Weiss Associates *Environmental Science, Engineering and Management*

350 E. Middlefield Road, Mountain View, CA 94043-4004 *Fax: 650-968-7034 Phone:* ***650-968-7000***

2010 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 10, 2011

Weiss Associates *Environmental Science, Engineering and Management*

350 E. Middlefield Road, Mountain View, CA 94043-4004 *Fax: 650-968-7034 Phone:* ***650-968-7000***

2010 ANNUAL PROGRESS REPORT

for

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

Submitted to

USEPA, Region 9, Superfund Division
75 Hawthorne Street
San Francisco, California 94105

Prepared by

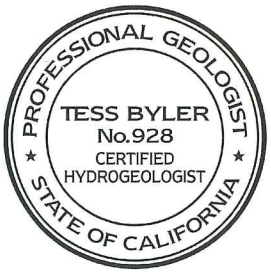
Weiss Associates
350 East Middlefield Road
Mountain View, California 94043

Weiss Project No. 363-1922-2-04

Alok D. Kolekar, P.E.
Quality Assurance/Quality Control

Edward Yeh, E.I.T.
Staff Engineer

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. We make no other warranty, either expressed or implied, and are not responsible for the interpretation by others of the contents in this report.



Tess Byler June 10, 2011

Tess Byler, P.G., C.Hg. Date
Senior Project Hydrogeologist
CA # 928, expiration Nov. 2012

CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATION

Fairchild	Fairchild Semiconductor Corporation
ft bgs	feet below ground surface
ft	feet
ft/ft	feet per foot
gpm	gallons per minute
GAC	granular activated carbon
Geosyntec	Geosyntec Consultants
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
O&M	operations and maintenance
PRPs	potentially responsible parties
QA/QC	quality assurance and quality control
RGRP	Regional Groundwater Remediation Program
RI/FS	remedial investigation and feasibility study
ROD	Record of Decision
RRWs	regional recovery wells
SCRWs	source control recovery wells
STC	Schlumberger Technology Corporation
SVE	soil vapor extraction
System 1	groundwater treatment system located at 515 Whisman Road
106 Order	Administrative Order for Remedial Design and Remedial Action
Site	401 National Avenue, Mountain View, California (Building 9)
TCE	trichloroethene
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
Weiss	Weiss Associates

SUMMARY

This *2010 Annual Progress Report for Former Fairchild Building 9, 401 National Avenue, Middlefield-Ellis-Whisman Study Area, Mountain View, California* (the Site; Figures 1, 2, and 3) summarizes Site activities from January 1 through December 31, 2010 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) and the USEPA's correspondence prescribing annual report contents (USEPA, 1990a, and 2005). The 2010 Annual Report Remedy Performance Checklist is included as Appendix A.

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 (ft) deep and extends to the A/B1 aquitard;
- Four source control recovery wells (SCRWs): RW-20A, RW-21A, AE/RW-9-1, and AE/RW-9-2, all of which are located inside the slurry wall; and
- Fourteen groundwater monitoring wells.

Groundwater extracted by these SCRWs is conveyed via double-contained piping to an offsite treatment facility located at 515 Whisman Road known as Fairchild Treatment System 1 (System 1), which is discussed in the *2010 Annual Progress Report for Former Fairchild Buildings 1-4, 515/545 Whisman Road and 313 Fairchild Drive, Middlefield-Ellis-Whisman Area, Mountain View, California* (Weiss, 2011).

A groundwater treatment system is located at 401 National Avenue that is part of an adjacent facility remedy; it is discussed in the *Annual Progress Report—2010, Facility Specific Work, 405 National Avenue, Mountain View, California* (AMEC Geomatrix Inc., 2011).

Site activities during this reporting period were conducted in compliance with the 106 Order. They comprise operation, monitoring, and maintenance activities for the Building 9 extraction and monitoring wells, quarterly slurry wall water level monitoring, semiannual groundwater level monitoring in March and November, annual groundwater sampling in November and December 2010, regional activities documented in the Regional Groundwater Remediation Program (RGRP) Annual Report (Geosyntec, 2010a), and submittal of cost information for the USEPA's MEW groundwater focused feasibility study.

Groundwater elevation and chemical monitoring results from 2010 demonstrate that the Site extraction wells continue to achieve adequate plume capture as indicated by converging lines of evidence, including graphical flow net analysis and chemical concentration trends. Volatile organic compound (VOC) concentrations in groundwater continue to remain well below historical maximums and generally show long-term decreasing trends.

During 2010 quarterly monitoring of Building 9 slurry wall well pairs, inward and upward gradients were generally observed within the slurry wall. The northwest (downgradient) corner, which has exhibited an outward gradient since August 2007, showed an inward gradient in November 2010. This switch may be attributed to turning on wells RW-20A and RW-21A in May 2010.

1. INTRODUCTION

This 2010 Annual Progress Report was prepared at the direction of Schlumberger Technology Corporation (STC) for the former Fairchild Semiconductor Corporation (Fairchild) facility located at 401 National Drive in Mountain View, California (the Site; Figures 1, 2, and 3). Geosyntec Consultants (Geosyntec) assisted with the preparation of this report.

This report summarizes Site activities from January 1 through December 31, 2010 and monitoring data from the past five years. The 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) and the USEPA's correspondence prescribing 2004 and future annual report contents (USEPA, 1990a and 2005).

1.1 Site Background

Former Fairchild Building 9 is located within the Middlefield-Ellis-Whisman (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 and piping, sumps, and/or surface spills. The former Fairchild Building 9 Site is currently used as a warehouse by Adema Technologies, Inc.; their manufacturing operations ceased by September 2010. Land use in the vicinity is industrial/commercial with surrounding residential development. The former Fairchild Building 9 Site is located within the MEW Study Area, defined by the USEPA (USEPA, 1989) as an approximately 1/4-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 (Figure 2).

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 the Building 9 slurry wall boundaries and the treatment system located at 401 National Avenue is provided in the *Annual Progress Report—2010, Facility Specific Work, 405 National Avenue, Mountain View, California* (AMEC Geomatrix, 2011).

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

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

1.2 Local Hydrogeology

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

Groundwater Zones	Approximate Depth Interval (feet below ground surface)
A[a]	20 to 45
B1[b]	50 to 75
B2	75 to110
B3	120 to 160
C	200 to 240
Deep	>240

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

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

> greater than

The upper groundwater zone is subdivided into two water-bearing zones, the A-zone and the B-zone, which are separated by the A/B1 aquitard. The B-zone has been further subdivided into three zones. From youngest to oldest (shallowest to deepest), these are the B1-, B2-, and B3-zones, separated by aquitards, designated as the B1/B2 aquitard and the B2/B3 aquitard. The lower groundwater zones occur below the B/C aquitard, from about 200 feet below ground surface (ft bgs). The B/C aquitard is the major confining layer beneath the MEW Area. Two lower groundwater zones have been defined: the C-zone and what has been termed deep groundwater, below the C-zone (HLA, 1987; Intel, 1987).

Ranges of hydraulic conductivity (K), hydraulic gradient, and transmissivity of the upper groundwater zones, i.e., above the B/C aquitard, calculated from pumping tests conducted at the MEW Area from 1986 through 2005, are presented in the table below (Canonie 1986a, 1986b, 1987, and 1988; Geomatrix, 2004; HLA, 1986 and 1987; Locus, 1998; PRC, 1991; Navy, 2005; and Weiss, 1995 and 2005).

Water-Bearing Zone	Estimated Hydraulic Conductivity (ft/day)		Approximate Horizontal Gradient (ft/ft)	Saturated Thickness (ft)	Transmissivity (ft^2/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 gradients and velocities have been locally altered near source control recovery wells (SCRWs), regional recovery wells (RRWs), and the Fairchild and Raytheon slurry walls.

The vertical component of groundwater flow is generally upward from the B1- to the A-zone, but it is locally downward in some areas of the Site (HLA, 1987). Groundwater extraction has likely exerted an influence on measured vertical gradients. Vertical gradients below the B1-zone are generally upward (Geosyntec et al., 2008a).

1.3 Description of Remedy

As specified in the ROD, the remedy consists of groundwater extraction and treatment. The remedy is designed to protect local water supplies and to remediate or control groundwater that contains elevated concentrations of chemicals, including control of discharge of such groundwater to surface water.[1] Groundwater cleanup goals are 5 micrograms per liter (µg/L) for TCE in shallow groundwater (A- and B- zones) and 0.8 µg/L for TCE in deep groundwater (C and deep zones).[2] Soil cleanup standards for the MEW Area are 0.5 milligrams per kilogram (mg/kg) of TCE for all soils outside of the slurry wall and 1 mg/kg TCE for soil inside the slurry wall. 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 maximum contaminant levels (MCLs).

Cleanup has been addressed in two stages: initial actions and a long-term remedial phase (USEPA, 1989). Initial cleanup actions 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, which consists of extraction and treatment of groundwater by air stripping towers or liquid-phase granular activated carbon (GAC). Remedial activities are being conducted by individual MEW PRPs as well as the MEW RGRP.

As part of the initial stage, in 1986, Fairchild installed a subsurface slurry wall at Building 9, which is approximately 40 feet (ft) deep, three ft thick and keyed a minimum of two ft into the A/B1 aquitard. Four SCRWs were installed inside the Building 9 slurry wall (AE/RW-9-1, AE/RW-9-2, RW-20A, and RW-21A), and the extracted groundwater was conveyed to air strippers that Fairchild installed from 1982 through 1986. An additional plume definition program for the MEW Area was completed in 1992, and between 1991 and 1995, preliminary and final design documents for soil and groundwater source control measures were developed and submitted to the USEPA (Canonie, 1993, 1994, and 1995).

Soil cleanup actions in the initial stage included *in-situ* vapor extraction with treatment by vapor-phase GAC, and excavation with treatment by aeration. In 1995, 3,000 cubic yards of soil were excavated to a depth of 6 ft and aerated at the 401 National Avenue Site. A soil vapor extraction (SVE) system operated from 1996 to 1997 to remediate soil from 6 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 both inside and outside the slurry walls in the MEW Area (Locus, 1997; Smith, 1997a; and Smith, 1997b). All soil remediation at the MEW Area was completed by 2001 (USEPA, 2009).

As part of the long-term remedial phase, in 2003, the air strippers were replaced with GAC systems (RMT, 2003). The first five-year remedy review for the MEW Site was completed in 2004 (USEPA, 2004). The second was completed in October 2009 (USEPA, 2009a).

[1] The objectives of the groundwater remedy design are described in the ROD and the *Feasibility Study* (Canonie, 1988).

[2] Groundwater cleanup goals are presented in the ROD.

Currently, groundwater extracted from the Site is conveyed via double-contained piping to an offsite treatment facility located at 515 Whisman Road (System 1), which consists of three 5,000-pound GAC vessels in series. Progress of the remediation during this phase is tracked by groundwater monitoring of extraction and monitoring wells on Site, construction details of which are provided in Table 1.

1.4 Summary of Site Activities and Deliverables

Table 2 provides the 2010 monitoring and reporting schedule for the Site. Site activities from January through December 2010 were conducted in compliance with the 106 Order (USEPA, 1990a). The activities comprise:

- Continuing groundwater extraction and treatment;
- Collecting quarterly groundwater elevation measurements in Site slurry wall well pairs on March 25, May 27, August 26, and November 18;
- Collecting semiannual groundwater elevation measurements in Site monitoring and extraction wells on March 25 and November 18;
- Distributing the 2009 Annual Progress Report to the USEPA and MEW Distribution List parties on June 15;
- Collecting groundwater samples from Site monitoring and extraction wells in November and December 2010;
- Annual settlement monitoring on December 7 and 8;
- Assessing the progress of remedial actions during 2010; and
- Planning remedial actions for 2011.

Section 2 of this report summarizes Site groundwater remedial activities conducted during this reporting period. Sections 3 through 7 document additional activities, problems encountered, and a technical assessment; present conclusions and recommendations; and remedial activities planned for 2011. Supporting data are presented in Figures 1 through 9, Tables 1 through 8, and Appendices A through D.

2. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

2.1 System Description

2.1.1 Extraction and Treatment System

No treatment system is specifically associated with the Building 9 remedy. Extracted groundwater from four SCRWs located inside of the slurry wall, AE/RW-9-1, AE/RW-9-2, RW 20A, and RW-21A, is piped via double-contained piping to offsite Fairchild Treatment System 1 located at 515/545 Whisman Road. Fairchild Treatment System 1 is discussed further in the 2010 Annual Progress Report for Former Fairchild Buildings 1-4 (Weiss, 2011).

From January to April 2010, two wells, AE/RW-9-1, AE/RW-9-2, were operating. By May 1, all four SCRWs were operating as part of groundwater extraction well optimization activities (Geosyntec, 2010). The average monthly flow rates and total volume of groundwater extracted by these wells during 2010 are provided in Tables 3 and 4, respectively. The average combined groundwater extraction flow rate of the two SCRWs operating at Building 9 from January to April was 6.0 gallons per minute (gpm). The average combined flow rate of the four SCRWs operating from May to December was 16.1 gpm. During 2010, these four SCRWs extracted approximately 6.8 million gallons of groundwater.

2.1.2 Monitoring Wells

Fourteen monitoring wells are used to evaluate the Building 9 Site (Table 1). Thirteen 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 (eight wells) and semiannually in other monitoring wells, and water quality samples are collected annually in eight of the 14 monitoring wells. Wells 35A and 122A located inside the slurry wall are sampled once every five years and were last sampled in 2007. Monitoring wells 69B1, 123A, 126A, and 138A are not part of the water quality sampling program; they are used to assess horizontal and vertical gradients at the Building 9 slurry wall.

2.2 Extraction and Treatment System Operation and Maintenance

From January 1 through December 31, 2010, the following non-routine maintenance and operational activities were performed:

2010 Dates	Component	Comments	Regulatory Notification
February 4	AE/RW-9-2	Extraction well AE/RW-9-2 was off-line for approximately 22 hours because of a pump change and repairs to the well head.	Not Required
June 21	AE/RW-9-1	Extraction well AE/RW-9-1 was off-line for approximately 2 hours because of a low-flow alert.	Not Required
August 9	AE/RW-9-2	Extraction well AE/RW-9-2 was off-line for approximately 2 hours because of a low-flow alert.	Not Required
September 2-3	AE/RW-9-2	This extraction well tends to accumulate orange colored microbial deposits (fouling), and requires roughly two pump changes every year to maintain performance. It was off-line for approximately 22 hours because of a low-flow alert and subsequent pump replacement.	Not Required
November 5-10	AE/RW-9-2	AE/RW-9-2 was off-line for a total of approximately 100 hours because of multiple low-flow alerts. The paddle wheel was cleaned and o-ring changed. At no time was the well off-line for 72 consecutive hours.	Not Required

2.3 Groundwater Level Monitoring

During this reporting period, groundwater levels were measured in all Site monitoring wells on March 25 and November 18, 2010. Water levels were measured in slurry wall well pairs quarterly from March through November 2010 (Table 5). Hydrographs of Site slurry wall well pair measurements are presented in Figures 4 through 7.

Potentiometric surface maps with estimated capture zones for the four extraction wells at Building 9 are presented in Figures 8 and 9 for March and November, respectively.

2.4 Groundwater Quality Monitoring

The 2010 annual groundwater sampling event was conducted in November and December 2010. Chemical analytical results for the previous five years (2006 through 2010) are summarized in Table 6. Appendix B contains the analytical reports and chain-of-custody documents for samples collected in 2010, and Appendix C contains the quality assurance/quality control (QA/QC) evaluation report. VOC-versus-time graphs for select monitoring wells are included in Appendix D. TCE isopleths are provided in Figure 9 and are based on concentrations in all Site wells sampled in 2010 as presented in the MEW RGRP Annual Progress Report (Geosyntec, 2011b).

