THIRD FIVE-YEAR REVIEW REPORT

Saegertown Industrial Area Superfund Site
Lord Corporation property

Borough of Saegertown

Crawford County, Pennsylvania

EPA ID#: PAD980692487

Prepared by:

U.S. Environmental Protection Agency

Region III

Philadelphia, Pennsylvania

James J. Burke, Director
Hazardous Site Cleanup Division

9/15/07
Date

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name: Saegertown Industrial Area Superfund Site – Lord Corporation property		
EPA ID: PAD980692487		
Region: III	**State: PA**	**City/County: Borough of Saegertown, Crawford County**

SITE STATUS	
NPL status: ▶ Final . Deleted Other (specify)_____	
Remediation Status (choose all that apply): . Under Construction . Operating ▶ Complete	
Multiple OUs?* . YES ▶ NO	**Construction completion date: March 15, 2004 (PCOR)**
Has site been put into reuse? . ▶ YES . NO	

REVIEW STATUS	
Lead agency: ▶ EPA State . Tribe . Other Federal Agency	
Author name: Mitch Cron	
Author title: Remedial Project Manager	**Author Affiliation: EPA Region III**
Review period: June 26, 2007 – September 19, 2007	
Date(s) of site inspection: June 26, 2007	
Type of review: ▶ Post-SARA Pre-SARA . NPL-Removal only Non-NPL Remedial Action Site . NPL State/Tribe-lead . Regional Discretion	
Review number: . 1 (first) . 2 (second) ▶ 3 (third) . Other(specify)	
Triggering action: . Actual RA Onsite Construction at OU # . Construction Completion . Other (specify)	.. Actual RA Start at OU# ▶ Previous Five-Year Review Report
Triggering action date: September 19, 2002 (signature date of second Five-Year Review)	
Due date (five years after triggering action date): September 19, 2007	

FIVE-YEAR REVIEW SUMMARY FORM, CONT'D.

Issues:

- Potential vapor intrusion from contaminated ground water

Recommendations and Follow-up Action:

- Vapor intrusion evaluation will be performed to determine if this is a pathway of concern

Protectiveness Statements:

A protectiveness determination of the remedy at the Lord property cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion evaluation for two buildings not located on the Lord property which are potentially underlain by the ground water contamination plume. It is expected that this evaluation will take six months to one year to complete, at which time a protectiveness determination will be made.

Other Comments:

N/A

EXECUTIVE SUMMARY

The Saegertown Industrial Area Site (Site) consists of approximately 100 acres in an industrial park in Saegertown, Crawford County, PA. The Site originally included properties owned by four separate companies: the Lord Corporation property; the Saegertown Manufacturing Corporation (SMC) property; the Spectrum Controls Incorporated (SCI) property; and the properties that were formerly owned by the General American Transportation Company (i.e. GATX properties). EPA determined in the first Five-Year Review (1997) that no further Five-Year Reviews were required for the SMC property or the SCI property (the ROD selected the No Action alternative for the SMC property and the SCI property). EPA determined in the second Five-Year Review (2002) that no further Five-Year Reviews were required for the GATX properties (the remedial action at GATX was completed in 1996, and the GATX, SMC, and SCI properties were deleted from the Site in 1997). Therefore, this third Five-Year Review addresses only the Lord Corporation portion (Lord property) of the Site.

In the 1993 Record of Decision (ROD), EPA selected a remedy for the Lord property consisting of the following components:

- Delineation of the Lord Corp. ground water contamination plume;
- Ground water extraction and treatment of contaminated ground water through air stripping or UV/oxidation;
- Air sparging injection wells;
- Vapor extraction and treatment through carbon adsorption; and
- Long-term ground water monitoring.

Due to Site conditions identified during a pre-Remedial Design investigation at the Lord property, EPA issued a ROD Amendment in 2002. The ROD Amendment eliminated the requirement to extract and treat volatile organic compound (VOC)-contaminated ground water and perform air sparging/vacuum extraction in the source area. Instead, the ROD Amendment required the following remedy at the Lord property: enhanced bioremediation of VOCs in ground water using a molasses-based carbon source and analysis of bioattenuation parameters and water quality to monitor performance; on-going operation and monitoring of a domestic well treatment system; a provision for additional residential treatment systems, if determined necessary; and institutional controls, in the form of safety and health management planning at the Lord Corp. facility and local ground water use restrictions. The ROD Amendment indicated that these institutional controls are already in place and will be implemented and enforced by Lord Corp. and the Borough of Saegertown.

This third Five-Year Review has determined that the remedy selected in the 2002 ROD Amendment has been constructed and is operating as designed.

However, a protectiveness determination of the remedy at the Lord property cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion evaluation for two buildings not located on the Lord property which

are potentially underlain by the ground water contamination plume. It is expected that this evaluation will take six months to one year to complete, at which time a protectiveness determination will be made.

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Acronyms

BW-2	Borough (Saegertown) Well Number Two
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DCA	dichloroethane
DCE	dichloroethene
EPA	Environmental Protection Agency
FS	Feasibility Study
G&M, Inc.	Geraghty and Miller, Inc.
GATX	General American Transportation Company
IRZ	in-situ reactive zone
MCL	Maximum Contaminant Level
MIBK	methyl isobutyl ketone
MW	monitoring well
NCP	National Contingency Plan
NPL	National Priorities List
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PAH	polyaromatic hydrocarbons
PCE	tetrachloroethene
PCOR	Preliminary Close Out Report
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SCI	Spectrum Controls Incorporated
SDWA	Safe Drinking Water Act
SMC	Saegertown Manufacturing Corporation
TCA	trichloroethane
TCE	trichloroethene
VOC	volatile organic compound
WTF	Western Tank Farm

U.S. Environmental Protection Agency
Region III
Hazardous Site Cleanup Division
Third Five-Year Review Report
Saegertown Industrial Area Superfund Site
Borough of Saegertown, Crawford County, Pennsylvania

I. Introduction

The purpose of the Five-Year Review is to determine whether the remedy at a Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (EPA or "the Agency") is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f) (4) (ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region III conducted this Five-Year Review of the remedy implemented at the Saegertown Industrial Area Superfund Site (Site) located in the Borough of Saegertown, Crawford County, Pennsylvania. This review was conducted by the Remedial Project Manager (RPM) for the Site from June 26, 2007 through September 19, 2007. This report documents the results of the Five-Year Review. This is the third Five-Year Review for the Site. The triggering action for this statutory review is the date of the second Five-Year Review: September 19, 2002. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that would allow for unlimited use and unrestricted exposure.

NOTE: The Site originally included properties owned by four separate companies: the Lord Corporation property; the Saegertown Manufacturing Corporation (SMC) property; the Spectrum Controls Incorporated (SCI) property; and the properties that were formerly owned by the General American Transportation Company (i.e. GATX properties). EPA determined in the first Five-Year Review (1997) that no further Five-Year Reviews were required for the SMC property or the SCI property (the ROD selected the No Action alternative for the SMC property and the SCI property). EPA determined in the second Five-Year Review (2002) that no further Five-Year Reviews were required for the GATX properties (the remedial action at GATX was completed in 1996, and the GATX, SMC, and SCI properties were deleted from the Site in 1997). Therefore, this third Five-Year Review addresses only the Lord Corporation portion (Lord property) of the Site.

II. Site Chronology

Table 1 lists the chronology of events for the Site.

TABLE 1: SITE CHRONOLOGY

Date	Event
1980	Initial discovery of ground water contamination
1984	EPA performed Site Inspection
1985	EPA calculated Hazard Ranking System Score
1988	Site proposed for the Nation Priorities List (NPL)
1990	Site listed on the NPL
1992	EPA completed the Remedial Investigation/Feasibility Study (RI/FS)
1993	EPA signed the Record of Decision (ROD)
1997	EPA issues Unilateral Administrative Order requiring Lord Corporation to install a domestic well treatment system
1997	First Five Year Review report issued
2002	ROD Amendment for the Lord Corporation property of the Site issued
2002	Second Five Year Review report issued
2003	Construction of the physical features of the in-Situ ground water bioremediation system at the Lord Corporation property is completed
2004	Superfund Preliminary Closeout Report (PCOR) issued

III. Background

Physical Characteristics

The Lord Corporation property (Lord property) consists of approximately 30 acres of land in the Borough of Saegertown. The Lord property is located on the south side of South Street (Route

198), to the east of the intersection of South Street and Main Street. Conrail railroad tracks lie immediately adjacent to the west of the Lord property. Further to the west lie a multi-use building (called the Knut Kustom Komplex), Main Street, and the French Creek. To the south of the Lord property lie vacant land, a sewer treatment plant and Woodcock Creek. To the north of the Lord property lie industrial properties, vacant land, Borough of Saegertown municipal and fire department facilities, and recreational baseball fields. To the east of the Lord property lie athletic fields, and commercial and industrial properties, beyond which lies vacant land.

Land and Resource Use

The Site is located in a broad valley formed by the stream terrace of French Creek which is located approximately 500 feet west of the Site and contains endangered mussels. Woodcock Creek borders the Site to the south. Beyond French Creek to the west lies a residential area of Saegertown which utilizes ground water as the sole source of potable water. Land use for the Site (including the Lord property) remains industrial, as it was during the RI/FS.

History of Contamination

Lord Corporation

Since 1962, the Lord Corporation has produced adhesives, urethane coatings and rubber chemicals on approximately 30 acres of property on the Site. Lord uses solvents including trichloroethylene (TCE), trichloroethane (TCA), xylene and methyl isobutyl ketone (MIBK) in its manufacturing processes. From 1968 until approximately 1987, Lord discharged non-contact cooling water to a shallow impoundment on its property. From 1987 until the present, Lord has been discharging non-contact cooling water via a pipeline to French Creek under National Pollutant Discharge Elimination System (NPDES) permit No. PA0101800.

Site Contamination History

In April 1980, during routine sampling of the Borough of Saegertown's municipal wells, Pennsylvania Department of Environmental Resources (PADER, now the Pennsylvania Department of Environmental Protection (PADEP)) discovered that Borough Well Number 2 (BW2), which is located approximately 400 feet west of the Site, was contaminated with TCE at a level of 310 parts per billion (ppb). The Borough removed BW2 from service, but continued to pump the well in an attempt to flush the contaminants from the ground water. The Borough also hired Moody and Associates (MAI), environmental consultants, to investigate the potential sources of the contamination. Test pits dug in the vicinity of the pond on the former GATX property revealed deteriorating barrels containing sludge. Analysis of a sample from one of the deteriorating barrels showed that the sludge contained 100 ppb TCE. MAI concluded that sludge in the pond and in the former treatment area on the GATX property were the sources of the contaminants impacting BW2.

In 1980, PADER sampled Lord Corporation's non-contact cooling water, which was being

discharged to an on-Site impoundment. Analysis of the samples revealed that they contained trace to low levels of several volatile organic compounds (VOCs), including TCE, tetrachloroethylene (PCE), benzene and xylene. Lord contended that the source of these contaminants was the water supplied by the Borough.

In 1980, PADER detected TCE and TCA in a monitoring well on the SMC property. In 1981, analysis of samples obtained by PADER from cutting oil tanks on the SMC property revealed the presence of trace amounts of TCA. SMC asserted that the source of the TCA was the Borough's water supply. SMC denied that it used TCA in its manufacturing processes, except in very small quantities which were totally consumed in the process, so that no waste was created.

In 1981, samples were taken on the SCI property from a well used by the milk plant that formerly operated there. Analysis of the ground water samples revealed the presence of TCE and TCA. On June 11, 1982, the Borough of Saegertown filed a legal action against SMC and SCI, alleging that these companies were responsible for polluting BW2. The Borough later voluntarily discontinued its action against SMC and SCI.

In July 1984, EPA began a Site Inspection of the Saegertown Industrial Area Site. Sampling confirmed the presence of TCE and TCA in ground water on-Site. Soil and sludge samples from the GATX pond area revealed the presence of TCE, PCE, polyaromatic hydrocarbons (PAHs) and 1,4-dichlorobenzene. On November 20, 1985, EPA calculated a Hazard Ranking System score of 33.62 for the Saegertown Industrial Area Site. This score was based primarily on the presence of hazardous substances in the ground water in the vicinity of the Site. On June 24, 1988, the Saegertown Industrial Area Site was proposed for listing on the National Priority List (NPL) of Superfund Sites.

Initial Response

In 1989, four companies, Lord Corp., GATX, SMC, and SCI, signed an Administrative Order on Consent (AOC) with EPA to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the Site. The Site was listed on the National Priorities List (NPL) on February 21, 1990, and the RI/FS was completed in 1992.

Basis for Taking Action

Ground water contamination was discovered on the Lord property during the RI. The ground water plume was not fully delineated during the RI. Table 1 of the ROD reveals that ground water at the Lord Corporation property was known to be contaminated with the following hazardous substances: tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and vinyl chloride. Table 1 from the ROD (included in this Five-Year Review report as Attachment 2) summarizes the contaminants and the estimated volume of contaminated ground water at the Lord property.

The ROD concluded that an unacceptable level of risk is presented by the groundwater in the

vicinity of the Lord property in a future land use scenario involving an on-Site resident's ingestion, inhalation and dermal contact with the ground water contaminants. It was determined in the ROD that the actual or threatened releases of hazardous substances from this portion of the Site, if not addressed by implementing the response action selected in the ROD, may present a substantial endangerment to public health, welfare, or the environment.

IV. Remedial Actions

Remedy Selection

On the Lord property, the RI/FS estimated that 7,500 pounds of chlorinated ethenes had leaked from a sump area (RG-1 Sump) into the ground water. As a result, the RI/FS estimated that 9.3 million gallons of ground water had been contaminated with PCE, TCE, 1,2-dichloroethene, and vinyl chloride. The ROD identified the RG-1 Sump as a potential source area but indicated that other potential source areas may be present at the Lord property, including potential past releases in the vicinity of the Lord Corp. buildings, tank farms, and unloading areas. In the ROD, EPA selected a remedy for the Lord property consisting of the following components:

- Delineation of the Lord Corp. ground water contamination plume;
- Ground water extraction and treatment of contaminated ground water through air stripping or UV/oxidation;
- Air sparging injection wells;
- Vapor extraction and treatment through carbon adsorption; and
- Long-term ground water monitoring.

As mentioned above, EPA issued a ROD that included the Lord property on January 29, 1993. On August 18, 1993, EPA entered into an AOC with Lord Corp. (EPA Docket No. III-93-47-DC). The AOC required Lord Corp. to perform a Remedial Design (RD) to address the Lord Corp. ground water contamination plume. Following the issuance of the ROD and AOC, Lord Corp. began the Pre-RD Investigation to further evaluate the hydrogeology of the Site and assess ground water quality.

EPA also entered into a Consent Decree with Lord Corp. for the performance of the remedial design/remedial action (RD/RA). The Consent Decree was lodged with the United States District Court on May 2, 1994, and entered by the Court on March 15, 1994.

Pre-RD Investigation

In May 1994, EPA approved the Final Workplan for the design of the remedy selected in the ROD for the Lord property. The Workplan specified that pre-RD studies be performed to delineate the extent of ground water contamination beneath the Lord property. An additional 17 monitoring wells (MWs) were constructed in July 1994 at the Lord property. The five existing RI MWs and the 17 newly installed MWs were then sampled. The geologic logs recorded during the drilling of the additional 17 MWs indicated that the overburden aquifer consists of clay-silts, sands, and

gravel, and that lower permeability silts and clays were prominent in the sump area and the central portion of the Site.

In October 1994, an in-situ air sparging/vapor extraction pilot study was performed. The silt-clay soils in the source area were found to restrict air movement and make the capture of sparged air unpredictable.

In November 1994, Lord Corp. performed an aquifer pumping test at the Lord property. The results of the test were used to develop a ground water flow and transport model of the aquifer beneath the Lord property. Lord Corp. reported that layers of lower permeability materials retard the movement of ground water and contaminants from the shallow zone of the aquifer to the deeper zone. Lord Corp. also reported that the pumping of a ground water remediation well would dewater the shallow silt-clay units and preclude the flushing of adsorbed contaminants while drawing contaminants lower into the aquifer.

The additional geologic and ground water data collected in the pre-RD studies was used by Lord Corp.'s contractor, Geraghty & Miller, Inc. (G&M), to perform a new calculation of the mass of contaminants in the aquifer. In a March 1995 report, G&M calculated that 78 pounds of VOCs were dissolved in ground water and 760 pounds of VOCs were adsorbed to the soil matrix. This estimate was almost an order of magnitude lower than the RI estimate.

On April 7, 1995, EPA and PADEP met with Lord Corp. and G&M. In the meeting, Lord Corp. and G&M asserted that biodegradation and natural attenuation of Site-related contaminants in the Lord Corp. ground water contamination plume was occurring. Lord Corp. based this conclusion on a comparison of the analytical data from 1991 and 1994. Lord Corp. also presented information regarding the degradation of PCE to "daughter compounds" (TCE, dichloroethane (DCA), dichloroethene (DCE), vinyl chloride), and ultimately to the innocuous products ethene and ethane. Daughter compounds of PCE had been identified in ground water at the Site during all sampling events. The Lord Corp. model predicted that pumping and treating of contaminated ground water, as required in the ROD, would not remediate the aquifer faster than the biodegradation/natural attenuation reportedly taking place.

Based on the April 7, 1995 meeting and the data collected to that date, EPA agreed to delay the design of the selected remedy in the ROD while additional data was collected and analyzed. It was determined that future ground water samples would also be analyzed for biological and geological parameters to better assess whether biodegradation was occurring in the aquifer.

Ground water sampling was conducted by Lord Corp. in October 1995, March 1996, and August 1996. Surface water samples were also collected in August 1996 from locations on French Creek that were upstream, mid-stream, and downstream of the Lord Corp. ground water contamination plume. In addition, a survey of French Creek identified one seep actively discharging from the stream bank and another potential seep area which was dry. Both seep areas exhibited iron staining of the soil in the discharge area. The actively discharging seep was sampled in August 1996. Analysis of the seep sample revealed several Site-related contaminants, including

chlorotoluene, vinyl chloride, TCE, and DCE. Analysis of surface water samples collected from French Creek indicated that the Creek was not adversely impacted by Site-related contaminants. These results confirmed the results obtained during the RI/FS which indicated that the Site is not adversely impacting the surface water quality of French Creek. The first Five-Year Review of the Site remedy, issued in 1997, listed several possible reasons for the Lord Corp. ground water contamination plume not impacting French Creek, which include: the low concentrations of VOCs in the seep, the massive dilution of seep water in the Creek, and volatilization of the VOCs from the seep and Creek water.

In the spring of 1996, Lord Corp. began to install engineered secondary containment systems around two tank farms located at the Lord Corp. facility. During excavation for the secondary containment system around the western tank farm (WTF), VOC-contaminated soil was identified. Contaminants detected in soil samples from the WTF area included 2-chlorotoluene, xylene, methyl isobutyl ketone, ethyl benzene, PCE, and toluene. EPA and PADEP were informed of the VOC contamination and began working with Lord Corp. to assess the contamination and to design a remedy. VOC-contaminated soil was characterized, excavated and placed into an aboveground engineered soil pile for enhanced biological treatment (biopile) on the Lord property. However, all VOC-contaminated soil could not be excavated as such an excavation may have compromised the integrity of the tank farm footings. Therefore, a bio-venting piping system was installed beneath the concrete secondary containment pad under the WTF. Approximately 800 cubic yards of VOC-contaminated soil were excavated and placed in the biopile. The approximate measurements of the biopile were 40 feet wide, by 160 feet long, by approximately five-foot high. Four perforated pipes ran the length of the biopile, and using a mechanical blower, air was drawn through the biopile to encourage aerobic degradation of the WTF-related contaminants. The first quarterly report calculated the mass of VOCs in the biopile at 59.26 pounds, down from the initial calculated contaminant mass of 2,722 pounds of VOCs. EPA issued a letter on September 22, 1997, indicating that EPA and PADEP had made the determination that, based on submittals by Lord Corp., the treatment of biopile soils was sufficient. No additional action regarding the biopile is anticipated.

After the bio-venting system was shut down beneath the WTF, the subsurface perforated piping was left in place to be used for carbon-solution introduction during the voluntary in-situ reactive zone (IRZ) Pilot Study that began in February 1998 (see below).

Chemicals stored in the WTF were added to the list of contaminants analyzed for in ground water and surface water samples. The following contaminants were detected in samples from monitoring well "MW-13S", which is located approximately 50 feet downgradient of the WTF: 2-chlorotoluene, xylene, ethyl benzene, and toluene.

In a letter dated October 22, 1996, EPA directed Lord Corp. to survey and sample selected private wells located across French Creek from the Lord Corp. ground water contamination plume. EPA and Lord Corp. collected water samples for independent analysis from home wells located west of French Creek. The results of the water sampling analyses confirmed the presence of vinyl chloride in one home well, identified as "PW-7", at a concentration that exceeds the Safe

Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) permitted in drinking water. On December 31, 1996, EPA contacted the residents at PW-7 to inform them about the contamination. On January 3, 1997, Lord Corp. began supplying bottled potable water to the residents at PW-7. Additional sampling was performed to confirm the results in January 1997.

On February 13, 1997, EPA issued a Unilateral Administrative Order to Lord Corp. which required Lord Corp. to provide bottled water to impacted residences, perform a comprehensive private well survey and sampling, continue to provide bottled water to the residents of PW-7, and install a water treatment system at PW-7. On May 23, 1997, EPA acknowledged that the PW-7 treatment system was operational and Lord Corp. could stop providing bottled water to the residents using PW-7. The PW-7 treatment system consists of an aeration unit and a carbon-filtration unit. This treatment system continues to operate at this residence.

Lord Corp. has performed monthly monitoring at PW-7 since 1997 to confirm that Site-related contaminants are removed from the water prior to usage by residents. Lord Corp. has performed quarterly monitoring at the nearest private wells to the north and south of PW-7, identified as "PW-20A" and "PW-19", respectively, since 1999. Site-related contaminants have not been identified in either PW-20A or PW-19 at concentrations that exceed SDWA MCLs.

Pilot Study

As part of the Pre-RD investigation, Lord Corp. initiated a voluntary pilot study to assess the feasibility of enhancing the naturally occurring reductive dechlorination processes to remediate VOCs in ground water.

The results of the Pilot Study are documented in a Revised 2001 Annual Report, Focused In-Situ Reactive Zone Enhanced Bioremediation Pilot Study Evaluation, prepared by Arcadis G&M, Inc. (Arcadis, formerly d/b/a G&M), for Lord Corp., and dated March 22, 2002. The Pilot Study was conducted in three phases between February 1998 and 2001. The three phases of the Pilot Study are described in the report as follows:

- Initial Phase: 8-month period between February 5, 1998 and October 8, 1998 where a carbon source solution consisting of approximately 1,230 gallons (14,400 pounds) of pure molasses with 50,270 gallons of potable water was introduced into 11 introduction points.
- Second Phase: 6-month period between May 9, 2000 and October 16, 2000 where the use of lower volume introductions of the carbon source solution on a less frequent basis was evaluated (total of 580-gallons [6,760 pounds] of pure molasses with 31,630 gallons of potable water added into 13 introduction points).
- Third Phase: The re-initiation of carbon source solution introductions beginning April 4, 2001 and continuing through August 2001. Approximately 1,420 gallons (16,600 pounds) of pure molasses with 41,000 gallons of potable water were introduced through August 2001 into 12 introduction points.

During the pilot study, Lord Corp. performed ground water sampling and analysis to determine if

IRZs were being created that would enhance naturally occurring dechlorination processes and to evaluate the effectiveness of the IRZs in degrading Site-related VOCs to innocuous daughter products (ethene, ethane). Introductions were halted prior to the annual spring and summer groundwater sampling events to ensure groundwater samples were representative of the aquifer being treated. Carbon source solution introductions were re-initiated after sampling was completed.

