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# 2008 ANNUAL PROGRESS REPORT

# for

# Former Fairchild Building 9
# 401 National Avenue
# Middlefield-Ellis-Whisman Study Area
# Mountain View, California

*prepared for*

**Schlumberger Technology Corporation**
225 Schlumberger Drive
Sugar Land TX 77478

June 15, 2009

Green Business
Santa Clara County

**Weiss Associates** *Environmental Science, Engineering and Management*

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**Schlumberger Technology Corporation**
225 Schlumberger Drive
Sugar Land, Texas 77478

*submitted to*

**USEPA, Region IX, Superfund Division**
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Weiss Associates work for Schlumberger Technology Corporation (STC) was conducted under my supervision. To the best of my knowledge, the data contained in this report are true and accurate and satisfy the scope of work prescribed by the client for this project in accordance with generally accepted professional engineering and geologic practice. The data, findings, recommendations, specifications or professional opinions were prepared solely for the use of STC to submit to the U.S. Environmental Protection Agency. The report Summary complements the entire report and is not a stand-alone document. We make no other warranty, either expressed or implied, and are not responsible for the interpretation by others of the contents in this report.


June 15, 2009

Tess Byler, P.G. Date
Sr. Project Geologist
(CA # 8131, expiration Nov. 2010)

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# ACRONYMS AND ABBREVIATION

| | |
|---|---|
| 106 Order | Administrative Order for Remedial Design and Remedial Action |
| former Building 9 | 401 National Avenue |
| cis-1,2-DCE | cis-1,2-dichloroethene |
| cm/sec | centimeter per second |
| DHS | Department of Health Services |
| ESD | Explanation of Significant Differences |
| Fairchild | Fairchild Semiconductor Corporation |
| ft bgs | feet below ground surface |
| ft/ft | foot per foot |
| ft/day | foot per day |
| $ft^2$/day | feet squared per day |
| gpm | gallons per minute |
| GAC | granular activated carbon |
| K | hydraulic conductivity |
| µg/L | micrograms per liter |
| mg/kg | milligram per kilogram |
| MCLs | maximum contaminant levels |
| MEW | Middlefield-Ellis-Whisman |
| NASA | National Aeronautics and Space Administration |
| NPDES | National Pollutant Discharge Elimination System |
| PCE | tetrachloroethene |
| PRPs | potentially responsible parties |
| QA/QC | quality assurance and quality control |
| RAO | remedial action objective |
| RGRP | Regional Groundwater Remediation Program |
| RI | remedial investigation |
| RI/FS | remedial investigation and feasibility study |
| ROD | Record of Decision |
| RPs | responsible parties |
| RRWs | regional recovery wells |
| SCRWs | source control recovery wells |

| | |
|---|---|
| SCVWD | Santa Clara Valley Water District |
| Water Board | Regional Water Quality Control Board, San Francisco Bay Region |
| Weiss Associates | Weiss |
| SVE | soil vapor extraction |
| System 1 | 515 Whisman Road |
| the Site | 401 National Avenue, Mountain View, California (Building 9) |
| TCE | trichloroethene |
| USEPA | United States Environmental Protection Agency |
| VOCs | volatile organic compounds |

# SUMMARY

This 2008 Annual Progress Report for the former Fairchild Semiconductor Corporation (Fairchild) Building 9 located at 401 National Avenue in Mountain View, California (the Site) contains a summary of Site activities from January 1 through December 31, 2008, and analytical data for the past five years. This report is submitted in accordance with Section XV of the 1990 Administrative Order for Remedial Design and Remedial Action (106 Order) issued by the United States Environmental Protection Agency (USEPA), Section XI of the Consent Decree entered in Action No. 20275 (N.D. Cal.) in 1992 (Consent Decree) and the USEPA's correspondence prescribing 2004 and future Annual Report contents (USEPA, 2005).

The groundwater remedy for Building 9 at 401 National Avenue consists of the following:

- A slurry wall installed in 1986 around former Fairchild Building 9 that is approximately 40 feet deep and extends to the A/B1 aquitard;
- AE/RW-9-1, AE/RW-9-2 – two operating Source Control Recovery Wells (SCRWs) located inside of the slurry wall;
- RW-20A, and RW-21A – two non-operating SCRWs[1] located inside of the slurry wall; and,
- Thirteen groundwater monitoring wells.

Groundwater extracted by the these SCRWs is conveyed via double-contained piping to an off-site treatment facility located at 515 Whisman Road known as Fairchild Treatment System 1. The Fairchild Treatment System 1 is discussed in the Annual Progress Report for Former Fairchild Buildings 1 through 4 (Weiss, 2009a).

In addition to the Site remedy, a groundwater treatment system located at 401 National Ave is part of a neighboring facility remedy and is discussed in the Annual Progress Report for 405 National Avenue, Mountain View California (AMEC Geomatrix Inc., 2009).

The Former Fairchild Building 9 Site is currently occupied by Adema Technologies Inc, an electronic circuits manufacturing facility.

Site activities conducted in compliance with the 106 Order during this reporting period included operation, monitoring, and maintenance activities of the Building 9 extraction and monitoring wells, and submitting an Optimization Evaluation to the USEPA for the Fairchild Sites on September 3, 2008 (Geosyntec et al, 2008).

A facility-specific capture zone analysis (consisting of comparison of interpreted capture zones to target capture zones, flow budget and capture zone width calculations, for example) is not applicable for the Building 9 Site because the SCRWs are located within the slurry wall, which acts as the primary hydraulic containment technology.

[1] SCRWs RW-20A and RW-21A have been shut down since August 2007[1] with approval from the USEPA (e-mail from Alana Lee, USEPA, to Maile Smith, Northgate Environmental Management, Inc., August 2, 2007).

During 2008 quarterly monitoring of Building 9 slurry wall well pairs, inward and upward gradients were observed within the slurry wall, with the exception of the northwest (downgradient) corner of the slurry wall that has exhibited an outward gradient since August 2007. This outward gradient may be attributed to the 2007 shutdown of wells RW-20A and RW-21A. These wells were higher volume but low concentration wells inside the slurry wall enclosure.

Based on visual inspection of the concentration-time plots (presented in Appendix B of this report), chemical concentration trends in monitoring wells downgradient of the slurry wall indicate stable or declining concentrations over time.

# 1. INTRODUCTION

This 2008 Annual Progress Report contains a summary of Site activities and data from January 1 through December 31, 2008 for the former Fairchild Semiconductor Corporation (Fairchild) Building 9 located at 401 National Avenue in Mountain View, California (the Site; Figure 1). This report is submitted in accordance with Section XV of the 1990 Administrative Order for Remedial Design and Remedial Action (106 Order) issued by the United States Environmental Protection Agency (USEPA), Section XI of the Consent Decree entered in Action No. 20275 (N.D. Cal.) in 1992 (Consent Decree) and the USEPA's correspondence prescribing 2004 and future Annual Report contents (USEPA, 2005). Weiss Associates (Weiss) prepared this report on behalf of Schlumberger Technology Corporation, and Geosyntec Consultants (Geosyntec) contributed to the content of this report

## 1.1 Site Background

The MEW area is an approximately ½-square-mile area, bounded by Middlefield Road on the south, Ellis Street on the east, Whisman Road on the west, and Highway 101 on the north in Mountain View California. Former Fairchild Building 9 is located within the MEW area at 401 National Avenue. Building 9 functioned as a facility for receiving, mixing, and delivering chemicals for Fairchild from 1966 to 1987. The primary constituent of concern at the Site is trichloroethene (TCE) in groundwater from historical underground tanks/piping, sumps and/or surface spills.

The 401 National Avenue property is part of a joint source control responsibility of Vishay General Semiconductor (formerly General Instrument Corporation), Sumitomo Mitsubishi Silicon America (formerly Siltec Corporation), and Fairchild. Further discussion regarding remediation outside of the Building 9 slurry wall boundaries and the treatment system located at 401 National Avenue is provided in the 2008 Annual Progress Report for 405 National Avenue (AMEC Geomatrix, 2009).

The RI/FS was completed in 1988 (HLA, 1987; Canonie, 1988), with the USEPA issuing a Record of Decision (ROD) in 1989. The ROD and two subsequent Explanations of Significant Differences (ESDs) specify the remedial actions for the MEW area (USEPA, 1989, 1990, 1996).

Remediation within the MEW area includes facility-specific activities by individual PRPs (such as Building 9) and a Regional Groundwater Remediation Program (RGRP) that addresses commingled VOCs that have migrated beyond the facility-specific areas and cannot be attributed to a single source.

The Former Fairchild Building 9 Site is currently occupied by Adema Technologies Inc, an electronic circuits manufacturing facility, and the land use remains industrial/commercial with surrounding residential development.

## 1.2 Local Geology

Subsurface geology consists of interbedded sediments ranging in grain size from silty clay to sandy gravel. The water-bearing zones defined at the MEW area are summarized below:

| Groundwater Zones | Approximate Depth Interval Below Ground Surface |
|---|---|
| A[a] | 0 to 45 feet |
| B1[b] | 50 to 75 feet |
| B2 | 75 to110 feet |
| B3 | 120 to 160 feet |
| C | 200 to 240 feet |
| Deep Aquifer | >240 feet |

[a] Navy and NASA refer to this zone as A1 zone north of Highway 101.

[b] Navy and NASA refer to this zone as A2 north of Highway 101.

> = greater than

The upper groundwater zone at the MEW area, defined as the saturated zone above the B/C aquitard, occurs to a depth of approximately 165 ft bgs south of Highway 101 and generally less than 100 ft bgs north of Highway 101. The B/C aquitard is the major confining layer beneath the MEW area. The upper groundwater zone is subdivided into two units, the A-zone and the B-zone, that are separated by the A/B aquitard. The B aquifer has been further subdivided into three zones. From youngest to oldest, these are the B1-, B2-, and B3-zones, separated by aquitards, designated as B1/B2 aquitard and the B2/B3 aquitard. Two lower groundwater zones have been defined: the C-zone and what has been termed the Deep Aquifer (HLA, 1987; Intel, 1987).

Ranges of hydraulic conductivity (K), hydraulic gradient, and transmissivity of the upper aquifer zone i.e., above the B3/C aquitard, calculated from pumping tests conducted at the MEW Site from 1986 through 2005[2] are presented below:

| Water-Bearing Zone | Estimated Hydraulic Conductivity (ft/day) | | Approximate Horizontal Gradient (ft/ft) | Saturated Thickness (ft) | Transmissivity (ft2/day) | |
|---|---|---|---|---|---|---|
| | Low | High | | | Low | High |
| A-zone | 6 | 480 | 0.004 | 15 | 44 | 4,400 |
| B1-zone | 20 | 260 | 0.003 | 25 | 150 | 2,600 |
| B2-zone | 0.4 | 5 | 0.002 to 0.005 | 35 | 2 | 230 |
| B3-zone | 0.5 | 5 | 0.001 to 0.002 | 40 | 5 | 130 |

Currently and historically, the horizontal component of groundwater flow beneath the Site is generally towards the north during non-pumping and pumping conditions. The Site groundwater

[2] References are Canonie 1986a, 1986b 1987 & 1988, Geomatrix 2004, HLA 1986 & 1987, Locus 1998, PRC 1991, Navy 2005 and Weiss Associates 1995.

gradients and velocities have been locally altered near SCRWs, RRWs, and the Fairchild and Raytheon slurry walls (Weiss, 2009b).

The vertical component of groundwater flow is generally upward from the B1- to the A-zone, but is locally downward in some areas of the Site (HLA 1987). Vertical gradients below the B1-zone are generally upward (Geosyntec et. al 2008). Hydrographs for select well pairs south and north of Highway 101 are included as Figures 20 and 21, respectively.

## 1.3 Description of Remedy

The remedial action objectives (RAOs) for the MEW area are to (1) protect potential potable water supplies, (2) remediate or control the elevated concentrations of chemicals present in the localized vadose zone soils, and (3) remediate or control the groundwater that contains elevated concentrations of specified chemicals, including discharge of such groundwater into the surface water (Canonie, 1988).

As specified in the ROD, cleanup has been addressed in two stages: initial actions and a long-term remedial phase (USEPA, 1989). Initial cleanup activities conducted by responsible parties (RPs) included tank removals, well sealing, soil removal and treatment, slurry wall construction, and local groundwater extraction and treatment. The Site is in the long term remedial phase that consists of extraction and treatment of groundwater by air stripping towers or liquid-phase granular activated carbon (GAC), with remedial activities being conducted by individual potentially responsible parties (PRPs) as well as the MEW Regional Groundwater Remediation Program (RGRP).

The ROD-approved remedies for soils are *in-situ* vapor extraction with treatment by vapor-phase GAC and excavation and treatment by aeration. In 1986, Fairchild installed a subsurface slurry wall at Building 9 which is approximately 40 feet deep and extending to the A/B1 aquitard. In 1995, 3,000 cubic yards of soil were excavated to a depth of 6 feet and aerated at the 401 National Avenue site. A soil vapor extraction (SVE) system operated from 1996 to 1997 to remediate soil from 6 feet below ground surface (ft bgs) to 18 inches above the water table. Soil samples collected after the SVE system was shut down showed that soils had reached the cleanup standards of 0.5 mg/kg and, 1 mg/kg TCE inside and outside the slurry walls, respectively (Locus, 1997; Smith, 1997a; Smith, 1997b). All soil remediation at the MEW area was completed by 2001.

The ROD-approved groundwater remedy is hydraulic remediation by groundwater extraction and treatment by air strippers or liquid-phase GAC. In 1986, four Source Control Recovery Wells (SCRWs) were installed inside the Building 9 slurry wall (AE/RW-9-1, AE/RW-9-2, RW-20A, and RW-21A). Groundwater is conveyed via double-contained piping to a treatment facility consisting of three 5,000-pound granular activated carbon (GAC) vessels in series and located at 515 Whisman Road (System 1).

The groundwater cleanup standards are 5 μg/L of TCE for the shallow aquifers and 0.8 μg/L TCE for the C and deep aquifers. The cleanup levels for other VOCs listed in the ROD are:

- Chloroform – 100 μg/L;
- 1,1-dichloroethene – 6 μg/L;
- 1,1,1-trichloroethane – 200 μg/L; and,

- Vinyl chloride – 0.5 µg/L.

The cleanup standards for the following chemicals of concern were not specified in the ROD: 1,2-dichlorobenzene, 1,1-dichloroethane, 1,2-dichloroethene, Freon 113, phenol, and tetrachloroethene (PCE). The ROD states that the chemical ratio of TCE to other chemicals found at the Site is such that achieving the cleanup goal for TCE will result in cleanup of the other Site chemicals to at least their respective federal MCLs.

## 1.4 Summary of Site Activities and Deliverables

The Site monitoring and reporting schedule is included as Table 1. Site activities conducted in compliance with the 106 Order during this reporting period include:

- Continued quarterly reporting of System 1 discharge under NPDES Permit CAG912003;
- Continuing groundwater extraction and treatment;
- Collecting quarterly groundwater elevation measurements in Site slurry wall well pairs on March 27, May 22, August 28, and November 20;
- Collecting semi-annual groundwater elevation measurements in Site monitoring and extraction wells on March 27 and November 20;
- Submitting Fairchild Buildings Slurry Wall System Efficiency Study Report and Efficiency Evaluation Report for MEW RGRP to the USEPA in April;
- Attending the All Parties Meeting on May 14, June 12, June 26, and December 3;
- Submitting the 2007 Annual Progress Report to the USEPA and MEW Distribution List parties on June 15;
- Submitting Optimization Evaluation for Fairchild Sites on September 3, 2008;
- Collecting groundwater samples from Site monitoring and extraction wells in November and December;
- Annual settlement monitoring on December 17;
- Assessing the progress of remedial actions during 2008; and,
- Planning remedial actions for 2009.