The data provided in Table 6 and Appendix D show that, in general, TCE concentrations in 2010 in Building 9 wells are much lower than historical TCE maximums and generally indicate stable to declining TCE concentrations.

Water quality samples are collected annually for specified wells outside the slurry wall and every five years for wells inside the slurry walls. The last five-year sampling event for wells inside the slurry walls was in 2007. Active extraction wells are voluntarily sampled annually to better assess treatment system mass removal.

Monitoring wells 137A, 36A, and 37A inside the slurry wall have been sampled annually since 2007 as part of slurry wall evaluations. In 2010, three additional monitoring wells, 126A, 138A, and 41A were voluntarily sampled 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 with a target capture area to determine if capture is sufficient (USEPA, 2008).

Hydraulic capture from the Building 9 extraction wells was estimated for March and November 2010 by graphical flow net evaluation of groundwater flow streamlines drawn perpendicular to groundwater contours to derive time-dependent estimated capture zones snapshots. The graphical analysis was guided by calculated distances to the stagnation point and capture zone width using the analytical solution of Javandel and Tsang (1986). Because the calculation method assumes a homogeneous, isotropic, two-dimensional groundwater flow zone and is dependent on a regionally estimated value of transmissivity, the calculated distances are of secondary importance compared with measured water level data and the resulting potentiometric surface.

The following six steps were used for the Building 9 capture evaluation:

Step 1: Review Site data, Site conceptual model, and remedy objectives.

Step 2: Define Site-specific target capture zones.

Step 3: Generate potentiometric surface maps based on interpolation of measured water levels.

Step 4: Calculate capture zone widths.

Step 5: Evaluate concentration trends for wells outside the target capture zone.

Step 6: Estimate capture using steps 1-5, compare with target capture zone(s), assess uncertainties and data gaps (Section 2.5.3.).

All four of the Building 9 extraction wells are located inside the slurry wall. The target capture area was assumed to be the width of the slurry wall. Estimated 2010 captures based on graphical flow net evaluation depicted in Figures 8 and 9 indicate that target capture has been achieved.

2.5.2 Horizontal and Vertical Gradients

Groundwater elevations were recorded quarterly in March, May, August, and November 2010 in monitoring wells 123A/122A, 126A/35A, and 138A/137A (slurry wall well pairs) and 69B1/37A (A/B1 aquitard pair) (Table 5). These well pairs are used to evaluate the direction of horizontal gradient across the slurry wall and the direction of vertical gradient across the A/B aquitard. Well locations are shown in Figure 3.

Figures 4 through 7 present graphs of hydraulic head difference between slurry wall well pairs at the Site grouped by upgradient, crossgradient, downgradient, and vertical gradient well pairs. Results of the well pair analysis indicate:

- Inward hydraulic gradients were consistently observed at upgradient and crossgradient well pairs 123A/122A and 138A/127A.
- Upward hydraulic gradients from the B1 to the A aquifer were consistently observed at well pair 69B1/37A.
- An inward gradient was observed in downgradient well pair 126A/35A in November 2010. This inward gradient is likely the result of turning on wells RW-20A and RW-21A in May 2010.

2.5.3 Capture Assessment

The 2010 capture evaluation is summarized below:

Step	2010 Status
Step 1: Review Site Data and Site Conceptual Model and Remedy Objectives	Site data, updated Site conceptual model (Geosyntec 2011a), and remedy objectives were reviewed and determined to be appropriate to assess capture.
Step 2: Define "Target Capture Zone(s)"	Target capture is based on the slurry wall enclosure boundaries, since the extraction wells are located within the Building 9 slurry wall. The slurry wall provides the primary containment methodology.
Step 3a: Create Water Level Maps	Potentiometric surface contours are presented in Figures 8 and 9. Water levels at extraction wells were measured through piezometers constructed in the filter packs of the extraction well and therefore were considered reliable for use in constructing potentiometric surface maps. Water levels inside and outside the slurry wall enclosure were contoured separately.
Step 3b: Water Level Pairs	As shown in Table 5 and Figures 4 through 7, there is an inward gradient in the upgradient slurry wall well pair, and both inward and outward gradients in the downgradient and crossgradient slurry wall well pairs. The vertical gradient well pair has an upward gradient. Downgradient slurry wall well pair, 126A/35A, has exhibited an outward gradient since August 2007, but had an inward gradient in November 2010. The likely cause of the gradient reversal is two extraction wells that had been off since 2007 were turned on in May 2010.
Step 4: Calculate Capture Zone Widths	Tables 7 and 8 present the results of the capture zone width calculations for March and November 2010. Calculated captures indicate that the groundwater within the slurry wall is effectively contained since widths are similar to or greater than the target capture width of slurry wall.
Step 5: Evaluate Concentration Trends	Long-term trends in VOC concentrations are generally decreasing to stable as indicated by the time-concentration plots in Appendix D.
Step 6: Estimate Capture Zones and Compare with Target Capture Zone(s)	TCE plume capture in 2010 meets the target capture for the A/A1 groundwater zone on the basis of converging lines of evidence, including concentration trends, and graphical flow net analysis and calculated captures.

3. OTHER ACTIVITIES

3.1 Optimization

Extraction well rates were optimized in 2010 (Geosyntec, 2010). RW-20A and RW-21A, which were temporarily shut down with USEPA approval since 2007, were turned back on. The 2010 target and annual average rates are provided in Table 3. Monthly average rates are shown in Table 4. The well pumps were adjusted frequently during the year to meet or exceed their target extraction rates.

3.2 Air/Vapor Intrusion

The USEPA issued a ROD amendment on August 16, 2010 to address vapor intrusion. The MEW parties continued to work with the USEPA and local entities to implement the ROD amendment during 2010.

3.3 Annual Settlement Survey

An annual soil settlement survey was performed on December 7 and 8, 2010. 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 ground settlement in the MEW Area. A qualified geotechnical engineer 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. Additional information on the settlement survey can be found in the RGRP 2010 Annual Progress Report (Geosyntec, 2011b).

4. PROBLEMS ENCOUNTERED

Section 2.2 summarizes all non-routine operations and maintenance (O&M) events that occurred at the Building 9 extraction wells. No other problems related to Building 9 were encountered.

5. TECHNICAL ASSESSMENT

The following assessment of the groundwater remedy performance for Building 9 was made on the basis of data collected through 2010.

- The remedy is functioning as intended. The Building 9 Site remedy continues to function as planned. The 2010 Annual Report Remedy Performance Checklist for the Site, and four other former Fairchild facilities, is included in Appendix A.
- Plume capture is achieved. Groundwater elevations, estimated captures zones, and chemical monitoring results from 2010 demonstrate that the four extraction wells at the Site continue to achieve target capture as indicated by calculated capture widths, graphical flow net analysis, and chemical concentration trends.
- The vertical gradients inside the slurry walls and gradients across slurry walls are variable. Inward gradients are routinely observed at the upgradient and crossgradient well pairs (123A/122A and 138A/137A, respectively). Upward gradients are consistently observed in vertical well pair 69B1/37A. The downgradient well pair, 126A/35A, has exhibited a slight outward gradient since 2007. In November 2010, inward gradients were observed. This change in gradient direction is attributed to turning on extraction wells RW-20A and RW-21A in May 2010. The slurry wall continues to provide an effective barrier to groundwater flow and VOC migration.
- TCE concentrations are decreasing over time. Chemical concentration trends in Building 9 wells within and downgradient of the slurry wall indicate generally stable or declining concentrations over time as indicated by inspection of concentration-time plots in Appendix D and Table 6. Current concentrations are below historical VOC concentrations for this area, and TCE isopleths indicate an overall reduction in VOC magnitude.

6. CONCLUSIONS AND RECOMMENDATIONS

The Building 9 remedy is functioning as intended. Capture snapshots from March and November 2010 meet the target capture area inside the Building 9 slurry wall as indicated by converging lines of evidence, including graphical flow net analysis, capture zone width calculations, and TCE concentration trends.

7. UPCOMING WORK IN 2011 AND PLANNED FUTURE ACTIVITIES

Activities for 2011 include the following:

- Continuing groundwater extraction and monitoring activities; and
- Continued coordination with USEPA on the August 2010 ROD amendment for vapor intrusion and activities related to the groundwater focused feasibility study.

The effectiveness and progress of Building 9 remedial actions during 2011 will continue to be evaluated using data generated from operation, maintenance, and monitoring activities in accordance with the Site monitoring and reporting schedule. All activities will be documented in the 2011 Annual Progress Report, which will be submitted to the USEPA by June 15, 2012.

8. REFERENCES

AMEC Geomatrix, Inc. 2011. *Annual Progress Report—2010, Facility Specific Work, 405 National Avenue, Mountain View, California*, April 15.

Canonie Environmental (Canonie), 1986a. *Pumping Test Interim Remedial Program, Mountain View Facility, Prepared for Fairchild Semiconductor Corporation,* January 1986.

Canonie, 1986b. P*umping Test for Wells 69A, 73A, 82A, 83A, 47B1, 17B2, 29B3, 58B3, Moffett Field,* Prepared for Harding Lawson Associates, March 1986.

Canonie, 1987. *Addendum to Technical Memorandum: Short- and Long-Term Aquifer Tests, Remedial Investigation Feasibility Study, Middlefield-Ellis-Whisman Study Area, Mountain View, California,* March 1987.

Canonie, 1988. *Draft Feasibility Study, Middlefield-Ellis-Whisman Area, Mountain View, California,* November 1988.

Canonie, 1993. *Plume Definition Program, Middlefield-Ellis-Whisman Site, Mountain View, California,* March 1993.

Canonie, 1994. *Revised Final Source Control Remedial Design, Fairchild Semiconductor Corporation, 515 and 545 North Whisman Road and 313 Fairchild Drive, Buildings 1, 2, 3, and 4, Middlefield-Ellis-Whisman Site, Mountain View, California,* November 1994.

Canonie, 1995. *Construction Operation and Maintenance Plan, Fairchild Semiconductor Corporation, 515 and 545 North Whisman Road and 313 Fairchild Drive, Buildings 1, 2, 3, and 4, Middlefield-Ellis-Whisman Site, Mountain View, California,* February 1995.

Geomatrix Consultants, Inc. (Geomatrix), 2004. *Revised Report, Aquifer Test and Off-Site B2 Source Control Evaluation, 401/405 National Avenue, Mountain View, California*, August 2004.

Geosyntec Consultants (Geosyntec, et al) 2008a. *Optimization Evaluation, Fairchild Sites, Middlefield-Ellis-Whisman Area, Mountain View, California,* September 3, 2008

Geosyntec et al, 2008b. *Optimization Evaluation, Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Area, Mountain View, California*, September 3, 2008.

Geosyntec, 2010. Letter from Nancy T. Bice to Ms. Alana Lee/USEPA, regarding *Addendum to 3 September 2008 Optimization Evaluation Fairchild Sites, Middlefield-Ellis-Whisman Study Area, Mountain View, California*, April 28, 2010.

Geosyntec, 2011a. *Draft Conceptual Site Model, Middlefield-Ellis-Whisman Regional Groundwater Remediation Program, Mountain View, California,* February 4, 2011.

Geosyntec, 2011b. *2010 Annual Progress Report for Middlefield-Ellis-Whisman Study Area, Regional Groundwater Remediation Program Mountain View, California*, June 15, 2011.

Harding Lawson Associates (HLA), 1986. Vol. 1, *Technical Memorandum, Short-and Long-Term Aquifer Tests, Middlefield-Ellis-Whisman Area, Mountain View, California*, April 14, 1986.

HLA, 1987. *Remedial Investigation Report, Remedial Investigation/Feasibility Study, Middlefield-Ellis-Whisman Area, Mountain View, California,* Vol. 1-8, July 1987 (revised in 1988).

Javandel I., and C.F. Tsang, 1986. *Capture-zone type curves: A tool for aquifer cleanup*. Ground Water 24(5) 616-625, 1986.

Intel, 1987. *Remedial Investigation/Endangerment Assessment/Feasibility Study, Intel Mountain View Facility, Mountain View, California*; prepared by Geraghty & Miller, Inc., Intel Corporation, and Allen Hatheway, 1987.

Locus Technologies (Locus), 1997. *Confirmatory Soil Sampling Report, Area 3, Fairchild Semiconductor Corporation, 401 National Avenue, Building 9, Mountain View, California,* July 15, 1997.

Locus, 1998. *DW3-219 Pumping Test, Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Site, Mountain View, California*, December 1998.

Navy, 2005. *West-Side Aquifers Treatment System Optimization Completion Report,* prepared by Tetra Tech FW, Inc., DCN No. FWSD-RAC-05-1106, Revision 0, May 17, 2005.

PRC, 1991. *Draft Technical Memorandum, Geology and Hydrogeology, Naval Air Station Moffett Field, California,* Prepared for Department of the Navy, Engineering Field Activity West, December 11, 1991.

RMT, 2003. *Revised Operation and Maintenance Manual, 515 and 545 North Whisman Road – System 1, 313 Fairchild Drive – System 3, Mountain View, California,* November 14, 2003.

Smith Technology Corporation (Smith), 1997a. *Confirmatory Soil Sampling Report, Area 1, Fairchild Semiconductor Corporation, 401 National Avenue, Building 9, Mountain View, California*, March 6, 1997.

Smith, 1997b. *Confirmatory Soil Sampling Report, Area 2, Fairchild Semiconductor Corporation, 401 National Avenue, Building 9, Mountain View, California,* April 24, 1997.

United States Environmental Protection Agency, 1989. *Record of Decision, Fairchild, Intel, and Raytheon Sites, Middlefield-Ellis-Whisman Study Area, Mountain View, California,* Superfund Records Center Document No. 2807-02332, May 1989.

USEPA, 1990a. EPA, Region 9, (106 Order) Docket No. 91-04. *Administrative Order for Remedial Design and Remedial Action in the Matter of the MEW Study Area,* Proceedings under Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Reauthorization Act of 1986 (42 U.S.C. Sections 9606(a), November 29, 1990.

USEPA, 1990b. *EPA Superfund Explanation of Significant Differences: Middlefield-Ellis-Whisman Study Area, Mountain View, CA*, September 1, 1990.

USEPA, 1996. EPA Superfund Explanation of Significant Differences: Middlefield-Ellis-Whisman Study Area, Mountain View, CA, April 16, 1996.

USEPA, 2004. *Final First Five Year Review Report for the Middlefield-Ellis-Whisman Study Area, Mountain View, California, Region 9 San Francisco, California*, September 2004.

USEPA, 2005. *Required Content for Annual Progress Reports*, distributed by Alana Lee to the MEW distribution list via email on May 6, 2005.

USEPA, 2007. E-mail from Alana Lee/USEPA, to Maile Smith/Northgate Environmental Management, Inc., regarding temporary approval to turn off selected extractions wells as part of Slurry wall evaluation Study. August 2, 2007.

USEPA 2008. *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* EPA/600/R-08/003. January 2008.

USEPA, 2009. *Final Second Five-Year Review Report Middlefield-Ellis-Whisman (MEW) Superfund Study Area Mountain View, California.* Region 9 San Francisco, September 2009.