Arcadis concluded in the pilot study report that the data generated during the pilot study provided a strong indication that the enhanced bioremediation technology can be effectively implemented at the Lord property to remediate VOCs in ground water. Arcadis cited three conditions to support this assertion:

- **Evidence of reducing environments**; including consumption of nitrates, increases in dissolved metals, methane, and carbon dioxide, and decreases in oxidation reduction potential.
- **Evidence of Bioactivity and Biodegradation**; including increases in methane, carbon dioxide, and ethene/ethane.
- **VOC mass removal**; as evidenced by the conversion of parent products PCE and TCE to daughter products of cis-1,2-DCE, vinyl chloride, and ethene/ethane during the pilot study, ultimately resulting in significant reductions in VOCs being observed in the summer 2001 data.

Arcadis indicated that, based on the pilot study, proper reducing conditions can be developed when a sufficient volume of molasses-based carbon source solution is added to the aquifer, and once developed, the reduction of chlorinated VOCs can be driven through to completion (to innocuous by-products, such as ethene and ethane).

Based on a review of the pilot study, EPA issued an Amendment to the ROD, as discussed below.

ROD Amendment

EPA issued a ROD Amendment on September 30, 2002. The ROD Amendment eliminated the requirement to extract and treat VOC-contaminated ground water and perform air sparging/vacuum extraction in the source area. Instead, the ROD Amendment required the following remedy at the Lord property: enhanced bioremediation of VOCs in ground water using a molasses-based carbon source and analysis of bioattenuation parameters and water quality to monitor performance; on-going operation and monitoring of the PW7 domestic well treatment system; a provision for additional residential treatment systems, if determined necessary; and institutional controls, in the form of safety and health management planning at the Lord Corp. facility and local ground water use restrictions. The ROD Amendment indicates that these institutional controls are already in place and will be implemented and enforced by Lord Corp. and the Borough of Saegertown.

The original ROD also required that contamination in the ground water be reduced to background

levels. The ROD Amendment modified the ground water cleanup Performance Standards for site-related contaminants to the MCLs identified in the SDWA. In addition, Performance Standards were established in the ROD Amendment for several contaminants at levels below the SDWA MCLs and PADEP Media-Specific Concentrations to insure that the risk to human health does not exceed EPA guidelines (cancer risk in excess of 1 in 10,000, or a Hazard Index greater than 1). Several new contaminants were identified during the sampling activities conducted after the 1993 ROD had been issued, and performance standards for these contaminants were included in the 2002 ROD Amendment. Tables from the ROD Amendment, including a list of the contaminants of concern in the Lord Corp. ground water contamination plume, and ground water performance standards from the ROD Amendment, are included in Attachment 3 of this Five-Year Review Report.

Remedy Implementation

The Remedial Design (RD) for the remedy selected in the ROD Amendment was approved by EPA on September 29, 2003.

Remedial Action construction activities outlined in the RD included:

- The installation of 22 introduction wells designed and installed specifically for the purpose of introducing carbon source solution to the subsurface. The introduction wells were constructed using four-inch diameter polyvinyl chloride (PVC) slotted well screen and solid riser pipe. The screen sections are approximately 15 feet in length, extending approximately five to 20 feet below land surface.
- The construction of two additional monitoring wells.
- The abandonment of 13 monitoring wells/piezometers.
- The construction of a trailer-mounted carbon source solution introduction system. The carbon solution introduction trailer consists of a carbon introduction tank, carbon introduction pumps, and associated instrumentation, piping and valves.

On December 5, 2003, EPA performed a pre-final inspection at the Lord property. The pre-final inspection was attended by representatives of EPA, PADEP, the United States Army Corps of Engineers (USACE), Lord Corp., and Arcadis. During the pre-final inspection, a representative number of introduction wells and the carbon-solution introduction equipment were observed. Additionally, a representative number of newly installed and abandoned MWs were observed. Based on the pre-final inspection, the remedy for the Lord property, selected in the ROD Amendment, was confirmed to have been constructed at the Site, as outlined in the final RD report.

A Preliminary Close-Out Report (PCOR) was issued for the Site by EPA on March 15, 2004.

During the time period between the December 5, 2003 pre-final inspection and the performance of the 2007 Five-Year Review, two modifications have been made to the in-Situ ground water bioremediation system currently operating at the Lord property, as follows:

1. In approximately July 2005, four additional introduction wells were installed at the Lord property. In addition, subsurface "Courtyard Area Lateral" pipes (located downgradient from the Courtyard tank farm), were discontinued as carbon source solution introduction points.
2. In October 2005, the concentration and volumes of molasses solution were adjusted to achieve maximum distribution of carbon-source solution in the subsurface environment.

Institutional Controls

Institutional controls for the Lord property are discussed in the ROD Amendment, as follows:

"*Institutional controls will be used to minimize the potential for future exposure to VOCs in groundwater during the remediation period. Lord will maintain its on-going health and safety program to ensure that proper supervision, monitoring and use of personal protective equipment is continued during any future excavation activities at the Site where groundwater may be encountered. Also, the Borough of Saegertown Ordinance (Ordinance Number 4, Series 1979) that prohibits the installation of future groundwater supply wells will be relied on to control potential exposures to VOCs in groundwater between Lord's property and French Creek.*"

A copy of the above-mentioned Borough of Saegertown ordinance is included as Attachment 4 to this Five-Year Review report.

System Operation/Operation and Maintenance

Operation of the in-Situ ground water bioremediation system includes introduction of molasses-based carbon source solution, and ground water monitoring. The molasses-solution introductions are performed approximately nine times per year, in accordance with the specifications included in the 2003 RD/Workplan, and subsequent modifications to the 2003 RD/Workplan. Documentation pertaining to 2007 molasses-solution schedule is included as Attachment 5 to this Five-Year Review Report.

Ground water sampling of MWs at the Site is performed pursuant to the 2003 RD/Workplan to provide data to evaluate the efficacy of the in-Situ ground water bioremediation system. Analytical parameters for ground water samples include Site-related contaminants of concern, and biogeochemical parameters.

As indicated above, the remedy outlined in the ROD Amendment required the on-going operation and maintenance of a water treatment system at a private well located on the western side of French Creek (PW-07). A maintenance visit is performed at the PW-07 treatment system once per month. During the maintenance visit, water samples are collected from three stages with the treatment system and analyzed for Site-related contaminants of concern. The monthly samples continue to indicate that Site-related contaminants of concern (specifically, vinyl chloride) are removed from the well water, prior to use by the PW-07 residents. The PW-07 treatment system is operated and maintained in accordance with the Ground Water Treatment Design Plan (dated

March 1997), which is Appendix F to the 2003/RD Workplan.

As indicated above, Lord Corp. has performed quarterly monitoring at the nearest private wells to the north and south of PW-7, identified as "PW-20A" and "PW-19", respectively, since 1999. Site-related contaminants have not been identified in either PW-20A or PW-19 at concentrations that exceed SDWA MCLs.

V. Progress Since the Last Five-Year Review

Substantive issues were not identified in the 2002 Five-Year Review report

The following Protectiveness Statement was included in the 2002 Five-Year Review report for the Lord property:

"*The selected remedy for the Lord Operable Unit is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.*"

The protectiveness statement generated by the 2007 Five-Year Review process is included in Section X of this Five-Year Review report.

VI. Five-Year Review Process

Administrative Components

Members of the local government of the Borough of Saegertown, PADEP, Lord Corp., and Arcadis were notified of the initiation of the Five-Year Review in approximately May 2007.

The Five-Year Review Team was led by the EPA Remedial Project Manager (RPM) for the Site.

The review team established the review schedule which included:

- Community Involvement;
- Document Review;
- Data Compilation and Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review

Community Involvement

The general public in the vicinity of the Site was notified of the performance of the Five-Year Review by publishing an advertisement in the following newspaper: *Meadville Tribune*. An advertisement in this newspaper was placed by EPA on August 1, 2007. The *Meadville Tribune* is

based out of Meadville, Pennsylvania. This newspaper serves the community in the vicinity of the Site.

Activities to involve the community in the Five-Year Review were initiated by interviewing the following individuals:

1. Borough Manager, Borough of Saegertown
2. PW-07 resident
3. PADEP Project Officer

During the interviews, the EPA RPM summarized the findings of the Site inspection and asked for any input on concerns regarding the protectiveness of the remedy.

Document Review

This Five-Year Review consisted of a review of relevant documents including:

- ROD – Signed January 29, 1993
- ROD Amendment – Signed September 30, 2002
- PCOR – Signed May March 15, 2004
- 1st Five-Year Review – Signed August 6, 1997
- 2nd Five-Year Review – Signed September 19, 2002
- 2003 RD/Workplan (September 9, 2003)
- Interim Remedial Action Report (dated September 7, 2005)

Data Review

The following data were reviewed during the performance of this Five-Year Review:

- 2006 Remedial System Implementation Annual Ground Water Monitoring Report (dated February 2007)
- 2005 Remedial System Implementation Annual Ground Water Monitoring Report (dated February 23, 2006)
- 2004 Remedial System Implementation Annual Ground Water Monitoring Report (dated April 5, 2005)
- Remedial System Implementation Annual Ground Water Monitoring Report (dated May 14, 2004)

Ground Water Monitoring/Remediation

As part of this Five-Year Review, EPA has reviewed data provided by Lord Corp. regarding ground water monitoring at the Site, and ground water remediation activities.

In accordance with the 2003 RD/Workplan, Arcadis and Lord Corp. perform introductions of a

molasses-based carbon solution into a network of introduction wells located on the Lord property. Documentation including the dates and volumes of molasses-solution introductions (2002-2007) is included as Attachment 6 to this Five-Year Review report.

Ground water monitoring at the Site is conducted in accordance with a sampling/analysis schedule included in the 2003 RD/Workplan (Table 6. Remedial Action Sampling and Analysis Schedule. included in this Five-Year Review report as Attachment 7).

The ground water monitoring data collected can be broadly categorized as follows:

1. Process monitoring data, which tracks parameters used to make adjustments, as needed, in the operation of the remediation system and determines whether subsurface conditions are suitable for the creation of IRZs. Process monitoring data parameters include pH, total organic carbon, and methane.

2. Performance monitoring data, which monitors parameters that determine whether the system is meeting its performance objectives (the ground water performance standards included in the ROD Amendment). Performance monitoring data includes analysis for the Site-related VOCs in ground water.

3. Secondary operational monitoring data. Secondary operational monitoring data includes dissolved iron and manganese, and sulfate concentrations, and Oxidation Reduction Potential (ORP).

Broadly, review of the performance monitoring data (concentrations of Site-related contaminants of concern) indicates that the establishment of in-situ reactive zones at the Site is facilitating VOC degradation. However, one potential concern is the presence of 2-chlorotoluene which appears to be less conducive to enhanced reductive dechlorination than other Site-related VOCs.

Arcadis has addressed the presence of 2-chlorotoluene in the ground water contamination plume, as follows: "*The presence of 2-chlorotoluene in GM-13S* (a monitoring well on the Lord property) *has been reported since August 1998. The Excavated Soil Remediation/Monitoring Plan that was submitted to the Pennsylvania Department of Environmental Protection (PADEP) in May 1996 (Geraghty & Miller, Inc., 1996) documented the installation of a secondary containment dike around the West Tank Farm (WTF). Installation of the secondary containment system required excavation of approximately 770 cubic yards of VOC-impacted soil. 2-chlorotoluene concentrations as great as 3,460 mg/kg were observed in the excavated soil, which indicates that the WTF was the likely source of 2-chlorotoluene impacts to ground water. The WTF is immediately upgradient of GM-13S and was used to store various raw materials including 2-chlorotoluene (Halso 99).*

Native soil bacteria utilize 2-chlorotoluene as a carbon donor and will degrade it under aerobic or anaerobic conditions. However, the soil microbes will preferentially use more easily degradable substrates, such as molasses, while present because they provide a greater energy

yield than 2-chlorotoluene. As a result, attenuation of 2-chlorotoluene will likely be minimal while carbon amendments are ongoing. It is anticipated that once the site goals for chlorinated ethenes have been achieved and molasses injections are discontinued, natural attenuation mechanisms will address the residual 2-chlorotoluene.

Lord will continue to collected groundwater quality data from GM-13S semi-annually. The monitoring program will continue after IRZ shutdown to observe post-remediation ground water quality. The post-remediation data will be used to assess attenuation of the 2-chlorotoluene, and whether further remediation focused on treatment of 2-chlorotoluene would be required."

Ground water remediation via the introduction of molasses-solution to establish IRZs will continue in accordance with the 2003 RD/Workplan. Ground water sampling/analysis will continue to evaluate the effectiveness of ground water remediation in accordance with the 2003 RD/Workplan. Evaluation of the progress of remediation of 2-chlorotoluene in ground water will continue.

A figure depicting the location of monitoring wells on the Site is included as Attachment 8 to this Five-Year Review report.

A figure depicting the location of the introduction wells on the Site is included as Attachment 9 to this Five-Year Review report.

Figures depicting the concentrations of contaminants of concern are included as Attachment 10 to this Five-Year Review report.

Graphs depicting the concentrations of contaminants of concern in monitoring wells over time are included as Attachment 11 to this Five-Year Review report.

PW-07 Operation and Maintenance

The following maintenance is performed at the water treatment system present at PW-07:

1. Monthly: Collect water samples from sampling ports SP-1, SP-2, and SP-3, add salt to the water softener as needed, and check operation of the booster pumps, shallow tray system and other treatment equipment. The sample port designated SP-1 (influent port sample) is the untreated well water prior to entering the treatment system, SP-3 (intermediate port sample) is collected after the aeration unit (Primary Treatment Unit) but before the carbon unit (Secondary Treatment Unit), and SP-5 (effluent port sample) is the final treated well water after it has passed through both stages of the treatment system prior to entering the residence.

2. Quarterly: Change the cartridge filters in the pre- and post-filter housings.

3. Annually: Perform a complete teardown of the shallow tray system. Clean out any accumulated sediment in the bottom of the system. Sanitize the system and return the system to

service.

Monitoring data from the PW-07 treatment system, collected between 1998 and 2006, is included as Attachment 12 to this Five-Year Review report. Based on the monitoring data, the PW-07 water treatment system is effective at removing VOCs from well water prior to use by the PW-07 residents.

Site Inspection

A Site inspection was performed on June 26, 2007.

The Site inspection at the Lord property was attended by Mr. Mitch Cron, EPA RPM, Mr. John Morettini, PADEP Project Officer, a representative of Arcadis, and representatives of Lord Corp. A Site inspection was also conducted at the residence where the PW-07 treatment system is located. (This portion of the Site visit was performed by the EPA RPM only).

The purpose of the Site inspection was to assess the protectiveness of the remedy. The Site inspection included a review of the Lord facility, specifically the Courtyard Tank Farm, the Western Tank Farm, and a review of representative introduction wells, and representative monitoring wells.

During the Site inspection, the introduction wells, monitoring wells, and PW-07 treatment system all appeared to be in satisfactory condition.

Interviews

The following individuals were interviewed during the performance of the Five-Year Review:

Borough of Saegertown – Borough Manager: The EPA RPM interviewed the Borough Manager of the Borough of Saegertown during the Site inspection. The Borough Manager indicated that he was satisfied with the response actions which have been performed at the Site and did not have concerns regarding the remedial action at the Lord property.

PW-07 resident: The EPA RPM interviewed the PW-07 resident during the Site inspection. The resident indicated that he was satisfied with the remedial action at the Lord property, and was satisfied with the upkeep and reporting associated with the PW-07 treatment system.

PADEP Project Officer: The EPA RPM interviewed the PADEP Project Officer assigned to the Site during the Site inspection. The Project Officer did not express concerns regarding the implementation of the remedial action at the Lord property, although he requested that Arcadis and Lord Corp. continue to verify that PADEP is copied on remedial action documentation/deliverables.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Yes.

The major components of the remedy for the Site, described above in Section IV (Remedial Actions), have been constructed and are functioning as intended.

The remedy for the Lord property outlined in the ROD Amendment includes the following components:

1. Enhanced bioremediation

This component of the remedy outlined in the ROD Amendment has been constructed in accordance with the 2003 RD/Workplan, and subsequent modifications. Review of ground water monitoring data for the Site, and molasses-solution introduction documentation, reveals that the in-situ enhanced reductive dechlorination ground water remediation system is operating as designed.

2. Domestic Well Treatment and Monitoring

This component of the remedy outlined in the ROD Amendment has been constructed and is operating properly. Monitoring data from the PW-07 water treatment system reveals that the system effectively removes VOCs from well water prior to use by residents. In addition, well monitoring at two private wells adjacent to PW-07 has not revealed the presence of Site-related ground water contamination.

3. Institutional Controls

Institutional controls have been implemented at the Site and are discussed in the ROD Amendment, as follows:

"*Institutional controls will be used to minimize the potential for future exposure to VOCs in groundwater during the remediation period. Lord will maintain its on-going health and safety program to ensure that proper supervision, monitoring and use of personal protective equipment is continued during any future excavation activities at the Site where groundwater may be encountered. Also, the Borough of Saegertown Ordinance (Ordinance Number 4, Series 1979) that prohibits the installation of future groundwater supply wells will be relied on to control potential exposures to VOCs in groundwater between Lord's property and French Creek.*"

Operations and Maintenance (O&M) Activities

O&M activities at the Site have been effective. As mentioned above, during the Site inspection, the introduction wells, monitoring wells, and PW-07 treatment system all appeared to be in satisfactory condition.

Optimization Opportunities

Optimization opportunities for the ground water monitoring program, or ground water remediation system were not identified during the Five-Year Review.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

No.

Vapor Intrusion

An exposure assumption which may apply to the Site (that was not considered during the ROD or ROD Amendment) is vapor intrusion.

Based on a review of ground water monitoring data for the Site, a VOC ground water contamination plume exists beneath the Lord property, and extends to the west towards French Creek. The westernmost well exhibiting Site-related contaminants is the private well, identified as "PW-07", which is located on the west side of French Creek. Based on the review of ground water monitoring data, a ground water contamination plume exists beneath the Lord property, and to the west of the Lord property at concentrations which exceed the ground water performance standards included in the ROD Amendment. Based on a review of the ground water monitoring data, it is expected that the Lord Corp. buildings on the Lord property are underlain by the ground water contamination plume. In addition, two other buildings, not located on the Lord property (a multi-use, apparently commercial building located to the west of the Lord property, and the PW-07 residence), may be underlain by the ground water contamination plume. Given this condition, EPA has requested that Lord Corp. evaluate the Site for potential vapor intrusion of Site-related VOCs from the ground water contamination plume. Vapor intrusion can occur when chemicals present in contaminated soil or ground water vaporize and move upwards, potentially entering buildings, such as homes or businesses. When vapor intrusion does occur, it can pose a health concern. Because the Lord property houses a facility where chemicals are routinely stored and used during manufacturing processes, it is not expected that a vapor intrusion evaluation for the Lord Corp. facility is appropriate by EPA at this time. Exposure to vapor forming chemicals on the Lord property is expected to be addressed by the Lord Corp. health and safety program. However, the vapor intrusion evaluation should address the two buildings, not located on the Lord property, which may be underlain by the ground water contamination plume. EPA is in receipt of a vapor intrusion evaluation which Arcadis has prepared. The vapor intrusion evaluation will be evaluated by EPA to determine if further action regarding this issue is necessary for protection of human health.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Yes.

As discussed above, an exposure assumption which may apply to the Site (that was not considered during the ROD or ROD Amendment) is vapor intrusion. EPA is currently reviewing a vapor intrusion evaluation for the Site that was prepared by Arcadis.

Technical Assessment Summary

Based on the results of the Five-Year Review process, one issue that requires resolution has been identified that impacts the protectiveness of the remedy:

1. As discussed above, an exposure assumption which may apply to the Site (that was not considered during the ROD or ROD Amendment) is vapor intrusion. EPA is currently reviewing a vapor intrusion evaluation for the Site that was prepared by Arcadis.

VIII. Issues

TABLE 4- ISSUES

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Potential vapor intrusion from contaminated ground water	Deferred	Deferred

IX. Recommendations and Follow Up Actions

TABLE 5- RECOMMENDATIONS

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)
Potential vapor intrusion	Vapor intrusion evaluation	PRP	EPA/PADEP	September 2008	Deferred

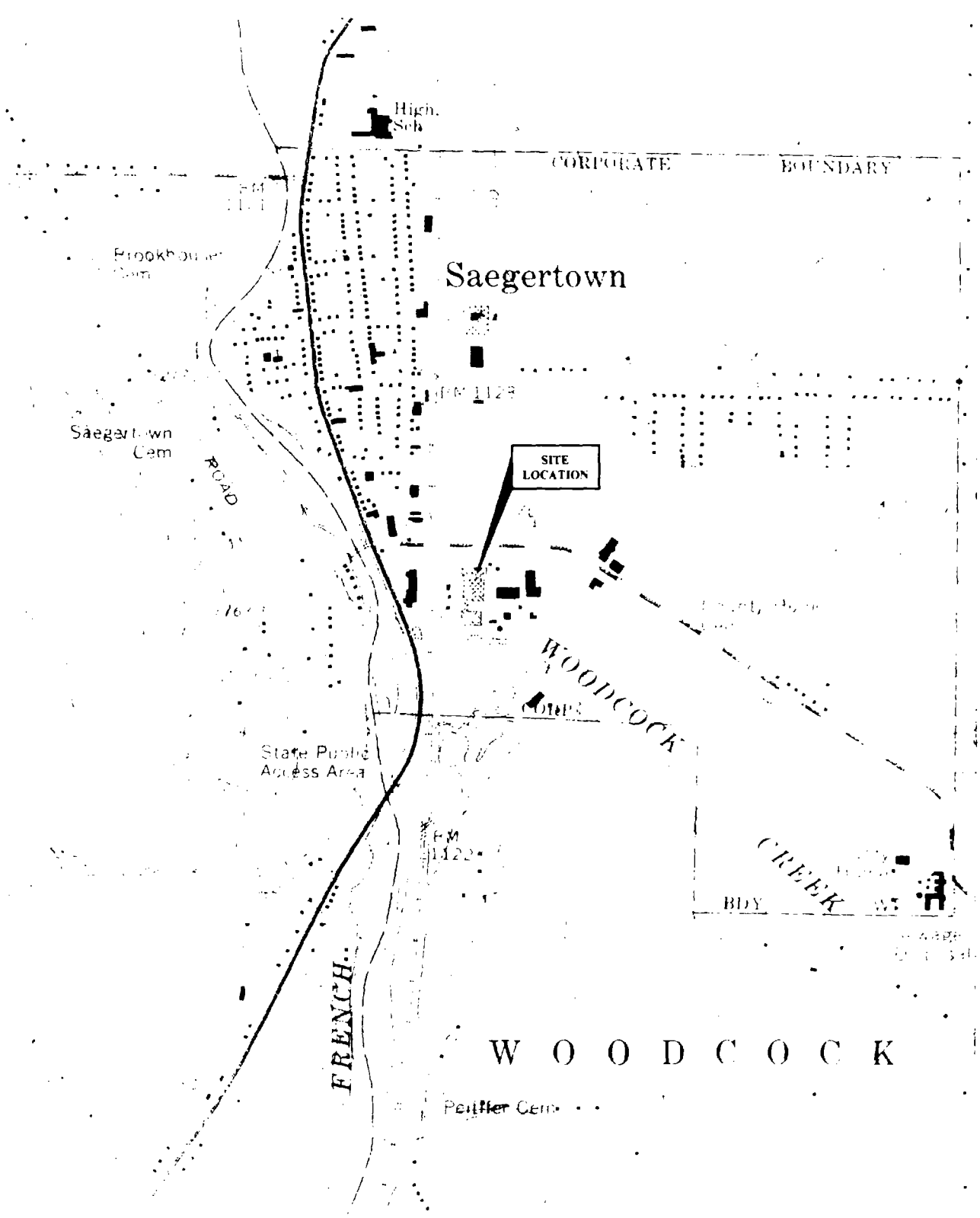
X. Statement on Protectiveness.

A protectiveness determination of the remedy at the Lord property cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion evaluation for two buildings not located on the Lord property which are potentially underlain by the ground water contamination plume. It is expected that this evaluation will take six months to one year to complete, at which time a protectiveness determination will be made.

