Third Five-Year Review Report

for the

Lorentz Barrel and Drum Superfund Site

San Jose

Santa Clara County, California

September 2010

Prepared by:

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Date:

9/29/10

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List of Acronyms

10th Street	10th Street Land Management
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CoC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CY	cubic yards
DHS	Department of Health Services (State of California)
DTSC	Department of Toxic Substances Control (State of California)
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
FSP	Field Sampling Plan
GAC	Granular Activated Carbon
gpm	gallons per minute
HASP	Health and Safety Plan
IA	Interagency Agreement
ICs	Institutional Controls
ICMP	Institutional Controls Monitoring Plan
LB&D Site	Lorentz Barrel and Drum Superfund Site
LB&D Property	Lorentz Barrel & Drum Property (consisting of the 10th Street Land Management & Newark Group properties)
LSGTF	Lorentz Shallow Groundwater Task Force
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MSL	mean sea level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/L	micrograms per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
Newark	The Newark Group, Inc.
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated biphenyls
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
PRG	Preliminary Remediation Goal
RAL	Risk Action Level
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision

RP	Responsible Parties
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board, San Francisco Bay Region
SCVWD	Santa Clara Valley Water District
SJSU	San Jose State University
SJWC	San Jose Water Company
SOP	Standard Operating Procedure
SVE	Soil Vapor Extraction
TAT	Technical Assistance Team
TCE	Trichloroethylene
USACE	U.S. Army Corps of Engineers
UV/Ox	Ultraviolet Oxidation
VOC	Volatile Organic Compound

Executive Summary

The U.S. Environmental Protection Agency (EPA) Region IX has conducted the third five-year review of the Lorentz Barrel and Drum (LB&D) Superfund Site (Site) in San Jose, California. The purpose of this five-year review is to determine whether the remedial actions implemented at the site are protective of human health and the environment. This five-year review is required because the final remediation goal for groundwater has not yet been attained. In addition, hazardous substances remain on-site above levels that allow for unlimited use/unrestricted exposure.

The former LB&D recycling facility accepted over two million drums from 1947 until July 1987. The facility received drums that contained aqueous wastes, organic solvents, acids, oxidizers, and oils. The drums were reconditioned through a variety of methods such as caustic and acid washing, incineration, blasting with steel shot, and steam cleaning. The waste residues and cleaning materials were dumped into sumps and basins on-site, which drained into the site soil and into the local storm sewer, which ultimately discharged to a nearby steam, Coyote Creek. The drums were then resealed and repainted with substances such as phenolic epoxy resins, rust inhibitors and lead based paints.

The following chemical contaminants have been detected in the soil: chlorinated solvents, pesticides, herbicides, polychlorinated biphenyls (PCBs), and heavy metals. In addition, chlorinated solvents have been found in the shallow groundwater originating at the site and extending approximately 2,000 feet to the north. There was a concern during initial site characterization that the contaminants could continue to migrate further from the site, impacting deeper drinking water aquifers, and Coyote Creek.

Response actions at the Site included a series of removal actions in which drums, heavily contaminated soil, buildings, tanks, and sumps were removed and taken off-site for disposal. Concurrent with the removal activities, EPA issued a Record of Decision (ROD) in 1988 for Operable Unit-2 (OU-2) to address the shallow zone groundwater plume. The OU-2 ROD selected a pump-and-treat remedy consisting of 18 groundwater extraction wells and a granular activated carbon (GAC) treatment system, which is operated by a group of potentially responsible parties (PRPs) known as the Lorentz Shallow Groundwater Task Force (LSGTF). In 1993, EPA issued an OU-1 ROD to address the soils and deep zone groundwater. The OU-1 remedial action, conducted by the EPA, removed the most contaminated soil remaining on site through excavation and disposal, capped the LB&D property, installed a soil vapor extraction (SVE) system, and put in place a monitoring program for the deeper drinking water aquifer to determine if any downward migration of contamination from the shallow aquifer was occurring. In addition, the remedial action included implementation of institutional controls to restrict use of the property.

The remedy for the Site is considered protective in the short-term since there are no current exposure pathways at the LB&D Property or the downgradient plume area. In addition, there is no evidence of impacts of the OU-2 plume on Coyote Creek or the deep aquifers. Pursuant to the draft Institutional Controls Monitoring Plan (ICMP), there are periodic inspections of the Lorentz-Property cap and reviews of cap maintenance activities. In addition, inspections by the State to insure compliance with land use covenants have been conducted annually since 2006. However, to be protective in the long-term, the impact of the residual VOCs in the A/B aquitard on contaminant levels in shallow groundwater and in soil gas needs to be assessed, the shallow groundwater system needs to achieve complete capture of the plume, and the institutional controls for the sidewalk area need to be implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Lorentz Barrel and Drum Site		
EPA ID: CAD029295706		
Region: 9	**State: CA**	**City/County: San Jose/Santa Clara**
SITE STATUS		
NPL status: √ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction √ Operating ☐ Complete		
Site Wide FYR √ YES ☐ NO	**Construction completion date:** _09__ / _29 / _1998_	
Has site been put into reuse? √ YES ☐ NO		
REVIEW STATUS		
Lead agency: √ EPA ☐ State ☐ Tribe ☐ Other Federal Agency ________________________		
Author name: Shiann-Jang Chern		
Author title: Remedial Project Manager	**Author affiliation: U.S. EPA**	
Review period: _09 / _03_ / _2005_ to _09 / _15 / _2010_		
Date(s) of site inspection: _02 /20/ _2010_		
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 #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion √ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from CERCLIS)*: 09 /28 /2005		
Due date *(five years after triggering action date)*: 09 / 28 / 2010		

Five-Year Review Summary Form, cont'd.

Issues:

1. The OU-1 ROD requires the imposition of deed restrictions on the sidewalk areas adjacent to the LB&D Property to prevent unsafe exposure to potentially contaminated soil beneath the sidewalks, but deed restrictions have not yet been put in place.

2. The soil vapor extraction (SVE) remedy is not able to meet the ROD cleanup goal of 1 mg/kg total VOCs in the clay aquitard between the vadose zone and the contaminated B Aquifer. The rate of ongoing diffusion of VOCs from the A/B aquitard into the aquifer and into the overlying soils is unknown. If significant, achieving the soil cleanup goals may require additional remedial actions to address contaminants in the aquitard soils.

3. Groundwater in the northwest end of the plume may not be fully captured by the current pump-and-treat system, and the downgradient extent of the plume in this area is not fully defined..

Recommendations:

1. Follow-up on recent efforts to record a restrictive covenant for the sidewalk areas by: 1) determining whether further investigation of soil contamination beneath the sidewalk is appropriate; 2) determining the appropriate scope for a restrictive covenant; 3) initiating discussions with the City of San Jose about a restrictive covenant and other IC mechanisms; 4) pending adoption of a restrictive covenant, pursuing alternative IC mechanisms such as construction permitting processes; and 5) if necessary, revising the ICs provisions of the OU-1 ROD.

2. Determine whether the residual soil contamination in the aquitard is adversely impacting the A Zone soil vapor concentrations and/or the shallow (B Zone) groundwater and, as necessary, develop and evaluate potential remedial alternatives

3. Continue to assess the shallow groundwater extraction well network to determine whether additional extraction wells and/or increased pumping rates are needed to achieve capture in the northwest area of the plume. Treatment capacity may need to be reevaluated if additional contaminated water is extracted. Install additional monitoring wells to fully define the extent of the plume in this area.

Protectiveness Statement:

The remedy is considered protective in the short-term since there are no current complete exposure pathways at the LB&D Property or the downgradient plume area. In addition, there is no evidence of impacts of the OU-2 plume on Coyote Creek or the deep aquifers. Pursuant to the draft Institutional Controls Monitoring Plan (ICMP), there are periodic inspections of the Lorentz-Property cap and reviews of cap maintenance activities. In addition, inspections by the State to insure compliance with land use covenants have been conducted annually since 2006. However, to be protective in the long-term, the impact of the residual VOCs in the A/B aquitard on contaminant levels in shallow groundwater and in soil gas needs to be assessed, capture of the groundwater plume in the northwest area needs to be achieved, and the institutional controls for the sidewalk area need to be implemented.

1. INTRODUCTION

The United States Environmental Protection Agency (EPA) is conducting this five-year review of the remedial actions implemented at the Lorentz Barrel & Drum Site (“Site” or “LB&D Site”) located in San Jose, California. The U.S. Army Corps of Engineers (USACE) provided analyses in support of the five-year review through an Interagency Agreement (IA) with EPA Region IX.

The five-year review process evaluates whether the remedies specified in the Operable Unit-2 (OU-2) Record of Decision (ROD) (EPA, 1988) and the OU-1 ROD (EPA, 1993) remain protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this five-year review report. In addition, five-year review reports identify issues found during the review and provide recommendations and proposed follow-up actions.

The EPA is preparing this five-year review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c) 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 often 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 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 EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (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 initiation of the selected remedial action.”*

This is the third statutory five-year review for the LB&D Site. The trigger date for this five-year review was the completion of the second five-year review report on September 28, 2005.

2. SITE CHRONOLOGY

Table 1: Chronology of Site Events	
Event	**Date**
EPA performed a Preliminary Assessment/Site Inspection	1984
EPA proposes Lorentz Site for National Priorities List (NPL)	1984
Lorentz facility was permanently closed	1987
EPA begins drum removal, drains tanks and begins soils removal	1987
EE/CA completed for OU-2 shallow groundwater	1988
EPA removes 26,000 drums and 3,000 cubic yards (CY) of contaminated soil	1988
OU-2 ROD signed	1988
Lorentz Site placed on the NPL	1989
Remedial Investigation (RI) Report completed by the owner	1990
Consent Decree for OU-2 signed by LSGTF	1990
Remedial Investigation/Feasibility Study (RI/FS) Report completed by the EPA	1990
Remedial design complete for OU-2	1991
Building structures, remaining debris, sumps, asbestos and drums are removed	1992
OU-2 Groundwater Treatment began	1992
Risk Assessment completed	1992
OU-1 ROD signed	1993
Remedial design complete for OU-1	1998
OU-2 ROD Explanation of Significant Differences (ESD) signed	1998
OU-1 ROD ESD signed	1998
OU-1 Remedial Action construction completed (cap and SVE system)	1998
SVE system startup	1998
First Five-Year Review completed	2000
10th Street purchases property at the Site; Covenant on Parcel No. 477-09-037	2002
Consent Decree (for cost recovery) signed by PRPs	2004
SVE system shut down	2004
Consent Decree and Covenant on Newark Parcel No. 477-09-034 and 477-09-036	2005
Second Five-Year Review completed	2005
Draft-Final Institutional Controls Monitoring Plan	2007
OU-1 Post-SVE source area soil investigation, Stage 1	2007
Aquifer Pumping Test, OU-2	2008
OU-1 Draft Post-SVE source area soil investigation, Stage 2	2008
LSGTF prepares Natural Attenuation report for OU-2	2008
EPA begins update of Conceptual Site Model for OU-1 and planning for Focused Feasibility Study	2009

3. BACKGROUND

3.1 Physical Characteristics

The original LB&D property covered 10.5 acres of land in San Jose, California. A 3.78-acre area at the southeastern portion of the original property was not significantly involved in drum recycling operations. Recycling operations took place on the remaining 6.72 acres (see Figure 1) which includes the 1.47 acres currently owned by The Newark Group (Newark) and the 5.25 acres currently owned by 10th Street Land Management (see Figure 2 – this area is referred to as the LB&D Property). The Site includes the Newark property, the 10th Street Land Management property, an adjacent city sidewalk and a groundwater plume extending approximately two thousand feet to the north (see Figure 3). The Site was listed on the National Priorities List (NPL) in 1989.

The LB&D Site is located at 1515 South Tenth Street, San Jose, California. The properties included in the site are zoned for commercial and industrial use. Land to the south and west is zoned for heavy industrial use. Land to the east and north is zoned for residential use although actual use is public land. The area north of the 10th Street and Newark properties includes sports fields and structures owned by San Jose State University (SJSU) and the land east of the LB&D property is public land belonging to the City of San Jose. Single-family residential housing is located 1,100 feet to the north of the Site. Approximately 3,000 people are estimated to live within a one-mile radius of the Site.

3.2 Geology

The subsurface sediments at the Site are composed of alternating layers of granular and fine-grained cohesive soil. There are four predominantly granular water-bearing or potential water-bearing subsurface zones below the Site. These zones have been designated with respect to increasing depth below ground surface (bgs) as Zone A, Zone B, Zone C, and Zone D (see Figure 4). Each of these zones is separated by fine-grained low permeability marine clay layers that function as aquitards. At the LB&D Site, the sand zones appear to be tabular and laterally continuous across the site (AMEC/Geomatrix, 2010).

Zone A: 5-15 ft. bgs **Material: sand, silty sand**
Lenses: silt, clayey silt, silty clay.

There is a 5- to 10-foot thick silt layer just below the ground surface that generally occurs across the site. The Zone A underlies this unit. Soil borings indicate that Zone A is normally dry, however, the zone occasionally has perched groundwater at the interface with the underlying clay zone. The clay/silty clay aquitard under Zone A is from 10-15 feet thick.

Zone B: 25 - 45 ft. bgs **Material: sand, silty sand, sandy gravel**
Lenses: silt, clayey silt, silty clay.

Zone B is a confined aquifer, and contains the uppermost water-bearing soils under the site. Zone B was identified in the 1993 OU-1 ROD as the shallow groundwater aquifer, and the zone containing the volatile organic compound (VOC) contaminant plume. An approximately 35-foot thick aquitard of very stiff clay/silty clay lies underneath Zone B, and it is found at approximately 35 to 70 feet bgs. Comparison of static head measurements in the B and C Zones (Figure 5) indicates a lack of hydraulic connection between the zones, which suggests that the aquitard is an effective barrier between the two zones. General groundwater flow direction is to the north toward a meander-cut bank in Coyote Creek.

Zone C: 70 - 90 ft. bgs **Material: sand, gravel, silty sand**
Lenses: silt, clayey silt, silty clay.

Monitoring wells located in this zone include MW-8C, MW-14, MW-18B, MW-31, MW-43 and MW-45. No contamination has been found in this zone to date. Zone C is underlain by an approximately 100 feetthick aquitard. General groundwater flow direction is to the northwest.

Zone D: 230 - 1,000 ft. bgs **Material: sand, gravel, silty sand**
Lenses: silt, clayey silt, silty clay

Zone D is the regional lower aquifer, which is used as a drinking water source. The producing zone is approximately 50 feet thick and contained the former MW-44. No contamination from the site has been found to date in this zone. General groundwater flow direction is to the north, and is influenced by pumping from the San Jose Water Company's 12th Street well field. Long-term groundwater monitoring of wells within Zones C and D indicate pumping from Zone D does not have a strong hydraulic effect on water levels within the Zone C (Figure 6). The lack of hydraulic influence suggests the aquitard between Zones C and D is an effective hydraulic barrier between the two zones.

3.3 Land and Resource Use

The Site is located at the edge of a large area zoned for industrial use. The existing businesses to the south and the east of the LB&D Property include a paper recycling facility, vehicle repair shops, metal plating and painting shops, and other similar types of industry. SJSU sports and recreation fields, a sports stadium, and an ice skating rink are to the northwest, north and east of the LB&D Property, respectively. The 10th Street Property is now used as a fenced parking area for a local automobile dealer. The resources potentially impacted by the Site contamination are the B Zone, C Zone, and D Zone aquifers and Coyote Creek, which meanders in a northwesterly direction approximately 0.5 miles east of the LB&D Property (Figure 1).

Shallow groundwater from Zone B near the site can discharge to Coyote Creek. Zone B aquifer monitoring wells at multiple locations, including the area between the plume and the creek, are sampled annually to verify that the contaminant plume is still contained.

Residents in the vicinity of the LB&D Site obtain water from a municipal water supply. A vertical conduit investigation performed during the OU-2 remedial design (and summarized in Remedial Design Report Number 5) included an exhaustive search for wells in the vicinity of the VOC plume. No evidence was found of any shallow water supply wells. Within the City of San Jose, including the LB&D Site, the San Jose Water Company (SJWC) is the water purveyor. The SJWC obtains water from several sources, including surface water and groundwater. Their groundwater supply network includes the 12th Street well field (Figure 1) which pumps from Zone D. Deep Zone C groundwater is currently monitored on a semi-annual basis by the EPA to verify that the shallow Zone B contamination has not migrated to the deeper (C and D) zones.

3.4 History of Contamination

Beginning in 1947, the drum recycling facility accepted over two million drums from more than 3,000 parties until it was closed in July 1987 by a court action brought by the California Department of Health Services (DHS). The facility received drums that contained aqueous wastes, organic solvents, acids, oxidizers, and oils. The drums were reconditioned through a variety of methods such as: caustic and acid washing, incineration, blasting with steel shot, and steam cleaning. The residues and cleaning materials were dumped into sumps and basins on-site, which drained into the site soils and into the local storm sewer. The drums were then resealed and repainted with substances such as phenolic epoxy resins, rust inhibitors and lead based paints. The drums were then either returned to the original owner or sold. In 1968, a San Jose industrial waste inspector discovered hazardous waste in Coyote Creek. The source of the waste was subsequently traced back to the LB&D Site. Site operations at the LB&D Property were temporarily shut down for three months in 1985 as a result of the Santa Clara County District Attorney obtaining a Temporary Restraining Order based on multiple violations of California Codes and Federal Regulations. In 1987, the LB&D facilities were permanently closed.

3.5 Initial Response

Multiple removal actions took place at the site before, as well as after, EPA issued the 1988 OU-2 ROD for the shallow groundwater and the 1993 OU-1 ROD for soils, the deep aquifer, and other actions not completely addressed by the OU-2 ROD. The initial removal actions included:

- Hazardous residues were removed from the sumps and basins on the Site in 1987 as a result of 1985 violations cited by the state and federal governments. In addition, drums with hazardous residues were removed from the Site in 1987 and 1988.

- A second removal action involved excavation of highly contaminated soils containing polychlorinated biphenyls (PCBs) greater than 50 milligrams per kilogram (mg/kg) and other contaminants, which were removed and disposed of off-site in 1988. Approximately 3,000 cubic yards (CY) of highly contaminated soil was removed from the northern part of the Site as well as 26,000 drums containing hazardous and other wastes.

The EPA also paved the site with a chip seal material to prevent rainwater and surface water runoff from infiltrating through the contaminated soil, and potentially leaching contaminants into the shallow groundwater. The surface seal also prevented direct contact with the contaminated soil. In 1992, the remaining drums, asbestos containing materials, general site debris, above ground structures, and sumps were removed from the Site.

3.6 Basis for Taking Action

The following chemical contaminants have been detected in the soil: volatile and semi-volatile organic compounds, pesticides, herbicides, PCBs, and heavy metals. Risks determined in the Remedial Investigation (RI) for potential future on-site workers, the most likely exposure scenario, were 1.8×10^{-4} (average) and 1.3×10^{-2} (upper-bound).

In addition, volatile and semi-volatile organic compounds have been found in the shallow groundwater. The potential exists for the compounds to migrate further from the LB&D Property, impact deep zone drinking water aquifers, and impact Coyote Creek. The shallow groundwater pump-and-treat system is removing and treating the following contaminants: tetrachloroethene (PCE), trichloroethene (TCE) and other solvents and degradation products including cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (l,l-DCE), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA);and 1,2-dichloropropane (1,2-DCPA).

4. REMEDIAL ACTIONS

EPA has issued two RODs and two Explanations of Significant Differences (ESDs) for the LB&D Site. The first ROD issued was the OU-2 ROD (in 1988), which addressed the contaminated shallow zone groundwater and selected pump and treat technology for the remedy. The second ROD, the OU-1 ROD (in 1993), addressed the Site soils and deep zone groundwater, and it is considered the “final ROD” for the LB&D Site.

4.1 Operable Unit 1 - Soil and Deep Aquifers

4.1.1 Remedy Selection

On August 26, 1993, EPA signed the ROD for OU-1. The stated objective in the ROD is to protect human health and the environment from all remaining releases or threats of releases of hazardous substances that were not addressed by previous or current cleanup actions at the LB&D Property. Contaminants in soil at the Site included VOCs, PCBs, polycyclic aromatic hydrocarbons (PAHs), pesticides, herbicides and hazardous inorganic materials. The selected remedy included placing an asphalt concrete cap and installation an SVE system at the 10th Street Property. In addition to its primary cleanup goal of preventing exposure to the soils contaminated with non-mobile compounds (e.g., PCBs, pesticides, herbicides, and metals), the asphalt containment cap was selected to prevent infiltration of precipitation and protect shallow groundwater from further degradation by mobile VOCs. Semi-annual monitoring of the C and D Zone groundwater was included in the OU-1 remedy to ensure that those deeper zones remain clean. Institutional controls were selected as part of the remedy to further limit the potential for direct exposure to soil and to ensure the integrity of the cap is maintained.

The OU-1 ROD sets forth the following remedial action objectives for the final remedy:

- Reducing the principal threat of soil contaminants potentially migrating into and contaminating groundwater;
- Reducing potential exposure to soil contaminants;
- Reducing potential exposure to contaminated structures, debris, and residues;
- Reducing potential migration of contaminated shallow groundwater to deeper aquifers and potential surface water infiltration; and
- Providing advance warning to drinking water suppliers and residents in the event that VOCs begin significant migration through conduits or confined air spaces of dwellings.

The soil cleanup standard for VOCs selected in the ROD is 1 mg/kg total VOCs in soils. The ROD also calls for implementation of institutional controls (ICs) at the 10th Street Land Management Property, Newark Group Property, as well as the adjacent sidewalk area. The ICs required by the OU-1 ROD are to prohibit residential use of the capped areas and to limit excavation in these three areas to prevent contact with contaminated soils. Monitoring of the deeper Zone C and D aquifers was included to ensure that the deeper Zone is not contaminated through vertical or horizontal conduits from the shallow aquifer addressed in the OU-2 ROD. The OU-1 ROD also requires monitoring vadose zone soil gas near residences located above the shallow groundwater contaminant plume, removal of structures and debris, and removal of incinerator ash residues and other hazardous materials accepted at the Site.

EPA issued an ESD for the OU-1 remedy in 1998. The ESD allowed off-site disposal of 900 CY of PCB-contaminated soils with concentrations below the ROD-specified 50 mg/kg threshold. This was necessary due to the presence of debris in the stockpile, poor compaction qualities, and problems with incorporating this volume of soil into the grading scheme under the cap.

4.1.2 Remedy Implementation

The following activities occurred as a result of enforcement actions, or activities specified in the OU-1 ROD:

- The removal and off-site disposal of the structures and remaining drums, and sealing of vertical and horizontal conduits was completed in 1994;

- EPA completed construction of the asphaltic concrete cap in September 1998;

- EPA completed construction of the SVE system in September 1998. The SVE system included seven vapor extraction wells, pumps, vapor-phase GAC units, and liquid-phase GAC units for treatment of condensation. The SVE system also included a perched water extraction system;

- An initial off-site soil gas survey was conducted by a LB&D contractor in 1987. The survey found that contaminated soil vapor had migrated downgradient of the LB&D Property with the shallow groundwater plume. EPA expanded the area to be further studied in the OU-1 ROD and a subsequent soil-gas assessment was conducted in areas downgradient of the LB&D Property above the shallow groundwater plume (Figure 7). The survey found that contamination had not migrated to the vadose zone from groundwater in the areas investigated. In addition, evaluation of the results from the most recent shallow groundwater sampling round (conducted late 2009 by the LSGTF) using the EPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (EPA, 2002), and *Screening for Environmental Concerns at Site with Contaminated Soil and Groundwater, Interim Final* (RWQCB, February 2005) indicated TCE and vinyl chloride concentrations in the groundwater in the vicinity of the student housing at the corner of 10^{th} and Humboldt Streets (since removed) would not be of concern (see Table 9); and

- Semi-annual groundwater monitoring of the deep aquifer on- and off-site began in 1990. Monitoring was done on a quarterly basis beginning in 1992, but the frequency was reduced to semi-annually in 1994. Groundwater monitoring from 20 monitoring wells has been performed semi-annually since the previous five-year review. Monitoring will continue until the level of on-site VOC contamination in the soil has been reduced to meet the remedial goals identified in the OU-1 ROD, and groundwater remedial action objectives (RAOs) are also achieved. No contamination from the site has been detected in the C Zone aquifer through April 2010.

In 2002, a Restrictive Covenant was recorded on the 10^{th} Street Property. In 2005, a Restrictive Covenant was recorded on the Newark property. Well permitting procedures are functioning as ICs to prevent well construction for municipal water supply purpose. A draft Institutional Controls Monitoring Plan (ICMP) has been developed by EPA but is not yet finalized. The implementation of the ICMP includes LB&D Property cap inspection, cap maintenance, and annual State inspections to ensure compliance with the land use covenants.

4.1.3 System Operations / Operation and Maintenance (O&M)

The SVE system started extracting contaminants from the soil in September 1998 and was operated over a period of six months before the system was shut down. The SVE system restarted in June 2001 and, after a period of troubleshooting, continued operating until June 2004. During the fall of 2001, the off-gas treatment system was modified to include a permanganate scrubber to destroy vinyl chloride present in concentrations greater than the vapor phase GAC units could handle in a cost-effective manner. In the winter of 2002, adjustments were made to manage the accumulation of condensate in the GAC vessels. The SVE system was turned off on June 6, 2004 due to low VOC removal from Zone A. The USACE performed a two-stage soil investigation in the source area in 2007 and 2008 to determine the effectiveness of the SVE in meeting the cleanup goal. For the last five years, the SVE system has remained off-line, but been maintained in a "standby" mode. The SVE system was briefly started for rebound tests in January 2005, September 2006 and October 2008. The results of the soil investigation and the rebound testing indicate that the SVE system has successfully removed VOCs from the vadose zone above the A/B Aquitard to levels below the cleanup goal but residual contamination remaining in the aquitard continues to slowly diffuse into the more porous soil above.

The containment cap and security fencing were completed in September 1998 and remain in good condition. 10th Street Land Management and The Newark Group perform maintenance of the cap and fences and also submit routine cap inspection reports to EPA on their respective parcels. 10th Street Land Management placed a seal coat on the cap in 2008 in accordance with the 10th Street Land Management Property site maintenance plan. In addition, repairs were made to curbing around vapor extraction well vaults as recommended in the previous Five Year Review. The Newark Group also repaired the surface concrete/asphalt cap in 2006, 2007, and 2009. The LB&D Property inspection reports were submitted to EPA routinely according to the CD requirements.

Groundwater monitoring was performed semi-annually at five C Zone wells during the past five years with no detections of VOCs. As discussed in the previous Five-Year Review, the single D Zone well was abandoned in 1998 due to concerns about its multiple-screen construction. EPA has determined that replacement of the D Zone well is not necessary. C Zone monitoring over the years has shown no C Zone impacts, and there is an aquitard approximately 100 feet thick between the C and D zones.

Current operational costs are shown in Table 2. The annual cost identified in the OU-1 ROD for O&M for Zone C & D monitoring and cap maintenance for the selected remedy (Alternative 2) was $63,000. Costs associated with the operation of the SVE system are assumed to average $47,000 per year over a two-year period. The OU-1 ROD estimated total annual O&M costs for the selected remedy at $110,000 per year.

Table 2: Annual OU-1 System Operations/O&M Costs

Dates		Total Cost rounded to nearest $100
From	**To**	
October 2005	September 2006	$50,900
October 2006	September 2007	$92,500
October 2007	September 2008	$18,900
October 2008	September 2009	$50,600
October 2009	March 2010	$13,200

The costs for October 2007 through September 2008 represent the typical costs for system stand-by maintenance and semi-annual C Zone groundwater monitoring. In the fiscal year beginning October 2005, rebound sampling was performed and a system evaluation was performed to identify critical system repair items. In the fiscal year beginning October 2006, some significant repairs were made, and a transition of O&M contractors occurred.

4.2 Operable Unit 2 - Shallow Groundwater

4.2.1 Remedy Selection

On September 25, 1988, EPA signed the ROD for OU-2. The remedial action objectives for the OU-2 remedy are to prevent further migration of the shallow groundwater plume; prevent the shallow groundwater plume from discharging into Coyote Creek; and prevent contamination of the deep groundwater aquifer located beneath the shallow-zone plume.

To accomplish these goals, the OU-2 ROD selected a remedy consisting of a groundwater extraction system, ultraviolet/oxidation (UV/Ox) treatment, and disposal of treated water to the storm sewer. The cleanup goals in the OU-2 ROD are to "substantially reduce or eliminate all groundwater contamination from the shallow groundwater." The numerical limits that define the Shallow Groundwater Cleanup Objectives are listed in the Table 8-2 of the OU-2 ROD. The shallow groundwater cleanup activities at the Site will continue until the contaminants of concern identified in the ROD are reduced to the remediation (cleanup) goals. During the last five years, EPA and the LSGTF have been using the MCL for each contaminant as the comparison value to evaluate "substantial reduction."

The OU-1 ROD, signed after the OU-2 ROD, contained provisions to address those groundwater issues (vapor intrusion and deep Zones C and D monitoring) that were not addressed in the OU-2 ROD.

The OU-2 ROD also contained provisions for remediating PCB and nickel in the groundwater if these compounds were found. The subsequent investigation did not find PCBs in either the shallow groundwater or the deep aquifer during the sampling events. Nickel was not found above the background level in either the shallow groundwater or the deep aquifer. Based on these results, it was determined that no further remedial action was required for either PCBs or nickel in either the shallow groundwater or the deep aquifer. Sampling efforts as recently as 2004 have verified the absence of PCBs and nickel in the groundwater. The remedial design for the groundwater treatment system without metals treatment was approved by EPA in July 1991.

4.2.2 Remedy Implementation

The construction of the shallow groundwater remedy began with the excavation of a shallow area near East Alma Street for the treatment facility foundation. The concrete foundation was completed and a pre-engineered steel building was constructed after installation of the treatment equipment. During this time, the groundwater wells were drilled and the pneumatic pumps, controllers, and piping to the treatment plant were installed. Construction of the treatment system was completed, and the system was inspected and accepted by EPA in March 1992. The system has been in continuous operation since that time.

The extraction system includes 18 four-inch cased groundwater extraction wells (see Figure 3). The groundwater is pumped to the LB&D Property through two-inch diameter pipes at a current average flow rate of 12,730 gallons per day (or approximately 8.8 gallons per minute) (Figure 8) and discharged into a 3,000 gallon tank. When the high level is reached in the tank, the treatment cycle is initiated at a flow rate of 12 to 16 gallon per minute (gpm) until the tank reaches the low water level cut off. The original design selected for the groundwater treatment was an UV/Ox unit. This selection was based on the expectation of high levels of efficiency and the fact that the VOCs would be destroyed on-site. During operation, a GAC unit was added to the treatment process due to a lack of efficiency of the UV/Ox system. A system analysis showed the GAC system alone was more effective and less costly to operate than the combined UV/Ox and GAC system. The 1998 OU-2 ESD eliminated the requirement to use the UV/Ox system and adopted GAC as the primary treatment process. Treated water is discharged to the storm sewer and eventually reaches Coyote Creek. The discharge is regulated by the San Francisco Bay Regional Water Quality Control Board through a National Pollutant Discharge Elimination System (NPDES) Permit. Spent GAC is regenerated off-site in accordance with State and Federal regulations.

4.2.3 System Operations / Operation and Maintenance (O&M)

In 1992, the system began operation with all 18 extraction wells. From spring 1997 to summer 2000, the LSGTF systematically shut down extraction wells in an effort to optimize operations. The shut-down extraction wells remain inactive. As of August 2000, the extraction system has been operating with three wells: EX-9, EX-13, and EX-19. These wells are located in the line of extraction wells that transect the plume approximately 1,100 feet downgradient of the LB&D Property. The operations contractor performs routine maintenance, system sampling, and corrective maintenance, generally during their weekly three- to five-hour site visits. In addition, they perform GAC change-outs as necessary and annual groundwater sampling.

Since the second Five-Year Review, questions have arisen as to whether the extraction system was achieving full capture of the VOC plume. The LSGTF performed aquifer testing in 2008 to evaluate the capture zone of the active wells. In November 2008, the LSGTF contractor installed larger pumps in groundwater extraction wells EX-9, EX-13 and EX-19, which increased the average groundwater extraction rate from approximately 1.7 gpm in 2007 to approximately 8.8 gpm in 2009 (Figure 8), and reduced scale formation in the system pipeline.

Current operational costs are shown in Table 3. The annual cost identified in the ROD for the shallow groundwater (Zone B) extraction and treatment system O&M was $198,000. These costs were based on use of a UV/Ox system. The UV/Ox system was replaced with a GAC system, which operates at a substantial cost savings. Costs associated with monitoring the Zone B aquifer were not included in the ROD.

Table 3: Annual OU-2 System Operations/O&M Costs

Dates		Total Cost (rounded to nearest $1,000)
From	**To**	
September 2005	December 2005	$83,000
January 2006	December 2006	$250,000
January 2007	December 2007	$250,000
January 2008	December 2008	$275,000
January 2009	December 2009	$325,000
January 2010	September 2010	$244,000

Costs in Table 3 reflect operations, maintenance, spare parts and labor for the extraction and treatment system, and monitoring costs for the Zone B aquifer. Costs have increased significantly due to the increase of groundwater extraction volume in November 2008. With the additional flow, the rate of vinyl chloride loading to the treatment system has increased. The GAC has a relatively low affinity for vinyl chloride, which has resulted in an increase in carbon change-out frequency from approximately one bed per calendar quarter to two beds per month.

5. PROGRESS SINCE THE LAST REVIEW

The previous Five-Year Review determined that:

> *"The remedy is considered protective in the short-term since there is no evidence of currently complete exposure pathways to contaminated soils and groundwater. However, in order for the remedy to remain protective in the long-term until performance standards specified in the ROD are met, institutional controls for the site must be fully implemented."*

Several issues and recommendations were made having to do with protectiveness, technical improvement, and site close-out. The recommendations and follow-up activities are discussed in detail in Section 5.1.

The follow-up activities revealed information to suggest that further evaluation of the remedies at both OU-1 and OU-2 is warranted. Therefore, EPA and the LSGTF have begun planning a focused feasibility study (FFS) to further address several issues identified in the second Five-Year Review and in the subsequent follow-up activities.

5.1 Recommendations and Follow-Up Activities

The recommendations made in the second Five-Year Review and the follow-up activities associated with each are listed below.

Recommendation on Potential Exposure of Construction/Utility Workers: "Current owners of land overlying the plume and/or potentially contaminated subsurface soils may need to ensure that construction activities include appropriate measures to ensure worker safety."

> **Follow-up:** As discussed in Section 7.1.1.3.2 of this document, efforts to establish a restrictive covenant in relation to potentially contaminated subsurface soil in the sidewalk areas adjacent to the LB&D Property have not been successful to date. Given the difficulties encountered, EPA intends to move forward with its efforts to use local governmental permitting controls as an IC while determining the feasibility of establishing a restrictive covenant. With regard to property outside of the LB&D Property that overlies the groundwater plume, EPA in the last five years on multiple occasions has received notice of construction activities that potentially could be impacted by the groundwater plume, and provided information to ensure protection of workers. Notwithstanding these successes, EPA intends to evaluate the feasibility of working with local governmental permitting agencies to put in place procedures to insure that planned construction projects take into account the presence and potential impacts of the OU-2 plume. EPA's draft "Institutional Controls Monitoring Plan" ("ICMP") issued in 2008 also identified the potential need for an IC that provides periodic notification to property owners of potential construction worker exposure to VOC vapors during excavation work in the area overlying the OU-2 plume.

Recommendation for Evaluation of Vapor Intrusion Pathway: "The vapor intrusion pathway [in the area of the SJSU sports fields] should be more fully evaluated for new construction. If the pathway presents a risk, an additional remedy may need to be designed. Such a remedy may include the selection of new institutional controls."

> **Follow-up:** The ICMP identified potential vapor intrusion on the SJSU sports field property as potentially requiring an additional IC. As discussed in Section 7.1.1.3.2 of this document, there currently are no structures on the SJSU property and no current plans to develop the property. As

part of an upcoming FFS related to the groundwater remedy, however, an investigation of the soil contamination will be undertaken. If the results of that investigation indicate a vapor intrusion risk would exist in the event of the property's development, EPA will work with SJSU and the City of San Jose to put in place appropriate IC's.

Recommendation to Implement Institutional Controls: "Institutional controls for the adjacent city sidewalk area need to be fully implemented. In addition to the recording of a restrictive covenant, layering of alternate institutional controls for the sidewalk areas may be desired and would enhance protectiveness. Further coordination with the San Jose City Department of Transportation, as described in 7.1.1.3, would allow existing governmental controls on sidewalk maintenance and utility work to be used as institutional controls. Signage should also be placed on 10th Street property fences to indicate that contaminated soils may be present under the adjacent city sidewalk. As the vapor intrusion pathway is more fully evaluated, ICs related to vapor intrusion issues may be suggested. An IC monitoring plan should be developed. This monitoring plan should identify the type and frequency of monitoring necessary to ensure the continued effectiveness of the implemented institutional controls."

Follow-up: As discussed above and in Section 7.1.1.3.2 of this document, efforts to establish a restrictive covenant in relation to potentially contaminated subsurface soil in the sidewalk areas adjacent to the LB&D Property have not been successful to date. Given the difficulties encountered, EPA intends to move forward with its efforts to use local governmental permitting controls as an IC while determining the feasibility of establishing a restrictive covenant. Although the posting of signs may be useful, signage is not considered an IC.

Regarding vapor intrusion, an investigation of vapor intrusion potential will be undertaken as part of the upcoming FFS. If the results of these investigations indicate a vapor intrusion risk exists at present or could in the future, EPA will revise the remedy to incorporate the necessary response actions, which could include additional IC's.

EPA issued a draft Institutional Controls Monitoring Plan in 2008. The primary focus of the ICMP is the 10th Street Land Management property, the Newark Group property, and the sidewalk area. Properties over the VOC plume downgradient of the LB&D Property are discussed briefly in a section titled "Pending and Future IC Requirements", which only discusses potential future activities to establish ICs.

Recommendation for technical improvement on (OU-1) soils: "VOCs continue to migrate off the 10th Street property and the extent of contamination is not well-defined. The SVE system was shut down in December 2004 due to significant downward trends in the recovery rates and is not currently operating. Due to limited analytical data, it is uncertain if clean up criteria have been met. A systems operations optimization should be conducted. Based on findings of the optimization study, soil sampling may be needed to determine if cleanup goals have been reached."

Follow-up: A two-stage soil investigation was performed in 2007 and 2008, and reported in draft reports dated May 2008 and October 2008. It was found that total VOCs in soil were below the 1 mg/kg remedial action goal in soils above the A/B aquitard (0-12 ft bgs). Concentrations above the clean-up goal persist in the A/B aquitard (12-25 ft bgs), and the contamination in the aquitard will not be effectively removed by SVE.

Recommendation for technical improvement on (OU-2) Groundwater Extraction System Optimization: "A qualitative capture zone analysis identified a potentially incomplete capture area between extraction wells EX –13 and EX-19. To ensure there is complete capture between extraction wells EX-13 and EX-19, the groundwater extraction system should be evaluated. It may be necessary to bring additional extraction well(s) on line to improve the extraction efficiency."

> **Follow-up:** Aquifer pumping tests were performed in Extraction Wells EX-19 and EX-15 in April 2008 and summarized in a Technical Memorandum (TM) dated July 2008. The TM provided estimates of the capture zones of these two extraction wells. The TM did not provide recommendations. The LSGTF installed larger pumps in extraction wells EX-9, EX-13, and EX-19 to increase flow and capture. The trending of VOC concentrations due to increase of pumping in late 2008 may not be discernable until after several monitoring events.

Recommendation for technical improvement on (OU-2) Groundwater Natural Attenuation Study: "The current groundwater remediation may not be as efficient and cost-effective as possible. The LSGTF may be able to accelerate source removal and/or possibly reduce cleanup time by initiating pumping from wells located adjacent to the LB&D Property along Alma Avenue. The LSGTF also needs to conduct a MNA study to determine if downgradient low concentration plume is attenuating and therefore unlikely to impact Coyote Creek."

> **Follow-up:** The LSGTF prepared a Technical Memorandum for Groundwater MNA Evaluation in December 2008. The evaluation concluded that reductive dechlorination has occurred in the past but is not currently occurring at a significant rate. Natural attenuation is therefore not effectively reducing the mass of VOCs in the plume, but it may still exert some control over movement of the dilute leading edge of the plume. Methods are available to stimulate re-start of biological degradation of the residual VOCs.
>
> Further evaluation of MNA will be included in the LB&D FFS to fully evaluate its potential for controlling low-concentration areas of the plume.

Recommendation for technical improvement on sampling technique: "The monitoring program offers some potential for cost reduction and improvement in data quality. The current practice of using the purge and bail approach for sampling groundwater should be replaced with low-flow sampling. This would potentially reduce the field time needed for sampling, reduce turbidity (and the resulting interference with metals analysis), and would reduce the potential for loss of volatile organics. Low flow sampling should be applied to OU-2 groundwater sampling to ensure sample quality is consistent with the current state of the science."

> **Follow-up:** Low flow sampling techniques were implemented in the Fall 2005 sampling event and have been in use for all subsequent sampling events.

Recommendation to achieve site closeout on (OU-1) soils: "The remediation goal specified in the OU-1 ROD needs to be clarified. The goal is given as 1 ppm total VOCs in soil. Regulatory agencies should review existing decision documents and determine how to implement the remediation goals. Procedures to measure progress toward the goal also need to be identified and instituted. The SVE system is not currently operating, and due to limited analytical data, it is uncertain if clean up criteria have been met. Methodology to determine if SVE has met soils cleanup criteria needs to be developed and appropriate samples to verify the achievement of clean up goal should be collected."

> **Follow-up:** EPA determined through the 2007 and 2008 investigation that the 1 mg/kg total VOC criterion has been met in all soil horizons that are influenced by the SVE system. However,

concentrations above the cleanup goal persist in the A/B aquitard. The FFS will evaluate the diffusion rates into soil gas and shallow groundwater of the remaining VOCs in the A/B aquitard. If the remaining VOCs in the aquitard prevent the current soil and/or groundwater remedies from meeting the clean-up goals, the FFS will evaluate alternatives for remediation of the A/B aquitard. The OU-1 ROD will be amended as necessary to select an additional soil remedy.

Recommendation to achieve site closeout on (OU-2) groundwater: "Cleanup goals for OU-2 shallow groundwater have not been clearly defined for the LSGTF to accelerate cleanup. Regulatory agencies should review existing decision documents and clarify quantitative remediation goals as appropriate."

Follow-up: Site-specific hydrogeology was reviewed, as were cleanup goals established at several similar NPL sites in the Silicon Valley region. EPA determined that MCLs for each contaminant (or State Notification Levels where MCLs do not exist) are reasonable and appropriate cleanup goals for shallow groundwater. This will be formalized following the FFS that is currently being planned.

Recommendation to achieve site closeout: "In order to fulfill the OU-1 ROD requirement, an assessment of the necessity of MW-44 replacement is required. If EPA determines that a replacement well of MW-44 is no longer necessary, an OU-1 ROD amendment or ESD may be necessary."

Follow-up: An evaluation of the C and D Zone monitoring results during the existence of MW-44 was performed. With the exception of detections in the first year of sampling (1991) in a C Zone well in the source area, no detections of COCs have occurred in the C or D Zones. Limited detections of VOCs attributable to laboratory contamination have occasionally been noted. Static head trends in the C and D Zones (Figure 6) suggest there is little hydraulic communication between the two aquifers. In addition, the C Zone wells are located where they will most likely identify impacts to the C Zone that would have potential to migrate toward existing D-Zone water supply wells. EPA determined that D-Zone sampling would not be necessary unless impacts to the C Zone first occurred. Formal documentation of the decision is pending completion of the FFS.

6. FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

The Five-Year Review team included Shiann-Jang Chern, the RPM for U.S. EPA, and Jim Powers, Maryellen Mackenzie, Cory Koger, and Doug Mackenzie from the U.S. Army Corps of Engineers. EPA and USACE established the review schedule which included the following components:

- Community Notification;
- Document Review;
- Discussions with operation and maintenance contractors;
- Site Inspection; and
- Five-Year Review Report Development and Review

6.2 Community Notification

Five-Year Review announcements were placed in San Jose Mercury News on April 1, 2010 and El Observator (Spanish) newspaper on April 2, 2010, notifying the community of the initiation of this five-year review. A copy of this completed report and an updated fact sheet will be available through the EPA Region IX Superfund Records Center located in San Francisco or from the Site information repository at the Martin Luther King, Jr. Library in San Jose. Notice of the completion of this report will also be announced in the two local newspapers. An electronic version of LB&D Site Five-Year Review report and Five-Year Review update will be posted on the EPA Lorentz Barrel & Drum Superfund Site website.

6.3 Document Review

This Five-Year Review included a review of relevant documents including monitoring reports, operation and maintenance reports, and documentation of additional investigative activities. The complete list of documents reviewed is included in Appendix A.

6.4 Data Review

6.4.1 Soil and Soil Gas

When the SVE system on the LB&D Property was shut down in June 2004, the system influent and each of the seven extraction wells were sampled. At that time, the VOC removal rate was 0.072 pounds per day (lb/day). In 2005 and 2006, the system was turned on briefly to perform additional rounds of vapor sampling. In 2008, the system was operated for one month, with samples collected at the beginning and end of operation. This event also included sampling of the six soil vapor monitoring wells installed in 2007. Results of these rebound tests are provided in Table 6. There is significant variability in the results, but there appears to be a general increase in soil vapor concentrations with time. Off-gassing from the residual contamination in the aquitard will result in soil vapor rebound as long as that contamination remains. Currently, the LB&D Property capped area is secured by the fence and used by a car dealership as a parking lot for new cars. There is no exposure under current conditions. The issue of soil vapor concentrations under the LB&D Property needs to be reassessed if the LB&D Property will be used for future commercial redevelopment.

A two-stage soil investigation was performed in 2007 and 2008 which had general objectives to evaluate the performance of the SVE system and to characterize the residual VOC contamination. It was determined from the pre-remedy soil data that, due to the high degree of localization, evaluation of progress toward the cleanup goal must be measured by returning to specific locations where elevated concentrations had previously been identified. At each boring, two or more soil samples were collected at depths similar to where contamination was historically found or was suspected, and a groundwater sample was collected at the depth where it was first encountered.

The results of the investigation are provided in tables and figures in Attachment C. The important findings included:

- The geologic stratigraphy was consistent across the area investigated. Of particular note was the consistent presence of the clay A/B aquitard typically encountered at approximately 12 feet below ground surface (bgs). Above the clay, a silty layer contained perched water varying in thickness from zero to three feet. Groundwater was first encountered below the aquitard at depths from 20-25 feet. The groundwater rose to depths of approximately 15 feet bgs in the borings. Photographs of the soil cores are provided in Attachment G to illustrate the various materials;
- Total VOC concentrations in soil have decreased to levels below the cleanup goal above the A/B aquitard across the site. At many of the historical borings, a large percentage of the total VOC mass consisted of non-chlorinated species such as ketones and BTEX. The non-chlorinated VOCs have nearly disappeared from the soils, likely due to biodegradation;
- Chlorinated VOCs persist at levels greater than 1 mg/kg at some locations in the A/B aquitard clays. There is evidence, particularly in the vicinity of RI boring SB-22, that the remedy has had little effect on chlorinated VOCs in the aquitard. Non-chlorinated species have nearly disappeared in the aquitard, however;
- The majority of the samples with total VOCs greater than 1 mg/kg (in clayey soil and the A/B aquitard) were collected from the areas of the 1987 excavations, suggesting that these areas contain the greatest mass of residual contamination;
- Two sample locations in the former excavation area in the northeast corner of the site showed anomalous results. The highest concentrations were found at shallow depth within backfill and diminished with depth. In addition, the suite of detected analytes is completely different from the suite found in the other borings and in the groundwater. This may be a small release that occurred after the 1987 excavation but before the cap was constructed. The data from these borings may be of value in evaluating contaminant fate and transport; and
- Groundwater sample results from the post-SVE investigation were generally higher in the northernmost borings area, and were reasonably comparable to the latest results in monitoring well P-6. The data collected in the post-SVE investigation suggest that the SVE system has accomplished the remedial action goal within the soil horizon in which it can be effective. The ongoing impact to the groundwater from the residual contamination in the aquitard is unknown.

6.4.2 Groundwater

The groundwater extraction system has been pumping from the same three extraction wells over the past five years – EW-9, EW-13, and EW-19. In November 2008, the LSGTF increased the extraction rates considerably by replacing the pumps with larger pumps. Figure 8 illustrates the flow rate trend. Current flows average approximately 12,000 gallons per day, which is about four times the flow rate prior to pump replacement. The increase in flow has resulted in a significant increase in the GAC change-out frequency. Prior to the flow increase, the lead bed of GAC was changed out approximately once per quarter. The current change-out frequency has both lead and polish beds being changed out monthly.

The B Zone groundwater monitoring data from the 2008 groundwater monitoring report (Pegasus 2008) were used in this five-year review to evaluate groundwater conditions in the last five years. Attachment

D provides a detailed analysis of the distribution of VOC contamination and includes figures with static head contours and contaminant concentration contours. Observations of significance include:

- Two wells greater than 400 feet downgradient of the extraction wells had VOC concentrations above their MCLs. MW-22 (monitoring well in northwest area) had 1,1-DCA at 5.2 micrograms per liter (µg/L) (Cal MCL: 5 µg/L) and vinyl chloride at 7.1 µg/L (MCL: 2 µg/L). MW-38 (monitoring well also in northwest area) had 1,1-DCE at 40 µg/L (MCL: 7 µg/L). The pumping rate of extraction well EX-19 in the northwest area has been increased by 300% since late 2008. There are no wells downgradient of the existing monitoring wells to bound the groundwater plume in this area;
- Elevated (i.e., greater than MCL) TCE and PCE levels are limited to areas upgradient of the operating extraction wells;
- The plume appears to have expanded more strongly in a northwest direction, roughly parallel to 10^{th} Street, rather than directly north toward the closest point at Coyote Creek.
- The highest VOC concentrations remain at wells P-6 on-site and P-18 immediately downgradient of the site; and
- Wells MW-37 and P-24 are not currently on the annual sampling program, but including them in the program would provide data to better delineate the plume along its preferred path. Due to their proximity to extraction well EX-19, the data from these wells would also provide useful information about the effects of the increased extraction rate starting in November 2008.

While the extent of contamination may not be defined in the vicinity of MW-22 and MW-38 in the northwest portion of the plume, concentrations at levels that would affect human health are not likely present at any location where an exposure pathway would be complete. There are no water supply wells extracting contaminated water in that area, and the only other potential exposure pathway is vapor intrusion into occupied structures. For VOCs to migrate from the Contaminated B Zone groundwater into structures, it must first pass through the clay A/B aquitard and the A Zone soil. The aquitard inhibits contaminant migration via soil vapor as readily as it inhibits migration via groundwater. In addition, sampling data from the 1996 soil vapor investigation show that the groundwater contaminants were not detected in soil vapor in areas where groundwater contamination ranged up to 155 µg/L total VOCs (well P-26, upgradient of residential area on Humboldt Street).