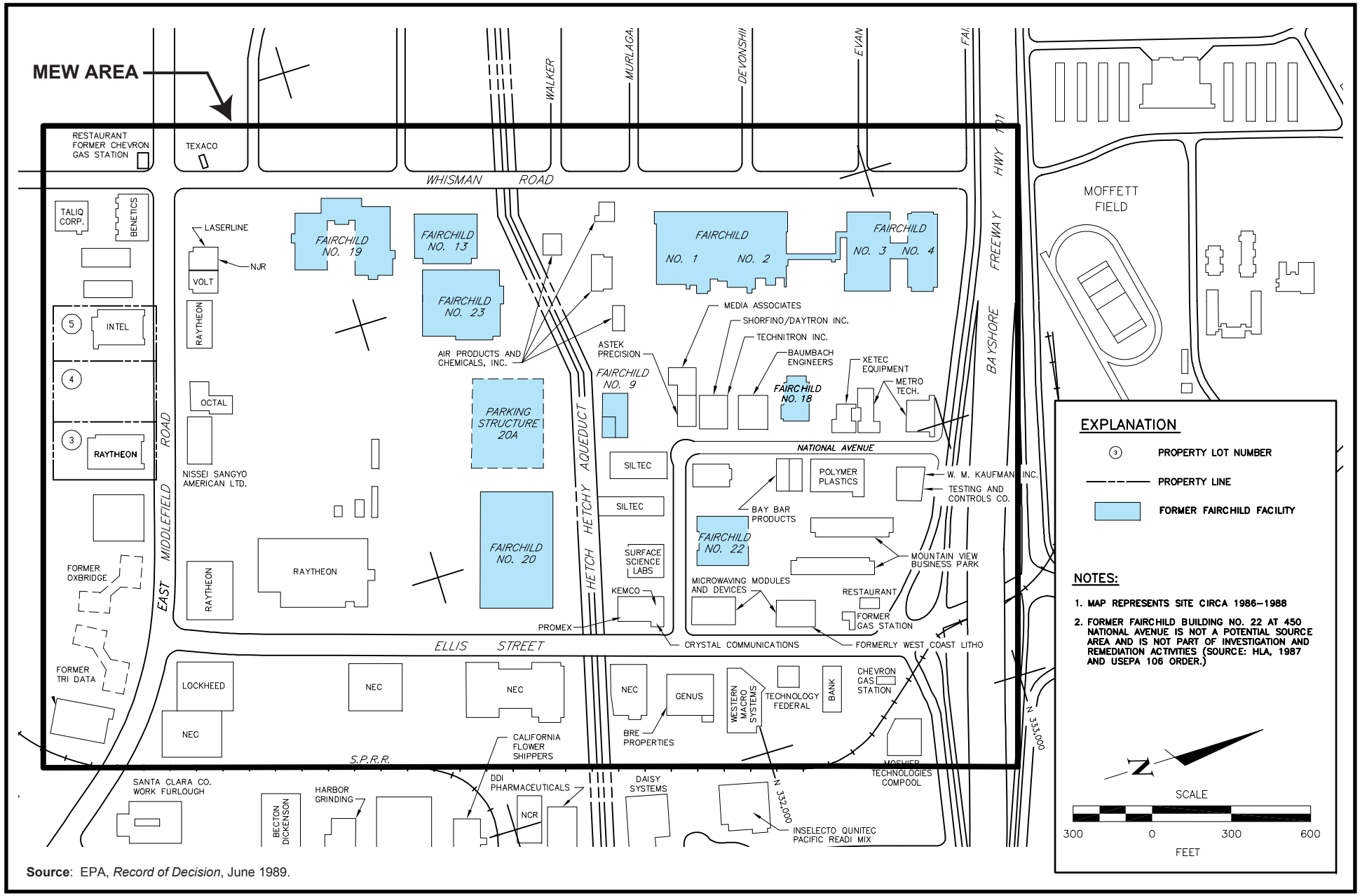
Weiss Associates (Weiss), 1995. *VOC Transport Report for Intel Mountain View, 365 Middlefield Road, Mountain View, California,* July 6, 1995.

Weiss, 2005 *Work Plan for Enhanced In-Situ Bioremediation Pilot Test for Intel Mountain View,* May 24, 2005

Weiss, 2011. *2010 Annual Progress Report for Former Fairchild Buildings 1-4, 515/545 Whisman Road and 313 Fairchild Drive, Middlefield-Ellis-Whisman Study Area, Mountain View, California,* June 15, 2011.

FIGURES

Figure 1. Site Location, MEW Area, Mountain View, California



Source: EPA, *Record of Decision*, June 1989.

Figure 2. Previous Building Configurations, Former Fairchild Facilities, MEW Area, Mountain View, California

MEW Area

Former Fairchild Building 9 Slurry Wall

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

Fairchild System 3
Former Fairchild Buildings 1 through 4 Site
RGRP - South
Fairchild System 1
126A
35A
69B1
36A
41A
42A
44A
43A
AE/RW-9-1
37A
AE/RW-9-2
40A
RW-21A
122A
137A
138A
123A
RW-20A
Fairchild System 19
Former Fairchild Building 19 Site
Raytheon Site
Raytheon System

0 300 600 900 Feet

Explanation

Extraction and Monitoring Wells at Building 9
- Source Control Recovery Well, On
- Regional Recovery Well, On
- Monitoring Well
- Source Control Recovery Well, Off
- Regional Recovery Well, Off

Extraction and Monitoring Wells in the Vicinity
- Regional Recovery Well, On
- Source Control Recovery Well, On
- Regional Recovery Well, Off
- Source Control Recovery Well, Off
- Monitoring Well

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

Figure 3

Site Map and Well Network
Former Fairchild Building 9
401 National Avenue,
Mountain View, California

Weiss Associates
Environmental Science, Engineering, and Management Services

T:\MEW\Maps\AnnRpt\draft2010\BdIg18SiteMapWellNetWrk.mxd

12-May-2011

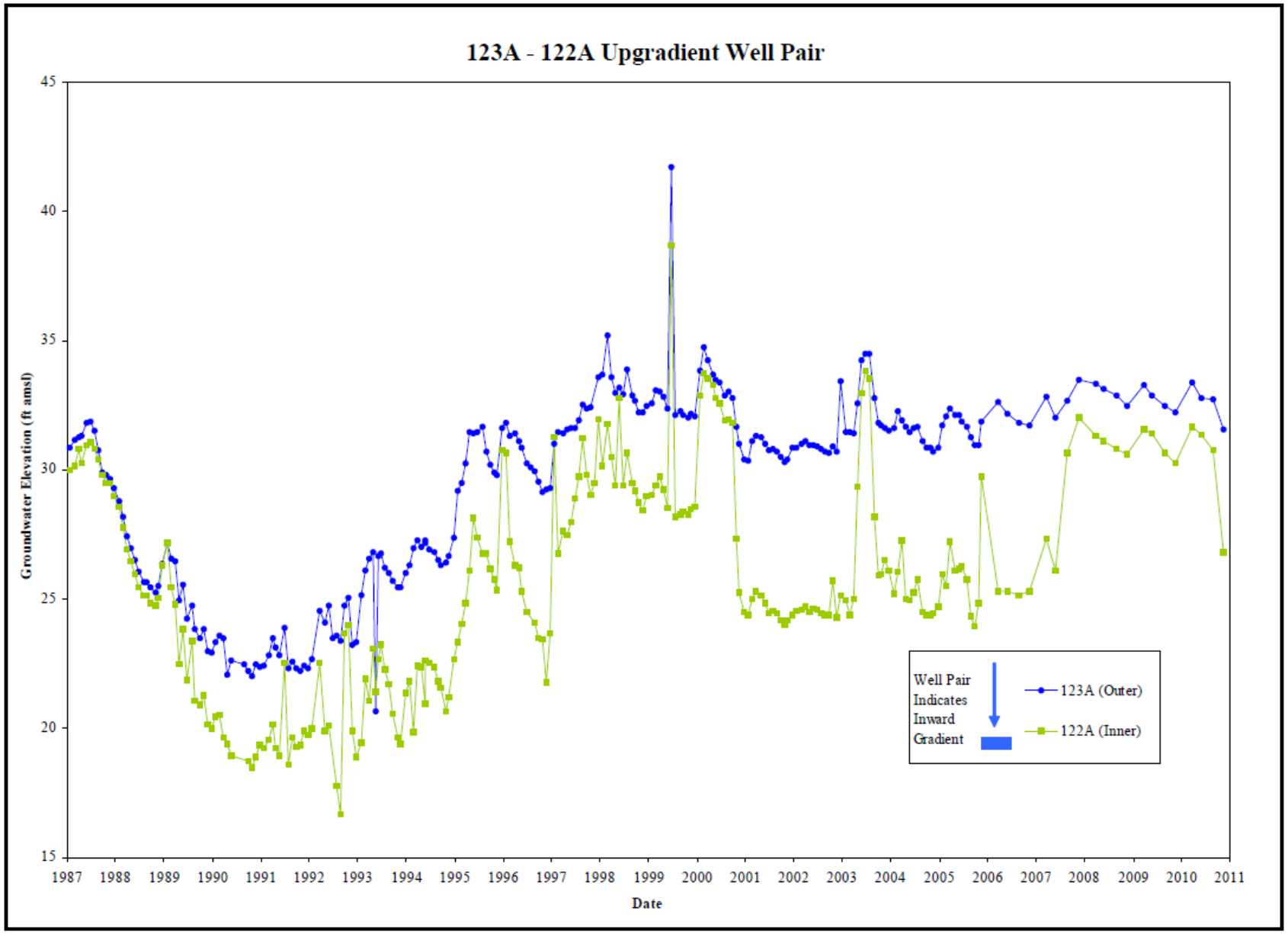


Figure 4. Hydrographs – Groundwater Elevation Measurements, Slurry Wall Well Pair – Upgradient Wells, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

R:\Schlumberger\02-MEW Fairchild\Reports\Bldg 9\2010\Figures\Figure 4.doc

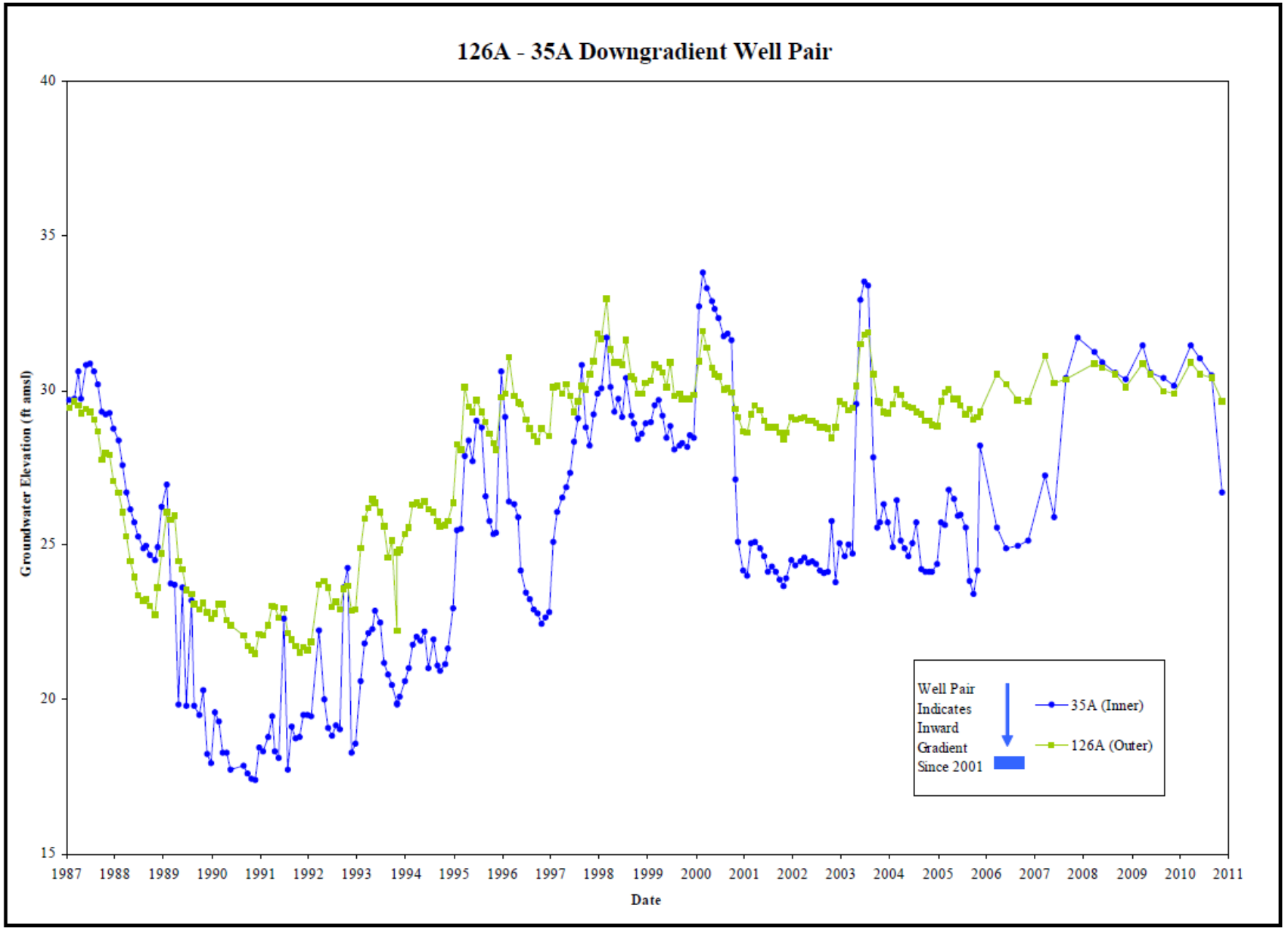


Figure 5. Hydrographs – Groundwater Elevation Measurements, Slurry Wall Well Pairs – Downgradient Wells, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

R:\Schlumberger\02-MEW Fairchild\Reports\Bldg 9\2010\Figures\Figure 5.doc

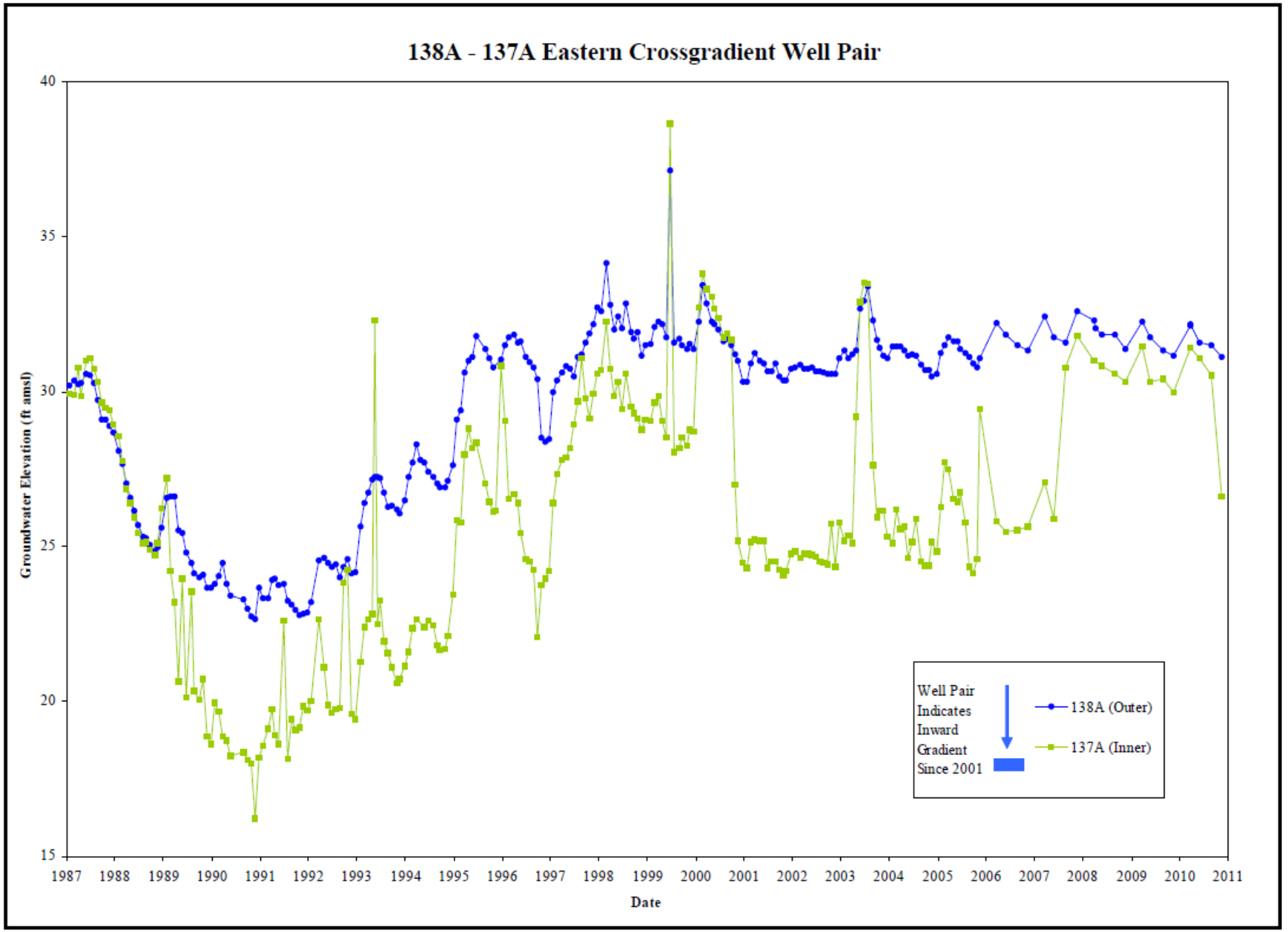


Figure 6. Hydrographs – Groundwater Elevation Measurements, Slurry Wall Well Pairs – Crossgradient Wells, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