XI. Next Five Year Review.

The next Five-Year Review will be completed no later than five years after the signature date of this Five-Year Review.

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 1



ARCADIS

SITE LOCATION,
LORD CORPORATION
SAEGERTOWN, PENNSYLVANIA

OH000483.0201

1

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 2

TABLE 1

SUMMARY OF SOIL AND GROUNDWATER CALCULATIONS
SAEGERTOWN INDUSTRIAL AREA SITE

Area	Impacted Medium	Volume[14]	Chemical Group[1]	Avg. Conc.[2] (ppm)	Max. Conc.[2] (ppm)
Lord	Groundwater	9,300,000 gallons	tetrachloroethene	1.97[3]	100[4]
			trichloroethene	0.31[3]	9.80[4]
			1,2 dichloroethene	0.28[3]	1.125[4]
			1,1,1 trichloroethane	0.021[3]	0.150[4]
			vinyl chloride	--	0.770[5]
SCI	Soil	40-240 cu. yds.[15]	PAHs	18[6]	18[6]
SMC	Sediment	15-60 cu. yds.	PCBs	0.260[7]	0.260[7]
GATX	Soil (B7)	285 cu. yds.	PCBs	800[8]	800[8]
	Sediments (SD6)	260 cu. yds.	PCBs	50[9]	50[9]
	Sludge (pond)	6,300 cu. yds.	PAHs	120,000[10]	190,000[11]
			BETX	17,000[10]	28,000[11]
			Chlorinated Ethenes	24[10]	39[11]
			Chlorinated Benzenes	380[10]	950[11]
			Phenols	1,900[10]	2,900[11]
			Miscellaneous	3,500[10]	5,800[11]
			Metals	1,900[10]	3,100[11]
	Sludge (lagoon)	2,500 cu. yds.	PAHs	27,000[12]	46,000[13]
			BETX	1,900[12]	3,300[13]
			Chlorinated Ethenes	1.6[12]	2.5[13]
			Chlorinated Benzenes	580[12]	980[13]
			Miscellaneous	440[12]	750[13]
			Metals	36[12]	39[13]

Notes

1. Chemical groups are broken out as shown in Tables 4-1 thru 4-4.
2. Concentrations listed are for the indicated target compound or the sum of all of the target compounds within a chemical group.
3. A flow-weighted average concentration, determined using pumping rates for the aggressive pump and treat system modeled in Appendix B, was considered to be representative for this target compound. The determination of the flow-weighted average concentration for each target compound is shown in the Attachment.
4. Maximum of temporary wellpoint samples WP1 to WP6, WP12 to WP15, WP17, WP25, E-2, E-4, E-10, and monitoring wells W-3 and W-7 was considered to be representative of the maximum concentration for this target compound.
5. Data from groundwater monitoring well sample GWW11S-02 was considered to be representative of the maximum concentration for this target compound.
6. Data from subsurface soil sample B2-6 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
7. Data from sediment sample SD9 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
8. Data from subsurface soil sample B7-02 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
9. Data from sediment sample SD6 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
10. The volume weighted-average of test pit samples TP1 and TP2, where TP1 represents sludge and TP2 represents lower concentration sludge and contaminated soil present below and at the perimeter of the sludge was considered to be representative of the average concentration(s) for target compound(s) in this chemical group.
11. Data from test pit sample TP1 was considered to be representative of the maximum concentration(s) for target compound(s) in this chemical group.
12. The volume weighted average of subsurface soil samples AP83 and B4-6, where AP83 represents sludge and B4-6 represents lower concentration sludge and contaminated soil present below and at the perimeter of the sludge was considered to be representative of the average concentration(s) for target compound(s) in this chemical group.
13. Data from subsurface soil sample AP83 was considered to be representative of the maximum concentration(s) for target compound(s) in this chemical group.
14. Soil and sludge volumes represent excavated volumes, assuming 30 percent bulking upon excavation.
15. See Section 4.3.2.2, Description for assumptions used to establish the volume of potentially contaminated SCI soil

Saegertown Industrial Area Superfund Site
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Attachment 3

Compliance with Applicable or Relevant and Appropriate Requirements

Two categories of remedial action requirements are identified in the National Oil and Hazardous Substances Contingency Plan: Applicable or Relevant and Appropriate Requirements ("ARARs"), and other criteria, advisories, guidance and proposed standards To-Be-Considered ("TBCs"). ARARs were designated by the EPA to be Federal, state, or local laws or regulations that are protective of human health and the environment. ARARs are determined for a site, in part, by the specific contaminants present and the exposure pathways and receptors relevant for the specific remedial action. TBC materials are advisories or guidance issued by the Federal or state government (e.g., reference doses) that are not generally enforceable and do not have the status of potential ARARs. However, the guidance documents or advisories may be considered in determining the necessary level of cleanup for protection of human health and the environment when specific ARARs are not available.

Both the original remedy in the 1993 ROD and the modified remedy comply with all state and Federal ARARs, although the original 1993 ROD does identify a concern regarding whether background levels are attainable and includes a technical impracticability provision if asymptotic conditions prevail within the plume.

An evaluation of ARARs for the modified remedy was completed in the 1999 Focused Feasibility Study ("FFS"). The FFS identified ARARs and TBCs based on EPA and Commonwealth of Pennsylvania regulations and guidance documents which have been issued since the completion of the FS in 1992 and issuance of the ROD in 1993, and action-specific ARARs associated with the enhanced bioremediation technology. These include the following:

- The SDWA MCLs, 40 C.F.R. Section § 141.61, are selected as the Performance Standards for the site-related contaminants of concern ("COCs"). The following table lists each COC, the specific citation in the SDWA regulations for each COC, and the Performance Standard for each COC.

Contaminant of Concern	SDWA Citation	Performance Standard
Vinyl Chloride	40 CFR § 141.61 (a) (1)	0.002 mg/L
Trichloroethene	40 CFR § 141.61 (a) (5)	0.005 mg/L
Tetrachloroethene	40 CFR § 141.61 (a) (15)	0.005 mg/L
Trans-1,2-Dichloroethene	40 CFR § 141.61 (a) (17)	0.1 mg/L

Preliminary Remediation Goals were established for the following Contaminants of Concern at levels below the SDWA MCLs:

Contaminant of Concern	SDWA MCL	Performance Standard
1,1-Dichloroethene	0.007 mg/L	0.003 mg/L
cis-1,2-Dichloroethene	0.07 mg/L	0.05 mg/L
Ethylbenzene	0.7 mg/L	0.1 mg/L
Toluene	1.0 mg/L	0.1 mg/L

A Performance Standard was also established for 2-Chlorotoluene at 0.2 mg/L to insure a Hazard Index of less than 1. Neither Federal nor State cleanup criteria (i.e., SDWA MCL or PADEP Media-Specific Concentrations) have been established for this contaminant of concern.

- PADEP has identified Act II as an ARAR for this remedy; EPA has determined that Act II does not, on the facts and circumstances of this remedy, impose any requirements more stringent than the Federal standard.

- The regulatory framework governing subsurface fluid distribution systems is established by the U.S. EPA Underground Injection Control ("UIC") Program. The regulations for the EPA UIC Program are set forth in 40 C.F.R. Part 144, Subpart C of the SDWA. The UIC regulations define and establish five classes of introduction wells. Generally, Class V wells are shallow discharge or disposal wells, stormwater or agricultural drainage systems, or other devices that are used to release fluids into or above an underground source of drinking water. In Pennsylvania, EPA Region III has primacy in matters involving UIC and the PADEP defers to EPA in implementing the UIC program. The following specific requirements apply to the carbon source introduction points:

  40 CFR, Part 144, § 144.26 (a) (1 -5);
  40 CFR, Part 144, § 144.26 (b) (1) (iii) (G);
  40 CFR, Part 144, § 144.26 (b) (2) (ii - x);
  40 CFR, Part 144, § 144.27 (entire section);
  40 CFR, Part 144, § 144.82 (entire section); and
  40 CFR, Part 144, § 144.84 (entire section)

- The U.S. EPA Office of Solid Waste and Emergency Response ("OSWER") Guidance for Evaluating the Technical Impracticability of Groundwater Restoration (Directive 9234.2-25, September 1993) and the U.S. EPA OSWER directive on Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Site (Directive 9200.4-17, dated November 1997) should be considered when evaluating remedial alternatives at the Site.

Long-Term Effectiveness and Permanence

Both the original remedy and the modified remedy provide long-term protection by remediating contaminated groundwater and monitoring the effectiveness of each approach. The extraction and treatment of groundwater and air sparging with vacuum extraction selected in the original ROD would remove and treat VOCs, although the additional hydrogeologic data indicated that low permeable layers could decrease the effectiveness of the system.

The enhanced bioremediation and monitored natural attenuation components of the modified remedy include the use of natural degradation processes that will continue to degrade subsurface contaminants as long as sufficient nutrients and carbon sources are available. The addition of the carbon source in the enhanced bioremediation component serves to increase the rate of these degradation processes and should reduce the mass of VOCs in a relatively short time frame. After this mass removal is achieved and the more highly chlorinated VOCs are degraded, the natural attenuation component should prove effective at addressing residual VOC concentrations.

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 4

Saegertown Borough Office
PO Box 558
603 Erie Street
Saegertown, PA 16433
Phone Number: 814-763-4600
Fax Number: 814-763-2250
Saegertown@alltel.net

FAX TRANSMITTAL FORM

To: Mitch Cron
Phone:
Fax: 215-814-3286

From: Tammy Bidwell
Date Sent: 1/5/07
Number of Pages: 4

Message: Ordinance # 4 1979 Saegertown Borough

Ordinance No. 4, Series 1979

Borough of Saegertown, Crawford County, Commonwealth of Pennsylvania

An Ordinance prohibiting the construction, drilling, operation, and maintenance of private water wells or systems within the Borough of Saegertown, and further requiring all consumers and users of water within the Borough to connect to the existing Borough Water System and prescribing penalties for violation of said Ordinance.

Whereas, the Borough of Saegertown does provide a water system of collection and distribution throughout the Borough; and

Whereas, the protection of the water table and the uniform distribution of water is necessary for the general health, safety and welfare of the inhabitants of the Borough of Saegertown; and

Whereas, the construction, drilling, operation, and maintenance of private water wells or systems within the Borough of Saegertown may adversely affect the water table and the uniform distribution of water throughout the Borough.

Now therefore, be it enacted and ordained as follows:

Section I. The construction, drilling operation and maintenance of private water wells or systems within the Borough of Saegertown is hereby prohibited.

Section II. All consumers and users of water within the Borough of Saegertown including but not limited to residential, commercial and industrial consumers and users, shall connect to the existing

Borough water distribution system to receive water.

Section III. This Ordinance shall have no application to wells or water systems regularly and continuously in existence prior to the effective date of this Ordinance or to consumers or users therefrom who regularly and continuously received water from same prior to the effective date of this Ordinance.

Section 4. Any person, partnership, or corporation who or which shall violate the provisions of this ordinance shall, upon conviction thereof in a summary proceeding be sentenced to pay a fine of not more than Three Hundred (300.00) dollars or in default of payment of the fine, each person the members of said partnership, or the officers of such corporation shall be liable to imprisonment for not more than Ninety (90) days. Each day that violation is continued shall constitute a separate offense. All fines collected for the violation of this ordinance shall be paid over to the Council of the Borough of Saegertown. Nothing herein shall prevent the Borough of Saegertown from taking such other lawful action as necessary to prevent, restrain, remedy, or abate any violation of this ordinance.

Section V. If any section of this ordinance shall be found to be invalid, the other sections of the ordinance shall not be affected thereby.

Section VI. This Ordinance shall take effect at the earliest date permitted by law.

Section 7: All Ordinances or parts of Ordinances which are inconsistent or in conflict with this Ordinance are hereby repealed.

Enacted and Ordained this 17th Day of September, 1979.

Borough of Hegetown
By: Leo C. Cramer
President of Council

Attest:
Sandra B. Smith
Secretary.

Approved this 17 day of September, 1979.

Donald Melville
Mayor.

Certification

I hereby certify the within to be true and correct copy of the original Ordinance as enacted on the 17th day of September, 1979 by Council, a quorum being then and there present for the transaction of official business.

Sandra B. Smith
Secretary.

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 5

ARCADIS

ARCADIS G&M, Inc
284 Cramer Creek Court
Dublin
Ohio 43017
Tel 614 764 2310
Fax 614 764 1270

MEMO

To:
Mitch Cron, U.S. EPA
John Morettini, PADEP

Copies
George Kickel, LORD
Mark Twinem, LORD
Bob Adams, LORD
Matt Comi, LORD

From
Jason Manzo

Date:
8 December 2006

ARCADIS Project No.:
OH000483.2006.00002

Subject:
2007 Introduction, Groundwater Sampling, and Residential Sampling Schedule

---

ARCADIS has prepared a 2007 schedule for introduction, groundwater sampling and residential sampling events. Please note that dates listed for winter months could potentially change due to inclement weather. The USEPA and PADEP will be notified as soon as practicable if inclement weather requires a change in the schedule.

2007 Introduction Schedule

January 8 (all wells)
February 19
April 2 (all wells)
May 14
June 25 (all wells)
August 6
September 17 (all wells)
October 29
December 10 (all wells)

2007 Groundwater Sampling Schedule

January 22 (quarterly field parameters and TOC sampling)
May 21 (semi-annual/quarterly field parameters and TOC sampling)
August 20 (quarterly field parameters and TOC sampling)
October 8 (annual/semi-annual/quarterly field parameters and TOC sampling)
Monthly sampling events and quarterly PRG VOCs are no longer required as outlined in the 2003 Remedial Design/Work Plan.

2007 Residential Sampling

Monthly sampling of the PW-7 Treatment System will be conducted the first week of each month. Quarterly events will coincide with the monthly sampling events on the following dates:

March 5
June 4
August 6
October 1

If you have any questions concerning the proposed schedule of events, please do not hesitate to contact me.

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 6

ARCADIS

Attachment 2

2002-2007 Carbon Solution
Introduction Volumes and Dates

ARCADIS

Carbon Solution Introduction Volume Totals for 2002, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)											
Date	V-1	V-2	V-3	BV-2	BV-4	BV-6	GM-11D	W11S	GM-12D	GM-12S	GMT-1	PTW-1
Full Scale IRZ Implementation												
1/10/02	225	175	200	600	600	500	0	150	150	125	150	0
1/24/02	200	100	150	600	600	500	0	150	100	100	150	225
2/7/02	175	100	100	600	600	500	0	150	100	125	125	275
2/21/02	200	75	75	600	600	500	0	150	75	75	150	300
3/8/02	125	75	100	600	600	500	10	125	75	125	125	300
3/21/02 & 4/3/02	130	205	105	600	600	500	150	150	90	65	150	70
4/12/02	460	50	100	600	600	500	150	150	150	150	150	30
4/25/02	175	125	90	600	600	500	150	150	150	150	100	225
5/10/02	180	100	85	600	600	500	150	150	150	150	150	10
5/23/02	170	115	45	600	600	500	150	150	150	150	150	40
6/5/02	170	120	95	600	600	500	150	150	150	150	150	40
6/20/02	300	200	105	600	600	500	150	150	150	150	150	150
7/10/02	430	290	225	600	420	500	65	150	150	150	150	300
7/26/02	450	150	250	600	600	500	130	150	150	150	150	300
8/6/02	500	200	150	600	600	500	60	150	150	150	150	300
8/23/02	500	300	210	600	600	500	30	150	150	150	160	300
10/4/02	300	225	215	600	600	500	40	150	150	150	150	300
10/17/02	325	1160	135	420	600	500	20	150	150	150	150	300
11/1/02	215	100	100	600	600	500	20	150	150	150	150	300
11/15/02	85	65	65	700	600	500	45	150	150	150	150	300
11/29/02	225	65	65	420	600	500	20	150	150	150	150	300
12/12/02	225	125	75	600	600	500	15	150	150	150	150	300
Total Gallons Introduced in 2002	5,765	4,120	2,740	12,940	13,020	11,000	1505	3275	2,990	3,015	3210	4665

IRZ - In-situ Reactive Zone.

ARCADIS

Carbon Solution Introduction Totals for 2003, Lord Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)																
Date	V-1	V-2	V-3	BV-2	BV-4	BV-6	GM-11D	W11S	GM-12D	GM-12S	GMT-1	PTW-1	RZ1-A	RZ1-B	RZ1-C	RZ1-D	RZ1-E
IRZ Pilot Study																	
4/3/03	70	5	70	600	600	500	70	100	150	150	150	240	NP	NP	NP	NP	NP
4/19/03	225	150	70	500	500	500	40	150	150	150	150	300	NP	NP	NP	NP	NP
4/30/03 - 5/1/03	195	10	90	600	600	500	30	150	175	175	150	240	NP	NP	NP	NP	NP
5/20/03	290	150	160	600	600	500	100	150	110	100	150	300	NP	NP	NP	NP	NP
5/23/03	110	30	60	600	600	500	20	110	150	150	150	200	NP	NP	NP	NP	NP
6/6/03	130	NI	130	600	600	500	NI	150	150	150	150	250	NP	NP	NP	NP	NP
6/20/03	120	NI	220	600	600	500	25	150	100	150	150	250	NP	NP	NP	NP	NP
7/2/03	225	200	NI	600	600	500	150	150	100	100	150	300	NP	NP	NP	NP	NP
7/16/03	175	200	NI	600	600	500	20	150	40	150	150	300	NP	NP	NP	NP	NP
7/31/03	150	NI	150	420	600	500	NI	150	50	150	150	300	NP	NP	NP	NP	NP
8/18/03	85	150	NI	600	600	500	50	150	50	150	150	300	NP	NP	NP	NP	NP
8/27/03	105	NI	200	600	600	500	NI	150	75	150	150	250	NP	NP	NP	NP	NP
9/11/03	200	145	NI	600	600	500	NI	150	30	150	150	300	NP	NP	NP	NP	NP
9/24/03	50	NI	50	600	600	500	NI	150	NI	150	150	300	NP	NP	NP	NP	NP
Full Scale IRZ																	
11/4/03-11/5/03	75	100	100	400	400	400	NI	NI	NI	NI	NI	200	40	200	10	200	200
11/20/03-11/21/03	75	25	25	400	400	400	NI	NI	NI	NI	NI	200	200	200	200	200	200
12/8/03-12/9/03	200	200	200	400	400	400	NI	NI	NI	NI	NI	200	200	200	200	200	200
12/22/03	200	200	200	400	400	400	NI	NI	NI	NI	NI	200	200	200	200	200	200
Total Gallons Introduced in 2003	2,680	1,565	1,725	9,720	9,900	8,600	505	2,010	1,330	2,025	2,100	4,630	640	800	610	800	800

IRZ - In-situ Reactive Zone.
NR - Data was not recorded.
NP - Introduction point did not exist.
NI - Injection did not occur.

ARCADIS

Carbon Solution Introduction Totals for 2003, Lord Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (in gallons)															
Date	RZ2-B	RZ2-C	RZ2-D	RZ2-E	RZ2-F	RZ2-G	RZ3-A	RZ3-B	RZ3-C	RZ3-D	RZ3-E	RZ3-F	RZ3-G	RZ3-H	RZ3-I	RZ3-J
IRZ Pilot Study																
4/3/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
4/19/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
4/30/03 - 5/1/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
5/20/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
5/23/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
6/6/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
6/20/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
7/2/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
7/16/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
7/31/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
8/18/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
8/27/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
9/11/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
9/24/03	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Full Scale IRZ																
11/4/03-11/5/03	200	200	200	40	200	200	200	200	40	200	200	200	200	200	200	200
11/20/03-11/21/03	75	200	200	200	200	200	200	200	200	200	200	100	200	200	200	200
12/8/03-12/9/03	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
12/22/03	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Total Gallons Introduced in 2003	675	800	800	640	800	800	800	800	640	800	800	700	800	800	800	800

IRZ - In-situ Reactive Zone.
NR - Data was not recorded.
NP - Introduction point did not exist.
NI - Injection did not occur.

ARCADIS

Carbon Solution Introduction Volume Totals for 2004, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)														
Date	V-1	V-2	V-3	BV-2	BV-4	BV-6	PTW-1	RZ1-A	RZ1-B	RZ1-C	RZ1-D	RZ1-E	RZ2-A	RZ2-B	RZ2-C
Full Scale IRZ Implementation															
1/22/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
3/4/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
4/29/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
5/28/2004 and 5/29/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
7/6/2004 and 7/7/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
8/16/2004	100	100	100	400	400	400	100	50	200	50	200	200	50	50	100
9/28/2004	150	25	250	400	400	400	100	75	200	50	200	200	200	50	75
11/9/2004	200	200	200	400	400	400	200	200	200	200	200	200	200	200	200
12/21/2004 and 12/22/2004	75	50	100	400	400	400	200	50	200	50	200	200	200	100	100
Total Gallons Introduced in 2004	1,525	1,375	1,650	3,600	3,600	3,600	1,600	1,375	1,800	1,350	1,800	1,800	1,650	1,400	1,475

IRZ - In-situ Reactive Zone.

ARCADIS

Carbon Solution Introduction Volume Totals for 2004, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)														
Date	RZ2-D	RZ2-E	RZ2-F	RZ2-G	RZ3-A	RZ3-B	RZ3-C	RZ3-D	RZ3-E	RZ3-F	RZ3-G	RZ3-H	RZ3-I	RZ3-J	Total (gallons)
Full Scale IRZ Implementation															
1/22/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
3/4/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
4/29/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
5/28/2004 and 5/29/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
7/6/2004 and 7/7/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
8/16/2004	200	50	200	200	200	200	50	50	200	75	200	200	200	200	4,725
9/28/2004	200	50	200	200	200	200	50	25	200	100	200	200	200	200	5,000
11/9/2004	200	200	200	200	200	200	200	200	200	200	200	200	200	200	6,400
12/21/2004 and 12/22/2004	200	25	200	200	200	200	25	75	200	25	200	200	200	200	6,875
Total Gallons Introduced in 2004	1,800	1,325	1,800	1,800	1,800	1,800	1,325	1,350	1,800	1,400	1,800	1,800	1,800	1,800	55,000

IRZ - In-situ Reactive Zone.

ARCADIS

Carbon Solution Introduction Volume Totals for 2005, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)																				
Date	V-1	V-2	V-3	BV-2	BV-4	BV-6	PTW-1	RZ1-A	RZ1-B	RZ1-C	RZ1-D	RZ1-E	RZ1-F	RZ1-G	RZ2-A	RZ2-B	RZ2-C	RZ2-D	RZ2-E	RZ2-F	RZ2-G
Full Scale IRZ Implementation																					
1/31/2005 through 2/2/2005	200	200	200	400	400	400	200	200	200	200	200	200	NI	NI	200	200	200	200	200	200	200
3/14/05 and 3/15/05	150	200	100	400	400	400	0	200	200	200	200	200	NI	NI	200	200	200	200	200	200	200
4/25/05	0	200	0	400	400	400	0	200	200	200	200	200	NI	NI	200	200	200	200	200	200	200
6/5/2005 and 6/6/2005	0	0	0	200	200	200	200	200	200	200	200	200	400	400	200	200	200	200	200	200	200
6/24/05	0	0	0	0	0	0	0	0	0	0	0	0	400	400	0	0	0	0	0	0	0
7/18/05	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
8/28/2005 and 8/29/2005	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
10/16/2005 and 10/17/05	0	0	0	200	200	200	75	200	200	200	200	200	200	200	200	200	200	200	200	200	200
11/19/2005 and 11/20/05*	0	0	0	400	410	400	0	200	200	0	200	200	400	400	400	400	400	400	0	0	0
Total Gallons Introduced in 2005	350	600	300	2,400	2,410	2,400	875	1,600	1,600	1,400	1,600	1,600	1,800	1,800	1,800	1,800	1,800	1,800	1,400	1,400	1,400

IRZ - In-situ Reactive Zone
NI - Not installed;
RZ-1F, RZ-1G,RZ-3K, and RZ-3L installed in May 2005
* In November 2005, water to molasses ratio in injectate was adjusted from 10:1 to 20:1.

