards

NS - no sample collected due to well water being frozen.

J - Below method detection limit, estimated concentration.



Map created using NYS Office of Cyber Security and Critical Infrastructure Coordination (OSCIC)
2 foot orthophotography and site-survey GPS Data.
GPS Collected in Lat, Lon, Decimal Degrees

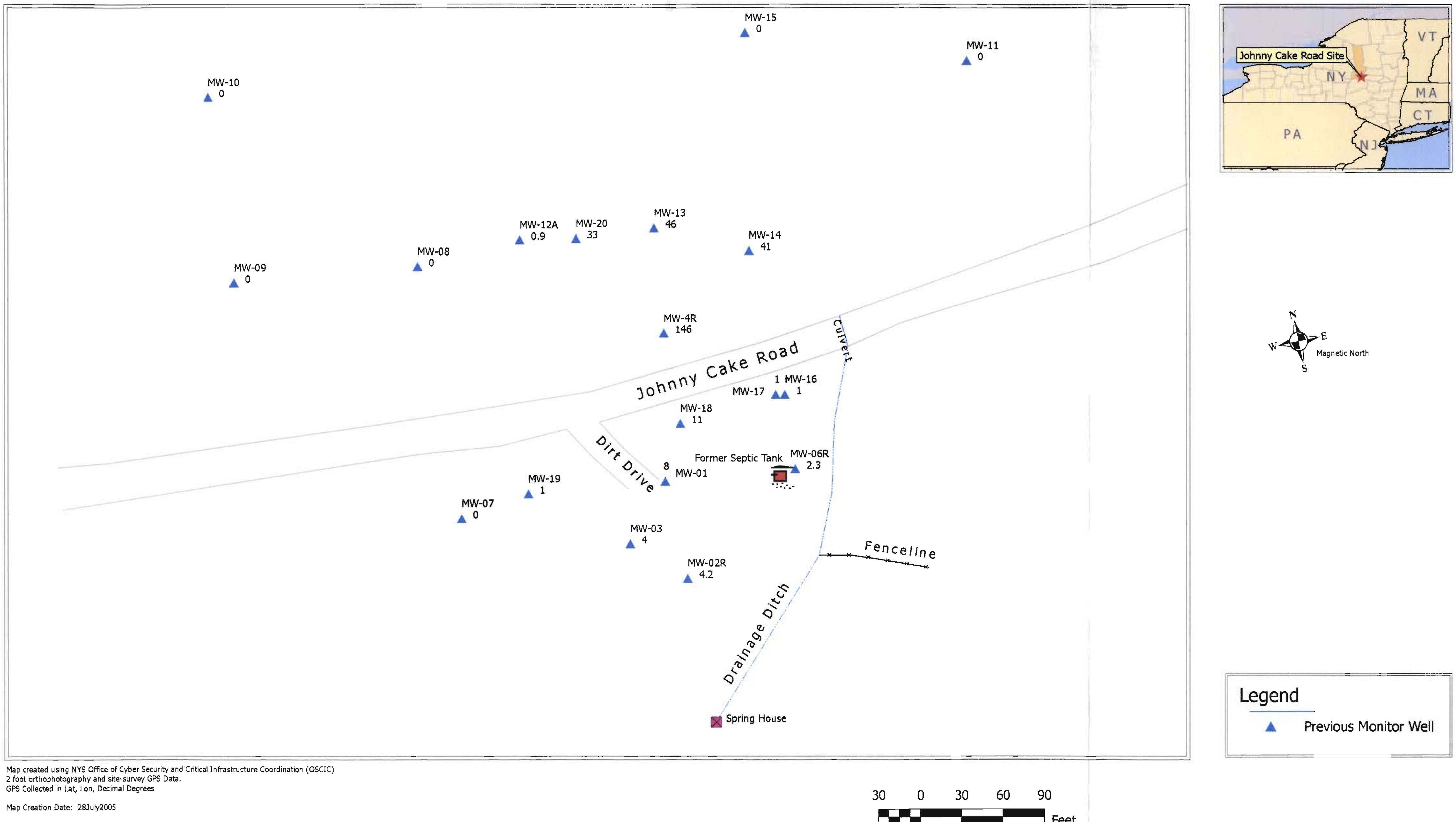
Map Creation Date: 30June2003

Coordinate system:	UTM
Zone:	18N
Units:	Meters
Datum:	NAD83

Data: g:\arcviewprojects\reac4\00-084
MXD file: g:\arcinfoprojects\reac4\EAC00084_JohnnyCake\084_sitemap_f1rev005
Revision Number: 005

U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
W.A.# 0-084

Figure 1
Site Map
Johnny Cake Road
Danube, NY
October 2006



Map created using NYS Office of Cyber Security and Critical Infrastructure Coordination (OSCIC)
2 foot orthophotography and site-survey GPS Data.
GPS Collected in Lat, Lon, Decimal Degrees

Map Creation Date: 28July2005

Coordinate system: UTM
Zone: 18N
Units: Meters
Datum: NAD83

Data: g:\arcviewprojects\reac4\00-084
MXD file: g:\arcinfoprojects\reac4\EAC00084_JohnnyCake\084_monitorwells_f2rev003
Revision Number: 003

U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
W.A.# 0-084

Figure 2
Monitor Well Locations
Johnny Cake Road
Danube, NY
October 2006

APPENDIX A

Reference: Calculation of First-Order Rate Constants (Partial Document)
Johnny Cake Road
Technical Memorandum
October 2006

EPA

Ground Water Issue

Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies

Charles J. Newell[1], Hanadi S. Rifai[2], John T. Wilson[3], John A. Connor[1], Julia A. Aziz[1], and Monica P. Suarez[2]

Introduction

This issue paper explains when and how to apply first-order attenuation rate constant calculations in monitored natural attenuation (MNA) studies. First-order attenuation rate constant calculations can be an important tool for evaluating natural attenuation processes at ground-water contamination sites. Specific applications identified in U.S. EPA guidelines (U.S. EPA, 1999) include use in characterization of plume trends (shrinking, expanding, or showing relatively little change), as well as estimation of the time required for achieving remediation goals. However, the use of the attenuation rate data for these purposes is complicated as different types of first-order rate constants represent very different attenuation processes:

Concentration vs. time rate constants (k_{point}) are used for estimating how quickly remediation goals will be met at a site.

Concentration vs. distance bulk attenuation rate constants (k) are used for estimating if a plume is expanding, showing relatively little change, or shrinking due to the combined effects of dispersion, biodegradation, and other attenuation processes.

Biodegradation rate constants (λ) are used in solute transport models to characterize the effect of biodegradation on contaminant migration.

Correct use of attenuation rate constants requires an understanding of the different attenuation processes that different first-order rate constants represent.

For further information contact John T. Wilson (580) 436-8534 at the Subsurface Protection and Remediation Division of the National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Ada, Oklahoma.

Why Are Attenuation Rate Constants Important?

Monitored natural attenuation (MNA) refers to the reliance on natural attenuation processes to achieve site-specific remediation objectives within a reasonable time frame. Natural attenuation processes include a variety of physical, chemical, and/or biological processes that act without human intervention to reduce the mass or concentration of contaminants in soil and ground water. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants (U.S. EPA, 1999).

The overall impact of natural attenuation processes at a given site can be assessed by evaluating the rate at which contaminant concentrations are decreasing either spatially or temporally. Recent guidelines issued by the U.S. EPA (U.S. EPA, 1999) and the American Society for Testing and Materials (ASTM, 1998) have endorsed the use of site-specific attenuation rate constants for evaluating natural attenuation processes in ground water. The U.S. EPA directive on the use of Monitored Natural Attenuation (MNA) at Superfund, RCRA, and UST sites (U.S. EPA, 1999) includes several references to the application of attenuation rates:

> Once site characterization data have been collected and a conceptual model developed, the next step is to evaluate the potential efficacy of MNA as a remedial alternative. This involves collection of site-specific data sufficient to estimate with an acceptable level of confidence both the rate of attenuation processes and the anticipated time required to achieve remediation objectives.
>
> At a minimum, the monitoring program should be sufficient to enable a determination of the rate(s) of attenuation and how that rate is changing with time.
>
> Site characterization (and monitoring) data are typically used for estimating attenuation rates.

The ASTM Standard Guide for Remediation of Groundwater by Natural Attenuation at Petroleum Release Sites (ASTM, 1998) also identifies site-specific attenuation rates as a secondary line of evidence of the occurrence and rate of natural attenuation. In addition, technical guidelines issued by various state environmental regulatory agencies recommend estimation of rate constants to evaluate contaminant plume trends and duration (New Jersey DEP, 1998; Wisconsin DNR, 1999). For example, the New Jersey Department of Environmental Protection (DEP) now requires such calculations for establishing "Classification Exception Areas (CEAs)" at sites where ground-water quality standards are or will be exceeded for an extended time period.

The technical literature contains numerous guidelines regarding methods for derivation of site-specific attenuation rate constants based upon observed plume concentration trends (e.g., ASTM, 1998; U.S. EPA, 1998a; 1998b; Wiedemeier et al. 1995; 1999; Wilson and Kolhatkar, 2002). Other resources, such as the

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BIOSCREEN and BIOCHLOR natural attenuation models (Newell et al., 1996; Aziz et al., 2000), include use of first-order rate constants for simulating the attenuation of dissolved contaminants once they leave the source and the attenuation of the source itself. However, many of these references do not clearly distinguish between the different types of rate constants and their appropriate application in evaluation of natural attenuation processes. The objective of this paper is to address this gap by briefly describing the derivation, significance, and appropriate use of three key types of attenuation rate constants commonly employed in natural attenuation studies.

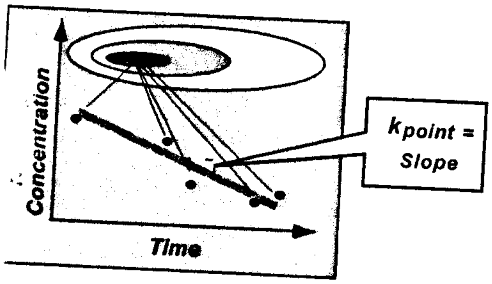
Key Point:

Rate calculations can help those performing MNA studies evaluate the contribution of attenuation processes and the anticipated time required to achieve remediation objectives. There are different types of rate calculations, however, and it is important to use the right kind of rate constant for the right application.

Types of First-Order Attenuation Rate Constants

In general, there are three different types of first-order attenuation rate constants that are in common use:

Concentration vs. Time Attenuation Rate Constant, where a rate constant, in units of inverse time (e.g., per day), is derived as the slope of the natural log concentration vs. time curve measured at a selected monitoring location (Figure 1).



-ermining concentration vs. time rate constant
,).

Concent ion vs. Distance Attenuation Rate Constant, where a rate constant, in units of inverse time (e.g., per day), is derived by plotting the natural log of the concentration vs. distance and (if determined to match a first-order pattern) calculating the rate as the product of the slope of the transformed data plot and the ground-water seepage velocity (Figure 2).

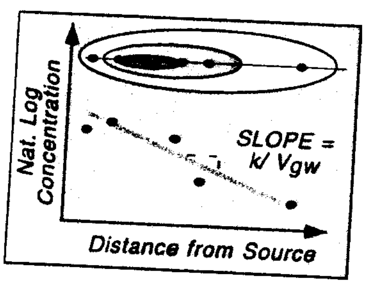


Figure 2. Determining concentration vs. distance rate constant (*k*).

Biodegradation Rate Constant. The "biodegradation rate constant" (λ) in units of inverse time (e.g., per day) can be derived by a variety of methods, such as comparison of contaminant transport vs. transport of a tracer, or more commonly, calibration of solute transport model to field data (Figure 3).

