INSTALLATION RESTORATION PROGRAM
TWIN CITIES ARMY AMMUNITION PLANT

FISCAL YEAR 2005 ANNUAL PERFORMANCE REPORT

Distribution is limited to U.S. Government Agencies only for protection of privileged information. Other requests for the document must be referred to:

Commander
Twin Cities Army Ammunition Plant
4700 Highway 10, Suite A
Arden Hills, Minnesota
55112-3928

Prepared for:

Commander
Twin Cities Army Ammunition Plant
4700 Highway 10, Suite A
ATTN: DAIM-BO-A-TW
Arden Hills, Minnesota 55112-3928

WENCK ASSOCIATES, INC.

ALLIANT TECHSYSTEMS INC.
CONESTOGA-ROVERS & ASSOCIATES, INC.
SECOR INTERNATIONAL, INC.

November 2006
FINAL REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

November 21, 2006 SR-6J

Mr. Michael R. Fix
Remedial Project Manager
Twin Cities Army Ammunition Plant
4700 Highway 10 – Suite A
Arden Hills, MN 55112- 3928

RE: Consistency Test for the Fiscal Year 2005 Annual Performance Report, Twin Cities Army Ammunition Plant, Arden Hills, Minnesota

Dear Mr. Fix:

Staff at the U.S. Environmental Protection Agency (U.S. EPA) and the Minnesota Pollution Control Agency (MPCA) have completed review of the Fiscal Year 2005 Annual Performance Report (Report). Our review of the Report included the following documents and communications:

- Fiscal Year 2005 Annual Performance Report, Installation Restoration Program, Twin Cities Army Ammunition Plant, Wenck Associates, Inc., February 2006 (Draft Report);
- U.S. Army (Army) responses to U.S. EPA's March 29, 2006 comments on the Report;
- U.S. Army responses to MPCA's April 3, 2006 comments on the Report;
- Redlines to the Draft Report dated May 31, 2006;
- Army responses to U.S. EPA's July 7, 2006 comments on the redlines;
- Army responses to MPCA's July 14, 2006 comments on the redlines;
- Additional redlines to the Report, received by e-mail on August 1, 2006;
- MPCA's August 23, 2006 responses to the additional redlines;
- U.S. EPA's August 30, 2006 responses to the additional redlines;
- TCAAP Technical Review Committee meeting, October 3, 2006;

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- Additional redlines to the Report, dated October 19, 2006;
- MPCA's November 6, 2006 e-mail comments on the additional redlines;
- Army responses to MPCA's additional comments by e-mail, November 15, 2006.

Based upon U.S. EPA and MPCA's review, you are hereby advised that, in accordance with Chapter XIV of the Federal Facility Agreement, the Twin Cities Army Ammunition Plant Fiscal Year 2005 Annual Performance Report passes the Consistency Test.

If you have any questions, please contact Dagmar Romano at (651) 296-7776 or Tom Barounis at (312) 353-5577.

Sincerely

Tom Barounis

for Dagmar M. Romano
Project Manager
Superfund Section
Majors and Remediation Division

Tom Barounis

Tom Barounis
Remedial Project Manager
U.S. EPA, Region 5

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List of Acronyms

Alliant	-	Alliant Techsystems Inc.
APR	-	Annual Performance Report
Army	-	United States Army
AS/SVE	-	Air Sparging/Soil Vapor Extraction
AWC	-	Area Weighted Concentration
Barr	-	Barr Engineering
BGRS	-	Boundary Groundwater Recovery System
COC	-	Chemical of Concern
CRA	-	Conestoga-Rovers & Associates, Inc.
CRDL	-	Contract Required Detection Limit
DNAPL	-	Dense Non-Aqueous Phase Liquid
DOD	-	Department of Defense
ERIS	-	Environmental Restoration Information System
FFA	-	Federal Facilities Agreement
FY	-	Fiscal Year
GAC	-	Granular Activated Carbon
GOS	-	TGRS Global Operation Strategy
gpm	-	gallons per minute
HBV	-	Health Based Value
HRC	-	Hydrogen Release Compound
HRL	-	Health Risk Limits
IRA	-	Interim Remedial Action
IRAP	-	Interim Response Action Plan
LUC	-	Land Use Control
LUCIP	-	Land Use Control Implementation Plan
MCES	-	Metropolitan Council Environmental Services
MCLs	-	Maximum Contaminant Levels

List of Acronyms (Cont.)

MCLGs	-	Maximum Contaminant Level Goals
MDH	-	Minnesota Department of Health
MDL	-	Method Detection Limit
mg/l	-	Milligrams per liter
MOS	-	TGRS Micro Operation Strategy
MPCA	-	Minnesota Pollution Control Agency
NBCGRS	-	New Brighton Contaminated Groundwater Recovery System
NBM	-	New Brighton Municipal
NPL	-	National Priorities List
O&M	-	Operation and Maintenance
OM	-	Operating Minimum
OS	-	TGRS Operating Strategy
OU	-	Operable Unit
OU1TG	-	OU1 Technical Group
PAR	-	Performance Assessment Report
PCBs	-	Polychlorinated Biphenyls
PGAC	-	Permanent Granular Activated Carbon
PGRS	-	Plume Groundwater Recovery System
PLC	-	Programmable Logic Controller
PM	-	Preventative Maintenance
POTW	-	Publicly-Owned Treatment Works
ppb	-	parts per billion
QAPP	-	Quality Assurance Project Plan
RAB	-	Restoration Advisory Board
RI/FS	-	Remedial Investigation/Feasibility Study
ROD	-	Records of Decision
scfm	-	Standard Cubic Feet per Minute

List of Acronyms (Cont.)

SDWA	-	Safe Drinking Water Act
SECOR	-	SECOR International, Inc.
Shaw	-	Shaw Environmental & Infrastructure, Inc. (formerly Stone & Webster)
SVE	-	Soil Vapor Extraction
TCAAP	-	Twin Cities Army Ammunition Plant
Tecumseh	-	Tecumseh Professional Associates, Inc.
TGRS	-	TCAAP Groundwater Recovery System
TSCA	-	Toxic Substances Control Act
TWISS	-	Tecumseh/Wenck Installation Support Services
µg/l	-	Micrograms per liter
USAEC	-	United States Army Environmental Center
USEPA	-	United States Environmental Protection Agency
VOC	-	Volatile Organic Compound
Wenck	-	Wenck Associates, Inc.

List of Chemical Abbreviations

Note: The abbreviations below are those that were required for data entry into the U.S. Army Environmental Center (USAEC) Installation Restoration Data Management Information System (IRDMIS), which was replaced by the USAEC Environmental Restoration Information System (ERIS) in November 2001. These abbreviations, though not used in ERIS, are still used in some tables and appendices presented in this report.

111TCE	-	1,1,1-Trichloroethane
112TCE	-	1,1,2-Trichloroethane
11DCE	-	1,1-Dichloroethene
11DCLE	-	1,1-Dichloroethane
12DCE	-	1,2-Dichloroethenes (*cis* and *trans* isomers)
12DCLB	-	1,2-Dichlorobenzene
12DCLE	-	1,2-Dichloroethane
12DCLP	-	1,2-Dichloropropane
13DCLB	-	1,3-Dichlorobenzene
14DCLB	-	1,4-Dichlorobenzene
2CLEVE	-	2-Chloroethyl vinyl ether
AG	-	Silver
BRDCLM	-	Bromodichloromethane
C12DCE	-	cis-1,2-Dichloroethene
C13DCP	-	cis-1,3-Dichloropropene
C2H3CL	-	Vinyl chloride
C2H5CL	-	Chloroethane
C6H6	-	Benzene
CCL3F	-	Trichlorofluoromethane
CCL4	-	Carbon tetrachloride
CH2CL2	-	Methylene chloride
CH3CL	-	Chloromethane
CHBR3	-	Bromoform

List of Chemical Abbreviations (Cont.)

CHCL3	-	Chloroform
CLC6H5	-	Chlorobenzene
CU	-	Copper
CYN	-	Cyanide
DBRCLM	-	Dibromochloromethane
EDTA	-	Ethylenediaminetetraacetic Acid
ETC6H5	-	Ethylbenzene
HG	-	Mercury
MEC6H5	-	Toluene
P4	-	Phosphorus
PB	-	Lead
SB	-	Antimony
T12DCE	-	trans-1,2-Dichloroethene
T13DCP	-	trans-1,3-Dichloropropene
TCLEA	-	Tetrachloroethane
TCLEE	-	Tetrachloroethene
TCLTFE	-	1,1,2-Trichloro-1,2,2-trifluoroethane
TRCLE	-	Trichloroethene
XYLEN	-	Xylenes
ZN	-	Zinc

1.0 Executive Summary

This Fiscal Year 2005 (FY 2005) Annual Performance Report:

- Summarizes the status of remedy implementation; and
- Addresses how the remedies are performing,

for each of the three operable units related to the Twin Cities Army Ammunition Plant (TCAAP). Fiscal Year 2005 is defined as the period from October 1, 2004, through September 30, 2005.

Records of Decision (RODs) have been signed for each of the three operable units (OUs):

- OU1 ROD signed September 1993
- OU2 ROD signed December 1997
- OU3 ROD signed September 1992

The RODs present the major components of the final remedies for the media of concern. This report looks at each of the major components and addresses:

1. *Are the remedies being implemented? (Compliance check with the RODs)*
2. *Are the remedies doing what they are supposed to?*

Table 1-1, at the end of this section, summarizes the status of remedial actions at the end of FY 2005. Following are highlights of the accomplishments for each operable unit.

Operable Unit 1 (OU1): Deep Groundwater

OU1 consists of the "north" plume of Volatile Organic Compound (VOC) groundwater contamination off the TCAAP installation. The final remedy for OU1 consists of pumping three primary municipal wells (New Brighton Municipal wells NBM #4, #14, and #15) and treating the extracted groundwater through the Permanent Granular Activated Carbon (PGAC) system. Treated water is piped to the New Brighton water supply system for distribution as potable water. Other remedy components include providing alternate water supply and/or well abandonment to affected private wells, and drilling advisories for new well construction. Highlights for FY 2005 are:

- Sixteen private wells were sampled in FY 2005 as part of the well inventory sampling "major" event. None of the wells sampled had TCAAP contaminants above the OU1 cleanup levels.
- The Minnesota Department of Health (MDH) Special Well Construction Area remains in effect. The MDH has the regulatory responsibility to assure that wells constructed in the advisory area meet appropriate well construction and human health requirements. There were several minor updates to the well inventory in FY 2005 with no new recommendations for abandonment or alternate water supply needed.
- Evaluation of pumping rates and water quality trends support the interpretation that the extraction system is effectively containing contamination in the Prairie du Chien aquifer. The degree of containment remains under discussion between the United States Army (Army), United States Environmental Protection Agency (USEPA), Minnesota Pollution Control Agency (MPCA), City of New Brighton, and Restoration Advisory Board. The Army, USEPA, MPCA, Restoration Advisory Board, and City of New Brighton continued discussions regarding amending the OU1 ROD to modify the requirement for containment, and replacing it with a requirement to demonstrate that the plume is not spreading and that aquifer restoration is occurring. These parties formed the OU1 Technical Group (OU1TG), which met throughout FY 2004 to address the technical aspects of a ROD amendment. In

January 2005, the Army completed a Proposed ROD Amendment.. At the end of FY 2005, a Proposed Plan for OU1 was under regulatory review. It is expected that the ROD amendment will require demonstration of decreasing contaminant trends using the statistical analysis developed by the OU1TG.

Highlights of the OU1 remediation activities are:

- The PGAC treated 1.33 billion gallons of water and removed 653 pounds of VOCs during FY 2005. Approximately 18,200 pounds of VOCs have been removed since system startup.
- The effluent of the PGAC was in compliance with the applicable Safe Drinking Water Act criteria for the OU1 chemicals of concern.
- The treated groundwater was beneficially used in the New Brighton and Fridley municipal water supply systems.
- The overall chemical monitoring data, using the statistical analysis as developed by the OU1TG, indicate that aquifer restoration is occurring and that the extent and magnitude of contamination in the Prairie du Chien aquifer are stable or improving.

Operable Unit 2 (OU2)

OU2 is defined as the original TCAAP property, including the groundwater beneath it. The OU2 ROD, which was signed in December 1997, documents the final remedies.

Highlights for activities within OU2 during FY 2005 are:

- Shallow Soil Sites
  - Closeout Reports for Sites A (including VOC-contaminated soils), E, H, 129-3, 129-5, and 129-15 (which received regulatory approval prior to FY 2005) continued to await final consistency based on resolution of land use controls.
  - In FY 2004, the MPCA, USEPA and Army agreed to incorporate the shallow groundwater response action at Site C into the TCAAP Federal Facilities Agreement (FFA). The groundwater contamination was an inadvertent result from a demonstration project for phytoremediation of soils. In FY 2005, the groundwater extraction system extracted 9.47 million gallons of groundwater and removed 8.41 pounds of lead. The total lead mass removed is 99.2 pounds. The monitoring requirements for demonstrating containment were met.

- Deep Soil Sites
  - The Site D Closeout Report received regulatory approval (in FY 2004), but final consistency will not be provided until concurrence of the land use control section of the report is reached between the Army and the regulators. A modification to the OU2 ROD documenting the remedy selection for Site D shallow soils was being prepared at the end of FY 2005.
  - Cover construction was completed over the Site G dump in early FY 2004. The Site G Closeout Report received regulatory approval (in FY 2004), but final consistency will not be provided until concurrence of the land use control section of the report is reached between the Army and the regulators. A modification to the OU2 ROD documenting the remedy selection for Site G was being prepared at the end of FY 2005.

- Site A Shallow Groundwater
  - Four extraction wells continued to provide containment and mass removal.
  - The system pumped at an average rate of 14.4 gallons per minute (gpm), just below the 15 gpm target rate. System cleaning is expected to increase the performance in FY 2006.
  - The system removed approximately 3.31 pounds of VOCs during FY 2005, with a cumulative mass removal of 44.84 pounds since system start-up on May 31, 1994.
  - The extracted water was discharged to the sanitary sewer system in compliance with all discharge criteria.
  - Overall, the groundwater extraction system has reduced contaminant concentrations in groundwater. The area where chemicals of concern exceed cleanup levels is between monitoring well 01U108 (source area) and 01U126 for tetrachloroethene. Extraction wells 01U352 and 01U353 were just below the cleanup standard for cis-1,2-dichloroethene for the first time.

- Site I Shallow Groundwater
  - Sampling at Site I indicated no significant changes in VOC concentrations in Unit 1 monitoring wells in FY 2005. USEPA requested monitoring four additional wells during FY 2004. Attempts to sample these wells (01U632, 01U666, 01U667, and 01U668) were continued in FY 2005. Six of the twelve wells scheduled for sampling were dry.
  - A Five-Year Review was performed during FY 2004. The review concluded that the remedy was functioning as intended, and that the components of the remedy remain protective of human health and the environment.

- Site K Shallow Groundwater
  - At Site K, the groundwater extraction trench and treatment system continued to operate as designed. The system captured and treated 4,601,555 gallons of water and maintained a continuous zone of capture downgradient of Building 103. A total of 10.3 pounds of VOCs were removed in FY 2005.
  - The extracted water was treated and discharged to Rice Creek in compliance with all discharge criteria.
  - A Five-Year Review was performed during FY 2004. The review concluded that the remedy was functioning as intended, and that the components of the remedy remain protective of human health and the environment.

- Deep Groundwater
  - The TCAAP Groundwater Recovery System (TGRS) operated in accordance with the OU2 ROD.
  - In FY 2005, the total extraction well water pumped averaged 1,703 gpm. The total extraction well water pumped was 98% of the Global Operation Strategy (GOS) Operating Minimum (OM) (1,745 gpm). The lower than expected average flow rate was mostly due to various power outages and a break in the forcemain that occurred during August and September 2005. Prior to these down times, the system operated at 1,751 gpm (October 2004 through July 2005).
  - In FY 2005, the TGRS treated 883,348,000 gallons of water. Average VOC influent concentrations decreased by 18.5% from FY 2004. The mass of VOCs removed was 2,663 pounds and is less than that achieved in FY 2004. The total VOC mass removed by the TGRS through FY 2005 is 191,931 pounds.
  - The TGRS Operating Strategy (OS) was approved by the regulatory agencies and finalized in FY 2003 with the latest modification (#3) implemented in 2004. The OS presents a GOS for the entire TGRS extraction system and a

Micro Operation Strategy (MOS) for well groups. The Army, MPCA, and USEPA plan to have further discussions regarding the TGRS OS, and interpreting the results of pumping rates with respect to meeting the goals of the ROD.

- The Army, MPCA, and USEPA plan to have further discussions regarding the TGRS OS, and interpreting the results of pumping rates with respect to meeting the goals of the ROD.
- Groundwater analytical data of the source area shows a general decrease in TRCLE concentration. This demonstrates that the TGRS is effectively removing VOC mass from the aquifer.
- Effluent VOC concentrations were below contaminant-specific requirements for all sampling events.

Operable Unit 3 (OU3): Deep Groundwater

- The Plume Groundwater Recovery System (PGRS) extraction well (NBM #13) and the associated treatment plant were not used for remediation (groundwater capture or containment) purposes, or to satisfy peak water supply needs during FY 2005. At the end of FY 2003, the PGRS was returned to standby status. The PGRS was operated in support of standby status and for collection of groundwater samples in FY 2005. All water pumped was sewered.

- The technical memorandum developed to support an OU3 ROD Amendment met the consistency test in May 2005. This document presents a statistical evaluation of trichloroethene concentrations in OU3 monitoring wells to demonstrate the stability of the OU3 plume. Based on the conclusions of the technical memorandum, a draft ROD Amendment is expected to be approved in FY 2006 that eliminates the requirement for groundwater extraction and treatment by the PGRS.

- Groundwater monitoring in FY 2005 continued to show that the OU3 plume no longer extends to the extraction well. The statistical evaluation presented in the technical memorandum was incorporated into this FY 2005 Annual Performance Report. Overall, the statistical evaluation showed the OU3 plume is stable.

Table 1-1

Status of Remedial Actions: FY 2005

Remedy Component	Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 1: Deep Groundwater				
#1: Alternate Water Supply/Well Abandonment	Yes	Yes	No	
#2: Drilling Advisories	Yes	Yes	No	
#3: Groundwater Containment	Yes	Yes	No	A ROD amendment is in progress
#4: Removal of VOCs by GAC (Discharge Quality)	Yes	Yes	No	
#5: Discharge of Treated Water	Yes	Yes	No	
#6: Groundwater Monitoring	Yes	Yes	No	
Overall Remedy	Yes	Yes	No	
Operable Unit 2: Shallow Soil Sites				
#1-7: Soil Remediation				
Site A	Yes	Yes	Partially	Closeout Report for metals was partially approved; however, see Note 1 at the end of the OU2 section of this table. See OU2 Site A Shallow Groundwater (below) for status on VOC soils.
Site C	Yes	Partially	No	Site was partially excavated FY 2000 - 2002. Excavation was suspended in FY 2002 due to high water table. Additional characterization was done in FY 2003. An alternatives analysis for this site was under review at the end of FY 2004. The groundwater response action is included in the APR for FY2004. The system is operating under the existing agreements with the MPCA. A ROD amendment to include the groundwater remediation under OU2 was in progress at the end of FY2005.
Site E	Yes	Yes	Partially	Closeout Report was partially approved; however, see Note 1 at the end of the OU2 section of this table.

Table 1-1 (continued)

Status of Remedial Actions: FY 2005

Remedy Component	Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 2: Shallow Soil Sites (continued)				
#1-7: Soil Remediation (continued)				
Site H	Yes	Yes	Partially	Closeout Report was partially approved; however, see Note 1 at the end of the OU2 section of this table.
Site 129-3	Yes	Yes	Partially	Closeout Report was partially approved; however, see Note 1 at the end of the OU2 section of this table.
Site 129-5	Yes	Yes	Partially	Closeout Report was partially approved; however, see Note 1 at the end of the OU2 section of this table.
#8: Groundwater Monitoring	Yes	Yes	No	The 5-year monitoring was started in FY 2003, and will tentatively end in FY 2007.
#9: Characterization of Dumps:				
Site B	Yes	Yes	Yes	
Site 129-15	Yes	Yes	Partially	Closeout Report was partially approved in FY 2003; however, see Note 1 at the end of the OU2 section of this table. A modification to the ROD was being prepared at end of FY 2004.
Overall Remedy	Yes	Yes	Partially	

<u>Note 1:</u> Closeout report has been approved, but final consistency will not be provided until concurrence on the land use control section of the report has been reached between the Army and the regulators or, alternatively, until the TCAAP LUCIP has received consistency approval from the regulators.

Table 1-1 (continued)

Status of Remedial Actions: FY 2005

Remedy Component	Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 2: Deep Soil Sites				
#1: Groundwater Monitoring	Yes	Yes	No	
#2: Restrict Site Access	Yes	Yes	No	
#3: SVE Systems (Deep)	NA	NA	Partially	Deep SVE systems will not be required at Sites D or G. The Site D VOC Closeout Report received consistency in FY 2002. The Site G VOC Closeout Report is in progress.
#4: Enhancements to SVE Systems	NA	NA	Yes	Neither system required operation with enhancements. The Site D SVE system was dismantled in FY 2001. The Site G SVE was dismantled in FY 2003.
#5: Maintain Existing Site Caps	Yes	Yes	No	
#6: Maintain Surface Drainage Controls	Yes	Yes	No	
#7: Characterize Shallow Soils and Dump	Yes	Partially	No	For Site D, 1381 cubic yards of contaminated soil were removed and transported off-site for disposal in FY 2003. A Closeout Report and a modification to the ROD were under review at the end of FY 2005. For Site G, a tech memo recommending improvements to the Site G cover received regulatory approval in FY 2003. A work plan for the cover design was also approved in FY 2003 and cover construction was completed in FY 2004.
Overall Remedy	Yes	Yes	No	

Table 1-1 (continued)

Status of Remedial Actions: FY 2005

Remedy Component		Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 2: Site A Shallow Groundwater					
#1:	Groundwater Monitoring	Yes	Yes	No	
#2:	Groundwater Containment/Mass Removal	Yes	Yes	No	
#3:	Drilling Advisory/Alternate Water Supply/Well Abandonment	Yes	Yes	No	
#4:	Discharge of Extracted Water	Yes	Yes	No	
#5:	Source Characterization/Remediation	Yes	Yes	No	SVE system operation was ceased near the end of FY 2002, due to minimal VOC removal rates. In FY 2003, a work plan to excavate the contaminated soil received regulatory approval. The SVE system was removed and 688 cubic yards of contaminated soil were excavated and transported off-site for disposal. A Closeout Report for the Former 1945 Trench soils received regulatory approval in FY 2004.
Overall Remedy		Yes	Yes	No	

Table 1-1 (continued)

Status of Remedial Actions: FY 2005

Remedy Component	Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 2: Site I Shallow Groundwater				
#1: Groundwater Monitoring	Yes	Yes	No	
#2: Groundwater Extraction	No	No	No	Pilot study determined that extraction remedies are not feasible. An amendment to the OU2 ROD is being pursued to change to a monitoring based remedy.
#3: POTW Discharge	No	No	No	See above.
#4: Additional Investigation	NA	NA	No	See above.
Overall Remedy	NA	NA	No	See above.
Operable Unit 2: Site K Shallow Groundwater				
#1: Groundwater Monitoring	Yes	Yes	No	
#2: Sentinel Wells	Yes	Yes	NA	
#3: Hydraulic Containment	Yes	Yes	No	
#4: Groundwater Treatment	Yes	Yes	No	
#5: Treated Water Discharge	Yes	Yes	No	
#6: Discharge Monitoring	Yes	Yes	No	
#7: Additional Investigation	Yes	Yes	Yes	Well 03U621 was added as a sentinel well and is sampled annually, as listed in the monitoring plan
Overall Remedy	Yes	Yes	No	

Table 1-1 (continued)

Status of Remedial Actions: FY 2005

Remedy Component	Is the component being implemented?	Is the component doing what it is supposed to?	Has the component undergone final closeout?	Comments
Operable Unit 2: Deep Groundwater				
#1: Hydraulic Containment and Contaminant Mass Removal	Yes	- -	No	Agency acceptance on whether the requirements of the OU2 ROD were met has been differed pending the outcome of Operating Strategy technical discussions to be conducted during FY2007.
#2: Groundwater Treatment	Yes	Yes	No	
#3: Treated Water Discharge	Yes	Yes	No	
#4: Institutional Controls	Yes	Yes	No	
#5: Review of New Technologies	Yes	Yes	No	
#6: Groundwater Monitoring	Yes	Yes	No	
Overall Remedy	Yes	- -	No	see comment above
Operable Unit 3: Deep Groundwater				
#1: Groundwater Extraction	Yes	Yes	No	Operation during FY 2005 was in support of maintaining system in stand-by status and for collecting samples.
#2: Groundwater Treatment	Yes	Yes	No	See above comment under Remedy Component #1.
#3: Use of Water for Municipal Supply	Yes	Yes	No	See above comment under Remedy Component #1.
#4: Groundwater Monitoring	Yes	Yes	No	
Overall Remedy	Yes	Yes	No	A ROD Amendment was in Progress at the end of FY2005

2.0 Introduction

2.1 PURPOSE

This Fiscal Year 2005 Annual Performance Report is intended to:

- Summarize the status of remedy implementation; and
- Address how the remedies are doing,

for remedial actions at the New Brighton/Arden Hills Superfund Site. Fiscal Year 2005 (FY 2005) extended from October 1, 2004, through September 30, 2005.

For purposes of remediation, the areas contaminated by activities at TCAAP have been divided into three areas designated "Operable Units." Operable Unit 1 (OU1) encompasses the deep groundwater "North Plume" of off-TCAAP contaminated groundwater. Operable Unit 2 (OU2) includes all soil, sediment, and groundwater contamination on the original TCAAP property. OU2 also includes the shallow Site A plume that extends off the north end of TCAAP in the Unit 1 aquifer. Operable Unit 3 (OU3) consists of the deep groundwater "South Plume" of off-TCAAP contaminated groundwater.

The report addresses remedial actions for the following media as prescribed in the Record of Decision (ROD) for each Operable Unit:

- Operable Unit 1
  - Deep Groundwater

- Operable Unit 2
  - Shallow Soil Sites
  - Deep Soil Sites
  - Site A Shallow Groundwater
  - Site I Shallow Groundwater
  - Site K Shallow Groundwater
  - Deep Groundwater

- Operable Unit 3
  - Deep Groundwater

In addition, the response action for shallow groundwater at Site C has been included beginning in last year's (FY 2004) report. The remedial action started under the regulatory framework of a State enforcement action. In April 2004, it was agreed to conduct further actions under the framework of the TCAAP Federal Facilities Agreement. The parties anticipate a future amendment to the OU2 ROD addressing the remedy selection for groundwater, surface water, soil, and sediment at Site C.

Monitoring activities and submittal of this report are in fulfillment of the Federal Facilities Agreement (FFA) signed August 12, 1987, between the United States Army (Army), United States Environmental Protection Agency (USEPA), and Minnesota Pollution Control Agency (MPCA). These parties agreed to minor modifications to the FFA on:

- October 12, 1990
- February 5, 1992
- March 3, 1992
- November 23, 1993
- January 9, 1998
- May 12, 1998
- June 30, 1998

The requirements have been fulfilled for FFA Attachment 2 (Interim Remedial Actions), Attachment 3 (Remedial Investigation), and Attachment 4 (Feasibility Study). Activities are now geared towards fulfilling the requirements of FFA Attachment 5 (Remedial Design and Remedial Action).

Assessment of performance is answered with two questions:

1. *Are all of the remedies being implemented? (Compliance check with the RODs)*
2. *Are the remedies doing what they are supposed to?*

To address these two questions, this report is broken into the three Operable Units. Using each ROD, the report is broken down to the major components of the selected remedy for each of the media described previously. Performance standards are then presented for each of the major remedy components. The performance standards are the "what they are supposed to" part of the question, "Are the remedies doing what they are supposed to?" The performance standards are the yardstick against which performance is measured, and are used to determine when a remedy component has been successfully implemented and/or completed.

For some of the remedy components, the performance standards are clearly defined in the RODs (e.g., soil or groundwater cleanup levels). For other remedy components (e.g., alternate water supply) the performance standards are less clear in the RODs, but may have been agreed to through Work Plans or design documents.

With the performance standards identified, this report then addresses the two questions described above, often through a series of sub-questions. The questions are written in the text in an attempt to make the report focused, streamlined, and user friendly. To the extent possible, answers are in the form of pictures (figures, graphs, etc.) versus words.

In addition to the performance evaluation, another objective of making the report focused is to make the monitoring program focused and efficient. With specific questions identified, it is easier

to develop the monitoring needs. In addition to reporting on FY 2005, this document presents proposed monitoring for future years (Appendix A). Monitoring locations or frequencies that are new in this year's report are shown in red color. The monitoring plan shows FY 2005 through FY 2009. The FY 2005 monitoring plan indicates the work that generated the results presented in this report. The FY 2005 monitoring plan is in progress. The monitoring plan covers a moving 5-year time span (i.e., next year FY 2005 will drop off and FY 2010 will be added).

This report represents the collaboration of work performed by the Army and Alliant Techsystems Inc. (Alliant). On behalf of the Army, Tecumseh/Wenck Installation Support Services (TWISS) prepared Sections 2.0 through 6.0, and 11.0 of this report. On behalf of Alliant, SECOR International, Inc. (SECOR) prepared Sections 7.0, 8.0, and 10.0, and Conestoga-Rovers & Associates, Inc. (CRA) prepared Section 9.0. TWISS, SECOR, and CRA all contributed to Section 1.0.

2.2 SITE DESCRIPTION

The Twin Cities Army Ammunition Plant is a government-owned facility located in the northern portion of the Minneapolis – St. Paul metropolitan area, in Ramsey County, and is surrounded by the cities of New Brighton, Arden Hills, Mounds View, and Shoreview, Minnesota (Figure 2-1). For purposes of the TCAAP restoration program, the facility occupied approximately a four square mile area (approximately 2,370 acres) immediately east of U.S. Interstate Highway 35W and north of Ramsey County Highway 96 (i.e., this was the original TCAAP boundary). Alliant has been the prime tenant on the installation; however, they discontinued manufacturing operations at TCAAP in 2004. TWISS was the contracted operator for FY 2005.

TCAAP was constructed between August 1941 and January 1943, and formerly included 323 buildings with associated utilities and services to support production activities. TCAAP produced small-caliber ammunition and related materials, proof-tested small-caliber ammunition and items as required, and handled/stored strategic and critical materials for other government

agencies. Production began in 1941 and then alternated between periods of activity and standby. The size of TCAAP has periodically shrunk as a result of property transfers. Most recently, between 2000 and 2002, approximately 1,521 acres were reassigned to the National Guard Bureau. 774 acres of the original TCAAP have been determined to be surplus to the needs of the federal government and are in the process of being transferred out of federal control.

During periods of activity, solvents were utilized as part of the manufacturing process. Disposal of solvents and other wastes at the TCAAP site resulted in soil contamination and also groundwater contamination, which has migrated beyond the site boundary. Groundwater contamination was first discovered in July 1981, and the site was placed on the National Priorities List (NPL) in 1983.

A number of known and potential contaminant source areas have been identified on the TCAAP property: Sites A, B, C, D, E, F, G, H, I, J, K, 129-3, 129-5, and 129-15 (see Figure 2-2 for locations). Site F was remediated and Site J was determined not to have a release prior to the 1997 OU2 ROD, while the remaining sites are addressed in the OU2 ROD. Surface water and sediment on TCAAP are being addressed separately from the OU2 ROD.

Five other sites (the Grenade Range, the Outdoor Firing Range, the Trap Range, and the 135 and 535 Primer/Tracer Areas) are being addressed as Removal Actions separate from the OU2 ROD.

2.3 HYDROGEOLOGIC UNITS AND WELL NOMENCLATURE

On- and off-post wells have been installed in four hydrogeologic units beneath the site: Unit 1 through Unit 4. Descriptions of these four units are presented in Appendix B, along with a description of the nomenclature system used for well designations (e.g., 03U704). A well-designation cross-reference guide (sorted two different ways) is included in Tables B-1 and B-2 in Appendix B. The well index lists wells of concern, including the TCAAP designation, Minnesota unique number, and any other name(s) the wells may have. Locations of wells that

are included in the TCAAP monitoring plan are shown on Figure B-2 (off-TCAAP wells) and Figure B-3 (on-TCAAP wells) in Appendix B (on the included CD). With a known well name, the location of that well can be determined using the "Edit, Find" or "Edit, Search" function and typing in the well name, which will highlight the desired well name on the figure. Available well logs can be viewed by selecting the well of interest in Table B-3 (on-TCAAP wells) and Table B-4 (off-TCAAP wells) in Appendix B (click on the well name with the mouse).

See the instructions on the attached CD for more information on using Appendix B.

2.4 DATA COLLECTION, MANAGEMENT, AND PRESENTATION

Performance monitoring data was collected in accordance with the:

- FY 2005 Monitoring Plan for Groundwater Monitoring Wells
- FY 2005 Monitoring Plan for Remedial Treatment Systems
- FY 2005 Monitoring Plan for Surface Water
- New Brighton Water System Sampling and Analysis Plan

Data was collected principally by four parties: TWISS on behalf of the Army, SECOR, and CRA on behalf of Alliant, and Barr Engineering on behalf of the City of New Brighton. Appendix C presents information on data collection, management, and presentation. Tables showing FY 2005 data are presented following the text at the end of each section in which it is referenced. The comprehensive groundwater level and groundwater quality databases from 1987 to present are contained in Appendix D.1. Groundwater quality trend graphs for the primary chemical of concern (trichloroethene) can be viewed by selecting the well of interest on Figure B-2 (off-TCAAP wells) and B-3 (on-TCAAP wells) in Appendix B (click on the well name with the mouse). The trend graphs for Site A also include tetrachloroethene and cis-1,2-dichloroethene, in addition to trichloroethene.

Is the data complete and representative (are we making decisions based on complete and technically-sound information)?

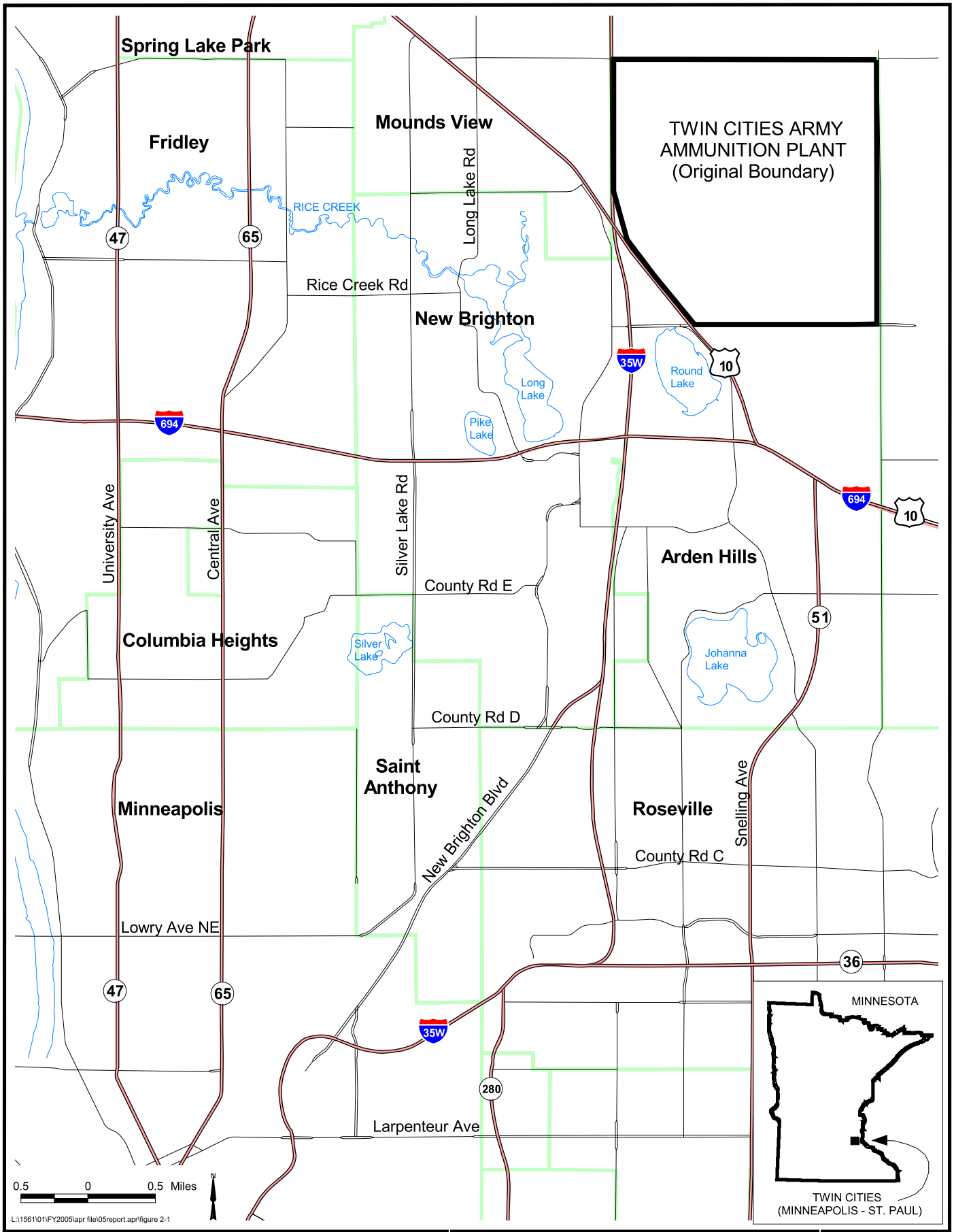
Yes. The data was collected in accordance with the FY 2005 Monitoring Plan. Data was collected, assessed, and validated in accordance with the "Quality Assurance Project Plan for Performance Monitoring, Revision 3, December 10, 2003, (TWISS, 2003).

The data tables in the various report sections and the comprehensive water quality databases (Appendix D.1) show the data qualifiers and flagging codes that were assigned to the data as a result of data assessment/validation. The data qualifiers and flagging codes applied to FY 2005 data are explained in footnotes on the data tables in the various report sections. Data assessments (performed on 100 percent of the data) and "full validation" (performed on at least 10 percent of the data) were provided to the MPCA and USEPA in submittals dated 2005. MPCA and USEPA approval letters for these submittals are included in Appendix C.3.

With regard to completeness, Appendix C.2 summarizes a few minor deviations from the FY 2005 Monitoring Plan. The completeness goals are the same in both the 1996 and 2003 Quality Assurance Project Plans (QAPPs). Field completeness for FY 2005 was 100% and laboratory completeness was 100% (wells that were dry or inoperative were not considered as missed samples), meeting the QAPP completeness goal of 95%. Field duplicates, equipment rinse blanks, and matrix spike/matrix spike duplicates were collected at overall frequencies of exceeding the QAPP-specified frequencies of 10%, 10%, and 5%, respectively. For the subset of metals analyses, matrix spike/matrix spike duplicates were collected at an overall frequency of 11.1%, also meeting the QAPP-specified frequency. Data validation was performed on 23% of the data, exceeding the QAPP-specified requirement of 10%. No problems with analytical procedures/reporting were identified in the data validations.

The 2003 QAPP additionally identified critical samples and set a completeness goal of 100%. The critical samples are: TGRS effluent, Site K effluent, and well inventory sampling. These were all complete in FY 2005.

The data for FY 2005 is deemed to be representative and meet data quality objectives based on: 1) adherence to QAPP-specified sampling and laboratory analytical procedures; 2) completion of data assessments and data validation; and 3) comparability to historical results (any substantial deviations from historical/anticipated results are discussed within the site-specific sections of this report).



TWIN CITIES ARMY AMMUNITION PLANT

Site Location Map

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Wenck

Wenck Associates, Inc. Environmental Engineers

1800 Pioneer Creek Center Maple Plain, MN 55359-0249

FY 2005

Figure 2-1

LEGEND

Site Boundary

TCAAP Boundary (Original Boundary)

Notes:
1. General NPL site boundaries determined during the initial site investigations. Please refer to the latest site reports for the current boundary definitions.
2. Aerial Orthophotography was flown in 2003.

800 0 800 1600 Feet

N

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TWIN CITIES ARMY AMMUNITION PLANT

TCAAP Site Boundaries

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Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0249

FY 2005

Figure 2-2

3.0 Operable Unit 1: Deep Groundwater

The reference for the OU1 ROD is:

RECORD OF DECISION
Groundwater Remediation
Operable Unit 1
At New Brighton/Arden Hills Superfund Site
September 1993

There have been no subsequent ROD Amendments or Explanations of Significant Differences.

Groundwater containment is provided by three primary municipal wells: New Brighton Municipal (NBM) #4, #14, and #15. NBM #3, which is located next to NBM #4, also contributes to containment, especially when one of the other three wells is off. The extracted water is treated in the Permanent Granular Activated Carbon (PGAC) treatment facility for removal of VOCs, and is then used as part of the municipal water supply. NBM #3 and #4 were pre-existing wells. NBM #14 and NBM #15 began pumping in December 1996 and March 1998, respectively.

The remedy also relies on institutional controls (drilling advisory, alternate water supply, and well abandonment) to manage risks, including downgradient of the containment system.

Section 1.4 of the ROD prescribes six major components of the remedy, which are described and evaluated in the following sections.

3.1 REMEDY COMPONENT #1: ALTERNATE WATER SUPPLY/WELL ABANDONMENT

Description: "Providing an alternative water supply to residents with private wells within the North Plume." (OU1 ROD, page 2)

- Clarified by the OU1 Alternate Water Supply Plan (Montgomery Watson, October 1995) to delete "residents with" since the remedy applies to other wells in addition to residential wells. This plan also identifies the criteria for determining what wells are eligible for an alternate water supply.
- Clarified by the OU1 Alternate Water Supply Plan to also include well abandonment.
- Clarified by the OU1 Alternate Water Supply Plan (page i-2) to also encompass OU3 and the OU2 Site A shallow groundwater plume.

Performance Standard (how do you know when you're done):

- For alternate water supply, when the owners of all wells that meet all of the following criteria have been offered and provided with an alternate water supply (or when the well owners have rejected the offers):
    i. The well is located within the area affected by groundwater plumes that originate at TCAAP, as shown on Figures E-2 and E-3; and
    ii. The well is completed in an affected aquifer; and
    iii. The well contains detectable concentrations of the TCAAP-related chemicals of concern identified on page 18 of the OU1 ROD (or page 26 of the OU3 ROD, or Table 1 of the OU2 ROD, as appropriate for the well location); and
    iv. The well is used in a manner to cause exposure (uses are defined in the Alternate Water Supply Plan); and
    v. The well owner does not already have an alternate water supply.

If eligible well owners refuse the offer to have an alternate water supply provided, this also satisfies the performance standard.

- For well abandonment, when the owners of all wells that meet all of the following criteria have been offered and provided abandonment (or when the well owners have rejected the offers):
    i. The well is located within the area affected by groundwater plumes that originate at TCAAP; and
    ii. The well is completed in an affected aquifer; and
    iii. The well contains detectable concentrations of the TCAAP-related chemicals of concern identified on page 18 of the OU1 ROD (or page 26 of the OU3 ROD, or Table 1 of the OU2 ROD, as appropriate for the well location); and
    iv. The well was constructed prior to the Minnesota Department of Health (MDH) Special Well Construction Area advisory; and
    v. The well is being used by the well owner or use was discontinued due to contamination; and
    vi. The well is used in a manner to cause exposure (uses are defined in the Alternate Water Supply Plan).

  If eligible well owners refuse the offer for abandonment, this also satisfies the performance standard. An exception to abandonment would be if the well is needed for groundwater monitoring.

Is this remedy component being implemented?

Yes. The Alternate Water Supply and Well Abandonment Program has been implemented and is an ongoing program maintained by the Army. The process of identifying wells eligible for alternate water supply and/or abandonment is accomplished by maintaining a "well inventory." The well inventory is a database that was initially developed in 1992, and which has been periodically updated since then. For the purposes of the well inventory, a study area was

established which encompasses the groundwater plume (the study area boundary is the same as the MDH Special Well Construction Area). The well inventory is intended to include all wells within the study area. Within the study area, areas of concern are defined by the edge of the groundwater plume, plus additional buffer area. The wells are grouped into categories based on factors such as location relative to the area of concern, type of use, active/non-active status, sealed, etc. Wells in categories with the potential to be impacted are periodically sampled to see if they qualify for alternate water supply and/or abandonment.

Thus, maintenance of the well inventory consists of the following tasks:

1. Check if the area of concern needs to be adjusted based on the extent of contamination,
2. Check if there are any previously unknown wells to be added to the database (in coordination with the MDH as described in Appendix E),
3. Sample wells on a prescribed schedule,
4. Take the appropriate course of action depending on the results,
5. Update the well inventory database with any new information (e.g., water quality results, owner information, construction information, well re-categorizing),
6. Report findings through the Annual Performance Report.

Additional information on the well inventory is presented in Appendix E. The following questions and answers summarize developments since the last Annual Performance Report with respect to Operable Unit 1.

Did the area of concern within OU1 change during FY 2005, as defined by the 1 µg/l contour line?

No. There was a comprehensive sampling round conducted in FY 2005. The 1 µg/l contour line remained essentially the same as in FY 2003, which was the last comprehensive sampling round (see Figure 3-1).

Were any additional water supply wells discovered within the area of concern for OU1 that are completed within an aquifer of concern?

Yes (see Appendix E for additional information).

Were any water supply wells within the area of concern for OU1 sampled during FY 2005 (outside of those included in the OU1 performance monitoring plan)? If yes, what were the findings?

Yes. Sixteen wells were sampled in FY 2005, as discussed in Appendix E. Analytical results are summarized in Table E-2 and the well location is illustrated on Figure E-5. Results for the well showed that no TCAAP contaminants were detected above the OU1 cleanup standards.

Were any well owners offered an alternate water supply and/or well abandonment during FY 2005? No.

For OU1, are there any well owners that meet the criteria, but have not yet been provided an alternate water supply? No.

For OU1, are there any wells that meet the criteria, but have not yet been abandoned? No.

Is any sampling of water supply wells (excluding those included in the OU1 performance monitoring plan) proposed prior to the next report?

No. FY 2006 is a non-sampling event for well inventory wells as shown in Appendix A.1. The next major event is in FY 2009.

Are there any changes or additional actions required for this remedy component? No.

3.2 REMEDY COMPONENT #2: DRILLING ADVISORIES

Description: "Implementing drilling advisories that would regulate the installation of new private wells within the North Plume as a Special Well Construction Area." (OU1 ROD, page 2)

Performance Standard (how do you know when you're done):
When the Minnesota Department of Health (MDH) has issued a Special Well Construction Area Advisory.

Has the MDH issued a Special Well Construction Area Advisory?
Yes. It was issued in June 1996. In addition to covering OU1, the Special Well Construction Area also encompasses OU3 and the OU2 Site A shallow groundwater plume. In June 1999, the MPCA requested that the MDH extend the boundary of the Special Well Construction Area further to the southwest to the Mississippi River and Marshall Avenue to ensure that the southern boundary fully encompassed the plume. The MDH revised the Special Well Construction Area in December 1999. The current boundary is shown on Figure E-1 (Appendix E).

Are any changes or additional actions required for this remedy component? No.

3.3 REMEDY COMPONENT #3: GROUNDWATER CONTAINMENT

Description: "Extracting groundwater at the containment boundary in the North Plume near County Road E." (ROD, page 2)

- This remedy component consists of recovering deep (Unit 4) groundwater using three City of New Brighton municipal wells: NBM #4, #14, and #15. New Brighton municipal well #4 (NBM #4) was an existing well completed in both the Prairie du Chien and Jordan. NBM #14 and NBM #15 were

constructed in the Prairie du Chien as part of the remedy and began pumping in December 1996 and March 1998, respectively. The locations of the three recovery wells are shown on Figure 3-1.

- NBM #3 has been designated as an alternate containment/production well for times when one of the three primary wells is not in operation. NBM #5 and NBM #6 are considered secondary alternates.

The extracted groundwater is used as part of the New Brighton water supply system, and as such, New Brighton took the lead on design and construction of the system, and is responsible for operation of the system. New Brighton contracted Barr Engineering to provide design and construction oversight services. The Army is paying for the OU1 remedy.

Performance Standard (how do you know when you're done):

When the containment boundary created by the extraction system is providing capture of groundwater with contaminant concentrations exceeding the cleanup standards specified on page 18 of the OU1 ROD.

During FY 2005, did the OU1 extraction system provide capture (at the containment boundary) of groundwater exceeding the cleanup standards specified on page 18 of the OU1 ROD?

The degree of containment remains under discussion between the Army, USEPA, MPCA, City of New Brighton, and Restoration Advisory Board. In FY 2002, the Army prepared a technical memorandum (TWISS, December 2001) regarding the feasibility of a modification to the ROD. The contemplated change would be to switch from a requirement for demonstrating complete hydraulic containment, to a requirement for maintaining a specified pumping rate while demonstrating that the plume is not spreading and that aquifer restoration is occurring.

To address the technical issues surrounding the contemplated ROD amendment, representatives from the Army, USEPA, MPCA, Restoration Advisory Board, and City of New Brighton formed the Operable Unit 1 Technical Group (OU1TG). The OU1TG comprises technical representatives who met throughout 2004 under a cooperative and non-binding effort to develop a set of statistical tools for evaluating the progress of aquifer restoration in OU1. In September 2004, the OU1TG completed a draft report titled "Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data" (OU1 Technical Memorandum) and presented it to the TCAAP project managers for review. The report was finalized in December of 2004. In January 2005, the Army completed the "Proposed Record of Decision Amendment, For Operable Unit 1 of the New Brighton/Arden Hills Superfund Site Arden Hills, Minnesota." During FY 2005, the Army worked with the USEPA, MPCA, RAB, and New Brighton on acceptable language for a draft ROD amendment. In November 2005, the "Proposed Plan for Groundwater Remediation for Operable Unit 1 of the New Brighton/Arden Hills Superfund Site Arden Hills, Minnesota" was under review by the USEPA, MPCA, Restoration Advisory Board (RAB) and New Brighton. The parties expect to complete the ROD amendment in FY 2006.

The statistical evaluation is presented here (see Section 3.7) in anticipation of the completion of the ROD amendment and that the statistical methods will become part of the annual performance evaluation of the remedial progress in OU1.

In the meantime, the extraction system has continued to operate. Following is a discussion of the performance of the system with respect to containment.

Pumping Rates

Table 3-1 presents the monthly pumping volumes for each extraction well and Figure 3-2 illustrates the average monthly pumping rate targets and actual monthly volumes pumped for NBM #3/4, #15, and #14 (west to east order). The pumping targets were derived by Barr Engineering (Barr) based on their Final Conceptual Design Report, Containment/Production Wells (Barr, 1995). The operating system devised by Barr includes different operational

conditions (named A thru G), which were designed to respond to maintenance issues by altering the target rates at each extraction well. Condition A is the normal operating condition for when NBM #4, #14, and #15 are all in operation, and has pumping targets (lower limits) of 1.19, 0.99, and 0.99 million gallons per day, respectively. Conditions B through F have different pumping targets for when different wells are out of service (e.g., a pumping target for NBM #3 is added whenever NBM #4, #14, or #15 are out of service, and pumping targets for NBM #5 and #6 are added whenever both NBM #3 and #4 are out of service). Condition G is unique from the other conditions because it does not have a pumping target (i.e., the targets for all wells are zero). Condition G primarily applies during carbon change-outs for the granular activated carbon (GAC) treatment system. Hence, the daily pumping targets can vary depending on what operating condition the system is in. The targets depicted on Figure 3-2 represent a collective or cumulative monthly target based on the daily operating conditions.

For FY 2005, the New Brighton Contaminated Groundwater Recovery System NBCGRS was in the normal operating condition (Condition A) approximately 74 percent of the time. The system was in Condition G (primarily for carbon change-outs) for 17 percent of the time, with other operating conditions comprising the remaining 9 percent of the time.

Figure 3-2 indicates that the NBCGRS, as a whole, exceeded the monthly targets in all months during FY 2005. The graph shows much lower targets in October 2004 and April 2005. Also, the monthly pumping volumes in April and May 2005were lower than the typical pumping volume in the other months. For substantial portions of the months cited above, the NBCGRS was in Condition G due to GAC change-outs that were performed in April/May. Looking at the total NBCGRS pumping volume for FY 2005 of 1,333 million gallons, the average monthly pumping volume (if pumping was at a uniform rate) would be about 111 million gallons. Compared with the typical monthly pumping target of about 100 million gallons (for the normal operating condition), it is clear that the NBCGRS pumped substantially more than the minimum target rate.

The graphs for the extraction wells on Figure 3-2 show that all of the wells generally exceeded targets throughout the year, indicating that the pumping was appropriately distributed. NBM #14 was below its target in February 2005 due to down time (Condition E) to replace a pump bowl.

The overall adherence to the pumping targets supports the interpretation that the extraction system is providing substantial containment in the Prairie du Chien.

Water Level Contour Analysis

Table 3-2 presents the groundwater elevations measured during FY 2005. Figure 3-3 presents the groundwater elevation contours and an estimate of the capture zone created.

Extraction Well Water Quality

Trend graphs for trichloroethene in NBM #3, #4, #14, and #15 are shown on Figure 3-4. At both NBM #3 and NBM #4, trichloroethene decreased dramatically between 1991 and 1998, and has been relatively stable since then.

While not conclusive in and of itself, the long-term decreasing water quality trends at the extraction wells, while pumping remains essentially constant, support the interpretation that the OU1 system is making progress towards aquifer restoration. The shorter term stability needs to be observed in the context of the overall plume behavior discussed in Section 3.7.

Monitoring Well Water Quality

As discussed above, the OU1TG developed and reported a method for analyzing groundwater quality trends over time. Section 3.7 below, presents a discussion of the statistical analysis and presents the FY 2005 monitoring well data.

Are any changes or additional actions required for this remedy component?

Potential changes and/or additional actions will be addressed through the ROD modification process discussed previously.

3.4 REMEDY COMPONENT #4: REMOVAL OF VOCS BY GAC

Description: "Pumping the extracted groundwater to the Permanent Granular Activated Carbon (PGAC) Water Treatment Facility in New Brighton for removal of VOCs by a pressurized GAC system." (OU1 ROD, page 2)

- Treatment by the PGAC (along with iron and manganese removal and chlorination) makes the recovered groundwater suitable for municipal drinking water purposes. The PGAC is located approximately one-third mile south of Interstate 694 near Silver Lake Road. The City of New Brighton is responsible for operation and maintenance of the PGAC, with cost reimbursement from the Army for the operations related to the remedy.

Performance Standard (how do you know when you're done):
When the treated water meets the Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) established by the Safe Drinking Water Act (SDWA) for the chemicals of concern, as identified on page 18 of the OU1 ROD.

Did the treated water meet the MCLs and non-zero MCLGs established by the SDWA for the OU1 chemicals of concern?
Yes. Table 3-3 shows that the PGAC effluent met the performance standard during FY 2005.

Each of the 8 pairs of GAC Contractors (labeled A and B) is normally run in series (i.e., water passes through A then B, or B then A, depending on whether the most recent carbon change-out was the A or B vessel). The sampling data is not from a combined effluent after the GAC vessels; instead, it is from sampling ports between the lead and lag GAC vessel *and/or* after the lag GAC vessel for each of the 8 GAC vessel pairs in the PGAC. The sampling between the lead and lag vessels is performed every month and determines when breakthrough of the lead GAC vessels has occurred. When there are no contaminant detections between the lead and lag vessels, there is no reason to sample after the lag vessels. When breakthrough of a lead vessel

has occurred, a carbon change-out of all 8 lead vessels is scheduled. Until the change-out occurs, monthly samples are collected after each lag vessel (in addition to the monthly between-vessel samples) to ensure that water leaving the PGAC meets the treatment requirements. When the carbon change-out of the lead vessels is completed, the lead vessels are switched to the lag position and vice versa. Monthly sampling then reverts to only between the lead and lag vessels until a contaminant detection occurs, whereupon the process repeats.

Table 3-3 shows that two carbon change-outs occurred in FY 2005: one in October/November 2004 that was triggered by breakthrough detection, and one in April/May 2005, which was electively done to avoid having to conduct a change-out during the peak demand months of the summer (breakthrough had not yet been detected). The sampling results that represent PGAC effluent water quality are highlighted in Table 3-3 for ease of viewing the compliance portion of the data. There were no detections of VOCs in the samples representing PGAC effluent water quality.

Is any sampling of the treated water proposed prior to the next report?
Yes. Sampling will continue to be performed by the City of New Brighton or their contractor.

Are any changes or additional actions required for this remedy component? No.

3.5 REMEDY COMPONENT #5: DISCHARGE OF TREATED WATER

Description: "Discharging all of the treated water to the New Brighton municipal distribution system." (OU1 ROD, page 2)

Performance Standard (how do you know when you're done):
When the connection to the New Brighton municipal supply system has been completed and water is being discharged.

Is the treated water being discharged to the New Brighton municipal distribution system?
Yes.

Are any changes or additional actions required for this remedy component? No.

3.6 REMEDY COMPONENT #6: GROUNDWATER MONITORING

Description: "Monitoring the groundwater to verify the effectiveness of the remedy." (OU1 ROD, page 2)

Performance Standard (how do you know when you're done):
When a performance groundwater monitoring program has been established and ongoing monitoring is in compliance with the program.

Is this remedy component being implemented?
Yes. Performance monitoring programs have been established to collect the data required to verify the effectiveness of remedy components #1 through #5. Table 3-4 summarizes the performance monitoring requirements, implementing parties, and the specific documents that contain the monitoring plans.

Were the groundwater monitoring requirements for this remedy met?
Yes, with the following exceptions:

- 200804 (St Anthony #3): Not in operation at the time of sampling. The monitoring plan does not require this well to be sampled unless it is in service.
- 234549 (Reiner Well): The pump quit working and the well owner didn't know if they would ever fix it.
- 234546 (Honeywell Well): The check valve failed and well owner didn't know when they would fix it.

These wells are not critical to the performance evaluations. Therefore, the groundwater monitoring requirements were met. If the Reiner and Honeywell wells are not repaired in FY 2006, they will be deleted from the sampling plan thereafter.

Is any groundwater sampling proposed prior to the next report? Yes.

- Monitoring of the extraction wells and treatment system effluent will be performed by the City of New Brighton in accordance with the "New Brighton Water System Sampling and Analysis Plan," June 1997.
- Other groundwater monitoring will be in accordance with the Groundwater Monitoring Plan included as Appendix A.1. The next "major" event will be in FY 2007.

Are any changes or additional actions required for this remedy component? No.

3.7 OVERALL REMEDY FOR OU1 DEEP GROUNDWATER

Has the OU1 remedy been completed (i.e., have the cleanup levels on page 18 of the OU1 ROD been attained throughout the areal and vertical extent of the North Plume)? No.

What impact is the groundwater extraction system having on contaminant concentrations? Figure 3-5, Figure 3-6, and Figure 3-7 show the trichloroethene plumes in the Upper Unit 3, Lower Unit 3 and Unit 4 portions of the aquifer for FY 2005. Cross sections showing the plumes are presented in Figure 3-8, Figure 3-9, and Figure 3-10. These figures show both the OU1 and OU3 plumes, which overlap to some extent and should be viewed together. In general, the plumes are similar to the last comprehensive sampling round in FY 2003. The most significant changes to the overall plume were in OU3 and are discussed in Section 11.0. Figure 3-1 and Figure 3-11 shows the 1 µg/l and 100 µg/l trichloroethene contours respectively for the last 5

major sampling rounds to help illustrate how the bulk and edge of the plumes have behaved over this time.

As discussed in Section 3.3 above, the OU1 Technical Memorandum was prepared to develop statistical methods specifically selected to evaluate the long-term progress of remediation and plume evolution in OU1. The OU1 Technical Memorandum states the objective of the statistical evaluation as follows:

> "Verify progress in cleanup of the plume through measurement of overall geographic plume shrinkage and decreasing contaminant concentrations."

The OU1TG identified five issues that need to be statistically addressed, now and over time, to achieve this objective:

1. Measure changing concentrations immediately downgradient of the TGRS, as this area is the first to be affected by any potential escape of contaminants from TCAAP.

2. Measure changes in the geographical size of the plume over time.

3. Measure changes in concentrations immediately downgradient of the NBCGRS, as this is the first area to be affected by any potential escape of contaminants from NBCGRS capture.

4. Measure any unforeseen changes in plume configuration. This addresses the possibility that changing flow patterns may cause a shift in the plume but not necessarily any change in size. A plume shift may require a redistribution of pumping.

5. Measure the long-term trends in overall VOC concentrations (as an indicator of contaminant mass). This provides an overall picture of remedial progress.

The OU1TG developed a series of five well groups designed to address each of the issues listed above. For each group, the appropriate statistical tools were specified and the statistical response threshold was identified that would trigger closer scrutiny by the Army and regulators (MPCA and USEPA). The five groups, corresponding to the five issues discussed above, are:

1. Group 1: Downgradient of the TGRS. This zone is the area downgradient of the TGRS capture zone. This zone should show overall reductions over time in response to TGRS mass removal and containment. However, it is also the stagnation zone of the TGRS so groundwater velocities are reduced and response may be slow. Furthermore, individual wells near the stagnation zone may show increases in contaminant concentrations during some points in time, as the plume shifts in response to changes in pumping.

2. Group 2: Plume Edge Wells. This zone includes wells that define the edges of the plume downgradient of the TGRS. These are wells with low concentrations of VOCs (<100 µg/l) that will indicate a reduction in overall plume size if VOC concentrations continue to decline.

3. Group 3: Downgradient Sentinel Wells. This is a zone downgradient of the NBCGRS stagnation zone. This group includes three wells but more accurately is defined as a geographic area immediately downgradient of the NBCGRS. This group should help demonstrate improvement due to the VOC mass removal by the NBCGRS over time, analogous to Group 1 and the TGRS.

4. Group 4: Lateral Sentinel Wells. These are “clean” wells downgradient of the TGRS that are beyond the current plume boundaries. These wells should help

identify large, unexpected, lateral changes in plume configuration, such as a shifting or expansion of the plume boundary.

5. Group 5: Global Plume Mass Wells. This group includes all the monitoring wells necessary to construct a contour map of the VOC plume. Production wells are not used in Group 5 since the data may not be comparable to monitoring well data. Some wells on TCAAP are included in Group 5 to support the contouring near the TCAAP boundary. This group reflects the overall VOC mass in the aquifer and should show an overall reduction in VOC mass over time.

In October 2005, the Army received a consistency determination on:

Modification #1 to:
OU1 Technical Group Technical Memorandum Statistical Evaluation Method For Water Quality Data, Operable Unit 1" prepared by the Army, Dated December 2004.

This modification created well Group 6 to address the Jordan portion of the Unit 4 aquifer.

6. Group 6: Jordan Wells: The group includes all Jordan monitoring wells, the Prairie du Chien wells nested with them, and New Brighton Municipal Wells 3, 4, 5, and 6. The inclusion of the Prairie du Chien wells is to facilitate comparing the trends between it and the Jordan at these locations. This group will help identify any changes in the plume occurring in the Jordan portion of the aquifer.

Additional detail on the well groups and analysis is presented in the OU1 Technical Memorandum, Modification #1 and Appendix D.2.

FY 2005 was a major sampling year, so new comprehensive plume mapping was completed (Figures 3-5 through 3-10). Table 3-5 presents the FY 2005 groundwater quality data for OU1. These data were collected to support the statistical analysis developed by the OU1TG. Graphs of

historical trichloroethene concentrations at any well can be viewed from Figure B-2 (Appendix B). The graphs help illustrate the long-term changes that have occurred throughout OU1 and provide a visual aid for examining the trichloroethene history at any well.

The statistical analysis in Appendix D.2 follows the format described in the OU1 Technical Memorandum with the addition of the new Group 6 analysis and the inclusion of hydrogeologic Unit 3 as an addition to the Group 5.

Upon review of the data for the Unit 3 portion of Group 5, it was determined that the data points lacked consistent sampling histories over time to complete a kriging-based contour map for the Unit 3 similar to the Unit 4 Group 5 wells. In addition, there are not large numbers of data points for each of the sub-levels of the Unit 3 (e.g., upper and lower Unit 3). Instead, the wells that defined the Unit 3 plume were evaluated as individual well trends.

Table 3-6 presents a summary of the statistical results for all groups, from Appendix D.2, reflecting the data collected through FY 2005. Table 3-6 includes an assessment of the statistical thresholds that were triggered in the analysis and brief comments addressing these threshold triggers. Further discussion is presented below.

Group 1:

The Group 1 (downgradient of the TGRS) response threshold was triggered for the north plume. In the FY 2003 analysis, these were triggered due to an increasing trend in the north plume and a stable trend in the south plume, since 1996. The FY 2005 data improved the trend statistics. North Plume statistics improved from increasing to a stable trend and the South Plume thresholds are no longer triggered based on data from FY 1998 through 2005. It should be noted however, that the data set for Group 1 was incomplete (due to different monitoring frequencies in the past) as discussed in Appendix D.2, Section 5.1, so some data points were interpolated. Some interpolated data was eliminated this year with the new sampling rounds. The Group 1 trends, therefore, need to be confirmed through future monitoring and evaluation. The monitoring plan

monitoring plan has been adjusted to eliminate this problem over time. The improvement shown in FY 2005 suggests that ongoing monitoring is a sufficient response to the threshold triggers.

Group 2:

Group 2 well 04U861continued to show an upward trend. This well is located between the north and south plumes so represents a mingling of the plumes and does not represent a widening of the plume(s). This area is being addressed as part of OU3 (see Section 11.0). The trend for Group 2 well 206688 was rejected due to insufficient number of data points. This will be resolved as future monitoring continues. A number of wells showed "no trend", which constitutes a threshold trigger. These generally consist of upward trends with low statistical confidence and the range of concentrations at these wells is consistent with historical data. Following are the wells with "No-Trend" results and a summary of key observations:

409549: Historically at or above 200 ug/L, located within expected area of North Plume and upgradient of NBCGRS.

409557: Historically had sporadic detections below 10 ug/L, a Unit 3 well located between North and South plume in area where they co-mingle.

03L859: Historically had consistent detections below 10 ug/L, also a Unit 3 well located between North and South plume in area where they co-mingle.

03U672: Historically non-detect. Statistics driven by detection (3.1 ug/l) in 2001. Currently non-detect.

03U805: Historically had sporadic detections below 5 ug/L. Statistics driven by detection (3 ug/l) in 2001. Currently at 1.5 ug/L.

04U841: Historically had sporadic detections around 20 ug/L. Currently at 19 ug/L.

04U843: Historically appears to be generally increasing since the early 1990's from 2 to 3 ug/L to 60 ug/l in FY 2005. Located downgradient of hot-spot at 04U847. Over 1 mile upgradient of NBCGRS.

04U846: Sporadic results since 1997 (non-detect to 75 ug/L). Currently at 4.2 ug/L and just north of and within hydraulic influence of the NBCGRS.

The key factors that apply to Group 2 (from Table D.2.5, Appendix D) are contaminant concentrations, risk to human health and urgency of response needed. Except for 03U843, the data are generally well within historical ranges, and in locations likely within the capture zones of the remedial systems. Given these are no-trend results and there is nothing dramatic enough in these trends to suggests an expansion of the plume, an immediate response is not needed. It should be expected that the plume shows spacial and temporal variations like this as the heterogeneous distribution of VOCs continue to migrate through the aquifer system toward the NBCGRS. Human health is protected by the remedial systems and a special well construction area. The current sampling frequency is adequate to continue to monitor the trends in these wells.

Group 3 and Group 5:

The trends in the Area Weighted Concentration (AWC) for the Group 3 (downgradient sentinel wells) and the Group 5 (global plume mass wells) were both downward, showing improvement in the plume overall and downgradient of the NBCGRS. For further explanation of how the AWC is calculated see Appendix D.2.

As discussed above, the Unit 3 portion of Group 5 was added to the analysis for FY 2005. Table 3-6 presents statistical summary of these wells. Wells already in Group 2 were not included. Increasing trends were identified at 03U822 and 03L809. The trend at 03U822 appears to correlate with the trend at the nested Jordan well. These data suggest a slug of VOCs are moving through the middle section of the Unit 3 plume. Since the Unit 3 plume shows limited horizontal extent (much smaller than the underlying Unit 4 plume) and does not reach the New Brighton well field, continued monitoring of this group is appropriate response.

Group 4:

In Group 4, three wells exceeded the cleanup level. These were 03U831, 04U838, and 04U848. 03U831 has been non-detect since 1996 and has had detections in only 4 of 16 rounds since 1989. This well was abandoned in early 1996 and replacement will be discussed with the agencies in FY 2006. Monitoring well 04U848 is in OU3, which is addressed in Section 11.0. Well 04U838 is

near New Brighton municipal well #15 and likely represents a smearing of the plume due to pumping influences.

There were 5 wells listed in Group 4 that were not in the monitoring plan and were not sampled in FY 2005. These wells were previously abandoned are believed to be typographical errors in the OU1 technical memorandum, and they were deleted from Table D.2.1, in Appendix D. The wells are: 03U832, 03U815, 03L856, 03L813, and 409546.

In addition, well 03L860 was only scheduled for a one-time sampling in FY 2005. This well will be deleted from Group 4 in the future. A modification to the OU1 Technical Memorandum will be issued in FY 2006 to correct these errors.

Group 6:

With respect to the Jordan, the three new wells installed and sampled in FY 2005 provide additional data points between TCAAP and the NBCGRS to help complete the understanding of the extent and magnitude of VOC concentrations in the Jordan. This, the first year of Group 6 analysis, shows mixed results. Well 04J822 shows an increasing trend, however, this reflects only two years of data. This well is also in the central part of the plume and does not suggest an expansion. The nested Unit 4 wells are also shown on Table 3-6 and show a mixed set of results. As a whole, the Group 6 wells require additional monitoring to improve the statistics. Additional monitoring is already planned for the new Jordan wells (04J822, 04J847, and 04J849) to create a larger database for analysis.

The New Brighton Municipal well trends were analyzed using a linear regression for data since 1998. Due to the large number of data points, regression was considered superior to the Mann-Kendall analysis. Data from 1998 were used to reflect the approximate time window used throughout the statistical analysis and to avoid skewing the analysis from the earlier high concentrations. All the New Brighton wells showed downward concentration trends except NBM #3. This suggests that overall concentrations are decreasing at the New Brighton municipal well field, which agrees with the decreasing mass removal observed over the life of the system.

Overall Statistical Assessment:

Overall, the data meet the statistical criteria developed in this document for assessing the remedial progress in the off-TCAAP aquifers. The data show continuing improvement in the OU1 plume through 2005. Concerns with the OU3 plume are addressed in Section 11.0.

There were individual threshold triggers identified. The broader analysis for Groups 1, 3, and 5 show continuing improvement. Overall, therefore, the monitoring data indicates that aquifer restoration is occurring in the Prairie du Chien. The Unit 3 plume appears to be in a more stable configuration, but is limited geographically. The thresholds triggered do not suggest any problems with the remedial systems, but suggest movement within the established plumes. The threshold triggers are appropriately addressed in the continuing monitoring plan.

How much VOC mass has been removed (at each well and total)?

Table 3-1 shows that the NBCGRS removed 653 pounds of VOCs during FY 2005. The total cumulative VOCs removed by the NBCGRS is 18,200 pounds. The relative contribution from each extraction well is also shown on Table 3-1 (new for FY 2005). As the table shows, over 79% of the VOC mass is removed by wells NBM #4 and NBM #15.

Figure 3-12 shows the annual VOC mass removed (listed at the top of the graph), annual pumping volumes, and the trend in annual mass removal per unit volume pumped since FY 1997 (when NBM #14 was brought online). The mass removal in FY 2005 was slightly decreased compared to FY 2004 (versus 733 pounds), which is due to both a decrease in pumping and a decrease in the annual mass removal per unit volume pumped. The trend in annual mass removal per unit volume pumped continued to decrease from FY 2004 to FY 2005 and has been on a decreasing trend since FY 1998, when the last extraction well was brought online (NBM #15). This overall decline in the mass removal trend agrees with the trichloroethene trends in OU1 deep groundwater, which generally show a decreasing trend, and suggests that aquifer restoration is progressing.

Besides the changes already discussed, are any other changes or additional actions required for OU1? No. The Army, USEPA, MPCA, City of New Brighton, and Restoration Advisory Board are continuing to work on the Proposed Plan for a ROD amendment as discussed earlier.

Table 3-1

OU1 Pumping / VOC Mass Removal Data
Fiscal Year 2005

	WELL #3			WELL #4			WELL #5			WELL #6			WELL #14			WELL #15			System Totals		
MONTH	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	VOC (ug/l)	WATER TREATED (mgallons)	VOC Mass Removed (lbs)	TOTAL VOC EFFLUENT (ug/l)	TOTAL WATER TREATED BY EXTRACTION SYSTEM (Mgallons)	TOTAL VOC'S REMOVED BY EXTRACTION SYSTEM (lbs)
TOTAL GALLONS PUMPED AND VOC'S REMOVED THROUGH SEPTEMBER 30, 2004																				14,475.879	17,547
OCTOBER	38	0.132	0.042	49	38.472	15.733	150	0.158	0.198	95	0.147	0.117	39	35.393	11.520	100	36.235	30.242	0	110.537	57.86
NOVEMBER	49	0.091	0.037	50	37.807	15.777	160	0.171	0.228	93	0.170	0.132	22	33.088	6.075	89	34.781	25.835	0	106.108	48.09
DECEMBER	54	16.155	7.281	54	39.991	18.023	160	0.407	0.543	98	0.117	0.096	20	34.870	5.821	96	35.720	28.619	0	127.260	60.39
JANUARY	53	3.696	1.635	53	38.484	17.023	160	1.157	1.545	93	0.502	0.390	16	30.364	4.055	82	35.023	23.969	0	109.226	48.62
FEBRUARY	63	4.637	2.438	64	39.282	20.982	140	8.602	10.051	100	2.250	1.878	7	6.692	0.363	75	36.563	22.887	0	98.026	58.60
MARCH	64	7.082	3.783	59	45.076	22.196	140	0.000	0.000	98	0.210	0.172	7	14.892	0.870	59	45.107	22.211	0	112.367	49.24
APRIL	64	0.000	0.000	76	27.220	17.266	140	0.001	0.001	120	0.173	0.173	16	17.840	2.382	82	32.470	22.222	0	77.704	42.05
MAY	75	0.603	0.377	81	25.347	17.135	150	0.304	0.381	94	0.174	0.137	20	27.567	4.601	72	25.765	15.482	0	79.760	38.12
JUNE	58	0.899	0.435	70	38.385	22.425	150	2.164	2.709	99	0.159	0.131	25	28.781	6.005	87	37.486	27.219	0	107.874	58.93
JULY	59	14.106	6.946	62	44.318	22.932	150	0.159	0.199	105	0.491	0.430	47	36.008	14.125	87	43.466	31.561	0	138.548	76.20
AUGUST	44	13.097	4.810	48	43.874	17.576	150	0.000	0.000	86	2.746	1.971	42	42.336	14.840	75	44.650	27.949	0	146.703	67.15
SEPTEMBER	34	3.627	1.029	42	43.008	15.076	150	0.000	0.000	76	0.317	0.201	37	38.378	11.851	70	33.268	19.436	0	118.598	47.60
Subtotal			28.813			222.145			15.855			5.827			82.509			297.631			
% of Total Mass			4.4			34.0			2.4			0.9			12.6			45.6			
TOTAL GALLONS TREATED AND VOC'S REMOVED FOR FISCAL YEAR 2005																				1,332.711	652.83
TOTAL GALLONS TREATED AND VOC'S REMOVED SINCE SYSTEM START UP																				15,808.590	18,200

Note: The mass of VOCs removed from Well Nos. 5 and 14 in March 2005 were calculated using analytical results from the previous month (February).
Note: The mass of VOCs removed from Well Nos. 3 and 5 in April 2005 were calculated using analytical results from the previous month (March).
Note: The mass of VOCs removed from Well No. 5 in September 2005 were calculated using analytical results from the previous month (August).

Table 3-2

TCAAP - OU1 Groundwater Elevations
Fiscal Year 2005

WELL NUMBER (IRDMIS)	WELL NUMBER Mn unique	LOCATION	6/1-2/2005 WL (ft.)	TOC (ft.)	GW Elev (ft.)	Notes
03L811	426809	SE of Belair Excavating Bldg, off of old hwy 8, Just N of RR tracks	64.07	909.8	845.73	TOC from 1992 Kemper Survey
03L822	426813	S of Long Lake Beach pkg lot, in trees between path and RR tracks	42.00	879.08	837.08	
03L841	434037	50' S of hwy 96 along entrance ramp to 35W S, marked with orange flags	67.06	911.91	844.85	
03L846	447899	United Church of Christ NB, entrance to back pkg lot, LL Rd and Pike Lk Cir.	56.94	888.54	831.60	
03M843	426852	Just W of NB Hist. Bldg in LL Park- next to RR Tracks.	49.11	887.16	838.05	
03U811	426808	SE of Belair Excavating Bldg, off of old hwy 8, Just N of RR tracks	63.93	910.57	846.64	TOC from 1992 Kemper Survey
03U821	426810	Asphalt fence- enter through Mid Asph.	42.73	880.20	837.47	TOC from 1992 Kemper Survey
03U822	426812	S of Long Lake Beach pkg lot, in trees between path and RR tracks	42.22	879.30	837.08	
03U831	426863	Across from Beisswenger's Hrdwre, on E side of old hwy 8	54.52	891.79	837.27	
04J822	706043	On south end of Long Lake Beach parking lot, in NE corner of trees	42.79			surveyed 6/24/04
04J834		29th and Rankin St. In the shrubs of the center island median	137.77	948.78	811.01	
04J836	596629	Inside fence for water tower, 7th St NW and Silver Lake Rd.	175.44	1001.49	826.05	
04J837	596631	N side of Belair middle school playground - take rd from 7th St NW	102.28	929.35	827.07	
04J838	596633	S side of 7th St NW, bottom of hill, in field to Hansen Park.	50.92	880.18	829.26	
04J839	596635	S side of 694 going E, between HWY 65 and Silver Lake Rd.	161.12	987.94	826.82	
04J847	706045	Back of Johnson Filters storage lot, NW of main bldg, E of propane tanks	73.35			surveyed 6/24/04
04J849	706044	On East side of Long Lake Rd, on south side of creek that goes to Pike Lake	44.60			surveyed 6/24/04
04J882	482707	St. Anthony Blvd and Silver Lake Rd., near Mobil Gas Station	111.25	920.60	809.35	
04U821	426811	Asphalt fence- enter through Mid Asph.	42.62	879.81	837.19	TOC from 1992 Kemper Survey
04U834	519836	29th and Rankin St. In the shrubs of the center island median	132.38	947.88	815.50	
04U836	596628	Inside fence for water tower, 7th St NW and Silver Lake Rd. Need NB key	177.22	1000.64	823.42	
04U837	596630	N side of Belair middle school playground - take rd from 7th St NW	99.35	929.15	829.80	
04U838	596632	S side of 7th St NW, bottom of hill, in field to Hansen Park.	48.88	880.49	831.61	
04U839	596634	S side of 694 going E, between HWY 65 and Silver Lake Rd.	157.66	987.73	830.07	
04U841	426851	50' S of hwy 96 along entrance ramp to 35W S, marked with orange flags	67.42	913.77	846.35	
04U843	426853	Long Lake Park, N of NB Hist. Center, N of Rd. just E of RR tracks.	50.75	888.13	837.38	
04U844	426854	SW corner of Midwest Asphalt-in trees, just E of RR track, S of conc. Found	50.88	886.74	835.86	
04U846	426856	United Church of Christ NB, entrance to back pkg lot, LL Rd and Pike Lk Cir.	58.17	889.46	831.29	

Table 3-2

TCAAP - OU1 Groundwater Elevations
Fiscal Year 2005

WELL NUMBER (IRDMIS)	WELL NUMBER Mn unique	LOCATION	6/1-2/2005 WL (ft.)	TOC (ft.)	GW Elev (ft.)	Notes
04U847	426857	Back of Johnson Filters storage lot, NW of main bldg, E of propane tanks	70.14	916.10	845.96	
04U849	416082	Corner of Long Lake Rd and Rosewood Court. Brown casing	43.17	874.47	831.30	TOC from 1992 Kemper Survey
04U850	416200	Along Pike Lk Dr, N of 694 sound barricade, brown well casing.	88.18	918.99	830.81	
04U855	426860	18th St NW and Long Lake Rd., brown well casing	62.89	898.15	835.26	
04U871	447889	Inside Silver Lake Camp, off of Cty Rd E intersecting Wexford Hts. Dr.	136.80	959.11	822.31	
04U872	447988	Equinox Apt., Silver Lake Rd and Silver Lane	133.56	954.87	821.31	
04U875	447898	Reservoir Blvd, N of nursing home, fenced in MPLS Water Works- call 612-661-4968 to enter gate	194.59	1015.72	821.13	
04U877	447896	Belair Middle School, 5th St NW past Inca Lane	93.51	923.08	829.57	
04U879	447900	29th Ave NW, N of 14th St. Hidden Oaks Park, by concrete block bldg.	117.77	948.12	830.35	
04U880	447895	SE corner of Ostrander Park, 40th and Polk	156.26	975.00	818.74	
04U881	447891	Waite Park, 33rd (34th?) and Garfield, north of hockey rink, next to plygrnd	160.85	978.39	817.54	
04U882	447890	St. Anthony Blvd and Silver Lake Rd., near Mobil Gas Station	105.47	919.96	814.49	
04U883	447892	Cty Rd C and Walnut, by RR tracks, SE corner of Penske Fence	138.08	951.11	813.03	
PJ#318	447894	N end of Central Park, E of Silver Lake Rd, down by Wading Pool.	167.50	985.60	818.10	
	191942	BS118U4- Just E of Midwest Asphalts main scale- flush mount, biggest plate, threaded cap- unscrews CCW	46.77	883.78	837.01	Assumed TOC from adjacent Well No. 409597 (all 3 wells are flush grade and TOC's should be close)
	409547	NW corner of entrance to Long Lake Park, alongside W side of old hwy 8.	58.70	898.60	839.90	
	409548	Boat Launch- S shore of Long Lake- Next to bathrooms, SE corner pkg lot	39.57	872.19	832.62	
	409549	W of Pike Lake School- S side of 14th st., by warming house parking lot.	92.46	923.23	830.77	
	409550	NW corner of Cheetah Precision Bldg fenced- Mounds Ave off old hwy 8.	67.42	914.40	846.98	
	409555	Oakwood, behind Silver Oak Condos @ park, Across from 694	100.95	925.23	824.28	
	409556	Highview Jr. High- on W side of new gymnasium construction	133.03	963.49	830.46	
	409557	NW corner of entrance to Long Lake Park, alongside W side of old hwy 8.	61.08	898.25	837.17	
	409596	scale- flush mount, 3rd plate from scale	46.54	883.62	837.08	TOC from 1992 Kemper Survey
	409597	Just E of Midwest Asphalts main scale- flush mount- 2nd plate closest to scale	46.59	883.78	837.19	
	512761	Gross Golf Course well #2- in well shed N of maint bldg see Head Green Keeper- Rick 612-789-2542 x 9	140.46	951.49	811.03	

Notes:
Water level measured June 1-2, 2005.
All groundwater elevations are in feet above mean sea level.
All TOC numbers are from a 1999 CRA-maintained file except as noted.

Table 3-3

OU1, PGAC Effluent Water Quality
Fiscal Year 2005

	Influent Well Monitoring						Operational Performance Monitoring													
Sampling	Well	Well	Well	Well	Well	Well	Contactor #1		Contactor #2		Contactor #3		Contactor #4		Contactor #5		Contactor #6		Contactor #7		Contactor #8	
Date	#3	#4	#5	#6	#14	#15	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
"A" Vessels are the Lead Vessels.																						
31-Oct-04	38	49	150	95	39	100	1.1	NS	0	NS	1.7	NS	1.2	NS	0	NS	0	NS	0	NS	0	NS
GAC replaced in contactors 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A between October 12, 2004 and November 12, 2004. "B" Vessels become the Lead Vessel																						
30-Nov-04	49	50	160	93	22	89	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0
31-Dec-04	54	54	160	98	20	96	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0
31-Jan-05	53	53	160	93	16	82	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0
28-Feb-05	63	64	140	100	6.5	75	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0
31-Mar-05	64	59	NS	98	NS	59	0	5.3, 0	0	16, 0	0	10	0	14, 0	0	13, 0	0	12, 0	0	24, 0	0	26, 0
30-Apr-05	NS	76	NS	120	16	82	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0
GAC replaced in contactors 1B, 2B, 3B, 4B, 5B, 6B, 7B, 8B between April 1, 2005 and May 26, 2005. "A" Vessels become the Lead Vessels.																						
31-May-05	75	81	150	94	20	72	0	NS	NS	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS
30-Jun-05	58	70	150	99	25	87	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS
31-Jul-05	59	62	150	105	47	87	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS
31-Aug-05	44	48	NS	86	42	75	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS
30-Sep-05	34	42	NS	76	37	70	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS	0	NS

Notes:

1) All water quality results shown are for Total VOCs (ug/l).

2) NS = Not Sampled.

3) The highlighted results indicate those results that are representative of effluent water quality for the given pair of contactor vessels (only the A or B vessel result is highlighted since vessels are operating in series).

4) In March, samples collected from the contactor vessels showed positive detections of Trichloroethylene in each of the lead vessels and the field blank sample ranging from 3.0 ug/L to 26 ug/L. The suspected cause of these elevated levels was a cleaning of the vessels earlier in the day by a product with TCE as a main ingredient. The lead and lag vessels were resampled and the samples were found to have no VOCs.

Table 3-4

Summary of OU1 Monitoring Requirements
Fiscal Year 2005

Remedy Component	Monitoring Requirements	Implementing Party	Documents Containing the Monitoring Plan
#1: Alternate Water Supply/Well Abandonment	a. Water quality data for the perimeter of the plume to define the area of concern	Army	OU1 Groundwater Monitoring Plan in the Annual Report
	b. Water quality data for water supply wells to determine eligibility for alternate supply/abandonment	Army	Well Inventory Report
#2: Drilling Advisories	a. Verification that drilling advisories are in place and functioning as intended	Army/MDH	N/A
#3: Groundwater Containment	a. Pumping volume and rates for each extraction well for comparison to design flowrates for containment	New Brighton	New Brighton Water System Sampling and Analysis Plan
	b. Water levels from monitoring wells to draw contour maps showing the influences of pumping	Army	OU1 Groundwater Monitoring Plan in the Annual Report
	c. Water quality, especially downgradient of the extraction system, to assist in evaluation of containment.	Army	OU1 Groundwater Monitoring Plan in the Annual Report
#4: Removal of VOCs	a. Effluent water quality to demonstrate compliance with the Safe Drinking Water Act	New Brighton	New Brighton Water System Sampling and Analysis Plan
#5: Discharge of Treated Water	a. Verification of discharge	New Brighton	N/A
#6: Groundwater Monitoring	Outlined above and below		
OR: Overall Remedy (Attainment of cleanup goals)	a. Water quality data throughout the North Plume to evaluate attainment	Army	OU1 Groundwater Monitoring Plan in the Annual Report

Table 3-5

OU1 Groundwater Quality Data
Fiscal Year 2005

			Trichloro-ethene (ug/l)	1,1-Dichloro-ethene (ug/l)	cis-1,2-Dichloro-ethene (ug/l)	1,1,1-Trichloro-ethane (ug/l)	1,1,2-Trichloro-ethane (ug/l)	1,1-Dichloro-ethane (ug/l)
OU1 Cleanup Level [1]			5	6	70	200	3	70
04J822		12/28/2004	**13**	2.6	JP 0.22 (JS127)	3.5	<1	1.7
04J822	D	12/28/2004	**13**	2.8	JP 0.20 (JS127)	3.5	<1	1.9
04J847		12/28/2004	**990**	**79**	11 (JS127)	77	<2	55
04J849		12/28/2004	<1	<1	<1	<1	<1	<1
03L811		6/6/2005	<1	4.0 (JL128)	JP 0.63	<1	<1	5.0 (JL134)
03L822		6/14/2005	**400**	**13**	3.8	11	<1	7.8
03L841		6/7/2005	<1	<1	JP 0.39	<1	<1	JP 0.51 (JL134)
03L846		6/7/2005	JP 0.25	2.1 (JL128)	JP 0.87	<1	<1	15 (JL134)
03M843		6/7/2005	<1	<1	<1	<1	<1	<1
03U811		6/6/2005	<1	<1	<1	<1	<1	<1
03U821		6/10/2005	**14** (JD30)	JP 0.71	<1	JP 0.93	<1	JP 0.72
03U821	D	6/10/2005	**19** (JD30)	JP 0.95	<1	1.2	<1	JP 0.91
03U822		6/10/2005	**160**	**11**	2.7	3.4	<1	15
03U831		6/7/2005	**22**	1.7 (JL128)	16 (JS134)	<1	<1	2.0 (JL134)
03U831	D	6/7/2005	**21**	1.6 (JL128)	15 (JS134)	<1	<1	1.9 (JL134)
04U821		6/13/2005	**25**	1.8	JP 0.21	1.8	<1	1.6
04U834		6/21/2005	3.7	<1	<1	<1	<1	<1
04U836		6/21/2005	**37**	3.8	JP 0.39 (JQ)	3.7	<1	2.8
04U836	D	6/21/2005	**40**	4.2	JP 0.48 (JQ)	3.8	<1	2.9
04U837		6/15/2005	**19**	1.5	JP 0.63	JP 0.93	<1	1.3

Table 3-5

OU1 Groundwater Quality Data
Fiscal Year 2005

			Trichloro-ethene (ug/l)	1,1-Dichloro-ethene (ug/l)	cis-1,2-Dichloro-ethene (ug/l)	1,1,1-Trichloro-ethane (ug/l)	1,1,2-Trichloro-ethane (ug/l)	1,1-Dichloro-ethane (ug/l)
OU1 Cleanup Level [1]			5	6	70	200	3	70
04U838		6/7/2005	**18**	2.5 (JL128)	JP 0.52	JP 0.79	<1	2.0 (JL134)
04U839		6/7/2005	1.4	JP 0.16 (JL128)	<1	<1	<1	<1
04U841		6/9/2005	**19**	2.9	JP 0.68	4.8	<1	2.2
04U843		6/7/2005	**60**	**13** (JL128)	1.7	10	<1	9.9 (JL134)
04U844		6/14/2005	**320**	**28**	3.2	43	JP 0.37	16
04U844	D	6/14/2005	**300**	**26**	3	40	JP 0.32	15
04U846		6/10/2005	4.2	**6.7**	4.2	<1	<1	11
04U847		6/15/2005	**1100**	**68**	9.9	55	JP 0.48	47
04U847	D	6/15/2005	**1200**	**68**	9	55	<2	47
04U849		6/13/2005	**33**	3.8	JP 0.35	3.0	<1	3.3
04U850		6/13/2005	**110**	**11**	1.6	8.8	<1	8.3
04U855		6/8/2005	<1	<1	<1	<1	<1	<1
04U871		6/22/2005	**31**	2.1	<1	2.2	<1	2.3
04U872		6/20/2005	**9.0**	JP 0.56	<1	JP 0.59	<1	JP 0.57
04U875		6/22/2005	2.5	<1	<1	JP 0.24	<1	<1
04U877		6/16/2005	2.0 (UB0.53)	<1	<1	<1	<1	JP 0.28
04U879		6/8/2005	<1	<1	<1	<1	<1	<1
04U880		6/16/2005	1.3 (UB0.53)	<1	<1	<1	<1	<1
04U880	D	6/16/2005	1.2 (UB0.53)	<1	<1	<1	<1	<1
04U881		6/9/2005	3.8	<1	<1	<1	<1	JP 0.22
04U882		6/17/2005	**23**	1.4	<1	1.9	<1	1.0

Table 3-5

OU1 Groundwater Quality Data
Fiscal Year 2005

			Trichloro-ethene (ug/l)	1,1-Dichloro-ethene (ug/l)	cis-1,2-Dichloro-ethene (ug/l)	1,1,1-Trichloro-ethane (ug/l)	1,1,2-Trichloro-ethane (ug/l)	1,1-Dichloro-ethane (ug/l)
OU1 Cleanup Level [1]			5	6	70	200	3	70
04U883		6/10/2005	<1	<1	<1	<1	<1	<1
04J822		6/30/2005	**29**	5	JP .63	6.8	<1	3.3
04J834		6/8/2005	JP 0.38	<1	<1	<1	<1	<1
04J836		6/21/2005	3.7	<1	<1	JP 0.54	<1	<1
04J837		6/20/2005	**14**	1.2	JP 0.25	JP 0.88	<1	1.1
04J838		6/17/2005	**30**	1.9	<1	1.5	<1	1.4
04J838	D	6/17/2005	**30**	1.9	JP 0.19	1.6	<1	1.5
04J839		6/17/2005	3.2	<1	<1	JP 0.25	<1	<1
04J847		6/15/2005	**950**	**64**	9.9	65	<2	43
04J849		6/9/2005	<1	<1	<1	<1	<1	<1
04J882		6/8/2005	<1	<1	<1	<1	<1	<1
191942		6/13/2005	**76**	**12**	2.1	7.6	<1	10
200154		6/24/2005	<1	<1	<1	<1	<1	<1
200524		6/16/2005	**9.9**	JP 0.49	<1	JP 0.37	<1	JP 0.49
200803		6/16/2005	**18**	1	<1	JP 0.60	<1	JP 0.85
206688		6/20/2005	**9.5**	JP 0.71	<1	1.1	<1	JP 0.69
409547		6/6/2005	<1	2.4 (JL128)	2.3	1.6	<1	2.2 (JL134)
409548		6/8/2005	1.1	JP 0.54 (JL128)	<1	<1	<1	JP 0.59 (JL134)
409549		6/10/2005	**28**	3.1	JP 0.22	3.0	<1	2.5
409550		6/14/2005	**80**	3.0	JP 0.58	8.7	<1	1.5

Table 3-5

OU1 Groundwater Quality Data
Fiscal Year 2005

		Trichloro-ethene (ug/l)	1,1-Dichloro-ethene (ug/l)	cis-1,2-Dichloro-ethene (ug/l)	1,1,1-Trichloro-ethane (ug/l)	1,1,2-Trichloro-ethane (ug/l)	1,1-Dichloro-ethane (ug/l)
OU1 Cleanup Level [1]		5	6	70	200	3	70
409555	6/8/2005	<1	<1	<1	<1	<1	<1
409556	6/7/2005	<1	<1	<1	<1	<1	<1
409557	6/9/2005	**27**	**9.1**	2.1	5.7	<1	8.1
409596	6/9/2005	**5.4**	JP 0.42	<1	JP 0.40	<1	JP 0.51
409597	6/14/2005	**94**	**13**	2.6	8.4	<1	12
447894	6/20/2005	1.9	<1	<1	<1	<1	<1
512761	6/23/2005	**17**	1	<1	1.2	<1	JP 0.91

Notes:

(1) Cleanup levels for OU1 deep groundwater are from page 18 of the OU1 ROD. Bolding (in red color) indicates exceedance of the cleanup level.

D Duplicate sample.

JD The relative percent difference (RPD) between the sample and the duplicate was above the QC limit (the RPD is listed after "JD"). Result should be considered estimated.

JL The percent recovery for the laboratory control sample was above the upper QC limit (the percent recovery is listed after "JL"). The sample result could be biased high.

JP The value is below the reporting level, but above the method detection limit. Results should be considered estima

JQ The compound identification is not confirmed. Results should be considered estimated.

JS The percent recovery for the matrix spike was above the upper QC limit (the percent recovery is listed after "JS"). The sample result could be biased high.

UB The sample result was less than 5 times the level detected in a blank (the result for the blank is listed after "UB"). The sample result can be considered non detect at an elevated detection limit.

Table 3-6

Group 1, 2, 3, 5, and 6 Mann-Kendall Summary and MAROS Conclusion
Fiscal Year 2005

Group	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments
Group 1									
Group1NP	-5	6	Decreasing	76.5%	0.273	S or NT	**Stable**	Yes	Likely decreasing, confidence low
Group1SP	-10	6	Decreasing	95.2%	0.776	Definite	**Decreasing**	No	
Group 2									
409549	3	6	Increasing	64.0%	0.621	S or NT	**No Trend**	Yes	
409557	8	6	Increasing	89.8%	1.065	S or NT	**No Trend**	Yes	
03L673	-5	6	Decreasing	76.5%	0.773	S or NT	**Stable**	No	
03L833	-15	6	Decreasing	99.9%	0.588	Definite	**Decreasing**	No	
03L848	-7	6	Decreasing	86.4%	0.434	S or NT	**Stable**	No	
03L859	3	6	Increasing	64.0%	0.414	S or NT	**No Trend**	Yes	
03U672	1	6	Increasing	50.0%	2.449	S or NT	**No Trend**	Yes	
03U805	8	6	Increasing	89.8%	0.940	S or NT	**No Trend**	Yes	
04U673	-5	6	Decreasing	76.0%	0.688	S or NT	**Stable**	No	
04U832	-1	6	Decreasing	50.0%	0.674	S or NT	**Stable**	No	
04U833	-13	6	Decreasing	99.2%	0.928	Definite	**Decreasing**	No	
04U841	4	6	Increasing	70.3%	0.499	S or NT	**No Trend**	Yes	
04U843	5	6	Increasing	76.5%	0.867	S or NT	**No Trend**	Yes	
04U845	-5	6	Decreasing	76.5%	0.669	S or NT	**Stable**	No	
04U846	3	6	Increasing	64.0%	1.751	S or NT	**No Trend**	Yes	
04U854	-13	6	Decreasing	99.2%	0.434	Definite	**Decreasing**	No	
04U859	-1	6	Decreasing	50.0%	0.763	S or NT	**Stable**	No	
04U861	13	6	Increasing	99.2%	1.380	Definite	**Increasing**	Yes	Located between N. and S. Plume
04U875	-15	6	Decreasing	99.9%	0.437	Definite	**Decreasing**	No	
04U877	-13	6	Decreasing	99.2%	0.896	Definite	**Decreasing**	No	
206688	0	5	Zero	41.0%	0.086	S or NT	**Stable**	No	only 5 data points
Group 3	-14	6	Decreasing	99.5%	0.577	Definite	**Decreasing**	No	
Group 5	-11	6	Decreasing	97.2%	0.136	Definite	**Decreasing**	No	

Table 3-6

Group 1, 2, 3, 5, and 6 Mann-Kendall Summary and MAROS Conclusion
Fiscal Year 2005

Group	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments
Group 5 Unit 3 Wells:									
409550	-15	6	Decreasing	99.9%	0.720	Definite	**Decreasing**	No	
409597	-9	6	Decreasing	93.2%	0.286	Probable	**Decreasing**	No	
409596	-6	5	Decreasing	88.3%	0.680	S or NT	**Stable**	Yes	Likely Decreasing
03U831	5	6	Increasing	76.5%	2.449	S or NT	**No Trend**	Yes	Single Detection in 2005
03U821	-7	6	Decreasing	86.4%	0.750	S or NT	**Stable**	Yes	Likely Decreasing
03U822	11	6	Increasing	97.2%	0.861	Definite	**Increasing**	Yes	Appears to have peaked
03L822	3	6	Increasing	64.0%	0.517	S or NT	**No Trend**	Yes	Appears to have peaked
03L809	11	6	Increasing	97.2%	0.744	Definite	**Increasing**	Yes	Stable since 2001
Group 6 OU1 Jordan Wells:									
04J822	6	4	Increasing	95.8%	0.689	Definite	**Increasing**	Yes	Only 2 years of data
04J834	2	6	Increasing	57.0%	1.760	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
04J836	-2	5	Decreasing	59.2%	0.703	S or NT	**Stable**	Yes	All conc. below 5 ug/L
04J837	-8	5	Decreasing	95.8%	1.079	Definite	**Decreasing**	No	
04J839	0	5	Increasing	40.8%	0.857	S or NT	**Stable**	Yes	All conc. below 5 ug/L
04J847	-1	4	Decreasing	50.0%	0.071	S or NT	**Stable**	Yes	Only 2 years of data
04J849	0	4	NA	37.5%	NA	S or NT	**NA**	No	All conc. ND
04J882	-5	6	Decreasing	76.5%	2.449	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
Group 6 Nested Unit 4 Wells:									
04U834	-13	6	Decreasing	99.2%	0.843	Definite	**Decreasing**	No	
04U836	2	4	Increasing	62.5%	0.485	S or NT	**No Trend**	Yes	4 data points, low confidence
04U837	0	4	Increasing	37.5%	0.885	S or NT	**Stable**	Yes	4 data points, low confidence
04U838	0	4	Increasing	37.5%	1.094	S or NT	**No Trend**	Yes	4 data points, low confidence
04U839	-2	4	Decreasing	62.5%	0.731	S or NT	**Stable**	Yes	
04U847	4	6	Increasing	70.3%	0.511	S or NT	**No Trend**	Yes	Trend driven by 1995 anomaly
04U849	-13	6	Decreasing	99.2%	0.521	Definite	**Decreasing**	No	

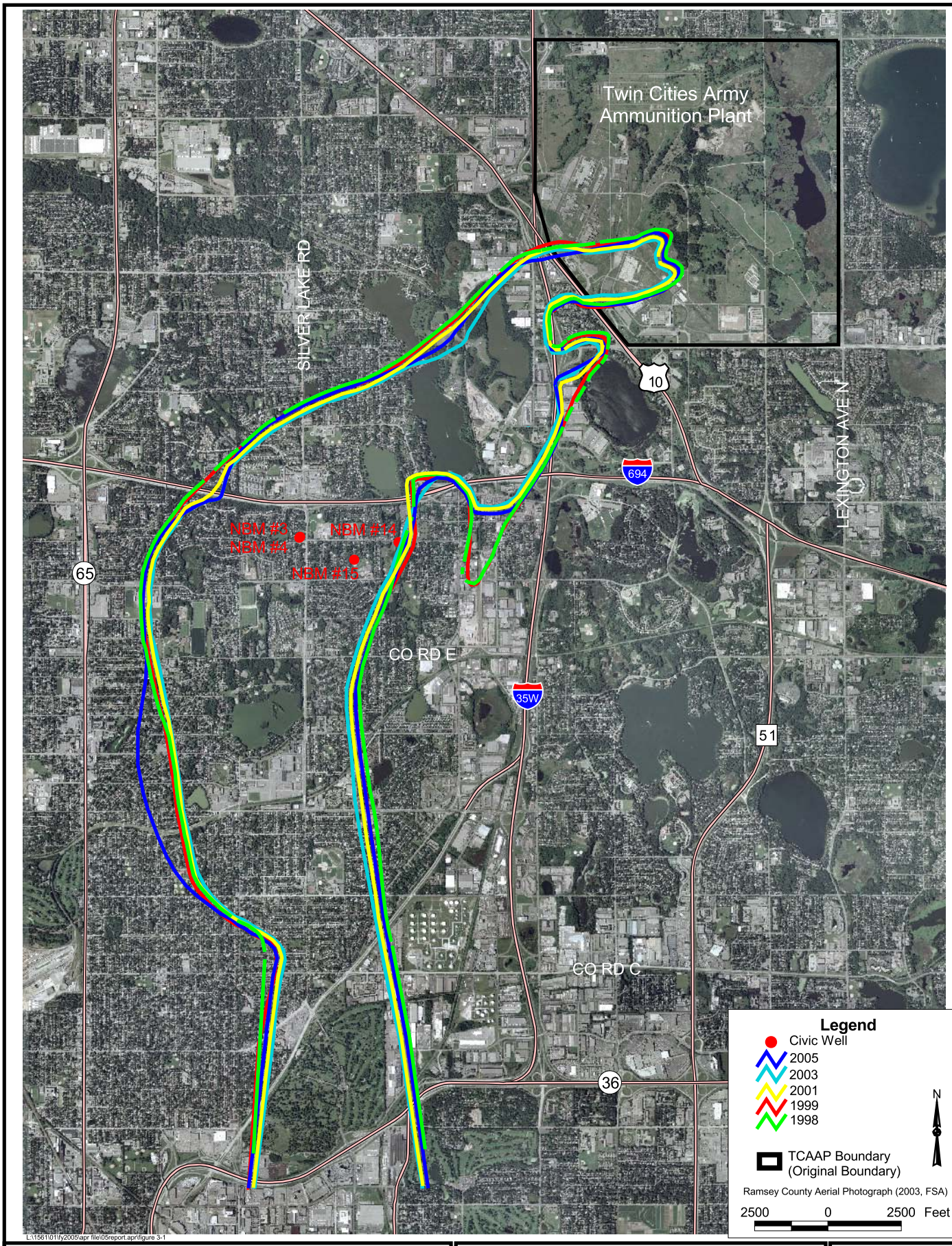
Table 3-6

Group 1, 2, 3, 5, and 6 Mann-Kendall Summary and MAROS Conclusion
Fiscal Year 2005

Group	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments

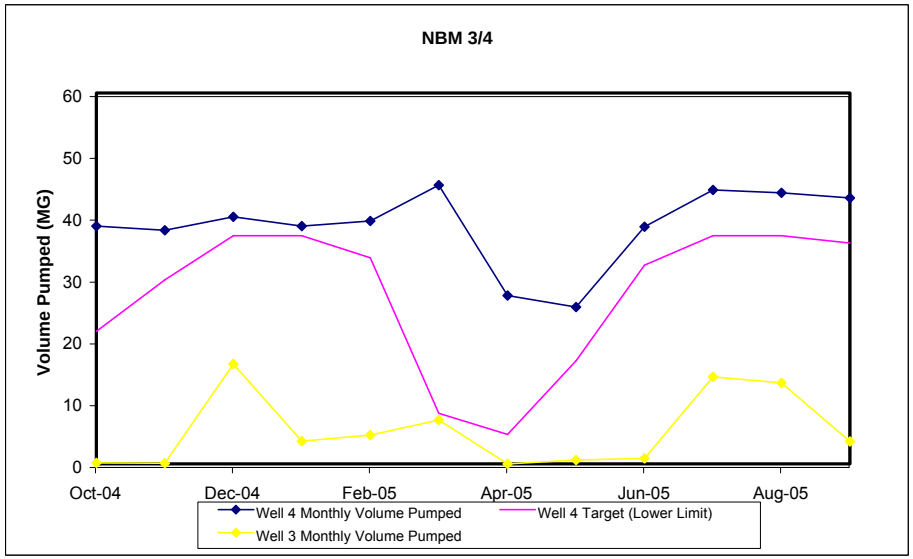
Notes:
S or NT = Stable or No Trend
N = number of data points
COV = Coefficient of Variance

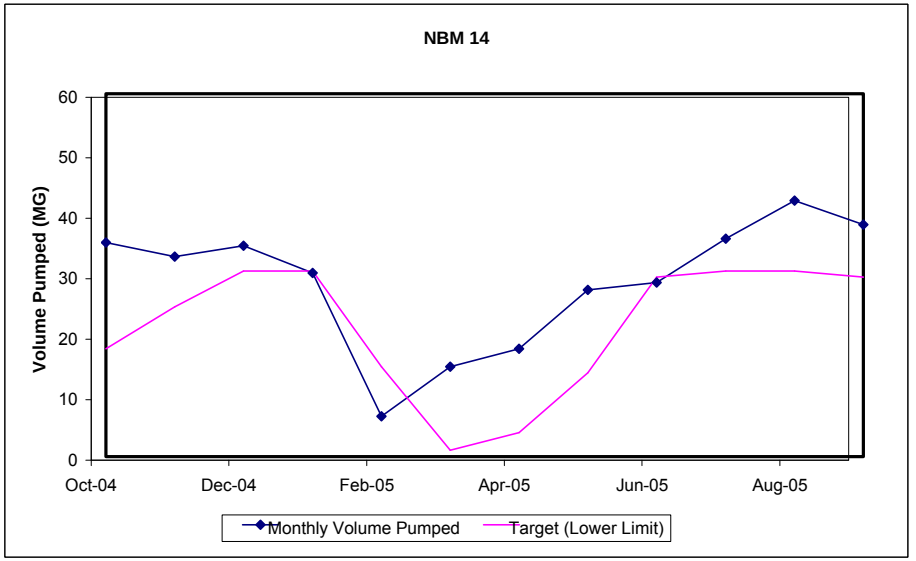
	MAROS Decision Matrix	
M-K S	Confidence	Trend
S > 0	> 95%	Increasing
S > 0	90-95%	Pr. Incr.
S > 0	< 90%	No Trend
S</= 0	< 90%	No Trend
S </= 0	< 90%	Stable
S < 0	90-95%	Pr. Decr.
S < 0	>95%	Decreasing

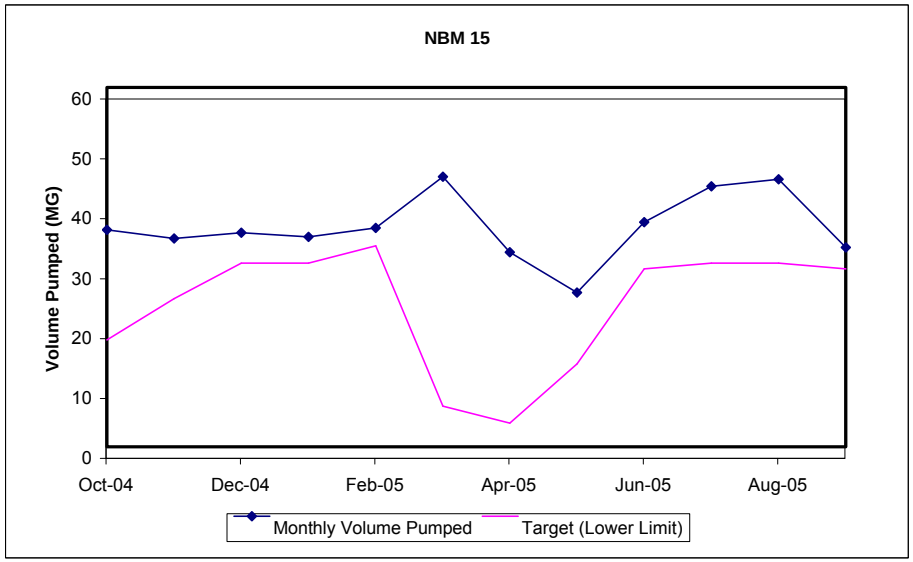


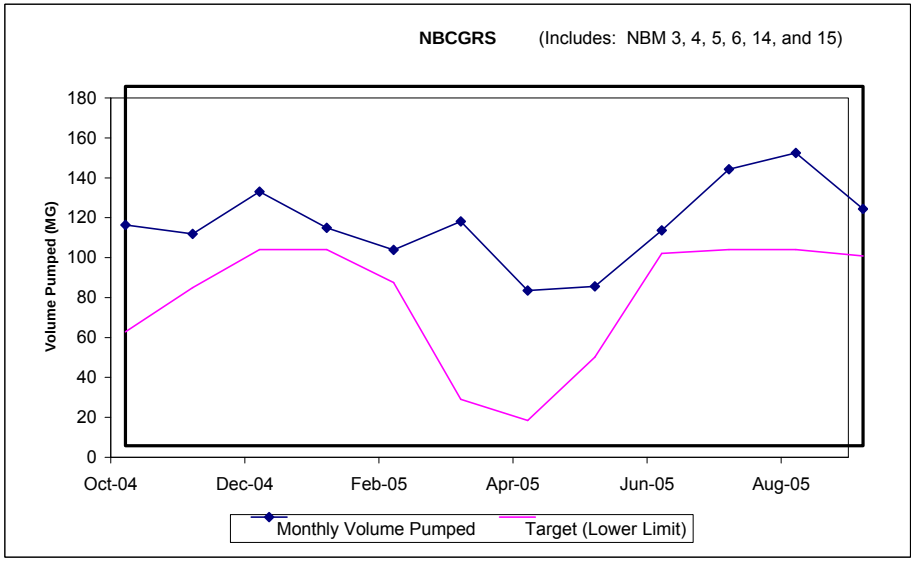
TWIN CITIES ARMY AMMUNITION PLANT Upper Unit 4, 1 ug/l Trichloroethene Isoconcentration Map	COPYRIGHT Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0429	FY 2005 Figure 3-1

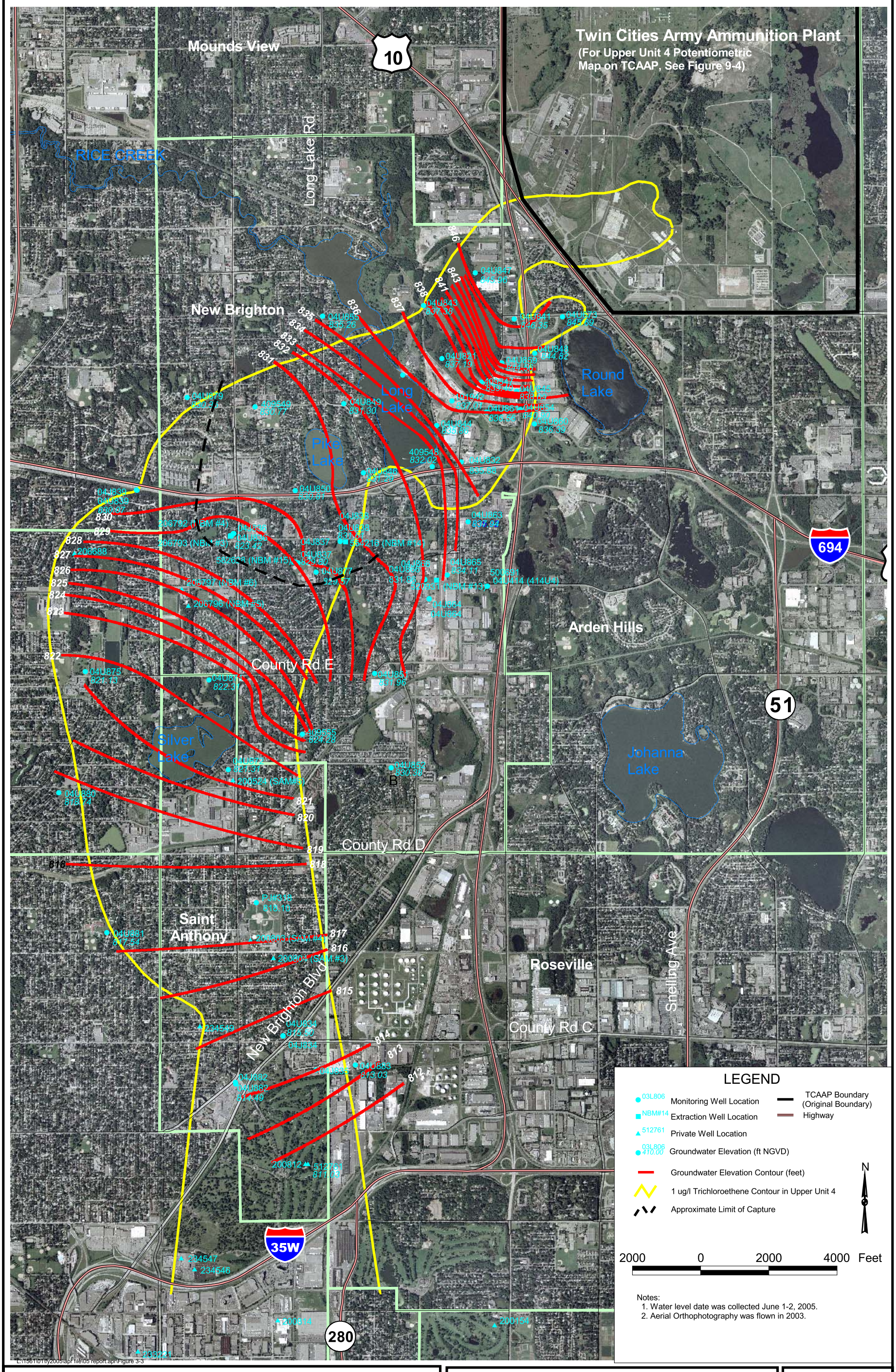
FIGURE 3-2
OU1 WELL PUMPING RATES VS. TARGETS
TWIN CITIES ARMY AMMUNITION PLANT











L:\1561\01\fy2005\apr file\05 report.apr\Figure 3-3

TWIN CITIES ARMY AMMUNITION PLANT

OU1 & OU3, Upper Unit 4, Potentiometric Map, Summer 2005

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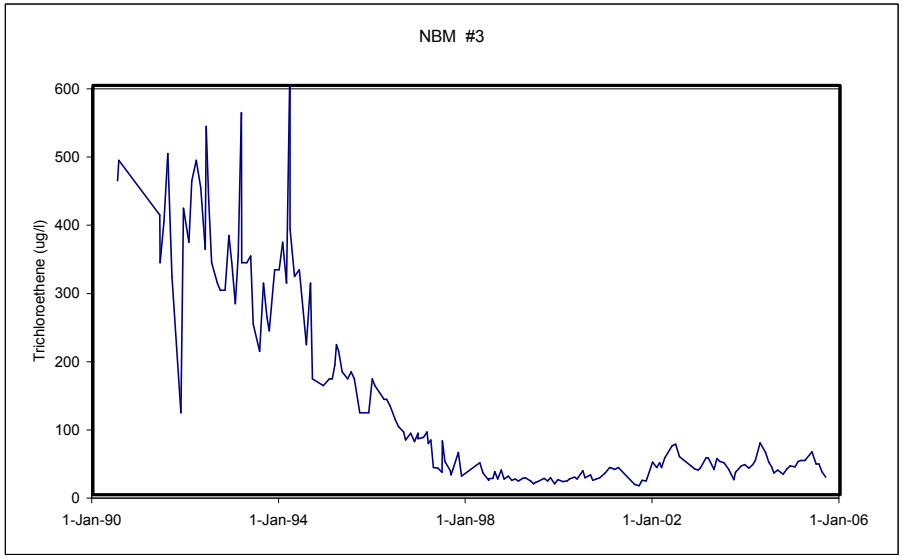
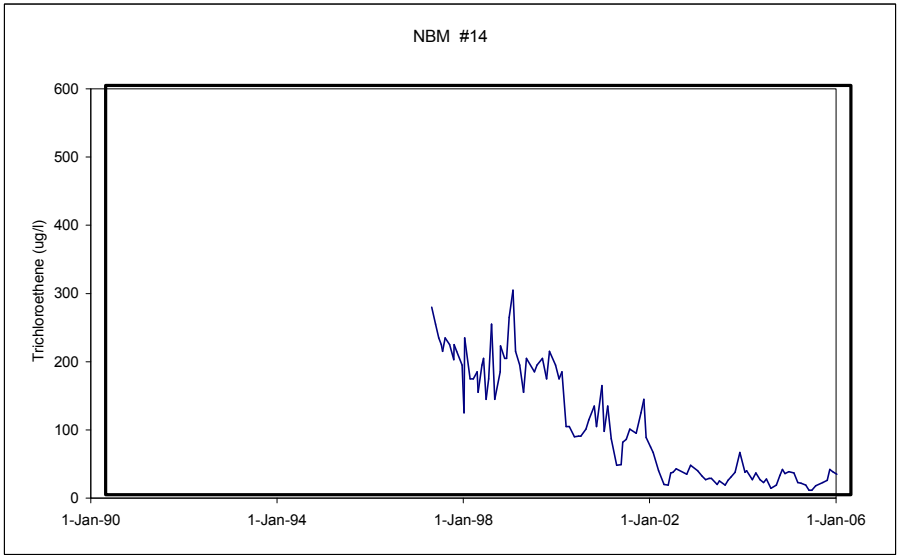
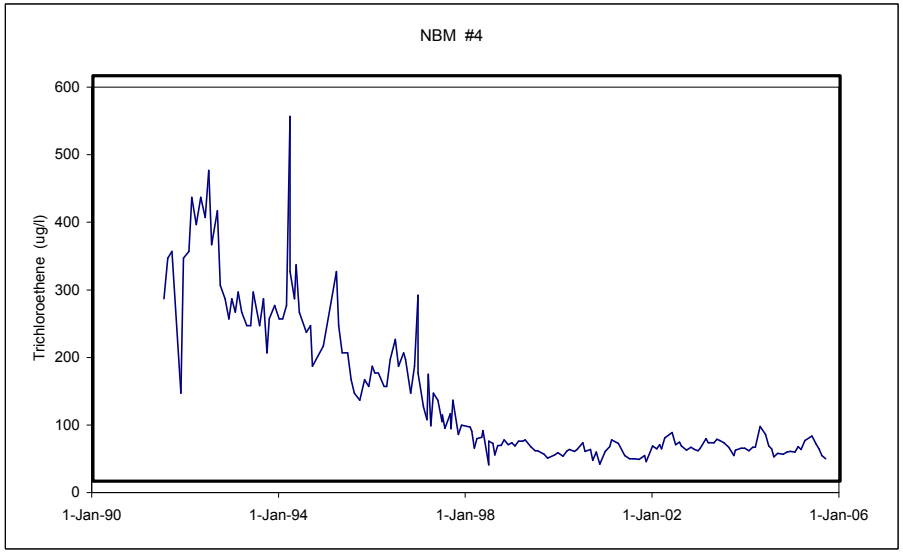
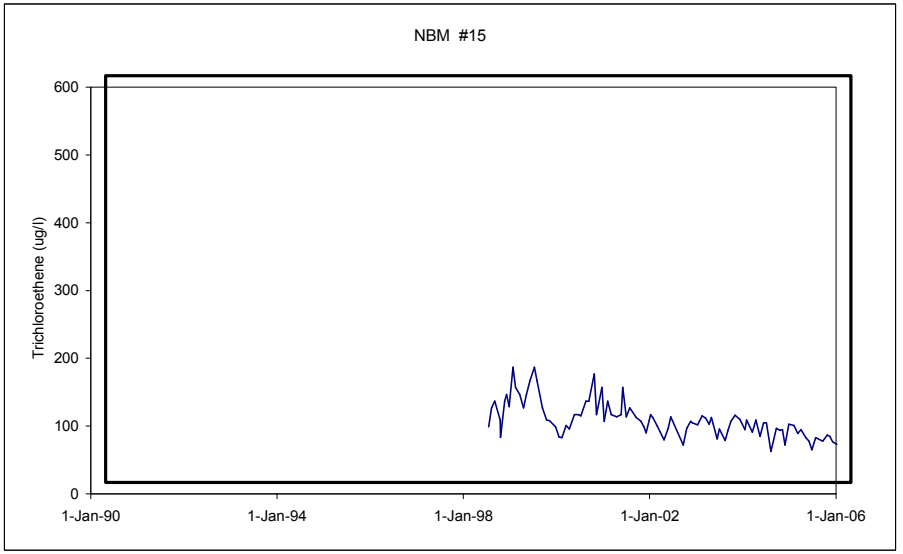
Figure 3-3

FIGURE 3-4
NEW BRIGHTON MUNICIPAL WELLS: TRICHLOROETHENE WATER QUALITY TRENDS
TWIN CITIES ARMY AMMUNITION PLANT



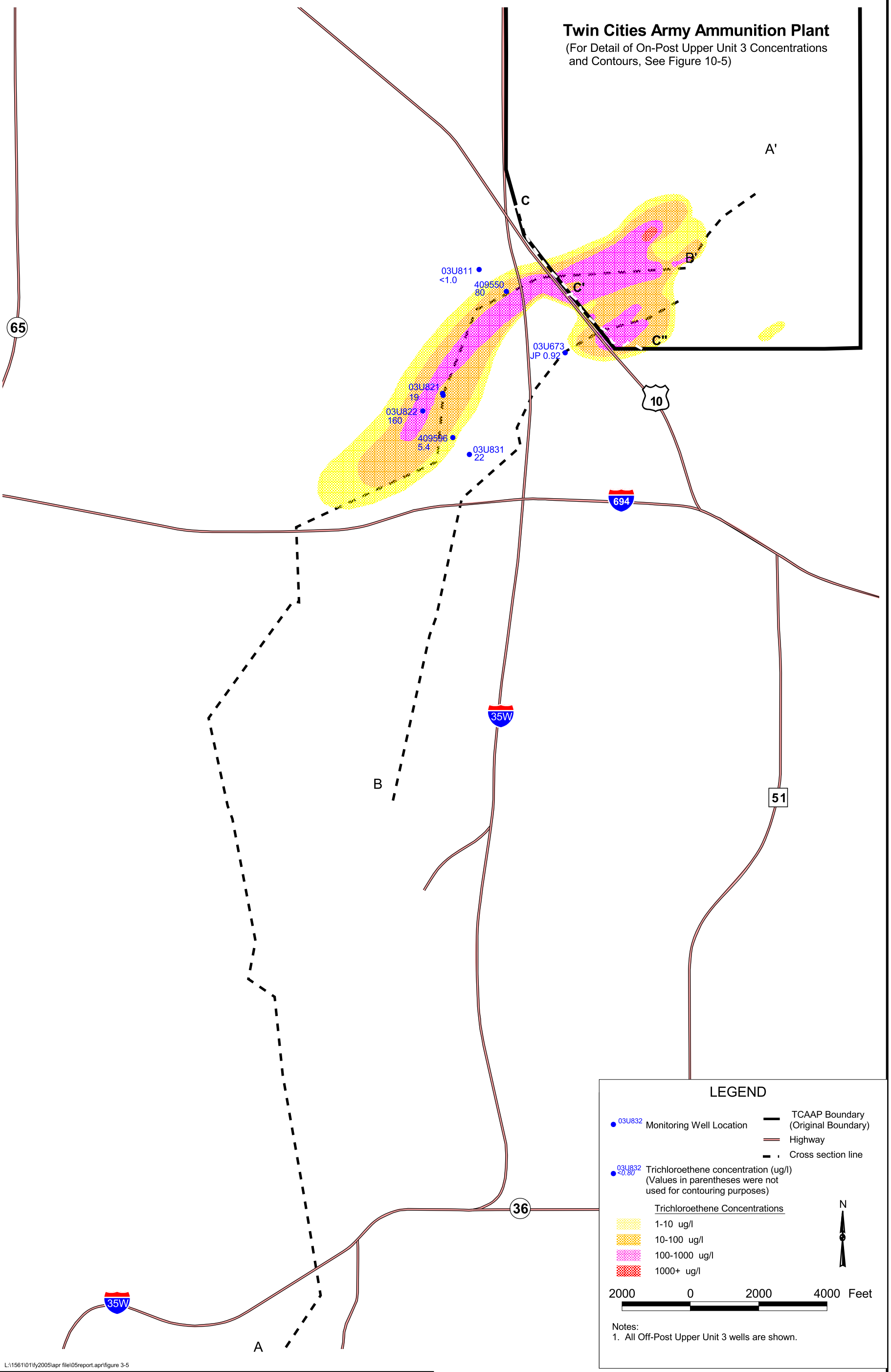






Twin Cities Army Ammunition Plant

(For Detail of On-Post Upper Unit 3 Concentrations and Contours, See Figure 10-5)



L:\1561\01\fy2005\apr file\05report.apr\figure 3-5

TWIN CITIES ARMY AMMUNITION PLANT

OU1 & OU3, Upper Unit 3, Trichloroethene Isoconcentration Map
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Figure 3-5

Twin Cities Army Ammunition Plant

(For Detail of On-Post Lower Unit 3 Concentrations and Contours, See Figure 10-6)

A'
B'
C"
C
C'
B
A

65
10
694
35W
51
36

03L811 <1.0
03L809 440
03M843 (<1.0)
03L841 <1.0
03L673 150
03M848 (230)
03L853
03L859 8.9
03L848 5.8
03L822 400
409557 27
409557 94
03L861 JP 0.33
03L854 <1.0
03L860 JP 0.23
03L846 <1.0
03L832 1.2
409556 <1.0
249632
476837 (MW15H) <1.0

LEGEND

- 03L806 — Monitoring Well Location
- TCAAP Boundary (Original Boundary)
- Highway
- Cross section line
- 03L806 *410.00* — Trichloroethene concentration (ug/l) (Values in parentheses were not used for contouring purposes)

Trichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- 100-1000 ug/l
- 1000+ ug/l

N

2000 0 2000 4000 Feet

Notes:
1. All Off-Post Lower Unit 3 wells are shown.
2. Off-Post Middle Unit 3 wells with data are shown with data in parentheses, but were not used for contouring.
3. The value at 03L853 was not used for contouring since it is completed at a depth more representative of Upper Unit 3 as shown on the cross section on Figure 3-8.

L:\1561\01\fy2005\apr file\05 report.apr\figure 3-6

TWIN CITIES ARMY AMMUNITION PLANT

OU1 & OU3, Lower Unit 3, Trichloroethene Isoconcentration Map
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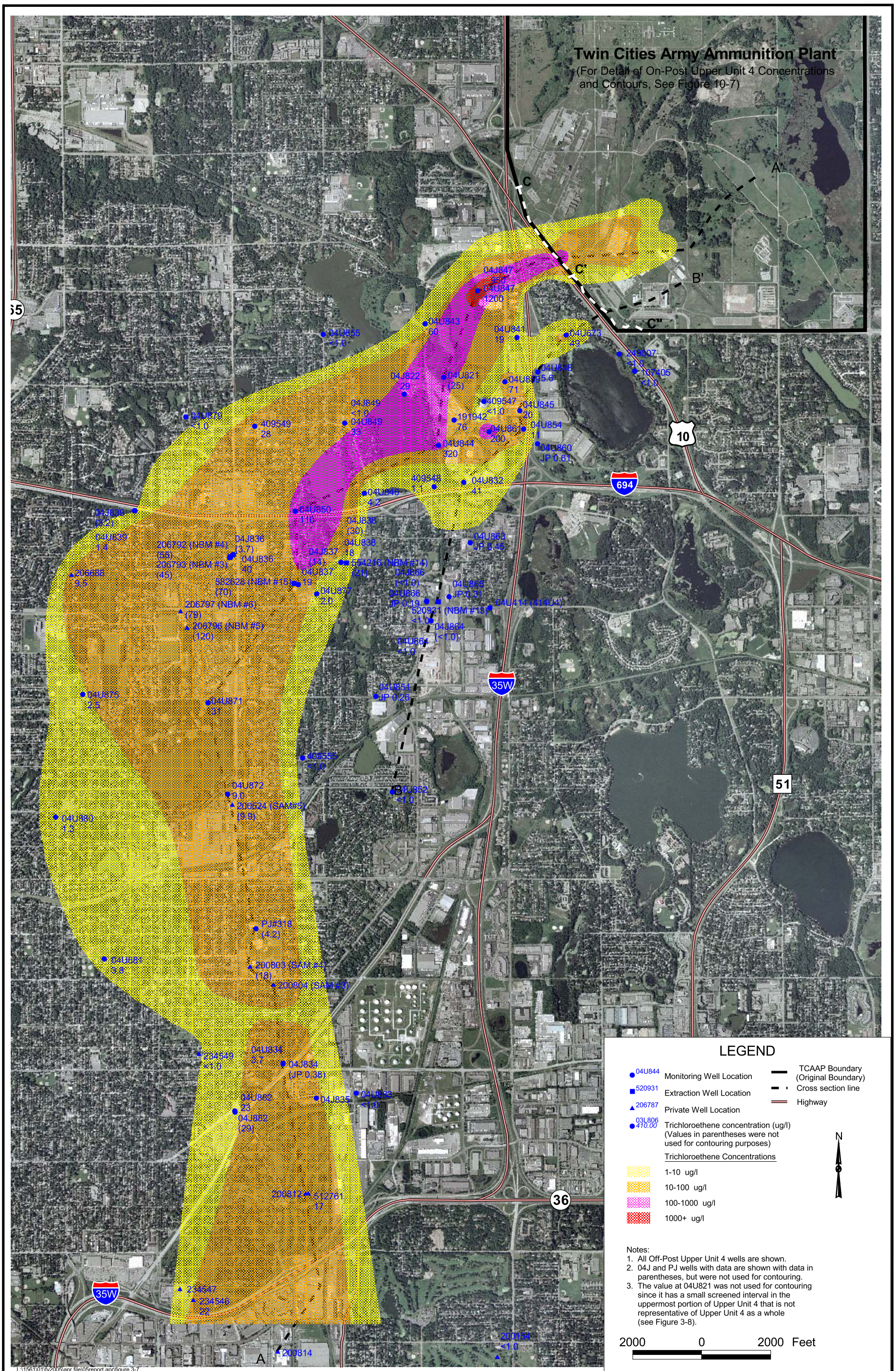
Figure 3-6



LEGEND

- 04U844 — Monitoring Well Location
- 520931 — Extraction Well Location
- 206787 — Private Well Location
- 03L606 410.00 — Trichloroethene concentration (ug/l) (Values in parentheses were not used for contouring purposes)

Trichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- 100-1000 ug/l
- 1000+ ug/l

- TCAAP Boundary (Original Boundary)
- Cross section line
- Highway

N

Notes:
1. All Off-Post Upper Unit 4 wells are shown.
2. 04J and PJ wells with data are shown with data in parentheses, but were not used for contouring.
3. The value at 04U821 was not used for contouring since it has a small screened interval in the uppermost portion of Upper Unit 4 that is not representative of Upper Unit 4 as a whole (see Figure 3-8).

2000 0 2000 Feet

TWIN CITIES ARMY AMMUNITION PLANT

OU1 & OU3, Upper Unit 4, Trichloroethene Isoconcentration Map
Summer 2005

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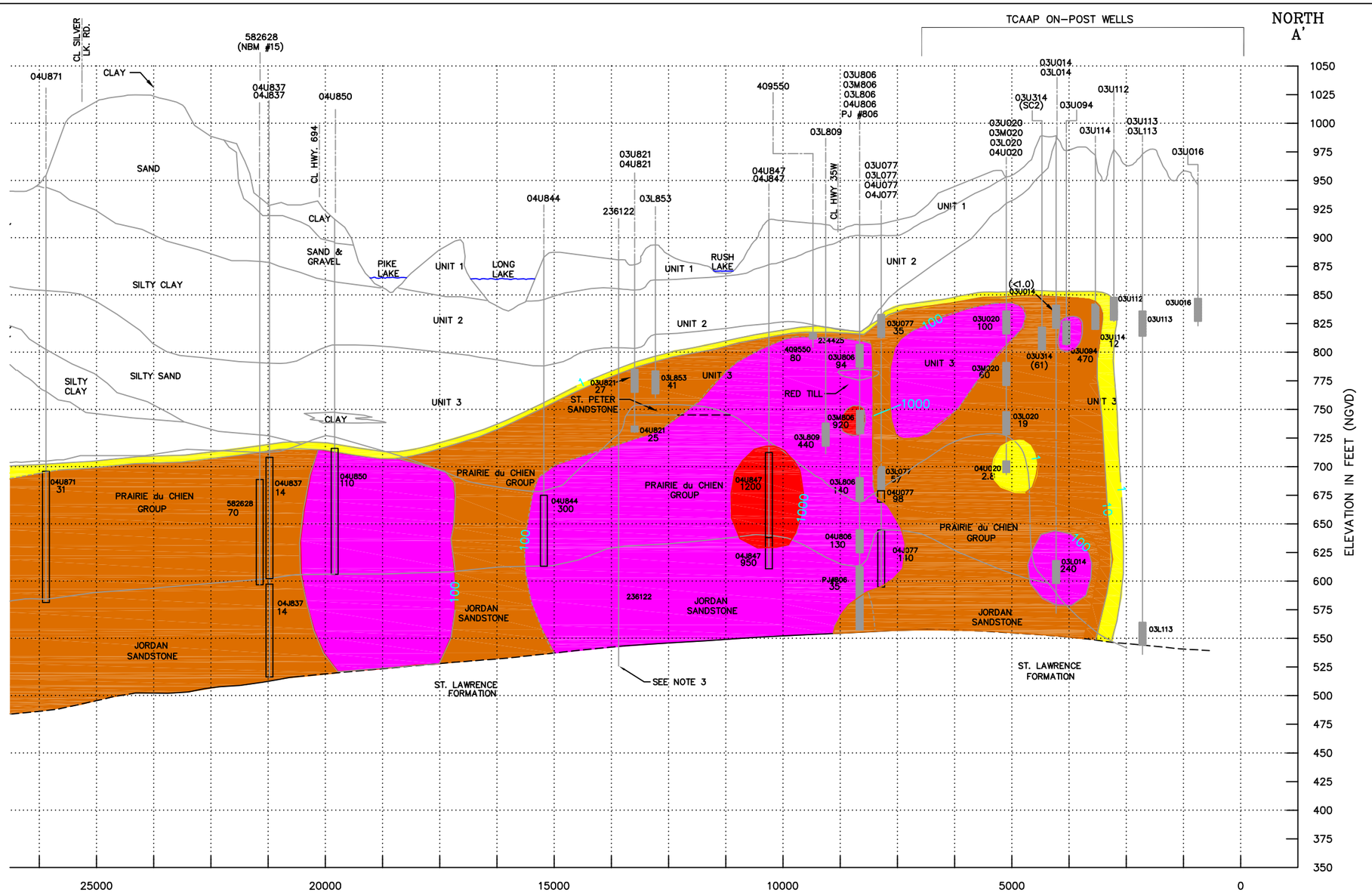
Figure 3-7



DISTANCE IN FEET

NOTES

(1) CROSS SECTION: TOPOGRAPHY CONSTRUCTED WITH DATA FROM U.S.G.S. NEW BRIGHTON 7.5 MINUTE SERIES QUAD MAP DATED 1967 (PHOTOREVISED 1972, AND 1980); WELL LOCATIONS AND THE "LINE" OF SECTION ARE SHOWN ON FIGURES 3-5 THROUGH 3-7.

(2) WELL NESTS, CONSISTING OF INDIVIDUAL WELLS IN THE SAME PROXIMITY, ARE REPRESENTED ON THE CROSS SECTION BY A SINGLE LINE WITH MULTIPLE WELL SCREENS

(3) WELL 236122 HAS BEEN SEALED, BUT IS SHOWN SINCE IT WAS USED TO PREPARE THE CROSS SECTION

LEGEND

- GEOLOGIC CONTACT
- INFERRED GEOLOGIC CONTACT
- SCREENED INTERVAL OF WELL
- OPEN HOLE INTERVAL OF WELL
- 04U806 2500.00 / 04U847 790.00 — TRICHLOROETHENE CONCENTRATION (ug/l) (VALUES IN PARENTHESES WERE NOT USED FOR CONTOURING PURPOSES)
- 10 — ISOCONCENTRATION CONTOUR (ug/l)
- 10 — ESTIMATED ISOCONCENTRATION CONTOUR (ug/l)
- 04U852 (JP 0.48) — THE VALUE IS ESTIMATED BECAUSE THE VALUE IS BELOW THE REPORTING LIMIT, BUT ABOVE THE METHOD DETECTION LEVEL.

M: /1038/ARDENHILLS/JAN-06/JAN 2006.DWG

TWIN CITIES ARMY AMMUNITION PALN

OU1 TRICHLOROETHENE CROSS-SECTION A-A' (NORTH HALF), SUMMER 2005

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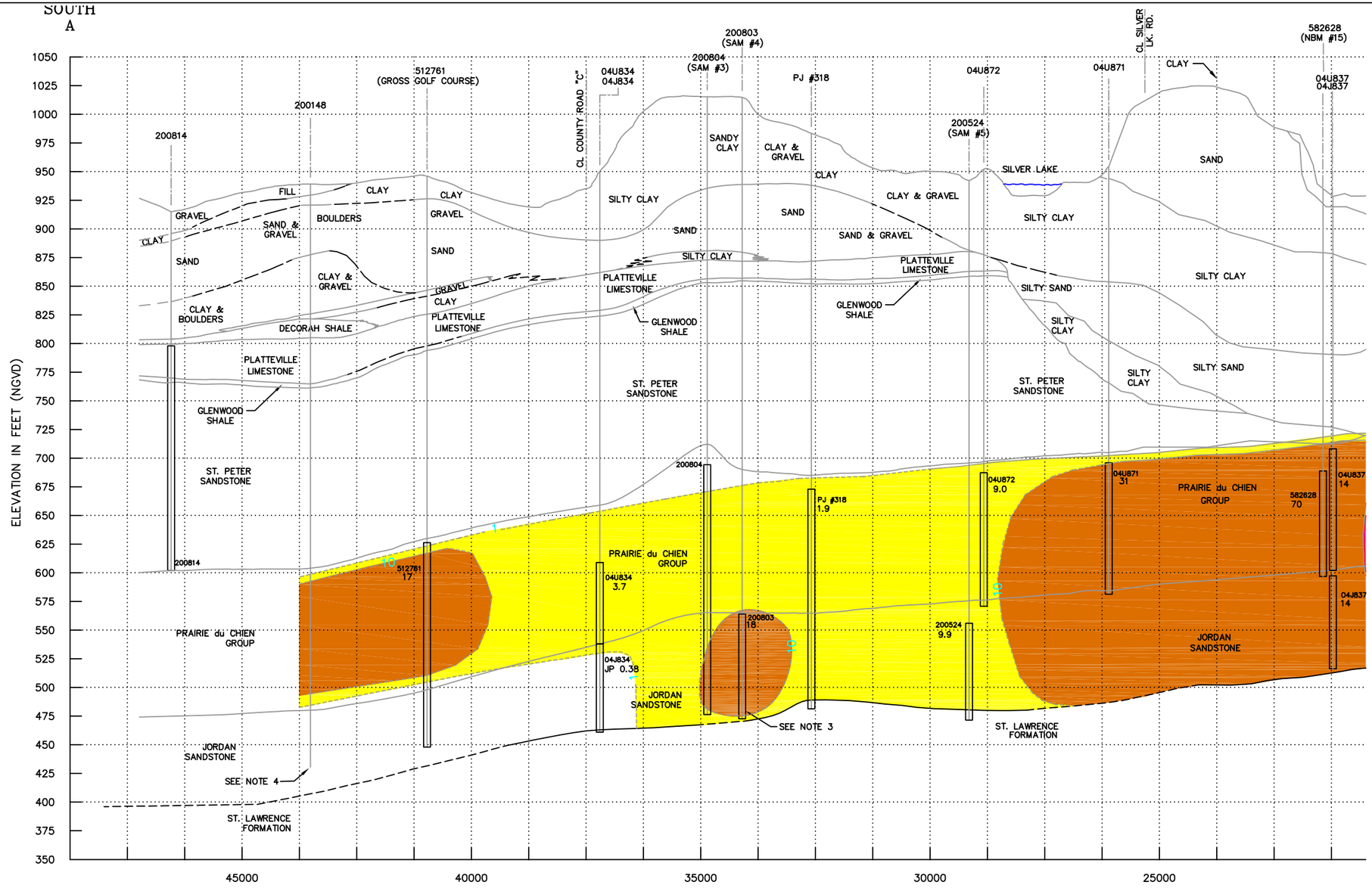
FIGURE 3-8

SOUTH

A



DISTANCE IN FEET

NOTES

(1) CROSS SECTION: TOPOGRAPHY CONSTRUCTED WITH DATA FROM U.S.G.S. NEW BRIGHTON 7.5 MINUTE SERIES QUAD MAP DATED 1967 (PHOTOREVISED 1972, AND 1980); WELL LOCATIONS AND THE "LINE" OF SECTION ARE SHOWN ON FIGURES 3-5 THROUGH 3-7.

(2) WELL NESTS, CONSISTING OF INDIVIDUAL WELLS IN THE SAME PROXIMITY, ARE REPRESENTED ON THE CROSS SECTION BY A SINGLE LINE WITH MULTIPLE WELL SCREENS

(3) NO INFORMATION WAS PROVIDED ON THE WELL LOG FOR 200803 (SAM #4) CONCERNING WELL CONSTRUCTION DETAILS, ESPECIALLY THE OPEN HOLE INTERVAL. AS THIS IS REFERRED TO AS A JORDAN WELL, THE OPEN HOLE WAS ASSUMED TO EXTEND FROM THE TOP OF THE JORDAN TO THE BOTTOM OF THE BOREHOLE.

(4) WELL 200148 HAS BEEN SEALED, BUT IS SHOWN SINCE IT WAS USED TO PREPARE THE CROSS SECTION

LEGEND

GEOLOGIC CONTACT

INFERRED GEOLOGIC CONTACT

SCREENED INTERVAL OF WELL

OPEN HOLE INTERVAL OF WELL

04U808 2500.00
04U847 790.00
TRICHLOROETHENE CONCENTRATION (ug/l) (VALUES IN PARENTHESES WERE NOT USED FOR CONTOURING PURPOSES)

10 ISOCONCENTRATION CONTOUR (ug/l)

10 ESTIMATED ISOCONCENTRATION CONTOUR (ug/l)

04U852 (JP 0.48) THE VALUE IS ESTIMATED BECAUSE THE VALUE IS BELOW THE REPORTING LIMIT, BUT ABOVE THE METHOD DETECTION LEVEL.

M: /1038/ARDENHILLS/JAN-06/JAN 2006.DWG

TWIN CITIES ARMY AMMUNITON PLANT

OU1 TRICHLOROETHENE CROSS-SECTION A-A' (SOUTH HALF), SUMMER 2005

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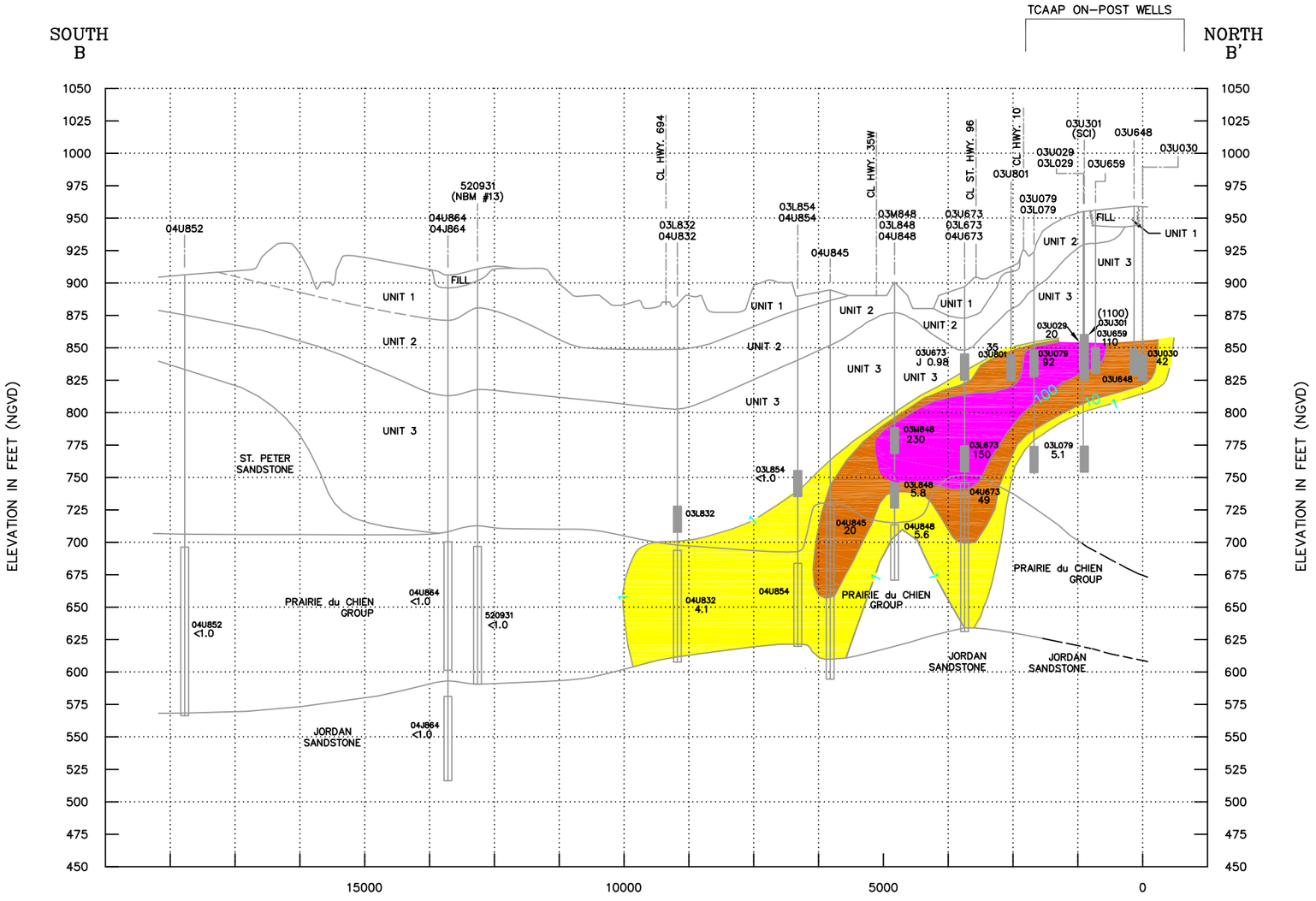
FIGURE 3-9



DISTANCE IN FEET

NOTES

(1) CROSS SECTION: TOPOGRAPHY CONSTRUCTED WITH DATA FROM U.S.G.S. NEW BRIGHTON 7.5 MINUTE SERIES QUAD MAP DATED 1967 (PHOTOREVISED 1972, AND 1980); WELL LOCATIONS AND THE "LINE" OF SECTION ARE SHOWN ON FIGURES 3-5 THROUGH 3-7.

(2) WELL NESTS, CONSISTING OF INDIVIDUAL WELLS IN THE SAME PROXIMITY, ARE REPRESENTED ON THE CROSS SECTION BY A SINGLE LINE WITH MULTIPLE WELL SCREENS

(3) NO INFORMATION WAS AVAILABLE ON THE WELL LOG FOR 03U029 AND 03U673 CONCERNING WELL CONSTRUCTION DETAILS, ESPECIALLY THE SCREENED INTERVALS. THE SCREENED INTERVALS FOR THESE WELLS WERE ASSUMED TO BE SIMILAR TO OTHER NEARBY UPPER UNIT 3 WELLS.

LEGEND

- GEOLOGIC CONTACT
- INFERRED GEOLOGIC CONTACT
- SCREENED INTERVAL OF WELL
- OPEN HOLE INTERVAL OF WELL
- 04U806 2500.00 / 04U847 790.00 — TRICHLOROETHENE CONCENTRATION (ug/l) (VALUES IN PARENTHESES WERE NOT USED FOR CONTOURING PURPOSES)
- 10 — ISOCONCENTRATION CONTOUR (ug/l)
- 10 — ESTIMATED ISOCONCENTRATION CONTOUR (ug/l)
- 04U852 (JP 0.48) — THE VALUE IS ESTIMATED BECAUSE THE VALUE IS BELOW THE REPORTING LIMIT, BUT ABOVE THE METHOD DETECTION LEVEL.

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TWIN CITIES ARMY AMMUNITION PLANT

OU1 TRICHLOROETHENE CROSS-SECTION B-B', SUMMER 2005

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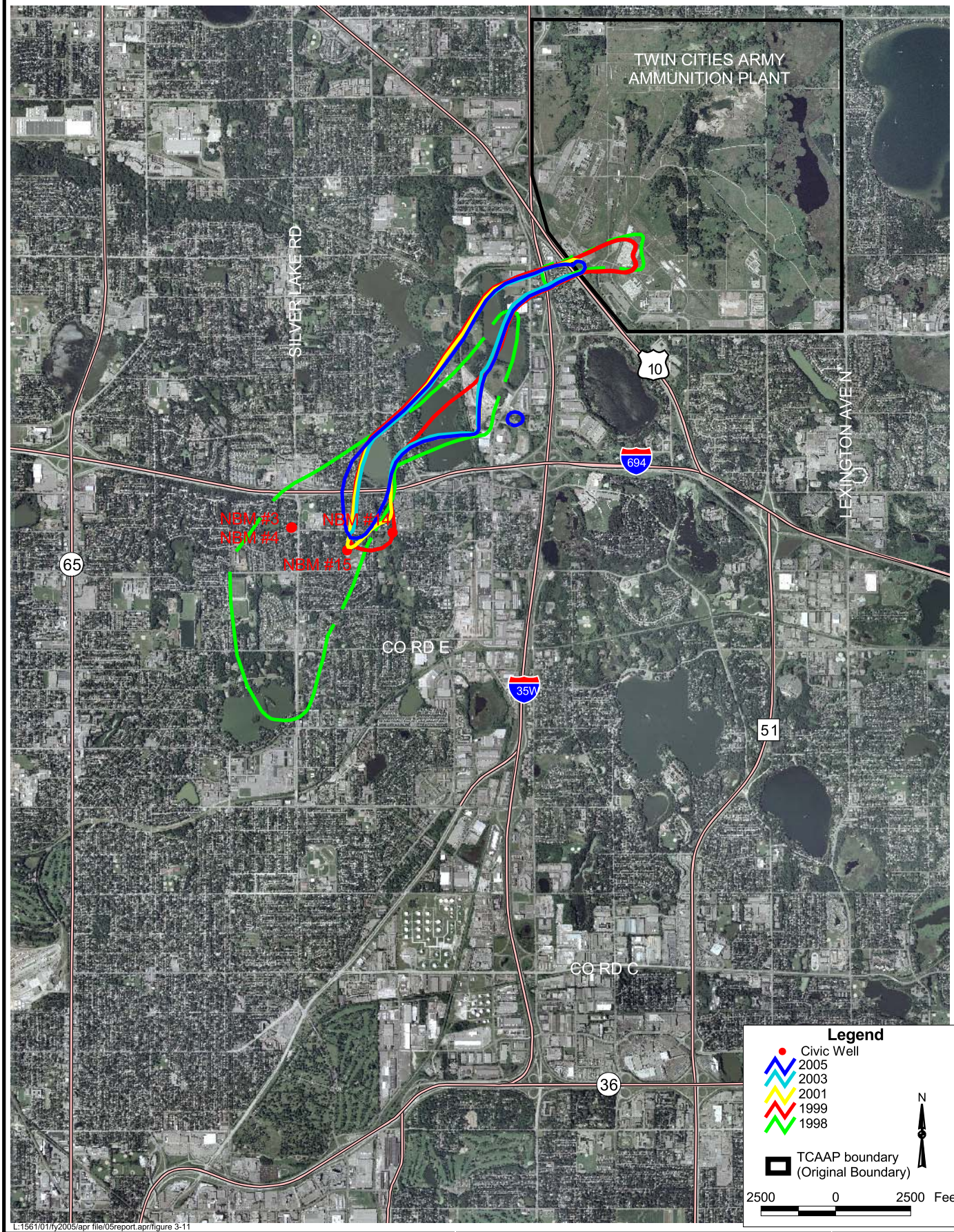
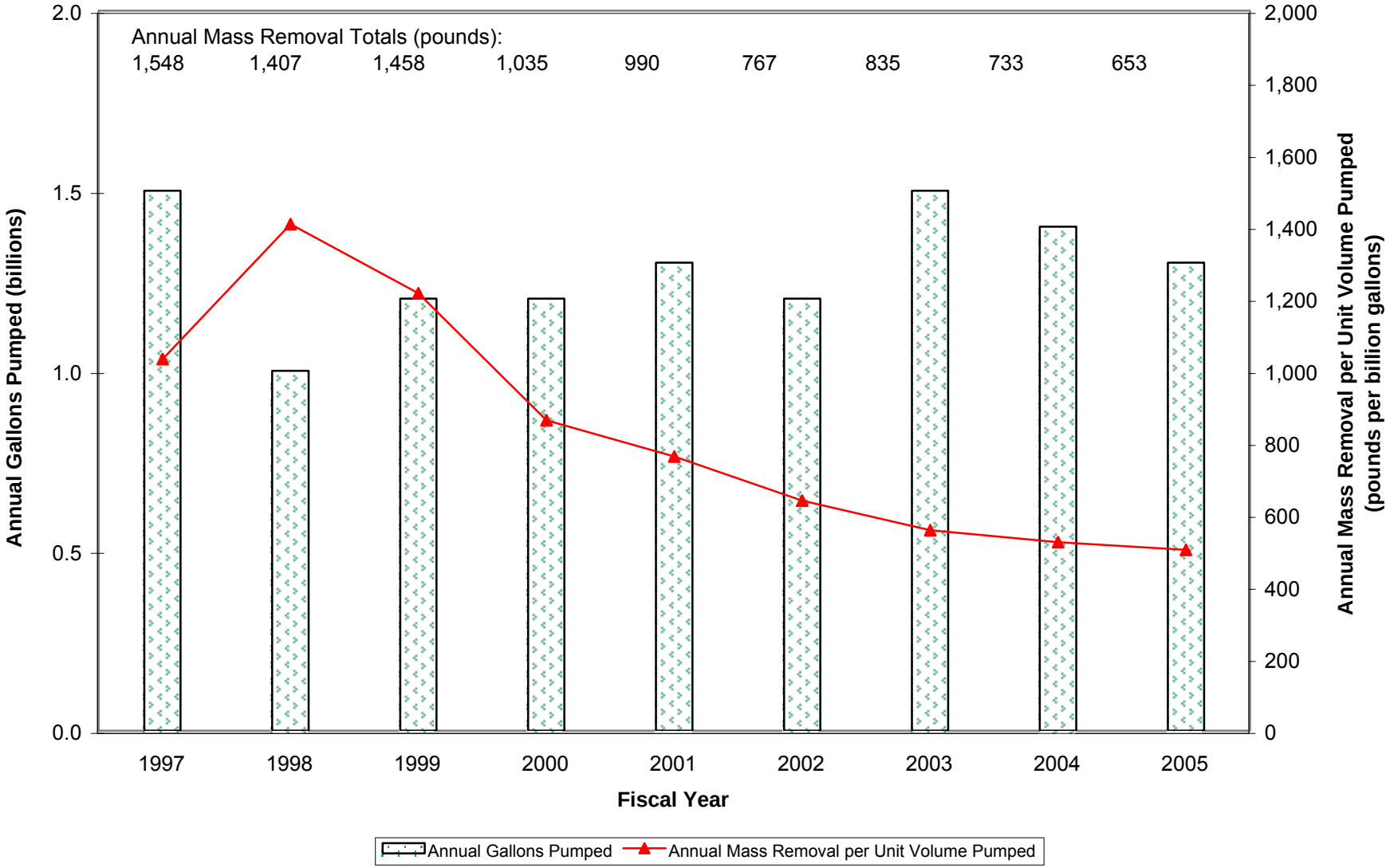
FY 2005

FIGURE 3-10



TWIN CITIES ARMY AMMUNITION PLANT Upper Unit 4, 100 ug/l Trichloroethene Isoconcentration Map	COPYRIGHT Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0429	FY 2005 Figure 3-11

FIGURE 3-12
OU1, NBCGRS MASS REMOVAL HISTORY
Twin Cities Army Ammunition Plant



C:\Files\Lisa\FY 2005 APR\Draft\Figures\Figure 3-12

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4.0 Operable Unit 2: Shallow Soil Sites

The reference for the OU2 ROD is:

Twin Cities Army Ammunition Plant
New Brighton/Arden Hills Superfund Site
Operable Unit 2
RECORD OF DECISION
October 1997

There have been no subsequent ROD Amendments or Explanations of Significant Differences.

Section 1.4 of the ROD prescribes major remedy components for each of four media as described in Sections 4.0 through 9.0 of this report. Section 4.0 addresses the shallow soil sites.

Through the Remedial Investigation/Feasibility Study (RI/FS) process, Sites A, C, E, H, 129-3, and 129-5 were found to have inorganic and/or organic contaminants above the cleanup goals specified in Table 1 of the OU2 ROD. Unpermitted landfills, or dumps, were identified within Sites A, B, E, H, and 129-15. The OU2 ROD (page 2) describes nine remedy components to address the shallow soil sites.

New for FY 2005 is the addition of the Site C groundwater response presented in Section 7.0. In FY 2005 the response action in progress at Site C was incorporated into the FFA.

4.1 REMEDY COMPONENTS #1 THROUGH 7: SOIL REMEDIATION

Description: These seven components collectively address the characterization, excavation, sorting, treatment, disposal, site restoration, and site access restrictions for the shallow soils and dumps at Sites A, C, E, H, 129-3, and 129-5.

Performance Standard (how do you know when you're done):

When the soils at these sites have been remediated such that the contaminant concentrations are below the cleanup levels specified in Table 1 of the OU2 ROD.

Are these remedy components being implemented?

Yes. Soil remediation field work was completed at Sites A, E, H, 129-3, and 129-5 prior to FY 2005. The Closeout Reports for each of these sites (prepared by Shaw Environmental & Infrastructure, Inc. (Shaw)) has received regulatory approval, but final consistency will not be provided until concurrence on the land use control section of each report has been reached between the Army and the regulators (see Section 12.0 for information on land use controls). Work at Site C remains to be completed.

Are any changes or additional actions required for this remedy component?

Yes. Technical issues need to get resolved in order to complete the remedy for soils and ditch sediments at Site C. Also, land use control issues need to get resolved in order to complete final consistency approval on the various closeout reports.

4.2 REMEDY COMPONENT #8: GROUNDWATER MONITORING

Description: "Five-year period of groundwater monitoring to verify no adverse remedy impacts at Sites A, C, E, H, 129-3, and 129-5." (OU2 ROD, page 2)

Performance Standard (how do you know when you're done):
When five years have elapsed with groundwater monitoring results below the groundwater cleanup levels.

Is this remedy component being implemented?
Yes. The intent of this remedy component is to verify that soil remediation activities did not somehow cause impacts to groundwater. As such, the five-year monitoring period was intended to start after completion of remedy components #1 through #7 described in the previous section. With the exception of Site C, the shallow soil remediation has been completed and this groundwater monitoring component was started in FY 2003 (and will tentatively end in FY 2007). As discussed in Section 5.7, shallow soil remediation work was also completed at Site D (for non-VOC contaminants) in early FY 2003, and the Closeout Report (prepared by Shaw) indicated that Site D should also be monitored for any impacts to groundwater that could have resulted from soil remediation activities. Site D was, therefore, added to the list of sites to be monitored under this remedy component.

The monitoring plan for each of the sites is presented below (these monitoring activities are included in the monitoring plan for groundwater monitoring wells presented in Appendix A.1). In general, the well most likely to be affected from a hypothetical release from the soil was selected for each Site. Thus, several wells are in the middle of the Site, since this would be the most likely location to see an impact under an assumption that impact would be due to vertical leaching from the soil. A monitoring well in the first encountered aquifer was selected at each Site. For Sites A and H, Unit 1 wells were selected. At Sites on the kame (D, E, 129-3, and 129-5), where Unit 1 is not present, upper Unit 3 wells were selected. The groundwater parameter list for each Site mirrors the chemicals of concern in soil for the respective Site.

There are no groundwater cleanup standards in the ROD for the chemicals of concern in soils at these Sites, with the exception of antimony at Site A, so the data collected under this monitoring program are screened against TCAAP background values that were developed during the OU2 Feasibility Study (as presented in the OU2 ROD). For chemicals not expected to be naturally occurring (VOCs and explosives), the results are screened against the Minnesota Health Risk Limits (HRLs). Since there are not any expected groundwater impacts, the screening will serve to identify possible concerns.

Monitoring Plan:

Site A

Monitoring point: 01U119

Rationale for selected location: Well is located in Unit 1 near to and downgradient of the area of soil excavation at Site A.

Parameters: Antimony, barium, copper, lead

Frequency: Annual

Site C

Shallow groundwater at Site C is known to be impacted and there is an ongoing Corrective Action for Site C groundwater. See Section 7.0 below.

Site D

Monitoring point: 03U093

Rationale for selected location: Well is a shallow Unit 3 well (the first encountered aquifer) located near and downgradient of the soil remediation area.

Parameters: Antimony, lead, nitroglycerine

Frequency: Annual

Site E

Monitoring point: 03U089

Rationale for selected location: Well is a shallow Unit 3 well (the first encountered aquifer) located near and downgradient of the soil remediation area.

Parameters: Antimony, barium, copper, lead, manganese

Frequency: Annual

Site H

Monitoring point: 01U060

Rationale for selected location: Well is on the downgradient edge of Site H and is also the only available Unit 1 monitoring well at the Site.

Parameters: Antimony, arsenic, copper, lead, manganese

Frequency: Annual

129-3

Monitoring point: 03U087

Rationale for selected location: Well is a Unit 3 well (the first encountered aquifer) located in the center of the Site and below the area of soil remediation.

Parameters: Antimony, lead, manganese, nitroglycerine, VOCs

Frequency: Annual

129-5

Monitoring point: 03U097

Rationale for selected location: Well is a Unit 3 well (the first encountered aquifer) located in the center of the Site and below the area of soil remediation.

Parameters: Antimony, barium, lead

Frequency: Annual

Monitoring Results for FY 2005:

Results for the June 2005 sampling event are summarized in Table 4-1 (see Section 7.0 for discussion of Site C). There were no exceedances of screening criteria at Sites A, D, E, 129-3, or 129-5. At Site H, only copper exceeded the background value (6.35 µg/l versus background of 4 µg/l). This well showed similar results (12.1 µg/l) in FY 2004. The HRL for copper is 1,000 µg/l so no remedial action is needed at this time. At Site 129-5, barium exceeded the background value in FY 2003, but was below the background value in FY 2004 and FY 2005. Both copper and barium warrant attention during monitoring in the next few years. Overall, the results suggest that there were no impacts to groundwater due to soil remediation activities.

Are any changes or additional actions required for this remedy component? No.

4.3 REMEDY COMPONENT #9: CHARACTERIZATION OF DUMPS

Description: "Characterization of dumps at Sites B and 129-15 to determine their contents. If contents are found to be toxic, hazardous, or contaminated, then a remedy for the landfill will be utilized and documented through a post-ROD amendment. If the contents are not toxic, hazardous or contaminated, a no further action remedy would be employed." (OU2 ROD, page 2)

Performance Standard (how do you know when you're done):

When characterization has been sufficient to determine if the contents are toxic, hazardous, or contaminated, and if they are, when the remedy is in place.

Is this remedy component being implemented?

Yes. Field work was performed at both sites in early FY 1999. At Site B, characterization revealed that a no further action remedy was appropriate. A Closeout Report (prepared by Stone & Webster) received consistency in FY 2001 ("Site B Dump Investigation, Characterization, and Closeout Report"). At Site 129-15, characterization led to construction of a soil cover in FY 2002. The Closeout Report for Site 129-15 (prepared by Shaw) received regulatory approval in FY 2003, but final consistency will not be provided until concurrence on the land use control section of each report has been reached between the Army and the regulators (see Section 12.0 for information on land use controls). A modification to the ROD that will document the remedy selection for Site 129-15 was being prepared at the end of FY 2005.

Are any changes or additional actions required for this remedy component? No.

Table 4-1

Groundwater Quality Data for OU2 Shallow Soil Site
5-Year Groundwater Monitoring
Fiscal Year 2005

VOCs (ug/L)	01U060 (Site H) 6/23/2005	03U087 (Site 129-3) 6/23/2005	03U093 (Site D) 6/23/2005	03U093 D (Site D) 6/23/2005	03U089 (Site E) 6/23/2005	03U097 (Site 129-5) 6/23/2005	01U119 (Site A) 6/23/2005	TCAAP Unit 1 GW Background (1)	TCAAP Units 3/4 GW Background (1)	MDH HRL
1,1,1-Trichloroethane		<1						None	None	600
1,1,2,2-Tetrachloroethane		<1						None	None	2
1,1,2-Trichloroethane		<1						None	None	3
1,1-Dichloroethane		<1						None	None	70
1,1-Dichloroethene		<1						None	None	6
1,2-Dichloroethane		<1						None	None	4
1,2-Dichloropropane		<1						None	None	5
2-Butanone		<5						None	None	4000
2-Hexanone		<5						None	None	(Note 2)
4-Methyl-2-Pentanone		<5						None	None	300
Acetone		<5						None	None	700
Benzene		<1						None	None	10
Bromodichloromethane		<1						None	None	6
Bromoform		<1						None	None	40
Bromomethane		<1						None	None	10
Carbon Disulfide		<1						None	None	700
Carbon Tetrachloride		<1						None	None	3
Chlorobenzene		<1						None	None	100
Chloroethane		<1						None	None	280
Chloroform		<1						None	None	60
Chloromethane		<1						None	None	80
cis-1,2-Dichloroethene		<1						None	None	70
cis-1,3-Dichloropropene		<1						None	None	2
Dibromochloromethane		<1						None	None	80
Ethylbenzene		<1						None	None	700
m&p-Xylene		<2						None	None	10,000
Methylene Chloride		<1						None	None	50
o-Xylene		<1						None	None	10,000
Styrene		<1						None	None	(Note 2)
Tetrachloroethene		<1						None	None	7
Toluene		<1						None	None	1000
trans-1,2-Dichloroethene		<1						None	None	100
trans-1,3-Dichloropropene		<1						None	None	2
Trichloroethene		JP 0.35						None	None	30
Vinyl Chloride		<1						None	None	0.2

Table 4-1

Groundwater Quality Data for OU2 Shallow Soil Site
5-Year Groundwater Monitoring
Fiscal Year 2005

	01U060 (Site H) 6/23/2005	03U087 (Site 129-3) 6/23/2005	03U093 (Site D) 6/23/2005	03U093 D (Site D) 6/23/2005	03U089 (Site E) 6/23/2005	03U097 (Site 129-5) 6/23/2005	01U119 (Site A) 6/23/2005	TCAAP Unit 1 GW Background (1)	TCAAP Units 3/4 GW Background (1)	MDH HRL
Metals (ug/L)										
Antimony	B 3.0 (UB0.73)	B 0.40 (UB0.73)	B 0.39 (UB0.73)	B 0.51 (UB0.73)	<5	<5	<5	<10	<10	6 (3)
Arsenic	B 2.6							6.80	14	(Note 2)
Barium					25.7	103	96.4	240	206	2000
Copper	6.35				B 2.6		B 0.96	4	27	1000
Lead	B 0.17 (UB0.068)	B 0.14 (UB0.068)	B 0.052 (UB0.068)	B 0.15 (UB0.068)	B 0.11 (UB0.068)	B 0.19 (UB0.068)	<5	4.2	3.8	15 (4)
Manganese	583 (JE13)	B 0.18			B 0.30			7,500	760	1000
Zinc										
Explosives (ug/L)										
Nitroglycerine		< 0.97	< 0.97	< 0.97				None	None	(Note 2)

Notes:

(1) Background values for Unit 1 groundwater from Appendix C, Table 6 in the OU2 ROD.
Background values for Unit 3/4 groundwater from Appendix C, Table 7 in the OU2 ROD.
Bolding (in red color) indicates exceedance of the respective background value.

(2) No HRL has been established for this analyte.

(3) For Site A Shallow Groundwater, this is also the Cleanup level from Table 1 of the OU2 ROD.

(4) No HRL has been established for this analyte. MDH utilizes 15 ug/l as the Action Level "at the tap".

D Duplicate sample.

B The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

JE Serial dilution interference (the result for the percent difference is listed after "JE"). Results should be considered estimated.

JP The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

UB The sample result was less than 5 times the level detected in a blank (the result for the blank is listed after "UB").
The sample result can be considered non detect at an elevated detection limit.

5.0 Operable Unit 2: Deep Soil Sites

Sites D and G were impacted primarily by VOC contaminants at depths extending to between 50 and 170 feet. Some additional shallow soil contaminants were also present at Site D, and Site G also contains a dump. The OU2 ROD (pages 2-3) describes seven remedy components for these two sites. The final remedy incorporated the use of existing soil vapor extraction (SVE) systems and site caps, which were installed in 1986.

5.1 REMEDY COMPONENT #1: GROUNDWATER MONITORING

Description: "Groundwater Monitoring." (OU2 ROD, page 2)

Performance Standard (how do you know when you're done):
When groundwater monitoring results from wells adjacent to each site are below the cleanup levels for deep groundwater specified in Table 1 of the OU2 ROD, and shown on Table 5-1 in this report.

Is this remedy component being implemented? Yes.

Were the groundwater monitoring requirements of this remedy met?
Yes. Samples were collected and analyzed from the wells that are nearest to Sites D and G in accordance with the FY 2005 Monitoring Plan.

What impact did the SVE systems have on contaminant concentrations in groundwater adjacent to Sites D and G?

Figure 5-1 shows the wells nearest to Sites D and G. Figure 5-2 and Figure 5-3 present trichloroethene trend graphs for these wells. Trichloroethene trends in other nearby wells can also be viewed from Figure B-3 (Appendix B).

Downgradient of Site D, at 03U093 (Figure 5-2), the concentrations over the past five years show a stable trend through FY 2005.

Downgradient of Site G, at 03U094 (Figure 5-3), the concentrations over the past five years show a decreasing trend through 2003 and a slight increase, but well within recent concentrations in 2004 and 2005.

Table 5-1 presents the FY 2005 data for the deep groundwater chemicals of concern for the two wells nearest to Sites D and G. The table shows that these wells still exceed the cleanup level for trichloroethene. There are no other cleanup level exceedances among these wells.

During the years of SVE operation (1986 to 1998), trichloroethene concentrations in groundwater decreased from 10,000's to less than 800 µg/l. The most dramatic improvement has been at 03U093 (Figure 5-2). Overall, these results indicate that SVE systems at Sites D and G effectively minimized (or eliminated) further contamination of the deep groundwater beneath these sites. However, the contaminant concentrations are still much greater than the cleanup levels. This suggests that residual contamination is acting as an ongoing source for groundwater contamination. The residual source has not been defined and could be in either the saturated or unsaturated zone. It is possible that natural attenuation will cause reductions in contaminant concentrations in the future, as suggested by the findings of the USEPA's Natural Attenuation Study (U.S. EPA 2001. "Evaluation of the Protocol for Natural Attenuation of Chlorinated Solvents: Case Study at the Twin Cities Army Ammunition Plant. Office of Research and Development, Washington DC EPA/600/R-01/025).

Is any groundwater sampling proposed prior to the next report?

Yes. As shown in Appendix A.1, wells 03U093 (Site D) and 03U094 (Site G) will be sampled in June 2006 for VOC analysis.

Are any changes or additional actions required for this remedy component? No.

5.2 REMEDY COMPONENT #2: RESTRICT SITE ACCESS

Description: "Restrict site access and use during remedy implementation." (OU2 ROD, page 2)

Performance Standard (how do you know when you're done):

When site access is adequately restricted to protect human health.

Is this remedy component being implemented?

Yes (see Section 12.0 for information on land use controls).

Are any changes or additional actions required for this remedy component? No.

5.3 REMEDY COMPONENT #3: SVE SYSTEMS

Description: "Install and operate deep soil vapor extraction (SVE) systems with modified shallow SVE." (OU2 ROD, page 2)

SVE systems were installed at Sites D and G in 1986 as Interim Remedial Actions to address soil contamination, which were then incorporated into the final remedy. The Site D system included 39 shallow vents (depths of 33-54 feet) and one deep vent (depth of 150 feet). The Site G system included 89 shallow vents (depths of 23-55 feet). The systems removed a combined total

of over 220,000 pounds of VOCs from both shallow and deep soils between startup in 1986 and shutdown in 1998 (116,199 pounds for Site D and 104,418 pounds for Site G).

Performance Standard (how do you know when you're done):
When the soil concentrations are below the cleanup levels specified in Table 8 of the OU2 ROD.

Is this remedy component being implemented?
The intent of this remedy component was to add additional deep vents at both sites, as needed, to address the presumed existence of contaminated soils below the existing SVE systems. Also, the existing systems were to be modified, as needed, to improve VOC mass removal. The site investigation conducted in FY 2000 showed that all Site D soils (shallow and deep) were below the Site D VOC cleanup levels, and that all Site G soils (shallow and deep) were below the subsequently-developed, higher cleanup goals, as documented in "Technical Memorandum, Soil Leaching Values, Site G," dated July 31, 2002. Therefore, neither deep SVE systems nor modifications to the shallow SVE systems will be required at either site. The Site D SVE system was dismantled in FY 2001, and the Site G SVE system was dismantled in FY 2003. The Site D Shallow and Deep Soil VOC Investigation and Closeout Report received regulatory approval in FY 2002. The Site G Closeout Report received regulatory approval in FY 2005.

Are any changes or additional actions required for this remedy component? No.

5.4 REMEDY COMPONENT #4: ENHANCEMENTS TO THE SVE SYSTEMS

Description: "Evaluate and potentially use enhancements to the SVE systems." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When an adequate evaluation has been completed.

Is this remedy component being implemented?

Yes. No enhancements to either SVE system were required, since soil cleanup levels were reached without the need for any such modifications.

Are any changes or additional actions required for this remedy component? No.

5.5 REMEDY COMPONENT #5: MAINTAIN EXISTING SITE CAPS

Description: "Maintain existing site caps." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When the cap is maintained in adequate condition.

Is this remedy component being implemented?

Yes. The caps for Sites D and G were originally intended to minimize infiltration of precipitation and to minimize short-circuiting of air during SVE system operation. With achievement of the soil cleanup goals at Site D, there is no longer a need for a cap relative to VOCs in the soil. At Site G, the revised cleanup goal for trichloroethene was based on maintaining a cap with a specified permeability over the area with trichloroethene contamination (see Section 12.0 for information on land use controls and long-term operation and maintenance (O&M)).

Are any changes or additional actions required for this remedy component? No.

5.6 REMEDY COMPONENT #6: MAINTAIN SURFACE DRAINAGE CONTROLS

Description: "Maintain surface [drainage] controls." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When surface water does not pond on the cap, and surface water flows off at a rate that does not cause erosion problems with the cap.

Is this remedy component being implemented?
Yes. As discussed above, drainage controls are no longer required for Site D relative to VOCs in the soil, but still apply for Site G (see Section 12.0 for information on land use controls and long-term O&M).

Are any changes or additional actions required for this remedy component? No.

5.7 REMEDY COMPONENT #7: CHARACTERIZE SHALLOW SOILS AND DUMP

Description: "Following completion of SVE remediation of deep soils, characterize Site D shallow soils and Site G dump to determine appropriate action." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the characterizations have provided answers necessary to determine if additional remediation is required, and if remediation is required, when it has been completed.

Is this remedy component being implemented?

Yes. For Site D, shallow soil characterization work was completed in FY 2002. In FY 2003, 1,381 cubic yards of soils contaminated with metals and nitroglycerin were excavated by Shaw and transported off-site for disposal at a permitted disposal facility. The Site D Closeout Report received regulatory approval in FY 2004, but final consistency will not be provided until concurrence of the land use control section of the report is reached between the Army and the regulators. A modification to the OU2 ROD documenting the remedy selection for Site D shallow soils was being prepared at the end of FY 2005.

For Site G, a technical memorandum recommending improvements to the Site G cover received regulatory approval in FY 2003. A work plan for the cover design also received regulatory approval in FY 2003. Cover construction was completed over the Site G dump in early FY 2005. The Site G Closeout Report received regulatory approval, but final consistency will not be provided until concurrence of the land use control section of the report is reached between the Army and the regulators. A modification to the OU2 ROD documenting the remedy selection for Site G was being prepared at the end of FY 2005.

Are any changes or additional actions required for this remedy component? No.

5.8 OVERALL REMEDY FOR DEEP SOIL SITES

Has the SVE remediation been completed (i.e., have the soil cleanup levels in Table 8 of the OU2 ROD been attained throughout the areal and vertical extent of Sites D and G)?

Yes, subject to the revised Site G cleanup levels cited previously.

Has it been determined that remediation of shallow soils at Site D and/or the dump at Site G is not required, or if required, has the remediation been completed?

For Site D, the additional soil removal that was determined to be required has been completed. For Site G, construction of the improvements to the cover were completed in FY 2004.

Table 5-1

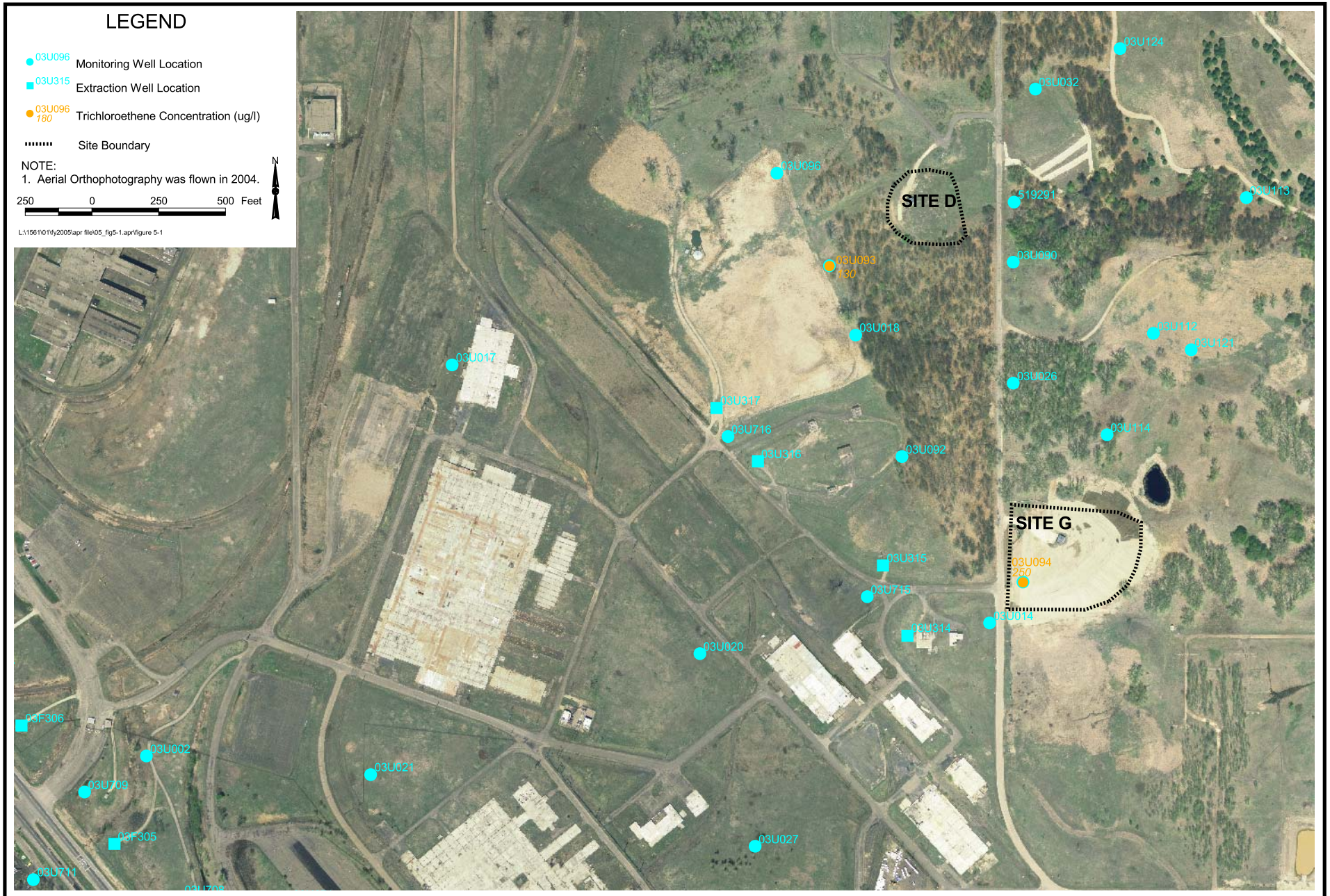
Deep Groundwater Data Near Sites D and G
Fiscal Year 2005

		Tetrachloro-ethene (ug/l)	Trichloro-ethene (ug/l)	1,1-Dichloro-ethene (ug/l)	cis-1,2-Dichloro-ethene (ug/l)	1,1-Dichloro-ethane (ug/l)	1,1,1-Trichloro-ethane (ug/l)	1,2-Dichloro-ethane (ug/l)
OU2 Cleanup Level [1]		5	5	6	70	70	200	4
Site D								
03U093	6/20/04	<1	**91**	2.9	2	0.33JP	39	<1
Site G								
03U094	6/21/04	0.51 JP	**470**	13	3.2	2.9	280	<1

Notes:

(1) Cleanup levels for Deep Groundwater are from Table 1 of the OU2 ROD. Bolding (in red color) indicates exceedance of the cleanup level.

JP The value is below the reporting level, but above the method detection limit. Results should be considered estimated.



TWIN CITIES ARMY AMMUNITION PLANT

Location of Wells Nearest to Sites D and G

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Environmental Engineers Maple Plain, MN 55359-0429

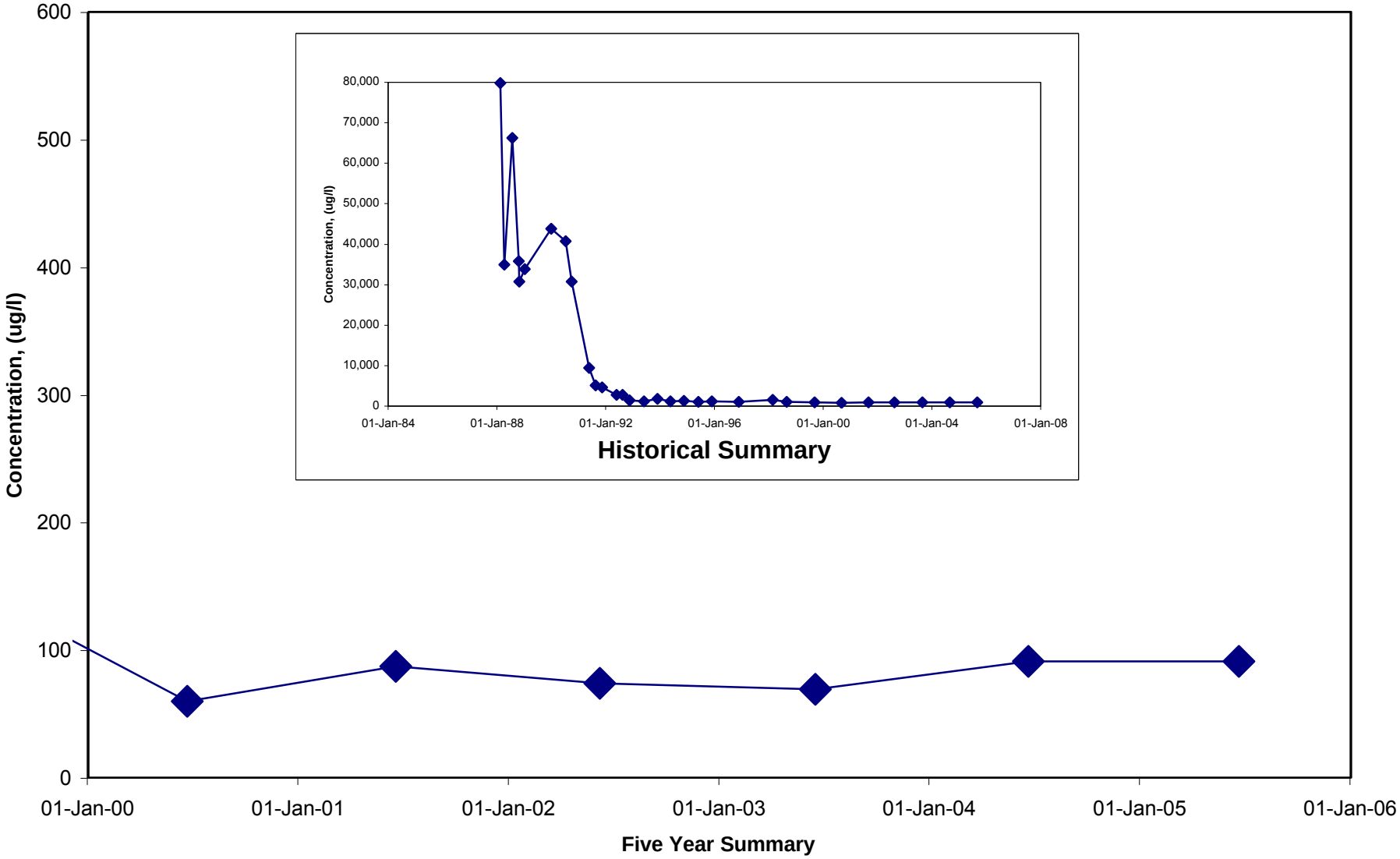
FY 2005

Figure 5-1

FIGURE 5-2

SITE D, WELL 03U093, TRICHLOROETHENE WATER QUALITY TRENDS

TWIN CITIES ARMY AMMUNITION PLANT



C:\Files\Lisa\FY 2005 APR\Figures\Figure 5-2

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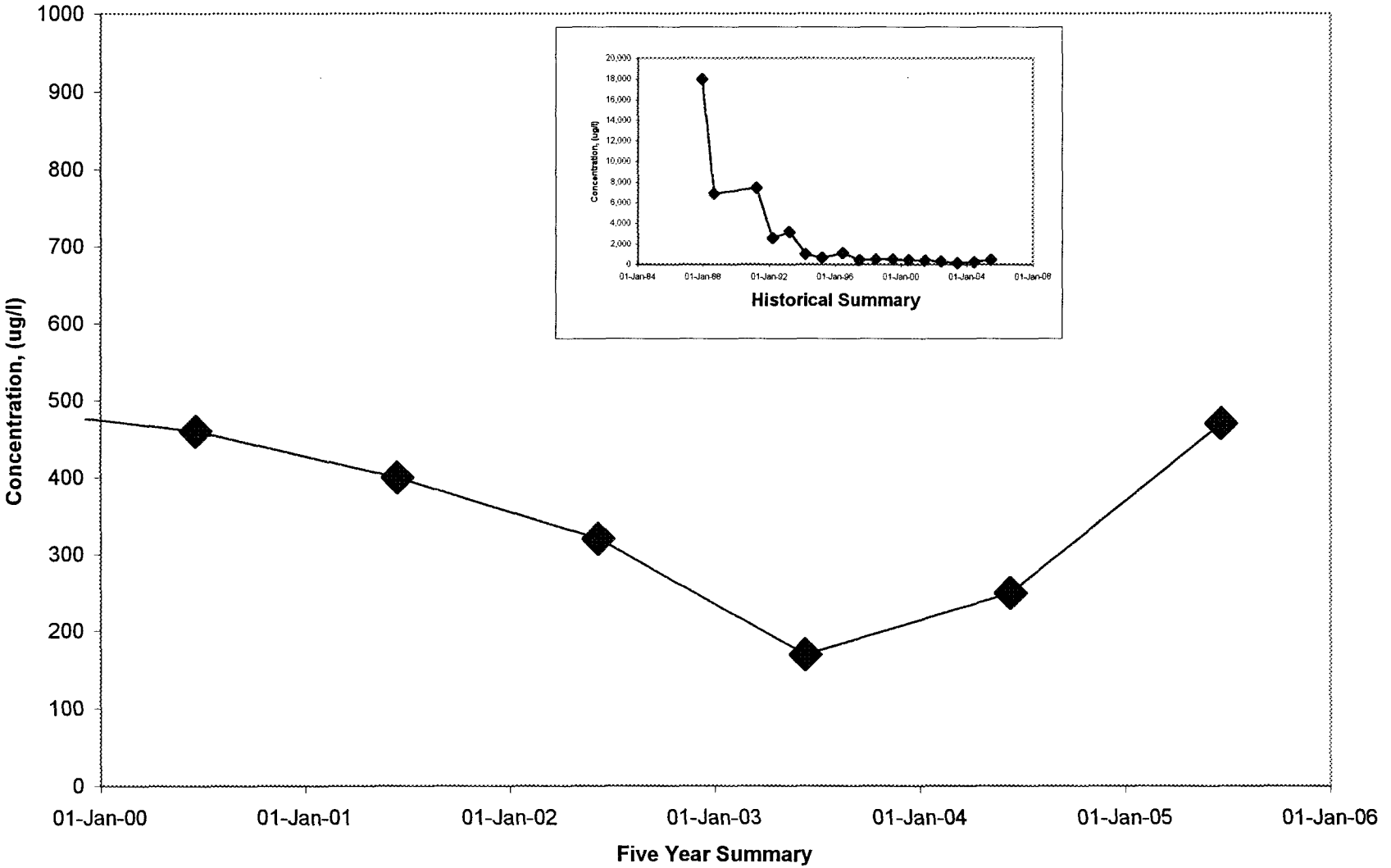
FIGURE 5-3
SITE G, WELL 03U094, TRICHLOROETHENE WATER QUALITY TRENDS
TWIN CITIES ARMY AMMUNITION PLANT



C:\Files\Lisa\FY 2005 APR\Figures\Figure 5-3

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6.0 Operable Unit 2: Site A Shallow Groundwater

Shallow groundwater at Site A has been impacted by VOCs and antimony. The selected remedy in the OU2 ROD incorporates the use of a groundwater extraction system, which began operation May 31, 1994. The containment system originally consisted of eight extraction wells installed along two lines downgradient of the source area. Only four of the eight extraction wells currently need to be operated to provide the necessary containment. Extracted groundwater is discharged to the sanitary sewer for treatment at a Publicly-Owned Treatment Works (POTW). The ROD prescribes five major components of the remedy that are described and evaluated in the following sections.

6.1 REMEDY COMPONENT #1: GROUNDWATER MONITORING

Description: "Groundwater monitoring to track plume migration and remedy performance." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When a performance groundwater monitoring program has been established and ongoing monitoring is in compliance with the program.

Is this remedy component being implemented?

Yes. Performance monitoring programs have been established to collect the data required for remedy components #2 to #4 and evaluation of the overall remedy. Table 6-1 summarizes the performance monitoring requirements, the implementing parties, and the documents that contain the monitoring plans. The FY 2005 Monitoring Plan is included in Appendix A. Figure 6-1 illustrates the wells and piezometers associated with Site A, and highlights the wells that were sampled in FY 2005.

Were the groundwater monitoring requirements for this remedy met? Yes.

Is any groundwater sampling proposed prior to the next report? Yes.

- Groundwater sampling of water supply wells related to alternate water supply and well abandonment will be in accordance with recommendations in Appendix E. No wells are recommended for FY 2005. The next "major" event will be in FY 2005.
- Monitoring of the extraction wells (pumping volumes, water levels, and water quality) and treatment system effluent will be in accordance with Appendix A.2.
- Other groundwater monitoring will be in accordance with the Groundwater Monitoring Plan included as Appendix A.1.

Are any changes or additional actions required for this remedy component? No.

6.2 REMEDY COMPONENT #2: GROUNDWATER CONTAINMENT AND MASS REMOVAL

Description: "Use of existing gradient control wells to contain the contaminant plume and remove mass." (OU2 ROD, page 3)

- Eight extraction wells, 01U351 – 01U358 (EW-1 – EW-8), were installed in two capture lines as shown on Figure 6-1. Seven of the eight extraction wells fully penetrate the Unit 1 aquifer and range in depth from 31 to 48 feet, as shown in cross-sectional view on Figure 6-2. The one partially penetrating well, 01U353 (EW-3), was completed in silt to sandy clay units that were resistant to drilling and determined to be the top of Unit 2 by the field geologist. The well log does not note the presence of silt (Fuller, 1994). The partially penetrating well is illustrated on cross-section B-B' on Figure 6-2.

- Wells 01U355 – 01U358 (EW-5 – EW-8), the line of extraction wells downgradient of the "first line" of extraction wells, were shut off (with regulatory approval) on July 11, 2000, and have remained off since that time. These wells were shut off because: 1) they were below the cleanup levels, and 2) the known area of groundwater having cleanup goal exceedances was within the capture area of the first line of extraction wells.

Performance Standard (how do you know when you're done):

When the extraction system is providing complete capture of all groundwater exceeding the cleanup levels specified in Table 1 of the OU2 ROD, and shown in Table 6-2 of this report.

Is the Site A groundwater extraction system providing complete capture of all groundwater exceeding the cleanup levels specified in Table 1 of the OU2 ROD?

Yes. Table 6-3 shows the monthly average pumping rate for each extraction well and the combined system total, along with the target pumping rate for containment. The original target pumping rate for wells 01U351 – 01U355 (EW-1 - 5) was 15 gpm. The average pumping rate for FY 2005 was 14.4 gpm, slightly below the target. Additional development and cleaning are scheduled in FY 2006 to improve the flow rates.

Water level data collected at Site A on June 1, 2005, is shown in Table 6-4, and a water level contour map prepared from this data is presented on Figure 6-3. This figure shows the influence from pumping the four extraction wells and the interpreted capture boundary, which supports the statement that the system is providing complete capture of all groundwater exceeding the Site A cleanup levels.

Table 6-2 (and also Figure 6-4 and Figure 6-5) show that the locations where groundwater exceeds cleanup levels continue to be at and upgradient of the first line of recovery wells. Two wells, 01U108 and 01U126 exceeded the cleanup level for tetrachloroethene. Cis-1,2-dichloroethene was below the cleanup standard at all monitoring locations and in the system effluent.

The decreasing concentration of cis-1,2-dichloroethene in 01U902 (downgradient of the extraction system) is also evidence of the extraction system's capture zone (Figure 6-6). The cis-1,2-dichloroethene concentration in this well has dropped from a historical high around 100 µg/l to 4.6 µg/l in FY 2005.

Were there any significant operation and maintenance problems (greater than 24-hour shutdown)?

Yes. Table 6-5 summarizes O&M notes for FY 2005.

Are any changes or additional actions required for this remedy component? No.

6.3 REMEDY COMPONENT #3: DRILLING ADVISORY/ALTERNATE WATER SUPPLY/WELL ABANDONMENT

Description: "Institutional controls to restrict new well installations and provide alternate water supplies and well abandonment as necessary." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When the MDH has issued a Special Well Construction Area Advisory and when well owners who qualify have been offered and provided with alternate water supply and/or have had their wells abandoned (or the offers have been rejected).

Is the remedy component being implemented?

Yes. The OU1 Alternate Water Supply and Well Abandonment Program is underway and was expanded to cover the area affected by the OU2 Site A shallow groundwater plume. See Section 3.1 of this report for more information on this program.

Has the MDH issued a Special Well Construction Area Advisory for the area impacted by Site A?

Yes, it was issued in June 1996 and revised in December 1999; however, this revision did not affect the boundary for the Site A vicinity.

Did the boundary of the Site A plume get any bigger during FY 2005, as defined by the 1 µg/l contour?

No. Figure 6-4 shows the 1 µg/l contour line for cis-1,2-dichloroethene (the chemical of concern at Site A with the biggest plume footprint). There were no significant increases in the plume footprint from last year.

Were any additional water supply wells discovered within the area of concern for the Site A plume that are completed within the aquifer of concern? No.

Were any water supply wells within the Site A plume sampled during FY 2005? If yes, what were the findings? No.

Were any well owners offered an alternate supply and/or well abandonment in FY 2005? No.

Within the Site A plume, are there any well owners that meet the criteria, but have not yet been provided an alternate water supply? No.

Within the Site A plume, are there any wells that meet the criteria, but have not yet been abandoned? No.

Is any sampling of water supply wells proposed prior to the next report? No.

Are any changes or additional actions required for this remedy component? No.

6.4 REMEDY COMPONENT #4: DISCHARGE OF EXTRACTED WATER

Description: "Discharge of extracted groundwater to a publicly-owned treatment works (POTW)." (OU2 ROD, page 3)

- The recovered groundwater is piped to a sewer discharge manhole (Shoreview sanitary sewer discharge manhole #229) located approximately 150 feet north of the TCAAP boundary as shown on Figure 6-1. The recovered groundwater is conveyed via a City of Shoreview sanitary sewer to the Metropolitan Council Environmental Services (MCES) Treatment Plant located at 2400 Childs Road in St. Paul, Minnesota. Discharge is in accordance with Industrial Discharge Permit Number 2194 from the MCES.

Performance Standard (how do you know when you're done):
When the concentrations of contaminants in the extracted groundwater and the flow rate are below the criteria in the Industrial Discharge Permit, as shown in Table 6-6.

During FY 2005, was the discharge water in compliance with the Industrial Discharge Permit requirements?
Yes. Table 6-6 shows that the effluent water quality was below the discharge criteria in every month of FY 2005.

Is any sampling of the discharge water proposed prior to the next report?
Yes. In accordance with the permit requirements, the discharge will be sampled monthly for 1,2-dichloroethene (cis and trans), trichloroethene, 1,1,1-trichloroethane, and mercury (see Appendix A.2).

Are any changes or additional actions required for this remedy component? No.

6.5 REMEDY COMPONENT #5: SOURCE CHARACTERIZATION/ REMEDIATION

Description: "Source characterization/remediation." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
For characterization, when the investigation has answered the questions needed to prepare remedial design documents. For remediation, when the contaminant concentrations in soil are below the cleanup levels specified in Table 1 of the OU2 ROD.

Is this remedy component being implemented?
Yes. Characterization work has been completed. Shaw performed investigation work in 1997 and the final "Site A Investigation Report" was issued December 12, 1997. The report delineated the extent of both VOC-contaminated and metal-contaminated soils requiring remediation.

Remediation has been completed. Shaw completed removal of metal-contaminated soils in FY 1999. Construction of an air sparging/soil vapor extraction (AS/SVE) system to remediate VOC-contaminated soils was completed by Shaw in FY 2000, which began operation in early FY 2001. The AS system was operated minimally in FY 2001 and was shut off permanently in June 2001 due to a lack of increase in SVE VOC levels and due to concern regarding potential plume spreading. The AS system was being implemented voluntarily and was not a requirement of the OU2 ROD. Soil samples were collected within the source area in July 2002 (and previously in August 2001). In both events, the results showed minimal reduction in soil VOC concentrations. Since it appeared that many years of SVE system operation would be required before cleanup levels would be reached (if ever), the Army ceased SVE system operation on August 21, 2002, and submitted a work plan clarification to the USEPA and MPCA for excavation of the VOC-contaminated soils in the source area. The work plan clarification received regulatory approval in early FY 2003, and 688 cubic yards of contaminated soil were

excavated by Shaw and transported off-site to a permitted disposal facility. The Site A Former 1945 Trench Closeout Report (prepared by Shaw) received regulatory consistency in FY 2004. **Are any changes or additional actions required for this remedy component?** No.

6.6 OVERALL REMEDY FOR SITE A SHALLOW GROUNDWATER

Performance Standard (how do you know when you're done):
When the cleanup levels in Table 1 of the OU2 ROD have been attained throughout the areal and vertical extent of the Site A plume within the anticipated ten-year lifespan of the remedy. If the remedy has not been completed within ten years, additional remedial measures will be addressed. (OU2 ROD, page 54)

Has the Site A shallow groundwater remedy been completed (i.e., have the cleanup levels in Table 1 of the OU2 ROD been attained throughout the areal and vertical extent of the Site A plume)?
No. Table 6-2 shows the exceedances in wells at Site A during FY 2005. Figure 6-5 shows that the area with tetrachloroethene exceedances (greater than 7 µg/l) extends from the source area (near 01U108) downgradient to near 01U126. The tetrachloroethene exceedances do not extend to the first line of extraction wells. There were no cis-1,2-dichloroethene exceedances (greater than 70 µg/l) at monitoring wells in the June 2005 event (Figure 6-4). However, Table 6-2 shows that extraction wells 01U352 (EW-2) and 01U353 (EW-3) were above the cleanup standard (140 µg/l and 71 µg/l). In FY 2004, they were just below the cleanup standards. These wells have been fluctuating near the cleanup standard for several years. This suggests that an area with cis-1,2-dichloroethene exceedances (greater than 70 µg/l) persists in the vicinity of EW-2 and EW-3, though it does not extend back to the source area. The presence of 1,2 dichloroethene in this area is consistent with the breakdown of trichloroethene and perchloroethene with distance from the source area. The benzene concentration in EW-2 was just above the cleanup level of 10 µg/l in the June 2005 event, but was below the cleanup level in the June 2004 event. The benzene cleanup level was not exceeded in any other wells.

What impact is the groundwater extraction system having on contaminant concentrations?
Groundwater contaminant concentrations at Site A were generally comparable to last year's data, with the cis-1,2-dichloroethene tetrachloroethene concentrations increasing slightly at some locations with the plume extent remaining about the same.

All wells downgradient of the first line of extraction wells had water quality results that remained below the cleanup levels. In FY 2003, the well adjacent to the source area (01U108) showed a considerable increase in tetrachloroethene (from 7.6 to 65 µg/l); and it was concluded that the result was likely an artifact of sporadic air sparging efforts. The subsequent reduction in FY 2004 to 11 µg/l, and confirmation in FY 2005 (14 µg/l) indicates remedial progress in this area.

The following figures present trend graphs of cis-1,2-dichloroethene, trichloroethene, and tetrachloroethene for representative wells that illustrate these points:

- Figure 6-6 01U902 (downgradient of the extraction system)
- Figure 6-7 Extraction Wells EW-1 to EW-4 (the first line of extraction wells) (cis-1,2-dichloroethene only)
- Figure 6-8 01U108 (near the source area)

Note that some of the data points prior to FY 1999 may be showing total 1,2-dichloroethene (cis and trans isomers combined), since analysis of the cis isomer alone has not always been performed.

What impact is source removal having on contaminant concentrations?
Since the contaminated soils from the Former 1945 Trench were removed from the site in early FY 2003, the source removal appears to be beginning to influence the FY 2005 monitoring data. At 01U108, the closest monitoring well downgradient of the source area, the concentration of tetrachloroethene decreased from FY 2003. Additional monitoring will be required to verify the trend at 01U108. Monitoring well 01U126 increased from 32 µg/l to 56 µg/l tetrachloroethene;

this may reflect the slight spike observed at 01U108 in FY 2003. The cis-1,2-dichloroethene increased at extraction wells EW-2 and EW-3, which may also reflect degradation of the tetrachloroethene observed at 01U108 and 01U126. The groundwater travel time from the source area to the first line of recovery wells is approximately 2 years, and therefore, the potential effects of source removal will be even more delayed at the recovery wells.

How much VOC mass has been removed?

Based on the calculated VOC mass removal rates for the total effluent, the groundwater extraction system removed approximately 3.31 pounds of VOCs in FY 2005, with a cumulative VOC mass removal of approximately 44.8 pounds since system startup on May 31, 1994 (Table 6-7).

Has 10 years elapsed since signing of the OU2 ROD? No. The June 2005 sampling event marked eight years of extraction system operation since the signing of the OU2 ROD. The ROD states, "should aquifer restoration not be attained within the anticipated ten-year lifespan of the remedy, additional remedial measures will be addressed". Based on the FY 2003 through FY 2005 contaminant concentrations and trends, it appears that cleanup levels could potentially be reached throughout the areal extent of the plume by the tenth year. However, even if cleanup levels are not reached by the tenth year, the situation might be that exceedances will persist only in the source area vicinity and will not extend to the first line of recovery wells.

Do additional remedial measures need to be addressed? No.

6.7 OTHER ACTIVITIES IN FY 2005

There we no other activities conducted at Site A in FY 2005.

Table 6-1

Summary of Site A Shallow Groundwater Monitoring Requirements
Fiscal Year 2005

Remedy Component	Monitoring Requirements	Implementing Party	Documents Containing the Monitoring Plan
#1: Groundwater Monitoring	Outlined below		
#2: Containment and Mass Removal	a. Pumping volumes and rates for each extraction well for comparison to design flowrates for containment	Army	Site A Monitoring Plan in the Annual Report
	b. Water levels from monitoring wells to draw contour maps showing the influences of pumping	Army	Site A Monitoring Plan in the Annual Report
	c. Water quality data for each extraction well to determine VOC mass removal	Army	Site A Monitoring Plan in the Annual Report
#3: Drilling Advisory/Alternate Water Supply/Well Abandonment	See OU1, Remedy Component #1 which also includes the area north of Site A		
#4: Discharge of Extracted Water	a. Water quality data for total system effluent to demonstrate compliance with the Industrial Discharge Permit	Army	Site A Monitoring Plan in the Annual Report
#5: Source Characterization/ Remediation	a. AS/SVE system flowrates and air quality data to evaluate system effectiveness and emissions (this system was permanently shut down on August 21, 2001)	Army	Site A Monitoring Plan in the Annual Report
OR: Overall Remedy (Attainment of cleanup goals)	a. Water quality data throughout the Site A plume to evaluate attainment	Army	Site A Monitoring Plan in the Annual Report

Table 6-2

Site A Groundwater Quality Data
Fiscal Year 2005

			Tetra-chloro-ethene (ug/l)	Tri-chloro-ethene (ug/l)	1,1-Di-chloro-ethene (ug/l)	1,2-Di-chloro-ethane (ug/l)	cis-1,2-Di-chloro-ethene (ug/l)	Chloro-form (ug/l)	Benzene (ug/l)	Antimony (ug/l)
Site A Cleanup Level [1]			7	30	6	4	70	60	10	6
01U039		6/12/2005	<1	<1	<1	<1	JP 0.35	<1	<1	
01U102		6/13/2005	JP 0.59	JP 0.15	<1	<1	<1	<1	<1	
01U103		6/13/2005	<1	<1	<1	<1	<1	<1	<1	B 2.1 (UB0.86)
01U103	D	6/13/2005	---	---	---	---	---	---	---	B 2.1 (UB0.86)
01U108		6/13/2005	**13**	2.0	<1	<1	JP 0.65	<1	<1	
01U108	D	6/13/2005	**14**	2.0	<1	<1	JP 0.54	<1	<1	
01U115		6/12/2005	<1	JP 0.10	<1	<1	JP 0.31	<1	<1	
01U116		6/12/2005	<1	JP 0.20	<1	<1	JP 0.72	<1	<1	
01U117		6/12/2005	4.4	JP 0.94	<1	<1	24	<1	<1	
01U126		6/13/2005	**56**	JP 0.83	<1	<1	<1	<1	<1	
01U126	D	6/13/2005	**54**	JP 0.86	<1	<1	<1	<1	<1	
01U127		6/12/2005	<1	<1	<1	<1	<1	<1	<1	
01U138		6/12/2005	<1	<1	<1	<1	<1	<1	<1	
01U139		6/13/2005	<1	JP 0.13	JP 0.25	JP 0.31	32	<1	2.1	
01U140		6/13/2005	<1	JP 0.24	<1	<1	2.6	<1	JP 0.76	
01U157		6/12/2005	<1	JP 0.50	<1	<1	2.1	<1	<1	
01U158		6/12/2005	<1	JP 0.31	<1	<1	1.8	<1	<1	
01U901		6/13/2005	<1	<1	<1	<1	JP 0.48	<1	<1	
01U902		6/13/2005	<1	JP 0.18	<1	<1	5.5	<1	<1	<5
01U903		6/13/2005	<1	JP 0.20	<1	<1	JP 0.67	<1	<1	
01U904		6/13/2005	<1	<1	<1	<1	1.6	<1	<1	<5

Table 6-2

Site A Groundwater Quality Data
Fiscal Year 2005

			Tetra-chloro-ethene (ug/l)	Tri-chloro-ethene (ug/l)	1,1-Di-chloro-ethene (ug/l)	1,2-Di-chloro-ethane (ug/l)	cis-1,2-Di-chloro-ethene (ug/l)	Chloro-form (ug/l)	Benzene (ug/l)	Antimony (ug/l)
Site A Cleanup Level [1]			7	30	6	4	70	60	10	6
Extraction Wells:										
01U351 (EW1)		6/13/2005	JP 0.66	JP 0.92	<1	<1	1.7	<1	<1	
01U352 (EW2)		6/13/2005	JP 0.34	1.8	<1	<1	**140**	<1	**11**	
01U353 (EW3)		6/13/2005	<1	JP 0.86	<1	<1	**71**	<1	1.9	
01U353 (EW3)	D	6/13/2005	<1	JP 0.91	<1	<1	**71**	<1	1.9	
01U354 (EW4)		6/13/2005	<1	JP 0.13	<1	<1	JP 0.82	<1	<1	

Notes:

(1) Cleanup levels for Site A Shallow Groundwater are from Table 1 of the OU2 ROD. Bolding (in red color) indicates exceedance of the cleanup level.

D Duplicate sample.

JP The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

B The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

UB The sample result was less than 5 times the level detected in a blank (the result for the blank is listed after "UB"). The sample result can be considered non detect at an elevated detection limit.

Table 6-3

Site A Removal Action Pumping Data
Fiscal Year 2005

Month	01U351	01U352	01U353	01U354	01U351-354 Subtotal
				Target Flowrate (gpm):	**15.0**
	Average Flowrate (gpm)				
Oct-04	3.8	2.7	2.6	5.7	14.7
Nov-04	3.8	2.3	2.1	5.5	13.7
Dec-04	4.6	2.6	3.1	5.7	16.1
Jan-05	4.7	1.4	3.4	4.3	13.8
Feb-05	4.4	3.2	1.7	4.4	13.7
Mar-05	4.2	2.9	1.6	4.0	12.7
Apr-05	5.4	4.0	2.3	3.5	15.2
May-05	4.9	3.9	1.8	4.8	15.4
Jun-05	5.2	3.0	2.1	5.3	15.6
Jul-05	4.3	2.5	2.5	4.3	13.6
Aug-05	4.0	2.8	2.6	4.5	13.8
Sep-05	5.5	3.7	1.1	4.0	14.2
FY05 Average	**4.6**	**2.9**	**2.2**	**4.7**	**14.4**

Table 6-4

Site A Groundwater Level Data
Fiscal Year 2005

Well ID	TOS (ft)	Stickup (ft)	GW Meas. 2005 (ft)	GW elev. 2005 (ft)
O1U038	900.30	1.69	11.45	890.54
O1U039	897.50	2.23	17.87	881.86
O1U040	892.54	2.43	12.34	882.63
O1U041	898.33	2.25	8.50	892.08
O1U063	892.61	2.40	11.66	883.35
O1U067	897.40	2.76	7.57	892.59
O1U102	905.20	2.28	20.77	886.71
O1U103	904.14	2.48	18.38	888.24
O1U104	899.12	2.41	10.06	891.47
O1U105	901.39	2.40	10.94	892.85
O1U106	896.80	2.88	11.91	887.77
O1U107	899.16	1.69	11.29	889.56
O1U108	904.30	2.14	18.68	887.76
O1U110	897.22	2.63	5.98	893.87
O1U115	900.33	1.67	18.54	883.46
O1U116	902.71	1.85	20.98	883.58
O1U117	902.69	1.81	19.81	884.69
O1U118	901.79	1.94	17.04	886.69
O1U119	898.08	2.00	9.28	890.80
O1U120	902.15	1.81	16.53	887.43
O1U126	903.34	2.33	20.61	885.06
O1U127	902.93	2.35	roots	roots
O1U133	900.73	2.46	13.36	889.83
O1U135	899.94	1.94	20.40	881.48
O1U136	898.84	2.42	22.68	878.58
O1U137	900.51	2.12	17.11	885.52
O1U138	904.38	2.14	23.46	883.06
O1U139	901.15	2.10	20.02	883.23
O1U140	898.83	1.82	18.11	882.54
O1U141	897.74	1.91	16.14	883.51
O1U145	902.56	2.57	20.35	884.78

Table 6-4

Site A Groundwater Level Data
Fiscal Year 2005

Well ID	TOS (ft)	Stickup (ft)	GW Meas. 2005 (ft)	GW elev. 2005 (ft)
O1U146	902.89	2.53	22.84	882.58
O1U147	902.80	2.44	20.89	884.35
O1U148	902.60	2.65	21.60	883.65
O1U149	901.30	2.71	20.58	883.43
O1U150	901.30	2.27	20.45	883.12
O1U151	904.70	2.49	roots	roots
O1U152	901.00	2.80	20.40	883.40
O1U153	899.90	2.69	19.43	883.16
O1U154	898.90	2.51	18.65	882.76
O1U155	897.90	3.09	18.84	882.15
O1U156	897.80	2.48	18.52	881.76
O1U157	901.90	2.78	21.40	883.28
O1U158	901.10	2.48	20.65	882.93
O1U351	904.00	2.70	25.92	880.78
O1U352	901.00	3.33	23.35	880.98
O1U353	902.00	2.82	28.06	876.76
O1U354	903.80	3.22	25.35	881.67
O1U901	901.48	2.79	23.19	881.08
O1U902	901.29	2.25	20.45	883.09
O1U903	903.70	3.04	22.35	884.39
O1U904	899.40	2.56	20.04	881.92

TOS = Top of Surface which represents the ground surface elevation in feet above mean sea level (MSL). The TOS elevations were retrieved from USAEC IRDMIS.

roots = Roots in the well casing prevented water levels from being taken.

Groundwater measurements taken on 1 June 2005

Table 6-5

Site A Removal Action Monthly Operation and Maintenance Notes
Fiscal Year 2005

October
During the month of October, operational parameters were recorded daily on business days.
10/4-6/04; System shut down for scheduled acid washing. Down time: 50 hours.

November
During the month of November, operational parameters were recorded daily on business days.
11/11-15/04; Control box at EW-353 shorted out. Re-wired and restarted well. EW-353 down time: 98 hours.
11/22-24/04; System shut down for scheduled acid washing. System down time: 57.5 hours.
11/29-30/04; Pump went out at EW-353. Scoured line with a foam "pig" and replaced pump. EW-353 down

December
During the month of December, operational parameters were recorded daily on business days.
12/01/04; EW-353 still down due to the foam pig being stuck in the extraction line. Blew pig out of line with an air compressor. EW-353 down time: 14.25 hours.
12/22/04; EW-353 flow meter stopped spinning. Cleaned out flow meter and reinstalled in system. Operating normally. EW-353 down time: 0.5 hours.

January
During the month of January, operational parameters were recorded daily on business days.
1/6/05; EW-353 flow meter stopped spinning. Cleaned out flow meter and reinstalled in system. Operating normally. EW-353 down time: 0.5 hours.
1/19/05; EW-353 flow meter stopped spinning. Cleaned out flow meter and reinstalled in system. Operating normally. EW-353 down time: 0.5 hours.

February
During the month of February, operational parameters were recorded daily on business days.
2/3/05; EW-353 flow meter stopped spinning. Cleaned out flow meter and reinstalled in system. Operating normally. EW-353 down time: 0.5 hours.
2/8-10/05; System was shut-down for scheduled acid washing. Down time: 44 hours.

March
During the month of March, operational parameters were recorded daily on business days.
3/16/05; Pitless adapters at EW-351 and EW-353 were found to be leaking. Drop pipes were reset and the leaking was minimized. EW-351 and EW-353 down time: 1 hour.
3/23-25/05; System was shut-down for installation of new pitless adapters. The pumps were pulled and new pitless adapters were welded into the well casing. The drop pipes were reset and the system was restarted.
3/28-29/05; System was shut-down for scheduled acid washing. System down time: 31.5 hours.

April
During the month of April, operational parameters were recorded daily on business days. The system continued to operate as designed.

May
During the month of May, operational parameters were recorded daily on business days. The system continued to operate as designed.
5/18-19/05; System being acid-washed. System down time: 42 hours.

Table 6-5

Site A Removal Action Monthly Operation and Maintenance Notes
Fiscal Year 2005

June
During the month of June, operational parameters were recorded daily on business days.
6/3/05; Replaced meter at EW-3 with a new meter- start count 00008 gallons. EW-3 down time: 0.5 hours.
6/15/05; EW-2 was found to be leaking at a failed check valve. Check valve was replaced. EW-2 down time: 2

July
During the month of July, operational parameters were recorded daily on business days.
7/11-13/05; EW-2 meter stopped spinning. Line appears to be fouled with Iron Bacteria. Scheduled acid washing. EW-2 down time: 48 hours.
7/13-15/05; System being acid washed. System down time: 49.5 hours.

August
During the month of August, operational parameters were recorded daily on business days.
8/29/05; EW-1 meter stopped spinning. Pump is inoperable. Called Glacier and EW-1 pump was replaced. EW-1 down time: 24 hours.
8/30-31/05; System being acid washed. System down time: 32 hours.

September
During the month of September, operational parameters were recorded daily on business days.
9/1-2/05; System being treated with welgicide. System down time: 30 hours.
9/2/05; EW-3 pump is inoperable. Called Glacier and EW-3 pump was replaced on 9/7/05. EW-3 down time: 96

Table 6-6

Site A Effluent Water Quality
Fiscal Year 2005

	cis-1,2-Dichloroethene (ug/l)	trans-1,2-Dichloroethene (ug/l)	Trichloroethene (ug/l)	1,1,1-Trichloroethane (ug/l)	Mercury (ug/l)
Discharge Limits:	3000	3000	3000	3000	2
20-Oct-04	54	JP 0.78	JP 0.95	<1	<0.100
16-Nov-04	57	JP 0.99	JP 0.85	<1	<0.100
29-Dec-04	38	JP 0.81	JP 0.80	<1	<0.100
13-Jan-05	39	JP 0.90	JP 0.86	<1	<0.100
21-Feb-05	47	JP 0.70	1.1	<1	<0.100
14-Mar-05	60	JP 0.85	1.1	<1	<0.100
21-Apr-05	71	JP 0.79	JP 0.95	<1	<0.100
26-May-05	66	JP 0.99	1.2	<1	<0.100
30-Jun-05	25	JP 0.85	JP 0.89	<1	<0.100
28-Jul-05	55	1.0	1.3	<1	<0.100
29-Aug-05	37	JP 0.73	JP 0.55	<1	<0.100
29-Sep-05	66	JP 0.99	JP 0.93	<1	<0.100

Notes:

JP The value is below the reporting limit, but above the method detection limit. Results should be considered estimated.

B The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

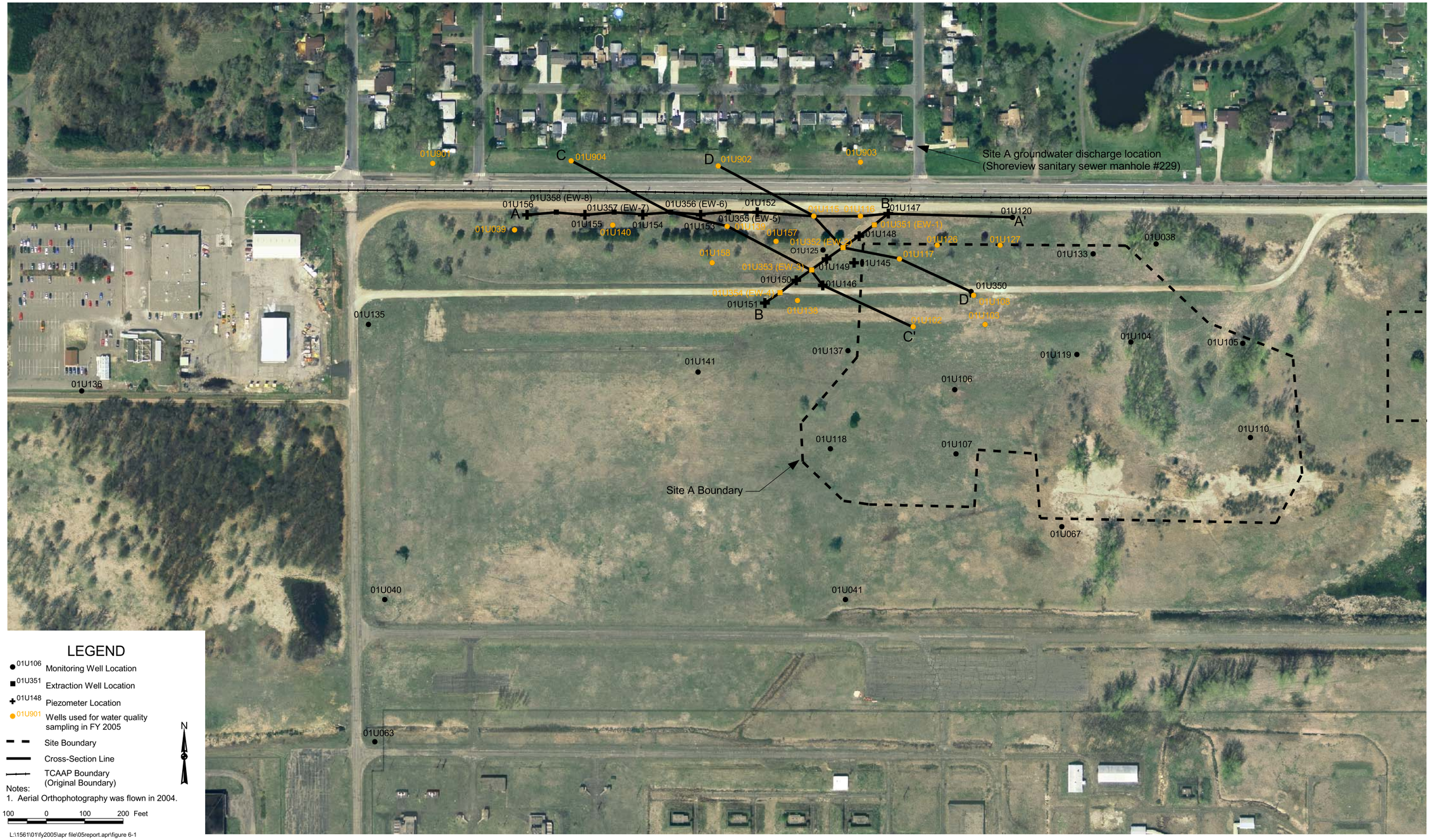
Table 6-7

Site A Monthly VOC Removal
Fiscal Year 2005

MONTH	1,2-DCE (ug/l)	TRCLE (ug/l)	TOTAL VOC EFFLUENT (ug/l)	CONVERSION FACTOR (l*lb)/(ug*gal)	WATER PUMPED (gallons)	TOTAL VOC'S REMOVED BY EXTRACTION SYSTEM (lbs)
TOTAL GALLONS PUMPED AND VOC'S REMOVED THROUGH SEPTEMBER 30, 2004					138,626,062	41.53
OCTOBER	54.78	0.95	55.73	8.35E-09	633,894	0.29
NOVEMBER	57.99	0.85	58.84	8.35E-09	583,591	0.29
DECEMBER	38.81	0.80	39.61	8.35E-09	697,459	0.23
JANUARY	39.90	0.86	40.76	8.35E-09	633,716	0.22
FEBRUARY	47.70	1.10	48.80	8.35E-09	548,176	0.22
MARCH	60.85	1.10	61.95	8.35E-09	568,905	0.29
APRIL	71.79	0.95	72.74	8.35E-09	627,167	0.38
MAY	66.99	1.20	68.19	8.35E-09	710,827	0.40
JUNE	25.85	0.89	26.74	8.35E-09	673,152	0.15
JULY	56.00	1.30	57.30	8.35E-09	570,506	0.27
AUGUST	37.73	0.55	38.28	8.35E-09	658,270	0.21
SEPTEMBER	66.99	0.93	67.92	8.35E-09	614,064	0.35
TOTAL GALLONS PUMPED AND VOC'S REMOVED FOR FISCAL YEAR 2005					7,519,727	3.31
TOTAL GALLONS TREATED AND VOC'S REMOVED SINCE SYSTEM START UP					146,145,789	44.84

Notes:

1) VOC concentrations do not include estimated concentrations for compounds detected below the reporting limit.



TWIN CITIES ARMY AMMUNITION PLANT

Site A, Well Location Map

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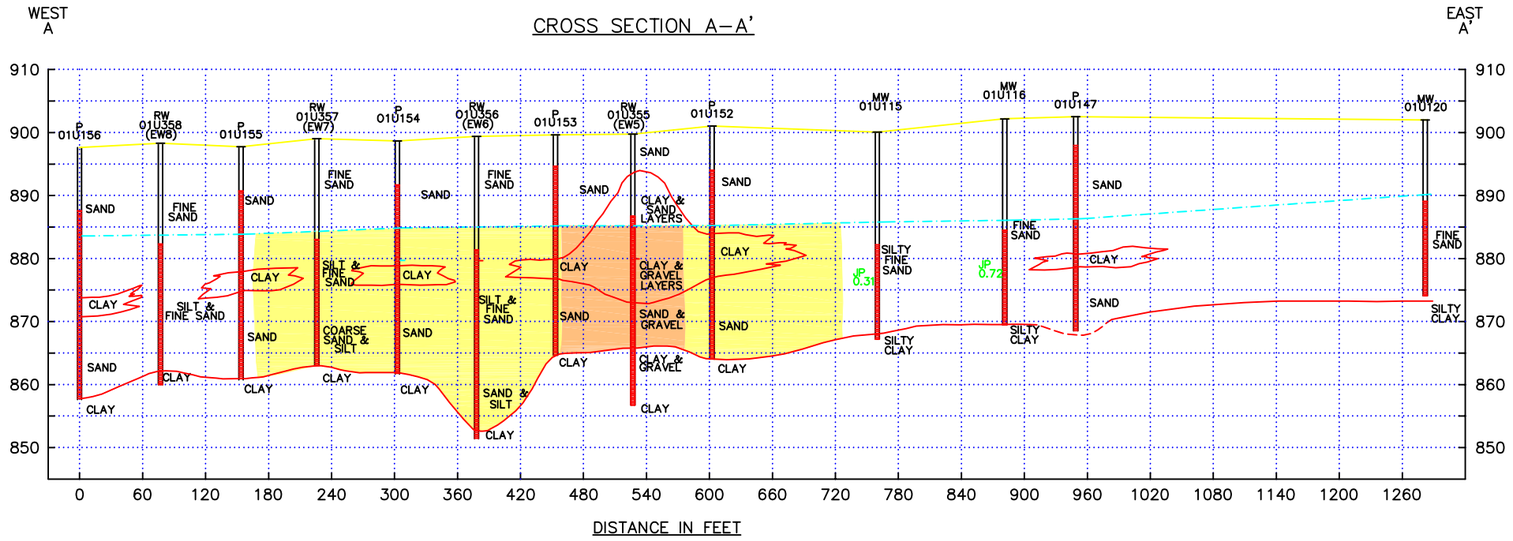
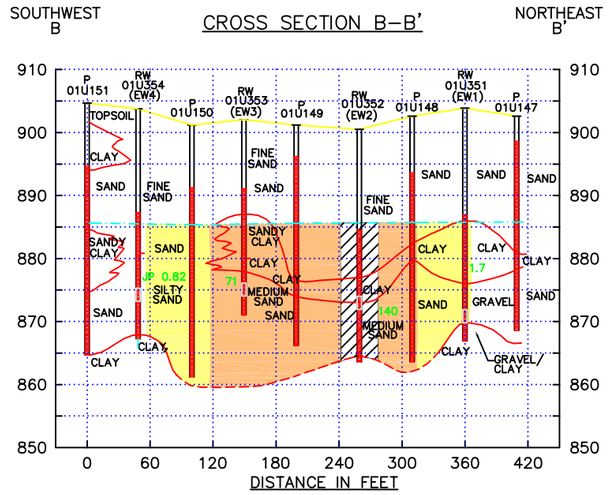
Wenck Associates, Inc.
Environmental Engineers

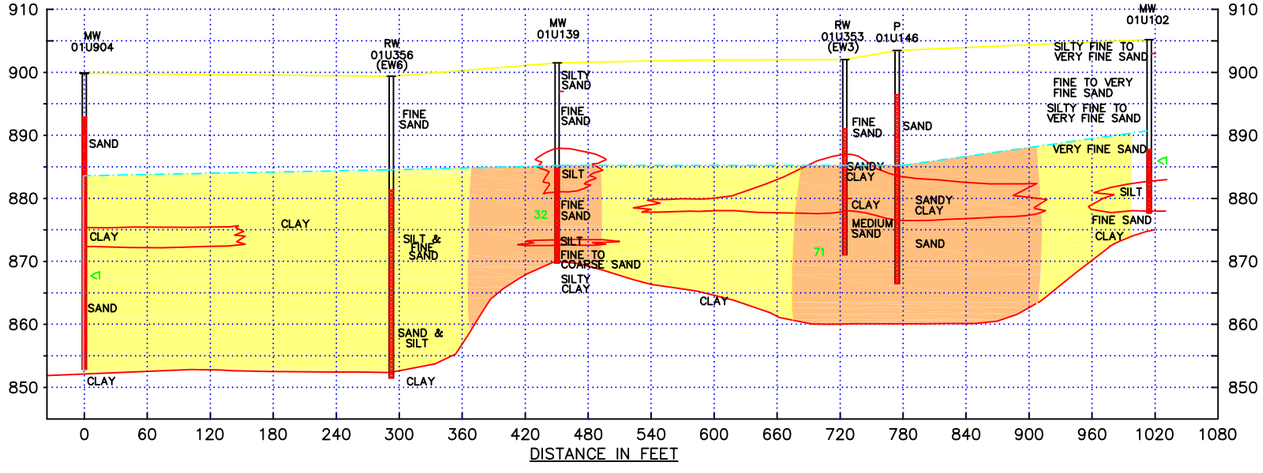
1800 Pioneer Creek Center
Maple Plain, MN 55359-0249

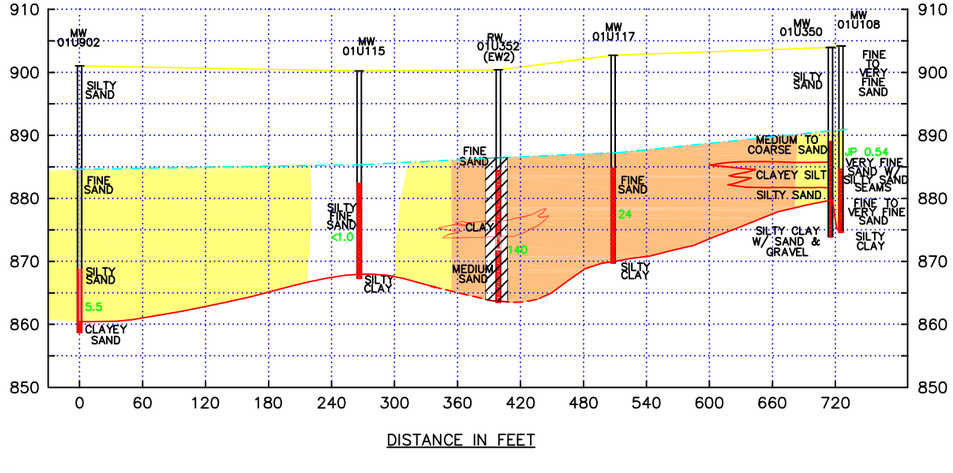
FY 2005

Figure 6-1









NOTES:

1. RESULTS ARE FROM GROUNDWATER SAMPLES COLLECTED BETWEEN JUNE 3–9, 2004.
2. CONSTRUCTION INFORMATION ON RECOVERY WELLS AND PIEZOMETERS WAS GENERATED BY DAHL AND ASSOCIATES, INC. AS PART OF THE SITE A REMOVAL ACTION SYSTEM CONSTRUCTION. CONSTRUCTION INFORMATION ON MONITORING WELLS WAS PROVIDED BY FEDERAL CARTRIDGE COMPANY.

LEGEND

- GEOLOGIC CONTACT
- INFERRED GEOLOGIC CONTACT
- SCREENED INTERVAL OF WELL
- PUMP LOCATION
- 885.0 WATER LEVEL SURFACE
- SLIGHT CHANGE IN GEOLOGIC UNIT (MARK LOCATED ALONG WELL STAFF)
- MW MONITORING WELL
- RW RECOVERY WELL
- P PIEZOMETER

MW 01U117 / 26 — cis–1,2–DICHLOROETHENE CONCENTRATION (ug/l) (VALUES IN PARENTHESES WERE NOT USED FOR CONTOURING PURPOSES)

cis–1,2–DICHLOROETHENE CONCENTRATIONS

- 1–10 ug/l
- 10–100 ug/l
- >100 ug/l

M: /1561/TCAX02B6.DWG

TWIN CITIES ARMY AMMUNITION PLANT

Site A, cis–1,2–Dichloroethene Cross Sections A–A', B–B', C–C' and D–D' Summer 2005

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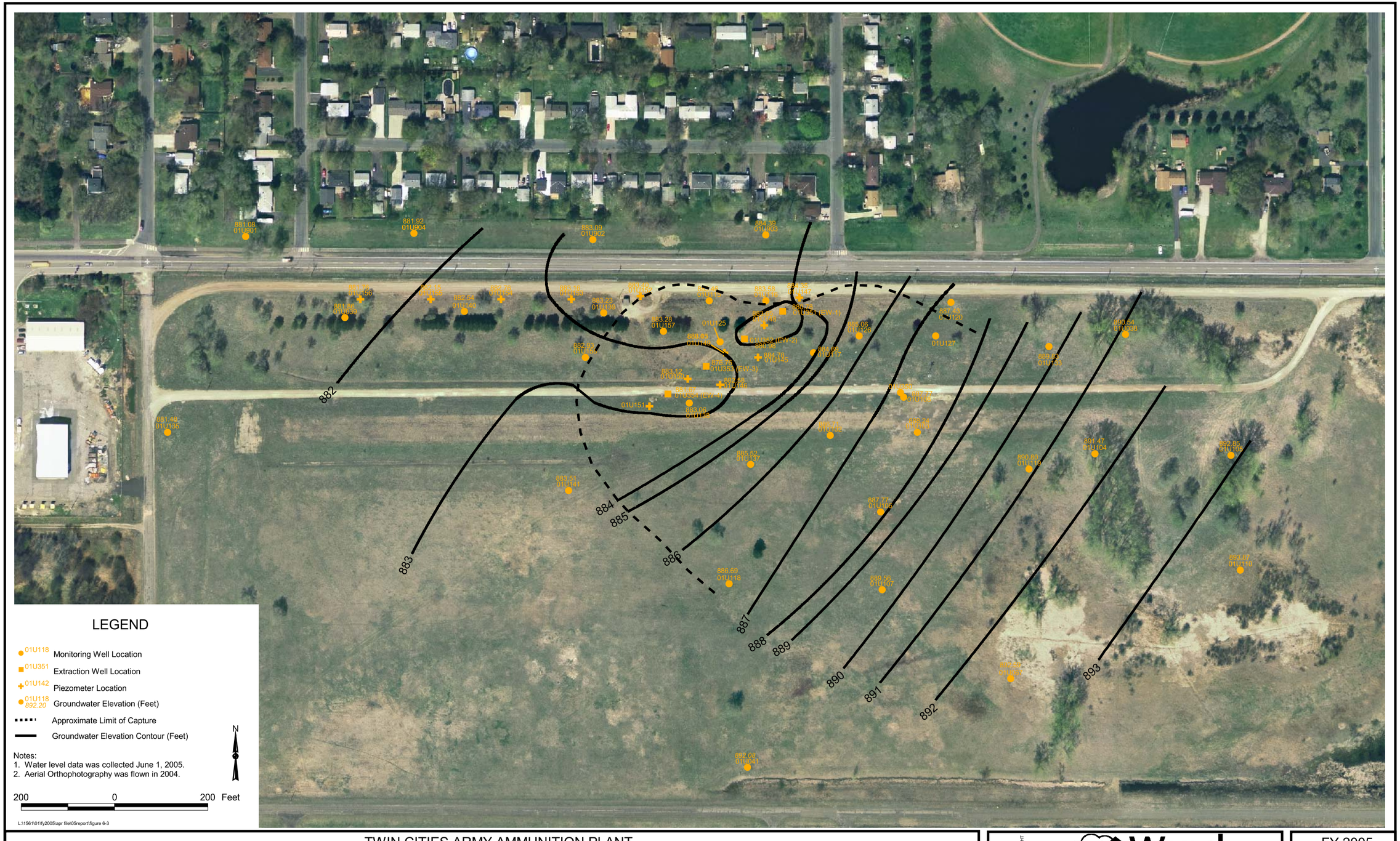
Grand Rapids, MI 49503

FY 2005

Figure 6–2



LEGEND

- 01U118 — Monitoring Well Location
- 01U351 — Extraction Well Location
- 01U142 — Piezometer Location
- 01U118 *892.20* — Groundwater Elevation (Feet)
- Approximate Limit of Capture
- Groundwater Elevation Contour (Feet)

Notes:
1. Water level data was collected June 1, 2005.
2. Aerial Orthophotography was flown in 2004.

N

200 0 200 Feet

L:\1561\01\fy2005\apr file\05report\figure 6-3

TWIN CITIES ARMY AMMUNITION PLANT

Site A, Unit 1, Potentiometric Map -- Summer 2005

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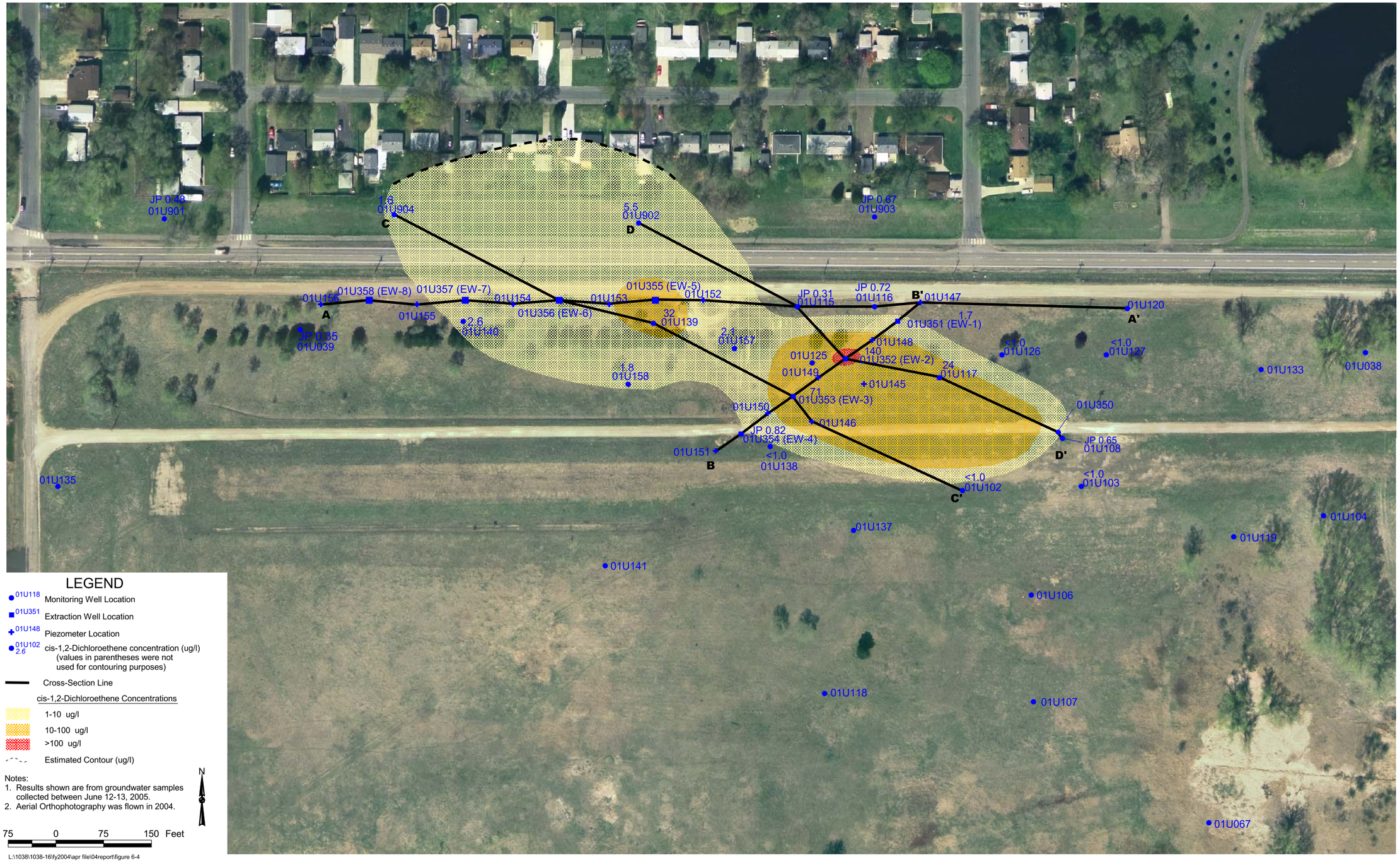
Figure 6-3



LEGEND

- 01U118 — Monitoring Well Location
- 01U351 — Extraction Well Location
- 01U148 — Piezometer Location
- 01U102 (2.6) — cis-1,2-Dichloroethene concentration (ug/l) (values in parentheses were not used for contouring purposes)
- Cross-Section Line

cis-1,2-Dichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- >100 ug/l
- Estimated Contour (ug/l)

Notes:
1. Results shown are from groundwater samples collected between June 12-13, 2005.
2. Aerial Orthophotography was flown in 2004.

N

75 0 75 150 Feet

L:\1038\1038-16\fy2004\apr file\04report\figure 6-4

TWIN CITIES ARMY AMMUNITION PLANT

Site A, Unit 1, cis-1,2-Dichloroethene Isoconcentration Map, Summer 2005

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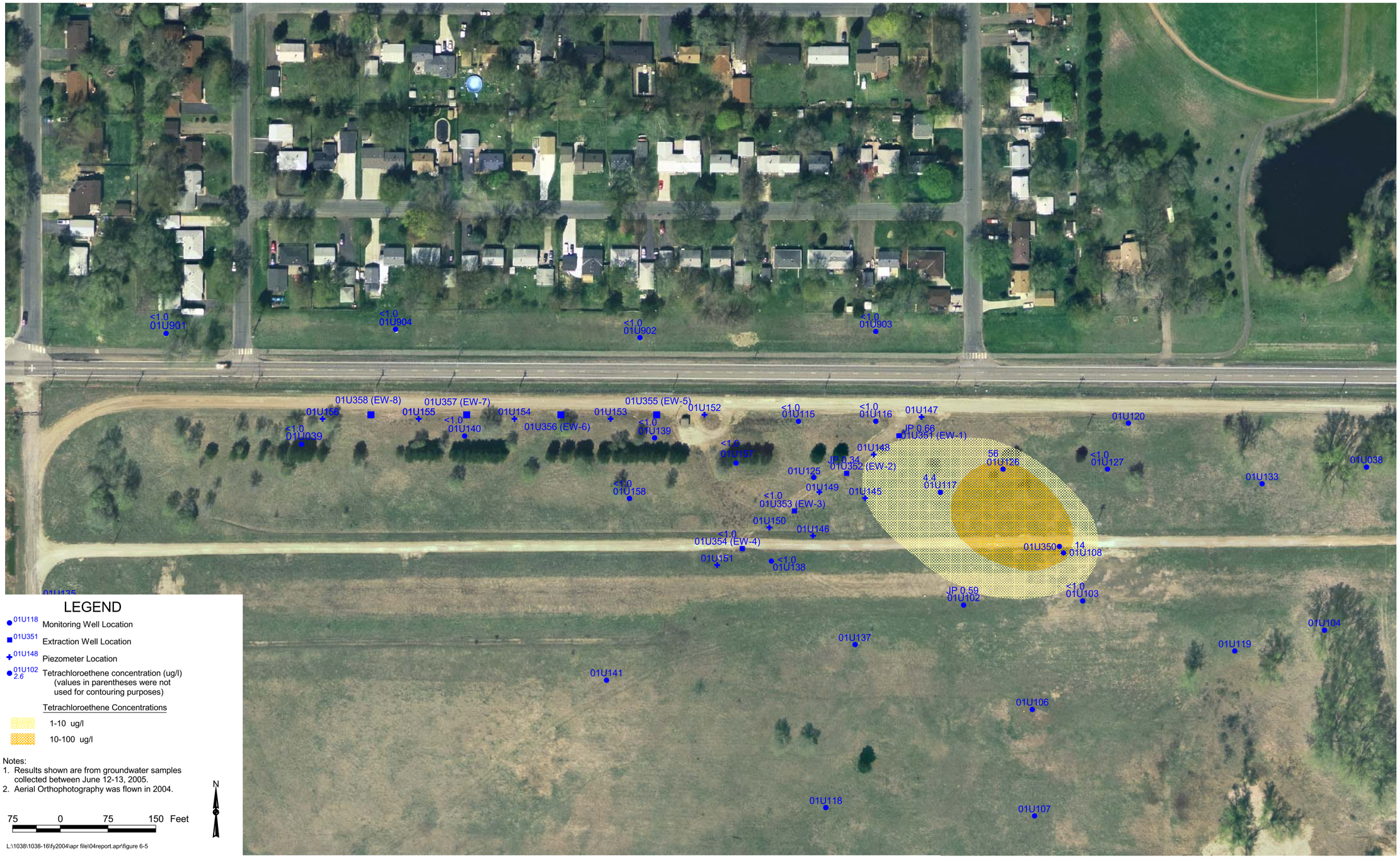
FY 2005

Figure 6-4



TWIN CITIES ARMY AMMUNITION PLANT

Site A, Unit 1 Tetrachloroethene Isoconcentration Map, Summer 2005

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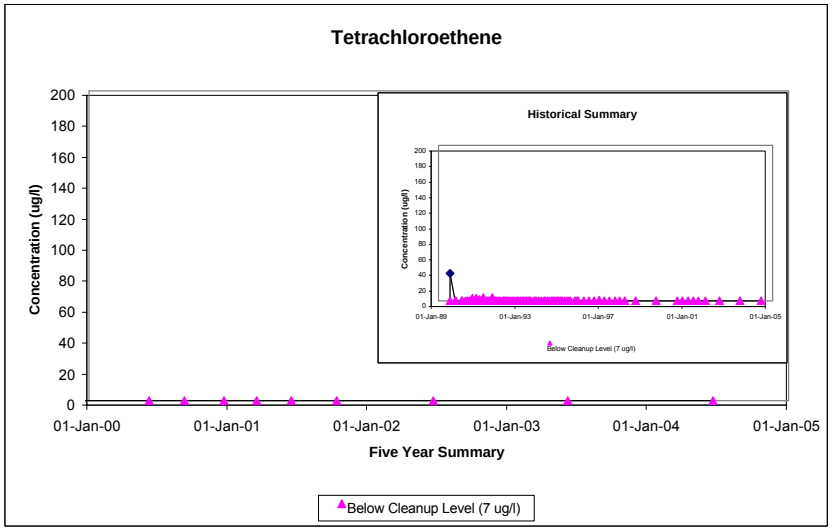
FY 2005

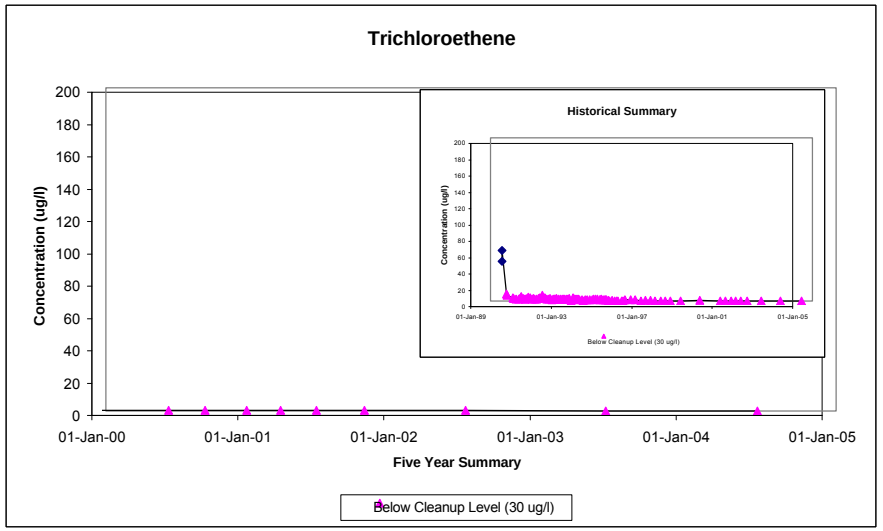
Figure 6-5

FIGURE 6-6

SITE A, WELL 01U902, TETRACHLOROETHENE, TRICHLOROETHENE, cis-1,2-DICHLOROETHENE WATER QUALITY TRENDS

TWIN CITIES ARMY AMMUNITION PLANT





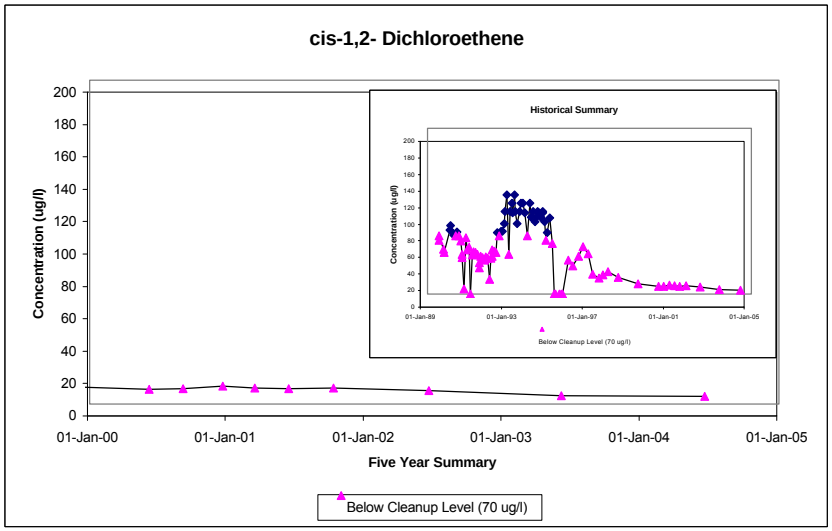
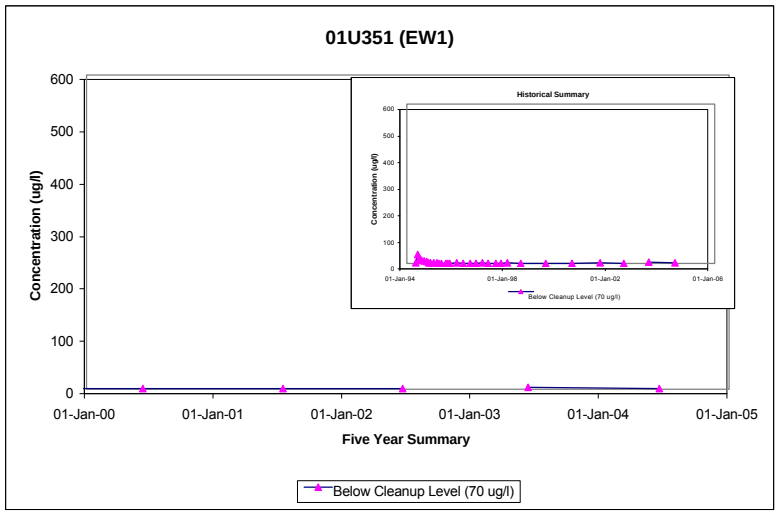
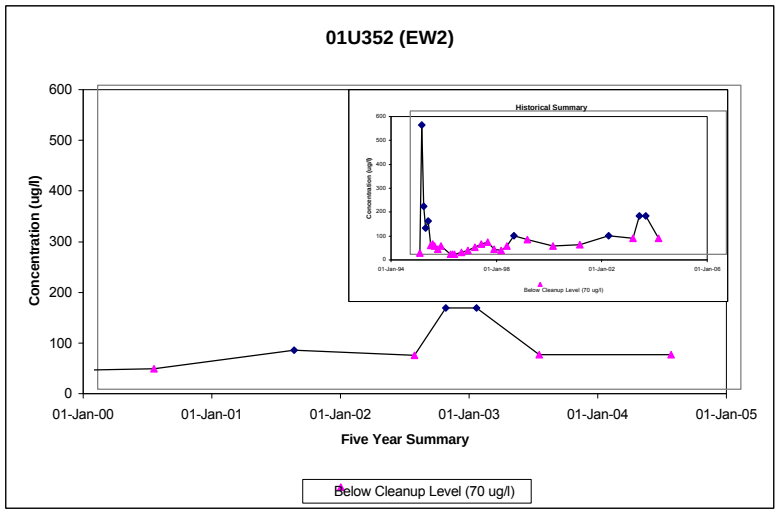


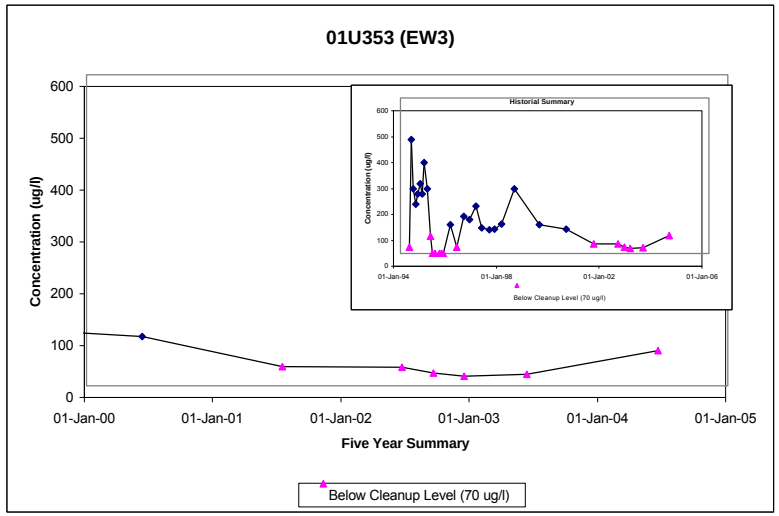
FIGURE 6-7

SITE A, cis-1,2-DICHLOROETHENE WATER QUALITY TRENDS: RECOVERY WELLS

TWIN CITIES ARMY AMMUNITION PLANT







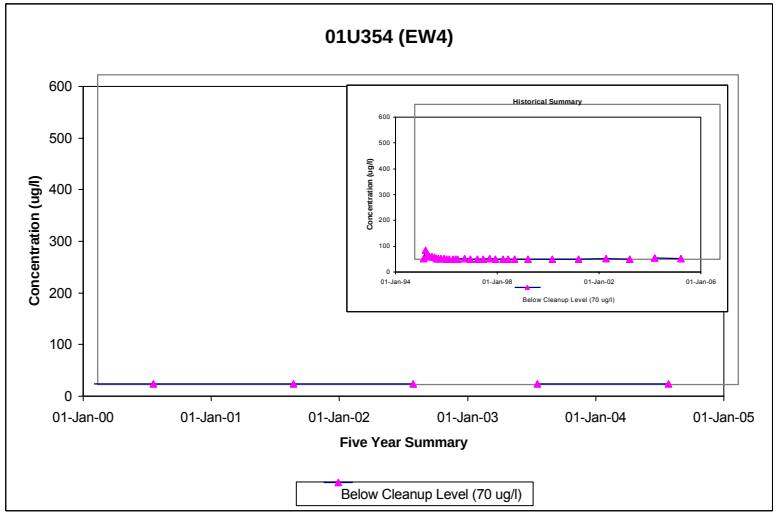
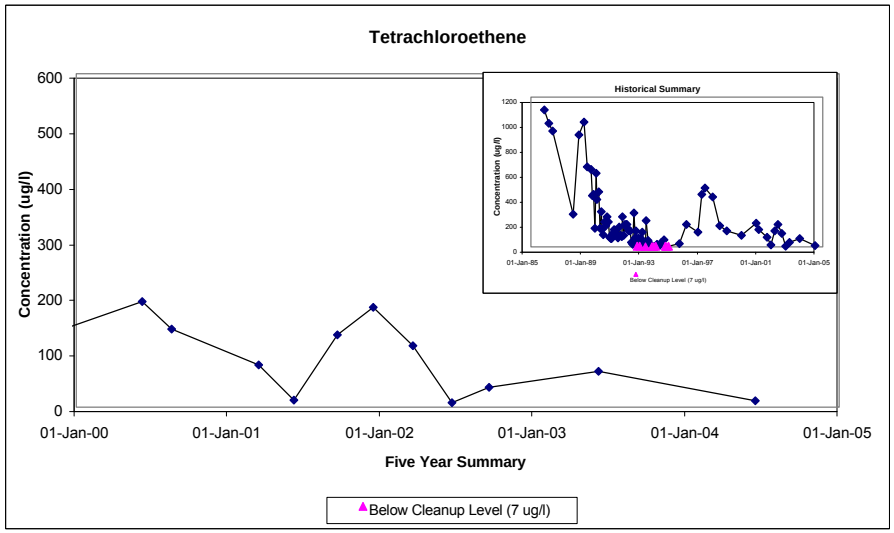
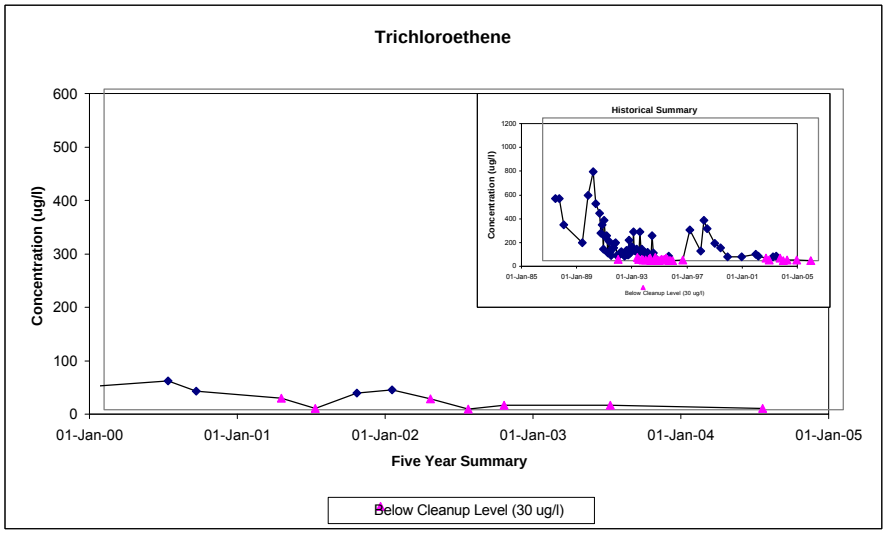
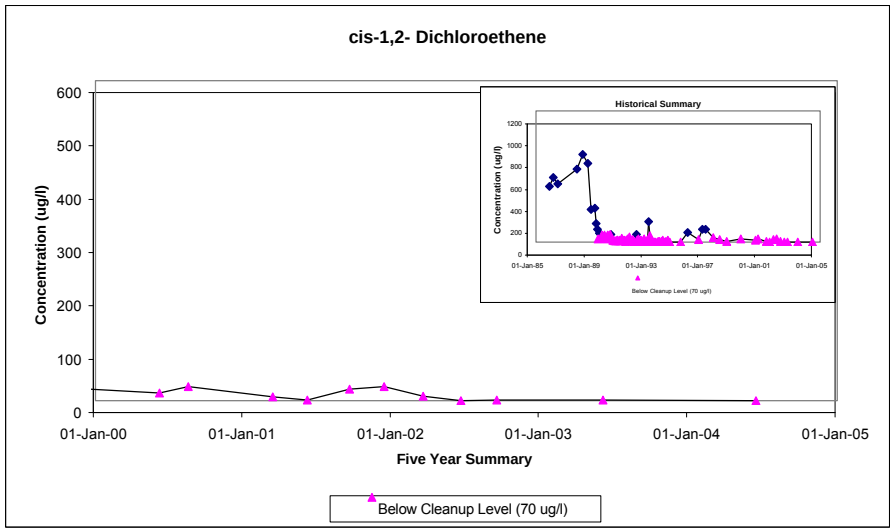


FIGURE 6-8
SITE A, WELL 01U108, TETRACHLOROETHENE, TRICHLOROETHENE, cis-1,2-DICHLOROETHENE WATER QUALITY TRENDS
TWIN CITIES ARMY AMMUNITION PLANT







7.0 Site C Groundwater Response Action

7.1 BACKGROUND

This site had been used for burning of scrap wooden boxes, solvents, oils, and production materials, and also had been used for land disposal and open storage. The remedial investigation/feasibility study process conducted for Site C, as documented in the OU2 ROD, identified six chemicals of concern (COCs) in Site C soils (antimony, arsenic, beryllium, lead, manganese, and thallium, with lead having the highest concentration and most prevalent detection), but did not identify any groundwater COCs.

In FY 1997, the U.S. Army Environmental Center (USAEC) funded a technology demonstration study of phytoremediation of contaminated soil at Site C. Corn and mustard crops were planted and harvested during the two growing seasons in FY 1998 and FY 1999. During the growing seasons, EDTA was applied to the soils to improve the metals uptake by the crops, and had the unintended consequence of causing migration of lead from the soils into the shallow groundwater, which is present within a few feet from the ground surface. On August 10, 2000, the MPCA issued a Notice of Violation to the Army for the impacts to Site C shallow groundwater caused by the phytoremediation demonstration project, requiring that the Army implement corrective actions.

At Site C, Unit 1 contains groundwater, but the aquifer yield is low and the water is not used as a municipal water supply source by any of the surrounding communities. Groundwater in Unit 1 generally flows north beneath Site C and then turns westward, ultimately discharging to Rice Creek. Unit 2 lies beneath Unit 1 and is a glacial till deposit that behaves as an aquitard at TCAAP, preventing downward migration of contaminants. Additional hydrogeologic

information is presented in "Hydrogeologic Investigation of Site C", Shaw Environmental & Infrastructure, March 9, 2001.

The Army installed a groundwater recovery trench to contain the plume, which was operated between November 2000 and July 2001. On July 6, 2001, the Army began operating three extraction wells, located as shown on Figure 7-1, to contain the plume (replacing recovery trench operation). At the start of extraction well operation, extracted groundwater met the MCES requirements for direct discharge to the sanitary sewer (without treatment). On July 15, 2002, due to elevated lead concentrations in EW-3, the Army began pre-treating water from EW-3 using two types of filter media, and has continued to discharge extracted groundwater to the sanitary sewer under an MCES permit.

Man-made ditches are present north and west of the phytoremediation demonstration plot area, and are monitored, as shown on Figure 7-2. The ditches ultimately discharge into Rice Creek, which is also monitored.

Figures 7-3 and 7-4 present cross-sections showing the geological features of the shallow soil and aquifer (the cross-section alignments are shown on Figure 7-1). The cross-sections show the complex geology of the Site, including significant accumulations of peat, consistent with the nearby wetlands and location in a drainage area.

In February 2002, a contingency plan was prepared to address the operation of the groundwater response action. The monitoring requirements are driven by the contingency plan. The monitoring plan for Site C is presented in Appendix A.5. It includes 16 monitoring wells and three extraction wells, as shown on Figure 7-1, and 8 surface water sampling locations, as shown on Figure 7-2.

The parameters being monitored at this site are copper, lead, total hardness, and EDTA, which were all cited in the Notice of Violation. Lead is the primary chemical of concern (COC) in both the soil and groundwater. Five of the six COCs in Site C soils (antimony, arsenic, beryllium,

manganese, and thallium) are not currently being monitored. These analytes were routinely monitored in groundwater and surface water through April 2002; however, since this monitoring data indicated that these analytes were not of concern, the MPCA approved discontinuing monitoring of these five analytes. Copper has continued to be monitored because concentrations have exceeded the respective surface water standard near the phytoremediation demonstration area at Site C. The complete historical water quality database is presented in Appendix D.3 (during FY 2004 and prior thereto, the historical water quality database was included with the Site C monthly data reports that were submitted electronically by the Army to the MPCA and USEPA).

The action levels for lead and copper are the State of Minnesota surface water standards (chronic), as defined in Minnesota Rules Chapter 7050.0222, that are applicable to the ditches and Rice Creek. The action levels are different for the ditches and Rice Creek because the standard is dependent on the ambient hardness of the surface water. These action levels are based on total hardness levels of 257 and 155 milligrams per liter (mg/l) for the ditches and Rice Creek, respectively. Thus, hardness itself does not have an action level, but is monitored annually in surface water to document these values in relation to the values that were used in calculating the lead and copper standards. EDTA is monitored because its concentrations are known to be elevated in groundwater; however, there are no applicable surface water or groundwater standards, and no decisions are being made based on the data. The EDTA data are thus considered "screening data" that are being collected for informational purposes only.

In lieu of an actual ROD requirement at this time, the elements of the contingency plan are described in the following subsections in a format consistent with the other Sites addressed in this document. The parties anticipate a future amendment to the OU2 ROD to document the final selected remedy for groundwater and surface water at Site C. Following completion of the ROD amendment, subsequent Annual Performance Reports will address the remedy components, as they will appear in the ROD.

7.2 REMEDY COMPONENT #1: GROUNDWATER MONITORING

Description: Monitor groundwater to track progress of the remedy and identify potential exceedances at compliance points.

Performance Standard (how do you know when you're done):
When a performance groundwater monitoring program has been established and ongoing monitoring is in compliance with the program.

Is this remedy component being implemented?
Yes. The groundwater monitoring program is ongoing. The Monitoring Plan for Site C is included in Appendix A.5. Unit 3 well 03U083 was added to the monitoring program for FY 2005 through FY 2007. This well will be sampled and analyzed for lead to verify that migration downward into the Unit 3 aquifer is not occurring.

7.3 REMEDY COMPONENT #2: SURFACE WATER MONITORING

Description: Monitor surface water to identify potential exceedances of the chronic standards.

Performance Standard (how do you know when you're done):
When a performance surface water monitoring program has been established and ongoing monitoring is in compliance with the program.

Is this remedy component being implemented?
Yes. The surface water monitoring program is ongoing. The Monitoring Plan for Site C is included in Appendix A.5.

7.4 REMEDY COMPONENT #3: GROUNDWATER CONTAINMENT

Description: Operate extraction wells to contain the lead plume.

Performance Standard (how do you know when you're done):
When a groundwater containment system is operating consistent with the requirements of the contingency plan and the concentrations at specified monitoring points are within the requirements of the contingency plan.

Is this remedy component being implemented?
Yes. Three extraction wells (EW-1, EW-2 and EW-3) are currently in operation. After the system was started, Shaw developed an operating criteria that specified that the pumping water levels in the extraction wells be maintained at least 14 feet below the top of casing. This criteria was agreed to with the MPCA. These drawdowns are being achieved.

Figure 7-5 presents the groundwater contours from June 2005. Appendix D.3 includes the historical groundwater level database for Site C. The hydraulic effect of the extraction well operation can be seen in the northern portion of the Site. The groundwater contours for the Site are complex, likely related to the heterogeneous nature of the geology (see cross-sections). In addition, the previously used groundwater extraction trench may be having a local influence on groundwater flow. The trench is aligned roughly parallel to the groundwater flow and upgradient of the extraction wells. Because of this alignment it does not pose a risk to capture and containment but does appear to influence the groundwater contours immediately around it.

Figure 7-6 presents the lead data from June 2005. The areas of exceedances are upgradient of the extraction wells and within the likely area of capture shown on Figure 7-5. The lack of lead exceedances in surface water (see discussions below) indicates that the system is capturing groundwater effectively.

7.5 REMEDY COMPONENT #4: EXTRACTED WATER TREATMENT AND DISCHARGE

Performance Standard (how do you know when you're done):

When the extracted groundwater is treated to meet the requirements of the MCES discharge permit.

Are the permit discharge requirements being met?

Yes. Table 7-1 presents the effluent analytical results for FY 2005 and the MCES discharge limits. The combined effluent is labeled "Effluent-C" on Table 7-1. The MCES requirements for lead, mercury, and pH were met. The other compounds listed are not regulated in the MCES permit.

7.6 REMEDY COMPONENT #5: CONTINGENCY PLAN FOR GROUNDWATER

Description: Contain and treat groundwater if trigger points are exceeded.

Performance Standard (how do you know when you're done):

The triggers for implementing contingency actions with respect to groundwater at Site C are:

- When the groundwater sample results from monitoring wells MW-6, MW-12, and MW-16 at the north end of the site are above the surface water chronic standard for the ditch during the same sampling event, or
- When the groundwater sample results from monitoring wells MW-4, MW-8, MW-9, MW-10, and MW-11 are above the surface water chronic standard for the ditch during the same sampling event.

If one of the triggers discussed above is met, the extraction system will be modified to increase the total volume of water extracted. The extraction and treatment system will continue to

operate in the contingency plan mode (i.e., increased extracted water) until the hydraulic containment is re-evaluated.

Have groundwater concentrations remained below the trigger points?

Yes. Table 7-2 presents the FY 2005 analytical results for groundwater. In FY 2005, the lead chronic standard for the ditch was 6.9 µg/l. There were no exceedances of the triggers in FY 2005. Appendix D.3 presents the historical database for groundwater. In addition, lead trend graphs for the individual monitoring wells are presented in Appendix B (Figure B-3).

Monitoring well MW-11 individually exhibited lead concentrations above the chronic standard in May and June 2005, with the highest detection at 62.3 µg/l. The other wells in the contingency group remained below the trigger. These results (which are similar to FY 2004) suggest, especially with the low to non-detectable concentrations at nearby MW-8, that the elevated detections at MW-11 are isolated and do not indicate an overall increase in the lead concentrations. These results do not indicate a problem with the containment remedy. The existing monitoring program is adequate to continue to monitor the anomalous concentrations at MW-11.

7.7 REMEDY COMPONENT #6: CONTINGENCY PLAN FOR SURFACE WATER

Description: Contain and treat surface water if trigger points are exceeded.

Performance Standard (how do you know when you're done):

When a contingency plan for surface water is in place and monitoring is in compliance with the program.

The triggers for implementation of contingency actions with respect to surface water at Site C are:

- When the average concentration of the 3-day monthly sampling event at sample location SW-6 is above the current surface water chronic standard for the ditch for one quarter (i.e., three consecutive months).
- When the average concentration of the 3-day monthly sampling event is above the surface water chronic standard for Rice Creek at sample location SW-8. The surface water chronic standard for Rice Creek is 4.0 µg/l.

If the trigger at SW-6 or SW-8 is met, then the surface water at SW-6 will be contained and collected. Collected surface water will be treated, if necessary, and discharged to the sanitary sewer. The surface water at SW-6 will continue to be contained and collected until the average concentration of the 3-day monthly sampling event at sample location SW-6 is below the current surface water chronic standard for one quarter (i.e., three consecutive months).

Have surface water concentrations remained below the trigger points?

Yes. Table 7-3 presents the FY 2005 analytical results for surface water. The surface water chronic standard for the ditch (SW-6) is 6.9 µg/l and the chronic standard for Rice Creek is 4 µg/l. No surface water triggers were exceeded in FY 2005. Appendix D.3 presents the historical database for surface water samples.

7.8 OVERALL REMEDY FOR SITE C SHALLOW GROUNDWATER

The groundwater containment remedy for Site C is operating as required by the contingency plan and subsequent agreements, and the data trends indicate that progress towards the remedial objectives is being achieved. In particular the three wells with the highest lead concentrations (MW-3, MW-13, and MW-14) showed significant decreases in FY 2005. The mean concentration at MW-3 decreased from 1.34 mg/l to 0.49 mg/l. The mean concentration at MW-

13 decreased from 5.21 mg/l to 1.96 mg/l, and the mean concentration at MW-14 decreased from 0.34 mg/l to 0.10 mg/l.

Table 7-4 presents a summary of the lead mass removal and pumped volumes through FY 2005. In FY 2005, the system treated 1.942 million gallons of water and removed 8.41 pounds of lead. Overall, the system has treated 9.47 million gallons of water and removed 99.2 pounds of lead. The lead mass removal decreased significantly from 23.4 pounds of lead in FY 2004. This is in part due to an apparent decrease in groundwater extraction over the year.

Setting the flow rate aside, the effluent lead concentrations in FY 2005 averaged 1.6 mg/l compared to 2.9 mg/l in FY 2004. Therefore, most of the decrease in mass removal in FY 2005 reflects improvement in the extracted groundwater quality.

Are any changes proposed for the remedy? No.

Table 7-1

Site C FY 2005 Extraction Well / Effluent Data

Sample Location	Collection Date	Collection Time	Lab	Total Lead (MCES Discharge Limit: 1) mg/L	Data Qualifier L	Data Qualifier D	Mercury (MCES Discharge Limit: 0.002) mg/L	pH (MCES Discharge Limit: 5-11)	COD mg/L	TSS mg/L	Copper	Data Qualifier L	Data Qualifier D	EDTA as EDTA mg/L
EW3	10/4/2004	9:30	Legend	1.9										
EW1	10/11/2004	9:30	Legend	<0.0030										
EW2	10/11/2004	9:30	Legend	<0.0030										
EW3	10/11/2004	9:30	Legend	1.7										
EW3	10/18/2004	10:00	Legend	1.7										
EFFLUENT-C	10/18/2004	10:00	Legend	<0.0030			<0.00020	6.8						
EW1	10/25/2004	10:00	Legend	<0.0030										
EW2	10/25/2004	10:00	Legend	<0.0030										
EW3	10/25/2004	10:00	Legend	1.9										
EW3	11/1/2004	10:00	Legend	1.8										
EW1	11/8/2004	10:00	Legend	<0.0030										
EW2	11/8/2004	10:00	Legend	0.0058										
EW3	11/8/2004	10:00	Legend	1.9										
EW3	11/15/2004	10:00	Legend	2.0										
EW3	11/22/2004	10:00	Legend	1.70										
EW1	11/29/2004	10:00	Legend	<0.0030										
EW2	11/29/2004	10:00	Legend	0.0066										
EW3	11/29/2004	10:00	Legend	1.9										
EFFLUENT-C	11/29/2004	10:00	Legend	0.011			<0.00020	6.7						
EW1	12/8/2004	2:45	CompuChem	0.0019	B	UB1.3								
EW2	12/8/2004	2:50	CompuChem	0.0027	B	UB1.3								
EW3	12/8/2004	2:55	CompuChem	2.33										
EW3D	12/8/2004	NA	CompuChem	2.33										
EFFLUENT-C	12/20/2004	10:30	Legend	0.034			<0.00020	6.8						
EFFLUENT-C	1/10/2005	10:00	Legend	0.046			<0.00020	6.9						
EW1	1/10/2005	3:55	CompuChem	0.0013	U									
EW2	1/10/2005	4:00	CompuChem	0.0013	U									
EW3	1/10/2005	4:05	CompuChem	1.94										
EW1	2/11/2005	1:00	CompuChem	0.0014	B	JS133								
EW2	2/11/2005	1:05	CompuChem	0.0013	U									
EW3	2/11/2005	1:10	CompuChem	2.01		JS133								
EFFLUENT-C	2/21/2005	10:00	Legend	0.040			<0.00020	7.0						
EW1	3/8/2005	12:40	CompuChem	0.0013	U									
EW2	3/8/2005	12:45	CompuChem	0.0013	U									
EW3	3/8/2005	12:50	CompuChem	1.88										
EFFLUENT-C	3/14/2005	9:00	Legend	0.023			<0.00020	6.8						
EW1	4/7/2005	3:45	CompuChem	0.005							0.0018	B		
EW2	4/7/2005	3:50	CompuChem	0.0095							0.0026			
EW3	4/7/2005	3:55	CompuChem	2.03							0.00084	B	UB0.36	
EW1	4/7/2005	3:45	ChemServe											13.1
EW2	4/7/2005	3:50	ChemServe											7.07
EW3	4/7/2005	3:55	ChemServe											270
EFFLUENT-C	4/7/2005	4:00	ChemServe											57.9
EFFLUENT-C	4/25/2005	10:00	Legend	0.021			<0.00020	6.8	<50	12				

Table 7-1

Site C FY 2005 Extraction Well / Effluent Data

Sample Location	Collection Date	Collection Time	Lab	Total Lead (MCES Discharge Limit: 1) mg/L	Data Qualifier L	Data Qualifier D	Mercury (MCES Discharge Limit: 0.002) mg/L	pH (MCES Discharge Limit: 5-11)	COD mg/L	TSS mg/L	Copper	Data Qualifier L	Data Qualifier D	EDTA as EDTA mg/L
EW1	5/4/2005	11:30	CompuChem	0.00013	B	UB0.13								
EW2	5/4/2005	11:35	CompuChem	0.00018	B	UB0.13								
EW3	5/4/2005	11:40	CompuChem	2.55		JS157								
EFFLUENT-C	5/9/2005	10:15	Legend	0.048			<0.00020	6.9						
EW1	6/16/2005	11:10	CompuChem	0.00084	B	UB0.26								
EW2	6/16/2005	11:15	CompuChem	0.00023	B	UB0.26								
EW3	6/16/2005	11:20	CompuChem	2.52										
EFFLUENT-C	6/27/2005	10:00	Legend	0.063			<0.00020	6.7						
EW1	7/13/2005	10:00	CompuChem	0.00043	B									
EW2	7/13/2005	10:05	CompuChem	0.000075	B									
EW3	7/13/2005	10:10	CompuChem	0.894										
EFFLUENT-C	7/26/2005	9:30	Legend	0.045			<0.00020	6.8						
EW1	8/18/2005	7:45	CompuChem	0.00030	B	UB0.4								
EW2	8/18/2005	7:50	CompuChem	0.00016	B	UB0.4								
EW2D	8/18/2005	7:50	CompuChem	0.00032	B	UB0.4								
EW3	8/18/2005	7:55	CompuChem	1.24										
EFFLUENT-C	8/22/2005	10:00	Legend	0.037			<0.00020	6.9						
EFFLUENT-C	9/19/2005	10:00	Legend	0.0099			<0.00020	6.9						
EW1	9/22/2005	9:30	CompuChem	0.00013	B	UB0.14								
EW2	9/22/2005	9:35	CompuChem	0.000099	B	UB0.14								
EW3	9/22/2005	9:40	CompuChem	0.773										
EW3D	9/22/2005	9:40	CompuChem	0.75										

Notes:
D duplicate sample

Laboratory Concentration Qualifiers (L):
U analyte was not detected above the Instrument Detection Limit (IDL)
B reported value is between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

Data Validation Qualifiers (D):
J estimated
JS# surrogate or matrix spike recovery, # = value of the percent recovery of the spike

R rejected data
UB# blank contamination, # = highest concentration of blank affecting data

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			EDTA as EDTA (mg/l)	
			L	D		L	D	L	D
MW 1	10/12/04	1.7	U			NS		NS	
MW 1	1/11/05	1.3	U			NS		NS	
MW 1	4/4/05	0.065	B	UB0.18	0.29	B	UB0.68	<0.50	
MW 1	7/14/05	0.18	B	UB0.21		NS		NS	
MW 2	10/12/04	1.7	U			NS		NS	
MW 2	1/11/05	1.3	U			NS		NS	
MW 2	4/4/05	0.14	B	UB0.18	2.1		UB0.68	<0.50	
MW 2	7/14/05	0.066	U			NS		NS	
MW 3	10/13/04	667				NS		NS	
MW 3	1/12/05	488				NS		NS	
MW 3	4/5/05	487			0.24	B	UB0.68	65.8	
MW 3D	4/5/05	466			0.18	B	UB0.68	73.7	
MW 3	7/14/05	312				NS		NS	
MW 3D	7/14/05	314				NS		NS	
MW 4	10/12/04	1.7	U			NS		NS	
MW 4	11/9/04	0.90	U	JK-1.0		NS		NS	
MW 4	12/8/04	1.3	B	UB1.3		NS		NS	
MW 4	1/11/05	1.3	U			NS		NS	
MW 4D	1/11/05	1.3	U			NS		NS	
MW 4	2/11/05	1.3	U			NS		NS	
MW 4	3/8/05	3.8				NS		NS	
MW 4	4/4/05	0.10	B	UB0.18	0.65	B	UB0.68	2.29	
MW 4	5/2/05	0.18	B	UB0.13		NS		NS	
MW 4D	5/2/05	0.033	B	UB0.13		NS		NS	
MW 4	6/15/05	1.0	U			NS		NS	
MW 4	7/13/05	0.11	B			NS		NS	
MW 4	8/18/05	0.066	U			NS		NS	
MW 4	9/22/05	0.024	B	UB0.14		NS		NS	
MW 5	10/12/04	1.7	U			NS		NS	
MW 5	1/12/05	1.3	U			NS		NS	
MW 5	4/4/05	0.099	B	UB0.18	0.75	B	UB0.68	<0.50	
MW 5	7/13/05	0.14	B			NS		NS	
MW 6	10/12/04	1.7	U			NS		NS	
MW 6	11/9/04	0.90	U	JK-1.0		NS		NS	
MW 6	12/7/04	0.90	U			NS		NS	
MW 6	1/10/05	1.3	U			NS		NS	
MW 6	2/11/05	1.3	U			NS		NS	

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			EDTA as EDTA (mg/l)	
			L	D		L	D	L	D
MW 6D	2/11/05	1.3	U			NS		NS	
MW 6	3/8/05	1.3	U			NS		NS	
MW 6	4/4/05	0.099	B	UB0.18	0.37	B	UB0.68	13.9	
MW 6	5/2/05	0.033	B	UB0.13		NS		NS	
MW 6	6/15/05	0.077	B	UB0.26		NS		NS	
MW 6	7/13/05	0.067	B			NS		NS	
MW 6	8/18/05	0.099	B	UB0.4		NS		NS	
MW 6	9/22/05	0.025	B	UB0.14		NS		NS	
MW 7	10/12/04	1.7	U			NS		NS	
MW 7	1/10/05	1.3	U			NS		NS	
MW 7	4/4/05	0.14	B	UB0.18	1.1	B	UB0.68	8.77	
MW 7	7/13/05	0.13	B			NS		NS	
MW 8	10/12/04	1.7	U			NS		NS	
MW 8	11/10/04	0.90	U	JK-1.0		NS		NS	
MW 8D	11/10/04	0.90	U	JK-1.0		NS		NS	
MW 8	12/8/04	1.2	B	UB1.3		NS		NS	
MW 8	1/12/05	1.3	U			NS		NS	
MW 8	2/11/05	1.3	U			NS		NS	
MW 8	3/8/05	1.3	U			NS		NS	
MW 8D	3/8/05	1.3	U			NS		NS	
MW 8	4/4/05	0.11	B	UB1.0	0.45	B	UB0.36	6.49	
MW 8	5/2/05	0.042	B	UB0.13		NS		NS	
MW 8	6/15/05	1.0	U			NS		NS	
MW 8D	6/15/05	1.0	U			NS		NS	
MW 8	7/13/05	0.46	B			NS		NS	
MW 8	8/18/05	0.066	U			NS		NS	
MW 8	9/22/05	0.41	B	UB0.14		NS		NS	
MW 9	10/12/04	1.7	U			NS		NS	
MW 9	11/10/04	0.90	U	JK-1.0		NS		NS	
MW 9	12/7/04	1.0	B	UB1.3		NS		NS	
MW 9	1/11/05	1.3	U			NS		NS	
MW 9	2/11/05	1.3	U			NS		NS	
MW 9	3/8/05	1.3	B			NS		NS	
MW 9	4/4/05	0.073	B	UB0.18	0.40	B	UB0.68	<0.50	
MW 9	5/2/05	0.028	U			NS		NS	
MW 9	6/16/05	0.085	B	UB0.26		NS		NS	
MW 9	7/14/05	0.066	U			NS		NS	

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			EDTA as EDTA (mg/l)		
			L	D		L	D		L	D
MW 9	8/18/05	0.10	B	UB0.4		NS			NS	
MW 9	9/22/05	0.036	B	UB0.14		NS			NS	
MW 10	10/12/04	1.7	U			NS			NS	
MW 10D	10/12/04	1.7	U			NS			NS	
MW 10	11/10/04	1.3	B	JK-1.0		NS			NS	
MW 10	12/7/04	1.4	B	UB1.3		NS			NS	
MW 10	1/11/05	1.3	U			NS			NS	
MW 10	2/11/05	1.3	U			NS			NS	
MW 10D	2/11/05	1.3	U			NS			NS	
MW 10	5/2/05	0.067	B	UB0.13		NS			NS	
MW 10	6/16/05	0.099	B	UB0.26		NS			NS	
MW 10	7/13/05	0.085	B			NS			NS	
MW 10	8/18/05	0.12	B	UB0.4		NS			NS	
MW 10	9/22/05	0.032	B	UB0.14		NS			NS	
MW 11	10/12/04	2.7	B			NS			NS	
MW 11	11/10/04	0.90	U	JK-1.0		NS			NS	
MW 11	12/8/04	2.1	B	UB1.3		NS			NS	
MW 11D	12/8/04	2.6	B	UB1.3		NS			NS	
MW 11	1/12/05	1.3	U			NS			NS	
MW 11	2/11/05	1.3	U			NS			NS	
MW 11	3/8/05	1.3	U			NS			NS	
MW 11	5/2/05	38.7		JS157		NS			NS	
MW 11	6/15/05	62.3				NS			NS	
MW 11	7/13/05	5.0				NS			NS	
MW 11	8/18/05	0.70	B	UB0.4		NS			NS	
MW 11	9/22/05	0.66	B	UB0.14		NS			NS	
MW 11D	9/22/05	1.1				NS			NS	
MW 12	10/12/04	2.7	B			NS			NS	
MW 12	11/9/04	0.90	U	JK-1.0		NS			NS	
MW 12	12/7/04	2.0	B	UB1.3		NS			NS	
MW 12	1/10/05	1.3	U			NS			NS	
MW 12	2/11/05	1.3	U			NS			NS	
MW 12	3/8/05	1.3	U			NS			NS	
MW 12	4/4/05	0.071	B	UB0.18	0.38	B	UB0.68	14.1		
MW 12	5/2/05	0.081	B	UB0.13		NS			NS	
MW 12	6/15/05	0.097	B	UB0.26		NS			NS	
MW 12	7/13/05	0.066	U			NS			NS	

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			EDTA as EDTA (mg/l)		
			L	D		L	D		L	D
MW 12	8/18/05	0.09	B	UB0.4		NS			NS	
MW 12D	8/18/05	0.38	B	UB0.4		NS			NS	
MW 12	9/22/05	0.024	B	UB0.14		NS			NS	
MW 13	10/13/04	1720				NS			NS	
MW 13	1/12/05	1770				NS			NS	
MW 13	4/5/05	3500			27.2			190		
MW 13	7/14/05	857				NS			NS	
MW 14	10/13/04	109				NS			NS	
MW 14	1/12/05	42.3				NS			NS	
MW 14	4/5/05	231			0.43	B	UB0.68	27		
MW 14D	4/5/05	249			0.42	B	UB0.68	27.3		
MW 14	7/14/05	14.1				NS			NS	
MW 15	10/13/04	38.1				NS			NS	
MW 15D	10/13/04	41.1				NS			NS	
MW 15	1/12/05	10.8				NS			NS	
MW 15D	1/12/05	9.5				NS			NS	
MW 15	4/5/05	6.1			0.46	B	UB0.68	2.72		
MW 15	7/14/05	10.6				NS			NS	
MW 15D	7/14/05	10.4				NS			NS	
MW 16	10/12/04	4.1				NS			NS	
MW 16	11/9/04	0.90	U	JK-1.0		NS			NS	
MW 16	12/8/04	0.90	U			NS			NS	
MW 16	1/10/05	1.3	U			NS			NS	
MW 16	2/11/05	1.3	U			NS			NS	
MW 16	3/8/05	1.3	U			NS			NS	
MW 16	4/4/05	0.35	B	UB0.18	0.32	B	UB0.68	10.8		
MW 16	5/2/05	0.27	B	UB0.13		NS			NS	
MW 16	6/15/05	0.11	B	UB0.26		NS			NS	
MW 16	7/13/05	0.12	B	UB0.21		NS			NS	
MW 16	8/18/05	0.16	B	UB0.4		NS			NS	
MW 16	9/22/05	0.62	B	UB0.14		NS			NS	
EW 1	10/11/04	3	U			NS			NS	
EW 1	10/25/04	3	U			NS			NS	
EW 1	11/8/04	3	U			NS			NS	
EW 1	11/29/04	3	U			NS			NS	
EW 1	12/8/04	1.9	B	UB1.3		NS			NS	
EW 1	1/10/05	1.3	U			NS			NS	

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)	L	D	Copper (Dissolved) (ug/l)	L	D	EDTA as EDTA (mg/l)	L	D
EW 1	2/11/05	1.4	B	JS133		NS			NS	
EW 1	3/8/05	1.3	U			NS			NS	
EW 1	4/7/05	5.0			1.8	B		13.1		
EW 1	5/4/05	0.13	B	UB0.13		NS			NS	
EW 1	6/16/05	0.84	B	UB0.26		NS			NS	
EW 1	7/13/05	0.43	B			NS			NS	
EW 1	8/18/05	0.30	B	UB0.4		NS			NS	
EW 1	9/22/05	0.13	B	UB0.14		NS			NS	
EW 2	10/11/04	3	U			NS			NS	
EW 2	10/25/04	3	U			NS			NS	
EW 2	11/8/04	5.8				NS			NS	
EW 2	11/29/04	6.6				NS			NS	
EW 2	12/8/04	2.7	B	UB1.3		NS			NS	
EW 2	1/10/05	1.3	U			NS			NS	
EW 2	2/11/05	1.3	U			NS			NS	
EW 2	3/8/05	1.3	U			NS			NS	
EW 2	4/7/05	9.5			2.6			7.07		
EW 2	5/4/05	0.18	B	UB0.13		NS			NS	
EW 2D	5/4/05	0.36	B	UB0.13		NS			NS	
EW 2	6/16/05	0.23	B	UB0.26		NS			NS	
EW 2D	6/16/05	0.15	B	UB0.26		NS			NS	
EW 2	7/13/05	0.075	B			NS			NS	
EW 2	8/18/05	0.16	B	UB0.4		NS			NS	
EW 2D	8/18/05	0.32	B	UB0.4		NS			NS	
EW 2	9/22/05	0.099	B	UB0.14		NS			NS	
EW 3	10/4/04	1900				NS			NS	
EW 3	10/11/04	1700				NS			NS	
EW 3	10/18/04	1700				NS			NS	
EW 3	10/25/04	1900				NS			NS	
EW 3	11/1/04	1800				NS			NS	
EW 3	11/8/04	1900				NS			NS	
EW 3	11/15/04	2000				NS			NS	
EW 3	11/22/04	1700				NS			NS	
EW 3	11/29/04	1900				NS			NS	
EW 3	12/8/04	2330				NS			NS	
EW 3D	12/8/04	2380				NS			NS	
EW 3	1/10/05	1940				NS			NS	

Table 7-2

Water Quality Data for Site C Groundwater
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)	L	D	Copper (Dissolved) (ug/l)	L	D	EDTA as EDTA (mg/l)	L	D
EW 3	2/11/05	2010		JS133		NS			NS	
EW 3	3/8/05	1880				NS			NS	
EW 3	4/7/05	2030			0.84	B	UB0.36	270		
EW 3	5/4/05	2550		JS157		NS			NS	
EW 3	6/16/05	2520				NS			NS	
EW 3	7/13/05	894				NS			NS	
EW 3	8/18/05	1240				NS			NS	
EW 3	9/22/05	773				NS			NS	
EW 3D	9/22/05	750				NS			NS	
03U083	6/15/05	0.15	B	UB0.26		NS			NS	

Notes:

Laboratory Concentration Qualifiers (L):

U	analyte was not detected above the Instrument Detection Limit (IDL)
B	reported value is between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

Data Validation Qualifiers (D):

J	estimated
JK#	negative blank results, # = value of negative blank
JS#	surrogate or matrix spike recovery, # = value of the percent recovery of the spike
UB#	blank contamination, # = highest concentration of blank affecting data

Other Notes:

NS	not sampled
EDTA	ethylenediaminetetraacetic acid

Table 7-3

Water Quality Data for Site C Surface Water
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			Hardness (mg/l)		EDTA as EDTA (mg/l)	
			L	D		L	D				
SW 1	6/14/05	1.0	U			NS			NS		NS
SW 1	6/15/05	1.0	U			NS			NS		NS
SW 1	6/16/05	1.0	U			NS			NS		NS
SW 1	9/22/05	0.55	B	UB0.93		NS			NS		NS
SW 2	4/5/05	0.33	B		6.5			80.3		0.68	
SW 2	4/6/05	0.39	B		7.1			86.2			NS
SW 2	4/7/05	0.36	B	UB0.98	7.7			96.3			NS
SW 2	5/3/05	3.2				NS			NS		NS
SW 2	5/4/05	2.5				NS			NS		NS
SW 2	5/5/05	2.9				NS			NS		NS
SW 2	6/14/05	1.0	U			NS			NS		NS
SW 2	6/15/05	2.1				NS			NS		NS
SW 2D	6/15/05	2.0				NS			NS		NS
SW 2	6/16/05	1.9				NS			NS		NS
SW 2	9/22/05	0.62	B	UB0.93		NS			NS		NS
SW 2D	9/22/05	0.48	B	UB0.93		NS			NS		NS
SW 3	10/11/04	1.2	B	UB2.4		NS			NS		NS
SW 3	10/12/04	0.90	U			NS			NS		NS
SW 3D	10/12/04	0.90	U			NS			NS		NS
SW 3	10/13/04	1.9	B			NS			NS		NS
SW 3	4/5/05	0.16	B	UB0.04	1.5	B		225		0.65	
SW 3	4/6/05	0.18	B	UB0.04	1.5	B		230			NS
SW 3	4/7/05	0.18	B	UB0.98	1.6	B	UB0.44	259			NS
SW 3D	4/7/05	0.32	B	UB0.98	1.7	B	UB0.44	259			NS
SW 3	5/3/05	0.12	B	UB0.05		NS			NS		NS
SW 3	5/4/05	0.15	B	UB0.05		NS			NS		NS
SW 3D	5/4/05	0.10	B	UB0.05		NS			NS		NS
SW 3	5/5/05	0.095	B	UB0.14		NS			NS		NS
SW 3	6/14/05	1.0	U			NS			NS		NS
SW 3	6/15/05	1.0	U			NS			NS		NS
SW 3	6/16/05	1.0	U			NS			NS		NS
SW 3	7/12/05	0.15	B	UB0.09		NS			NS		NS
SW 3	7/13/05	0.066	U			NS			NS		NS
SW 3	7/14/05	0.066	U			NS			NS		NS
SW 3D	7/14/05	0.15	B			NS			NS		NS
SW 3	9/20/05	0.13	B	UB0.14		NS			NS		NS

Table 7-3

Water Quality Data for Site C Surface Water
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			Hardness (mg/l)			EDTA as EDTA (mg/l)		
			L	D		L	D		L	D		L	D
SW 3	9/21/05	0.15	B	UB0.93		NS			NS			NS	
SW 3	9/22/05	0.33	B	UB0.93		NS			NS			NS	
SW 4	10/11/04	0.90	U			NS			NS			NS	
SW 4	10/12/04	0.90	U			NS			NS			NS	
SW 4	10/13/04	1.7	U			NS			NS			NS	
SW 4D	10/13/04	1.7	U			NS			NS			NS	
SW 4	4/5/05	0.33	B		4.3			222			0.92		
SW 4	4/6/05	0.39	B		4.4			242				NS	
SW 4	4/7/05	0.29	B	UB0.98	4.4			254				NS	
SW 4	5/3/05	0.92	B			NS			NS			NS	
SW 4	5/4/05	0.98	B			NS			NS			NS	
SW 4	5/5/05	1.1				NS			NS			NS	
SW 4	6/14/05	1.0	U			NS			NS			NS	
SW 4	6/15/05	1.0	U			NS			NS			NS	
SW 4	6/16/05	1.0	U			NS			NS			NS	
SW 4D	6/16/05	1.0	U			NS			NS			NS	
SW 4	7/12/05	0.088	B	UB0.09		NS			NS			NS	
SW 4	7/13/05	0.066	U			NS			NS			NS	
SW 4	7/14/05	0.078	B			NS			NS			NS	
SW 4	9/20/05	0.57	B	UB0.14		NS			NS			NS	
SW 4	9/21/05	0.48	B	UB0.93		NS			NS			NS	
SW 4	9/22/05	0.75	B	UB0.93		NS			NS			NS	
SW 5	10/11/04	0.90	U			NS			NS			NS	
SW 5	10/12/04	0.90	U			NS			NS			NS	
SW 5	10/13/04	1.7	U			NS			NS			NS	
SW 5	4/5/05	0.24	B		1.9	B		217			1.22		
SW 5	4/6/05	0.30	B		1.9	B		235				NS	
SW 5D	4/6/05	0.29	B		2.2			231				NS	
SW 5	4/7/05	0.35	B	UB0.98	2.2			251				NS	
SW 5	5/3/05	1.3				NS			NS			NS	
SW 5	5/4/05	1.3				NS			NS			NS	
SW 5	5/5/05	1.2				NS			NS			NS	
SW 5D	5/5/05	1.2				NS			NS			NS	
SW 5	6/14/05	1.1				NS			NS			NS	
SW 5	6/15/05	1.0				NS			NS			NS	
SW 5	6/16/05	1.0	U			NS			NS			NS	

Table 7-3

Water Quality Data for Site C Surface Water
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			Hardness (mg/l)		EDTA as EDTA (mg/l)	
			L	D		L	D		D		D
SW 5	7/12/05	0.076	B	UB0.09		NS			NS		NS
SW 5D	7/12/05	0.066	U			NS			NS		NS
SW 5	7/13/05	0.070	B			NS			NS		NS
SW 5	7/14/05	0.073	B			NS			NS		NS
SW 5	8/16/05	0.066	U			NS			NS		NS
SW 5	8/17/05	0.49	B			NS			NS		NS
SW 5	8/18/05	0.17	B			NS			NS		NS
SW 5	9/20/05	0.23	B	UB0.14		NS			NS		NS
SW 5	9/21/05	0.12	B	UB0.93		NS			NS		NS
SW 5	9/22/05	1.0	B	UB0.93		NS			NS		NS
SW 6	10/11/04	0.90	U			NS			NS		NS
SW 6D	10/11/04	0.90	U			NS			NS		NS
SW 6	10/12/04	0.90	U			NS			NS		NS
SW 6	10/13/04	1.7	U			NS			NS		NS
SW 6	4/5/05	0.23	B		1.5	B		207		1.64	
SW 6D	4/5/05	0.22	B		1.6	B		208		2.01	
SW 6	4/6/05	0.27	B		1.6	B		221			NS
SW 6	4/7/05	0.23	B	UB0.98	2.1		UB0.44	241			NS
SW 6	5/3/05	1.4				NS			NS		NS
SW 6	5/4/05	1.4				NS			NS		NS
SW 6	5/5/05	1.3				NS			NS		NS
SW 6	6/14/05	1.2				NS			NS		NS
SW 6D	6/14/05	1.2				NS			NS		NS
SW 6	6/15/05	1.1				NS			NS		NS
SW 6	6/16/05	1.1				NS			NS		NS
SW 6	7/12/05	0.074	B	UB0.09		NS			NS		NS
SW 6	7/13/05	0.10	B			NS			NS		NS
SW 6D	7/13/05	0.11	B			NS			NS		NS
SW 6	7/14/05	0.092	B			NS			NS		NS
SW 6	8/16/05	0.13	B			NS			NS		NS
SW 6D	8/16/05	0.13	B			NS			NS		NS
SW 6	8/17/05	0.33	B			NS			NS		NS
SW 6D	8/17/05	0.26	B			NS			NS		NS
SW 6	8/18/05	0.16	B			NS			NS		NS
SW 6	9/20/05	0.23	B	UB0.14		NS			NS		NS
SW 6	9/21/05	0.27	B	UB0.93		NS			NS		NS

Table 7-3

Water Quality Data for Site C Surface Water
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)			Copper (Dissolved) (ug/l)			Hardness (mg/l)		EDTA as EDTA (mg/l)	
			L	D		L	D		D		D
SW 6D	9/21/05	0.22	B	UB0.93		NS			NS		NS
SW 6	9/22/05	1.7		UB0.93		NS			NS		NS
SW 7	10/11/04	0.90	U			NS			NS		NS
SW 7	10/12/04	0.90	U			NS			NS		NS
SW 7	10/13/04	1.7	U			NS			NS		NS
SW 7	4/5/05	0.11	B	UB0.04	0.88	B	UB0.19	84.6		<0.50	
SW 7	4/6/05	0.21	B		0.99	B		93.0			NS
SW 7	4/7/05	0.21	B	UB0.98	1.0	B	UB0.44	99.1			NS
SW 7	5/3/05	0.19	B	UB0.05		NS			NS		NS
SW 7	5/4/05	0.26	B			NS			NS		NS
SW 7	5/5/05	0.21	B	UB0.14		NS			NS		NS
SW 7	6/14/05	1.0	U			NS			NS		NS
SW 7	6/15/05	1.0	U			NS			NS		NS
SW 7	6/16/05	1.0	U			NS			NS		NS
SW 7	7/12/05	0.18	B	UB0.09		NS			NS		NS
SW 7	7/13/05	0.15	B			NS			NS		NS
SW 7	7/14/05	0.17	B			NS			NS		NS
SW 7	8/16/05	0.25	B			NS			NS		NS
SW 7	8/17/05	0.23	B			NS			NS		NS
SW 7	8/18/05	0.25	B			NS			NS		NS
SW 7	9/20/05	0.16	B	UB0.14		NS			NS		NS
SW 7	9/21/05	0.14	B	UB0.93		NS			NS		NS
SW 7	9/22/05	0.70	B	UB0.93		NS			NS		NS
SW 8	10/11/04	0.90	U			NS			NS		NS
SW 8	10/12/04	0.90	U			NS			NS		NS
SW 8	10/13/04	1.7	U			NS			NS		NS
SW 8	4/5/05	0.14	B	UB0.04	0.89	B	UB0.19	82.1		<0.50	
SW 8	4/6/05	0.16	B	UB0.04	0.97	B		95.3			NS
SW 8	4/7/05	0.27	B	UB0.98	1.3	B	UB0.44	95.6			NS
SW 8	5/3/05	0.14	B	UB0.05		NS			NS		NS
SW 8D	5/3/05	0.17	B	UB0.05		NS			NS		NS
SW 8	5/4/05	0.18	B	UB0.05		NS			NS		NS
SW 8	5/5/05	0.18	B	UB0.14		NS			NS		NS
SW 8	6/14/05	1.0	U			NS			NS		NS
SW 8	6/15/05	1.0	U			NS			NS		NS
SW 8	6/16/05	1.0	U			NS			NS		NS

Table 7-3

Water Quality Data for Site C Surface Water
Fiscal Year 2005

Sample Location	Date Collected	Lead (Dissolved) (ug/l)	L	D	Copper (Dissolved) (ug/l)	L	D	Hardness (mg/l)	L	D	EDTA as EDTA (mg/l)	L	D
SW 8	7/12/05	0.18	B	UB0.09	NS			NS			NS		
SW 8	7/13/05	0.17	B		NS			NS			NS		
SW 8	7/14/05	0.24	B		NS			NS			NS		
SW 8	8/16/05	0.36	B		NS			NS			NS		
SW 8	8/17/05	0.25	B		NS			NS			NS		
SW 8	8/18/05	0.25	B		NS			NS			NS		
SW 8	9/20/05	0.28	B	UB0.14	NS			NS			NS		
SW 8D	9/20/05	0.13	B	UB0.14	NS			NS			NS		
SW 8	9/21/05	0.13	B	UB0.93	NS			NS			NS		
SW 8	9/22/05	0.83	B	UB0.93	NS			NS			NS		

Notes:

Laboratory Concentration Qualifiers (L):

U	analyte was not detected above the Instrument Detection Limit (IDL)
B	reported value is between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

Data Validation Qualifiers (D):

UB#	blank contamination, # = highest concentration of blank affecting data

Other Notes:

NS	not sampled
EDTA	ethylenediaminetetraacetic acid

Table 7-4

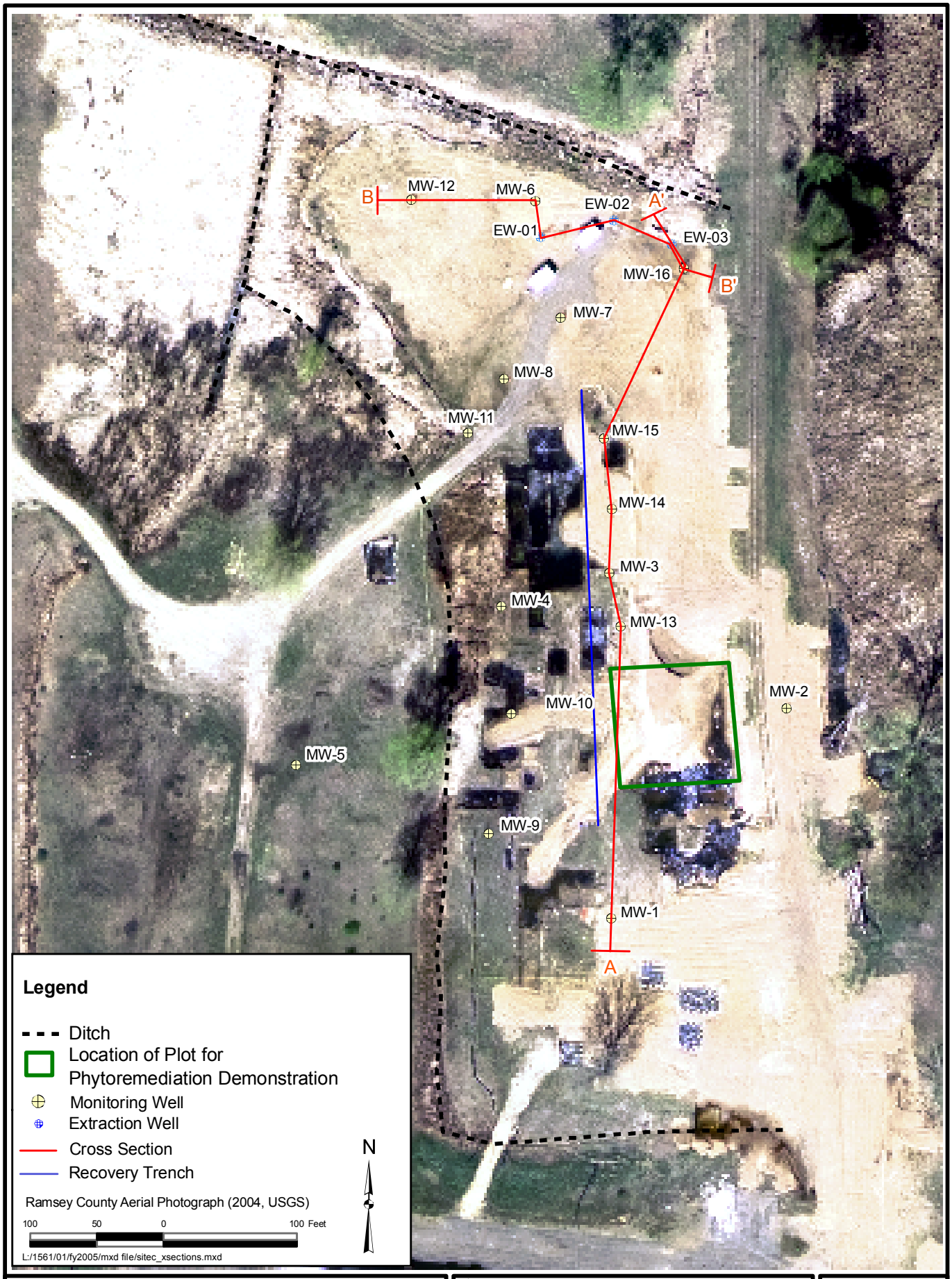
Site C Removal Action Monthly Lead Removal
Fiscal Year 2005

MONTH	EW-3		CONVERSION FACTOR	TOTAL LEAD REMOVED BY EXTRACTION SYSTEM (EW-3)	SYSTEM EFFLUENT
	Average Lead Concentration (mg/L)	Volume (gallons)	(l*lb)/(mg*gal)	(lbs)	Volume (gallons)
WATER AND LEAD REMOVED (TO 9/30/04)		2,517,408		90.78	7,527,500
OCTOBER	1.80	46,309	8.35E-06	0.70	207,781
NOVEMBER	1.86	60,247	8.35E-06	0.94	203,620
DECEMBER	2.33	52,985	8.35E-06	1.03	226,327
JANUARY	1.94	49,121	8.35E-06	0.80	263,049
FEBRUARY	2.01	41,213	8.35E-06	0.69	286,453
MARCH	1.88	45,029	8.35E-06	0.71	211,919
APRIL	2.03	41,368	8.35E-06	0.70	91,815
MAY	2.55	48,405	8.35E-06	1.03	115,444
JUNE	2.52	45,345	8.35E-06	0.95	94,961
JULY	0.89	33,912	8.35E-06	0.25	75,496
AUGUST	1.24	40,673	8.35E-06	0.42	90,392
SEPTEMBER	0.77	30,151	8.35E-06	0.19	74,743
WATER AND LEAD REMOVED (FY 2005)		534,758		8.41	1,942,000
WATER AND LEAD REMOVED (TOTAL)		3,052,166		99.19	9,469,500

Notes:

1) EW-1 and EW-2 remain at or near non-detect lead levels and do not provide a significant source of removed

2) This summary table began in June 2002



TWIN CITIES ARMY AMMUNITION PLANT

Site C: Site Plan and Cross Section Locations

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FY 2005

Figure 7-1

TWIN CITIES ARMY AMMUNITION PLANT

Surface Water Monitoring Locations Related to Site C

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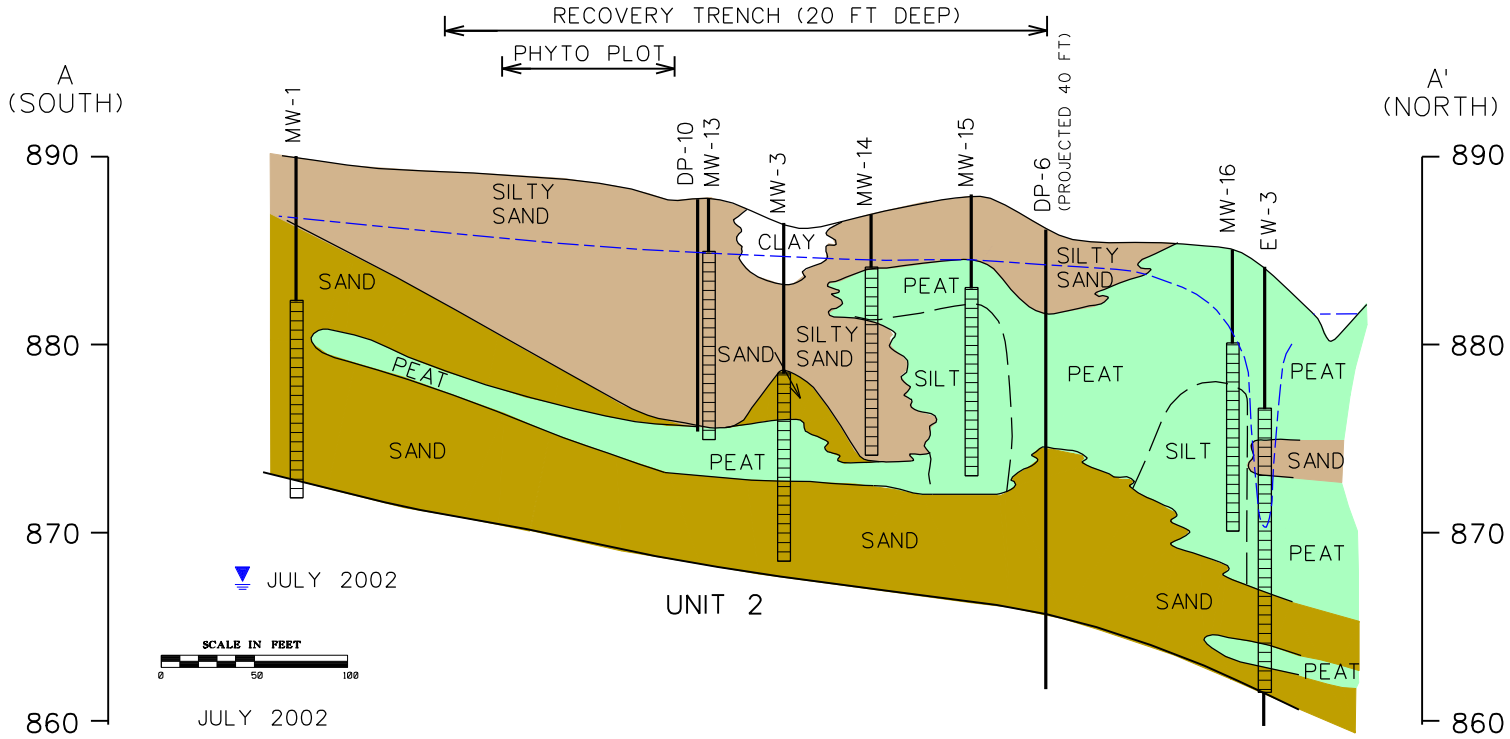
FY 2005

Figure 7-2



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Site C: Cross-Section A-A'

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FY 2005

Fig. 7-3

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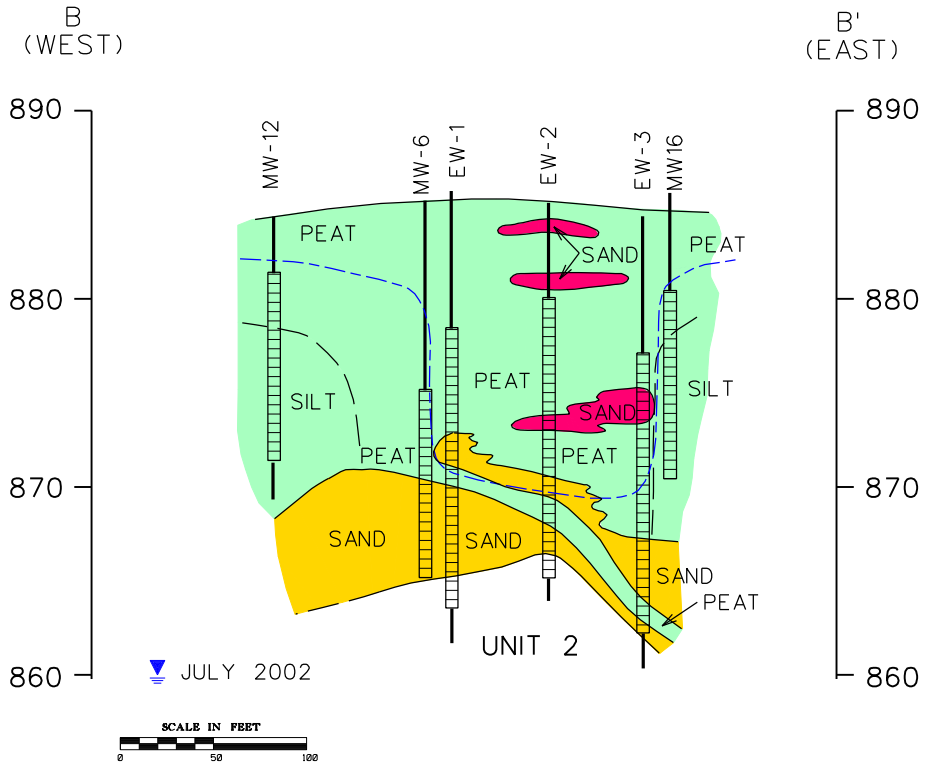

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Site C: Cross-Section B-B'

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FY 2005

Fig. 7-4

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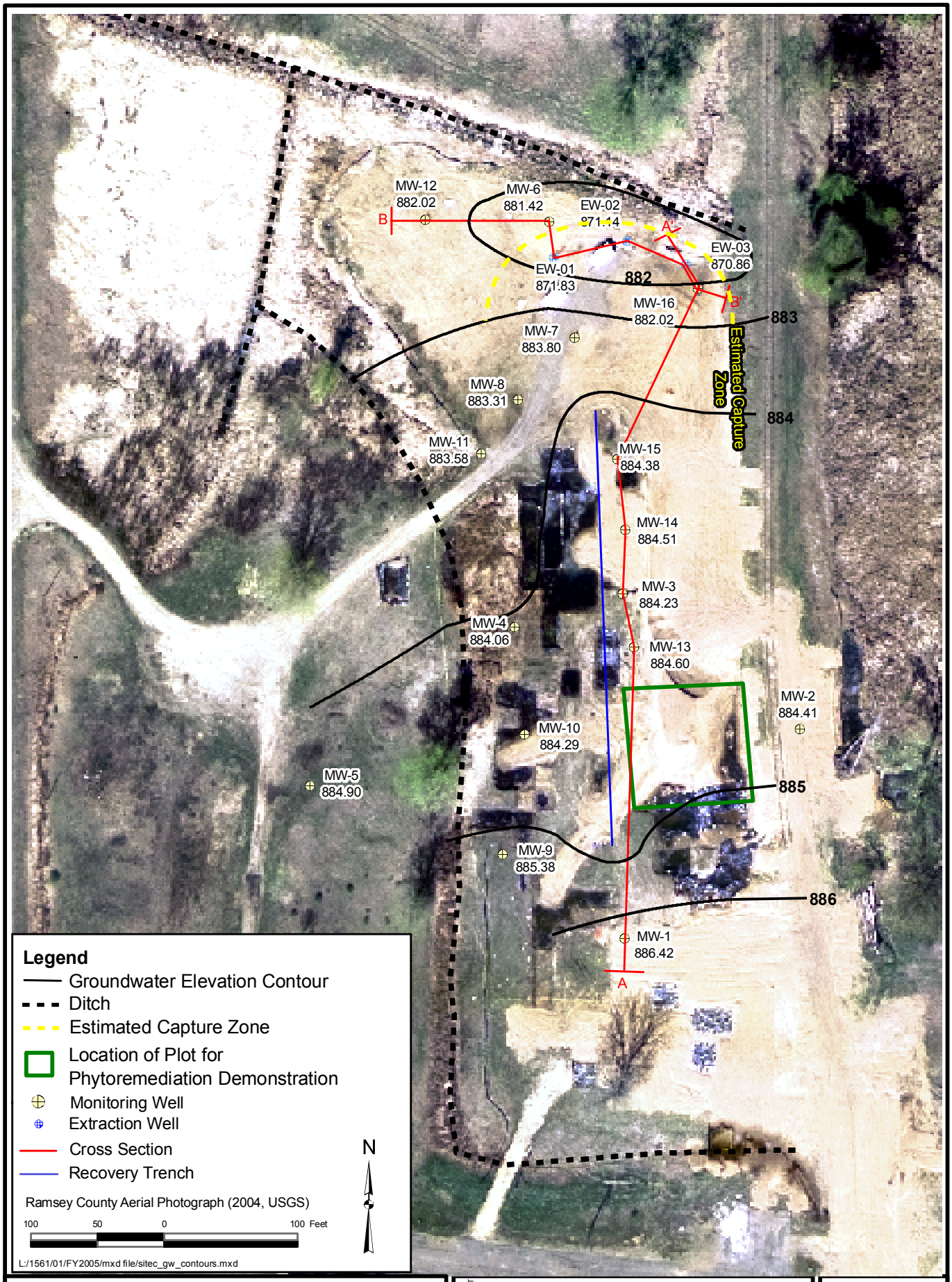

TWIN CITIES ARMY AMMUNITION PLANT

Site C: June 2005
Groundwater Elevation Contours

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FY 2005

Figure 7-5

TWIN CITIES ARMY AMMUNITION PLANT

Site C Lead in Groundwater July 2005

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FY 2005

Figure 7-6

8.0 Operable Unit 2: Site I Shallow Groundwater

VOCs have been identified in the Unit 1 groundwater at Site I. Polychlorinated biphenyls (PCBs) have been identified in soils east of Building 502.