ARCADIS

Carbon Solution Introduction Volume Totals for 2005, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)												
Date	RZ3-A	RZ3-B	RZ3-C	RZ3-D	RZ3-E	RZ3-F	RZ3-G	RZ3-H	RZ3-I	RZ3-J	RZ-3K	RZ-3L	Total (gallons)
Full Scale IRZ Implementation													
1/31/2005 through 2/2/2005	200	200	200	200	200	200	200	200	200	200	NI	NI	6,400
3/14/05 and 3/15/05	200	200	200	200	200	200	200	200	200	200	NI	NI	6,050
4/25/05	200	200	200	200	200	200	200	200	200	200	NI	NI	5,800
6/5/2005 and 6/6/2005	200	200	200	200	200	200	200	200	200	200	400	400	6,800
6/24/05	0	0	0	0	0	0	0	0	0	0	400	400	1,600
7/18/05	200	200	200	200	200	200	200	200	200	200	200	200	6,000
8/28/2005 and 8/29/2005	200	200	200	200	200	200	200	200	200	200	200	200	6,000
10/16/2005 and 10/17/05	200	200	200	200	200	200	200	200	200	200	200	200	6,875
11/19/2005 and 11/20/05*	200	200	400	400	400	200	0	0	0	0	400	400	7,010
Total Gallons Introduced in 2005	1,600	1,600	1,800	1,800	1,800	1,600	1,400	1,400	1,400	1,400	1,800	1,800	52,535

IRZ - In-situ Reactive Zone.
NI - Not installed;
RZ-1F, RZ-1G,RZ-3K, and RZ-3L installed in May 2005
* In November 2005, water to molasses ratio in injectate was adjusted from 10:1 to 20:1

ARCADIS

Carbon Solution Introduction Volume Totals for 2006, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)																
Date	BV-2	BV-4	BV-6	RZ1-A	RZ1-B	RZ1-C	RZ1-D	RZ1-E	RZ1-F	RZ1-G	RZ2-A	RZ2-B	RZ2-C	RZ2-D	RZ2-E	RZ2-F	RZ2-G
Proposed amount per Injection	400	400	400	200	200	200*	200	200	400	400	400	400	400	400	200*	200*	200*
Full Scale IRZ Implementation																	
1/5/2006 through 1/7/2006	400	400	400	200	200	200	200	200	400	400	400	400	400	400	200	200	200
2/15/2006 through 2/18/2006	400	400	400	200	200	NI	200	200	400	400	400	400	400	400	NI	NI	NI
3/28/2006 through 4/1/2006	400	400	400	200	200	200	200	200	400	400	400	400	400	400	200	200	200
5/8/2006 through 5/10/2006	400	400	400	200	200	NI	200	200	400	400	400	400	400	400	NI	NI	NI
6/20/2006 through 6/22/2006	400	400	400	200	200	200	200	200	400	400	400	400	400	400	200	200	200
7/31/2006	400	400	400	200	200	NI	200	200	400	400	400	400	400	400	NI	NI	NI
9/11/2006 through 9/12/2006	400	400	400	200	200	200	200	200	400	400	400	400	200	400	200	200	200
10/23/2006 through 10/25/2006	400	400	400	200	200	NI	200	200	400	400	400	400	400	400	NI	NI	NI
12/4/2006 through 12/7/2006	400	400	400	200	200	200	200	200	400	400	400	400	200	400	200	200	200
Total Gallons Introduced in 2006	3,600	3,600	3,600	1,800	1,800	1,000	1,800	1,800	3,600	3,600	3,600	3,600	3,200	3,600	1,000	1,000	1,000

(*) Molasses solution was injected every other introduction event.
IRZ - In-situ Reactive Zone.
NI - Not Introduced.

ARCADIS

Carbon Solution Introduction Volume Totals for 2006, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)												
Date	RZ3-A	RZ3-B	RZ3-C	RZ3-D	RZ3-E	RZ3-F	RZ3-G	RZ3-H	RZ3-I	RZ3-J	RZ-3K	RZ-3L	Total (gallons)
Proposed amount per Injection	200	200	400	400	400	200	200*	200*	200*	200*	400	400	
Full Scale IRZ Implementation													
1/5/2006 through 1/7/2006	200	200	400	400	400	200	200	200	200	200	400	400	8,600
2/15/2006 through 2/18/2006	200	200	400	400	400	200	NI	NI	NI	NI	400	400	7,000
3/28/2006 through 4/1/2006	200	200	400	200	400	200	200	200	200	200	400	400	8,400
5/8/2006 through 5/10/2006	200	200	400	400	400	200	NI	NI	NI	NI	400	400	7,000
6/20/2006 through 6/22/2006	200	200	400	400	400	200	200	200	200	200	400	400	8,600
7/31/2006	200	200	400	400	400	200	NI	NI	NI	NI	400	400	7,000
9/11/2006 through 9/12/2006	200	200	400	400	400	200	200	200	200	200	400	400	8,400
10/23/2006 through 10/25/2006	200	200	400	400	400	200	NI	NI	NI	NI	400	400	7,000
12/4/2006 through 12/7/2006	200	200	200	400	400	200	200	200	200	200	400	400	8,200
Total Gallons Introduced in 2006	1,800	1,800	3,400	3,400	3,600	1,800	1,000	1,000	1,000	1,000	3,600	3,600	70,200

(*) Molasses solution was injected every other introduction event.

IRZ - In-situ Reactive Zone.

NI - Not Introduced.

ARCADIS

Carbon Solution Introduction Volume Totals for 2007, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)									
Date	BV-2	BV-4	BV-6	RZ1-A	RZ1-B	RZ1-C	RZ1-D	RZ1-E	RZ1-F	RZ1-G
Proposed amount per Injection	400	400	400	200	200	200	200	200	400	400
Full Scale IRZ Implementation										
1/5/2007 through 1/11/2007	400	400	400	200	200	200	200	200	400	400
2/20/2007 through 2/23/2007	400	400	400	200	200	0	200	200	400	400
4/2/2007 through 4/4/2007	400	400	400	200	200	200	200	200	400	400
5/14/2007 through 5/16/2007	400	400	400	200	200	200	200	200	400	400
6/26/2007 through 6/28/2007	400	400	400	200	200	0	200	200	400	400
Total Gallons Introduced in 2007	2,000	2,000	2,000	1,000	1,000	600	1,000	1,000	2,000	2,000

(*) Molasses solution was injected every other introduction event.

IRZ - In-situ Reactive Zone.

NI - Not Introduced.

ARCADIS

Carbon Solution Introduction Volume Totals for 2007, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)									
Date	RZ2-A	RZ2-B	RZ2-C	RZ2-D	RZ2-E	RZ2-F	RZ2-G	RZ3-A	RZ3-B	RZ3-C
Proposed amount per Injection	400	400	400	400	200*	200*	200*	200	200	400
Full Scale IRZ Implementation										
1/5/2007 through 1/11/2007	400	400	400	400	200	200	200	200	200	400
2/20/2007 through 2/23/2007	400	400	400	400	0	0	0	200	200	400
4/2/2007 through 4/4/2007	400	400	400	400	200	200	200	200	200	400
5/14/2007 through 5/16/2007	400	400	400	400	200	200	200	200	200	400
6/26/2007 through 6/28/2007	400	400	400	400	0	0	0	200	200	400
Total Gallons Introduced in 2007	2,000	2,000	2,000	2,000	600	600	600	1,000	1,000	2,000

(*) Molasses solution was injected every other introduction event.

IRZ - In-situ Reactive Zone.

NI - Not Introduced.

ARCADIS

Carbon Solution Introduction Volume Totals for 2007, LORD Corporation, Saegertown, Pennsylvania.

	Volume of Carbon Solution Introduced (gallons)									
Date	RZ3-D	RZ3-E	RZ3-F	RZ3-G	RZ3-H	RZ3-I	RZ3-J	RZ-3K	RZ-3L	Total (gallons)
Proposed amount per Injection	400	400	200	200*	200*	200*	200*	400	400	
Full Scale IRZ Implementation										
1/5/2007 through 1/11/2007	400	400	200	200	200	200	200	400	400	8,600
2/20/2007 through 2/23/2007	400	0	200	0	0	0	0	400	400	6,600
4/2/2007 through 4/4/2007	400	400	200	200	200	200	200	400	400	8,600
5/14/2007 through 5/16/2007	400	400	200	200	200	200	200	400	400	8,600
6/26/2007 through 6/28/2007	400	0	200	0	0	0	0	400	400	6,600
Total Gallons Introduced in 2007	2,000	1,200	1,000	600	600	600	600	2,000	2,000	39,000

(*) Molasses solution was injected every other introduction event.

IRZ - In-situ Reactive Zone.

NI - Not Introduced.

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 7

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Table 6. Remedial Action Sampling and Analyses Schedule, Lord Corporation, Saegertown, Pennsylvania.

IRZ Operations and Compliance Monitoring Programs[1]

	Operation Program Years 1 and 2				Operation Program Years 3 and beyond			Compliance Monitoring Program (Post Introduction)[3]		
								Year 1		Year 2+
Event Sample or Data Collection	Monthly Field & TOC	Quarterly PRG VOCs, Biogeo, DTW & Field	Semi-annual PRG VOCs, Biogeo, DTW & Field	Annual PRG VOCs, DTW & Field	Quarterly Field & TOC	Semi-annual PRG VOCs, Biogeo, DTW, & Field	Annual PRG VOCs, DTW & Field	Semi-annual PRG VOCs, Biogeo, DTW & Field	Annual PRG VOCs, DTW & Field	Annual PRG VOCs, DTW & Field
Shallow Wells										
W7S	X	X	X	XB	X	X	XB	X	X	X
W8S				X			X		X	X
W11S	X	X	X	XB	X	X	XB	X	X	X
GM-12S				X			X		X	X
GM-13S	X	X	X	XB	X	X	XB	X	X	X
GM-14S				X			X		X	X
GM-15S				X			X		X	X
GM-17S				X			X		X	X
GM-20I				X			X		X	X
GM-22I				X			X		X	X
GM-23S	X		X	XB		X	XB		X	X
GMT-1	X	X	X	XB	X	X	XB	X	X	X
TPZ-2[2]	X				X					
Deep Wells										
W7D			X	XB		X	XB		X	X
W8D				X			X		X	X
GM-11D			X	XB		X	XB		X	X
GM-12D				X			X		X	X
GM-13D		X	X	XB		X	XB		X	X
GM-14D				X			X		X	X
GM-15D				X			X		X	X
GM-20D				X			X		X	X
GM-23D			X	XB		X	XB		X	X

PRG VOCs - Preliminary Remediation Goal volatile organic compounds. Monitor well specific. Listed in Section 5.0 of Remedial Design Plan

Biogeo - Biogeochemical analytical parameters listed on Table 5 of the Remedial Design Plan

DTW - Depth to water measurements

Field - Field parameters (DO, ORP, pH, conductivity, and temperature)

TOC - Total organic carbon

(1) Note that quarterly, semi-annual and annual sampling events will be scheduled concurrently as appropriate to meet the presented sampling frequency

(2) Sampling at TPZ-2 will only involve the collection of field parameters and analysis for total organic carbon

(3) Select biogeochemical indicator parameters will be monitored at certain wells, as deemed necessary by Lord

X - Well data collections to include information/parameters listed in column header

XB - Biogechemical parameters will be analyzed in addition to the information/parameters listed in column header

CVOCs - Chlorinated volatile organic compounds (tetrachloroethene, trichloroethene, 1,1-dichloroethene, cis-dichloroethene, trans-dichloroethene, and vinyl chloride)

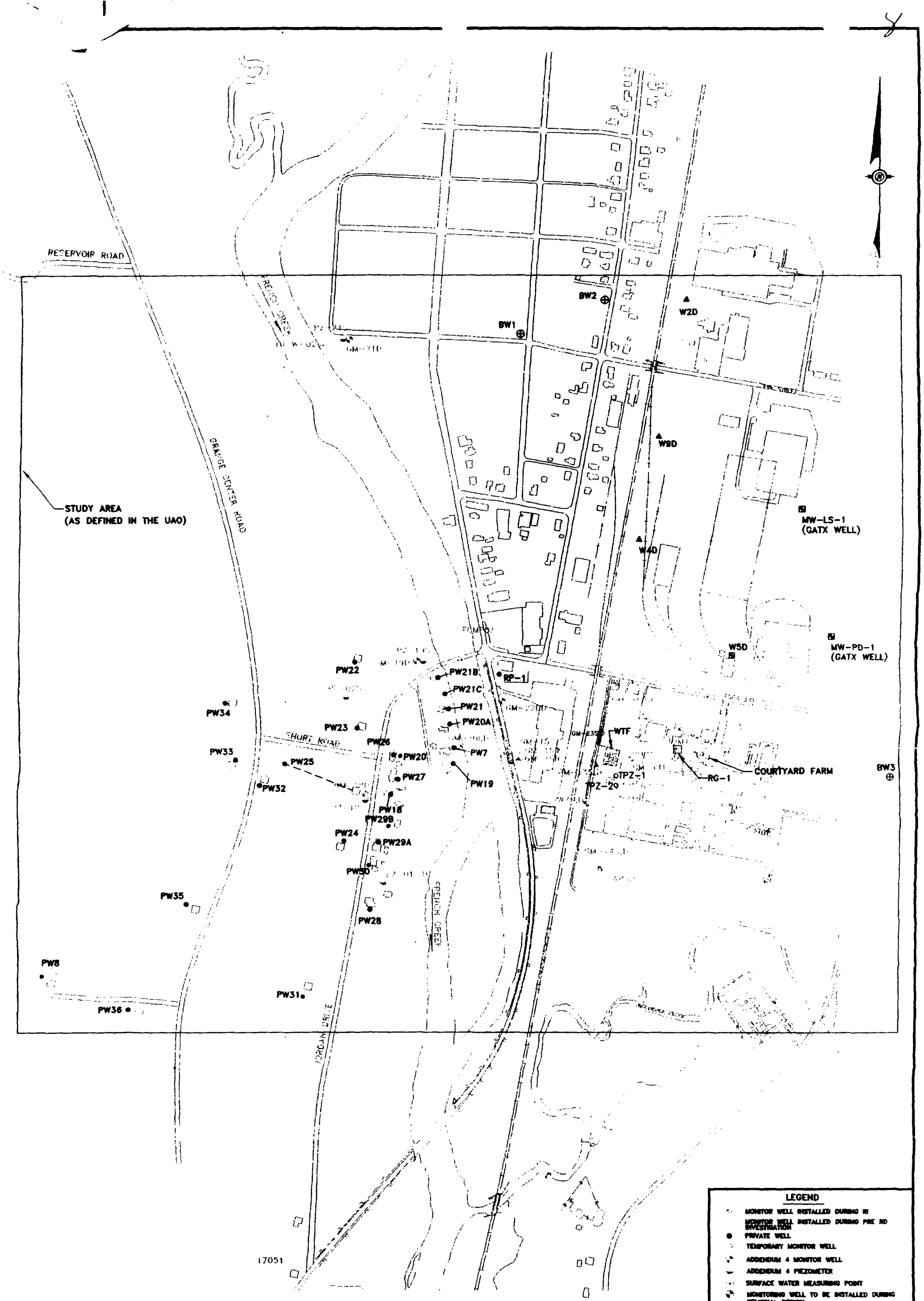
Table 6. Remedial Action Sampling and Analyses Schedule, Lord Corporation, Saegertown, Pennsylvania.

West of French Creek Monitoring Program

	Operation Year 1 and beyond	
	Monthly	Quarterly
Event Sample or Data Collection	CVOCs	CVOCs
PW-7		X
PW-19		X
PW-20A		X
PW7 Treatment System	X	

PRG VOCs - Preliminary Remediation Goal volatile organic compounds Monitoring well specific Listed in Section 5 0 of Remedial Design Plan
Biogeo - Biogeochemical analytical parameters listed on Table 5 of the Remedial Design Plan
DTW - Depth to water measurements
Field - Field parameters (DO, ORP, pH, conductivity, and temperature)
TOC - Total organic carbon
(1) Note that quarterly, semi-annual and annual sampling events will be scheduled concurrently as appropriate to meet the presented sampling frequency
(2) Sampling at TPZ-2 will only involve the collection of field parameters and analysis for total organic carbon
X - Well data collections to include information/parameters listed in column header
XB - Biogechemical parameters will be analyzed in addition to the information/parameters listed in column header
CVOCs - Chlorinated volatile organic compounds (tetrachloroethene, trichloroethene, 1,1-dichloroethene, cis-dichloroethene, trans-dichloroethene, and vinyl chloride)

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 8



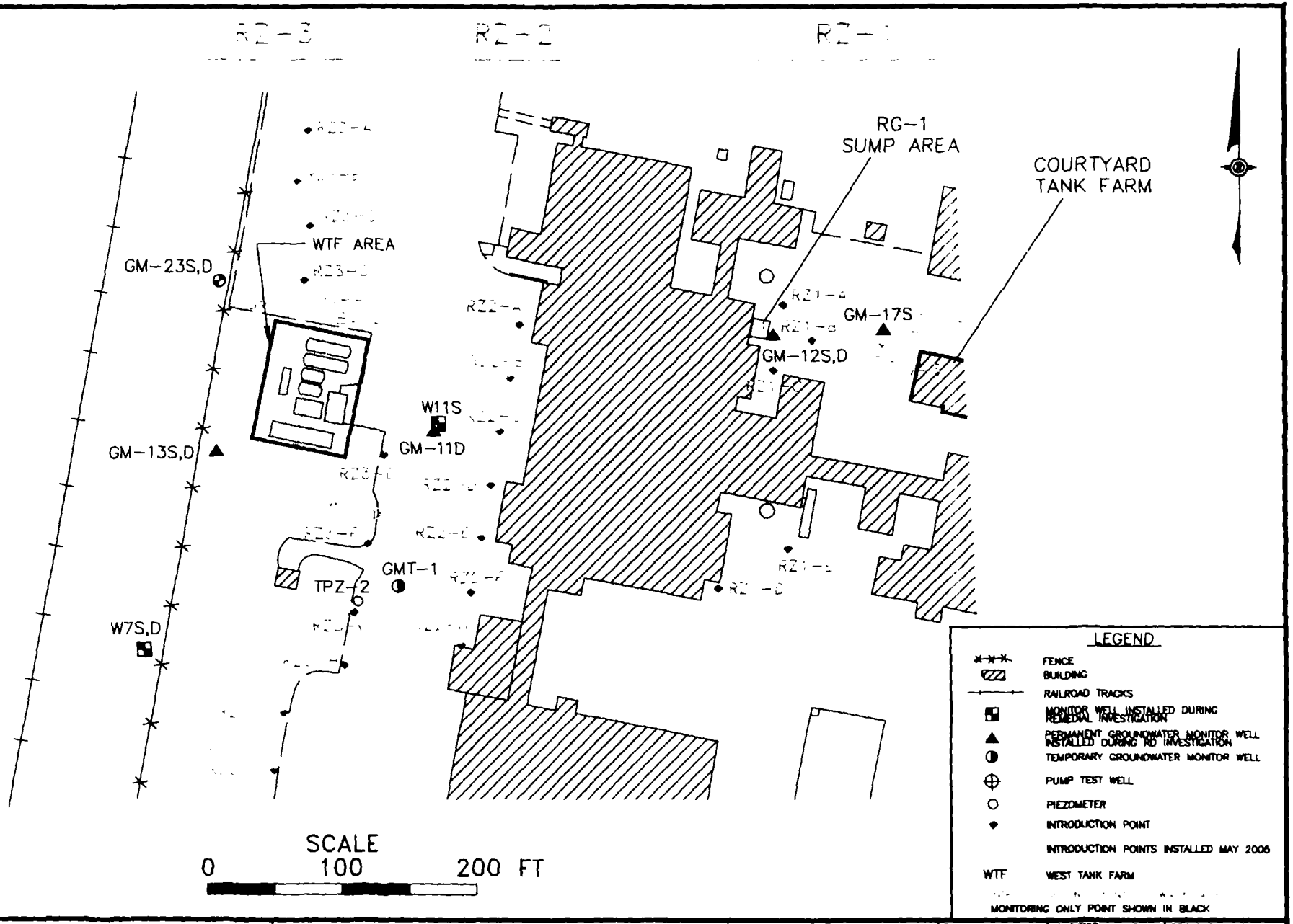
ARCADIS
397 Emerald Parkway
uite 150, Dublin, OH 43016
el: 614/764-2310 Fax: 614/764-1270

SITE MAP AND MONITORING POINT LOCATIONS

LORD CORPORATION
SAEGERTOWN, PENNSYLVANIA

DATE	PROJECT MANAGER	DRAWING NAME
4/23/2002	D. BALCER	LORD\SITEMAP
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	C.CAPELL
PROJECT NUMBER		DRAWING NUMBER
0H000483.0204		2

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 9



ARCADIS

LOCATIONS OF MONITOR WELLS AND INTRODUCTION WELLS
IN-SITU REACTIVE ZONE ENHANCED BIOREMEDIATION
TREATMENT TECHNOLOGY
LORD CORPORATION, SAEGERTOWN, PENNSYLVANIA

DATE	PROJECT MANAGER	DRAWING NAME
2/7/2006	D. BALCER	LORD\SAEG\2005-01
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	J. MANZO
PROJECT NUMBER		FIGURE NUMBER
0H000483.2006		3

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 10

RESERVOIR ROAD

FRENCH CREEK

GRANGE CENTER ROAD

STUDY AREA
(AS DEFINED IN THE UAO)

SHORT ROAD

JORDAN DRIVE

FRENCH CREEK

GM-23S	4/04	10/04	4/05	10/05	5/06	10/06
PCE	2.3	6.9	5.0	18.6	13	5.0
TCE	0.22J	7.3	4.8	16.3	12	4.8
c-1,2-DCE	<1	75.4	27.1	111.6	78	47.4
VC	<1	<1	4.2	1.4	<2.5	<1
2-CHLOR	<1	1.1	<1	<1	<2.5	<1

GM-22I	10/04	10/05	10/06
VC	5.7	5.4	4.9
2-CHLOR	1.3	<1	<1

GM-20I	10/04	10/05	10/06
2-CHLOR	1.7	<1	<1

GM-15S	10/04	10/05	10/06
PCE	<1J	1.1	<1
TCE	1.4J	1.8	<1
c-1,2-DCE	8.6J	4.4	<1
2-CHLOR	6J	<1	<1

GM-13S	4/04	10/04	4/05	10/05	5/06	10/06
c-1,2-DCE	0.62J	100.4J	7.2	<1	<200	<1
VC	1.5J	108.4J	41.9	<1	<200	1.8
TOL	1.1J	68.5J	4.7	2.1	401	19.2
2-CHLOR	6J	5775.1J	1041.5	615.2	6800	4057
EB	0.85J	12J	7.4	<1	180J	42.7

W11S	4/04	10/04	4/05	10/05	5/06	10/06
TCE	0.32J	<1	<1	<1	<10	<1
c-1,2-DCE	6.7	189.6	14.3	1.9	280	5.6
t-1,2-DCE	1.7	1.6	1.6	<1	1.7J	<1
VC	7.8	137	31.2	<1	180	6.9
TOL	0.88J	258.2	6.5	4.0	2.2J	5.6
2-CHLOR	4.8	3.9	4.5	6.6	6.2J	6.7
EB	0.28J	<1	<1	<1	<10	<1

GM-12S	10/04	10/05	10/06
c-1,2-DCE	1.8	1.4	<1
VC	<1	2.8	<1
TOL	9.3	8.6	<1
2-CHLOR	11.6	27.8	<1
EB	7.2	11.9	<1

GM-17S	10/04	10/05	10/06
PCE	84.5	820	340
TCE	32.6	128.3	333
c-1,2-DCE	284.9	470.4	2326
t-1,2-DCE	6.9	5.8	18.3
1,1-DCE	1.6	3.6	6.9
VC	41.8	58.5	185