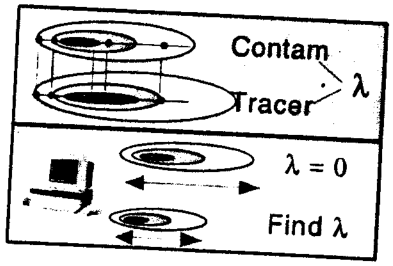


Figure 3. Determining biodegradation rate constant (λ).

Distinctions Between Rate Constants

To interpret the past behavior of plumes, and to forecast their future behavior, it is necessary to describe the behavior of the plume in both space and time. It is necessary to collect long-term monitoring data from wells that are distributed throughout the plume. *Concentration vs. Time Rate Constants* describe the behavior of the plume at one point in space; while *Concentration vs. Distance Rate Constants* describe the behavior of the entire plume at one point in time. The *Biodegradation Rate Constant* is usually applied over both time and space, but only applies to one attenuation mechanism. Standard practice for the environmental industry finds applications for each of these rate constants. Under appropriate conditions, each of the three constants can be employed to assist in site-specific evaluation and quantification of natural attenuation processes. Each of these terms is identified as an "attenuation rate." Because they differ in their significance and appropriate application, it is important to understand the potential for misapplication of each type of rate as summarized below:

Concentration vs. Time Rate Constants: A rate constant derived from a concentration vs. time (C vs. T) plot at a single monitoring location provides information regarding the potential plume lifetime at that location, but cannot be used to evaluate the distribution of contaminant mass within the ground-water system. The C vs. T rate constant at a location within the source zone represents the persistence in source strength over time and can be used to estimate the time required to reach a remediation goal at that particular location. To adequately assess an entire plume, monitoring wells must be available that adequately delineate the entire plume, and an adequate record of monitoring data must be available to calculate a C vs. T plot for each well. At most sites, the rate of attenuation in the source area (due to weathering of residual source materials such as NAPLs) is slower than the rate of attenuation of materials in ground water, and concentration profiles in plumes tend to retreat back toward the source over time. In this circumstance, the lifecycle of the plume is controlled by the rate of attenuation of the source, and can be predicted by the C vs. T plots in the most contaminated wells. At some sites, the rate of attenuation of the source is rapid compared to the rate of attenuation in ground water. This pattern is most common when contaminants are readily soluble in ground water and when contaminants are not biodegraded in ground water. In this case, the rate of attenuation of the source as predicted by a C vs. T plot will underestimate the lifetime of the plume.

Concentration vs. Distance Rate Constants: Attenuation rate constants derived from concentration vs. distance (C vs. D) plots serve to characterize the distribution of contaminant mass within *space* at a given point in time. A single C vs. D plot provides no information with regard to the variation of dissolved contaminant mass over *time* and, therefore, cannot be employed to estimate the time required for the dissolved plume concentrations to be reduced to a specified remediation goal. This rate constant incorporates all attenuation parameters (sorption, dispersion, biodegradation) for dissolved constituents after they leave the source. Use of the rate constant derived from a C vs. D plot (i.e., characterization of contaminant mass over space) for this purpose (i.e., to characterize contaminant mass over time) will provide erroneous results. The C vs. D-based rate constant indicates how quickly dissolved contaminants are attenuated once they leave the source but provides no information on how quickly a residual source zone is being attenuated. Note that most sites with organic contamination will have some type of continuing residual source zone, even after active remediation (Wiedemeier et al., 1999), making the C vs. D rate constant inappropriate for estimating plume lifetimes for most sites.

Biodegradation Rate Constant: Another type of error occurs if a C vs. D rate constant is used as the biodegradation rate term (λ) in a solute transport model. The attenuation rate constant derived from the C vs. D plot already reflects the combined effects of contaminant sorption, dispersion, and biodegradation. Consequently, use of a C vs. D rate constant as the biodegradation rate within a model that separately accounts for sorption and dispersion effects will significantly overestimate attenuation effects during ground-water flow.

These examples serve to illustrate the need to ensure an appropriate match between the significance and use of each rate constant. Further guidelines regarding derivation and use of attenuation rate constants are provided below.

Key Point:

There are three general types of first-order rate constants that are commonly used for MNA studies: (1) Concentration vs. Time, (2) Concentration vs. Distance, and (3) Biodegradation.

Rate Constants vs. Half-Lives

Both first-order rate constants and attenuation half-lives represent the same process, first-order decay. Some environmental professionals prefer to use rate constants (in units of per time) to describe the first-order decay process, while others prefer half-lives. These two terms are linearly related by:

Rate constant = 0.693 / [half-life] and
Half-life = 0.693 / [rate constant]

For example, a 2 year half-life is equivalent to a first-order rate constant of 0.35 per year. This document describes the first-order decay process in terms of rate constants instead of half-lives.

Key Point:

Rate constants and half-lives represent the same first-order decay process, and are inversely related.

Appropriate Use of Attenuation Rate Constants in Natural Attenuation Studies

Attenuation rate constants may be used for the following three purposes in natural attenuation studies:

Plume Attenuation: Demonstrate that contaminants are being attenuated within the ground-water flow system;

Plume Trends: Determine if the affected ground-water plume is expanding, showing relatively little change, or shrinking; and

Plume Duration: Estimate the time required to reach ground-water remediation goals by natural attenuation alone.

Appropriate use of the various attenuation rate constants for evaluation of plume attenuation, trends, and duration is shown in Table 1.

As described in the U.S. EPA MNA Directive (U.S. EPA, 1999):

> Site characterization (and monitoring) data are typically used for estimating attenuation rates. These calculated rates may be expressed with respect to either time or distance from the source. Time-based estimates are used to predict the time required for MNA to achieve remediation objectives and distance-based estimates provide an evaluation of whether a plume will expand, remain stable, or shrink.

To clarify the applicability of the various first-order decay rate constants, appropriate nomenclature is useful to indicate the significance of each term. For example, **point decay rates** (defined

Table 1. Summary of First-Order Rate Constants for Natural Attenuation Studies

Rate Constant	Method of Analysis	Significance	Use of Rate Constant: Plume Attenuation	Plume Trends?	Plume Duration?
Point Attenuation Rate (Fig. 1) (k_{point}, time per year)	C vs. T Plot	Reduction in contaminant concentration over time at a single point	NO*	NO*	YES
Bulk Attenuation Rate (Fig. 2) (k; time per year)	C vs. D Plot	Reduction in dissolved contaminant concentration with distance from source	YES	NO*	NO
Biodegradation Rate (Fig. 3) (λ, time per year)	Model Calibration, Tracer Studies, Calculations	Biodegradation rate for dissolved contaminants after leaving source, exclusive of advection, dispersion, etc.	YES	NO	NO

* Note: Although assessment of an attenuation rate constant at a single location does not yield plume attenuation information, or plume trend information, an assessment of general trends of multiple wells over the entire plume is useful to assess overall plume attenuation and plume trends.

as k_{point}), derived from single well concentration vs. time plot, may be used to determine how long a plume will persist (Plume Duration). While concentration vs. time data at a single point in the plume are useful for determining trends at that location (i.e., are concentrations increasing, showing relatively little change, or declining), a rate constant calculated from concentration vs. time data at a single location cannot be used to estimate the trend of an entire plume.

Bulk attenuation rates (defined as k), derived from concentration vs. distance plots, can be used to indicate if a plume is expanding, showing relatively little change, or shrinking (Plume Trends).

Biodegradation rates (λ), modeling parameters which are specific to biodegradation effects and exclusive of dispersion, etc., can be used in appropriate solute transport models to indicate if a plume is expanding, showing relatively little change, or shrinking (Plume Trends).

For each of these first-order decay rate parameters, Table 2 summarizes information on the derivation and appropriate use as well as providing representative values. In summary, different types of first-order attenuation rate calculations are available to help evaluate natural attenuation processes at contaminated ground-water sites. These different types of rate constants represent different types of attenuation processes, therefore, the right type of rate constant should be used for the right purpose.

Examples 1-3 illustrate how the three types of rate constants are calculated and applied.

Key Point:

In general, all three types of rate constants are useful indicators that attenuation is occurring. Concentration vs. time rate constants (k_{point}) can be used to estimate the duration of contamination at a particular location. Concentration vs. time rate constants for wells encompassing the entire plume can be used to identify overall trends and predict the duration of the plume. Concentration vs. distance rate constants (k) and biodegradation rate constants (λ) can be used to project the rate of attenuation of contaminants along the flow path in ground water, and predict the spatial extent of the plume.

Tables 1 and 2 provide more detail on use, calculations, and analysis of the three types of rate constants. Examples 1-3 illustrate the use and application of the three types of rate constants.

Other Types of Rate Constants

Mass-Based Rate Constants. The previous discussion focused on concentration-based rates. It is also possible to calculate mass vs. time rate constants and mass vs. distance rate constants. In practice, these rates would be very similar to the concentration-based rates.

Mass vs. Time Rate Constant. This constant compares changes in the total mass of contaminants in the plume over time. A Thiessen polygon network can be used to weight the concentration data from all the available wells at a site to derive a comprehensive estimate of the mass of contaminants in the plume at any particular round of sampling. Mass vs. time decay rates (in units of inverse time) are estimated by plotting the natural log of total dissolved mass as a function of time and estimating the slope of the line. This rate is similar to the concentration vs. time rate and since it accounts for the entire plume, it is a good indicator of how long a plume will persist. Many plumes change flow direction over time, making it difficult to identify a stable centerline. Estimates based on the entire plume are less subject to errors caused by changes in flow direction. See Hyman and DuPont, 2001 and DuPont et al., 1998 for discussion and details of the methods.

Mass Flux vs. Distance Rate Constant. A mass vs. distance decay rate (in units of inverse time) can be calculated by plotting the natural log of mass flux through different transects perpendicular to the flow as a function of distance from the source and multiplying the slope of the best-fit line by the seepage velocity. Comparable to the bulk attenuation rate, this type of rate can be used to indicate if a plume is expanding, showing relatively little change, or shrinking. See Einarson and Mackay, 2001 for examples of mass flux calculations. Another method for calculating mass loss rates is described by the Remediation Technologies Development Forum (RTDF, 1997).

Mass Flux-Based Biodegradation Rate Constant. Mass fluxes across plume transects can be further analyzed to determine whether the observed mass loss spatially and temporally can be attributed to biodegradation and/or source decay. For this purpose, the mass flux across the source area is compared to the mass flux through the next downgradient section. Theoretically, mass fluxes at the downgradient transect should mimic the trends observed in the source transect if source decay, sorption, and dispersion were the only mass reduction attenuation mechanisms. If there is additional mass loss, it can only be attributed to biodegradation since the other processes are already accounted for in the mass flux calculation. Once the actual mass loss attributable to biodegradation has been determined, it is plotted as a function of time and a biodegradation rate is estimated using linear regression or a first-order decay model fit to the data. See Borden et al. (1997) and Semprini et al. (1995) for examples of biodegradation rates calculated from mass flux across transects.

Mass-based rate constants are not often used in practice due to the data needs for mass estimates including a dense well network as well as localized gradients, conductivity measurements, and aquifer thickness at monitoring points.

Average-Plume Concentration Rate Constants. Some researchers and practitioners have calculated rate constants for the change in average plume concentration. This rate constant reflects primarily the change in source strength over time.

Effect of Residual NAPL on Point Decay Rate Constant

When a monitoring well is screened across an interval that contains residual NAPL, and when the rate of weathering of the NAPL is slow, the well water may sustain high concentrations of contaminants over long periods of time.

Effect of NA Processes on Rate Constants

Natural attenuation processes include a variety of physical, chemical, or biological processes that act without human intervention to reduce the mass or concentration of contaminants in soil and ground water. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, radioactive decay, and chemical or biological stabilization, transformation, or destruction of contaminants (U.S. EPA, 1999).