Section 2 of this report provides a summary of Site groundwater remedial activities conducted during this reporting period. Sections 3-7 document additional activities, problems encountered, technical assessment, conclusions and recommendations, and a summary of remedial activities planned for calendar year 2009. Supporting data are presented in Figures 1 through 3, Tables 1 through 6, and Appendices A through C.

# 2. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

## 2.1 System Description

### *2.1.1 Extraction and Treatment System*

The groundwater extraction and treatment system consists of the following components:

- Slurry wall, installed in 1986, around former Fairchild Building 9. The Building 9 Slurry wall enclosure is approximately 40 feet deep and extends a minimum of two feet into the A/B1 aquitard; and,

- Four SCRWs located inside of the slurry wall: AE/RW-9-1, AE/RW-9-2, RW-20A, and RW-21A. Currently, two of the four SCRWs (AE/RW-9-1 and AE/RW-9-2) are pumping.

There is no treatment system specifically associated with the Building 9 remedy. Extracted groundwater is piped via double contained piping to off-site Fairchild Treatment System 1 located at 515/545 Whisman Road.

The average monthly flow rates and total volume of groundwater extracted at the Site during 2008 are provided in Tables 2 and 3, respectively. The average combined groundwater extraction flow rate of the two SCRWs at Building 9 was 6.7 gallons per minute (gpm). During 2008, these two SCRWs extracted approximately 3.5 million gallons of groundwater (Table 3). Average monthly flow rates, monthly extraction totals, and further discussion of extraction wells that are treated by Fairchild System 1 are provided in the 2008 Annual Progress Report for Former Fairchild Buildings 1-4 (Weiss, 2009a). Extraction well construction details are provided in Table 6.

### *2.1.2 Monitoring Wells*

Currently, thirteen monitoring wells are used to evaluate the Building 9 Site. Twelve of the monitoring wells are in the A-zone, and one monitoring well is located in the B1-zone. Water levels are measured quarterly in four slurry wall well pairs (8 wells), semiannually in other monitoring wells, and water quality samples are collected annually in seven of the 13 monitoring wells. Wells 35A and 122A located inside the slurry wall are sampled once every five years. These wells were last sampled in 2007. Monitoring wells 69B1, 123A, 126A, and 138A are not part of the water quality sampling program, but are used to assess horizontal and vertical gradients at the Building 9 Slurry Wall. Monitoring well construction details are provided in Table 6.

## 2.2 Extraction and Treatment System Operation and Maintenance

From January 1 through December 31, 2008, the following maintenance or operational activities were conducted on the Site extraction wells during this reporting period:

| Date | Component | Comments | Regulatory Notification |
|---|---|---|---|
| January 4, 2008 | AE/RW 9-1 | Extraction well AE/RW 9-1 was turned off after a low-flow alarm on January 4. The well remained offline until the flow meter could be accessed and repaired on February 28. | April 30, 2008 |
| September 2, 2008 | AE/RW-9-2 | Paddle wheel of the flow meter was cleaned and the pump was restarted the same day. | Not Applicable |

## 2.3 Groundwater Level Monitoring

Facility-specific water levels were measured in slurry wall well pairs quarterly from March through November 2008 (Figure 2; Table 4).

Hydrographs of Site slurry wall well pair water levels are provided in Figure 3. During this reporting period, groundwater elevations were recorded in Site monitoring wells on March 27 and November 20, 2008. All groundwater elevation data have been added to the MEW RGRP database and are reported in the MEW RGRP Annual Progress Report (Weiss, 2009b). Hydrographs of select MEW monitoring wells and Potentiometric Surface Maps and Estimated Capture Zones for the five aquifers monitored at MEW are also included in the MEW RGRP Annual Progress Report (Weiss, 2009b).

## 2.4 Groundwater Quality Monitoring

The 2008 Annual Groundwater Sample Event at the Site was conducted in November 2008. A summary of chemical analytic results for the previous five years (2004 through 2008) is provided in Table 5. VOC concentration versus time graphs for Site wells are included in Appendix B. Appendix C contains the quality assurance/quality control (QA/QC) report and summary tables.

The data provided in Table 5 and Appendix B show that, in general, TCE concentrations in 2008 in Building 9 wells are less than 2007 concentrations, much less than historical TCE maximums, and currently appear mostly stable to declining. Extraction well AE/RW-9-1 which was inaccessible during 2007 Annual Groundwater Sampling Event was sampled in April 2008.

Annual water quality samples are collected for wells outside the slurry wall and water quality samples every five years are collected for wells inside the slurry walls. The last 5-year sampling event for wells inside the slurry walls was in 2007. In 2008, extraction wells inside the slurry walls were voluntarily added to the annual sampling schedule as part of slurry wall evaluation activities.

## 2.5 Hydraulic Control and Capture Zone Analysis

### *2.5.1 Methodology*

Capture zone analysis is the process of evaluating field observations of hydraulic heads and groundwater chemistry to estimate the capture zone achieved by the groundwater extraction system, and then comparing the estimated capture zone at specific measurement events to a "Target Capture Zone" to determine if capture is sufficient (USEPA, 2008).

A facility specific capture for the wells within the Building 9 slurry wall enclosure is not applicable since the wall functions as the primary capture technology. Groundwater elevation and groundwater quality data were used to assess if the slurry wall continues to function as an effective barrier to impede groundwater flow and VOC migration.

### *2.5.2 Estimated Capture Zones for 2008*

A capture evaluation was not performed for wells AE/RW-9-1 and AE/RW-9-2.

A regional capture zone analysis was performed for the March and November 2008 water level events, according to the methodology outlined in the USEPA's 2008 "Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems" (USEPA, 2008), and is included in the MEW RGRP 2008 Annual Progress Report (Weiss, 2009b). A facility specific capture evaluation of wells outside of the slurry wall boundaries is provided in the 2008 Annual Progress Report for 405 National Avenue (AMEC Geomatrix, 2009).

### *2.5.3 Horizontal and Vertical Gradients*

Groundwater elevations were recorded quarterly in March, May, August and November 2008 in monitoring wells 123A/122A, 126A/35A, 138A/137A, (slurry wall well pairs) and 69B1/37A (A/B1 aquitard pair) (Table 4). During this reporting period, inward hydraulic gradients were consistently observed at well pairs 123A/122A and 138A/137A (i.e., the groundwater elevation in the well outside the slurry wall was higher than the groundwater elevation in its partner well inside the slurry wall). Upward hydraulic gradients from the B1 to the A aquifer were consistently observed at well pair 69B1/37A (Figure 3). However, a slight outward gradient was observed in well pair 126A/35A during 2008. This outward gradient was initially observed in August 2007 and is likely the result of ceasing groundwater extraction from Wells RW-20A, and RW-21A since 2007. These two wells are lower concentration extraction wells with 2008 TCE concentrations of 360 μg/L in RW-20A and 58 μg/L in RW-21A.

# 3. OTHER ACTIVITIES

## 3.1 Optimization Evaluation for Groundwater

In response to a request from USEPA[3], an Optimization Evaluation Report for the Fairchild Sites in the MEW area was submitted to USEPA September 3, 2008 (Geosyntec et al, 2008). The evaluation considered previous efficiency evaluations at the Site (Northgate, 2007a-c and 2008a-b) and recommended implementing an optimization program for the Fairchild Sites in conjunction with similar optimization programs for the RGRP and other facilities. The MEW Companies are awaiting EPA comments on the Optimization Evaluations prior to implementing the recommended programs.

## 3.2 Air/ Vapor Intrusion

The MEW companies have completed Site investigation and feasibility studies of remedial alternatives to address the vapor intrusion pathway at the Site. In addition, Interim Remedial Measures were implemented in Building 9 in 2003 and 2004.

### *3.2.1 Supplemental RI/FS*

A *Revised Supplemental Feasibility Study for Vapor Intrusion* was submitted in January 2008 (Locus, 2008a) and a *Revised Supplemental Remedial Investigation* report was submitted to the USEPA in February 2008 (Locus, 2008b). The USEPA provided comments on these reports June 2, 2009, and plans to issue a Proposed Plan for a ROD amendment in 2009.

### *3.2.2 401 National Avenue Status*

No additional air work was conducted at 401 National Avenue during this reporting period.

## 3.3 Annual Settlement Survey

An annual settlement survey was performed on December 17, 2008. The purpose of these annual measurements is to evaluate any potential adverse effects on the Site facilities, and whether long-term remedial groundwater extraction could affect soil settlement in the MEW study area. Geosyntec reviewed the historical settlement and water level elevation data and concluded that the measured values of ground elevation change do not appear to be related to groundwater extraction operations. Furthermore, the changes are relatively uniform over a large area, whereas settlement induced stress is typically caused by differential settlement over the scale of a single building footprint. Additional information on the settlement survey can be found in the RGRP 2008 Annual Progress Report (Weiss, 2009b).

[3] Letter from USEPA to MEW Parties dated 5 June 2008,

# 4. PROBLEMS ENCOUNTERED

Section 2.2 provides a summary of all non-routine O&M events that occurred at the Building 9 extraction wells.

In response to a comment from USEPA regarding timely reporting of system down-time events, reporting requirements were clarified as follows:

1. USEPA: The owner and /or operator of the Fairchild treatment system will make a best effort to orally notify EPA within 24 hours of a RRW or system shutdown that occurs for more than 72 hours;

2. Water Board: If the treatment system is shut down for more than 120 consecutive hours after the start up period (maintenance, repair, violations, etc.) the reason(s) for shut down, proposed corrective action(s) and estimated start-up date shall be orally reported to the Water Board within five days of shut down and a written submission shall also be provided within 15 days of shut down.

# 5. TECHNICAL ASSESSMENT

The following assessment of the groundwater remedy performance for Building 9 was made based on data collected through 2008.

- The Remedy is Functioning as Intended. The Building 9 Site continues to meet the RAOs for the MEW area. The Building 9 slurry wall is functioning as designed and is an effective barrier to VOC migration as demonstrated by groundwater hydraulic and chemical data collected in 2008. An Annual Remedy Performance Checklist is included in Appendix A;

- The Vertical Gradients Inside and Gradients Across Slurry Walls are Appropriate. Inward and upward gradients are observed within the Building 9 slurry wall enclosure, with the exception of the northwestern (downgradient) area. The slight outward gradient (at 126A/35A) was initially observed in August 2007 and is likely the result of ceasing groundwater extraction from wells RW-20A, and RW-21A since 2007.

- Chemical Concentrations are Decreasing over Time. Chemical concentration trends in Building 9 wells within and downgradient of the slurry wall indicate stable or declining concentrations over time based on inspection of concentration-time plots in Appendix B and Table 5. Current concentrations are below historical VOC concentrations for this area, and plume maps (Weiss, 2009b) indicate an overall reduction in VOC plume size and magnitude.

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# 6. CONCLUSIONS AND RECOMMENDATIONS

During 2008, the Building 9 slurry wall continued to function as an effective barrier to VOC migration as demonstrated by groundwater hydraulic and chemical data collected during the reporting period.

Groundwater VOC concentrations in Building 9 monitoring wells continue to remain well below historical maximums and show a long term decreasing trend.

Upon receipt of comments from the USEPA, recommendations from the Optimization Evaluation for the Fairchild sites should be implemented. Planned actions during 2009 include continued operations and maintenance of AE/RW-9-1 and AE/RW-9-2 and continued monitoring of the Site monitoring and extraction wells.

# 7. UPCOMING WORK IN 2009 AND PLANNED FUTURE ACTIVITIES

Activities for 2009 include the following:

- Continued groundwater extraction in AE/RW-9-1 and AE/RW-9-2, measuring water levels, and analyzing water samples in accordance with the Site monitoring and reporting schedule;
- Submitting a Notice of Intent to continue treatment operations beyond June 2009 as part of permit renewal activities for Fairchild Treatment System 19;
- Responding to EPA comments on the September 3, 2008 Optimization Evaluation and implementing approved recommendations; and,
- Comments on EPA's Proposed Plan for a ROD amendment for vapor intrusion.

The effectiveness and progress of Site remedial actions during 2009 will continue to be evaluated, and data collected during 2009 will be summarized in the Annual Progress Report, which will be submitted to the USEPA by June 15, 2010.

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# FIGURES

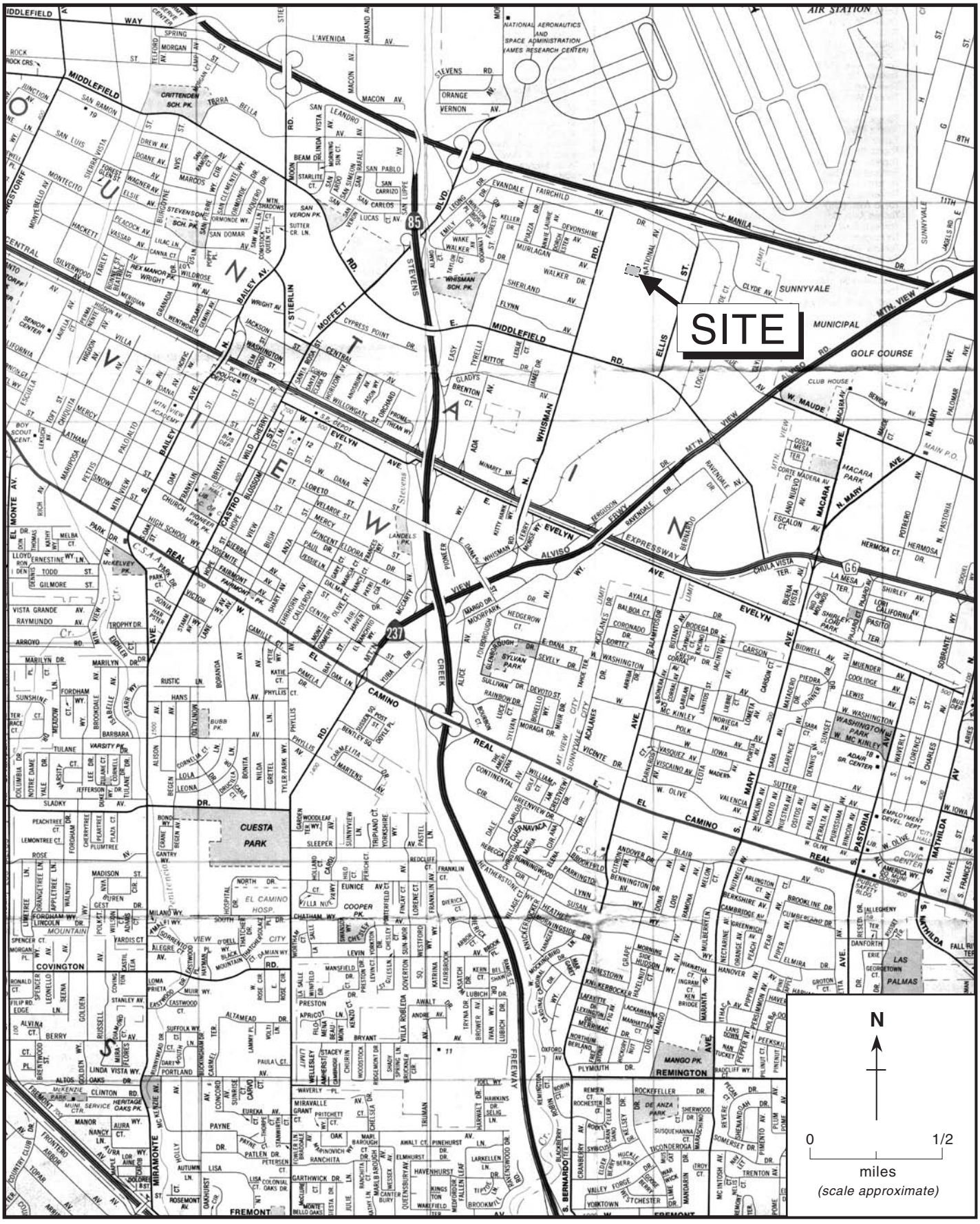


Figure 1. Site Location Map, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Perimeter Rd
Bailey Rd
Dailey Rd
Bayshore Fwy/Hwy 101
Fairchild Dr
Evandale Ave
Devonshire Ave
Murlagan Ave
Sherland Ave
N. Whisman Rd
Flynn Ave
National Ave
Ellis St
Middlefield Road