GM-14S	10/04	10/05	10/06
PCE	3.2	3.2	2.4

W8S	10/04	10/05	10/06
PCE	2.9	2.2	1.6
TCE	3.3	1.9	<1
c-1,2-DCE	10.8	2.1	<1

GMT-1	4/04	10/04	4/05	10/05	5/06	10/06
PCE	<7.5	<1J	<1	<1	<1	<1
TCE	<7.5	<1J	<1	<1	<1	<1
c-1,2-DCE	110	1.5J	<1	2.2	1.0	2.2
t-1,2-DCE	<7.5	<1J	<1	<1	0.20J	<1
1,1-DCE	<7.5	<1J	<1	<1	<1	<1
VC	36J	<1J	<1	<1	<1	<1
TOL	2300	1312.5J	188	1.8	0.86J	<1
2-CHLOR	<7.5	1.5J	3.0	<1	<1	<1
EB	<7.5	<1J	<1	<1	<1	<1

W7S	4/04	10/04	04/05	10/05	5/06	10/06
PCE	<1	<1	<1	<1	0.45J	<1
TCE	2.1J	<1	<1	<1	<1	<1
c-1,2-DCE	170	<1	<1	<1	1.4	<1
t-1,2-DCE	2.2J	<1	<1	<1	0.33J	<1
VC	33	<1	<1	<1	1.2	<1

GM-22I
PW20A
GM-20I,D
PW7
PW19
GM-15S
GM-15D
GM-23S
WTF
GM-12S
GM-17S
COURTYARD TANK FARM
RG-1
GM-13S,D
W7S,D
GM-14S,D
W8S,D

0 400 800
SCALE IN FEET

LEGEND

- MONITOR WELL INSTALLED DURING RI
- MONITOR WELL INSTALLED DURING PRE RD INVESTIGATION
- TEMPORARY MONITOR WELL
- ADDENDUM 4 MONITOR WELL
- MONITORING WELL INSTALLED DURING REMEDIAL DESIGN
- PRIVATE WELL
- PIEZOMETER

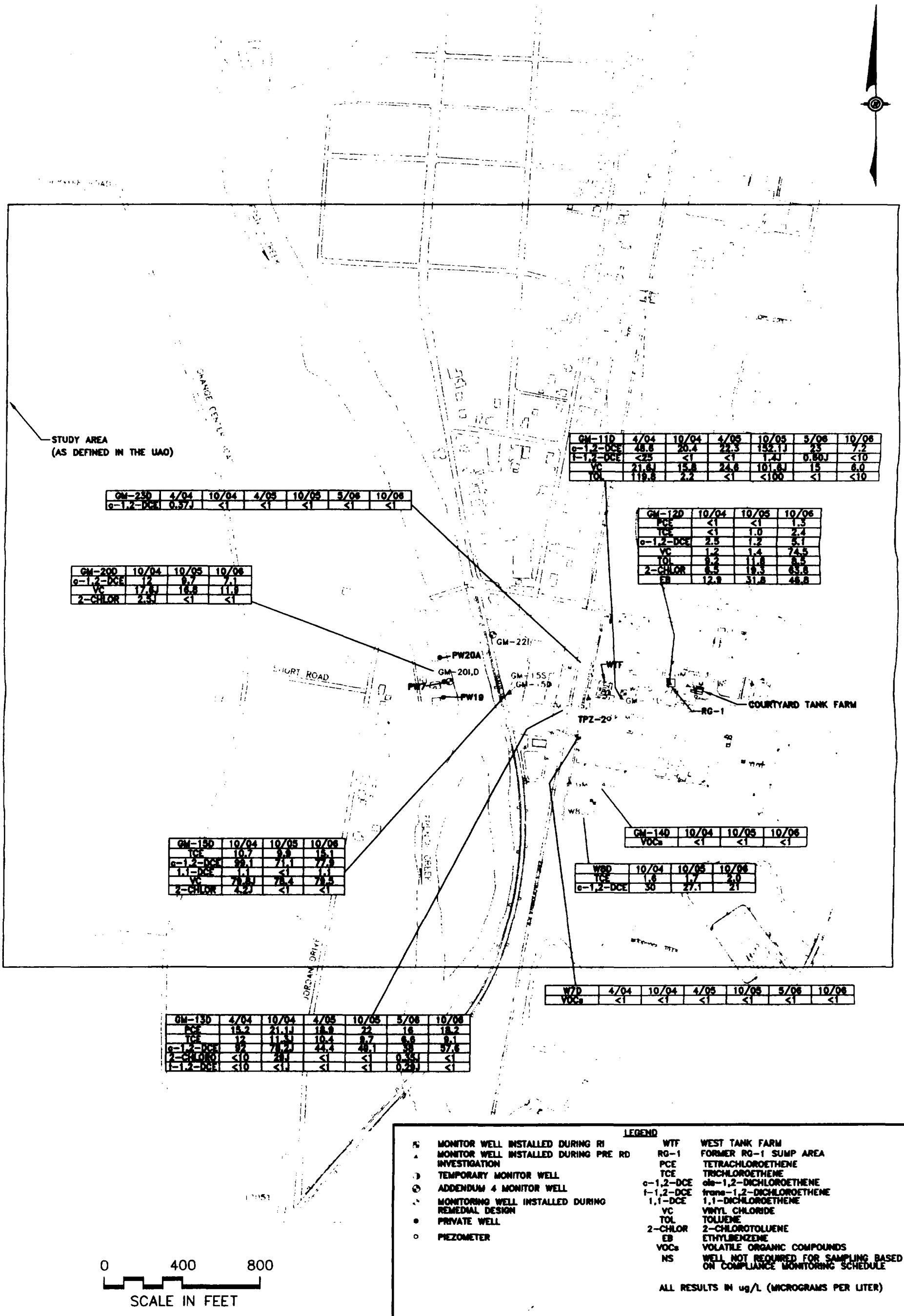
WTF	WEST TANK FARM
RG-1	FORMER RG-1 SUMP AREA
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
c-1,2-DCE	cis-1,2-DICHLOROETHENE
t-1,2-DCE	trans-1,2-DICHLOROETHENE
1,1-DCE	1,1-DICHLOROETHENE
VC	VINYL CHLORIDE
TOL	TOLUENE
2-CHLOR	2-CHLOROTOLUENE
EB	ETHYLBENZENE
VOCs	VOLATILE ORGANIC COMPOUNDS

BASELINE SAMPLING CONDUCTED 10/03
QUARTERLY SAMPLING CONDUCTED 1/04 AND 7/04
SEMI-ANNUAL SAMPLING CONDUCTED 4/04
ANNUAL SAMPLING CONDUCTED 10/04
ALL RESULTS IN ug/L (MICROGRAMS PER LITER)

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

DETECTED VOC CONCENTRATIONS, SHALLOW AND INTERMEDIATE MONITOR WELLS MONITORING DATA LORD CORPORATION, SAEGERTOWN, PENNSYLVANIA

DATE	PROJECT MANAGER	DRAWING NAME
10/17/2006	D. BALCER	LORD\SAEG\2006-02
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	J. MANZO
PROJECT NUMBER		DRAWING NUMBER
0H000483.2006		8



LEGEND

- MONITOR WELL INSTALLED DURING RI
- MONITOR WELL INSTALLED DURING PRE RD INVESTIGATION
- TEMPORARY MONITOR WELL
- ADDENDUM 4 MONITOR WELL
- MONITORING WELL INSTALLED DURING REMEDIAL DESIGN
- PRIVATE WELL
- PIEZOMETER

WTF	WEST TANK FARM
RG-1	FORMER RG-1 SUMP AREA
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
c-1,2-DCE	cis-1,2-DICHLOROETHENE
t-1,2-DCE	trans-1,2-DICHLOROETHENE
1,1-DCE	1,1-DICHLOROETHENE
VC	VINYL CHLORIDE
TOL	TOLUENE
2-CHLOR	2-CHLOROTOLUENE
EB	ETHYLBENZENE
VOCs	VOLATILE ORGANIC COMPOUNDS
NS	WELL NOT REQUIRED FOR SAMPLING BASED ON COMPLIANCE MONITORING SCHEDULE

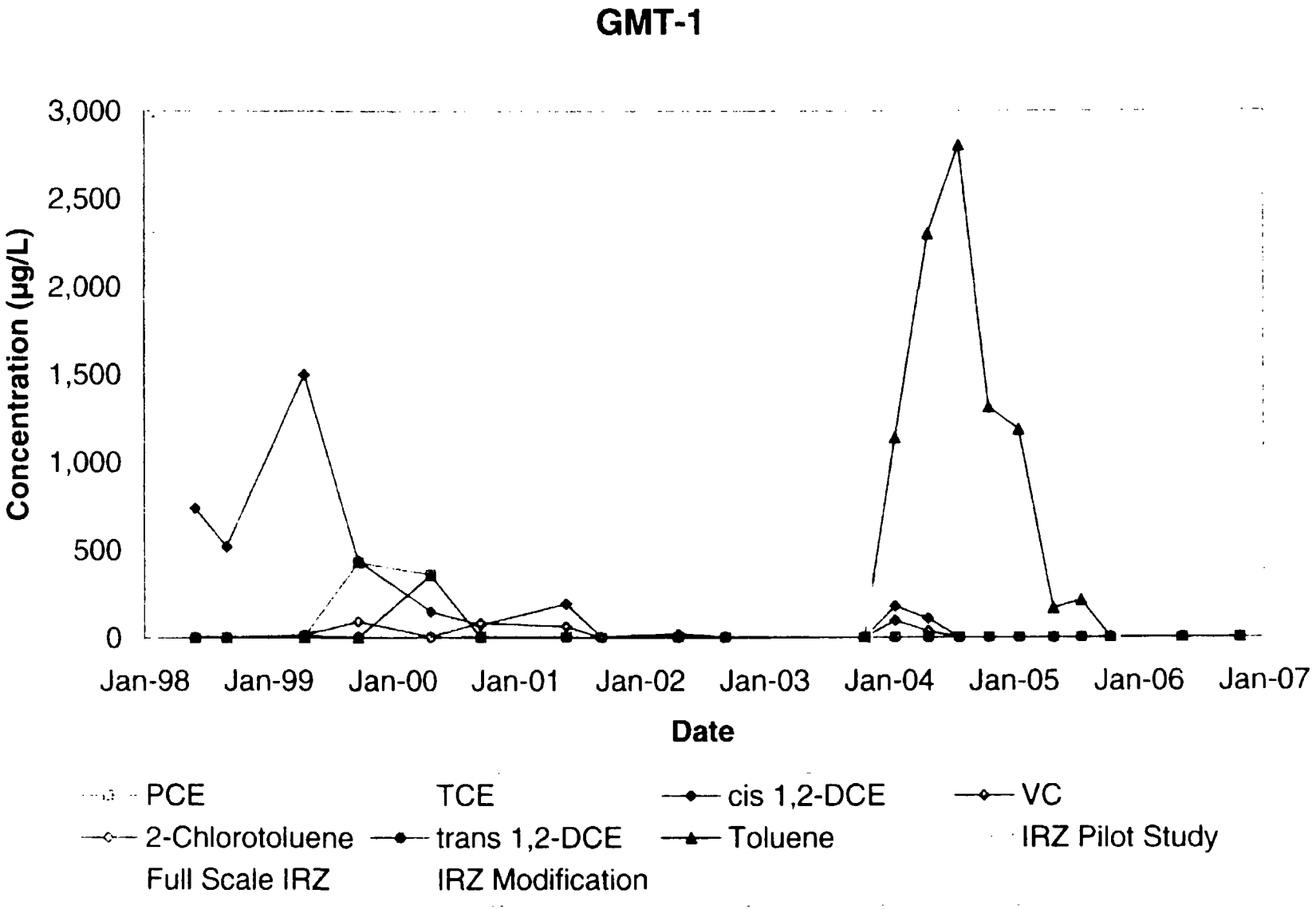
ALL RESULTS IN ug/L (MICROGRAMS PER LITER)

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

DETECTED VOC CONCENTRATIONS, DEEP MONITOR WELLS MONITORING DATA LORD CORPORATION, SAEGERTOWN, PENNSYLVANIA

DATE 10/17/2006	PROJECT MANAGER D. BALCER		DRAWING NAME LORD\SAEG\2006-02
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID		CHECKED J. MANZO
PROJECT NUMBER 0H000483.2006			DRAWING NUMBER 9

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 11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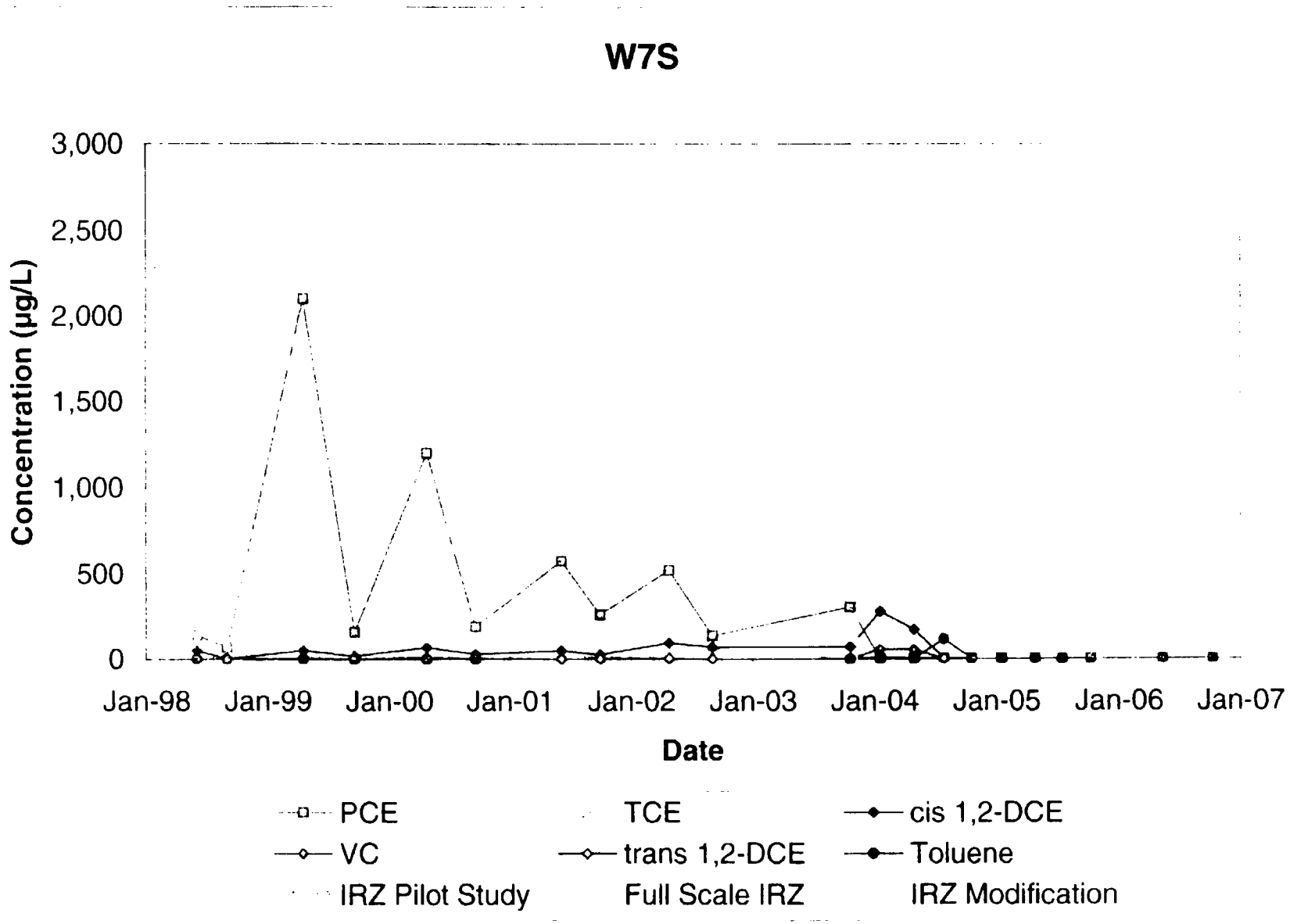
2,500
2,000
1,500
1,000
500
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification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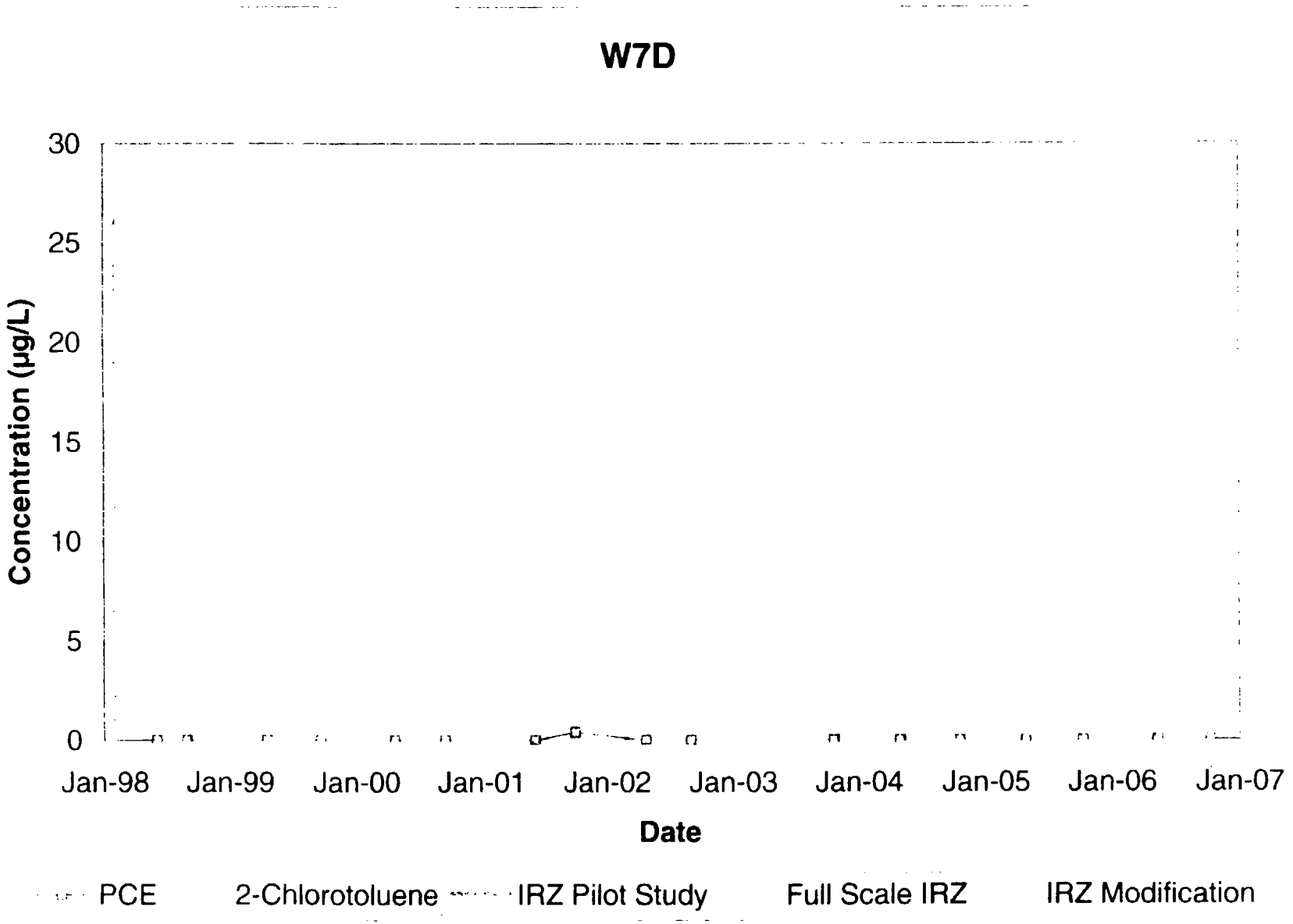
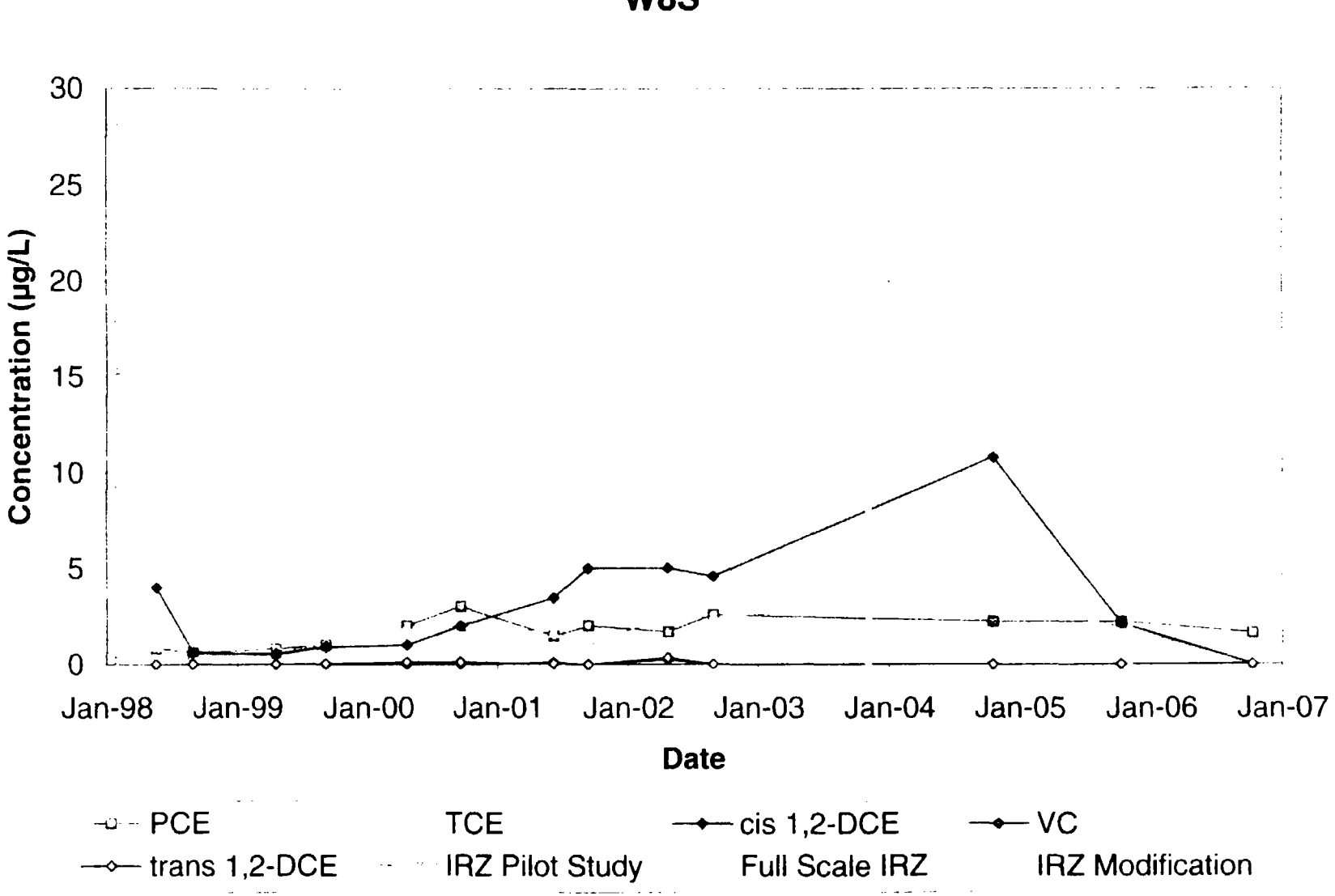
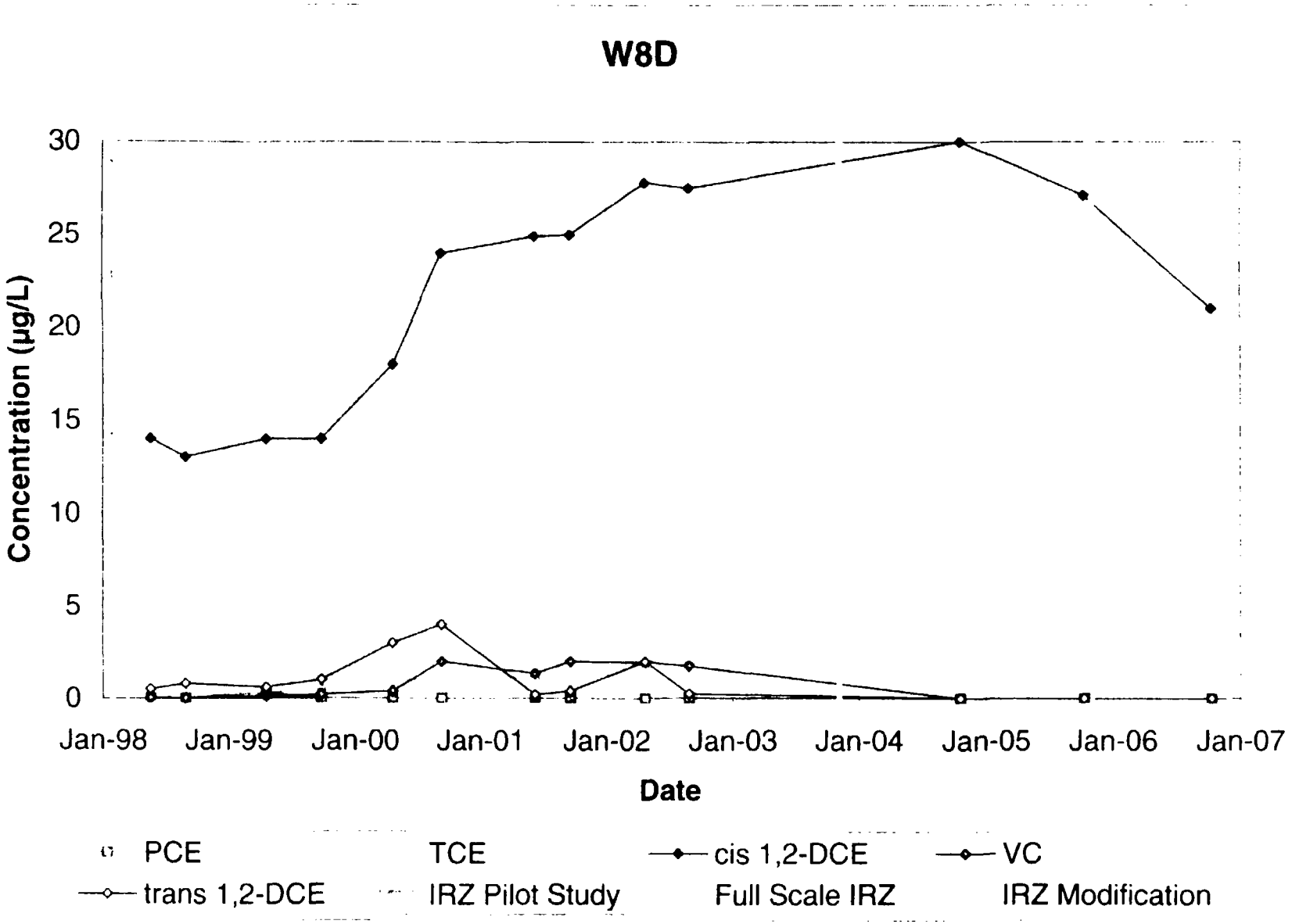
3,000
2,500
2,000
1,500
1,000
500
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
trans 1,2-DCE
Toluene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