Each of these processes influences contaminant concentrations in soil and ground water both spatially and temporally at a site. Contaminant concentrations in ground water are reduced as they travel downgradient from the source. Subject to source degradation, contaminant concentrations will also be reduced with time at any given distance downgradient from the source. These concepts are illustrated in Appendices II and III. The data in Appendix II illustrate the change in contaminant concentrations downgradient from the source at a hypothetical site in response to the different attenuation processes. It can be clearly seen from Appendix II that contaminant concentrations downgradient from source areas are attenuated due to dispersion, sorption, biodegradation and source decay. The data in Appendix III illustrate the change in contaminant concentrations with time at two points downgradient from the source at the hypothetical site (one point near the source and the other point at the leading edge of the plume). As can be seen from Appendix III, contaminant concentrations near the source will attenuate with time only if source decay is occurring. While source decay is also important for the leading edge of the plume, maximum contaminant concentrations in that zone are significantly attenuated from their source concentration counterparts due to biodegradation, sorption, and dispersion.

Uncertainty in Rate Calculations

Rate calculations can be affected by uncertainty from a number of sources, such as the design of the monitoring network, seasonal variations, uncertainty in sampling methods and lab analyses, and the heterogeneity in most ground-water plumes. Appendix I discusses uncertainty in rate calculations and provides methods for managing this uncertainty.

ORD has developed software (RaCES) to extract rate constants from field data. This software is intended to facilitate an evaluation of the uncertainty associated with the projections made by computer models of the future behavior of plumes of contamination in ground water. The software is available from The Ecosystem Research Division of the National Exposure Research Laboratory in Athens, Georgia (Budge et al., 2003).

Notice

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Quality Assurance Statement

All research projects making conclusions or recommendations based on environmental data and funded by the U.S. Environmental Protection Agency are required to participate in the Agency Quality Assurance Program. This project did not involve the collection or use of environmental data and, as such, did not require a Quality Assurance Project Plan.

Table 2. Quick Reference Summary of Three Types of Attenuation Rate Constants

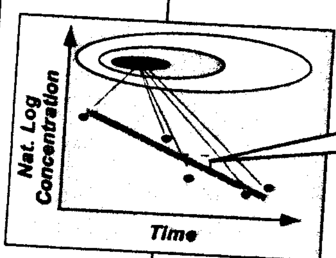
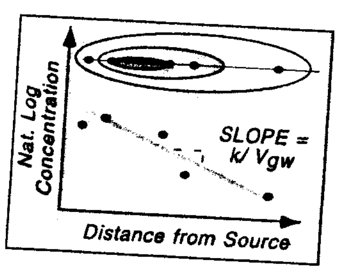
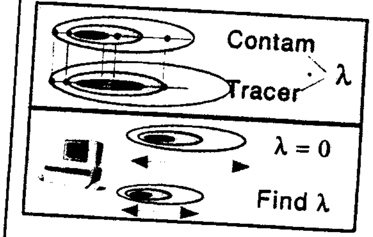
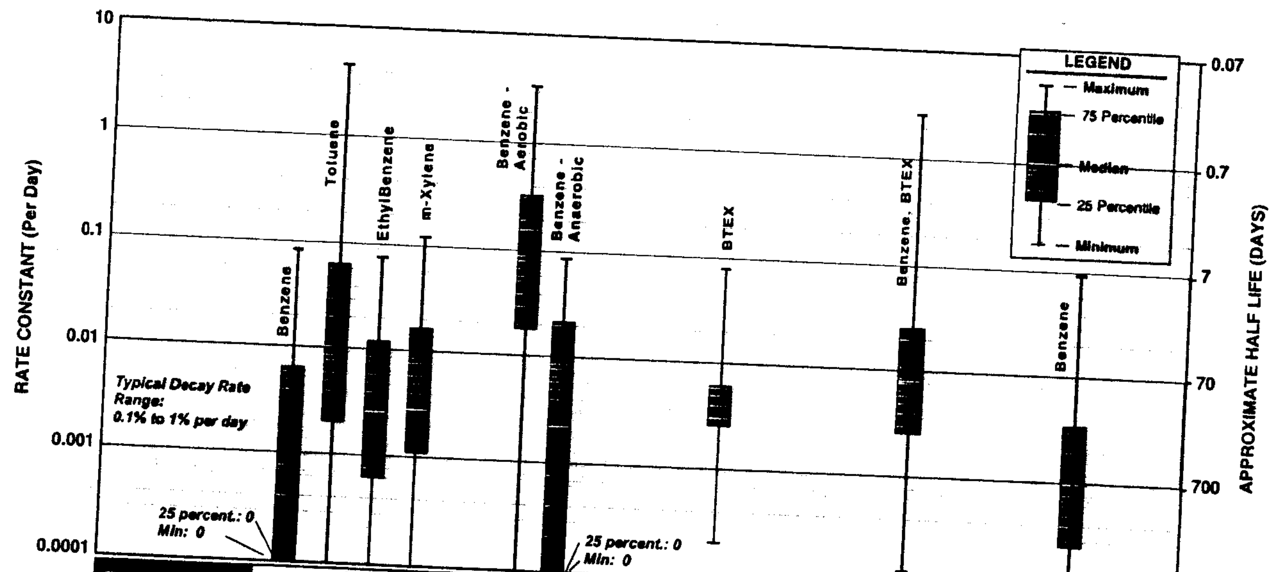
	Point Decay Rate Constant ([illegible])	Bulk Attenuation Rate Constant	[illegible] Rate Constant
USED FOR:	***Plume Duration Estimate.*** Used to estimate time required to meet a remediation goal at a particular point within the plume. If wells in the source zone are used to derive k_{point}, then this rate can be used to estimate the time required to meet remediation goals for the entire site. k_{point} should *not* be used for representing biodegradation of dissolved constituents in ground-water models (use λ as described in the right hand column).	***Plume Trend Evaluation.*** Can be used to project how far along a flow path a plume will expand. This information can be used to select the sites for monitoring wells and plan long-term monitoring strategies. Note that k should not be used to estimate how long the plume will persist except in the unusual case where the source has been completely removed, as the source will keep replenishing dissolved contaminants in the plume.	***Plume Trend Evaluation.*** Can be used to indicate if a plume is still expanding, or if the plume has reached a dynamic steady state. First calculate λ, then enter λ into a fate and transport model and run the model to match existing data. Then increase the simulation time in the model and see if the plume grows larger than the plume simulated in the previous step. Note that λ should not be used to estimate how long the plume will persist except in the unusual case where the source has been completely removed.
REPRESENTS:	Mostly the change in source strength over time with contributions from other attenuation processes such as dispersion and biodegradation. k_{point} is not a biodegradation rate as it represents how quickly the source is depleting. In the rare case where the source has been completely removed (for a discussion of source zones, see Wiedemeier et al., 1999), k_{point} will approximate k.	Attenuation of dissolved constituents due to all attenuation processes (primarily sorption, dispersion, and biodegradation).	The biodegradation rate of dissolved constituents once they have left the source. It does not account for attenuation due to dispersion or sorption.
HOW TO CALCULATE:	Plot natural log of concentration vs. time for a single monitoring point and calculate k_{point} = slope of the best-fit line (ASTM, 1998). This calculation can be repeated for multiple sampling points and for average plume concentration to indicate spatial trends in k_{point} as well.  Note this calculation *does not* account for any changes in attenuation processes, particularly Dual-Equilibrium Desorption (availability) which can reduce the apparent attenuation rate at lower concentrations (e.g., see Kan et al., 1998).	Plot natural log of conc. vs. distance. If the data appear to be first-order, determine the slope of the natural log-transformed data by: 1. Transforming the data by taking natural logs and performing a linear regression on the transformed data, or 2. Plotting the data on a semi-log plot, taking the natural log of the y intercept minus the natural log of the x intercept and dividing by the distance between the two points. Multiply this slope by the contaminant velocity (seepage velocity divided by the retardation factor R) to get k.  	Adjust contaminant concentration by comparison to existing tracer (e.g., chloride, tri-methyl benzenes) and then use method for bulk attenuation rate (see Wiedemeier et al., 1999); or Calibrate a ground-water solute transport computer model that includes dispersion and retardation (e.g., BIOSCREEN, BIOCHLOR, BIOPLUME III, MT3D) by adjusting λ; or Use the method of Buscheck and Alcantar (1995) (plume must be at steady-state to apply this method). Note this method is a hybrid between k and λ as the Buscheck and Alcantar method removes the effects of longitudinal dispersion, but does not remove the effects of transverse dispersion from their λ. 

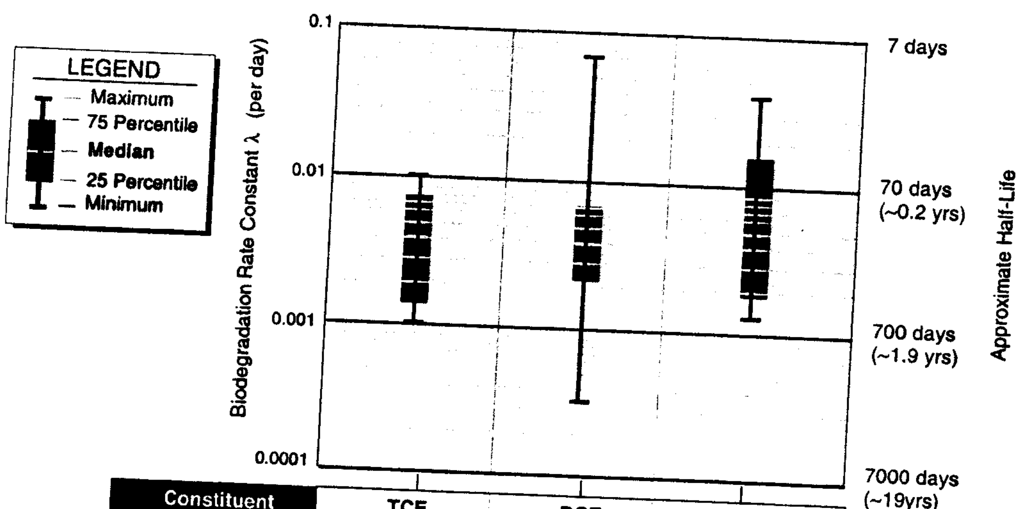
Table 2. Continued...

[illegible]	Point Decay Rate Constant ([illegible])	Bulk Attenuation Rate Constant ([illegible])	Biodegradation Rate Constant (λ)
HOW TO USE:	*To estimate plume lifetime:* The time (t) to reach the remediation goal at the point where K_{point} was calculated is: $t = \dfrac{-Ln\left[\dfrac{C_{goal}}{C_{start}}\right]}{k_{point}}$	*To estimate if a plume is showing relatively little change:* Pick a point in the plume but downgradient of any source zones. Estimate the time needed to decay these dissolved contaminants to meet a remediation goal as these contaminants move downgradient: $t = \dfrac{-Ln\left[\dfrac{C_{goal}}{C_{start}}\right]}{k}$ Calculate the distance L that the dissolved constituents will travel as they are decaying using V_s as the seepage velocity and R is the retardation factor for the contaminant: $L = \dfrac{V_s}{R} \cdot t$ If the plume currently has not traveled this distance L then this rate analysis suggests the plume may expand to that point. If the plume has extended beyond point L, then this rate analysis suggests the plume may shrink in the future. Note that an alternative (and probably easier method) is to merely extrapolate the regression line to determine the distance where the regression line reaches the remediation goal.	*To estimate if a plume is showing relatively little change:* Enter λ in a solute transport model that is calibrated to existing plume conditions. Increase the simulation time (e.g. by 100 years, or perhaps to the year 2525), and determine if the model shows that the plume is expanding, showing relatively little change, or shrinking.
TYPICAL VALUES:	Reid and Reisinger (1999) indicated that the mean point decay rate constant for benzene from 49 gas station sites was 0.46 per year (half-life of 1.5 years). For MTBE they reported point decay rate constants of 0.44 per year (half-life of 1.6 years). In contrast, Peargin (2002) calculated rates from wells that were screened in areas with residual NAPL; the mean decay rate for MTBE was 0.04 per year (half life of 17 years) the rate for benzene was 0.14 per year (half life of 5 years). Newell (personal communication) calculated the following median point decay rate constants: 0.33 per year (2.1 year half-life) for 159 benzene plumes at service station sites in Texas; and 0.15 per year (4.7 year half-life) for 37 TCE plumes around the U.S.	For many BTEX plumes, *k* will be similar to biodegradation rates λ (on the order of 0.001 to 0.01 per day; see Figure 4) as the effects of dispersion and sorption will be small compared to biodegradation.	For BTEX compounds, 0.1 - 1 %/day (half-lives of 700 to 70 days)(Suarez and Rifai, 1999). Chlorinated solvent biodegradation rates may be lower than BTEX biodegradation rates at some sites (Figures 4 and 5). For more information about biodegradation rates for a variety of compounds, see Wiedemeier et al., 1999 and Suarez and Rifai, 1999.