Fairchild System 3
Former Fairchild Buildings 1 through 4 Site
RGRP - South
Fairchild System 1
126A
35A
36A
69B1
37A
42A
44A
43A
40A
AE/RW-9-1
RW-21A
AE/RW-9-2
122A
137A
138A
123A
RW-20A
Fairchild System 19
Former Fairchild Building 19 Site
Raytheon System
Raytheon Site

## Legend

**Building 9 Remedy Components**

- Source Recovery, On
- Source Recovery, Off
- Monitoring Well

**Extraction and Monitoring Wells in the Vicinity**

- Regional Recovery Well
- Source Recovery Well
- Monitoring Well

- 401 National Avenue
- Fairchild System 1
- Groundwater Treatment Plant
- Slurry Wall
- Building
- Road
- Treatment-System Pipeline
- Treatment-System Discharge Pipeline

N

0 300 600 900 Feet

**Figure 2**

**Former Fairchild Building 9**
**Site Map and Well Network**
**Mountain View, California**

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9-June-2009

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Figure 3. Building 9 Hydrographs – Groundwater Elevation Measurements

# TABLES

Table 1. 2008 Monitoring and Reporting Schedule, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 122A | | | | | | | | | | | # | |
| 123A[4] | | | | | | | | | | | | |
| 126A[4] | | | | | | | | | | | | |
| 137A | | | | | | | | | | | #,1,o | |
| 138A[4] | | | | | | | | | | | | |
| 35A | | | | | | | | | | | # | |
| 36A | | | | | | | | | | | # | 1,o |
| 37A | | | | | | | | | | | # | 1,o |
| 40A | | | | | | | | | | | 2,o | |
| 42A | | | | | | | | | | | 2,3,o | |
| 43A | | | | | | | | | | | 2,o | |
| 44A | | | | | | | | | | | 2,o | |
| AE/RW-9-1 | | | | | | | | | | | #,2,o | |
| AE/RW-9-2 | | | | | | | | | | | #,2,o | |
| RW-20A | | | | | | | | | | | #,2,o | |
| RW-21A | | | | | | | | | | | #,2,o | |
| 69B1[4] | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Site Wide Well Water Levels | | | X | | | | | | | | X | |
| Slurry Wall Well Water Levels [5] | | | X | | X | | | X | | | X | |
| Annual Progress Report. | | | | | | X | | | | | | |

**Notes and Abbreviations:**

o = standard observations, including field analysis for pH, temperature, and conductivity

# = Wells sampled every five years and last sampled during 2007 sampling event.

1 = 36A, 37A, and 137A were sampled using USEPA Method 8010MS for VOCs as part of slurry wall evaluation in November/December and will be sampled annually henceforth.

2 = Previously sampled every five years and will be sampled annually henceforth using USEPA Method 8010 MS for VOCs

3 = Sampled also for antimony and cadmium as part of MEW RGRP sampling event and reported in 2008 MEW RGRP Annual Groundwater Sampling Event.

4 = Only water levels are measured for 69B1, 123A, 126A, and 138A.

5 = Slurry wall water levels are measured in 35A/126A, 122A/123A, 69B1/37A, and 137A/138A in March, May, August, and November

MEW RGRP = Middlefield Ellis Whisman Regional Groundwater Remediation Program

MS = mass spectroscopy

USEPA = United States Environmental Protection Agency

VOCs = volatile organic compounds

Table 2. Monthly Average Flow Rates, January through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| Month | RW-20A | RW-21A | AE/RW-9-1 | AE/RW-9-2 | Total |
|---|---|---|---|---|---|
| | | | gallons per minute | | |
| January | 0 | 0 | 0.63 | 1.14 | 1.76 |
| February | 0 | 0 | 0.00 | 2.18 | 2.18 |
| March | 0 | 0 | 4.98 | 4.09 | 9.07 |
| April | 0 | 0 | 5.21 | 1.66 | 6.88 |
| May | 0 | 0 | 5.53 | 1.44 | 6.97 |
| June | 0 | 0 | 5.74 | 1.44 | 7.18 |
| July | 0 | 0 | 7.19 | 1.44 | 8.63 |
| August | 0 | 0 | 5.82 | 1.44 | 7.26 |
| September | 0 | 0 | 5.58 | 1.44 | 7.02 |
| October | 0 | 0 | 5.35 | 2.21 | 7.56 |
| November | 0 | 0 | 5.59 | 2.08 | 7.67 |
| December | 0 | 0 | 5.25 | 2.10 | 7.35 |

Table 3. Monthly Extraction Totals, January through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| Month | RW-20A | RW-21A | AE/RW-9-1 | AE/RW-9-2 | Total |
|---|---|---|---|---|---|
| | | | gallons | | |
| January | 0 | 0 | 27,041 | 49,139 | 76,180 |
| February | 0 | 0 | 2 | 81,603 | 81,605 |
| March | 0 | 0 | 250,856 | 206,262 | 457,118 |
| April | 0 | 0 | 210,260 | 67,087 | 277,347 |
| May | 0 | 0 | 230,868 | 60,080 | 290,948 |
| June | 0 | 0 | 289,321 | 72,576 | 361,897 |
| July | 0 | 0 | 279,432 | 55,987 | 335,419 |
| August | 0 | 0 | 234,480 | 58,061 | 292,541 |
| September | 0 | 0 | 281,427 | 72,576 | 354,003 |
| October | 0 | 0 | 215,606 | 89,133 | 304,739 |
| November | 0 | 0 | 241,547 | 89,798 | 331,345 |
| December | 0 | 0 | 249,547 | 99,792 | 349,339 |

Table 4. Groundwater Elevations, Slurry Wall Well Pairs, January through December 2008, Former Fairchild Building 9, Mountain View, California

| Date | Well ID (outer/B1 well) | Groundwater Elevation (ft amsl) | Well ID (inner/A well) | Groundwater Elevation (ft amsl) | Difference[1] (ft) |
|---|---|---|---|---|---|
| 03/27/08 | 123A | 33.31 | 122A | 31.31 | 2.00 |
| 05/22/08 | 123A | 33.14 | 122A | 31.13 | 2.01 |
| 08/28/08 | 123A | 32.87 | 122A | 30.82 | 2.05 |
| 11/20/08 | 123A | 32.47 | 122A | 30.59 | 1.88 |
| 03/27/08 | 126A | 30.87 | 35A | 31.23 | -0.36 |
| 05/22/08 | 126A | 30.73 | 35A | 30.93 | -0.20 |
| 08/28/08 | 126A | 30.55 | 35A | 30.57 | -0.02 |
| 11/20/08 | 126A | 30.10 | 35A | 30.37 | -0.27 |
| 03/27/08 | 138A | 32.30 | 137A | 31.00 | 1.30 |
| 05/22/08 | 138A | 31.85 | 137A | 30.83 | 1.02 |
| 08/28/08 | 138A | 31.83 | 137A | 30.58 | 1.25 |
| 11/20/08 | 138A | 31.33 | 137A | 30.31 | 1.02 |
| 03/27/08 | 69B1 | 31.69 | 37A | 31.37 | 0.32 |
| 05/22/08 | 69B1 | 31.66 | 37A | 30.81 | 0.85 |
| 08/28/08 | 69B1 | 31.34 | 37A | 30.56 | 0.78 |
| 11/20/08 | 69B1 | 30.82 | 37A | 30.51 | 0.31 |

Notes and Abbreviations:

[1] = Positive value denotes either an inward gradient (outer > inner) or an upward gradient (B1 > A).
A = A water-bearing zone
B1 = B1 water-bearing zone
ft = feet
ft amsl = feet above mean sea level
inner = well inside slurry wall
outer = well outside slurry wall

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Table 5. Chemical Analytic Results Summary, January 2004 through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| Sample Location | Sample Date | Lab/Analytical Method | Chloro-form | 1,1-DCA | 1,2-DCA | 1,1-DCE | cis-1,2-DCE | trans-1,2-DCE | Freon 113 | Methylene Chloride | PCE | 1,1,1-TCA | TCE | Vinyl Chloride | Total VOC's |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | micrograms per liter (µg/L) | | | | | | | | | | | | |
| 35A | 11/13/07 | CT/8260 | <1 | **34** | <0.5 | **22** | **420** | **4.3** | **11** | <20 | <0.5 | **5.9** | **370** | **9.7** | **878** |
| 36A | 11/13/07 | CT/8260 | <5 | **18** | <2.5 | **7.3** | **360** | **6.4** | <2.5 | <100 | <2.5 | **45** | **160** | <2.5 | **597** |
| 36A | 12/11/08 | CT/8260 | <3.3 | **20** | <1.7 | **9.2** | **370** | **3** | **4** | <67 | <1.7 | **21** | **110** | <1.7 | **537** |
| 37A | 11/13/07 | CT/8260 | <50 | **1,100** | <25 | **610** | **1,100** | <25 | **98** | <1,000 | <25 | **2,700** | **2,900** | **78** | **8,586** |
| 37A | 12/11/08 | CT/8260 | <25 | **3,000** | <13 | **610** | **2,000** | **20** | **140** | <500 | <13 | **2,600** | **2,300** | **280** | **10,950** |
| 40A | 11/12/04 | CT/8260 | <5 | **5.2** | <5 | <5 | **89** | **9.2** | **15** | <200 | <5 | **9.5** | **690** | <5 | **818** |
| 40A | 11/16/05 | CT/8260 | <8.3 | **7** | <4.2 | **5.9** | **120** | <4.2 | **14** | <170 | <4.2 | **12** | **1,100** | <4.2 | **1,259** |
| 40A | 11/14/06 | CT/8260 | <14 | **7.7** | <7.1 | <7.1 | **140** | **13** | **51** | <290 | <7.1 | **12** | **960** | <7.1 | **1,184** |
| 40A | 11/14/07 | CT/8260 | <13 | <6.3 | <6.3 | <6.3 | **140** | <6.3 | **13** | <250 | <6.3 | **8.5** | **780** | <6.3 | **942** |
| 40A | 11/7/08 | CT/8260 | <20 | <10 | <10 | <10 | **150** | <10 | **20** | <400 | <10 | **11** | **1,000** | <10 | **1,181** |
| 42A | 11/12/04 | CT/8260 | <3.6 | <3.6 | <3.6 | <3.6 | **37** | <3.6 | **9.4** | <140 | <3.6 | **3.7** | **390** | <3.6 | **440** |
| 42A | 11/16/05 | CT/8260 | <4 | **2.7** | <2 | **2.1** | **44** | <2 | **11** | <80 | <2 | **4.5** | **480** | <2 | **544** |
| 42A | 11/14/06 | CT/8260 | <6.3 | **3.3** | <3.1 | **3.8** | **49** | <3.1 | **25** | <130 | <3.1 | **4.8** | **480** | <3.1 | **566** |
| 42A | 11/14/07 | CT/8260 | <5 | **3.6** | <2.5 | **3.1** | **55** | <2.5 | **15** | <100 | **3.5** | **5.6** | **430** | <2.5 | **516** |
| 42A | 11/15/08 | CT/8260 | <6.3 | **4.2** | <3.1 | **3.4** | **61** | <3.1 | **9.9** | <130 | <3.1 | **5.2** | **380** | <3.1 | **464** |
| 43A | 11/11/04 | CT/8260 | <2.5 | <2.5 | <2.5 | <2.5 | **36** | <2.5 | **8** | <100 | <2.5 | **2.6** | **330** | **4.5** | **381** |
| 43A | 11/15/05 | CT/8260 | <5 | **3.3** | <2.5 | <2.5 | **47** | <2.5 | **7.2** | <100 | <2.5 | **5.2** | **480** | <2.5 | **543** |
| 43A | 11/8/06 | CT/8260 | <4 | **2.5** | <2 | **3** | **58** | <2 | **8.4** | <80 | <2 | **4.3** | **350** | <2 | **426** |
| 43A | 11/12/07 | CT/8260 | <8.3 | **5.4** | <4.2 | **4.7** | **91** | <4.2 | **21** | <170 | <4.2 | **9.5** | **480** | <4.2 | **612** |
| 43A | 11/7/08 | CT/8260 | <6.3 | **4.5** | <3.1 | **3.9** | **72** | <3.1 | **12** | <130 | <3.1 | **6.8** | **390** | <3.1 | **489** |
| 44A | 11/23/04 | CT/8260 | <1.3 | **2** | <1.3 | **2.3** | **63** | **1.3** | **5.9** | <50 | **1.6** | **2.7** | **430** | <1.3 | **509** |
| 44A | 11/15/05 | CT/8260 | <4 | **2.8** | <2 | **2.4** | **110** | **2.8** | **7.4** | <80 | **2.6** | **3.1** | **660** | <2 | **791** |
| 44A | 11/8/06 | CT/8260 | <6.3 | <3.1 | <3.1 | **3.6** | **100** | <3.1 | **23** | <130 | **3.5** | **3.4** | **730** | <3.1 | **864** |
| 44A | 11/12/07 | CT/8260 | <10 | <5 | <5 | <5 | **93** | <5 | **7.8** | <200 | <5 | <5 | **560** | <5 | **661** |
| 44A | 11/7/08 | CT/8260 | <7.1 | <3.6 | <3.6 | <3.6 | **40** | <3.6 | **7** | <140 | <3.6 | **5** | **450** | <3.6 | **502** |
| 122A | 11/13/07 | CT/8260 | <1 | **71** | <0.5 | **17** | **120** | **1.7** | **6.6** | <20 | <0.5 | **190** | **250** | **0.8** | **658** |

Table 5. Chemical Analytic Results Summary, January 2004 through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| Sample Location | Sample Date | Lab/Analytical Method | Chloro-form | 1,1-DCA | 1,2-DCA | 1,1-DCE | cis-1,2-DCE | trans-1,2-DCE | Freon 113 | Methylene Chloride | PCE | 1,1,1-TCA | TCE | Vinyl Chloride | Total VOC's |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | micrograms per liter (µg/L) | | | | | | | | | | | | |
| 137A | 11/13/07 | CT/8260 | <100 | <50 | <50 | <50 | **9,100** | **82** | <50 | <2,000 | <50 | <50 | **4,600** | **83** | **13,865** |
| 137A | 11/18/08 | CT/8260 | <63 | <31 | <31 | <31 | **3,800** | **69** | <31 | <1,300 | <31 | <31 | **2,100** | <31 | **5,969** |
| AE/RW-9-1 | 8/8/07 | CT/8260 | <33 | **500** | <17 | **74** | **1,000** | <17 | **24** | <670 | <17 | **2,600** | **1,200** | **71** | **5,469** |
| AE/RW-9-1 | 4/22/08 | CT/8260 | <8.3 | **47** | <4.2 | **22** | **430** | **11** | **16** | <170 | <4.2 | **140** | **650** | **5.1** | **1,331** |
| AE/RW-9-1 | 11/7/08 | CT/8260 | <13 | **54** | <6.3 | **24** | **460** | **10** | **19** | <250 | <6.3 | **360** | **730** | <6.3 | **1,668** |
| AE/RW-9-2 | 8/8/07 | CT/8260 | <100 | <50 | <50 | <50 | **5,100** | **59** | **110** | <2,000 | <50 | **84** | **5,400** | **220** | **10,973** |
| AE/RW-9-2 | 11/16/07 | CT/8260 | <50 | **58** | <25 | **39** | **3,700** | **45** | **56** | <1,000 | <25 | **74** | **2,500** | **170** | **6,642** |
| AE/RW-9-2 | 11/6/08 | CT/8260 | <100 | <100 | <100 | <100 | **3,100** | <100 | <100 | <100 | <100 | <100 | **4,100** | **130** | **7,330** |
| RW-20A | 8/8/07 | CT/8260 | <13 | **23** | <6.3 | **18** | **860** | **11** | **9.1** | <250 | <6.3 | **34** | **790** | **15** | **1,768** |
| RW-20A | 11/16/07 | CT/8260 | <6.3 | **83** | <3.1 | **69** | **480** | **8.6** | **7.1** | <130 | **8.5** | **420** | **440** | <3.1 | **1,516** |
| RW-20A | 11/15/08 | CT/8260 | <5 | **21** | <2.5 | **18** | **590** | **8.4** | **6.7** | <100 | **3.1** | **48** | **360** | **4.2** | **1,063** |
| RW-21A | 8/8/07 | CT/8260 | <6.3 | **8.7** | <3.1 | **7.4** | **250** | **6.9** | **12** | <130 | **6.3** | **8.5** | **340** | <3.1 | **644** |
| RW-21A | 11/16/07 | CT/8260 | <1.4 | **8.1** | <0.7 | **5** | **64** | **4.8** | **52** | <29 | **3.5** | **4.9** | **71** | **1.1** | **214** |
| RW-21A | 11/17/08 | CT/8260 | <1 | **7.8** | <0.5 | **5.8** | **68** | **8.1** | **49** | <20 | <0.5 | **1.7** | **58** | **1.3** | **200** |
| RW-21A (DUP) | 11/17/08 | CT/8260 | <1 | **8** | <0.5 | **5.5** | **68** | **8.7** | **50** | <20 | <0.5 | **1.6** | **60** | **1.3** | **203** |