PCB-contaminated soils east of Building 502 were excavated in 1986. These soils were stored in a storage building built as part of the PCB Interim Remedial Action (IRA) at Site I. During August and September 1996, these soils were removed and disposed of at a Toxic Substances Control Act (TSCA) landfill with approval of the MPCA and USEPA. Groundwater monitoring was conducted for PCBs through FY 1997. PCBs were not detected in groundwater and the monitoring was discontinued. Information on this work is included in the OU2 Remedial Investigation (Argonne National Laboratory 1991).

Monitoring in FY 2005 addressed the VOCs identified in the Unit 1 groundwater beneath the western portion of Building 502. The selected remedy in the OU2 ROD consists of four components that incorporate the use of an existing well for groundwater extraction as well as additional investigation beneath the building slab. The additional investigation and Predesign Investigation Work Plan (Work Plan) were completed in FY 2000. Based on these documents, the selected remedy was modified to consist of a dual-phase vacuum extraction system, which combines groundwater extraction with soil vapor extraction, to be installed beneath Building 502. A pilot test of dual-phase extraction subsequently determined that the technology was not feasible due to the low permeability of the Unit 1 aquifer beneath the building.

8.1 REMEDY COMPONENT #1: GROUNDWATER MONITORING

Description: "Groundwater monitoring to track remedy performance." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When a monitoring plan has been established and ongoing monitoring is in compliance with the plan.

Is the remedy component being implemented?
Yes. Monitoring at Site I in FY 2005 was conducted according to the monitoring plan for FY 2005. Appendix A summarizes the FY 2005 monitoring plan and any deviations are explained in Appendix C.2.

Monitoring was performed in accordance with the TCAAP RD/RA QAPP (1996) and a new QAPP. The *IRP-QAPP for Performance Monitoring*, TWISS, dated June 7, 2005, was accepted by the USEPA and MPCA as passing the Consistency Test on October 14, 2005. The new QAPP was implemented on December 1, 2005, the beginning of the 2nd quarter FY 2006.

Twelve Unit 1 monitoring wells were planned for sampling at Site I (Building 502) during FY 2005. These wells were 01U064, 01U632, 01U636, 01U639, 01U640, 01U666, 01U667, 01U668, I01MW, I02MW, I04MW, and I05MW. Figure 8-1 shows these well locations. As requested by USEPA, wells 01U632, 01U666, 01U667, and 01U668 were added to the FY 2005 monitoring event for groundwater sampling on a "one-time" basis and annual groundwater level measurements. For FY 2005, monitoring wells 01U639 and 482089 (I04MW) were also included on the list of monitoring locations. Of the two wells, well 01U639 will be the primary sampling location and 482089 (I04MW) will be the alternate sampling location. If it is not possible to collect a groundwater sample from 01U639, then an attempt will be made to collect a sample from 482089 (I04MW). Well 01U639 is selected as the primary location because there is more analytical data associated with this location.

Wells 01U632, 01U639, 01U666, 01U668, I02MW, and I05MW were dry at the time of sampling (June, 2005). Wells 01U667, 01U640, and I01MW bailed dry after collecting between one and three well volumes; however, there was sufficient groundwater to collect samples for analysis. Groundwater samples were analyzed using EPA Method 8260 for VOCs. Attempts to sample wells 01U632, 01U666, and 01U668 will continue during the FY 2006 sampling event.

Monitoring Well 01U667 will be sampled during the next two annual sampling rounds (June 2006 and June 2007). These additional two years of sampling will provide a four-year trend for MW 01U667. The downgradient and perimeter wells, which have showed decreasing trends in contaminants of concern, will continue to be monitored on an annual basis.

What were the monitoring results for FY 2005?

Table 8-1 presents the results of the FY 2005 analyses. Monitoring well 01U064 continues to show overall declines in concentrations of trichloroethene since the early 1990's. Monitoring well 01U640, has shown overall declines in concentration of trichloroethene and 1,2-dichloroethene since the early 1990's. Well 01U640 remains below the cleanup standards for Site I. Well 01U064 remains slightly above the Site I cleanup standards for vinyl chloride in FY 2005. The results for wells 01U636 and I01MW are non-detect for site-specific required analytes. Well 482089 (I04MW) analytical results for trichloroethene were above the cleanup standards for Site I and 1,2-dichloroethene was below cleanup standards for Site I; vinyl chloride was non-detect. Well 01U667 had concentrations of 1,2-dichloroethene and vinyl chloride above cleanup standards for Site I. Figure 8-2 presents the groundwater elevations.

8.2 REMEDY COMPONENT #2: GROUNDWATER EXTRACTION

Description: "Use of an existing well to remove impacted groundwater." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the equipment has been installed and is operating according to the Remedial Design approved by the regulators.

Has the remedy component been implemented?
No. The report on the dual-phase vacuum extraction pilot test was submitted to the Agencies and received a consistency determination on March 16, 2000. The report concluded that neither dual-phase extraction nor groundwater extraction is feasible. The pilot test found that the soil permeability is low. As a result, the test yielded only approximately 1 gallon per hour. The report recommended that no further remedial action is considered until the building is demolished.

8.3 REMEDY COMPONENT #3: POTW DISCHARGE

Description: "POTW discharge of extracted groundwater." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the discharge component has been implemented.

Has the remedy component been implemented?
No. As discussed above, the report on dual-phase vacuum extraction determined that extraction remedies are not currently feasible.

8.4 REMEDY COMPONENT #4: ADDITIONAL INVESTIGATION

Description: "Additional characterization of the Unit 1 and Unit 2 soil and groundwater." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the work has been completed according to an Agency approved work plan.

Has the remedy component been implemented?
Yes. The results of the additional investigation were included in the Work Plan. The additional investigation resulted in a pilot study to evaluate the applicability of dual-phase vacuum extraction technology to the site.

Overall Remedy for Site I Shallow Groundwater
The remedy specified in the OU2 ROD was modified in the RD work plan. Based on the results presented in the dual-phase pilot test report, the preferred remedy is in need of further modification so as to only consist of groundwater monitoring. This is acceptable, in large part, due to the fact that groundwater in the Unit 1 aquifer does not flow off-site. Contaminants from the Unit 1 leak downward into the Unit 3. The deeper Unit 3 aquifer is hydraulically contained by the TGRS.

Monitoring in FY 2005 was consistent with the FY 2005 monitoring plan. The following conclusions are made for FY 2005:

- VOCs continue to be present in the Unit 1 aquifer beneath the western portion of Building 502.
- The additional investigation work identified the sources of VOCs in the Unit 1 aquifer beneath Building 502 and allowed for an evaluation of dual- phase vacuum extraction technology to be completed. The evaluation determined that extraction technologies are not feasible beneath the building.

Is additional monitoring proposed prior to the next report?

Yes. Appendix A presents the FY 2005 – FY 2008 Monitoring Plan. Table 8-2 presents the monitoring requirements for Site I. Unit 3 and Unit 4 groundwater monitoring at Site I is addressed as part of the deep groundwater portion of the monitoring plan. The monitoring plan for Site I will be subject to review based on the anticipated OU2 ROD amendment.

Based on a USEPA request made in FY 2003, water levels will continue to be measured at wells 01U632, 01U666, 01U667, and 01U668 on an annual basis.

8.5 OTHER ACTIVITY

During FY 2004, a Five-Year Review of the remedy was performed. The review concluded that the remedy was functioning as intended, and that the components of the remedy remain protective of human health and the environment. The Review also recommended:

- Monitoring the trichloroethene HRL for any changes due to the USEPA's potential update of the trichloroethene health risk assessment; and
- Preparing a ROD amendment for the change from a pump and treat remedy to a monitoring based remedy.

Eight monitoring wells (01U004, 01U054, 01U634, 01U635, 01U638, 01U642, 01U652, and 01U675) were abandoned in FY 2004. Well abandonment is documented in the *Well Abandonment Report, Sites I and K, TCAAP*, SECOR, dated December 15, 2003.

Table 8-1

Groundwater Quality Data
Fiscal Year 2005
Site I, TCAAP
Arden Hills, Minnesota

Location	Date	*1,1,1-Trichloroethane* 111TCE	*1,1,2-Trichloroethane* 112TCE	*1,1-Dichloroethylene* 11DCE	*1,1-Dichloroethane* 11DCLE	*cis-1,2-Dichloroethylene* C12DCE	*Vinyl chloride* C2H3CL	*Chloroform* CHCL3	*trans-1,2-Dichloroethylene* T12DCE	*Tetrachloroethylene* TCLEE	*Trichloroethylene* TRCLE	*1,2-Dichloroethane* 12DCLE
01U064	6/7/2005	<1	<1	<1	0.52 (J)	52	5.3	<1	3.3	<1	0.38 (J)	<1
01U632	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
01U636	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
01U639	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
I04MW	6/7/2005	<1	<1	<1	<1	1.7	<1	<1	<1	<1	54	<1
I04MW D	6/7/2005	<1	<1	<1	<1	1.9	<1	<1	<1	<1	57	<1
01U640	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.48 (J)	<1
01U666	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
01U667(1)	6/7/2005	<50	<50	100	72	43000 (2)	57000(2)	<50	130	<50	<50	18 (J)
01U668	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
482086 (I01MW)	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Table 8-1

Groundwater Quality Data
Fiscal Year 2005
Site I, TCAAP
Arden Hills, Minnesota

Location	Date	*1,1,1-Trichloroethane* 111TCE	*1,1,2-Trichloroethane* 112TCE	*1,1-Dichloroethylene* 11DCE	*1,1-Dichloroethane* 11DCLE	*cis-1,2-Dichloroethylene* C12DCE	*Vinyl chloride* C2H3CL	*Chloroform* CHCL3	*trans-1,2-Dichloroethylene* T12DCE	*Tetrachloroethylene* TCLEE	*Trichloroethylene* TRCLE	*1,2-Dichloroethane* 12DCLE
482088 (I02MW)	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
482087 (I05MW)	6/7/2005	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

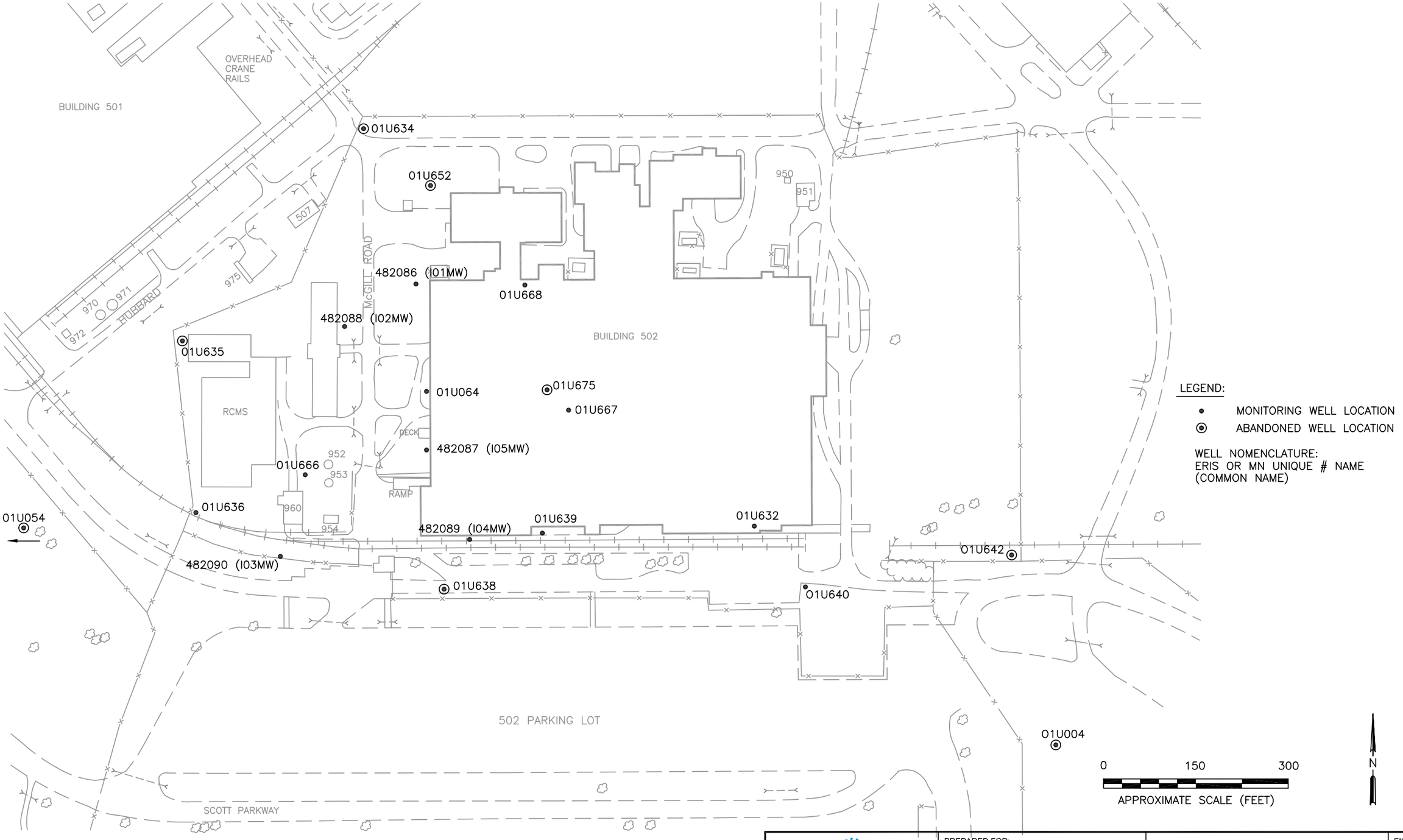
Notes:
Concentrations in ug/L.
J - Value is estimated.
P - Results less than reporting level but greater than instrumental detection limit.
(1) Sample dilution = 50
(2) Sample dilution = 500

Table 8-2

Summary of Groundwater Monitoring Requirements
Fiscal Year 2005
Site I, TCAAP
Arden Hills, Minnesota

	Remedy Component		Monitoring Requirements	Responsible Party	Document Containing the Monitoring Plan
#1	Groundwater Monitoring	a.	Groundwater quality and water levels to track remedy progress.	Alliant	Site I Monitoring Plan in Annual Performance Report
#2	Groundwater Extraction (1)	a.	Extracted water volumes and rates.	Alliant	Not applicable (1)
#3	POTW Discharge (1)	a.	Water quality data for system effluent to demonstrate compliance with discharge requirement.	Alliant	Not applicable (1)
#4	Additional Investigation	a.	As per work plan (completed).	Alliant	Not applicable
	Overall Remedy	a.	Water quality data to evaluate attainment.	Alliant	Site I Monitoring Plan in Annual Performance Report

Note:
(1) Currently there is no pumping required based on results of additional investigation and pilot test results.



SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

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SITE I, UNIT 1
GROUNDWATER QUALITY
MONITORING LOCATIONS

FIGURE:
8-1

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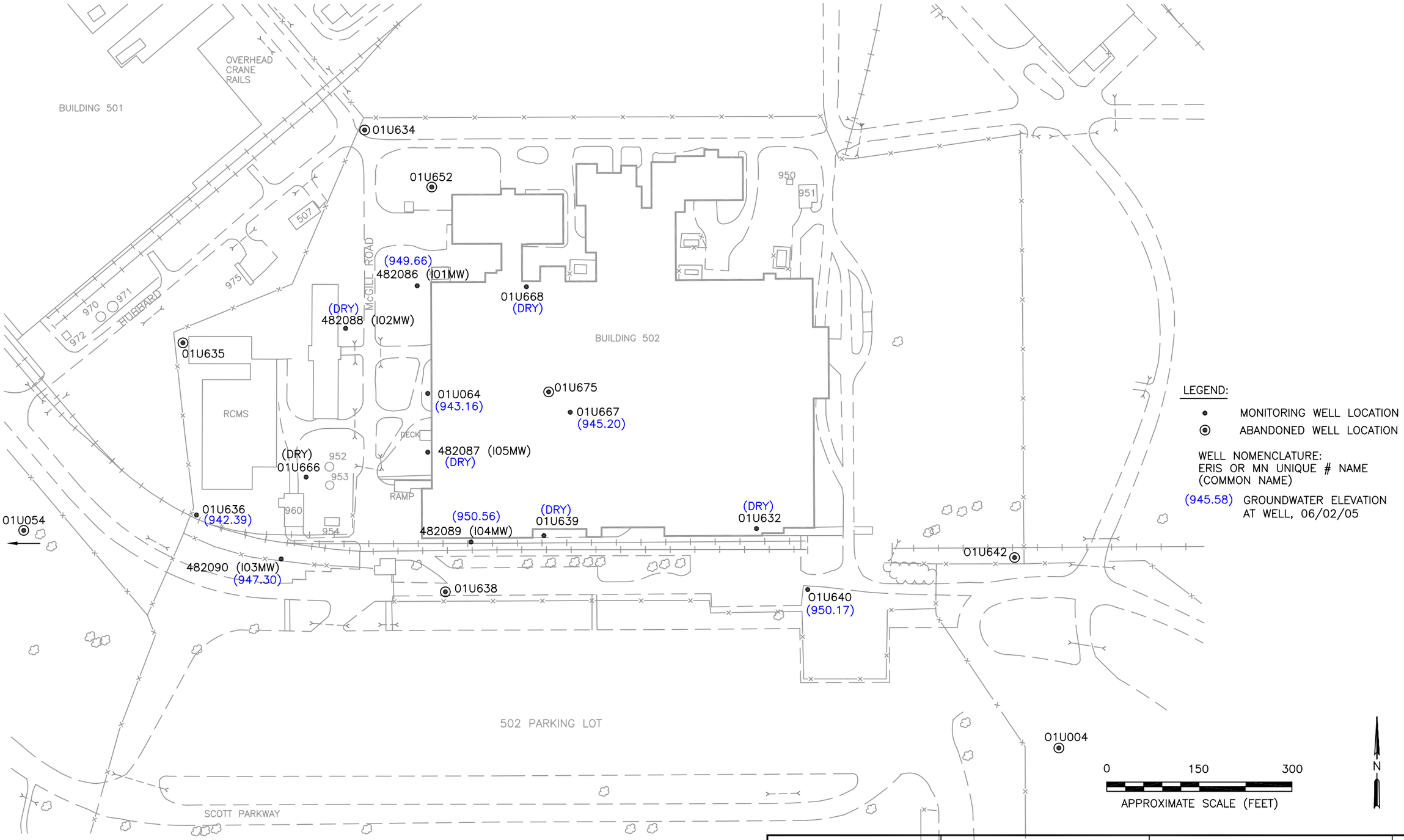

LEGEND:

- MONITORING WELL LOCATION
- ABANDONED WELL LOCATION

WELL NOMENCLATURE:
ERIS OR MN UNIQUE # NAME
(COMMON NAME)

(945.58) GROUNDWATER ELEVATION AT WELL, 06/02/05

SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

PREPARED FOR:
TWIN CITY ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

SITE I, UNIT 1
GROUNDWATER ELEVATION MAP, 06/02/05

FIGURE: **8-2**

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9.0 Operable Unit 2: Site K Shallow Groundwater

VOC contamination has been identified in the Unit 1 (perched aquifer) at Building 103. The limits of the VOC plume in the perched groundwater have been defined to be beneath and immediately northwest of Building 103.

The remedy selected in the OU2 ROD consists of seven components that incorporate the existing groundwater extraction trench and air stripper, which began operation in August 1986. The remedy also includes additional investigation of the unsaturated soils beneath the building slab.

9.1 REMEDY COMPONENT #1: GROUNDWATER MONITORING

Description: "Groundwater monitoring to track remedy performance." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When a monitoring plan is established and monitoring is in compliance with the plan.

Is the remedy component being implemented?
Yes. Appendix A summarizes the FY 2005 monitoring plan and any deviations are explained in Appendix C.2.

Monitoring was performed in accordance with the TCAAP RD/RA QAPP (1996) and a new QAPP. The *IRP-QAPP for Performance Monitoring*, TWISS, dated June 7, 2005, was accepted by the USEPA and MPCA as passing the Consistency Test on October 14, 2005. The new QAPP was implemented on December 1, 2005, the beginning of the 2nd quarter FY 2006.

Water levels are collected annually from the monitoring wells and bundle piezometers in the vicinity of the groundwater collection and treatment system. FY 2005 monitoring was performed in accordance with the Monitoring Plan included as Appendix A. The comprehensive monitoring well sampling round was conducted in June 2005. Figure 9-1 presents the sampling and water level monitoring locations. Figure 9-1 also shows the cross-section alignment.

9.2 REMEDY COMPONENT #2: SENTINEL WELLS

Description: "Installation of sentinel wells at the bottom of Unit 1 and top of Unit 3." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the wells have been installed according to a regulator approved work plan.

Is the remedy component being implemented?
Yes. The OU2 ROD was signed in December 1997 (FY 1998). The Predesign Investigation Work Plan for Site K was approved in February 1999. The upper Unit 3 sentinel well was installed in February 2000.

Existing piezometers were used to accomplish the deep Unit 1 sentry monitoring. Piezometers 01U625D, 01U626D, 01U627D, and 01U628D were used since they monitor the base of the Unit 1 aquifer near the trench. The issue is the potential for Dense Non-Aqueous Phase Liquids (DNAPLs) to migrate beneath the trench along the Unit 1/Unit 2 interface. These four piezometers are screened at that interface.

Figure 9-1 shows the location of the upper Unit 3 sentinel well (03U621) and the piezometers. The sentinel well was installed to monitor the potential for VOCs to migrate through the Unit 2 till and into the Unit 3 aquifer.

What are the results of the Unit 1 piezometer and Unit 3 sentinel well sampling?

The piezometers (Unit 1 sentinel wells) were sampled in March 2000 and the results were discussed in the FY 2000 APR. The results did not indicate the presence of DNAPLs at the Unit 2/Unit 3 interface. This was a one-time sampling event, as required by the MPCA/USEPA approved Predesign Investigation Work Plan, Site K, TCAAP, CRA, February 1999, and as documented in the Predesign Investigation Report, Site K, TCAAP, CRA, December 2001, for which concurrence was received.

The Unit 3 sentinel well (03U621) was sampled in March, July, and September 2000, of FY 2000, and in January 2001 for the quarterly sampling required by the Work Plan. After that, the well was incorporated into the regular TCAAP monitoring plan. The well was sampled in June 2005 for FY 2005. The results of the sample collected during FY 2005 are presented in Table 9-1. VOCs were not detected in the Unit 3 sentinel well.

9.3 REMEDY COMPONENT #3: HYDRAULIC CONTAINMENT

Description: "Use of existing interceptor/recovery trench to contain the plume and remove impacted groundwater." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When the trench is operating as designed and capturing all groundwater exceeding the cleanup levels presented in Table 1 of the OU2 ROD, as described below.

Is the remedy component being implemented?

Yes. The groundwater collection system continues to provide capture (as described later) of the Unit 1 groundwater, upgradient of the trench and beneath Building 103, as designed.

Is the system providing hydraulic capture of the plume?

Yes. Water level data are presented in Table 9-2. Figure 9-2 presents a plan view of the groundwater contours from the June 2005 round of groundwater level measurements. At nested wells, the numerically lowest water elevation was used to create the plan view contours. Monitoring wells downgradient of the extraction trench show consistently higher water levels than those near and upgradient of the trench. This demonstrates that the horizontal hydraulic gradient has been reversed toward the extraction trench due to system operation.

Vertical capture was also effective as illustrated on Figure 9-3. As seen in the figure, groundwater both upgradient and downgradient of the trench is captured and collected. The upward gradient beneath the trench indicates that groundwater does not migrate below the trench. The monitoring coverage provided by the bundle piezometers, demonstrates complete vertical and horizontal hydraulic capture.

Figure 9-4 presents the trichloroethene concentrations from the June 2005 annual sampling event. Trichloroethene concentrations range from non-detect to 2,700 µg/l. The FY 2005 concentrations at wells 01U615 and 01U611, which monitor the core of the plume, were approximately 50% lower in 01U615 and decreased two orders of magnitude in 01U611 compared to the concentrations measured in FY 2004. Water levels measured during the FY 2005 monitoring were 1.6 feet lower at 01U615 and 0.03 feet higher at 01U611 compared to FY 2004 elevations. These wells have historically exhibited fluctuating concentrations.

Comparison of Figure 9-4 to the groundwater contour maps indicates that the VOC plume is hydraulically contained by the treatment system. Table 9-1 presents the monitoring well sampling data. The plume was originally defined based on data from all of the monitoring wells. The current monitoring well network is used to confirm the plume contours and measure the progress of remediation. Thus, the contours on Figure 9-4 were drawn with consideration of the extensive historical data.

Three wells (01U128, 01U617, and 01U621) exhibit low concentrations of 1,2-dichloroethene downgradient of the groundwater collection system's capture zone. Two of these wells (01U128 and 01U617) have exhibited reasonably consistent concentrations of 1,2-dichloroethene since 1987, indicating that it migrated prior to the establishment of the capture zone. The third well, 01U621, has exhibited 1,2-dichloroethene since September 1993. The concentrations at these wells were consistent with those measured in FY 2004 and previous years.

9.4 REMEDY COMPONENT #4: GROUNDWATER TREATMENT

Description: "Treatment of contaminated groundwater using air stripping." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the air stripping facility is treating water to the cleanup standards.

Is the remedy component being implemented?
Yes. See discussion below.

Were there any major operational changes during the year?
No. The original air stripping tower and controls were replaced with a new fluidized bed type air stripper system on June 21, 1999. During FY 2005, the treatment system functioned properly. The new air stripper is less prone to fouling and requires less maintenance. The treatment system was operational over 98% of the time in FY 2005. During FY 2005, a regular maintenance schedule was maintained. Appendix F.1 summarizes operational data and events at the groundwater extraction and treatment system.

9.5 REMEDY COMPONENT #5: TREATED WATER DISCHARGE

Description: "Discharge of treated groundwater to Rice Creek." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the system is operating as designed with treated water discharge to the storm sewer that, in turn, discharges to Rice Creek. The water is required to meet the substantive requirements of Document No. MNU000579 (MPCA), which contains the state-accepted discharge limits for surface water. Sampling and analysis are performed to monitor performance (see below).

Is the remedy component being implemented?
Yes. See discussion in Section 9.6.

9.6 REMEDY COMPONENT #6: DISCHARGE MONITORING

Description: "Monitoring to track compliance with discharge requirements." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When a monitoring plan is established and is being implemented in accordance with the plan.

Is the remedy component being implemented?
Yes. Treatment system monitoring consisted of quarterly influent and effluent sampling. Influent and effluent analytical results are presented in Table 9-3 and Table 9-4. The discharge met all the treatment requirements.

Table 9-5 presents the VOC mass removal and monthly flow rates. A total of 4,601,555 gallons of water and 10.3 pounds of VOCs were removed from the aquifer in FY 2005. The cumulative mass removal is 159.8 pounds of VOCs.

See discussion regarding new QAPP in Section 9.1.

9.7 REMEDY COMPONENT #7: ADDITIONAL INVESTIGATION

Description: "Additional characterization of the unsaturated Unit 1 soil." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the additional investigation has been completed according to a regulator approved work plan.

Is the remedy component being implemented?
Yes. The Work Plan was approved in FY 1999. Work began in February 2000. A report of the investigation results was submitted in November 2001 and received a consistency determination from the Agencies on December 6, 2001. The report defined the extent of VOC contaminated soils beneath Building 103 and refined the location of the source area. The report and subsequent follow up sampling resolved anomalous dissolved zinc, lead, and nickel data at two monitoring wells. Zinc, lead, and nickel are no longer groundwater concerns.

9.8 OVERALL REMEDY FOR SITE K

Overall, the remedy for Site K continued to operate consistent with past years and in compliance with the required performance criteria.

Is additional monitoring proposed prior to the next report?
No.

9.9 OTHER ACTIVITY

Alliant conducted pilot scale tests of two new technologies at Site K. These are Hydrogen Release Compound™ (HRC), and direct hydrogen injection with gas-permeable membranes. Both technologies are intended to enhance natural anaerobic degradation of chlorinated VOCs. These tests were completed in late FY 2000 and a report of the results was issued in FY 2001. The report determined that HRC was not effective under the specific conditions beneath the building slab at Site K. The direct hydrogen injection test yielded promising results but more research is needed for full-scale operation.

In FY 2002, no research field work was conducted; however, Alliant allowed the University of Minnesota to continue its research into direct hydrogen injection by making the test plot available for its use.

In June 2002, a Remedial Action Report for Site K, TCAAP, CRA, was submitted to the USEPA and MPCA. The purpose of the report was to document the remedial action implementation as required by the FFA. The report discussed implementation of the components required by the TCAAP OU2 ROD. A consistency letter for this report was received in FY 2003.

During the June 2004 monitoring, a groundwater sample was collected from well 01U615 and analyzed for 1,4-dioxane using EPA method 8270c. The laboratory analytical result for 1,4-dioxane was estimated to be 0.64 µg/l, which is below the MDH HBV of 30 µg/l. The method detection limit (MDL) was 0.11 µg/l and the contract required detection limit (CRDL) was 1.0 µg/l.

Two monitoring wells (01U622 and 01U623) were abandoned in FY 2004. Well abandonment is documented in the *Well Abandonment Report, Sites I and K, TCAAP,* SECOR, dated December 15, 2003.

During FY 2004 a Five-Year Review of the remedy was performed. The review concluded that the remedy was functioning as intended, and that the components of the remedy remain protective of human health and the environment. The Review also recommended monitoring the trichloroethene HRL for any changes due to the USEPA's potential update of the trichloroethene health risk assessment.

During FY 2005, the groundwater collection system trench was cleaned using a high-pressure water jetting technique. Pre-cleaning and post-cleaning video documentation was used to assess the effectiveness of the high pressure jetting. Pre-cleaning (June 2005) and post-cleaning (November 2005) groundwater contouring (Figure 9-2 and Figure 9-5, respectively) and groundwater elevations were used to further assess the trench cleanings effectiveness on hydraulic containment within the VOC plume. Results of both effectiveness assessments indicate that the jet cleaning improved the hydraulic containment compared to pre-cleaned conditions.

Table 9-1

Groundwater Quality Data
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

Location	Date	Trichloroethylene TRCLE	1,1,1-Trichloroethane 111TCE	1,1,2-Trichloroethane 112TCE	1,1-Dichloroethylene 11DCE	1,1-Dichloroethane 11DCLE	cis-1,2-Dichloroethylene C12DCE	Vinyl chloride C2H3CL	Chloroform CHCL3	trans-1,2-Dichloroethylene T12DCE	Tetrachloroethylene TCLEE	1,2-Dichloroethane 12DCLE
01U128	6/7/2005	<1	<1	<1	<1	<1	4.0	<1	<1	0.45 J	<1	<1
OW103 (01U603)	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
01U604	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
OW111 (01U611)	6/7/2005	140	<1	<1	<1	<1	4.5	<1	<1	1.1	<1	<1
OW115 (01U615) (1)	6/7/2005	2700 (2)	<5	<5	<5	<5	970	6.3	<5	360	<5	<5
OW117 (01U617)	6/7/2005	<1	<1	<1	<1	<1	2.7	<1	<1	0.44 J	<1	<1
OW118 (01U618)	6/7/2005	0.76 J	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
OW119 (01U619)	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
OW121 (01U621)	6/7/2005	<1	<1	<1	<1	<1	2.6	<1	<1	<1	<1	<1
OW121 (01U621) D	6/7/2005	<1	<1	<1	<1	<1	2.5	<1	<1	<1	<1	<1

Table 9-1

Groundwater Quality Data
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

Location	Date	Trichloroethylene TRCLE	1,1,1-Trichloroethane 111TCE	1,1,2-Trichloroethane 112TCE	1,1-Dichloroethylene 11DCE	1,1-Dichloroethane 11DCLE	cis-1,2-Dichloroethylene C12DCE	Vinyl chloride C2H3CL	Chloroform CHCL3	trans-1,2-Dichloroethylene T12DCE	Tetrachloroethylene TCLEE	1,2-Dichloroethane 12DCLE
03U621	6/7/2005	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
482083 (K04MW)	6/7/2005	3.3	<1	<1	<1	1	<1	<1	<1	<1	<1	<1

Notes:
Concentrations in ug/L.
D - Duplicate analysis.
J - Value is estimated.
P - Results less than reporting level but greater than instrumental detection limit.
Sample dilution = 1, unless noted otherwise.
(1) Sample dilution = 5.
(2) Sample dilution = 50.

Table 9-2

Groundwater Elevation Monitoring
Site K, TCAAP
Arden Hills, Minnesota

Well ID	***TOC Elevation***	***Groundwater Elevation 6/2/2005***
01U047	880.31	873.67
01U048	885.32	874.19
01U052	886.51	874.81
01U065	883.90	873.90
01U128	883.69	874.60
01U601	892.68	883.84
01U602	889.35	NM
01U603	887.31	877.63
01U604	888.98	876.65
01U605	887.76	877.70
01U607	891.01	885.10
01U608	889.30	883.26
01U609	889.33	883.11
01U611	889.29	883.57
01U612	886.91	877.79
01U613	892.07	883.69
01U615	888.66	876.28
01U616	890.37	878.46
01U617	887.72	877.01
01U618	891.52	878.85
01U619	891.75	883.01
01U620	888.65	877.93
01U621	886.57	877.84
01U622	889.43	ABD
01U623	889.44	ABD
01U624A	889.88	877.56
01U624B	889.88	877.55
01U624C	889.91	877.56
01U624D	889.89	877.56
01U625A	886.92	876.90
01U625B	886.91	876.84
01U625C	886.91	876.86
01U625D	886.92	876.85
01U626A	886.87	876.97
01U626B	886.88	876.54
01U626C	886.88	876.59
01U626D	886.88	876.63
01U627A	886.46	877.88
01U627B	886.47	876.87
01U627C	886.47	876.78
01U627D	886.48	876.80
01U628A	887.82	877.83
01U628B	887.83	877.54
01U628C	887.82	877.14
01U628D	887.84	877.13
482085 (K01MW)	891.24	886.22
482084 (K02MW)	891.35	885.43
482083 (K04MW)	887.66	879.68
03U621	887.01	853.54

Notes:
ABD - Abandoned
NM - No water level was recorded in 01U602 due to the well lying under a pool of water.

Table 9-3

Treatment System Concentrations (Organics)
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

Location	***Sample Date***	1,1-Dichloroethane ***11DCLE***		1,1-Dichloroethene ***11DCE***		1,2-Dichloroethane ***12DCLE***		cis-1,2-Dichloroethene ***C12DCE***		trans-1,2-Dichloroethene ***T12DCE***		Trichloroethene ***TRCLE***		Vinyl chloride ***C2H3CL***	
Effluent	10/27/2004	ND		ND		ND		ND		ND		ND		ND	
Effluent	10/27/2004	ND	D	ND	D	ND	D	ND	D	ND	D	ND	D	ND	D
Effluent	3/8/2005	ND		ND		ND		ND		ND		ND		ND	
Effluent	3/8/2005	ND	D	ND	D	ND	D	ND	D	ND	D	ND		ND	D
Effluent	6/7/2005	ND		ND		ND		ND		ND		0.28	J	ND	
Effluent	6/7/2005	ND	D	ND	D	ND	D	ND	D	ND	D	0.27	JD	ND	D
Effluent	9/8/2005	ND		ND		ND		ND		ND		ND		ND	
Effluent	9/8/2005	ND	D	ND	D	ND	D	ND	D	ND	D	ND	D	ND	D
Influent	10/27/2004	ND		ND		ND		120		15		200		1.4	
Influent	3/8/2005	ND		ND		ND		93		13		160		1.4	
Influent	6/7/2005	ND		ND		ND		73		9.8		160		1.1	
Influent	9/8/2005	ND		ND		ND		97		9.7		120		1.3	
MDL		0.355		0.199		0.297		0.171		0.168		0.195		0.456	
CRDL		1		1		1		1		1		1		1	
REQ.		--		7.0		3.8		70		100		10		0.18	

Notes:
Results are reported in µg/L unless otherwise noted.
CRDL - Contract Required Detection Limit
D - Duplicate Analysis
J - Value Estimated
MDL - Method Detection Limit
ND - Not Detected
P - Results less than reporting level but greater than instrument detection limit.
REQ - Substantive Requirement Document Concentration Limit, Maximum Daily Concentration

Table 9-4

Treatment System Concentrations (Inorganics)
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

Location	Sample Date	Phosphorus Total		Copper		Cyanide		Lead		Mercury		Silver		Zinc
Effluent	10/27/04	335		7.6		ND		2.8		ND	U	ND	U	76.6
Effluent	3/8/05	318		4.2		3.9		0.65		ND		ND		91.5
Effluent	6/7/05	607		6.0		ND	U	1.7	B	ND	U	ND	U	34.8
Effluent	9/8/05	369		4.5	B	2.0	B	0.57	UB.16	ND	U	ND	U	14.4
MDL	10/27/04	84.7		0.341		2.32		0.0798		0.0234		0.221		0.580
MDL	3/8/05	84.7		0.074		2.32		0.0347		0.0126		0.027		0.441
MDL	6/7/05	56.2		0.341		1.41		0.0798		0.0126		0.221		0.580
MDL	9/8/05	56.2		0.086		1.41		0.0196		0.0126		0.146		0.489
CRDL	10/27/04	300	1	5		10		2		0.100		2.0		5
REQ.		1000		21		17		106		0.2		3.4		134

Notes:
Results are reported in ug/L unless otherwise noted.
CRDL - Contract Required Detection Limit
MDL - Method Detection Limit
ND - Not Detected
REQ - Substantive Requirement Document Concentration Limit, Maximum Daily Conc.
U - Not detected at or above the MDL or IDL.
B - Value is between the MDL and PQL
1 - CRDL for Total Phosphorus for June-05 and Sept-05 sampling was 200
UB - Analytes reported as contaminants in the preparation blank; analyte conc.=0.16

Table 9-5

Summary of Monthly VOC Removal
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

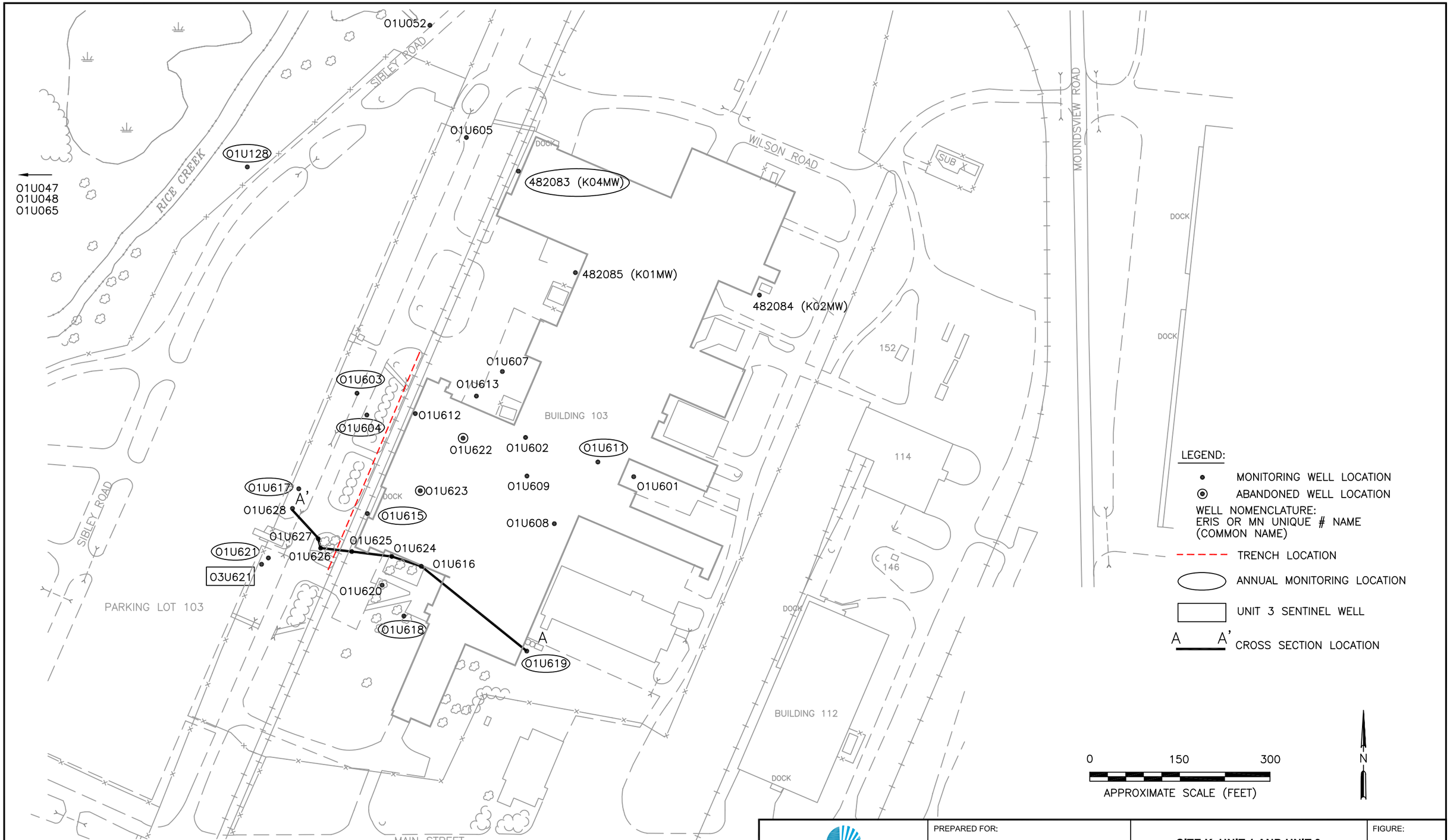
Month	Total Monthly Flow (million gallons)	Total VOC Influent Concentration	Total VOC Effluent Concentration	Total VOCs in Treatment Center Discharge (g)	Total VOC Mass Removed (g)	Total VOC Mass Removed (lb)
Cumulative As Of September 2004 (FY04)						149.5
October	0.40856	336.4	0	0.00	519.52	1.14
November[(1)]	0.41669	336.4	0	0.00	529.86	1.17
December[(1)]	0.38786	336.4	0	0.00	493.20	1.09
January[(1)]	0.32469	267.4	0	0.00	328.19	0.72
February[(1)]	0.27130	267.4	0	0.00	274.22	0.60
March	0.27257	267.4	0	0.00	275.51	0.61
April[(1)]	0.31973	243.9	0	0.00	294.77	0.65
May[(1)]	0.41470	243.9	0	0.00	382.33	0.84
June	0.47313	243.9	0.27	0.48	435.72	0.96
July[(1)]	0.50290	228	0	0.00	433.42	0.95
August[(1)]	0.40951	228	0	0.00	352.93	0.78
September	0.39992	228	0	0.00	344.67	0.76
Totals - FY05	4.60156			0.5	4664.3	10.3
Cumulative To Date						159.8

Notes:
(1) Influent and Effluent VOC concentrations from 10/27/04, 3/8/05, 6/9/05 and 9/8/05 quarterly samples, respectively.
Calculations based on compounds with concentrations above the CRDL only.
Analytical data has not received Level IV review and may be revised after completion of review.

Table 9-6

Summary of Groundwater Monitoring Requirements
Fiscal Year 2005
Site K, TCAAP
Arden Hills, Minnesota

	Remedy Component	Monitoring Requirements	Responsible Party	Documents Containing the Monitoring Plan
#1	Groundwater Monitoring	Outlined below	Alliant	Site K Monitoring Plan in Annual Performance Report
#2	Sentinel Wells	a. Water quality to monitor potential migration.	Alliant	Site K Monitoring Plan in Annual Performance Report
#3	Hydraulic Containment	a. Water levels for use in drawing contour maps showing capture.	Alliant	Site K Monitoring Plan in Annual Performance Report
		b. Pumping volumes and rates for reporting and mass removal calculation.	Alliant	Site K Monitoring Plan in Annual Performance Report
#4	Groundwater Treatment	None	Alliant	Site K Monitoring Plan in Annual Performance Report
#5	Treated Water Discharge	None	Alliant	Site K Monitoring Plan in Annual Performance Report
#6	Discharge Monitoring	a. Treated effluent water quality for comparison to substantive requirements criteria for discharge maximum daily concentration.	Alliant	Site K Monitoring Plan in Annual Performance Report
#7	Additional Investigation	a. As per work plan (completed).	Alliant	Site K Monitoring Plan in Annual Performance Report



SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

PREPARED FOR:
TWIN CITY ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

SITE K, UNIT 1 AND UNIT 3 GROUNDWATER MONITORING LOCATIONS

FIGURE: **9-1**

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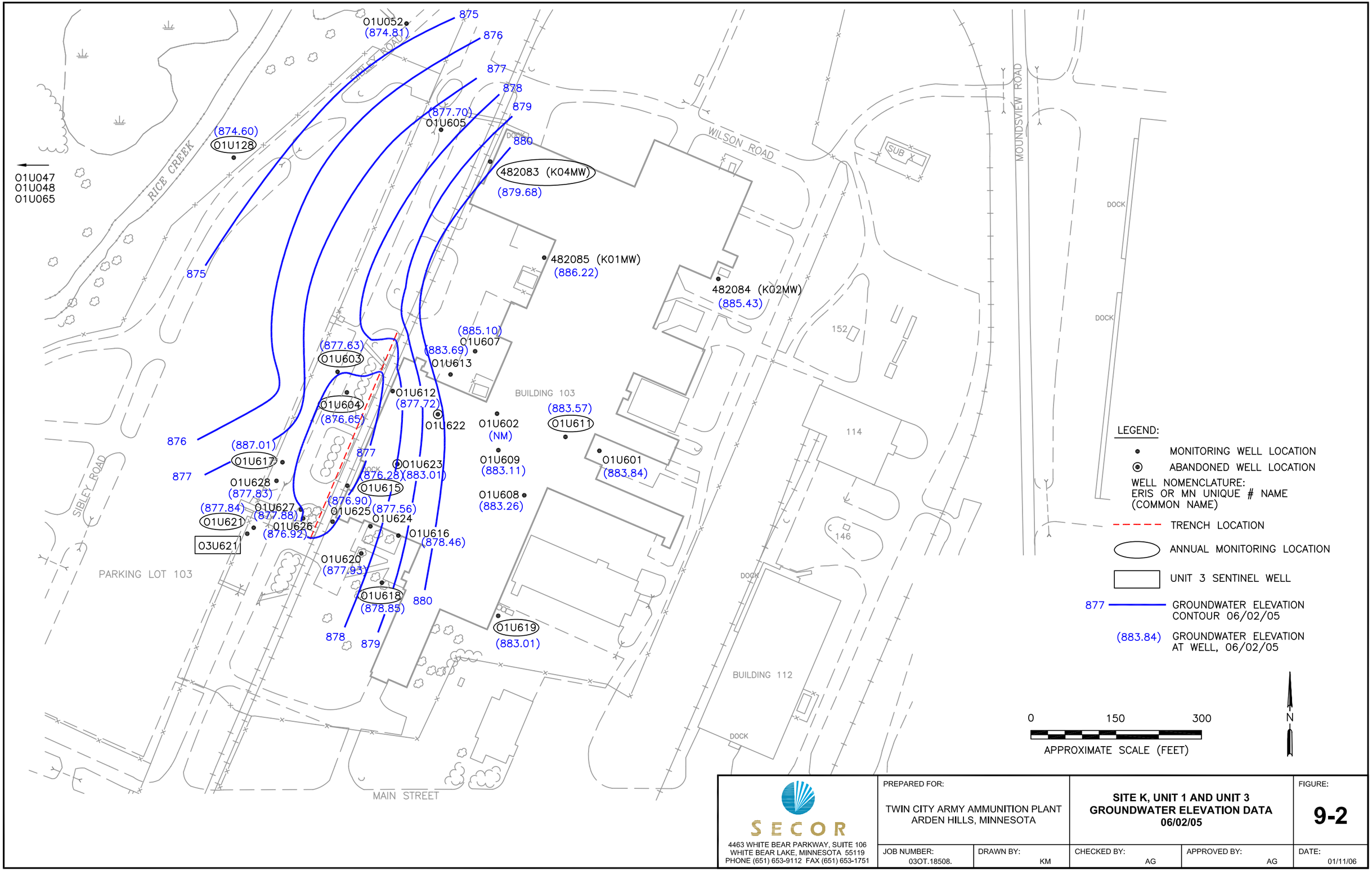
03OT.18508.	KM	AG	AG	01/11/06

SITE-K-05-A



SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

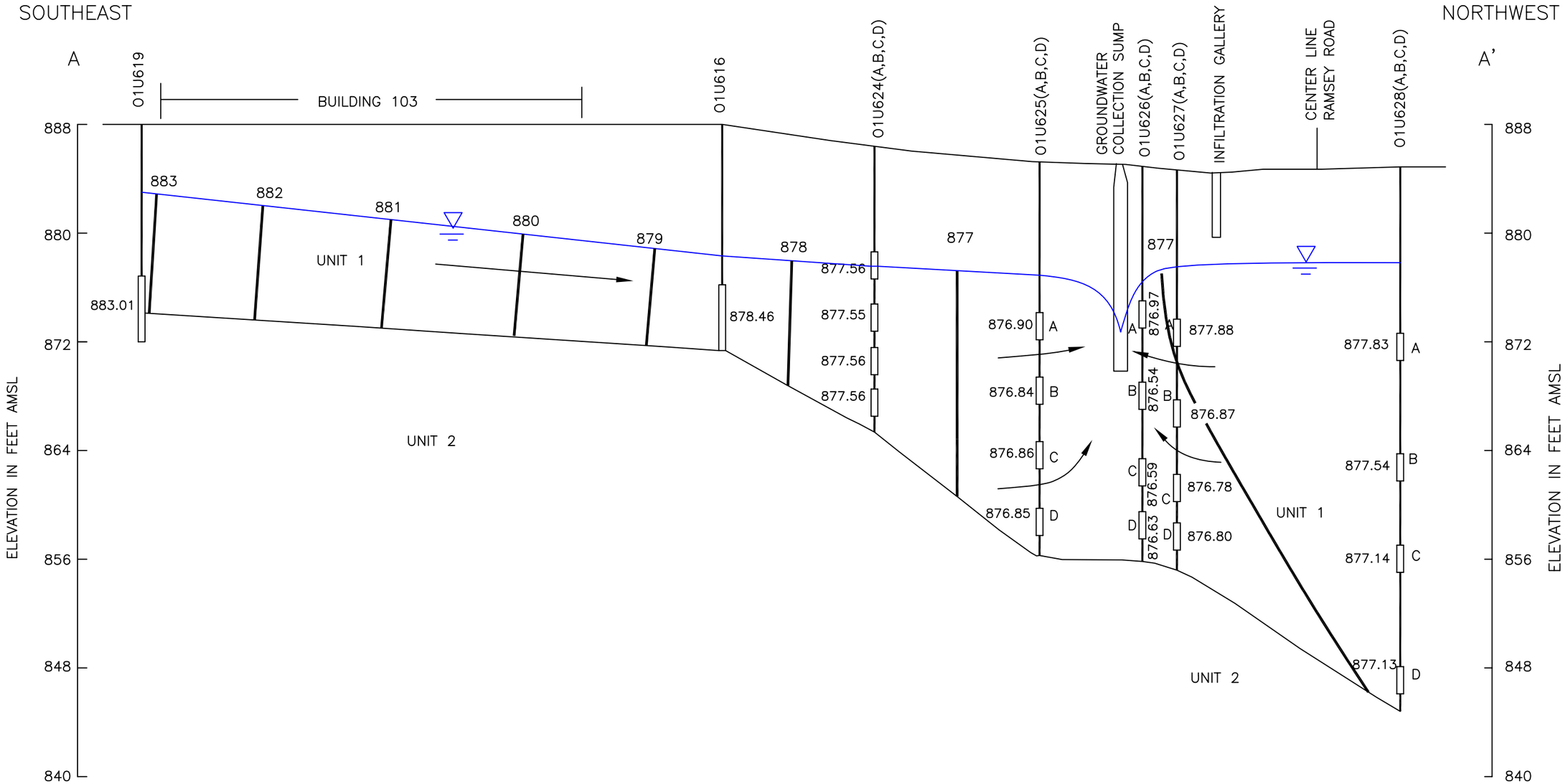
PREPARED FOR:
TWIN CITY ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

SITE K, UNIT 1 AND UNIT 3
GROUNDWATER ELEVATION DATA
06/02/05

FIGURE: **9-2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
03OT.18508.	KM	AG	AG	01/11/06

SITE-K-05-A



VERTICAL SCALE
1"=8'
0 8

HORIZONTAL SCALE
1"=40'
0 40

SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55110
PHONE (651) 653-9112 FAX (651) 653-1751

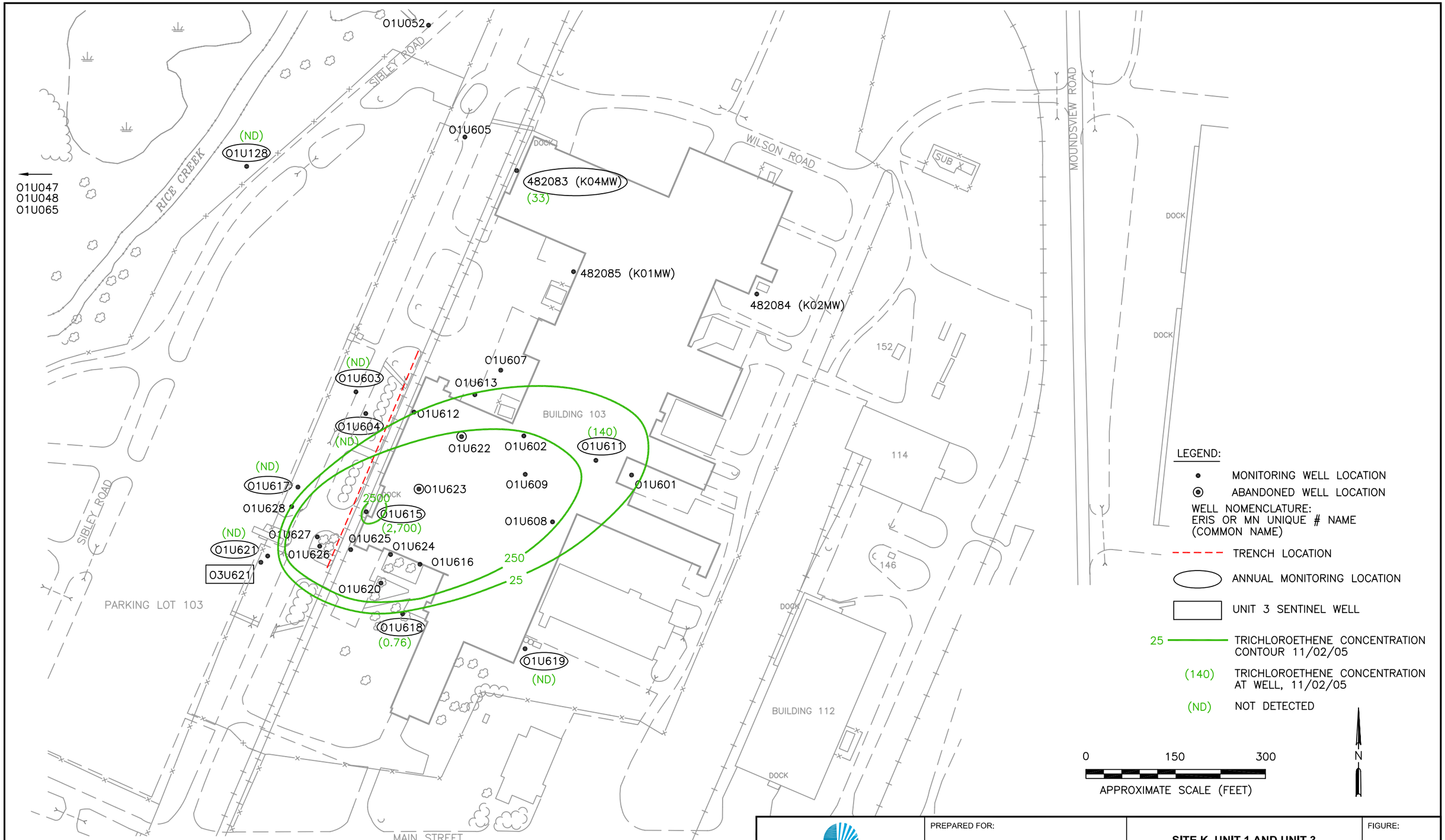
PREPARED FOR:
TWIN CITY ARMY AMMUNTION PLANT
ARDEN HILLS, MINNESOTA

SITE K
HYDROGEOLOGIC CROSS SECTION A-A'
6/2/05 (Q87)

FIGURE: **9-3**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
03OT.18508.	KM	MP	AG	12/20/05

CROSS-05-A



SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

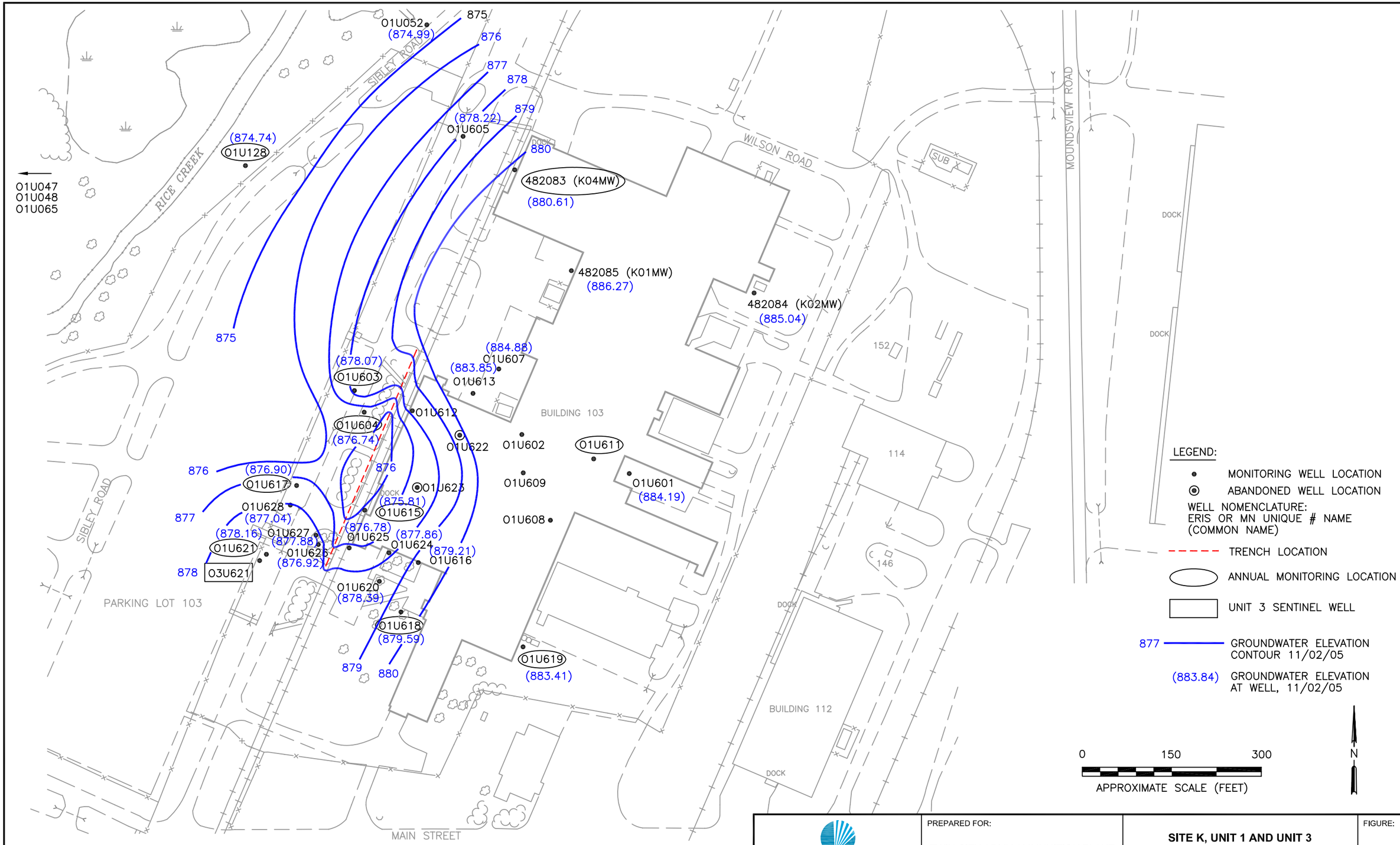
PREPARED FOR:
TWIN CITY ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

SITE K, UNIT 1 AND UNIT 3
TRICHLOROETHENE CONCENTRATION
MAP- 06/07/05 (Q87)

FIGURE: **9-4**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
03OT.18508.	KM	AG	AG	01/11/06

SITE-K-05-A



SECOR
4463 WHITE BEAR PARKWAY, SUITE 106
WHITE BEAR LAKE, MINNESOTA 55119
PHONE (651) 653-9112 FAX (651) 653-1751

PREPARED FOR:
TWIN CITY ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

SITE K, UNIT 1 AND UNIT 3
GROUNDWATER ELEVATION DATA
11/02/05

FIGURE: **9.5**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
03OT.18508.	KM	AG	AG	01/11/06

SITE-K-05-A

10.0 Operable Unit 2: Deep Groundwater

The selected remedy for the Deep Groundwater in the OU2 ROD consists of five remedial components that include continued use of the TGRS, with modifications to improve VOC contaminant removal from the source area. It also includes an annual review of new and emerging technologies potentially applicable to the Deep Groundwater. This report documents all performance and monitoring data collected from October 2004 through September 2005.

Historical Design and Evaluation of TGRS Remedial Action

In September 1987, a Record of Decision (1987 ROD) was prepared by the USEPA in order to implement the Interim Response Action Plan (IRAP) for TCAAP. The 1987 ROD provided specific criteria for the Boundary Groundwater Recovery System (BGRS). Following extensive interagency negotiations on the FFA and the ROD, the BGRS was started on October 19, 1987.

The BGRS consisted of six Unit 3 extraction wells (B1 through B6), that were connected by a forcemain to an air stripping treatment facility. The initial six BGRS extraction wells (B1 through B6) were installed and pumping tests were conducted prior to startup of the BGRS. These pumping tests were documented in the BGRS Extraction Well Pumping Test Report.

Following the initial 90-day operation of the BGRS, the IRA–BGRS Performance Assessment Report (PAR) was prepared. The PAR assessed the hydraulic and treatment performance of the BGRS. The PAR presented an extensive database collected during the initial 90-day period of BGRS operation and prior pertinent data. The PAR also included a summary of the geology, hydrogeology, and remediation history for TCAAP. The PAR was subsequently approved by the MPCA and USEPA.

A pumping test on well B9 was conducted in August 1988 and formed the basis of the final design of the TGRS. This test, and the previous pumping tests, were utilized to determine the pumping rate required to achieve the necessary zone of capture for the TGRS; based on the plume size at that time. The PAR stated that the overall pumping rate needed for the 17 extraction wells was 2,450 gpm. During the detailed design of the TGRS, the system was designed with the capacity to operate at a maximum theoretical rate of 2,900 gpm. The additional pumpage was included to provide a safety margin for the calculations and to allow for fluctuations in system operation.

The PAR made recommendations for expansion of the BGRS into the TGRS in order to meet the Phase II remediation criteria established in the 1987 ROD. These modifications were completed and the expanded system began operation on January 31, 1989.

The 1989 Annual Monitoring Report was the first report covering the fully configured TGRS. It concluded that the TGRS develops a continuous zone of capture that was approximately 4,500 feet wide at the TCAAP boundary. The zone of capture widened to approximately 8,300 feet upgradient of the boundary. This zone of capture was demonstrated at average system pumping rates of 2,400 to 2,700 gpm.

The 1989 Annual Monitoring Report was wider in scope than subsequent annual monitoring reports for the TGRS. The 1989 report was both a performance assessment report and a monitoring report. The 1989 report represented the first year of operation of the expanded TGRS. Thus, a more detailed and exhaustive performance assessment was appropriate and possible, as there were data available from non-pumping conditions for detailed comparison with pumping conditions. Between 1990 and 2002, the system continued to operate at an essentially steady state condition, so the TGRS was evaluated by comparing the pumping rates to those achieved for the 1989 evaluation.

In FY 2003, the Army received agency approval on the TGRS Operating Strategy (OS) document. The OS was based in part on findings from the 1989 Annual Monitoring Report and

presented a Global Operation Strategy (GOS) for the entire TGRS extraction system and a Micro Operation Strategy (MOS) for selected well groups. Evaluations now consider and compare actual pumping rates to the GOS and MOS rates presented in the Final TGRS OS.

TGRS Modifications

Since 1990, a number of modifications have been made to the TGRS operation in response to changes in plume configuration or operational issues. A brief summary of the major changes is presented below:

1. Source control well SC4 was shut down in November 1996 in response to insignificant VOC mass removal by this well. SC4 operated at an average extraction rate of 29 gpm in 1989 and 45 gpm prior to shut down.
2. Boundary extraction well B12 was shut down in November 1996. The plume in the B12 area had dropped below cleanup standards for several years. Well B12 operated at an average extraction rate of 139 gpm in 1989 and 190 gpm prior to shut down.
3. As per the OS, boundary extraction well B2 was shutdown and replaced with well B13 that began production in December 2002. The well screen in B2 became fouled and flow rates decreased from an average of nearly 200 gpm in the early 1990s to 52 gpm in 2002. During FY 2003, well B13 operated at maximum pumping capacity of nearly 100 gpm. The original design capacity for B13 was 200 gpm.
4. As per the OS, boundary extraction wells B7 and B10, and source control well SC3 were officially shut down in December 2002 due to the low TRCLE concentrations.
5. As per the OS, a larger capacity pump was installed at well B9 in December 2002 to raise the pumping rate from 150 gpm to approximately 300 gpm.
6. In July 2004, the TGRS was modified (Modification #3) as approved by the Agencies in May 2004. Pumps in Wells B1 and B13 were replaced and the pump in Well B13 was lowered to allow pumping below the well screen.
7. Flow rates at individual wells have been modified from time to time due to plume configuration changes, operational issues, and to maintain the OS.

10.1 REMEDY COMPONENT #1: HYDRAULIC CONTAINMENT AND CONTAMINANT REMOVAL FROM THE SOURCE AREA

Description: "Groundwater extraction to hydraulically contain the contaminated source area to the 5 µg/l TRCLE concentration contour and optimize the removal of contaminants from the source area through pumping of select wells." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When the TGRS is containing the contaminated source area to the 5 µg/l TRCLE contour and the system is operated to maximize the contaminant removal from the source area.

Is the remedy component being implemented?

Yes. The TGRS was operated in FY 2005 consistent with the requirements of the OU2 ROD. Table 10-1 presents the cleanup requirements for the TGRS from the OU2 ROD.

During FY 2005, the total extraction well water pumped averaged 1,703 gpm. The lower than expected average flow rate was mostly due to various power outages and a break in the forcemain that occurred during August and September 2005.

How is the system operated and what preventative maintenance measures were conducted during the year?

Summary of Operations

Beginning in FY 2003, the system operation changed to conform to the OS. Under the OS, groundwater is extracted from 8 wells along the southwest boundary of TCAAP (B1, B3 through B6, B8, B9, B11, and B13) and three wells downgradient of interior source areas on TCAAP (SC1, SC2, and SC5). Prior to this, wells B2, B7, B10, and SC3 were also operating components of the system. Submersible pumps in the extraction wells discharge into a common pressurized forcemain that carries the water to the treatment system. The treatment system is located adjacent to Building 116. The TGRS layout is presented on Figure 10-1.

The TGRS is designed and constructed with three options for treated water discharge: recharge at the Arsenal Sand and Gravel Pit, discharge to Rice Creek, and discharge to the TCAAP elevated water tank. Water stored in the elevated tank is "softened" and then "polished" with granular activated carbon (GAC) prior to distribution at TCAAP. Currently, the Arsenal Sand and Gravel Pit option is utilized for the majority of treated water.

System Operation Specifications

In general, the influent and effluent water flow rates at the treatment plant are designed to be equal, thereby providing continuous operation of all processes and equipment. The following is a summary of the system design parameters:

- The groundwater extraction system, including the treatment center and 17 TGRS extraction wells, was originally designed to provide a theoretical hydraulic capacity of 2,900 gpm and a sustained daily average capacity of 2,730 gpm.
- The influent to the treatment plant is divided between Towers 1 and 2, each receiving up to a maximum of 1,450 gpm.
- Wet Well Pumps 1 and 2 (WWP#1 and WWP#2 located in Wet Wells 1 and 2) transfer water to Towers 4 and 3, respectively. Each pump and tower handles up to a maximum of 1,450 gpm.
- Wet Well Pumps 3 and 4 (WWP#3 and WWP#4 located in Wet Well 3) discharge treated water to an end use at a combined rate of up to a maximum of 2,900 gpm.
- Air blowers provide air to the towers. The blowers for Towers 1 and 2 are designed to provide 6,000 – 7,000 standard cubic feet per minute (scfm) each. The blowers for Towers 3 and 4 are designed to provide 9,000 – 14,000 scfm each.

Water level sensors within the wet wells communicate with the programmed logic controller (PLC) according to changing water levels. A complete and balanced operation should provide continuing water levels above the low-level sensors and below the high-level sensors. However, given the probability of unbalanced flows for any number of reasons (e.g., changing hydraulic

heads, maintenance, repairs, temporary malfunctions), the PLC has provisions within its program to cycle-off the extraction well(s) or wet well pumps according to high water levels occurring in the wet wells; and in turn, cycle-off the wet well pumps according to low levels occurring within these wet wells.

The system operates such that the wet well pumps cycle rather than the extraction well pumps. The rationale behind this is that there are a relatively small number of motors, starters and electrically controlled valves associated with the wet wells when compared with the extraction well field. This also provides for more continuous and complete hydraulic capture within the aquifer units. However, the extraction well field will cycle if necessary, starting with the least contaminated extraction well, B7 (if operating), and followed by the other extraction wells in a predetermined sequence.

In summary, the priority of operation is as follows:

- Maintain constant operation of all extraction wells and air stripping towers above the operating minimum.
- Maintain the desired flow rates at individual wells.
- Maintain treatment center WWP#1 and WWP#2 pumping rate equal to or slightly above the combined pumping rate of the extraction well field.
- Maintain treatment center WWP#3 and WWP#4 pumping rate equal to or slightly above WWP#1 and WWP#2.
- Provide water to the TCAAP water supply system.

FY 2005 Maintenance and Inspection Activity

During FY 2005, the following inspection and maintenance activities occurred:

Preventive Maintenance (PM): The extensive PM program allowed the operations staff to identify and repair or replace equipment to avoid a down time failure. The program consists of

monthly, quarterly and annual maintenance tasks. When required, further repair work was scheduled rather than waiting for the failure to occur. A broad range of system-specific information was collected during this year's PM. This information is used to direct future repair work.

Electrical Inspection and Temperature Survey: A system-wide electrical inspection and infrared temperature survey was performed to identify loose connections and overheating components. Component overheating often precedes equipment failure. Electrical components that were identified as failing were replaced.

Verification of Flow Meters: As part of the routine PM, flow meters in the pumphouses were compared to a factory-calibrated flow meter. Flow volume measurements before and after conducting maintenance on the meters were compared to verify the consistency of measurements. Meters found to be out of calibration were replaced or recalibrated.

Daily Tracking of Flow Rates: Pumphouse and treatment center meter readings were recorded in the course of the daily inspections. Daily meter readings were entered into the computer and the flow rates were calculated and reviewed by the operations staff. Early detection of changes in flow rate was critical in early identification of failing equipment. By early detection of flow rate changes, equipment repair was typically scheduled before a failure occurred.

Did the system operate at a rate sufficient for complete capture?

The total annual extraction rate of 1,703 gpm was slightly lower (2.4 percent) than the operational minimum rate presented in the OS (1,745 gpm).

Figure 10-2 plots the daily average flow rate since October 1, 2004 and shows that the TGRS operated above the OM for the majority of the time (274 days or 75.1% of the time) in FY2005. Daily extraction rates fell below the immediate response minimum of 1,500 gpm (representing a 25 percent safety factor above the calculated base rate of capture of 1,200 gpm) for 18 days in FY2005 which means that the TGRS operated above 1,500 gpm 95 percent of the time on a daily

basis. On a monthly basis, total TGRS extraction rates were below 1,745 gpm during the following months:

- December 2004 (1,740 gpm, lower flow due to a Snelling Avenue valve malfunction over Christmas break).
- March 2005 (1,720 gpm, lower flow due to Well B3 failure between March 5, 2005 and March 21, 2005).
- May 2005 (1,721 gpm, lower flow due to Pump 3 and Well B8 failure between May 7, 2005 and May 11, 2005).
- July 2005 (1,696 gpm, lower flow due to pitless adapter failure in B6, pump failure in B9, motor failure in B4, well cleaning in SC2).
- August 2005 (1,441 gpm, lower flow due to forcemain break that included communications control break between August 3, 2005 and August 9, 2005).
- September 2005 (1,482 gpm, lower flow due to power outages causing communications control failures between September 2, 2006 and September 7, 2006, on September 16, 2006 and between September 21, 2006 and September 26, 2006).

Appendix F.2 provides additional information on the various downtimes throughout FY 2005.

The monthly and annual volume of water pumped is presented in Table 10-2 and 10-3. Table 10-2 presents the pumphouse metered monthly flow volumes of each extraction well and historical flow data. MOS flow rates were no less than 97 percent of the MOS OM for FY 2005.

Table 10-3 presents the combined pumphouse-metered flow volume (extraction wells) and the flow volumes metered at various stages in the treatment center along with historical data. As shown on Table 10-3, the TGRS successfully captured and treated 883,348,000 gallons of contaminated water from October 2004 through September 2005. This volume reflects a decrease over FY 2004 rates that is attributed to the down time that occurred during August and September 2005.

The above extraction volume is corrected to reflect the total from treatment center meters #1 and #2, which are located after the first set of air stripping towers. Review of Table 10-3 shows that the sum of the individual pumphouse extraction volumes was larger (895,339,710 gallons in FY 2005 that converts to an average flow rate of 1,703 gpm). While this is only a 1.3 percent difference from the sum of treatment center meters #1 and #2, it correlates to an average difference of 23 gpm over the year.

The TGRS as a whole was operational approximately 95 percent of the time (i.e., 346.1 days out of 365 days in FY 2005).

Monthly Flow Reports

Each month a Monthly Flow Report is prepared. The report includes the month's meter totalizer readings, calculated flow volumes, and operational notes. Flow volumes are presented on a daily basis and are totaled to provide a monthly flow volume. A compilation of FY 2005 operational notes is presented in Appendix F.2. Treatment center flow meters #1 and #2 were used to measure total flow volumes for monthly reports and for this report for total mass removal estimates (but would represent a slightly lower than actual extraction rates since they are located after the first set of air stripping towers). Daily variation in readings at individual wells is primarily due to differences in the time of day when meter readings were taken.

How much down time occurred during the year?

The down time for each extraction well, over the last five years, is presented in Table 10-4. A summary of average down time for the pumphouses and the treatment center by the category of failure is presented in Table 10-5. A description of each down time event, organized chronologically, is presented in Appendix F.2. The same descriptions organized by affected pumphouse, treatment center, and forcemain is presented in Appendix F.3.

Treatment center and extraction well down times resulted primarily from failure and subsequent repair of components in the pumphouses, treatment center, and electrical service. The treatment center and extraction wells were shut down for repairs more in FY 2005 then they were in FY

2004. However, interruptions to electrical service increased over 700% from FY 2004 and accounted for much of the increase in down time.

Description of Down Time Categories

Pumphouse component failures accounted for an average of 5.5 days down time per pumphouse. Down times due to pumphouse maintenance were similar in FY 2005 to FY 2004. The major pumphouse repairs causing down time were:

- Pump and motor replacement at Pumphouse B3;
- Input/Output module and check valve malfunction at Pumphouse B9;
- O-ring replacement at pitless adapter at Pumphouse B6;
- ECV malfunction and pump and drop pipe replacement at Pumphouse SC2; and
- Motor replacement at Pumphouse B4.

Treatment center component failures and repairs that caused pumphouse down time consisted of electric check valve maintenance, malfunctions and repairs, and electrical control equipment failures and subsequent repairs. Treatment center component failures, repairs, and adjustments accounted for an average of just 0.5 days down time per pumphouse.

Electrical service system failures accounted for an average of 6.5 days down time per pumphouse. Electrical storm damage was the primary cause of down time.

Preventative maintenance procedures accounted for an average of 0.6 days of down time per pumphouse. Preventative maintenance procedures are described in the project Operation and Maintenance Manual.

System modifications accounted for an average of 0.0 days down time per pumphouse. There were no modifications to the system in FY 2005.

Forcemain issues accounted for an average of 5.8 days down time per pumphouse. Diagnosis and repair of a forcemain failure on the raw water loop in August 2005 and the repair of the water tower altitude valve were another primary cause of down time in FY 2005.

Were there any major operational changes during the year? No.

Did the system achieve hydraulic capture?

The total annual extraction rate of 1,703 gpm was slightly lower (2.4 percent) than the operational minimum rate presented in the OS (1,745 gpm). The TGRS operated above the operational minimum and immediate response minimum of 1,500 gpm on a daily basis for the majority of the time (274 days or 75.1% of the time) in FY 2005.

A positive sign with respect to capture are the generally stable or decreasing TRCLE concentrations evident at many wells across the TGRS boundary since FY2001.

Groundwater elevation measurements were collected in June 2005. Appendix D contains the water level database for the monitoring wells. Figures 10-3 through 10-5 present the groundwater elevations for Upper Unit 3, Lower Unit 3, and Upper Unit 4 during these time periods. These figures present the potentiometric contours from three vertical portions of the aquifer. The groundwater elevation contours and limits of capture in the three portions of the aquifer are similar to those observed in FY 2003 after the modification to the OS was implemented. These groundwater contours support the interpretation that the zone of capture created by the TGRS very likely extends beyond the 5 µg/l TRCLE contour, in both the Unit 3 and the Unit 4 aquifers.

How much VOC mass was removed by the system and how is it changing with time?

As discussed above, the TGRS extracted and treated 883,348,000 gallons of water from October 2004 through September 2005. Based on the monthly influent and effluent VOC concentrations and the monthly flow totals measured with meters #1 and #2, the TGRS removed a total of 2,663 pounds of VOCs from October 2004 through September 2005. The VOC mass removal is 19

percent lower than the FY 2004 VOC mass removal of 3,291 pounds. The decrease can be attributed to two main factors. First, the increased amount of down time in FY 2005 as compared to FY 2004. Second, the decrease in FY 2005 reflects an overall decrease in plume concentration. Average VOC influent concentrations decreased from 447 µg/l in FY 2004 to 364 µg/l in FY 2005 (18.5 percent lower). Table 10-7 summarizes the individual VOC mass contribution of each extraction well and the entire system. Overall, the TGRS has removed 191,931 pounds of VOCs from the aquifers since 1987.

The total mass removed is based on the monthly TGRS influent and effluent sampling and flow through the treatment system. The monthly sampling of the treatment system provides the best estimate of overall mass removal, compared to the individual extraction well sampling, due to the larger number of samples and consistency in the month-to-month analytical results. The percent contributions for each well are based on the average flows from each well and the semi-annual VOC results from each well.

To calculate the number of pounds of VOCs for each well, the flows and concentrations were normalized to the treatment center flows and concentrations. This corrects for variance between flow meters in the well houses and for consistency between VOC concentrations at the wells and monthly VOC concentrations in the influent and effluent.

VOC samples were collected semi-annually from the operating extraction wells that comprise the TGRS. Wells B2, B7, B10, B12, SC3, and SC4 are shut down, but were temporarily operated for June 2005 sampling. Table 10-8 presents a summary of these sampling results. Variations in detection limits from round to round are the result of varying sample dilution performed by the laboratory. Dilutions are required due to the high concentrations of some analytes. The location of the extraction wells is presented on Figure 10-1.

Appendix G.1 presents TRCLE versus time graphs for each extraction well. Wells B1, B2, B6, B7, B8, B9, B10, B11, B12, SC2, SC3, and SC5 exhibit declining TRCLE concentrations over time. As is typical, these wells exhibit asymptotic decreases over time. In the past, wells B3 and

B4 exhibited rising TRCLE concentrations with time, but now B3 appears to be leveling off and B4 is declining. Well B5 was increasing through 1992 and has been decreasing since then. Well B10 showed an elevated TRCLE concentration of 10 µg/l in the June 2004 sampling, but has now fallen back to a level consistent with its declining trend. TRCLE concentrations have been gradually declining at SC1 since 1993. TRCLE concentrations peaked at SC4 in 1999, and then leveled off. Since its installation in November 2002, TRCLE concentrations at B13 first increased, but now appear to be decreasing since they peaked in December 2003. Overall, the trends indicate a long-term decrease in VOC concentrations.

Extraction well B6 exhibited a slight concentration increase in FY 1998 and was stable or slightly declining through FY 2005. This is probably due to plume redistribution following the shutdown of B12 in FY 1996. Extraction well B7 has been stable and below the contaminant-specific requirement for TRCLE (5 µg/l), and all other VOCs from March 1995 through FY 2005.

These trends reflect the overall decline in OU2 deep groundwater contaminant concentrations. In addition, as discussed below, there has been a reduction in overall TGRS influent concentrations over the previous several years.

As Table 10-7 illustrates, eight wells, B1, B4, B5, B6, B9, B13, SC1, and SC5, that are located in the centers of the plume, achieve the largest rates of VOC removal. These eight wells together accounted for nearly 99 percent of the VOC mass removed.

The source control wells, SC1 through SC5, together accounted for 65 percent of the VOC mass removed while accounting for only 8 percent of the water pumped by the system. SC5, in particular, removed 61 percent of the total VOC mass at a rate of only approximately 93 gpm (5 percent of the total water pumped by the system). This illustrates the efficiency of extracting groundwater from near the source areas.

What do the long-term trends in the monitoring wells show?

Appendix B presents the TRCLE graphs over time for monitoring wells on- and off-TCAAP. Although a formal statistical analysis has not been conducted, the large majority of these graphs reflect downward trends in TRCLE concentration, indicating an overall improvement in water quality both upgradient and downgradient of the TGRS. Due to the complexity of the flow system, changes in flow direction over time, and the variation in chemical transport properties across the study area, the graphs may not reflect a uniform or easily predictable pattern.

Several wells were identified in previous APRs or when reviewing the FY 2005 database that have inconsistent or upward trends in TRCLE concentrations that warrant further observation and discussion:

Well	Trend Observation
03U003	Trend identified during FY 2004 data review. Dropped from 1,000's of parts per billion (ppb) in early 1990s, recently stable in 100's of ppb; however, increased from 78 ppb in 2003 to 120 ppb in 2004 and 110 ppb in 2005. Maintain annual sampling frequency through 2006.
03U030	Trend identified during FY 2003 data review. Under 30 ppb through 1998, peaked over 60 ppb in 1999, recently at 42 ppb. Maintain biennial sampling frequency (next event 2007).
03U806, 03L806, and 04U806	Trend identified in FY 2001 APR. Dropped from 1000's of ppb in mid 1990s, recently showing marked decrease in TRCLE since 2001. Maintain sampling frequency.

Well	Trend Observation
03U094	Trend identified during FY 2004 data review. Dropped from 1,000's of ppb in late 1980s and early 1990s, recently stable in 100's of ppb; however, increased from 170 ppb in 2003 to 470 ppb in 2005. Maintain annual sampling frequency.
03M806	Trend identified during FY 2003 data review. Dropped from near 900 ppb in 1987, to below 100 ppb from 1993 through 1996. Increased to 1,300 ppb, a historical high concentration, in 2003. Recently at 920 ppb. Maintain annual sampling frequency.
03U708	No clear trend in TRCLE concentration is evident at this time. TRCLE concentrations have fluctuated between 120 µg/l and 270 µg/l over the last 6 sampling events, with the 2005 sample having a TRCLE concentration of 120 µg/l.
03U711	Trend identified in FY 2001 APR. Dropped from near 1,000 ppb in 1994, to 75 ppb in 1999, increased to 250 ppb in 2004 and was fairly stable at 190 ppb in 2005. Maintain annual sampling frequency.
03U710	Trend identified during FY 2004 data review. Dropped from over 3,000 ppb in late 1980s, to 100's during the 1990s, decreased to 85 ppb in 2004 and 88 ppb in 2005, historical low concentrations. Maintain biennial sampling frequency.

Well	Trend Observation
03L014	Trend identified during FY 2003 data review. Increased from near non-detect in late 1980s to over 800 ppb in 1999, recently at 240 ppb. Maintain biennial sampling frequency (next event 2007).
03L809	Trend identified in FY 2001 APR. Dropped from over 3,000 ppb to 67 ppb through 1998, recently at 440 ppb. Maintain biennial sampling frequency (next event 2007).
04U861	Trend identified in FY 2001 APR. Below 10 ppb during late 1980s through 1993, increased to high 20's during 1999, recently increased to 200 ppb. Recommend collecting additional sample in 2006.
04U843	Trend identified in FY 2001 APR. Below 15 ppb from late 1980s through 1997, increased to above 30 ppb in 1998, peaked at 38 ppb, dropped to below 1 ppb in 2003 and increased to 60 ppb in 2005. Maintain biennial sampling frequency.
04U841	Trend identified in FY 2001 APR. Below 10 ppb through 1995, increased to 25 ppb in 2001, decreased to 5 ppb in 2003 and increased to 19 ppb in 2005. Maintain biennial sampling frequency.
03U822	Trend identified during FY 2003 data review. Below 20 ppb through 1998, peaked at 375 ppb in 1999, decreased to 160 ppb in 2005. Maintain biennial sampling frequency.

Well	Trend Observation
03L822	Trend identified in FY 2001 APR. Increased from below 5 ppb during early 1990s to over 600 ppb in 1999 and 2003. Approximately 1 mile from TGRS. Well historically showed 1,1,1-trichloroethane as major contaminant. Maintain biennial sampling frequency.

10.2 REMEDY COMPONENT # 2: GROUNDWATER TREATMENT

Description: "Groundwater treatment using air stripping." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):
When the air stripping treatment facility is treating water and meeting the cleanup requirements in Table 1 of the OU2 ROD.

Is the remedy component being implemented?
Yes. The air stripping treatment facility has been operating since 1986.

Did the treatment system meet the treatment requirements in the OU2 ROD?
Yes. Influent and effluent water was sampled on a monthly basis during FY 2005. The influent/effluent database for FY 2005 is contained in Appendix G.2. Figure 10-11 presents a graph of influent TRCLE versus time. This graph is cumulative and includes data from before 1989, when the system consisted of only six extraction wells. The average FY 2005 influent TRCLE concentration was 280 µg/l, down from 335 µg/l in FY 2004. FY 2005 represents the third year since the TGRS was reconfigured to achieve greater pumping in the centers of the VOC plumes and less pumping on the edges of the plumes where VOC concentrations are much lower. The system could be stabilizing and the decreasing TRCLE concentration could also be due in part to an overall decrease in plume concentration.

Figure 10-11 also presents a graph of the effluent TRCLE concentration versus time. As indicated, the effluent was below 5 µg/l TRCLE for all sampling events in FY 2005. A review of the FY 2005 database indicates that the effluent has also remained below the treatment requirements for all other VOC compounds specified in the OU2 ROD. Comparison of influent and effluent TRCLE concentrations indicates average removal efficiency of 99.7 percent.

What was the mass of VOCs emitted into the air?

The air stripping towers remove VOCs with an efficiency of approximately 99.7 percent. Thus, the air emissions are essentially equal to the VOC mass removal rates presented in Table 10-7. Air emissions therefore averaged 7.3 pounds/day based on the VOC mass removal rates. The total VOC emissions from October 2004 through September 2005 were 2,663 pounds.

10.3 REMEDY COMPONENT #3: TREATED WATER DISCHARGE

Description: "Discharge of treated water to the on-site gravel pit." (OU2 ROD, page 3)

Performance Standard (how do you know when you're done):

When the gravel pit is accommodating the discharge from the treatment system and allowing it to recharge to the aquifer.

Is the remedy component being implemented?

Yes. Based on visual observation during FY 2005, there were no noticeable changes in Gravel Pit performance. The Gravel Pit is accommodating the TGRS discharge as designed.

10.4 REMEDY COMPONENT #4: INSTITUTIONAL CONTROLS

Description: "Institutional controls to restrict access to contaminated aquifers and prevent exposure to contaminated groundwater." (OU2 ROD, page 4)

Performance Standard (how do you know when you're done):
When a special well construction area and alternate water supply have been established and private wells in impacted areas have been sealed.

Is the remedy component being implemented?
Yes, although, the institutional controls have not been formally adopted for OU2. There are no private users of groundwater on TCAAP and the TCAAP potable water supply is treated by the TGRS prior to distribution. TCAAP is a government reservation, is fenced, and access is restricted to authorized personnel.

10.5 REMEDY COMPONENT #5: REVIEW OF NEW TECHNOLOGIES

Description: "Reviews of new and emerging technologies that have the potential to cost-effectively accelerate the timeframe for aquifer restoration. Reviews shall be performed by the Army and reported annually in accordance with the consistency provisions of the TCAAP FFA." (OU2 ROD, page 4)

- The intent is to consider new technologies of merit, which is not on any set schedule. To have merit, a new technology must have promise in reducing cost and the time for cleanup. There may be years where no technologies are considered. It is envisioned that at any time, any interested party (Army, USEPA, and MPCA) can suggest new technologies for consideration. At a minimum, the Technical Review Committee meetings can serve as a forum for discussion of possible technologies. If a technology is agreed to have merit by the Army, USEPA, and MPCA, then the Army will evaluate the

technology. The level of effort for evaluations can range from simple literature searches to extensive treatability studies. On an annual basis, the Army will report on:

- Whether or not any new technologies were identified and considered to have merit that year,
- The progress or results of any evaluations during that year,
- Any planned evaluations for the following year.

Performance Standard (how do you know when you're done):

When the Army reports on the status of any reviews of emerging technologies in the annual monitoring report.

Is the remedy component being implemented?

Yes. Beginning with the FY 1997 Annual Performance Report, the Army reports annually on the status of any reviews of emerging technologies.

- In September 2002, the MPCA and USEPA announced they would be conducting a natural attenuation microcosm study using carbon dating. In October 2002, Army drilled a boring at Site G to collect soil for the study. The study results are expected to be published in FY 2005.
- "New technologies" is an ongoing agenda item for the monthly Technical Review Committee meetings between the Army, USEPA, and MPCA. No emerging technologies were identified through the process during FY 2005.
- The MPCA identified a study involving the addition of vegetable oil to groundwater that is being monitored at the Navy site in Fridley, Minnesota, as a potential technology of interest.

Were any new technologies identified and considered to have merit during FY 2005?

No. The Army's review did not identify any new or emerging technologies that have the potential to cost-effectively accelerate the timeframe for aquifer restoration.

What is the status and/or findings of any previously initiated reviews of emerging technologies?

MPCA continued its research into natural attenuation processes at TCAAP. The MPCA and USEPA published the results of the microcosm study for deep groundwater sediments in 2004 showing that abiotic degradation of cis-DCE is an important factor contributing to the natural attenuation of this compound at the site. (*Non-biological Removal of cis-dichloroethylene and 1,1-dichloroethylene in aquifer sediment containing magnetite.* Environmental Science and Technology, 38: 1746-1752.)

Are any new reviews planned at this time for the coming year?

No. The Army will continue to have new technologies on the agenda for the quarterly Technical Review Committee meetings, and attend conferences that highlight emerging and new technologies. However, reviews of specific technologies are not planned in FY 2006.

10.6 REMEDY COMPONENT #6: GROUNDWATER MONITORING

Description: "Groundwater monitoring to track remedy performance." (OU2 ROD, page 4)

Performance Standard (how do you know when you're done):

When a regulator approved monitoring plan is in place and monitoring is conducted according to the plan.

Is the remedy component being implemented?

Yes. Monitoring in FY 2005 was consistent with the OU2 ROD. Water level measurements and water quality samples were collected as stated in Appendix A.1. Appendix A summarizes the

FY 2005 monitoring plan and any deviations are explained in Appendix C.2. Monitoring was as follows:

Groundwater

TGRS groundwater level measurements were collected during December 2004 and June/July 2005 according to the monitoring plan. Appendix D contains the comprehensive groundwater quality and water level database for the TGRS monitoring wells. Water quality samples were collected from TGRS wells according to the monitoring plan. Groundwater samples were collected at wells stated in Appendix A.1. All wells were sampled for volatile organic compound (VOC) (8260B) analysis (except for well 03U084 that was sampled for lead). FY 2005 was a "full round" year in the biennial sampling program, so samples were collected for the full list of wells. Table 10-6 presents the groundwater quality data for FY 2005. Figures 10-6 through 10-8 present plan views of the TRCLE plumes and Figures 10-9 and 10-10 present a cross sectional view of the plume along the TCAAP boundary.

Results from the 2005 groundwater sampling showed similar or decreasing TRCLE concentrations at most wells sampled. Decreases from 2003 data were most notable along the northwest end of the 5 µg/l TRCLE contour (such as at the 806 nest and the 833 nest) and extraction wells B4, B5, B6, and B13. The notable exceptions to the decreasing trends were at 03U003 (increased from 78 to 110 µg/l), 03U671 (increased from 1.8 to 61 µg/l), and 03U094 (increased from 250 to 470 µg/l). (**discussion moved to Section 7)**.

Treatment System

The TGRS treatment system influent and effluent was sampled monthly during FY 2005 in accordance with the FY 2005 monitoring plan. Groundwater samples from the extraction wells were collected in December 2004 and June 2005 in accordance with the FY 2005 monitoring plan.

Is additional monitoring proposed prior to the next report?

Yes. Although an OU3 monitoring well, VOC sampling is proposed for well 04U861 (one sample).

10.7 OVERALL REMEDY FOR DEEP GROUNDWATER

Did the TGRS meet the requirements of the OU2 ROD?

Below are general conclusions on how the TGRS operated in FY 2005:

- During FY 2005, the total extraction well water pumped averaged 1,703 gpm. The total extraction well water pumped was 98% of the Global Operation Strategy (GOS) Operating Minimum (OM) (1,745 gpm). The lower than expected average flow rate was mostly due to various power outages and a break in the forcemain that occurred during August and September 2005.
- The TGRS treated 883,348,000 gallons of water and removed 2,663 pounds of VOCs from October 2004 to September 2005. Average VOC influent concentrations decreased by 18.5% from FY 2004.
- Groundwater analytical data of the source area shows a general decrease in TRCLE concentration. This demonstrates that the TGRS is effectively removing VOC mass from the aquifer.
- Effluent VOC concentrations were below contaminant-specific requirements for all sampling events.

Do any additional measures need to be addressed?

The Army, MPCA, and USEPA plan to have further discussions regarding the TGRS OS, and interpreting the results of pumping rates with respect to meeting the goals of the ROD.

Table 10-1

Groundwater Cleanup Levels
TGRS, TCAAP
Arden Hills, Minnesota

Substance	***Expected Level in Discharge (ppb)***	***Operable Unit 2 Rod Requirements (ppb)***
Volatile Organic Compounds (VOCs)		
cis-1,2-Dichloroethene plus trans-1,2-Dichloroethene	<1	70
1,1-Dichloroethene	<1	6
1,1,1-Trichloroethane	<1	200
1,2-Dichloroethane	--	4
Trichloroethene	<5	5
1,1-Dichloroethane	--	70
Tetrachloroethene	--	5

Table 10-2

Extraction Well Water Pumped
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Volume of Water Pumped (gallons)													
	B1	***B3***	***B4***	***B5***	***B6***	***B8***	***B9***	***B11***	***B13***	***SC1***	***SC2***	***SC5***	***TOTAL***
October 2004	10,506,800	7,728,300	7,749,400	9,162,700	10,143,100	5,377,500	12,479,500	4,193,500	4,804,500	1,087,400	1,447,900	4,537,800	79,218,400
(gpm)	235	173	174	205	227	120	280	94	108	24	32	102	1,775
November 2004	10,160,700	8,050,500	7,124,300	9,028,800	9,887,600	4,973,600	12,182,500	4,724,100	3,845,100	959,100	1,614,900	4,218,700	76,769,900
(gpm)	235	186	165	209	229	115	282	109	89	22	37	98	1,777
December 2004	10,384,400	8,715,600	7,372,700	8,959,400	9,952,100	4,718,100	12,411,000	4,584,300	3,442,300	1,028,800	1,603,800	4,481,600	77,654,100
(gpm)	233	195	165	201	223	106	278	103	77	23	36	100	1,740
January 2005	10,307,600	9,141,800	6,873,200	8,748,400	10,431,200	6,775,000	12,058,200	4,697,500	3,530,700	1,078,600	1,601,300	4,412,800	79,656,300
(gpm)	231	205	154	196	234	152	270	105	79	24	36	99	1,784
February 2005	9,414,600	7,501,000	7,115,600	7,840,200	9,230,400	5,970,100	10,212,800	4,214,200	3,249,000	986,300	965,700	3,822,000	70,521,900
(gpm)	233	186	176	194	229	148	253	105	81	24	24	95	1,749
March 2005	10,823,100	3,218,200	9,195,600	8,716,800	10,728,500	6,974,900	12,032,600	4,825,300	3,894,200	1,128,100	1,166,100	4,094,900	76,798,300
(gpm)	242	72	206	195	240	156	270	108	87	25	26	92	1,720
April 2005	10,186,300	8,549,900	8,946,900	8,014,600	10,112,400	6,087,300	11,497,000	4,732,300	3,311,400	1,073,000	1,319,700	3,940,600	77,771,400
(gpm)	236	198	207	186	234	141	266	110	77	25	31	91	1,800
May 2005	10,065,800	8,675,900	9,513,900	7,733,300	9,887,200	5,908,000	11,705,400	4,493,700	3,305,600	1,050,500	566,600	3,924,900	76,830,800
(gpm)	225	194	213	173	221	132	262	101	74	24	13	88	1,721
June 2005	9,958,000	8,709,600	9,569,600	7,268,200	9,975,400	6,395,700	9,706,100	4,479,300	4,243,000	991,800	400,000	4,370,900	76,067,600
(gpm)	231	202	222	168	231	148	225	104	98	23	9	101	1,761
July 2005	10,711,000	8,389,600	8,340,800	7,719,100	9,101,300	6,411,500	10,106,700	4,335,300	4,888,500	1,181,400	357,600	4,147,900	75,690,700
(gpm)	240	188	187	173	204	144	226	97	110	26	8	93	1,696
August 2005	9,581,300	6,021,800	7,150,800	6,785,900	9,335,000	4,356,500	10,596,500	1,917,410	4,100,600	767,300	403,500	3,325,100	64,341,710
(gpm)	215	135	160	152	209	98	237	43	92	17	9	74	1,441
September 2005	8,748,000	5,835,800	5,839,800	6,362,800	8,955,800	4,482,200	11,069,500	3,122,700	4,288,600	1,112,100	780,700	3,420,600	64,018,600
(gpm)	203	135	135	147	207	104	256	72	99	26	18	79	1,482
TOTAL FY 2005	**120,847,600**	**90,538,000**	**94,792,600**	**96,340,200**	**117,740,000**	**68,430,400**	**136,057,800**	**50,319,610**	**46,903,500**	**12,444,400**	**12,227,800**	**48,697,800**	**895,339,710**
Operational Minimum	225	170	195	195	210	135	275	80	110	20	30	100	1,745

	B1, B2, B3, B4	B11, B1, B13	B4, B5, B6	B4, B5, B6, B8, B9	Total System
FY05 Average Flow Rate (gpm)		415	588	977	1,703
MOS Operational Minimum (gpm)	615	415	600	1,010	1,745

Table 10-3

Treatment Center Water Meter Totals
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Volume of Water Pumped (gallons)										
	Extraction Wells	***Meter 1***	***Meter 2***	***Total Meters 1 & 2***	***Meter 3***	***Meter 4***	***Total Meters 3 & 4***	***Meter 5***	***Meter 6***	***Total Meters 5 & 6***
October 2004	79,218,400	44,004,000	33,733,000	77,737,000	22,309,000	53,105,000	75,414,000	0	0	0
November 2004	76,769,900	43,403,000	32,263,000	75,666,000	20,377,000	53,138,000	73,515,000	0	0	0
December 2004	77,654,100	44,114,000	32,385,000	76,499,000	23,878,000	54,642,000	78,520,000	0	0	0
January 2005	79,656,300	46,734,000	32,261,000	78,995,000	23,819,000	57,582,000	81,401,000	0	0	0
February 2005	70,521,900	41,287,000	29,303,000	70,590,000	21,442,000	51,546,000	72,988,000	0	0	0
March 2005	76,798,300	44,924,000	31,255,000	76,179,000	22,897,000	56,155,000	79,052,000	0	0	0
April 2005	77,771,400	45,279,000	31,629,000	76,908,000	17,347,000	59,473,000	76,820,000	0	0	0
May 2005	76,830,800	45,670,000	30,591,000	76,261,000	18,854,000	56,017,000	74,871,000	0	0	0
June 2005	76,067,600	44,990,000	29,726,000	74,716,000	12,239,000	61,378,000	73,617,000	0	0	0
July 2005	75,690,700	45,226,000	29,094,000	74,320,000	16,168,000	57,165,000	73,333,000	0	0	0
August 2005	64,341,710	37,680,000	25,085,000	62,765,000	12,897,000	48,965,000	61,862,000	0	0	0
September 2005	64,018,600	36,762,000	25,950,000	62,712,000	12,596,000	49,239,000	61,835,000	0	0	0
TOTAL FY 2005	895,339,710	520,073,000	363,275,000	883,348,000	224,823,000	658,405,000	883,228,000	0	0	0

FY89	1,033,353,676	501,826,000	560,836,000	1,062,662,000	383,736,000	587,596,000	971,332,000	493,681,000	582,955,000	1,076,636,000
FY90	1,008,415,750	493,915,000	526,417,000	1,020,332,000	371,391,000	588,642,000	960,033,000	487,946,000	543,726,000	1,031,672,000
FY91	1,382,327,590	666,166,000	708,313,000	1,374,479,000	523,702,000	789,947,000	1,313,649,000	601,307,000	649,621,000	1,250,928,000
FY92	1,401,346,600	68,289,000	724,328,000	1,407,227,000	557,169,000	772,509,000	1,329,678,000	767,707,000	677,735,000	1,445,442,000
FY93	1,388,206,172	666,814,000	725,341,000	1,392,155,000	504,027,000	651,149,000	1,155,176,000	729,078,000	762,791,000	1,491,869,000
FY94	1,245,663,275	660,700,000	659,953,000	1,320,653,000	457,210,000	715,668,000	1,172,878,000	653,913,000	550,131,000	1,204,044,000
FY95	1,369,361,500	706,114,000	683,982,000	1,390,096,000	500,275,000	739,744,000	1,240,019,000	495,616,000	274,507,000	770,123,000
FY96	1,341,763,220	734,443,000	629,327,000	1,363,770,000	503,518,000	754,399,000	1,257,917,000	4,000	600,035,000	600,039,000
FY97	1,213,035,110	688,312,000	568,804,600	1,257,116,600	538,625,000	586,515,000	1,125,140,000	13,000	578,900,000	578,913,000
FY98	1,196,007,900	624,784,000	540,353,000	1,220,604,000	511,065,000	603,871,000	1,114,936,000	58,000	178,076,000	178,134,000
FY99	1,158,224,870	623,500,000	496,773,200	1,177,206,200	398,620,000	718,384,000	1,117,004,000	26,000	17,000	43,000
FY 2000	1,148,448,350	635,724,000	489,669,000	1,183,258,000	389,709,000	663,807,000	1,053,516,000	0	0	0
FY 2001	1,113,163,360	614,341,000	443,167,000	1,113,164,000	318,517,000	718,661,000	1,037,178,000	0	0	0
FY 2002	917,318,879	491,082,800	434,959,700	926,042,500	225,460,000	650,839,000	876,299,000	0	0	0
FY 2003	904,295,450	545,281,000	345,993,000	891,274,000	125,965,000	750,518,000	876,483,000	0	0	0
FY 2004	908,718,760	518,391,900	376,889,660	895,281,560	216,177,000	680,633,000	896,810,000	0	0	0
FY 2005	895,339,710	520,073,000	363,275,000	883,348,000	224,823,000	658,405,000	883,228,000	0	0	0

Table 10-4

Pumphouse Down Time (Days)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Well Name	*FY05 Down Time (Days)*	*FY04 Down Time (Days)*	*FY03 Down Time (Days)*	*FY02 Down Time (Days)*	*FY01 Down Time (Days)*	*FY00 Down Time (Days)*
B1	11.5	7.1	46	22.4	3.4	7.5
B2	(1)	(1)	1	63.2	3.9	18.7
B3	34.0	11.3	26	117.9	1.8	8.8
B4	26.2	7.6	21	11.8	1.7	5.7
B5	13.9	7.6	29	9.4	3.3	6.0
B6	15.6	15.4	19	10.8	1.6	32.3
B7	(1)	(1)	(1)	109.4	2.9	11.8
B8	18.5	10.0	18	107.6	1.3	9.0
B9	23.1	8.4	15	51.3	1.3	4.8
B10	(1)	(1)	(1)	109.9	2.4	8.0
B11	22.7	15.5	23	90.8	1.5	12.0
B12	(1)	(1)	(1)	(1)	(1)	(1)
B13	13.7	12.8	19	(1)	(1)	(1)
SC1	21.8	17.8	29	35.9	2.9	18.7
SC2	13.9	11.4	27	107.7	3.0	6.8
SC3	(1)	(1)	(1)	108.1	1.5	7.2
SC4	(1)	(1)	(1)	(1)	(1)	(1)
SC5	11.9	24.8	18	5.9	2.0	12.1

Note:
(1) The extraction well was not in operation during the fiscal year.

Table 10-5

Down Time (Days) By Category
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Category	***Down Time (Days)***
Pumphouse Component	5.5
Treatment Center Component	0.5
Electrical Service	6.5
Miscellaneous	0.0
Preventive Maintenance	0.6
System Modification	0.0
Forcemain	5.8
Total System Equivalent	18.9

Anticipated Down Time for Fiscal Year 2006

Pumphouse Component	3.5
Treatment Center Component	3
Electrical Service	1
Miscellaneous	0.1
Preventive Maintenance	3.5
System Modification	1
Forcemain	2

Table 10-6

Groundwater Quality Data (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Date	Dup	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene
TGRS Cleanup Level [1]			*200 µg/L*	*70 µg/L*	*6 µg/L*	*4 µg/L*	*70 µg/L*	*5 µg/L*	*5 µg/L*
03L002	6/16/05		2.3	0.93 JP	2.2	< 1	0.45 JP	< 1	30
03L007	6/6/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L014	6/8/05		150	2.2 JL135	7 JL127	< 1	1.7 JL129	0.27 JP	240
03L017	6/6/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L018	6/10/05		< 1	< 1	< 1	< 1	< 1	< 1	0.33 JP
03L018	6/10/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L020	6/16/05		0.98 JP	0.36 JP	0.44 JP	< 1	0.3 JP	< 1	19
03L077	6/7/05		4.5	0.54 JP	2.5	< 1	1.1	< 1	57
03L078	6/7/05		< 1	< 1	< 1	< 1	< 1	< 1	0.47 JP
03L078	6/7/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L079	6/10/05		< 1	< 1	0.33 JL127,JS153,JP	< 1	0.81 JS135,JP	< 1	5.1
03L084	6/10/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L802	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	4.8
03L806	6/10/05		11	16	16	< 1	1.4	< 1	140
03L809	6/17/05		7.4	96	65	1.2	6.8	1.1	440
03L833	6/9/05		< 1	< 1	< 1	< 1	< 1	< 1	4.7
03L833	6/9/05	D	< 1	< 1	< 1	< 1	< 1	< 1	4.9
03M003	6/16/05		< 1	0.99 JP	0.99 JP	0.37 JP	1.6	< 1	1.8
03M020	6/16/05		4.1	1.5	1.2	< 1	0.83 JP	< 1	60

Table 10-6

Groundwater Quality Data (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Date	Dup	1,1,1-Trichloroethane 200 µg/L	1,1-Dichloroethane 70 µg/L	1,1-Dichloroethene 6 µg/L	1,2-Dichloroethane 4 µg/L	cis-1,2-Dichloroethene 70 µg/L	Tetrachloroethene 5 µg/L	Trichloroethene 5 µg/L
TGRS Cleanup Level [1]									
03M802	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	12
03M806	6/10/05		0.78 JP	120	73	1.1	9.6	< 1	920
03U003	6/10/05		52	5.4	8.7 JL127	< 1	15	< 1	110
03U007	6/6/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U009	6/10/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U014	6/8/05		< 1	< 1	< 1	< 1	< 1	< 1	0.2 JP
03U017	6/6/05		0.57 JP	< 1	< 1	< 1	< 1	< 1	2.8
03U018	6/10/05		7.5	1	2.1 JL127	< 1	13	< 1	51
03U018	6/10/05	D	7.3	0.91 JP	1.9 JL127	< 1	13	< 1	50
03U020	6/16/05		31	1.3	7.7	< 1	1	< 1	100
03U021	6/17/05		90	13	18	0.75 JP	9.1	< 1	480
03U021	6/17/05	D	88	12	17	0.74 JP	9.1	< 1	500
03U028	6/13/05		3	< 1	1.2 JL127	< 1	5.3	0.21 JP	56
03U029	6/13/05		1.6	< 1	0.62 JL127,JP	< 1	2.9	< 1	20
03U030	6/13/05		0.27 JP	< 1	< 1	< 1	4.3	< 1	42
03U032	6/20/05		< 1	< 1	< 1	< 1	< 1	< 1	1 UB 0.2
03U075	6/17/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U077	6/7/05		3.1	0.59 JP	0.86 JP	0.38 JP	< 1	1	35
03U078	6/7/05		4.4	0.52 JP	2.7	< 1	3.8	15	130

Table 10-6

Groundwater Quality Data (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Date	Dup	1,1,1-Trichloroethane 200 µg/L	1,1-Dichloroethane 70 µg/L	1,1-Dichloroethene 6 µg/L	1,2-Dichloroethane 4 µg/L	cis-1,2-Dichloroethene 70 µg/L	Tetrachloroethene 5 µg/L	Trichloroethene 5 µg/L
TGRS Cleanup Level [1]									
03U079	6/10/05		17	0.85 JP	4.3 JL127	< 1	4.2	< 1	92
03U093	6/20/05		39	0.33 JP	2.9	< 1	2	< 1	91
03U094	6/21/05		280	2.9	13	< 1	3.2	0.51 JP	470
03U096	6/20/05		2.6	1.6	0.89 JP	< 1	< 1	< 1	13
03U099	6/10/05		2.6	< 1	0.98 JL127,JP	< 1	< 1	< 1	6.4
03U114	6/20/05		1.6	< 1	0.88 JP	< 1	< 1	< 1	12
03U659	6/20/05		5.3	0.78 JP	1.2	< 1	12	< 1	110
03U671	6/17/05		8.8	0.72 JP	2.4	< 1	0.53 JP	4.2	61
03U672	6/17/05		< 1	< 1	< 1	< 1	< 1	< 1	1 UB 0.2
03U672	6/17/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U701	6/8/05		0.52 JP	< 1	< 1	< 1	< 1	0.25 JP	6.1
03U702	6/8/05		< 1	< 1	< 1	< 1	< 1	< 1	1.5
03U703	6/13/05		3.1	< 1	1.2 JL127	< 1	5.2	12	44
03U708	6/9/05		26	5.9 JL135	10 JL127	< 1	4.4 JL129	2.8	120
03U709	6/13/05		7.5	4	6.1 JL127	< 1	1 JP	< 1	61
03U709	6/13/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U710	6/13/05		10	1	2.9 JL127	0.38 JP	3.2	< 1	88
03U711	6/15/05		35	7.5	11	< 1	3.8	2	190

Table 10-6

Groundwater Quality Data (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

			1,1,1-Trichloroethane	*1,1-Dichloroethane*	*1,1-Dichloroethene*	*1,2-Dichloroethane*	*cis-1,2-Dichloroethene*	*Tetrachloroethene*	*Trichloroethene*
TGRS Cleanup Level [1]			*200 µg/L*	*70 µg/L*	*6 µg/L*	*4 µg/L*	*70 µg/L*	*5 µg/L*	*5 µg/L*
Location	***Date***	***Dup***							
03U801	6/15/05		0.23 JP	< 1	< 1	< 1	1.2	< 1	35
03U801	6/15/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U803	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U804	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U804	6/15/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U805	6/15/05		0.24 JP	2.7	< 1	< 1	< 1	0.3 JP	1.5
03U806	6/10/05		< 1	2.9	2.4	< 1	0.45 JP	1.3	94
04J077	6/7/05		10	9.2	9.6	< 1	6.2	0.75 JP	140
04J702	6/8/05		0.82 JP	< 1	0.44 JL127,JP	< 1	< 1	< 1	8.2
04J708	6/9/05		0.66 JP	0.71 JL135,JP	0.86 JL127,JP	< 1	< 1	< 1	4.5
04J713	6/9/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U002	6/16/05		0.42 JP	0.27 JP	0.42 JP	< 1	< 1	< 1	4.1
04U007	6/6/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U020	6/16/05		< 1	< 1	< 1	< 1	< 1	< 1	2.8
04U027	6/13/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U077	6/7/05		9.7	2.5	4.5	< 1	2.2	0.24 JP	98
04U077	6/7/05	D	9.2	2.4	5.1	< 1	2.2	0.23 JP	95
04U510	6/10/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U701	6/8/05		0.4 JP	< 1	0.5 JL127,JP	< 1	< 1	< 1	6.1

Table 10-6

Groundwater Quality Data (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Date	Dup	1,1,1-Trichloroethane 200 µg/L	1,1-Dichloroethane 70 µg/L	1,1-Dichloroethene 6 µg/L	1,2-Dichloroethane 4 µg/L	cis-1,2-Dichloroethene 70 µg/L	Tetrachloroethene 5 µg/L	Trichloroethene 5 µg/L
TGRS Cleanup Level [1]									
04U702	6/8/05		< 1	< 1	< 1	< 1	< 1	< 1	1.4
04U708	6/9/05		< 1	< 1	< 1	< 1	< 1	< 1	0.95 JP
04U709	6/13/05		1.3	0.72 JP	1.5 JL127	0.38 JP	0.28 JP	< 1	19
04U709	6/13/05	D	1.3	0.72 JP	1.7 JL127	< 1	0.32 JP	< 1	19
04U711	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	0.92 JP
04U713	6/9/05		< 1	< 1	< 1	< 1	< 1	< 1	0.49 JP
04U802	6/15/05		< 1	< 1	< 1	< 1	< 1	< 1	0.2 JP
04U806	6/10/05		17	14	14	< 1	1.5	< 1	130
04U833	6/9/05		< 1	< 1	< 1	< 1	< 1	< 1	2.1
04U833	6/9/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
PJ#806	6/10/05		0.79 JP	0.9 JP	0.85 JP	< 1	< 1	< 1	35

Notes:
(1) Cleanup levels for TGRS are from the OU2 ROD. Shading indicates exceedance of the cleanup level.
D - Duplicate Analysis
J - Value is estimated
JP - Results less than reporting level but greater than instrument detection limit.
JL# - Laboratory Control Sample Recovery, # = percent recovery of the LCS.
JS# - Surrogate Matrix Spike Recovery, # = percent recovery of the spike.
UB# - Blank Contamination, # = highest concentration of blank affecting data.

Table 10-7

VOC Mass Loading Summary
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Well	*Percent Contribution to VOC Mass Removal*	*FY 2005 Total Pounds VOCs Mass Removed*
B1	4.7%	125.2
B2	0.0%	0.0
B3	0.3%	7.6
B4	9.5%	253.5
B5	7.1%	189.4
B6	4.2%	111.5
B7	0.0%	0.0
B8	0.5%	14.2
B9	6.1%	161.5
B10	0.0%	0.0
B11	0.0%	0.9
B13	2.9%	77.1
SC1	3.4%	90.2
SC2	0.2%	5.9
SC3	0.0%	0.0
SC4	0.0%	0.0
SC5	61.1%	1,626
Fiscal Year 2005 Total (lbs)		***2,663***
Daily Average (lbs/day)		***7.3***

HISTORICAL TOTAL

Fiscal Year		*Pounds VOC Mass Removed*
2005		***2,663***
2004		3,291
2003		3,041
2002		2,852
2001		3,418
2000		4,499
1999		4,878
1998		6,132
1997		6,210
1996		10,655
1995		13,355
1994		15,070
1993		20,165
1992		24,527
1991		26,760
1990		18,005
1989	(First year of full scale system)	19,510
1988		4,800
1987		2,100
Total		***189,268***

Table 10-8

VOC Concentrations In TGRS Extraction Wells (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Alias	Date	Dup	*1,1,1-Trichloroethane µg/L*	*1,1,2-Trichloroethane µg/L*	*1,1-Dichloroethane µg/L*	*1,1-Dichloroethene µg/L*	*1,2-Dichloroethane µg/L*	*Carbon Tetrachloride µg/L*	*Chloroform µg/L*
03F302	B1	12/1/04		7.9	0.62 JP	1.7 JP	2.1 JP	< 1	< 1	< 1
03F302	B1	6/3/05		7.4	0.46 JP	1.9	2.9	< 1	< 1	< 1
03F303	B2	6/3/05		0.46 JP	2.4	1.1	3	0.56 JP	< 1	< 1
03F304	B3	12/1/04		1.3 JP	< 1	1.3 JP	1.5 JP	< 1	< 1	< 1
03F304	B3	6/3/05		1.3	< 1	1.2	1.7	< 1	< 1	< 1
03F304	B3	6/3/05	D	1.1	< 1	1.2	1.5	< 1	< 1	< 1
03F305	B4	12/1/04		33	< 1	19	18	0.36 JP	< 1	< 1
03F305	B4	6/3/05		25	< 1	19	18	0.47 JP	< 1	< 1
03F306	B5	12/1/04		15	< 1	9.2	8.5	< 1	< 1	< 1
03F306	B5	6/3/05		11	< 1	9.4	10	< 1	< 1	< 1
03F307	B6	12/1/04		2.1 JP	< 1	3.7 JP	3.3 JP	< 1	< 1	< 1
03F307	B6	6/3/05		1.9	< 1	4.4	4.5	< 1	< 1	< 1
03F308	B7	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
PJ#309	B8	12/1/04		2.1 JP	< 1	1.1 JP	1.2 JP	< 1	< 1	< 1
PJ#309	B8	6/3/05		2.3	< 1	1.4	1.9	0.33 JP	< 1	< 1
PJ#310	B9	12/1/04		15	< 1	9.5	11	< 1	< 1	< 1
PJ#310	B9	6/3/05		17	< 1	12	13	0.47 JP	< 1	< 1
PJ#311	B10	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
PJ#311	B10	6/3/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Table 10-8

VOC Concentrations In TGRS Extraction Wells (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Alias	Date	Dup	*1,1,1-Trichloroethane µg/L*	*1,1,2-Trichloroethane µg/L*	*1,1-Dichloroethane µg/L*	*1,1-Dichloroethene µg/L*	*1,2-Dichloroethane µg/L*	*Carbon Tetrachloride µg/L*	*Chloroform µg/L*
03F312	B11	12/1/04		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03F312	B11	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03F312	B11	6/3/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1
PJ#313	B12	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03F319	B13	12/1/04		6.3	< 1	2 JP	2 JP	< 1	< 1	< 1
03F319	B13	6/3/05		4.3	< 1	1.9	1.9	< 1	< 1	< 1
03U301	SC1	12/1/04		14 JP	< 5	1.3 JP	2.5 JP	< 5	< 5	< 5
03U301	SC1	6/3/05		14	< 1	1.7	4.1	< 1	< 1	0.43 JP
03U314	SC2	12/1/04		14	< 1	1.4 JP	2 JP	< 1	< 1	< 1
03U314	SC2	6/3/05		4	< 1	1.1	1 JS127, JP	< 1	< 1	< 1
03U314	SC2	6/3/05	D	3.6	< 1	1.1	0.78 JP	< 1	< 1	< 1
03U315	SC3	6/3/05		0.48 JP	< 1	< 1	< 1	< 1	< 1	0.34 JP
03U316	SC4	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U317	SC5	12/1/04		1100	< 10	23 JP	43 JP	4.4 JP	< 10	< 10
03U317	SC5	12/1/04	D	1300	< 10	26 JP	49 JP	4.5 JP	< 10	< 10
03U317	SC5	6/3/05		810	< 10	23	41	< 10	< 10	< 10

Table 10-8

VOC Concentrations In TGRS Extraction Wells (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Alias	Date	Dup	*cis-1,2-Dichloroethene µg/L*	*Freon 113 µg/L*	*Methylene Chloride µg/L*	*Tetrachloroethene µg/L*	*trans-1,2-Dichloroethene µg/L*	*Trichloroethene µg/L*	*Vinyl Chloride µg/L*
03F302	B1	12/1/04		7.1	< 1	< 1	2.6 JP	< 1	110	< 1
03F302	B1	6/3/05		9	< 1	< 1	2.5	< 1	120	< 1
03F303	B2	6/3/05		2.1	< 1	< 1	1.2	< 1	34	0.4 JP
03F304	B3	12/1/04		0.41 JP	< 1	< 1	< 1	< 1	6.9	< 1
03F304	B3	6/3/05		0.43 JP	< 1	< 1	< 1	< 1	6.7	< 1
03F304	B3	6/3/05	D	0.52 JP	< 1	< 1	< 1	< 1	6.3	< 1
03F305	B4	12/1/04		11	< 1	< 1	< 1	< 1	300	< 1
03F305	B4	6/3/05		9.9	< 1	< 1	< 1	0.39 JP	260	< 1
03F306	B5	12/1/04		1.7 JP	0.3 JP	< 1	1 JP	< 1	240	< 1
03F306	B5	6/3/05		2.6	0.55 JP	< 1	1.3	0.19 JP	210	< 1
03F307	B6	12/1/04		0.78 JP	< 1	< 1	< 1	< 1	120	< 1
03F307	B6	6/3/05		1.3	< 1	< 1	< 1	< 1	110	< 1
03F308	B7	6/3/05		< 1	< 1	< 1	< 1	< 1	1.9	< 1
PJ#309	B8	12/1/04		0.53 JP	< 1	< 1	< 1	< 1	20	< 1
PJ#309	B8	6/3/05		0.58 JP	< 1	< 1	< 1	< 1	24	< 1
PJ#310	B9	12/1/04		3.9 JP	< 1	< 1	< 1	< 1	110	< 1
PJ#310	B9	6/3/05		4.9	< 1	< 1	< 1	0.14 JP	120	< 1
PJ#311	B10	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
PJ#311	B10	6/3/05	D	< 1	< 1	< 1	< 1	< 1	0.59 JP	< 1

Table 10-8

VOC Concentrations In TGRS Extraction Wells (µg/L)
Fiscal Year 2005
TGRS, TCAAP
Arden Hills, Minnesota

Location	Alias	Date	Dup	*cis-1,2-Dichloroethene µg/L*	*Freon 113 µg/L*	*Methylene Chloride µg/L*	*Tetrachloroethene µg/L*	*trans-1,2-Dichloroethene µg/L*	*Trichloroethene µg/L*	*Vinyl Chloride µg/L*
03F312	B11	12/1/04		< 1	< 1	< 1	< 1	< 1	3.2 JP	< 1
03F312	B11	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03F312	B11	6/3/05	D	< 1	< 1	< 1	< 1	< 1	3.2	< 1
PJ#313	B12	6/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1
03F319	B13	12/1/04		10	< 1	< 1	0.83 JP	< 1	230	< 1
03F319	B13	6/3/05		9.4	< 1	< 1	0.81 JP	< 1	170	< 1
03U301	SC1	12/1/04		69	< 5	< 5	< 5	< 5	860	< 5
03U301	SC1	6/3/05		81	< 1	< 1	0.39 JP	0.92 JP	880	< 1
03U314	SC2	12/1/04		0.55 JP	< 1	< 1	< 1	< 1	52	< 1
03U314	SC2	6/3/05		0.88 JP	< 1	< 1	< 1	< 1	48	< 1
03U314	SC2	6/3/05	D	1.4	< 1	< 1	< 1	< 1	44	< 1
03U315	SC3	6/3/05		< 1	< 1	< 1	< 1	< 1	6.1	< 1
03U316	SC4	6/3/05		< 1	< 1	< 1	< 1	< 1	0.6 JP	< 1
03U317	SC5	12/1/04		1.7 JP	15 JP	< 10	8 JP	< 10	3500	< 10
03U317	SC5	12/1/04	D	1.9 JP	17 JP	< 10	9.1 JP	< 10	3600	< 10
03U317	SC5	6/3/05		2.5 JP	16	< 10	5.7 JP	< 10	3100	< 10

Notes:

D - Duplicate analysis

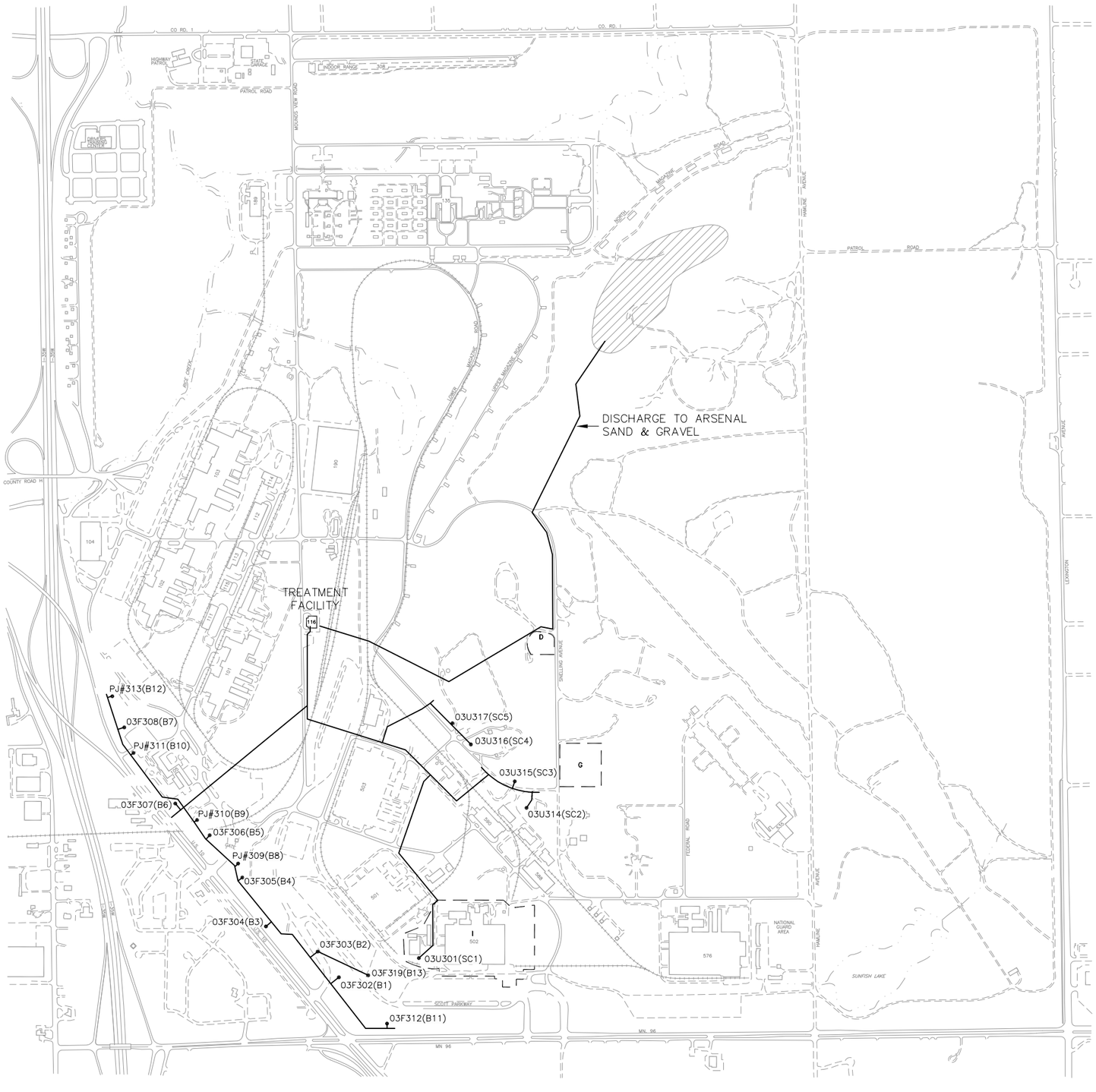
JP - Results less than reporting level but greater than instrument detection limit.

JS# - Surrogate Matrix Spike Recovery, # = percent recovery of the spike.

Table 10-9

Summary of OU2 Deep Groundwater Monitoring Requirements
TGRS, TCAAP
Arden Hills, Minnesota

Remedy Component	*Monitoring Requirements*	*Implementing Party*	*Documents Containing the Monitoring Plan*
#1 Hydraulic Containment and Mass Removal	a. Water levels to draw contour maps showing hydraulic zone of capture	Alliant / Army	Deep groundwater monitoring plan in Annual Report
	b. Pumping volumes and rates for comparison to design rates	Alliant / Army	Deep groundwater monitoring plan in Annual Report
	c. Influent and extraction well water quality for overall mass removal calculations	Alliant / Army	Deep groundwater monitoring plan in Annual Report
#2 Groundwater Treatment	• Outlined below	Alliant / Army	Deep groundwater monitoring plan in Annual Report
#3 Treated Water Discharge	• Effluent monitoring to verify attainment of treatment requirements	Alliant / Army	Deep groundwater monitoring plan in Annual Report
#4 Institutional Controls	• None	Alliant / Army	Deep groundwater monitoring plan in Annual Report
#5 Review of New Technologies	• None	Alliant / Army	Deep groundwater monitoring plan in Annual Report
#6 Groundwater Monitoring	• As above	Alliant / Army	Deep groundwater monitoring plan in Annual Report
Overall Remedy	a. Groundwater quality to verify attainment of clean up goals	Alliant / Army	Deep groundwater monitoring plan in Annual Report



0 400 1200ft

LEGEND

- PRIMARY ROAD
- SECONDARY ROAD
- RAILROAD
- DRAINAGE
- BUILDING
- BUILDING REMOVED
- SOURCE AREA
- WELL LOCATION

EXTRACTION WELL NAME CROSS REFERENCE

B1	03F302
B2	03F303
B3	03F304
B4	03F305
B5	03F306
B6	03F307
B7	03F308
B8	PJ#309
B9	PJ#310
B10	PJ#311
B11	03F312
B12	PJ#313
B13	03F319
SC1	03U301
SC2	03U314
SC3	03U315
SC4	03U316
SC5	03U317

figure 10–1

TGRS LAYOUT

Twin Cities Army Ammunition Plant

CRA

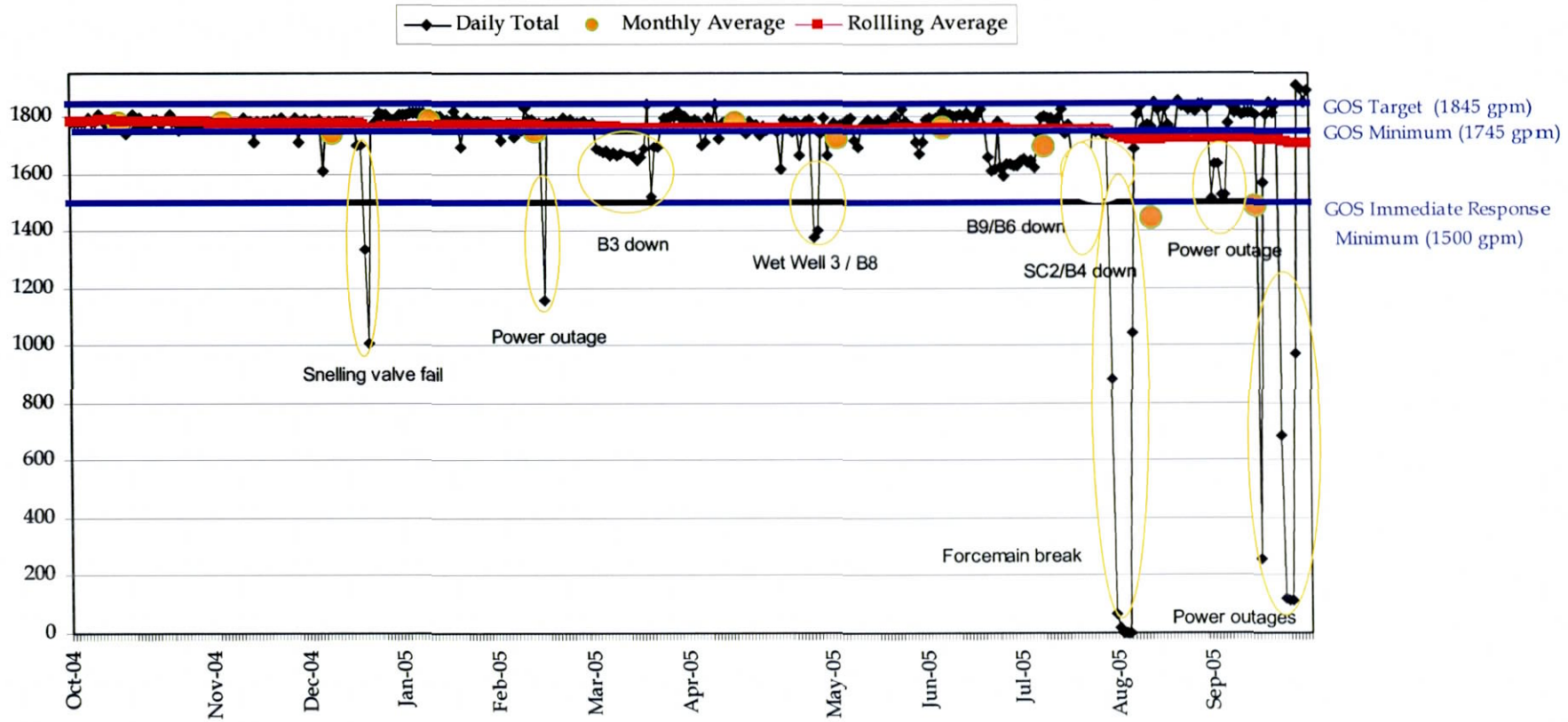
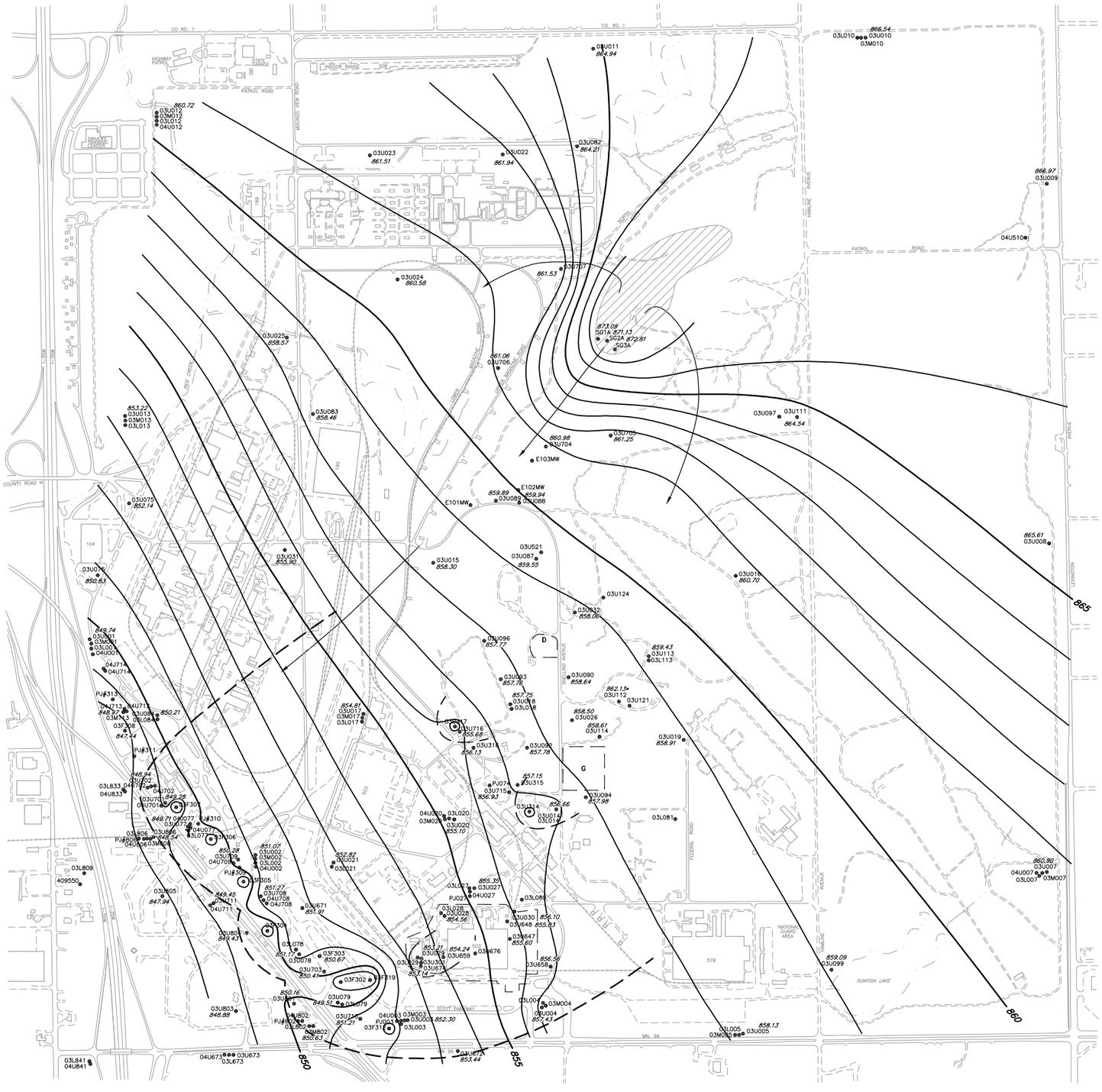


figure 10-2

TGRS FY2005 TOTAL DAILY FLOW RATES
TWIN CITIES ARMY AMMUNITION PLANT
Arden Hills, Minnesota



0 400 1200ft

LEGEND

- PRIMARY ROAD
- SECONDARY ROAD
- RAILROAD
- DRAINAGE
- BUILDING
- BUILDING REMOVED
- SOURCE AREA
- WELL LOCATION
- *844.52* GROUNDWATER ELEVATION IN FEET AMSL
- GROUNDWATER CONTOUR
- DIRECTION OF GROUNDWATER FLOW
- LIMIT OF CAPTURE

NOTE: GROUNDWATER CONTOURS ARE INTERPOLATED FROM THE DATA POINTS SHOWN.

- *NA* NOT AVAILABLE
- * GROUNDWATER ELEVATION NOT USED IN CONTOURING
- ARSENAL SAND AND GRAVEL PIT TREATED WATER DISCHARGE AREA. (APPROXIMATE BOUNDARIES)

EXTRACTION WELL NAME CROSS REFERENCE

B1	03F302
B2	03F303
B3	03F304
B4	03F305
B5	03F306
B6	03F307
B7	03F308
B8	PJ#309
B9	PJ#310
B10	PJ#311
B11	03F312
B12	PJ#313
B13	03F319
SC1	03U301
SC2	03U314
SC3	03U315
SC4	03U316
SC5	03U317

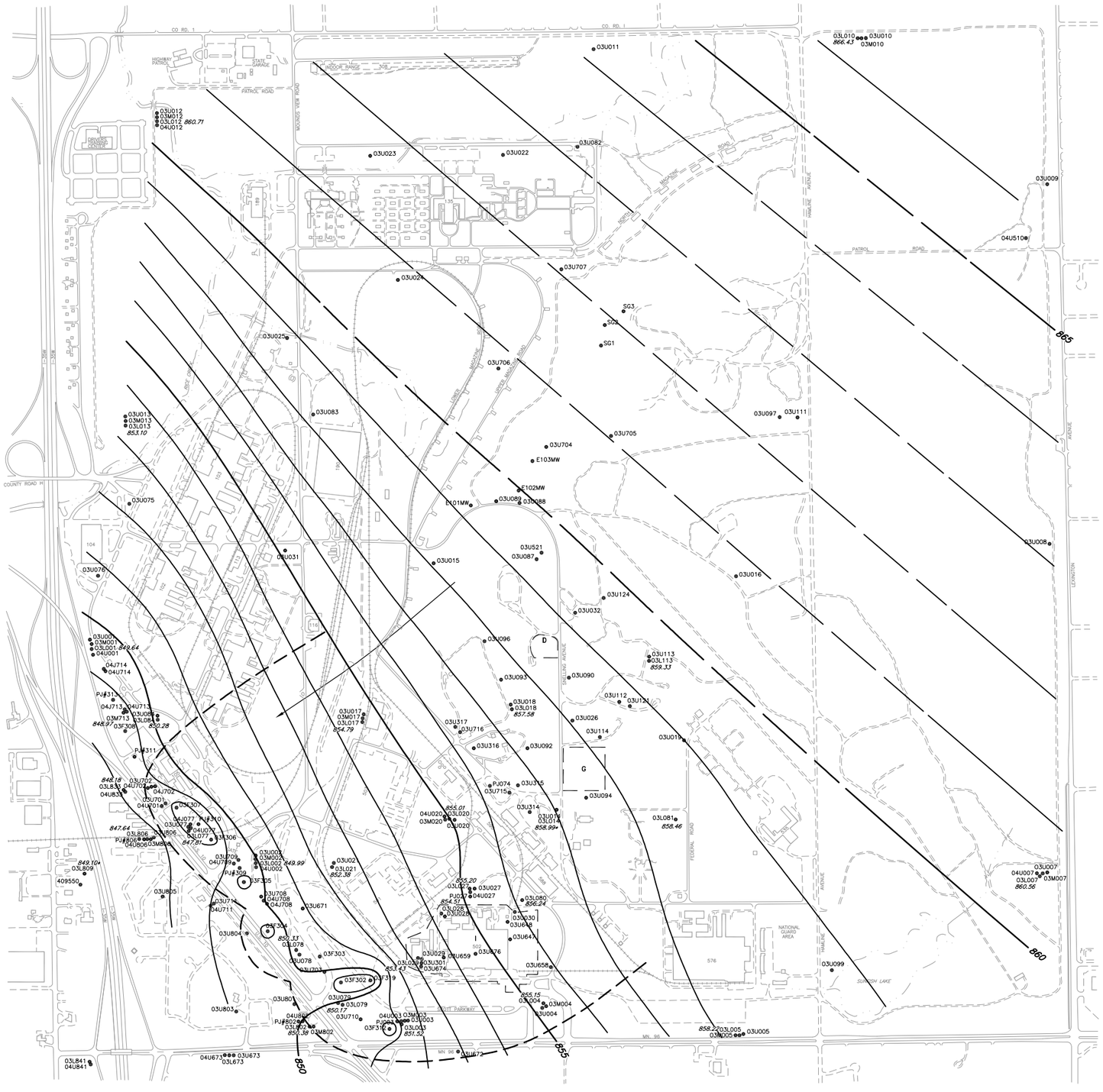
figure 10–3

OU2, UPPER UNIT 3, POTENTIOMETRIC MAP, 6/1/05 (Q87)

Twin Cities Army Ammunition Plant

CRA

37773–43(001)GN–SP004 MAY 31/2006


CO. RD. 1
HIGHWAY PATROL
STATE GARAGE
INDOOR RANGE
PATROL ROAD
WOODS VIEW ROAD
GROUND WATER REMEDY
03U012
03M012
03L012 860.71
04U012
03U023
03U022
03U082
03U011
03U010
03M010
866.43
03U009
04U510
03U707
03U024
SG3
SG2
SG1
03U025
03U706
03U083
03U013
03M013
03L013
853.10
03U705
03U704
E103MW
E102MW
E101MW
03U089
03U088
03U097
03U111
03U075
03U031
03U076
03U015
03U521
03U087
03U016
03U008
03U124
03U032
03U096
03U113
03L113
859.33
03U093
03U090
03U112
03U121
03U018
03L018
857.58
03U026
03U114
03U317
03U716
03U316
03U092
03U019
03U315
PJ074
03U715
03U094
03U314
03U014
858.99
03U081
858.46
03U007
04U007
03L007
860.56
03M007
03U027
PJ027
04U027
03L080
856.24
03U028
03U030
03U648
03U641
03U659
03U676
03U658
03U099
03U005
03U006
03U673
03L673
04U673
03L841
04U841
03U671
03U804
03U078
03F303
03F302
03F319
03U801
03U803
03U079
03U710
03U003
03M003
03L003
851.52
03M802
03F316
03U002
03L021
852.38
03U708
04U708
03U711
04U711
03F305
03F304
03F306
03U709
04U709
PJ#309
03U805
03L809
409550
03U806
03L806
PJ#806
04U806
03M806
03U077
04U077
PJ#310
03F307
03U702
04U702
03L702
848.18
03L853
04U853
03U701
04U701
848.64
03U001
03M001
03L001
04U001
04J714
04U714
PJ#311
04J713
04U713
03U085
03M713
03L085
848.97
03F308
850.28
03U017
03M017
03L017
854.79
03U717
03U716
03U316
03U092
PJ#311
03U002
03M002
03L002
849.99
03U000
03M000
03L000
849.104
03U031
03U076
03U096
03U093
03U090
03U112
03U121
03U026
03U114
03U019
03U315
03U314
03U094
03U081
03U007
03U027
03U028
03U030
03U648
03U641
03U659
03U676
03U658
03U099
03U005
03U006
03U673
03L673
04U673
03L841
04U841
03U671
03U804
03U078
03F303
03F302
03F319
03U801
03U803
03U079
03U710
03U003
03M003
03L003
03M802
03F316
03U002
03L021
03U708
04U708
03U711
04U711
03F305
03F304
03F306
03U709
04U709
PJ#309
03U805
03L809
409550
03U806
03L806
PJ#806
04U806
03M806
03U077
04U077
PJ#310
03F307
03U702
04U702
03L702
03L853
04U853
03U701
04U701
03U001
03M001
03L001
04U001
04J714
04U714
PJ#311
04J713
04U713
03U085
03M713
03L085
03F308
PJ#311
03U017
03M017
03L017
03U717
03U716
03U316
03U092
03U018
03L018
03U317
03U026
03U114
03U019
03U315
PJ074
03U715
03U094
03U314
03U014
03U081
03U007
03U027
PJ027
04U027
03L080

0 400 1200ft

LEGEND

- PRIMARY ROAD
- SECONDARY ROAD
- RAILROAD
- DRAINAGE
- BUILDING
- BUILDING REMOVED
- SOURCE AREA
- WELL LOCATION
- *844.52* GROUNDWATER ELEVATION IN FEET AMSL
- GROUNDWATER CONTOUR
- DIRECTION OF GROUNDWATER FLOW
- LIMIT OF CAPTURE

NOTE: GROUNDWATER CONTOURS ARE INTERPOLATED FROM THE DATA POINTS SHOWN.

- *NA* NOT AVAILABLE
- * GROUNDWATER ELEVATION NOT USED IN CONTOURING
- ARSENAL SAND AND GRAVEL PIT TREATED WATER DISCHARGE AREA. (APPROXIMATE BOUNDARIES)

EXTRACTION WELL NAME CROSS REFERENCE

B1	03F302
B2	03F303
B3	03F304
B4	03F305
B5	03F306
B6	03F307
B7	03F308
B8	PJ#309
B9	PJ#310
B10	PJ#311
B11	03F312
B12	PJ#313
B13	03F319
SC1	03U301
SC2	03U314
SC3	03U315
SC4	03U316
SC5	03U317

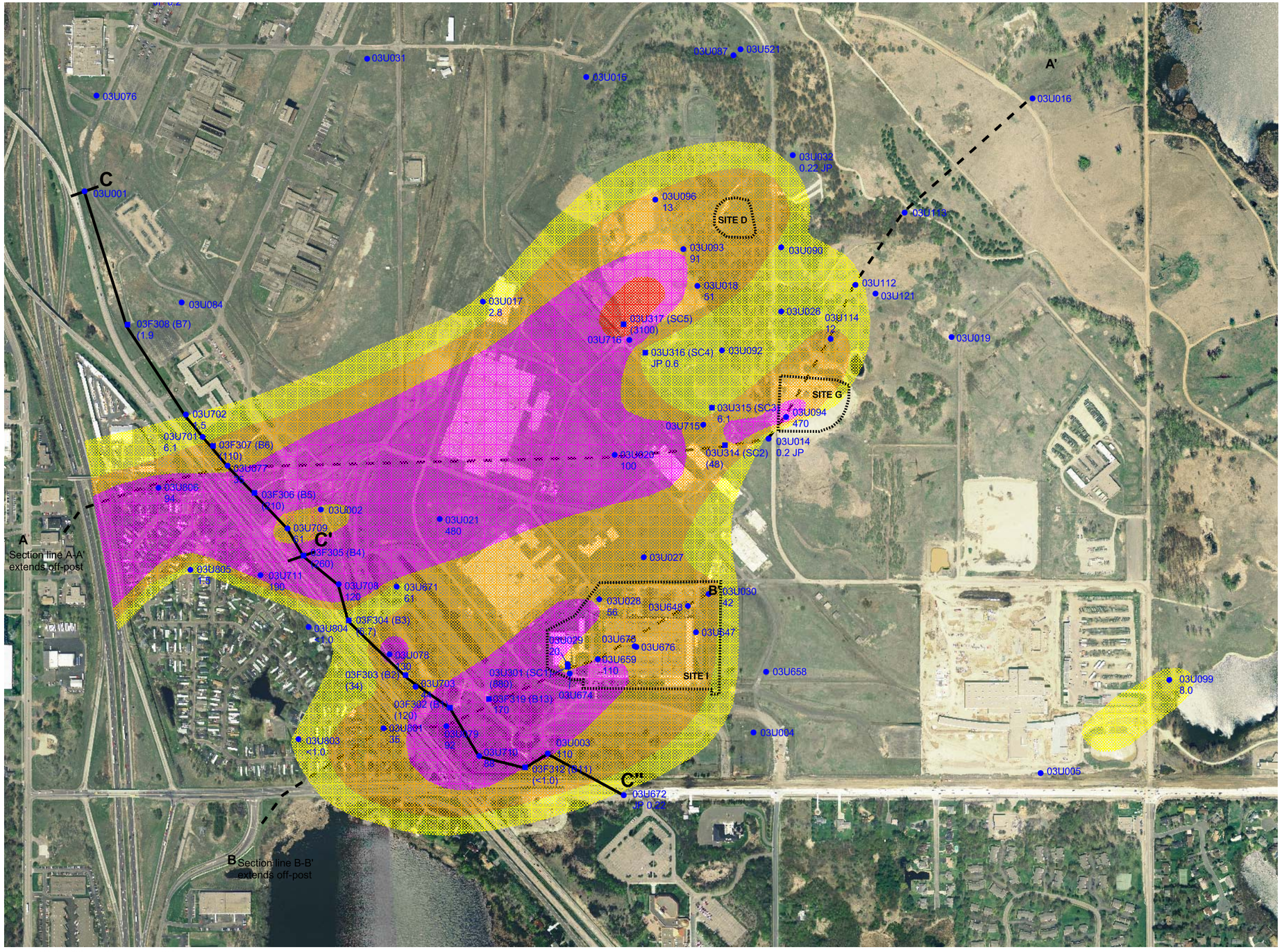
figure 10–5

OU2, UPPER UNIT 4, POTENTIOMETRIC MAP, 6/1/05 (Q87)

Twin Cities Army Ammunition Plant

CRA

37773–43(001)GN–SP006 MAY 31/2006



L:\1561\01\fy2005\apr file\05report.apr\figure 10-5

LEGEND

- 03U096 — Monitoring Well Location
- 03U315 — Extraction Well Location
- 03U096 *15* — Trichloroethene concentration (ug/l) (values in parentheses were not used for contouring purposes)
- Site Boundary
- Cross-Section Line

Trichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- 100-1000 ug/l
- 1000+ ug/l

Notes:

1. 03F and 03U extraction wells are shown with data in parentheses, but concentrations were not used for contouring (except for SC-3 and SC-4, which were used for contouring since they are being sampled as monitoring wells and since they are screened only within Upper Unit 3.)
2. Aerial Orthophotography was flown in 2004.
3. Results are from groundwater samples collected in June, 2005.

N

700 0 700 Feet

TWIN CITIES ARMY AMMUNITION PLANT

OU2, Upper Unit 3, Trichloroethene Isoconcentration Map, Summer 2005

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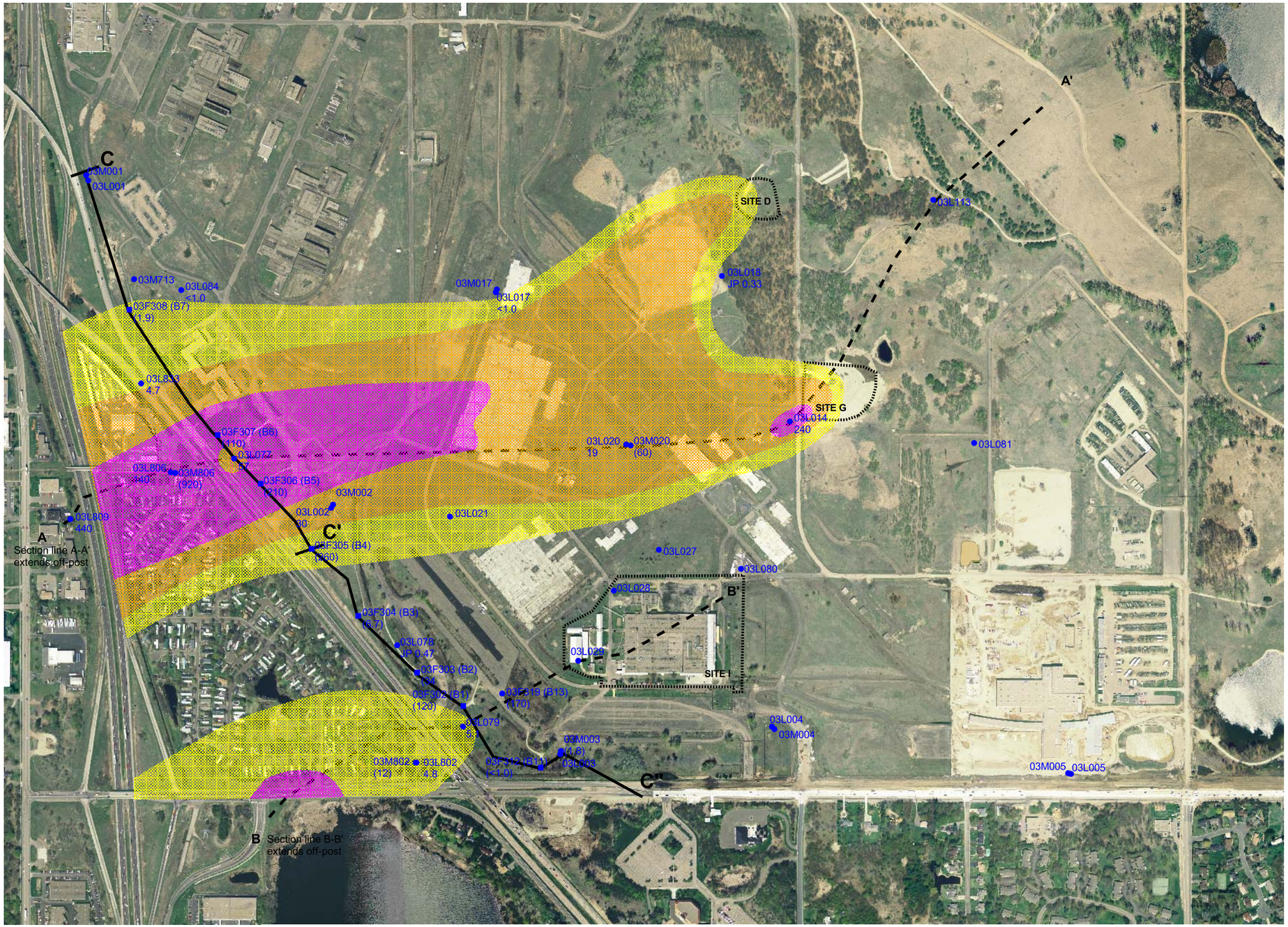
Environmental Engineers Maple Plain, MN 55359-0249

FY 2005

Figure 10-6



LEGEND

- 03L077 — Monitoring Well Location
- 03F307 — Extraction Well Location
- 03L077 62 — Trichloroethene concentration (ug/l) (values in parentheses were not used for contouring purposes)
- Site Boundary
- Cross-Section Line

Trichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- 100-1000 ug/l
- 1000+ ug/l

Notes:

1. Middle Unit 3 wells with data are shown with data in parentheses, but were not used for contouring.
2. 03F extraction wells are shown with data in parentheses, but were not used for contouring.
3. Aerial Orthophotography was flown in 2004.
4. Results are from groundwater samples collected in June, 2005.

N

700 0 700 Feet

L:\1561\01\fy2005\apr file\05report.apr\figure 10-6

TWIN CITIES ARMY AMMUNITION PLANT

OU2, Lower Unit 3, Trichloroethene Isoconcentration Map, Summer 2005

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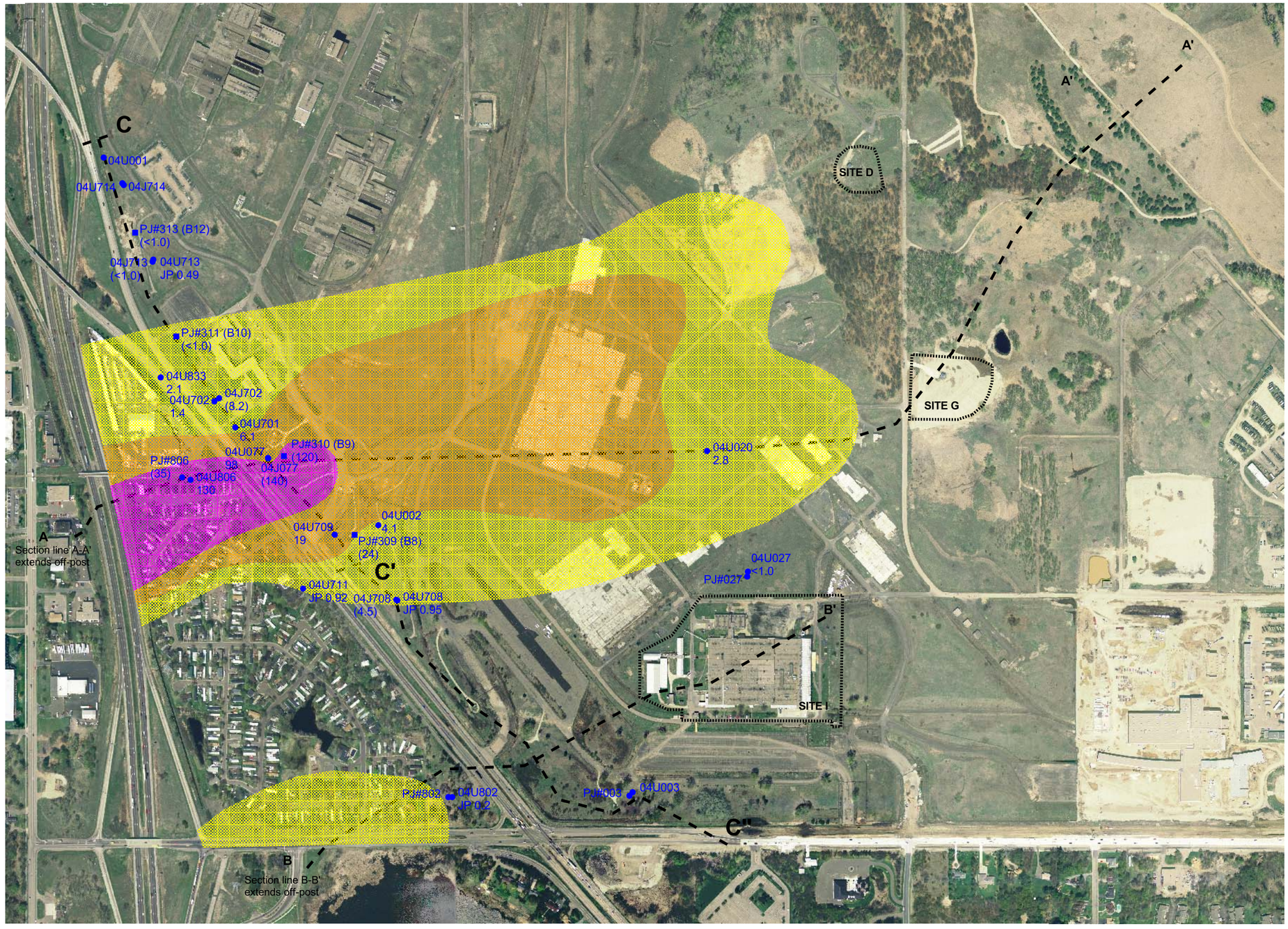
FY 2005

Figure 10-7



LEGEND

- 04U020 — Monitoring Well Location
- PJ#307 — Extraction Well Location
- 04U020 / 62 — Trichloroethene concentration (ug/l) (values in parentheses were not used for contouring purposes)
- Site Boundary
- Cross-Section Line

Trichloroethene Concentrations

- 1-10 ug/l
- 10-100 ug/l
- 100-1000 ug/l
- 1000+ ug/l

Notes:
1. All 04J wells (Jordan Wells) with data are shown with data in parentheses, but were not used for contouring.
2. All PJ# Extraction wells are shown with data in parentheses, but were not used for contouring.
3. PJ# monitoring wells are shown with data in parentheses, but were not used for contouring.
4. Aerial Orthophotography was flown in 2004.
5. Results are from groundwater samples collected in June, 2005.

N

700 0 700 Feet

L:\1561\01\fy2005\apr file\05report.apr\figure 10-7

TWIN CITIES ARMY AMMUNITION PLANT

OU2, Upper Unit 4, Trichloroethene Isoconcentration Map, Summer 2005

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FY 2005

Figure 10-8

NORTHWEST C

NORTHWEST C'

ELEVATION IN FEET AMSL

03U001,03M001, 03L001,04U001

04U714,04J714 (OFFSET 70')

B12

03M713,04U713, 04J713 (OFFSET 70')

B7

B10

03U702,04U702, 04J702

03U701,04U701

B6

03U077,03L077, 04U077,04J077

B9 (OFFSET 160')

B5

03U709,04U709

B8

B4

UNIT 1

UNIT 2

UNIT 3

RED SANDY TILL

Opdc

Cjs

0.4

2.5

26

5.0

15 0.49J

15 ND

9.6 ND

52 ND

32 1.9

38 1.5

38 1.4

30 8.2

9.8 6.1

190 6.1

3000 35

3000 110

3000 57

3000 95/95

2700 210

2700 120

220 140

370 19/19

270 24

140 61

430 260

5

2

10

100

1000

LEGEND:

100 TRCLE CONTOUR IN ug/L (10–89)

100 TRCLE CONTOUR IN ug/L (06–05)

VERTICAL SCALE 0 20 SCALE IN FEET

HORIZONTAL SCALE 0 100 SCALE IN FEET

figure 10-9

JUNE 2005 GROUNDWATER TRCLE DATA
CROSS SECTION C-C'
TWIN CITIES ARMY AMMUNITION PLANT
Arden Hills, Minnesota

37773-43(001)GN-SP001 MAY 31/2006

NORTHWEST
C'

SOUTHEAST
C"

B4 | 03U708,04U708, 04J708 | B3 | 03U078, 03L078 | B2 | 03U703 (OFFSET 65') | B1 | B13 (OFFSET 350') | 03U079,03L079 (OFFSET 110') | 03U710 | B11 | 03U003,03M003, 03L003,04U003, PJ003 | 03U672(PD2U3)

UNIT 1
UNIT 2
UNIT 3

ELEVATION IN FEET AMSL

960 940 920 900 880 860 840 820 800 780 760 740 720 700 680 660 640 620 600 580

430
260
57
120
170
130
900
44
2300
120
2300
92
1100
88
110
0.3
0.77J
850
34
31
3.2
1.8
0.5
5.1
1.5
0.47J
5.4
6.7/6.3
0.7
0.95J
1.8
4.5

100 10 5 1

Opdc
Cjs
Csl

ELEV. 538.90

LEGEND:

100 TRCLE CONTOUR IN ug/L (10–89)

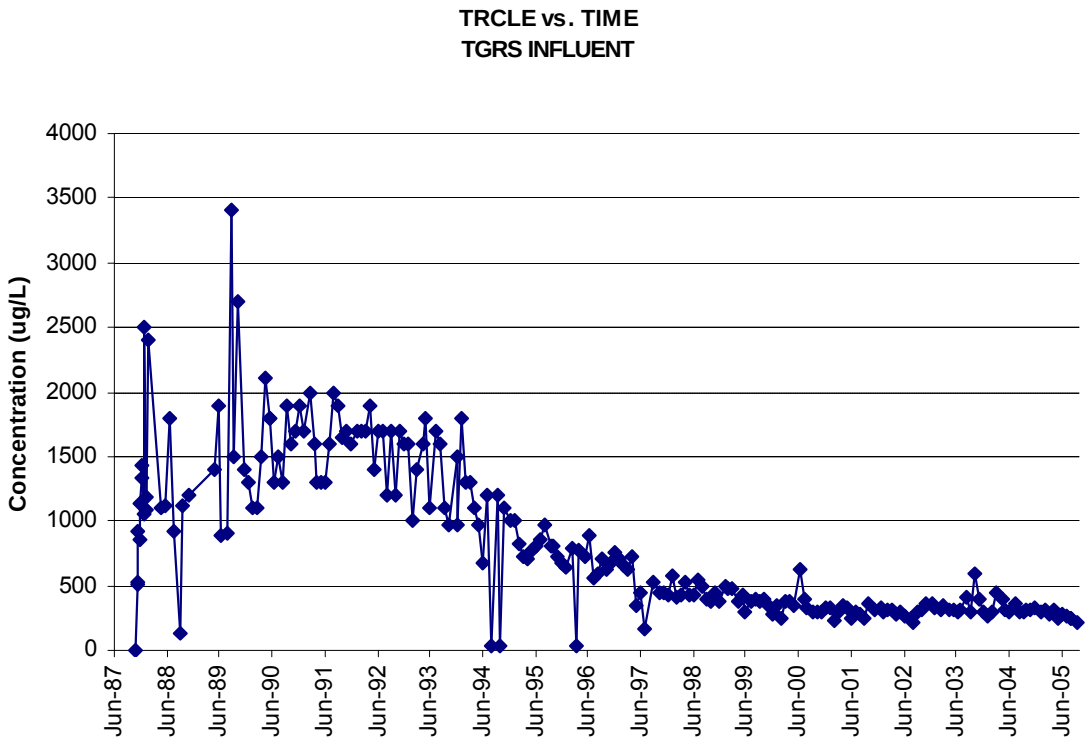
100 TRCLE CONTOUR IN ug/L (06–05)

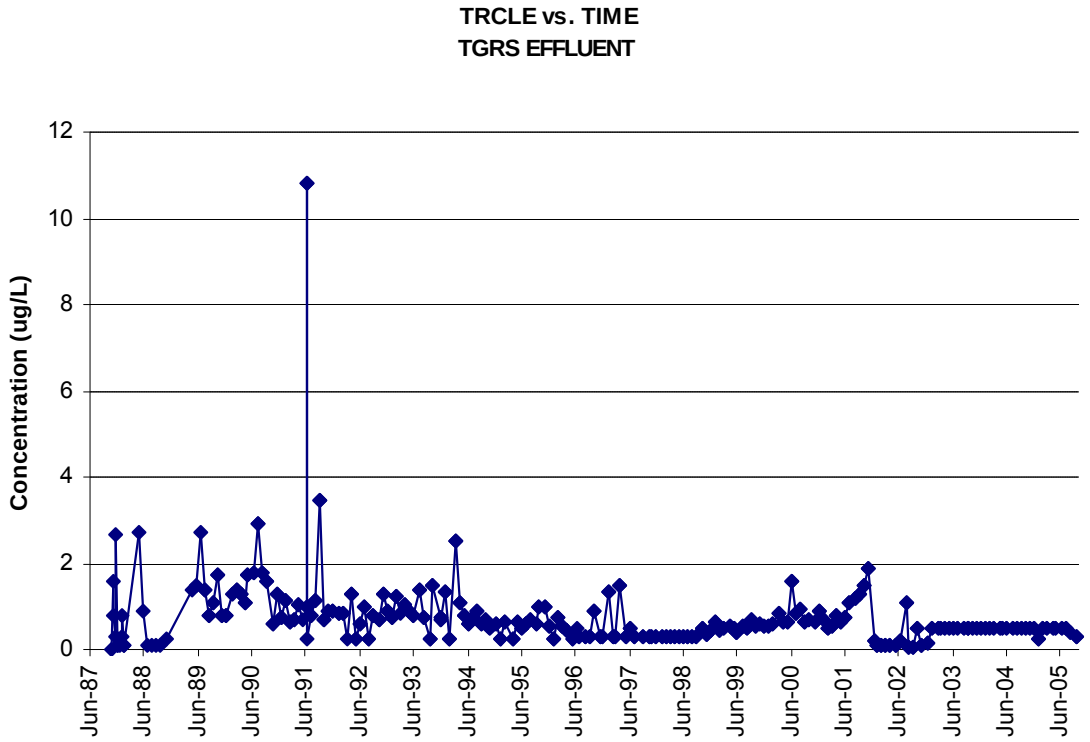
VERTICAL SCALE
0 20
SCALE IN FEET

HORIZONTAL SCALE
0 100
SCALE IN FEET

figure 10-10

JUNE 2005 GROUNDWATER TRCLE DATA
CROSS SECTION C'-C"
TWIN CITIES ARMY AMMUNITION PLANT
Arden Hills, Minnesota





NOTE: SAMPLES REPORTING CONCENTRATIONS LESS THAN THE DETECTION LIMIT WERE PLOTTED AS HALF THE DETECTION LIMIT. WHEN DUPLICATE SAMPLES WERE COLLECTED, THE HIGHER CONCENTRATION WAS PLOTTED.

figure 10–11

TGRS TREATMENT SYSTEM PERFORMANCE

Twin Cities Army Ammunition Plant

CRA

11.0 Operable Unit 3: Deep Groundwater

RECORD OF DECISION
Groundwater Remediation
Operable Unit 3
at New Brighton/Arden Hills Superfund Site
September 1992

There have been no subsequent ROD Amendments or Explanations of Significant Differences during FY 2005.

The final "Groundwater Statistical Evaluation, OU3" technical memorandum received consistency on May 2, 2005. This document presented a statistical evaluation showing that the South Plume has been receding since at least 1996, including the period since the Plume Groundwater Recovery System (PGRS) was shut off in 2001. This document forms the basis for an OU3 ROD Amendment, due to be signed in FY 2006. For OU3, that will effectively remove the need for a pump and treat remedy using the PGRS extraction well and treatment train for OU3.

The PGRS is an off-post groundwater extraction and treatment system and municipal potable water supply. The PGRS consists of New Brighton Municipal Well #13 (NBM #13) and a GAC treatment plant. The water is used by New Brighton for municipal supply. The PGRS is designed to contain the south plume of VOC contamination emanating from TCAAP and to prevent further downgradient migration. Recovered groundwater is treated and used by the City of New Brighton to fulfill its municipal water supply demand. Figure 11-1 presents an OU3 site plan.

The PGRS began operations on May 3, 1994. In 1997, the PGRS influent dropped to below the ROD required limits for all VOCs. In December 1999, under an agreement with the Agencies,

the PGRS pumping rate was reduced from a nominal rate of 1,000 gpm to 400 gpm to help determine if the reductions in concentration were the result of actual plume decreases or the result of dilution from over pumping. In conjunction with the flow rate decrease, a quarterly monitoring program was undertaken to monitor for potential "rebound" in VOC concentrations. As of the end of FY 2000, no rebound was observed and a review of the historical database for all of OU3 and the associated source area in OU2 revealed that the entire south plume had dramatically decreased in size and concentration since the early 1990s. The concentration decreases were such that the leading edge of the South Plume, at the PGRS, dropped below the ROD requirements.

The results of this evaluation were presented to the Agencies on September 6, 2000, and a report titled "Plume History Evaluation, Operable Unit 3", CRA, was submitted to the Agencies on October 10, 2000. The report documents the history of plume size and concentration reductions throughout OU3. Based on the dramatic reductions in plume size and concentration, the report recommended shutting down the PGRS. The Agencies subsequently accepted the recommendation. The City of New Brighton stopped significant pumping in August 2001 and the PGRS was maintained in standby status. During the period May 2003 through September 2003, the PGRS was operated solely to satisfy peak water supply demands and then was placed back into standby status. The PGRS remained in standby status throughout FY 2004 and FY 2005. The City has conducted an evaluation of its municipal system to, in part, determine the future use of the PGRS extraction well and treatment system. The City has decided the PGRS treatment system and well NBM #13 are not part of the City's long-term water supply plan.

11.1 REMEDY COMPONENT #1: GROUNDWATER EXTRACTION

Description: "Extraction of groundwater at the leading edge of the South Plume." (OU3 ROD, page 2)

Performance Standard (how do you know when you're done):

When the PGRS is operating at the designed flow rates and the zone of capture is achieving containment of the leading edge of the south plume.

Is the remedy component being implemented?

Yes. The PGRS began full-scale operation in May 1994. The flow rate was reduced to zero in August 2001 due to the reduction in plume size and concentration. The PGRS was operated from May 2003 through September 2003, solely to satisfy municipal peak water supply demand requirements, and then placed back in "standby" mode. The system remained in standby mode during FY 2005. PGRS operations during FY 2005 were in support of maintaining the system in "standby" condition in the event groundwater must be treated for contamination and for collection of groundwater samples. All water pumped was sewered.

Is the PGRS containing the South Plume?

The intent of this ROD requirement is being met. The monitoring data indicates that the south plume no longer extends as far as the PGRS at concentrations above the ROD requirements. Samples collected in FY 2005 from the extraction well and from monitoring wells in the vicinity of the extraction well, were below 1 µg/l, indicating that the southern edge of the South Plume was north of monitoring well 04U863. Table 11-1 presents a summary of the monitoring well sample analyses.

11.2 REMEDY COMPONENT #2: GROUNDWATER TREATMENT

Description: "Treatment of extracted groundwater for the removal of volatile organic compounds (VOCs) by a pressurized granular activated carbon (GAC) system." (OU3 ROD, page 2)

Performance Standard (how do you know when you're done):

When the effluent from the treatment system meets the standards in the OU3 ROD.

Is the remedy component being implemented?

Yes. The City of New Brighton maintained the PGRS in "standby" mode during FY 2005. PGRS operations during FY 2005 were in support of maintaining the system in "standby" condition in the event groundwater must be treated for contamination and for collection of groundwater samples. All water pumped was sewered.

Is treatment meeting the requirements of the OU3 ROD?

Yes. The influent and effluent water was sampled in FY 2003 by the City of New Brighton after returning the system to operational status and on a monthly basis during the months the system was in operation. The City did not monitor the PGRS during FY 2004 or FY 2005 because the PGRS did not provide potable water to the City. Historical monitoring data is provided in Appendix H.1.

The FY 2003 influent and effluent trichloroethene and FY 2005 NBM #13 concentrations were less than 1.0 µg/l (below detection limits for all sampling events). Figure 11-2 presents a summary of the influent and effluent trichloroethene concentrations versus time.

How much VOC mass did the system remove?

The PGRS extracted 13,000 gallons of water during FY 2005 in support of "standby" status operations and monitoring. All water was sewered.

The PGRS did not remove any measurable VOC mass during FY 2005 as NBM #13 concentrations were non-detect. A summary of the monthly pumping volumes and VOC removal is shown in Table 11-3. The total mass removed by the PGRS since startup is 132.0 pounds.

11.3 REMEDY COMPONENT #3: USE OF WATER FOR MUNICIPAL SUPPLY

Description: "Discharge of treated groundwater to the potable supply of the City of New Brighton." (OU3 ROD, page 2)

Performance Standard (how do you know when you're done):
When the City of New Brighton is able to accept the entire discharge from the PGRS, and is doing so on a full-time basis.

Is the remedy component being implemented?
Yes. The City of New Brighton maintained the PGRS in "standby" mode during FY 2005. PGRS operations during FY 2005 were in support of maintaining the system in "standby" condition in the event groundwater must be treated for contamination and for collection of groundwater samples. All water pumped was sewered.

11.4 REMEDY COMPONENT #4: GROUNDWATER MONITORING

Description: "Monitoring of the groundwater to verify the effectiveness of the remedy." (OU3 ROD, page 2)

Performance Standard (how do you know when you're done):
When a monitoring program is established and monitoring is in compliance with the regulator approved Annual Monitoring Plan.

Is the remedy component being implemented?

Yes. Appendix A summarizes the FY 2005 monitoring plan and any deviations are explained in Appendix C.2. Monitoring was as follows:

Groundwater

Groundwater samples were collected from seven wells, including the extraction well, in the vicinity of the PGRS (south of Interstate 694) in October 2004. These seven wells, 04U863, 04U864, 04U865, 04U866, 04J864, 04J866, and 520931 (NBM #13) served as sentinel wells since December 1999 (March 2002 for 04U863) to monitor the plume while pumping of the PGRS was reduced, and then eliminated. These wells provided a sentry-monitoring network near the extraction well to monitor for any potential rebound in concentrations. The Groundwater Statistical Evaluation Technical Memorandum provided the basis for ending quarterly monitoring of these wells. Well 04U863 was sampled in September 2005 as required by the Groundwater Statistical Evaluation Technical Memorandum.

A larger list of wells was monitored in June 2005 as part of the OU1, OU2, and OU3 comprehensive biennial sampling round. All samples were analyzed for VOCs using SW846 8260. Changes made to the FY 2005 monitoring plan based on the conclusions of the Groundwater Statistical Evaluation Technical Memorandum include monitoring 03L832 and 03L860 on a one-time basis in 2005 and eliminating 04U864, 04J864, and 520931 (NBM #13) from the annual sampling list. Three other wells that were sampled in June 2005 (04U865, 04U866, and 04J866) were changed from the quarterly sampling schedule to the biennial sampling schedule. Wells used for monitoring OU3 are shown on Figure 11-1. The specific role of each well is provided in Appendix A. Water elevations were gathered during monitoring events and are presented in Appendix D.1.

Table 11-1 presents a summary of the analytical results. All of the wells in the vicinity of the PGRS (former sentinel wells) were either non-detect for trichloroethene or had detections below the contract detection limit of 1 µg/l. The two wells that were sampled on a one time basis, 03L832 and 03L860, had trichloroethene concentrations of 1.2 µg/l and 0.23 µg/l JP, below the

cleanup standard. Further upgradient, trichloroethene was detected in 11 wells above the cleanup standard.

The Mann-Kendall statistical analysis was updated for the 11 wells that it was originally completed for in the Groundwater Statistical Evaluation Technical Memorandum. A summary of the statistical analysis, updated with FY 2005 data and available FY 2004 data, is presented in Table 11-2. Individual spreadsheets presenting the Mann-Kendall test results for each well are provided in Appendix H.2.

Treatment System

Samples were collected in FY 2003 by the City of New Brighton from the treatment system after returning the system to operational status and on a monthly basis during the months the system was in operation. The City did not perform sampling during the FY 2004 or FY 2005 periods. Historical data is provided in Appendix H.1.

Are contingency actions warranted?

The Groundwater Statistical Evaluation and the Draft OU3 ROD Amendment require contingency actions to be considered when the Mann-Kendall statistical analysis shows that a well at the edge of the South Plume has a stable or increasing trend or a well at the center of the South Plume has an increasing trend. Wells were identified as being at the center of the plume, edge of the plume, or outside of the plume in the Groundwater Statistical Evaluation. The edge-of-plume and center-of-plume wells are identified on Table 11-2.

In FY 2005, the three center-of-plume wells had the same trends as reported in the Groundwater Statistical Evaluation (FY 2003), stable for 03M848 and 04U859, and increasing for 04U861. While the statistical trend was stable, the concentration at 03M848, which is considered the heart of the South Plume decreased from 450 µg/l in 2003 to 230 µg/l in 2005. Wells 04U859 and 04U861 are classified as center-of-plume wells because they are at the boundary between OU1 and OU3. Both of these wells had increased concentrations since 2003. However, 1,1,1-trichloroethane was detected in both of these wells, indicating that the OU1 plume is likely

commingling with the OU3 plume. 1,1,1-Trichloroethane had not been detected in either 04U859 or 04U861, since 1999.

The trend for seven of the eight edge-of-plume wells changed from decreasing to stable since FY 2003. Four of these wells are in the upgradient portion of the South Plume, and it may be more appropriate to consider them center-of-plume wells (however, reclassification of these wells is not recommended at this time). They were classified as edge-of-plume wells in the Groundwater Statistical Evaluation because of decreasing trends, recent low concentrations, and their proximity to the side-gradient edge of the plume. Wells 03L673 and 04U673 are at the far upgradient edge of the South Plume (see Figure 11-1). Wells 03L848 and 04U848 are directly below 03M848, the heart of the South Plume. For these reasons, additional sampling is not proposed.

While the trend for 04U863 changed from decreasing to stable since FY 2003, this well has had concentrations less than 1 µg/l since December 1999. Given a stable trend at a concentration less than 1 µg/l, this well should be reclassified as outside of the plume and should not be statistically analyzed in the future. Well 04U863 is on an annual sampling schedule as a sentry well just downgradient of the South Plume.

The trend for one edge-of-plume well (409548) changed from stable to decreasing. This well is an OU1 well, but is statistically evaluated for OU3 because it is near the OU1/OU3 boundary and is also near the downgradient edge of OU3. Trichloroethene concentrations in 409548 have been fairly consistent, and less than 3 µg/l since 1995. The statistical result may continue to alternate between decreasing and stable in the future.

The two other edge-of-plume wells that had a stable trend were 04U832 and 04U845. The trichloroethene concentrations in both of these wells increased in 2005 after exhibiting concentrations near 4 µg/l in 2001 and 2003. Similar to 04U859 and 04U861, 1,1,1-trichloroethane was detected in 04U832 for the first time since 1999, indicating a commingling of the OU1 and OU3 plumes.

Based on the changes in the statistical trends observed in the OU3 monitoring wells, three additional wells (04U832, 04U845, and 04U861) are proposed to be monitored in FY 2006 as a contingency action. The Mann-Kendall statistical evaluation will also be updated for 04U832 and 04U845.

Please note that well 04U861, which will be abandoned in the spring of 2006 to accommodate construction activities, will be sampled before it is abandoned and the statistical evaluation updated.

Is additional monitoring proposed prior to the next report?

Yes. The existing OU3 monitoring requirements are presented in Table 11-4. Appendix A presents the FY 2005 – FY 2009 monitoring plan. In addition to the two wells previously scheduled for annual monitoring (03M848 and 04U863), three additional wells will be sampled as a contingency action in FY 2006. Those three wells are 04U832, 04U845, and 04U861.

11.5 OVERALL REMEDY FOR OU3

Is the Remedy for OU3 Operating in Compliance with the OU3 ROD?

The PGRS extraction well was shut down in FY 2001. In FY 2005, there were no wells exhibiting VOC concentrations above the ROD requirements in the vicinity of the PGRS. All detection limits were below the requirements of the ROD.

Are any changes or additional actions required for OU3?

Yes. A technical memorandum in support of the ROD amendment received consistency from the USEPA and MPCA on May 2, 2005. This document proposes permanent shutdown of NBM #13 for remediation purposes. A ROD Amendment that eliminates the requirements for extraction of groundwater at the leading edge of the South Plume, treatment of contaminated groundwater, and municipal use of the treated groundwater is due to be signed in FY 2006.

Groundwater monitoring will continue in order to confirm that the plume remains below applicable standards.

The City of New Brighton has proposed abandonment of two monitoring wells, 04U861 and 03L861, to accommodate a construction project due to commence in the spring of 2006. Well 04U861 will be replaced once construction work is complete.

Table 11-1

Groundwater Quality Data
Operable Unit 3, TCAAP

Fiscal Year 2005

Well	Date	Trichloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	cis-1,2-Dichloroethene	Vinyl Chloride	Carbon Tetrachloride	Chloroform	Freon 113	Methylene Chloride	Tetrachloroethene	trans-1,2-Dichloroethene	1,2-Dichloroethane
OU3 Cleanup Level (1)		5	200	3	6	70	70	--	--	--	--	--	--	--	--
03L673	6/22/05	150	< 1	< 1	0.84 JP	0.57 JP	7.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L832	6/23/05	1.2	< 1	< 1	0.43 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L832 D	6/23/05	1.2	< 1	< 1	0.36 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L848	6/21/05	5.8	< 1	< 1	< 1	< 1	0.51 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L854	6/23/05	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L859	6/22/05	8.9	5.5	< 1	1.3	2.3	0.9 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L860	6/23/05	0.23 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03L861	6/23/05	0.33 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03M848	6/21/05	230	0.3 JP	< 1	1.5	0.93 JP	10	< 1	< 1	< 1	< 1	< 1	0.57 JP	0.34 JP	< 1
03U673	6/22/05	0.98 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
03U673 D	6/22/05	0.92 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04J864	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04J864 D	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04J866	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04J866	6/21/05	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U673	6/22/05	49	< 1	< 1	0.33 JP	0.19 JP	2.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U832	6/23/05	41	3.1	< 1	3.6	2.5	3.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.34 JP
04U845	6/22/05	20	< 1	< 1	< 1	< 1	1.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U848	6/21/05	5.6	< 1	< 1	< 1	< 1	0.24 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U851	6/22/05	0.26 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U852	6/24/05	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U854	6/23/05	11	< 1	< 1	< 1	< 1	0.69 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U859	6/22/05	71	18	< 1	11	7.2	2.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.4 JP

Table 11-1

Groundwater Quality Data
Operable Unit 3, TCAAP

Fiscal Year 2005

Well	Date	Trichloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	cis-1,2-Dichloroethene	Vinyl Chloride	Carbon Tetrachloride	Chloroform	Freon 113	Methylene Chloride	Tetrachloroethene	trans-1,2-Dichloroethene	1,2-Dichloroethane
OU3 Cleanup Level (1)		5	200	3	6	70	70	--	--	--	--	--	--	--	--
04U860	6/23/05	0.61 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U861	6/23/05	200	1.5	< 1	5	3.8	20	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2
04U863	10/27/04	0.21 JP	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04U863	6/22/05	0.45 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U863	9/29/05	0.27 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U864	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04U865	10/28/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04U865	6/22/05	0.31 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
04U866	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04U866 D	10/27/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1
04U866	6/21/05	0.19 JP	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
476837 (MW15H)	6/24/05	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
520931 (NBM#13)	11/2/04	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1			< 1	< 1	< 1

Notes:

(1) Cleanup levels for OU3 are from the OU3 ROD. Shading indicates exceedance of the cleanup level.

D - Duplicate analysis

JP - Results are less than the reporting limit, but greater than the instrument detection limit. Value is estimated.

Table 11-2

Mann-Kendall Statistical Summary
Operable Unit 3, TCAAP

Fiscal Year 2005

Well	*Kendall S*	*Number of Data Points*	*Raw Trend*	*Confidence*	*Coefficient of Varience*	*Raw Trend Decision*	*MAROS Conclusion*	*June 2005 TRCLE Conc.*
Edge of Plume Wells								
03L673	-5	6	Decreasing	76.50%	0.7727	Stable or No Trend	Stable	150
03L848	-7	6	Decreasing	86.40%	0.4340	Stable or No Trend	Stable	5.8
409548	-11	6	Decreasing	97.20%	0.3921	Definite	Decreasing	1.1
04U673	-5	6	Decreasing	76.50%	0.6877	Stable or No Trend	Stable	49
04U832	-1	6	Decreasing	50.00%	0.6741	Stable or No Trend	Stable	41
04U845	-5	6	Decreasing	76.50%	0.6689	Stable or No Trend	Stable	20
04U848	-1	6	Decreasing	50.00%	0.7030	Stable or No Trend	Stable	5.6
04U863	-5	6	Decreasing	76.50%	0.8668	Stable or No Trend	Stable	0.45 J
Center of Plume Wells								
03M848	-7	6	Decreasing	86.40%	0.3640	Stable or No Trend	Stable	230
04U859	-1	6	Decreasing	50.00%	0.7632	Stable or No Trend	Stable	71
04U861	13	6	Increasing	99.17%	1.3710	Definite	Increasing	200

Table 11-3

Summary of Monthly VOC Removal
Operable Unit 3, TCAAP

Fiscal Year 2005

Month	Total Monthly Flow[1] (million gallons)	Total VOC Influent[2] Concentration	Total VOC Effluent [2] Concentration	Total VOCs in Treatment Center Discharge (gm)	Total VOC Mass Removed (gm)	Total VOC Mass Removed (lb)
Cumulative As Of September 2004 (FY2004)						132.0
October	0.00000					
November	0.01300					
December	0.00000					
January	0.00000					
February	0.00000					
March	0.00000					
April	0.00000					
May	0.00000					
June	0.00000					
July	0.00000					
August	0.00000					
September	0.00000					
Totals - FY2005	0.01300					
Cumulative To Date						132.0

Notes:

[1]Data collected by City of New Brighton.

[2] The plant was not operated as a water supply system during FY05 and no monitoring was performed by the City of New Brighton.

Table 11-4

Summary of Groundwater Monitoring Requirements
Operable Unit 3, TCAAP

Fiscal Year 2005

	Remedy Component		***Monitoring Requirements***	***Implementing Party***	***Documents Containing the Monitoring Plan***
#1	Groundwater Extraction	a.	Water levels for use in drawing contour maps demonstrating capture (currently not applicable).	Alliant	OU3 Monitoring Plan in Annual Report
		b.	Pumping rates and volumes for reporting (currently not applicable).	Alliant	OU3 Monitoring Plan in Annual Report
#2	Groundwater Treatment	a.	Influent / effluent monitoring to verify compliance and calculate mass removal (currently not applicable).	Alliant	OU3 Monitoring Plan in Annual Report
#3	Use of Water for Municipal Supply	a.	Effluent monitoring for verifying compliance with public water supply requirements (currently not applicable).	New Brighton	New Brighton's Monitoring Plan
#4	Groundwater Monitoring	a.	Groundwater sampling to track progress of clean-up.	Alliant	OU3 Monitoring Plan in Annual Report
	Overall Remedy	a.	Water quality monitoring to verify attainment of clean-up goals.	Alliant	OU3 Monitoring Plan in Annual Report

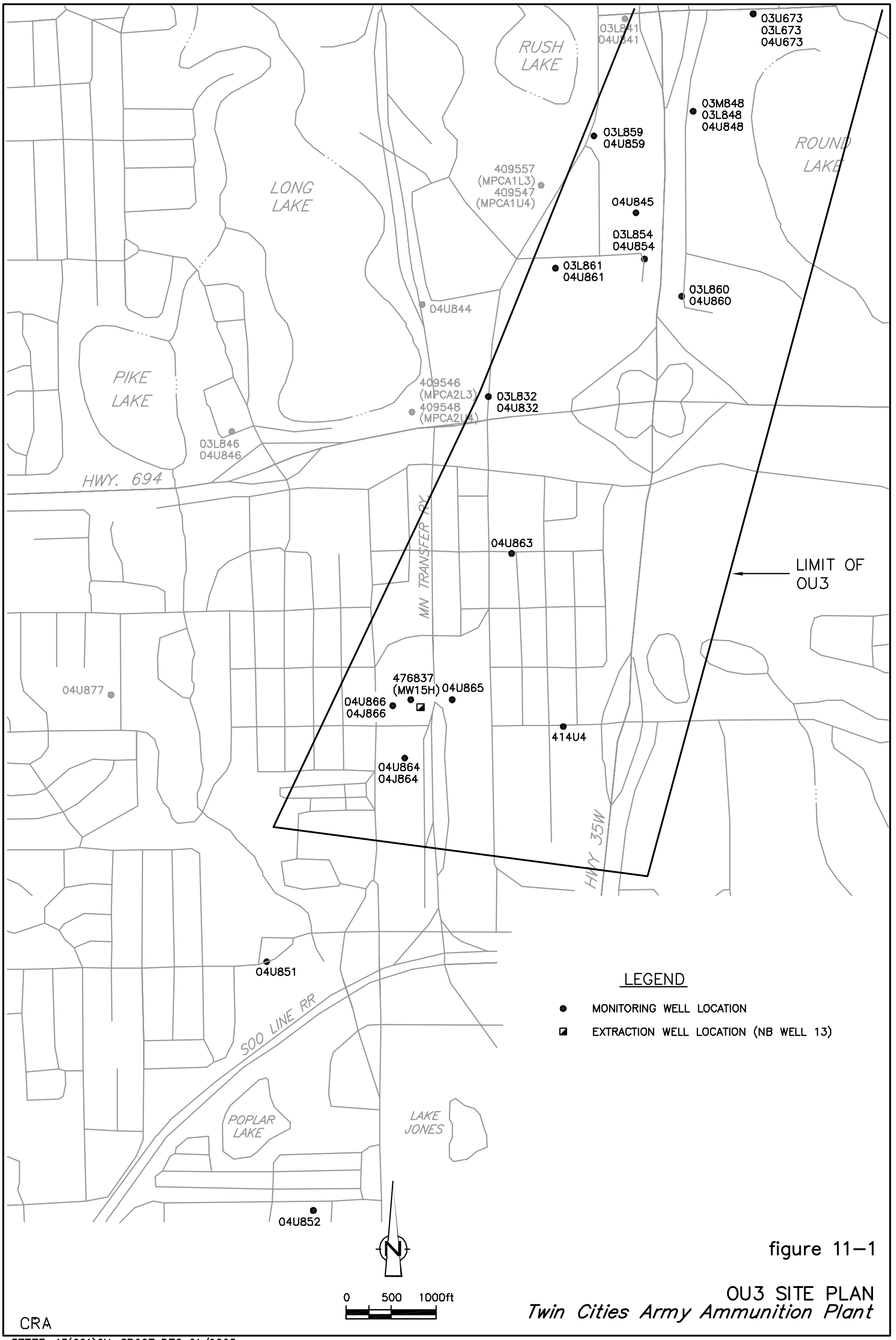
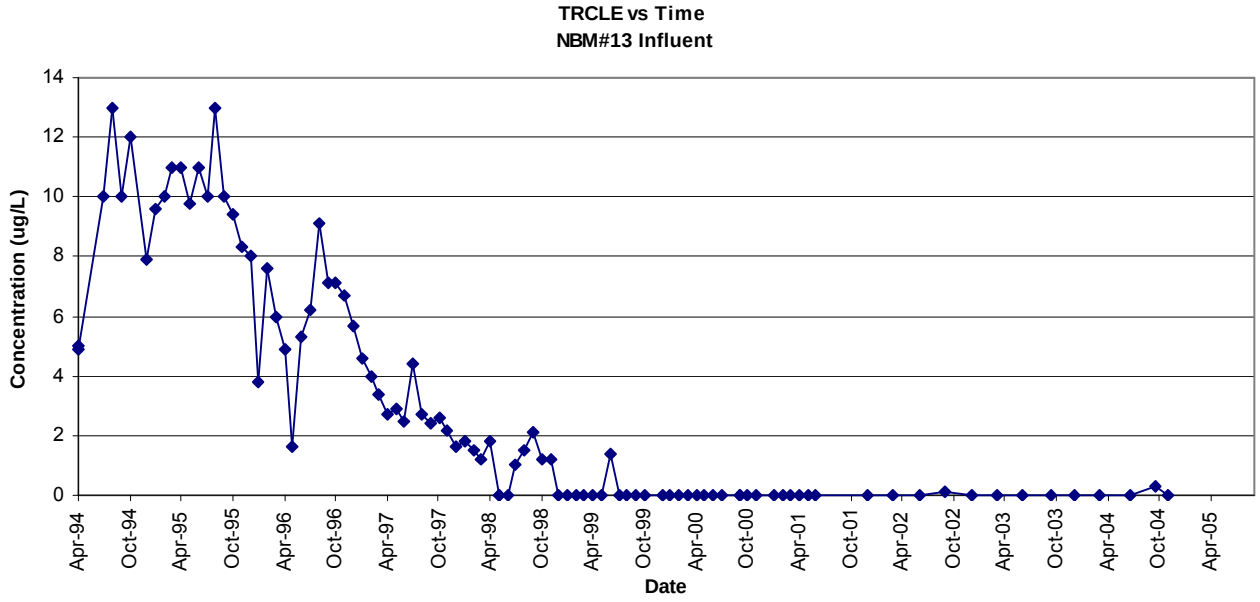


figure 11–1

OU3 SITE PLAN
Twin Cities Army Ammunition Plant

CRA

37773–43(001)GN–SP007 DEC 21/2005



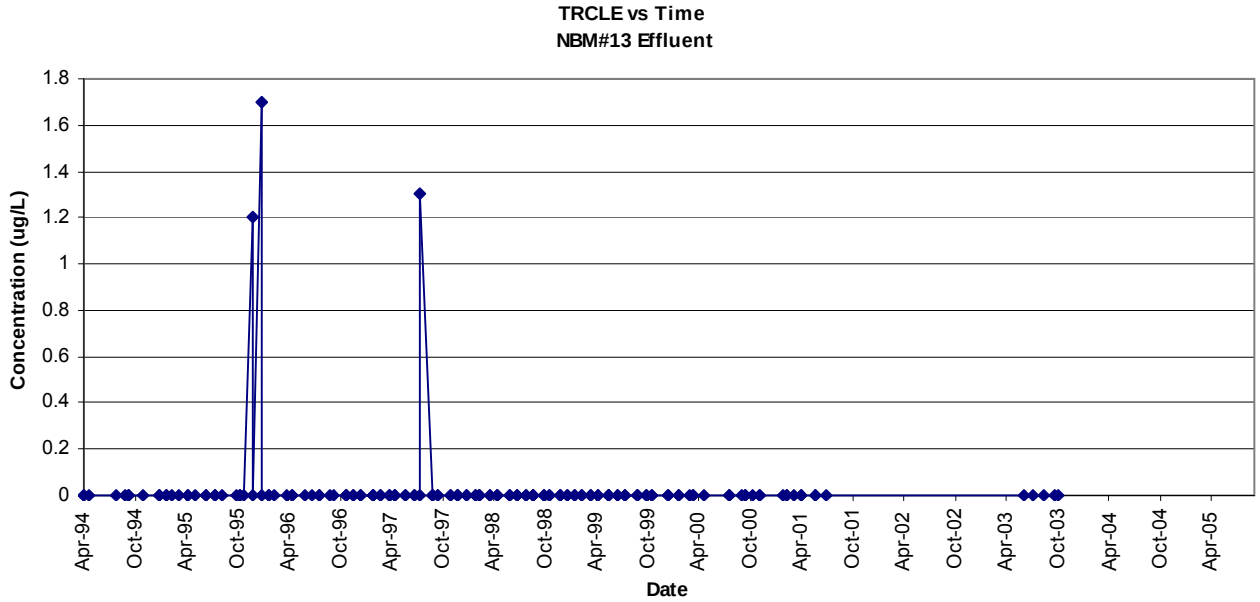


figure 11–2

OU3 (PGRS) TRCLE vs. TIME

Twin Cities Army Ammunition Plant

CRA

12.0 Land Use Controls

Has a Land Use Control Implementation Plan (LUCIP) been prepared to address land use control (LUC) issues and is it being implemented?

The Army prepared a LUCIP for TCAAP, dated February 2003. During FY 2005, the Army, the National Guard, and Alliant implemented the LUCIP. Although the LUCIP is already being implemented, it has not been approved by the MPCA and USEPA. In light of apparent resolution in 2005 of a national-level debate between the USEPA and Department of Defense (DOD) regarding LUC enforcement, TCAAP needs to resolve installation LUC issues with the MPCA and USEPA (Region V). It is expected that these issues will be resolved in FY 2006.

Was the annual site inspection for land use controls conducted in FY 2005, as specified in the LUCIP?

On July 27, 2005, the Army, National Guard, and TWISS conducted the annual inspection of TCAAP sites. The checklist that was completed during the inspection is included as Appendix J.

Were any items requiring additional actions identified in the annual site inspection?

The soil remedy needs to be completed at Site C, and if the remedy involves a cover, then signs need to be installed around the cover area.

13.0 Other Installation Restoration Activities During FY 2004

Appendix I briefly summarizes the status of other activities at TCAAP that are related to the Installation Restoration Program, but are not required in the RODs for OU1 through OU3.

14.0 References

Argonne National Laboratory, 1991. "Installation Restoration Program: Remedial Investigation Report for the Twin Cities Army Ammunition Plant." Final Report, April 1991.

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"Federal Facility Agreement." August 12, 1997.

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Montgomery Watson, 1995. "Operable Unit 1 Alternate Water Supply Plan." Final Report, October 1995.

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Montgomery Watson, 1997. "Operable Unit 2 Feasibility Study." Final Report, March 1997.

Montgomery Watson, 1999. "Final Alternate Water Supply Construction Report for Period 1997 through 1998". March 1999 (updated April 17, 2000 and August 2, 2000).

OU1 Technical Group, 2005. "Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data." Final Report, December 2005.

"Record of Decision (ROD) for Gradient Control System for TCAAP." September 1987.

"Record of Decision, Groundwater Remediation Operable Unit 3 at New Brighton/Arden Hills Superfund Site." September 1992.

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Tecumseh/Wenck Installation Support Services, 2003. "Land Use Control Implementation Plan." February 2003.

Tecumseh/Wenck Installation Support Services, 2003. "Quality Assurance Project Plan for Performance Monitoring." Revision 3, December 10, 2003.

"Twin Cities Army Ammunition Plant, New Brighton/Arden Hills Superfund Site, Operable Unit 2, Record of Decision." October 1997.

Appendix A

FY 2005 – FY 2009 Monitoring Plans

A.1 Groundwater Monitoring Wells

APPENDIX A.1
FY 2005 – FY 2009 MONITORING PLAN
FOR GROUNDWATER MONITORING WELLS

Unit Designations:

01U - Upper Fridley Formation	03L - Lower Hillside Formation	SL - St. Lawrence
01L - Lower Fridley Formation	SP - St. Peter	UNK - Unknown
03U - Upper Hillside Formation	PC - Prairie du Chien	
03M - Middle Hillside Formation	J - Jordan	

Notes:

(A) Indicates that the monitoring is the responsibility of Alliant.

(B) Indicates that the monitoring is the responsibility of the Army.

(1) "L (A or B)" denotes a water level measurement by the appropriate party.

(2) "Q (A or B)" denotes a water quality sampling by the appropriate party. The required analyte list for each specific site is shown in Appendix A.4.

(3) The designations refer to the following purposes:

- ❖ Operable Unit 1 Water Quality
  - – 1.a = To contour the perimeter of the plume which defines the area of concern for alternate water supply/well abandonment
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ Operable Unit 1 Water Levels
  - – 3.b = To contour water levels for evaluation of containment
- ❖ Site A Water Quality
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ Site A Water Levels
  - – 2.b = To contour water levels for evaluation of containment
- ❖ Site I Water Quality
  - – 1.a = To track remedy progress
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ Site I Water Levels
  - – 1.a = To track remedy progress
- ❖ Site K Water Quality
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ Site K Water Levels
  - – 3.a = To contour water levels for evaluation of containment
- ❖ TGRS Water Quality
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ TGRS Water Levels
  - – 1.a = To contour water levels for evaluation of containment
- ❖ Operable Unit 3 Water Quality
  - – OR = Overall remedy. To evaluate attainment of the cleanup levels throughout the plume
- ❖ Operable Unit 3 Water Levels
  - – 1.a = To contour water levels for evaluation of containment

(4) Sample if in production at time of sample collection.

(5) Sample extraction well annually or biennially, as shown, since it is no longer being pumped.

(6) (Deleted)

(7) Sample annually for five years (FY 2003 through FY 2007) to verify that there have been no adverse impacts to groundwater due to shallow soil remediation work.

(8) Of the two wells, well 01U639 will be the primary sampling location and 482089 (I04MW) will be the alternate sampling location. If it is not possible to collect a groundwater sample from 01U639, then an attempt will be made to collect a sample from 482089 (I04MW).

APPENDIX A.1

FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Operable Unit 1			Note: Changes from the monitoring plan presented in the previous Annual Performance Report are highlighted in this appendix.								
03U	03U811			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
03U	03U821			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
03U	03U822			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03U	03U831			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03U	409550	PCA 6U3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
03U	409596	BS118U3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
03M	03M843			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03L	03L811			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
03L	03L822			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
03L	03L832			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
03L	03L841			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03L	03L846			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03L	03L853			---	---	---	---	---	OR	None	
03L	409556	PCA4L3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03L	409557	PCA1L3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
03L	409597	BS118L3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
PC	04U821			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U834			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
PC	04U836	MW-1		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U837	MW-3		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U838	MW-5		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U839	MW-7		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U841			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U843			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	
PC	04U844			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U846			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U847			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U849			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U850			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	04U855			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	

APPENDIX A.1

FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
PC	04U871			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
PC	04U872			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
PC	04U875			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	
PC	04U877			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
PC	04U879			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	
PC	04U880			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	
PC	04U881			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
PC	04U882			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
PC	04U883			Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	None	
PC	191942	BS118U4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	200154	UM Golf Course		Q(B)	---	Q(B)	---	Q(B)	1.a, OR	---	
PC	200814	American Linen		---	---	---	---	---	---	---	
PC	206688	Cloverpond		Q(B)	---	Q(B)	---	Q(B)	1.a, OR	---	
PC	234547	Hnywell Ridgway		---	---	---	---	---	---	---	
PC	409547	PCA1U4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	409548	PCA2U4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	409549	PCA3U4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	409555	PCA5U4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	1.a, OR	3.b	
PC	512761	Gross Golf Course #2		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
PC	554216	New Brighton #14									See Appendix A.2
PC	582628	New Brighton #15									See Appendix A.2
J	04J822			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
J	04J834			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
J	04J835			---	---	---	---	---	---	---	
J	04J836	MW-2		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
J	04J837	MW-4		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
J	04J838	MW-6		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
J	04J839	MW-8		Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	3.b	
J	04J847			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
J	04J849			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	3.b	
J	04J882			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
J	200524	St. Anthony #5	(4)	Q(B)	---	Q(B)	---	Q(B)	OR	---	Army gets St. Anthony Data
J	200803	St. Anthony #4	(4)	Q(B)	---	Q(B)	---	Q(B)	OR	---	Army gets St. Anthony Data

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
J	206796	New Brighton #5									See Appendix A.2
J	206797	New Brighton #6									See Appendix A.2
PC/J	200804	St. Anthony #3	(4)	Q(B)	---	Q(B)	---	Q(B)	OR	---	Army gets St. Anthony Data
PC/J	200812	Gross Golf #1		---	---	---	---	---	---	---	
PC/J	206792	New Brighton #4									See Appendix A.2
PC/J	206793	New Brighton #3									See Appendix A.2
PC/J	233221	R&D Systems, N. Well		---	---	---	---	---	---	---	
PC/J	234549	Reiner		Q(B)	---	Q(B)	---	Q(B)	1.a, OR	---	
PC/J	PJ#318			Q,L(B)	---	Q,L(B)	---	Q,L(B)	OR	None	
UNK	234546	Hnywell Ridgway		Q(B)	---	Q(B)	---	Q(B)	OR	---	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Operable Unit 2											
Site A Removal Action											
01U	01U038			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U039			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U040			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U041			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U063			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U067			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U102			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U103			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U104			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U105			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U106			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U107			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U108			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U110			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U115			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U116			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U117			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U118			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U119		(7)	Q,L(B)	Q,L(B)	Q,L(B)	L(B)	Q,L(B)	(Note 7)	2.b	See Page 2 of Appendix A.4
01U	01U120			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U125			---	---	---	---	---	OR	2.b	
01U	01U126			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U127			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U133			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U135			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U136			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U137			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
01U	01U138			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U139			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U140			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U141			L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U145	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U146	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U147	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U148	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U149	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U150	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U151	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U152	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U153	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U154	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U155	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U156	Piezometer		L(B)	L(B)	L(B)	L(B)	L(B)	---	2.b	
01U	01U157			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U158			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U350			---	---	---	---	---	---	---	
01U	01U351	EW-1									See Appendix A.2
01U	01U352	EW-2									See Appendix A.2
01U	01U353	EW-3									See Appendix A.2
01U	01U354	EW-4									See Appendix A.2
01U	01U355	EW-5		---	---	---	---	---	---	---	
01U	01U356	EW-6		---	---	---	---	---	---	---	
01U	01U357	EW-7		---	---	---	---	---	---	---	
01U	01U358	EW-8		---	---	---	---	---	---	---	
01U	01U901			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U902			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U903			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	
01U	01U904			Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	Q,L(B)	OR	2.b	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Site I Remedial Action											
01U	01U064			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	01U632			L(A)	L(A)	L(A)	L(A)	L(A)	---	1a, OR	
01U	01U636			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	01U639		(8)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	01U640			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	01U666			L(A)	L(A)	L(A)	L(A)	L(A)	---	1a, OR	
01U	01U667			Q,L(A)	Q,L(A)	Q,L(A)	L(A)	L(A)	---	1a, OR	
01U	01U668			L(A)	L(A)	L(A)	L(A)	L(A)	---	1a, OR	
01U	482086	I01MW		Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	482087	I05MW		Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	482088	I02MW		Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	482089	I04MW	(8)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	1a, OR	1a, OR	
01U	482090	I03MW		L(A)	L(A)	L(A)	L(A)	L(A)	---	1a, OR	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Site K Remedial Action											
01U	01U047			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U048			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U052			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U065			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U128			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U601			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U602			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U603			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U604			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U605			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U607			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U608			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U609			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U611			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U612			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U613			L(A)	L(A)	L(A)	L(A)	L(A)	OR	3.a	
01U	01U615			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U616			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U617			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U618			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U619			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U620			L(A)	L(A)	L(A)	L(A)	L(A)	OR	3.a	
01U	01U621			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	01U624			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U625			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U626			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U627			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	01U628			L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
01U	482083	K04-MW		Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	
01U	482084	K02-MW		L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
01U	482085	K01-MW		L(A)	L(A)	L(A)	L(A)	L(A)	---	3.a	
03U	03U621			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	3.a	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
TCAAP Groundwater Recovery System											
03F	03F302	B1									See Appendix A.2
03F	03F303	B2	(5)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03F	03F304	B3									See Appendix A.2
03F	03F305	B4									See Appendix A.2
03F	03F306	B5									See Appendix A.2
03F	03F307	B6									See Appendix A.2
03F	03F308	B7	(5)	Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03F	03F312	B11									See Appendix A.2
03F	03F319	B13									See Appendix A.2
03U	03U001			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U002			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U003			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U004			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U005			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U007			Q,L(A)	---	Q,L(A)	---	Q,L(A)	Background	1.a	
03U	03U008			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U009			Q,L(A)	---	Q,L(A)	---	Q,L(A)	Background	1.a	
03U	03U010			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U011			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U012			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U013			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U014			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U015			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U016			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U017			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U018			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U019			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U020			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
03U	03U021			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U022			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U023			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U024			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U025			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U026			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U027			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U028			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U029			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U030			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U031			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U032			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U075			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U076			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U077			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U078			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U079			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U082			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U083			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U084			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U087		(7)	Q(B),L(A)	Q(B)	Q(B),L(A)	---	Q(B),L(A)	(Note 7)	1.a	See Page 2 of Appendix A.4
03U	03U088			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U089		(7)	Q(B),L(A)	Q(B)	Q(B),L(A)	---	Q(B),L(A)	(Note 7)	1.a	See Page 2 of Appendix A.4
03U	03U090			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U092			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U093		(7)	Q,L(A),Q(B)	Q,L(A),Q(B)	Q,L(A),Q(B)	Q,L(A)	Q,L(A),Q(B)	OR, (Note 7)	1.a	See Page 2 of Appendix A.4
03U	03U094			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03U	03U096			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U097		(7)	Q(B)	Q(B)	Q(B)	---	Q(B)	(Note 7)	---	See Page 2 of Appendix A.4
03U	03U099			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03U	03U111			L(A)	---	L(A)	---	L(A)	---	1.a	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
03U	03U112			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U113			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U114			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U121			---	---	---	---	---	---	---	
03U	03U129			---	---	---	---	---	---	---	
03U	03U301	SC1									See Appendix A.2
03U	03U314	SC2									See Appendix A.2
03U	03U315	SC3	(5)	Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U316	SC4	(5)	Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U317	SC5									See Appendix A.2
03U	03U521			---	---	---	---	---	---	---	
03U	03U647			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U648			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U658			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U659			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U671			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U672			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U674			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U675			---	---	---	---	---	---	---	
03U	03U676			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U701			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U702			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U703			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U704			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U705			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U706			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U707			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U708			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03U	03U709			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U710			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U711			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
03U	03U715			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U716			L(A)	---	L(A)	---	L(A)	---	1.a	
03U	03U801			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03U	03U803			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U804			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U805			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03U	03U806			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03U	519288	E101-MW		---	---	---	---	---	---	---	
03U	519289	E102-MW		---	---	---	---	---	---	---	
03U	519290	E103-MW		---	---	---	---	---	---	---	
03M	03M001			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M002			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03M	03M003			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M004			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M005			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M007			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M010			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M012			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M013			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M017			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M020			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03M	03M713			L(A)	---	L(A)	---	L(A)	---	1.a	
03M	03M802			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03M	03M806			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03L	03L001			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L002			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L003			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L004			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L005			L(A)	---	L(A)	---	L(A)	---	1.a	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
03L	03L007			Q,L(A)	---	Q,L(A)	---	Q,L(A)	Background	1.a	
03L	03L010			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L012			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L013			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L014			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L017			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L018			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L020			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L021			L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L027			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L028			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L029			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L077			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L078			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L079			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L080			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L081			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L084			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L113			L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L802			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03L	03L806			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03L	03L809			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L833			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U001			L(A)	---	L(A)	---	L(A)	---	1.a	
PC	04U002			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U003			L(A)	---	L(A)	---	L(A)	---	1.a	
PC	04U007			Q,L(A)	---	Q,L(A)	---	Q,L(A)	Background	1.a	
PC	04U012			L(A)	---	L(A)	---	L(A)	---	1.a	
PC	04U020			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U027			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
PC	04U077			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U510			Q,L(A)	---	Q,L(A)	---	Q,L(A)	Background	1.a	
PC	04U701			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U702			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U708			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U709			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U711			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
PC	04U713			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U714			L(A)	---	L(A)	---	L(A)	---	1.a	
PC	04U802			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
PC	04U806			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
PC	04U833			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
J	04J077			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
J	04J702			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
J	04J708			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
J	04J713			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
J	04J714			L(A)	---	L(A)	---	L(A)	---	1.a	
PC/J	PJ#003			L(A)	---	L(A)	---	L(A)	---	1.a	
PC/J	PJ#027			L(A)	---	L(A)	---	L(A)	---	1.a	
PC/J	PJ#309	B8									See Appendix A.2
PC/J	PJ#310	B9									See Appendix A.2
PC/J	PJ#311	B10	(5)	Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC/J	PJ#313	B12	(5)	Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC/J	PJ#802			L(A)	---	L(A)	---	L(A)	---	1.a	
PC/J	PJ#806			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
---	Staff Gauges			L(A)	---	L(A)	---	L(A)	---	---	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Unit 1 Wells											
01U	01U035			---	---	---	---	---	---	---	
01U	01U043			---	---	---	---	---	---	---	
01U	01U044			---	---	---	---	---	---	---	
01U	01U045			---	---	---	---	---	---	---	
01U	01U046			---	---	---	---	---	---	---	
01U	01U060		(7)	Q(B)	Q(B)	Q(B)	---	Q(B)	(Note 7)	---	See Page 2 of Appendix A.4
01U	01U072			---	---	---	---	---	---	---	
01U	01U085			---	---	---	---	---	---	---	

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FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Operable Unit 3											
03U	03U673			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03M	03M848			Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
03L	03L673			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L832			Q,L(A)	---	---	---	---	---	---	
03L	03L848			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L854			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L859			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
03L	03L860			Q,L(A)	---	L(A)	---	L(A)	---	1.a	
03L	03L861			Q,L(A)	---	--	---	--	OR	1.a	
03L	476837	MW15H		Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U414	414U4		---	---	---	---	---	---	---	
PC	04U673			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U832			Q,L(A)	Q,L(A)	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U845			Q,L(A)	Q,L(A)	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U848			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U851			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U852			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U854			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U859			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U860			Q,L(A)	---	Q,L(A)	---	Q,L(A)	OR	1.a	
PC	04U861			Q,L(A)	Q,L(A)	Q,L(A)	---	Q,L(A)	OR	1.a	Abandoned FY06
PC	04U863	323U4	(6)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	Q,L(A)	OR	1.a	
PC	04U864	324U4	(6)	--	--	--	--	--	--	--	
PC	04U865	325U4	(6)	Q,L(A)	--	Q,L(A)	--	Q,L(A)	OR	1.a	
PC	04U866	326U4	(6)	Q,L(A)	--	Q,L(A)	--	Q,L(A)	--	--	
PC	520931	NBM #13				--	--	--	--	--	--

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
J	04J864	324 J	(6)	--	--	--	--	--	--	--	
J	04J866	326 J	(6)	Q,L(A)	--	Q,L(A)	--	Q,L(A)	OR	1.a	

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Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
Other Installation Restoration Activities											
TCAAP Well Inventory											
(Entries under "Notes" refer to the well inventory category)											
---	234356	Nordquist, Bob	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	1873 Old Hwy 8
---	249608	Rapit Printing, Inc	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2520 Larpenteur Ave
---	433298	Town & Cntry Golf Crse	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2279 Marshall Ave
---	509052	Shriners Hospital	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2025 E River Rd
---	S00311	Inglebrech, Brenda	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	1390 Silver Lake Rd
---	S00444	Mnpls Parks & Rec Dept	1a	Q(B)	---	---	---	Q(B)	Well Inventory	---	Ontario & E River Rd
---	200173	KSTP Radio TV	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	3415 University Ave
---	234355	Kingdom Hall	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	1987 Mound St
---	234421	BioChem	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2151 Mustang Dr
---	234469	Palwski, T.	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2816 Hwy 88
---	234544	R&D Systems	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2201 Kennedy St NE
---	249632	Montzka, Harold	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2301 N Upland Crest NE
---	537801	Midwest Industrial	1b	Q(B)	---	---	---	Q(B)	Well Inventory	---	4759 Old Hwy 8
---	200180	Town & Cntry Golf Crse	1c	Q(B)	---	---	---	Q(B)	Well Inventory	---	2279 Marshal Ave
---	200522	Pemtom	1c	Q(B)	---	---	---	Q(B)	Well Inventory	---	Silver Lake Rd
---	200523	Pemtom	1c	Q(B)	---	---	---	Q(B)	Well Inventory	---	Silver Lake Rd & Co Rd E
---	756236	Pechiney Plastic Pckging	1c	Q(B)	---	---	---	Q(B)	Well Inventory	---	150 26th Ave SE
---	S00437	Northern Star Co.	1c	Q(B)	---	---	---	Q(B)	Well Inventory	---	3171 5th St SE
---	107405	Anderson, Paul	2a	Q(B)	---	---	---	Q(B)	Well Inventory	---	4355 Hwy 10
---	249007	Walton, Reggie	2a	Q(B)	---	---	---	Q(B)	Well Inventory	---	4453 Hwy 10
---	249113	Wyttenbach, Daniel	2a	Q(B)	---	---	---	Q(B)	Well Inventory	---	990 11th Ave NW
---	127537	Midwest Asphalt	2b	Q(B)	---	---	---	Q(B)	Well Inventory	---	1400 Old Hwy 8
---	200176	Waldorf Paper Products	2b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2236 Myrtle Ave
---	234571	Leiser, Mark	2b	Q(B)	---	---	---	Q(B)	Well Inventory	---	1901 17th St NW
---	S00002	Midland Hills Cntry Club	2b	Q(B)	---	---	---	Q(B)	Well Inventory	---	2001 N Fulham St
---	200076	Old Dutch Foods, Inc.	2c	Q(B)	---	---	---	Q(B)	Well Inventory	---	2375 Terminal Rd

APPENDIX A.1

FY 2005 - FY 2009 MONITORING PLAN FOR GROUNDWATER MONITORING WELLS

Well Information									Purpose For Monitoring (3)		
Unit	Well I.D.	Common Name	Notes	June 05	June 06	June 07	June 08	June 09	Water Quality	Water Level	Comments
---	236029	R&D Systems, S. Well	2c	Q(B)	---	---	---	Q(B)	Well Inventory	---	2201 Kennedy St NE
---	236439	Waldorf Paper Products	2c	Q(B)	---	---	---	Q(B)	Well Inventory	---	2250 Wabash Ave
---	249150	Coldor, Lisa	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	3511 Stinson Blvd NE
---	249185	Novotny, Mark	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	1706 Malvern St
---	249191	Wells, Henry	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	1651 Millwood Ave
---	S00294	Western Remodelers	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2520 W Larpenteur Ave
---	S00295	Alfson, Loren	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2351 Summer St
---	S00409	Ohara, Rose	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	3553 Stinson Blvd NE
---	S00608	Grundtner, James	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	136 Oakwood Dr
---	---	Beach, Larry	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	1615 Silver Lake Rd
---	---	City of New Brighton	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	19 14th St NW
---	---	Burton, Jason	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2073 Tenth St NW
---	---	Tabaika, Dorothy	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2512 27th Ave NE
---	---	Willig, Allan	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2600 Pahl Ave
---	---	Weisenberger, Heidi	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2816 Silver Lake Rd
---	---	Hinton/Hermes	4a	Q(B)	---	---	---	Q(B)	Well Inventory	---	2935 Old Hwy 8

Grenade Range

---	653903	GR1-1		---	---	---	---	---	OR	---	
---	653904	GR1-2		---	---	---	---	---	OR	---	
---	653905	GR2-1		---	---	---	---	---	OR	---	
---	675976	GR-DF1		---	---	---	---	---	OR	---	

A.2 Remedial Treatment Systems

APPENDIX A.2
FY 2005 - FY 2009 MONITORING PLAN
FOR REMEDIAL TREATMENT SYSTEMS

OU1: DEEP GROUNDWATER [(1)]

Location	Sampling Frequency	Parameters
• Extraction Wells NBM#4, #14, and #15	- Monthly	- Pumping Volumes
(and also NBM#3, #5, and #6)	- Monthly	- Water Quality [(2)]
• PGAC Effluent	- Monthly	- Water Quality [(2)]

OU2: SITE A SHALLOW GROUNDWATER

Location	Sampling Frequency	Parameters
• Extraction Wells (EW1 through EW4)	- Monthly	- Pumping Volumes
	- Annual	- Water Levels
	- Annual	- Water Quality [(2)]
• Extraction/Discharge System Effluent	- Monthly	- Trichloroethene; 1,1,1-Trichloroethane; 1,2-Dichloroethene (cis and trans); and Mercury [(3)]

OU2: SITE K REMEDIAL ACTION

Location	Sampling Frequency	Parameters
• Extracted Groundwater	- Monthly	- Pumping Volume
• Treatment System Effluent [Outfall 391 (010)]	- See Appendix A.3	- See Appendix A.3

OU2: TCAAP GROUNDWATER RECOVERY SYSTEM (TGRS)

Location	Sampling Frequency	Parameters
• Extraction Wells	- Monthly	- Pumping Volumes
	- Semi-Annually	- Water Levels
	- Semi-Annually	- Water Quality [(2)]
• Treatment System Influent	- Monthly	- Pumping Volumes
	- Monthly	- Water Quality [(2)]
• Treatment System Effluent	- Monthly	- Water Quality [(2)]

OU3: PLUME GROUNDWATER RECOVERY SYSTEM (PGRS) [Not Operating]

Location	Sampling Frequency	Parameters
• Extraction Well (NBM#13)	none	none

Notes:

(1) Performed by the City of New Brighton using their Sampling and Analysis Plan.

(2) The required analyte list for each specific site is presented in Appendix A.4.

(3) Site A effluent sampling frequency and parameters are as required by the MCES Special Discharge Permit (#2194).

A.3 Surface Water

APPENDIX A.3
FY 2005 - FY 2009 MONITORING PLAN
FOR SURFACE WATER

Analysis	Analytical Method	Units	Site K Effluent (Outfall 010)	Rice Creek (Entering TCAAP) (20700)	Rice Creek (Leaving TCAAP) (20800)
Flow Rate	- -	M gal/day	Continuous	- -	- -
Total Flow	- -	M gal	M	- -	- -
pH	(field)	(pH)	Q	A	A
Cyanide	9012A	µg/l	Q	A	A
Copper	6020	µg/l	Q	A	A
Lead	6020	µg/l	Q	A	A
Mercury	7470A	µg/l	Q	A	A
Phosphorus (Total)	365.4	µg/l	Q	A	A
Silver	6020	µg/l	Q	- -	- -
Silver	7761	µg/l	- -	A	A
Zinc	6020	µg/l	Q	A	A
Trichloroethene	8260B	µg/l	Q	A	A
1,1-Dichloroethene	8260B	µg/l	Q	A	A
1,1-Dichloroethane	8260B	µg/l	Q	A	A
Cis-1,2-Dichloroethene	8260B	µg/l	Q	A	A
Trans-1,2-Dichloroethene	8260B	µg/l	Q	A	A
Vinyl Chloride	8260B	µg/l	Q	A	A
1,2-Dichloroethane	8260B	µg/l	Q	A	A

Notes:

M = Measurement required once per month

Q = Analysis required once per quarter

A = Analysis required once per year

A.4 Site Specific Lists of Required Analytes

APPENDIX A.4
SITE SPECIFIC LISTS OF REQUIRED ANALYTES

Note: Cleanup levels (in ug/l) from each Record of Decision are shown below for use in determining the required method detection limits. Also note that these lists represent the minimum list of analytes. A larger analyte list may be utilized by the monitoring organization, if so desired.

OU1 (DEEP GROUNDWATER) (1)

1,1-Dichloroethane	70
1,1-Dichloroethene	6
cis-1,2-Dichloroethene	70
1,1,1-Trichloroethane	200
1,1,2-Trichloroethane	3
Trichloroethene	5

SITE A (SHALLOW GROUNDWATER) (2)

Antimony*	6
1,1-Dichloroethene	6
1,2-Dichloroethane	4
Benzene	10
Chloroform	60
cis-1,2-Dichloroethene	70
Tetrachloroethene	7
Trichloroethene	30

*Antimony is only monitored at these wells: 01U103, 01U902 and 01U904.

SITE I (SHALLOW GROUNDWATER) (2)

1,2-Dichloroethene (cis and trans)	70
Trichloroethene	30
Vinyl Chloride	0.2

SITE K (SHALLOW GROUNDWATER) (2)

1,2-Dichloroethene (cis and trans)	70
Trichloroethene	30

OU2 (DEEP GROUNDWATER) (2)

1,1,1-Trichloroethane	200
1,1-Dichloroethane	70
1,1-Dichloroethene	6
1,2-Dichloroethane	4
cis-1,2-Dichloroethene	70
Tetrachloroethene	5
Trichloroethene	5

OU3 (DEEP GROUNDWATER) (3)

1,1-Dichloroethane	70
1,1-Dichloroethene	6
cis-1,2-Dichloroethene	70
1,1,1-Trichloroethane	200
1,1,2-Trichloroethane	3
Trichloroethene	5

Notes:

(1) From page 18 of the OU1 Record of Decision.

(2) From Table 1 of the OU2 Record of Decision.

(3) From Page 26 of the OU3 Record of Decision.

Analytical Methods:

VOCs: SW-846 Method 8260B

Antimony: SW-846 Method 6020

APPENDIX A.4 (cont'd)
SITE SPECIFIC LISTS OF REQUIRED ANALYTES

OTHER INSTALLATION RESTORATION ACTIVITIES

WELL INVENTORY SAMPLING

VOCs (report full VOC list)

OU2 SHALLOW SOIL SITE 5-YEAR GROUNDWATER MONITORING

01U119 (Site A)	Metals (antimony, barium, copper, lead)
03U093 (Site D)	Metals (antimony, lead), Explosives (nitroglycerine)
03U089 (Site E)	Metals (antimony, barium, copper, lead, manganese)
01U060 (Site H)	Metals (antimony, arsenic, copper, lead, manganese)
03U087 (Site 129-3)	Metals (antimony, lead, manganese), Explosives (nitroglycerine), VOCs (report full VOC list)
03U097 (Site 129-5)	Metals (antimony, barium, lead)

Analytical Methods:

VOCs: SW-846 Method 8260B
Metals: SW-846 Method 6020
Explosives (nitroglycerine): SW-846 Method 8332
SVOCs (bis (2-ethylhexyl) phthalate): SW-846 Method 8270C
PCBs: SW-846 Method 8082
Radionuclides (gross alpha/gross beta): EPA Method 900.0
Radionuclides (radium 226/radium 228): EPA Method 9315/9320

A.5 Site C Monitoring Plan

Appendix A.5
Site C Monitoring Plan
Twin Cities Army Ammunition Plant

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surface Water Sampling	*(Total numbers of samples are shown, excluding field duplicates.)*											
SW-1 through 8 (three consecutive days):												
Lead (dissolved) [2]				24	24	24	24	24	24	24		
Copper (dissolved) [2]				24								
Total Hardness				24								
EDTA				8[1]								
Groundwater Sampling												
MW-4, 6, 8, 9, 10, 11, 12, & 16:												
Lead (dissolved) [2]	8	8	8	8	8	8	8	8	8	8	8	8
Copper (dissolved) [2]				8								
EDTA				8								
EW-1, 2, 3:												
Lead (dissolved) [2]	3	3	3	3	3	3	3	3	3	3	3	3
Copper (dissolved) [2]				3								
EDTA				3								
MW-1, 2, 3, 5, 7, 13, 14 & 15:												
Lead (dissolved) [2]	8			8			8			8		
Copper (dissolved) [2]				8								
EDTA				8								
03U083						1[3]						

Notes:

1) A sample for EDTA analysis is collected at each of the 8 surface water locations on only 1 day of the 3-day surface water sampling event.
2) Analytical method 6020 for lead and copper
3) Well 03U083 will be sampled and analyzed for lead from FY2005 through FY2007.

Appendix B

Description of Hydrogeologic Units/Well Nomenclature and Trichloroethene Trends

(Trichloroethene Trend Graphs are located at the end of this Appendix)

APPENDIX B
DESCRIPTION OF HYDROGEOLOGIC UNITS/WELL NOMENCLATURE AND TRICHLOROETHENE TRENDS

On- and off-TCAAP wells have been installed in four hydrogeologic units beneath the site. These hydrogeologic units, as referred to in this report, are conceptually illustrated on Figure B-1 and are described below:

Unit 1: This unit, referred to as the Fridley Formation, consists of alluvium and lacustrine deposits above the Twin Cities Formation (Unit 2). The formation is made up of fine- to medium-grained sand and clayey silt, which acts as an unconfined aquifer with an estimated hydraulic conductivity of 8.3×10^{-3} cm/sec (International Technology Corp. 1992). The Unit 1 deposits are discontinuous at TCAAP and ranges in thickness from zero to 50 feet. They are predominantly limited to the north, east, and southwest portions of the site. Groundwater in Unit 1 is also discontinuous.

Unit 2: Known as the Twin Cities Formation, Unit 2 consists of Quaternary aged glacial till and, similar to Unit 1, is discontinuous at TCAAP. Unit 2 is generally regarded as an aquitard to vertical migration of groundwater; however, sand and gravel lenses may contain water.

Unit 3: This unit consists primarily of the Quaternary aged Hillside Sand Formation, which is continuous beneath TCAAP. Near the center of TCAAP, the Hillside Sand Formation is overlain by the Arsenal Sand, which forms a kame. There is no distinct lithologic contact between the Hillside Sand and the Arsenal Sand, and both are considered included in Unit 3. Unit 3 ranges in thickness from 25 to 450 feet. For monitoring purposes, the Unit 3 aquifer thickness has been arbitrarily subdivided into thirds designated as upper, middle, and lower.

Unit 4: This unit consists collectively of bedrock from the Prairie du Chien Group and Jordan Formation (Ordovician and Cambrian periods, respectively). For monitoring purposes, the Prairie du Chien Group is referred to as Upper Unit 4, while the Jordan Formation is Lower Unit 4. The Jordan Formation varies from fine- to coarse-grained quartz sandstone. The Prairie du Chien Group in the TCAAP area consists of a finely crystalline dolomite of the Oneota Formation, as well as quartz sandstone and dolomite members of the Shakopee Formation. A more detailed description of the bedrock geology can be found in the Remedial Investigation Report (Argonne National Laboratory, 1991).

In order to identify the hydrogeologic unit in which each well is completed, the United States Army Environmental Center (USAEC), formerly the United States Army Toxic and Hazardous Materials Agency (USATHAMA), developed a standardized identification system for wells at TCAAP (referred to as the IRDMIS number). Well designations consist of six characters, such as 03U093. The first two characters represent the hydrogeologic unit in which the well is completed, as follows:

01	-	Unit 1
03	-	Unit 3
04	-	Unit 4: Prairie du Chien Group or Jordan Formation
PJ	-	Unit 4: Prairie du Chien Group and Jordan Formation

The third character represents the relative position of the well screen or open hole within the specified hydrogeologic unit, as follows:

U	-	upper portion
M	-	middle portion
L	-	lower portion
J	-	Jordan Sandstone
F	-	fully penetrating Unit 3
#	-	open hole (total or partial thickness)

The remaining three characters represent the well number, as follows:

001 thru 500	USAEC wells and additional wells installed by others adjacent to an existing well with the 001-500 designation.
501 thru 600	TCAAP wells.
601 thru 800	On-post Alliant wells.
801 thru 999	Off-post Alliant wells.

Off-TCAAP wells installed by parties other than USAEC, TCAAP, or Alliant are designated by their Minnesota unique number. For reference, a well-designation cross-reference guide is included as Tables B-1 and B-2, which lists all wells of concern, the Minnesota unique number, the IRDMIS number, and any other name(s) the wells may have. Table B-1 is sorted by unique number and Table B-2 is sorted by IRDMIS number. The well type in these two tables is abbreviated as follows:

UN	-	Unknown
MUNI	-	Municipal
MON	-	Monitoring
DOM	-	Domestic
IND	-	Industrial
P.S.	-	Public Supply
COM	-	Commercial
IRR	-	Irrigation
ABAND	-	Abandoned
PIEZ.	-	Piezometer
REM	-	Remedial

Tables B-3 and B-4, which contain the same list of wells as Table B-2 (i.e., a listing that is sorted by IRDMIS number), can be used to view the boring log for a given well, if available. To view the well log, click on the desired well name in the table with the mouse. Table B-3 provides the boring logs for on-TCAAP wells and Table B-4 provides the boring logs for off-TCAAP wells.

Figures B-2 and B-3 show locations for off- and on-TCAAP wells, respectively. With a known well name, the location of that well can be determined using the "Edit, Find" or "Edit, Search" function and then typing in the desired well name, which will highlight this well name on the figure. Using either of the figures, the trichloroethene trend graph for a specific well can be viewed by clicking on the desired well name with the mouse. Some of the wells do not have trend graphs available (primarily sealed wells). Refer to the historical water quality database in Appendix D for this information.

TABLE B-1
TCAAP WELL INDEX
SORTED BY UNIQUE NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
107405		ROEBKE	OFF	UN		
110485		NEW BRIGHTON #12	OFF	MUNI		
114410	03U521		OFF	MON		
122210		ST. PAUL PORT AUTH. #3	OFF	IND		
127537		MIDWEST ASPHALT	OFF	DOM		
134318		LORENZ W SEUTTER	OFF	DOM		
139035		WATERGATE MARINA	OFF	P.S.		
151568		ARDEN MANOR MOBILE HOME	OFF	P.S.		
161432		NEW BRIGHTON #10	OFF	MUN		
191942		118PDC/MODEL STONE	OFF	MON		
194701	01U620	OW120U1	ON	MON		
194702	01U621	PW121U1	ON	MON		
194703	01U622	OW122U1	ON	MON	✓	
194704	01U623	OW123U1	ON	MON	✓	
194716	01U634	OW504U1	ON	MON	✓	
194717	01U638	OW508U1		MON	✓	
194718	01U639	OW509U1	ON	MON		
194719	01U640	OW510U1	ON	MON		
194720	01U631	OW501U1	ON	MON		
194721	01U632	OW502U1		MON		
194722	01U635	OW505U1	ON	MON	✓	
194723	01U636	OW506U1	ON	MON.		
194724	01U642	OW512U1	ON	MON	✓	
194725	01U612	OW112U1	ON	MON		194758
194726	01U613		ON	MON		194759
194727	01U615	OW115U1	ON	MON		194760
194728	01U616	OW116U1	ON	MON		194761
194729	01U617	OW117U1	ON	MON		194770
194730	01U618	OW118U1	ON	MON		194771
194772	01U619	PW119U1	ON	MON		
200070		RUAN TRANSPORT	OFF	COM	✓	
200071		PRESTRESSED CONCRETE	OFF	IND	✓	
200072		WITTE TRANSPORTATION	OFF	IND	✓	
200073		WILSON TRANSFER & STORAGE	OFF	IND		
200074		ASBESTOS PROD	OFF	IND	✓	
200075		PHILLIPS PETROLEUM	OFF	IND	✓	
200076		OLD DUTCH FOODS INC	OFF	IND		
200077		JOHN CONLIN	OFF	DOM	✓	
200078		WILLIAM CLASS	OFF	DOM		
200079		LAWRENCE SCHOENING	OFF	DOM		
200080		CARL A OSTROM & SON	OFF	DOM		
200081		A. O. LIEBIG	OFF	DOM		
200082		2196 MARION ROAD	OFF	DOM		
200148		PAPER CALMERSON	OFF	IND	✓	
200154		U OF M GOLF COURSE	OFF	IRR		
200167		KOPPERS COKE #1	OFF	IND		
200171		PLATING INC	OFF	IND		

TABLE B-1
TCAAP WELL INDEX
SORTED BY UNIQUE NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
200197		SNOW FLAKE DAIRY	OFF	COM		
200264		1620 CENTRAL	OFF	IND		
200384		METALLURGICAL INC. WELL #1	OFF	IND		
200524		ST. ANTHONY #5	OFF	MUNI		
200525		PLETSCHER	OFF	UN		
200531		NAZARETH	OFF	UN		
200599		CEDAR AVE. TRIANGLE	OFF	P.S.		
200602		ATKINSON MILL CO.	OFF	IND		
200629		GENERAL MILLS	OFF	IND		
200803		ST. ANTHONY #4	OFF	P.S.		
200804		ST. ANTHONY #3	OFF	MUNI		
200812		GROSS GOLF COURSE #1	OFF	COM		
200814		AMERICAN LINEN	OFF	IND		
201074		GLEASSON MORTUARY	OFF	COM		
201082		NORTHWESTERN HOSPITAL	OFF	P.S.		
206669		FRIDLEY #8	OFF	MUNI		
206672		FRIDLEY #9	OFF	MUNI		
206673		FRIDLEY #6	OFF	MUNI		
206688		CLOVERPOND WELL	OFF	DOM		
206689		JAMES K. O'NEIL	OFF	UN		
206693		FERNELIUS	OFF	UN		
206702		MINN E.S.	OFF	UN		
206720		MOUNDSVIEW	OFF	MUNI		
206722		M0UNDSVIEW #5	OFF	MUNI		
206724	PJ#504	TWIN CITIES ARSENAL	OFF	ABAND	✓	
206725	03L523	ARSENAL GRAVEL PIT	ON	ABAND	✓	
206750		SHORE #4	OFF	MUNI		
206753	PJ#506	TWIN CITIES ARSENAL NO. 6	ON		✓	
206754	PJ#501	TWIN CITIES ARSENAL NO. 1	ON	P.S.	✓	
206755	PJ#507	TWIN CITIES ARSENAL NO. 7	ON	ABAND	✓	
206756	PJ#502	TWIN CITIES ARSENAL NO. 2	ON	IND	✓	
206758	PJ#503	TWIN CITIES ARSENAL NO. 3	ON	IND	✓	
206759	PJ#508	TWIN CITIES ARSENAL NO. 8	ON	ABAND	✓	
206760	03M509		ON		✓	
206760	PJ#509	TWIN CITIES ARSENAL NO.9	ON	DOM	✓	
206787		MOUNDSVIEW H.S.	OFF	P.S.		
206789		NEW BRIGHTON #1	OFF	MUNI	✓	
206791		NEW BRIGHTON #7	OFF	MUNI		
206792		NEW BRIGHTON #4				
206793		NEW BRIGHTON #3	OFF	MUNI		
206794		NEW BRIGHTON #9	OFF	MUNI		
206795		NEW BRIGHTON #8	OFF	MUNI		
206796		NEW BRIGHTON #5	OFF	MUNI		
206797		NEW BRIGHTON #6	OFF	MUNI		
206798		NEW BRIGHTON #2	OFF	MUNI	✓	
223844		KURTH MALTING CO EAST WL	OFF	IND		
223992		BOOM ISLAND	OFF	IND		

TABLE B-1
TCAAP WELL INDEX
SORTED BY UNIQUE NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
225886		FRANKLIN STEEL SQUARE	OFF	P.S.		
225905		ST PAUL TERM. WAREHOUSE	OFF	IND		
225906		ST PAUL TERM. WAREHOUSE	OFF	IND		
231741		LABELLE	OFF	UN		
231742	04U510	GRENADE PLANT PROOF RANGES	ON	IND		
231845		MNDOT CIVIL DEFENSE TRAIN.	ON/OFF	P.S.		
231854	03L522	ARSENAL GRAVEL PIT	ON	ABAND 8/9	✓	
231857	03M505			ABAND	✓	
231878		MENGELKOCH #2	OFF	UN		
232067		NBR 135	OFF	UN		
232069		UHIL	OFF	UN		
233221		REUBEN MEAT	OFF	DOM		
233222		LOWRY GROVE TRAILER	OFF	ABAND	✓	
233241		KOZAH'S MARKET	OFF	UN	✓	
233520		MCGILLIS	OFF	UN		
233533		ROSELAWN CEMETARY	OFF	IRR		
233763		P. L. MORGAN	OFF	DOM		
233806		2581 NORTH CLEVELAND	OFF	DOM		
234135	03U001	S1U3	ON	MON		
234136	03M001	S1M3	ON	MON		
234137	03L001	S1L3	ON	MON		
234138	04U001	S1U4	ON	MON		
234139	03U002	S2U3	ON	MON		
234140	03M002	S2M3	ON	MON		
234141	03L002	S2L3	ON	MON		
234142	03U003	S3U3	ON	MON		
234143	03M003	S3M3	ON	MON		
234144	03L003	S3L3	ON	MON		
234145	03U004	S4U3	ON	MON		
234146	03M004	S4M3	ON	MON		
234147	03L004	S4L3	ON	MON		
234148	03U005	S5U3	ON	MON		
234149	03U006	S6U3	ON	MON	✓	
234150	03U007	S7U3	ON	MON		
234151	03M007	S7M3	ON	MON		
234152	03L007	S7L3	ON	MON		
234153	03U008	S8U3	ON	MON		
234154	03U009	S9U3	ON	MON		
234155	03U010	S10U3	ON	MON		
234156	03M010	S10M3	ON	MON		
234157	03L010	S10L3	ON	MON		
234158	03U011	S11U3	ON	MON		
234159	03U012	S12U3	ON	MON		
234160	03M012	S12M3	ON	MON		
234161	03L012	S12L3	ON	MON		
234162	03U013	S13U3	ON	MON		
234163	03M013	S13M3	ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
234164	03L013	S13L3	ON	MON		
234165	03U014	S14U3	ON	MON		
234166	03U015	S15U3	ON	MON		
234167	03U016	S16U3	ON	MON		
234168	03U017	S17U3	ON	MON		
234169	03M017	S17M3	ON	MON		
234170	03L017	S17L3	ON	MON		
234171	03U018	S18U3	ON	MON		
234172	03U019	S19U3	ON	MON		
234173	03U020	S20U3	ON	MON		
234174	03M020	S20M3	ON	MON		
234175	03L020	S20L3	ON	MON		
234176	03U021	S21U3	ON	MON		
234193	04U003	S3U4	ON	MON		
234194	04U002	S2U4	ON	MON		
234195	04U007	S7U4	ON	MON		
234196	04U012	S12U4	ON	MON		
234197	04U020	S20U4	ON	MON		
234198	01U004	S4U1	ON	MON	✓	
234199	01U011	S11U1	ON	MON	✓	
234200	01U012	S12U1	ON	MON	✓	
234201	01U022	S22U1	ON	MON	✓	
234202	01U033	S33U1	ON	MON	✓	
234204	01U034	S34U1	ON	MON	✓	
234205	01U035	S35U1	ON	TEST		
234206	01U036	S36U1	ON	MON	✓	
234207	01U037	S37U1		MON	✓	
234208	01U038	S38U1		MON		
234209	01U039	S39U1	ON	MON		
234210	01U040	S40U1	ON	MON		
234211	01U041	S41U1	ON	MON		
234212	01U044	S44U1	ON	MON		
234215	01U045	S45U1	ON	MON		
234216	01U046	S46U1	ON	MON		
234217	01U047	S47U1	ON	MON		
234218	01U048	S48U1		MON		
234221	01U050	S50AU1		MON	✓	
234222	01U051	S51U1	ON	MON	✓	
234223	01U052	S52U1	ON	MON		
234225	01U053	S53AU1	ON	MON	✓	
234227	01U054	S54AU1		MON	✓	
234235	01U060	S60U1	ON	MON		
234237	01U062	S62U1	ON	MON	✓	
234239	01U063	S63U1	ON	MON		
234240	01U064	S64U1	ON	MON		
234241	01U065	S65U1	ON	MON		
234243	01U067	S67U1	ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
234250	01U072	S72AU1	ON	MON		
234301		DEWITT	OFF	UN	✓	
234305		GLENN BEGGIN	OFF	UN		
234319		HIDE & TALLOW #1	OFF	UN		
234327		BRESKE	OFF	UN		
234335		MENGELKOCH #1	OFF	UN		
234337		MENGELKOCH #3	OFF	UN	✓	
234350		GORDON	OFF	UN		
234351		YEMPA	OFF	UN		
234352		1206 12TH AV NW	OFF	UN	✓	
234353		LENTSCH'S ICE WK.	OFF	UN		
234355		KINGDOM HALL	OFF	UN		
234356		NORDQUIST P43	OFF	UN		
234357		PHILLIPS PET P46	OFF	UN		
234386		ZELL OLS.	OFF	UN		
234391		SHERER L.	OFF	UN		
234396		DEWITT	OFF	UN	✓	
234406		KLAPP	OFF	UN	✓	
234409		HIDE & TALLOW	OFF	UN		
234425		KEN GEREBI	OFF	UN	✓	
234430		CMIEL	OFF	UN	✓	
234431		HARSTAD	OFF	UN		
234463		KEN SOLIE	OFF	UN		
234546		HONEYWELL RIDGEWAY	OFF	UN		
234547		HONEYWELL RIDGEWAY	OFF	UN		
234549		REINER	OFF	IRR		
235539		OLD HOTEL	OFF	UN		
235557		HIDDEN FALLS PARK W.WELL	OFF	P.S.		
235565	PJ#074	S74PJ		MON	✓	
235619		SHRINERS HOSPITAL	OFF	P.S.		
235735		FLOUR CITY ARCHITECTURAL	OFF	COM		
235748	03L014	S14L3	ON	MON		
235749	03L018	S18L3	ON	MON		
235750	03L021	S21L3	ON	MON		
235751	03L027	S27L3	ON	MON		
235752	03L028	S28L3		MON		
235753	03L029	S29L3		MON		236066
236066	03U094	S94U3	ON	MON		
236067	03L091	S91L3	ON	MON	✓	
236068	03L086	S86L3	ON	MON	✓	
236069	03U084	S84U3	ON	MON		
236070	03L081	S81L3	ON	MON		
236071	03L080	S80L3	ON	MON		
236072	03U079	S79U3	ON	MON		
236073	03U078	S78U3	ON	MON		
236074	03L078	S78L3	ON	MON		
236075	03U077	S77U3	ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
236076	03L077	S77L3	ON	MON		
236077	03U076	S76U3	ON	MON		
236078	03U075	S75U3	ON	MON		
236079	03L005	S5L3	ON	MON		
236080	03L113	WF1L3	ON	MON		
236122		NWR	OFF	ABAND		
236176	01U003	S3U1	ON	MON	✓	
236177	01U043	S43AU1		MON		
236178	03U022	S22U3		MON		
236179	03U023	S23U3		MON		
236180	03U024	S24U3		MON		
236181	03U025	S25U3		MON		
236182	03U026	S26U3	ON	MON		
236183	03U027	S27U3		MON		
236184	03U028	S28U3		MON		
236185	03U029	S29U3		MON		
236186	03U030	S30U3		MON		
236187	03U031	S31U3		MON		
236188	03U032	S32U3		MON		
236189	01U601	OW101U1	ON	MON		
236190	01U602	OW102U1	ON	MON		
236191	01U603	OW103U1	ON	MON		
236192	01U604	OW104U1	ON	MON		
236193	01U605	OW10571	ON	MON		
236194	01U524	FA4U1	ON	PIEZ.	✓	
236195	01U527	FV8U1	ON	PIEZ.	✓	
236196	01U525	FW5U1	ON	PIEZ.	✓	
236197	01U526	FV12U1	ON	PIEZ.	✓	
236437	PJ#802	T2PJ	OFF	MON		421437
236449	03U801	T1U3	OFF	MON		
236450	04U802	T2U4	OFF	MON		
236452	01U803	T3U1	OFF	TEST	✓	424053
236453	03U803	T3U3	OFF	MON		421434
236455	03U804	T4U3	OFF	MON		421433
236457	01U805	T5U1	OFF	MON	✓	424060
236458	03U805	T5U3	OFF	MON		421432
236460	01U806	T6U1	OFF	MON	✓	424058
236461	03U806	T6U3	OFF	MON		421431
236462	03M806	T6M3	OFF	MON		421430
236463	03L806	T6L3	OFF	MON		421429
236464	04U806	T6U4	OFF	MON		421428
236465	PJ#806	T6PJ	OFF	MON		421427
236468	PJ#003	S3PJ	ON	MON		
236469	PJ#027	S27PJ	ON	MON		
236471	01U807	T7U1	OFF	TEST	✓	424059
236476	03U082	S82U3	ON	MON		
236478	03U083	S83U3	ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
236479	01U085	S85U1	ON	MON		
236480	03U087	S87U3	ON	MON		
236482	03U088	S88U3	ON	MON		
236483	03U089	S89U3	ON	MON		
236485	03U090	S90U3	ON	MON		
236487	03U092	S92U3	ON	MON		
236489	03U093	S93U3	ON	MON		
236491	03U096	S96U3	ON	MON		
236493	03U097	S97U3	ON	MON		
236494	01U098	S98U1	ON	MON	✓	
236495	03U099	S99U3	ON	MON		
236497	01U100	S100U1	ON	MON	✓	
236498	01U101	S101U1	ON	MON	✓	
236499	01U102	S102U1	ON	MON		
236500	01U103	S103U1	ON	MON		
236501	01U104	S104U1	ON	MON		
236502	01U105	S105U1	ON	MON		
236503	01U106	S106U1	ON	MON		
236504	01U107	S107U1	ON	MON		
236505	01U108	S108U1	ON	MON		
236506	01U109	S109U1	ON	MON	✓	
236507	01U110	S11OU1	ON	MON		
236508	03U111	S111U3	ON	MON		
236510	03U112	S112U3	ON	MON		
242124	03U113	WF1U3	ON	MON		
242125	03U114	WF2U3	ON	MON		
242127	01U607	OW107U1	ON	MON		
242128	01U608	OW108U1	ON	MON		
242129	01U609	OW109U1	ON	MON		
242130	01U610	OW110U1	ON	MON		
242131	01U611	OW111U1	ON	MON		
242132	03U647	OW517U3	ON	MON		
242133	03U648	OW518U3	ON	MON		
242134	01U652	OW522U1	ON	MON	✓	
242135	01U666	OW536U1	ON	MON		
242136	01U667	OW537U1	ON	MON		
242137	01U668	OW538U1	ON	MON		
242138	04U027	S27U4		MON		
242153	01U813	H3U1	OFF	MON	✓	
242160	03L079	S79L3	ON	MON		
242162		301PB	OFF	UN		
242182	01U624A	BP185A	ON	PIEZ		
242183	01U624B	BP185B	ON	PIEZ		
242184	01U624C	BP185C	ON	PIEZ		
242185	01U624D	BP185D	ON	PIEZ		
242186	01U625A	BP285A	ON	PIEZ		
242187	01U625B	BP285B	ON	PIEZ		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
242188	01U625C	BP285C	ON	PIEZ		
242189	01U625D	BP285D	ON	PIEZ		
242190	01U626A	BP385A	ON	PIEZ		
242191	01U626B	BP385B	ON	PIEZ		
242192	01U626C	BP385C	ON	PIEZ		
242193	01U626D	BP385D	ON	PIEZ		
242194	01U627A	BP485A	ON	PIEZ		
242195	01U627B	BP485B	ON	PIEZ		
242196	01U627C	BP485C	ON	PIEZ		
242197	01U627D	BP485D	ON	PIEZ		
242198	01U628A	BP585A	ON	PIEZ		
242199	01U628B	BP585B	ON	PIEZ		
242200	01U628C	BP585C	ON	PIEZ		
242201	01U628D	BP585D	ON	PIEZ		
242207		SUNSET MEMORIAL CEMETARY	OFF	UN		
249152		BOYLE	OFF	DOM		
265735		FLOUR CITY ARCH	OFF	UN		
322664		ABBOTT NW HOSP	OFF	UN		
405651		METAL-MATIC INC.	OFF	IND		
406198	04U851	311U4	OFF	MON		
409546		PCA2L3	OFF	TEST	✓	
409547		PCA1U4	OFF	TEST		
409548		PCA2U4	OFF	TEST		
409549		PCA3U4	OFF	TEST		
409550		PCA6U3	OFF	TEST		
409555		PCA5U4	OFF	TEST		
409556		PCA4L3	OFF	TEST		
409557		PCA1L3	OFF	TEST		
409595		B109U3	OFF	ABAND		
409596		B118U3	OFF	MON		
409597		B118L3	OFF	IND		
409598		B117U3	OFF	ABAND		
416051	03M848	308M3	OFF	MON		
416078	04U848	308U4	OFF	TEST		
416080	04U852	312U4	OFF	MON		
416081	03L858	318L3	OFF	MON	✓	
416082	04U849	309U4	OFF	MON		
416143			OFF	ABAND		
416198		311U4	OFF	MON		
416199	03L848	308L3	OFF	MON		
416200	04U850	310U4	OFF	MON		
420713		HERBST LANDFILL	OFF	MON		
421425	03U659	OW529U3	ON	MON		
421426	03U658	OW528U3	ON	MON		
421438	03U671	PO-1	ON	MON		
421440	03U672	PD2U3	OFF	MON		
421441	03U673	PD3U3	OFF	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
424052	01L822	NW2L1	OFF	TEST	✓	
424054	01L821	NW1L1	OFF	TEST	✓	
424055	01L811	H1L1; MDNR Well	OFF	TEST		
424056	01L816	H6L1	OFF	ABAND	✓	
424057	01U808	T8U1	ON	MON	✓	
424061	01L823	NW3L1	OFF	TEST	✓	
424062	01L813	H3L1	OFF	TEST	✓	
426808	03U811	H1U3	OFF	TEST		
426809	03L811	H1L3	OFF	TEST		
426810	03U821	NW1U3	OFF	TEST		
426811	04U821	NW1U4	OFF	TEST		
426812	03U822	NW2U3	OFF	TEST		
426813	03L822	NW2L3	OFF	TEST		
426814	03U824	NW4U3	OFF	TEST	✓	
426815	03L673	PD3L3	OFF	TEST		
426816	03L813	H3L3	OFF	TEST	✓	
426817	03L802	T2L3	OFF	TEST		
426818	03M802	T2M3	OFF	TEST		
426842	03F302	B1	ON	REM		
426843	03F303	B2	ON	REM		
426844	03F304	B3	ON	REM		
426845	03F305	B4	ON	REM		
426846	03F306	B5	ON	REM		
426847	03F307	B6	ON	REM		
426848	03U701	701U3	ON	MON		
426849	04U701	701U4	ON	MON		
426850	03U702	702U3	ON	MON		
426851	04U841	301U4	OFF	TEST		
426852	03M843	303M3	OFF	TEST		
426853	04U843	303U4	OFF	TEST		
426854	04U844	304U4	OFF	TEST		
426855	04U845	305U4	OFF	MON		
426856	04U846	306U4	OFF	MON		
426857	04U847	307U4	OFF	MON		
426858	03L853	313L3	OFF	MON		
426859	03L854	314L3	OFF	MON		
426860	04U855	315U4	OFF	MON		
426861	03L856	316L3	OFF	MON	✓	
426862	03U815	H5U3	OFF	TEST	✓	
426863	03U831	OM1U3	OFF	TEST		
426864	03U832	OM2U3	OFF	TEST	✓	
426865	03L832	OM2L3	OFF	TEST		
426866	04U832	OM2U4	OFF	TEST		
426867	04U673	PD3U4	OFF	TEST		
426868	03L809	T9L3	OFF	MON		
426876	04U702	702U4	ON	MON		
426877	04U077	ST77U4	ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
426878	03U703	703U3		MON		
426879	03U708	708U3	ON	MON		
426880	04U708	708U4	ON	MON		
426881	03U709	709U3	ON	MON		
426882	04U709	709U4	ON	MON		
426883	03U704	704U3	ON	MON		
426884	03U705	705U3	ON	MON		
426885	03U706	706U3	ON	MON		
426886	03U707	707U3	ON	MON		
427410	01U120		ON	MON		
427411	01U115		ON	MON		
427412	01U116		ON	MON		
427413	01U117		ON	MON		
427414	01U118		ON	MON		
427415	01U119		ON	MON		
434031	04U711	711U4	OFF	MON		
434032	03U710	71OU3	ON	MON		
434033	03U711	711U3	OFF	MON		
434034	04U861	321U4	OFF	MON		
434035	04U860	320U4	OFF	MON		
434036	04U859	319U4	OFF	MON		
434037	03L841	301L3	OFF	MON		
434038	03L860	320L3	OFF	MON		
434039	03L861	321L3	OFF	MON		
434040	03L859	319L3	OFF	MON		
439701	04U854	314U4	OFF	MON		
440884	03U121		ON	MON		
440885	03M005	ST-5-M3	ON	MON		
440886	03U129		ON	MON		
440887	03L084	ST84L3	ON	MON		
440888	01U122		ON	MON	✓	
440889	01U125		ON	MON		
440890	01U126		ON	MON		
440891	01U127		ON	MON		
440892	01U128		ON	MON		
440893	01U133		ON	MON		
440894	01U134		OFF	MON		
440895	01U130		ON	MON	✓	
440896	03U124		ON	MON	✓	
447889	04U871	401U4	OFF	MON		
447890	04U882	412U4	OFF	MON		
447891	04U881	411U4	OFF	MON		
447892	04U883	413U4	OFF	MON		
447893	01U350		ON	MON		
447894	PJ#318	318U4	OFF	MON		
447895	04U880	410U4	OFF	MON		
447896	04U877	407U4	OFF	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
447898	04U875	405U4	OFF	MON		
447899	03L846	306L3	OFF	MON		
447900	04U879	409U4	OFF	MON		
447988	04U872	402U4	OFF	MON		
447998	01U135		ON	MON		
447999	01U136		ON	MON		
453821	03U317	SC-5	ON	REM		
453822	03U316	SC-4	ON	REM		
453823	03F308	B7	ON	REM		
453824	03F312	B11	ON	REM		
453825	PJ#309	B8	ON	REM		
453826	PJ#310	B9	ON	REM		
453827	PJ#311	B10	ON	REM		
453828	PJ#313	B12	ON	REM		
453829	04J708		ON	MON		
453830	04J713		ON	MON		
453831	03M713		ON	MON		
453832	04U714		ON	MON		
453833	03U715	SM1	ON	MON		
453834	03U716	SM2	ON	MON		
471394	04U863	323U4	OFF	MON		
476387		MW15H	OFF	MON		
482083		K04-MW	ON	MON		
482084		K02-MW	ON	MON		
482085		K01-MW	ON	MON		
482086		I01-MW	ON	MON		
482087		I05-MW	ON	MON		
482088		I02-MW	ON	MON		
482089		I04-MW	ON	MON		
482090		I03-MW	ON	MON		
482707	04J882		OFF	MON		
482708	04J835		OFF	MON		
482709	04J834		OFF	MON		
500691	04U414	414U4/EZ SELF SERVICE	OFF	MON		
500694	03L137		ON	MON	✓	
505189	01U137		ON	MON		
505190	01U138		ON	MON		
505191	01U139		ON	MON		
505192	01U140		ON	MON		
505193	01U141		ON	MON		
505209	01U902		OFF	MON		
505210	01U901	H3U1	OFF	MON		
505618	03L138		ON	MON	✓	
508115	04U322	322U4	OFF	MON		
508117	04J702		ON	MON		
508118	04J077		ON	MON		
508119	04U713		ON	MON		

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Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
508120	04J714		ON	MON		
508122	03U314	SC-2	ON	REM		
509083		NEW BRIGHTON #11	OFF	MUNI		
512761		GROSS GOLF #2	OFF	IRR		
519288		E101-MW	ON	MON		
519289		E102-MW	ON	MON		
519290		E103-MW	ON	MON		
519291		129-1501-MW	ON	MON	✓	
519836	04U834		OFF	MON		
519956	03L833		OFF	MON		
519957	04U833		OFF	MON		
520931		NEW BRIGHTON #13	OFF	MUNI		
524047	04U865	325U4	OFF	MON		
524048	04J866	326J	OFF	MON		
524049	04U866	326U4	OFF	MON		
524050	04U864	324U4	OFF	MON		
524051	04J864	324J	OFF	MON		
538039	01U145		ON	PIEZ.		
538040	01U146		ON	PIEZ.		
538041	01U147		ON	PIEZ.		
538042	01U148		ON	PIEZ.		
538043	01U149		ON	PIEZ.		
538044	01U150		ON	PIEZ.		
538045	01U151		ON	PIEZ.		
538046	01U152		ON	PIEZ.		
538047	01U153		ON	PIEZ.		
538048	01U154		ON	PIEZ.		
538049	01U155		ON	PIEZ.		
538050	01U156		ON	PIEZ.		
538051	01U351	EW1	ON	REM		
538052	01U352	EW2	ON	REM		
538053	01U353	EW3	ON	REM		
538054	01U354	EW4	ON	REM		
538055	01U355	EW5	ON	REM		
538056	01U356	EW6	ON	REM		
538057	01U357	EW7	ON	REM		
538058	01U358	EW8	ON	REM		
538059	01U904		OFF	MON		
538060	01U903		OFF	MON		
538062	01U157		ON	MON		
538063	01U158		ON	MON		
554216		NEW BRIGHTON #14	OFF	MUNI		
582628		NEW BRIGHTON #15	OFF	MUNI		
589650		CM1MW	ON	MON		
596628	04U836	MW-1	OFF	MON		
596629	04J836	MW-2	OFF	MON		
596630	04U837	MW-3	OFF	MON		

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TCAAP WELL INDEX
SORTED BY UNIQUE NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
596631	04J837	MW-4	OFF	MON		
596632	04U838	MW-5	OFF	MON		
596633	04J838	MW-6	OFF	MON		
596634	04U839	MW-7	OFF	MON		
596635	04J839	MW-8	OFF	MON		
616601		CM2MW	ON	MON		
616602		CM3MW	ON	MON		
624019		CM5MW	ON	MON		
643379			ON	PIEZ.	✓	
643380			ON	PIEZ.	✓	
643381			ON	PIEZ.	✓	
643382			ON	PIEZ.	✓	
653903		GR1-1	ON	MON		
653904		GR1-2	ON	MON		
653905		GR2-1	ON	MON		
675976		GR-DF1	ON	MON		
687112	03F319	B13	ON	REM		
706043	04J822		OFF	MON		
706044	04J849		OFF	MON		
706045	04J947		OFF	MON		
	01U131				✓	
	01U132					
	01U142				✓	
	01U143				✓	
	01U144				✓	
	01U653			MON		
	01U675				✓	
	03L306		ON	MON		
	03L843	303L3	OFF	MON		
	03U301	SC-1	ON	REM		
	03U315	SC-3		REM		
	03U674	OW541U3	ON	MON		
	03U675					
	03U676	OW543U3	ON	MON		
	04U842			MON		
	PJ#006		ON	MON		
		MW15D	OFF	MON		
		MW15S	OFF	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
424055	01L811	H1L1; MDNR Well	OFF	TEST		
424062	01L813	H3L1	OFF	TEST	✓	
424056	01L816	H6L1	OFF	ABAND	✓	
424054	01L821	NW1L1	OFF	TEST	✓	
424052	01L822	NW2L1	OFF	TEST	✓	
424061	01L823	NW3L1	OFF	TEST	✓	
236176	01U003	S3U1	ON	MON	✓	
234198	01U004	S4U1	ON	MON	✓	
234199	01U011	S11U1	ON	MON	✓	
234200	01U012	S12U1	ON	MON	✓	
234201	01U022	S22U1	ON	MON	✓	
234202	01U033	S33U1	ON	MON	✓	
234204	01U034	S34U1	ON	MON	✓	
234205	01U035	S35U1	ON	TEST		
234206	01U036	S36U1	ON	MON	✓	
234207	01U037	S37U1		MON	✓	
234208	01U038	S38U1		MON		
234209	01U039	S39U1	ON	MON		
234210	01U040	S40U1	ON	MON		
234211	01U041	S41U1	ON	MON		
236177	01U043	S43AU1		MON		
234212	01U044	S44U1	ON	MON		
234215	01U045	S45U1	ON	MON		
234216	01U046	S46U1	ON	MON		
234217	01U047	S47U1	ON	MON		
234218	01U048	S48U1		MON		
234221	01U050	S50AU1		MON	✓	
234222	01U051	S51U1	ON	MON	✓	
234223	01U052	S52U1	ON	MON		
234225	01U053	S53AU1	ON	MON	✓	
234227	01U054	S54AU1		MON	✓	
234235	01U060	S60U1	ON	MON		
234237	01U062	S62U1	ON	MON	✓	
234239	01U063	S63U1	ON	MON		
234240	01U064	S64U1	ON	MON		
234241	01U065	S65U1	ON	MON		
234243	01U067	S67U1	ON	MON		
234250	01U072	S72AU1	ON	MON		
236479	01U085	S85U1	ON	MON		
236494	01U098	S98U1	ON	MON	✓	
236497	01U100	S100U1	ON	MON	✓	
236498	01U101	S101U1	ON	MON	✓	
236499	01U102	S102U1	ON	MON		
236500	01U103	S103U1	ON	MON		
236501	01U104	S104U1	ON	MON		
236502	01U105	S105U1	ON	MON		
236503	01U106	S106U1	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
236504	01U107	S107U1	ON	MON		
236505	01U108	S108U1	ON	MON		
236506	01U109	S109U1	ON	MON	✓	
236507	01U110	S11OU1	ON	MON		
427411	01U115		ON	MON		
427412	01U116		ON	MON		
427413	01U117		ON	MON		
427414	01U118		ON	MON		
427415	01U119		ON	MON		
427410	01U120		ON	MON		
440888	01U122		ON	MON	✓	
440889	01U125		ON	MON		
440890	01U126		ON	MON		
440891	01U127		ON	MON		
440892	01U128		ON	MON		
440895	01U130		ON	MON	✓	
	01U131				✓	
	01U132					
440893	01U133		ON	MON		
440894	01U134		OFF	MON		
447998	01U135		ON	MON		
447999	01U136		ON	MON		
505189	01U137		ON	MON		
505190	01U138		ON	MON		
505191	01U139		ON	MON		
505192	01U140		ON	MON		
505193	01U141		ON	MON		
	01U142				✓	
	01U143				✓	
	01U144				✓	
538039	01U145		ON	PIEZ.		
538040	01U146		ON	PIEZ.		
538041	01U147		ON	PIEZ.		
538042	01U148		ON	PIEZ.		
538043	01U149		ON	PIEZ.		
538044	01U150		ON	PIEZ.		
538045	01U151		ON	PIEZ.		
538046	01U152		ON	PIEZ.		
538047	01U153		ON	PIEZ.		
538048	01U154		ON	PIEZ.		
538049	01U155		ON	PIEZ.		
538050	01U156		ON	PIEZ.		
538062	01U157		ON	MON		
538063	01U158		ON	MON		
447893	01U350		ON	MON		
538051	01U351	EW1	ON	REM		
538052	01U352	EW2	ON	REM		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
538053	01U353	EW3	ON	REM		
538054	01U354	EW4	ON	REM		
538055	01U355	EW5	ON	REM		
538056	01U356	EW6	ON	REM		
538057	01U357	EW7	ON	REM		
538058	01U358	EW8	ON	REM		
236194	01U524	FA4U1	ON	PIEZ.	✓	
236196	01U525	FW5U1	ON	PIEZ.	✓	
236197	01U526	FV12U1	ON	PIEZ.	✓	
236195	01U527	FV8U1	ON	PIEZ.	✓	
236189	01U601	OW101U1	ON	MON		
236190	01U602	OW102U1	ON	MON		
236191	01U603	OW103U1	ON	MON		
236192	01U604	OW104U1	ON	MON		
236193	01U605	OW10571	ON	MON		
242127	01U607	OW107U1	ON	MON		
242128	01U608	OW108U1	ON	MON		
242129	01U609	OW109U1	ON	MON		
242130	01U610	OW110U1	ON	MON		
242131	01U611	OW111U1	ON	MON		
194725	01U612	OW112U1	ON	MON		194758
194726	01U613		ON	MON		194759
194727	01U615	OW115U1	ON	MON		194760
194728	01U616	OW116U1	ON	MON		194761
194729	01U617	OW117U1	ON	MON		194770
194730	01U618	OW118U1	ON	MON		194771
194772	01U619	PW119U1	ON	MON		
194701	01U620	OW120U1	ON	MON		
194702	01U621	PW121U1	ON	MON		
194703	01U622	OW122U1	ON	MON	✓	
194704	01U623	OW123U1	ON	MON	✓	
242182	01U624A	BP185A	ON	PIEZ		
242183	01U624B	BP185B	ON	PIEZ		
242184	01U624C	BP185C	ON	PIEZ		
242185	01U624D	BP185D	ON	PIEZ		
242186	01U625A	BP285A	ON	PIEZ		
242187	01U625B	BP285B	ON	PIEZ		
242188	01U625C	BP285C	ON	PIEZ		
242189	01U625D	BP285D	ON	PIEZ		
242190	01U626A	BP385A	ON	PIEZ		
242191	01U626B	BP385B	ON	PIEZ		
242192	01U626C	BP385C	ON	PIEZ		
242193	01U626D	BP385D	ON	PIEZ		
242194	01U627A	BP485A	ON	PIEZ		
242195	01U627B	BP485B	ON	PIEZ		
242196	01U627C	BP485C	ON	PIEZ		
242197	01U627D	BP485D	ON	PIEZ		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
242198	01U628A	BP585A	ON	PIEZ		
242199	01U628B	BP585B	ON	PIEZ		
242200	01U628C	BP585C	ON	PIEZ		
242201	01U628D	BP585D	ON	PIEZ		
194720	01U631	OW501U1	ON	MON		
194721	01U632	OW502U1		MON		
194716	01U634	OW504U1	ON	MON	✓	
194722	01U635	OW505U1	ON	MON	✓	
194723	01U636	OW506U1	ON	MON.		
194717	01U638	OW508U1		MON	✓	
194718	01U639	OW509U1	ON	MON		
194719	01U640	OW510U1	ON	MON		
194724	01U642	OW512U1	ON	MON	✓	
242134	01U652	OW522U1	ON	MON	✓	
	01U653			MON		
242135	01U666	OW536U1	ON	MON		
242136	01U667	OW537U1	ON	MON		
242137	01U668	OW538U1	ON	MON		
	01U675				✓	
236452	01U803	T3U1	OFF	TEST	✓	424053
236457	01U805	T5U1	OFF	MON	✓	424060
236460	01U806	T6U1	OFF	MON	✓	424058
236471	01U807	T7U1	OFF	TEST	✓	424059
424057	01U808	T8U1	ON	MON	✓	
242153	01U813	H3U1	OFF	MON	✓	
505210	01U901	H3U1	OFF	MON		
505209	01U902		OFF	MON		
538060	01U903		OFF	MON		
538059	01U904		OFF	MON		
426842	03F302	B1	ON	REM		
426843	03F303	B2	ON	REM		
426844	03F304	B3	ON	REM		
426845	03F305	B4	ON	REM		
426846	03F306	B5	ON	REM		
426847	03F307	B6	ON	REM		
453823	03F308	B7	ON	REM		
453824	03F312	B11	ON	REM		
687112	03F319	B13	ON	REM		
234137	03L001	S1L3	ON	MON		
234141	03L002	S2L3	ON	MON		
234144	03L003	S3L3	ON	MON		
234147	03L004	S4L3	ON	MON		
236079	03L005	S5L3	ON	MON		
234152	03L007	S7L3	ON	MON		
234157	03L010	S10L3	ON	MON		
234161	03L012	S12L3	ON	MON		
234164	03L013	S13L3	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
235748	03L014	S14L3	ON	MON		
234170	03L017	S17L3	ON	MON		
235749	03L018	S18L3	ON	MON		
234175	03L020	S20L3	ON	MON		
235750	03L021	S21L3	ON	MON		
235751	03L027	S27L3	ON	MON		
235752	03L028	S28L3		MON		
235753	03L029	S29L3		MON		236066
236076	03L077	S77L3	ON	MON		
236074	03L078	S78L3	ON	MON		
242160	03L079	S79L3	ON	MON		
236071	03L080	S80L3	ON	MON		
236070	03L081	S81L3	ON	MON		
440887	03L084	ST84L3	ON	MON		
236068	03L086	S86L3	ON	MON	✓	
236067	03L091	S91L3	ON	MON	✓	
236080	03L113	WF1L3	ON	MON		
500694	03L137		ON	MON	✓	
505618	03L138		ON	MON	✓	
	03L306		ON	MON		
231854	03L522	ARSENAL GRAVEL PIT	ON	ABAND	✓	
206725	03L523	ARSENAL GRAVEL PIT	ON	ABAND	✓	
426815	03L673	PD3L3	OFF	TEST		
426817	03L802	T2L3	OFF	TEST		
236463	03L806	T6L3	OFF	MON		421429
426868	03L809	T9L3	OFF	MON		
426809	03L811	H1L3	OFF	TEST		
426816	03L813	H3L3	OFF	TEST	✓	
426813	03L822	NW2L3	OFF	TEST		
426865	03L832	OM2L3	OFF	TEST		
519956	03L833		OFF	MON		
434037	03L841	301L3	OFF	MON		
	03L843	303L3	OFF	MON		
447899	03L846	306L3	OFF	MON		
416199	03L848	308L3	OFF	MON		
426858	03L853	313L3	OFF	MON		
426859	03L854	314L3	OFF	MON		
426861	03L856	316L3	OFF	MON	✓	
416081	03L858	318L3	OFF	MON	✓	
434040	03L859	319L3	OFF	MON		
434038	03L860	320L3	OFF	MON		
434039	03L861	321L3	OFF	MON		
234136	03M001	S1M3	ON	MON		
234140	03M002	S2M3	ON	MON		
234143	03M003	S3M3	ON	MON		
234146	03M004	S4M3	ON	MON		
440885	03M005	ST-5-M3	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
234151	03M007	S7M3	ON	MON		
234156	03M010	S10M3	ON	MON		
234160	03M012	S12M3	ON	MON		
234163	03M013	S13M3	ON	MON		
234169	03M017	S17M3	ON	MON		
234174	03M020	S20M3	ON	MON		
231857	03M505			ABAND	✓	
206760	03M509		ON		✓	
453831	03M713		ON	MON		
426818	03M802	T2M3	OFF	TEST		
236462	03M806	T6M3	OFF	MON		421430
426852	03M843	303M3	OFF	TEST		
416051	03M848	308M3	OFF	MON		
234135	03U001	S1U3	ON	MON		
234139	03U002	S2U3	ON	MON		
234142	03U003	S3U3	ON	MON		
234145	03U004	S4U3	ON	MON		
234148	03U005	S5U3	ON	MON		
234149	03U006	S6U3	ON	MON	✓	
234150	03U007	S7U3	ON	MON		
234153	03U008	S8U3	ON	MON		
234154	03U009	S9U3	ON	MON		
234155	03U010	S10U3	ON	MON		
234158	03U011	S11U3	ON	MON		
234159	03U012	S12U3	ON	MON		
234162	03U013	S13U3	ON	MON		
234165	03U014	S14U3	ON	MON		
234166	03U015	S15U3	ON	MON		
234167	03U016	S16U3	ON	MON		
234168	03U017	S17U3	ON	MON		
234171	03U018	S18U3	ON	MON		
234172	03U019	S19U3	ON	MON		
234173	03U020	S20U3	ON	MON		
234176	03U021	S21U3	ON	MON		
236178	03U022	S22U3		MON		
236179	03U023	S23U3		MON		
236180	03U024	S24U3		MON		
236181	03U025	S25U3		MON		
236182	03U026	S26U3	ON	MON		
236183	03U027	S27U3		MON		
236184	03U028	S28U3		MON		
236185	03U029	S29U3		MON		
236186	03U030	S30U3		MON		
236187	03U031	S31U3		MON		
236188	03U032	S32U3		MON		
236078	03U075	S75U3	ON	MON		
236077	03U076	S76U3	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
236075	03U077	S77U3	ON	MON		
236073	03U078	S78U3	ON	MON		
236072	03U079	S79U3	ON	MON		
236476	03U082	S82U3	ON	MON		
236478	03U083	S83U3	ON	MON		
236069	03U084	S84U3	ON	MON		
236480	03U087	S87U3	ON	MON		
236482	03U088	S88U3	ON	MON		
236483	03U089	S89U3	ON	MON		
236485	03U090	S90U3	ON	MON		
236487	03U092	S92U3	ON	MON		
236489	03U093	S93U3	ON	MON		
236066	03U094	S94U3	ON	MON		
236491	03U096	S96U3	ON	MON		
236493	03U097	S97U3	ON	MON		
236495	03U099	S99U3	ON	MON		
236508	03U111	S111U3	ON	MON		
236510	03U112	S112U3	ON	MON		
242124	03U113	WF1U3	ON	MON		
242125	03U114	WF2U3	ON	MON		
440884	03U121		ON	MON		
440896	03U124		ON	MON	✓	
440886	03U129		ON	MON		
	03U301	SC-1	ON	REM		
508122	03U314	SC-2	ON	REM		
	03U315	SC-3		REM		
453822	03U316	SC-4	ON	REM		
453821	03U317	SC-5	ON	REM		
114410	03U521		OFF	MON		
242132	03U647	OW517U3	ON	MON		
242133	03U648	OW518U3	ON	MON		
421426	03U658	OW528U3	ON	MON		
421425	03U659	OW529U3	ON	MON		
421438	03U671	PO-1	ON	MON		
421440	03U672	PD2U3	OFF	MON		
421441	03U673	PD3U3	OFF	MON		
	03U674	OW541U3	ON	MON		
	03U675					
	03U676	OW543U3	ON	MON		
426848	03U701	701U3	ON	MON		
426850	03U702	702U3	ON	MON		
426878	03U703	703U3		MON		
426883	03U704	704U3	ON	MON		
426884	03U705	705U3	ON	MON		
426885	03U706	706U3	ON	MON		
426886	03U707	707U3	ON	MON		
426879	03U708	708U3	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
426881	03U709	709U3	ON	MON		
434032	03U710	71OU3	ON	MON		
434033	03U711	711U3	OFF	MON		
453833	03U715	SM1	ON	MON		
453834	03U716	SM2	ON	MON		
236449	03U801	T1U3	OFF	MON		
236453	03U803	T3U3	OFF	MON		421434
236455	03U804	T4U3	OFF	MON		421433
236458	03U805	T5U3	OFF	MON		421432
236461	03U806	T6U3	OFF	MON		421431
426808	03U811	H1U3	OFF	TEST		
426862	03U815	H5U3	OFF	TEST	✓	
426810	03U821	NW1U3	OFF	TEST		
426812	03U822	NW2U3	OFF	TEST		
426814	03U824	NW4U3	OFF	TEST	✓	
426863	03U831	OM1U3	OFF	TEST		
426864	03U832	OM2U3	OFF	TEST	✓	
508118	04J077		ON	MON		
508117	04J702		ON	MON		
453829	04J708		ON	MON		
453830	04J713		ON	MON		
706043	04J822		OFF	MON		
508120	04J714		ON	MON		
482709	04J834		OFF	MON		
482708	04J835		OFF	MON		
596629	04J836	MW-2	OFF	MON		
596631	04J837	MW-4	OFF	MON		
596633	04J838	MW-6	OFF	MON		
596635	04J839	MW-8	OFF	MON		
706045	04J847		OFF	MON		
706044	04J840		OFF	MON		
524051	04J864	324J	OFF	MON		
524048	04J866	326J	OFF	MON		
482707	04J882		OFF	MON		
234138	04U001	S1U4	ON	MON		
234194	04U002	S2U4	ON	MON		
234193	04U003	S3U4	ON	MON		
234195	04U007	S7U4	ON	MON		
234196	04U012	S12U4	ON	MON		
234197	04U020	S20U4	ON	MON		
242138	04U027	S27U4		MON		
426877	04U077	ST77U4	ON	MON		
508115	04U322	322U4	OFF	MON		
500691	04U414	414U4/EZ SELF SERVICE	OFF	MON		
231742	04U510	GRENADE PLANT PROOF RANGES	ON	IND		
426867	04U673	PD3U4	OFF	TEST		
426849	04U701	701U4	ON	MON		

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TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
426876	04U702	702U4	ON	MON		
426880	04U708	708U4	ON	MON		
426882	04U709	709U4	ON	MON		
434031	04U711	711U4	OFF	MON		
508119	04U713		ON	MON		
453832	04U714		ON	MON		
236450	04U802	T2U4	OFF	MON		
236464	04U806	T6U4	OFF	MON		421428
426811	04U821	NW1U4	OFF	TEST		
426866	04U832	OM2U4	OFF	TEST		
519957	04U833		OFF	MON		
519836	04U834		OFF	MON		
596628	04U836	MW-1	OFF	MON		
596630	04U837	MW-3	OFF	MON		
596632	04U838	MW-5	OFF	MON		
596634	04U839	MW-7	OFF	MON		
426851	04U841	301U4	OFF	TEST		
	04U842			MON		
426853	04U843	303U4	OFF	TEST		
426854	04U844	304U4	OFF	TEST		
426855	04U845	305U4	OFF	MON		
426856	04U846	306U4	OFF	MON		
426857	04U847	307U4	OFF	MON		
416078	04U848	308U4	OFF	TEST		
416082	04U849	309U4	OFF	MON		
416200	04U850	310U4	OFF	MON		
406198	04U851	311U4	OFF	MON		
416080	04U852	312U4	OFF	MON		
439701	04U854	314U4	OFF	MON		
426860	04U855	315U4	OFF	MON		
434036	04U859	319U4	OFF	MON		
434035	04U860	320U4	OFF	MON		
434034	04U861	321U4	OFF	MON		
471394	04U863	323U4	OFF	MON		
524050	04U864	324U4	OFF	MON		
524047	04U865	325U4	OFF	MON		
524049	04U866	326U4	OFF	MON		
447889	04U871	401U4	OFF	MON		
447988	04U872	402U4	OFF	MON		
447898	04U875	405U4	OFF	MON		
447896	04U877	407U4	OFF	MON		
447900	04U879	409U4	OFF	MON		
447895	04U880	410U4	OFF	MON		
447891	04U881	411U4	OFF	MON		
447890	04U882	412U4	OFF	MON		
447892	04U883	413U4	OFF	MON		
236468	PJ#003	S3PJ	ON	MON		

TABLE B-2
TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
	PJ#006		ON	MON		
236469	PJ#027	S27PJ	ON	MON		
235565	PJ#074	S74PJ		MON	✓	
453825	PJ#309	B8	ON	REM		
453826	PJ#310	B9	ON	REM		
453827	PJ#311	B10	ON	REM		
453828	PJ#313	B12	ON	REM		
447894	PJ#318	318U4	OFF	MON		
206754	PJ#501	TWIN CITIES ARSENAL NO. 1	ON	P.S.	✓	
206756	PJ#502	TWIN CITIES ARSENAL NO. 2	ON	IND	✓	
206758	PJ#503	TWIN CITIES ARSENAL NO. 3	ON	IND	✓	
206724	PJ#504	TWIN CITIES ARSENAL	OFF	ABAND	✓	
206753	PJ#506	TWIN CITIES ARSENAL NO. 6	ON		✓	
206755	PJ#507	TWIN CITIES ARSENAL NO. 7	ON	ABAND	✓	
206759	PJ#508	TWIN CITIES ARSENAL NO. 8	ON	ABAND	✓	
206760	PJ#509	TWIN CITIES ARSENAL NO.9	ON	DOM	✓	
236437	PJ#802	T2PJ	OFF	MON		421437
236465	PJ#806	T6PJ	OFF	MON		421427
107405		ROEBKE	OFF	UN		
110485		NEW BRIGHTON #12	OFF	MUNI		
122210		ST. PAUL PORT AUTH. #3	OFF	IND		
127537		MIDWEST ASPHALT	OFF	DOM		
134318		LORENZ W SEUTTER	OFF	DOM		
139035		WATERGATE MARINA	OFF	P.S.		
151568		ARDEN MANOR MOBILE HOME	OFF	P.S.		
161432		NEW BRIGHTON #10	OFF	MUNI		
191942		118PDC/MODEL STONE	OFF	MON		
200070		RUAN TRANSPORT	OFF	COM	✓	
200071		PRESTRESSED CONCRETE	OFF	IND	✓	
200072		WITTE TRANSPORTATION	OFF	IND	✓	
200073		WILSON TRANSFER & STORAGE	OFF	IND		
200074		ASBESTOS PROD	OFF	IND	✓	
200075		PHILLIPS PETROLEUM	OFF	IND	✓	
200076		OLD DUTCH FOODS INC	OFF	IND		
200077		JOHN CONLIN	OFF	DOM	✓	
200078		WILLIAM CLASS	OFF	DOM		
200079		LAWRENCE SCHOENING	OFF	DOM		
200080		CARL A OSTROM & SON	OFF	DOM		
200081		A. O. LIEBIG	OFF	DOM		
200082		2196 MARION ROAD	OFF	DOM		
200148		PAPER CALMERSON	OFF	IND	✓	
200154		U OF M GOLF COURSE	OFF	IRR		
200167		KOPPERS COKE #1	OFF	IND		
200171		PLATING INC	OFF	IND		
200197		SNOW FLAKE DAIRY	OFF	COM		
200264		1620 CENTRAL	OFF	IND		
200384		METALLURGICAL INC. WELL #1	OFF	IND		

TABLE B-2
TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
200524		ST. ANTHONY #5	OFF	MUNI		
200525		PLETSCHER	OFF	UN		
200531		NAZARETH	OFF	UN		
200599		CEDAR AVE. TRIANGLE	OFF	P.S.		
200602		ATKINSON MILL CO.	OFF	IND		
200629		GENERAL MILLS	OFF	IND		
200803		ST. ANTHONY #4	OFF	P.S.		
200804		ST. ANTHONY #3	OFF	MUNI		
200812		GROSS GOLF COURSE #1	OFF	COM		
200814		AMERICAN LINEN	OFF	IND		
201074		GLEASSON MORTUARY	OFF	COM		
201082		NORTHWESTERN HOSPITAL	OFF	P.S.		
206669		FRIDLEY #8	OFF	MUNI		
206672		FRIDLEY #9	OFF	MUNI		
206673		FRIDLEY #6	OFF	MUNI		
206688		CLOVERPOND WELL	OFF	DOM		
206689		JAMES K. O'NEIL	OFF	UN		
206693		FERNELIUS	OFF	UN		
206702		MINN E.S.	OFF	UN		
206720		MOUNDSVIEW	OFF	MUNI		
206722		M0UNDSVIEW #5	OFF	MUNI		
206750		SHORE #4	OFF	MUNI		
206787		MOUNDSVIEW H.S.	OFF	P.S.		
206789		NEW BRIGHTON #1	OFF	MUNI	✓	
206791		NEW BRIGHTON #7	OFF	MUNI		
206792		NEW BRIGHTON #4				
206793		NEW BRIGHTON #3	OFF	MUNI		
206794		NEW BRIGHTON #9	OFF	MUNI		
206795		NEW BRIGHTON #8	OFF	MUNI		
206796		NEW BRIGHTON #5	OFF	MUNI		
206797		NEW BRIGHTON #6	OFF	MUNI		
206798		NEW BRIGHTON #2	OFF	MUNI	✓	
223844		KURTH MALTING CO EAST WL	OFF	IND		
223992		BOOM ISLAND	OFF	IND		
225886		FRANKLIN STEEL SQUARE	OFF	P.S.		
225905		ST PAUL TERM. WAREHOUSE	OFF	IND		
225906		ST PAUL TERM. WAREHOUSE	OFF	IND		
231741		LABELLE	OFF	UN		
231845		MNDOT CIVIL DEFENSE TRAIN.	ON/OFF	P.S.		
231878		MENGELKOCH #2	OFF	UN		
232067		NBR 135	OFF	UN		
232069		UHIL	OFF	UN		
233221		REUBEN MEAT	OFF	DOM		
233222		LOWRY GROVE TRAILER	OFF	ABAND	✓	
233241		KOZAH'S MARKET	OFF	UN	✓	
233520		MCGILLIS	OFF	UN		
233533		ROSELAWN CEMETARY	OFF	IRR		

TABLE B-2
TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
233763		P. L. MORGAN	OFF	DOM		
233806		2581 NORTH CLEVELAND	OFF	DOM		
234301		DEWITT	OFF	UN	✓	
234305		GLENN BEGGIN	OFF	UN		
234319		HIDE & TALLOW #1	OFF	UN		
234327		BRESKE	OFF	UN		
234335		MENGELKOCH #1	OFF	UN		
234337		MENGELKOCH #3	OFF	UN	✓	
234350		GORDON	OFF	UN		
234351		YEMPA	OFF	UN		
234352		1206 12TH AV NW	OFF	UN	✓	
234353		LENTSCH'S ICE WK.	OFF	UN		
234355		KINGDOM HALL	OFF	UN		
234356		NORDQUIST P43	OFF	UN		
234357		PHILLIPS PET P46	OFF	UN		
234386		ZELL OLS.	OFF	UN		
234391		SHERER L.	OFF	UN		
234396		DEWITT	OFF	UN	✓	
234406		KLAPP	OFF	UN	✓	
234409		HIDE & TALLOW	OFF	UN		
234425		KEN GEREBI	OFF	UN	✓	
234430		CMIEL	OFF	UN	✓	
234431		HARSTAD	OFF	UN		
234463		KEN SOLIE	OFF	UN		
234546		HONEYWELL RIDGEWAY	OFF	UN		
234547		HONEYWELL RIDGEWAY	OFF	UN		
234549		REINER	OFF	IRR		
235539		OLD HOTEL	OFF	UN		
235557		HIDDEN FALLS PARK W.WELL	OFF	P.S.		
235619		SHRINERS HOSPITAL	OFF	P.S.		
235735		FLOUR CITY ARCHITECTURAL	OFF	COM		
236122		NWR	OFF	ABAND		
242162		301PB	OFF	UN		
242207		SUNSET MEMORIAL CEMETARY	OFF	UN		
249152		BOYLE	OFF	DOM		
265735		FLOUR CITY ARCH	OFF	UN		
322664		ABBOTT NW HOSP	OFF	UN		
405651		METAL-MATIC INC.	OFF	IND		
409546		PCA2L3	OFF	TEST	✓	
409547		PCA1U4	OFF	TEST		
409548		PCA2U4	OFF	TEST		
409549		PCA3U4	OFF	TEST		
409550		PCA6U3	OFF	TEST		
409555		PCA5U4	OFF	TEST		
409556		PCA4L3	OFF	TEST		
409557		PCA1L3	OFF	TEST		
409595		B109U3	OFF	ABAND		

TABLE B-2
TCAAP WELL INDEX
SORTED BY IRDMIS NUMBER

Minnesota Unique #	IRDMIS #	Common Name	Well Location	Well Type	Well Sealed	Second Unique #
409596		B118U3	OFF	MON		
409597		B118L3	OFF	IND		
409598		B117U3	OFF	ABAND		
416143			OFF	ABAND		
416198		311U4	OFF	MON		
420713		HERBST LANDFILL	OFF	MON		
476387		MW15H	OFF	MON		
482083		K04-MW	ON	MON		
482084		K02-MW	ON	MON		
482085		K01-MW	ON	MON		
482086		I01-MW	ON	MON		
482087		I05-MW	ON	MON		
482088		I02-MW	ON	MON		
482089		I04-MW	ON	MON		
482090		I03-MW	ON	MON		
509083		NEW BRIGHTON #11	OFF	MUNI		
512761		GROSS GOLF #2	OFF	IRR		
519288		E101-MW	ON	MON		
519289		E102-MW	ON	MON		
519290		E103-MW	ON	MON		
519291		129-1501-MW	ON	MON	✓	
520931		NEW BRIGHTON #13	OFF	MUNI		
554216		NEW BRIGHTON #14	OFF	MUNI		
582628		NEW BRIGHTON #15	OFF	MUNI		
589650		CM1MW	ON	MON		
616601		CM2MW	ON	MON		
616602		CM3MW	ON	MON		
624019		CM5MW	ON	MON		
643379			ON	PIEZ.	✓	
643380			ON	PIEZ.	✓	
643381			ON	PIEZ.	✓	
643382			ON	PIEZ.	✓	
653903		GR1-1	ON	MON		
653904		GR1-2	ON	MON		
653905		GR2-1	ON	MON		
675976		GR-DF1	ON	MON		
		MW15D	OFF	MON		
		MW15S	OFF	MON		

Appendix B: Table B-3

Boring Logs On-TCAAP Wells
Sorted by IRDMIS Number

TCAAP Well Boring logs are include on this CD ROM as Table B-3 and Table B-4

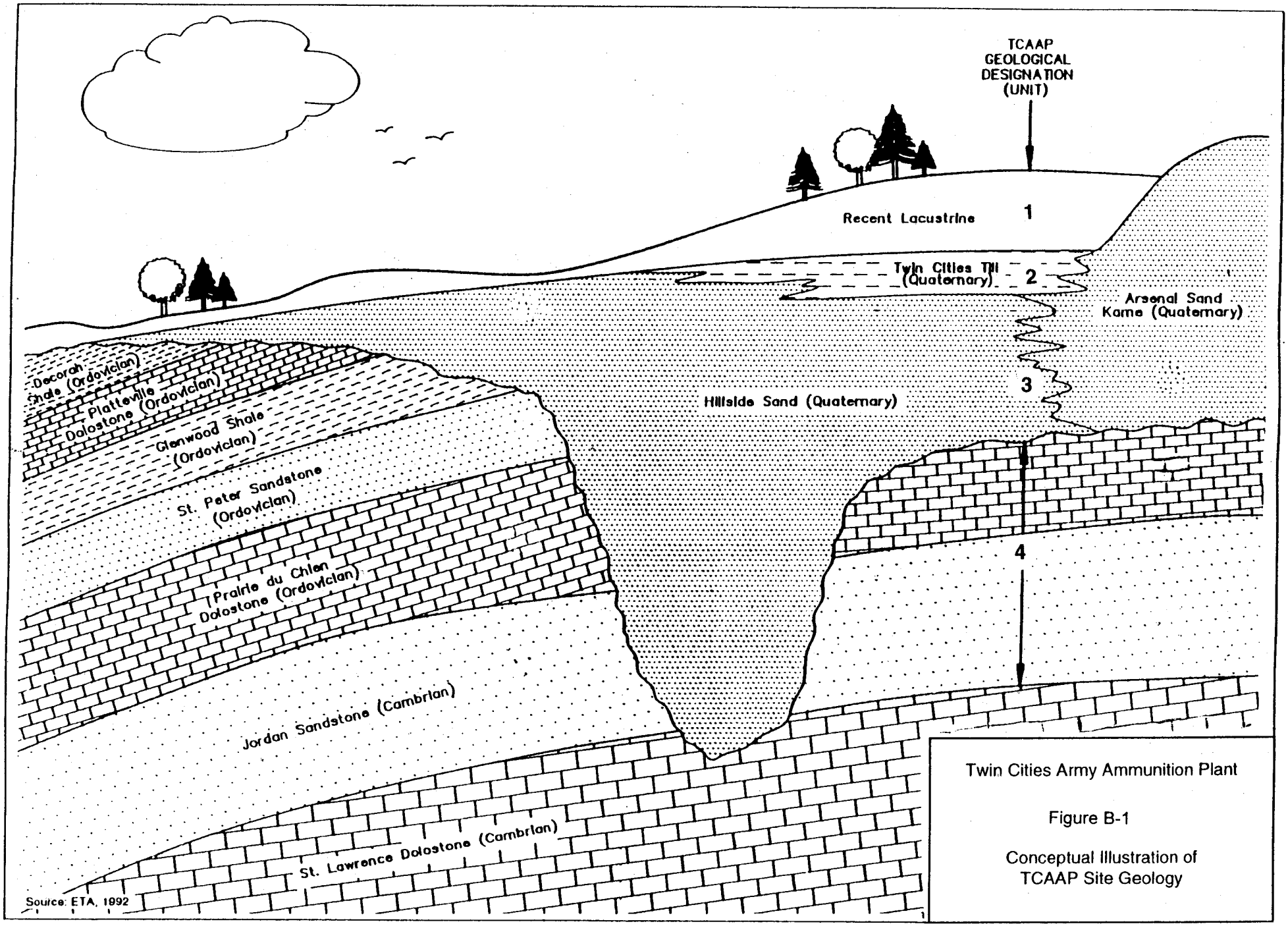
TCAAP Well Boring Logs are included on this CDROM as Table B-3 and Table B-4

Appendix B: Table B-4

Boring Logs Off-TCAAP Wells
Sorted by IRDMIS Number

TCAAP Well Boring logs are include on this CD ROM as Table B-3 and Table B-4

TCAAP Well Boring Logs are included on this CDROM as Table B-3 and Table B-4



Twin Cities Army Ammunition Plant

Figure B-1

Conceptual Illustration of
TCAAP Site Geology

TWIN CITIES ARMY AMMUNITION PLANT
(Original Boundary)

Mounds View
Fridley
New Brighton
Arden Hills
Columbia Heights
Saint Anthony
Roseville
Minneapolis
Shorev

I-694
I-35W
US 10
Highway 65
Silver Lake Rd
Highway 8
County Rd C
Highway 36

01L813 01U813 03L813
03L811 03U811
01U807
01L816
03L856 03U815
04U847 O4J847
409550
03L841 04U841
03U673 04U673
04U843 03M843
04U855
03L848 03M848 04U848
01L822 03L822 O4J822
01L821 04U821
03L859 04J859
409547 409557
04U845
03L854 04U854
03U824
409596 409597 191942
04U849 O4J849
04U879
409549
03L861 04U861
03U831 04U844
03L860 04U860
409546 409548
03U832 03L832 04U832
03L846 04U846
01L823
04U839 04J839
04U850
04J838 04U838
04U863
409556
04J836 04U836
554216 (NBM #14)
476837 (MW15H)
04U865
206688
206792 (NBM #4)
206793 (NBM #3)
04J837 04U837
04U877
04J866 04U866
500691
04U414 (414U4)
206797 (NBM #6)
582628 (NBM #15)
520931 (NBM #13)
206796 (NBM #5)
04J864 04U864
04U875
04U871
04U851
409555
04U872
200524 (SAM #5)
04U852
04U880
PJ#318
03L858
200803 (SAM #4)
200804 (SAM #3)
04U881
234549
04J834 04U834
04U883
04J835
04J882 04U882
200812
512761
234547
234546
200814
200154
233221

LEGEND

- 04U837 — Monitoring Well Location (click on well name to view TCE trend graph)
- 554216 — Extraction Well Location (click on well name to view TCE trend graph)
- 200804 — Private Well Location (click on well name to view TCE trend graph)
- 03U824 — Sealed Well Location (No TCE trend graph available; refer to historical water quality database in Appendix D.)