W7D
30
25
20
15
10
5
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
2-Chlorotoluene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


W8S
30
25
20
15
10
5
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
trans 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


W8D
Concentration (µg/L)
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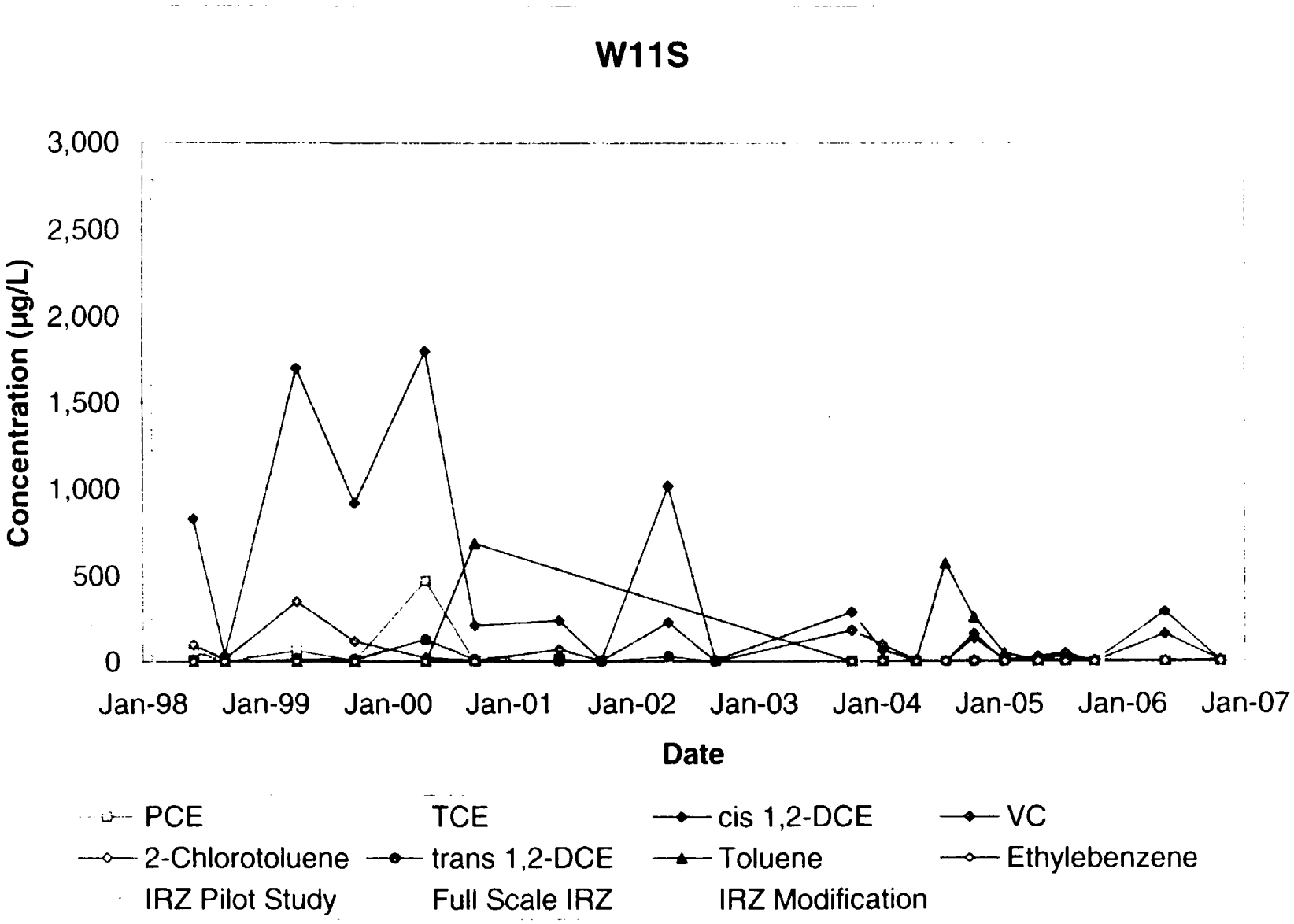
25
20
15
10
5
0
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
trans 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification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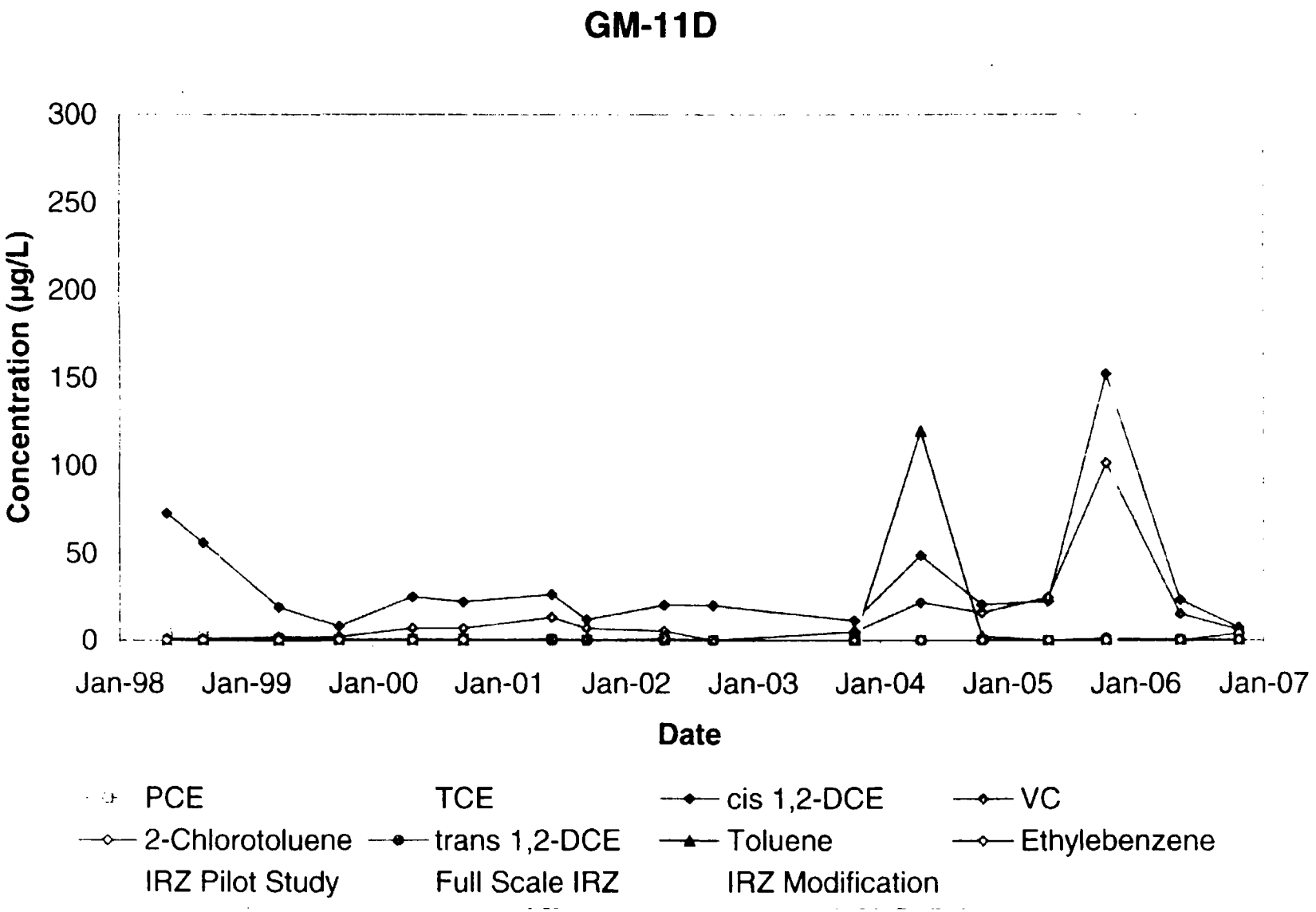
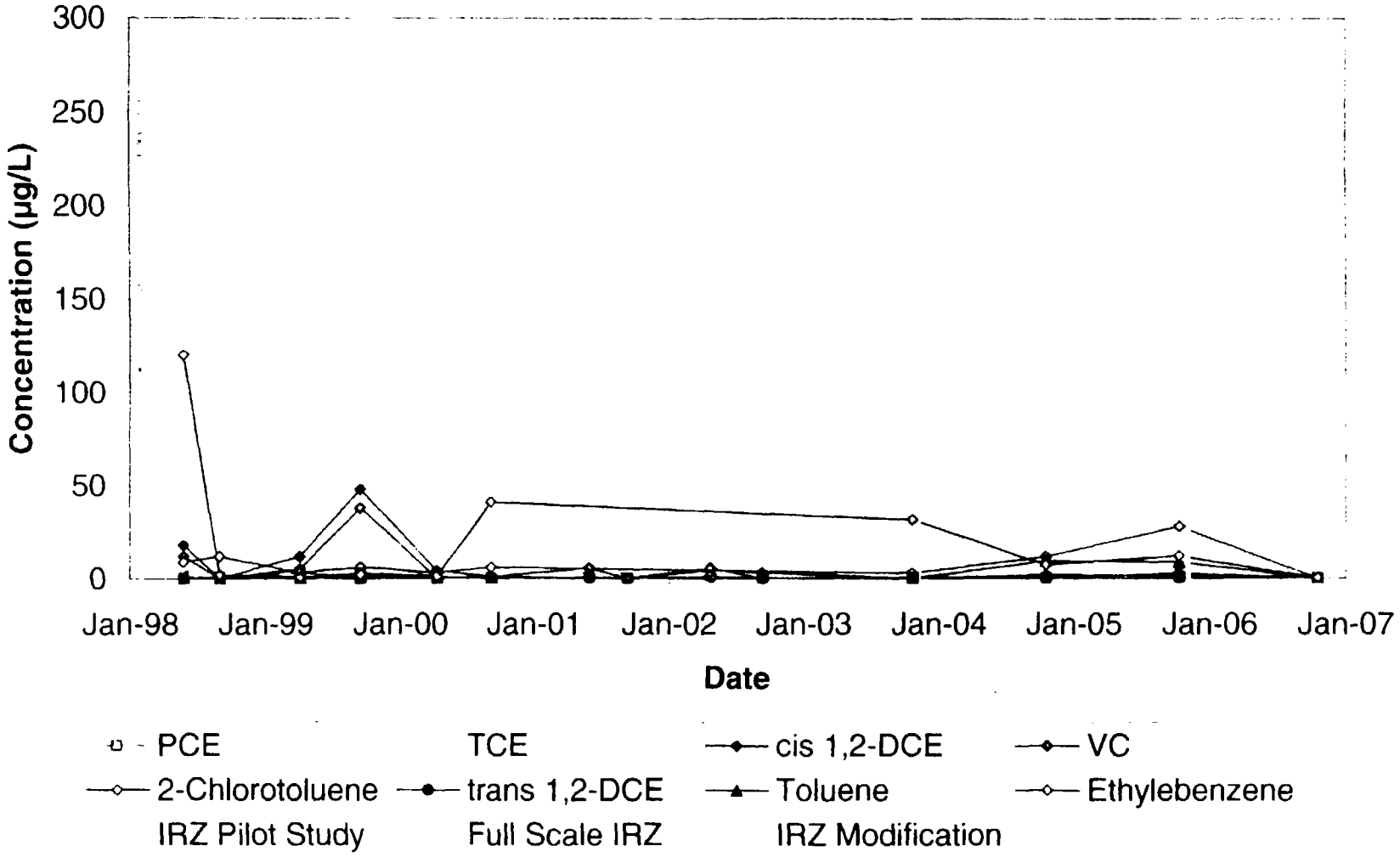
3,000
2,500
2,000
1,500
1,000
500
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
Ethylebenzene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-11D
300
250
200
150
100
50
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
Ethylebenzene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

GM-12S


300
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200
150
100
50
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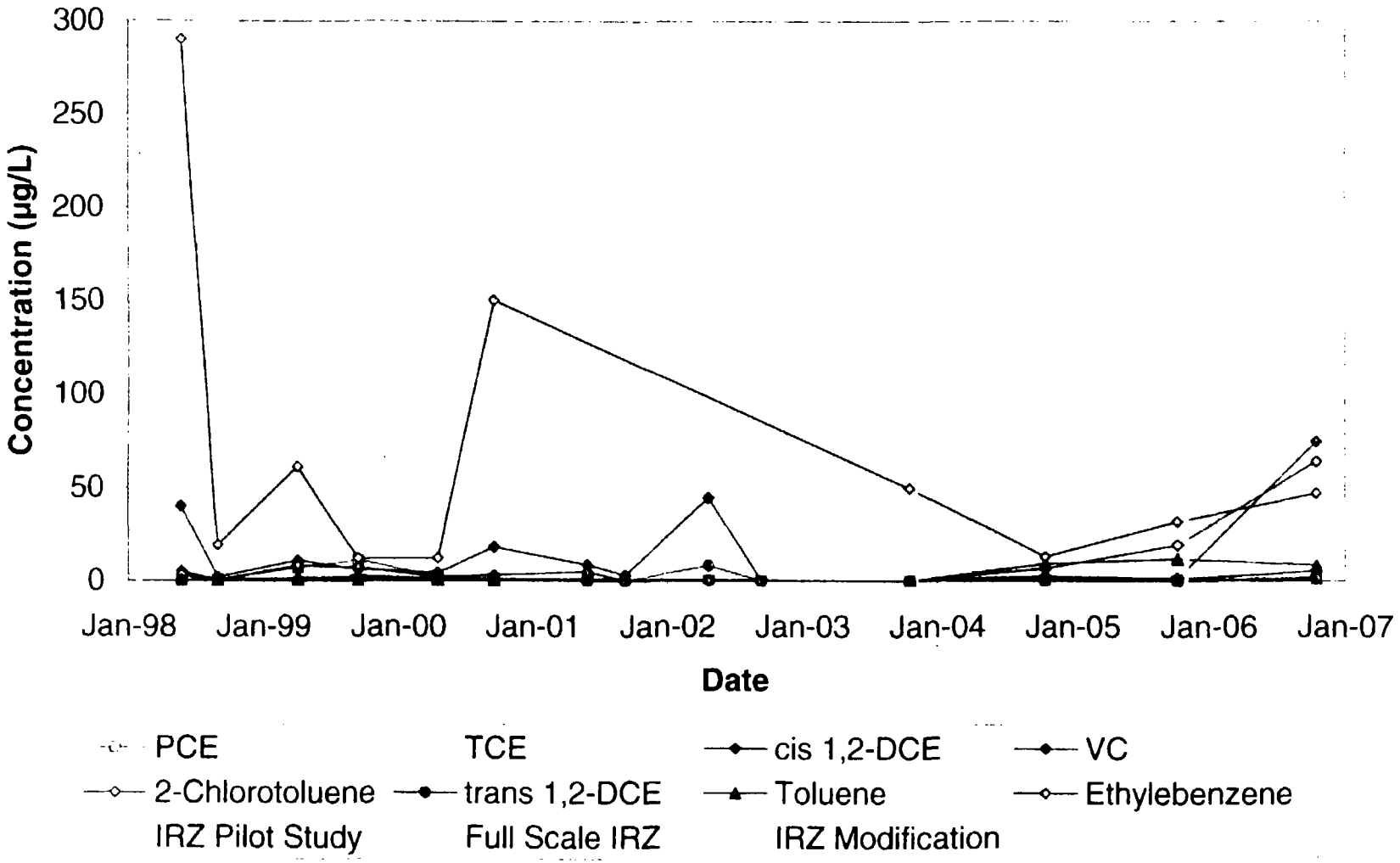
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
Ethylebenzene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