Notes and Abbreviations:
< # = analyte not detected above the reported detection limit of "#" µg/L
8260 = USEPA Method 8260B for halogenated VOCs, for USEPA Method 8010 list of analytes
CT = Curtis and Tompkins, Berkeley, California
DCA = Dichloroethane
DCE = Dichloroethene
DUP = duplicate sample
ND = no analytes detected above the laboratory detection limit
PCE = Tetrachloroethene
TCA = Trichloroethane
TCE = Trichloroethene
VOCs = volatile organic compounds

Table 6. Extraction and Monitoring Well Details, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| **Well Details** | Date Installed | Zone | TOC Elevation (ft amsl) | Diameter (inches) | Total Well Depth (ft btoc) | Top of Screened Interval (ft btoc) | Bottom of Screened Interval (ft btoc) | Top of Sand Pack (ft btoc) | Bottom of Sand Pack (ft btoc) | Well Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 122A | 09/25/86 | A | 44.23 | 4 | 38 | 28 | 38 | 18 | 39 | Mon |
| 123A | 09/29/86 | A | 44.37 | 4 | 38 | 28 | 38 | 18 | 39 | Mon |
| 126A | 09/30/86 | A | 42.85 | 4 | 38 | 23 | 38 | 18 | 40 | Mon |
| 137A | 10/10/86 | A | 43.68 | 4 | 36 | 34 | 36 | 32 | 38 | Mon |
| 138A | 10/10/86 | A | 43.60 | 4 | 37 | 34 | 37 | 32 | 38 | Mon |
| 35A | 02/02/82 | A | 42.67 | 2 | 37 | 12 | 37 | 12 | 37 | Mon |
| 36A | 02/02/82 | A | 42.32 | 2 | 40 | 35 | 40 | 15 | 40 | Mon |
| 37A | 02/02/82 | A | 43.21 | 2 | 30 | 15 | 30 | 12 | 30 | Mon |
| 40A | 04/04/82 | A | 43.44 | 2 | 27 | 11.5 | 27 | 12 | 27 | Mon |
| 42A | 02/02/82 | A | 42.97 | 2 | 35 | 10 | 35 | 12 | 35 | Mon |
| 43A | 02/02/82 | A | 43.38 | 2 | 27 | 15 | 27 | 15 | 27 | Mon |
| 44A | 04/04/82 | A | 43.13 | 2 | 28 | 13.5 | 28 | 13.5 | 28 | Mon |
| AE/RW-9-1 | --- | A | 43.15 | 6 | 33 | 8 | 33 | 6 | 36 | Ext |
| AE/RW-9-2 | --- | A | 43.85 | 6 | 37 | 8 | 37 | 6 | 38 | Ext |
| RW-20A | --- | A | 43.57 | 8 | 37.5 | 26.5 | 36.5 | 11 | 38 | Ext |
| RW-21A | --- | A | 43.16 | 6 | 37 | 21 | 36 | 11 | 38 | Ext |
| 69B(1) | 12/12/85 | B1 | 42.62 | 4 | 59 | 54 | 59 | 50 | 61 | Mon |

**Notes and Abbreviations:**

--- = date installed not available
Zone = A, B1, B2, or C water-bearing zone
ft amsl = feet above mean sea level
ft btoc = feet below top-of-casing
Well Type = extraction well (Ext), monitoring well (Mon)

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# APPENDIX A

2008 ANNUAL REPORT REMEDY PERFORMANCE CHECKLIST

# 2008 Annual Report Remedy Performance Checklist

## I. GENERAL SITE INFORMATION

Facility Name: **Former Fairchild Facilities, Middlefield-Ellis-Whisman Study Area (MEW Site)**

Facility Address, City, State: **515/545 North Whisman Road and 313 Fairchild Drive (former Bldgs. 1-4)**
**369 and 441 North Whisman Road (former Bldgs. 13 and 19 and 23)**
**401 National Avenue (former Bldg. 9)**
**644 National Avenue (former Bldg. 18)**
**464 Ellis Street (former Bldg. 20 and 20A)**

Checklist completion date: **June 3, 2009**

EPA Site ID: **System-1: CAR000164285**
**System-3: CAD095989778**
**System-19: CAR000164228**

Site Lead: ☐ Fund ■ PRP ☐ State ☐ State Enforcement ☐ Federal Facility ☐ Other: EPA Region IX

Site Remedy Components (Include Other Reference Documents for More Information, as appropriate):

1. **Three slurry wall enclosures around former Buildings 1-4, Building 9, and Building 19. The slurry walls extend to a depth of about 40 feet below ground surface and are keyed a minimum of two feet into the A2/B1 aquitard.**
2. **Three treatment systems as detailed below:**

**System 1:**

- **Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.**
- **Thirteen source control recovery wells (Four wells operated during 2008).**
- **One regional recovery wells (One well operated during 2008).**

**System 3:**

- **Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.**
- **Seven source control recovery wells (Five wells operated during 2008).**
- **Three regional recovery wells (Two wells operated during 2008).**

**System 19:**

- **Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.**
- **Fifteen source control recovery wells (Ten operated during 2008).**
- **Seven regional recovery wells (Two operated during 2008).**

## II. CONTACTS

List important personnel associated with the Site: Name, title, phone number, e-mail address:

| | Name/Title | Phone | E-mail |
|---|---|---|---|
| **RP/Facility Representative** | **Du'Bois (Joe) Ferguson Schlumberger Technology Corporation** | **281-285-3692** | dferguson3@sugar-land.oilfield.slb.com |
| **RP Consultant** | **John Gallinatti Geosyntec Consultants** | **510-285-2750** | jgallinatti@geosyntec.com |
| **RP Consultant** | **Tess Byler Weiss Associates** | **650-968-7000** | tb@weiss.com |

# 2008 Annual Report Remedy Performance Checklist

**III. O&M COSTS (OPTIONAL)**

What is your annual O&M cost total for the reporting year?_____
Breakout your annual O&M cost total into the following categories (use either dollars or %):

- Analytical (e.g., lab costs): _____
- Labor (e.g., site maintenance, sampling): _____
- Materials (e.g., treatment chemicals): _____
- Oversight (e.g., project management): _____
- Utilities (e.g., electric, gas, phone, water): _____
- Reporting (e.g., NPDES, progress): _____
- Other (e.g., capital improvements): _____

Describe unanticipated/unusually high or low O&M costs (go to section [fill in] to recommend optimization methods):

**IV. ON-SITE DOCUMENTS AND RECORDS (Check all that apply)**

■ O&M Manual ■ O&M Maintenance Logs ☐ O&M As-built drawings ■ O&M reports
■ Daily access/Security logs
■ Site-Specific Health & Safety Plan ■ Contingency/Emergency Response Plan
■ O&M/OSHA Training Records ■ Settlement Monument Records
☐ Gas Generation Records ■ Groundwater monitoring records ☐ Leachate extraction records
■ Discharge Compliance Records
☐Air discharge permit ■ Effluent discharge permit ■ Waste disposal, POTW Permit

Are these documents currently readily available? ■ Yes ☐ No If no, where are records kept?

**Documents and records are available at treatment systems and/or on-site office located at, 350 E. Middlefield Road Mountain View, CA**

**V. INSTITUTIONAL CONTROLS (as applicable)**

List institutional controls called for (and from what enforcement document):

**Signs and other security measures are in place at extraction and treatment points.**

Status of their implementation:

**Posted signage (Health & Safety and emergency contact information). Bay Alarm Security System at the site.**

Where are the ICs documented and/or reported?

ICs are being properly implemented and enforced? ☐ Yes ☐ No, elaborate below
ICs are adequate for site protection? ☐ Yes ☐ No, elaborate below

Additional remarks regarding ICs:

# 2008 Annual Report Remedy Performance Checklist

**VI. SIGNIFICANT SITE EVENTS**
**Check all Significant Site events Since the Last Checklist that Affects or May Affect Remedy Performance**

☐ Community Issues
☐ Vandalism
■ Maintenance Issues
☐ Other:

Please elaborate on Significant Site Events:

**Maintenance issues:**

**System 19:**
**During 2008, the extraction and treatment system operated within the effluent limits established by the site NPDES permit for the entire period. However, the treatment system shut down from July 7-14 for approximately 165 hours without any alarm notification. There was no treatment unit bypass or discharge during the system shut down. Based on communication with Water Board staff on September 30, 2008, any future shut downs greater than 120 hours will be orally reported within five days of shut down, and a written submission within 15 days of shut down.**

**Additional non-routine maintenance issues are reported in Section 2 of the facility-specific 2008 Annual Progress Reports.**

**VII. REDEVELOPMENT**

Is redevelopment on property planned? ■ Yes ☐ No

If yes, what is planned? Please describe below.

Is redevelopment plan complete Yes, date:_____; ■ No ? ☐ Not Applicable

Redevelopment proposal in progress? ■ Yes, elaborate below
☐ No; If no, is a proposal anticipated? ☐ Yes ☐ No

☐ Is the redevelopment proposal compatible with remedy performance? ■ Yes ☐ No

Elaborate on redevelopment proposal and how it affects remedy performance:

**Planned and ongoing redevelopment in the residential area over the western edge of the MEW A/A1 and B1/A2 zone plume. Planned redevelopment of apartments on Whisman Road; ongoing redevelopment of residential area on Fairchild Drive, west of Whisman Road.**

**Building 18, the 644 National Avenue property has been bought by Carr America National Avenue LLC; redevelopment plans include new buildings and a parking structure.**

**The existing treatment systems and their components (conveyance piping, extraction wells, and monitoring wells) will be maintained or modified as appropriate to accommodate redevelopment.**

# 2008 Annual Report Remedy Performance Checklist

**VIII. GROUNDWATER REMEDY (reference isoconcentration, capture zone maps, trend analysis, and other documentation to support analysis)**

Groundwater Quality Data

| List the types of data that are available: | What is the source report? |
|---|---|
| **Potentiometric surface maps, hydrographs** | **2008 Annual Reports & 5-Year Review** |
| **Capture zone maps, isoconcentration maps** | |

■ Contaminant trend(s) tracked during O&M (i.e., temporal analysis of groundwater contaminant trends).
■ Groundwater data tracked with software for temporal analyses.
☐ Reviewed MNA parameters to ensure health of substrate (e.g., DO, pH, temperature), if appropriate?

Groundwater Pump & Treat Extraction Well and Treatment System Data

| List the types of data that are available: | What is the source report? |
|---|---|
| **O&M logs** | **NPDES Reports** |
| **System Influent & Effluent water samples** | **2008 Annual Reports** |
| **VOC mass and groundwater removal graphs, VOC concentration trends** | |

■ The system is functioning adequately.
☐ The system has been shut down for significant periods of time in the past year. Please elaborate below.

Discharge Data

| List the types of data that are available: | What is the source report? |
|---|---|
| **System performance data such as average flow rates, totalized flow, influent/effluent analyticals, GAC removal efficiencies** | **NPDES Discharge Reports** |

■ The system is in compliance with discharge permits.

Slurry Wall Data

| List the types of data that are available: | What is the source report? |
|---|---|
| **Water level elevations in select well pairs** | **2008 Annual Reports & 5-Year Review** |
| **Analysis of inward and upward hydraulic gradients** | |

Is slurry wall operating as designed? ■ Yes ☐ No

If not, what is being done to correct the situation?

**The slurry walls are operating as designed. However, the ROD specifies that the slurry walls, "maintain inward and upward gradients." Historically, that has not been the case in the downgradient direction even under maximum historical pumping scenarios. Since 2007, pumping ceased in the lower concentration/higher pumping rate extraction wells within the slurry walls. Gradients have maintained trends consistent with those prior to reduced groundwater extraction rates within the slurry wall. In one case, a change in gradient from inward to outward was observed in the cross-gradient direction in one of the three slurry walls (Buildings 1-4) in May 2008. In August and November, gradient measurements were inward again.**

**The chemical concentration data and potentiometric surface contours continue to demonstrate that the slurry walls are an effective means of impeding VOC migration outside of the slurry walls.**

Elaborate on technical data and/or other comments

# 2008 Annual Report Remedy Performance Checklist

**IX. AIR MONITORING/VAPOR INTRUSION PATHWAY EVALUATION (Include in Annual Progress Report and reference document)**

**Walk-throughs/Surveys: N/A**

**No additional air work was conducted at 401 and 644 National Avenue in 2008.**

Summary of Results: **N/A**

Problems Encountered: **None**

Recommendations/Next Steps: **None**

Schedule: **All work is coordinated with the USEPA.**

**X. REMEDY PERFORMANCE ASSESSMENT**

**A. Groundwater Remedies**

What are the remedial goals for groundwater? ■ Plume containment (prevent plume migration); ■ Plume restoration (attain ROD-specific cleanup levels in aquifer); ☐ Other goals, please explain:

**The groundwater remedy is hydraulic remediation by extraction and treatment. The Treatment System is reliable and consistent in its operation and mass removal ability, with greater than 95% up-time. The capture zones from the extraction wells provide sufficient overlap to achieve hydraulic control over the plume based on flow net evaluation and converging lines of evidence, including stable lateral extent of TCE exceeding 5 µg/L. Remediation is also demonstrated because concentrations within the TCE plume have continued to decrease in all zones. Groundwater with TCE concentrations exceeding 5 µg/L does not discharge to surface water.**

Have you done a trend analysis? ■ Yes ☐ No; If Yes, what does it show?