FY2003 Upper Unit 4 Trichloroethene Concentrations

- 1 ug/l
- 10 ug/l
- 100 ug/l
- 1000 ug/l
- Highway
- City Boundaries
- TCAAP Boundary (Original Boundary)

N

Notes:
1. To locate a well go to "edit, find" or "edit, search" and type in well name.
2. Aerial Orthophotography was flown in 2000.
3. Not all wells are completed at the same depth as reflected by the OU1 & OU3, Upper Unit 4 plume contours shown.

2000 0 2000 4000 Feet

L:\1561\1561-01\FY2005\apr file\05report.apr\figure B-2

TWIN CITIES ARMY AMMUNITION PLANT

OU1 & OU3 Well Location and TCE History Map

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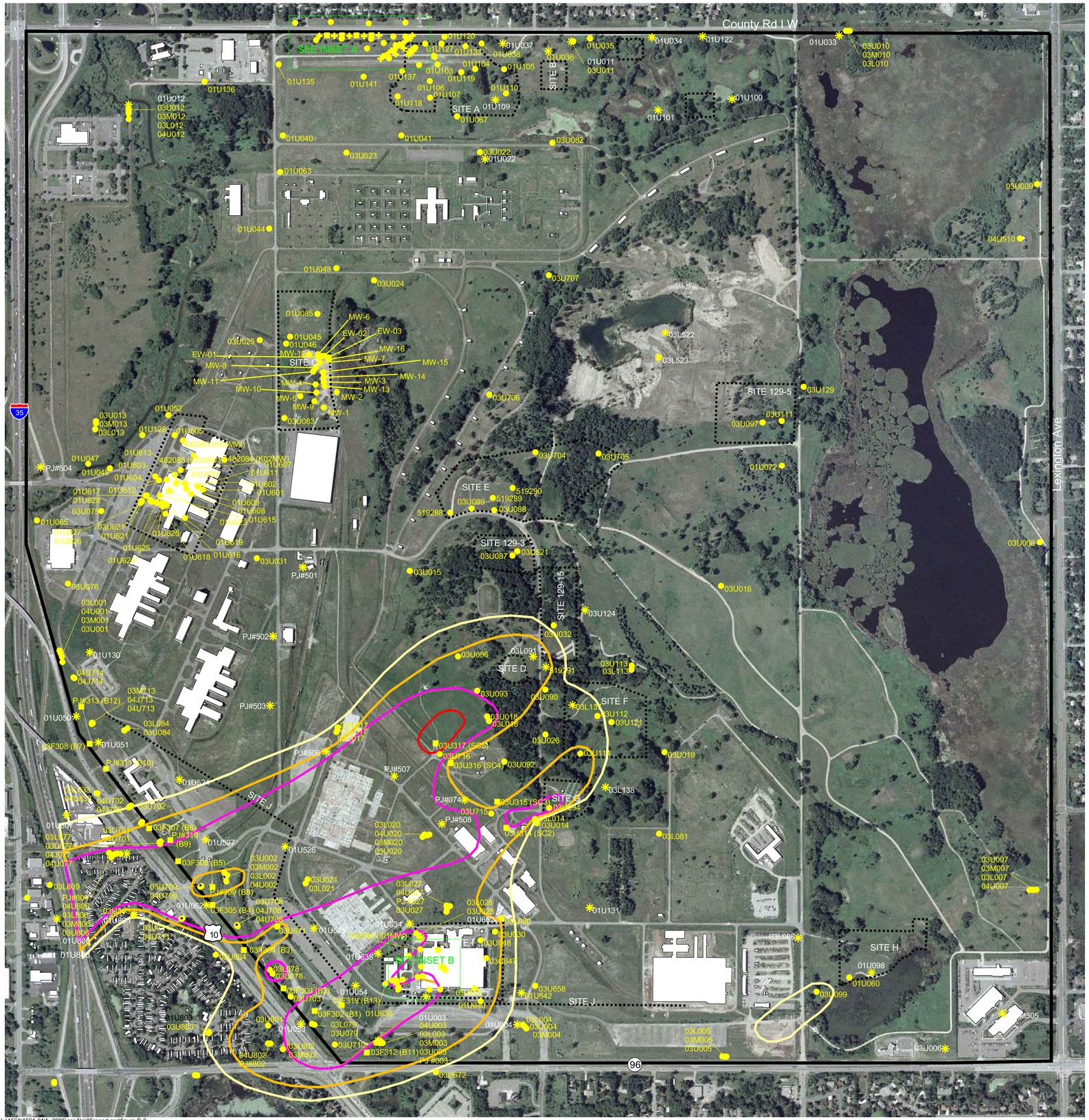
Wenck
Wenck Associates, Inc.
Environmental Engineers
1800 Pioneer Creek Center
Maple Plain, MN 55359-0249

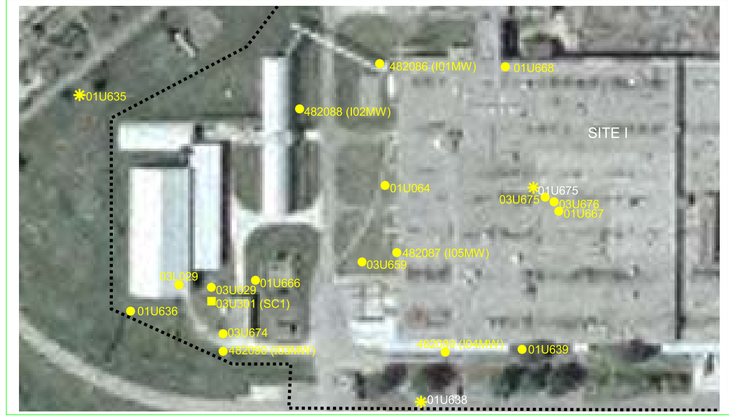
FY 2005

Figure B-2



INSET A

INSET B



LEGEND

- Monitoring Well Location (click on well name to view TCE trend graph)
- Extraction Well Location (click on well name to view TCE trend graph)
- Piezometer Location (for groundwater elevation only; no water quality data is collected.)
- Sealed Well Location (No TCE trend graph available; refer to historical water quality database in Appendix D.)

FY2003 Upper Unit 3 Trichloroethene Concentrations

- 1 ug/l
- 10 ug/l
- 100 ug/l
- 1000 ug/l
- Buildings
- TCAAP Boundary (Original Boundary)
- Site Boundaries

Notes:
1. To locate a well go to "edit, find" or "edit, search" and type in well name.
2. Aerial Orthophotography was flown in 2003 by the Farm Service Agency.
3. Not all wells are completed at the same depth as reflected by the OU2, Upper Unit 3 plume contours shown.

N

800 0 800 1600 Feet

L:\1561\1561-01\fy 2005\apr file\05report.apr\figure B-3

TWIN CITIES ARMY AMMUNITION PLANT

OU2 Well Location and TCE History Map

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FY 2005

Figure B-3

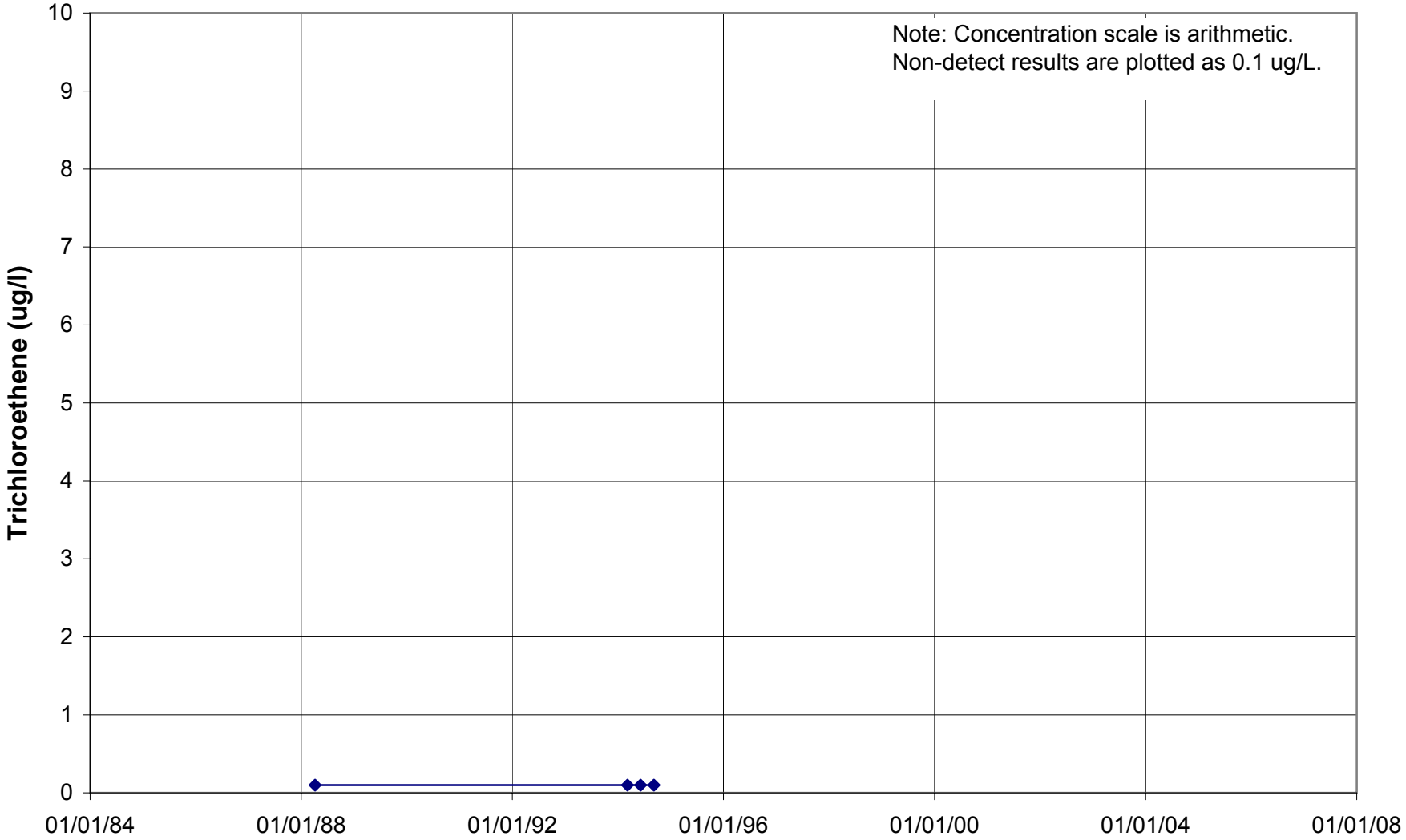
Trend Graph Not Available,
Well No Longer Routinely Sampled

TO RETURN TO MAP: Click on "Go to Previous View" Button in the Tool Bar

Monitoring Well Has Been Sealed

TO RETURN TO MAP: Click on "Go to Previous View" Button in the Tool Bar

01U038



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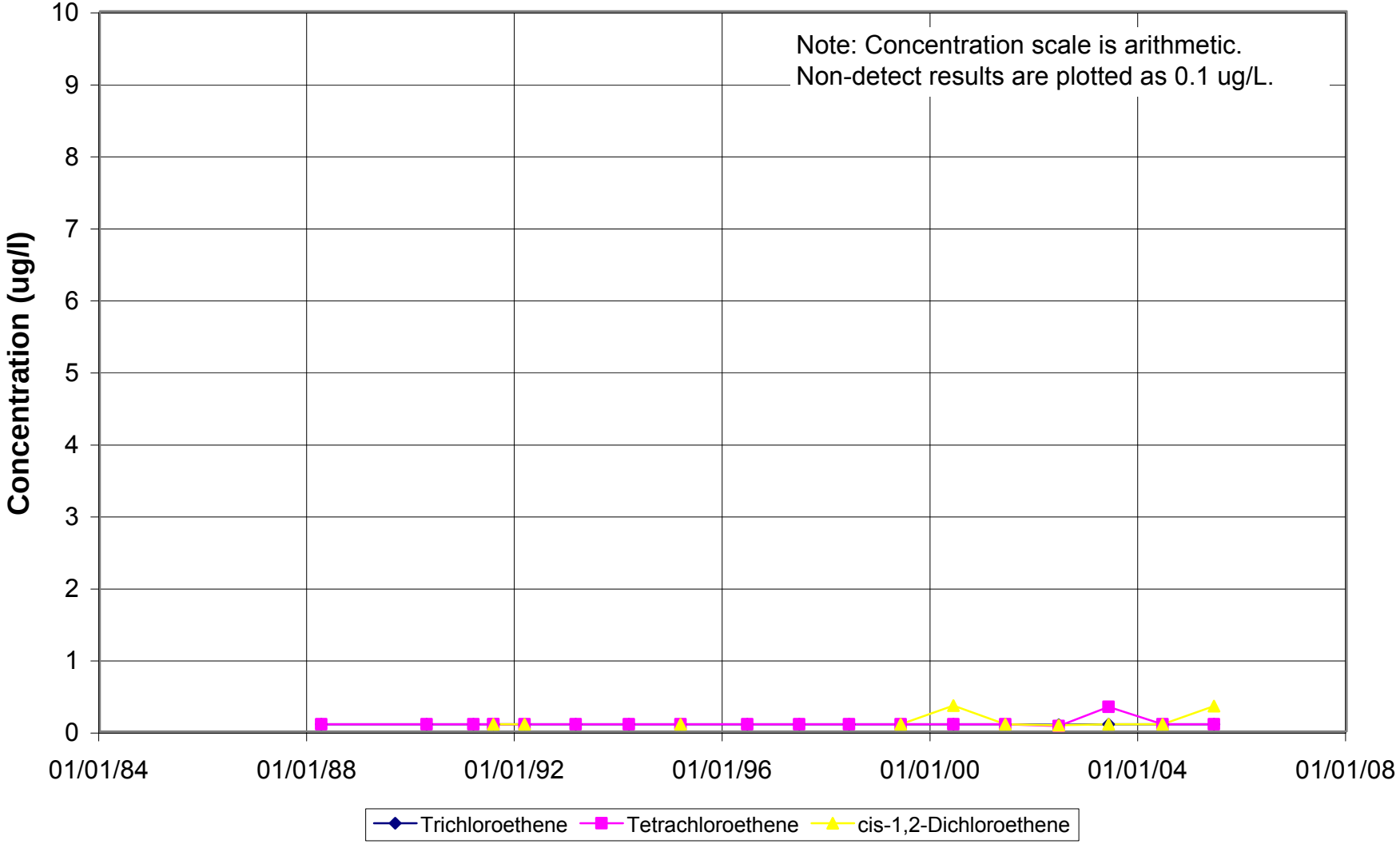
01U039



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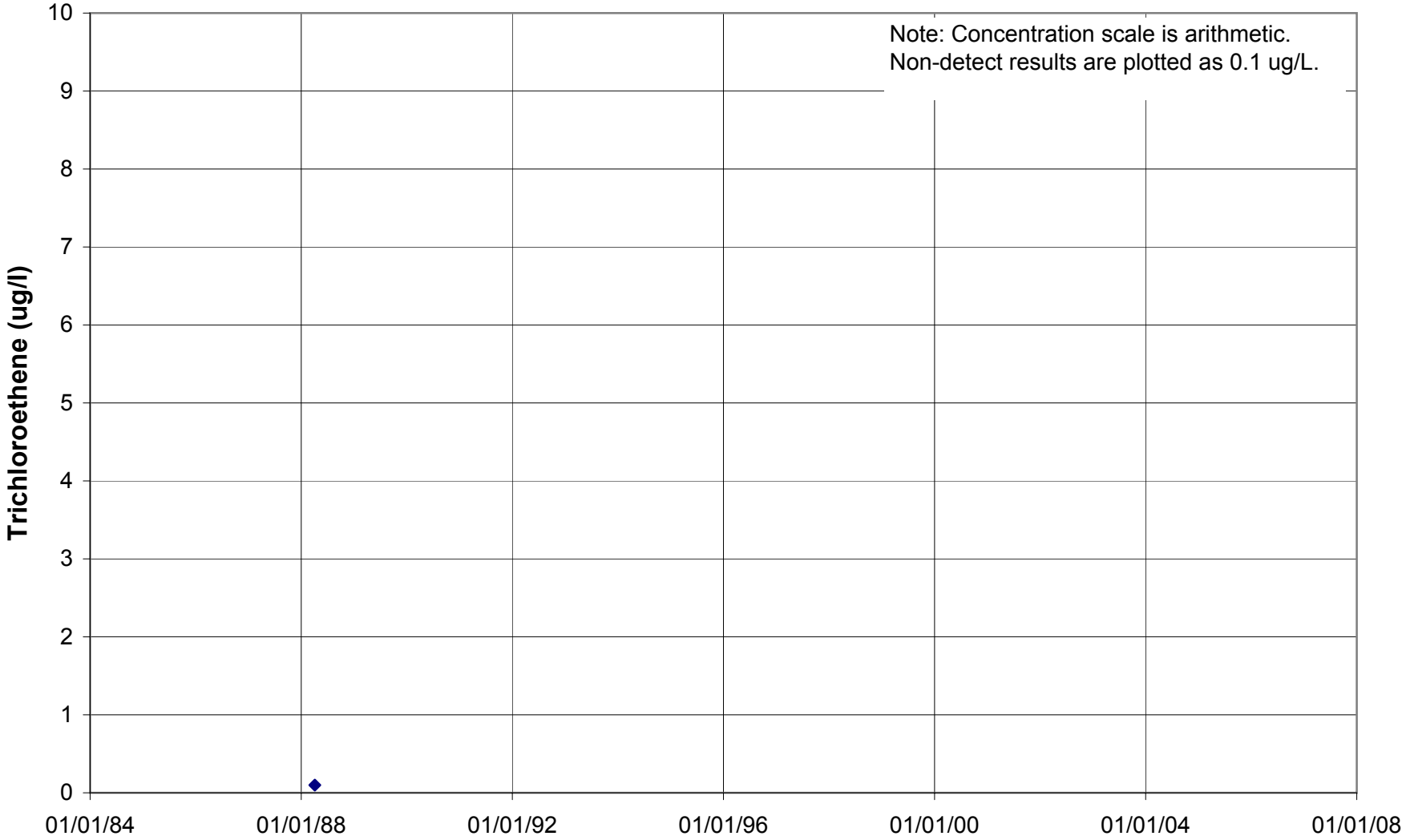

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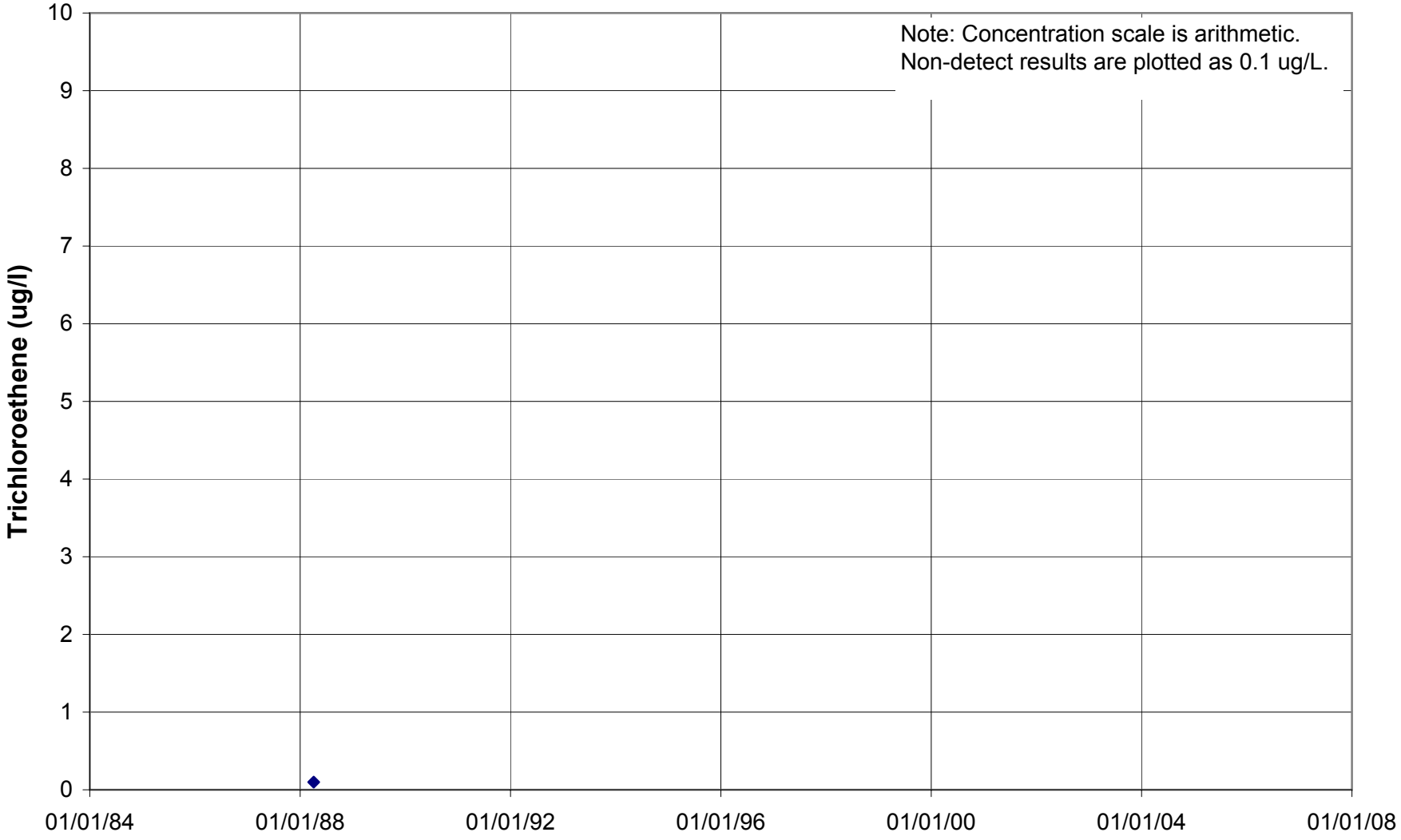

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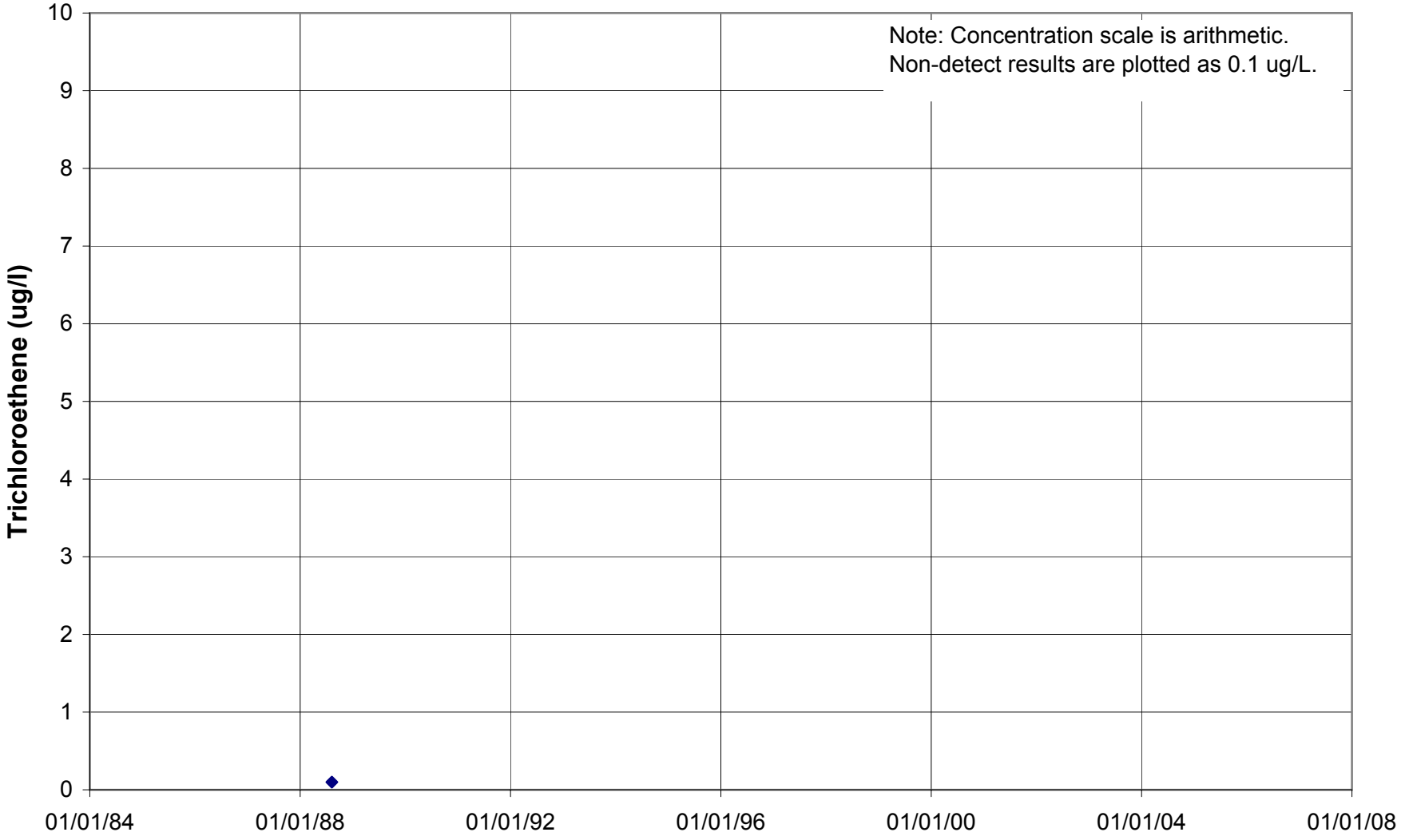

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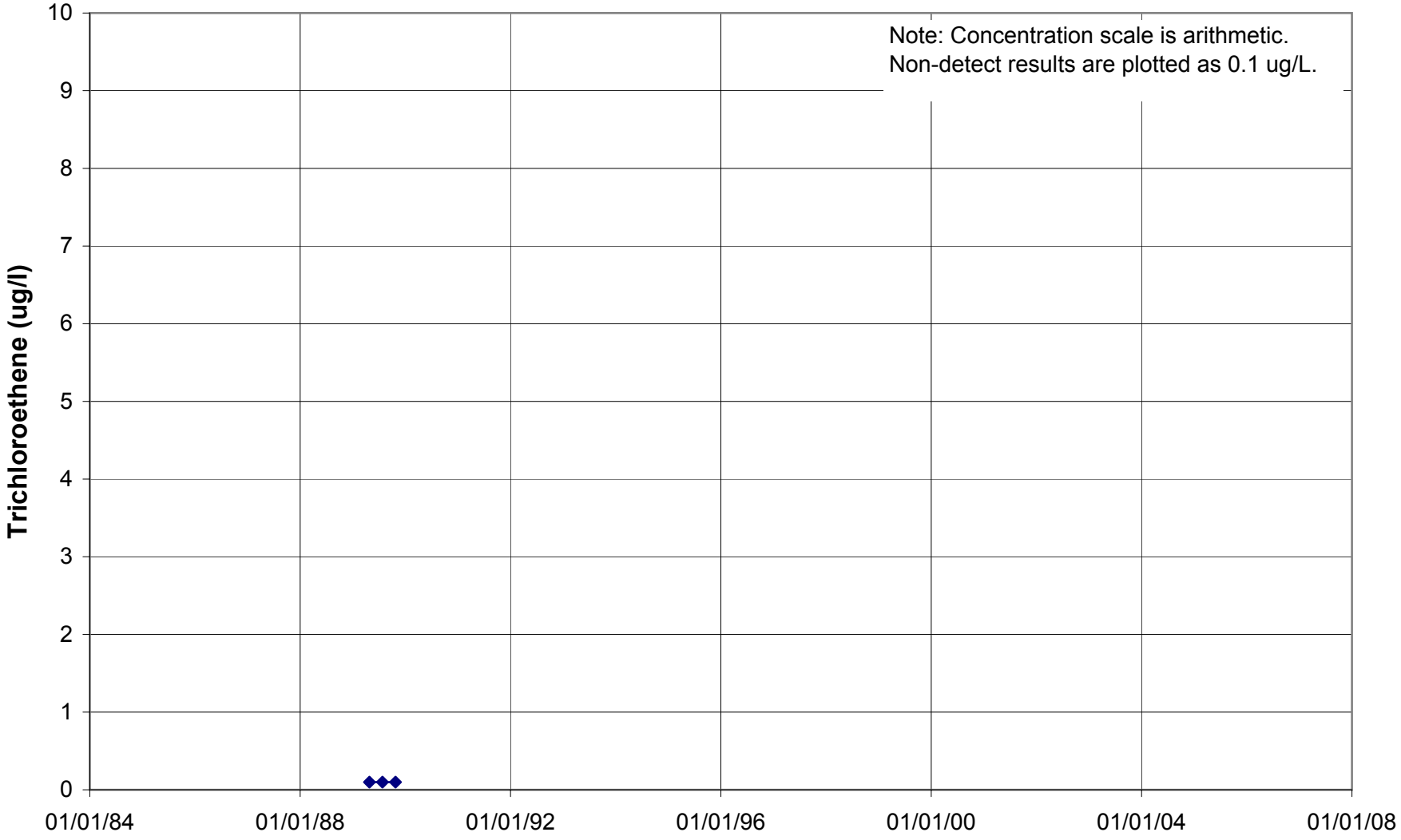

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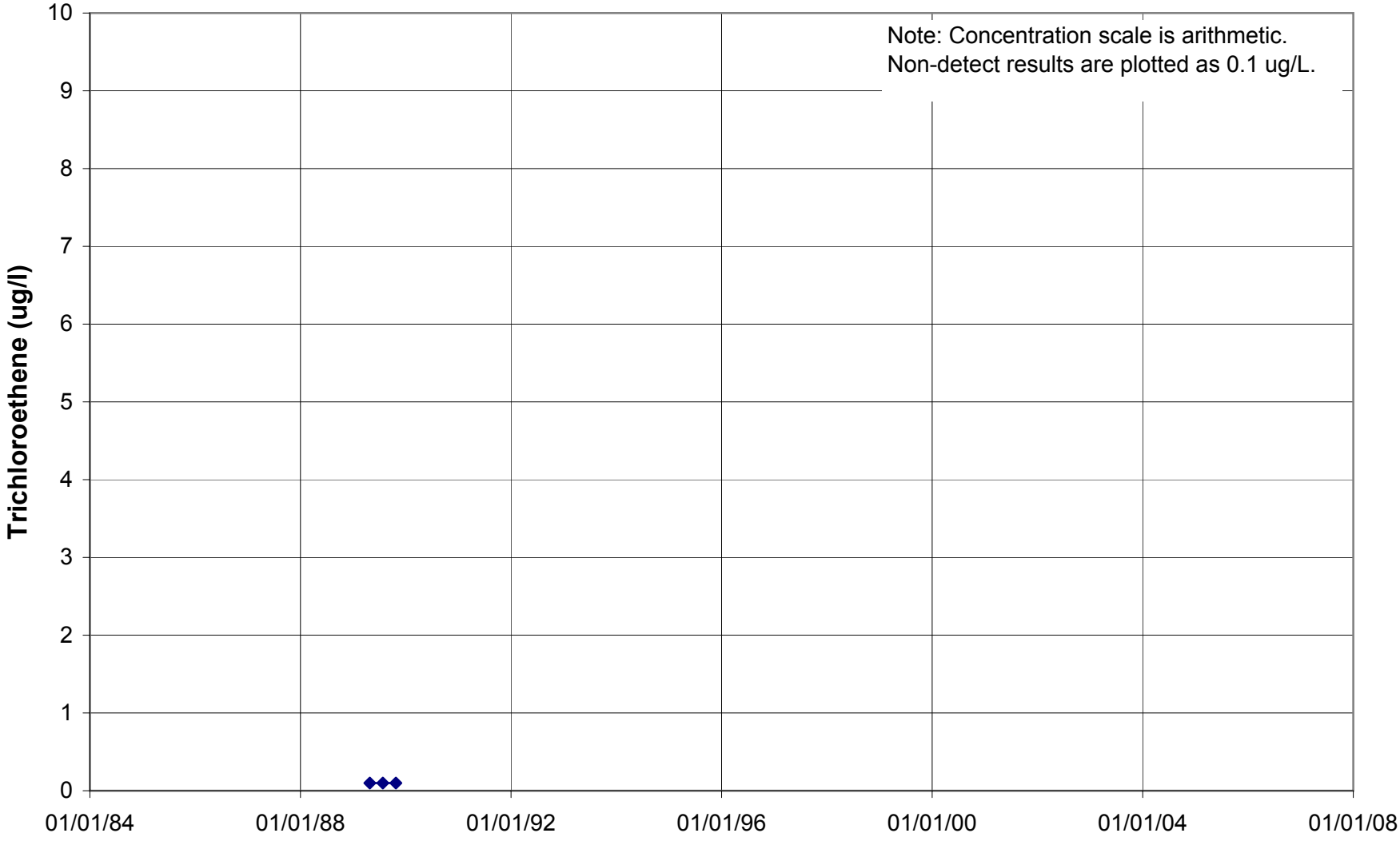
01U052



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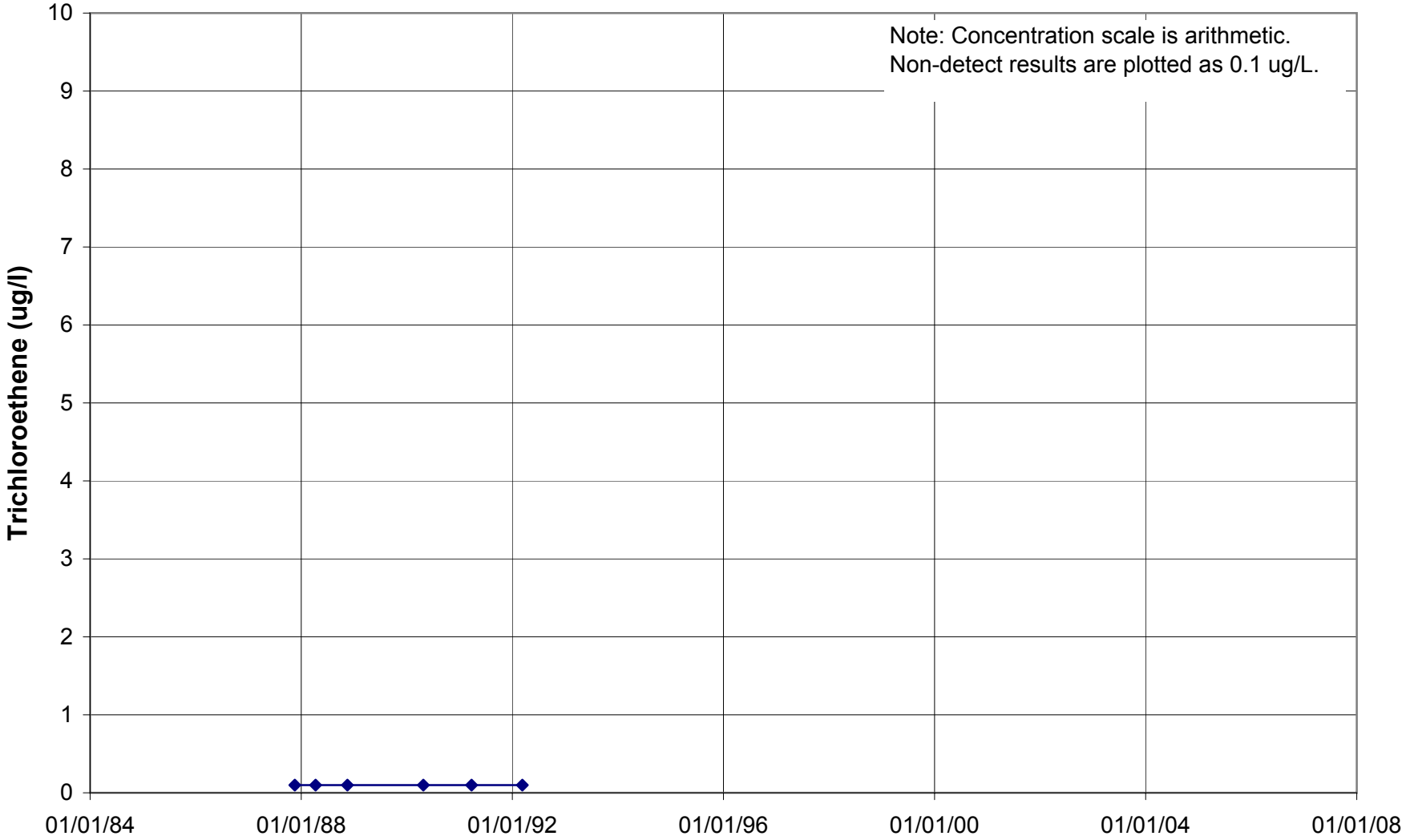
01U060



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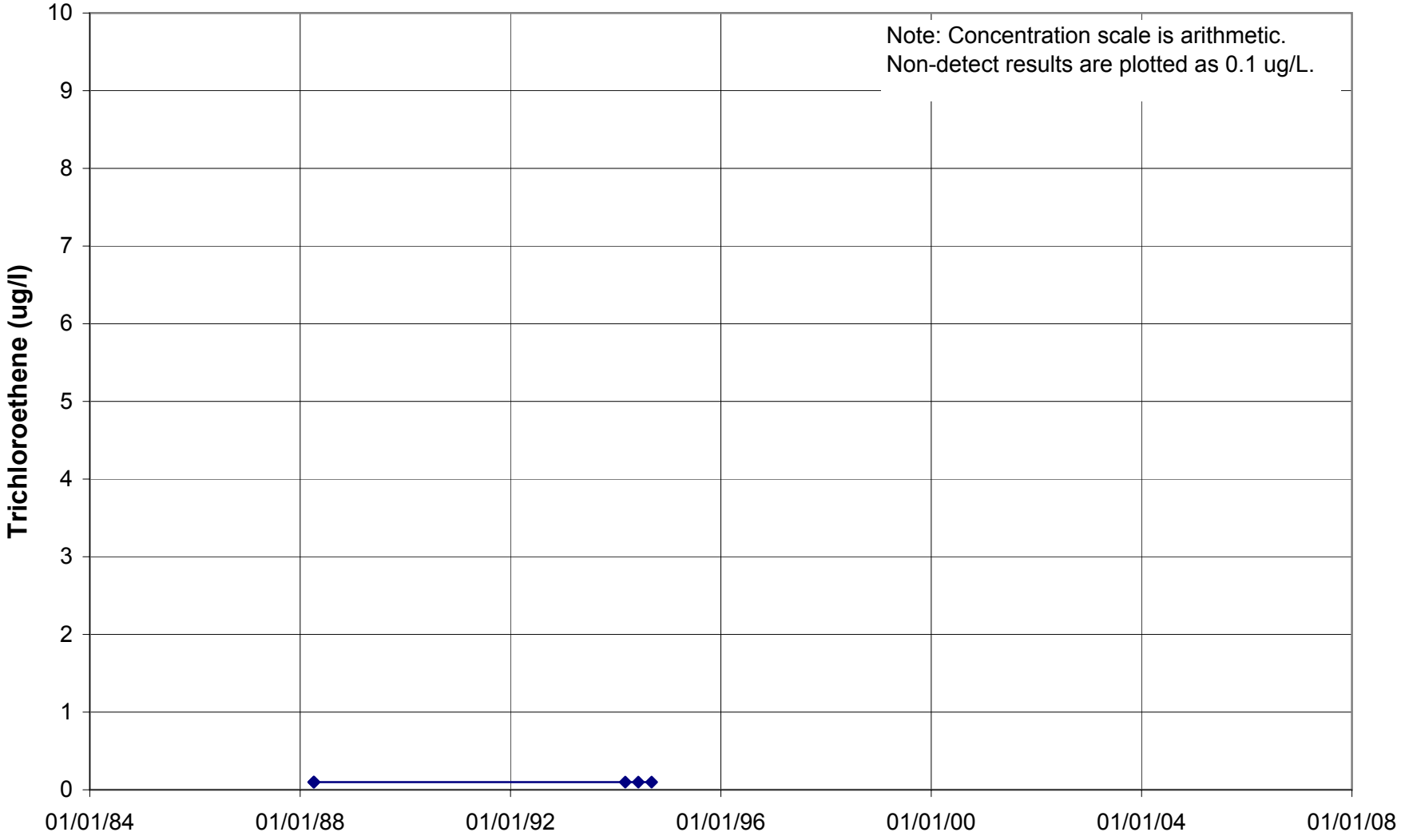
01U063



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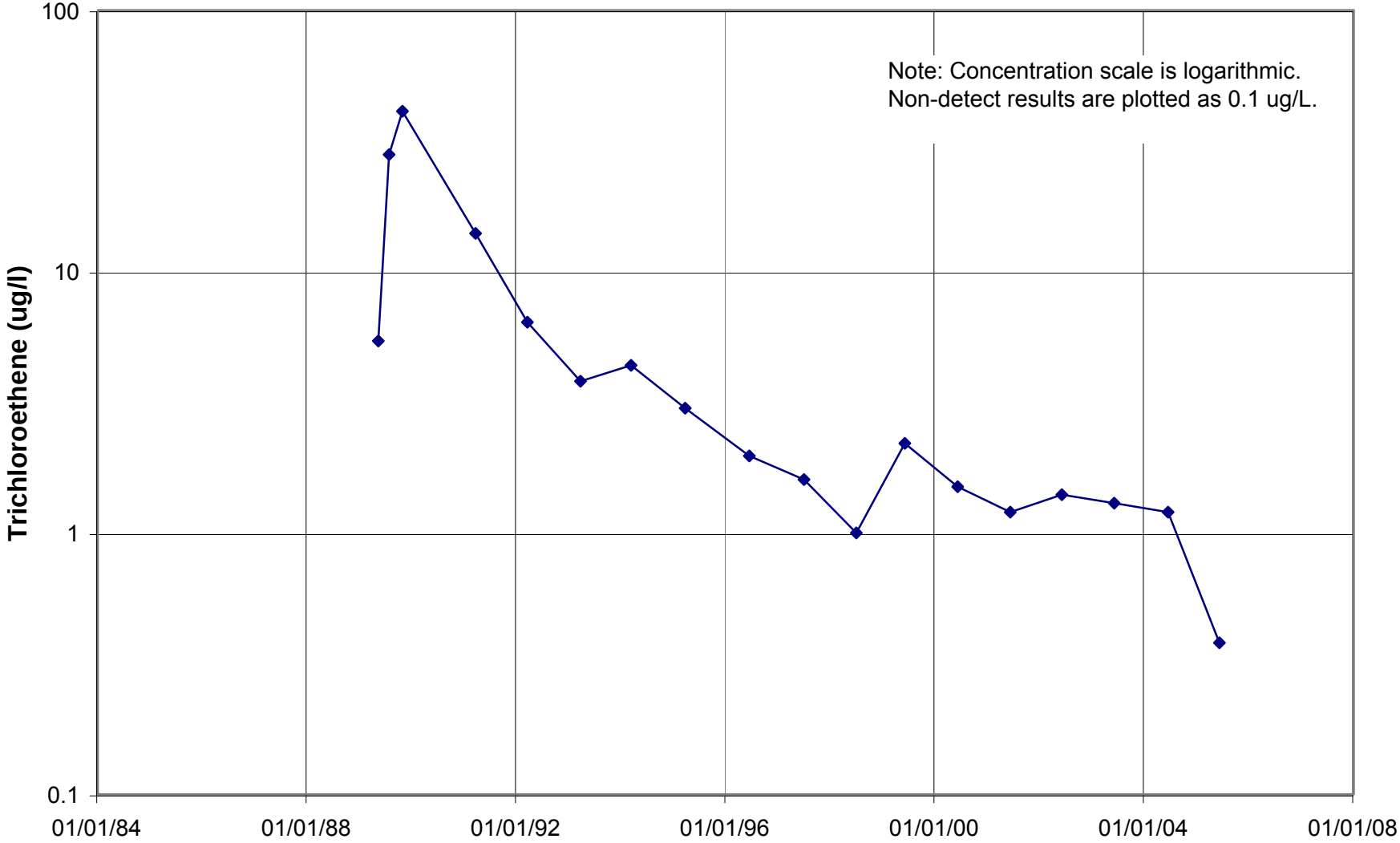
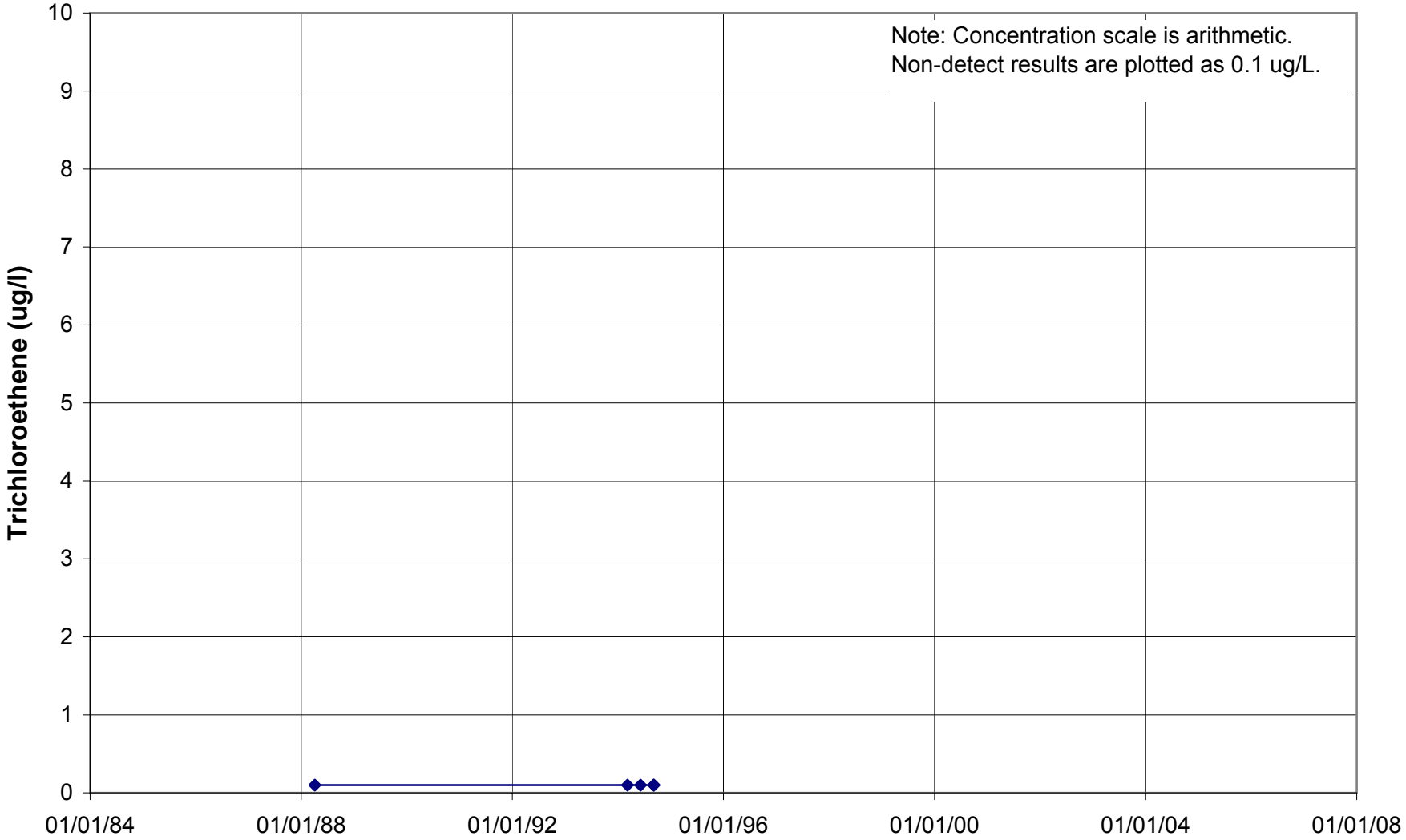


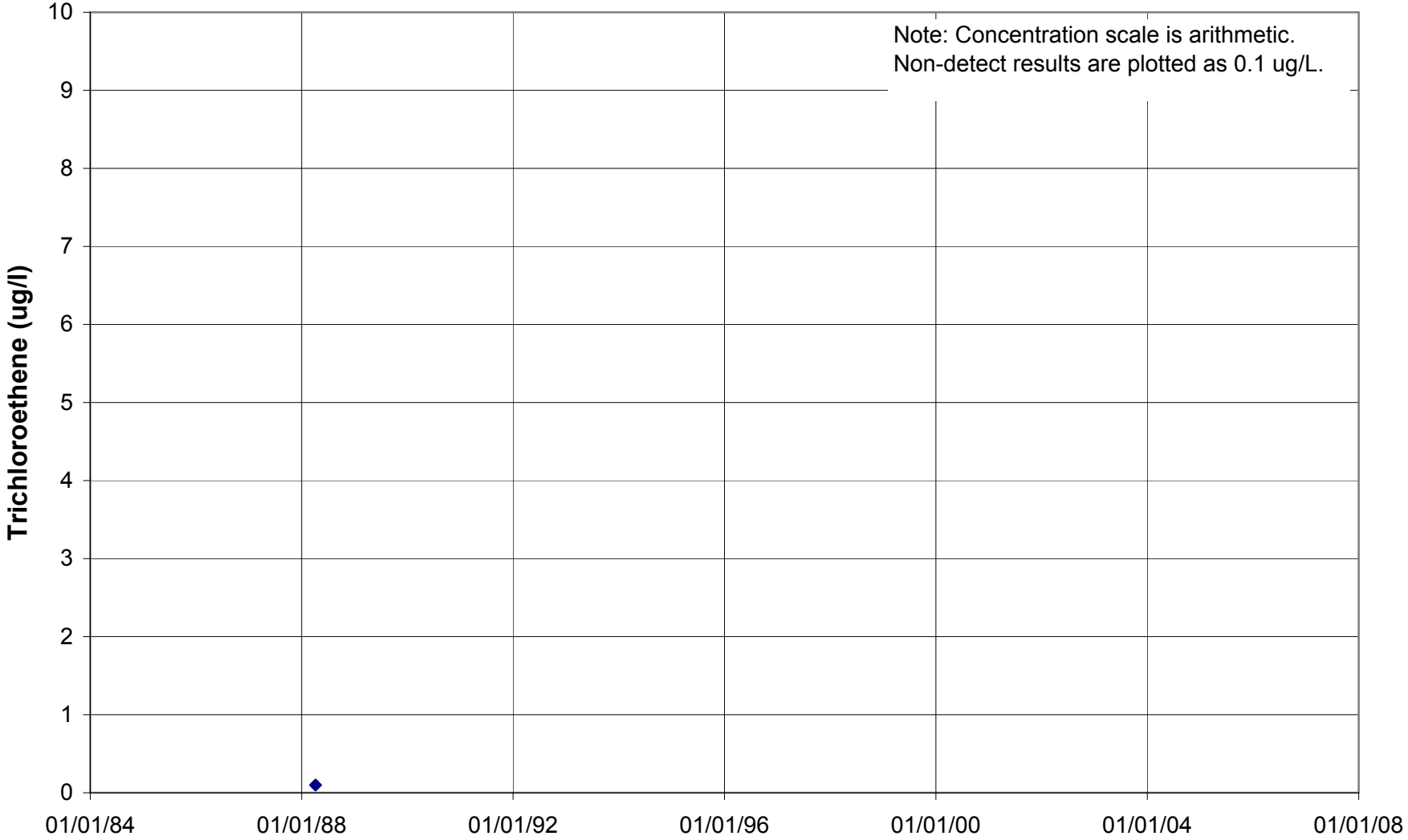
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U067



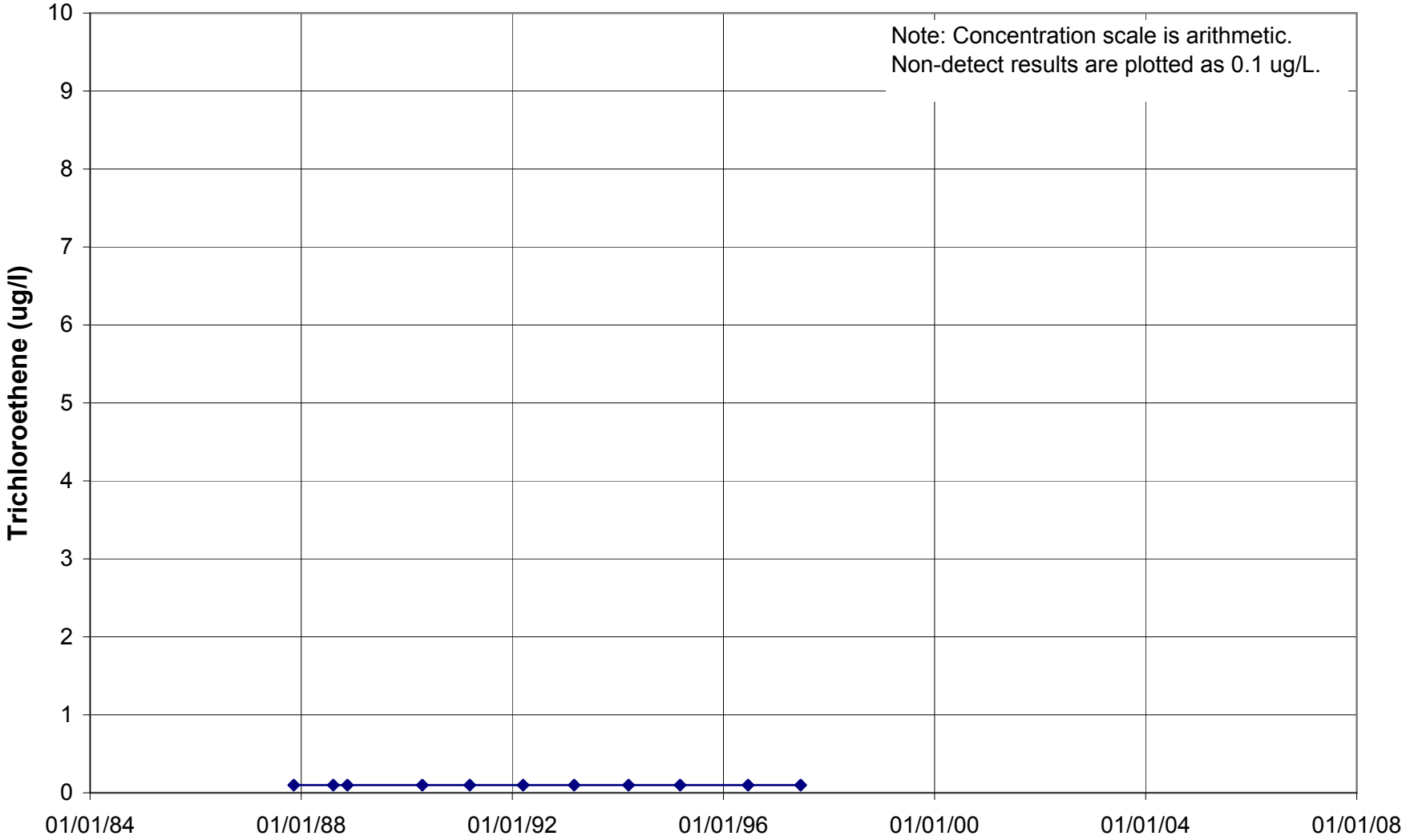
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U072



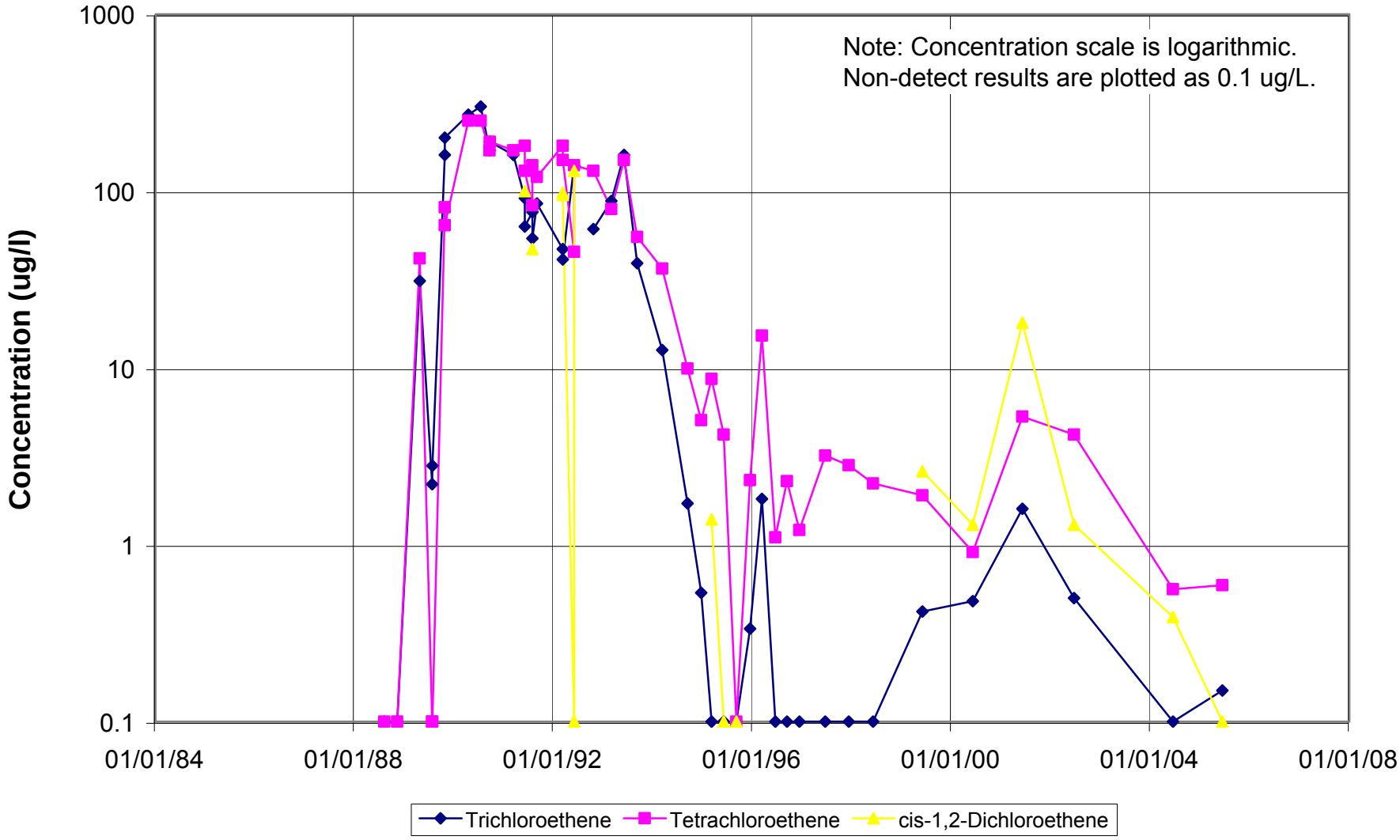
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U085



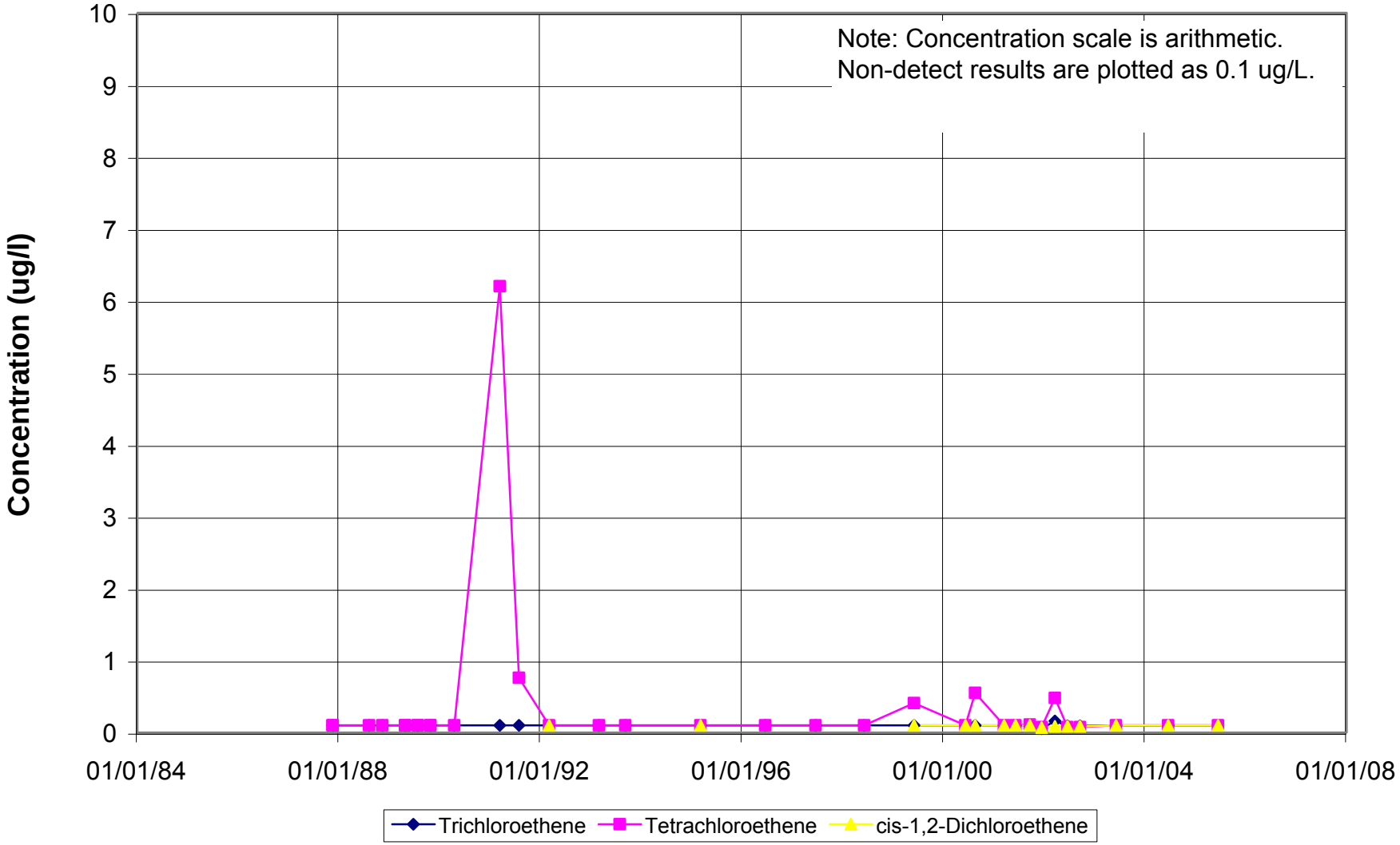
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U102



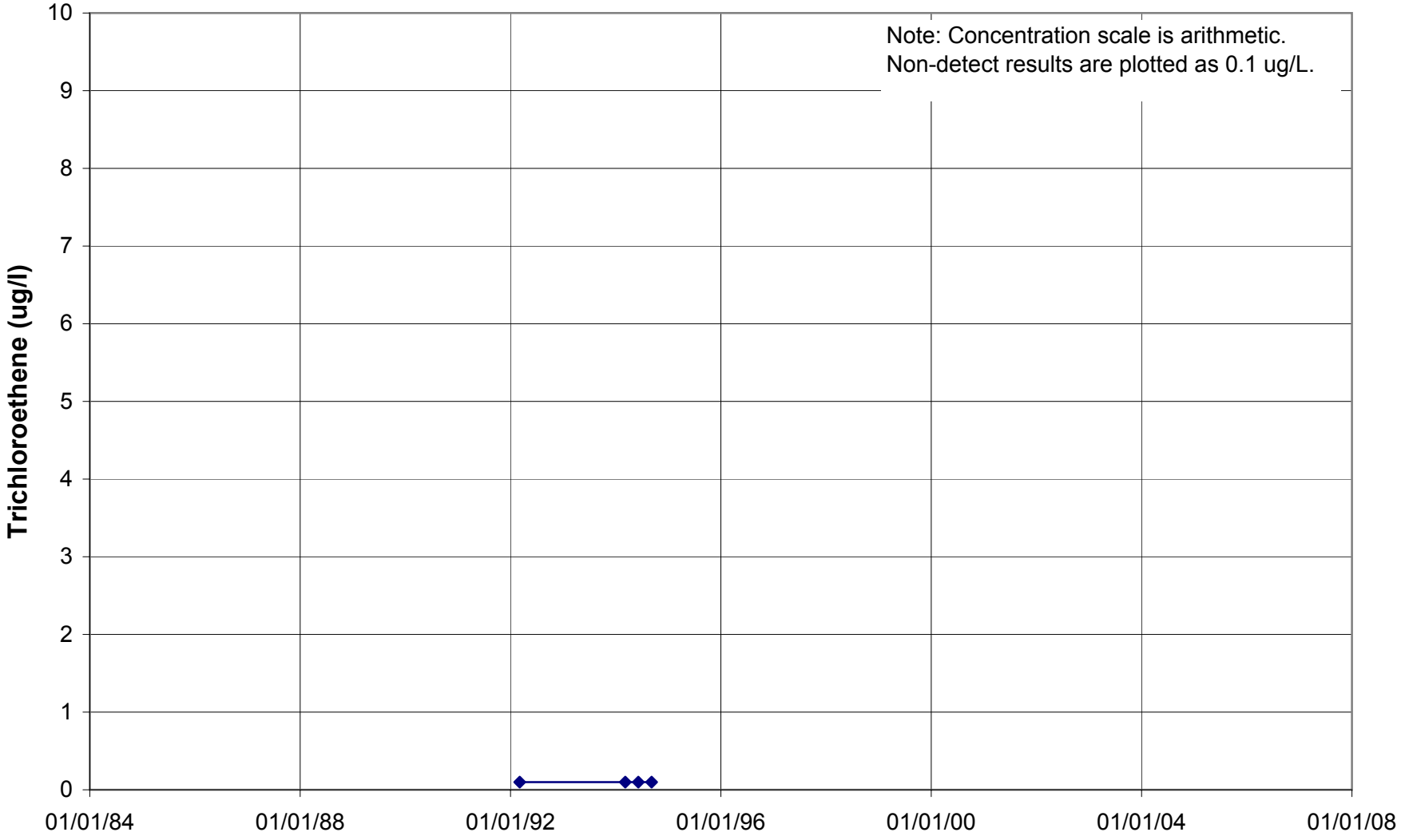
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U103



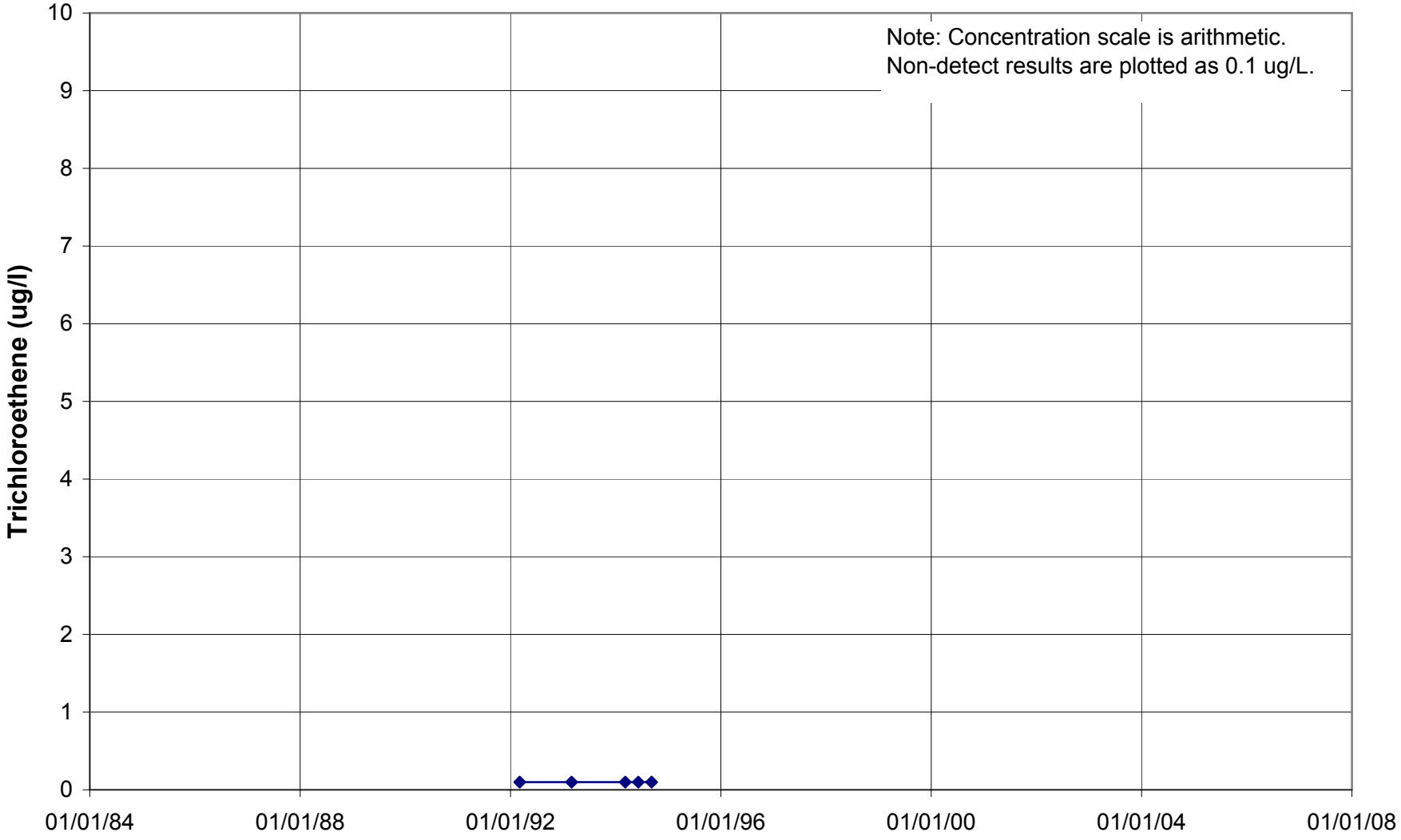
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U104



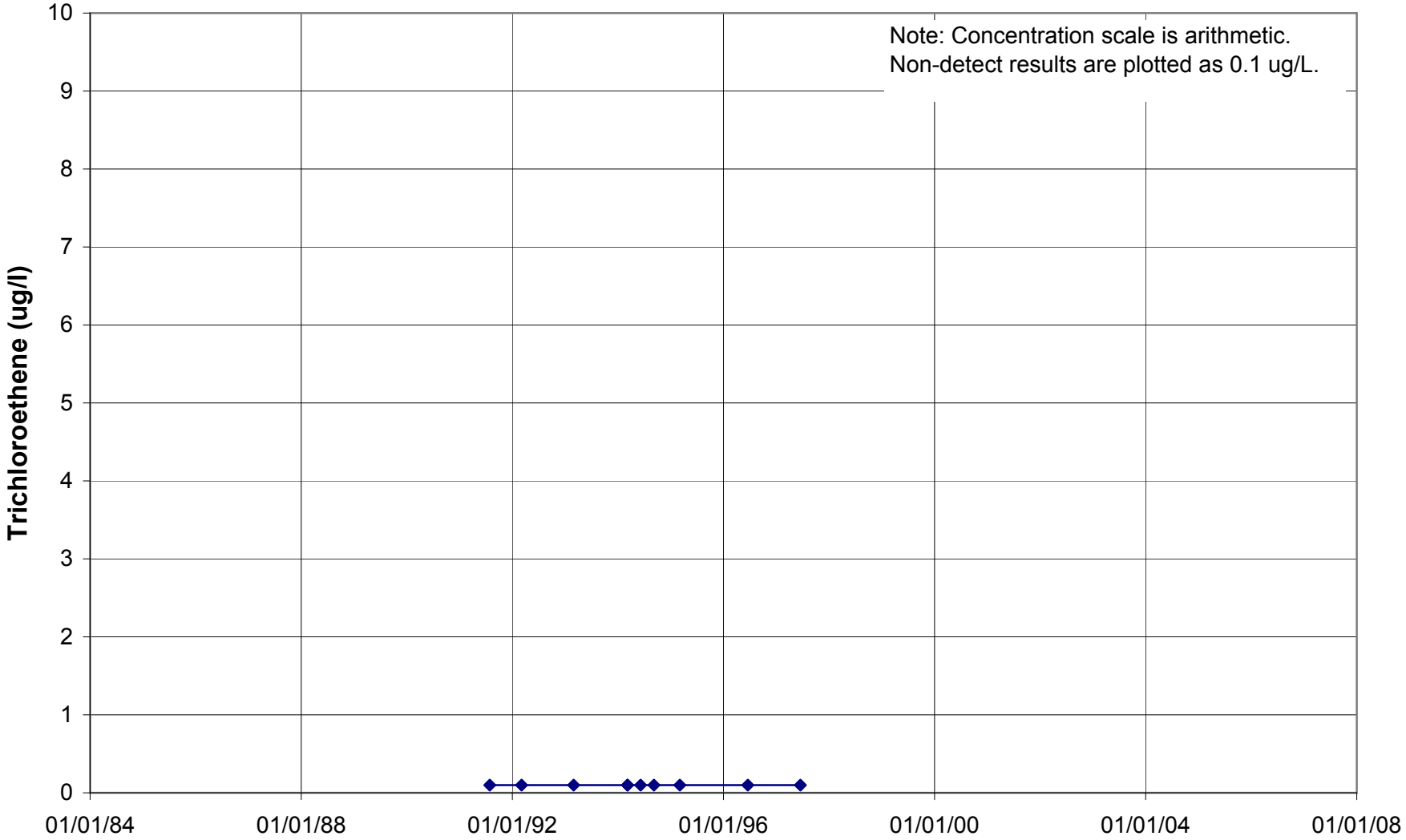
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U105



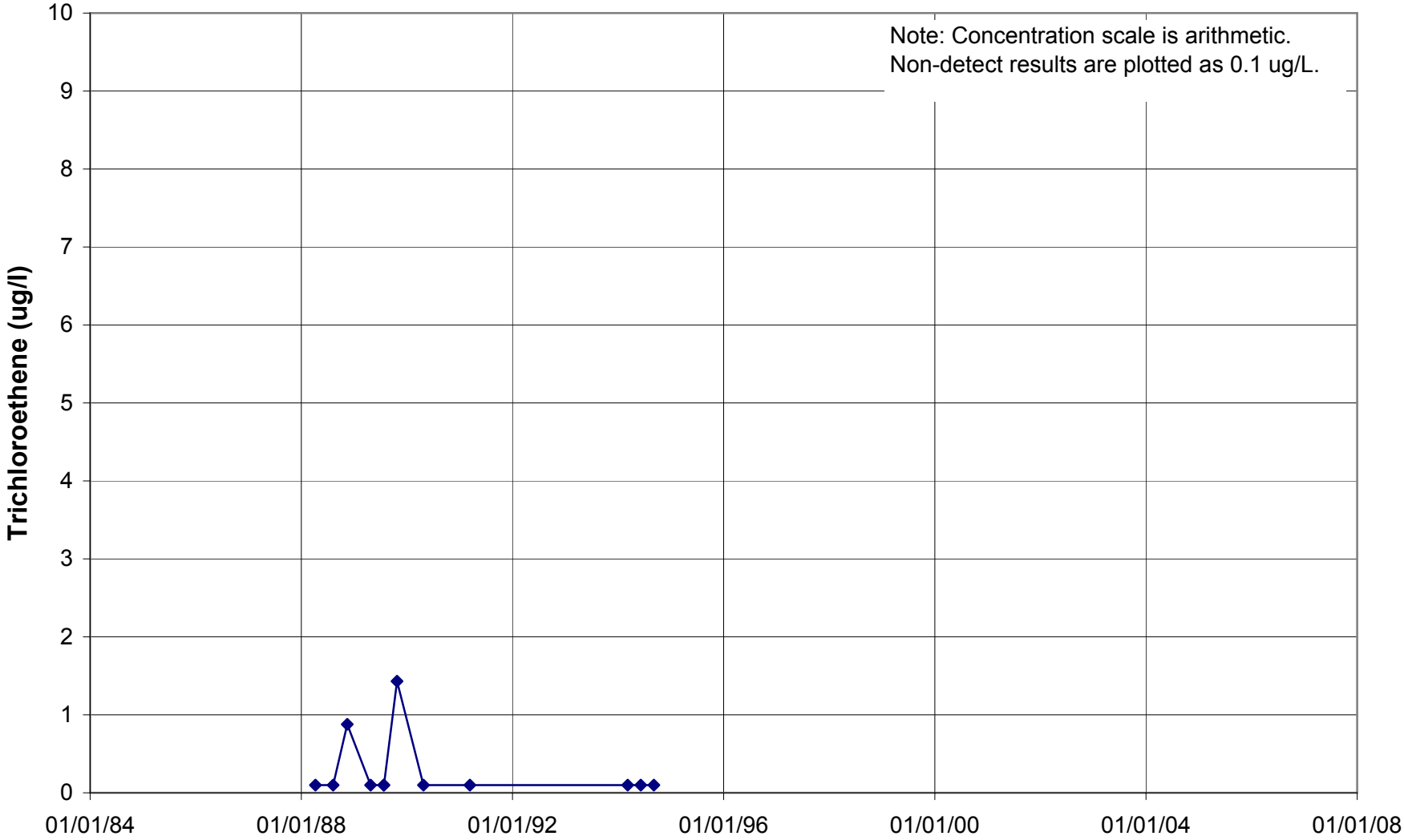
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U106



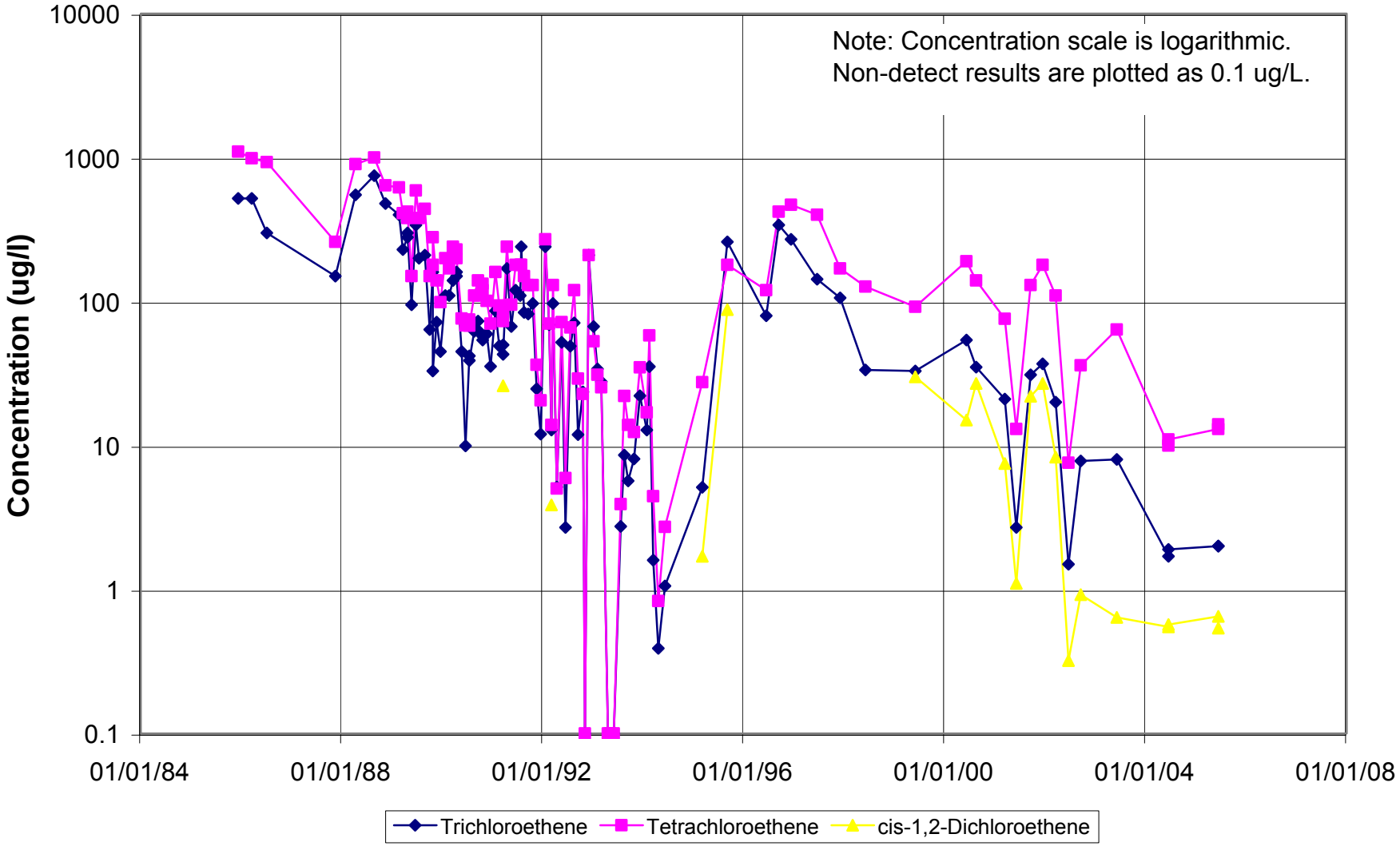
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U107



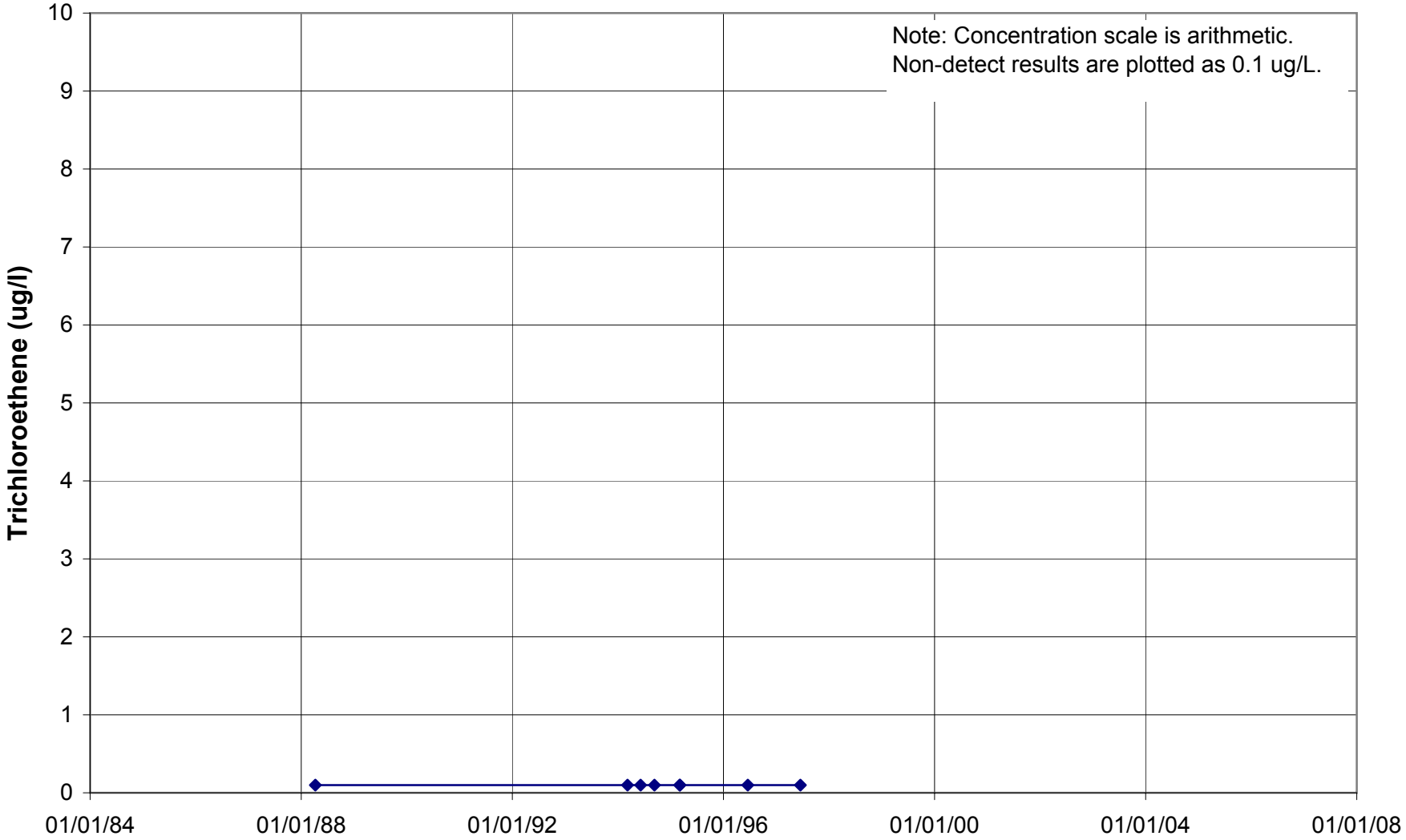
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U108



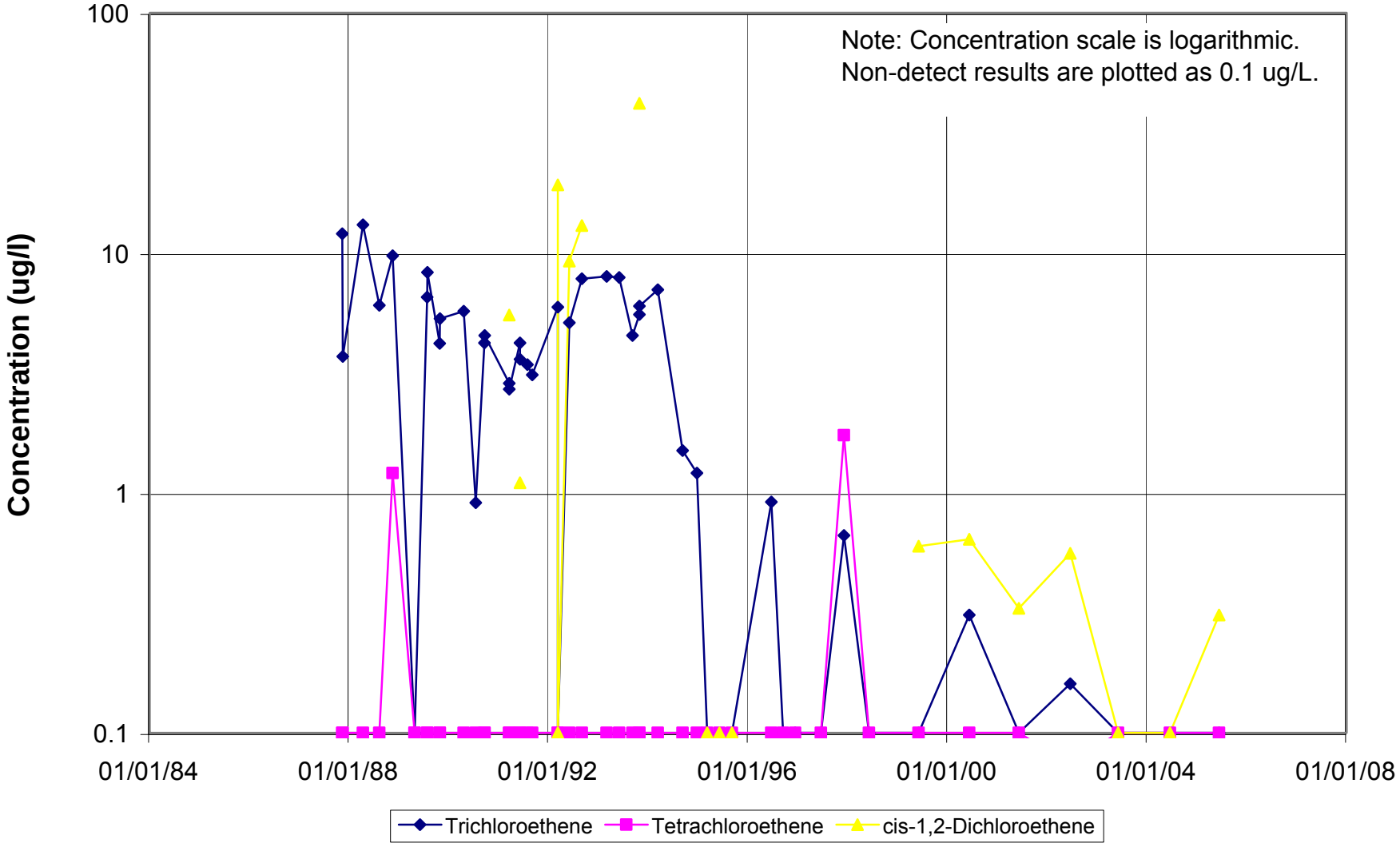
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U110



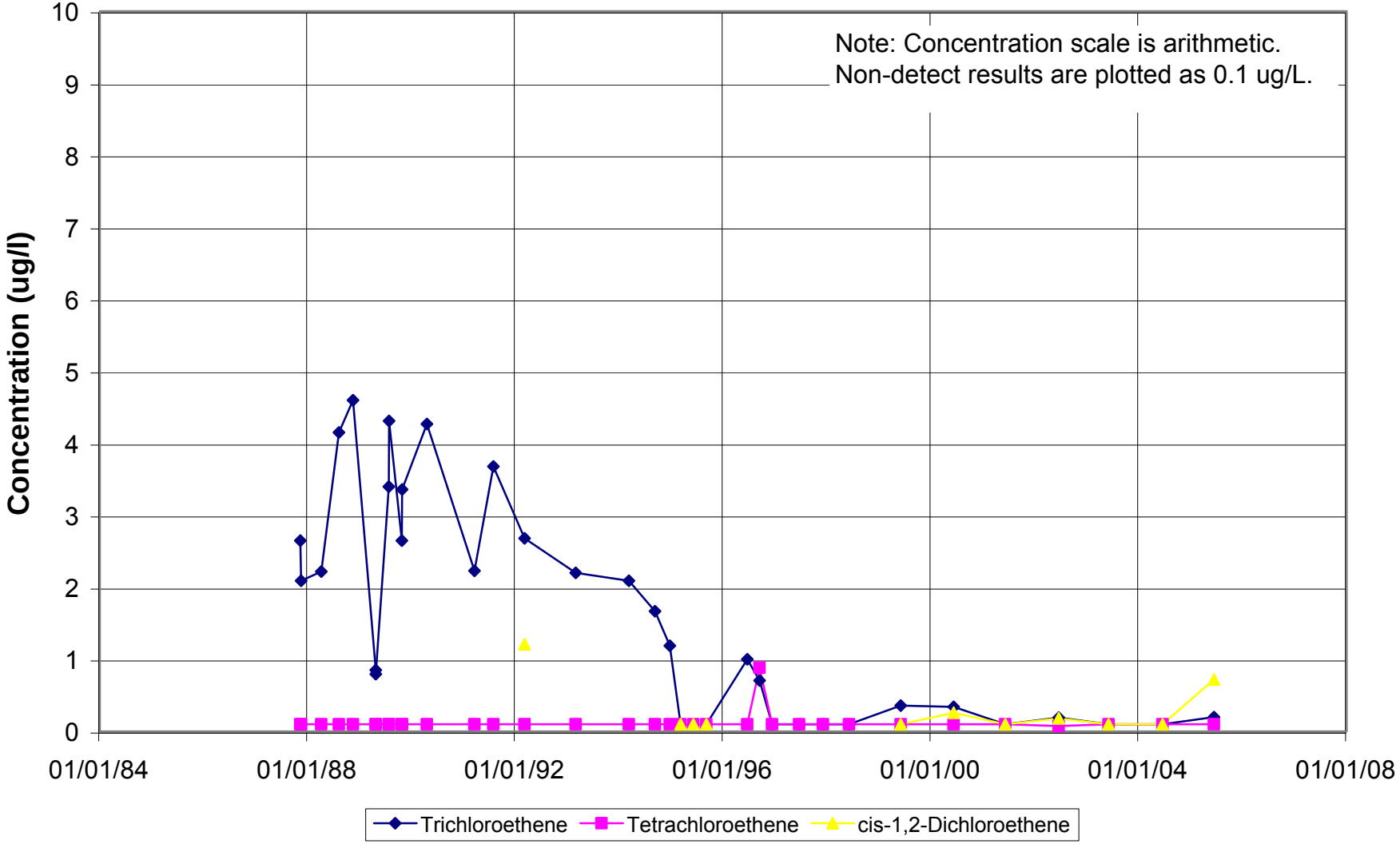
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U115



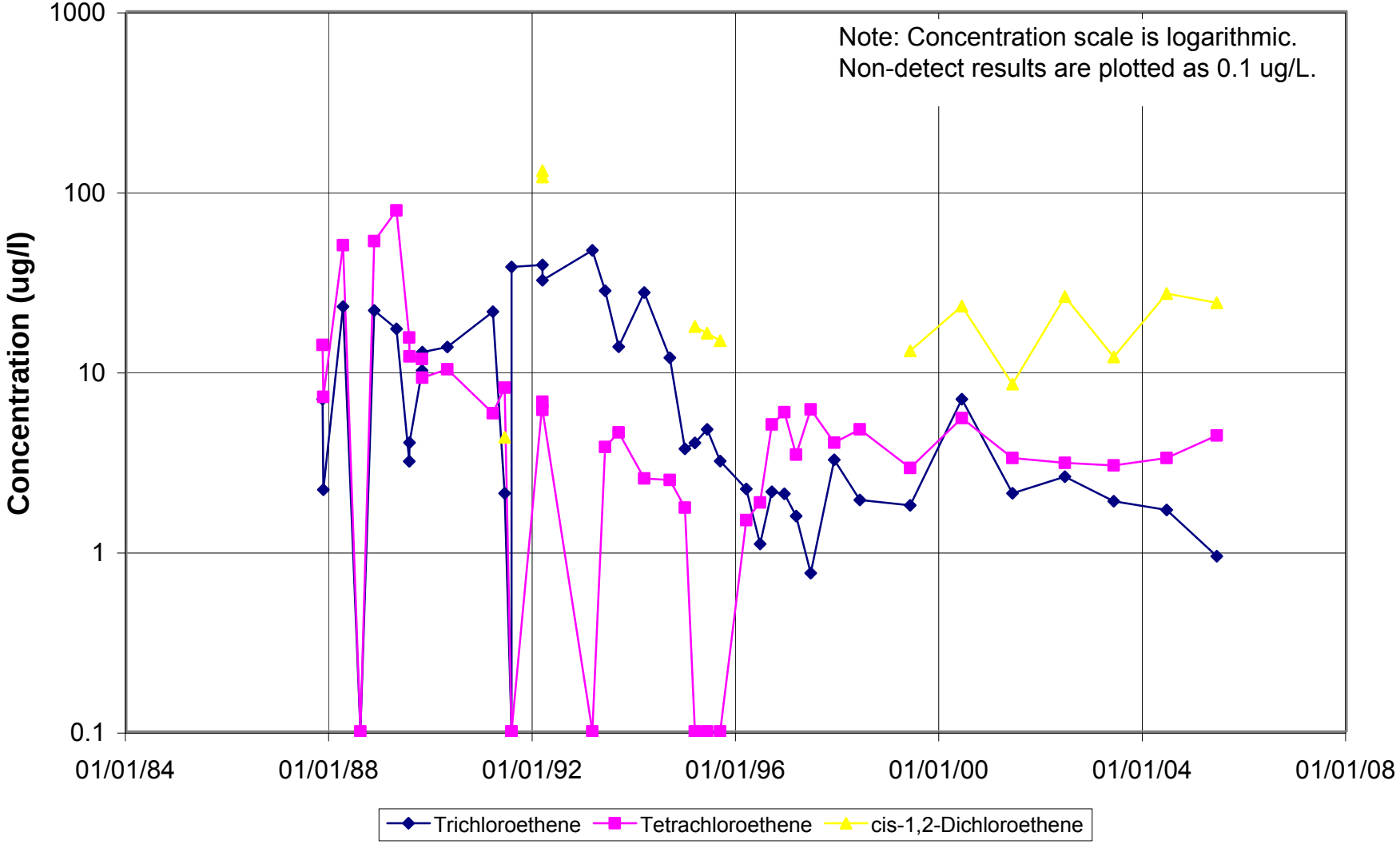
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U116



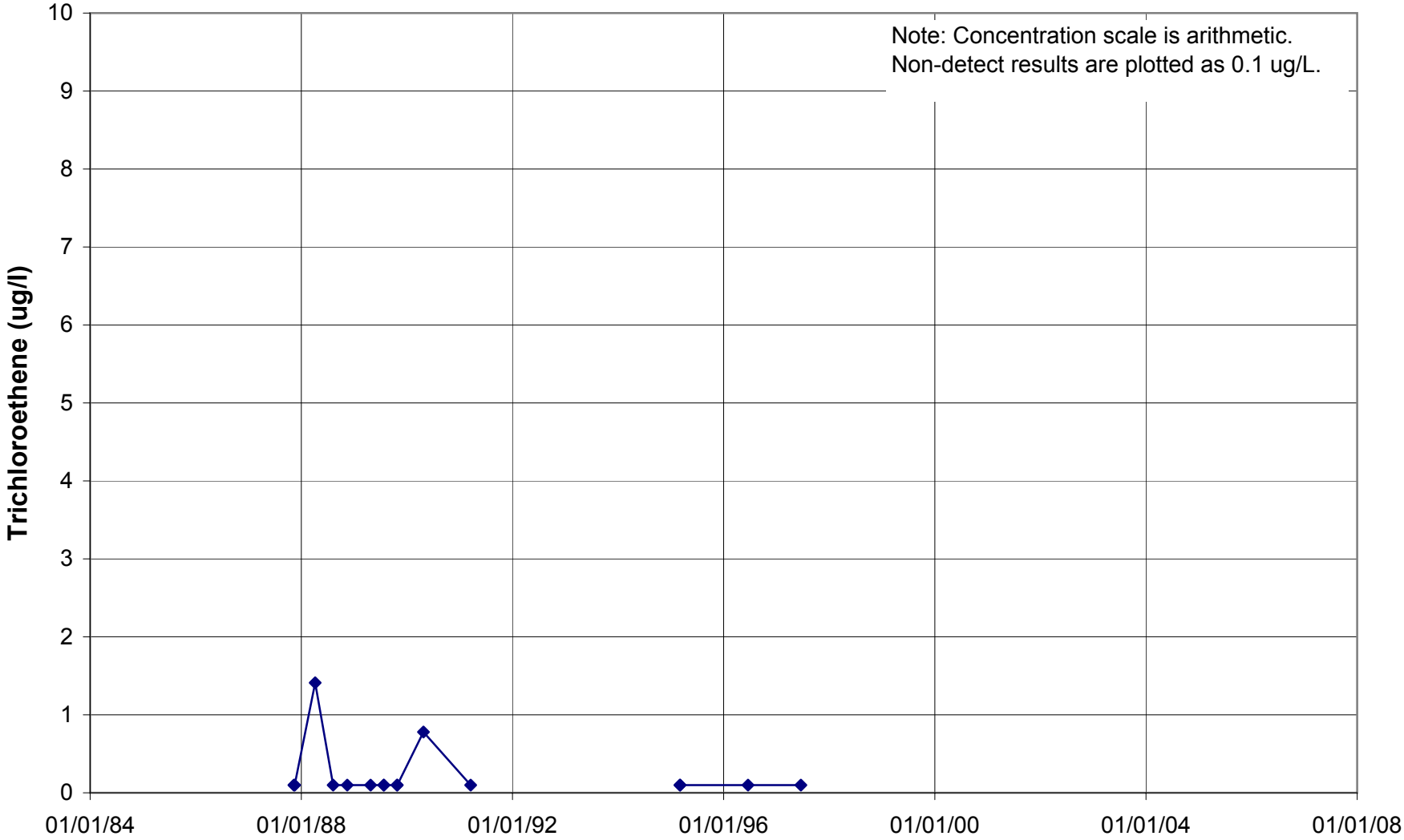
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U117



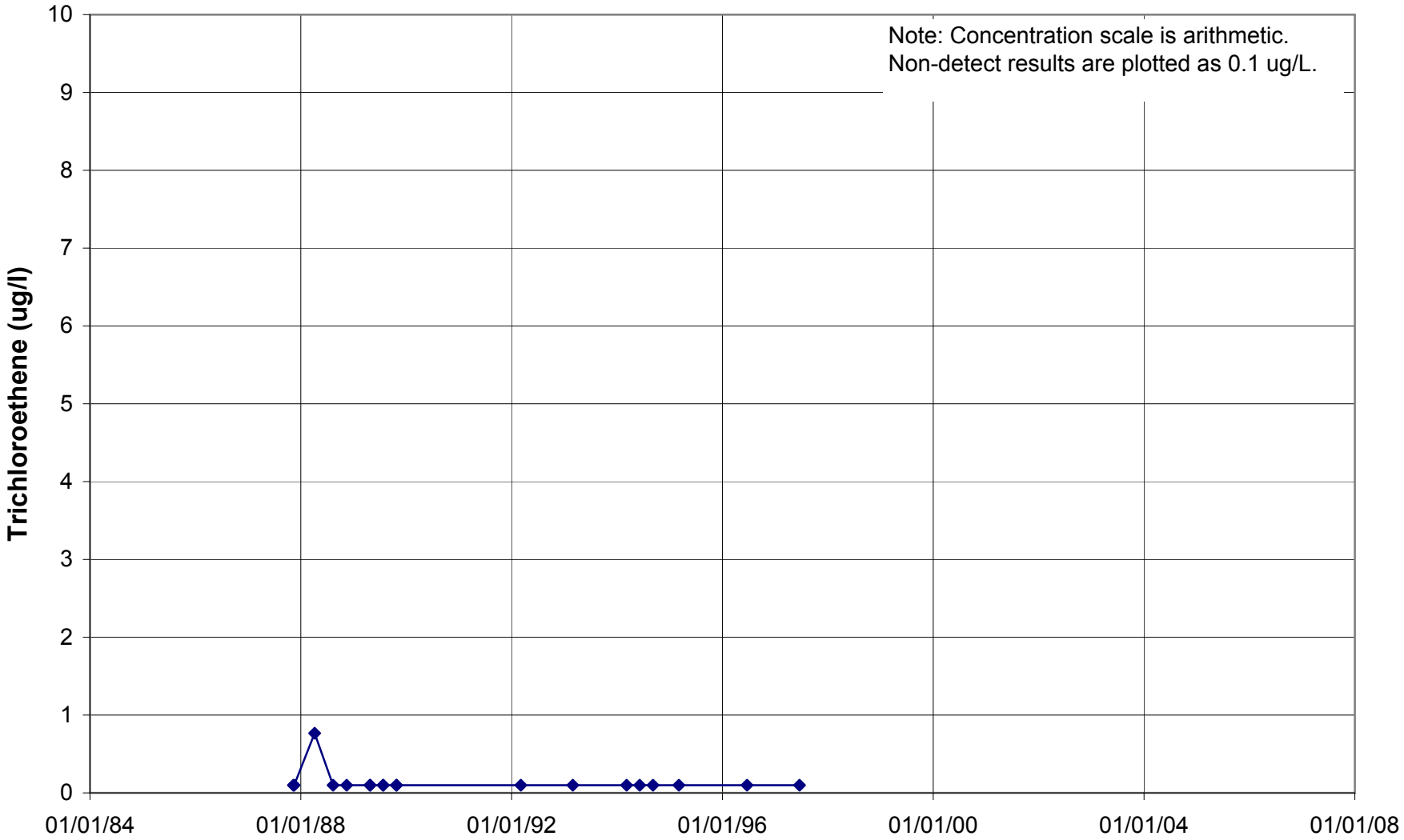
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U118



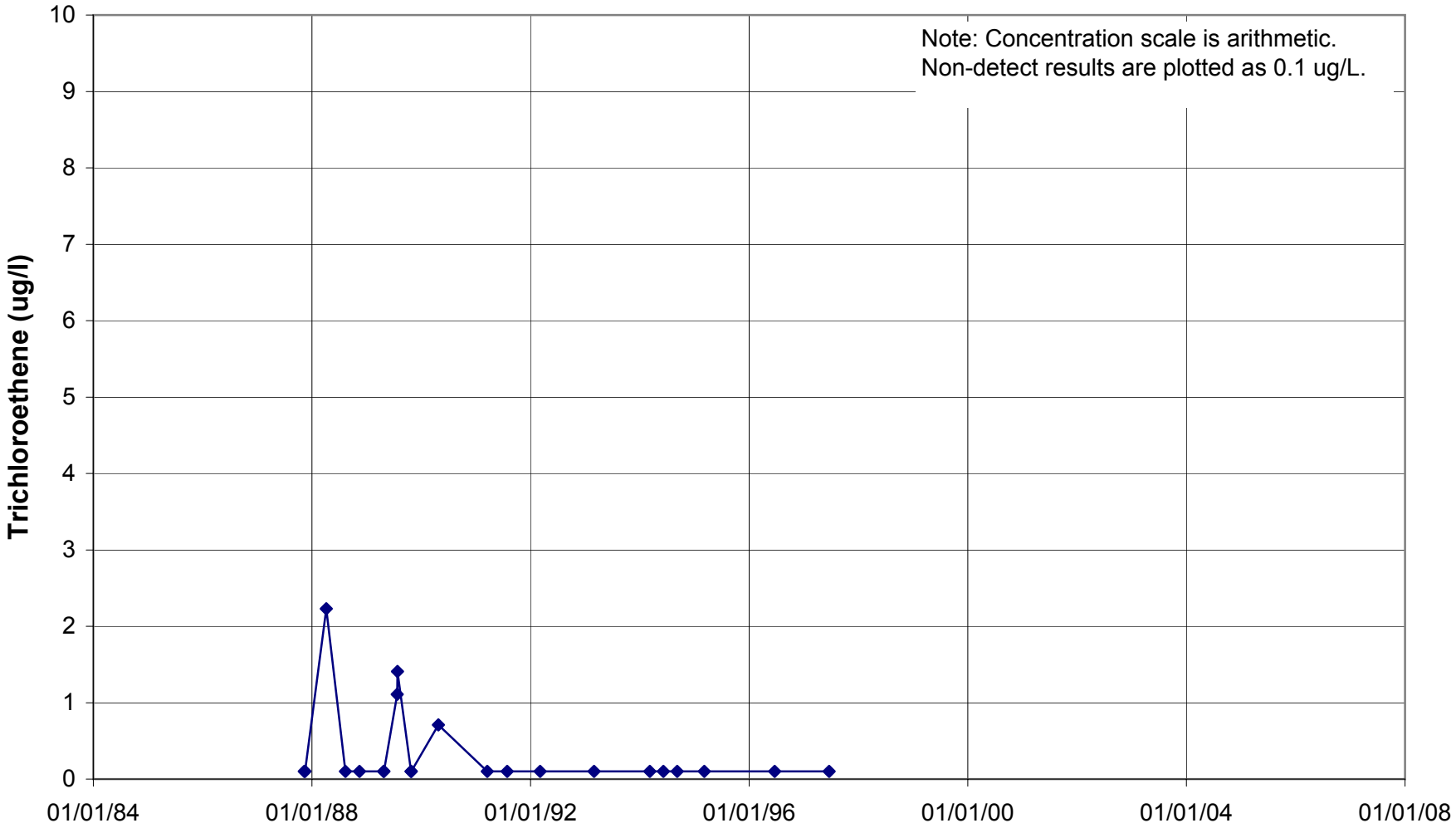
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U119



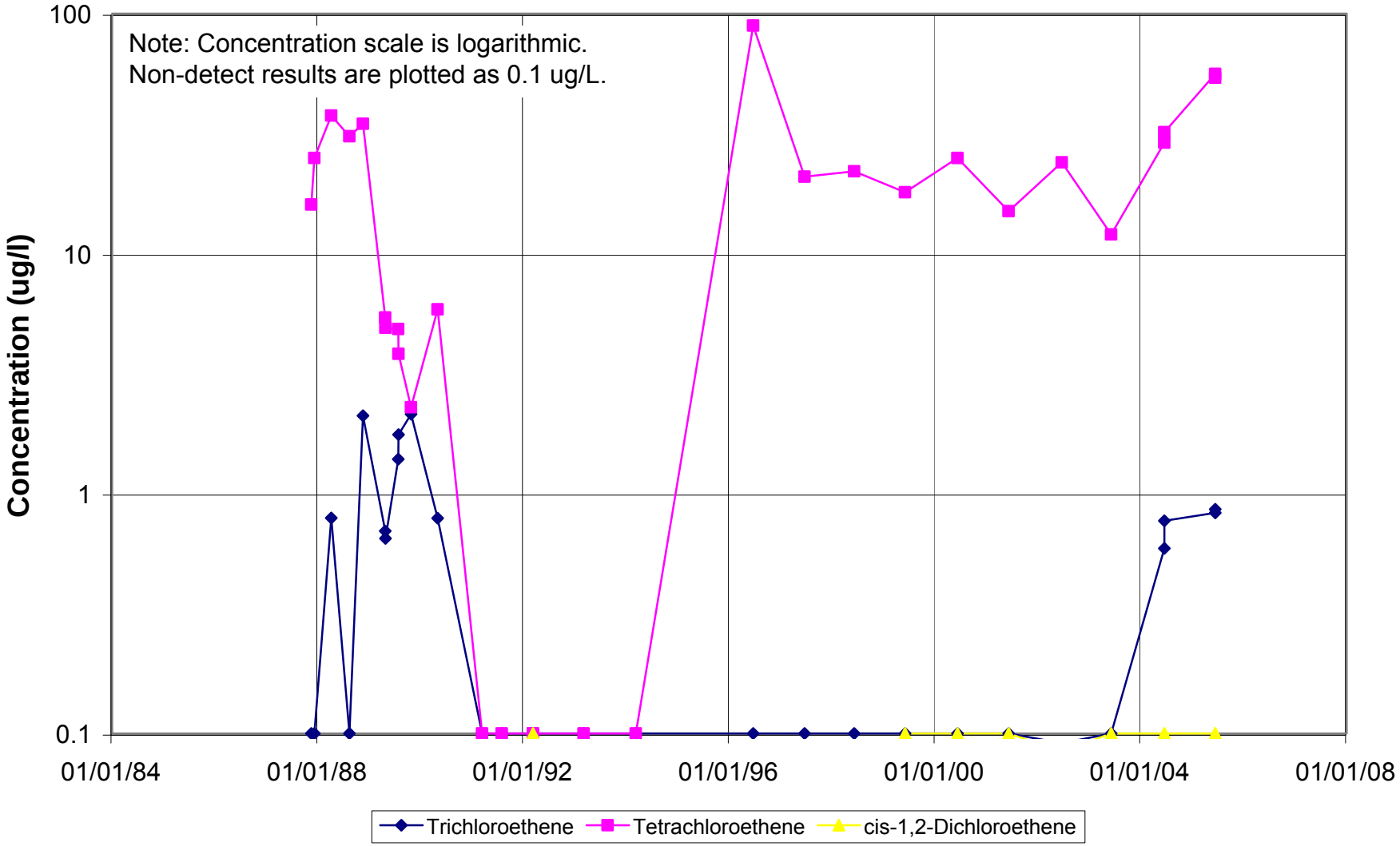
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U120



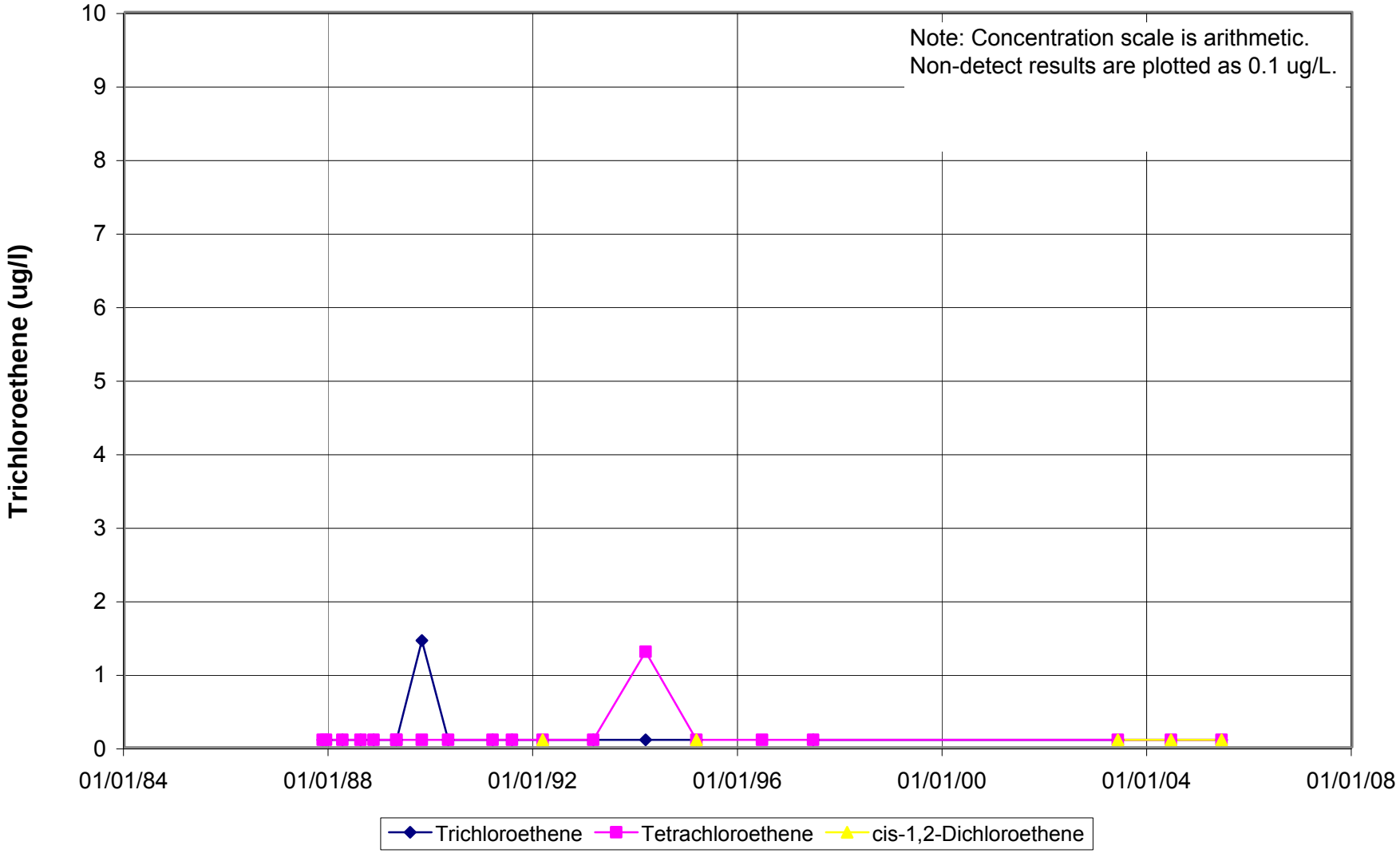
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U126



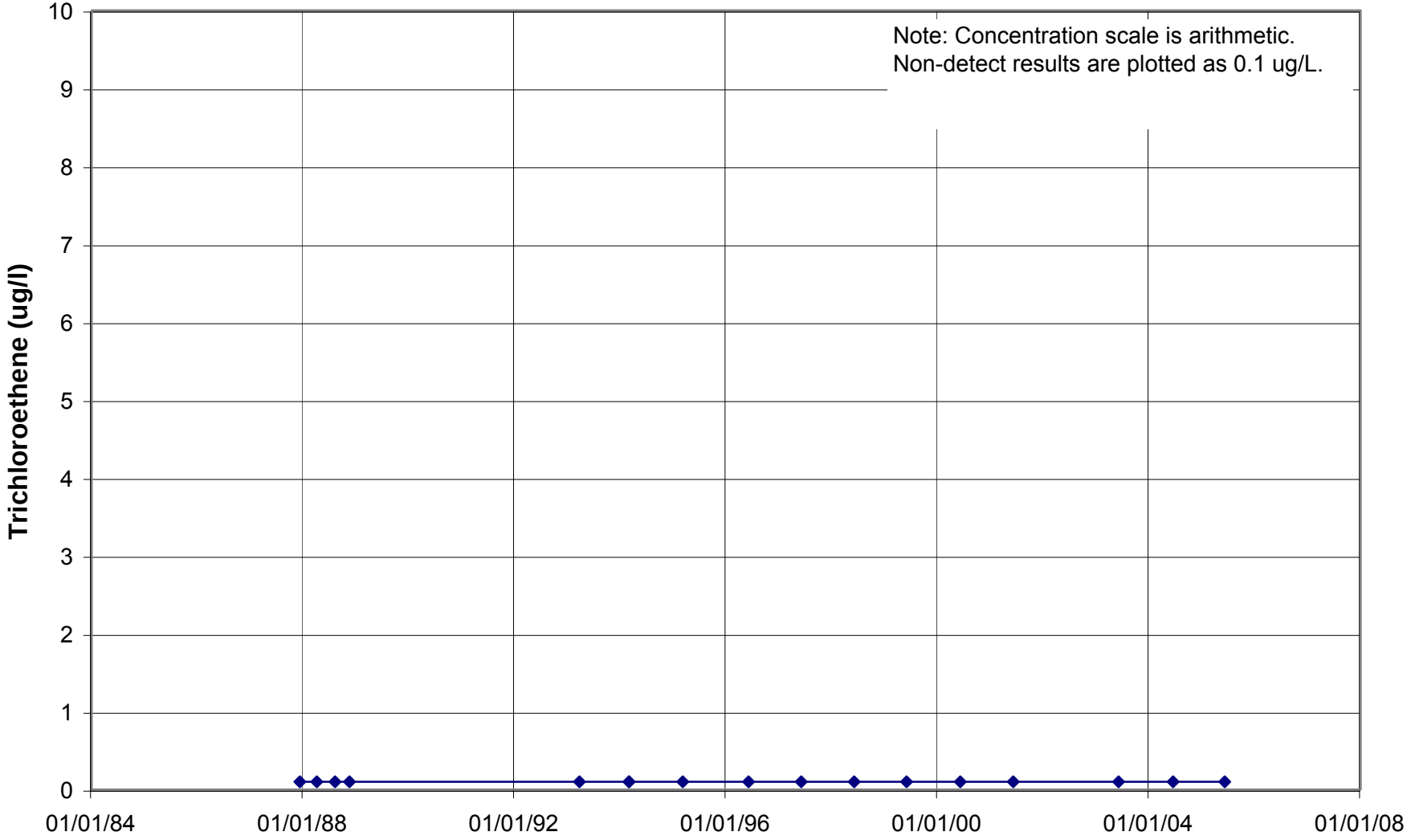
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U127



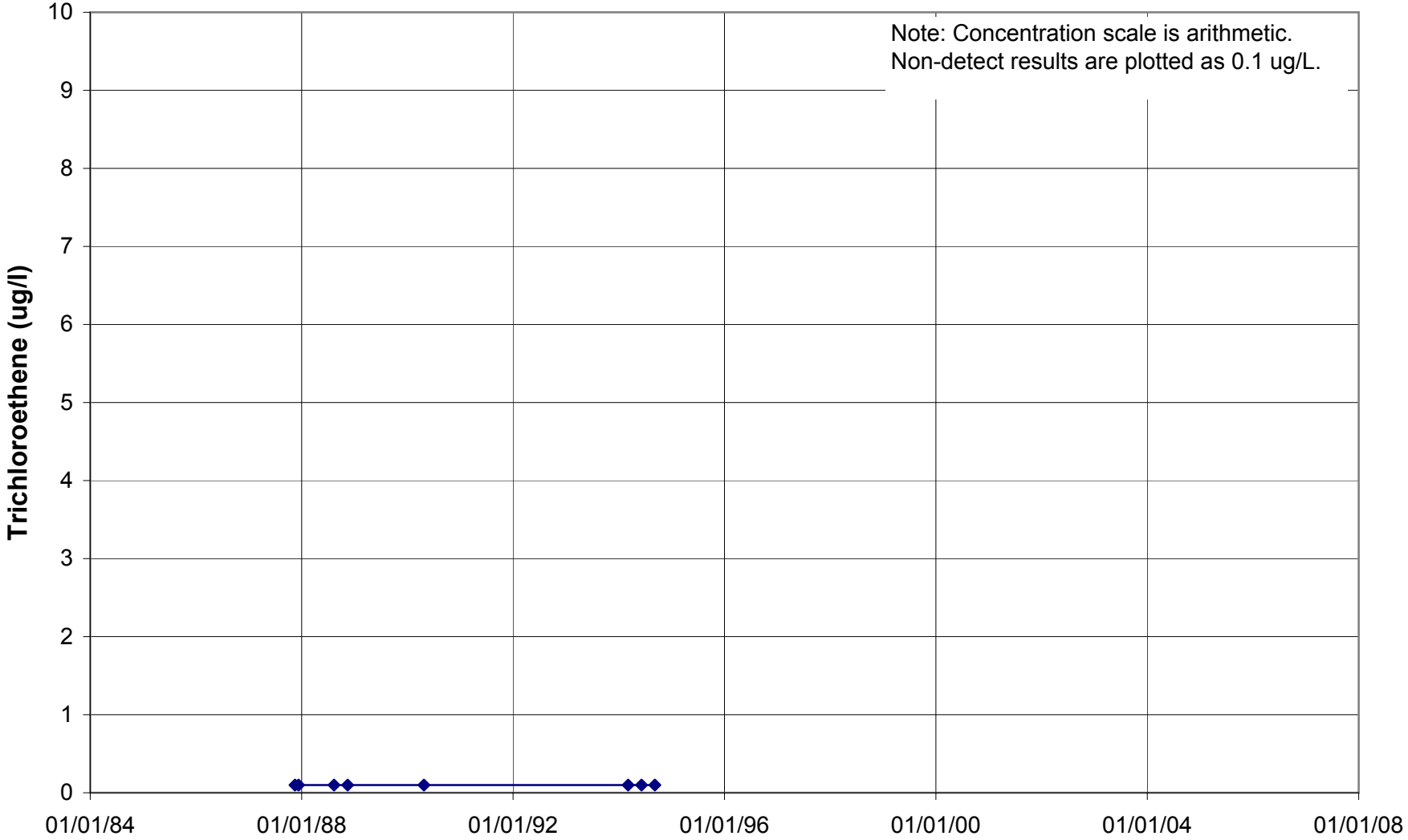
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U128



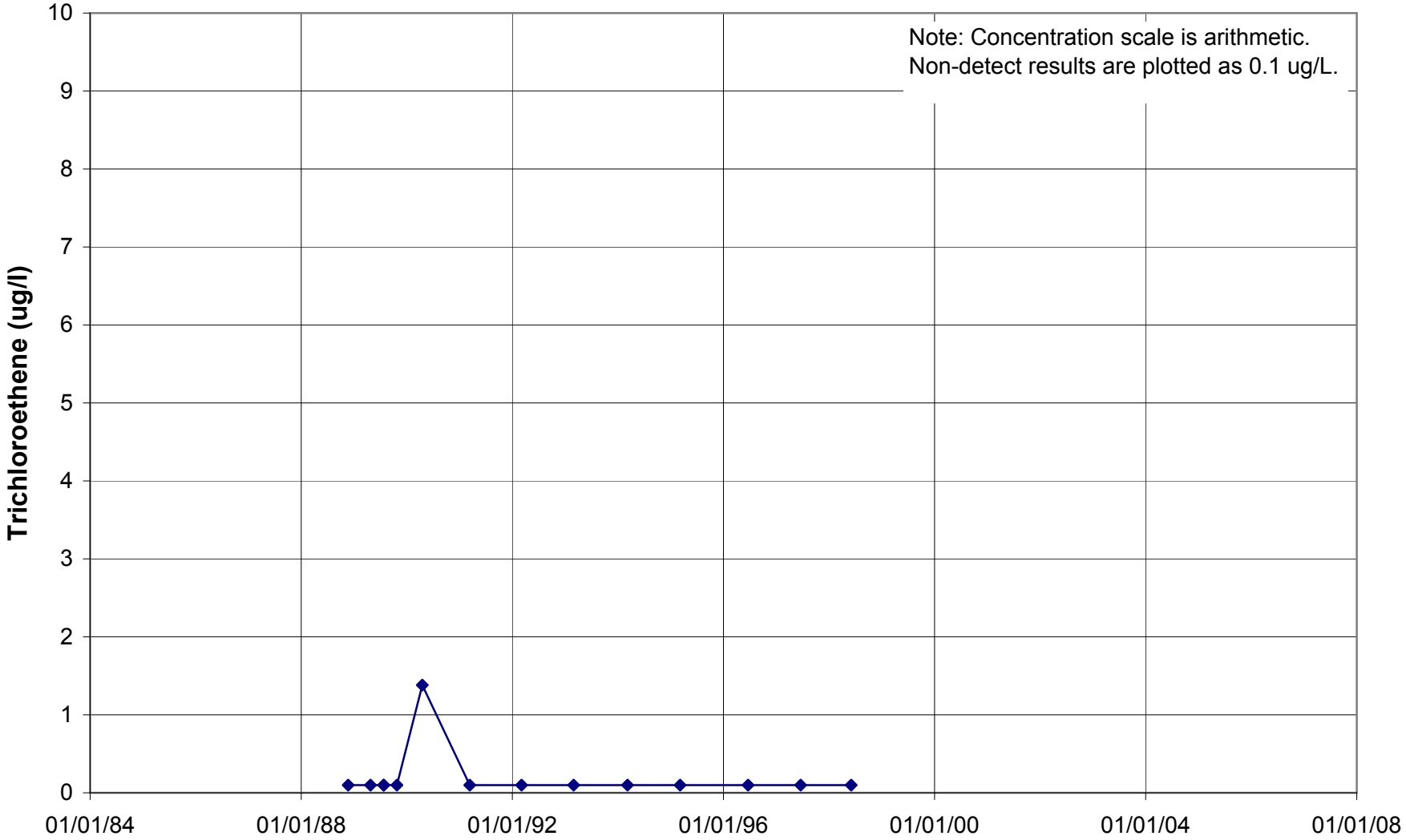
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U133



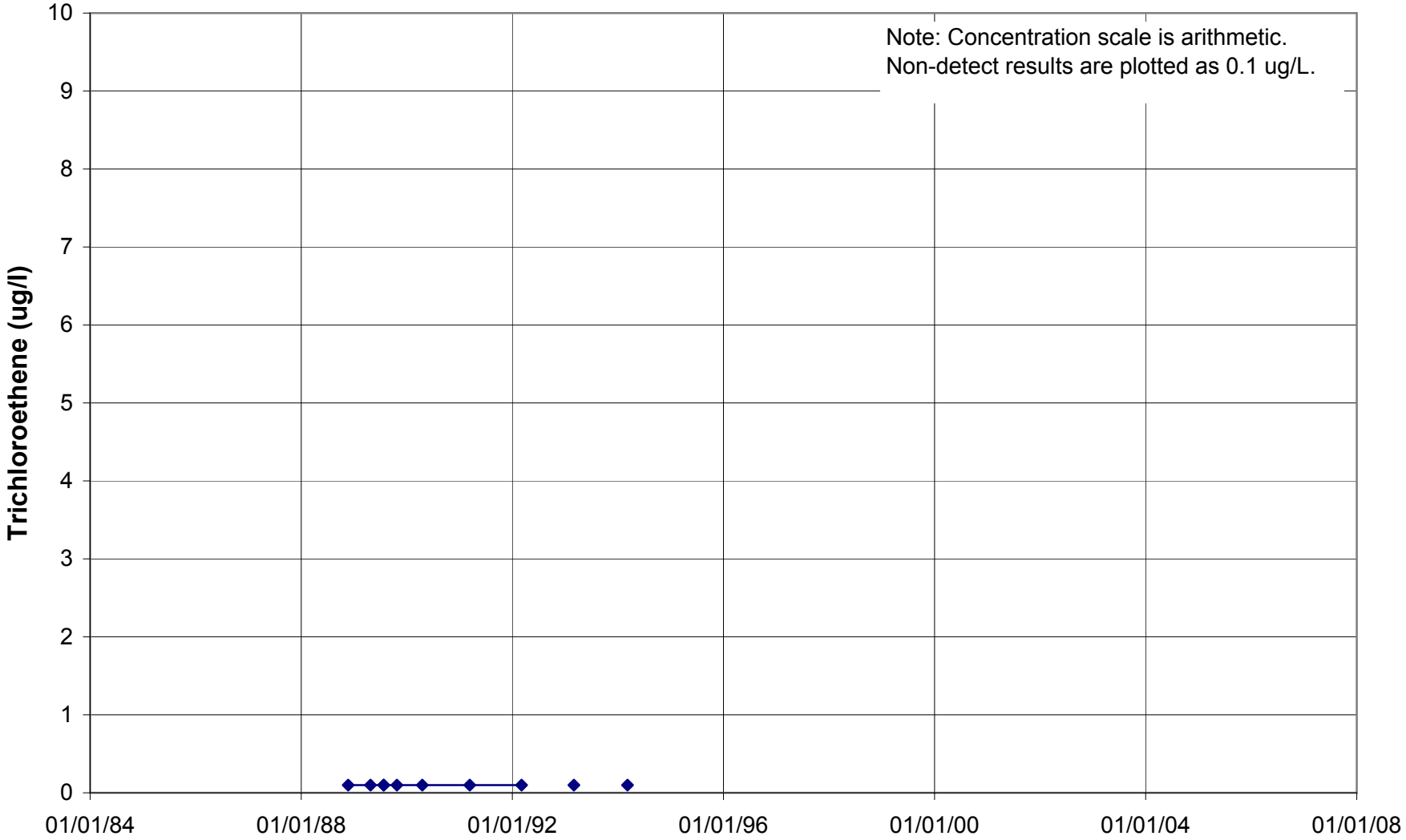
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U135



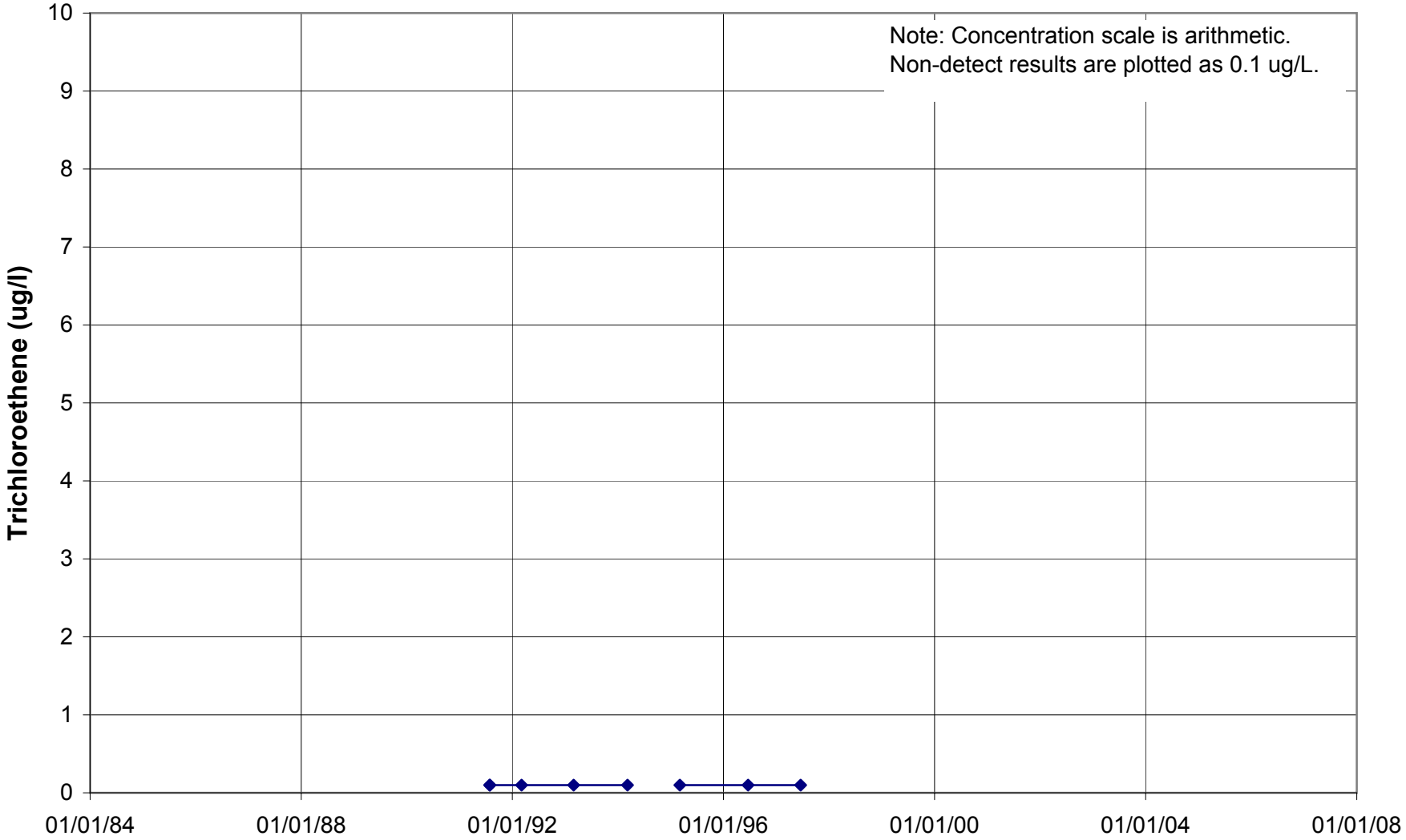
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U136



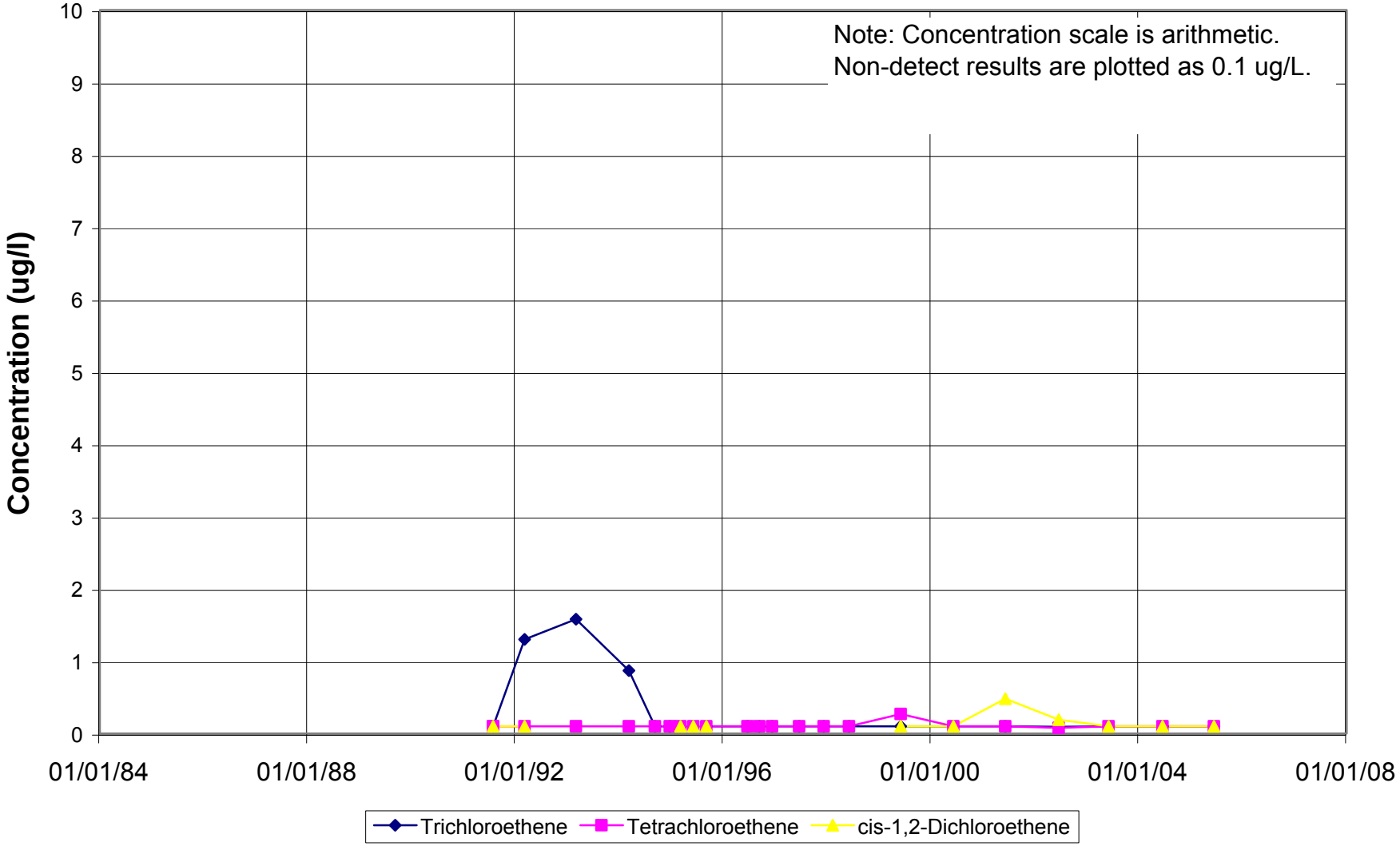
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U137



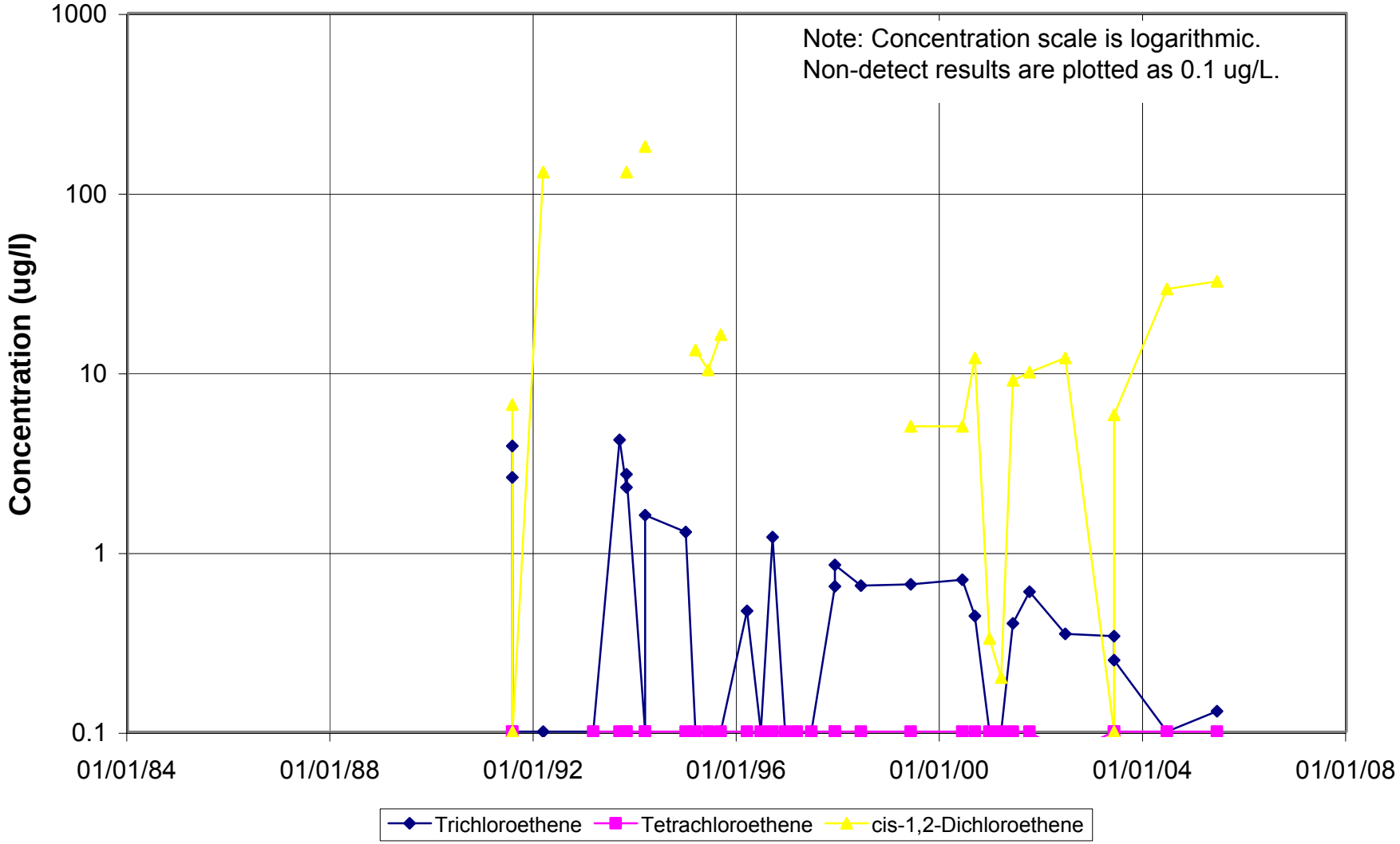
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U138



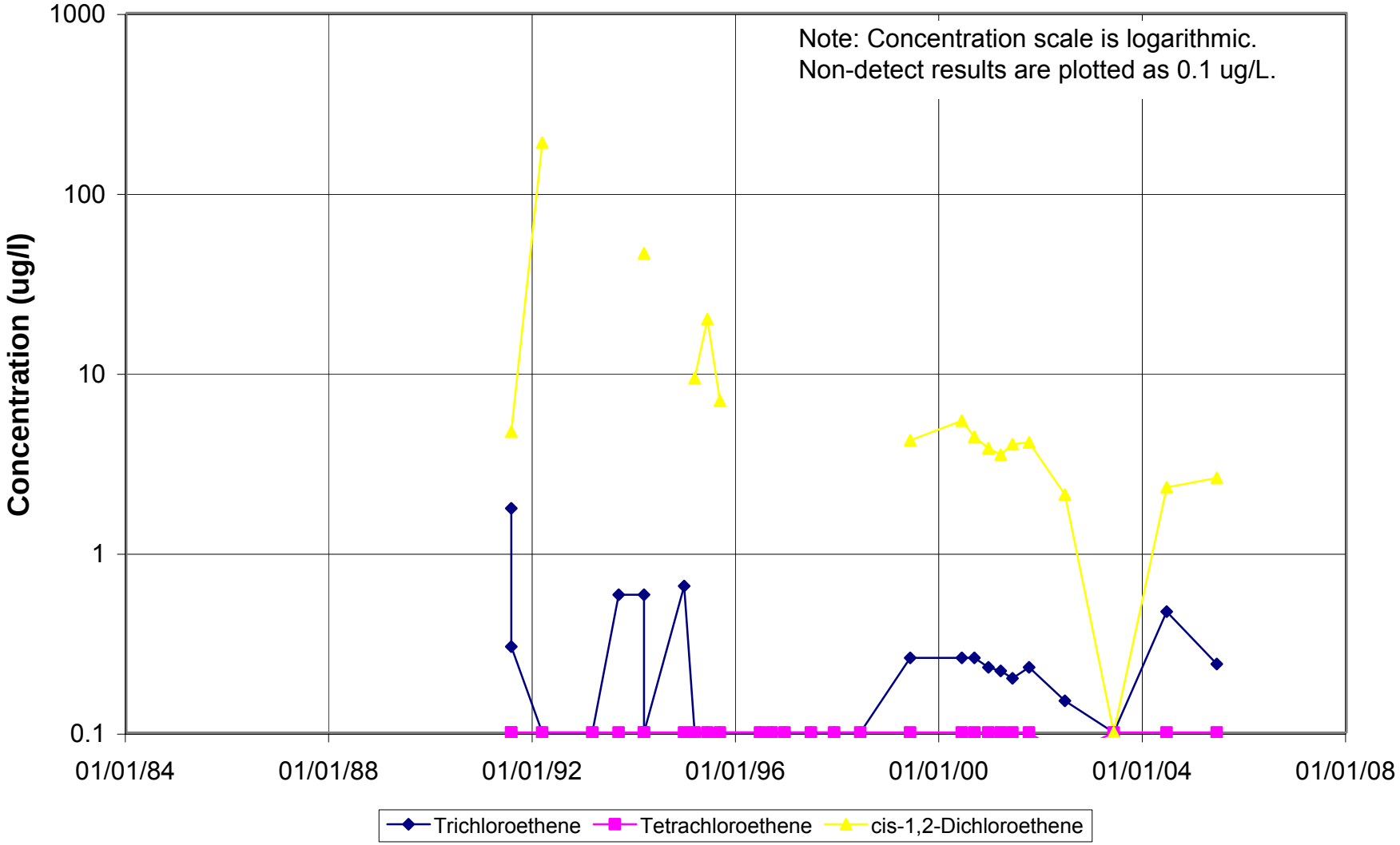
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U139



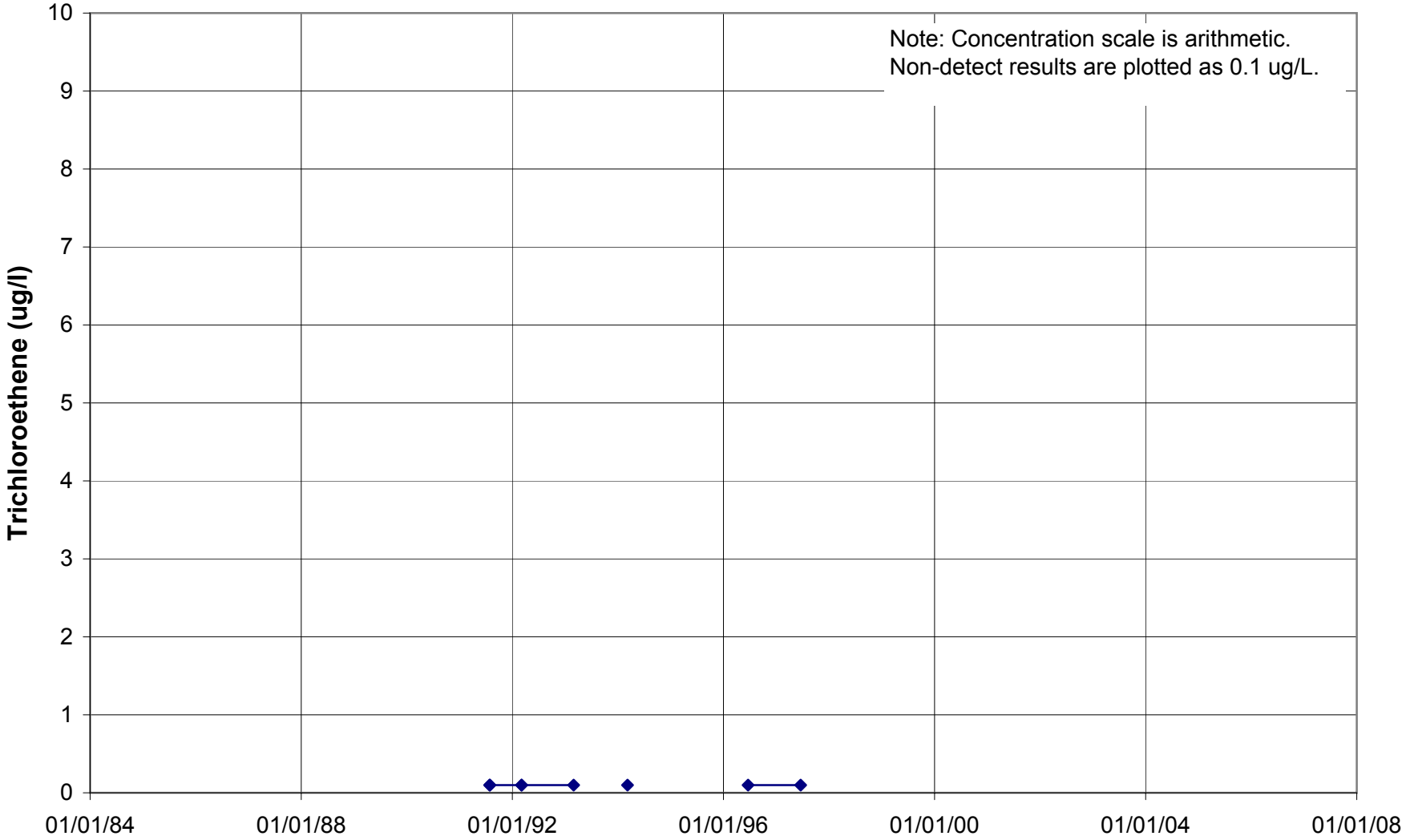
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U140



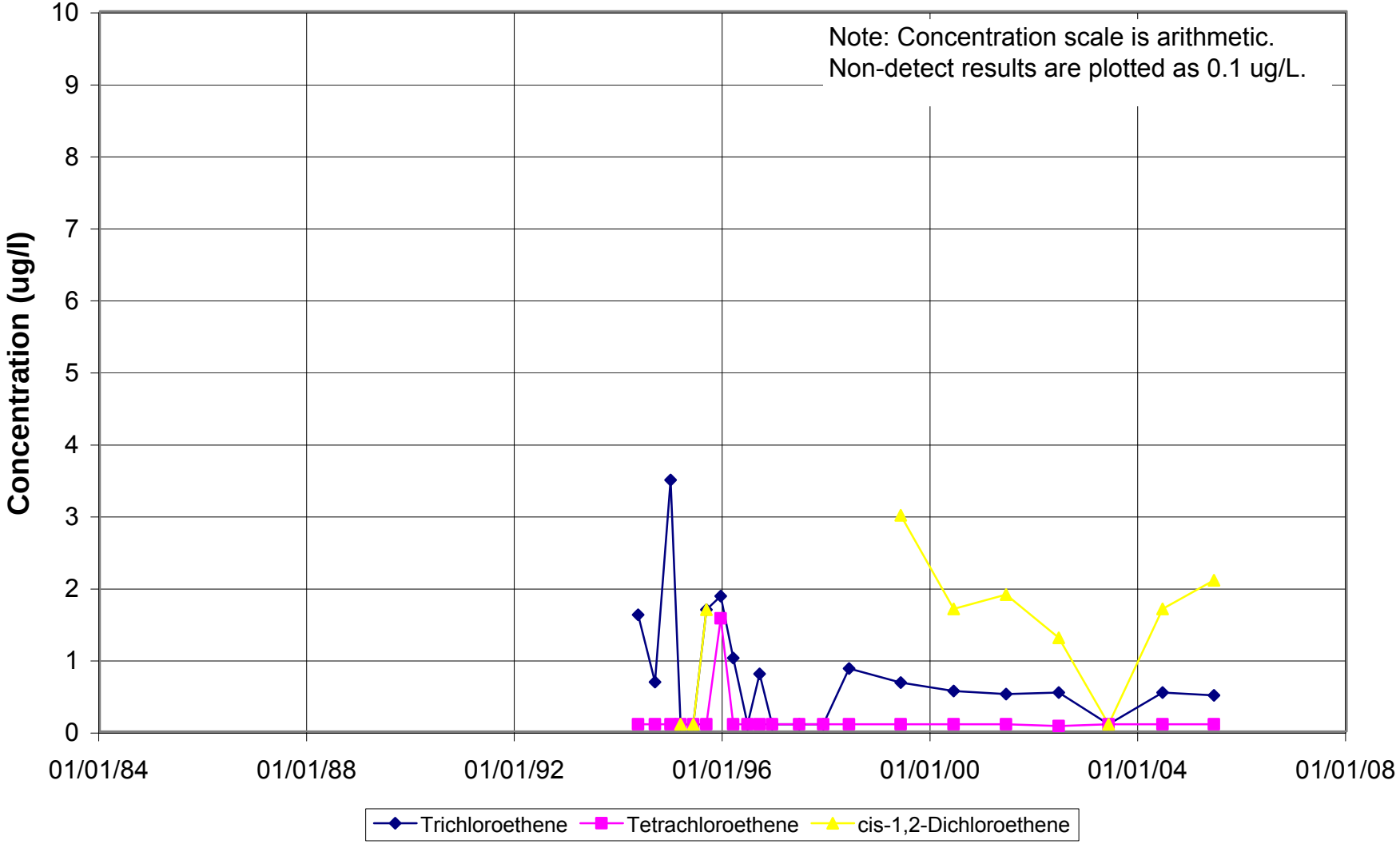
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U141



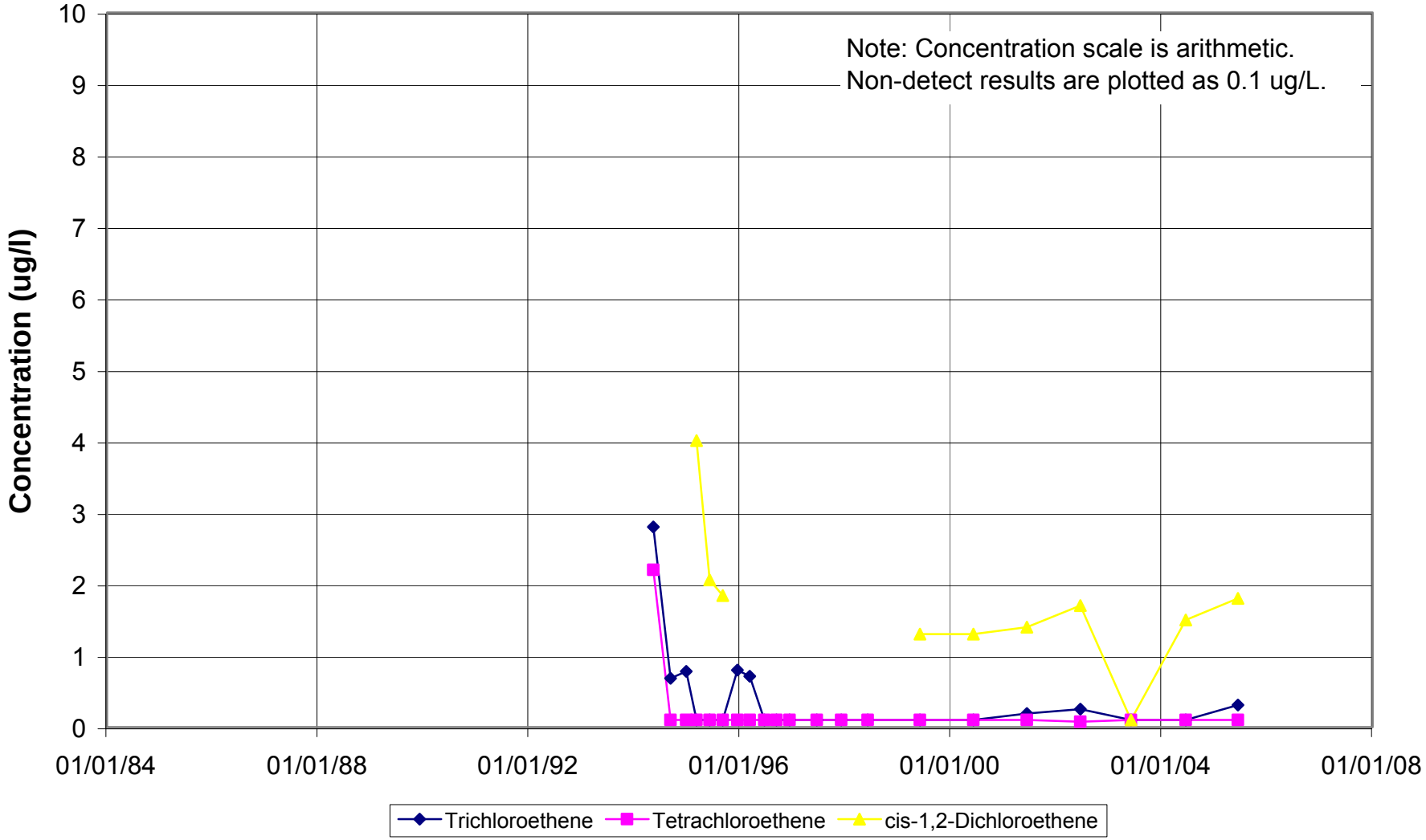
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U157



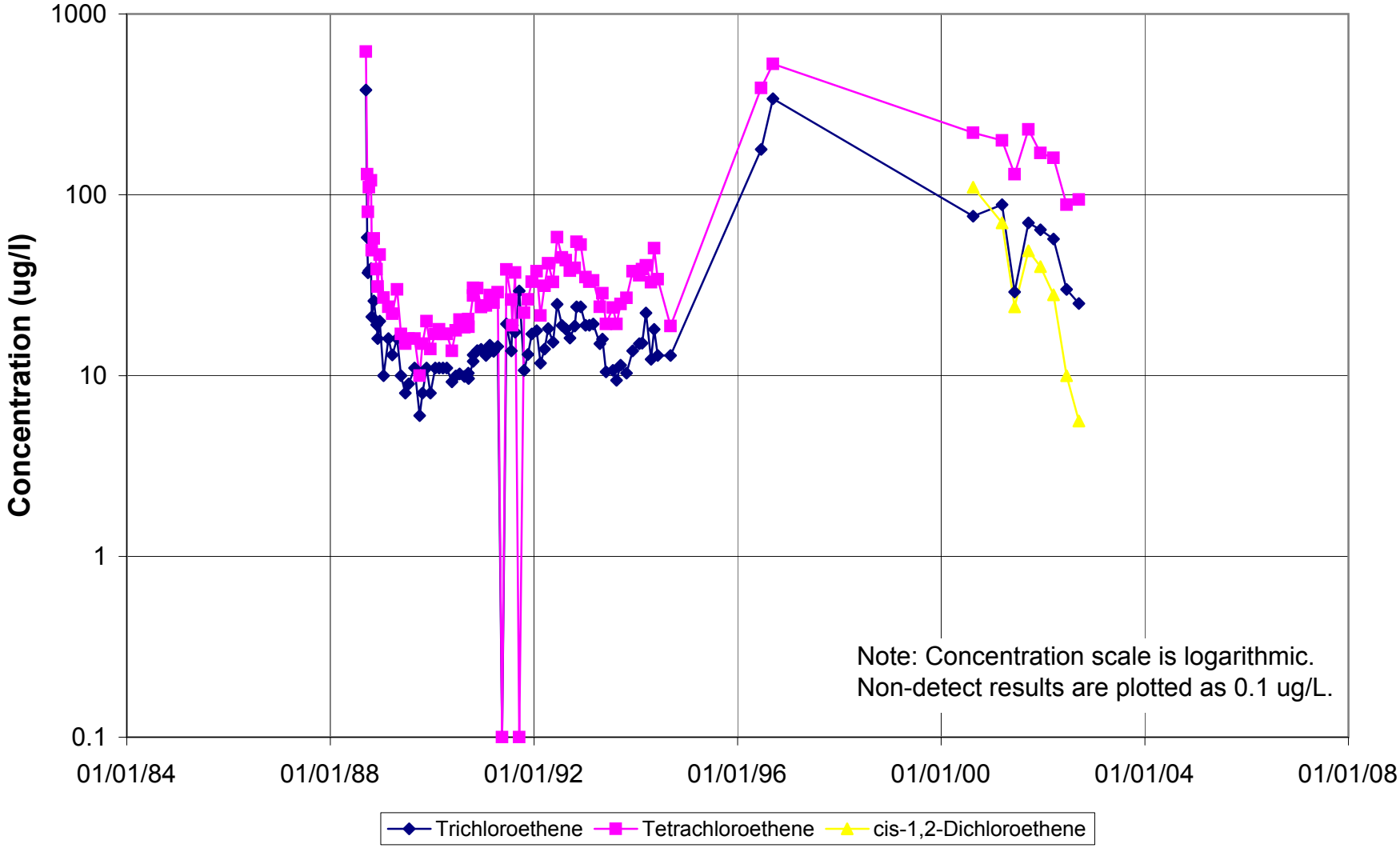
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U158



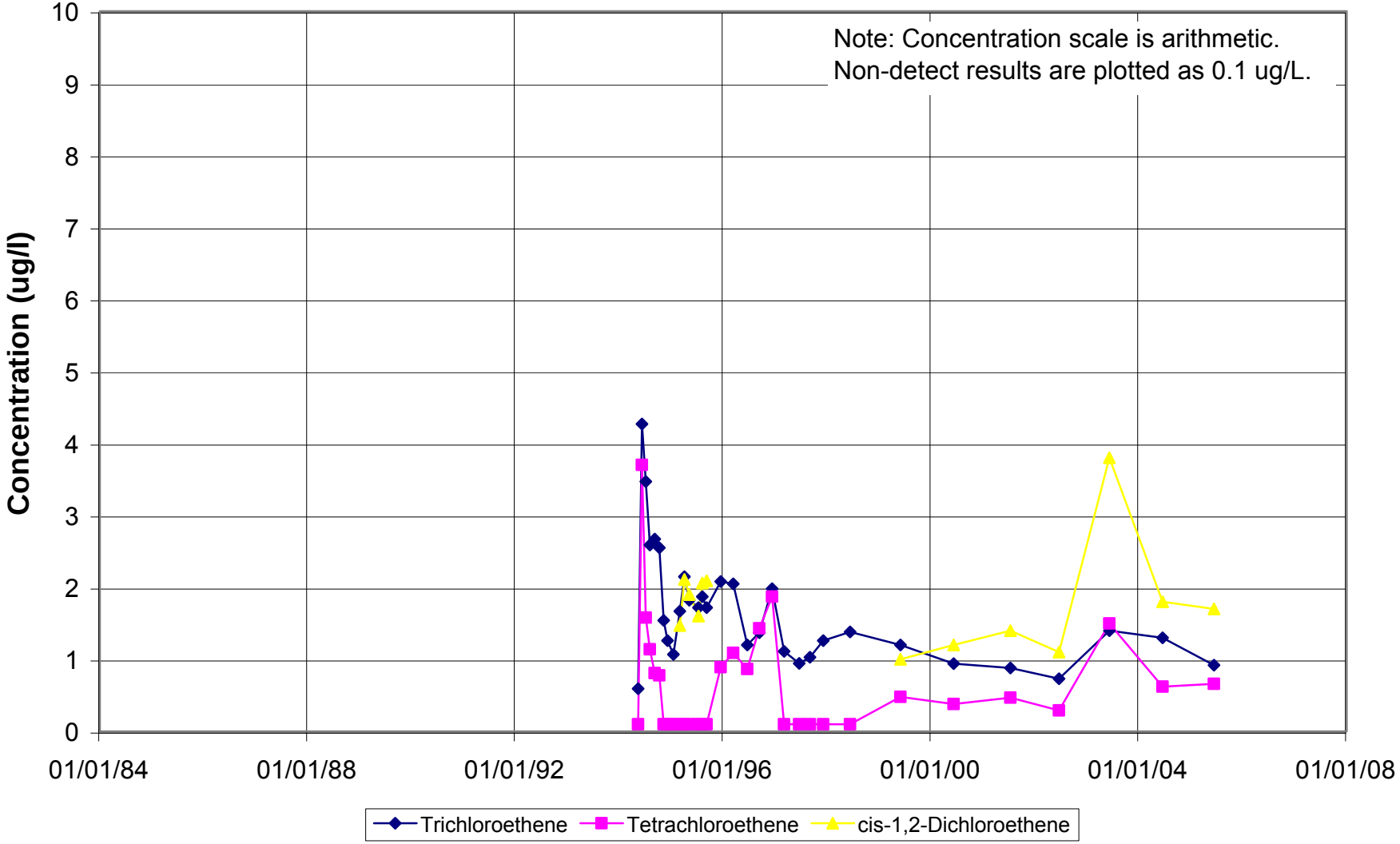
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U350



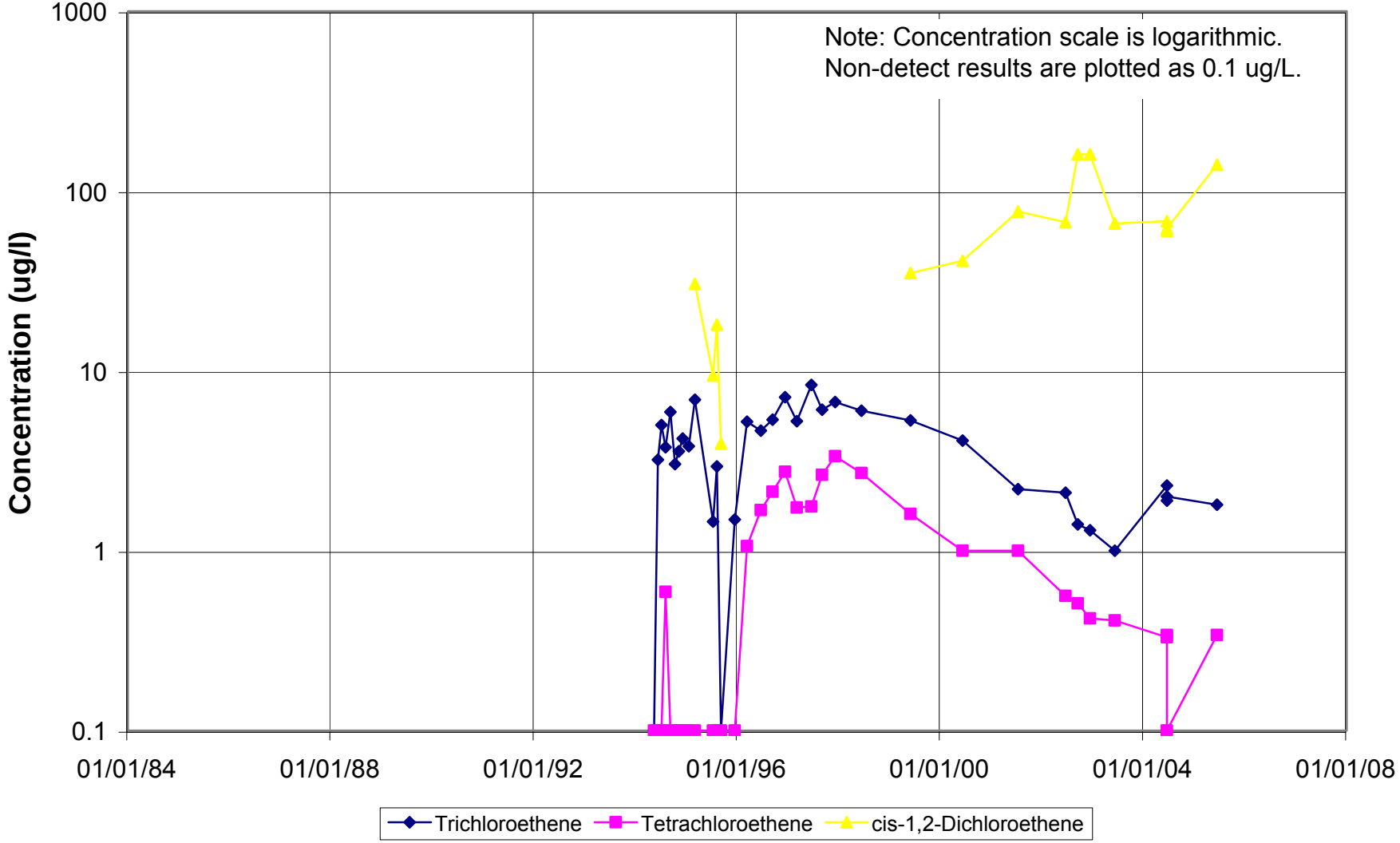
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U351 (EW-1)



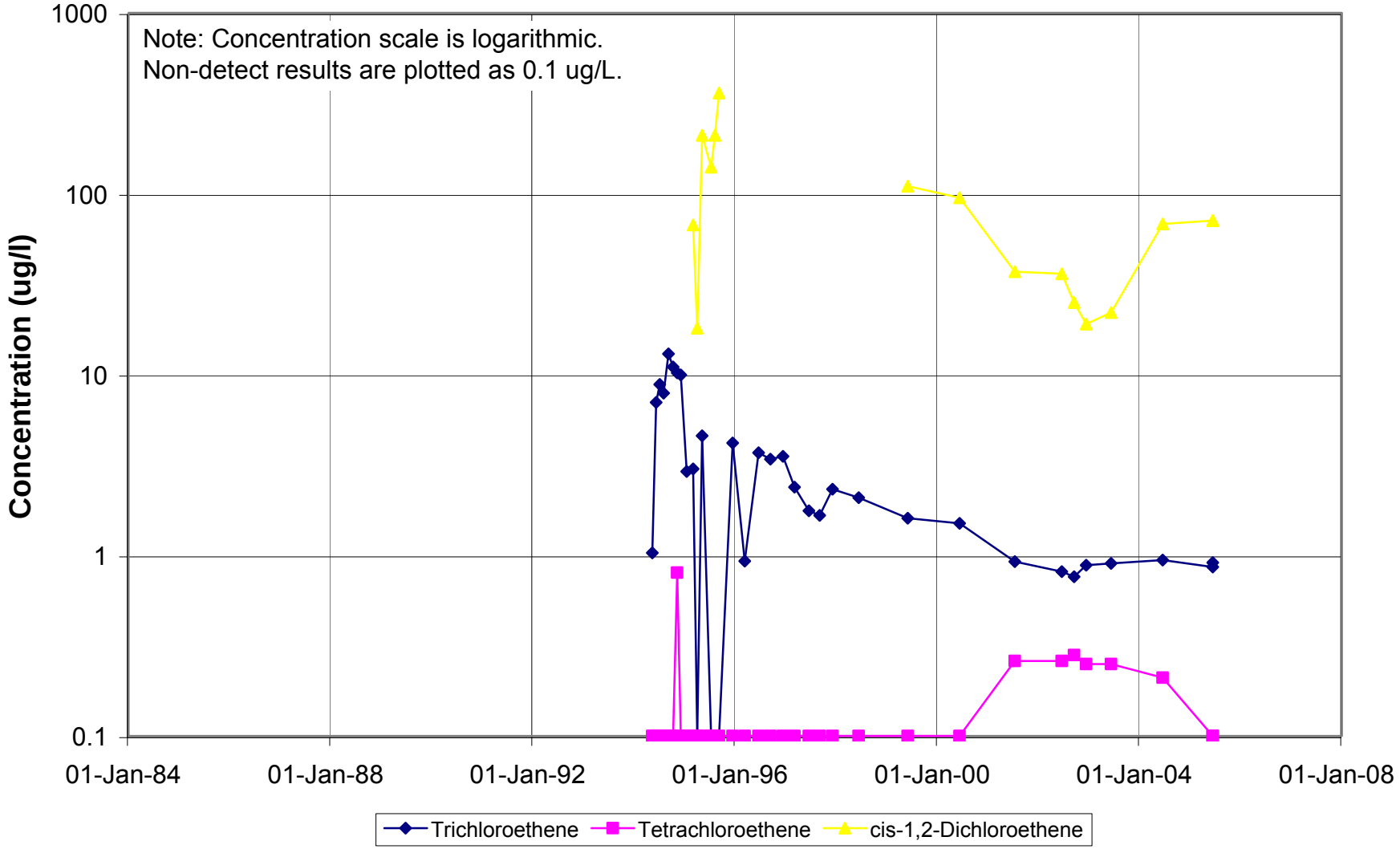
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U352 (EW-2)



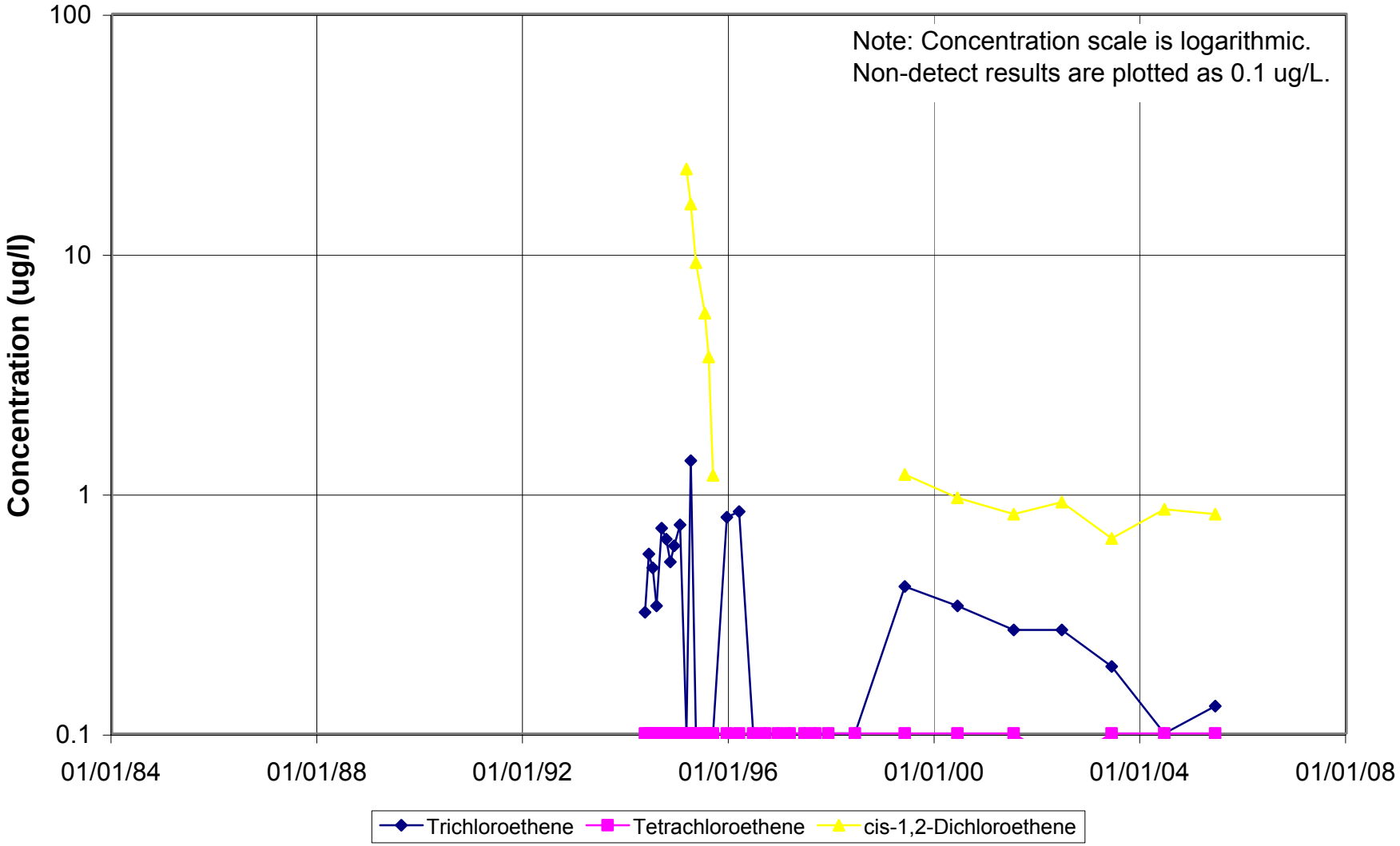
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U353 (EW-3)



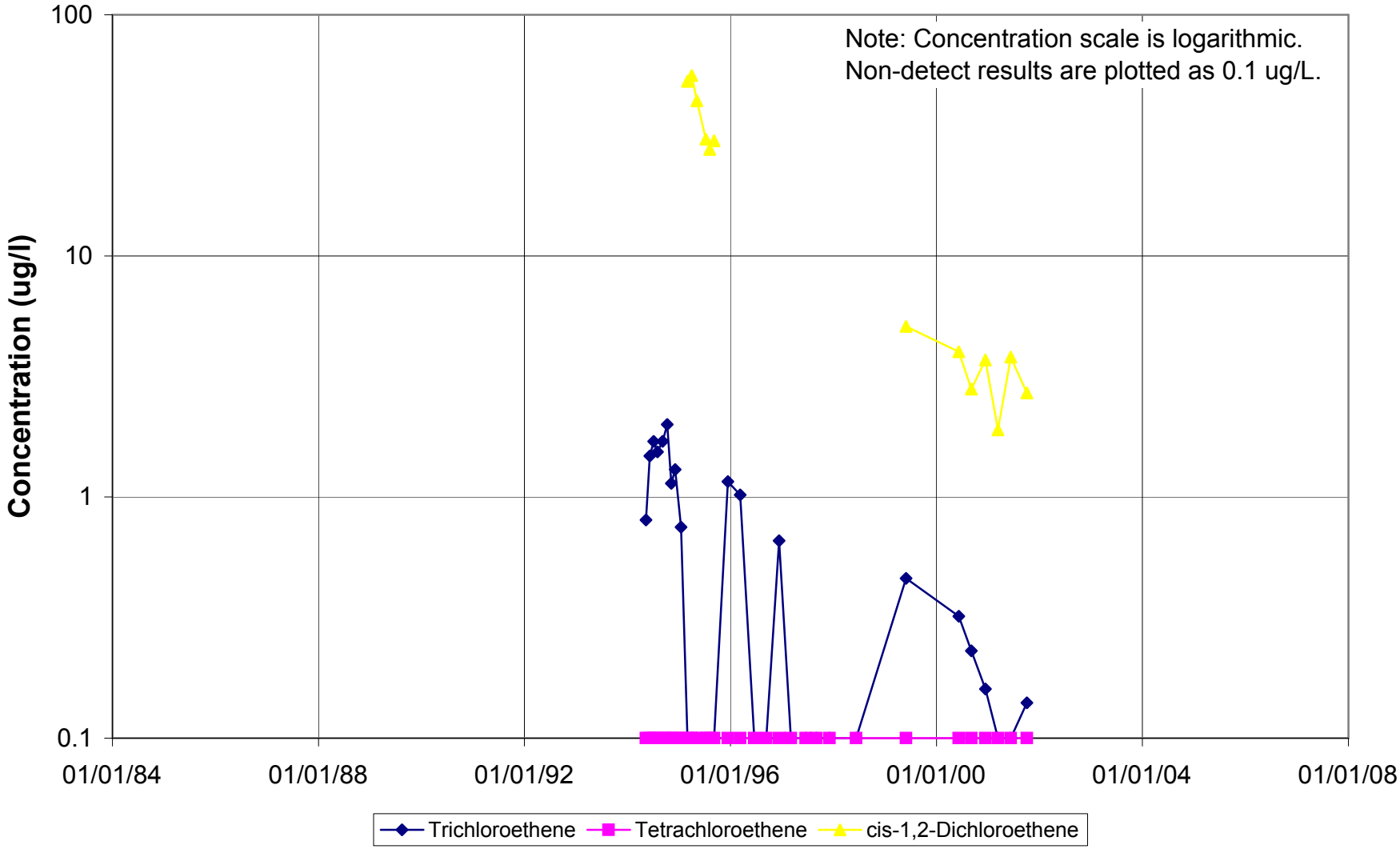
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U354 (EW-4)



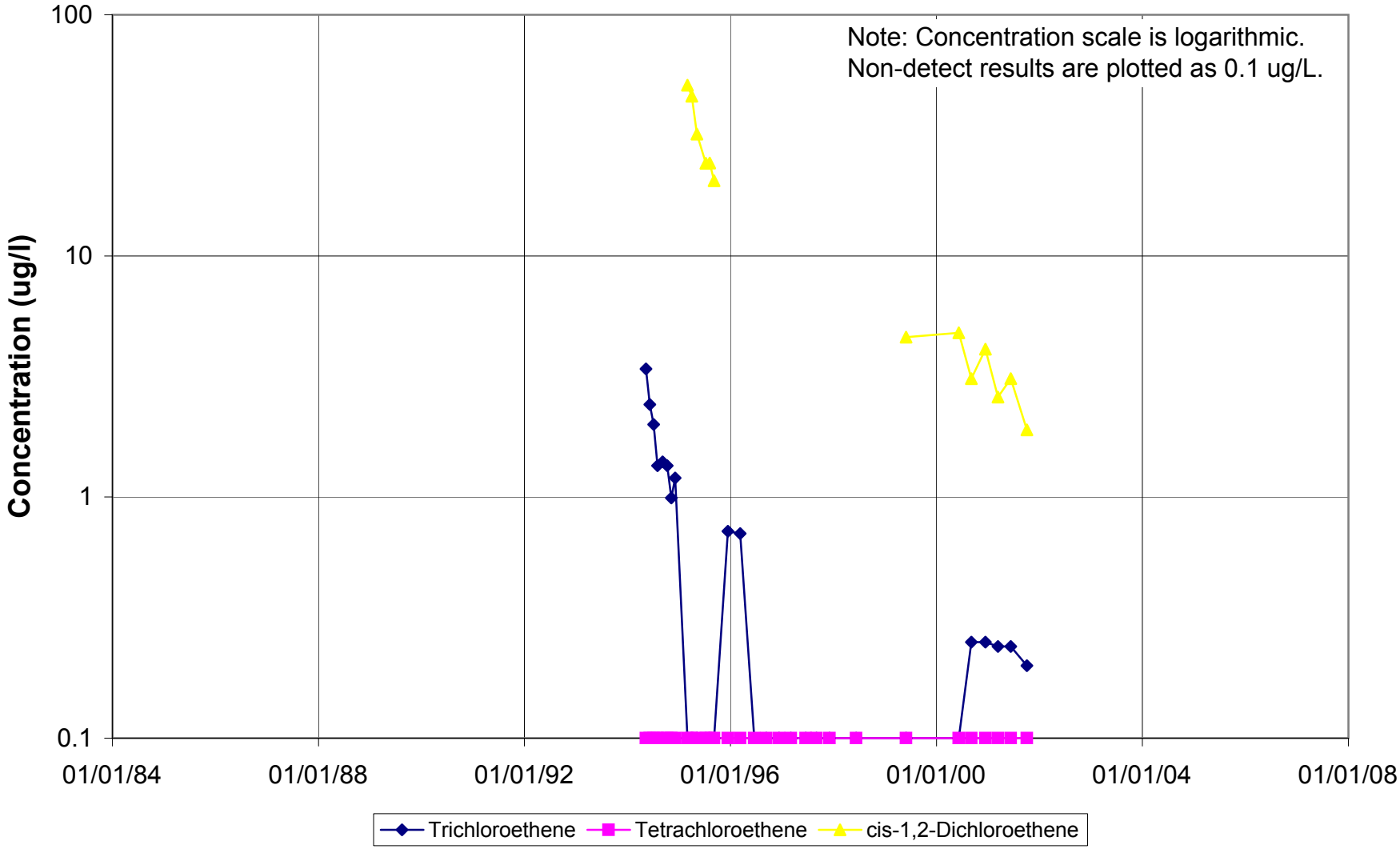
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U355 (EW-5)



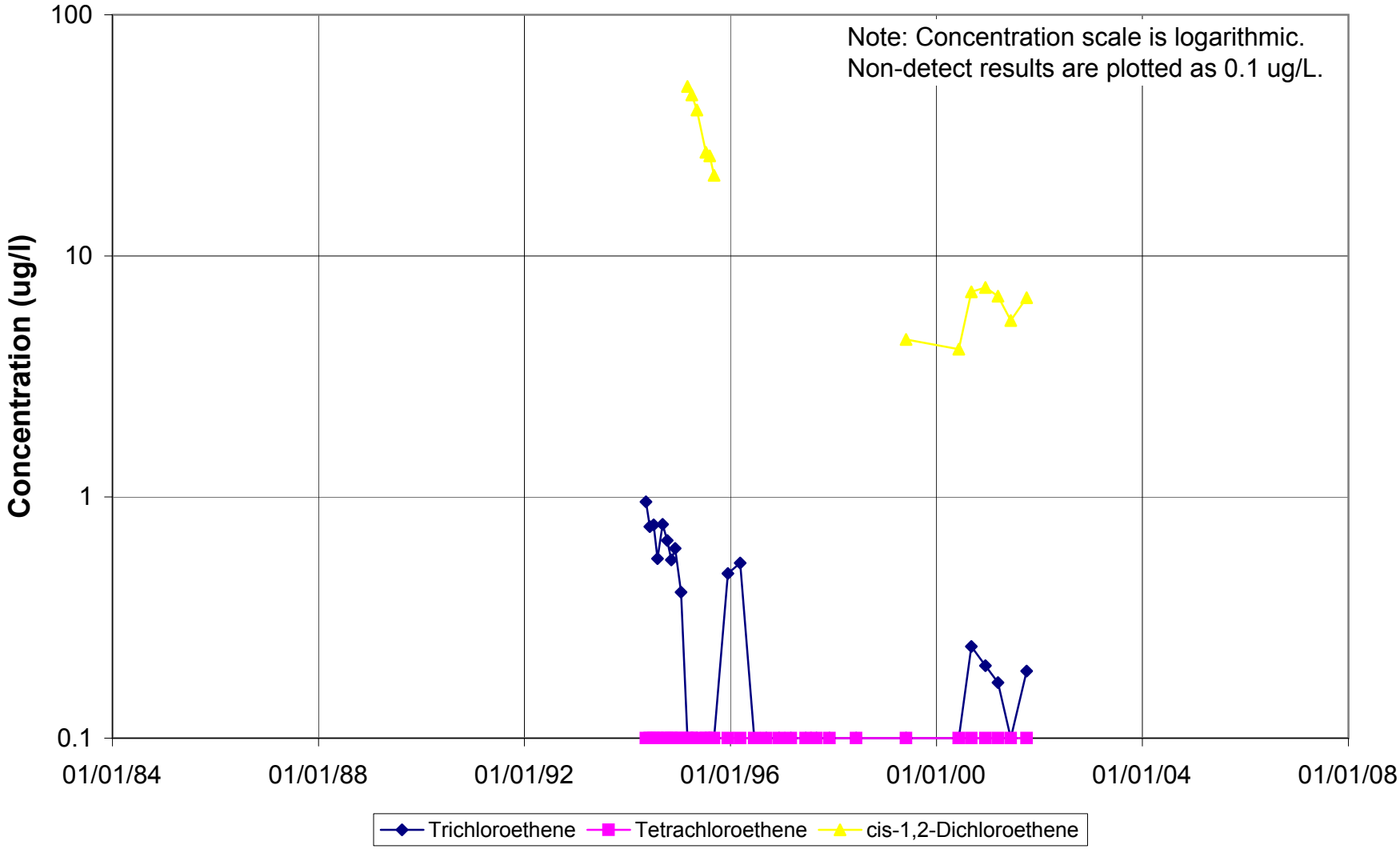
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U356 (EW-6)



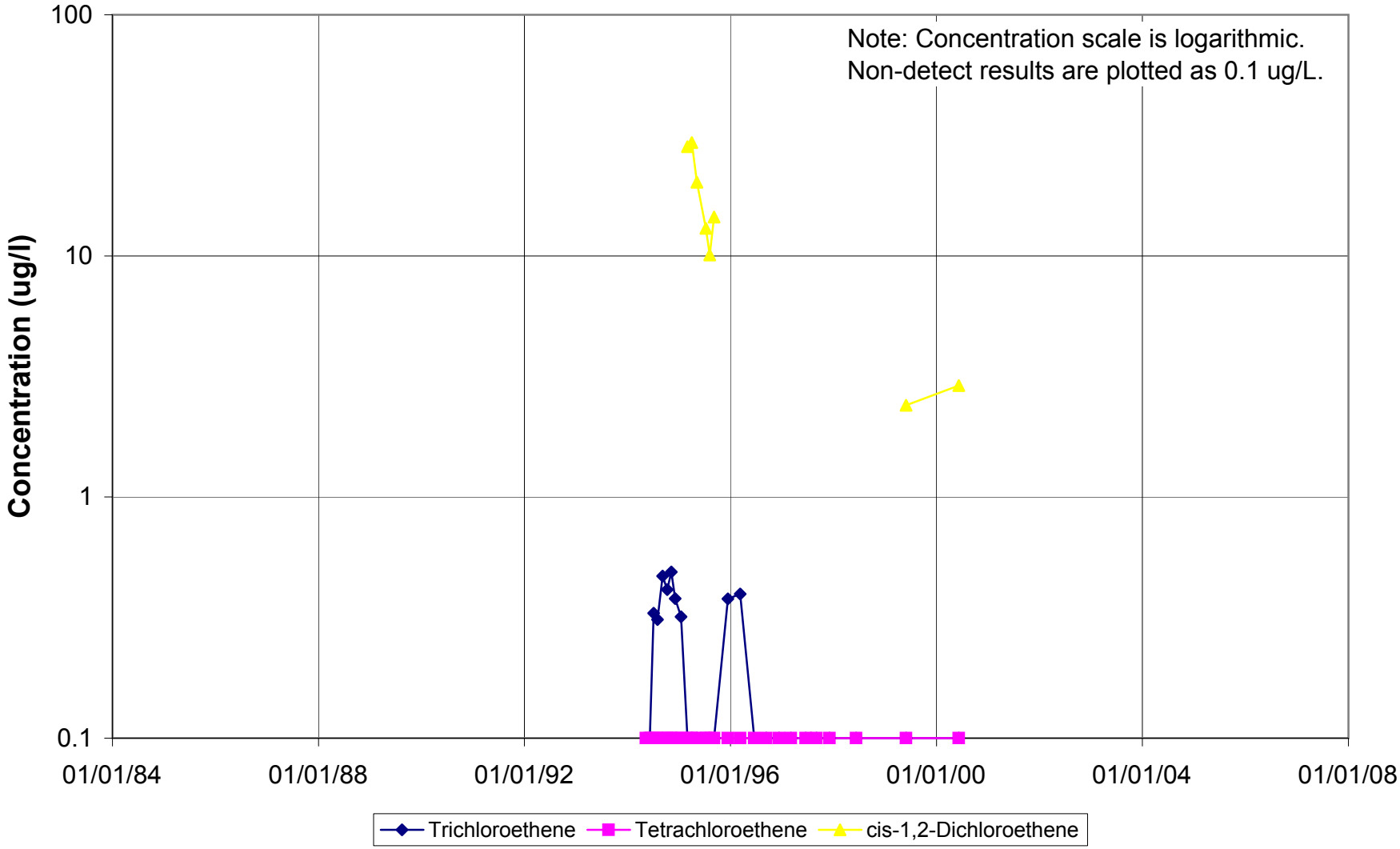
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U357 (EW-7)



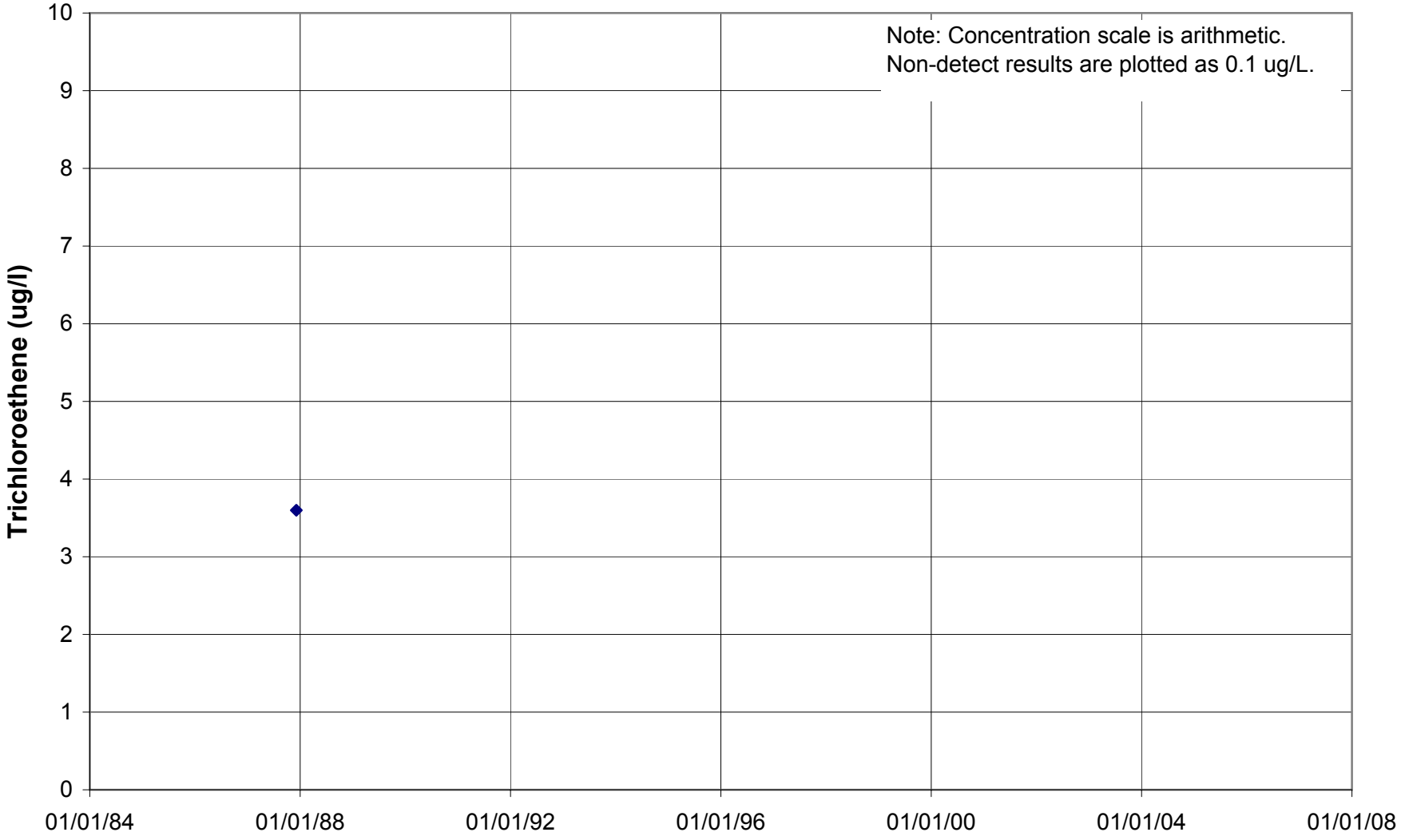
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U358 (EW-8)



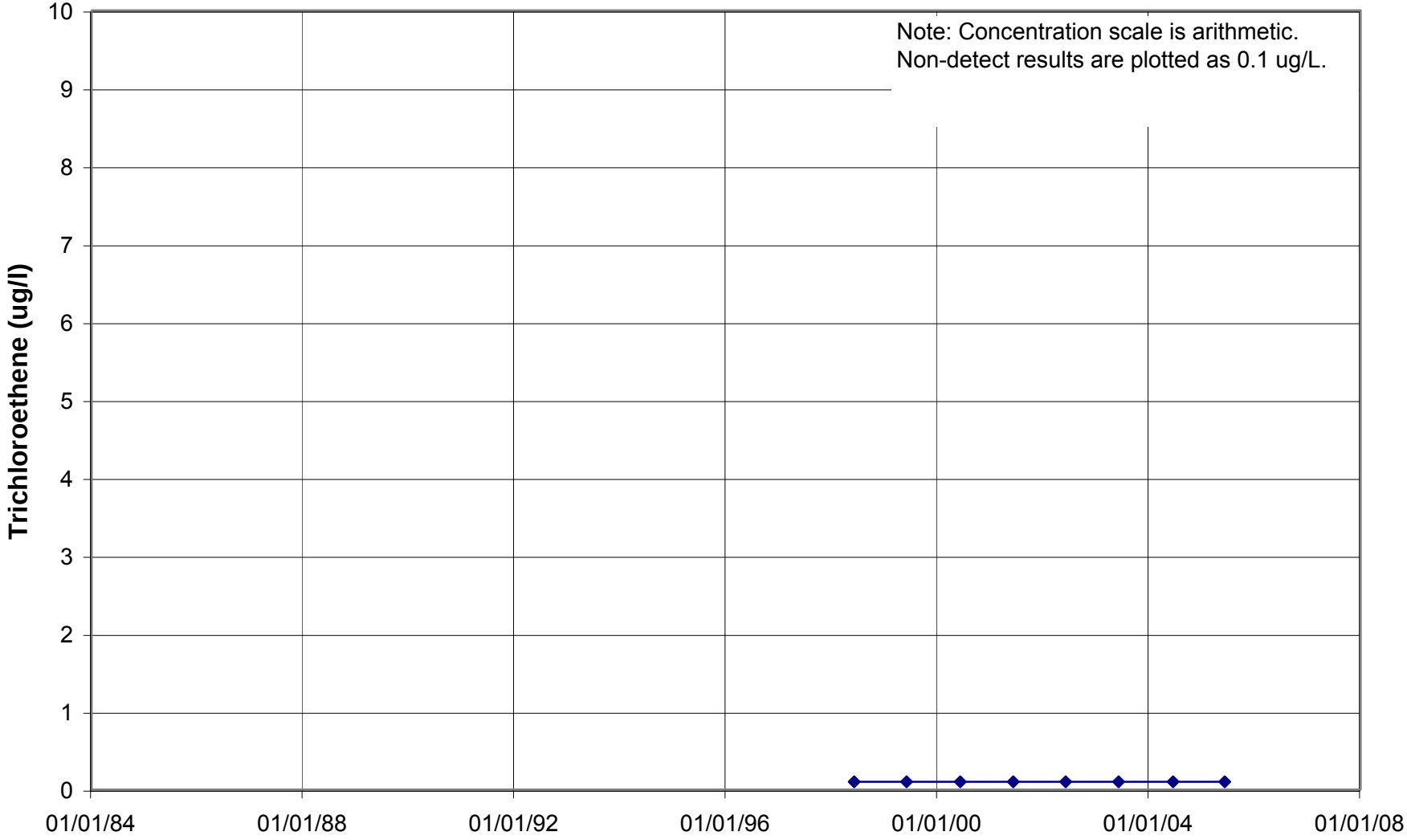
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U601



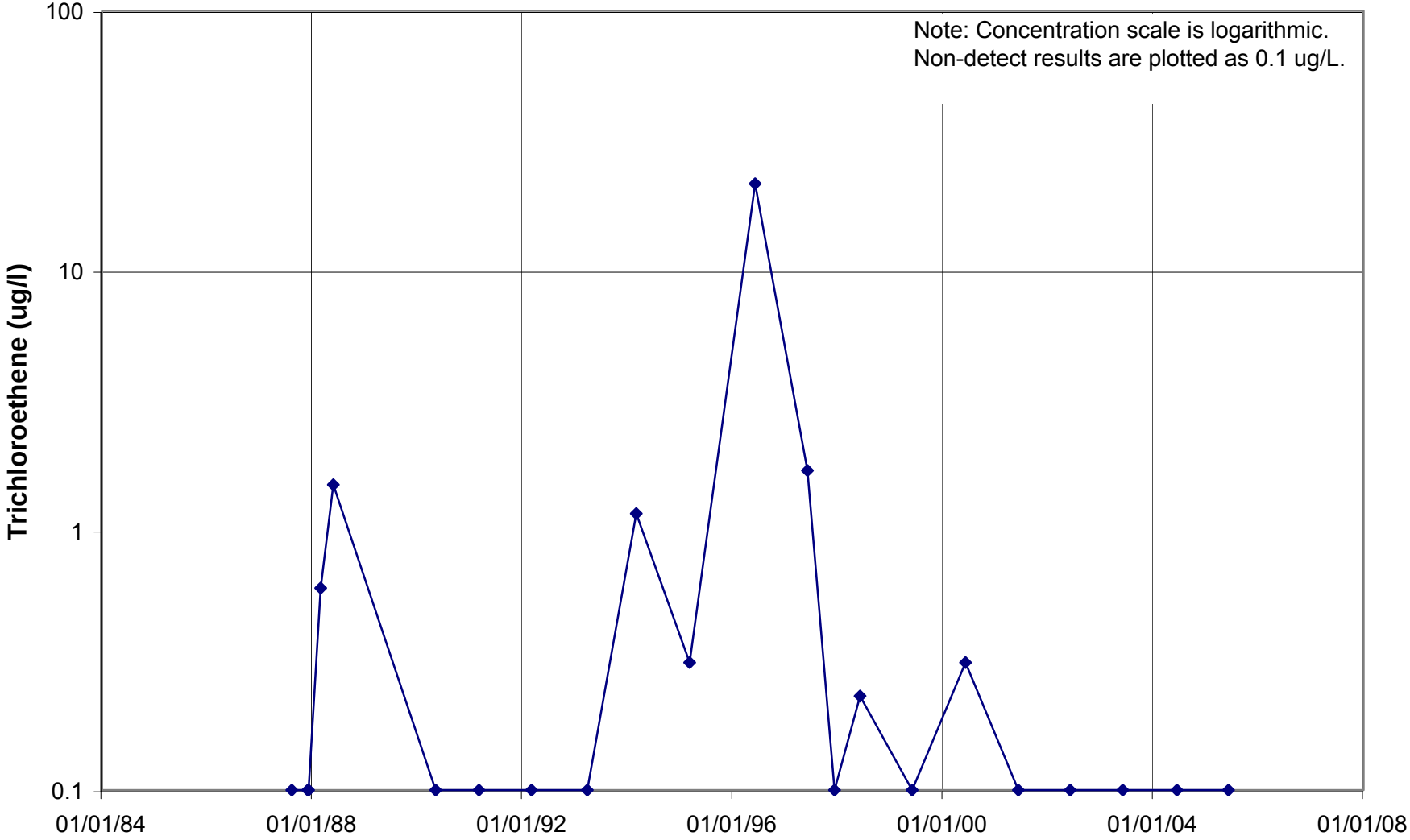
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U603



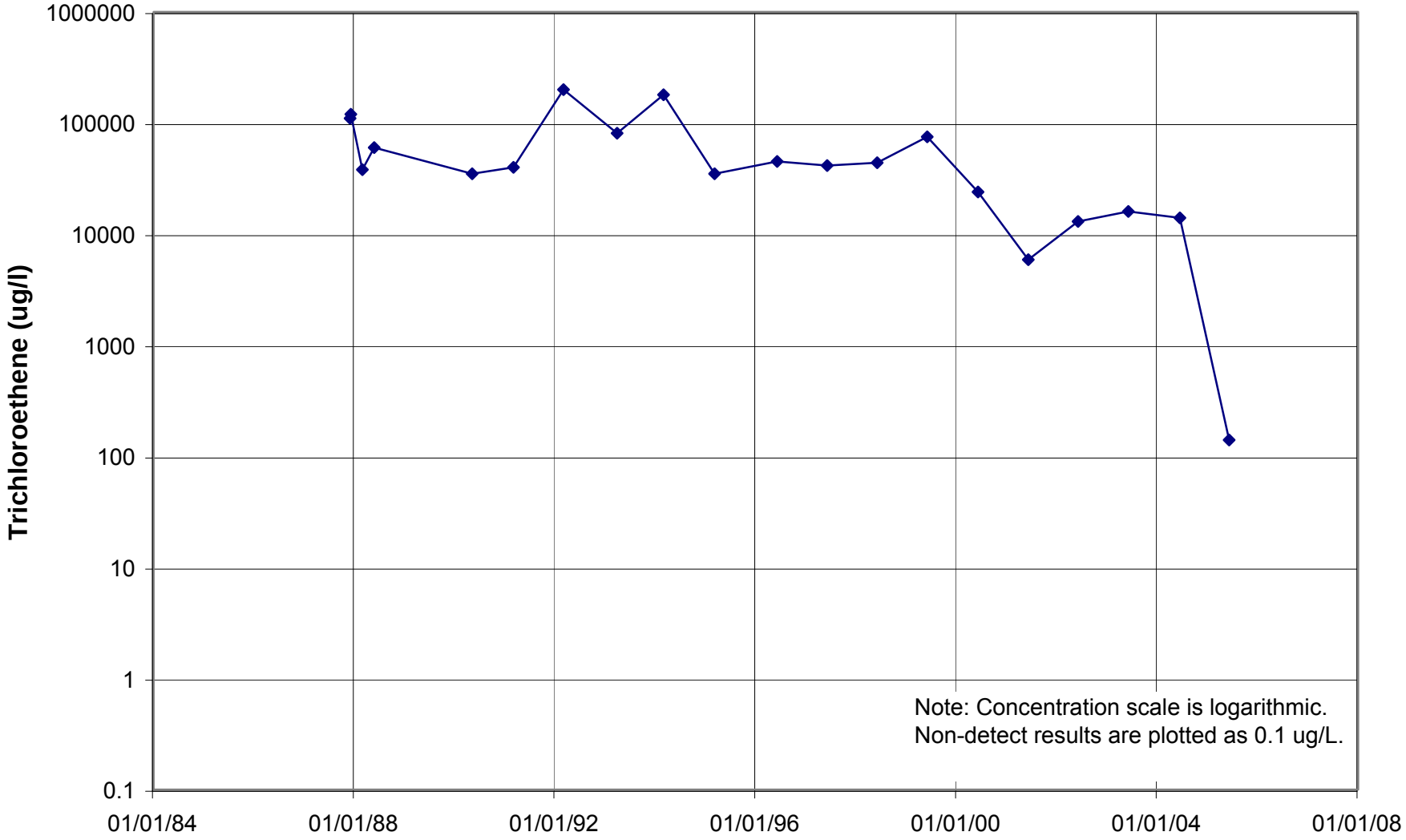
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U604



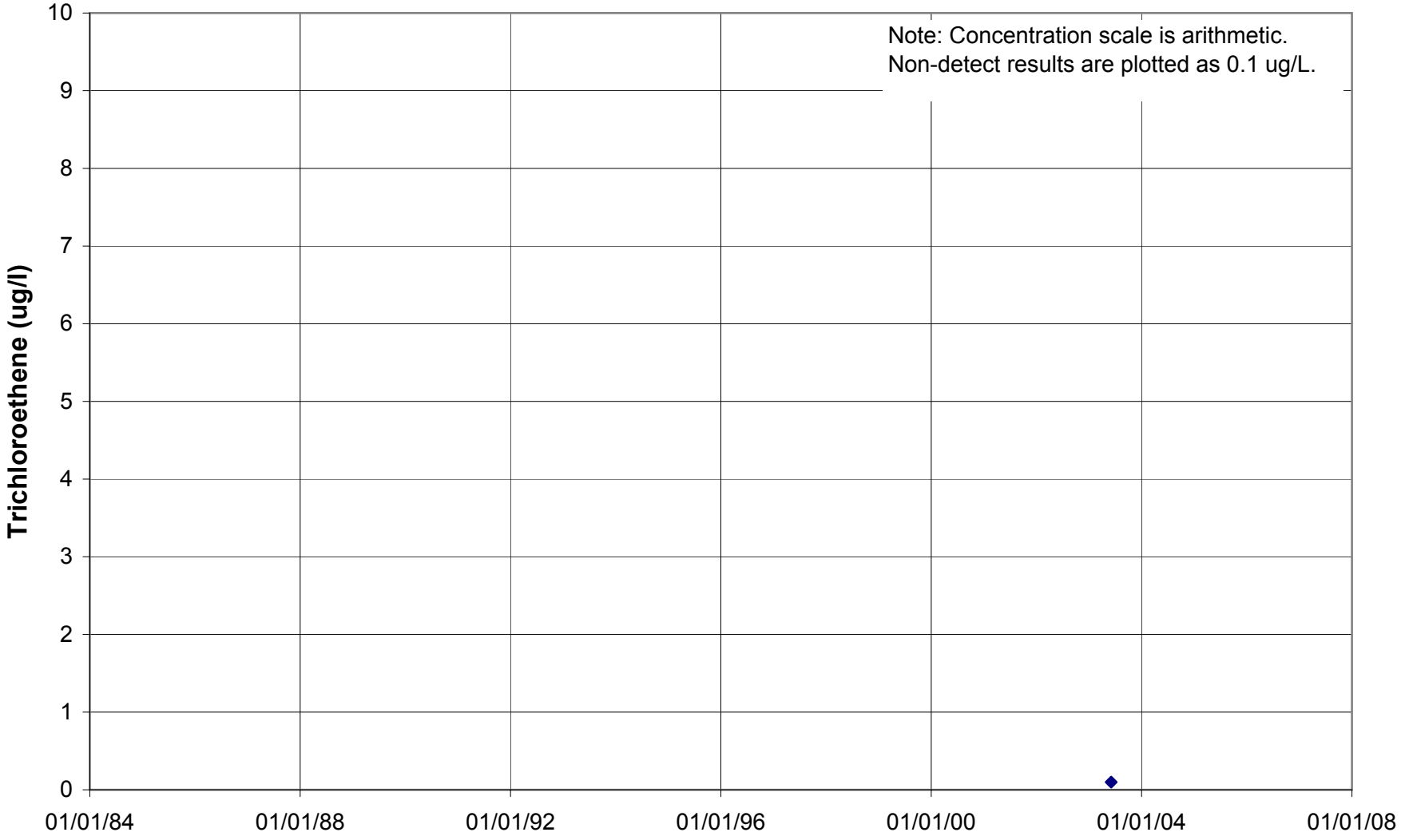
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U611



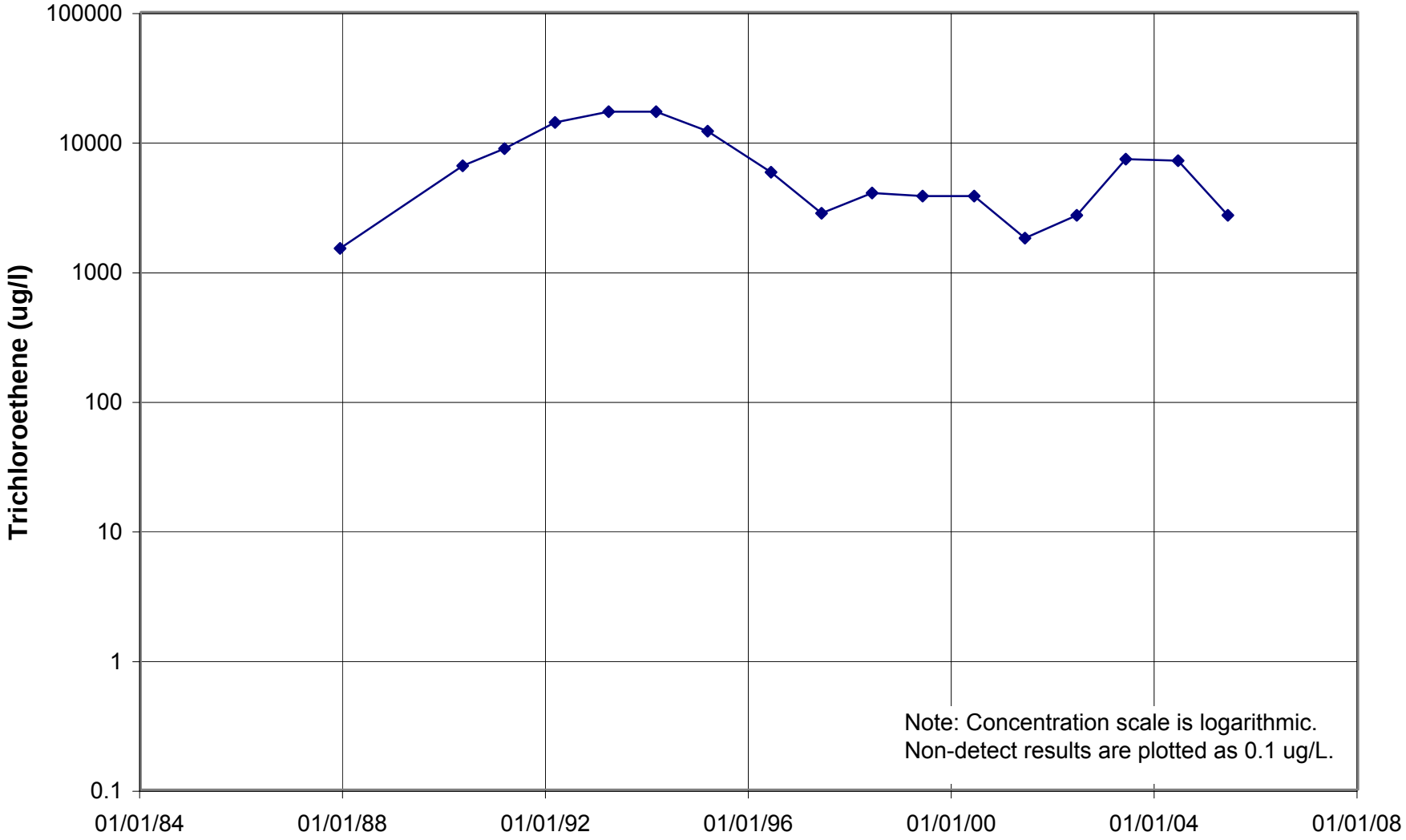
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U613



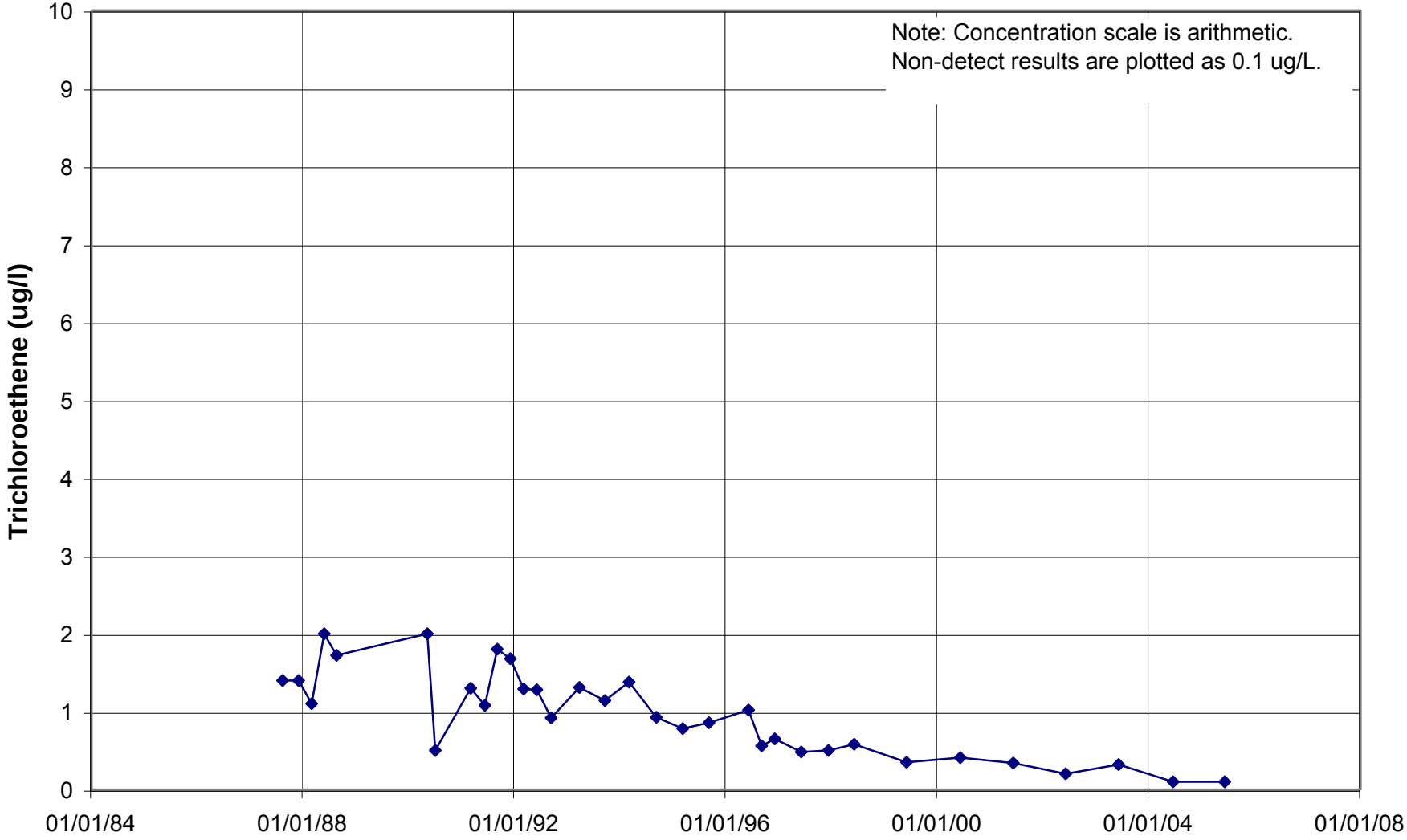
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U615



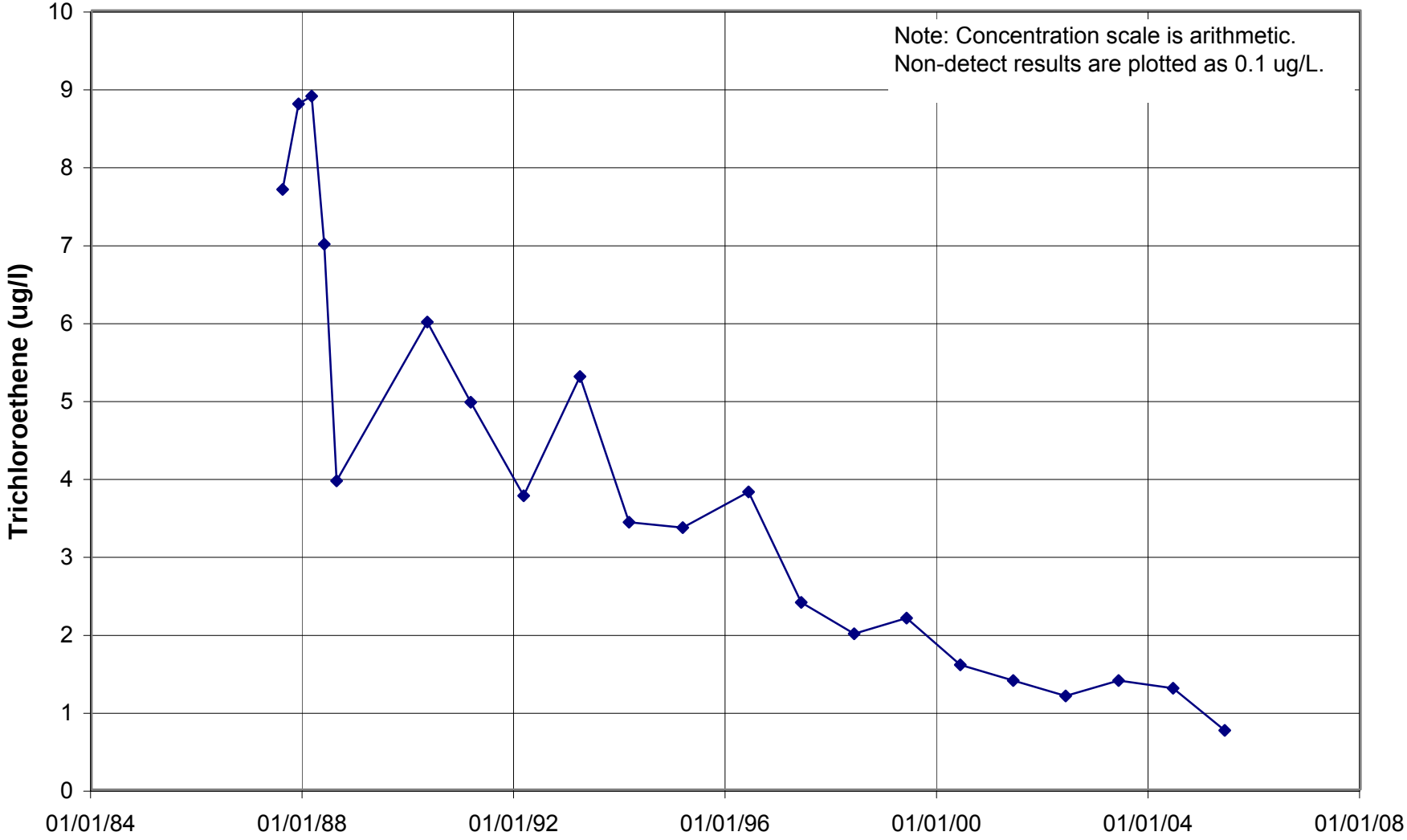
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U617



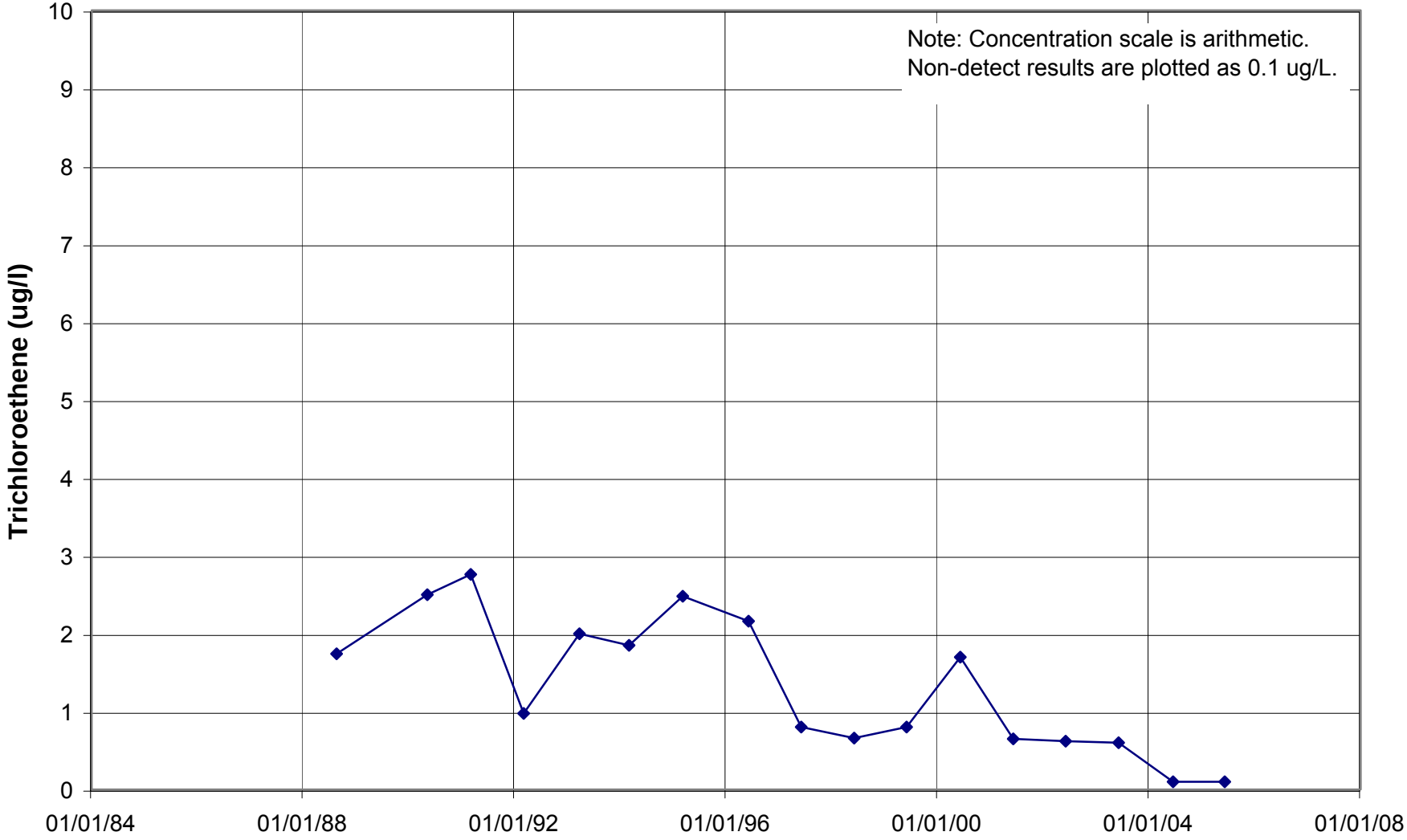
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U618



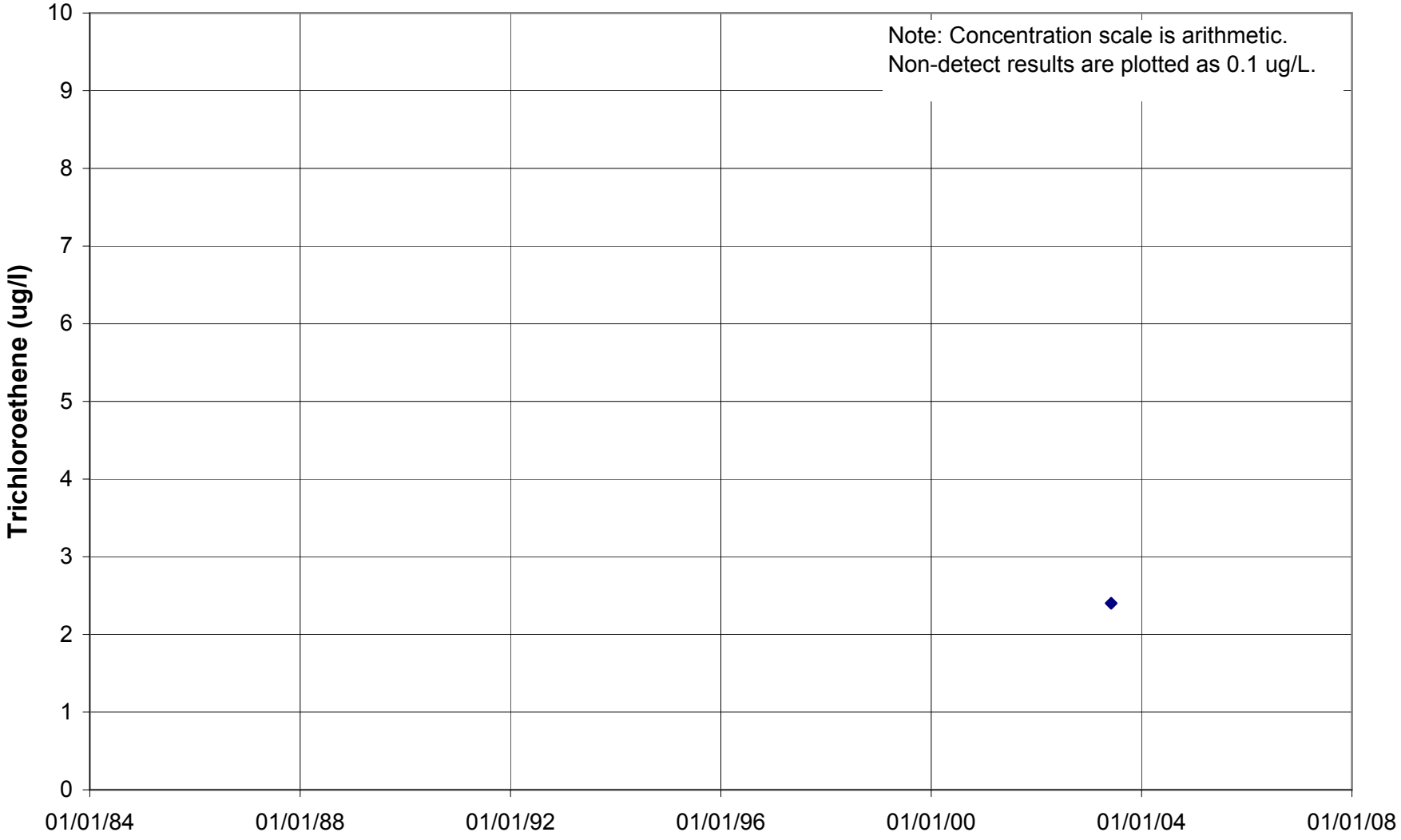
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U619



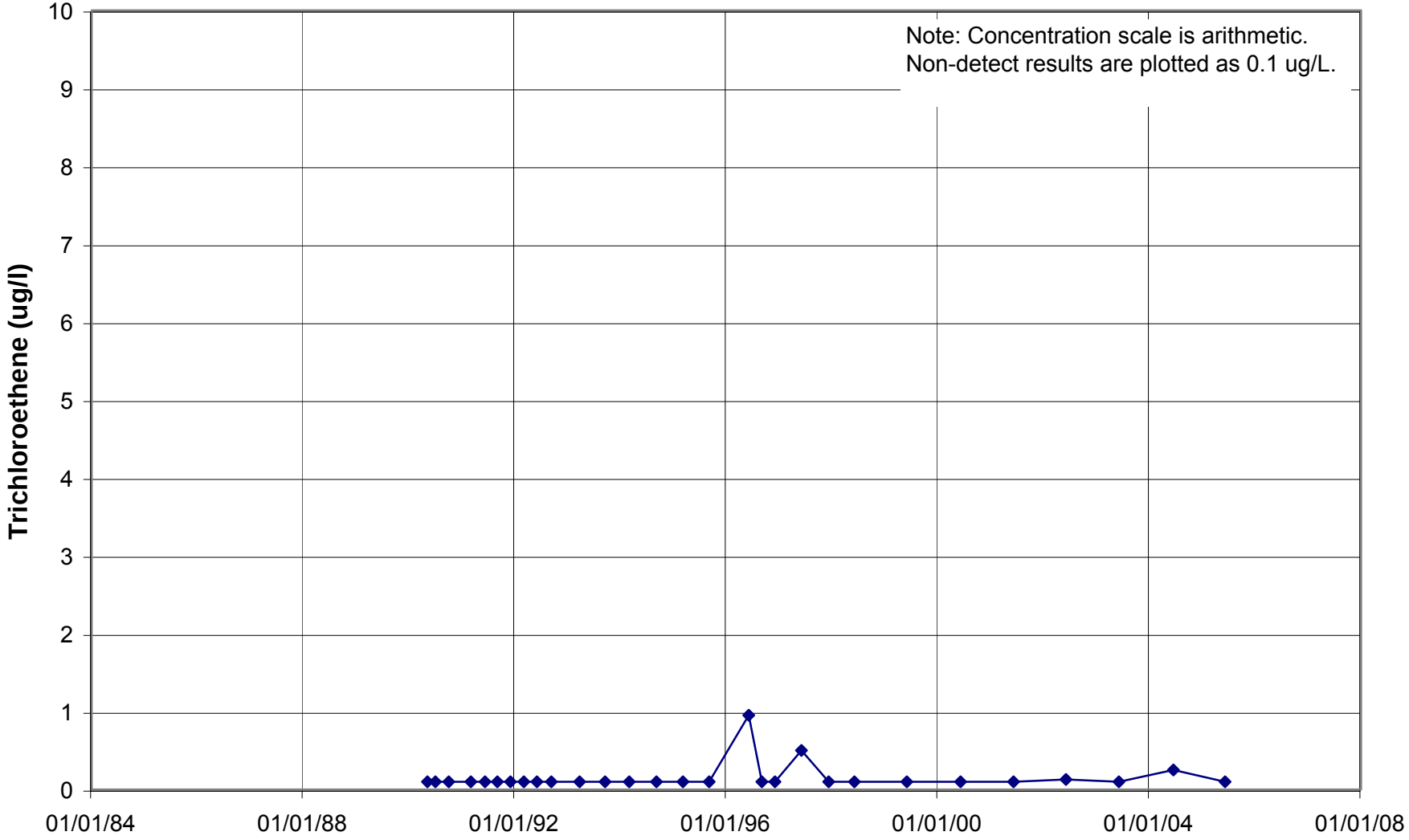
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U620



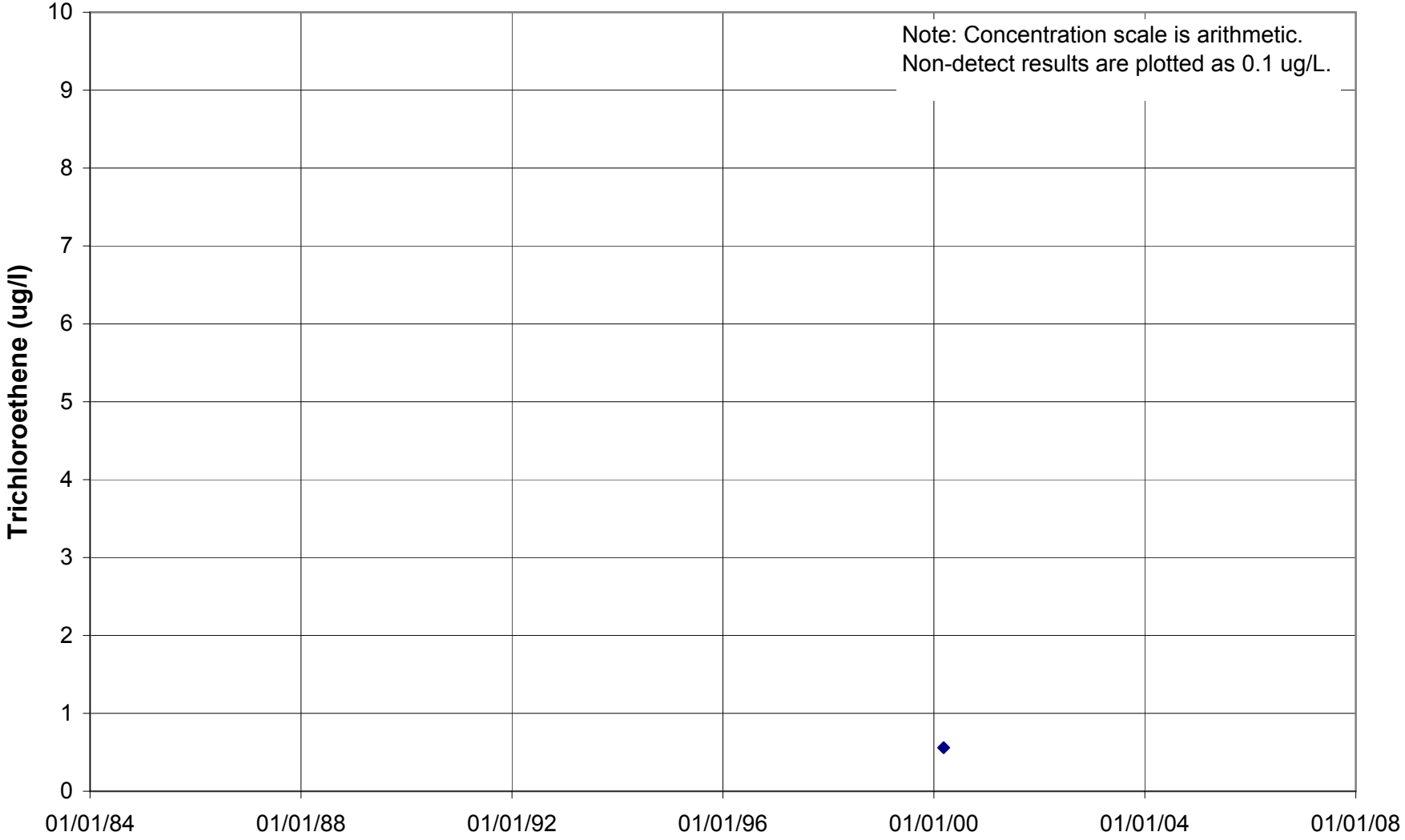
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U621



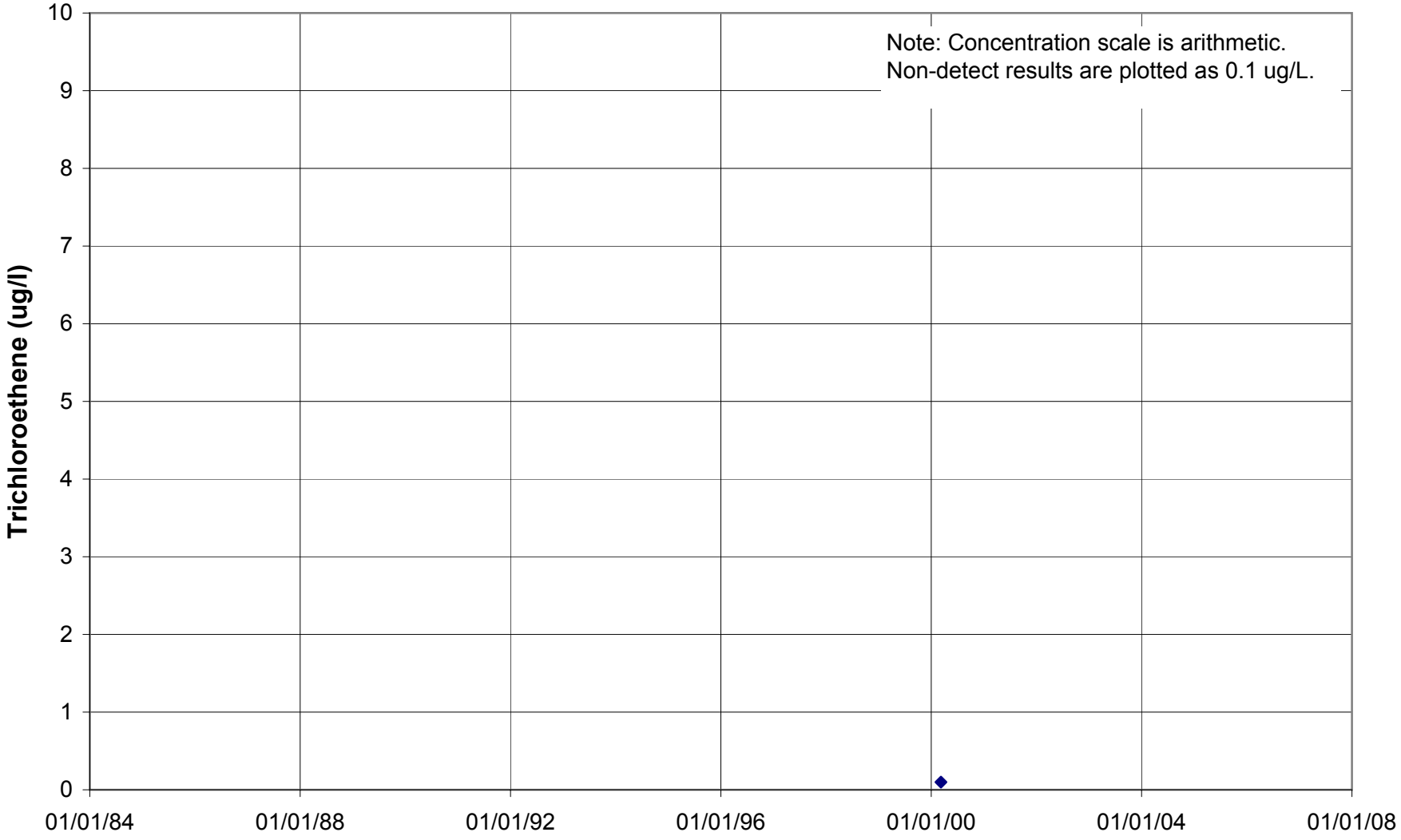
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U626



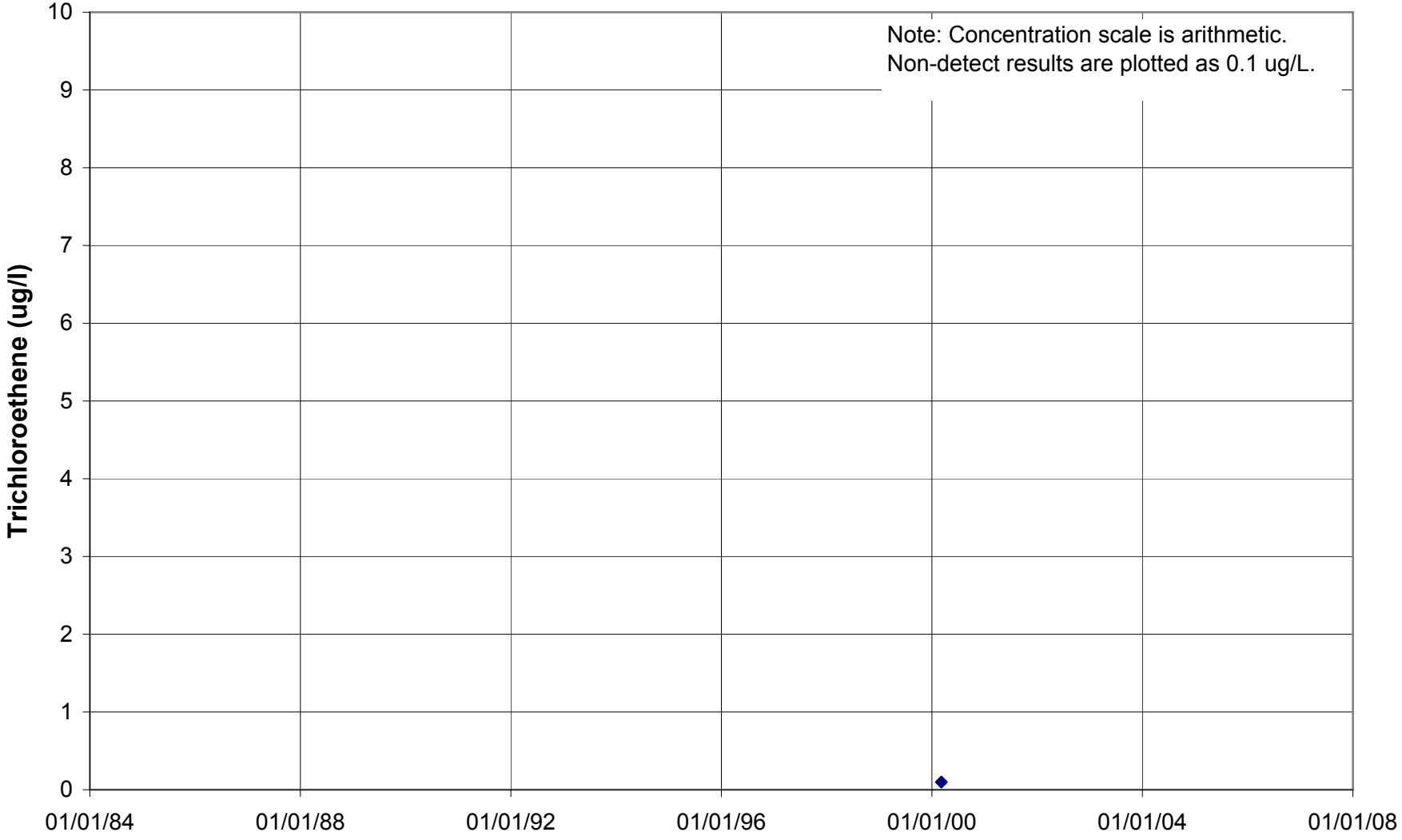
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U627



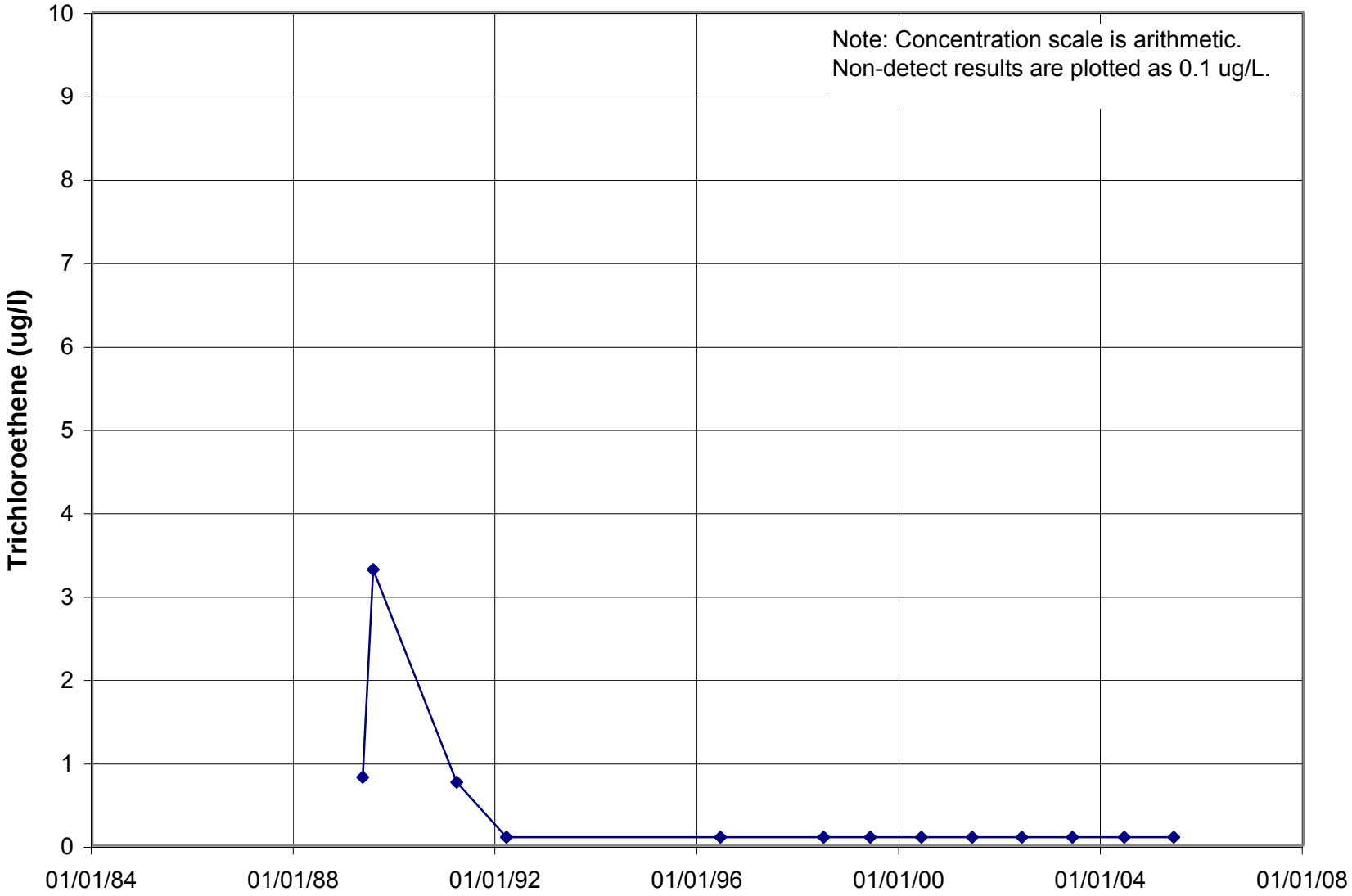
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U628



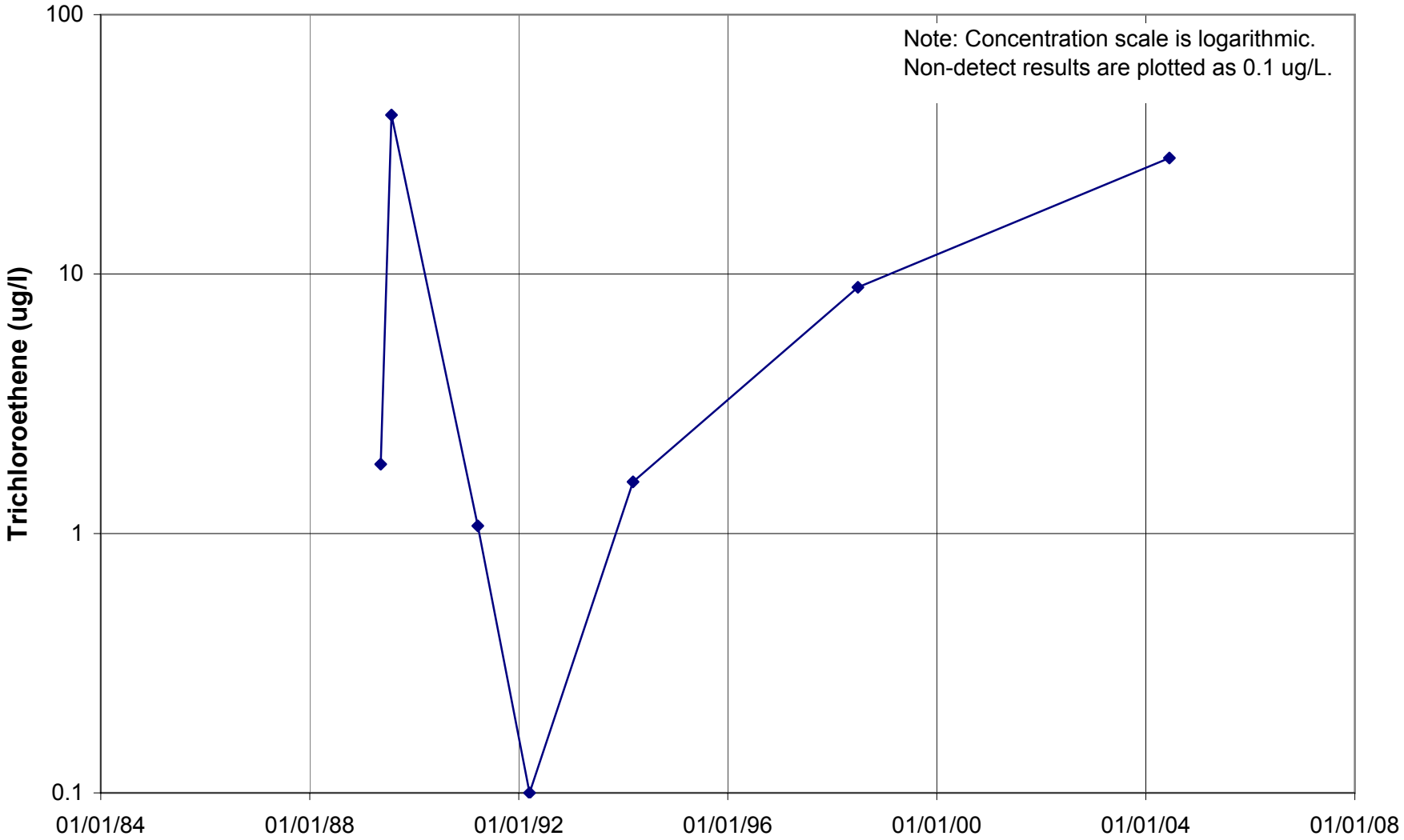
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U636



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U639



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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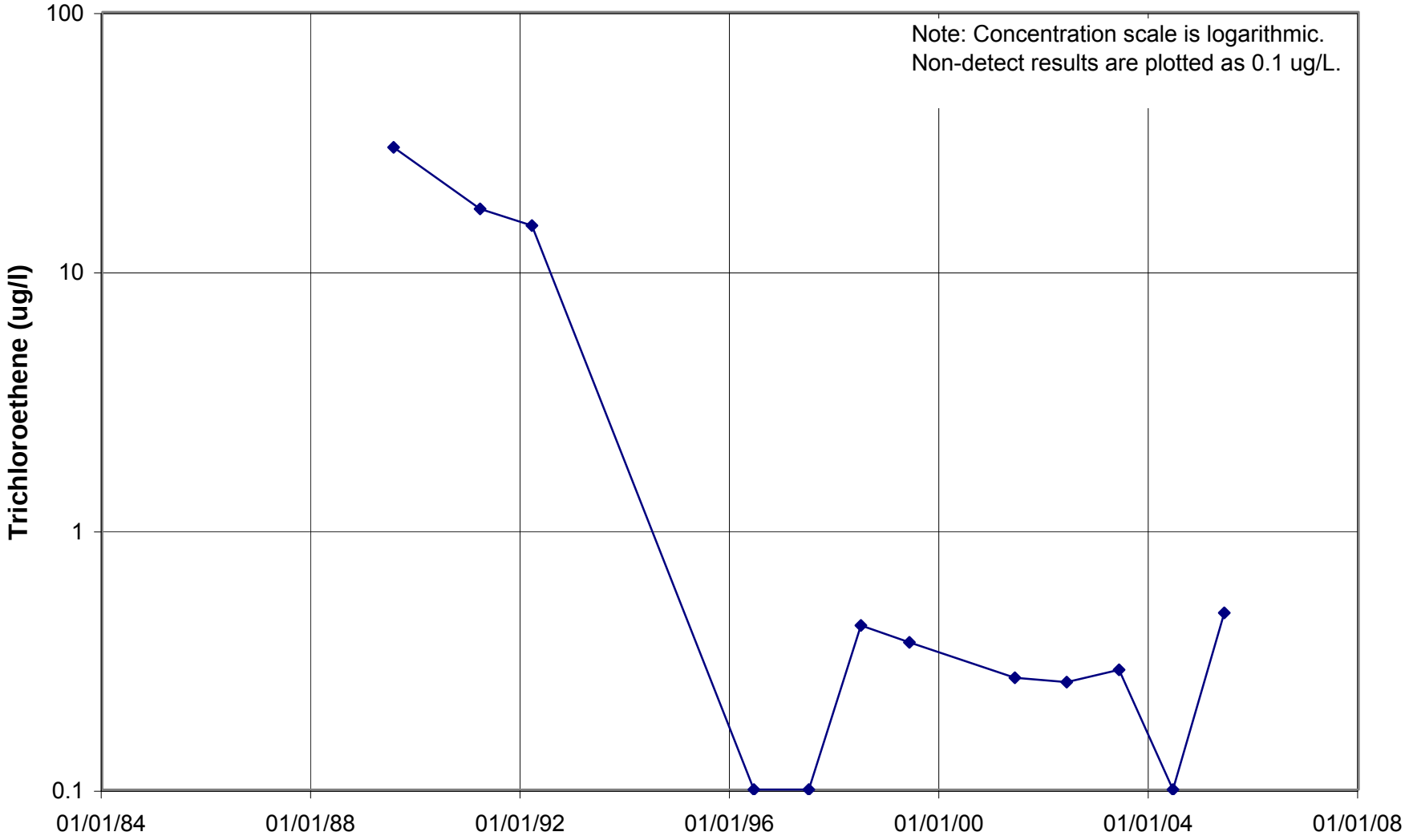

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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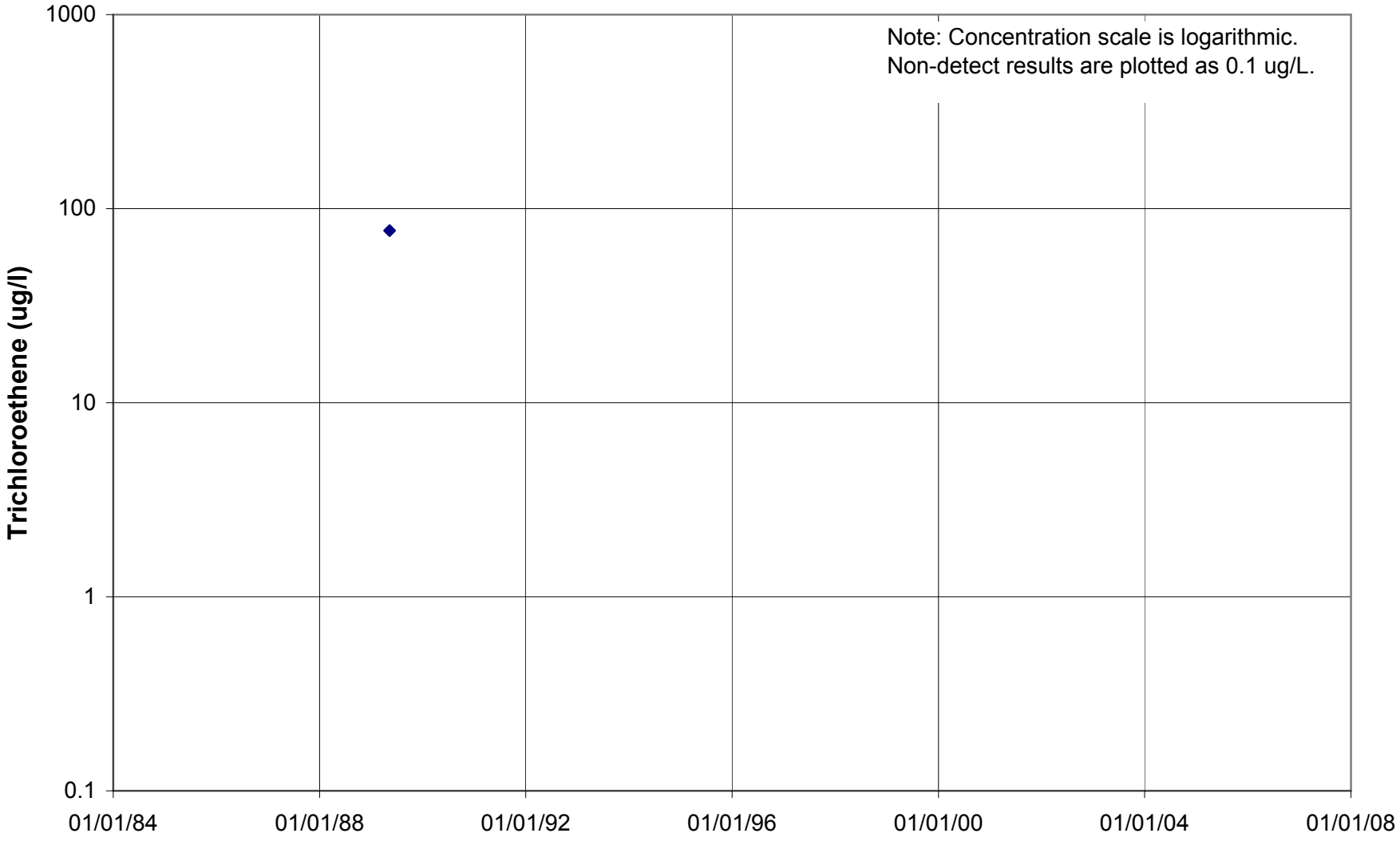
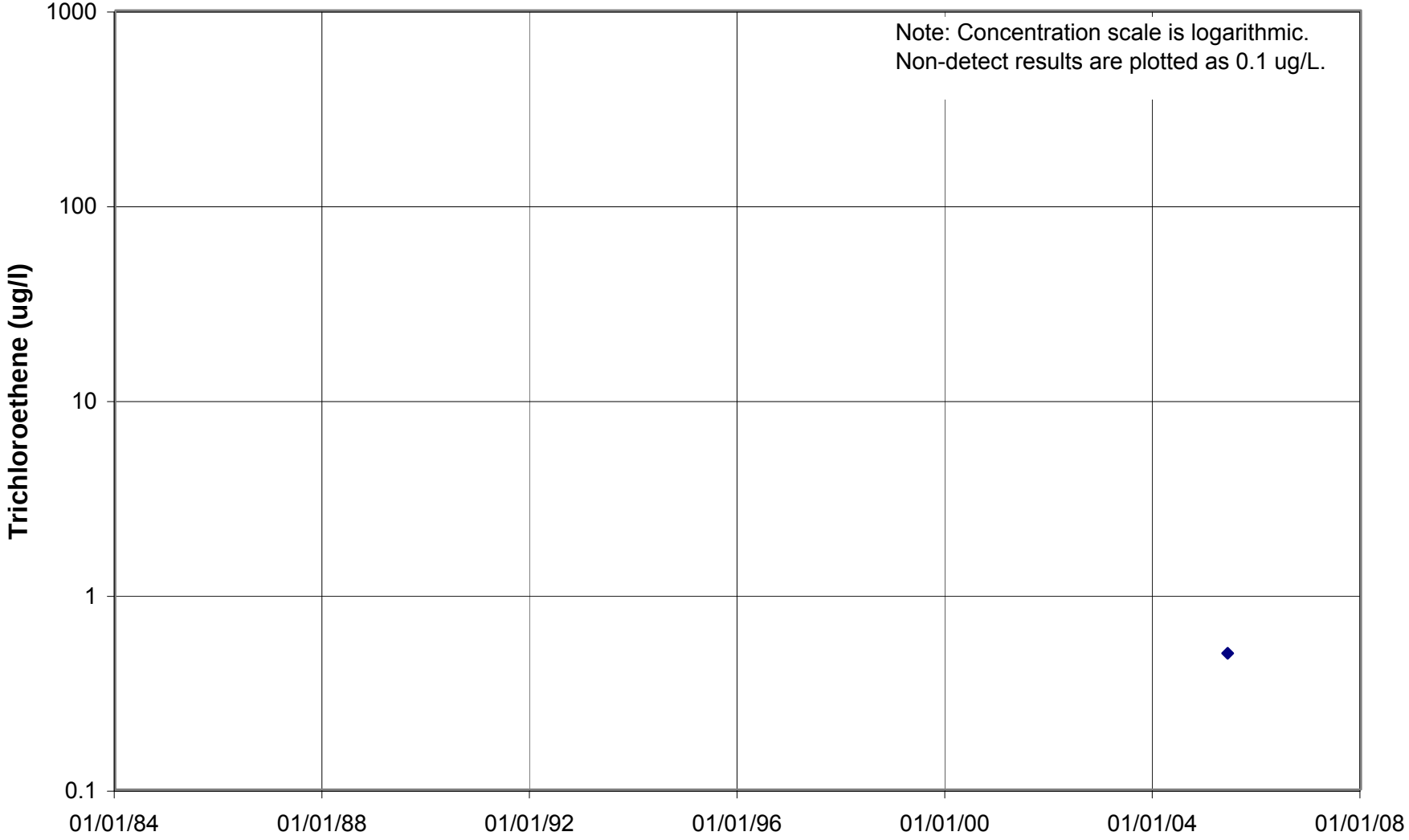


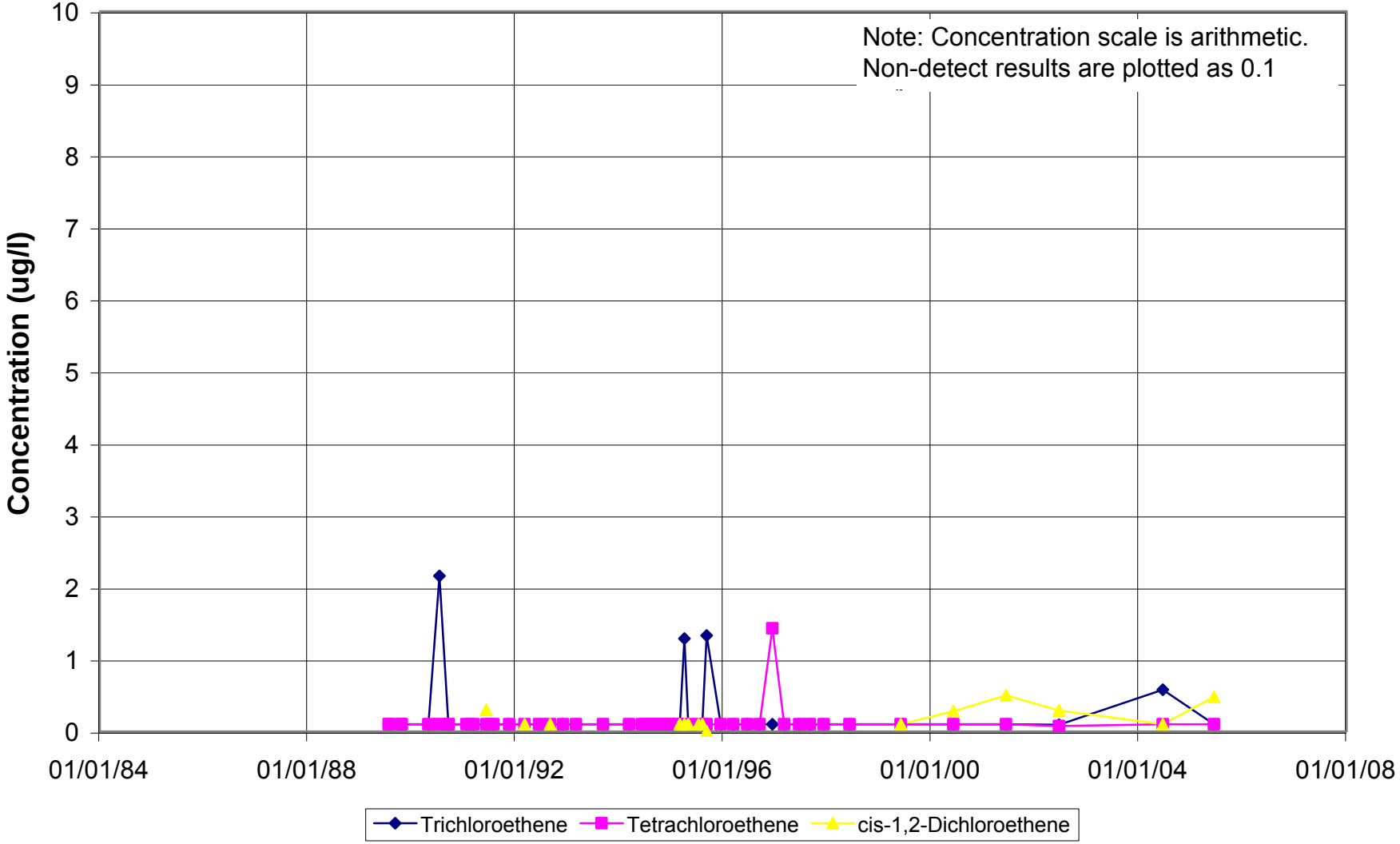
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U667



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U901



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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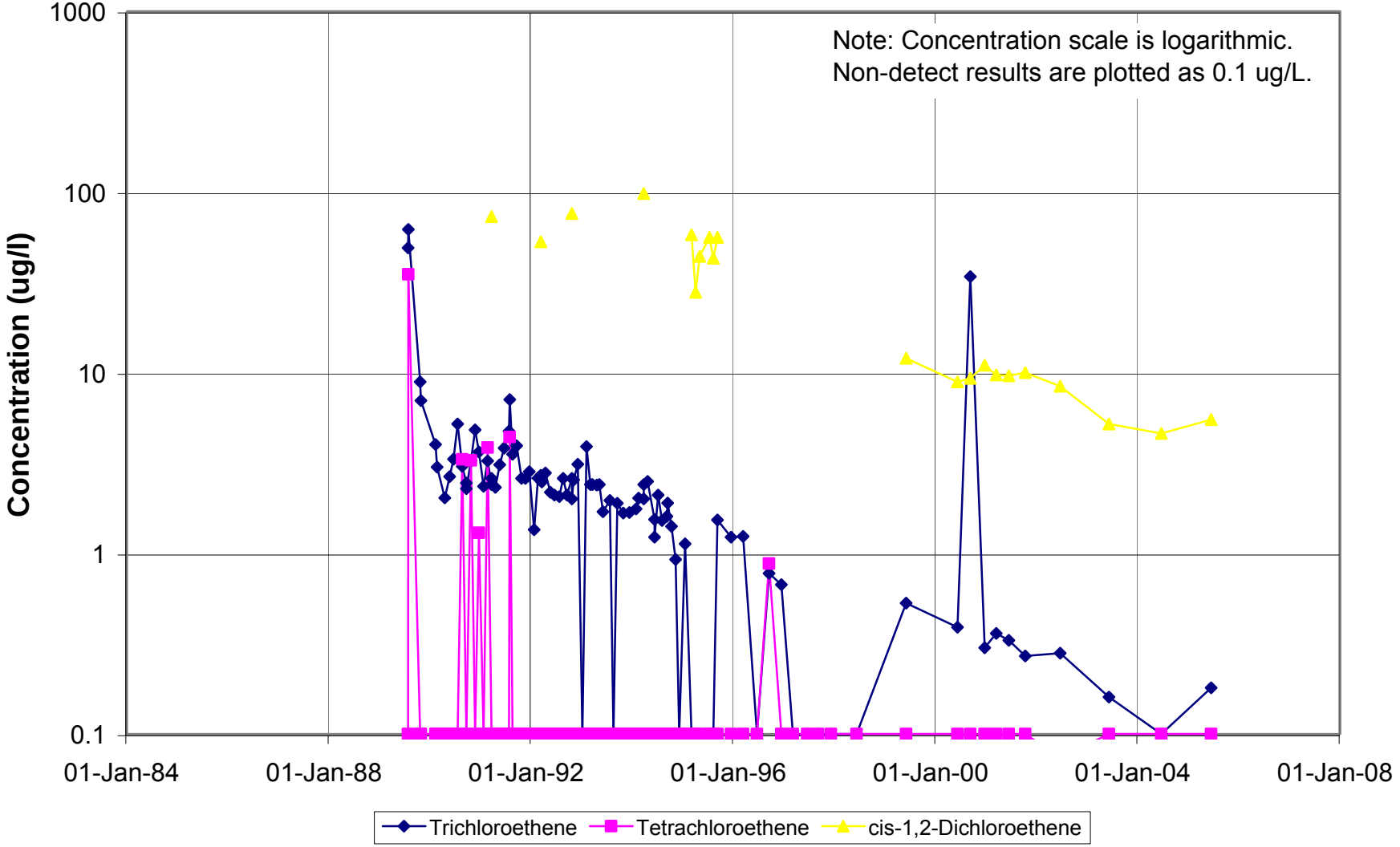

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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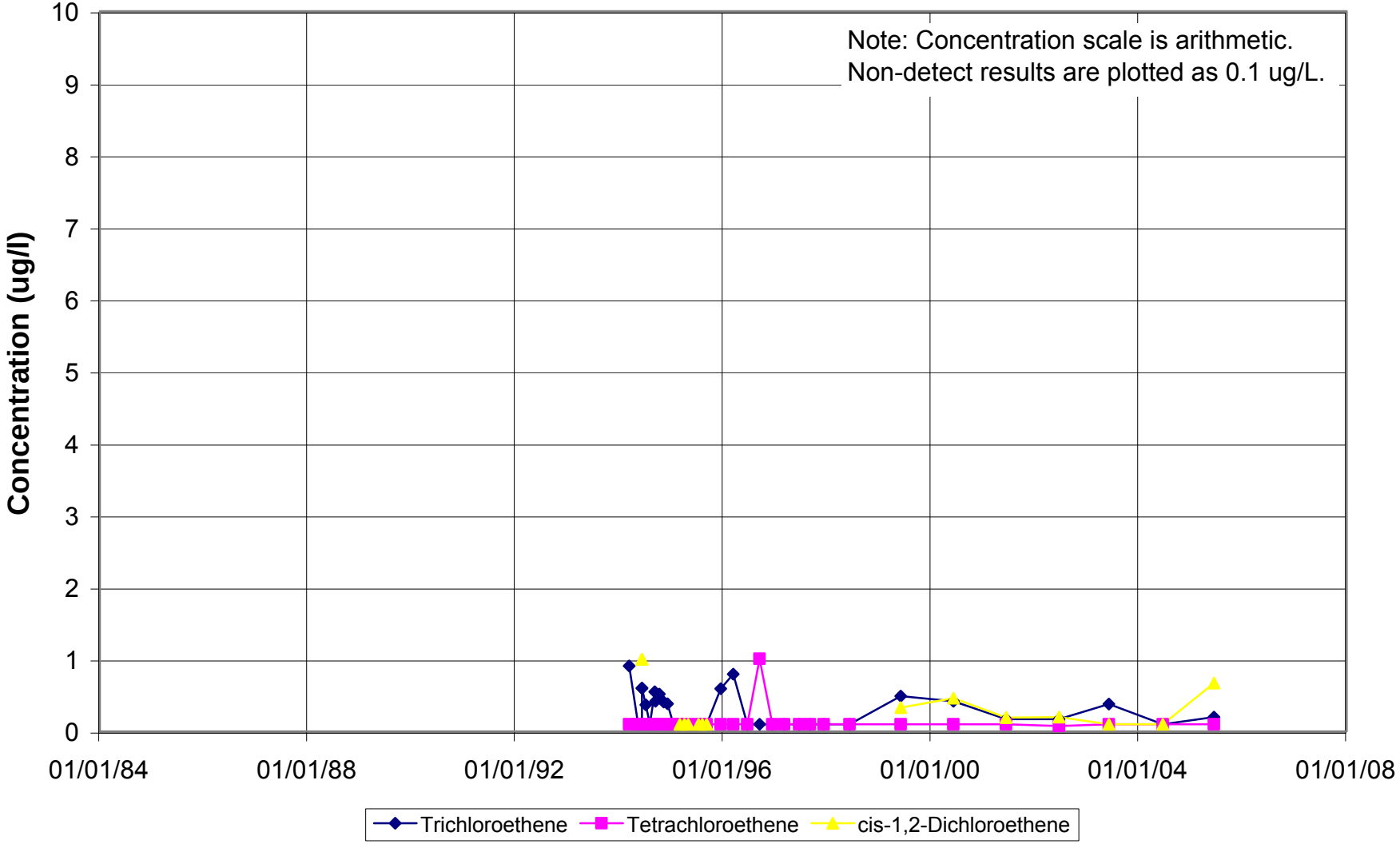
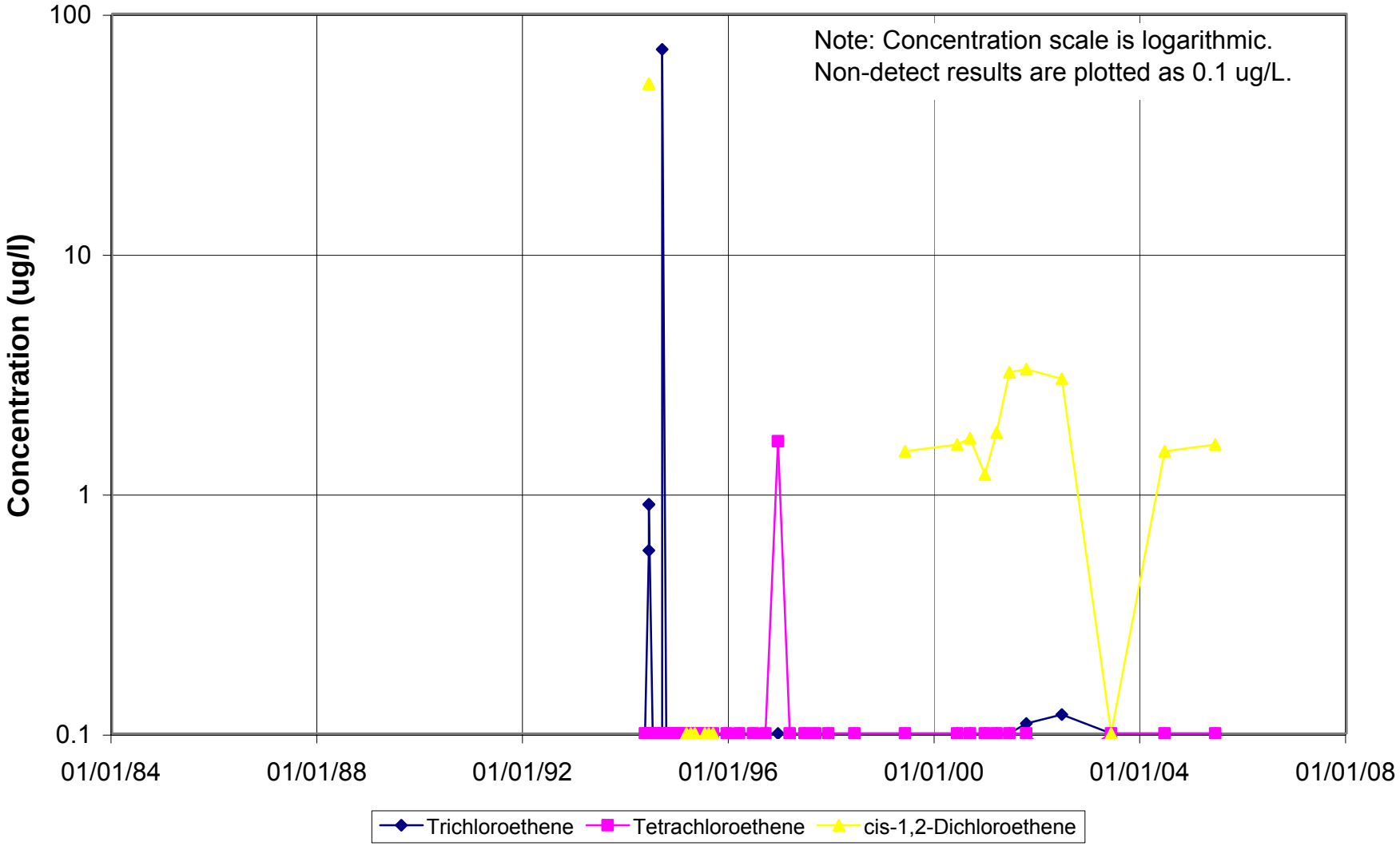


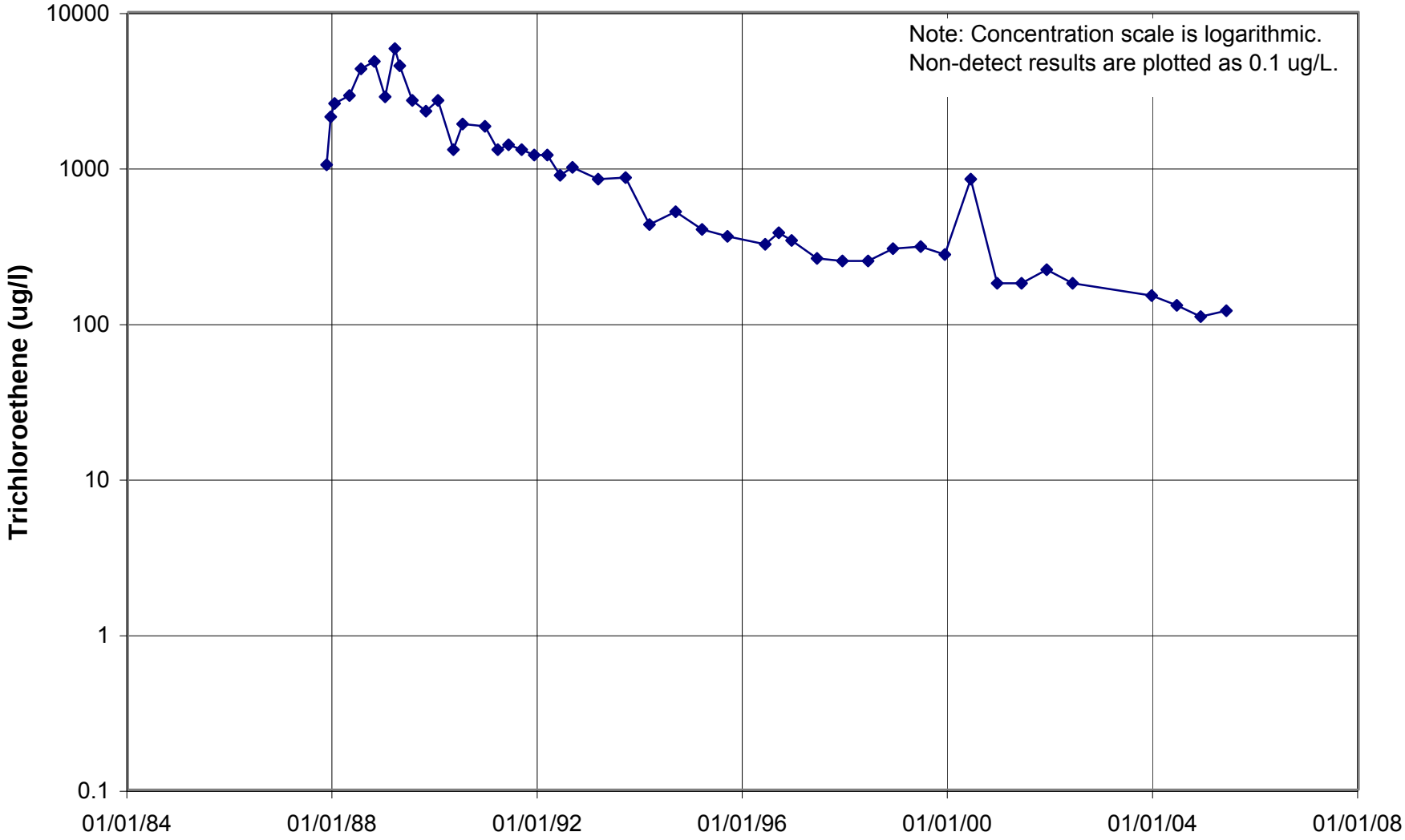
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

01U904



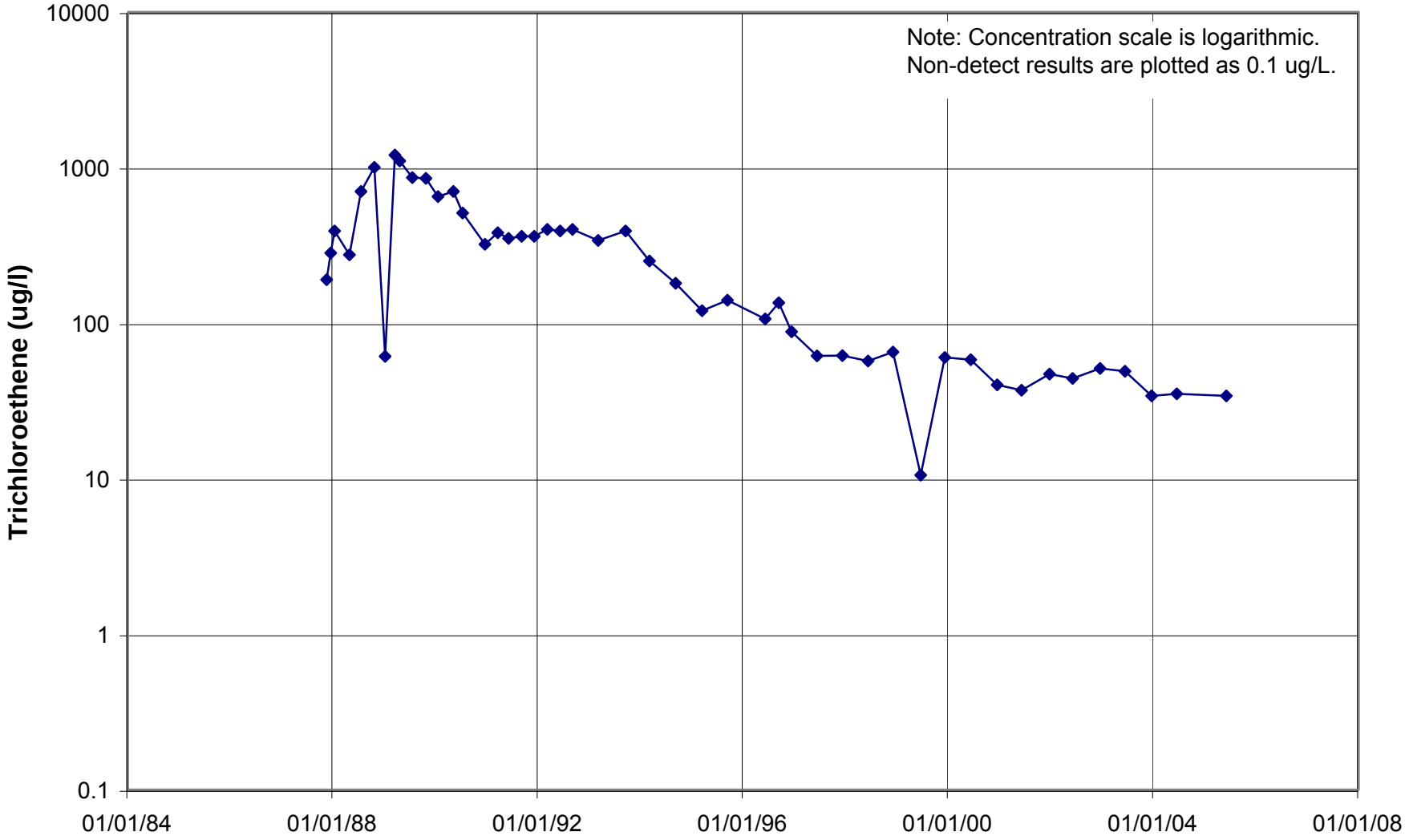
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03F302 (B1)



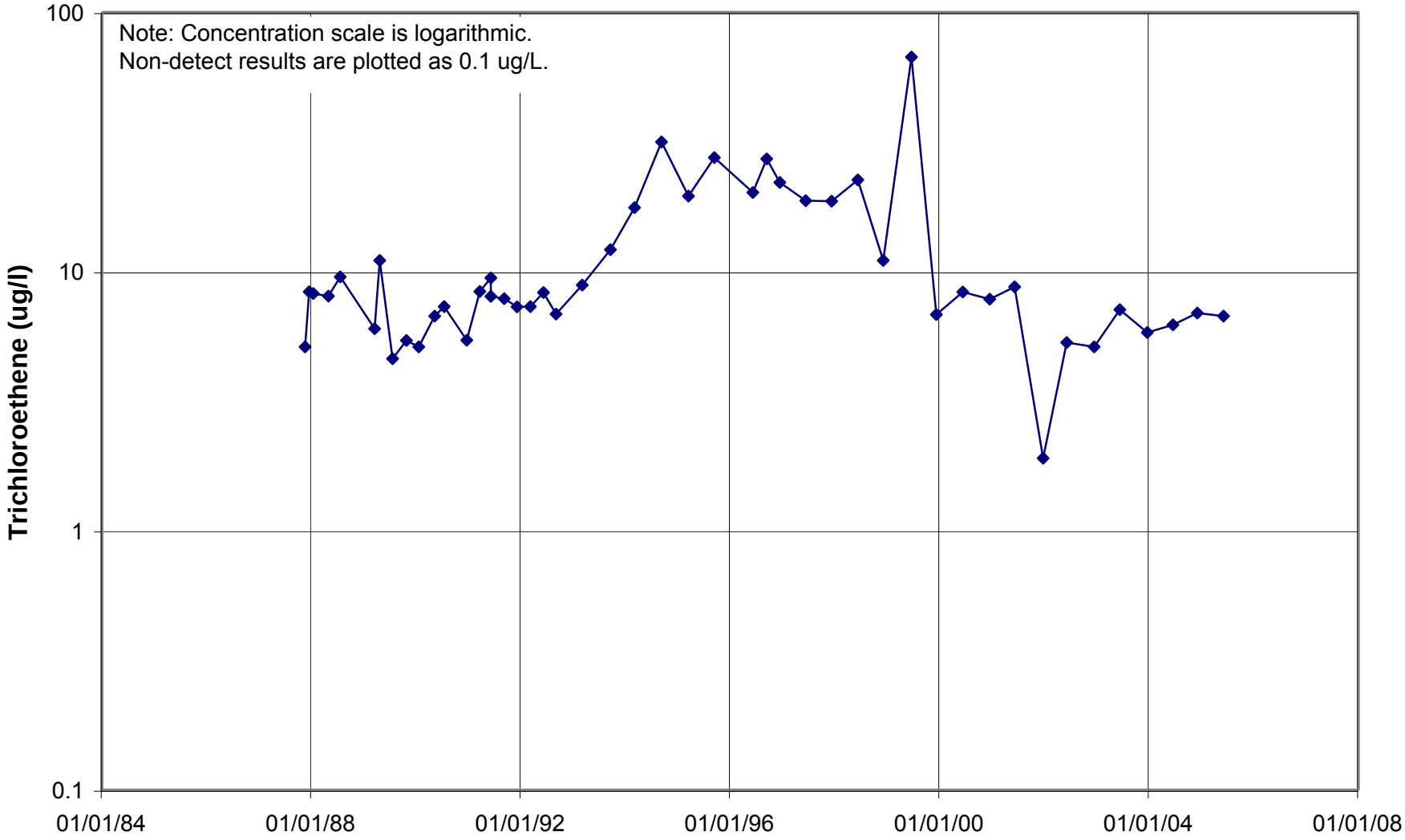
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03F303 (B2)



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03F304 (B3)



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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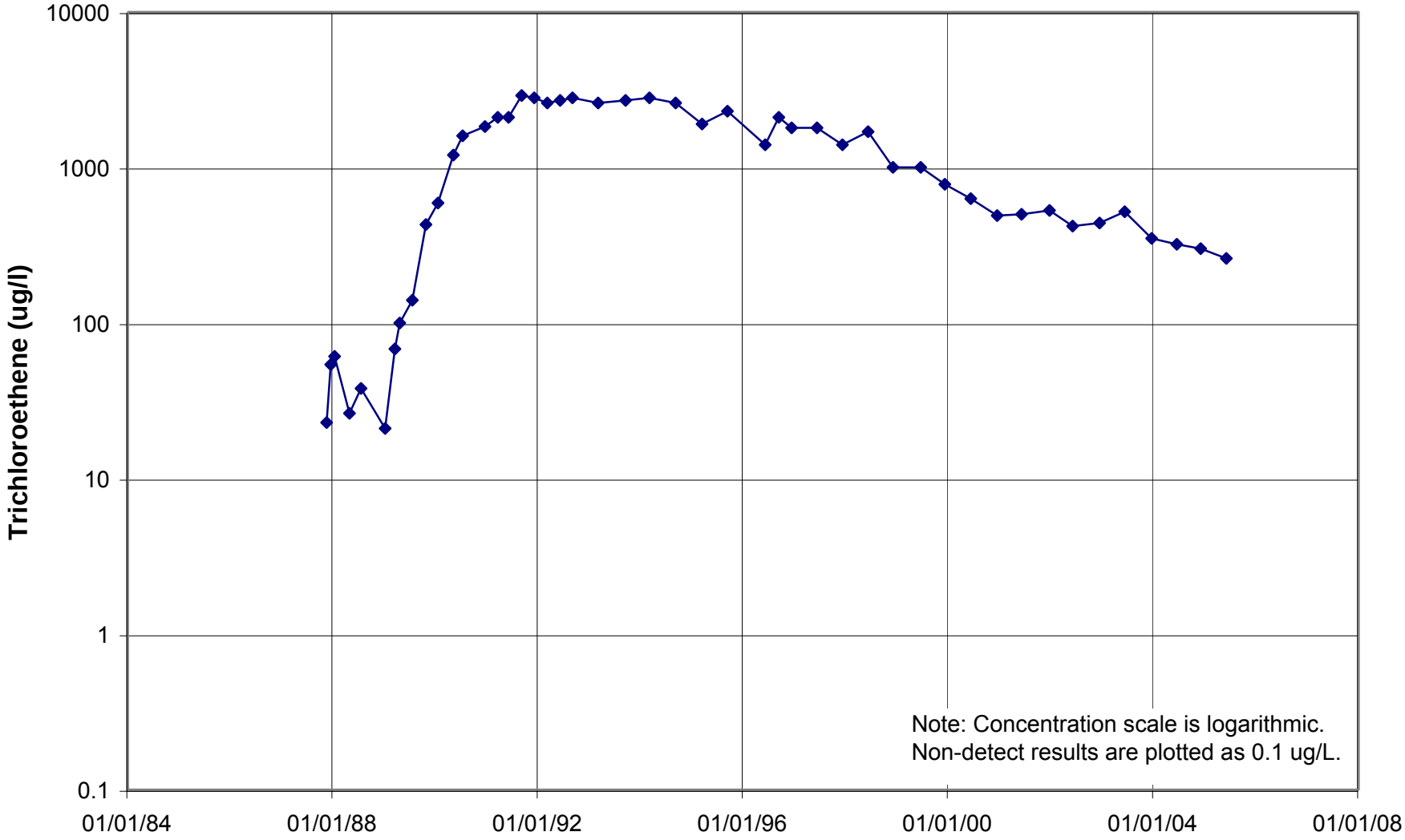

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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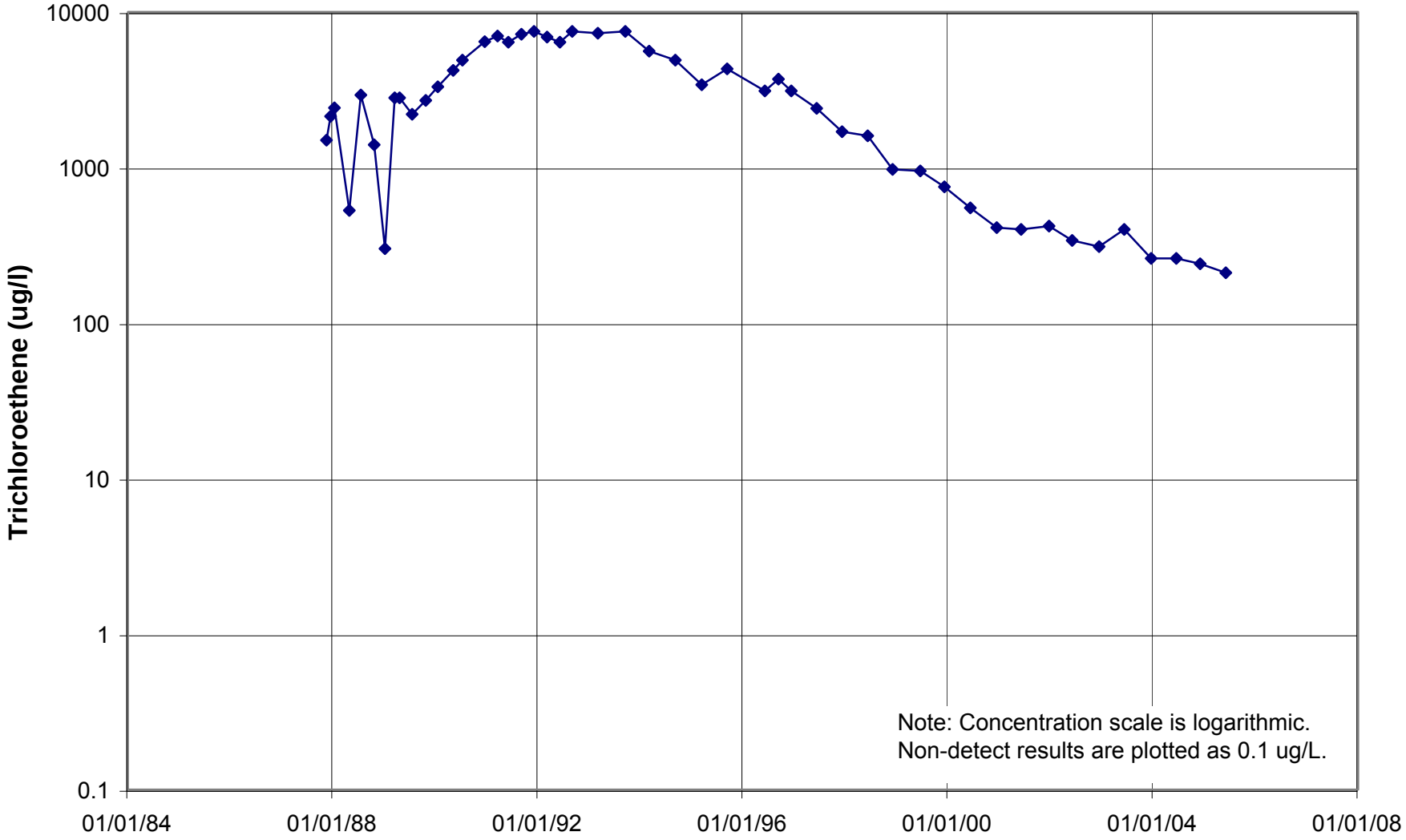

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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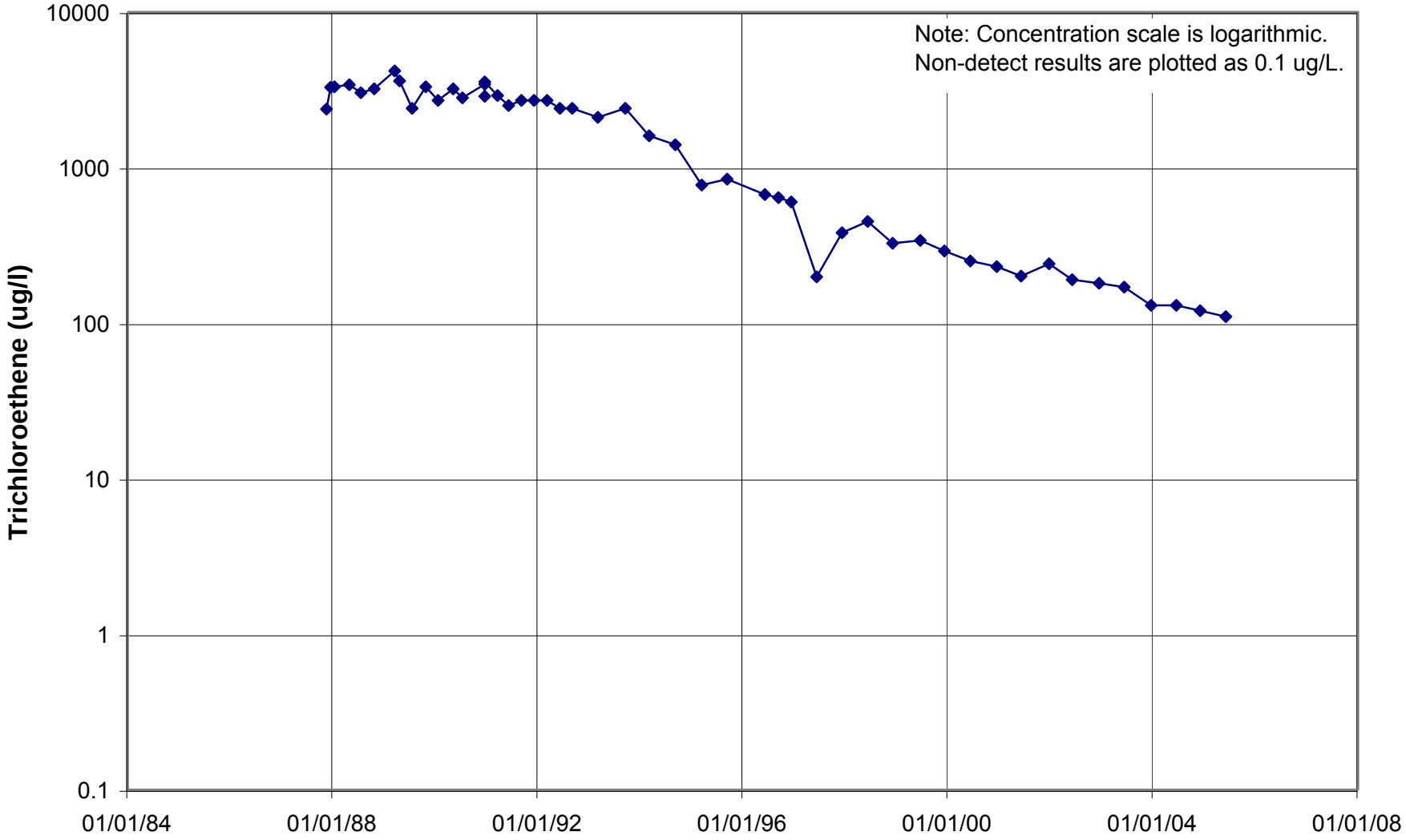