GM-12D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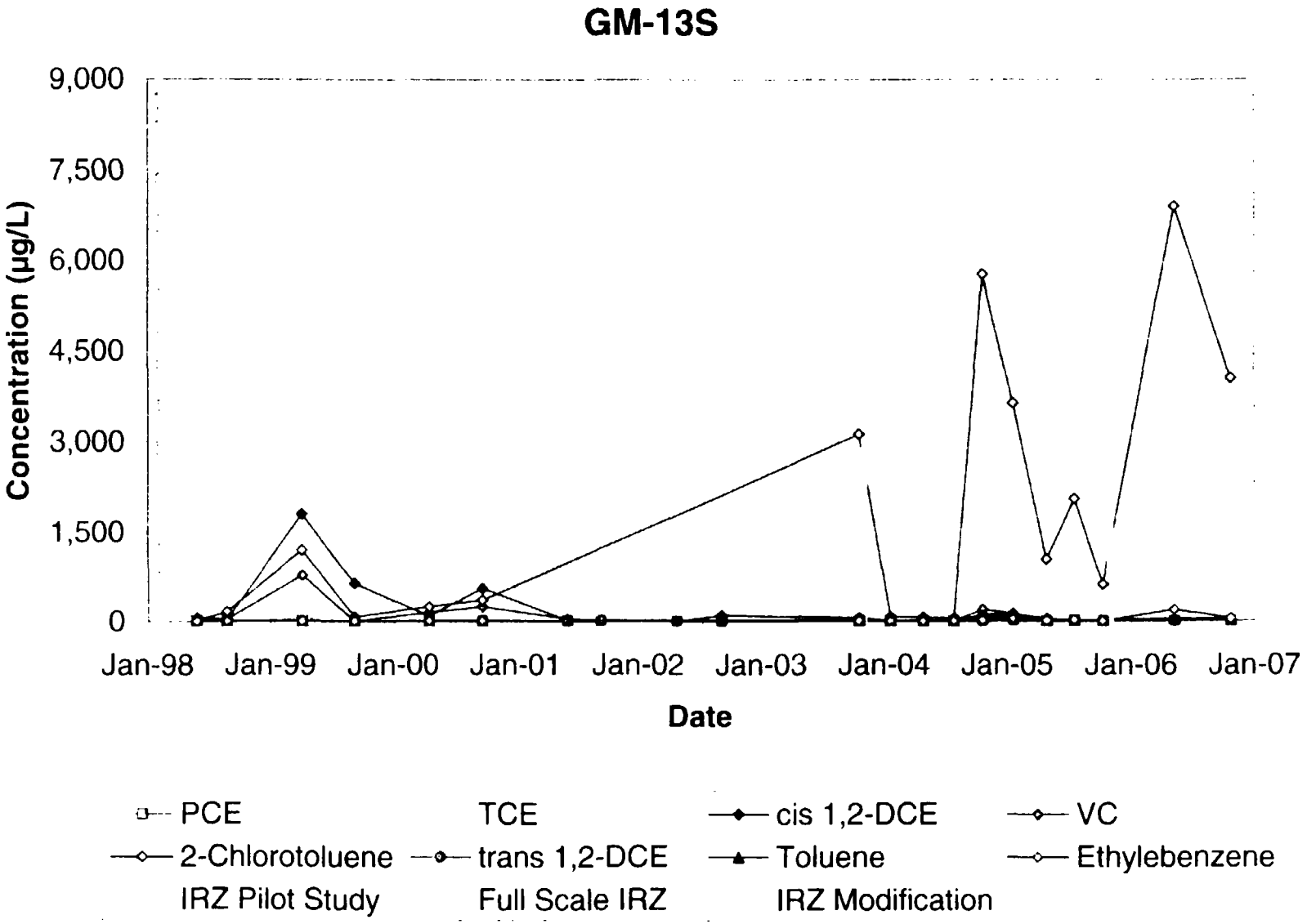
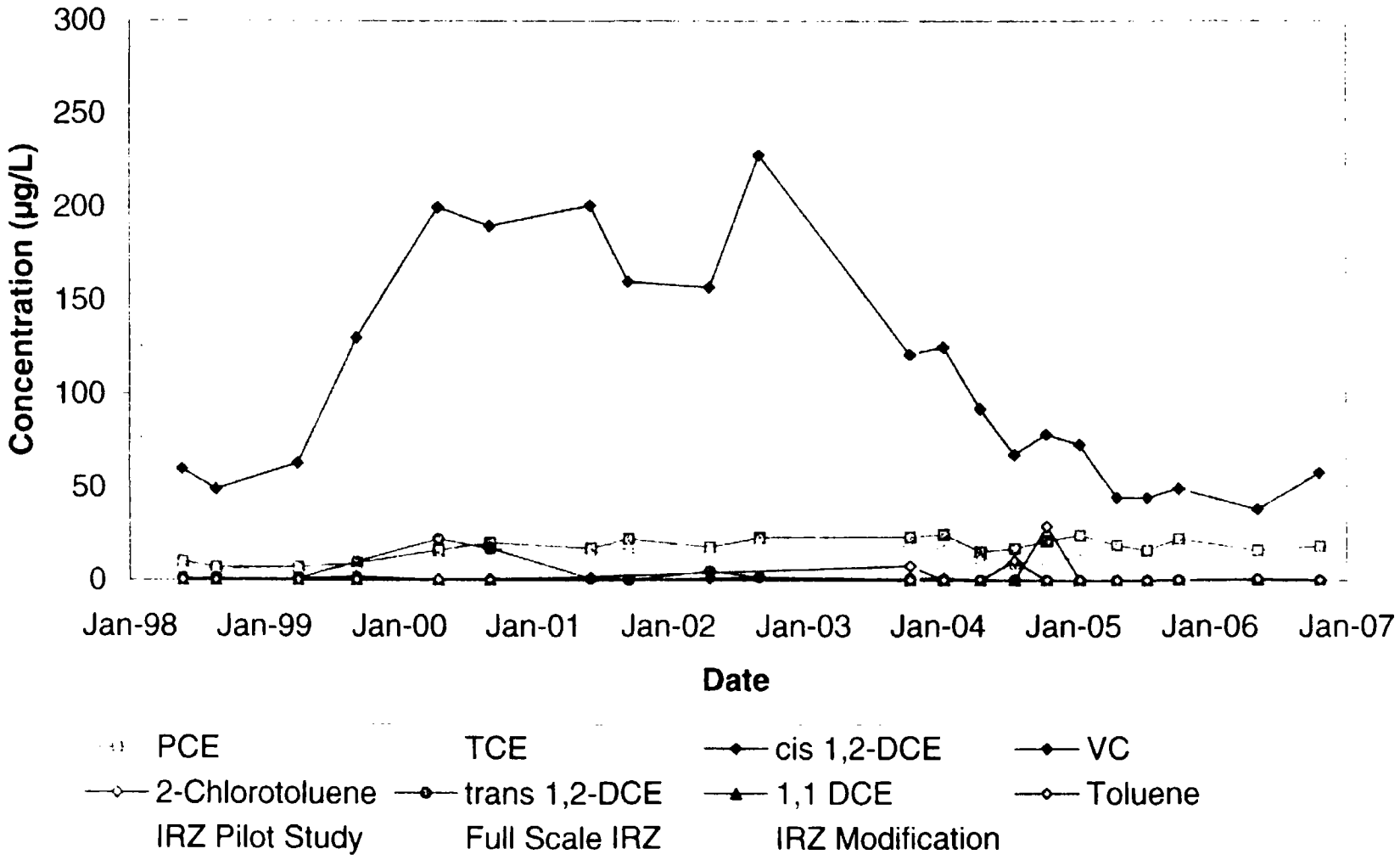
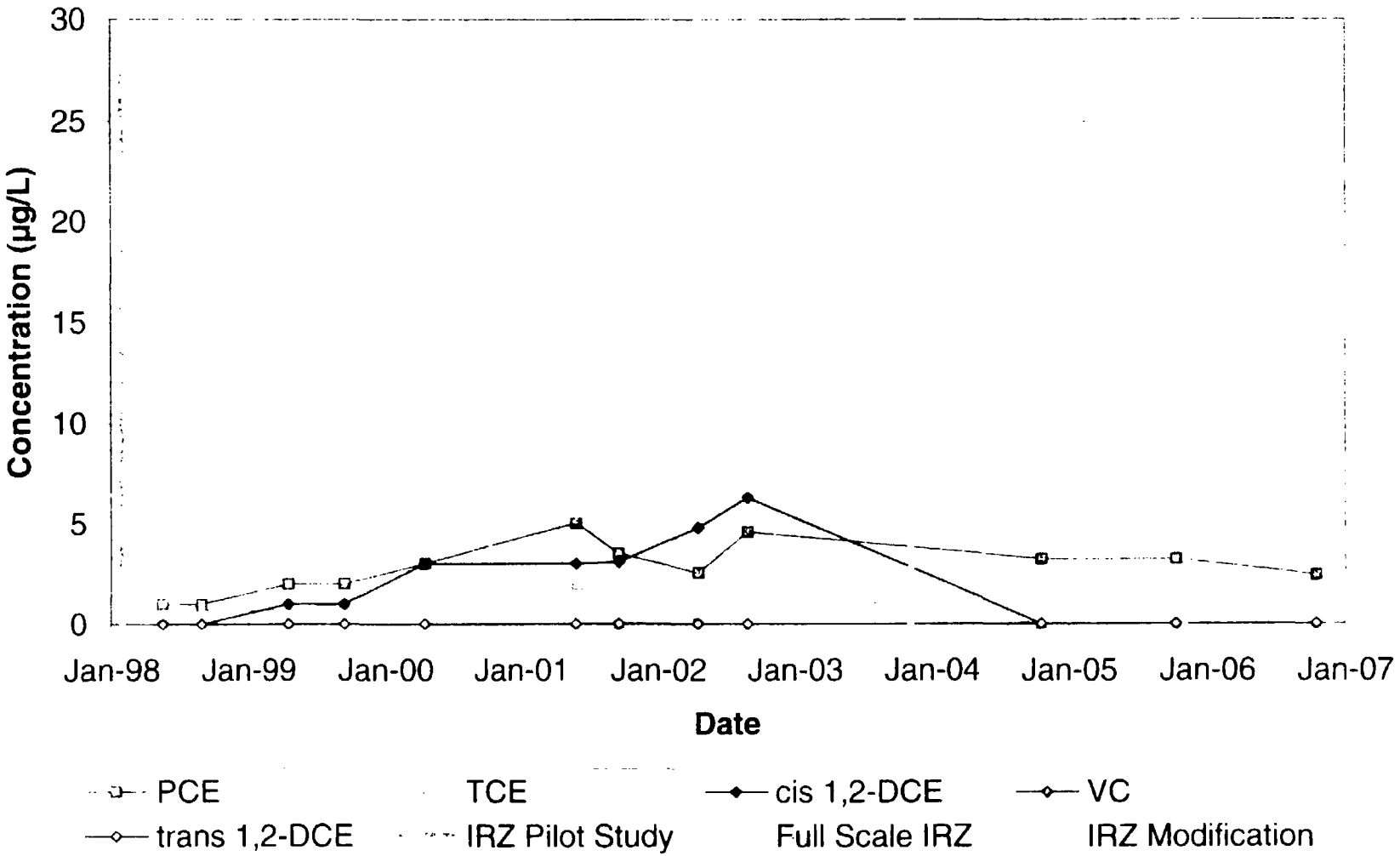
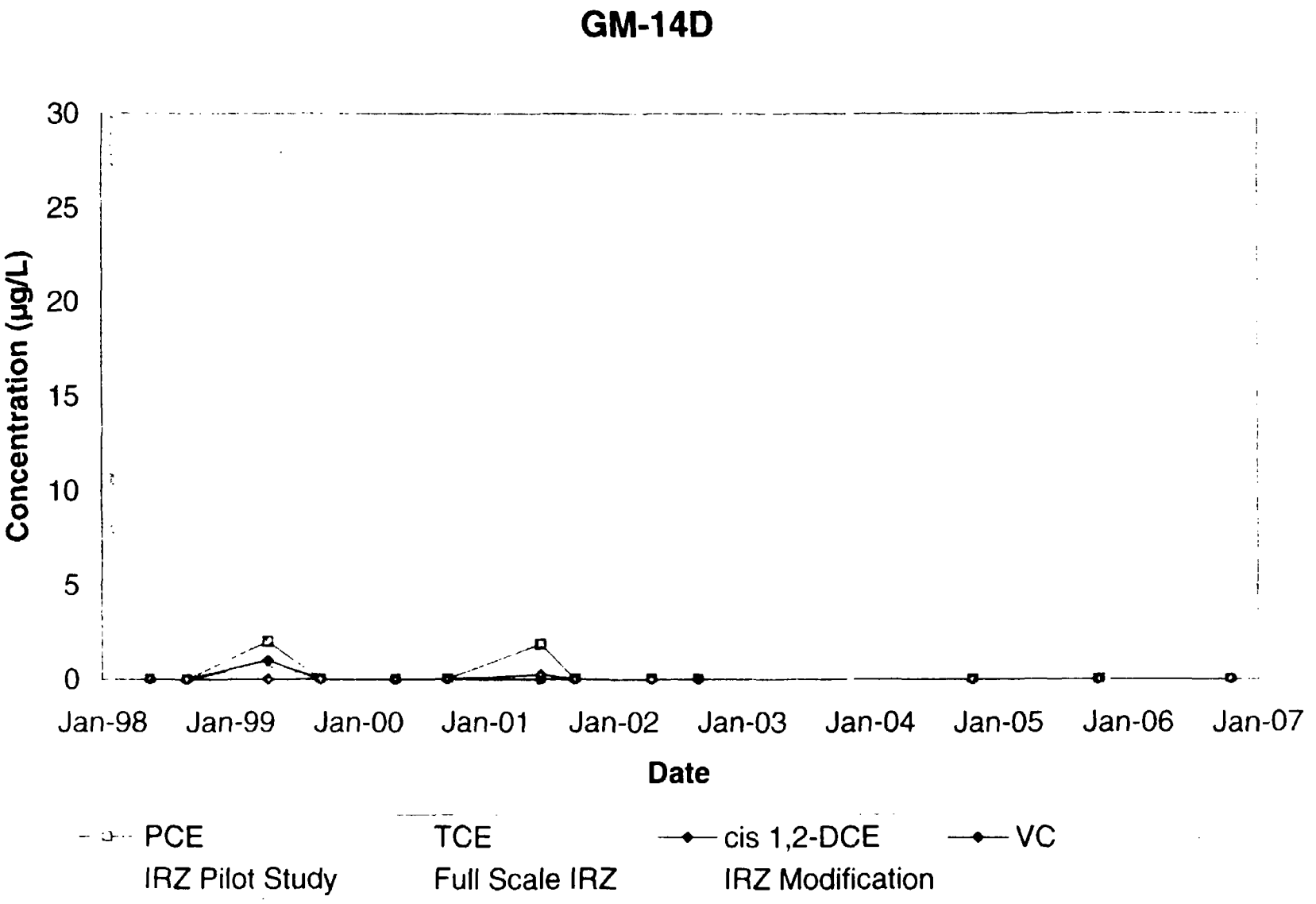
250
200
150
100
50
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
Ethylebenzene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

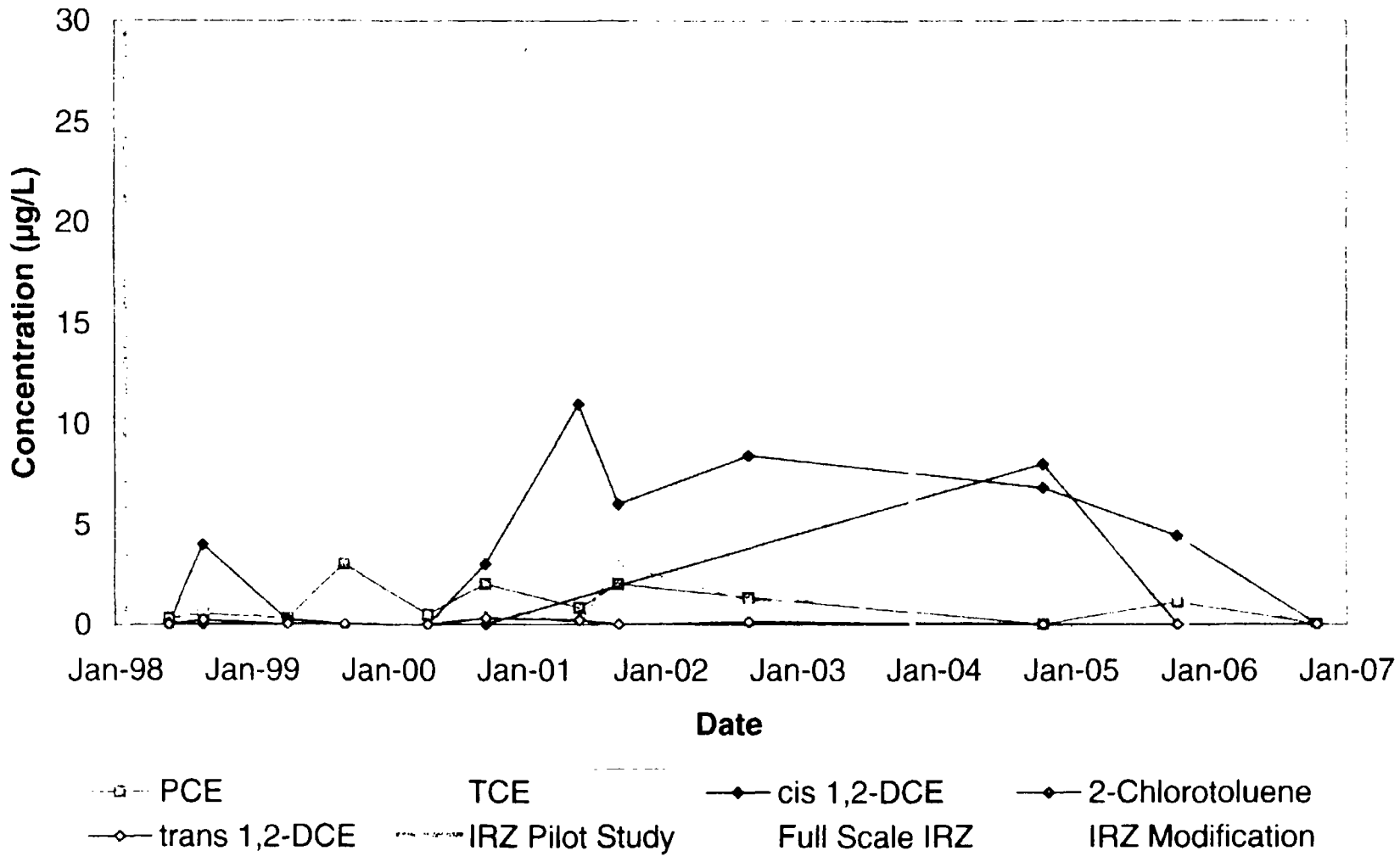

GM-13S
9,000
7,500
6,000
4,500
3,000
1,500
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
Toluene
Ethylebenzene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

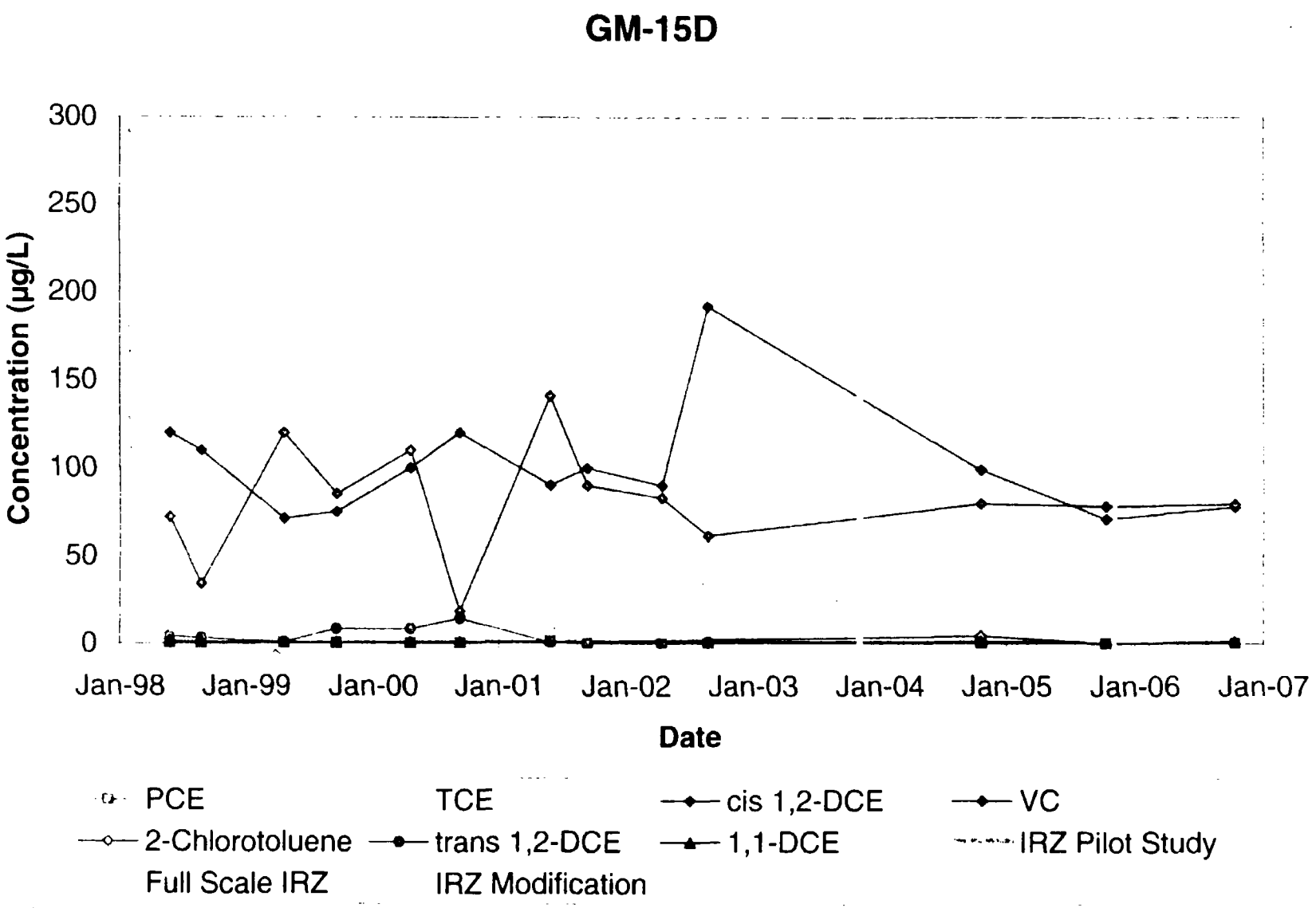

GM-13D
300
250
200
150
100
50
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
1,1 DCE
Toluene
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

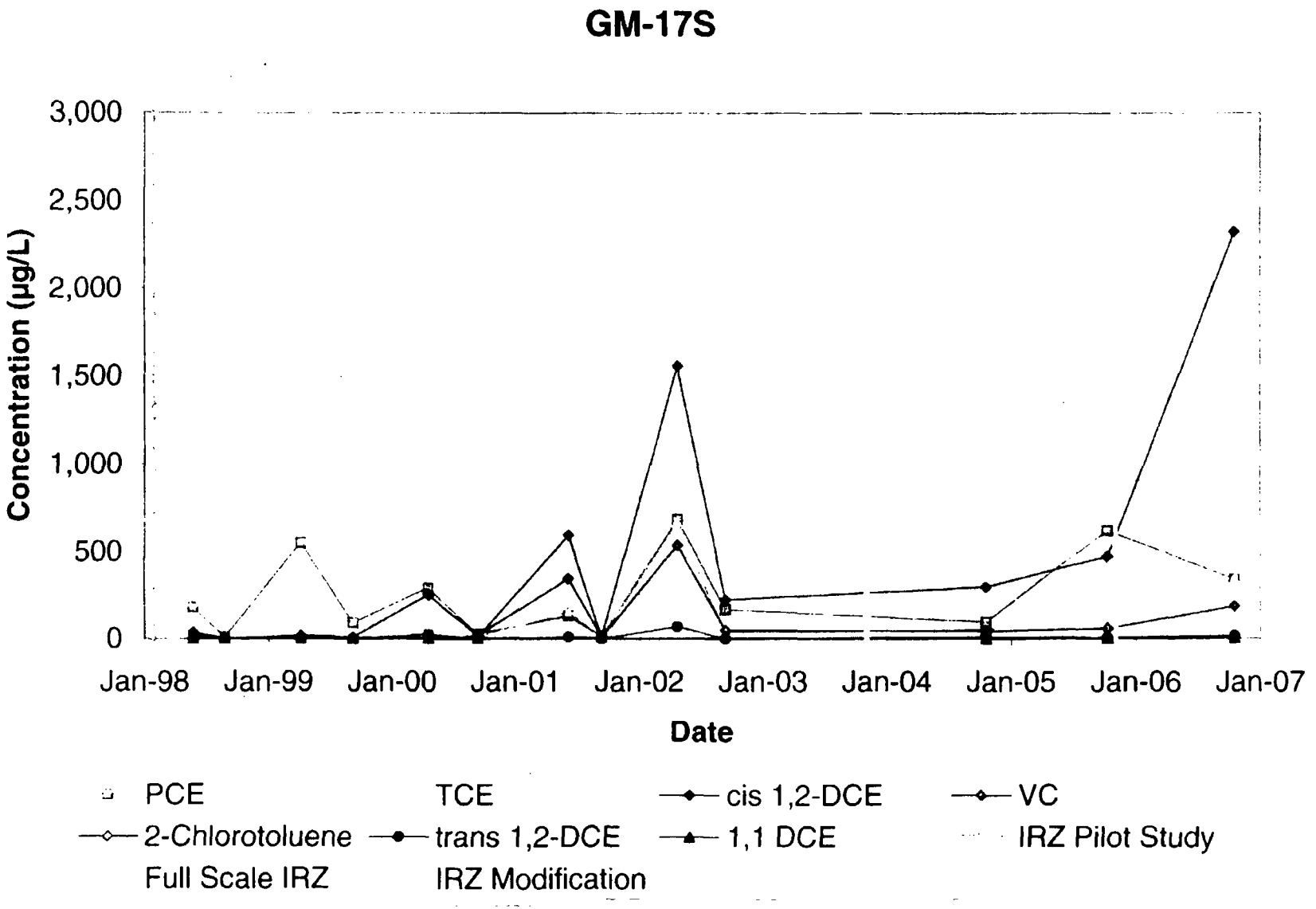
GM-14S

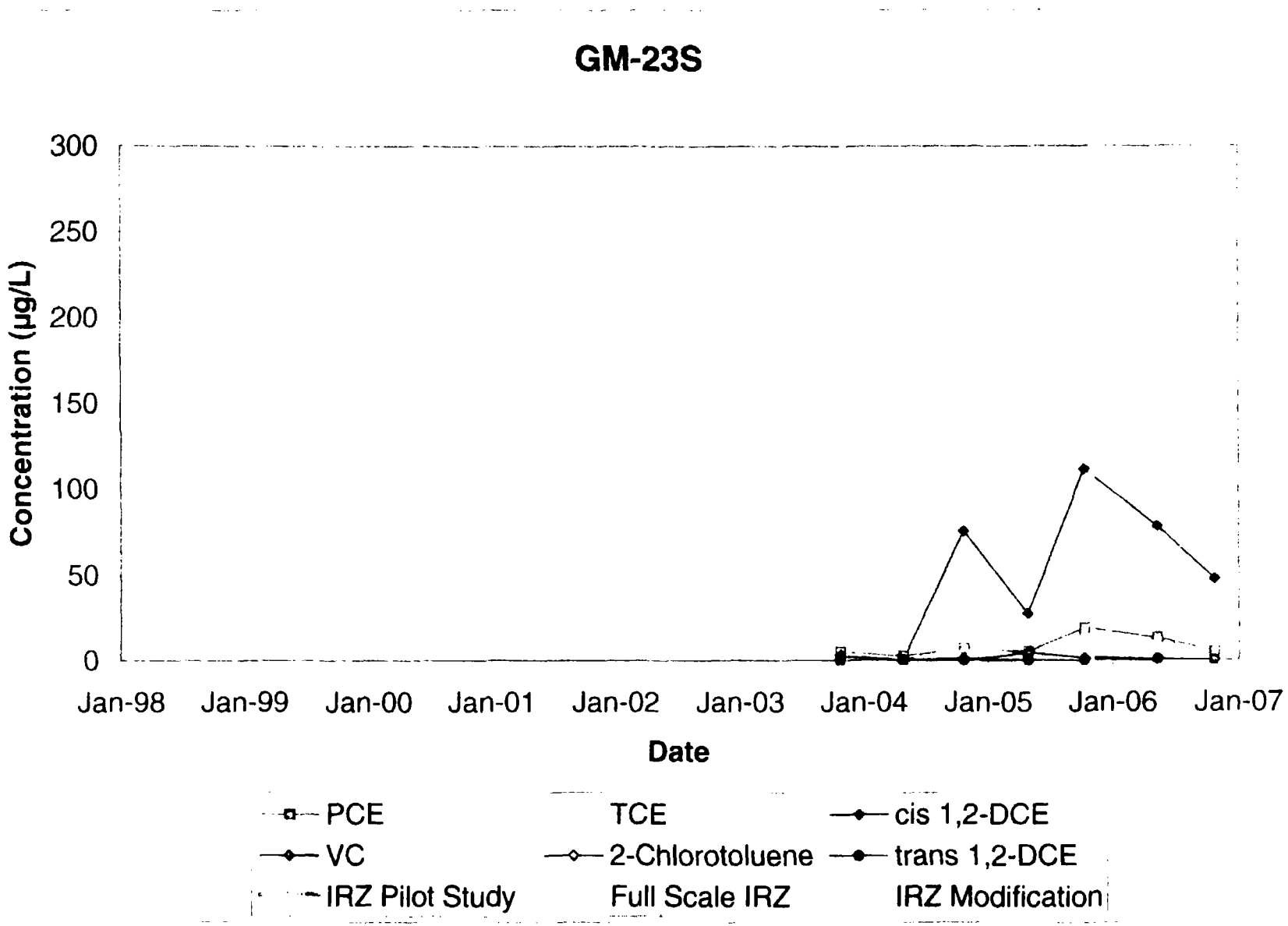

30
25
20
15
10
5
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
trans 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