Type Rate Const:	λ	λ	λ	λ	k and λ
Source:	Suarez & Rifai, 1999	Suarez & Rifai, 1999	Wied. et al, 1999	Rifai & Newell, 2002	Rifai et al, 1995
Number:	35-50 studies	23-61 studies	23 Air Force sites	66 Florida Gas Stations	14 sites
Field or Lab:	Field Only	Lab Only	Field Only	Field	Field Only
Constituents:	B, T, E, X	Benzene	BTEX	Benzene and BTEX	Benzene

Figure 4. Biodegradation Rate Constants (λ) and Bulk Attenuation Rate Constants (*k*) for BTEX compounds from the literature. Source: Rifai and Newell, 2001.



Constituent	TCE	cDCE	VC
Number of Sites	10	9	7

Figure 5. Biodegradation Rate Constants (λ) for Trichloroethene (TCE), cis-Dichloroethene (cDCE), and Vinyl Chloride (VC) compounds from BIOCHLOR modeling studies. Source: Aziz et al., 2000.

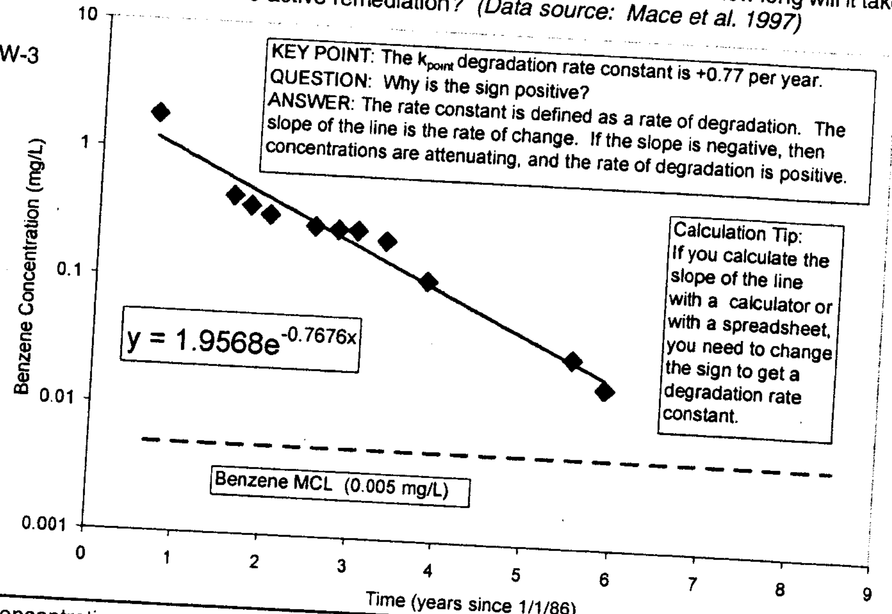
EXAMPLE 1. *Use of Concentration vs. Time Rate Constants (k_{point})*

INTRODUCTION: A leaking underground storage tank site in Elbert, Anystate, has a maximum source concentration of 1.800 mg/L of benzene at well MW-3. A remediation goal of 0.005 mg/L of benzene has been established. How long will it take for this site to reach the remediation goal using MNA with no active remediation? *(Data source: Mace et al. 1997)*

DATA:

The following are data from well MW-3 for the period 1986 to 1991.

DATE	Years Since 1/1/86	MW-3 Benzene (mg/L)
8/19/86	0.63	1.800
7/17/87	1.54	0.440
9/29/87	1.74	0.370
12/19/87	1.96	0.320
6/25/88	2.48	0.270
9/30/88	2.75	0.260
12/21/88	2.97	0.260
4/25/89	3.31	0.220
10/23/89	3.81	0.110
7/4/91	5.50	0.030
11/20/91	5.88	0.018



CALCULATION: Construct a plot of concentration vs. time. Although the plot can be developed in many ways, the clearest way is to convert the time data to years using an arbitrary starting point (for this example we chose 1/1/86). By transforming the concentrations to natural log concentration, and using a spreadsheet or calculator to get the slope (-0.77) and intercept (0.67), the following equation of the line was generated:

Ln (Conc. Benzene) = exp $^{(0.67-0.77x)}$ which resulted in the following rate equation:

Benzene concentration (mg/L) = 1.96 mg/L* exp $^{(-0.77 \text{ yrs since } 1/1/86)}$ where k_{point} = +0.77 per year.

Rearranging the equation:

Time (years since 1/1/86) = - Ln [Conc. Benzene (mg/L) / 1.96] / 0.77

For the case where the remediation goal is 0.005 mg/L benzene,

Time (years since 1/1/86) = - Ln [0.005 / 1.96] / 0.77 = 7.7 years = **late 1993**

A statistical analysis of the uncertainty involved in the calculation can be performed by determining the "one tailed" 90% confidence interval using the methods outlined in Appendix I. The "one tailed" 90% confidence limit on the time to remediation is a time that is no longer than 8.6 years from 1/1/86, or late 1994.

Plume Attenuation?

The concentration vs. time rate constant is positive, indicating that attenuation at this location (the source zone in this example) is occurring. The attenuation is probably due to weathering of the source caused by dissolution of benzene from a residual NAPL into flowing ground water. Raoult's Law predicts that weathering from dissolution will be a first-order process.

Plume Trends?

The concentration vs. time rate constant is positive, indicating that concentrations in this portion of the plume are going down and that at least a portion of the plume may be shrinking. However, from the information obtained at a single location, no conclusion can be drawn regarding the overall plume trend.

Plume Duration?

The concentration vs. time rate constant was used to show that if current trends hold then the plume will reach the clean-up goal in 1994. Note this assessment does not consider any other processes which could reduce the observed attenuation rate (i.e., changes in water levels, availability effects at low concentration as described by Kan et al., 1998, etc.).

Key Point:

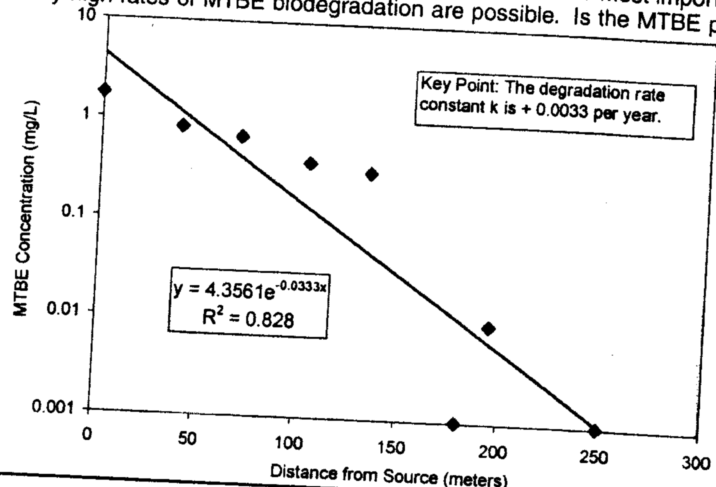
A concentration vs. time rate constant is one of the best ways to estimate how long MNA (or any type of remediation system) might take to reach a clean-up goal. A second method is to perform a mass-based approach (i.e., see DuPont et al., 1998; Hyman and DuPont, 2001; Newell et al., 1996 or Chapter 2 of Wiedemeier et al., 1999).

EXAMPLE 2. *Use of Concentration vs. Distance Rate Constants (k)*

INTRODUCTION: This constant is estimated between wells along the inferred centerline of the plume. An MTBE plume at a former fuel farm located at a U.S. Coast Guard Base has a maximum source zone concentration of 1.740 mg/L of MTBE. The average calculated seepage velocity at the site was calculated to be 82 meters per year and the retardation factor, R, is assumed to be equal to one. For the purpose of this example, a clean-up goal of 0.030 mg/L was assumed. Most importantly, the site is strongly anaerobic, indicating that relatively high rates of MTBE biodegradation are possible. Is the MTBE plume attenuating? How far should it extend?
(source: Wilson et al., 2000).

DATA:
The following is data from wells along the plume centerline:

Well	Distance from Source(m)	MTBE Conc.(mg/L)
CPT-1	0	1.74
CPT-3	40	0.823
CPT-5	70	0.672
ESM-14	104	0.383
ESM-3	134	0.319
ESM-9	180	0.001
ESM-10	195	0.0097
GP-1	250	0.001



CALCULATION: First, plot the natural log of concentration vs. distance at a point in time and calculate the slope of the best-fit line using linear regression analysis, as shown above. The slope of the C vs. D plot is -0.033 per meter of travel.

Next, calculate the bulk attenuation rate constant, k, by multiplying the negative of the slope of the regression by the contaminant velocity. The contaminant velocity equals the seepage velocity divided by the retardation factor. In this case the retardation factor is 1, and the contaminant velocity is 82 meters per year. The bulk attenuation rate is (+0.033 per meter) * (82 meter per year) = 2.7 per yr. This corresponds to a dissolved-phase half-life of 0.26 yrs (0.26 yrs = 0.69 / 2.7 per yr) <u>after the MTBE leaves the source zone.</u>

To estimate the travel time required for the concentration of MTBE to attenuate to the cleanup goal, use the equation in Table 2. The travel time to reach the remediation goal at the down gradient margin of the plume is 1.5 years (1.5 yr = - Ln [0.030 mg/L/ 1.74 mg/L] / 2.7 per y). Based on the calculated attenuation rate, an MTBE source concentration of 1.74 mg/L, and a cleanup goal of 0.030 mg/L, the MTBE plume should extend 123 meters from the source (123 meters = 82 meters per yr * 1.5 yr travel time).

A sensitivity analysis can be performed on the rate estimates. See Appendix I for a discussion of confidence intervals. The one-tailed 95% confidence interval on the slope is -0.021 per foot. At a seepage velocity of 82 meters per year, this is equivalent to a concentration vs. distance rate constant (k) of 1.7 per year. The plume would require 2.4 years of travel in the aquifer to attenuate to the cleanup goal. At 95% confidence, the plume boundary would be no more than 200 meters from the source. The estimate of seepage velocity is also subject to uncertainty. A reasonable upper boundary on the seepage velocity at this site is 150 meters per year (Wilson et al., 2000). At the upper bound on seepage velocity, and at the 95% confidence interval on the slope, the MTBE plume would extend no more than 360 meters.

Plume Attenuation?
The calculated concentration vs. distance rate constant is positive, indicating that attenuation of dissolved MTBE is occurring after the MTBE leaves the source zone. The rate constant of 2.7 per year indicates that dissolved MTBE concentrations will be reduced by 50% every 0.25 yrs <u>after the MTBE leaves the source zone.</u> It does not indicate the entire plume will be reduced in concentration by 50% in 0.25 yrs.