Monitoring well MW-38 is located in the residential block between Humboldt and Keyes Streets. The 1996 soil vapor investigation included one sample location (SG-4) in the same vicinity which showed no detections of VOCs. Quarterly groundwater sampling of MW-38 in 1996 had total VOC concentrations ranging from 26 to 81 µg/L. The 2009 sample result is 65 µg/L, within the same range. MW-22 is one block to the east and its total VOC concentration was 15.2 µg/L in the latest sample. Based on comparison of current groundwater concentrations at MW-22 and MW-38 to 1996 groundwater concentrations at P-26, VOC concentrations at the northwest extent of the well network have not yet reached a level that would result in significant soil vapor concentrations.

A comprehensive data review was performed in 2009 for the purpose of updating the conceptual model for VOC fate and transport. A technical memorandum to document the findings (AMEC/Geomatrix 2009) is currently in draft. The draft report notes that historically the VOCs probably transported through the A/B aquitard to the B Zone through secondary porosity, such as root holes, which were noted on some boring logs. In the evaluation, it was stated that release of VOCs from the aquitard currently is likely dominated by molecular diffusion. However, the possibility of advective movement of the perched water through the secondary porosity was also identified as a potential transport mechanism.

With respect to plume migration toward Coyote Creek, the document noted that stream bed deposits are often rich in organic material and nutrients that provide a good environment for natural attenuation of contaminants, and recommended further exploration of that as a means to ensure that VOC contamination will not impact Coyote Creek.

6.4.3 Groundwater Trends

Statistical analysis of VOC concentration versus time trends was performed for this review. A detailed discussion of that analysis and the outputs from the computer program are provided in Attachment E. Currently, the LB&D Site has 20 monitoring wells. Nine wells were selected to represent the center line of the plume and the downgradient end of the plume. Four chemicals were selected to represent the VOC spectrum of contaminants: 1,1-DCA, 1,1-DCE, TCE, and vinyl chloride. The analysis was performed for the 1999-to-present time frame. During that time period, groundwater extraction was from the three wells currently pumping. By limiting the data set to the time frame of the three-well pumping scenario, the resulting trend provides the best indicator of future conditions under that scenario. Table 11 provides a summary of the results.

Qualitative review of the trends shows some decrease of VOC mass near the source area (wells P-6 and P-18), but the decrease is slow relative to the current concentrations. Increasing trends of TCE in wells further from the source area (P-12, P-22) and a dramatically decreasing trend for vinyl chloride at the source (P-6) support the conclusion in the 2008 Monitored Natural Attenuation Study (Pegasus 2008) that in-situ reductive dechlorination has likely stalled. As noted above, wells MW-22 and MW-38 show concentrations of vinyl chloride and 1,1-DCE, respectively, above their MCLs, and have no well downgradient from them to bound the plume. In addition, the trends for those wells are suspected upward for MW-22 and confirmed upward for MW-38. The well closest to Coyote Creek (MW-24) has concentrations of 1,1-DCA below the California MCL of 5 µg/L and ranging from 2.4 to 3.9 µg/L with no trend. The most recent measured concentration of 1,1-DCA in MW-24 is 2.5 µg/L.

In order to verify whether plume capture is being achieved, the LSGTF proposed field work and studies in a draft Focused Feasibility Study (FFS) annotated outline submitted to EPA in 2009. The FFS would, among other things, address whether additional wells downgradient of MW-22 and MW-38 are necessary. EPA expects that the LSGTF FFS work plan will be submitted in fall of 2010. The results from MW-24 indicate that the RAO of preventing impacts to Coyote Creek has likely been met, but sampling at the stream bed and evaluation as suggested by AMEC/Geomatrix (2009) would more conclusively demonstrate that the low levels found in MW-24 do not reach the creek. Additional work to address this issue will be undertaken as part of the FFS.

The increased pumping rates for the extraction system have been in effect for less than two years, so the long-term effects of that change on plume concentrations may not be seen for several years.

6.4.4 Recommended Changes to Monitoring Programs

The annual frequency for monitoring of the B Zone groundwater is sufficient to detect changes in trends. No changes are recommended to the sampling frequency. The OU-1 ROD specifies a semi-annual frequency for sampling the deeper groundwater aquifers. There are several years of semi-annual data for Zone C showing non-detect results. An annual frequency to match that of the shallow aquifer is adequate and recommended.

6.5 Site Inspection

On February 22, 2010, the EPA, USACE, and the LSGTF operations contractor participated in a site inspection. The site inspection consisted of an inspection of the asphaltic concrete cap, the retaining walls, fencing, SVE system, and the groundwater treatment system. Several primary monitoring wells were located, as well as the extraction wells north of the property. Photographs of OU-1 and OU-2 features are provided in Attachment G.

6.5.1 OU-1 Summary

The asphaltic containment cap on the Tenth Street property was in good condition with signs of only hairline cracking and no signs of settlement visible in any of the cap components, i.e., the asphaltic concrete cap, concrete curbs and gutters, and the retaining walls. In 2008, 10th Street Land Management applied a seal coat at the asphalt cap and repaired concrete curbs around soil vapor extraction wells. The "capping" of the Newark Property consists of pre-existing concrete and asphalt paving. In 2007, Newark submitted a major concrete/asphalt repair work plan. The concrete/asphalt repair work was completed in fall of 2007. In 2008 and 2009, minor repairs were also performed on the Newark Property. The most current repair work was the completed in early April 2010.

The SVE system was not in operation at the time of the site inspection. A draft report has been prepared by the system maintenance contractor (ERM 2010) documenting the condition of the system and recommending activities for restoring the system to full operational status or for de-commissioning the system. The condition of the SVE system was verified to be as documented in the report (Attachment G). Many of the gauges, instruments, and piping have been impacted by the continuous exposure to the sun. Many of the clear plastic lenses have become discolored due to sun exposure and are no longer readable. The above-ground plastic piping systems may be damaged to the extent of needing replacement if the system is to be operated for a long term. Rust was observed on some system components, but not to the extent of compromising the integrity of the component.

Monitoring well and SVE well completions on-site appear in good condition. Extraction well vaults are currently not locked, though the traffic-rated lids are heavy and require tools to open. While no tampering of the wellheads has occurred to date, there appears to be nothing to prevent its occurrence. Off-site C Zone monitoring wells are in need of some well head maintenance to include bolts and gaskets for the security lids and some replacements of compression seal caps and rusted locks.

6.5.2 OU-2 Summary

The site inspection of the groundwater pump and treat system found that it was operating in accordance with the current NPDES permit requirements. The inspection involved discussions with the site operators, a tour of the treatment facilities, and a question-and-answer session concerning operations. The two site operations personnel both had several years of experience at the site, and were able to discuss on-site activities for the full five-year period. Three of the 18 wells used to contain the plume were in operation. The average flow rate to the plant is approximately 9 gpm. The current NPDES permit had a maximum allowable discharge rate to the storm drain/Coyote Creek of 14 gpm. With the exception of one exceedance of the effluent standard for vinyl chloride, the plant operated free of discharge violations during the past five years. In February 2009, an effluent sample contained 0.53 µg/L of vinyl chloride, slightly exceeding the standard of 0.5 µg/L. The site operation contractors responded in accordance with permit requirements, and ultimately found that the violation was due to a problem with the batch of GAC that had been installed six days prior to the sample collection date. Both vessels of GAC were subsequently changed out, and the issue was resolved within the month. The treatment facility building and treatment system components were functioning properly. The health and safety plan, chemical quality assurance plan, operation and maintenance manual, and field sampling plan were present at the site.

6.6 Interviews

Representatives from the site contractors for the LSGTF were interviewed to address various aspects of site operations. The USACE developed a series of questions that were deemed to be pertinent to operations at the site, and a telephone conference call was held to obtain input from the project manager from the LSGTF. A follow-up call was made to the site operations manager. The results of the calls are included in the Attachment F.

In general, the site contractors indicated that the OU-2 remediation system is running smoothly and has been optimized to its full extent. The increase in flow in 2008 has brought about a significant increase in carbon change-out frequency. The LSGTF Project Manager stressed the importance of continued collaborative efforts with EPA to evaluate the remedies for both OUs and work toward an exit strategy.

7. TECHNICAL ASSESSMENT

The 1988 OU-2 ROD was issued before completion of the baseline risk assessment in the 1990 RI/FS and the 1992 RI Addendum 3 which addressed vapor intrusion. The 1993 OU-1 ROD is considered as the "final remedy" for the LB&D Site to address those groundwater issues (vapor intrusion and deeper groundwater Zones C and D monitoring) that were not addressed in the OU-2 ROD for a shallow groundwater extraction and treatment system.

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

7.1.1 Operable Unit 1

7.1.1.1 Remedial Action Performance and Operations

The existing cap system is functioning as expected. The cap was designed to seal the surface and have adequate strength to function as a parking facility. In 2002, a portion of the original LB&D property was sold to 10th Street Land Management, which leases the space to auto dealerships to stage cars in transit to the sales lot. The property owners are performing cap maintenance as required in the restrictive covenants.

The soil vapor extraction system has not been operated for the past five years, except for three rebound tests performed at the Site. The results of soil sampling in 2007 and 2008 showed achievement of the cleanup goal in all samples collected from soil horizons above the A/B aquitard and the thin perched water layer directly above the A/B aquitard. The sample results also showed levels of VOCs above the cleanup goal in the A/B Aquitard. EPA has concluded that SVE will not achieve the cleanup goal in the A/B aquitard (USACE, 2008).

The deep aquifer (Zone C) monitoring has verified that contamination has not reached the deeper aquifers. The deep aquifer monitoring during the last five years has not detected contamination in the aquifer.

7.1.1.2 Opportunities for Optimization

The Zone B aquifer monitoring has been performed annually for 10 years and has not shown trends that would necessitate more frequent sampling. The Zone C aquifer monitoring results continue to be non-detect. An annual frequency for Zone C should be considered.

7.1.1.3 Implementation of Institutional Controls

The OU-1 ROD selected a remedy that included institutional controls that would 1) prohibit well construction for drinking water supply purposes in areas that remain contaminated, and 2) use deed restrictions on the LB&D Property and adjacent sidewalk area that contain contaminated soil exceeding the cap action levels to prohibit residential development and limit industrial development to activities that do not breach integrity of the cap or do not mobilize soil contaminants. Restrictions would also preclude excavation other than temporary subsurface work beneath the cap and require complete restoration of any disturbed cap or fill once any temporary work is completed.

LB&D Property Institutional Controls

The LB&D Property is composed of three property parcels. In 2002, 10th Street Land Management purchased one of the parcels (477-09-037) and entered into a Prospective Purchaser Agreement ("PPA") with EPA. The PPA includes institutional control mechanisms such as requiring 10th Street Land Management to provide a copy of the PPA to lessees and sublessees, and to ensure that any document transferring an interest in the property be consistent with the requirements of the PPA. In addition, the PPA required 10th Street Land Management to record a restrictive covenant in relation to the property. As noted in the Second Five-Year Review, a title search confirmed that the restrictive covenant appears in the chain of title and is not impaired by any previously recorded encumbrances.

The Newark Group, Inc. owns the two other property parcels (477-09-034 and 477-09-036) that comprise the LB&D Property, and was a *de minimis* generator at the Site. In 2005, the Newark Group, Inc. entered into a Consent Decree with EPA which required it to record a restrictive covenant in relation to the property. As with the 10th Street Land Management Property, the title search of the Newark Group Property parcels, conducted as part of the Second Five-Year Review, confirmed that the restrictive covenant appears in the chain of title and is not impaired by any previously recorded encumbrances.

The existence of the 10th Street Land Management and Newark Group covenants also is documented on the DTSC website which identifies hazardous waste sites with restrictive covenants. The URL for the web site listing deed-restricted properties is:
http://www.envirostor.dtsc.ca.gov/public/deed_restrictions.asp.

Property Outside the LB&D Property

Following the Second Five-Year Review, DTSC undertook efforts to develop and implement a restrictive covenant in relation to the sidewalk adjacent to the 10th Street Land Management Property. Its efforts were unsuccessful, and DTSC asked EPA to assume responsibility for the development of a restrictive covenant. The primary impediment to DTSC's efforts has been uncertainty about, and disagreement over, who owns the sidewalk property - 10th Street Land Management or the City of San Jose. In addition, more recently, questions have arisen as to how far the soil contamination extends towards the street from the fence line of the LB&D Property. EPA and the USACE are working to answer the technical question of the extent of the soil contamination. Once the extent of contamination is confirmed, hence the appropriate scope of a restrictive covenant, EPA will initiate efforts to put in place a restrictive covenant for the contaminated property.

Pending development and implementation of a restrictive covenant for the sidewalk/street areas, EPA will work to put in place a formal mechanism by which a variety of existing local governmental construction permitting requirements (e.g., for sidewalk maintenance and utility work) can serve as institutional controls. The viability of using such permitting requirements as institutional controls in relation to the Site was demonstrated recently in the context of construction activities in the vicinity of the groundwater plume (see the discussion below).

Institutional Controls Monitoring Plan

In follow-up to the Second Five-Year Review's recommendation for development of an institutional controls monitoring plan, EPA issued a draft "Institutional Controls Monitoring Plan" ("ICMP") for the LB&D Site in 2008. The ICMP's primary focus is on the 10th Street Land Management Property, the Newark Group Property, and the 10th Street sidewalk, although the section titled "Pending and Future IC Requirements," briefly discusses a potential future need to develop an IC mechanism to notify all owners of property overlying the groundwater plume of the potential exposure to VOC vapors by construction/utility workers.

7.1.1.4 Indicators of Potential Issues

During this review, potential issues were identified that should be evaluated for inclusion in the FFS. These items include:

- Rebound testing shows gradually increasing concentrations of VOCs under the cap, which may disperse to offsite areas. Passive venting should be considered to address continued off-gassing and rebound from the shallow aquitard. Alternatively, a soil gas survey could be performed to determine what, if any, vapor intrusion risk might exist for adjacent properties in the absence of soil vapor extraction or passive venting.

- Although there is no formal IC of this nature in place, there have been instances in the past five years when EPA was contacted about a construction project in the vicinity of the groundwater plume and in response provided information and recommendations regarding potential contamination-related hazards. These events suggest that the ICMP (and the ICs themselves) should be revised to include procedures to ensure that all construction projects in the vicinity of the groundwater plume (including the potential development of the SJSU sports field) take into account the potential for impacts related to the VOC plume (e.g., exposure to vapors off-gassing from the plume or dewatering activities that are impacted by contaminated groundwater) as well as potential impacts to the OU-2 monitoring well network. The outcome should be a more robust plan to facilitate exchange of information between EPA, the City of San Jose and SJSU regarding planned construction activities in the area of the OU-2 plume.

7.1.2 Operable Unit 2

7.1.2.1 Remedial Action Performance and Operations

The remedy is currently operating only three extraction wells. Based on a trend analysis of the shallow groundwater monitoring data, some contamination exceeding MCLs (e.g., 1,1-DCE and vinyl chloride) continues to be detected downgradient of the extraction well system. However, minimal contamination with no statistically verified trend has been detected in well MW-24 (the monitoring well closest to Coyote Creek). Contaminant migration to the lower aquifers has not occurred.

Upward trends in MW-22 and MW-38 at the northwest downgradient end of the plume raise concerns about plume capture. The extraction well pumps were upgraded in 2008 to larger, more powerful pumps that extract at a higher pumping rate. Extracting from more wells (including new extraction wells) may be necessary to fully capture the plume but changes to the treatment train would be necessary to accommodate increased loading of vinyl chloride to the system. The GAC-based treatment system continues to provide effluent quality which meets the NPDES permit requirements under the current pumping scheme.

7.1.2.2 Opportunities for Optimization

It may be beneficial to operate the existing extraction wells nearest the 10th Street Property. This will provide greater mass removal and ultimately should decrease the operating time of the extraction system.

In order to extract from these wells, the groundwater treatment system must be modified to accommodate increased quantities of vinyl chloride.

7.1.2.3 Implementation of Institutional Controls

Institutional controls related to this OU are limited to restrictions on well construction for water supply purposes as described previously for OU-1. No other ICs with a bearing on the OU-2 remedy were selected in either the OU-1 or OU-2 RODs.

Property in SJSU Sport Fields Area

No evaluation has been undertaken yet to determine whether there is a risk of vapor intrusion (issue 2 in the Second Five-Year Review) in this area in the event that residential structures are constructed in the future. The potential for vapor intrusion in the areas overlying the OU-2 plume will be evaluated in the FFS. Based on the outcome of that evaluation, EPA will determine whether additional ICs or any other response action are needed to address potential risks.

Drinking Water Well Installation Downgradient of the LB&D Property

No formal institutional control mechanism is in place to prevent exposure to OU-2 contaminated groundwater from the installation and/or use of wells in the area of the OU-2 plume. However, the Santa Clara Valley Water District (SCVWD or District) regulates well drilling in the area of the Site through a permitting system. Permitting procedures and requirements are summarized on the SCVWD Permits web link (http://www.valleywater.org/Programs/BusinessInformationPermits.aspx). According to Mr. Mike Duffy of the SCVWD, the District has a GIS database that shows all permitted wells within the SCVWD's jurisdiction, and there have not been any applications for water supply wells in the vicinity of the Site for many years. Mr. Duffy noted that if an application for a well permit for a new well in the vicinity of a cluster of monitoring wells were received, the District would notify the applicant of the potential for groundwater contamination. In addition, Mr. Duffy indicated that the District would be willing to work with EPA to develop a formal agreement pursuant to which the SCVWD would implement an institutional control to prevent well drilling/installation in areas designated by EPA.

7.1.2.4 Indicators of Potential Issues

As a result of increasing flow to the groundwater treatment system, the change-out frequency increased to monthly for both beds of GAC. Vinyl chloride is the VOC that drives the change-out frequency.

Upward trends or potential upward trends for VOCs in the northwestern edge of the plume cast some doubt on the effectiveness of plume capture. Pumping rates were increased less than two years ago, but statistical trend analysis may not be helpful in demonstrating the effect of that change on VOC levels in the plume for several years. Aquifer tests have been performed at extraction wells EX-15 and EX-19 to evaluate whether their capture zone is adequate, and the results are evaluated in a technical memorandum (Pegasus, 2008). Estimates of plume capture provided in that document suggest that the increases in well pumping rates in November 2008 might be adequate to capture any further migration of VOCs past the currently operating wells in the northwestern part of the extraction well field. The current uncertainty of plume capture does not represent a near-term threat. As discussed in section 6.4.2, VOC concentrations in groundwater are not expected to be found at levels high enough to indicate a vapor intrusion risk in housing areas in the vicinity of the apparent upward VOC trends.

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

7.2.1 Operable Unit 1

7.2.1.1 Changes in Standards, Newly Promulgated Standards, and TBCs

There have been no changes in standards or other criteria that affect the protectiveness of the OU-1 soil cap. The SVE system is no longer in operation, and thus any changes in the air emission standards for the vapor-phase GAC filters that treated the soil gas are no longer relevant.

7.2.1.2 Changes in Exposure Pathways, Toxicity, Other Contaminant Characteristics

Numerous changes in toxicity and other contaminant characteristics have occurred since the risk assessment, as evidenced in Table 7. These changes in toxicity values do not affect the protectiveness of the remedy.

The OU-1 ROD provided for evaluation of the vapor intrusion pathway at residential areas located above the shallow groundwater plume downgradient of the LB&D Property; however, this pathway was not addressed for current or potential future indoor industrial/commercial workers in structures overlying the shallow groundwater plume on or downgradient of the LB&D Property.

The 1996 Remedial Design Report No. 5 Soil Gas Survey provided for some vapor intrusion analysis above the plume in areas 1,100 to 2,000 feet downgradient of the LB&D Property, including areas of existing housing (Figure 7). The survey indicated that vapor intrusion would not be of concern for receptors on the SJSU campus in the vicinity of 10th Street and Humboldt Street, where a student housing complex existed, or in other residential areas to the northeast. A subsequent vapor intrusion screening evaluation was conducted in the last five-year review in 2005. The evaluation, using current vapor intrusion methodology, indicated that concentrations of trichloroethylene and vinyl chloride were not of concern for the vapor intrusion pathway. However, given the changes in VOC profiles due to anaerobic degradation of TCE, the current (October 2009) concentrations for vinyl chloride exceed the screening criteria for vapor intrusion in groundwater downgradient from the current extraction system at well P-26 (26 µg/L vinyl chloride). This detection however, is a maximum in the history of results for that well and may not be fully representative of the recent VOC concentrations increasing trend (Attachment E). The nearest housing to P-26 is approximately 200 feet to the north.

The vapor intrusion pathway should be evaluated prior to any construction on the SJSU sports field overlying the most-contaminated area of the groundwater plume immediately downgradient of the LB&D Property because current vinyl chloride concentrations in the groundwater in that area are higher than groundwater screening levels for evaluation of potential vapor intrusion as cited in Federal and State agencies' guidance (Cal EPA, 2005; EPA, 2002 and RWQCB, May 2008).

Surrounding land use has changed, with the SJSU student housing complex at the corner of 10th and Humboldt Streets removed and completion of the Bella Castello apartment complex at the location of a former parking lot on the corner of Keyes and 12th Streets. The 1996 soil gas survey included a sampling point at the Bella Castello location and no groundwater contaminants were detected in the vapor sample. VOC contamination in groundwater in this area has not shown increasing trends. The land use changes do not alter the protectiveness of the remedy. Limitations placed on the LB&D Property as designated in the ROD have remained unchanged.

7.2.1.3 Expected Progress Towards Meeting Remedial Action Objectives (RAOs)

Since the waste with contaminant concentrations above the ROD excavation action levels has been removed and the remaining waste will remain in place under the cap, the RAOs related to exposure to soil and site structures have been met.

Concentrations of VOCs below the cap in soils previously subjected to SVE have been measured to determine if contaminants are present. Two sampling events indicate that VOC concentrations have been reduced to below the cleanup goal of 1 mg/kg in soils above the A/B aquitard. However, concentrations of VOCs remain above 1 mg/kg in the clay aquitard and will not be effectively removed by the SVE system. The rate at which the residual VOCs in the aquitard are being released to groundwater or to soil gas in the overlying vadose zone is unknown.

The RAOs with respect to protection of deeper aquifers and protection of residents have been met. The C Zone groundwater remains un-impacted by Site contamination. Soil vapor sampling has shown insignificant VOC concentrations in soil vapor near occupied buildings.

A soil gas evaluation is recommended for the area immediately downgradient from the LB&D out to the former SJSU student housing area and the north end of the track (Figure 7). A soil gas survey and risk screening evaluation would show whether VOCs are diffusing through the A/B aquitard to present a vapor intrusion risk, and would also facilitate re-evaluation of institutional controls in the proposed study area.

7.2.2 Operable Unit 2

7.2.2.1 Changes in Standards, Newly Promulgated Standards, and TBCs

A comparison of the chemical-specific ARARs selected in the 1988 ROD to current regulations is presented in Table 12. An evaluation of the changes indicates that there are no new regulations that affect protectiveness. There have been ten (10) new or more stringent MCLs promulgated since the original ROD for OU-2. However, all those additions have been included in the effluent limitation parameter analysis suite or they are on the trigger list of the NPDES permit. Following completion of the FFS, EPA plans to revise the OU-2 ROD to incorporate the change in MCLs into the groundwater cleanup goals.

While antimony was not indicated as a COC in the 1988 OU-2 ROD nor identified in the ARARs table, antimony was discussed as a non-carcinogenic groundwater pathway constituent in section 6.4.2 of the OU-1 ROD. Antimony was not an original constituent of the self-monitoring program, however, it is now included as a trigger parameter requiring evaluation on a three (3) year cycle. Antimony is included in the summary table to further clarify this for later five-year reviews. 1,4-dioxane was also not an original constituent, but has been part of the effluent and groundwater sampling and analysis since 2004. 1,4-dioxane has also been included in Table 12.

7.2.2.2 Changes in Exposure Pathways, Toxicity, Other Contaminant Characteristics

Exposure pathways for contaminants in groundwater have not significantly changed since the risk assessment was developed. With the exception of the vapor intrusion pathway, discussed under OU-1, there are no changes that affect protectiveness of the remedy. The OU-1 ROD provided for evaluation of the vapor intrusion pathway in residences located above the shallow groundwater plume downgradient of the LB&D property; however, this pathway was not addressed for current or potential future indoor industrial/commercial workers in structures overlying the shallow groundwater plume on or downgradient of the LB&D property. Changes in toxicity values are summarized in Table 8.

7.2.2.3 Changes in Risk Assessment Methods

Exposure parameters and methodology have not significantly changed since the risk assessment was developed.

7.2.2.4 Expected Progress Towards Meeting Remedial Action Objectives (RAOs)

The OU-2 ROD includes three RAOs, all related to controlling plume migration. The VOC plume has not expanded to deeper zones, and data from the monitoring well closest to Coyote Creek indicate no impact to the Creek, thus satisfying two of the RAOs.

Increasing VOC concentrations in wells at the northwest leading edge of the plume suggest that the plume has been expanding in that direction. A significant increase in groundwater extraction rate in EX-19 occurred in November 2008. One round of annual groundwater sampling was conducted in September 2009 after increase of the EX-19 pumping rate. Additional data is needed to complete the plume capture analysis. The FFS will also evaluate the need for additional extraction wells and monitoring wells in the northwest area.

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

There have been no newly identified ecological risks identified at the Site. There is no evidence of any Site impacts caused by natural disasters.

1,4-dioxane is an emerging contaminant that is currently being monitored at the LB&D Site. The maximum concentration of 1,4-dioxane detected at the LB&D Site during the most recent groundwater sampling event was 170 µg/L in a monitoring well immediate downgradient of the LB&D Property. The concentration of 1,4-dioxane in the treated groundwater effluent has been monitored as part of discharge permit requirements. There are current toxicity criteria for 1,4-dioxane as an oral carcinogen in the IRIS database (http://www.epa.gov/ncea/iris/subst/0326.htm). There are also screening levels for residential and industrial air for 1,4-dioxane from EPA (http://www.epa.gov/region09/superfund/prg/index.html) and California EPA (http://www.oehha.ca.gov/risk/chhsl120409.html). CDPH has established a Notification Level for 1,4-dioxane in drinking water of 3 µg/L, and EPA has identified an RSL for 1,4-dioxane in tap water of 6.1 µg/L.

PCBs and dioxin were detected in the surface and subsurface soils at the LB&D Property. During the site remediation, contaminated soils with high concentrations of PCBs and dioxin were removed and disposed off-site. An asphalt concrete cap was built on the LB&D Property as part of final remedy in 2000. The concentration of 0.086 ppb of PCBs/Dioxin was used as cap action level.

EPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have currently not been finalized and have not been adopted into state or federal standards. EPA anticipates that a final revision to the dioxin toxicity numbers may be released by the end of 2010. In addition, EPA/OSWER has proposed to revise the interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, EPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five-Year Review. Unless the soil underneath the asphalt cap was disturbed, it is unlikely the LB&D Property will be impacted by the dioxin reassessment.

8. ISSUES

Issues identified during the five-year review process are presented in Table 4 below:

Table 4: Issues Identified during the Five-Year Review

Issue		Affects Current Protectiveness (Y/N)?	Affects Future Protectiveness (Y/N)?
1.	The OU-1 ROD requires the imposition of deed restrictions on the sidewalk areas adjacent to the LB&D Property to prevent unsafe exposure to potentially contaminated soil beneath the sidewalks, but deed restrictions have not yet been put in place.	N	Y
2.	The soil vapor extraction (SVE) remedy is not able to meet the ROD cleanup goal of 1 mg/kg total VOCs in the clay aquitard between the vadose zone and the contaminated B Aquifer. The rate of ongoing diffusion of VOCs from the A/B aquitard into the aquifer and into the overlying soils is unknown. If significant, achieving the soil cleanup goals may require additional remedial actions to address contaminants in the aquitard soils.	N	Y
3.	Groundwater in the northwest end of the plume may not be fully captured by the current pump & treat system , and the downgradient extent of the plume in this area is not fully defined.	N	Y

9. RECOMMENDATIONS AND FOLLOW-UP

Recommendations and follow-up identified during the five-year review process are presented in Table 5 below:

Table 5: Recommendations and Follow-up

Issue	Recommendation	Responsible Entity	Milestone
The OU-1 ROD requires the imposition of deed restrictions on the sidewalk areas adjacent to the LB&D Property to prevent unsafe exposure to potentially contaminated soil beneath the sidewalks, but deed restrictions have not yet been put in place.	Follow-up on recent efforts to record a restrictive covenant for the sidewalk areas by: 1) determining whether further investigation of soil contamination beneath the sidewalk is appropriate; 2) determining the appropriate scope for a restrictive covenant; 3) initiating discussions with the City of San Jose about a restrictive covenant and other IC mechanisms; 4) pending adoption of a restrictive covenant, pursuing alternative IC mechanisms such as construction permitting processes; and 5) if necessary, revising the ICs provisions of the OU-1 ROD.	EPA	12/2011
The soil vapor extraction (SVE) remedy is not able to meet the ROD cleanup goal of 1 mg/kg total VOCs in the clay aquitard between the vadose zone and the contaminated B Aquifer. The rate of ongoing diffusion of VOCs from the A/B aquitard into the aquifer and into the overlying soils is unknown. If significant, achieving the soil cleanup goals may require additional remedial actions to address contaminants in the aquitard soils.	Determine whether the residual soil contamination in the aquitard is adversely impacting the A Zone soil vapor concentrations and/or the shallow (B Zone) groundwater and, as necessary, develop and evaluate potential remedial alternatives.	EPA	12/2012
Groundwater in the northwest end of the plume may not be fully captured by the current pump & treat system, and the downgradient extent of the plume in this area is not fully defined.	Continue to assess the shallow groundwater extraction well network to determine whether additional extraction wells and/or increased pumping rates are needed to achieve capture in the northwest area of the plume. Treatment capacity may need to be reevaluated if additional contaminated water is extracted. Install additional monitoring wells to fully define the extent of the plume in this area.	LSGTF	12/2012

In addition, EPA should continue with the planned FFS to:

- Formally establish numerical groundwater cleanup goals for VOCs and 1,4-dioxane

- Provide a remedial strategy to meet the clarified groundwater and soil cleanup goals in a reasonable timeframe.
- Provide clarification of remaining vapor intrusion issues.

10. PROTECTIVENESS STATEMENT

The remedy is considered protective in the short-term since there are no current complete exposure pathways at the LB&D Property or the downgradient plume area. In addition, there is no evidence of impacts of the OU-2 plume on Coyote Creek or the deep aquifers. Pursuant to the draft Institutional Controls Monitoring Plan (ICMP), there are periodic inspections of the Lorentz-Property cap and review of cap maintenance activities. In addition, inspections by the State to insure compliance with land use covenants have been conducted annually since 2006. However, to be protective in the long-term, the impact of the residual VOCs in the A/B aquitard on contaminant levels in shallow groundwater and in soil gas needs to be assessed, capture of the groundwater plume in the northwest area needs to be achieved, and the institutional controls for the sidewalk area need to be implemented.

11. NEXT REVIEW

The next review will be due in September 2015, and will address both OU-1 and OU-2.

TABLES

Table 6. Soil Vapor Extraction Rebound Evaluation

TCE IN SYSTEM MANIFOLD					
Event	**Date**	**Concentration***			**Notes**
URS Startup	Dec. 1998	72,000			Initial system startup
Panacea Startup	Jun. 2001	33,000			Rebound after 2-year down period
Panacea operation, pre-shutdown	Jun. 2004	1,200			Operational concentration at end of 3-year operation period
Panacea Re-start for sampling	Jan. 2005	4,200			Rebound after 7 month down time
Panacea sampling event	Sep. 2006	NM			Manifold not sampled this event
TerranearPMC re-start event	Oct. 2008	3,300			System continuously down since last sampling
* units are micrograms per cubic meter					
TOTAL VOC IN EACH WELL AND MANIFOLD					
Location	**Jun-04**	**Jan-05**	**Sep-06**	**Oct-08**	
Manifold	1800	6848	NM	7890	
EW1	2044	35.2	7422	8207	
EW2	381	3353	35.6	17489	
EW3	859	38.7	74.9	44912	
EW4	661	921	15,440	22,858	
EW5	25.6	947	23.9	9443	
EW6	262	2936	67.5	57910	
EW7	9540	18372	14,097	80,870	
TCE in each well					
EW1	1600	ND	3100	3300	
EW2	250	1400	ND	6400	
EW3	450	ND	26	23000	
EW4	450	410	7300	8000	
EW5	12	580	ND	5600	
EW6	190	1900	ND	36000	
EW7	6300	12000	8700	57000	
* June 4, 2004 event samples collected after 3 years operation, and before system shut-down					
* January 2005 event samples collected after 7 months down-time					
* September 2006 event samples collected after an additional 20 months down-time					
* October 2008 event samples collected after continued non-operation					

Table 7
Changes in Toxicity Values OU-1 Soils

	CSFo ORIGINAL		RfDo ORIGINAL		CSFi ORIGINAL		RfDi ORIGINAL		CSFo CURRENT		RfDo CURRENT		CSFi CURRENT		RfDi CURRENT	
	1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d	
ORGANICS																
PESTICIDES																
Aldrin	1.70E+01	h'89	3.00E-05	h'89	1.70E+01	h'89	NA		1.70E+01	I	3.00E-05	I	1.75E+02	I		
Chlordane	1.30E+00	h'89	6.00E-05	h'89	1.30E+00	h'89	ND		3.50E-01	I	5.00E-04	I	3.50E-01	I	2.00E-04	I
4,4-DDD	2.40E-01	h'89	5.00E-04	h'89	NA				2.40E-01	I			2.40E-01	c		
4,4-DDE	3.40E-01	h'89	5.00E-04	h'89	3.40E-01		NA		3.40E-01	I			3.40E-01	c		
4,4-DDT	3.40E-01	h'89	5.00E-04	h'89	3.40E-01		ND		3.40E-01	I	5.00E-04	I	3.40E-01	I		
Dieldrin	1.60E+01	h'89	5.00E-05	h'89	1.60E+01	h'89	ND		1.60E+01	I	5.00E-05	I	1.60E+01	I		
Endosulfan	NA		5.00E-05	h'89	NA		ND				6.00E-03	I				
PCBs/Dioxins																
PCBs (total)	7.70E+00	h'89	ND		1.00E-05	h'89	1.00E-05	h'89	2.00E+00	I	3.00E-03	I	2.00E+00	I	2.90E-02	I
PCB, unspeciated mix, low risk									7.00E-02		7.00E-05	I	7.00E-02	I	7.00E-05	r
PCB, unspeciated mix, high risk									2.00E+00	I	2.00E-05	I	2.00E+00	I	2.00E-05	r
2,3,7,8-TCDD (eq.)(ppb)	1.56E+05	h'89	NA		1.56E+05	h'89	NA		1.30E+05	c	3.80E+01	c	1.30E+05	A	1.10E-08	c
INORGANICS																
Arsenic	1.75E+00	h'88	1.00E-03	h'88	5.00E+01	h'88			1.50E+00	I	3.00E-04	I	1.50E+01	i		
Chromium (VI)			5.00E-03	i	4.10E+01	h'88			5.00E-01	J	3.00E-03	I	3.00E+02	I	2.70E-05	I
Lead																

Original = RI (Ebasco),1990; RI Addendum 3 (URS), June 19, 1992
Current = December 2009 Region 9 RSLss (as listed March 2010, online), March 2010 IRIS (online)

Key : CSFo,I = Cancer Slope Factor oral, inhalation; RfDo,I = Reference Dose oral, inhalation
I=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation
NA = Not Available A=ATSDR J=New Jersey

Table 8
Changes in Toxicity Values Post OU-2 ROD Groundwater (Zone B)

	CSFo 1988 ROD ORIGINAL		RfDo ORIGINAL		CSFi ORIGINAL		RfDi ORIGINAL		CSFo CURRENT		RfDo CURRENT		CSFi CURRENT		RfDi CURRENT	
	1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d		1/mg/kg/d		mg/kg/d	
ORGANICS																
Benzene	2.90E-02	h'89		nva	2.90E-02	h'89	NVA		5.50E-02	I	4.00E-03	I	2.70E-02	I	8.60E-03	I
Chlordane	1.61E+00	h'89	6.00E-05	h'89	1.30E+00	h'89	ND		3.50E-01	I	5.00E-04	I	3.50E-01	I	2.00E-04	I
Chloroform	8.10E-02	h'89	1.00E-02	h'89	8.10E-02	h'89	ND		3.10E-02	c	1.00E-02	I	8.10E-02	I	1.40E-02	n
1,1-Dichloroethane			1.00E-02	I			1.43E-01	h	5.70E-03	c	2.00E-01	p			1.40E-01	h
1,2-Dichloroethane	9.10E-02				3.50E-02				9.10E-02	I	2.00E-02	n	9.10E-02	I	6.90E-01	A
1,1-Dichloroethene	5.80E-01	h'89	9.00E-03	h'89	1.16E+00	h'89	NA				5.00E-02	I			5.70E-02	I
1,2-dichloropropane																
PCBs (total)	7.70E+00															
PCB, unspeciated mix, low risk									7.00E-02	I	7.00E-05	I	7.00E-02	I	7.00E-05	r
PCB, unspeciated mix, high risk									2.00E+00	I	2.00E-05	I	2.00E+00	I	2.00E-05	r
1,1,2,2 Tetratchloroethane	2.00E-01				2.00E-01				2.00E-01	I	4.00E-03	P				
Tetrachloroethene	5.10E-02	n	1.00E-02	I	1.70E-03	n	1.10E-01	n	5.40E-01	c	1.00E-02	I	2.10E-02	c	7.70E-02	A
Toxaphene	1.10E+00								1.10E+00	I			1.10E+00	I		
1,1,1-Trichloroethane																
Trichloroethene	1.10E-02	h'88	NA		2.50E-02	h'88	NA		5.90E-03	c			7.00E-03	c		
Vinyl Chloride	2.30E+00	h'88	NA		2.50E-02	h'88	NA		7.20E-01	I	3.00E-03	I	1.60E-02	I	2.90E-02	I
INORGANICS																
Antimony			4.00E-04	h'88												
Arsenic	1.50E-01	h'88	1.00E-03	h'88	5.00E+01	h'88			1.50E+00	i	3.00E-04	I	1.50E+01	I		
Barium			7.00E-02	I							2.00E-01	I				
Chromium (VI)			5.00E-03	I	4.10E+01	h'88			5.00E-01	J	3.00E-03	I	3.00E+02	I	2.70E-05	I
Cobalt			3.70E-02	h							9.00E-03	P	3.20E+01	P	1.70E-06	P
Nickel			2.00E-03	I	8.40E-01						2.00E-02	I	9.10E-01	c	2.60E-05	A
Zinc			2.00E-01	I							3.00E-01	I				

Original = 1988 ROD: cited only CSFos and provided no sources; only carcinogenicity was evaluated.
Other original values and sources (italics) are from RI (Ebasco),1990; RI Addendum 3 (URS), June 19, 1992
Chemicals in italics were not listed as COCs but had NPDES discharge limits in the 1988 ROD.
Risk was addressed in 1990 RI; Sb had HI>1
Current = December 2009 Region 9 RSLss (as listed March 2010, online), March 2010 IRIS (online)

Key : CSFo,I = Cancer Slope Factor oral, inhalation; RfDo,I = Reference Dose oral, inhalation
I=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation
NA = Not Available A=ATSDR J=New Jersey

TABLE 9
Vapor Intrusion - Comparison of Groundwater Concentrations to Screening Values

	Oct 2008 Zone B Groundwater Concentration Downgradient of Extraction System (SJSU dorms)(C)				Oct 2008 Zone B Groundwater Concentration Upgradient of Extraction System (SJSU athletic fields)(D)	EPA (A) Question 1	EPA (A) Question 4	EPA (A) Question 4	RWQCB (B) Question 5
	Minimum	Maximum	Mean	95%UCL	Maximum	Toxic?	Table 2c Target GW Concentration Risk=1E-06	Table 2c Target GW Concentration Risk=1E-06	Table E-1 Target GW Concentration Risk=1E-06, α=2.0E-04
	ug/l	ug/l	ug/l	ug/l	ug/l		ug/l	ug/l	ug/l
ORGANICS								MCL	ESL
1,1-Dichloroethane	1.9	10	4.7	7.2	72	Yes	2.20E+03	-	1.10E+03
1,2-Dichloroethane	<0.5	<0.5	<0.5		**19**	Yes	2.30E+02	5*	2.00E+02
1,1-Dichloroethene	15	58	36	49.3	**720**	Yes	1.90E+02	4*	6.30E+03
cis-1,2-Dichloroethene	0.8	23	11.5	18.5	**130**	Yes	-	70*	6.20E+03
Tetrachloroethene	<0.5	<0.5	<0.5		**80**	Yes	1.10E+02	5*	1.20E+02
1,1,1-TCA	2.2	11	8.3	14	51	Yes	3.10E+03	200*	1.30E+05
Trichloroethene	<0.5	2.8	1.2	2.2	**290**	Yes	5.3	5*	5.30E+02
Vinyl Chloride	<0.5	26	4.6	**26**	**46**	Yes	25	2*	3.80E+00

(A) Draft *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (EPA, November, 2002), Tables 1, 2c, 3c (R=E-06, HI=.1); **Bold**> MCL
(B) *Screening for Environmental Concerns at Site with Contaminated Soil and Groundwater* , Interim Final
(California Regional Water Quality Control Board, San Francisco Bay Region, May 2008)
Table E-1a, Low/Moderate Permeability Vadose Zone Soil
(C) Wells P-10, P-26, P-28, P-30, MW-38, and MW39-A
(D) Wells P-9, P-14, P-18, P-22
* MCL
Lesser of 95% UCL or maximum used as exposure point concentration
Bold values are > MCls or EPA generic but < EPA Semi-site-specific or RWQCB residential and industrial values

Table 10
Vapor Intrusion - Comparison of Soil Gas Concentrations to Screening Values

	1996 Zone B Concentration	1996 Zone B Concentration	EPA Question 4 Table 2c (A)	EPA (A) Question 4 Table 2c	EPA (A) Question 5 Table 3c SG	EPA (A) Question 5 Table 3c SG	RWQCB (B)	RWQCB (B)	OEHHA (C)	OEHHA (C)
	Downgradient SJSU & Residential Maximum Detection Limit Depth <5'	**Downgradient SJSU & Residential Maximum Detection Limit Depth 5-15'**	**Target Shallow Soil Gas Concentration Risk=1E-06**	**Target Deep Soil Gas Concentration Risk=1E-06**	**Target Soil Gas Concentration Risk=1E-06 α=2.0E-03 Loamy Sand Depth <5'**	**Target Soil Gas Concentration Risk=1E-06, α=7.0E-04 Loamy Sand Depth 5 -15'**	**Soil Gas SLs <3 m Residential**	**Soil Gas SLs <3m Industrial**	**Soil Gas SLs <3 m Residential**	**Soil Gas SLs <3m Industrial**
	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
ORGANICS										
Trichloroethene	**<11**	**<12**	2.20E-01	2.20E+00	1.10E+01	3.20E+01	1.20E+03	4.10E+03	5.28E+02	1.77E+03
Vinyl Chloride	**<5.1**	<7	2.80E+00	2.80E+01	1.40E+02	4.00E+02	3.10E+01	1.00E+02	1.33E+01	4.48E+01

(A) Draft *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (EPA, November, 2002), Tables 2c and 3c
(B) *Screening for Environmental Concerns at Site with Contaminated Soil and Groundwater* , Interim Final (California Regional Water Quality Board, San Francisco Bay Region, May 2008)
Table E-1, Groundwater Screening Levels for Evaluation of Vapor Intrusion Concerns
© *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties* , Table 2, Shallow Soil Gas Human Health Screening Levels
All TCE and VC soil gas samples were non-detects, but some samples had elevated detection limits
Bold Detection Limits > EPA Table 2c target generic but < EPA target semi-site specific and RWQCB soil gas screening levels

Table 11 – VOC Concentration Trend Analysis Summary

Well	Constituent	Trend	Slope [(ug/L)/yr]	Comments
MW-22	1,1-DCA Vinyl Chloride	None Limited Data		Vinyl chloride data set has too many non-detects. Those results, however, are in the earliest events, suggesting a possible upward trend in future evaluations.
MW-24	1,1-DCA	None		No other analytes detected regularly
MW-38	1,1-DCA 1,1-DCE	None Upward	 2.3	Current 1,1-DCE concentrations in the 40's. No wells downgradient of this well. No vinyl chloride detected regularly.
P-6	1,1-DCA 1,1-DCE TCE Vinyl Chloride	Downward Downward None Downward	-2.9 -1.1 -26	Vinyl chloride trend supports conclusion of MNA study that bio-degradation has stalled. Current concentrations approximately 30.
P-9	1,1-DCA 1,1-DCE TCE Vinyl Chloride	Downward None None None	-1.8	Current concentrations of 1,1-DCA approx. 12.
P-12	1,1-DCA 1,1-DCE TCE Vinyl Chloride	None None Upward Limited Data	 1.75	Current TCE concentrations approx. 26. Qualitative review of Vinyl chloride data does not suggest a trend.
P-18	1,1-DCA 1,1-DCE TCE Vinyl Chloride	None None Downward None	 -8.3	The 2001 data for all VOCs are suspect. Current TCE concentrations approx. 150.
P-22	1,1-DCA 1,1-DCE TCE Vinyl Chloride	Limited Data None Upward None	 3.3	Current TCE concentrations approx. 32.
P-26	1,1-DCA 1,1-DCE TCE Vinyl Chloride	None None Limited Data Limited data		This well is down-gradient of extraction line. Three of 11 events ND for Vinyl chloride. Erratic concentrations of Vinyl chloride up to 29. Consistently detected in last 7 events.