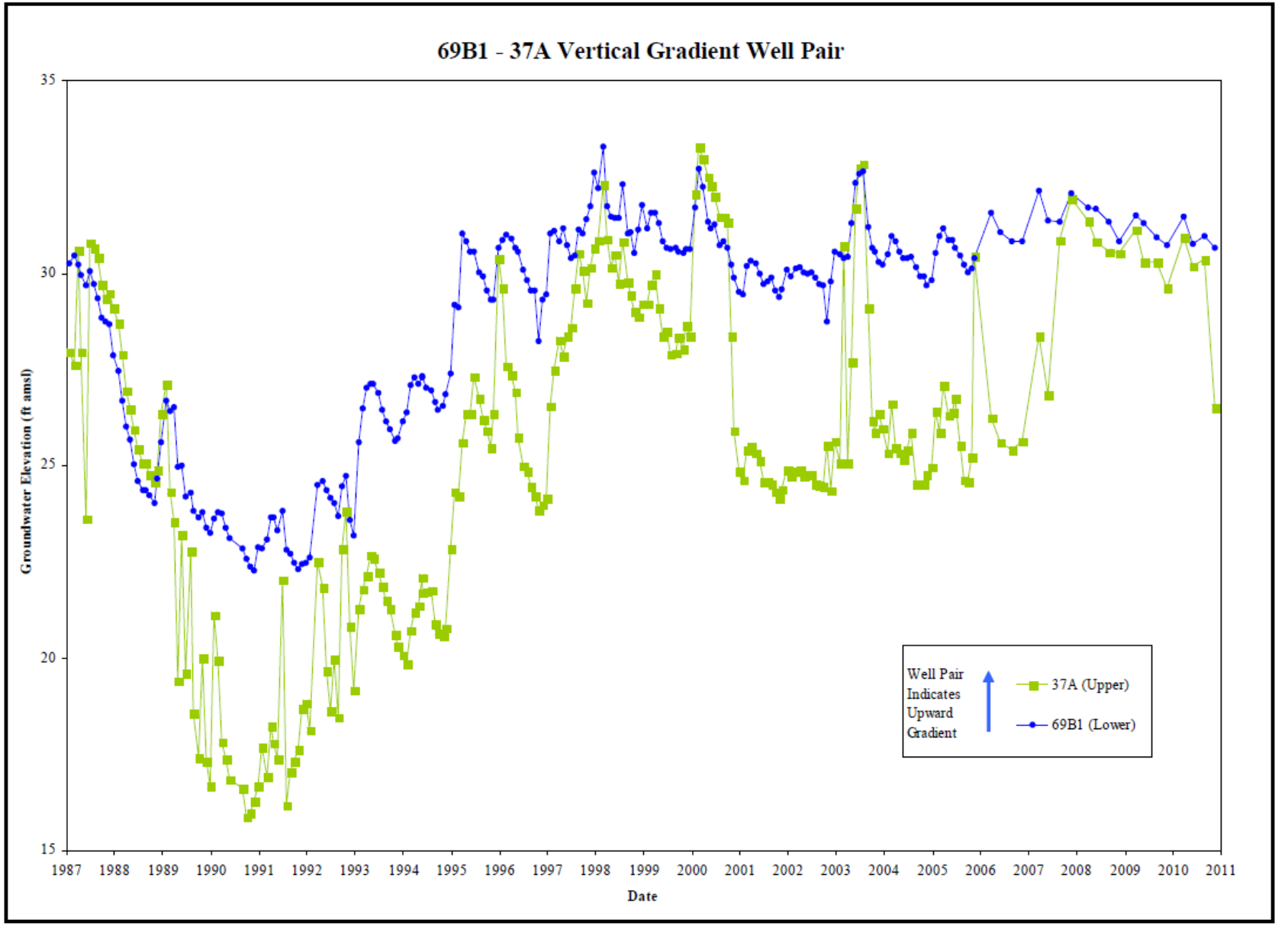


Figure 7. Hydrographs – Groundwater Elevation Measurements, Slurry Wall Well Pairs – Vertical Gradient Wells, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

R:\Schlumberger\02-MEW Fairchild\Reports\Bldg 9\2010\Figures\Figure 7.doc

Buildings 1 through 4 Slurry Wall

Former Fairchild
Building 9 Slurry Wall

National Ave

126A
35A
36A
37A
41A
42A
44A
43A
40A
AE/RW-9-1
(4.9)
AE/RW-9-2
(1.9)
RW-21A
RW-20A
122A
123A
137A
138A

28 29 30 31 32 33 34 35 36 37 41

Explanation

Extraction and Monitoring Wells at Building 9

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

Extraction and Monitoring Wells in the Vicinity

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

- Estimated Capture Zone, March 2010
- Groundwater Elevation Index 5 ft Contour
- Groundwater Elevation Intermediate 1 ft Contour
- Slurry Wall
- Building
- Road
- Slurry Wall Well Pair and Gradient Direction

(4.9) = Average pumping rate in gallons per minute for the period between March 24-31, 2010

Note:
Groundwater elevation contours based on MEW Regional data presented in the 2010 Annual Report (Geosyntec 2011b).
Captures are shown for wells specific to Building 9.
There are no target captures for wells inside slurry walls before the slurry walls define the target capture.
126A/35A flow gradient was outward in March, but inward in Nov 2010.

N

0 50 100 150 Feet

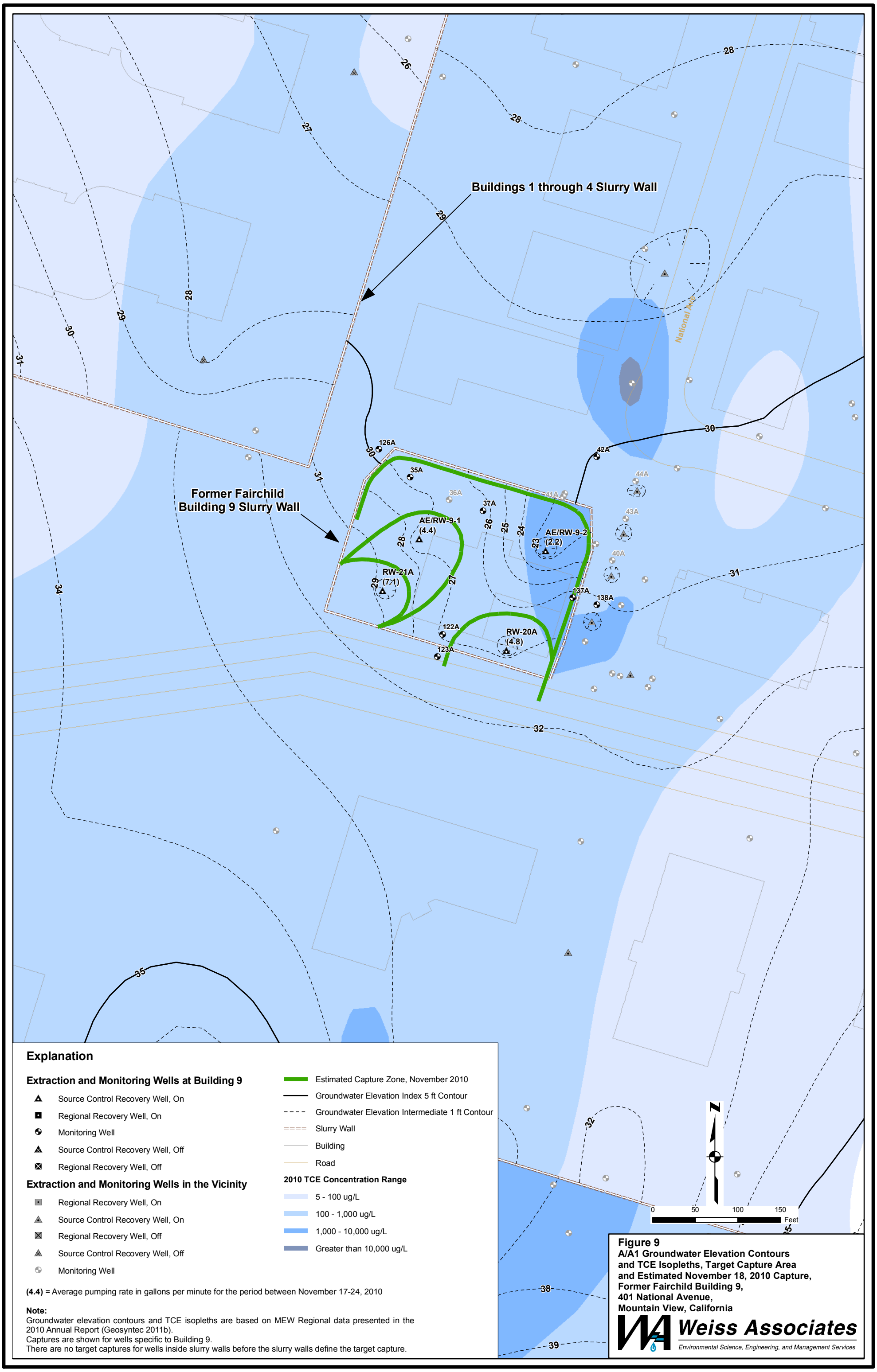
Figure 8

A/A1 Groundwater Elevation Contours, Target Capture Area and Estimated March 25, 2010 Capture, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Weiss Associates
Environmental Science, Engineering, and Management Services

T:\MEW\Maps\AnnRpt\draft2010\Bdlg9CaptureZonesAA1_mar.mxd

17-May-2011



Explanation

Extraction and Monitoring Wells at Building 9

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

Extraction and Monitoring Wells in the Vicinity

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

- Estimated Capture Zone, November 2010
- Groundwater Elevation Index 5 ft Contour
- Groundwater Elevation Intermediate 1 ft Contour
- Slurry Wall
- Building
- Road

2010 TCE Concentration Range

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

(4.4) = Average pumping rate in gallons per minute for the period between November 17-24, 2010

Note:
Groundwater elevation contours and TCE isopleths are based on MEW Regional data presented in the 2010 Annual Report (Geosyntec 2011b).
Captures are shown for wells specific to Building 9.
There are no target captures for wells inside slurry walls before the slurry walls define the target capture.

Figure 9
A/A1 Groundwater Elevation Contours and TCE Isopleths, Target Capture Area and Estimated November 18, 2010 Capture, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Weiss Associates
Environmental Science, Engineering, and Management Services

T:\MEW\Maps\AnnRpt\draft2010\Bdlg9CaptureZonesAA1_nov.mxd

17-May-2011

TABLES

Table 1. Extraction and Monitoring Well Details, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Well Details	Date Installed	Zone[a]	Reference Elevation[b] (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	09/24/86	A	44.23	4	38	28	38	18	39	Mon
123A	09/25/86	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	10/16/86	A	43.68	4	36	34	36	32	38	Mon
138A	10/17/86	A	43.60	4	37	34	37	32	38	Mon
35A	02/20/82	A	42.67	2	37	12	37	12	37	Mon
36A	02/20/82	A	42.32	2	40	35	40	15	40	Mon
37A	02/18/82	A	43.21	2	30	15	30	12	30	Mon
40A	04/08/82	A	43.44	2	27	11.5	27	12	27	Mon
41A	02/26/82	A	42.40	2	25	13	25	13	25	Mon
42A	02/01/82	A	42.97	2	35	10	35	12	35	Mon
43A	02/26/82	A	43.38	2	27	15	27	15	27	Mon
44A	04/07/82	A	43.13	2	28	13.5	28	13.5	28	Mon
AE/RW-9-1	09/13/95	A	43.15	6	33	8	33	6	36	Ext
AE/RW-9-2	09/13/95	A	43.85	6	37	8	37	6	38	Ext
RW-20A	12/09/97	A	43.57	8	37.5	26.5	36.5	11	38	Ext
RW-21A	12/07/87	A	43.16	6	37	21	36	11	38	Ext
69B1	12/17/87	B1	42.62	4	59	54	59	50	61	Mon

Notes:

General Notes:

Wells Associated with the Building 9 Site are shown in **bold**. All are shown in Figure 3.

Water levels for extraction wells are taken from a 2" piezometer located next to the well.

Referenced Notes:

a = The letter in the well ID identifies each well's respective water-bearing zone. There are six designated water-bearing zones in the MEW area: A, B1, B2, B3, C, and deep groundwater (DW).

b = Reference Elevations are in National Geodetic Vertical Datum from 1929 (NGVD 29).

Abbreviations:

amsl = above mean sea level

btoc = below top-of-casing

Ext = extraction well

ft = feet

Mon = monitoring well

Table 2. 2010 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[a]			S		S			S			S	
123A			S		S			S			S	
126A[b]			S		S			S			1, S	
137A[b]			S		S			S			1, S	
138A			S		S			S			1, S	
35A[a]			S		S			S			S	
36A[b]			WL								1, WL	
37A			S		S			S			1, S	
40A[b]			WL								1, WL	
41A[b]			WL								1, WL	
42A			WL								1, WL	
43A[b]			WL								1, WL	
44A[b]			WL								1, WL	
AE/RW-9-1			WL								1, WL	
AE/RW-9-2			WL								1, WL	
RW-20A			WL								1, WL	
RW-21A			WL								1, WL	
69B1			S		S			S			S	
USEPA Annual Progress Report						6/15/2010						

Notes:

General Notes:

Wells Associated with the Building 9 Site are shown in **bold**. All are shown in Figure 3.

Standard observations were recorded whenever a sample was collected for chemical analysis, including field analysis for pH, temperature, conductivity, DO, and ORP.

Referenced Notes:

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

b = Sampling of well is not required. Voluntary sampling was performed for slurry wall evaluations and plume monitoring.

1 = USEPA Method 8260 for Halogenated VOCs using 8010 MS parameters.

S = Slurry wall water levels measured on March 25, May 27, August 26, and November 18, 2010.

WL = Water levels measured on March 25 and November 18, 2010.

Abbreviations:

DO = dissolved oxygen

MEW RGRP = Middlefield Ellis Whisman Regional Groundwater Remediation Program

ORP = oxidation reduction potential

USEPA = United States Environmental Protection Agency

VOCs = volatile organic compounds

Table 3. Monthly Average Flow Rates, January through December 2010, 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	4.79	1.10	5.89
February	0	0	5.06	0.79	5.85
March	0	0	4.78	1.21	5.99
April	0	0	3.95	2.34	6.29
May	2.11	3.41	4.14	2.20	11.86
June	4.20	6.67	3.94	1.87	16.68
July	4.42	6.95	4.19	1.83	17.39
August	4.44	6.72	4.02	1.43	16.61
September	4.70	6.85	3.95	1.96	17.46
October	4.14	6.68	3.86	1.98	16.66
November	4.46	6.58	4.00	1.72	16.76
December	4.46	6.50	4.03	2.08	17.07

Note:

All extraction wells are plumbed to Fairchild System 1.