(Is it inconclusive due to inadequate data? Are the concentrations increasing or decreasing?) Explain and provide source document reference

**Concentrations within the core of the TCE plume have continued to decrease in all zones, while the lateral extent of TCE exceeding 5 µg/L has been stable. See Annual Reports for trends in monitoring wells (Appendix D) and the Optimization Evaluation Report (Geosyntec et al., 2008) for change in TCE distribution over time (Figures 4-18 through 4-21).**

**While the lateral extent of TCE concentrations exceeding 5 µg/L has not grown since 1992 and concentrations within TCE plume have generally decreased by an order of magnitude or more, the perimeter extent of TCE concentrations has largely stabilized. Optimization of the remedy may therefore be warranted (Geosyntec et al, 2008).**

If plume containment is a remedial goal, check all that apply:
■ Plume migration is under control (explain basis below)
☐ Plume migration is not under control (explain basis below)
☐ Insufficient data to determine plume stability (explain below)
(Include attachments that substantiate your answers, e.g., reference plume, trend analysis, and capture zone maps in source document)

Elaborate on basis for determining that plume containment goal is being met or not being met**:**

**Plume containment goal is met, slurry walls provide physical containment of sources on 369 N. Whisman Road, 401 National Avenue, and 515/545 N. Whisman Road and 313 Fairchild Drive.**

**Groundwater elevation and chemical monitoring results from 2008 demonstrate that the Fairchild extraction wells continue to achieve adequate horizontal and vertical capture based on converging lines of evidence, including graphical flow net analysis and chemical concentration trends. VOC concentrations in groundwater continue to remain well below historical maximums, and generally show long-term decreasing trends.**

# 2008 Annual Report Remedy Performance Checklist

If plume restoration is a cleanup objective, check all that apply:
■ Progress is being made toward reaching cleanup levels (explain basis below)
☐ Progress is not being made toward reaching cleanup levels (explain basis below)
☐ Insufficient data to determine progress toward restoration goal (explain below)

Elaborate on basis for determining progress or lack of progress toward restoration goal:

**The objective is to remediate and control the plume. The groundwater extraction, treatment, and containment systems are functioning as intended and meet the Remedial Action Objectives for the Site. While concentrations within TCE plume have generally decreased by an order of magnitude or more, treatment system influent concentrations have declined and the perimeter extent of TCE concentrations has largely stabilized. Optimization of the remedy may therefore be warranted.**

**B. Vertical Migration**

Have you done an assessment of vertical gradients? ■ Yes ☐ No; If Yes, what does it show? (Is it inconclusive due to inadequate data?

Are the concentrations increasing or decreasing? Explain and provide source document reference

**In general, vertical gradients across the B and deeper water-bearing zones are upward. Upward vertical gradients are typical from the B- to A-zone, but downward vertical gradients are observed at a few locations.**

**Source document reference: 2008 Annual Reports & 5-Year Review**

**C. Source Control Remedies**

What are the remedial goals for source control?

**Capture of former source areas is the goal for source control. Cleanup standards are Maximum Contaminant Level (MCLs) in upper groundwater zones; the TCE is 5 µg/L.**

Elaborate on basis for determining progress or lack of progress toward these goals:

**Capture zone analysis in the 2008 Annual Progress Report indicate plume containment of target capture areas.**

**XI. PROJECTIONS**

Administrative Issues
Dates of next monitoring and sampling events for next annual reporting period: Nov/Dec 2009

**A. Groundwater Remedies - Projections for the upcoming year and long-term** (Check all that apply)

Remedy Projections for **the upcoming year (2009)**
☐ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. Expansion or **minimization** (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
■Other modification(s) anticipated: **Optimization** Elaborate below. Target date: **TBD**

# 2008 Annual Report Remedy Performance Checklist

**Elaborate on Remedy Projections:**

**The RPs for the Former Fairchild Facilities anticipate implementing remediation optimization strategies, pending receipt of and response to EPA comments on the September 3, 2008 Optimization Evaluation Report**.

Remedy Projections for **the long-term** (Check all that apply)
☐ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. ☐ Expansion or ☐ minimization (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
■ Other modification(s) anticipated: **Groundwater Feasibility Study** Elaborate below. Target date: **TBD**

Elaborate on Remedy Projections:

**Minor changes to the EPA's January 15, 2009 Draft Process Framework for a site-wide Groundwater Feasibility Study were proposed January 30, 2009. The PRPs are prepared to implement the modified Framework as soon as the Draft Framework is finalized by EPA .**

**B. Projections – Slurry Walls** (Check all that apply)

Remedy Projections for **the upcoming year**
☐No significant changes projected.
☐ PRP will request remedy modification. Target date of request:

☐Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
■ Other modification(s) anticipated: **Optimization** Elaborate below. Target date: **TBD**

Elaborate on Remedy Projections:

**The slurry walls are part of the groundwater remedy. The recommendations of the Optimization Evaluation Report will be implemented upon receipt of, and response to, comments from EPA. In the interim, the system continued to operate per the August 2007 groundwater extraction scheme.**

Remedy Projections for **the long-term**
☐ No significant changes projected.
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Other modification(s) anticipated: **Groundwater Feasibility Study** Elaborate below. Target date: TBD

Elaborate on Remedy Projections:

**See above. The slurry walls are part of the groundwater remedy.**

**C. Projections – Other Remedial Options Being Reviewed to Enhance Cleanup**

Progress implementing recommendations from last report or Five-Year Review
Has optimization study been implemented or scheduled? ■ Yes; ☐ No; If Yes, please elaborate.

**An Optimization Evaluation Report was submitted September 2008.**

# 2008 Annual Report Remedy Performance Checklist

**XII. ADMINISTRATIVE ISSUES**
**Check all that apply:**

☐ Explanation of Significant Differences in progress ■ ROD Amendment in progress
☐ Site in operational and functional ("shake down") period;
☐ Notice of Intent to Delete in progress ☐ Partial site deletion in progress ☐ TI Waivers
☐ Other administrative issues:

**Proposed Plan to address vapor intrusion pathway planned for 2009, with ROD amendment to follow.**

Date of Next EPA Five-Year Review: **September 30, 2009**

**XII. RECOMMENDATIONS**

- **Implement optimization strategies for Fairchild systems pending receipt of and response to EPA comments on the Optimization Evaluation Report.**
- **Follow revised groundwater feasibility study framework pending finalization by EPA.**
- **Potentially responsible parties (PRPs) requested in the 2008 Annual Progress Report that USEPA not require further facility-specific reporting for Former Fairchild Building 20 beginning in 2009. However, this request has not yet been acknowledged by the USEPA. The PRPs are requesting again to discontinue additional facility-specific reporting for Former Fairchild Building 20. The rationale for this request is:**
    1. **No potential source areas were identified at former Fairchild Building 20 property during Site investigations.**
    2. **Analytical results for the monitoring wells sampled in 2008 continue to indicate that VOC concentrations in groundwater are generally stable to declining. This is also reported in the RGRP Annual report.**
    3. **Building 20 does not have an associated groundwater treatment system.**
    4. **There is no facility-specific capture to evaluate.**

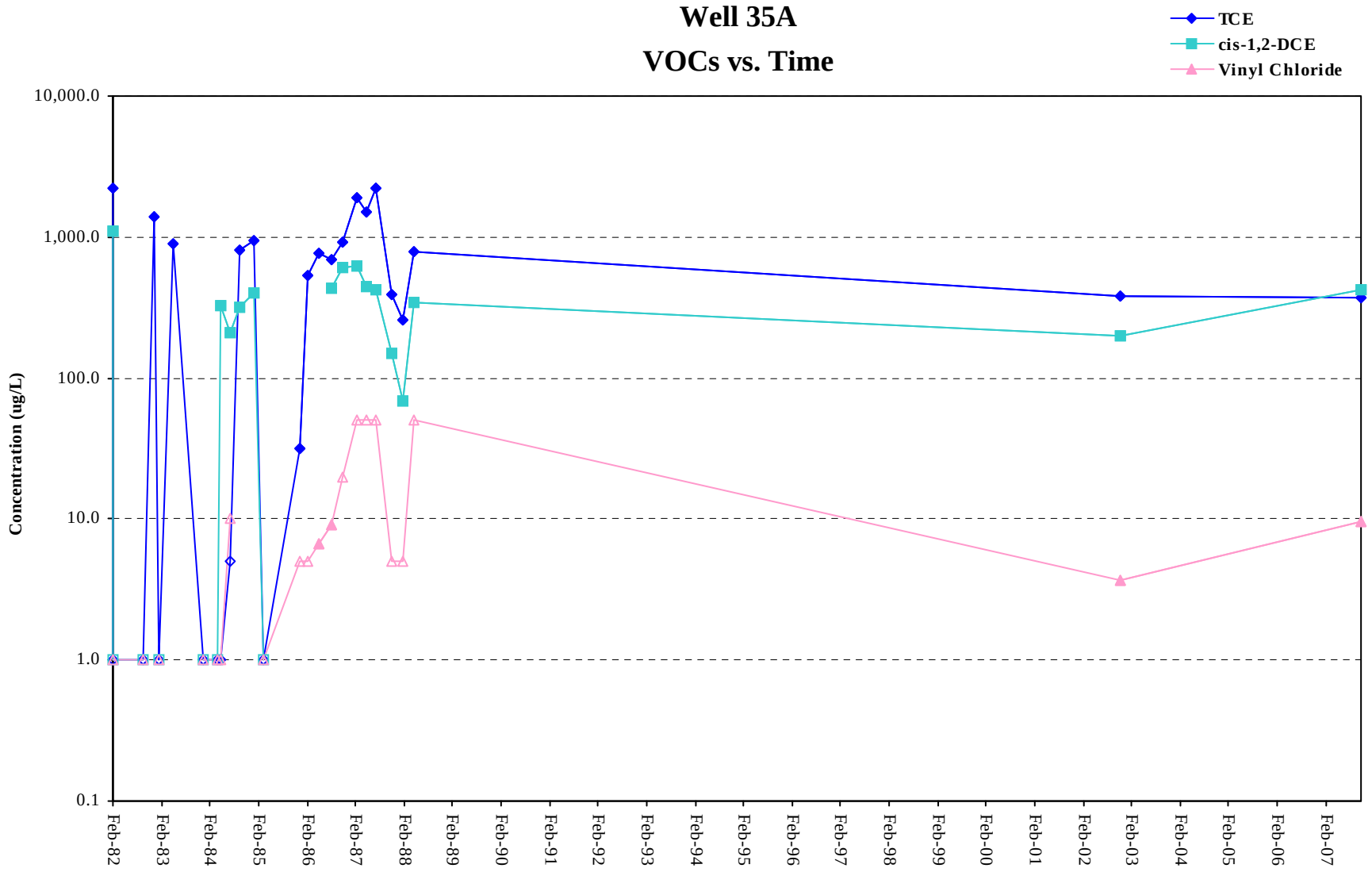
  **In summary, the groundwater monitoring data are evaluated in the RGRP report, and this report is redundant with other reports at the MEW Site since all information is covered under Raytheon Facility Specific and RGRP reporting.**

# APPENDIX B

SELECTED VOCS VERSUS TIME GRAPHS

Weiss Associates

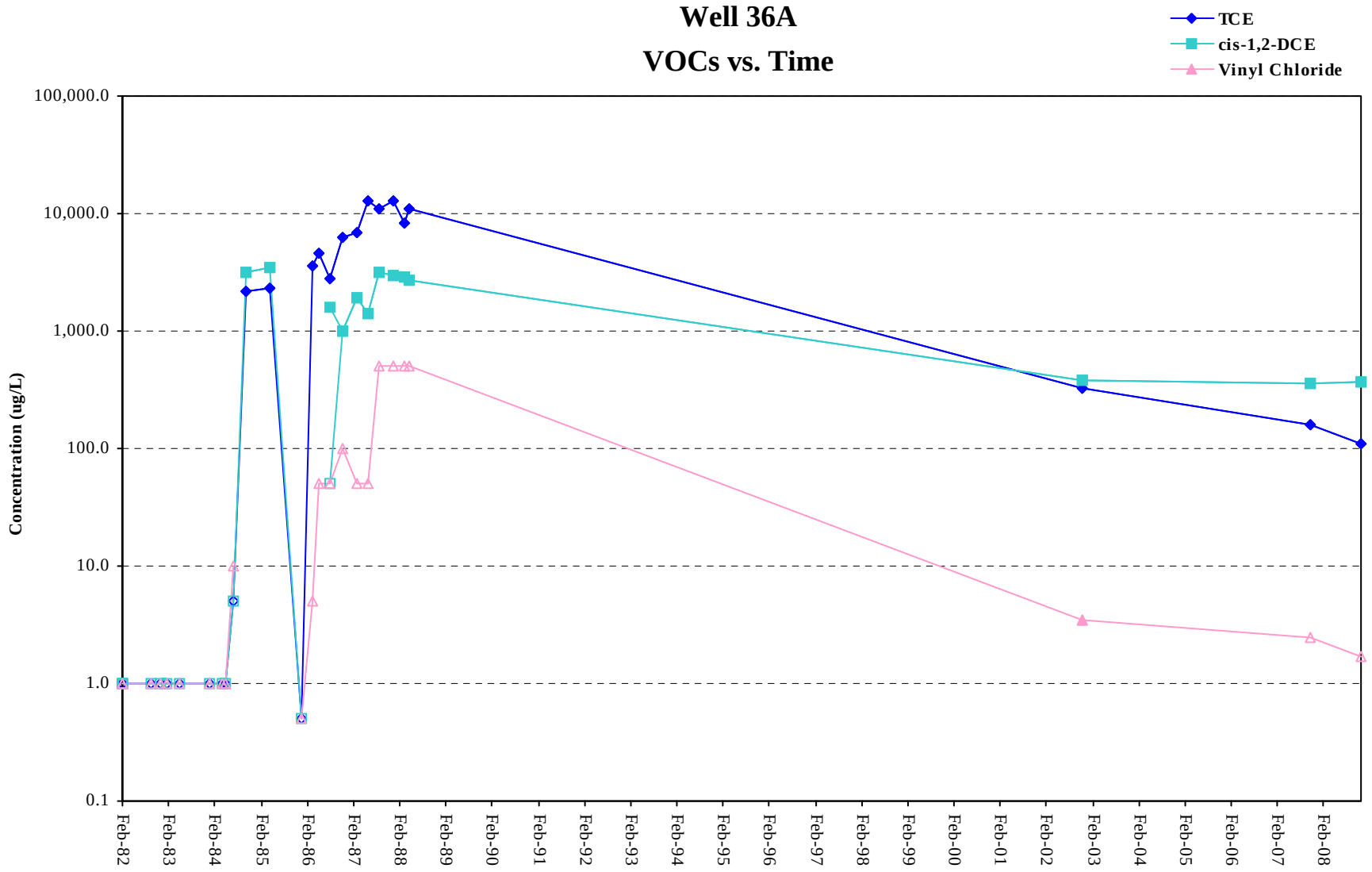
# Well 35A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

# Well 36A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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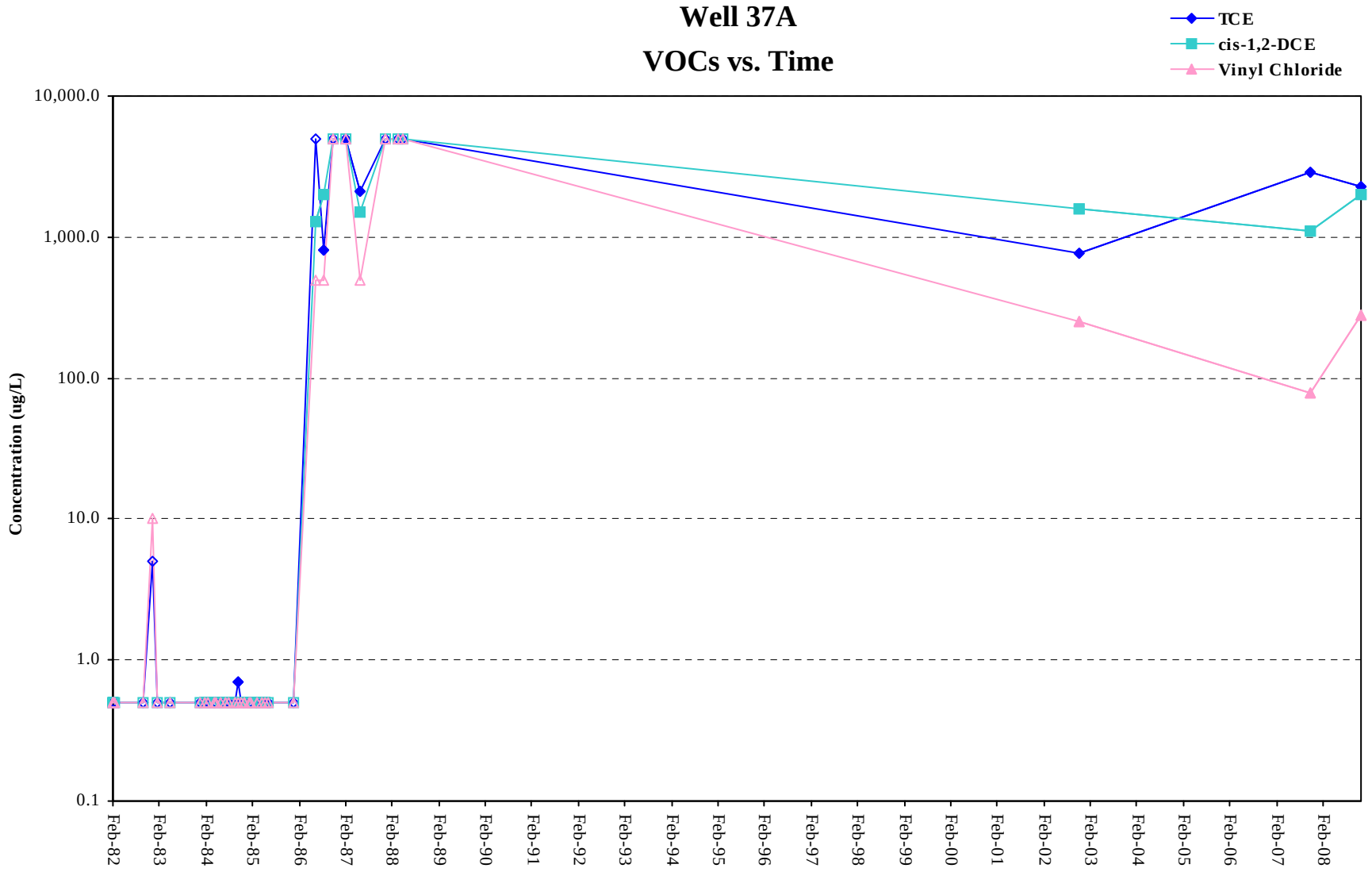
Weiss Associates