TABLE 12
OU-2 Chemical Specific Evaluations (MCLs and Surface Water Discharge)

Compound	Federal/State MCLs (ug/l)		OU-2 ROD (1988) NPDES Limits (1) (ug/l)	2009 NPDES Permit Requirements **	
	1988	2010		Average Monthly Effluent Limitation*** (ug/l)	Maximum Daily Effluent Limitation (ug/l)
Benzene	5/0.07(5)	5/1(5)	5	--	1
Carbon Tetrachloride	--	5	--	0.25*	0.50
Chloroform	100	80(3)	5	--	5
1,1-Dichloroethane	--	20(5)	5	--	5
1,2-Dichloroethane	5	5	1	0.38*	0.5
1,1-Dichloroethylene	7	7/6(5)	5	0.057*	0.11*
Ethylbenzene	--	700/300(5)	--	--	5
Methylene Chloride (Dichloromethane)	--	5	--	4.7	5
Tetrachloroethylene	5/4(5)	5	5	0.8	1.6
Toluene	--	1000/15(5)	--	--	5
Cis 1,2-Dichloroethylene	--	70/6(5)	--	--	5
Trans 1,2-Dichloroethylene	70	100/10(5)	5	--	5
1,1,1-Trichloroethane	--	200	5	--	5
1,1,2-Trichloroethane	--	5	1.2	0.6	1.2
Trichloroethylene	5	5	5	2.7	5
Vinyl Chloride	2	2/0.5(5)	2	--	0.5
Total Xylenes	--	10000/1.75(5)	5	--	5

TABLE 12
OU-2 Chemical Specific Evaluations (MCLs and Surface Water Discharge)

Compound	Federal/State MCLs (ug/l)		OU-2 ROD (1988) NPDES Limits [1] (ug/l)	2009 NPDES Permit Requirements **	
	1988	2010		Average Monthly Effluent Limitation*** (ug/l)	Maximum Daily Effluent Limitation (ug/l)
Methyl Tertiary Butyl Ether (MtBE)	--	13[5]	5	--	5
Total Petroleum Hydrocarbons	--	--	--	--	50
Ethylene Dibromide (1,2-Dibromoethane)	--	--	--	--	0.05*
Trichloro-trifluoroethane	--	15[5]	--	--	5
Chloroethane	--	--	5	--	--
1,2-Dichloropropane	6	5	5	--	--
1,1,2,2-Tetrachloroethane	--	1	5	--	--
Arsenic	50	10[2]	20	--	--
Antimony[4]	--	6	--	--	--
Barium	1000	2000/1000[5]	1000	--	--
Chlordane	--	2/0.1[5]	0.014	--	--
Chromium (total)	50	100/50[5]	11	--	--
Nickel[@]	--	Remanded/100[5]	7.1	--	--
Zinc	--	--	58	--	--

TABLE 12
OU-2 Chemical Specific Evaluations (MCLs and Surface Water Discharge)

Compound	Federal/State MCLs (ug/l)		OU-2 ROD (1988) NPDES Limits (1) (ug/l)	2009 NPDES Permit Requirements **	
	1988	2010		Average Monthly Effluent Limitation*** (ug/l)	Maximum Daily Effluent Limitation (ug/l)
Toxaphene	5	3	0.24	--	--
1,4-Dioxane	--	--	--	--	3****

* If reported detection level is greater than effluent limit, then a non-detect result using a 0.5 ug/L detection level is deemed to be in compliance.
** Drinking water areas are defined as surface waters with the existing or potential beneficial uses of "municipal and domestic supply" and "groundwater recharge" (the latter includes recharge areas to maintain salt balance or to halt salt water intrusion into fresh water aquifers).
*** Applicable when three or more days of effluent monitoring results are available
**** NPDES Permit Trigger Level
(1) Original OU-2 ARARs and TBCs for Groundwater (Table 8-1; OU-2 ROD, 1988)
(2) Effective 1/23/06
(3) As Total trihalomethanes (TTHM)
(4) Antimony (Sb) discussed in OU-01 ROD (6.4.2), but not a GW COC in 1988 OU-02 ROD
(5) California DHS value, 1987
@ Tentative value per OU-2 ROD
-- Not Available

FIGURES

Figure 1. Site Location

Figure 2. Current Property Owners

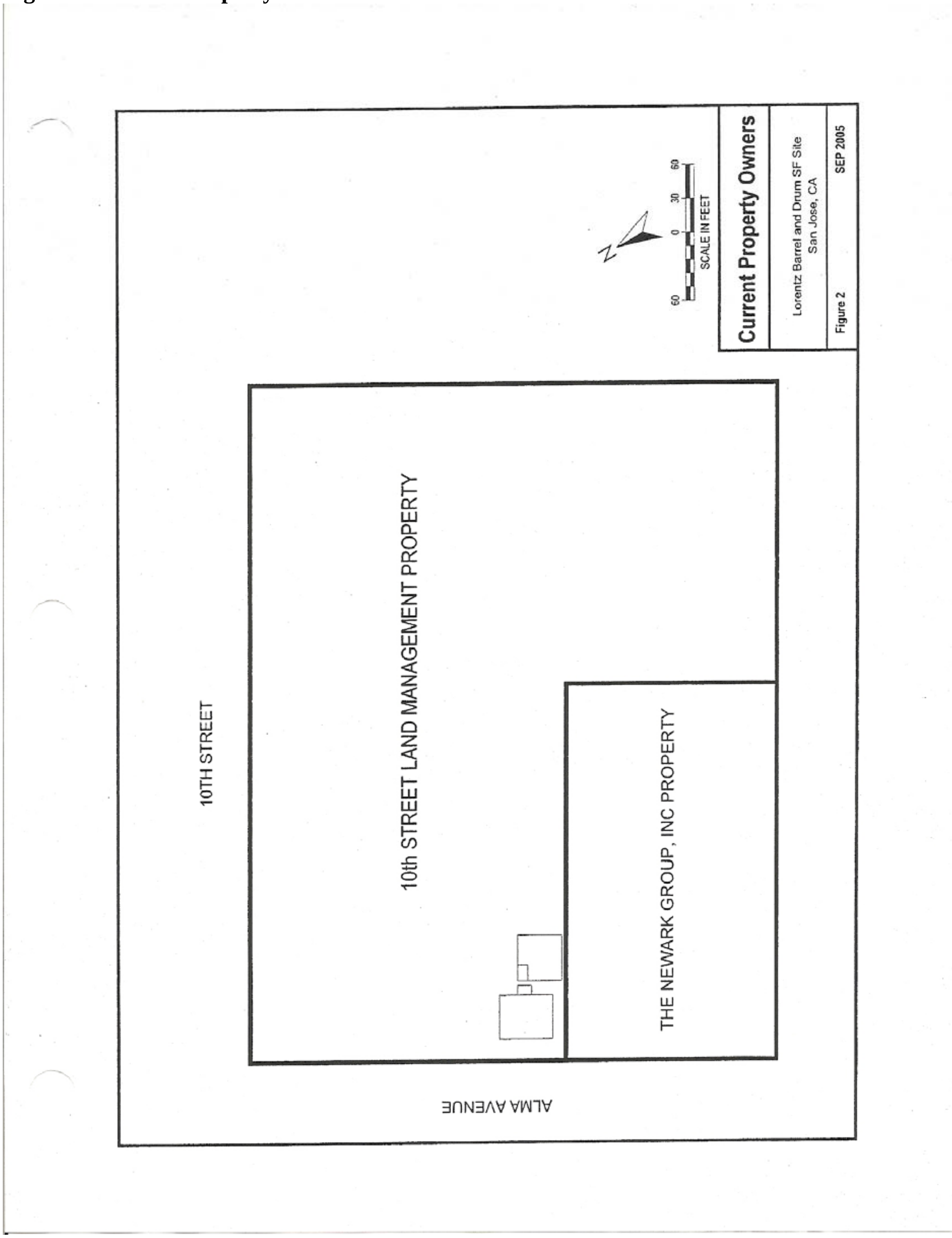


Figure 3. Monitoring and Extraction Well Layout

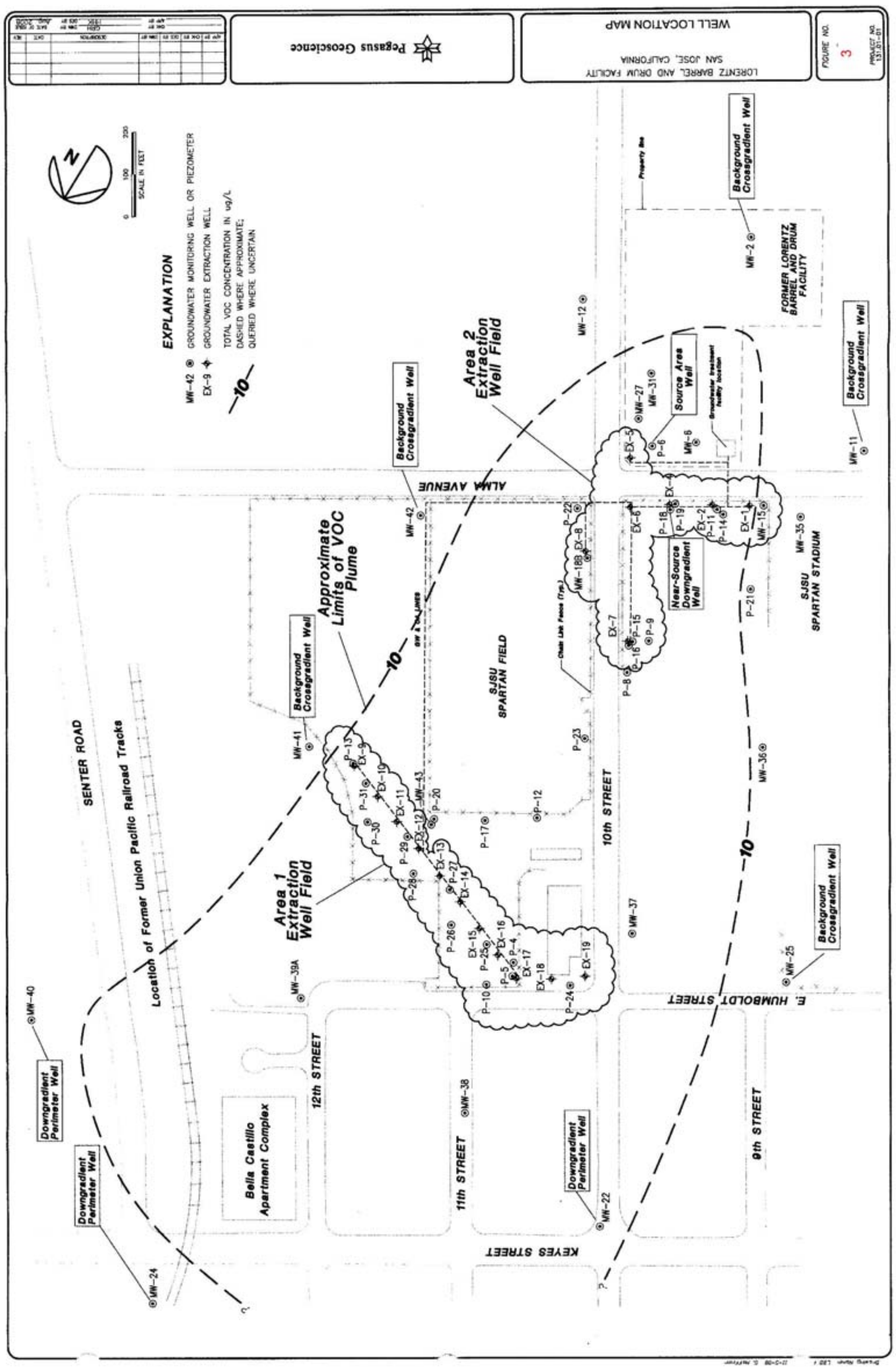


Figure 4 – Generalized Cross Section

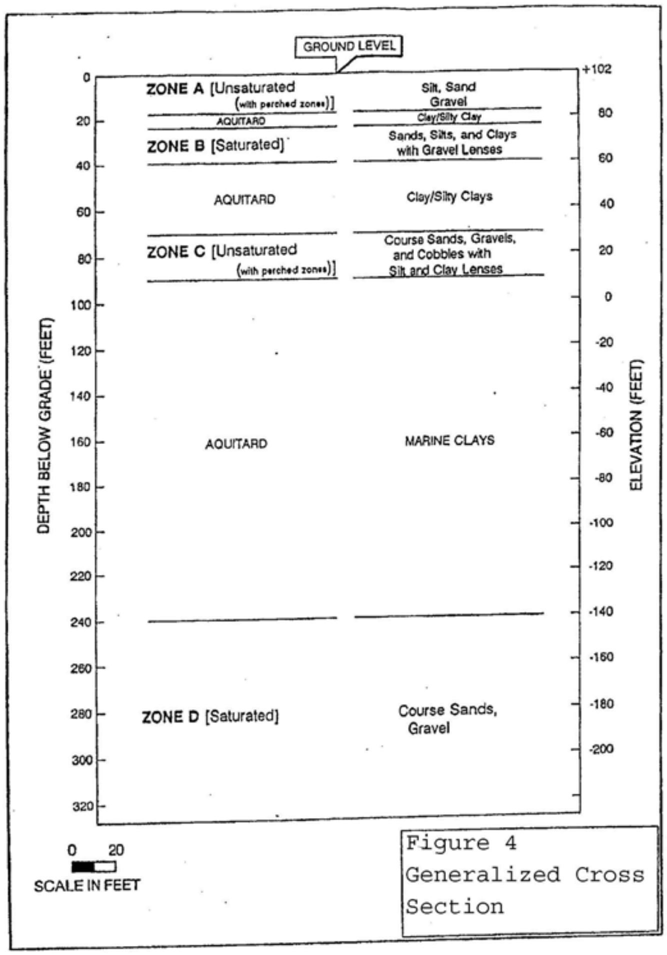


Figure 5 - Water Level Histograms
B and C Zones

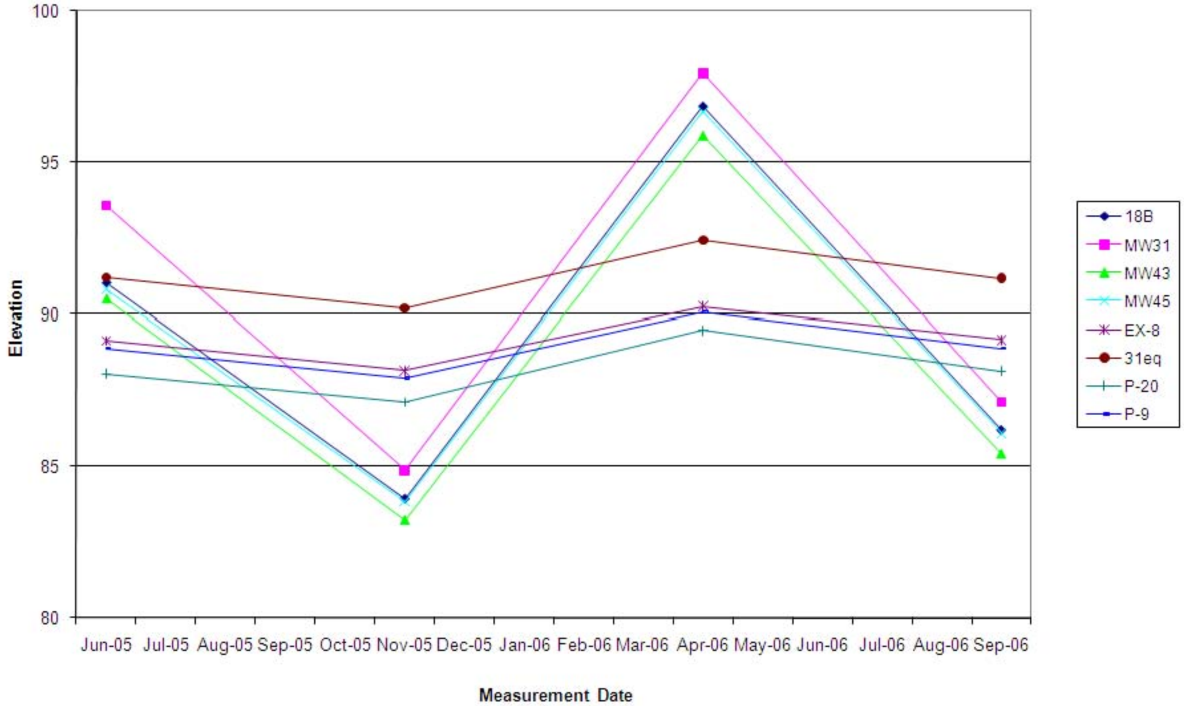


Figure 6 - C and D Zone Histograms

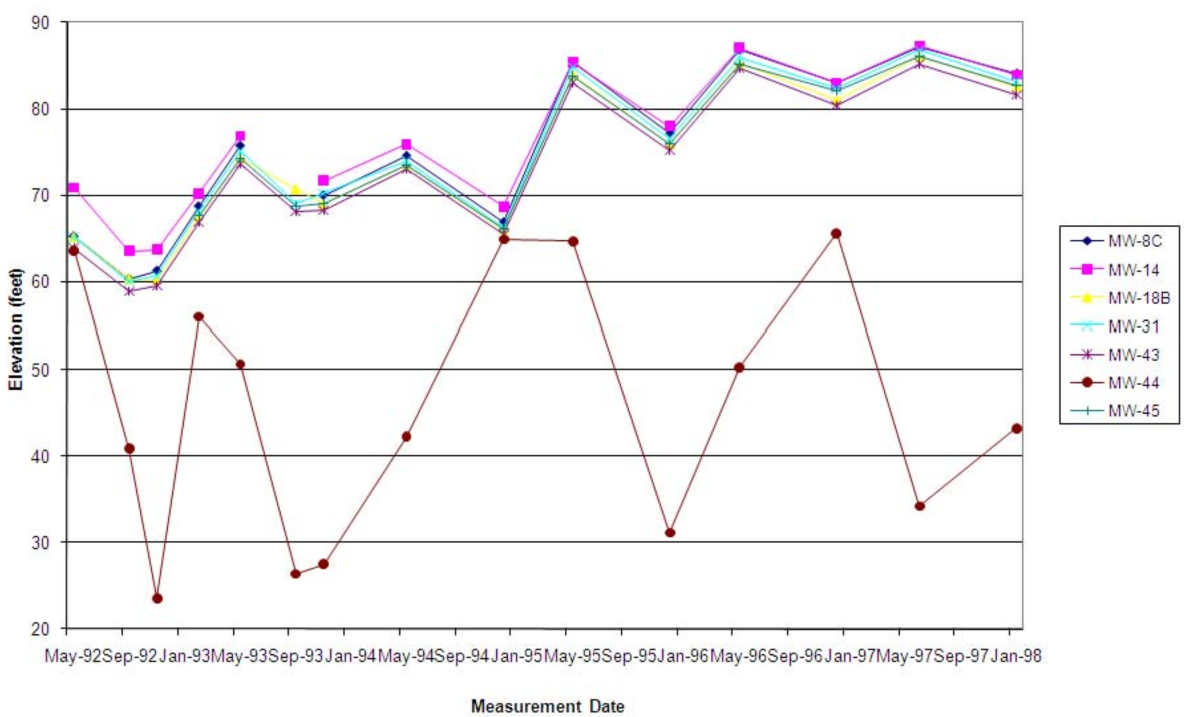
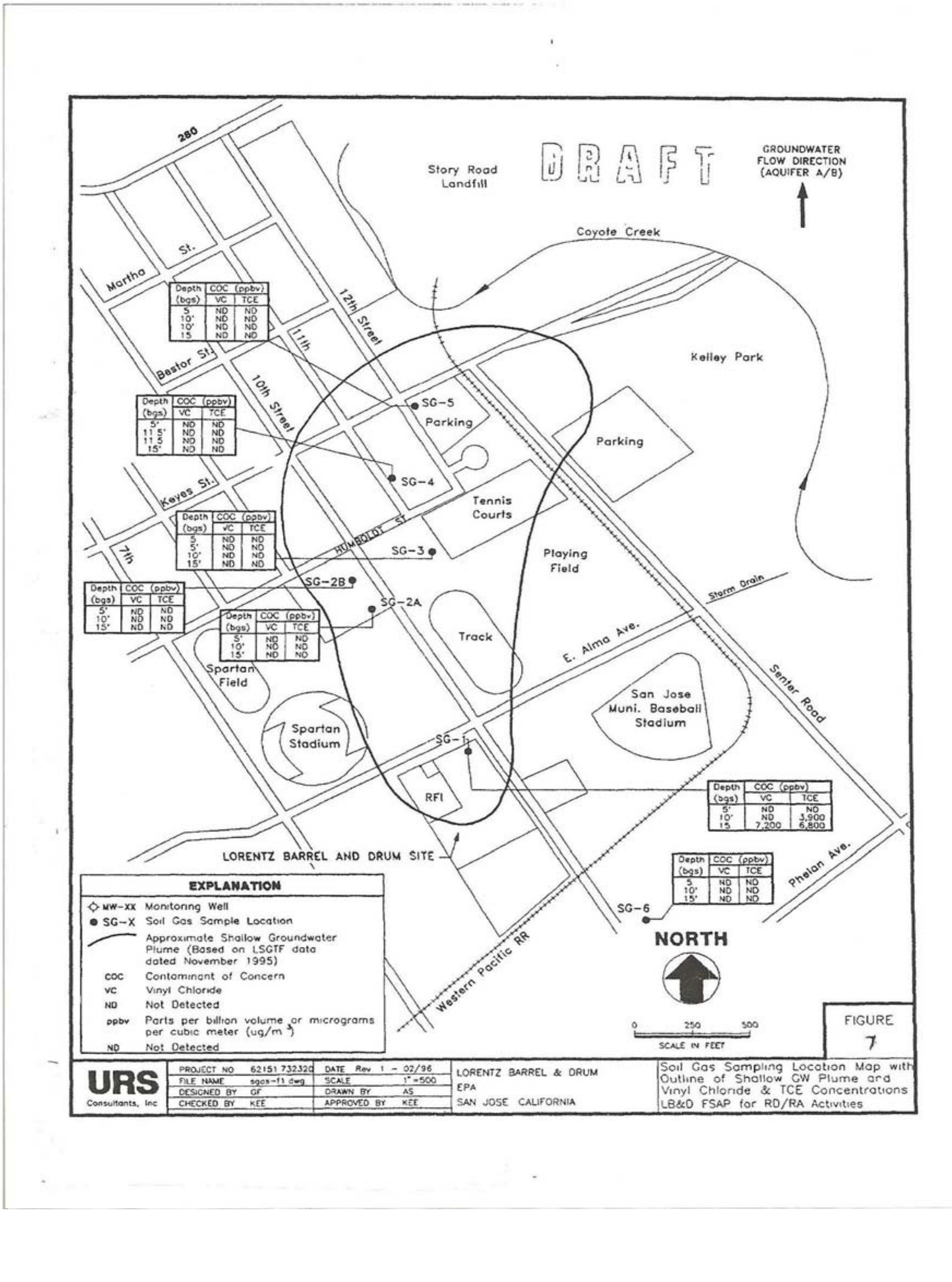


Figure 7 – 1996 Soil Vapor Sampling



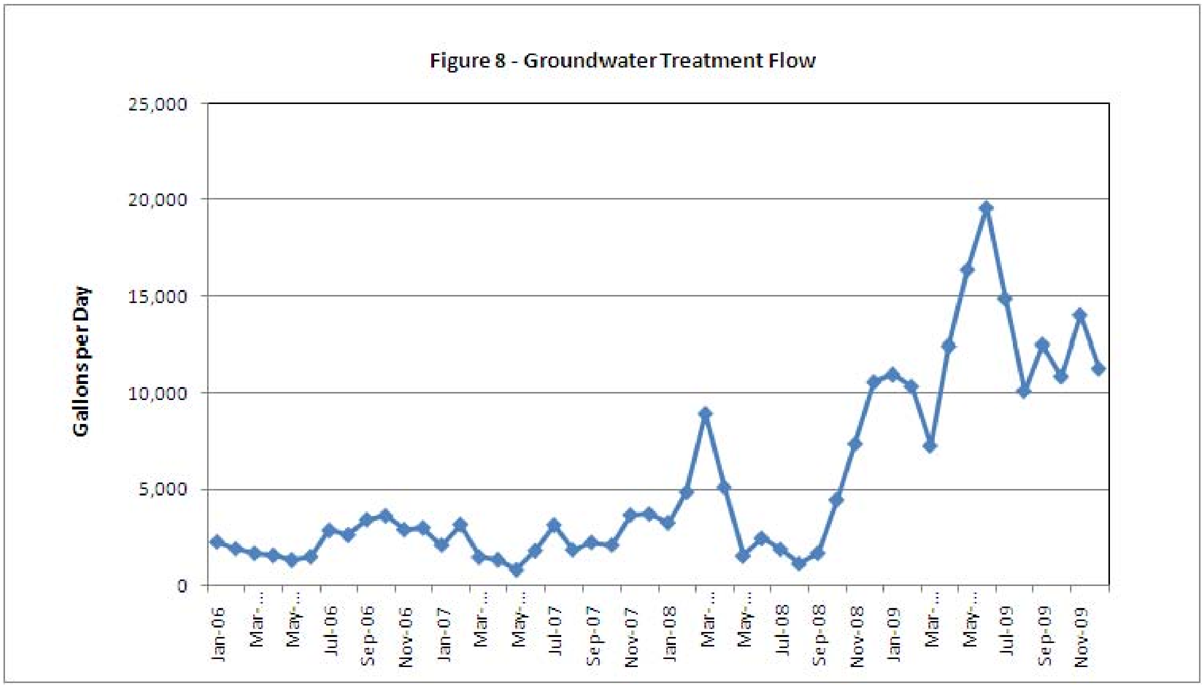


Figure 8 - Groundwater Treatment Flow
25,000
20,000
15,000
10,000
5,000
0
Gallons per Day
Jan-06
Mar-...
May-...
Jul-06
Sep-06
Nov-06
Jan-07
Mar-...
May-...
Jul-07
Sep-07
Nov-07
Jan-08
Mar-...
May-...
Jul-08
Sep-08
Nov-08
Jan-09
Mar-...
May-...
Jul-09
Sep-09
Nov-09

ATTACHMENT A

Documents Reviewed

Documents Reviewed

1988-1995

OU2 Record of Decision, Lorentz Barrel and Drum Superfund Site, San Jose, CA, USEPA Region 9, September 25, 1988

Work Plan Shallow Ground-water Treatment Remedial Design, Lorentz Barrel and Drum, San Jose, CA, EMCON Associates Project 787-03.01, December, 1989

Consent Decree, US District Court for the Northern District of California, July 6, 1990

Remedial Investigation Report, Volume 1 of 3, Lorentz Barrel and Drum Superfund Site, San Jose, CA, Ebasco Services, Incorporated, July 27, 1990

Remedial Investigation Addendum **No. 3**, Risk Assessment Update, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, June 19, 1992

Remedial Investigation Addendum **No. 4**, Conduit Investigation Update, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, June 19, 1992

Remedial Investigation Addendum **No. 6**, Zone C (MW-45) Well Installation, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, March 10, 1993

Zone C (MW-45) Well Installation Report, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, March 10, 1993

OU1 Record of Decision, Lorentz Barrel and Drum Superfund Site, San Jose, CA, USEPA Region 9, August 26, 1993

1996-2000

Remedial Investigation Addendum **No. 5**, Soil Gas Survey, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, July 8, 1996

Remedial Design Report for Lorentz Barrel & Drum, URS Greiner, December 10, 1996

OU2 Explanation of Significant Differences Lorentz Barrel and Drum Superfund Site, San Jose, CA, USEPA Region 9, April 24, 1998

Draft Removal and Remedial Actions Summary, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Consultants, April, 1998

100% Remedial Design Report, Lorentz Barrel and Drum Superfund Site, San Jose, CA, URS Greiner, May 12, 1998

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100% Remedial Design Specifications Asphalt Cap, Lorentz Barrel and Drum Superfund-Site, San Jose, CA URS Greiner, May, 1998

National Pollution Discharge Elimination System, Permit Number CAG912003, San Francisco Bay Regional Water Quality Control Board, June 18, 1998

Draft Remedial Action Report Volume 1, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Greiner Woodward Clyde Federal Services, April, 1999

Soil Vapor Extraction System Monthly Operations, Report Number 1, (April/May 1999)

Soil Vapor Extraction System Startup Report, Volume I, Lorentz Barrel and Drum Superfund Site, San Jose, CA URS Greiner Woodward Clyde Federal Services, June, 1999

Lorentz Barrel & Drum Site Asphalt Cap & Soil Vapor Extraction System As-Built Drawings, URS Greiner-Woodward Clyde, June 3, 1999

2001-2005

Comprehensive Five-Year Review Guidance, USEPA Office of Emergency and Remedial Response, EPA 540-01-007, June 2001

Covenant to Restrict Use of Property, Environmental Restriction (parcel 477-09-037) 10th Street Land Management, Department of Toxic Substances Control March 6, 2002

Draft Third Quarterly Soil Vapor Extraction System Monitoring Report for Lorentz Barrel and Drum Superfund Site, San Jose, CA Panacea, Inc, December 4, 2002

Draft Sixth Quarterly Soil Vapor Extraction System Monitoring Report for Lorentz Barrel and Drum Superfund Site, San Jose, CA Panacea, Inc, July 22, 2004

Quarterly Groundwater and Analysis Report for Lorentz Barrel and Drum Superfund Site, San Jose, CA Panacea, Inc, November 18, 2004

Draft Seventh Quarterly Soil Vapor Extraction System Monitoring Report for Lorentz

Barrel and Drum Superfund Site, San Jose, CA Panacea, Inc, March. 22, 2005

Covenant to Restrict Use of Property, Environmental Restriction (parcel 477-09-034 and 477-09-036) The Newark Group, Inc., Department of Toxic Substances Control June 10, 2005

Agreement and Covenant not to Sue 10th Street Land Management, USEPA

Agreement and Covenant not to Sue The Newark Group, Inc., USEPA

Second Five-Year Review Report for Lorentz Barrel and Drum Superfund Site, San Jose, Santa Clara County, CA, US EPA Region IX, September 2005

2006-2010

Sampling & Analysis Plan – Rebound Test and Groundwater Sampling, Lorentz Barrel and Drum Superfund Site, San Jose, California September 4, 2007

Institutional Controls Monitoring Plan, Lorentz Barrel & Drum Superfund Site, San Jose, California, November 2007

Aquifer Pumping Tests at Wells EX-19 and EX-15, Lorentz Barrel & Drum Site, San Jose, California, Pegasus Geoscience, July 29 2008

Geologic Cross Sections A-A' and A'-A'', Lorentz Barrel and Drum Site, San Jose, California, Pegasus Geoscience, July 29 2008

Report of Findings, Evaluation of VOCs in Soil & Groundwater – Post Soil Vapor Extraction – Stage 1, Lorentz Barrel & Drum EPA Superfund Site Santa Clara County, CA EPA ID CAD029295206, May 2008

Report of Findings, Evaluation of VOCs in Soil & Groundwater – Post Soil Vapor Extraction – Phase 2, Lorentz Barrel & Drum EPA Superfund Site Santa Clara County, CA EPA ID CAD029295206, October 2008

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Attachment B

Post-SVE Soil and Groundwater Investigation Information

Stage 1 - Soil Results **26-Sep-07**

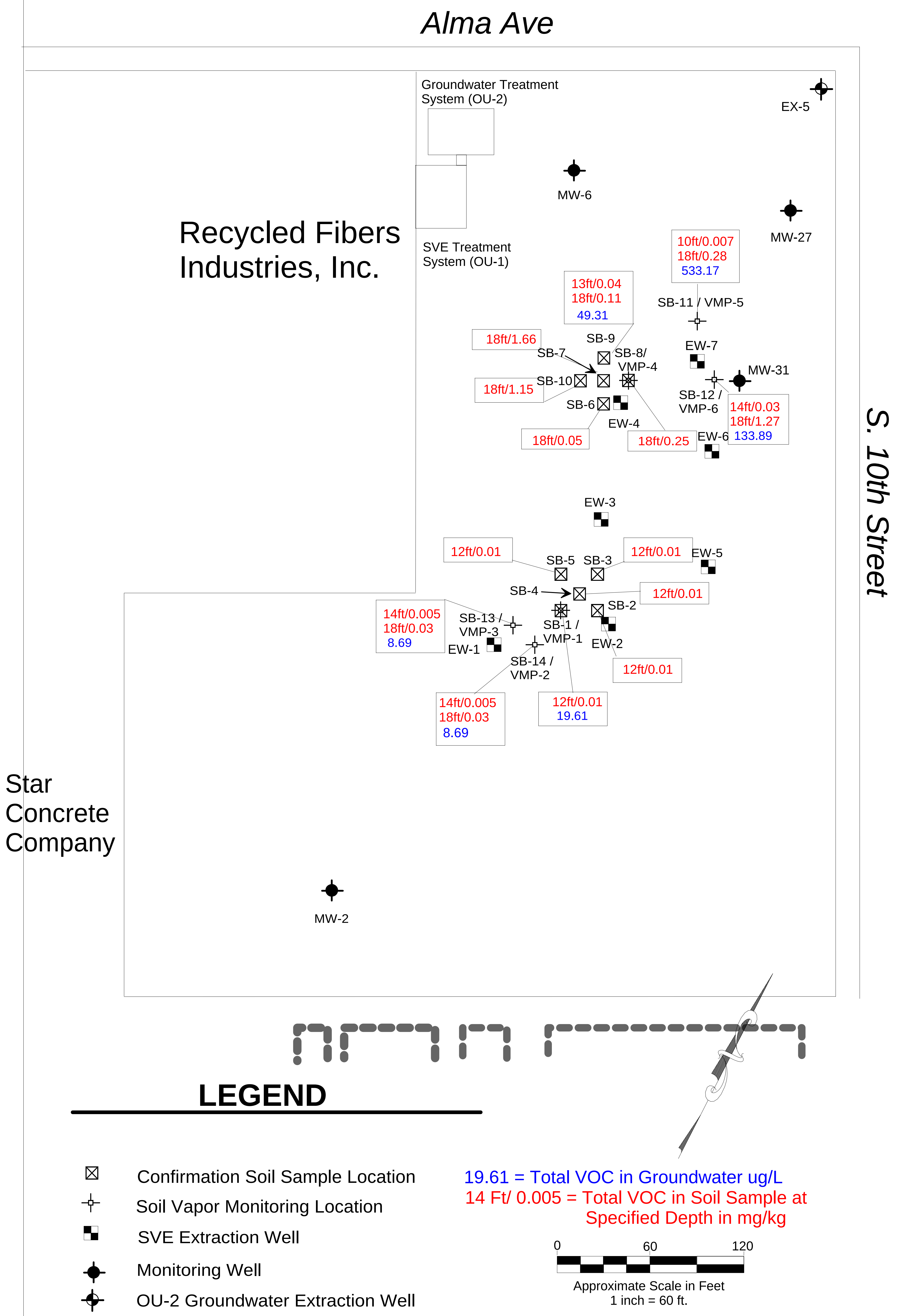
location	SB-01	SB-02	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08		SB-09
depth (ft bgs)	12	12	12	12	12	18	18	13	18	18
units ug/kg										
Vinyl Chloride						8.7	12		9.4	7.4
Acetone	7.4J	3.6J	7.4J	5.8J	8.7J	11	2.2J	3.8J	5.9J	3.3J
1,1-Dichloroethene										
trans-1,2-Dichloroethene										
Vinyl Acetate										
1,1-Dichloroethane						2.4J	3.1J		2.2J	2.1J
2-Butanone							3.1J			
cis-1,2-Dichloroethene	0.68J	2.9J	0.68J	0.95J	0.55J	2.3J	31	2.2J	5.7	29
2,2-Dichloropropane					2.0J	3.3J	1.6J			
Cloroform										
1,2-Dichloroethane										
Benzene						3.7J	1.7J		1.5J	0.9J
Trichloroethene	1.8J	4.7J	1.4J	2.7	1.9J	12J	1600J	27J	72J	200J
1,2-Dichloropropane										
trans-1,3-Dichloropropene				1.6J						
Tetrachloroethene	0.75J	1.6J		1.1J	0.79J		7.2J	3.8J	7.8J	11J
Chlorobenzene						3.3J				0.75J
TOTAL (mg/kg)	0.011	0.014	0.01	0.012	0.014	0.047	1.66	0.037	0.11	0.25

* FD SS11 is a duplicate of SM-11 at 10 ft.

Stage 1 - Soil Results

location	SB10	FD SS-11	SB-11		SB-12		SB-13		SB-14	
depth (ft bgs)	18	15	10	18	14	18	12	18	14	18
units ug/kg										
Vinyl Chloride	7			29						
Acetone										
1,1-Dichloroethene					0.61J					
trans-1,2-Dichloroethene				0.7J						
Vinyl Acetate										
1,1-Dichloroethane	2.3J			2.1J		2.4J		1.5J		1.1J
2-Butanone										
cis-1,2-Dichloroethene	34	0.58J		62	0.71J	13		26	1.4J	25
2,2-Dichloropropane										
Cloroform						2J				
1,2-Dichloroethane								4.3J		1.6J
Benzene	0.77J									
Trichloroethene	1100	7.5	5.4	170	22	1200	4.7J	12J	3.2J	2.9J
1,2-Dichloropropane				14		16				
trans-1,3-Dichloropropene					1.9J					
Tetrachloroethene	3.5J	2.0J	1.5J	6.2	5.5	39J	1.1J		0.87J	
Chlorobenzene										
TOTAL (mg/kg)	1.15	0.01	0.007	0.28	0.031	1.27	0.006	0.044	0.005	0.031

* FD SS11 is a duplicate of SM-



U.S. Army Corps of Engineers
Sacramento District

Soil and Groundwater Sampling Results
Lorentz Barrel and Drum
San Jose, Californian

FIGURE 3-1

Edited By: Verne Brown, P.G. USACOE

Date: 03/18/08
Filename: soilvapormonitor locs

Table 1
Lorentz Barrel and Drum Soil Data - July 2008

Stage 2 Results - Soil

Units - ug/Kg	SB-1		SB-2		SB-3						SB-4				
	20	25	14	20	6	7	9	11	15	20	7	11	17	20	FD1
Vinyl Chloride	0.89 J	6 J		4.1 J								1.3 J	11	11	5.8
Acetone	3.2 J							1400 J				300 J	26	7.1 J	13 J
Freon 113		1.1 J													
1,1-Dichloroethene	1.7 J	53	0.86 J	1.2 J											
Methylene Chloride					920 J	910 J	1800 J	410 J	56 J	61 J	160 J				
MTBE															
trans-1,2-Dichloroethene				0.82 J									0.84 J		
1,1-Dichloroethane		3.5 J											3.8 J		
2-Butanone									82 J			32	4.1 J	1.8 J	2.8 J
cis-1,2-Dichloroethene	7.7	32	6 J	14								3.7 J		J	2.2 J
Cloroform															
1,1,1-Trichlorethane		11													
1,2-Dichloroethane		3.2 J													
Benzene												1 J	11	0.92 J	
Trichloroethene	54	78	460	87								1 6 J		4 J	5.4
1,2-Dichloropropane		2.4 J		1.9 J									1.8 J		
4-Methyl-2-Pentanone								380 J	130 J			4.3 J	1.1 J		
Toluene									300	40 J		7.6	28		
1,1,2-Trichloroethane															
2-Hexanone												1.1 J			
Tetrachloroethene	16	19	7.4 J	12											
Chlorobenzene												0.8 J			
Ethylbenzene					2700 J	800 J	1500 J	330 J	150 J		120 J	11	3.4 J		
m,p-Xylenes					7800	2100 J	5200 J	1400	740	190	230 J	20	93		
o-Xylene					4100	1100 J	2900 J	700 J	360		110 J	11	56		
Styrene					430 J							1.4 J			
Isopropylbenzene					650 J				20 J	19 J		0.91 J	2.2 J		
1,2,3-Trichloropropane															
Propylbenzene					1400 J	460 J	1100 J	180 J	41 J	45 J	110 J	3.3 J	1.4 J		
1,3,5-Trimethylbenzene					4300	1600 J	4100 J	670 J	170	140 J	340 J	12	9.2		
1,2,4-Trimethylbenzene					15000	6000	17000	2700	660	470	1100	53	26		
sec-butylbenzene					1200 J	490 J	1100 J	160 J	28 J	50 J	110 J	2.2 J	0.82 J		
para-Isopropyl Toluene					2400 J	990 J	3000 J	410 J	160	120 J	300 J	9.7	3.6 J		
1,3-Dichlorobenzene					1400 J						100 J	23	0.78 J		
1,4-Dichlorobenzene					1500 J						200 J	22			
n-butylbenzene					1900 J	890 J	2100 J	270 J	47 J	78 J	220 J	7.2			
1,2-Dichlorobenzene					2100 J	850 J	1600 J	200 J	61 J	37 J	140 J	33	3 J		
1,2,4-Trichlorobenzene					22000	2400 J	1900 J	340 J	29 J	34 J	2300	520	2.5 J	2.8 J	3.3 J
Naphthalene					13000	9700	19000	2100	520	270	1400	84	2.3 J		
1,2,3-Trichlorobenzene					1600 J	600 J					500 J	10			
Total VOCs	83.2	209.2	474.3	121	84400	28890	62300	11650	3554	1554	7440	1177.1	291.8	30.1	32.5
1,4-Dioxane								86 J	110	7.5 J		6.5 J	29 J		

Table 1
Lorentz Barrel and Drum Soil Data - July 2008

Stage 2 Results - Soil

Units - ug/Kg	SB-5		SB-6		SB-7		SB-8		SB-9		SB-10		
	20	24	13	20	15	20	15	20	14	20	16	20	FD2
Vinyl Chloride	1.3 J					7.5 J		0.64 J		3 J	1 J	0.63 J	0.63 J
Acetone					2.7 J	4.4 J		3 J		6.4 J	2.3 J	2 J	2.6 J
Freon 113													
1,1-Dichloroethene	0.88 J		38	4 J	26	J	8.8	0.84 J	2.8 J	1.8 J	1.5 J	0.66 J	0.69 J
Methylene Chloride													
MTBE				1.5 J									
trans-1,2-Dichloroethene													
1,1-Dichloroethane			3.5 J			1.8 J				0.87 J	1.9 J		
2-Butanone						1.2 J				1.4 J		0.95 J	
cis-1,2-Dichloroethene	4.8 J		3.2 J	2.4 J	7 J	29	4.1 J	6.8		6.8	13	2.5 J	2.6 J
Cloroform													
1,1,1-Trichlorethane			9.2 J	J	8.9	0.75 J	4.9 J		2 J		1.7 J		
1,2-Dichloroethane				1.5 J									
Benzene													
Trichloroethene	79	250	19	40	50	84	490	96	9.8	16	6.8	28	26
1,2-Dichloropropane	1.8 J					1.6 J		1.6 J		0.92 J	1 J		0.69 J
4-Methyl-2-Pentanone													
Toluene													
1,1,2-Trichloroethane													
2-Hexanone													
Tetrachloroethene	9.5	43 J	4.5 J	17	3.3 J	12	4.4 J	16				2.4 J	2.3 J
Chlorobenzene						0.79 J							
Ethylbenzene													
m,p-Xylenes													
o-Xylene													
Styrene													
Isopropylbenzene													
1,2,3-Trichloropropane													
Propylbenzene													
1,3,5-Trimethylbenzene													
1,2,4-Trimethylbenzene													
sec-butylbenzene													
para-Isopropyl Toluene													
1,3-Dichlorobenzene													
1,4-Dichlorobenzene													
n-butylbenzene													
1,2-Dichlorobenzene													
1,2,4-Trichlorobenzene													
Naphthalene													
1,2,3-Trichlorobenzene													
Total VOCs	97.3	293	77.4	68.4	97.9	145.4	512.2	124.9	14.6	37.2	29.2	37.1	35.5
1,4-Dioxane													

Table 1
Lorentz Barrel and Drum Soil Data - July 2008

Stage 2 Results - Soil

Units - ug/Kg	SB-11		SB-12			SB-13				SB-14			SB-15		
	15	20	15	17	20	15	FDA	20	25	17	20	23	15	20	25
Vinyl Chloride		1.1 J		6.8 J	6.3 J			16	1 J		0.59 J	0.74 J			
Acetone					2.7 J				9.1 J						
Freon 113												0.53 J			
1,1-Dichloroethene			3.9 J	4.1 J	1.9 J	2.4 J	1.6 J	5.5			1.2 J	0.96 J		1.8 J	
Methylene Chloride							4.9 J	4.8 J							
MTBE				0.26 J											
trans-1,2-Dichloroethene								3.4 J							
1,1-Dichloroethane	1.7 J		1.2 J	1.8 J	1.9 J	2.8 J	1.7 J	2.6 J		1 J	5 J	1.4 J		3.6 J	
2-Butanone					0.94 J				1.3 J						
cis-1,2-Dichloroethene	4.9 J	2.9 J	41	21	22	31	18	76	6.1	7.5	51	18	4.9 J	53	2.5 J
Cloroform			1.8 J			2.9 J	J				2.2 J			1.8 J	
1,1,1-Trichlorethane			2 J	1.6 J		2 J	1.4 J	2.1 J			0.84 J			0.96 J	
1,2-Dichloroethane			8.3	5	1.2 J	8.5	5.4 J	3.5 J						2.8 J	
Benzene				J				0.69 J							
Trichloroethene	6.4 J	36	600	180	51	1100	950	2300	36	320	850	1000	89	1100	23
1,2-Dichloropropane			1 J	1 J	0.99 J	19	10	22		6.8	45	8.7	2.2 J	26	
4-Methyl-2-Pentanone															
Toluene															
1,1,2-Trichloroethane						3.4 J	2 J							1.9 J	
2-Hexanone															
Tetrachloroethene		2.7 J	710	75	3.9 J	460	94	49		25	48	39	53	540	0.88 J
Chlorobenzene				0.58 J										2.2 J	
Ethylbenzene															
m,p-Xylenes															
o-Xylene															
Styrene															
Isopropylbenzene															
1,2,3-Trichloropropane													2.4 J	3.3 J	
Propylbenzene															
1,3,5-Trimethylbenzene															
1,2,4-Trimethylbenzene															
sec-butylbenzene															
para-Isopropyl Toluene															
1,3-Dichlorobenzene									0.63 J						
1,4-Dichlorobenzene															
n-butylbenzene															
1,2-Dichlorobenzene															
1,2,4-Trichlorobenzene									7.7						
Naphthalene															
1,2,3-Trichlorobenzene									0.66 J						
Total VOCs	13	42.7	1369.2	297.6	92.8	1632	1090.7	2485.6	62.5	360.3	1003.8	1069.3	151.5	1737.4	26.4
1,4-Dioxane			99	33 J										5.2 J	

Table 1
Lorentz Barrel and Drum Soil Data - July 2008

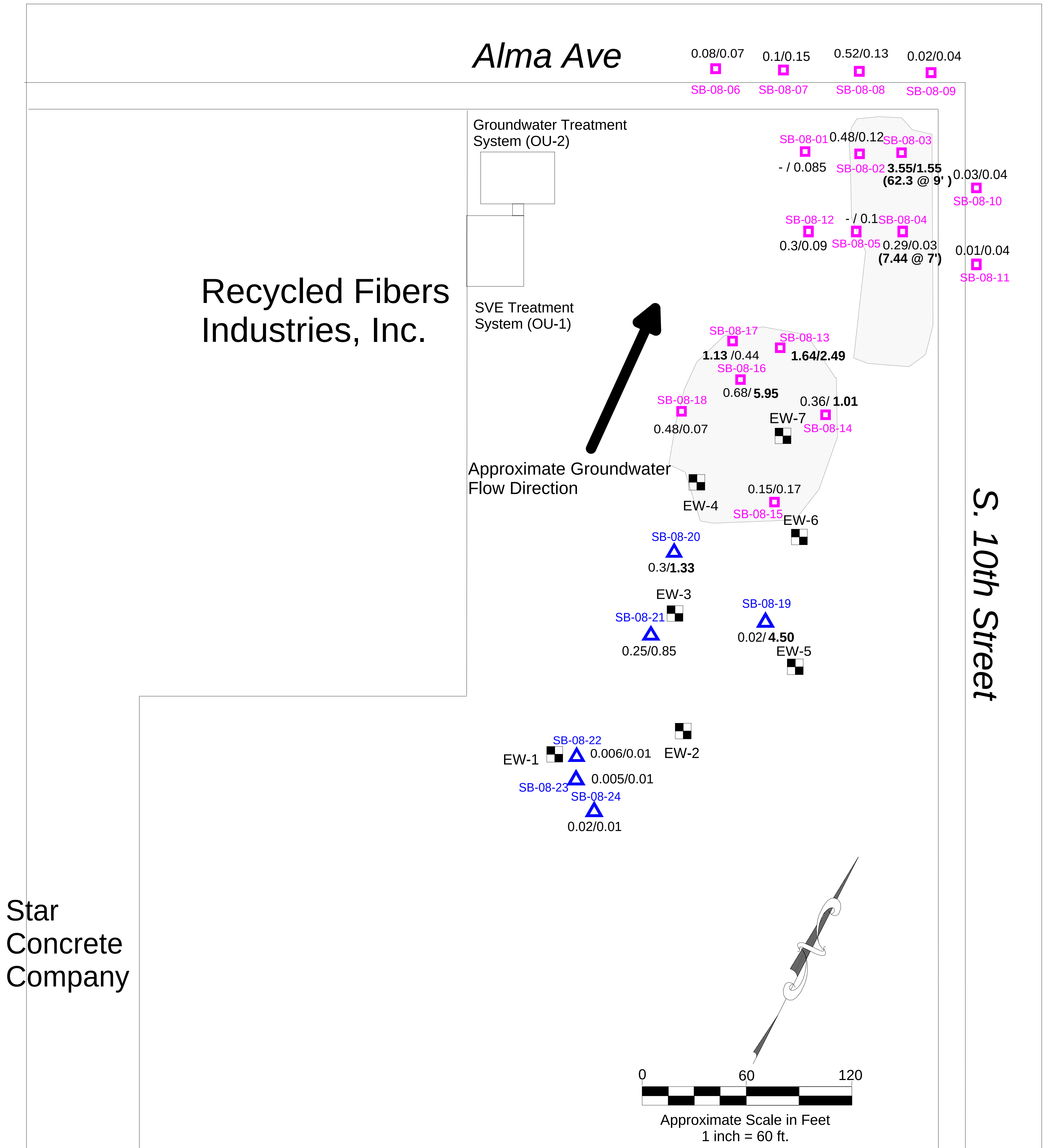
Stage 2 Results - Soil

Units - ug/Kg	SB-16				SB-17			SB-18		SB-19		
	15	FD5	20	25	16	20	25	16	20	16	20	24
Vinyl Chloride				3 J		8.7 J	2.3 J		3.9 J			0.98 J
Acetone				1.6 J		3.6 J	8.8 J					4.2 J
Freon 113						0.49 J						
1,1-Dichloroethene	1.3 J	2.2 J			13	7.3		2.5 J	0.68 J			1.4 J
Methylene Chloride			290 J									
MTBE												
trans-1,2-Dichloroethene												
1,1-Dichloroethane	1.6 J	2.5 J			5.6 J	2.8 J	1 J	2.4 J	1.1 J	1 J		
2-Butanone						1 J	1.4 J					1.2 J
cis-1,2-Dichloroethene	13	22	230	15	19	31	13	12	18	42	340	34 J
Cloroform		1.5 J			2.6 J			0.93 J				
1,1,1-Trichlorethane		1.1 J			6.6 J	2.4 J		1.7 J				
1,2-Dichloroethane					6.7 J							1.7 J
Benzene								0.4 J				
Trichloroethene	640	630	4800	32	950	370	27	380 J	48	120	3900	590
1,2-Dichloropropane	3.6 J	6.5 J		1.2 J	5.2 J	1.9 J		1.7 J		2.5 J		3.9 J
4-Methyl-2-Pentanone												
Toluene												
1,1,2-Trichloroethane												
2-Hexanone												
Tetrachloroethene	13	33	630	1.2 J	120	8.3		66 J+	1.4 J	23	260	8.9
Chlorobenzene						0.98 J						
Ethylbenzene												
m,p-Xylenes												
o-Xylene												
Styrene												
Isopropylbenzene												
1,2,3-Trichloropropane												
Propylbenzene												
1,3,5-Trimethylbenzene												
1,2,4-Trimethylbenzene												
sec-butylbenzene												
para-Isopropyl Toluene												
1,3-Dichlorobenzene												
1,4-Dichlorobenzene												
n-butylbenzene												
1,2-Dichlorobenzene												
1,2,4-Trichlorobenzene										1.5 J		
Naphthalene												
1,2,3-Trichlorobenzene												
Total VOCs	672.5	698.8	5950	54	1128.7	438.5	53.7	467.6	73.1	190	4500	646.3
1,4-Dioxane	66	71	25 J		8.2 J			4.9 J			6 J	

Table 1
Lorentz Barrel and Drum Soil Data - July 2008

Stage 2 Results - Soil

Units - ug/Kg	SB-20				SB-21				SB-22			SB-23			SB-24	
	10	15	FD6	20	12	15	17	20	10	15	20	15	20	FD8	15	20
Vinyl Chloride		4.5 J		13	22	140 J	420	9.6 J								
Acetone	2.5 J		2.7 J	1.9 J	6.2 J	12 J	17 J	6.7 J			5.6 J		7.9 J	5.1 J		8.4 J
Freon 113													1.1 J	0.94 J		2.7 J
1,1-Dichloroethene		2.1 J		7.4			1.9 J									
Methylene Chloride																
MTBE											0.84 J		0.84 J	0.79 J		
trans-1,2-Dichloroethene		1.5 J		2 J		2.2 J	6.3									
1,1-Dichloroethane		11		12	2 J	7.8	14	1.1 J		1.2 J			0.92 J	0.8 J		
2-Butanone						2.8 J	3.6 J						2.1 J	1.5 J		2 J
cis-1,2-Dichloroethene	1.9 J	120 J	5.9	440	6	6.9	330	21		23					2 J	
Cloroform				1 J												
1,1,1-Trichlorethane				0.86 J												
1,2-Dichloroethane										4.2 J						
Benzene		2.2 J		1.3 J	0.88 J	2 J	2.8 J									
Trichloroethene	1.7 J	130	5.4 J	830	5.5 J	2.2 J	39	5	3.7 J	26		3.6 J			12	
1,2-Dichloropropane		14		14	1.3 J	2.8 J	11	0.92 J		2.1 J						
4-Methyl-2-Pentanone																
Toluene						1.2 J										
1,1,2-Trichloroethane																
2-Hexanone																
Tetrachloroethene		12		5.1 J	1.9 J		1.8 J		1.5 J			1.6 J			7.5 J	
Chlorobenzene																
Ethylbenzene						1.1 J										
m,p-Xylenes						2.5 J										
o-Xylene						2.7 J	1.7 J									
Styrene																
Isopropylbenzene																
1,2,3-Trichloropropane																
Propylbenzene																
1,3,5-Trimethylbenzene																
1,2,4-Trimethylbenzene						2.1 J										
sec-butylbenzene																
para-Isopropyl Toluene						1 J										
1,3-Dichlorobenzene					23	20										
1,4-Dichlorobenzene					3.5 J	3.1 J										
n-butylbenzene																
1,2-Dichlorobenzene					2.5 J	5.7 J				3.3 J						
1,2,4-Trichlorobenzene					57	24		0.7 J								
Naphthalene		1.5 J			0.48 J	0.78 J										
1,2,3-Trichlorobenzene					1.4 J											
Total VOCs	6.1	298.8	14	1328.6	133.7	242.9	849.1	45	5.2	59.8	6.4	5.2	12.9	9.1	21.5	13.1
1,4-Dioxane		37 J		8.7 J		5.7 J	8.7 J									



LEGEND

Soil Sample Location To Define Extent Of Contamination In Aquitard

SVE Confirmation Soil Sample Location

SVE Extraction Well

1.02/0.03 Total VOCs (mg/kg) in soils at approximately 15 and 20 feet BGS except where noted. BOLD where exceeding clean-up standard of 1.0 mg/kg.

SB-08-10 Soil Boring Location - Extent of Contamination

SB-08-19 Soil Boring Location - SVE Confirmation

Excavated Area / Basin Identified From Previous Investigations

U.S. Army Corps of Engineers Sacramento District	Total VOCs in Soil Samples at 15 and 20 Feet bgs Lorentz Barrel and Drum Site San Jose, California	FIGURE 3-1
Edited By: Verne Brown, P.G. USACOE	Date: 10/20/08 Filename: soilvapormonitor locs	

Attachment C

Groundwater Contaminant Concentration Evaluation

Groundwater Contaminant Concentration Evaluation

An evaluation of the shallow groundwater contaminant concentrations was performed for the Lorentz Barrel and Drum site. Data from the fall 2008 groundwater sampling was used to evaluate the areal distribution of 1,1-DCA, 1,1-DCE, cis-1,2-DCE, PCE TCE and vinyl chloride in the shallow groundwater plume. The fall 2008 groundwater chemistry data was used as it coincided with a larger than normal sampling event where more of the site's wells were sampled. This evaluation took the most of the site's total CVOCs and contoured them individually by hand. They were contoured over the fall 2009 groundwater potentiometric surface map. The maps are included as figures 1 through 6 at the end of this attachment.