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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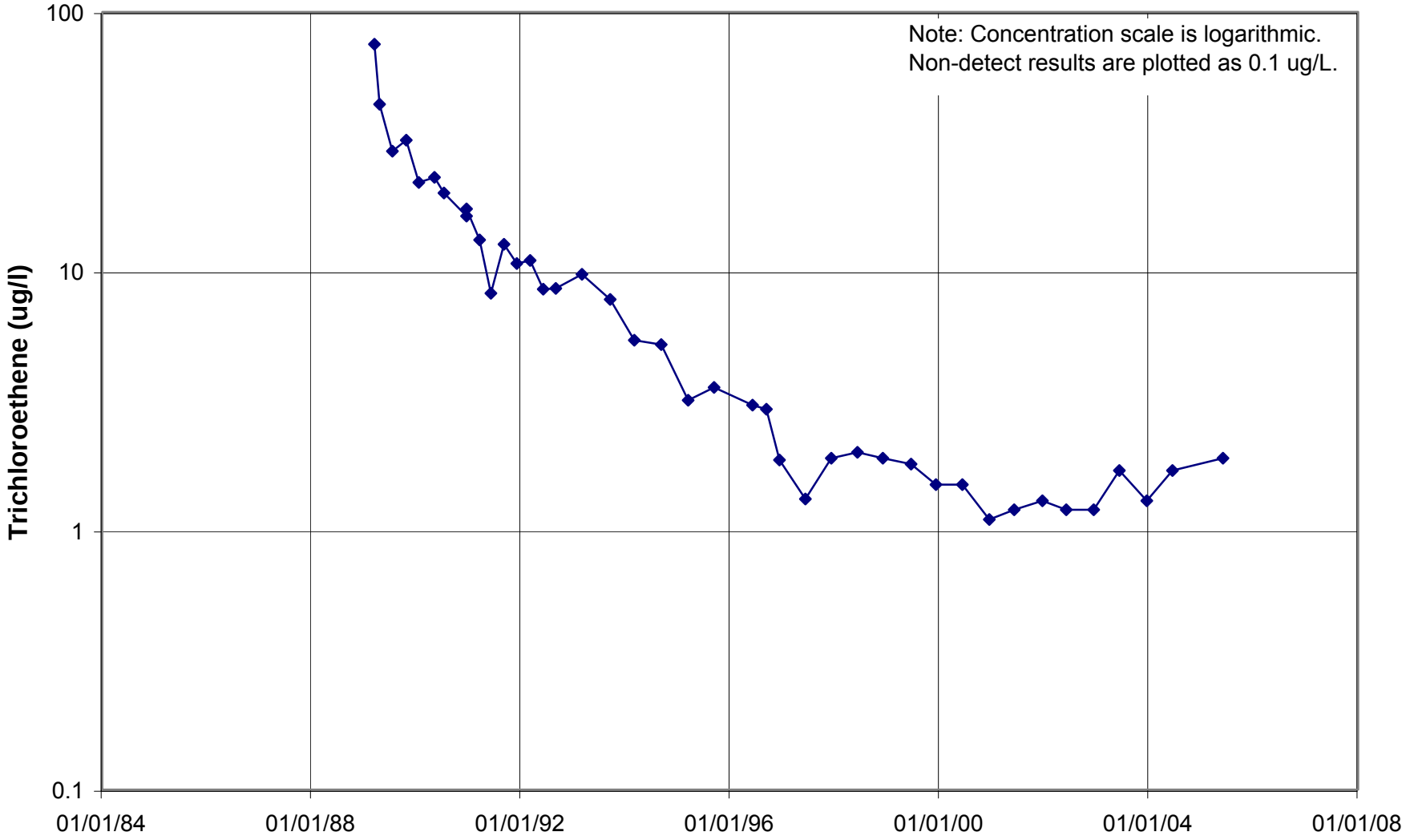

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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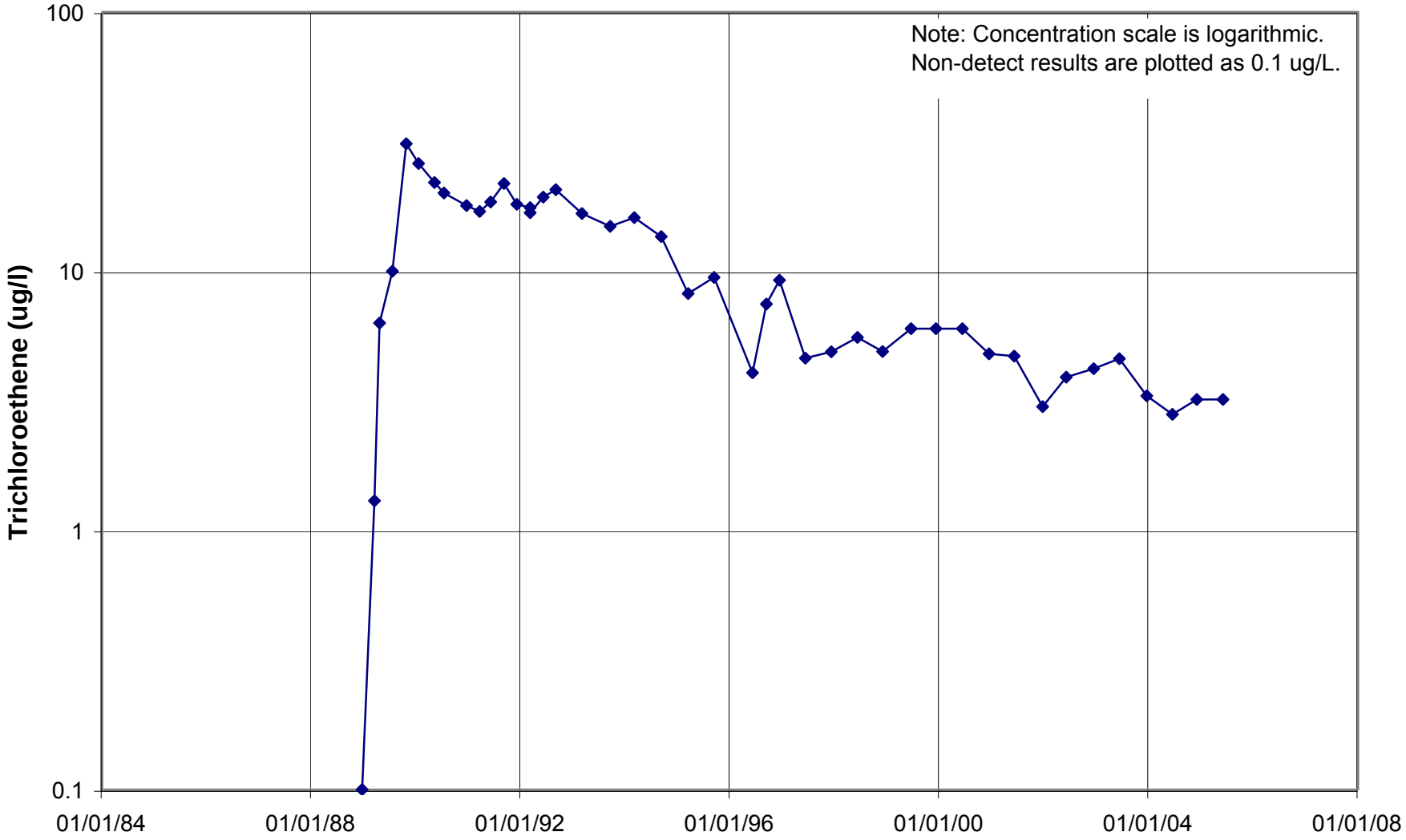

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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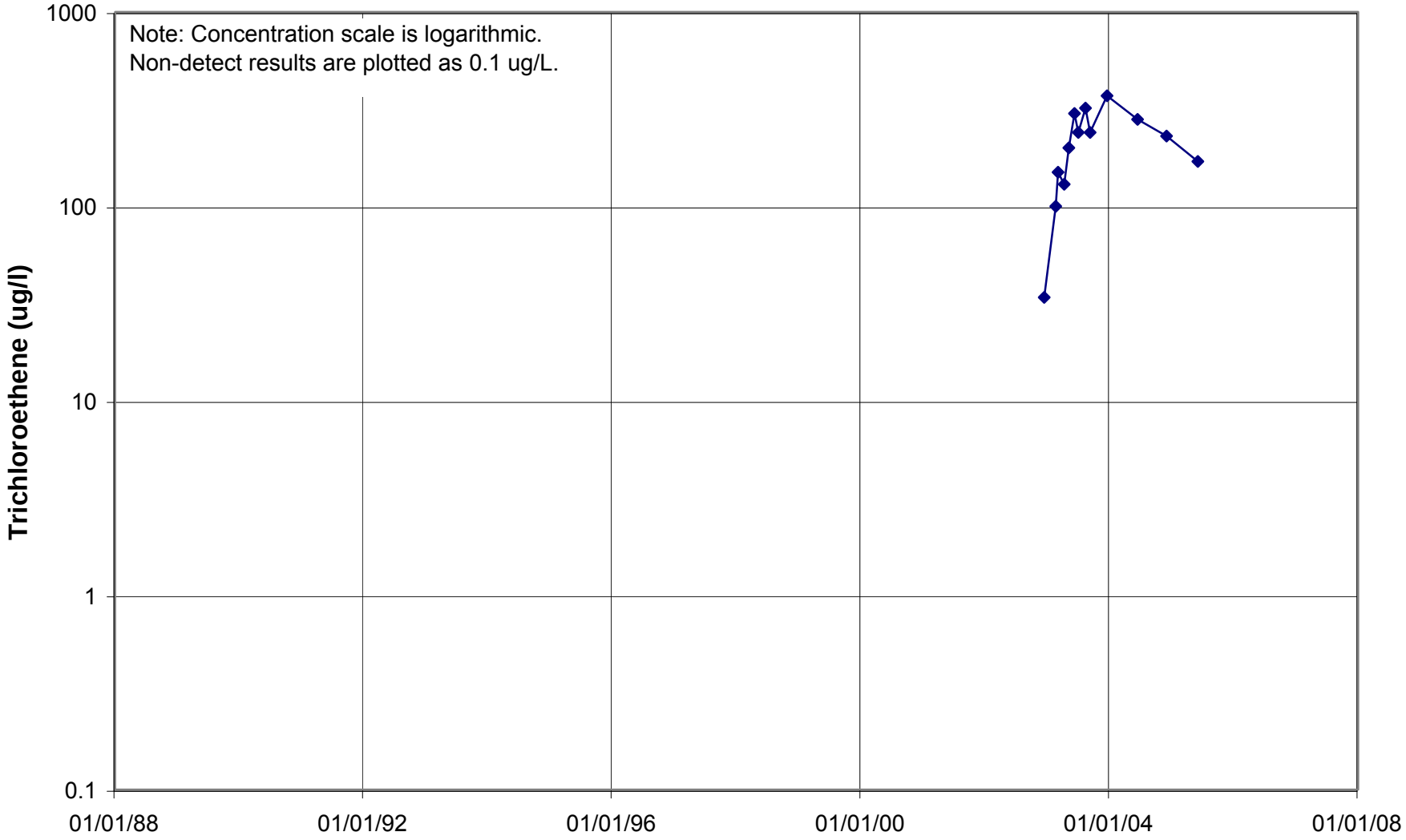
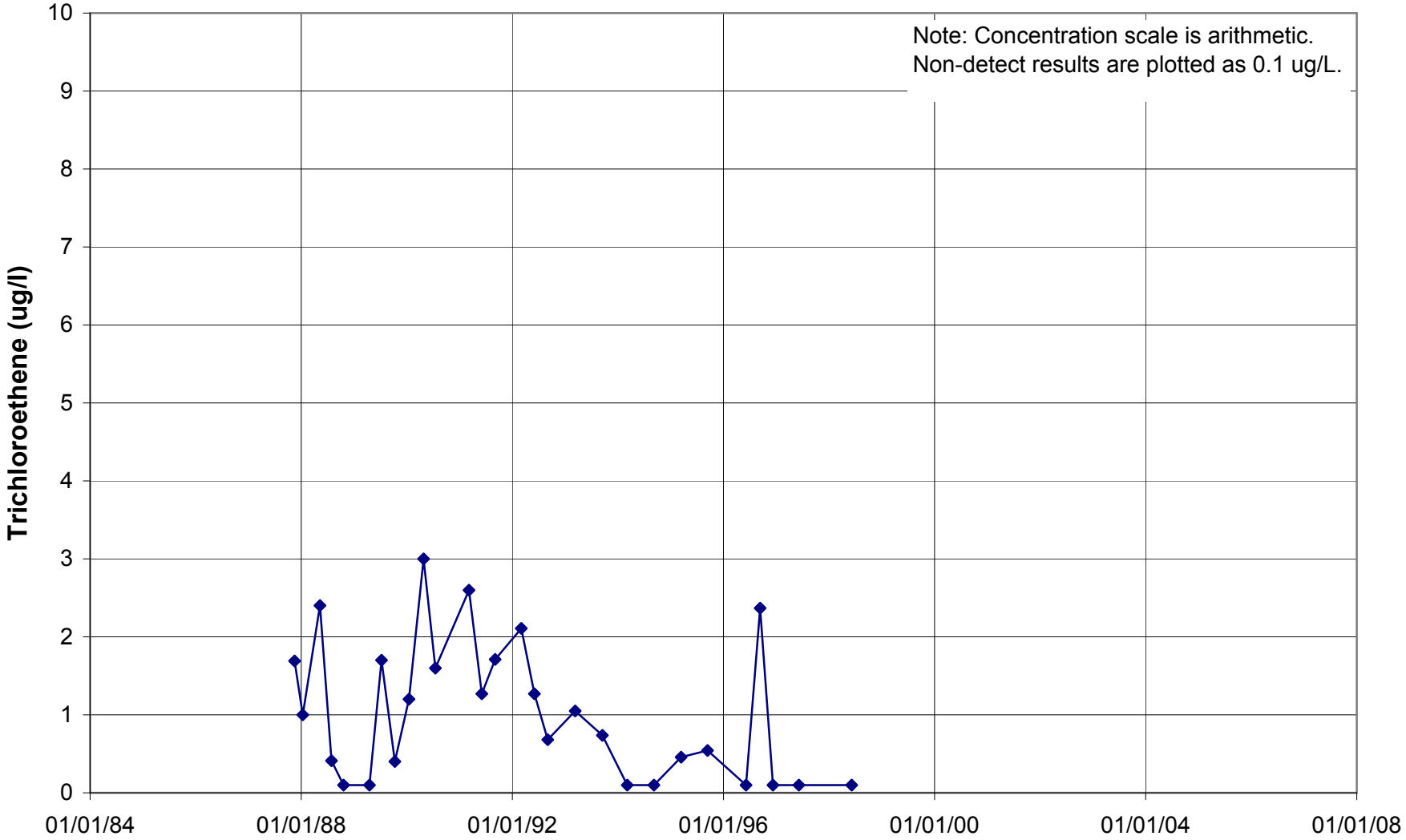


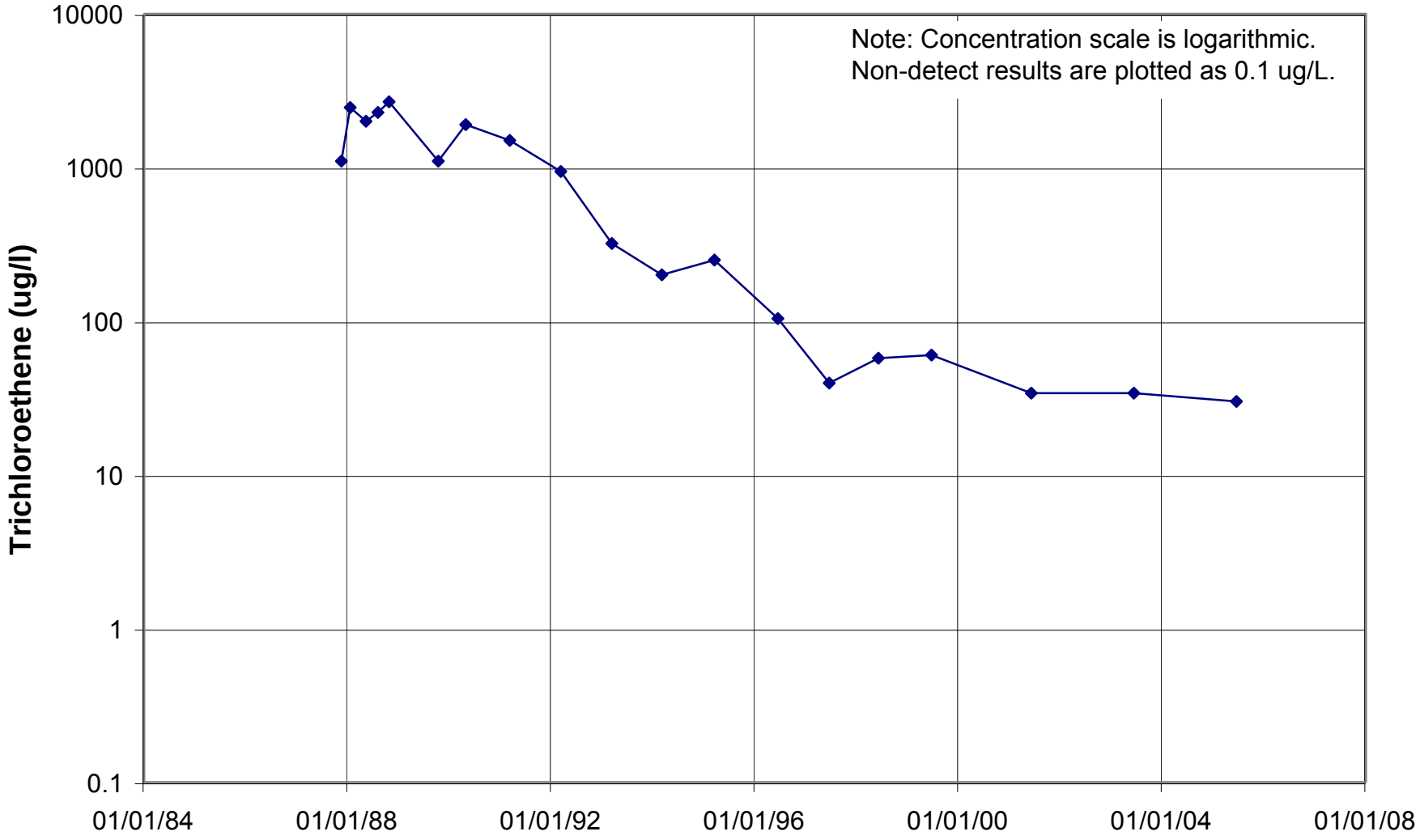
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L001



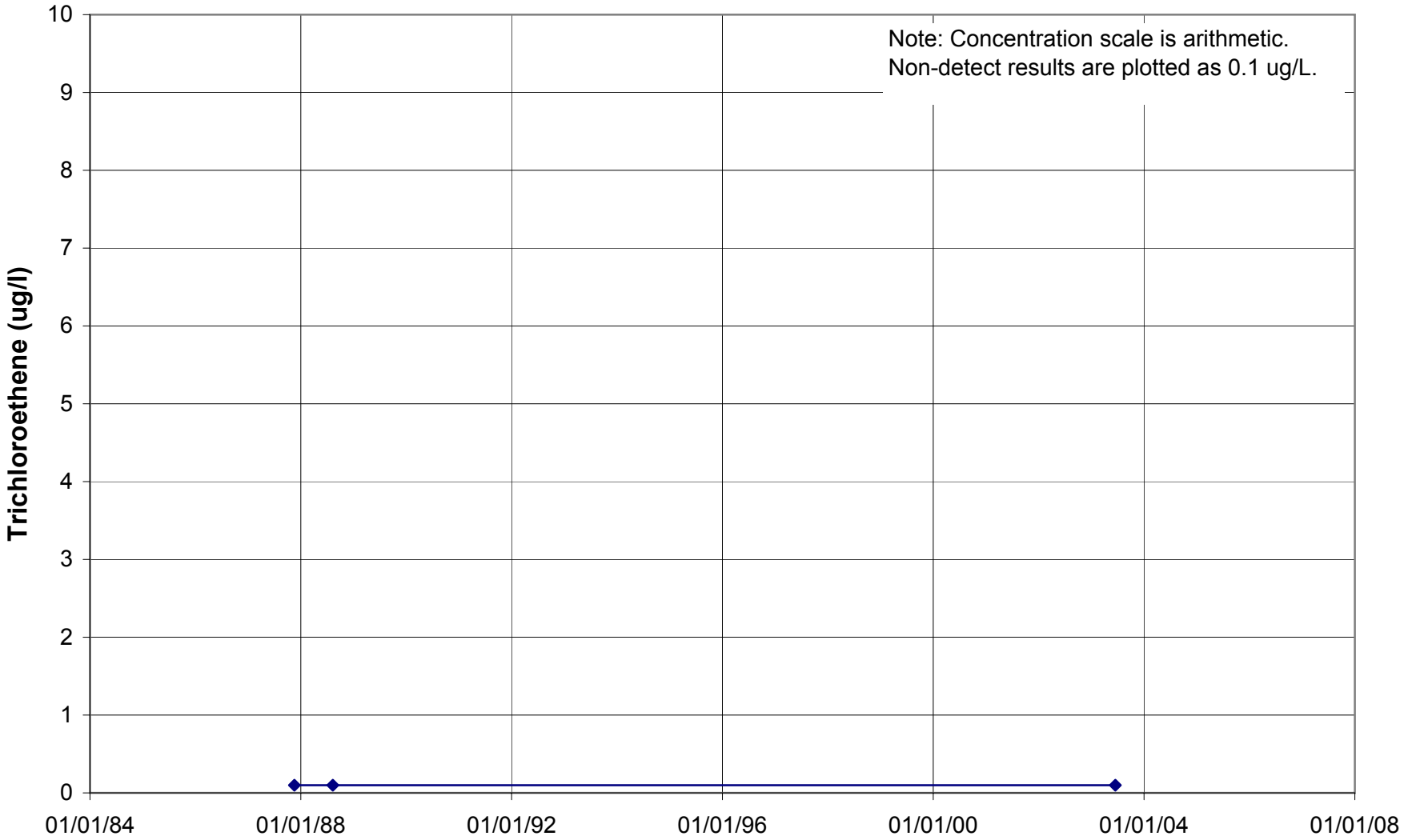
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L002



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L003



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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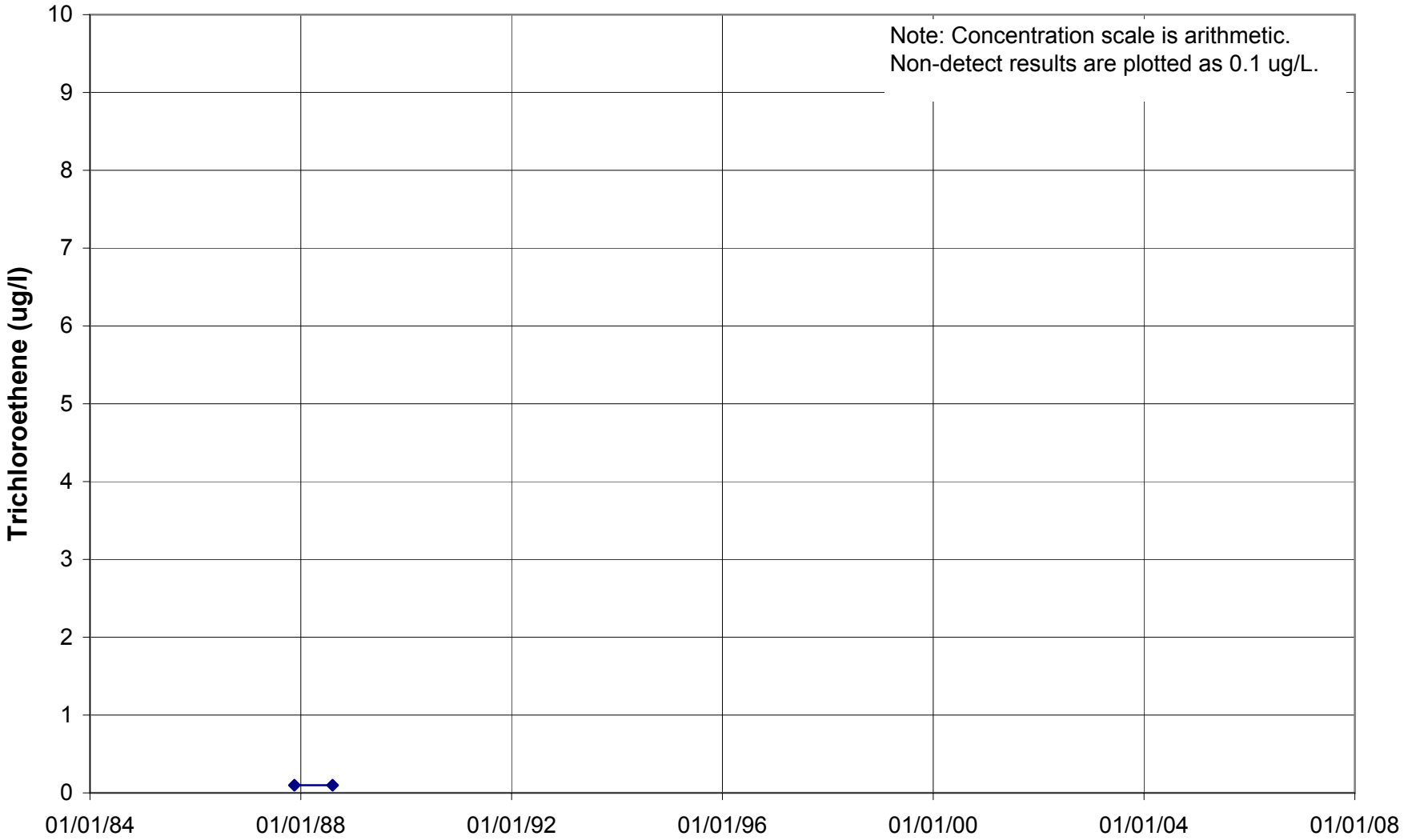

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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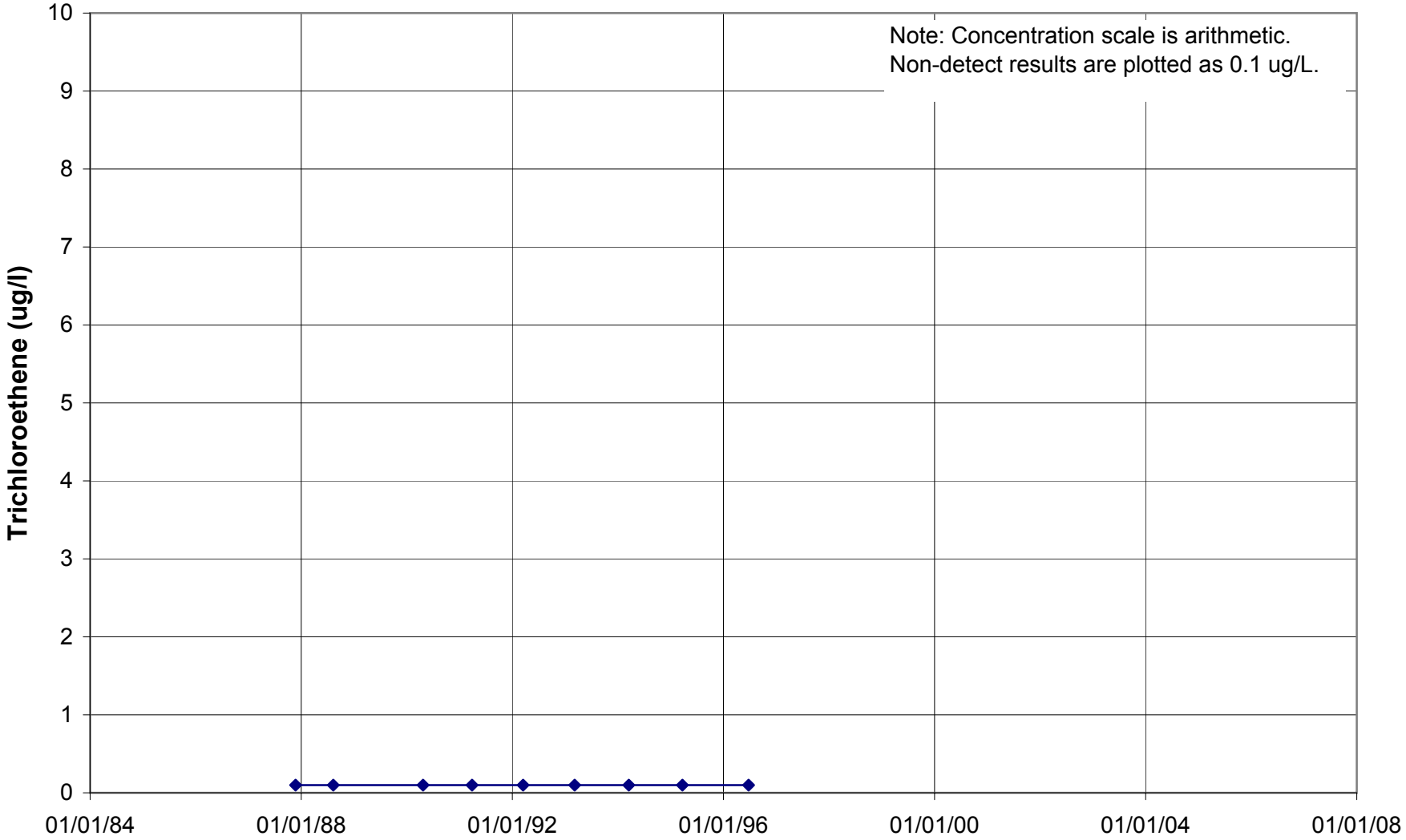

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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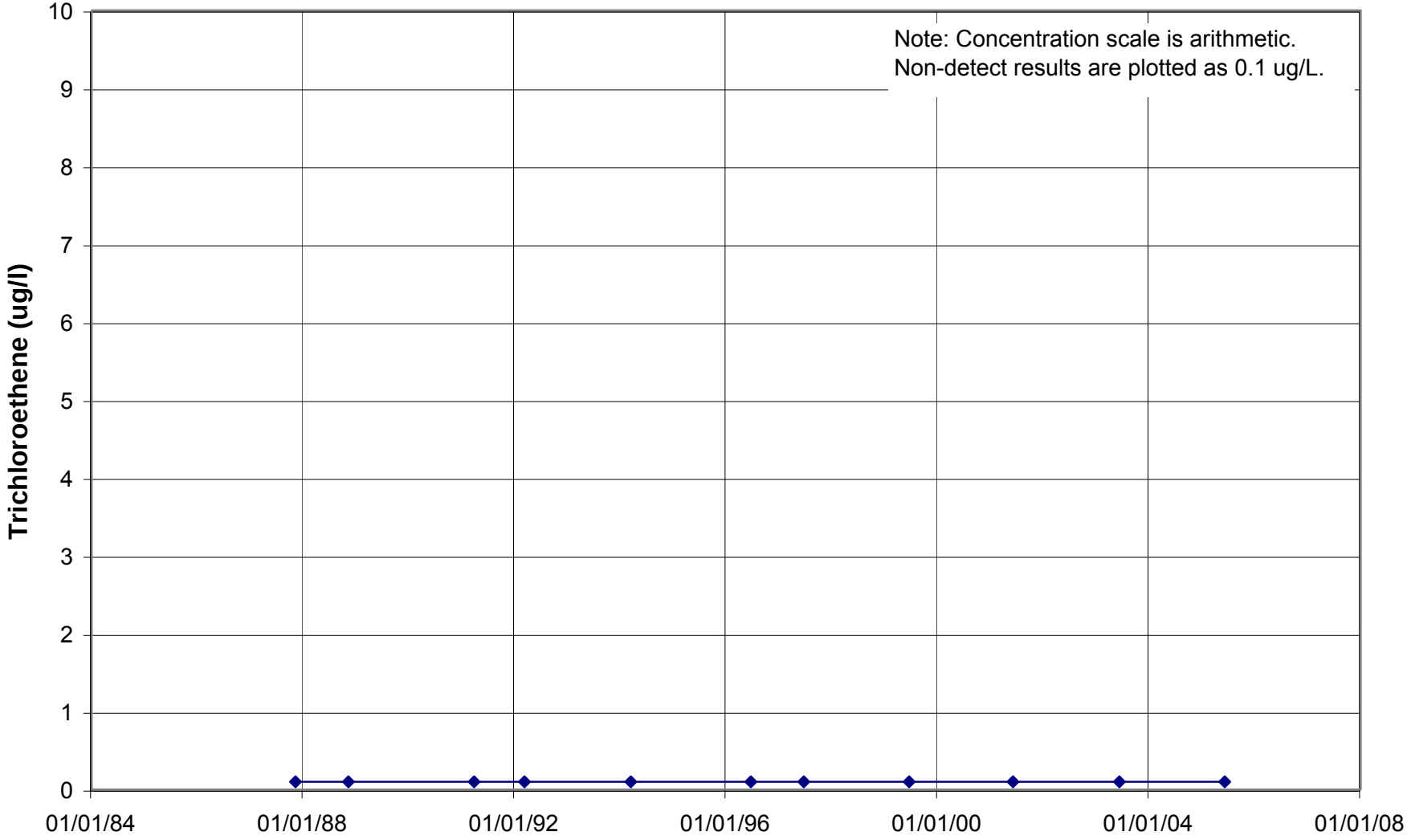
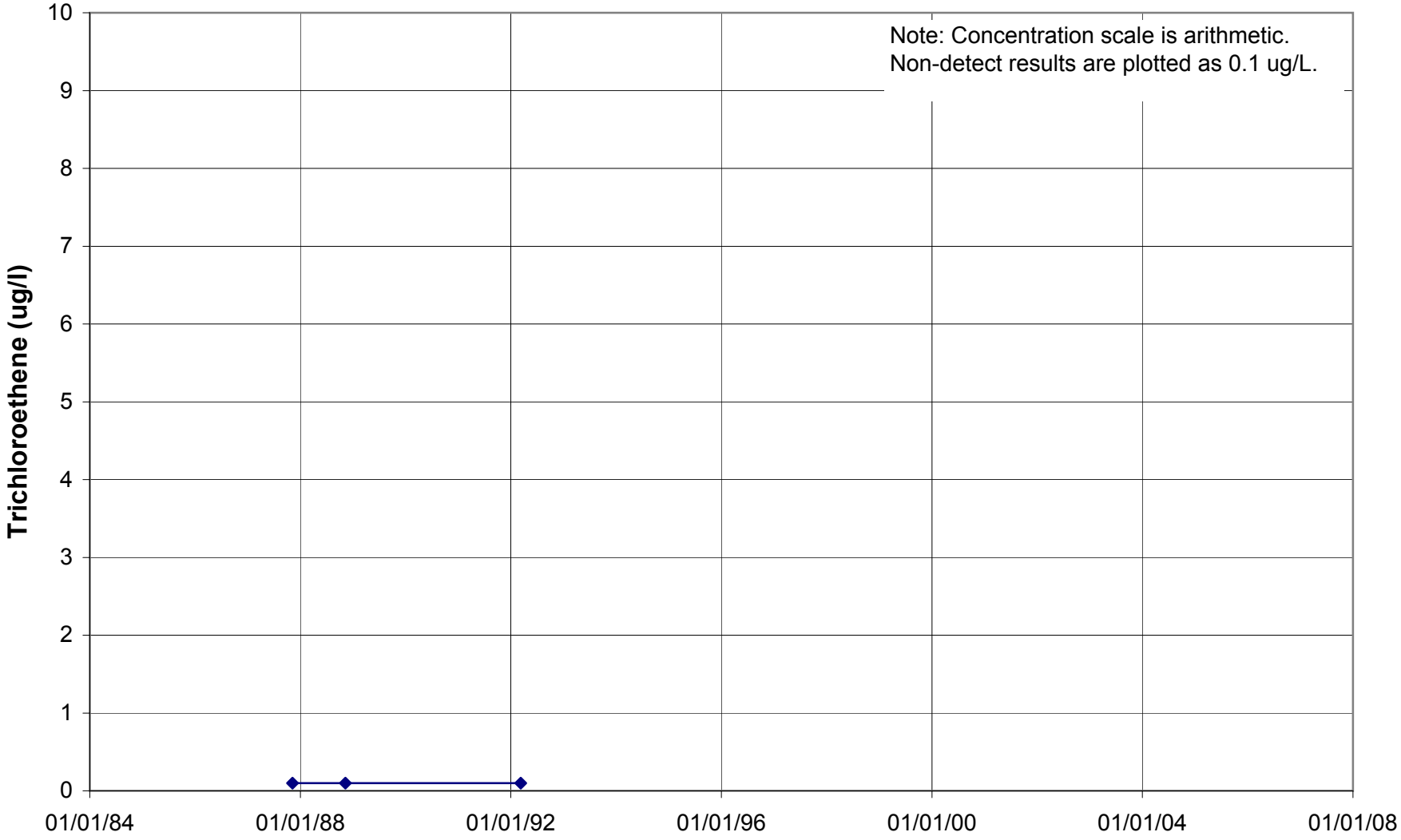


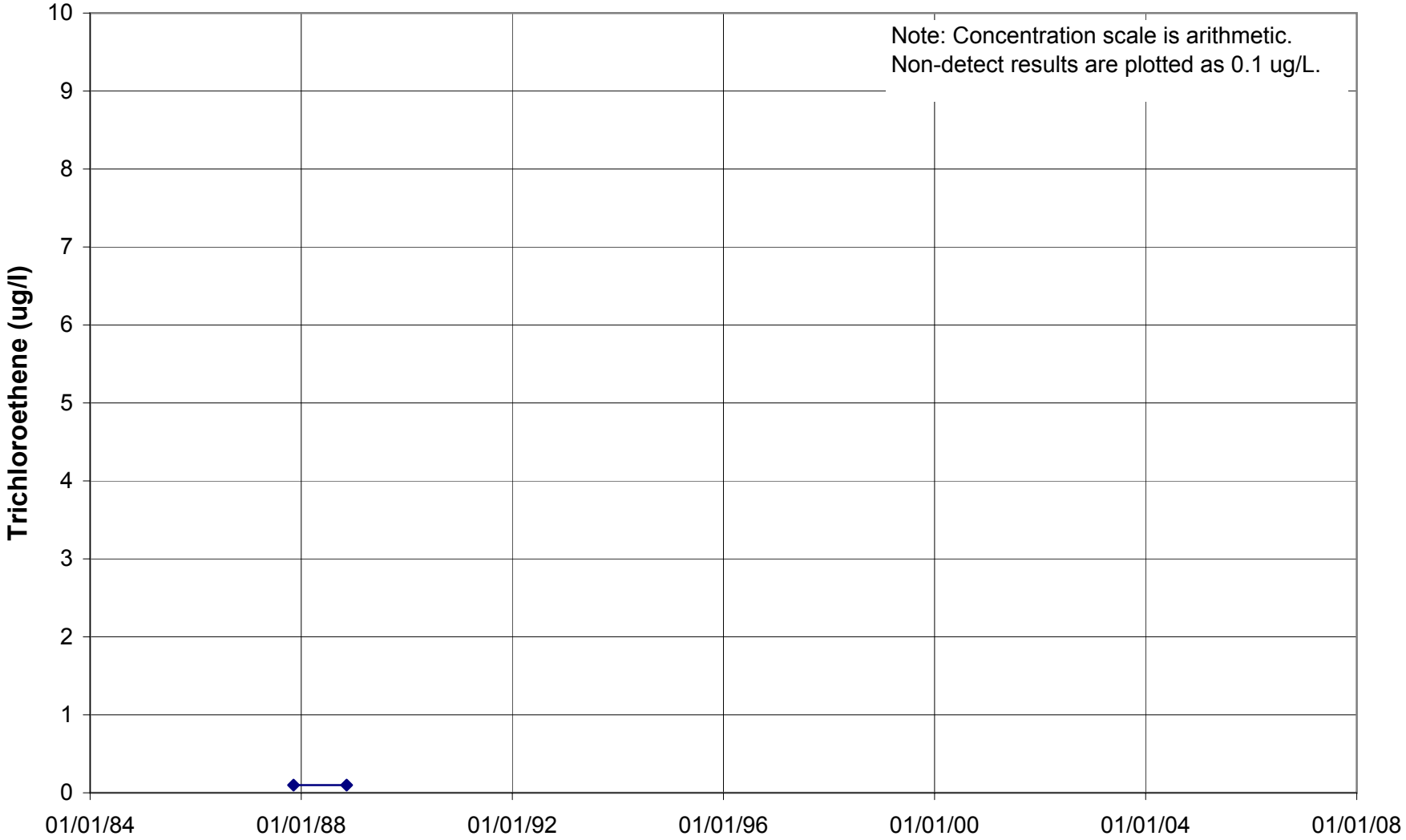
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L010



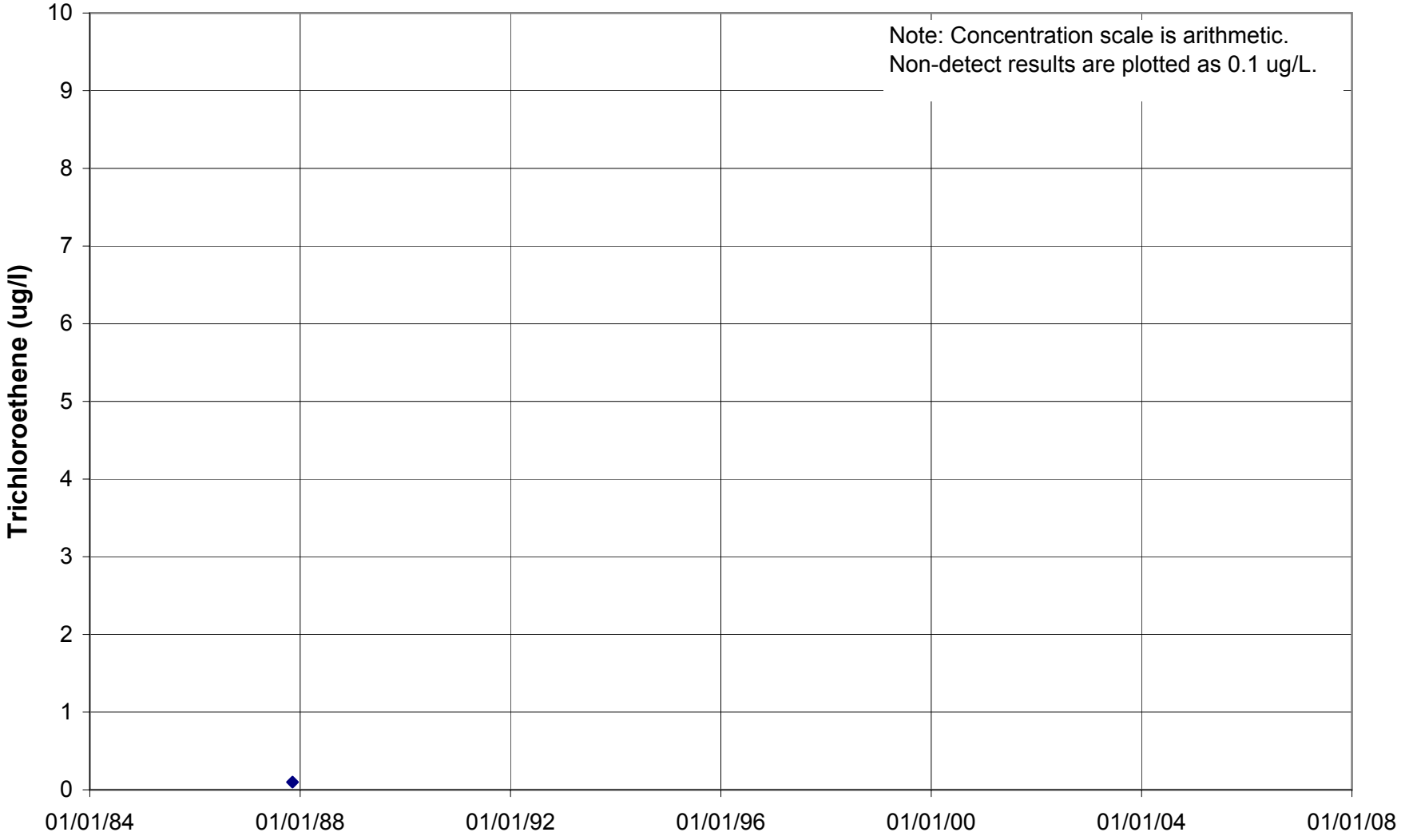
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L012



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L013



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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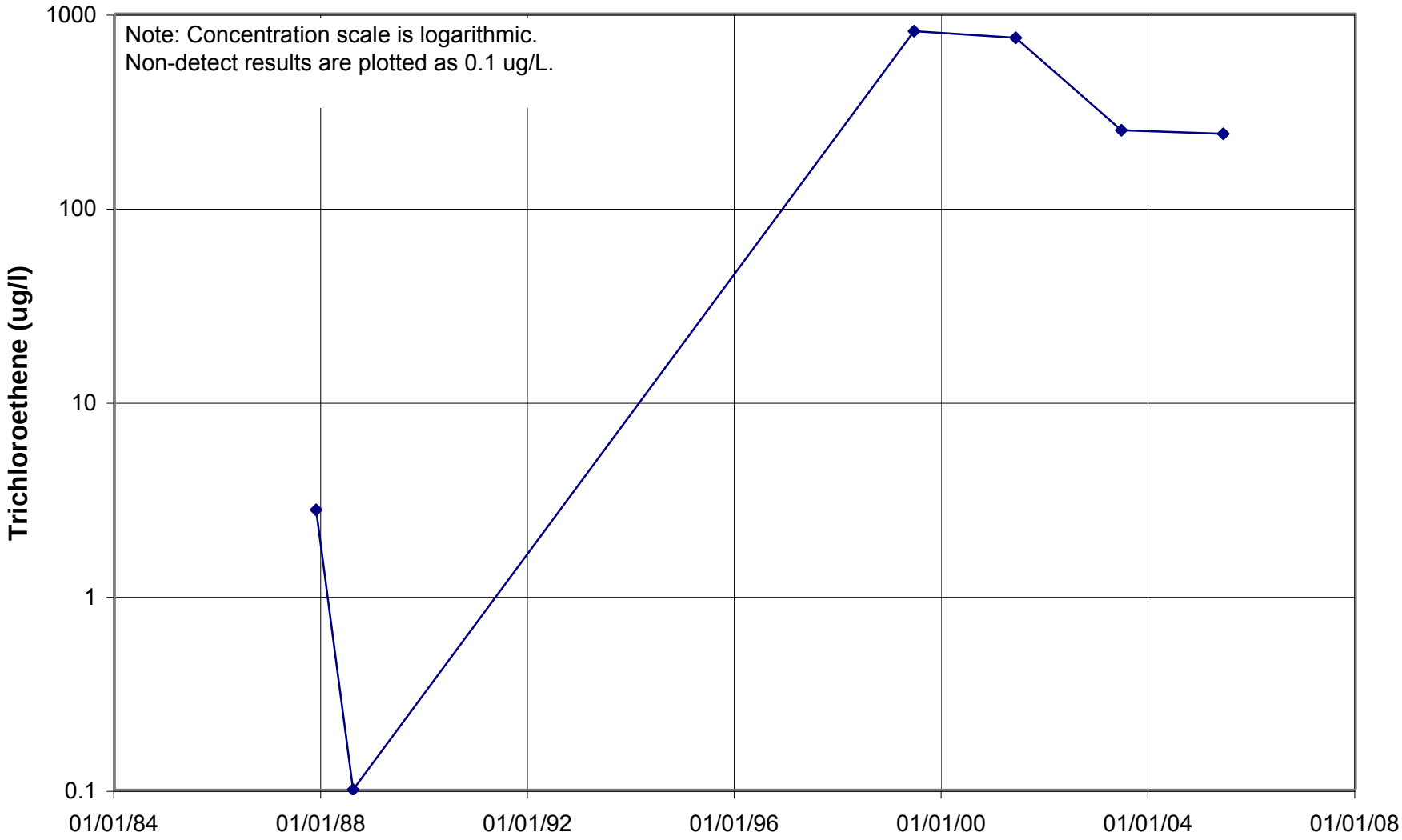

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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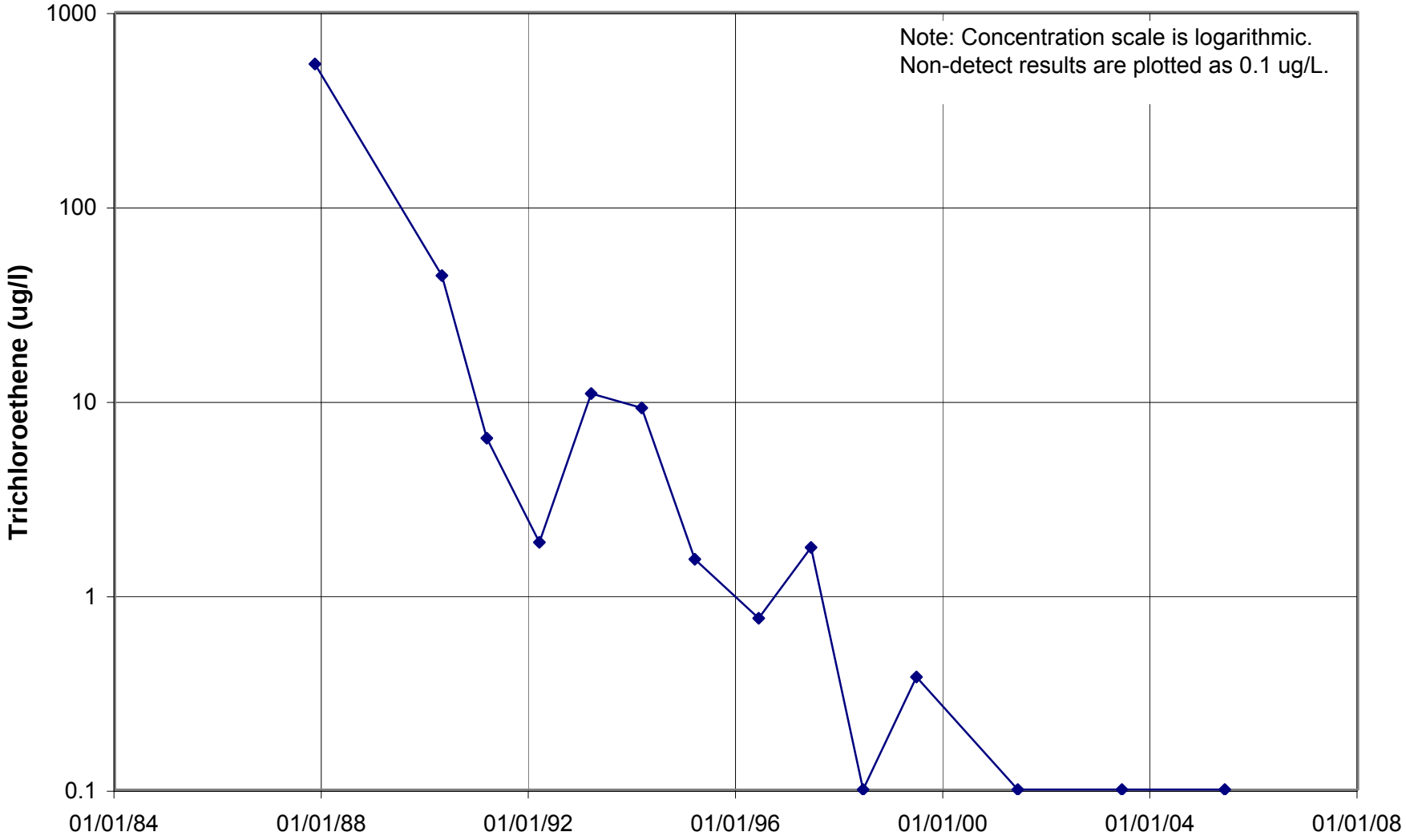

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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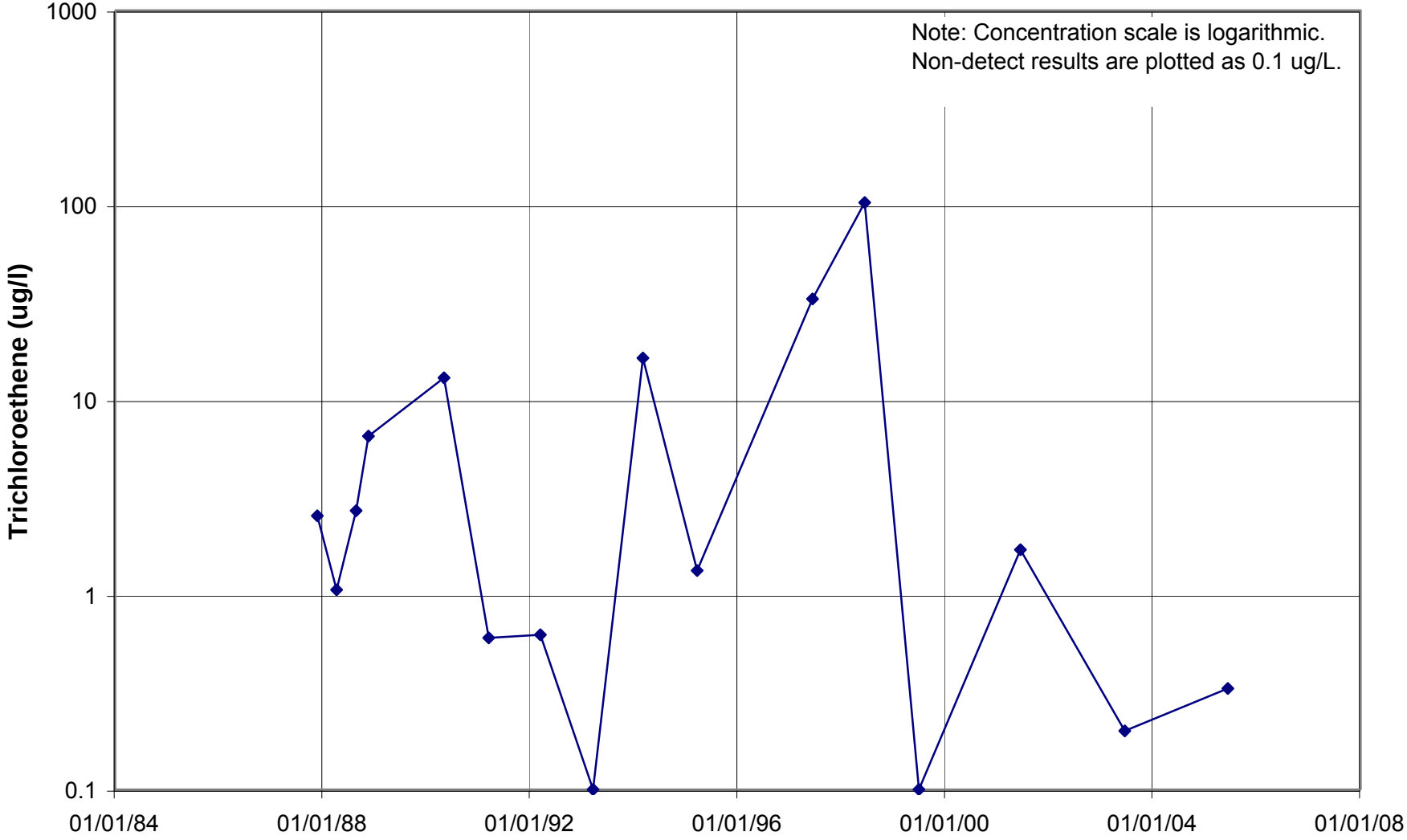
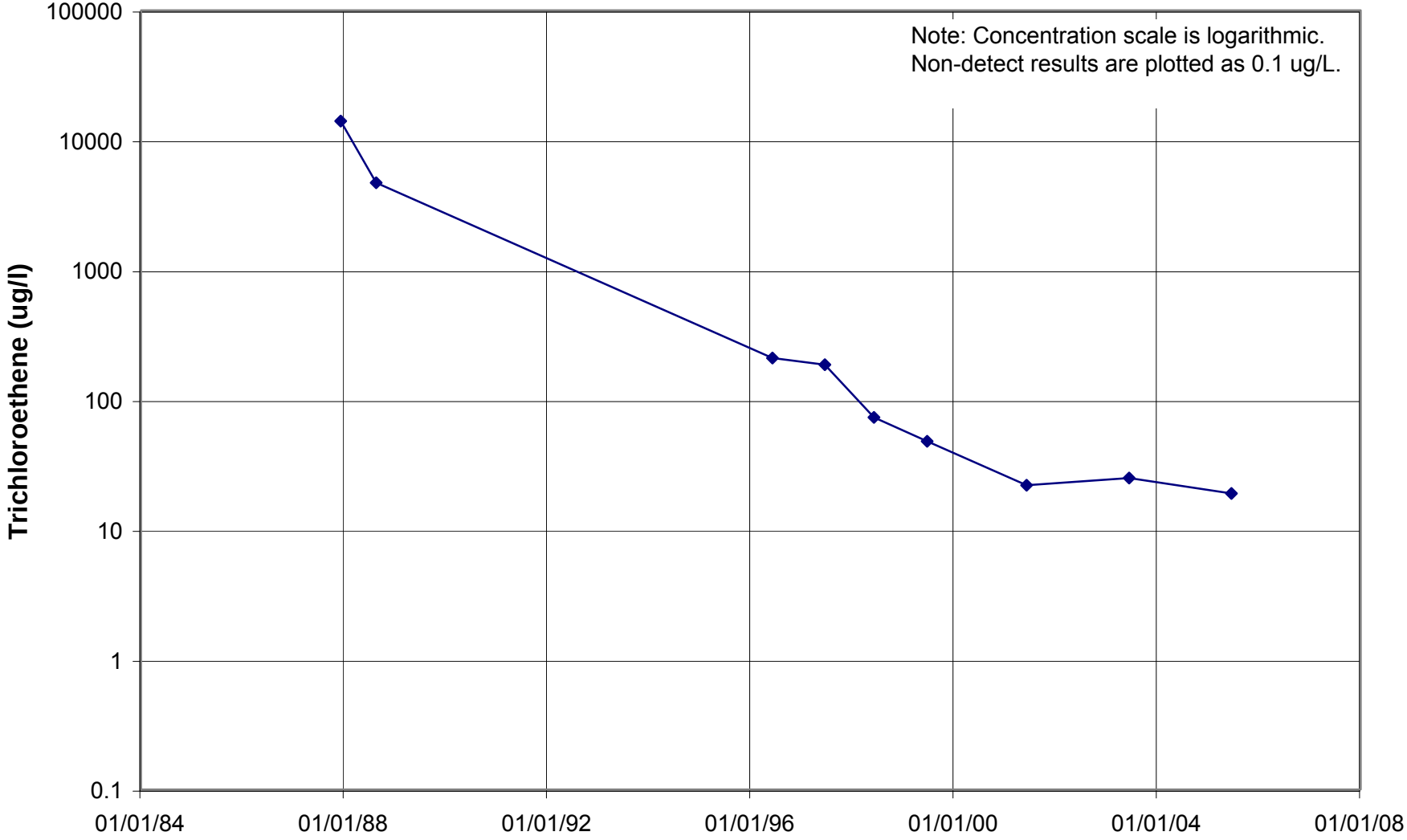


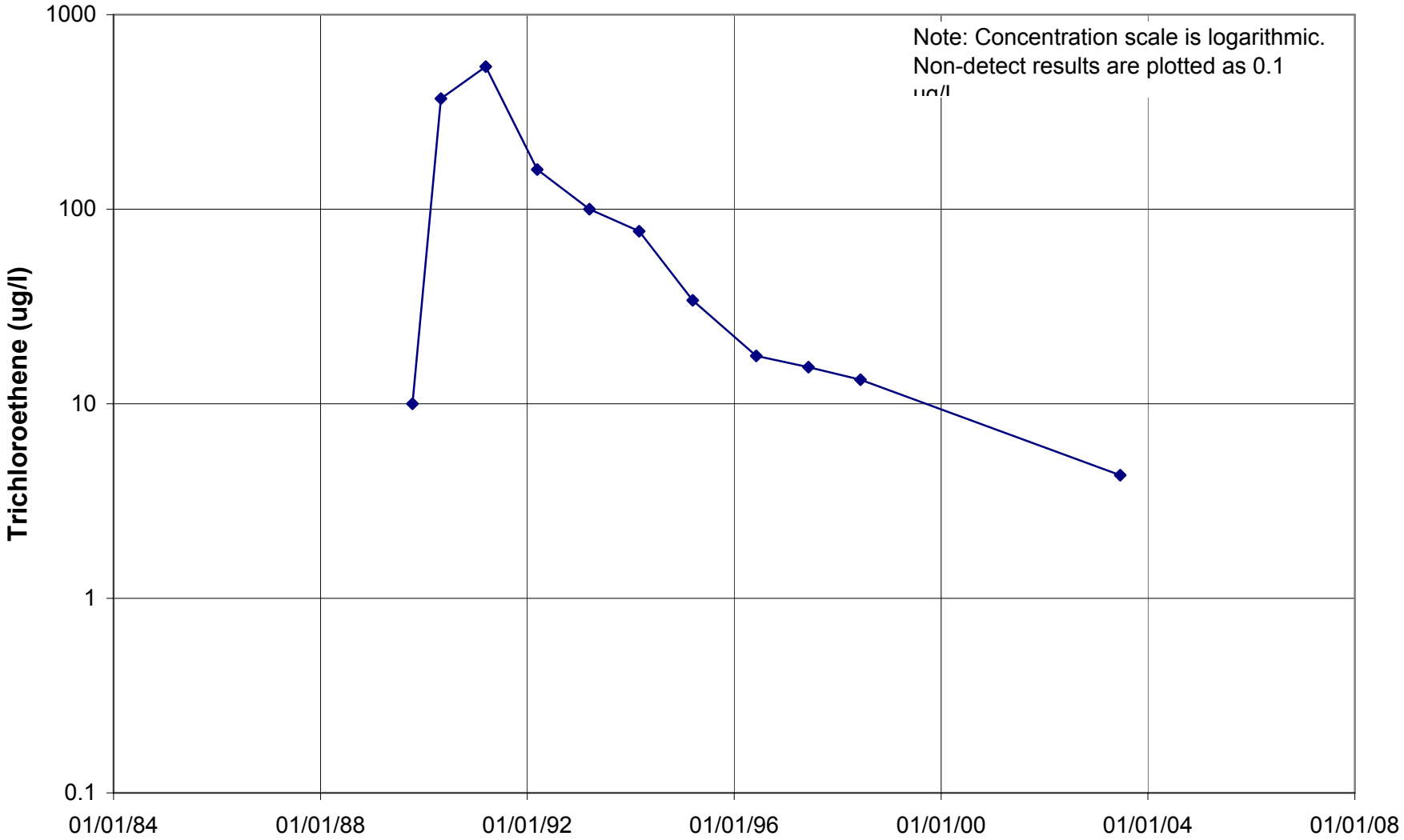
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L020



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L021



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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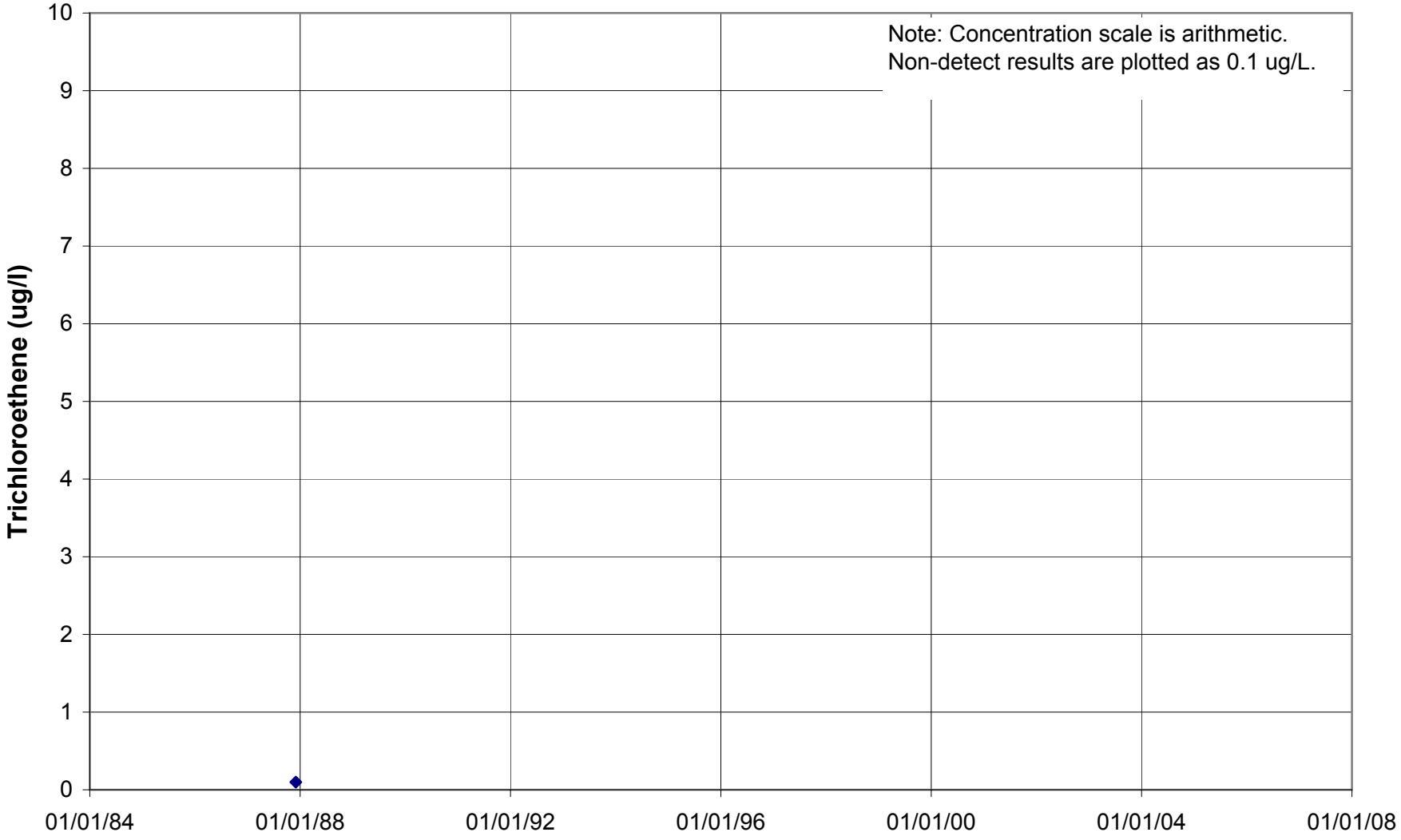

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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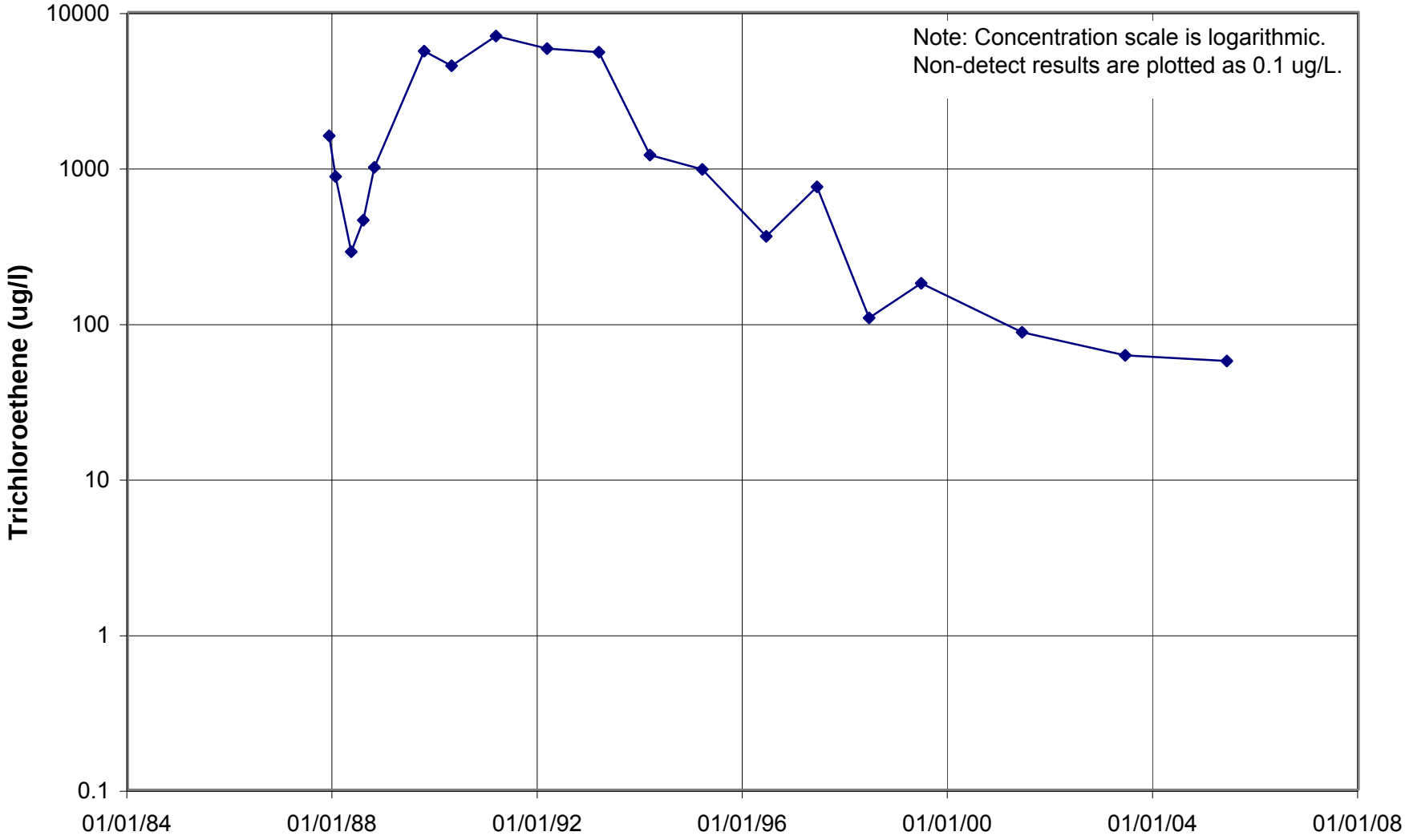

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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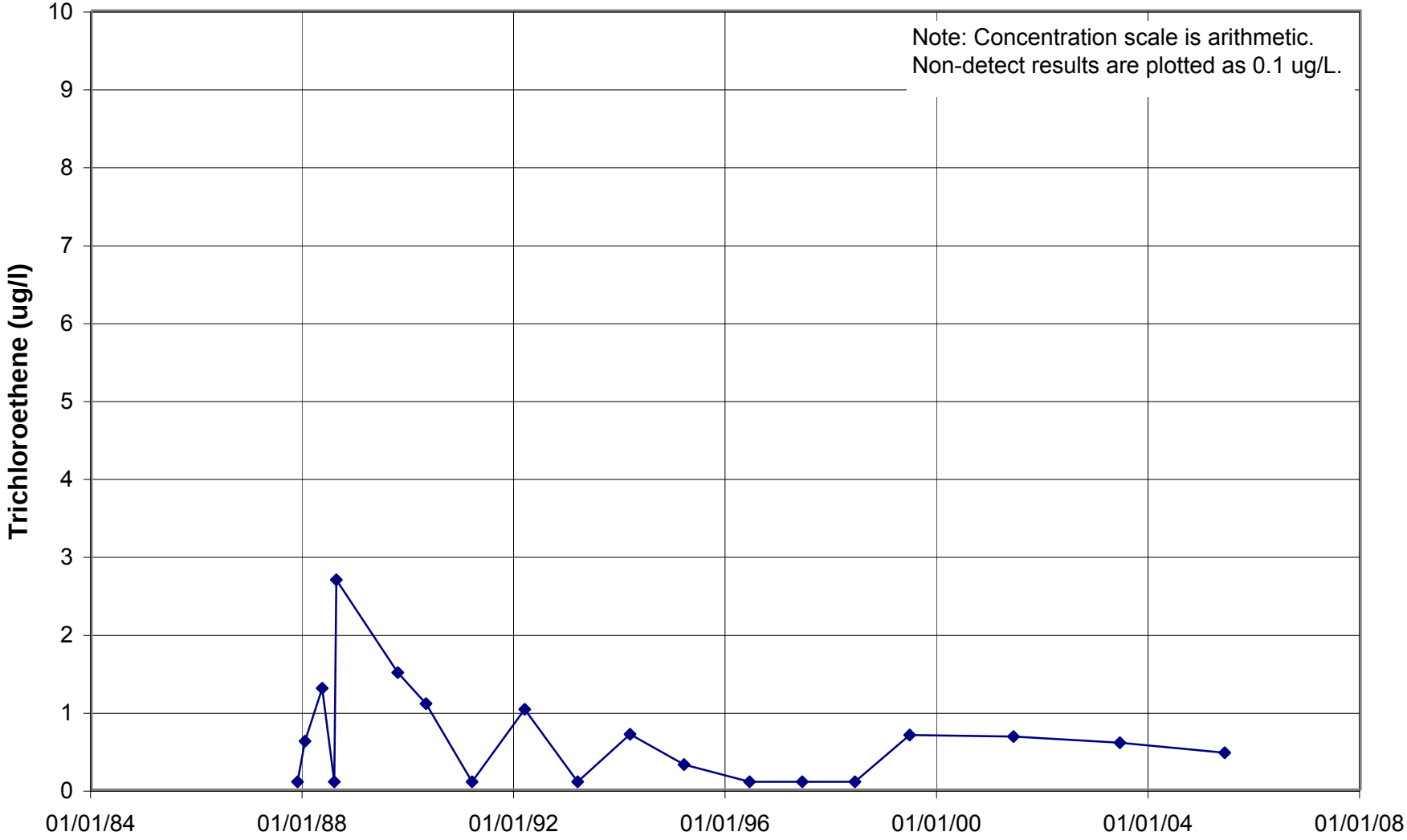

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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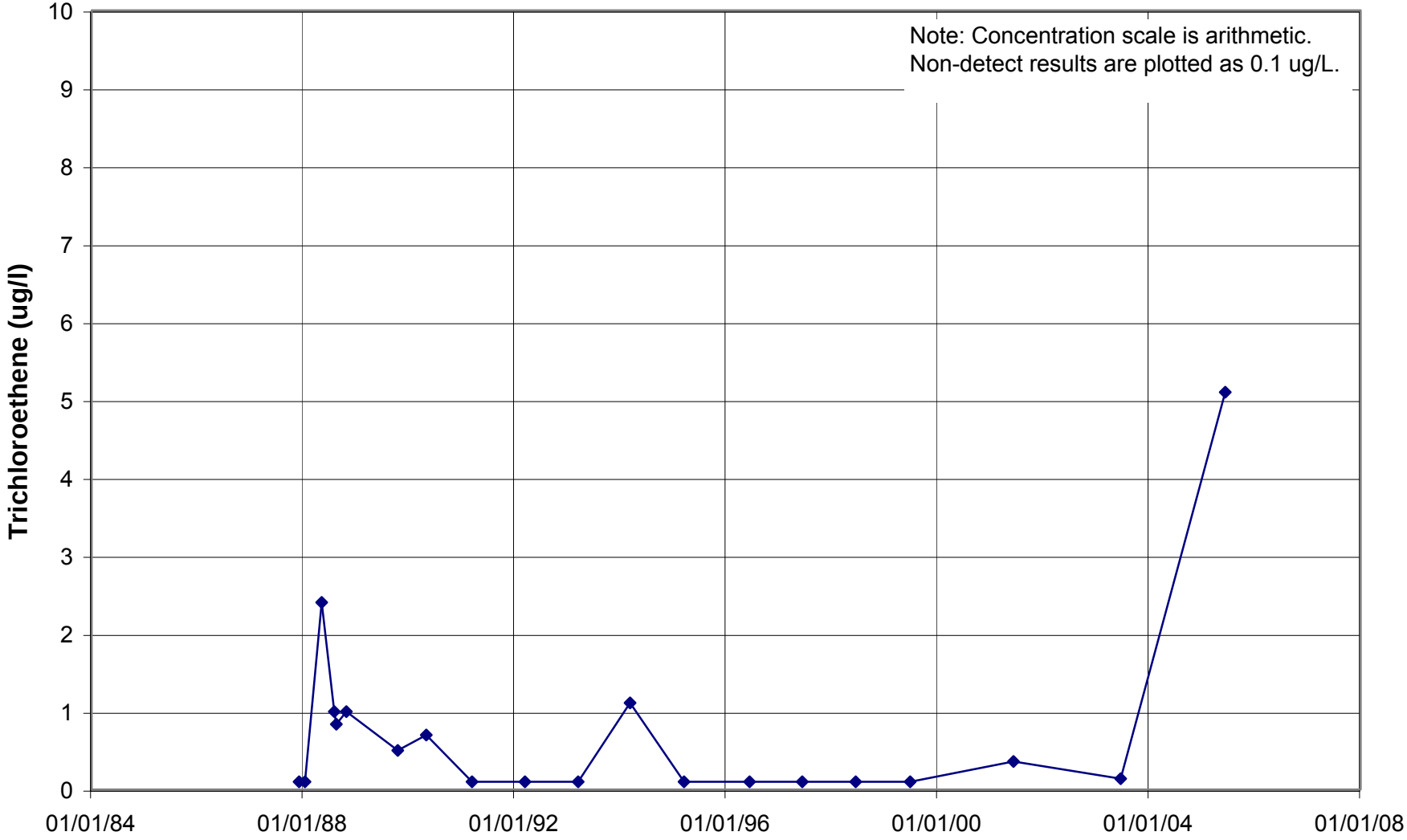

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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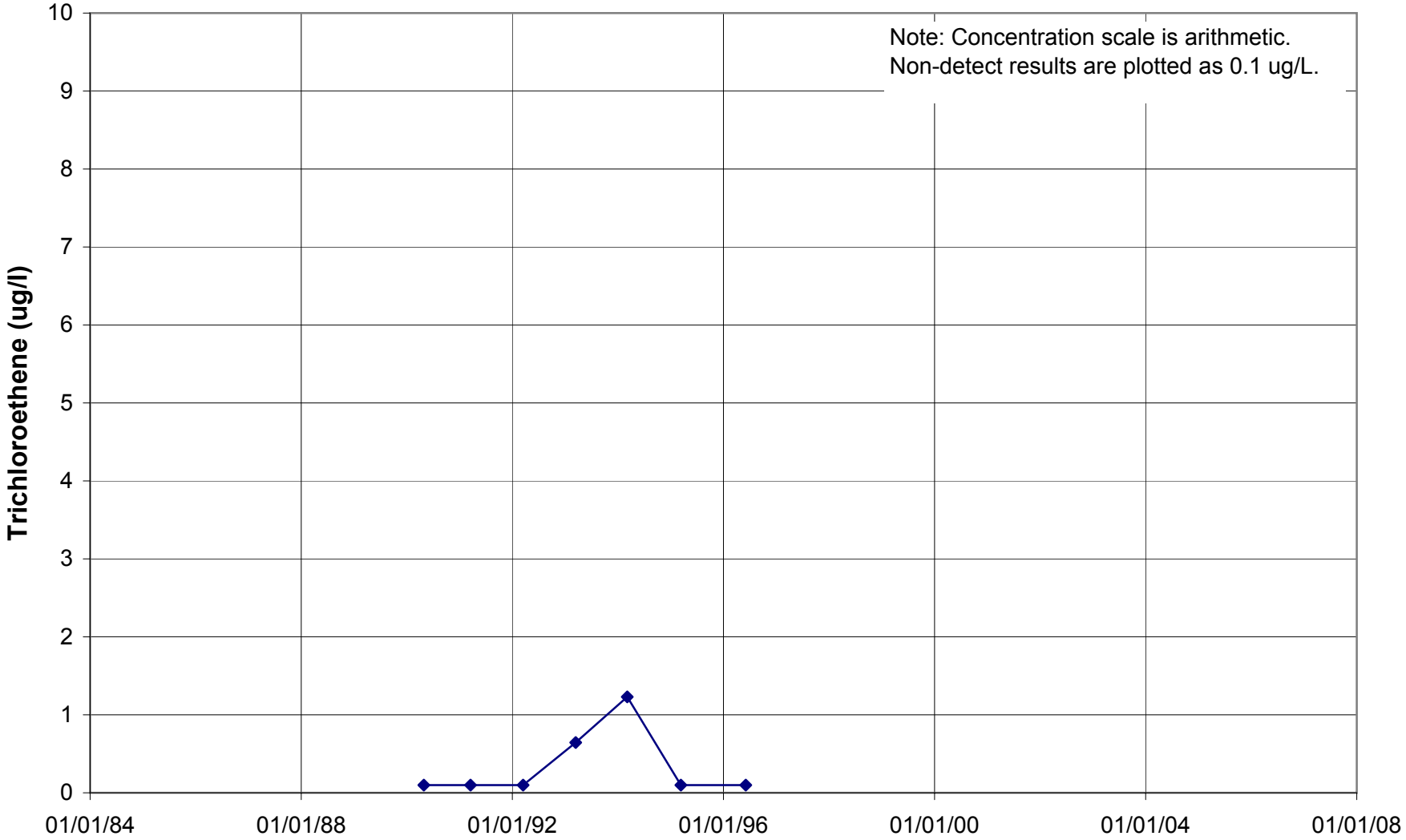

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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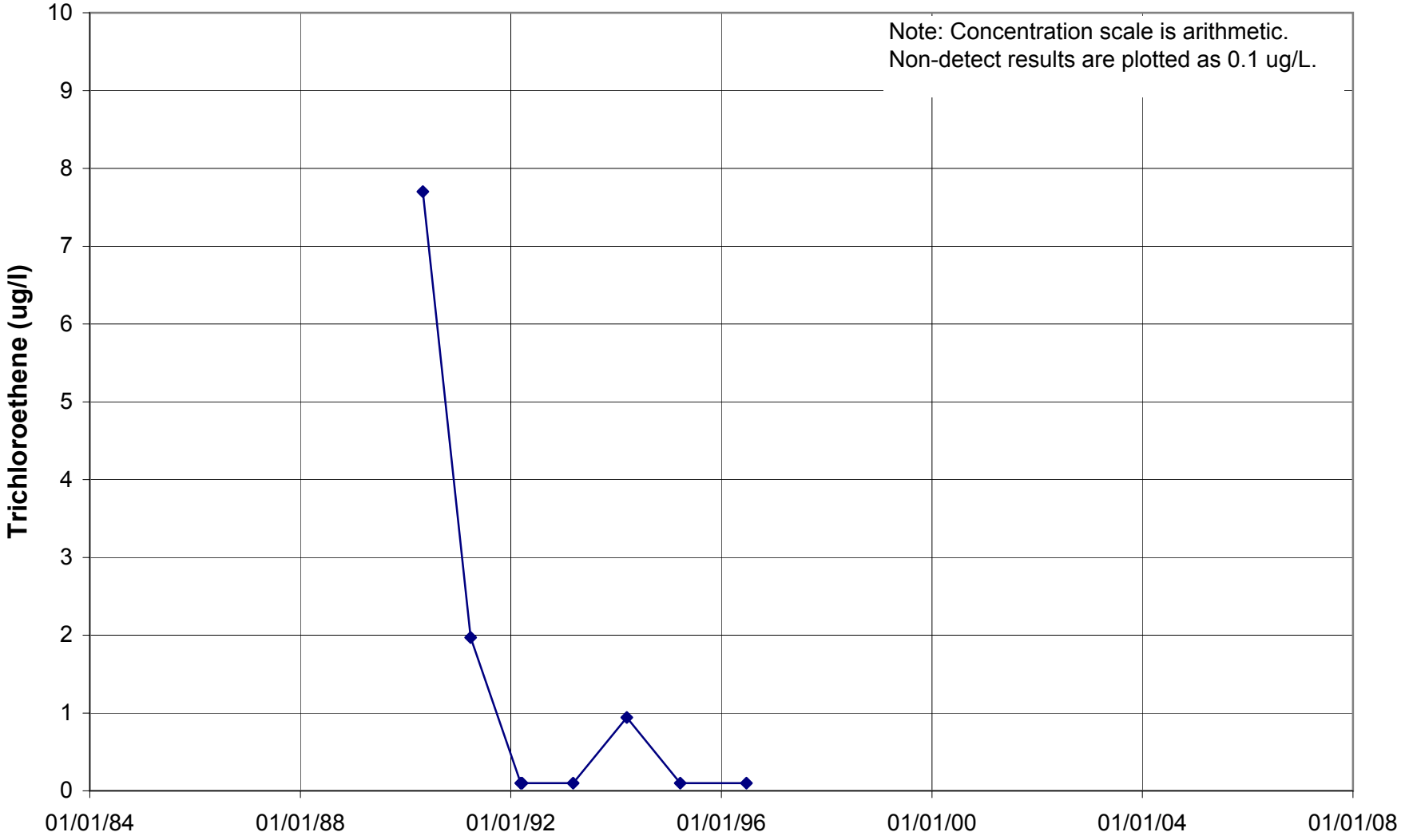

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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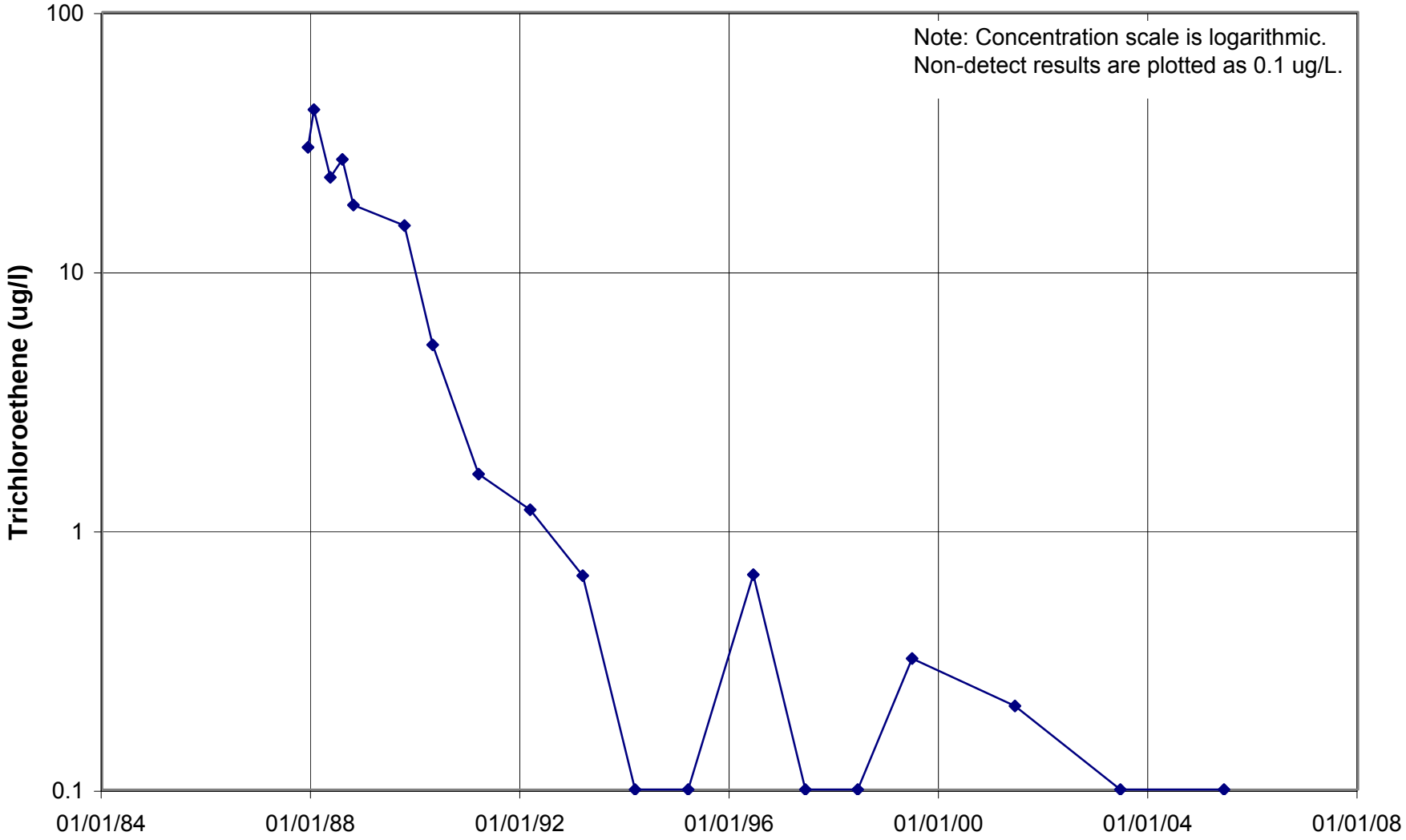
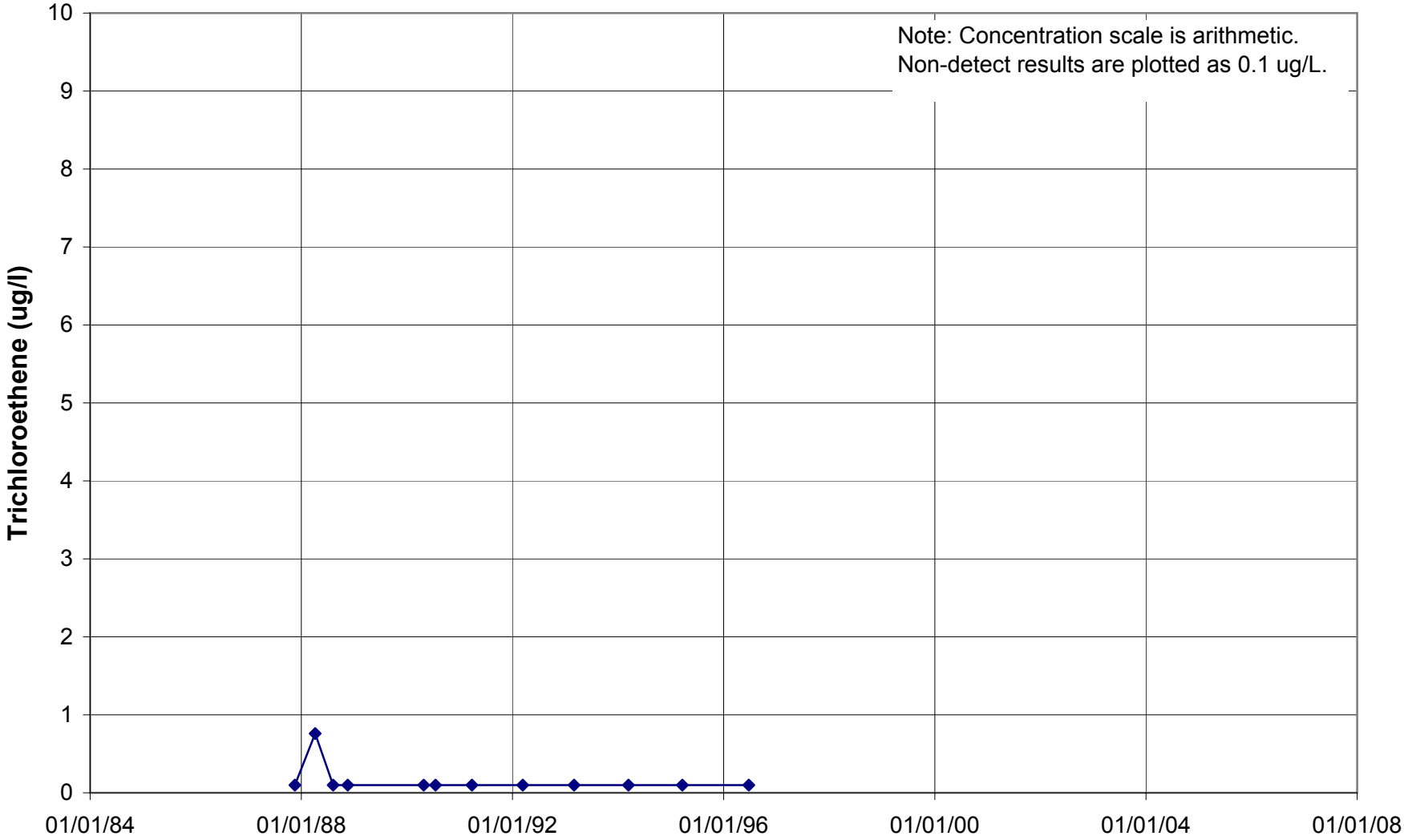


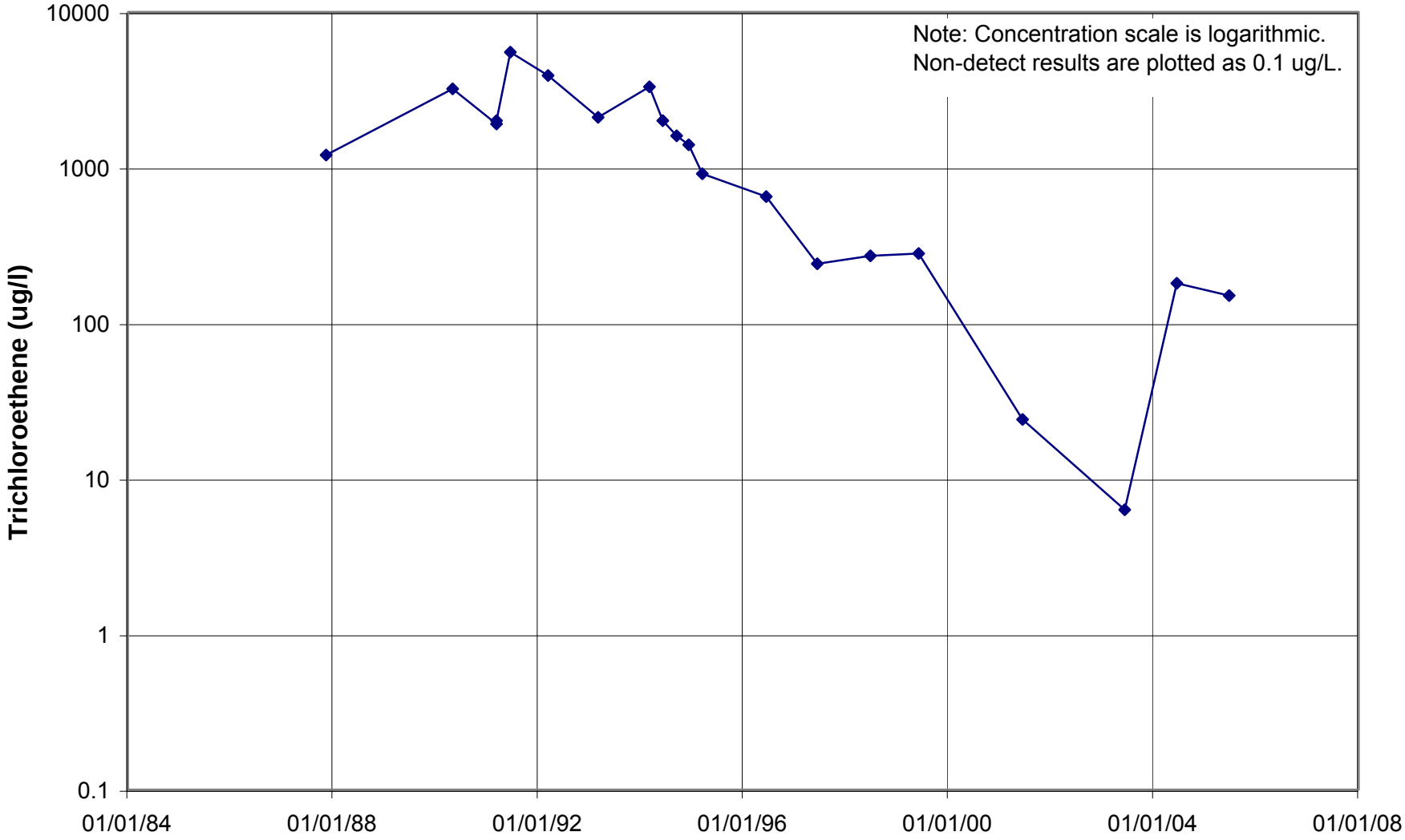
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L113



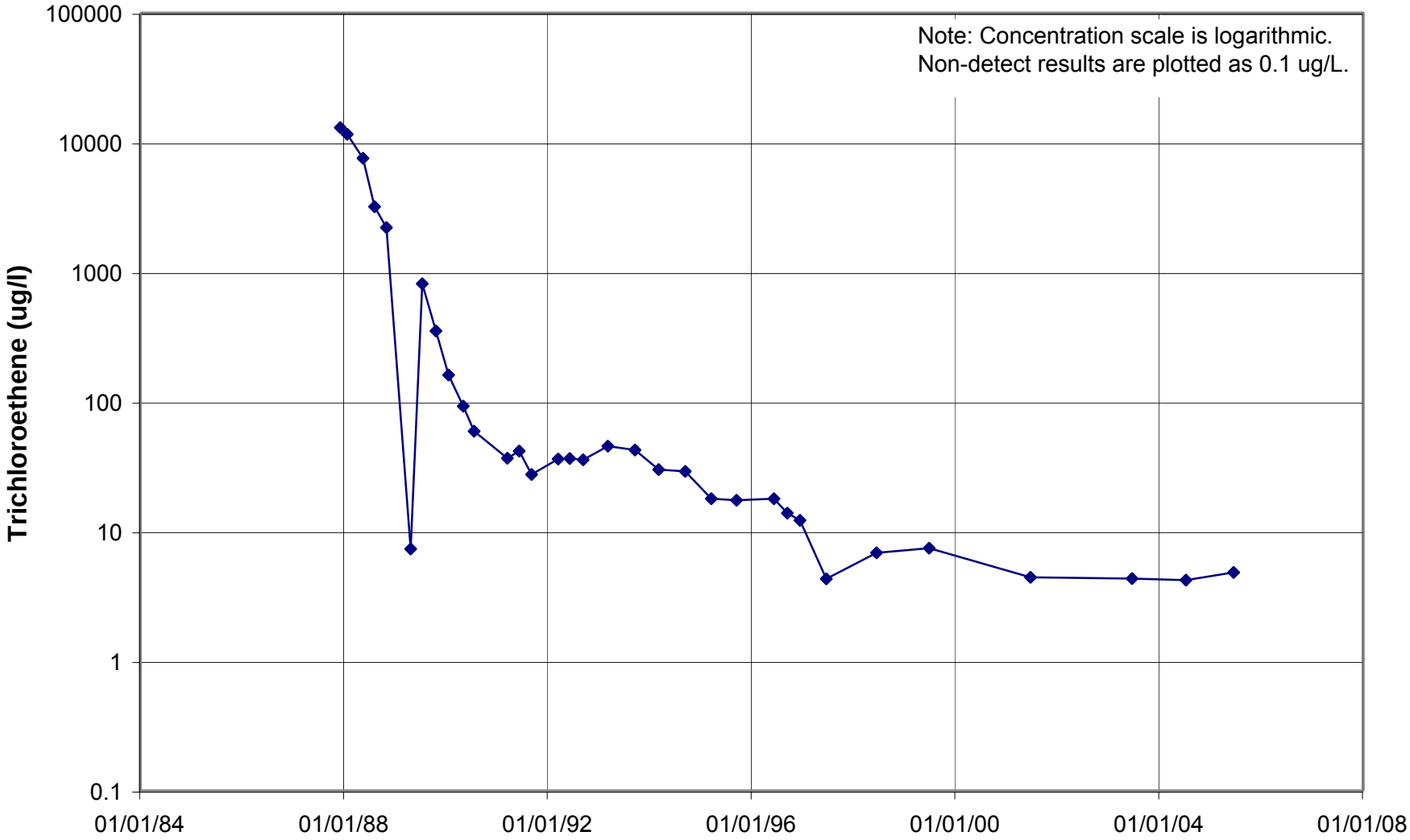
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L673



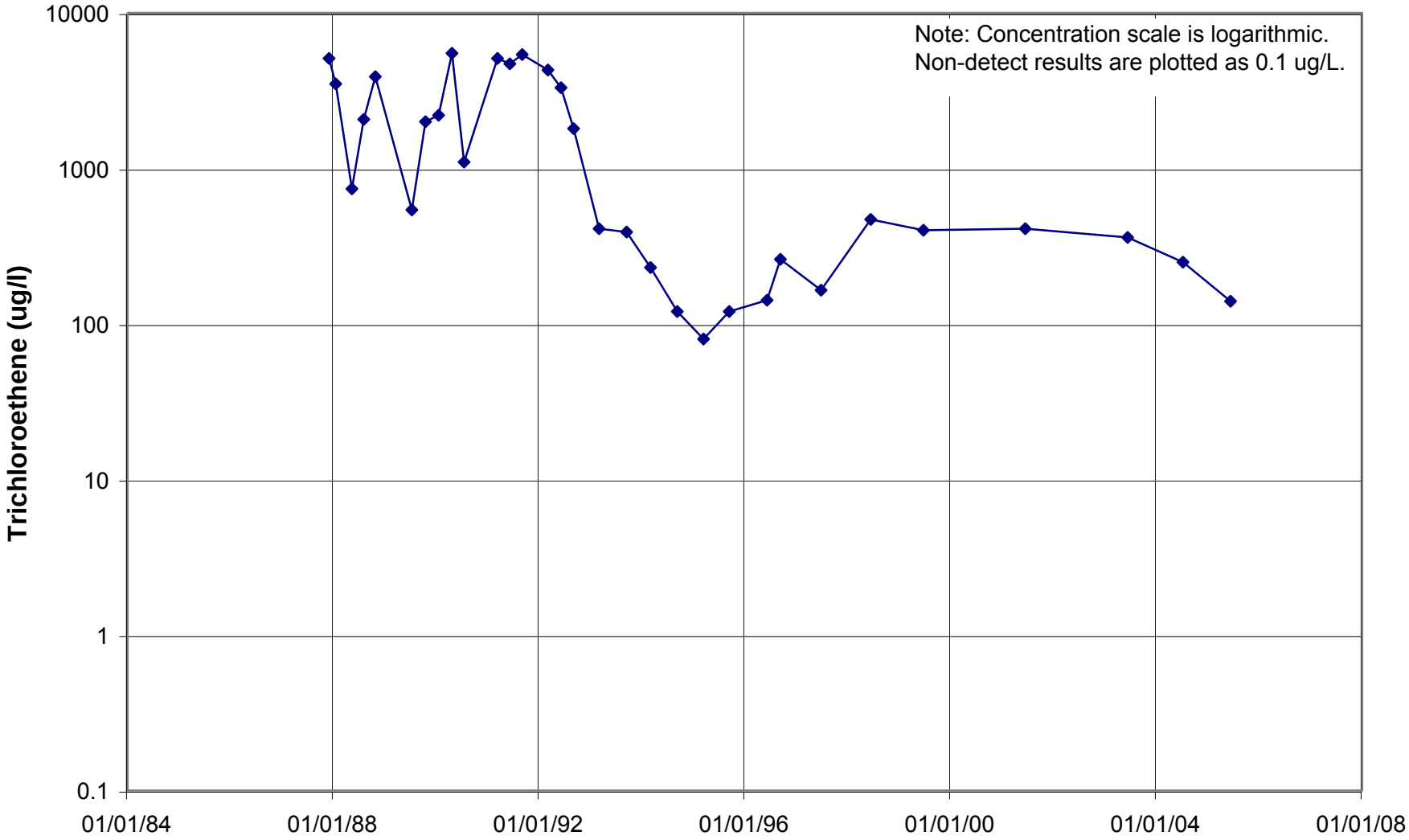
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L802



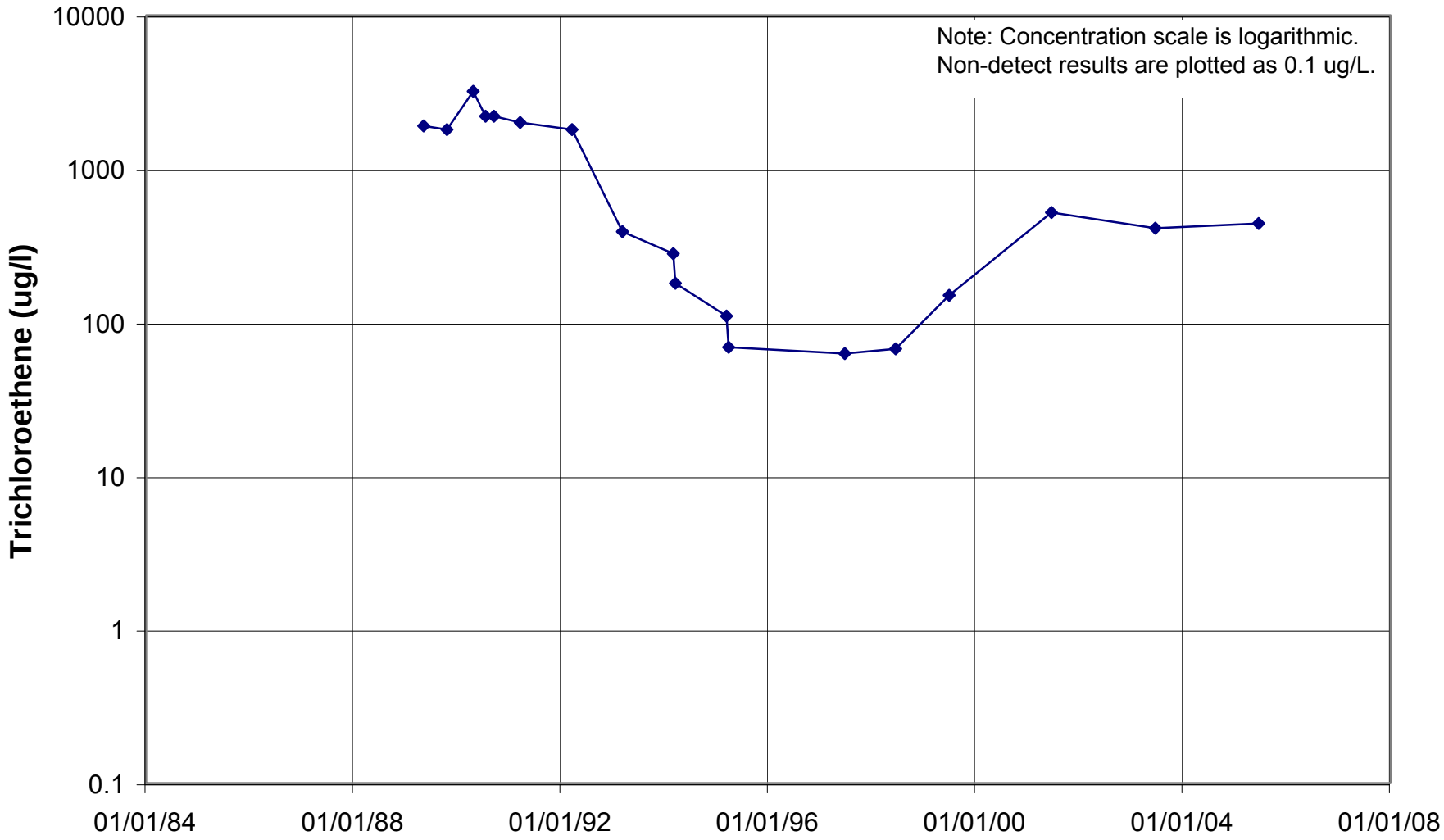
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L806



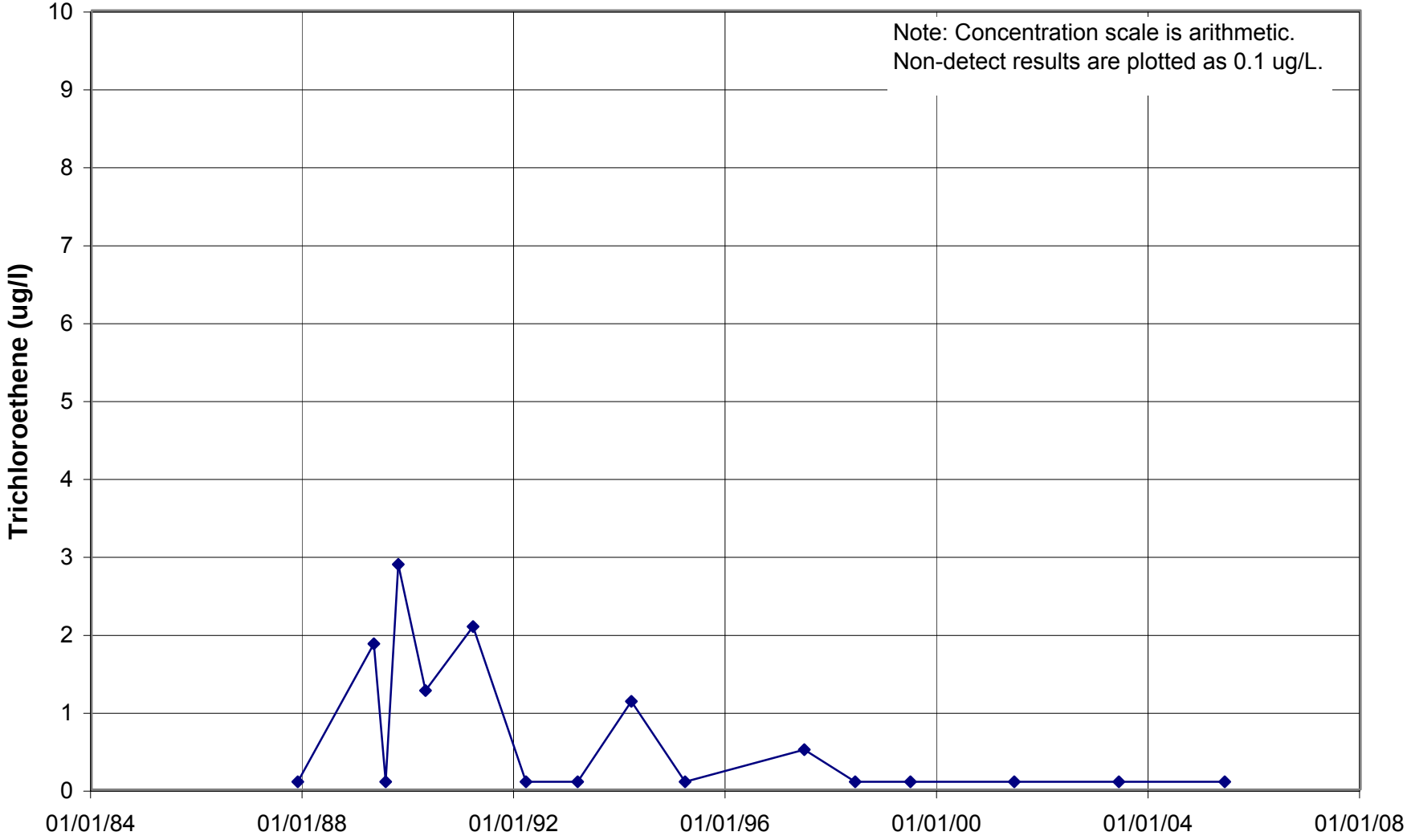
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L809



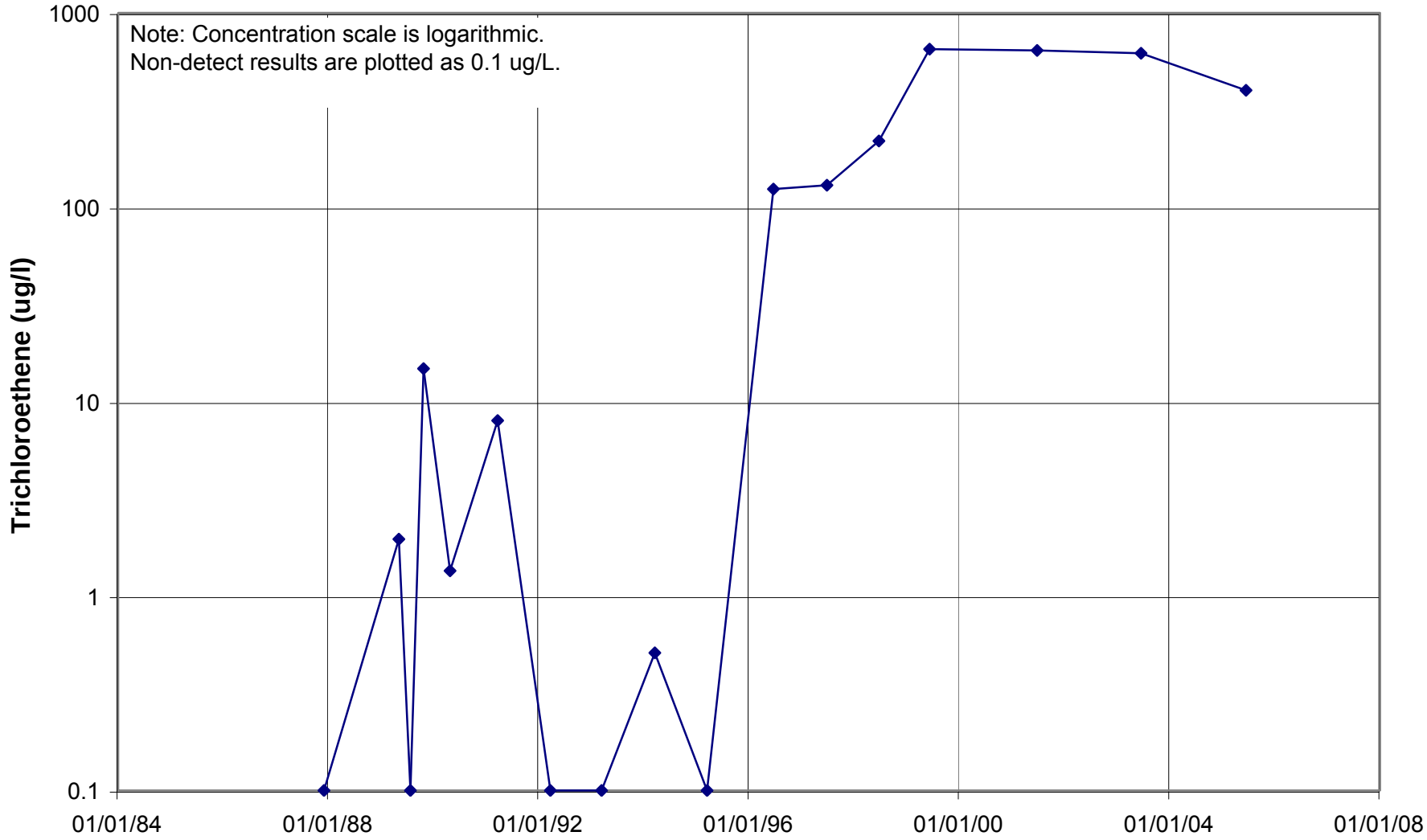
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L811



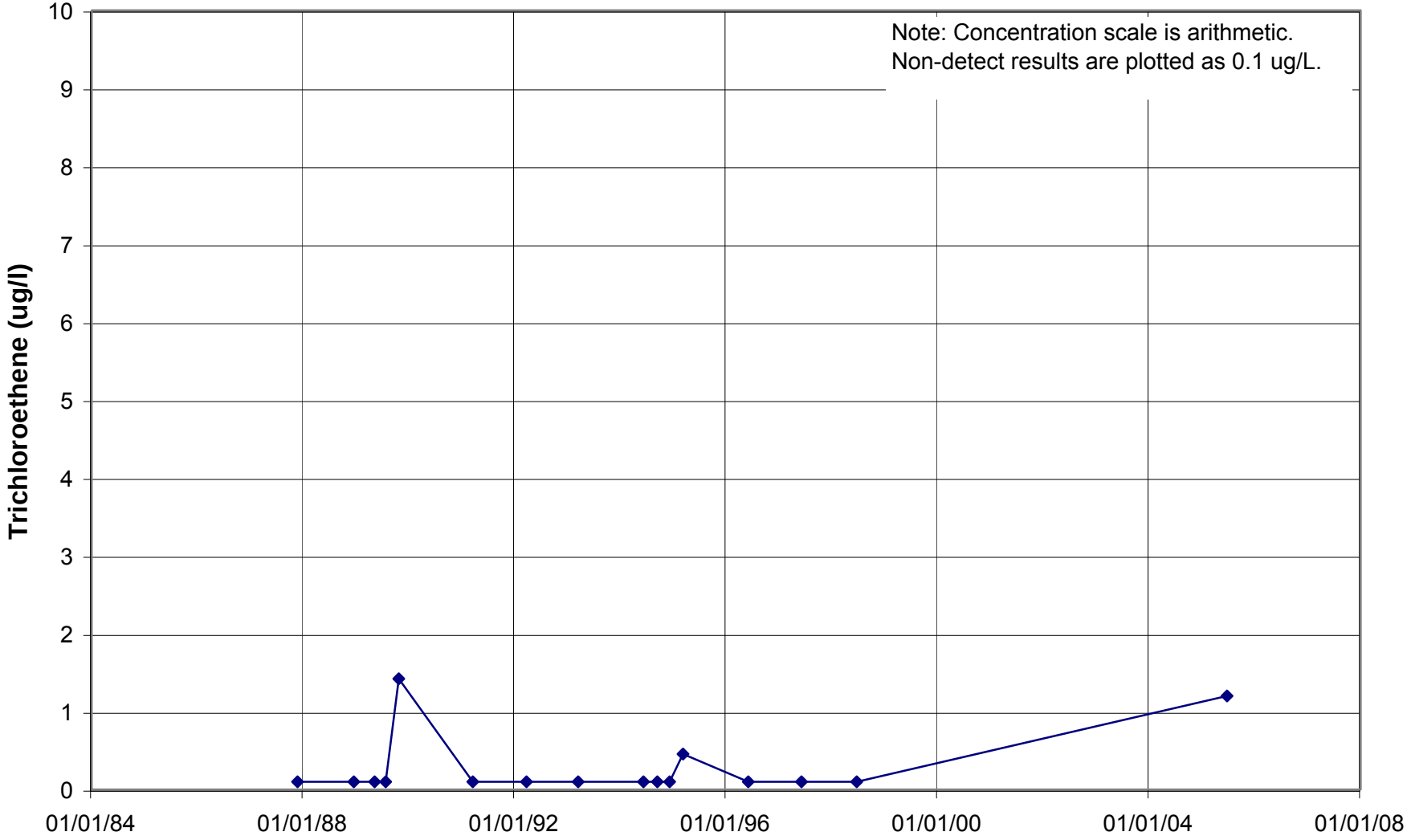
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L822



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03L832



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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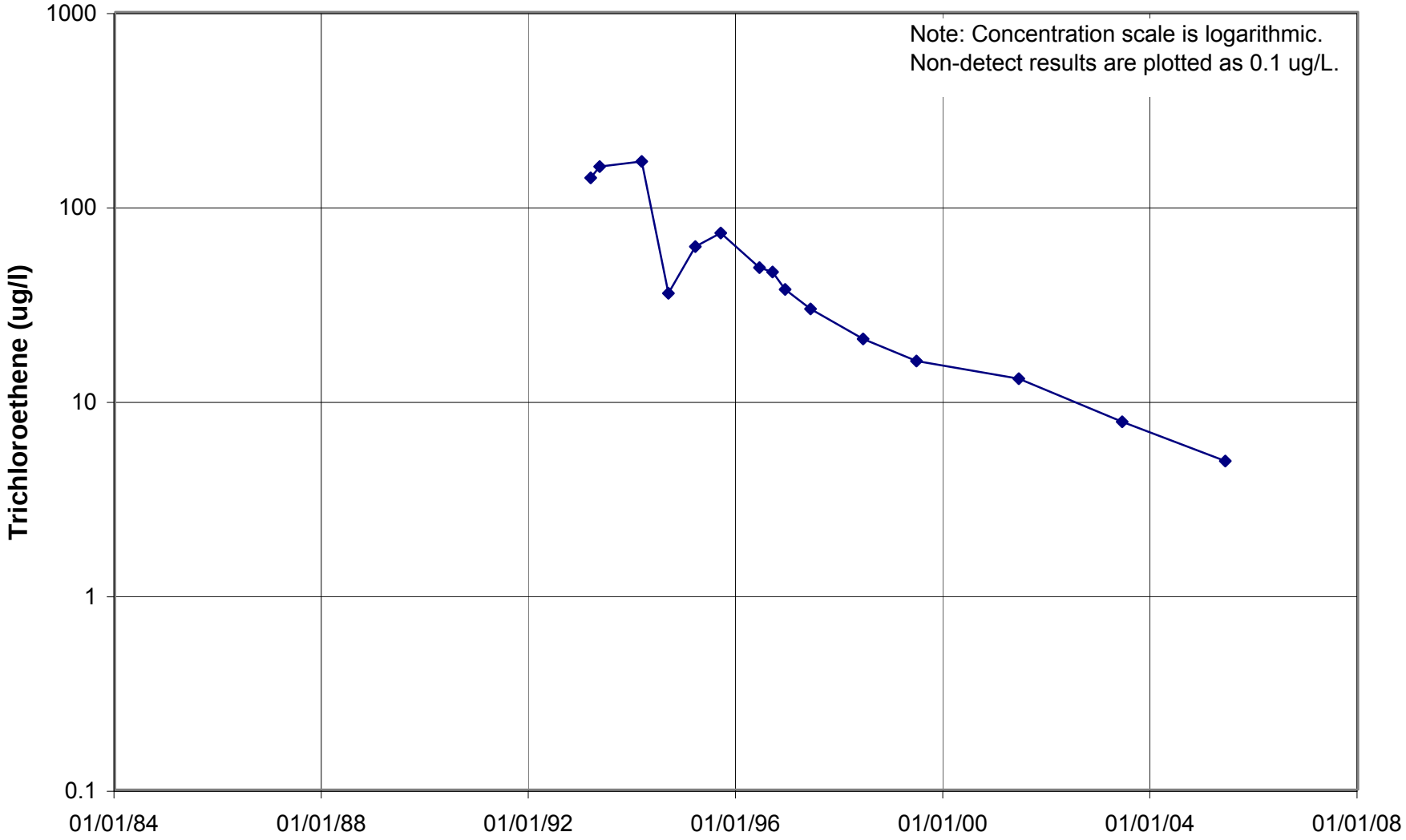

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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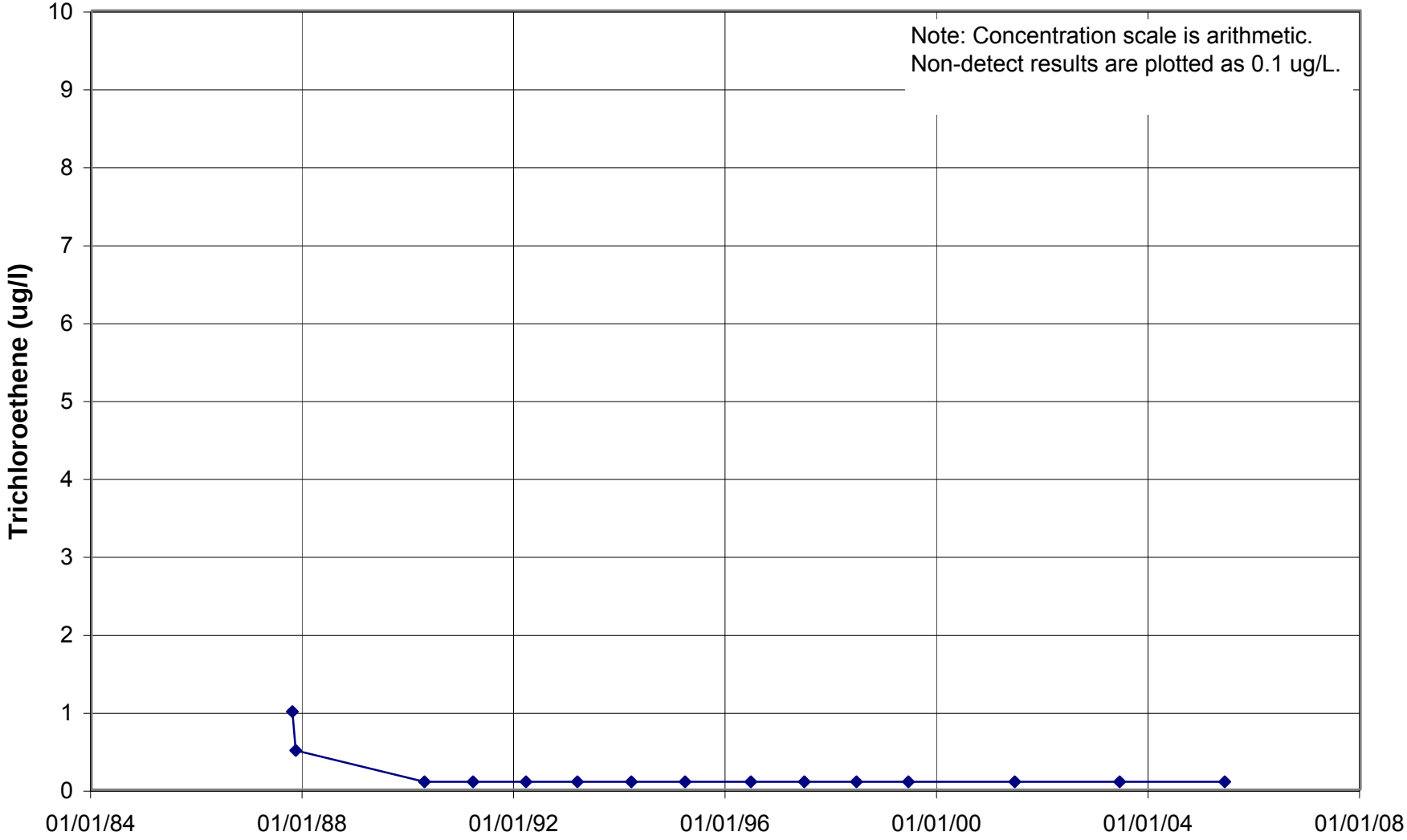

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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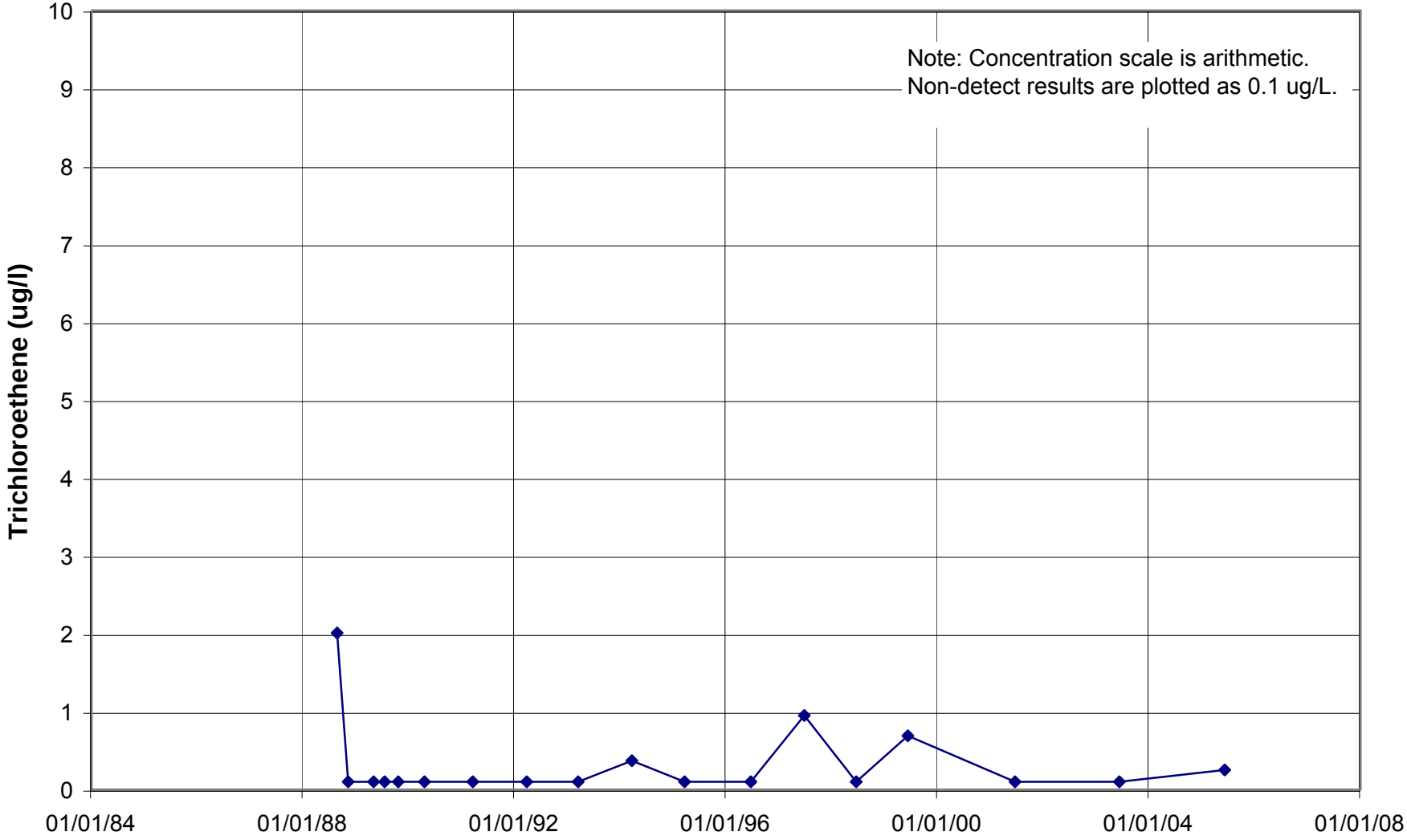

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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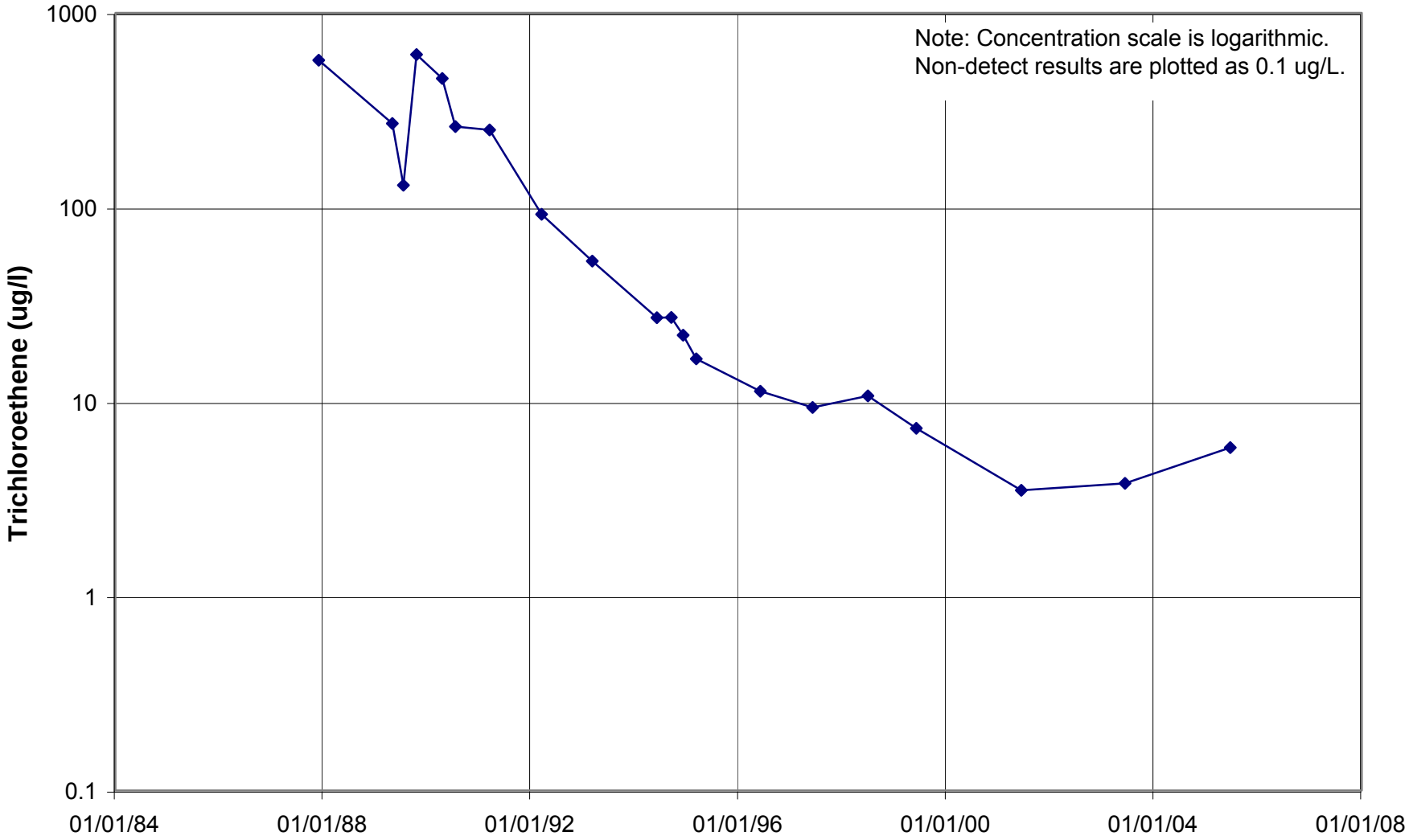

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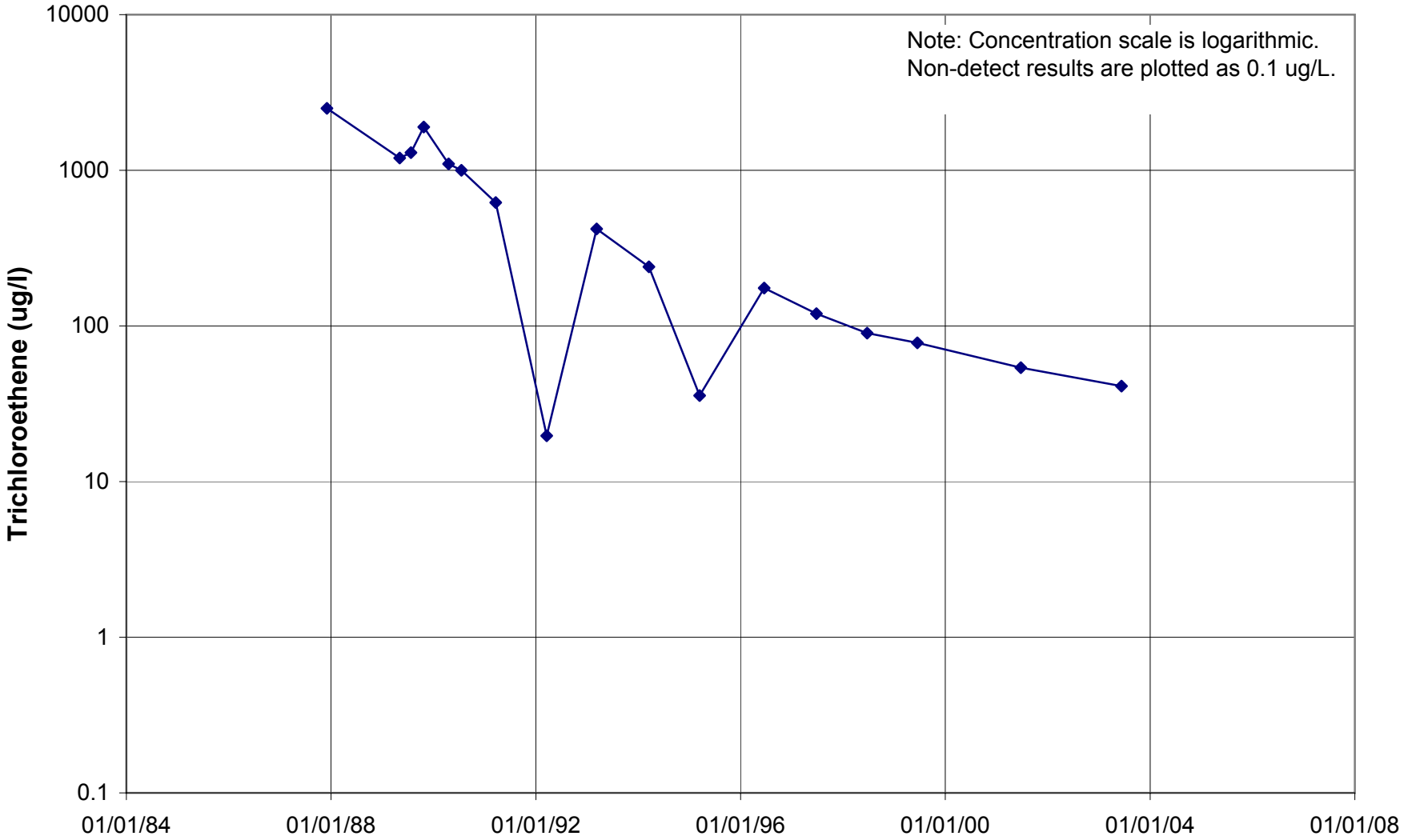

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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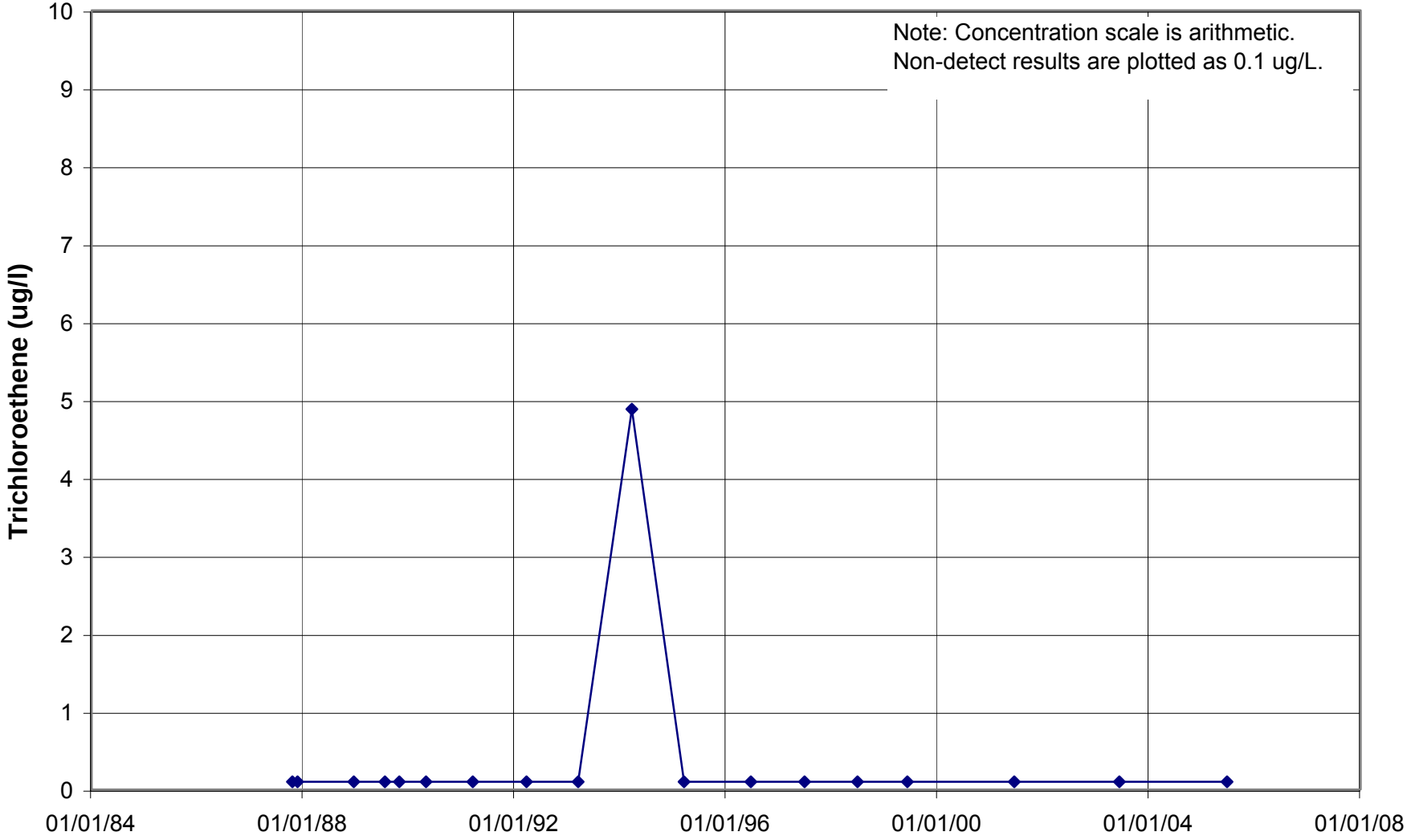

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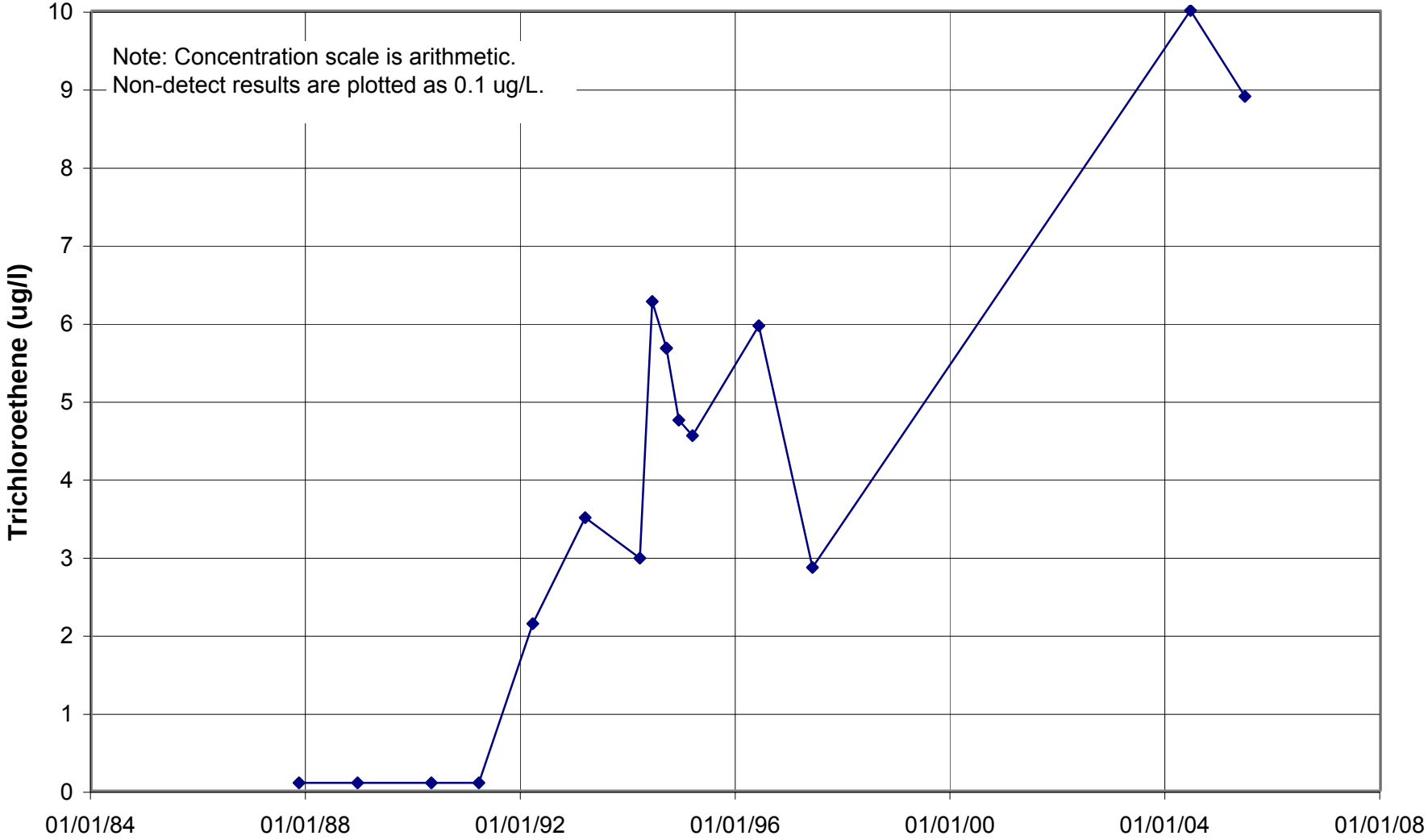

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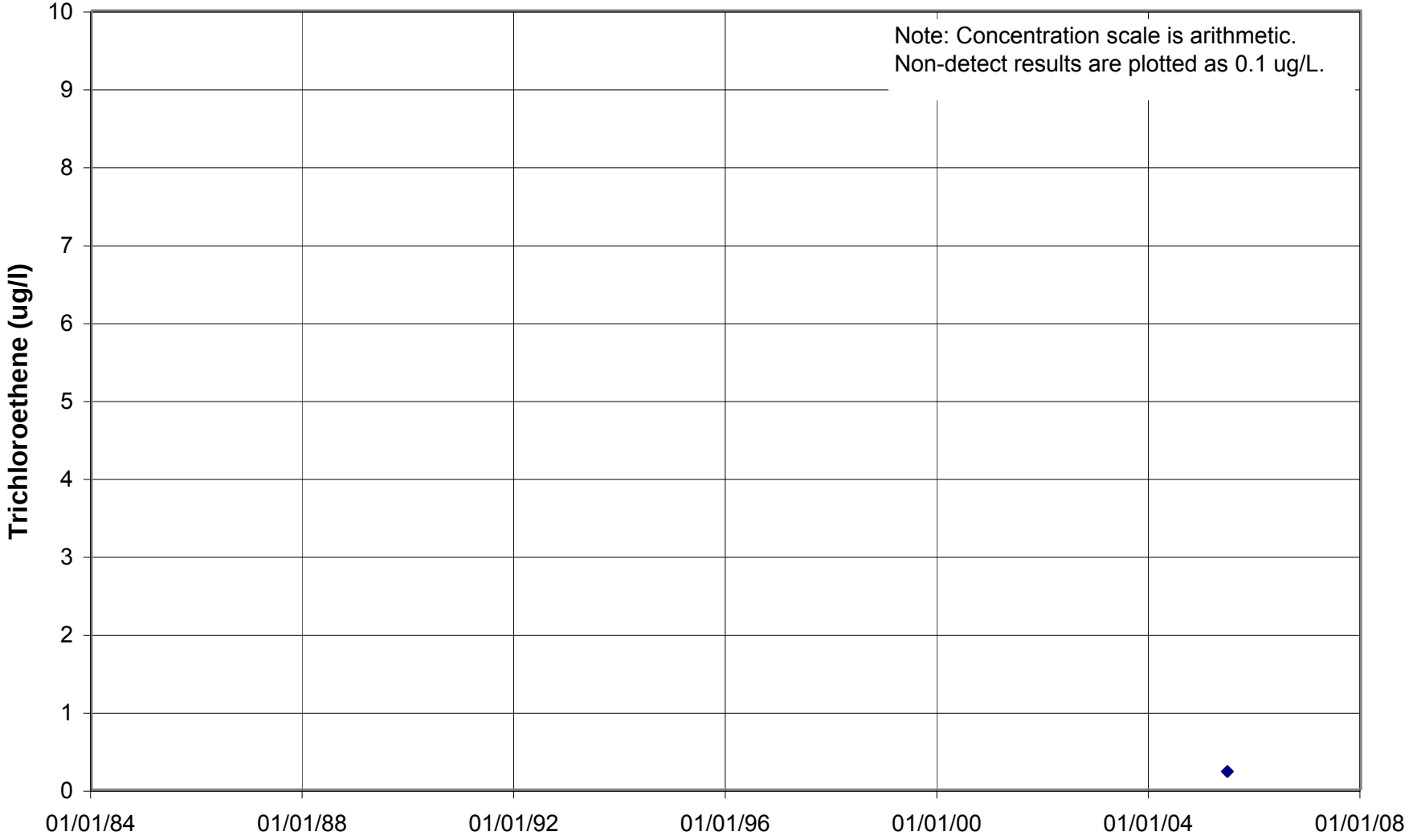

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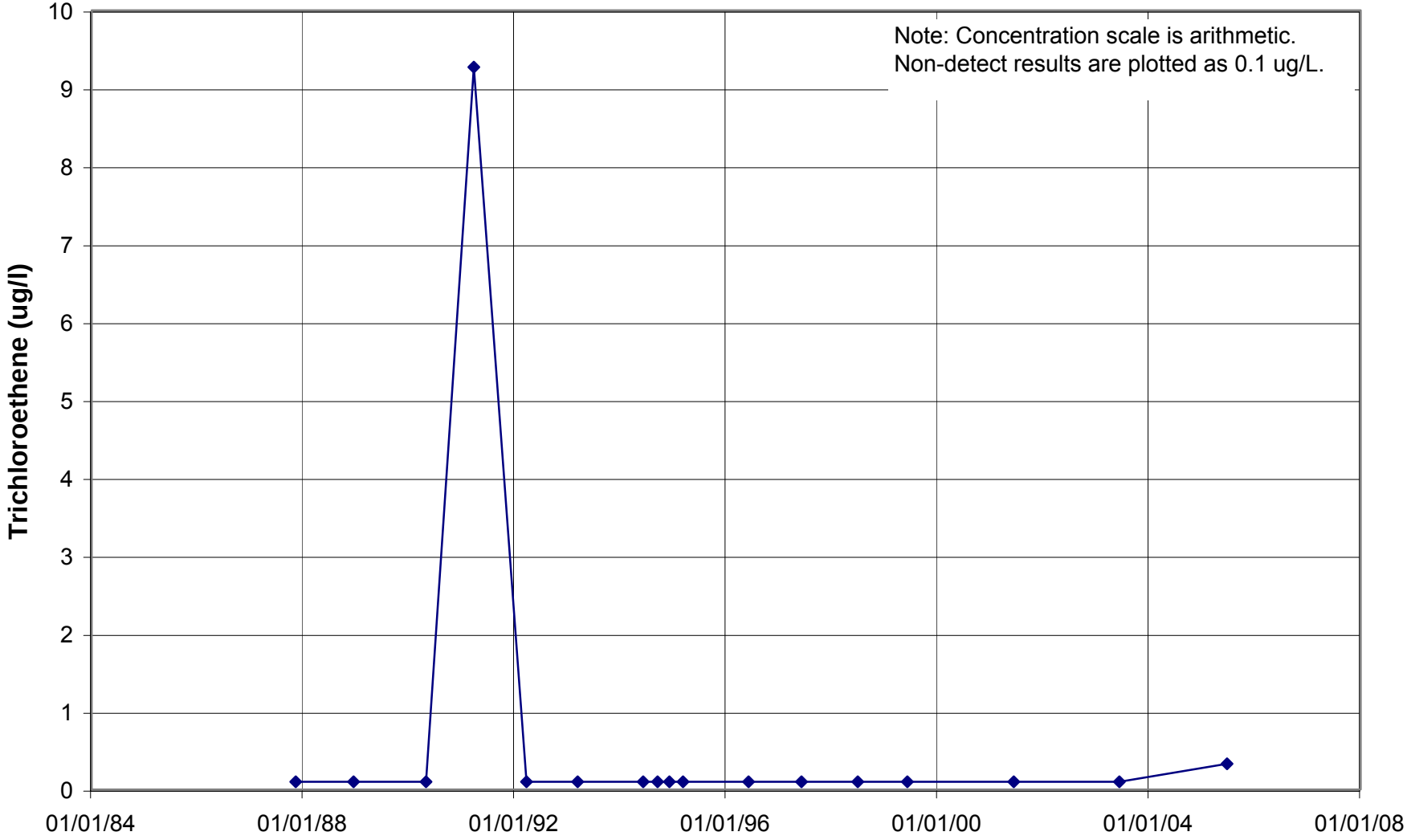
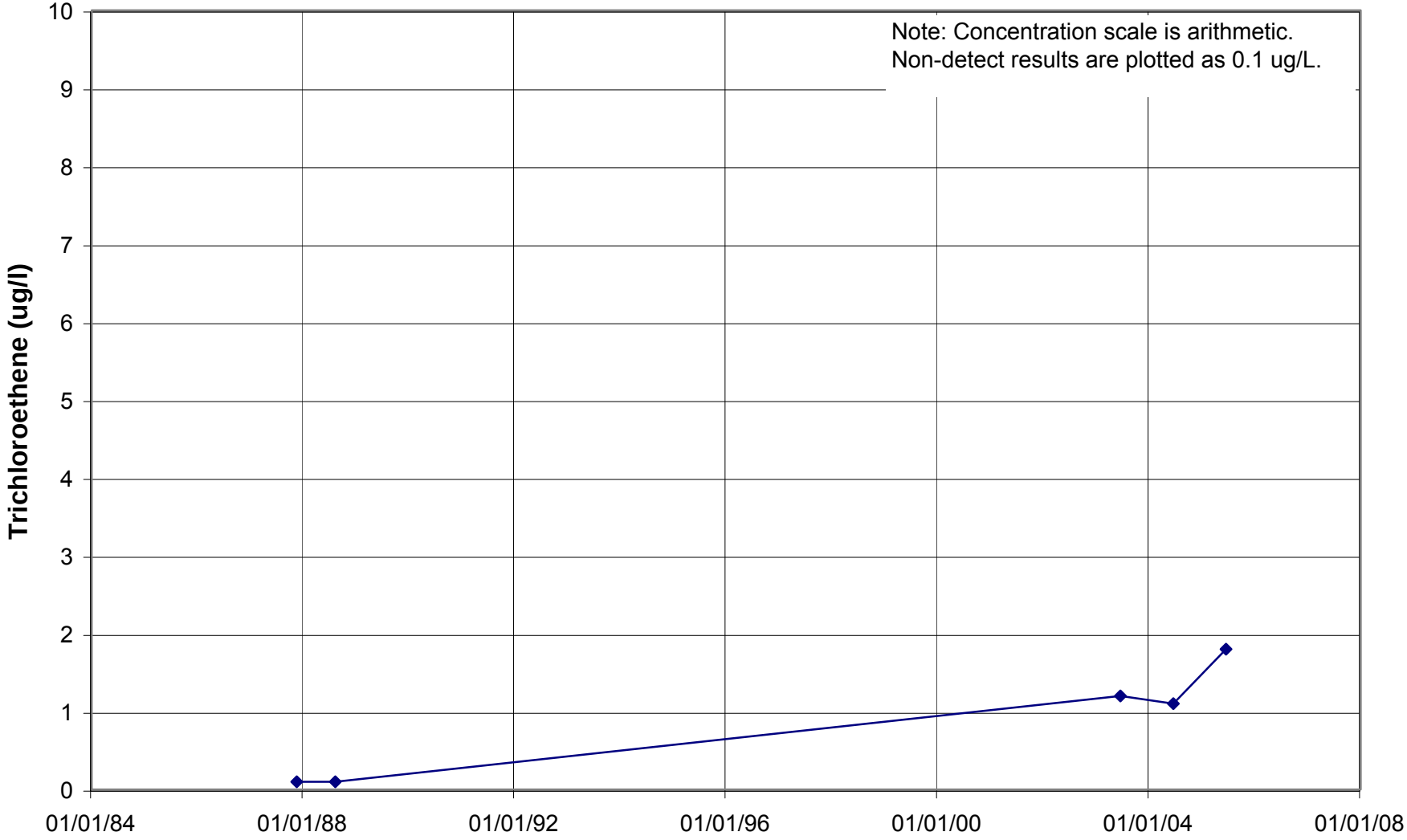


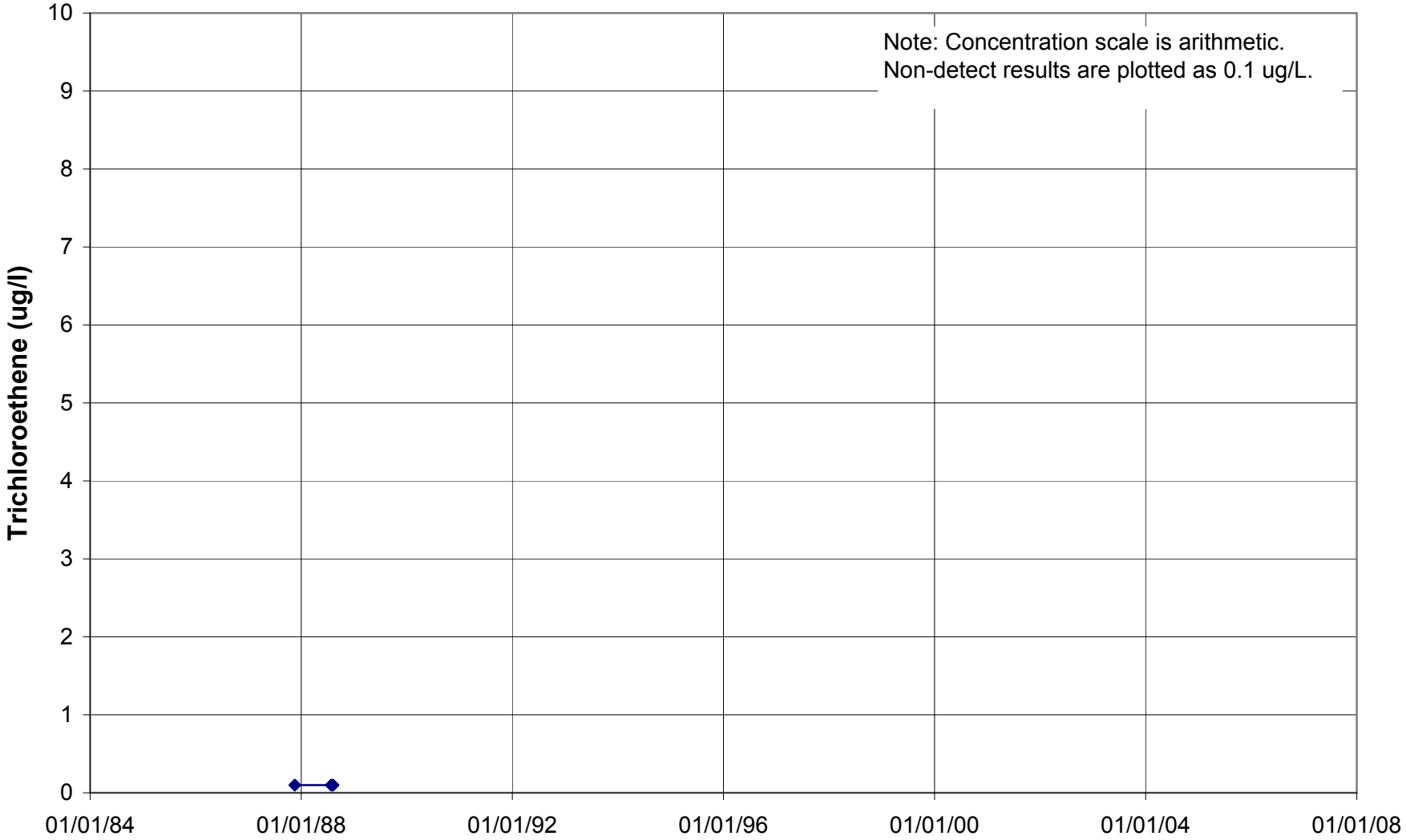
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03M003



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03M004



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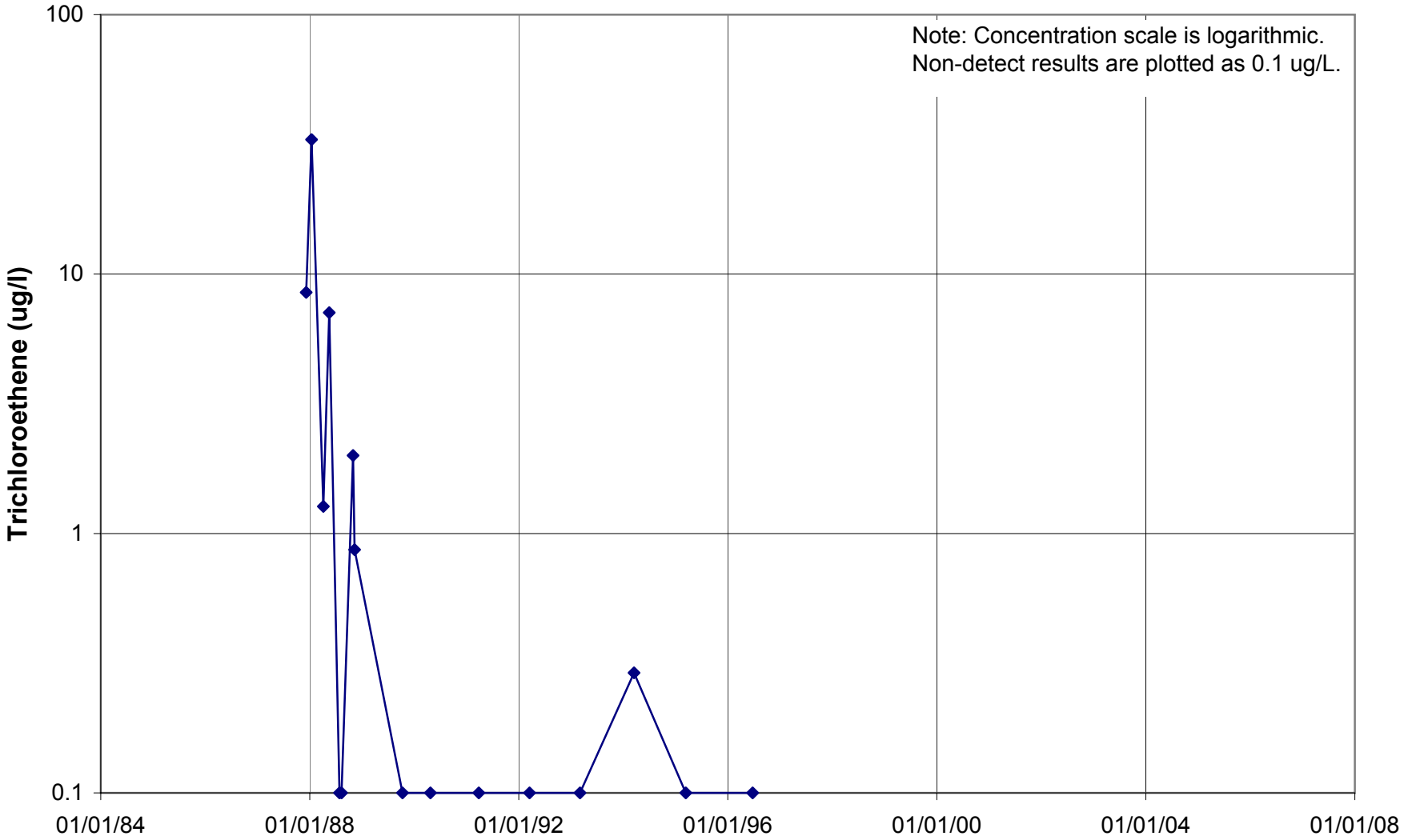

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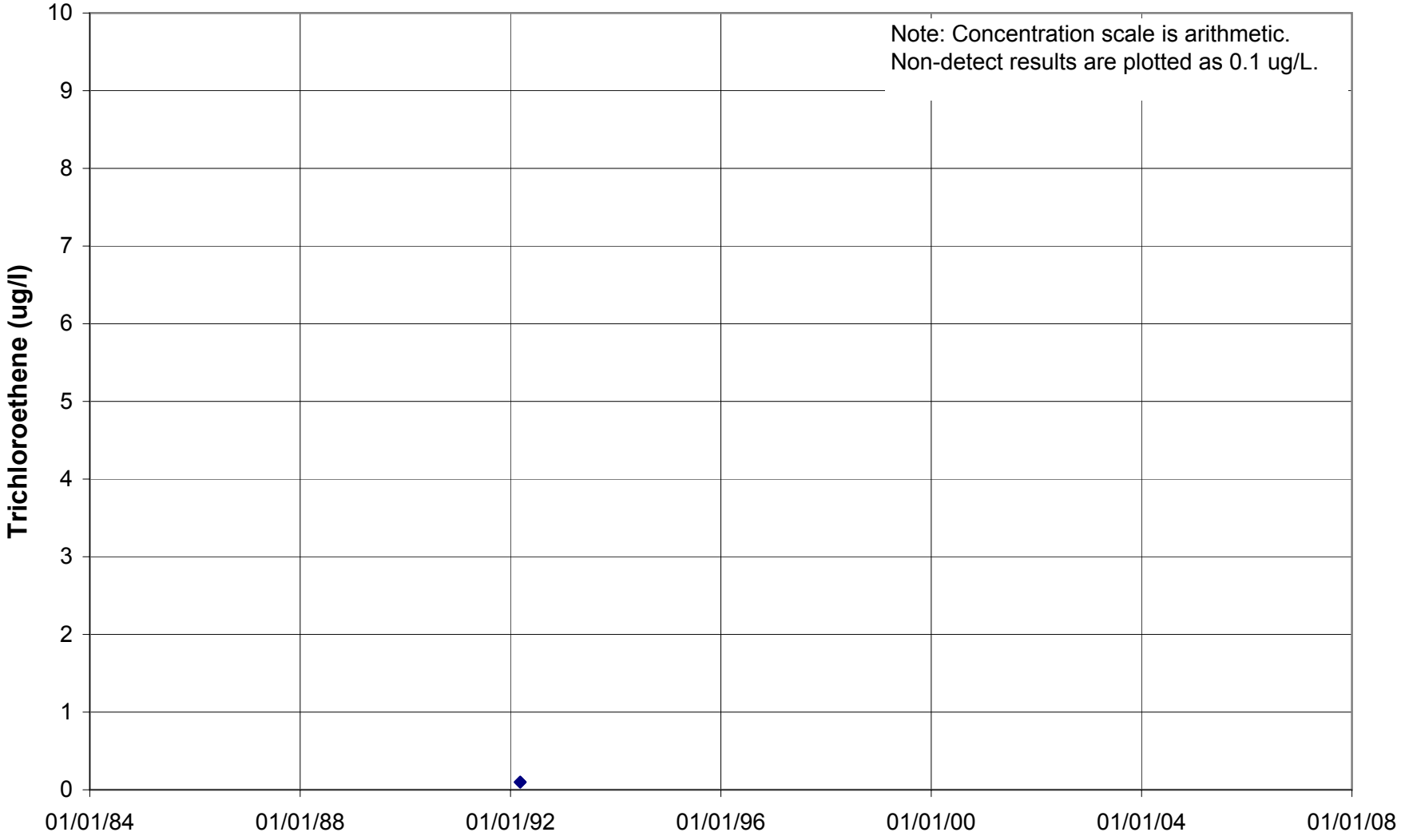
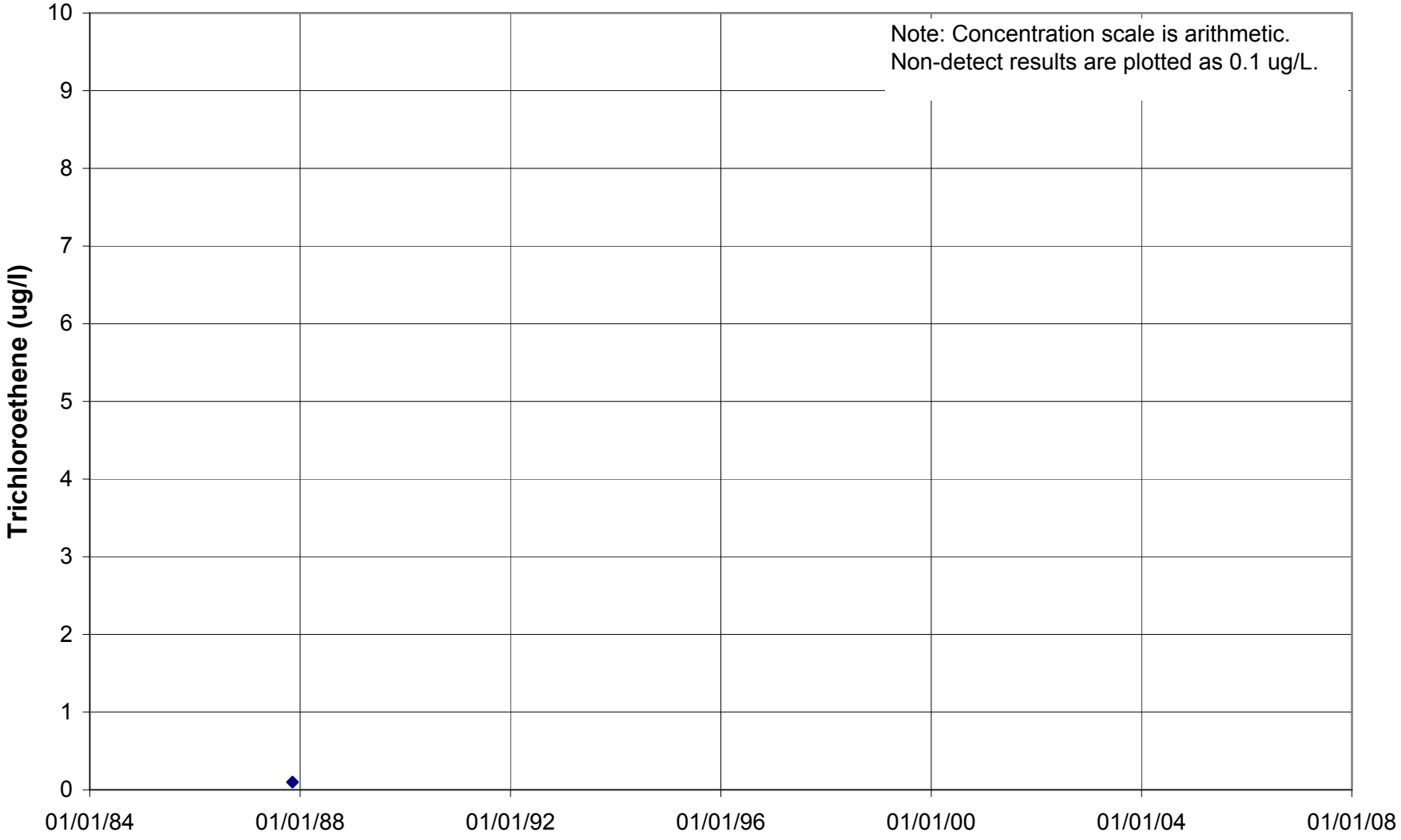


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03M013



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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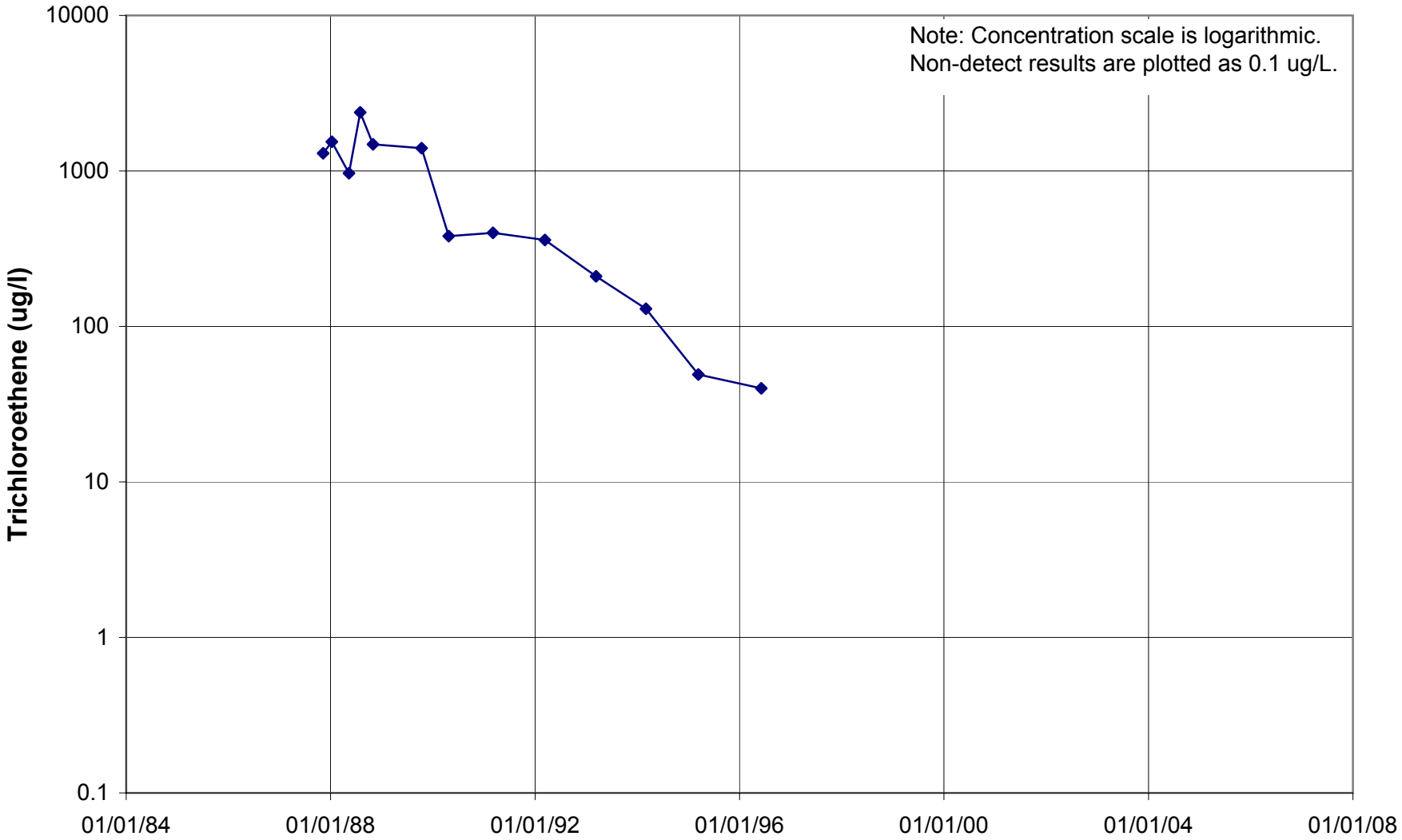
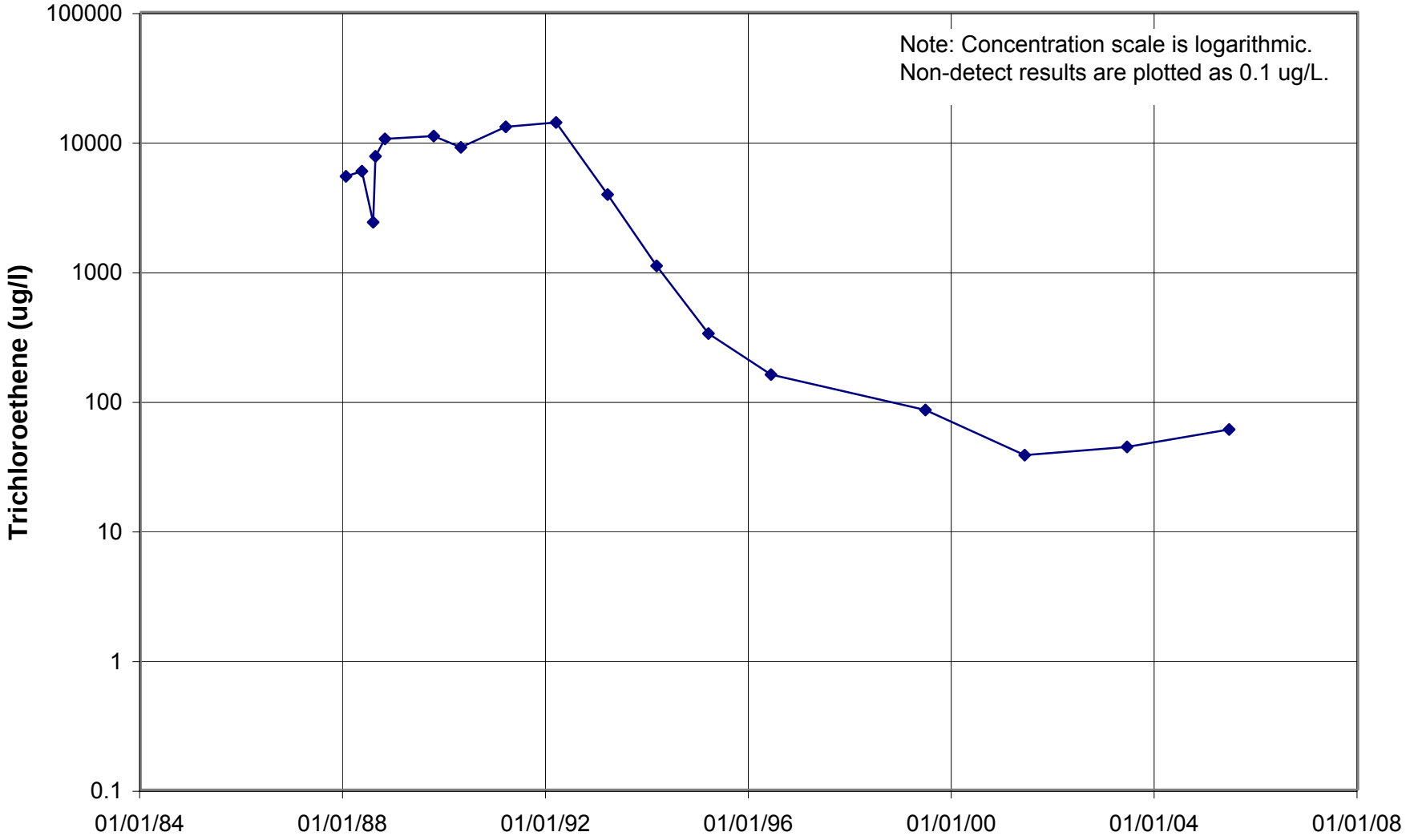


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03M020



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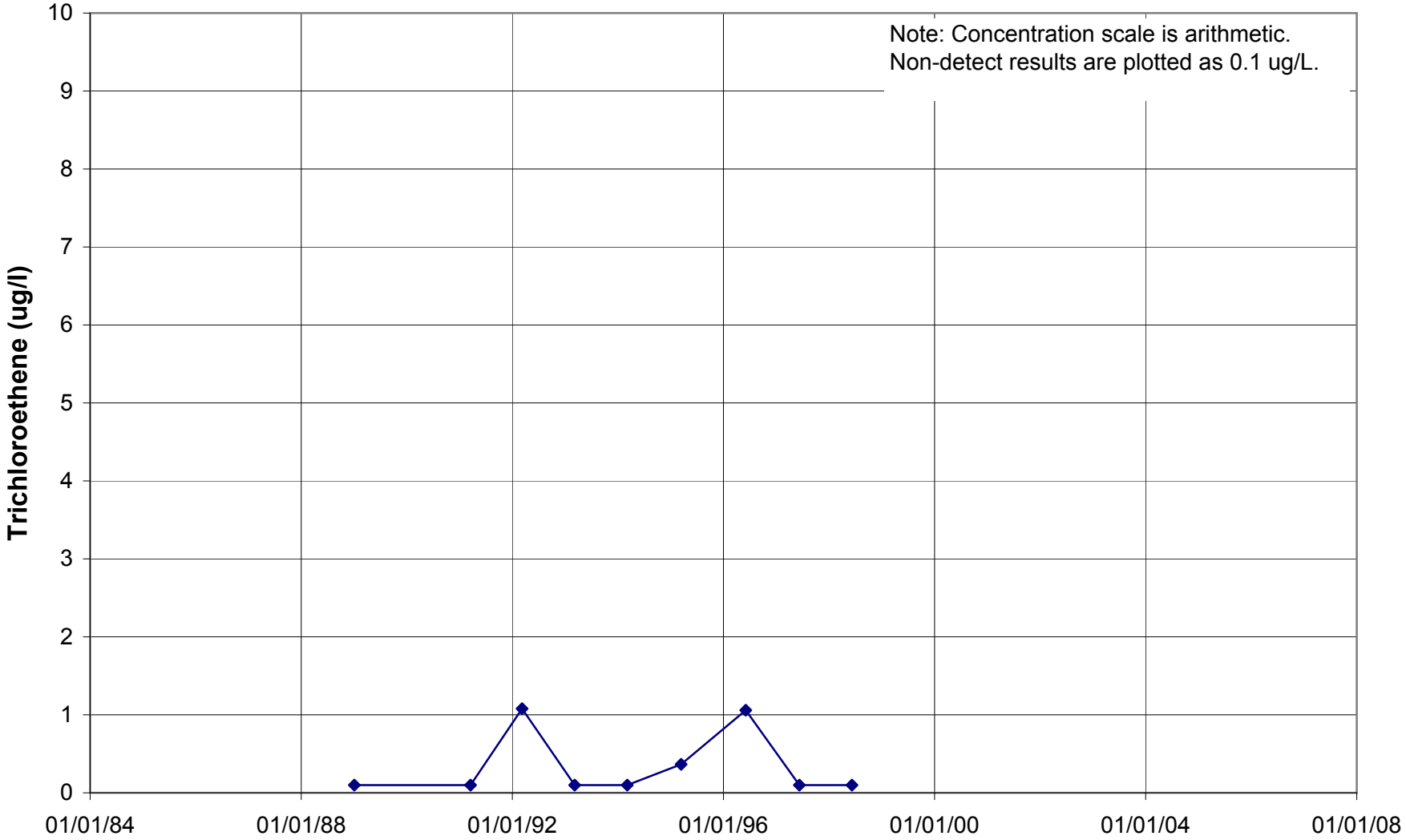

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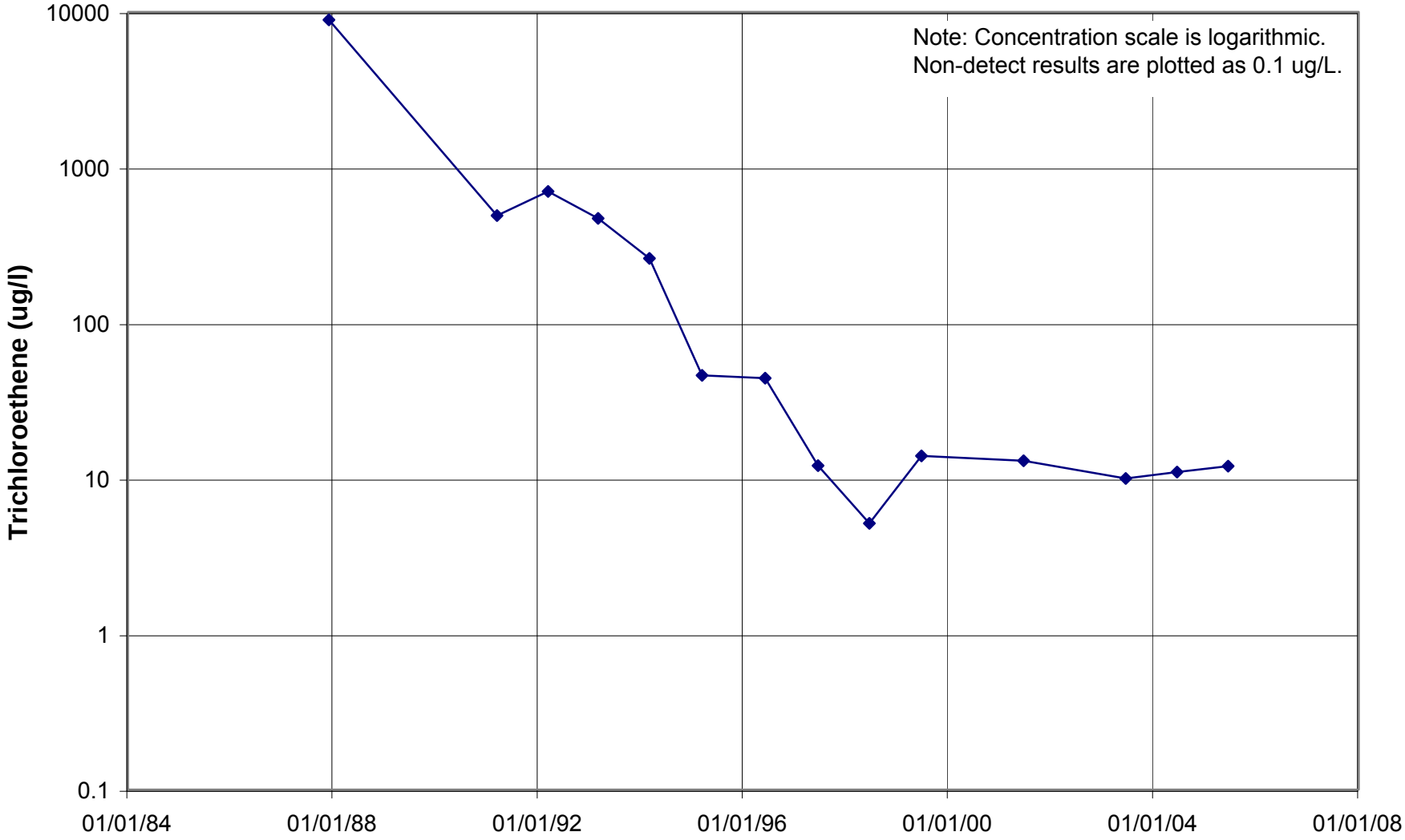

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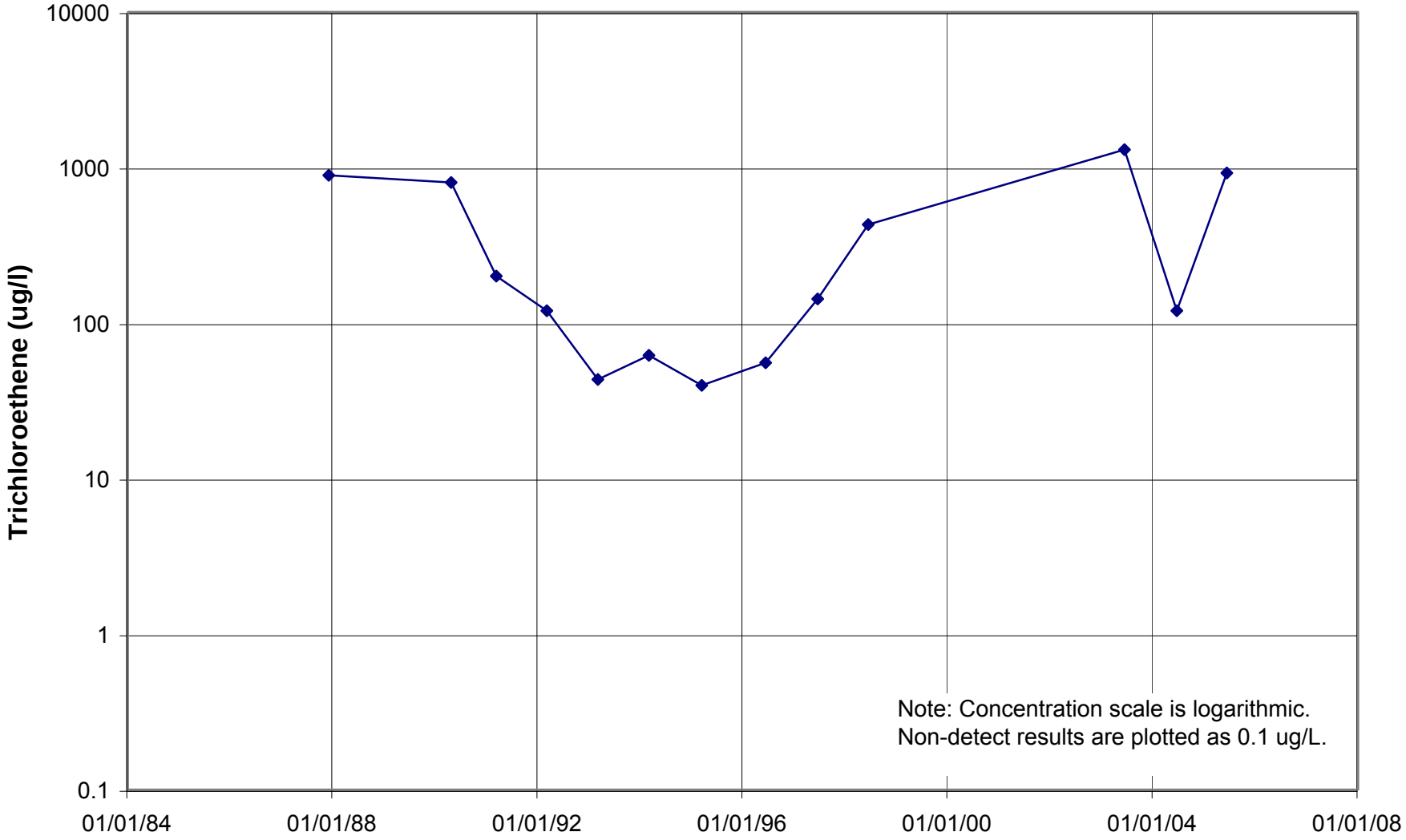

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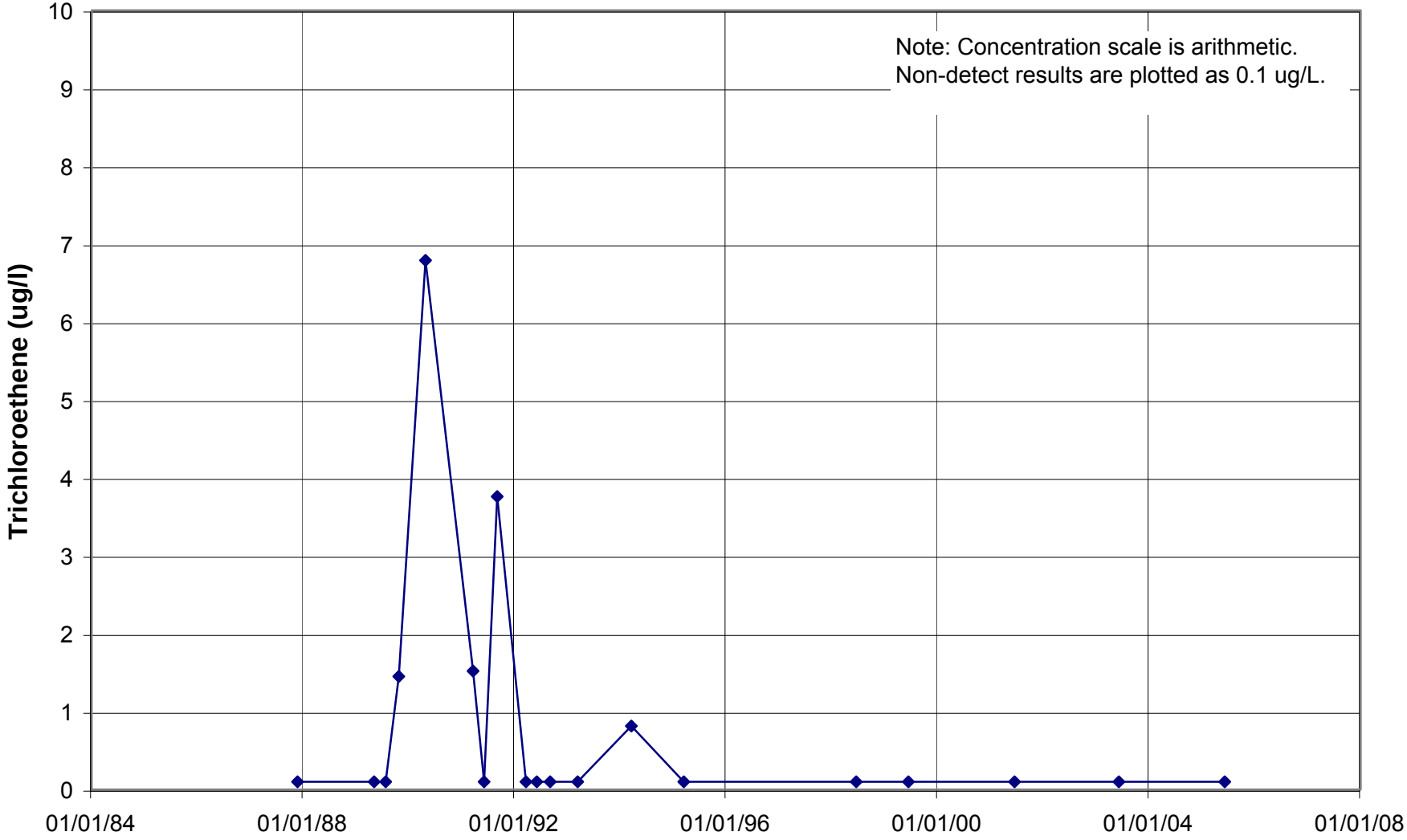

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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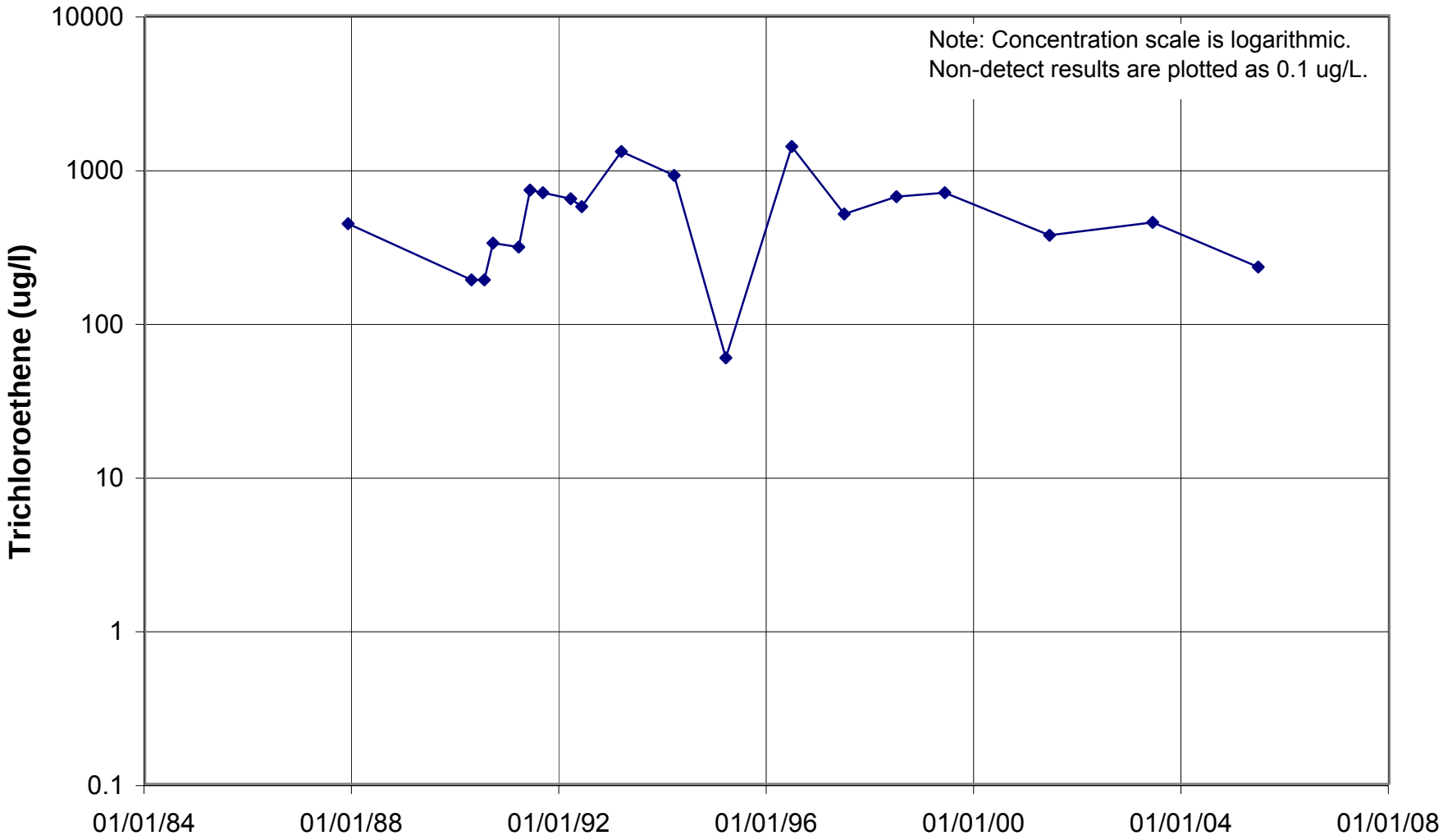
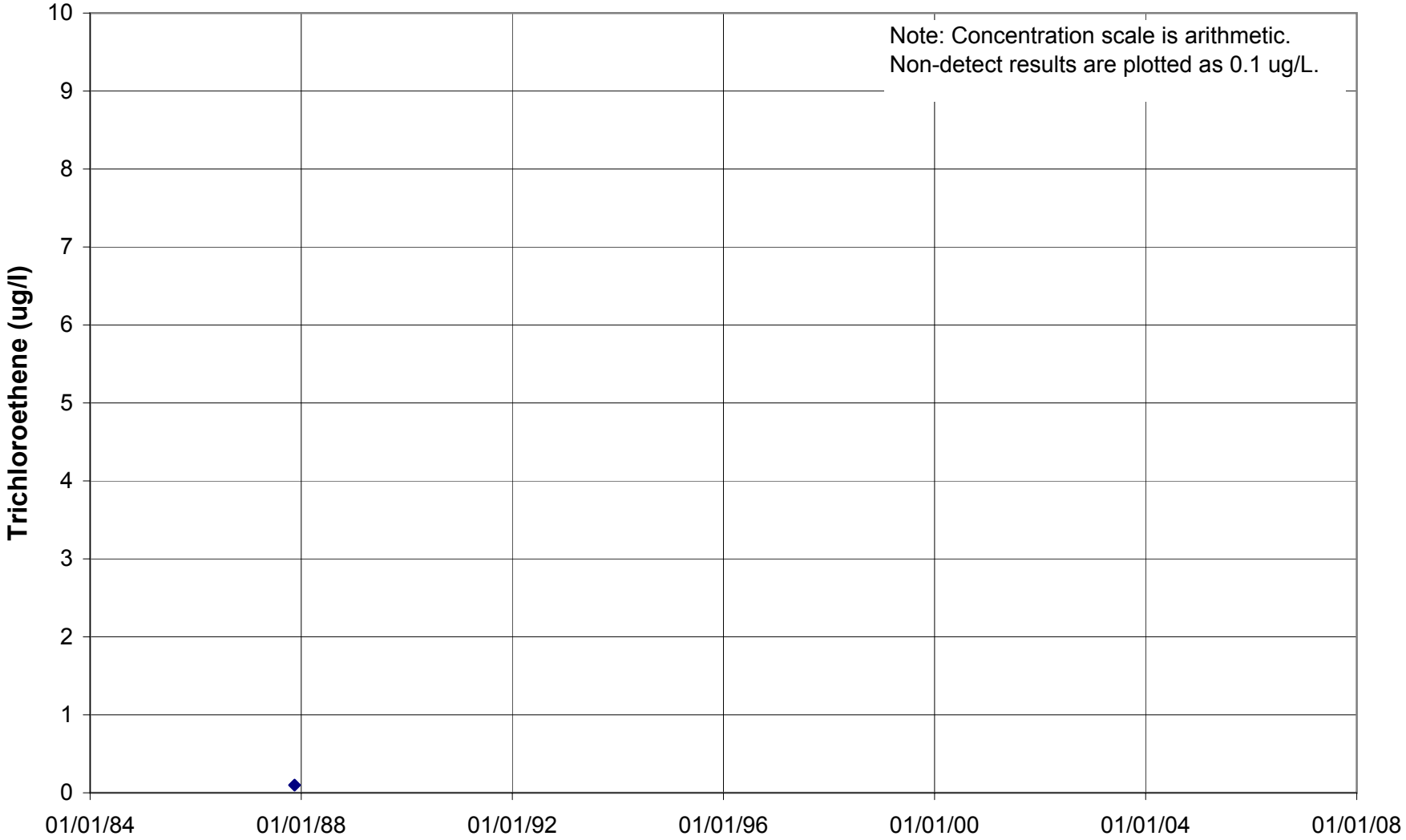


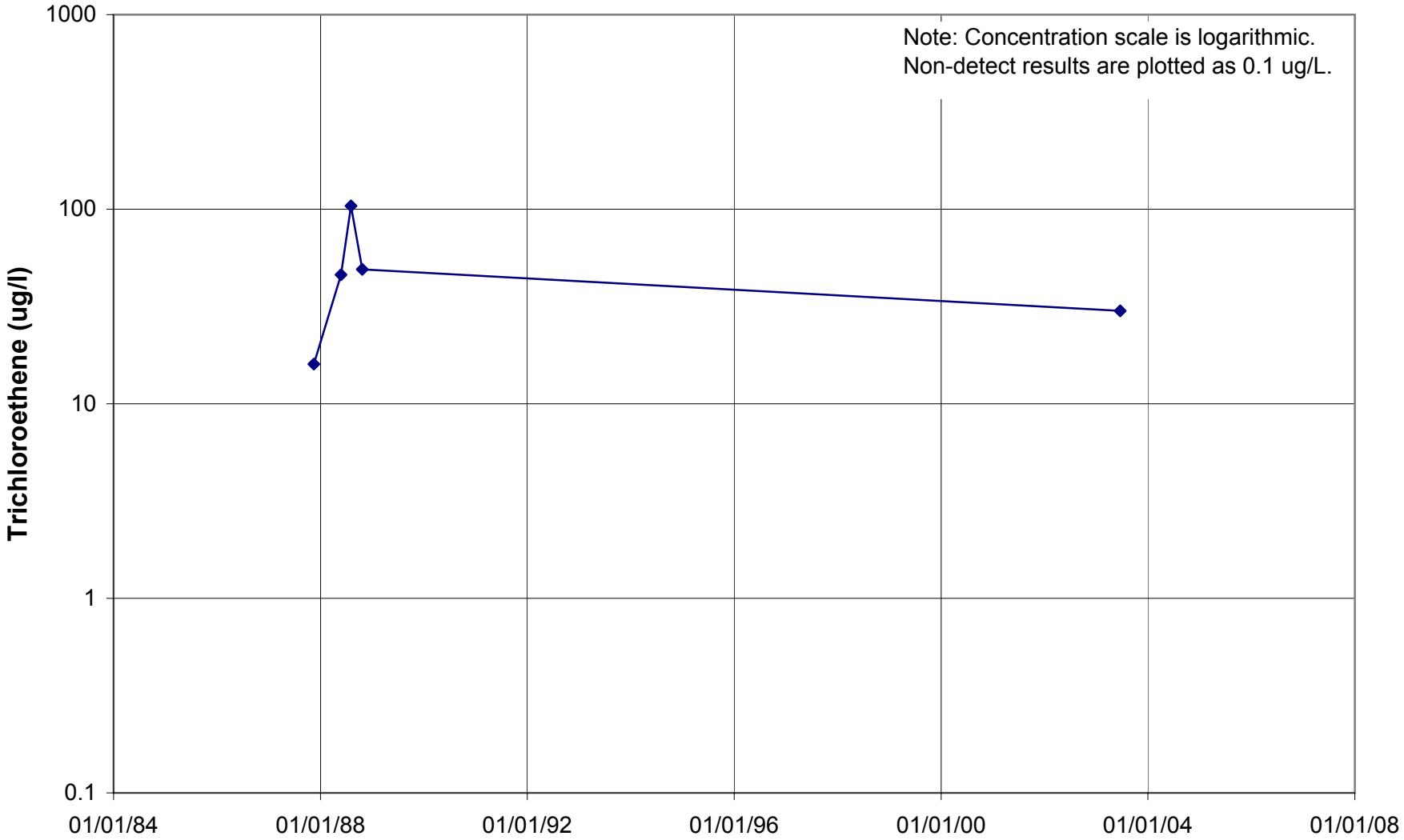
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U001



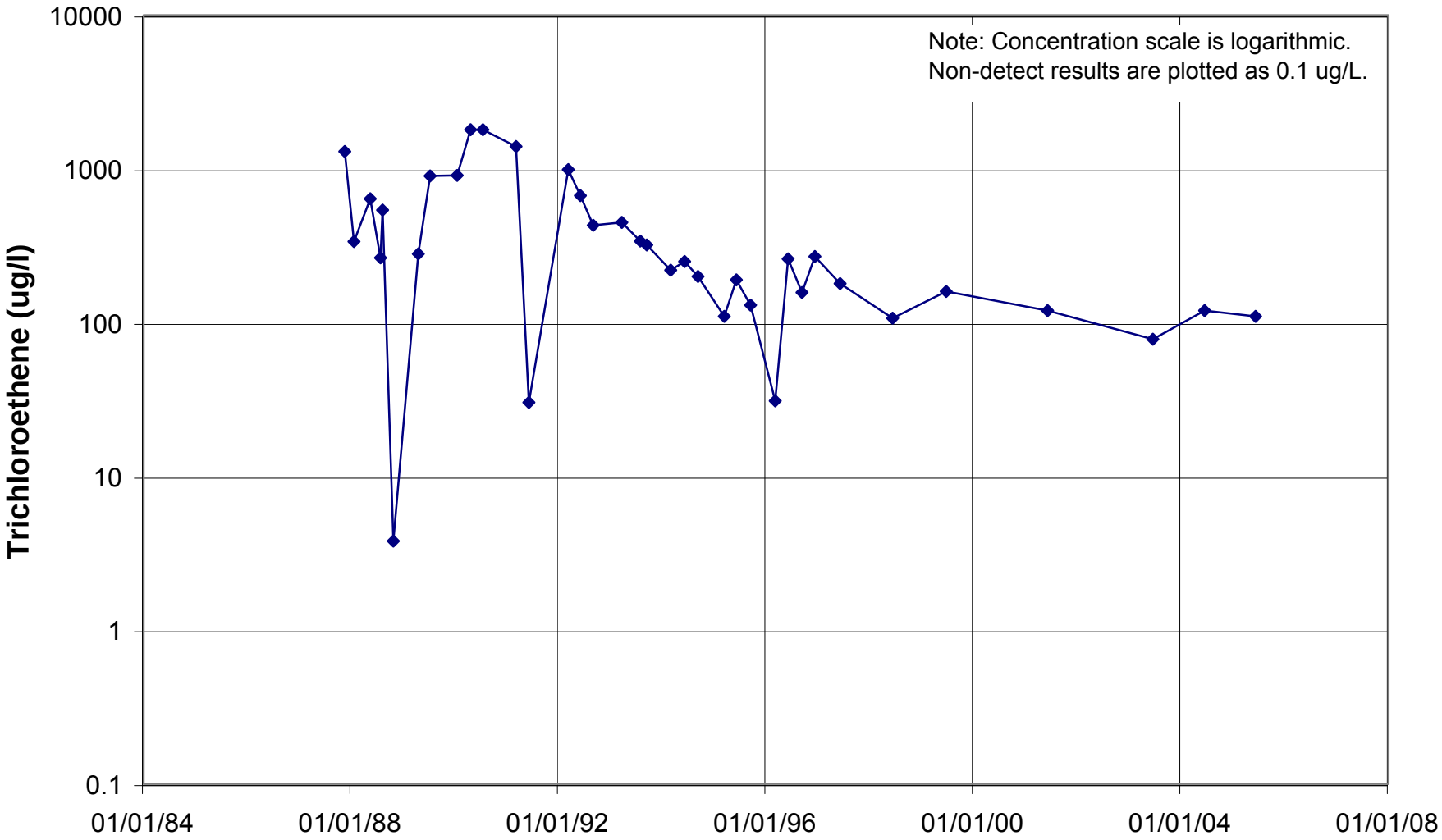
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U002



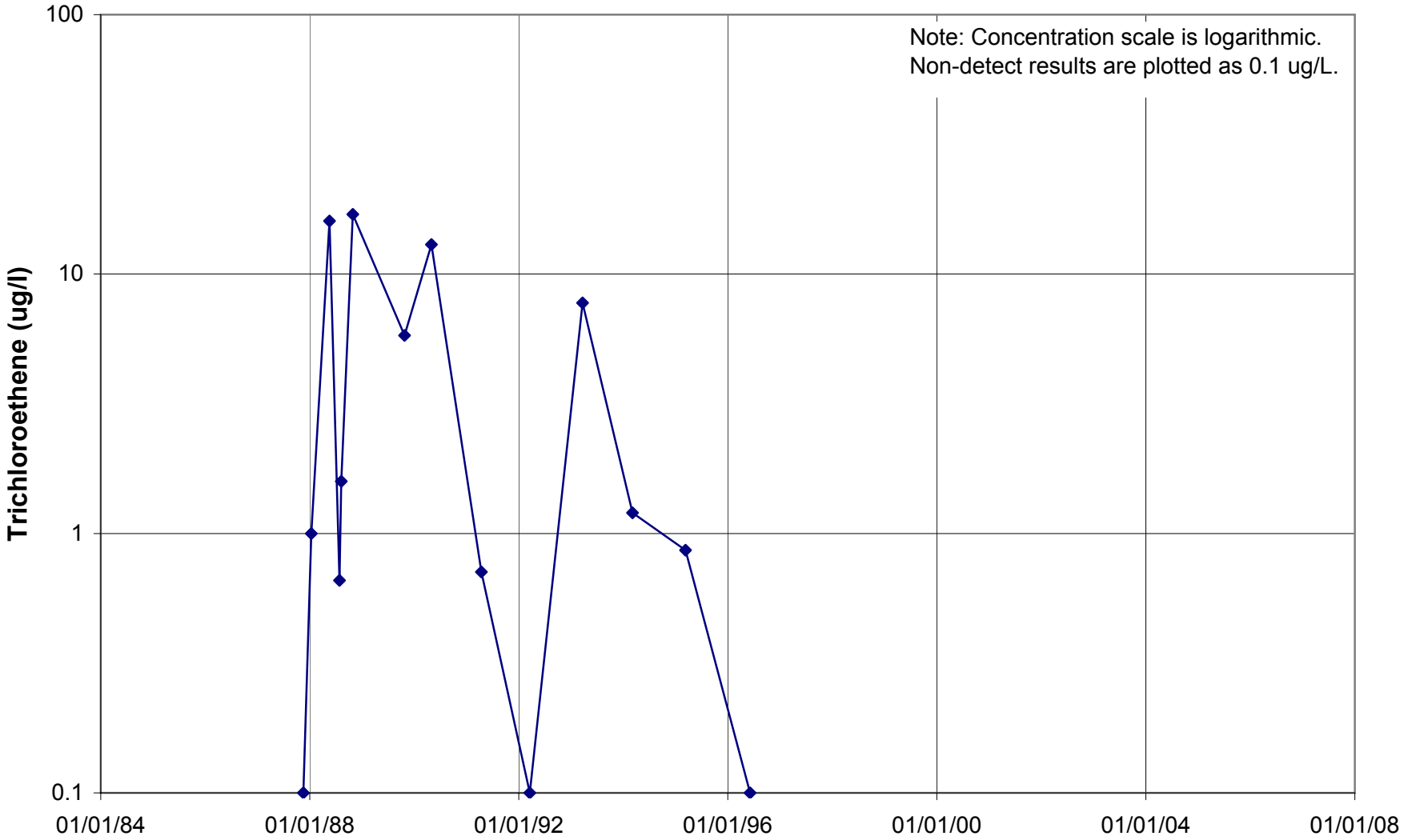
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U003



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U004



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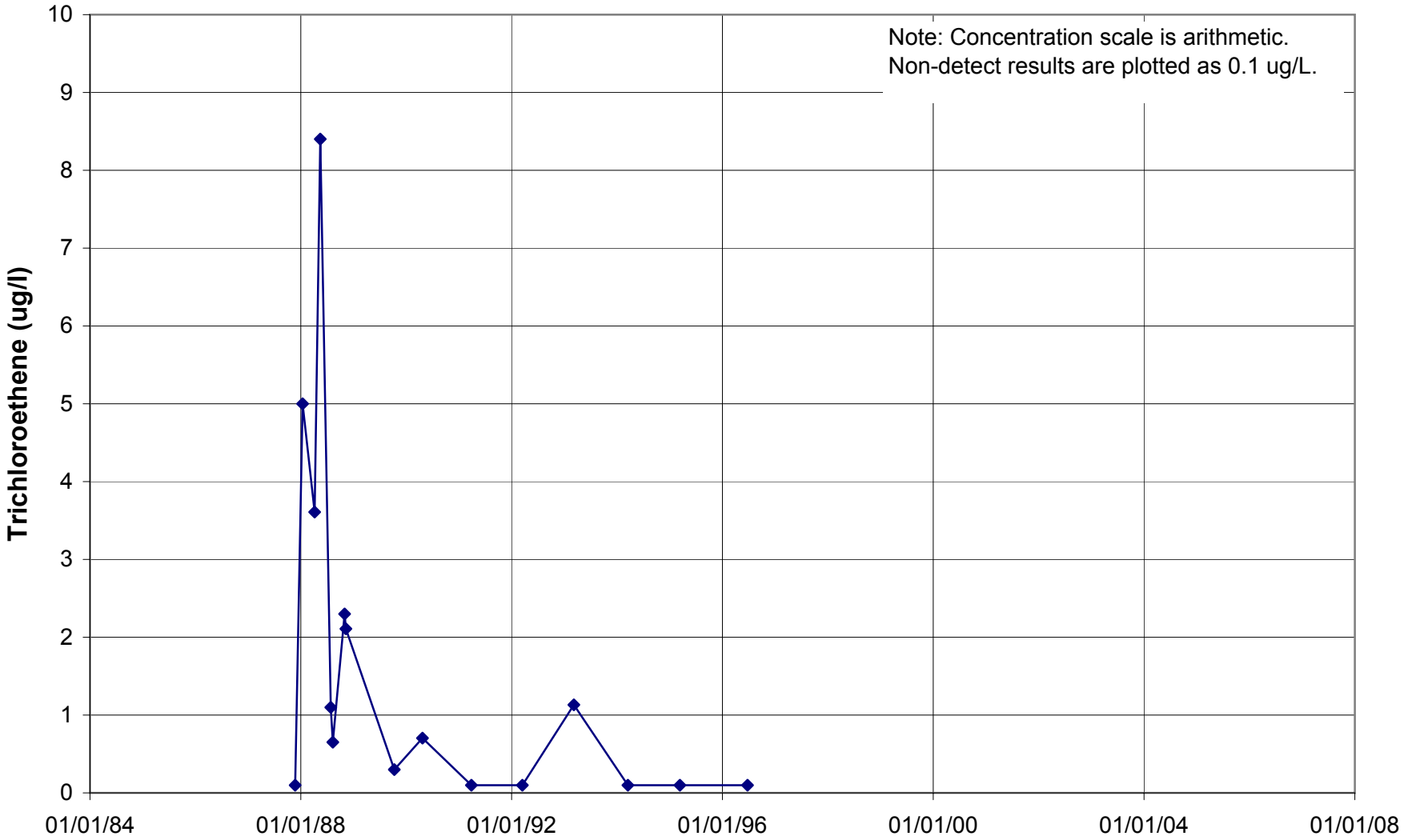

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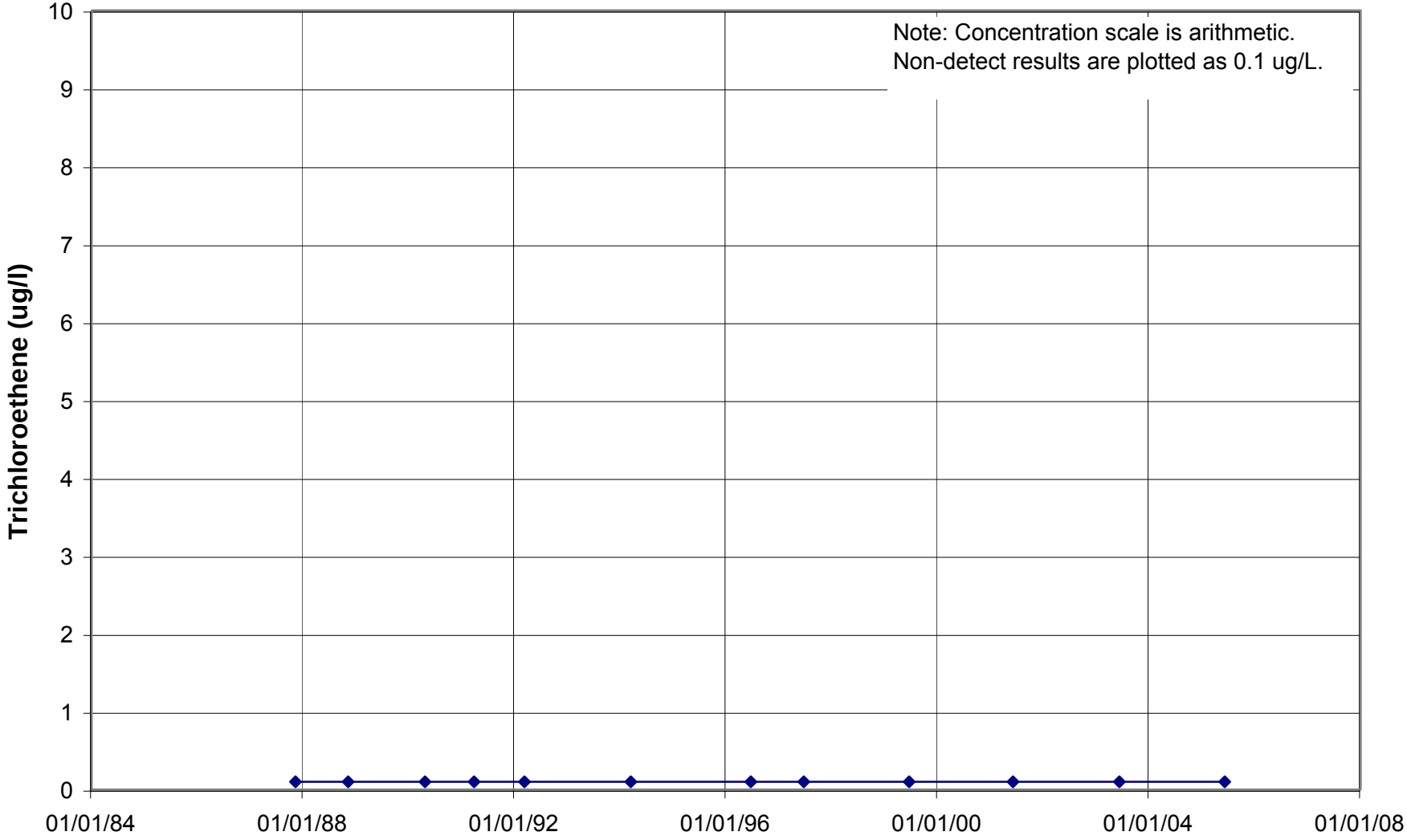
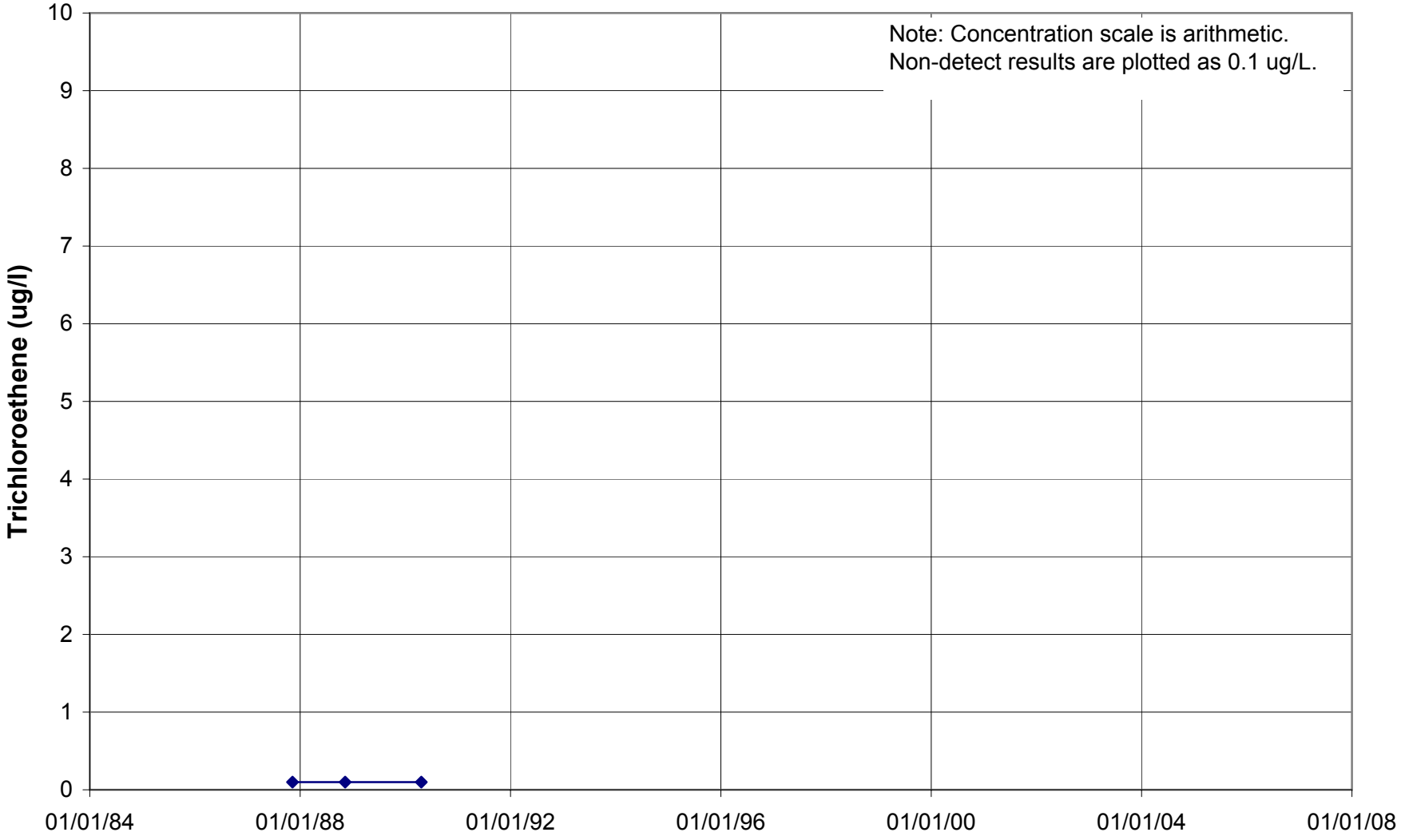


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U008



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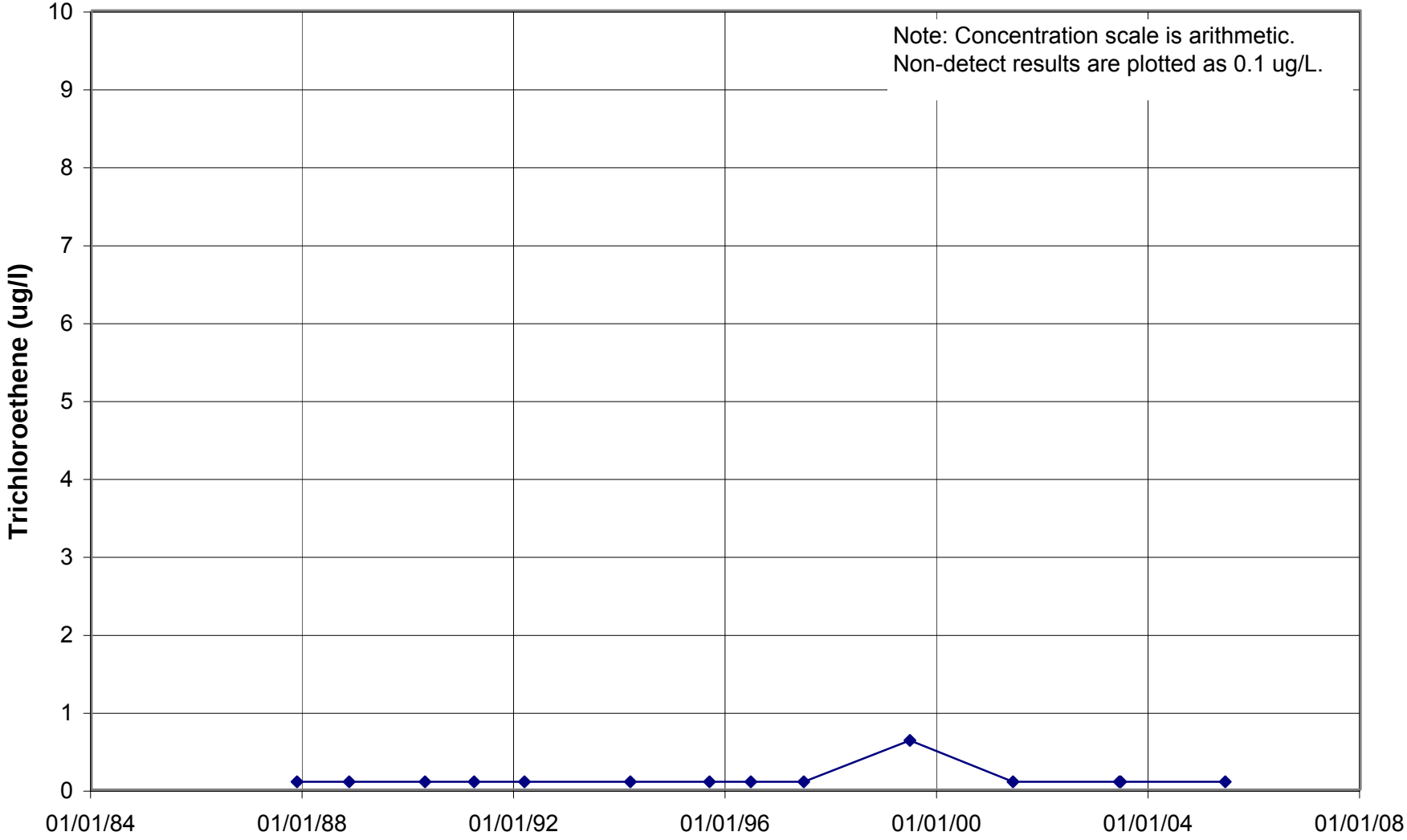

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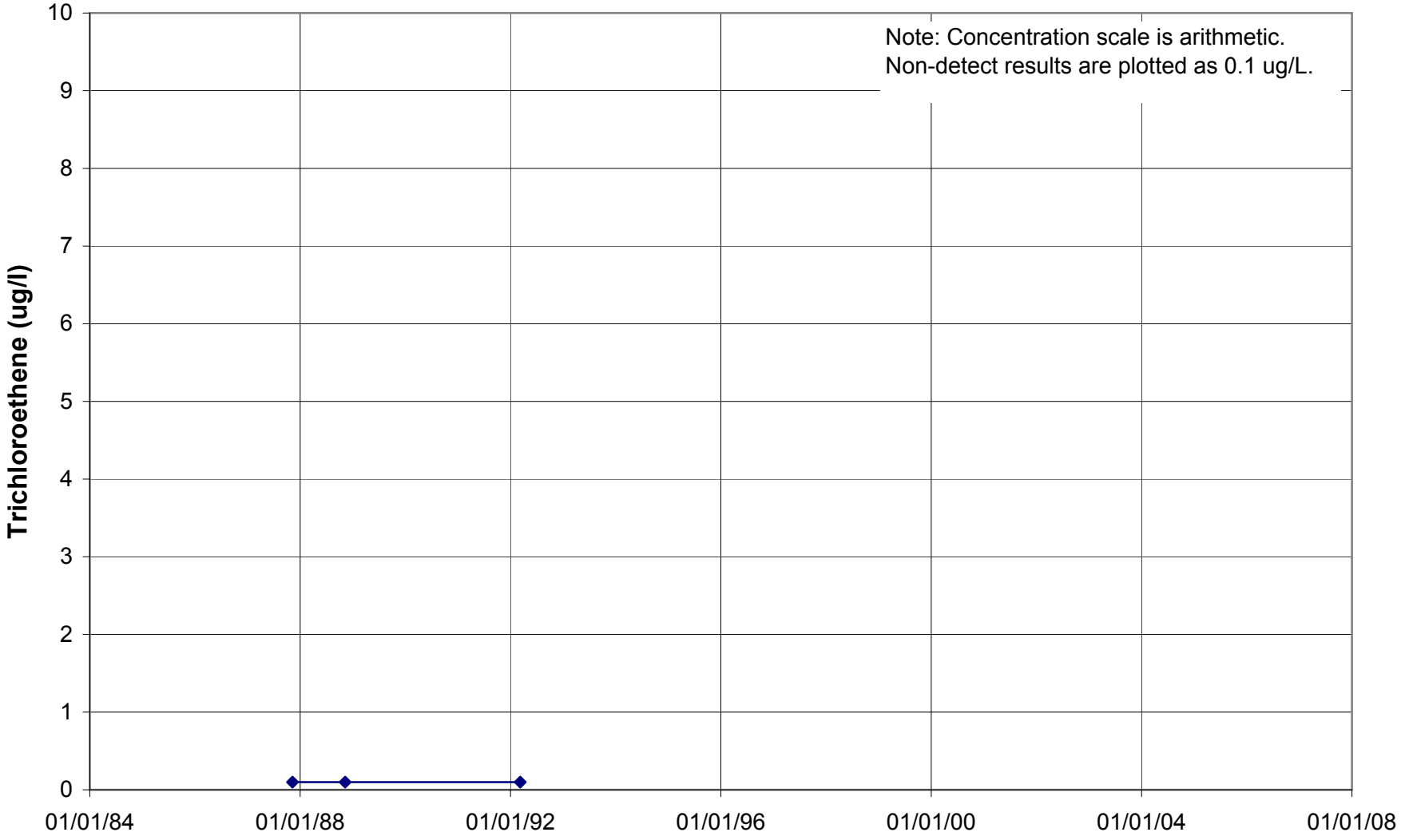

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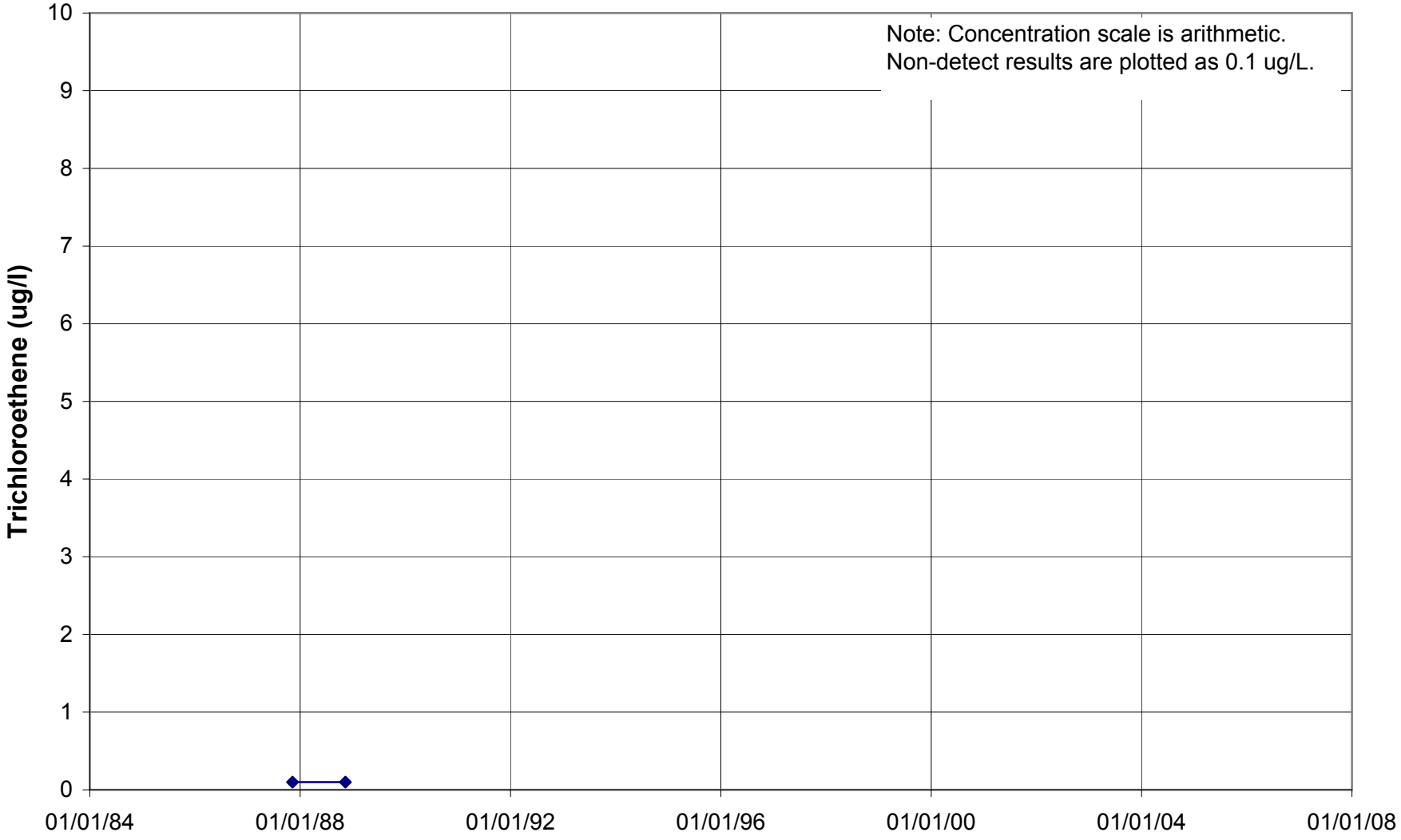
03U012



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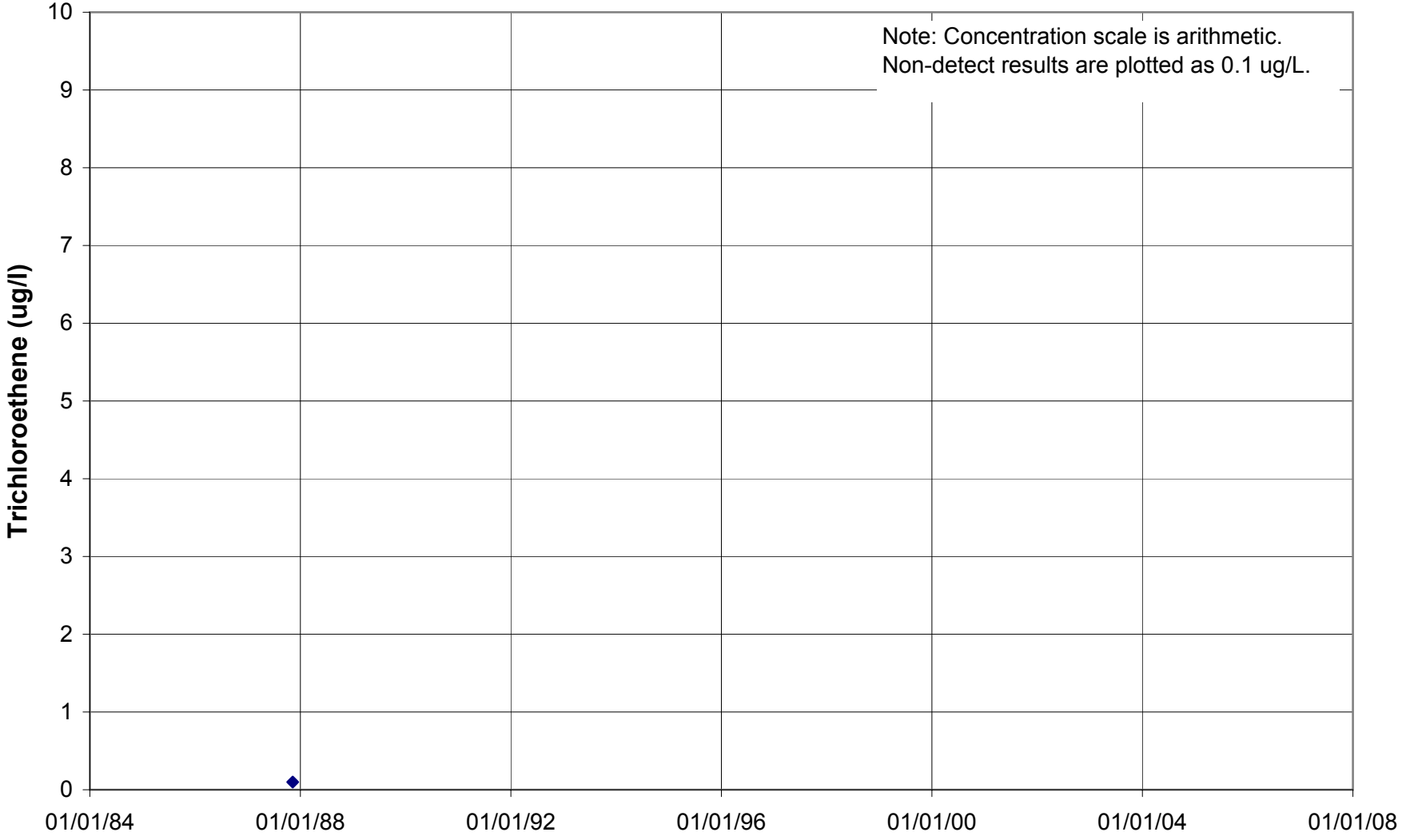
03U013



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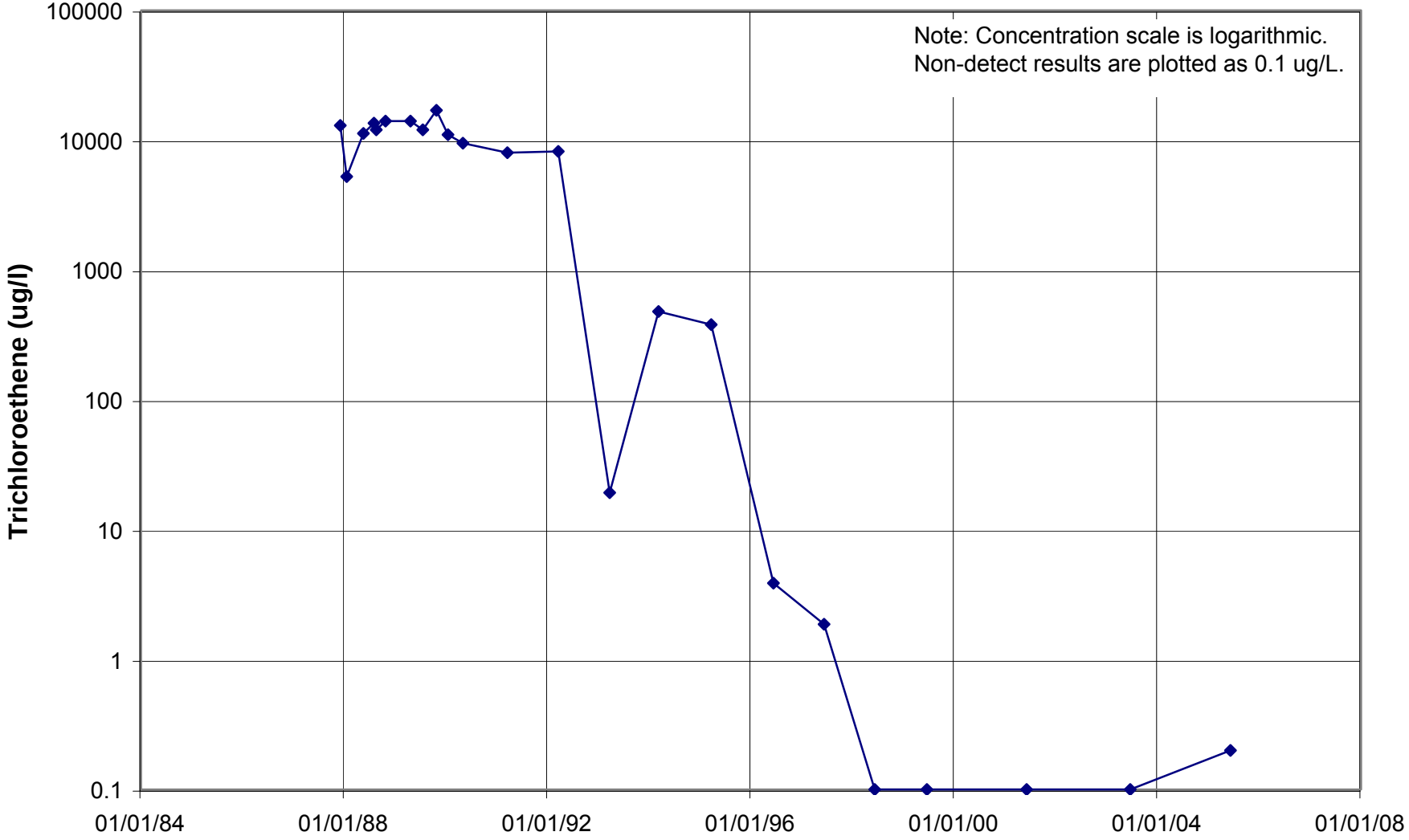

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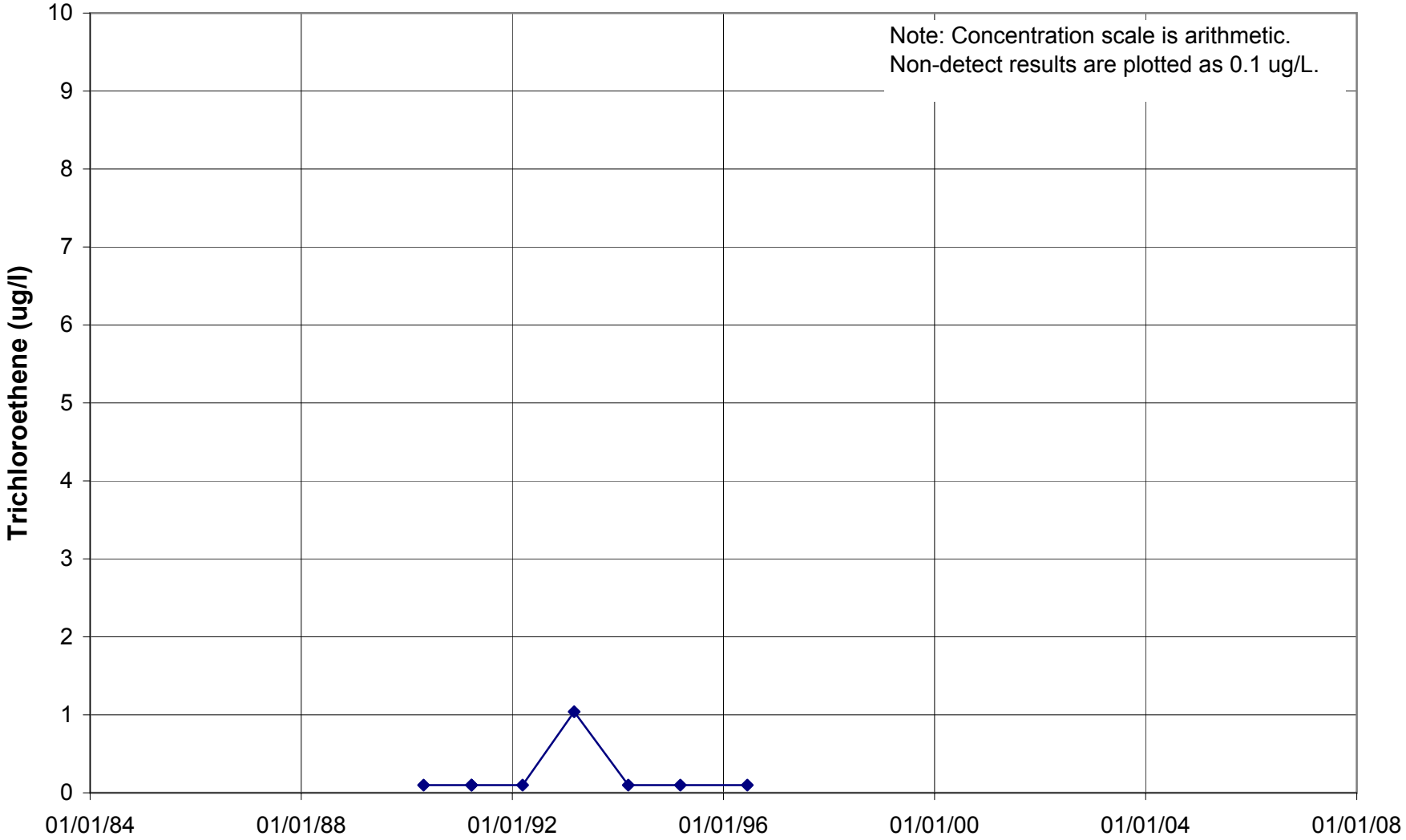
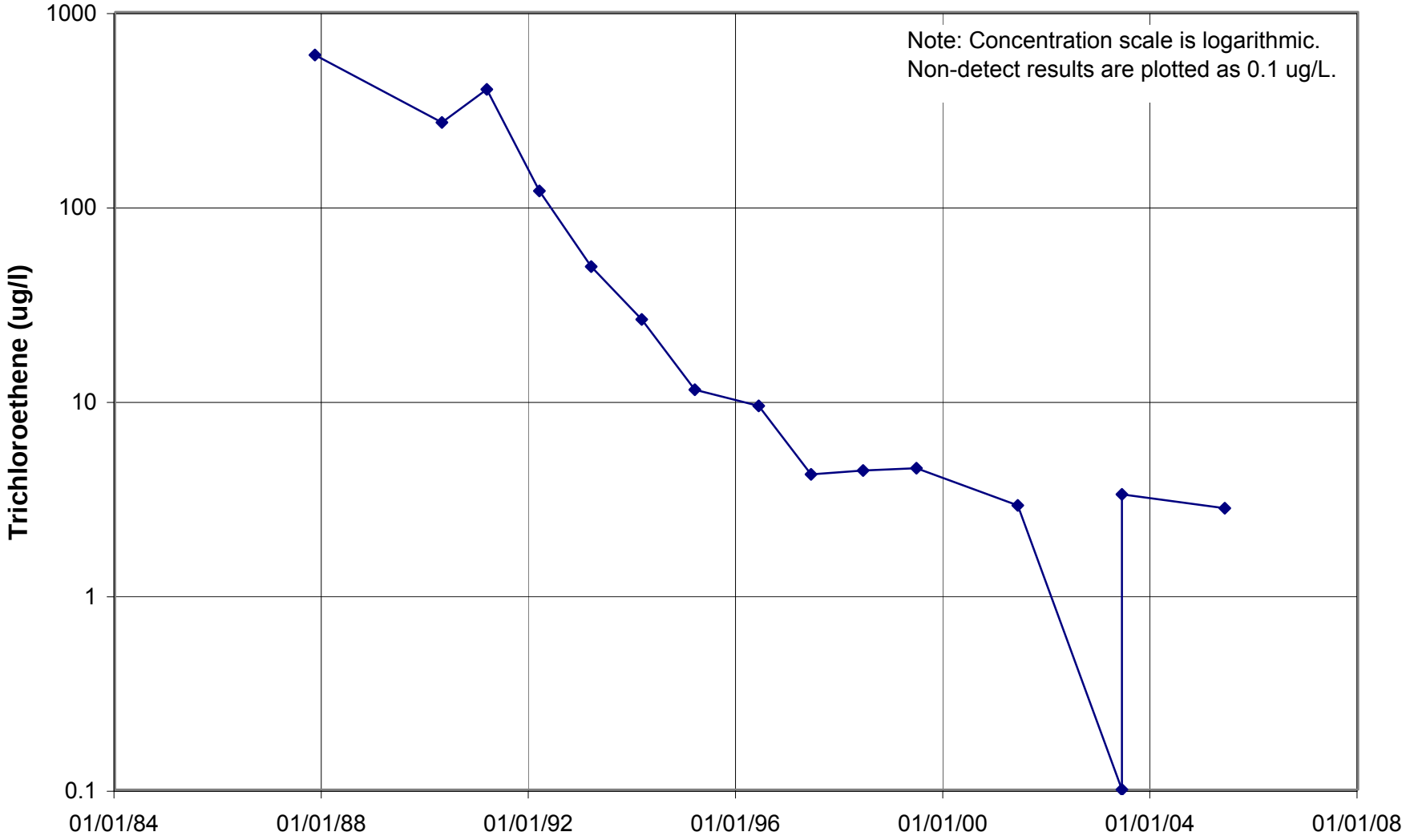
03U016



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U017



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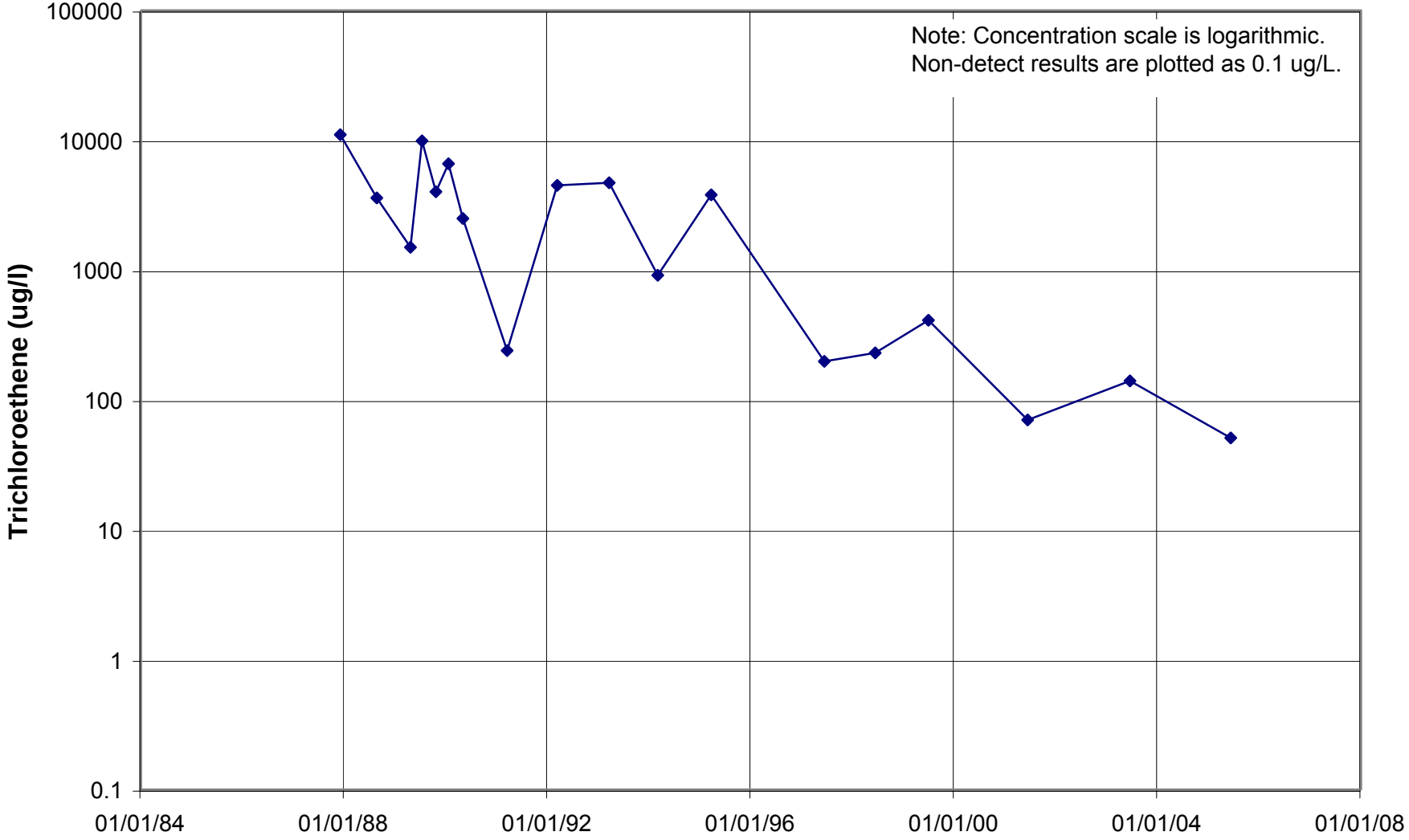

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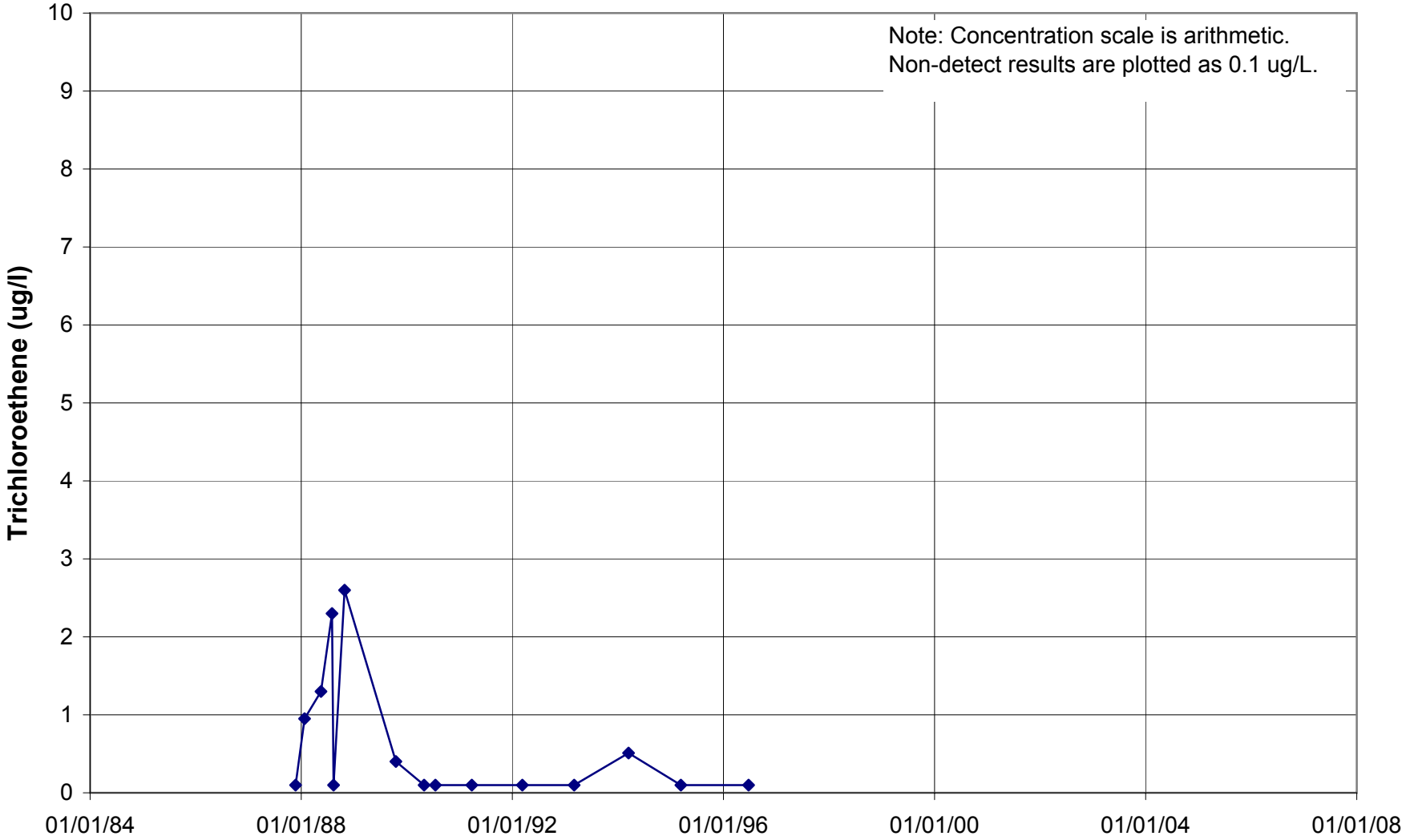

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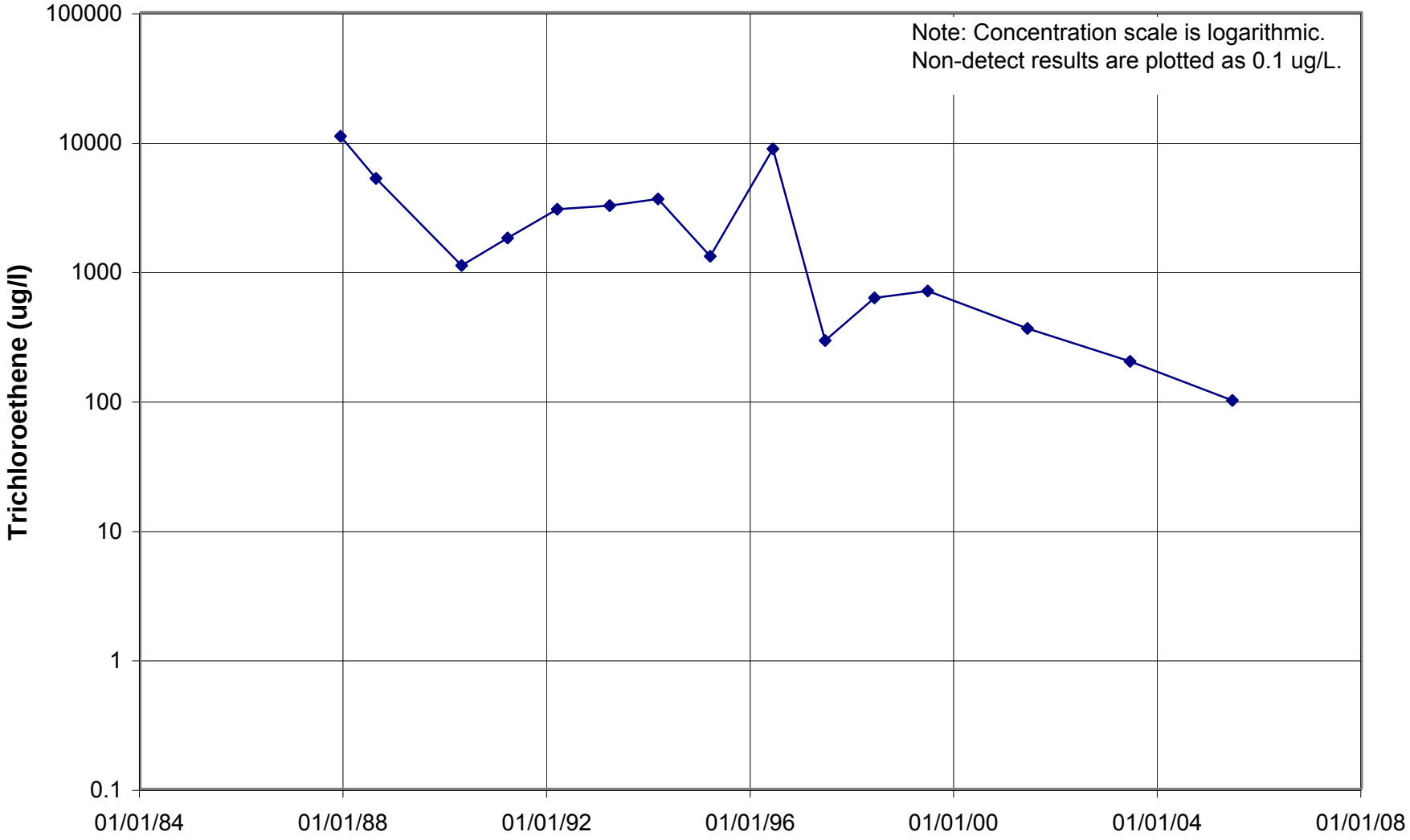

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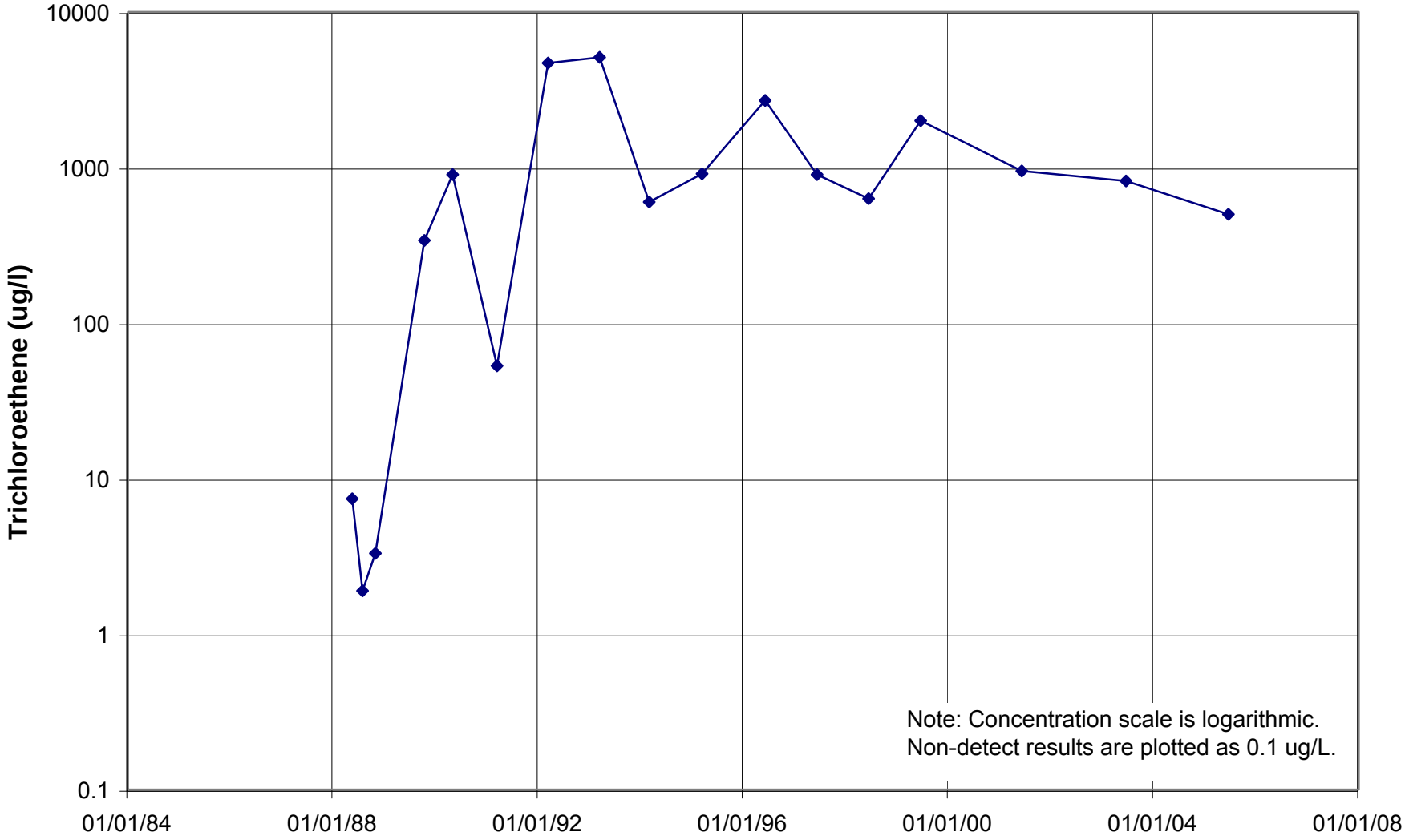
03U021



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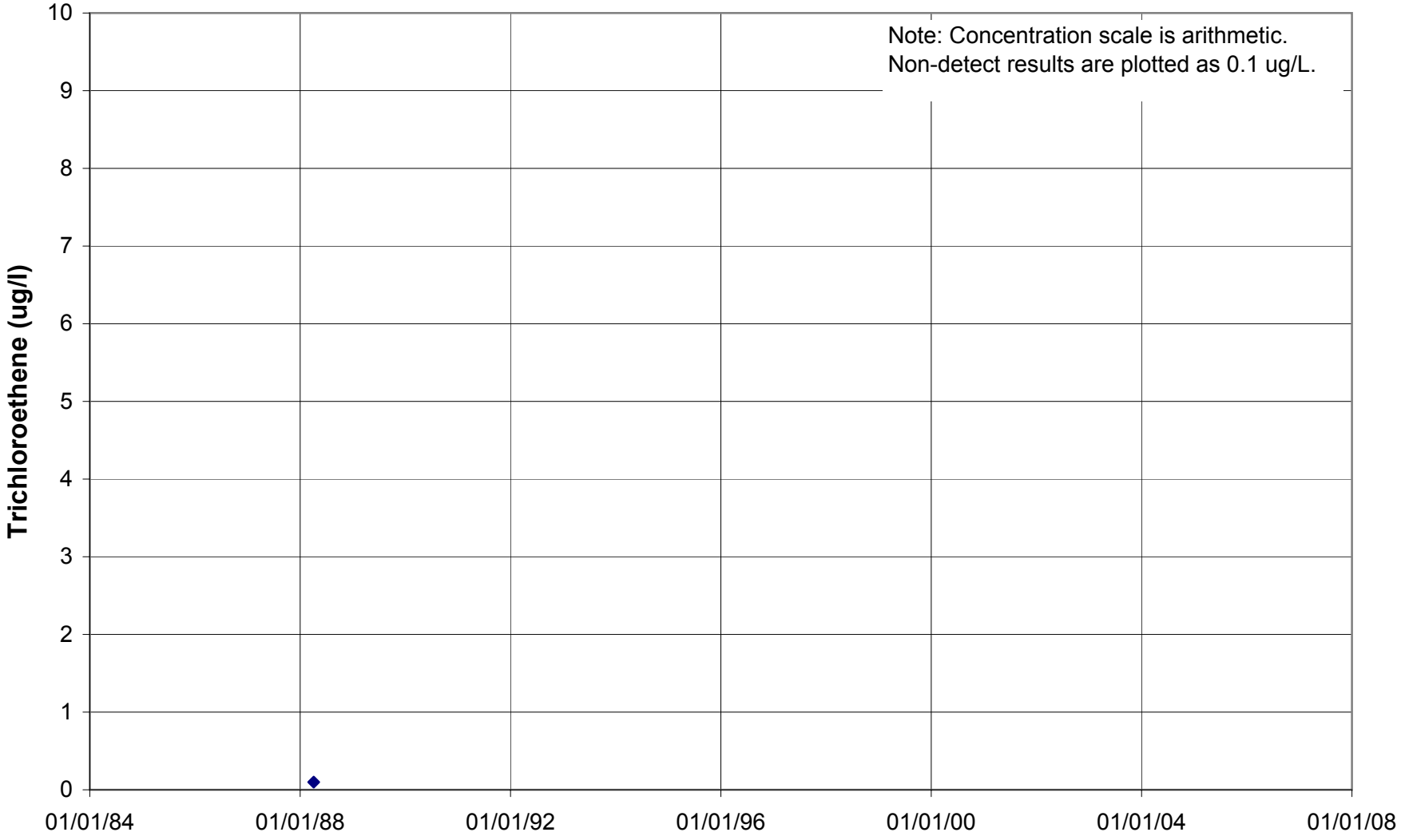
03U022



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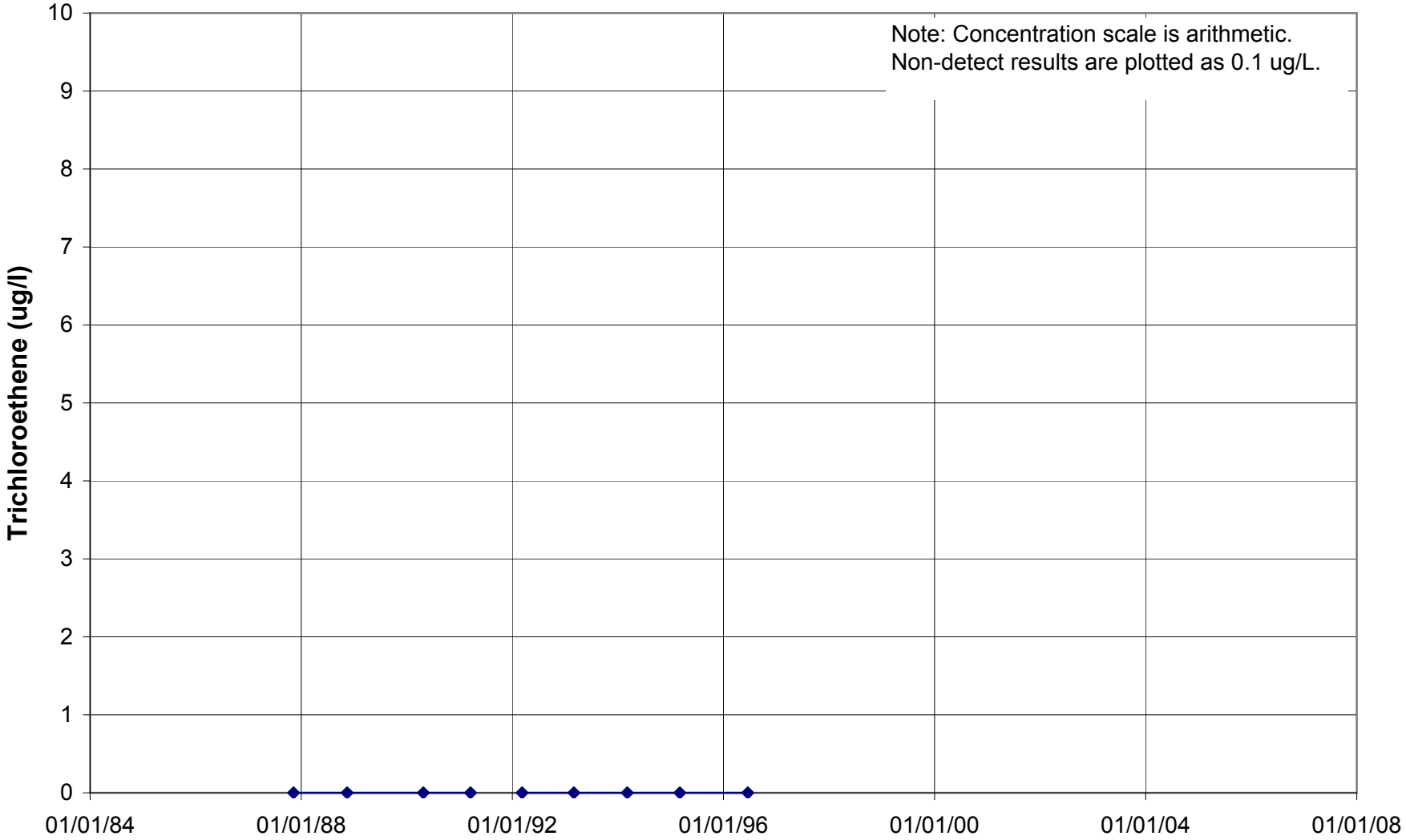
03U023



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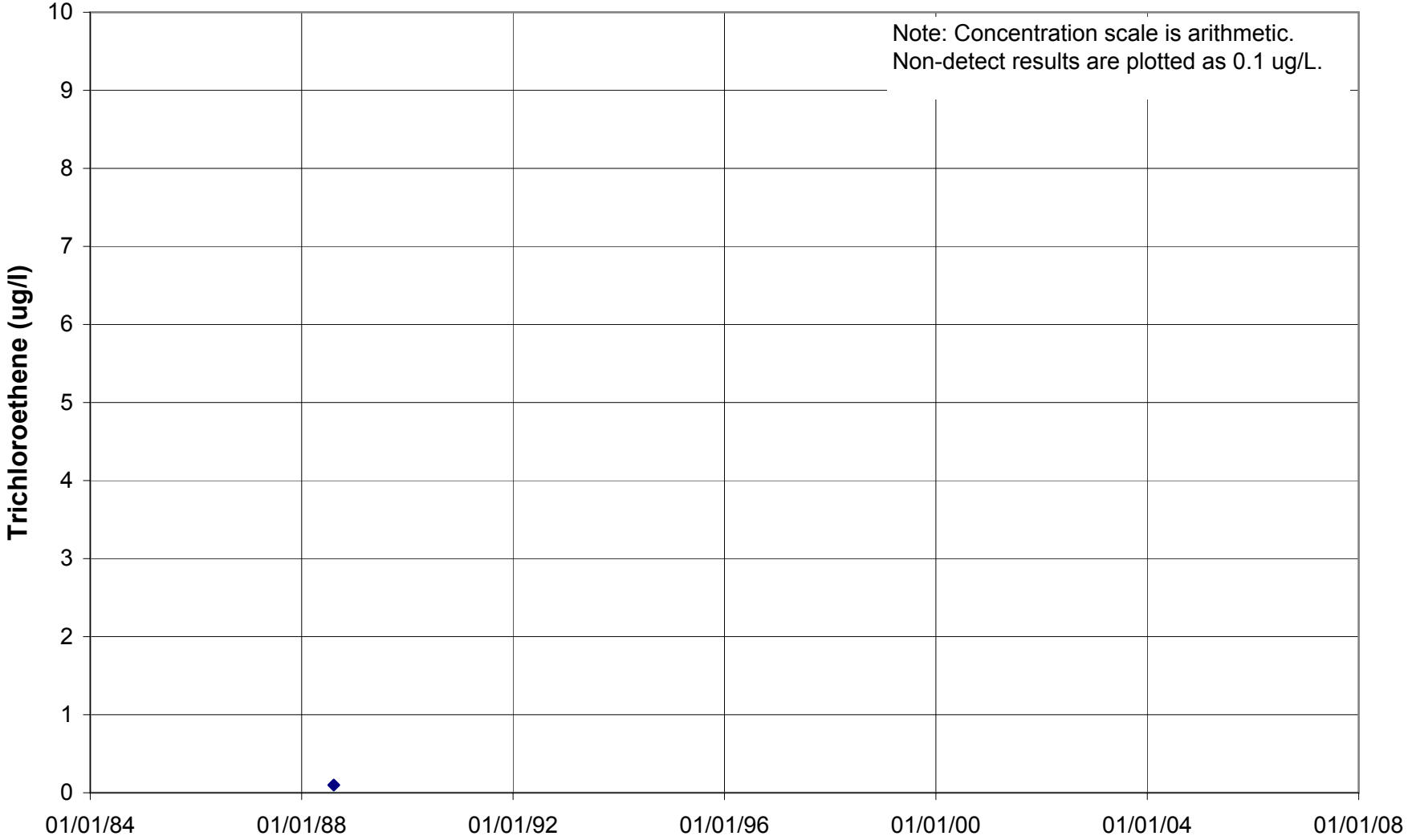
03U024



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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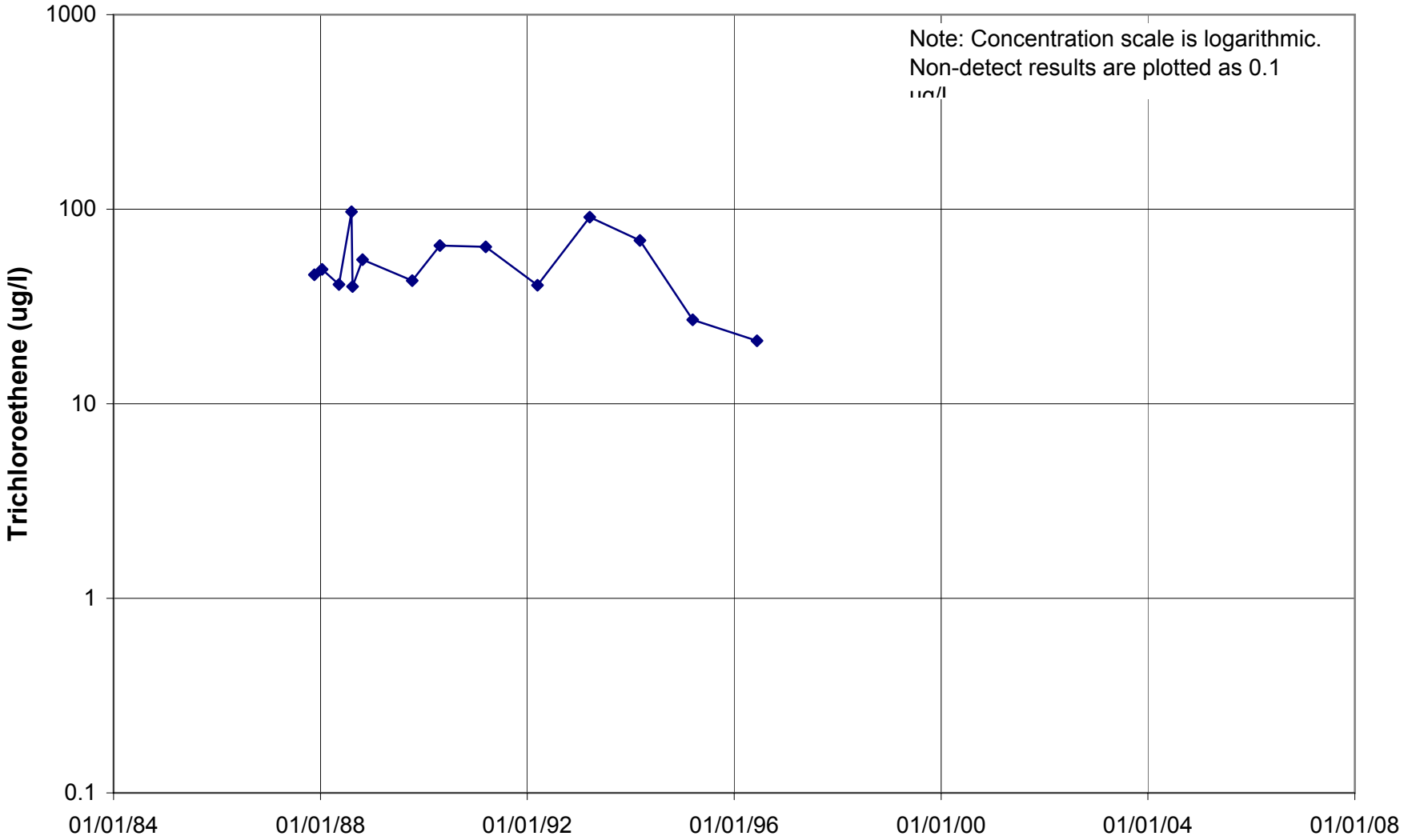

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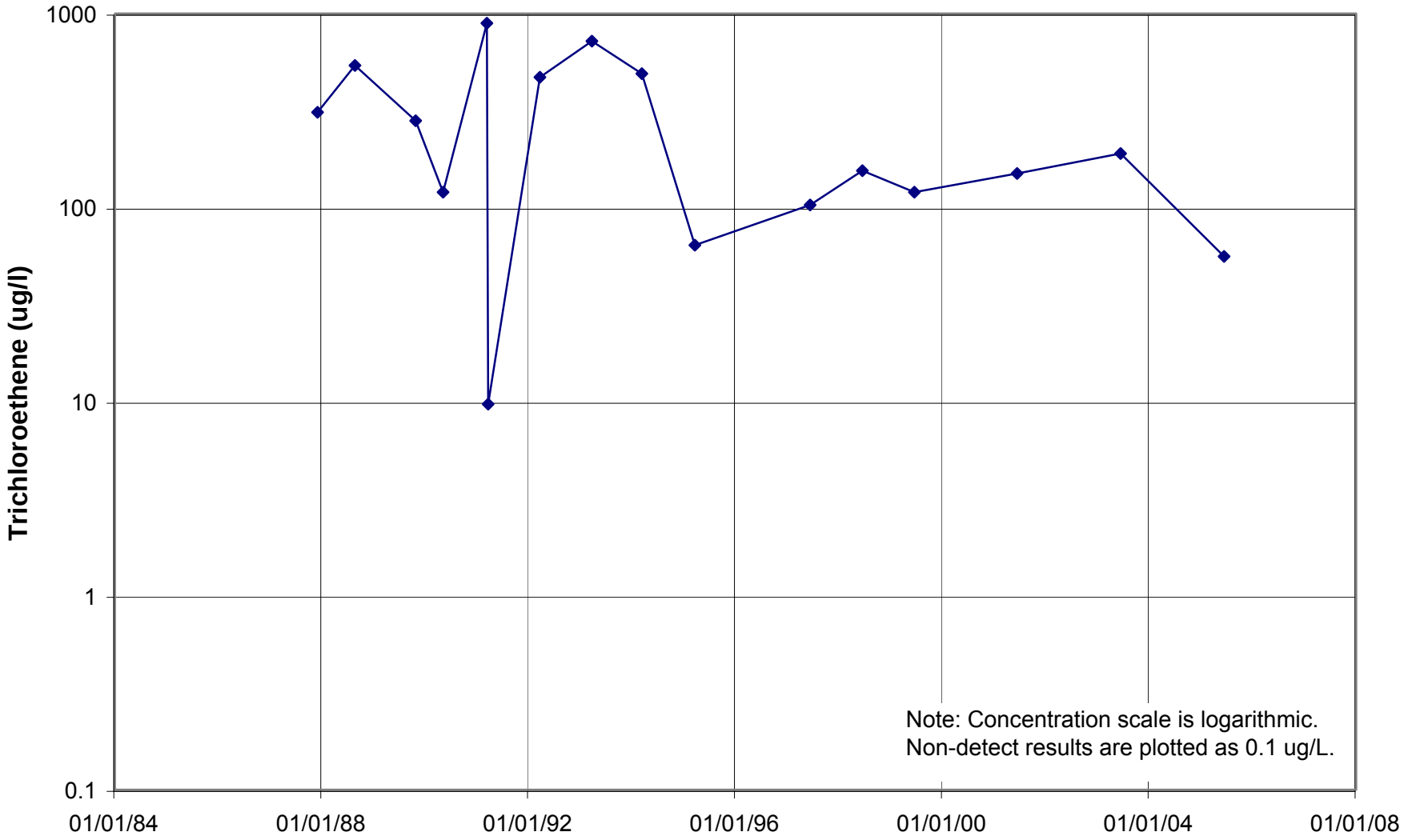
03U028



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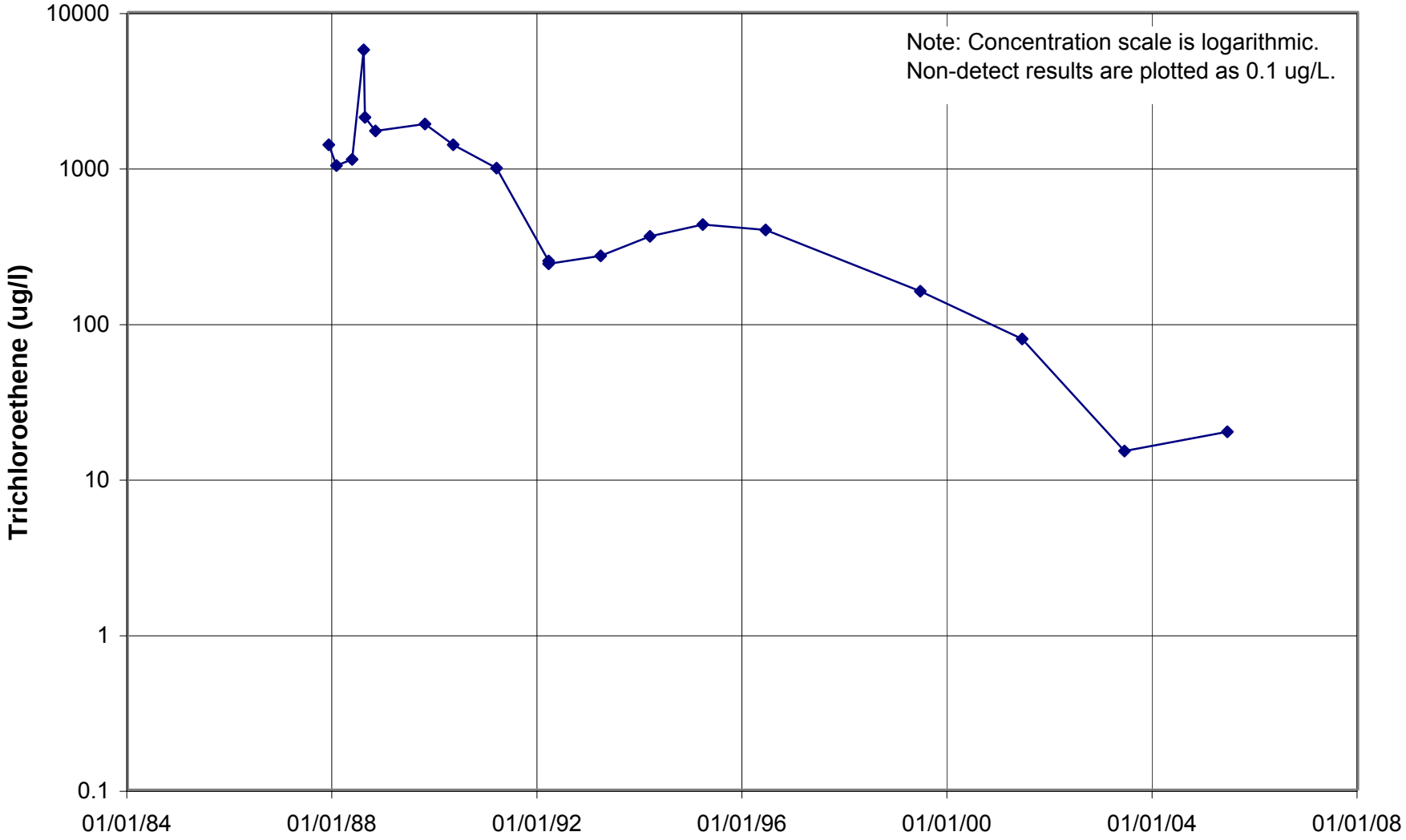
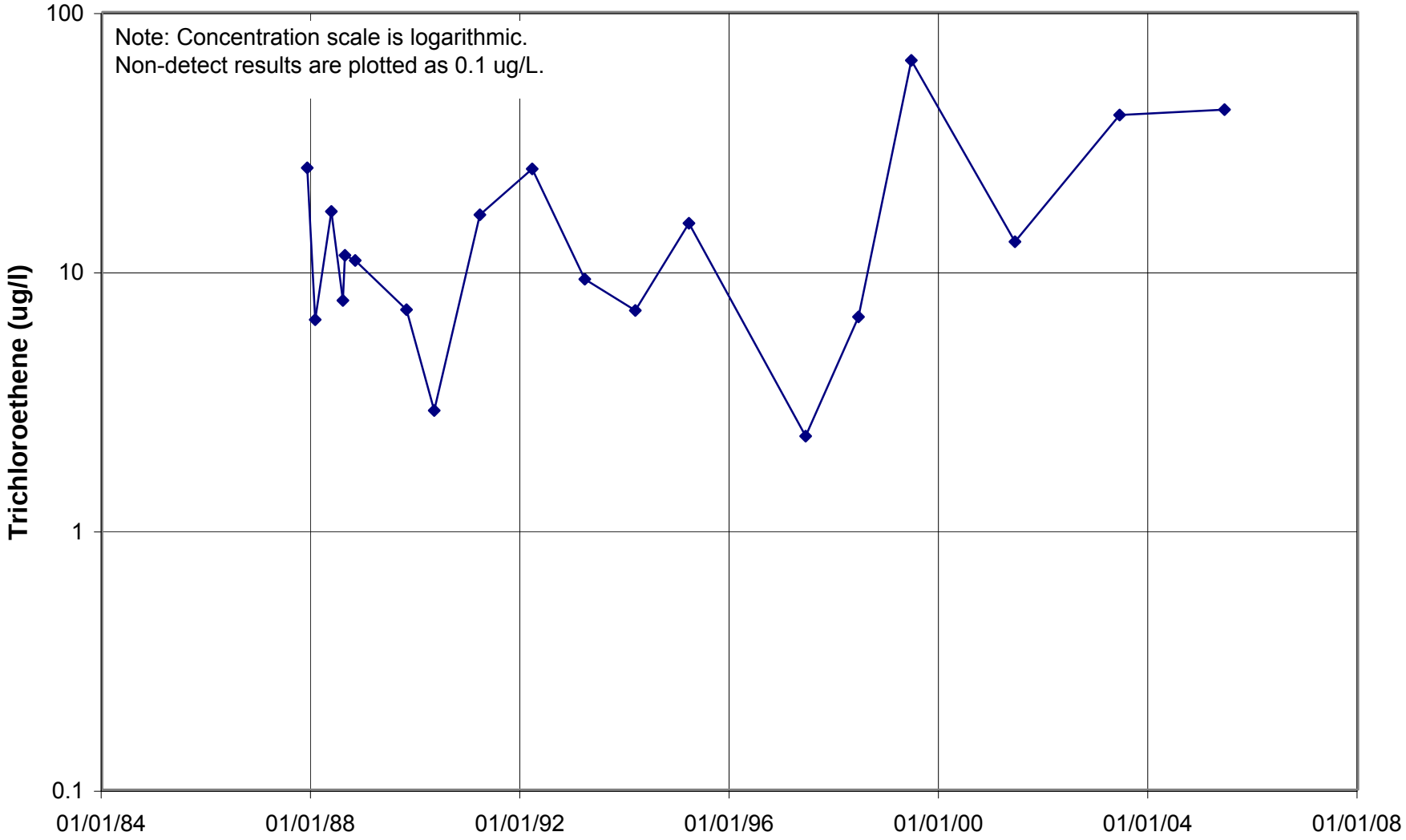
03U029



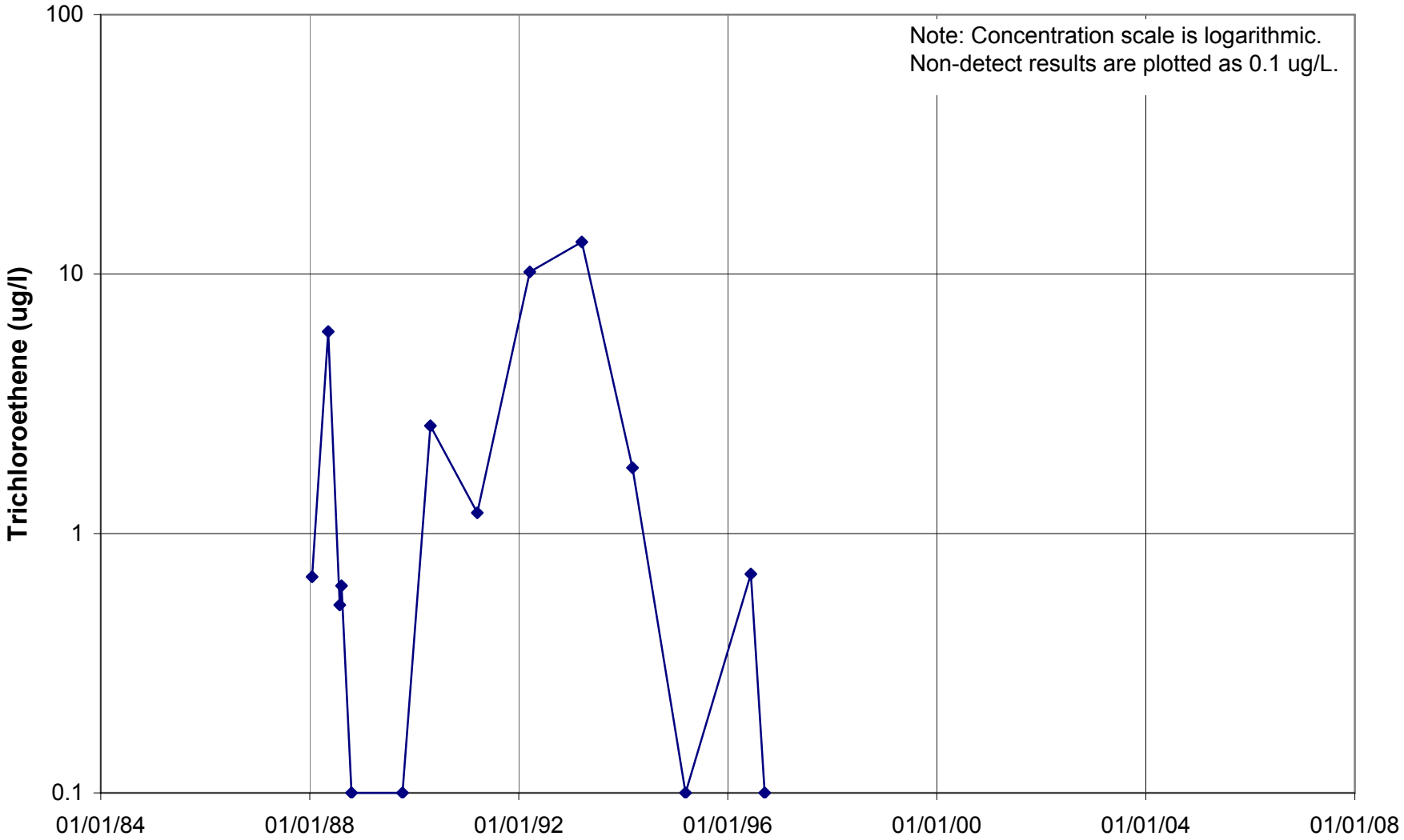
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U030



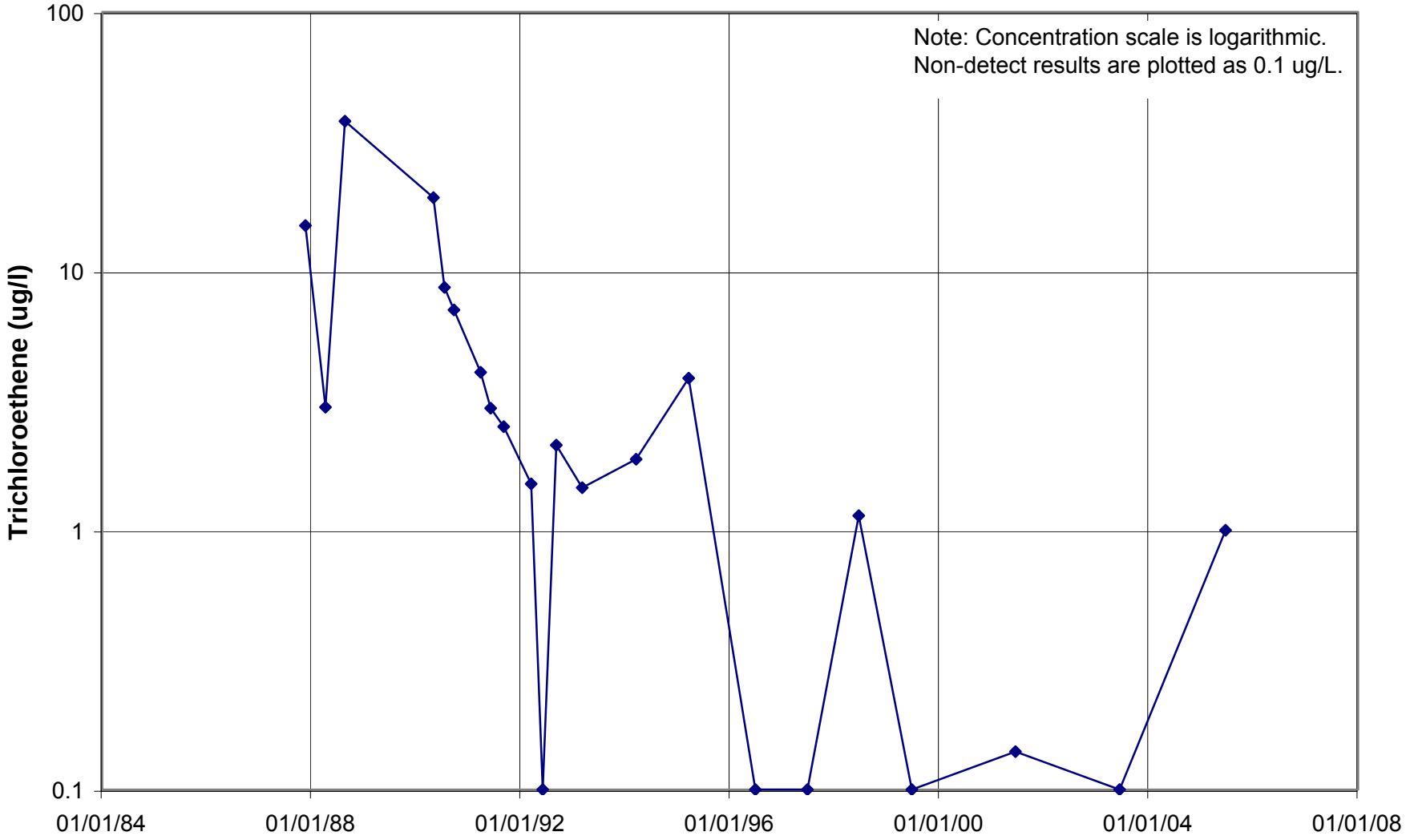
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U031



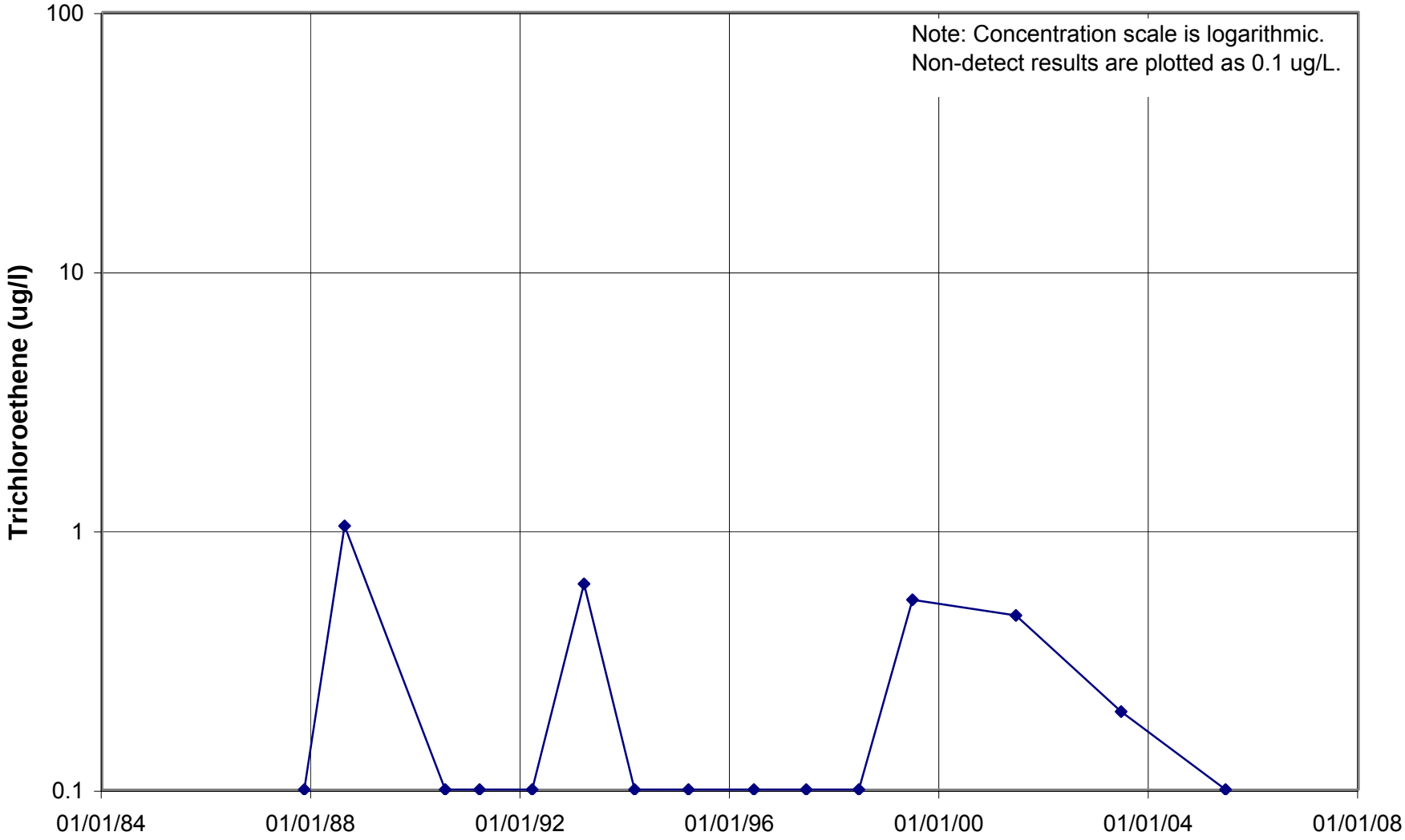
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U032



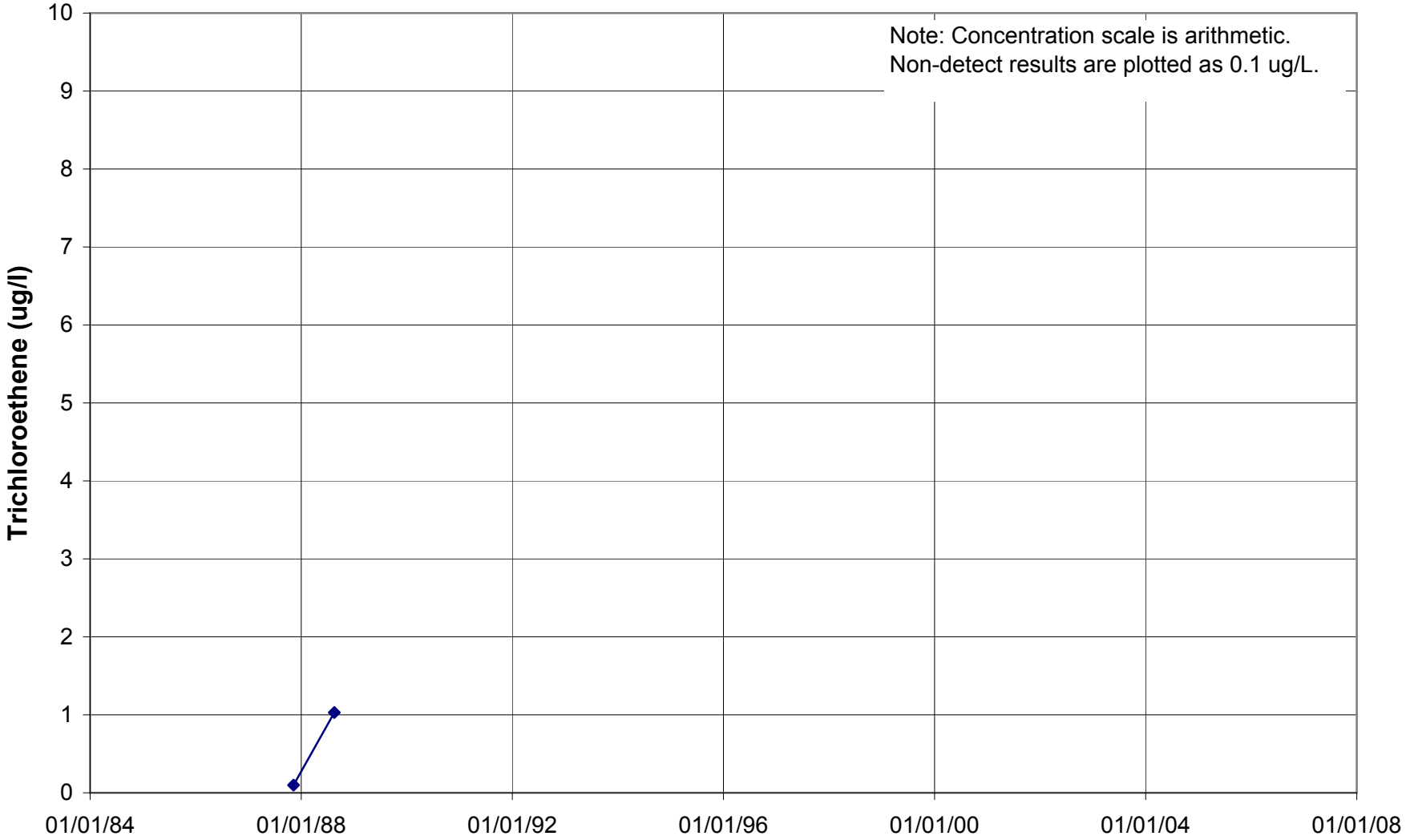
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U075



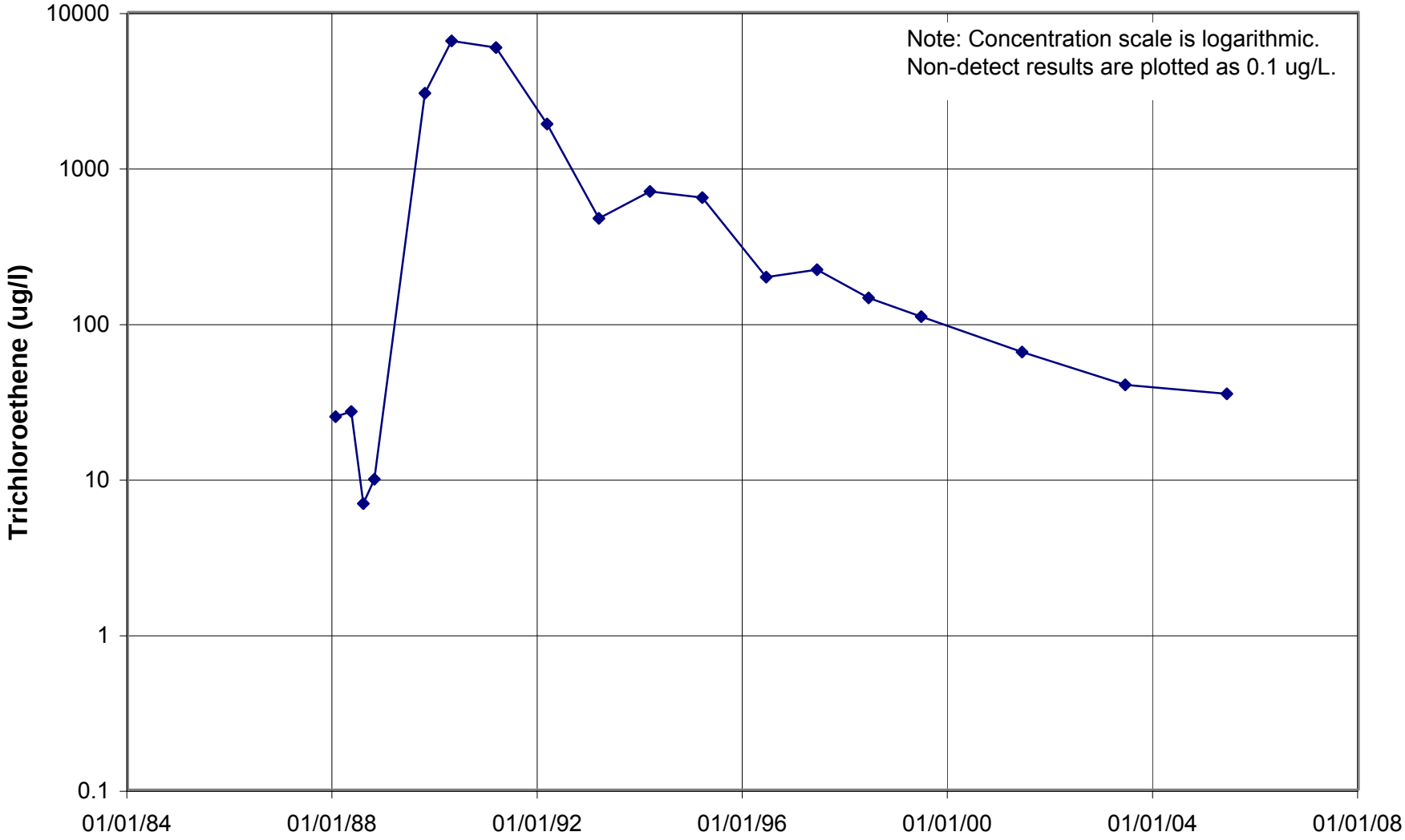
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U076