# Well 37A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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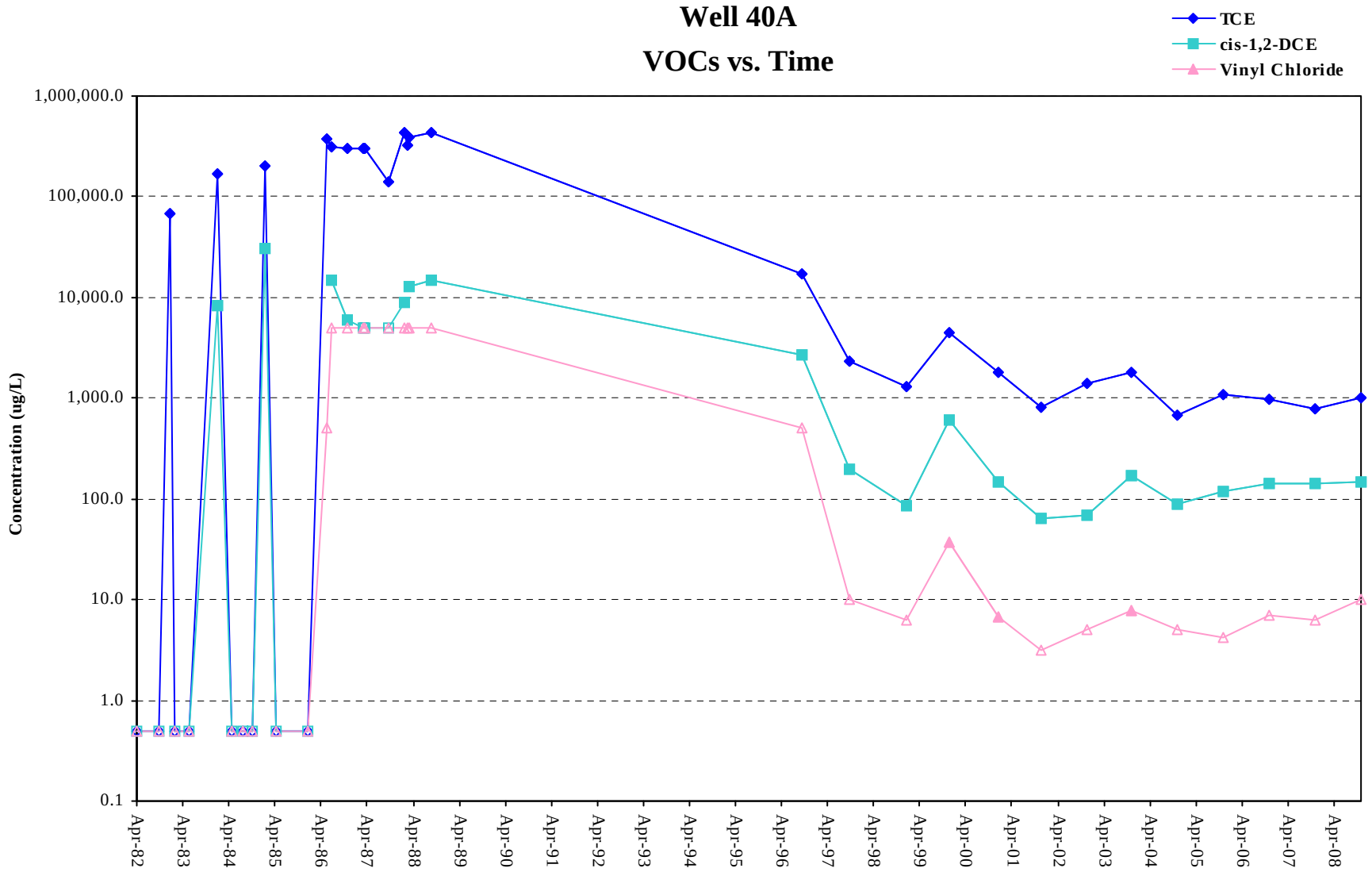
Weiss Associates

# Well 40A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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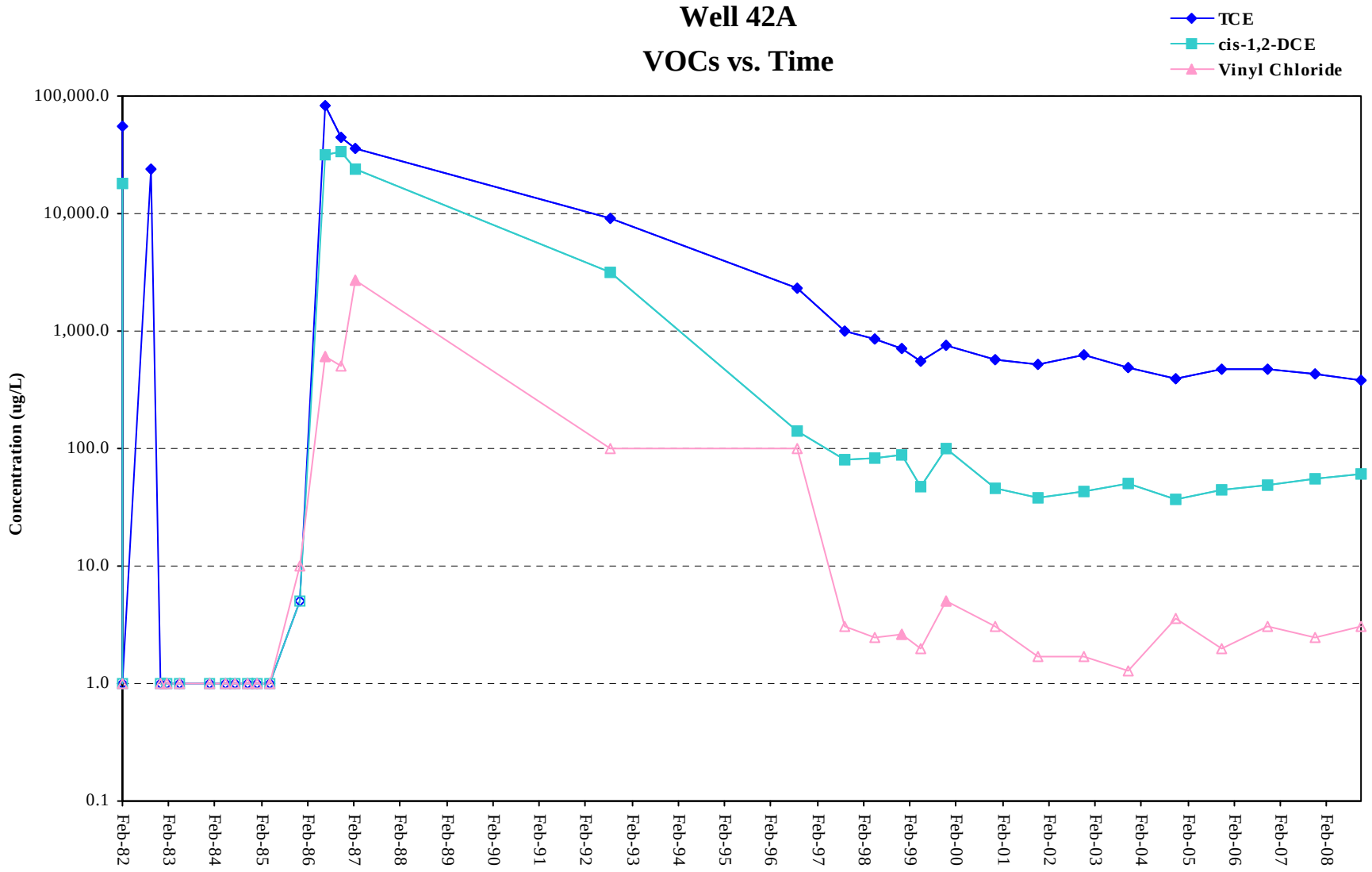
Weiss Associates

# Well 42A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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Weiss Associates

# Well 43A
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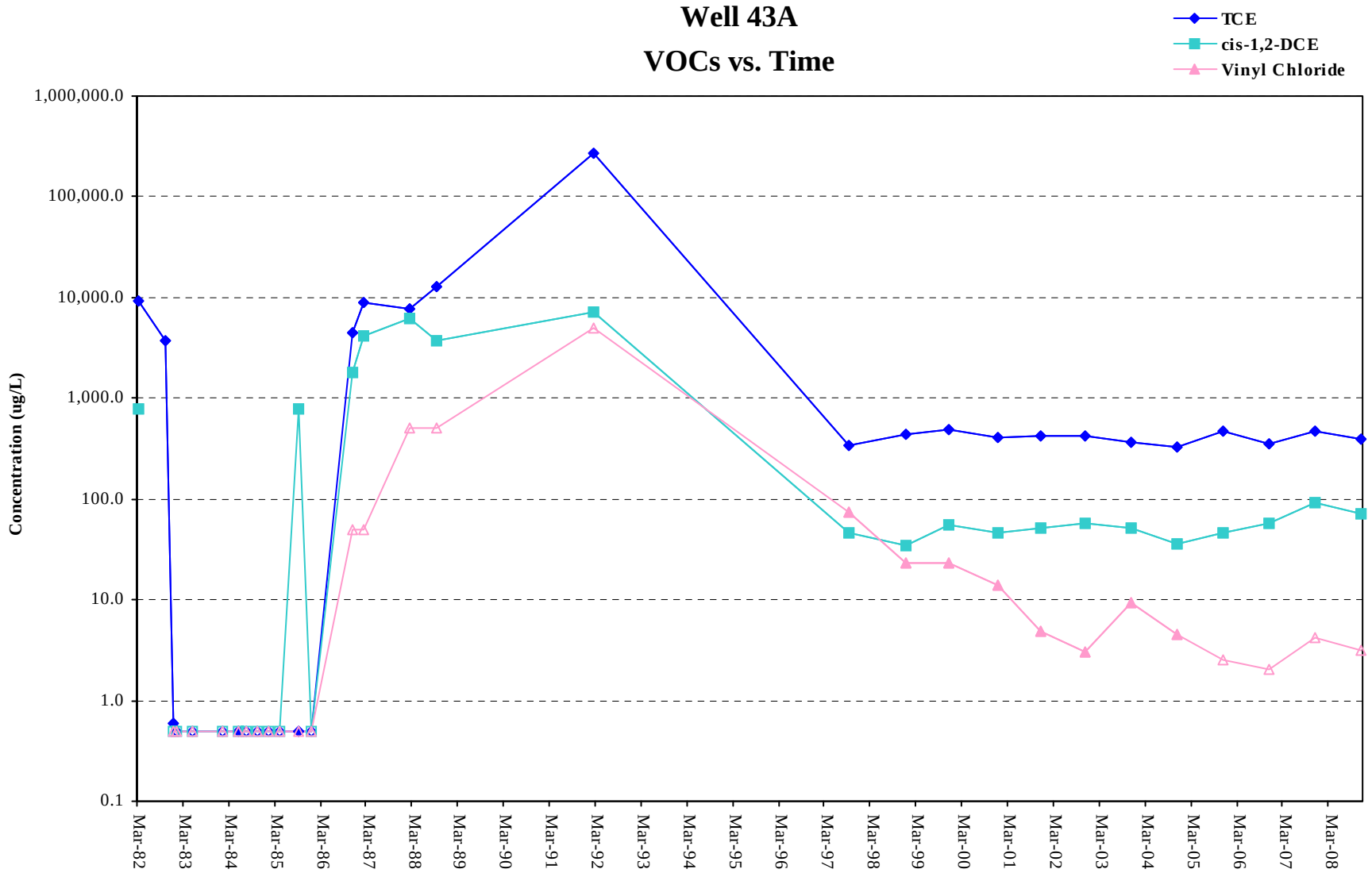


NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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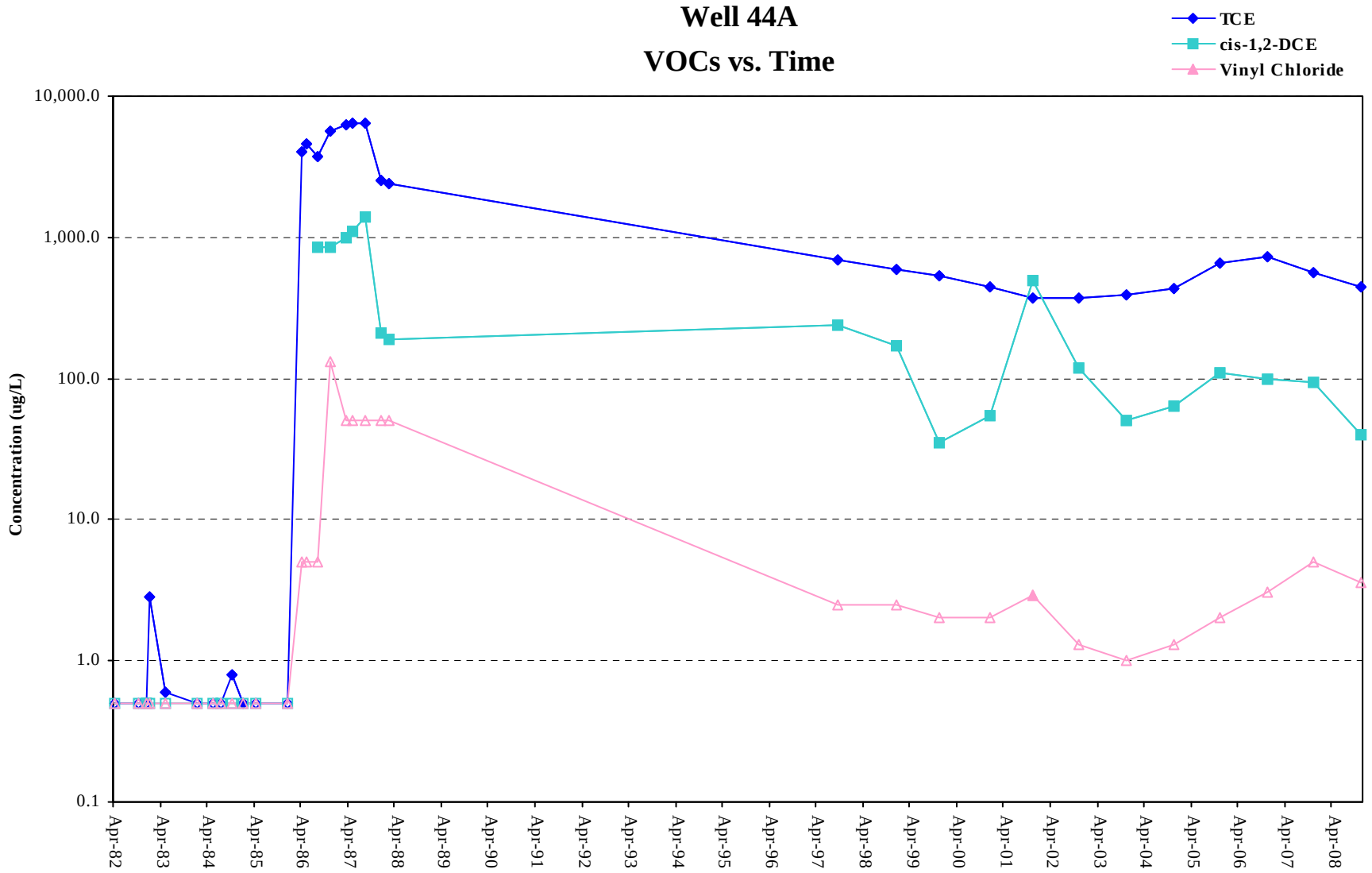
Weiss Associates