Table 4. Monthly Extraction Totals, January through December 2010, 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	199,995	45,869	245,864
February	0	0	204,108	31,977	236,085
March	0	0	240,997	61,182	302,179
April	0	0	159,069	94,167	253,236
May	84,948	137,332	166,946	88,852	478,078
June	211,836	336,197	198,425	94,172	840,630
July	178,123	280,115	168,926	73,761	700,925
August	210,961	319,403	190,916	67,965	789,245
September	202,979	295,774	170,786	84,480	754,019
October	166,729	269,232	155,749	79,799	671,509
November	179,778	265,351	161,215	69,401	675,745
December	224,833	327,834	202,971	104,994	860,632

Note:
All extraction wells are plumbed to Fairchild System 1.

Table 5. Groundwater Elevations, Slurry Wall Well Pairs, January 2006 through December 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Date	Well ID (outer or lower)	Groundwater Elevation (ft amsl)	Well ID (inner or upper)	Groundwater Elevation (ft amsl)	Difference (ft)	Inward/Outward Upward/Downward[1]
Southern Wall - Upgradient Well Pairs						
03/23/06	123A	32.62	122A	25.30	7.32	Inward
05/25/06	123A	32.18	122A	25.31	6.87	Inward
08/24/06	123A	31.80	122A	25.16	6.64	Inward
11/16/06	123A	31.72	122A	25.31	6.41	Inward
03/22/07	123A	32.81	122A	27.31	5.50	Inward
05/24/07	123A	32.01	122A	26.13	5.88	Inward
08/23/07	123A	32.66	122A	30.68	1.98	Inward
11/15/07	123A	33.46	122A	32.03	1.43	Inward
03/27/08	123A	33.31	122A	31.31	2.00	Inward
05/22/08	123A	33.14	122A	31.13	2.01	Inward
08/28/08	123A	32.87	122A	30.82	2.05	Inward
11/20/08	123A	32.47	122A	30.59	1.88	Inward
03/26/09	123A	33.28	122A	31.59	1.69	Inward
05/21/09	123A	32.90	122A	31.42	1.48	Inward
08/27/09	123A	32.47	122A	30.68	1.79	Inward
11/19/09	123A	32.22	122A	30.25	1.97	Inward
03/25/10	123A	33.40	122A	31.66	1.74	Inward
05/27/10	123A	32.78	122A	31.35	1.43	Inward
08/26/10	123A	32.71	122A	30.75	1.96	Inward
11/18/10	123A	31.59	122A	26.83	4.76	Inward
NorthWest Corner - Downgradient Well Pairs						
03/23/06	126A	30.52	35A	25.56	4.96	Inward
05/25/06	126A	30.18	35A	24.88	5.30	Inward
08/24/06	126A	29.70	35A	24.99	4.71	Inward
11/16/06	126A	29.64	35A	25.14	4.50	Inward
03/22/07	126A	31.12	35A	27.23	3.89	Inward
05/24/07	126A	30.25	35A	25.89	4.36	Inward
08/23/07	126A	30.36	35A	30.39	-0.03	Outward
03/27/08	126A	30.87	35A	31.23	-0.36	Outward
05/22/08	126A	30.73	35A	30.93	-0.20	Outward
08/28/08	126A	30.55	35A	30.57	-0.02	Outward
11/20/08	126A	30.10	35A	30.37	-0.27	Outward
03/26/09	126A	30.87	35A	31.45	-0.58	Outward
05/21/09	126A	30.51	35A	30.56	-0.05	Outward
08/27/09	126A	29.97	35A	30.42	-0.45	Outward
11/19/09	126A	29.92	35A	30.15	-0.23	Outward
03/25/10	126A	30.89	35A	31.47	-0.58	Outward
05/27/10	126A	30.54	35A	31.03	-0.49	Outward
08/26/10	126A	30.41	35A	30.47	-0.06	Outward
11/18/10	126A	29.64	35A	26.70	2.94	Inward

Table 5. Groundwater Elevations, Slurry Wall Well Pairs, January 2006 through December 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Date	Well ID (outer or lower)	Groundwater Elevation (ft amsl)	Well ID (inner or upper)	Groundwater Elevation (ft amsl)	Difference (ft)	Inward/Outward Upward/Downward[1]
Eastern Wall - Crossgradient Well Pairs						
03/23/06	138A	32.23	137A	25.82	6.41	Inward
03/23/06	138A	32.10	137A	25.82	6.28	Inward
05/25/06	138A	31.84	137A	25.48	6.36	Inward
08/24/06	138A	31.49	137A	25.53	5.96	Inward
11/16/06	138A	31.31	137A	25.65	5.66	Inward
11/16/06	138A	31.34	137A	25.65	5.69	Inward
03/22/07	138A	32.44	137A	27.10	5.34	Inward
05/24/07	138A	31.77	137A	25.90	5.87	Inward
08/23/07	138A	31.57	137A	30.78	0.79	Inward
11/15/07	138A	32.58	137A	31.81	0.77	Inward
03/27/08	138A	32.30	137A	31.00	1.30	Inward
05/22/08	138A	31.85	137A	30.83	1.02	Inward
08/28/08	138A	31.83	137A	30.58	1.25	Inward
11/20/08	138A	31.33	137A	30.31	1.02	Inward
11/20/08	138A	31.37	137A	30.31	1.06	Inward
03/26/09	138A	32.26	137A	31.47	0.79	Inward
03/26/09	138A	31.11	137A	31.47	-0.36	Outward
05/21/09	138A	31.73	137A	30.34	1.39	Inward
08/27/09	138A	31.33	137A	30.42	0.91	Inward
11/19/09	138A	31.17	137A	29.97	1.20	Inward
11/19/09	138A	31.16	137A	29.97	1.19	Inward
03/25/10	138A	32.15	137A	31.43	0.72	Inward
05/27/10	138A	31.60	137A	31.09	0.51	Inward
08/26/10	138A	31.51	137A	30.52	0.99	Inward
11/18/10	138A	31.10	137A	26.61	4.49	Inward
11/18/10	138A	30.90	137A	26.61	4.29	Inward
Vertical Gradient Well Pairs						
03/23/06	69B1	31.55	37A	26.23	5.32	Upward
05/25/06	69B1	31.07	37A	25.60	5.47	Upward
08/24/06	69B1	30.84	37A	25.39	5.45	Upward
11/16/06	69B1	30.83	37A	25.63	5.20	Upward
03/22/07	69B1	32.14	37A	28.37	3.77	Upward
05/24/07	69B1	31.36	37A	26.84	4.52	Upward
08/23/07	69B1	31.32	37A	30.87	0.45	Upward
11/15/07	69B1	32.08	37A	31.95	0.13	Upward
03/27/08	69B1	31.69	37A	31.37	0.32	Upward
05/22/08	69B1	31.66	37A	30.81	0.85	Upward
08/28/08	69B1	31.34	37A	30.56	0.78	Upward
11/20/08	69B1	30.82	37A	30.51	0.31	Upward
03/26/09	69B1	31.49	37A	31.12	0.37	Upward
05/21/09	69B1	31.30	37A	30.27	1.03	Upward

Table 5. Groundwater Elevations, Slurry Wall Well Pairs, January 2006 through December 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Date	Well ID (outer or lower)	Groundwater Elevation (ft amsl)	Well ID (inner or upper)	Groundwater Elevation (ft amsl)	Difference (ft)	Inward/Outward Upward/Downward[1]
Vertical Gradient Well Pairs						
08/27/09	69B1	30.92	37A	30.29	0.63	Upward
11/19/09	69B1	30.72	37A	29.60	1.12	Upward
03/25/10	69B1	31.47	37A	30.94	0.53	Upward
05/27/10	69B1	30.76	37A	30.20	0.56	Upward
08/26/10	69B1	30.96	37A	30.36	0.60	Upward
11/18/10	69B1	30.66	37A	26.50	4.16	Upward

Notes:

[1] = Inward/Outward indicates horizontal groundwater flow gradient into or out of the slurry wall, and Upward/Downward indicates vertical groundwater flow gradient to upper or lower groundwater zones.

Abbreviations:

ft = feet
ft amsl = feet above mean sea level
inner = well inside slurry wall
outer = well outside slurry wall
upper = shallower well inside slurry wall
lower = deeper well inside slurry wall

Table 6. Groundwater Sampling Results Summary, January 2006 through December 2010, 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 VOCs	1,4-Dioxane
			<				µg/L									>
35A	11/13/07	CT/8260	<1.0	34	<0.5	22	420	4.3	11	<20	<0.5	5.9	370	9.7	877.7	---
36A	11/13/07	CT/8260	<5.0	18	<2.5	7.3	360	6.4	<2.5	<100	<2.5	45	160	<2.5	596.7	---
36A	12/11/08	CT/8260	<3.3	20	<1.7	9.2	370	3	4	<67	<1.7	21	110	<1.7	537.2	---
36A	11/17/09	CT/8260	<1.0	7.2	<0.5	7.5	490	3.9	2.2	<20	<0.5	2	98	1.6	613.1	---
36A	11/12/10	CT/8260	<5.0	4.9	<2.5	5.9	380	7.7	<10	<10	<2.5	<2.5	150	<2.5	548.5	---
37A	11/13/07	CT/8260	<50	1,100	<25	610	1,100	<25	98	<1000	<25	2,700	2,900	78	8586	---
37A	12/11/08	CT/8260	<25	3,000	<13	610	2,000	20	140	<500	<13	2,600	2,300	280	10950	---
37A	11/17/09	CT/8260	<1.0	18	<0.5	17	140	1.9	7.5	<20	<0.5	160	300	1.9	646.3	---
37A	11/12/10	CT/8260	<4.0	10	<2.0	9.1	110	3	<8.0	<8.0	<2.0	61	270	<2.0	463.1	---
40A	11/14/06	CT/8260	<14	7.7	<7.1	<7.1	140	13	51	<290	<7.1	12	960	<7.1	1183.7	---
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	941.5	---
40A	11/07/08	CT/8260	<20	<10	<10	<10	150	<10	20	<400	<10	11	1,000	<10	1181	---
40A	11/17/09	CT/8260	<1.0	6.3	<0.5	11	310	4.3	22	<20	<0.5	9.4	1,100	30	1493	---
40A	11/12/10	CT/8260	<10	6.7	<5.0	10	140	<5.0	23	<20	<5.0	8.8	790	8.3	986.8	---
41A	11/16/10	CT/8260	<2.5	<1.3	<1.3	<1.3	59	1.3	<5.0	<5.0	<1.3	<1.3	240	2.9	303.2	---
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	565.9	---
42A	11/14/07	CT/8260	<5.0	3.6	<2.5	3.1	55	<2.5	15	<100	3.5	5.6	430	<2.5	515.8	---
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	463.7	---
42A	11/24/09	CT/8260	<5.0	3.6	<2.5	<2.5	49	3.9	12	<100	<2.5	6.1	430	<2.5	504.6	---
42A	12/02/10	CT/8260	<3.3	3	<1.7	2.3	47	<1.7	<6.7	<6.7	<1.7	2.9	250	<1.7	305.2	---
43A	11/08/06	CT/8260	<4.0	2.5	<2.0	3	58	<2.0	8.4	<80	<2.0	4.3	350	<2.0	426.2	---
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	611.6	---
43A	11/07/08	CT/8260	<6.3	4.5	<3.1	3.9	72	<3.1	12	<130	<3.1	6.8	390	<3.1	489.2	---
43A	11/16/09	CT/8260	<5.0	5.6	<2.5	4.4	88	4.5	11	<100	<2.5	6.7	320	<2.5	440.2	---
43A	11/12/10	CT/8260	<4.0	4.7	<2.0	5.1	65	<2.0	11	<8.0	<2.0	5.5	330	<2.0	421.3	---
44A	11/08/06	CT/8260	<6.3	<3.1	<3.1	3.6	100	<3.1	23	<130	3.5	3.4	730	<3.1	863.5	---
44A	11/12/07	CT/8260	<10	<5.0	<5.0	<5.0	93	<5.0	7.8	<200	<5.0	<5.0	560	<5.0	660.8	---

Table 6. Groundwater Sampling Results Summary, January 2006 through December 2010, 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 VOCs	1,4-Dioxane
			< µg/L >													
44A	11/07/08	CT/8260	<7.1	<3.6	<3.6	<3.6	40	<3.6	7	<140	<3.6	5	450	<3.6	502	---
44A	11/16/09	CT/8260	<6.3	4.4	<3.1	3.4	54	<3.1	<13	<130	<3.1	5.2	360	<3.1	427	---
44A	11/12/10	CT/8260	<5.0	4.4	<2.5	5.3	120	2.6	<10	<10	<2.5	4.1	440	5.2	581.6	---
122A	11/13/07	CT/8260	<1.0	71	<0.5	17	120	1.7	6.6	<20	<0.5	190	250	0.8	658	---
126A	11/17/10	CT/8260	<2.0	5.9	<1.0	4.2	110	1.3	<4.0	<4.0	<1.0	<1.0	130	1.4	252.8	---
137A	11/13/07	CT/8260	<100	<50	<50	<50	9,100	82	<50	<2000	<50	<50	4,600	83	13865	---
137A	11/18/08	CT/8260	<63	<31	<31	<31	3,800	69	<31	<1300	<31	<31	2,100	<31	5969	---
137A	11/17/09	CT/8260	<33	<17	<17	<17	4,200	45	<67	<670	<17	<17	1,700	<17	5945	---
137A	11/12/10	CT/8260	<100	<50	<50	<50	7,000	<50	<200	<200	<50	<50	6,200	<50	13200	---
138A	11/17/10	CT/8260	<20	12	<10	23	1,900	20	<40	<40	<10	<10	120	130	2205	---
AE/RW-9-1	08/08/07	CT/8260	<33	500	<17	74	1,000	<17	24	<670	<17	2,600	1,200	71	5469	---
AE/RW-9-1	04/22/08	CT/8260	<8.3	47	<4.2	22	430	11	16	<170	<4.2	140	650	5.1	1331.1	---
AE/RW-9-1	11/07/08	CT/8260	<13	54	<6.3	24	460	10	19	<250	<6.3	360	730	<6.3	1668	---
AE/RW-9-1	11/17/09	CT/8260	<2.0	19	<1.0	11	400	12	11	<40	4.4	36	460	2.6	965.8	---
AE/RW-9-1	11/17/09	CT/8270	---	---	---	---	---	---	---	---	---	---	---	---	---	3.4
AE/RW-9-1	11/12/10	CT/8260	<6.3	71	<3.1	26	470	11	<13	<13	<3.1	260	490	12	1346.1	---
AE/RW-9-2	08/08/07	CT/8260	<100	<50	<50	<50	5,100	59	110	<2000	<50	84	5,400	220	10973	---
AE/RW-9-2	11/16/07	CT/8260	<50	58	<25	39	3,700	45	56	<1000	<25	74	2,500	170	6642	---
AE/RW-9-2	11/06/08	CT/8260	<100	<100	<100	<100	3,100	<100	<100	<100	<100	<100	4,100	130	7330	---
AE/RW-9-2	11/17/09	CT/8260	<4.0	58	<2.0	27	2,700	35	67	<80	<2.0	42	3,000	95	6024	---
AE/RW-9-2	11/17/09	CT/8270	---	---	---	---	---	---	---	---	---	---	---	---	---	3.2
AE/RW-9-2	11/12/10	CT/8260	<100	130	<50	78	5,400	<50	210	<200	<50	74	7,200	260	13352	---
RW-20A	08/08/07	CT/8260	<13	23	<6.3	18	860	11	9.1	<250	<6.3	34	790	15	1767.7	---
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	1516.2	---
RW-20A	11/15/08	CT/8260	<5.0	21	<2.5	18	590	8.4	6.7	<100	3.1	48	360	4.2	1063.2	---
RW-20A	11/13/09	CT/8260	<1.0	13	<0.5	14	680	9.7	8.5	<20	2.4	6.5	840	5.1	1588.3	---
RW-20A	11/13/09	CT/8270	---	---	---	---	---	---	---	---	---	---	---	---	---	3.9