Plume Trends?
In theory, the concentration vs. distance rate constant can provide supporting evidence that the plume may be showing relatively little change or shrinking in the future. However, an analysis of concentration vs. time data for all locations within an adequately delineated plume is a much more direct and robust method for estimating plume trends.

Plume Duration?
A concentration vs. distance rate constant is not useful for estimating plume duration (i.e., the time to reach a clean-up goal). A mass-based analysis by Wilson et al., 2000 indicated that 60 years might be required to reach the clean-up goal.

Key Point:
Concentration vs. distance rate constants cannot be used for estimating remediation time frames, and are only marginally useful for estimating plume trends. This type of rate constant is most useful to predict the boundaries of a plume. It can be used to plan the location of monitoring wells or sentinel wells. This rate constant is also used with other information to calculate the rate of biodegradation.

Example 3. Use of Biodegradation Rate Constants (λ).

INTRODUCTION: A chlorinated solvent plume at the Cape Canaveral Air Force Base, Florida, has maximum source concentrations of 0.056 mg/L Tetrachloroethene (PCE), 15.8 mg/L Trichloroethene (TCE), 98.5 mg/L cis-Dichloroethene (DCE), and 3.08 mg/L Vinyl Chloride (VC), 33 years after the spill originally occurred. The calculated seepage velocity at the site is 111.7 ft per year. Based on the existing distribution of chlorinated solvents and degradation products, how far down the flow path will the plume extend when it eventually comes to a steady state? This example is based on the example in Appendix A.6 of the User's Manual for the BIOCHLOR natural attenuation decision support system (Aziz et al., 2000). This model and the user's guide can be downloaded at no cost from the EPA Center for Subsurface Modeling Support (CSMoS) at http://www.epa.gov/ada/csmos/models.html.

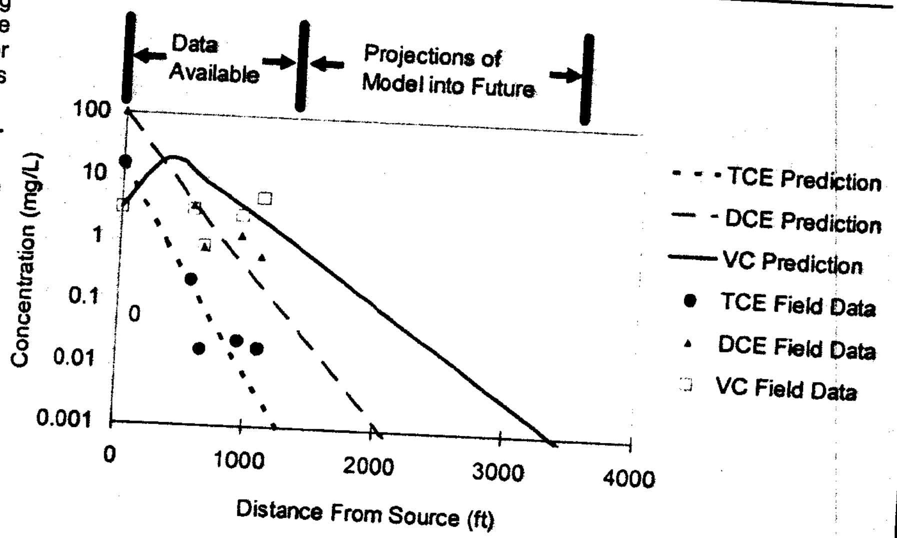
Well	*Distance from Source (feet)*	*PCE (mg/L)*	*TCE (mg/L)*	*cis-DCE (mg/L)*	*VC (mg/L)*
CCFTA2-9S	0	0.056	15.8	98.5	3.08
MP-3	560	<0.001	0.220	3.48	3.08
CPT-4	650	ND	0.0165	0.776	0.797
MP-6	930	<0.001	0.0243	1.2	2.52
MP-4s	1085	<0.001	<0.001	0.556	5.02

CALCULATION: The following approach was used to determine biodegradation rate constants for each of the chlorinated solvents using a solute transport model:

Step 1: Perform parameter estimation and enter data into model.

Step 2: By trial-and-error, adjust the first-order biodegradation rate constants (λ) to match the observed site data. The resulting first-order biodegradation rate constant for PCE was 2.0 per year (half-life of 0.34 years), for TCE was 1.0 per year (half-life was 0.7 years), for cis-DCE was 0.7 per year (half-life 1.0 years) and for VC was 0.4 per year (half- life of 1.7 years).

Step 3: Run the simulation forward in time until it comes to an apparent steady state.



Step 4: Compare the simulated distribution of contaminants to the existing data used to calibrate the model. As discussed in Example 1, attenuation rates for declining concentration are positive values. When compared to values in the literature (see Figures 4 and 5), the values appear to be reasonable. All plume lengths were projected to the boundary defined by the MCL for Vinyl Chloride. Available data to calibrate the model extended 1085 ft from the source. The model was calibrated to the first 33 years of the plume. When the simulation was extended to 100 years the projections reached a steady state. At steady-state, there was no significant increase in the length of the TCE plume, but the cis-DCE plume was approximately twice as long at the time data available for calibration were collected, and the VC plume was approximately three times as long.

Plume Attenuation?
The calculated biodegradation rate constant is positive, indicating that biodegradation of dissolved chlorinated solvents *is occurring after the solvents leave the source zone.* PCE and TCE had the highest rates, while VC had the lowest rate at this site.

Plume Trends?
The screening model used biodegradation rate constants to project the future distribution of PCE, TCE, cis-DCE, and VC. The model projects relatively little change in the PCE, and TCE plumes, but the model predicts that the cis-DCE and VC plumes are expanding. To confirm the true behavior of the cis-DCE and VC plume, it may be necessary to install more monitoring wells to adequately delineate the plume, and collect data on concentration vs. time in all the wells in the plume.

Plume Duration?
A biodegradation rate constant is not useful for estimating the duration of the plume (i.e., the time to reach a clean-up goal).

Key Point:
Biodegradation rate constants cannot be used for estimating remediation time frames, but are useful for identifying possible trends in the behavior of plumes using mathematical models.

References

American Society for Testing and Materials, 1998. Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites. E 1943-98, West Conshohocken, PA. www.astm.org

Aziz, C.E., C.J. Newell, J.R. Gonzales, P.E. Haas, T.P. Clement, and Y. Sun, 2000. BIOCHLOR Natural Attenuation Decision Support System, User's Manual Version 1.1, U.S. EPA, Office of Research and Development, EPA/600/R-00/008, Washington D.C., www.epa.gov/ada/csmos/models.html

Borden, R.C., R.A. Daniel, L.E. LeBrun IV, and C.W. Davis, 1997. Intrinsic Biodegradation of MTBE and BTEX in a Gasoline-Contaminated Aquifer. Water Resour. Res. 33(5):1105-1115.

Budge, T., S. Young, and J. Weaver. 2003. Rate-Constant Estimation Software (RaCES) for Extracting Biodegradation Rates from Field Data. Available in 2003 from Jim Weaver at weaver.jim@epa.gov, Later in 2003 the software will be available at http://www.epa.gov/athens/onsite/index.html, and http://www.epa.gov/ceampubl/gwater/index.htm

Buscheck, T.E., and C.M. Alcantar, 1995. "Regression Techniques and Analytical Solutions to Demonstrate Intrinsic Bioremediation." In, *Proceedings* of the 1995 Battelle International Conference on In-Situ and On Site Bioreclamation, R. E. Hinchee and R. F. Olfenbuttel eds., Battelle Memorial Institute, Butterworth-Heinemann, Boston, MA.

Dupont, R.R., C. J. Bruell, D. C. Downey, S. G. Huling, M. C. Marley, R. D. Norris, B. Pivetz, 1998. Innovative site remediation technology,design and application. Bioremediation. American Academy of Environmental Engineers, Annapolis, MD. 450 pp.

Einarson, M.D. and D.M. Mackay, 2001. Predicting Impacts of Groundwater Contamination. Environ. Sci. Technol. 35(3):66A-73A.

Hyman, M., and R.R. Dupont, 2001. Groundwater and soil remediation: process design and cost estimating of proven technologies. American Society of Civil Engineers Press, Reston, VA. 517 pp.

Kan, A.T., G. Fu, M. Hunter, W. Chen, C.H. Ward, and M.B. Tomson, 1998. "Irreversible Sorption of Neutral Hydrocarbons to Sediments: Experimental Observations and Model Predictions," Environ. Sci. Technol., 32: 892-902.

Kolhatkar, R., J. Wilson, and L.E. Dunlap. 2000. Evaluating Natural Biodegradation of MTBE at Multiple UST Sites. Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference, API, NGWA, STEP Conference and Exposition, Anaheim, CA, November 15-17, 2000, pp. 32-49.

Mace, R.E., R.S. Fisher, D.M. Welch, and S.P. Parra, 1997. Extent, Mass, and Duration of Hydrocarbon Plumes from Leaking Petroleum Storage Tank Sites in Texas, Bureau of Economic Geology, University of Texas, Geologic Circular 97-1, Austin, Texas, 1997.

New Jersey Department of Environmental Protection, 1998. Final Guidance on Designation of Classification Exception Areas, www.state.nj.us/dep/srp/dl/ceaguid2.pdf

Newell, C.J., and J.A. Connor, 1998. Characteristics of Dissolved Hydrocarbon Plumes: Results of Four Studies, American Petroleum Institute, Washington D.C., December, 1998. www.gsi-net.com

Newell, C.J., S.K. Farhat, P.C. de Blanc, and J.R. Gonzales, 2002. BIOSOURCE Source Attenuation Decision Support System and Database," Air Force Center for Environmental Excellence, Brooks AFB, TX, in review.

Newell, C.J., R.K. McLeod, and J. Gonzales, 1996. BIOSCREEN Natural Attenuation Decision Support System, EPA /600/R-96/087, August, 1996. www.epa.gov/ada/csmos/models.html

Newell, C.J., L.P. Hopkins, and P.B. Bedient, 1990. "A Hydrogeologic Database for Ground Water Modeling." Ground Water, 28(5): 703-714.

Peargin, T.R., 2002. Relative Depletion Rates of MTBE, Benzene, and Xylene from Smear Zone Non-Aqueous Phase Liquid. In *Bioremediation of MTBE, Alcohols, and Ethers.* Editors V.S. Magar, J.T. Gibbs, K.T. O'Reilly, M.R. Hyman, and A. Leeson. Proceedings of the Sixth International In Situ and On-Site Bioremediation Symposium. San Diego, California, June 4-7, 2001. Battelle Press. Pages 67 to 74.

Reid, J. B., and Reisinger, H. J. 1999. Comparative MtBE versus Benzene Plume Length Behavior BP Oil Company Florida Facilities. Prepared by Integrated Sciences & Technology, Marietta, Georgia for BP Oil Company, Cleveland, Ohio.

Remediation Technologies Development Forum, 1997. Natural Attenuation of Chlorinated Solvents in Groundwater Seminar, RTDF, www.dep.state.pa.us/dep/deputate/airwaste/wm/remserv/biotreat/P_Pman.pdf.

Rifai, H.S., R. C. Borden, J. T. Wilson and C. H. Ward. (1995). Intrinsic bioattenuation for subsurface restoration, *Intrinsic Bioremediation*, R. E. Hinchee, J.T. Wilson, and D.C. Downey, eds., Battelle Memorial Institute, Columbus, OH, 1-29.

Rifai, H. S., and C.J. Newell, 2002. Estimating First Order Decay Constants for Petroleum Hydrocarbon Biodegradation in Groundwater, American Petroleum Institute, Soil/Groundwater Technical Task Force, Washington, DC.