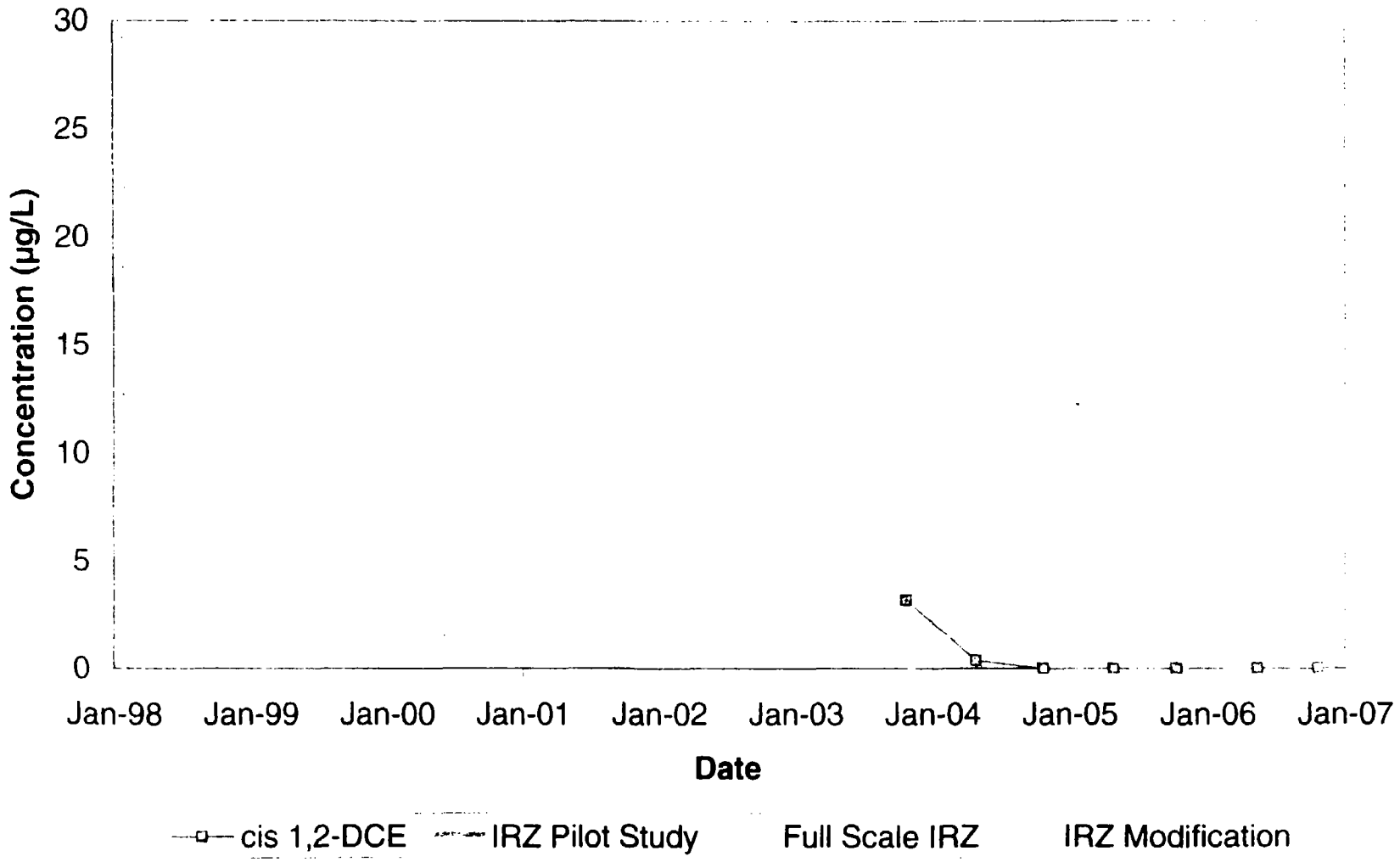

GM-14D
Concentration (µg/L)
30
25
20
15
10
5
0
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-15S
Concentration (µg/L)
30
25
20
15
10
5
0
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
2-Chlorotoluene
trans 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-15D
Concentration (µg/L)
300
250
200
150
100
50
0
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
1,1-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-17S
Concentration (µg/L)
3,000
2,500
2,000
1,500
1,000
500
0
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
1,1 DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-23S
300
250
200
150
100
50
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
PCE
TCE
cis 1,2-DCE
VC
2-Chlorotoluene
trans 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification


GM-23D
30
25
20
15
10
5
0
Concentration (µg/L)
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Date
cis 1,2-DCE
IRZ Pilot Study
Full Scale IRZ
IRZ Modification

Saegertown Industrial Area Superfund Site
2007 Five-Year Review
Attachment 12

ARCADIS

PW-7 Treatment System Monitoring Data, 1998, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/07/98	PW-7 SP-1 02/04/98	PW-7 SP-1 03/05/98	PW-7 SP-1 04/01/98	PW-7 SP-1 05/06/98	PW-7 SP-1 06/03/98	PW-7 SP-1 07/01/98	PW-7 SP-1 08/06/98	PW-7 SP-1 09/03/98	PW-7 SP-1 10/07/98	PW-7 SP-1 11/04/98	PW-7 SP-1 12/02/98
Volatile Organics													
Vinyl chloride	ug/l	3.0	4.0	2.0	5.0	3.0	2.0	3.0	--	2.0	2.0	2.0	2
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	<1.0	<1.0	--	--	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	5.0	3.0	3.0	5.0	--	3.0	3.0	--	3.0	2.0	2.0	2
Trichloroethene	ug/l	--	--	--	--	--	<1.0	<1.0	--	--	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	*	*	*	*	*	<1.0	<1.0	*	*	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-3 01/07/98	PW-7 SP-3 02/04/98	PW-7 SP-3 03/05/98	PW-7 SP-3 04/01/98	PW-7 SP-3 05/06/98	PW-7 SP-3 06/03/98	PW-7 SP-3 07/01/98	PW-7 SP-3 08/06/98	PW-7 SP-3 09/03/98	PW-7 SP-3 10/07/98	PW-7 SP-3 11/04/98	PW-7 SP-3 12/02/98
Volatile Organics													
Vinyl chloride	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
Trichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	*	*	*	*	*	*	*	*	*	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/07/98	PW-7 SP-5 02/04/98	PW-7 SP-5 03/05/98	PW-7 SP-5 04/01/98	PW-7 SP-5 05/06/98	PW-7 SP-5 06/03/98	PW-7 SP-5 07/01/98	PW-7 SP-5 08/06/98	PW-7 SP-6 09/03/98	PW-7 SP-5 10/07/98	PW-7 SP-5 11/04/98	PW-7 SP-5 12/02/98
Volatile Organics													
Vinyl chloride	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
Trichloroethene	ug/l	--	--	--	--	--	--	--	--	--	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	*	*	*	*	*	*	*	*	*	<1.0	<1.0	<1.0

ug/l - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
-- Not detected above laboratory reporting limit.
* - no data.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 1999, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/06/99	PW-7 SP-1 02/03/99	PW-7 SP-1 03/03/99	PW-7 SP-1 04/08/99	PW-7 SP-1 05/05/99	PW-7 SP-1 06/03/99	PW-7 SP-1 07/07/99	PW-7 SP-1 08/04/99	PW-7 SP-1 09/01/99	PW-7 SP-1 10/06/99	PW-7 SP-1 11/03/99	PW-7 SP-1 12/08/99
Volatile Organics													
Vinyl chloride	ug/l	2	2	2	3J	4	2	3J	7.0J	3	2.0	5.0J	3.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	3J	2J	3J	3	4	3	4	3	2.0B	2.0	3.0	4.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-3 01/06/99	PW-7 SP-3 02/03/99	PW-7 SP-3 03/03/99	PW-7 SP-3 04/08/99	PW-7 SP-3 05/05/99	PW-7 SP-3 06/03/99	PW-7 SP-3 07/07/99	PW-7 SP-3 08/04/99	PW-7 SP-3 09/01/99	PW-7 SP-3 10/06/99	PW-7 SP-3 11/03/99	PW-7 SP-3 12/08/99
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/06/99	PW-7 SP-5 02/03/99	PW-7 SP-5 03/03/99	PW-7 SP-5 04/08/99	PW-7 SP-5 05/05/99	PW-7 SP-5 06/03/99	PW-7 SP-5 07/07/99	PW-7 SP-5 08/04/99	PW-7 SP-5 09/01/99	PW-7 SP-5 10/06/99	PW-7 SP-5 11/03/99	PW-7 SP-5 12/08/99
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ug/l - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
J - Estimated concentration.
B - Detected in associated laboratory method blank.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 2000, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/06/00	PW-7 SP-1 02/02/00	PW-7 SP-1 03/20/00	PW-7 SP-1 04/06/00	PW-7 SP-1 05/03/00	PW-7 SP-1 05/24/00	PW-7 SP-1 07/06/00	PW-7 SP-1 08/23/00	PW-7 SP-1 09/07/00	PW-7 SP-1 10/11/00	PW-7 SP-1 11/14/00	PW-7 SP-1 12/06/00
Volatile Organics													
Vinyl chloride	ug/l	5.0	2.0J	2.0	2.0	4.0	1.3	5J	4.0	3.0	3.0	3J	1.0J
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	2.0B	--	--
cis-1,2-dichloroethene	ug/l	4.0	4.0	3.0	3.0	4.0	3.3	7J	3.0	3.0	3.0J	8J	3J
Trichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--

Compound	Units	PW-7 SP-3 01/06/00	PW-7 SP-3 02/02/00	PW-7 SP-3 03/20/00	PW-7 SP-3 04/06/00	PW-7 SP-3 05/03/00	PW-7 SP-3 05/24/00	PW-7 SP-3 07/06/00	PW-7 SP-3 08/23/00	PW-7 SP-3 09/07/00	PW-7 SP-3 10/11/00	PW-7 SP-3 11/14/00	PW-7 SP-3 12/06/00
Volatile Organics													
Vinyl chloride	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--

Compound	Units	PW-7 SP-5 01/06/00	PW-7 SP-5 02/02/00	PW-7 SP-5 03/20/00	PW-7 SP-5 04/06/00	PW-7 SP-5 05/03/00	PW-7 SP-5 05/24/00	PW-7 SP-5 07/06/00	PW-7 SP-5 08/23/00	PW-7 SP-5 09/07/00	PW-7 SP-5 10/11/00	PW-7 SP-5 11/14/00	PW-7 SP-5 12/06/00
Volatile Organics													
Vinyl chloride	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-dichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	ug/l	--	--	--	--	--	--	--	--	--	--	--	--

ug/l - Micrograms per liter.
-- Not detected above laboratory reporting limit.
J - Estimated concentration.
B - Detected in associated laboratory method blank.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 2001, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/03/01	PW-7 SP-1 02/07/01	PW-7 SP-1 03/07/01	PW-7 SP-1 04/11/01	PW-7 SP-1 05/02/01	PW-7 SP-1 06/06/01	PW-7 SP-1 07/11/01	PW-7 SP-1 08/01/01	PW-7 SP-1 09/13/01	PW-7 SP-1 10/03/01	PW-7 SP-1 11/07/01	PW-7 SP-1 12/05/01
Volatile Organics													
Vinyl chloride	ug/l	1.0	2.0J	3.3	3.97	3.36	5.94	2.31	2.56	2.50	3.0	1.0	6.31J
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	4.0	3.0J	3.06	5.88	4.82	5.93	3.00B	2.56B	2.91	3.0	1.3	3.25
Trichloroethene	ug/l	<1.0J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0B	<1.0	<1.0J	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-3 01/03/01	PW-7 SP-3 02/07/01	PW-7 SP-3 03/07/01	PW-7 SP-3 04/11/01	PW-7 SP-3 05/02/01	PW-7 SP-3 06/06/01	PW-7 SP-3 07/11/01	PW-7 SP-3 08/01/01	PW-7 SP-3 09/13/01	PW-7 SP-3 10/03/01	PW-7 SP-3 11/07/01	PW-7 SP-3 12/05/01
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0B	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/03/01	PW-7 SP-5 02/07/01	PW-7 SP-5 03/07/01	PW-7 SP-5 04/11/01	PW-7 SP-5 05/02/01	PW-7 SP-5 06/06/01	PW-7 SP-5 07/11/01	PW-7 SP-5 08/01/01	PW-7 SP-5 09/13/01	PW-7 SP-5 10/03/01	PW-7 SP-5 11/07/01	PW-7 SP-5 12/05/01
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0B	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.00	<1.00	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.00	<1.00J	<1.0	<1.0	<1.0

ug/l - Microgrammes per liter.
< - Not detected above posted laboratory reporting limit.
J - Estimated concentration.
B - Detected in associated laboratory method blank.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 2002, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/09/02	PW-7 SP-1 02/06/02	PW-7 SP-1 03/06/02	PW-7 SP-1 04/03/02	PW-7 SP-1 05/01/02	PW-7 SP-1 06/05/02	PW-7 SP-1 07/10/02	PW-7 SP-1 08/07/02	PW-7 SP-1 09/05/02	PW-7 SP-1 10/03/02	PW-7 SP-1 11/06/02	PW-7 SP-1 12/05/02
Volatile Organics													
Vinyl chloride	ug/l	2.65	2.77	3.35	3.60J	8.93	4.18B	2.72	1.58	1.21	3.46	2.72	2.32
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	1.94	2.63	3.15	3.42J	4.46	4.29	2.98	1.78	1.51	3.30 B	3.02	2.55 B
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-3 01/09/02	PW-7 SP-3 02/06/02	PW-7 SP-3 03/06/02	PW-7 SP-3 04/03/02	PW-7 SP-3 05/01/02	PW-7 SP-3 06/05/02	PW-7 SP-3 07/10/02	PW-7 SP-3 08/07/02	PW-7 SP-3 09/05/02	PW-7 SP-3 10/03/02	PW-7 SP-3 11/06/02	PW-7 SP-3 12/05/02
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/09/02	PW-7 SP-5 02/06/02	PW-7 SP-5 03/06/02	PW-7 SP-5 04/03/02	PW-7 SP-5 05/01/02	PW-7 SP-5 06/05/02	PW-7 SP-5 07/10/02	PW-7 SP-5 08/07/02	PW-7 SP-5 09/05/02	PW-7 SP-5 10/03/02	PW-7 SP-5 11/06/02	PW-7 SP-5 12/05/02
Volatile Organics													
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ug/l - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
J - Estimated concentration.
B - Detected in associated laboratory method blank.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

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PW-7 Treatment System Monitoring Data, 2003, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/02/03	PW-7 SP-1 02/05/03	PW-7 SP-1 03/05/03	PW-7 SP-1 04/03/03	PW-7 SP-1 05/07/03	PW-7 SP-1 06/04/03	PW-7 SP-1 07/09/03	PW-7 SP-1 08/06/03	PW-7 SP-1 09/03/03	PW-7 SP-1 10/01/03	PW-7 SP-1 11/05/03	PW-7 SP-1 12/03/03
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/L	3.36	2.66	2.46	3.32	3.25	4.81	4.03	5.11	2.43	3.03	1.70	3.36
trans-1,2-dichloroethene	ug/L	<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	ug/L	3.53	2.72	2.40	3.04	2.32	4.08	5.12	5.33	1.66	3.29	1.35	3.53

Compound	Units	PW-7 SP-3 01/02/03	PW-7 SP-3 02/05/03	PW-7 SP-3 03/05/03	PW-7 SP-3 04/03/03	PW-7 SP-3 05/07/03	PW-7 SP-3 06/04/03	PW-7 SP-3 07/09/03	PW-7 SP-3 08/06/03	PW-7 SP-3 09/03/03	PW-7 SP-3 10/01/03	PW-7 SP-3 11/05/03	PW-7 SP-3 12/03/03
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/L	<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	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/02/03	PW-7 SP-5 02/05/03	PW-7 SP-5 03/05/03	PW-7 SP-5 04/03/03	PW-7 SP-5 05/07/03	PW-7 SP-5 06/04/03	PW-7 SP-5 07/09/03	PW-7 SP-5 08/06/03	PW-7 SP-5 09/03/03	PW-7 SP-5 10/01/03	PW-7 SP-5 11/05/03	PW-7 SP-5 12/03/03
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/L	<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	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

MCLs - Federal Drinking Water Standards Maximum Containment Levels.
ug/L - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

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PW-7 Treatment System Monitoring Data, 2004, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/08/04	PW-7 SP-1 02/05/04	PW-7 SP-1 03/03/04	PW-7 SP-1 04/07/04	PW-7 SP-1 05/05/04	PW-7 SP-1 06/02/04	PW-7 SP-1 07/07/04	PW-7 SP-1 08/04/04	PW-7 SP-1 09/01/04	PW-7 SP-1 10/06/04	PW-7 SP-1 11/03/04	PW-7 SP-1 12/01/04
Volatile Organics													
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	ug/l	3.87	3.28	4.32	4.70	4.10	3.30	3.60	3.50	3.20	2.50	3.00	3.20
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	ug/l	4.85	3.18	4.57	4.10	3.70	3.60	2.90	2.80	2.70	2.10	2.70	3.10

Compound	Units	PW-7 SP-3 01/08/04	PW-7 SP-3 02/05/04	PW-7 SP-3 03/03/04	PW-7 SP-3 04/07/04	PW-7 SP-3 05/05/04	PW-7 SP-3 06/02/04	PW-7 SP-3 07/07/04	PW-7 SP-3 08/04/04	PW-7 SP-3 09/01/04	PW-7 SP-3 10/06/04	PW-7 SP-3 11/03/04	PW-7 SP-3 12/01/04
Volatile Organics													
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/08/04	PW-7 SP-5 02/05/04	PW-7 SP-5 03/03/04	PW-7 SP-5 04/07/04	PW-7 SP-5 05/05/04	PW-7 SP-5 06/02/04	PW-7 SP-5 07/07/04	PW-7 SP-5 08/04/04	PW-7 SP-5 09/01/04	PW-7 SP-5 10/06/04	PW-7 SP-5 11/03/04	PW-7 SP-5 12/01/04
Volatile Organics													
Tetrachloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/l	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ug/l - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 2005, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/06/05	PW-7 SP-1 02/02/05	PW-7 SP-1 03/04/05	PW-7 SP-1 04/06/05	PW-7 SP-1 05/04/05	PW-7 SP-1 06/01/05	PW-7 SP-1 07/06/05	PW-7 SP-1 08/03/05	PW-7 SP-1 09/07/05	PW-7 SP-1 10/07/05	PW-7 SP-1 11/02/05	PW-7 SP-1 Dec
Volatile Organics													
Tetrachloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	3.7	4.8	3.2	4.5	3.7	2.8	4.1	1.9	1.6	2.7	1.3	2.1
trans-1,2-dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1
1,1-Dichloroethene	ug/L	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/l	3.6	4.4	2.9	4.2	3.3	1.8	6.1	1.5	1.8	2.4	1.5	2.5

Compound	Units	PW-7 SP-3 01/06/05	PW-7 SP-3 02/02/05	PW-7 SP-3 03/04/05	PW-7 SP-3 04/06/05	PW-7 SP-3 05/04/05	PW-7 SP-3 06/01/05	PW-7 SP-3 07/06/05	PW-7 SP-3 08/03/05	PW-7 SP-3 09/07/05	PW-7 SP-3 10/07/05	PW-7 SP-3 11/02/05	PW-7 SP-3 Dec
Volatile Organics													
Tetrachloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	1.3
trans-1,2-dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Compound	Units	PW-7 SP-5 01/06/05	PW-7 SP-5 02/02/05	PW-7 SP-5 03/04/05	PW-7 SP-5 04/06/05	PW-7 SP-5 05/04/05	PW-7 SP-5 06/01/05	PW-7 SP-5 07/06/05	PW-7 SP-5 08/03/05	PW-7 SP-5 09/07/05	PW-7 SP-5 10/07/05	PW-7 SP-5 11/02/05	PW-7 SP-5 Dec
Volatile Organics													
Tetrachloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/l	<1	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ug/l - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.

ARCADIS

PW-7 Treatment System Monitoring Data, 2006, LORD Corporation, Saegertown, Pennsylvania.

Monthly Results

Compound	Units	PW-7 SP-1 01/04/06	PW-7 SP-1 02/01/06	PW-7 SP-1 03/01/06	PW-7 SP-1 04/05/06	PW-7 SP-1 05/02/06	PW-7 SP-1 06/14/06	PW-7 SP-1 07/05/06	PW-7 SP-1 08/02/06	PW-7 SP-1 09/06/06	PW-7 SP-1 10/04/06	PW-7 SP-1 11/01/06	PW-7 SP-1 12/06/06
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	2.1	2.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	<1.0	1.7	2.2	1.6	1.1	<1.0	<1.0	<1.0	<1.0	1.7	2.4	2.4
trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	1.6	1.2	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	ug/L	<1.0	1.7	2.4	1.6	1.5	<1.0	<1.0	<1.0	<1.0	1.4	2.5	2.4

Compound	Units	PW-7 SP-3 01/04/06	PW-7 SP-3 02/01/06	PW-7 SP-3 03/01/06	PW-7 SP-3 04/05/06	PW-7 SP-3 05/02/06	PW-7 SP-3 06/14/06	PW-7 SP-3 07/05/06	PW-7 SP-3 08/02/06	PW-7 SP-3 09/06/06	PW-7 SP-3 10/04/06	PW-7 SP-3 11/01/06	PW-7 SP-3 12/06/06
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	1.1	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	1.8	1.5
trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/L	<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	ug/L	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0

Compound	Units	PW-7 SP-5 01/04/06	PW-7 SP-5 02/01/06	PW-7 SP-5 03/01/06	PW-7 SP-5 04/05/06	PW-7 SP-5 05/02/06	PW-7 SP-5 06/14/06	PW-7 SP-5 07/05/06	PW-7 SP-5 08/02/06	PW-7 SP-5 09/06/06	PW-7 SP-5 10/04/06	PW-7 SP-5 11/01/06	PW-7 SP-5 12/06/06
Volatile Organics													
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/L	<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	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ug/L - Micrograms per liter.
< - Not detected above posted laboratory reporting limit.
PW7SP1 - Influent sample prior to treatment.
PW7SP3 - Intermediate sample.
PW7SP5 - Post treatment sample.