The following discussion pertains to each contaminant of concern at the site:

- *1,1-DCA* *(*Figure 1)
  - 1,1-DCA is distributed in relatively low concentrations throughout the groundwater plume. It's concentration at the distal end were 3.1 µg/L in MW-24, 5.2 µg/L at MW-22, 4.5 µg/L at MW-38, and 2.9 µg/L at MW-39A. Nearer the source, the concentrations were 3.1 µg/L at MW-6 and 8.8 µg/L at P-6. Currently there are no down gradient wells that are non-detect for this compound. As 1,1-DCA is often a breakdown of 1,1,1-TCA, it is generally collocated with 1,1,1-TCA except in the distal wells MW-22 and MW-24. As the concentration of 1,1,1-TCA degrades over time potentially the 1,1-DCA concentrations will also be reduced.
  - The highest concentration was found immediately down gradient of the source area in P-18 at 31 µg/L. Concentrations immediately down gradient of the extraction wells were 4.5 µg/L in P-10, 5.9 µg/L in P-26, 2.7 µg/L in P-28 and 2 µg/L in P-30.
  - Non-detects were found in the eastern boundary of the plume in monitoring wells MW-41, MW-42 and in the up gradient well MW-2. A comparison of the fall 2008 data with the fall 2009 data shows that the fall 2009 concentrations are similar in the distal end wells to the concentrations recorded in 2008.
  - Source area wells P-6 and P-9 show fairly reliable downward trends for 1,1-DCA. Data from down gradient wells, is relatively inconsistent and for a few wells may be showing increases but the data over time bounces up and down and it would be difficult to suggest a trend. MW-22 has shown a relatively consistent upward trend since 2005 but it's reliability because of too few data points puts the appearance of a trend in question.
  - In general, the concentrations up gradient and down gradient of the extraction wells are within the same range as in 2008. At the up gradient end of the plume, the concentration at P-18 increased from 31 µg/L to 72 µg/L.
  - The extraction wells appear to have a minimal impact to the concentration of 1,1-DCA in groundwater. Up gradient well P-12 has a concentration of 5.4 µg/L and immediately down gradient of the extraction wells is 5.9 µg/L in P-26 and 4.5 µg/L in P-25. While there is no apparent trend in MW-38 at the down gradient end of the plume, this well and MW-22 approach and exceed the State MCL of 5 µg/L in, a down gradient monitoring well should be considered.
  - There is currently no federal MCL for 1,1-DCA. The State MCL is 5 µg/L.

- *1,1-DCE* (Figure 2)
  - The 1,1-DCE groundwater plume is not distributed throughout the entire groundwater monitoring network. Down gradient wells MW-22, MW-24, and MW-40 have low to non-detect concentrations of 1,1,-DCE. Non-detects are also found along the boundaries of the plume except in areas of MW-40 (1 µg/L, northeast area of the plume), MW-36, (3.5 µg/L, southeast area of the plume) and at MW-22 (1.3 µg/L, down gradient end of the plume).
  - The highest concentration of 1,1-DCE is found at monitoring well P-18 at 420 µg/L. The concentration at this location increased to 720 µg/L in 2009.
  - At monitoring wells immediately down gradient of the extraction wells, the 2008 concentrations of 1,1-DCE are nearly the same as at the up gradient well P-12.
  - In comparing the 2008 data with the 2009 data, a change occurred in the 2009 sample results near extraction well EX-13 where the concentration of 1,1,-DCE is reduced from 44 µg/L to 15 µg/L. A smaller decrease occurred near extraction well EX-9 where the concentration of 1,1,-DCE is monitoring well P-30 is reduced from 24 µg/L to 18 µg/L. This may be evidence of the increased pumping that occurred in the extraction well field starting in the fall of 2008. The same phenomena doesn't appear true near extraction well EX-19 where the concentrations both up gradient and down gradient are essentially the same in 2008 and 2009 and minimal impact is seen of the groundwater treatment system.
  - Consideration should be given to a non-detect monitoring well down gradient of MW-22 and continued regular monitoring of MW-37, the nearest up gradient well to MW-22.
  - The federal MCL is 7 µg/L; State of California MCL is 6 µg/L.
- *cis-1,2-DCE* (Figure 3)
  - The cis-1,2-DCE groundwater plume is also not distributed throughout the entire groundwater monitoring well network. Down gradient well MW-24 is non-detect for cis-1,2-DCE. Peripheral wells MW-40, MW-41, MW-42, MW-25, MW-36, P-21, P-11, MW-35 and MW-15 are non detect for cis-1,2-DCE. Up gradient well MW-2 is also non-detect for cis-1,2-DCE. There appears to be three hot spots; one is near the source area in P-6, another at MW-19/EX-7 and a third at P-24 near Extraction well EX-19. This third hot spot may be a continuation of the hotspot at MW-19/EX-7.
  - The highest concentrations were found in monitoring wells MW-19/EX-7 (160 µg/L) and in source area well P-6 (150 µg/L).
  - Down gradient of the extraction well field, the concentrations of cis-1,2-DCE ranged from non-detect in well P-30 to 11 µg/L in P-26.
  - A comparison with the 2009 data showed an increase in concentration of cis-1,2-DCE in P-9 from 88 µg/L to 130 µg/L and an increase in P-18 from 59 µg/L to 130 µg/L. A decrease was noted in P-26 from 11 µg/L to 3.2 µg/L and in source area well P-6 from 150 µg/L to 75 µg/L. The decrease in concentration at P-26 may also coincides with the increased pumping from the extraction well field at extraction well EX-13.
  - The current well field annual sampling seems to adequately depict the cis-1,2-DCE groundwater plume.
  - The currently federal MCL is 70 µg/L while the State MCL is 6 µg/L.

- *PCE* (Figure 4)
    - The PCE groundwater plume is relatively small in comparison to the other groundwater contaminants. PCE currently only shows up in four wells, P-6, MW-19/EX-7, P-18 and P-22.
    - The PCE plume is surrounded by numerous non-detect wells.
    - The highest concentration is in source area well P-6 at 29 µg/L. The wells down gradient of the source that are affected are MW-19/EX-7 (6.7 µg/L) and P-18 (17 µg/L). Cross gradient well P-22 has a very small amount of PCE (0.57 µg/L).
    - The federal MCL for TCE is 2 µg/L; the State MCL is 0.5 µg/L.
- *TCE* (Figure 5)
    - The TCE groundwater plume is much less dispersed than either the 1,1-DCA or 1,1-DCE groundwater plumes.
    - The entire TCE plume appears to be located up gradient of the extraction well field. All wells down gradient of the extraction well field are non-detect for TCE.
    - The 5 µg/L plume has a fairly well defined boundary; it is bracketed by non-detections in all directions.
    - The highest concentration is in the source area well, P-6, at 320 µg/L. Down gradient of the source area, wells P-9 (230 µg/L) and P-15 (190 µg/L) show the next highest concentrations.
    - If the concentration of TCE in the groundwater is any indication of groundwater flow, it would appear that this plume is naturally being directed more towards MW-37 than towards the extraction well field. In fact, it would almost appear the extraction well field may be only slightly pulling the TCE plume towards the extraction well field. Consideration should be given to regular monitoring of MW-37 and MW-22.
    - Changes of TCE concentrations in groundwater between the 2008 and 2009 were minimal. However, two changes are noted. At P-26, immediately down gradient of the extraction well field, the concentration of TCE decreased from 3.1 µg/L in 2008 to 1.3 µg/L in 2009. This reduction may be an impact of increasing groundwater pumping from the extraction well field at EX-13. Monitoring wells adjacent to EX-9 were non-detect for both events so a correlation to the increased extraction rate could not be made. Near EX-19, adjacent monitoring well P-24 was not sampled in 2009, so again a correlation could not be made.
    - Recommend regular sampling of monitoring well P-24. Monitoring well P-12, up gradient of the extraction well field, shows a fairly good upward trend of TCE. P-22, a monitoring well immediately down gradient of the source area, also shows a fairly reasonable upward trend of TCE, though it is not a statistically significant trend.
    - The federal MCL for TCE is 5 µg/L; the State MCL for TCE is also 5 µg/L.
- *Vinyl Chloride* (Figure 6)
    - The vinyl chloride plume, a breakdown product of TCE, in groundwater is not well distributed throughout the monitoring well network at the site. The vinyl chloride plume in long and narrow and trends to the northwest. Non-detects were noted in numerous peripheral wells MW-40, MW-41, MW-42, MW-11, MW-35, MW-15, P-21, MW-36 and

MW-25. Down gradient wells MW-24, MW-39A, and MW-38 all had non-detects for 2008.

- The highest concentration of vinyl chloride was found in source area well P-6 at 60 µg/L. The next highest concentrations were in down gradient well P-24 (35 µg/L), MW-19/EX-7 (34 µg/L) and P-9 (38 µg/L). P-24 is down gradient of EX-19. P-9 is immediately down gradient of the source area. MW-19/EX-7 is immediate between the source and the extraction well field.
- The most down gradient of the vinyl chloride plume wells, MW-22, showed a concentration of 7.1 µg/L in 2008.
- In comparing the 2008 and 2009 vinyl chloride concentrations, increases occurred at P-9 (from 38 µg/L to 46 µg/L), P-18 (from 25 µg/L to 73 µg/L), MW-22 (from 7.1 µg/L to 8 µg/L), MW-38 (0.55 µg/L), P-26 (26 µg/L from 6.1 in 2009).
- The increase at P-26 is significant as it is immediately down gradient of EX-13. The increase at MW-22 is significant in that it appears to be the farthest down gradient well in the well monitoring network.
- A monitoring well down gradient of MW-22 should be considered.
- There were no statistically significant vinyl chloride trends. However, there is an apparent upward trend in the vinyl chloride concentrations at MW-22. The reason it could not be calculated statistically is that there were not enough data points to calculate a trend. However, in evaluating the data visually, the concentrations in 1999 and 2000 were non-detect and have been rising fairly significantly since 2005.
- The federal MCL for vinyl chloride is 2 µg/L and the State MCL is 0.5 µg/L.

Attachment D

Groundwater Concentration Trend Analysis

The *Minitab* software was used to evaluate VOC concentration trends in nine monitoring wells (MW-22, MW-24, MW-38, P-6,P-9, P-12, P-18, P-22, and P-26) for the analytes 1,1-DCA, 1,1-DCE, TCE, vinyl chloride, and 1,1,1-TCA where sufficient data was available to perform the trend analyses. Only data from 1999 to 2009 was used. The *Minitab* software was used to calculate both linear regression and the Mann-Kendall test. In addition, further statistical analyses were performed by calculating parameters such as confidence intervals, prediction intervals, and Sen's slope as discussed below. The following includes a discussion of the various statistical concepts, a summary table of the statistical trend information, output from the *Minitab* software and the concentration versus time plots from the Fall 2009 Groundwater Monitoring Report for Lorentz.

- *Linear regression*. Linear regression examines the relationship between a response and predictor(s). In order to determine whether or not the observed relationship between a response and (difference in contaminant concentration) and predictors (time) is statistically significant. Elements of linear regression are slope (b), coefficient p-value, prediction intervals, and confidence intervals. These elements are discussed below:

    - *Slope (b).* Slope is the slant of the regression line. It is the change in Y (contaminant concentration that occurs when X increases by one unit (date of next sampling event).

    - *Coefficient p-values (P)*. The coefficient value for P (p-value) indicates whether or not the association between the response and predicator(s) is statistically significant. If the p-value is smaller than the α-level selected, the association is statistically significant. A commonly used α-level is 0.05 (95% confidence level) so if the p-value is less than 0.05 then the equation is statistically significant.

    - *Prediction intervals (PI)*. PI illustrates the range of likely values for new observations (values of contaminants). These values represent a series of prediction intervals that span the range of observed values (known contaminant concentrations from sampling and analysis results).

    - *Confidence intervals (CI).* Confidence intervals are used to indicate the reliability of an estimate. How likely the interval is to contain the parameter is determined by the confidence level or confidence coefficient. A confidence interval is always qualified by a particular confidence level, usually expressed as a percentage; for example a "95% confidence interval" was used to evaluate the Lorentz groundwater data. The end points of the confidence interval are referred to as confidence limits. For a given estimation procedure, the higher the confidence level, usually the wider the confidence interval will be. A 95% confidence interval does not mean that there is a 95% probability that the interval contains the true mean. The interval computed from a given sample either contains the true mean or it does not. Instead, the level of confidence is associated with the method of calculating the interval. The confidence coefficient is simply the proportion of samples of a given size that may be expected to contain the true mean. That is, for a 95% confidence interval, if many samples are collected and the confidence interval computed, in the long run about 95% of these intervals would contain the true mean.

- *Mann-Kendall Test* The Mann-Kendal test is a signed rank test and assumes no particular distribution, i.e., it doesn't have to be normally distributed. It is based on the difference between the numbers of pair-wise differences (number of positive signs minus the number of negative). If the difference is a large positive value, then there is evidence of an increasing trend in the data and if it is a large negative value, then there is evidence of a decreasing trend. The baseline condition for this test (null hypothesis) is that there is no temporal trend in the data values. The alternative hypothesis is that of either an upward trend or a downward trend. The null hypothesis (there is no trend) is rejected when the computed Z value is greater than Z_α where α is the level of statistical significance.

The Mann-Kendall test is used for detecting trends in data collected over time. An adjustment is made for tied observations in this non-parametric test. You must have at least 10 observations for the Normal approximation to be appropriate. Normal approximation is often used to test the difference between scores of data where the central point under the null hypothesis would be expected to be zero. Scores exactly to the central point are excluded and the absolute values of the deviation from the central point of the remaining score are ranked such that the smallest deviation has a rank of 1. Tied scores are assigned a mean rank. The sums for the ranks of scores with positive and negative deviations from the central point are then calculated separately. A value *S* is defined as the smaller of these two rank sums. *S* is then compared to a table of all possible distributions of ranks to calculate *p*, the statistical probability of attaining *S* from a population of scores that is symmetrically distributed around the central point. *S* is measured in the units of the response variable and represents the standard distance data values fall from the regression line. Normally the better the equation predicts the response, the lower the value of *S*.

As the number of scores used, *n*, increases, the distribution of all possible ranks *S* tends towards the normal distribution. So although $n \leq 20$, exact probabilities would usually be calculated, for $n > 20$, the normal approximation is used. The recommended cutoff varies; some use 20 although some put it lower (10) or higher (25). *Minitab* calculates Mann-Kendall trend test by normal approximation at data where *n* is greater than 10.

- *z-value* The *z*-value measures how far an observation lies from its mean in units of standard deviation. Converting an observation to a z-value is called standardization. To standardize an observation in a population, subtract the population mean from the observation of interest and divide the result by the population standard deviation. The product of these operations is the *z*-value associated with the observation of interest. As discussed above there is no trend when the computed *z*-value is greater than z_α where α is the level of statistical significance (for a definition of statistical significance see coefficient p-values above).

- *R2* Statistical measure of how well a regression line approximates real data points; an r-squared of 1.0 (100%) indicates a perfect fit. In linear regression, R2 is simply the square of the sample correlation coefficient between the outcomes and their predicted values, or in the case of simple linear regression, between the outcome and the values being used for prediction.

- *Sen's slope* Sen's slope is an alternative for estimating a slope. This approach involves computing slopes for all the pairs of time points and then using the median of these slopes as an estimate of the overall slope. If there is no underlying trend, there will be an approximately equal number of positive and negative slopes, and thus the median will be near zero. Sen's slope provides an estimate of the slope (unit change, i.e., contaminant concentration per time period) or the magnitude of the trend. Sen's slope was only calculated for those wells and analytes that were identified as having a reliable trend.

Computed Trends at the Lorentz Barrel and Drum Sites

The statistical calculation results and the linear regression plots are included in this appendix. A summary analysis is included below. The data used was from the time frame fall 1999 through fall 2009, roughly a ten year time span. In some instances, the Mann-Kendall Test could not be performed as there was insufficient data during that time span. Where there is not sufficient data to perform a Mann-Kendall Test and where there was not enough evidence to support a trend, the Sen's slope analysis was not performed. The '*z-value*' can be used a predictor of slope, i.e, where it is negative, the trend may be downward. However, the reliability of using that as a predictor is not supported by the *Minitab* software.

Well No.	Analyte	Predicted Trend (Mann-Kendall)	Calculated Z	Sen's Slope concentration per unit time (µg/L)	R^2 value (percentage)
MW-22	1,1-DCA	Not enough evidence to support a trend	1.09656	Not calculated	25.7%
MW-22	Vinyl Chloride	Not enough data to perform a Mann-Kendall	Not calculated	Not calculated	70.5%
MW-24	1,1,-DCA	Not enough evidence to support a trend	1.51935	Not calculated	13.5%
MW-38	1,1-DCA	Not enough evidence to support a trend	2.25527	Not calculated	0%
MW-38	1,1-DCE	Evidence to support an upward trend	2.07817	2.3 µg/L/yr upward	37.9%
MW-38	1,1,1-TCA	Not enough evidence to support a trend*	-0.55391	Not calculated	2.9%
P-6	1,1-DCA	Evidence to support a downward trend	-3.20156	-2.9 µg/L/yr downward	75.5%
P-6	1,1-DCE	Evidence to support a downward trend	-2.50643	-1.14 µg/L/yr downward	45.1%
P-6	TCE	Not enough evidence to support a trend*	-1.32748	Not calculated	36.7%
P-6	Vinyl Chloride	Evidence to support a downward trend	-3.42540	-26 µg/L/yr downward	79.6%
P-9	1,1-DCA	Evidence to support a downward trend	-2.68514	-1,8 µg/L/yr downward	71.2%
P-9	1,1-DCE	Not enough evidence to support a trend*	-0.94770	Not calculated	10.6%
P-9	TCE	Not enough evidence to support a trend*	-0.080236	Not calculated	1.4%
P-9	Vinyl Chloride	Not enough evidence to support a trend*	-1.40987	Not calculated	24.8%
P-12	1,1-DCA	Not enough evidence to support a trend	-0.718421	Not calculated	2.2%
P-12	1,1-DCE	Not enough evidence to support a trend	0	Not calculated	2.5%
P-12	TCE	Evidence to support an upward trend	3.67008	1.75 µg/L/yr upward	86.0%
P-12	Vinyl Chloride	Not enough data to perform a Mann-Kendall	Not calculated	Not calculated	23.4%
P-18	1,1-DCA	Not enough evidence to support a trend*	-0.07809	Not calculated	0%

P-18	1,1-DCE	Not enough evidence to support a trend	0.546608	Not calculated	4.5%
P-18	TCE	Evidence to support a downward trend	-1.64992	-8.3 µg/L/yr	2.1%
P-18	Vinyl Chloride	Not enough evidence to support a trend*	-0.39043	Not calculated	17.0%
P-22	1,1-DCA	There is not data to perform a Mann-Kendall	Not calculated	Not calculated	4.3%
P-22	1,1-DCE	Not enough evidence to support a trend	1.55700	Not calculated	34.3%
P-22	TCE	Evidence to support an upward trend	1.79600	3.3 µg/L/yr	46.2%
P-26	1,1-DCA	Not enough evidence to support a trend	1.16276	Not calculated	34.2%
P-26	1,1-DCE	Not enough evidence to support a trend*	-1.56652	Not calculated	23.8%
P-26	TCE	Not enough data to perform a Mann-Kendall	Not calculated	Not calculated	34.0%
P-26	Vinyl Chloride	Not enough data to perform a Mann-Kendall	Not calculated	Not calculated	40.2%

*Negative Z = possible downward trend

Conclusions

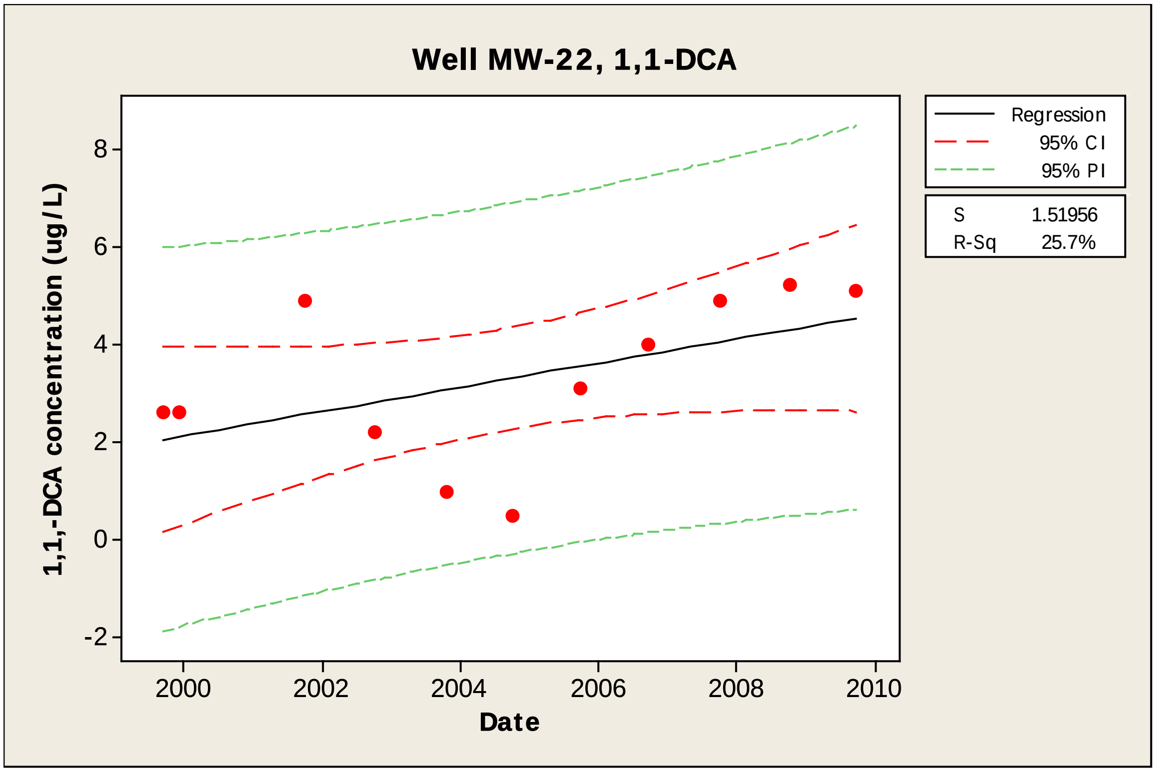
The wells with the more reliable upward trends are wells MW-38 (1,1-DCE), P-12 (TCE), and P-22 (TCE). MW-38 is down gradient of the extraction well field. P-22 is near the source area and P-12 is midway between the source area and the extraction well field. It is recommended that continued monitoring and evaluation be performed at these wells to further evaluate these trends. For a stable plume and a fully functional extraction well network, an increasing trend of a COC down gradient of the extraction well network would not be expected to continue.

The wells with the fairly reliable downward trends are P-6 (1,1-DCA, 1,1-DCE and vinyl chloride), P-9 (1,1-DCA).

The wells with the most reliable trend data are those with estimated R-squared values over 70 percent.

In reviewing the data that was entered into the statistical software, many wells showed quite a bit of fluctuation in the recorded concentrations of the COC values. This may have lead to the large number of wells where a reliable trend could not be calculated. It is not known whether this was a function of data quality, a change in sampling methodology or something inherent in the site conditions.

A few wells visually showed upward trends but didn't have enough data to support a statistical evaluation. Of concern to the project might be vinyl chloride in well MW-22. The 1999-2000 data showed non-detect for vinyl chloride. From 2001 to 2003 there were small periodic hits and then another non-detect in 2004. Vinyl chloride concentrations have been increasing since 2004. Similarly in well P-26, there are not enough vinyl chloride detections to perform a Mann-Kendall trend test but the concentrations do appear to be increasing over time.



Data

Date	1,1-DCA concentration (ug/L)
9/16/1999	2.6
12/14/1999	2.6
11/27/2000	<0.5
10/5/2001	4.9
10/11/2002	2.2
10/29/2003	0.98
10/6/2004	0.49
10/6/2005	3.1
9/29/2006	4
10/10/2007	4.9
10/10/2008	5.2
9/29/2009	5.1

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

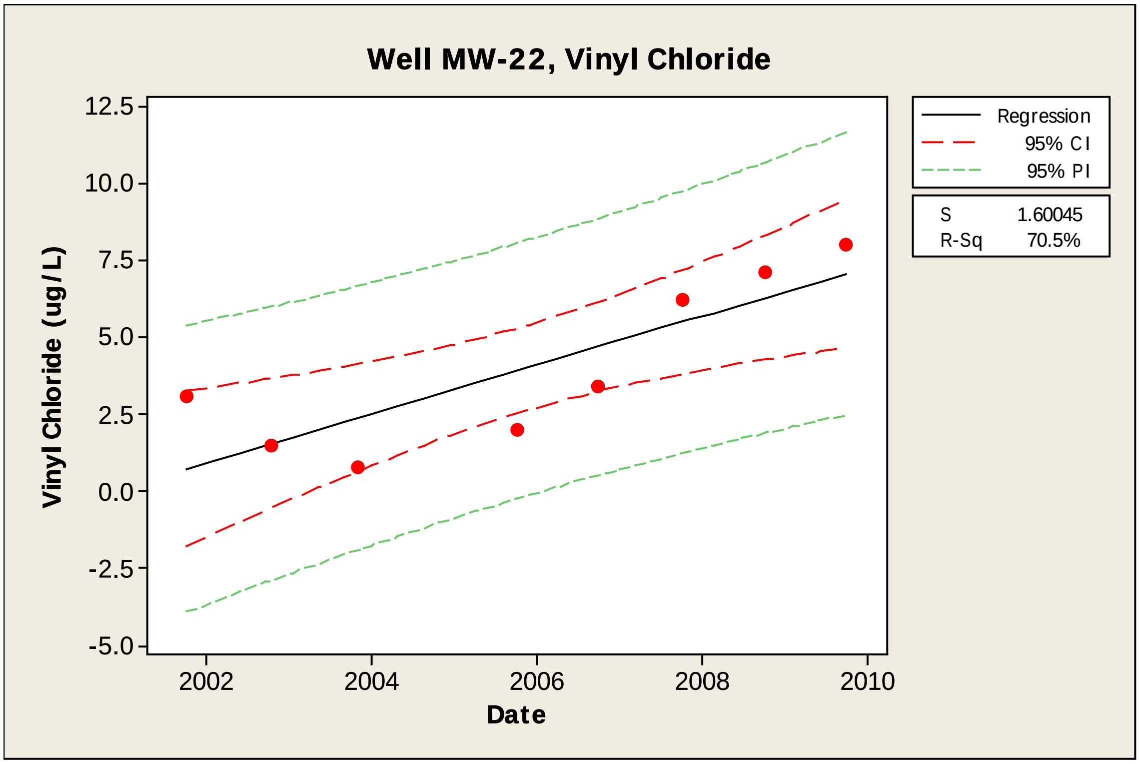
```
The regression equation is
1,1-DCA concentration (ug/L) = - 22.62 + 0.000677 Date
S = 1.51956   R-Sq = 25.7%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

```
The calculated z = 1.09656
For Ha: Upperward trend, the p-value = 0.136416
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.863584
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```

MW-22



Data

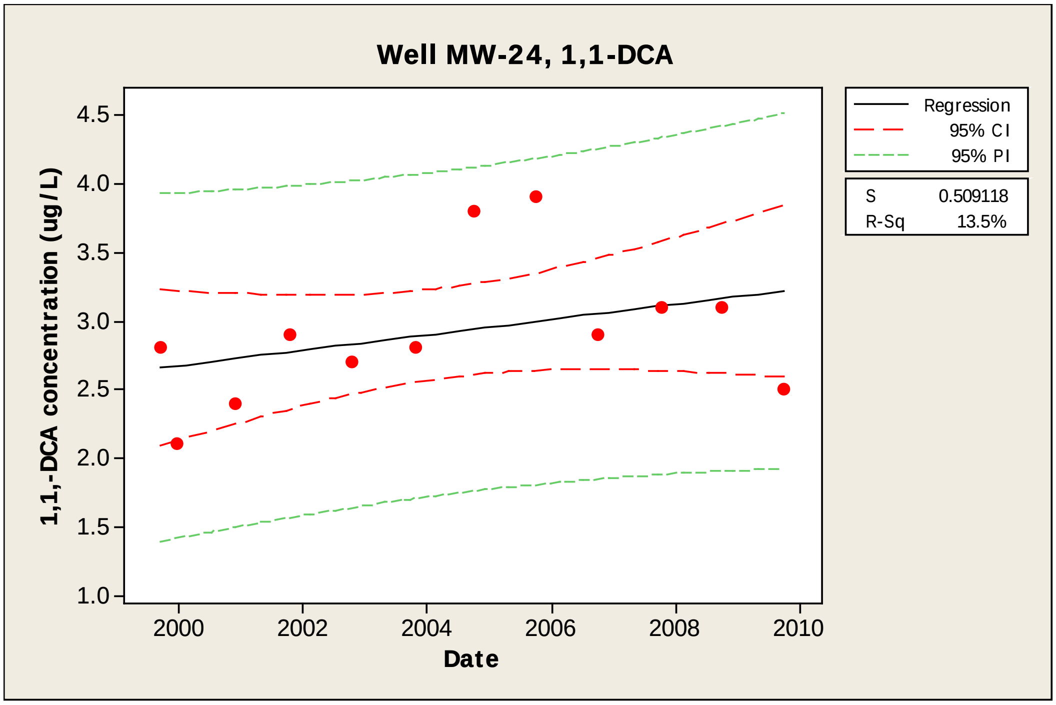
Date	Vinyl Chloride (ug/L)
9/16/1999	<0.5
12/14/1999	<0.5
11/27/2000	<0.5
10/5/2001	3.10
10/11/2002	1.50
10/29/2003	0.80
10/6/2004	<0.5
10/6/2005	2.00
9/29/2006	3.40
10/10/2007	6.20
10/10/2008	7.10
9/29/2009	8.00

Regression Analysis: Vinyl Chloride (ug/L) versus Date

```
The regression equation is
Vinyl Chloride (ug/L) = - 79.93 + 0.002170 Date
S = 1.60045   R-Sq = 70.5%

There is not enough data for a Mann Kendall Test of Normal Approximation
```

MW-24



Data

Date	1,1-DCA (ug/L)
9/16/1999	2.8
12/14/1999	2.1
11/28/2000	2.4
10/8/2001	2.9
10/14/2002	2.7
10/29/2003	2.8
10/6/2004	3.8
10/6/2005	3.9
9/29/2006	2.9
10/10/2007	3.1
10/8/2008	3.1
9/28/2009	2.5

Regression Analysis: 1,1,-DCA concentration (ug/L) versus Date

```
The regression equation is
1,1,-DCA concentration (ug/L) = - 2.899 + 0.000153 Date
S = 0.509118   R-Sq = 13.5%
```

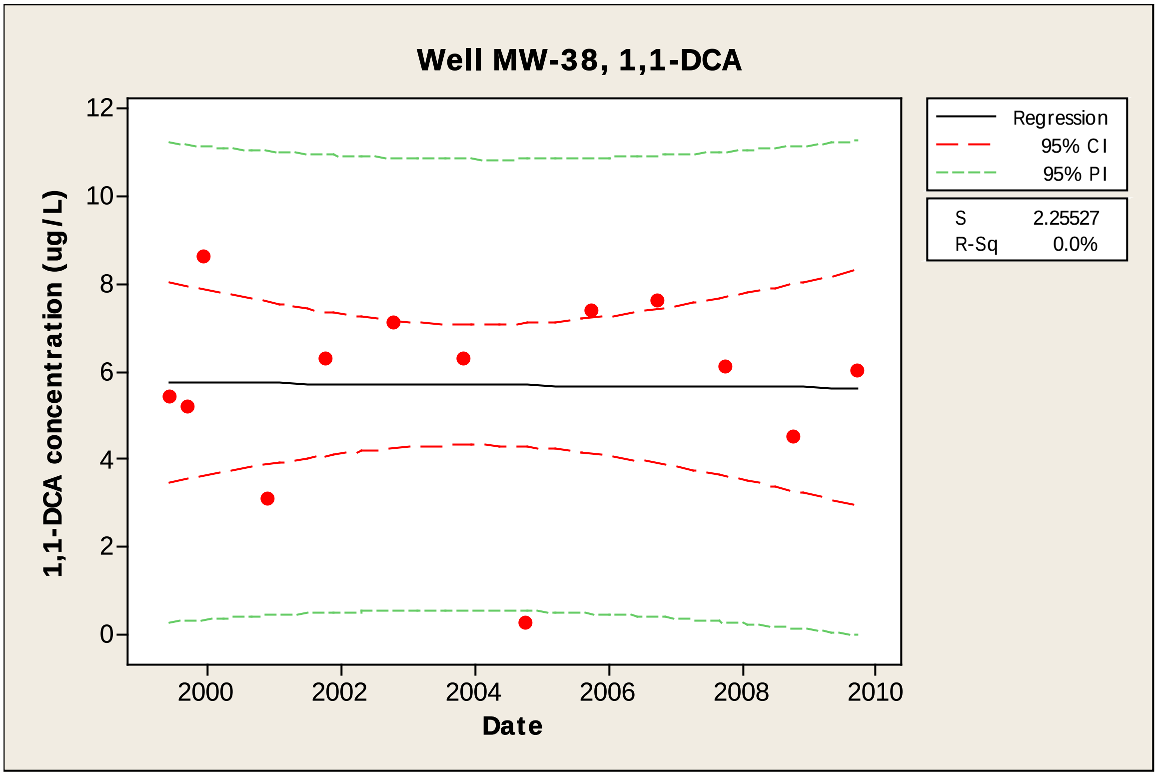
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1,-DCA concentration (ug/L)

The calculated z = 1.51935
For Ha: Upperward trend, the p-value = 0.0643371
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.935663
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

MW-38



Data

Date	1,1-DCA Concentration (ug/L)
6/4/1999	5.4
9/17/1999	5.2
12/15/1999	8.6
11/28/2000	3.1
10/8/2001	6.3
10/14/2002	7.1
10/29/2003	6.3
10/6/2004	0.26
10/6/2005	7.4
9/29/2006	7.6
10/9/2007	6.1
10/8/2008	4.5
9/28/2009	6

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

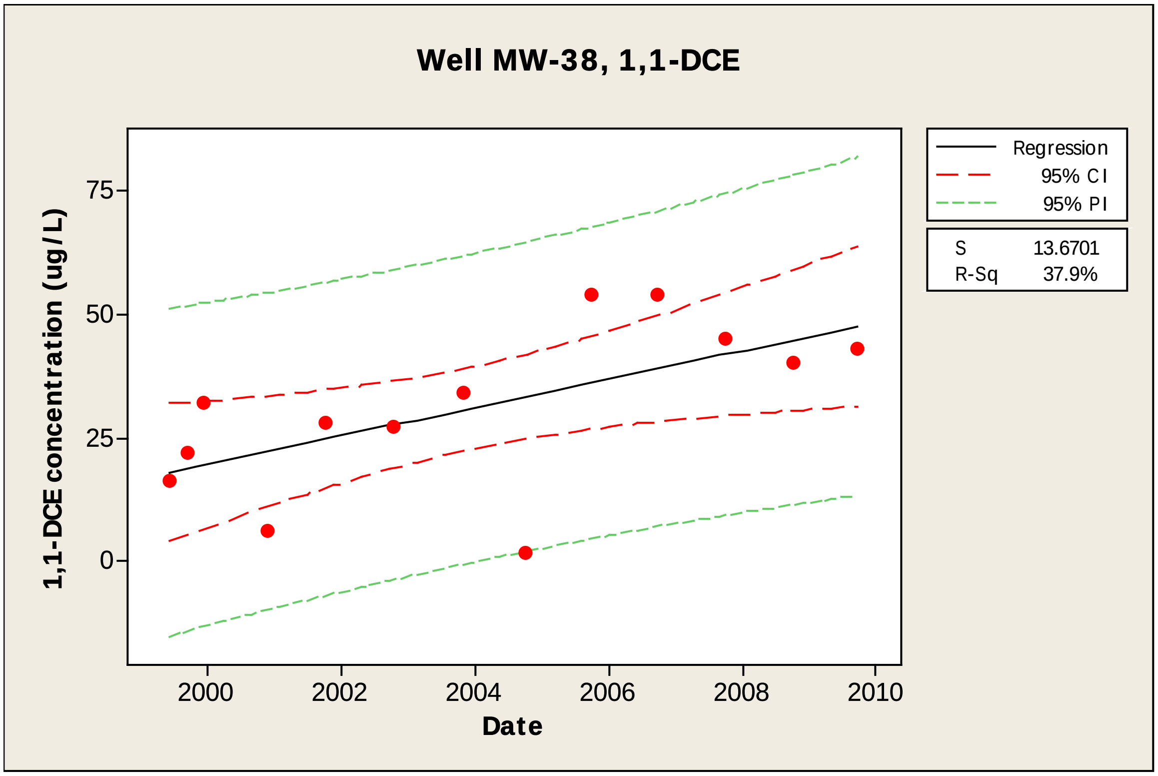
```
The regression equation is
1,1-DCA concentration (ug/L) = 6.88 - 0.000032 Date
S = 2.25527   R-Sq = 0.0%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

The calculated z = 0
For Ha: Upperward trend, the p-value = 0.5
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.5
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

MW-38



Data

Date	1,1-DCE concentration (ug/L)
6/4/1999	16
9/17/1999	22
12/15/1999	32
11/28/2000	5.9
10/8/2001	28
10/14/2002	27
10/29/2003	34
10/6/2004	1.7
10/6/2005	54
9/29/2006	54
10/9/2007	45
10/8/2008	40
9/28/2009	43

Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

The regression equation is
1,1-DCE concentration (ug/L) = - 266.7 + 0.007837 Date
S = 13.6701   R-Sq = 37.9%

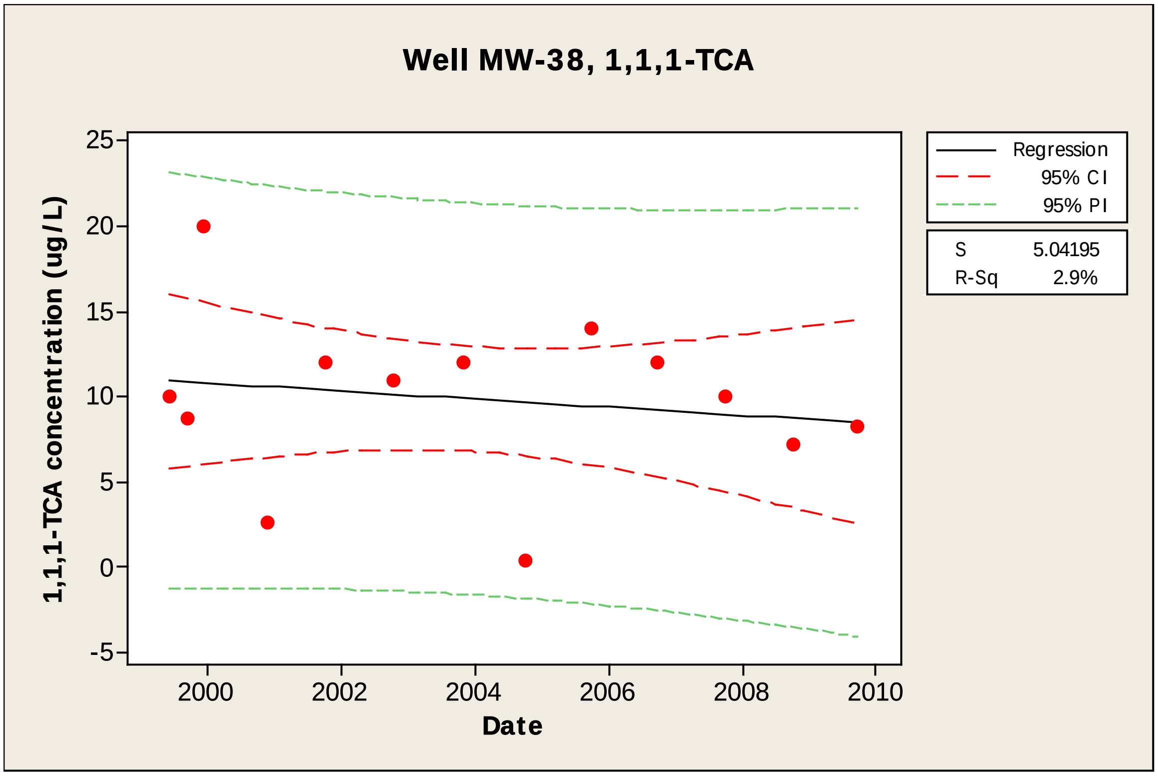
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

The calculated z = 2.07817
For Ha: Upperward trend, the p-value = 0.0188467
At alpha = 0.05, there is enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.981153
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

Sen's Slope for 1,1-DCE concentration (ug/L) = 2.34286 ug/L/year; therefore, there is a 95% probability that the concentration of 1,1-DCE is increasing at 2.3 ug/L per year.

MW-38



Data

Date	1,1,1-TCA concentration (ug/L)
6/4/1999	10
9/17/1999	8.7
12/15/1999	20
11/28/2000	2.6
10/8/2001	12
10/14/2002	11
10/29/2003	12
10/6/2004	0.4
10/6/2005	14
9/29/2006	12
10/9/2007	10
10/8/2008	7.2
9/28/2009	8.3

Regression Analysis: 1,1,1-TCA concentration (ug/L) versus Date

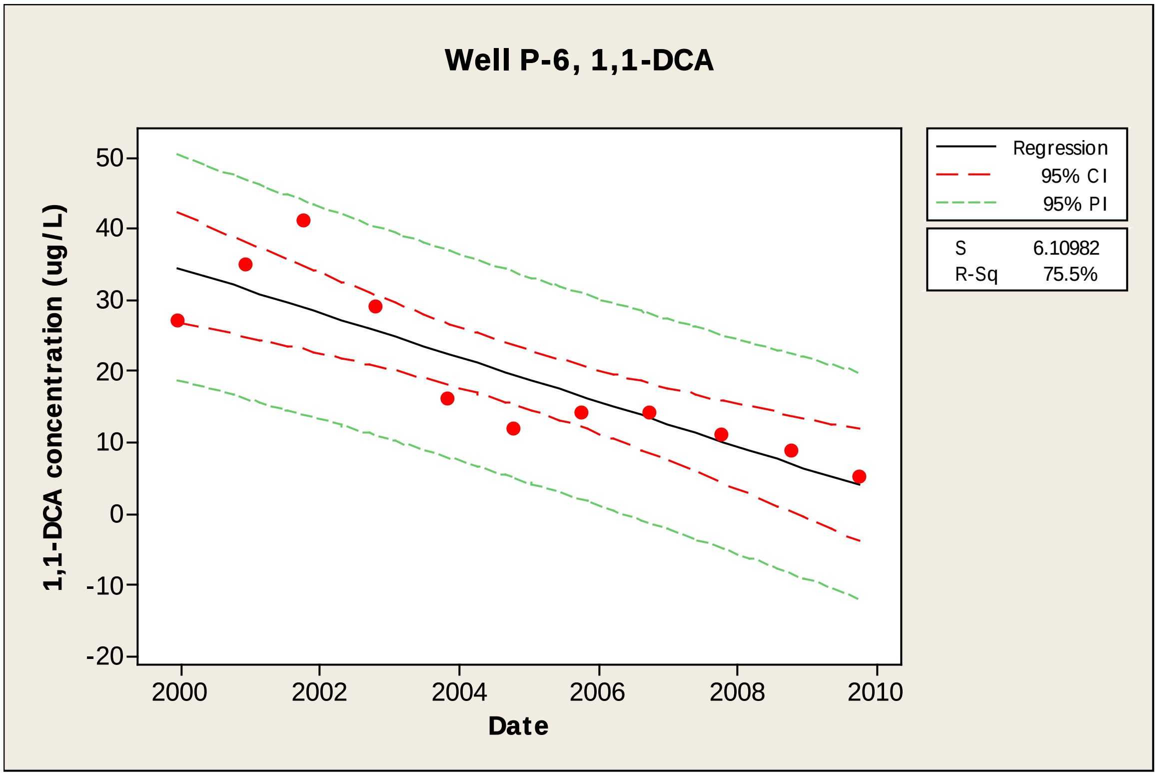
```
The regression equation is
1,1,1-TCA concentration (ug/L) = 34.32 - 0.000644 Date
S = 5.04195   R-Sq = 2.9%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1,1-TCA concentration (ug/L)

```
The calculated z = -0.55391
For Ha: Upperward trend, the p-value = 0.710180
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.289820
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```

P-6



Data

Date	1,1-DCA concentration (ug/L)
12/15/99	27
11/29/00	35
10/5/01	41
10/14/02	29
10/29/03	16
10/6/04	12
10/6/05	14
9/28/06	14
10/10/07	11
10/9/08	8.8 D
9/30/09	5.2

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

```
The regression equation is
1,1-DCA concentration (ug/L) = 345.6 - 0.008521 Date
S = 6.10982   R-Sq = 75.5%
```

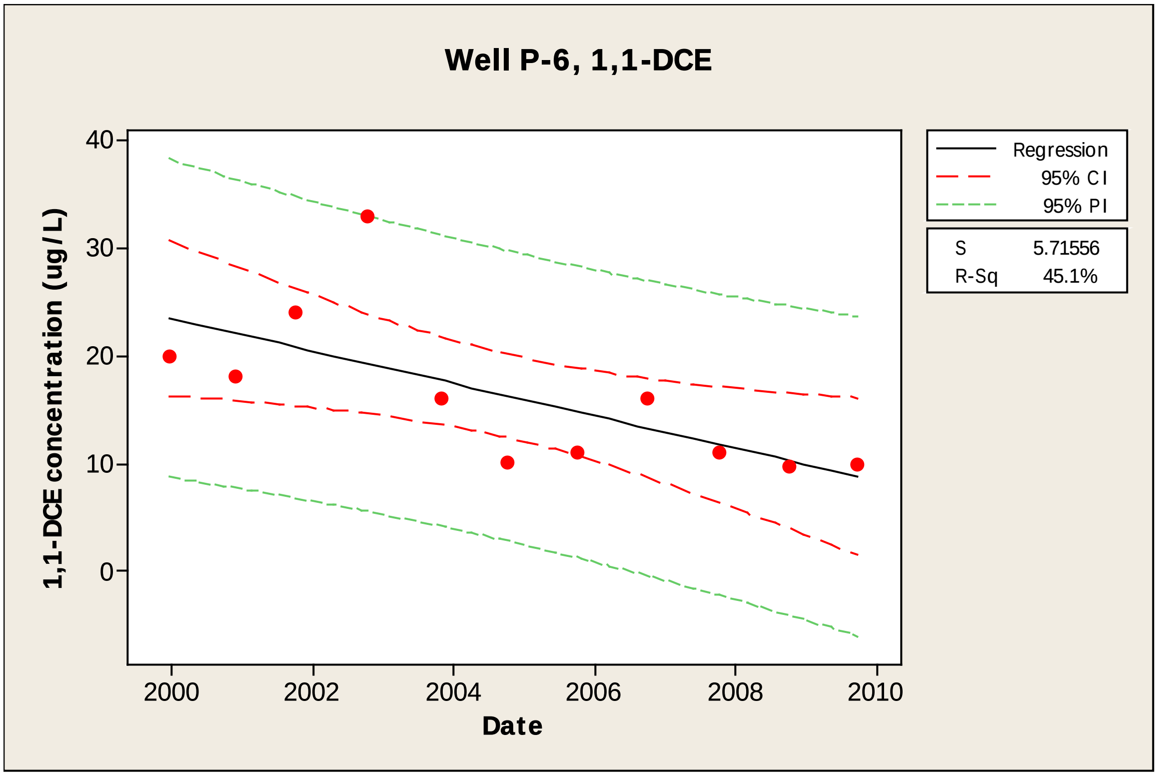
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

The calculated z = -3.20156
For Ha: Upperward trend, the p-value = 0.999317
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.0006834
At alpha = 0.05, there is enough evidence to determine that there is a downward trend.

Sen's Slope for 1,1-DCA concentration (ug/L) = -2.93333; therefore, there is a 95% probability that the concentration of 1,1-DCA is decreasing in P-6 at 2.9 ug/L per year.

P-6



Data

Date	1,1-DCE concentration (ug/L)
12/15/99	20
11/29/00	18
10/5/01	24
10/14/02	33
10/29/03	16
10/6/04	10
10/6/05	11
9/28/06	16
10/10/07	11
10/9/08	9.7 D
9/30/09	9.9

Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

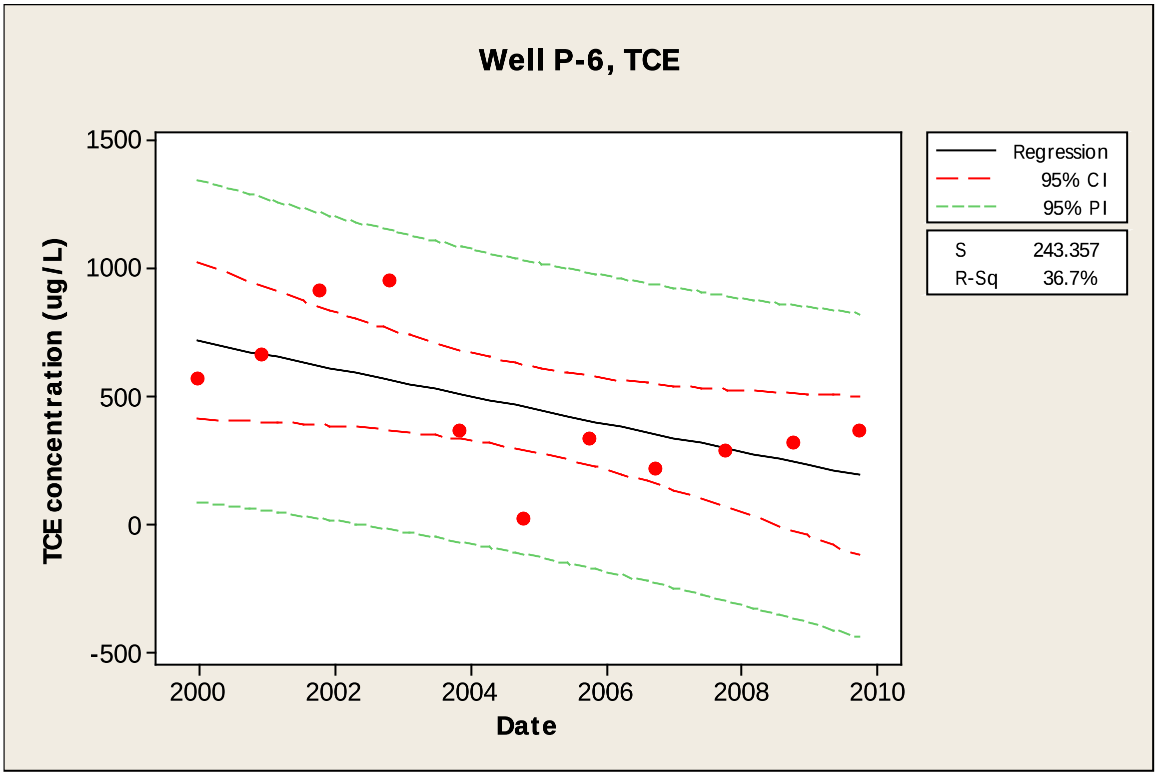
```
The regression equation is
1,1-DCE concentration (ug/L) = 173.9 - 0.004118 Date
S = 5.71556   R-Sq = 45.1%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

The calculated z = -2.50643
For Ha: Upperward trend, the p-value = 0.993902
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.0060978
At alpha = 0.05, there is enough evidence to determine that there is a downward trend.

Sen's Slope for 1,1-DCE concentration (ug/L) = -1.14444; therefore there is a 95% probability that the concentration of 1,1-DCE is decreasing in P-6 at 1.14 ug/L per year.