Rice, D.W., R.D. Grose, J.C. Michaelsen, B.P. Dooher, D.H. MacQueen, S.J. Cullen, W.E. Kastenberg, L.G. Everett, and M.A. Marino, 1995. California Leaking Underground Fuel Tank (LUFT) Historical Case Analysis, California Environmental Protection Department, November 16, 1995.

Semprini, L., P.K. Kitanidis, D.H. Kampbell, and J.T. Wilson, 1995. Anaerobic Transformation of Chlorinated Aliphatic Hydrocarbons in a Sand Aquifer Based on Spatial Chemical Distributions. Water Resour. Res. 31(4):1051-1062.

Suarez, M. P. and H. S. Rifai, 1999. Biodegradation Rates for Fuel Hydrocarbons and Chlorinated Solvents in Groundwater, Bioremediation J., 3(4):337 - 362, 1999.

U.S. Environmental Protection Agency, 1998a. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, EPA/600/R/128, Washington D.C., Sept. 1998. www.epa.gov/swerust1/oswermna/mna_epas.htm

U.S. Environmental Protection Agency, 1998b. Seminar Series on Monitored Natural Attenuation for Ground Water, EPA/625/K-98/001, Washington, D.C., September 1998. www.epa.gov/swerust1/oswermna/mna_epas.htm

U.S. Environmental Protection Agency, 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, Office of Solid Waste and Emergency Response (OSWER), Directive 9200.4-17P, Final Draft, Washington, D.C., April 21, 1999. www.epa.gov/swerust1/oswermna/mna_epas.htm

Wiedemeier, T. H, H.S. Rifai, C. J. Newell, and J. T. Wilson, 1999. *Natural Attenuation of Fuel Hydrocarbons and Chlorinated Solvents in the Subsurface*, John Wiley and Sons, NY, 1999. www.gsi-net.com

Wiedemeier, T.H., J.T. Wilson, D.H. Kampbell, R.N. Miller, and J.E. Hansen, 1995. Technical Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater (Revision 0), Air Force Center for Environmental Excellence, Brooks AFB, TX, November 1995.

Wilson, J.T., J.S. Cho, B.H. Wilson, and J.A. Vardy, 2000, Natural Attenuation of MTBE in the Subsurface under Methanogenic Conditions, EPA/600/R-00/006, www.epa.gov/ada/publications.html.

Wilson, J.T., and R. Kolhatkar. 2002. Role of Natural Attenuation in Life Cycle of MTBE Plumes. J. Environ. Eng., 128(9):876-882.

Wisconsin Department of Natural Resources, 1999. Interim Guidance on Natural Attenuation for Petroleum Releases, PUBL-RR-614, Wisconsin DNR, Bureau for Remediation and Redevelopment.

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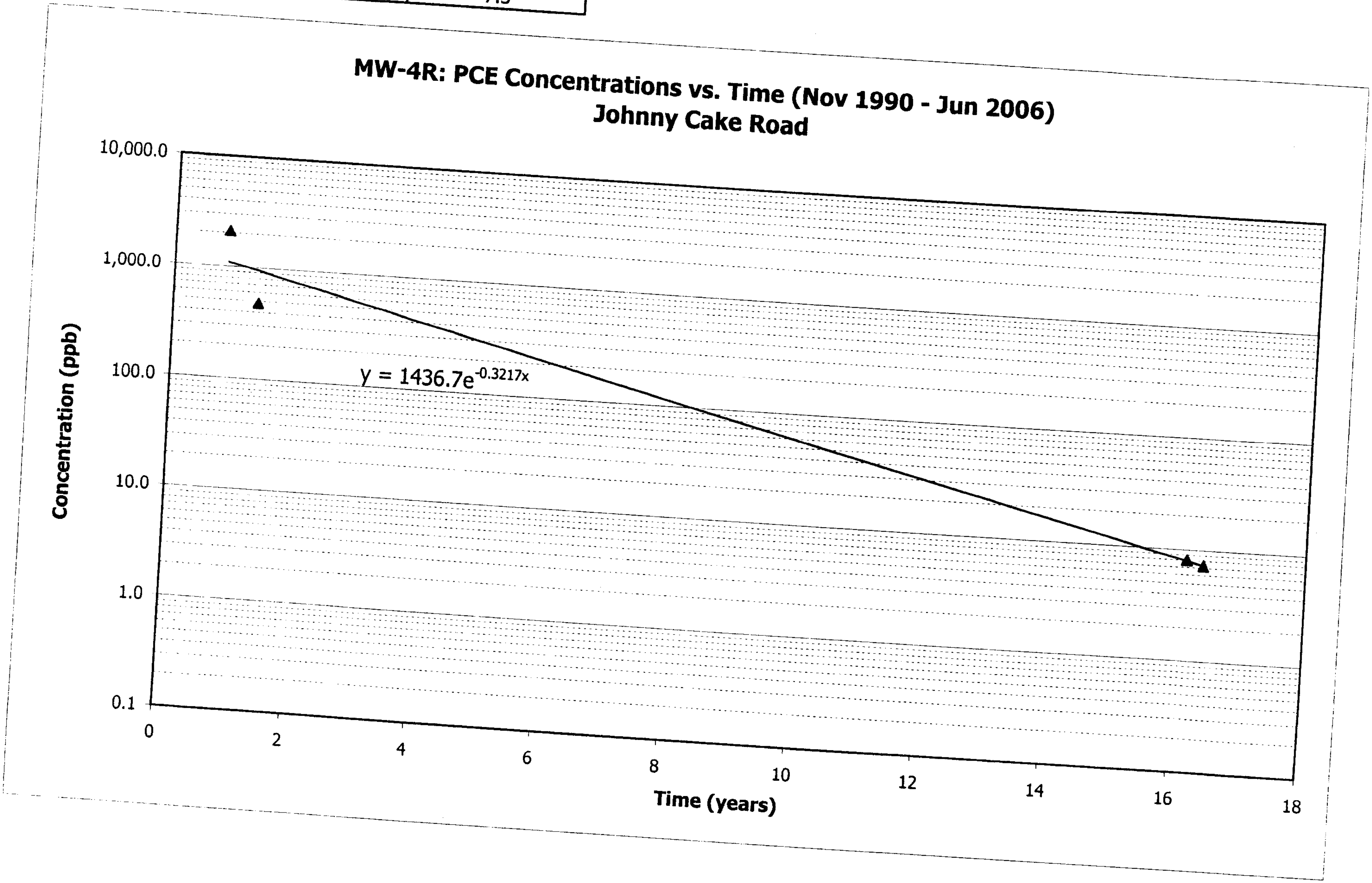
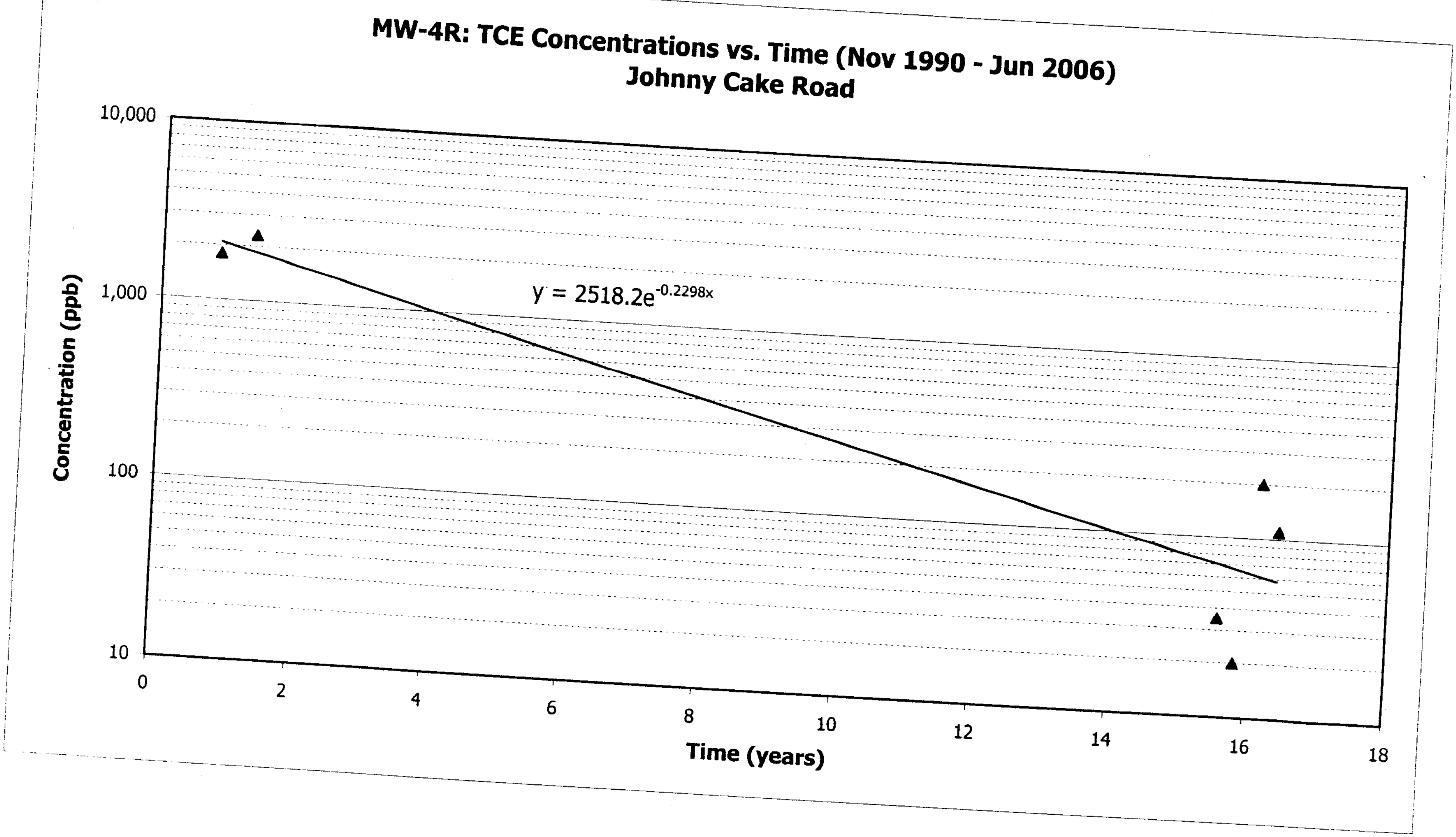
APPENDIX B

Contaminant Concentration vs. Time Graphs
Johnny Cake Road
Technical Memorandum
October 2006