Table 6. Groundwater Sampling Results Summary, January 2006 through December 2010, 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 VOCs	1,4-Dioxane
			<					µg/L								>
RW-20A	11/12/10	CT/8260	<14	13	<7.1	17	730	15	<29	<29	<7.1	13	910	7.6	1714.2	---
RW-21A	08/08/07	CT/8260	<6.3	8.7	<3.1	7.4	250	6.9	12	<130	6.3	8.5	340	<3.1	644.1	---
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	214.4	---
RW-21A	11/17/08	CT/8260	<1.0	7.8	<0.5	5.8	68	8.1	49	<20	<0.5	1.7	58	1.3	199.7	---
RW-21A (DUP)	11/17/08	CT/8260	<1.0	8	<0.5	5.5	68	8.7	50	<20	<0.5	1.6	60	1.3	203.1	---
RW-21A	11/13/09	CT/8260	<1.0	4.9	<0.5	4.2	68	0.7	50	<20	<0.5	0.5	79	0.8	208.1	---
RW-21A (DUP)	11/13/09	CT/8260	<1.0	4.9	<0.5	3.9	65	0.6	50	<20	<0.5	<0.5	79	0.9	204.3	---
RW-21A	11/13/09	CT/8270	---	---	---	---	---	---	---	---	---	---	---	---	---	2.1
RW-21A	11/12/10	CT/8260	<4.0	8.9	<2.0	9.2	310	11	26	<8.0	2.7	2.5	310	2.7	686.3	---
RW-21A (DUP)	11/12/10	CT/8260	<4.0	8.7	<2.0	9.1	300	11	26	<8.0	2.5	2.6	310	2.9	676.2	---

Abbreviations:

--- = sample not analyzed for particular analyte
< # = 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
8270 = USEPA Method 8270C-SIM for SVOCs
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
µg/L = micrograms per liter
VOCs = volatile organic compounds

Table 7. Capture Zone Calculations and Analysis, March 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Extraction Well:		AE/RW-9-1	AE/RW-9-2
b		15	15
i		0.004	0.004
K		40	40
T		600	600
w		275	275
estimated well loss (ft):	$s_w = CQ^2$	0.0045	0.0003
extraction rate (gpm):		4.78	1.21
stagnation point (ft):	$X_0 = -Q / 2\pi Ti$	-61	-15
capture zone width (at extraction well; ft):	$Y_{well} = \pm Q / 4Ti$	96	24
capture zone width (maximum; ft):	$Y_{max} = \pm Q / 2Ti$	192	49

LINE OF EVIDENCE	CAPTURE?	COMMENTS
Water Levels *Potentiometric Surface Maps*	*Adequate*	*Groundwater extraction consists of two operating wells inside the Building 9 Slurry Wall. The slurry wall provides the primary containment methodology for VOC capture, as demonstrated by piezometric surface contours and water level differences inside and outside the wall.*
Calculations *Capture Zone Widths*	*Adequate*	*The calculated stagnation points and capture zone width at extraction well are smaller than target capture of total slurry wall width.*
Concentration Trends *Downgradient Monitoring Wells*	*Adequate*	*TCE is decreasing to stable in downgradient wells (Appendix D).*

Notes and Abbreviations:

b = aquifer or saturated thickness (ft)
C = turbulent well loss coefficient from Walton, 1962 (sec^2/ft^5); the following are coefficients and their corresponding well condition:
5 = properly designed and developed, 5 to 10 = mild deterioration, 10 to 40 = severe deterioration (40 used in the calculation)
factor = accounts for other contributions to the extraction well (a factor of 1.5 was used in the calculation)
ft = feet
gpm = gallons per minute
i = regional hydraulic gradient (ft/ft)
K = hydraulic conductivity (ft/day). Value is based on the calibrated MEW groundwater flow model (Geosyntec et al., 2008b)
Q = extraction flow rate (gallons per minute; gpm)
sec = second
s_w = drawdown due to well loss
T = transmissivity (ft^2/day)
TCE = trichloroethene
w = plume width (ft) (the width of the Site slurry wall, 275 ft, is used in the calculation)
X_0 = stagnation point (ft)
Y_{max} = maximum capture zone width (ft)
Y_{well} = capture zone width in-line w/ extraction well (ft)

Assumptions:

- homogeneous, isotropic, confined aquifer of infinite extent
- uniform regional horizontal hydraulic gradient
- no net recharge (or net recharge is accounted for in regional hydraulic gradient)
- no other sources of water introduced into aquifer due to extraction

Table 8. Capture Zone Calculations and Analysis, November 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Extraction Well:		AE/RW-9-1	AE/RW-9-2	RW-20A	RW-21A
b		15	15	15	15
i		0.004	0.004	0.004	0.004
K		40	40	40	40
T		600	600	600	600
w		275	275	0	0
estimated well loss (ft):	$s_w = CQ^2$	0.003	0.001	0.004	0.009
extraction rate (gpm):		4.00	1.72	4.46	6.58
stagnation point (ft):	$X_0 = -Q / 2\pi Ti$	-51	-22	-57	-84
capture zone width (at extraction well; ft):	$Y_{well} = \pm Q / 4Ti$	80	34	89	132
capture zone width (maximum; ft):	$Y_{max} = \pm Q / 2Ti$	160	69	179	264

LINE OF EVIDENCE	CAPTURE?	COMMENTS
Water Levels *Potentiometric Surface Maps*	*Adequate*	*Groundwater extraction consists of four operating wells inside the Building 9 Slurry Wall. The slurry wall provides the primary containment methodology for VOC capture, as demonstrated by piezometric surface contours and water level differences inside and outside the wall.*
Calculations *Capture Zone Widths*	*Adequate*	*The calculated stagnation points and capture zone widths at extraction wells are smaller than target capture of total slurry wall width.*
Concentration Trends *Downgradient Monitoring Wells*	*Adequate*	*TCE is decreasing to stable in downgradient wells (Appendix D).*

Notes and Abbreviations:

b = aquifer or saturated thickness (ft)
C = turbulent well loss coefficient from Walton, 1962 (sec^2/ft^5); the following are coefficients and their corresponding well condition:
5 = properly designed and developed, 5 to 10 = mild deterioration, 10 to 40 = severe deterioration (40 used in the calculation)
factor = accounts for other contributions to the extraction well (a factor of 1.5 was used in the calculation)
ft = feet
i = regional hydraulic gradient (ft/ft)
K = hydraulic conductivity (ft/day). Value is based on the calibrated MEW groundwater flow model (Geosyntec et al., 2008b)
Q = extraction flow rate (gallons per minute; gpm)
s_w = drawdown due to well loss
sec = second
T = transmissivity (ft^2/day)
TCE = trichloroethene
VOC = voliatile organic comopounds
w = plume width (ft) (the width of the Site slurry wall, 275 ft, is used in the calculation)
X_0 = stagnation point (ft)
Y_{max} = maximum capture zone width (ft)
Y_{well} = capture zone width in-line w/ extraction well (ft)

Assumptions:

- homogeneous, isotropic, confined aquifer of infinite extent
- uniform regional horizontal hydraulic gradient
- no net recharge (or net recharge is accounted for in regional hydraulic gradient)
- no other sources of water introduced into aquifer due to extraction

Weiss Associates

APPENDIX A

2010 ANNUAL REPORT REMEDY PERFORMANCE CHECKLIST

2010 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 15, 2011**

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 (Eight wells operated during 2010).**
- **One regional recovery well (One well operated during 2010).**

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.**
- **Nine source control recovery wells (Seven wells operated during 2010).**
- **Three regional recovery wells (Three wells operated during 2010).**

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 (Thirteen operated during 2010).**
- **Seven regional recovery wells (Two operated during 2010).**

II. CONTACTS

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

	Name/Title	Phone	E-mail
RP/Facility Representative	**Virgilio Cocianni Schlumberger Technology Corporation**	**281-285-4747**	cocianni-v@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

2010 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).

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:

2010 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:

Record of Decision Amendment for the Vapor Intrusion Pathway August 16, 2010

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:

644 National Avenue property (former Fairchild Building 18) was purchased by Carr America National Avenue LLC in 2008; redevelopment plans remained on hold during 2010.

369 and 441 North Whisman Road (former Bldgs. 13 and 19 and 23), owned by Keenan, Lovewell Ventures, is developing a proposal for additional buildings on the site.

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

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	**2010 Annual Fairchild Building Reports (Weiss, 2011) and**
Capture zone maps, isoconcentration maps	**2010 Annual Regional Report (Geosyntec, 2011)**

■ 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 Self-Monitoring Reports**
System Influent & Effluent water samples	**2010 Annual Fairchild Building 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.

2010 Annual Report Remedy Performance Checklist

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 chemical data, GAC removal efficiencies	**NPDES Self-Monitoring 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	**2010 Annual Reports**
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 and are effective at impeding flow and preventing VOCs inside the wall from migrating downgradient. However, the ROD specifies that the slurry walls, "maintain inward and upward gradients." Historically, this has not been observed in all well pairs, even under maximum historical pumping scenarios. In 2010, pumping was started in some wells that had been off since 2007. Slurry wall gradients have generally maintained trends consistent before and after reduced groundwater extraction rates.

The chemical concentration data and potentiometric surface contours from 2010 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

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

Walk-throughs/Surveys: Yes

Additional building sampling was performed during 2010.

Summary of Results: The sampling results indicated no short-term or long-term potential health risk concerns from the vapor intrusion pathway under current conditions (Haley and Aldrich 2010).

Reference:

Haley and Aldrich, 2010. *Air Sampling Activities Conducted Fall 2009 at the Middlefield-Ellis-Whisman Vapor Intrusion Study Area, Mountain View, California, March 19.*

Problems Encountered: None

Recommendations/Next Steps: None

Schedule: All work is coordinated with the USEPA.

X. REMEDY PERFORMANCE ASSESSMENT

A. Groundwater Remedies

2010 Annual Report Remedy Performance Checklist

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.

During First Quarter 2010, several extraction wells were tested and new pumps were installed to support optimization of the groundwater pumping regime at Fairchild Treatment Systems 1, 3, and 19 under the jurisdiction of USEPA Region 9. Optimization of extraction rates began during the week of March 29, and continued during the Second Quarter of 2010. Optimization activities are documented in the 2010 Annual Progress Reports to USEPA for the former Fairchild Buildings 1-4, and 19.

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 (Weiss 2010).

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 based on 2008 optimization report was implemented with EPA modifications in 2010.

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, 515/545 N. Whisman Road and 313 Fairchild Drive.

Groundwater elevation and chemical monitoring results from 2010 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.

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.

2010 Annual Report Remedy Performance Checklist

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: 2010 Annual Fairchild Building Reports (Weiss, 2010)

2010 Annual Regional Report (Geosyntec, 2010)

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 MCL is 5 µg/L.

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

Capture zone analysis in the 2010 Fairchild Building and RGRP Annual Progress Reports indicate containment of target capture areas.

XI. PROJECTIONS

Administrative Issues
Dates of next monitoring and sampling events for next annual reporting period: Fall 2010

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

Remedy Projections for **the upcoming year (2011)**

■ 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: Elaborate below. Target date:

Elaborate on Remedy Projections:

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:

2010 Annual Report Remedy Performance Checklist

☐ 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: **2012**

Elaborate on Remedy Projections:

The EPA is developing a groundwater site-wide focused feasibility study.

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: Elaborate below. Target date:

Elaborate on Remedy Projections:

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: 2012

Elaborate on Remedy Projections: Site-Wide Focused Groundwater Feasibility Study being conducted by EPA may affect long term 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.

Fairchild extraction well optimization occurred during 2010.

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:

Site-Wide Focused Groundwater Feasibility Study for Groundwater being conducted by EPA.

Date of Next EPA Five-Year Review: **September 30, 2014**

XII. RECOMMENDATIONS

Weiss Associates

APPENDIX B

LABORATORY ANALYTICAL REPORTS

(THIS APPENDIX IS BEING SUBMITTED ON CD TO THE USEPA ONLY AND IS AVAILABLE UPON REQUEST)

APPENDIX C

QA/QC REPORT, SUMMARY TABLES, AND CRITERIA

2010 QA/QC SUMMARY

The analytical laboratory data and accompanying quality assurance/quality control (QA/QC) information used in the *2010 Annual Reports* for Former Fairchild Buildings 1, 2, 3, 4, 9, 13, 18, 19, 20, 20A, and 23 in the Middlefield-Ellis Whisman (MEW) Area were reviewed for precision, accuracy, reproducibility, and completeness in accordance with the approved MEW 1991 *Quality Assurance Plan*.[3] In addition, this data quality review is based on November 2009 *Standard Operating Procedures* (SOPs) for data verification and validation and on validation procedures for metals, volatile organic chemicals, and semivolatile organic chemicals. The SOPs are based on the 1991 MEW "Unified" *Quality Assurance Project Plan* (QAPP), but functionally they adhere to the most recent United States Environmental Protection Agency (USEPA) data validation guidelines.

This data quality review summarizes the Level 2 and 10% Level 4 data quality review for samples collected by Weiss Associates during the 2010 annual sampling event in accordance with the MEW QAPP.

The analytical results for each sampling point were compared with the historical record to confirm they are representative. To assess the reliability of field sampling procedures and materials, the following field QA/QC samples were collected or prepared for each sampling event by MEW parties:

- Quality control samples (field duplicate, matrix spike, matrix spike duplicate) - Field duplicate samples are blind duplicates that provide data to assess precision of the contract laboratory. Matrix spike/matrix spike duplicate (MS/MSD) samples measure the accuracy and precision of the analytical methods. Field duplicates are specified to be collected at a frequency of 5% of the field samples collected. MS/MSD samples are specified at a frequency of 5% of field samples collected. Note that only samples collected by Weiss Associates were evaluated for MS/MSD procedures.
- Rinseate sample/equipment blank - Samples consist of reagent water collected from a final rinse of sampling equipment after the decontamination procedure has been performed. The purpose of rinseate samples is to determine whether the sampling equipment is causing cross-contamination of samples. Following equipment decontamination, deionized/organic-free water will be used as a final rinse and collected in appropriate bottles. Rinseate samples were specified at a frequency of 5% of the field samples collected. In 2010, all rinseate sample/equipment blank samples had VOC concentrations below the detection limit.
- Field blank - Samples consisting of source water used for decontamination of equipment. Field blanks will be collected at a frequency of 1 per source or lot of water being used for rinsing and submitted to the laboratory for all required analyses. Field blanks are specified at a frequency of 5% of the field samples collected. In 2010, all field blank samples had VOC concentrations below the detection limit.

[3] 1991, Quality Assurance Project Plan Middlefield-Ellis-Whisman Site, Mountain View, California, prepared by Canonie Environmental, Rev. 1.0, August 16, 1991.

- Trip blank - Samples consisting of a "clean," volatile organic analysis (VOA) vial filled with deionized/organic-free water and preserved. These vials are supplied by the laboratory to the field Site and returned to the laboratory for storage and analysis along with the field samples as may be required in the task planning documents. Trip blanks were submitted to the contract laboratory with each shipment (cooler) of environmental samples for volatile organic compound (VOC) analyses. Trip blanks were analyzed for all VOC analyses specified for samples in the corresponding cooler. The trip blank data demonstrate that the samples were not exposed to contamination during storage and transport to the laboratory. Trip blanks were submitted for VOC analysis; therefore the containers did not contain head space. Trip blanks are typically required for VOC sampling of: groundwater; surface water; storm water; and rinseate. In 2010, all trip blank samples had VOC concentrations below the detection limit.