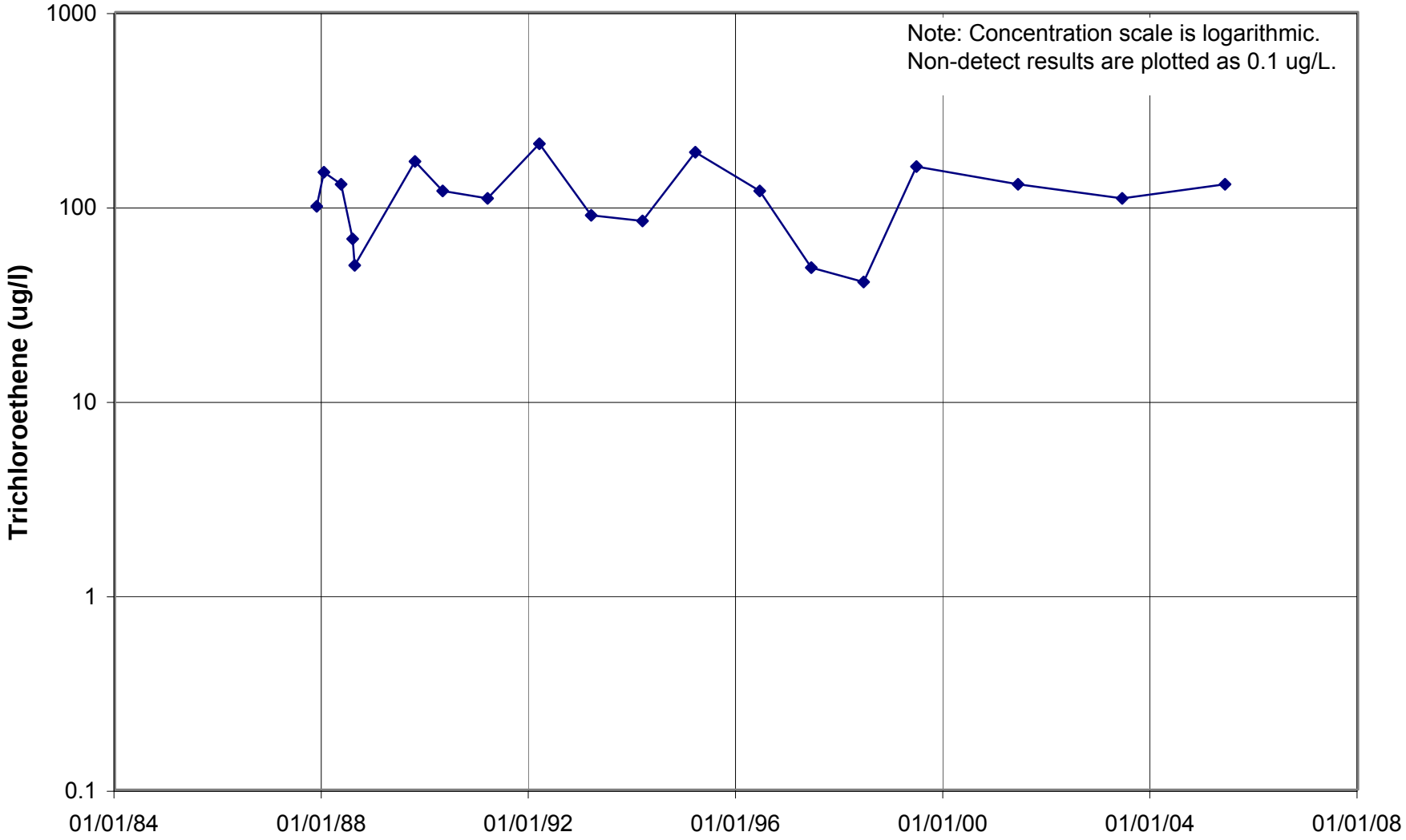
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U077



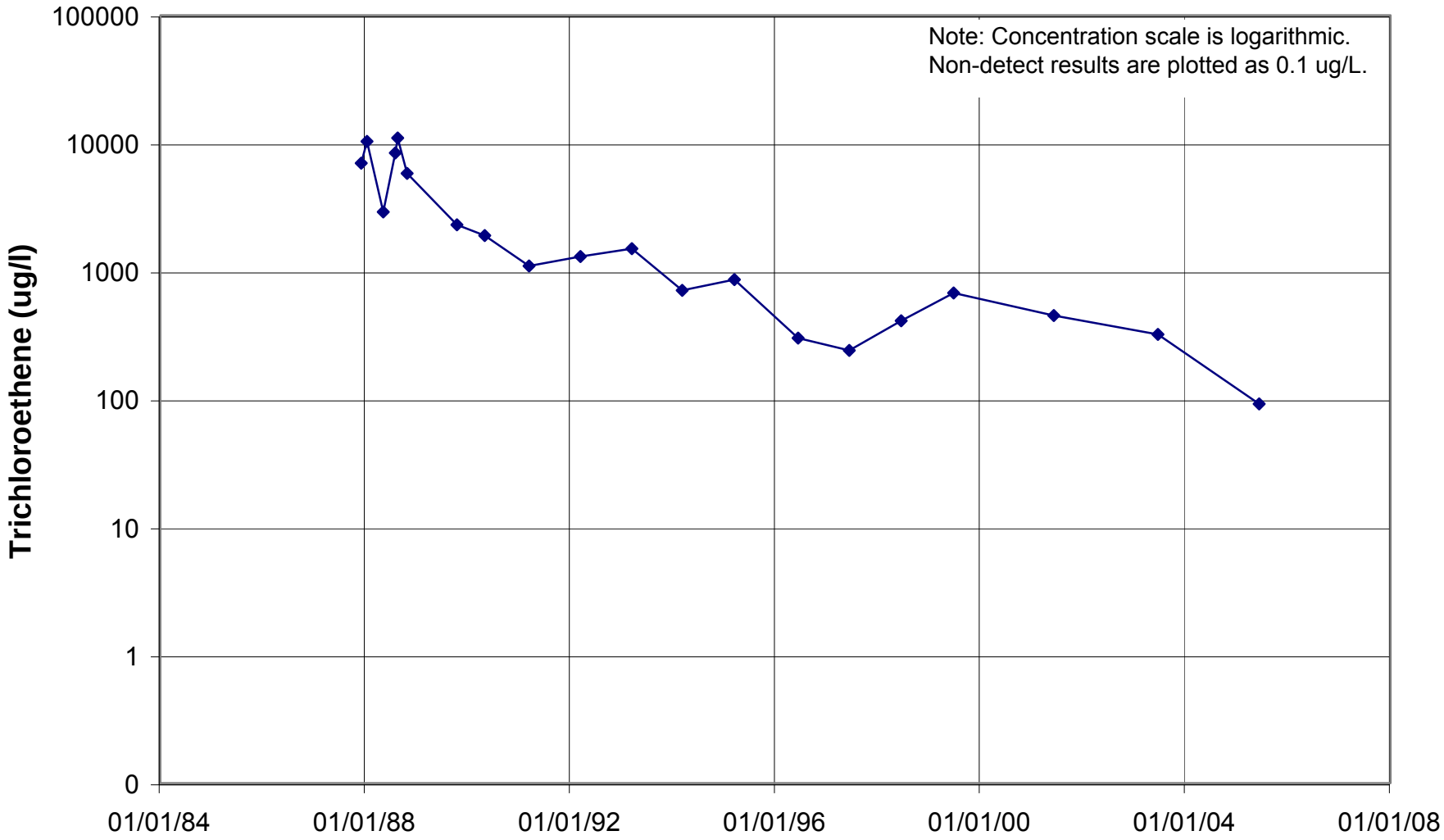
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U078



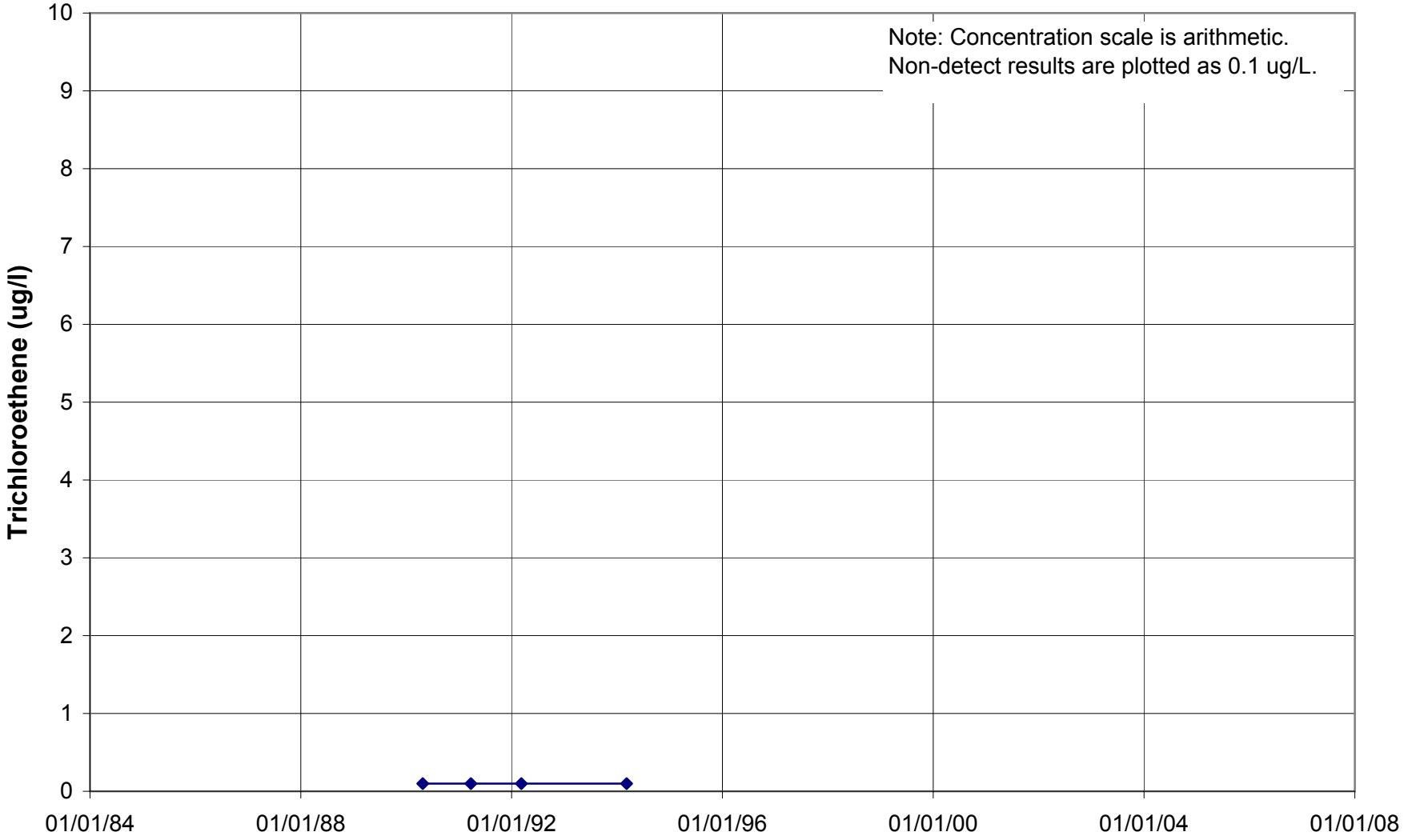
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U079



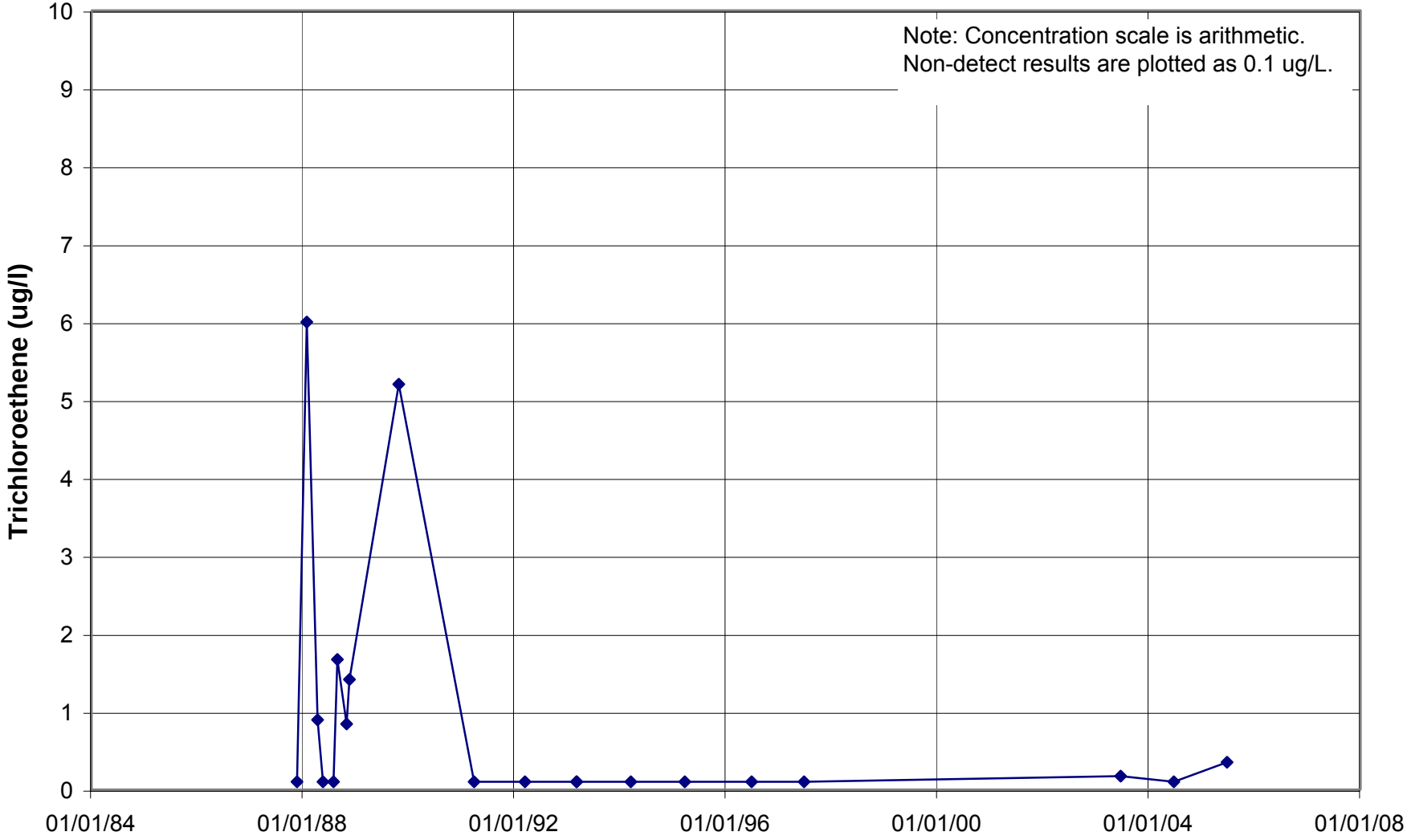
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U082



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U087



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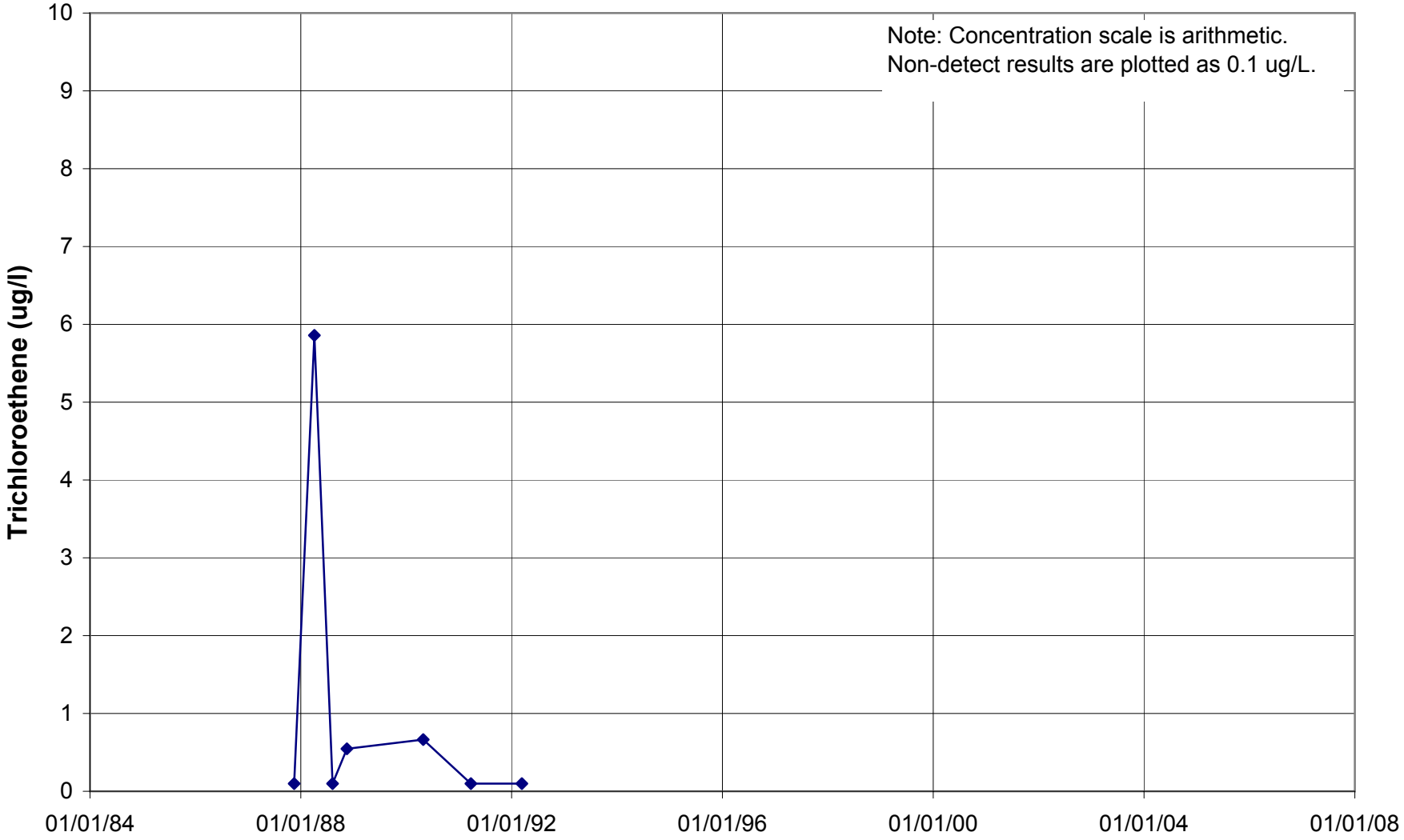
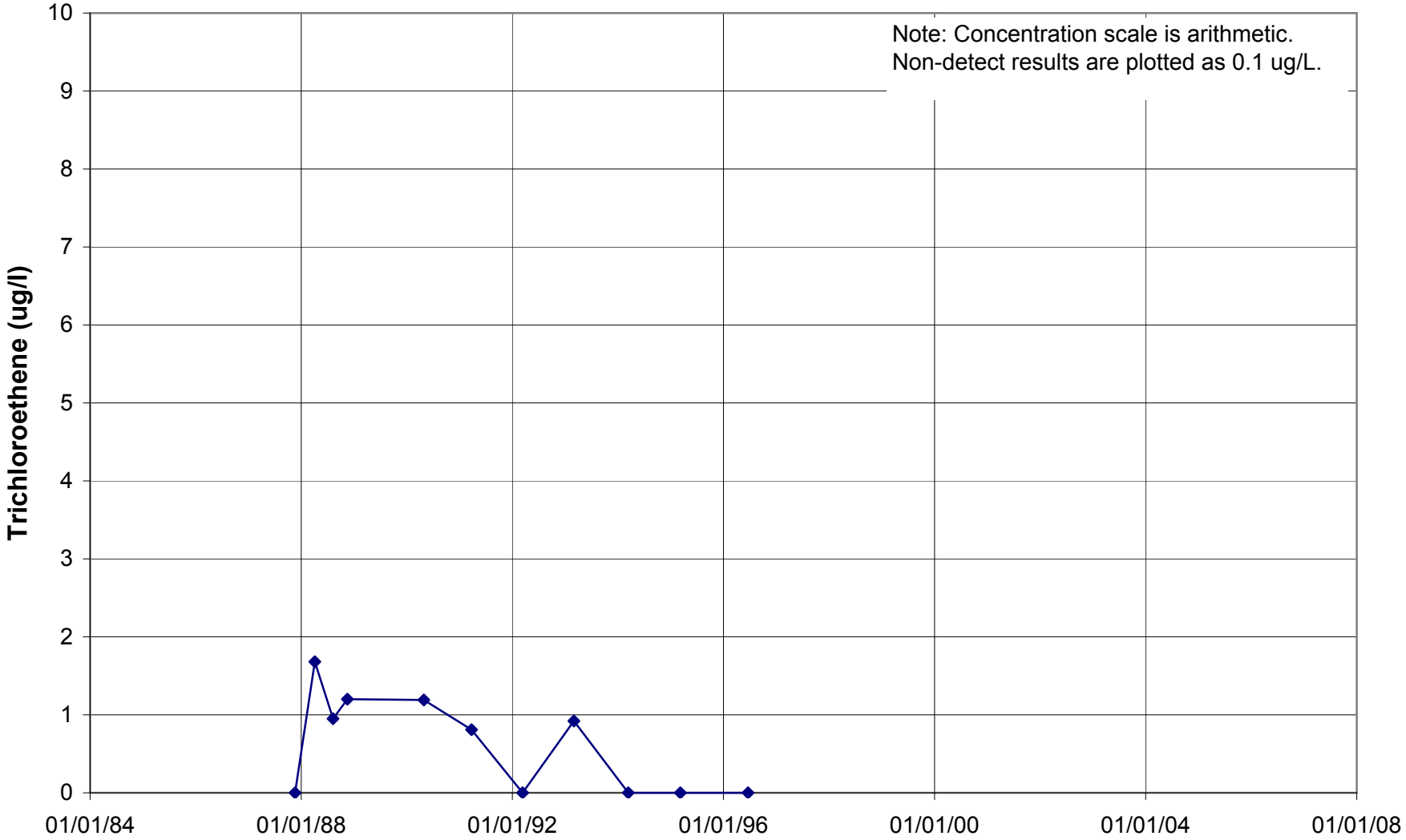
03U088



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U089



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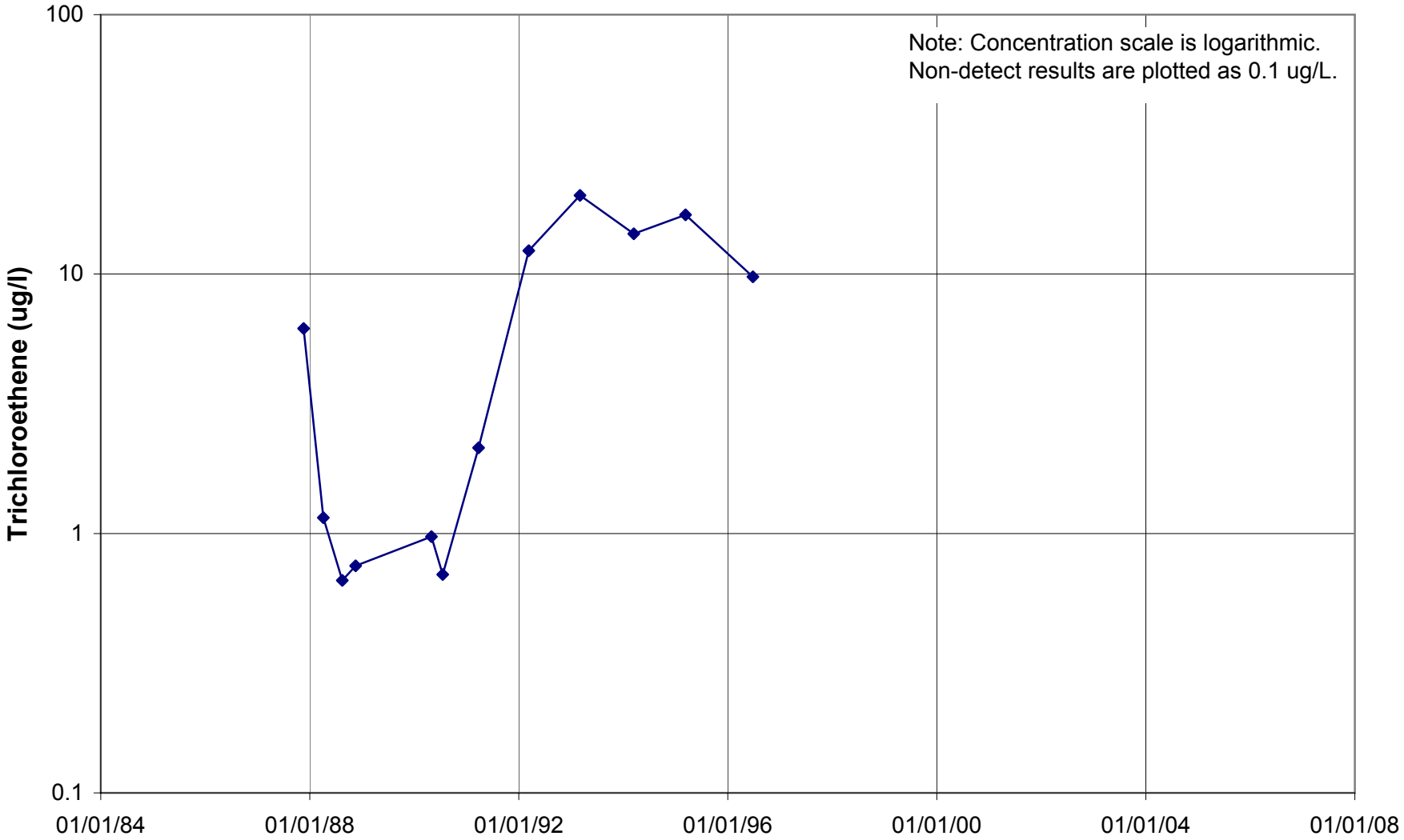

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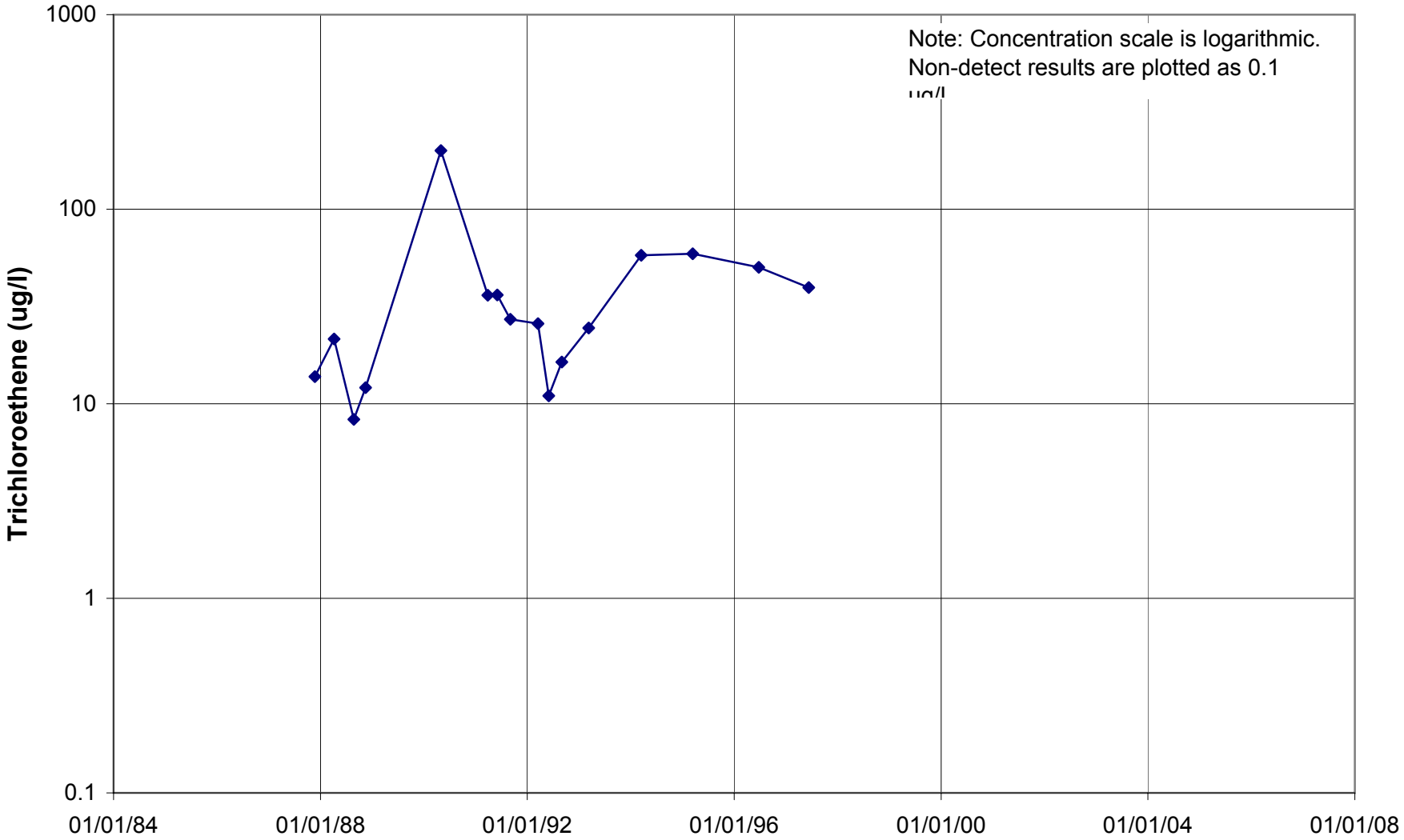
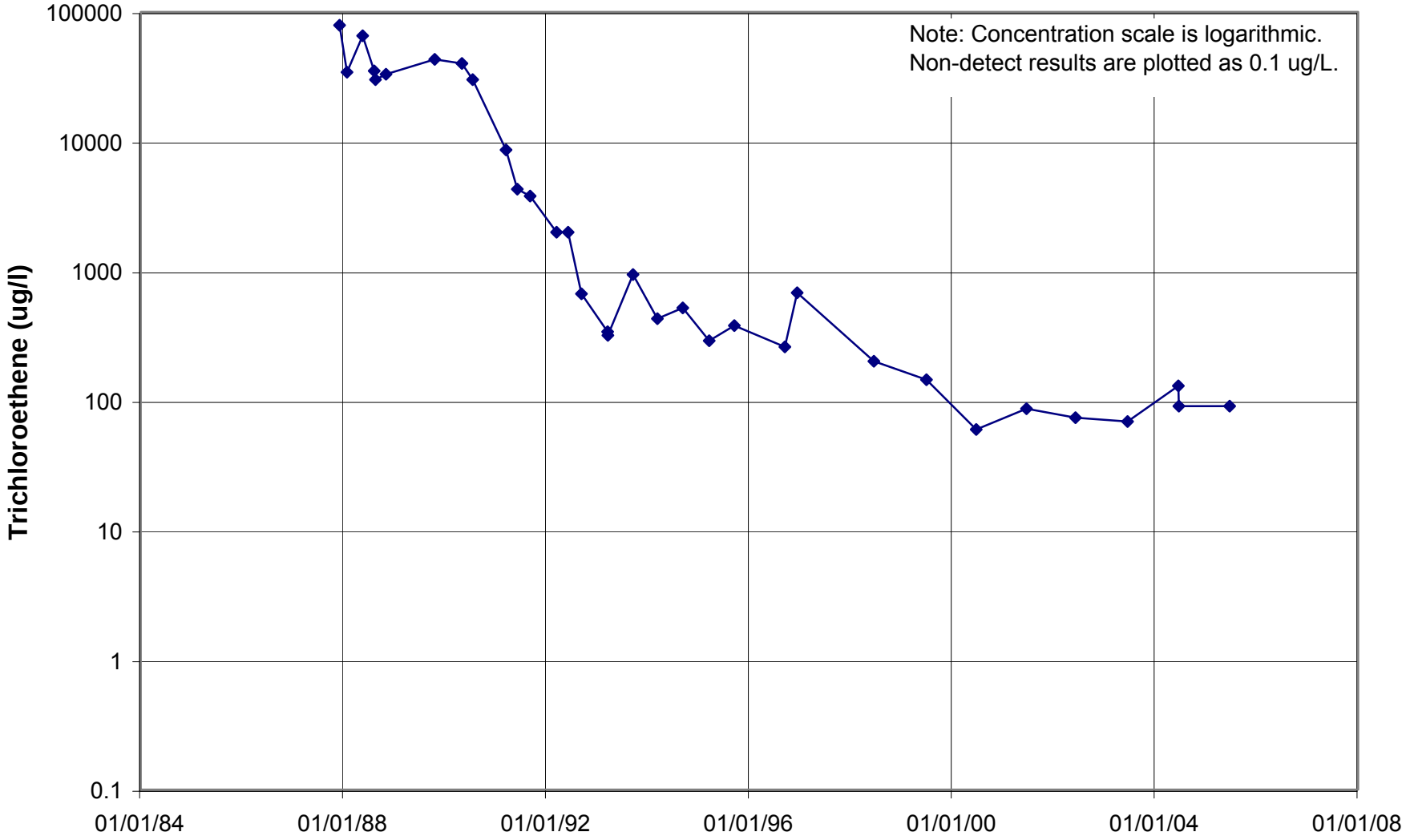
03U092



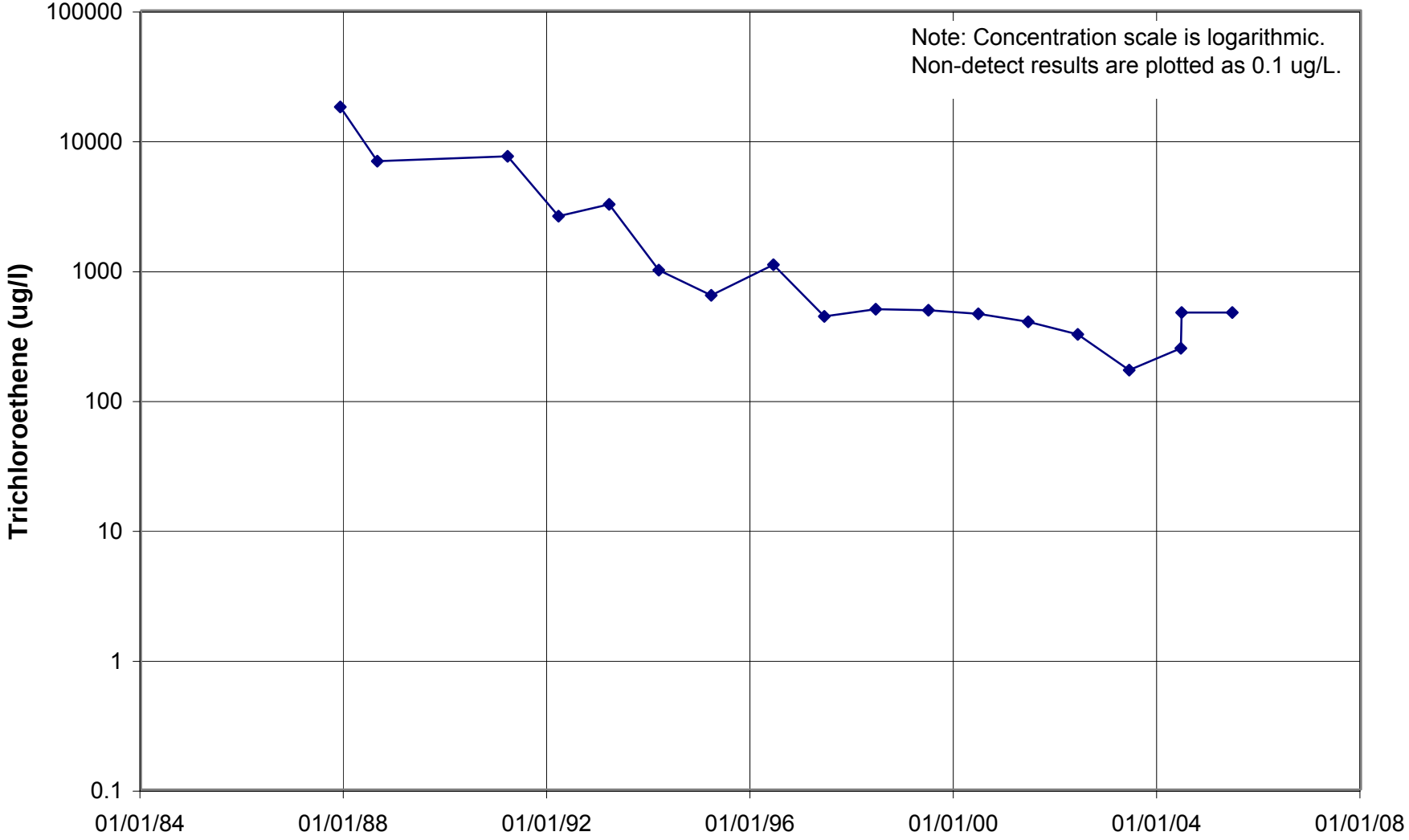
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U093



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U094



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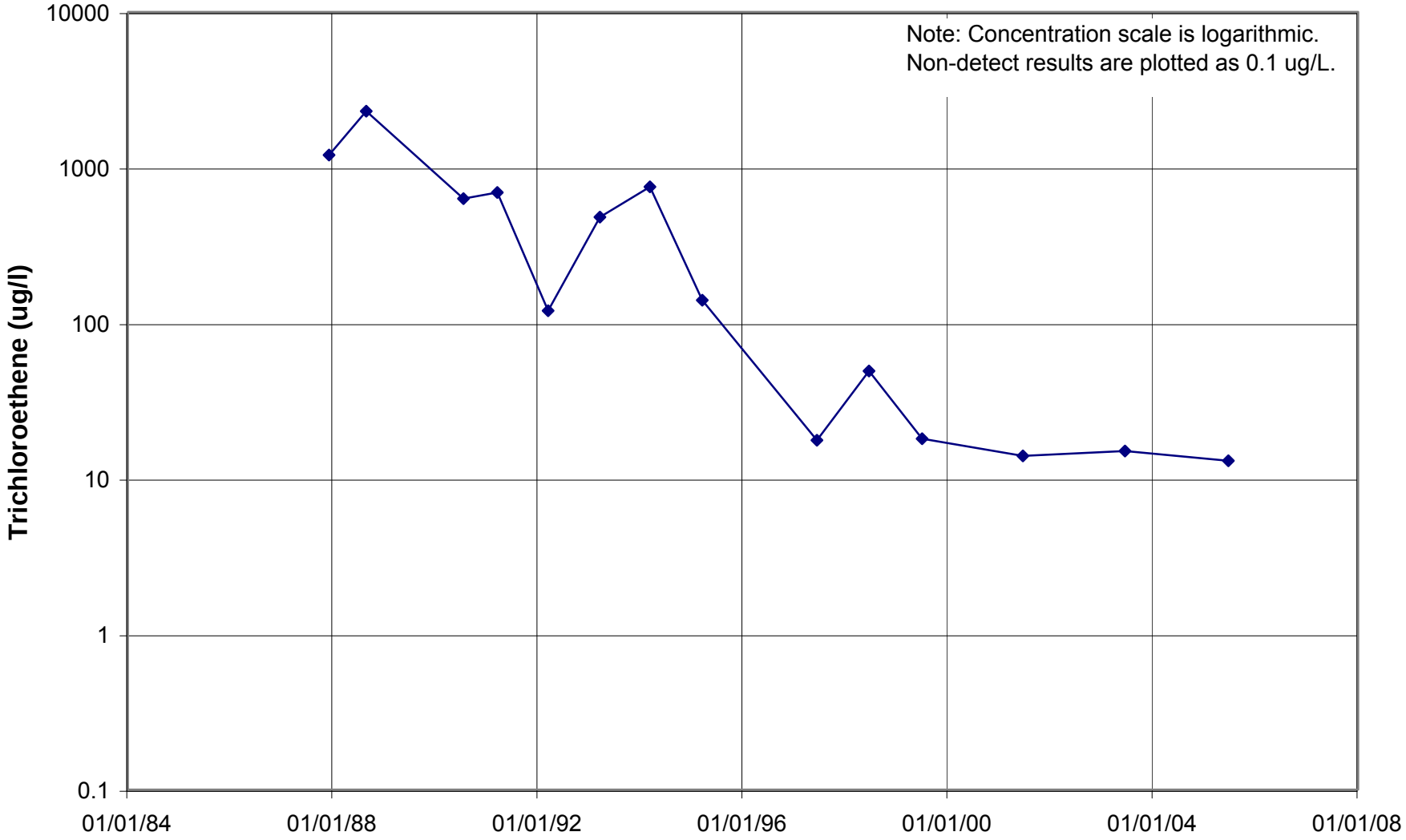
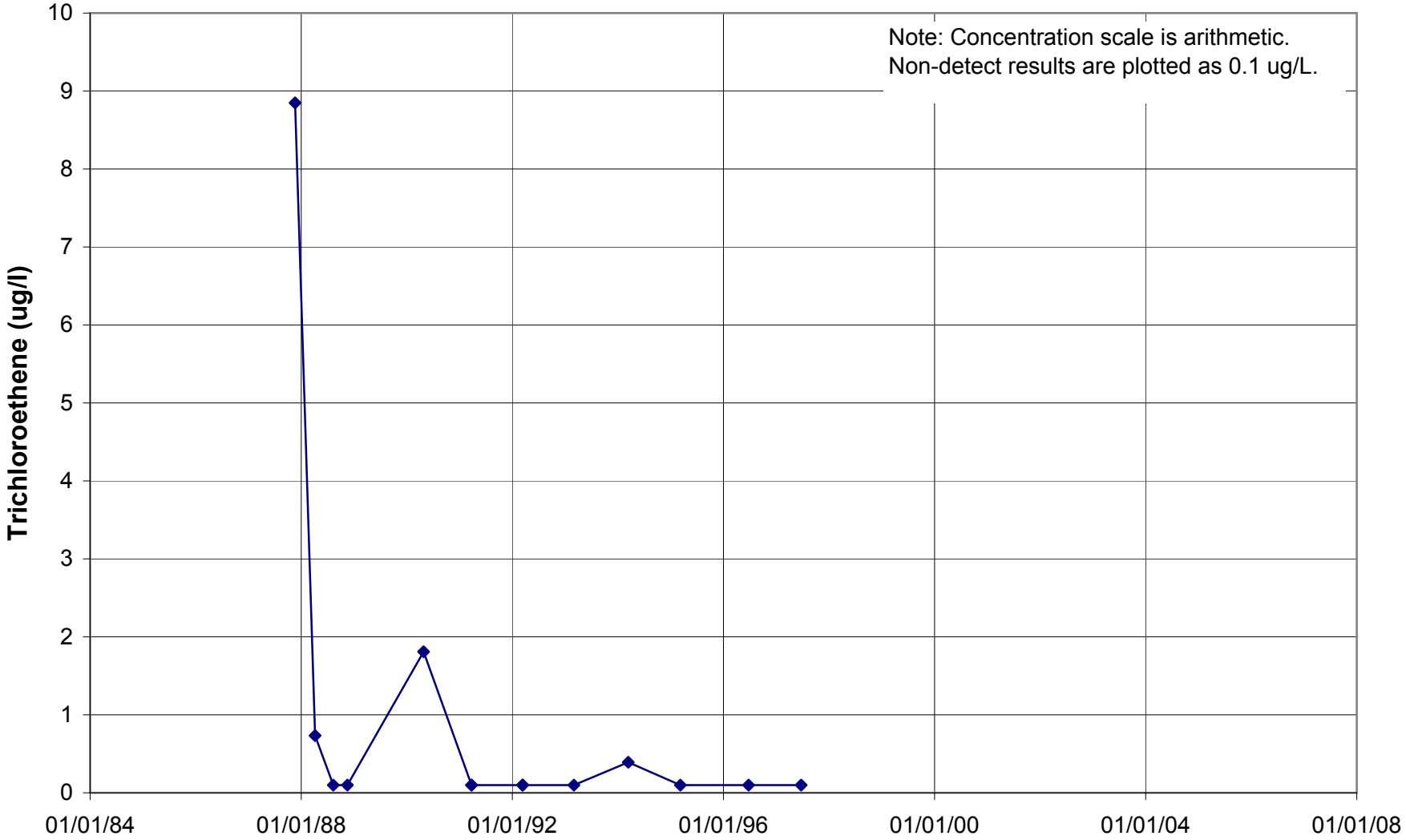
03U096



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U097



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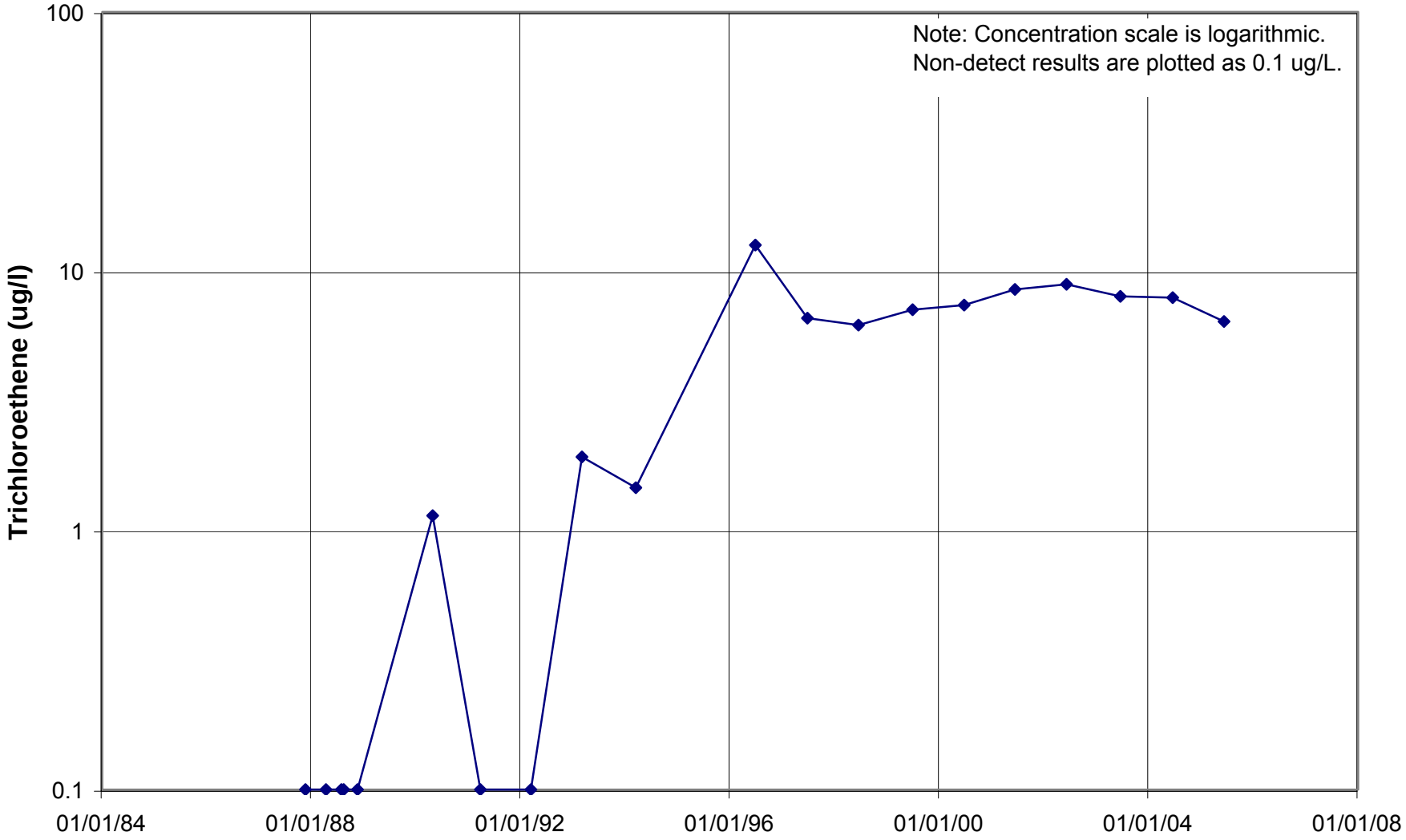
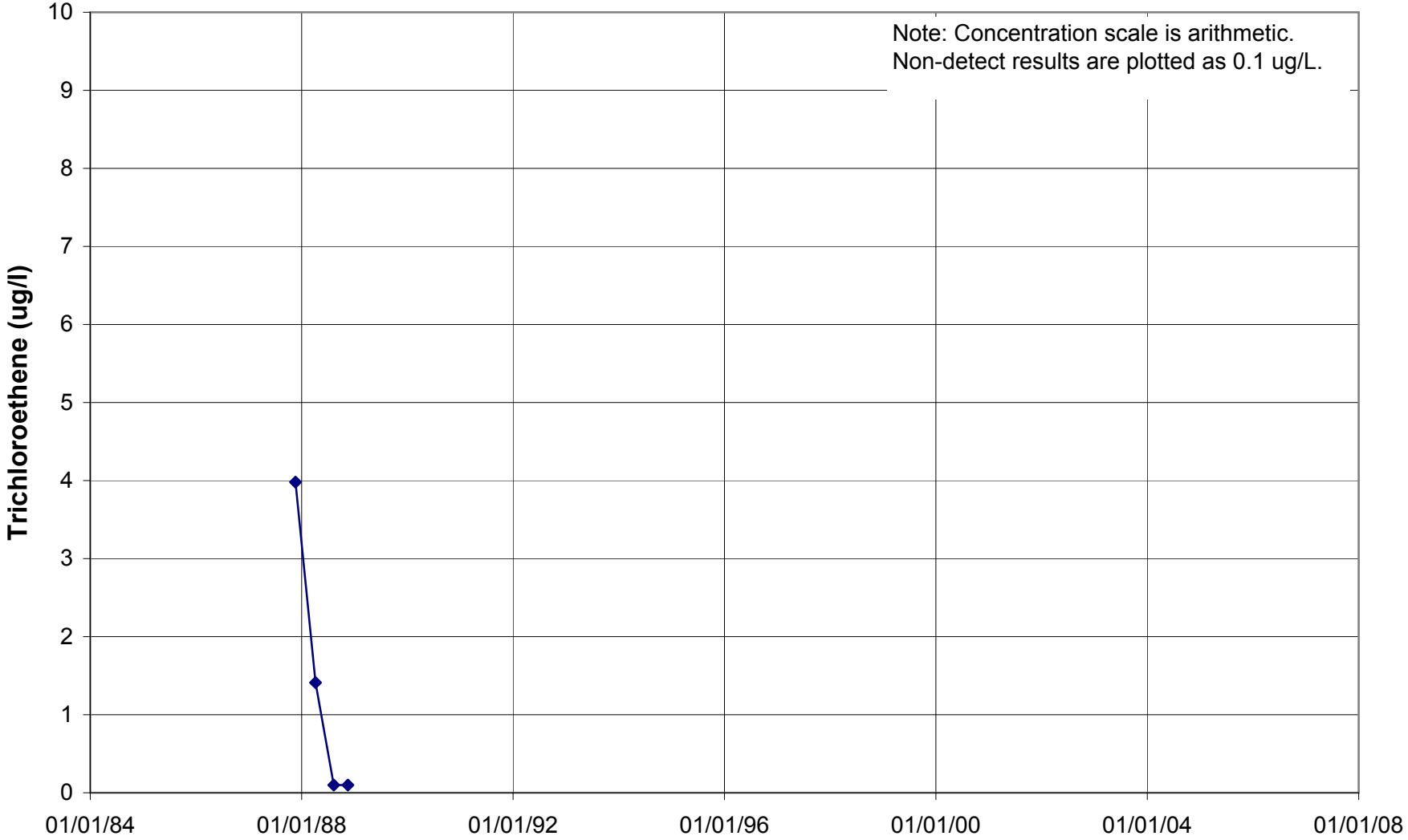
03U099



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U111



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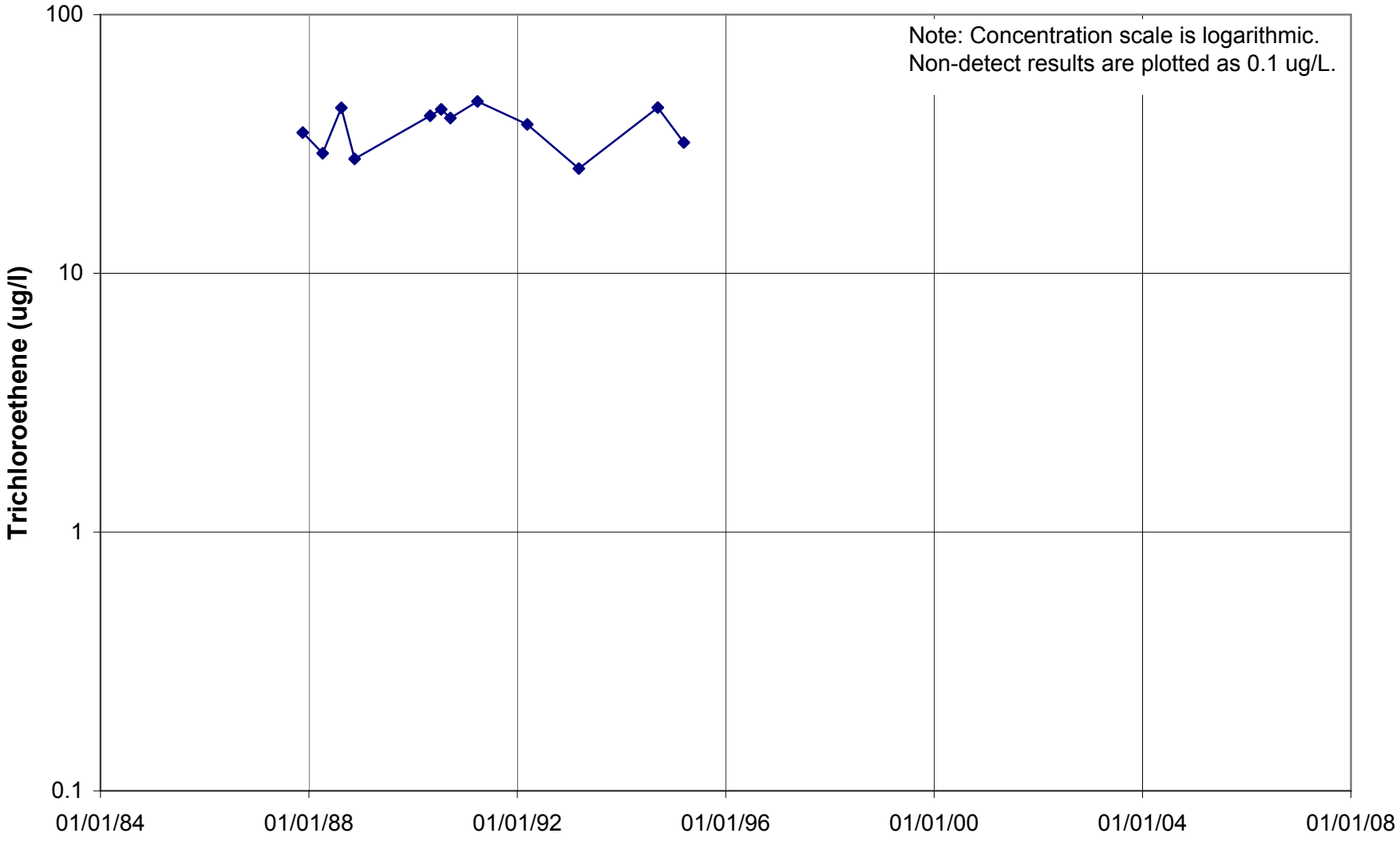
03U112



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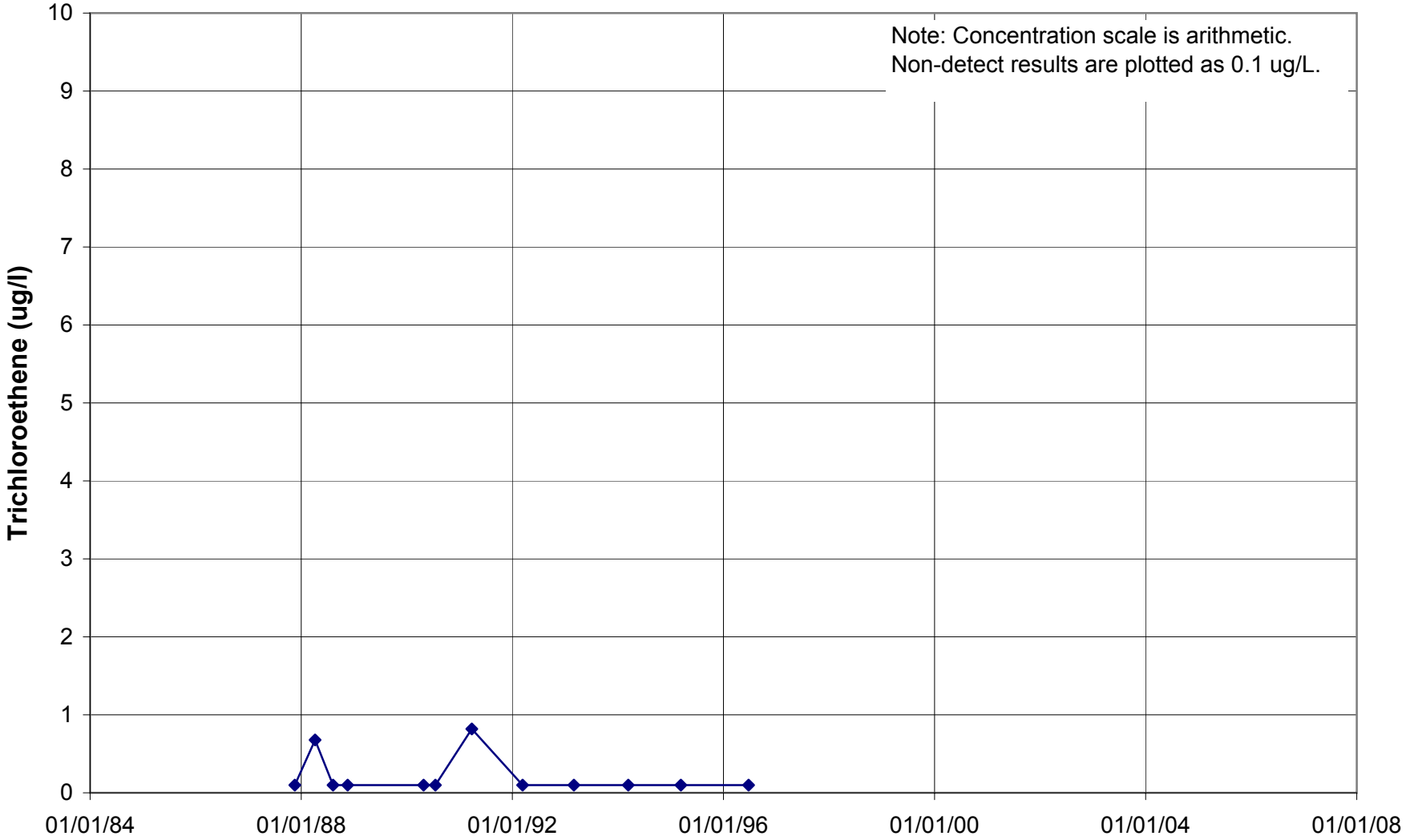
03U113



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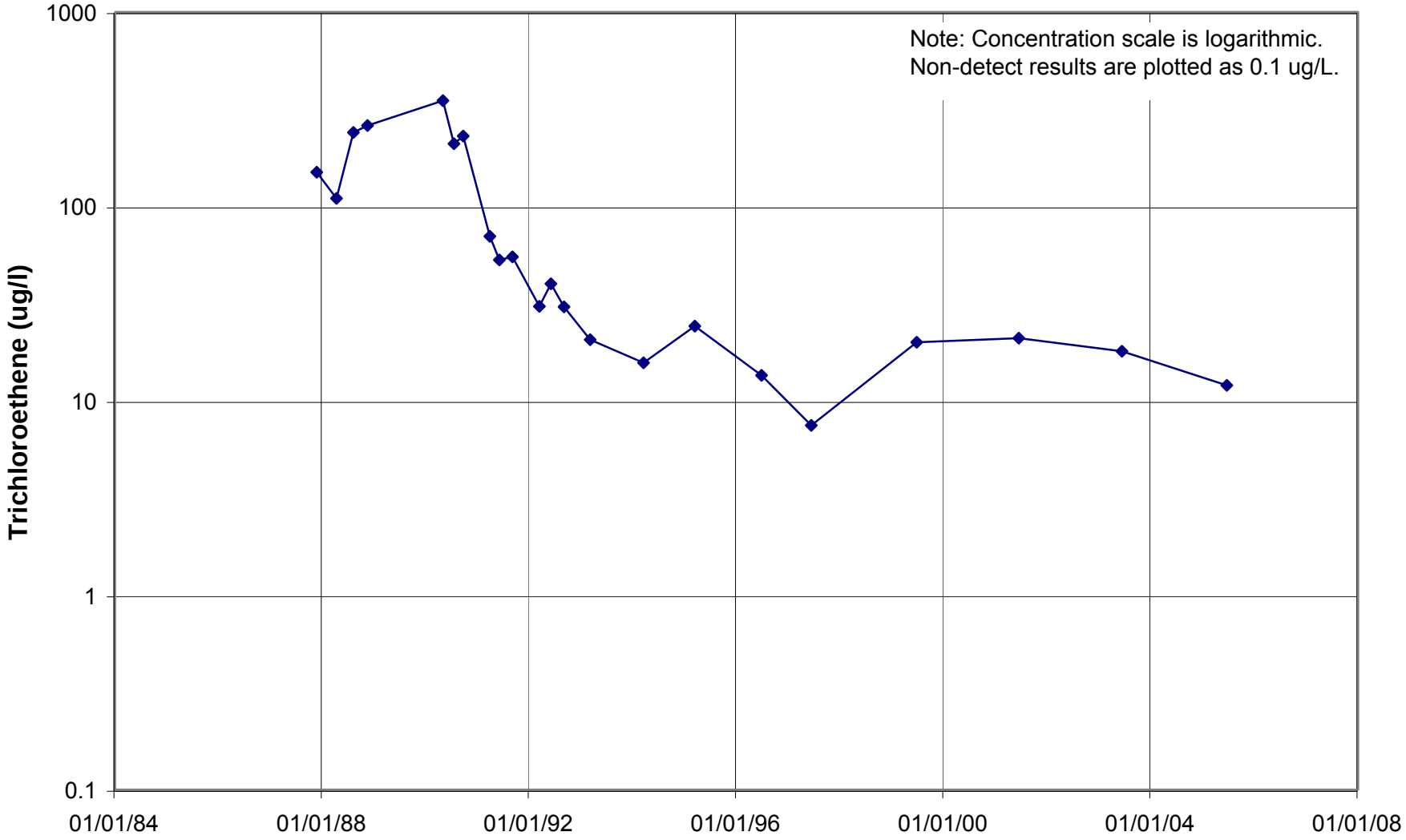
03U114



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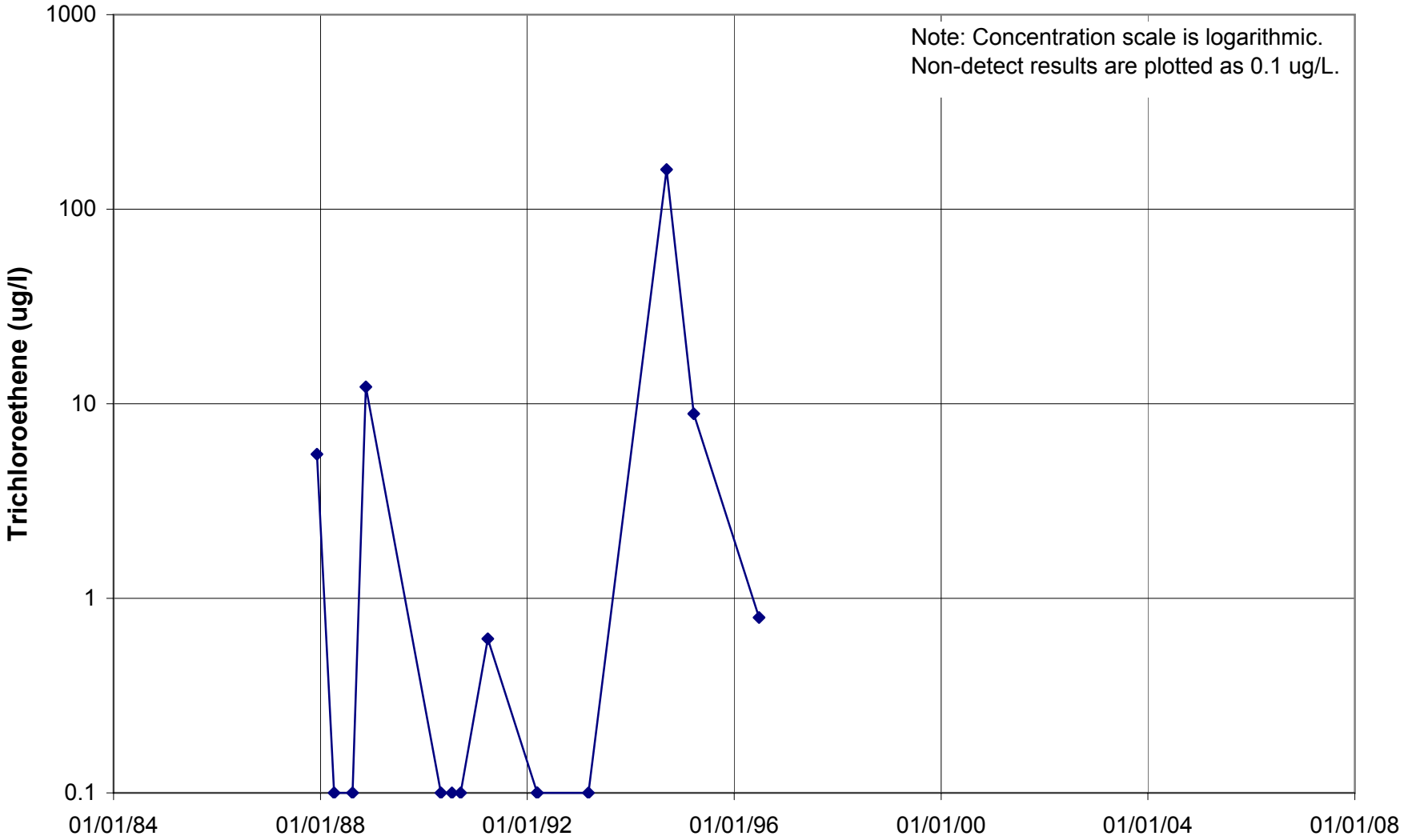
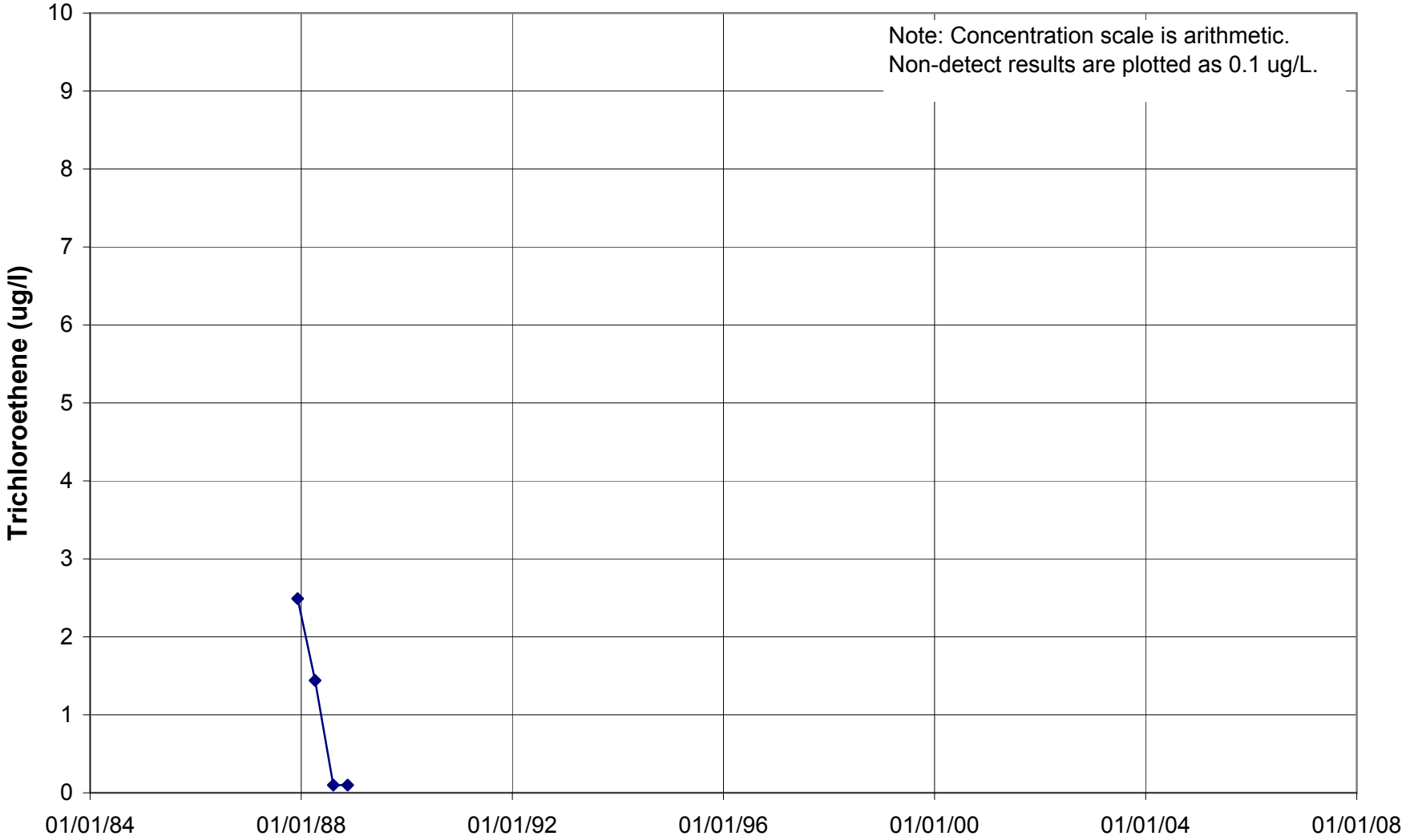
03U121



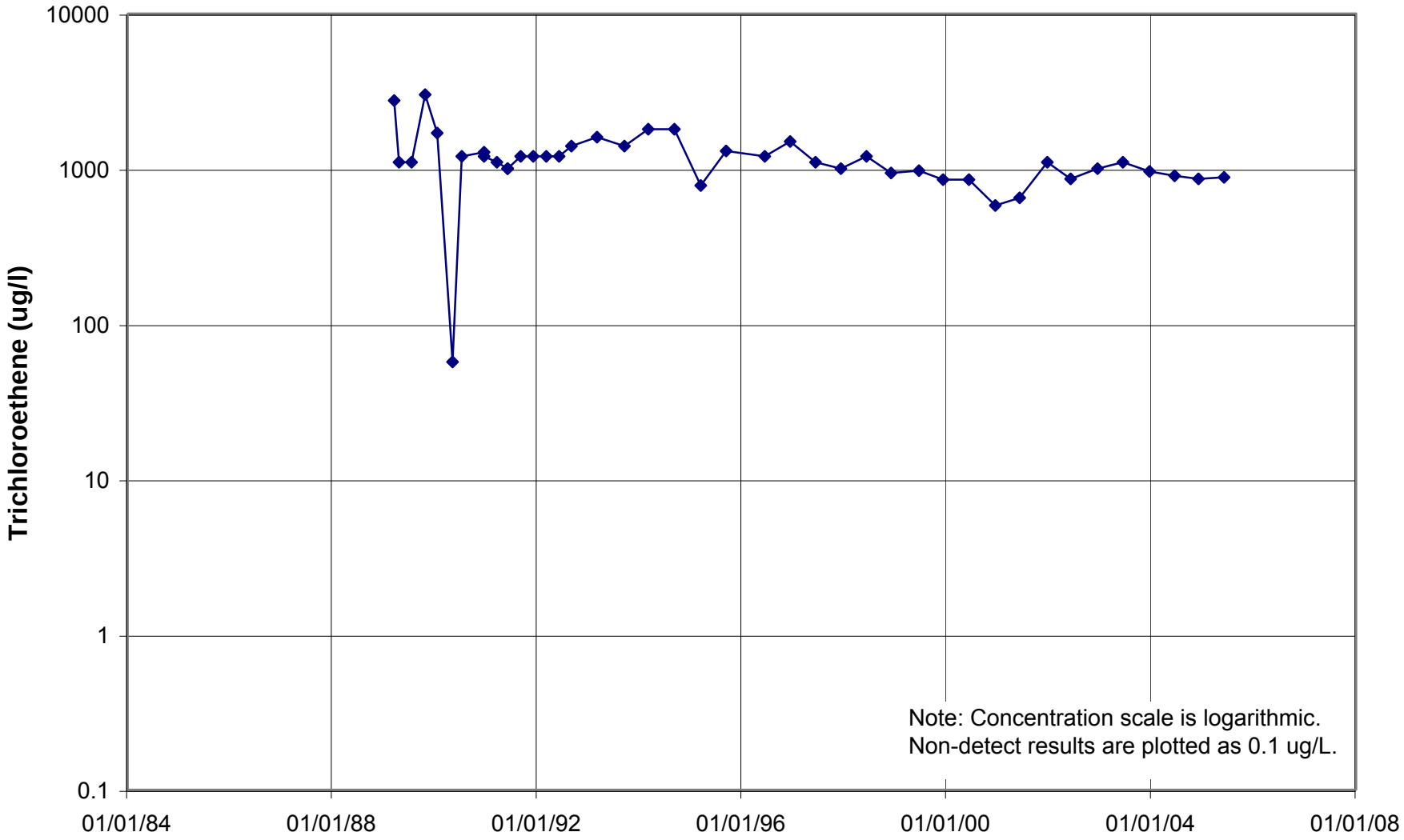
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U129



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U301 (SC1)



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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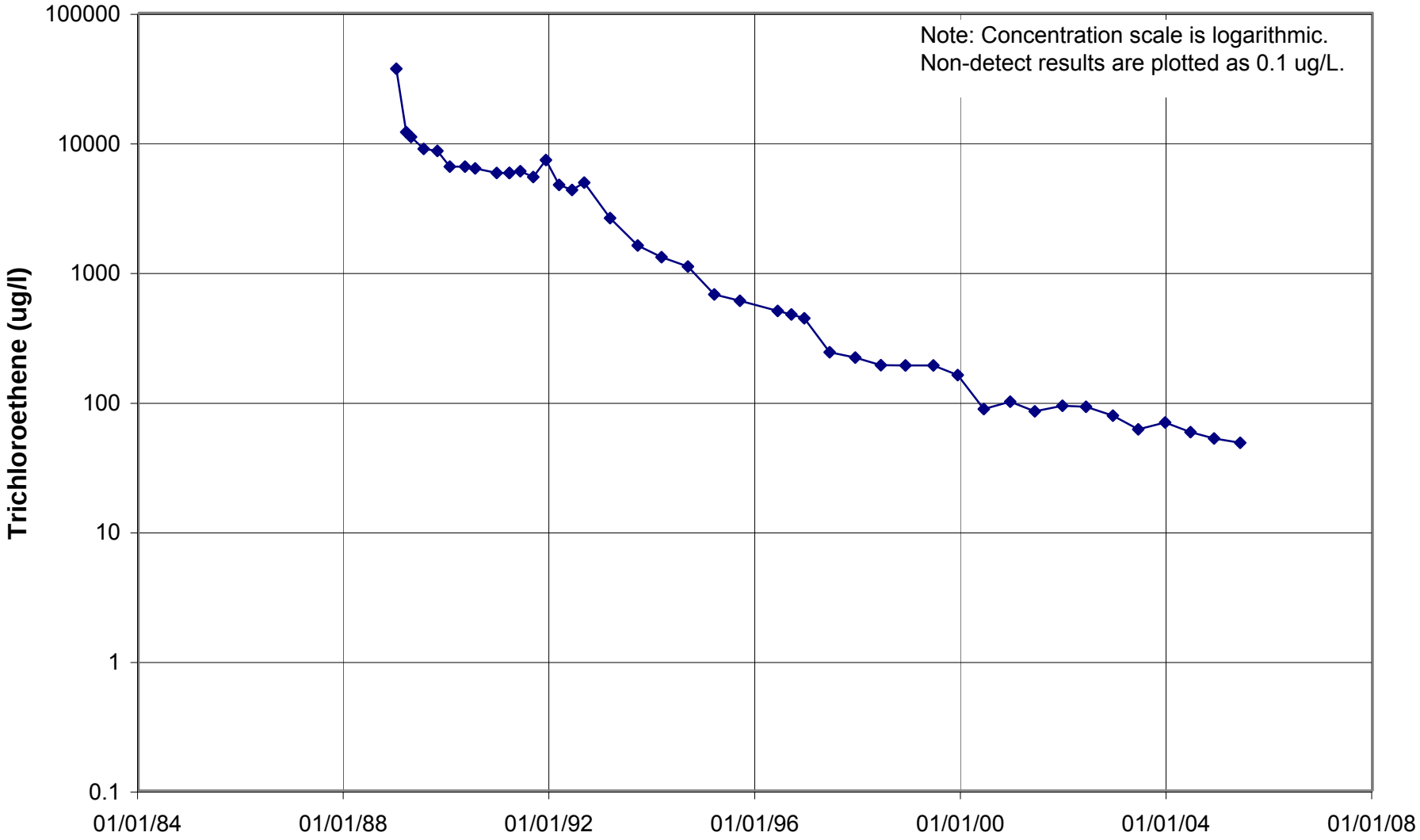

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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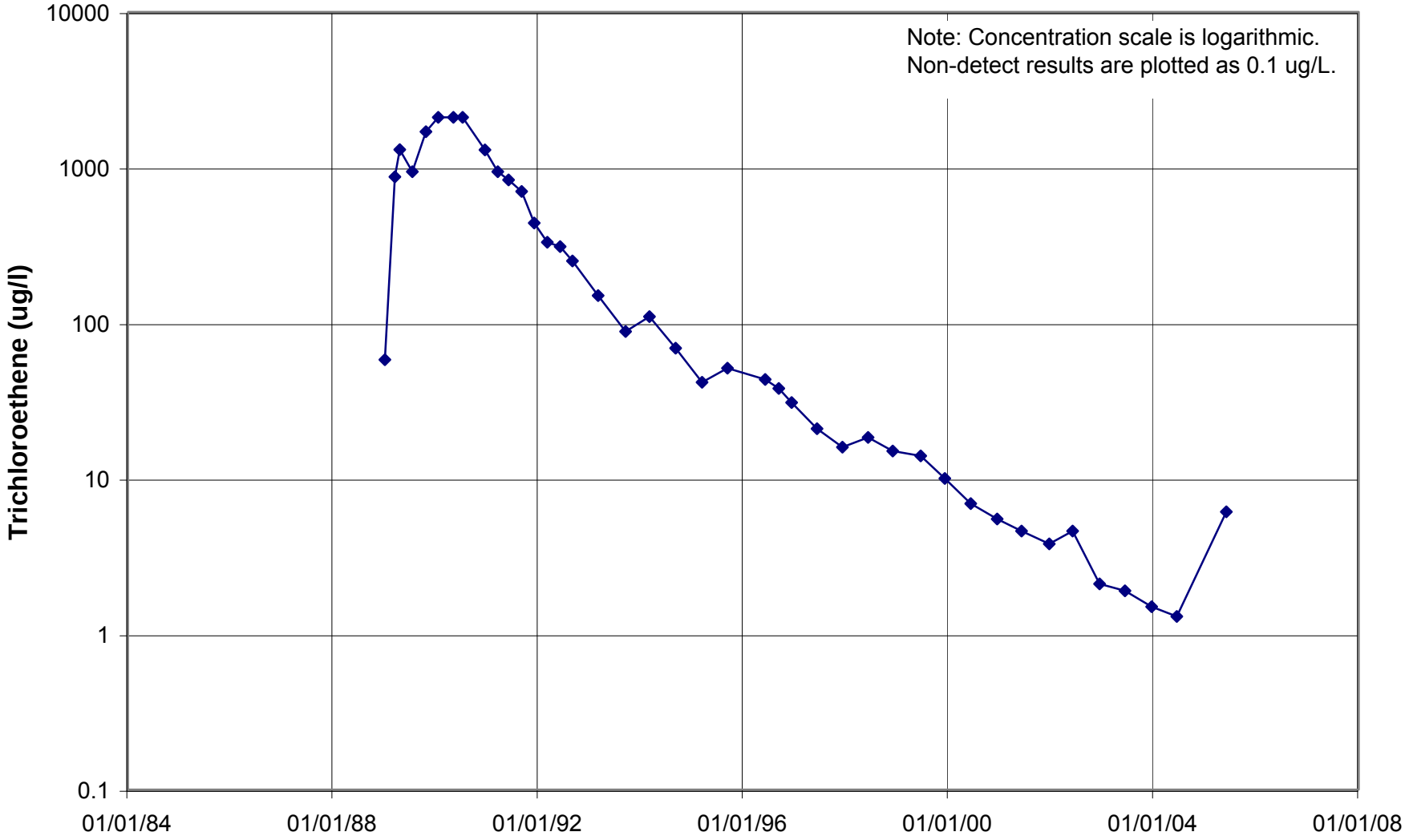

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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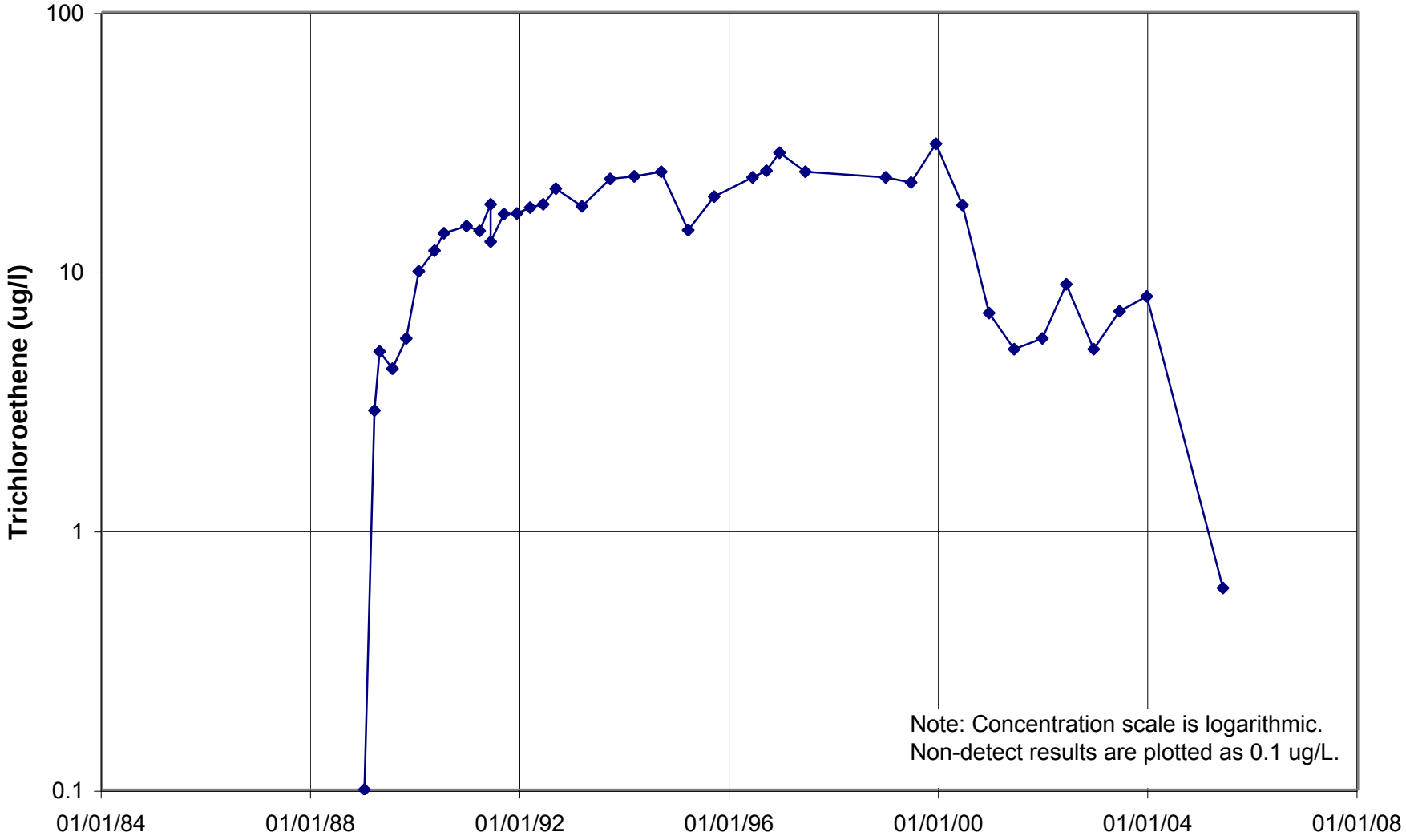
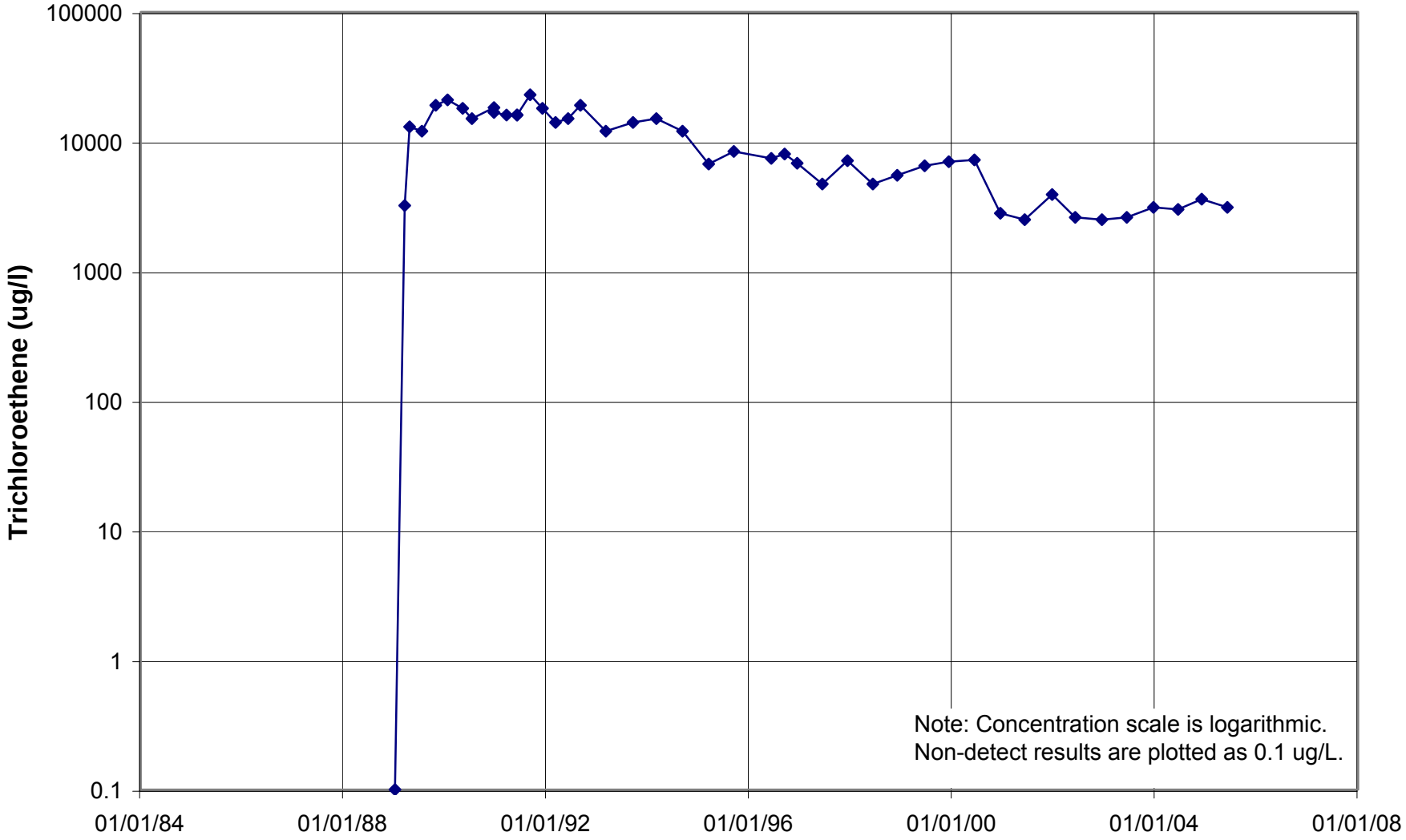


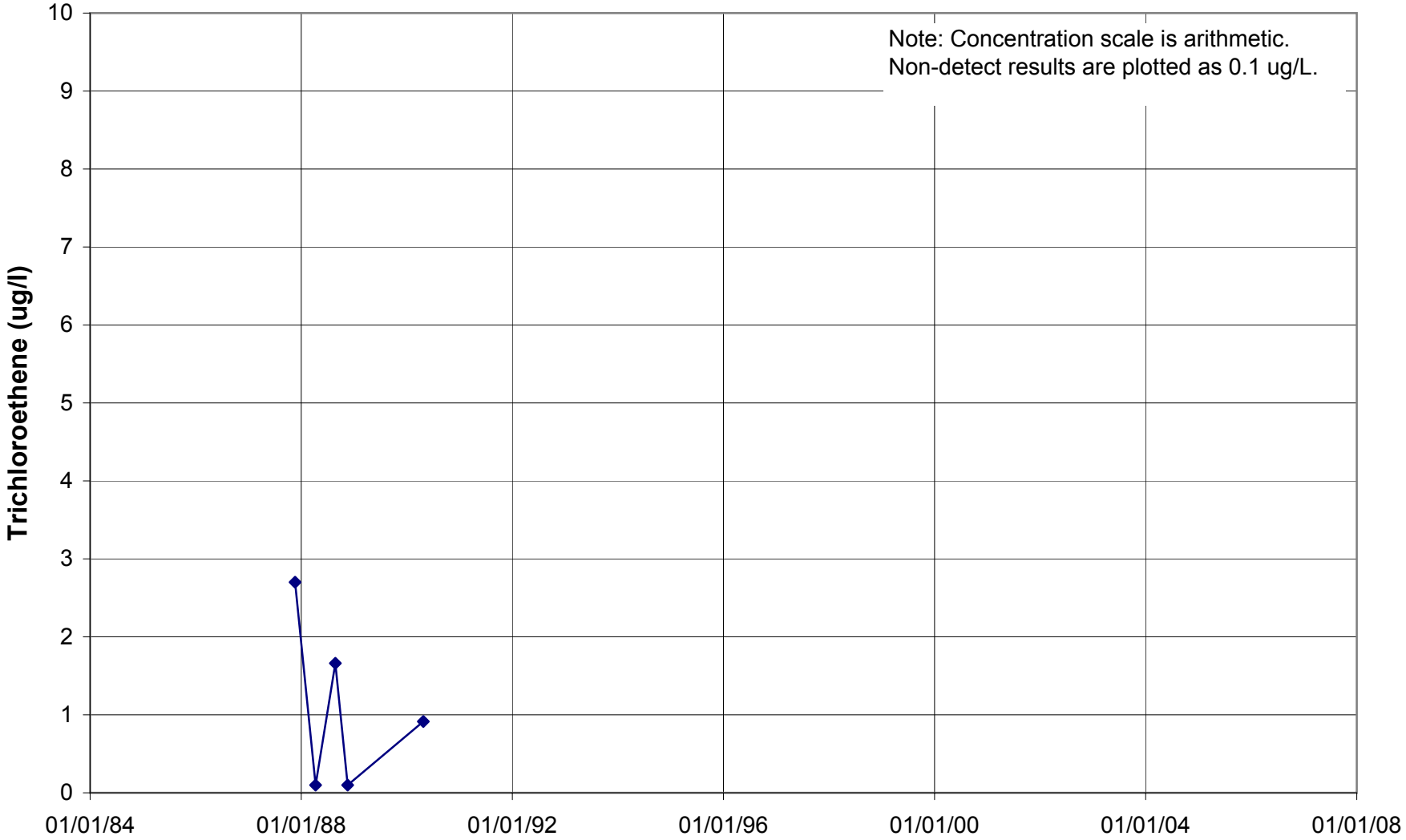
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U317 (SC5)



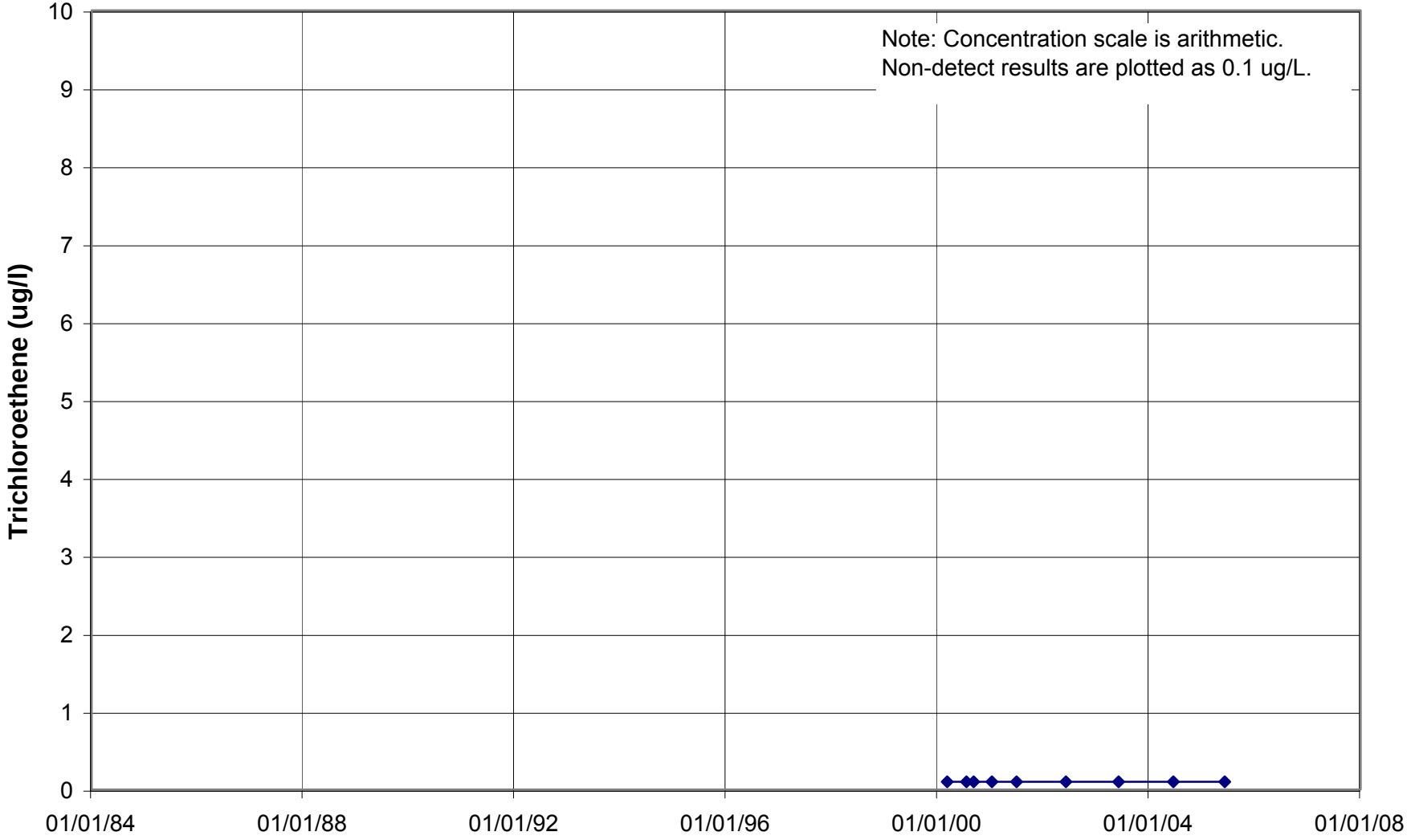
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U521



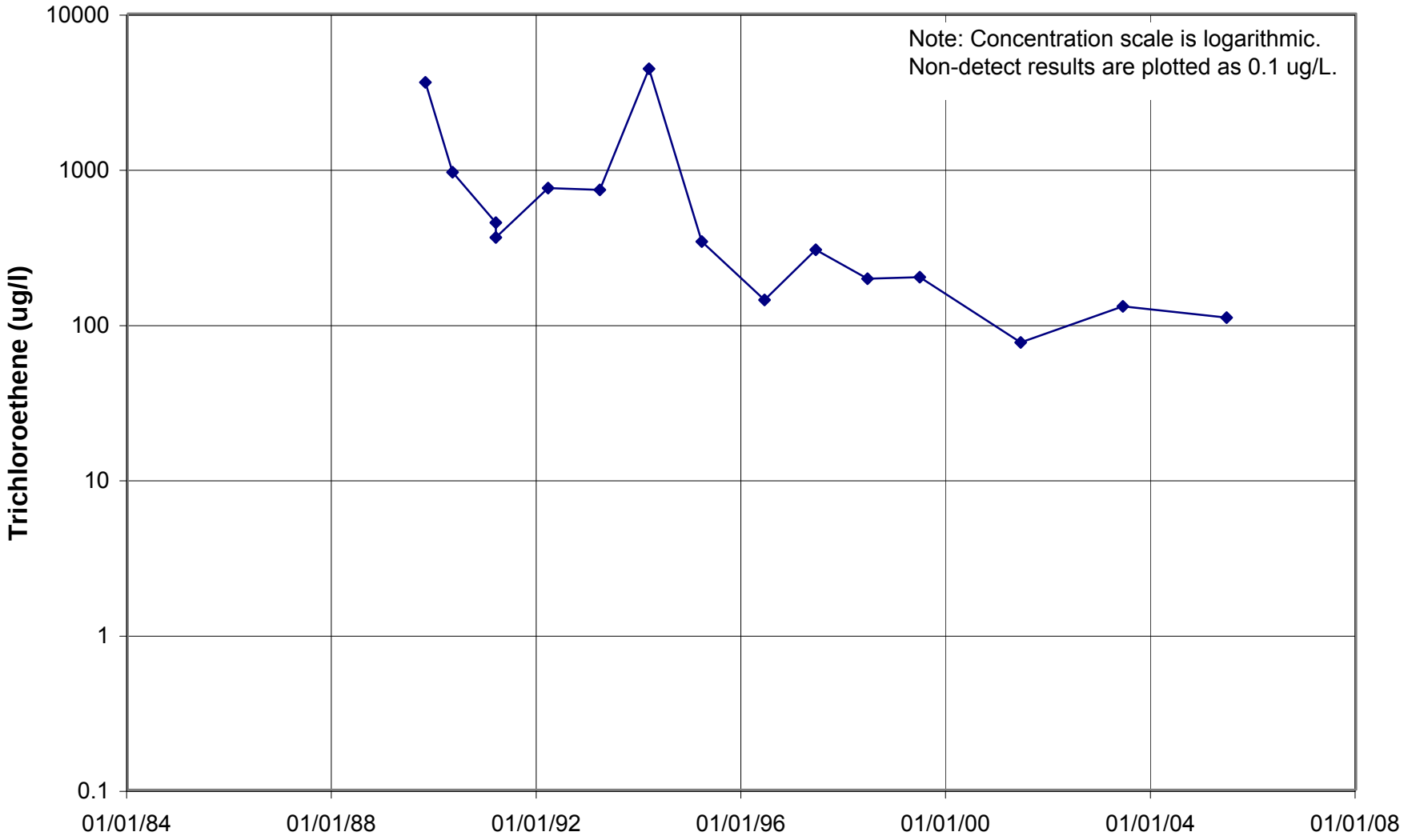
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U621



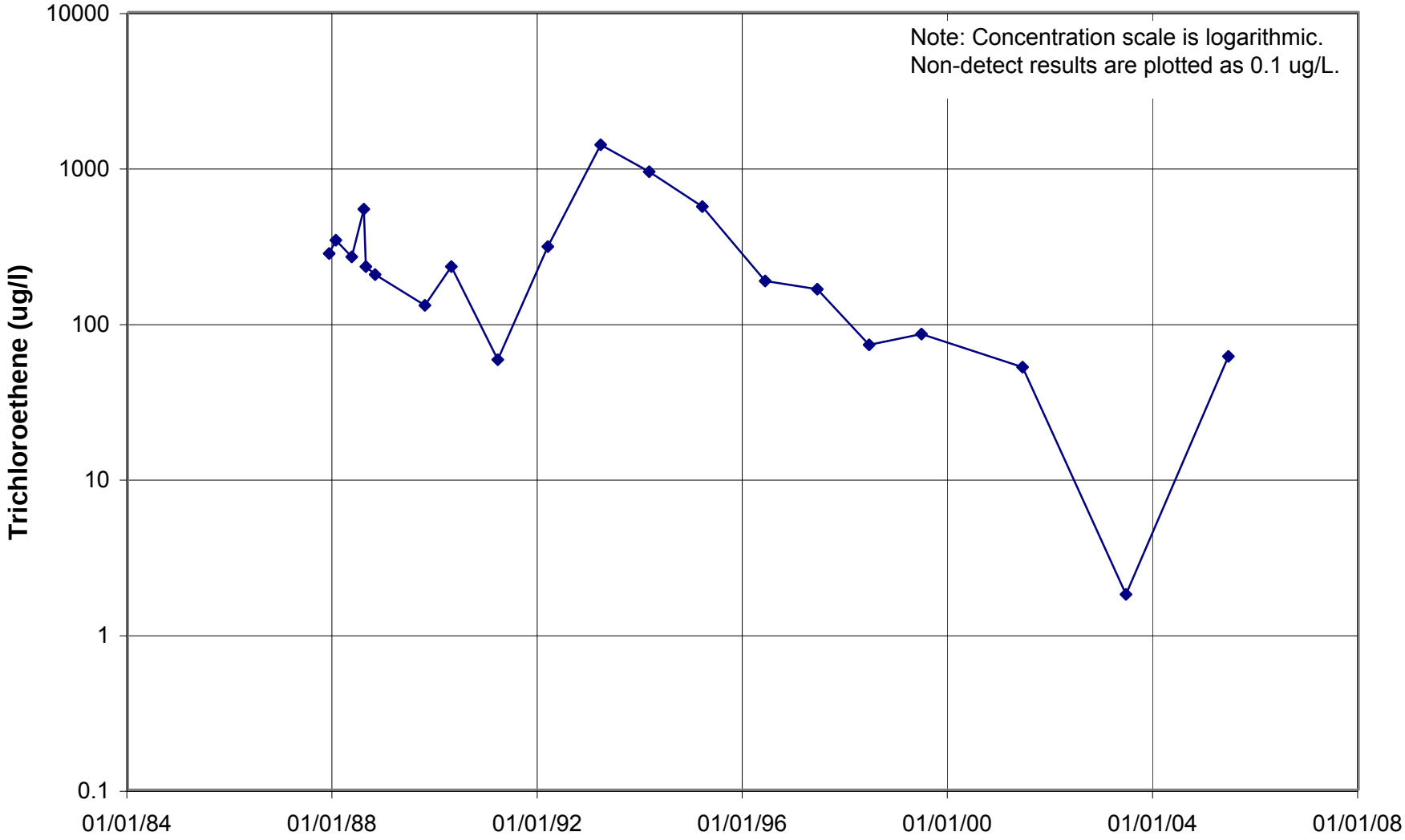
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U659



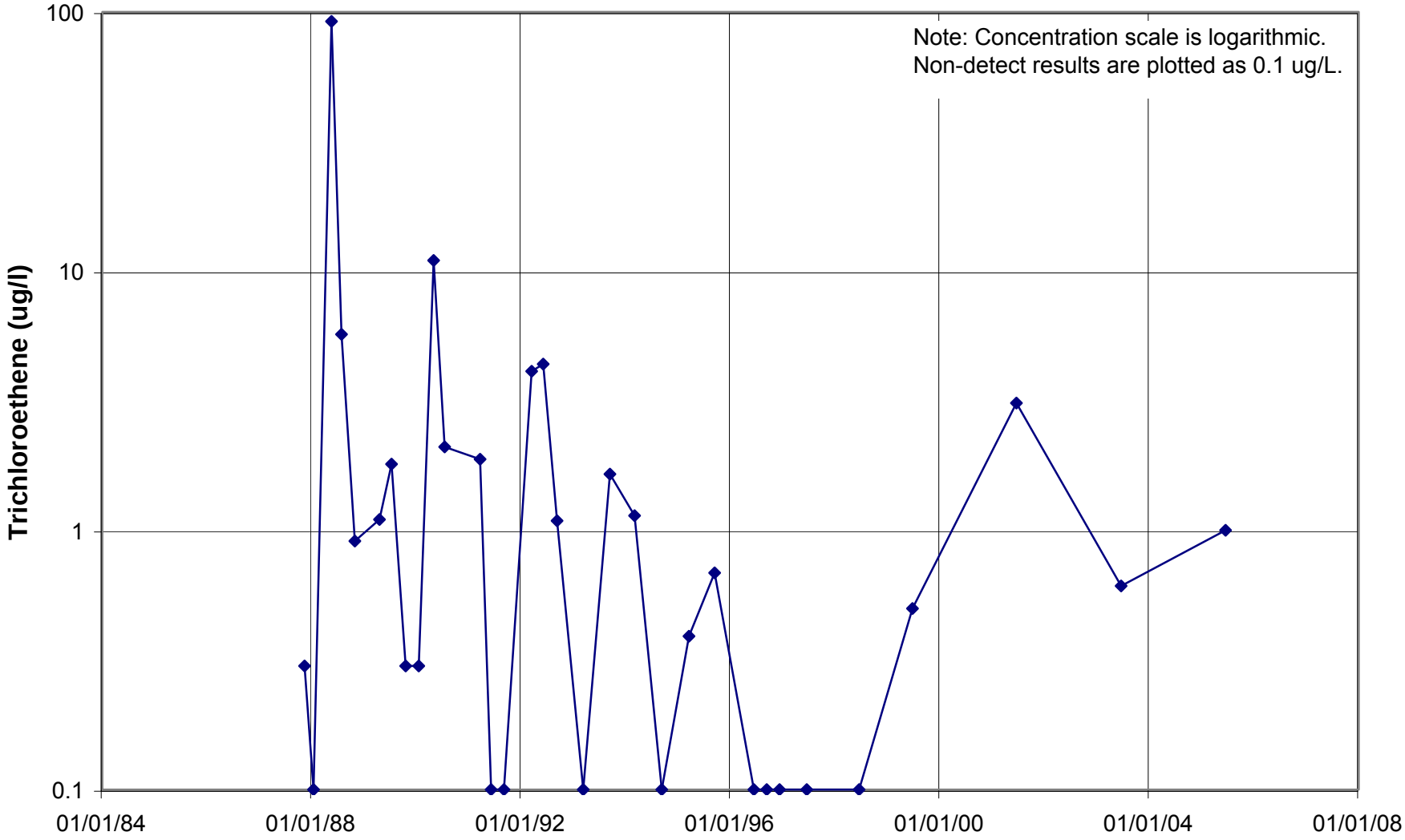
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U671



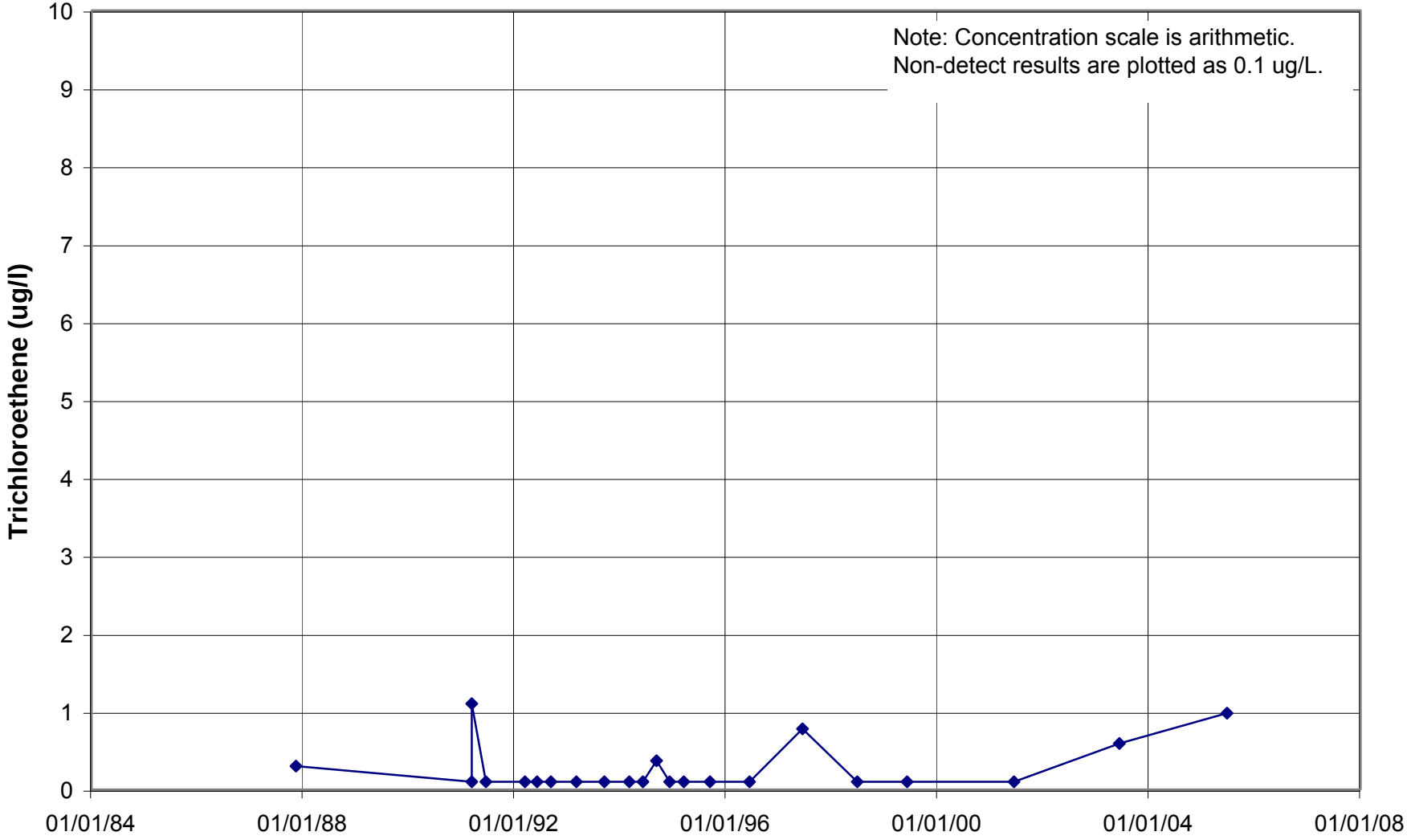
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U672



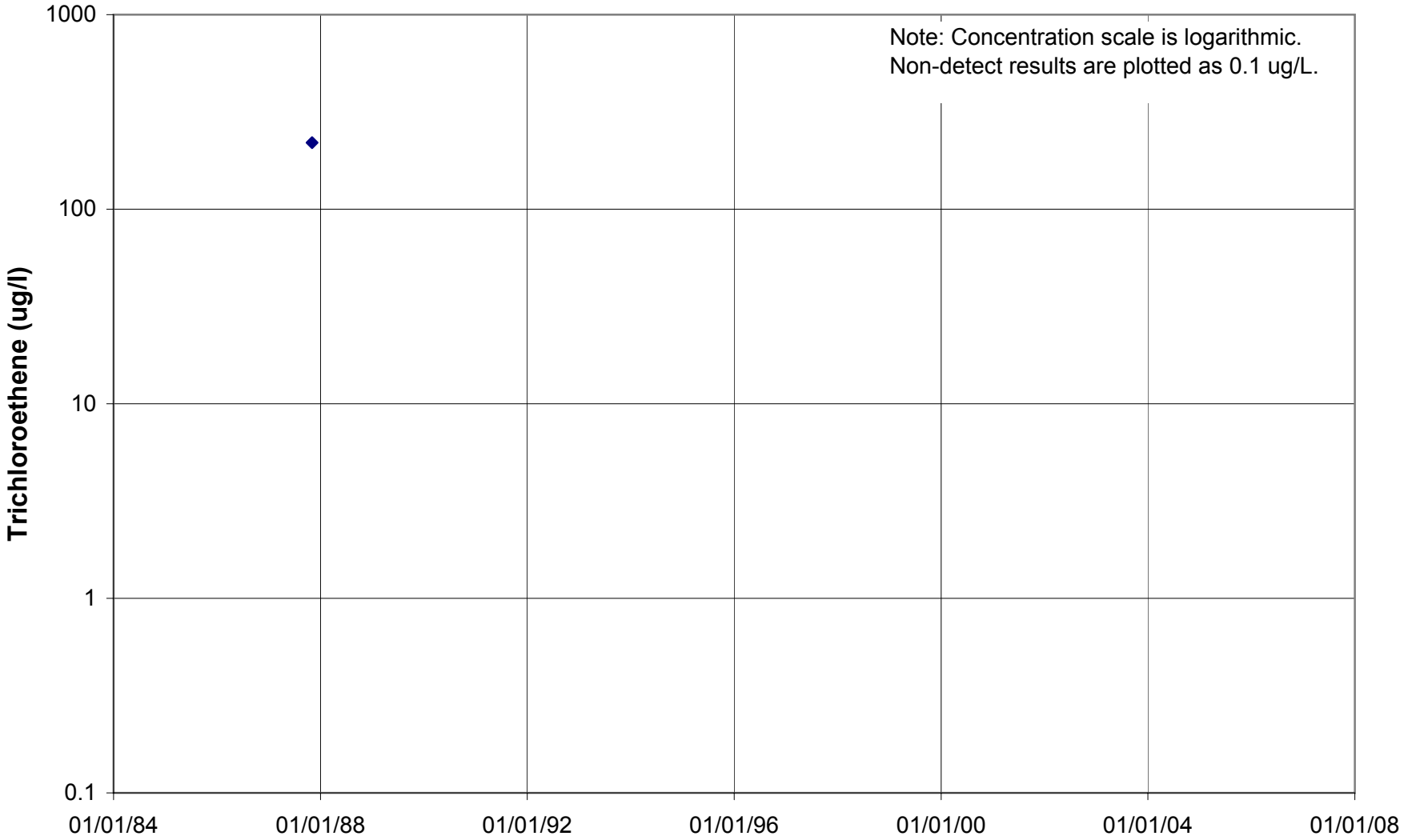
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U673



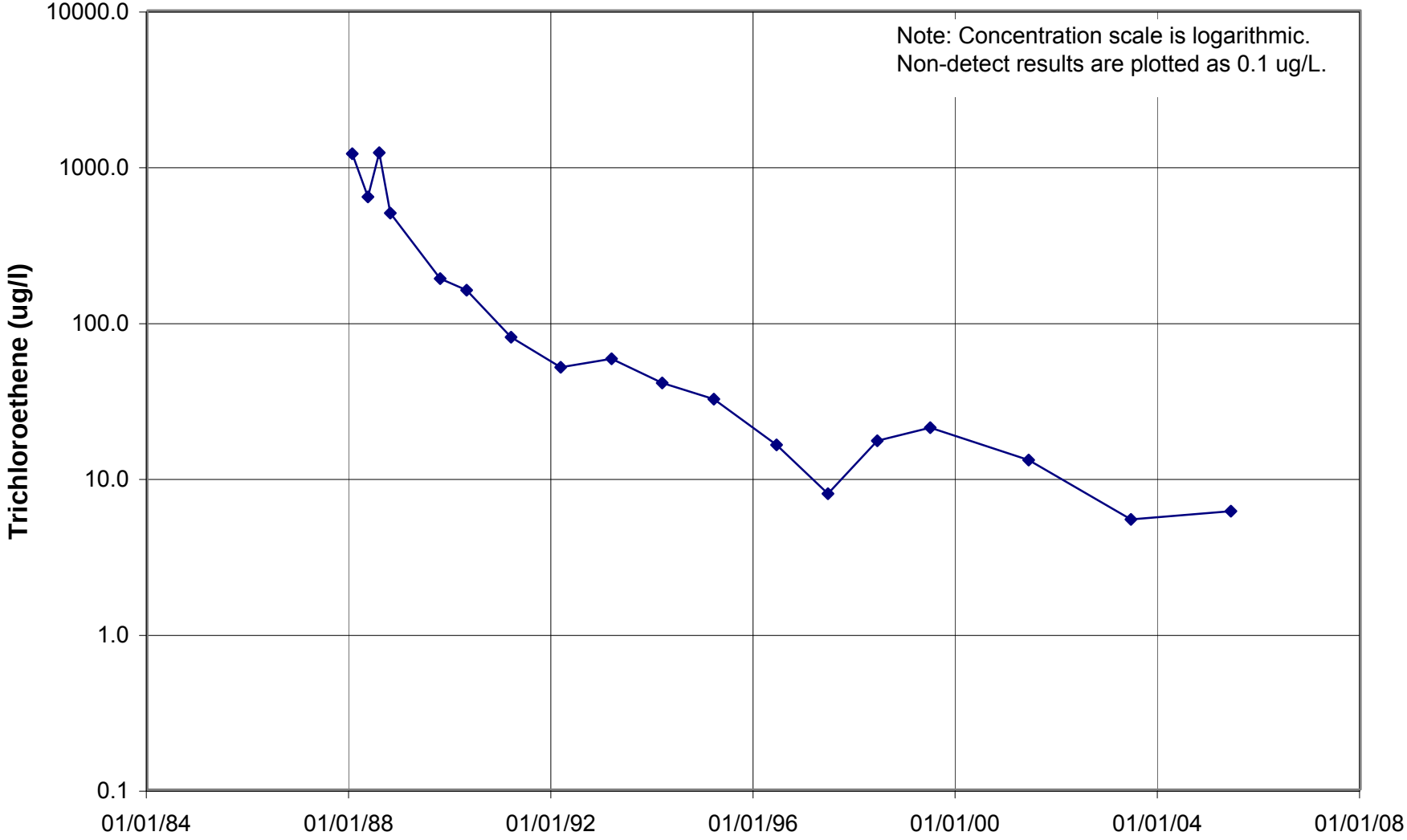
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U676



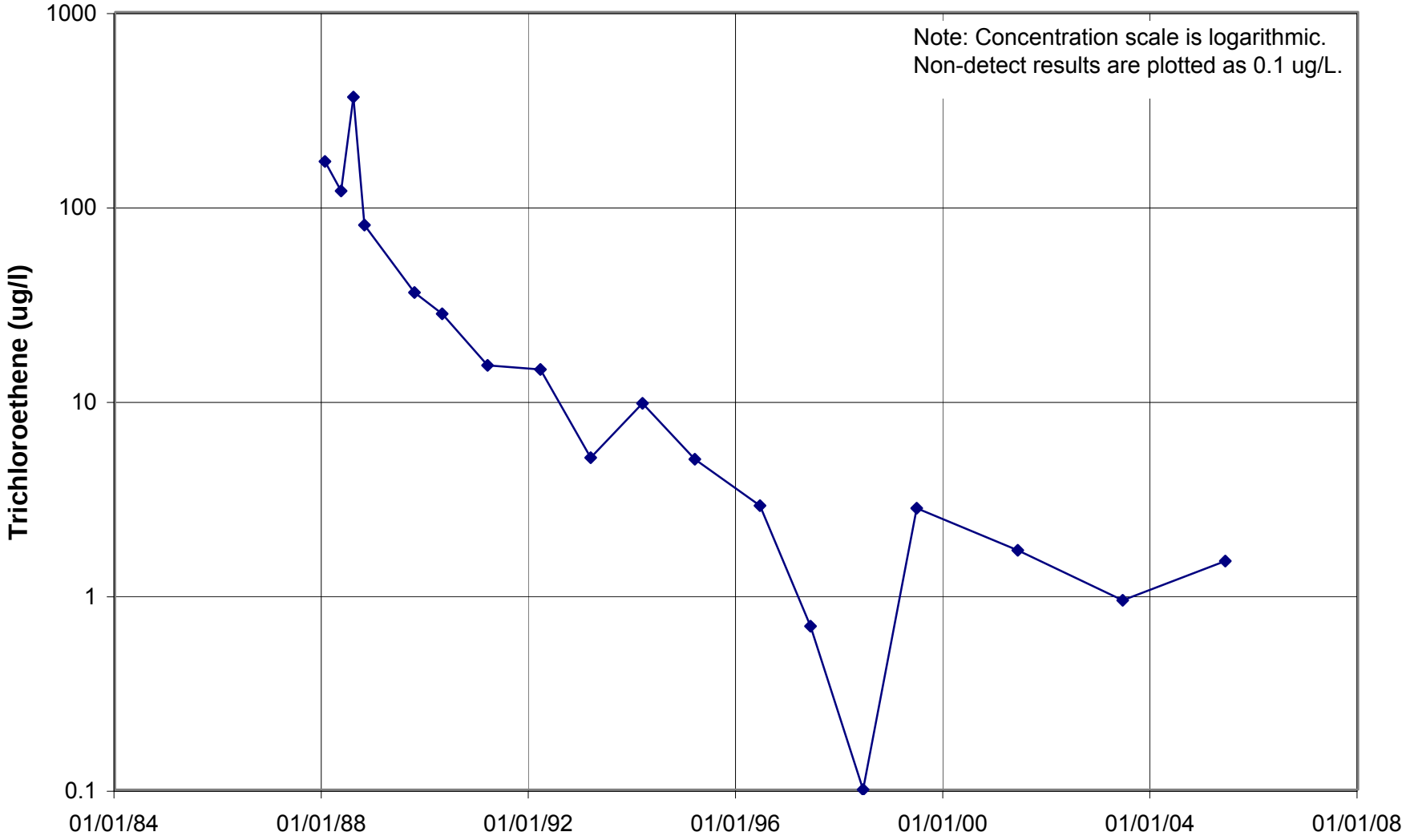
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U701



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U702



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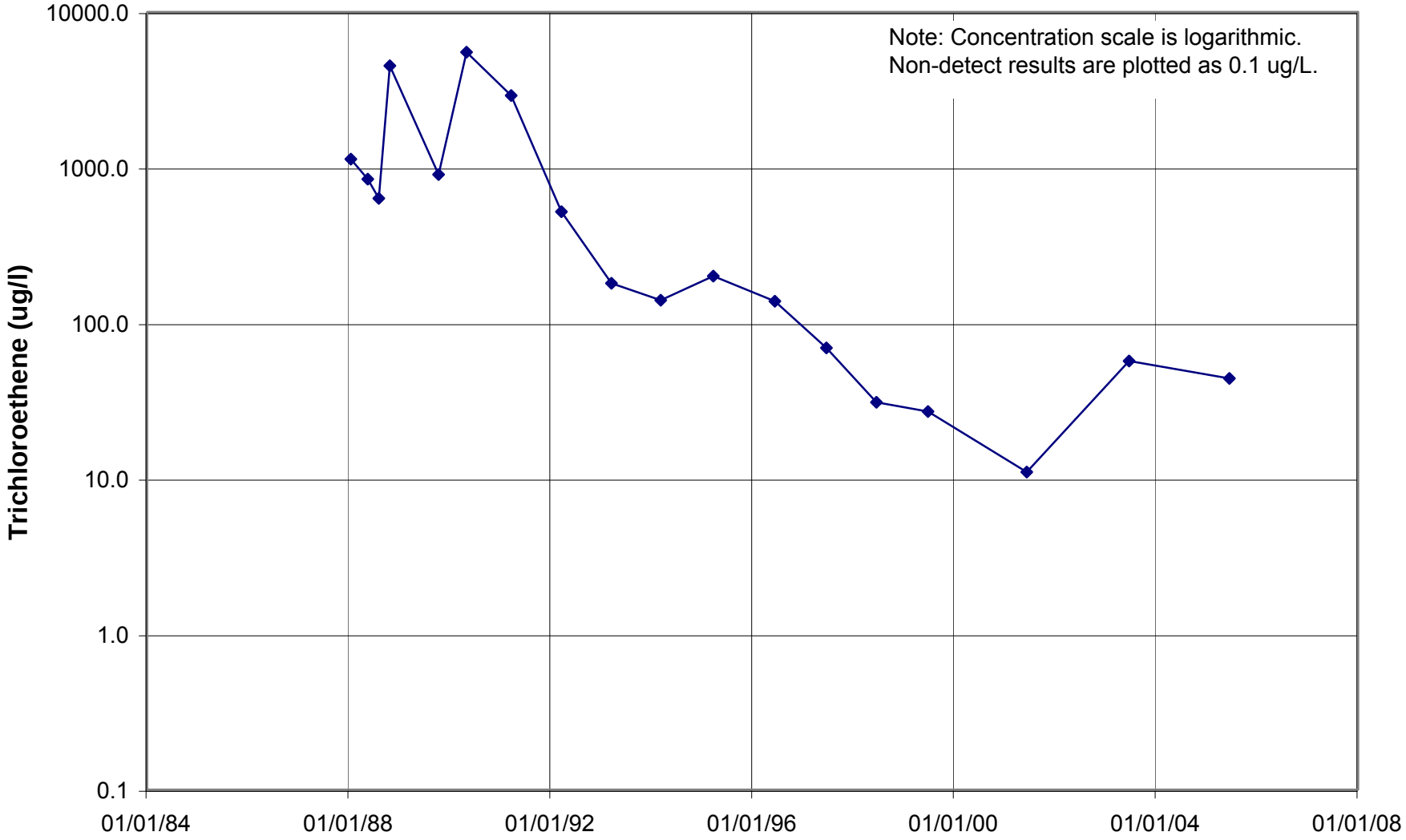
03U703



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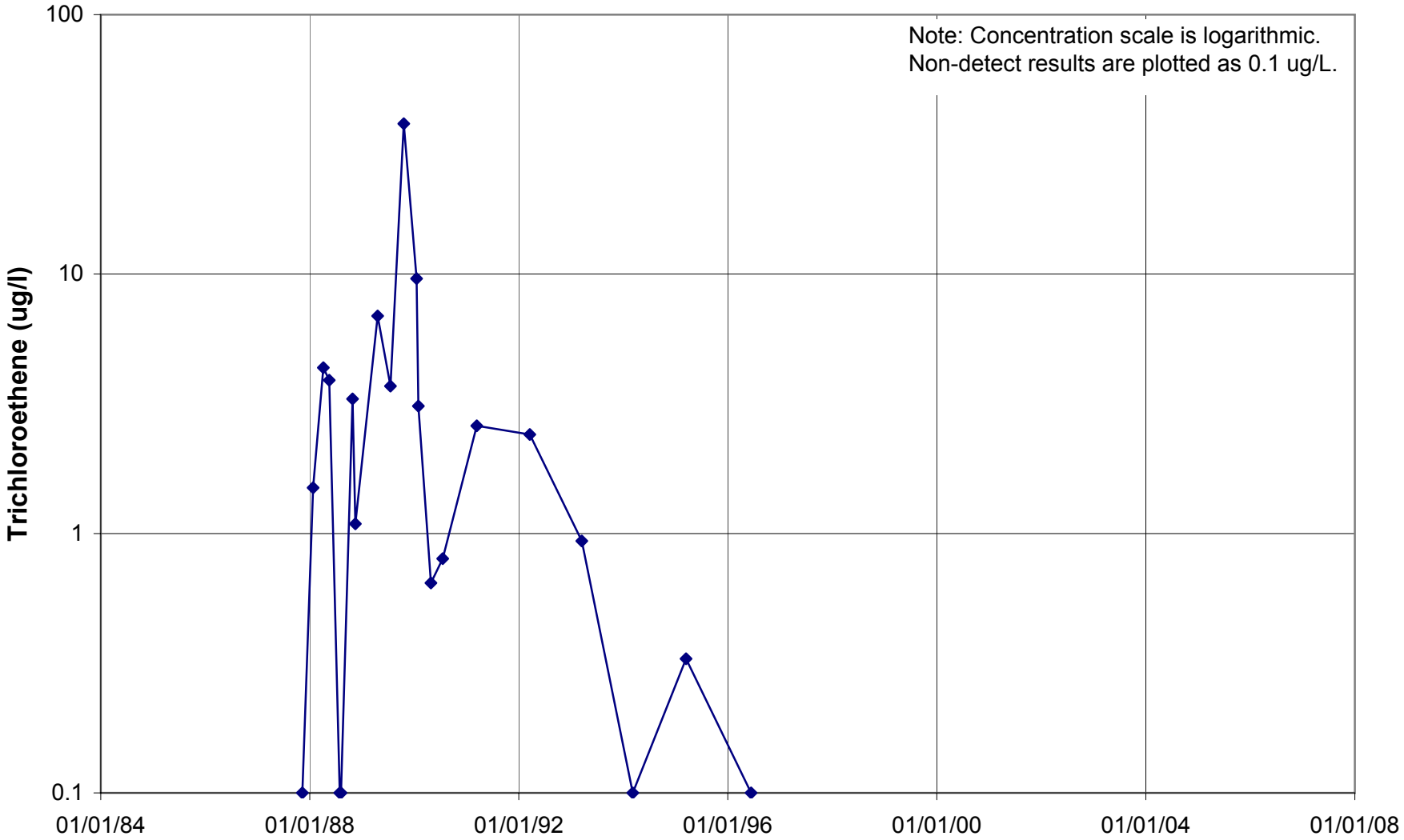
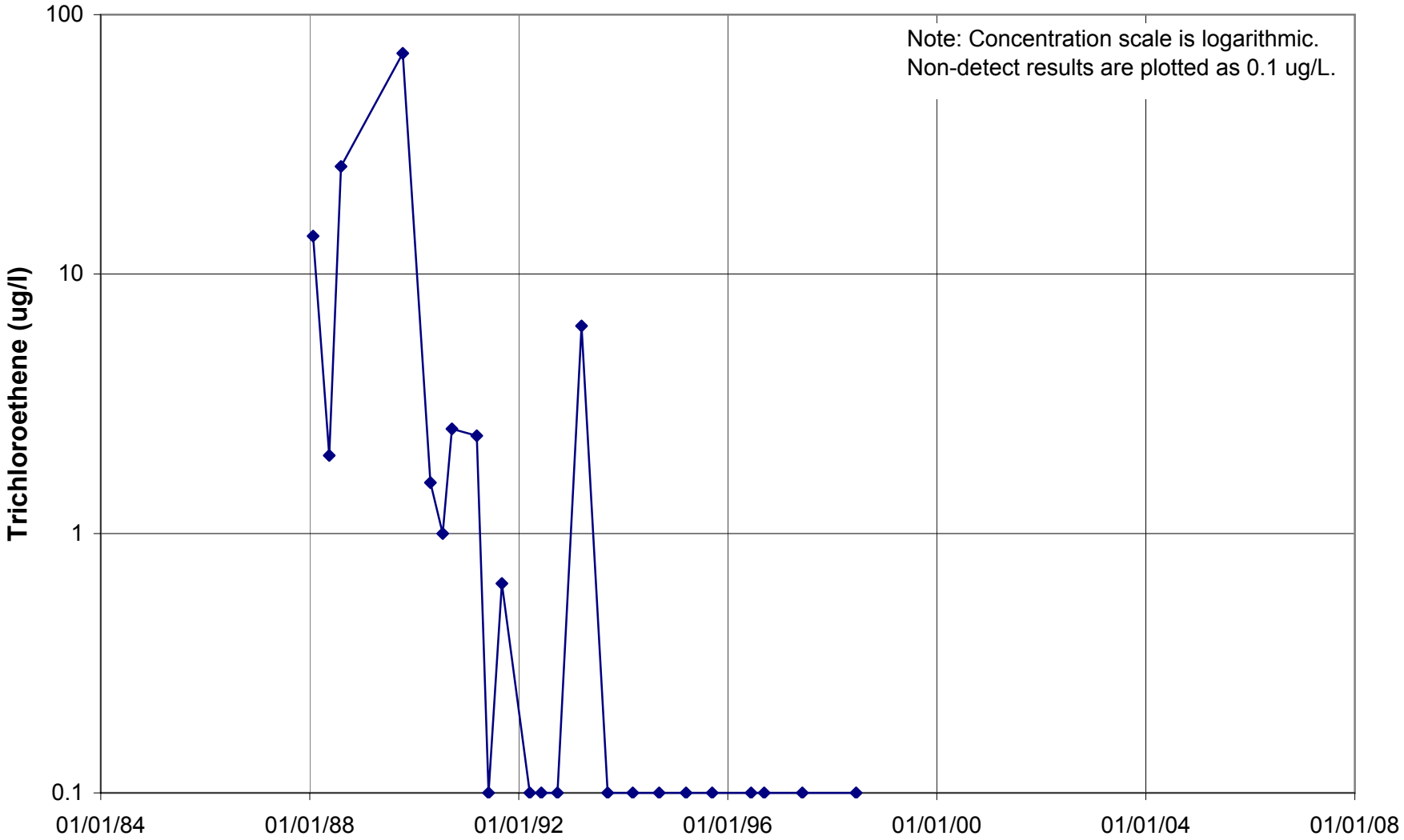
03U704



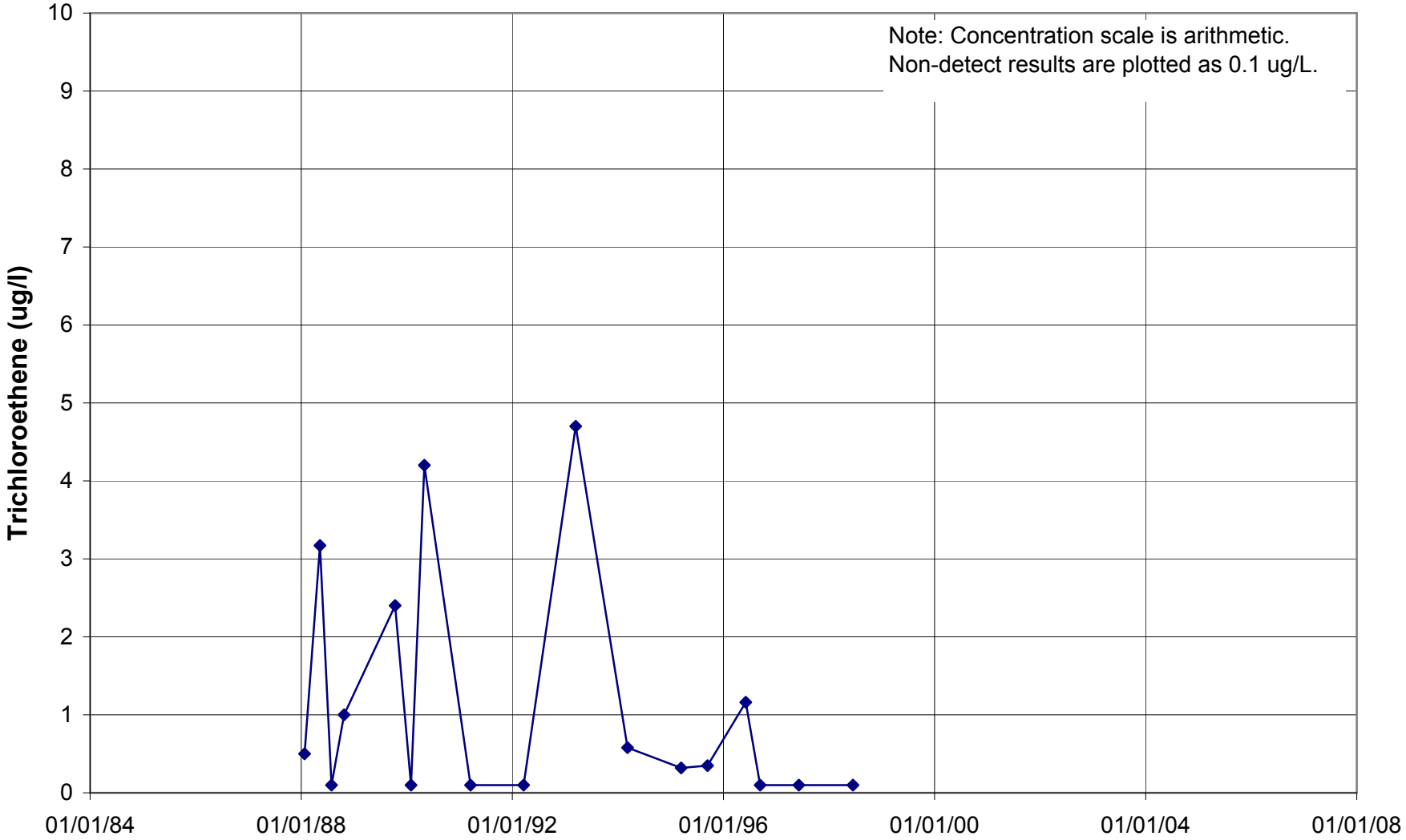
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U705



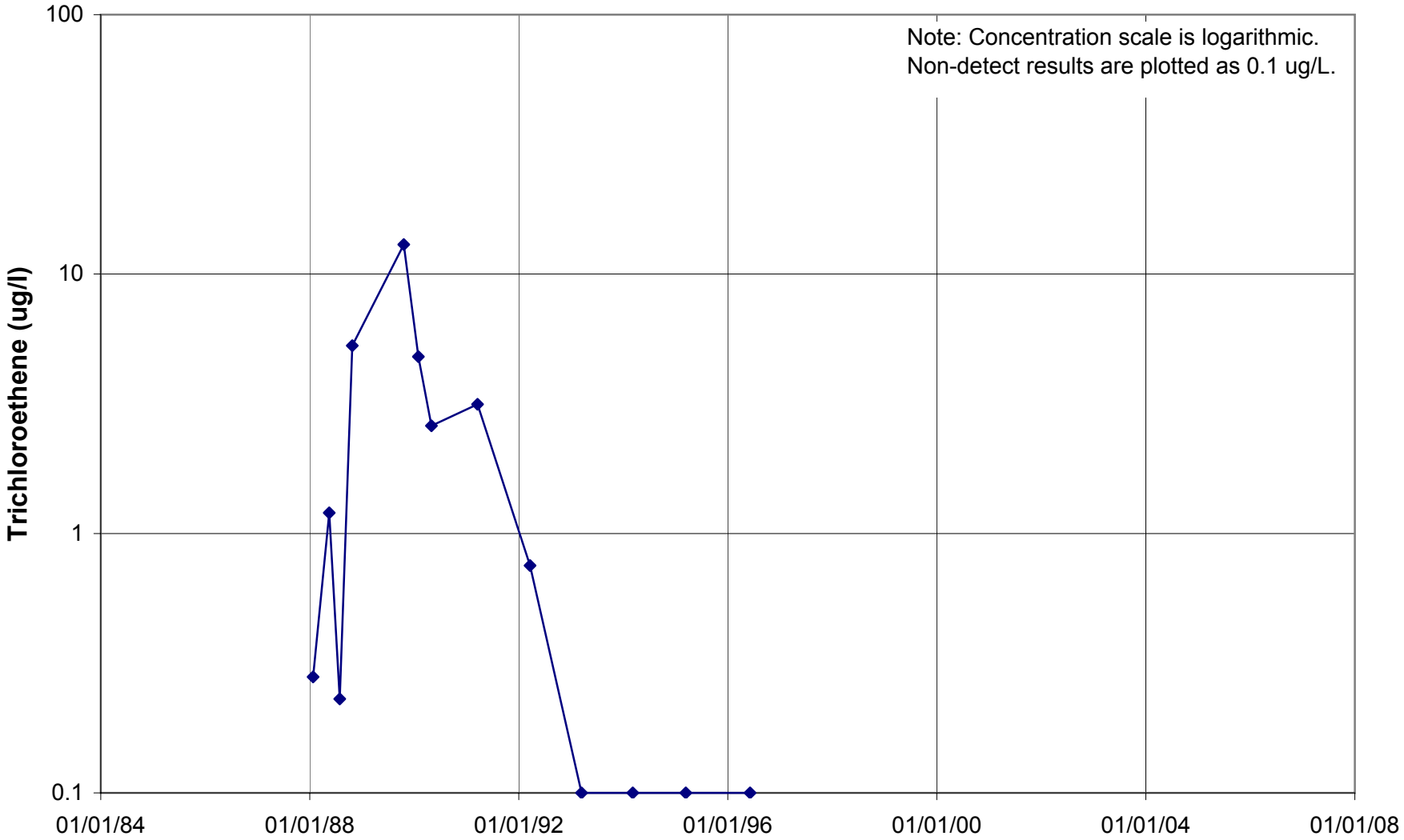
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U706



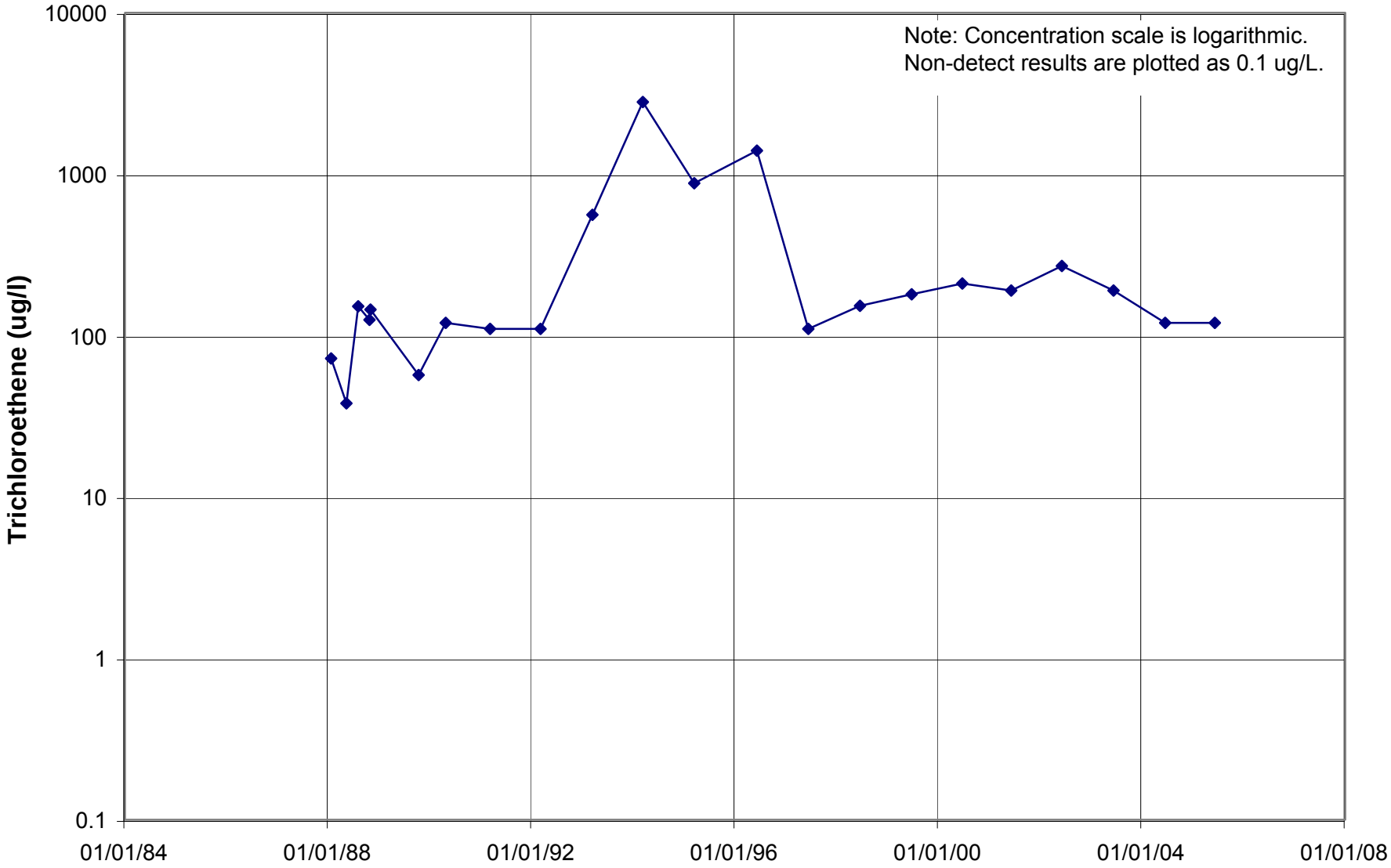
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U707



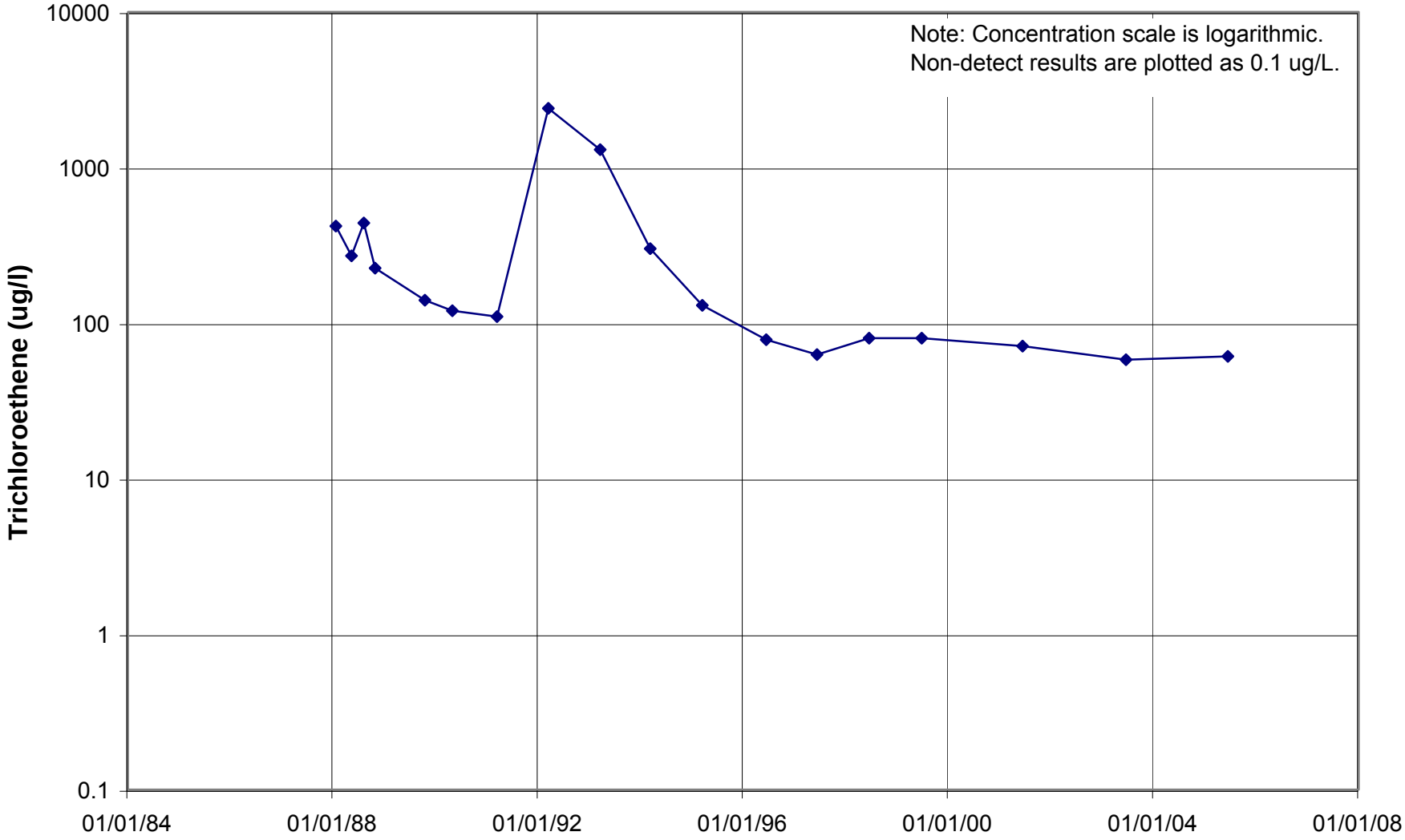
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U708



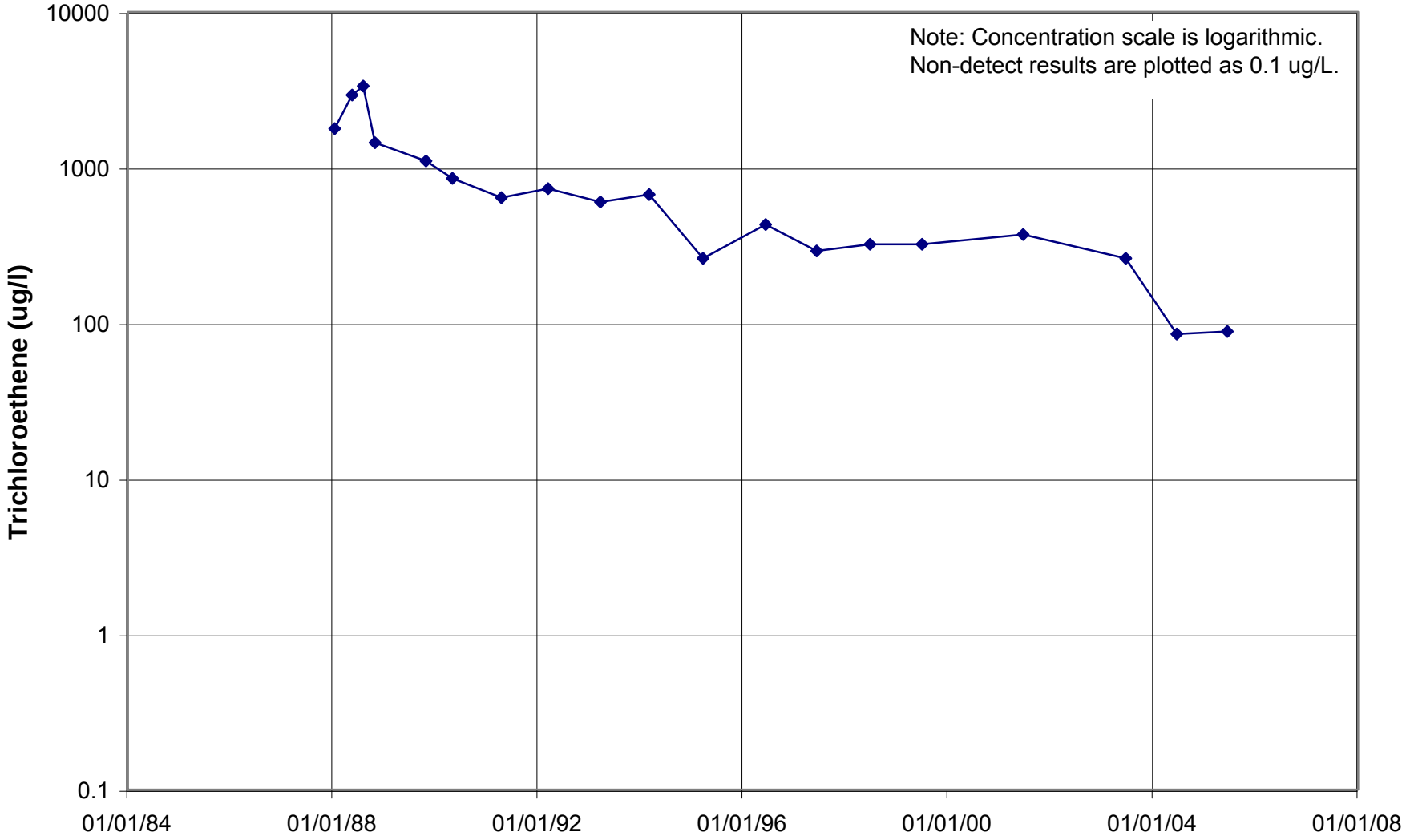
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U709



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U710



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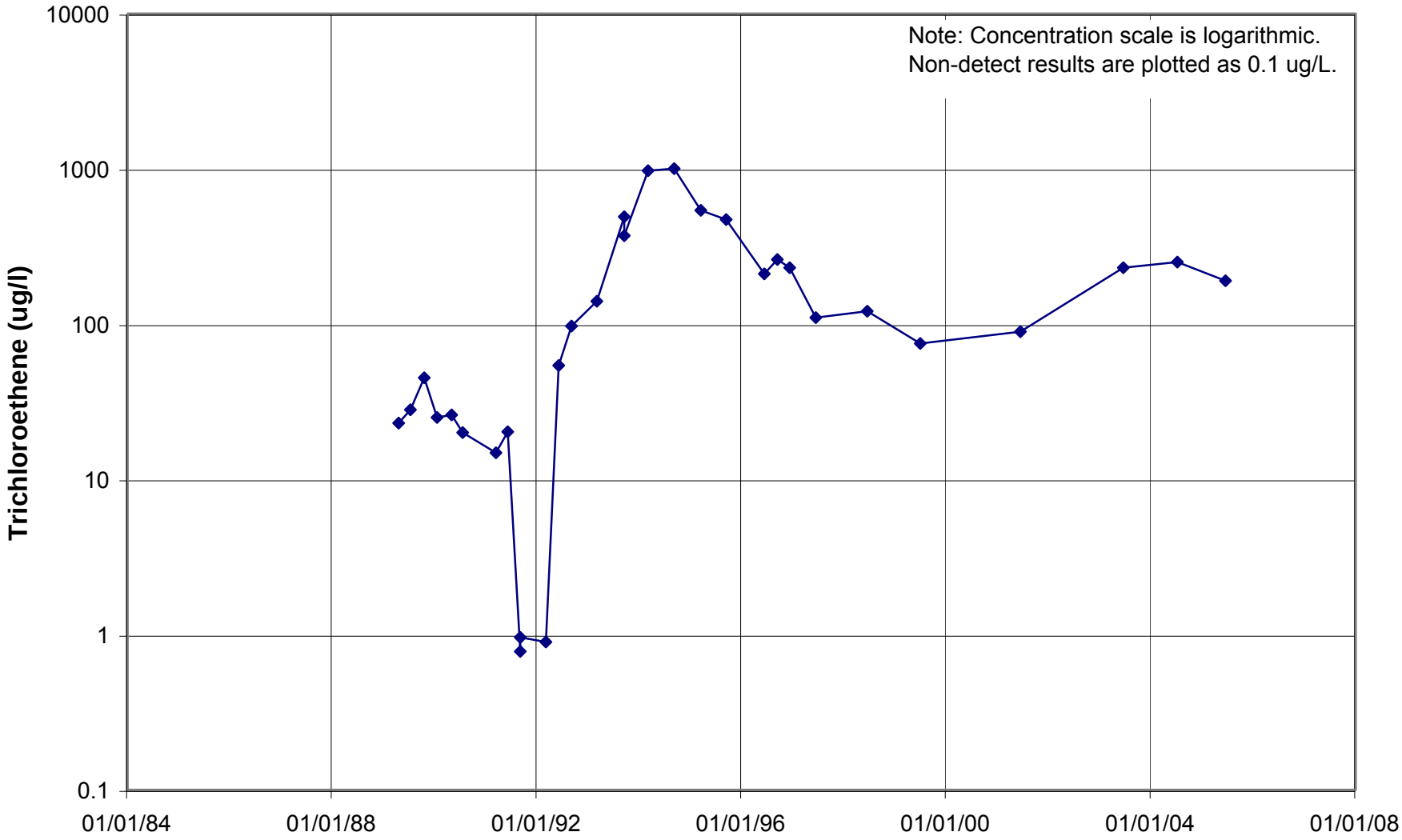
03U711



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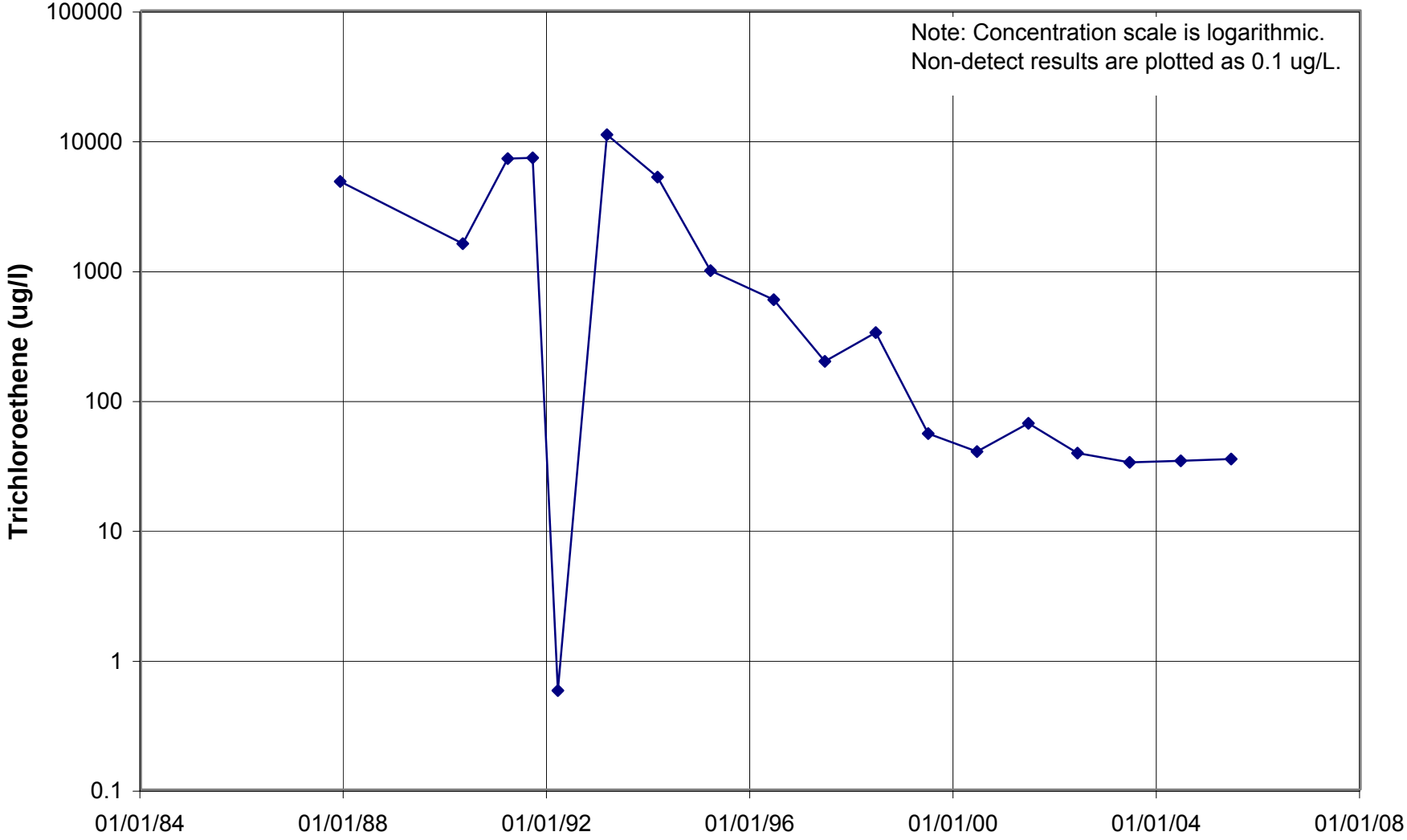
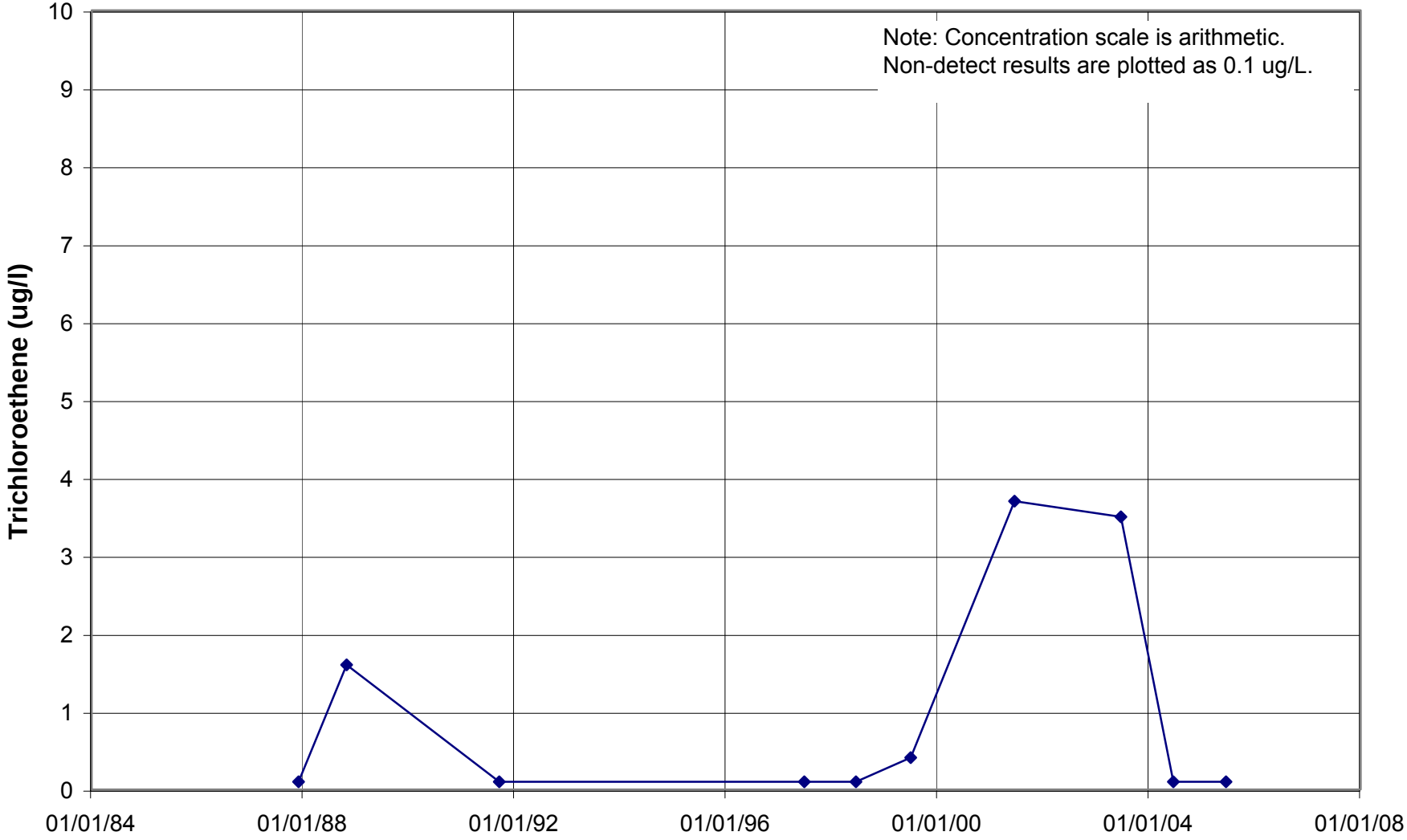
03U801



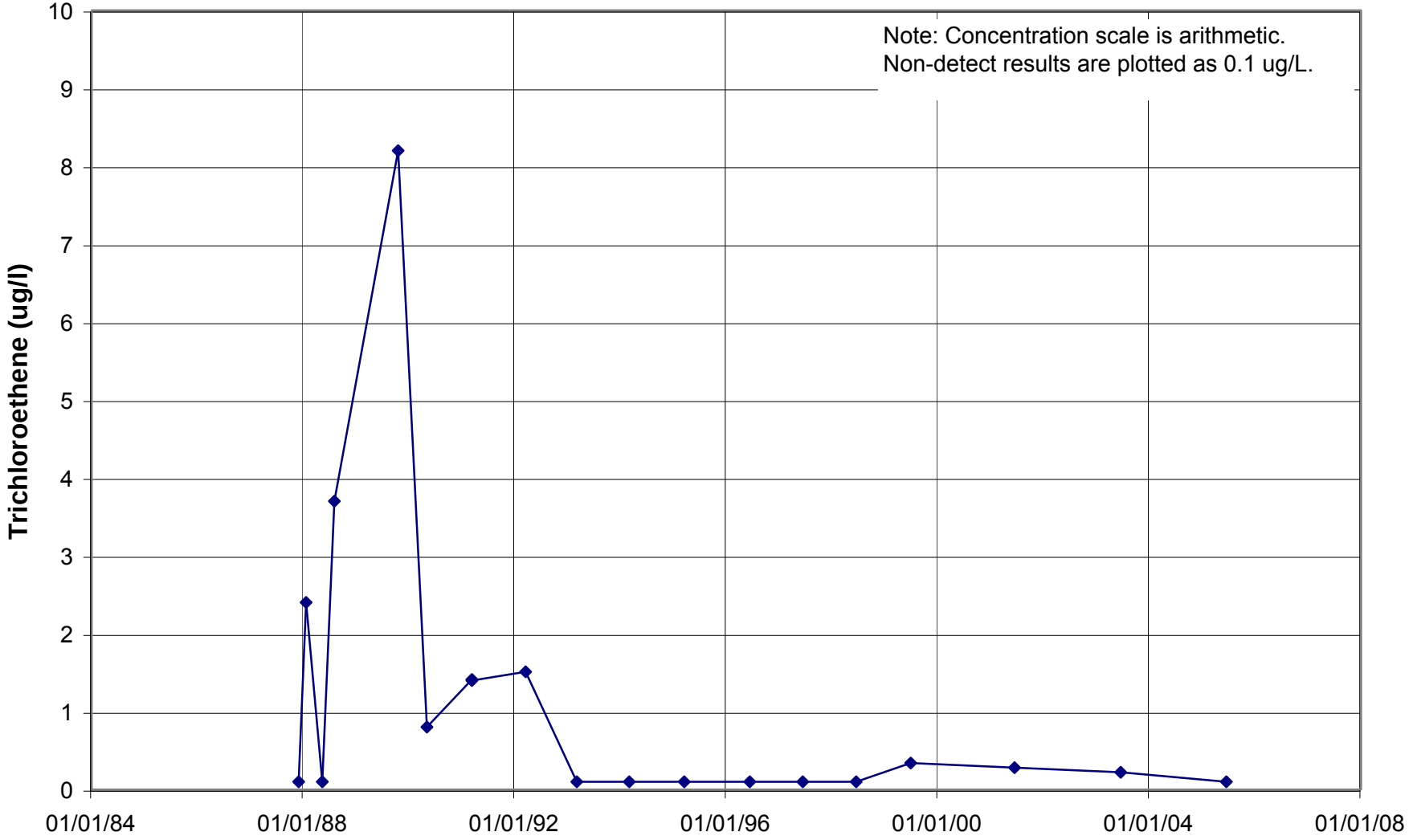
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U803



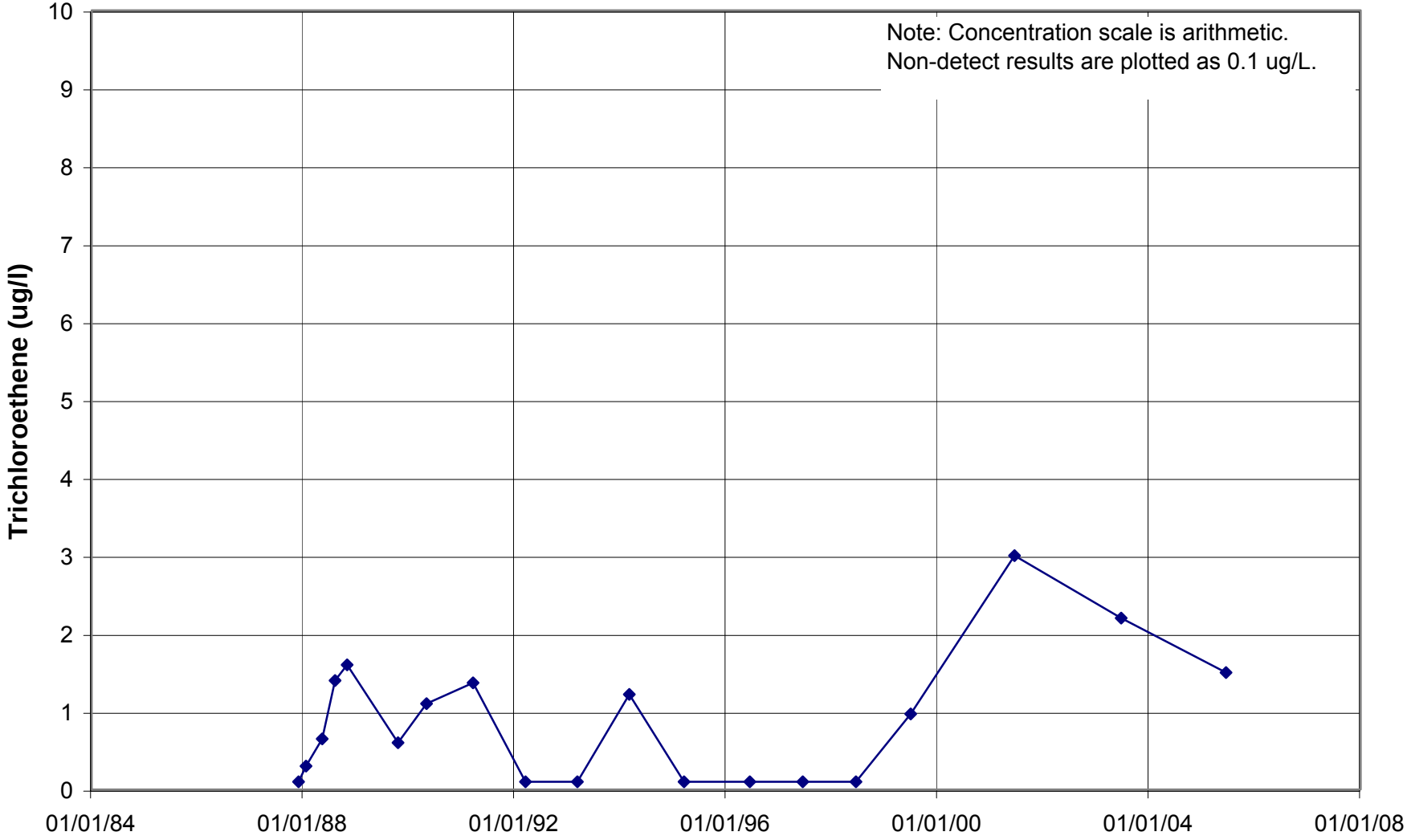
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U804



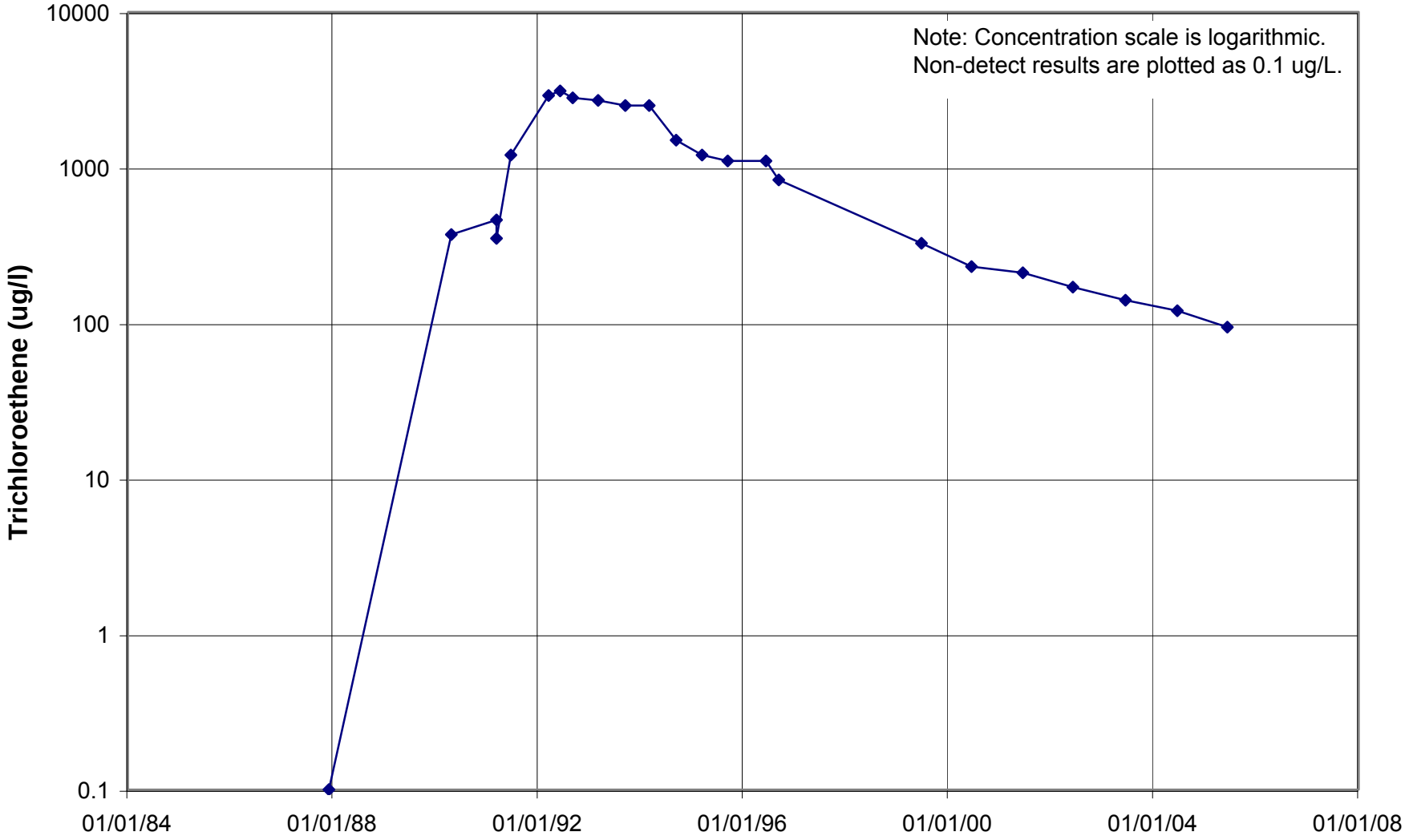
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U805



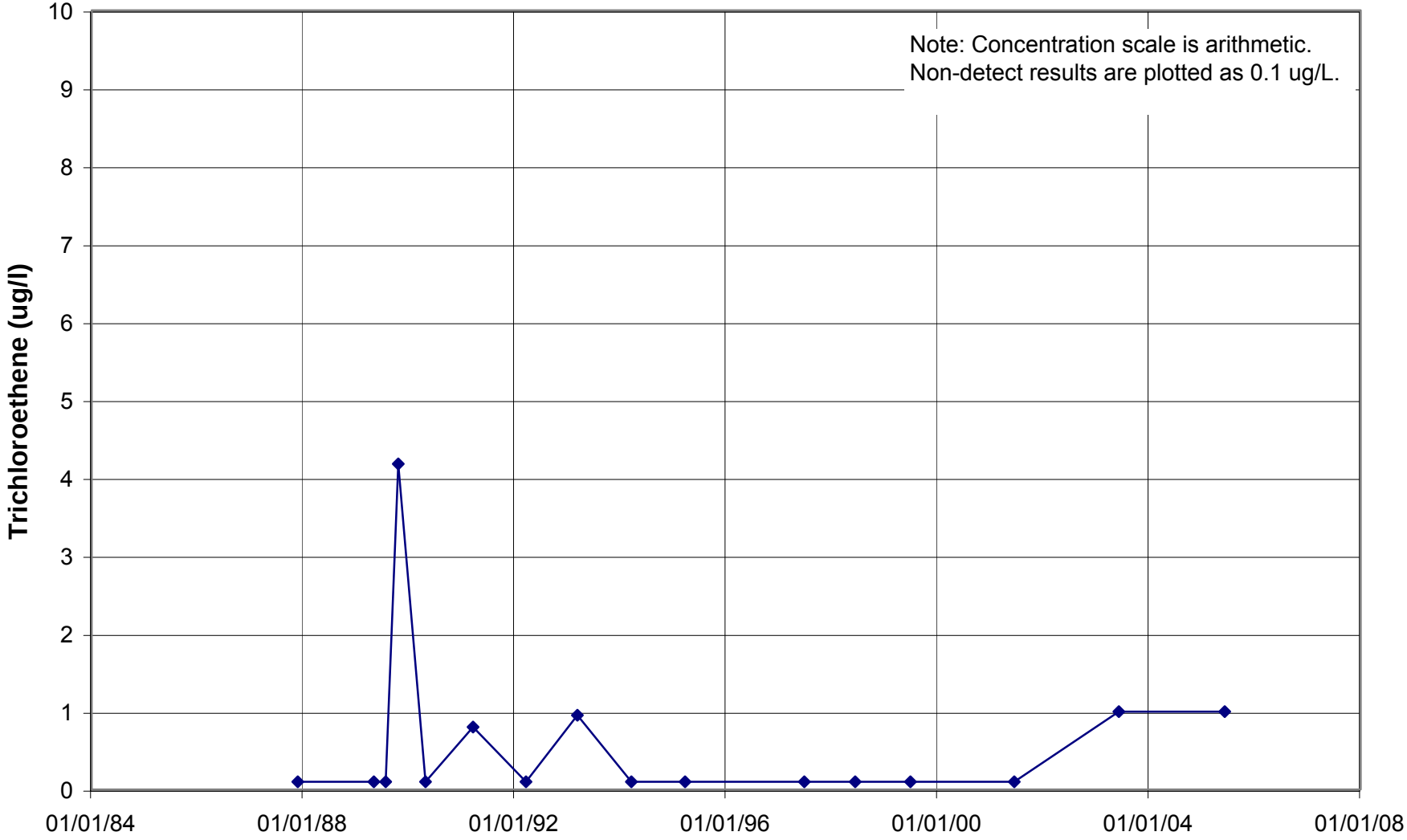
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U806



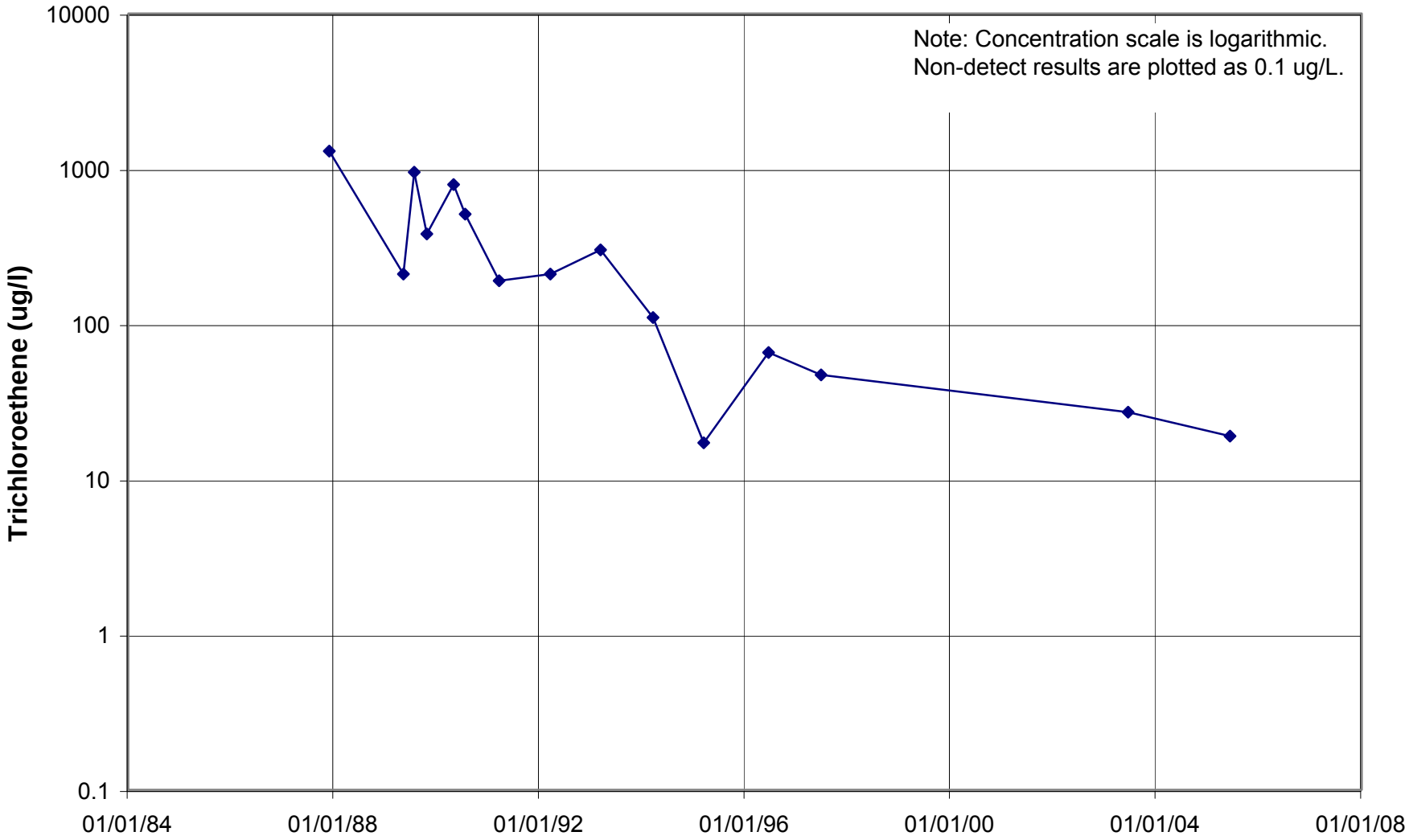
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U811



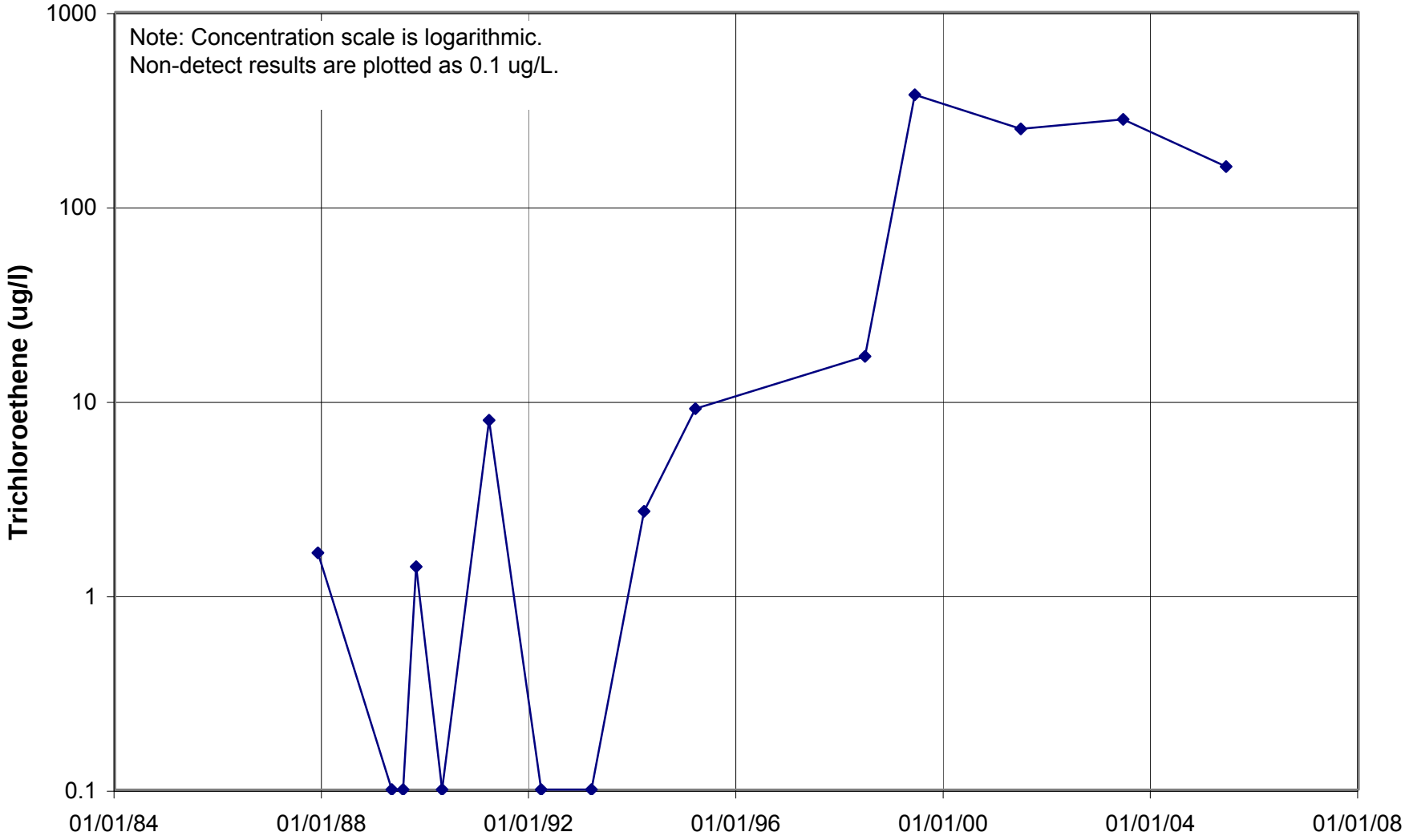
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U821



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

03U822



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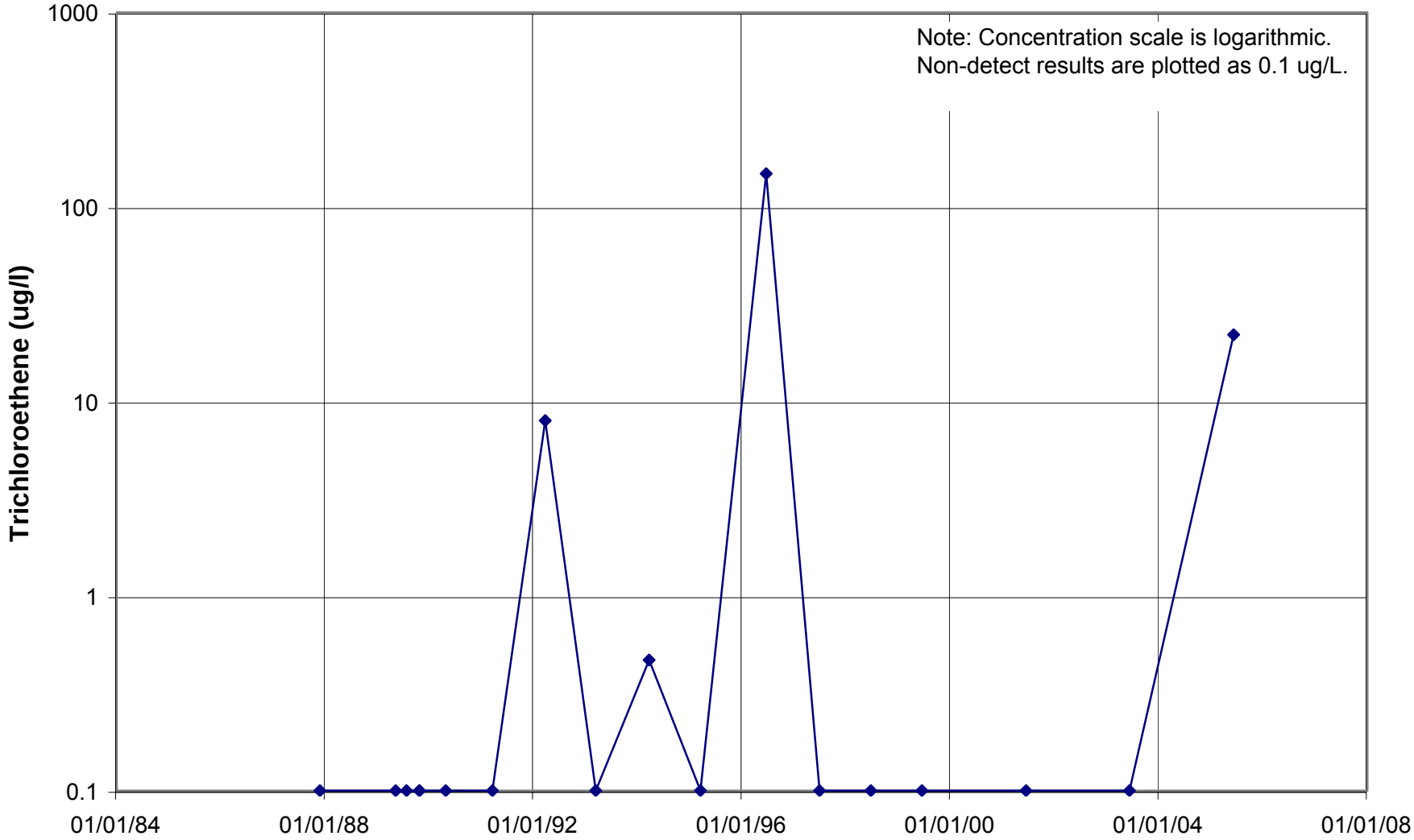
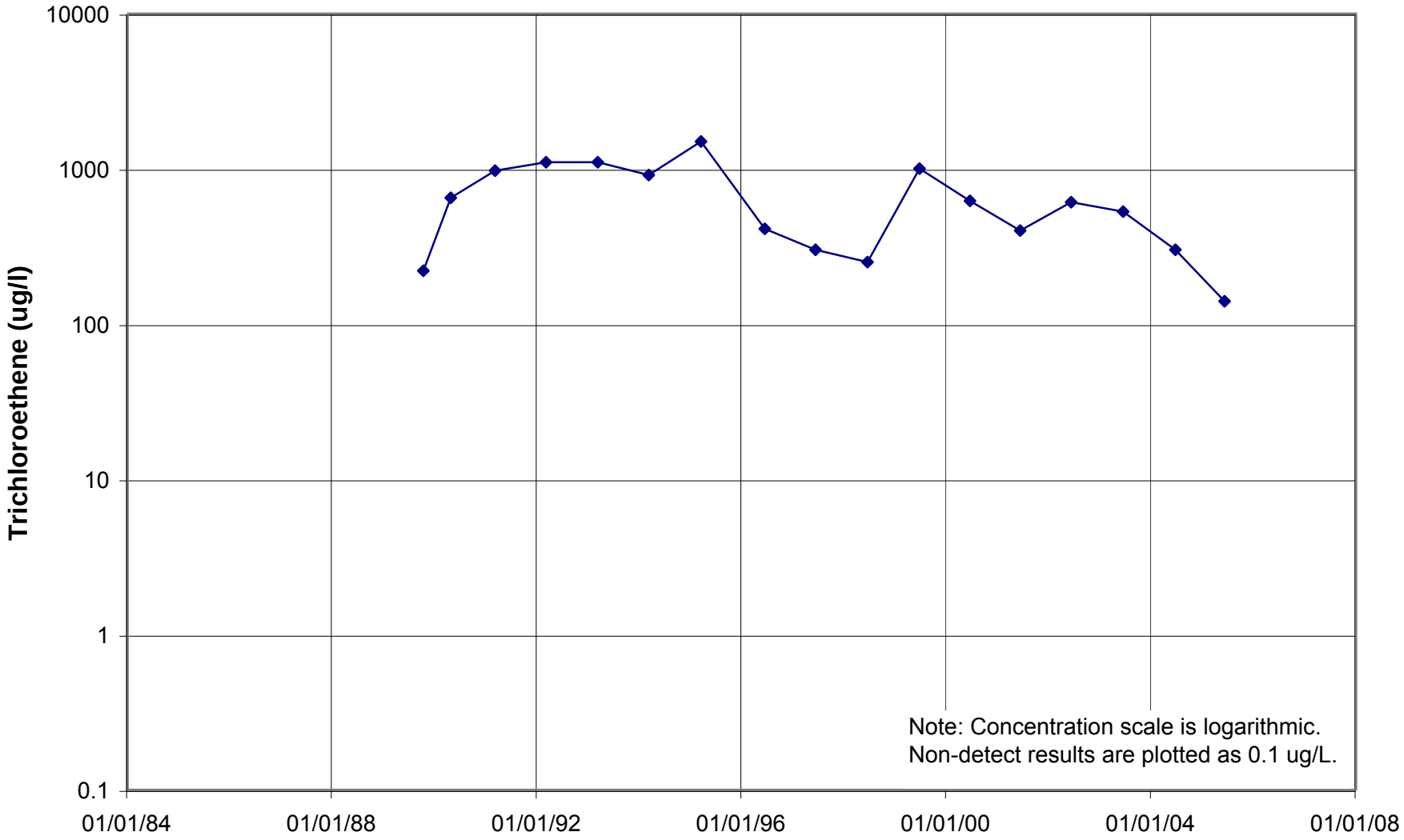
03U831



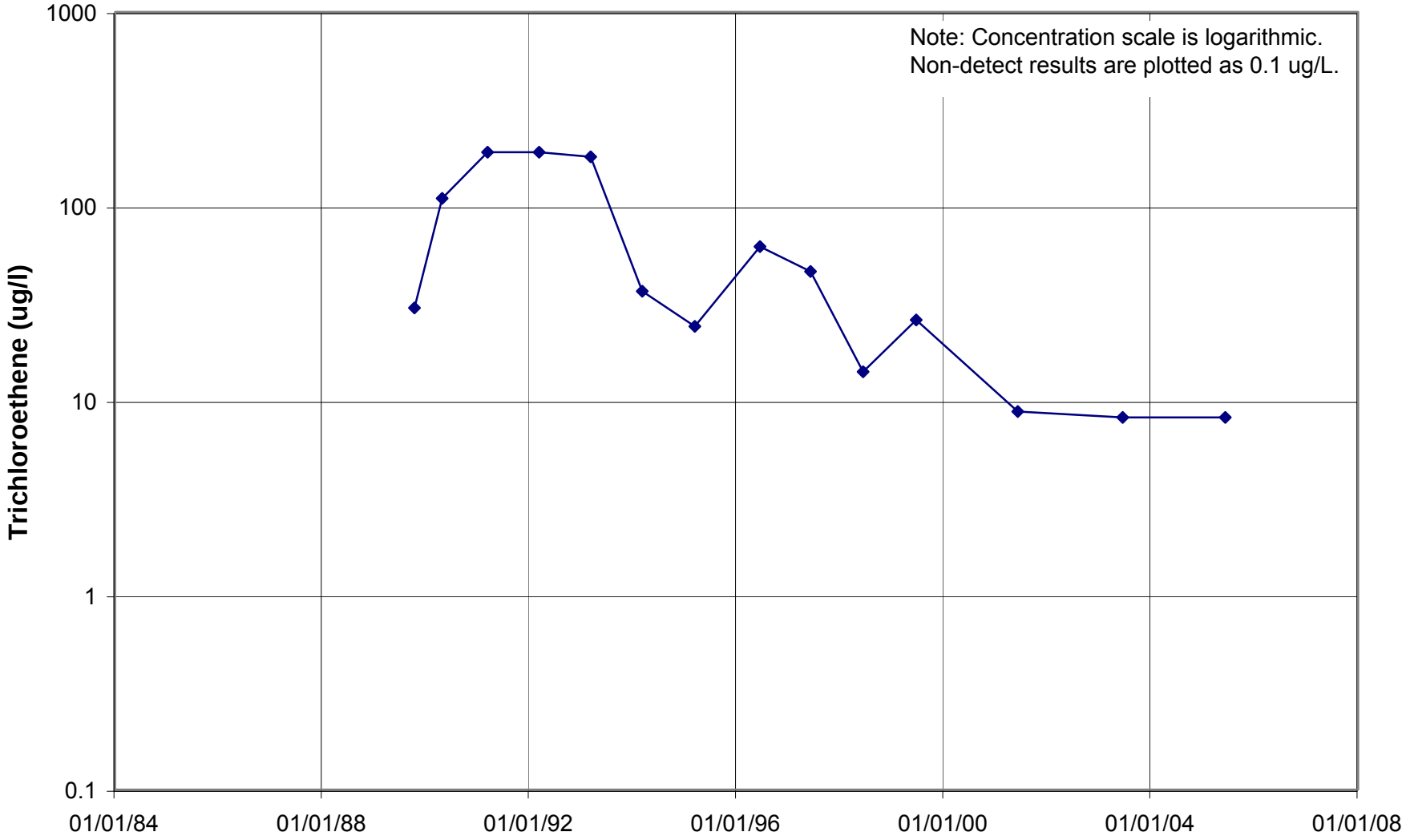
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J077



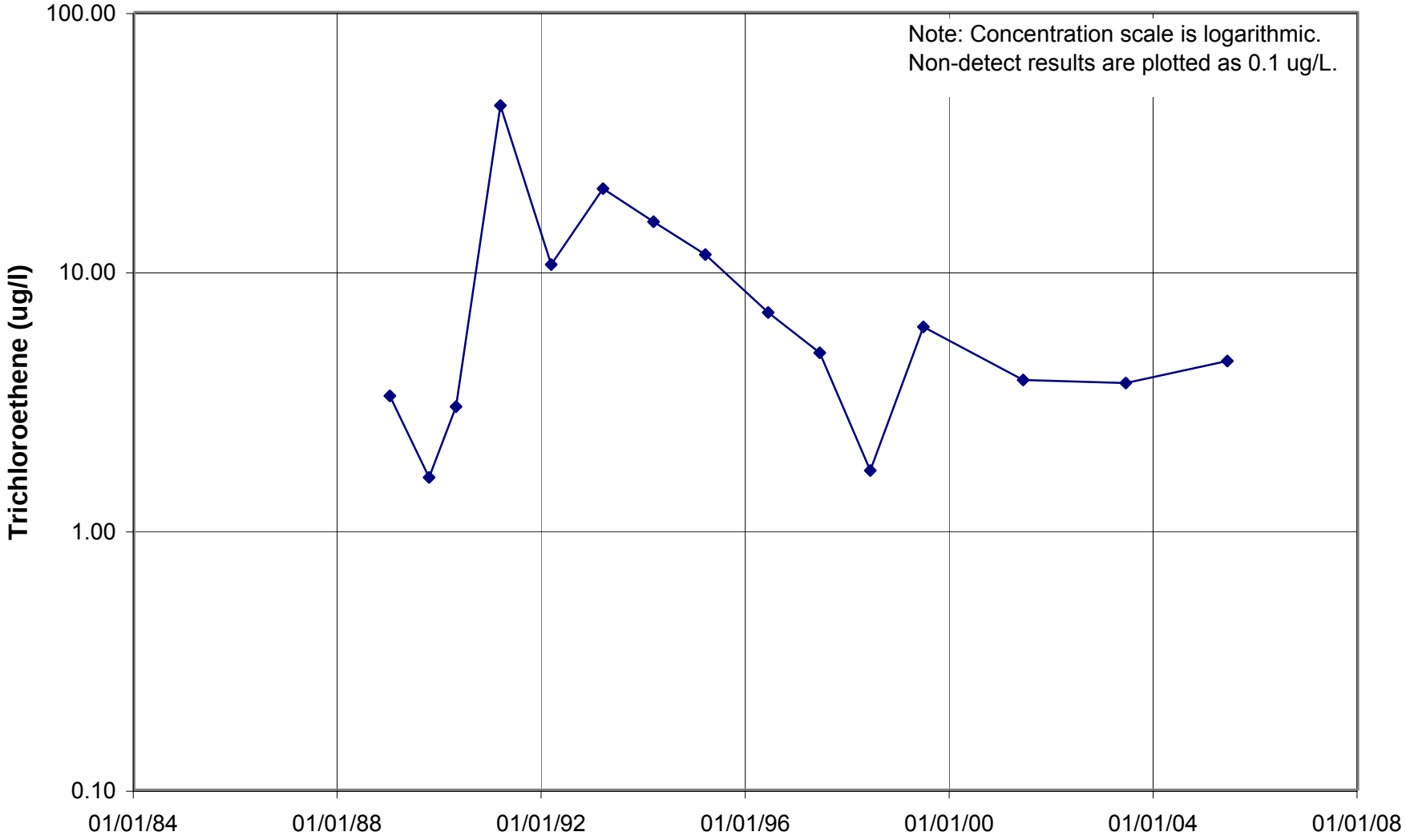
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J702



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J708



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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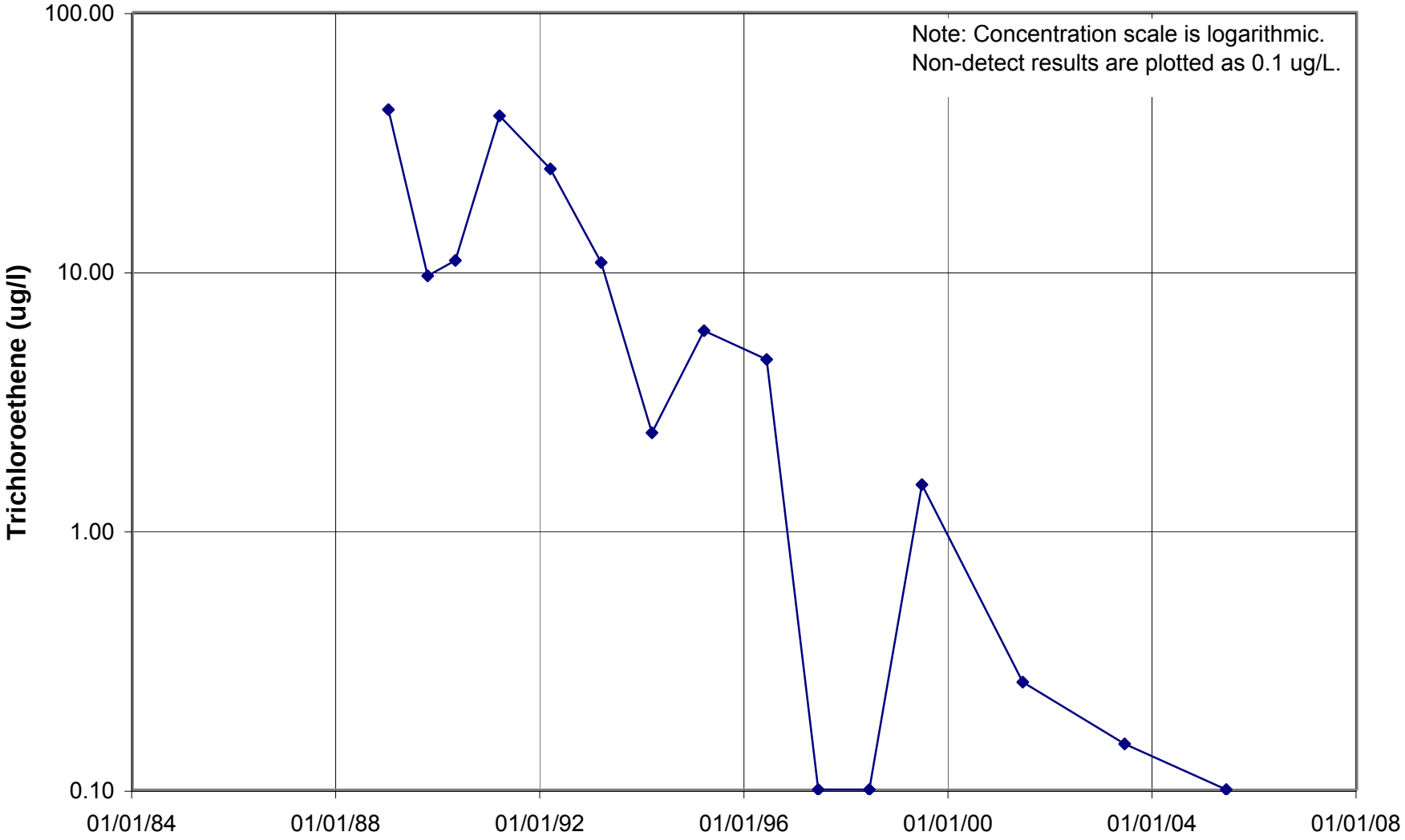

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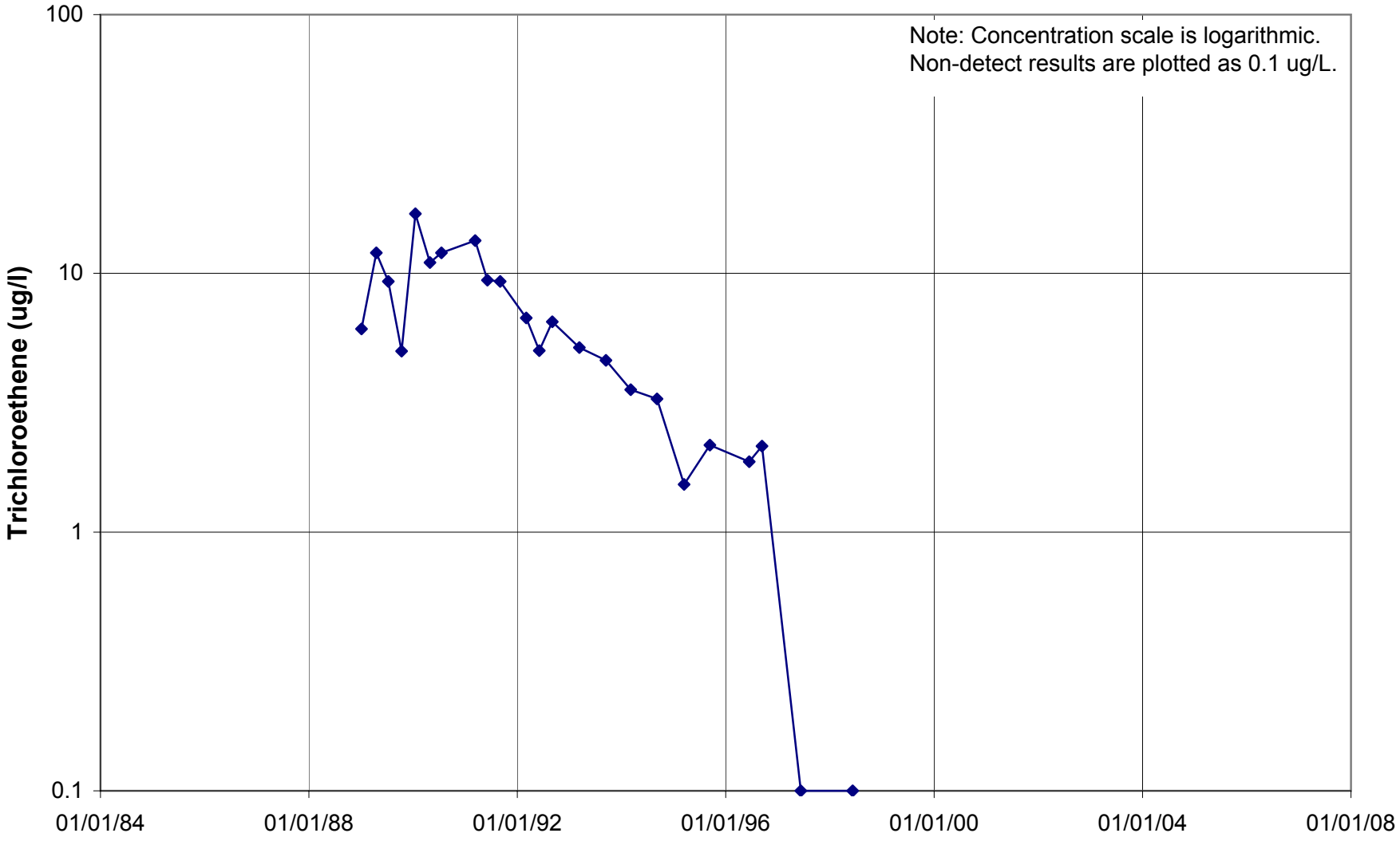
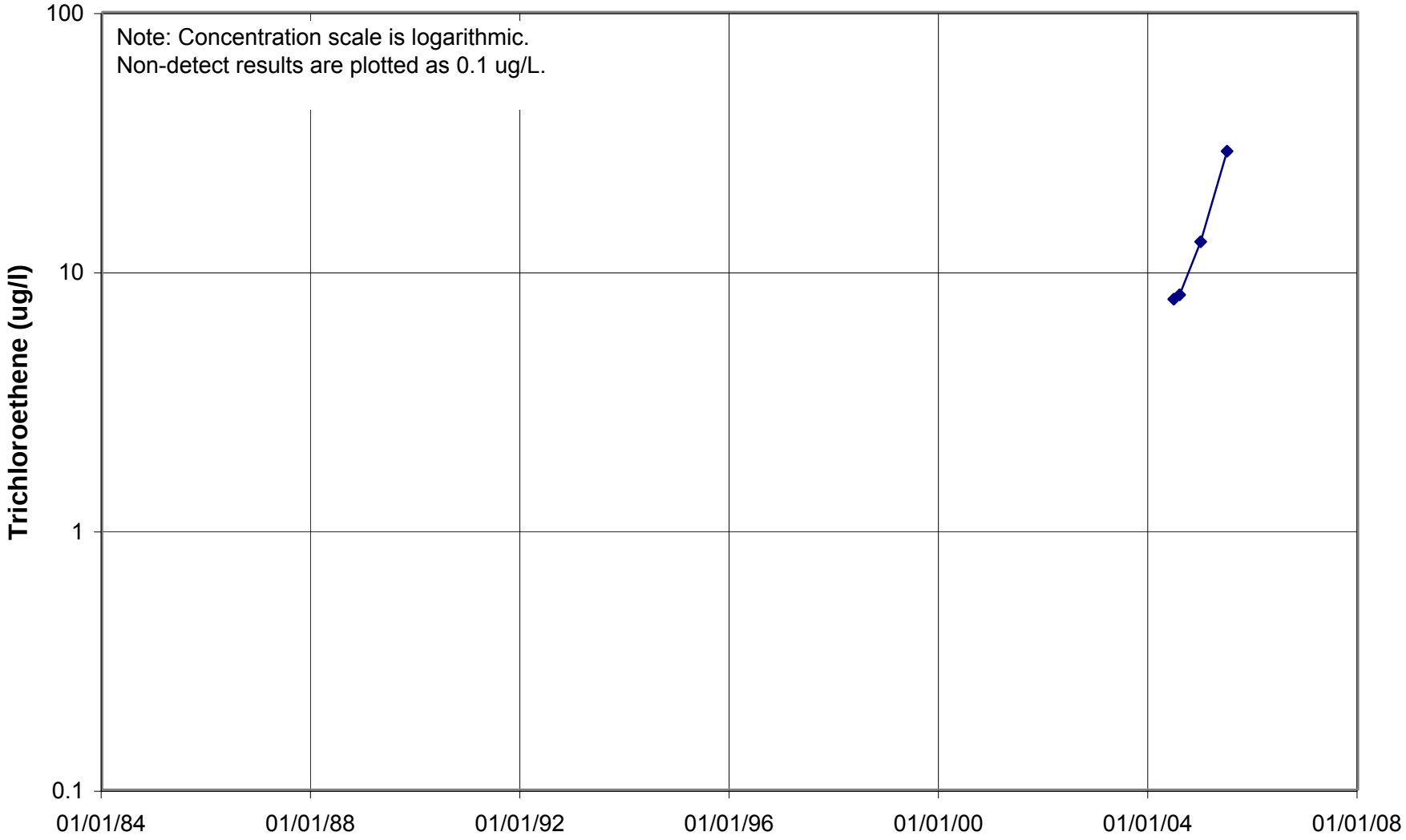


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J822



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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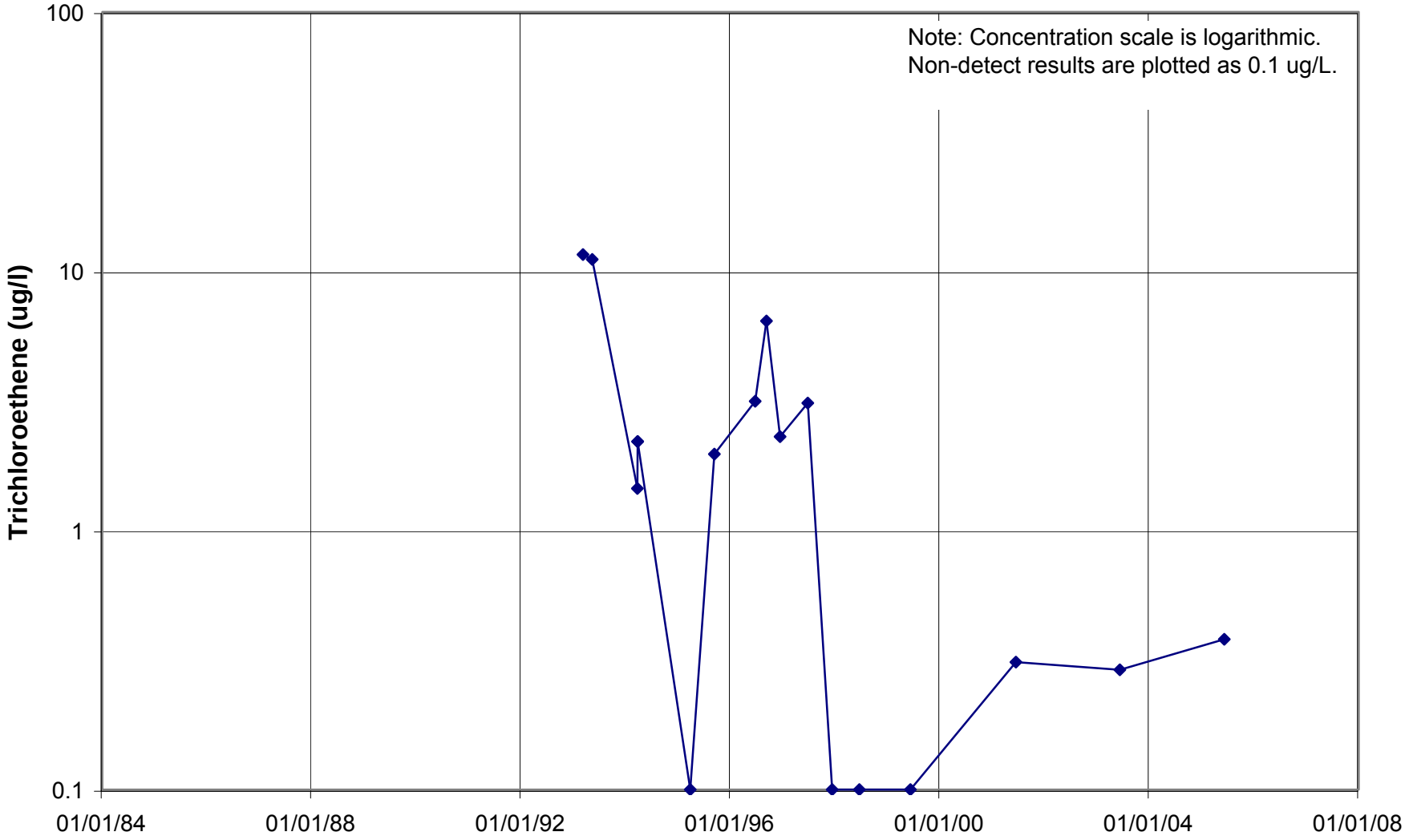

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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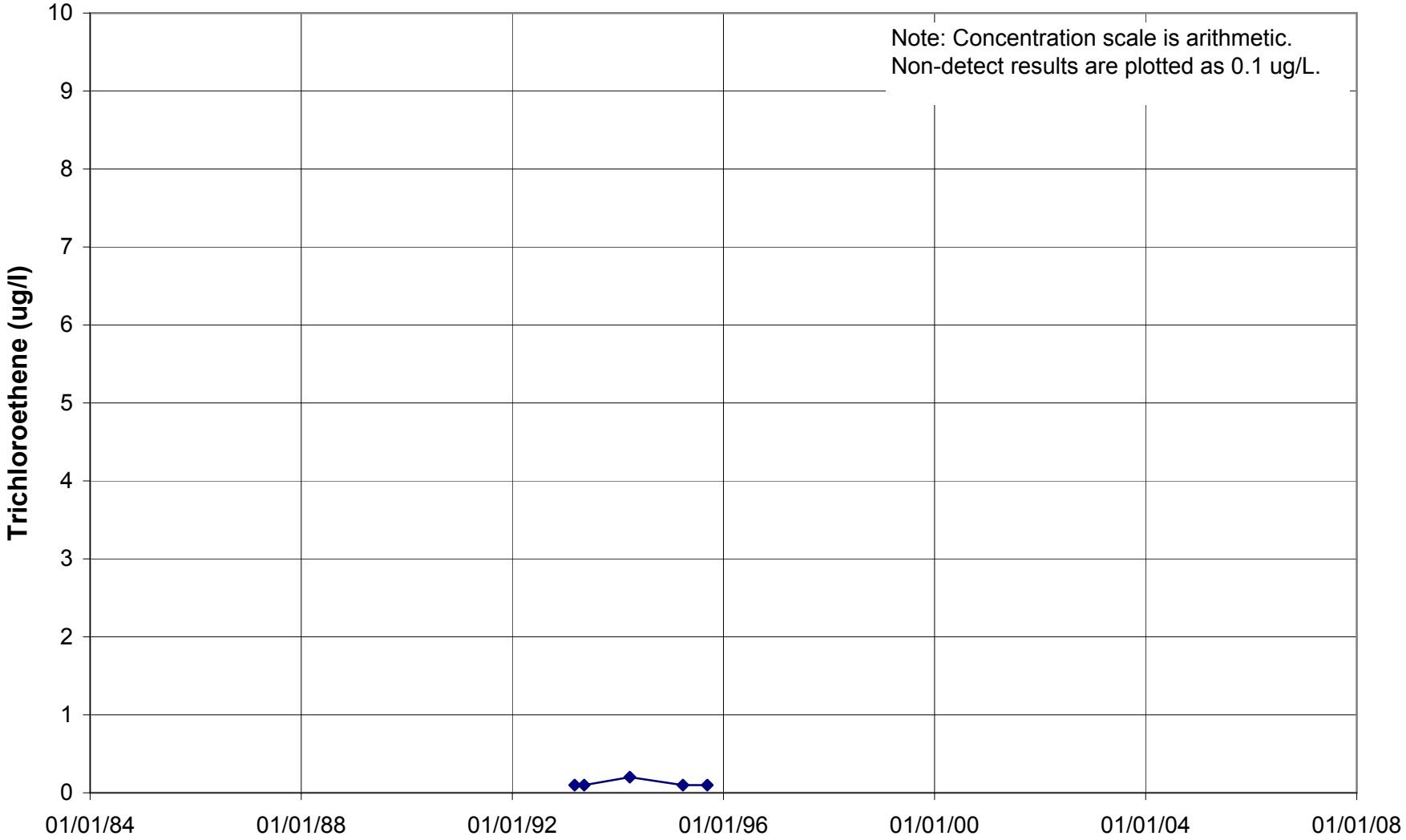

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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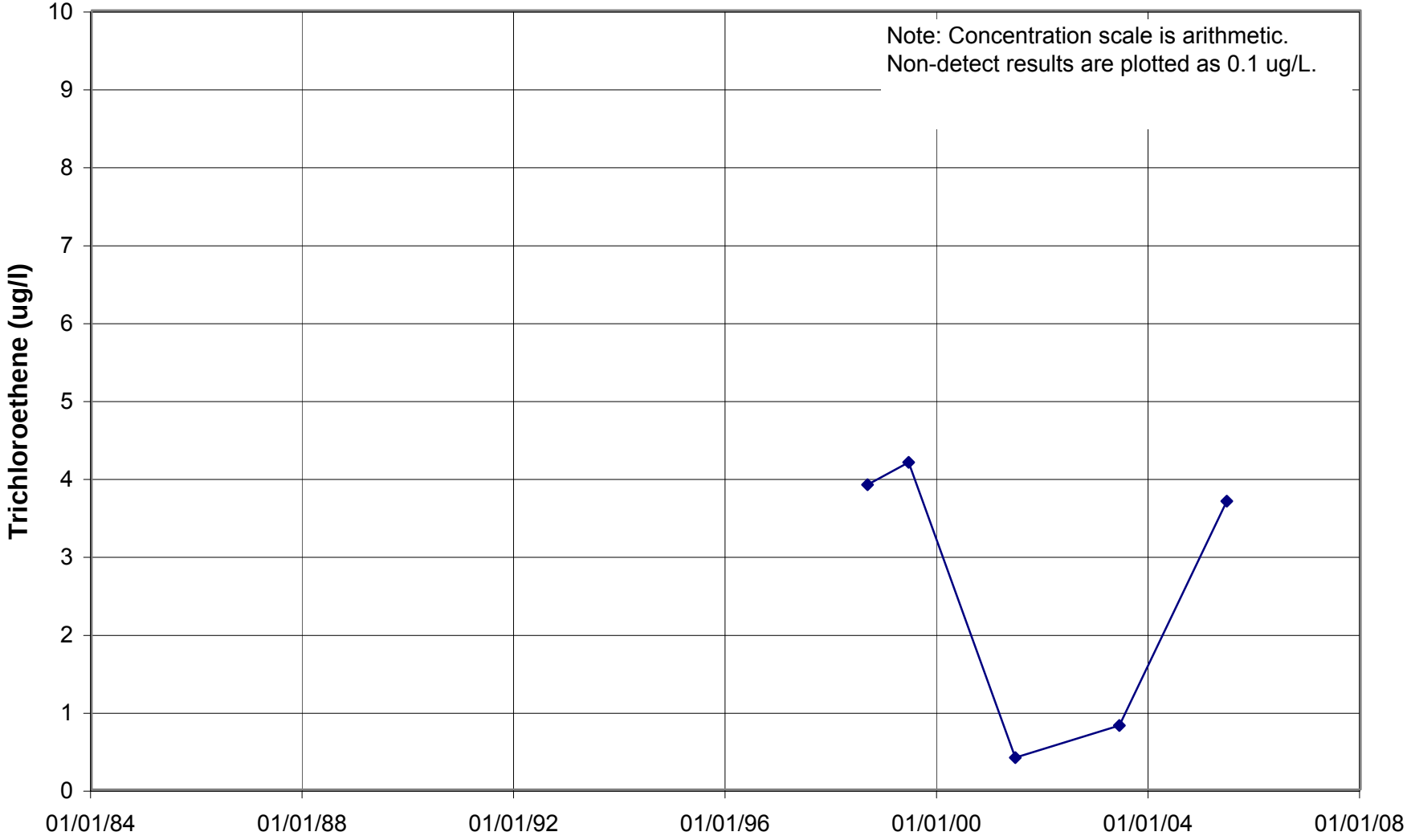
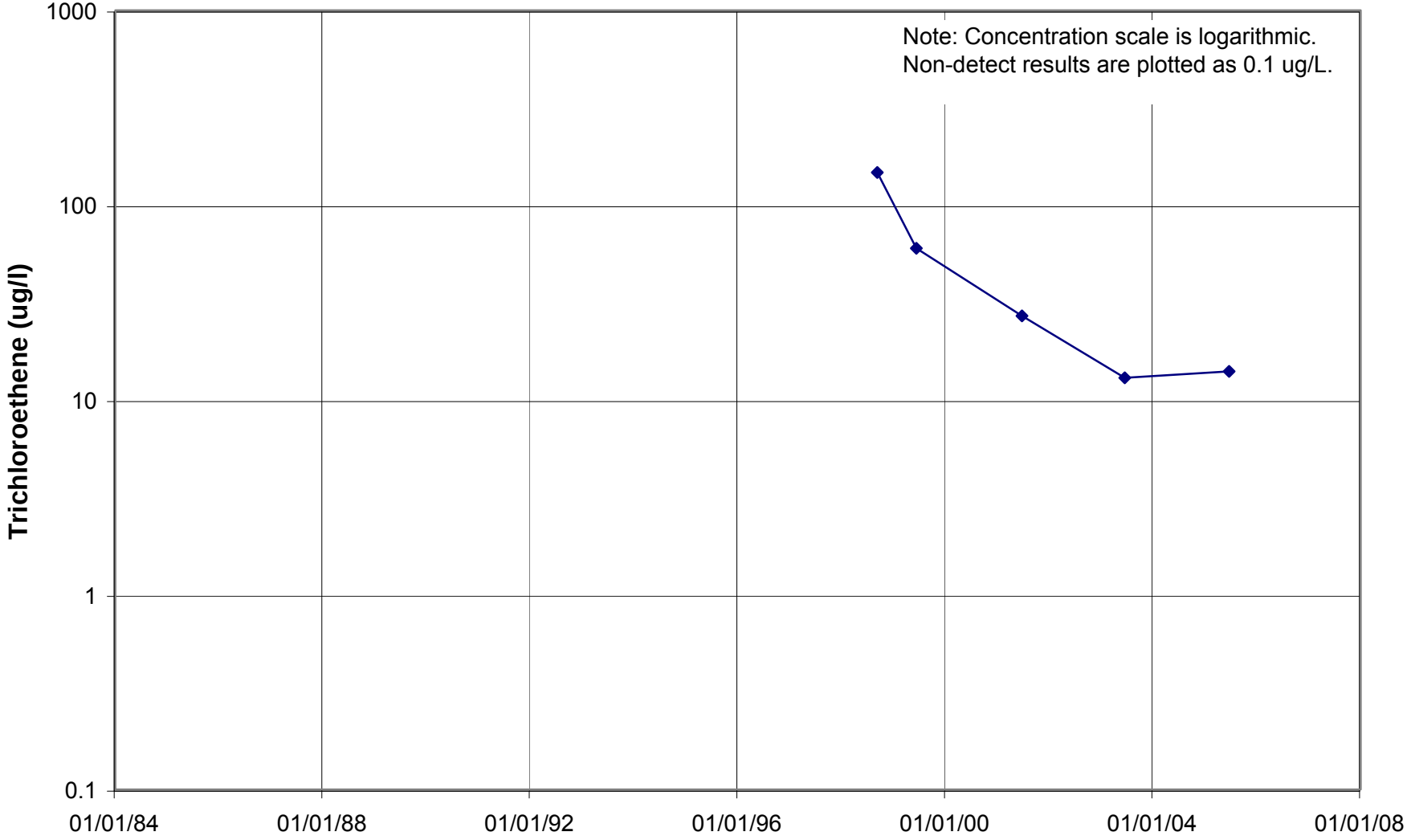


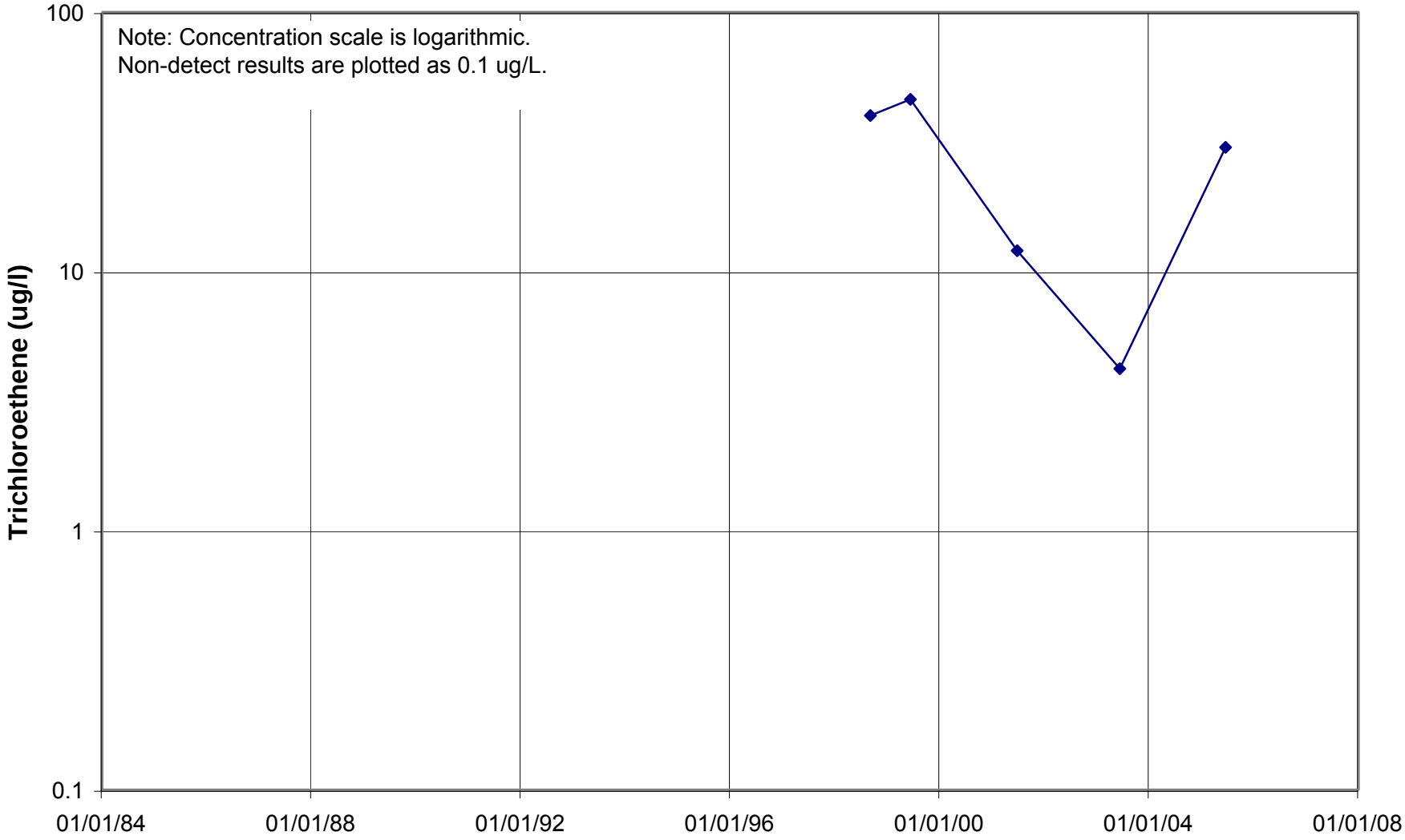
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J837



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J838



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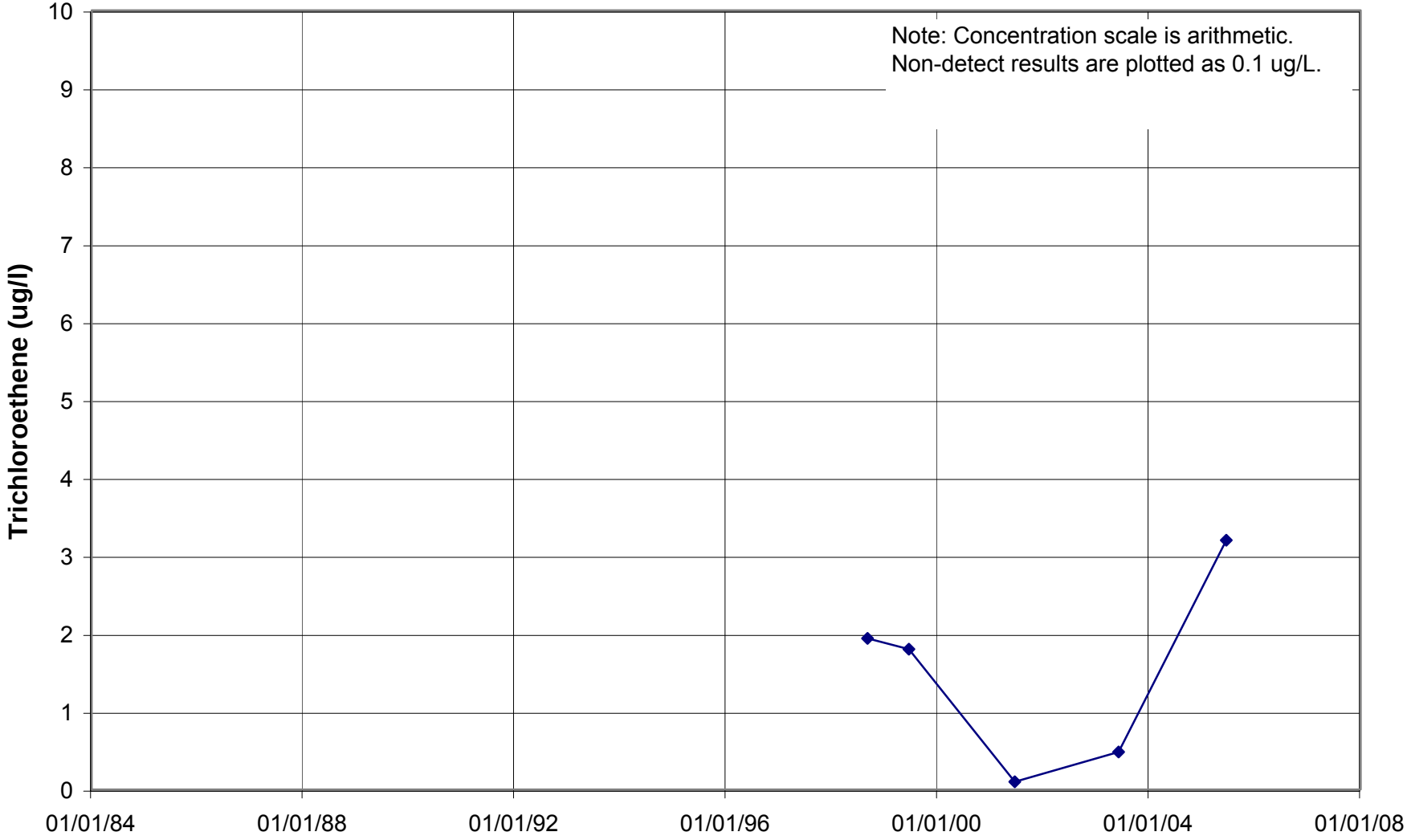
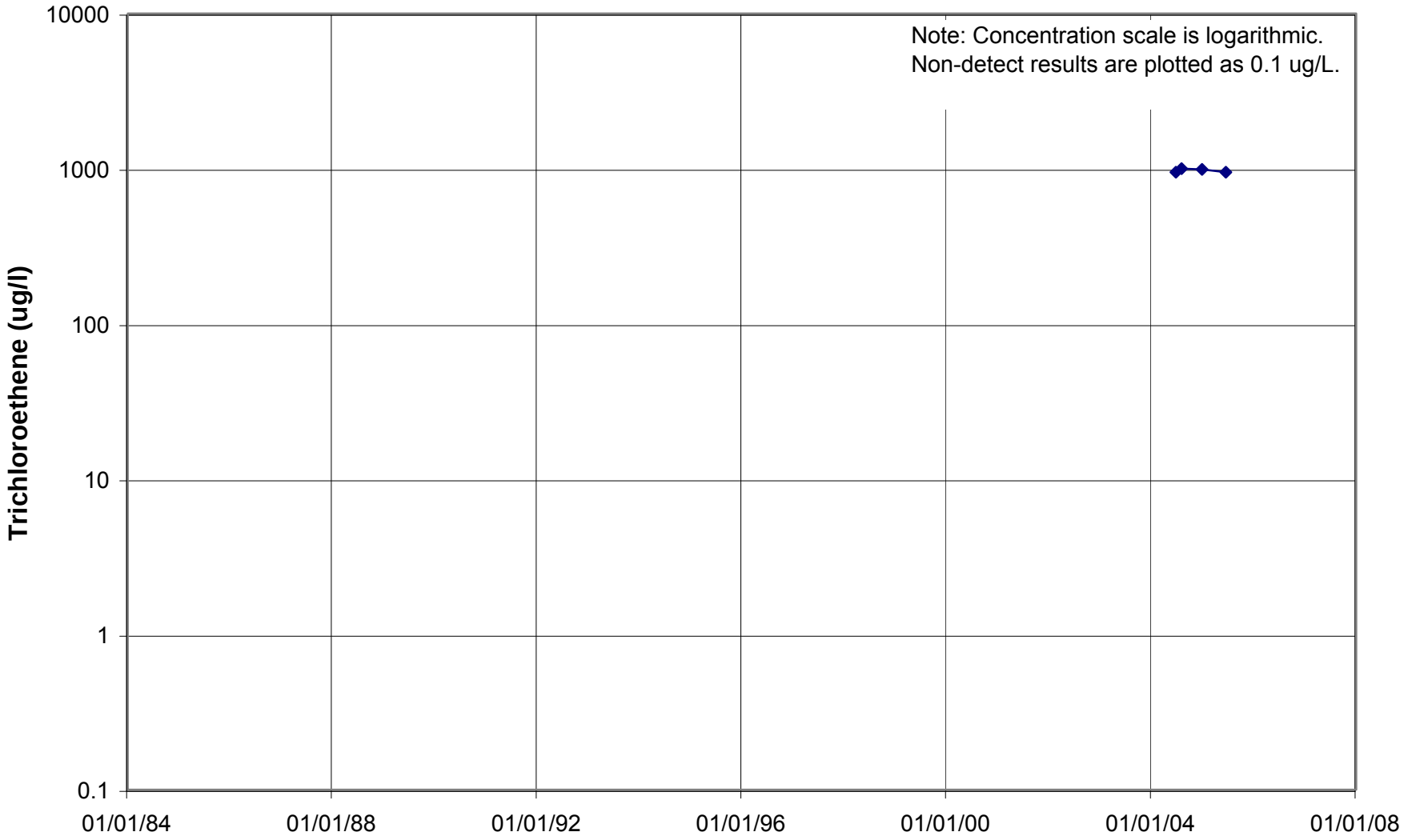


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04J847



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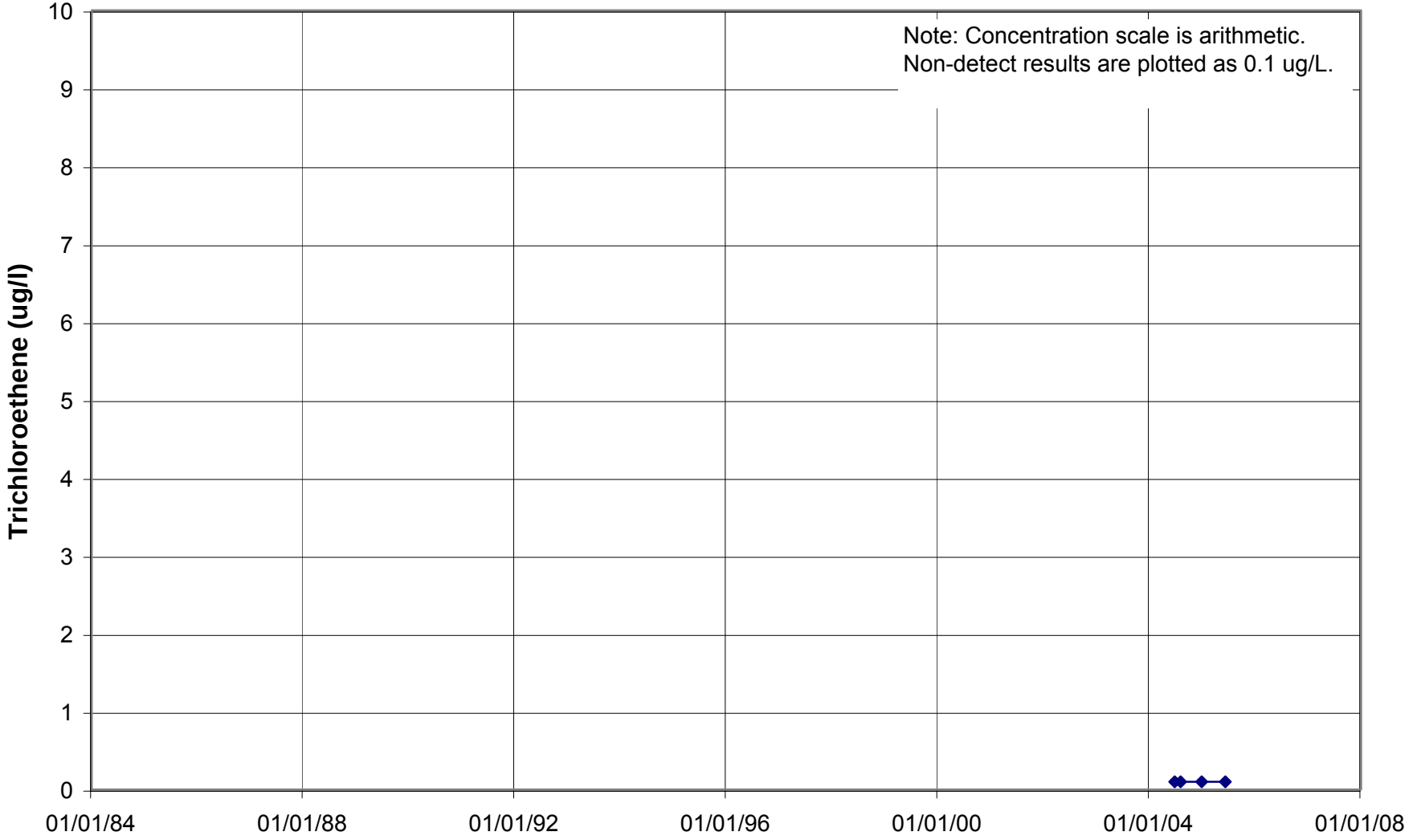

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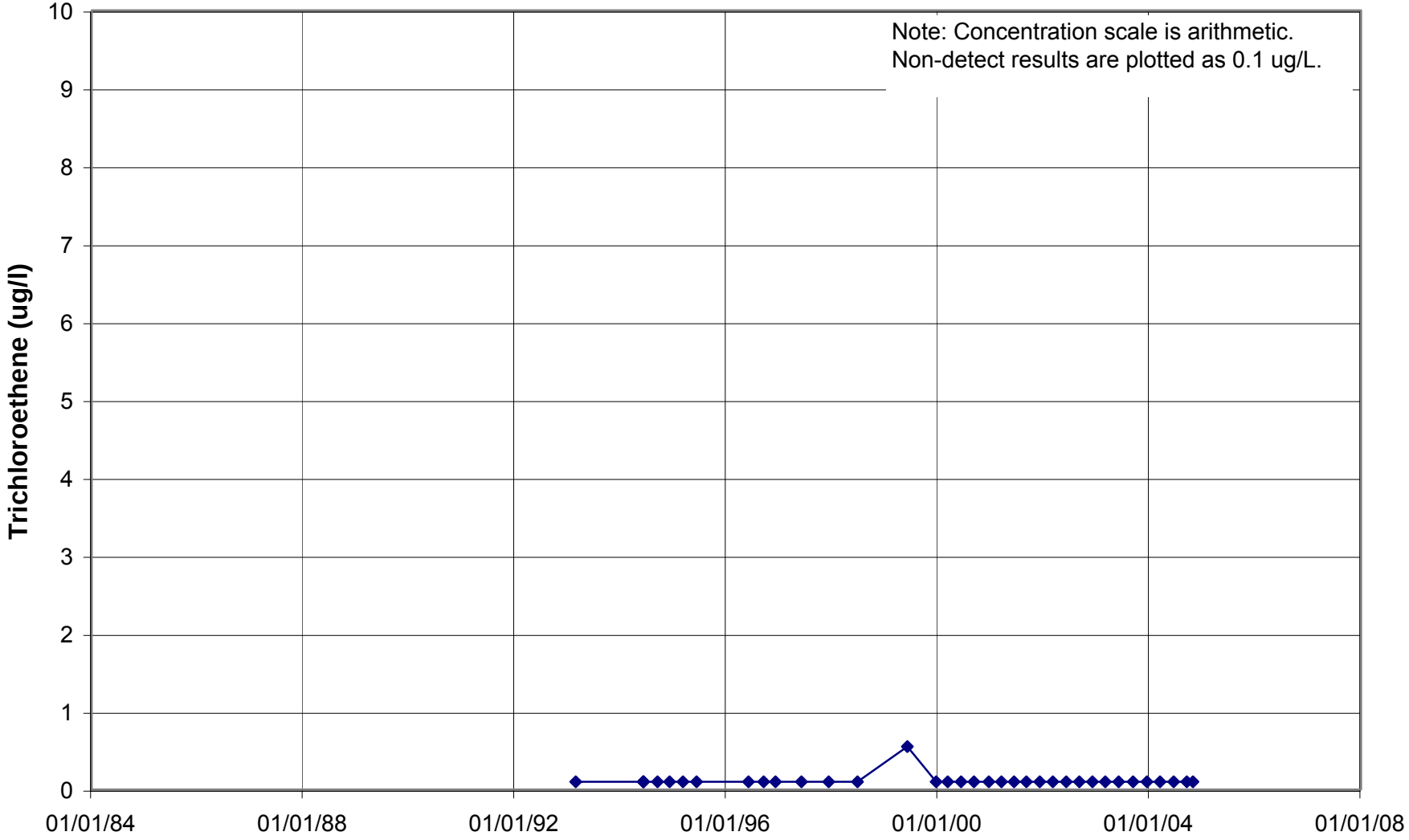

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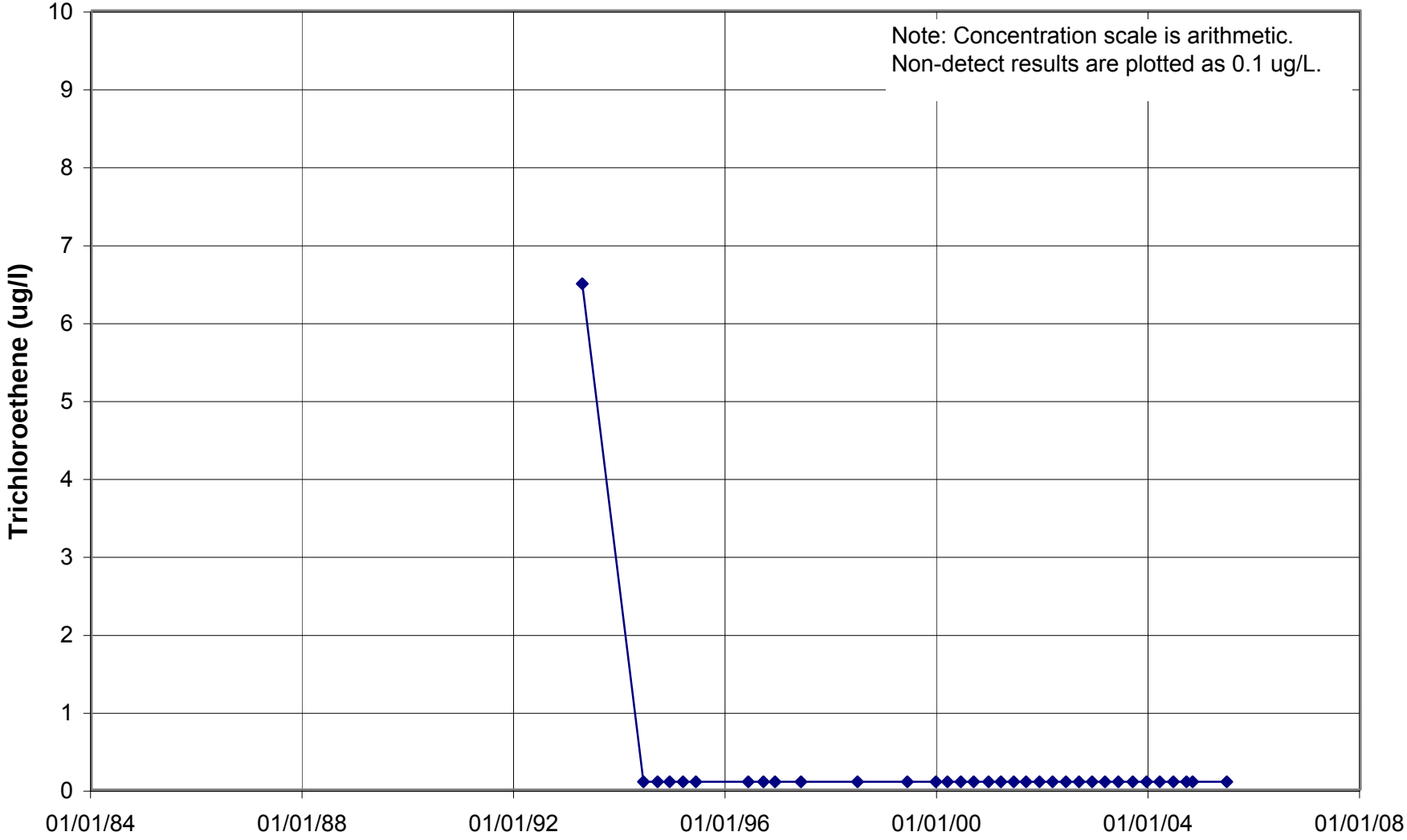

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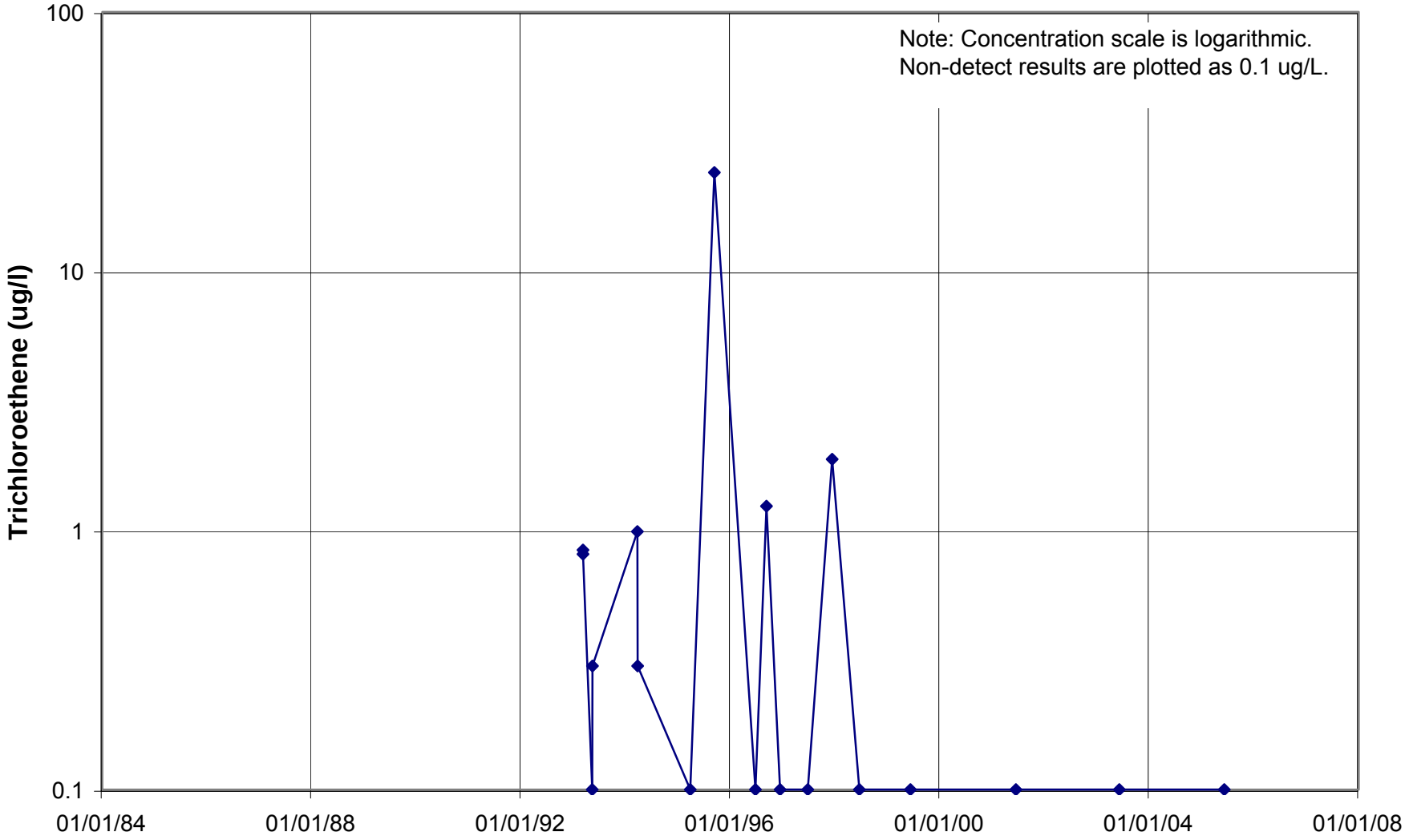
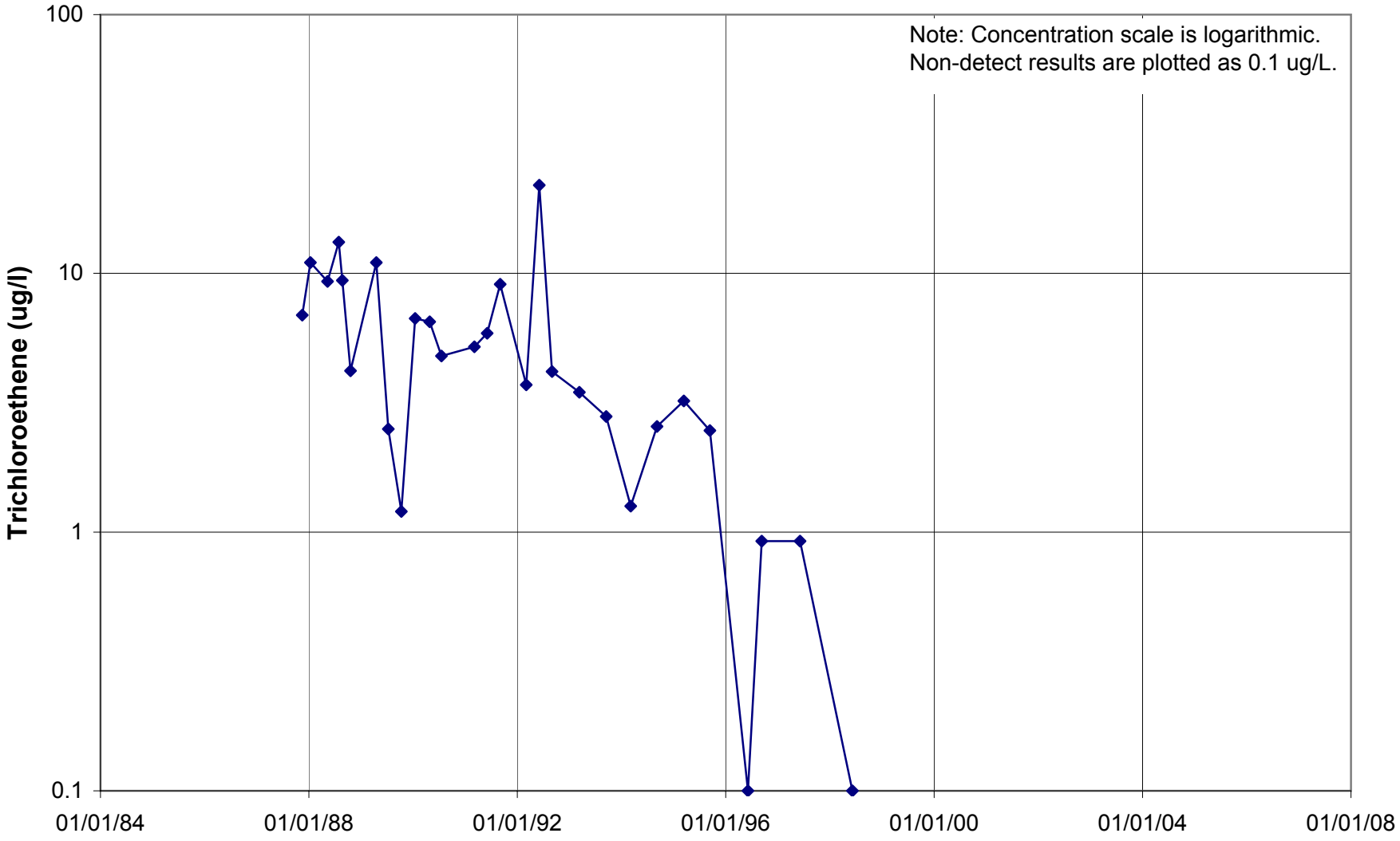


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U001



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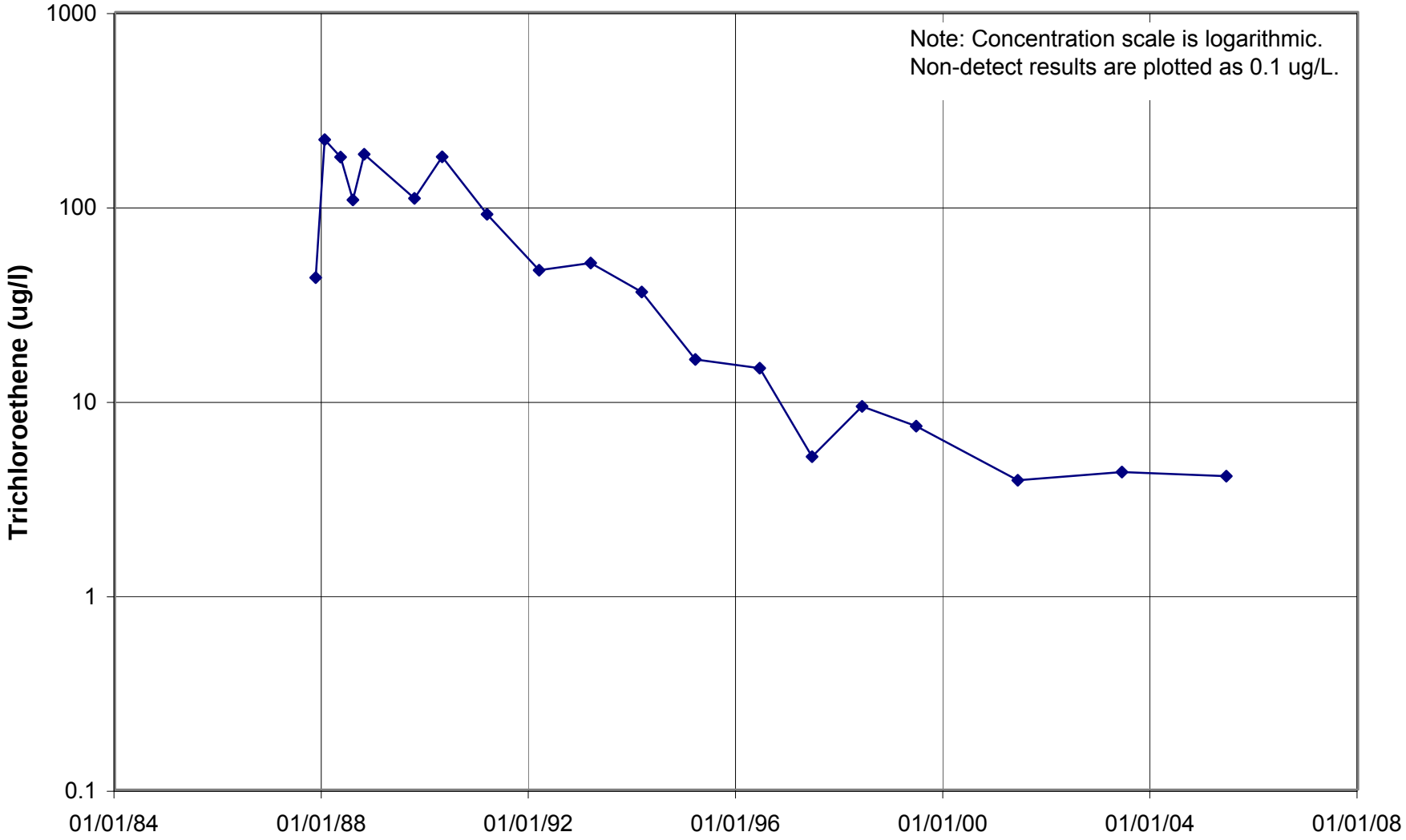

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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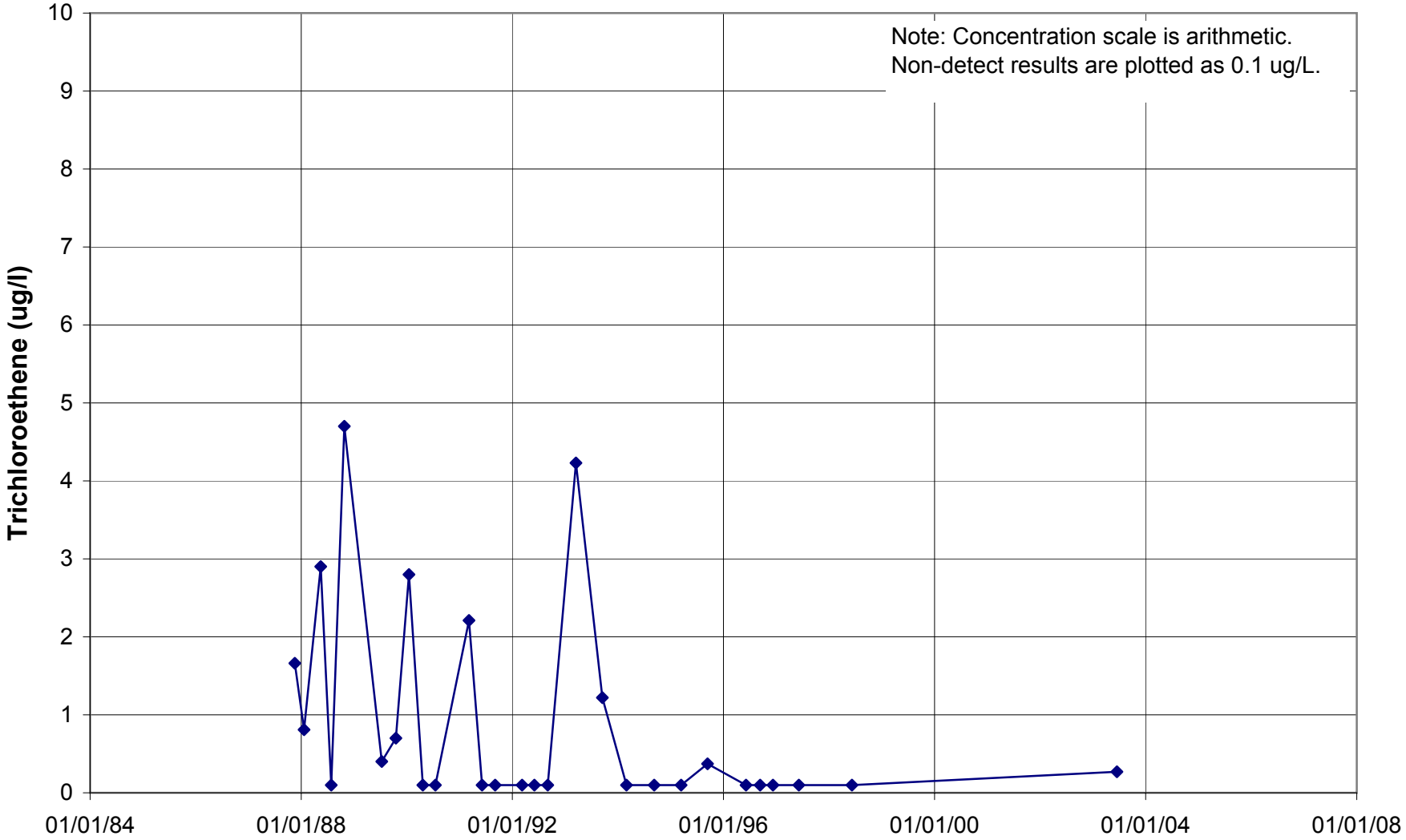

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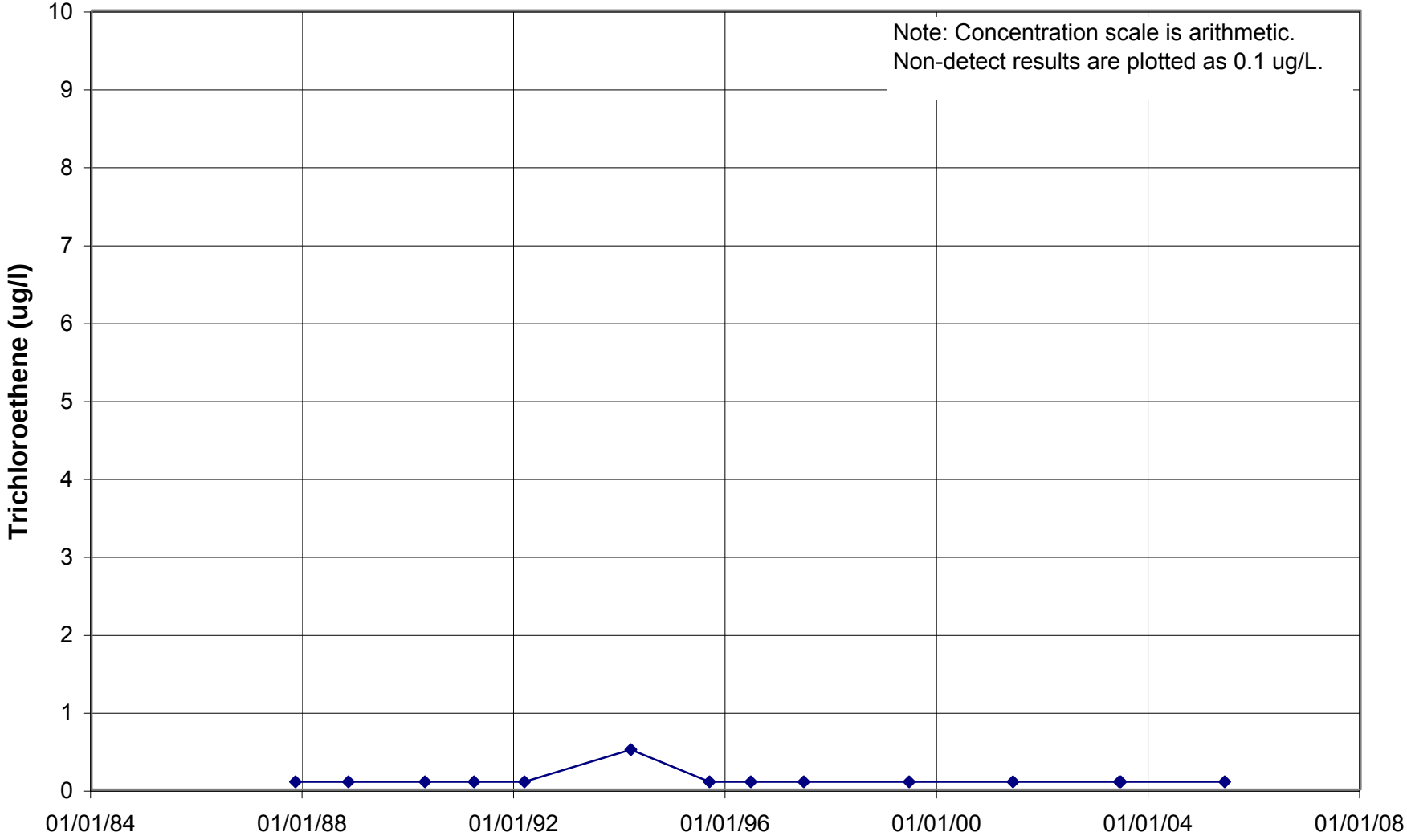
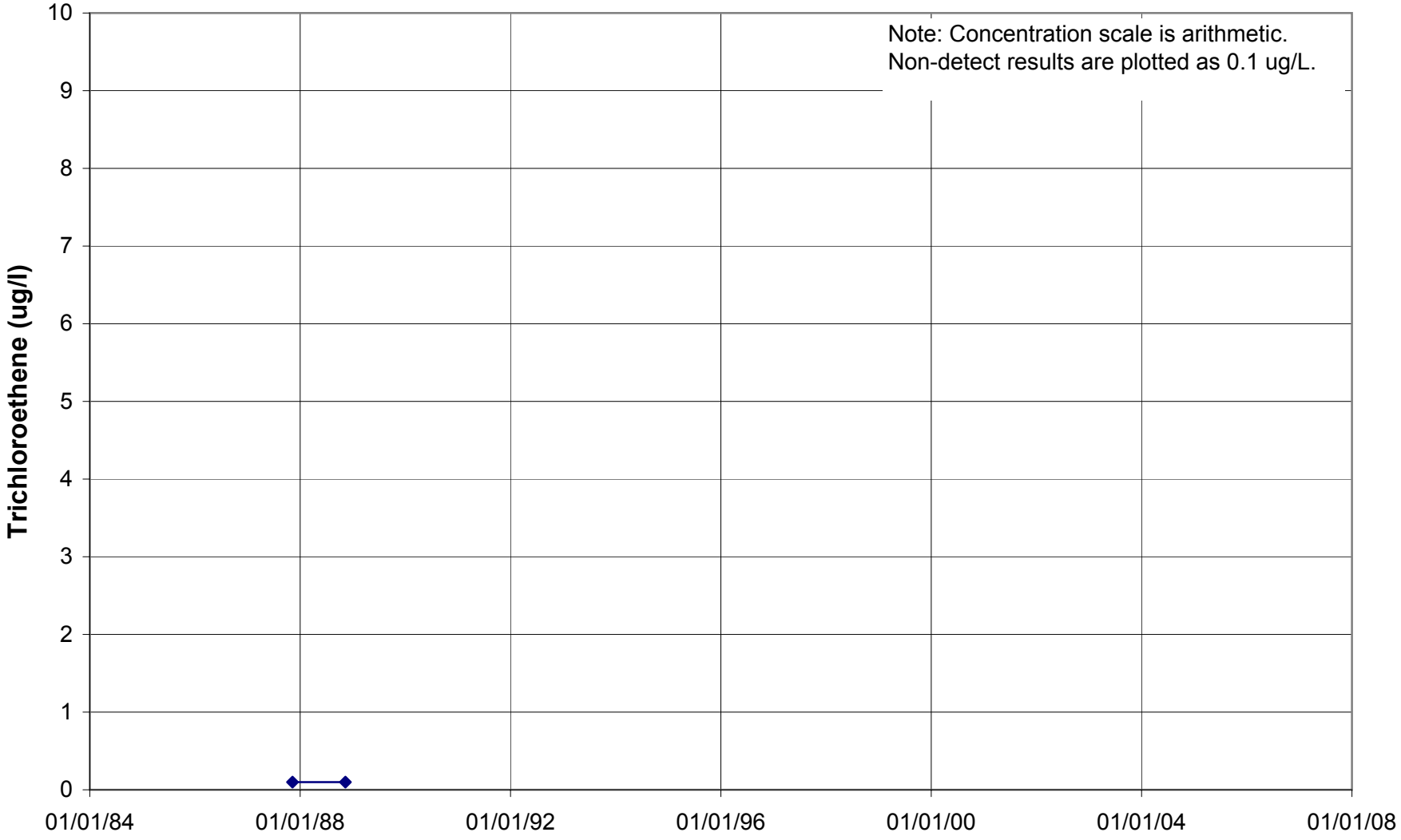


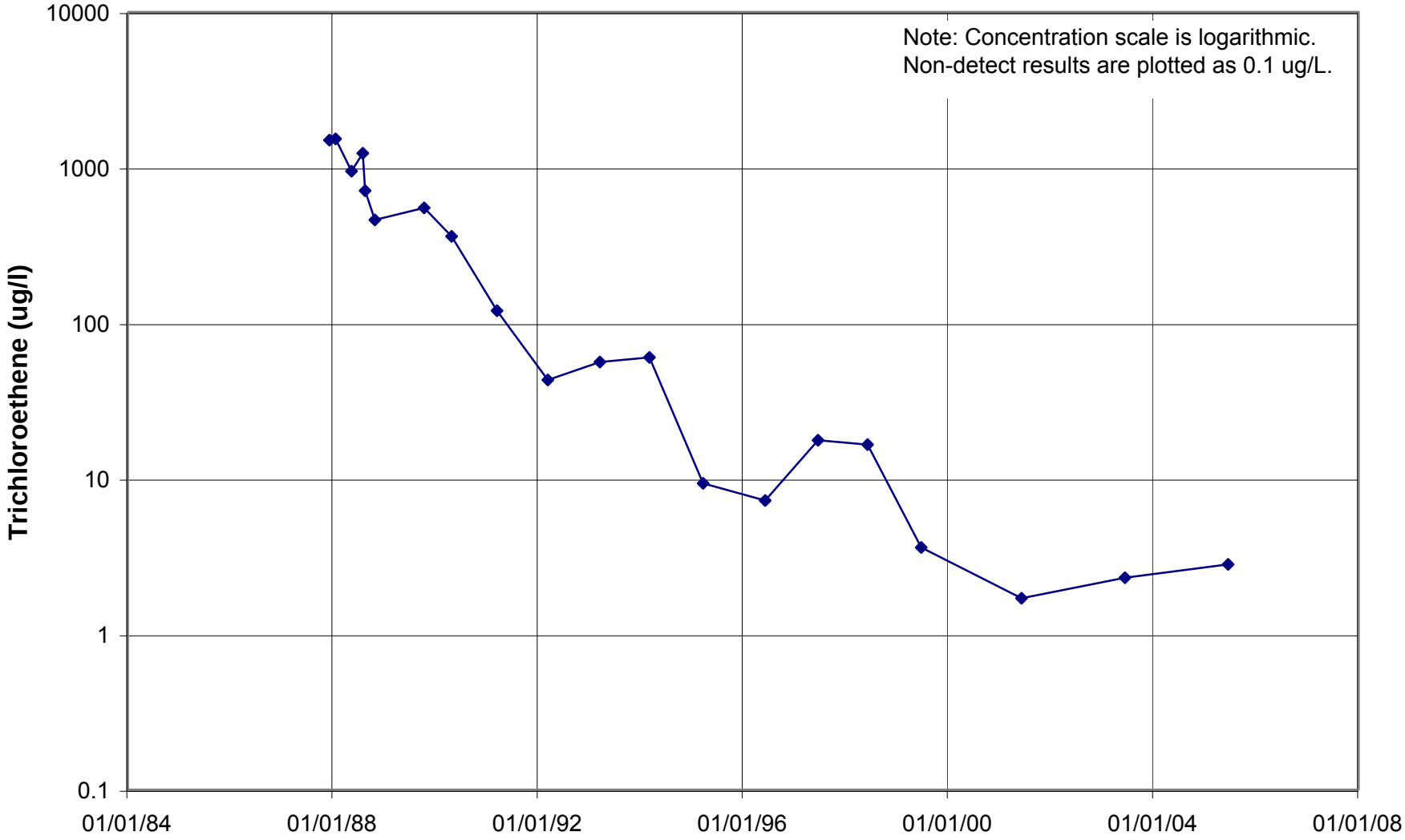
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U012



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U020



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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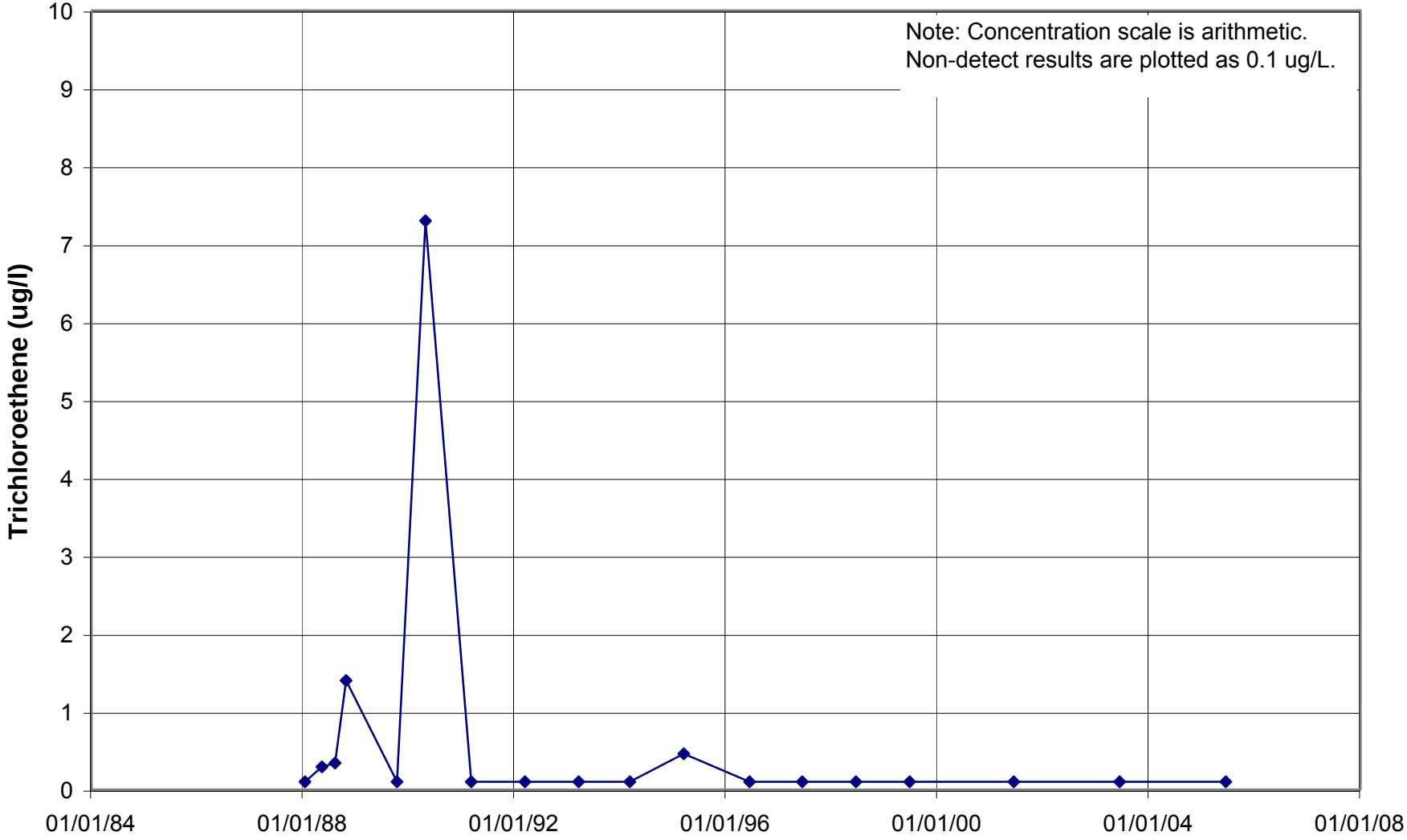

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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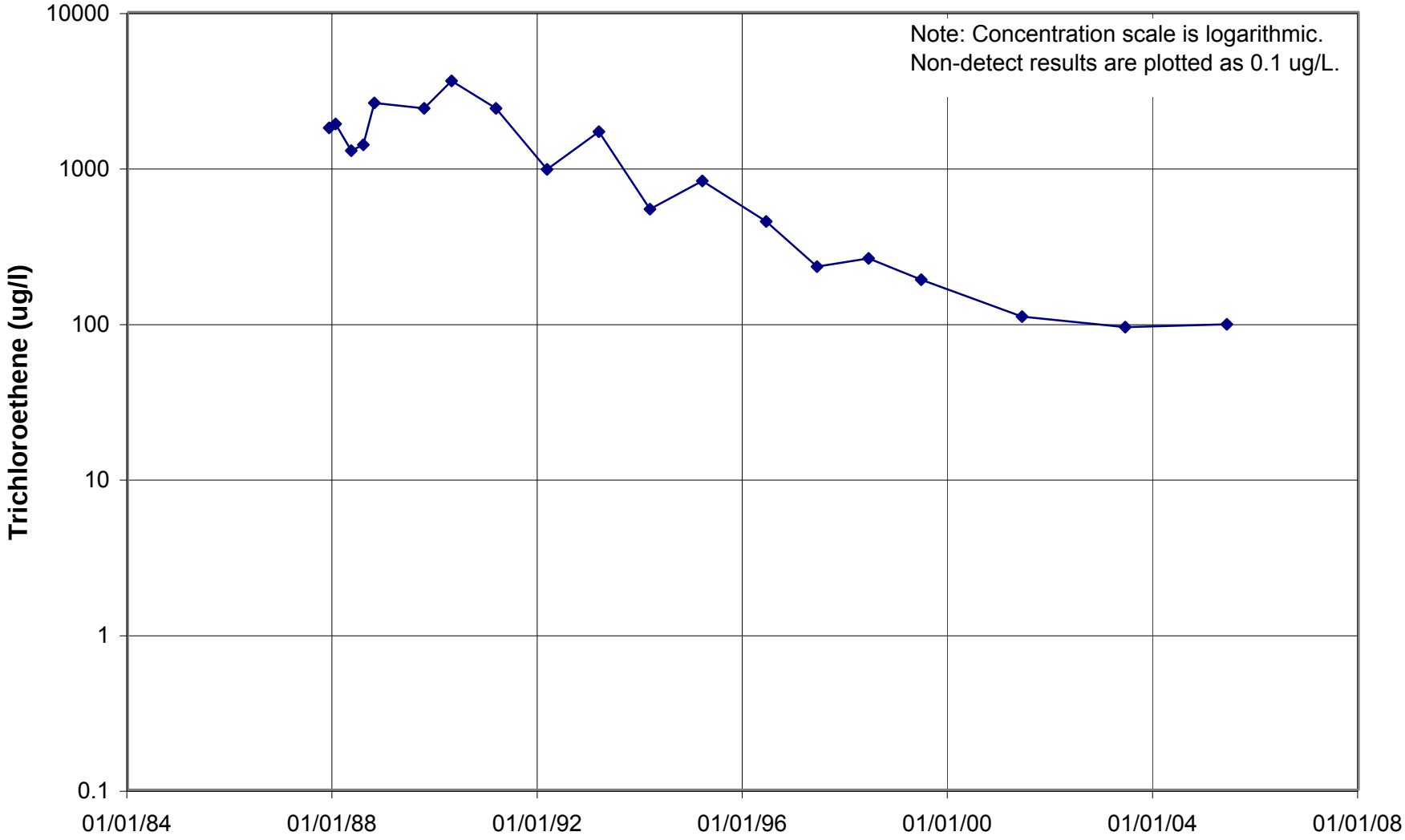

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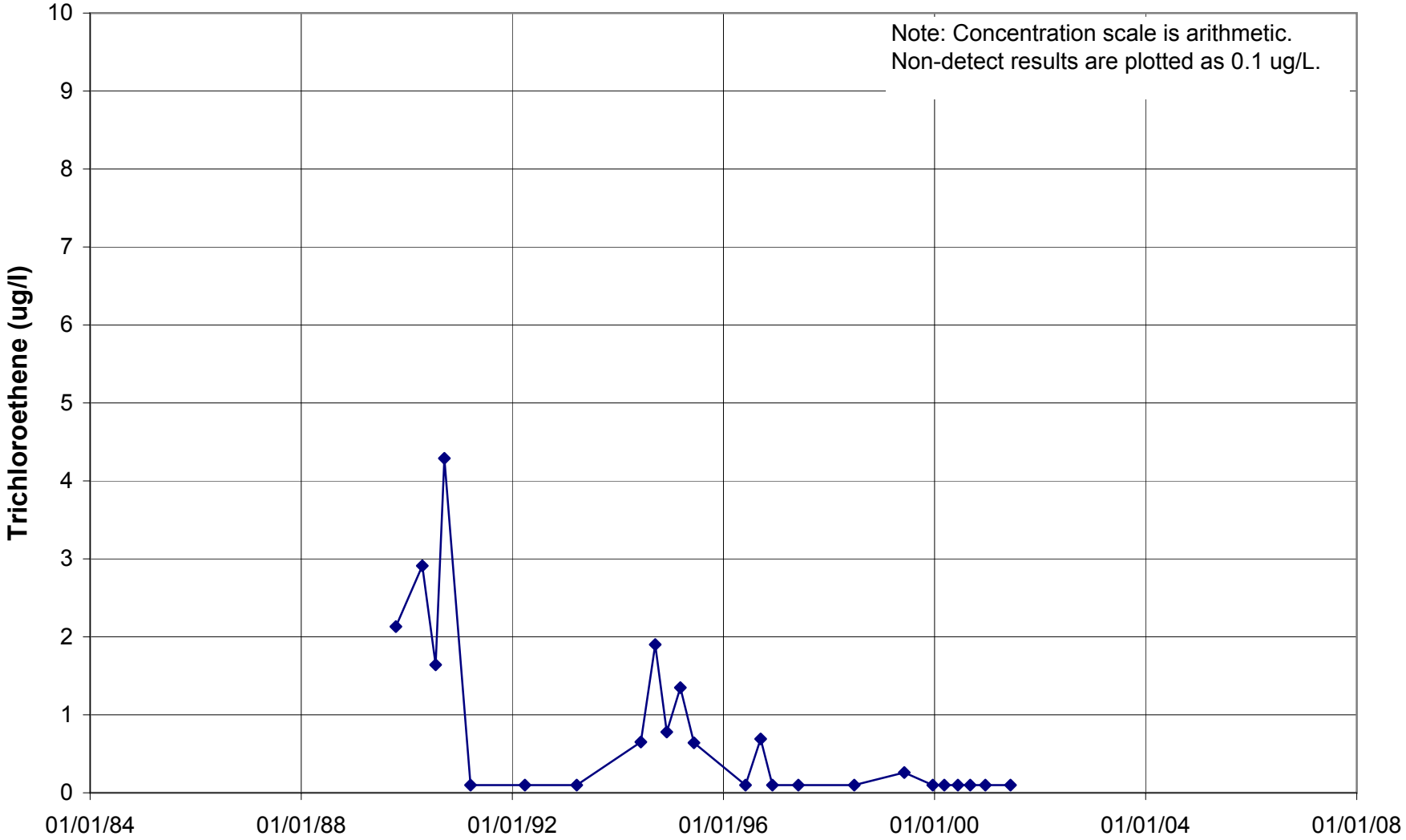
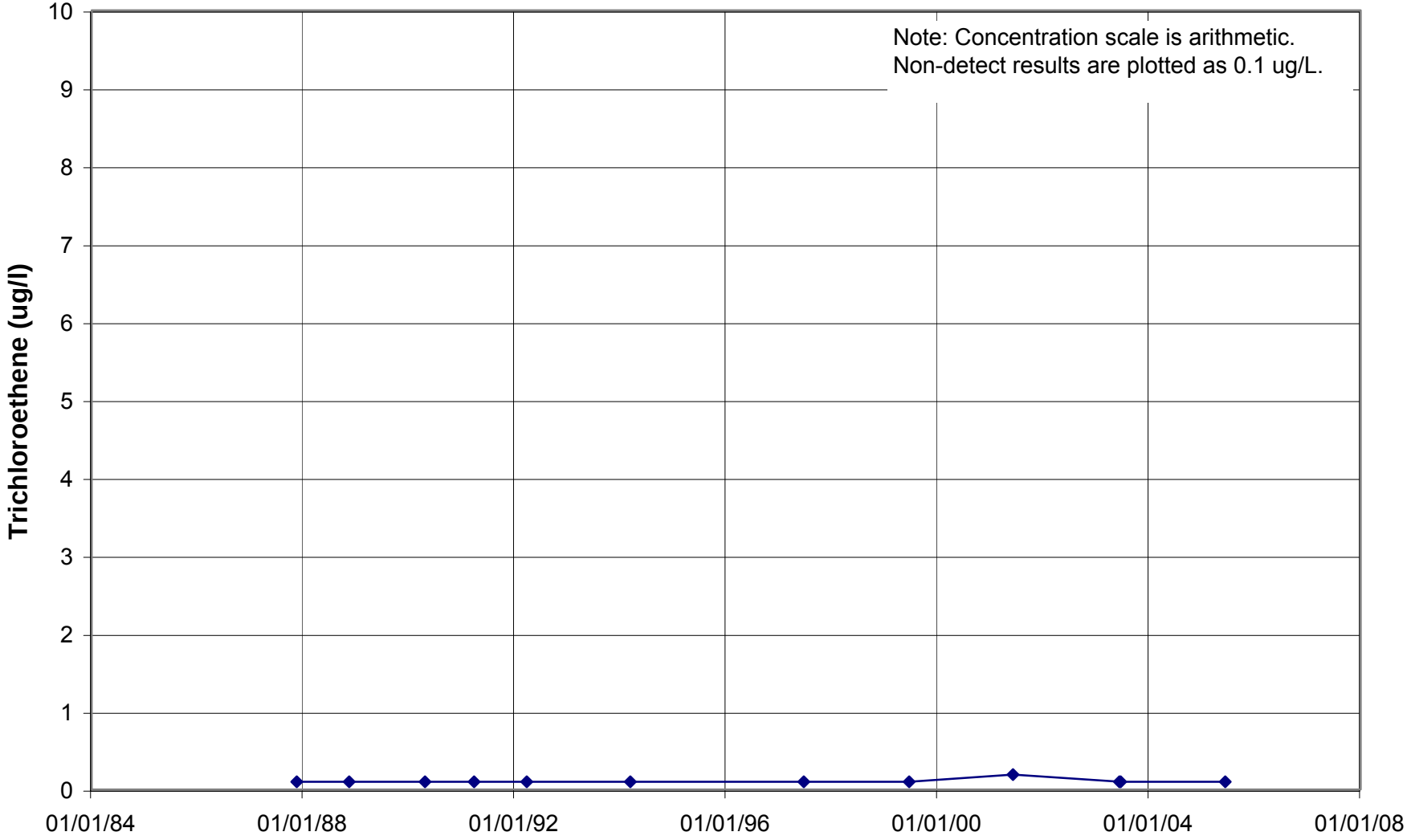
04U414 (414U4)



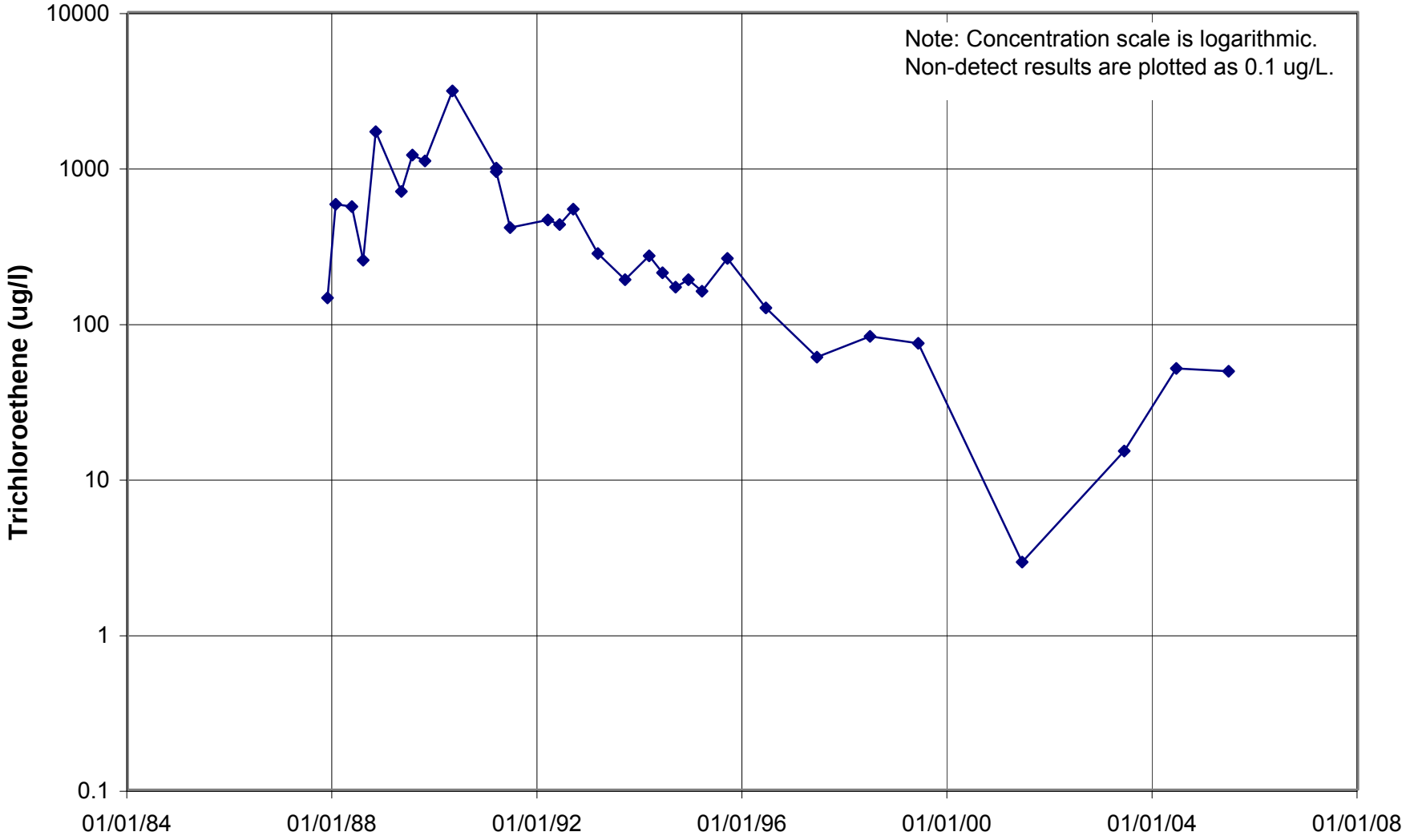
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U510



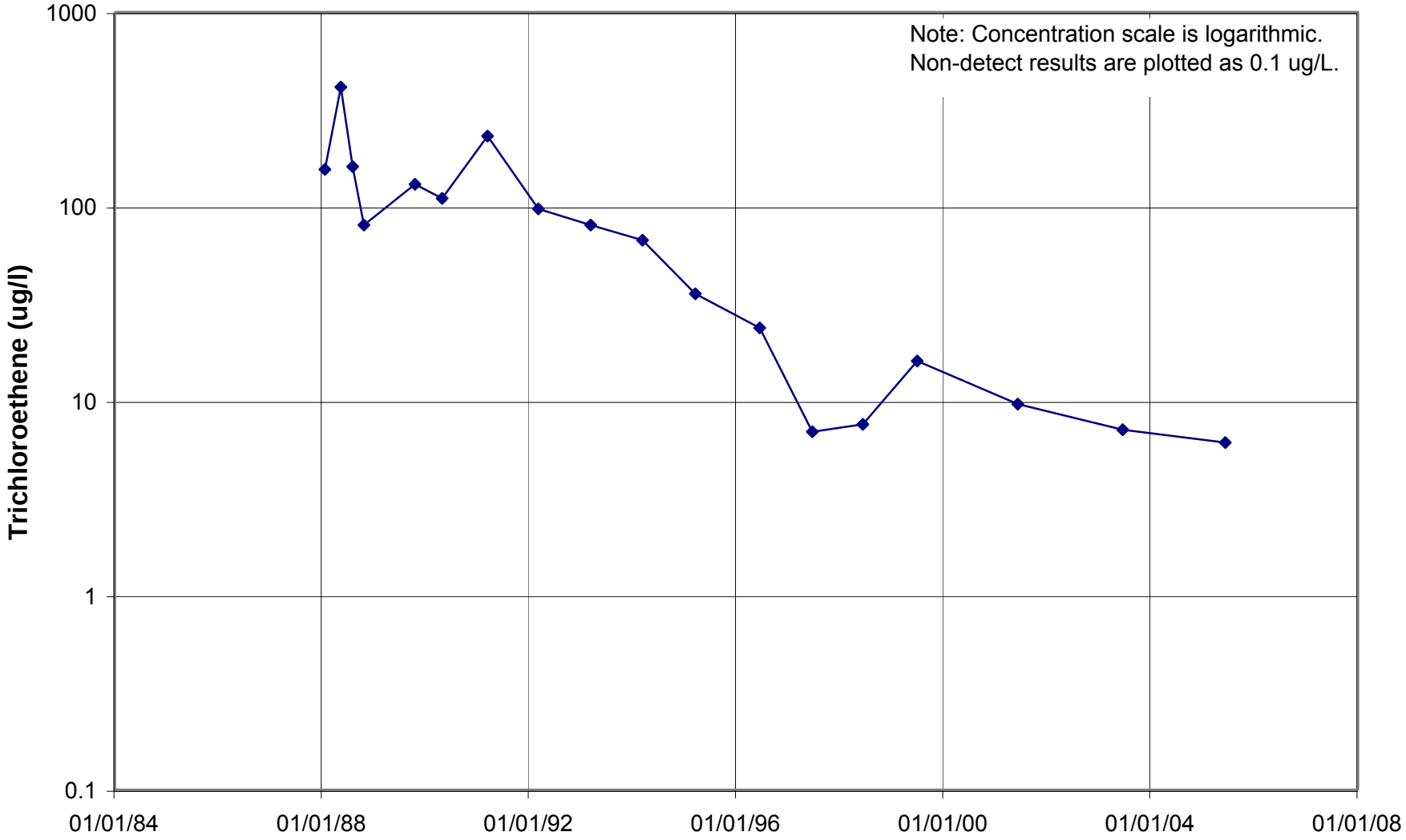
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U673



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U701



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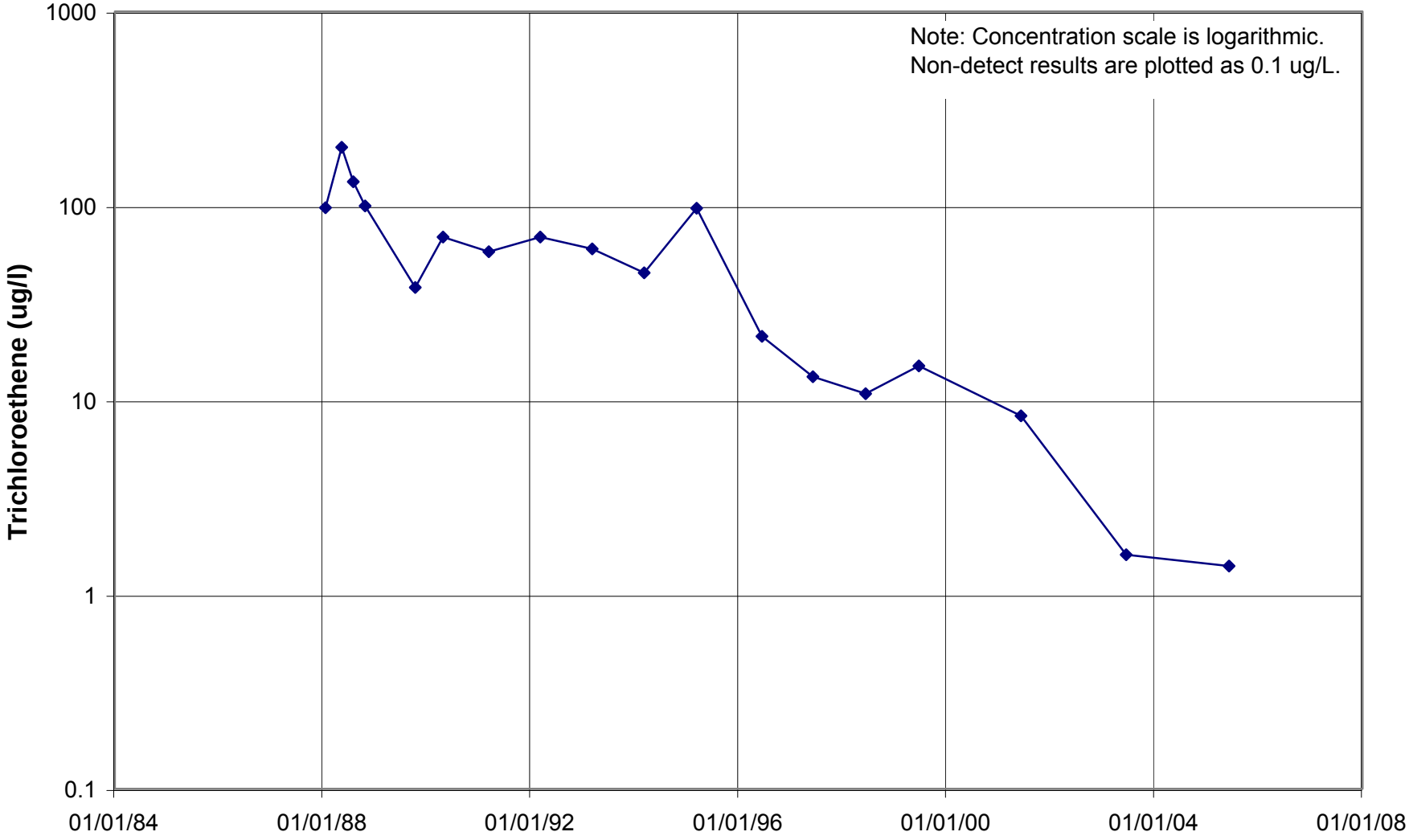
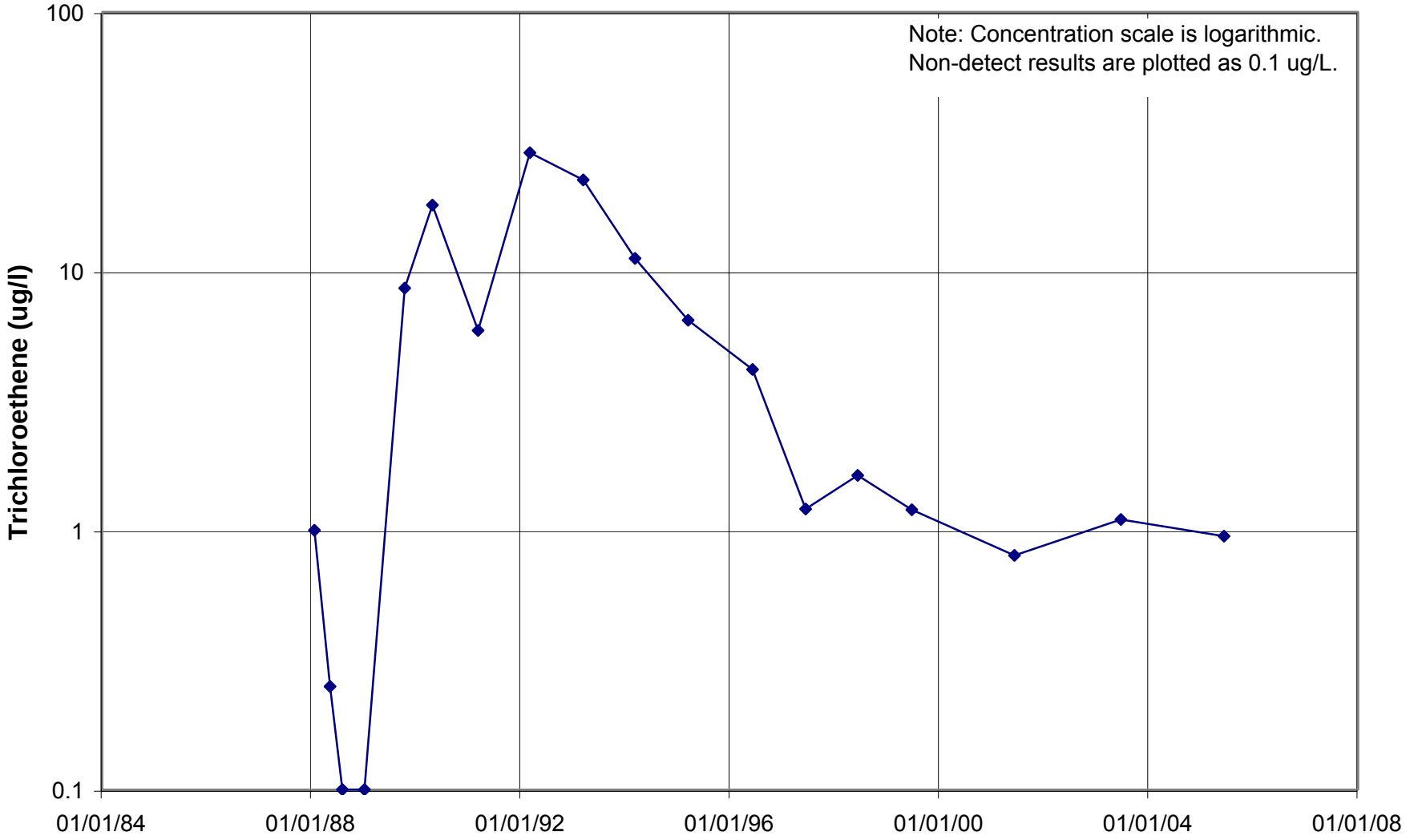


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U708



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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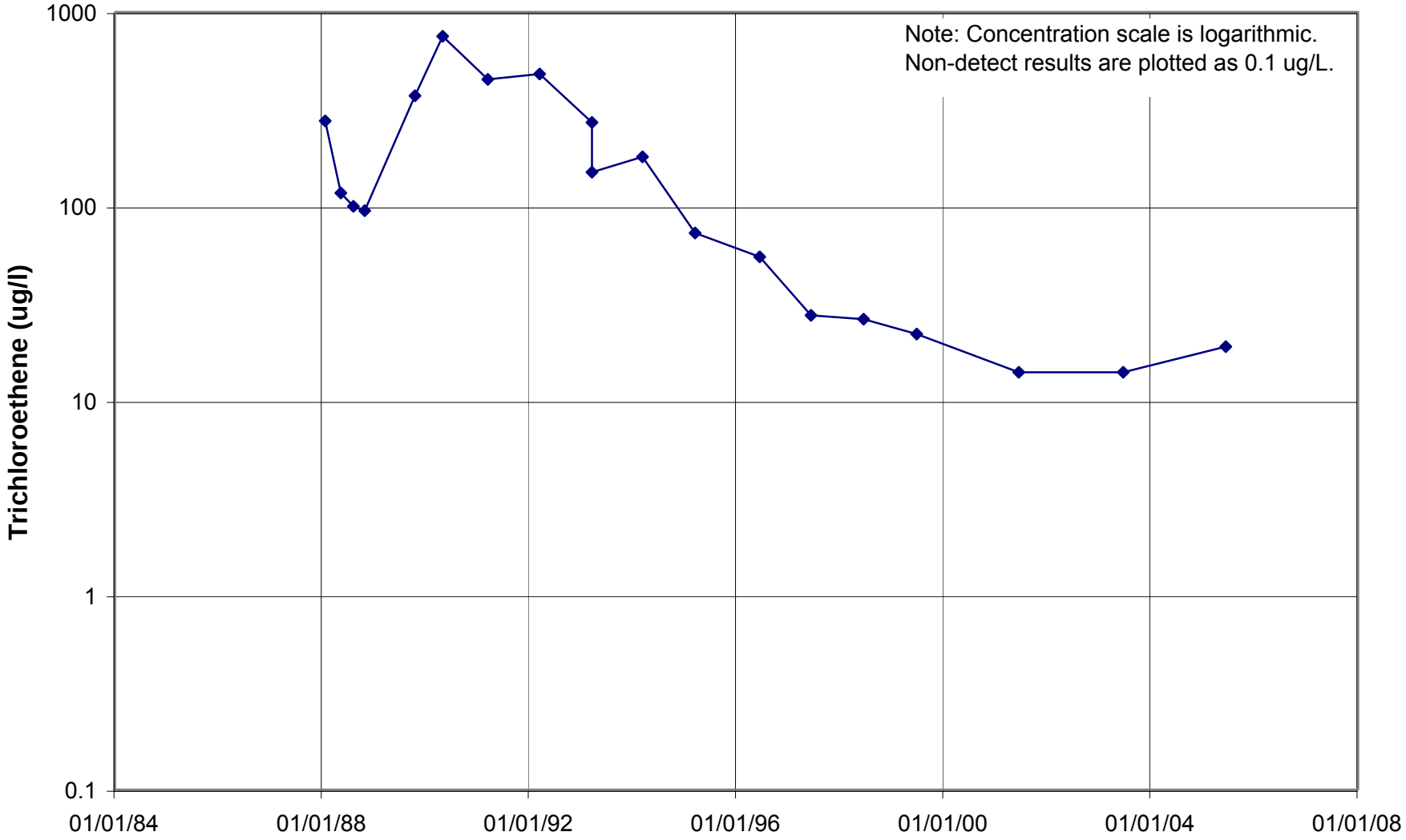