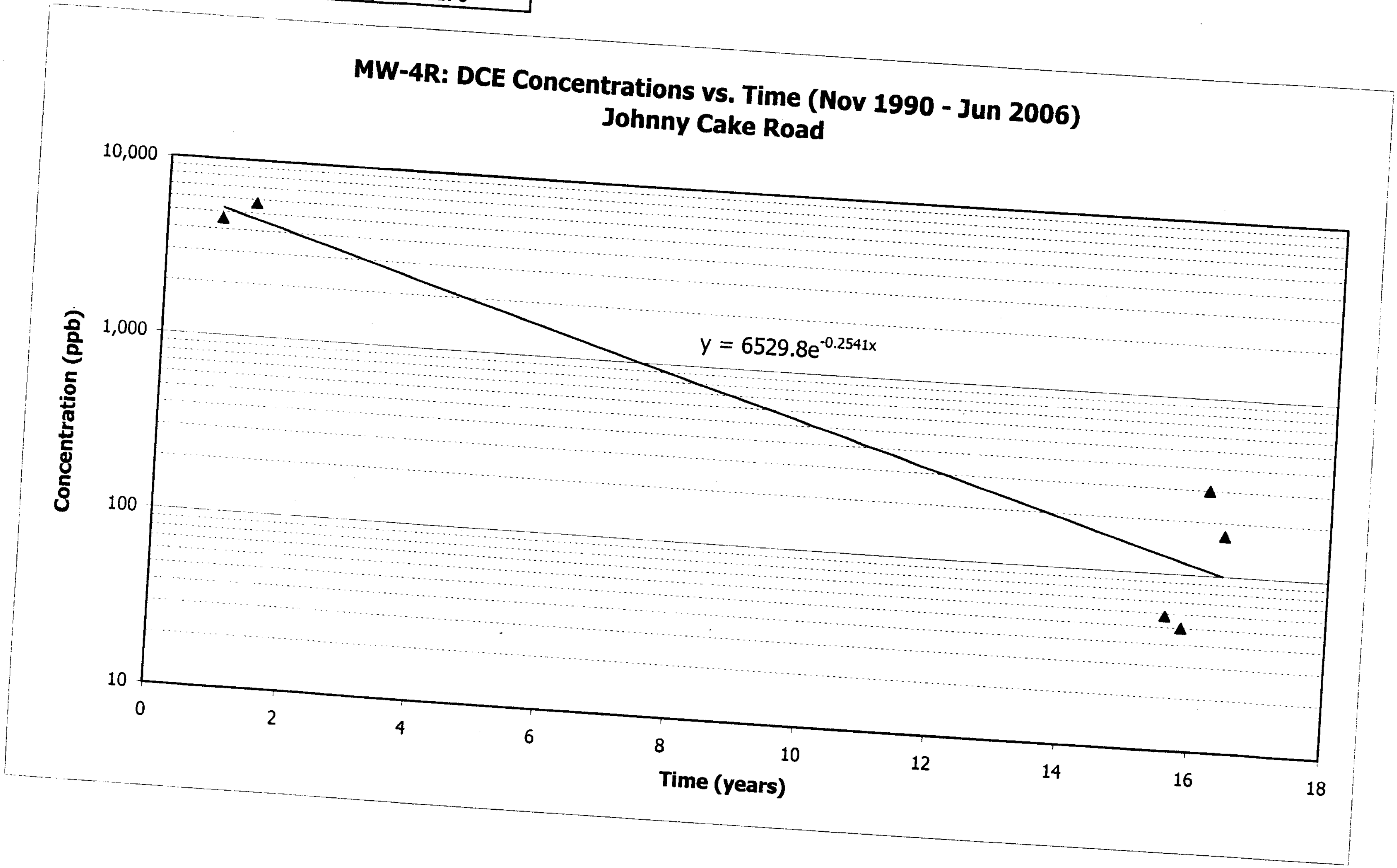
Date	Time since 1/90	PCE (ppb)
Nov-90	0.83	2,100
May-91	1.33	480
Mar-06	16.16	8.1
Jun-06	16.42	7.3



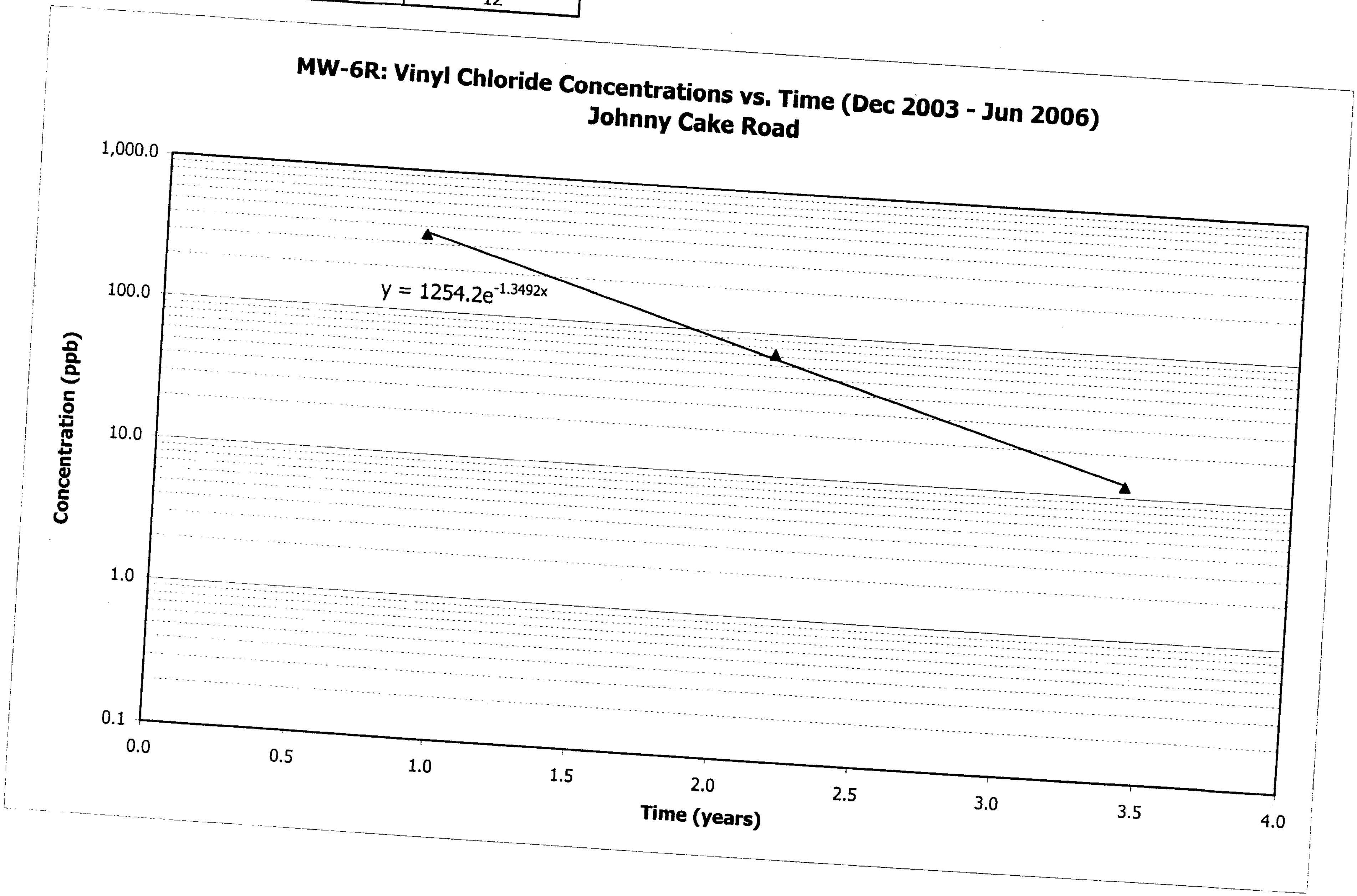
Date	Time since 1/90	TCE (ppb)
Nov-90	0.83	1,800
May-91	1.33	2,300
Aug-05	15.58	35
Nov-05	15.83	20
Mar-06	16.16	200
Jun-06	16.42	110



Date	Time since 1/90	DCE-total (ppb)
Nov-90	0.83	4,600
May-91	1.33	5,700
Aug-05	15.58	58
Nov-05	15.83	50
Mar-06	16.16	300
Jun-06	16.42	170