For the 2010 annual groundwater sampling event, all sample results collected for former Fairchild Buildings were verified for completeness by completion of a Level 2 data review Summary. Custody seals were used for each sample location as specified in the 1991 MEW QAPP. Ten percent of all sample delivery groups underwent a stringent Level 4 data validation as required by the MEW QAPP.

The following QA/QC parameters were used to assess the laboratory analytic data via Level 2 Data Review:

- Holding time;
- Detection and reporting limits;
- Surrogate recovery (organic methods only);
- Laboratory control sample recovery;
- Matrix spike and spike duplicate recovery;
- Method blank contamination;
- Travel blank contamination (organic methods only);
- Field/rinseate blank contamination; and
- Field sample duplicates precision.

The samples validated via Level 4 data were placed on chain(s) of custody separate from those for the Level 2 data deliverables. Level 4 validation procedures vary by method. In addition to the verification check list provided above, the Level 4 review of organic laboratory data checks the following:

- Ion abundance;
- Minimum number of initial calibration standards analyzed;
- Relative response factors in initial and continuing calibrations;
- Percent relative standard deviations in initial calibrations;
- Percent differences in continuing calibrations;
- Internal standard retention times;

- Internal standard area counts;
- Analytical sequence carryover;
- Dilutions performed appropriately;
- Calibration blank contamination; and
- Data package completeness for all raw data, including chromatograms and bench sheets, for calibration standards, quality control data, and samples.

The Level 4 review of inorganic (metals) data checks for the following:

- Minimum number of initial calibration standards analyzed;
- All initial calibration verification recoveries are within established limits;
- Initial calibration correlation coefficients are within established limits;
- Continuing calibration verification recoveries are within established limits;
- Analytical sequence carryover;
- Dilutions performed appropriately;
- Laboratory duplicate results are within established limits;
- Initial and continuing calibration blank contamination; and
- Data package completeness for all raw data, including bench sheets, for calibration standards, quality control data, and sample.

Technical staff assigned qualifiers to data that were found outside control limits in the MEW QAPP. Data qualifiers, or flags, communicate data issues to end users and decision makers and are defined in the USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review.

From January through December 2010, 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 sampling, a total of 14 groundwater samples from the MEW annual groundwater sampling event were submitted to Curtis and Tompkins in Berkeley, California, a state-certified analytical laboratory for VOCs.

All samples were collected, stored, transported, and managed according to USEPA protocols. Sample temperature and holding times were correctly observed.

No significant analytical issues were noted and the data are usable for their intended purposes. Tables C-1 and C-2 present a summary of sampling and analysis QA/QC for 2010 at former Fairchild Building 9.

Table C-1. Summary of Sampling QA/QC for January through December 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California.

Who performed sampling (Firm name/address/contact/phone):	Weiss Associates 350 East Middlefield Road Mountain View, CA 94043 Tess Byler (650) 968-7000
Chain-of-custody forms completed for all samples?	YES
Field parameters stabilized prior to taking sample?	YES
Headspace in sample containers < 6 mm (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 2010, Former Fairchild Building 9, 401 National Avenue, Mountain View, California

Who performed analysis (Lab name/address/contact/phone):	Curtis & Tompkins 2323 Fifth Street Berkeley, CA 94710 Micah Smith (510) 204-2223
Analytical methods[1] (by method number and chemical category):	19 samples (including 2 travel blanks, 1 duplicate, and 2 rinseate blanks) analyzed by USEPA 8260B – Halogenated Volatile Organic Compounds (8010 MS Parameters)
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.

Notes:

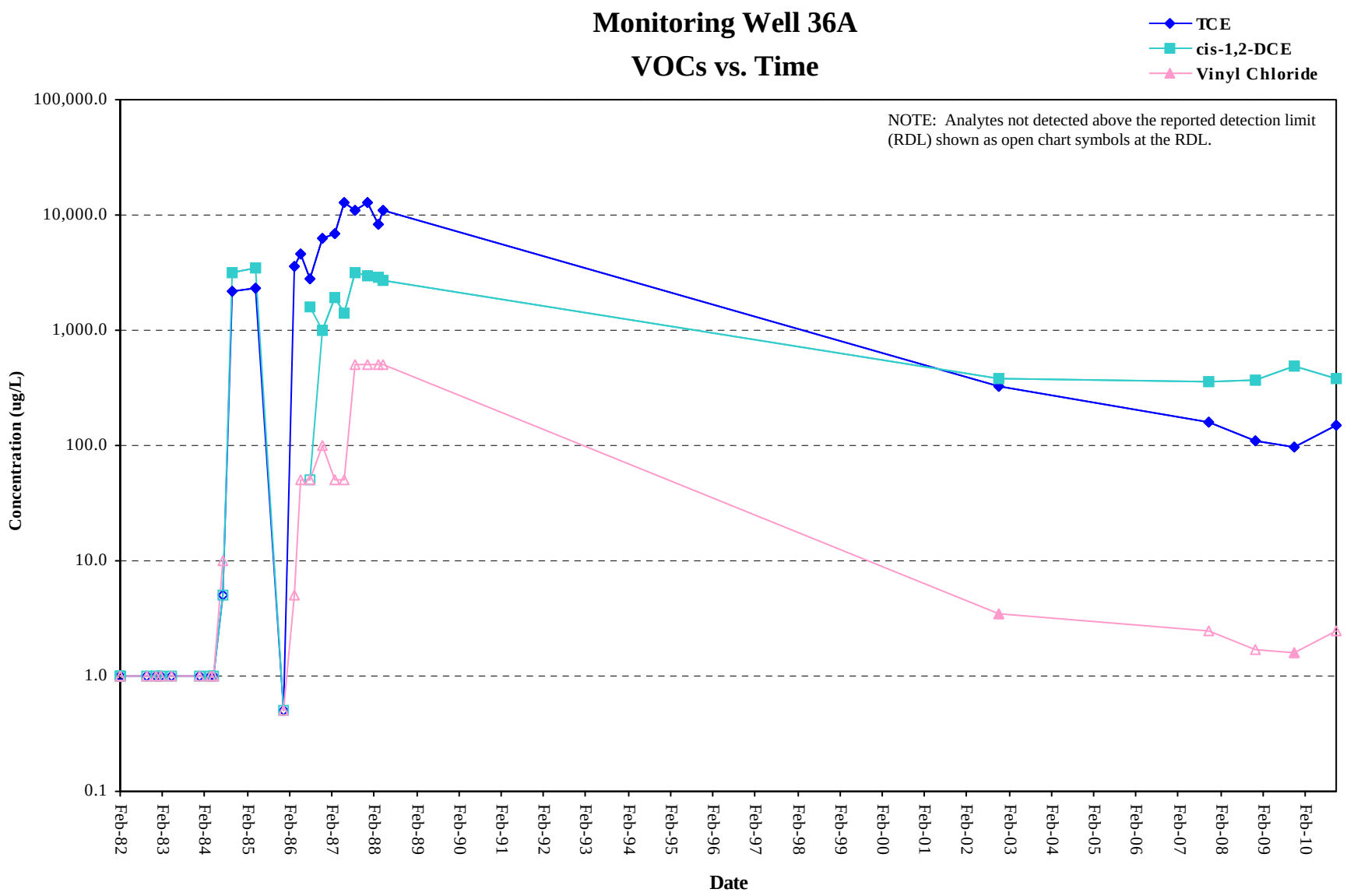
1. The analytical reports are located in Appendix B.
2. Analytical issues for groundwater samples collected during the 2010 annual groundwater sampling event are also summarized in Appendix G of the *2010 Annual Progress Report for Middlefield-Ellis-Whisman Study Area Regional Groundwater Remediation Program, Mountain View, CA.*