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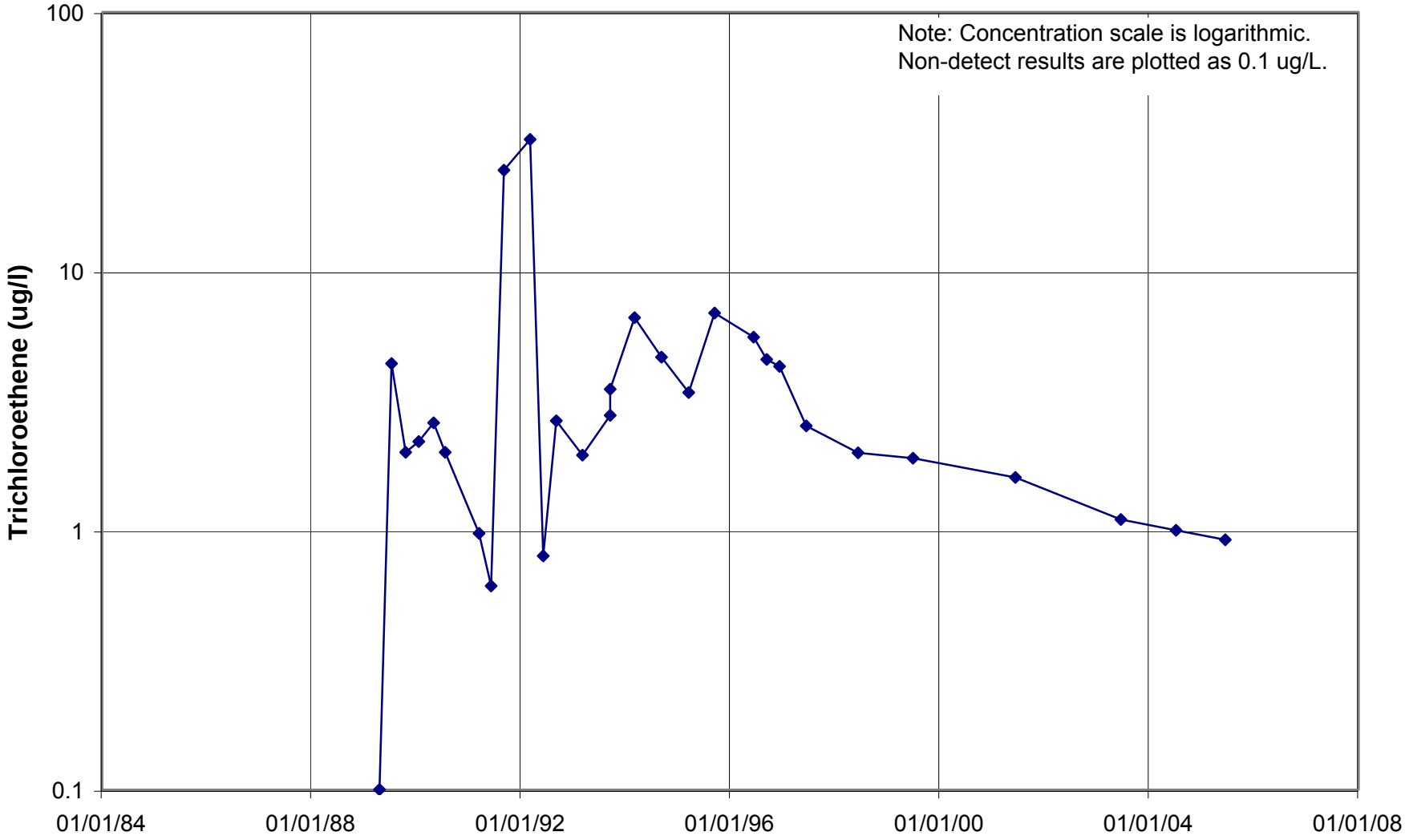
04U711



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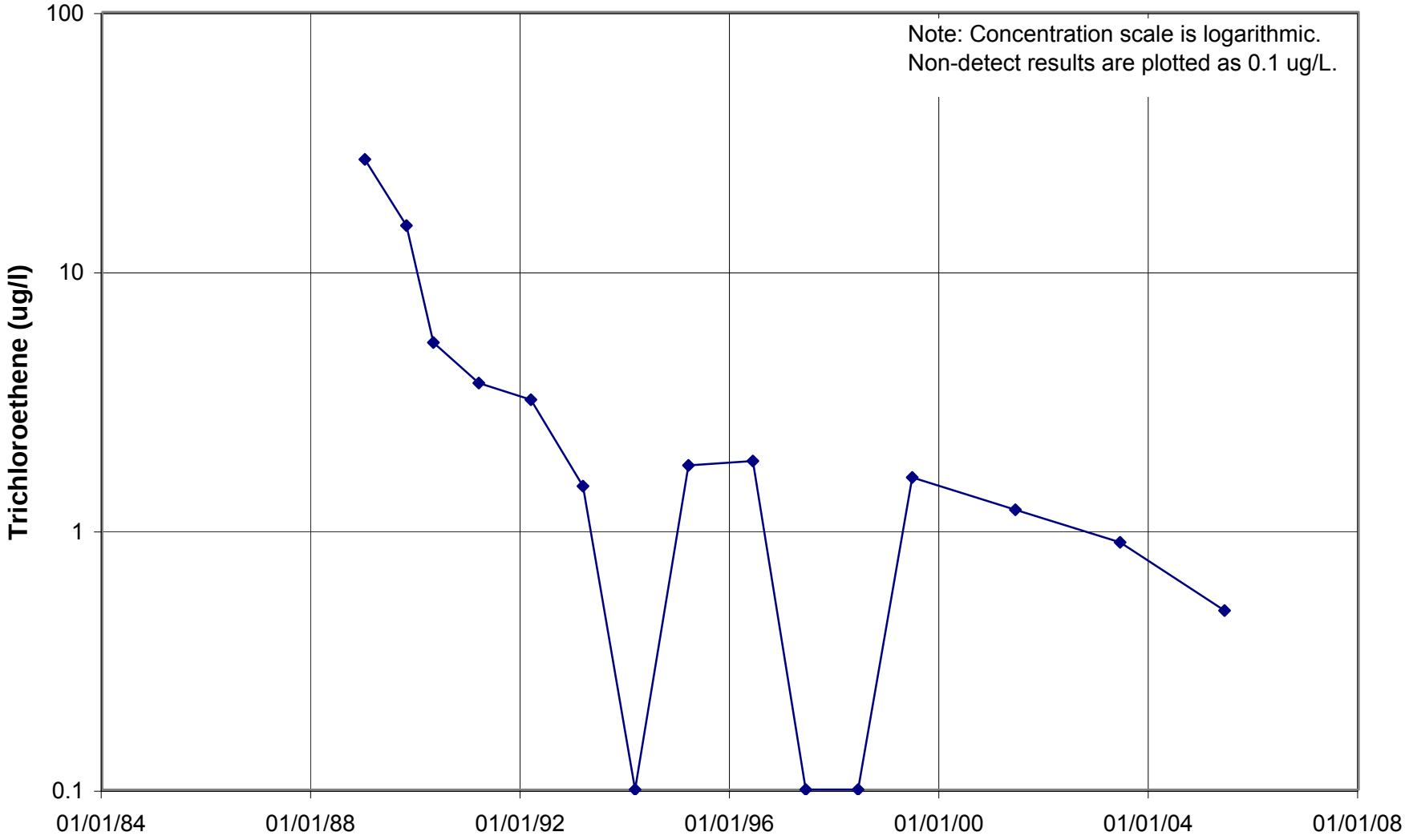
04U713



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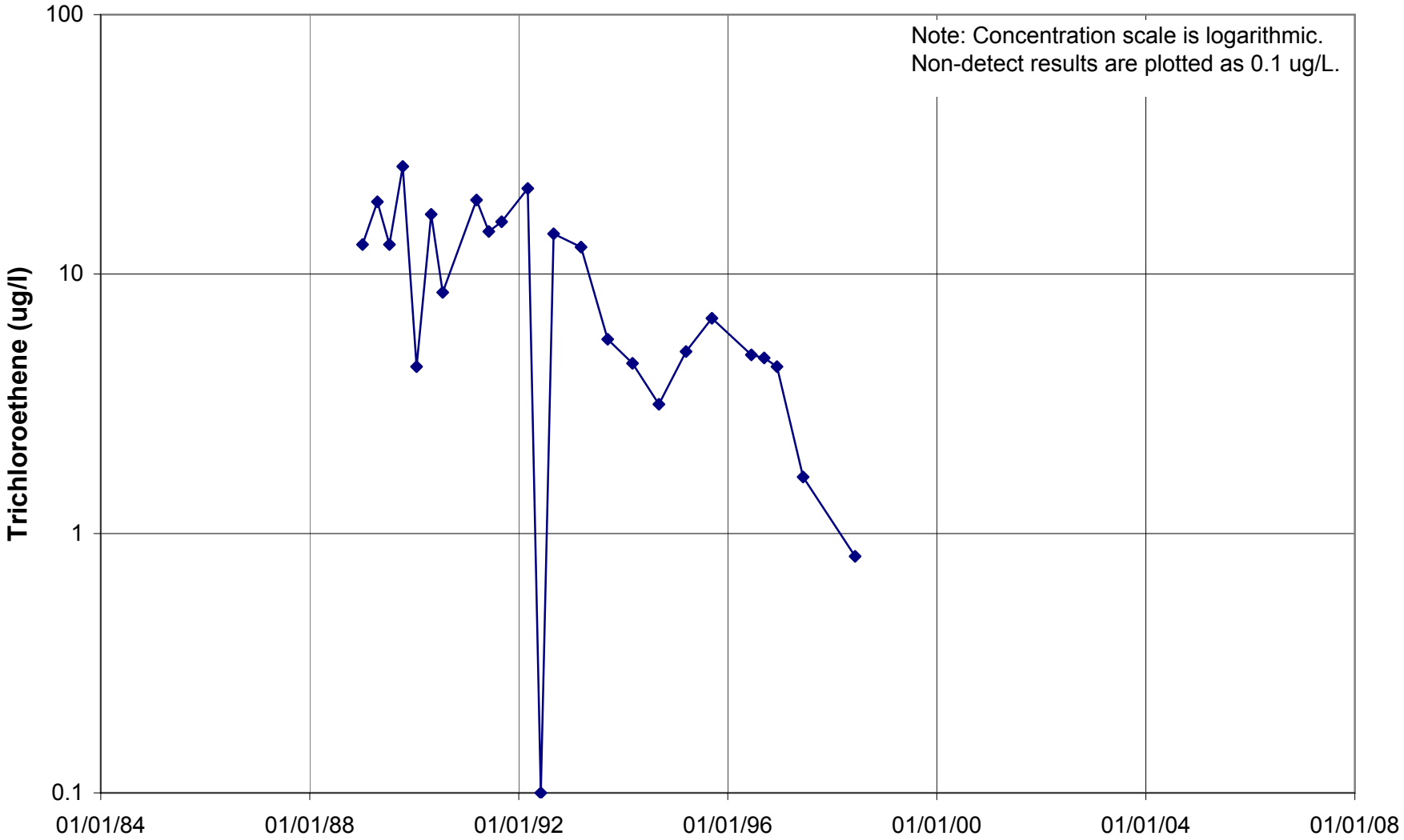
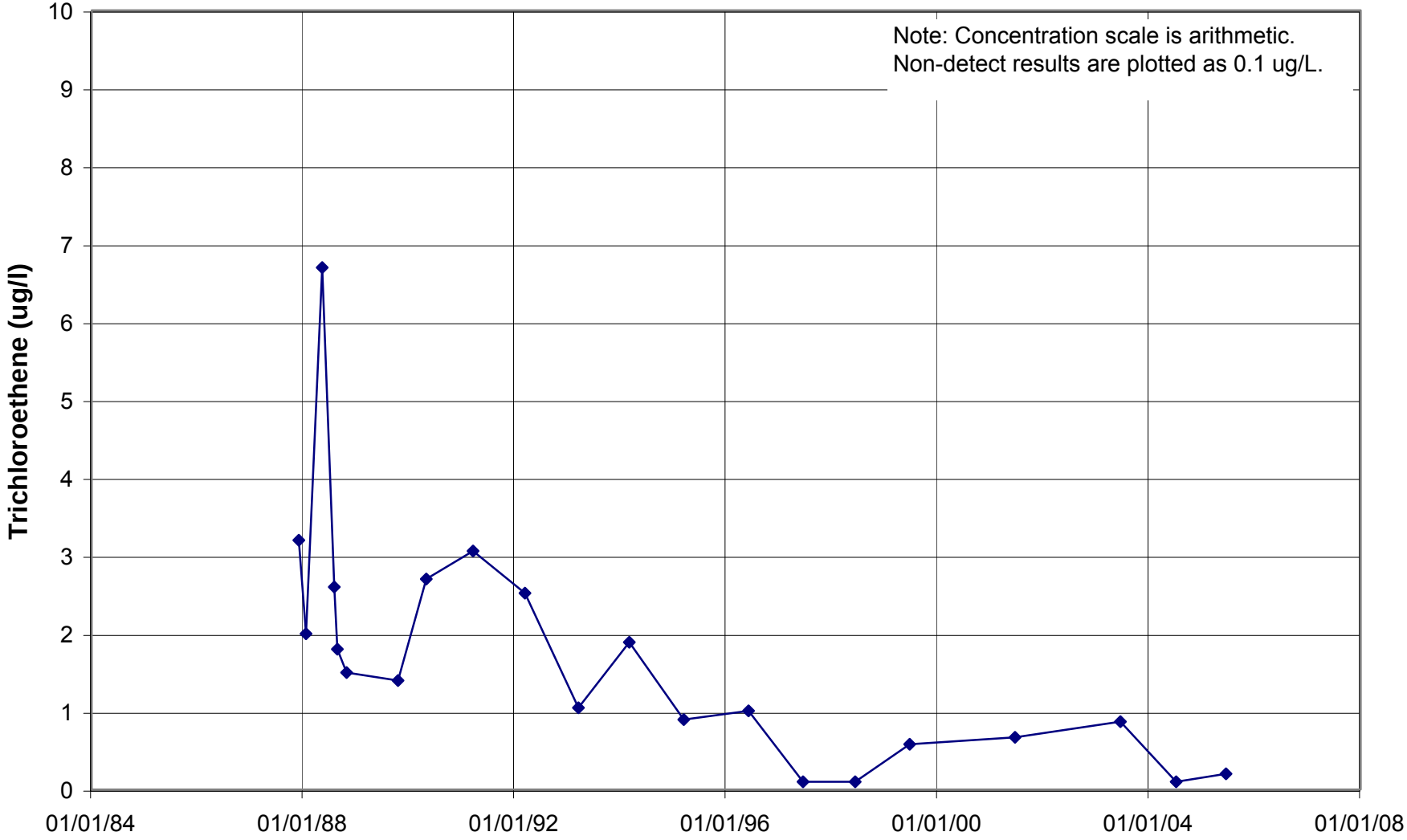


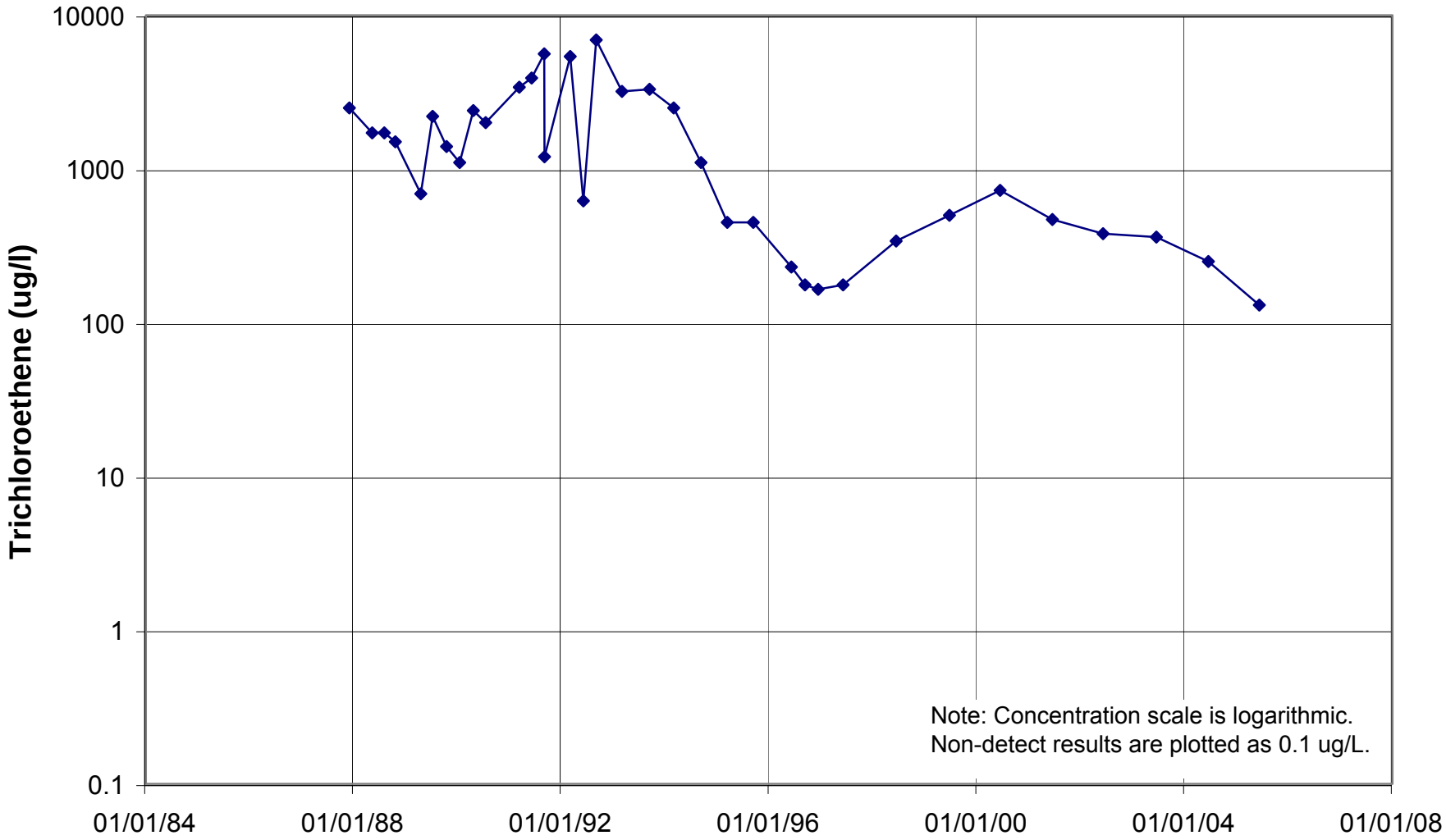
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U802



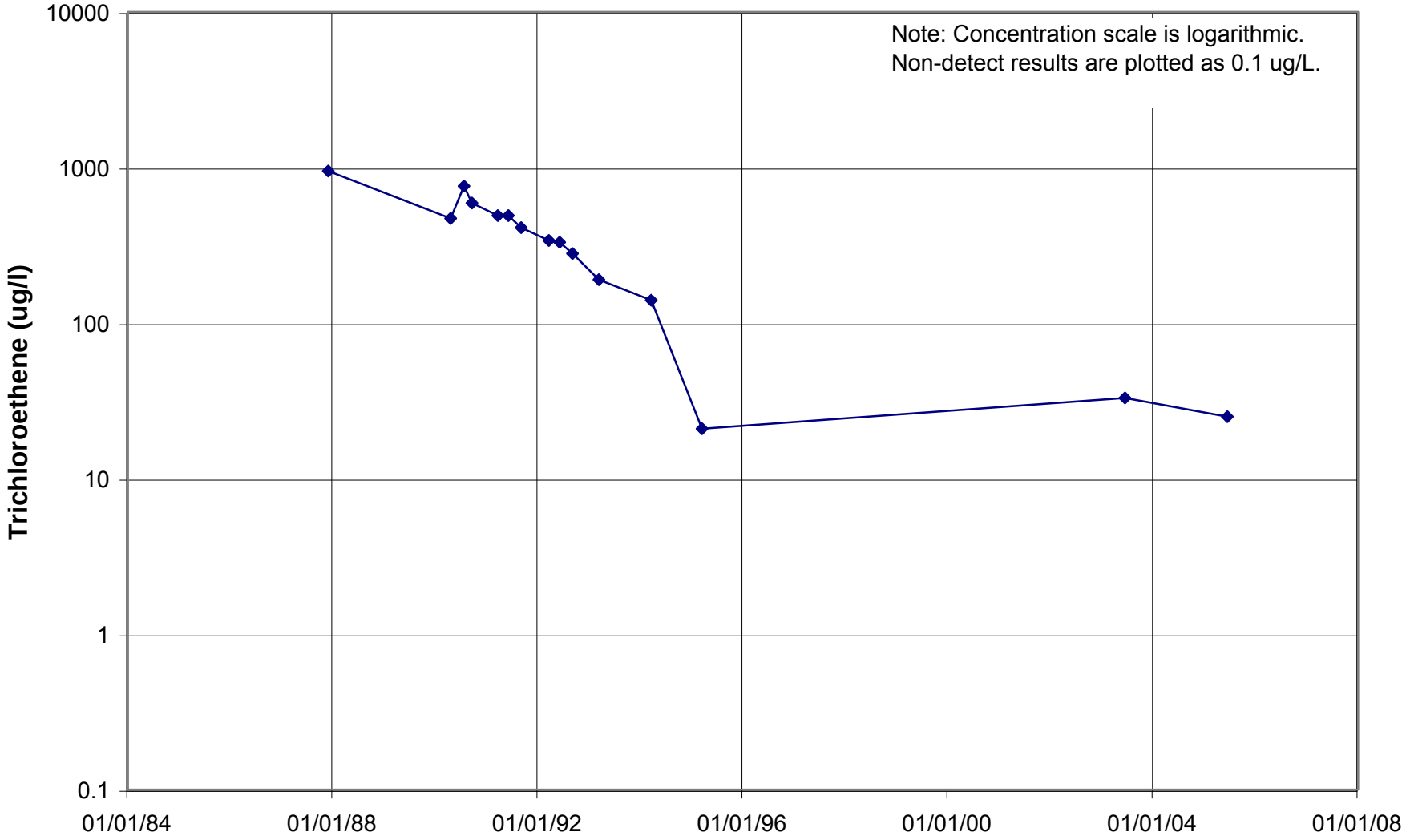
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U806



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U821



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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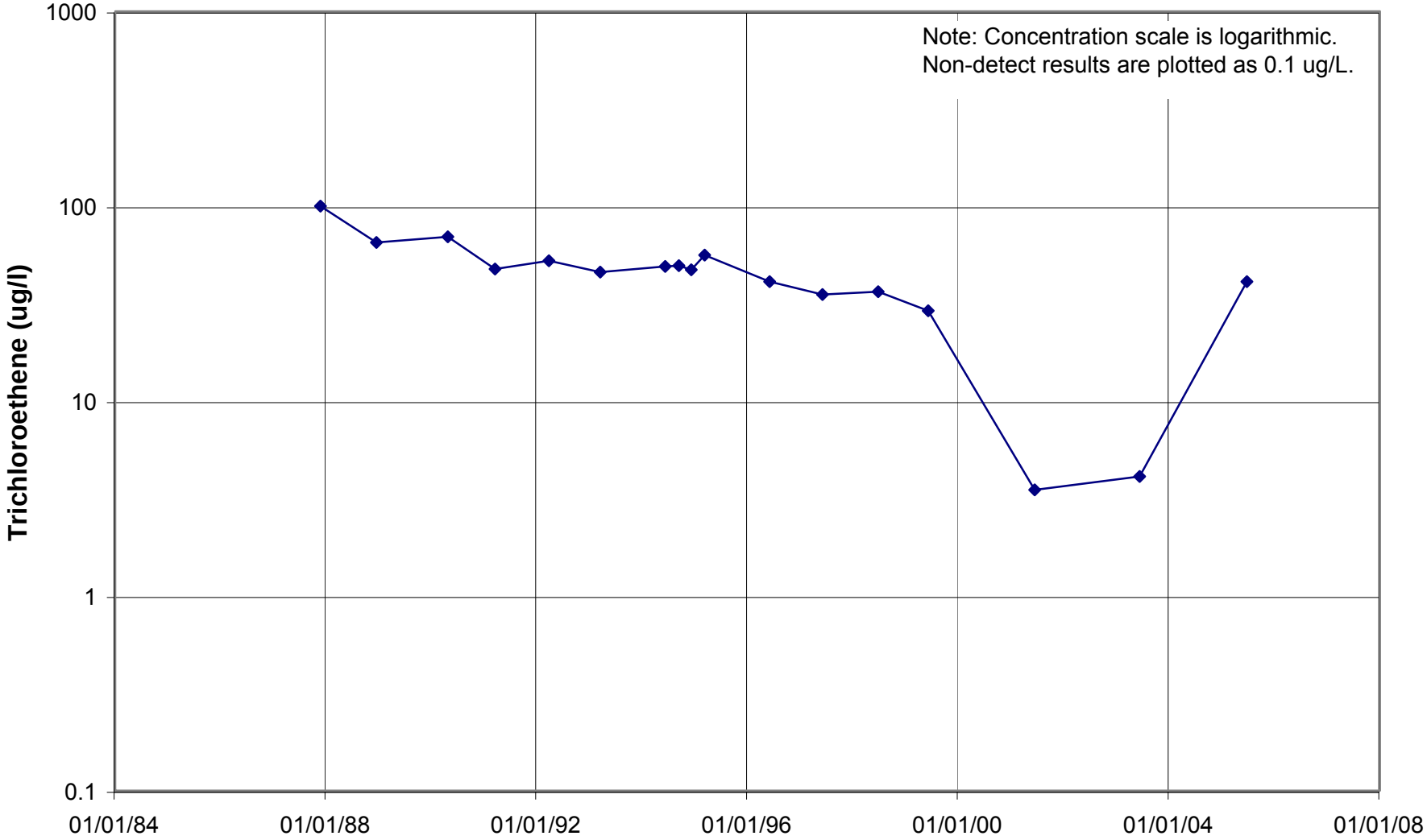

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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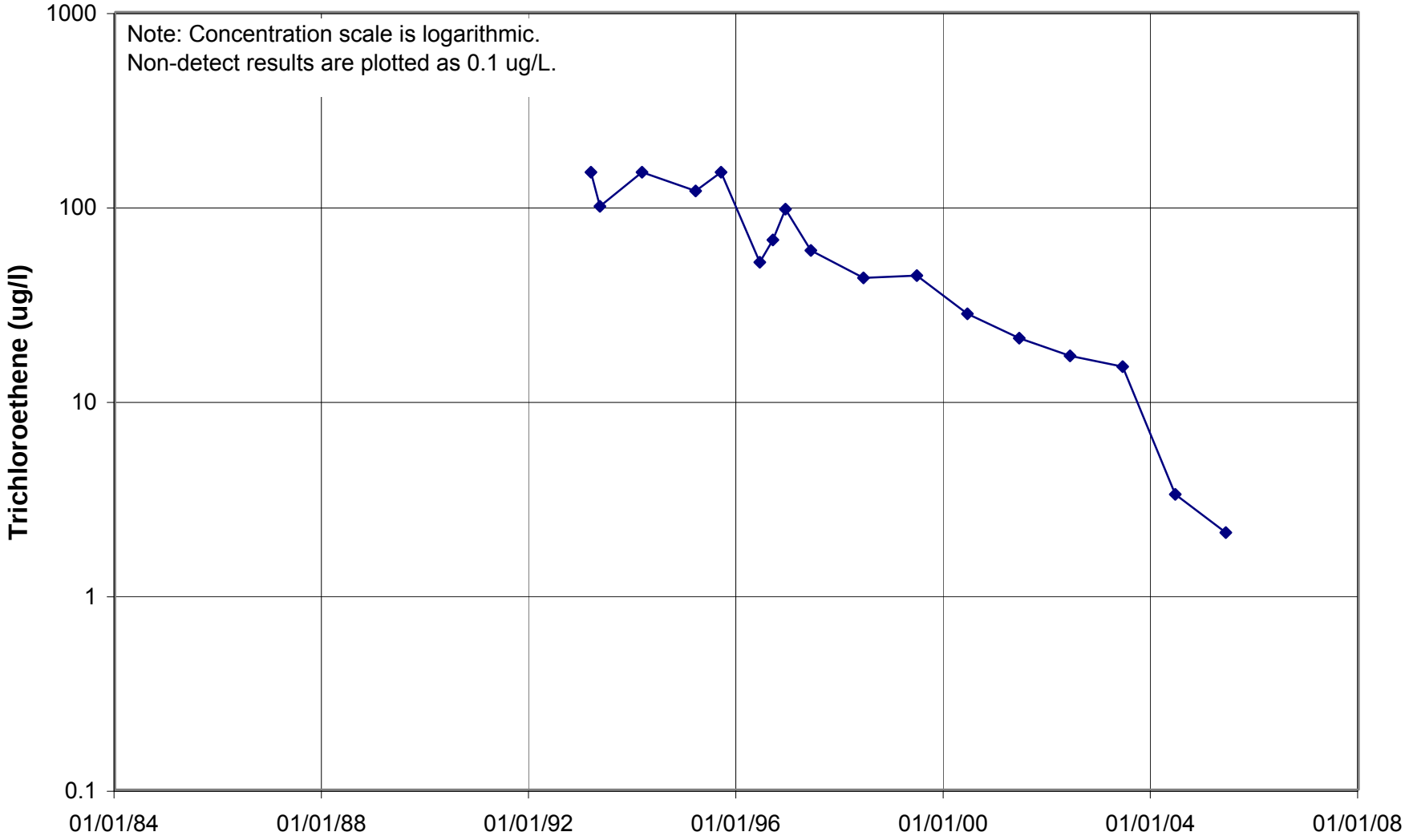
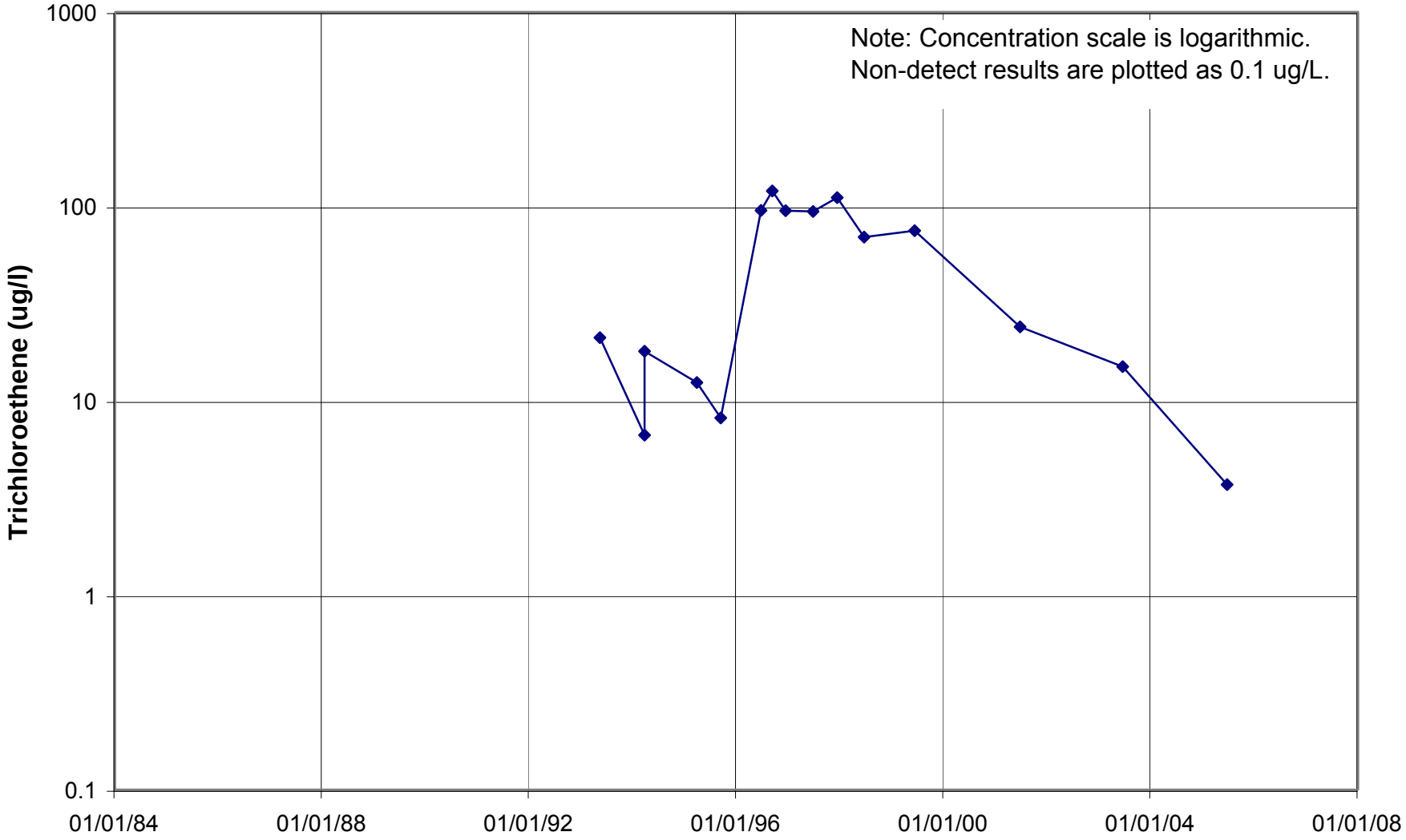


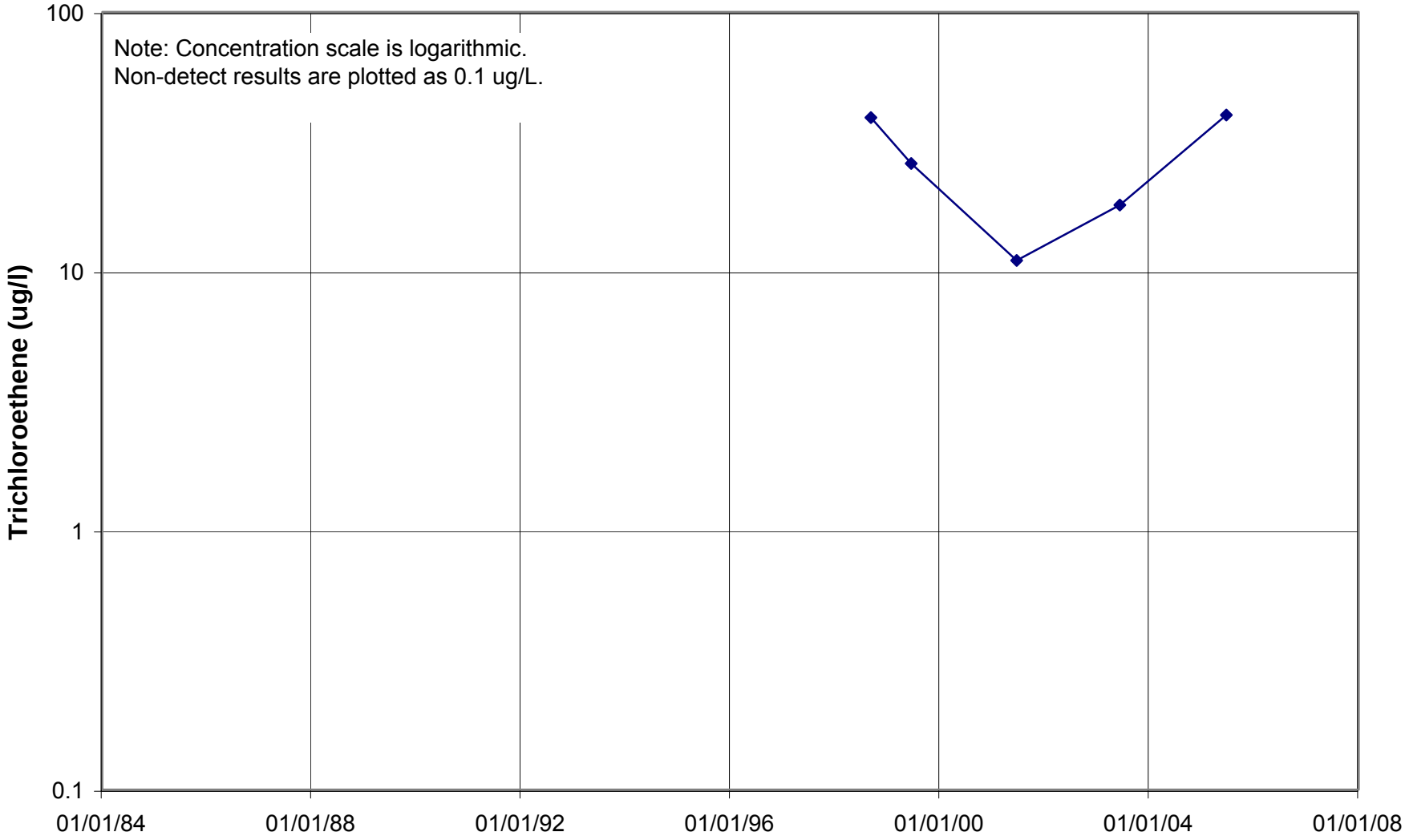
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U834



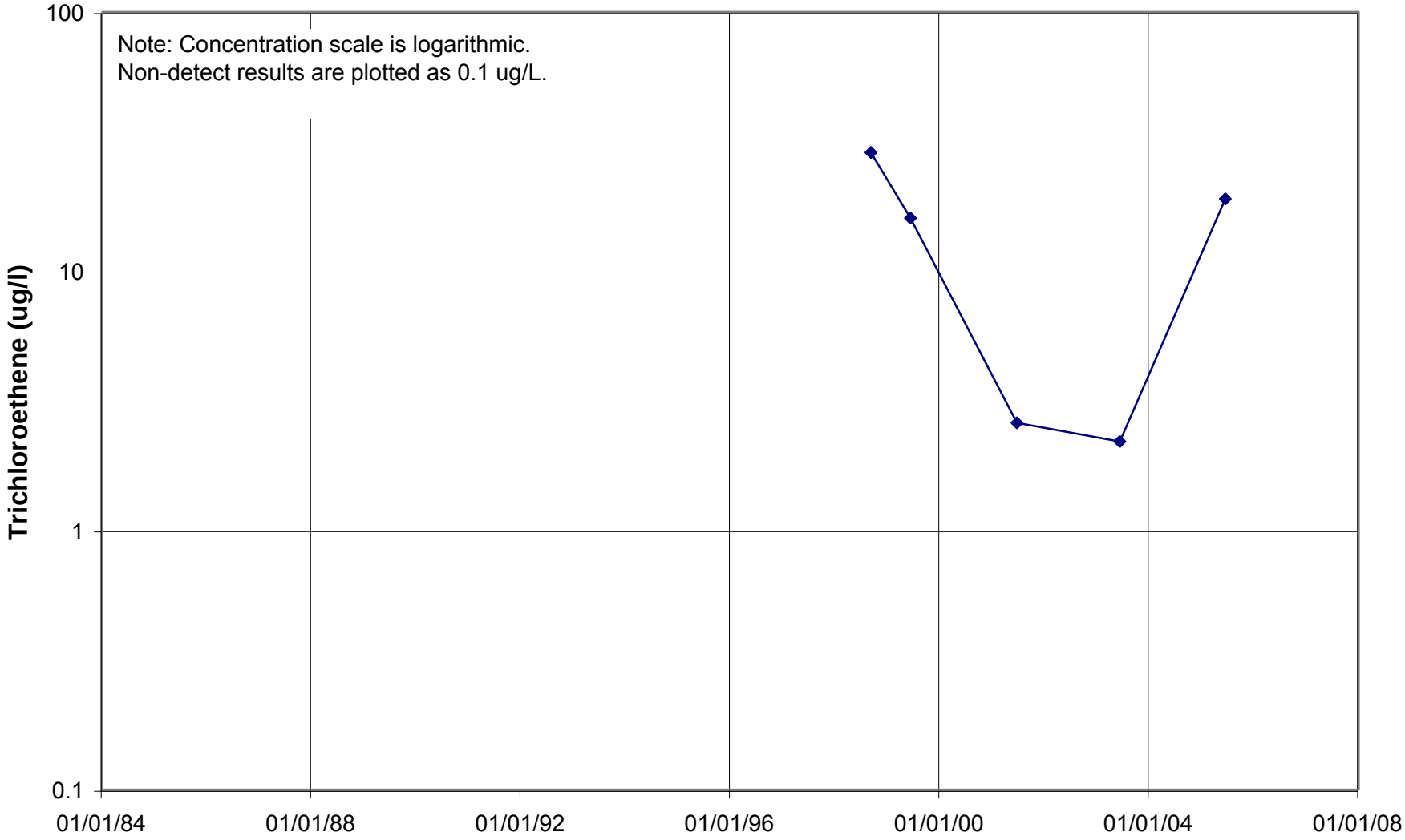
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U836



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

04U837



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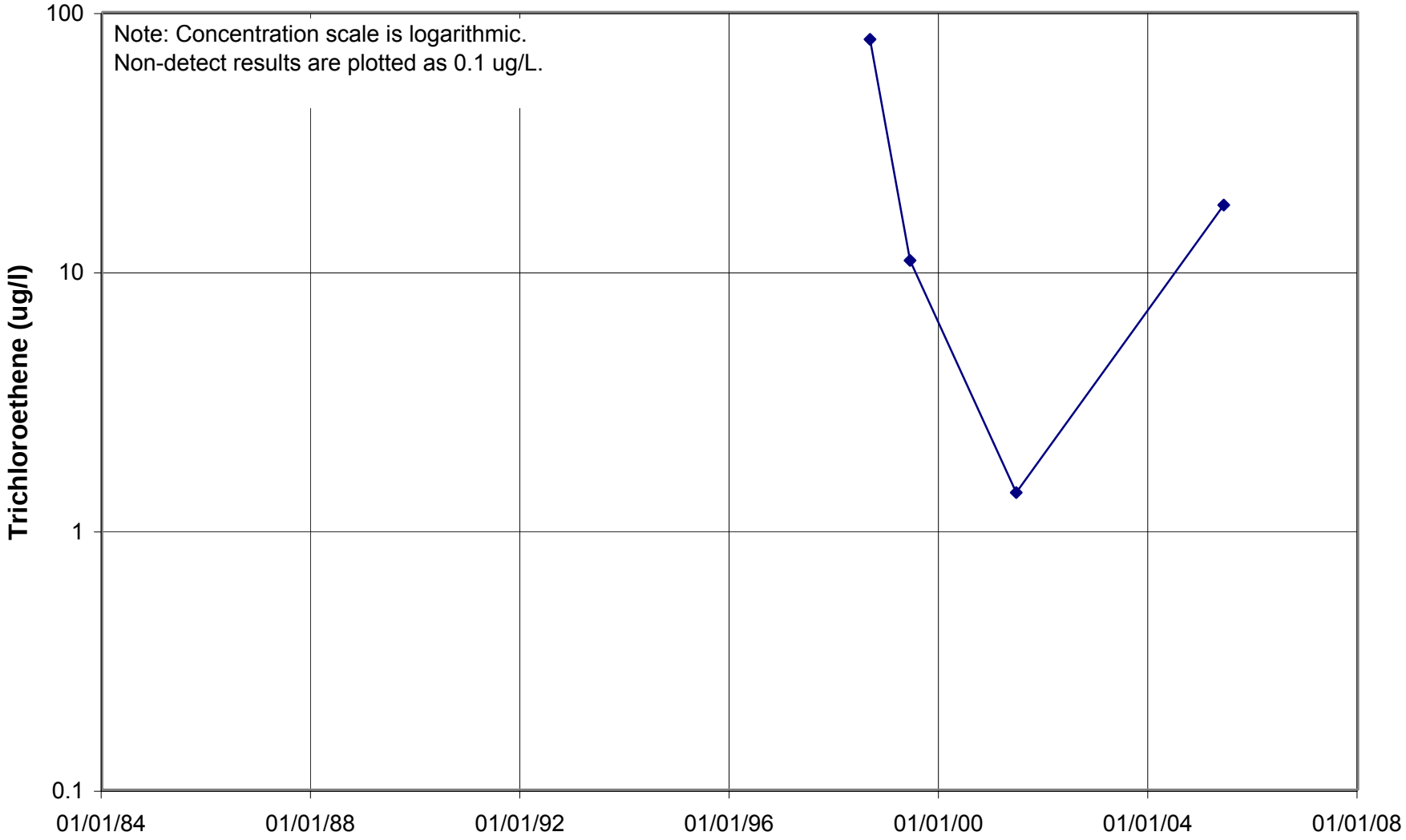
04U838



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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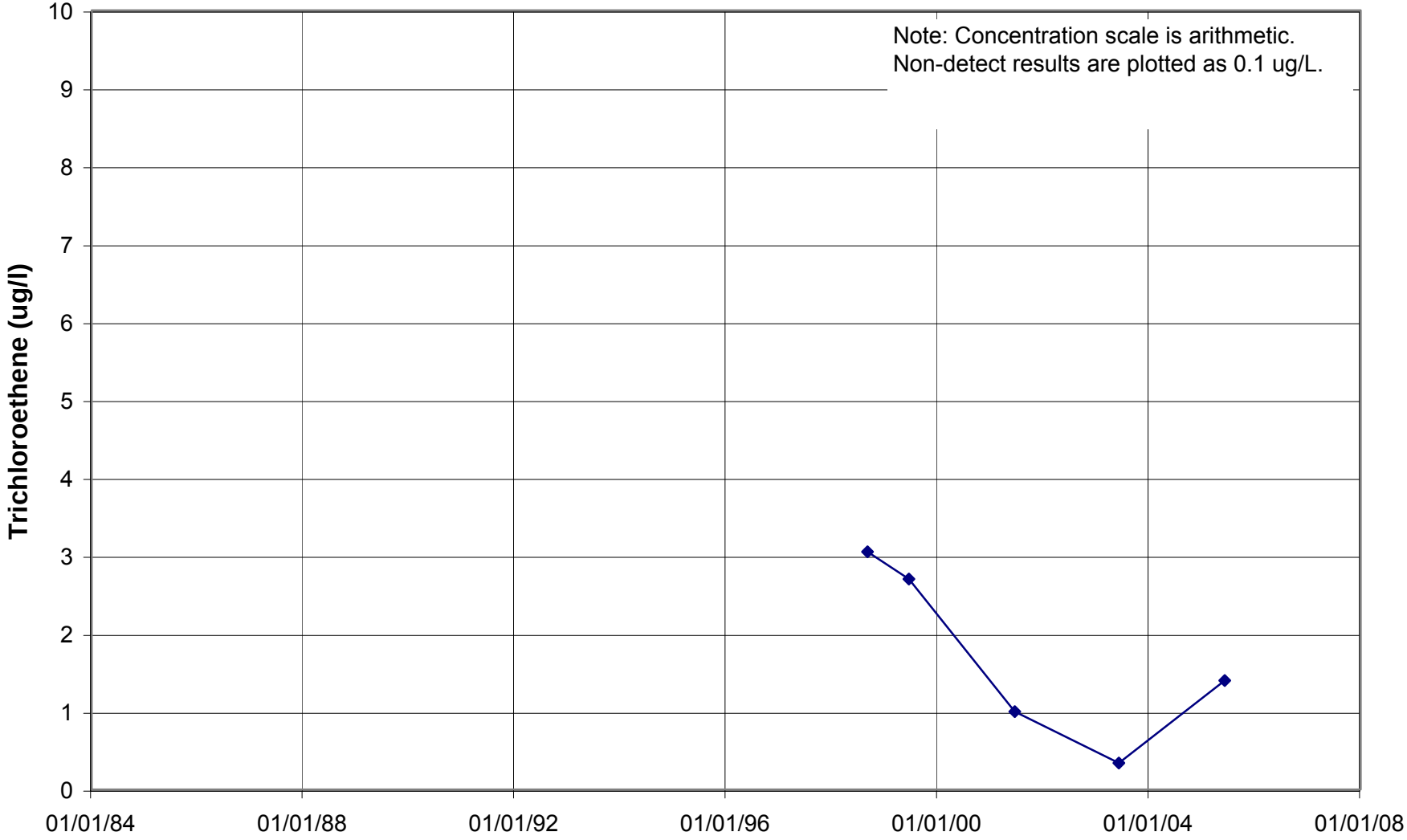

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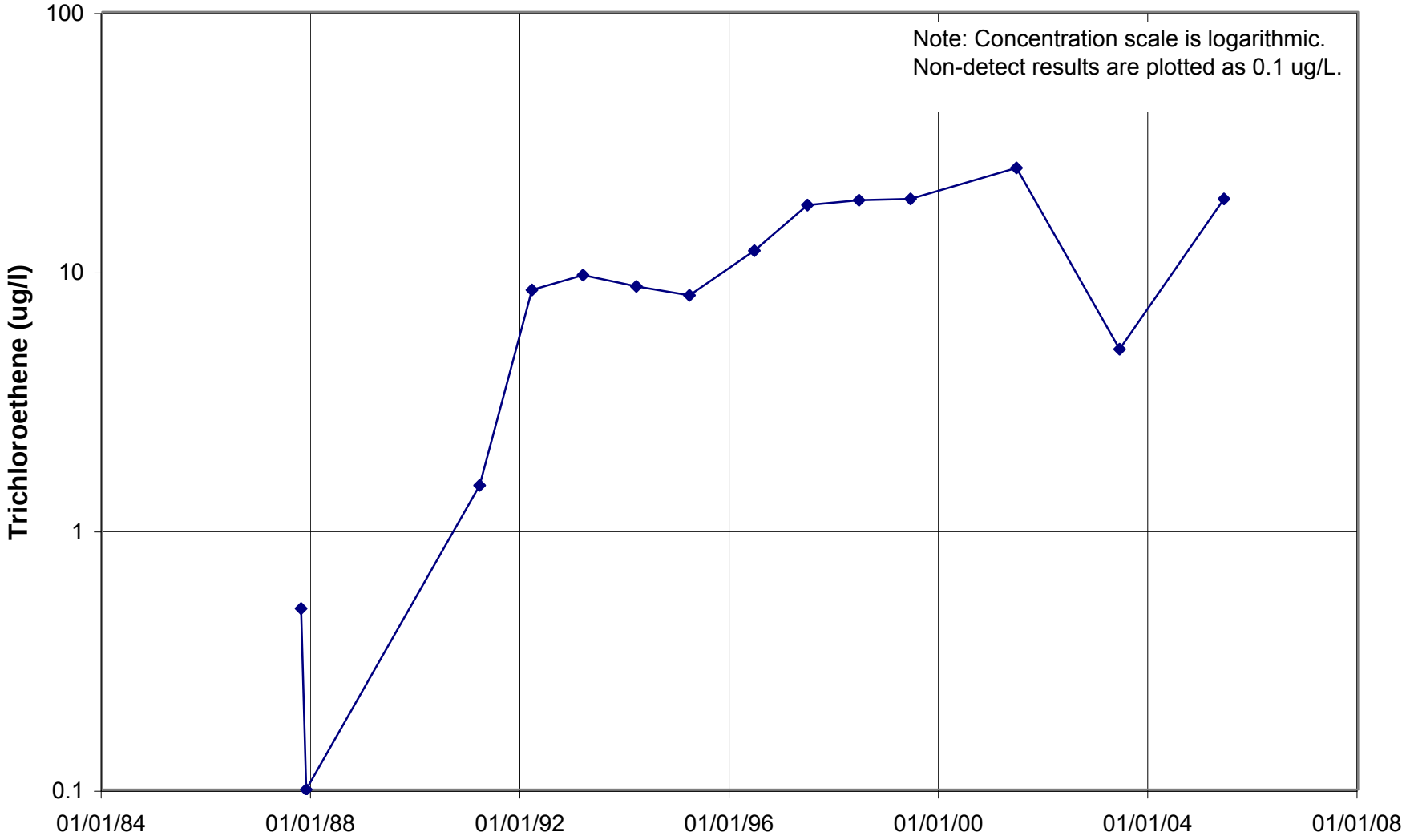

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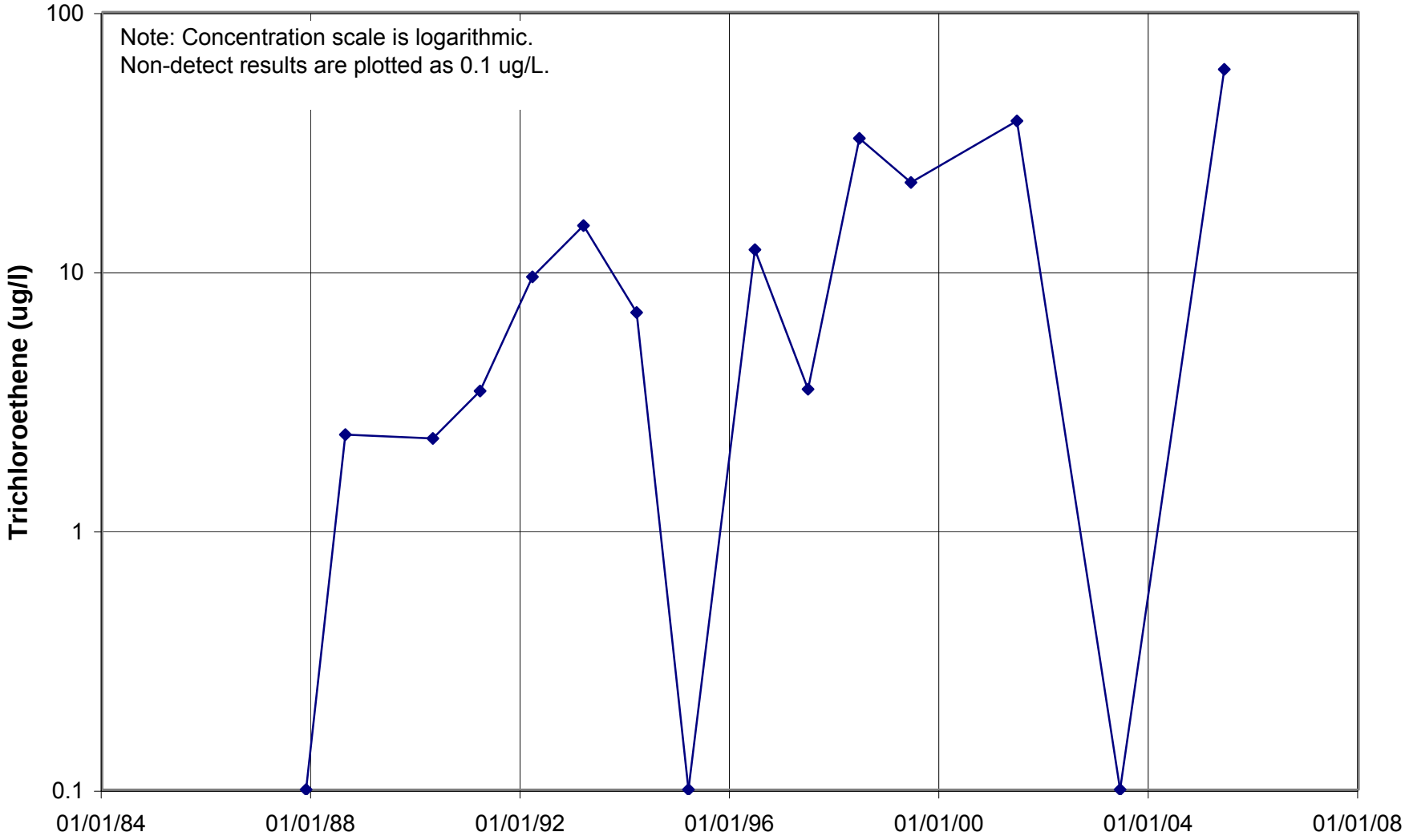

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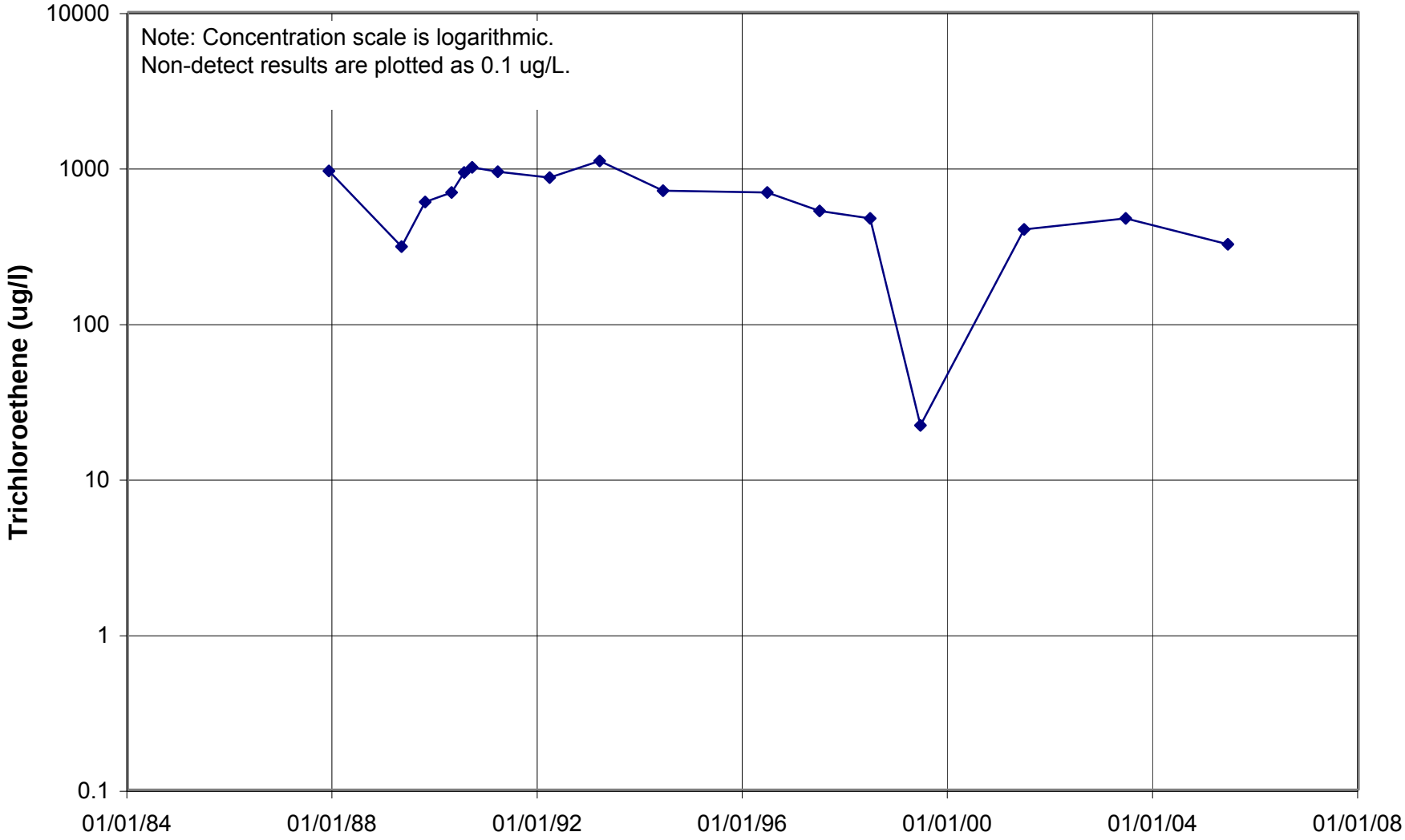

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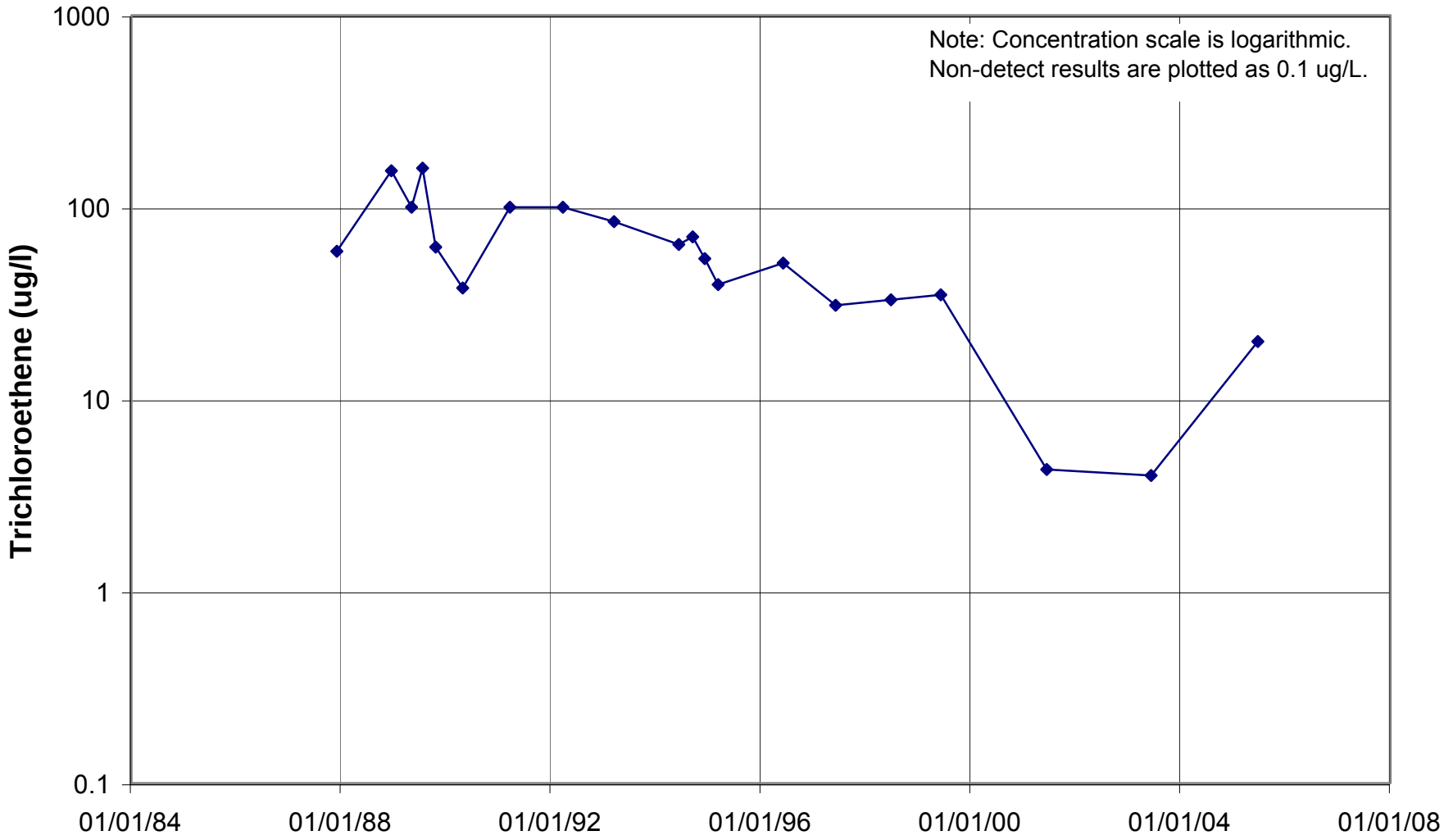

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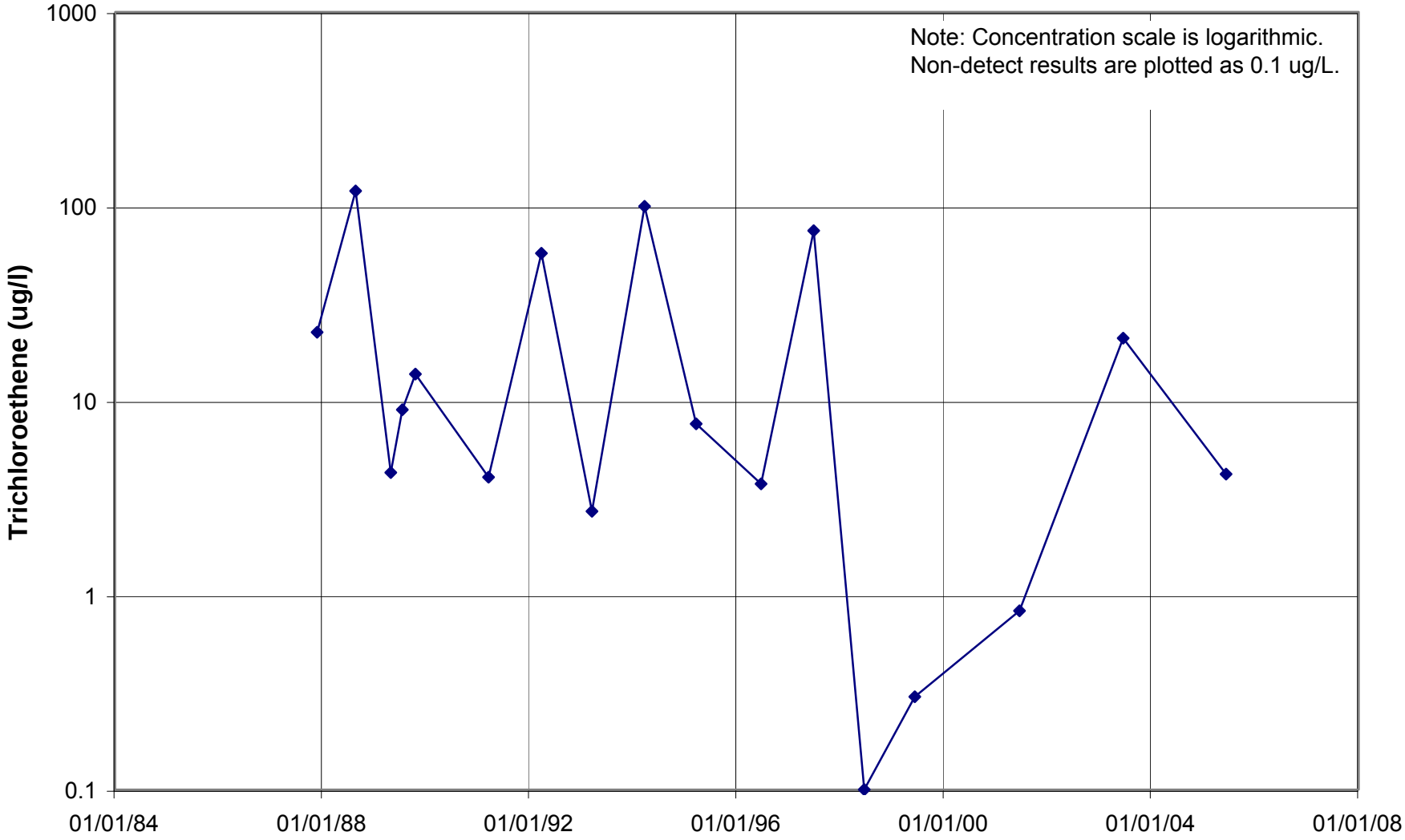
04U846



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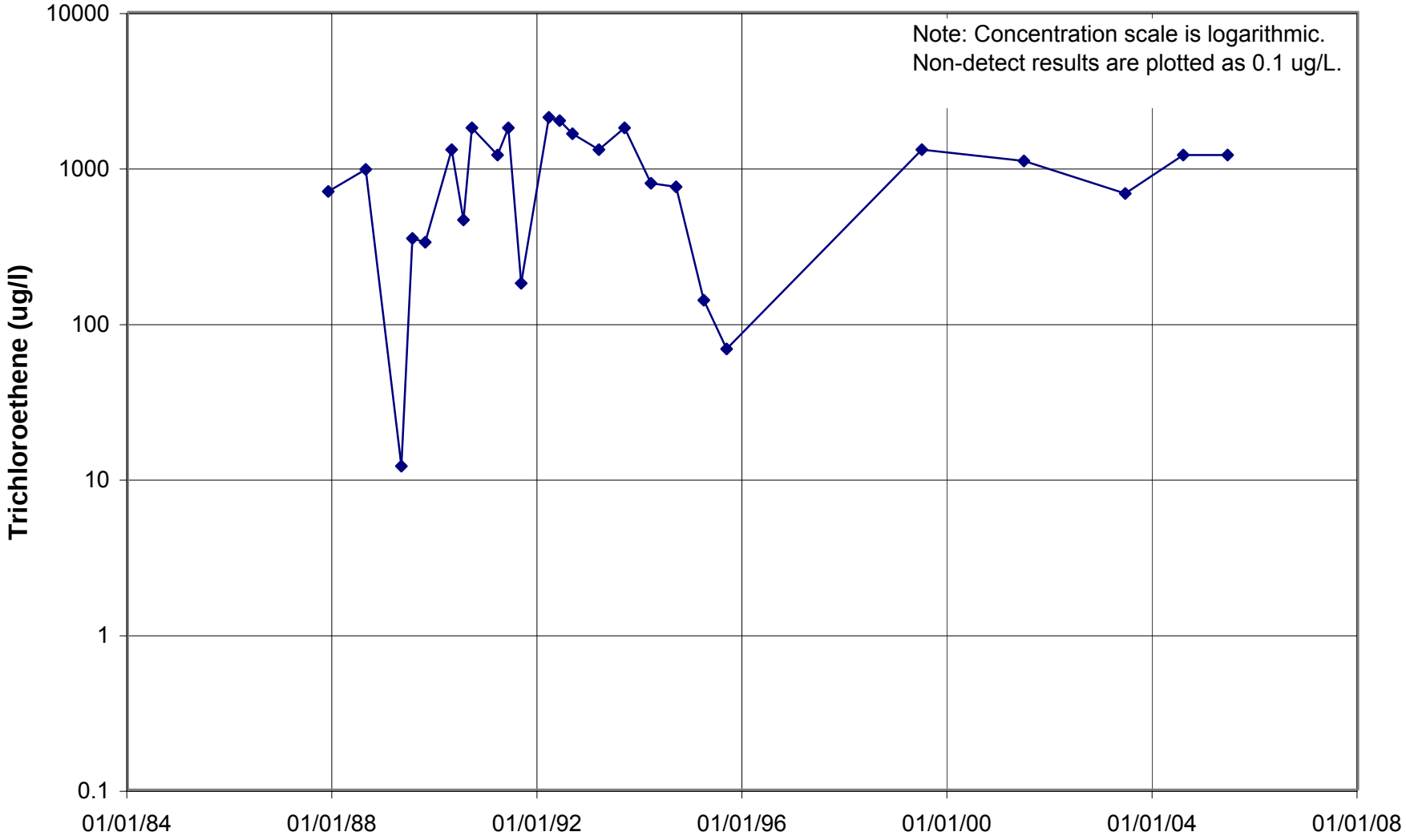

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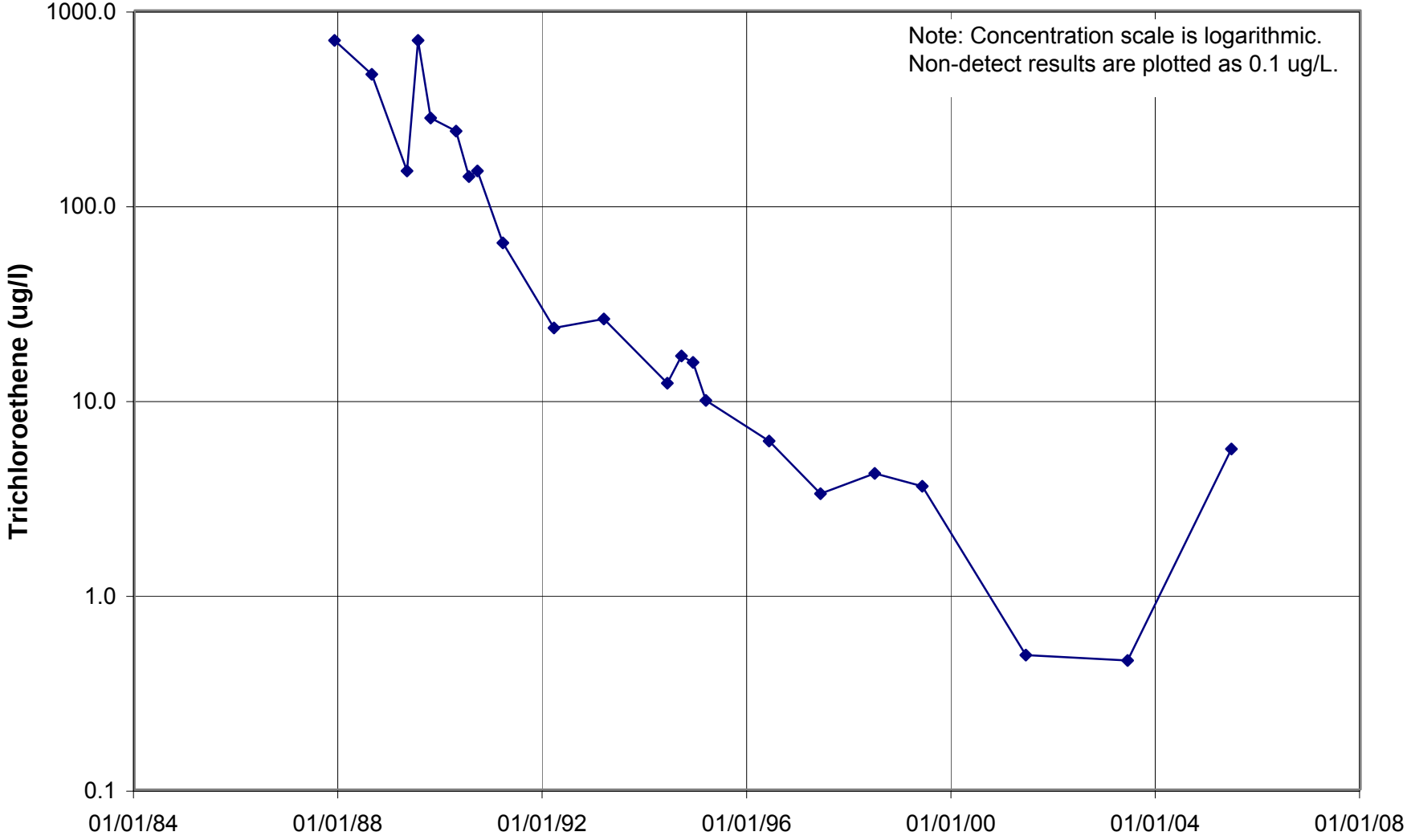

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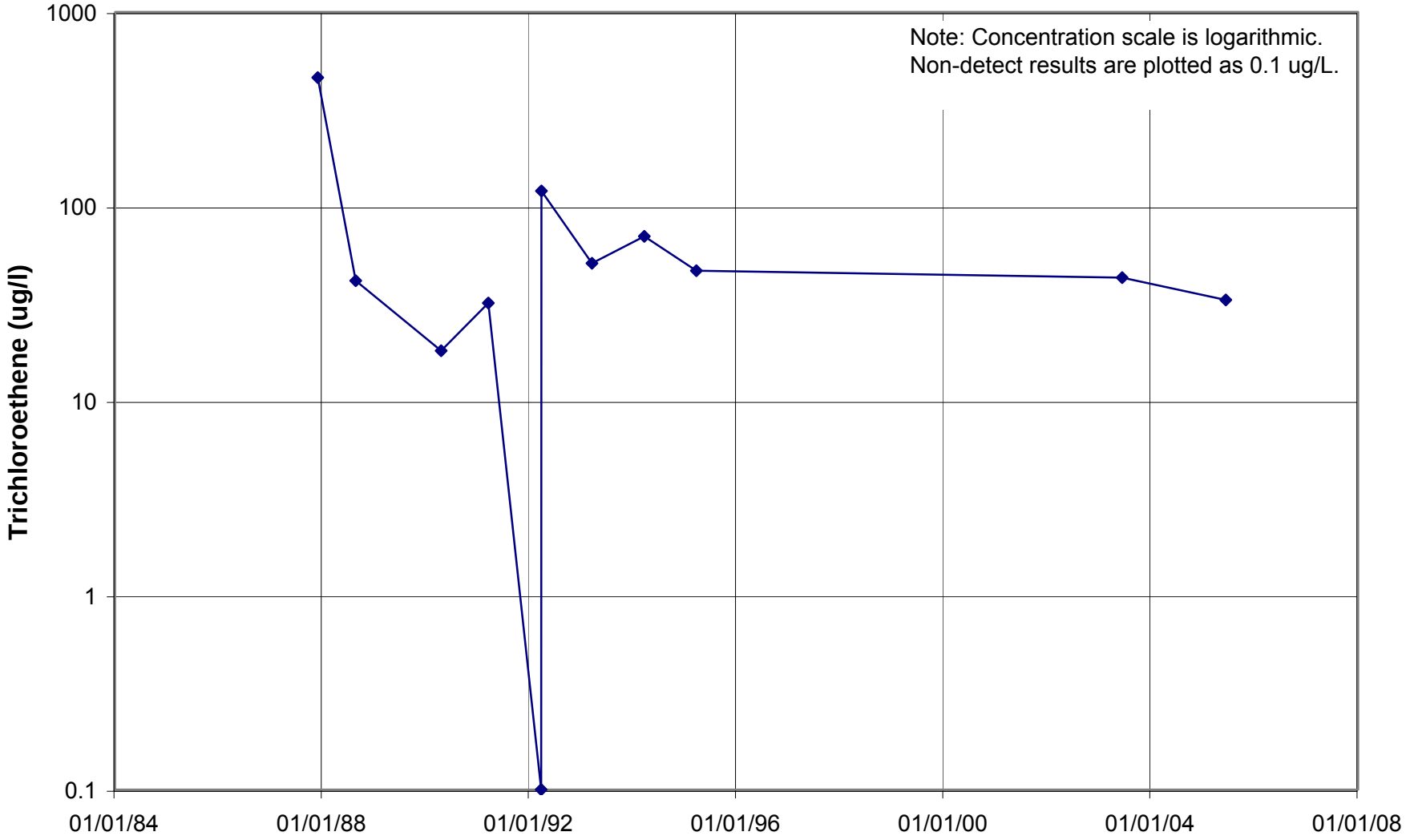

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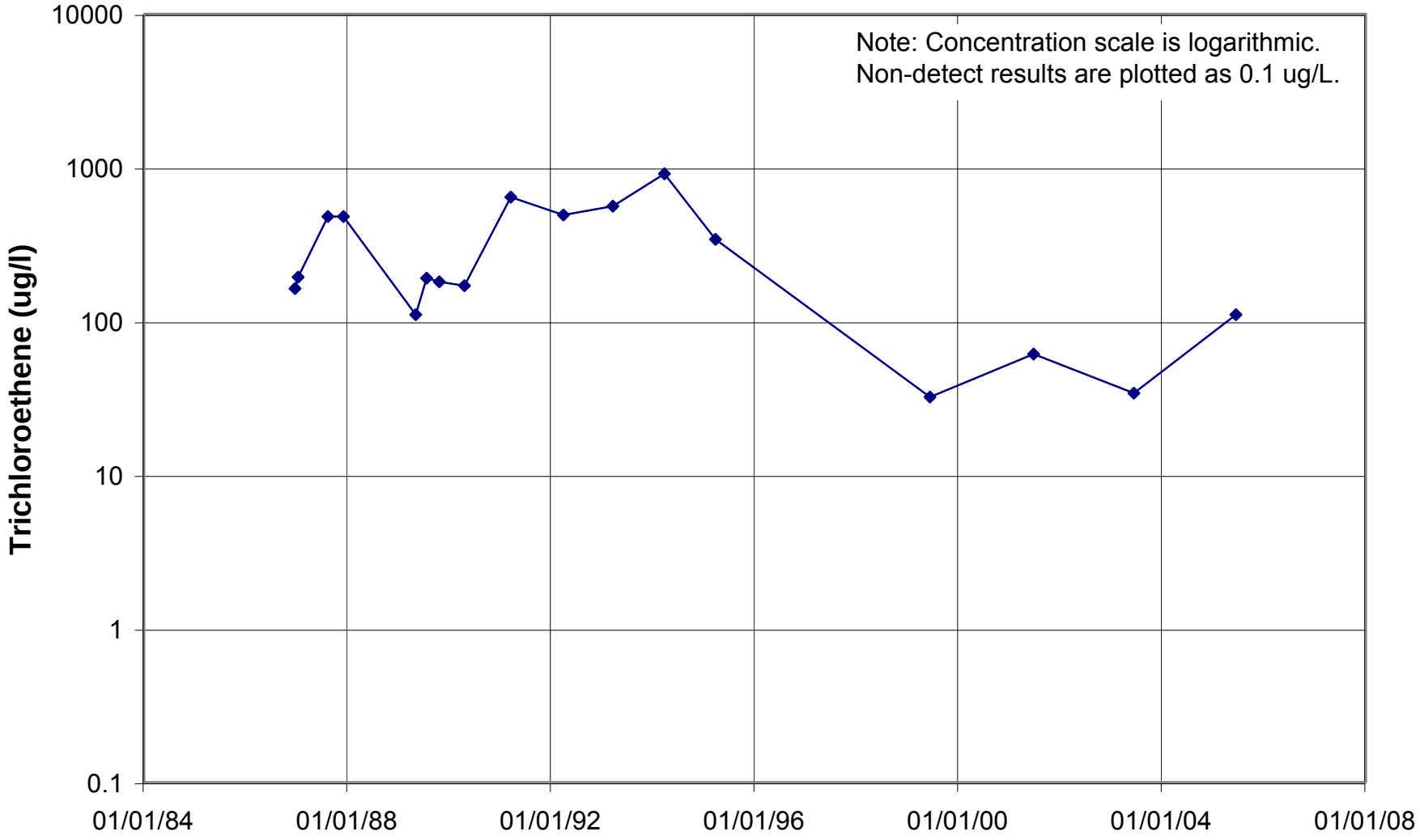

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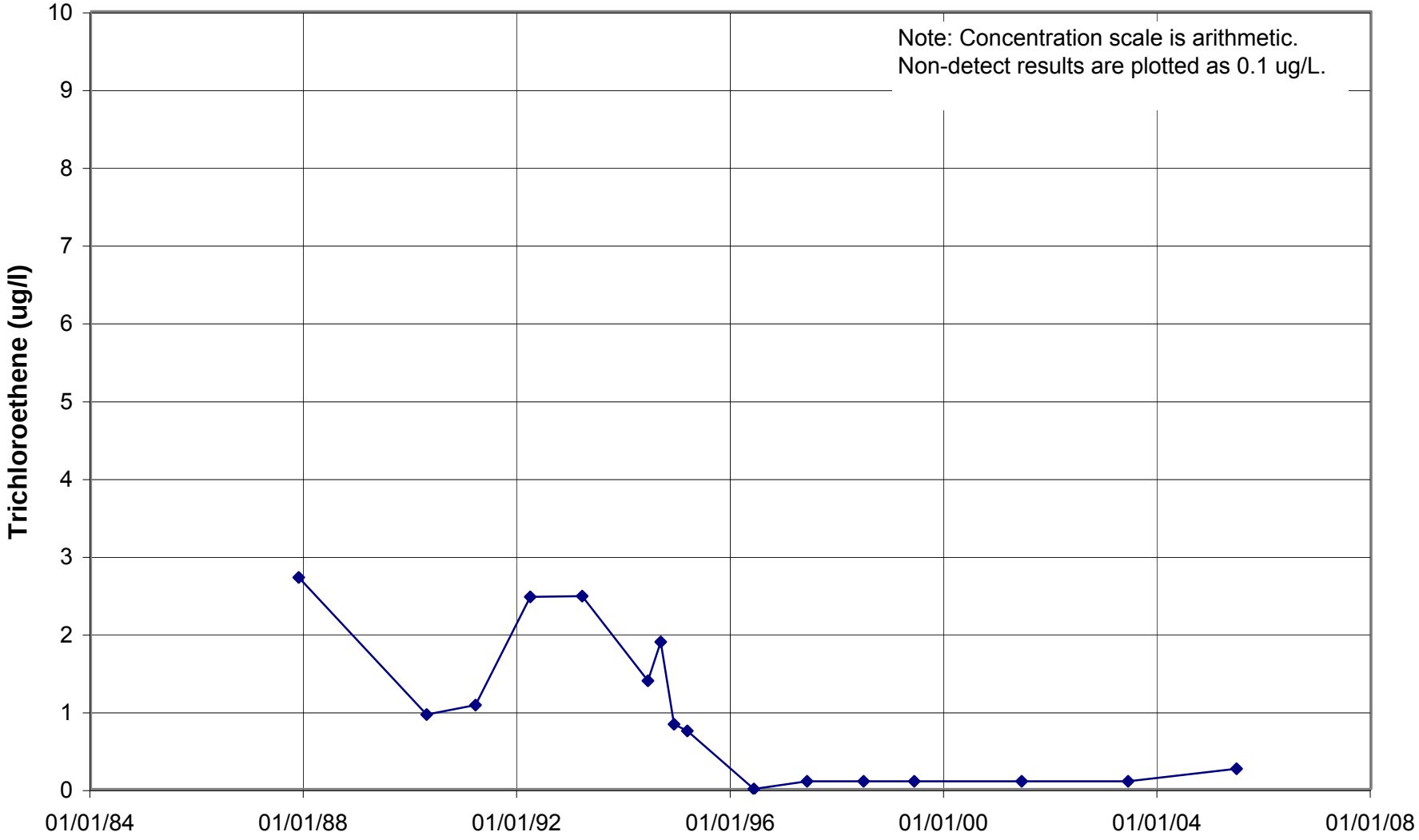

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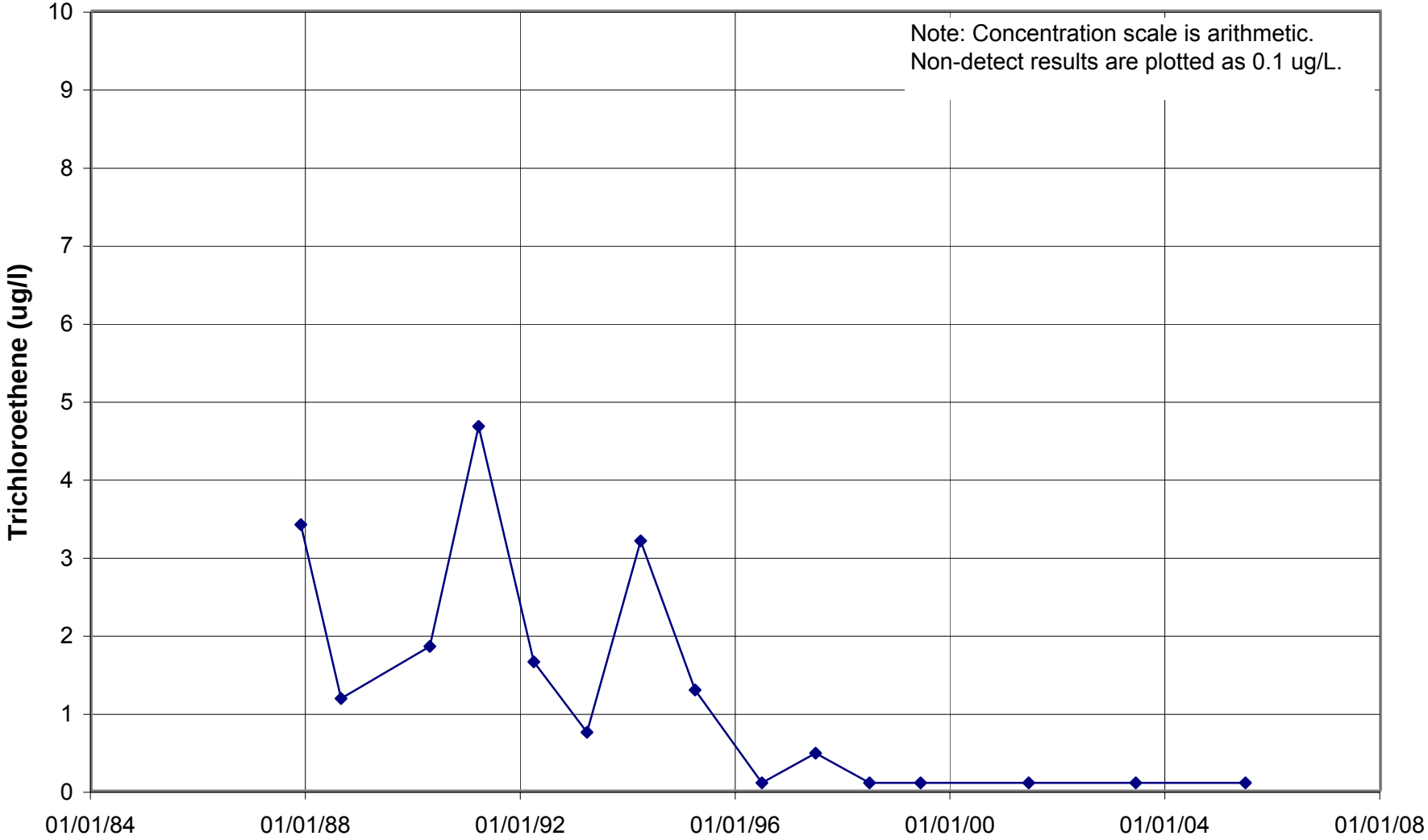

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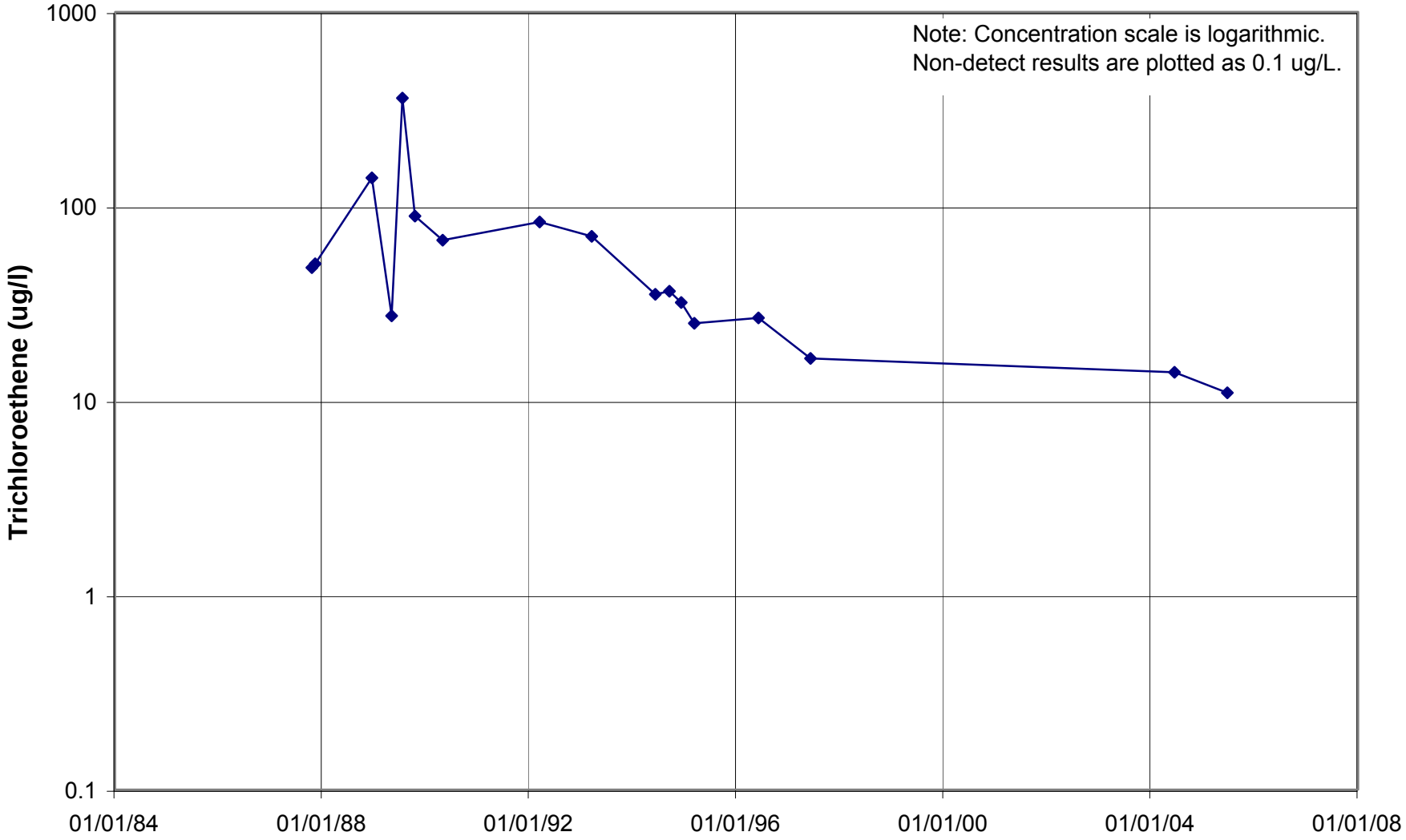

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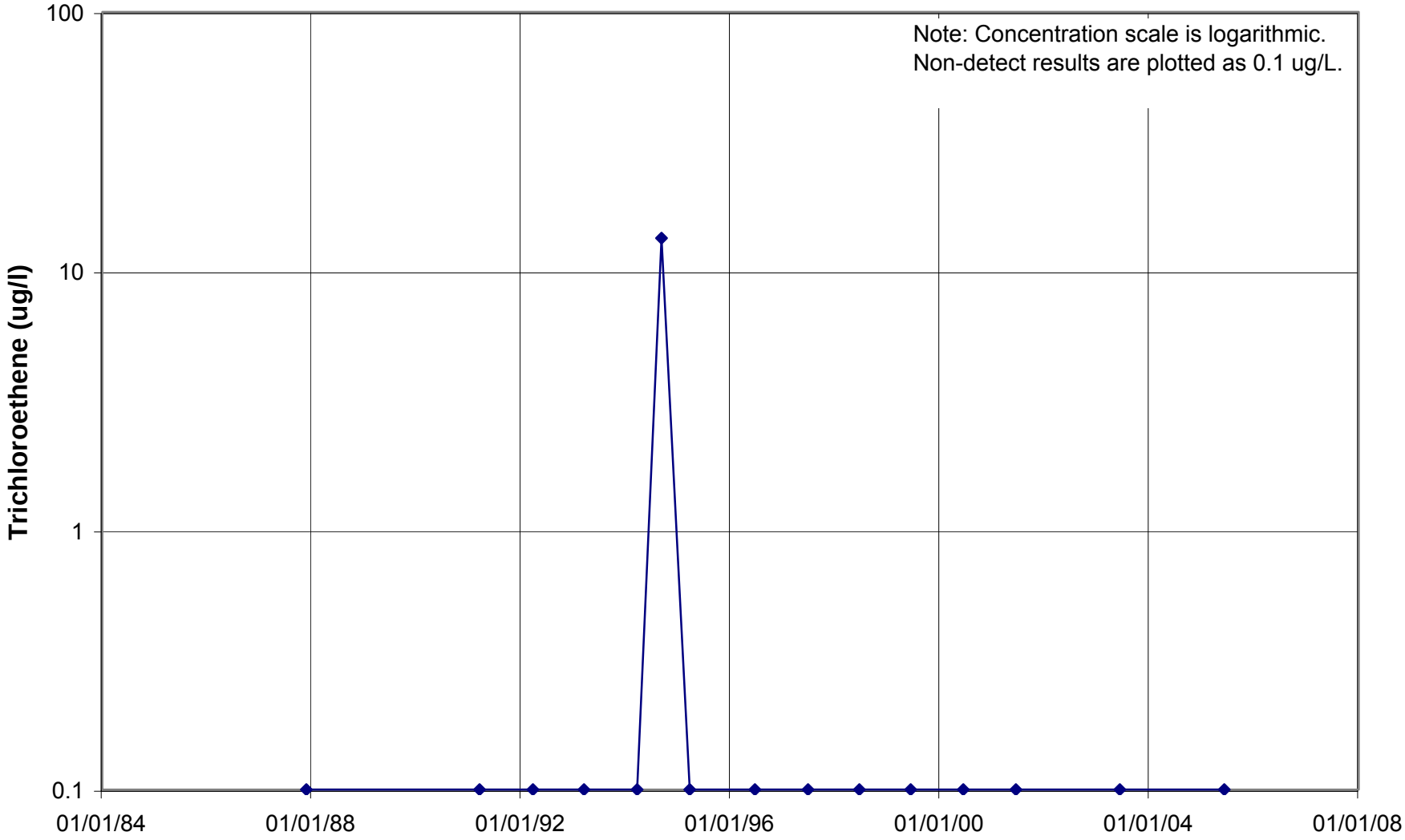

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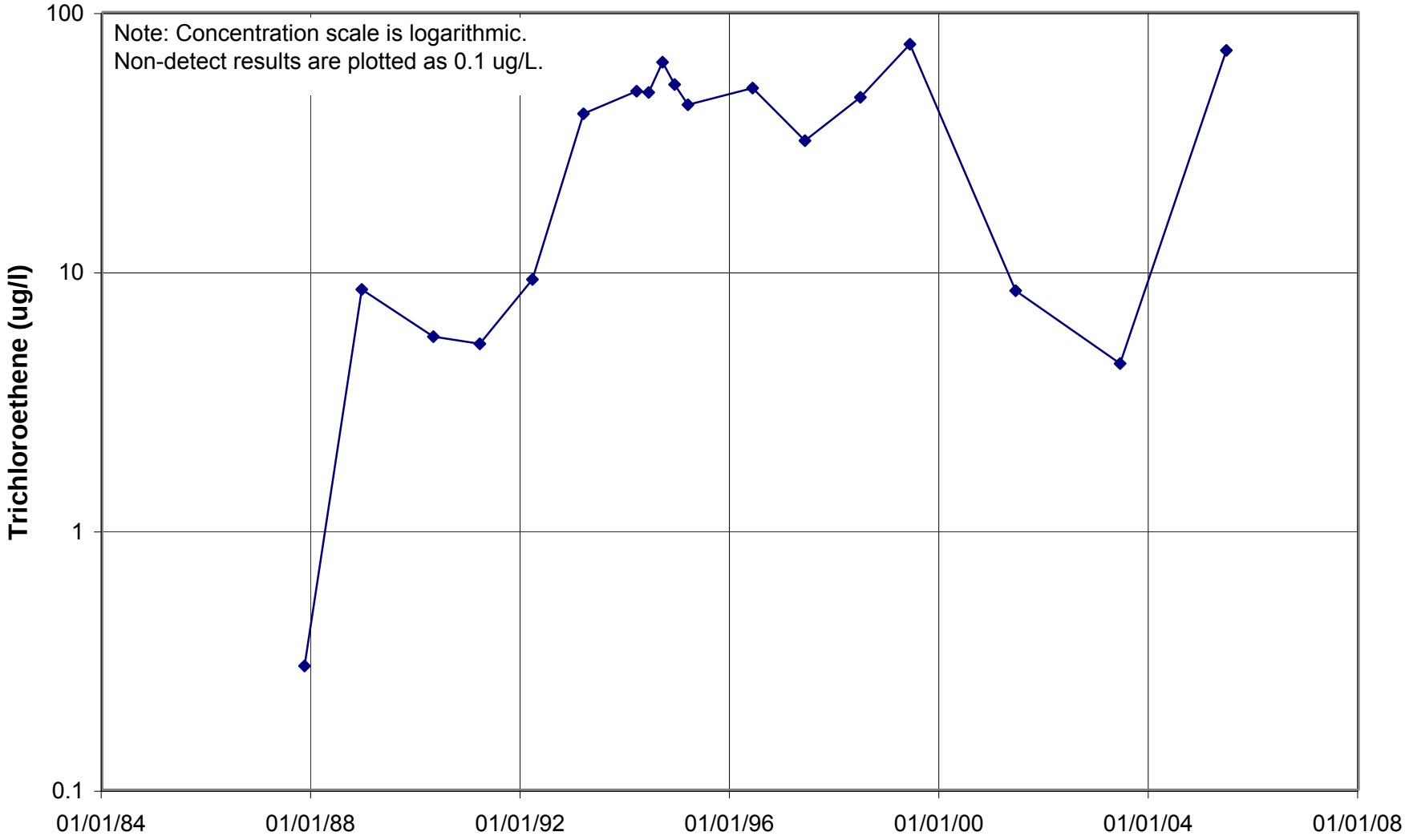

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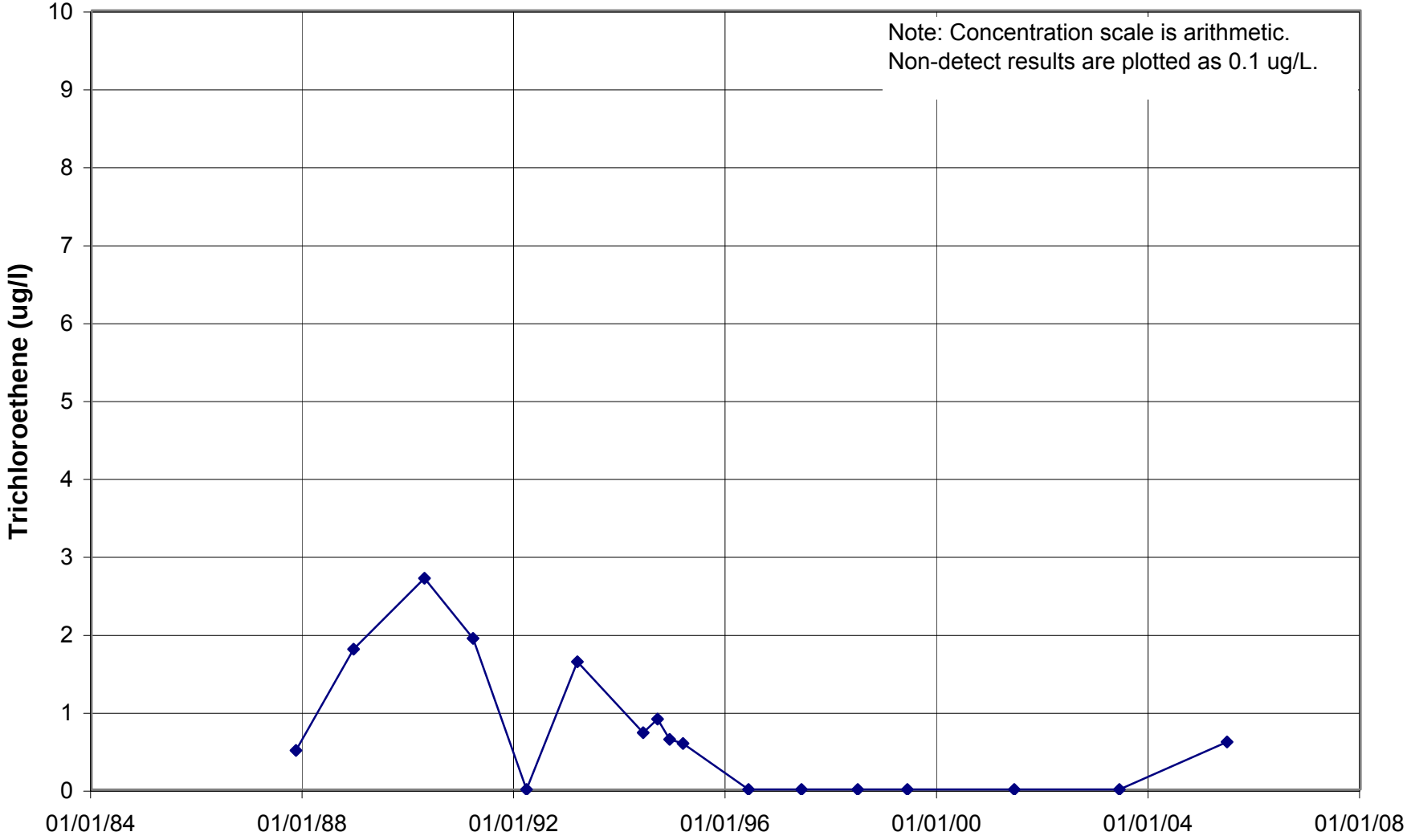

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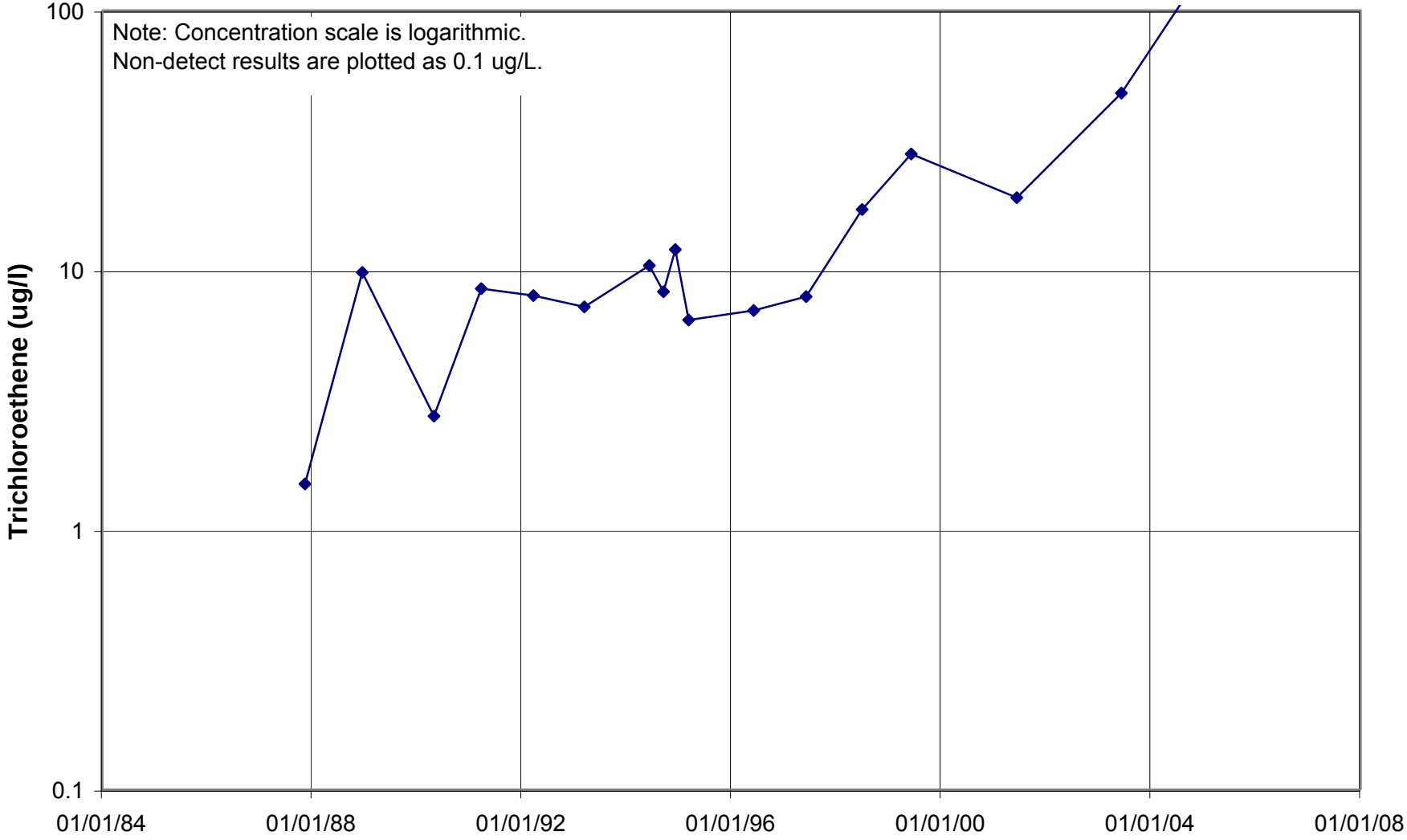

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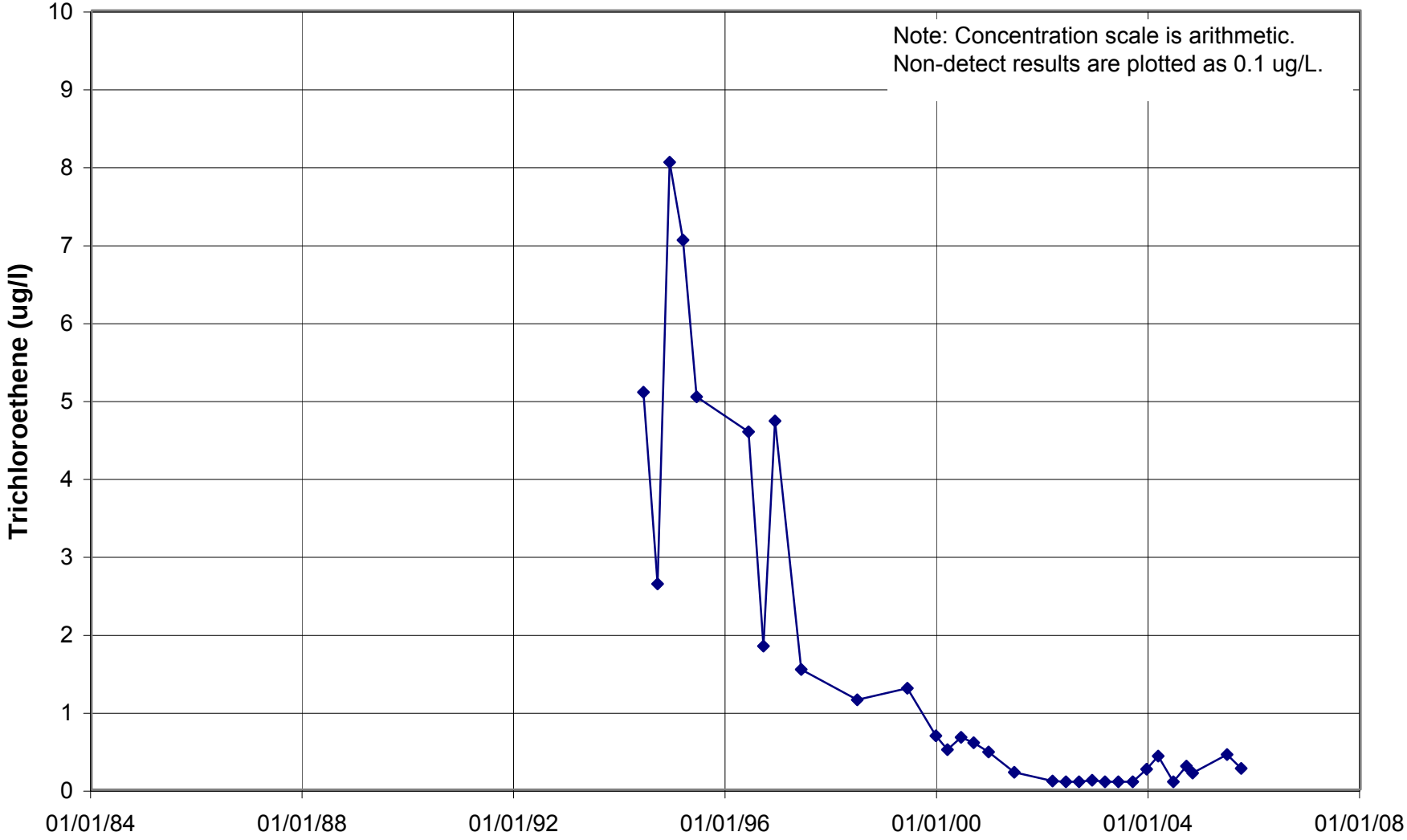

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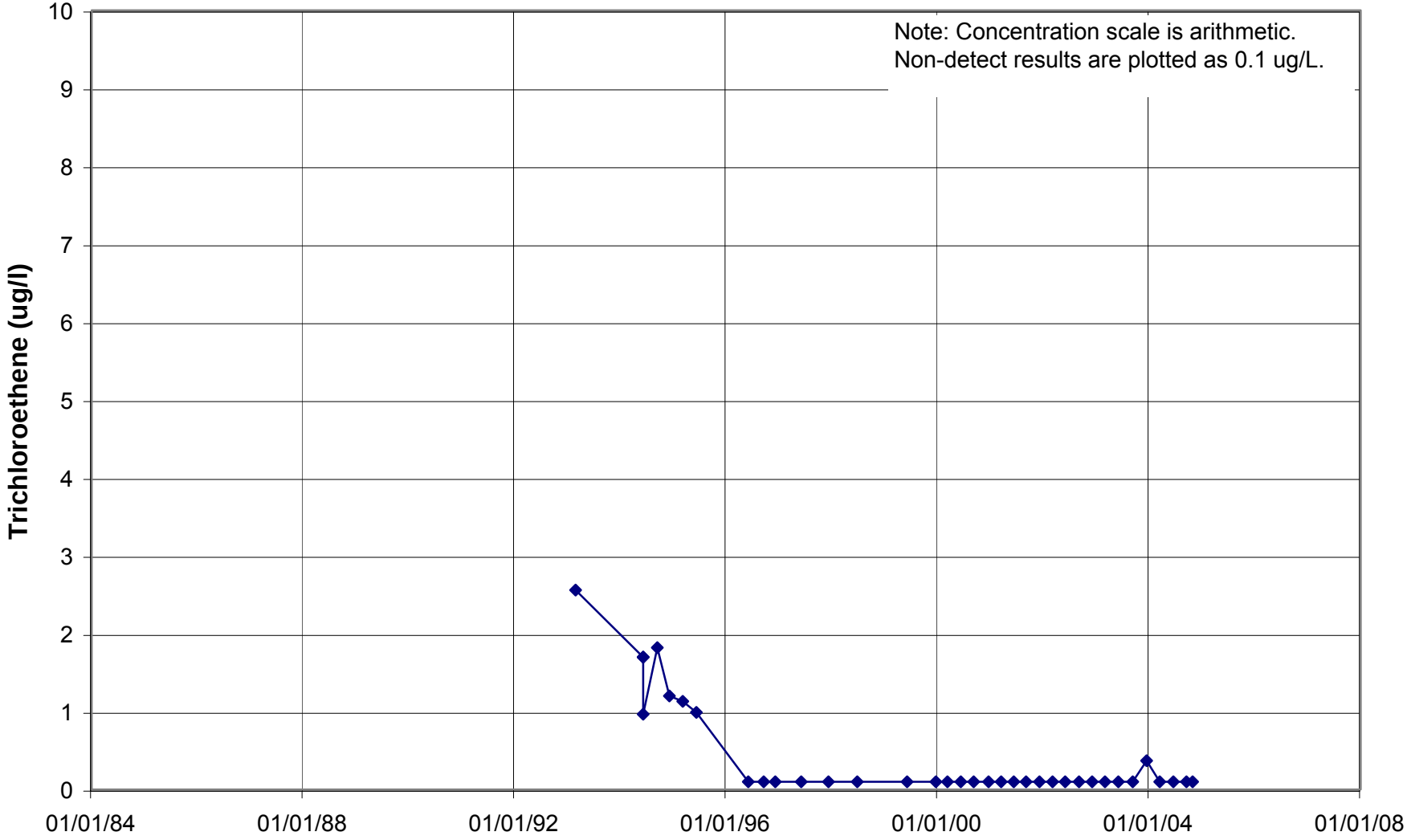

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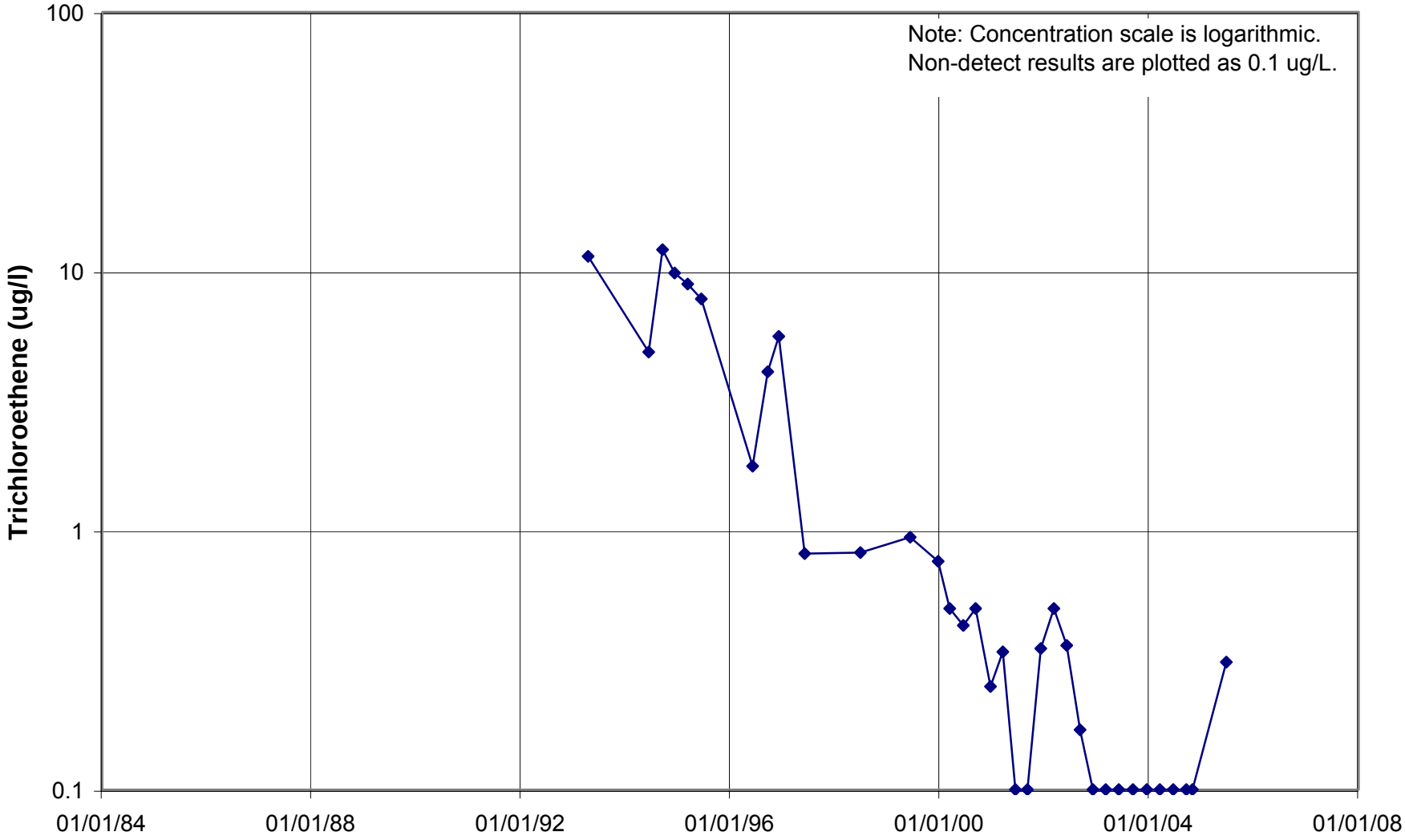

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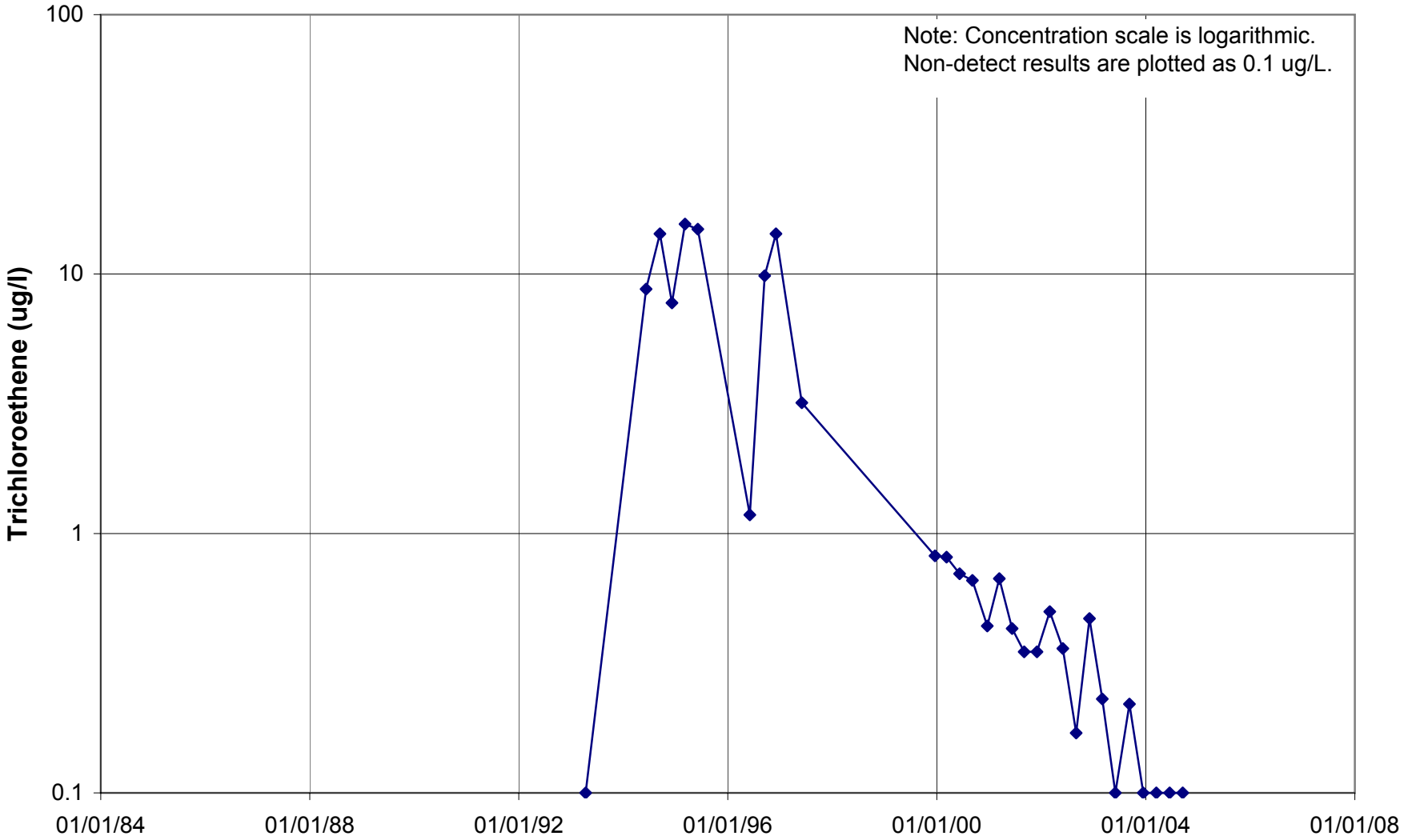

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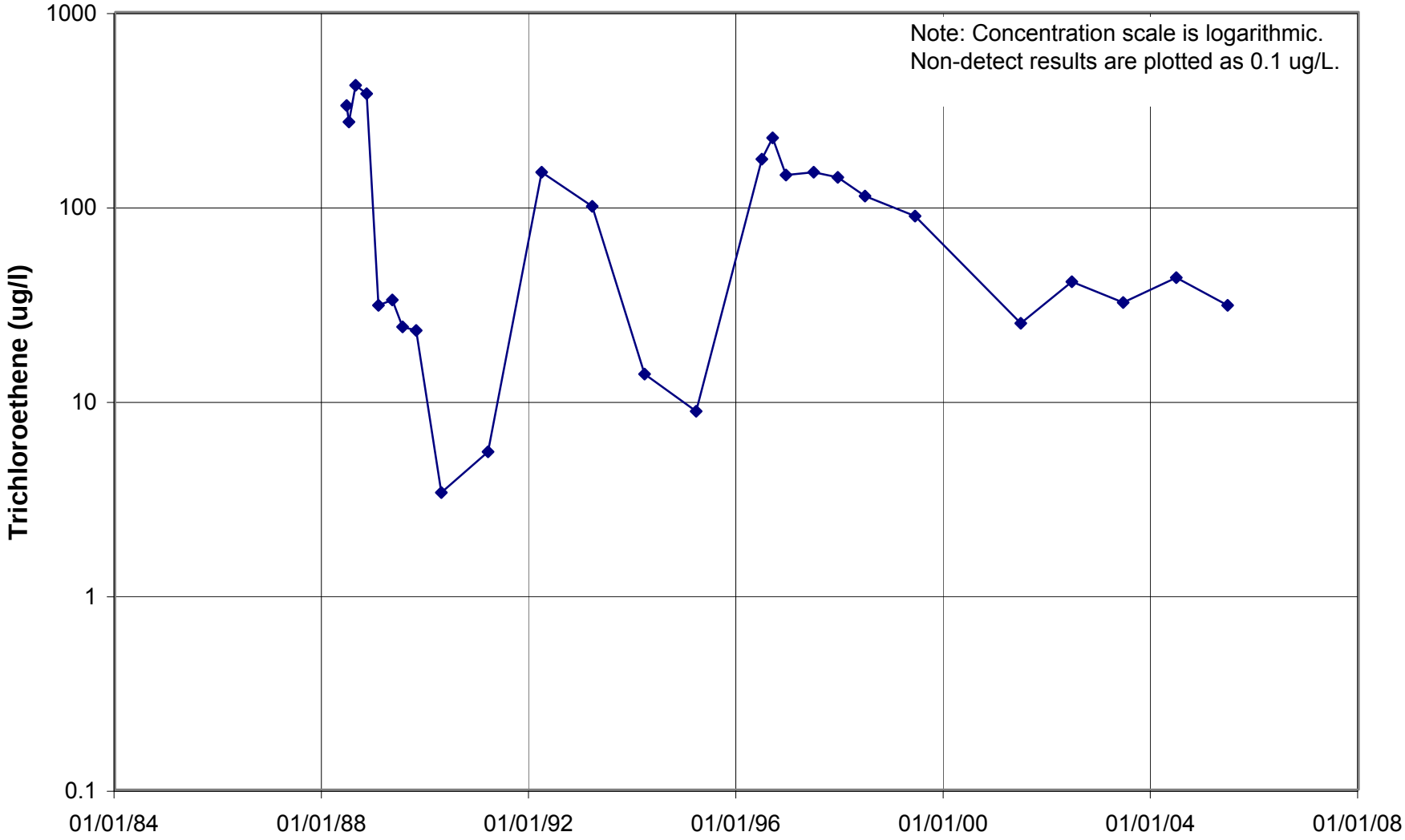

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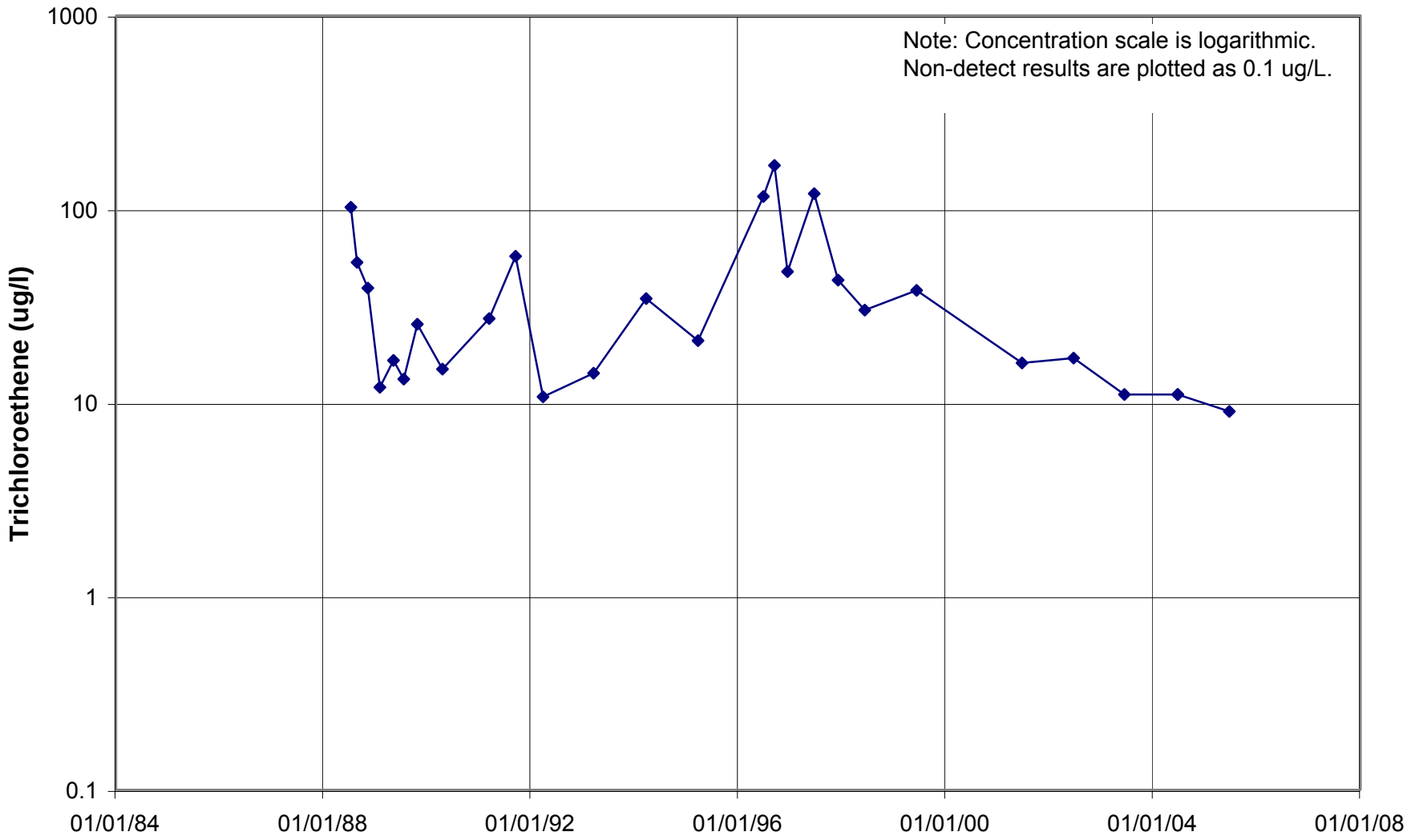

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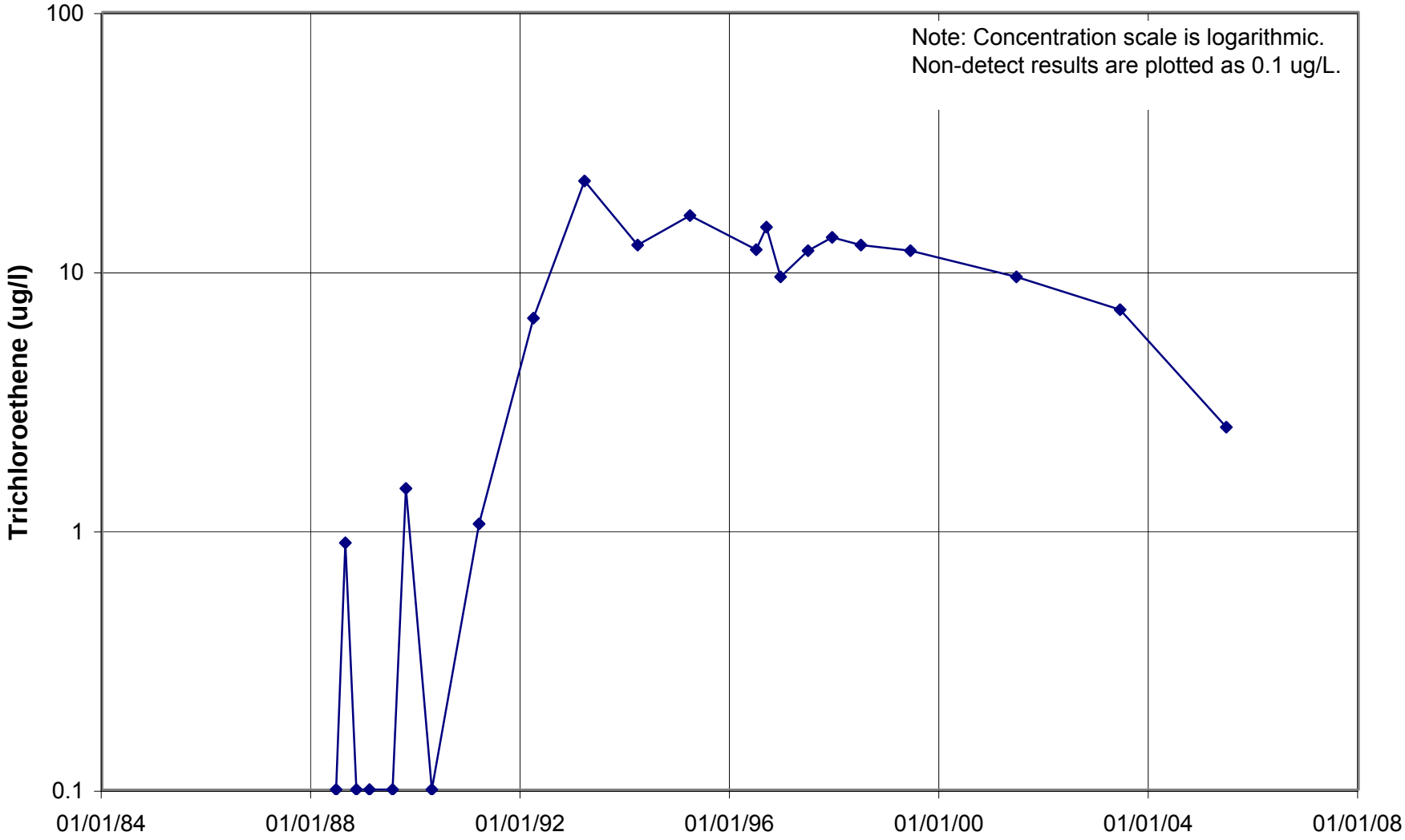

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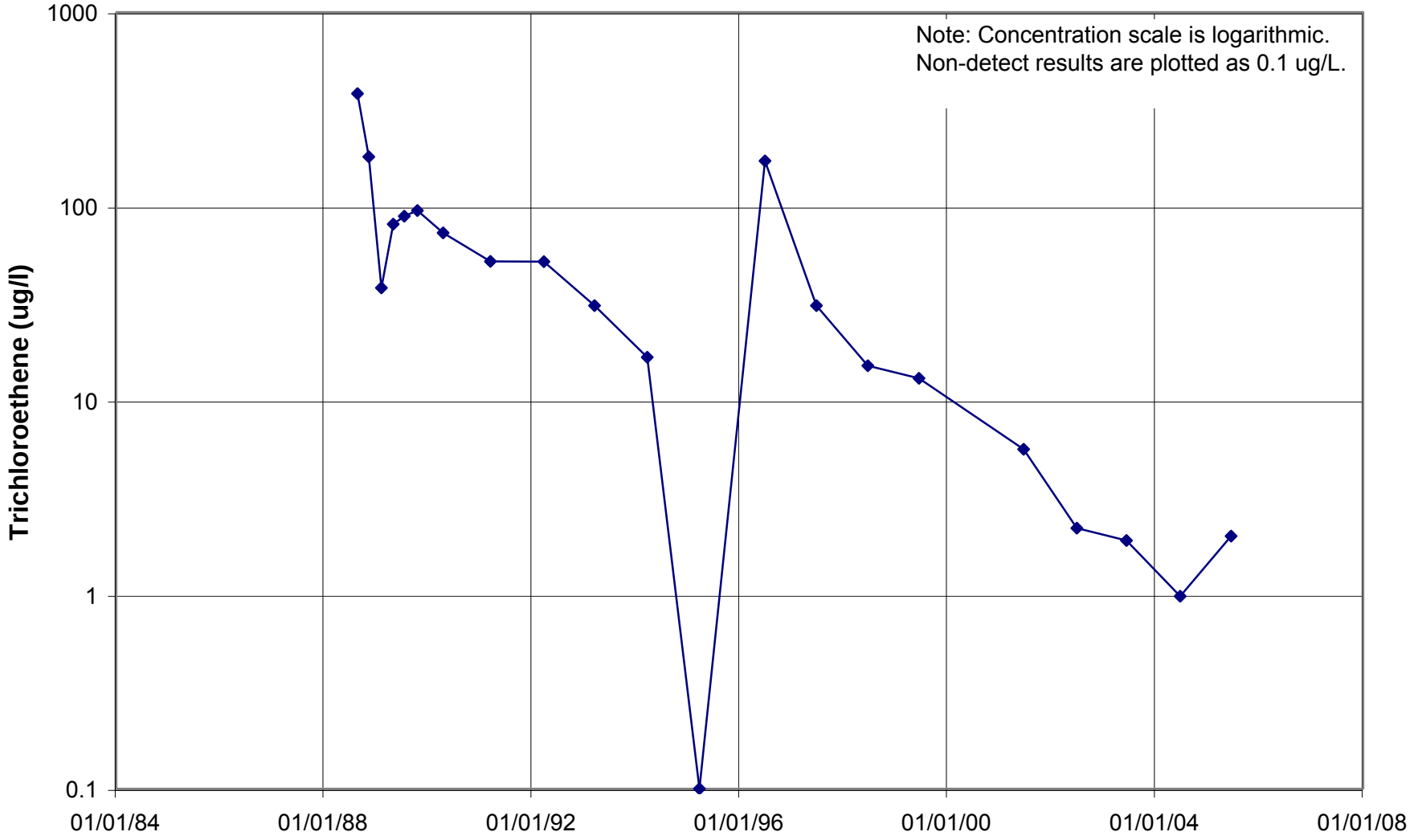

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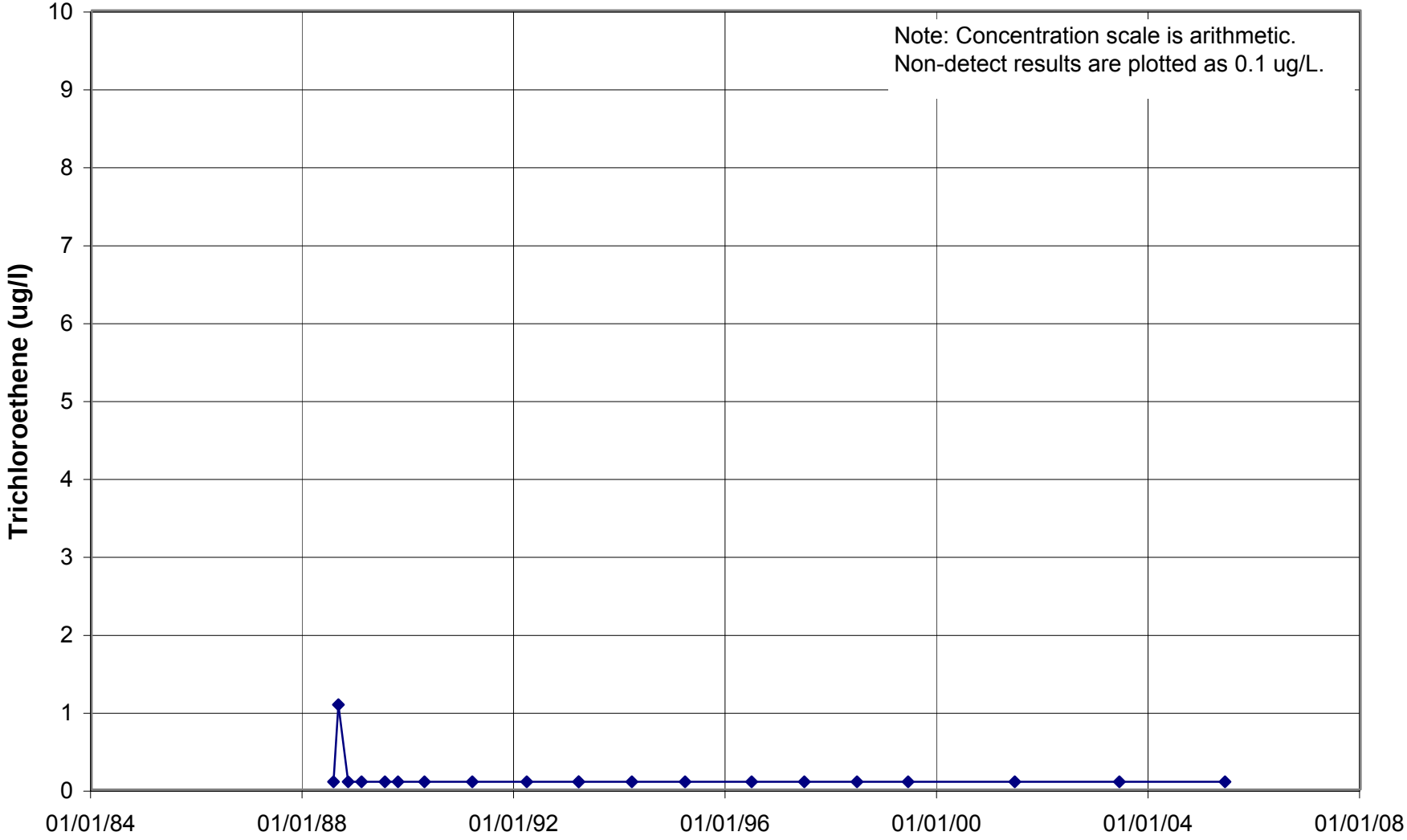

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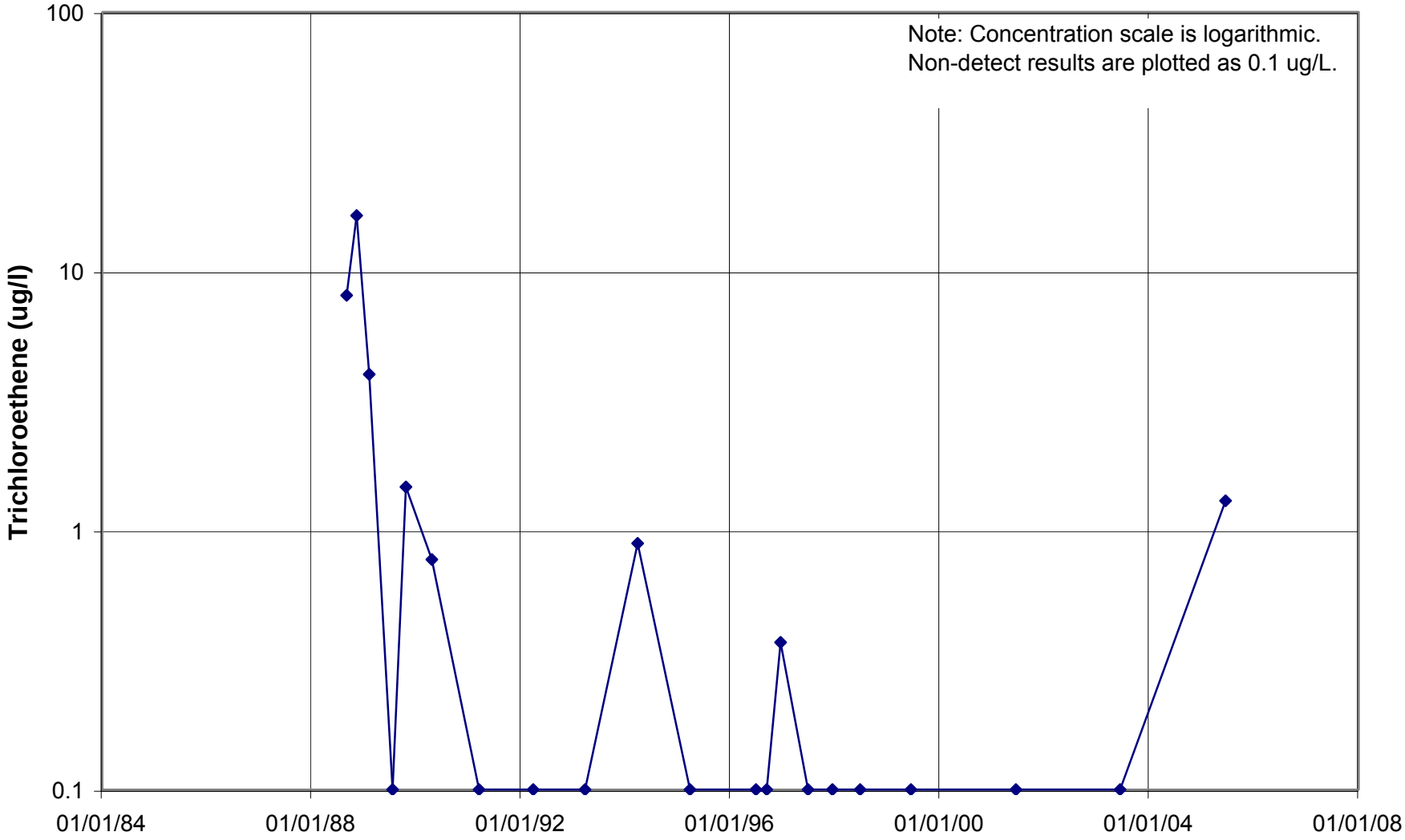

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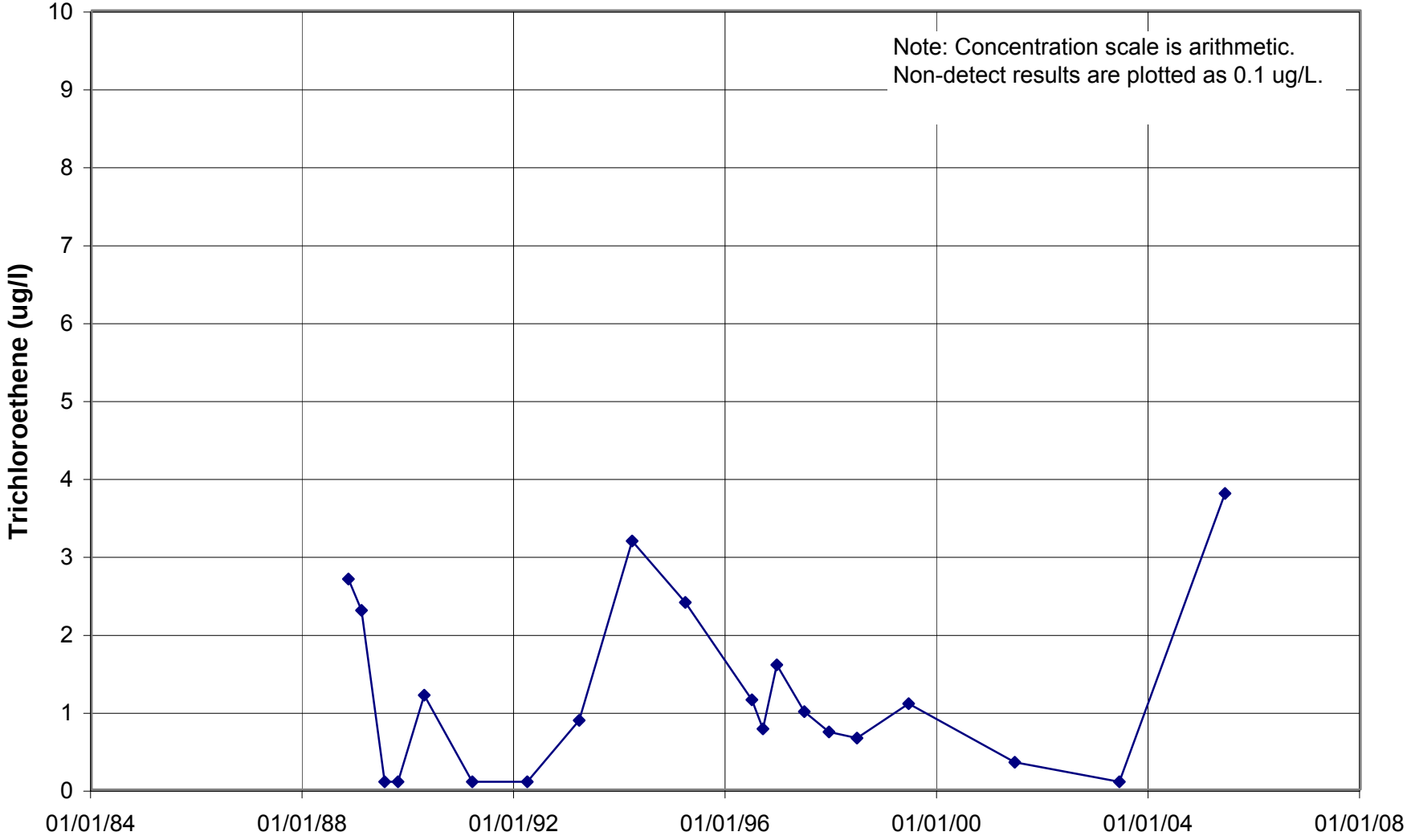

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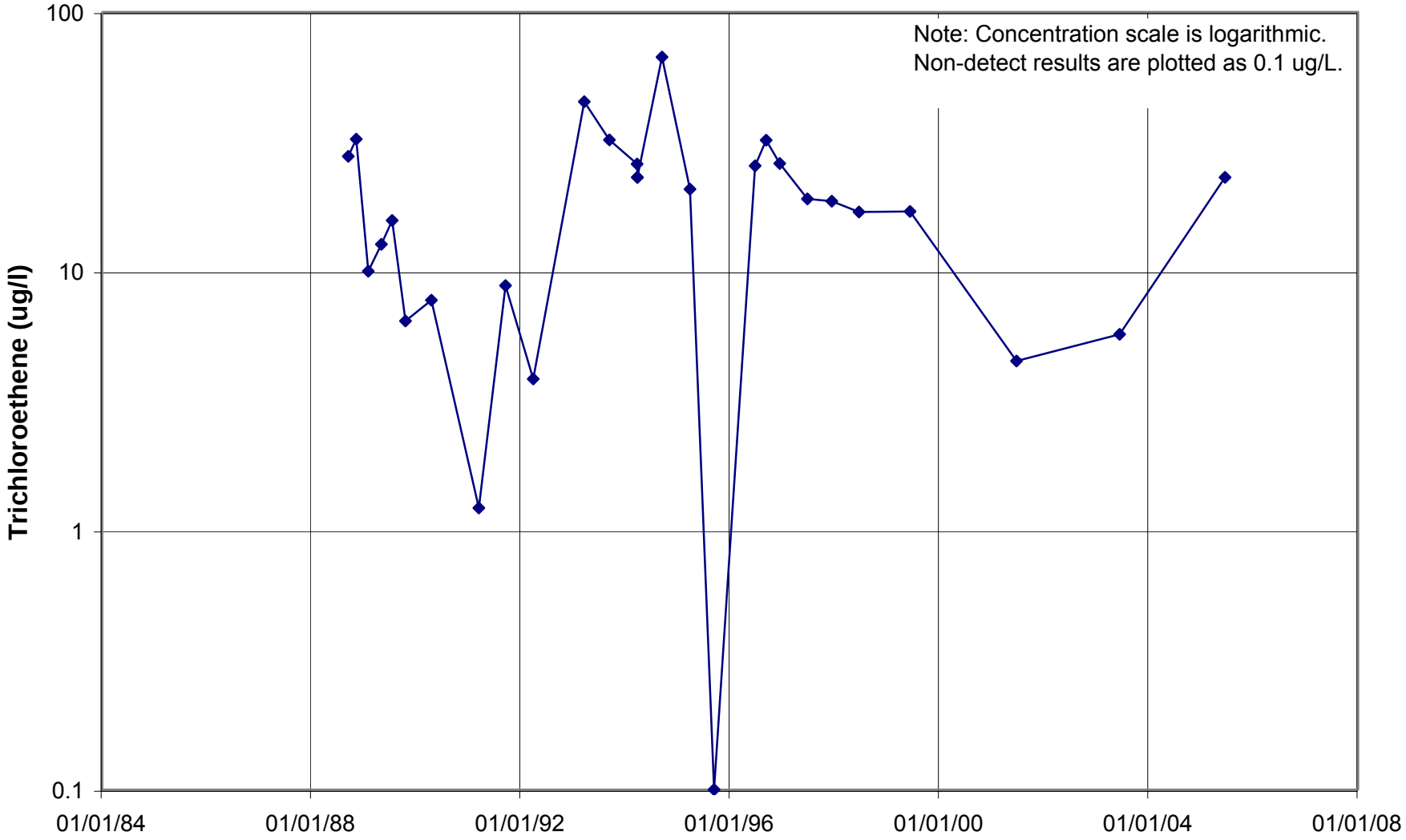

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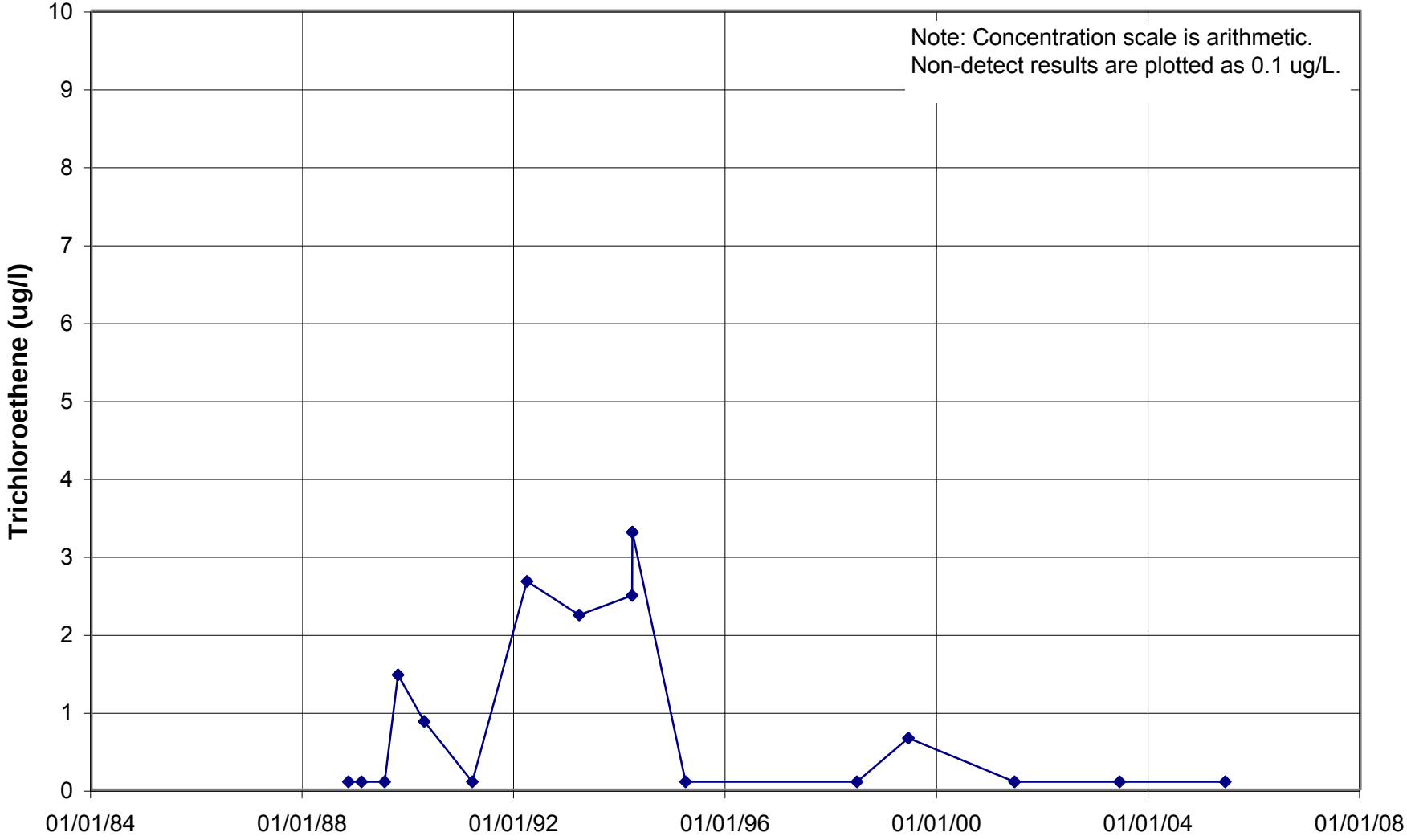

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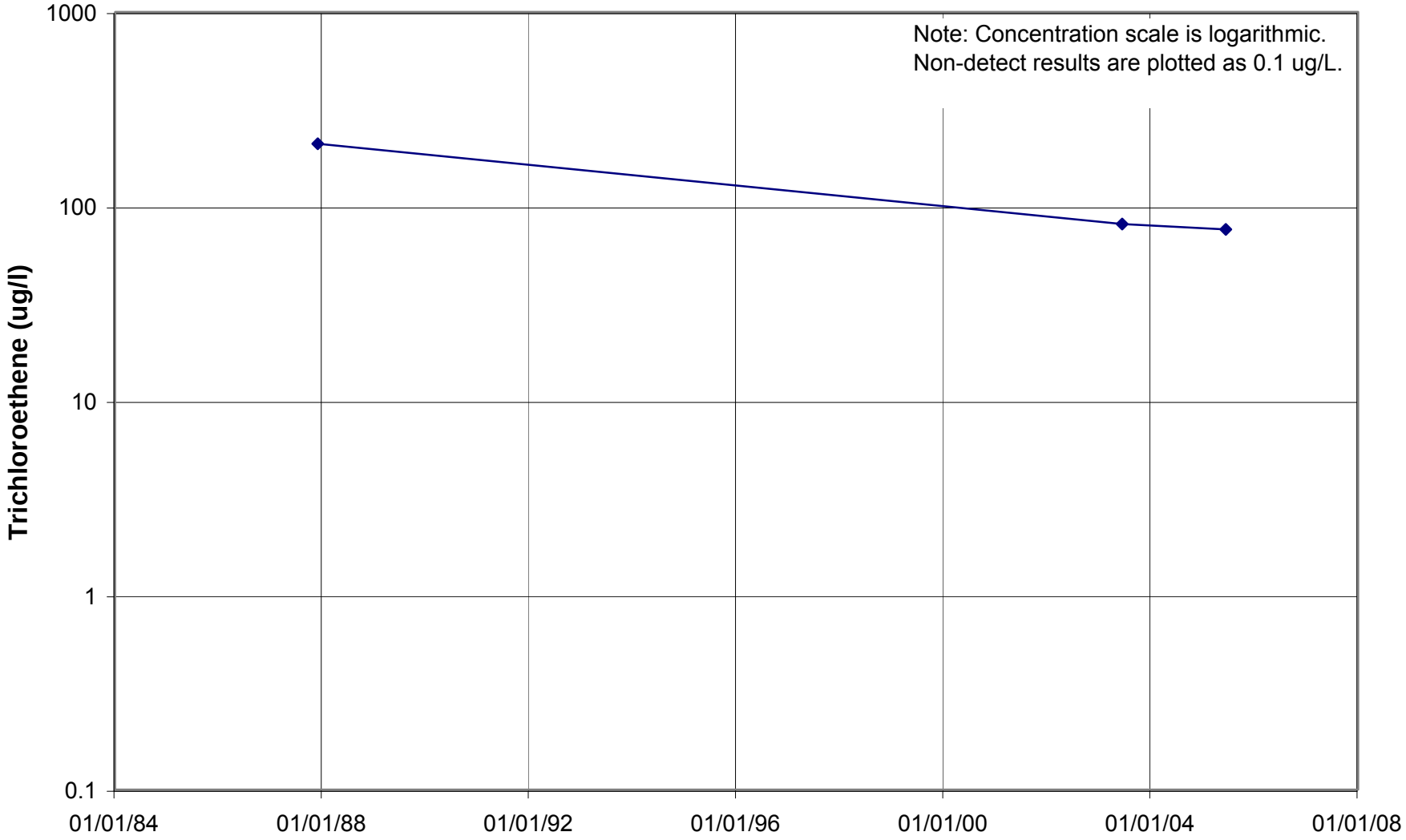

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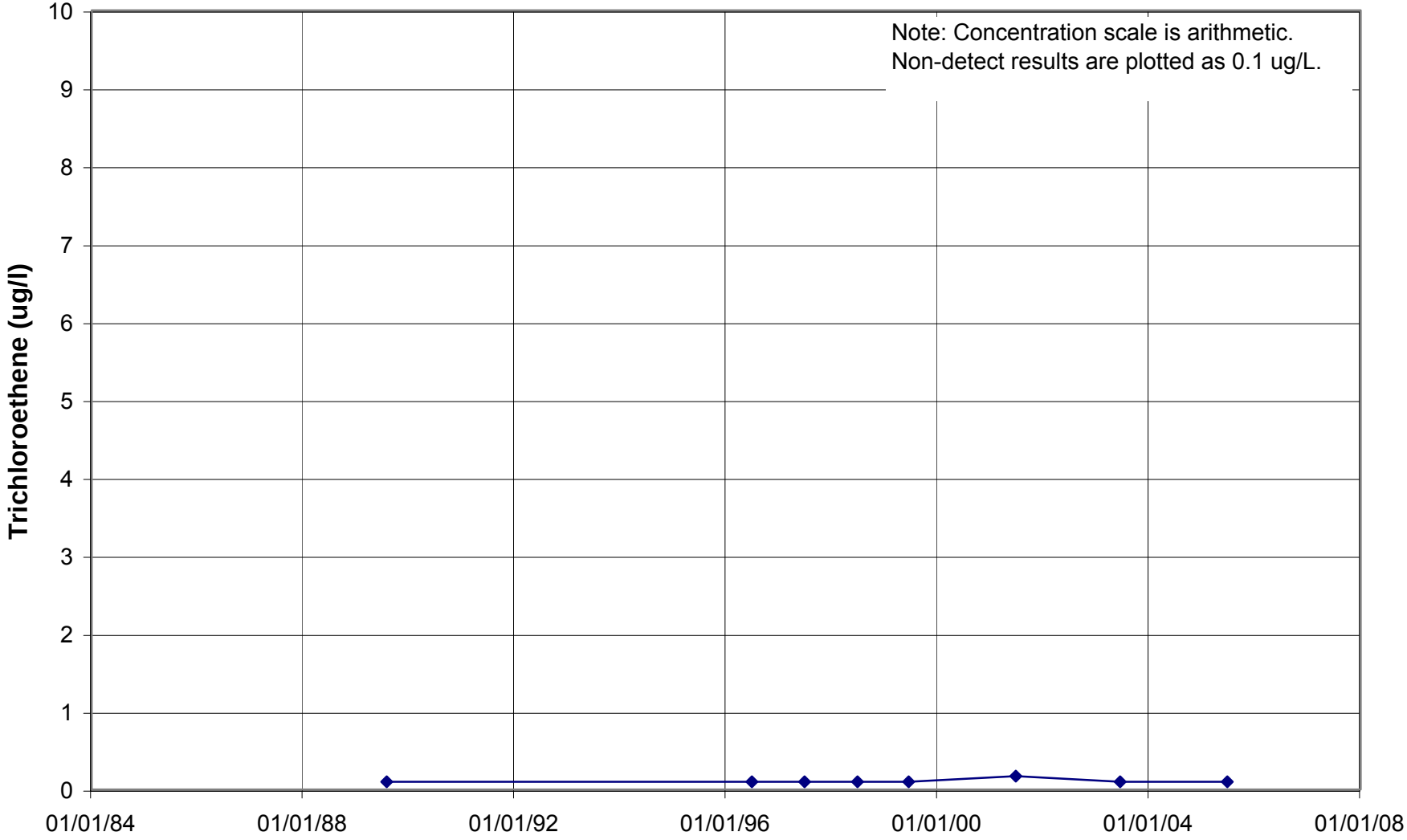
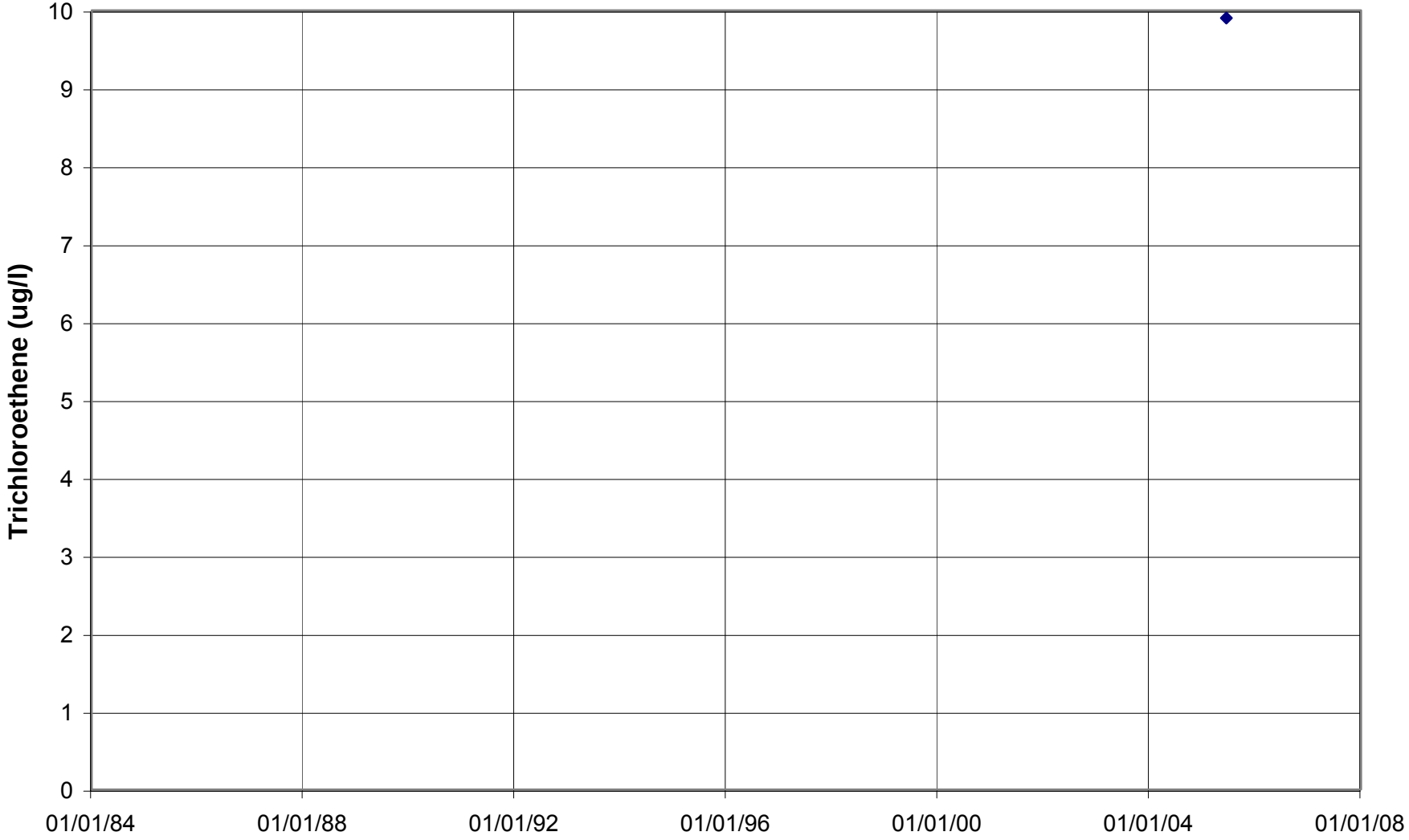
200154



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

200524

Note: Concentration scale is arithmetic.
Non-detect results are plotted as 0.1 ug/L.



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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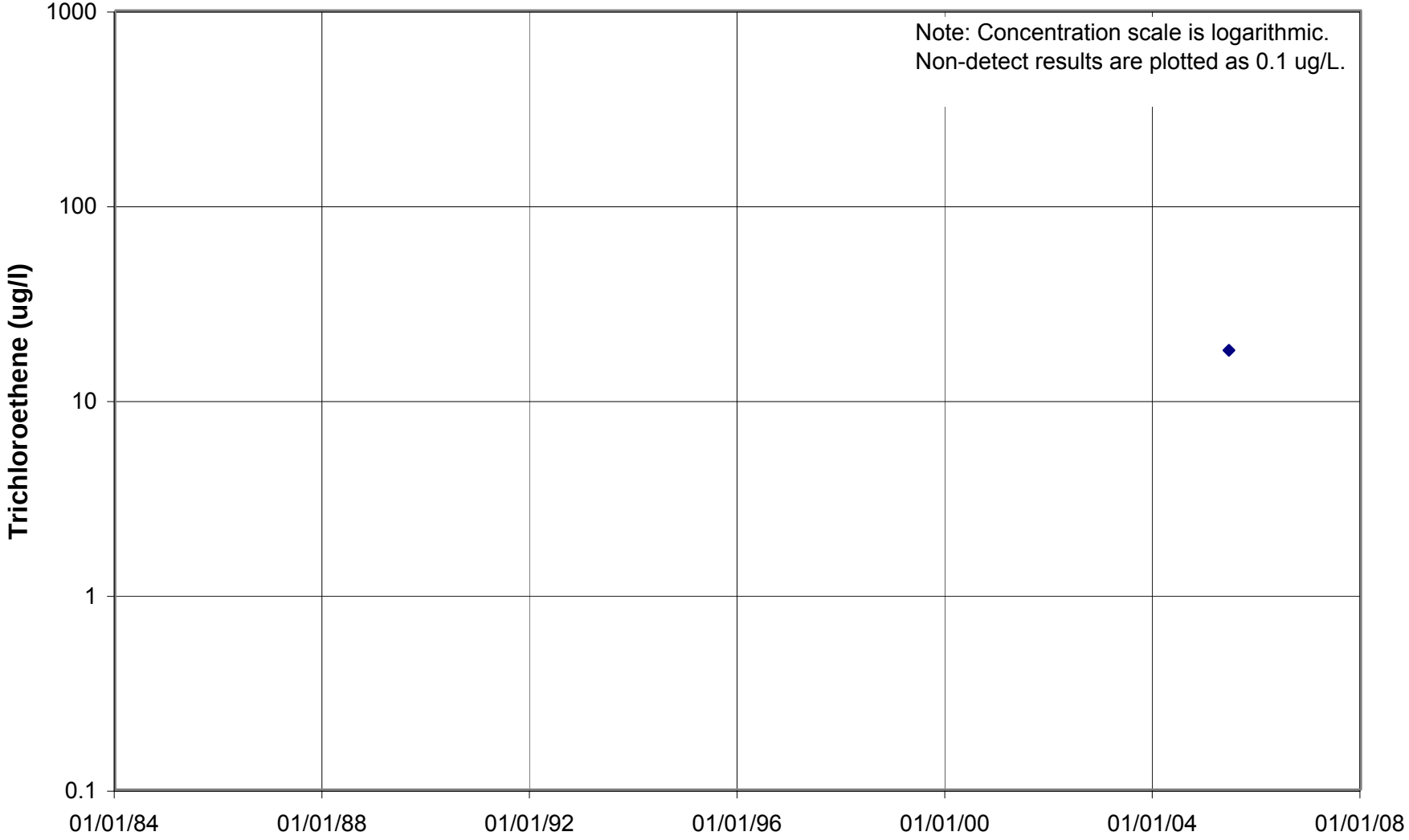
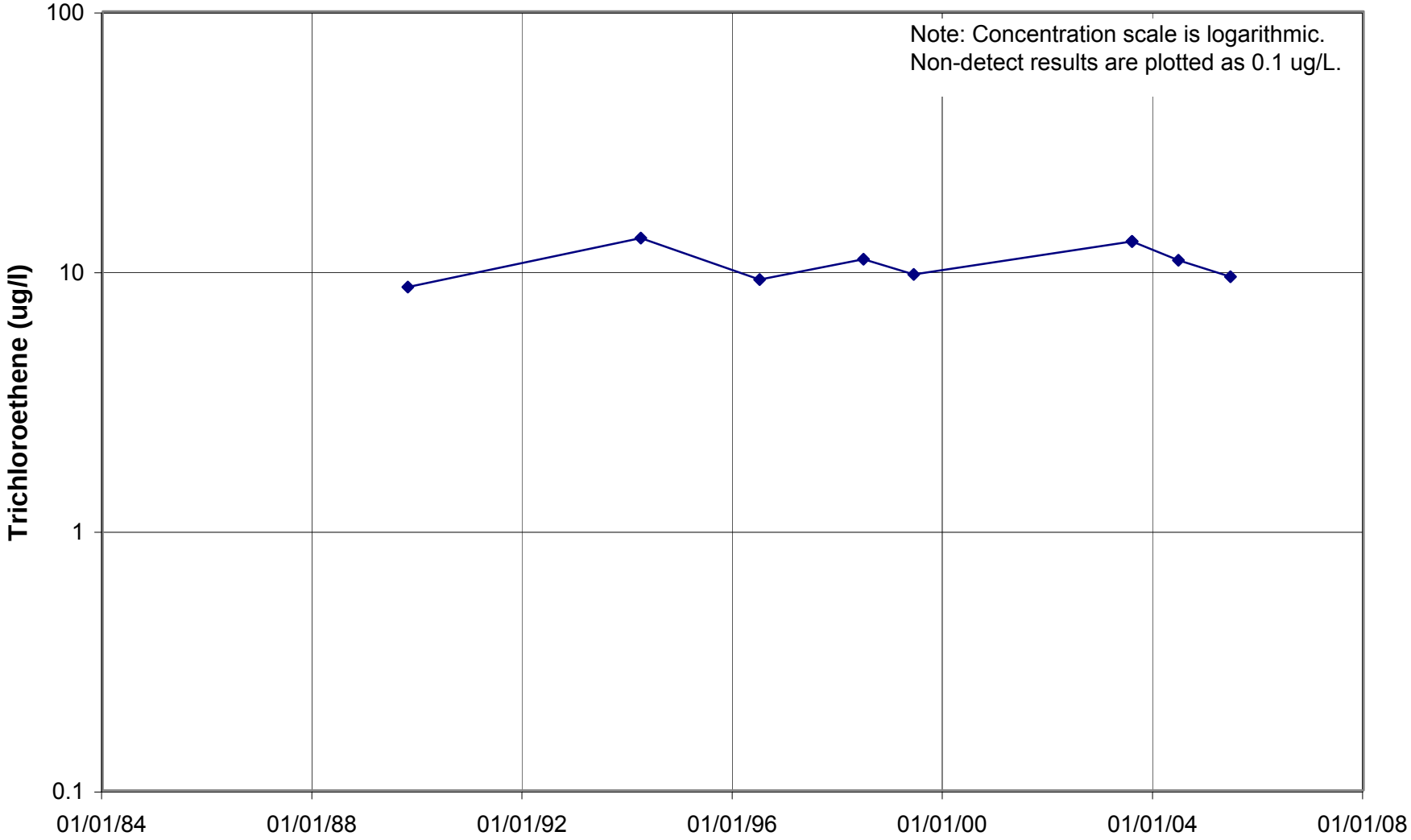


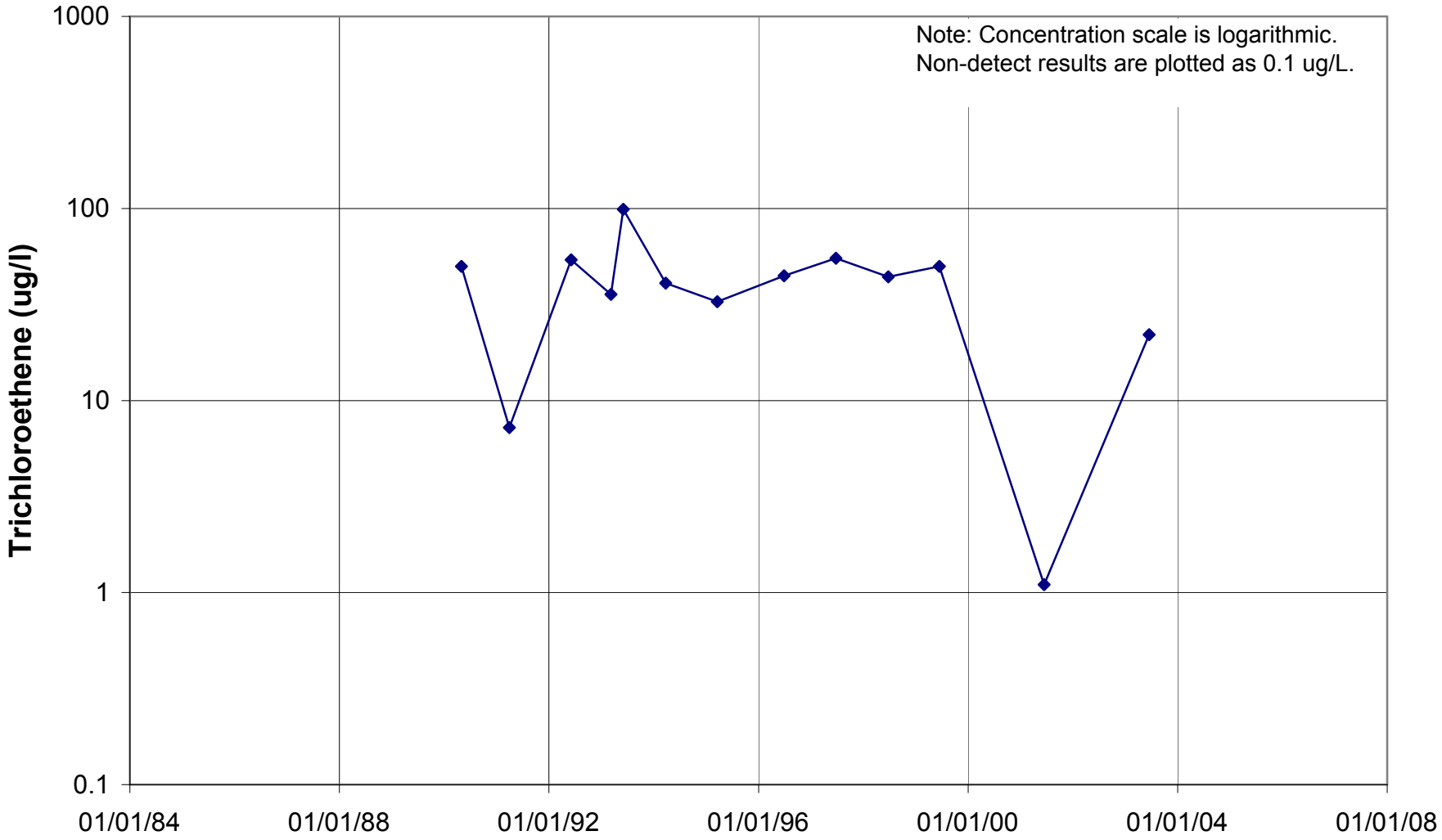
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

206688



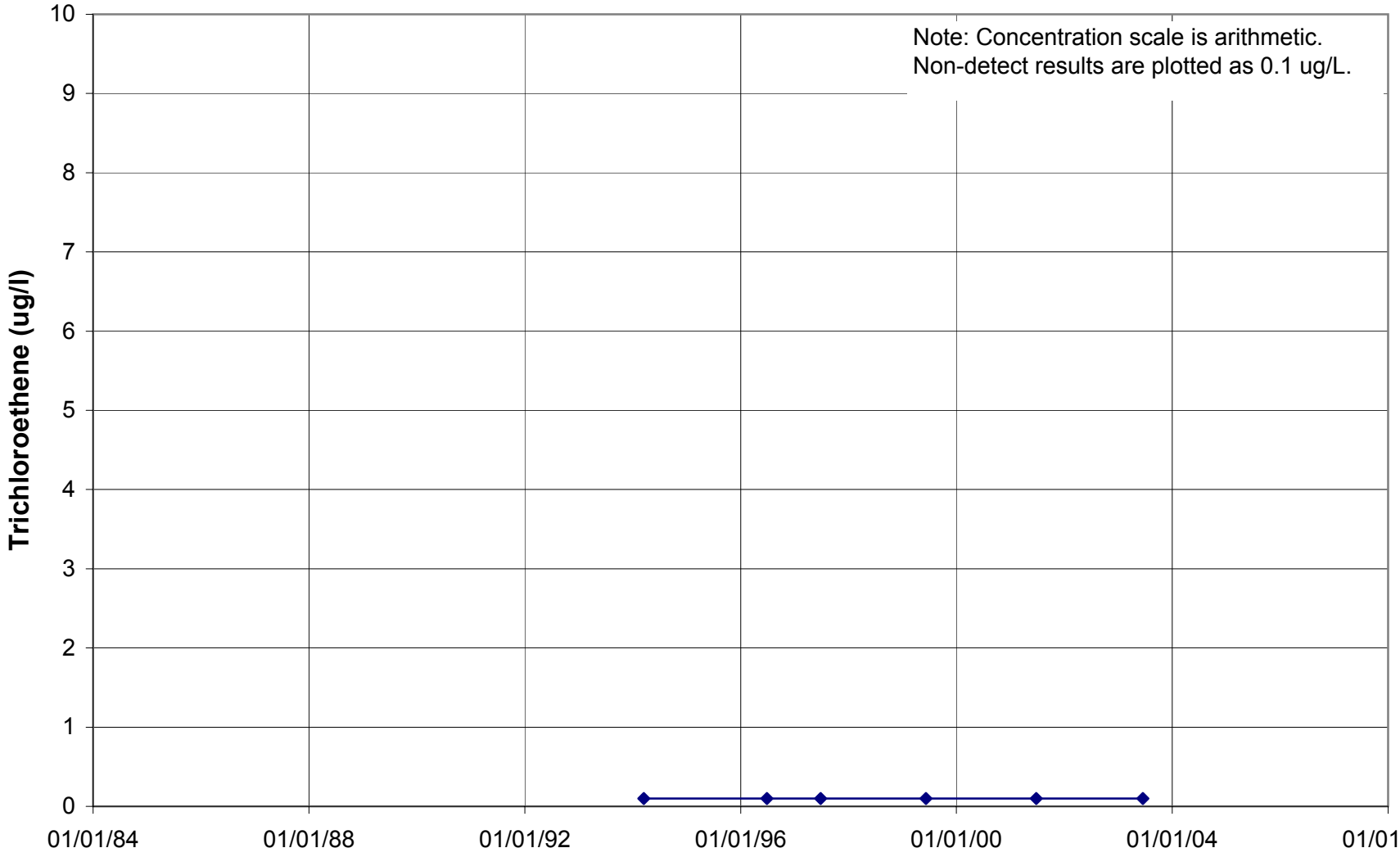
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

234546



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

234549



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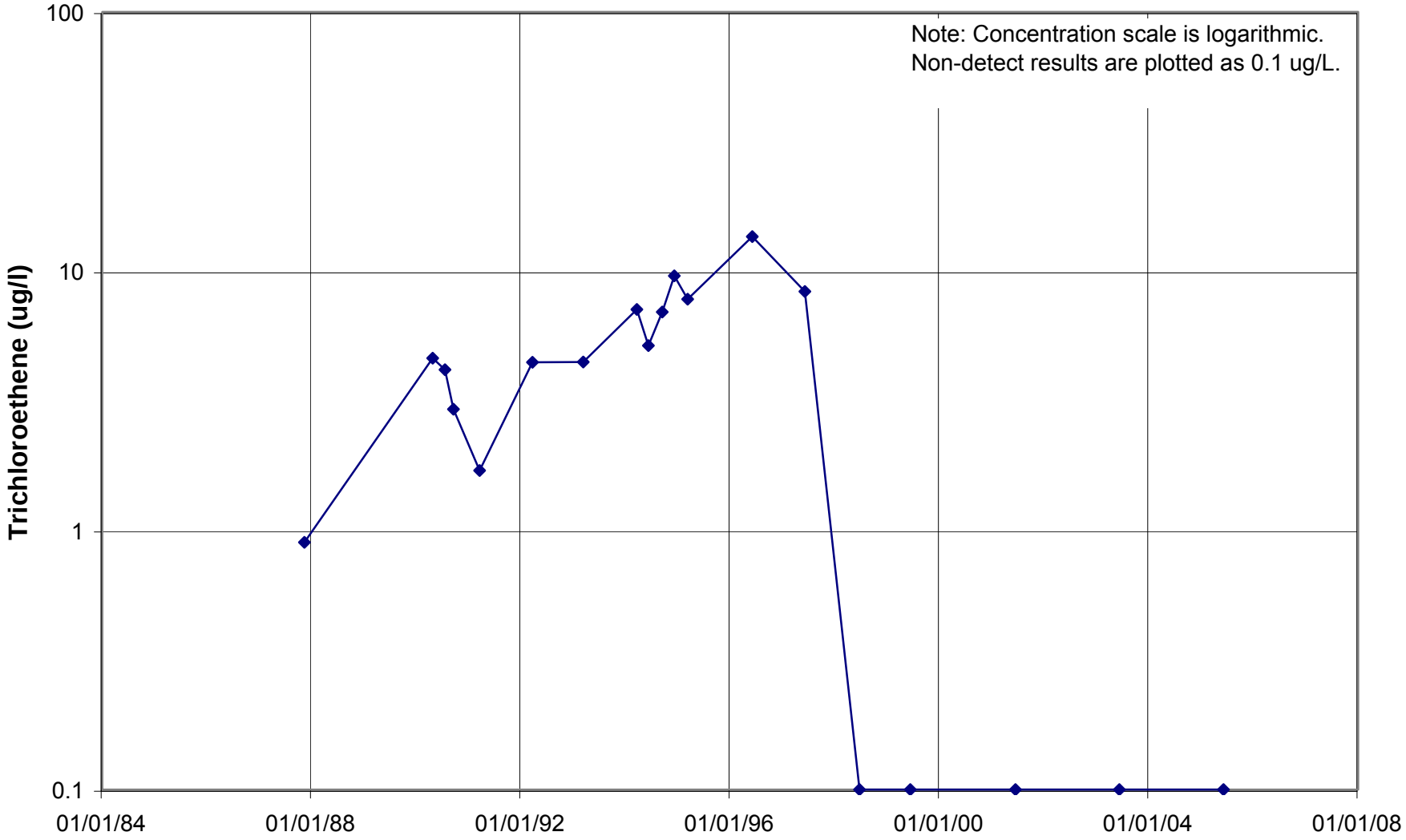
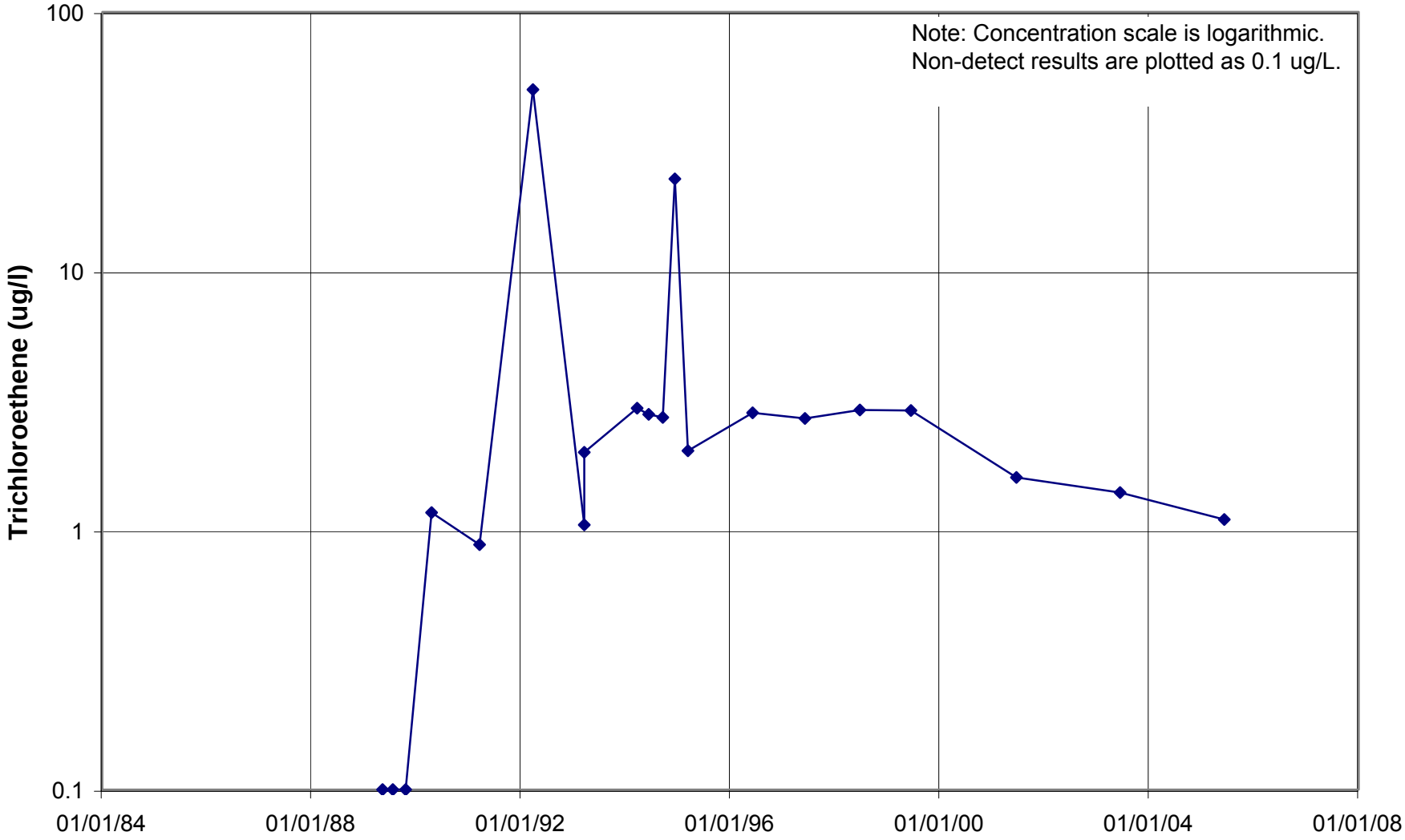
409547



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

409548



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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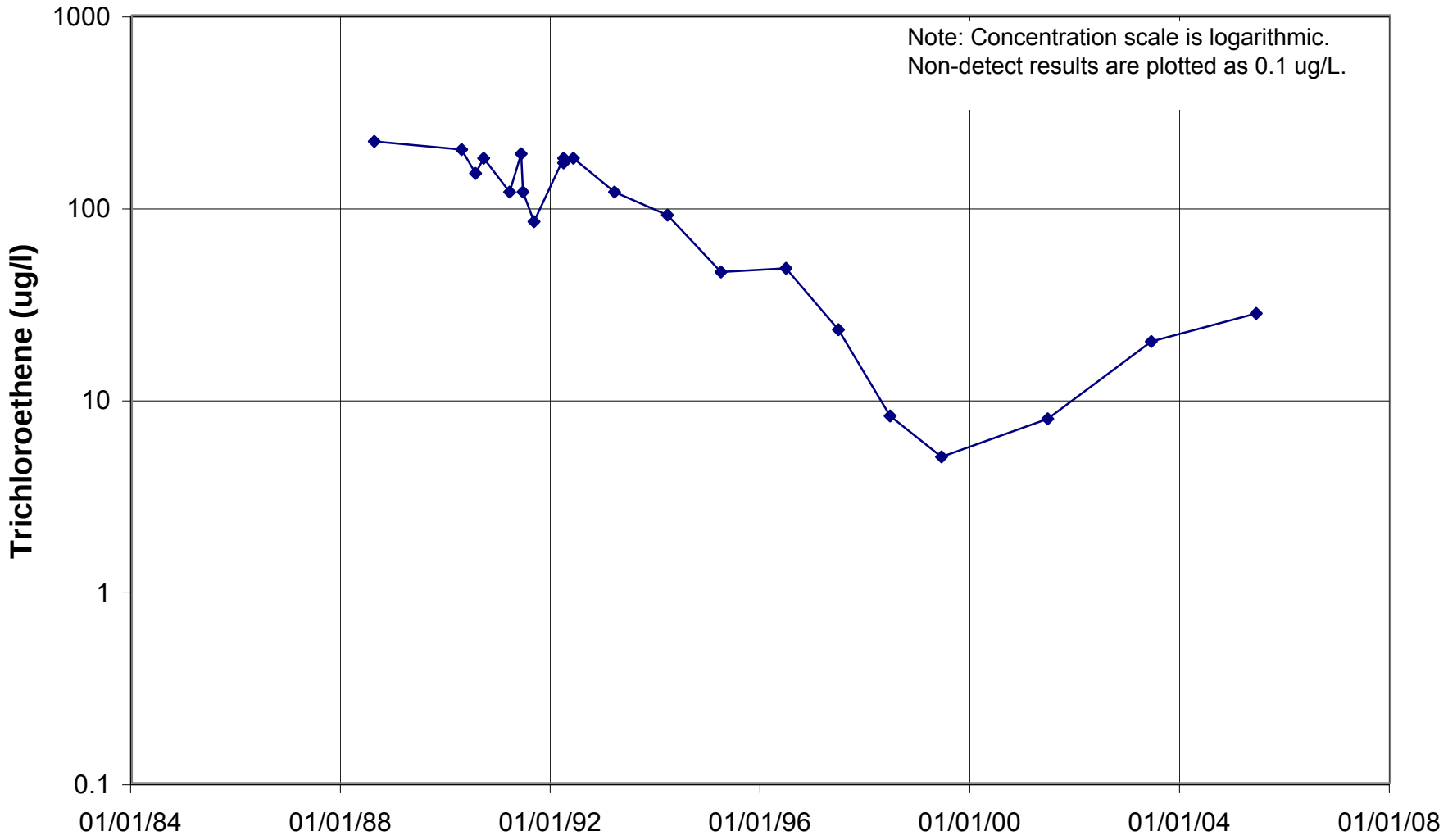
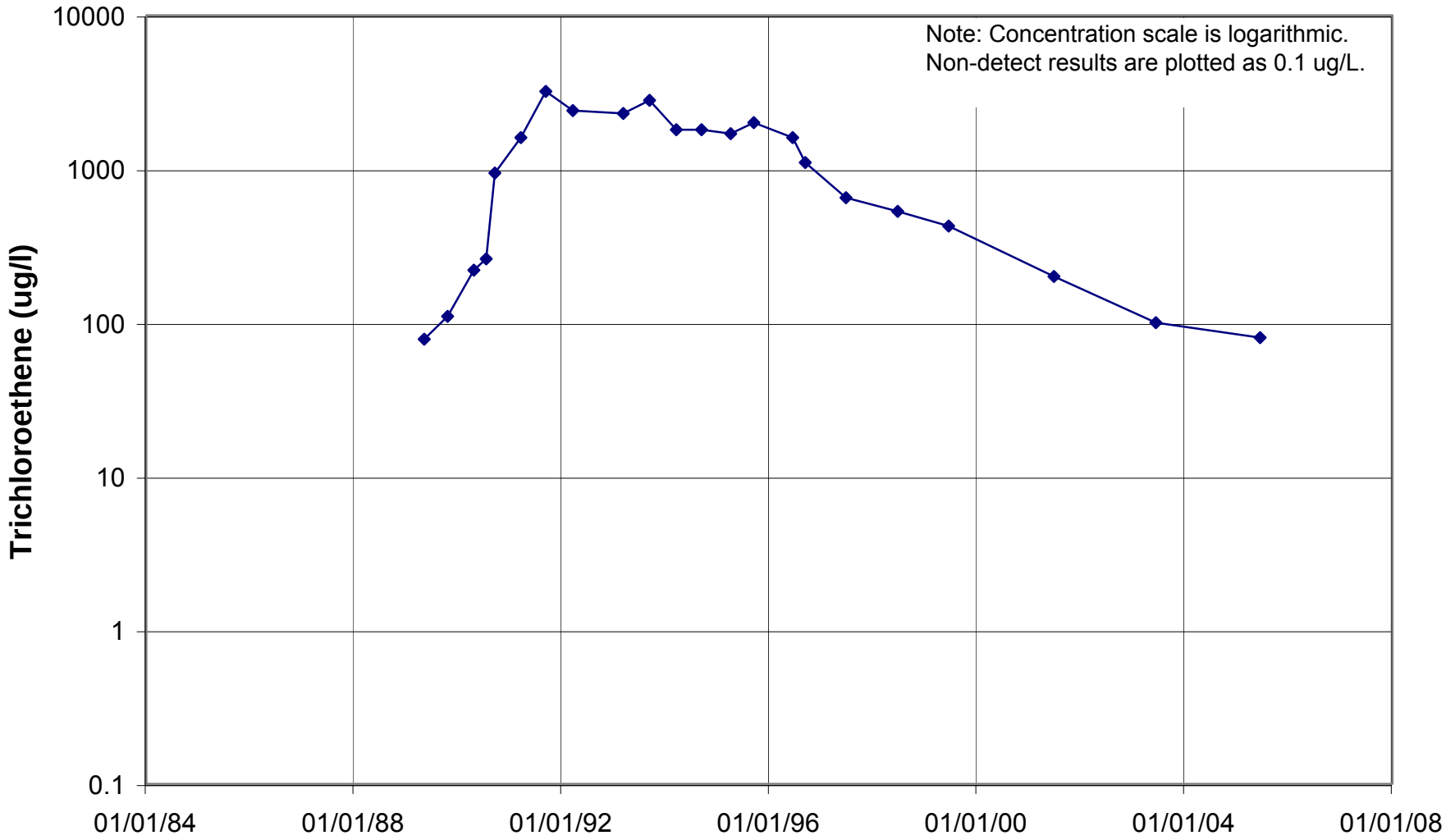


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

409550



TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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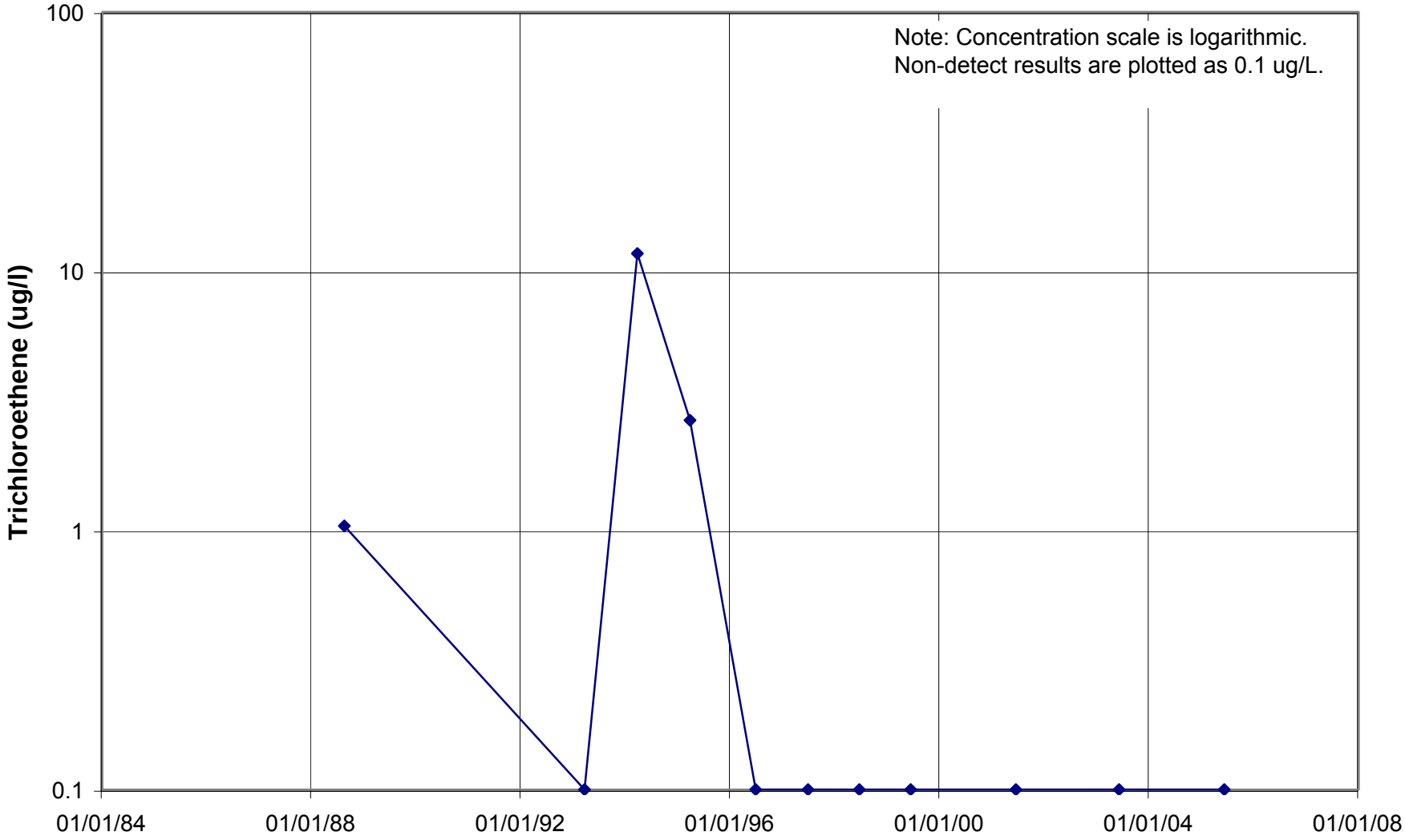
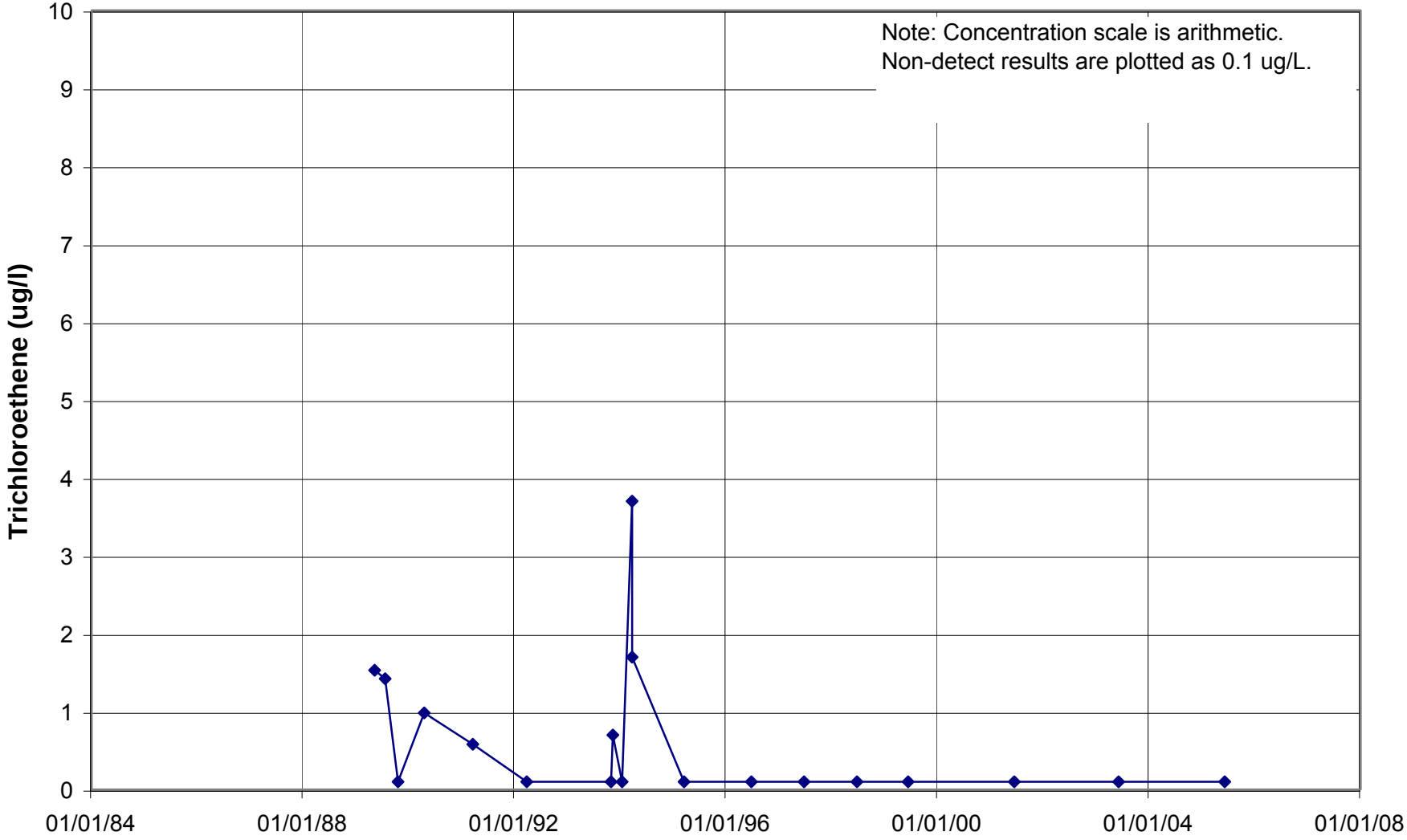


TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

409556



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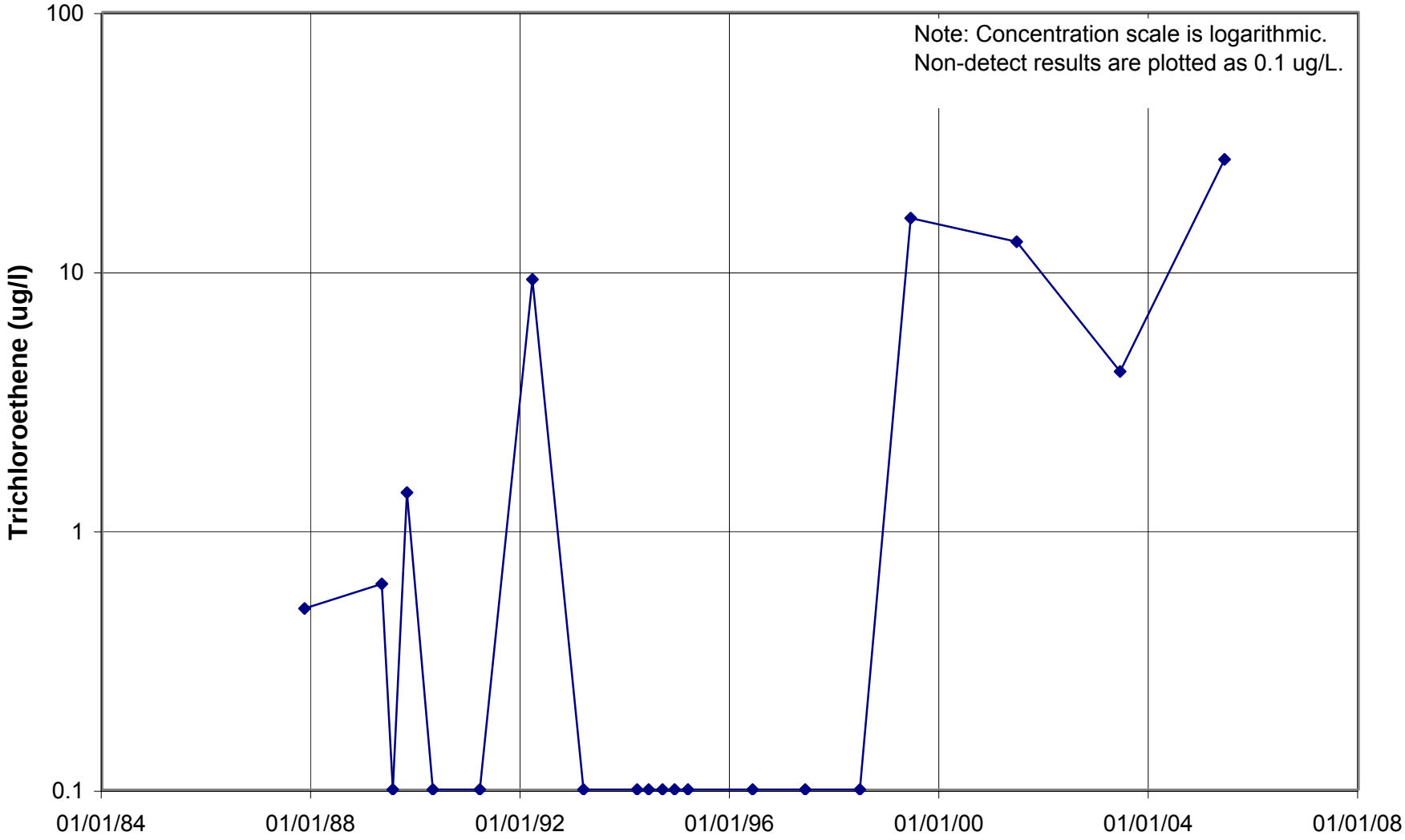

TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

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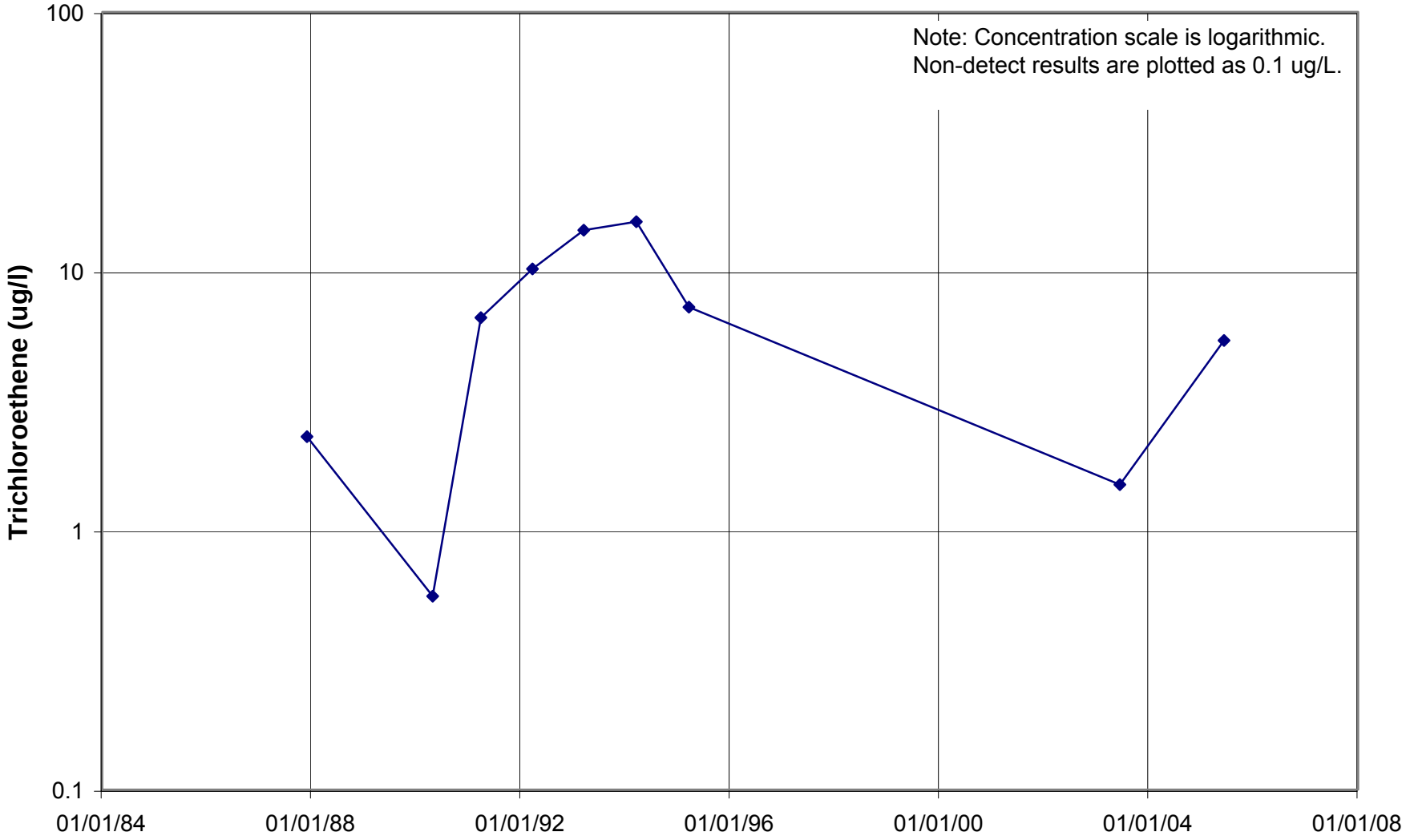
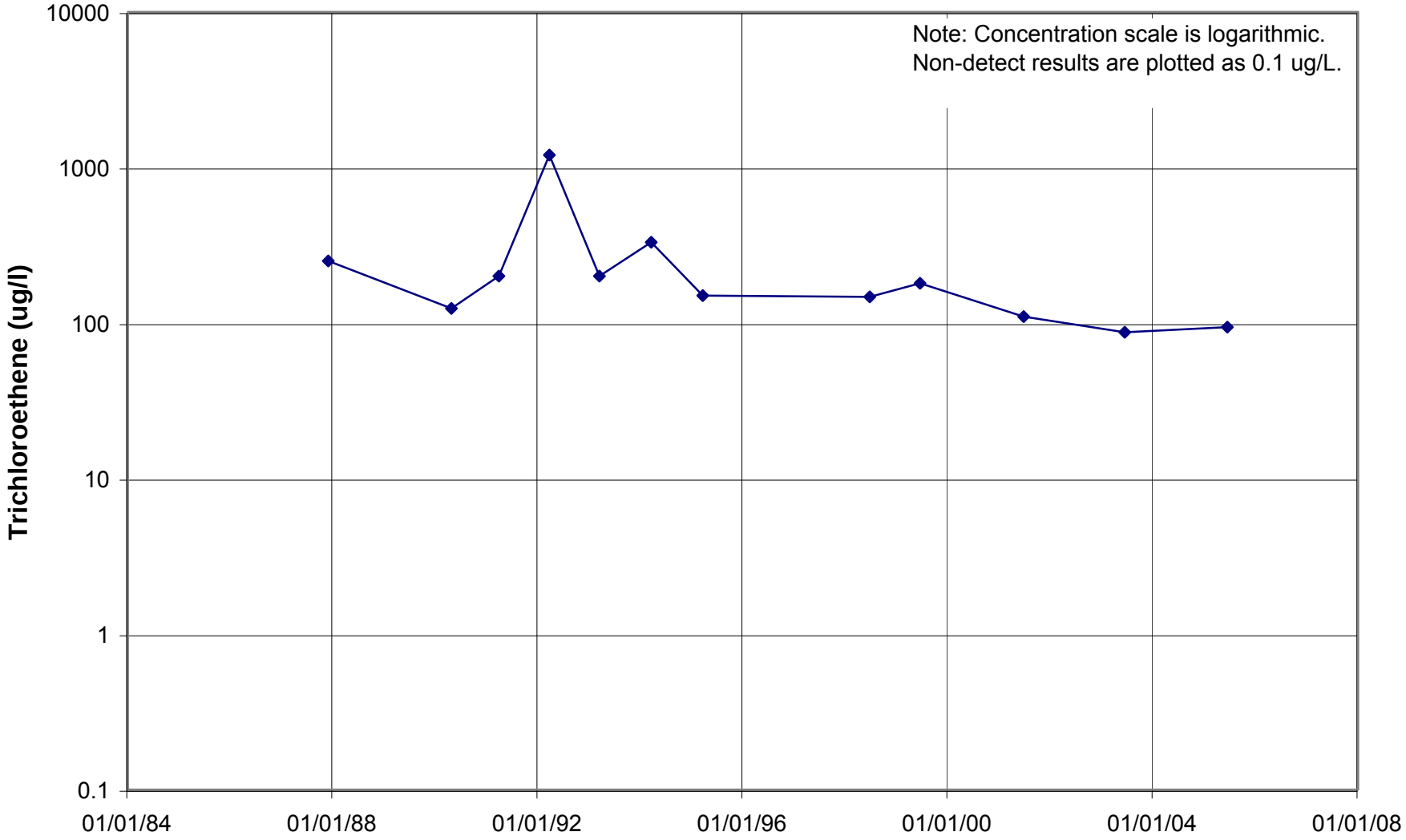


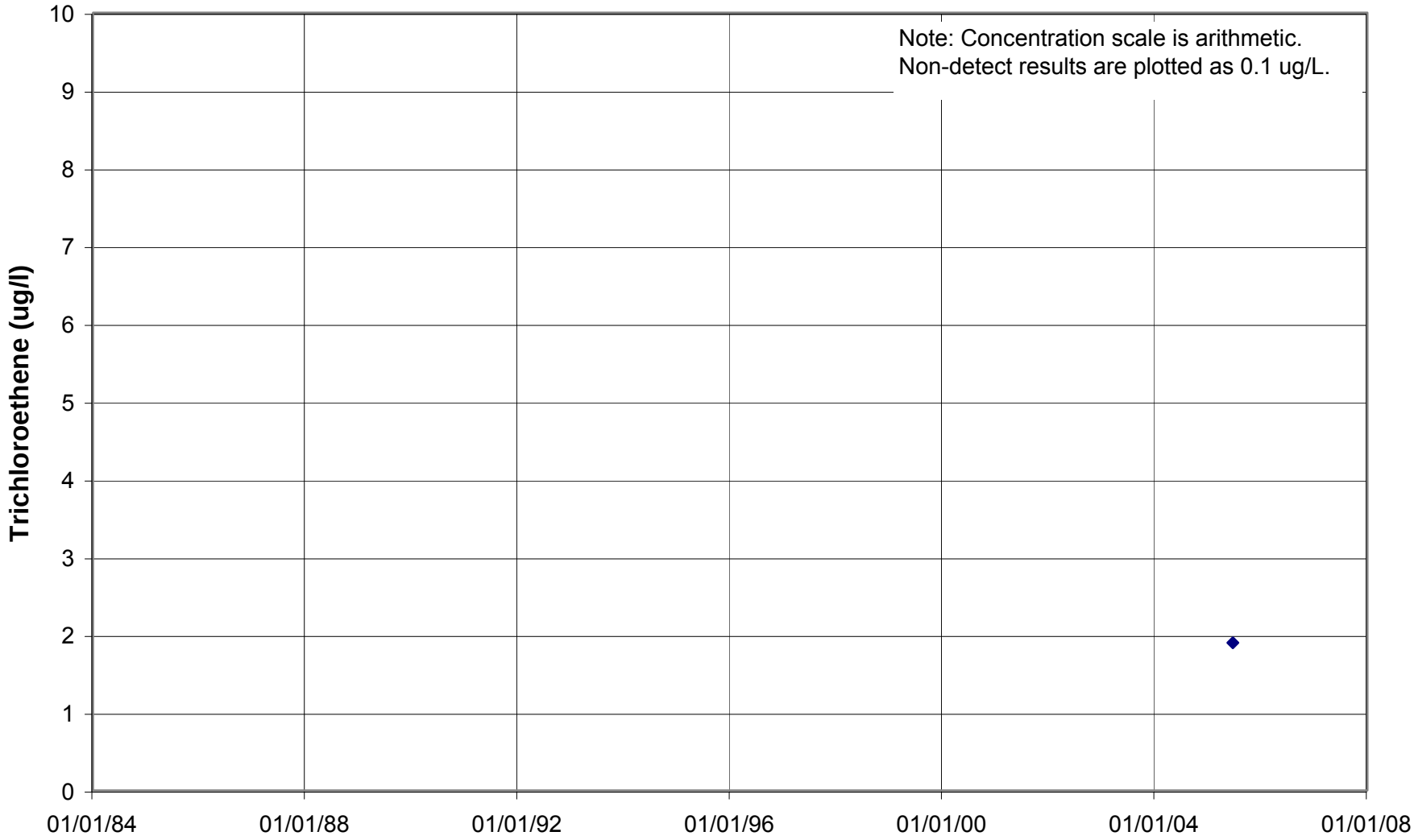
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

409597



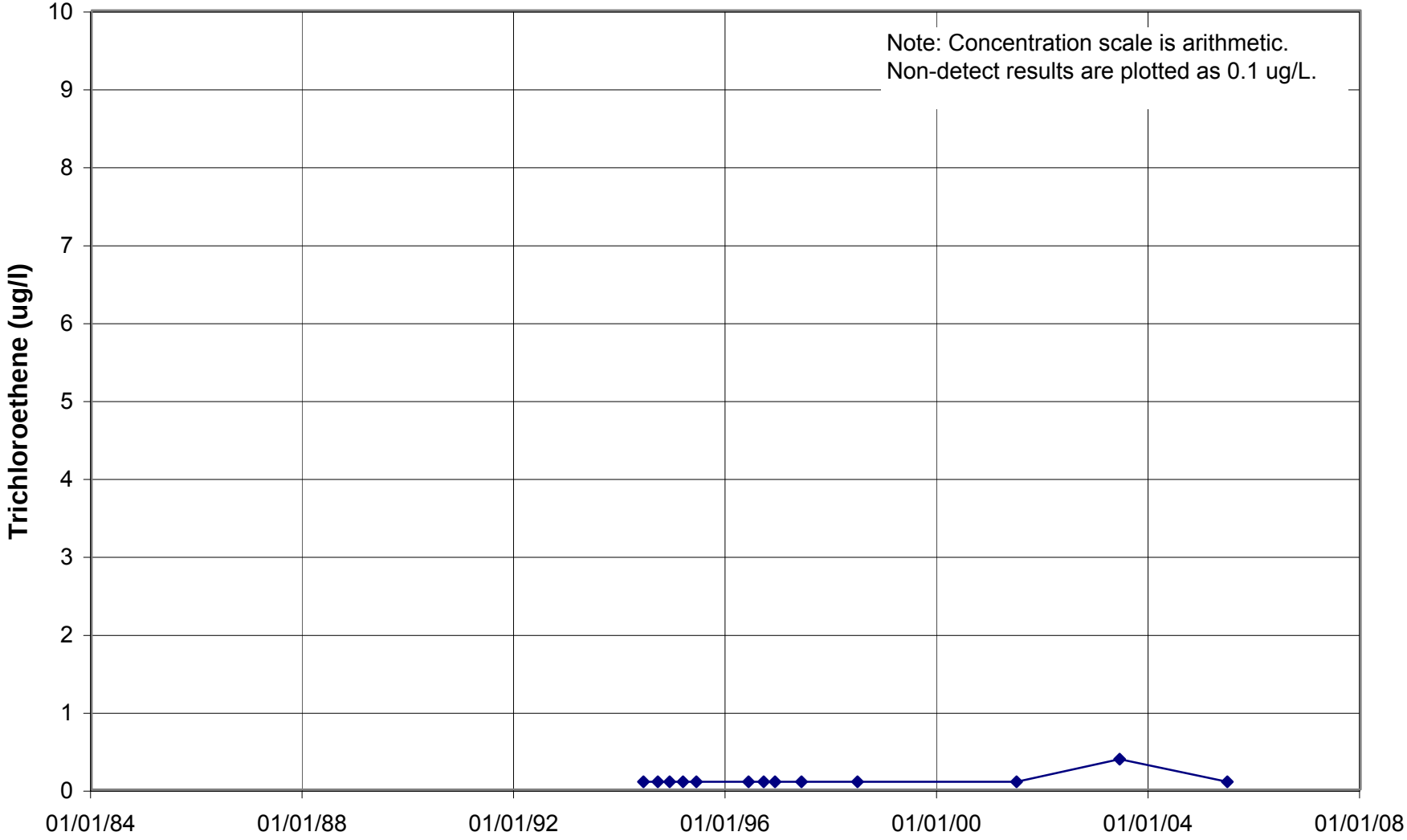
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

447894



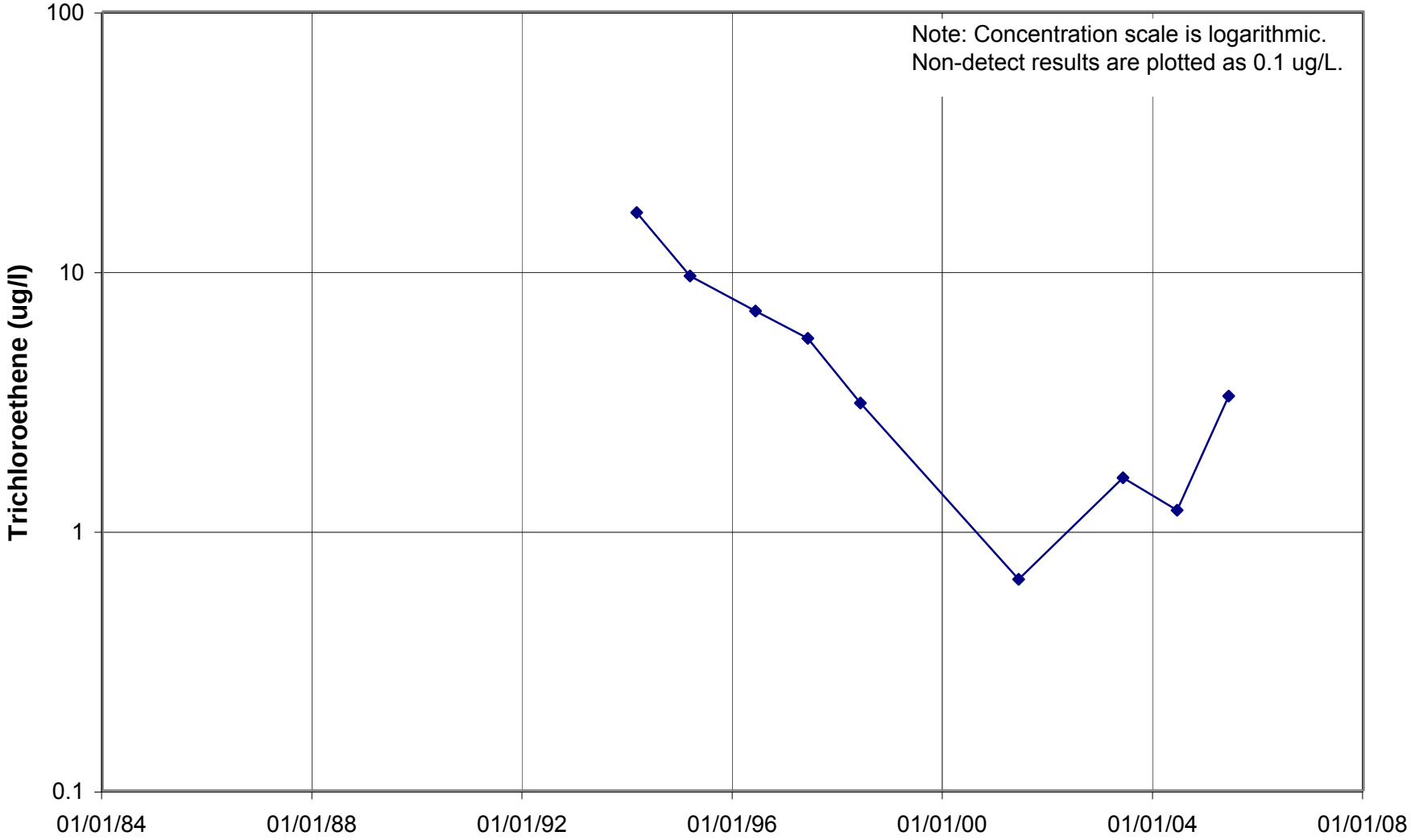
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

476837 (MW15H)



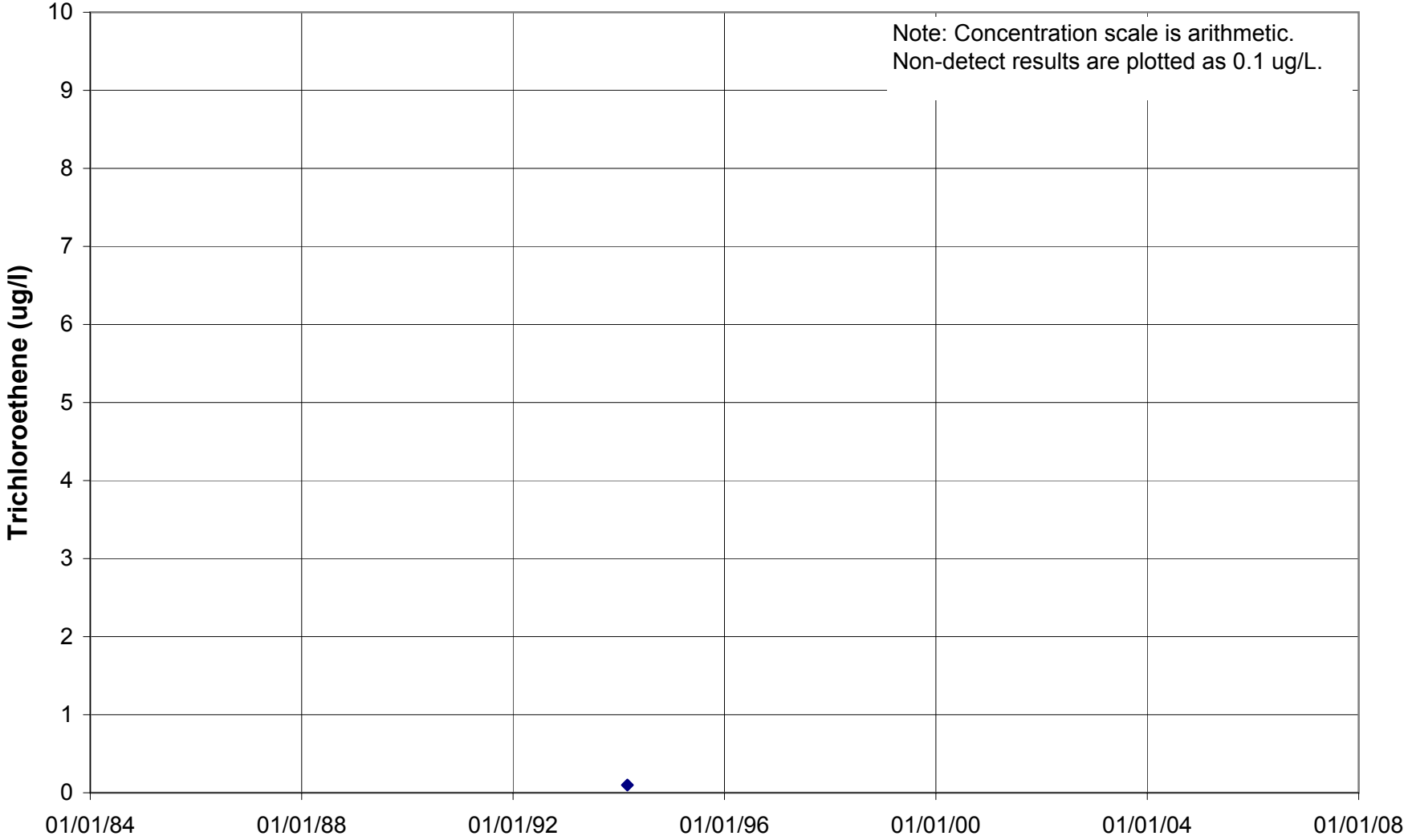
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482083 (K04MW)



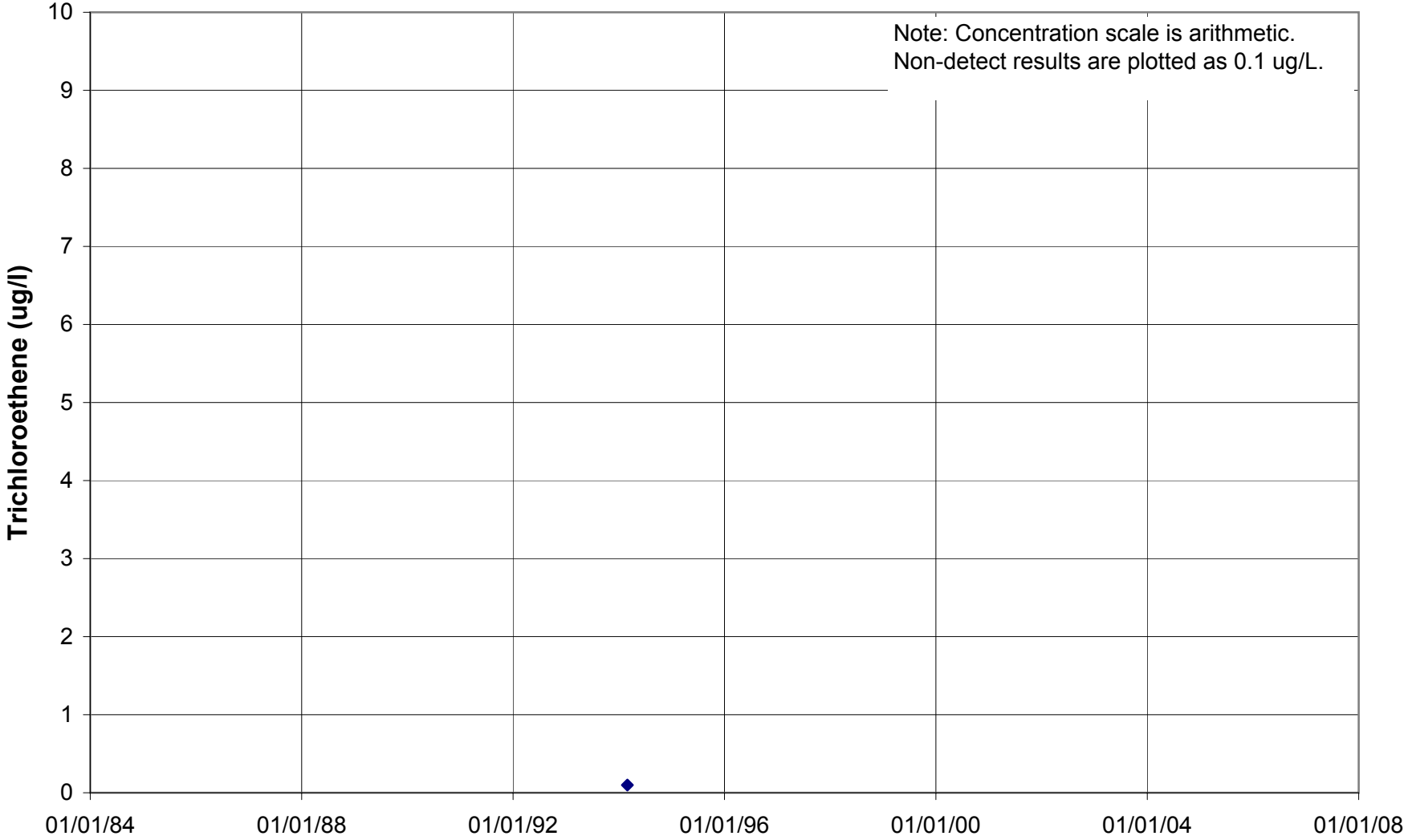
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482084 (K02MW)



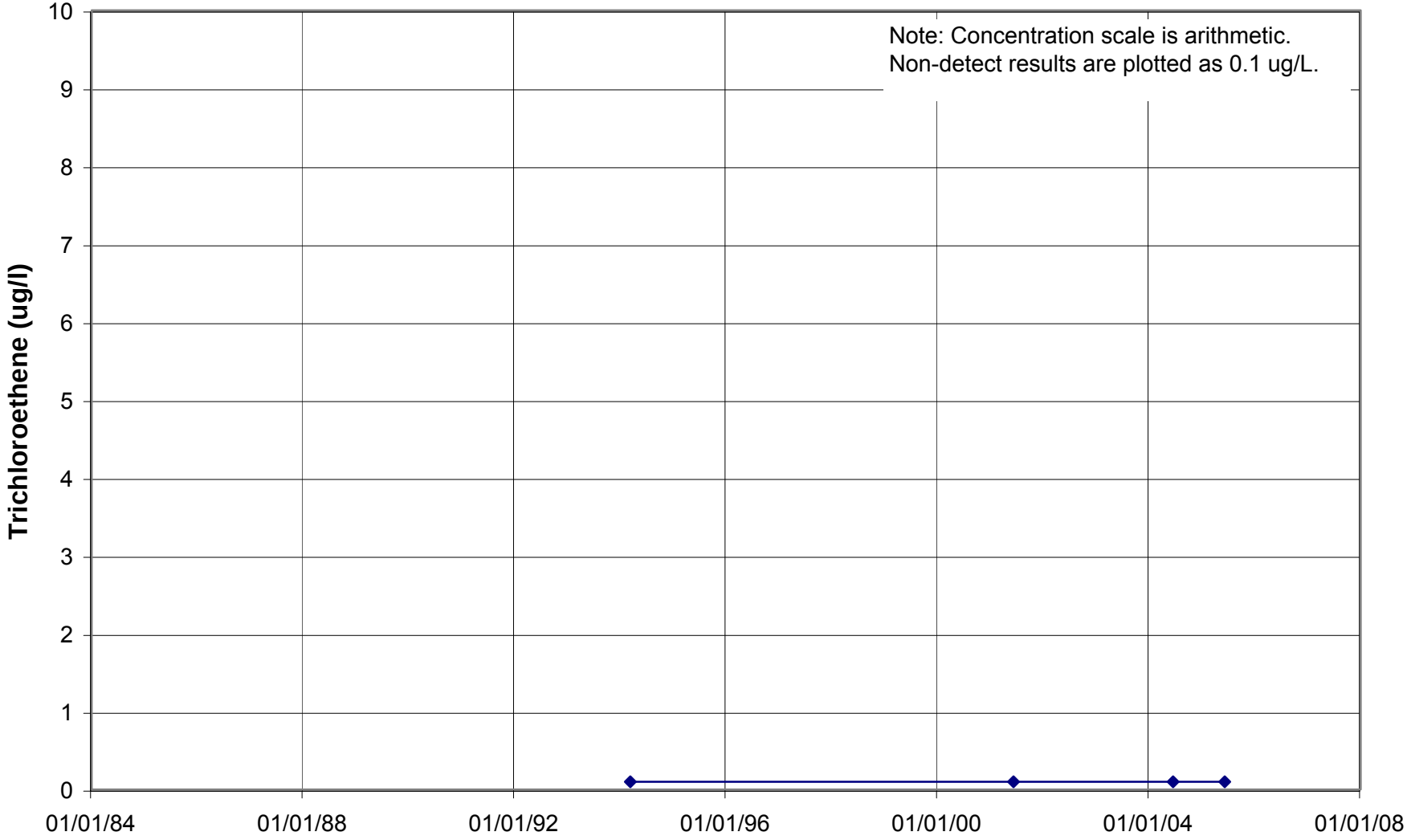
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482085 (K01MW)



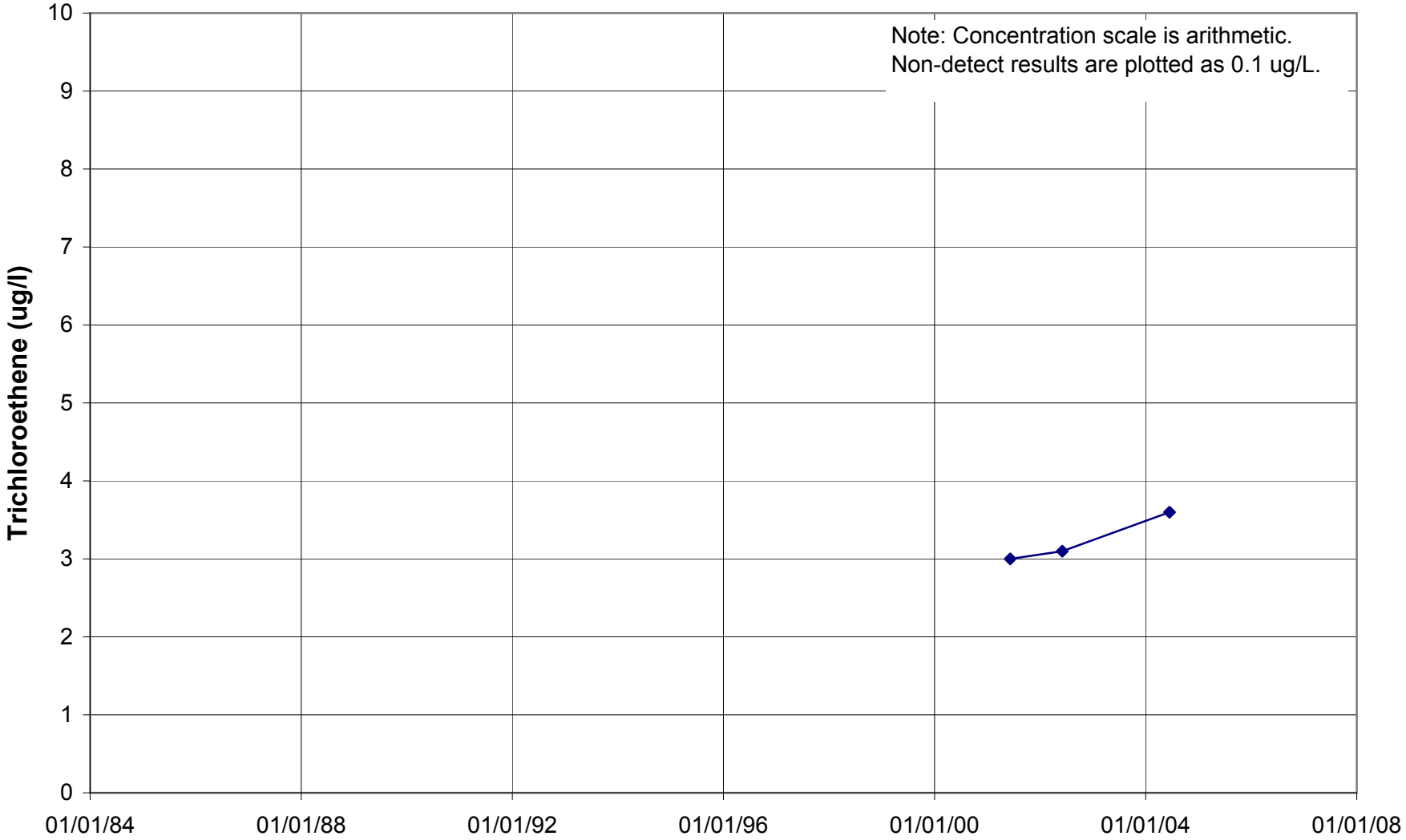
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482086 (I01MW)



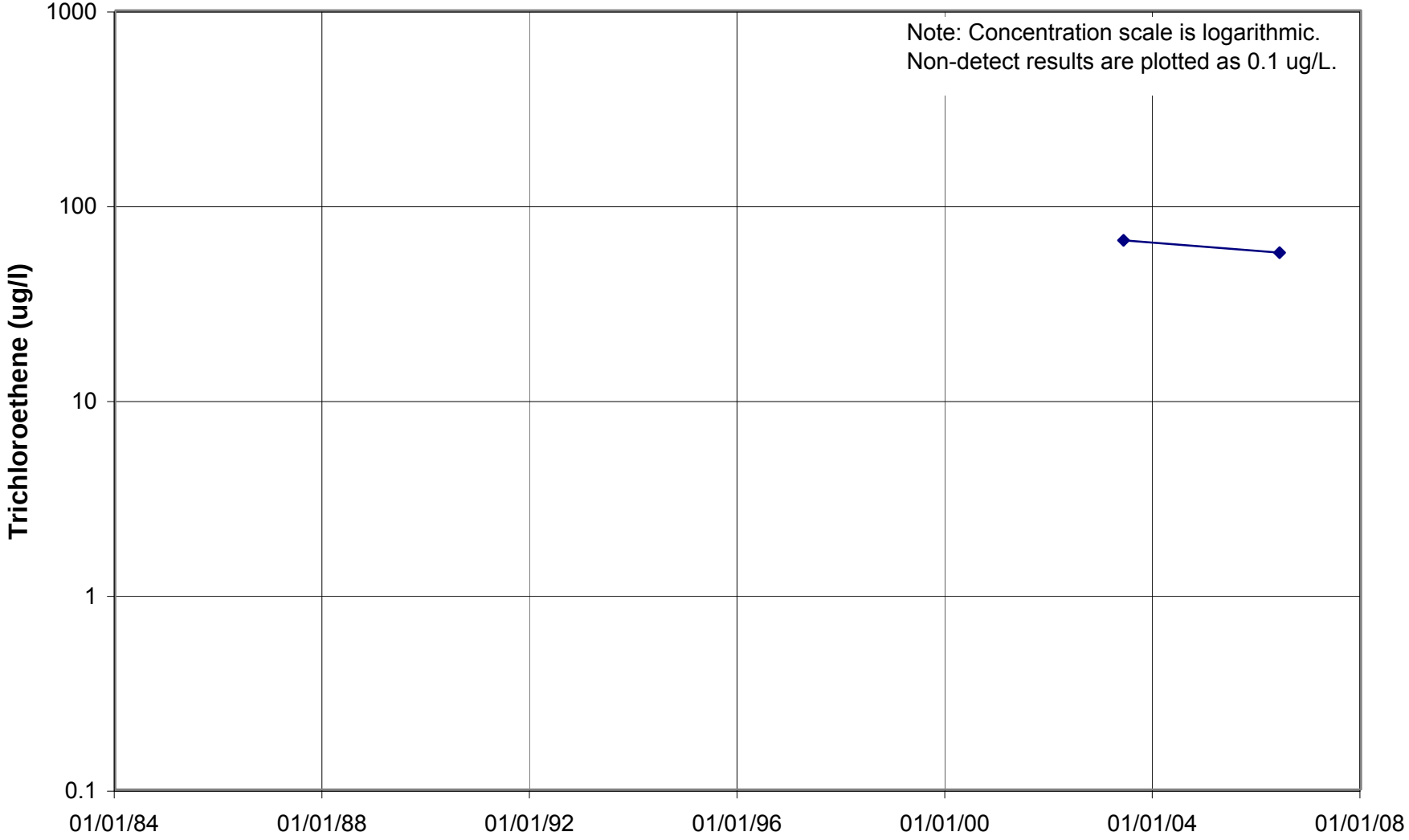
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482087 (I05MW)



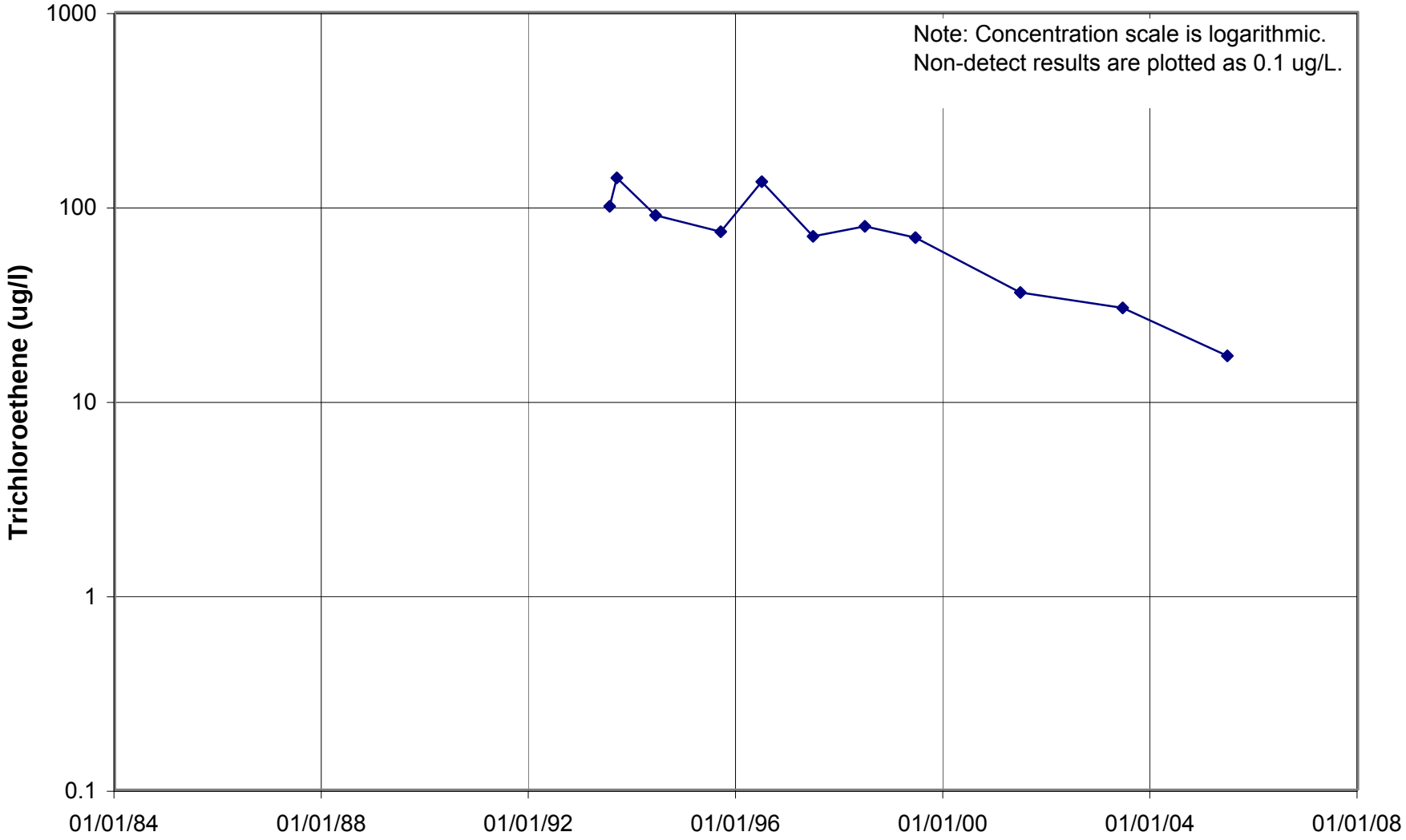
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

482089 (I04MW)



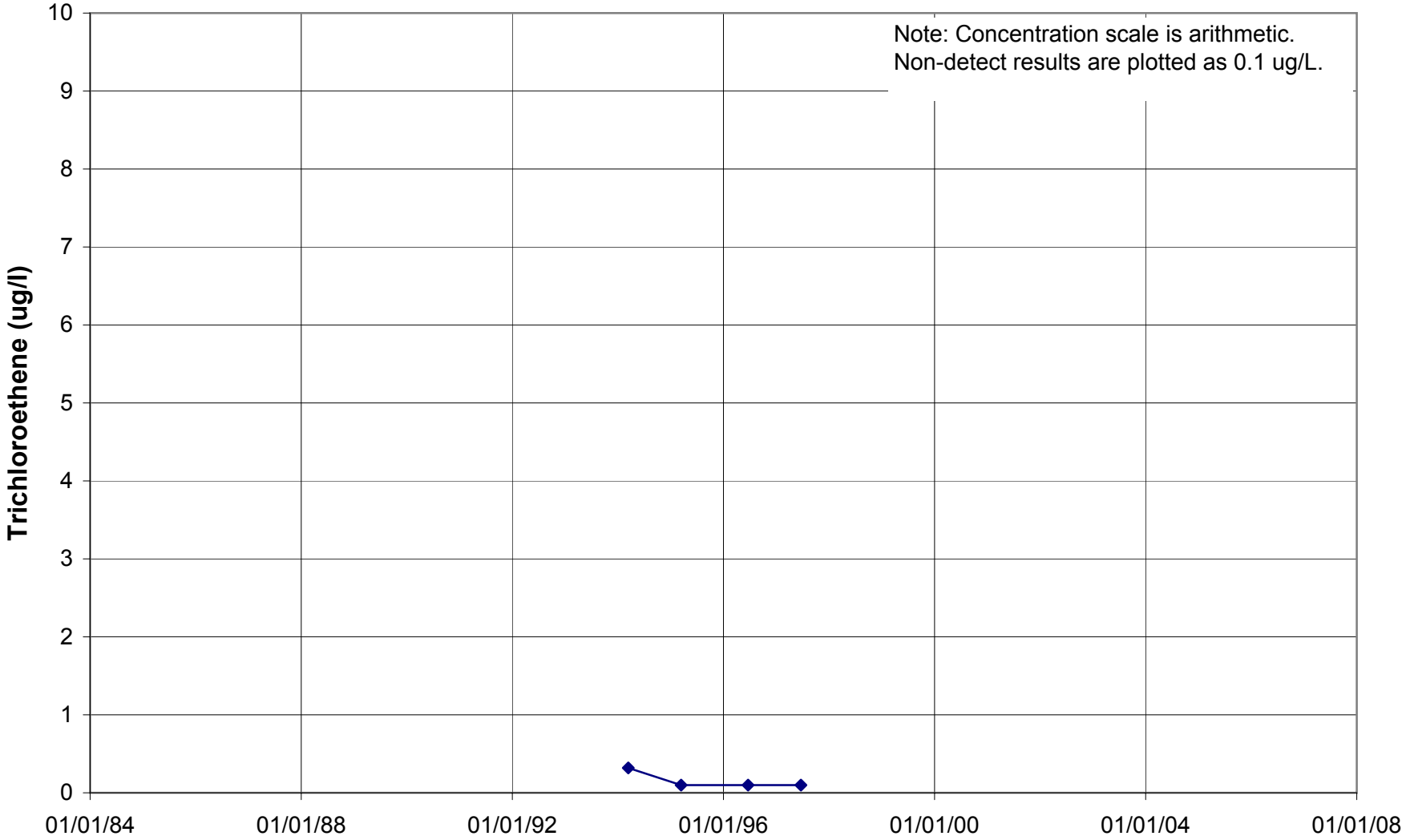
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

512761



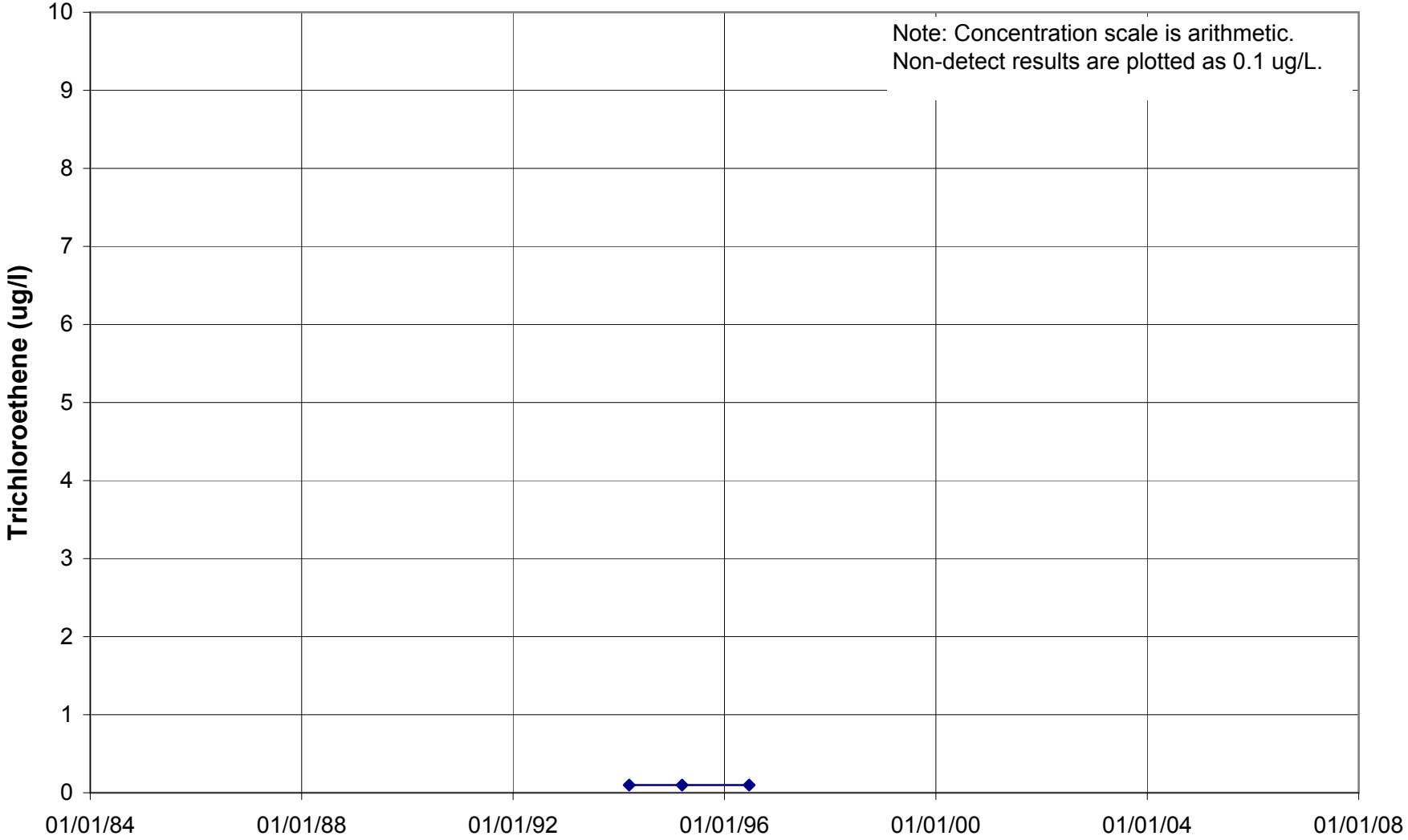
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

519288



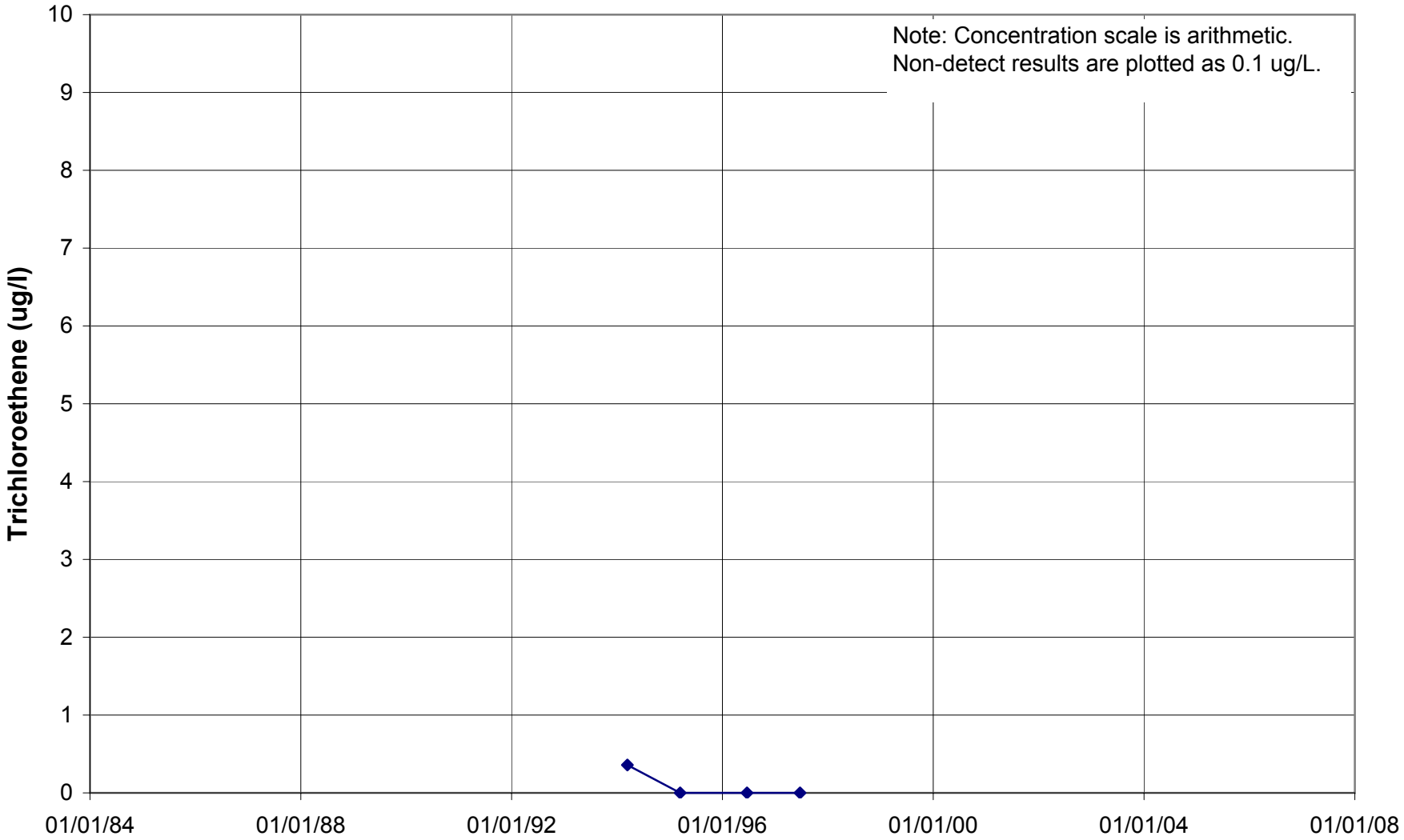
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

519289



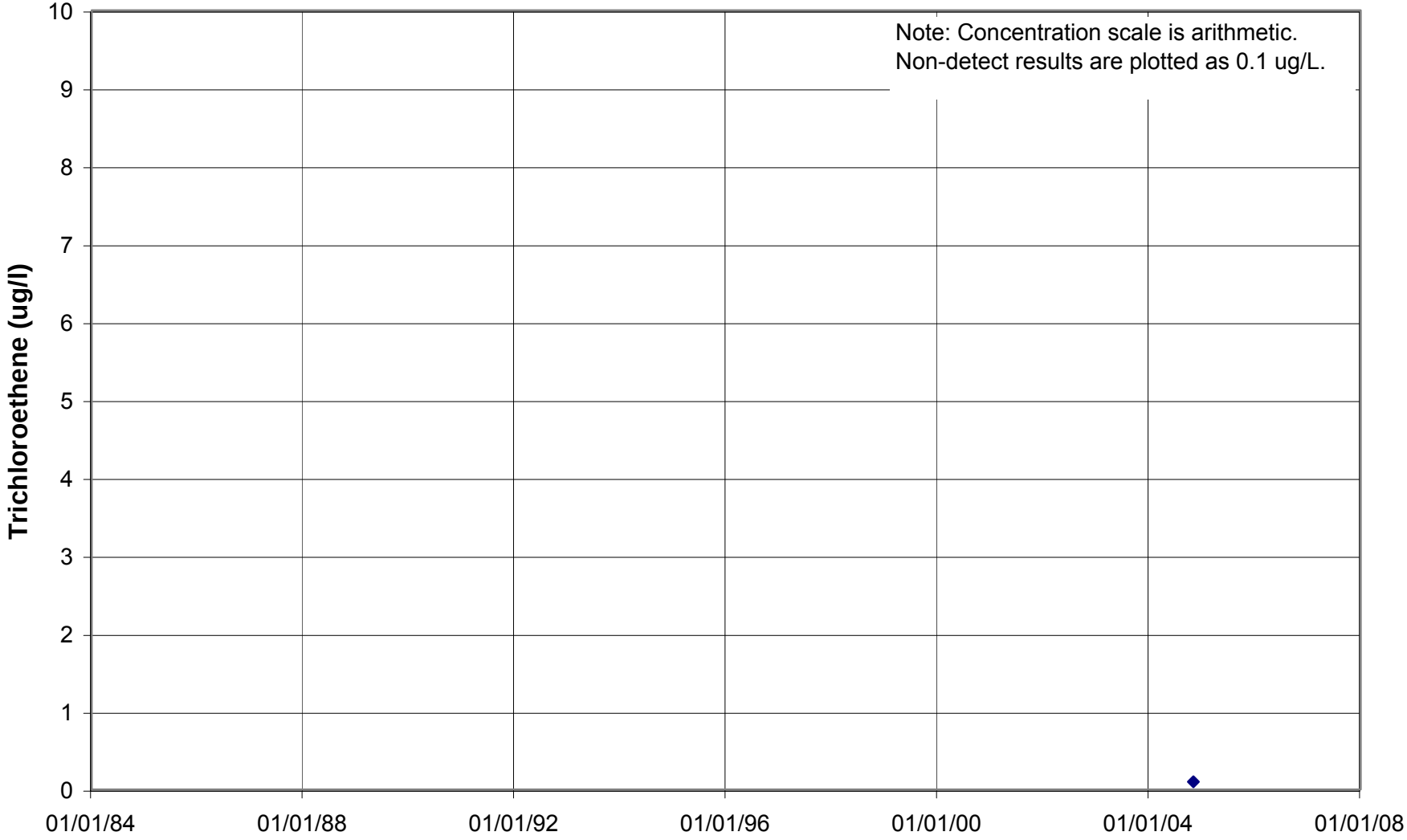
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

519290



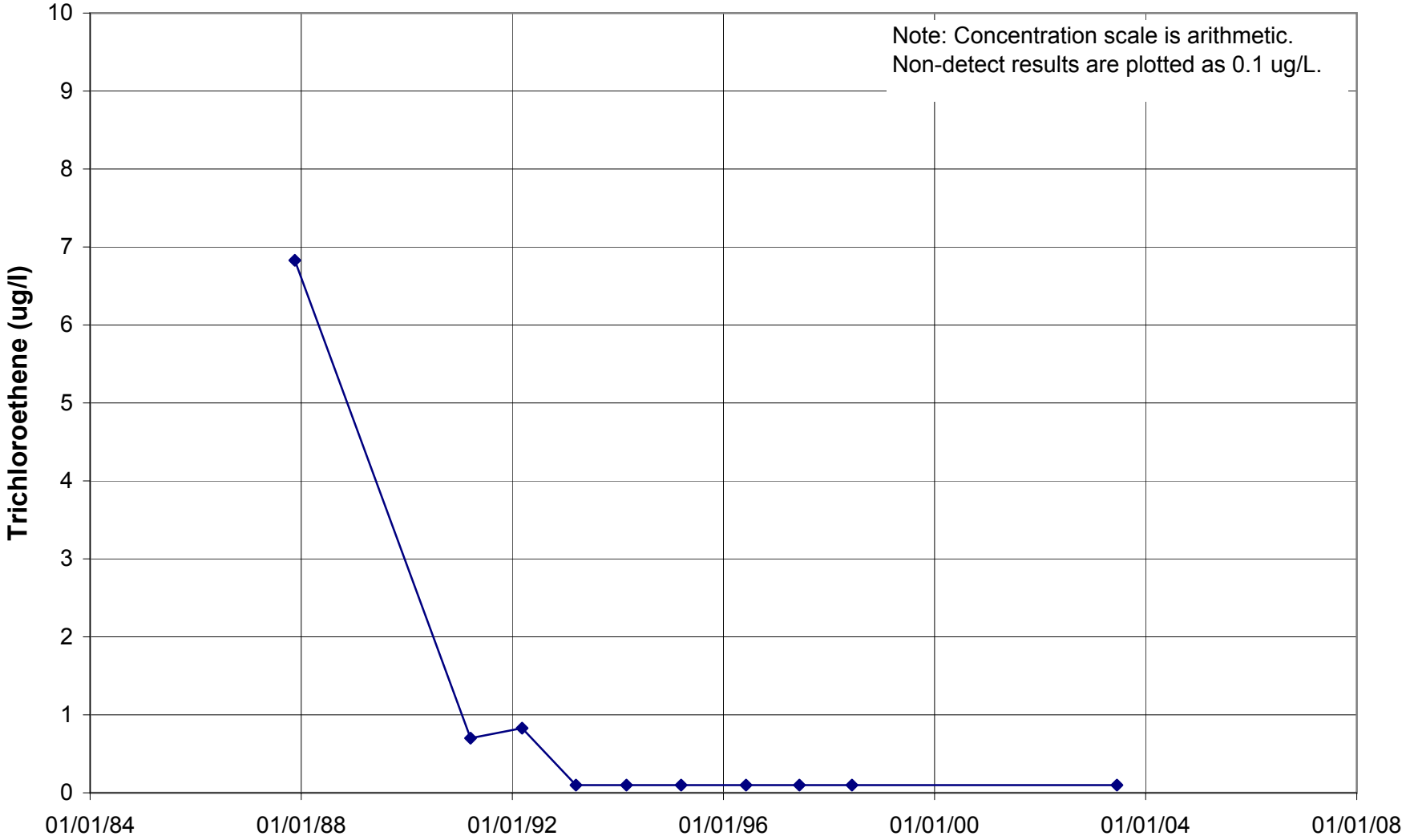
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

520931



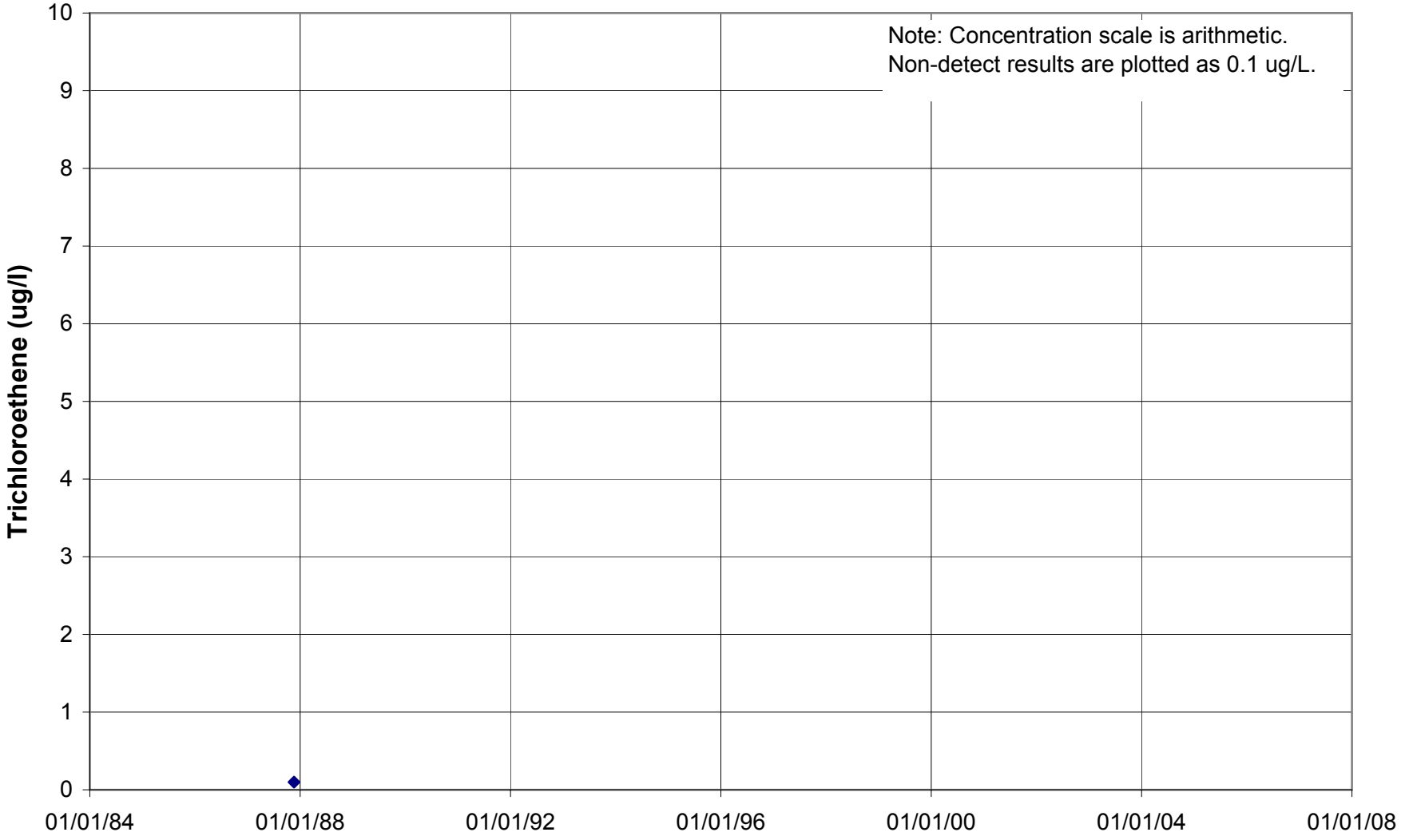
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#003



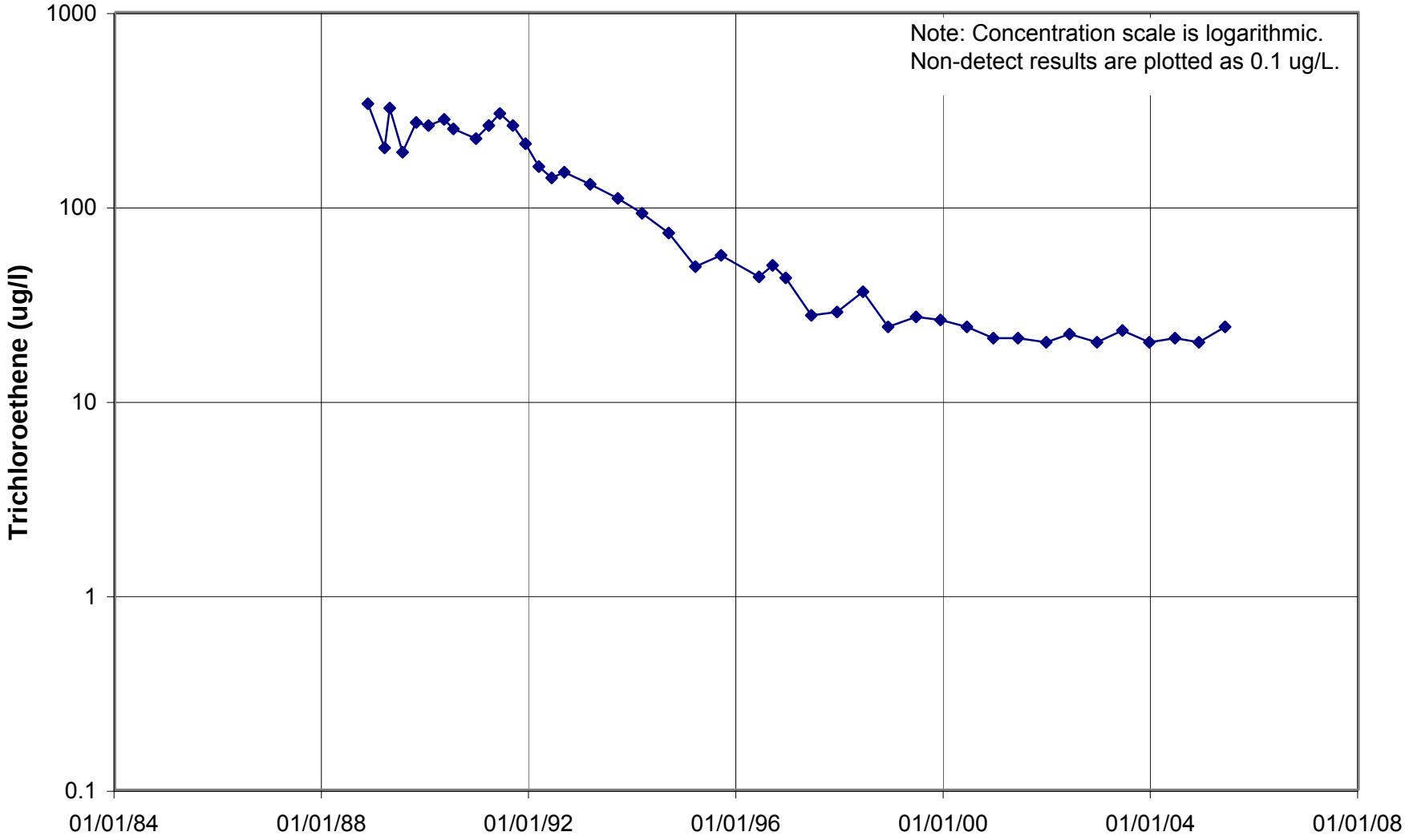
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#027



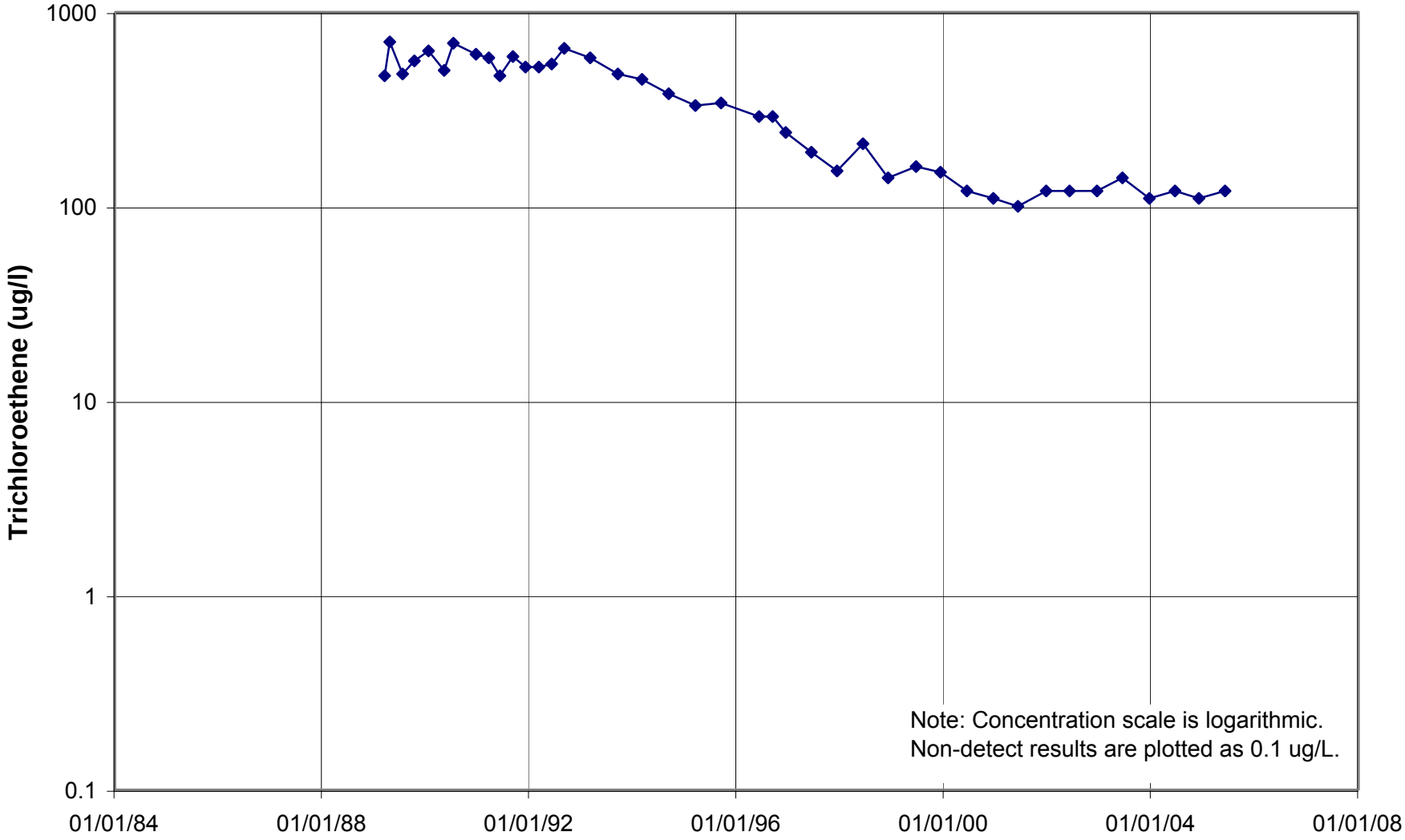
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#309 (B8)



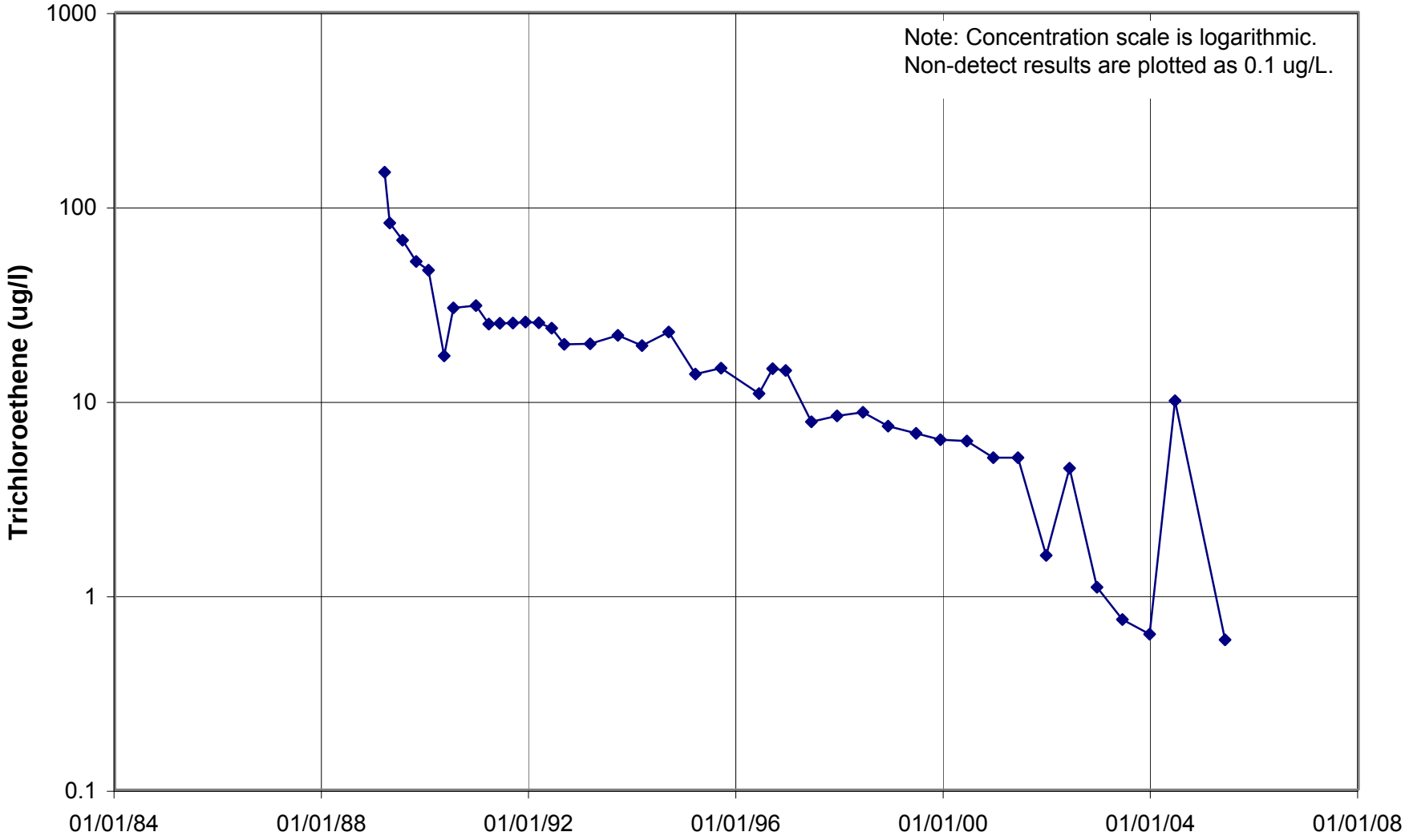
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#310 (B9)



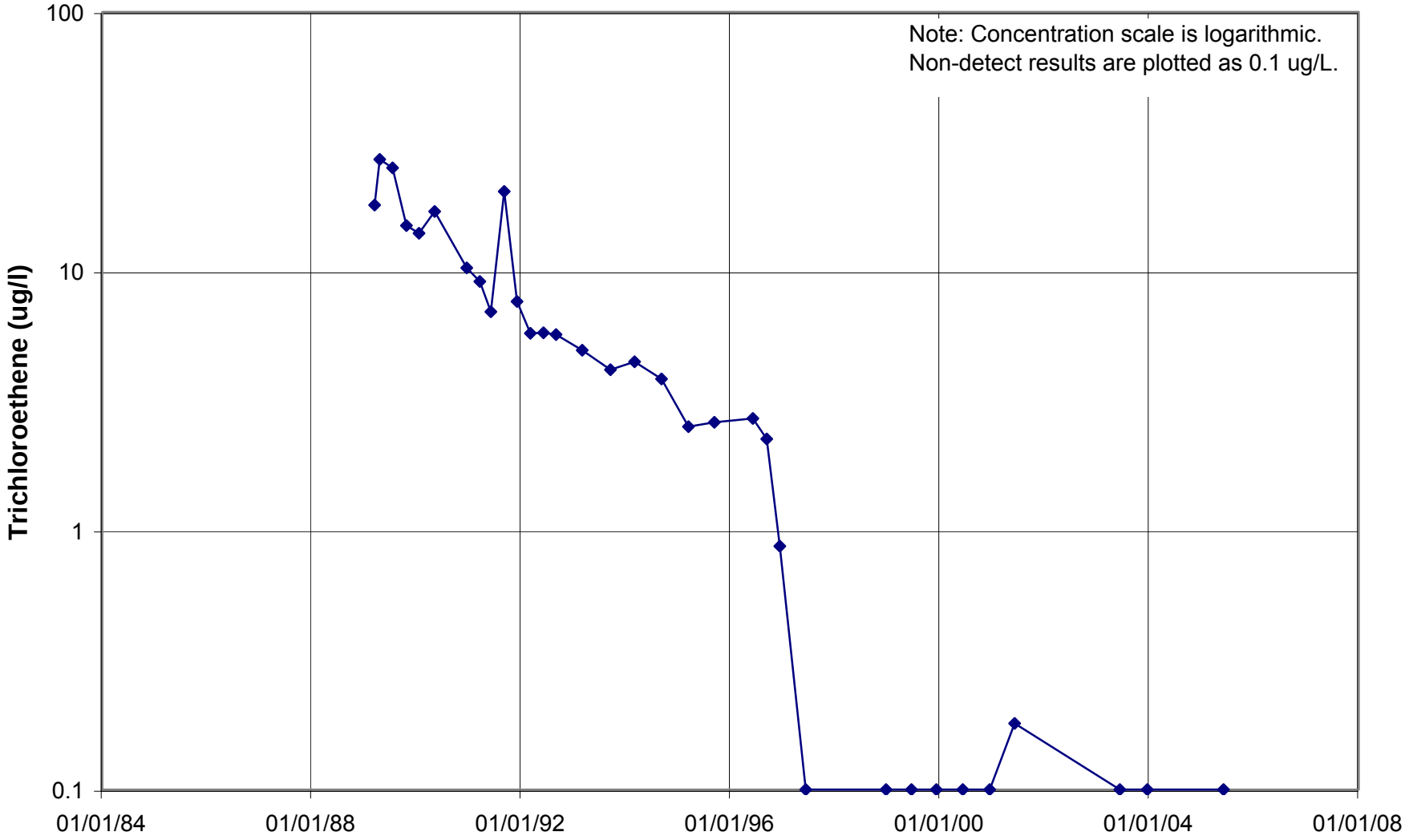
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#311 (B10)



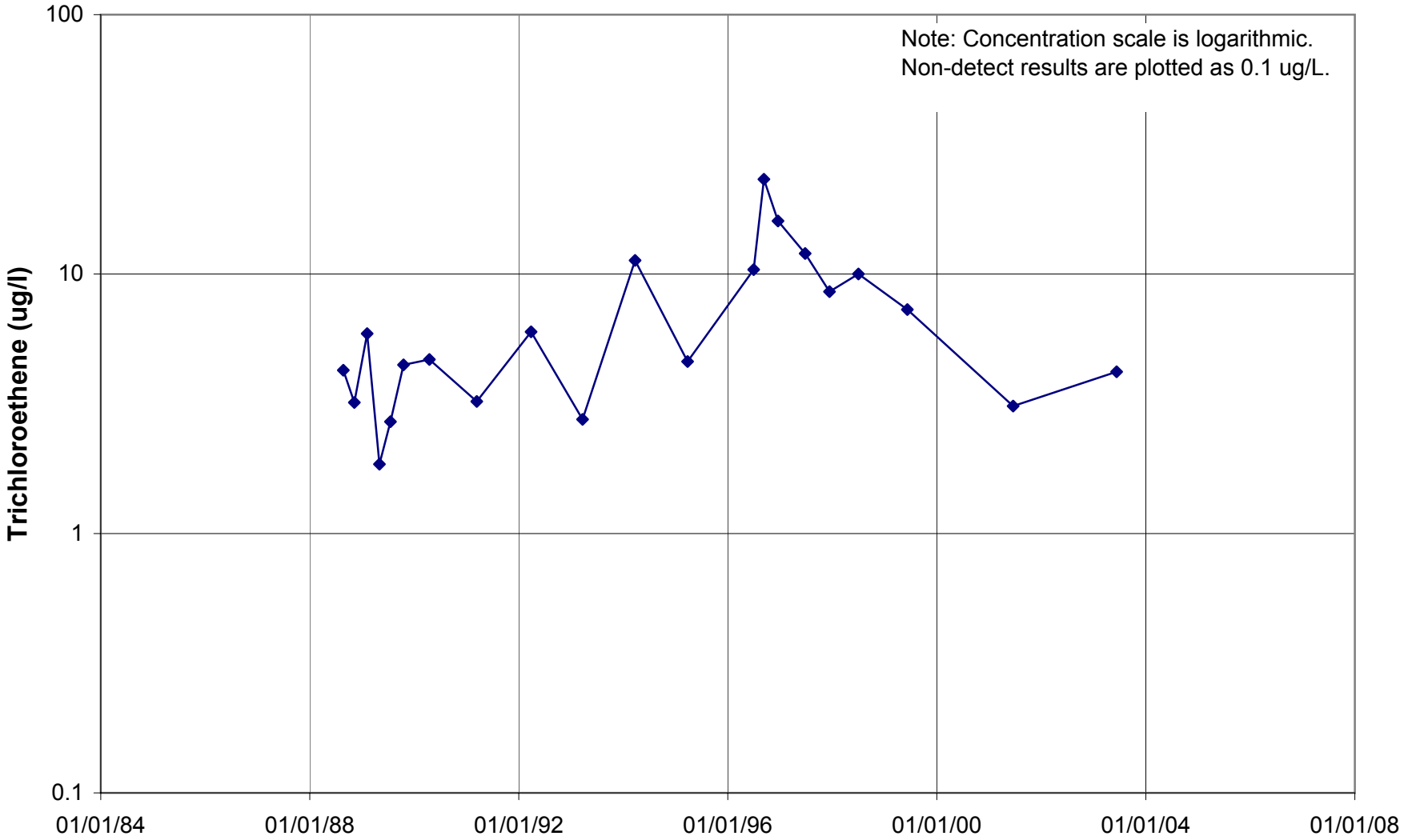
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#313 (B12)



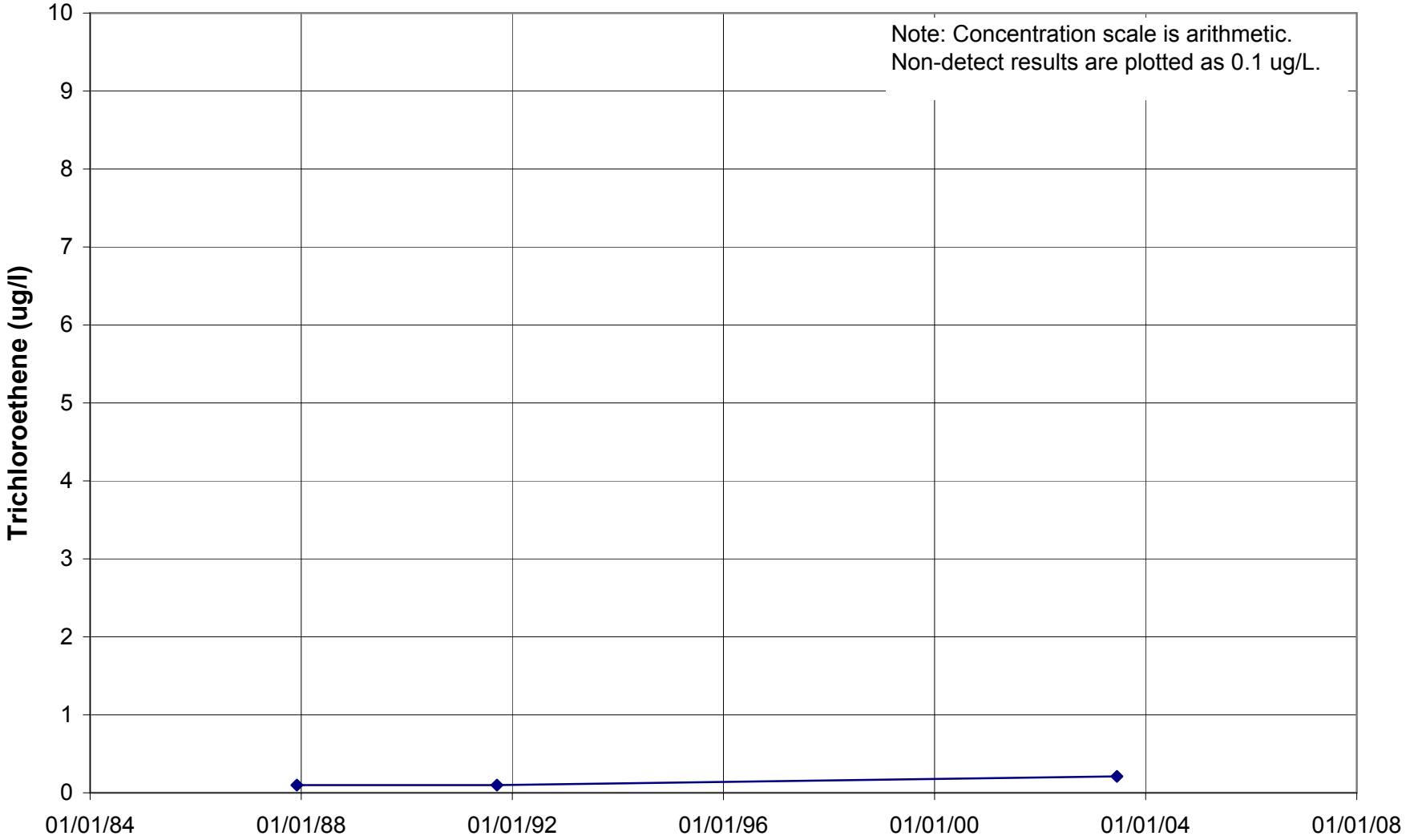
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#318



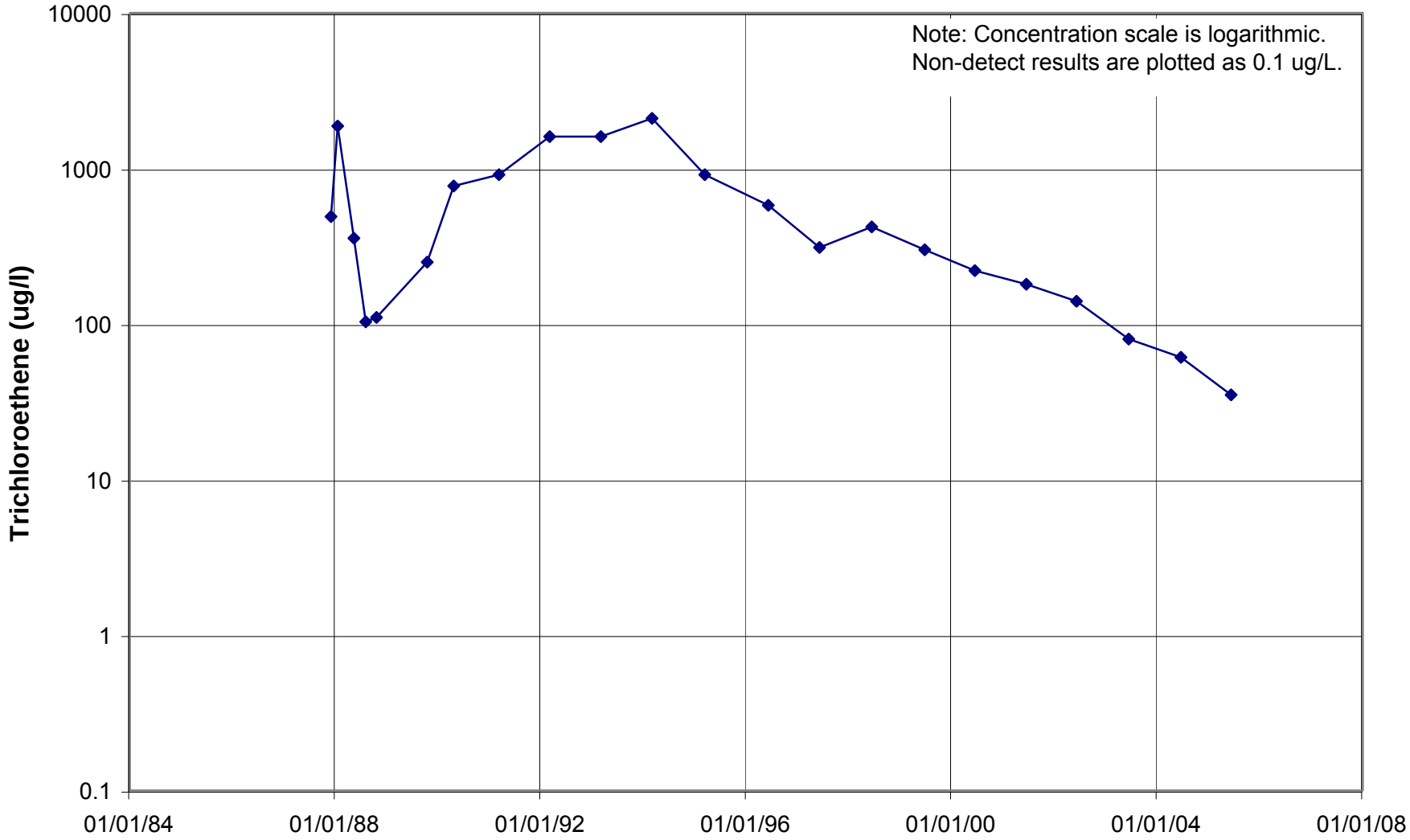
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#802



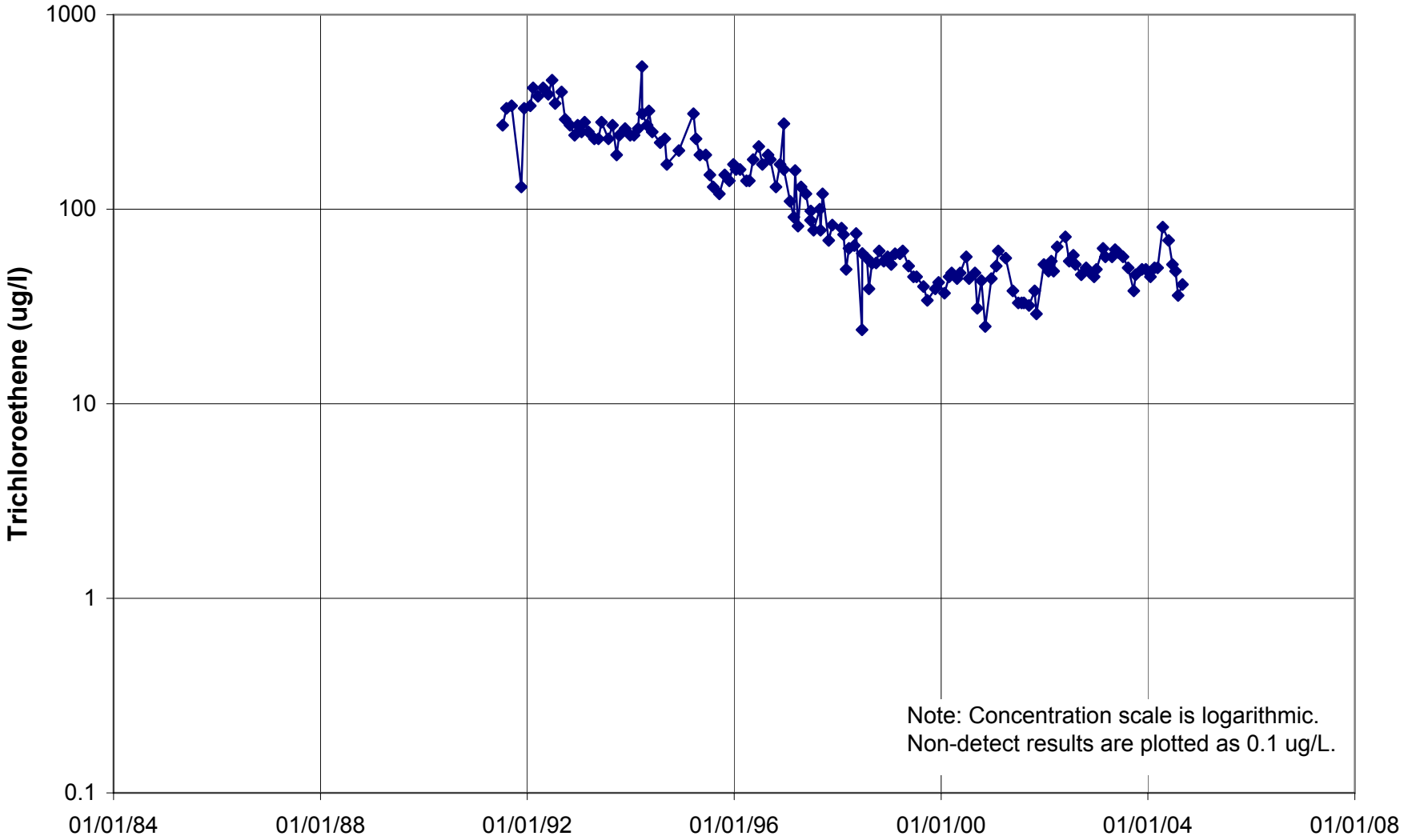
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

PJ#806



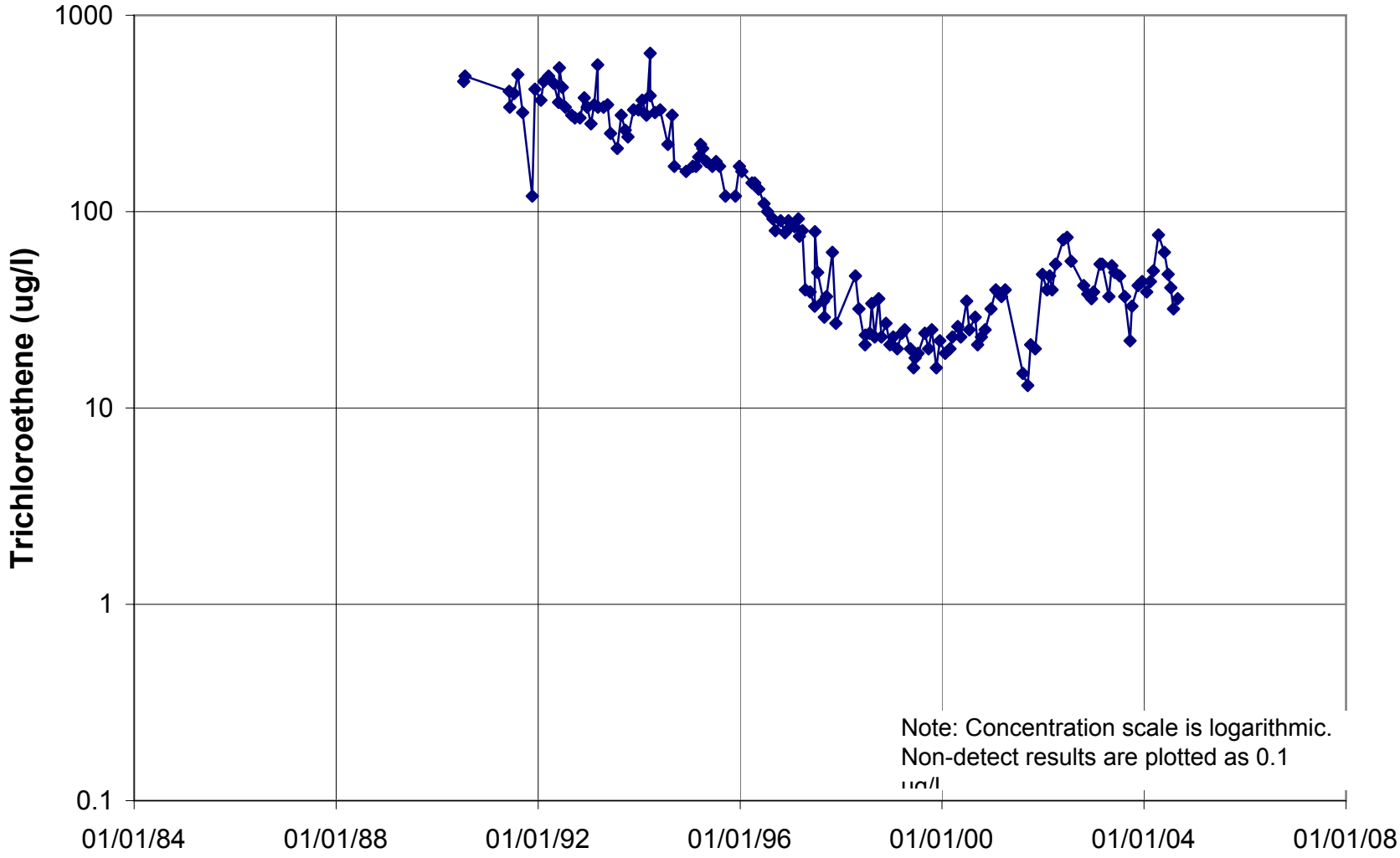
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

206792 (NBM#4)



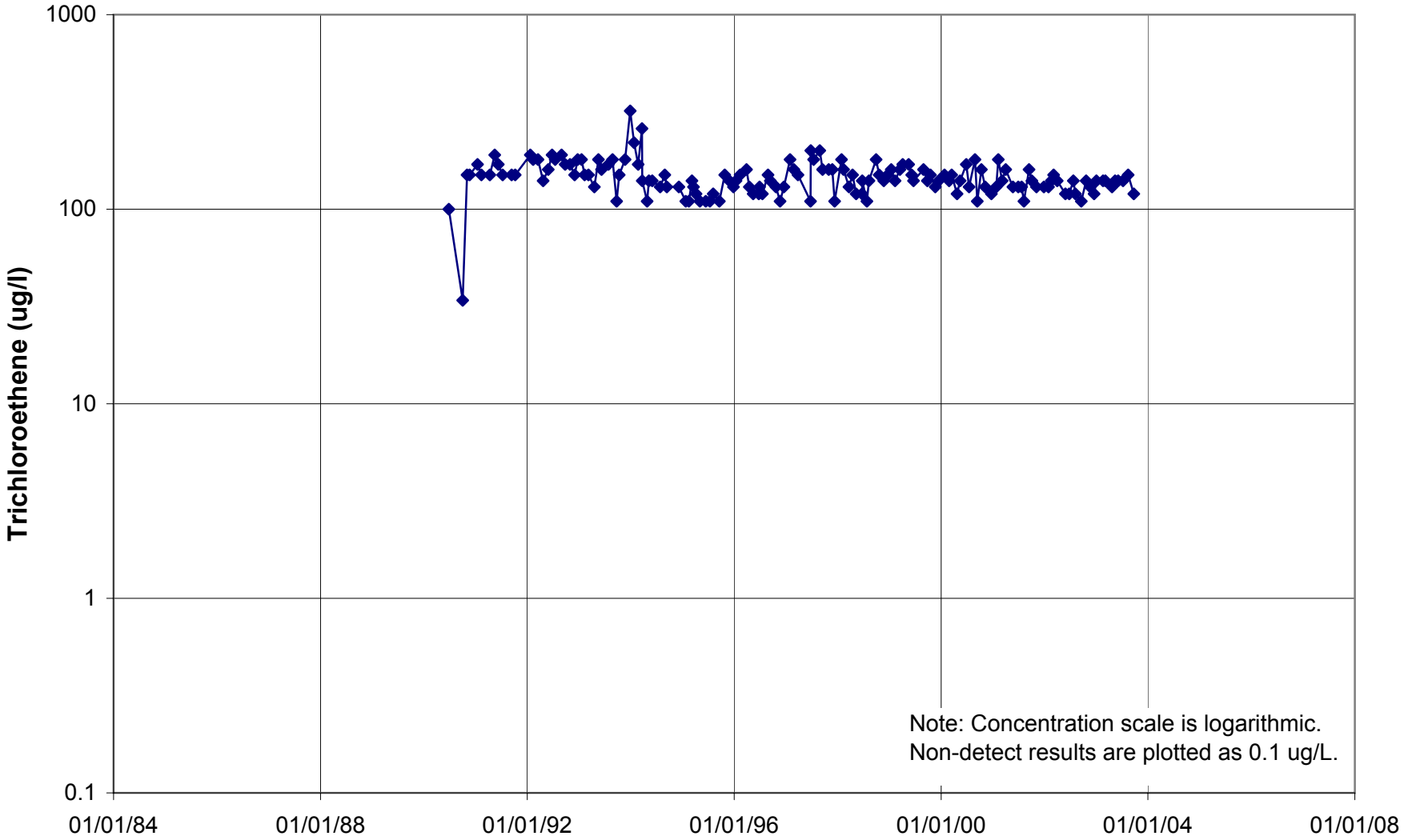
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

206793 (NBM#3)