Data

Date	TCE concentration (ug/L)
12/15/99	570
11/29/00	670
10/5/01	920
10/14/02	960
10/29/03	370
10/6/04	27
10/6/05	340
9/28/06	220
10/10/07	290
10/9/08	320 D
9/30/09	370 D

Regression Analysis: TCE concentration (ug/L) versus Date

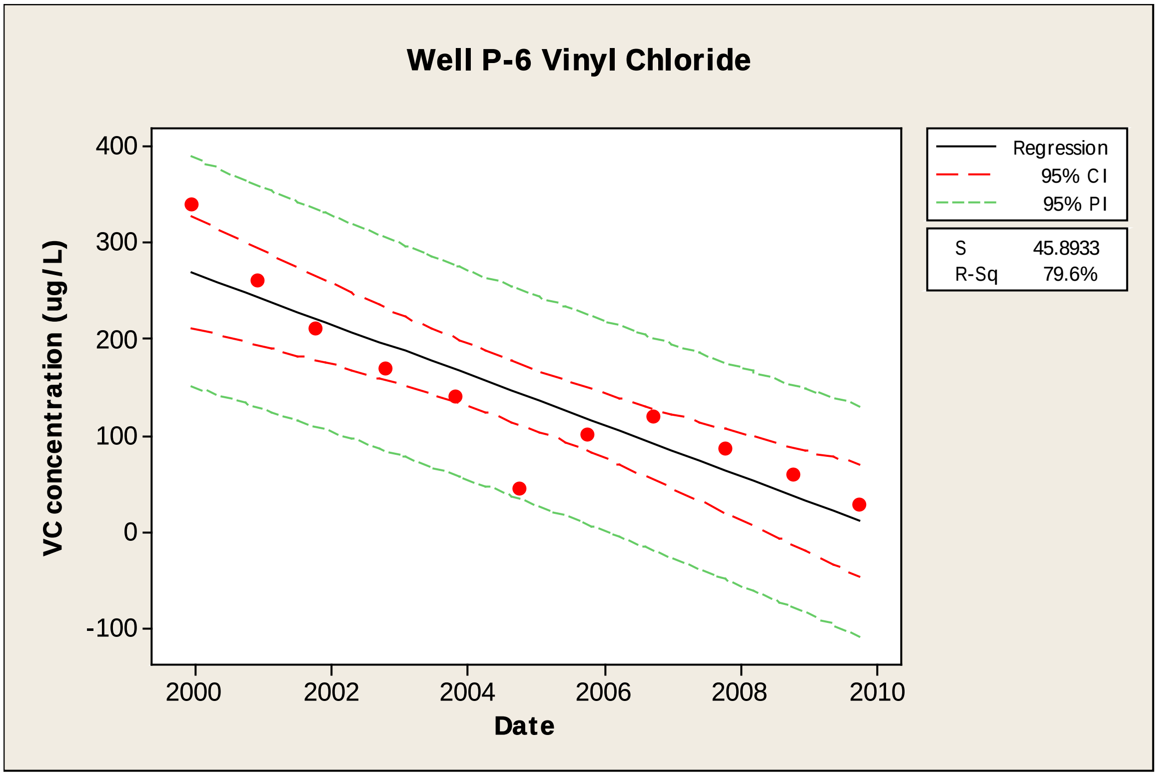
```
The regression equation is
TCE concentration (ug/L) = 6101 - 0.1474 Date
S = 243.357   R-Sq = 36.7%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in TCE concentration (ug/L)

The calculated z = -1.32748
For Ha: Upperward trend, the p-value = 0.907825
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.0921755
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.



Data

Date	Vinyl Chloride concentration (ug/L)
12/15/99	340
11/29/00	260
10/5/01	210
10/14/02	170
10/29/03	140
10/6/04	44
10/6/05	100
9/28/06	120
10/10/07	86
10/9/08	60 D
9/30/09	29

Regression Analysis: VC concentration (ug/L) versus Date

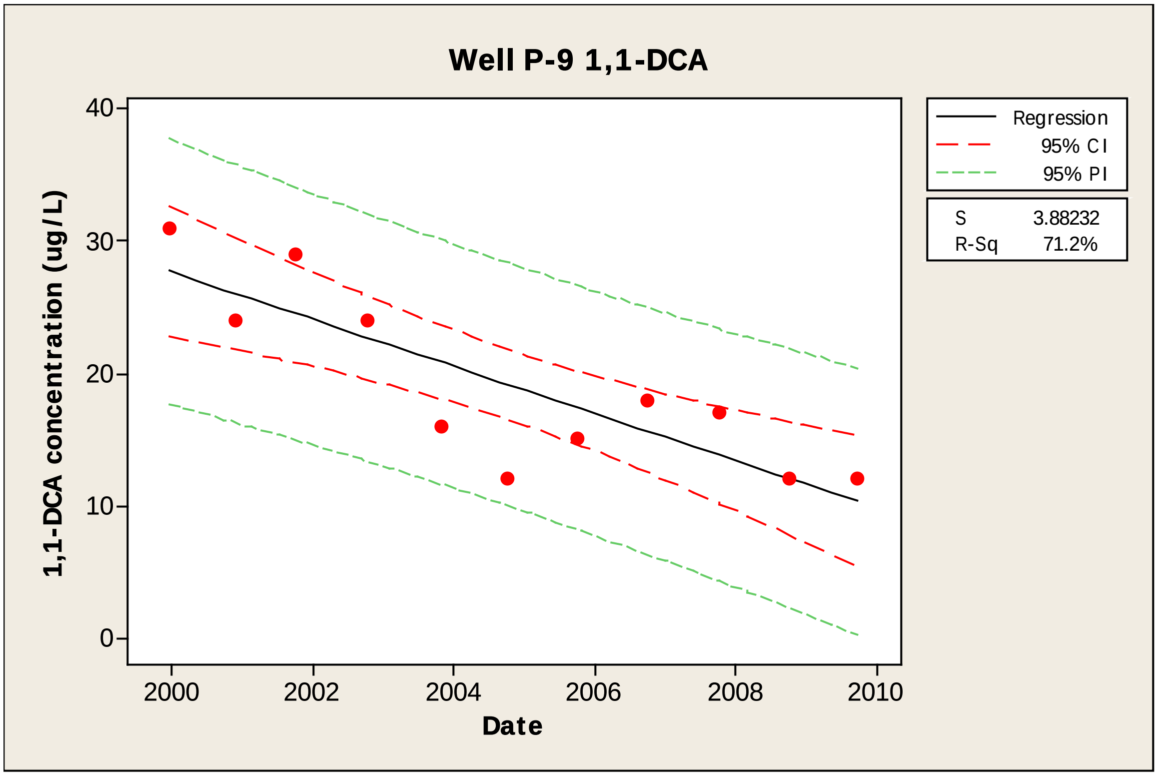
The regression equation is
VC concentration (ug/L) = 2904 - 0.07215 Date
S = 45.8933   R-Sq = 79.6%

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in VC concentration (ug/L)

The calculated z = -3.42540
For Ha: Upperward trend, the p-value = 0.999693
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.0003070
At alpha = 0.05, there is enough evidence to determine that there is a downward trend.

Sen's Slope for VC concentration (ug/L) = -26; therefore there is a 95% probability that the concentration of vinyl chloride is decreasing in P-6 at 26 ug/L per year.



Data

Date	1,1-DCA concentration (ug/L)
12/15/1999	31
11/29/2000	24
10/4/2001	29
10/14/2002	24
10/29/2003	16
10/6/2004	12
10/6/2005	15
9/28/2006	18
10/10/2007	17
10/8/2008	12 D
9/29/2009	12

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

The regression equation is
1,1-DCA concentration (ug/L) = 204.9 - 0.004855 Date
S = 3.88232   R-Sq = 71.2%

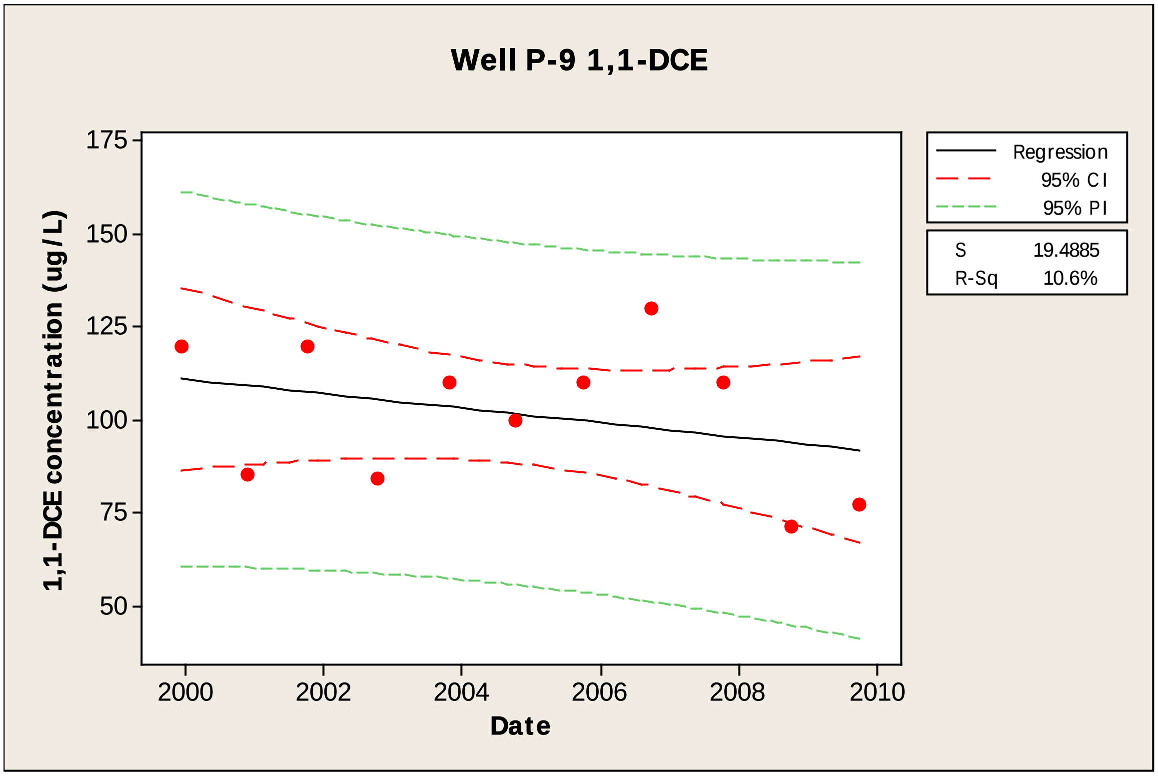
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

The calculated z = -2.68514
For Ha: Upperward trend, the p-value = 0.996375
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.0036250
At alpha = 0.05, there is enough evidence to determine that there is a downward trend.

Sen's Slope for 1,1-DCA concentration (ug/L) = -1.8; therefore, there is a 95% probability that the concentration of 1,1-DCA is decreasing in P-9 at 1.8 ug/L per year.

P-9



Data

Date	1,1-DCE concentration (ug/L)
12/15/1999	120
11/29/2000	85
10/4/2001	120
10/14/2002	84
10/29/2003	110
10/6/2004	100
10/6/2005	110
9/28/2006	130
10/10/2007	110
10/8/2008	71 D
9/29/2009	77

Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

```
The regression equation is
1,1-DCE concentration (ug/L) = 306.2 - 0.005346 Date
S = 19.4885   R-Sq = 10.6%
```

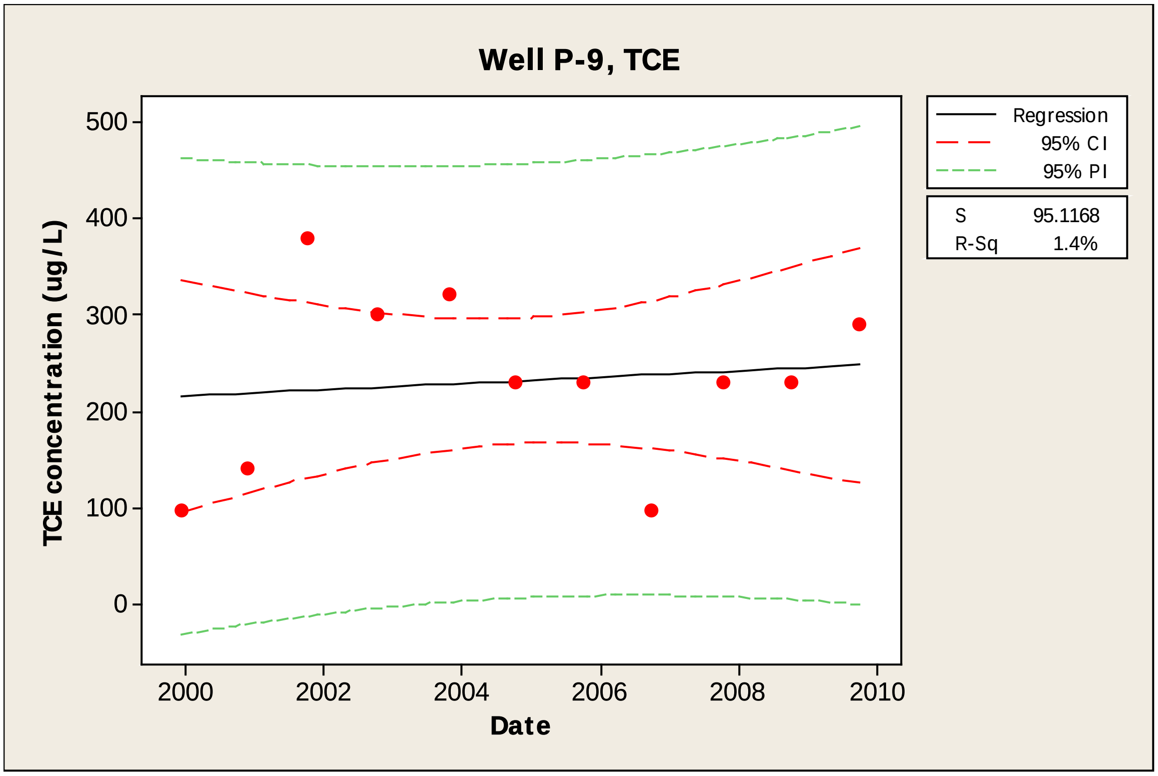
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

The calculated z = -0.94770
For Ha: Upperward trend, the p-value = 0.828358
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.171642
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

P-9



Data

Date	TCE concentration (ug/L)
12/15/1999	97
11/29/2000	140
10/4/2001	380
10/14/2002	300
10/29/2003	320
10/6/2004	230
10/6/2005	230
9/28/2006	97
10/10/2007	230
10/8/2008	230 D
9/29/2009	290 D

Regression Analysis: TCE concentration (ug/L) versus Date

```
The regression equation is
TCE concentration (ug/L) = - 110.7 + 0.00893 Date
S = 95.1168   R-Sq = 1.4%
```

Mann-Kendall Trend Test by Normal Approximation

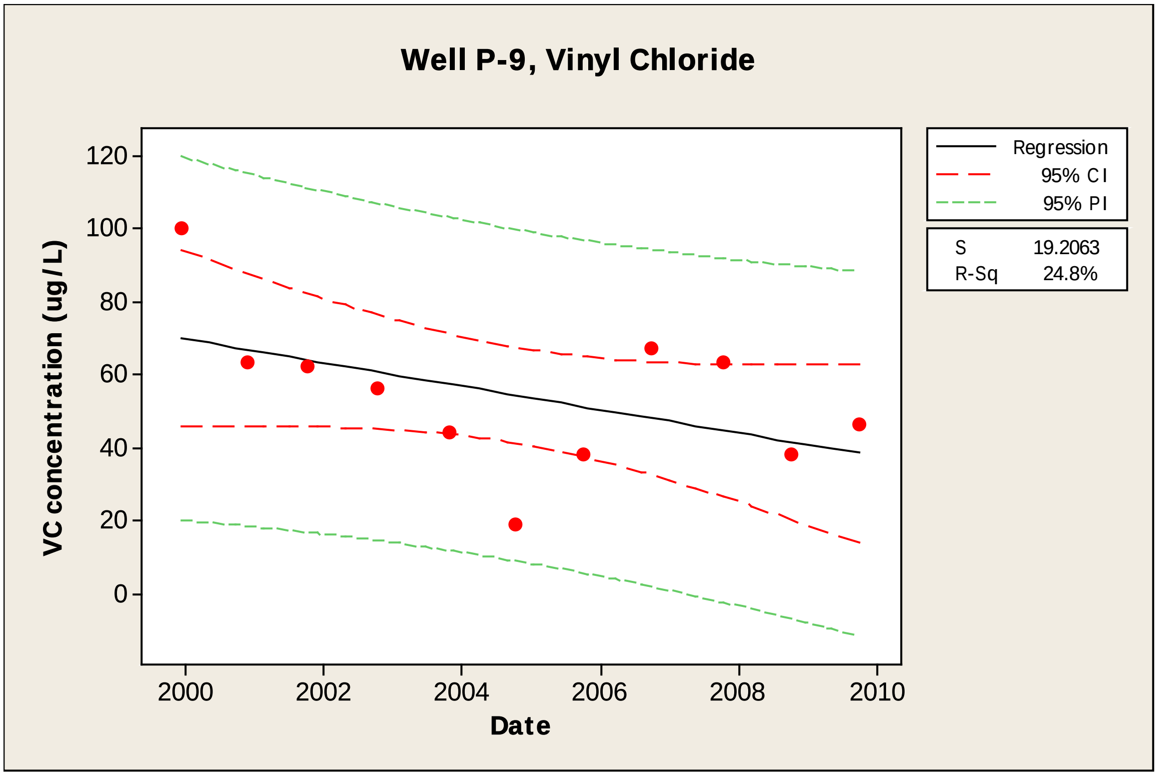
Ho: No trend in TCE concentration (ug/L)

The calculated z = 0.080236

For Ha: Upperward trend, the p-value = 0.468025
At alpha = 0.05, there is <u>not</u> enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.531975
At alpha = 0.05, there is <u>not</u> enough evidence to determine that there is a downward trend.

P-9



Data

Date	Vinyl Chloride concentration (ug/L)
12/15/1999	100
11/29/2000	63
10/4/2001	62
10/14/2002	56
10/29/2003	44
10/6/2004	19
10/6/2005	38
9/28/2006	67
10/10/2007	63
10/8/2008	38 D
9/29/2009	46

Regression Analysis: VC concentration (ug/L) versus Date

```
The regression equation is
VC concentration (ug/L) = 390.2 - 0.008777 Date
S = 19.2063   R-Sq = 24.8%
```

Mann-Kendall Trend Test by Normal Approximation

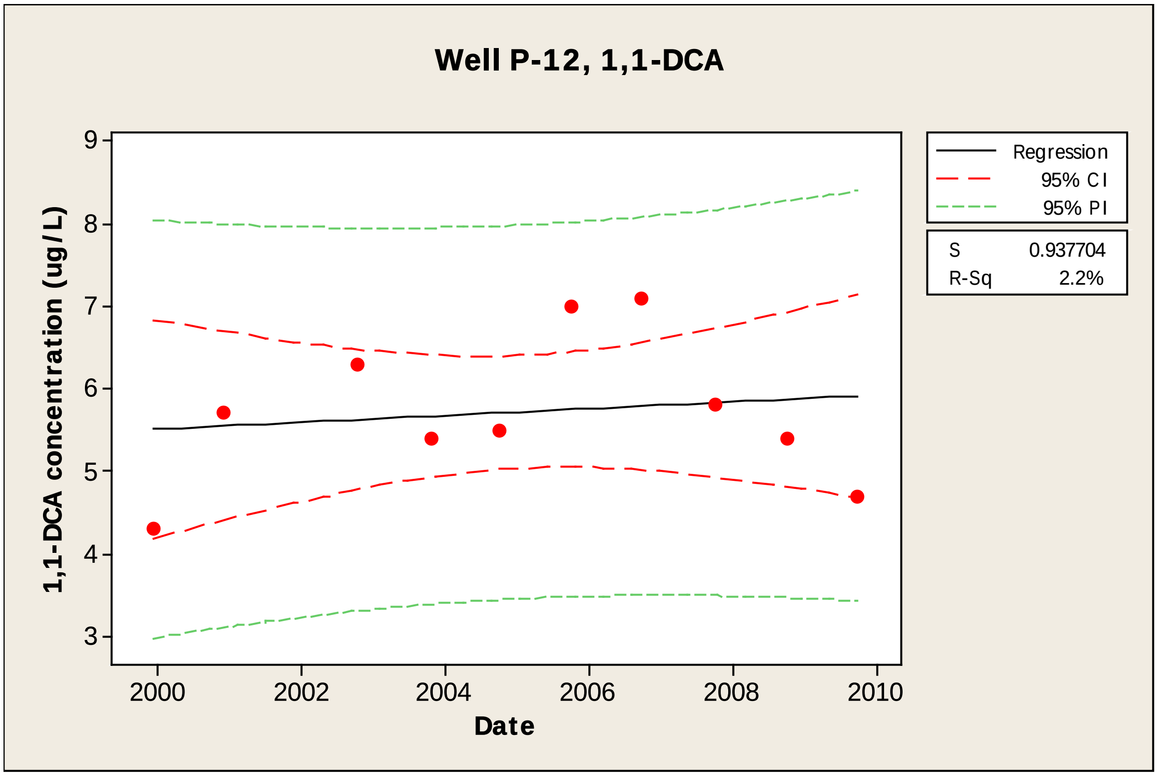
Ho: No trend in VC concentration (ug/L)

```
The calculated z = -1.40987

For Ha: Upperward trend, the p-value = 0.920711
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.

For Ha: Downward trend, the p-value = 0.0792892
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```

P-12



Data

Date	1,1-DCA concentration (ug/L)
12/15/1999	4.3
11/29/2000	5.7
10/4/2001	<8
10/14/2002	6.3
10/29/2003	5.4
10/6/2004	5.5
10/6/2005	7
9/29/2006	7.1
10/10/2007	5.8
10/9/2008	5.4
9/29/2009	4.7

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

```
The regression equation is
1,1-DCA concentration (ug/L) = 1.42 + 0.000112 Date
S = 0.937704   R-Sq = 2.2%
```

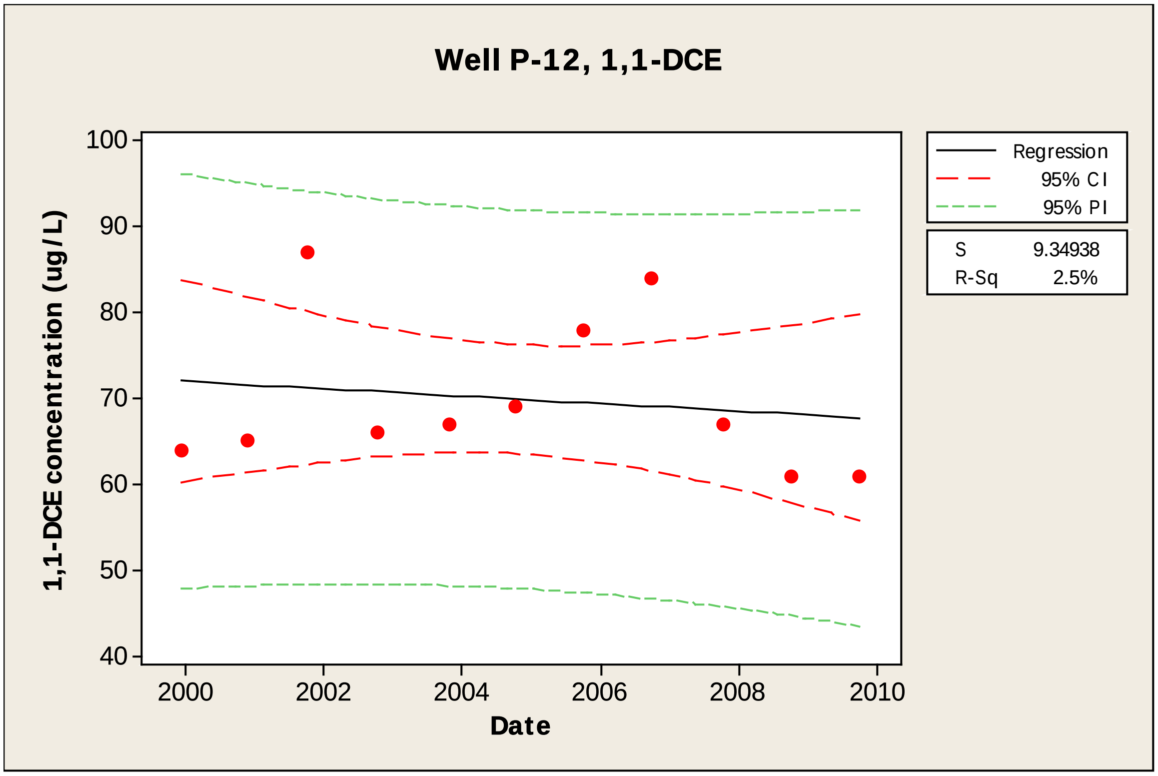
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

The calculated z = 0.718421
For Ha: Upperward trend, the p-value = 0.236249
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.763751
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

P-12



Data

Date	1,2-DCE concentration (ug/L)
12/15/1999	64
11/29/2000	65
10/4/2001	87
10/14/2002	66
10/29/2003	67
10/6/2004	69
10/6/2005	78
9/29/2006	84
10/10/2007	67
10/9/2008	61
9/29/2009	61

Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

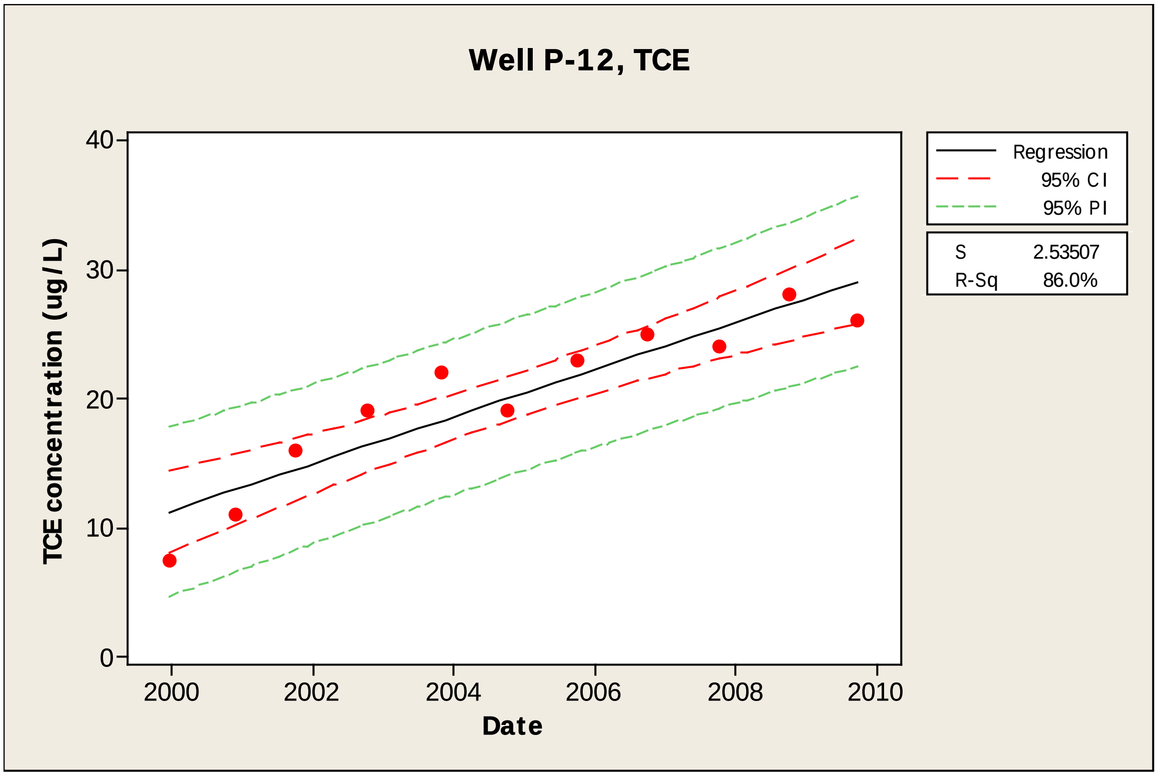
```
The regression equation is
1,1-DCE concentration (ug/L) = 115.5 - 0.001192 Date
S = 9.34938   R-Sq = 2.5%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

The calculated z = 0
For Ha: Upperward trend, the p-value = 0.5
At alpha = 0.05, there is <u>not</u> enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.5
At alpha = 0.05, there is <u>not</u> enough evidence to determine that there is a downward trend.

P-12



Data

Date	TCE concentration (ug/L)
12/15/1999	7.4
11/29/2000	11
10/4/2001	16
10/14/2002	19
10/29/2003	22
10/6/2004	19
10/6/2005	23
9/29/2006	25
10/10/2007	24
10/9/2008	28
9/29/2009	26

Regression Analysis: TCE concentration (ug/L) versus Date

The regression equation is
TCE concentration (ug/L) = - 170.9 + 0.004988 Date
S = 2.53507   R-Sq = 86.0%

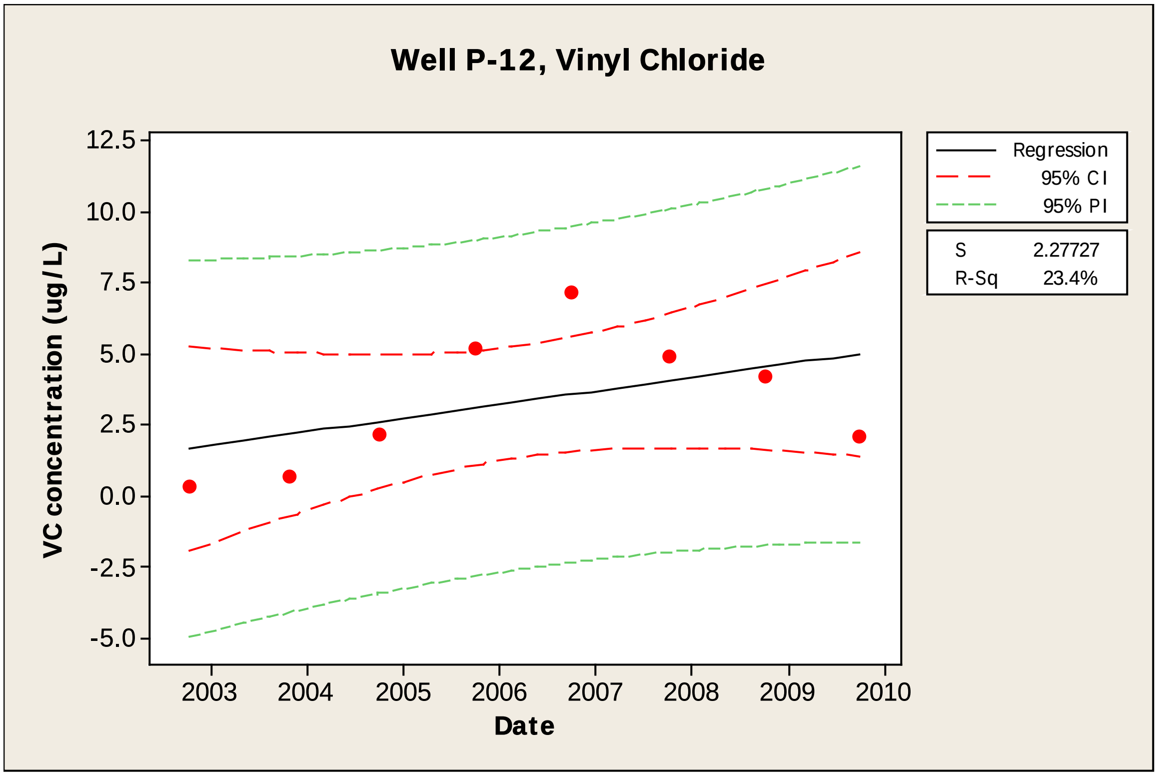
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in TCE concentration (ug/L)

The calculated z = 3.67008
For Ha: Upperward trend, the p-value = 0.0001212
At alpha = 0.05, there is enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.999879
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

Sen's Slope for TCE concentration (ug/L) = 1.75; therefore, there is a 95% probability that the concentration of TCE is increasing in P-12 at 1.75 ug/L per year.

P-12



Data

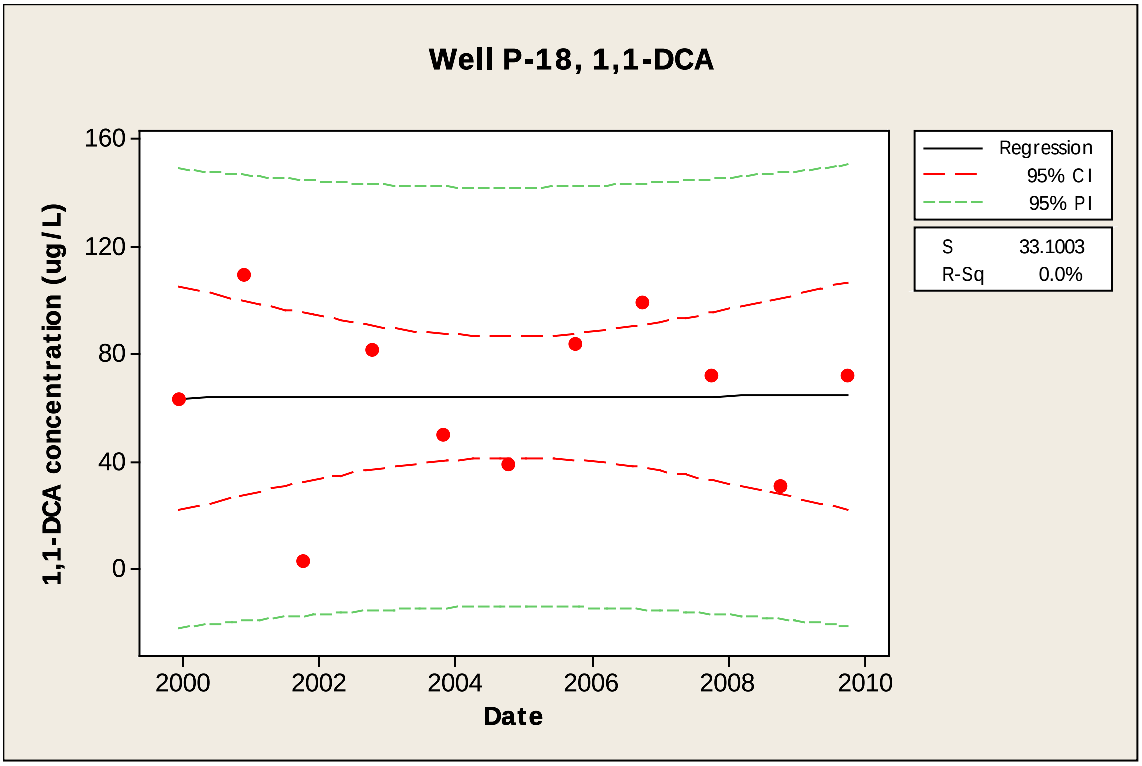
Date	Vinyl Chloride concentration (ug/L)
12/15/1999	<0.5
11/29/2000	<0.5
10/4/2001	<12
10/14/2002	0.30
10/29/2003	0.69
10/6/2004	2.20
10/6/2005	5.20
9/29/2006	7.20
10/10/2007	4.90
10/9/2008	4.20
9/29/2009	2.10

Regression Analysis: VC concentration (ug/L) versus Date

```
The regression equation is
VC concentration (ug/L) = - 47.57 + 0.001312 Date
S = 2.27727   R-Sq = 23.4%

There is not enough current data for a Mann Kendall Test by Normal Approximation.
```

P-18



Data

Date	1,1-DCA concentration (ug/L)
12/15/1999	63
11/29/2000	110
10/4/2001	2.7
10/14/2002	82
10/29/2003	50
10/6/2004	39
10/6/2005	84
9/28/2006	99
10/9/2007	72
10/8/2008	31 D
9/29/2009	72

Note: the highlighted data appears to be significantly outside of the normal range of this data. This is true for all the VOC sample results from the 2001 event for this well. This data appears suspect.

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

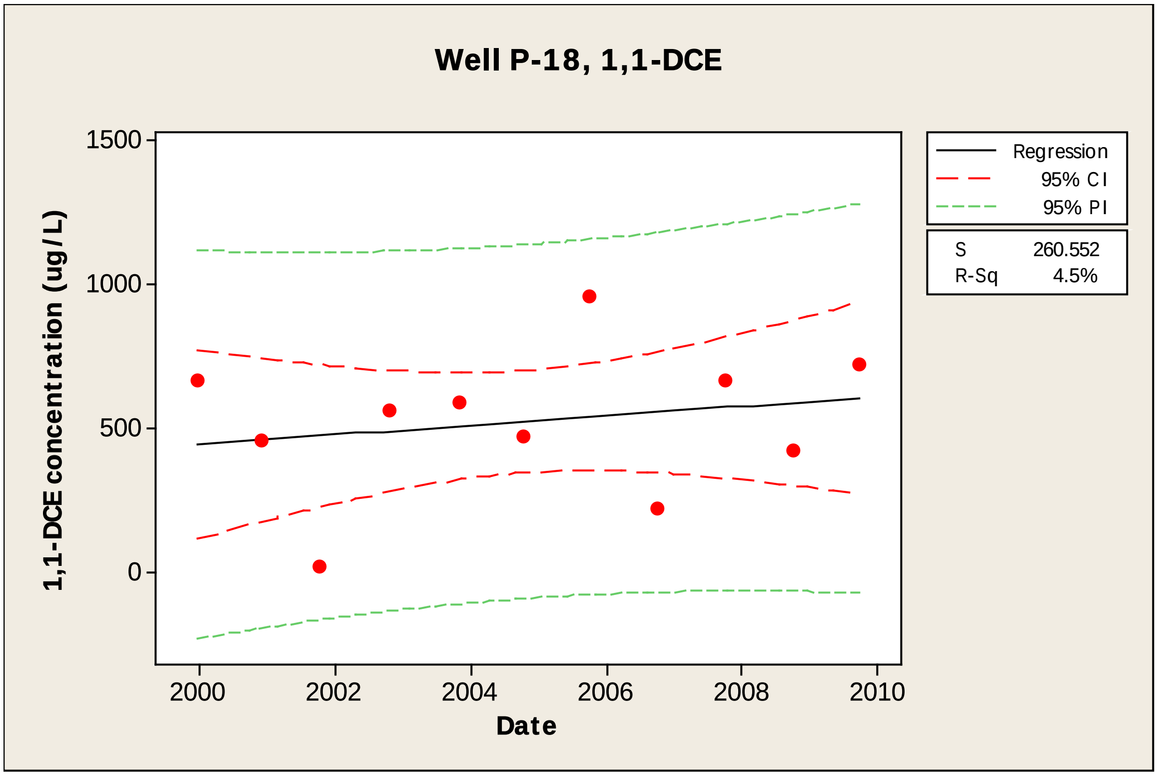
```
The regression equation is
1,1-DCA concentration (ug/L) = 54.0 + 0.000264 Date
S = 33.1003   R-Sq = 0.0%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

```
The calculated z = -0.07809
For Ha: Upperward trend, the p-value = 0.531121
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.468879
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```

P-18



Data

Date	1,1-DCE concentration (ug/L)
12/15/1999	670
11/29/2000	460
10/4/2001	21
10/14/2002	560
10/29/2003	590
10/6/2004	470
10/6/2005	960
9/28/2006	220
10/9/2007	670
10/8/2008	420 D
9/29/2009	720 D

Note: the highlighted data appears to be significantly outside of the normal range of this data. This is true for all the VOC sample results from the 2001 event for this well. This data appears suspect.

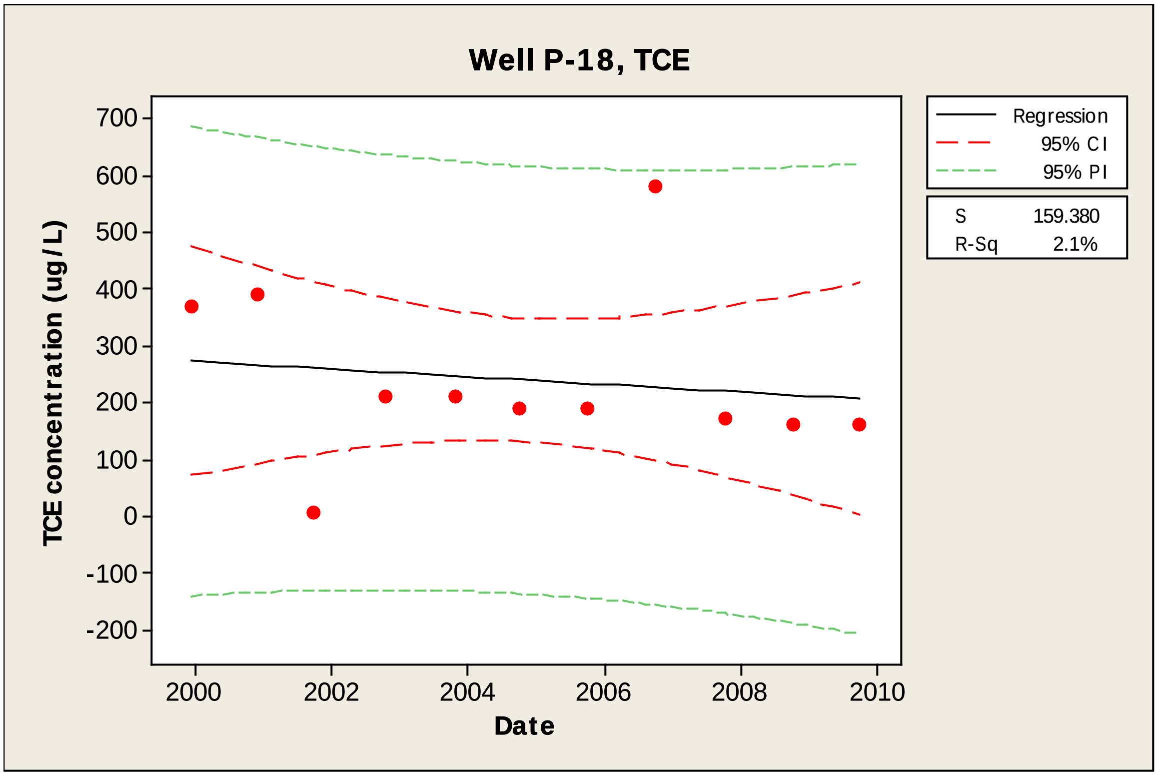
Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

```
The regression equation is
1,1-DCE concentration (ug/L) = - 1206 + 0.04520 Date
S = 260.552   R-Sq = 4.5%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

```
The calculated z = 0.546608
For Ha: Upperward trend, the p-value = 0.292324
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.707676
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```



Data

Date	TCE concentration (ug/L)
12/15/1999	370
11/29/2000	390
10/4/2001	7.6
10/14/2002	210
10/29/2003	210
10/6/2004	190
10/6/2005	190
9/28/2006	580
10/9/2007	170
10/8/2008	160 D
9/29/2009	150 D

Note: the highlighted data appears to be significantly outside of the normal range of this data. This is true for all the VOC sample results from the 2001 event for this well. This data appears suspect.

Regression Analysis: TCE concentration (ug/L) versus Date

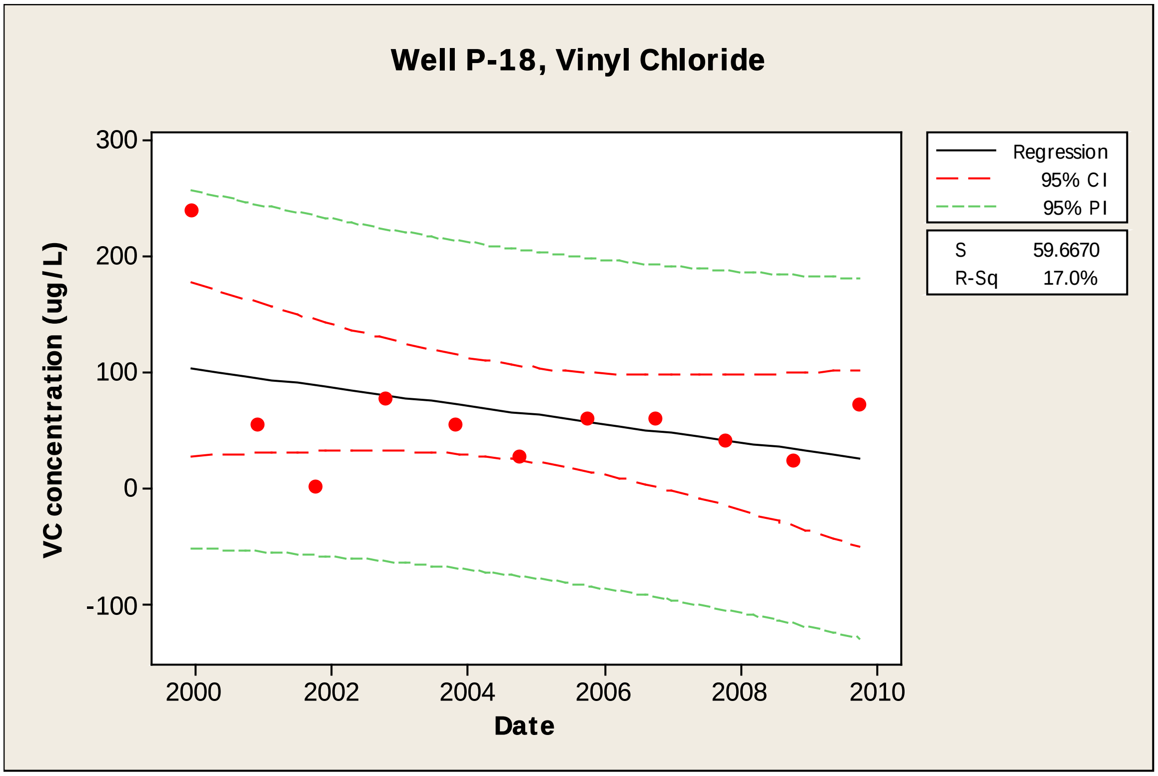
```
The regression equation is
TCE concentration (ug/L) = 949 - 0.01854 Date
S = 159.380   R-Sq = 2.1%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in TCE concentration (ug/L)

```
The calculated z = -1.64992
For Ha: Upperward trend, the p-value = 0.950520
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.0494801
At alpha = 0.05, there is enough evidence to determine that there is a downward trend.

Sen's Slope for TCE concentration (ug/L) = -8.33333; therefore, there is a 95%
probability that the concentration of TCE is decreasing in P-18 at 8.3 ug/L per year.
```



Data

Date	Vinyl Chloride concentration (ug/L)
12/15/1999	240
11/29/2000	55
10/4/2001	2.1
10/14/2002	78
10/29/2003	55
10/6/2004	28
10/6/2005	60
9/28/2006	61
10/9/2007	41
10/8/2008	25 D
9/29/2009	73

Note: the highlighted data appears to be significantly outside of the normal range of this data. This is true for all the VOC sample results from the 2001 event for this well. This data appears suspect.