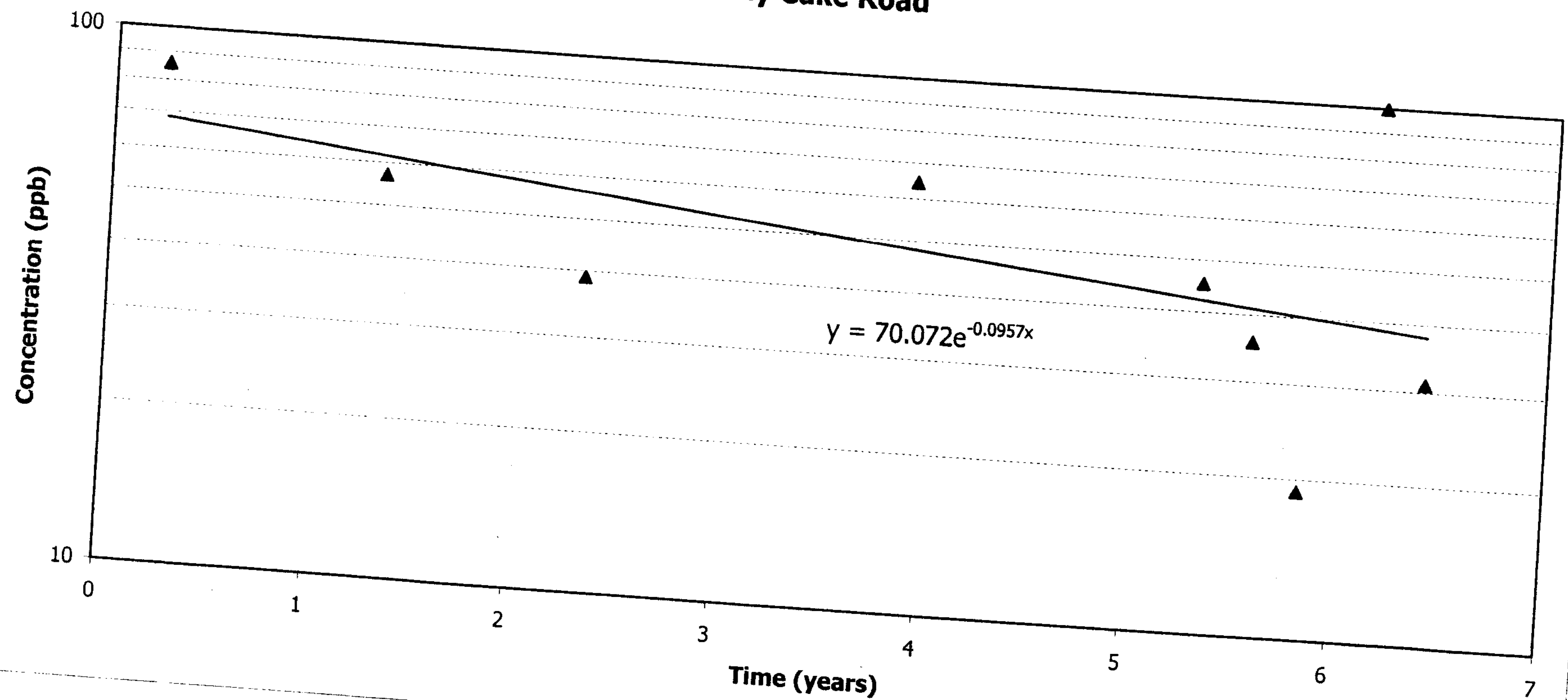


Date	Time since 1/03	VC (ppb)
Dec-03	0.92	350
Mar-05	2.17	72
Jun-06	3.42	12

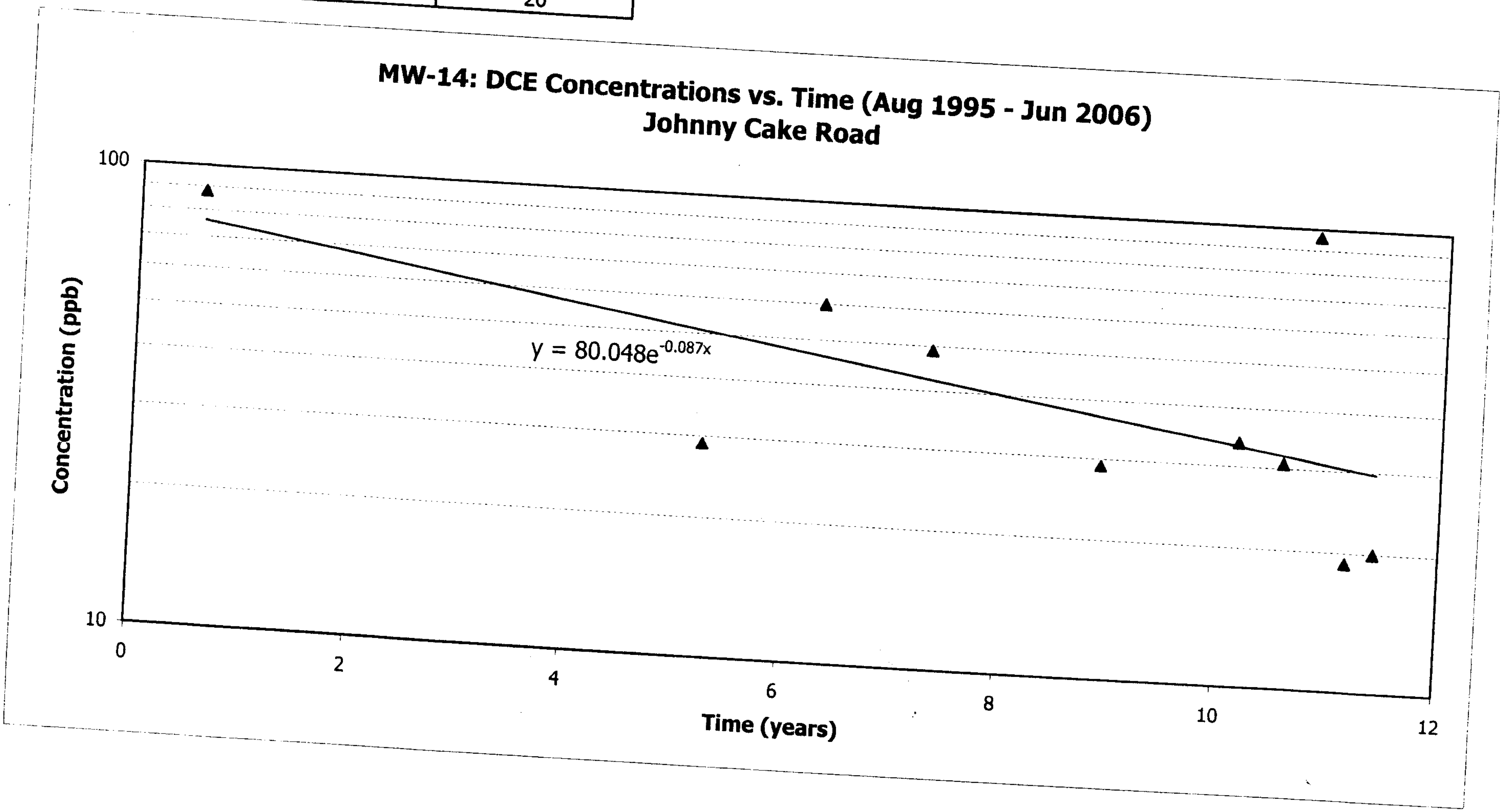


Date	Time since 1/00	DCE-total (ppb)
Apr-00	0.25	86
May-01	1.33	57
May-02	2.33	39
Dec-03	3.92	64.4
Mar-05	5.33	45.1
Aug-05	5.58	35.6
Nov-05	5.83	19
Mar-06	6.17	100
Jun-06	6.42	31

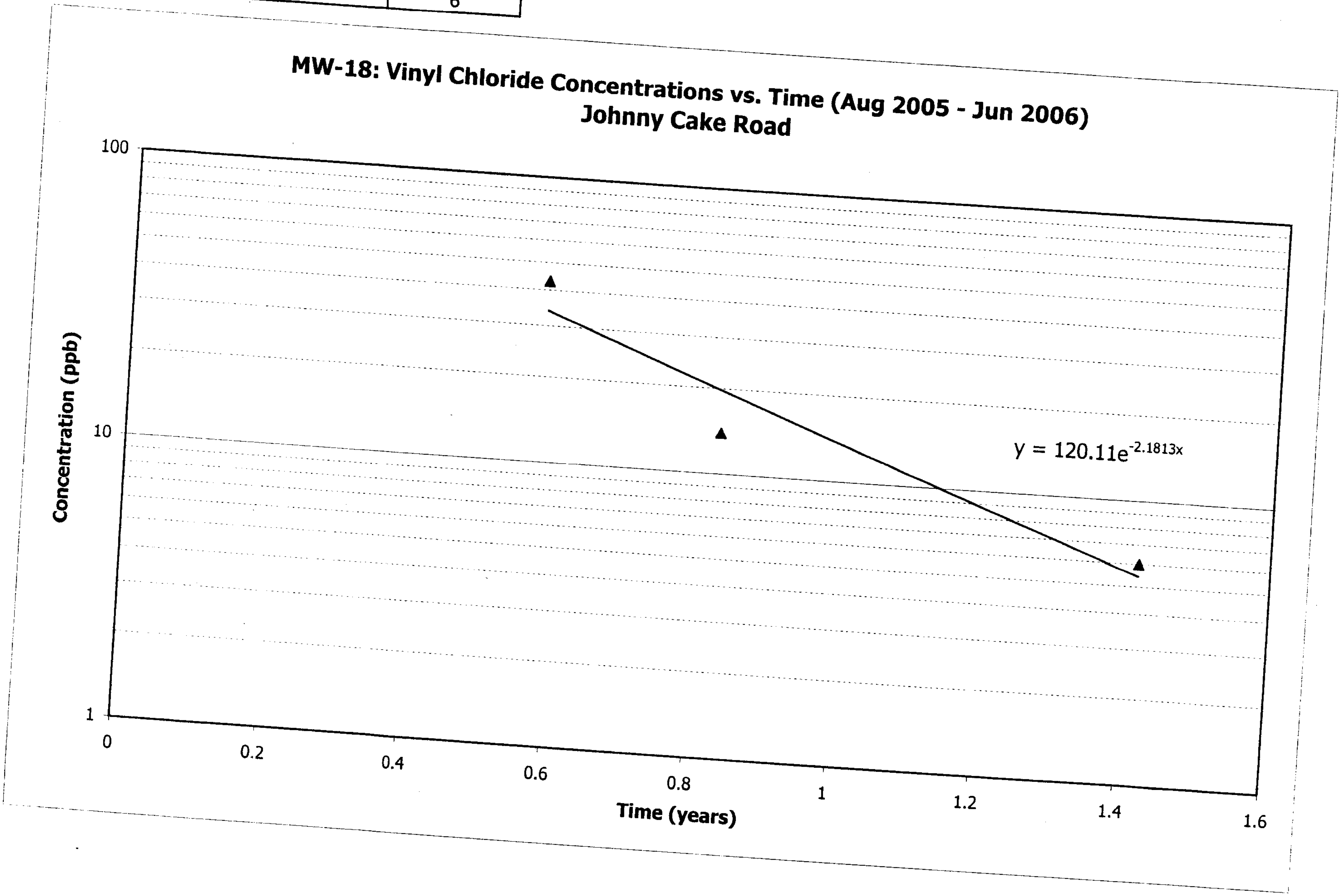
MW-13: DCE Concentrations vs. Time (Apr 2000 - Jun 2006)
Johnny Cake Road



Date	Time since 1/95	DCE-total (ppb)
Aug-95	0.58	88
Apr-00	5.25	29
May-01	6.33	60
May-02	7.33	49
Dec-03	8.92	29
Mar-05	10.17	33.7
Aug-05	10.58	30.7
Nov-05	10.83	96
Mar-06	11.17	19
Jun-06	11.42	20



Date	Time since 1/05	VC (ppb)
Aug-05	0.58	43
Nov-05	0.83	14
Jun-06	1.42	6

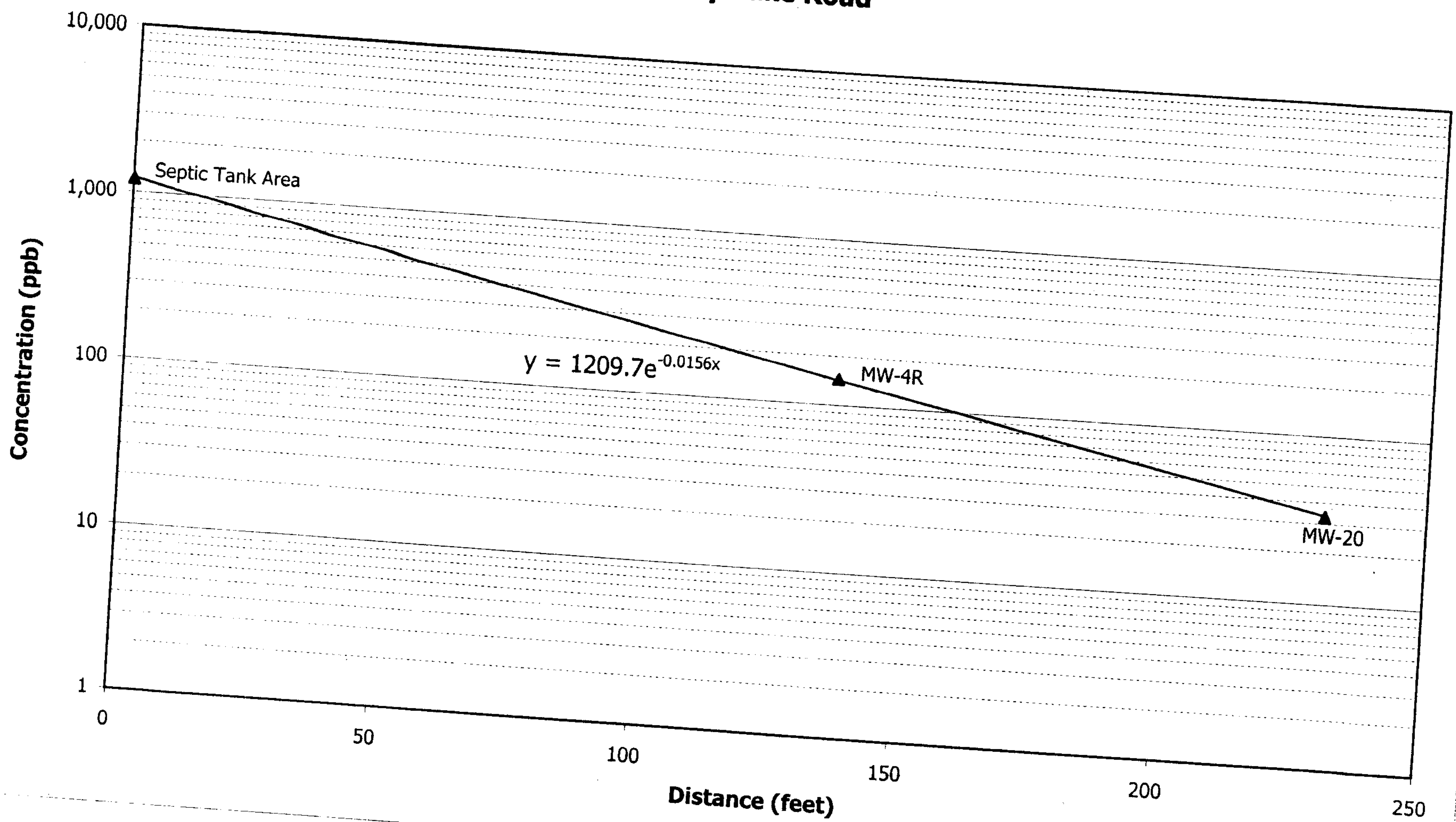


APPENDIX C

Contaminant Concentration vs. Distance Graphs
Johnny Cake Road
Technical Memorandum
October 2006

Distance feet)	DCE (ppb)	Location
0.1	1,200	Septic tank area (near MW-6R)
137	146	MW-4R
231	33	MW-20

DCE: Distance vs. Concentration
Johnny Cake Road



Distance feet)	VC (ppb)	Location
0.1	21	MW-18
63	3	M[illegible]
157	2.3	[illegible]0