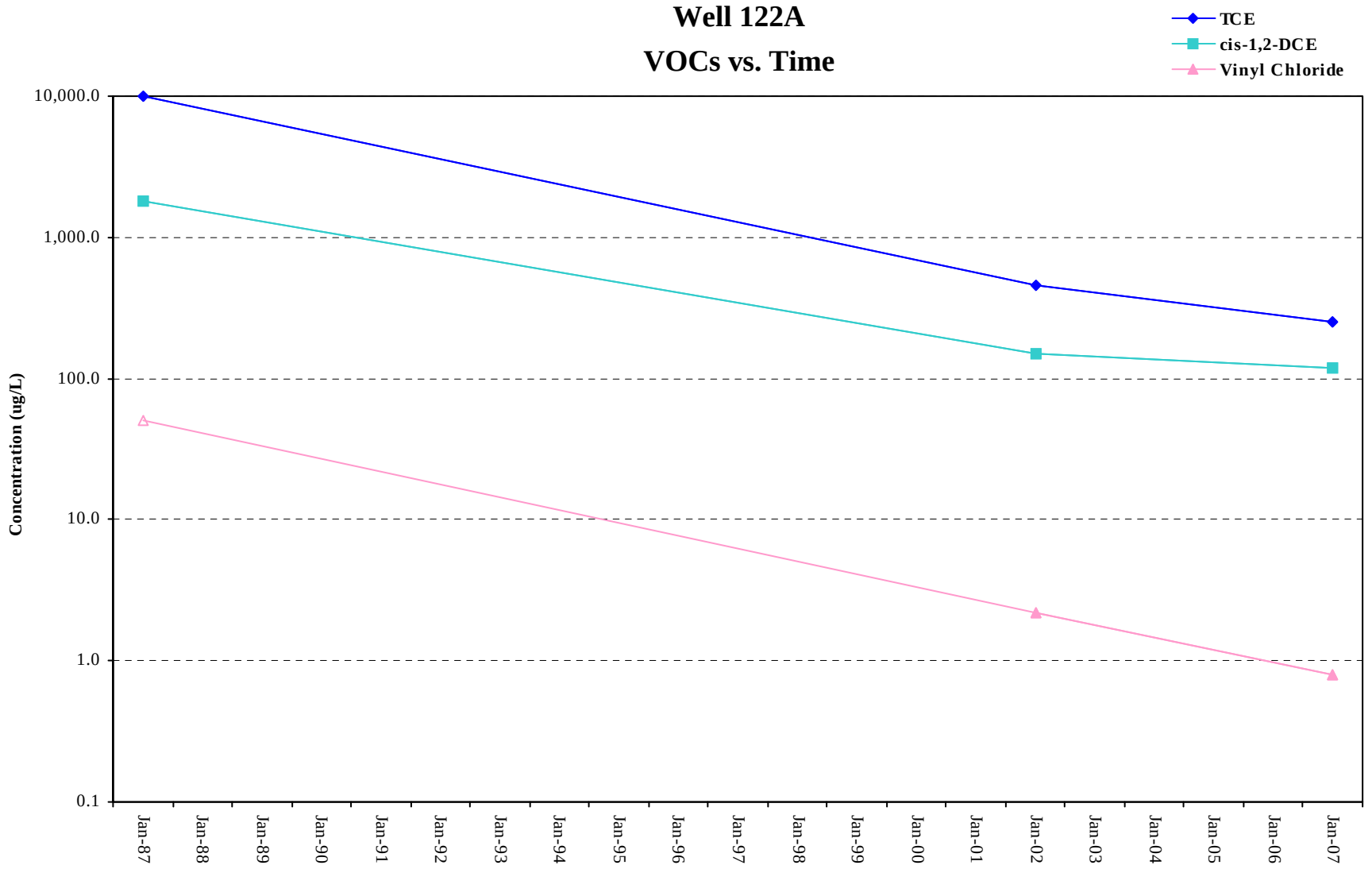
# Well 44A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

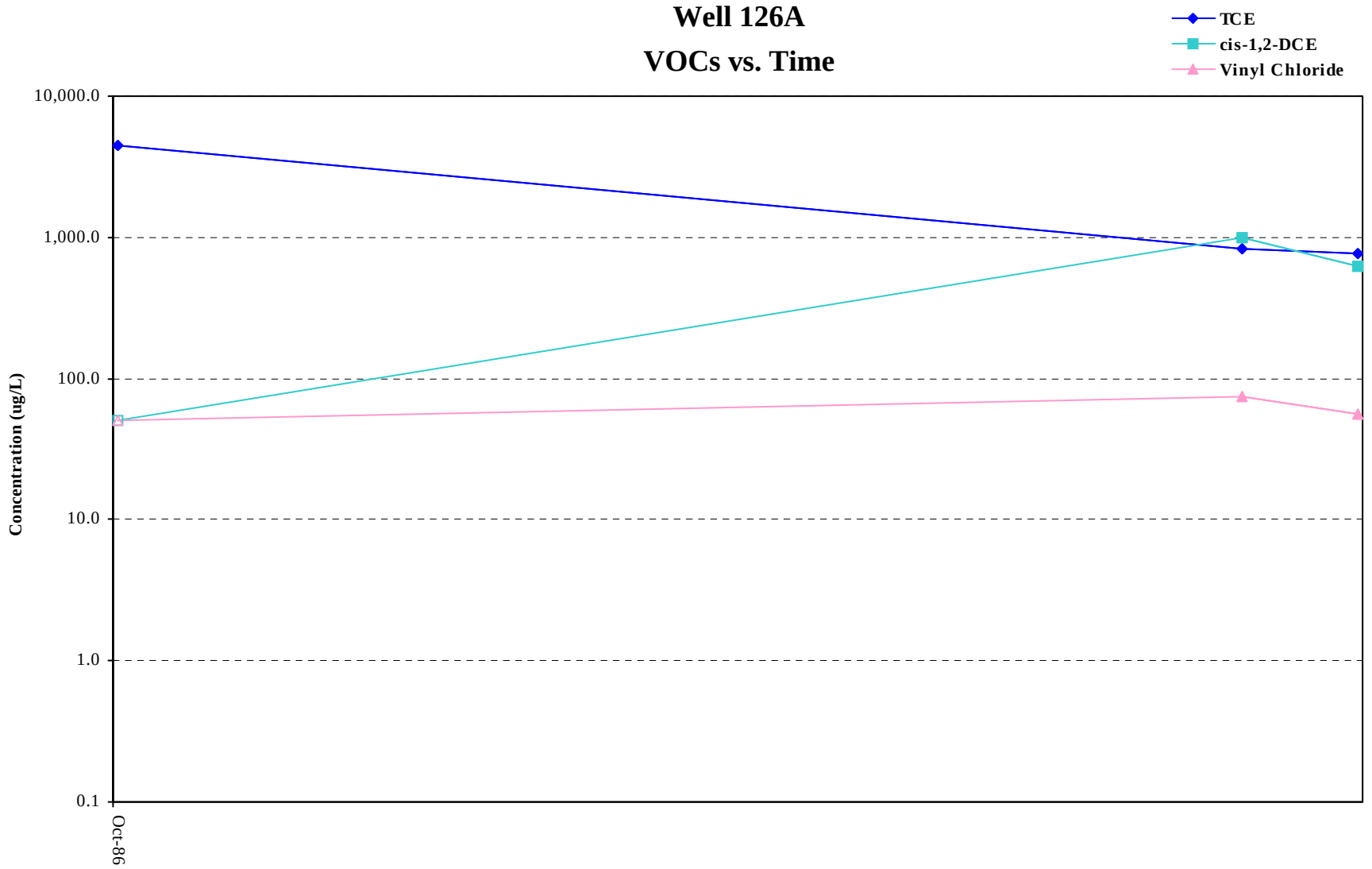
# Well 122A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

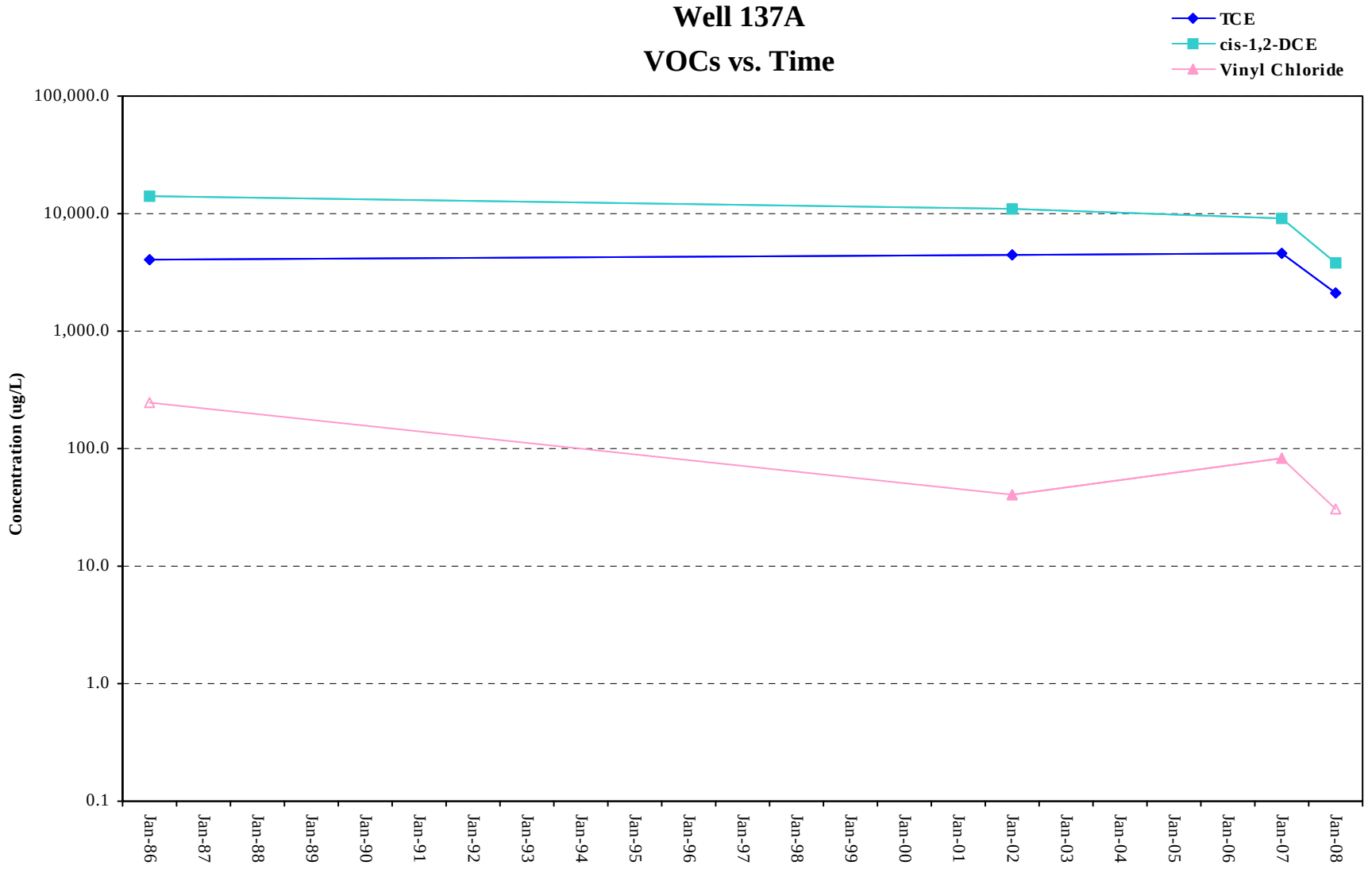
# Well 126A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

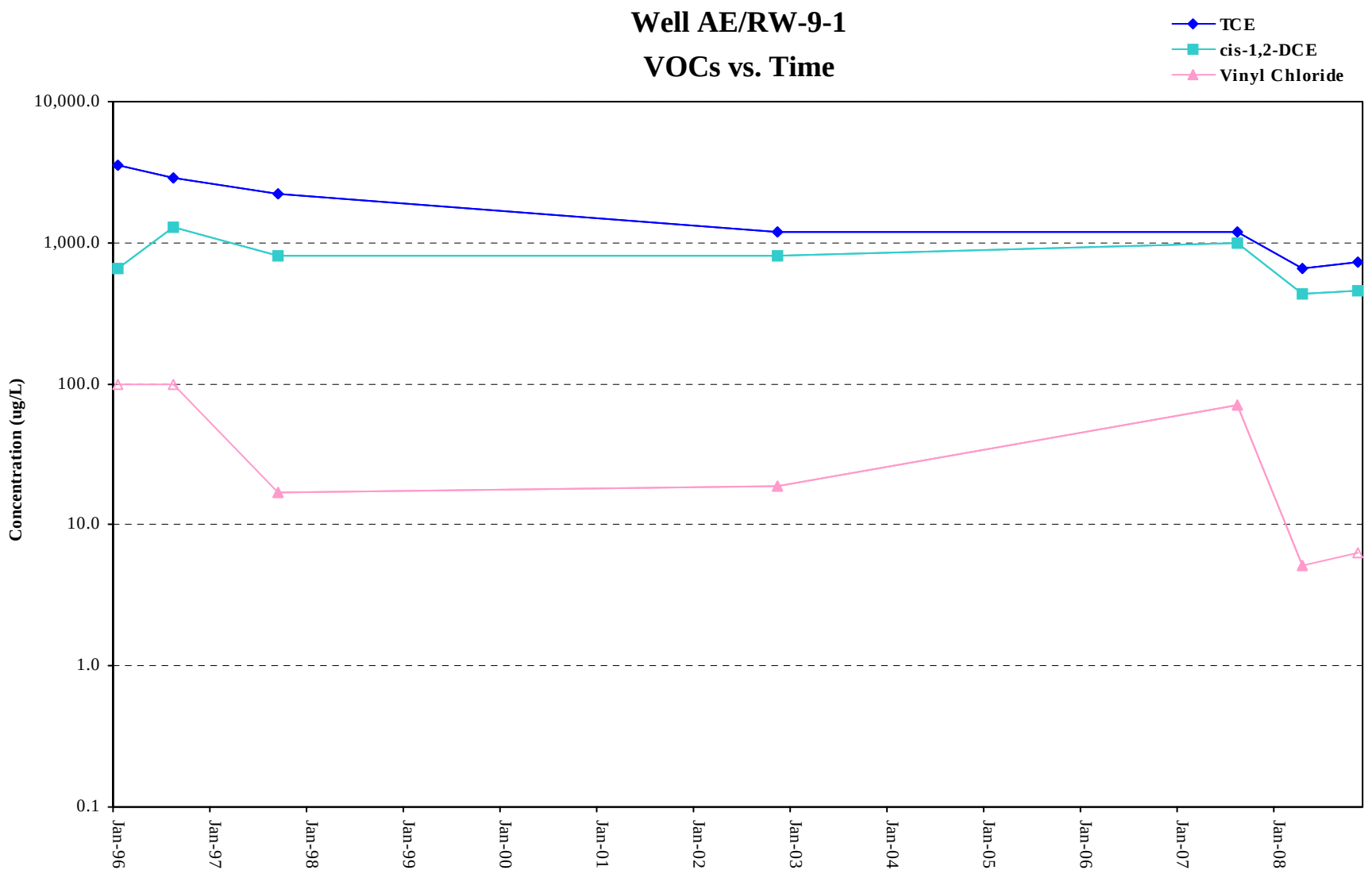
# Well 137A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