Regression Analysis: VC concentration (ug/L) versus Date

```
The regression equation is
VC concentration (ug/L) = 887.3 - 0.02148 Date
S = 59.6670   R-Sq = 17.0%
```

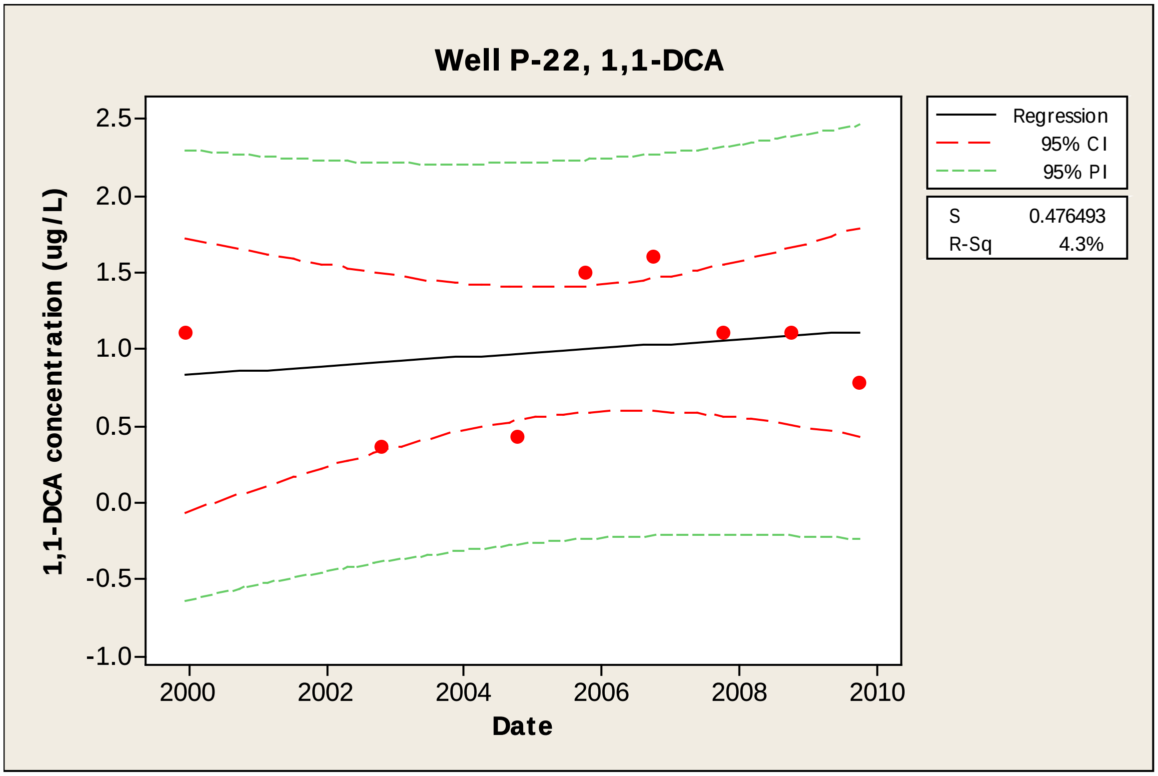
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in VC concentration (ug/L)

```
The calculated z = -0.39043
For Ha: Upperward trend, the p-value = 0.651892
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.

For Ha: Downward trend, the p-value = 0.348108
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```

P-22



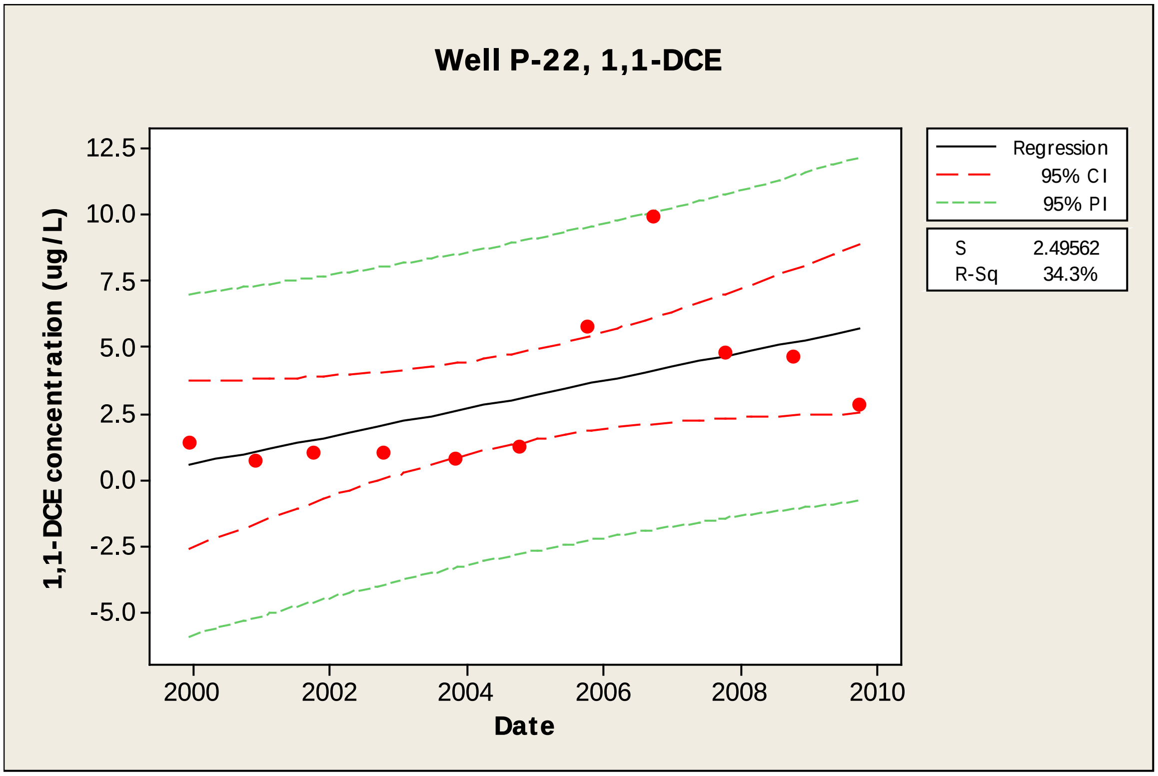
Data

Date	1,1-DCA concentration (ug/L)
12/15/1999	1.1
11/28/2000	<0.5
10/4/2001	<0.8
10/14/2002	0.36
10/29/2003	<0.5
10/6/2004	0.43
10/6/2005	1.5
9/28/2006	1.6
10/10/2007	1.1
10/9/2008	1.1
9/28/2009	0.78

Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

```
The regression equation is
1,1-DCA concentration (ug/L) = - 2.039 + 0.000079 Date
S = 0.476493   R-Sq = 4.3%

There is not enough current data for a Mann Kendall Test by Normal Approximation.
```



Data

Date	1,1-DCE concentration (ug/L)
12/15/1999	1.4
11/28/2000	0.7
10/4/2001	1.0
10/14/2002	0.99
10/29/2003	0.76
10/6/2004	1.2
10/6/2005	5.8
9/28/2006	9.9
10/10/2007	4.8
10/9/2008	4.6
9/28/2009	2.8

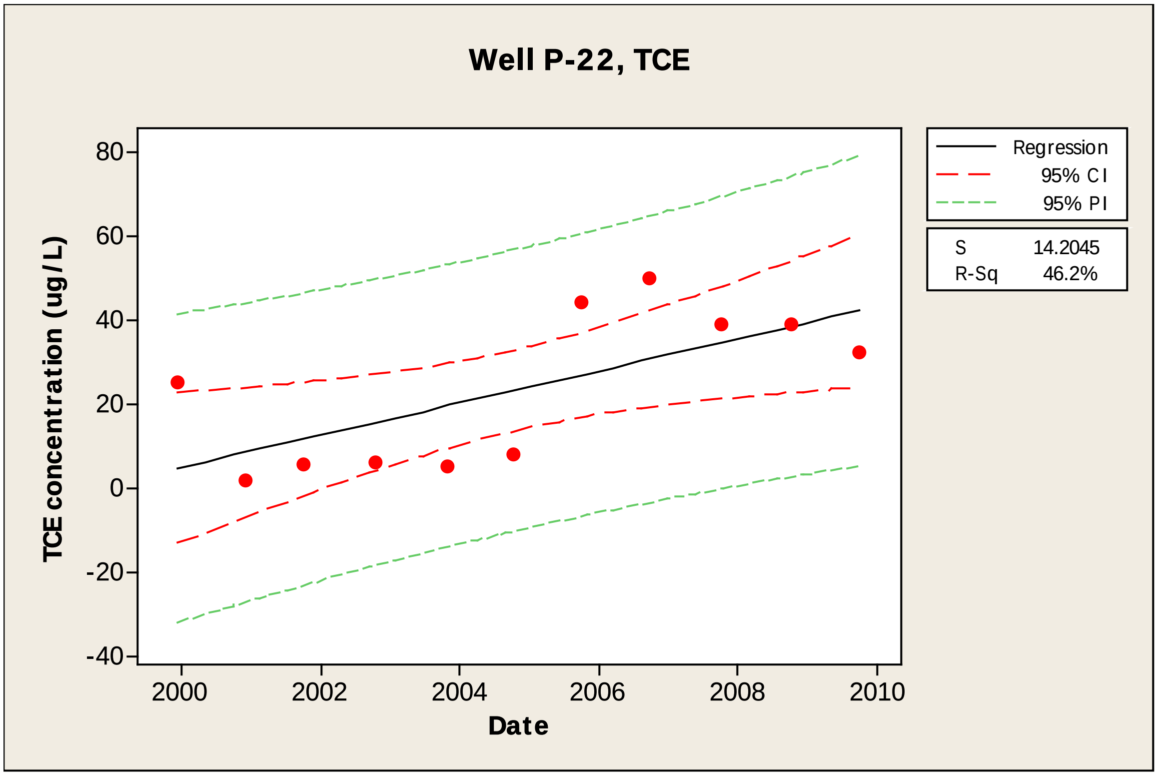
Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

```
The regression equation is
1,1-DCE concentration (ug/L) = - 51.85 + 0.001435 Date
S = 2.49562   R-Sq = 34.3%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

```
The calculated z = 1.55700
For Ha: Upperward trend, the p-value = 0.0597355
At alpha = 0.05, there is not enough evidence to determine that there is an upward
trend.
For Ha: Downward trend, the p-value = 0.940265
At alpha = 0.05, there is not enough evidence to determine that there is a downward
trend.
```



Data

Date	TCE concentration (ug/L)
12/15/1999	25
11/28/2000	1.5
10/4/2001	5.5
10/14/2002	6.2
10/29/2003	5
10/6/2004	7.8
10/6/2005	44
9/28/2006	50
10/10/2007	39
10/9/2008	39
9/28/2009	32

Regression Analysis: TCE concentration (ug/L) versus Date

The regression equation is
TCE concentration (ug/L) = - 377.2 + 0.01046 Date
S = 14.2045   R-Sq = 46.2%

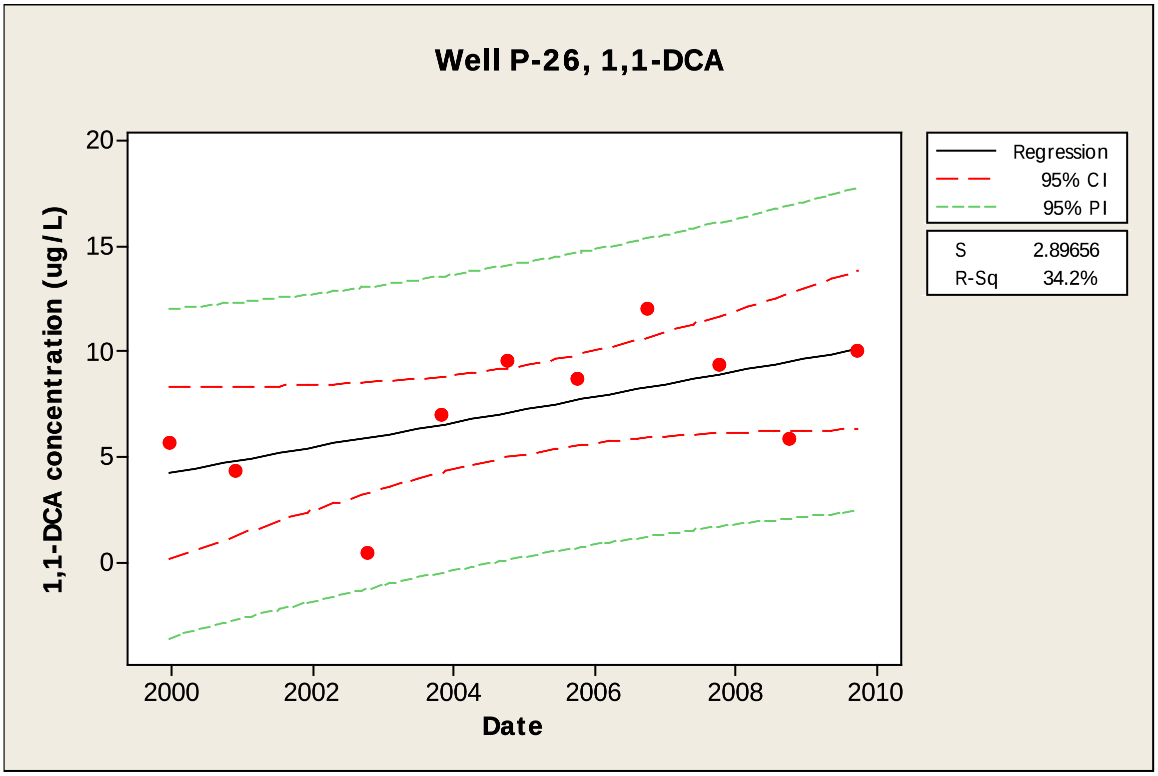
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in TCE concentration (ug/L)

The calculated z = 1.79600
For Ha: Upperward trend, the p-value = 0.0362474
At alpha = 0.05, there is enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.963753
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

Sen's Slope for TCE concentration (ug/L) = 3.3125; therefore, there is a 95% probability that the concentration of TCE is decreasing in P-22 at 3.3 ug/L per year.

P-26



Data

Date	1,1-DCA concentration (ug/L)
12/15/1999	5.7
11/29/2000	4.3
10/4/2001	<8
10/14/2002	0.42
10/29/2003	7
10/6/2004	9.6
10/6/2005	8.7
9/28/2006	12
10/10/2007	9.4
10/9/2008	5.9
9/30/2009	10

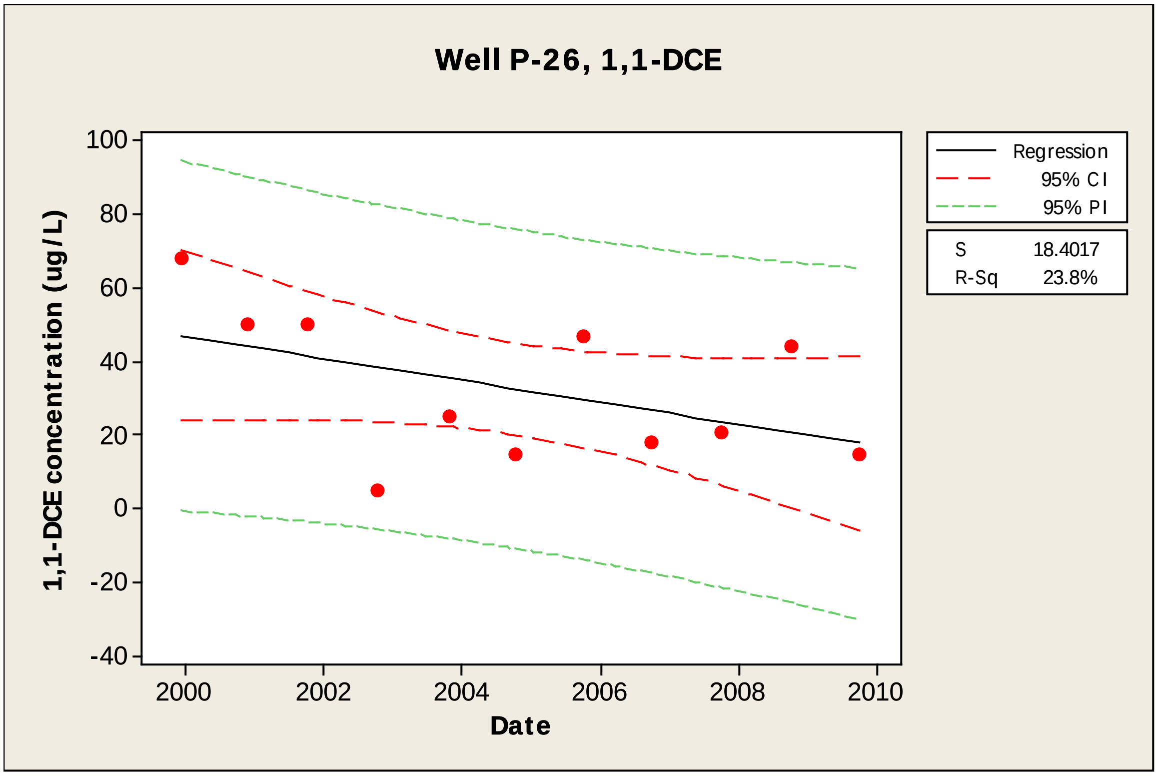
Regression Analysis: 1,1-DCA concentration (ug/L) versus Date

```
The regression equation is
1,1-DCA concentration (ug/L) = - 55.88 + 0.001646 Date
S = 2.89656   R-Sq = 34.2%
```

Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCA concentration (ug/L)

The calculated z = 1.16276
For Ha: Upperward trend, the p-value = 0.122464
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.
For Ha: Downward trend, the p-value = 0.877536
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.



Data

Date	1,1-DCE concentration (ug/L)
12/15/1999	68
11/29/2000	50
10/4/2001	50
10/14/2002	4.7
10/29/2003	25
10/6/2004	15
10/6/2005	47
9/28/2006	18
10/10/2007	21
10/9/2008	44
9/30/2009	15

Regression Analysis: 1,1-DCE concentration (ug/L) versus Date

```
The regression equation is
1,1-DCE concentration (ug/L) = 345.6 - 0.008179 Date
S = 18.4017   R-Sq = 23.8%
```

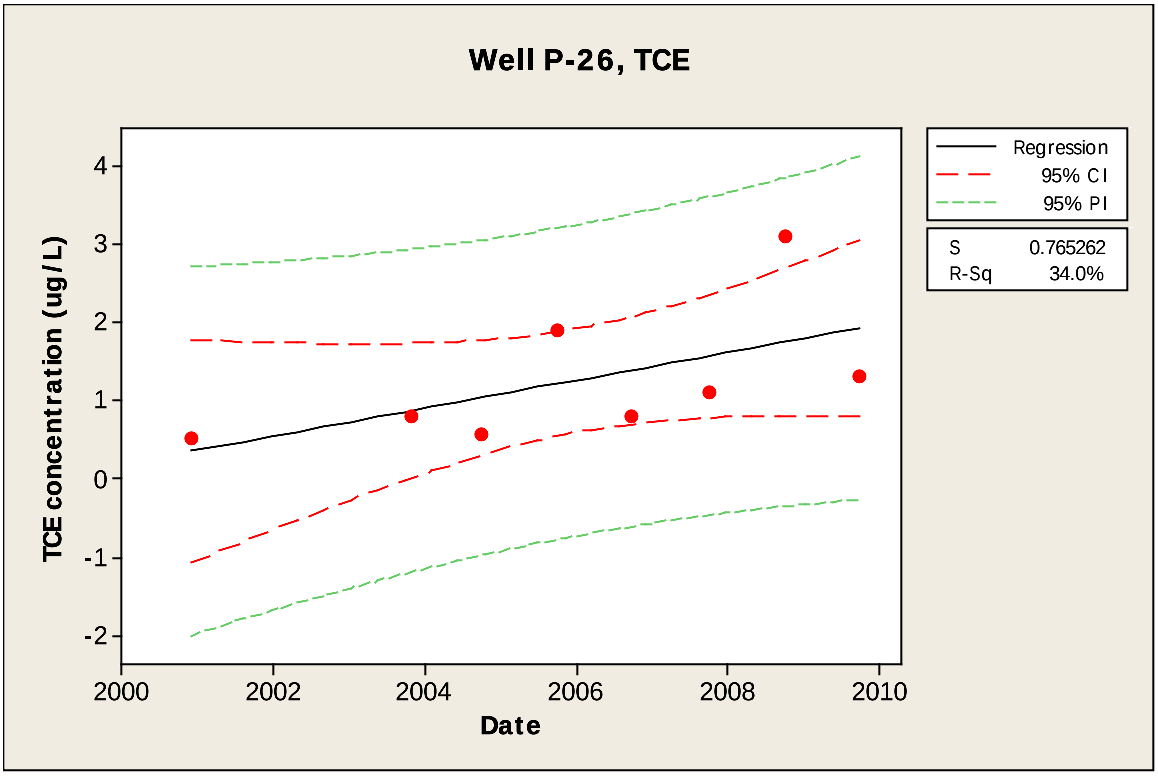
Mann-Kendall Trend Test by Normal Approximation

Ho: No trend in 1,1-DCE concentration (ug/L)

The calculated z = -1.56652
For Ha: Upperward trend, the p-value = 0.941387
At alpha = 0.05, there is not enough evidence to determine that there is an upward trend.

For Ha: Downward trend, the p-value = 0.0586134
At alpha = 0.05, there is not enough evidence to determine that there is a downward trend.

P-26



Data

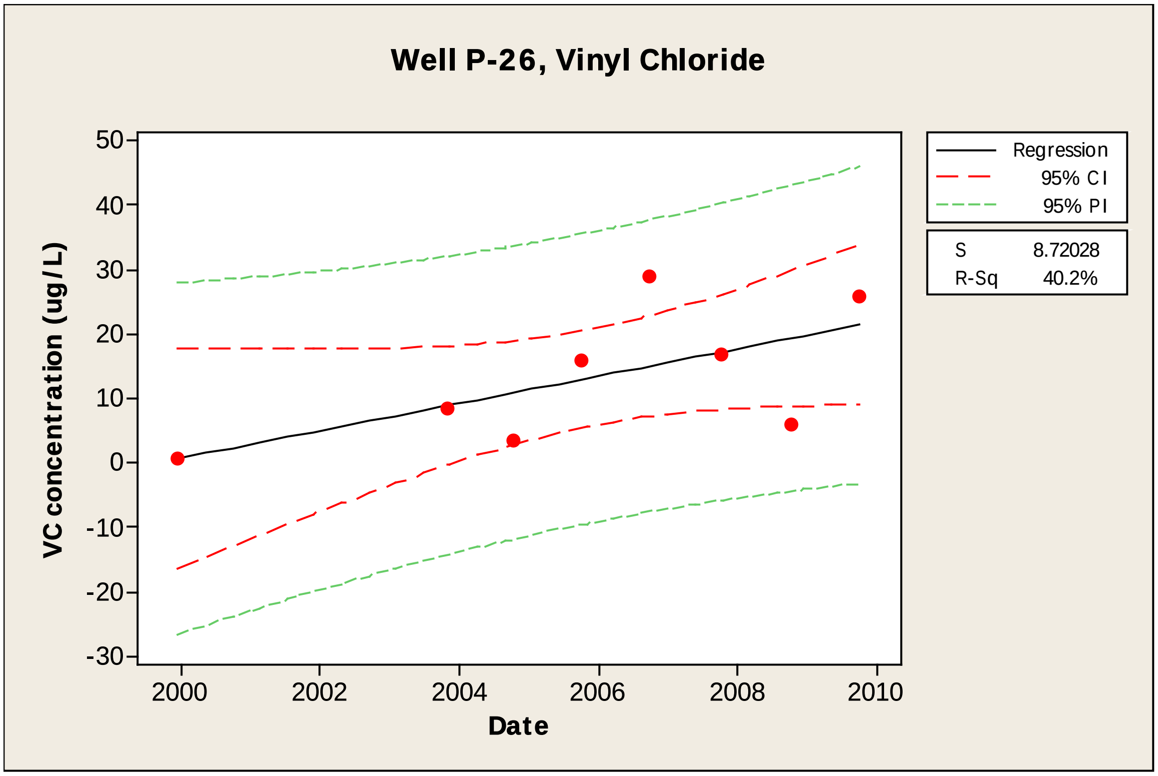
Date	TCE concentration (ug/L)
12/15/1999	<0.5
11/29/2000	0.50
10/4/2001	<8.4
10/14/2002	<0.5
10/29/2003	0.80
10/6/2004	0.55
10/6/2005	1.90
9/28/2006	0.80
10/10/2007	1.10
10/9/2008	3.10
9/30/2009	1.30

Regression Analysis: TCE concentration (ug/L) versus Date

```
The regression equation is
TCE concentration (ug/L) = - 17.56 + 0.000486 Date
S = 0.765262   R-Sq = 34.0%

There is not enough data current for a Mann Kendall Test by Normal Approximation
```

P-26



Data

Date	Vinyl Chloride concentration (ug/L)
12/15/1999	0.6
11/29/2000	<0.5
10/4/2001	<12
10/14/2002	<0.5
10/29/2003	8.5
10/6/2004	3.4
10/6/2005	16
9/28/2006	29
10/10/2007	17
10/9/2008	6.1
9/30/2009	26

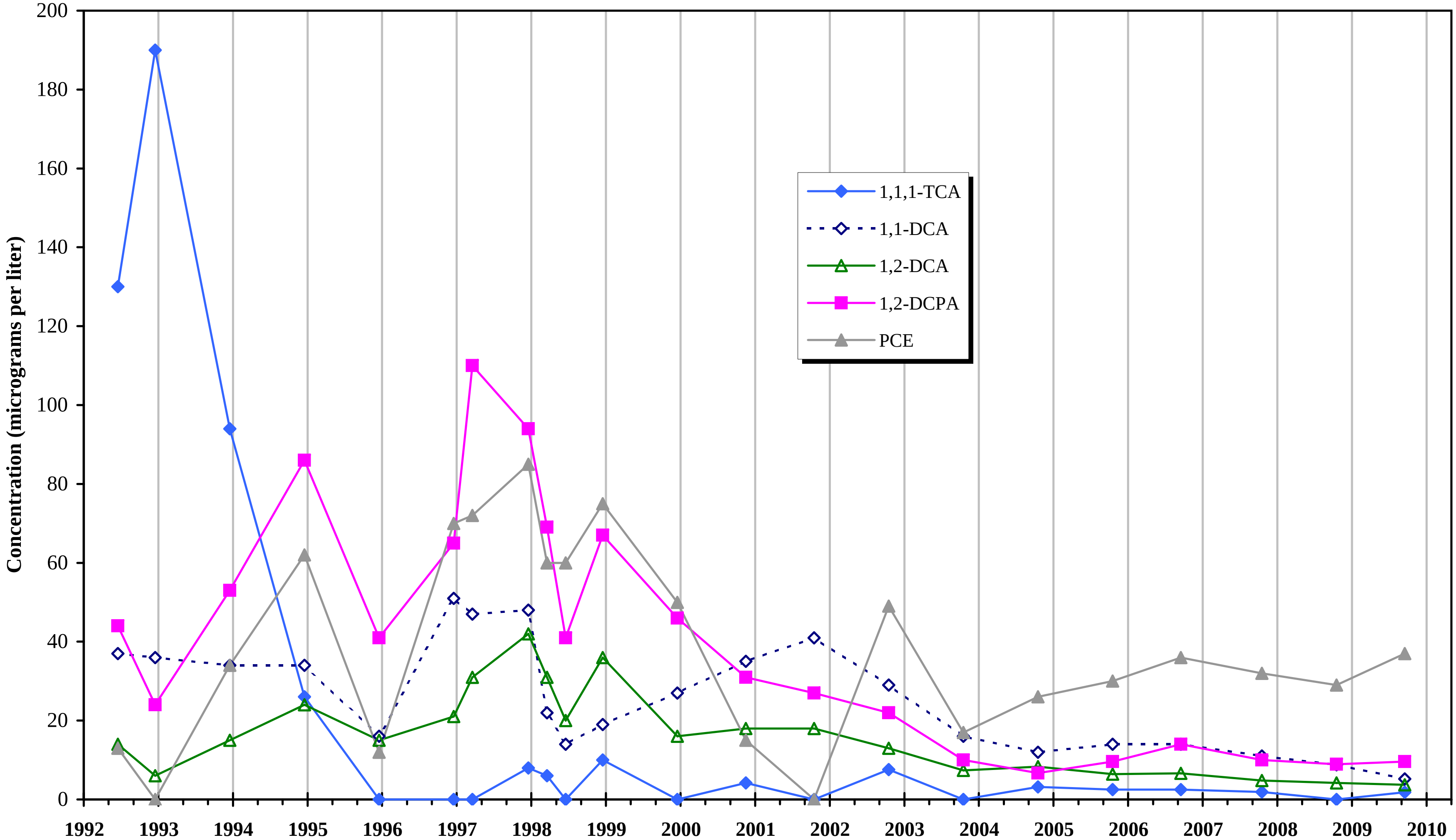
Regression Analysis: VC concentration (ug/L) versus Date

```
The regression equation is
VC concentration (ug/L) = - 211.2 + 0.005804 Date
S = 8.72028   R-Sq = 40.2%

There is not enough data current for a Mann Kendall Test by Normal Approximation
```

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-6 (Low Concentration Compounds)



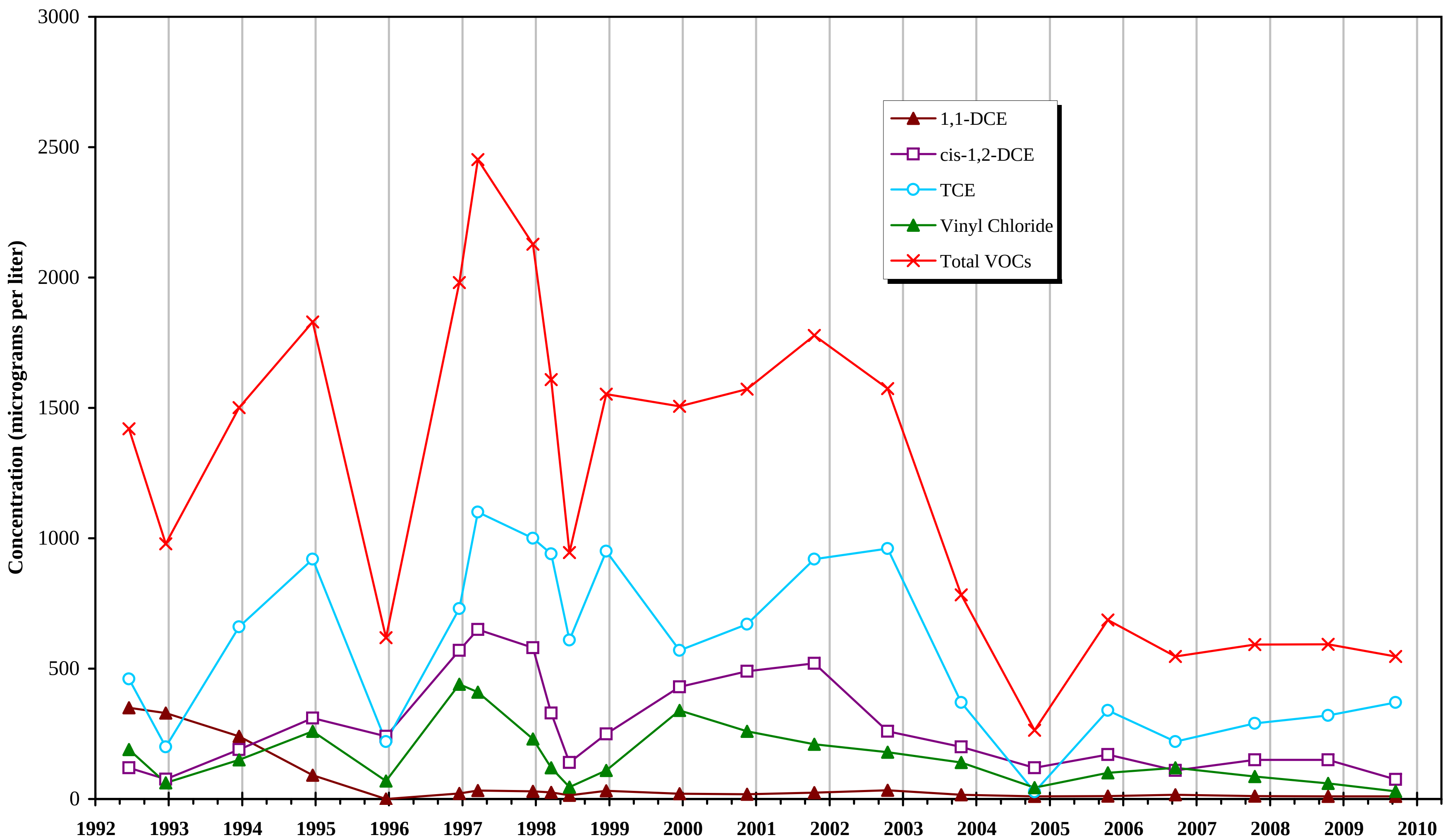
P-6 Low

Location: On LBD property

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Piezometer P-6 (High Concentration Compounds)



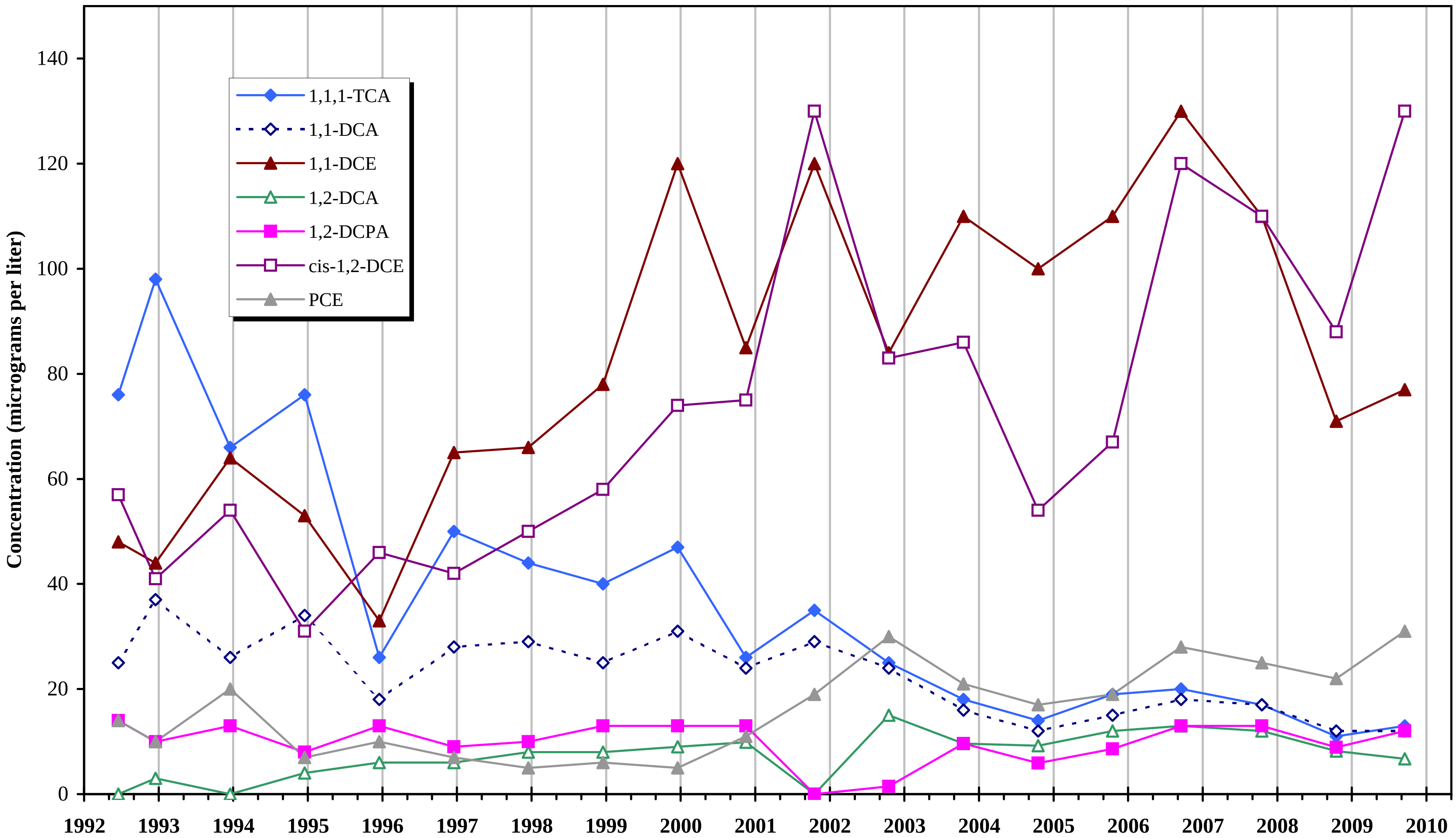
P-6 High

Location: On LBD Property

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Piezometer P-9 (Low Concentration Compounds)



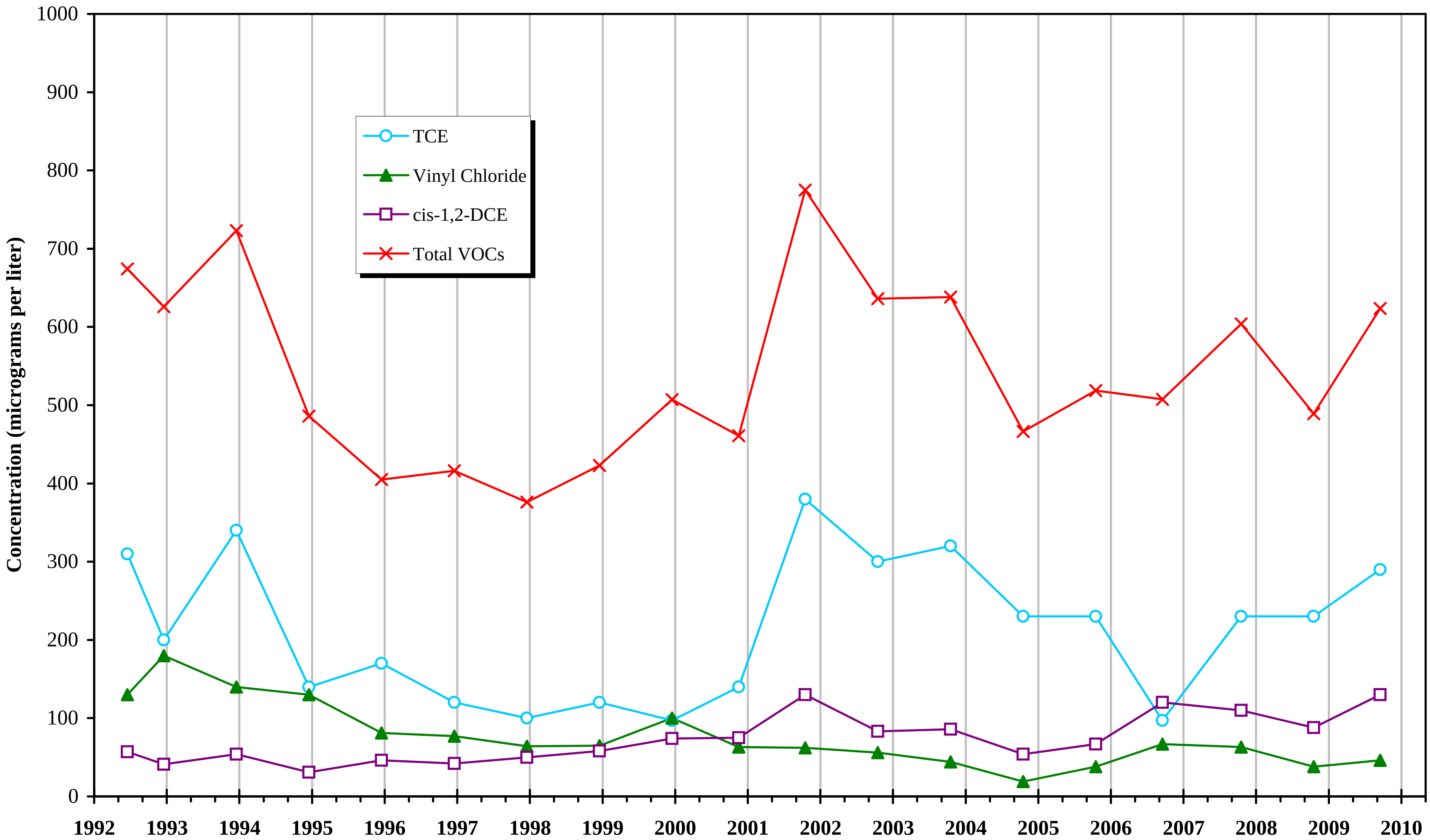
P-9 Low

Location: Central; adjacent to 10th St.; NW of Alma, SW of 10th

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Piezometer P-9 (High Concentration Compounds)

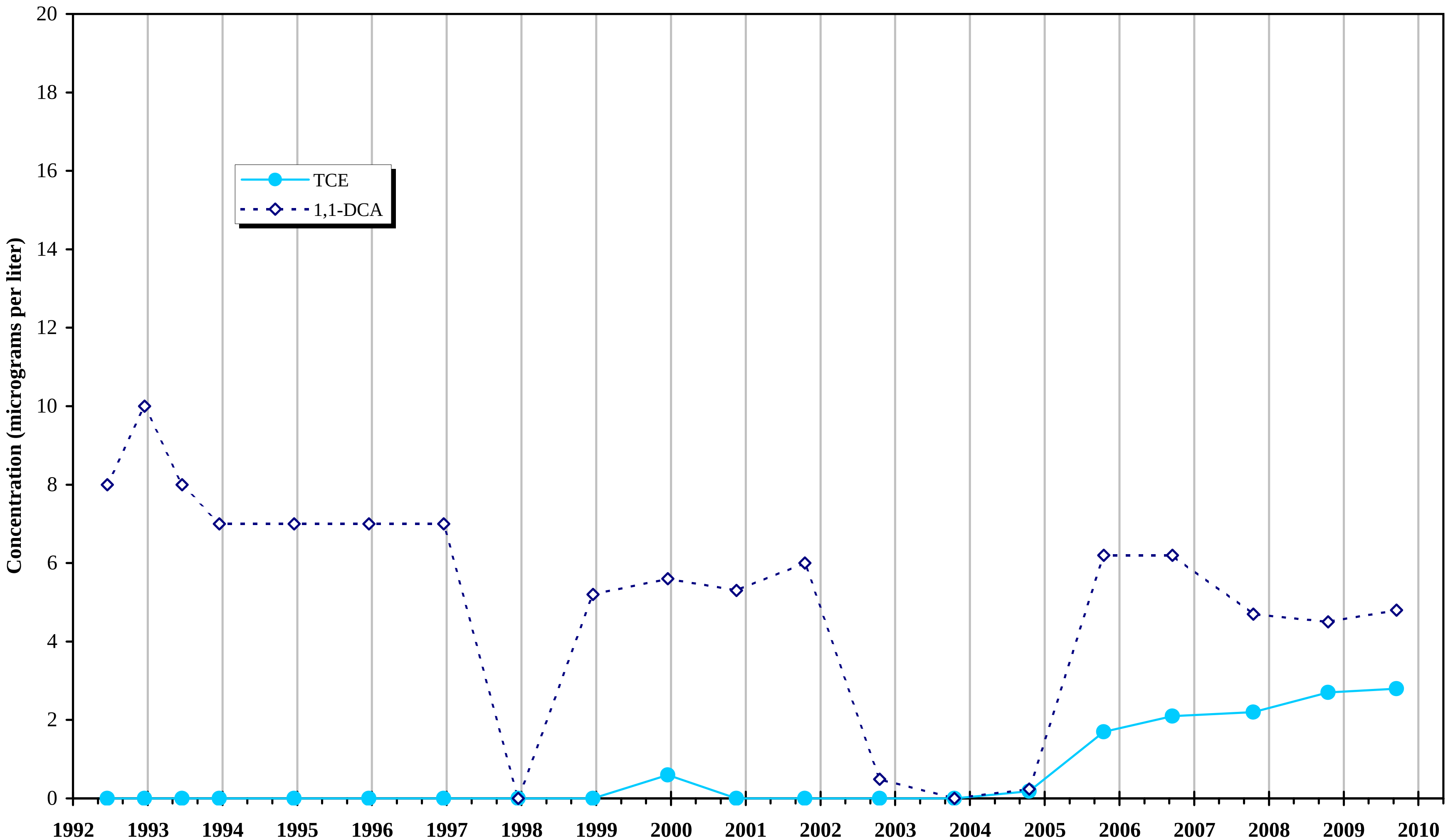


P-9 (High)

Location: Central; adjacent to 10th St.; NW of Alma, SW of 10th St.

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-10 (Low Concentration Compounds)

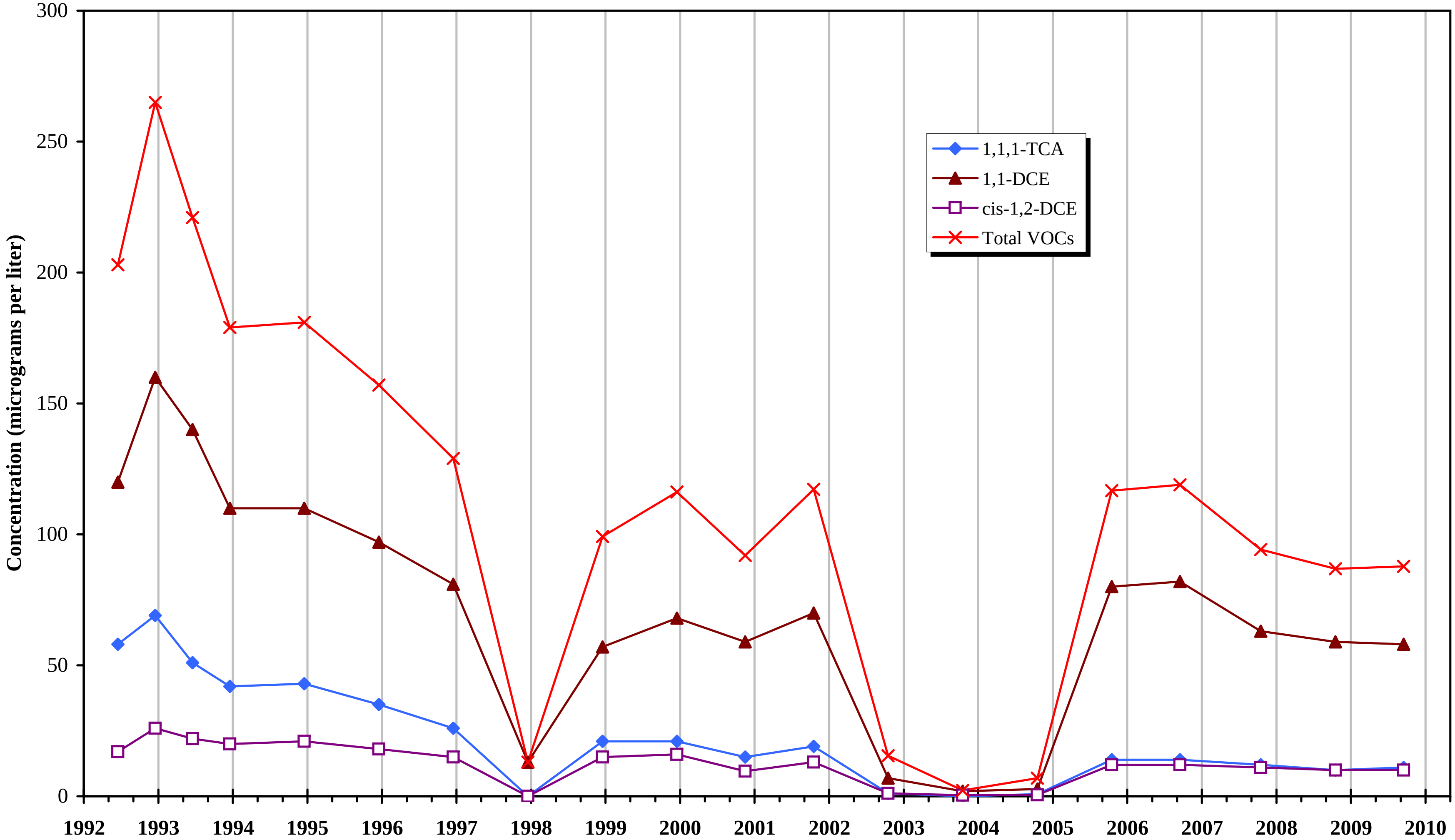


P-10 Low

Location: Near EX-16

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-10 (High Concentration Compounds)

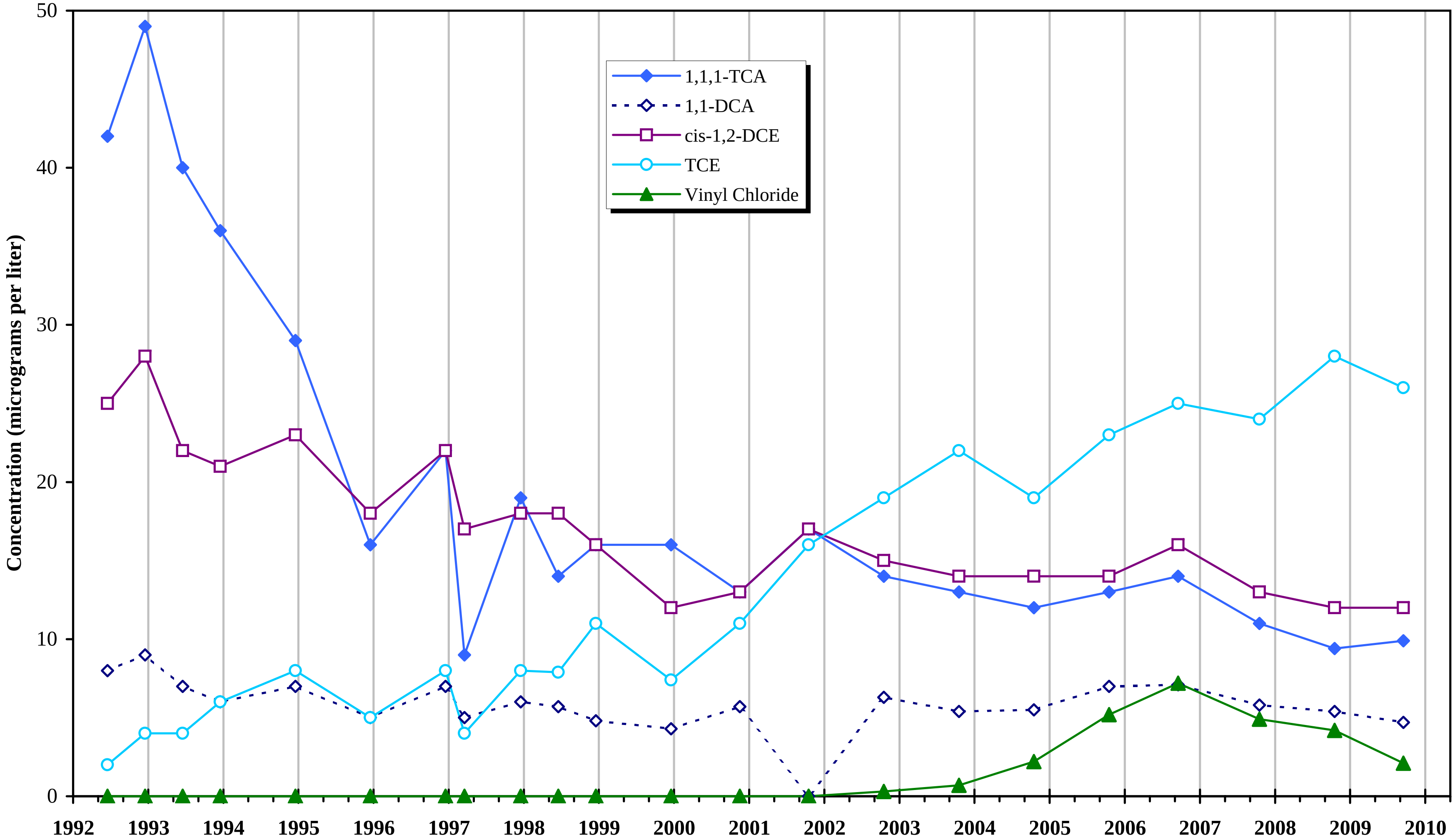


P-10 High

Location: Near EX-16

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-12 (Low concentrations)

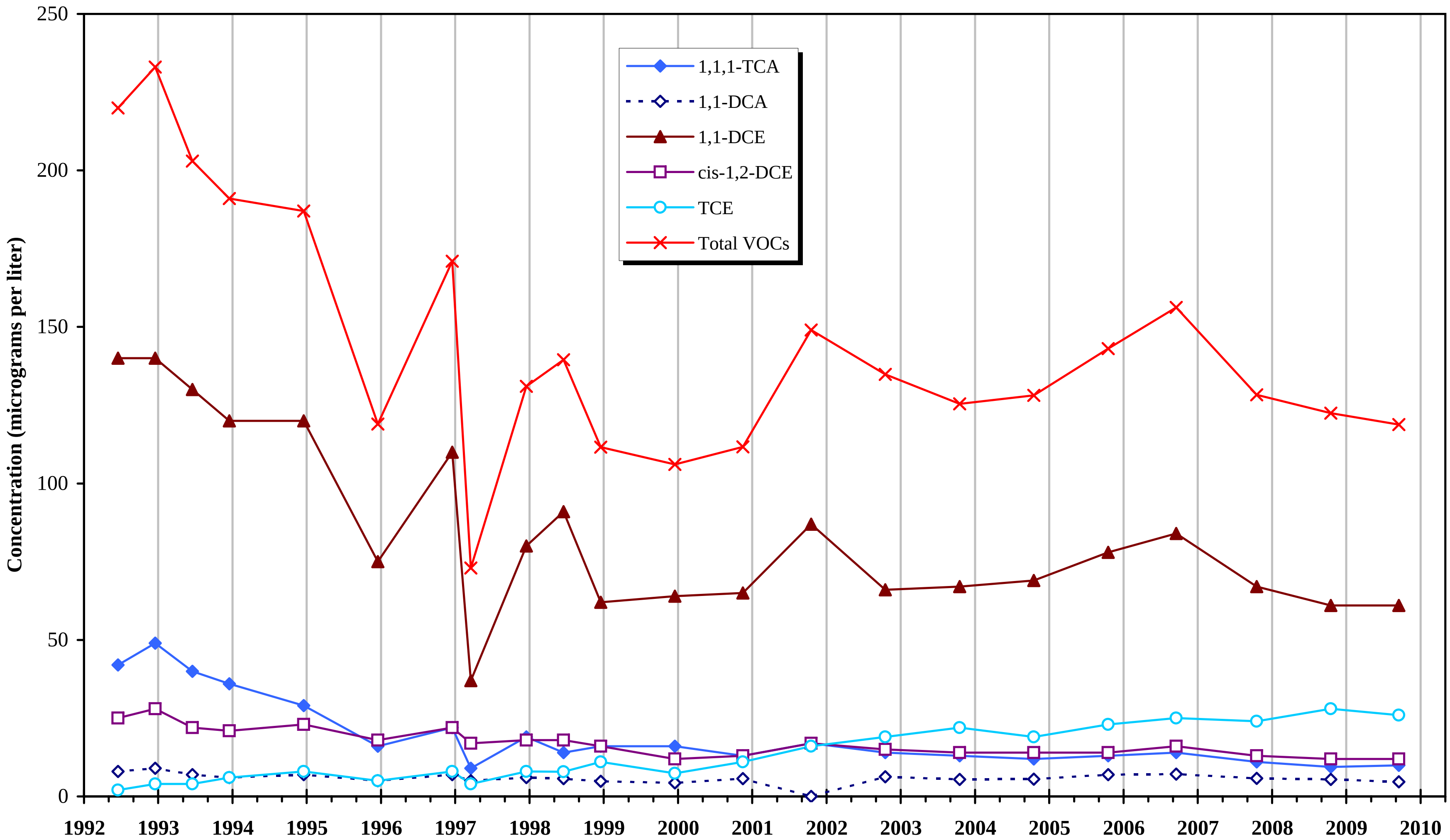


P-12 Low

Location: Central plume near SJSC field; NE of 10th St; SE of Humboldt

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-12 (High Concentrations)