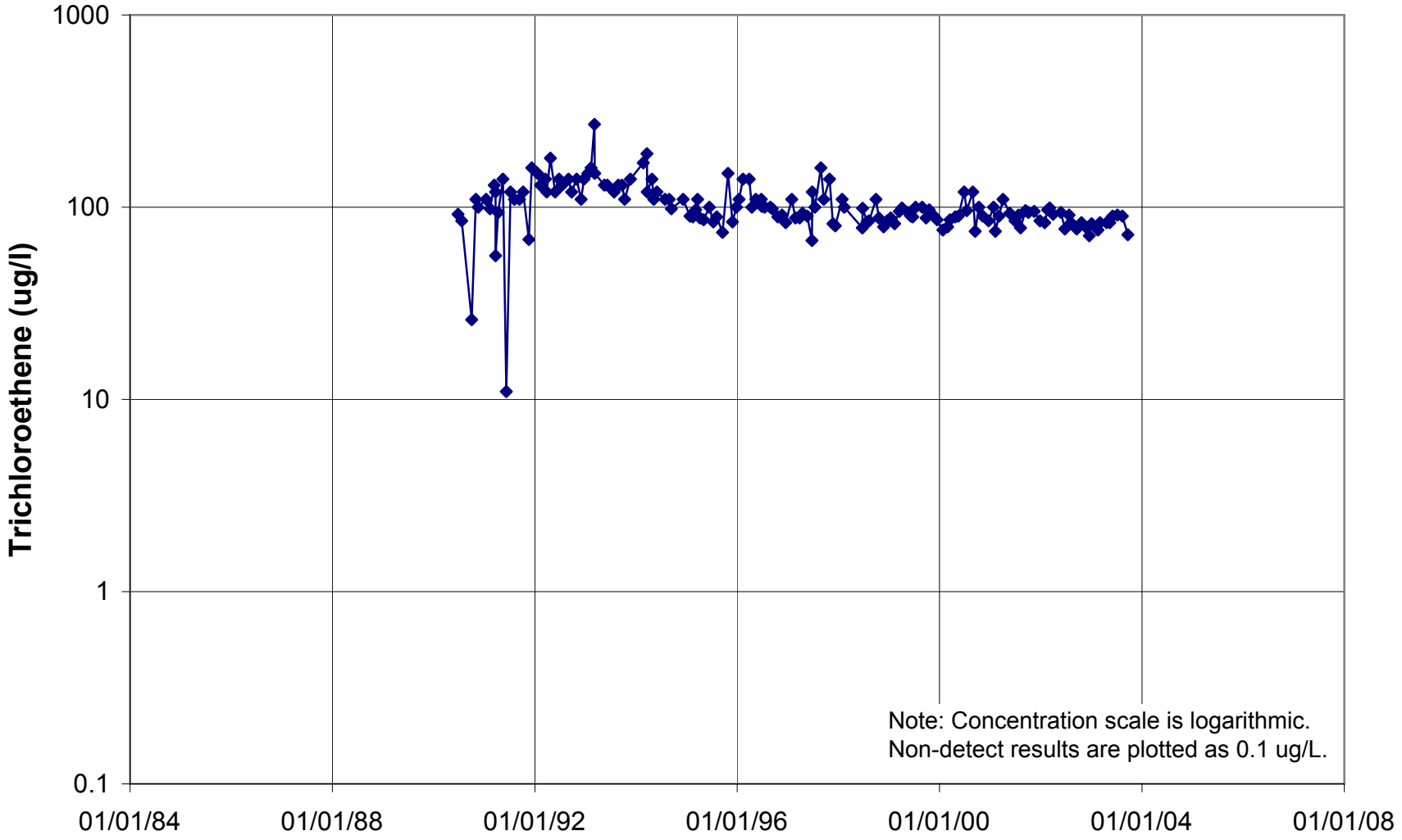
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

206796 (NBM#5)



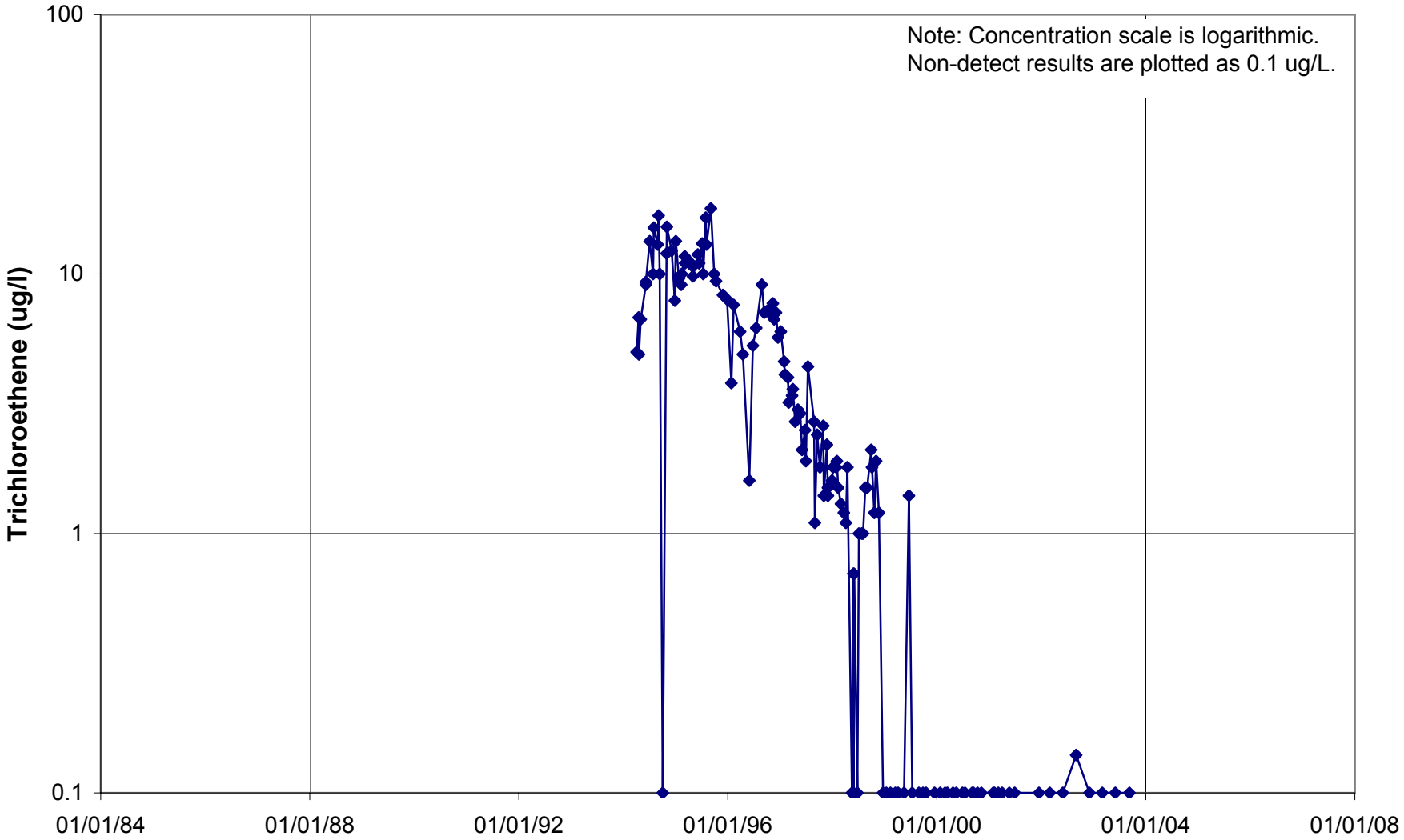
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

206797 (NBM#6)



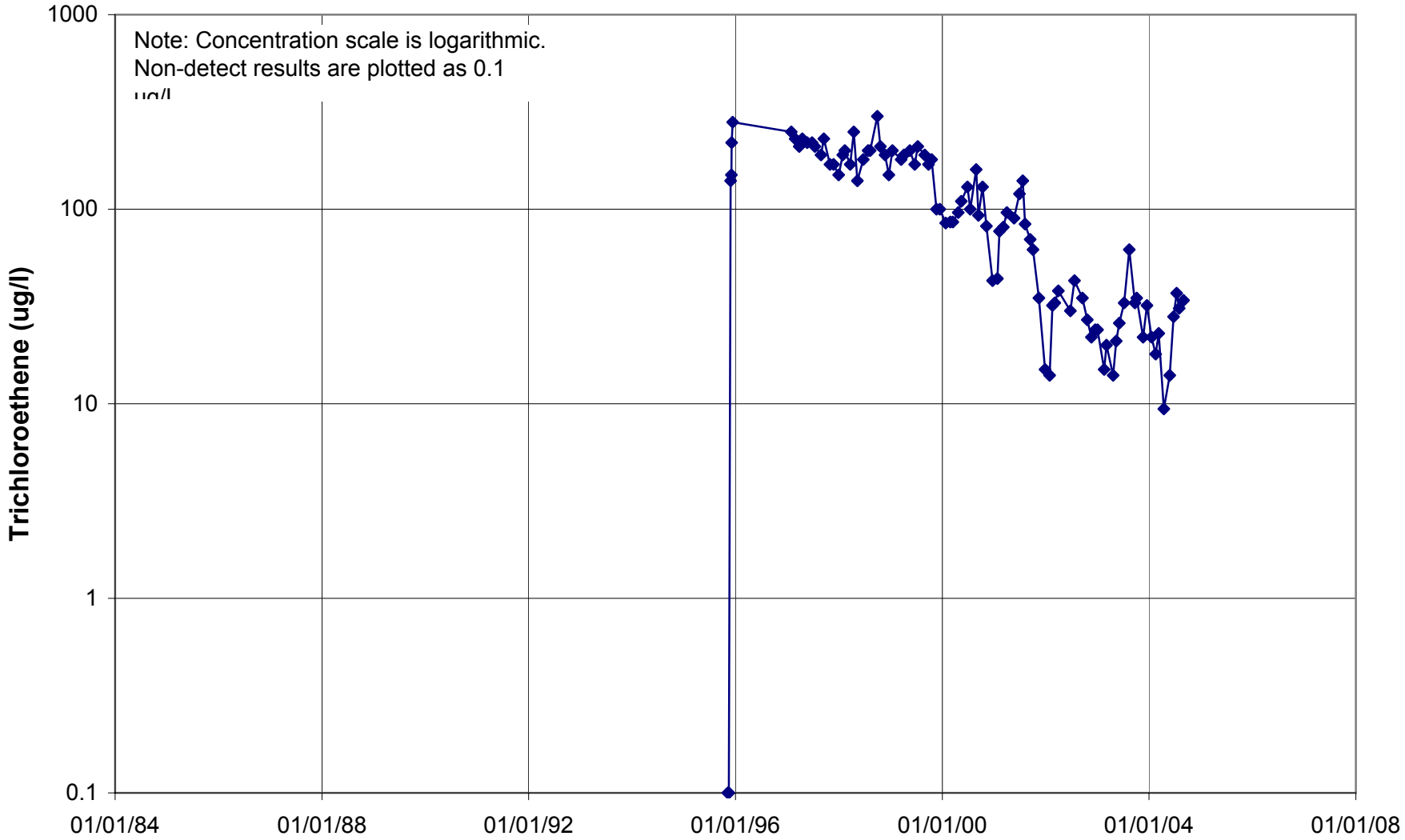
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

520931 (NBM#13)



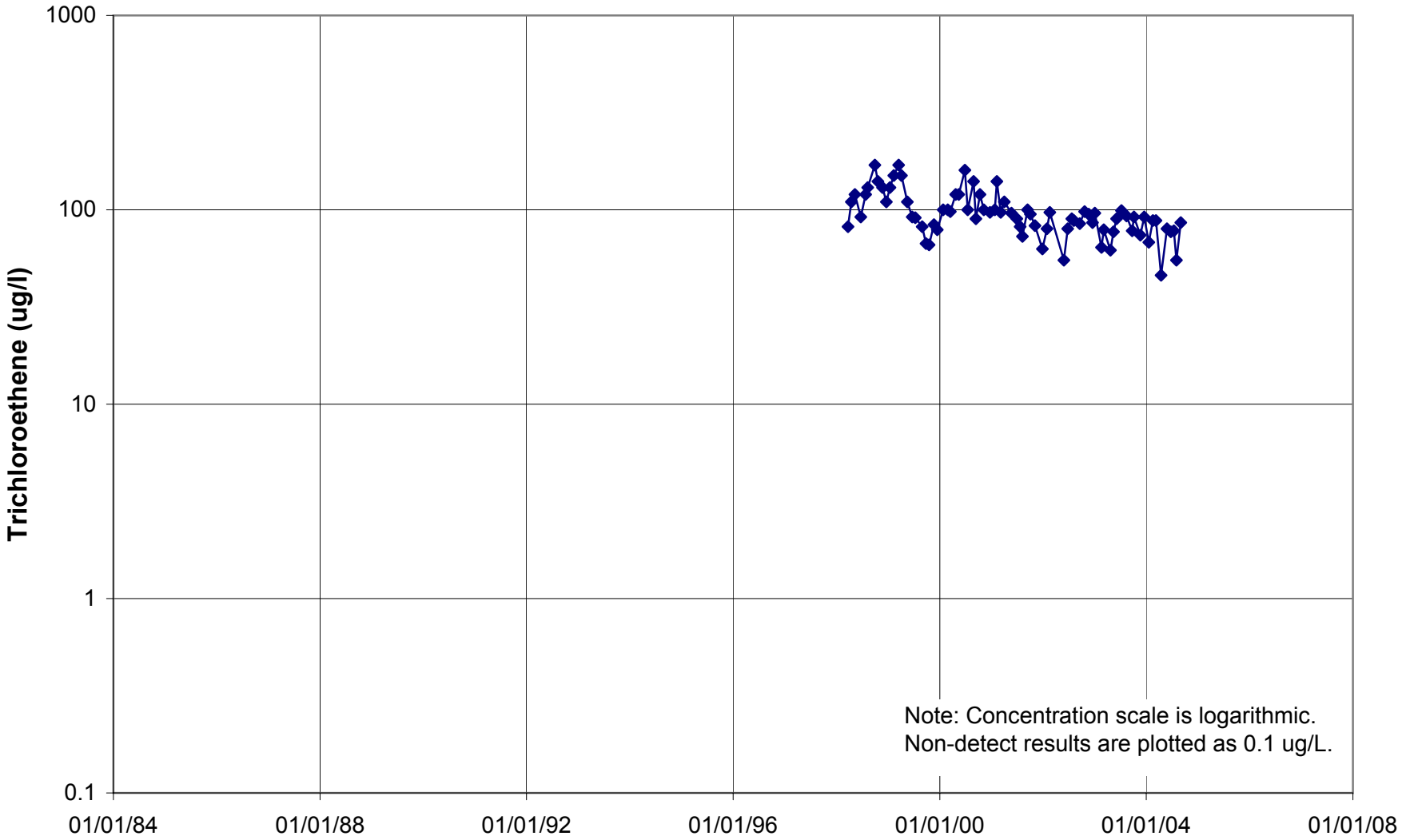
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

554216 (NBM#14)



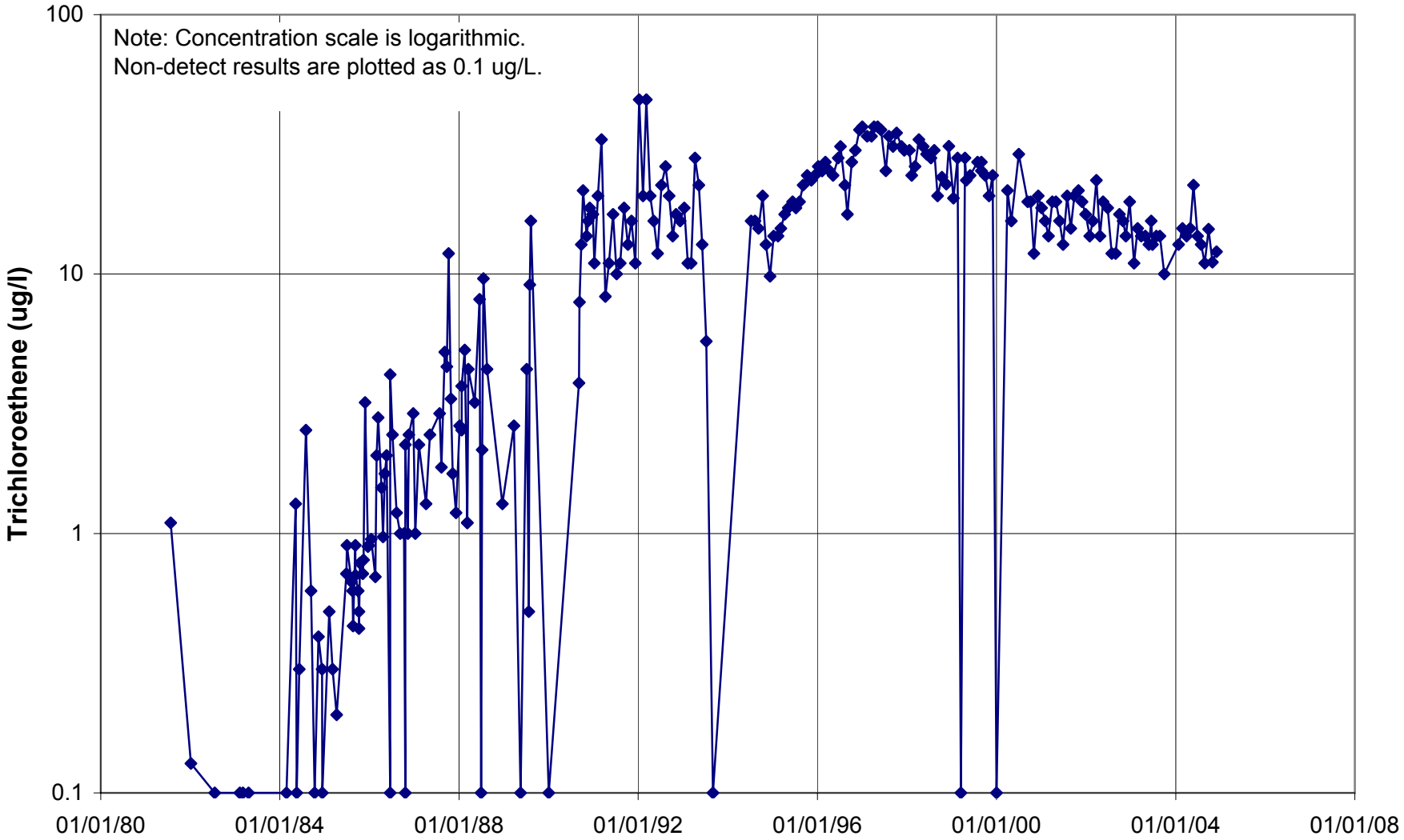
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

582628 (NBM#15)



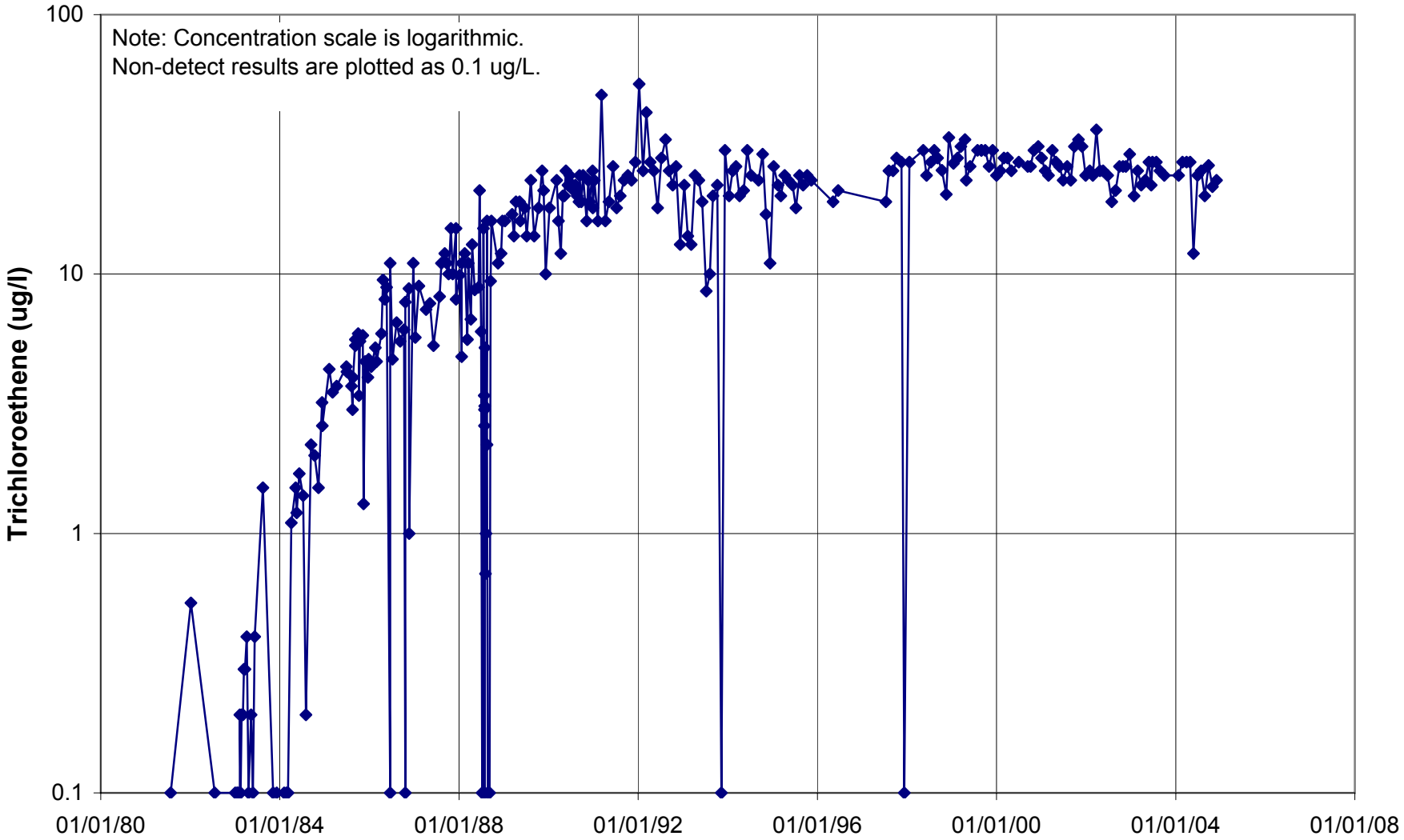
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

200524 (SAM#5)



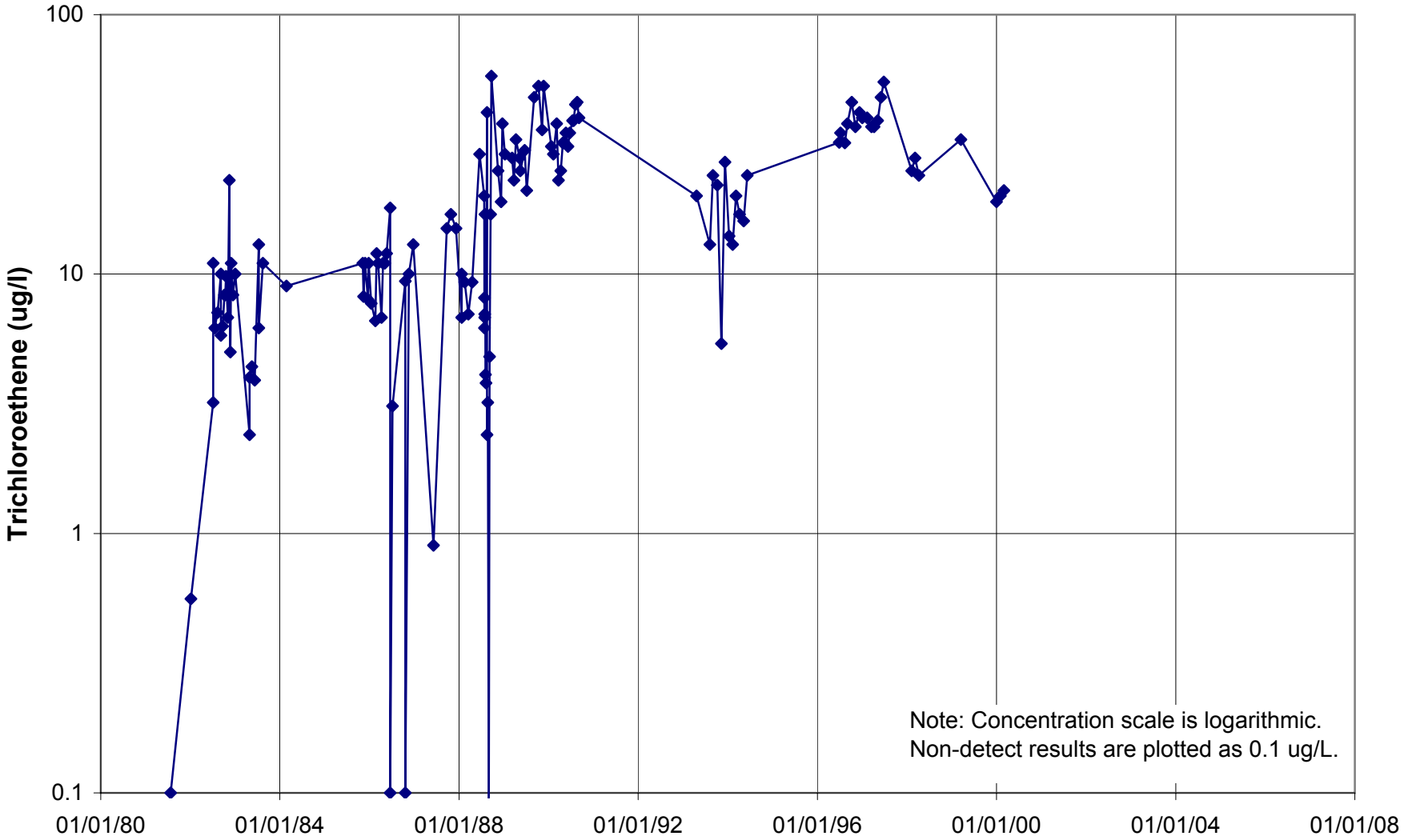
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

200803 (SAM#4)

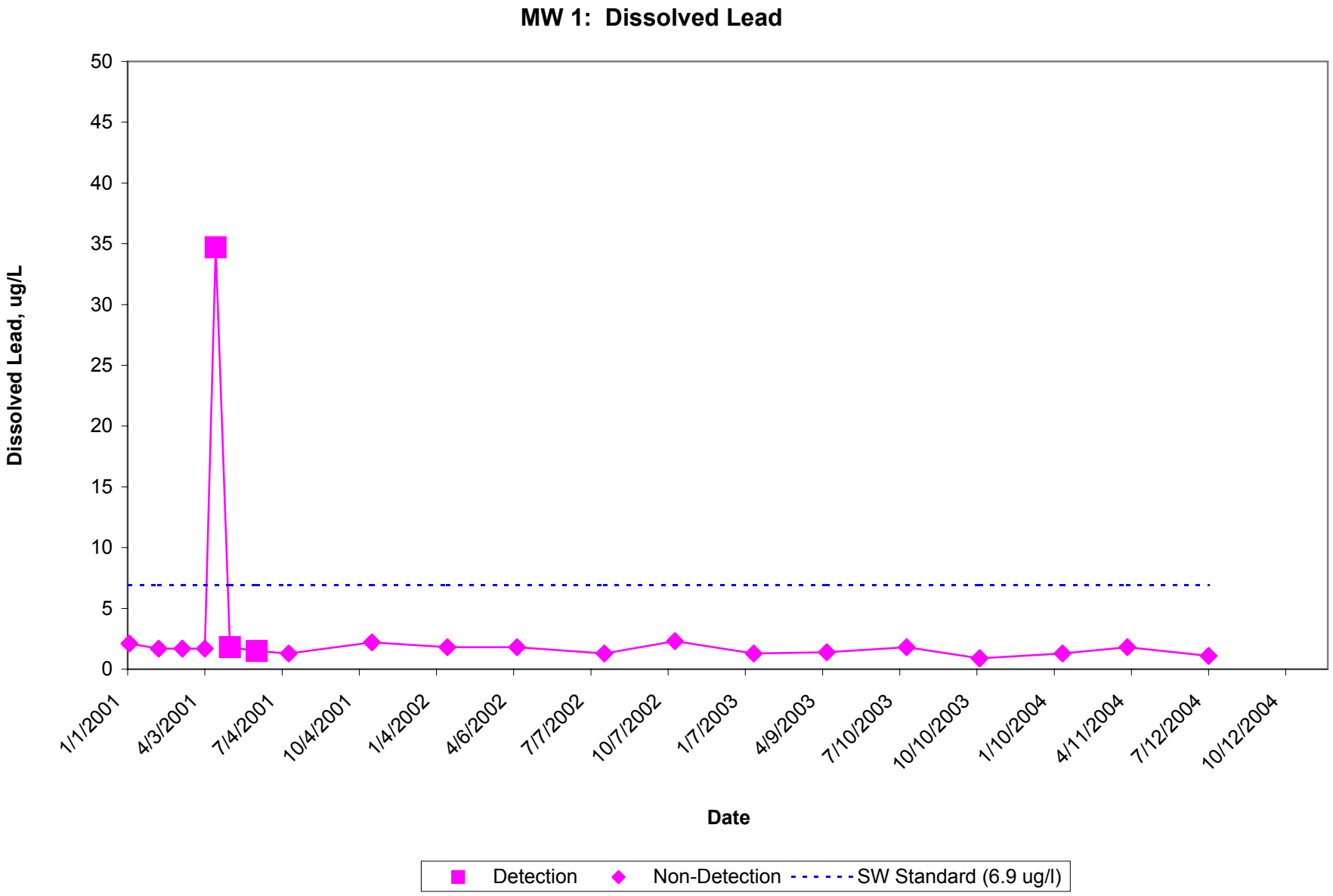


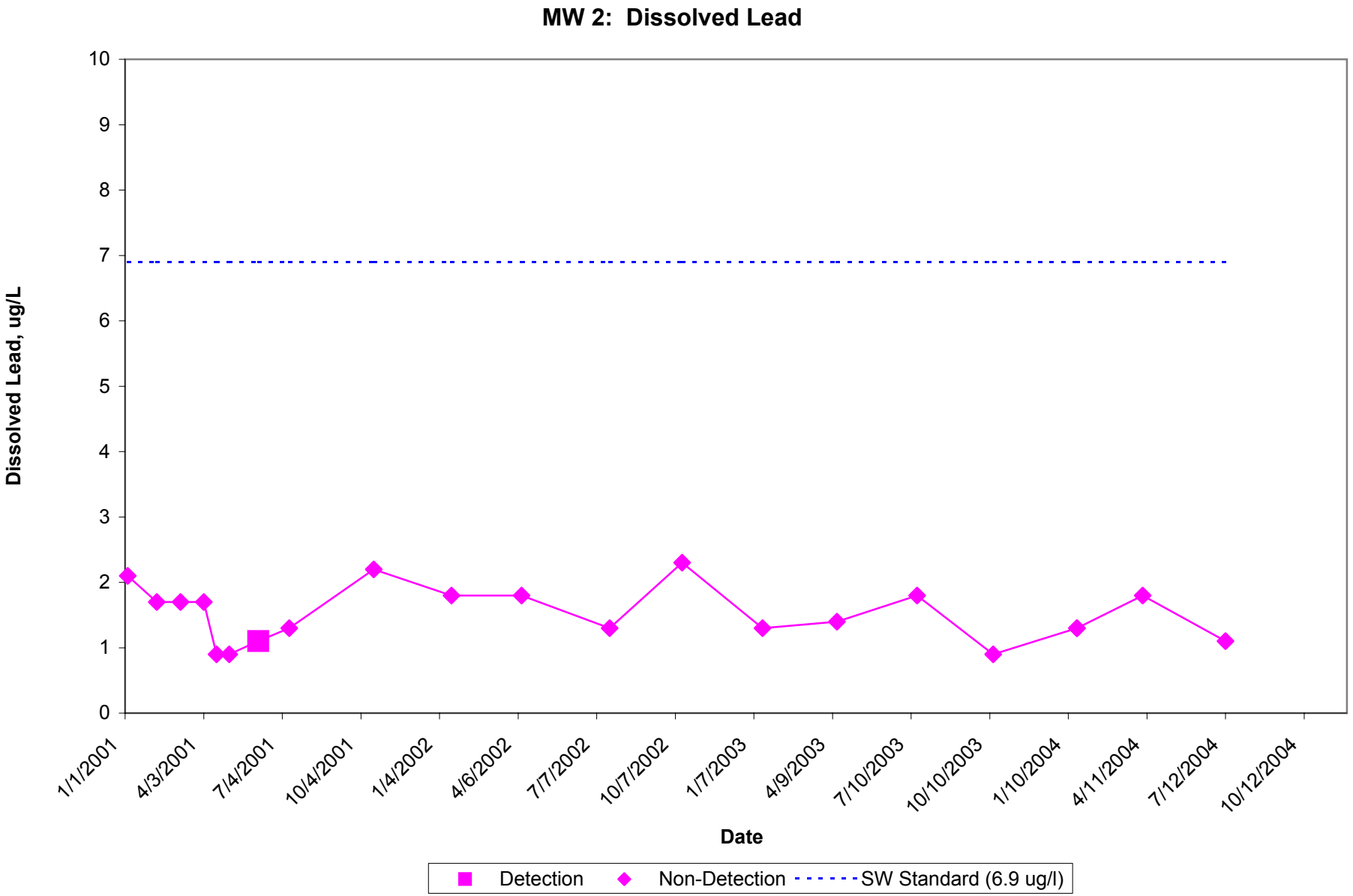
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

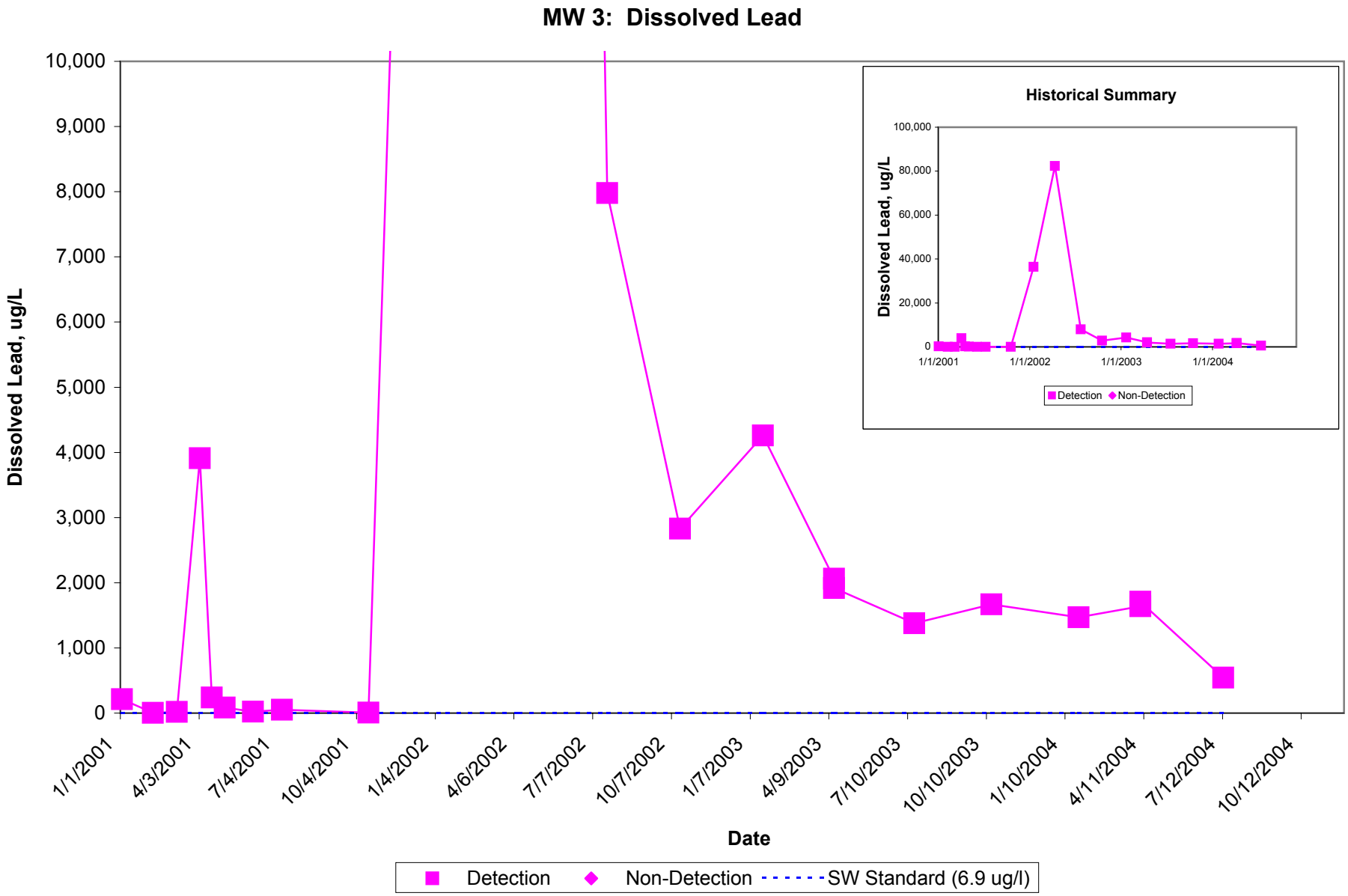
200804 (SAM#3)

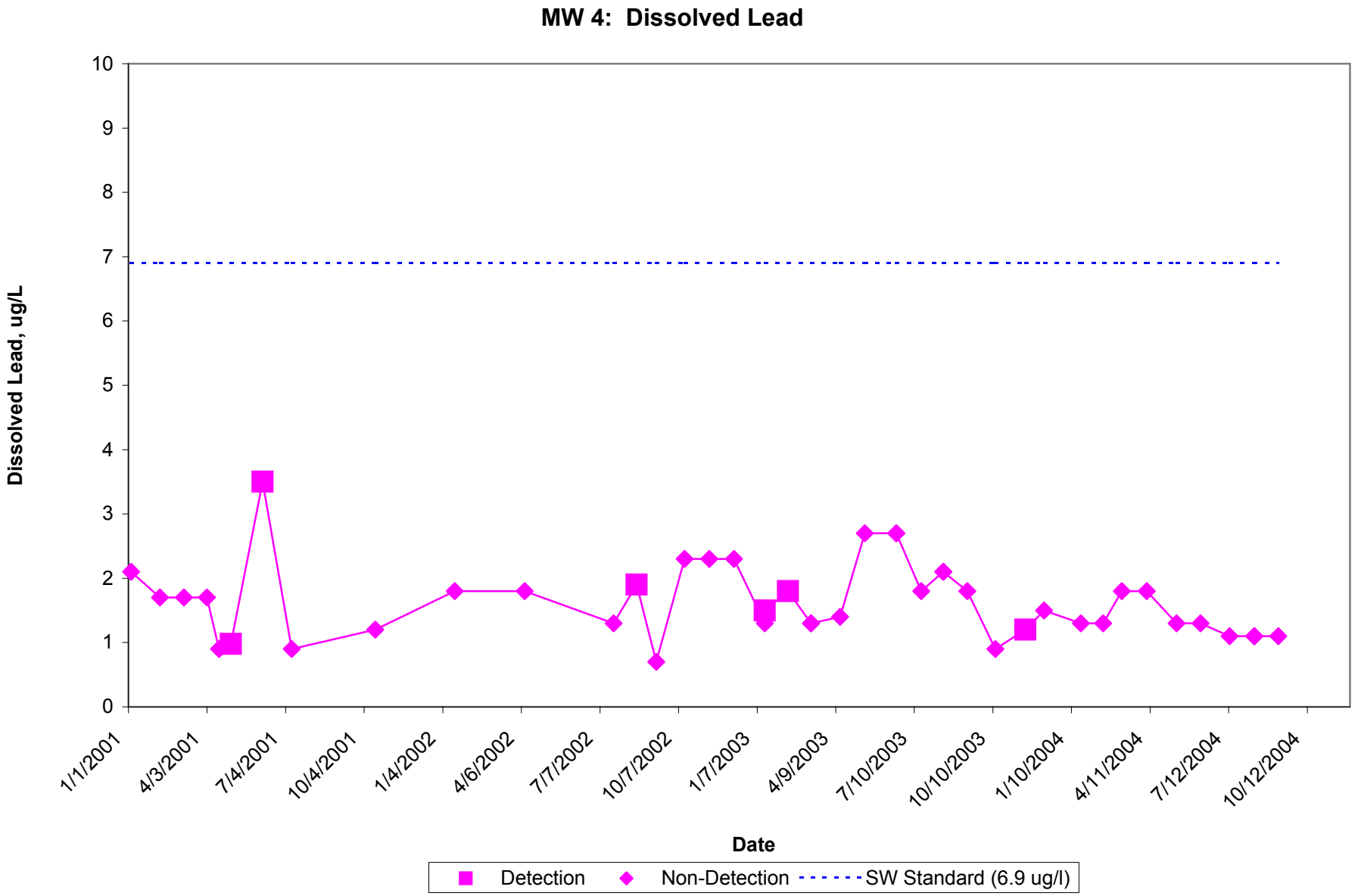


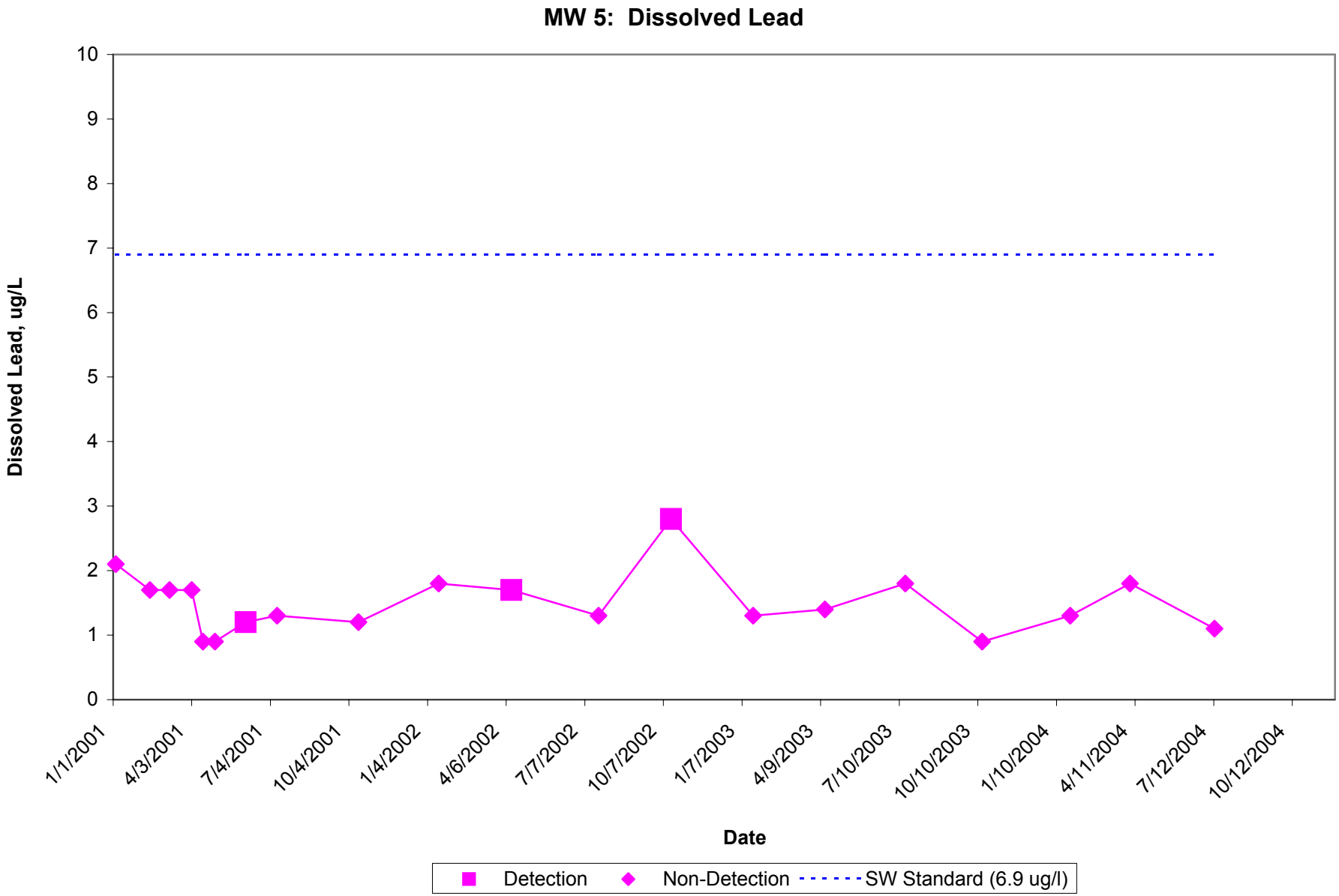
TO RETURN TO MAP: Click on "Go To Previous View" Button in the Tool Bar

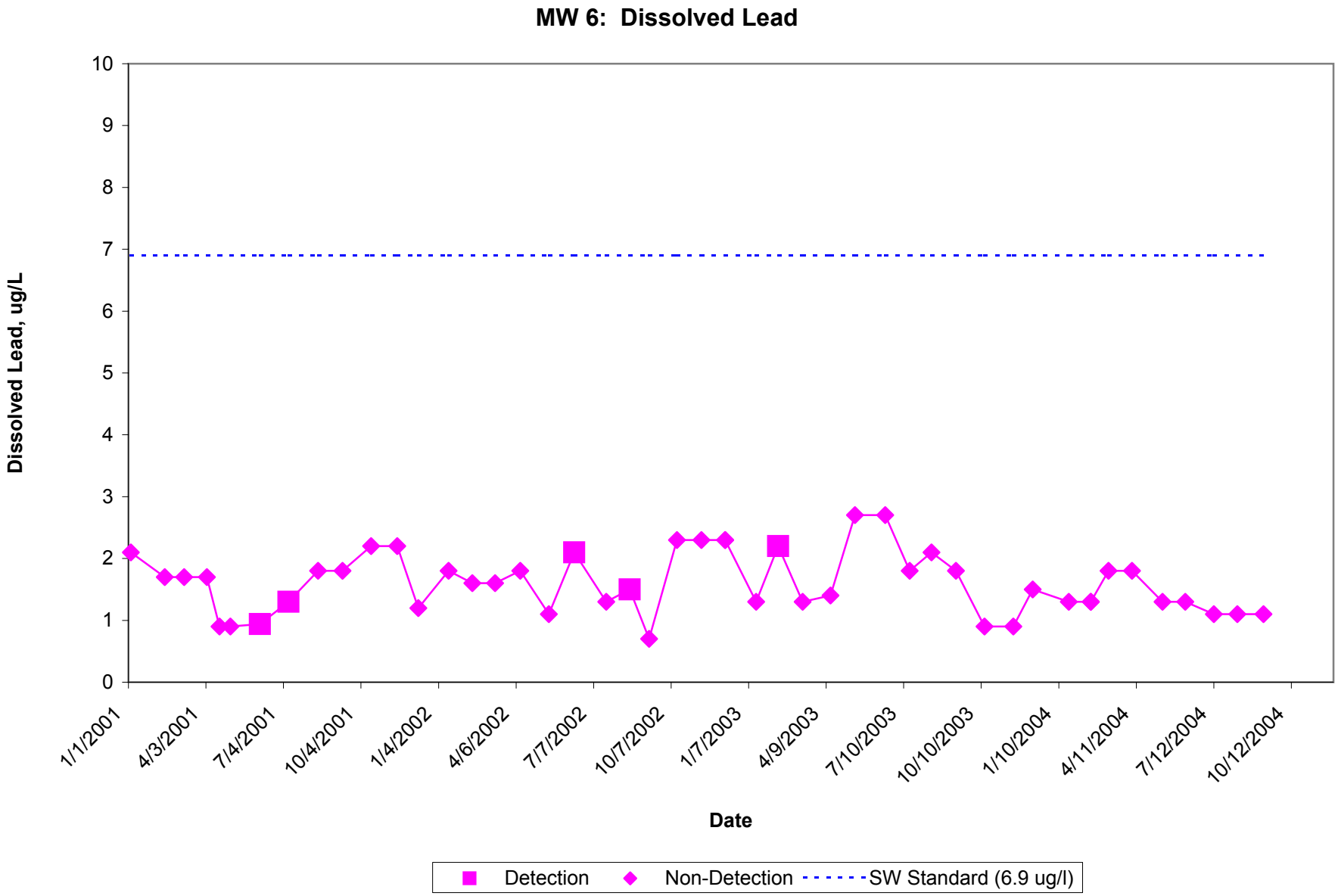

MW 1: Dissolved Lead
Dissolved Lead, ug/L
50
45
40
35
30
25
20
15
10
5
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

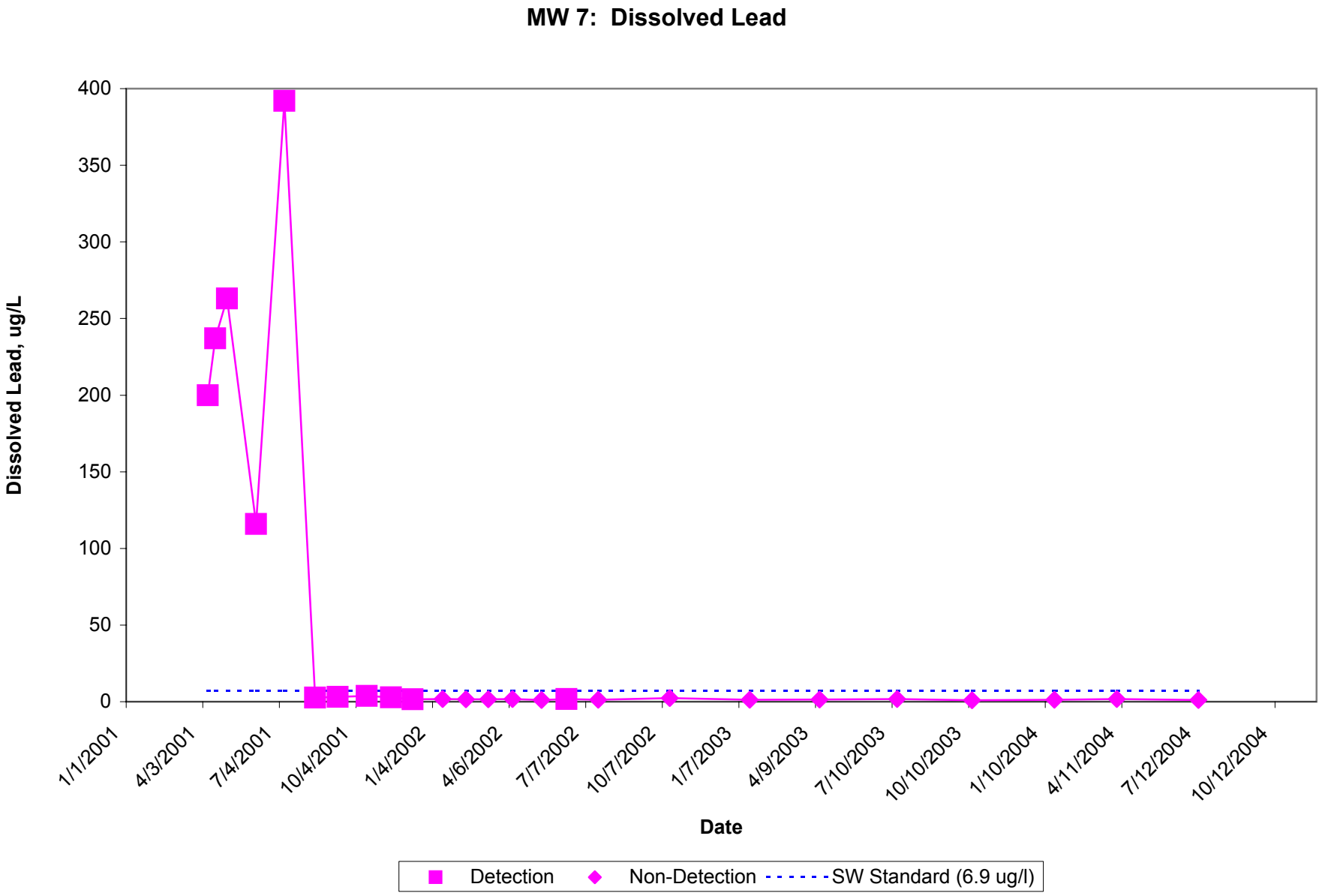

MW 2: Dissolved Lead
Dissolved Lead, ug/L
10
9
8
7
6
5
4
3
2
1
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)


MW 3: Dissolved Lead
Dissolved Lead, ug/L
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)
Historical Summary
Dissolved Lead, ug/L
100,000
80,000
60,000
40,000
20,000
0
1/1/2001
1/1/2002
1/1/2003
1/1/2004
Detection
Non-Detection

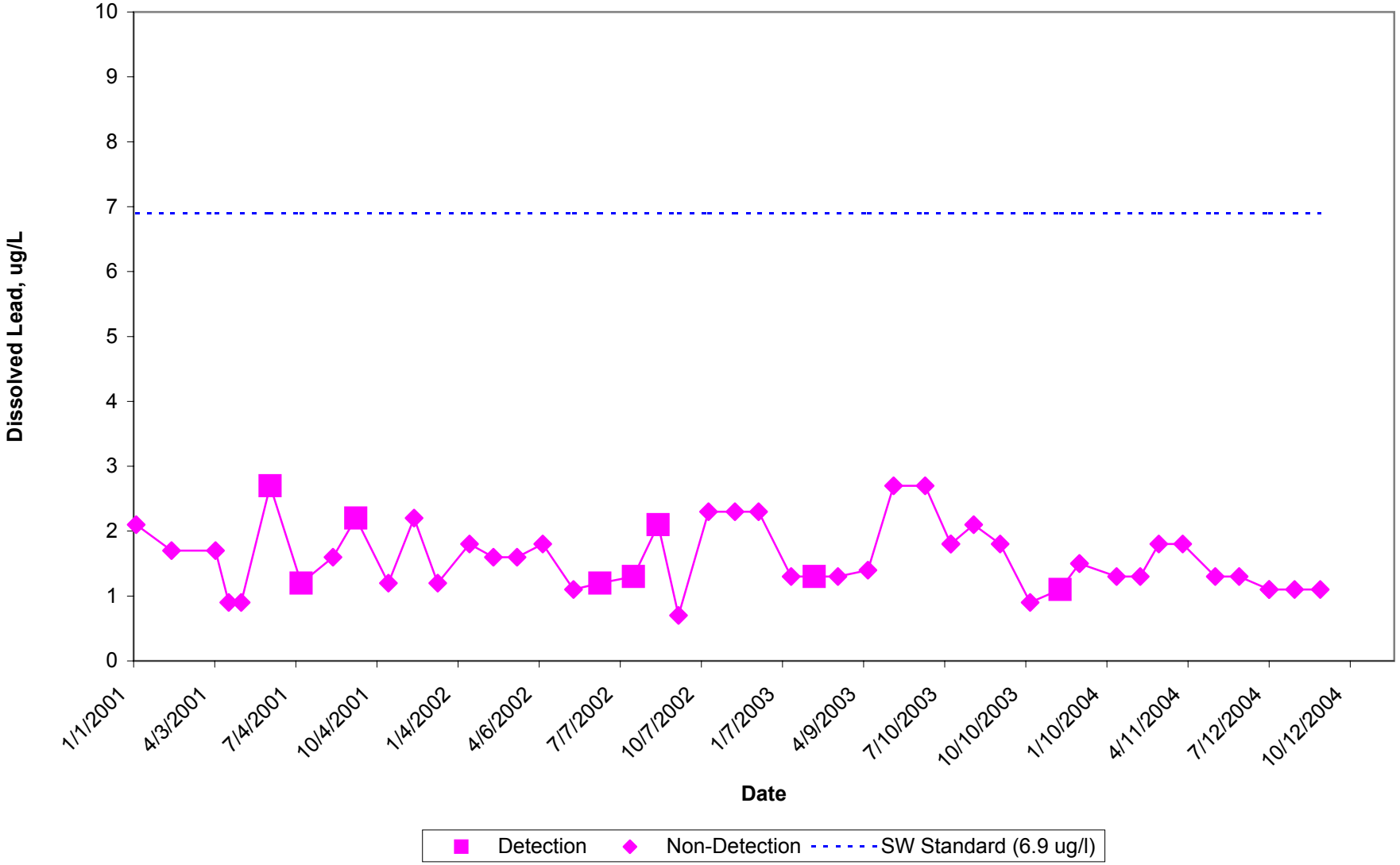

MW 4: Dissolved Lead
Dissolved Lead, ug/L
10
9
8
7
6
5
4
3
2
1
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)


MW 5: Dissolved Lead
Dissolved Lead, ug/L
10
9
8
7
6
5
4
3
2
1
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

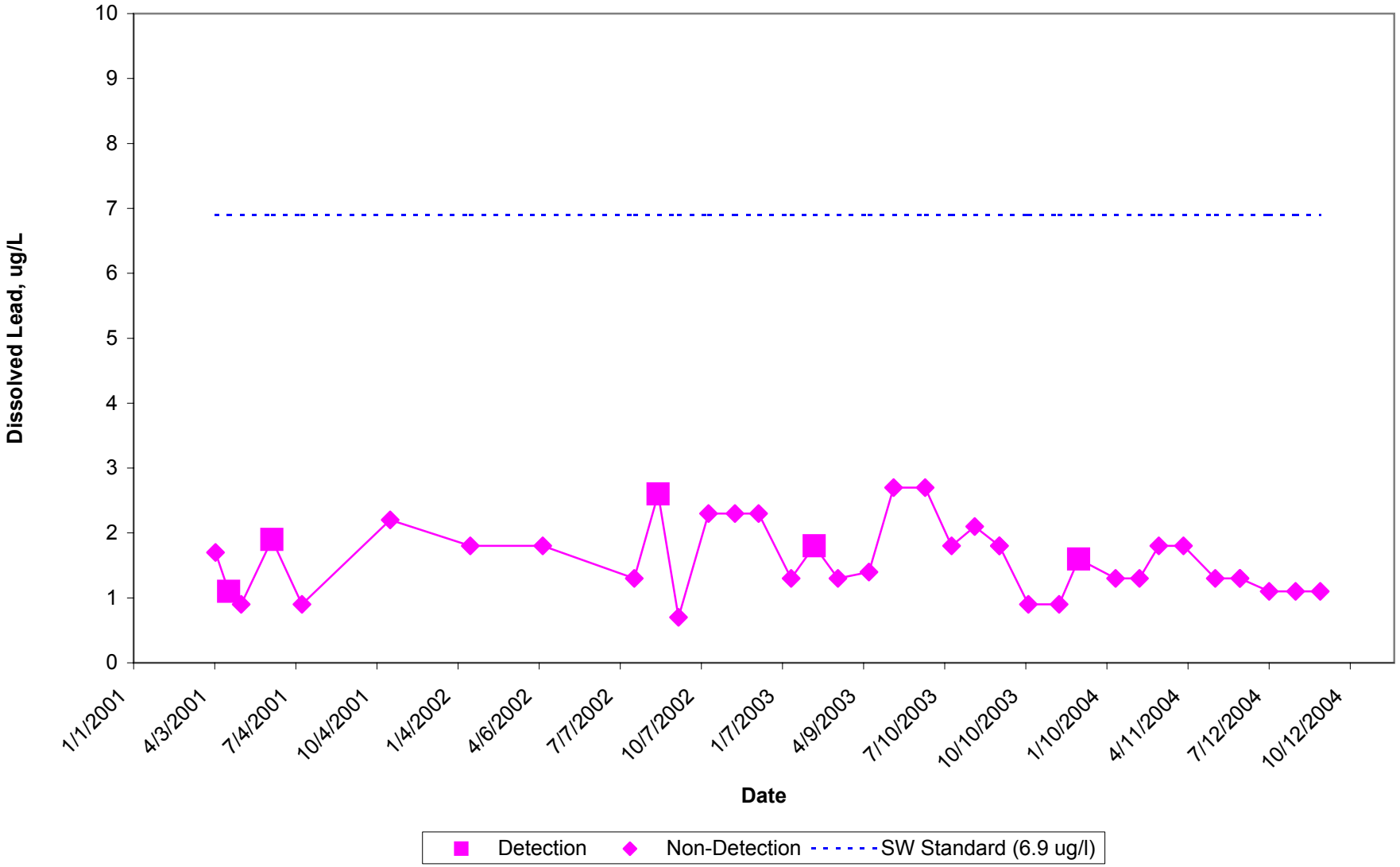

MW 6: Dissolved Lead
Dissolved Lead, ug/L
10
9
8
7
6
5
4
3
2
1
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

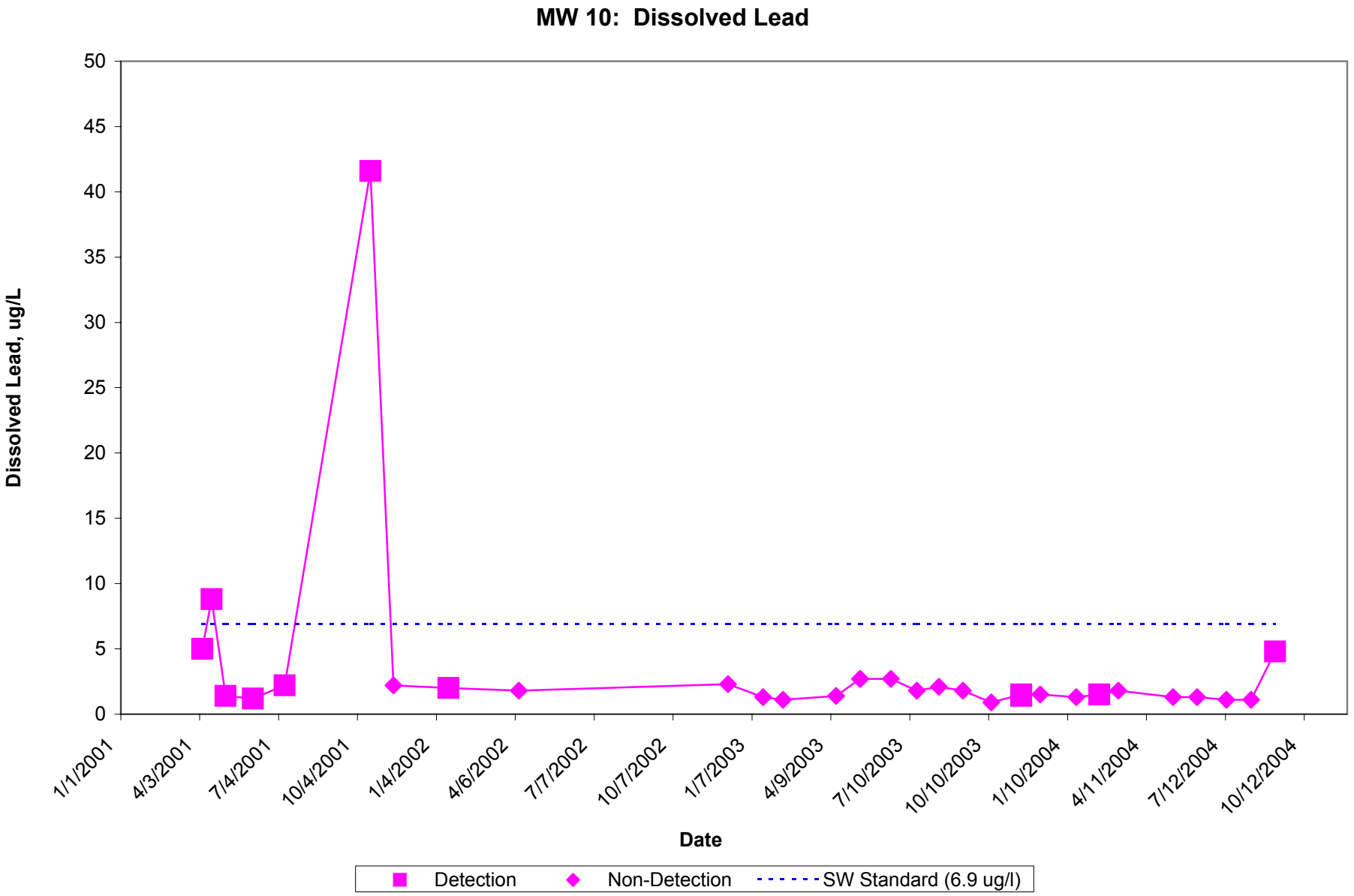

MW 7: Dissolved Lead
Dissolved Lead, ug/L
400
350
300
250
200
150
100
50
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

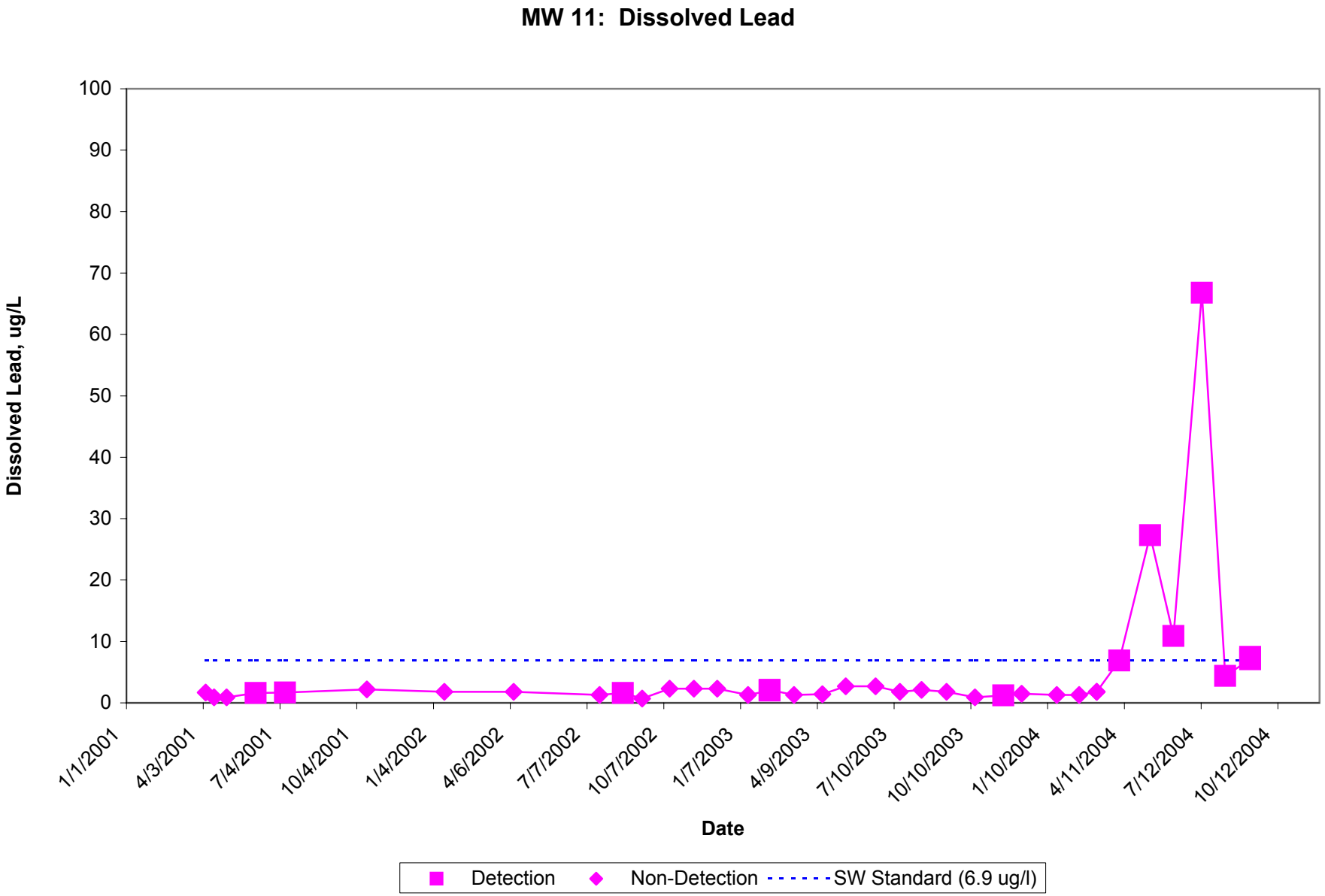
MW 8: Dissolved Lead

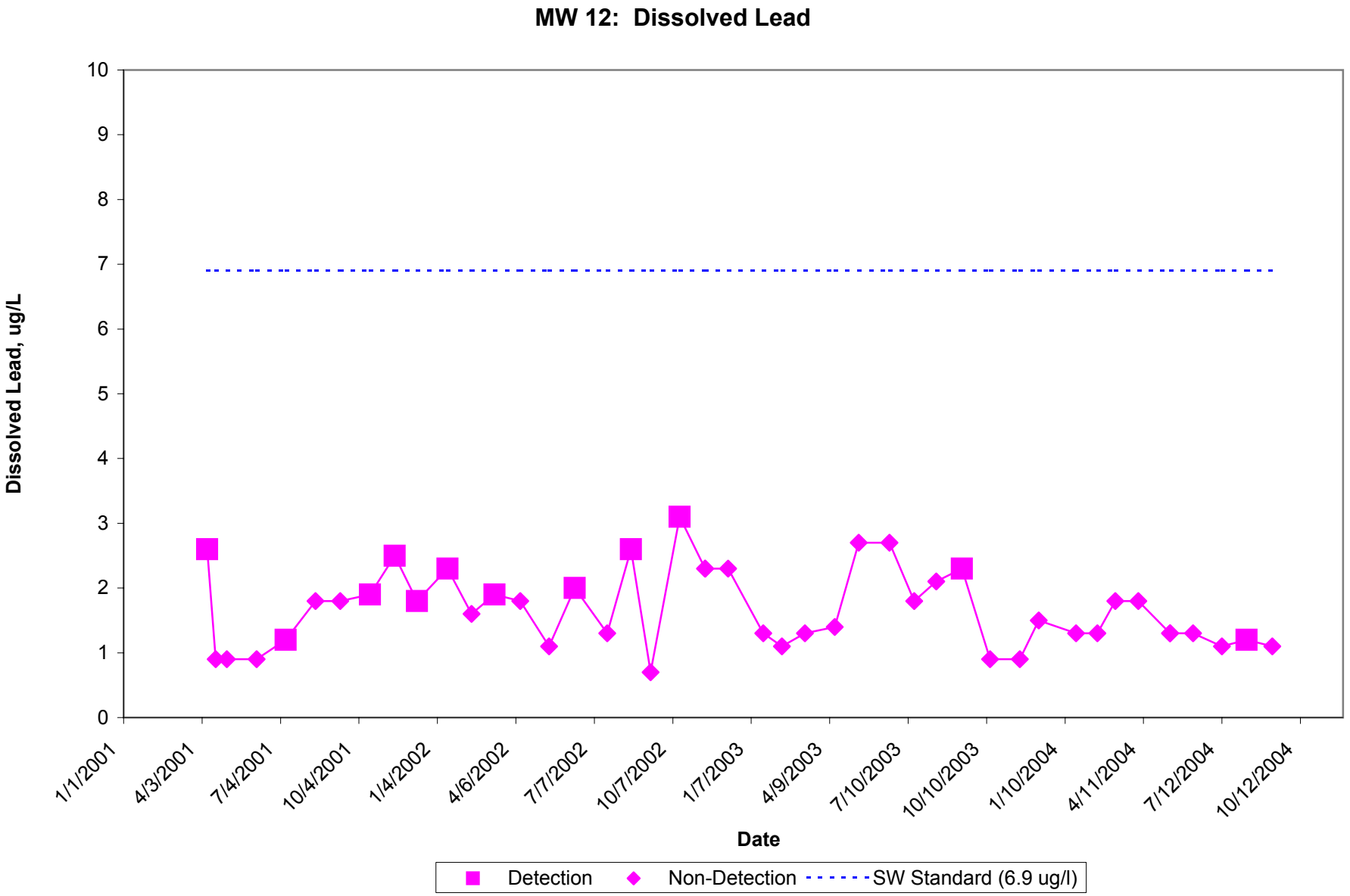


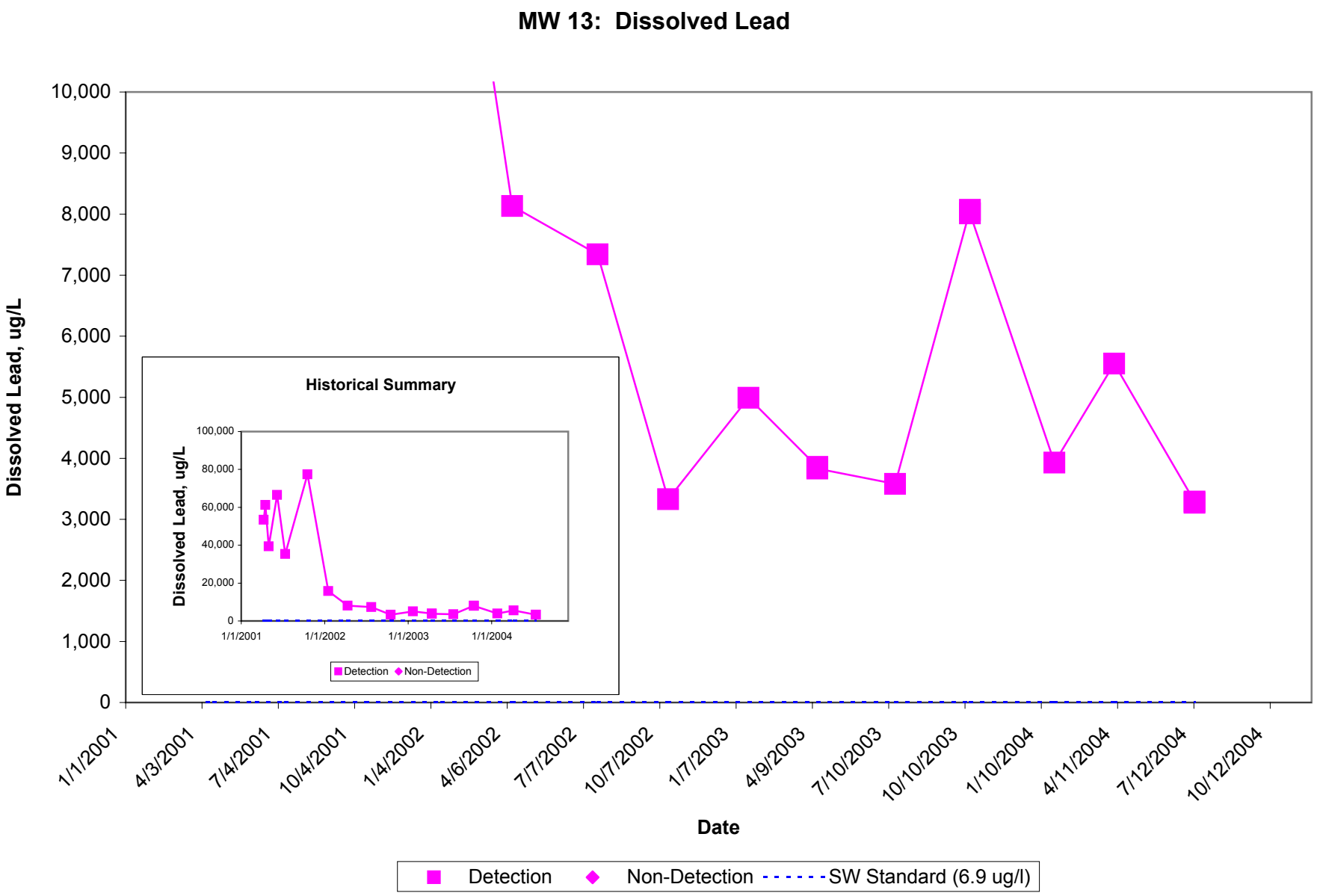
MW 9: Dissolved Lead

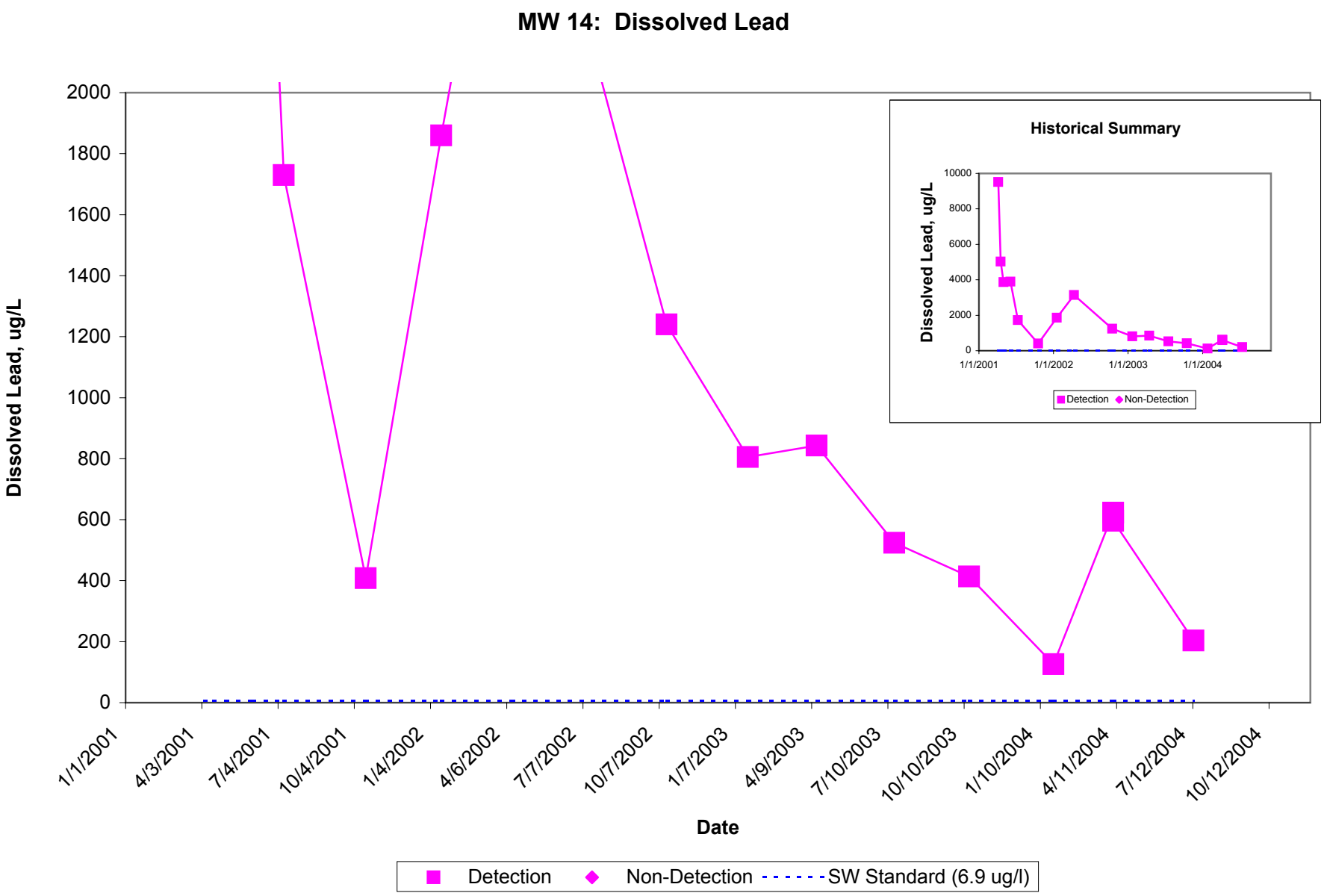



MW 10: Dissolved Lead
Dissolved Lead, ug/L
50
45
40
35
30
25
20
15
10
5
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

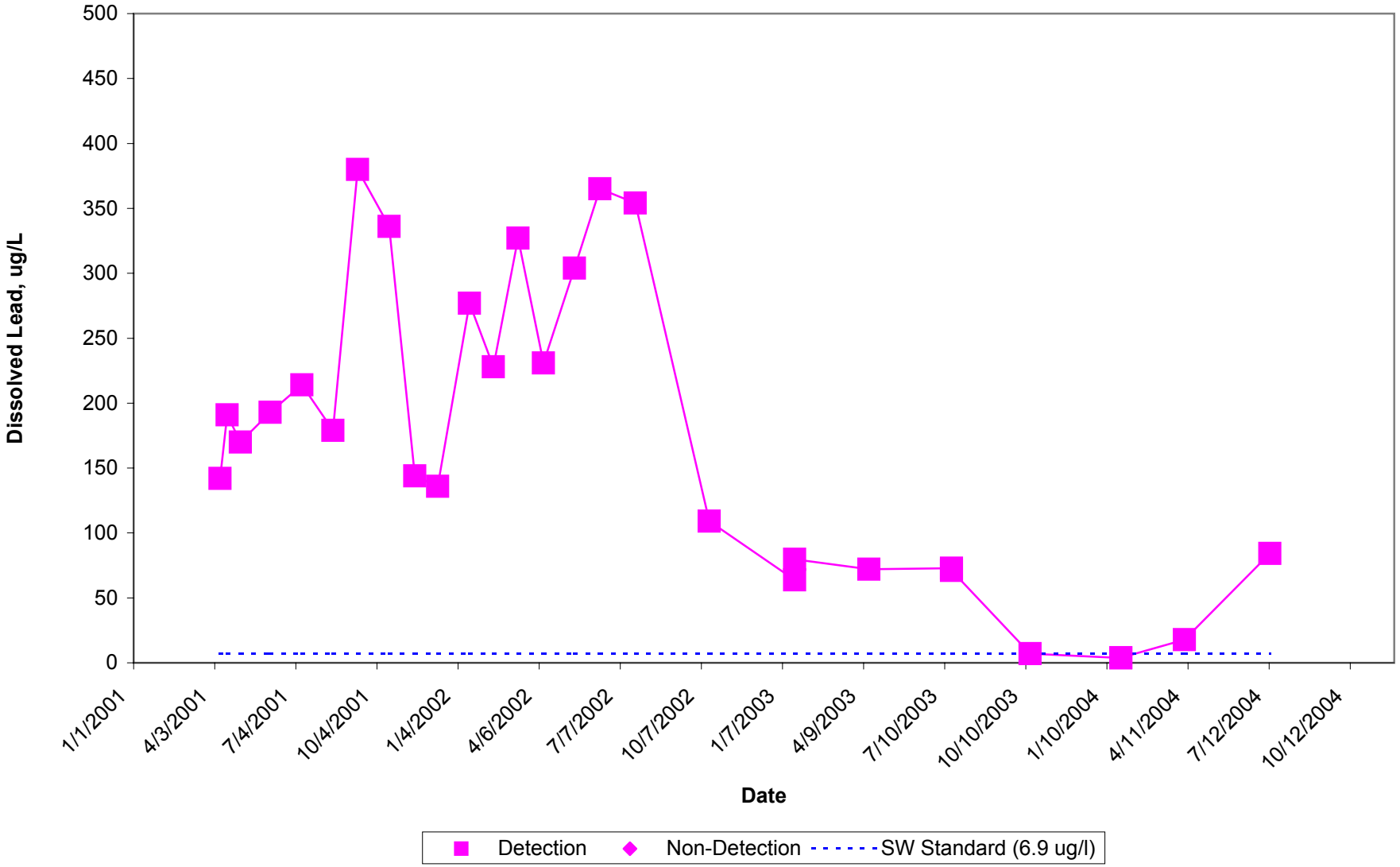

MW 11: Dissolved Lead
Dissolved Lead, ug/L
100
90
80
70
60
50
40
30
20
10
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)


MW 12: Dissolved Lead
Dissolved Lead, ug/L
10
9
8
7
6
5
4
3
2
1
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)

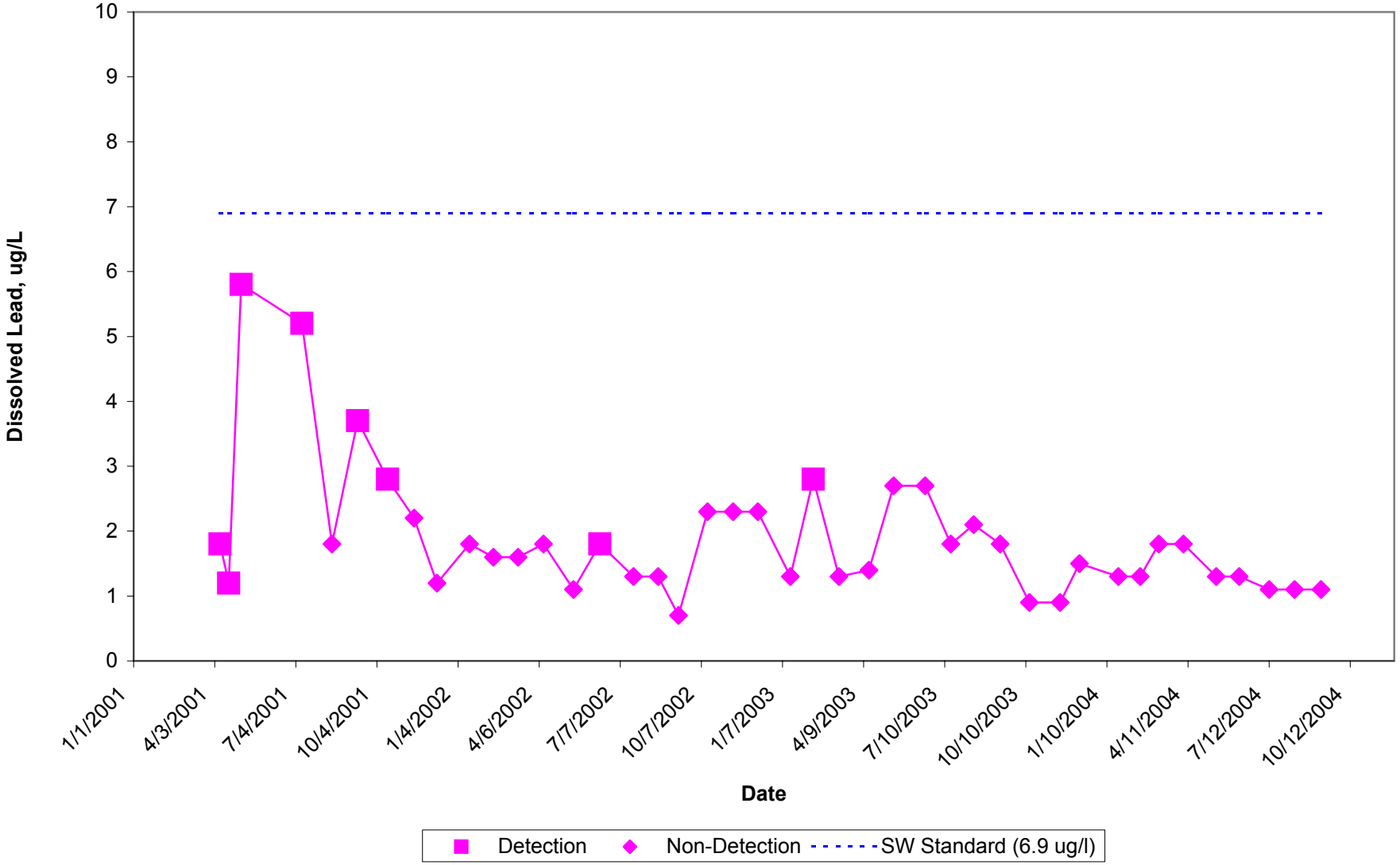

MW 13: Dissolved Lead
Dissolved Lead, ug/L
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Historical Summary
Dissolved Lead, ug/L
100,000
80,000
60,000
40,000
20,000
0
1/1/2001
1/1/2002
1/1/2003
1/1/2004
Detection
Non-Detection
Detection
Non-Detection
SW Standard (6.9 ug/l)


MW 14: Dissolved Lead
Dissolved Lead, ug/L
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1/1/2001
4/3/2001
7/4/2001
10/4/2001
1/4/2002
4/6/2002
7/7/2002
10/7/2002
1/7/2003
4/9/2003
7/10/2003
10/10/2003
1/10/2004
4/11/2004
7/12/2004
10/12/2004
Date
Detection
Non-Detection
SW Standard (6.9 ug/l)
Historical Summary
Dissolved Lead, ug/L
10000
8000
6000
4000
2000
0
1/1/2001
1/1/2002
1/1/2003
1/1/2004
Detection
Non-Detection

MW 15: Dissolved Lead



MW 16: Dissolved Lead



Appendix C

FY 2005 Data Collection and Management

C.1 Data Collection, Management, and Presentation

APPENDIX C.1
DATA COLLECTION, MANAGEMENT, AND PRESENTATION

1.0 INTRODUCTION

A groundwater monitoring program was initiated in January 1984 to obtain water level and water quality data at TCAAP. Each year has been divided into quarters with each quarter assigned a number. Accordingly, FY 2005 was comprised of Quarter 85 (October through December), Quarter 86 (January through March), Quarter 87 (April through June), and Quarter 88 (July through September). Water sampling, water level measurements, and laboratory analysis were conducted in accordance with the TCAAP "Remedial Design/Remedial Action, Quality Assurance Project Plan" (Montgomery Watson, 1996).

Prior to November 1, 2001, data collected at TCAAP was stored in the U.S. Army Environmental Center (USAEC) Installation Restoration Data Management Information System (IRDMIS). The IRDMIS was managed by Potomac Research, Inc. (PRI) on behalf of the USAEC. USAEC replaced the IRDMIS System on November 1, 2001, with a new system, the Environmental Restoration Information System (ERIS), which incorporated all of the data that had previously been entered into ERIS.

2.0 GROUNDWATER LEVELS AND GROUNDWATER QUALITY

2.1 Data Collection and Management

Groundwater level and groundwater quality data were collected in accordance with the FY 2005 Annual Monitoring Plan (Appendix A), which established the monitoring responsibilities for both the Army and Alliant. Water level monitoring and water sampling were conducted by TWISS for the Army and by SECOR and CRA for Alliant. For all samples, laboratory analysis was performed by DataChem Laboratories, Salt Lake City, Utah.

Appendix A.4 contains lists of required analytes, as referenced by the monitoring plans in Appendix A. The lists are site-specific, based on the chemicals of concern. Halogenated volatile

organic compounds were the parameters of primary interest, while select wells were sampled for aromatic volatile organic compounds, metals, and explosives. Appendix C.2 presents clarifications and deviations from the FY 2005 Annual Monitoring Plan.

Data assessment and validation was conducted in accordance with procedures and requirements outlined in the TCAAP QAPP. Flagging codes and data qualifiers assigned to data through data assessment/validation appear in the data tables included within the individual sections of this report (see table footnotes for definitions) and also in the historical databases (Appendix D). Data assessment and validation information was submitted to the MCPA and USEPA for review. Regulatory approvals for these submittals are included in Appendix C.3.

For water level measurements, the depth to water from the surveyed top of the well casing was measured. Groundwater elevations were calculated and data tables are included within the individual sections of this report and also in the historical database (Appendix D).

2.2 Groundwater Elevation Contour Maps

The most extensive water level monitoring event performed during FY 2005 was in June (Quarter 87). This data was used to prepare groundwater elevation contour maps for OU1/OU3 deep groundwater (off-TCAAP), OU2 deep groundwater (on-TCAAP), and Sites A and K shallow groundwater. These maps are included within the individual sections of this report.

2.3 Groundwater Quality Contour Maps and Cross-Sections

The most extensive sampling event performed during FY 2005 was in June (Quarter 87). This data was used to prepare groundwater quality isoconcentration contour maps and/or cross-sections for OU1/OU3 deep groundwater, OU2 deep groundwater, and Sites A and K shallow groundwater. Contour maps were generated by hand, based on the observed contaminant concentrations and the extent of past site contamination. These maps are included within the individual sections of this report.

For OU1/OU3 deep groundwater and OU2 deep groundwater, isoconcentration maps and cross-sections are provided for trichloroethene, as this is the principal contaminant on a concentration

basis. Isoconcentration maps were prepared for OU1/OU3 deep groundwater (combined) and OU2 deep groundwater, with individual maps for Upper Unit 3, Lower Unit 3, and Upper Unit 4. To complement the isoconcentration maps, cross-sections have been prepared to illustrate the vertical distribution of trichloroethene. One section line passes through the source area at Site G and follows the north plume (OU1) off-TCAAP through well 582628 (NBM#15) of the New Brighton Contaminated Groundwater Recovery System (NBCGRS). A second section line passes through the source area at Site I and traces the south plume (OU3) off-TCAAP through the Plume Groundwater Recovery System (PGRS).

Contaminant concentrations for Middle Unit 3 wells and wells that fully penetrate Unit 3 (03F) (including any recovery wells that fully penetrate Unit 3 and that are being sampled as a monitoring well) are shown in parentheses on the Lower Unit 3 isoconcentration maps, but were not used for contouring purposes except when no Lower Unit 3 wells are in the vicinity. Similarly, wells completed in the Jordan aquifer (04J) and wells completed as open holes intersecting both the Prairie du Chien and Jordan aquifers (PJ#) are shown with the data in parentheses on the Upper Unit 4 isoconcentration maps, but were not used for contouring purposes.

For Site A, isoconcentration maps were developed for cis-1,2-dichloroethene, since this is the most widespread contaminant at Site A, and also for tetrachloroethene, which illustrates the source area. Site A cross-sections were also prepared which illustrate cis-1,2-dichloroethene. The isoconcentration maps for Site A were prepared only for Unit 1, since this is the only contaminated aquifer.

For Site K, an isoconcentration map was developed for trichloroethene (the primary contaminant). The map for Site K was prepared only for Unit 1, since this is the only contaminated aquifer.

Contaminant concentrations for recovery wells that are actively pumping are shown in parentheses on the isoconcentration maps. These values were considered, but were not used alone to prepare the isoconcentration contours. Concentrations of recovery wells generally represent an average contaminant value for all groundwater being drawn to the well; hence, the concentrations do not necessarily represent a discrete location or depth.

C.2 Deviations from Monitoring Program

APPENDIX C.2
DEVIATIONS FROM MONITORING PROGRAM

Fiscal Year 2005

OU1 Deep Groundwater

June 2005:
City of St. Anthony Municipal Well #3 was not sampled because it was not in service at the time of the June sampling event. However, the sampling plan requires sampling of this well only if it is in service at the time of the June event.

Other deviations were related to the well inventory sampling and are documented in Appendix E.

OU2 Site I

June 2005:
Well I01MW: Insufficient water for stabilization readings, the sample was taken immediately.
Well 01U640: Bailed dry after 0.50 gallons removed (just over 1 well volume).
Well 01U667: Bailed dry after 3 gallons removed (just over 1 well volume).
Well 01U639: No sample collected, well was dry. A groundwater sample was collected from the alternate sampling location well I04MW.
Well I02MW: No sample collected, well was dry.
Well I05MW: No sample collected, well was dry.
Well 01U632: No sample collected, well was dry.
Well 01U666: No sample collected, well was dry.
Well 01U668: No sample collected, well was dry.

OU2 Site K

June 2005:
Well 01U611: Bailed dry after 1 gallon removed (1.3 well volumes).
Well 01U617: Bailed dry after 8.5 gallons removed (1.5 well volumes).
Well 01U618: Bailed dry after 1.75 gallons removed (just over 1 well volume).
Well 01U604: Bailed dry after 1.75 gallons removed (1.75 well volumes).
Well 01U603: Bailed dry after 0.50 gallons removed (just over 1 well volume).
Well 01U615: Bailed dry after 5 gallons removed (2.25 well volumes).

OU2 Deep Groundwater

No deviations from the monitoring plan in FY 2005.

OU3 Deep Groundwater

June 2005
As approved in the Groundwater Statistical Evaluation, Operable Unit 3, Wells 03U832 and 03U860 were sampled.

As approved in the Groundwater Statistical Evaluation, Operable Unit 3, Wells 04U864, 04J864, and NBM#13 were not sampled.

September 2005
As approved in the Groundwater Statistical Evaluation, Operable Unit 3, Well 04U863 was sampled.

C.3 Regulatory Approvals for Data Assessments and Validation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGIONS 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

June 14, 2006

REPLY TO THE ATTENTION OF: SR-6J

Mr. Michael R. Fix
Commander's Representative
Twin Cities Army Ammunition Plant
4700 Highway 10 - Suite A
Arden Hills MN 55112-3928

Subject: **Approval of Data Usability Report Numbers 39, 40, 41, and 42**

Dear Mr. Fix:

This letter shall serve to document that the U.S. Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) have completed their review of the subject Data Usability Reports (DURs) Numbers 39, 40, 41 and 42. EPA and MPCA's review included review of:

- Final DUR No. 39 (1st Quarter FY 2005 Performance Monitoring), revised in accordance with the Army's June 28 and August 9, 2005 responses to EPA and MPCA comments;
- Final DUR No. 40 (2nd Quarter FY 2005 Performance Monitoring), revised in accordance with the Army's September 30, 2005 responses to EPA and MPCA comments;
- Final DUR No. 41 (3rd Quarter FY 2005 Performance Monitoring), revised in accordance with the Army's March 31, 2006 and April 27, 2006 responses to EPA and MPCA comments;
- Final DUR No. 42 (4th Quarter FY 2005 Performance Monitoring), revised in accordance with the Army's March 31, 2006 and April 27, 2006 responses to EPA and MPCA comments;

Based upon our review of the information provided by the U.S. Army (Army) and upon technical discussions held among EPA, MPCA and Army staff to resolve the regulators' comments on the DURs, EPA and MPCA agree that the subject DURs are acceptable. You are hereby advised that the EPA and the MPCA approve Data Usability Report Numbers 39, 40, 41 and 42.

If you have any questions, please contact Tom Barounis of the EPA at (312) 353-5577 or Dagmar Romano of the MPCA at (651) 296-7776.

Sincerely,

Tom Barounis

Tom Barounis
Remedial Project Manager
U.S. Environmental Protection Agency
Region 5

Tom Barounis for

Dagmar Romano
Superfund Unit 2
Superfund Section
Majors and Remediation Division
Minnesota Pollution Control Agency

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Appendix D

Comprehensive Groundwater Quality and Groundwater Level Databases

D.1 Comprehensive Groundwater Quality and Groundwater Level Databases

APPENDIX D.1
COMPREHENSIVE GROUNDWATER QUALITY AND GROUNDWATER LEVEL DATABASES

The historical groundwater tables are located on this CD-ROM in a directory named Appendix D. This directory contains three Microsoft Excel files:

File	Contents
Compelev.xls	Groundwater elevations
Comporwq.xls	Groundwater quality: organic data
Compinwq.xls	Groundwater quality: inorganic data

D.2 Operable Unit 1 Statistical Analysis

D.2.1 Well Groups and Statistical Evaluation Criteria Tables

Table D.2.1
Statistical Evaluation
Well Groups

Group 1 – Downgradient of TGRS

03U806	04U806	03L802	03U801
03M806	PJ#806	04U802	03U711
03L806	03M802	PJ#802*	04U711

Group 2 – Areal Extent of Plume

03U805	409557	04U841	04U875
03U672	04U673	04U843	04U877
03L848	04U832	04U833	206688
03L673	04U845	04U846	04U849
03L833	04U854	04U861	04U821
03L859	04U859	409549	191942

Group 3 ** – Downgradient Sentinel

04U871	04U875	04U851	

Group 4 – Lateral Sentinel

03U831	03L846	409556	409548
03U811	03L832	04U855	04U839
03U804	03L861	04U879	04U838
03U673	03L854	04U860	04U848
03U672	03L841	409547	04J839
03M843	03L811	04U863	

Group 5 – Global Plume

04J077	04U702	04U848	04U877
04J702	04U709	04U851	04U879
04J708	04U711	04U852	04U880
04J713	04U713	04U855	04U881
04J834	04U802	04U859	04U882
04J864	04U806	04U860	200154
04J866	04U832	04U861	234546
04J882	04U833	04U863	234549
04U002	04U834	04U864	409547
04U020	04U841	04U865	409548
04U027	04U843	04U866	409549
04U077	04U844	04U871	409555
04U673	04U845	04U872	512761
04U701	04U846	04U875	PJ#318

Group 6 – Jordan Aquifer

04J077	04J838	04U713	04U882
04J702	04J839	04U834	NBM#3
04J708	04J882	04U836	NBM#4
04J713	04J847	04U837	NBM#5
04J822	04J849	04U838	NBM#6
04J834	04U077	04U839	
04J836	04U702	04U847	
04J837	04U708	04U849	

* PJ#802 will not be monitored or used for evaluation unless 04U802 shows TCE concentrations greater than 1 ppb.

** Group 3 is analyzed as a rectangular area taken from the Group 5 contouring.

TABLE D.2.2

MAROS Decision Matrix

Mann-Kendall S	Confidence	Coefficient of Variance	Trend Conclusion
S > 0	> 95%	NA	Increasing
S > 0	90-95%	NA	Probably Increasing
S > 0	< 90%	NA	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	NA	Probably Decreasing
S < 0	>95%	NA	Decreasing

Table D.2.3
Summary of Groups, Purpose, and Statistical Tests

Well Group	Purpose	Measure	Time Window/ Monitoring Frequency	Test	Response Threshold
Group 1	AWC Immediately Downgradient of TGRS	AWC Trend	6 years/annual	Mann-Kendall and MAROS	Stable, Increasing, or No Trend
Group 2	Defining Plume Size (Low Concentration Edges)	Individual Well Trend for TCE	12 years/biennial	Mann-Kendall and MAROS	Increasing or No Trend
Group 3	AWC Immediately Downgradient of NBCGRS	AWC Trend	12 years/biennial	Mann-Kendall and MAROS	Stable, Increasing, or No Trend
Group 4	Lateral (Clean) Sentinel Wells	Individual Well Concentration	12 years/biennial	Individual Concentrations	Greater than ROD goals
Group 5	Global Plume Mass Reduction	AWC Trend	12 years/biennial	Mann-Kendall and MAROS	Stable, Increasing, or No Trend
Group 6	Evaluating and comparing trends in Jordan Aquifer	Individual Well Trend for TCE	12 years/biennial	Mann-Kendall and MAROS	Stable, Increasing or No Trend

Note: A Response Threshold is the test result(s) that triggers further response. See text for additional explanation of response process.

AWC = Area-Weighted Concentration.

Table D.2.4
Group 1 – Downgradient of TGRS, Evaluation Process

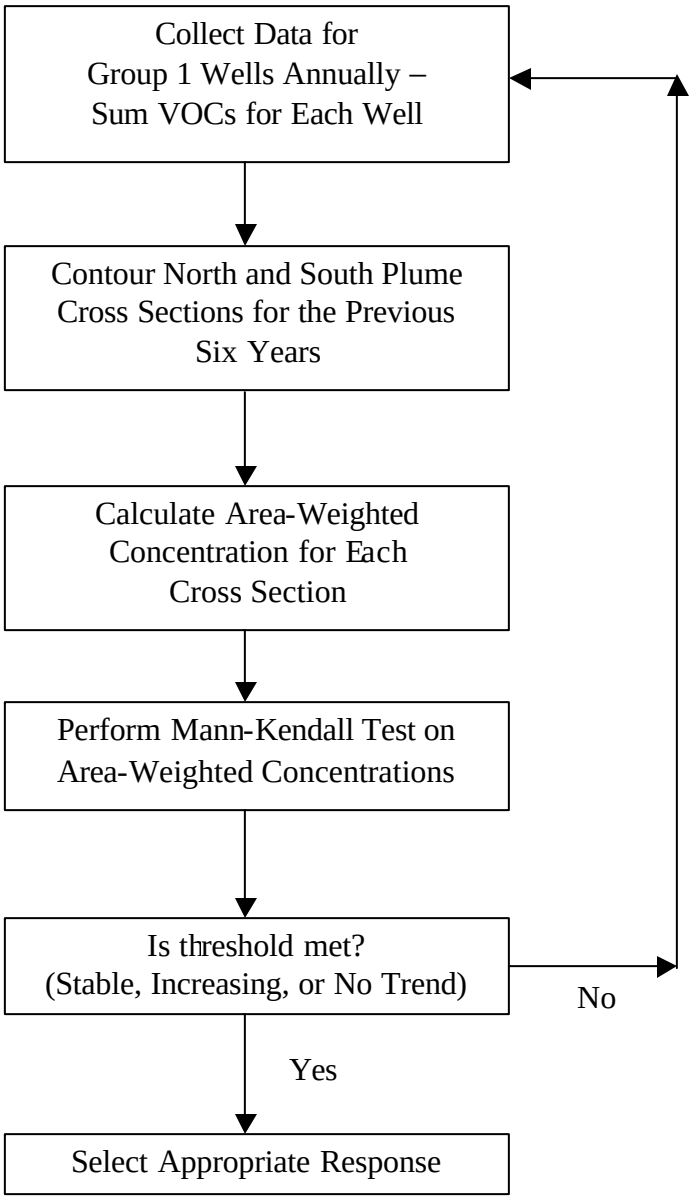


Table D.2.5
Group 2 – Areal Extent of Plume, Evaluation Process

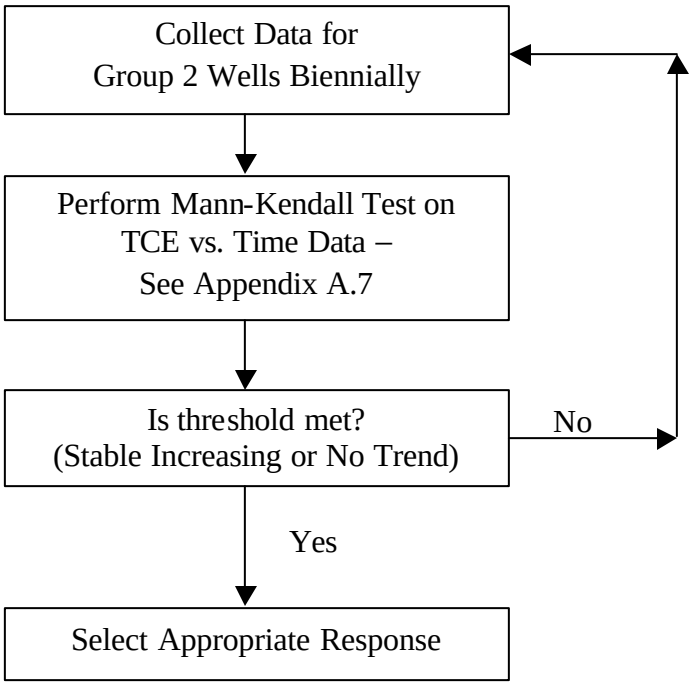


Table D.2.6
Group 3 and Group 5 – Downgradient Sentinel and Global Plume, Evaluation Processes

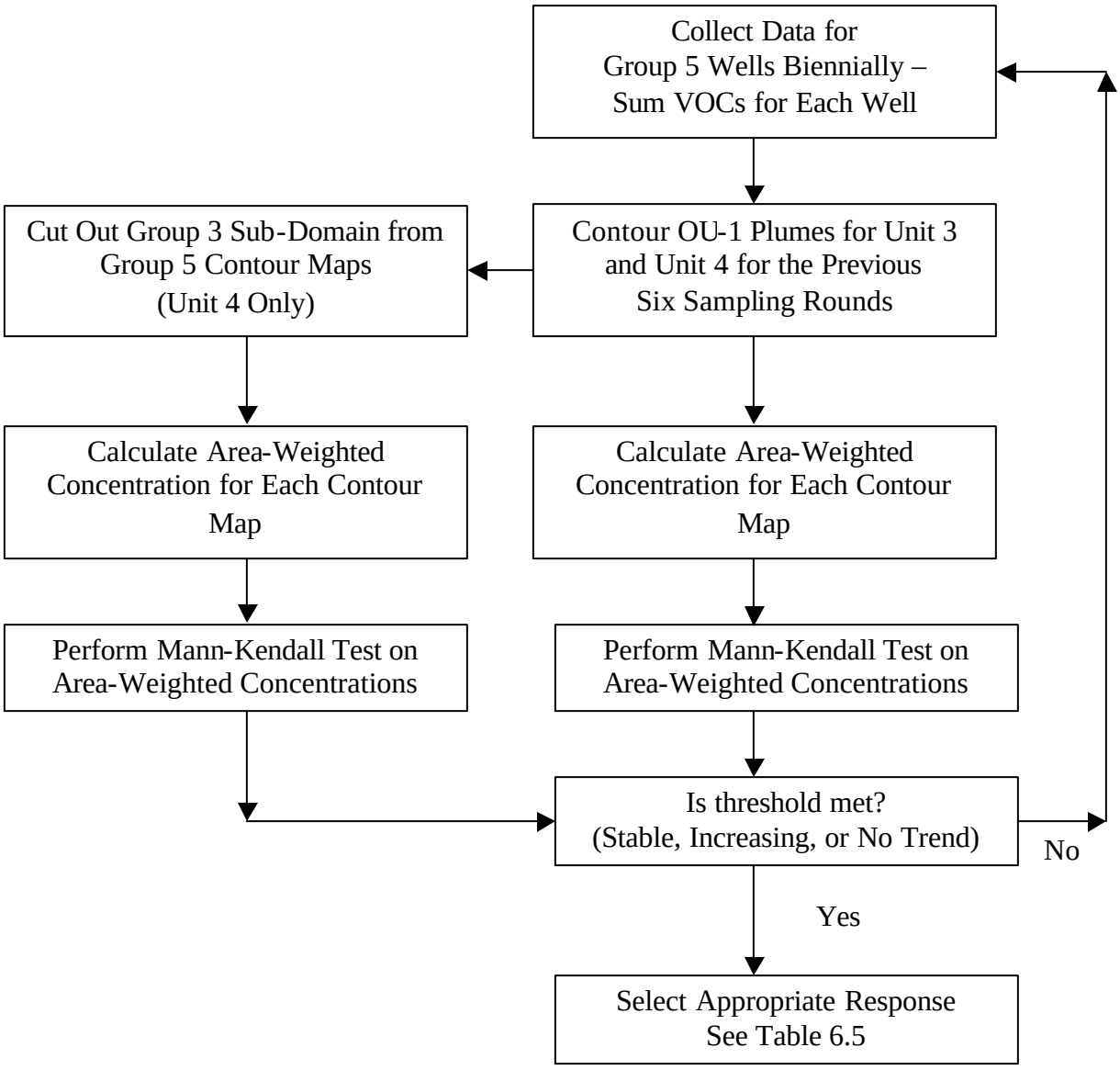


Table D.2.7
Group 4 – Lateral Sentinel Wells, Evaluation Process

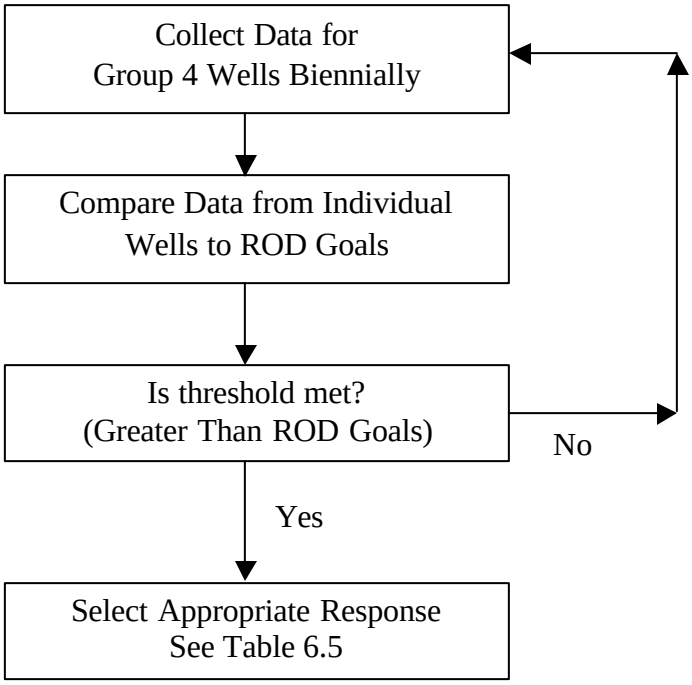


Table D.2.8

Responses to Threshold Indicators

Factors to Consider

- Contaminant concentrations
- Location (vertical and horizontal)
- Surrounding data
- Risks to human health or the environment
- Need for urgency in response

Possible Evaluation Responses

- Perform additional or confirmation sampling
- Write up in the Annual Performance Report
- Perform separate evaluation and write-up (Tech Memo)

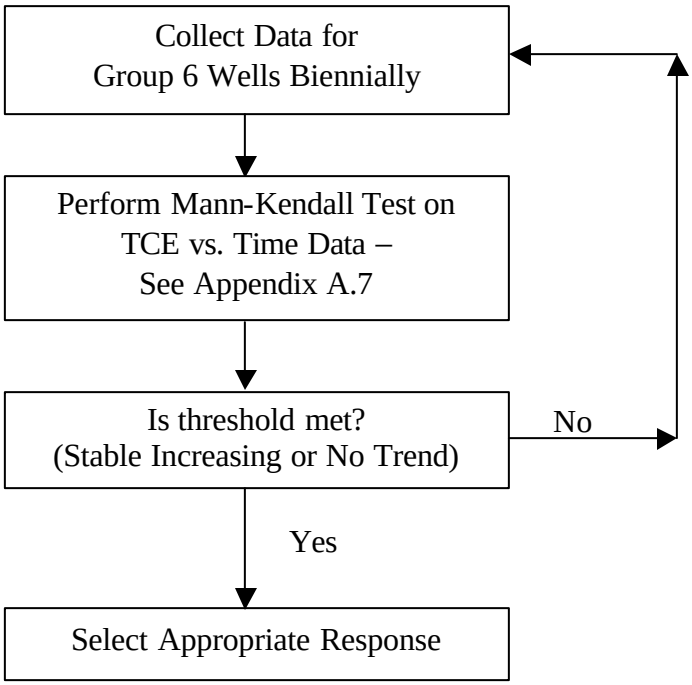
Possible Long-Term Responses

- Increase sampling frequency
- Modify operation of remedial system(s)
- Perform new remedy evaluation
- Install additional monitoring well(s)
- Modify the Special Well Construction Area
- Control risk at the receptors

Note: Threshold responses to be described and evaluated in the Annual Performance Reports.

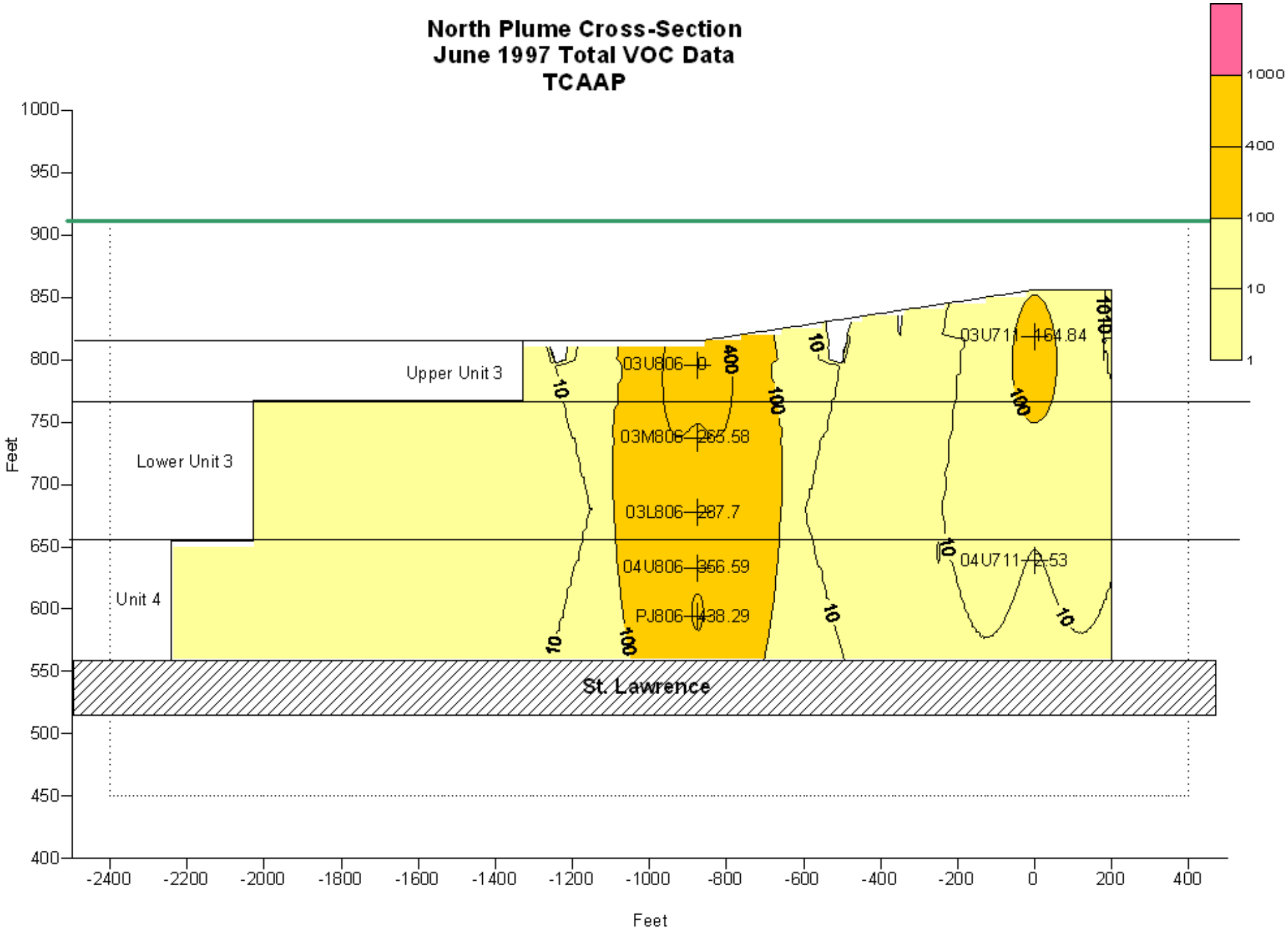
Table D.2.9

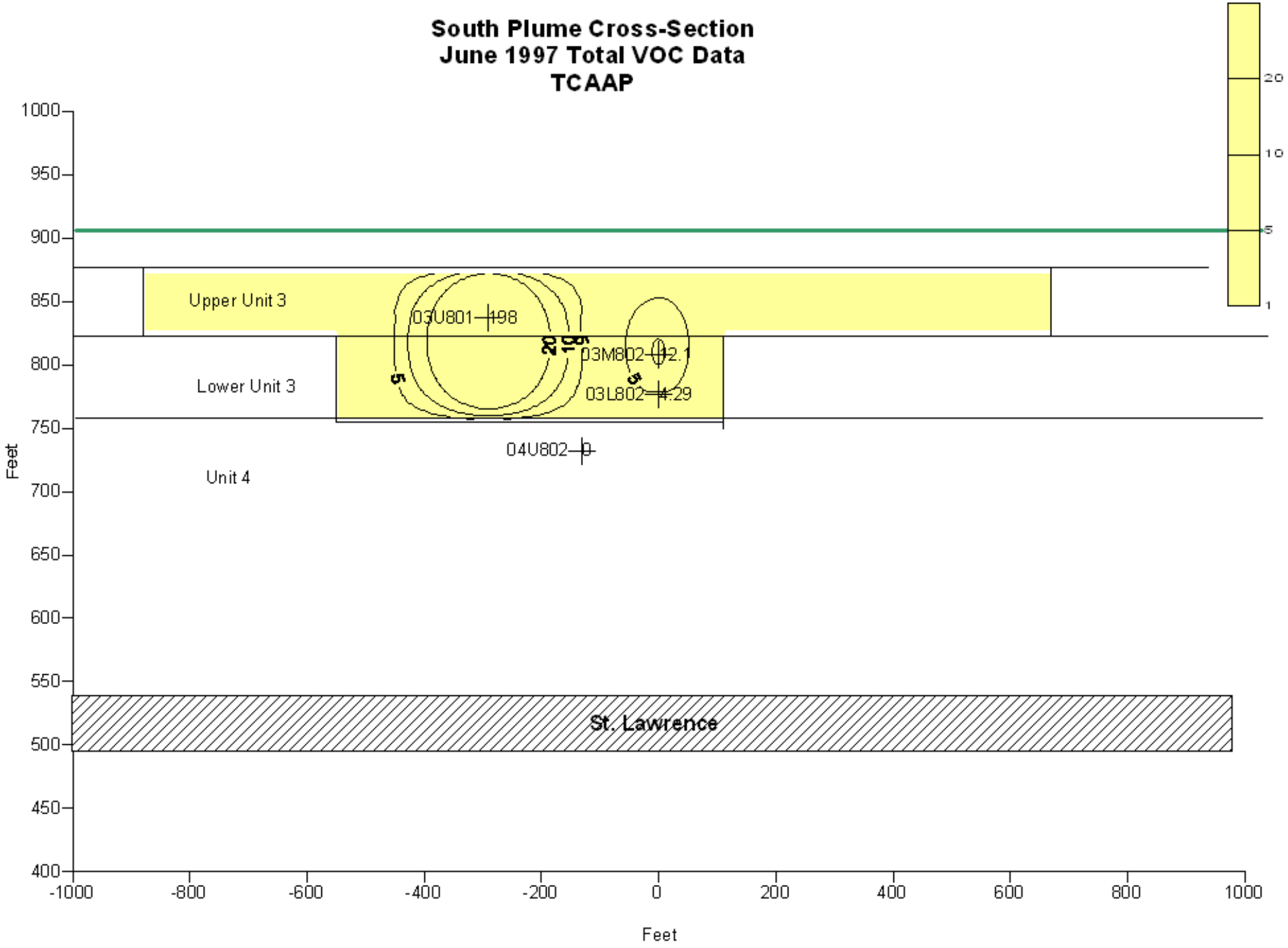
Group 6 – Jordan Aquifer, Evaluation Process



D.2.2 Group 1 Kriging Evaluation

1997


North Plume Cross-Section
June 1997 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806
03M806
03L806
04U806
PJ806
03U711
04U711
Feet
Feet


South Plume Cross-Section
June 1997 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
03U801—198
03M802—12.1
03L802—4.29
04U802—0
5
20
10
5
St. Lawrence
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
20
10
5
1

Groundwater Quality Data (Organics) - 1997		
Well	Date	TOTAL VOCs (ug/l)
03L806	6/25/1997	287.70
03M806	6/17/1997	265.58
03U711	6/13/1997	164.84
03U806*		986.00
04U711	6/13/1997	2.53
04U806	6/5/1997	356.59
PJ#806	6/5/1997	438.29
03L802	6/16/1997	4.29
03M802	6/16/1997	12.10
03U801	6/17/1997	201.66
04U802	6/16/1997	0.00

* Interpolated

South Plume

North plume

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 1997

Concentration	Positive Planar Area (ft2)
Plume to 1	570490
Plume to 5	288525
Plume to 10	269887
Plume to 50	165775
Plume to 100	113709
Plume to 200	74691
Plume to 300	43287
Plume to 400	12634
Plume to 500	6612
Plume to 600	3768
Plume to 700	2021
Plume to 800	917
Plume to 900	191
Plume to 1000	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	281964	845893
5 to 10	7.5	18638	139786
10 to 50	30	104112	3123373
50 to 100	75	52065	3904904
100 to 200	150	39018	5852772
200 to 300	250	31404	7850995
300 to 400	350	30653	10728491
400 to 500	450	6022	2709721
500 to 600	550	2845	1564609
600 to 700	650	1746	1135058
700 to 800	750	1105	828667
800 to 900	850	725	616459
900 to 1000	950	191	181775
	Sum	570490	39482503

Area Wtd Conc	69	ug/L

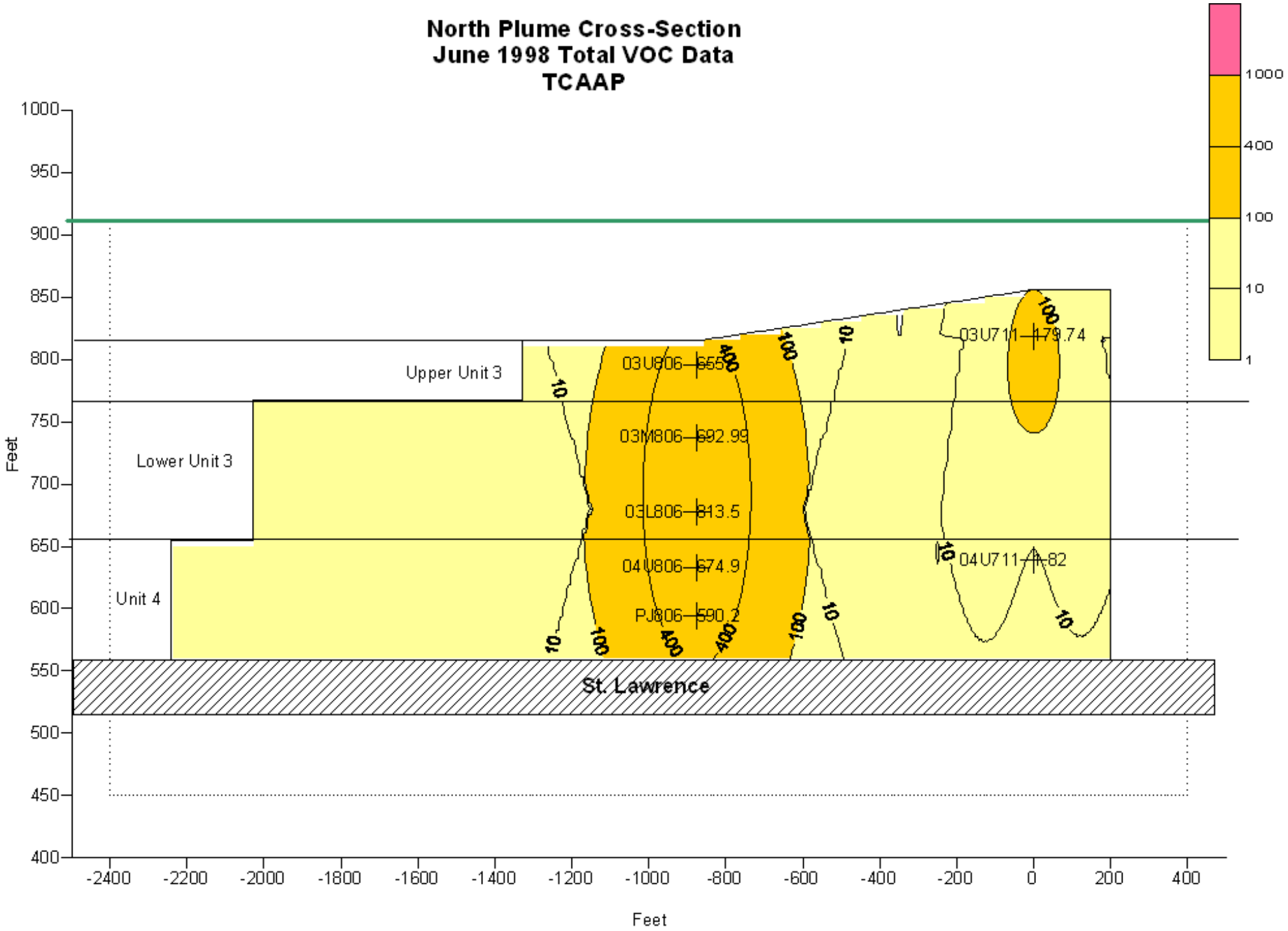
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June 1997

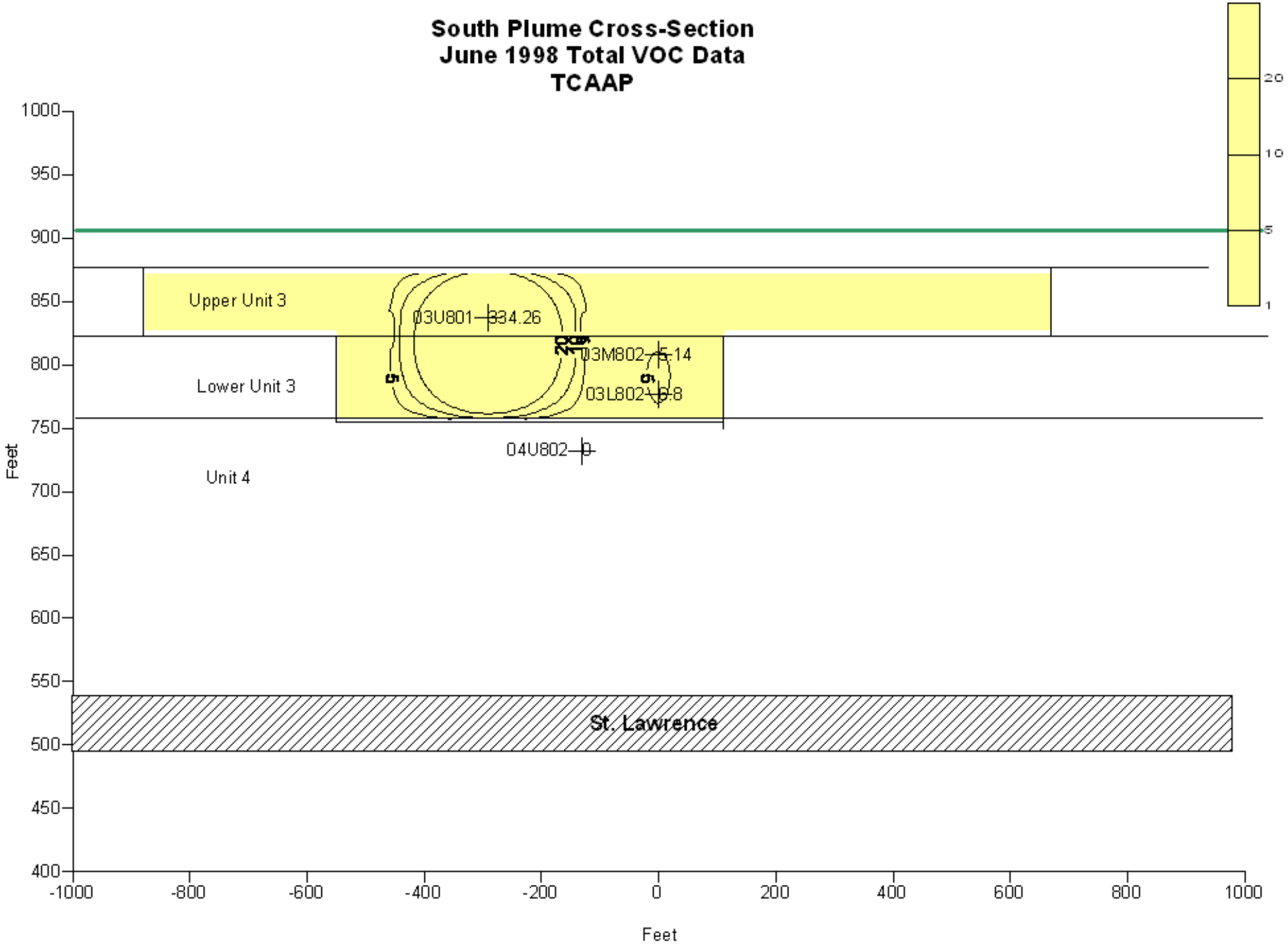
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	40363
Plume to 10	26616
Plume to 25	15757
Plume to 50	8734
Plume to 100	2906
Plume to 200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	74873	224619
5 to 10	7.5	13748	103107
10 to 25	17.5	10858	190020
25 to 50	37.5	7023	263376
50 to 100	75	5828	437100
100 to 200	150	2906	435878
	Sum	115236	1654100

Area Wtd Conc	14	ug/L

1998


North Plume Cross-Section
June 1998 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806—655
03M806—692.99
03L806—813.5
04U806—674.9
PJ806—590.2
03U711—779.74
04U711—782
Feet
Feet


South Plume Cross-Section
June 1998 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U801
34.26
03M802
5.14
03L802
6.8
04U802
0
5
20
10
5
1
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000

Groundwater Quality Data (Organics) - 1998		
Well	Date	TOTAL VOCs (ug/l)
03L806	6/12/1998	813.50
03M806	6/12/1998	692.99
03U711	6/16/1998	179.74
03U806*		655.00
04U711	6/9/1998	1.82
04U806	6/12/1998	674.90
PJ#806	6/12/1998	590.20
03L802	6/11/1998	6.80
03M802	6/17/1998	5.14
03U801	6/17/1998	334.26
04U802	6/11/1998	0.00

* Interpolated

South Plume

North plume

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 1998

Concentration	Positive Planar Area (ft2)
Plume to 1	572327
Plume to 5	291283
Plume to 10	275277
Plume to 50	200943
Plume to 100	151271
Plume to 200	102729
Plume to 300	78851
Plume to 400	58828
Plume to 500	39484
Plume to 600	22174
Plume to 700	6155
Plume to 800	71
Plume to 900	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	281044	843132
5 to 10	7.5	16006	120046
10 to 50	30	74334	2230032
50 to 100	75	49671	3725356
100 to 200	150	48542	7281374
200 to 300	250	23877	5969303
300 to 400	350	20024	7008373
400 to 500	450	19344	8704734
500 to 600	550	17310	9520603
600 to 700	650	16018	10411811
700 to 800	750	6084	4563319
800 to 900	850	71	60279
	Sum	572327	60438362

Area Wtd Conc	106	ug/L

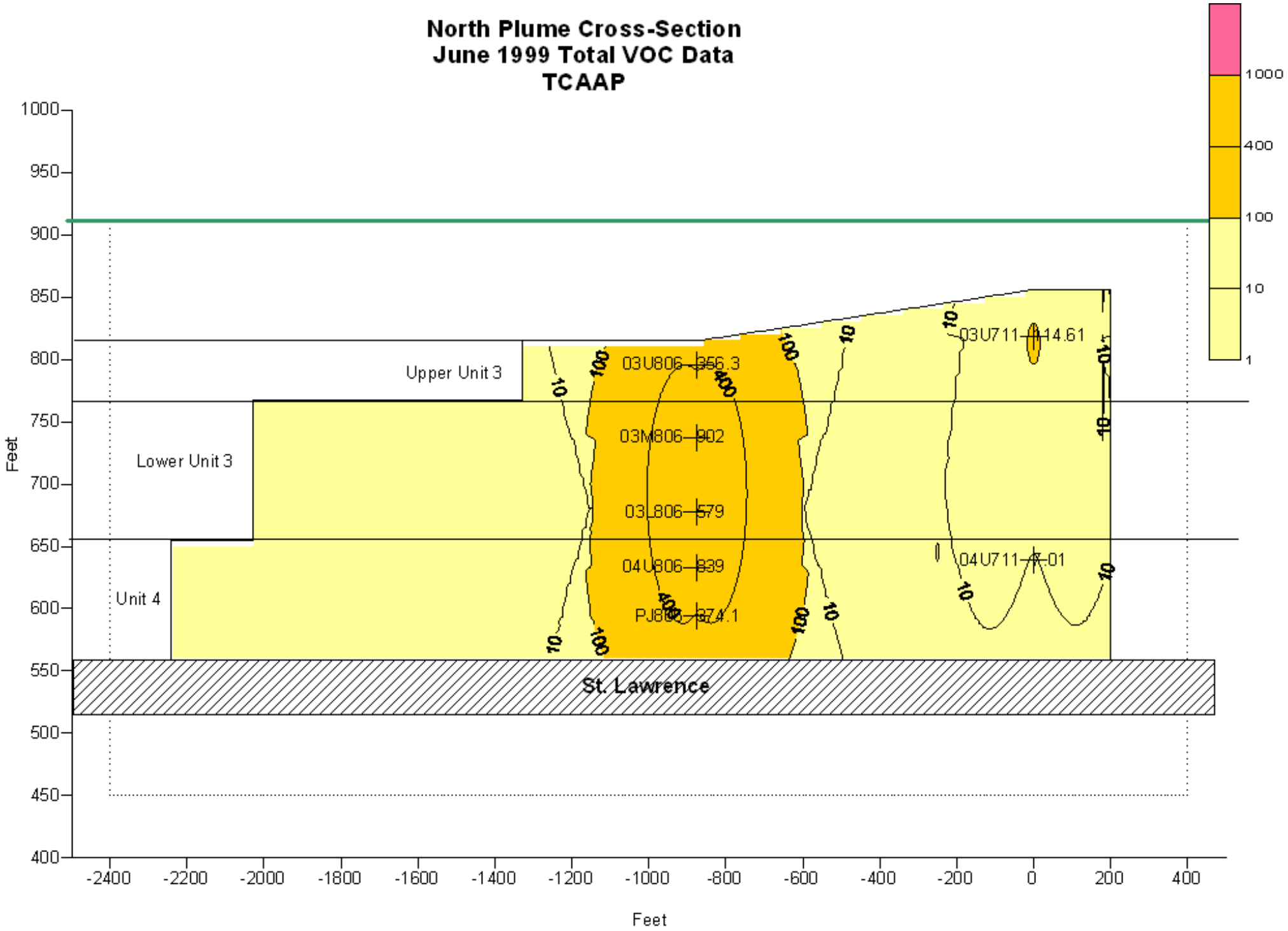
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June 1998

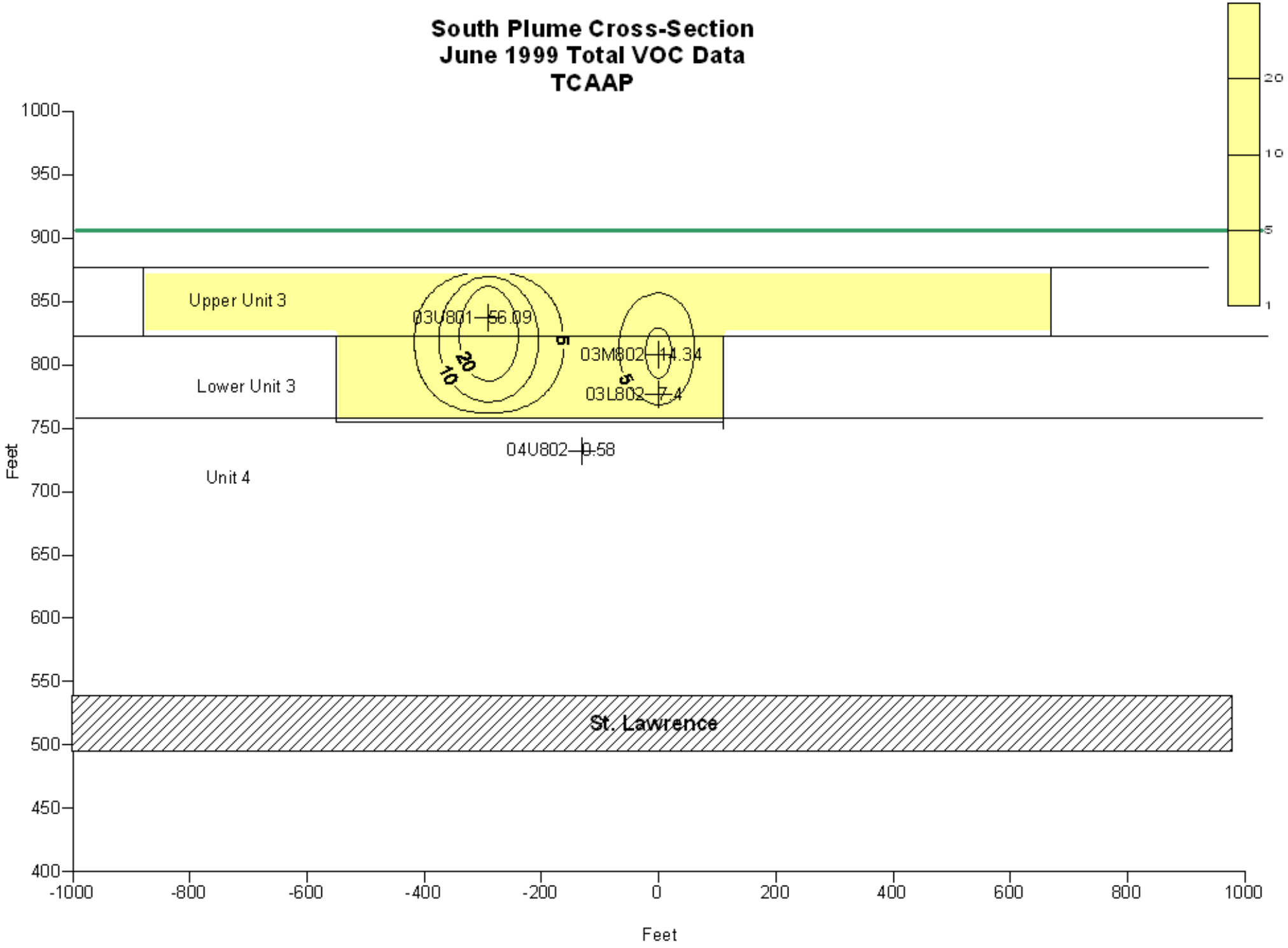
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	37221
Plume to 10	30498
Plume to 25	20858
Plume to 50	13520
Plume to 100	6920
Plume to 200	1673
Plume to 300	75
Plume to 400	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	78015	234045
5 to 10	7.5	6723	50426
10 to 25	17.5	9640	168693
25 to 50	37.5	7339	275194
50 to 100	75	6599	494951
100 to 200	150	5248	787167
200 to 300	250	1597	399360
300 to 400	350	75	26341
	Sum	115236	2436177

Area Wtd Conc	21	ug/L

1999


North Plume Cross-Section
June 1999 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806
356.3
03M806
902
03L806
579
04U806
839
PJ806
874.1
03U711
14.61
04U711
7.01
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-2400
-2200
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Feet


South Plume Cross-Section
June 1999 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
03U801 56.09
03M802 14.34
03L802 7.4
04U802 0.58
St. Lawrence
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
20
10
5
1

Groundwater Quality Data (Organics) - 1999		
Well	Date	TOTAL VOCs (ug/l)
03L802	6/23/1999	7.40
03M802	6/23/1999	14.34
03U801	6/29/1999	56.09
04U802	6/23/1999	0.58
03L806	6/23/1999	579.00
03M806*		902.00
03U711	6/28/1999	114.61
03U806	6/23/1999	356.30
04U711	6/28/1999	7.01
04U806	6/23/1999	839.00
PJ#806	6/23/1999	374.10

* Interpolated

South Plume

North plume

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 1999

Concentration	Positive Planar Area (ft2)
Plume to 1	572514
Plume to 5	294922
Plume to 10	270495
Plume to 50	183129
Plume to 100	138286
Plume to 200	99392
Plume to 300	70102
Plume to 400	44570
Plume to 500	27825
Plume to 600	15887
Plume to 700	4664
Plume to 800	783
Plume to 900	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	277592	832777
5 to 10	7.5	24427	183204
10 to 50	30	87366	2620971
50 to 100	75	44843	3363213
100 to 200	150	38894	5834158
200 to 300	250	29290	7322437
300 to 400	350	25532	8936067
400 to 500	450	16746	7535697
500 to 600	550	11937	6565574
600 to 700	650	11223	7294904
700 to 800	750	3881	2910574
800 to 900	850	783	665891
	Sum	572514	54065467

Area Wtd Conc	94	ug/L

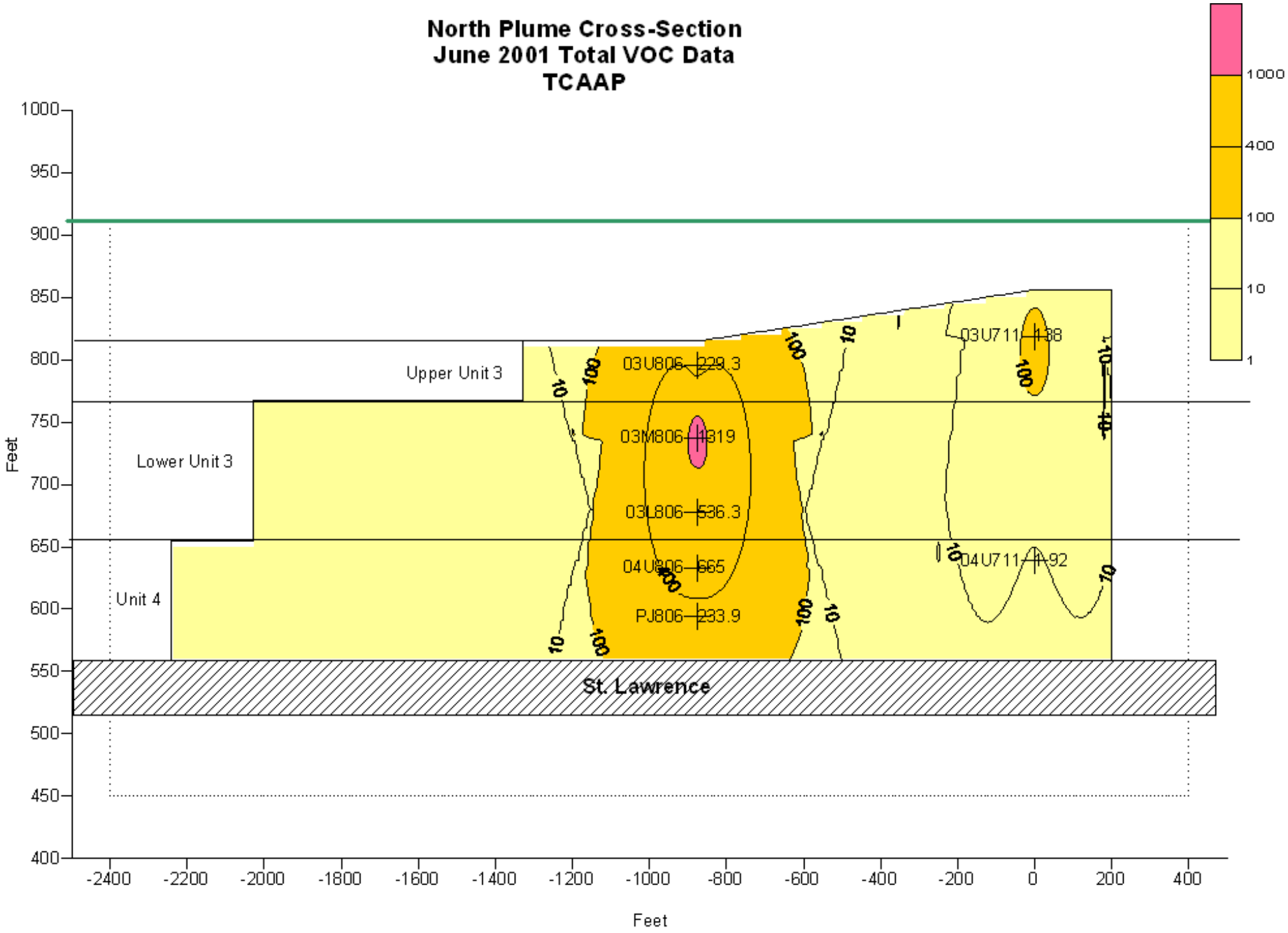
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June 1999

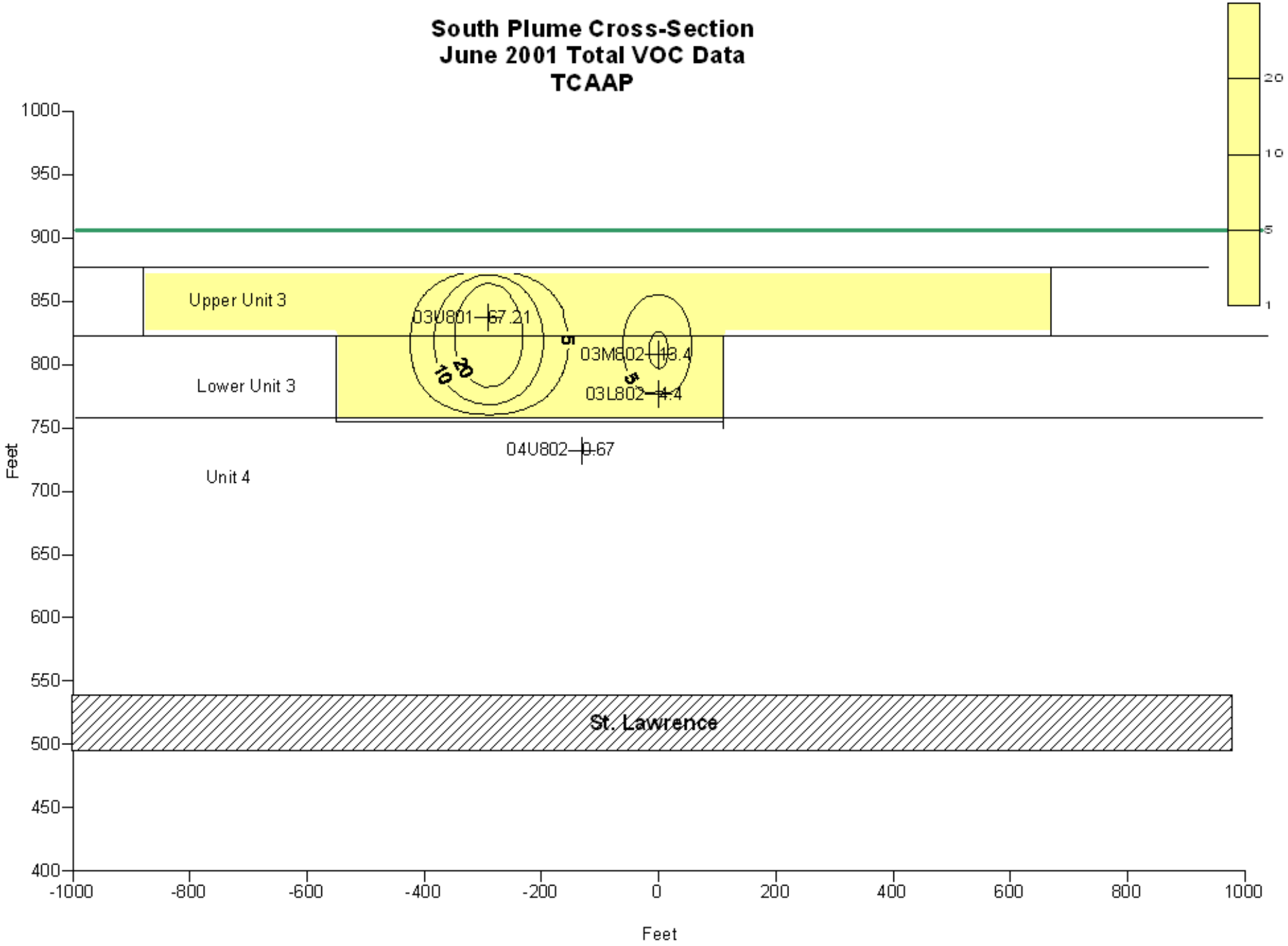
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	32196
Plume to 10	14726
Plume to 25	3947
Plume to 50	94
Plume to 100	0

TCE (ug/L)	Avg TCE (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	83040	249120
5 to 10	7.5	17470	131025
10 to 25	17.5	10779	188629
25 to 50	37.5	3854	144519
50 to 100	75	94	7016
	Sum	115236	720309

Area Wtd Conc	6	ug/L

2001


North Plume Cross-Section
June 2001 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806 229.3
03M806 819
03L806 536.3
04U806 665
PJ806 233.9
03U711 138
04U711 92
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-2400
-2200
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400


South Plume Cross-Section
June 2001 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U801—67.21
03M802—13.4
03L802—4.4
04U802—0.67
5
10
20
5
20
10
5
1
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000

Groundwater Quality Data (Organics) - 2001		
Well	Date	TOTAL VOCs (ug/l)
03L806	6/15/2001	536.30
03M806*		1319.00
03U711	6/12/2001	138.00
03U806	6/15/2001	229.30
04U711	6/12/2001	1.92
04U806	6/15/2001	665.00
PJ#806	6/15/2001	233.90
03L802	6/19/2001	4.40
03M802	6/19/2001	13.40
03U801	6/18/2001	67.21
04U802	6/19/2001	0.67

* Interpolated

South Plume

North plume

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 2001

Concentration	Positive Planar Area (ft2)
Plume to 1	572398
Plume to 5	288569
Plume to 10	267944
Plume to 50	191092
Plume to 100	143221
Plume to 200	103426
Plume to 300	65435
Plume to 400	42734
Plume to 500	28083
Plume to 600	16350
Plume to 700	9048
Plume to 800	5367
Plume to 900	3079
Plume to 1000	1615
Plume to 1100	697
Plume to 1200	184
Plume to 1300	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	283829	851488
5 to 10	7.5	20624	154683
10 to 50	30	76853	2305575
50 to 100	75	47871	3590299
100 to 200	150	39795	5969323
200 to 300	250	37991	9497682
300 to 400	350	22701	7945227
400 to 500	450	14651	6593110
500 to 600	550	11733	6453374
600 to 700	650	7302	4746206
700 to 800	750	3680	2760309
800 to 900	850	2288	1944735
900 to 1000	950	1465	1391325
1000 to 1100	1050	918	963849
1100 to 1200	1150	513	589863
1200 to 1300	1250	184	229853
	Sum	572398	55986901

Area Wtd Conc	98	ug/L

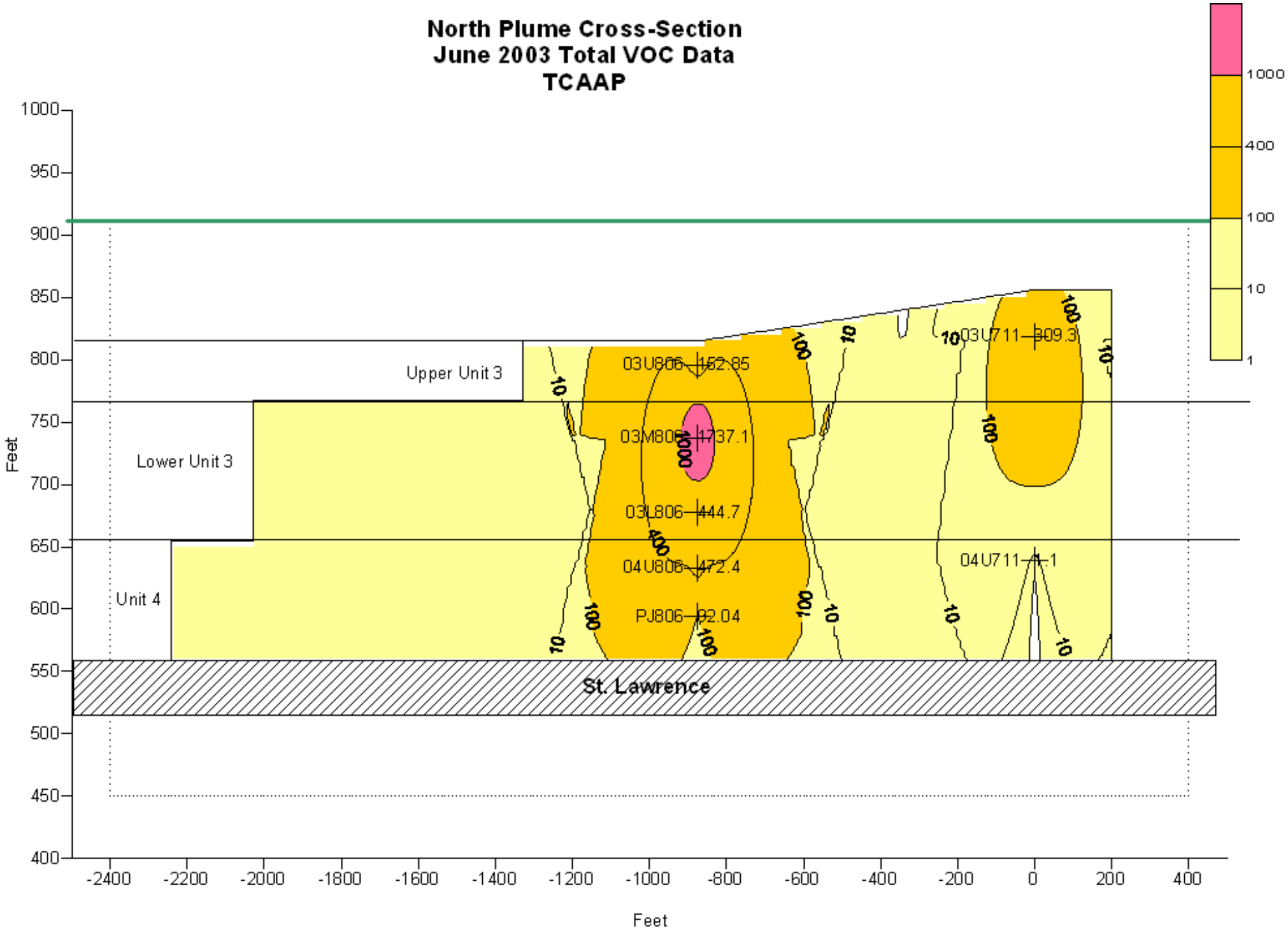
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June 2001

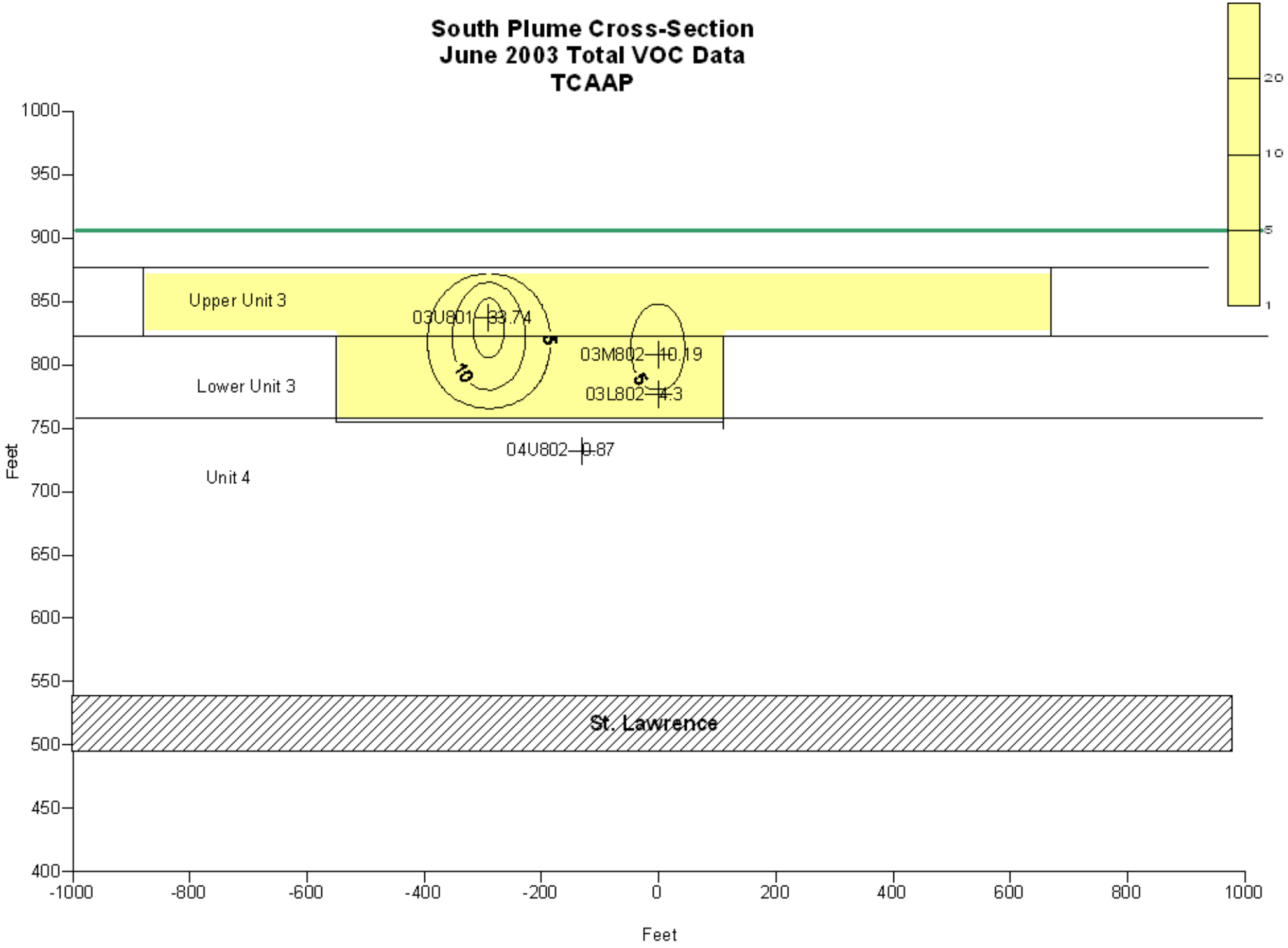
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	32494
Plume to 10	15927
Plume to 25	5422
Plume to 50	638
Plume to 100	0

TCE (ug/L)	Avg TCE (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	82743	248228
5 to 10	7.5	16567	124253
10 to 25	17.5	10505	183839
25 to 50	37.5	4783	179368
50 to 100	75	638	47878
	Sum	115236	783566

Area Wtd Conc	7	ug/L

2003


North Plume Cross-Section
June 2003 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806 152.85
03M806 1737.1
03L806 444.7
04U806 472.4
PJ806 92.04
03U711 309.3
04U711 1.1
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-2400
-2200
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Feet


South Plume Cross-Section
June 2003 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
03U801 33.74
03M802 10.19
03L802 4.3
04U802 0.87
10
5
5
St. Lawrence
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
20
10
5
1

Groundwater Quality Data (Organics) - 2003		
Well	Date	TOTAL VOCs (ug/l)
03L806	6/12/2003	444.70
03M806	6/12/2003	1737.10
03U711	6/17/2003	309.30
03U806	6/16/2003	152.85
04U711	6/17/2003	1.10
04U806	6/16/2003	472.40
PJ#806	6/12/2003	92.04
03L802	6/17/2003	4.30
03M802	6/17/2003	10.19
03U801	6/17/2003	33.74
04U802	6/17/2003	0.87

South Plume
North plume

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 2003

Concentration	Positive Planar Area (ft2)
Plume to 1	570970
Plume to 5	293399
Plume to 10	285615
Plume to 50	226380
Plume to 100	172784
Plume to 200	104726
Plume to 300	62076
Plume to 400	41078
Plume to 500	26311
Plume to 600	17751
Plume to 700	12321
Plume to 800	8684
Plume to 900	6147
Plume to 1000	4318
Plume to 1100	2971
Plume to 1200	1969
Plume to 1300	1227
Plume to 1400	687
Plume to 1500	318
Plume to 1600	93
Plume to 1700	0

TCE (ug/L)	Avg TCE (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	277571	832713
5 to 10	7.5	7784	58377
10 to 50	30	59235	1777060
50 to 100	75	53596	4019665
100 to 200	150	68058	10208666
200 to 300	250	42650	10662576
300 to 400	350	20998	7349150
400 to 500	450	14767	6645320
500 to 600	550	8560	4708004
600 to 700	650	5430	3529256
700 to 800	750	3638	2728383
800 to 900	850	2537	2156220
900 to 1000	950	1829	1737148
1000 to 1100	1050	1348	1414965
1100 to 1200	1150	1002	1151948
1200 to 1300	1250	742	927859
1300 to 1400	1350	539	728236
1400 to 1500	1450	369	534776
1500 to 1600	1550	226	349576
1600 to 1700	1650	93	153324
	Sum	570970	61673222

Area Wtd Conc	108	ug/L

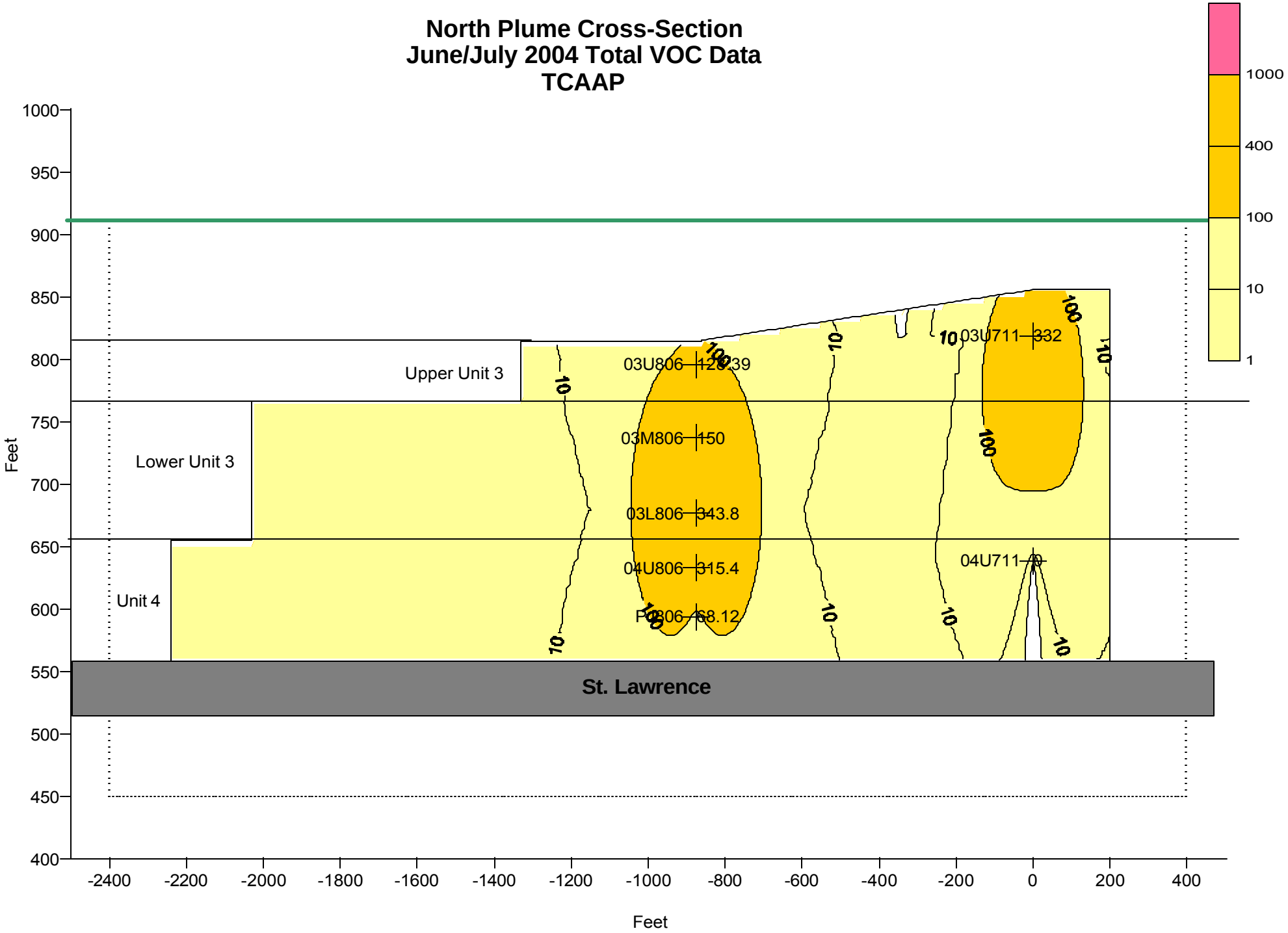
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June 2003

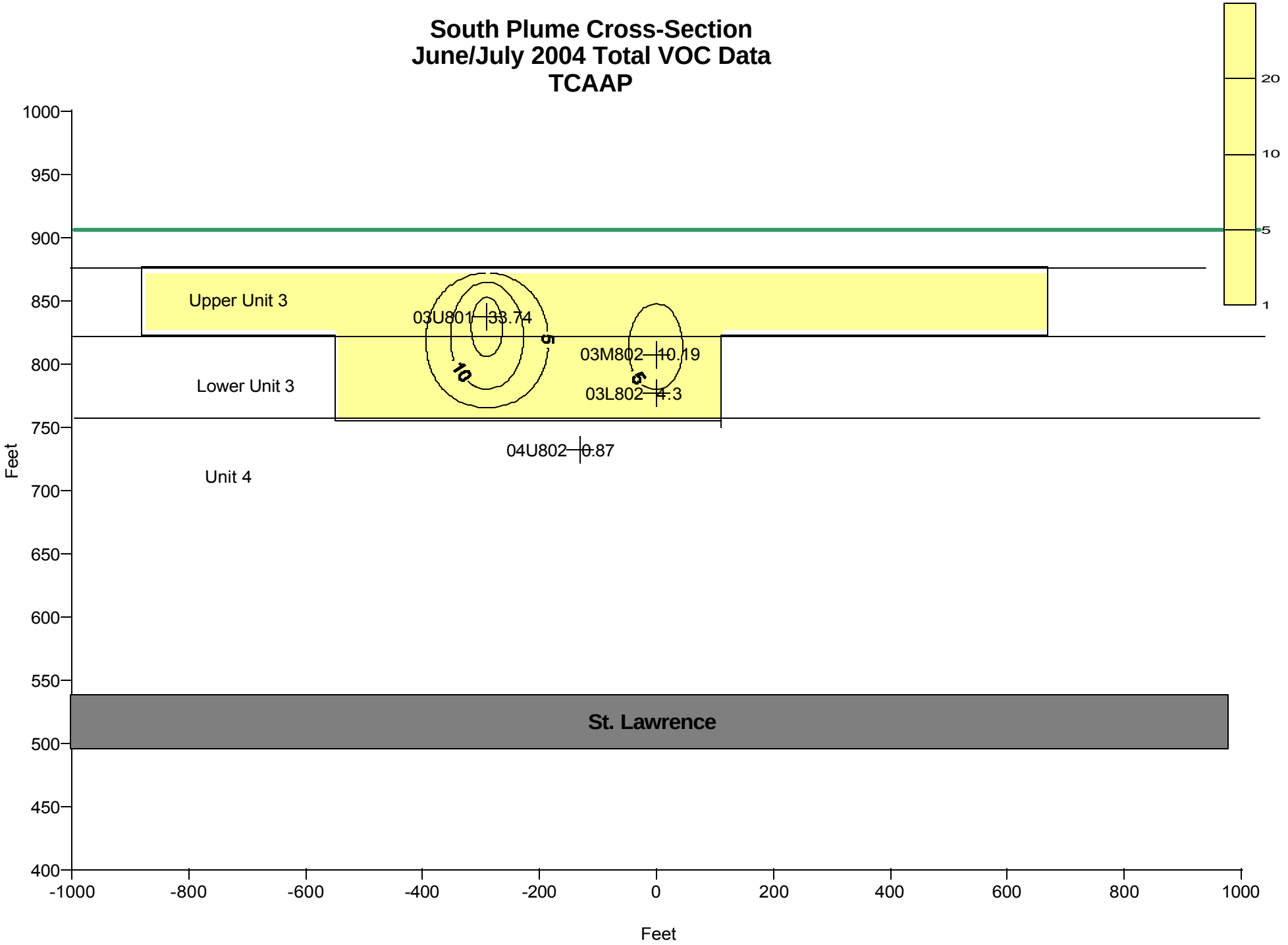
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	22810
Plume to 10	8328
Plume to 25	701
Plume to 50	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	92426	277278
5 to 10	7.5	14482	108617
10 to 25	17.5	7627	133469
25 to 50	37.5	701	26296
	Sum	115236	545660

Area Wtd Conc	5	ug/L

2004


North Plume Cross-Section
June/July 2004 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
03U806—128.39
03M806—150
03L806—343.8
04U806—315.4
P806—68.12
03U711—332
04U711—0
St. Lawrence
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-2400
-2200
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400


South Plume Cross-Section
June/July 2004 Total VOC Data
TCAAP
20
10
5
1
Upper Unit 3
Lower Unit 3
Unit 4
03U801 33.74
03M802 10.19
03L802 4.3
04U802 0.87
10
5
5
St. Lawrence
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
Feet

Groundwater Quality Data
Fiscal Year 2004
TGRS, TCAAP
Arden Hills, Minnesota

Location	Date	*1,1,1-Trichloroethane*	*1,1-Dichloroethane*	*1,1-Dichloroethene*	*1,2-Dichloroethane*	*cis-1,2-Dichloroethene*	*Tetrachloroethene*	*Trichloroethene*	*Total VOCs*
TGRS Cleanup Level[1]		200 µg/L	70 µg/L	6 µg/L	4 µg/L	70 µg/L	5 µg/L	5 µg/L	µg/L
03L802	7/7/04	<1	<1	<1	<1	<1	<1	4.2	4.2
03M802	6/17/04	<1	<1	<1	<1	<1	<1	11	11
03U801	6/17/04	<1	<1	<1	<1	0.6P	<1	34	34.61
04U802	7/7/04	<1	<1	<1	<1	<1	<1	<1	0
03L806	7/7/04	37	29	25	<1	2.8	<1	250	343.8
03M806	6/18/04	<1	19	9.9	<1	1.1	<1	120	150
03U711	7/6/04	51	10	14	<1	4.6	2.4	250	332
03U806	6/18/04	<1	3.6	2.9	<1	0.6P	1.3	120	128.39
04U711	7/6/04	<1	<1	<1	<1	<1	<1	<1	0
04U806	6/17/04	18	24	20	<1	3.4	<1	250	315.4
PJ#806	6/17/04	1.4	2.9	2.4	<1	0.4P	<1	61	68.12

Notes:
(1) Cleanup levels for TGRS are from the OU2 ROD. Shading indicates exceedence of the cleanup level.
D - Duplicate Analysis
J - Value is estimated
P - Results less than reporting level but greater than instrument detection limit.
South Plume
North Plume

Assumptions:
(<) values were treated as 0
any value with a text before or after number was treated as the detection.

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June/July 2004

Concentration	Positive Planar Area (ft2)
Plume to 1	570022
Plume to 5	292356
Plume to 10	283133
Plume to 50	191824
Plume to 100	100970
Plume to 200	23072
Plume to 300	2543
Plume to 400	0
Plume to 500	0

TCE (ug/L)	Avg TCE (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	277666	832998
5 to 10	7.5	9223	69173
10 to 50	30	91309	2739270
50 to 100	75	90854	6814050
100 to 200	150	77898	11684700
200 to 300	250	20529	5132250
300 to 400	350	2543	890050
400 to 500	450	0	0
	Sum	570022	28162491

Area Wtd Conc	49	ug/L

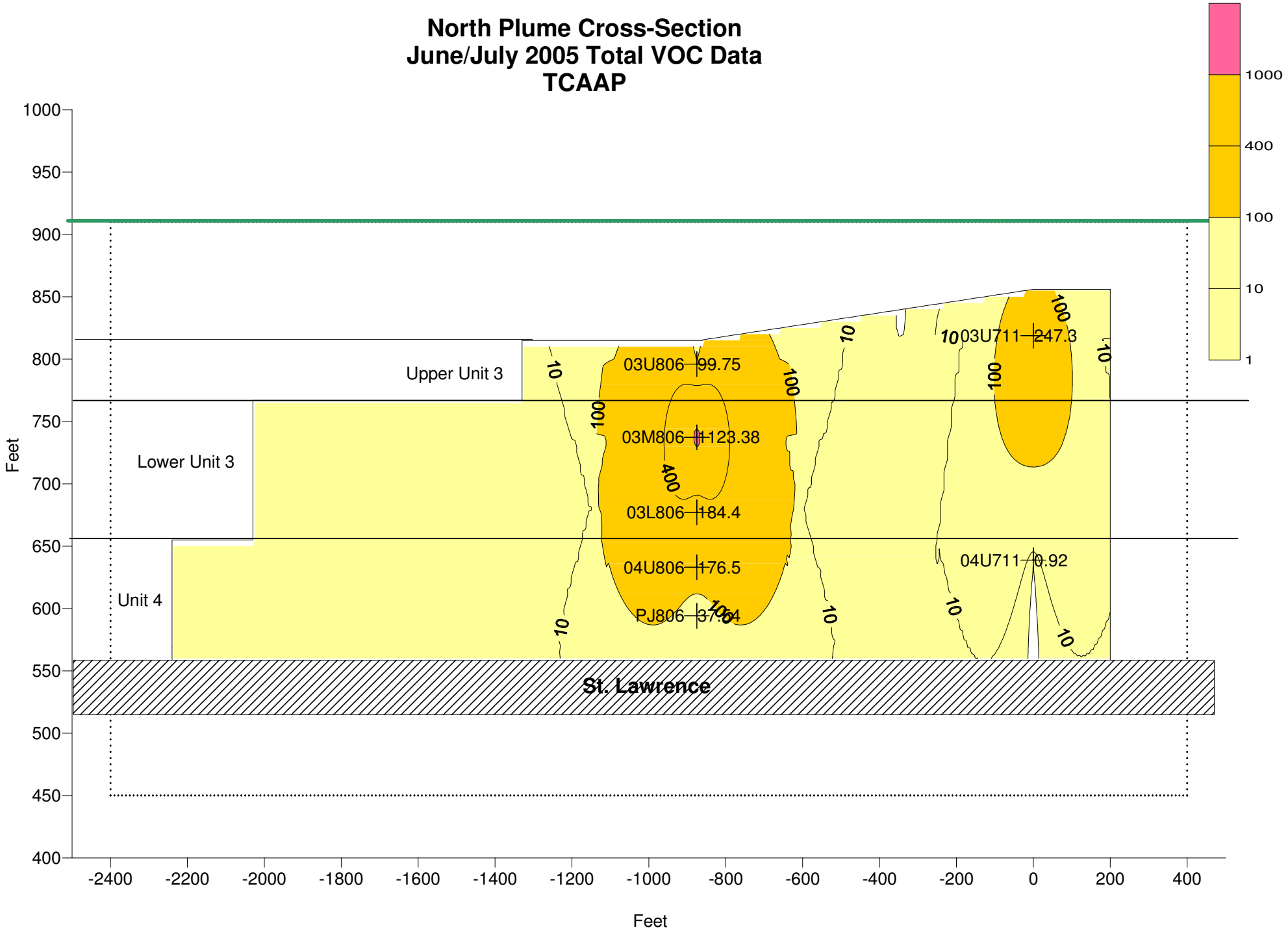
South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June/July 2004

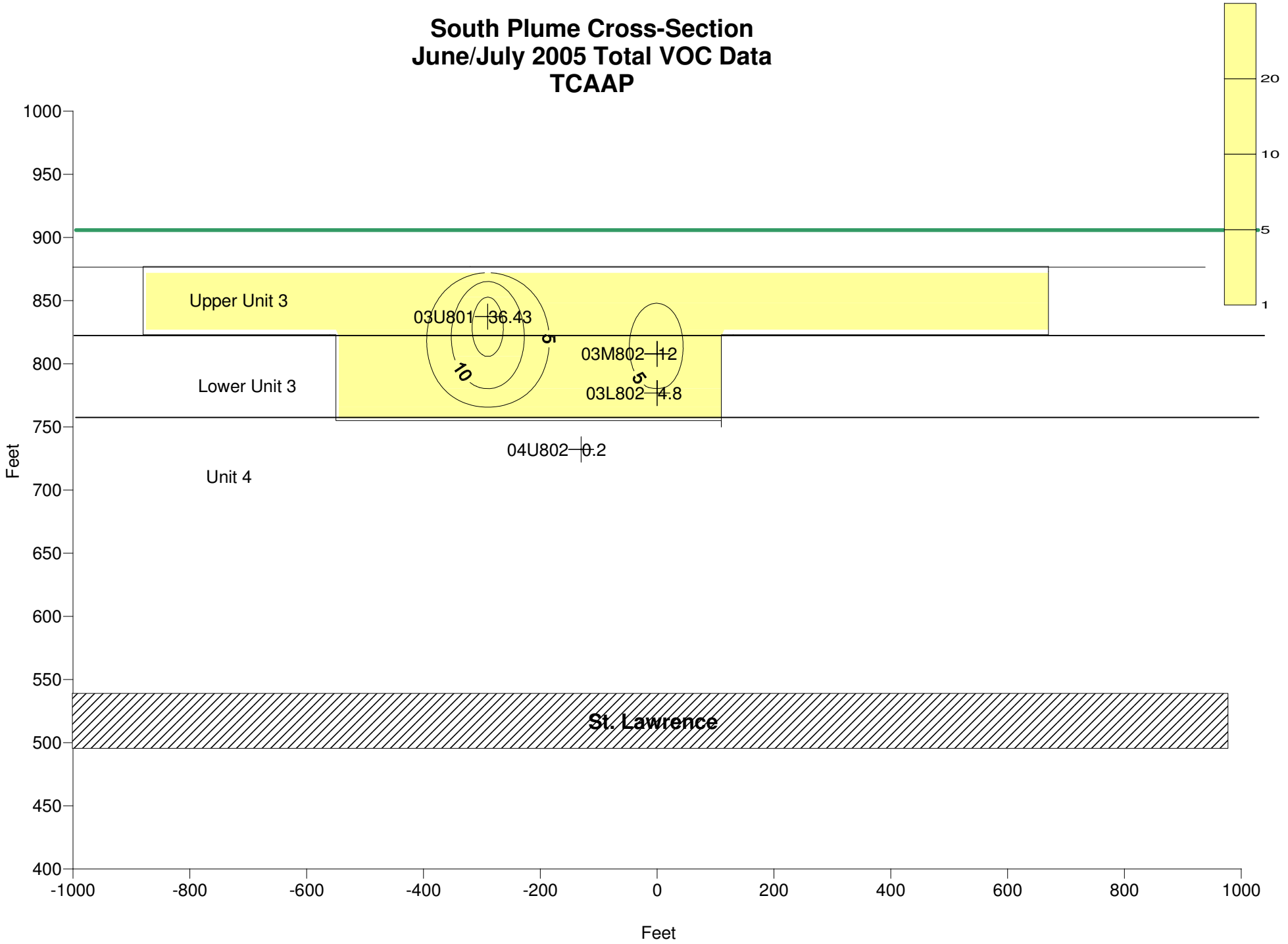
Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	23878
Plume to 10	8680
Plume to 25	817
Plume to 50	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	91358	274074
5 to 10	7.5	15198	113985
10 to 25	17.5	7863	137603
25 to 50	37.5	817	30638
	Sum	115236	556299

Area Wtd Conc	5	ug/L

2005


North Plume Cross-Section
June/July 2005 Total VOC Data
TCAAP
1000
400
100
10
1
Upper Unit 3
Lower Unit 3
Unit 4
St. Lawrence
03U806 99.75
03M806 1123.38
03L806 184.4
04U806 176.5
PJ806 37.64
03U711 247.3
04U711 0.92
Feet
Feet


South Plume Cross-Section
June/July 2005 Total VOC Data
TCAAP
Upper Unit 3
Lower Unit 3
Unit 4
03U801 36.43
03M802 12
03L802 4.8
04U802 0.2
5
10
5
St. Lawrence
Feet
Feet
1000
950
900
850
800
750
700
650
600
550
500
450
400
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
20
10
5
1

North Plume Cross Section Data

well	June 2005 - Total VOC Conc (ug/L)
03L806	184.4
03M806	1123.4
03U711	247.3
03U806	99.8
04U711	0.9
04U806	176.5
PJ806	37.5

North Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Expanded Contouring and Blanking
TCAAP
June 2005

Concentration	Positive Planar Area (ft2)
Plume to 1	570939
Plume to 5	291677
Plume to 10	280513
Plume to 50	197699
Plume to 100	127405
Plume to 200	49292
Plume to 300	24075
Plume to 400	13538
Plume to 500	8008
Plume to 600	4780
Plume to 700	2761
Plume to 800	1459
Plume to 900	638
Plume to 1000	174
Plume to 1100	0

TCE (ug/L)	Avg TCE (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	279263	837788
5 to 10	7.5	11164	83727
10 to 50	30	82814	2484409
50 to 100	75	70294	5272047
100 to 200	150	78113	11716958
200 to 300	250	25217	6304365
300 to 400	350	10537	3687899
400 to 500	450	5530	2488435
500 to 600	550	3228	1775257
600 to 700	650	2020	1312854
700 to 800	750	1302	976374
800 to 900	850	821	697839
900 to 1000	950	464	440980
1000 to1100	1050	174	182396
	Sum	570939	38261328

Area Wtd Conc	67	ug/L

South Plume Cross Section Data

well	June 2005 - Total VOC Conc (ug/L)
03L802	4.8
03M802	12
03U801	36.43
04U802	0.2

South Plume
Average Total VOC Concentration Calculations
Vertical Cross-Section
Contouring and Blanking
TCAAP
June/July 2005

Concentration	Positive Planar Area (ft2)
Plume to 1	115236
Plume to 5	25368
Plume to 10	9422
Plume to 25	1068
Plume to 50	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (ft2)	Areal Conc (ug*ft2/L)
1 to 5	3	89869	269606
5 to 10	7.5	15946	119592
10 to 25	17.5	8354	146200
25 to 50	37.5	1068	40035
	Sum	115236	575434

Area Wtd Conc	5	ug/L

D.2.3 Group 1, 2, 3, 5, and 6 Mann-Kendall Evaluations

Summary Table

Group 1, 2, 3, and 5 Mann-Kendall Summary and MAROS Conlusion

Group	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments
Group 2 Wells:									
409549	3	6	Increasing	64.00%	0.6210	S or NT	**No Trend**	yes	
409557	8	6	Increasing	89.80%	1.0648	S or NT	**No Trend**	yes	
03L673	-5	6	Decreasing	76.50%	0.7727	S or NT	**Stable**	no	
03L833	-15	6	Decreasing	99.90%	0.5877	Definite	**Decreasing**	no	
03L848	-7	6	Decreasing	86.40%	0.4340	S or NT	**Stable**	no	
03L859	3	6	Increasing	64.00%	0.4141	S or NT	**No Trend**	yes	
03U672	1	6	Increasing	50.00%	2.4495	S or NT	**No Trend**	yes	
03U805	8	6	Increasing	89.80%	0.9404	S or NT	**No Trend**	yes	
04U673	-9	6	Decreasing	93.20%	0.9598	Probable	**Decreasing**	no	
04U832	-11	6	Decreasing	97.20%	0.9310	Definite	**Decreasing**	no	
04U833	-13	6	Decreasing	99.17%	0.9280	Definite	**Decreasing**	no	
04U841	4	6	Increasing	70.30%	0.4991	S or NT	**No Trend**	yes	
04U843	5	6	Increasing	76.50%	0.8670	S or NT	**No Trend**	yes	
04U845	-5	6	Decreasing	76.50%	0.6689	S or NT	**Stable**	no	
04U846	3	6	Increasing	64.00%	1.7512	S or NT	**No Trend**	yes	
04U854	-13	6	Decreasing	99.20%	0.4341	Definite	**Decreasing**	no	
04U859	-1	6	Decreasing	50.00%	0.7632	S or NT	**Stable**	no	
04U861	13	6	Increasing	99.17%	1.3803	Definite	**Increasing**	yes	located between N. and S. Plume
04U875	-15	6	Decreasing	99.90%	0.4366	Definite	**Decreasing**	no	
04U877	-13	6	Decreasing	99.20%	0.8965	Definite	**Decreasing**	no	
206688	0	5	Zero	41.00%	0.0859	S or NT	**Stable**	yes	only 5 data points
Group 5	-11	6	Decreasing	97.20%	0.1362	Definite	**Decreasing**	no	
Group 3	-14	6	Decreasing	99.50%	0.5947	Definite	**Decreasing**	no	
Group 1 NP	-5	6	Decreasing	76.50%	0.2728	S or NT	**Stable**	yes	Likely decreasing, confidence low
Group 1 SP	-10	6	Decreasing	95.20%	0.7760	Definite	**Decreasing**	no	

Notes:
S or NT = Stable or No Trend
N = number of data points
COV = Coefficient of Variance

MAROS Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Group 6 Mann-Kendall Summary and MAROS Conlusion

Group	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments
Group 6 OU1 Jordan Wells:									
04J822	6	4	Increasing	95.80%	0.6889	Definite	**Increasing**	Yes	only 2 years of data
04J834	2	6	Increasing	57.00%	1.7598	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
04J836	-2	5	Decreasing	59.20%	0.7031	S or NT	**Stable**	Yes	All conc. below 5 ug/L
04J837	-8	5	Decreasing	95.80%	1.0785	Definite	**Decreasing**	No	
04J839	0	5	Increasing	40.80%	0.8565	S or NT	**Stable**	Yes	All conc. below 5 ug/L
04J847	-1	4	Decreasing	50.00%	0.0711	S or NT	**Stable**	Yes	only 2 years of data
04J849	0	4	Increasing	37.50%	#DIV/0!	S or NT	**#DIV/0!**	No	All conc. ND
04J882	-5	6	Decreasing	76.50%	2.4495	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
04J077	-11	6	Decreasing	97.00%	0.4383	Definite	**Decreasing**	No	
04J702	-12	6	Decreasing	98.00%	0.8158	Definite	**Decreasing**	No	
04J708	-9	6	Decreasing	50.00%	0.3565	S or NT	**Stable**	Yes	five of six below 5ug/L
04J713	0	6	Increasing	50.00%	1.8489	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
Group 6 Nested Unit 4 wells:									
04U077	-11	6	Decreasing	97.00%	0.4441	Definite	**Decreasing**	No	
04U702	-11	6	Decreasing	97.00%	0.6906	Definite	**Decreasing**	No	
04U708	-9	6	Decreasing	93.20%	0.2468	Probable	**Decreasing**	No	
04U713	2	6	Increasing	57.00%	0.9333	S or NT	**No Trend**	Yes	All conc. below 5 ug/L
04U834	-13	6	Decreasing	99.20%	0.8427	Definite	**Decreasing**	No	
04U836	2	4	Increasing	62.50%	0.4855	S or NT	**No Trend**	Yes	4 data points, low confidence
04U837	0	4	Increasing	37.50%	0.8849	S or NT	**Stable**	Yes	4 data points, low confidence
04U838	0	4	Increasing	37.50%	1.0938	S or NT	**No Trend**	Yes	4 data points, low confidence
04U839	-2	4	Decreasing	62.50%	0.7313	S or NT	**Stable**	Yes	All conc. below 5 ug/L
04U847	4	6	Increasing	70.30%	0.5112	S or NT	**No Trend**	Yes	trend driven by 1995 anomaly
04U849	-13	6	Decreasing	99.20%	0.5208	Definite	**Decreasing**	No	

Notes:
S or NT = Stable or No Trend
N = number of data points
COV = Coefficient of Variance

MAROS Decsion Matrix

M-K S	Confidence	Trend
S > 0	> 95%	Increasing
S > 0	90-95%	Pr. Incr.
S > 0	< 90%	No Trend
S</= 0	< 90%	No Trend
S </= 0	< 90%	Stable
S < 0	90-95%	Pr. Decr.
S < 0	>95%	Decreasing

Group 5 Unit 3 Mann-Kendall Summary and MAROS Conlusion

Group Group 5 Unit 3 Wells:	Kendall S	N	Raw Trend	Confidence	COV	Raw Trend Decision	MAROS Conclusion	Threshold Triggered?	Comments
409550	-15	6	Decreasing	99.90%	0.7200	Definite	**Decreasing**	no	
409597	-9	6	Decreasing	93.20%	0.2862	Probable	**Decreasing**	no	
409596	-6	5	Decreasing	88.30%	0.6796	S or NT	**Stable**	yes	Likely Decreasing
03U831	5	6	Increasing	76.50%	2.4495	S or NT	**No Trend**	yes	Single Detection in 2005
03U821	-7	6	Decreasing	86.40%	0.7502	S or NT	**Stable**	yes	Likely Decreasing
03U822	11	6	Increasing	97.20%	0.8614	Definite	**Increasing**	yes	Appears to have peaked
03L822	3	6	Increasing	64.00%	0.5175	S or NT	**No Trend**	yes	Appears to have peaked
03L809	11	6	Increasing	97.20%	0.7441	Definite	**Increasing**	yes	Stable since 2001
Group 5 Unit 3 Avg.	3	6	Increasing	64.00%	0.2294	S or NT	**No Trend**	yes	Appears to have peaked

Notes:
S or NT = Stable or No Trend
N = number of data points
COV = Coefficient of Variance

MAROS Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

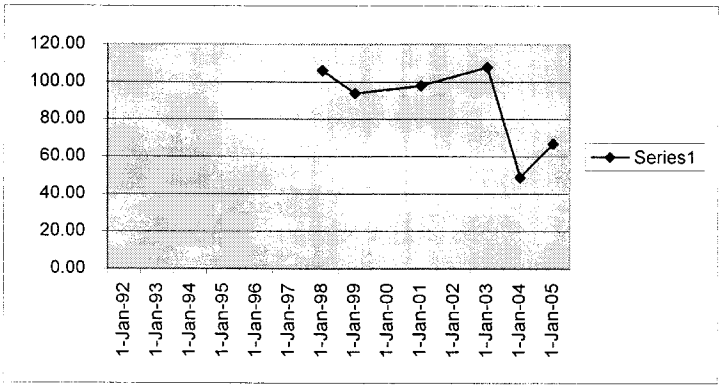
Mann-Kendall Plots

Well: Group 1 NP

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/18/1998	106.00	1					
6/18/1999	94.00	1	-1				
6/18/2001	98.00	1	-1	1			
6/18/2003	108.00	1	1	1	1		
6/18/2004	49.00	1	-1	-1	-1	-1	
6/18/2005	67.00	1	-1	-1	-1	-1	1

N		6	5	4	3	2	1	15
	sum		-3	0	-1	-2	1	-5
	Possibles	15						

Mean	87.00
STNDEV	23.73184
COV	0.27278
Trend:	Negative
Confidence (lookup)	76.50%



S	-5
tau	-0.33333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: Group 1 SP

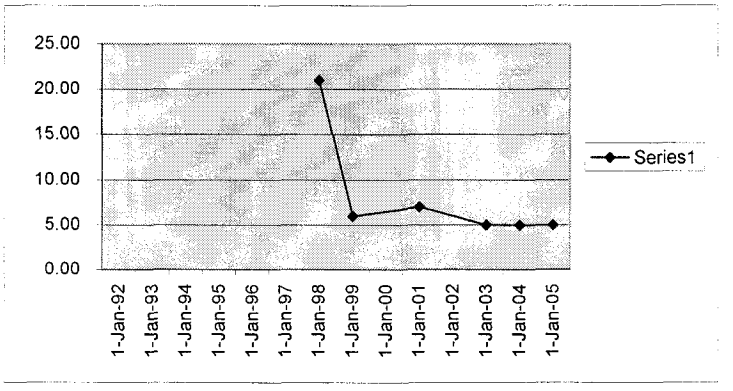
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/18/1998	21.00	1					
6/18/1999	6.00	1	-1				
6/18/2001	7.00	1	-1	1			
6/18/2003	5.00	1	-1	-1	-1		
6/18/2004	5.00	1	-1	-1	-1	0	
6/18/2005	5.00	1	-1	-1	-1	0	0

N		6	5	4	3	2	1	15
	sum		-5	-2	-3	0	0	-10
Possibles		15						

Mean	8.17
STNDEV	6.337718
COV	0.776047

Trend: Negative

Confidence (lookup) 95.20%



S	-10
tau	-0.66667

Decsion Matrix

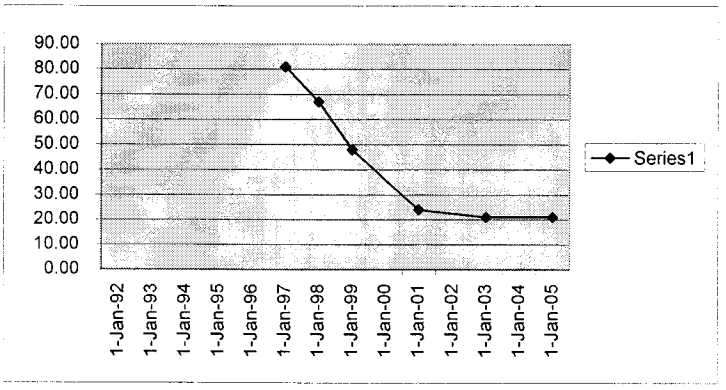
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: Group 3

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/18/1997	81.00	1					
6/18/1998	67.00	1	-1				
6/18/1999	48.00	1	-1	-1			
6/18/2001	24.00	1	-1	-1	-1		
6/18/2003	21.00	1	-1	-1	-1	-1	
6/18/2005	21.00	1	-1	-1	-1	-1	0

N		6	5	4	3	2	1	15
	sum		-5	-4	-3	-2	0	-14
Possibles		15						

Mean	43.67
STNDEV	25.96665
COV	0.594656
Trend:	Negative
Confidence (lookup)	99.50%



S	-14
tau	-0.93333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: Group 5

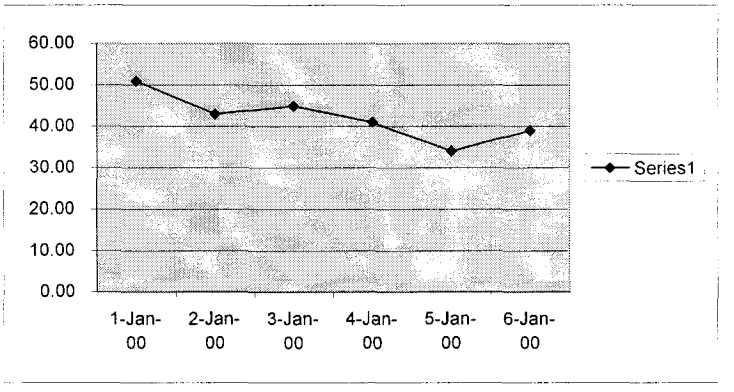
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/18/1997	51.00	1					
6/18/1998	43.00	1	-1				
6/18/1999	45.00	1	-1	1			
6/18/2001	41.00	1	-1	-1	-1		
6/18/2003	34.00	1	-1	-1	-1	-1	
6/18/2005	39.00	1	-1	-1	-1	-1	1

N		6	5	4	3	2	1	0	-1	-2	-3	-4	5
	sum		-5	-2	-3	-2	1	0	0	0	0	0	-11
Possibles		15											

Mean	42.17
STNDEV	5.741661
COV	0.136166

Trend: Negative

Confidence (lookup) 97.20%



S	-11
tau	-0.73333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: Group 5 Unit 3 Avg.

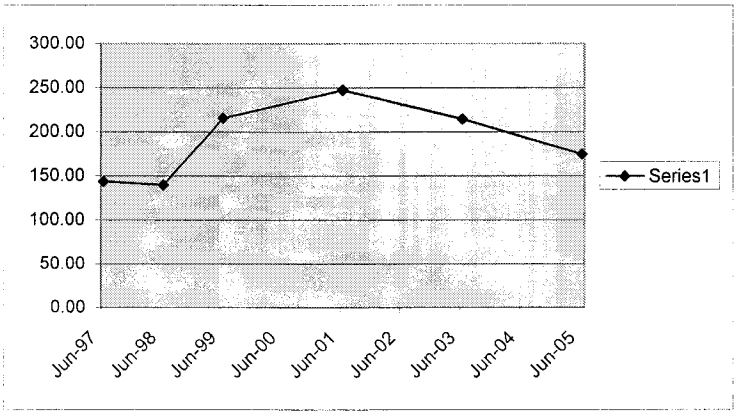
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/24/1997	143.79	1					
6/17/1998	140.03	1	-1				
6/29/1999	215.71	1	1	1			
6/18/2001	247.57	1	1	1	1		
6/19/2003	214.44	1	1	1	-1	-1	
6/9/2005	174.71	1	1	1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		3	4	-1	-2	-1	3
Possibles		15						

Mean	189.38
STNDEV	43.4429
COV	0.229401

Trend: Positive

Confidence (lookup) 64.00%



S	3
tau	0.2

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 03U672

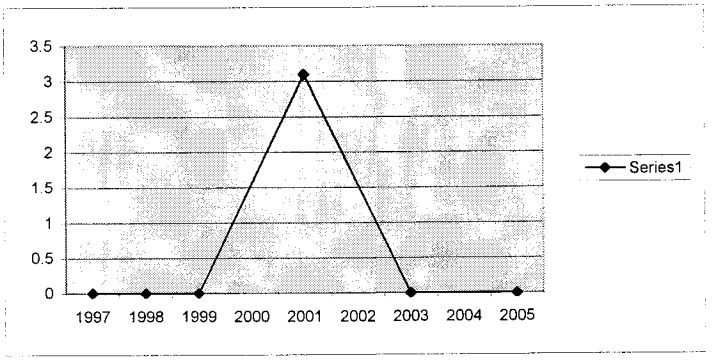
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/17/1997	0	1					
6/17/1998	0.00	1	0				
6/24/1999	0.00	1	0	0			
6/18/2001	3.1	1	1	1	1		
6/1/2003	0.00	1	0	0	0	-1	
6/17/2005	0.00	1	0	0	0	-1	0

N		6	5	4	3	2	1	0	-1	-2	-3	-4	5
	sum		1	1	1	-2	0	0	0	0	0	0	1
Possibles		15											

Mean	0.52
STNDEV	1.2655697
COV	2.44948974

Trend: Positive

Confidence (lookup) 50.0%



S	1
tau	0.066667

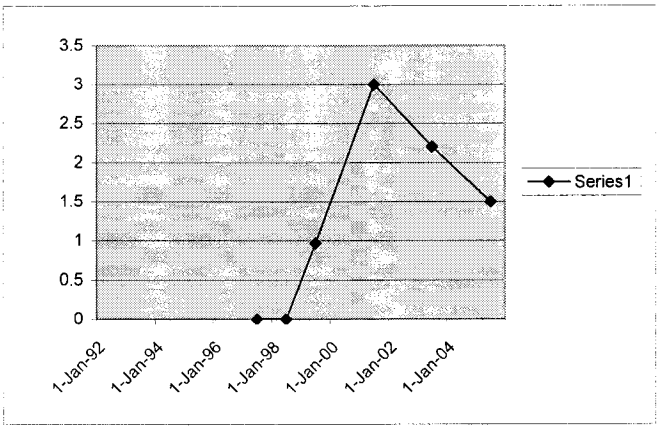
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 03U805

Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/13/1997	0	1					
6/16/1998	0.00	1	0				
6/29/1999	0.97	1	1	1			
6/15/2001	3	1	1	1	1		
6/1/2003	2.2	1	1	1	1	-1	
6/15/2005	1.5	1	1	1	1	-1	-1

N		6	5	4	3	2	1	15
	sum		4	4	3	-2	-1	8
Possibles		15						



Mean	1.28
STNDEV	1.2021716
COV	0.9404211

S	8
tau	0.533333

Trend: Positive

Confidence (lookup) 89.80%

Decsion Matrix

M-K S	Confide	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 03U821

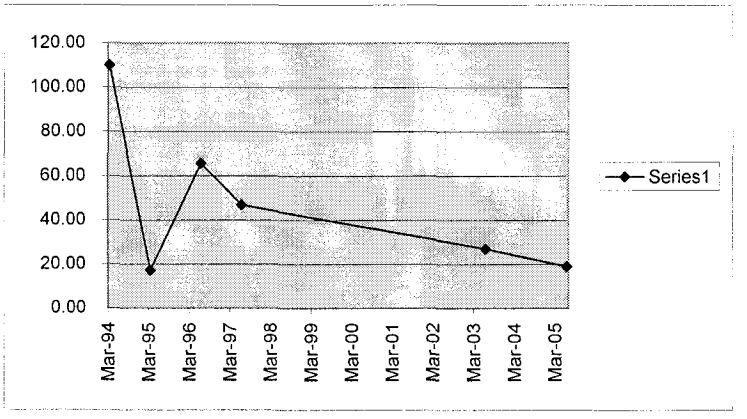
Date	TCE (ug/l)	Mann-Kendall Calculation:					
3/18/1994	110.00	1					
3/15/1995	17.20	1	-1				
6/18/1996	65.60	1	-1	1			
6/26/1997	47.00	1	-1	1	-1		
6/16/2003	27.00	1	-1	1	-1	-1	
6/10/2005	19.00	1	-1	1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		-5	4	-3	-2	-1	-7
Possibles		15						

Mean	47.63
STNDEV	35.734
COV	0.750189

Trend: Negative

Confidence (lookup) 86.40%



S	-7
tau	-0.46667

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

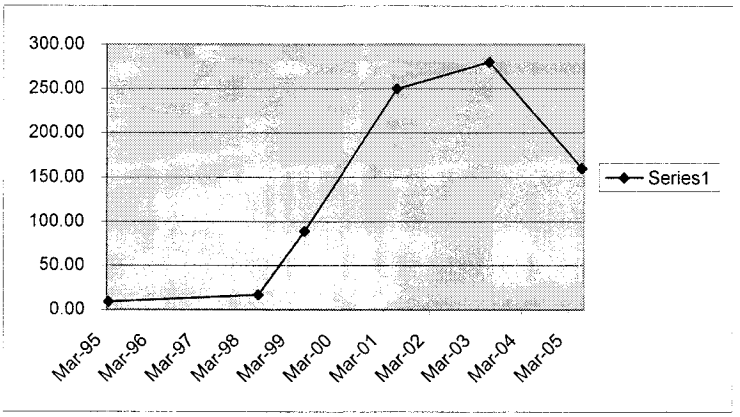
Well: 03U822

Date	TCE (ug/l)		Mann-Kendall Calculation:					
3/15/1995	9.10	1						
6/22/1998	16.90	1	1					
6/16/1999	89.00	1	1	1				
6/25/2001	250.00	1	1	1	1			
6/16/2003	280.00	1	1	1	1	1		
6/10/2005	160.00	1	1	1	1	-1	-1	
	N	6	5	4	3	2	1	15
	sum		5	4	3	0	-1	11
	Possibles	15						

Mean	134.17
STNDEV	115.5727
COV	0.861411

Trend: Positive

Confidence (lookup) 97.20%



S	11
tau	0.733333

Decsion Matrix

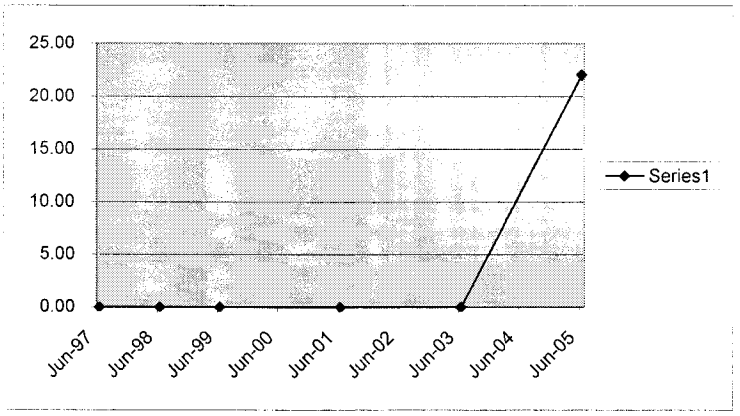
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 03U831

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/27/1997	0.00	1					
6/23/1998	0.00	1	0				
6/15/1999	0.00	1	0	0			
6/15/2001	0.00	1	0	0	0		
6/9/2003	0.00	1	0	0	0	0	
6/7/2005	22.00	1	1	1	1	1	1

N		6	5	4	3	2	1	15
	sum		1	1	1	1	1	5
Possibles		15						

Mean	3.67
STNDEV	8.981462
COV	2.44949
Trend:	Positive
Confidence (lookup)	76.50%



S	5
tau	0.333333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

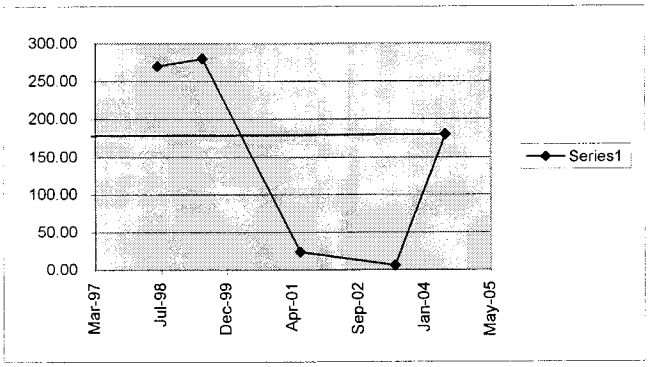
Well: 03L673

Date	TCE (ug/l)		Mann-Kendall Calculation:						
6/25/1998	270.00	1						270.00	
6/4/1999	280.00	1	1					280.00	
6/12/2001	24	1	-1	-1				24	
6/1/2003	6.3	1	-1	-1	-1			6.3	
6/15/2004	180	1	-1	-1	1	1		180	
6/22/2005	150	1	-1	-1	1	1	-1		
	N	6	5	4	3	2	1	0	15
	sum		-3	-4	1	2	-1	0	-5
	Possibles	15							

Mean	151.72
STNDEV	117.22458
COV	0.7726546

Trend: Negative

Confidence (lookup) 76.5%



S	-5
tau	-0.333333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 03L809

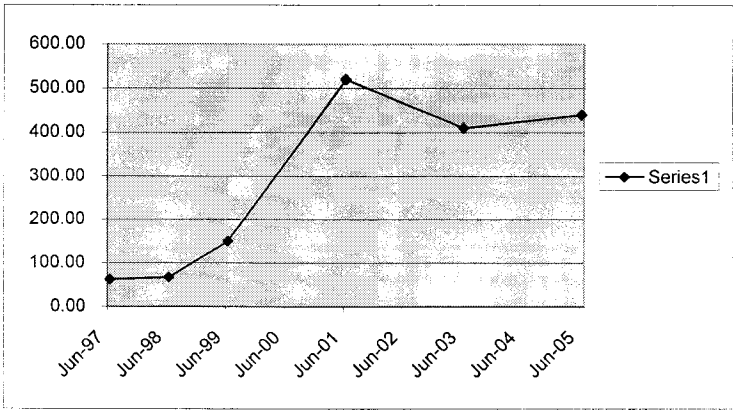
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/24/1997	62.60	1					
6/17/1998	67.30	1	1				
6/29/1999	150.00	1	1	1			
6/18/2001	520.00	1	1	1	1		
6/19/2003	410.00	1	1	1	1	-1	
6/9/2005	440.00	1	1	1	1	-1	1

N		6	5	4	3	2	1	15
	sum		5	4	3	-2	1	11
Possibles		15						

Mean	274.98
STNDEV	204.6231
COV	0.744129

Trend: Positive

Confidence (lookup) 97.20%



S	11
tau	0.733333

Decsion Matrix

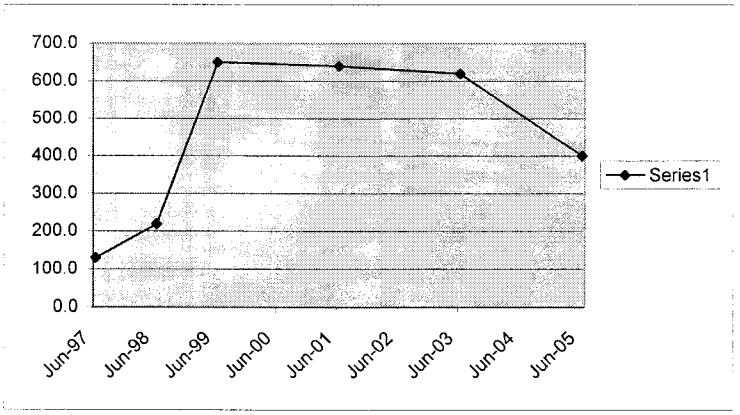
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 03L822

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/25/1997	130.0	1						
6/22/1998	219.0	1	1					
6/9/1999	650.0	1	1	1				
6/25/2001	640.0	1	1	1	-1			
6/16/2003	620.0	1	1	1	-1	-1		
6/14/2005	400.0	1	1	1	-1	-1	-1	

N		6	5	4	3	2	1	15
	sum		5	4	-3	-2	-1	3
Possibles		15						

Mean	443.17
STNDEV	229.3385
COV	0.5175
Trend:	Positive
Confidence (lookup)	64.00%



S	3
tau	0.2

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 03L848

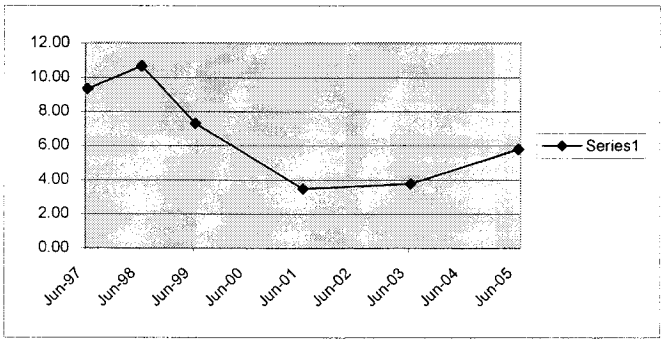
Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/5/1997	9.34	1					
6/29/1998	10.70	1	1				
6/4/1999	7.30	1	-1	-1			
6/12/2001	3.5	1	-1	-1	-1		
6/1/2003	3.8	1	-1	-1	-1	1	
6/21/2005	5.8	1	-1	-1	-1	1	1

N		6	5	4	3	2	1	0	15
	sum		-3	-4	-3	2	1	0	-7
Possibles		15							

Mean	6.74
STNDEV	2.9250641
COV	0.4339858

Trend: Negative

Confidence (lookup) 86.4%



S	-7
tau	-0.466667

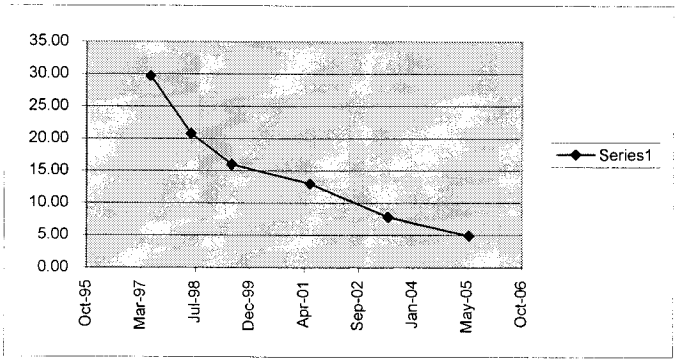
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 03L833

Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/5/1997	29.70	1						
6/11/1998	20.80	1	-1					29.70
6/22/1999	16.00	1	-1	-1				20.80
6/13/2001	13.00	1	-1	-1	-1			16.00
6/1/2003	7.80	1	-1	-1	-1	-1		13.00
6/9/2005	4.90	1	-1	-1	-1	-1	-1	7.80
	N	6	5	4	3	2	1	15
	sum		-5	-4	-3	-2	-1	-15
	Possibles	15						

Mean	15.37
STNDEV	9.030762
COV	0.587685
Trend:	Negative
Confidence (lookup)	99.9%



S	-15
tau	-1

Decsion Matrix

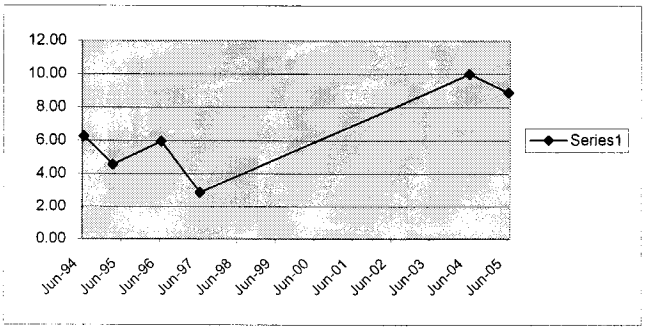
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 03L859

Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/9/1994	6.27	1					
3/10/1995	4.55	1	-1				
6/3/1996	5.96	1	-1	1			
6/4/1997	2.86	1	-1	-1	-1		
6/15/2004	10.00	1	1	1	1	1	
6/22/2005	8.90	1	1	1	1	1	-1

N		6	5	4	3	2	1	15
	sum		-1	2	1	2	-1	3
Possibles		15						

Mean	6.42
STNDEV	2.6597494
COV	0.4140762
Trend:	Positive
Confidence (lookup)	64.00%
Conclusion	Increasing



S	3
tau	0.2

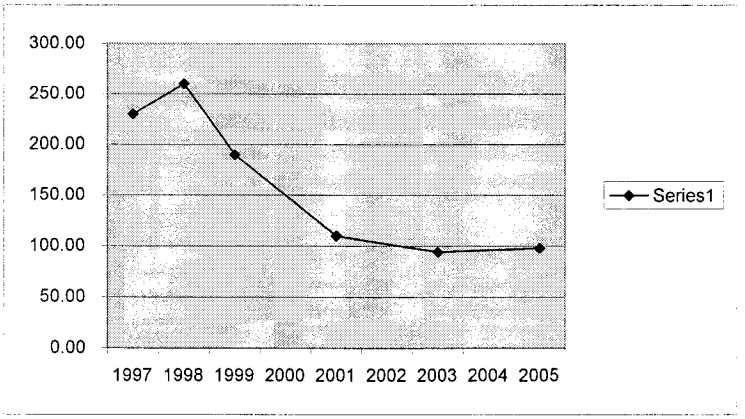
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U077

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/10/1997	230.00	1						
6/12/1998	260.00	1	1					
6/22/1999	190.00	1	-1	-1				
6/8/2001	110.00	1	-1	-1	-1			
6/13/2003	94.00	1	-1	-1	-1	-1		
6/7/2005	98.00	1	-1	-1	-1	-1	1	
	N	6	5	4	3	2	1	15
	sum		-3	-4	-3	-2	1	-11
	Possibles	15						

Mean	163.67
STNDEV	72.69021
COV	0.444136
Trend:	Negative
Confidence (lookup)	97.00%



S	-11
tau	-0.73333

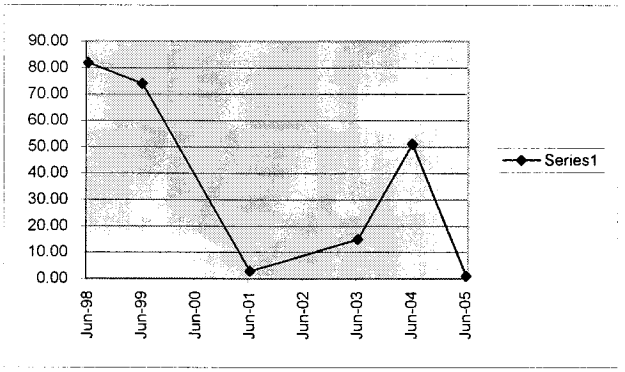
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U673

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/25/1998	81.90	1					
6/4/1999	74.00	1	-1				
6/12/2001	2.9	1	-1	-1			
6/1/03	15	1	-1	-1	1		
6/15/2004	51	1	-1	-1	1	1	
6/22/2005	0.98	1	-1	-1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		-5	-4	1	0	-1	-9
Possibles		15						



Mean	37.63
STNDEV	36.118912
COV	0.9598435

Trend: Negative

Confidence (lookup) 93.20%

S	-9
tau	-0.6

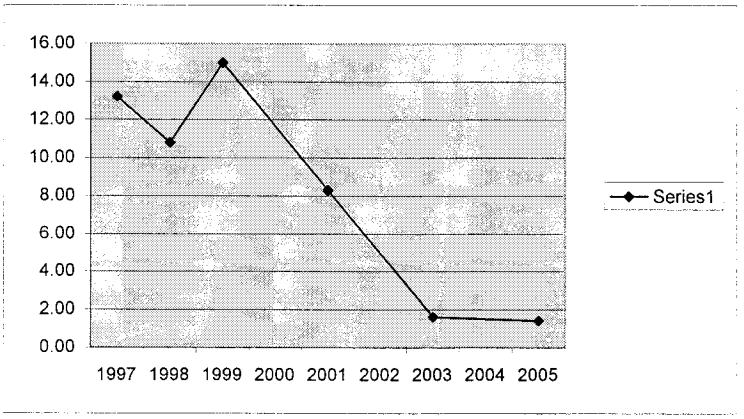
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U702

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/6/1997	13.20	1						0
6/11/1998	10.80	1	-1					0.00
6/21/1999	15.00	1	1	1				0.97
6/7/2001	8.30	1	-1	-1	-1			3
6/16/2003	1.60	1	-1	-1	-1	-1		2.2
6/8/2005	1.40	1	-1	-1	-1	-1	-1	
	N	6	5	4	3	2	1	15
	sum		-3	-2	-3	-2	-1	-11
	Possibles	15						

Mean	8.38
STNDEV	5.78979
COV	0.690631
Trend:	Negative
Confidence (lookup)	97.00%



S	-11
tau	-0.73333

Decsion Matrix

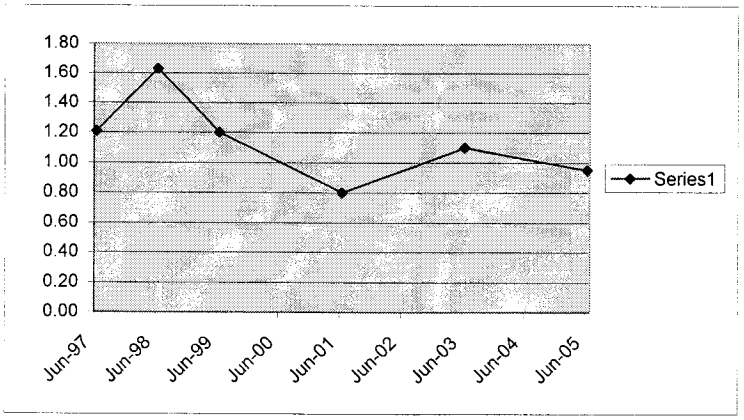
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U708

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/11/1997	1.21	1						0
6/9/1998	1.63	1	1					0.00
6/23/1999	1.20	1	-1	-1				0.97
6/7/2001	0.80	1	-1	-1	-1			3
6/20/2003	1.10	1	-1	-1	-1	1		2.2
6/9/2005	0.95	1	-1	-1	-1	1	-1	

N		6	5	4	3	2	1	15
	sum		-3	-4	-3	2	-1	-9
	Possibles	15						

Mean	1.15
STNDEV	0.283367
COV	0.246763
Trend:	Negative
Confidence (lookup)	93.20%



S	-9
tau	-0.6

Decsion Matrix

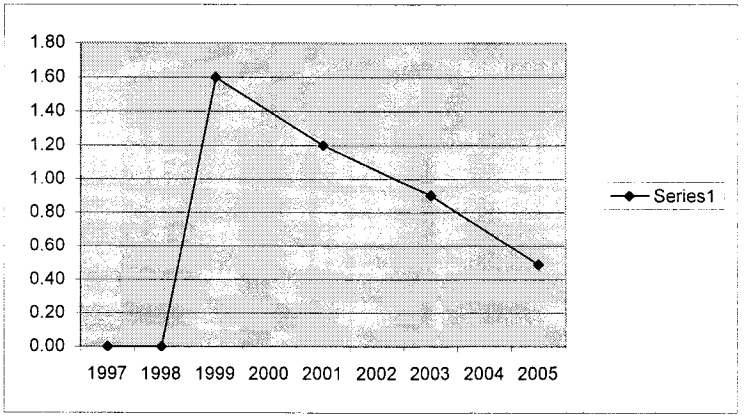
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U713

Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/10/1997	0.00	1					
6/10/1998	0.00	1	0				
6/22/1999	1.60	1	1	1			
6/12/2001	1.20	1	1	1	-1		
6/12/2003	0.90	1	1	1	-1	-1	
6/9/2005	0.49	1	1	1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		4	4	-3	-2	-1	2
Possibles		15						

Mean	0.70
STNDEV	0.65178
COV	0.933336
Trend:	Positive
Confidence (lookup)	57.00%



S	2
tau	0.133333

Decsion Matrix

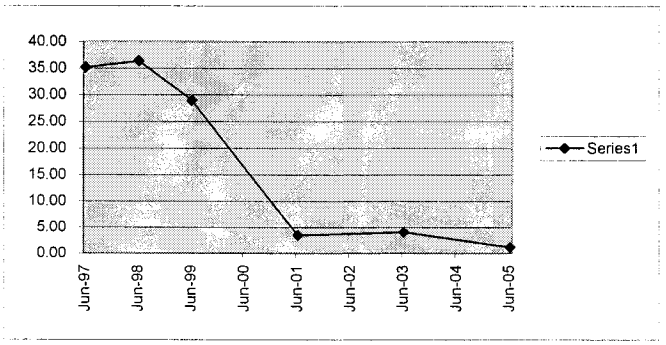
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U832

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/4/1997	35.20	1						
6/25/1998	36.40	1	1					
6/7/1999	29.00	1	-1	-1				
6/14/2001	3.5	1	-1	-1	-1			
6/1/03	4.1	1	-1	-1	-1	1		
6/23/2005	1.2	1	-1	-1	-1	-1	-1	

N		6	5	4	3	2	1	0	15
	sum		-3	-4	-3	0	-1	0	-11
Possibles		15							

Mean	18.23
STNDEV	16.975119
COV	0.9309937
Trend:	Negative
Confidence (lookup)	97.20%



S	-11
tau	-0.733333

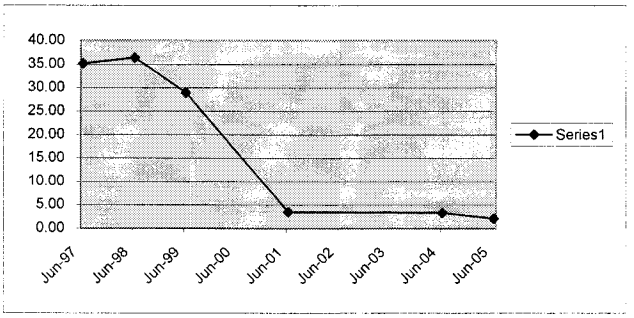
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U833

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/4/1997	35.20	1						
6/25/1998	36.40	1	1					
6/7/1999	29.00	1	-1	-1				
6/14/2001	3.5	1	-1	-1	-1			
6/18/2004	3.3	1	-1	-1	-1	-1		
6/9/2005	2.1	1	-1	-1	-1	-1	-1	
	N	6	5	4	3	2	1	15
	sum		-3	-4	-3	-2	-1	-13
	Possibles	15						

Mean	18.25
STNDEV	16.936204
COV	0.9280112
Trend:	Negative
Confidence (lookup)	99.17%



S	-13
tau	-0.86667

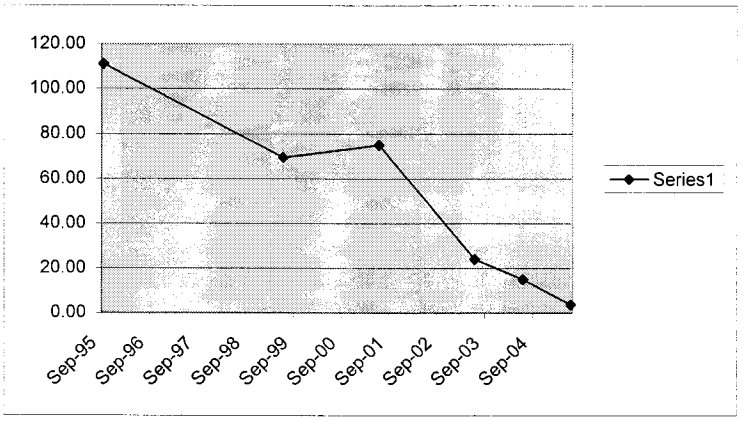
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U834

Date	TCE (ug/l)		Mann-Kendall Calculation:					
9/6/1995	111.00	1						
6/29/1999	69.50	1	-1					
6/25/2001	75.00	1	-1	1				
6/17/2003	24.00	1	-1	-1	-1			
6/24/2004	15.00	1	-1	-1	-1	-1		
6/21/2005	3.70	1	-1	-1	-1	-1	-1	
	N	6	5	4	3	2	1	15
	sum		-5	-2	-3	-2	-1	-13
	Possibles	15						

Mean	49.70
STNDEV	41.88174
COV	0.842691
Trend:	Negative
Confidence (lookup)	99.20%



S	-13
tau	-0.86667

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: **04U836**

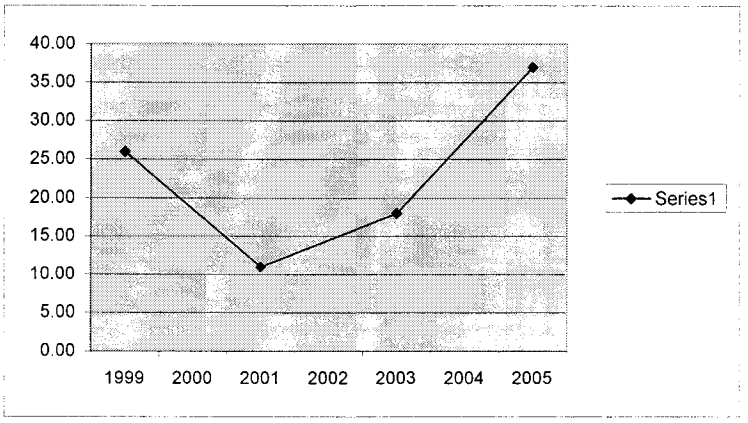
Date	TCE (ug/l)		Mann-Kendall Calculation:			
6/16/1999	26.00	1				
6/20/2001	11.00	1	-1			
6/10/2003	18.00	1	-1	1		
6/21/2005	37.00	1	1	1	1	

N		4	3	2	1	6
	sum		-1	2	1	2
Possibles		6				

Mean	23.00
STNDEV	11.16542
COV	0.485453

Trend: Positive

Confidence (lookup) 62.50%



S	2
tau	0.333333

Decsion Matrix

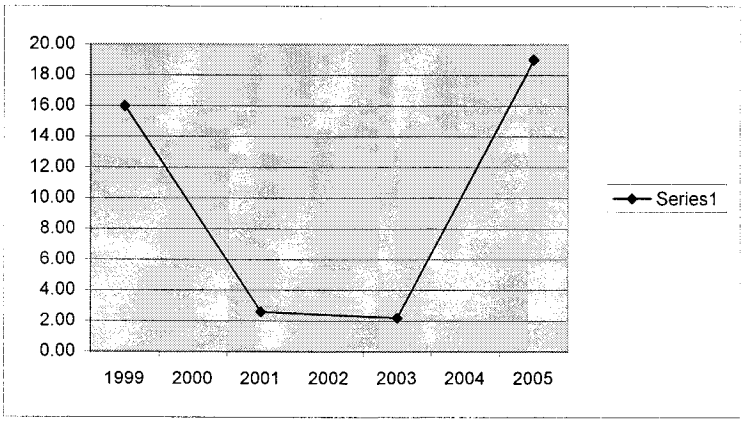
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U837

Date	TCE (ug/l)		Mann-Kendall Calculation:			
6/10/1999	16.00	1				
6/21/2001	2.60	1	-1			
6/10/2003	2.20	1	-1	-1		
6/15/2005	19.00	1	1	1	1	

N		4	3	2	1	0	-1	5
	sum		-1	0	1	0	0	0
	Possibles	6						

Mean	9.95
STNDEV	8.805112
COV	0.884936
Trend:	Zero
Confidence (lookup)	37.50%



S	0
tau	0

Decsion Matrix

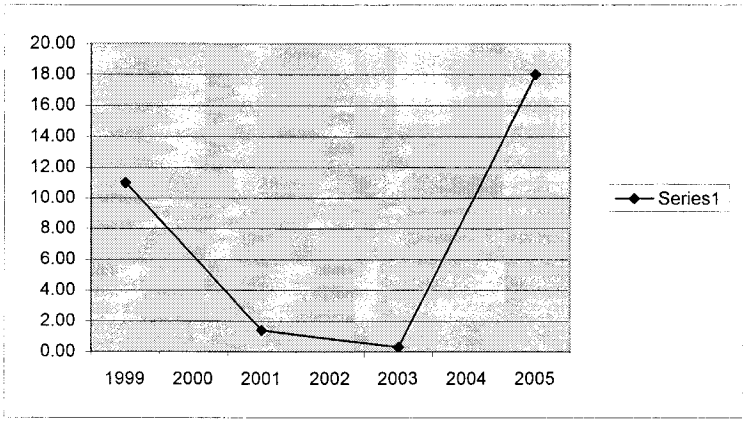
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U838

Date	TCE (ug/l)		Mann-Kendall Calculation:			
6/10/1999	11.00	1				
6/20/2001	1.40	1	-1			
6/9/2003	0.30	1	-1	-1		
6/7/2005	18.00	1	1	1	1	

N		4	3	2	1	6
	sum		-1	0	1	0
Possibles		6				

Mean	7.68
STNDEV	8.394989
COV	1.09381
Trend:	Zero
Confidence (lookup)	37.50%



S	0
tau	0

Decsion Matrix

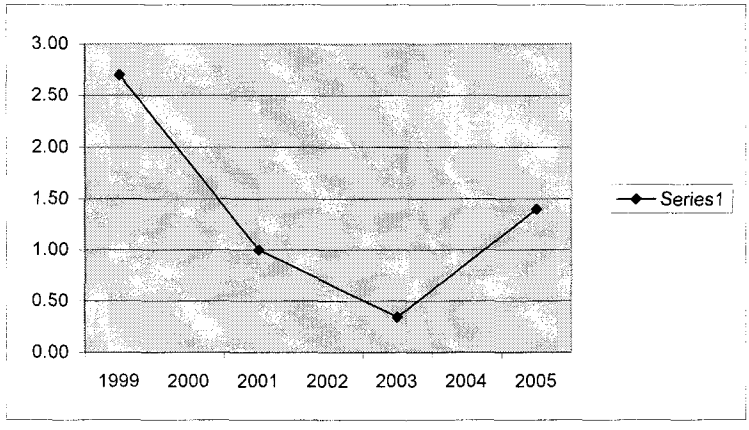
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U839

Date	TCE (ug/l)		Mann-Kendall Calculation:		
6/17/1999	2.70	1			
6/18/2001	1.00	1	-1		
6/6/2003	0.34	1	-1	-1	
6/7/2005	1.40	1	-1	1	1

N		4	3	2	1	0	6
	sum		-3	0	1	0	-2
Possibles		6					

Mean	1.36
STNDEV	0.994518
COV	0.731263
Trend:	Negative
Confidence (lookup)	62.50%



S	-2
tau	-0.33333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U841

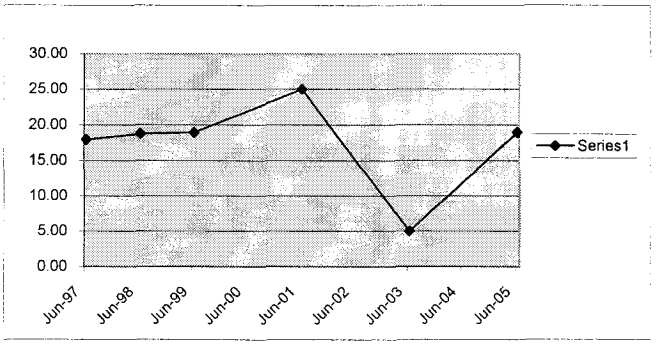
Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/24/1997	18.00	1						18.00
6/19/1998	18.80	1	1					18.80
6/14/1999	19.00	1	1	1				19.00
6/21/2001	25	1	1	1	1			25
6/11/2003	5.0	1	-1	-1	-1	-1		5.0
6/9/2005	19.0	1	1	1	0	-1	1	

N		6	5	4	3	2	1	15
	sum		3	2	0	-2	1	4
Possibles		15						

Mean	17.00
STNDEV	8.4852814
COV	0.4991342

Trend: Positive

Confidence (lookup) 70.30%



S	4
tau	0.266667

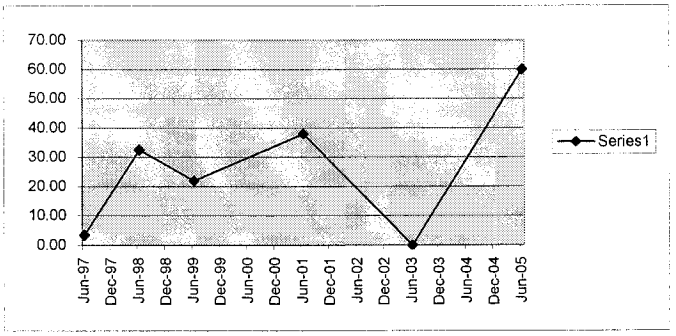
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U843

Date	TCE (ug/l)		Mann-Kendall Calculation:						
6/25/1997	3.50	1							
6/18/1998	32.50	1	1						
6/14/1999	22.00	1	1	-1					
6/21/2001	38	1	1	1	1				
6/12/2003	0	1	-1	-1	-1	-1			
6/7/2005	60	1	1	1	1	1	1	0	
	N	6	5	4	3	2	1		15
	sum		3	0	1	0	1		5
	Possibles	15							

Mean	26.00
STNDEV	22.5410736
COV	0.86696437
Trend:	Positive
Confidence (lookup)	76.50%



S	5
tau	0.333333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

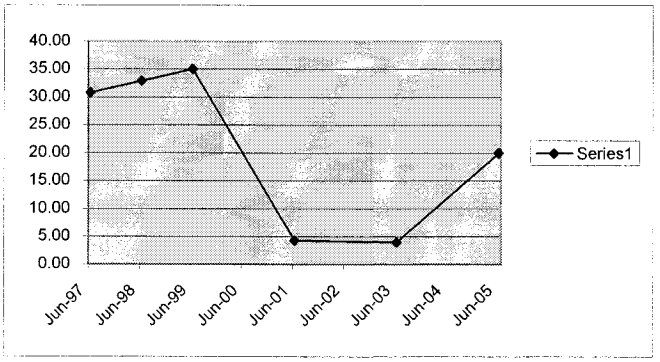
Well: 04U845

Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/5/1997	30.80	1						
6/25/1998	32.90	1	1					
6/7/1999	35.00	1	1	1				
6/13/2001	4.3	1	-1	-1	-1			
6/1/2003	4	1	-1	-1	-1	-1		
6/22/2005	20	1	-1	-1	-1	1	1	
	N	6	5	4	3	2	1	15
	sum		-1	-2	-3	0	1	-5
	Possibles	15						

Mean	21.17
STNDEV	14.158908
COV	0.6689248

Trend: Negative

Confidence (lookup) 76.50%



S	-5
tau	-0.33333

Decsion Matrix

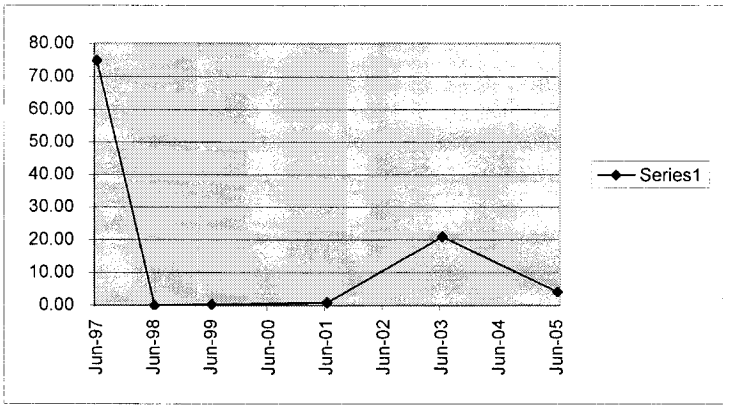
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U846

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/25/1997	75.00	1					
6/17/1998	0.00	1	-1				
6/9/1999	0.30	1	-1	1			
6/15/2001	0.83	1	-1	1	1		
6/9/2003	21	1	-1	1	1	1	
6/10/2005	4.2	1	-1	1	1	1	-1

N		6	5	4	3	2	1	-1	14
	sum		-5	4	3	2	-1	0	3
Possibles		15							

Mean	16.89
STNDEV	29.5740565
COV	1.75115305
Trend:	Positive
Confidence (lookup)	64.00%



S	3
tau	0.2

Decsion Matrix

	Confidence	COV	
M-K S	> 95%	na	Trend
S > 0	90-95%	na	Increasing
S > 0	< 90%	na	Prob. Incr.
S > 0	< 90%	>/= 1	No Trend
S</= 0	< 90%	< 1	No Trend
S </= 0	90-95%	na	Stable
S < 0	>95%	na	Prob Decr.
S < 0			Decreasing

Well: 04U847

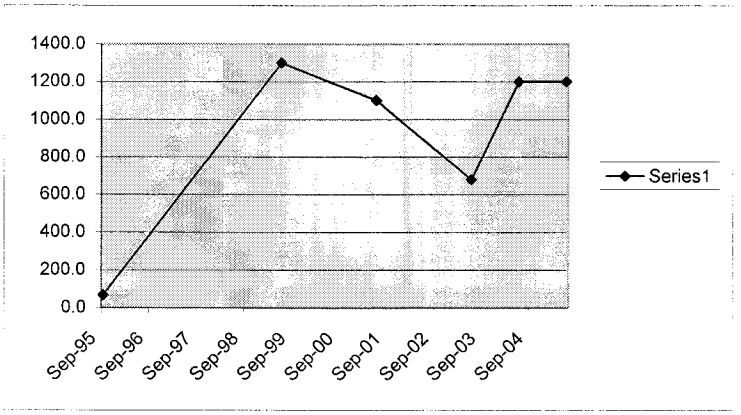
Date	TCE (ug/l)		Mann-Kendall Calculation:					
9/6/1995	68.0	1						
6/29/1999	1300.0	1	1					
6/25/2001	1100.0	1	1	-1				
6/17/2003	680.0	1	1	-1	-1			
6/24/2004	1200.0	1	1	-1	1	1		
6/15/2005	1200.0	1	1	-1	1	1	0	

N		6	5	4	3	2	1	15
	sum		5	-4	1	2	0	4
Possibles		15						

Mean	924.67
STNDEV	472.6464
COV	0.511153

Trend: Positive

Confidence (lookup) 70.30%



S	4
tau	0.266667

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04U849

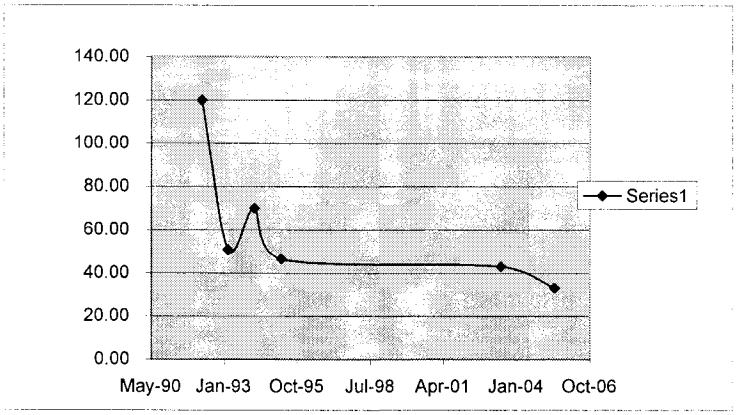
Date	TCE (ug/l)	Mann-Kendall Calculation:						
3/26/1992	120.00	1						0
3/17/1993	50.90	1	-1					0.00
3/21/1994	70.00	1	-1	1				0.97
3/23/1995	46.60	1	-1	-1	-1			3
6/12/2003	43.0	1	-1	-1	-1	-1		2.2
6/16/2005	33.00	1	-1	-1	-1	-1	-1	

N		6	5	4	3	2	1	15
	sum		-5	-2	-3	-2	-1	-13
Possibles		15						

Mean	60.58
STNDEV	31.55417
COV	0.520839

Trend: Negative

Confidence (lookup) 99.20%



S	-13
tau	-0.86667

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

120.00
50.90
70.00
46.60
43

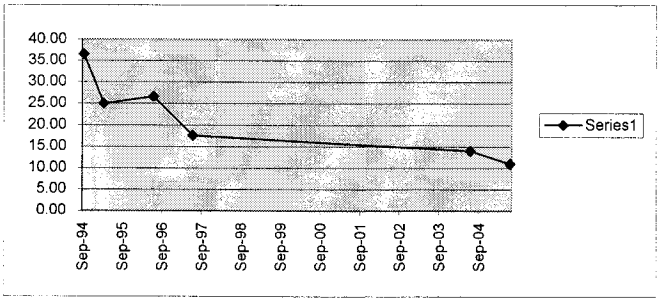
Well: 04U854

Date	TCE (ug/l)	Mann-Kendall Calculation:						
9/14/1994	36.60	1						
3/9/1995	25.00	1	-1					
6/4/1996	26.70	1	-1	1				
6/5/1997	17.60	1	-1	-1	-1			
6/16/2004	14.00	1	-1	-1	-1	-1		
6/23/2005	11.00	1	-1	-1	-1	-1	-1	
	N	6	5	4	3	2	1	15
	sum		-5	-2	-3	-2	-1	-13
	Possibles	15						

Mean	21.82
STNDEV	9.4700405
COV	0.4340737

Trend: Negative

Confidence (lookup) 99.20%



S	-13
tau	-0.866667

Decsion Matrix

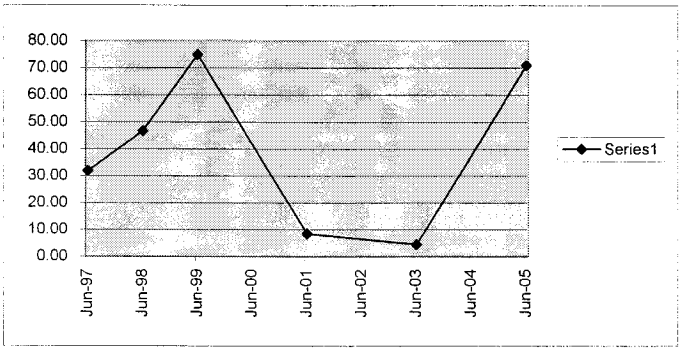
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U859

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/4/1997	31.90	1					
6/25/1998	46.80	1	1				
6/7/1999	75.00	1	1	1			
6/13/2001	8.4	1	-1	-1	-1		
6/1/2003	4.4	1	-1	-1	-1	-1	
6/22/2005	71	1	1	1	-1	1	1

N		6	5	4	3	2	1	15
	sum		1	0	-3	0	1	-1
Possibles		15						

Mean	39.58
STNDEV	30.2083708
COV	0.76315884
Trend:	Negative
Confidence (lookup)	50.0%



S	-1
tau	-0.066667

Decsion Matrix

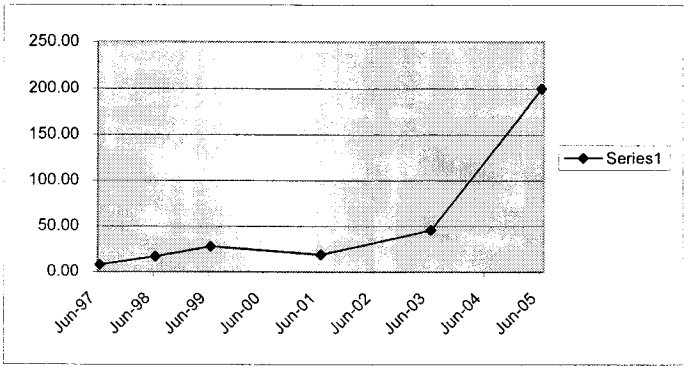
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U861

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/4/1997	7.91	1						
6/29/1998	17.10	1	1					
6/7/1999	28.00	1	1	1				
6/11/2001	19	1	1	1	-1			
6/1/2003	46	1	1	1	1	1		
6/23/2005	200	1	1	1	1	1	1	

N		6	5	4	3	2	1	15
	sum		5	4	1	2	1	13
Possibles		15						

Mean	53.00
STNDEV	73.15862
COV	1.3803079
Trend:	Positive
Confidence (lookup)	99.17%



S	13
tau	0.866667

Decsion Matrix

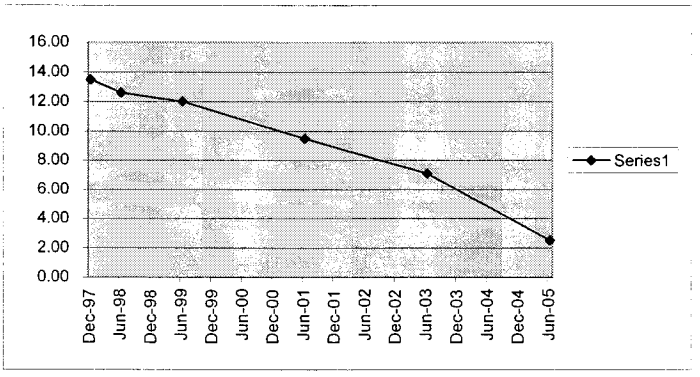
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U875

Date	TCE (ug/l)	Mann-Kendall Calculation:					
12/11/1997	13.50	1					
6/29/1998	12.60	1	-1				
6/9/1999	12.00	1	-1	-1			
6/19/2001	9.5	1	-1	-1	-1		
6/12/2003	7.1	1	-1	-1	-1	-1	
6/22/2005	2.5	1	-1	-1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		-5	-4	-3	-2	-1	-15
Possibles		15						

Mean	9.53
STNDEV	4.1620508
COV	0.4365788
Trend:	Negative
Confidence (lookup)	99.9%



S	-15
tau	-1

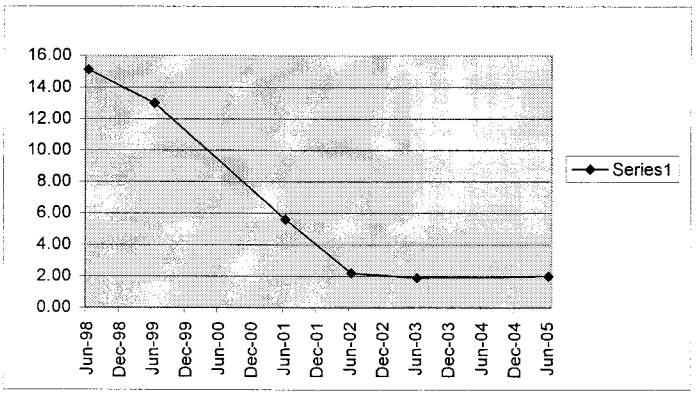
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04U877

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/19/1998	15.10	1						
6/14/1999	13.00	1	-1					
6/20/2001	5.60	1	-1	-1				
6/28/2002	2.20	1	-1	-1	-1			
6/13/2003	1.90	1	-1	-1	-1	-1		
6/16/2005	2.00	1	-1	-1	-1	-1	1	
	N	6	5	4	3	2	1	15
	sum		-5	-4	-3	-2	1	-13
	Possibles	15						

Mean	6.63
STNDEV	5.94665172
COV	0.89648016
Trend:	Negative
Confidence (lookup)	99.2%



S	-13
tau	-0.86667

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 04J077

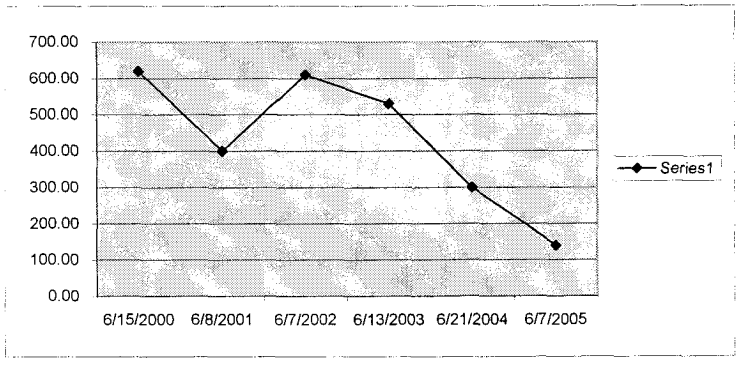
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/15/2000	620.00	1					
6/8/2001	400.00	1	-1				
6/7/2002	610.00	1	-1	1			
6/13/2003	530.00	1	-1	1	-1		
6/21/2004	300.00	1	-1	-1	-1	-1	
6/7/2005	140.00	1	-1	-1	-1	-1	-1

	N	6	5	4	3	2	1	15
	sum		-5	0	-3	-2	-1	-11
	Possibles	15						

Mean	433.33
STNDEV	189.9123
COV	0.438259

Trend: Negative

Confidence (lookup) 97.00%



S	-11
tau	-0.73333

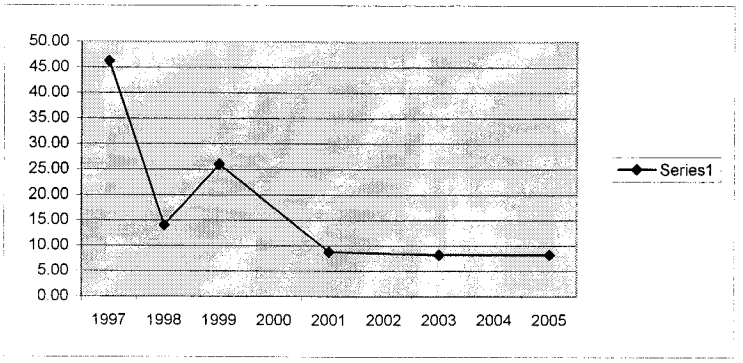
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J702

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/6/1997	46.20	1						
6/11/1998	14.10	1	-1					
6/21/1999	26.00	1	-1	1				
6/7/2001	8.80	1	-1	-1	-1			
6/16/2003	8.20	1	-1	-1	-1	-1		
6/8/2005	8.20	1	-1	-1	-1	-1	0	
	N	6	5	4	3	2	1	15
	sum		-5	-2	-3	-2	0	-12
	Possibles	15						

Mean	18.58
STNDEV	15.16
COV	0.815785
Trend:	Negative
Confidence (lookup)	98.00%



S	-12
tau	-0.8

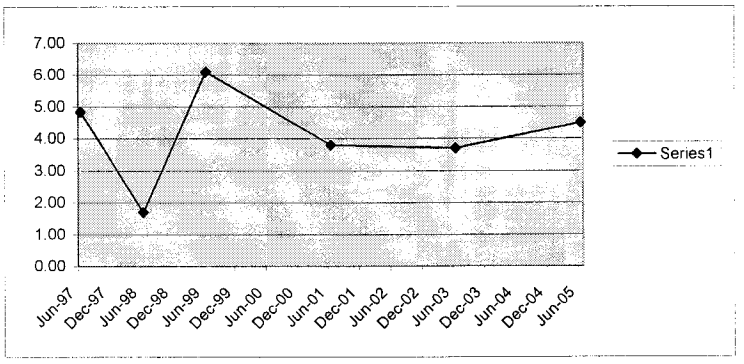
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J708

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/11/1997	4.84	1						
6/9/1998	1.70	1	-1					
6/23/1999	6.10	1	1	1				
6/7/2001	3.80	1	-1	1	-1			
6/12/2003	3.70	1	-1	1	-1	-1		
6/9/2005	4.50	1	-1	1	-1	1	1	
	N	6	5	4	3	2	1	15
	sum		-3	4	-3	0	1	-1
	Possibles	15						

Mean	4.11
STNDEV	1.464058
COV	0.356508
Trend:	Negative
Confidence (lookup)	50.00%



S	-1
tau	-0.06667

Decsion Matrix

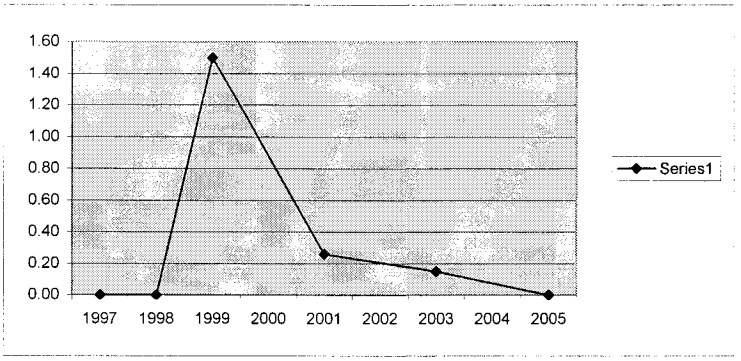
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J713

Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/10/1997	0.00	1					
6/10/1998	0.00	1	0				
6/22/1999	1.50	1	1	1			
6/12/2001	0.26	1	1	1	-1		
6/12/2003	0.15	1	1	1	-1	-1	
6/9/2005	0.00	1	0	0	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		3	3	-3	-2	-1	0
Possibles		15						

Mean	0.32
STNDEV	0.588572
COV	1.848916
Trend:	Zero
Confidence (lookup)	50.00%



S	0
tau	0

Decsion Matrix

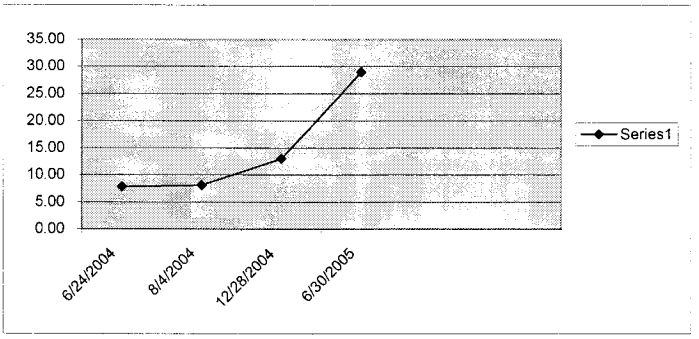
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J822

Date	TCE (ug/l)	Mann-Kendall Calculation:			
6/24/2004	7.80	1			
8/4/2004	8.10	1	1		
12/28/2004	13.00	1	1	1	
6/30/2005	29.0	1	1	1	1

N		4	3	2	1	6
	sum		3	2	1	6
Possibles		6				

Mean	14.48
STNDEV	9.9724203
COV	0.68894095
Trend:	Positive
Confidence (lookup)	95.80%



S	6
tau	1

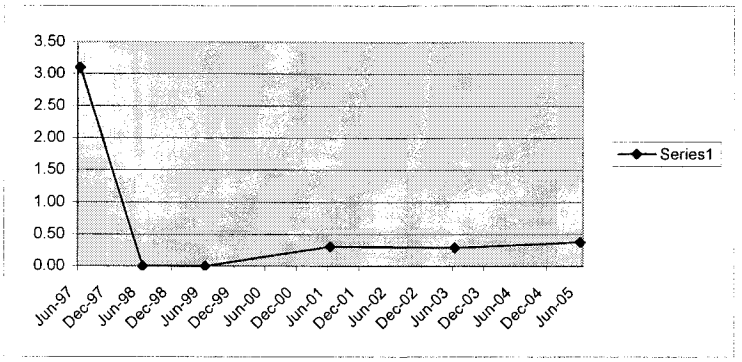
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J834

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/24/1997	3.10	1						0
6/18/1998	0.00	1	-1					0.00
6/10/1999	0.00	1	-1	0				0.97
6/15/2001	0.31	1	-1	1	1			3
6/9/2003	0.29	1	-1	1	1	-1		2.2
6/8/2005	0.38	1	-1	1	1	1	1	
	N	6	5	4	3	2	1	15
	sum		-5	3	3	0	1	2
	Possibles	15						

Mean	0.68
STNDEV	1.196679
COV	1.759822
Trend:	Positive
Confidence (lookup)	57.00%



S	2
tau	0.133333

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J836

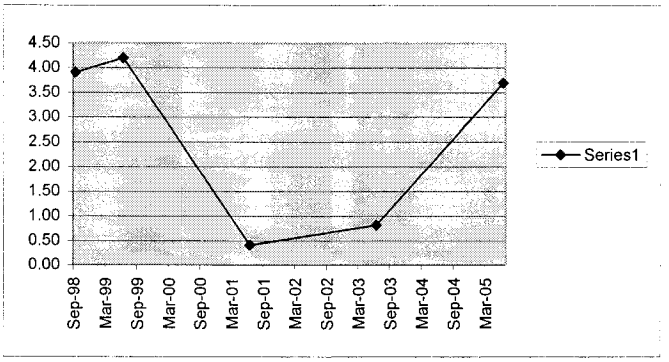
Date	TCE (ug/l)		Mann-Kendall Calculation:			
9/4/1998	3.91	1				
6/16/1999	4.20	1	1			
6/20/2001	0.41	1	-1	-1		
6/10/2003	0.82	1	-1	-1	1	
6/21/2005	3.70	1	-1	-1	1	1

N		5	4	3	2	1	10
	sum		-2	-3	2	1	-2
Possibles		10					

Mean	2.61
STNDEV	1.833731
COV	0.703118

Trend: Negative

Confidence (lookup) 59.20%



S	-2
tau	-0.2

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J837

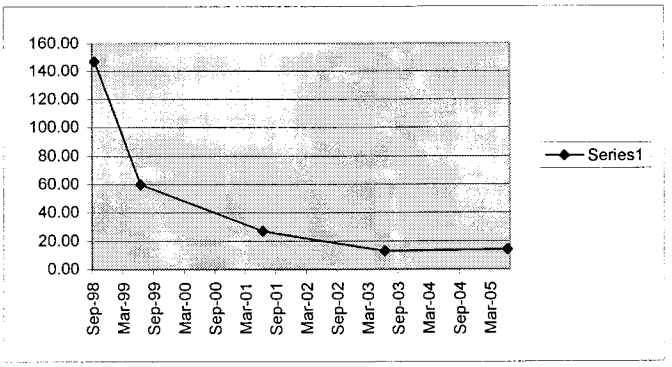
Date	TCE (ug/l)	Mann-Kendall Calculation:				
9/8/1998	147.00	1				
6/10/1999	60.00	1	-1			
6/23/2001	27.00	1	-1	-1		
6/16/2003	13.00	1	-1	-1	-1	
6/20/2005	14.00	1	-1	-1	-1	1

N		5	4	3	2	1	0	10
	sum		-4	-3	-2	1	0	-8
Possibles		10						

Mean	52.20
STNDEV	56.30009
COV	1.078546

Trend: Negative

Confidence (lookup) 95.80%



S	-8
tau	-0.8

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J838

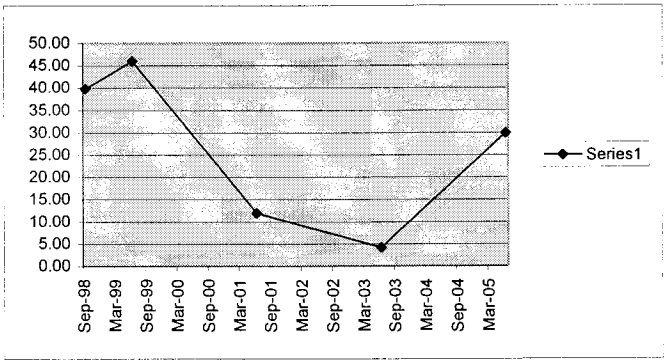
Date	TCE (ug/l)		Mann-Kendall Calculation:				
9/3/1998	39.80	1					
6/10/1999	46.00	1	1				
6/23/2001	12.00	1	-1	-1			
6/9/2003	4.20	1	-1	-1	-1		
6/17/2005	30.00	1	-1	-1	1	1	

N		5	4	3	2	1	0	10
	sum		-2	-3	0	1	0	-4
Possibles		10						

Mean	26.40
STNDEV	17.86673
COV	0.67677

Trend: Negative

Confidence (lookup) 75.80%



S	-4
tau	-0.4

Decsion Matrix

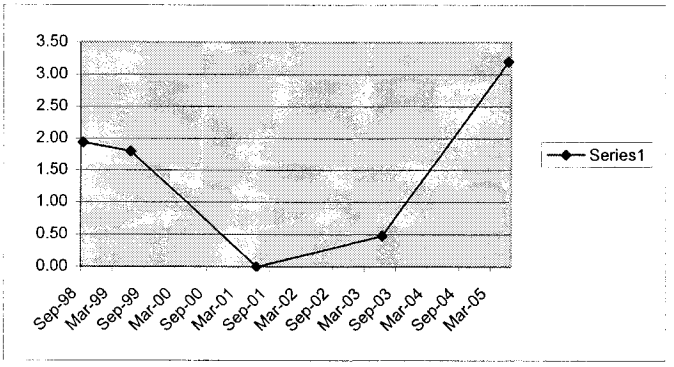
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J839

Date	TCE (ug/l)	Mann-Kendall Calculation:				
9/4/1998	1.94	1				
6/17/1999	1.80	1	-1			
6/18/2001	0.00	1	-1	-1		
6/5/2003	0.48	1	-1	-1	1	
6/17/2005	3.20	1	1	1	1	1

N		5	4	3	2	1	10
	sum		-2	-1	2	1	0
	Possibles	10					

Mean	1.48
STNDEV	1.271094
COV	0.856532
Trend:	Zero
Confidence (lookup)	40.80%



S	0
tau	0

Decsion Matrix

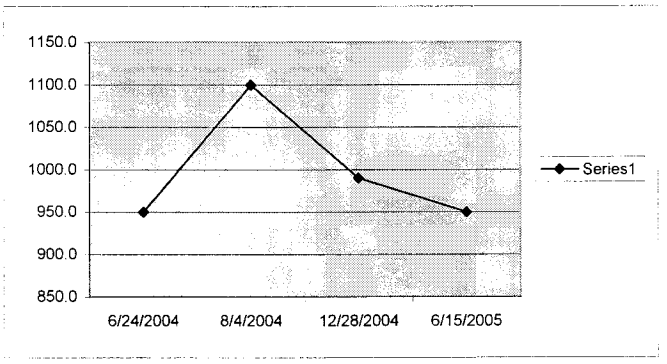
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J847

Date	TCE (ug/l)		Mann-Kendall Calculation:			
6/24/2004	950.0	1				
8/4/2004	1100.0	1	1			
12/28/2004	990.0	1	1	-1		
6/15/2005	950.0	1	0	-1	-1	

N		4	3	2	1	6
	sum		2	-2	-1	-1
Possibles		6				

Mean	997.50
STNDEV	70.88723
COV	0.071065
Trend:	Negative
Confidence (lookup)	50.00%



S	-1
tau	-0.166667

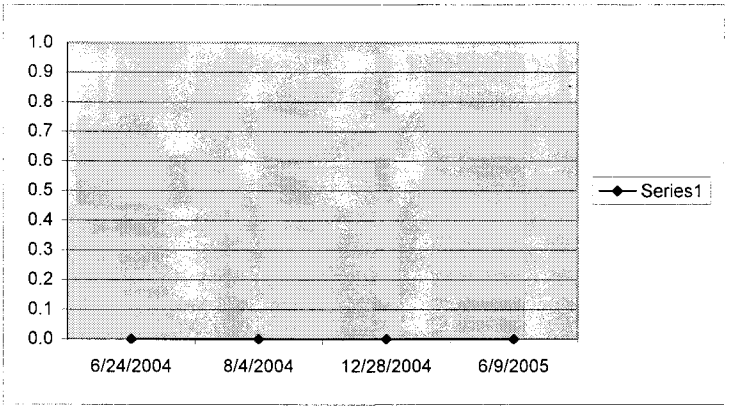
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J849

Date	TCE (ug/l)	Mann-Kendall Calculation:			
6/24/2004	0.0	1			
8/4/2004	0.0	1	0		
12/28/2004	0.0	1	0	0	
6/9/2005	0.0	1	0	0	0

N		4	3	2	1	6
	sum		0	0	0	0
Possibles		6				



Mean	0.00
STNDEV	0
COV	#DIV/0!

S	0
tau	0

Trend: Zero

Confidence (lookup) 37.50%

Decsion Matrix

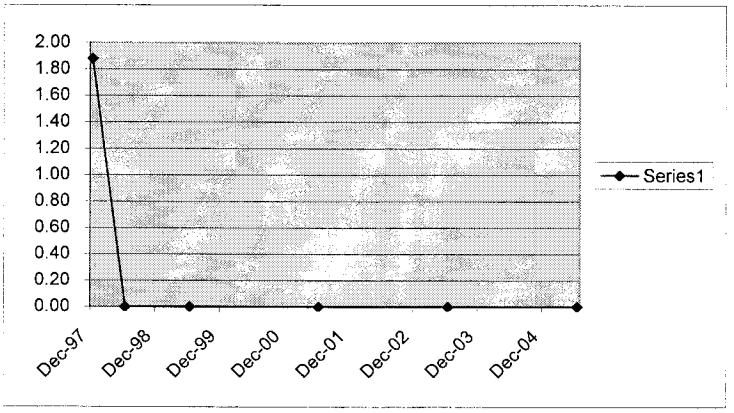
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 04J882

Date	TCE (ug/l)	Mann-Kendall Calculation:						
12/10/1997	1.88	1						0
6/19/1998	0.00	1	-1					0.00
6/10/1999	0.00	1	-1	0				0.97
6/15/2001	0.00	1	-1	0	0			3
6/6/2003	0.00	1	-1	0	0	0		2.2
6/8/2005	0.00	1	-1	0	0	0	0	

N		6	5	4	3	2	1	15
	sum		-5	0	0	0	0	-5
Possibles		15						

Mean	0.31
STNDEV	0.767507
COV	2.44949
Trend:	Negative
Confidence (lookup)	76.50%



S	-5
tau	-0.333333

Decsion Matrix

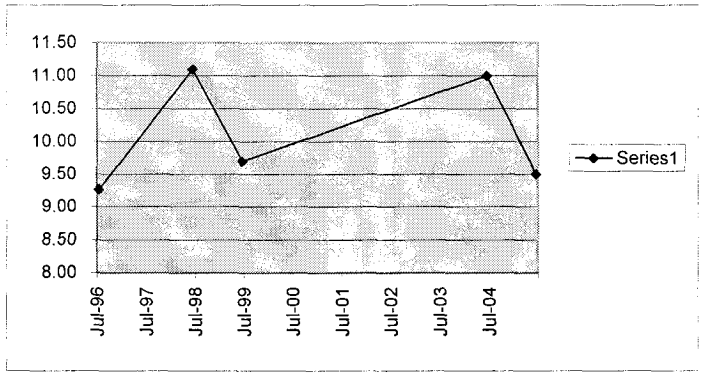
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: 206688

Date	TCE (ug/l)	Mann-Kendall Calculation:				
7/3/1996	9.27	1				
6/26/1998	11.10	1	1			
6/9/1999	9.70	1	1	-1		
6/23/2004	11.00	1	1	-1	1	
6/6/2005	9.50	1	1	-1	-1	-1

N	5	4	3	2	1	0		10
sum		4	-3	0	-1	0		0
Possibles	10							

Mean	10.11
STNDEV	0.8686081
COV	0.0858818
Trend:	Zero
Confidence (lookup)	41.0%



S	0
tau	0

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: 409549

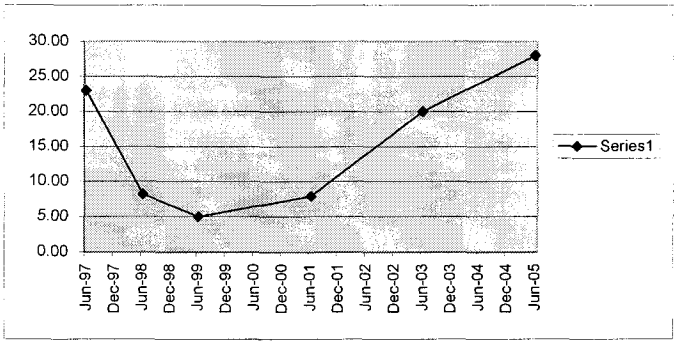
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/23/1997	23.00	1					
6/19/1998	8.18	1	-1				
6/11/1999	5.00	1	-1	-1			
6/19/2001	7.9	1	-1	-1	1		
6/11/2003	20	1	-1	1	1	1	
6/10/2005	28	1	1	1	1	1	1

N		6	5	4	3	2	1	15
	sum		-3	0	3	2	1	3
Possibles		15						

Mean	15.35
STNDEV	9.531016
COV	0.621048

Trend: Positive

Confidence (lookup) 64.00%



S	3
tau	0.2

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: **409550**

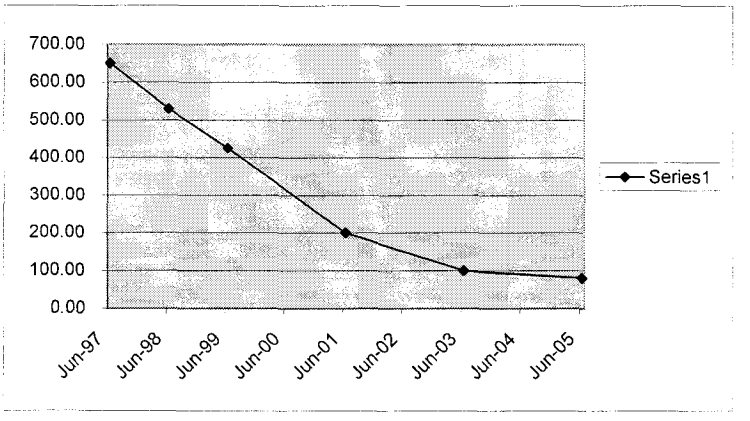
Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/24/1997	650.00	1					
6/23/1998	530.00	1	-1				
6/15/1999	425.00	1	-1	-1			
6/25/2001	200.00	1	-1	-1	-1		
6/13/2003	100.00	1	-1	-1	-1	-1	
6/14/2005	80.00	1	-1	-1	-1	-1	-1

N		6	5	4	3	2	1	15
	sum		-5	-4	-3	-2	-1	-15
Possibles		15						

Mean	330.83
STNDEV	238.2103
COV	0.720031

Trend: Negative

Confidence (lookup) 99.90%



S	-15
tau	-1

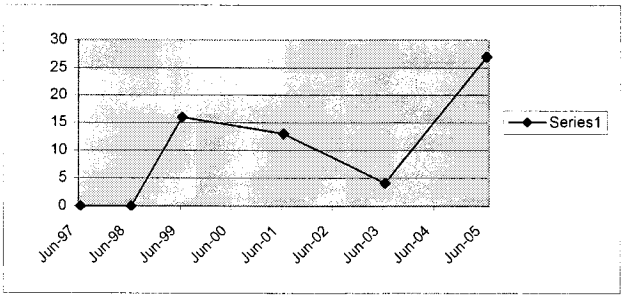
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: **409557**

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/5/1997	0	1						
6/22/1998	0.00	1	0					
6/11/1999	16.00	1	1	1				
6/20/2001	13	1	1	1	-1			
6/1/2003	4.1	1	1	1	-1	-1		
6/9/2005	27	1	1	1	1	1	1	
	N	6	5	4	3	2	1	15
	sum		4	4	-1	0	1	8
	Possibles	15						

Mean	10.02
STNDEV	10.6659114
COV	1.06481645
Trend:	Positive
Confidence (lookup)	89.80%



S	8
tau	0.533333

Decsion Matrix

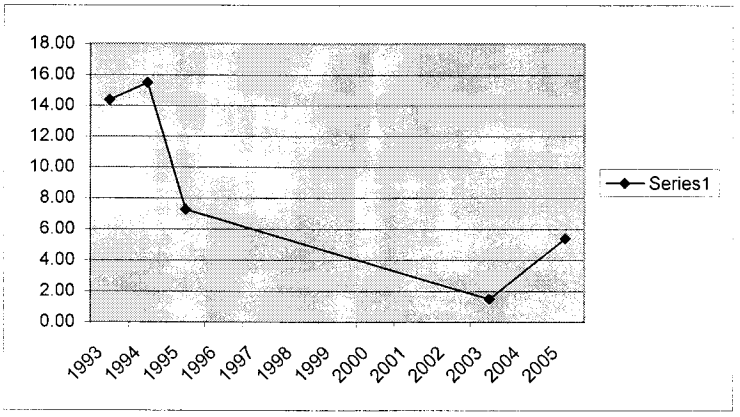
M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Prob. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Prob Decr.
S < 0	>95%	na	Decreasing

Well: **409596**

Date	TCE (ug/l)		Mann-Kendall Calculation:			
3/15/1993	14.40	1				
3/18/1994	15.50	1	1			
3/20/1995	7.26	1	-1	-1		
6/13/2003	1.50	1	-1	-1	-1	
6/9/2005	5.40	1	-1	-1	-1	1

N		5	4	3	2	1	10
	sum		-2	-3	-2	1	-6
Possibles		10					

Mean	8.81
STNDEV	5.988967
COV	0.679638
Trend:	Negative
Confidence (lookup)	88.30%



S	-6
tau	-0.6

Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

Well: **409597**

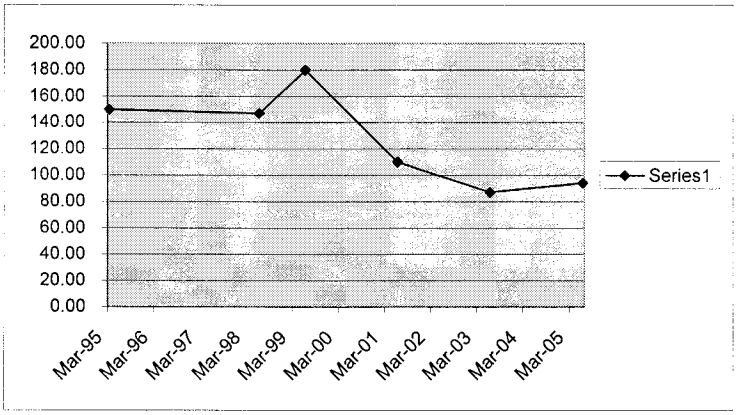
Date	TCE (ug/l)	Mann-Kendall Calculation:					
3/20/1995	150.00	1					
6/23/1998	147.00	1	-1				
6/15/1999	180.00	1	1	1			
6/23/2001	110.00	1	-1	-1	-1		
6/13/2003	87.00	1	-1	-1	-1	-1	
6/14/2005	94.00	1	-1	-1	-1	-1	1

N		6	5	4	3	2	1	15
	sum		-3	-2	-3	-2	1	-9
Possibles		15						

Mean	128.00
STNDEV	36.63332
COV	0.286198

Trend: Negative

Confidence (lookup) 93.20%



S	-9
tau	-0.6

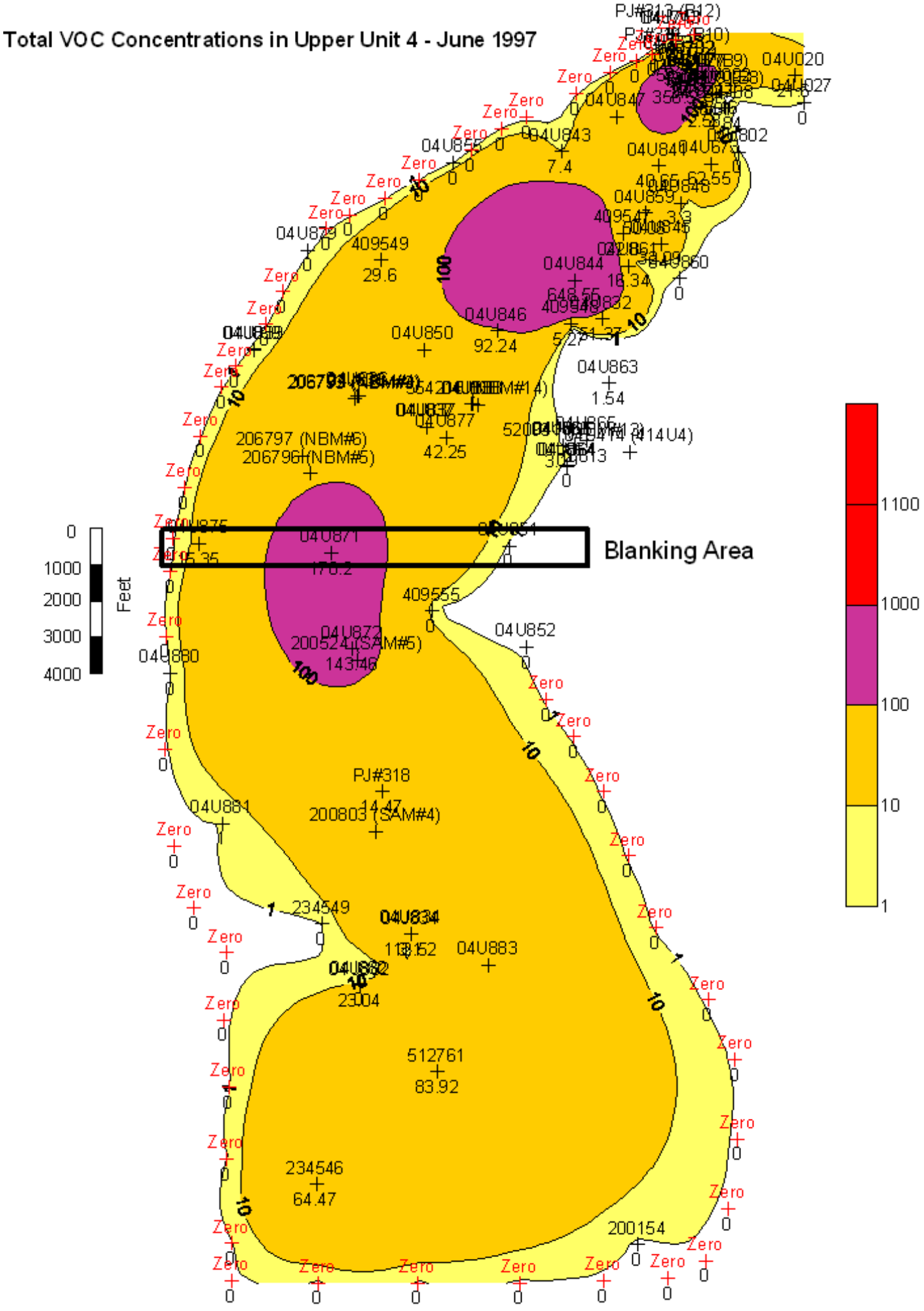
Decsion Matrix

M-K S	Confidence	COV	Trend
S > 0	> 95%	na	Increasing
S > 0	90-95%	na	Pr. Incr.
S > 0	< 90%	na	No Trend
S</= 0	< 90%	>/= 1	No Trend
S </= 0	< 90%	< 1	Stable
S < 0	90-95%	na	Pr. Decr.
S < 0	>95%	na	Decreasing

D.2.4 Group 3 and Group 5 Kriging Evaluation

Group 5

1997


Total VOC Concentrations in Upper Unit 4 - June 1997
Blanking Area
0
1000
2000
3000
4000
Feet
1100
1000
100
10
1
Zero
04U020
04U847
04U843
04U855
04U840
04U802
04U859
04U829
409549
29.6
04U844
18.34
04U846
04U850
92.24
04U863
1.54
206797 (NBM#6)
206796 (NBM#5)
04U877
42.25
04U871
176.2
409555
04U852
04U880
200524 (SAM#5)
143.46
PJ#318
14.47
200803 (SAM#4)
04U881
234549
04U883
23.04
512761
83.92
234546
64.47
200154

Groundwater Quality Data (Organics) - 1997		
Well	Date	TOTAL VOCs (ug/l)
04J077	6/10/97	346.57
04J702	6/6/97	53.83
04J708	6/11/97	4.84
04J713	6/10/97	0.00
04J834	6/24/97	3.10
04J864	6/3/97	0.00
04J866	6/2/97	0.00
04J882	6/24/97	0.00
04U002	6/16/97	5.16
04U020	6/16/97	21.60
04U027	6/10/97	0.00
04U077	6/10/97	273.72
04U673	6/12/97	62.55
04U701	6/18/97	6.92
04U702	6/6/97	14.71
04U709	6/9/97	28.01
04U711	6/13/97	2.53
04U713	6/10/97	0.00
04U802	6/16/97	0.00
04U806	6/5/97	356.59
04U832	6/4/97	51.37
04U833	6/5/97	59.30
04U834	6/24/97	112.52
04U841	6/24/97	40.65
04U843	6/25/97	7.40
04U844	6/27/97	648.55
04U845	6/5/97	32.09
04U846	6/25/97	92.24
04U848	6/5/97	3.30
04U851	6/4/97	0.00
04U852	6/24/97	0.00
04U855	6/26/97	0.00
04U859	6/4/97	50.08
04U860	6/5/97	0.00
04U861	6/4/97	16.34
04U863	6/3/97	1.54
04U864	6/3/97	0.00
04U865	6/3/97	0.81
04U866	6/2/97	3.19
04U871	6/25/97	178.20
04U872	6/19/97	143.46
04U875	6/26/97	15.35
04U877	6/23/97	42.25
04U879	6/25/97	0.00
04U880	6/26/97	0.00
04U881	6/24/97	1.00
04U882	6/24/97	23.04
200154	6/27/97	0.00
234546	6/24/97	64.47
234549	6/27/97	0.00
409547	6/5/97	22.80
409548	6/4/97	5.27
409549	6/23/97	29.60
409555	6/26/97	0.00
512761	6/24/97	83.92
PJ#318	6/26/97	14.47

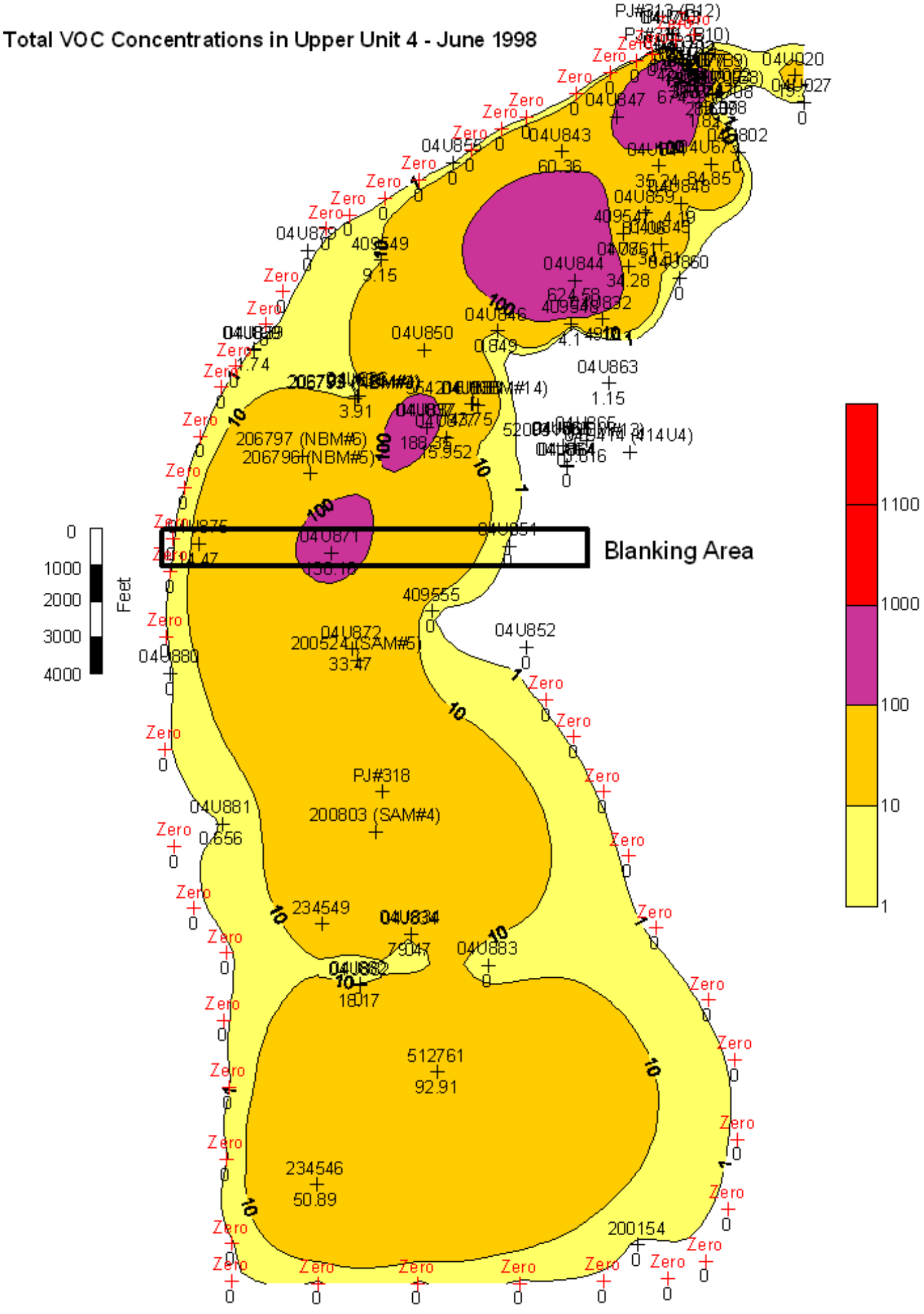
North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 1997

Concentration	Positive Planar Area (m2)
Plume to 1	32684921
Plume to 5	29464761
Plume to 10	26448984
Plume to 50	10398696
Plume to 100	3199895
Plume to 200	745654
Plume to 300	317170
Plume to 400	127939
Plume to 500	32208
Plume to 600	100
Plume to 700	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	3220160	9660479
5 to 10	7.5	3015777	22618327
10 to 50	30	16050289	481508657
50 to 100	75	7198801	539910067
100 to 200	150	2454241	368136114
200 to 300	250	428484	107121047
300 to 400	350	189231	66230926
400 to 500	450	95731	43078773
500 to 600	550	32107	17659116
600 to 700	650	100	65324
	Sum	32684921	1655988831

Area Wtd Conc	51	ug/L

1998


Total VOC Concentrations in Upper Unit 4 - June 1998
Blanking Area
Feet
0
1000
2000
3000
4000
1100
1000
100
10
1
Zero
04U847
04U843
04U844
04U846
04U850
04U863
04U871
04U851
04U852
04U872
04U880
04U881
04U834
04U883
04U882
04U802
04U673
04U848
04U859
04U860
04U861
04U879
04U855
04U020
04U027
409549
409555
206797 (NBM#6)
206796 (NBM#5)
200524 (SAM#5)
PJ#318
200803 (SAM#4)
234549
512761
92.91
234546
50.89
200154
60.36
35.24
84.85
9.15
34.28
624.58
4.19
1.15
3.91
33.47
79.47
18.17
0.656
1.74

Groundwater Quality Data (Organics) - 1998		
Well	Date	TOTAL VOCs (ug/l)
04J077	6/15/98	318.11
04J702	6/11/98	15.26
04J708	6/9/98	1.70
04J713	6/10/98	0.00
04J834	6/18/98	0.00
04J836	9/4/98	3.91
04J837	9/8/98	188.35
04J838	9/3/98	43.75
04J839	9/4/98	1.74
04J864	6/25/98	0.00
04J866	6/26/98	0.00
04J882	6/19/98	0.00
04U002	6/5/98	12.08
04U020	6/4/98	19.70
04U027	6/16/98	0.00
04U077	6/12/98	307.74
04U673	6/25/98	84.85
04U701	6/10/98	7.56
04U702	6/11/98	11.85
04U709	6/16/98	28.61
04U711	6/9/98	1.82
04U713	6/10/98	0.00
04U802	6/11/98	0.00
04U806	6/12/98	674.90
04U832	6/25/98	49.20
04U833	6/11/98	42.90
04U834	6/18/98	79.47
04U841	6/19/98	35.24
04U843	6/18/98	60.36
04U844	6/23/98	624.58
04U845	6/25/98	34.31
04U846	6/17/98	0.85
04U848	6/29/98	4.19
04U851	6/26/98	0.00
04U852	6/26/98	0.00
04U855	6/18/98	0.00
04U859	6/25/98	81.06
04U860	6/29/98	0.00
04U861	6/29/98	34.28
04U863	6/25/98	1.15
04U864	6/25/98	0.00
04U865	6/25/98	0.82
04U871	6/23/98	138.16
04U872	6/9/98	33.47
04U875	6/29/98	14.47
04U877	6/19/98	15.95
04U879	6/24/98	0.00
04U880	6/24/98	0.00
04U881	6/23/98	0.66
04U882	6/19/98	18.17
04U883	6/24/98	0.00
200154	6/26/98	0.00
234546	6/25/98	50.89
409547	6/22/98	1.77
409548	6/22/98	4.10
409549	6/19/98	9.15
409555	6/19/98	0.00
512761	6/25/98	92.91

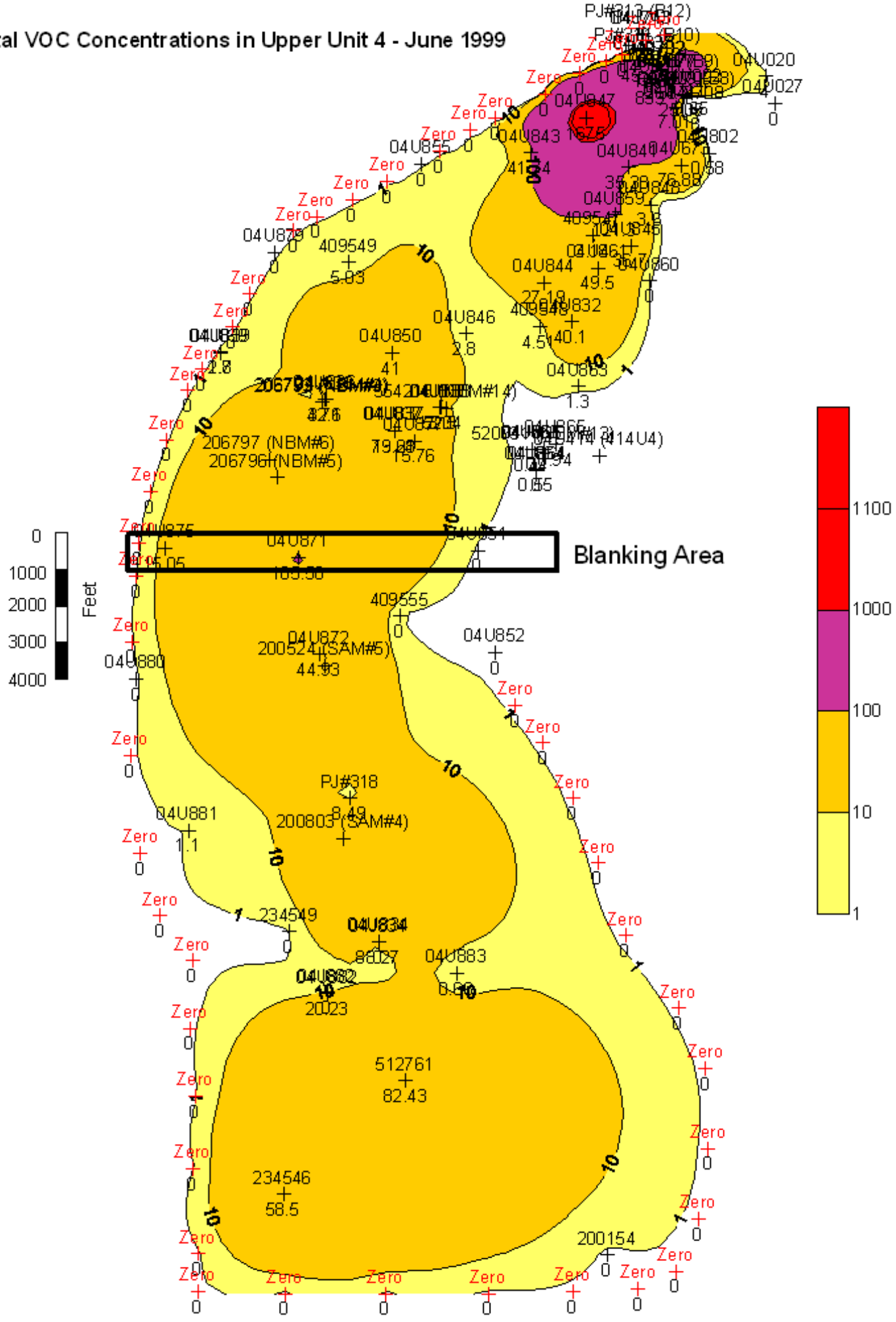
North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 1998

Concentration	Positive Planar Area (m2)
Plume to 1	32092171
Plume to 5	27662632
Plume to 10	23087160
Plume to 50	7346565
Plume to 100	2377485
Plume to 200	787450
Plume to 300	352369
Plume to 400	134661
Plume to 500	25717
Plume to 600	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	4429539	13288616
5 to 10	7.5	4575472	34316037
10 to 50	30	15740596	472217867
50 to 100	75	4969080	372680972
100 to 200	150	1590035	238505230
200 to 300	250	435081	108770344
300 to 400	350	217708	76197641
400 to 500	450	108945	49025219
500 to 600	550	25717	14144095
	Sum	32092171	1379146020

Area Wtd Conc	43	ug/L

1999


Total VOC Concentrations in Upper Unit 4 - June 1999
Blanking Area
Feet
0
1000
2000
3000
4000
1100
1000
100
10
1
Zero
04U847
04U843
1675
04U840
41.24
04U855
04U020
04U027
04U802
04U859
04U829
409549
5.03
04U844
49.5
04U846
2.8
04U850
41
04U832
4.5
140.1
04U863
1.3
206797 (NBM#6)
206796 (NBM#5)
15.76
04U871
105.56
409555
04U852
04U872
200524 (SAM#5)
44.93
04U880
PJ#318
8.49
200803 (SAM#4)
04U881
1.1
234549
04U834
8027
04U883
2023
512761
82.43
234546
58.5
200154

Groundwater Quality Data (Organics) - 1999		
Well	Date	TOTAL VOCs (ug/l)
04J077	6/22/99	1314.00
04J702	6/21/99	30.20
04J708	6/23/99	8.00
04J713	6/22/99	1.50
04J834	6/10/99	0.00
04J836	6/16/99	4.71
04J837	6/10/99	73.61
04J838	6/10/99	52.50
04J839	6/17/99	1.80
04J864	6/4/99	0.55
04J866	6/7/99	0.00
04J882	6/10/99	0.00
04U002	6/21/99	9.65
04U020	6/21/99	4.00
04U027	6/22/99	0.00
04U077	6/22/99	214.70
04U673	6/4/99	76.88
04U701	6/28/99	17.80
04U702	6/21/99	16.84
04U709	6/25/99	25.05
04U711	6/28/99	7.01
04U713	6/22/99	1.60
04U802	6/23/99	0.58
04U806	6/23/99	839.00
04U832	6/7/99	40.10
04U833	6/22/99	45.47
04U834	6/10/99	88.27
04U836	6/16/99	32.60
04U837	6/10/99	19.28
04U838	6/10/99	13.04
04U839	6/17/99	2.70
04U841	6/14/99	35.38
04U843	6/14/99	41.74
04U844	6/15/99	27.19
04U845	6/7/99	36.70
04U846	6/9/99	2.80
04U847	6/29/99	1675.00
04U848	6/4/99	3.60
04U850	6/9/99	41.00
04U851	6/8/99	0.00
04U852	6/8/99	0.00
04U855	6/11/99	0.00
04U859	6/7/99	121.30
04U860	6/7/99	0.00
04U861	6/7/99	49.50
04U863	6/7/99	1.30
04U864	6/4/99	0.00
04U865	6/8/99	0.94
04U866	12/18/00	0.44
04U871	6/11/99	105.58
04U872	6/9/99	44.93
04U875	6/9/99	15.05
04U877	6/14/99	15.76
04U879	6/11/99	0.00
04U880	6/14/99	0.00
04U881	6/15/99	1.10
04U882	6/10/99	20.23
04U883	6/14/99	0.66
200154	6/15/99	0.00
234546	6/15/99	58.50
234549	6/9/99	0.00
409547	6/11/99	3.14
409548	6/14/99	4.51
409549	6/11/99	5.03
409555	6/11/99	0.00
512761	6/15/99	82.43
PJ#318	6/10/99	8.49

North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 1999

Concentration	Positive Planar Area (m2)
Plume to 1	32152197
Plume to 5	26871107
Plume to 10	21286747
Plume to 50	5028631
Plume to 100	1308233
Plume to 200	945626
Plume to 300	751118
Plume to 400	607728
Plume to 500	499154
Plume to 600	402501
Plume to 700	306873
Plume to 800	206371
Plume to 900	147267
Plume to 1000	102626
Plume to 1100	68502
Plume to 1200	43348
Plume to 1300	23382
Plume to 1400	1580
Plume to 1500	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	5281090	15843270
5 to 10	7.5	5584361	41882705
10 to 50	30	16258115	487743458
50 to 100	75	3720399	279029890
100 to 200	150	362607	54391038
200 to 300	250	194508	48627018
300 to 400	350	143390	50186427
400 to 500	450	108574	48858241
500 to 600	550	96653	53159057
600 to 700	650	95628	62158118
700 to 800	750	100502	75376593
800 to 900	850	59104	50238740
900 to 1000	950	44641	42409035
1000 to 1100	1050	34124	35830376
1100 to 1200	1150	25154	28927105
1200 to 1300	1250	19966	24957475
1300 to 1400	1350	21802	29432460
1400 to 1500	1450	1580	2290660
	Sum	32152197	1431341667

Area Wtd Conc	45	ug/L

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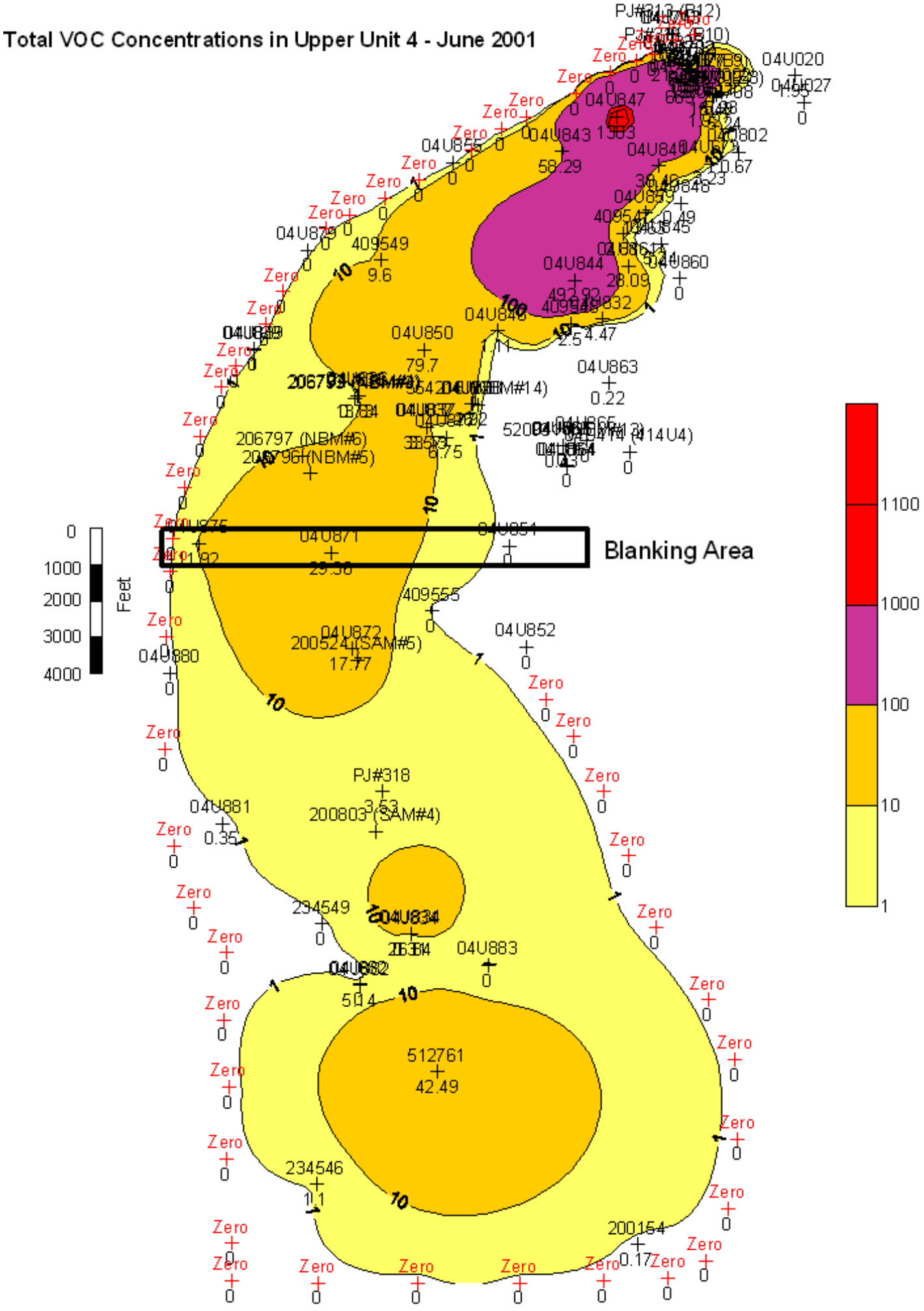
2001


Total VOC Concentrations in Upper Unit 4 - June 2001
Blanking Area
Feet
0
1000
2000
3000
4000
1100
1000
100
10
1
04U847
1383
04U843
58.29
04U840
04U844
28.09
04U850
79.7
04U863
0.22
04U871
29.58
04U872
17.77
04U852
04U881
0.35
PJ#318
3.53
200803 (SAM#4)
234549
04U883
512761
42.49
234546
1.1
200154
0.17
206797 (NBM#6)
206796 (NBM#5)
409549
9.6
409555
04U880
04U851
04U020
Zero

Groundwater Quality Data (Organics) - 2001		
Well	Date	TOTAL VOCs (ug/l)
04J077	6/8/01	571.00
04J702	6/7/01	9.97
04J708	6/7/01	5.24
04J713	6/12/01	0.26
04J834	6/15/01	0.31
04J836	6/20/01	0.73
04J837	6/23/01	33.13
04J838	6/23/01	16.20
04J839	6/18/01	0.00
04J864	6/11/01	0.00
04J866	6/11/01	0.00
04J882	6/15/01	0.00
04U002	6/6/01	5.23
04U020	6/5/01	1.95
04U027	6/11/01	0.00
04U077	6/8/01	127.46
04U414 (414U4)	6/11/01	0.00
04U673	6/12/01	3.23
04U701	6/7/01	10.68
04U702	6/7/01	9.31
04U709	6/13/01	16.43
04U711	6/12/01	1.92
04U713	6/12/01	1.35
04U802	6/19/01	0.67
04U806	6/15/01	665.00
04U832	6/14/01	4.47
04U833	6/13/01	21.78
04U834	6/23/01	26.84
04U836	6/20/01	13.84
04U837	6/21/01	3.57
04U838	6/20/01	2.92
04U839	6/18/01	1.00
04U841	6/21/01	38.46
04U843	6/21/01	58.29
04U844	6/23/01	492.92
04U845	6/13/01	5.24
04U846	6/15/01	1.11
04U847	6/25/01	1383.00
04U848	6/12/01	0.49
04U850	6/22/01	79.70
04U851	6/12/01	0.00
04U852	6/12/01	0.00
04U855	6/15/01	0.00
04U859	6/13/01	13.63
04U860	6/13/01	0.00
04U861	6/11/01	28.09
04U863	6/14/01	0.22
04U864	6/11/01	0.00
04U865	6/12/01	0.00
04U866	6/11/01	0.43
04U871	6/25/01	29.36
04U872	6/21/01	17.77
04U875	6/19/01	11.92
04U877	6/20/01	6.75
04U879	6/18/01	0.00
04U880	6/14/01	0.00
04U881	6/18/01	0.35
04U882	6/21/01	5.14
04U883	6/15/01	0.00
200154	6/25/01	0.17
234546	6/15/01	1.10
234549	6/25/01	0.00
409547	6/14/01	2.81
409548	6/19/01	2.50
409549	6/19/01	9.60
409555	6/14/01	0.00
512761	6/25/01	42.49
PJ#318	6/19/01	3.53

North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 2001

Concentration	Positive Planar Area (m2)
Plume to 1	28115641
Plume to 5	19249812
Plume to 10	12948481
Plume to 50	3342924
Plume to 100	2196190
Plume to 200	1277869
Plume to 300	771564
Plume to 400	512338
Plume to 500	375231
Plume to 600	257607
Plume to 700	174105
Plume to 800	115542
Plume to 900	71537
Plume to 1000	41011
Plume to 1100	17338
Plume to 1200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	8865830	26597489
5 to 10	7.5	6301331	47259979
10 to 50	30	9605557	288166702
50 to 100	75	1146734	86005059
100 to 200	150	918321	137748138
200 to 300	250	506305	126576320
300 to 400	350	259226	90729057
400 to 500	450	137107	61698046
500 to 600	550	117625	64693598
600 to 700	650	83502	54276144
700 to 800	750	58563	43922147
800 to 900	850	44005	37403841
900 to 1000	950	30526	28999732
1000 to 1100	1050	23673	24856763
1100 to 1200	1150	17338	19939076
	Sum	28115641	1138872092

Area Wtd Conc	41	ug/L

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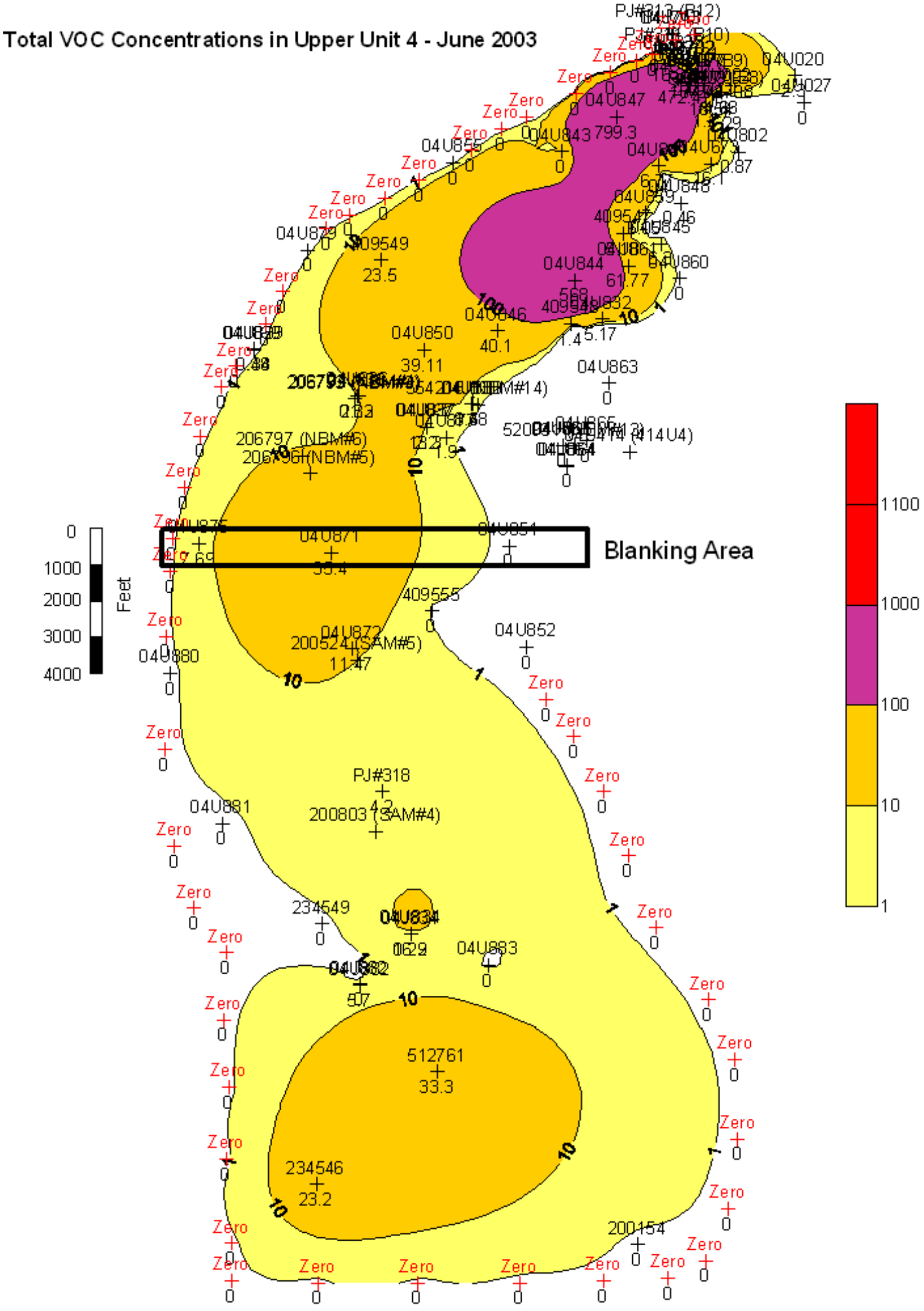
2003


Total VOC Concentrations in Upper Unit 4 - June 2003
Blanking Area
Feet
0
1000
2000
3000
4000
1100
1000
100
10
1
Zero
04U847
799.3
04U843
04U844
61.77
04U846
40.1
04U850
39.11
04U863
206797 (NBM#6)
206796 (NBM#5)
04U871
55.4
409555
04U852
200524 (SAM#5)
11.47
04U880
04U881
PJ#318
42
200803 (SAM#4)
234549
04U834
04U883
512761
33.3
234546
23.2
200154
04U802
04U020
04U027
04U845
04U860
04U832
5.17
04U851
04U872

Groundwater Quality Data (Organics) - 2003		
Well	Date	TOTAL VOCs (ug/l)
04J077	6/13/03	747.00
04J702	6/16/03	9.07
04J708	6/12/03	4.29
04J713	6/12/03	0.15
04J834	6/9/03	0.29
04J836	6/10/03	0.82
04J837	6/16/03	13.30
04J838	6/9/03	8.58
04J839	6/5/03	0.48
04J864	6/3/03	0.00
04J866	6/3/03	0.00
04J882	6/6/03	0.00
04U002	6/11/03	4.63
04U020	6/11/03	2.30
04U027	6/12/03	0.00
04U077	6/13/03	107.93
04U673	6/10/03	16.10
04U701	6/16/03	7.79
04U702	6/16/03	1.60
04U709	6/19/03	16.54
04U711	6/17/03	1.10
04U713	6/12/03	0.90
04U802	6/17/03	0.87
04U806	6/16/03	472.40
04U832	6/11/03	5.17
04U833	6/13/03	16.34
04U834	6/16/03	16.20
04U836	6/10/03	21.30
04U837	6/10/03	2.20
04U838	6/9/03	1.43
04U839	6/6/03	0.34
04U841	6/11/03	6.77
04U843	6/12/03	0.00
04U844	6/17/03	568.00
04U845	6/9/03	6.30
04U846	6/9/03	40.10
04U847	6/17/03	799.30
04U848	6/11/03	0.46
04U850	6/12/03	39.11
04U851	6/11/03	0.00
04U852	6/11/03	0.00
04U855	6/9/03	0.00
04U859	6/11/03	6.05
04U860	6/9/03	0.00
04U861	6/10/03	61.77
04U863	6/3/03	0.00
04U864	6/3/03	0.00
04U865	6/3/03	0.00
04U866	6/3/03	0.00
04U871	6/17/03	35.40
04U872	6/13/03	11.47
04U875	6/12/03	7.69
04U877	6/13/03	1.90
04U879	6/10/03	0.00
04U880	6/11/03	0.00
04U881	6/9/03	0.00
04U882	6/11/03	5.70
04U883	6/11/03	0.00
200154	6/16/03	0.00
234546	6/17/03	23.20
234549	6/17/03	0.00
409547	6/9/03	5.18
409548	6/11/03	1.40
409549	6/11/03	23.50
409555	6/5/03	0.00
512761	6/17/03	33.30
PJ#318	6/12/03	4.20

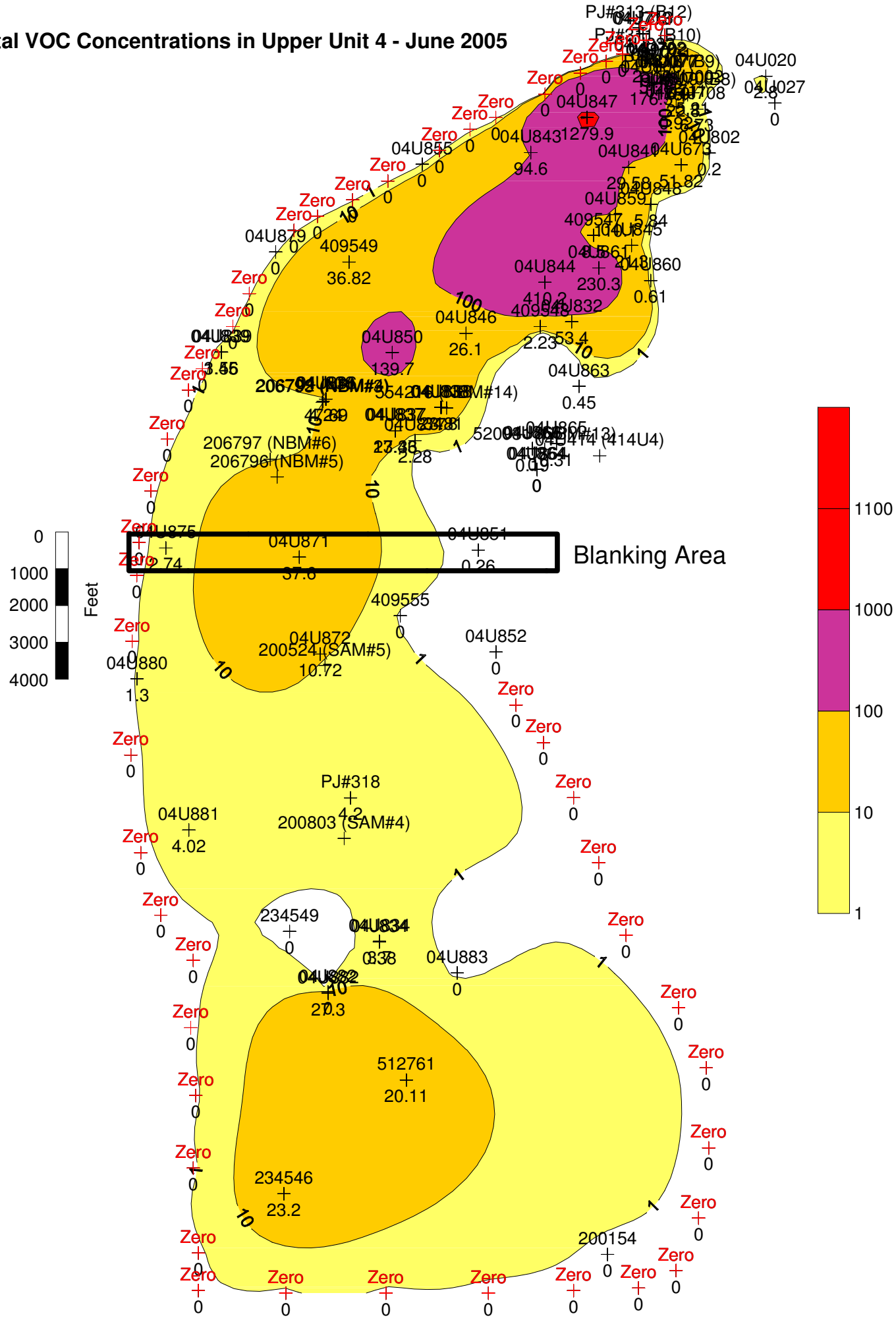
North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 2003

Concentration	Positive Planar Area (m2)
Plume to 1	28791345
Plume to 5	18699650
Plume to 10	12798074
Plume to 50	3142883
Plume to 100	2173590
Plume to 200	1123881
Plume to 300	608059
Plume to 400	280353
Plume to 500	90384
Plume to 600	31815
Plume to 700	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	10091695	30275084
5 to 10	7.5	5901576	44261822
10 to 50	30	9655191	289655727
50 to 100	75	969293	72696966
100 to 200	150	1049709	157456333
200 to 300	250	515822	128955417
300 to 400	350	327707	114697415
400 to 500	450	189969	85486073
500 to 600	550	58569	32212909
600 to 700	650	31815	20679505
	Sum	28791345	976377251

Area Wtd Conc	34	ug/L

2005


Total VOC Concentrations in Upper Unit 4 - June 2005
Blanking Area
Feet
0
1000
2000
3000
4000
1100
1000
100
10
1
PJ#313 (B12)
PJ#311 (B10)
04U020
04U027
04U847
1279.9
04U843
94.6
04U855
04U840
04U673
04U802
04U859
409547
04U845
04U879
409549
36.82
04U844
230.3
04U860
0.61
410.2
04U832
04U846
26.1
2.23
53.4
04U850
139.7
04U863
0.45
206797 (NBM#6)
206796 (NBM#5)
2.28
04U865
04U871
37.8
0.26
04U851
409555
04U872
200524 (SAM#5)
10.72
04U852
04U880
1.3
PJ#318
4.2
200803 (SAM#4)
04U881
4.02
234549
04U834
04U883
512761
20.11
234546
23.2
200154
Zero

Group 3 & 5 Total VOCs 2005		
Well	Date	Total VOCs for Surfer
04J077	6/7/05	175.0
04J702	6/8/05	9.5
04J708	6/9/05	6.7
04J713	6/9/05	0.0
04J834	6/8/05	0.4
04J836	6/21/05	4.2
04J837	6/20/05	17.4
04J838	6/17/05	34.8
04J839	6/17/05	3.5
04J864	10/27/04	0.0
04J866	6/21/05	0.0
04J882	6/8/05	0.0
04U002	6/16/05	5.2
04U020	6/16/05	2.8
04U027	6/13/05	0.0
04U077	6/7/05	116.9
04U673	6/22/05	51.8
04U701	6/8/05	51.8
04U702	6/8/05	1.4
04U709	6/13/05	22.8
04U711	6/15/05	0.9
04U713	6/9/05	0.5
04U802	6/15/05	0.2
04U806	6/10/05	176.5
04U832	6/23/05	53.4
04U833	6/9/05	2.1
04U834	6/21/05	3.7
04U836	6/21/05	47.7
04U837	6/15/05	23.4
04U838	6/7/05	23.8
04U839	6/7/05	1.6
04U841	6/9/05	29.6
04U843	6/7/05	94.6
04U844	6/14/05	410.2
04U845	6/22/05	21.3
04U846	6/10/05	26.1
04U847	6/15/05	1279.9
04U848	6/21/05	5.8
04U850	6/13/05	139.7
04U851	6/22/05	0.3
04U852	6/24/05	0.0
04U855	6/8/05	0.0
04U859	6/22/05	110.1
04U860	6/23/05	0.6
04U861	6/23/05	230.3
04U863	6/22/05	0.5
04U864	10/27/04	0.0
04U865	6/22/05	0.3
04U866	6/22/05	0.2
04U871	6/22/05	37.6
04U872	6/20/05	10.7

Well	Date	Total VOCs for Surfer
04U875	6/22/05	**2.7**
04U877	6/16/05	**2.3**
04U879	6/8/05	**0.0**
04U880	6/16/05	**1.3**
04U881	6/9/05	**4.0**
04U882	6/17/05	**27.3**
04U883	6/10/05	**0.0**
200154	6/24/05	**0.0**
234546	June 2003	**23.2**
234549	June 2003	**0.0**
409547	6/6/05	**8.5**
409548	6/8/05	**2.2**
409549	6/10/05	**36.8**
409555	6/8/05	**0.0**
512761	6/23/05	**20.1**
PJ#318	June 2003	**4.2**

North Plume
Average Total VOC Concentration Calculations
Group 5
TCAAP
June 2005

Concentration	Positive Planar Area (m2)
Plume to 1	28416504
Plume to 5	18057961
Plume to 10	12905641
Plume to 50	4370262
Plume to 100	2524385
Plume to 200	1170045
Plume to 300	577584
Plume to 400	357818
Plume to 500	255077
Plume to 600	178064
Plume to 700	120431
Plume to 800	75158
Plume to 900	41900
Plume to 1000	17798
Plume to 1100	841
Plume to 1200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	10358544	31075631
5 to 10	7.5	5152320	38642403
10 to 50	30	8535378	256061350
50 to 100	75	1845877	138440801
100 to 200	150	1354340	203150983
200 to 300	250	592461	148115197
300 to 400	350	219766	76917976
400 to 500	450	102742	46233743
500 to 600	550	77013	42357132
600 to 700	650	57633	37461543
700 to 800	750	45272	33954190
800 to 900	850	33258	28269487
900 to 1000	950	24102	22897095
1000 to 1100	1050	16957	17804642
1100 to 1200	1150	841	967443
	Sum	28416504	1122349616

Area Wtd Conc	39	ug/L

Group 3 Blanking Area

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 1996

Concentration	Positive Planar Area (m2)
Plume to 1	592601
Plume to 5	570392
Plume to 10	545894
Plume to 50	419898
Plume to 100	291064
Plume to 200	36252
Plume to 300	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	22209	66628
5 to 10	7.5	24498	183736
10 to 50	30	125996	3779882
50 to 100	75	128834	9662522
100 to 200	150	128834	19325043
200 to 300	250	254812	63702970
	Sum	685183	96720781

Area Wtd Conc	141	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 1997

Concentration	Positive Planar Area (m2)
Plume to 1	596512
Plume to 5	562636
Plume to 10	526681
Plume to 50	356729
Plume to 100	210760
Plume to 200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	33877	101630
5 to 10	7.5	35954	269658
10 to 50	30	169953	5098579
50 to 100	75	145968	10947626
100 to 200	150	210760	31614023
	Sum	596512	48031516

Area Wtd Conc	81	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 1998

Concentration	Positive Planar Area (m2)
Plume to 1	594793
Plume to 5	557997
Plume to 10	519880
Plume to 50	320227
Plume to 100	129750
Plume to 200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	36796	110387
5 to 10	7.5	38118	285882
10 to 50	30	199653	5989581
50 to 100	75	190477	14285783
100 to 200	150	129750	19462464
	Sum	594793	40134097

Area Wtd Conc	67	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 1999

Concentration	Positive Planar Area (m2)
Plume to 1	593106
Plume to 5	551228
Plume to 10	507677
Plume to 50	278285
Plume to 100	138
Plume to 200	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	41877	125632
5 to 10	7.5	43551	326636
10 to 50	30	229392	6881769
50 to 100	75	278147	20861018
100 to 200	150	138	20657
	Sum	593106	28215713

Area Wtd Conc	48	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 2001

Concentration	Positive Planar Area (m2)
Plume to 1	585543
Plume to 5	516681
Plume to 10	442357
Plume to 50	5028
Plume to 100	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	68862	206585
5 to 10	7.5	74324	557434
10 to 50	30	437329	13119874
50 to 100	75	5028	377079
	Sum	585543	14260972

Area Wtd Conc	24	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 2003

Concentration	Positive Planar Area (m2)
Plume to 1	558061
Plume to 5	458092
Plume to 10	367139
Plume to 50	0

Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	99969	299907
5 to 10	7.5	90953	682144
10 to 50	30	367139	11014170
	Sum	558061	11996221

Area Wtd Conc	21	ug/L

North Plume
Average Total VOC Concentration Calculations
Group 3 Blanked Area
TCAAP
June 2005

Concentration	Positive Planar Area (m2)
Plume to 1	517277
Plume to 5	405408
Plume to 10	323683
Plume to 50	0

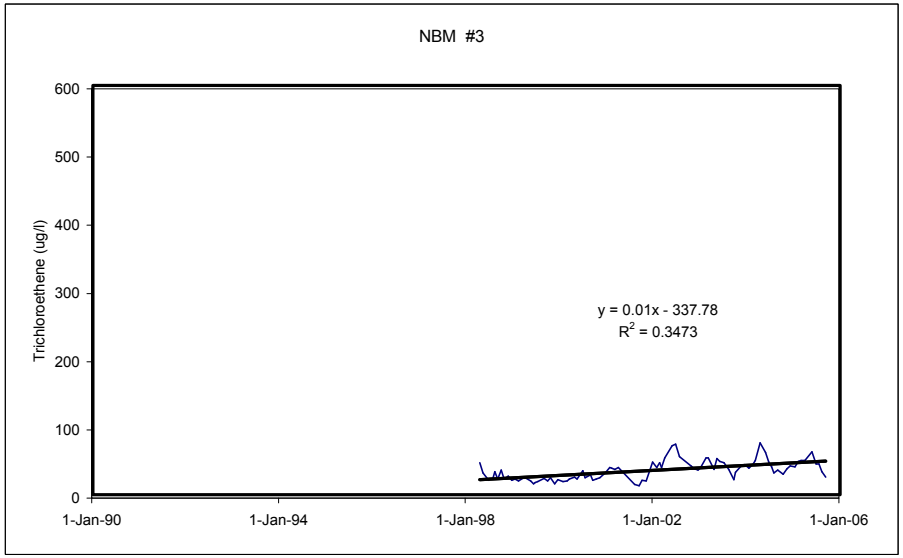
Total VOCs (ug/L)	Avg Total VOCs (ug/L)	Area (m2)	Areal Conc (ug*m2/L)
1 to 5	3	111868	335604
5 to 10	7.5	81725	612940
10 to 50	30	323683	9710493
	Sum	517277	10659037

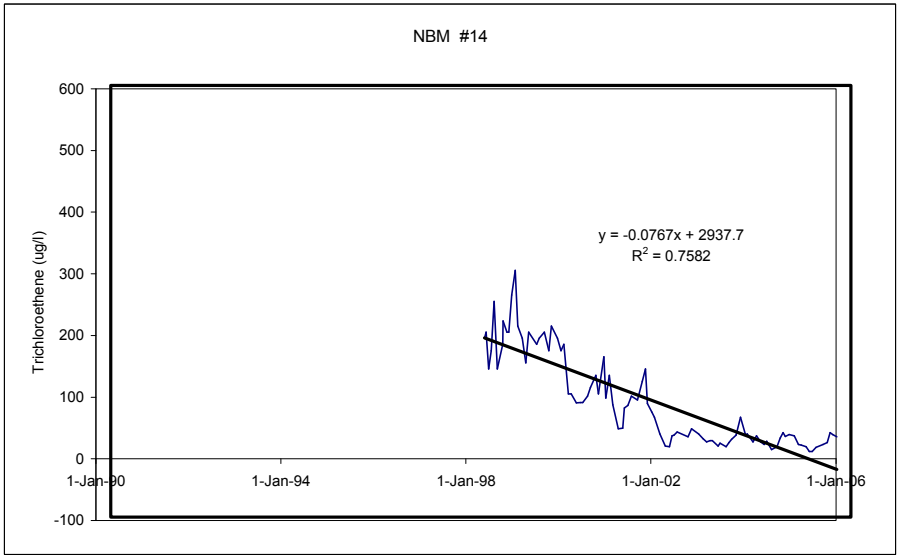
Area Wtd Conc	21	ug/L

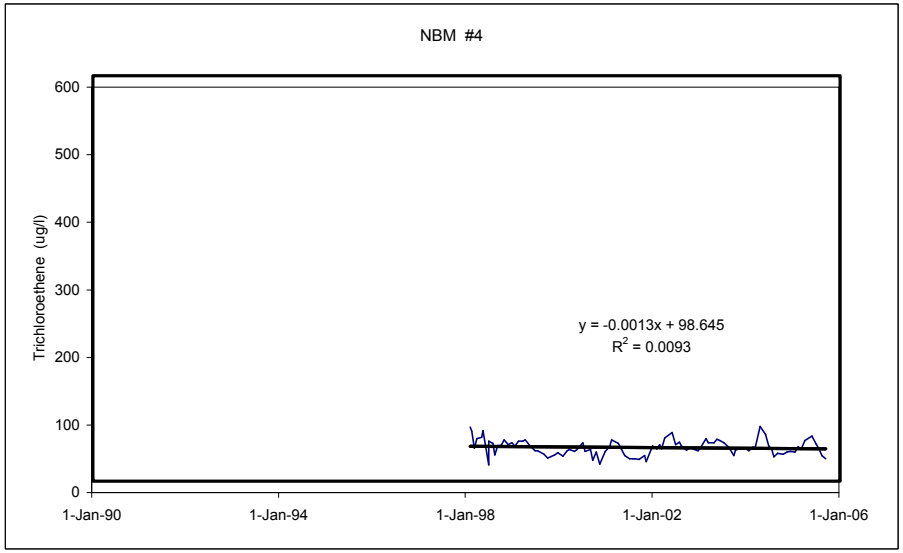
D.2.5 Group 6 New Brighton Municipal Well Regression Analysis

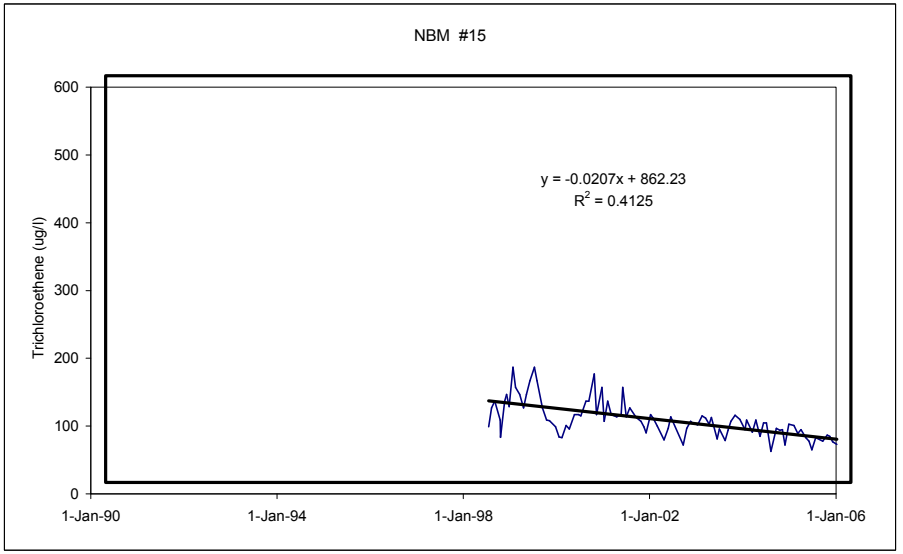
NEW BRIGHTON MUNICIPAL WELLS: Regression Analysis Since 1998: TRICHLOROETHENE

TWIN CITIES ARMY AMMUNITION PLANT



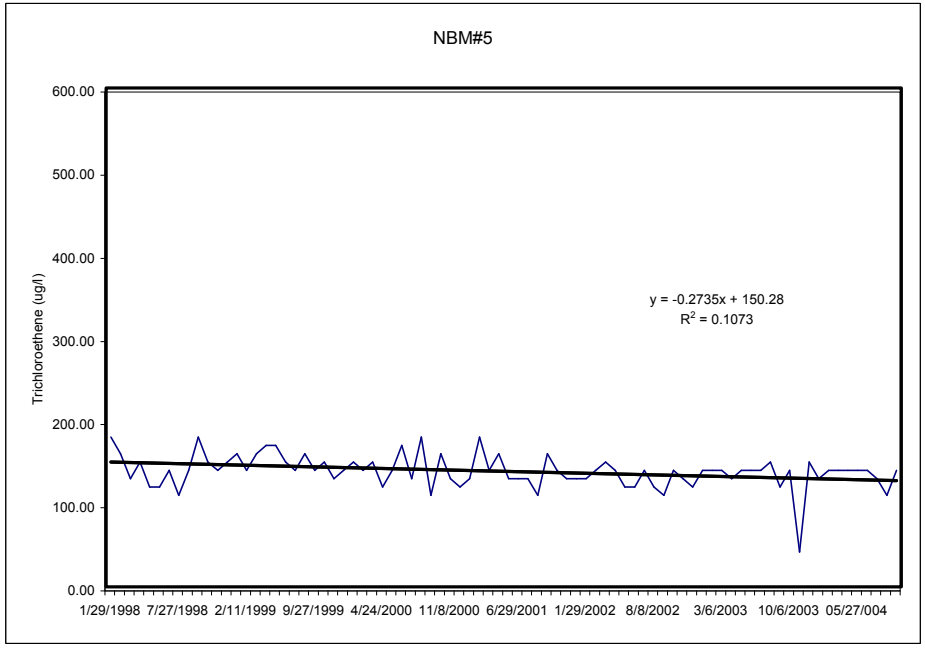


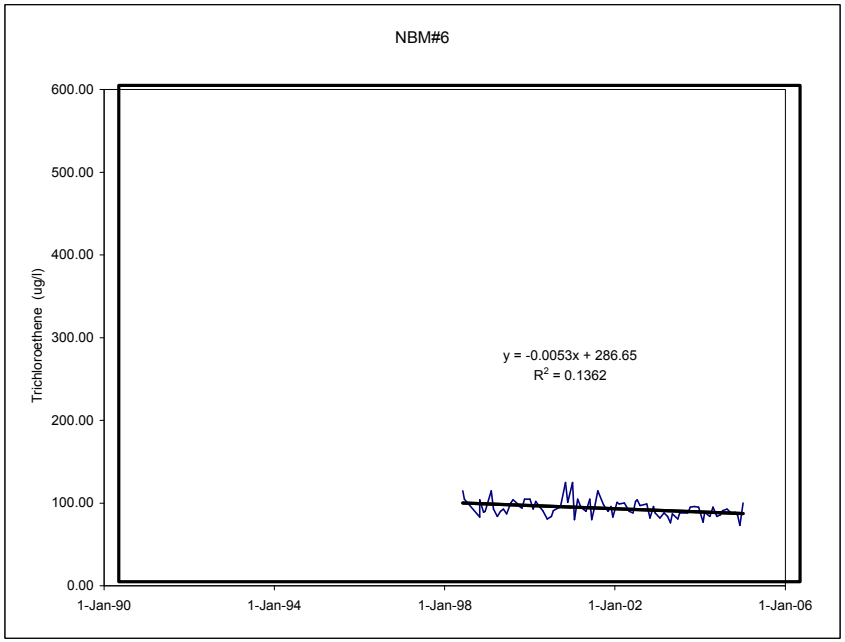




NEW BRIGHTON MUNICIPAL WELLS: Regression Analysis Since 1998: TRICHLOROETHENE

TWIN CITIES ARMY AMMUNITION PLANT





D.3 Site C Analytical and Water Level Database

Appendix E

TCAAP Well Inventory Update, FY 2005

APPENDIX E
TCAAP WELL INVENTORY UPDATE

FISCAL YEAR 2005

Purpose

The purpose of well inventory is to identify wells that have been impacted by contaminants from TCAAP or that could potentially be impacted by TCAAP contaminants.