# Well AE/RW-9-1
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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Report: rptMvChrts2008Log Loc. Group: Bldg9

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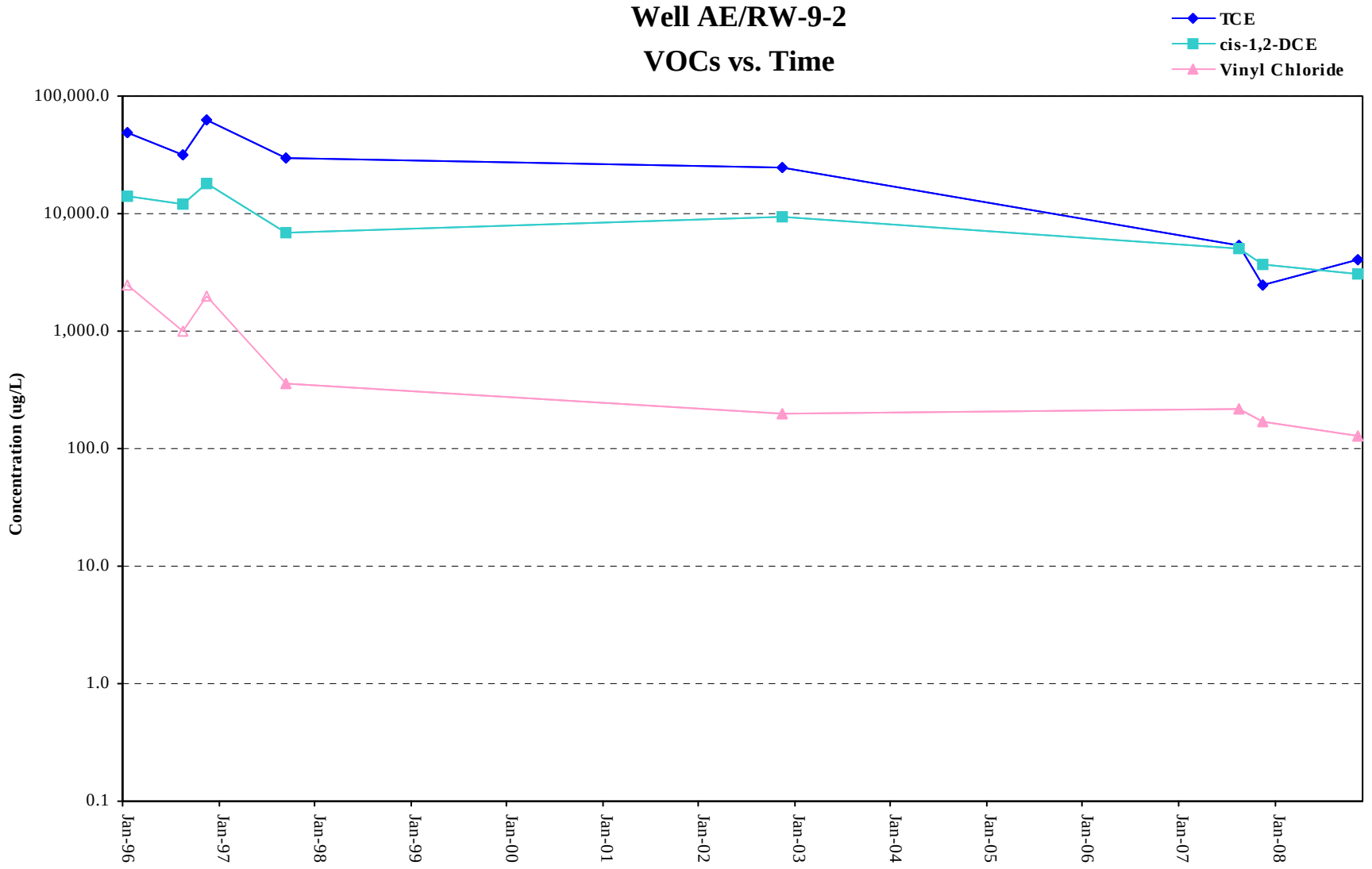
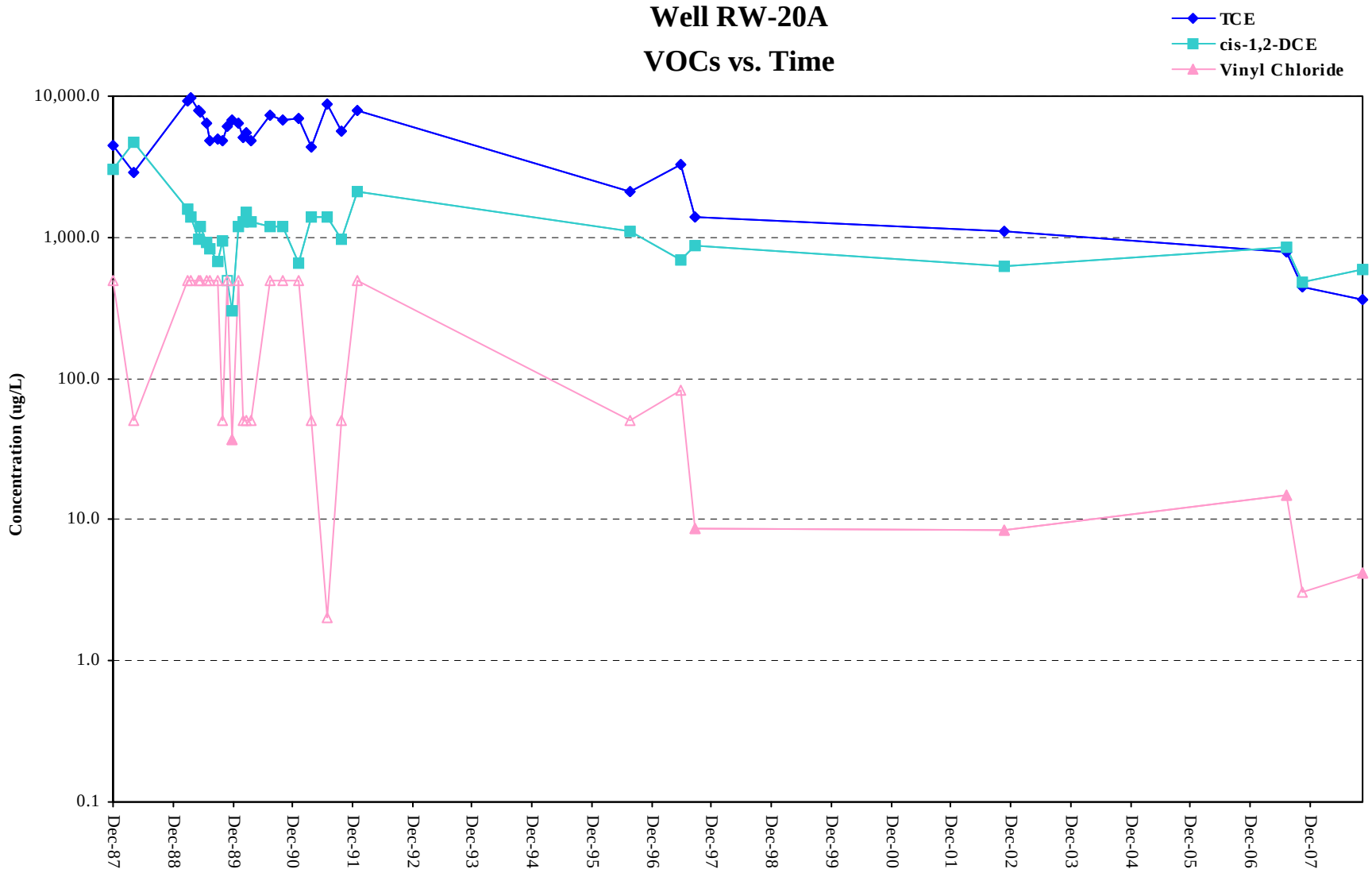
# Well AE/RW-9-2
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

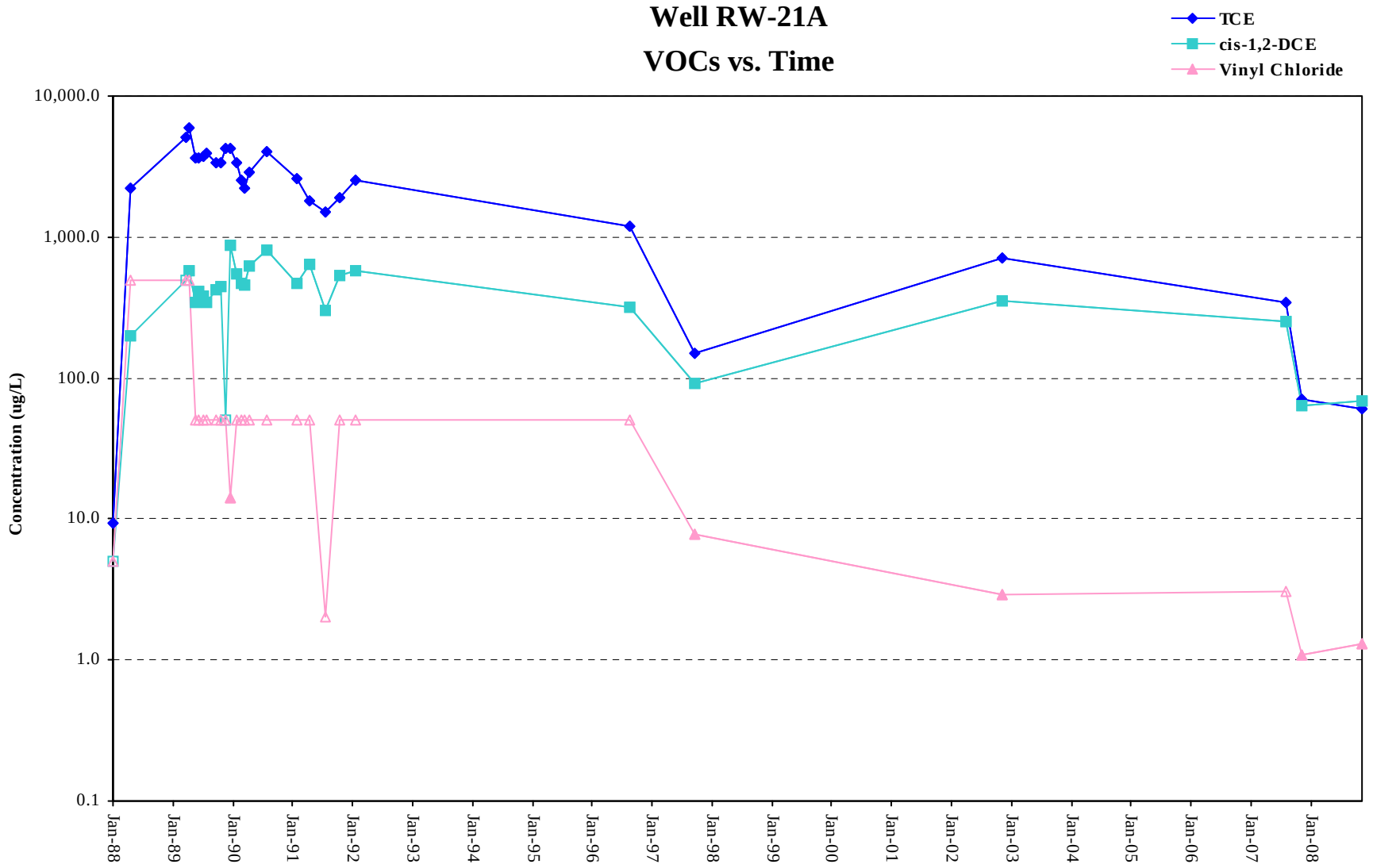
# Well RW-20A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

Weiss Associates

# Well RW-21A
## VOCs vs. Time




NOTE: Analytes not detected above the reported detection limit (RDL) shown as open chart symbols at the RDL.

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# APPENDIX C

QA/QC REPORT, SUMMARY TABLES, AND CRITERIA

Weiss Associates

# 2008 QA/QC SUMMARY

From January through December 2008, the extraction wells at Building 9 (401 National Avenue) pumped to Fairchild System 1 (515 Whisman Road) where combined influent is sampled monthly as required by the NPDES permit. In addition to monthly treatment system samples, twelve groundwater samples were collected from Site monitoring and extraction wells as part of the MEW RGRP Annual Groundwater Sample Event. Samples (including QC samples) were submitted to Curtis and Tompkins in Berkeley, California, a state-certified analytical laboratory. All samples were collected, stored, transported and managed according to USEPA protocols. Sample temperature and holding times were correctly observed. Tables C-1 and C-2 present a summary of sampling and analysis QA/QC for 2008. Analytical laboratory reports for the groundwater and related QC samples (travel blanks, rinseate/equipment blanks, and field blanks) are presented in Appendix F of the MEW 2008 Annual Progress Report. Appendix G of the MEW 2008 Annual Progress Report summarizes the analytical issues (Table G-2) and the results of the QC samples (Table G-3) for the 2008 annual groundwater sampling event.

Table C-1. Summary of Sampling QA/QC for January through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California.

| | |
|---|---|
| Who performed sampling<br>(Firm name/address/contact/phone): | Weiss Associates<br>350 East Middlefield Road<br>Mountain View, CA 94043<br><br>Joyce Adams (510) 450-6162 |
| Chain of Custody forms completed for all samples? | YES |
| Field parameters stabilized prior to taking sample? | YES |
| Zero headspace in sample containers (applicable to VOCs only)? | YES |
| Samples preserved according to analytical method? | YES |
| Required field QA/QC samples taken? | YES |

*Explain any "NO" answers:

Table C-2. Summary of Analytical QA/QC for January through December 2008, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

| | |
|---|---|
| Who performed analysis (Lab name/address/contact/phone): | Curtis & Tompkins<br>2323 Fifth Street<br>Berkeley, CA 94710<br>Anna Pajarillo (510) 486-0900 |
| Analytical methods[1] (by method number and chemical category): | Twelve samples analyzed by USEPA 8260B – Halogenated Volatile Organic Compounds |
| Are the labs state-certified for the above analytical methods? | YES |
| Analyses performed according to standard methods? | YES |
| Sample holding times met? | YES |
| Analytical results reported for all values above MDL? | YES |
| QA/QC analyses run consistent with analytical methods? | YES |
| QA/QC results meet all acceptance criteria? | YES[1,2] |
| QA/QC results and acceptance criteria on file? | YES |

*Explain any "NO" answers:

1. The Analytic Reports and Chain of Custody forms are located in Appendix F of the *2008 Annual Progress Report for Middlefield-Ellis-Whisman Study Area Regional Groundwater Remediation Program, Mountain View, CA.*

*2.* Analytical issues for treatment systems samples collected during 2008 are reported in the2008 Quarterly NPDES reports for Treatment System 1. Analytical issues for groundwater samples collected during the 2008 annual groundwater sampling event are summarized in Appendix G of the *2008 Annual Progress Report for Middlefield-Ellis-Whisman Study Area Regional Groundwater Remediation Program, Mountain View, CA.*