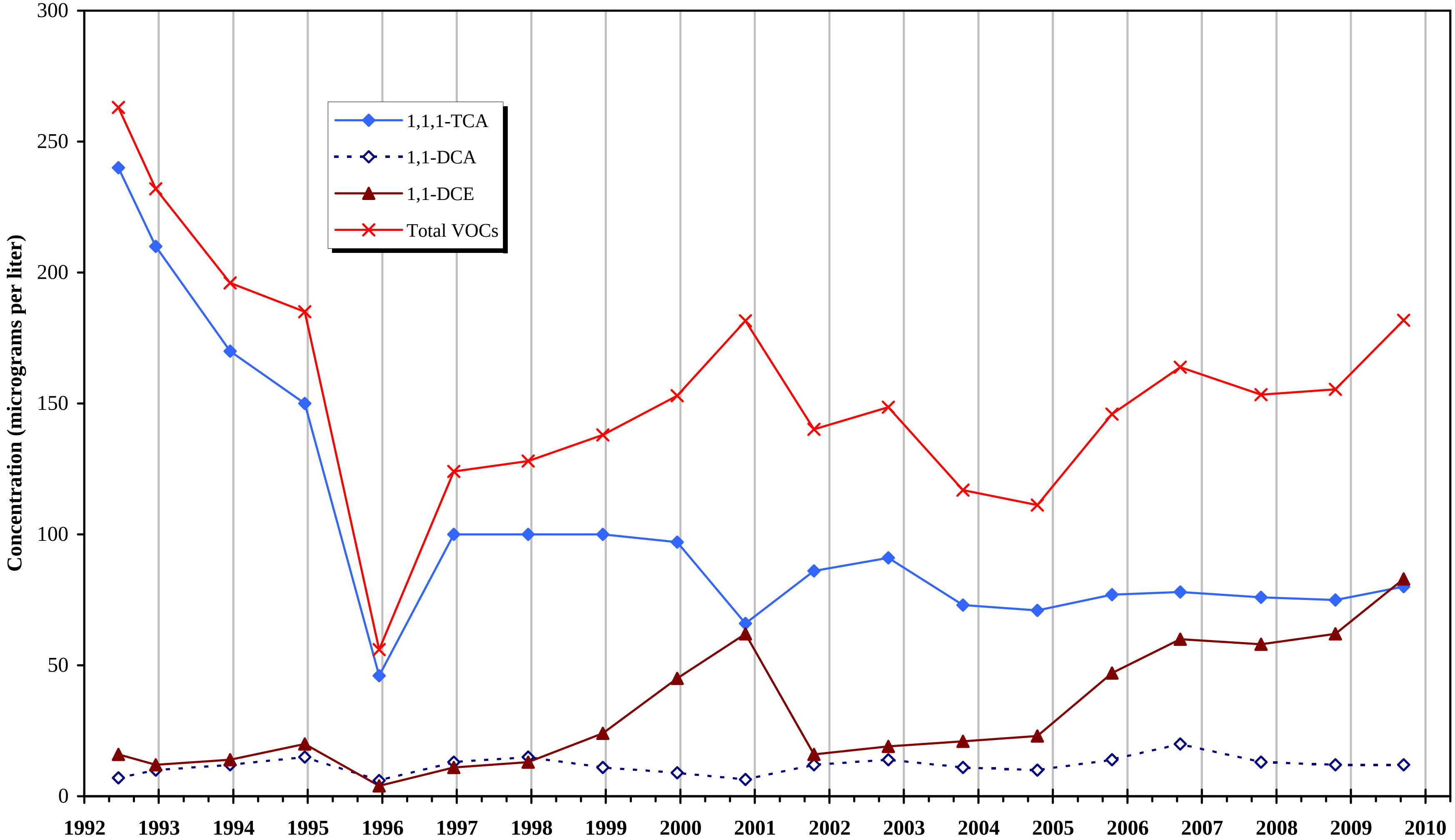


P-12 High

Location: Central plume near SJSC field; NE of 10th St; SE of Humboldt

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-14

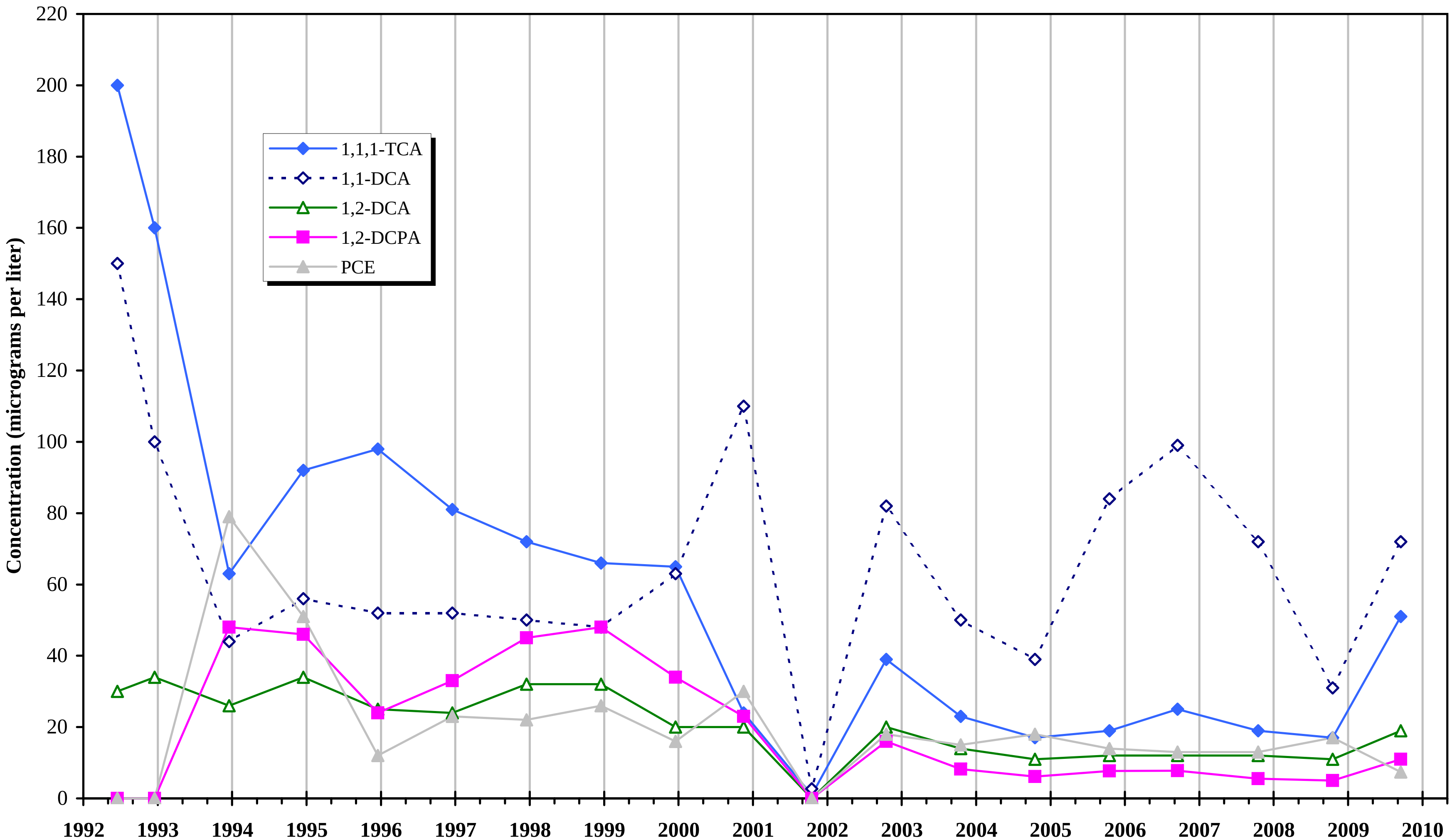


P-14

Location: Adjacent to and NW of Alma across from LBD site

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-18 (Low ConcentrationCompounds)

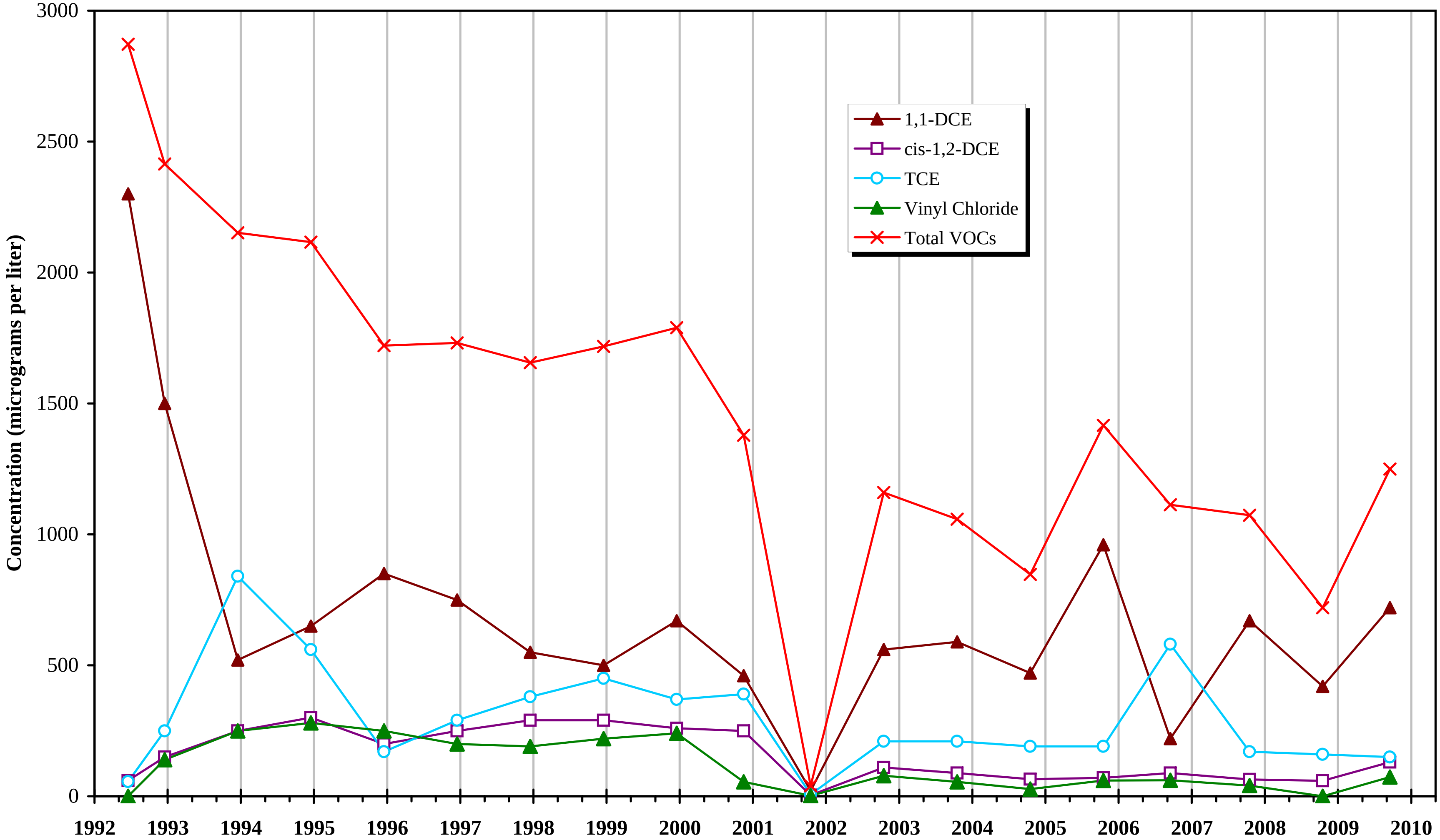


P-18 Low

Location: Adjacent NW of Alma across from LBD site

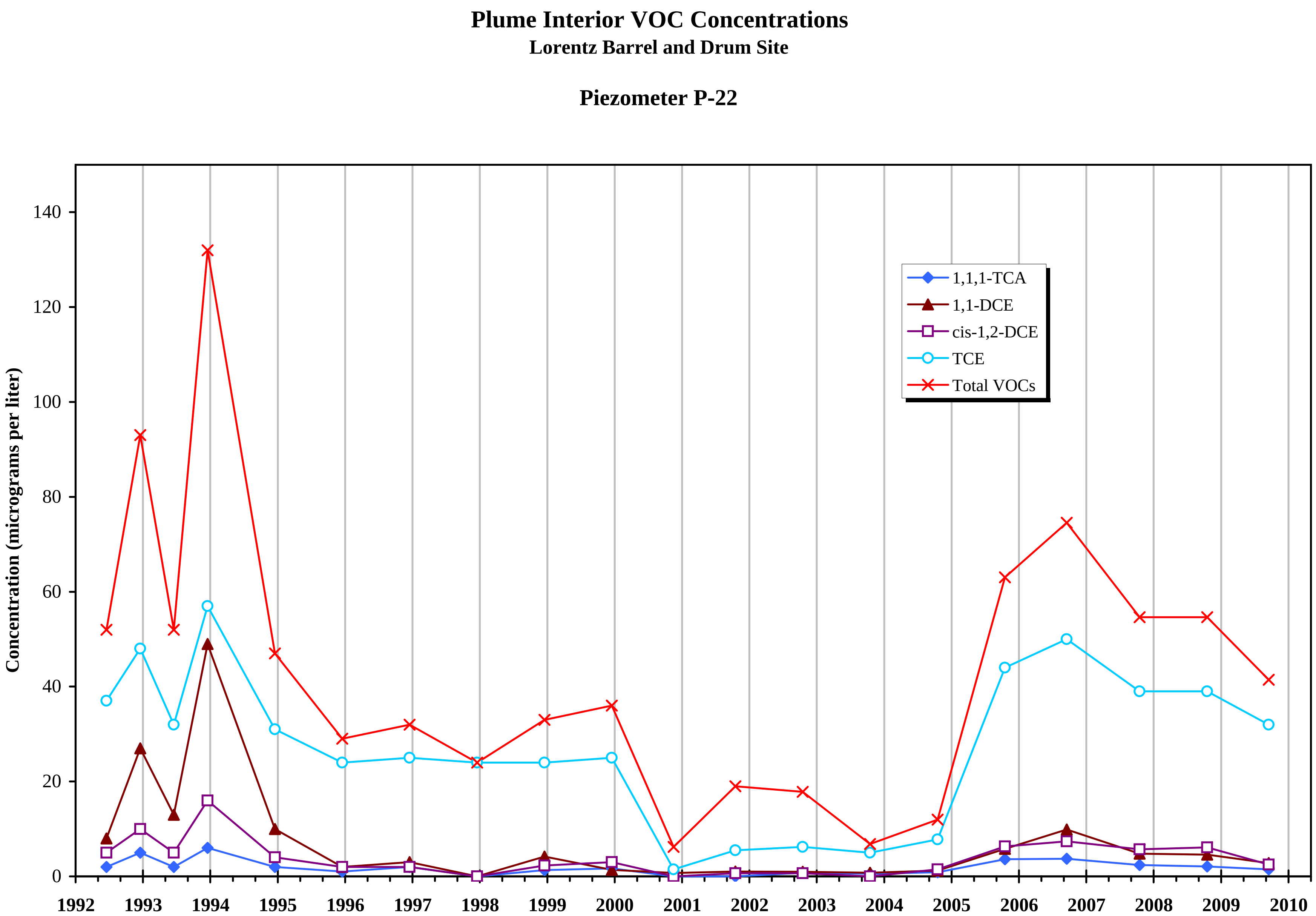
Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Piezometer P-18 (High Concentration Compounds)



P-18 High

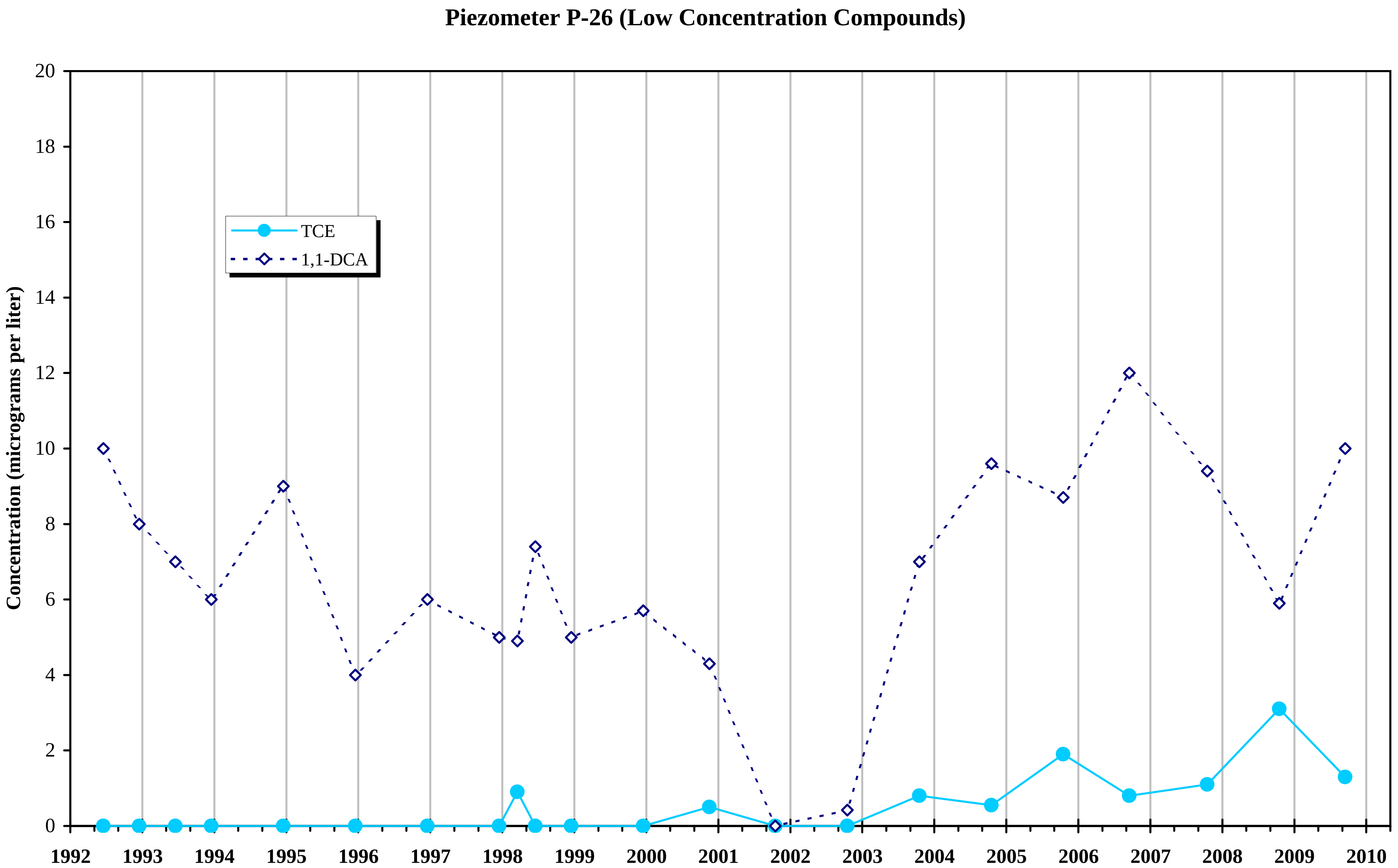
Location: Adjacent and NW of Alma across from LBD site



P-22

Location: N corner of 10th and Alma

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site



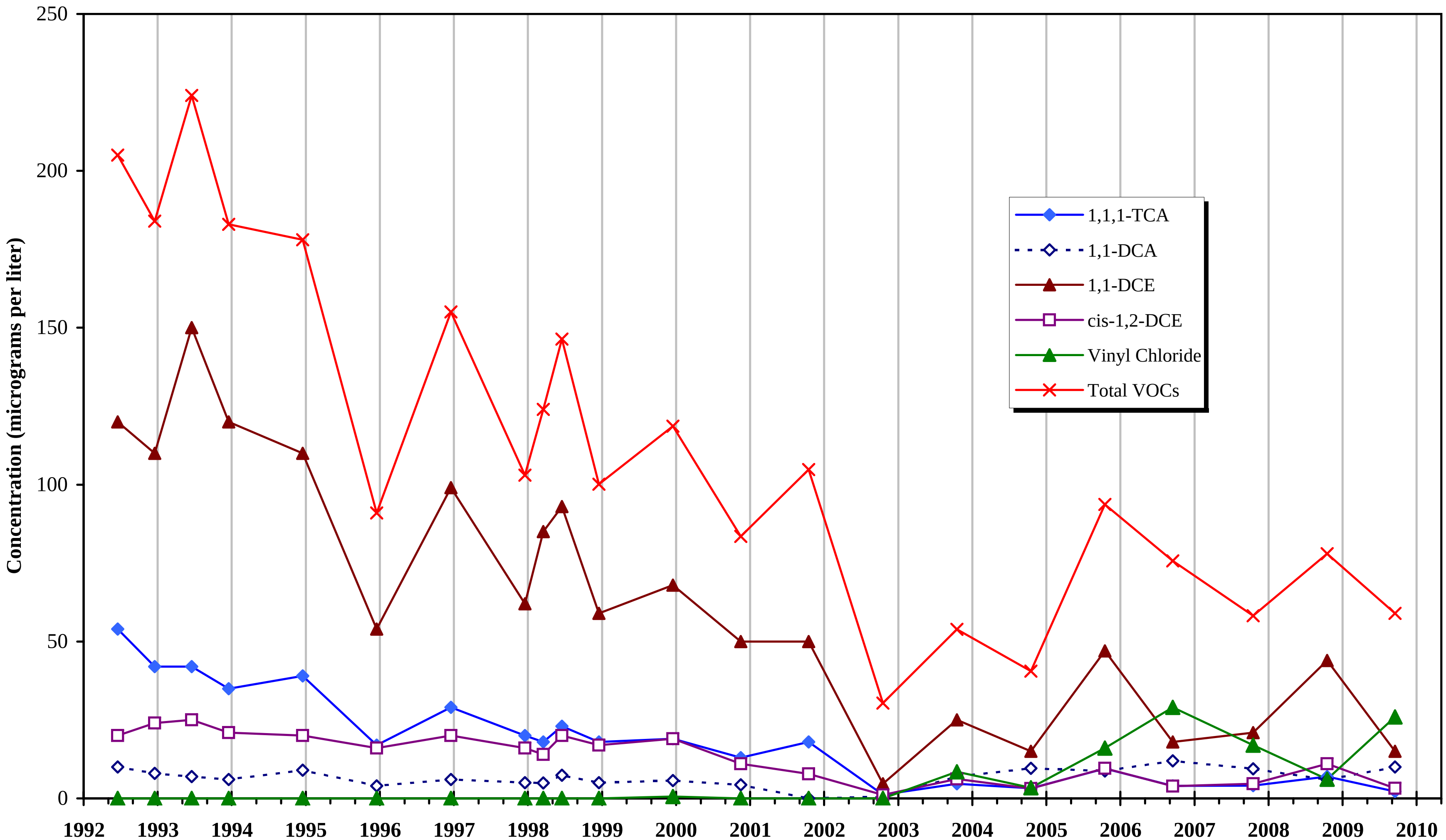
P-26 Low

Location: Near EX-16

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Piezometer P-26 (High Concentration Compounds)

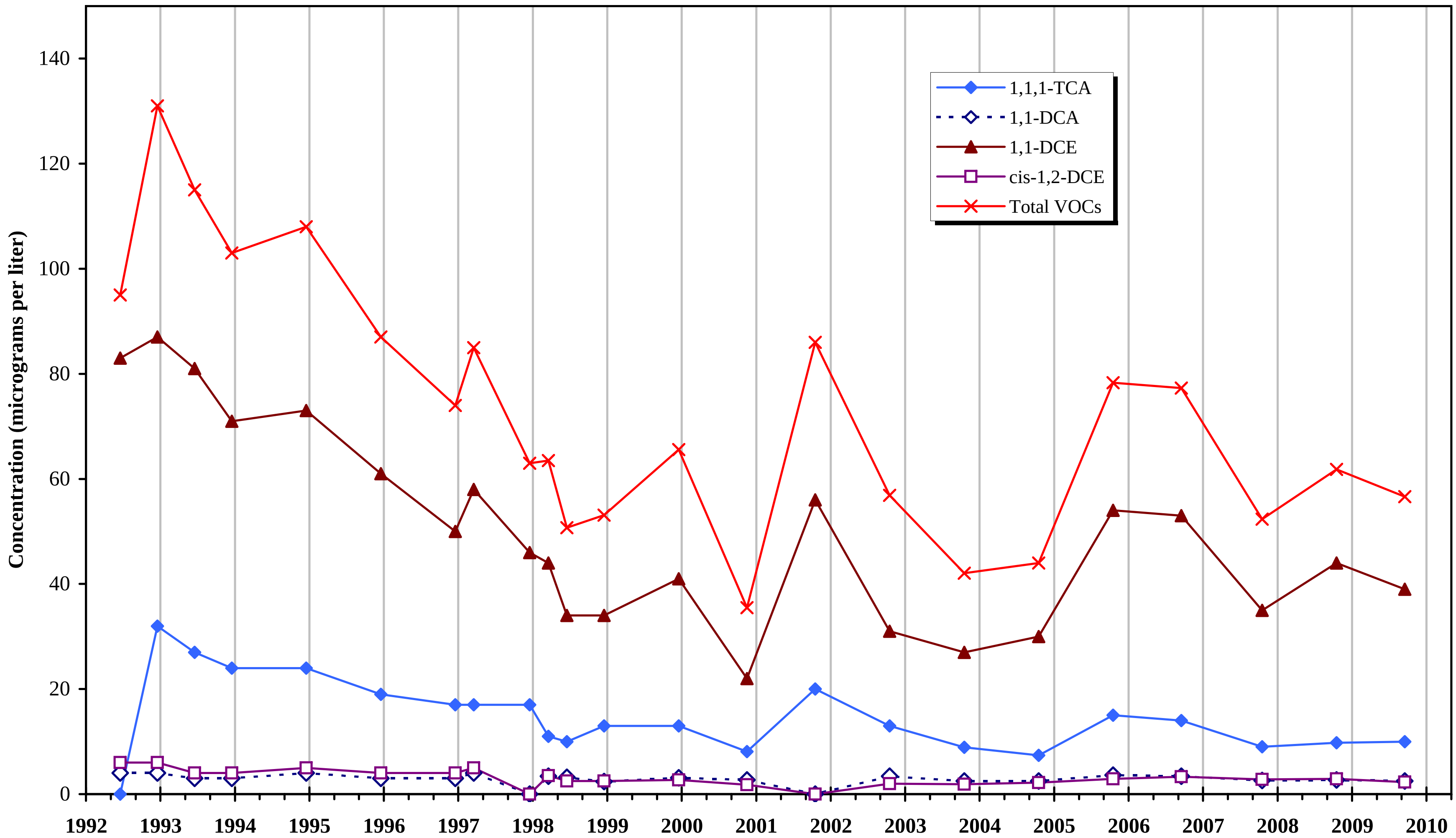


P-26 High

Location: N of Downgradient extraction system near EX-14

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

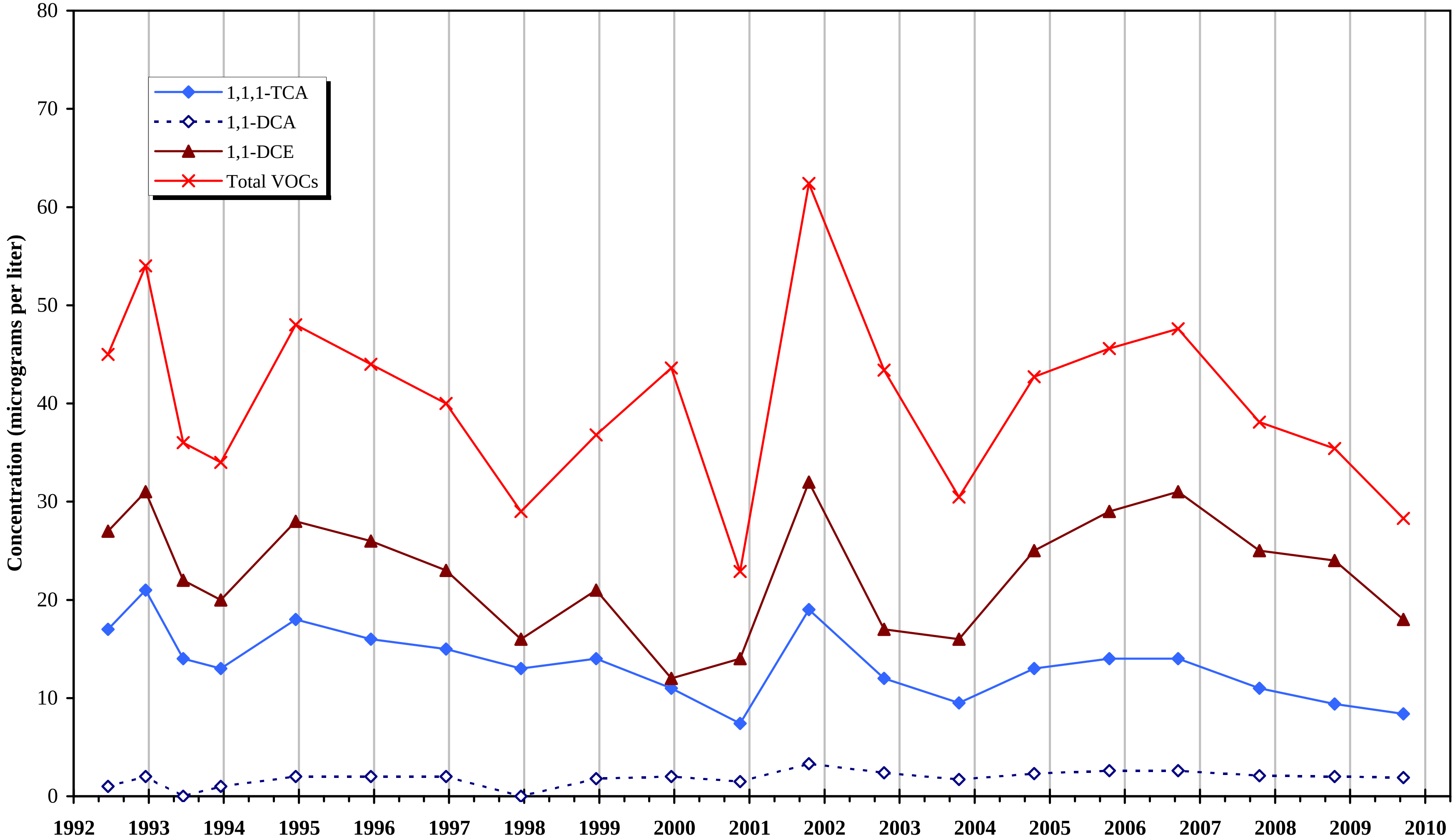
Piezometer P-28



Location: N of Downgradient Extraction System, Near EX-12

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

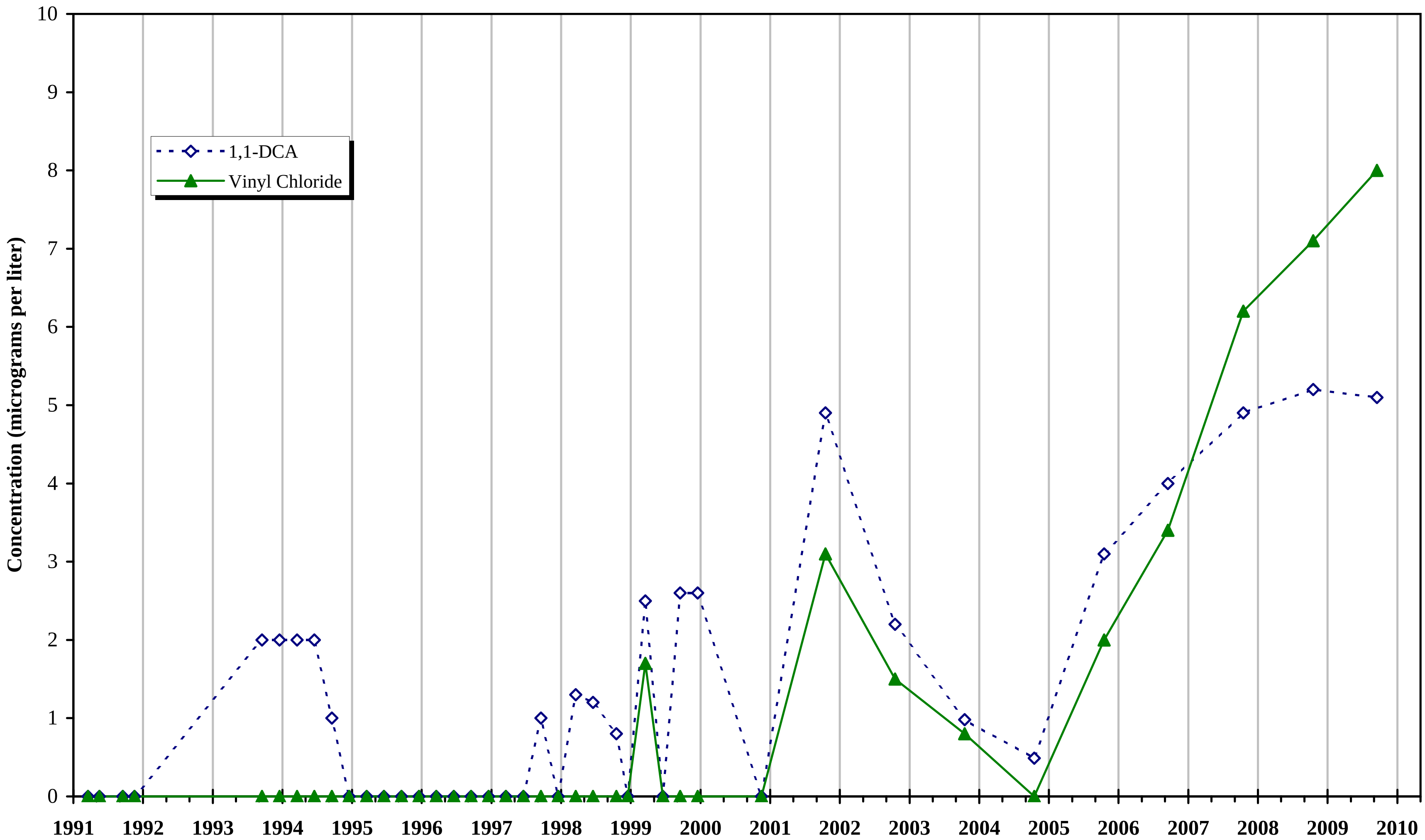
Piezometer P-30



Location: Downgradient of Extraction System, Near EX-10

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Monitoring Well MW-22



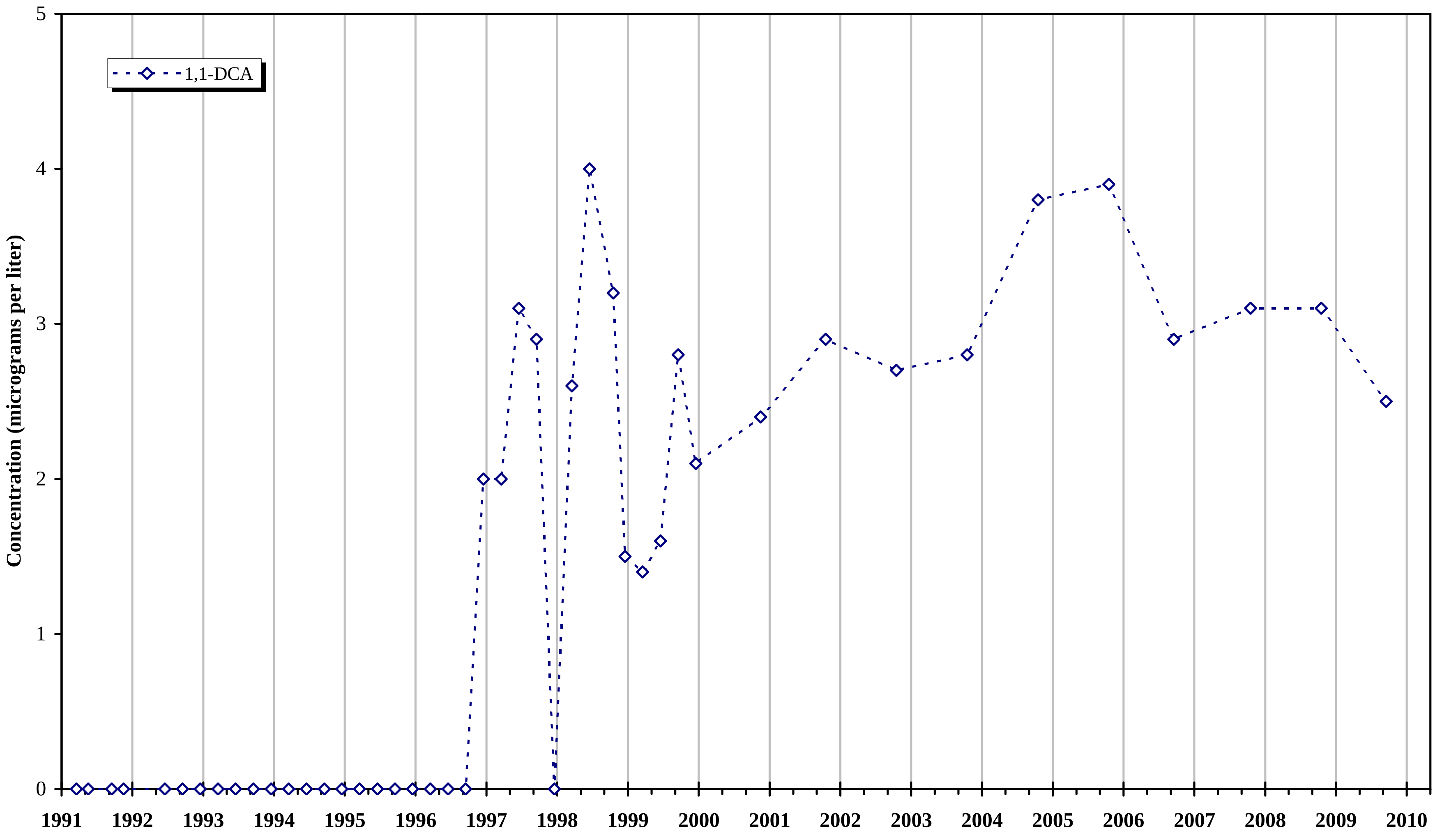
MW-22

Location: 10th St and Keys St.

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Monitoring Well MW-24



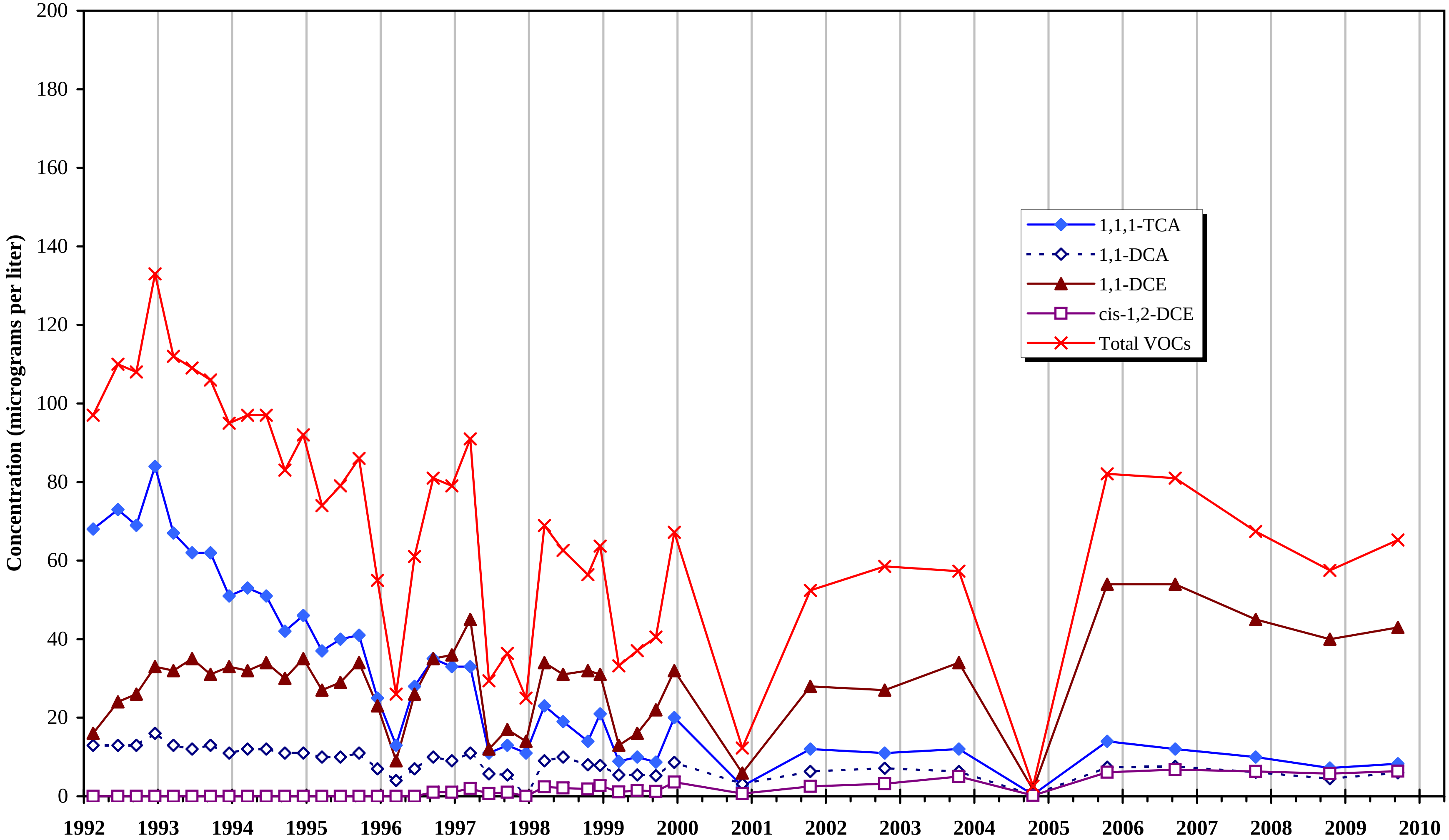
MW-24

Location: Downgradient Near Senter Rd

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Well MW-38



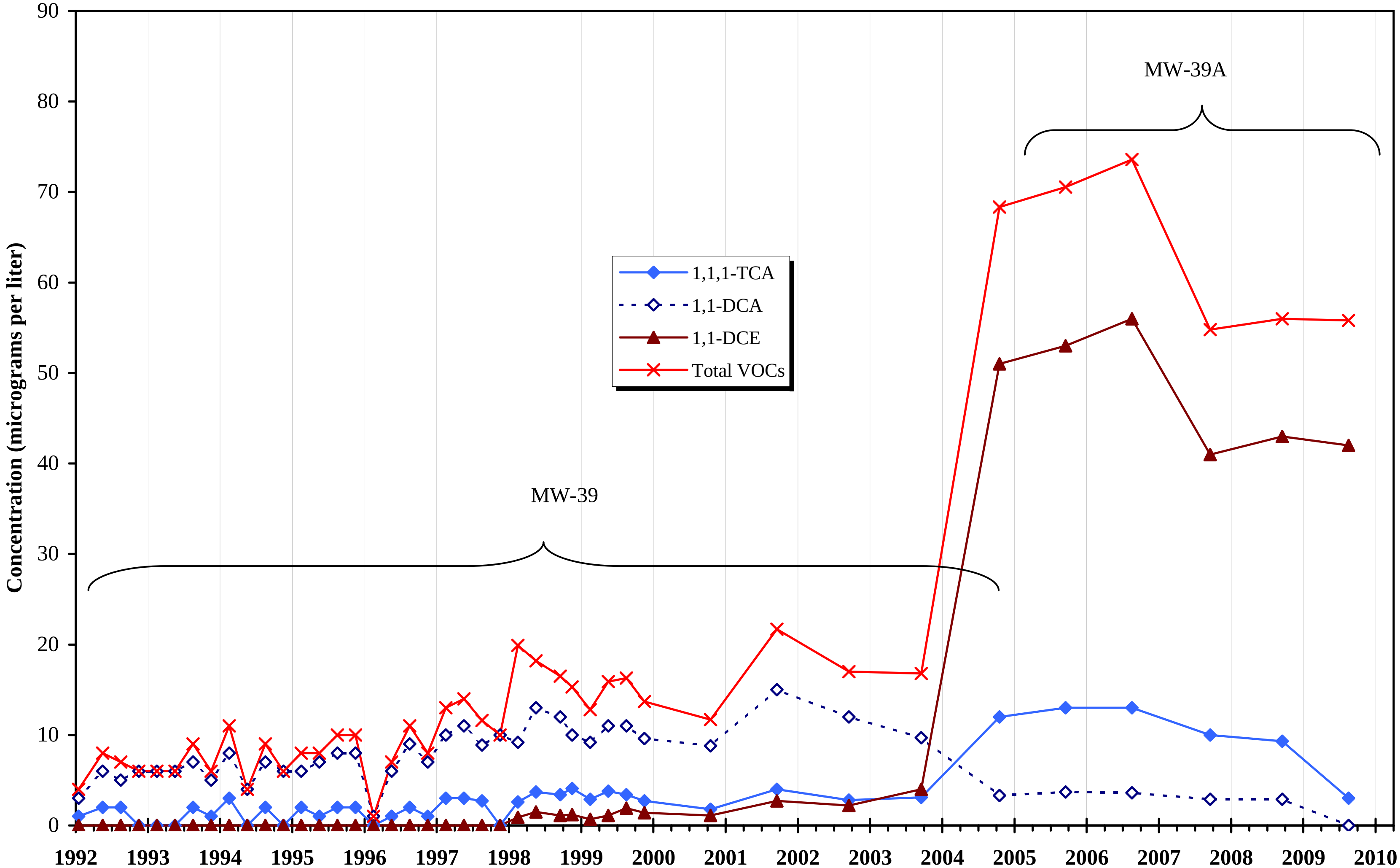
MW-38

Location: 11th St. between Keyes and Humboldt

Plume Interior VOC Concentrations

Lorentz Barrel and Drum Site

Monitoring Wells MW-39 and MW-39A

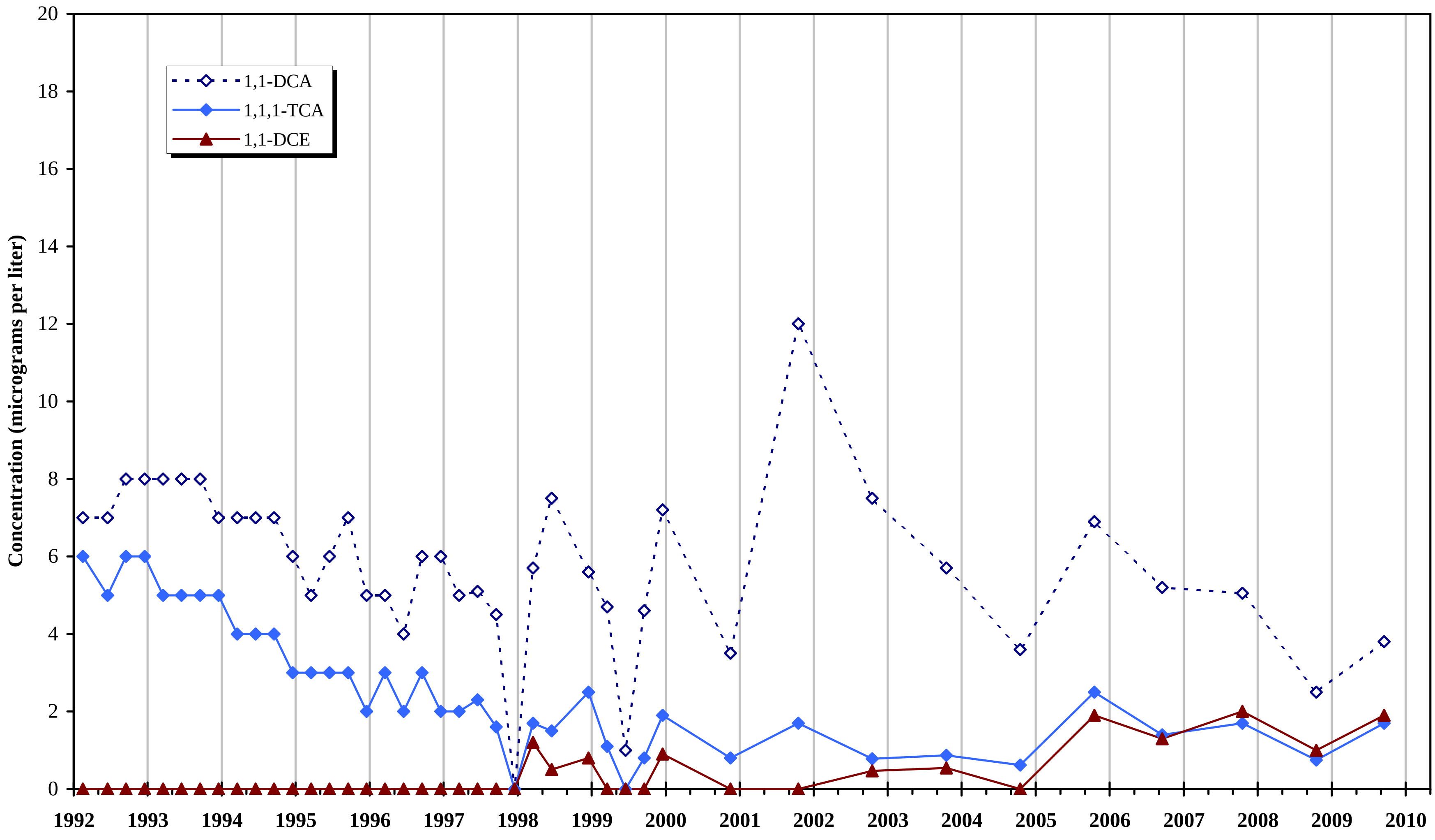


MW-39_39A

Location MW-39A: 12th Sreet and Humboldt St.

Plume Interior VOC Concentrations
Lorentz Barrel and Drum Site

Monitoring Well MW-40



MW-40

Location: Near Senter and Keyes

Attachment E

Interview Forms

INTERVIEW RECORD

Site Name: Lorentz Barrel L& Drum

EPA ID No: CAD029295706

Subject: Third 5-yr review

Time: 1000 **Date: 4/7/2010**

Type: ☒ Telephone ☐ Visit ☐ Other ☐ Incoming ☐ Outgoing

Location of Visit:

Interviewer(s)

Name: Maryellen Mackenzie **Title:** Geologist **Organization:** USACE

Interviewee

Name: Chris Waldron **Title: Project Manager** **Organization: Pioneer Technologies, Corp.**

Telephone No: (360) 570-1700
Fax No: (360) 570-1777
E-Mail Address: waldronc@uspioneer.com

Street Address:
2612 Yelm Highway, SE, Sutie B
Olympia, WA 98501

Lorentz Interview Questions

1. *What is your current role as it relates to the site? What is your overall impression of the work conducted at the site to date? (general sentiment)*

   Project Manager, Shallow Groundwater Task Force (SGWTF), Lorentz Barrel and Drum Site, working for Pioneer Technologies Corporation

   Overall Impression is that things are efficient. Field Solutions is our group in the field, Howard Koltermann with Pegasus Geoscience is doing a good job as hydrogeologist. Everything seems to be running smoothly.