Background

Developing and maintaining the well inventory is a process that was initiated in 1991, with the work efforts documented in several update reports since that time. Beginning in FY 1999, the update reporting was incorporated into the Annual Performance Reports.

The well inventory "study area," as defined by the Minnesota Pollution Control Agency, is shown on Figure E-1, and coincides with the Minnesota Department of Health (MDH) Special Well Construction Area.

The aquifers of concern are defined by the 1 µg/l trichloroethene contour for the Unit 3 and Unit 4 aquifers, and the 1 µg/l cis-1,2-dichloroethene contour for the Unit 1 aquifer north of TCAAP.

The "area of concern" for the Unit 3 and Unit 4 aquifers is created by adding a quarter mile buffer area outside the 1 µg/l trichloroethene contour. The area of concern for the Unit 3 and Unit 4 aquifers is shown on Figure E-2.

The area of concern for the Unit 1 aquifer north of TCAAP is delineated by city streets. The area of concern for the Unit 1 aquifer is shown on Figure E-3.

Wells within the study area are categorized based on location, depth/aquifer, and use. Well categories for the well inventory are described in Table E-1.

Program Requirements

The well inventory program requirements have evolved over time, with changes documented through the update reports. A flowchart that describes the annual requirements for maintaining the TCAAP well inventory database is shown on Figure E-4. Requirements are summarized below.

At the beginning of each federal fiscal year, an updated version of the MDH database of wells in the study area is acquired. The MDH database consists of three lists:

1. Wells constructed since 1990 (generated through drillers submitting Water Well Records);
2. Sealed wells (generated through drillers submitting Well Sealing Records); and
3. Wells disclosed through property transfer.

Since the MDH database is comprehensive for all time, the database is screened to extract the new information that was added since the previous update.

With the new MDH information, the TCAAP well inventory database is updated by recategorizing wells, as necessary, and by adding any new wells that are within the study area. Any new wells found in Categories 1a, 1b, 1c, 2a, 2b, 2c, or 4a are targeted for sampling in that fiscal year; however, an attempt to reclassify any new category 4a wells will be made prior to sampling. Wells that are not sampled due to non-responsive well owners are targeted for sampling in the next major sampling event.

Category 4 wells are those with an unknown depth or unknown location, or both. Ideally, there should be no wells in Category 4. Each year, an attempt is made to reclassify Category 4 wells into one of the other categories. This is accomplished through phone calls, letters, and/or site visits in an attempt to obtain additional information. Any wells which are re-classified as Category 1a, 1b, 1c, 2a, 2b, or 2c are targeted for sampling in that fiscal year.

"Major" well inventory sampling events occur every four years and are shown in Appendix A.1. The major sampling events are scheduled to coincide with the biennial sampling events for performance purposes as delineated in the APR (FY 2005 was a major well inventory sampling event). For each major event, all wells in Categories 1a, 1b, 1c, 2a, 2b, 2c, and 4a are targeted for sampling. After every sampling event, each well owner is mailed a copy of their testing results. Wells that are not sampled due to non-responsive well owners are targeted for sampling in the next major sampling event.

For each sampling event, if any well has a detection which exceeds the applicable TCAAP groundwater cleanup level for that contaminant (or an additivity of 1.0, similar to the MDH Hazard Index calculation), the well is evaluated using the flow chart presented in Figure E-4 to determine the timing of additional sampling. Wells that are used for drinking water are sampled again within one month of data validation. Wells that are not used for drinking water, but have possible contact exposure risks, are sampled the next fiscal year. If a cleanup level exceedance is confirmed (two consecutive events), and the contaminant concentrations in the well are proportional to contaminant concentrations of the TCAAP OU1 plume, the Army offers to abandon the well and/or provide an alternate water supply.

The annual reporting requirements for the TCAAP well inventory will include:

- A list of any wells found or reclassified.
- Analytical results and a summary of sampling efforts from that fiscal year.
- Recommendations for participation in the Well Abandonment/Alternate Water Supply Program.
- An updated well inventory database that lists wells by well category.
- An updated database listing water quality of wells.

FY 2005 Update

The updated MDH database was provided to TWISS on November 9, 2004. MDH generates the database from specific Township, Range, and Section data. This comprehensive database was screened to extract the lists of wells that were constructed, disclosed, or sealed between October 1, 2003 and September 30, 2004. Further investigative efforts were primarily focused on determining each well's location (inside or outside the study area and/or area of concern), status (active, inactive, or sealed), and water use (supply/non-supply).

Newly constructed active and inactive wells, and wells of unknown status that were determined to be located within the study area, are presented in Table E-3. With the exception of two wells, all newly constructed wells were monitoring wells and were classified into Category 6. The remaining two wells were located outside of the area of concern and were classified into Category 3.

Disclosed wells that were identified as being in use, inactive, or of unknown status (but not sealed) and that were determined to be located within the study area are identified in Table E-4. Most of these wells were Category 3 wells that required no further investigation. Five of these wells were further investigated, with the following results:

- The well located at 2816 St. Anthony Blvd is an inactive supply well located inside the 1 µg/l TCE contour. According to the current owner, the well is inoperable, has not been used in several years. The well is classified as Category 4a due to the lack of information on its depth.
- The well located at 4439 Old Hwy 10 is located inside the buffer lines but outside the 1 µg/l TCE contour. The owner did not respond to numerous contacting efforts, including a hand-delivered letter. The well is classified as Category 4a due to the lack of information on its depth.
- The well located at 2271 7th Street NW and the well located at 2600 29th Ave NE were site investigated and the owner's reported no well on their property. The wells are classified as Category 5, field checked and not located.
- The well located at 401 County Rd E2 West was found to be a monitoring well, Category 6.

Sealed wells were found by reviewing the MDH sealed well list, by screening the MDH disclosed and new construction lists (which also contain sealed wells), and by talking with well owners. Wells identified as sealed are shown in Table E-5. Disclosed wells that were located

within the area of concern and that the MDH identified as having a change in status from active or inactive to sealed were further investigated for confirmation of their sealed status. Any wells that were already in the TCAAP well inventory database that the MDH identified as having a change in status from active or inactive to sealed are shown in Table E-5 with strikeouts through the old well category entry. Wells identified as sealed in the MDH database updates were assigned to Category 7a (documented as sealed/abandoned). Wells that were determined to be sealed through conversations with well owners were assigned to Category 7b (undocumented as sealed, or improperly abandoned).

The FY 2004 APR monitoring plan identified twenty-eight Category 1a, 1b, 1c, 2a, 2b, and 2c wells to be sampled during the FY 2005 well inventory "major" sampling event. Along with these wells, seventeen Category 1d and 2d wells, and forty-six Category 4 wells were field studied in FY 2005. This field study was accomplished through telephone calls, letters, and/or site visits in an attempt to sample the wells or obtain additional information. An attempt was made to reclassify Category 4 wells that were in the existing TCAAP well inventory database into one of the other categories. Contact information was updated, eighteen wells were re-categorized, and one well was deleted from the list as it was found to be located outside of the study area. A field investigation and sampling summary is included in Table E-6.

Through the FY 2005 well inventory update effort, sixteen wells were sampled. The wells of concern that were not sampled were either found to be abandoned, non-existent, inoperable, or the well owners were not responsive to requests for access to sample. The analytical data from the FY 2005 sampling effort are summarized in Table E-2. The location of the wells sampled in FY 2005 is shown on Figure E-5. The reason for differing analyte lists on Table E-2 was a laboratory error. The wells were supposed to be sampled for the longer list, however, the lab analyzed a number of samples for only the TCAAP list of VOCs (similar to the OU1 monitoring wells). The purpose of the longer list is to check for potential non-TCAAP related contamination that may impact the Hazard Index calculation for evaluating synergistic effects of chemicals. For the wells where the analytical mistake was made, the results for the TCAAP-related contaminants were either non-detect or so low that even if other VOCs were detected, it would not change the decisions made with respect to alternate water supply or well abandonment. The longer analyte list will be used for future sampling events.

Ten wells did not have any detections of TCAAP contaminants and six wells had one or more detections of TCAAP contaminants. None of the sampled wells had detections of TCAAP contaminants above their respective OU1 cleanup levels. One well, 249191, was inadvertently sampled. This "Category 4a" well has been on the well inventory database since 1997 but was not sampled until 2005. Well 249191 is located outside of the study area and will be deleted from the well inventory database.

Information contained in Tables E-3 through E-6 has been updated in the well inventory database (Filename "Well_Inv", an Excel file included on this CD-ROM).

Recommendations

- At this time no wells are recommended for the Army to offer alternate water supply or well abandonment.
- Wells to be sampled during the next sampling event in FY 2006 are:
    - Any previously undiscovered wells determined to be in Categories 1a, 1b, 1c, 2a, 2b, 2c, or 4a based on the FY 2006 review of the MDH database.
    - Any Category 4 wells that are determined, from further investigation, to be in Category 1a, 1b, 1c, 2a, 2b, or 2c.
- The next "major" well inventory sampling event will occur in FY 2009.

TABLE E-1
WELL INVENTORY CATEGORY DESCRIPTIONS

Category	*Subcategory*	*Explanation*
1		Water supply wells screened in an aquifer of concern, inside the 1 μg/l contour. Wells are divided into the following subcategories:
	1a	• Drinking water well
	1b	• Nondrinking but possible contact water
	1c	• Nondrinking, noncontact water
	1d	• Well is inoperable or has not been used for several years
	1e	• Well for which the owner has refused (or has been unresponsive to) an Army offer for abandonment, or for which the water use has been deemed acceptable
2		Water supply wells in an area of concern, inside the buffer lines, but outside the 1 μg/l contour, screened in an aquifer of concern. Wells are divided into the following subcategories:
	2a	• Drinking water well
	2b	• Nondrinking but possible contact water
	2c	• Nondrinking, noncontact water
	2d	• Well is inoperable or has not been used for several years
3		Water supply wells within the Study Area that are either outside the area of concern, or are within the area of concern but are not screened in an aquifer of concern.
4		Water supply wells with missing information, divided into the following subcategories:
	4a	• Unknown depth or aquifer, but located in the area of concern.
	4b	• Unknown location, but potentially located within the Study Area. Wells with both an unknown depth and an unknown location are included in 4b.
5		Wells that are in the study area, but that have been field checked and not located. No further action is recommended for these wells.
6		Nonsupply wells (primarily monitoring wells).
7		Sealed or abandoned wells. Wells are divided into the following subcategories:
	7a	• Documented as sealed/abandoned
	7b	• Undocumented as sealed, or improperly abandoned

TABLE E-2

WELL INVENTORY SAMPLING RESULTS
Fiscal Year 2005

Unique Number:	107405	127537	200076	200176	200176 D	234421	236439	249007	249191	249608		
Address:	4355 Hwy 10	1400 Old Hwy 8	2375 Terminal Rd	2236 Myrtle Ave	2236 Myrtle Ave	2151 Mustang Dr	2250 Wabash Ave	4453 Hwy 10	1651 Millwood Ave	2520 Larpenteur Ave		
VOCs (µg/l)	6/22/05	6/24/05	6/28/05	6/24/05	6/24/05	6/16/05	6/24/05	6/16/05	6/27/05	6/16/05	OU1 Cleanup Level[1]	MDH HRL[2]
OU1 Chemicals of Concern:												
Trichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	JP 0.95	<1	5	
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	JP 0.31	<1	6	
cis-1,2-Dichloroethene	<1	<1	<1	JP 0.21	JP 0.27	<1	2.1	<1	1.5	<1	70	
1,1,1-Trichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	200	
1,1,2-Trichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	
1,1-Dichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	JP 0.45	<1	70	
Other Analytes:												
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		2
1,2-Dichloroethane	<1	<1	JP 0.56 (JS136)	<1	<1	---	<1	---	<1	---		4
1,2-Dichloropropane	<1	<1	<1	<1	<1	---	<1	---	<1	---		5
2-Butanone	<5	<5	<5	<5	<5	---	<5	---	<5	---		4000
2-Hexanone	<5	<5	<5	<5	<5	---	<5	---	<5	---		(Note 3)
4-Methyl-2-Pentanone	<5	<5	<5	<5	<5	---	<5	---	<5	---		300
Acetone	<5 (RC0.042)	<5 (RC0.042)	<5	<5 (RC0.042)	<5 (RC0.042)	---	<5 (RC0.042)	---	<5	---		700
Benzene	<1	<1	<1	<1	<1	---	<1	---	<1	---		10
Bromodichloromethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		6
Bromoform	<1	<1	<1	<1	<1	---	<1	---	<1	---		40
Bromomethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		10
Carbon Disulfide	<1	<1	<1	<1	<1	---	<1	---	<1	---		700
Carbon Tetrachloride	<1	<1	<1	<1	<1	---	<1	---	<1	---		3
Chlorobenzene	<1	<1	<1	<1	<1	---	<1	---	<1	---		100
Chloroethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		280
Chloroform	<1	<1	<1	<1	<1	---	<1	---	<1	---		60
Chloromethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		80
cis-1,3-Dichloropropene	<1	<1	<1	<1	<1	---	<1	---	<1	---		2
Dibromochloromethane	<1	<1	<1	<1	<1	---	<1	---	<1	---		80
Ethylbenzene	<1	<1	<1	<1	<1	---	<1	---	<1	---		700
m&p-Xylene	<2	<2	<2	<2	<2	---	<2	---	<2	---		10,000
Methylene Chloride	<1	<1	<1	<1	<1	---	<1	---	<1	---		50
o-Xylene	<1	<1	<1	<1	<1	---	<1	---	<1	---		10,000
Styrene	<1	<1	<1	<1	<1	---	<1	---	<1	---		(Note 3)
Tetrachloroethene	<1	<1	<1	<1	<1	---	<1	---	<1	---		7
Toluene	<1	<1	<1	<1	<1	---	<1	---	<1	---		1000
trans-1,2-Dichloroethene	<1	<1	<1	<1	<1	---	<1	---	<1	---		100
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1	---	<1	---	<1	---		2
Vinyl Chloride	<1	<1	<1	<1	<1	---	<1	---	<1	---		0.2

TABLE E-2

WELL INVENTORY SAMPLING RESULTS
Fiscal Year 2005

Unique Number:	249632	509052	537801	756236	756236 D	2935HWY8	2935HWY8 D	S00437	S00444		
Address:	2301 N Upland Crest NE	2025 E River Rd	4759 Old Hwy 8	150 26th Ave SE	150 26th Ave SE	2935 Old Hwy 8	2935 Old Hwy 8	3171 5th St SE	Ontario & E River Rd		
VOCs (µg/l)	6/22/05	6/28/05	6/24/05	6/23/05	6/23/05	6/22/05	6/22/05	6/23/05	6/16/05	OU1 Cleanup Level[1]	MDH HRL[2]
OU1 Chemicals of Concern:											
Trichloroethene	<1	<1	<1	JP 0.41	JP 0.36	<1	<1	<1	JP 0.32	5	
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	<1	6	
cis-1,2-Dichloroethene	<1	<1	<1	JP 0.28	JP 0.32	<1	<1	<1	JP 0.74	70	
1,1,1-Trichloroethane	<1	<1	JP 0.30	<1	<1	<1	<1	<1	<1	200	
1,1,2-Trichloroethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	
1,1-Dichloroethane	<1	<1	JP 0.34	<1	<1	<1	<1	<1	<1	70	
Other Analytes:											
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1	<1	<1	<1	<1	---		2
1,2-Dichloroethane	<1	<1	<1	<1	JP 0.43	<1	<1	<1	---		4
1,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	---		5
2-Butanone	<5	<5	<5	<5	<5	<5	<5	<5	---		4000
2-Hexanone	<5	<5	<5	<5	<5	<5	<5	<5	---		(Note 3)
4-Methyl-2-Pentanone	<5	<5	<5	<5	<5	<5	<5	<5	---		300
Acetone	<5 (RC0.042)	<5	91 (JC0.042)	<5 (RC0.042)	<5 (RC0.042)	<5 (RC0.042)	<5 (RC0.042)	<5 (RC0.042)	---		700
Benzene	<1	<1	<1	<1	<1	<1	<1	<1	---		10
Bromodichloromethane	<1	<1	<1	<1	<1	<1	<1	<1	---		6
Bromoform	<1	<1	<1	<1	<1	<1	<1	<1	---		40
Bromomethane	<1	<1	<1	<1	<1	<1	<1	<1	---		10
Carbon Disulfide	<1	<1	<1	<1	<1	<1	<1	<1	---		700
Carbon Tetrachloride	<1	<1	<1	<1	<1	<1	<1	<1	---		3
Chlorobenzene	<1	<1	<1	<1	<1	<1	<1	<1	---		100
Chloroethane	<1	<1	<1	<1	<1	<1	<1	<1	---		280
Chloroform	<1	<1	<1	<1	<1	<1	<1	<1	---		60
Chloromethane	<1	<1	<1	<1	<1	<1	<1	<1	---		80
cis-1,3-Dichloropropene	<1	<1	<1	<1	<1	<1	<1	<1	---		2
Dibromochloromethane	<1	<1	<1	<1	<1	<1	<1	<1	---		80
Ethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	---		700
m&p-Xylene	<2	<2	<2	<2	<2	<2	<2	<2	---		10,000
Methylene Chloride	<1	<1	120	<1	<1	<1	<1	<1	---		50
o-Xylene	<1	<1	<1	<1	<1	<1	<1	<1	---		10,000
Styrene	<1	<1	<1	<1	<1	<1	<1	<1	---		(Note 3)
Tetrachloroethene	<1	<1	<1	<1	<1	<1	<1	<1	---		7
Toluene	<1	<1	6.1	<1	<1	<1	<1	<1	---		1000
trans-1,2-Dichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	---		100
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1	<1	<1	<1	---		2
Vinyl Chloride	<1	<1	<1	<1	<1	<1	<1	<1	---		0.2

Notes:

(1) Cleanup levels for OU1 deep groundwater are from page 18 of the OU1 ROD.

(2) Minnesota Department of Health's Health Risk Limits (HRLs), for reference.

(3) No HRL has been established for this analyte.

D Duplicate sample.

JC The response factor during continuing calibration did not meet the QC limit (the response factor is listed after "JC"). Results should be considered estimated.

JP The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

JS The percent recovery for the matrix spike was above the upper QC limit (the percent recovery is listed after "JS"). The sample result could be biased high.

RC Rejected data. The response factor during continuing calibration did not meet the QC limit (the response factor is listed after "RC").

TABLE E-3
CONSTRUCTED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Use	Depth	Date Drilled
661544	3	American Freightways, Inc.	2323 Terminal Rd	Roseville			
705722	3	New Heights Development, LLC.	4747 Central Ave NE	Columbia Heights			
439233	6	Anoka County Farm Service Coop	1427 Old Hwy 8	New Brighton	Monitoring	20	
439234	6	Anoka County Farm Service Coop	1427 Old Hwy 8	New Brighton	Monitoring	20	
677434	6	U of M	1715 5th St SE	Minneapolis	Monitoring	14	12/2003
699643	6	CSM Corporation	0 Westgate Dr	St. Paul	Monitoring	21	11/2003
699644	6	CSM Corporation	0 Westgate Dr	St. Paul	Monitoring	21	11/2003
699645	6	CSM Corporation	0 Westgate Dr	St. Paul	Monitoring	65	11/2003
699646	6	CSM Corporation	0 Westgate Dr	St. Paul	Monitoring	22	11/2003
699647	6	CSM Corporation	0 Westgate Dr	St. Paul	Monitoring	66	11/2003
699648	6	CSM Corporation	526 Malcolm Ave SE	Minneapolis	Monitoring	50	11/2003
699649	6	CSM Corporation	526 Malcolm Ave SE	Minneapolis	Monitoring	57	11/2003
701932	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	48	10/2003
701945	6	Canadian Pacific Railway	2730 Central Ave NE	Minneapolis	Monitoring	240	10/2003
701951	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	241	12/2003
701964	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	240	04/2004
701965	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	240	04/2004
701967	6	Columbia Heights, City of	317 37th Ave	Columbia Heights	Monitoring	94	04/2004
701972	6	Canadian Pacific Railway	2418 Washington St NE	Minneapolis	Monitoring	175	04/2004
702835	6	Kunz Oil Co.	2280 County Road I West	Mounds View	Monitoring	17	12/2003
702838	6	Roseville, City of	2958 Cleveland Ave N	Roseville	Monitoring	80	01/2004
702839	6	Roseville, City of	2814 Cleveland Ave N	Roseville	Monitoring	57	01/2004
702840	6	Roseville, City of	2680 Prior Ave N	Roseville	Monitoring	50	01/2004
702843	6	Roseville, City of	0 Mound Ridge Rd	Roseville	Monitoring	67	01/2004
704817	6	U of M	2221 University Ave SE	Minneapolis	Monitoring	23	03/2004
704818	6	U of M	2221 University Ave SE	Minneapolis	Monitoring	56	03/2004
704819	6	U of M	2221 University Ave SE	Minneapolis	Monitoring	23	03/2004
704820	6	U of M	2221 University Ave SE	Minneapolis	Monitoring	20	03/2004
705472	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	44	03/2004
705473	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	43	03/2004
705483	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	43	03/2004
705484	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	44	04/2004
705485	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	44	03/2004
705486	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	42	03/2004
705494	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	194	04/2004
705497	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	43	04/2004
706043	6	US Army	0 Long Lake Regional Park	New Brighton	Monitoring	287	06/2004
706044	6	US Army	1356 Long Lake Rd	New Brighton	Monitoring	285	06/2004
706045	6	US Army	1950 Old Hwy 8 NW	New Brighton	Monitoring	305	06/2004
709250	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	197	04/2004
709253	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	196	03/2004
709254	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	62	04/2004
709255	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	42	04/2004
709256	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	139	04/2004
710253	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	44	04/2004
710254	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	58	04/2004
710255	6	Canadian Pacific Railway	1001 29th Ave NE	Minneapolis	Monitoring	240	05/2004
713940	6	Canadian Pacific Railway	2622 Taylor St NE	Minneapolis	Monitoring	247	07/2004
713941	6	Canadian Pacific Railway	2622 Taylor St NE	Minneapolis	Monitoring	150	07/2004
716453	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	239	08/2004
718150	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	239	08/2004
718151	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	43	09/2004
718152	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	36	09/2004
718153	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	135	09/2004
718154	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	240	09/2004
718155	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	239	09/2004
718156	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	138	09/2004
718157	6	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Monitoring	36	09/2004
719462	6	Brenntag Great Lake, LLC	2340 Rose Place	Roseville	Monitoring	90	
719463	6	Brenntag Great Lake, LLC	2340 Rose Place	Roseville	Monitoring	90	
719464	6	Brenntag Great Lake, LLC	2340 Rose Place	Roseville	Monitoring	90	
719465	6	Brenntag Great Lake, LLC	2340 Rose Place	Roseville	Monitoring	90	

TABLE E-4
WELLS DISCLOSED THROUGH PROPERTY TRANSFER

Unique Number	Category	Last Name or Business Name	Street	City	Use	Status	Date Sealed	Depth	Aquifer	Date Drilled
	3	CSM Investors Li, Inc.	Westgate Dr	St. Paul		In Use				
	3	Juaire	1163 Norton Ave NE	Fridley		In Use				
	3	~~Wrech~~ Rempfer	1599 County Road I	Shoreview		In Use		110		
	3	Aysola	1611 Oak Ave	St. Paul		In Use				
	3	~~Hanglid~~ Yang	1663 Hillview Rd	Shoreview	Domestic	In Use		136		1977
	3	~~Imes, White~~ Sullivan	1687 Hillview Rd	Shoreview	Domestic	In Use		40		
	3	Sandberg	1698 Oakwood Dr	Shoreview		In Use				
	3	Pomeroy	1703 Lake Valentine Rd	Arden Hills		In Use				
	3	Washburn	1741 Lois Dr	Shoreview		In Use				
	3	Lewis	1761 Terrace Dr	Shoreview		In Use				
	3	Vossen	1768 Terrace Dr	Shoreview		In Use				
	3	~~Tate~~ Huang	1779 Cedar Dr	New Brighton		Inactive				
	3	Wacker	1840 Gramsie Rd	Arden Hills		In Use				
	3	Marcatto	1853 Stowe Ave	Arden Hills		In Use				
	3	Sarantos	1927 Autumn St	Falcon Heights		Not In Use				
	3	United Properties Investment, LLC	1984 County Road C2	Roseville		In Use				
	3	Hruby	1986 Prior Ave N	Roseville		In Use				
	3	Pouladian	2030 Eldridge Ave W	Roseville		Unknown				
	3	Cox Built, Inc.	2185 County Road B West	Roseville		In Use				
	3	Salour	2470 Ridge Lane	New Brighton		Not In Use				
	3	Jacob Holdings Of Long Lake Road, LLC	2755 Long Lake Rd	Roseville		In Use				
	3	Sulander	3040 Bronson Dr	Mounds View		In Use				
	3	Fox	3777 New Brighton Rd	Arden Hills		Not In Use				
	3	Paloma Partners, LLC	401 Johnson St	Minneapolis		In Use				
	3	Stone Labs, LLC	419 29th Ave SE	Minneapolis		In Use				
	3	Wulff, Li	4337 Old Hwy 10	Arden Hills		Not In Use				
	3	Blair	4345 Old Hwy 10	Arden Hills		In Use				
	3	Trapp	4350 Hamline Ave N	Arden Hills		In Use				
	3	Tec Real Estate, Inc.	4920 Tyler St NE	Columbia Heights		Not In Use				
	3	Mylchreest	5053 Red Oak Dr	Mounds View		In Use				
	3	Ghebre	5206 Red Oak Dr	Mounds View		In Use				
	3	Westberg	5601 Schutta Rd	Shoreview		In Use				
	3	Lyndale Terminal Co.	5695 Hackmann Ave NE	Fridley		Unknown				
	3	Raza	6423 Pierce St NE	Fridley		In Use				
	3	Bultman	6537 Central Ave	Fridley		In Use				
	4a	Amundsen	2816 St. Anthony Blvd	St. Anthony		Not In Use				
	4a	Olson	4439 Old Hwy 10	Arden Hills		In Use				
	5	Surface	2271 7th Street NW	New Brighton		Inactive				
	5	Serie	2600 29th Ave NE	St. Anthony		Inactive				
	6	Donatelle Associates, LLC	401 County Rd E2 West	New Brighton	Monitoring	Unknown				

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
	7a				Sealed	6/14/2004
	7a	Kulangaroth			Sealed	7/15/2004
	7a	Bergmanis	1531 Stinson Blvd	New Brighton	Sealed	5/17/2004
	7a	Prozinski	1637 Longview Dr	New Brighton	Sealed	4/16/2004
	7a	Ninnemann	1715 Lois Dr	Shoreview	Sealed	10/27/2003
	7a	Spector	1770 Glenview Ave	Arden Hills	Sealed	11/14/2003
	7a	Tran	1786 Tatum St	Falcon Heights	Sealed	7/19/2004
	7a	Scroggins	1808 Tatum St	Falcon Heights	Sealed	10/23/2003
	7a	Vostlius	1874 Shryer Ave	Roseville	Sealed	10/31/2003
	7a	Hennepin County HRA	1900 Central Ave NE	Minneapolis	Sealed	4/14/2004
	7a	Mcclay	1905 Sunnyside Terrace	New Brighton	Sealed	7/19/2004
	7a	Rocha	1953 10th St NW	New Brighton	Sealed	2/17/2004
	7a	Gruetzman	1967 Glen Paul Ave	Arden Hills	Sealed	7/14/2004
	7a	Berglund	1975 Malvern St	Lauderdale	Sealed	10/23/2003
	7a	Johnstone	2091 Fairways Lane	Roseville	Sealed	10/31/2003
	7a	Bleskachek	2150 Belle Lane	Mounds View	Sealed	7/14/2004
	7a	Wendt Realstan Title	2223 County Road B West	Roseville	Sealed	10/23/2003
	7a	Xiong	2243 Lambert Ave	Mounds View	Sealed	5/5/2004
	7a	Chilefone	2249 St. Stephens St	Roseville	Sealed	9/29/2004
	7a	Lau	2260 Hwy 36 West	Roseville	Sealed	2/4/2004
	7a	Nygaard	2504 14th Ave	New Brighton	Sealed	3/17/2004
	7a	Windram	2577 County Road H	New Brighton	Sealed	9/8/2004
	7a	Goldstein	2805 Silver Lane NE	St. Anthony	Sealed	8/25/2004
	7a	Lundquist	2849 Browson Dr	Mounds View	Sealed	2/2/2004
	7a	Stueve	2908 30th Ave NE	St. Anthony	Sealed	1/6/2004
	7a	Radil	3728 Hayes St NE	Columbia Heights	Sealed	1/6/2004
	7a	Redwine	4647 Hwy 10	Arden Hills	Sealed	5/17/2004
	7a	Schlaak	5065 Greenwood Dr	Mounds View	Sealed	5/5/2004
	7a	Casperson	6531 McKinley St NE	Fridley	Sealed	10/22/2003
	7a	Mekic	7092 Pleasant View Dr	Mounds View	Sealed	10/31/2003
180916	7a	General Mills	1008 19th Ave SE	Minneapolis	Sealed	8/31/2004
180917	7a	General Mills	1000 18th Ave SE	Minneapolis	Sealed	8/31/2004
191905	7a	General Mills	885 21st Ave SE	Minneapolis	Sealed	8/31/2004
191912	7a	Boise Cascade Corporation	7000 Central Ave NE	Fridley	Sealed	
196721	7a	General Mills	2010 E Hennepin Ave	Minneapolis	Sealed	11/21/2003
200818	7a	Renaissance Properties	2633 4th St SE	Minneapolis	Sealed	12/29/2003
225905	7a	Unisys Corporation	0 Walnut & Terminal Rd.	Roseville	Sealed	6/3/2004
225906	7a	Unisys Corporation	0 Walnut & Terminal Rd.	Roseville	Sealed	5/24/2004
234353	7a	MN PCA	2087 Old Hwy 8	New Brighton	Sealed	
235397	7a	Boise Cascade Corporation	7000 Central Ave NE	Fridley	Sealed	
424059	7a	US Army	4700 Hwy 10	Arden Hills	Sealed	

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
424061	7a	US Army	4700 Hwy 10	Arden Hills	Sealed	
424062	7a	US Army	4700 Hwy 10	Arden Hills	Sealed	02020110
436331	7a	Exxon Mobil Cororation	606 Vandalia St	St. Paul	Sealed	10/10/2003
462115	7a	Hassett	2300 Territorial Ave	Minneapolis	Sealed	
462310	7a	Tesoro Refining And Marketing Company	2288 County Road C West	Roseville	Sealed	
462317	7a	Tesoro Refining And Marketing Company	2288 County Road C West	Roseville	Sealed	
467180	7a	Chicago & Northwestern Transportation Co	2000 Elm St SE	Minneapolis	Sealed	
468793	7a	Total Petroleum, Inc.	5300 Central Ave	Fridley	Sealed	
468794	7a	Total Petroleum, Inc.	5300 Central Ave	Fridley	Sealed	
477249	7a	Reichhold Chemicals, Inc.	525 25th Ave SE	Minneapolis	Sealed	
477250	7a	Reichhold Chemicals, Inc.	525 25th Ave SE	Minneapolis	Sealed	
477865	7a	U.S. West Communications	100 9th Ave SW	New Brighton	Sealed	
477866	7a	U.S. West Communications	100 9th Ave SW	New Brighton	Sealed	
477867	7a	U.S. West Communications	100 9th Ave SW	New Brighton	Sealed	
477892	7a	Overnite Transporation Company	400 1st St SW	New Brighton	Sealed	
477893	7a	Overnite Transporation Company	400 1st St SW	New Brighton	Sealed	
477894	7a	Overnite Transporation Company	400 1st St SW	New Brighton	Sealed	
478237	7a	US EPA	400 5th Ave NW	New Brighton	Sealed	
478238	7a	US EPA	400 5th Ave NW	New Brighton	Sealed	
478241	7a	US EPA	400 5th Ave NW	New Brighton	Sealed	
478983	7a	Retail Foods of MN	2390 Hwy 10	Mounds View	Sealed	
479596	7a	Dana Corporation	0	Minneapolis	Sealed	3/29/2004
480649	7a	USPS, Facilities Service Office	1255 Old Highway 8	New Brighton	Sealed	
480650	7a	USPS, Facilities Service Office	1255 Old Highway 8	New Brighton	Sealed	
480651	7a	USPS, Facilities Service Office	1255 Old Highway 8	New Brighton	Sealed	
480958	7a	CSM Corporation	2140 County Road C West	Roseville	Sealed	10/13/2003
480959	7a	CSM Corporation	2140 County Road C West	Roseville	Sealed	10/13/2003
483834	7a	Drayna	403 8th Ave NW	New Brighton	Sealed	
487711	7a	City of New Brighton	845 5th Ave NW	New Brighton	Sealed	
487712	7a	City of New Brighton	845 5th Ave NW	New Brighton	Sealed	
487713	7a	City of New Brighton	845 5th Ave NW	New Brighton	Sealed	
487714	7a	City of New Brighton	845 5th Ave NW	New Brighton	Sealed	
491918	7a	Paper Calmenson and Company	0 Hwy 280 and County Road B	Roseville	Sealed	
491919	7a	Paper Calmenson and Company	0 Hwy 280 and County Road B	Roseville	Sealed	
491920	7a	Paper Calmenson and Company	0 Hwy 280 and County Road B	Roseville	Sealed	
491921	7a	Paper Calmenson and Company	0 Hwy 280 and County Road B	Roseville	Sealed	
491922	7a	Paper Calmenson and Company	0 Hwy 280 and County Road B	Roseville	Sealed	
491937	7a	Unocal Corporation	0 Franklin & Thornton St NE	Minneapolis	Sealed	
491938	7a	Unocal Corporation	0 Franklin & Thornton St NE	Minneapolis	Sealed	
492770	7a	Amoco Oil Company - Tank Farm	2288 County Road C West	Roseville	Sealed	
492771	7a	Amoco Oil Company - Tank Farm	2288 County Road C West	Roseville	Sealed	

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
495211	7a	Sooline Railroad Company	0	Minneapolis	Sealed	
496250	7a	Jrs Associates	1015 Essex St SE	Minneapolis	Sealed	
498079	7a	Lindig	1875 County Road C West	Roseville	Sealed	
498080	7a	Lindig	1875 County Road C West	Roseville	Sealed	
498083	7a	Lindig	1875 County Road C West	Roseville	Sealed	
499855	7a	Amoco Oil Company, SS #5070	2102 Como Ave	St. Paul	Sealed	
506348	7a	Reed H.B. Fuller Company	520 Malcom Ave SE	Minneapolis	Sealed	
511151	7a	Nordquist / Multiple Resource Rem Estate	2884 Hwy 8	Roseville	Sealed	
511164	7a	Nordquist / Multiple Resource Rem Estate	2884 Hwy 8	Roseville	Sealed	
511165	7a	Nordquist / Multiple Resource Rem Estate	2884 Hwy 8	Roseville	Sealed	
512189	7a	Mcnally Construction & Tunneling/Mwcc	0 Map Attach To Applic		Sealed	
512190	7a	Mcnally Construction & Tunneling/Mwcc	0 Map Attach To Applic		Sealed	
512191	7a	Mcnally Construction & Tunneling/Mwcc	0 Map Attach To Applic		Sealed	
519125	7a	Estate Of Fredrick W Thoine	3224 Old Hwy 8	Roseville	Sealed	
519126	7a	Estate Of Fredrick W Thoine	3224 Old Hwy 8	Roseville	Sealed	
519127	7a	Estate Of Fredrick W Thoine	3224 Old Hwy 8	Roseville	Sealed	
522115	7a	Equitable Real Estate	0		Sealed	
522116	7a	Equitable Real Estate	0		Sealed	
522732	7a	US EPA/Darryl Owens	305 6th St NW	New Brighton	Sealed	
522738	7a	US EPA/Darryl Owens	251 NW 5th St	New Brighton	Sealed	
522935	7a	Miller / Crown Coco Inc.	574 8th Ave NW	New Brighton	Sealed	
522936	7a	Miller / Crown Coco Inc.	574 8th Ave NW	New Brighton	Sealed	
529711	7a	Silver Lake Camp	2950 County Road E West	St. Anthony	Sealed	
533276	7a	New Brighton, City of	0	New Brighton	Sealed	
536854	7a	Burlington Northern Railroad/David Seep	3171 5th St SE	Minneapolis	Sealed	
538749	7a	Bell Lumber & Pole Company	778 1st St NW	New Brighton	Sealed	
538750	7a	Bell Lumber & Pole Company	778 1st St NW	New Brighton	Sealed	
538751	7a	Bell Lumber & Pole Company	778 1st St NW	New Brighton	Sealed	
538819	7a	New Brighton, City of	875 5th Ave NW	New Brighton	Sealed	
539508	7a	St. Anthony Minneapolis, Inc.	2616 Hwy 88	St. Anthony	Sealed	
539566	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/10/2003
539567	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/10/2003
539568	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/10/2003
539569	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/13/2003
539570	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/13/2003
540710	7a	Superamerica Group/Ashland Oil	2010 Silver Lake Rd	New Brighton	Sealed	
540711	7a	Superamerica Group/Ashland Oil	2010 Silver Lake Rd	New Brighton	Sealed	
541543	7a	St. Paul Public Works Department	0 Cromwell & Myrtle	St. Paul	Sealed	5/27/1994
544137	7a	Tetra Rex Inc.	2285 University Ave	St. Paul	Sealed	
544162	7a	First Industrial Realty Trust Inc.	1853 County Road C West	Roseville	Sealed	10/13/2003
545582	7a	CSM Corporation	2360 County Road C West	Roseville	Sealed	6/24/1996

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
545994	7a	U of M	0 SE Corner 35W & County Road J West	Shoreview	Sealed	
547881	7a	Ryder Truck Rental	2580 Long Lake Rd	Roseville	Sealed	
547882	7a	Ryder Truck Rental	2580 Long Lake Rd	Roseville	Sealed	
547883	7a	Ryder Truck Rental	2580 Long Lake Rd	Roseville	Sealed	
547884	7a	Ryder Truck Rental	2580 Long Lake Rd	Roseville	Sealed	
547885	7a	Ryder Truck Rental	2580 Long Lake Rd	Roseville	Sealed	
547985	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
547986	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
547987	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
547988	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
547989	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
547990	7a	Fina Oil & Chemical Company	11 Silver Lake Rd	New Brighton	Sealed	
548008	7a	Modine Manufacturing	2475 Doswell Ave	St. Paul	Sealed	
548009	7a	Modine Manufacturing	2475 Doswell Ave	St. Paul	Sealed	
552117	7a	First Industrial Realty Trust Inc.	1853 County Road C West	Roseville	Sealed	10/10/2003
552118	7a	First Industrial Realty Trust Inc.	1853 County Road C West	Roseville	Sealed	10/10/2003
552567	7a	Menard Inc.	5351 Central Ave NE	Fridley	Sealed	
553077	7a	Apache Redevelopment, LLC and St. Anthony	3800 Silver Lake Rd	St. Anthony	Sealed	7/19/2004
558111	7a	Super America	2010 Silver Lake Rd	New Brighton	Sealed	
558113	7a	Super America	2010 Silver Lake Rd	New Brighton	Sealed	
558114	7a	Super America	2010 Silver Lake Rd	New Brighton	Sealed	
558357	7a	First Industrial Realty Trust Inc.	1853 County Road C West	Roseville	Sealed	10/13/2003
561171	7a	Holiday Companies	4259 Central Ave NE	Columbia Heights	Sealed	
561172	7a	Holiday Companies	4259 Central Ave NE	Columbia Heights	Sealed	
561173	7a	Holiday Companies	4259 Central Ave NE	Columbia Heights	Sealed	
563998	7a	Midwest Motor Express Company	2778 Cleveland Ave N	Roseville	Sealed	
563999	7a	Midwest Motor Express Company	2778 Cleveland Ave N	Roseville	Sealed	
572629	7a	Chenan Construction	2301 Seventh St NW	New Brighton	Sealed	
576969	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/10/2003
576970	7a	First Industrial Realty Trust Inc.	1905 County Road C West	Roseville	Sealed	10/13/2003
578368	7a	Rihm Motor Company	567 Cleveland Ave	St. Paul	Sealed	
578369	7a	Rihm Motor Company	567 Cleveland Ave	St. Paul	Sealed	
578370	7a	Rihm Motor Company	567 Cleveland Ave	St. Paul	Sealed	
589650	7a	TCAAP	4700 Hwy 10	Arden Hills	Sealed	6/15/2004
594263	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
594264	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
594265	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
594266	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
594267	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
610453	7a	Goodwill Industries/Easter Seals	2520 Como Ave	St. Paul	Sealed	
610454	7a	Goodwill Industries/Easter Seals	2520 Como Ave	St. Paul	Sealed	

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
610455	7a	Goodwill Industries/Easter Seals	2543 Como Ave	St. Paul	Sealed	
616482	7a	US EPA Region V	251 5th Ave NW	New Brighton	Sealed	
616601	7a	TCAAP	4700 Hwy 10	Arden Hills	Sealed	6/15/2004
616602	7a	TCAAP	4700 Hwy 10	Arden Hills	Sealed	6/15/2004
616603	7a	United States Federal Government	105 Twin City Arms Plant	Arden Hills	Sealed	
617479	7a	Wethern	534 Glendale St	St. Paul	Sealed	
619717	7a	US EPA	324 Mehigan NW	New Brighton	Sealed	8/22/2002
621358	7a	Shoreview, City of	0		Sealed	
623335	7a	US EPA	310 5th Ave NW	New Brighton	Sealed	
623336	7a	US EPA	310 5th Ave NW	New Brighton	Sealed	
623369	7a	Sunset Acquisition Corporation	2250 St. Anthony Blvd	St. Anthony	Sealed	
624019	7a	U.S. Federal Government/TCAAP	105 Twin City Arms Plant	Arden Hills	Sealed	
624020	7a	U.S. Federal Government/TCAAP	105 Twin City Arms Plant	Arden Hills	Sealed	
624376	7a	Ti-Kromatic Paints Inc.	2576 Doswell Ave	St. Paul	Sealed	6/18/2004
624377	7a	Ti-Kromatic Paints Inc.	2492 Doswell Ave	St. Paul	Sealed	6/30/2004
624378	7a	Ti-Kromatic Paints Inc.	2492 Doswell Ave	St. Paul	Sealed	6/30/2004
624432	7a	Sunset Acquisition Corporation	2250 St. Anthony Blvd	St. Anthony	Sealed	
624433	7a	Sunset Acquisition Corporation	2250 St. Anthony Blvd	St. Anthony	Sealed	
635423	7a	Ti-Kromatic Paint Inc.	2492 Doswell Ave	St. Paul	Sealed	6/30/2004
643886	7a	U.S. Army/TCAAP	4700 Hwy 10	Arden Hills	Sealed	
649985	7a	Murphy Oil Company USA	3110 Cleveland Ave N	Roseville	Sealed	10/15/2003
652670	7a	Roseville, City of	2690 Cleveland Ave N	Roseville	Sealed	
652671	7a	Roseville, City of	1947 County Road C West	Roseville	Sealed	
652672	7a	Roseville, City of	1947 County Road C West	Roseville	Sealed	
652673	7a	Roseville, City of	2680 Prior Ave N	Roseville	Sealed	
652674	7a	Roseville, City of	0 Fairview Ave (West of 2785)	Roseville	Sealed	
658731	7a	U.S. Army/Tcaap	4700 Hwy 10	Arden Hills	Sealed	
658732	7a	U.S. Army/Tcaap	4700 Hwy 10	Arden Hills	Sealed	
659894	7a	Murphy Oil Company USA	3110 Cleveland Ave N	Roseville	Sealed	10/15/2003
659895	7a	Murphy Oil USA, Inc.	3110 Cleveland Ave N	Roseville	Sealed	
660216	7a	U of M	2525 Fourth St SE	Minneapolis	Sealed	12/27/2001
665819	7a	Phillips Petroleum Company	2525 County Road 10	Mounds View	Sealed	
671114	7a	Murphy Oil Company USA	3110 Cleveland Ave N	Roseville	Sealed	10/15/2003
683304	7a	US EPA	310 5th Ave NW	New Brighton	Sealed	
692839	7a	Northeast Towing	6519 Central Ave	Fridley	Sealed	2/25/2004
711774	7a	MPCA	1227 Central Ave	Minneapolis	Sealed	
711775	7a	MPCA	1227 Central Ave	Minneapolis	Sealed	
711776	7a	MPCA	1227 Central Ave	Minneapolis	Sealed	
711777	7a	MPCA	1227 Central Ave	Minneapolis	Sealed	
H0010494	7a	Boyd	2461 Clearview Ave	Mounds View	Sealed	10/23/2003
H0017888	7a	Stern	1785 Venus Ave	Arden Hills	Sealed	6/10/2004

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
H0018146	7a	C.W. Terminal	2785 Fairview Ave N	Roseville	Sealed	
H0023590	7a	Suksi	754 9th Ave NW	New Brighton	Sealed	7/13/2004
H0026851	7a	Kerner	1400 66th Ave NE	Fridley	Sealed	
H0029825	7a	Roseville, City of	1905 County Road C West	Roseville	Sealed	
H0031473	7a	Kelly	1926 Shryer Ave W	Roseville	Sealed	
H0034638	7a	Twin City Arsenal Plant (TCAAP)	0 Arsenal (TCAAP)	New Brighton	Sealed	
H0034639	7a	Twin City Arsenal Plant (TCAAP)	0 Arsenal (TCAAP)	New Brighton	Sealed	
H0034640	7a	Twin City Arsenal Plant (TCAAP)	0 Arsenal (TCAAP)	New Brighton	Sealed	
H0035609	7a	Maplewood Development	1952 Eustis St	St. Paul	Sealed	
H0035784	7a	Rose	1921 Glen Paul Ave	Arden Hills	Sealed	10/23/2003
H0036269	7a	Greater Metropolitan Housing Corp.	352 New Brighton Rd	New Brighton	Sealed	5/17/2004
H0037486	7a	Midwest Jobbers Terminal	620 & 656 Pelham Blvd	St. Paul	Sealed	11/28/1907
H0038703	7a	Eiter	621 Silver Lake Rd	New Brighton	Sealed	
H0056405	7a	Lumber	401 Johnson St NE	Minneapolis	Sealed	
H0063453	7a	Rybeck	4949 Old Hwy 8	Mounds View	Sealed	
H0070542	7a	Ripsin	274 New Brighton Rd	New Brighton	Sealed	6/10/2004
H0073710	7a	Holz	1776 Venus Ave	Arden Hills	Sealed	7/13/2004
H0074503	7a	Mark Youngdahl & Associates	2938 Old Hwy 8	St. Anthony	Sealed	
H0091871	7a	Belland	1322 Hillcrest Dr NE	Fridley	Sealed	1/30/2004
H0108792	7a	Kruger	169 Oakwood Dr	New Brighton	Sealed	
H0115604	7a	Williams Pipe Line Company	0 County Road C & Long Lake Rd	Roseville	Sealed	
H0115605	7a	Williams Pipe Line Company	0 County Road C & Long Lake Rd	Roseville	Sealed	
H0115606	7a	Williams Pipe Line Company	0 County Road C & Long Lake Rd	Roseville	Sealed	
H0115607	7a	Williams Pipe Line Company	0 County Road C & Long Lake Rd	Roseville	Sealed	
H0115608	7a	Williams Pipe Line Company	0 County Road C & Long Lake Rd	Roseville	Sealed	
H0115890	7a	Bergen Transfer & Storage	3015 37th Ave NE	St. Anthony	Sealed	
H0116455	7a	Jaglowski	2025 County Road B West	Roseville	Sealed	
H0118456	7a	Bodycoat Thermal Processing	900 E Hennepin Ave	Minneapolis	Sealed	4/30/2004
H0120553	7a	Ettinger	2360 County Road C West	Roseville	Sealed	
H0121193	7a	Midland Hills Country Club	2001 Fulham St	Roseville	Sealed	
H0121194	7a	Midland Hills Country Club	2001 Fulham St	Roseville	Sealed	
H0121396	7a	Mcdonald	1876 Stowe Ave	Arden Hills	Sealed	7/19/2004
H0123177	7a	Roseville, City of	2417 Cleveland Ave N	Roseville	Sealed	
H0123232	7a	Macgillis Gibbs Company	400 5th Ave NW	New Brighton	Sealed	
H0123233	7a	Macgillis Gibbs Company	400 5th Ave NW	New Brighton	Sealed	
H0123866	7a	Malecha	1822 Venus Ave	Arden Hills	Sealed	7/19/2004
H0125316	7a	Bundy	1856 Ryan Ave W	Roseville	Sealed	
H0130085	7a	Raymond	3007 Old Hwy 8	New Brighton	Sealed	
H0131756	7a	Moffa	1903 County Road D West	Arden Hills	Sealed	7/19/2004
H0133393	7a	Thorp	1929 Summer St	Falcon Heights	Sealed	12/4/2003
H0137327	7a	Noecker	5066 Rainbow Lane	Mounds View	Sealed	4/29/1998

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
H0137376	7a	Nichols	1969 Summer St	Falcon Heights	Sealed	
H0137388	7a	Lumke	1888 County Road E West	Arden Hills	Sealed	
H0139227	7a	Cavanaugh	2909 St. Anthony Blvd	St. Anthony	Sealed	
H0140711	7a	CSM Corporation	3065 Centre Pointe Dr	Roseville	Sealed	
H0147556	7a	US EPA Region V	251 5th Ave NW	New Brighton	Sealed	
H0147567	7a	US EPA	103 Wedgewood Ct	New Brighton	Sealed	12/3/1902
H0147568	7a	US EPA	151 Hanson Ct	New Brighton	Sealed	12/3/1901
H0153062	7a	Bochnak	2600 St Anthony Blvd	St. Anthony	Sealed	
H0153097	7a	Ramsey County Parks	1500 Old Hwy 8	St. Paul	Sealed	7/21/1900
H0159575	7a	Crowley	1938 Lake St	Roseville	Sealed	5/5/2004
H0159995	7a	Cruz	4005 Hayes St	Columbia Heights	Sealed	
H0168140	7a	Chrun	1795 Tatum St	Falcon Heights	Sealed	5/17/2004
H0170226	7a	MN PCA	312 5th Ave NW	New Brighton	Sealed	
H0177268	7a	Ramsey County Engineering/Operations	0 TCAAP Bldg.576	Arden Hills	Sealed	
H0177295	7a	MAI Properties	0 Old Hwy 8 & County Road C2	Roseville	Sealed	
H0177315	7a	Forum	2524 St. Anthony Blvd	St. Anthony	Sealed	
H0177932	7a	US Army	4700 Hwy 10	Arden Hills	Sealed	
H0177933	7a	US Army	4700 Hwy 10	Arden Hills	Sealed	
H0178067	7a	Twin Cities Army Ammunition Plant	4700 Hwy 10	Arden Hills	Sealed	
H0181421	7a	Myslajek	1820 Long Lake Rd	New Brighton	Sealed	9/14/2004
H0184827	7a	Armstrong Rigging & Erecting, Inc.	587 1st St SW	New Brighton	Sealed	8/5/2004
H0185014	7a	Childrens Home Society of MN	1605 Eustis St	St. Paul	Sealed	
H0185127	7a	TCAAP	4740 Snelling Ave	New Brighton	Sealed	
H0185728	7a	Birch	1620 County Road E West	New Brighton	Sealed	3/17/2004
H0190124	7a	Lube Tech	2420 County Road 2 West	Roseville	Sealed	
H0190242	7a	Flink	1698 Pinewood Dr	Shoreview	Sealed	3/4/2004
H0190485	7a	Larson	2813 Pahl Ave	St. Anthony	Sealed	
H0190528	7a	Allison	1805 Roselawn Ave W	Roseville	Sealed	6/28/2004
H0191987	7a	US Bank	2402 University Ave	St. Paul	Sealed	
H0192306	7a	Disney	2265 Marion Rd	Roseville	Sealed	10/1/2003
H0195266	7a	Emerald Park LLC	0 Berry St	St. Paul	Sealed	
H0196823	7a	Longnecker	256 Cleveland Ave	New Brighton	Sealed	7/14/2004
H0198135	7a	Noren	2515 Murray Ave	St. Anthony	Sealed	
H0198712	7a	Murphy	3731 New Brighton Ave	Arden Hills	Sealed	10/31/2003
H0199939	7a	Bedecarre	1955 Carl St	Lauderdale	Sealed	10/31/2003
H0200400	7a	Rizo	2285 Oriole Ave	New Brighton	Sealed	7/13/2004
H0202464	7a	Salathe	3812 Hayes St NE	Columbia Heights	Sealed	10/10/2003
H0202998	7a	General Mills	1030 20th Av SE	Minneapolis	Sealed	8/31/2004
H0204724	7a	Brenntag Great Lakes LLC	2340 Rose Place	Roseville	Sealed	8/23/2004
H0205071	7a	Huckle	3453 Lake Johanna Blvd	Arden Hills	Sealed	7/14/2004
H0206269	7a	New Brighton, City of		New Brighton	Sealed	9/30/2004

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
H0206405	7a	Emerson	2275 County Road B	Roseville	Sealed	
H0206417	7a	Mellema	3898 Dellview Ave	Arden Hills	Sealed	5/17/2004
H0206454	7a	Quintero	183 3rd Ave SE	New Brighton	Sealed	6/10/2004
H0208574	7a	Staurseth	2908 County Road H2	Mounds View	Sealed	
H0208575	7a	Staurseth	2908 County Road H2	Mounds View	Sealed	
H0208600	7a	Mounds View, City of	3016 County Road H2	Mounds View	Sealed	
H0209380	7a	Metal Matic Inc.	629 SE Second St	Minneapolis	Sealed	12/19/2003
H0210065	7a	Wachter	4337 Old Hwy 10	Arden Hills	Sealed	
H0211385	7a	Vadnais	1905 Sunnyside Terrace	New Brighton	Sealed	10/16/2003
H0211497	7a	Northeast Towing	6519 Central Ave	Fridley	Sealed	3/2/2004
H0212132	7a	Mcgough	1977 Summer St	Falcon Heights	Sealed	
H0212660	7a	Schweizer	1215 12th Ave NW	New Brighton	Sealed	6/28/2004
H0212688	7a	Presbyterian Homes	3151 Lake Johanna Blvd	Arden Hills	Sealed	11/19/2003
H0212918	7a	Brickner Builders	7492 Bacon Dr NE	Fridley	Sealed	
H0212923	7a	Stanczyk	2222 Bronson Dr	Mounds View	Sealed	10/8/2003
H0212969	7a	New Brighton, City of	1360 Old Hwy 8	New Brighton	Sealed	11/14/2003
H0212974	7a	Canadian Pacific Railway	3001 University Ave	Minneapolis	Sealed	12/1/2003
H0213127	7a	Bird	1842 Ryan Ave W	Roseville	Sealed	6/10/2004
H0213143	7a	Aasen	7444 Silver Lake Rd	Mounds View	Sealed	7/14/2004
H0213171	7a	Miley	2183 W Roselawn	Roseville	Sealed	11/12/2003
H0213434	7a	Canadian Pacific Railway	2919 Central Ave NE	Minneapolis	Sealed	12/12/2003
H0213438	7a	Canadian Pacific Railroad	2800 Central Ave NE	Minneapolis	Sealed	12/17/2003
H0213439	7a	Canadian Pacific Railway	2730 Central Ave NE	Minneapolis	Sealed	12/23/2003
H0213484	7a	Kane	6328 Dellwood Dr NE	Fridley	Sealed	6/14/2004
H0213680	7a	Hanson	7767 Groveland Rd	Mounds View	Sealed	11/25/2003
H0213726	7a	Erickson Oil Products	3810 Silver Lake Rd	St. Anthony	Sealed	9/25/03
H0214120	7a	Wall Development Company	419 29th Ave SE	Minneapolis	Sealed	
H0214121	7a	Wall Development Company	501 29th Ave SE	Minneapolis	Sealed	
H0214122	7a	Wall Development Company	700 29th Ave SE	Minneapolis	Sealed	
H0214123	7a	Wall Development Company	700 29th Ave SE	Minneapolis	Sealed	
H0214196	7a	Tower Glen LP	2216 County Road D West	Roseville	Sealed	10/20/2003
H0214350	7a	U of M	216 Pillsbury Dr SE	Minneapolis	Sealed	11/4/2003
H0214460	7a	Canadian Pacific Railway	2730 Central Ave NE	Minneapolis	Sealed	10/10/2003
H0214468	7a	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Sealed	10/30/2003
H0214469	7a	Canadian Pacific Railway	2907 Central Ave NE	Minneapolis	Sealed	11/21/2003
H0214470	7a	Canadian Pacific Railway	2907 Central Ave NE	Minneapolis	Sealed	12/9/2003
H0214471	7a	Canadian Pacific Railway	953 29th Ave NE	Minneapolis	Sealed	12/22/2003
H0214907	7a	Moses	342 11th Ave NW	New Brighton	Sealed	6/10/2004
H0215163	7a	Laden	2597 Cleveland Ave N	Roseville	Sealed	10/30/2003
H0215638	7a	Meyers	2701 31st Ave NE	St. Anthony	Sealed	11/6/2003
H0215892	7a	Vaughn	3809 New Brighton Rd	Arden Hills	Sealed	10/23/2003

TABLE E-5
SEALED WELLS

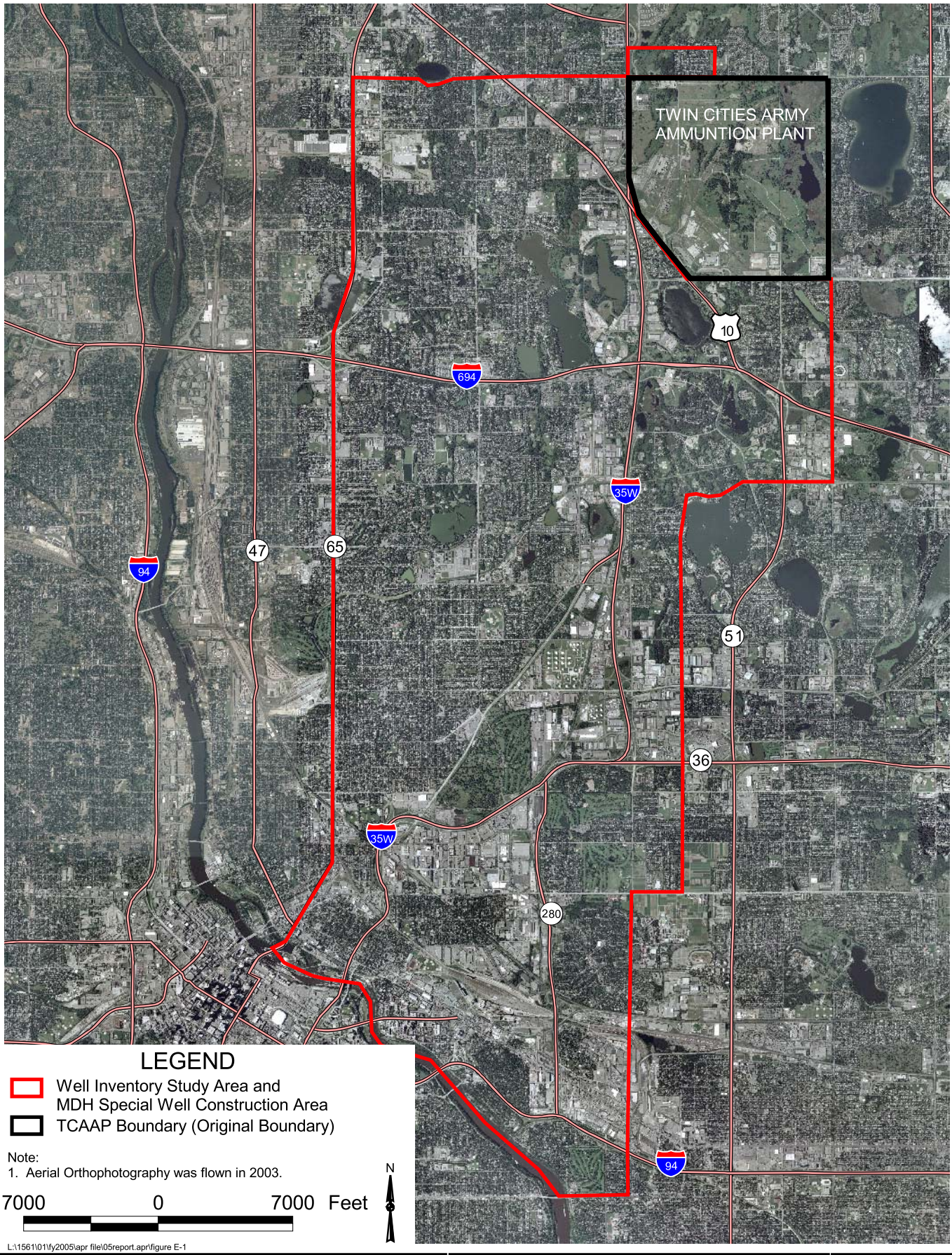
Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
H0215915	7a	Sherman	2163 29th Ave NW	New Brighton	Sealed	
H0215986	7a	Johnson Screens	1872 Old Hwy 8	New Brighton	Sealed	
H0216110	7a	Lee	1882 Shryer Ave W	Roseville	Sealed	7/15/2004
H0216331	7a	Moses	342 11th Ave NW	New Brighton	Sealed	
H0216485	7a	Tippmann	2500 University Ave SE	Minneapolis	Sealed	5/21/2004
H0216955	7a	Miller	1741 Oakwood Dr	Shoreview	Sealed	11/19/2003
H0216955	7a	Lavone	1741 Oakwood Dr	Shoreview	Sealed	9/14/2004
H0216986	7a	Nevale	5054 Silver Lake Rd	Mounds View	Sealed	3/17/2004
H0216990	7a	Loncar	1561 Ferndale Ave NE	Fridley	Sealed	3/24/2004
H0217020	7a	Ammann	1869 Moore St	Falcon Heights	Sealed	5/19/2004
H0217071	7a	Warner	1354 Hillcrest Dr NE	Fridley	Sealed	8/30/2004
H0217088	7a	Northrup	1942 Summer St	Falcon Heights	Sealed	9/30/2004
H0217212	7a	MWF Properties	321 Old Hwy 8	New Brighton	Sealed	
H0217545	7a	Wallin	564 County Road 4	Shoreview	Sealed	9/7/2004
H0217670	7a	Xtra Lease, Inc.	2700 Cleveland Ave N	Roseville	Sealed	1/6/2004
H0217678	7a	Tower Glen Limited LP	2216 County Road D West	Roseville	Sealed	12/22/2003
H0217737	7a	Shaw Stewart Lumber Company	645 Johnson St NE	Minneapolis	Sealed	2/12/2004
H0217952	7a	General Mills	1030 22nd Av SE	Minneapolis	Sealed	8/31/2004
H0217953	7a	General Mills	885 21st Ave SE	Minneapolis	Sealed	8/31/2004
H0217954	7a	General Mills	935 17th Ave SE	Minneapolis	Sealed	8/31/2004
H0217957	7a	General Mills	2010 E Hennepin Ave	Minneapolis	Sealed	11/21/2003
H0217958	7a	General Mills	1083 19th Ave SE	Minneapolis	Sealed	11/21/2003
H0217959	7a	General Mills	1083 19th Ave SE	Minneapolis	Sealed	11/21/2003
H0217961	7a	General Mills	2010 E Hennepin Ave	Minneapolis	Sealed	11/21/2003
H0217985	7a	New Brighton, City of	1853 Old Hwy 8	New Brighton	Sealed	
H0217986	7a	New Brighton, City of	1873 Old Hwy 8	New Brighton	Sealed	
H0218064	7a	Holmgren	1767 Venus Ave	Arden Hills	Sealed	8/5/2004
H0218255	7a	Kunz Oil Company	2280 County Road I West	Mounds View	Sealed	12/17/2003
H0218276	7a	Brown	2809 St. Anthony Blvd NE	Minneapolis	Sealed	1/23/2004
H0218277	7a	Knox	2809 St. Anthony Blvd NE	Minneapolis	Sealed	1/23/2004
H0218431	7a	Hohenstein	2530 Sunbow Lane	New Brighton	Sealed	3/25/2004
H0218555	7a	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Sealed	3/29/2004
H0218596	7a	Canadian Pacific Railway	2800 Central Ave NE	Minneapolis	Sealed	3/24/2004
H0218618	7a	Canadian Pacific Railroad	2800 Central Ave NE	Minneapolis	Sealed	3/9/2004
H0218619	7a	Canadian Pacific Railroad	2800 Central Ave NE	Minneapolis	Sealed	3/17/2004
H0218778	7a	Applebees International	5277 Central Ave NE	Fridley	Sealed	5/6/2004
H0218849	7a	Pik Terminal, Inc.	2680 Prior Ave N	Roseville	Sealed	7/28/2004
H0218949	7a	Fredrickson	2341 Hampden Ave	St. Paul	Sealed	6/15/2004
H0219268	7a	U of M Env. Health & Safety	216 Pillsbury Dr SE	Minneapolis	Sealed	6/21/2004
H0220145	7a	United Properties, LLC	1878 Old Hwy 8	New Brighton	Sealed	
H0220402	7a	Enfro Assessment Corp.	445 Malcolm Ave	Minneapolis	Sealed	3/11/2004

TABLE E-5
SEALED WELLS

Unique Number	Category	Last Name or Business Name	Street	City	Status	Date Sealed
H0220408	7a	Westgate	1000 Westgate Dr	St. Paul	Sealed	3/18/2004
H0220417	7a	Metalurgical Inc.	900 E Hennepin Ave	Minneapolis	Sealed	4/9/2004
H0220449	7a	Canadian Pacific Railway	2729 Central Ave NE	Minneapolis	Sealed	7/1/2004
H0221080	7a	Peterson	1731 Hillview Rd	Shoreview	Sealed	7/15/2004
H0221924	7a	Lange	1201 Old Highway 8 (1209)	New Brighton	Sealed	6/4/2004
H0222003	7a	Beckler	2191 Roselawn Ave	Roseville	Sealed	5/25/2004
H0222004	7a	Beckler	2191 Roselawn Ave	Roseville	Sealed	5/20/2004
H0222009	7a	Brant	1779 Lois Dr	Shoreview	Sealed	7/9/2004
H0222015	7a	Casci Decorators Inc.	1910 County Road C West	Roseville	Sealed	
H0222018	7a	Beneke	1975 N Cleveland Ave	Roseville	Sealed	8/27/2004
H0222228	7a	TCAAP	4700 Hwy 10	Arden Hills	Sealed	6/15/2004
H0222312	7a	Stampfle	2005 Thom Dr	Arden Hills	Sealed	5/5/2004
H0222507	7a	Presbyterian Homes	1910 County Road D West	Roseville	Sealed	5/4/2004
H0222518	7a	Howel	3941 Rolling Hills Rd	Arden Hills	Sealed	5/17/2004
H0222549	7a	Heupel	2542 Sunbow Lane	New Brighton	Sealed	6/15/2004
H0222698	7a	Hall	3055 Arthur St	Roseville	Sealed	
H0224626	7a	United Properties	1984 County Road C2	Roseville	Sealed	7/26/2004
H0225076	7a	Cox	2185 County Road B West	Roseville	Sealed	7/9/2004
H0225542	7a	Valdes	2404 27th Ave NE	St. Anthony	Sealed	7/30/2004
H0225604	7a	From	5323 Raymond Ave	Mounds View	Sealed	7/19/2004
H0226475	7a	Brenntag Great Lakes LLC	2340 Rose Place	Roseville	Sealed	
H0226921	7a	New Brighton, City of	1427 Old Hwy 8	New Brighton	Sealed	
H0226922	7a	New Brighton, City of	1427 Old Hwy 8	New Brighton	Sealed	
H0226923	7a	New Brighton, City of	1427 Old Hwy 8	New Brighton	Sealed	
H0226924	7a	New Brighton, City of	1427 Old Hwy 8	New Brighton	Sealed	
H0226925	7a	New Brighton, City of	1427 Old Hwy 8	New Brighton	Sealed	
H0226991	7a	Chesapeake Companies Property Group, LLC	1901 13th St NE	Arden Hills	Sealed	9/10/2004
H0227810	7a	Palmquist	1971 Glen Paul Ave	Arden Hills	Sealed	9/17/2004
H0230565	7a	Hoelscher	1750 Gramsie Rd W	Arden Hills	Sealed	
	7b	Anderson	1758 Venus Ave	Arden Hills	Sealed	2004
	~~7b~~, 7a	~~Fodness~~ Singerhouse	1733 Oakwood Dr	Shoreview	Sealed	6/15/2004
234355	~~1b~~, 7b	~~Kingdom Hall~~ First Resources Group	1987 Mound St	New Brighton	~~Inactive~~, Sealed	
249607	~~1d~~, 7b	~~Foerster~~ Mulver	2443 Larpenteur Ave	Lauderdale	~~Inactive~~, Sealed	
234571	~~2b~~, 7b	Leiser	1901 17th St NW	New Brighton	~~Active~~, Sealed	
	~~2d~~, 7b	Sayer	4482 Snelling Ave N	Arden Hills	~~Inactive~~, Sealed	
	~~3~~, 7a	~~Deggit~~ Boe	1648 Hillview Rd	Shoreview	Sealed	2/4/2004
	~~3~~, 7a	Lund	1670 Lois Dr	Shoreview	Sealed	10/23/2003
	~~4b~~, 7b	Hogan (Hoye?)	1700 County Road F West	Arden Hills	Sealed	

TABLE E-6
FY 2005 FIELD INVESTIGATION AND SAMPLING SUMMARY

Unique Number	Category	Last Name or Business Name	Street	City	Date Last Sampled	Status	Depth	Comments
249608	1a	Rapit Printing Inc	2520 Larpenteur Ave	Lauderdale	6/16/2005	Active	375	Sampled 6/16/05
433298	1a	Town & Country Golf Course	2279 Marshall Ave	St. Paul	9/5/2000	Active	500	Well temporarily inoperable.
509052	1a	Shriners Hospital	2025 E River Rd	Minneapolis	6/28/2005	Active	302	Sampled 6/28/05
S00311	1a	~~Inglebrech (Engelbrecht?)~~ Vogel	1390 Silver Lake Rd	New Brighton	9/21/2000	Active		Owner refused sampling.
S00444	1a	Minneapolis Parks & Rec Dept	Ontario & E River Rd (Erie)	Minneapolis	6/16/2005	Active	236	Sampled 6/16/05
234356	~~1a~~, 5	Nordquist	1873 Old Hwy 8	New Brighton	9/1/2000	~~Active~~, Inactive	100	House demolished, no well.
200173	1b	KSTP Radio TV	3415 University Ave	St. Paul	11/20/2001	Active	525	Well temporarily inoperable.
234421	1b	BioClean (BioChem)	2151 Mustang Dr	New Brighton	6/16/2005	Active	270	Sampled 6/16/05
234469	1b	~~Palwski~~ Palkowski	2816 Hwy 88	St. Anthony	7/1/1999	Active	500	No response.
234544	1b	R&D Systems	2201 Kennedy St NE	Minneapolis	7/29/1986	Inactive	500	Owner refused sampling.
249632	1b	Montzka	2301 N Upland Crest NE	Columbia Heights	6/22/2005	Active	240	Sampled 6/22/05
537801	~~1b~~, 2b	~~Midwest~~ Midway Industrial	4759 Old Hwy 8	New Brighton	6/24/2005	Active	165	Sampled 6/24/05
234355	~~1b~~, 7b	~~Kingdom Hall~~ First Resources Group	1987 Mound St	New Brighton	3/1/1984	~~Inactive~~, Sealed		Well sealed per owner.
200180	1c	Town & Country Golf Course	2279 Marshal Ave	St. Paul		Active	500	No response.
200522	1c	Pemtom (Land Corporation)	Silver Lake Rd	New Brighton		Active	254	No response.
200523	1c	Pemtom (Land Corporation)	Silver Lake Rd & Cty Rd E	New Brighton		Active	255	No response.
S00437	1c	Northern Star Co	3171 5th St SE	Minneapolis	6/23/2005	Active	450	Sampled 6/23/05
756236	1c	Pechiney Plastic Packaging, Inc. (Alcan)	150 26th Ave SE	Minneapolis	6/23/2005	Active	280	Sampled 6/23/05
	1d	Schenk	1783 Pinewood Dr	Shoreview	1/22/1991	Inactive	30	Well inoperable.
	1d	McCalla	281 Silver Lake Rd S	New Brighton		Inactive		Well inoperable.
234304	1d	Cmiel	4549 Lakeshore Pl	Arden Hills	8/27/1985	Inactive	100	Well inoperable.
234339	1d	Schuessler	1657 14th Ave NW	New Brighton	6/8/1982	Inactive	90	Well inoperable.
234340	1d	Loren	1100 27th Ave NW	New Brighton	6/8/1982	Inactive	180	No response.
236438	1d	Waldorf Paper Products (Rock-Tenn)				Active	800	Well temporarily inoperable.
249194	1d	Murphy Warehouse Co	2130 Elm St SE	Minneapolis		Inactive	500	Well inoperable.
S00410	1d	Lacarella	3555 Stinson Blvd NE	Minneapolis		Inactive		Owner claims no well.
249607	~~1d~~, 7b	~~Foerster~~ Mulver	2443 Larpenteur Ave	Lauderdale		~~Inactive~~, Sealed	500	Well sealed per owner.
249153	~~1d~~, 5	Markely Labs	1853 Old Hwy 8	New Brighton	3/21/1994	Inactive	72	Property demolished, no well.
234338	~~1d~~, 1b	Bosell	1575 14th Ave NW	New Brighton	3/17/1994	~~Inactive~~, Active	210	Owner refused sampling.
107405	2a	Anderson	4355 Hwy 10	Arden Hills	6/22/2005	Active	181	Sampled 6/22/05
249113	2a	Wyttenbach	990 11th Ave NW	New Brighton		Active	80	Owner refused sampling.
249007	~~2a~~, 2b	Walton	4453 Hwy 10	Arden Hills	6/16/2005	Active	200	Sampled 6/16/05
127537	2b	Midwest Asphalt	1400 Old Hwy 8	New Brighton	6/24/2005	Active	117	Sampled 6/24/05
200176	2b	Waldorf Paper Products (Rock-Tenn)	2236 Myrtle Ave	St. Paul	6/24/2005	Active	758	Sampled 6/24/05
S00002	2b	Midland Hills Country Club	2001 N Fulham St	Roseville	9/10/2001	Active	260?	Well temporarily inoperable.
234571	~~2b~~, 7b	Leiser	1901 17th St NW	New Brighton	7/24/1997	~~Active~~, Sealed	200	Well sealed per owner.
200076	2c	Old Dutch Foods, Inc	2375 Terminal Rd	Roseville	6/28/2005	Active	550	Sampled 6/28/05
236029	2c	R&D Systems, South Well	2201 Kennedy St NE	Minneapolis		Active	435	Owner refused sampling.
236439	2c	Waldorf Paper Products (Rock-Tenn)	2250 Wabash Ave	St. Paul	6/24/2005	~~Inactive~~, Active	790	Sampled 6/24/05
233221	2d	R&D Systems, North Well	2201 Kennedy St NE	Minneapolis	8/31/1988	Inactive	500	Owner refused sampling.
234366	2d	Zehnle	978 11th Ave NW	New Brighton		Inactive	75	No response.
234380	2d	Podlasek	4410 N Snelling Ave	Arden Hills	6/1/1982	Inactive	160	Well inoperable.
234558	2d	Nyholm	1587 26th Ave NW	New Brighton		Inactive	140	Well inoperable.
234569	2d	Waldron	2525 St Anthony Blvd	St. Anthony		Inactive	200?	Well inoperable.
	~~2d~~, 7b	Sayer	4482 Snelling Ave N	Arden Hills		~~Inactive~~, Sealed		Well sealed per owner.
	4a	City of New Brighton	19 14th St NW	New Brighton		Active		Could not locate.
	4a	Burton	2073 10th St NW	New Brighton		Inactive		Well inoperable.
	4a	Tabaika	2512 27th Ave NE	St. Anthony		Inactive		Well inoperable.
	4a	Willig	2600 Pahl Ave	St. Anthony		~~Active~~, Inactive		Well inoperable.
	4a	Weisenberger	2816 Silver Lake Rd	St. Anthony		Inactive		No response.
	4a	Cuddihy	2933 Troseth Road	Roseville		Not in Use		Well inoperable.
	4a	~~Hinton, E and T Hermes~~ Hermes	2935 Old Hwy 8	Roseville	6/22/2005	Active		Sampled 6/22/05
	4a	Bryant, Jr.	615 12th Ave NW	New Brighton		Not in Use		Well inoperable.
249150	4a	Coldor	3511 Stinson Blvd NE	St. Anthony		Unknown		No response.
249185	4a	Novotny	1706 Malvern St	Lauderdale		Unknown		No response.
S00295	4a	Alfson	2351 Summer St	Lauderdale		Unknown		No response.
S00294	~~4a~~, 5	Western Remodelers	2520 W Larpenteur Ave	St. Paul		Unknown		Site visit with owner, no well found.
S00409	~~4a~~, 5	~~Ohara~~ Mallow	3553 Stinson Blvd NE	St. Anthony		Unknown		Site visit with owner, no well found.
	~~4a~~, 5	Beach	1615 Silver Lake Rd	New Brighton		Active		Site visit property redeveloped, no well found.
S00608	~~4a~~, 5	Grundtner (Gruntner?)	136 Oakwood Dr	New Brighton		Unknown		Site visit with owner, no well found.
249191	~~4a~~, DELETE	Wells	1651 Millwood Ave	Roseville	6/27/2005	Active		Sampled 6/27/05, Delete- located outside study area.
	4b	New Brighton Alano Society, Inc.		Mounds View		Active		Could not locate.
	4b	Brighton Land Development, LLC	1001 County Rd E West	New Brighton		Active		Could not locate.
	4b	Nottestad	1001 County Rd E West	New Brighton		Active		Could not locate.
	4b	Meridian Properties Real Estate Dev., LLC.	3700 Silver Lake Rd	St. Anthony		Active		Could not locate.
105242	4b	Weber, Nordeen Jr.				Active	214	Could not locate.
105271	4b	Nelson				Active	137	Could not locate.
126463	4b	B & M Construction	Nordeen Estates			Active	216	Could not locate.
130000	4b	550 Associates		Arden Hills		Inactive		No response.
148132	4b	Vince Velie, H & H Construction				Active	190	Could not locate.
180922	4b					Active		Could not locate.
192091	4b			Elmwood		Active		Could not locate.
201192	4b					Active		Could not locate.
234434	4b	Marquart		Arden Hills		Unknown		Could not locate.
234532	4b							Could not locate.
234537	4b							Could not locate.
234545	4b				PHASE I			Could not locate.
234568	4b	Thomsen	4 88th NE	Minneapolis			200	No response.
234658	4b				6/7/1982			Could not locate.
239465	4b	Lennox				Active	256	Could not locate.
239468	4b	Burlington Northern Railroad		Minneapolis		Active	253	Could not locate.
239469	4b	Great Northern Railway				Active	200	Could not locate.
S00471	4b	R Komarek/Nelson-Miller Cons				Inactive		Could not locate.
S00551	4b	Tamarack Care Temp			2/17/1982	Unknown		Could not locate.
S00650	4b	CME		New Brighton	6/24/1984			Could not locate.
	~~4b~~, 7b	Hogan (Hoye?)	1700 County Road F West	Arden Hills		Sealed		Well sealed per owner.
S00413	~~4b~~, DELETE	Norquist Campground	Located on Coon Lake.	East Bethel		Unknown		Delete- located outside study area.
688419	~~4b~~, 6	Samina - Sci	2516 Wabash Ave	St. Paul		Active	30	Monitoring well.
688420	~~4b~~, 6	Samina - Sci	2516 Wabash Ave	St. Paul		Active	30	Monitoring well.
688421	~~4b~~, 6	Samina - Sci	2516 Wabash Ave	St. Paul		Active	33	Monitoring well.
	~~4b~~, 6	Donatelle Associates, LLC (Donatelle Plastics, Inc.)	401 County Road E2 West	New Brighton		Active		Monitoring well.



TWIN CITIES ARMY AMMUNITION PLANT

Well Inventory Study Area

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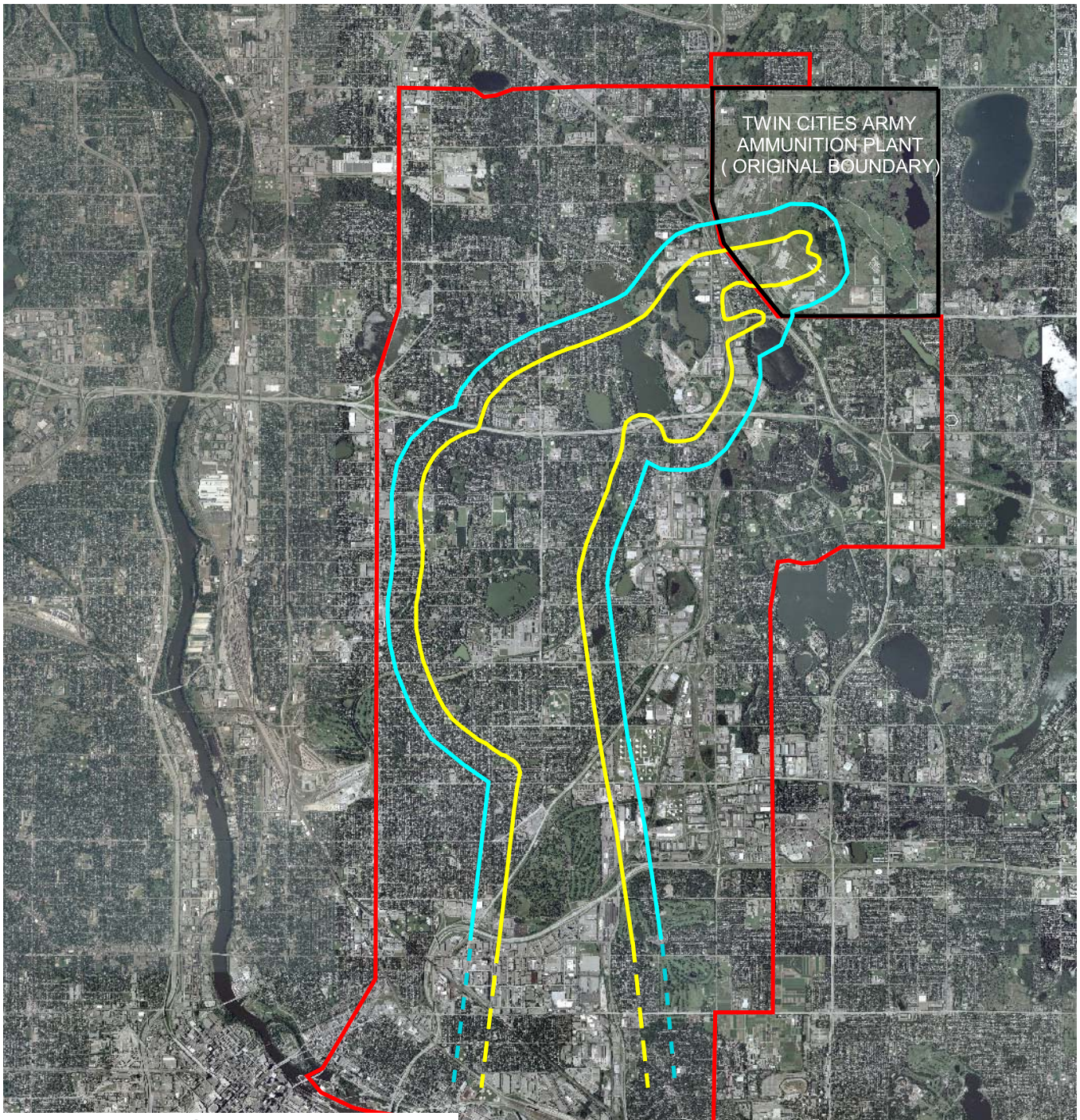
Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0249

FY 2005

Figure E-1



LEGEND

- Well Inventory Study Area
- TCAAP Boundary (Original Boundary)
- Area of Concern (1/4 mile Buffer)
- Upper Unit 4 1 ug/L TCE Plume (FY 2005)

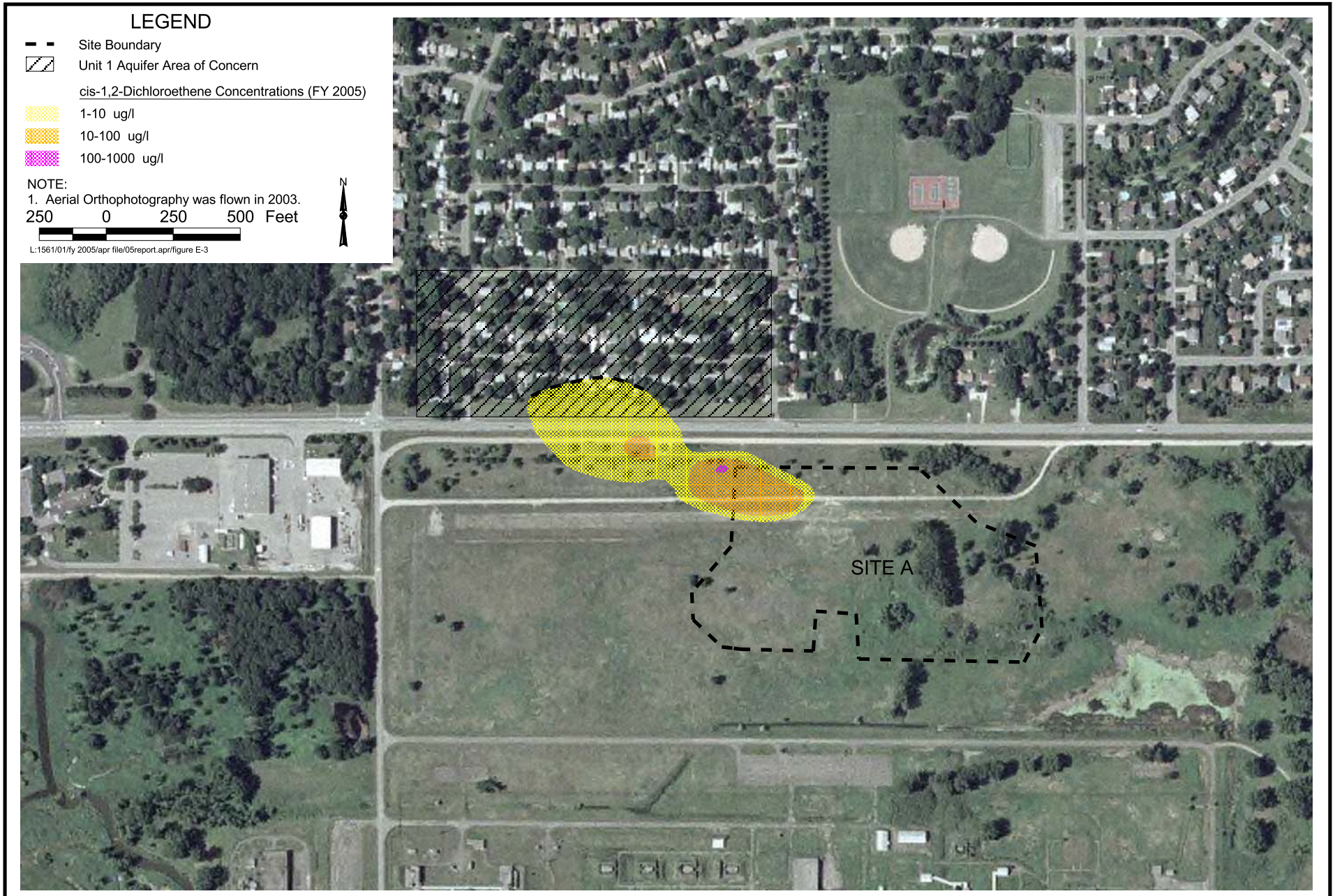
Note:
1. Aerial Orthophotography was flown in 2003.

7000 0 7000 Feet

N

L:\1561\01\fy2005\apr file\05report.apr\figure E-2

TWIN CITIES ARMY AMMUNITION PLANT	COPYRIGHT Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	FY 2005
Areas of Concern (Unit 3 and Unit 4)		Figure E-2



TWIN CITIES ARMY AMMUNITION PLANT

Area of Concern (Unit 1)

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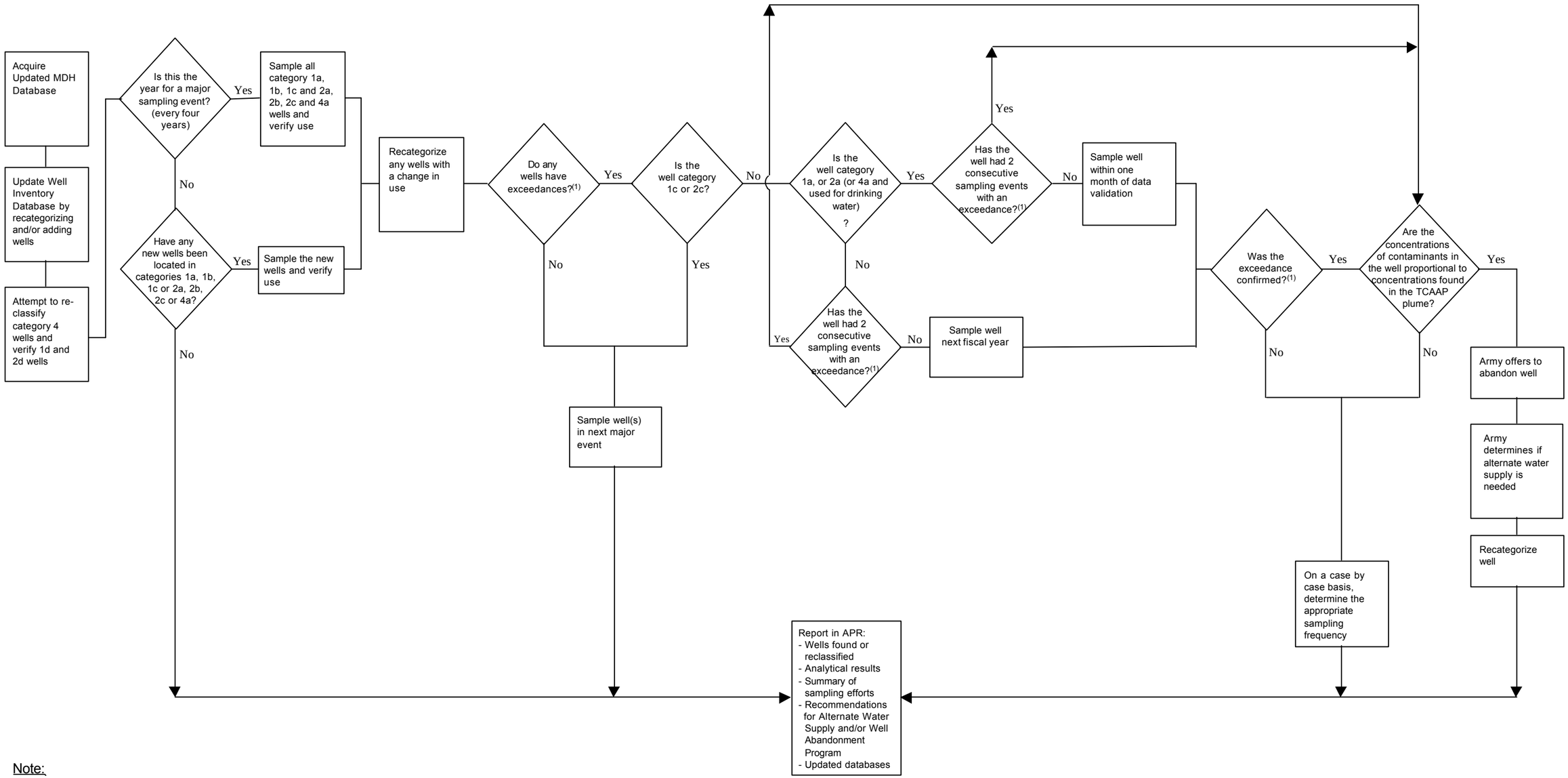
FY 2005

Figure E-3

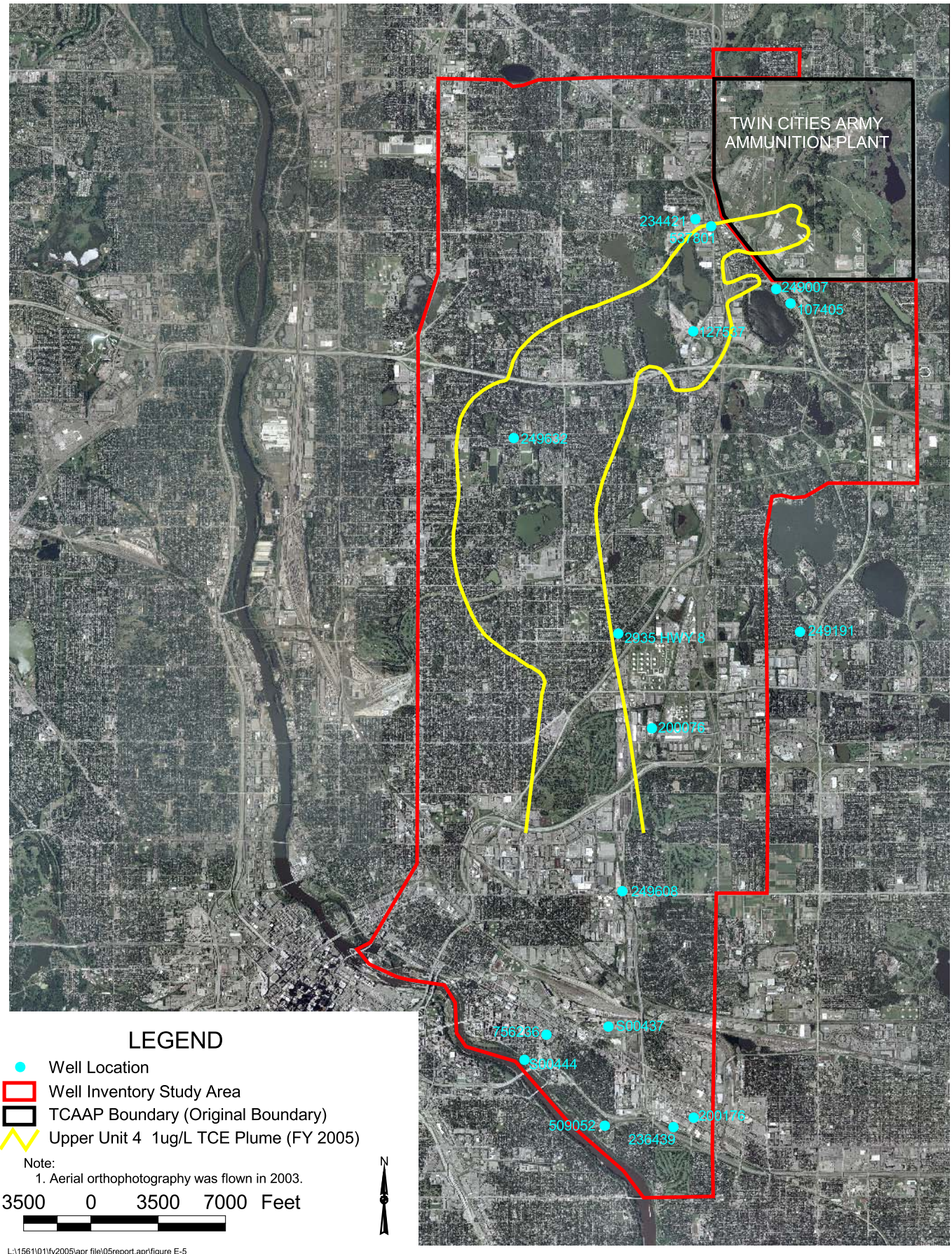
Figure E-4

Annual Requirements for Maintaining TCAAP Well Inventory Database



Note:

(1) = Exceedance of a TCAAP Groundwater Cleanup Level



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TWIN CITIES ARMY AMMUNITION PLANT	COPYRIGHT Wenck Wenck Associates, Inc. 1800 Pioneer Creek Center Environmental Engineers Maple Plain, MN 55359-0249	FY 2005
FY2005 Well Inventory Sampling Locations		Figure E-5

TCAAP WELL INVENTORY DATABASE

The TCAAP Well Inventory Database is located on this CD-ROM in the following Microsoft Excel file:

Well_Inv.xls

Appendix F

Site K, TGRS, and PGRS Operational Data

F.1 Inspection and Maintenance Activities, Fiscal Year 2005, Site K, TCAAP

APPENDIX F.1

INSPECTION AND MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
SITE K, TCAAP
ARDEN HILLS, MINNESOTA

October 2004

1) 10/7/04, System in suspense. System downtime: None.

2) 10/14/04, System in suspense. System downtime: None.

3) 10/19/04, System in suspense. System downtime: None.

4) 10/21/04, System in suspense. System downtime: None.

5) 10/22/04, System in suspense. System downtime: None.

6) 10/28/04, Attempt to increase flow rate. Nozzle appears to be partially plugged. System downtime: None.

November 2004

1) 11/1/04, Nozzle plugged, removed debris, adjusted flow rate to 12.9 gpm. System downtime: None.

2) 11/3/04, System in suspense. System downtime: None.

3) 11/4/04, System in suspense. System downtime: None.

4) 11/9/04, System in suspense. System downtime: None.

5) 11/22/04, System in suspense. System downtime: None.

6) 11/24/04, System in suspense. System downtime: None

December 2004

1) 12/02/04, System in suspense. System downtime: None.

2) 12/09/04, System in suspense. System downtime: None.

3) 12/10/04, System in suspense. System downtime: None.

4) 12/28/04, System in suspense. System downtime: None.

APPENDIX F.1

INSPECTION AND MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
SITE K, TCAAP
ARDEN HILLS, MINNESOTA

January 2005

1) 01/04/05, System in suspense. System downtime: None.

2) 01/14/05, System down on Low Building Temperature Alarm. Thermostat in building is not functioning properly, electric heater on. Replaced wall thermostat and checked panel heater- panel heater functioning properly. New wall thermostat functioning. Observed cycling on and off of building heater. System operational. System downtime: 3.5 hours.

3) 01/17/05, System in suspense. System downtime: None.

4) 01/21/05, System in suspense. System downtime: None.

5) 01/25/05, System in suspense. System downtime: None.

6) 01/25/05, System in suspense. System downtime: None.

7) 01/28/05, System in suspense. System downtime: None.

8) 01/31/05, System in suspense. System downtime: None.

February 2005

1) 02/01/05, System in suspense. System downtime: None.

2) 02/02/05, System in suspense. System downtime: None.

3) 02/03/05, System in suspense. System downtime: None.

4) 02/10/05, System in suspense. System downtime: None.

5) 02/11/05, System in suspense. System downtime: None.

6) 02/28/05, System in suspense. System downtime: None.

March 2005

1) 3/1/05, System in suspense. System downtime: None.

2) 3/3/05, System in suspense. System downtime: None.

APPENDIX F.1

INSPECTION AND MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
SITE K, TCAAP
ARDEN HILLS, MINNESOTA

March 2005 Continued

3) 3/7/05, System in suspense. System downtime: None.

4) 3/8/05, System in suspense. System downtime: None. Performed monthly maintenance.

5) 3/9/05, System in suspense. System downtime: None.

6) 3/10/05, System in suspense. System downtime: None.

7) 3/15/05, System in suspense. System downtime: None.

8) 3/16/05, System in suspense. System downtime: None.

9) 3/17/05, System in suspense. System downtime: None.

10) 3/18/05, System in suspense. System downtime: None.

11) 3/21/05, System in suspense. System downtime: None.

12) 3/22/05, System in suspense. System downtime: None.

13) 3/23/05, System in suspense. System downtime: None.

14) 3/25/05, System in suspense. System downtime: None.

15) 3/28/05, System in suspense. System downtime: None.

16) 3/30/05, System in suspense. System downtime: None.

17) 3/31/05, System in suspense. System downtime: None.

April 2005

1) 4/5/05, System in suspense. System downtime: None.

2) 4/14/05, System in suspense. System downtime: None.

3) 4/18/05, System in suspense. System downtime: None.

APPENDIX F.1

INSPECTION AND MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
SITE K, TCAAP
ARDEN HILLS, MINNESOTA

April 2005 Continued

4) 4/22/05, System in suspense. System downtime: None.

5) 4/26/05, System in suspense. System downtime: None.

6) 4/29/05, System in suspense. System downtime: None.

May 2005

1) 5/9/05, System in suspense. System downtime: None.

2) 5/12/05, Low water flow fault alarm, nozzle blocked with debris; cleaned and restarted system. System downtime: 20 hours.

3) 5/13/05, Monthly O & M performed. System downtime: None.

4) 5/17/05, System in suspense. System downtime: None.

5) 5/27/05, Low water flow fault alarm, nozzle blocked with debris; cleaned and restarted system. System downtime: 12 hours.

6) 5/31/05, System in suspense. System downtime: None.

June 2005

1) 6/3/2005, System in suspense. System downtime: None.

2) 6/13/2005, System in suspense. System downtime: None. Monthly O & M performed.

3) 6/15/2005, System in suspense. System downtime: None.

July 2005

1) 7/11/2005, System in suspense. System downtime: None.

2) 7/12/2005, System in suspense. System downtime: None.

3) 7/13/2005, System in suspense. System downtime: None.

APPENDIX F.1

INSPECTION AND MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
SITE K, TCAAP
ARDEN HILLS, MINNESOTA

July 2005 Continued

4) 7/18/2005, System in suspense. System downtime: None.

5) 7/21/2005, System in suspense. System downtime: None.

6) 7/26/2005, System in suspense. System downtime: None.

7) 7/29/2005, System in suspense. System downtime: None. Monthly O & M performed.

August 2005

1) 8/02/2005, System in suspense. System downtime: None.

2) 8/05/2005, System in suspense. System downtime: None.

3) 8/09/2005, Low water flow alarm. System downtime: Approximately 17 hours.

4) 8/10/2005, Low water flow alarm, spray nozzle blocked. System downtime: 24 hours. Monthly O & M Performed

5) 8/23/2005, System in suspense. System downtime: None.

6) 8/30/2005, Low water flow alarm, spray nozzle blocked. System downtime: Approximately 8 hours.

September 2005

1) 9/15/2005, Annual O&M, System Cleaning. System downtime: ~98 hours

F.2 Maintenance Activities, Fiscal Year 2005, TGRS, TCAAP

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

October 2004

10/1/2004 Pumphouse SC2; Light flashing on PLC; Reset PLC and observed normal operation.
Down time: 11 hours.

10/5/2004 Treatment System; ECV 3 will not open on command; changed filter, flushed control piping and adjusted control valves.
Down time: None.

10/6/2004 Treatment System; Tightened gland bushing at wet well pump 4; Repaired leak containment system; cleaned flow meter.
Down time: None.

10/17/2004 On arrival ECV #4 opening fault, changed out pilot and solenoid. Water supply port to the solenoid valve was blocked. Cleared out and reset system.
Down time: None.

10/28/2004 Water Tower; Opened Altitude valve to fill tower from 23.3' to 31.2feet.
Down time: None.

10/29/2004 Pumphouses B7, B10 and B12; Removed flow meters and prepared pumphouses for winter.
Down time: None.

10/29/2004 Pumphouses B5 and B11; Decreased pressure to increase flow rates.
Down time: None.

November 2004

11/9/2004 Treatment System; Changed printer ribbon and adjusted paper output on printer.
Down time: None.

11/9/2004 Treatment System; Cleaned two 3" Neptune cold water flow meters with muriatic acid. Both acceptable for reuse.
Down time: None.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

11/9/2004	Treatment System; Increased level in water tower from 20.3 feet to 36.8 feet. Down time: None.
11/10/2004	Pumphouse B11; Checked flow rate of meter versus calibrated meter; flow rate measured the same. Down time: None.
11/10/2004	Pumphouse B1; Swapped out flow meters due to difference in existing meter versus calibrated meter. Down time: None.
11/10/2004	Pumphouse B13; Swapped out flow meters due to difference in existing meter versus calibrated meter. Down time: None.
11/11/2004	Treatment System; ECV 3 will not close on command; Flush control piping, change filter and adjust speed control valves. Observed normal operation. Down time: None.
11/11/2004	Pumphouse B13; Water level is at 115.30, static water level is 91.8 feet and the flow rate is at 85 gpm with the ECV wide open. The specific capacity is at 3.6 GPM/ft and the dead head pressure is at 124 psi. Down time: None.
11/19/2004	Pumphouse B8; The pumping water level is at 70.2 feet. Down time: None.
11/19/2004	Pumphouse B4; ECV would not open at pump start up; flushed control piping, adjusted pilot and speed control valves and restarted pump. Observed normal operation. Down time: 4 hours.
11/23/2004	Altitude Valve; Opened altitude valve to fill water tower from 23.7 feet to 33.5 feet. Down time: None.
11/24/2004	Altitude Valve; Opened altitude valve to fill water tower from 25.8 feet to 35.5 feet. Down time: None.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

11/24/2004 Snelling Avenue Valve; Changed out strainer screen and flushed control piping.
Down time: None.

11/24/2004 Pumphouse B4; ECV would not open at pump start up; changed out solenoid valve with new, restarted pump and observed normal operation.
Down time: 17.5 hours.

11/24/2004 Altitude Valve; Changed out filter and replaced microswitch.
Down time: None.

11/24/2004 Treatment System; ECV#3; Replaced micro switch on valve.
Down time: None.

11/27/2004 Pumphouse SC1; Flow meter not totaling; Removed and cleaned flow meter. Restarted pumphouse and observed normal operation.
Down time: 3 hours (adjusted flow rate on spreadsheet as if no down time occurred).

11/29/2004 Pumphouse B8; Pump is very noisy, possible leak on riser.
Down Time: None

11/29/2004 Treatment System; Elevated tank changed to winter operation.
Down time: None.

11/30/2004 Treatment System; Elevated tank low level alarm. Call from Rick Boyer. Acknowledge alarm and fill water tower to 35 feet.
Down Time: None

December 2004

12/2/2004 Treatment System; Tecumseh/Wenck, Boyer Building Services and CRA on site to troubleshoot winter operation of elevated tank.
Down time: None.

12/3/2004 Treatment System; Trending indicates B1, B13, B5 and B6 started and stopped during the previous day.
Down time: None.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

12/5/2004	Building 116; Audible alarms, RTU 1, RTU 2, Elevated Tank low all flashing; Acknowledged alarms, now normal. Down time: None.
12/6-7/2004	Received a call from Time Communications at 2330, TGRS fail. Onsite at 0015 on 12/07/2004; WWP 1 disconnect tripped at motor control center; Reset disconnect and system (well field); Observed normal operation. Down time: None.
12/8/2004	Treatment System; Pump 2 on PDU flashing red; No faults on trending; Cycled pump 2 and observed normal operation. Down time: None.
12/13/2004	The altitude valve vault contains about one foot of clean water, the floor drain is plugged. The leak is occurring at the top of the valve through the valve stem. Down time: None.
12/13/2004	Treatment System; Call from Time Communications-TGRS Fail; ECV 3 will not open on command; Adjusted open and close speed control valves, changed filter, flushed control piping and cycled valve several times. Observed normal operation. Down time: B8 for 5 hours, B9 for 1 hour and B13 for 4 hours.
12/15/2004	Altitude Valve; Pumped standing water out of vault and cleaned out drain; Water began draining; Added muriatic acid to further break up blockage. Down time: None.
12/27/2004	Snelling Avenue Valve; Well field cycling and high pressure at the effluent and at Snelling Avenue. Flushed the valve control piping and pilot and reset the pressure to 32 psi. Down time: B1, B4, B9 for 8 hours; B6 and SC5 for 14 hours; B13, B5, B11, SC1 and SC2 for 22 hours; B8 for 28 hours and B3 for 40 hours.
12/29/2004	Pumphouse B8; Replaced pump, motor, drop pipe, electrical wire and check valve. Down time: 5 hours.
12/29/2004	Altitude Valve; All Enviro on Site; Tightened nut on valve stem to stop leak; Pumped standing water out of vault and water no longer accumulates. Down time: None

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

January 2005

1/4-6/2005	Treatment System; Burnt odor and rattling noise from blower motor 1; Removed motor and replaced with new from inventory; Old motor sent in for inspection. Down time: None.
1/7/2005	Treatment System; Old blower motor is not repairable; Purchased new for backup and placed in inventory. Down time: None.
1/11/2005	Treatment System; ECV4 would not open on command; Flushed control piping, adjusted speed control valves and changed filter. Down time: None.
1/12/2005	Treatment System; ECV4 would not open on command; Flushed control piping, adjusted speed control valves and changed filter. Down time: None.
1/13/2005	Pumphouse B4; Performed dead head test at 122 psi (new it was 138 psi); water level is at 73.5 feet btoc; Amps are at 31.4/30.4/30.7 (new it was 33.2/32.3/32.6) and the valve is wide open at 154 GPM at 96 psi. Down time: None.
1/13/2005	Pumphouse SC5; Changed out flow meter with new; New meter read 55718500 at 17:35 and registered 92 GPM. Down time: None.
1/16/2005	Building 116; RTU 1 communication fail, no current alarms, chart ok. Down time: None.
1/17/2005	Building 116; RTU 1 communication fail, no current alarms, chart ok. Informed David Knight of alarms. Down time: None.
1/18/2005	Treatment System; Blower towers down intermittently for quarterly maintenance work. Down time: None.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

1/18/2005 Pumphouse B5; Maximum flow rate with ECV wide open is 211 gpm.
Down time: None.

1/18/2005 Pumphouse B4; The size 2 starter must be upgraded to a size 3 starter to accommodate a 30 HP pump and motor.
Down time: None.

1/23/2005 Treatment System; ECV3 would not open on command - flushed control piping.
Down time: Pumphouse B5, B9, B13 and SC5 were down for 2.5 hours each.

February 2005

2/2/2005 Pumphouse SC2; Changed out flow meter with new.
Down time: None.

2/5/2005 Pumphouse B11; Light off on PLC in Building 116; Reset PLC and light relit normally.
Down time: 20 hours.

2/5/2005 Pumphouse B4; Laughlin Electric removed a size 2 starter and installed a size 3 starter.
Down time: 2 hours.

2/8/2005 Pumphouse B4; ECV control piping is leaking.
Down time: None.

2/8/2005 Pumphouse B5; Increased flow rate from 189 GPM (94 psi) to 203 GPM (86 psi).
Down time: None.

2/8/2005 Treatment System; ECV 3 would not open on command; Adjusted opening and closing speed control valves and flushed control piping; Observed two complete cycles of normal valve operation.
Down time: 2 hours each at B8, B9, B13 and SC2; 12 hours at SC5.

2/10/2005 Pumphouse B4; Shut down from 9 AM to 3:40 PM to replace the pump and motor. Cleaned flow meter.
Down time: 7 hours.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

2/18/2004 Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem.
Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.

March 2005

3/3/2005 Treatment System; ECV 3 will not close on command; Flush control piping, adjust opening and closing speed control valves and change filter; Observe two cycles of normal operation.
Down time: None.

3/5-23/2005 Pumphouse B3; Cycling on and off rapidly; Switched H-O-A switch to off; Contacted Laughlin Electric to inspect on 3/7/2005. Laughlin indicates failed motor; Pump pull rig on site on 3/23/2005; Replace pump and motor
Down time: 450 hours.

3/16/2005 Treatment System; Call from Time Communications-TGRS Fail; Upon inspection, ECV 3 will not open on command; Flushed control piping.
Down time: B5, SC2 and SC5 down for 1.5 hours each.

3/18/2005 Call from Time Communications; TGRS Fail. ECV #3 not opening on command; Adjusted control valve, reset and observed normal operation.
Down Time: SC5 for 1 hour.

3/28/2005 Pumphouse B5; Detected a gurgling noise in well; Additional monitoring will be performed.
Down time: None.

April 2005

4/4-6/2005 Pumphouse B8; Pump is off and the overload light is lit on the pumphouse control panel; Hit reset button and the pump restarted; Pump ran for approximately 45 minutes and then stopped and the overload light relit; Shut the pump off awaiting further troubleshooting. Laughlin Electric diagnosed the amps for each leg were higher than the heaters were designed for; He switched out the K54 with K56 heaters and the amps were at 30.8 for each leg.
Down time: 44 hours.

APPENDIX F.2

MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

4/5-6/2005	Treatment System; ECV 4 will not open on command; Change filter and flush control piping; Checked operation 3 times in Hand; Observed normal Down time: None.
4/17-18/2005	Pumphouse SC5; Major fault indicated at 4 AM and light is flashing on PLC; Switched to OFF and restarted in AUTO; Flushed control piping, adjusted pilot and observed normal operation. Down time: 15 hours.
4/21/2005	Pumphouse B5; Low level light on; Loud gurgling noise from inside casing; Closed valve to 100 psi . Down time: None.
4/26/2005	Treatment System; ECV 3 would not open on command; Acknowledged read out and inspected; Observed normal operation. Down time: None.
4/1-26/2005	Pumphouse SC2; Cleaned flow meter; Adjusted flow rate readings for month on spreadsheet to 15 gpm. Down time: None.
4/22-30/2005	Pumphouse B5; Water level is at 112.7' btoc @ 165 gpm and 95 psi; Installed new water level probe wire and lowered the probe to top of shroud at 132.5' btoc; Increased flow rate to 192 gpm with a water level of 119.8 ' btoc and pressure of 86 psi. Down time: 35 hours.
4/27/2004	Treatment System; Call from Time Communications; TGRS fail; ECV 3 will not open on command; flush control piping and adjust opening and closing speed control valves; checked operation and observed normal operation. Down time: None.
4/28/2005	Pumphouse B4; Light is off on PLC; ECV will not open on start up; Adjusted pilot and flushed control piping. Down time: 21 hours.
4/28/2005	Pumphouse B5; Pumping water level is at 118.0' btoc at 187 gpm and 88 psi. Down time: None.

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MAINTENANCE ACTIVITIES
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May 2005

5/8-9/2005	Treatment System; Wet well pump 3 low pressure fault warning is illuminated on the PDU control board; No call out from autodialer; Well field cycling; After further inspection, the stop pump switch for wet well pump 4 has failed; Replaced with new and observed normal operation. Down time: 7 hours at B1, B6, B11, B13 and SC1; 4 hours at B8; 11 hours at B3 and SC5; 15 hours at SC2 and 12.5 hours at B5.
5/7-11/2005	Pumphouse B8; Blown 30 amp fuse; Laughlin replaces with 40 amp fuses and upgrades main switch to 60 amp disconnect. Down time: 59 Hours.
5/11/2005	Pumphouse B13; Water level is 108.2 feet btoc, the pilot is wide open at 114 psi and the flow rate is 76 gpm. Down time: None.
5/11/2005	Pumphouse B4; Decreased flow rate to 207 gpm. Down time: None.
5/11/2005	Treatment System; ECV 4 will not close all the way on command; Changed filter, flushed control piping and adjusted speed control valves. Down time: None.
5/10-12/2005	Treatment System and Well Field; Annual TGRS electrical inspection performed. Down time: B5 for 1.5 hours and B9 for 2.5 hours. B1, B3, B4, B6, B11, SC1, SC2, and SC5 for 0.5 hours.
5/11/2005	Treatment System; Install new opening and closing speed ball valves on ECV 4 control piping. Down time: None, Treatment System already down for annual electrical inspection.
5/15/2005	Treatment System; Failed belt at blower 2; Replaced with new. Down time: None.

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MAINTENANCE ACTIVITIES
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

5/15/2005	Pumphouse B9; There is a clicking sound coming from the flow meter; Removed, repaired and reinstalled the flow meter; Observed normal operation. Down time: None, however, the meter readings were adjusted to 260 gpm for 5/13, 14 and 15, 2005.
5/20-21/2005	Pumphouse SC5; ECV will not open on command; Flushed control piping, adjusted pilot and speed control valves and observed normal operation. Down time: 47 hours.
5/24/2005	Treatment System; Shut down Pump 4 and Pump 2 to remove and clean bushings and tighten gland packing. Down time: None.
5/25/2005	Treatment System; Removed leak containment containers from ECV 3 and 4 and tightened valve stem bushings. Down time: None.
5/31/2005	Treatment System; ECV 4 would not close on command; Flushed control piping, changed filter, adjusted speed control valves and cycled valve two times. Observed normal operation. Down time: None.

June 2005

6/7-8/2005	Pumphouse B9; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Anik called to troubleshoot; Communications between remote I/O and I/O controller disabled. Caused major fault in related I/O of pumphouse B10. Lightning strike was the probable cause. Down time: 18 hours.
6/9/2005	Pumphouse B13; All Enviro pulled lift system and replaced pump (wet end only). Down time: None.
6/13/2005	Pumphouse SC-2; Removed and acid cleaned flow meter. Down time: None.
6/14/2005	Pumphouse B9; Old meter out (27752300), new meter in (385048) on at 0750. Old meter 263 gpm, new 266 gpm. Down time: None.

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MAINTENANCE ACTIVITIES
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TGRS, TCAAP
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6/27-30/2005	Pumphouse B9; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Upon arrival, flow meter was totaling backwards; According to the totalizer, approximately 218,000 gallons of groundwater extracted from other extraction wells flowed down B9; Approximately 0.25 lb. of TCE reintroduced into well. Pump started on June 30, 2005 at 250 gpm. Hence "lost water was likely recaptured within 24 hours of restart. Both the ECV and the check valve on the pipe column failed; Anik called to troubleshoot; Remote I/O adapter had faulted and overloaded the power supply. ECV was repaired and the check valve on the pipe column was replaced. Down time: 70 hours
6/27-30/05	Pumphouse SC1; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Anik called to troubleshoot; Faulty interposing relay which in turn blew a fuse in the SC1 I/O card in B11. Down time: 49 hours.

July 2005

7/2-8/2005	Pumphouse B9; Laughlin on site to inspect starter problem at B9; Bad output module; Replaced and observed normal operation. Down time: 165.5 hours.
7/2/2005	Building 116; High tower level alarm sounding and acknowledged. Down time: None
7/3/2005	Pumphouse SC-5; Light flashing on PLC, reset at panel, normal when at pumphouse. Down time: 7 hours.
7/5/2005	Pumphouse B5; Bucket test performed for sand grains. None produced, however, there was a small percentage of manganese and rust particles in the bottom of the bucket; water level is at 131.1' BTOC. Down time: None
7/5/2005	Pumphouse SC5; Removed, cleaned and replaced the flow meter. Down time: 2 hours.

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MAINTENANCE ACTIVITIES
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ARDEN HILLS, MINNESOTA

7/5/2005	Treatment System; Removed airflow measurement sections from Towers 3 and 4 and thoroughly cleaned them; Blowers were turned off during maintenance work. Down time: None.
7/7/2005	Treatment System; ECV 3 will not close on command; Changed filter, flushed control piping, adjusted speed control valves and observed normal operation. Down time: None.
7/11/2005	Treatment System; Removed airflow measurement sections from Towers 1 and 2 and thoroughly cleaned them. Blowers 1 and 2 were turned off during the work. Down time: None.
7/12/2005	Pumphouse B6; Replaced O-ring at pitless adapter. Down time: 101.5 hours.
7/12/2005	Pumphouse B9; Replaced pump (wet end) and failed check valve. Down time: 3.5 hours.
7/13-14/2005	Pumphouse SC2; Circulated acid through pump, piping and well for 24 hours. Down time: 26 hours.
7/13/2005	Treatment System; ECV 3 flashing on PDU; Changed filter, flushed control piping, adjusted speed control valves and observed normal operation. Down time: None.
7/13/2005	Pumphouse B13; Light flashing on PLC in Building 116; Reset PLC and observed normal operation. Down time: 16 hours.
7/15-19/2005	Pumphouse SC2; Light flashing each day on PLC; ECV not working correctly; Flushed control piping, removed and acid washed ECV components but problem continues. Closed lower upstream valve to disable ECV. Probable inadequate pump pressure to activate ECV. Ordered new drop pipe and upon arrival will schedule pump pull. Down time: 104.5 hours.

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MAINTENANCE ACTIVITIES
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TGRS, TCAAP
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7/19/2005 Pumphouse SC2; Pumping water level is at 126.5' btoc, dead head pressure is 78 psi and the flow rate is 11 gpm at 35 psi.
Down time: None.

7/22-28/2005 Pumphouse B4; Three blown 50 Amp fuses in breaker panel; Replace with new and one 50 amp fuse blows; Laughlin Electric on site on 7/26/2005 to troubleshoot and finds the electrical components are in working order; All Enviro replaces motor with new and the pump is restarted.
Down time: 137 hours.

7/23/2005 Pumphouse SC-5; Light flashing on PLC, reset at panel, normal when at pumphouse.
Down time: 4.5 hours.

7/25/2005 Treatment System; Data cable from the groundwater storage reservoir is laying on the ground, Informed David Knight.
Down time: None.

7/27/2005 Treatment System; ECV 4 will not close on command; Replace filter, flush control piping and observe normal operation.
Down time: None.

7/27/2005 Treatment System; Shut down the well field and treatment system to measure sediment in wet wells.
Down time: B8 for 2 hours and SC5 for 1 hour.

7/30/2005 Treatment System; ECV 4 flashing on PDU; Change filter, adjust speed control valves and flush control piping.
Down time: None.

7/31/2005 Treatment System; ECV 3 flashing on PDU; Change filter, adjust speed control valves and flush control piping.
Down time: None.

August 2005

8/1/2005 Treatment System; ECV #3 valve seal leaking out vent line. Valve is closing on command for now.
Down time: None.

APPENDIX F.2

MAINTENANCE ACTIVITIES
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8/2-3/2005	Treatment System; Tower packing maintenance; Closed gate valve to tower 1 and turned off and locked out wet well pump 1 to stop water flow to tower 4 to dry out packing material in towers 1 and 4; Turned off extraction wells B3, B5, B8, B9, B11 and B13. Down time: 27.5 hours at B3, B5, B8, B9, B11 and B13.
8/2/2005	Treatment System; ECV 4 flashing on PDU; Changed filter, flushed control piping and adjusted speed control valves; Removed control piping valves and inspected control piping. Cleaned closing speed valve with acid, otherwise piping looks good; Likely a filter problem. Down time: None.
8/3/2005	Treatment System; ECV 4 flashing on PDU; Adjusted speed control valves and flushed control piping. Down time: None.
8/3-5/2005	Forcemain; A leak was found flowing out of the ground approximately 500 feet south of Building 116 and 20 feet east of Mounds View Road. Ro-So repaired a 1" diameter leak found in the bottom of the 16-inch diameter cast iron forcemain. The forcemain is located approximately 12 feet below ground surface. Down time: 25 hours at B1, B4, B6, SC1, SC2 and SC5.
8/5-9/2005	Electrical/Communication; During repair of forcemain leak, Ro-So severed communication cables between well field and treatment system. Laughlin Electric pulled new cable and Anik sounded and hooked up the cables. Down time: 97 hours at B1, B5, B6, SC2 and SC5; 116 hours at B13, B3, B4, B8, B9, B11 and SC1.
8/10/2005	Pumphouse B4; Performed maintenance on ECV and adjusted flow rate. Down time: 23 hours.
8/10-22/2005	Pumphouse B11; Light flashing on PLC; Reset control panel but pump off during inspection; Performed maintenance on ECV control piping and observed normal operation. Also, guy wire grounding problem at power pole near B11 causing communication errors. Down time: 201 hours.

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MAINTENANCE ACTIVITIES
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8/12-22/2005 Pumphouse SC1; Pump light is on at PLC but pump is cycling often at pumphouse. Communication problem due to inadequate guy wire grounding at B11.
Down time: 184 hours.

8/30/2005 Pumphouse B11; Failed cold water flow meter; Replaced with new at 9:50 AM; New totalizer reading is 15475400.
Down time: None, adjusted flow rates accordingly on TGRS spreadsheet.

September 2005

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/4/2005 Pumphouse SC5; SC5 light flashing on PLC; Reset but light continues to flash; Flush ECV control piping, adjust opening and closing speed control valves and reset pilot; Observed normal operation.
Down time: 12 hours.

9/14/2005 Treatment System; Normal light flashing on autodialer, cycled power, now normal.
Down time: None.

9/16/2005 Pumphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694.
Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.

9/17/2005 Pumphouses B4 and SC5; Lights flashing on PLC in Building 116; Reset at PLC, but ECVs would not open; Flushed the ECV control piping and adjusted their speed control valves; Lowered flow rate at SC5 due to low level light on.
Down time: 24 hours at B4 and 26 hours at SC5.

9/19-20/2005 Pumphouse SC2; Replaced pump and drop pipe.
Down time: 28 hours.

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MAINTENANCE ACTIVITIES
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9/21-26/2005	Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm. Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.
9/22/2005	Treatment System; ECV 3 and 4 would not open on command; Flushed control piping, changed filter and adjusted opening and closing speed valves. Down time: None, system already down from power outage.
9/23/2005	Treatment System; ECV 1 and 2 would not open or close on command; Flushed control piping, changed filter and adjusted opening and closing speed valves. Down time: None, system already down from power outage.
9/24-26/2005	Pumphouse SC5; Pressure is fluctuating between 70 psi and shutoff; Removed valve control piping and reset pilot and speed control valves. Down time: 7 hours.
9/26/2005	Pumphouse B7, Electrical station off of building, Laughlin took parts list and will repair in next few weeks. Down time: None.
9/26/2005	Pumphouse B1, Down on arrival, Wires from control panel to well head are bad; Laughlin Electric replaced wires; Amps 44/45/46 and 230 gpm. Down time: 6 hours.

F.3 Maintenance Activities by Location, Fiscal Year 2005, TGRS, TCAAP

APPENDIX F.3

MAINTENANCE ACTIVITIES BY LOCATION
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

Pumphouse B1

11/10/2004 Pumphouse B1; Swapped out flow meters due to difference in existing meter versus calibrated meter.
Down time: None.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

9/26/2005 Pumphouse B1, Down on arrival, Wires from control panel to well head are bad; Laughlin Electric replaced wires; Amps 44/45/46 and 230 gpm.
Down time: 6 hours.

Pumphouse B3

3/5-23/2005 Pumphouse B3; Cycling on and off rapidly; Switched H-O-A switch to off; Contacted Laughlin Electric to inspect on 3/7/2005. Laughlin indicates failed motor; Pump pull rig on site on 3/23/2005; Replace pump and motor with new.
Down time: 450 hours.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/16/2005 Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694.
Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours

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MAINTENANCE ACTIVITIES BY LOCATION
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Pumphouse B4

11/19/2004	Pumphouse B4; ECV would not open at pump start up; flushed control piping, adjusted pilot and speed control valves and restarted pump. Observed normal operation. Down time: 4 hours.
11/24/2004	Pumphouse B4; ECV would not open at pump start up; changed out solenoid valve with new, restarted pump and observed normal operation. Down time: 17.5 hours.
1/13/2005	Pumphouse B4; Performed dead head test at 122 psi (new it was 138 psi); water level is at 73.5 feet btoc; Amps are at 31.4/30.4/30.7 (new it was 33.2/32.3/32.6) and the valve is wide open at 154 GPM at 96 psi. Down time: None.
1/18/2005	Pumphouse B4; The size 2 starter must be upgraded to a size 3 starter to accommodate a 30 HP pump and motor. Down time: None.
2/8/2005	Pumphouse B4; ECV control piping is leaking. Down time: None.
2/10/2005	Pumphouse B4; Shut down from 9 AM to 3:40 PM to replace the pump and motor. Cleaned flow meter. Down time: 7 hours.
2/18/2004	Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem. Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.
4/28/2005	Pumphouse B4; Light is off on PLC; ECV will not open on start up; Adjusted pilot and flushed control piping. Down time: 21 hours.
5/11/2005	Pumphouse B4; Decreased flow rate to 207 gpm. Down time: None.
7/22-28/2005	Pumphouse B4; Three blown 50 Amp fuses in breaker panel; Replace with new and one 50 amp fuse blows; Laughlin Electric on site on 7/26/2005 to troubleshoot and finds the electrical components are in working order; All Enviro replaces motor with new and the pump is restarted. Down time: 137 hours.

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MAINTENANCE ACTIVITIES BY LOCATION
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8/10/2005 Pumphouse B4; Performed maintenance on ECV and adjusted flow rate.
Down time: 23 hours.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/16/2005 Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694.
Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.

9/17/2005 Pumphouses B4 and SC5; Lights flashing on PLC in Building 116; Reset at PLC, but ECVs would not open; Flushed the ECV control piping and adjusted their speed control valves; Lowered flow rate at SC5 due to low level light on.
Down time: 24 hours at B4 and 26 hours at SC5.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse B5

1/18/2005 Pumphouse B5; Maximum flow rate with ECV wide open is 211 gpm.
Down time: None.

2/8/2005 Pumphouse B5; Increased flow rate from 189 GPM (94 psi) to 203 GPM (86 psi).
Down time: None.

2/18/2004 Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem.
Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.

3/28/2005 Pumphouse B5; Detected a gurgling noise in well; Additional monitoring will be performed.

Down time: None.

4/21/2005 Pumphouse B5; Low level light on; Loud gurgling noise from inside casing; Closed valve to 100 psi .
Down time: None.

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MAINTENANCE ACTIVITIES BY LOCATION
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4/22-30/2005 Pumphouse B5; Water level is at 112.7' btoc @ 165 gpm and 95 psi; Installed new water level probe wire and lowered the probe to top of shroud at 132.5' btoc; Increased flow rate to 192 gpm with a water level of 119.8 ' btoc and pressure of 86 psi.
Down time: 35 hours.

4/28/2005 Pumphouse B5; Pumping water level is at 118.0' btoc at 187 gpm and 88 psi.
Down time: None.

7/5/2005 Pumphouse B5; Bucket test performed for sand grains. None produced, however, there was a small percentage of manganese and rust particles in the bottom of the bucket; water level is at 131.1' BTOC.
Down time: None

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/16/2005 Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694.
Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse B6

2/18/2004 Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem.
Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.

7/12/2005 Pumphouse B6; Replaced O-ring at pitless adapter.
Down time: 101.5 hours.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

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MAINTENANCE ACTIVITIES BY LOCATION
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9 / 16 / 2005 Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694.
Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.

9 / 21-26 / 2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse B7

10 / 29 / 2004 Pumphouses B7, B10 and B12; Removed flow meters and prepared pumphouses for winter.
Down time: None.

9 / 26 / 2005 Pumphouse B7, Electrical station off of building, Laughlin took parts list and will repair in next few weeks.
Down time: None.

Pumphouse B8

11 / 19 / 2004 Pumphouse B8; The pumping water level is at 70.2 feet.
Down time: None.

11 / 29 / 2004 Pumphouse B8; Pump is very noisy, possible leak on riser.
Down Time: None

12 / 29 / 2004 Pumphouse B8; Replaced pump, motor, drop pipe, electrical wire and check valve.
Down time: 5 hours.

2 / 18 / 2004 Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem.
Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.

4 / 4-6 / 2005 Pumphouse B8; Pump is off and the overload light is lit on the pumphouse control panel; Hit reset button and the pump restarted; Pump ran for approximately 45 minutes and then stopped and the overload light relit; Shut the pump off awaiting further troubleshooting. Laughlin Electric diagnosed the amps for each leg were higher than the heaters were designed for; He switched out the K54 with K56 heaters and the amps were at 30.8 for each leg.
Down time: 44 hours.

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MAINTENANCE ACTIVITIES BY LOCATION
FISCAL YEAR 2005
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5/7-11/2005 Pumphouse B8; Blown 30 amp fuse; Laughlin replaces with 40 amp fuses and upgrades main switch to 60 amp disconnect.
Down time: 59 Hours.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse B9

2/18/2004 Pumphouses B4, B5, B6, B8 and B9; Pumps are not pumping; Power outage to boundary wells; Xcel energy responds and repairs problem.
Down time: 14 hours at B4, B5, B6 and B8; 21 hours at B9.

5/15/2005 Pumphouse B9; There is a clicking sound coming from the flow meter; Removed, repaired and reinstalled the flow meter; Observed normal operation.
Down time: None, however, the meter readings were adjusted to 260 gpm for 5/13, 14 and 15, 2005.

6/7-8/2005 Pumphouse B9; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Anik called to troubleshoot; Communications between remote I/O and I/O controller disabled. Caused major fault in related I/O of pumphouse B10. Lightning strike was the probable cause.
Down time: 18 hours.

6/14/2005 Pumphouse B9; Old meter out (27752300), new meter in (385048) on at 0750. Old meter 263 gpm, new 266 gpm.
Down time: None.

APPENDIX F.3

MAINTENANCE ACTIVITIES BY LOCATION
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6/27-30/2005	Pumphouse B9; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Upon arrival, flow meter was totalling backwards; According to the totalizer, approximately 218,000 gallons of groundwater extracted from other extraction wells flowed down B9; Approximately 0.25 lb. of TCE reintroduced into well. Pump started on June 30, 2005 at 250 gpm, Hence "lost water was likely recaptured within 24 hours of restart. Both the ECV and the check valve on the pipe column failed; Anik called to troubleshoot; Remote I/O adapter had faulted and overloaded the power supply. ECV was repaired and the check valve on the pipe column was replaced. Down time: 70 hours
7/2-8/2005	Pumphouse B9; Laughlin on site to inspect starter problem at B9; Bad output module; Replaced and observed normal operation. Down time: 165.5 hours.
7/12/2005	Pumphouse B9; Replaced pump (wet end) and failed check valve. Down time: 3.5 hours.
9/2-7/2005	Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair. Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.
9/16/2005	Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694. Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.
9/21-26/2005	Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm. Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse B10

10/29/2004	Pumphouses B7, B10 and B12; Removed flow meters and prepared pumphouses for winter. Down time: None.

Pumphouse B11

10/29/2004	Pumphouses B5 and B11; Decreased pressure to increase flow rates. Down time: None.

APPENDIX F.3

MAINTENANCE ACTIVITIES BY LOCATION
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11 / 10 / 2004	Pumphouse B11; Checked flow rate of meter versus calibrated meter; flow rate measured the same. Down time: None.
2 / 5 / 2005	B11 off, reset New size 3 starter installed at B4
8 / 10-22 / 2005	Pumphouse B11; Light flashing on PLC; Reset control panel but pump off during inspection; Performed maintenance on ECV control piping and observed normal operation. Also, guy wire grounding problem at power pole near B11 causing communication errors. Down time: 201 hours.
8 / 30 / 2005	Pumphouse B11; Failed cold water flow meter; Replaced with new at 9:50 AM; New totalizer reading is 15475400. Down time: None, adjusted flow rates accordingly on TGRS spreadsheet.
9 / 2-7 / 2005	Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair. Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.
9 / 16 / 2005	Punphouses B3, B4, B5, B6, B8, B9 and B11; Xcel shut power off to replace a power pole near I-694. Down time: B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1 for 19.5 hours each.
9 / 21-26 / 2005	Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm. Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse 12

10 / 29 / 2004	Pumphouses B7, B10 and B12; Removed flow meters and prepared pumphouses for winter. Down time: None.

Pumphouse B13

11 / 10 / 2004	Pumphouse B13; Swapped out flow meters due to difference in existing meter versus calibrated meter. Down time: None.

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11/11/2004 Pumphouse B13; Water level is at 115.30, static water level is 91.8 feet and the flow rate is at 85 gpm with the ECV wide open. The specific capacity is at 3.6 GPM/ft and the dead head pressure is at 124 psi.
Down time: None.

5/11/2005 Pumphouse B13; Water level is 108.2 feet btoc, the pilot is wide open at 114 psi and the flow rate is 76 gpm.
Down time: None.

6/9/2005 Pumphouse B13; All Enviro pulled lift system and replaced pump (wet end only).
Down time: None.

7/13/2005 Pumphouse B13; Light flashing on PLC in Building 116; Reset PLC and observed normal operation.
Down time: 16 hours.

9/2-7/2005 Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair.
Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.

9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse SC1

11/27/2004 Pumphouse SC1; Flow meter not totaling; Removed and cleaned flow meter. Restarted pumphouse and observed normal operation.
Down time: 3 hours (adjusted flow rate on spreadsheet as if no down time occurred).

6/27-30/05 Pumphouse SC1; Light is off on PLC in Building 116; Pump works in Hand, but not Auto; Anik called to troubleshoot; Faulty interposing relay which intern blew a fuse in the SC1 I/O card in B11.
Down time: 49 hours.

8/12-22/2005 Pumphouse SC1; Pump light is on at PLC but pump is cycling often at pumphouse. Communication problem due to inadequate guy wire grounding at B11.
Down time: 184 hours.

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9/21-26/2005 Pumphouses B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC1; Power is out to the pumphouses due to a storm.
Down time: B1, B13, B4, B8 and B11 for 110 hours each; B3, B5, B6, B9 and SC1 for 96 hours each.

Pumphouse SC2

10/1/2004 Pumphouse SC2; Light flashing on PLC; Reset PLC and observed normal operation.
Down time: 11 hours.

2/2/2005 Pumphouse SC2; Changed out flow meter with new.
Down time: None.

4/1-26/2005 Pumphouse SC2; Cleaned flow meter; Adjusted flow rate readings for month on spreadsheet to 15 gpm.
Down time: None.

6/13/2005 Pumphouse SC-2; Removed and acid cleaned flow meter.
Down time: None.

7/13-14/2005 Pumphouse SC2; Circulated acid through pump, piping and well for 24 hours.
Down time: 26 hours.

7/15-19/2005 Pumphouse SC2; Light flashing each day on PLC; ECV not working correctly; Flushed control piping, removed and acid washed ECV components but problem continues. Closed lower upstream valve to disable ECV. Probable inadequate pump pressure to activate ECV. Ordered new drop pipe and upon arrival will schedule pump pull.
Down time: 104.5 hours.

7/19/2005 Pumphouse SC2; Pumping water level is at 126.5' btoc, dead head pressure is 78 psi and the flow rate is 11 gpm at 35 psi.
Down time: None.

9/19-20/2005 Pumphouse SC2; Replaced pump and drop pipe.
Down time: 28 hours.

Pumphouse SC5

1/13/2005 Pumphouse SC5; Changed out flow meter with new; New meter read 55718500 at 17:35 and registered 92 GPM.
Down time: None.

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MAINTENANCE ACTIVITIES BY LOCATION
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4/17-18/2005	Pumphouse SC5; Major fault indicated at 4 AM and light is flashing on PLC; Switched to OFF and restarted in AUTO; Flushed control piping, adjusted pilot and observed normal operation. Down time: 15 hours.
5/20-21/2005	Pumphouse SC5; ECV will not open on command; Flushed control piping, adjusted pilot and speed control valves and observed normal operation. Down time: 47 hours.
7/3/2005	Pumphouse SC-5; Light flashing on PLC, reset at panel, normal when at pumphouse. Down time: 7 hours.
7/5/2005	Pumphouse SC5; Removed, cleaned and replaced the flow meter. Down time: 2 hours.
7/23/2005	Pumphouse SC-5; Light flashing on PLC, reset at panel, normal when at pumphouse. Down time: 4.5 hours.
9/2-7/2005	Pumphouse B1, B13, B3, B4, B5, B6, B8, B9, B11 and SC5; The transformer on a power pole near B1 blew; Xcel energy on site to repair; Created associated damage to communication ground line between B3 and B4; Anik on site to troubleshoot and repair. Down time: B1, B13, SC2 and B9 for 2 hours each; B5 and B8 for 5 hours each; B11 for 22 hours; B3 for 56 hours and B4 for 100 hours.
9/4/2005	Pumphouse SC5; SC5 light flashing on PLC; Reset but light continues to flash; Flush ECV control piping, adjust opening and closing speed control valves and reset pilot; Observed normal operation. Down time: 12 hours.
9/17/2005	Pumphouses B4 and SC5; Lights flashing on PLC in Building 116; Reset at PLC, but ECVs would not open; Flushed the ECV control piping and adjusted their speed control valves; Lowered flow rate at SC5 due to low level light on. Down time: 24 hours at B4 and 26 hours at SC5.
9/24-26/2005	Pumphouse SC5; Pressure is fluctuating between 70 psi and shutoff; Removed valve control piping and reset pilot and speed control valves. Down time: 7 hours.

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MAINTENANCE ACTIVITIES BY LOCATION
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TREATMENT SYSTEM

10/5/2004	Treatment System; ECV 3 will not open on command; changed filter, flushed control piping and adjusted control valves. Down time: None.
10/6/2004	Treatment System; Tightened gland bushing at wet well pump 4; Repaired leak containment system; cleaned flow meter. Down time: None.
10/17/2004	On arrival ECV #4 opening fault, changed out pilot and solenoid. Water supply port to the solenoid valve was blocked. Cleared out and reset system. Down time: None.
11/9/2004	Treatment System; Changed printer ribbon and adjusted paper output on printer. Down time: None.
11/9/2004	Treatment System; Cleaned two 3" Neptune cold water flow meters with muriatic acid. Both acceptable for reuse. Down time: None.
11/9/2004	Treatment System; Increased level in water tower from 20.3 feet to 36.8 feet. Down time: None.
11/11/2004	Treatment System; ECV 3 will not close on command; Flush control piping, change filter and adjust speed control valves. Observed normal operation. Down time: None.
11/23/2004	Altitude Valve; Opened altitude valve to fill water tower from 23.7 feet to 33.5 feet. Down time: None.
11/24/2004	Altitude Valve; Opened altitude valve to fill water tower from 25.8 feet to 35.5 feet. Down time: None.
11/24/2004	Snelling Avenue Valve; Changed out strainer screen and flushed control piping. Down time: None.
11/24/2004	Altitude Valve; Changed out filter and replaced microswitch. Down time: None.
11/24/2004	Treatment System; ECV#3; Replaced micro switch on valve. Down time: None.

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11/29/2004	Treatment System; Elevated tank changed to winter operation. Down time: None.
11/30/2004	Treatment System; Elevated tank low level alarm. Call from Rick Boyer. Acknowledge alarm and fill water tower to 35 feet. Down Time: None
12/2/2004	Treatment System; Tecumseh/Wenck, Boyer Building Services and CRA on site to troubleshoot winter operation of elevated tank. Down time: None.
12/3/2004	Treatment System; Trending indicates B1, B13, B5 and B6 started and stopped during the previous day. Down time: None.
12/3/2004	After 12/16/2004, the new phone number to contact the guards will be 651-755-3734 (cell). Down time: None.
12/5/2004	Building 116; Audible alarms, RTU 1, RTU 2, Elevated Tank low all flashing; Aknowledged alarms, now normal. Down time: None.
12/6-7/2004	Received a call from Time Communications at 2330, TGRS fail. Onsite at 0015 on 12/07/2004; WWP 1 disconnect tripped at motor control center; Reset disconnect and system (well field); Observed normal operation. Down time: None.
12/8/2004	Treatment System; Pump 2 on PDU flashing red; No faults on trending; Cycled pump 2 and observed normal operation. Down time: None.
12/13/2004	The altitude valve vault contains about one foot of water, the floor drain is plugged. The leak is occuring at the top of the valve through the valve stem. Down time: None.
12/13/2004	Treatment System; Call from Time Communications-TGRS Fail; ECV 3 will not open on command; Adjusted open and close speed control valves, changed filter, flushed control piping and cycled valve several times. Observed normal operation. Down time: B8 for 5 hours, B9 for 1 hour and B13 for 4 hours.
12/15/2004	Altitude Valve; Pumped standing water out of vault and cleaned out drain; Water began draining; Added muriatic acid to further break up blockage. Down time: None.

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MAINTENANCE ACTIVITIES BY LOCATION
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TGRS, TCAAP
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12 / 27 / 2004	Snelling Avenue Valve; Well field cycling and high pressure at the effluent and at Snelling Avenue. Flushed the valve control piping and pilot at the Snelling and reset the pressure to 32 psi. Down time: B1, B4, B9 for 8 hours; B6 and SC5 for 14 hours; B13, B5, B11, SC1 and SC2 for 22 hours; B8 for 28 hours and B3 for 40 hours.
12 / 29 / 2004	Altitude Valve; All Enviro on Site; Tightend nut on valve stem to stop leak; Pumped standing water out of vault and water no longer accumulates. Down time: None
1 / 4-6 / 2005	Treatment System; Burnt odor and rattling noise from blower motor 1; Removed motor and replaced with new from inventory; Old motor sent in for inspection. Down time: None.
1 / 7 / 2005	Treatment System; Old blower motor is not repairable; Purchased new for backup and placed in inventory. Down time: None.
1 / 11 / 2005	Treatment System; ECV4 would not open on command; Flushed control piping, adjusted speed control valves and changed filter. Down time: None.
1 / 12 / 2005	Treatment System; ECV4 would not open on command; Flushed control piping, adjusted speed control valves and changed filter. Down time: None.
1 / 16 / 2005	Building 116; RTU 1 communication fail, no current alarms, chart ok. Down time: None.
1 / 17 / 2005	Building 116; RTU 1 communication fail, no current alarms, chart ok. Informed David Knight of alarms. Down time: None.
1 / 18 / 2005	Treatment System; Blower towers down intermittently for quarterly maintenance work. Down time: None.
1 / 23 / 2005	Treatment System; ECV3 would not open on command - flushed control piping. Down time: Pumphouse B5, B9, B13 and SC5 were down for 2.5 hours each.
2 / 8 / 2005	Treatment System; ECV 3 would not open on command; Adjusted opening and closing speed control valves and flushed control piping; Observed two complete cycles of normal valve operation. Down time: 2 hours each at B8, B9, B13 and SC2; 12 hours at SC5.

APPENDIX F.3

MAINTENANCE ACTIVITIES BY LOCATION
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TGRS, TCAAP
ARDEN HILLS, MINNESOTA

3/3/2005	Treatment System; ECV 3 will not close on command; Flush control piping, adjust opening and closing speed control valves and change filter; Observe two cycles of normal operation. Down time: None.
3/16/2005	Treatment System; Call from Time Communications-TGRS Fail; Upon inspection, ECV 3 will not open on command; Flushed control piping. Down time: B5, SC2 and SC5 down for 1.5 hours each.
3/18/2005	Call from Time Communications; TGRS Fail. ECV #3 not opening on command; Adjusted control valve, reset and observed normal operation. Down Time: SC5 for 1 hour.
4/5-6/2005	Treatment System; ECV 4 will not open on command; Change filter and flush control piping; Checked operation 3 times in Hand; Observed normal operation. Down time: None.
4/26/2005	Treatment System; ECV 3 would not open on command; Acknowledged read out and inspected; Observed normal operation. Down time: None.
4/27/2004	Treatment System; Call from Time Communications; TGRS fail; ECV 3 will not open on command; flush control piping and adjust opening and closing speed control valves; checked operation and observed normal operation. Down time: None.
5/8-9/2005	Treatment System; Wet well pump 3 low pressure fault warning is illuminated on the PDU control board; No call out from autodialer; Well field cycling; After further inspection, the stop pump switch for wet well pump 4 has failed; Replaced with new and observed normal operation. Down time: 7 hours at B1, B6, B11, B13 and SC1; 4 hours at B8; 11 hours at B3 and SC5; 15 hours at SC2 and 12.5 hours at B5.
5/11/2005	Treatment System; ECV 4 will not close all the way on command; Changed filter, flushed control piping and adjusted speed control valves. Down time: None.
5/10-12/2005	Treatment System and Well Field; Annual TGRS electrical inspection performed. Down time: B5 for 1.5 hours and B9 for 2.5 hours.
5/11/2005	Treatment System; Install new opening and closing speed ball valves on ECV 4 control piping. Down time: None, Treatment System already down for annual electrical inspection.

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5/15/2005	Treatment System; Failed belt at blower 2; Replaced with new. Down time: None.
5/24/2005	Treatment System; Shut down Pump 4 and Pump 2 to remove and clean bushings and tighten gland packing. Down time: None.
5/25/2005	Treatment System; Removed leak containment containers from ECV 3 and 4 and tightened valve stem bushings. Down time: None.
5/31/2005	Treatment System; ECV 4 would not close on command; Flushed control piping, changed filter, adjusted speed control valves and cycled valve two times. Observed normal operation. Down time: None.
7/2/2005	Building 116; High tower level alarm sounding and acknowledged. Down time: None
7/5/2005	Treatment System; Removed airflow measurement sections from towers 3 and 4 and thoroughly cleaned them; Blowers were turned off during maintenance work. Down time: None.
7/7/2005	Treatment System; ECV 3 will not close on command; Changed filter, flushed control piping, adjusted speed control valves and observed normal operation. Down time: None.
7/11/2005	Treatment System; Removed airflow measurement banks from towers 1 and 2 and throughly cleaned them. Blowers 1 and 2 were turned off during the work. Down time: None.
7/13/2005	Treatment System; ECV 3 flashing on PDU; Changed filter, flushed control piping, adjusted speed control valves and observed normal operation. Down time: None.
7/25/2005	Treatment System; Data cable from the groundwater storage reservoir is laying on the ground, Informed David Knight. Down time: None.
7/27/2005	Treatment System; ECV 4 will not close on command; Replace filter, flush control piping and observe normal operation. Down time: None.

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7/27/2005	Treatment System; Shut down the well field and treatment system to measure sediment in wet wells. Down time: B8 for 2 hours and SC5 for 1 hour.
7/30/2005	Treatment System; ECV 4 flashing on PDU; Change filter, adjust speed control valves and flush control piping. Down time: None.
7/31/2005	Treatment System; ECV 3 flashing on PDU; Change filter, adjust speed control valves and flush control piping. Down time: None.
8/1/2005	Treatment System; ECV #3 valve seal leaking out vent line. Valve is closing on command for now. Down time: None.
8/2-3/2005	Treatment System; Tower packing maintenance; Closed gate valve to tower 1 and turned off and locked out wet well pump 1 to stop water flow to tower 4 to dry out packing material in towers 1 and 4; Turned off extraction wells B3, B5, B8, B9, B11 and B13. Down time: 27.5 hours at B3, B5, B8, B9, B11 and B13.
8/2/2005	Treatment System; ECV 4 flashing on PDU; Changed filter, flushed control piping and adjusted speed control valves; Removed control piping valves and inspected control piping. Cleaned closing speed valve with acid, otherwise piping looks good; Likely a filter problem. Down time: None.
8/3/2005	Treatment System; ECV 4 flashing on PDU; Adjusted speed control valves and flushed control piping. Down time: None.
9/14/2005	Treatment System; Normal light flashing on autodialer, cycled power, now normal. Down time: None.
9/22/2005	Treatment System; ECV 3 and 4 would not open on command; Flushed control piping, changed filter and adjusted opening and closing speed valves. Down time: None, system already down from power outage.
9/23/2005	Treatment System; ECV 1 and 2 would not open or close on command; Flushed control piping, changed filter and adjusted opening and closing speed valves. Down time: None, system already down from power outage.

APPENDIX F.3

MAINTENANCE ACTIVITIES BY LOCATION
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

FORCEMAIN

8/3-5/2005	Forcemain; A leak was found flowing out of the ground approximately 500 feet south of Building 116 and 20 feet east of Mounds View Road. Ro-So repaired a 1" diameter leak found in the bottom of the 16-inch diameter cast iron forcemain. The forcemain is located approximately 12 feet below ground surface. Down time: 25 hours at B1, B4, B6, SC1, SC2 and SC5.
10/28/2004	Water Tower; Opened Altitude valve to fill tower from 23.3' to 31.2feet. Down time: None.
8/5-9/2005	Electrical/Communication; During repair of forcemain leak, Ro-So severed communication cables between well field and treatment system. Laughlin Electric pulled new cable and Anik sounded and hooked up the cables. Down time: 97 hours at B1, B5, B6, SC2 and SC5; 116 hours at B13, B3, B4, B8, B9, B11 and SC1.

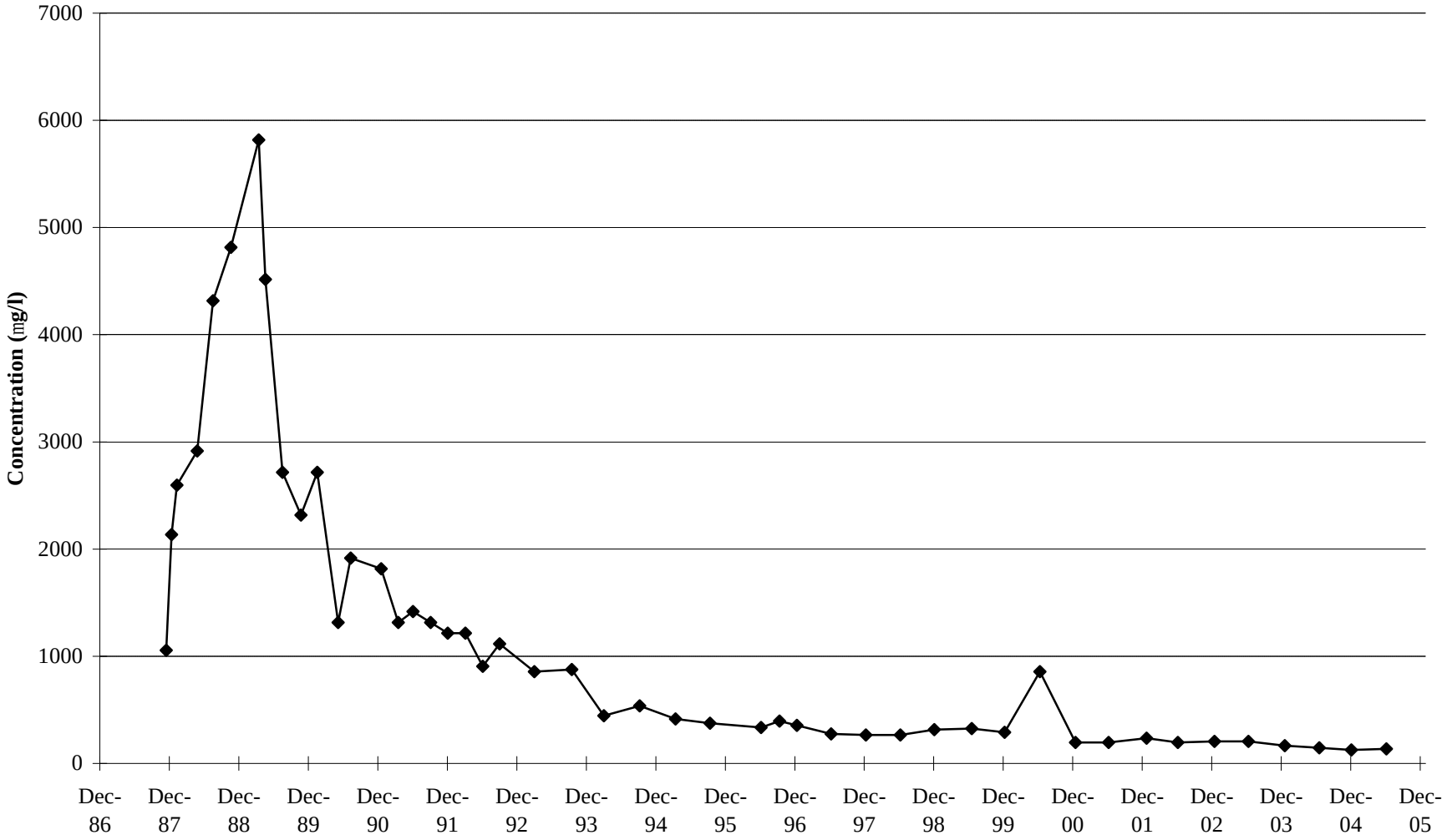
Appendix G

TGRS Chemical Data

G.1 TGRS Extraction Wells – TRCLE Versus Time

APPENDIX G.1

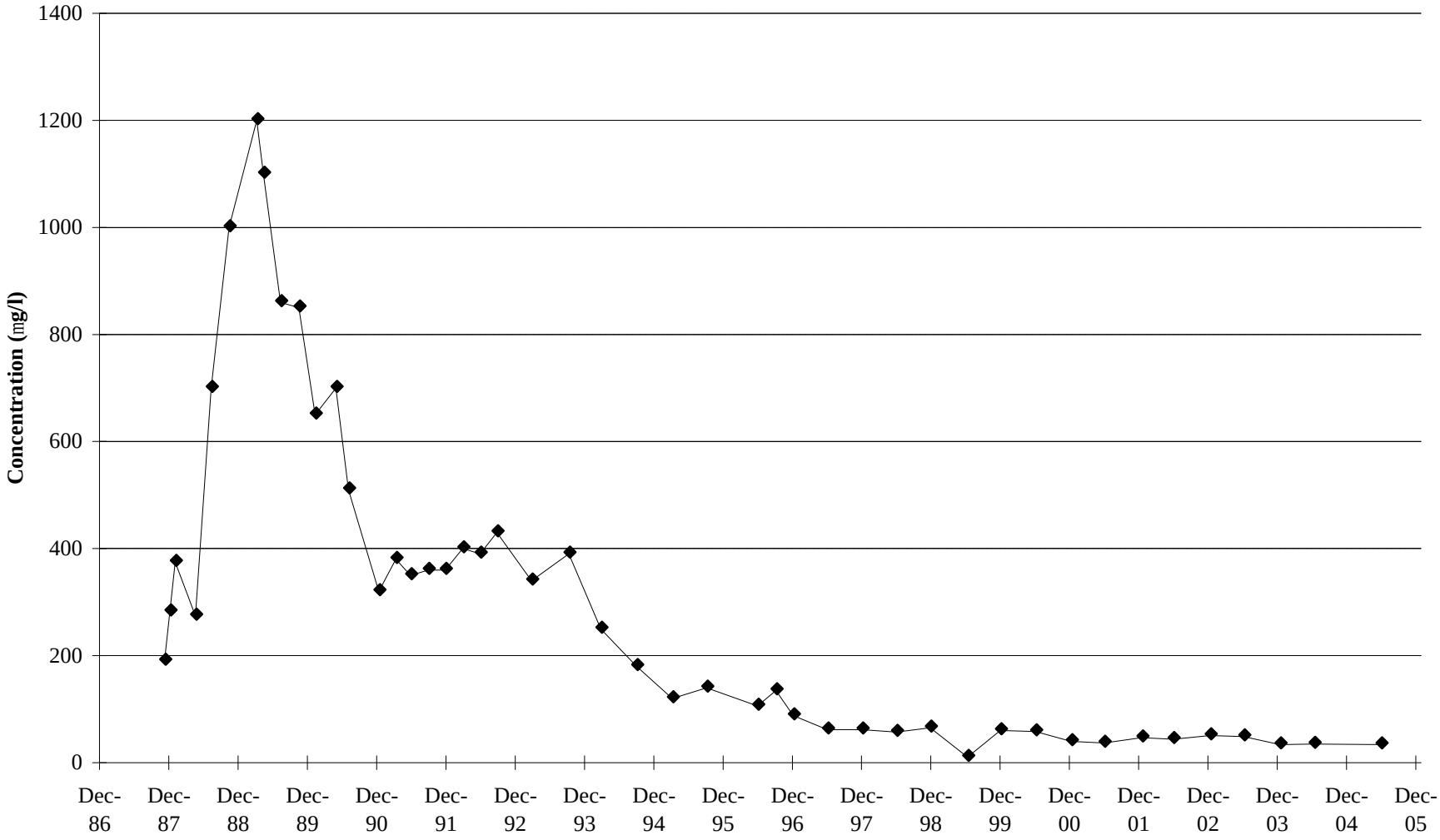
EXTRACTION WELL B1 - TRCLE VS.TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

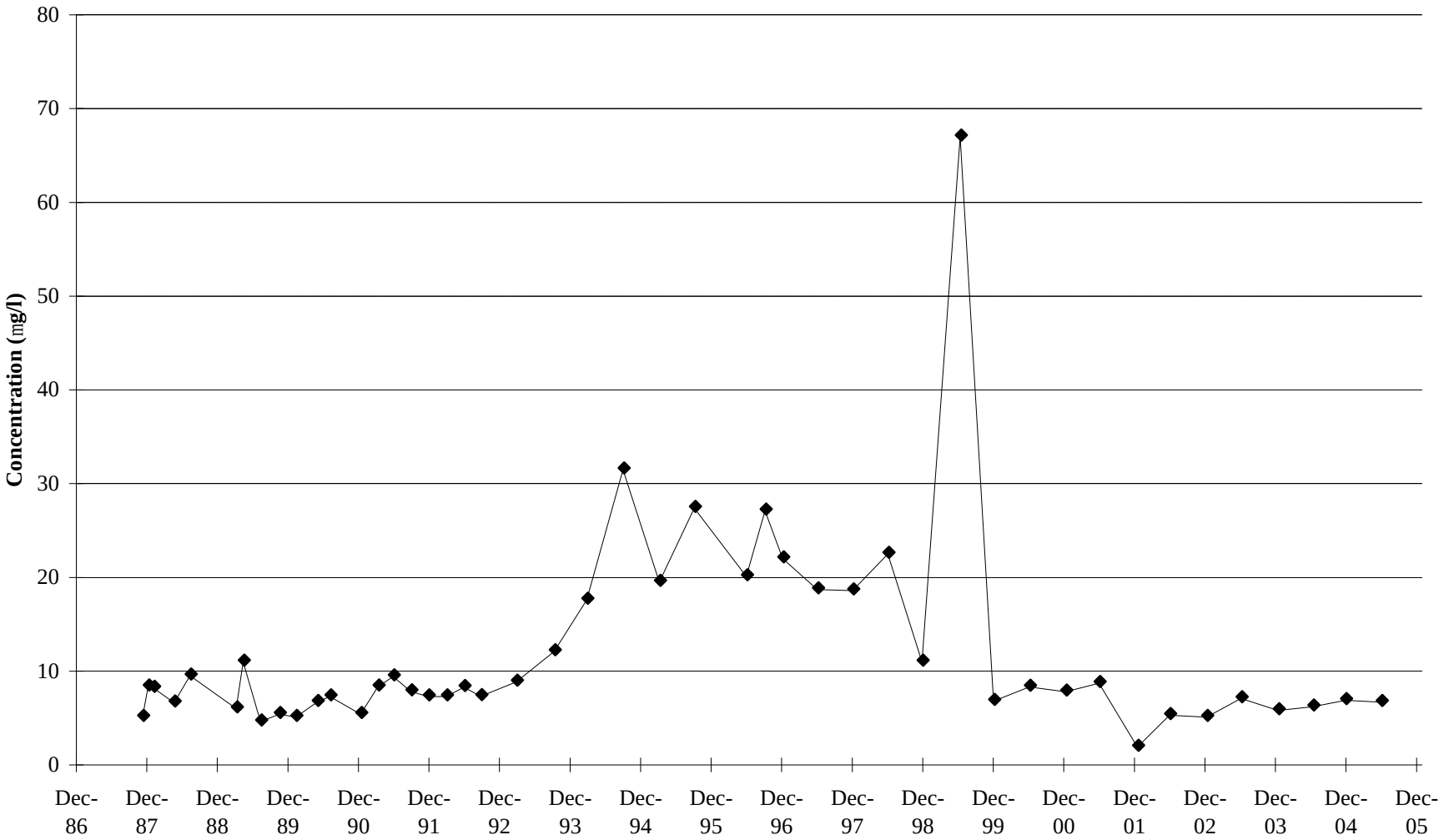
EXTRACTION WELL B2 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

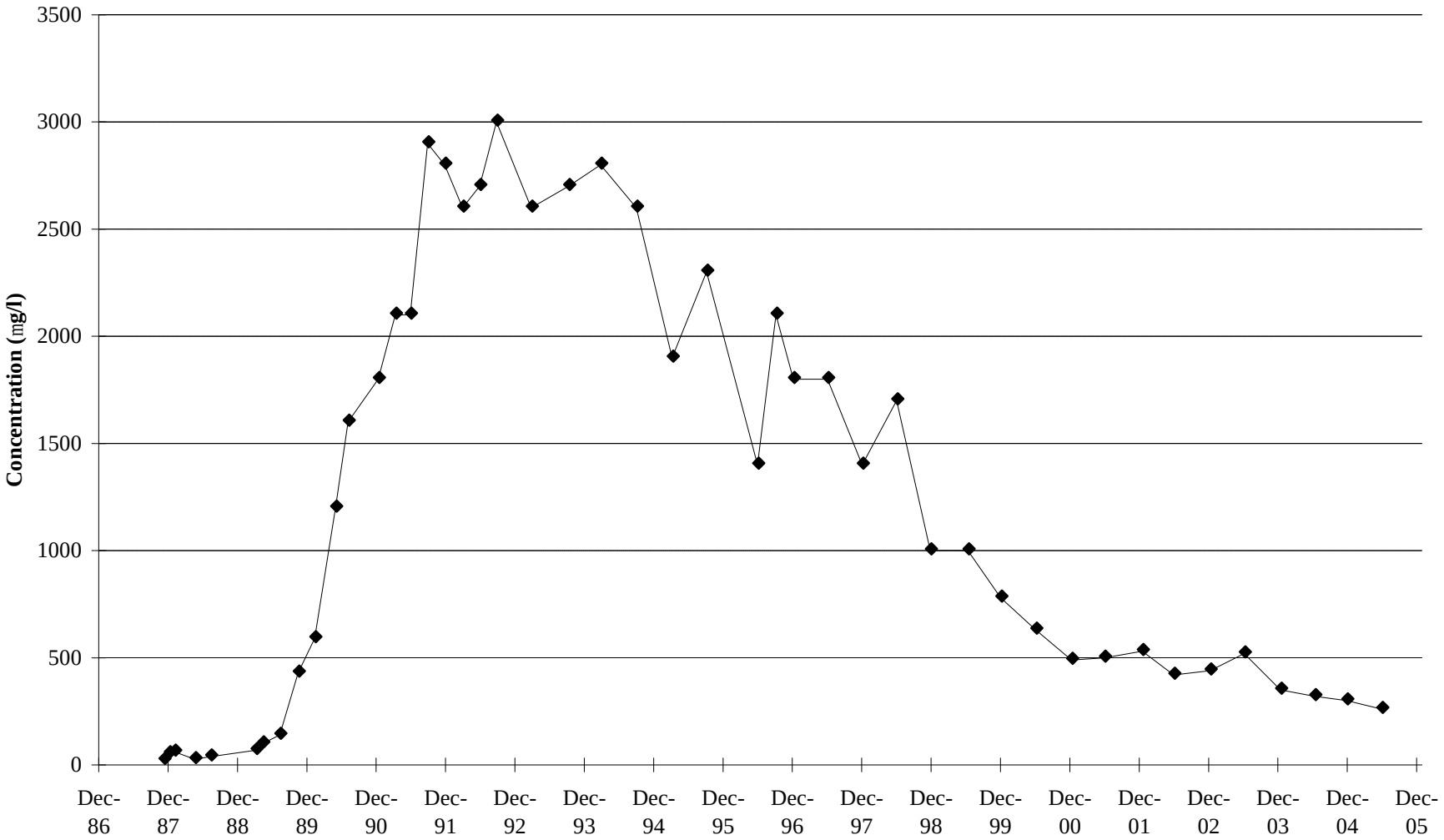
EXTRACTION WELL B3 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

EXTRACTION WELL B4 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

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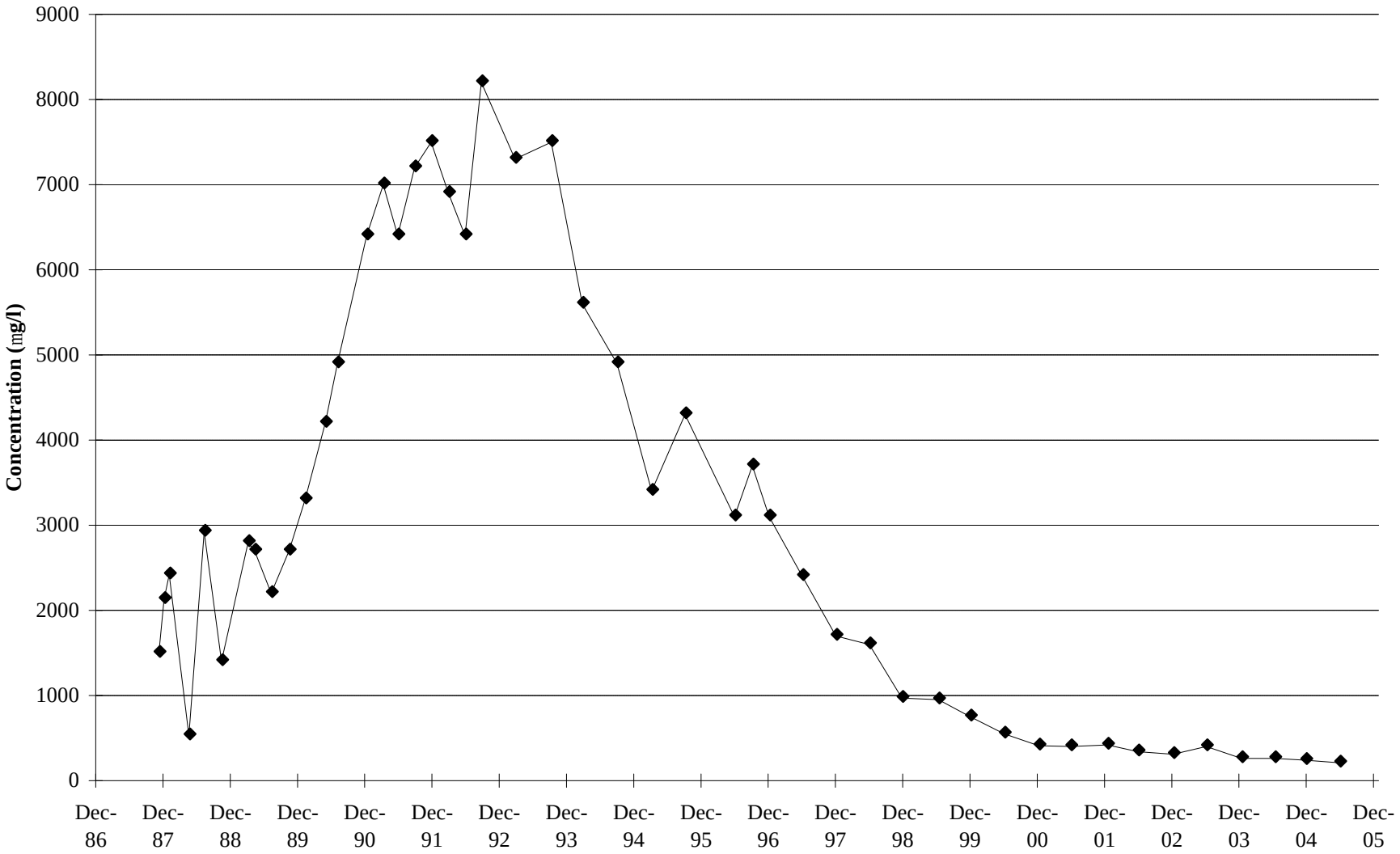
C:\Files\Lisa\FY 2005 APR\Appendices\Appendix G\Appendix G.1\B4

APPENDIX G.1

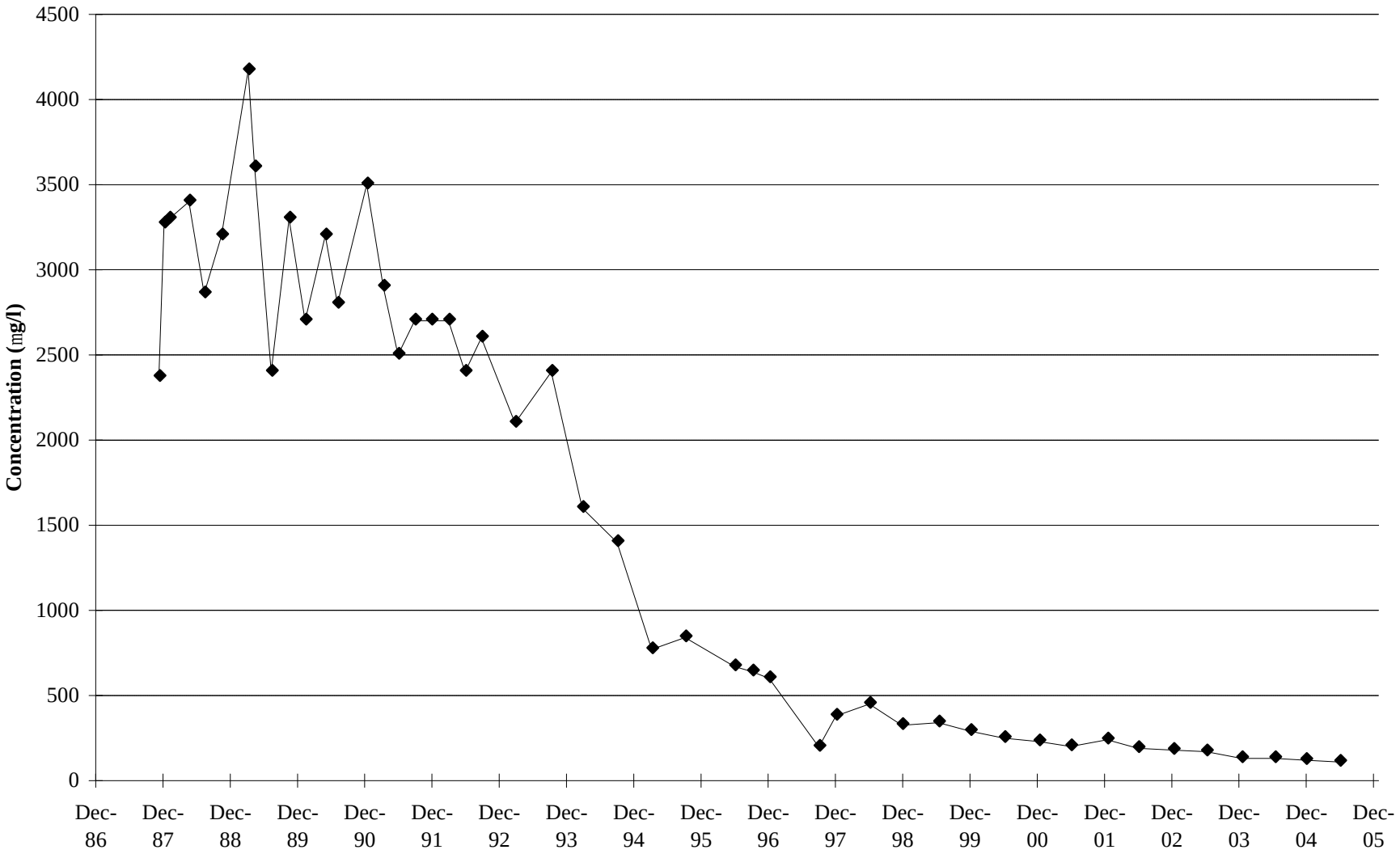
EXTRACTION WELL B5 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

EXTRACTION WELL B6 - TRCLE VS. TIME

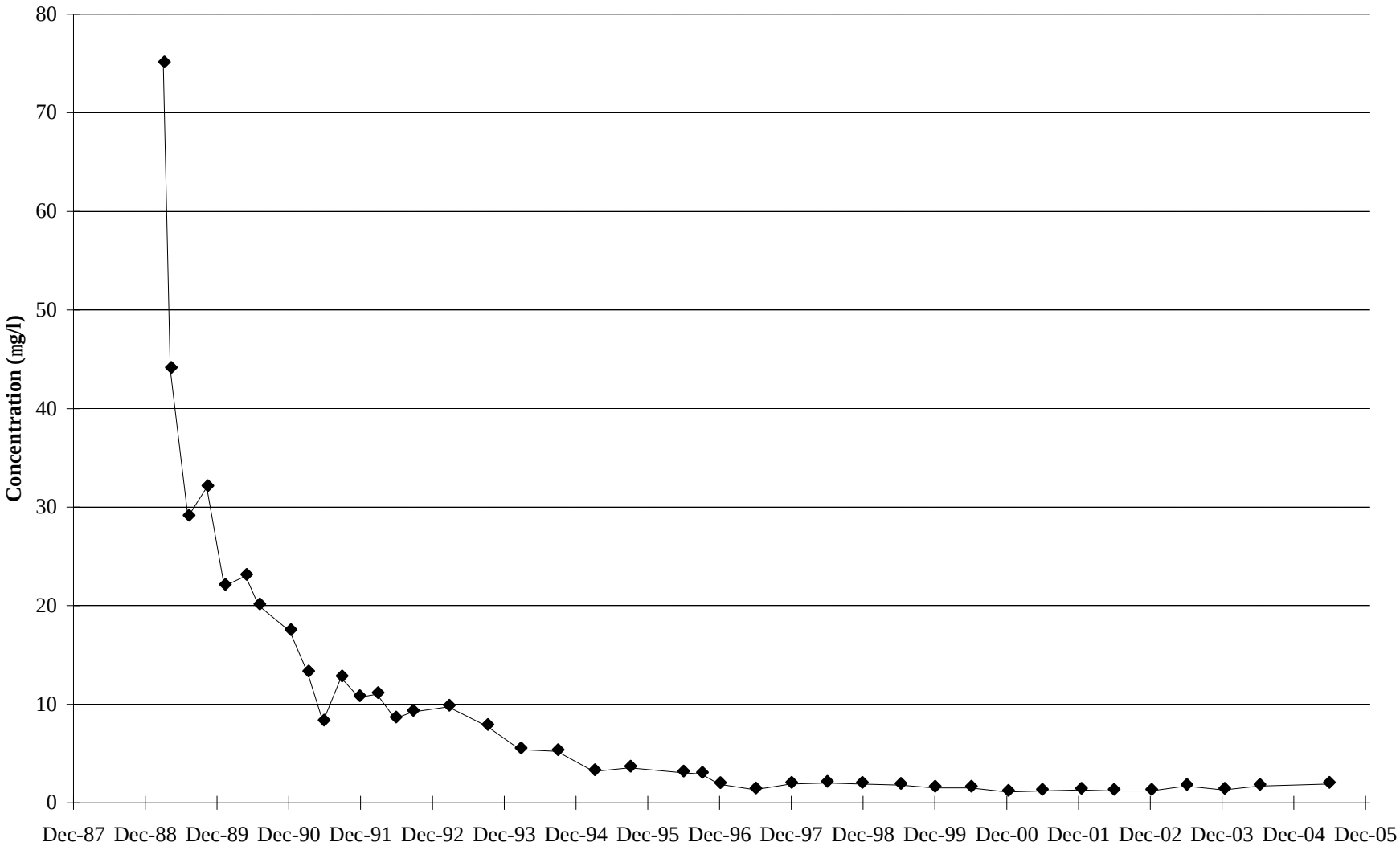


Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

37773 (1)
C:\Files\Lisa\FY 2005 APR\Appendices\Appendix G\Appendix G.1\B6

APPENDIX G.1

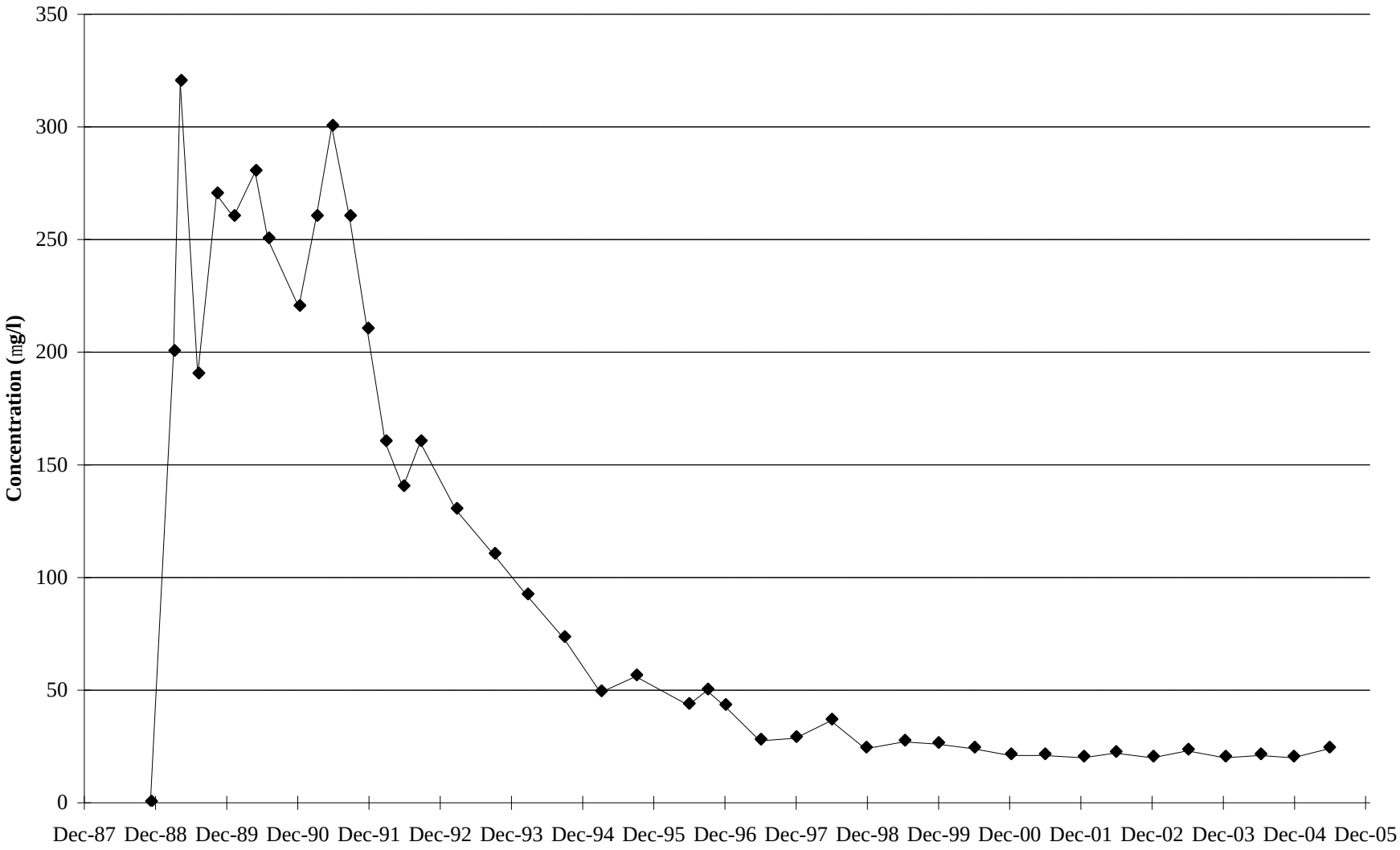
EXTRACTION WELL B7 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

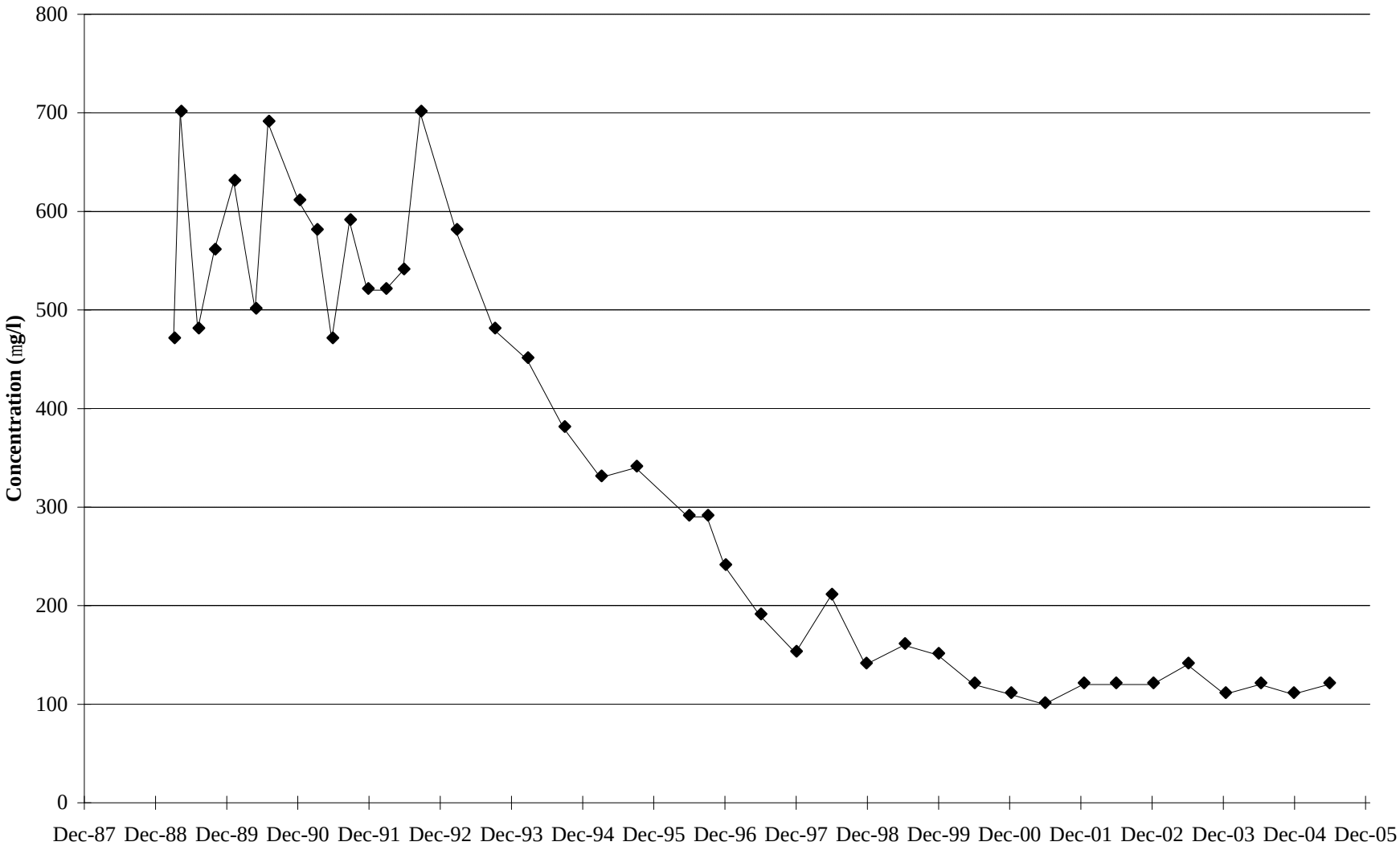
EXTRACTION WELL B8 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

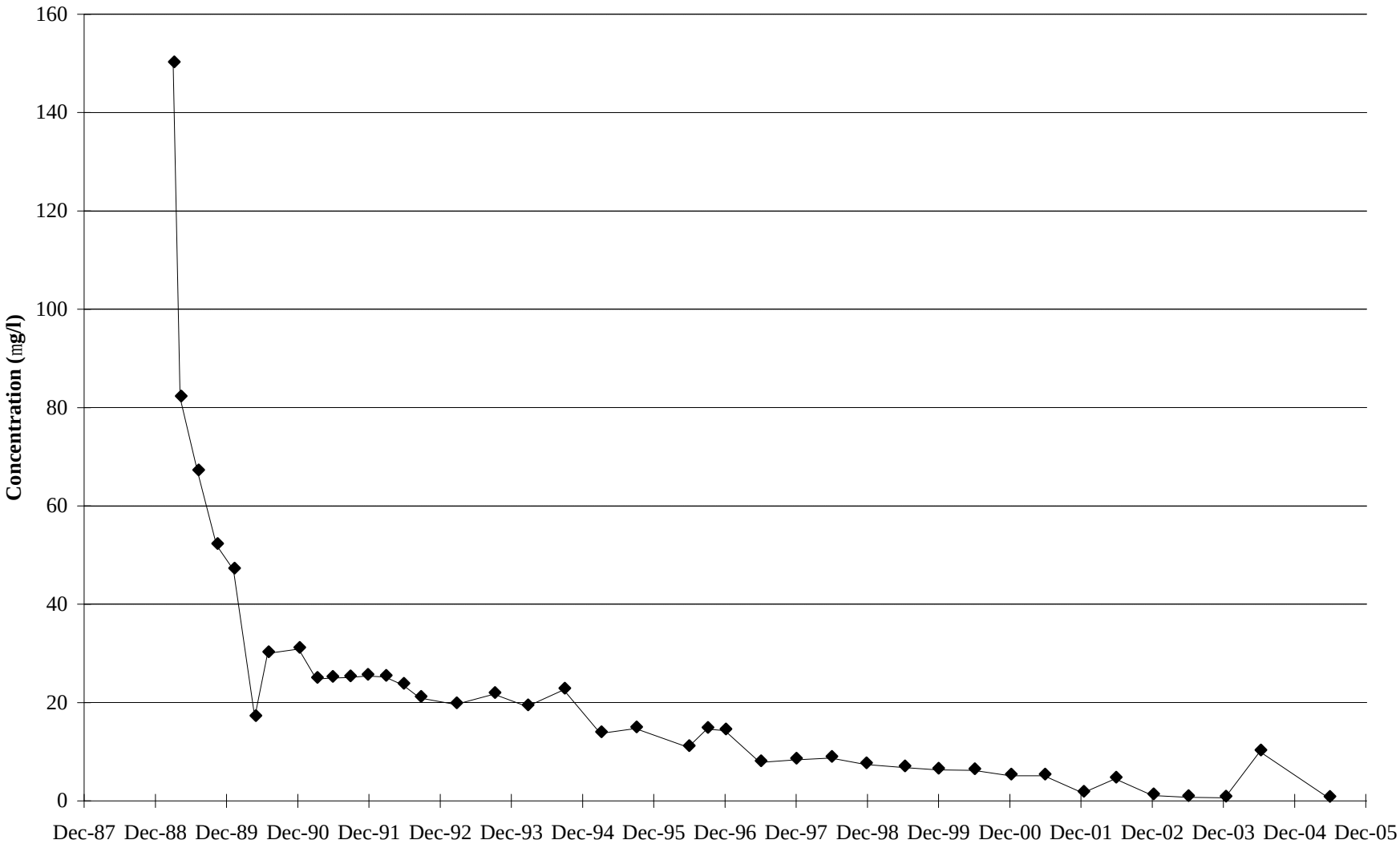
EXTRACTION WELL B9 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

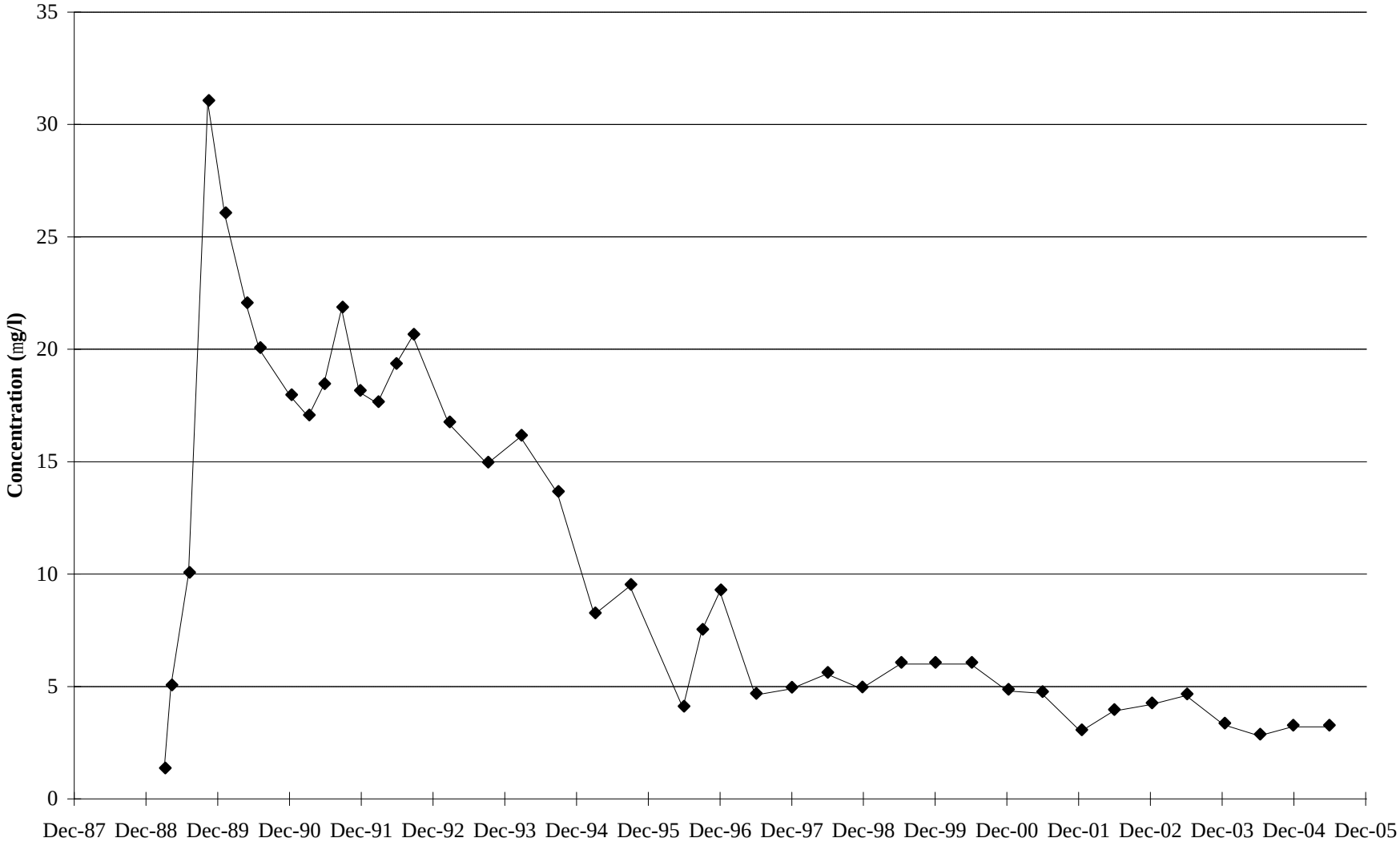
EXTRACTION WELL B10 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

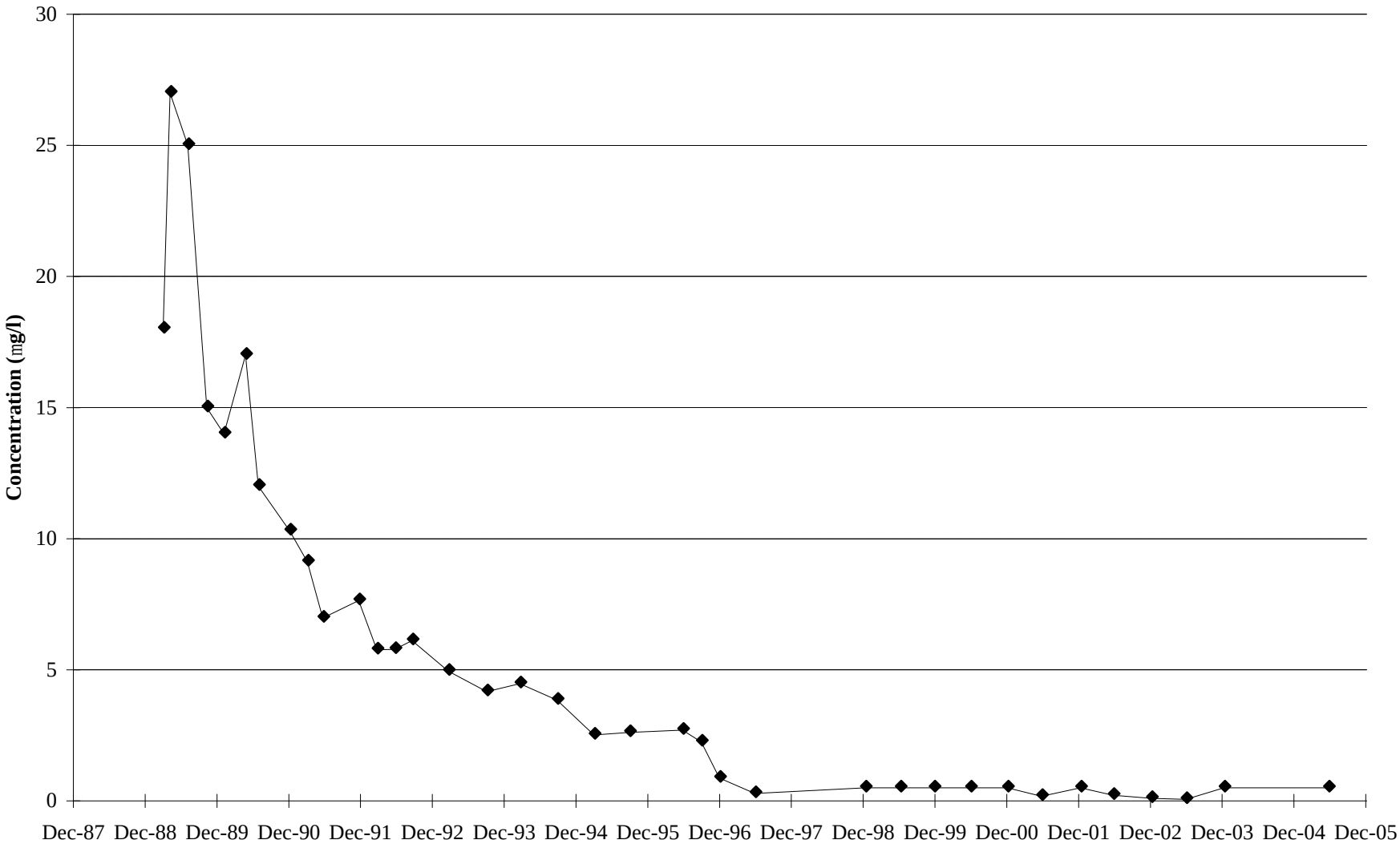
EXTRACTION WELL B11 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

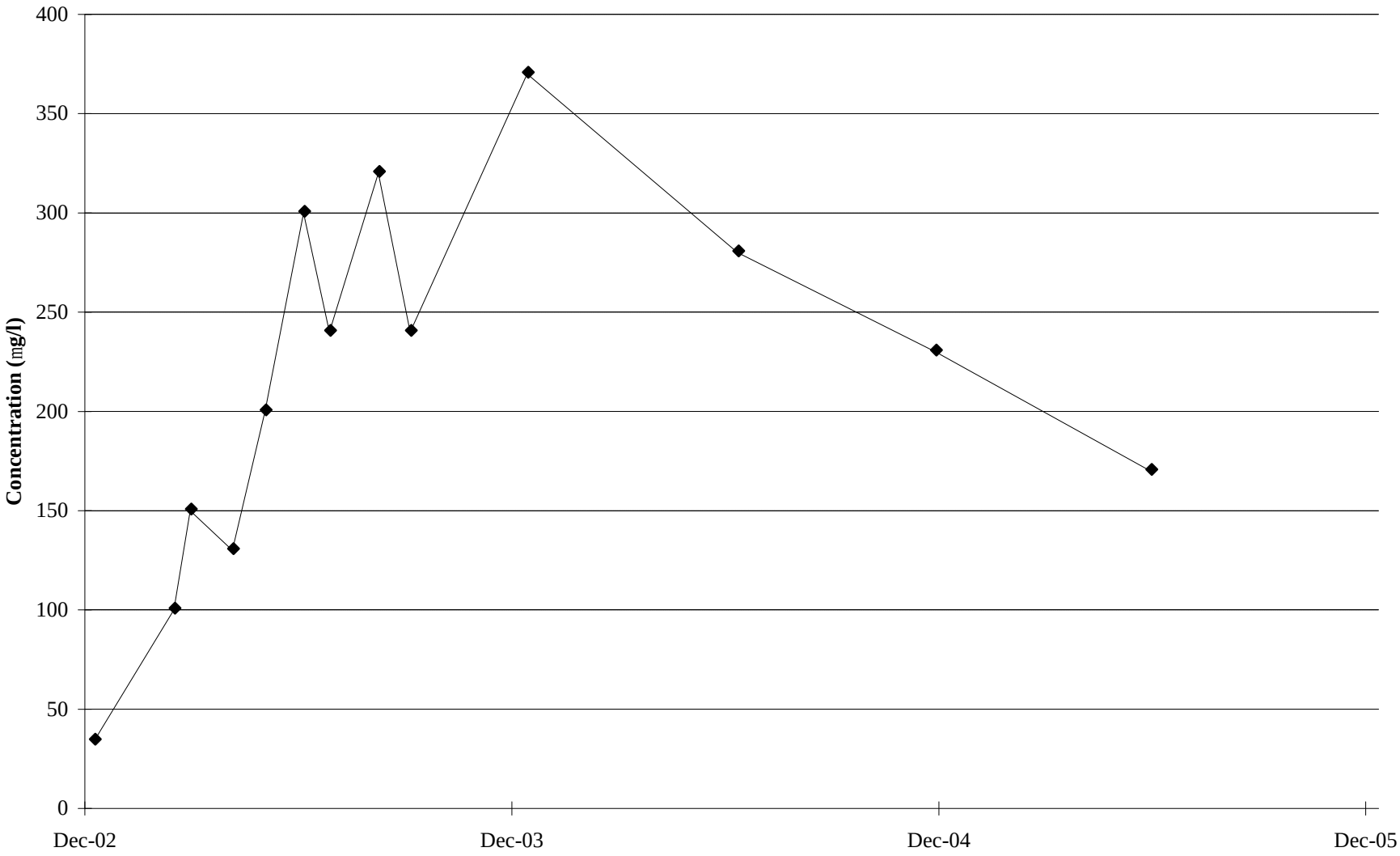
EXTRACTION WELL B12 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

EXTRACTION WELL B13 - TRCLE VS. TIME

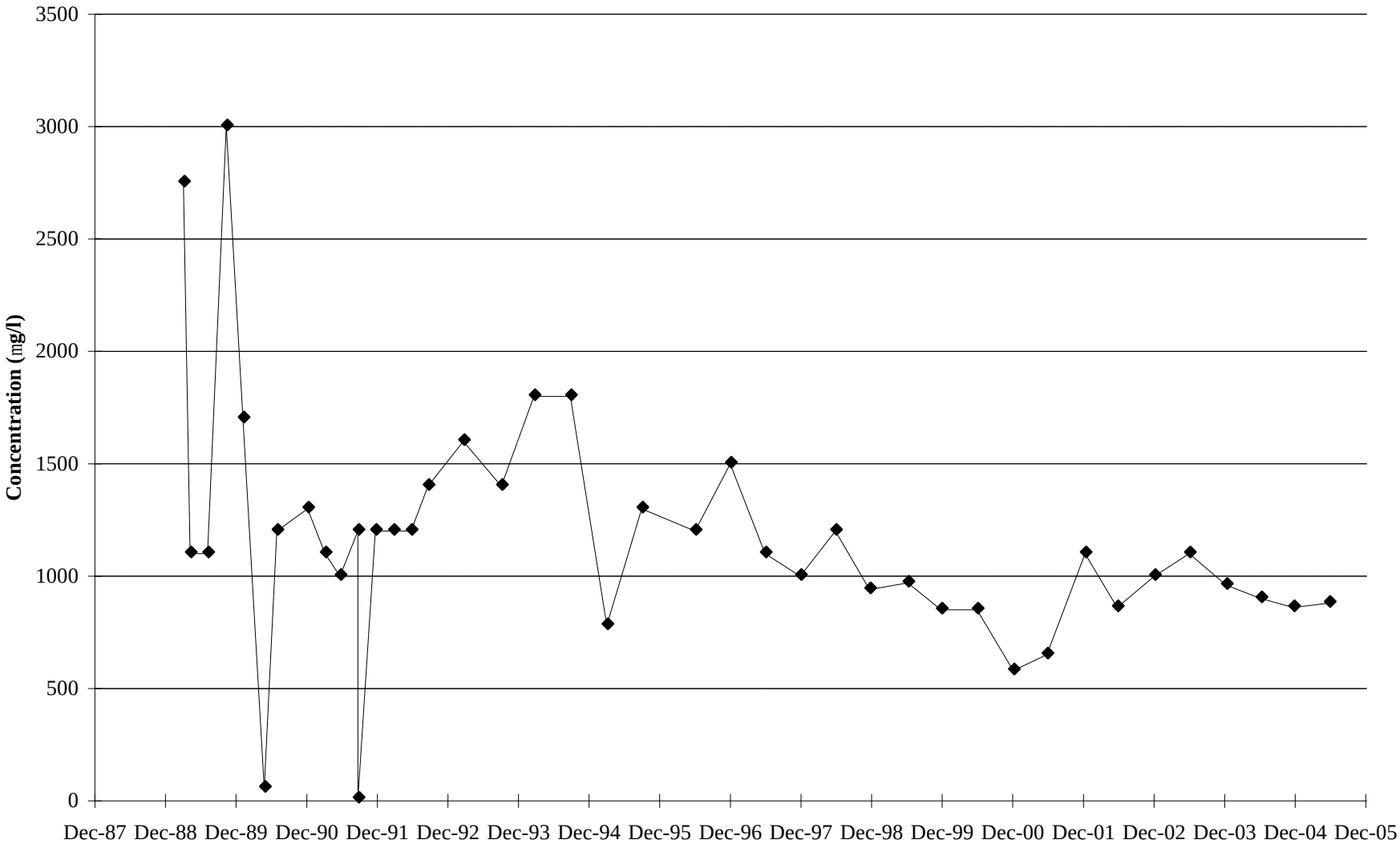


Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

37773 (1)
C:\Files\Lisa\FY 2005 APR\Appendices\Appendix G\Appendix G.1\B13

APPENDIX G.1

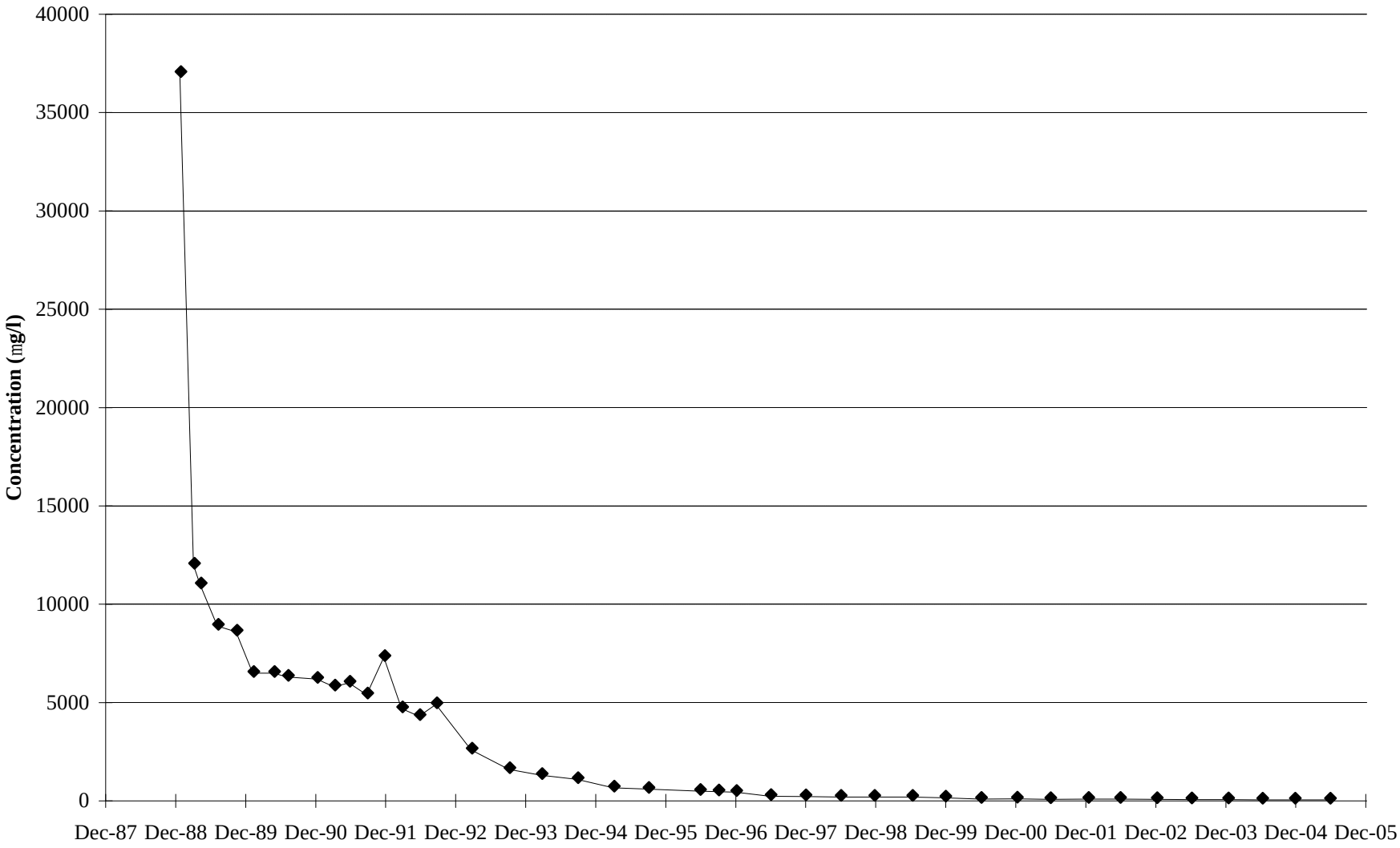
EXTRACTION WELL SC1 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

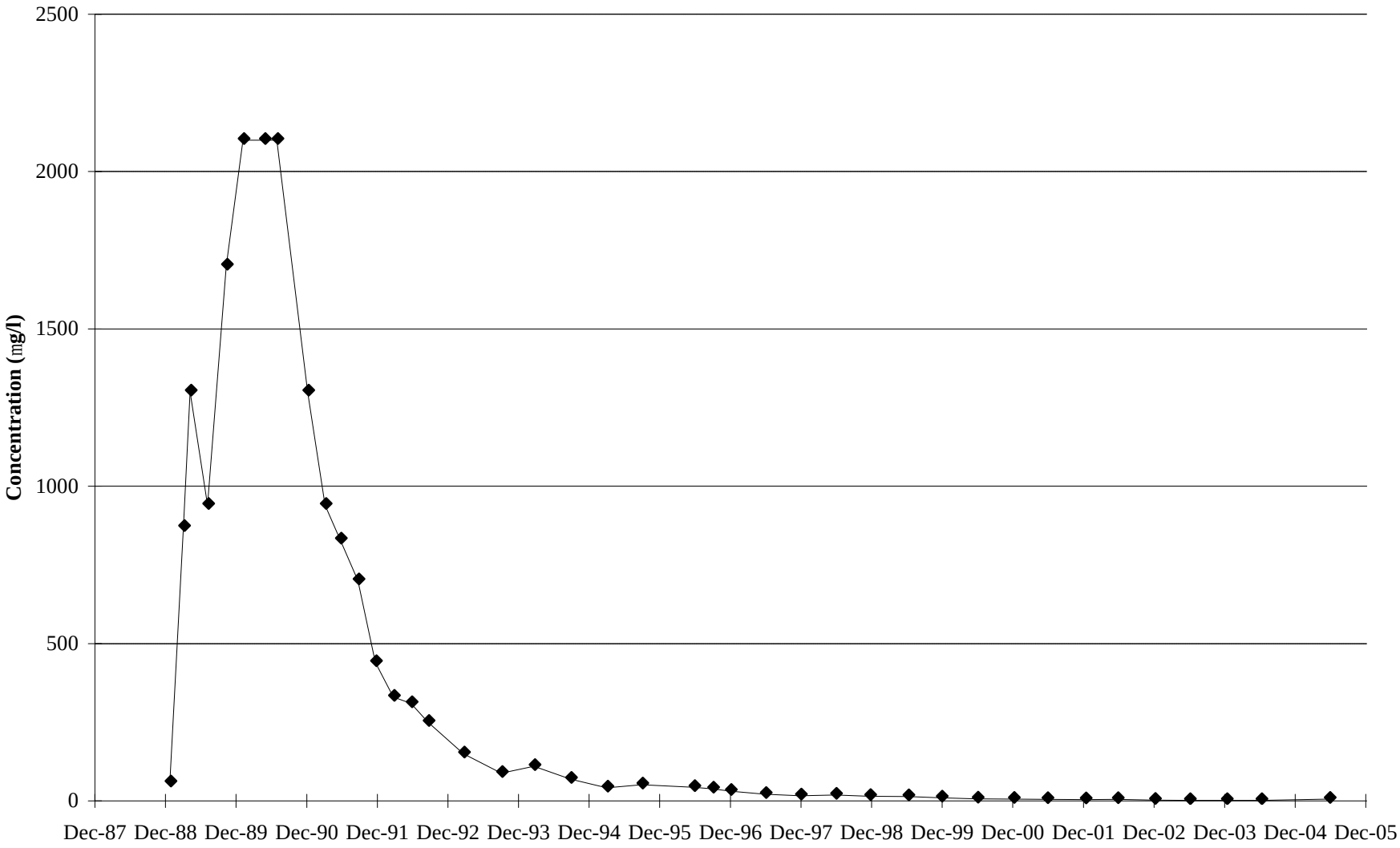
EXTRACTION WELL SC2 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

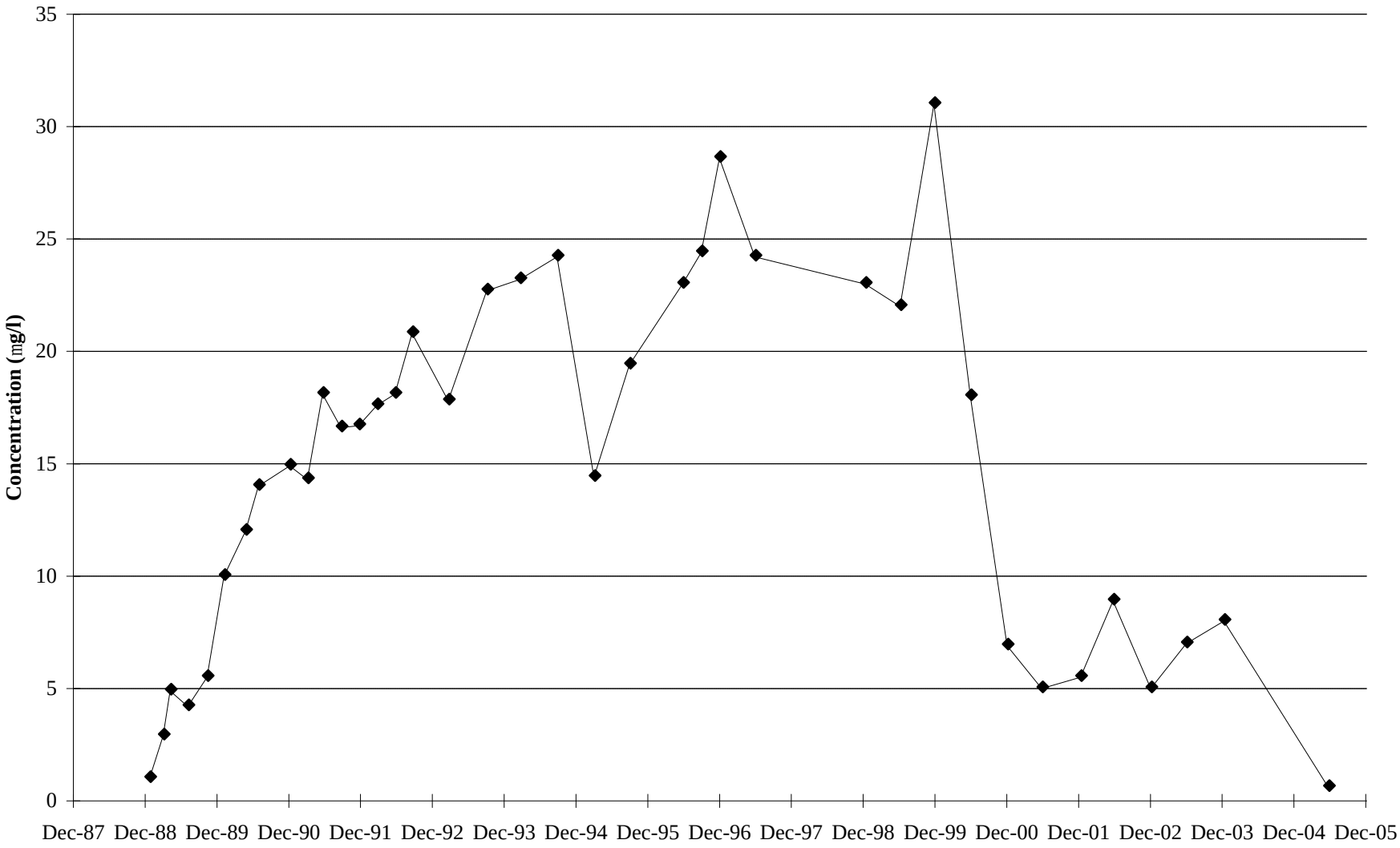
EXTRACTION WELL SC3 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

APPENDIX G.1

EXTRACTION WELL SC4 - TRCLE VS. TIME

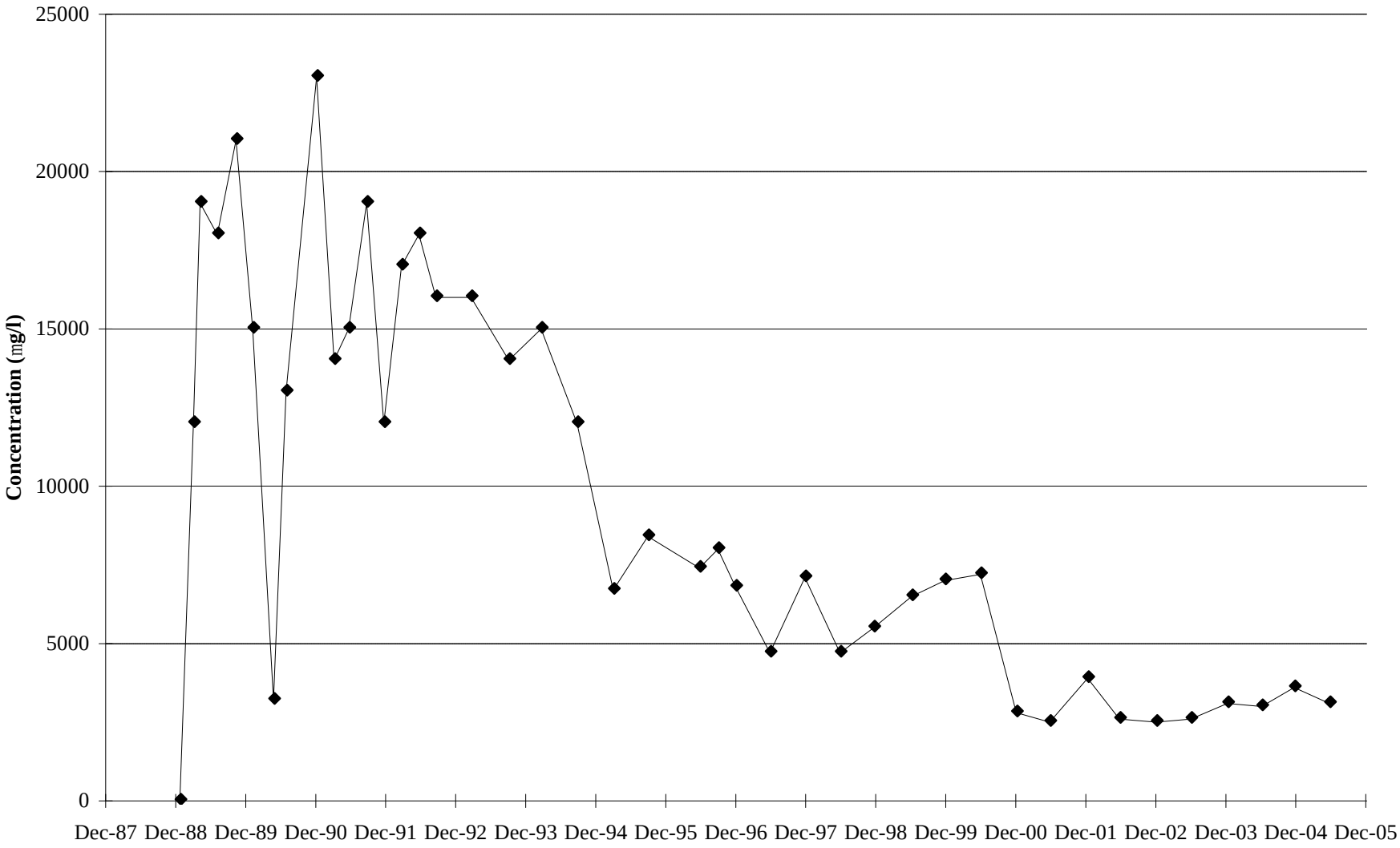


Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

37773 (1)
C:\Files\Lisa\FY 2005 APR\Appendices\Appendix G\Appendix G.1\SC4

APPENDIX G.1

EXTRACTION WELL SC5 - TRCLE VS. TIME



Note: Samples reporting concentrations less than the detection limit were plotted as half the detection limit.

G.2 Influent/Effluent Database, Fiscal Year 2005, TGRS, TCAAP

APPENDIX G.2

INFLUENT/EFFLUENT DATABASE
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

Location	Date		1,1,1-Trichloroethane µg/l	1,1,2-Trichloroethane µg/l	1,1-Dichloroethane µg/l	1,1-Dichloroethene µg/l	1,2-Dichloroethane µg/l	Carbon Tetrachloride µg/l	Chloroform µg/l	cis-1,2-Dichloroethene µg/l	Freon 113 µg/l	Methylene Chloride µg/l	Tetrachloroethene µg/l	trans-1,2-Dichloroethene µg/l	Trichloroethene µg/l	Vinyl Chloride µg/l
TGRSE	10/4/04		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	10/4/04	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	11/2/04		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	11/2/04	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	12/1/04		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	12/1/04	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	1/6/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.18 JP	< 1
TGRSE	1/6/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.25 JP	< 1
TGRSE	2/3/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	2/3/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	3/2/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	3/2/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	4/5/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	4/5/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	5/2/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	5/2/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	6/8/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	6/8/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	7/11/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TGRSE	7/11/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

APPENDIX G.2

INFLUENT/EFFLUENT DATABASE
FISCAL YEAR 2005
TGRS, TCAAP
ARDEN HILLS, MINNESOTA

Location	Date		1,1,1-Trichloroethane µg/l	1,1,2-Trichloroethane µg/l	1,1-Dichloroethane µg/l	1,1-Dichloroethene µg/l	1,2-Dichloroethane µg/l	Carbon Tetrachloride µg/l	Chloroform µg/l	cis-1,2-Dichloroethene µg/l	Freon 113 µg/l	Methylene Chloride µg/l	Tetrachloroethene µg/l	trans-1,2-Dichloroethene µg/l	Trichloroethene µg/l	Vinyl Chloride µg/l
TGRSE	8/10/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.39 JP	< 1
TGRSE	9/15/05		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.26 JP	< 1
TGRSE	9/15/05	D	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.31 JP	< 1
TGRSI	10/4/04		68	0.38 JP	6.6	7.5	< 1	< 1	< 1	4.9	0.8 JP	< 1	0.9 JP	< 1	310	< 1
TGRSI	11/2/04		65	0.52 JP	6.3	7.3	0.38 JP	< 1	< 1	4.3	0.86 JP	< 1	0.88 JP	< 1	320	< 1
TGRSI	12/1/04		67	< 1	6.4	7.9	0.37 JP	< 1	< 1	4.3 JP	0.91 JP	< 1	0.97 JP	< 1	330	< 1
TGRSI	1/6/05		72	< 1	7.5	8.6	< 1	< 1	< 1	4.5	0.79 JP	< 1	0.97 JP	< 1	290	< 1
TGRSI	2/3/05		73	0.54 JP	6.3	7.7	0.43 JP	< 1	< 1	4.4	0.91 JP	< 1	0.91 JP	< 1	310	< 1
TGRSI	3/2/05		58	0.42 JP	6.8	8	0.44 JP	< 1	< 1	4.4	0.78 JP	0.14 JP	0.95 JP	< 1	280	< 1
TGRSI	4/5/05		52	0.34 JP	6.6	7.9	0.32 JP	< 1	< 1	4.8	0.75 JP	< 1	0.91 JP	< 1	320	< 1
TGRSI	5/2/05		61	< 1	8.2	9.1	< 1	< 1	< 1	4.3	0.9 JP	< 1	0.94 JP	< 1	240	< 1
TGRSI	6/8/05		76	< 1	7 JL135	8.3 JL127	< 1	< 1	< 1	4.2 JL129	1.4	< 1	1.1	< 1	280	< 1
TGRSI	7/11/05		60	< 1	6.9	7.1	0.47 JP	< 1	< 1	4.2	0.62 JP	< 1	0.68 JP	< 1	260	< 1
TGRSI	8/10/05		54	< 1	5.3	5.8	0.3 JP	< 1	< 1	3.6	0.71 JP	< 1	0.67 JP	< 1	250	< 1
TGRSI	8/10/05	D	58	< 1	5.7	6.1	0.39 JP	< 1	< 1	3.9	0.74 JP	< 1	0.71 JP	< 1	230	< 1
TGRSI	9/15/05		45	< 1	5.8	6.2	0.33 JP	< 1	< 1	4	0.81 JP	< 1	0.66 JP	< 1	220	< 1

Notes:

D - Duplicate Analysis.

JP - Result is less than reporting level but greater than instrument detection limit.

U - The analyte is non-detect with the associated value being the quantitation limit.

J - Value is estimated

UJ - The quantitaion limit is estimated

Appendix H

PGRS Hydraulic, Operational and Chemical Data

H.1 Influent/Effluent Database, Fiscal Year 2005, PGRS, TCAAP

APPENDIX H.1

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*4/5/1994*	*4/21/1994*	*7/28/1994*	*8/30/1994*	*9/13/1994*	*10/31/1994*	*12/27/1994*	*1/25/1995*	*2/14/1995*	*3/9/1995*	*4/7/1995*	*5/4/1995*	*6/15/1995*	*7/13/1995*	*8/7/1995*
Dup																
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	**5.0**	**4.9**	**10**	**13**	**10**	**12**	**7.9**	**9.6**	**10**	**11**	**11**	**9.8**	**11**	**10**	**13**
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1 b**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	**7.8**	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*9/28/1995*	*10/11/1995*	*11/28/1995*	*12/27/1995*	*1/26/1996*	*2/12/1996*	*3/28/1996*	*4/17/1996*	*5/31/1996*	*6/25/1996*	*7/18/1996*	*8/27/1996*	*9/12/1996*	*10/22/1996*	*11/21/1996*
Dup																
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	**10**	**9.4**	**8.3**	**8.0**	**3.8**	**7.6**	**6.0**	**4.9**	**1.6**	**5.3**	**6.2**	**9.1**	**7.1**	**7.1**	**6.7**
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.3 b**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*12/17/1996*	*1/30/1997*	*2/26/1997*	*3/27/1997*	*4/17/1997*	*5/22/1997*	*6/26/1997*	*7/16/1997*	*8/28/1997*	*9/17/1997*	*10/30/1997*	*11/24/1997*	*12/30/1997*	*1/29/1998*	*2/12/1998*
Dup												*RMS*	*RMS*	*RMS*	*RMS*	*RMS*
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	**5.7**	**4.6**	**4.0**	**3.4**	**2.7**	**2.9**	**2.5**	**4.4**	**2.7**	**2.4**	**2.6**	**2.2**	**1.6**	**1.8**	**1.5**
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*3/23/1998*	*4/16/1998*	*5/20/1998*	*5/29/1998*	*6/25/1998*	*7/27/1998*	*8/20/1998*	*9/30/1998*	*10/21/1998*	*11/23/1998*	*12/21/1998*	*1/14/1999*	*2/11/1999*	*3/17/1999*	*4/6/1999*
Dup		*RMS*	*RMS*	*RMS*	*RMS*	*RMS*										
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	**1.2**	**1.8**	<1.0	<1.0	<1.0	**1.0**	**1.5**	**2.1**	**1.2**	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	**2.2 b**	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	**12 b**	**8.6 b**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*5/18/1999*	*6/21/1999*	*7/13/1999*	*8/30/1999*	*9/27/1999*	*10/19/1999*	*12/16/1999*	*1/25/2000*	*2/28/2000*	*3/16/2000*	*4/24/2000*	*5/16/2000*	*6/28/2000*	*7/17/2000*	*9/5/2000*
Dup																
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*	*NB13INF.*
Sample Date	*Abbreviation*	*9/14/2000*	*10/12/2000*	*11/8/2000*	*1/29/2001*	*2/8/2001*	*3/7/2001*	*4/3/2001*	*5/23/2001*	*6/29/2001*	*5/22/2003*	*6/5/2003*	*7/9/2003*	*8/14/2003*	*9/23/2003*	*10/6/2003*
Dup																
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10*	<10*	<10*	<10*	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*4/4/1994*	*4/21/1994*	*7/28/1994*	*8/30/1994*	*9/13/1994*	*9/13/1994*	*10/31/1994*	*12/27/1994*	*12/27/1994*	*1/25/1995*	*1/25/1995*	*2/14/1995*
Dup													
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

APPENDIX H.1

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*3/9/1995*	*4/7/1995*	*4/7/1995*	*5/4/1995*	*6/15/1995*	*6/15/1995*	*7/13/1995*	*7/13/1995*	*8/7/1995*	*9/28/1995*	*10/11/1995*	*10/11/1995*
Dup													
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	**1.2**	**1.3**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

APPENDIX H.1

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location / *Sample Date* / *Dup*	*IRDMIS Abbreviation*	*NB13EFF. 11/28/1995*	*NB13EFF. 12/27/1995*	*NB13EFF. 10/22/1996*	*NB13EFF. 11/21/1996*	*NB13EFF. 12/17/1996*	*NB13EFF. 1/30/1997*	*NB13EFF. 2/26/1997*	*NB13EFF. 3/27/1997*	*NB13EFF. 4/17/1997*	*NB13EFF. 5/22/1997*	*NB13EFF. 6/26/1997*	*NB13EFF. 7/16/1997*
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	**1.2**	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**1.3**	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	**1.1**	**1.0**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

APPENDIX H.1

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*8/28/1997*	*8/28/1997*	*9/17/1997*	*10/30/1997*	*11/24/1997*	*11/24/1997*	*12/30/1997*	*1/29/1998*	*2/12/1998*	*2/12/1998*	*3/23/1998*	*4/16/1998*
Dup					*RMS*	*RMS*	*DUP*	*RMS*	*RMS*	*RMS*	*RMS*	*RMS*	*RMS*
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**1.2**	**1.2**	**1.8**	**2.4**	**2.2**	**1.2**	**3.0**	**2.8**	**2.8**	**2.9**	**3.8**	**2.6**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*4/16/1998*	*5/29/1998*	*6/25/1998*	*7/27/1998*	*8/20/1998*	*8/20/1998*	*9/30/1998*	*10/21/1998*	*11/23/1998*	*11/23/1998*	*12/21/1998*	*1/14/1999*
Dup		*DUP*	*RMS*	*RMS*									
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**2.9**	**2.5**	**2.7**	**2.2**	**2.6**	**2.8**	**1.9**	**1.8**	**1.4**	**1.5**	**1.5**	**1.3**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	**12 b**	**8.7 b**	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*2/11/1999*	*3/17/1999*	*4/6/1999*	*5/18/1999*	*5/18/1999*	*6/21/1999*	*7/13/1999*	*8/30/1999*	*8/30/1999*	*9/27/1999*	*10/19/1999*	*4/4/1994*
Dup						*DUP*				*DUP*			
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	**1.2**	**1.2**	**1.2**	**1.1**	**1.2**	<1.0	<1.0	**1.1**	**1.0**	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	**7.5**

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*10/27/1995*	*11/28/1995*	*12/27/1995*	*1/26/1996*	*1/26/1996*	*2/12/1996*	*3/28/1996*	*4/17/1996*	*4/17/1996*	*5/31/1996*	*6/25/1996*	*7/18/1996*
Dup													
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.0 b**	**1.4**	**1.7**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	***IRDMIS***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***
Sample Date	***Abbreviation***	***7/18/1996***	***8/27/1996***	***9/12/1996***	***10/22/1996***	***10/22/1996***	***11/21/1996***	***12/17/1996***	***1/30/1997***	***1/30/1997***	***2/26/1997***	***3/27/1997***	***4/17/1997***
Dup													
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**1.7**	**2.0**	**2.1**	**1.6**	**1.6**	**3.1**	**1.6**	**1.5**	**1.6**	**1.4**	**1.4**	**1.9**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*4/17/1997*	*5/22/1997*	*6/26/1997*	*7/16/1997*	*8/28/1997*	*9/17/1997*	*10/30/1997*	*11/24/1997*	*12/30/1997*	*1/29/1998*	*2/12/1998*	*3/23/1998*
Dup								***RMS***	***RMS***	***RMS***	***RMS***	***RMS***	***RMS***
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**1.9**	**2.5**	**1.6**	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*4/16/1998*	*5/29/1998*	*6/25/1998*	*7/27/1998*	*8/20/1998*	*9/30/1998*	*10/21/1998*	*11/23/1998*	*12/21/1998*	*1/14/1999*	*2/11/1999*	*3/17/1999*
Dup		***RMS***	***RMS***	***RMS***									
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	**1.5**	**1.3**	<1.0	**1.3**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<1.0	<5.0	<5.0	<5.0	<5.0	**12 b**	**8.8 b**	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	***IRDMIS***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***
Sample Date	***Abbreviation***	***4/6/1999***	***5/18/1999***	***6/21/1999***	***7/13/1999***	***8/30/1999***	***9/27/1999***	***10/19/1999***	***12/16/1999***	***12/16/1999***	***1/25/2000***	***1/25/2000***	***2/28/2000***
Dup										***DUP***		***DUP***	
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**1.4**	**1.6**	**1.4**	**1.5**	**1.3**	**1.6**	**1.5**	**1.5**	<1.0	**3.2**	**2.8**	**2.8**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

APPENDIX H.1

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	***IRDMIS***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***	***NB13EFF.***
Sample Date	***Abbreviation***	***3/16/2000***	***3/16/2000***	***4/24/2000***	***7/17/2000***	***7/17/2000***	***9/5/2000***	***9/14/2000***	***9/14/2000***	***10/12/2000***	***11/8/2000***	***11/8/2000***
Dup			***DUP***			***DUP***			***DUP***			***DUP***
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**3.0**	**2.9**	**2.8**	**2.8**	**2.3**	**2.5**	**2.3**	**2.2**	**2.1**	**2.2**	**2.3**
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	*IRDMIS*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*	*NB13EFF.*
Sample Date	*Abbreviation*	*1/29/2001*	*2/8/2001*	*2/8/2001*	*3/7/2001*	*4/3/2001*	*4/3/2001*	*5/23/2001*	*5/23/2001*	*6/29/2001*	*6/5/2003*	*7/9/2003*	*8/14/2003*
Dup				***DUP***			***DUP***		***DUP***				
1,1-Dichloroethane	11DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	11DCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene	12DCE	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1,1-Trichloroethane	111TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	112TCE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethylene	TRCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	C6H6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	BRDCLM	**1.1**	**1.2**	**1.0**	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	CHBR3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	CH3BR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	CL4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	CLC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	C2H5CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *	<10 *
Chloroform	CHCL3	**4.3**	**4.2**	**3.8**	**3.6**	**3.1**	**2.9**	**2.3**	**2.3**	**1.4**	<1.0	<1.0	<1.0
Chloromethane	CH3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	DBRCLM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	12DCLE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	12DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	13DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	14DCLB	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	12DCLP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl benzene	ETC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	CH2CL2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	TCLEE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	MEC6H5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	CCL3F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	C2H3CL	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes total	XYLEN	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Location	***IRDMIS***	***NB13EFF.***	***NB13EFF.***
Sample Date	***Abbreviation***	***9/23/2003***	***10/6/2003***
Dup			
1,1-Dichloroethane	11DCLE	<1	<1.0
1,1-Dichloroethylene	11DCE	<1	<1.0
1,2-Dichloroethylene	12DCE	<2	<2.0
1,1,1-Trichloroethane	111TCE	<1	<1.0
1,1,2-Trichloroethane	112TCE	<1	<1.0
Trichloroethylene	TRCLE	<1	<1.0
Benzene	C6H6	<1	<1.0
Bromodichloromethane	BRDCLM	<1	<1.0
Bromoform	CHBR3	<1	<1.0
Bromomethane	CH3BR	<1	<1.0
Carbon tetrachloride	CL4	<1	<1.0
Chlorobenzene	CLC6H5	<1	<1.0
Chloroethane	C2H5CL	<1	<1.0
2-Chloroethylvinyl ether	2CLEVE	<10 *	<10 *
Chloroform	CHCL3	<1	<1.0
Chloromethane	CH3CL	<1	<1.0
Chlorodibromomethane	DBRCLM	<1	<1.0
1,2-Dichloroethane	12DCLE	<1	<1.0
1,2-Dichlorobenzene	12DCLB	<1	<1.0
1,3-Dichlorobenzene	13DCLB	<1	<1.0
1,4-Dichlorobenzene	14DCLB	<1	<1.0
1,2-Dichloropropane	12DCLP	<1	<1.0
1,3-Dichloro-1-propene, cis	C13DCP	<1	<1.0
1,3-Dichloro-1-propene trans	T13DCP	<1	<1.0
Ethyl benzene	ETC6H5	<1	<1.0
Methylene chloride	CH2CL2	<5	<5.0
1,1,2,2-Tetrachloroethane	TCLEA	<1	<1.0
Tetrachloroethylene	TCLEE	<1	<1.0
Toluene	MEC6H5	<1	<1.0
Trichlorofluoromethane	CCL3F	<1	<1.0
Vinyl chloride	C2H3CL	<1	<1.0
Xylenes total	XYLEN	<3	<3.0

INFLUENT/EFFLUENT DATABASE
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

Notes:

- Not analyzed.

b - Potential false positive based on blank data validation procedure.

* Estimated value, QA / QC criteria not met.

ND - None detected.

Dup - Duplicate sample.

RMS - Routine monitoring sample.

1234 - analytical data in bold indicates a detection.

Concentrations in µg / l

Samples were collected and analyzed by Barr Engineering for City of New Brighton.

The system was shut down per agreement with Agencies during the period June '01 through April 2003. The system was operated as needed through October 2003 and then shut down again. The system was not operated as a potable water supply system after October 2003 and there is no analytical data after October 2003.

NB13EFF location is OPER1B.

H.2 Operable Unit 3 Statistical Analysis

MAROS DECISION MATRIX

Kendall S	*Confidence*	*Coefficient of Varience*	*Trend*
S > 0	> 95%	NA	Definitely Increasing
S > 0	90-95%	NA	Probably Increasing
S > 0	< 90%	NA	No Trend
S< / = 0	< 90%	> / = 1	No Trend
S < / = 0	< 90%	< 1	Stable
S < 0	90-95%	NA	Probably Decreasing
S < 0	>95%	NA	Definitely Decreasing

MANN-KENDALL STATISTICAL SUMMARY
OPERABLE UNIT 3, TCAAP

FISCAL YEAR 2005

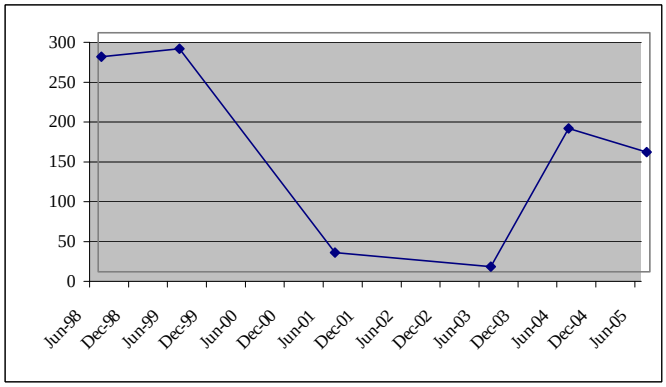
Well	*Kendall S*	*Number of Data Points*	*Raw Trend*	*Confidence*	*Coefficient of Varience*	*Raw Trend Decision*	*MAROS Conclusion*	*June 2005 TRCLE Conc.*
Edge of Plume Wells								
03L673	-5	6	Decreasing	76.50%	0.7727	Stable or No Trend	Stable	150
03L848	-7	6	Decreasing	86.40%	0.4340	Stable or No Trend	Stable	5.8
409548	-11	6	Decreasing	97.20%	0.3921	Definite	Decreasing	1.1
04U673	-5	6	Decreasing	76.50%	0.6877	Stable or No Trend	Stable	49
04U832	-1	6	Decreasing	50.00%	0.6741	Stable or No Trend	Stable	41
04U845	-5	6	Decreasing	76.50%	0.6689	Stable or No Trend	Stable	20
04U848	-1	6	Decreasing	50.00%	0.7030	Stable or No Trend	Stable	5.6
04U863	-5	6	Decreasing	76.50%	0.8668	Stable or No Trend	Stable	0.45 J
Center of Plume Wells								
03M848	-7	6	Decreasing	86.40%	0.3640	Stable or No Trend	Stable	230
04U859	-1	6	Decreasing	50.00%	0.7632	Stable or No Trend	Stable	71
04U861	13	6	Increasing	99.17%	1.3710	Definite	Increasing	200

Well: 03L673

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/25/98	**270.00**	1					
6/4/99	**280.00**	1	1				
6/12/01	**24.00**	1	-1	-1			
Jun-03	**6.30**	1	-1	-1	-1		
Jun-04	180	1	-1	-1	1	1	
6/22/2005	150	1	-1	-1	1	1	-1

	N	6	5	4	3	2	1	0	15
	sum		-3	-4	1	2	-1	0	Kendall S -5
	Possibles	15							
									Kendall tau -0.3333333

Mean	151.72
STNDEV	117.2245779
COV	0.772654584
Trend:	Negative
Confidence (lookup)	76.50%



Raw Data 03L673	Date	TCE
	11/12/87	**1200.00**
	5/2/90	**3200.00**
	3/11/91	2000.00
	3/11/91	1900.00
	6/17/91	**5500.00**
	3/12/92	**3900.00**
	3/3/93	**2100.00**
	3/4/94	3300.00
	6/6/94	2000.00
	6/6/94	**2000.00**
	9/14/94	1600.00
	12/8/94	1400.00
	3/15/95	**910.00**
	6/12/96	**650.00**
	6/12/97	**240.00**
	6/25/98	**270.00**
	6/4/99	**280.00**
	6/12/01	**24.00**
	Jun-03	**6.30**
	Jun-04	**180**
	6/22/2005	**150**

Well: 03L848

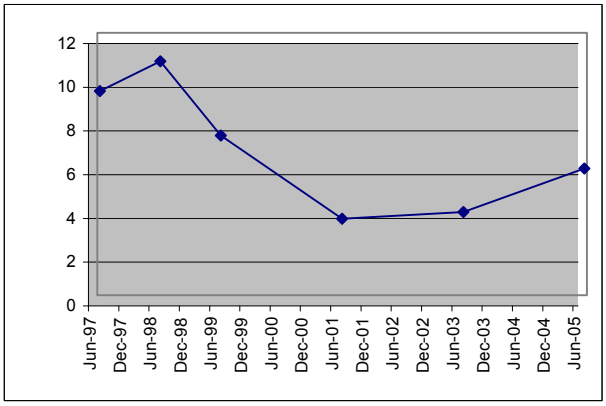
Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/5/1997	**9.34**	1						
6/29/1998	**10.70**	1	1					
6/4/1999	**7.30**	1	-1	-1				
6/12/2001	**3.50**	1	-1	-1	-1			
Jun-03	**3.80**	1	-1	-1	-1	1		
6/21/2005	5.8	1	-1	-1	-1	1	1	

	N	6	5	4	3	2	1	0	15
	sum		-3	-4	-3	2	1	0	Kendall S -7
	Possibles	15							
									Kendall tau -0.466667

Mean	6.74
STNDEV	2.925064102
COV	0.433985772

Trend: Negative

Confidence (lookup) 86.40%



Raw Data 03L848	Date	TCE
	12/2/1987	**570.00**
	5/3/1989	**270.00**
	7/20/1989	130.00
	10/19/1989	**610.00**
	4/19/1990	**460.00**
	7/19/1990	260.00
	3/18/1991	**250.00**
	3/18/1992	**92.00**
	3/9/1993	**52.90**
	6/6/1994	27.00
	9/15/1994	**27.10**
	12/8/1994	22.00
	3/10/1995	**16.60**
	6/3/1996	**11.30**
	6/5/1997	**9.34**
	6/5/1997	8.57
	6/29/1998	**10.70**
	6/4/1999	**7.30**
	6/12/2001	**3.50**
	Jun-03	**3.80**
	6/21/2005	**5.8**

Well: 409548

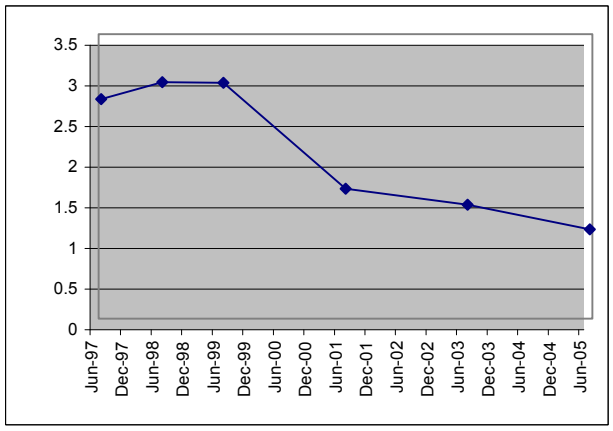
Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/4/97	2.7	1						
6/22/98	2.91	1	1					
6/14/99	2.9	1	1	-1				
6/19/01	1.6	1	-1	-1	-1			
6/11/03	1.4	1	-1	-1	-1	-1		
6/8/05	1.1	1	-1	-1	-1	-1	-1	

N		6	5	4	3	2	1	0	15
	sum		-1	-4	-3	-2	-1	0	Kendall S -11
Possibles		15							
									Kendall tau -0.73333

Mean 2.10
STNDEV 0.82414602
COV 0.39213927

Trend: Negative

Confidence (lookup) 97.20%



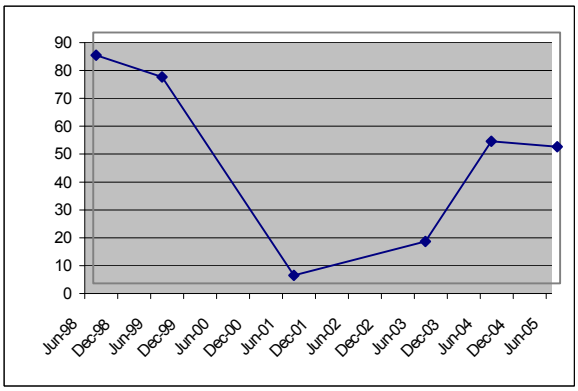
Raw Data 409548	Date	TCE	
	5/10/89	<0.50	
	7/20/89	<1.10	
	10/18/89	**<1.10**	
	4/17/90	**1.17**	
	3/18/91	**0.88**	
	3/25/92	**>50.10**	
	3/18/93	1.05	
	3/18/93	**2.00**	
	3/21/94	2.66	
	3/21/94	2.96	
	6/9/94	2.80	
	9/16/94	2.73	
	12/9/94	**22.70**	
	3/10/95	**2.03**	
	6/4/96	**2.84**	
	6/4/97	**2.70**	JP
	6/22/98	**2.91**	
	6/14/99	2.80	
	6/14/99	**2.90**	
	6/19/01	**1.60**	
	6/11/03	**1.40**	
	6/8/05	**1.1**	

Well: 04U673

Date	TCE (ug/l)		Mann-Kendall Calculation:				
6/25/1998	**81.9**	1					
6/4/1999	**74.0**	1	-1				
6/12/2001	**2.9**	1	-1	-1			
Jun-03	**15.0**	1	-1	-1	1		
Jun-04	51	1	-1	-1	1	1	
6/22/2005	49	1	-1	-1	1	1	-1

	N	6	5	4	3	2	1		15
	sum		-5	-4	3	2	-1	Kendall S	-5
	Possibles	15							
								Kendall tau	-0.33333

Mean	45.63
STNDEV	31.3834776
COV	0.68773143
Trend:	Negative
Confidence (lookup)	76.50%



Raw Data 04U673	Date	TCE
	11/24/1987	**145.0**
	1/21/1988	580.0
	5/16/1988	560.0
	8/4/1988	253.0
	11/1/1988	**1700.0**
	5/3/1989	700.0
	7/21/1989	**1200.0**
	10/19/1989	1100.0
	5/1/1990	**3100.0**
	3/11/1991	**990.0**
	3/11/1991	940.0
	6/17/1991	410.0
	3/12/1992	460.0
	6/4/1992	430.0
	9/8/1992	**540.0**
	3/3/1993	**280.0**
	9/13/1993	190.0
	3/3/1994	**270.0**
	6/6/1994	210.0
	9/8/1994	170.0
	12/8/1994	190.0
	3/15/1995	160.0
	3/15/1995	140.0
	9/12/1995	**260.0**
	6/12/1996	**125.0**
	6/12/1997	**60.4**
	6/25/1998	**81.9**
	6/4/1999	**74.0**
	6/12/2001	**2.9**
	Jun-03	**15.0**
	Jun-04	**51**
	6/22/2005	**49**

Well: 04U832

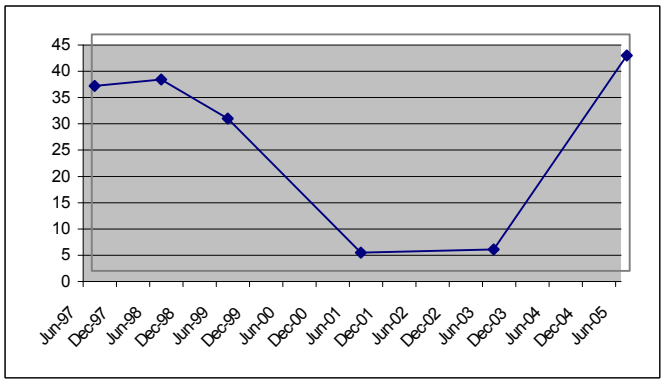
Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/4/1997	**35.20**	1					
6/25/1998	**36.40**	1	1				
6/7/1999	**29.00**	1	-1	-1			
6/14/2001	**3.50**	1	-1	-1	-1		
Jun-03	**4.10**	1	-1	-1	-1	1	
6/23/2005	41	1	1	1	1	1	1

N		6	5	4	3	2	1	0	15
	sum		-1	-2	-1	2	1	0	Kendall S -1
Possibles		15							
									Kendall tau -0.066667

Mean 24.87
STNDEV 16.76277622
COV 0.674106282

Trend: Negative

Confidence (lookup) 50.00%

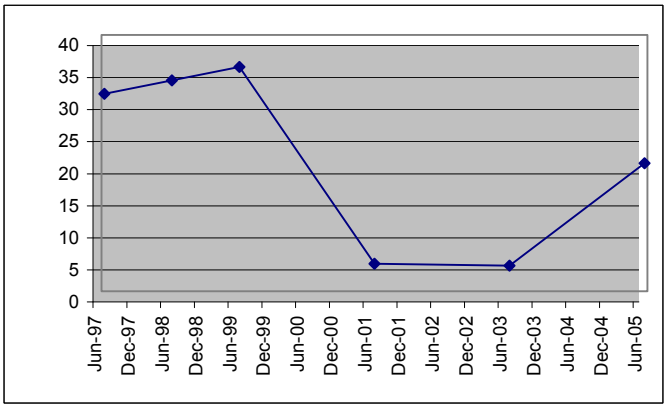


Raw Data 04U832	Date	TCE
	11/24/1987	**100.00**
	12/16/1988	**65.00**
	4/25/1990	**69.53**
	3/19/1991	**47.60**
	3/25/1992	**52.50**
	3/16/1993	42.00
	3/16/1993	**45.90**
	6/10/1994	49.00
	9/13/1994	**49.50**
	12/7/1994	43.30
	12/7/1994	47.10
	3/10/1995	**56.00**
	6/3/1996	**41.00**
	6/4/1997	**35.20**
	6/25/1998	**36.40**
	6/7/1999	**29.00**
	6/14/2001	**3.50**
	Jun-03	**4.10**
	6/23/2005	**41**

Well: 04U845

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/5/1997	**30.80**	1						
6/25/1998	**32.90**	1	1					
6/7/1999	**35.00**	1	1	1				
6/13/2001	**4.30**	1	-1	-1	-1			
6/1/2003	**4.00**	1	-1	-1	-1	-1		
6/22/2005	20	1	-1	-1	-1	1	1	
	N	6	5	4	3	2	1	15
	sum		-1	-2	-3	0	1	Kendall S -5
	Possibles	15						
								Kendall tau -0.333333

Mean	21.17
STNDEV	14.1589077
COV	0.66892477
Trend:	Negative
Confidence (lookup)	76.50%
Conclusion	



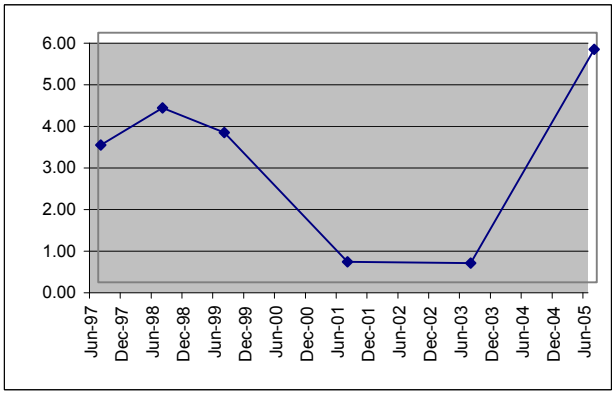
Raw Data 04U845	Date	TCE
	12/1/1987	**59.00**
	12/16/1988	**155.00**
	5/4/1989	100.00
	7/20/1989	**160.00**
	10/20/1989	62.00
	4/26/1990	**38.00**
	3/20/1991	**100.00**
	3/23/1992	>50.10
	3/23/1992	**100.00**
	3/15/1993	**84.00**
	6/8/1994	64.00
	9/13/1994	**70.00**
	12/7/1994	54.00
	3/10/1995	**39.50**
	6/4/1996	**51.20**
	6/5/1997	**30.80**
	6/25/1998	**32.90**
	6/7/1999	**35.00**
	6/13/2001	**4.30**
	6/1/2003	**4.00**
	6/22/2005	**20**

Well: 04U848

Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/5/97	**3.30**	1						
6/29/98	**4.19**	1	1					
6/4/99	**3.60**	1	1	-1				
6/12/01	**0.49**	1	-1	-1	-1			
6/1/03	**0.46**	1	-1	-1	-1	-1		
6/21/05	5.60	1	1	1	1	1	1	
	N	6	5	4	3	2	1	0
	sum		1	-2	-1	0	1	0
	Possibles	15						

	15
Kendall S	-1
Kendall tau	-0.06667

Mean	2.94
STNDEV	2.066697849
COV	0.702958452
Trend:	Negative
Confidence (lookup)	50.00%



Raw Data 04U848	Date	TCE	
	12/2/87	**700.00**	
	8/24/88	**470.00**	
	5/3/89	150.00	
	7/20/89	**700.00**	
	10/19/89	280.00	
	4/19/90	**240.00**	
	7/19/90	140.00	
	9/17/90	150.00	
	3/18/91	**64.00**	
	3/18/92	22.50	
	3/18/92	**23.40**	
	3/10/93	**26.00**	
	6/6/94	12.20	
	9/15/94	**16.80**	
	12/8/94	15.60	
	3/10/95	**9.94**	
	6/3/96	**6.15**	
	6/5/97	**3.30**	
	6/29/98	**4.19**	
	6/4/99	**3.60**	
	6/12/01	**0.49**	J
	6/1/03	**0.46**	JP
	6/21/05	**5.60**	

Well: 04U863

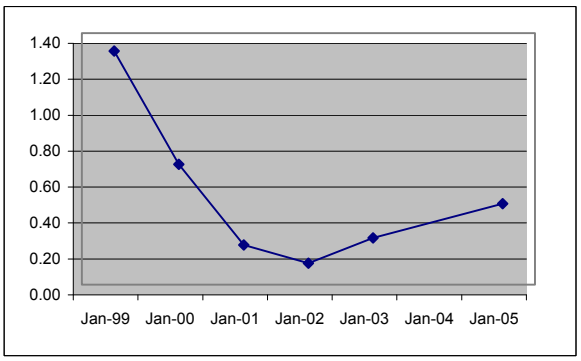
Date	TCE (ug/l)	Mann-Kendall Calculation:						
6/1/1999	1.30	1						
6/1/2000	0.67	1	-1					
6/1/2001	0.22	1	-1	-1				
12/1/2002	0.12	1	-1	-1	-1			
12/1/2003	0.26	1	-1	-1	1	1		
6/1/2005	0.45	1	-1	-1	1	1	1	

	N	6	5	4	3	2	1	0		15
	sum		-5	-4	1	2	1	0	Kendall S	-5
	Possibles	15								
									Kendall tau	-0.33333

Mean	0.50
STNDEV	0.436287367
COV	0.866796094

Trend: Negative

Confidence (lookup) 76.50%



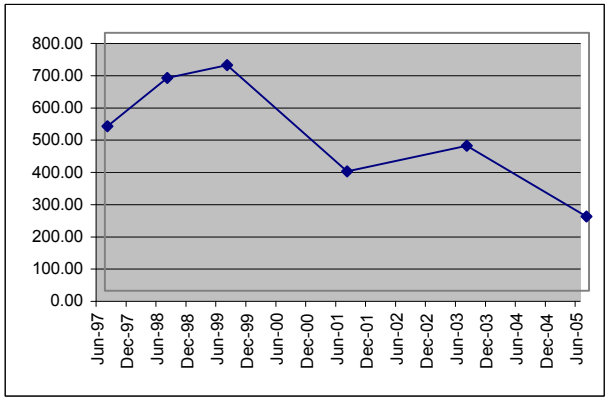
Raw Data 04U863	Date	TCE
	Jun-94	5.10
	Sep-94	2.64
	Dec-94	**8.05**
	Mar-95	**7.05**
	Jun-95	5.04
	Jun-96	4.59
	Sep-96	1.84
	Dec-96	**4.73**
	Jun-97	**1.54**
	Jun-98	**1.15**
	Jun-99	**1.30**
	Dec-99	0.69 JP
	Mar-00	0.51 JP
	Jun-00	**0.67** JP
	Sep-00	0.60 JP
	Dec-00	0.47 JP
	Dec-00	0.48 JP
	Jun-01	**0.22** JP
	Mar-02	0.11 JP
	Jun-02	<1
	Sep-02	<1
	Sep-02	<1
	Dec-02	**0.12** JP
	Mar-03	<1
	Jun-03	<1
	Sep-03	<1
	Dec-03	**0.26** JP
	10/27/04	0.21 JP
	6/22/05	**0.45** JP
	9/29/05	0.27 JP

Well: 03M848

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/26/1997	**510.00**	1					
6/29/1998	**660.00**	1	1				
6/4/1999	**700.00**	1	1	1			
6/12/2001	**370.00**	1	-1	-1	-1		
6/1/2003	**450.00**	1	-1	-1	-1	1	
6/21/2005	230	1	-1	-1	-1	-1	-1

N	6	5	4	3	2	1	0		15
sum		-1	-2	-3	0	-1	0	Kendall S	-7
Possibles	15								
								Kendall tau	-0.466667

Mean	486.67
STNDEV	177.162825
COV	0.3640332
Trend:	Negative
Confidence (lookup)	86.40%



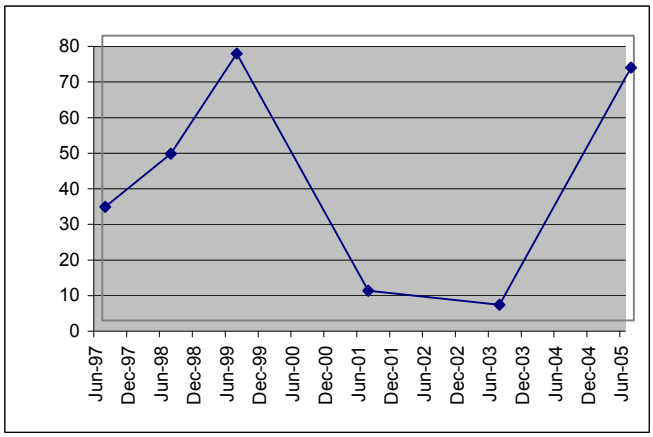
Raw Data 03M848	Date	TCE
	12/2/1987	**440.00**
	4/19/1990	190.00
	7/19/1990	190.00
	9/17/1990	**330.00**
	3/18/1991	310.00
	6/4/1991	**730.00**
	9/3/1991	700.00
	3/18/1992	**640.00**
	6/3/1992	>50.10
	6/3/1992	570.00
	9/3/1992	>50.10
	3/9/1993	**1300.00**
	3/9/1993	970.00
	3/17/1994	**910.00**
	3/16/1995	**59.00**
	6/21/1996	**1400.00**
	6/26/1997	**510.00**
	6/29/1998	**660.00**
	6/4/1999	**700.00**
	6/4/1999	650.00
	6/12/2001	**370.00**
	6/1/2003	**450.00**
	6/21/2005	**230**

Well: 04U859

Date	TCE (ug/l)		Mann-Kendall Calculation:					
6/4/1997	**31.90**	1						
6/25/1998	**46.80**	1	1					
6/7/1999	**75.00**	1	1	1				
6/13/2001	**8.40**	1	-1	-1	-1			
Jun-03	**4.40**	1	-1	-1	-1	-1		
6/22/2005	71	1	1	1	-1	1	1	

N		6	5	4	3	2	1	0	15
	sum		1	0	-3	0	1	0	Kendall S -1
Possibles		15							
									Kendall tau -0.066667

Mean	39.58
STNDEV	30.2083708
COV	0.763158841
Trend:	Negative
Confidence (lookup)	50.00%



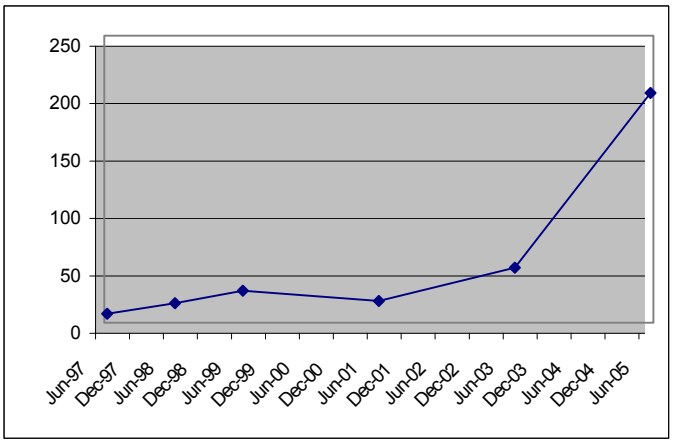
Raw Data 04U859	Date	TCE
	11/13/1987	**0.30**
	12/15/1988	**8.50**
	4/30/1990	**5.59**
	3/19/1991	**5.24**
	3/20/1992	**9.29**
	3/11/1993	**40.50**
	3/18/1994	47.00
	3/18/1994	49.50
	6/9/1994	48.90
	9/14/1994	**64.00**
	12/7/1994	52.50
	3/10/1995	**43.80**
	6/3/1996	**50.80**
	6/4/1997	**31.90**
	6/25/1998	42.00
	6/25/1998	**46.80**
	6/7/1999	**75.00**
	6/13/2001	**8.40**
	Jun-03	**4.40**
	6/22/2005	**71**

Well: 04U861

Date	TCE (ug/l)	Mann-Kendall Calculation:					
6/4/1997	**7.91**	1					
6/29/1998	**17.10**	1	1				
6/7/1999	**28.00**	1	1	1			
6/11/2001	**19.00**	1	1	1	-1		
Jun-03	**48.00**	1	1	1	1	1	
6/23/2005	200	1	1	1	1	1	1

N		6	5	4	3	2	1	15
	sum		5	4	1	2	1	Kendall S 13
Possibles		15						
								Kendall tau 0.866667

Mean	53.34
STNDEV	73.124886
COV	1.37104877
Trend:	Positive
Confidence (lookup)	99.17%



Raw Data 04U861	Date	TCE
	11/12/1987	**1.50**
	12/16/1988	**9.80**
	4/30/1990	**2.74**
	3/25/1991	**8.49**
	3/23/1992	**7.97**
	3/12/1993	**7.22**
	6/8/1994	9.69
	6/8/1994	10.40
	9/14/1994	8.26
	12/6/1994	**12.00**
	3/9/1995	**6.42**
	6/4/1996	**6.99**
	6/4/1997	**7.91**
	6/29/1998	**17.10**
	6/7/1999	**28.00**
	6/11/2001	**19.00**
	Jun-03	**48.00**
	6/23/2005	**200**

Appendix I

Other Installation Restoration Activities During FY 2005

APPENDIX I

OTHER INSTALLATION RESTORATION ACTIVITIES DURING FY 2005

This appendix is intended to give the reader a brief overview of other activities at TCAAP that are related to the Installation Restoration Program, but are not required by the RODs for OU1 through OU3.

A. BACKGROUND MONITORING

1. Deep Groundwater

In order to assess the quality of deep groundwater flowing from off-site to beneath TCAAP, monitoring is performed at locations near the upgradient side of TCAAP (the northeast corner and east side). Locations of these wells are shown on Figure B-3 in Appendix B. The FY 2005 results were:

Well	Trichloroethene
03U007	<1.0
03U009	<1.0
03L007	<1.0
04U007	<1.0
04U510	<1.0

These locations will be sampled again in FY 2007 as shown in Appendix A.1 (the wells are listed under TCAAP Groundwater Recovery System in the appendix).

2. Surface Water

The FY 2005 – FY 2009 Surface Water Monitoring Plan is presented in Appendix A.3. Although an NPDES permit is no longer in effect, monitoring for the Building 103 (Site K) treatment system effluent (Outfall 010) is being done to comply with the Final Modified Substantive Requirements Document (MN U000579), dated November 19, 1997. The data for Outfall 010 is presented in Tables 9-3 and 9-4, where it is listed as "effluent."

In addition, the Army has chosen to monitor Rice Creek as it enters and exits TCAAP (monitoring points 20700 and 20800, respectively, as shown on Figure I-1). This voluntary monitoring (not a regulatory requirement) is conducted to establish baseline characteristics for Rice Creek. Monitoring has been conducted annually beginning with FY 2001 (previous years had been quarterly). The FY 2005 data is presented in Table I-1. VOCs, mercury, and cyanide were all non-detectable in the water entering and leaving TCAAP. There were low detections reported for copper, lead, and zinc, both entering and leaving TCAAP.

B. AQUATIC STUDIES

The Tier II Ecological Risk Assessment Report for aquatic sites, prepared by the U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM), was approved by the MPCA and USEPA in December 2004. In June 2005, the Army submitted a draft feasibility study to support the Risk Manager's decision with respect to "No Further Action" or "Implement a Remedy" for each aquatic site.

C. GRENADE RANGE

The removal action to address contaminated soils was completed in early FY 2000. The Grenade Range Closeout Report received partial regulatory approval in FY 2002, with land use control issues still needing resolution. There was no activity related to this site in FY 2005.

D. OUTDOOR FIRING RANGE

The removal action to address metals-contaminated soils was completed in early FY 2000 and the Outdoor Firing Range Closeout Report received partial regulatory approval in FY 2002, with land use control issues still needing resolution. Construction was completed in October 2004 of a soil cover over a portion of the 1900-yard range that is contaminated with polynuclear aromatic hydrocarbons (PAHs). At the end of FY 2005, Army was in the process of preparing an addendum to the above-referenced closeout report to document the work at the 1900-yard range.

E. 135 AND 535 PRIMER/TRACER AREAS

Preliminary assessment reports for both of these sites received regulatory approval in FY 2002. It was recommended that a Site Inspection be conducted for both areas. The Site Inspection investigation report for each of these sites received MPCA and USEPA approval in FY 2005. It is recommended that an Engineering Evaluation/Cost Analysis be conducted for both areas to determine what, if any, remediation is required to address contamination observed in the soils.

F. PROPERTY TRANSFER-RELATED ENVIRONMENTAL ACTIVITIES

In 2002, the remaining 774 acres that were still under the control of TCAAP, were declared excess to the needs of the Department of Defense. The Army Base Realignment and Closure Office funded environmental site assessment (ESA) work to collect reliable information regarding the environmental condition of the property in order to facilitate property transfer. The work included document reviews and field sampling of various media. The findings were published in "Environmental Site Assessment for 774-Acre Excess Parcel, Phase I and Phase II Report, Twin Cities Army Ammunition Plant" (Plexus Scientific Corporation, February 20, 2004, final report). Based on comments from the MPCA and USEPA, additional samples were collected and analyzed in FY 2005. The Army submitted a draft "ESA Addendum Report" in May 2005, documenting the additional field work, and addressing other concerns raised by the regulators. At the end of FY 2005, the report was under regulatory review.

G. BUILDING 102 GROUNDWATER

The ESA referenced in the previous section identified groundwater contamination at Building 102. Additional push-probe investigation work was performed in April 2005, which confirmed the presence of groundwater contamination. In September 2005, the Army installed eight monitoring wells to help assess the extent and magnitude of the contamination. A report of the findings was being prepared at the end of FY 2005.

H. RICE CREEK AREA

In FY 2005, 112 acres along Rice Creek were transferred from the federal government to Ramsey County as a public benefit conveyance for recreational use. During the transfer process, it came to light that a sample showed sediment in a drainage ditch was contaminated with polynuclear aromatic hydrocarbons (PAHs). The sample was collected at the outfall of a storm sewer that conveys water from the 135 Primer/Tracer Area. While the 135 Primer/Tracer Area is not on the 112-acre parcel, the outfall and ditch were on the transferring property. In FY 2005, the Army collected additional samples to delineate the extent of contamination. At the end of FY 2005, the field work to excavate and remove the PAH contamination was underway (completed in October 2005). A closeout report will be prepared and reviewed in FY 2006.

I. VAPOR INTRUSION EVALUATION

In May 2005, the Army completed the "Off-TCAAP Vapor Intrusion Pathway Analysis Operable Unit 1, Operable Unit 3, and Operable Unit 2 (Site A) New Brighton-Arden Hills Superfund Site." The report evaluated the vapor intrusion pathway, according to USEPA guidance, for off-TCAAP portions of the groundwater plumes. The report found the vapor intrusion pathway is incomplete off-TCAAP and no further evaluation is necessary. The report received regulatory approval in FY 2005.

TABLE I-1

WATER QUALITY DATA FOR SURFACE WATER
Fiscal Year 2005

	20700 (Entering TCAAP)	20800 (Leaving TCAAP)
	6/23/05	6/23/05
VOCs (µg/l)		
1,1-Dichloroethane	<1.0	<1.0
1,1-Dichloroethene	<1.0	<1.0
1,2-Dichloroethane	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0
Trichloroethene	<1.0	<1.0
Vinyl Chloride	<1.0	<1.0
Metals (µg/l)		
Copper	B 1.5	B 1.4
Lead	B 0.12	B 0.099
Mercury	<0.100	<0.100
Silver	---	---
Zinc	B 1.1	B 1.3
Inorganics (µg/l)		
Cyanide	<10	<10
Total Phosphorus	B 127	B 105

Notes:

B = The value is below the reporting level, but above the method detection limit. Results should be considered estimated.

LEGEND

Site Boundary

TCAAP Boundary (Original Boundary)

Notes:
1. General NPL site boundaries determined during the initial site investigations. Please refer to the latest site reports for the current boundary definitions.
2. Aerial Orthophotography was flown in 2003

800 0 800 1600 Feet

N

L:1561/01/fy 2005/apr file/05report.apr/figure I-1

TWIN CITIES ARMY AMMUNITION PLANT

Surface Water Monitoring Locations

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Wenck

Wenck Associates, Inc. 1800 Pioneer Creek Center
Environmental Engineers Maple Plain, MN 55359-0429

FY 2005

Figure I-1

Appendix J

Annual Site Inspection Checklist for Land Use Controls

ANNUAL SITE INSPECTION CHECKLIST FOR LAND USE CONTROLS

Twin Cities Army Ammunition Plant

Date: July 27, 2005 Inspected By: Dave Fuller (TCAAP), Dave Hamernick (Nat'l Guard)
Keith Benker (Tecumseh/Wenck Installation Support Services)

Sites:	A	C	D	E	G	H	I	K
Site is located on property held by:	N.G.	AMC	N.G.	N.G.	N.G.	N.G.	AMC	AMC
Is the fence surrounding federally-controlled property intact?	Yes (1)	→	→	→	→	→	→	→
Is access to the federally-controlled property still controlled by the AMC, ~~ATK~~, & the National Guard?	Yes (2)	→	→	→	→	→	→	→
Is the current land use consistent with the land use scenario upon which the cleanup levels were based?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Has there been any excavation or other man-made soil disturbance at the site?	Yes (3)	Yes (3)	No	No	Yes (4)	No	No	No
If excavation or soil disturbance has occurred, was prior approval given by the AMC or National Guard?	Yes	Yes	N/A	N/A	Yes	N/A	N/A	N/A
If excavation or soil disturbance was authorized, was the work done in accordance with the approved plan?	Yes	Yes	N/A	N/A	Yes	N/A	N/A	N/A
Have any new structures or facilities (including new wells) been constructed on the site?	No	No	No	No	No	No	No	No
If new facilities or structures were constructed, was prior approval given by the AMC or National Guard?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If new facilities or structures were authorized, was constuction in accordance with the approved plan?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Has there been any damage to or removal/modification of groundwater remediation systems?	No	N/A	N/A	N/A	N/A	N/A	N/A	No
If such systems were removed or modified, was prior approval given by the AMC or National Guard?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If system removal/modification was authorized, was removal/modification in accordance with approved plan?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If a protective soil cover is present, is adequate vegetation present throughout the soil cover area?	N/A	N/A	Yes	Yes	Yes	Yes	N/A	N/A
If a protective soil cover is present, is there any woody vegetation > 2" diameter present on the soil cover area?	N/A	N/A	N/A	N/A	Yes (5)	N/A	N/A	N/A
If a protective soil cover is present, are run-on/runoff controls in good condition (swales, berms, riprap, etc.)?	N/A	N/A	Yes	Yes	Yes	Yes	N/A	N/A
If a protective soil cover is present, are signs marking the edge of the soil cover present and in good condition?	N/A	N/A	Yes	Yes	Yes	Yes	N/A	N/A

Comments (Attach additional pages as necessary):

(1) The National Guard has erected fence around its property so there is no longer open access from the TCAAP side.

(2) ATK has discontinued operations at TCAAP and no longer controls access at any exterior gates.

(3) There has been excavation to repair piping associated with the groundwater extraction system.

(4) Repairs were made to erosion gullies and runoff controls in the Fall '04.

(5) National Guard action item to remove a lone 3" cottonwood tree growing next to the garage.

ANNUAL SITE INSPECTION CHECKLIST FOR LAND USE CONTROLS

Twin Cities Army Ammunition Plant

Date: July 27, 2005 Inspected By: Dave Fuller, Dave Hamernick, Keith Beaker

Sites:	129-3	129-5	129-15	Grenade Range	Outdoor Firing Range	Bldg 135 P/T Area	Bldg 535 P/T Area	Phyto Demo Area	Unchar. Land
Site is located on property held by:	N.G.	N.G.	N.G.	N.G.	N.G.	AMC	N.G.	AMC	AMC/N.G.
Is the fence surrounding federally-controlled property intact?	Yes (1)	→	→	→	→	→	→	→	→
Is access to the federally-controlled property still controlled by the AMC, ~~ATK~~, & the National Guard?	Yes (2)	→	→	→	→	→	→	→	→
Is the current land use consistent with the land use scenario upon which the cleanup levels were based?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (8)	N/A
Has there been any excavation or other man-made soil disturbance at the site?	No	No	No	No	Yes (6)	Yes (7)	No	Yes (3)	N/A
If excavation or soil disturbance has occurred, was prior approval given by the AMC or National Guard?	N/A	N/A	N/A	N/A	Yes	Yes	N/A	Yes	N/A
If excavation or soil disturbance was authorized, was the work done in accordance with the approved plan?	N/A	N/A	N/A	N/A	Yes	Yes	N/A	Yes	N/A
Have any new structures or facilities (including new wells) been constructed on the site?	No	No	No	No	No	No	No	No	N/A
If new facilities or structures were constructed, was prior approval given by the AMC or National Guard?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If new facilities or structures were authorized, was constuction in accordance with the approved plan?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Has there been any damage to or removal/modification of groundwater remediation/monitoring systems?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	N/A
If such systems were removed or modified, was prior approval given by the AMC or National Guard?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If system removal/modification was authorized, was removal/modification in accordance with approved plan?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If a protective soil cover is present, is adequate vegetation present throughout the soil cover area?	N/A	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A
If a protective soil cover is present, is there any woody vegetation > 2" diameter present on the soil cover area?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
If a protective soil cover is present, are run-on/runoff controls in good condition (swales, berms, riprap, etc.)?	N/A	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A
If a protective soil cover is present, are signs marking the edge of the soil cover present and in good condition?	N/A	N/A	Yes	N/A	Yes	N/A	N/A	N/A	N/A

Comments (Attach additional pages as necessary):

(6) Additional cover material was placed on various portions of the site in Fall '04 and Spring '05.

(7) Several explosives-contaminated structures or wings of structures were demolished in Fall '05.

(8) The Phyto Demo Area was located at site C, and in 2004, a decision was made to administer activities related to groundwater and surface water as part of site C. This column will be combined with site C for future LUC inspections.