   Chris said he's been on the job since late 2006.

2. *Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, give purpose and results.*

   Site visits are coordinated by Field Solutions. They are at the site weekly. They collect the samples for NPDES Permit reporting, plant influent and effluent sampling and annual groundwater sampling. Chris said he wasn't at the site much. He does get calls regularly from Howard Koltermann who is in the Santa Clara area. He may come to meetings with EPA and the State of California as needed. They generally have an annual meeting with EPA; sometimes that's handled by a conference call. He has regular communications with SJ Chern (EPA Region 9), several times a month.

3. *Have any new or emerging COCs been identified? If so, have they impacted the effectiveness of the remedy?*

   1,4-dioxane is not something that is part of the NPDES permit. It is included in a generic permit with the State of California. They have been both above and below the trigger (3 ppb) for this compound in the plant effluent. The high concentration in the effluent was 9 ppb of 1,4-dioxane. It's a COC from the RWQCP.

4. *Would you say that O&M and /or sampling efforts have been fully optimized? Please describe how improved efficiency has/has not occurred.*

   Yes, effective as far as the O&M, good and solid. Down-time is very rare. The questions is what are you trying to optimize? System optimization? Minimize electricity usage? I think we are as optimized as we can get.

5. *Are you aware of any institutional controls, site access controls, new ordinances in place, changes in actual or projected land use, and/or complaints being filed or unusual activities at the site? Please describe.*

   No, not at this time. We had a scare about a new stadium at the soccer field, SJSU, the City of San Jose. Most of the IC are going through EPA and the State of California. No one is notifying SGWTF when there's a change of land use.

6. *Have any problems been encountered which required changes to the remedial design or ROD?*

   No problems encountered in O&M. There was an issue related to fouling. Scale built up within conveyance system. They were able to increase throughput by 3-6 times by installing in-line clean outs, pneumatic pumps and acid washes. Field Solutions at first were cleaning the lines out a couple of times a year to start. They are not having to clean the lines out much anymore.

7. *Do you have any comments, suggestions, or recommendations regarding the site?*

   In terms of the site in general, pump and treat – not seen a significant change in hydraulic control. They are working with EPA and OU1 to reevaluate the site, working on an exit strategy, source control. They are trying to evaluate options with OU2 and OU1 to get to an exit strategy.

8. *What is your current staffing and what is your projected staffing?*

   2-1/2 to 3 people work part time regularly at Pioneer. Field Solutions has Mark Adler and Pat . Howard and Chris Koltermann prepared the Groundwater Monitoring Reports and the NPDES Permit Report. Follow-up phone interview with Pat Lacey (Field Solutions) recommended.

9. *Are the institutional controls effective? Any recommended improvements?*

   We have not been involved with the Institutional Controls. We control what we're able to control. It's incumbent on SFSU and the City of San Jose to incorporate the site institutional controls into their planning. Maintaining and enforcing of the institutional control is the responsibility of EPA and the State of California.

10. *Is there any information available to help evaluation of relative flow rates among the 3 active wells (cycle counts, duration, etc)?*

    No cycle counters. What they have is not the most accurate. Follow-up phone interview with Pat Lacey (Field Solutions) recommended.

11. *Is there information available regarding the timeline of the changes in extraction well usage (ie. When was each of the 15 off-line wells taken out of service)?*

    Not that I have any knowledge of. My involvement started at the end 2006. At that time there were only three wells operating. There is nothing in the files that I have seen regarding why there are only three wells operating. Follow-up phone interview with Pat Lacey (Field Solutions) recommended.

12. *Is the fouling problem in the extraction system fully under control? Would bringing additional wells on-line be a problem in that regard? Are there maintenance activities beyond routine cleaning of in-line screens that address the fouling?*

    The fouling is under control with the cleanouts and the acid flush.
    Bringing other wells online would not be a problem.
    The periodic acid flushing also addresses the fouling.

13. *Any un-anticipated events or costs associated with the operation, maintenance, and monitoring at the site?*

    Regarding surprises.
    -The kingpin is the compressor, we replaced it last year. We are proactive about maintenance of the compressor.
    -Issue with pumps, we have backup pumps. We were using AP3 pumps but have upgraded to AP4s, they're pretty robust. There hasn't been much failure of the pumps.

14. *What types of "green remediation" techniques have been used?*

    "Green remediation" not much green remediation with the O&M. We do "recycle" the carbon in the carbon canisters.

15. *What was the annual cost to operate the remediation system for the past five years including monitoring & reporting cost?*

    Average annual costs are about $275,000 per year.
    That includes maintenance, monitoring and sampling and carbon change outs.
    2005-2007 about $250,000 per year
    2008 $275,000 per year
    2009 $325,000 per year
    2010 anticipated $325,000 per year

16. *Is there an exit strategy?*

    Working with EPA, they're working on a Focused Feasibility study that may openly address the ROD. It may put all the options on the table at both sites and arrive at a solution for both sites. After 20 years we are not close to shutting down the system.

17. *Are there any issues you can think of that have not been covered by these questions?*
No

INTERVIEW RECORD

Site Name: Lorentz Barrel L& Drum **EPA ID No: CAD029295706**

Subject: Third 5-yr review **Time: 1000** **Date: 4/19/2010**

Type: ☒ Telephone ☐ Visit ☐ Other ☐ Incoming ☐ Outgoing

Location of Visit:

Interviewer(s)

Name: Doug Mackenzie **Title:** Env. Engineer **Organization:** USACE

Interviewee

Name: Patrick Lacey **Title: CIH/Operations Manager** **Organization: Field Solutions Inc.**

Telephone No: (408) 281-2322
Fax No:
E-Mail Address: placey@fieldsolutionsinc.com

Street Address:
6276 San Ignacio Avenue, Suite A
San Jose, CA 95119-1363

Summary Of Conversation

Mr. Lacey was present at the site visit with Mark Adler, System Operator, where the two gentlemen explained the various OU2 site features to the review team and answered questions. This interview record documents a follow-up call to Mr. Lacey to address specific questions that arose at a later date.

1) *The individual groundwater extraction wells do not have flow measurement, but is there any way you have a sense of the relative flows among the three operational wells?*

Cycle counters were installed about one year ago. With the total system flow and the cycle counts at each well you can derive the flow for each well by direct proportion. Generally EX-19 produces the most water and EX-9 produces the least. Mr. Lacey provided a spreadsheet with the cycle counter data by electronic mail at a later time.

2) *We have noticed that the carbon change-out frequency increased significantly,to approximately monthly, and it appears to coincide with the increased flow. Is that observation correct?*

The increased was a direct result of the increased flow. Mr. Lacey also indicated that the VOC concentrations seemed to increase as well.

3) *Is vinyl chloride the VOC that is driving the change-out frequency?*

They determine change-out frequency by calculating the breakthrough time for vinyl chloride using the vendor's isotherm data. VC is the contaminant that will break through first. The timing of change-out is not based on sampling because the discharge limit is too low and the breakthrough time is too fast. A violation would occur before they could receive analysis results and respond to them.

4) *Do you know the sequence of shut-downs of the extraction wells from 18 wells to the current three?*

Mr. Lacey was involved at the site at the beginning, when all 18 wells were operating, but was not on the project during the mid-1990's. When he returned to the project, there were 3 wells operating. He stated that the monitoring reports from the 1990'2 would contain the information. (At a later date, Chris Waldron of Pioneer Technologies provided information by electronic mail.)

Attachment F

Site Photographs

Lorentz Barrel and Drum

Site Stratigraphy – A Zone

Upper permeable soil

Perched water in silt above A/B Aquitard

Lorentz Barrel and Drum

Site Stratigraphy – A Zone

A/B Aquitard

A/B Aquitard

SVE System Condition

Plastic piping sun burned

Plastic instrumentation windows fogged

SVE System Condition

Rust

Large flex piping also sun damaged and cracking

Groundwater Extraction/Treatment Process

System Influent Tank

Compressor to drive pneumatic well pumps

Granular Activated Carbon

Groundwater Extraction Well

SVE System – Standing water in containment from previous day rain

Apartment complex over plume at 12th and Keyes Street

Bridge over Coyote Creek. MW-24 in foreground

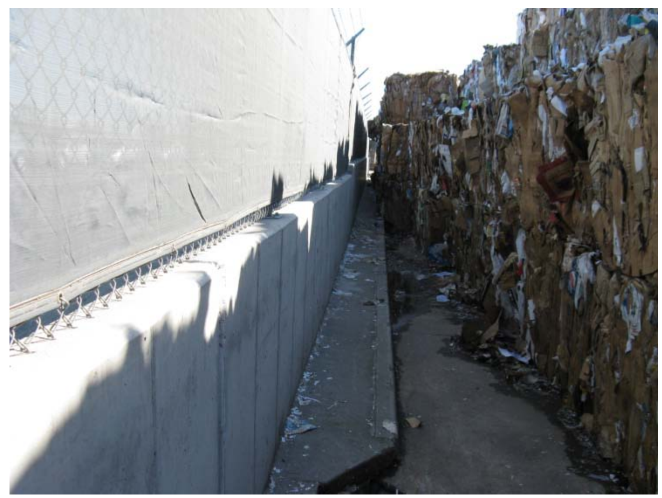
Coyote Creek

Newark Property

Alma Street Entrance

Patched pavement in foreground

Alma Street Entrance – patched pavement



Retaining wall between 1oth St and Newark properties

Attachment G

Cap Inspection Reports

10th. Street Land Management
Site Analysis

For

1507 South 10th Street, San Jose, CA 95112-2516

Observation Date:___January 8, 2010 Observation Time:_4 PM
Previous Observation Date:___December 28, 2009____)
Company Representative who conducted Observation: _____________Chinh Q. Vu____________

Company Name Conducting the Observation: **URS Corporation**
Company Address: **55 South Market Street, Ste 1500, San Jose, CA 95113**
Company Phone Number: **(408) 297-9585**

Items Inspected

Asphalt Cap: CV Initials — I have walked the entire site and inspected the Asphalt Cap.

______ Initials — There where no issues found with the Asphalt Cap.

CV Initials — There where issues found as described below. (If required, use reverse side of this form for additional notes)

There were small hairline cracks in various locations within the property.

Routine Maintenance Completed:

____.

Retaining Walls, Curbs, and Gutters: CV Initials — I have walked the entire site and inspected the Retaining Walls, curbs, and gutters.

______ Initials — There where no issues found with the Retaining Walls, curbs, and gutters.

CV Initials — There where issues found as described below. (If required, use reverse side of this form for additional notes)

There were hairline cracks on all sides of the curbs. It appears that patches made in recent repair were not effective. Recommend a different patching material. A small portion of the curb to the southwest, adjoining the recycle plant, where a fence post is tied into the curb, appears to have been slightly damaged.

Routine Maintenance Completed:
Patches were observed for hairline cracks along the eastern curb. However, several hairline cracks remain along the southern curb.

Security Fence: CV Initials — I have walked the entire site and inspected the Security Fence.

CV Initials — There where no issues found with the Security Fence.

______ Initials — There where issues found as described below. (If required, use reverse side of this form for additional notes)

____.

Routine Maintenance Completed:

____

Representatives Signature	February 23, 2010 Date	**Observation Date:**_February 2010__)

URS

March 30, 2010

Mr. Shiann-Jang Chern
USEPA, Region IX, SFD-7-4
75 Hawthorne Street
San Francisco, CA 94105

Re: Monthly Wet-Weather Site Inspection Report – Concrete and Asphalt Surfaces
February 2010
The Newark Group – Recycle Fibers San Jose Facility
388 East Alma Avenue
San Jose, CA 95112

Dear Mr. Chern:

Attached is a copy of the Monthly Wet-Weather Site Inspection Report for February 2010 for the Newark Group's Recycle Fibers San Jose facility located at 388 East Alma Avenue. URS is conducting these inspections periodically on behalf of The Newark Group as required by the California Consent Order No. HAS-CO-04/05-033 and Federal CERCLIS No. CAD02925706. The observations represent our professional judgments and opinions based upon the site inspection. This site inspection was performed on February 28, 2010.

Please do not hesitate to contact us if there are any questions or comments.

Sincerely,
URS Corporation

Patrick Walz, P.E.
Project Manager

cc: Mr. Bill Doerr/Newark Group
Mr. Eddie Tolentino/Newark Group
Mr. Jose Saez/Newark Group
Mr. Mark Piros/DTSC

URS Corporation
100 W. San Fernando Street
Suite 200
San Jose, CA 95113-2254
Tel: 408.297.9585
Fax: 408.297.6962
www.urscorp.com

Newark Paperboard Wet Weather Site
Monthly Inspection Form
February, 2010

Inspection Date: February 28, 2010 Company Representative who conducted inspection: Patrick Walz
Company conducting inspection: URS Corporation, 100 W. San Fernando Street, Ste.200, San Jose, CA 95113, (408) 297-9585

I certify that I have walked the entire site and performed the inspection described below: ______________
Representative Signature

Note: Monthly Inspection Notes for general and specific portions of the Site in reference to attached Figure.

Specific Conditions (See Page 2 for General Conditions)

Grid ID	Photo Index #[1]	Previous Reported Changes and Recommended Repairs[2]	Repair Status[2]/New Findings
Asphalt Paved Area			
A1	20	Area in good condition	No change from previous inspection.
A2	27		
A3	21		Slight depression forming, approx. 2'x8' in size. Will continue to monitor
B1	14		No change from previous inspection.
B2	27	Very small Triangle piece developing. Will continue to monitor.	
Bale Storage and Truck Loading			
B3	15	Small cracks	No change from previous inspection.
B4	16	Small cracks	
C1	14	The degraded concrete piece was repaired with epoxy-patching.	
C2	15	Small cracks	
C3	16	Small cracks	
C4	17	The developing triangle piece was replaced with new concrete pavement and joints are sealed with new Microflex compound.	No change from previous inspection.
D1	8	Concrete separation have been sealed with new Microflex compound. Concrete pieces with 1" vertical separation has been replaced and joints are sealed with new Microflex compound.	No change from previous inspection.
D2	9		
D3	10		
D4	11		
E1	1	Cracks have been sealed with new Microflex compound. Damaged concrete between the gate and the catched basin was replaced and joints are sealed with new Microflex compound.	No change from previous inspection.
E2	2		
E3	3		
E4	4		
Baler Building and Loose Material Storage Area			
B5	17	Area in good condition.	No change from previous inspection.
B6	30	Area in good condition.	
C5	18	Area in good condition.	
C6	18, 19	Concrete beginning to settle and cracks have increased from hairline to ~1/8". Liquid was observed, around the crack. Will continue to monitor.	Significant settlement observed. Concrete repair recommended for an area approximately 13'x20' in size.
Scale and Loading Ramp Area			
D5	12	Cracks have been sealed with new Microflex compound. Damaged concrete pieces near the dumpster area and the loading ramp have been replaced and joints are sealed with new Microflex compound.	Over flowing Microflex joint sealing compound are pealing due to heavy traffic. Will continue to monitor.
D6	12, 13		
E5	5		
E6	5, 6		
E7	7	Small cracks	No change from previous inspection.
Equipment Storage Area			
A3	21	Small cracks	No change from previous inspection.
A4	26	Damaged curb was repaired to original state. Cracked concrete area were replaced with new asphalt.	
A5	22, 31		
A6	28, 30		
Covered Storage Area			
A7	28, 23	Single long hairline crack with very narrow opening extends length of this area. Will continue monitoring.	No change from previous inspection.
B7	29		
C7	19, 24		
D7	13, 25		
Catch Basins (Grid ID refers to location of individual Catch Basin)			
A2	21	Catch basins recently repaired and remain in good condition.	No change from previous inspection.
C2	15	Moderate backup and ponding at Catch Basin due to accumulation of paper, however, no cracks have been observed within the ponded area.	
E2	2	Moderate backup and ponding at Catch Basin due to accumulation of paper, however, no cracks have been observed within the ponded area.	
C7	13	Area in good condition.	

1: See 2009 Biennial Report for Site Photographs

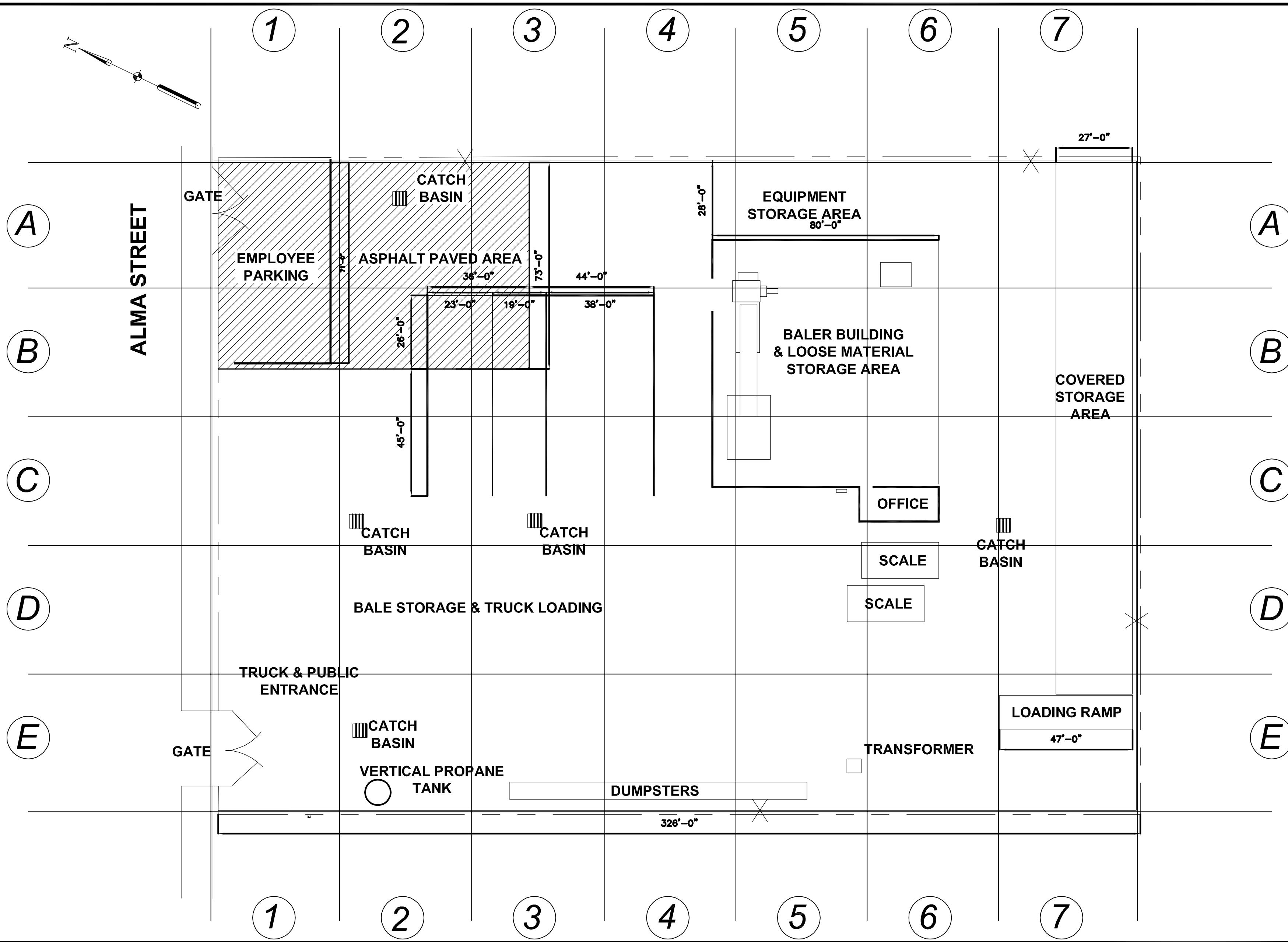
Newark Paperboard Wet Weather Site
Monthly Inspection Form
February, 2010

General Conditions

Location	Grid IDs (Approximate)	General Description	Repair Status/Recommendations
Asphalt Paved Area	A1, A2, B1, B2	The Asphalt Area is in generally good condition with few or no cracks in the surface.	No change from previous inspection.
Bale Storage and Truck Loading	B3, B4, C1-C4, D1-D4, E1-E4	This area has been the focus of several repairs in the past two years to address the most significant cracks. This year, several cracked concrete areas have been sealed with Microflex compound, and damage pieces of concrete have been replaced and joints are sealed with new Microflex compound. Some smaller cracks less likely to impact groundwater remain.	No change from previous inspection.
Baler Building and Loose Material Storage Area	B5, B6, C5, C6	The surface within the baler building is in good condition with few or no cracks in the surface.	One significant crack with settlement has occurred. Repairs are recommended for an area approximately 13'x20' in size.
Scale and Loading Ramp Area	D5, D6, E5-E7	This area has been the focus of several repairs in the past two years to address the most significant cracks. This year, several cracked concrete areas have been sealed with Microflex compound, and damage pieces of concrete have been replaced and joints are sealed with new Microflex compound. Some smaller cracks less likely to impact groundwater remain.	No change from previous inspection.
Equipment Storage Area	A3-A6	This area, behind the baler building, has been the focus of several repairs to address cracks which have allowed the upflow of groundwater. This year the damaged pieces of concrete have been replaced by asphalt. Additionally, the damage curb cause by the tree growth has also been repaired. Several smaller cracks less likely to impact groundwater remain.	No change from previous inspection.
Covered Storage Area.	A7, B7, C7, D7	This area is in generally good condition. One long crack extends the length of the covered area; this crack does not appear likely to impact groundwater.	No change from previous inspection.
Catch Basins	Catch Basins are located within A2, C2, E2, and E7	Each catch basin has been repaired in the past two years to repair cracks along the perimeter of the drainage grate. Few or no cracks remain in the immediate vicinity of the catch basins.	No change from previous inspection.

1: See 2009 Biennial Report for Site Photographs

File:



URS

Nerark Paperboard
Alma Facility

SITE PLAN

1"-50'

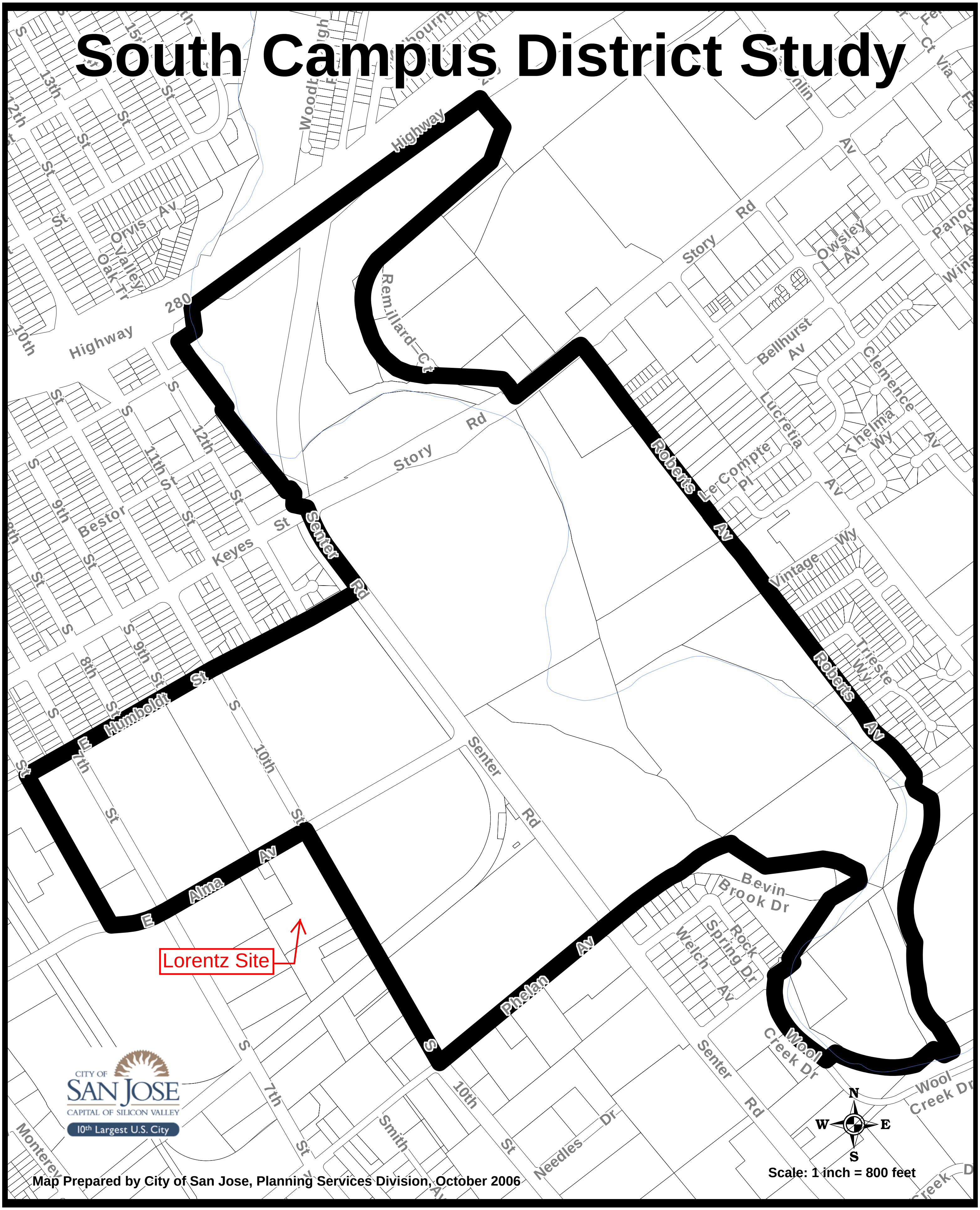
Figure
1

10/17/08

Attachment H

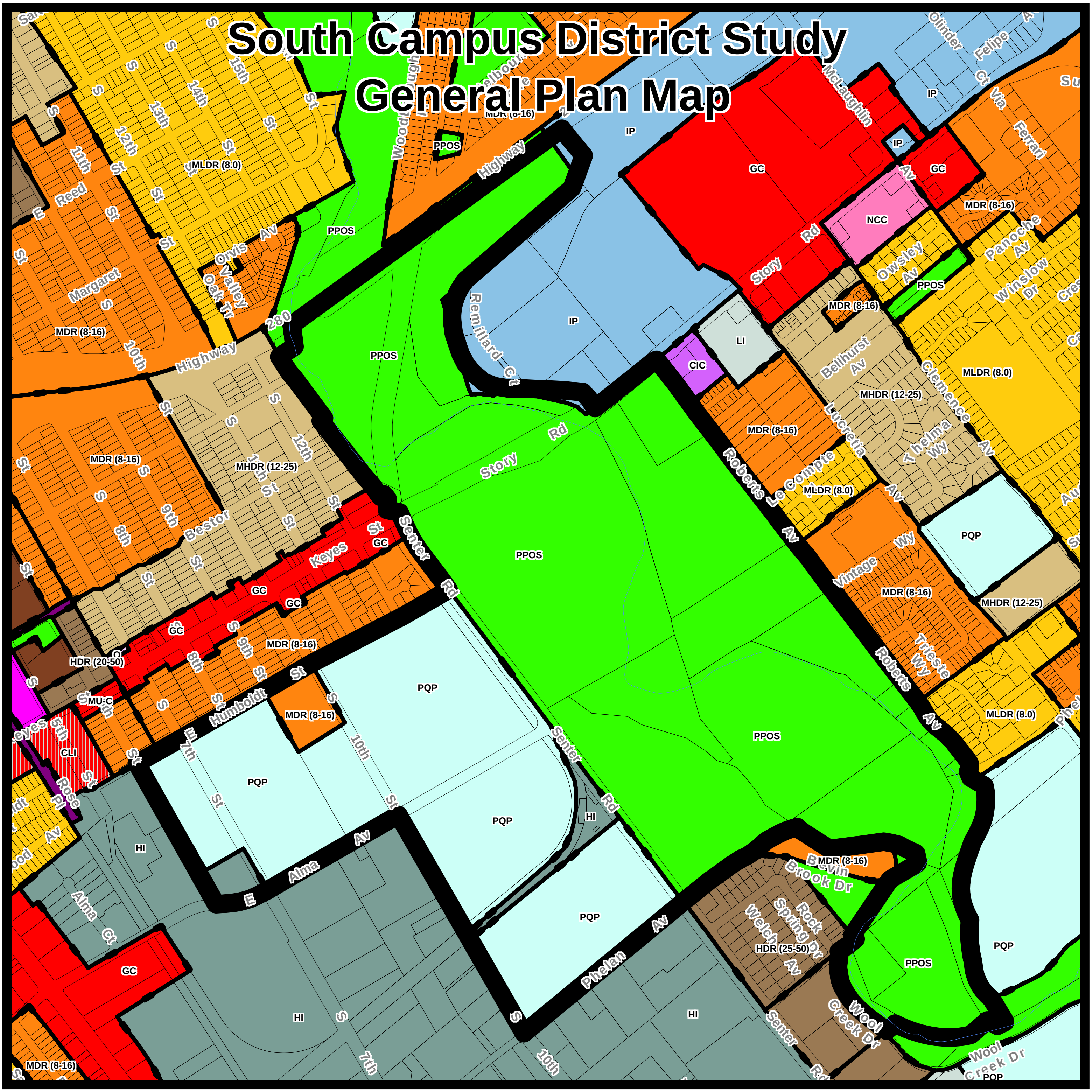
Excerpts from City of San Jose South Campus District Plan

South Campus District Study



Map Prepared by City of San Jose, Planning Services Division, October 2006

Scale: 1 inch = 800 feet



South Campus General Plan Legend

- Medium Low Density (MLDR) Residential (8.0 DU/AC)
- Medium Density Residential (MDR) (8-16 DU/AC)
- Medium High Density (MHDR) Residential (12-25 DU/AC)
- High Density Residential (HDR) (25-50 DU/AC)
- General Commercial (GC)
- Neighborhood/Community Commercial (NCC)
- Commercial/Light Industrial (CLI)
- Industrial Park (IP)
- Light Industrial (LI)
- Heavy Industrial (HI)
- Combined Industrial/ Commercial (CIC)
- Public/Quasi-Public PQP)
- Public Park and Open Space (PPOS)

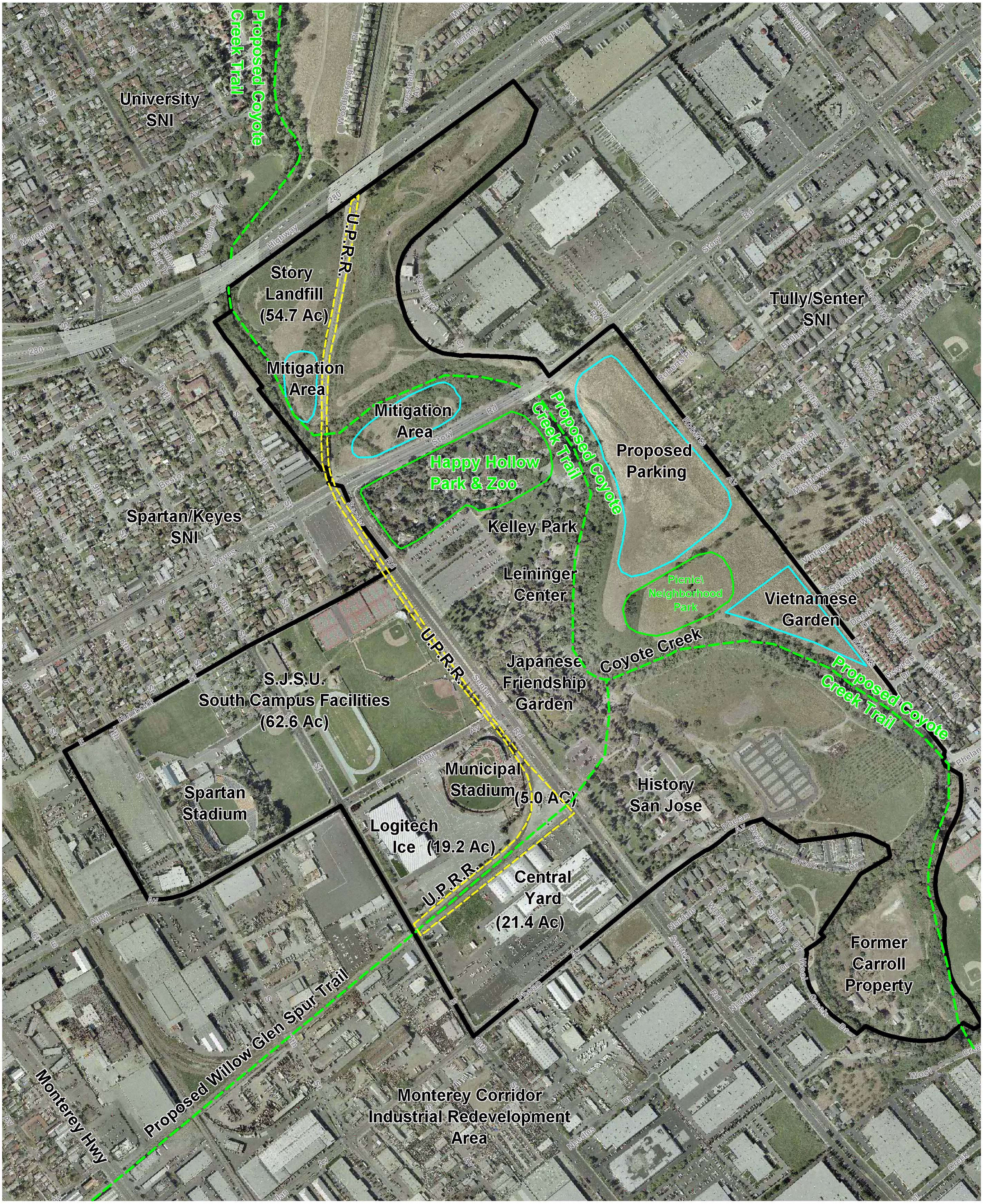
CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY
10th Largest U.S. City

N
W E
S

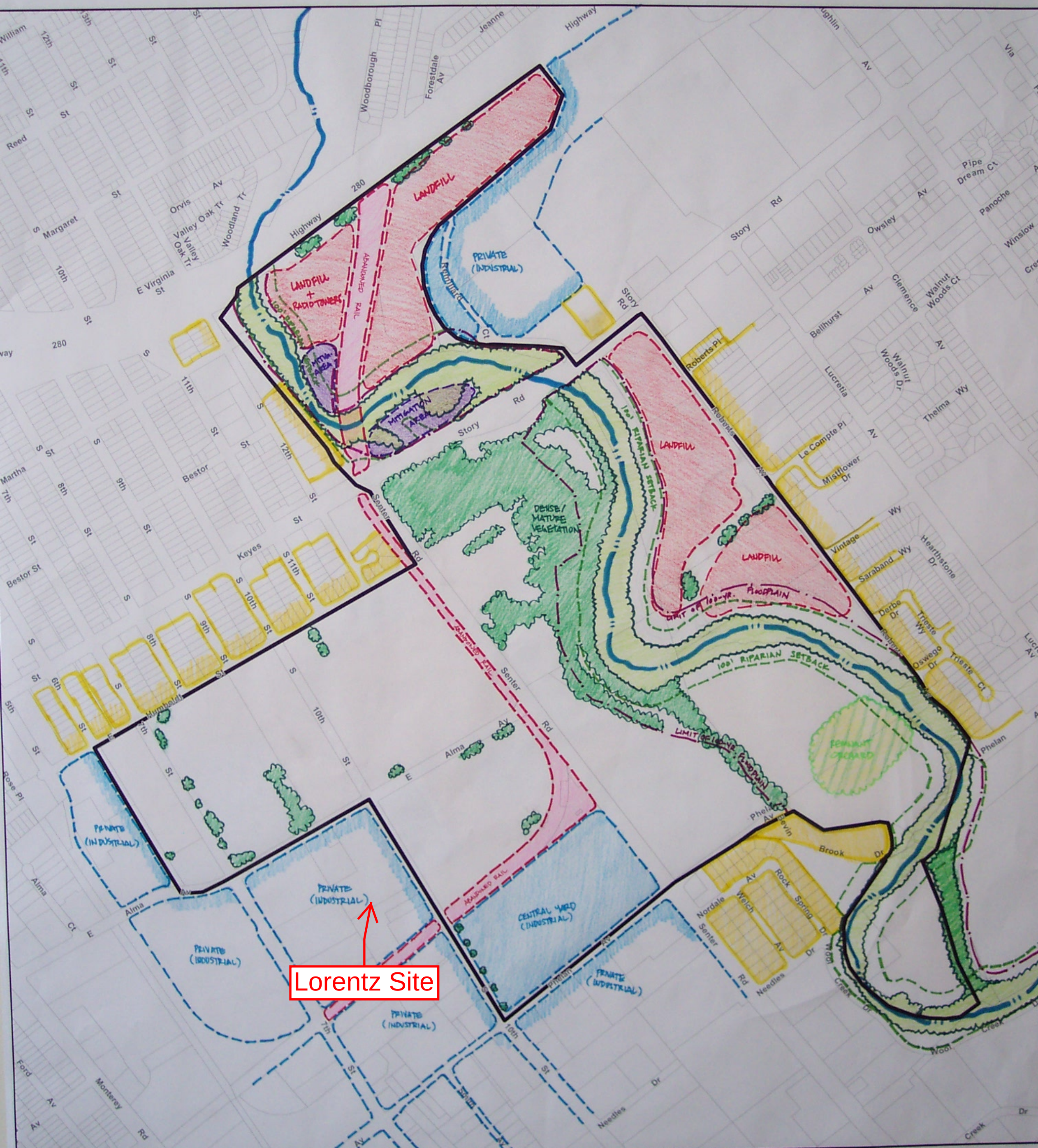
Scale: 1 inch = 950 feet

Map Prepared by City of San Jose, Planning Services Division, October 2006

South Campus District Plan



South Campus District Study

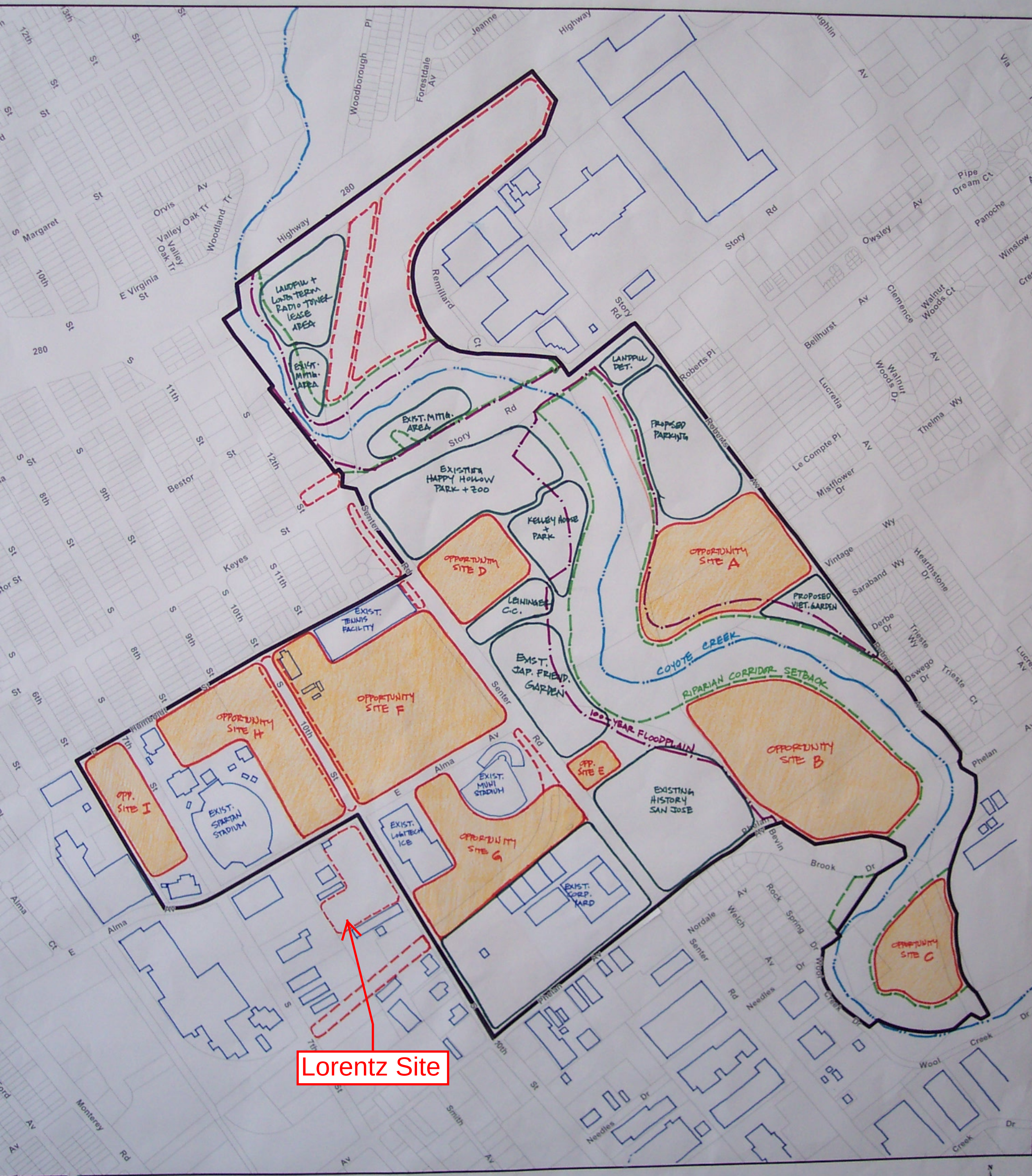


EXISTING ENVIRONMENTAL CONSIDERATIONS

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Map Prepared by City of San Jose, Planning Services Division, October 2006

South Campus District Study



OPPORTUNITIES & CONSTRAINTS MAP

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

San José State University South Campus District Plan

DRAFT WORK PROGRAM - UPDATE OF 3/23/07

Task No.	Activity and Deliverable	Responsible Party	Task Duration	Status / Comments / Deliverables
New Phase I: Preparation and Initial Data Gathering (Months 1-6)			***Jun-06-Jan-07***	
1	**Finalize and sign MOU**	**City and University**	**Jun-06**	**Complete. MOU was finalized and signed.**
2	**Identify staff project team**	**City and University**	**Aug-06**	**Complete. Team Roster prepared and distributed.**
3	**City/university gather basic information, compile inventory of city and university-owned land, evaluation of existing facilities and conditions, general environmental scan**	**City and University**	**Sep-Oct-06**	**Complete. See Subtask comments below.**
	3a. Identify onsite/adjacent property ownership, boundaries, acreages, easements, location of major infrastructure/utilities, etc.	SJ Planning	Sep-Oct-06	Complete. Deliverables include: Study Area/Boundary Map; Property Ownership Map; and Labeled Aerial Photo Map.
	3b. Evaluate zoning, GP, existing land uses, and other relevant-policy/plan documents for the subject site.	SJ Planning & PR&NS	Oct-06	Complete. Deliverables include: Zoning Map; General Plan Land Use Map; and documents included on the Background Research Documents List were evaluated/reviewed.
	3c. Evaluate status, terms, etc. of existing City/University MOUs, lease agreements, etc. with other entities (i.d. which areas are contractually locked-down).	SJSU, SJ PR&NS & OED	Oct-06	Complete. Deliverables include: Collected and reviewed MOUs, lease agreements, etc., which were evaluated/reviewed and listed on the Background Research Documents List.
	3d. Evaluate existing onsite buildings/facilities (e.g., size, condition, construction, useful life/reuse potential, etc.).	SJSU, SJ PR&NS & Planning	Oct-06	Complete. Deliverables include Inventory of San Jose's Existing Facilities and review of SJSU's South Campus Space Allocation Database.
	3e. Evaluate existing environmental issues (e.g., riparian corridor setbacks, landfill sites/issues, potential sensitive habitat areas, floodplain areas/issues, potential abandoned rail hazmat issues, historic preservation issues, etc.).	SJ Planning & ESD	Oct-06	Complete. Deliverables include: Existing Environmental Considerations Map.
	3f. Identify programmatic/operational considerations.	SJSU & SJ PR&NS	Oct-06	Complete. Deliverables include: two City/SJSU Meetings to identify and discuss programmatic/operational considerations (information was graphically assimilated into and assisted the preparation of the Opportunities & Constraints Map listed in Subtask 5b below).
4	**Develop communications plan**	**City and University**	**Oct-06**	**Ongoing. See Subtask comments below.**
	4a. Develop initial web presence and communication to City, SJSU, and community stakeholders.	SJSU Chancellor's Office, SJ Planning & PR&NS	Oct-06	Substantially Complete (pending outcome of Executive Team Meeting). Deliverables include: Draft Joint SJSU/City Letter to Community Stakeholders for signing at Executive Team Meeting; and draft web language for posting on San Jose Planning Website.
5	**Initial assessment of opportunities and constraints**	**City and University**	**Nov-06**	**Substantially Complete. See comments under Subtask 5c below.**

San José State University South Campus District Plan

DRAFT WORK PROGRAM - UPDATE OF 3/23/07

Task No.	Activity and Deliverable	Responsible Party	Task Duration	Status / Comments / Deliverables
	5a. Develop preliminary programmatic list of needs/uses.	SJSU & SJ PR&NS	Nov-06	Complete. Based on results of the two City/SJSU meetings regarding programmatic needs, future opportunities may exist for joint program/facility use in the areas of soccer. Given programmatic needs and land constraints identified, other recreational programs, including softball, will need to be explored at other sites outside of the South Campus District study area. The need for a traffic, parking, and public transit study was identified and will be incorporated into Phase II as specific facility parking demands are identified.
	5b. Develop summary opportunities/constraints map(s).	SJSU, SJ Planning & PR&NS	Nov-06	Complete. Deliverables include: Draft Opportunities & Constraints Map.
	5c. Conduct UP rail property ROW acquisition visioning process.	City Manager's Office & PR&NS	Nov-06	Ongoing. City & UPRR are negotiating facility purchase of the portion of UPRR right-of-way through the Story Road landfill site. This section will provide a trail connection between the Spartan Keyes neighborhood and the Selma-Olinder Park/Five Wounds Trail. Depending on the outcome of this transaction, negotiations to acquire of other segments of the UPRR right-of-way within the study area may follow.
6	**Fast-track Assessment: Measure P**	**SJ PR&NS**	**Dec-06-Jan-07**	**Ongoing. City/SJSU to pursue parallel/collaborative efforts regarding soccer fields: SJSU - via the Earthquakes proposal and the City - via Kelley Park area. City staff will initiate a feasibility study for soccer development at Kelley Park.**
7	**Fast-track Assessment: USTA**	**SJ PR&NS**	**Dec-06-Jan-07**	**Ongoing. Discussions to date have not identified a proposal regarding USTA.**

San José State University South Campus District Plan

DRAFT WORK PROGRAM - UPDATE OF 3/23/07

Task No.	Activity and Deliverable	Responsible Party	Task Duration	Status / Comments / Deliverables
New Phase II: Stakeholder and Plan Vision Development (Months 5-7)			***Mar-Jul-07***	
8	**Develop RFQ for consultant services to prepare a feasibility/master plan study for a soccer field complex in Kelley Park**	**PR&NS**	**Mar-May-07**	**Ongoing.**
	8a. Prepare and advertise RFQ.	PR&NS	Mar-Apr-07	Ongoing.
	8b. Conduct consultant interviews.	City Staff	Apr-May-07	Pending, TBD.
	8c. Contract and hire consultant(s).	PR&NS	May-07	Pending, TBD.
	8d. Prepare Feasibility/Master Plan Study	Consultant	May-Jun-07	Pending, TBD.
9	**Jointly retain consultant services for feasibility/master plan study for other uses on sites within the study area and/or new stadium proposal (prepare RFP, conduct interviews, negotiate/create contract and hire). Determine financial and in-kind contributions from parties towards this effort**	**City and University will decide which agency will contract with any needed consultant(s); City and University will decide on appropriate cost sharing.**	**May-Aug-07**	**Pending, TBD.**
	9a. Prepare and advertise RFQ(s).	City and Unversity	May-Jun-07	Pending, TBD.
	9b. Conduct consultant interviews.	City and Unversity	Jun-Jul-07	Pending, TBD.
	9c. Contract and hire consultants.	City and University	Aug-07	Pending, TBD.
10	**Design Community Stakeholder Working Group engagement process**	**City and University**	**Mar-May-07**	**Ongoing. Pending completion of Subtask 4a, design of engagement process with Community Stakeholder Groups (versus an 'Appointed Stakeholder Working Group') to continue in March 2007.**
	10a. Collect and compile lists of community groups, athletic groups, resident, other interested parties to invite to participate in the engagement process.	SJ Planning	Mar-May-07	Ongoing.
	10b. Design engagement process and schedule or work with consultant to design and facilitiate.	City and University	May-Jun-07	Pending, TBD.
11	**Initiate Community Stakeholder Working Group Meetings**	**City and University**	**Jun-Jul-07**	**Pending. Will not "appoint" but will instead compile community groups, athletic groups, resident, other interested parties list and will initiate the public engagement/outreach process to gather input and feedback.**

San José State University South Campus District Plan

DRAFT WORK PROGRAM - UPDATE OF 3/23/07

Task No.	Activity and Deliverable	Responsible Party	Task Duration	Status / Comments / Deliverables
Phase III: Alternatives Analysis (Months 8-12)			**Jun-Oct-07**	
12	**Develop Preliminary Vision and Plan direction/launch Community Stakeholder process**	**City and University**	**Jun-Jul-07**	**Pending completion of Task 11.**
13	**Develop and analyze draft plan alternatives**	**City and University**	**Aug-Sep--07**	**Pending Completion of Tasks 8, 9, 10, 11 and 12.**
14	**Community Stakeholder engagement around alternatives**	**City and University**	**Oct-07**	**Pending Completion of Tasks 8, 9, 10, 11, 12, and 13.**
Phase IV: Full Plan Development (Months 13-18)			**Nov-07-Apr-08**	
15	**Select preferred alternative(s).**	**City and University**	**Nov-Dec-07**	
16	**Prepare the land use development, operations, and maintenance plan, including appropriate mitigation measures, required infrastructure cost estimates and financing sources**	**City and University**	**Dec-07-Feb-08**	
	16a. Prepare a joint land use development agreement, including appropriate mitigation measures, required infrastructure cost estimates, and financing sources.	City and University	Dec-07-Feb-08	
	16b. Prepare a joint maintenance and operation plan.	City and University	Dec-07-Feb-08	
17	**Community Stakeholder engagement around plan**	**City and University**	**Mar-08**	
18	**Prepare master environmental document**	**City**	**Nov-07-Mar-08**	
19	**Prepare joint financing agreement for fair share allocation of costs of improvements, related infrastructure, related mitigation measures, and maintenance of improvements, infrastructure and mitigation.**	**City and University**	**Apr-08**	
Phase V: Approval Process (Months 18-24)			**Apr-Nov-08**	
20	**Approve joint financing agreement for costs of improvements, related infrastructure, related mitigation measures, and maintenance of improvements, infrastructure and mitigation.**	**City and University**	**Apr-Nov-08**	
21	**Approve the planning and environmental document through a joint approval process, recognizing that each agency may have additional approvals related to their jurisdiction.**	**City and University**	**Apr-Nov-08**	