APPENDIX D

SELECTED VOCS-VERSUS-TIME GRAPHS

Weiss Associates

Monitoring Well 36A
VOCs vs. Time

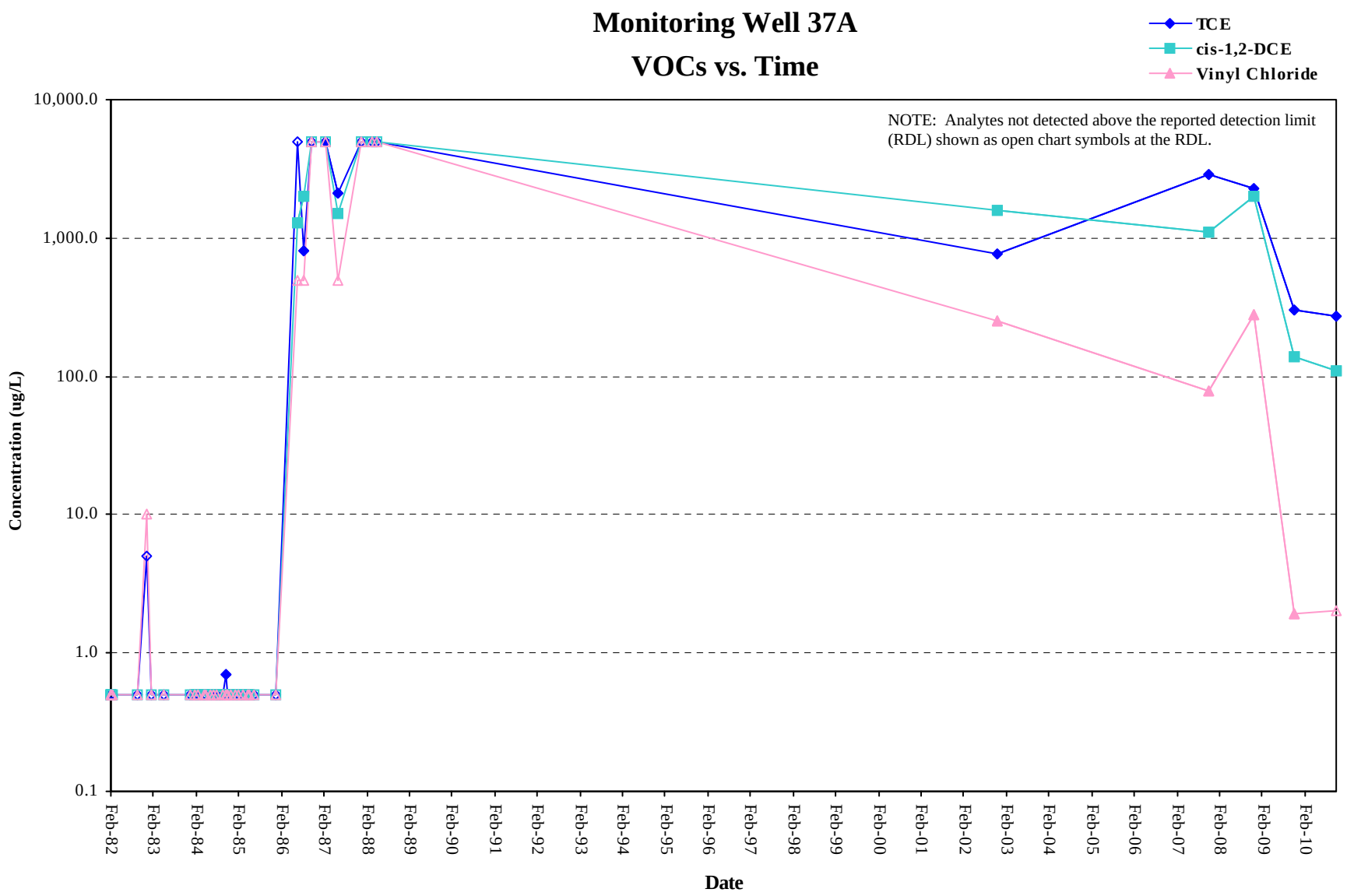


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:07:54 PM

Weiss Associates

Monitoring Well 37A
VOCs vs. Time

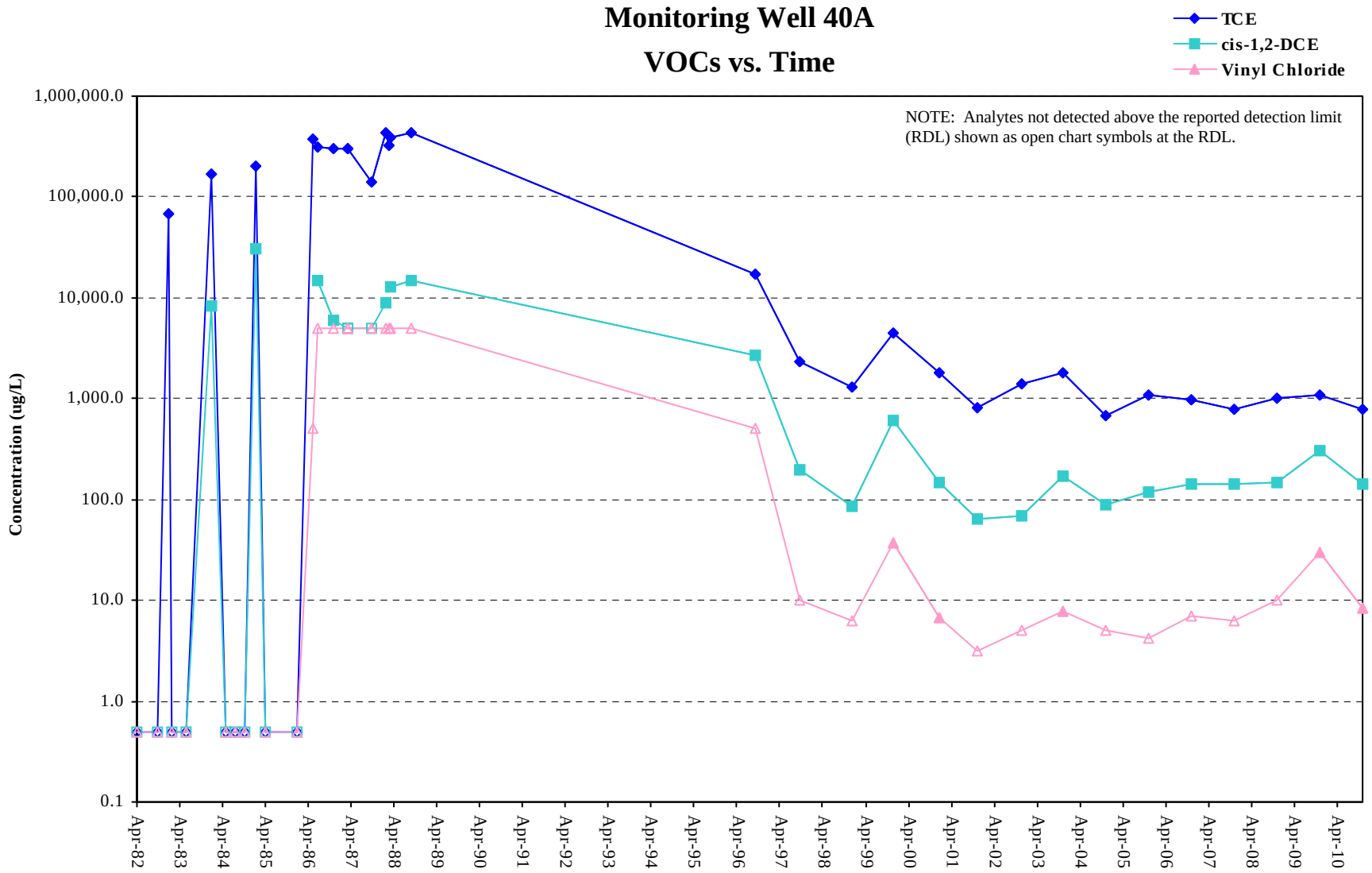


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:07:55 PM

Weiss Associates

Monitoring Well 40A
VOCs vs. Time

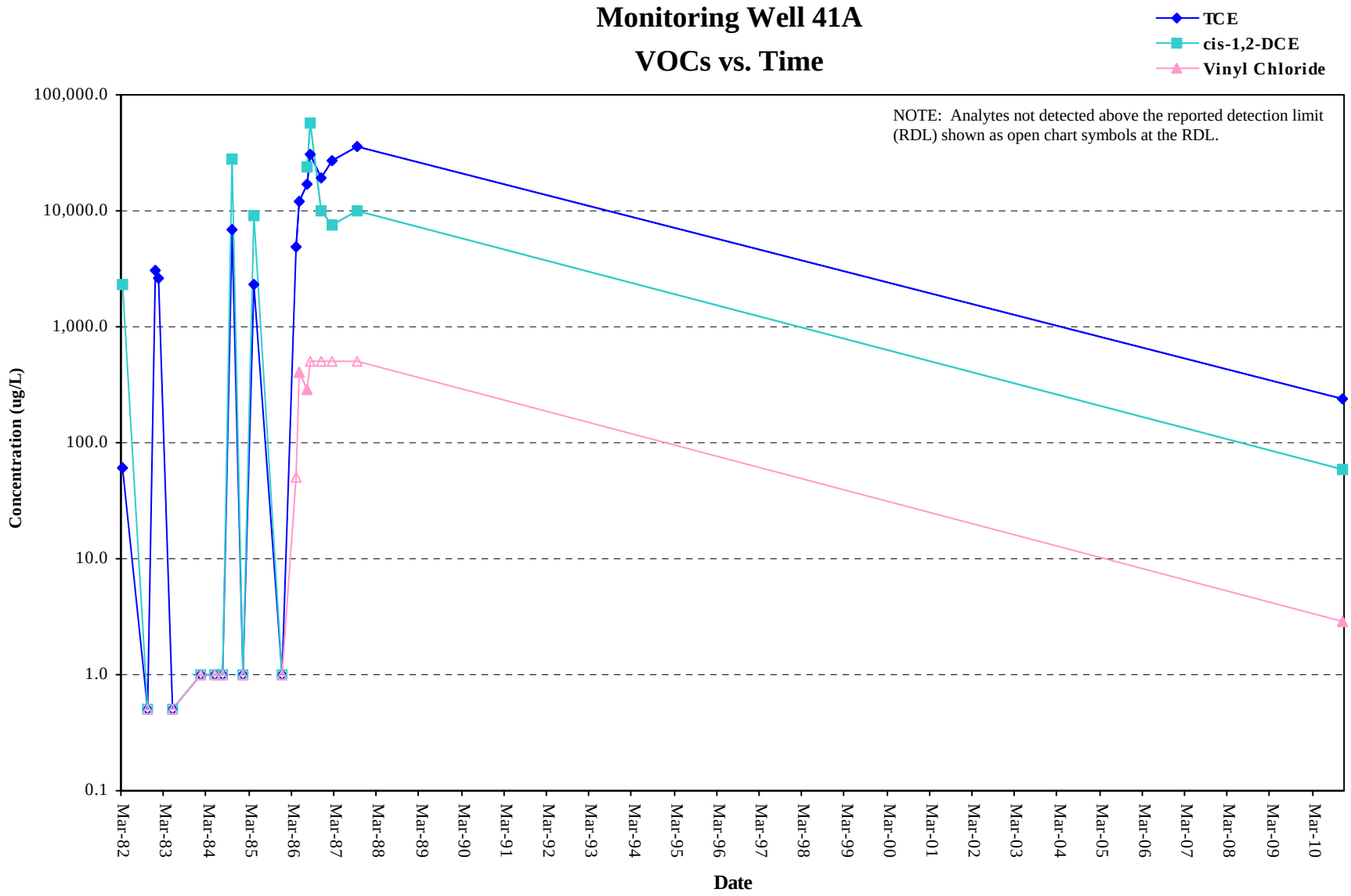


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:07:57 PM

Weiss Associates

Monitoring Well 41A
VOCs vs. Time

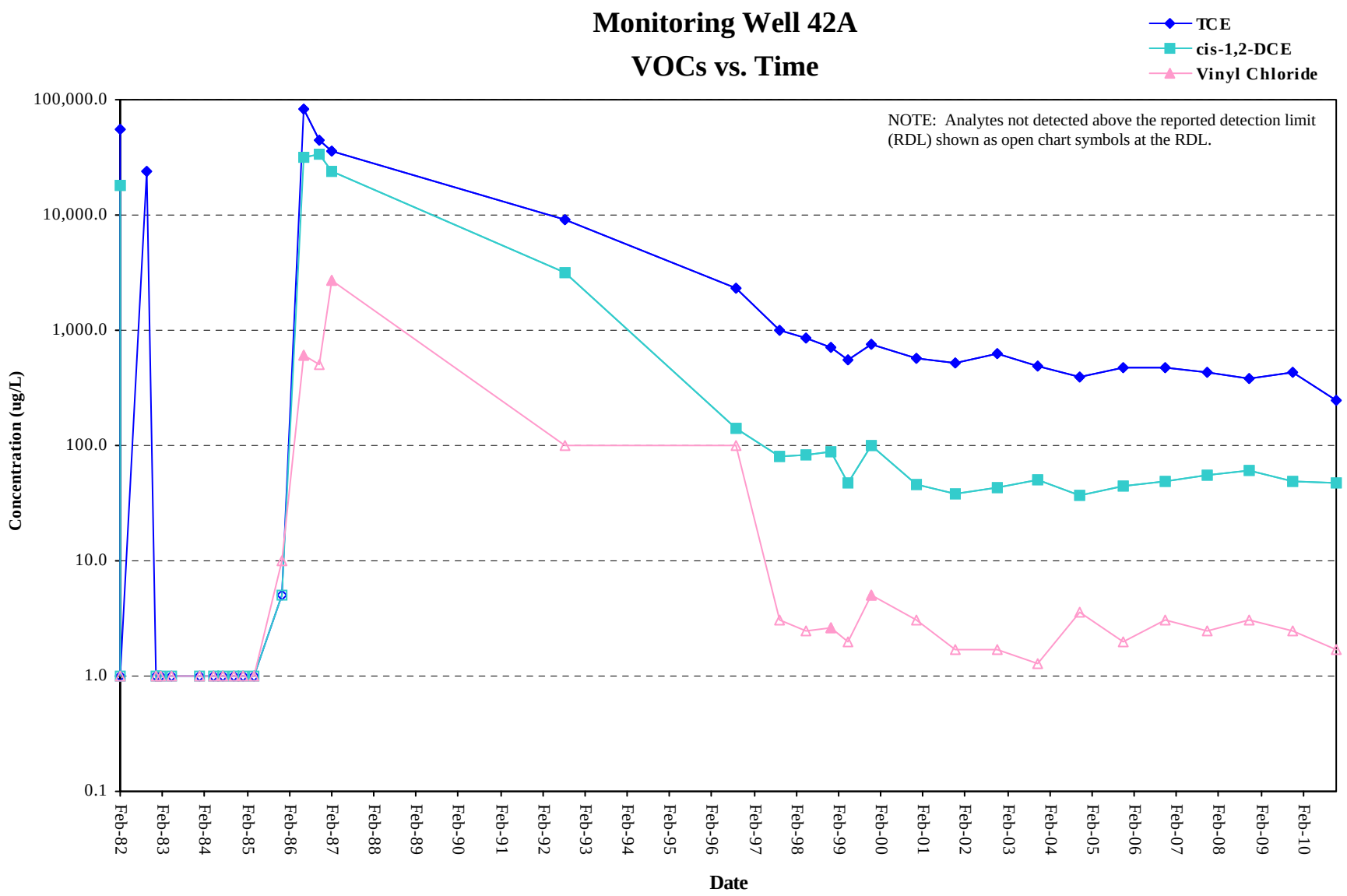


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:07:58 PM

Weiss Associates

Monitoring Well 42A
VOCs vs. Time

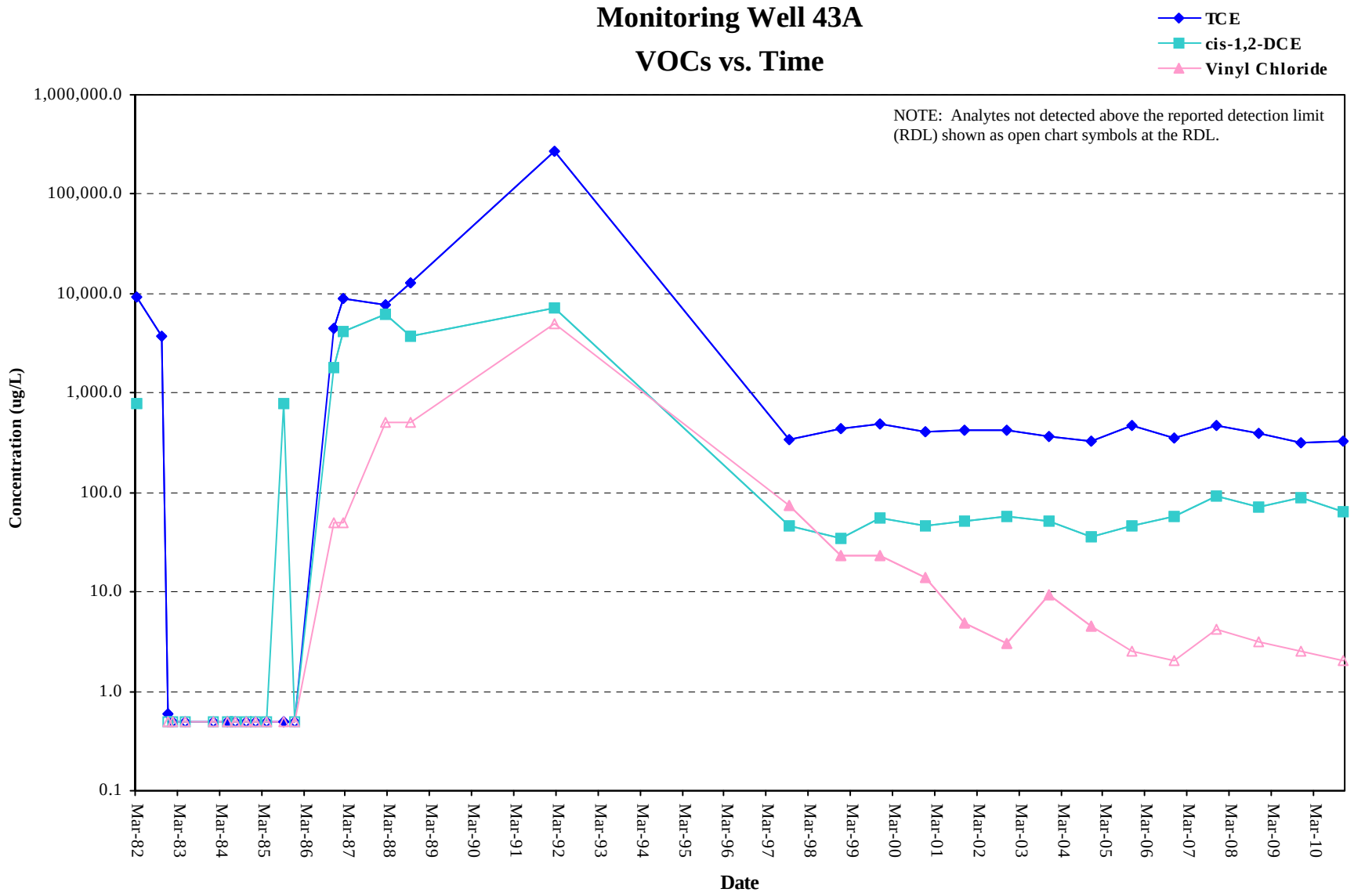


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:07:59 PM

Weiss Associates

Monitoring Well 43A
VOCs vs. Time

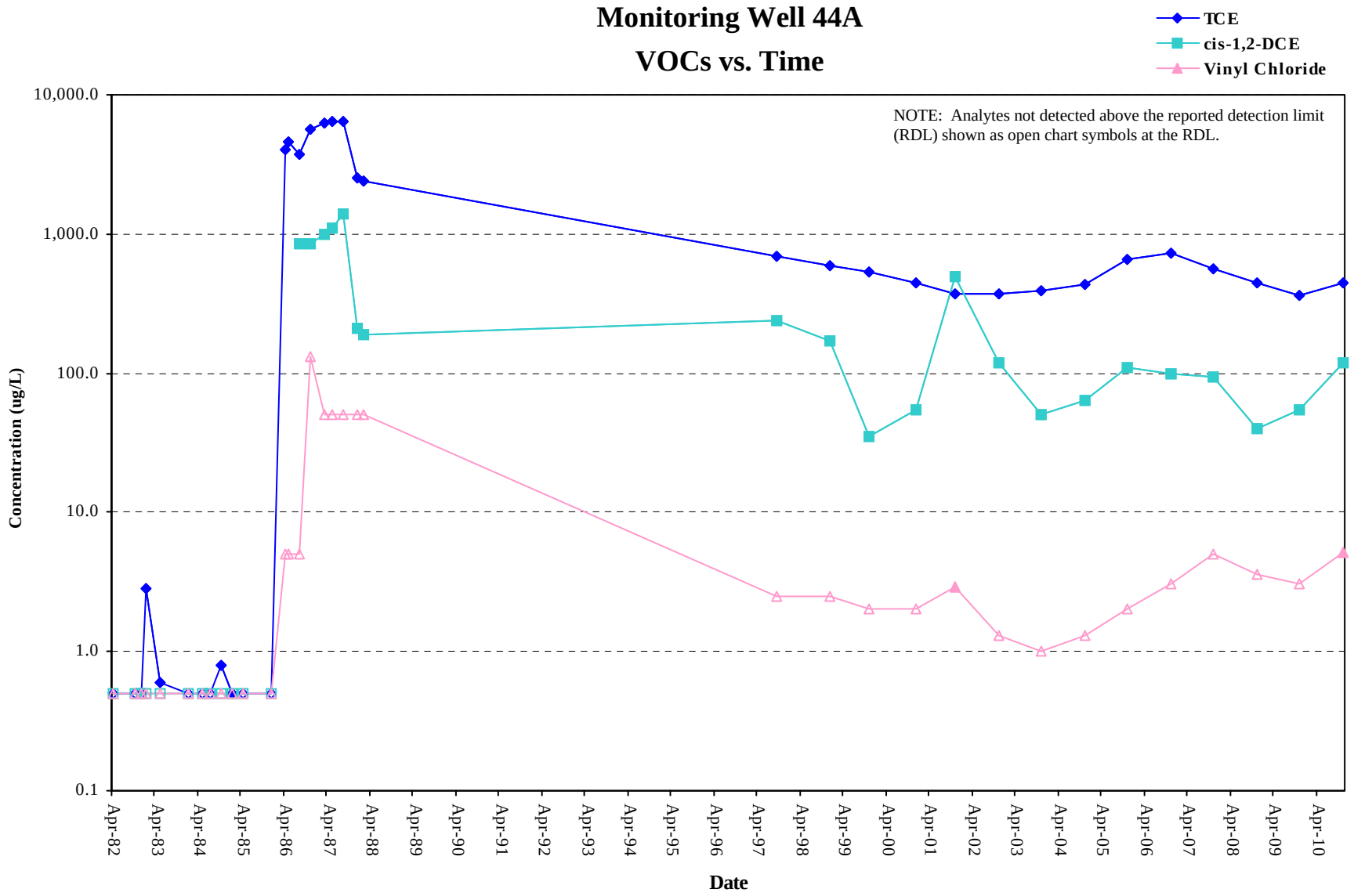


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:01 PM

Weiss Associates

Monitoring Well 44A
VOCs vs. Time

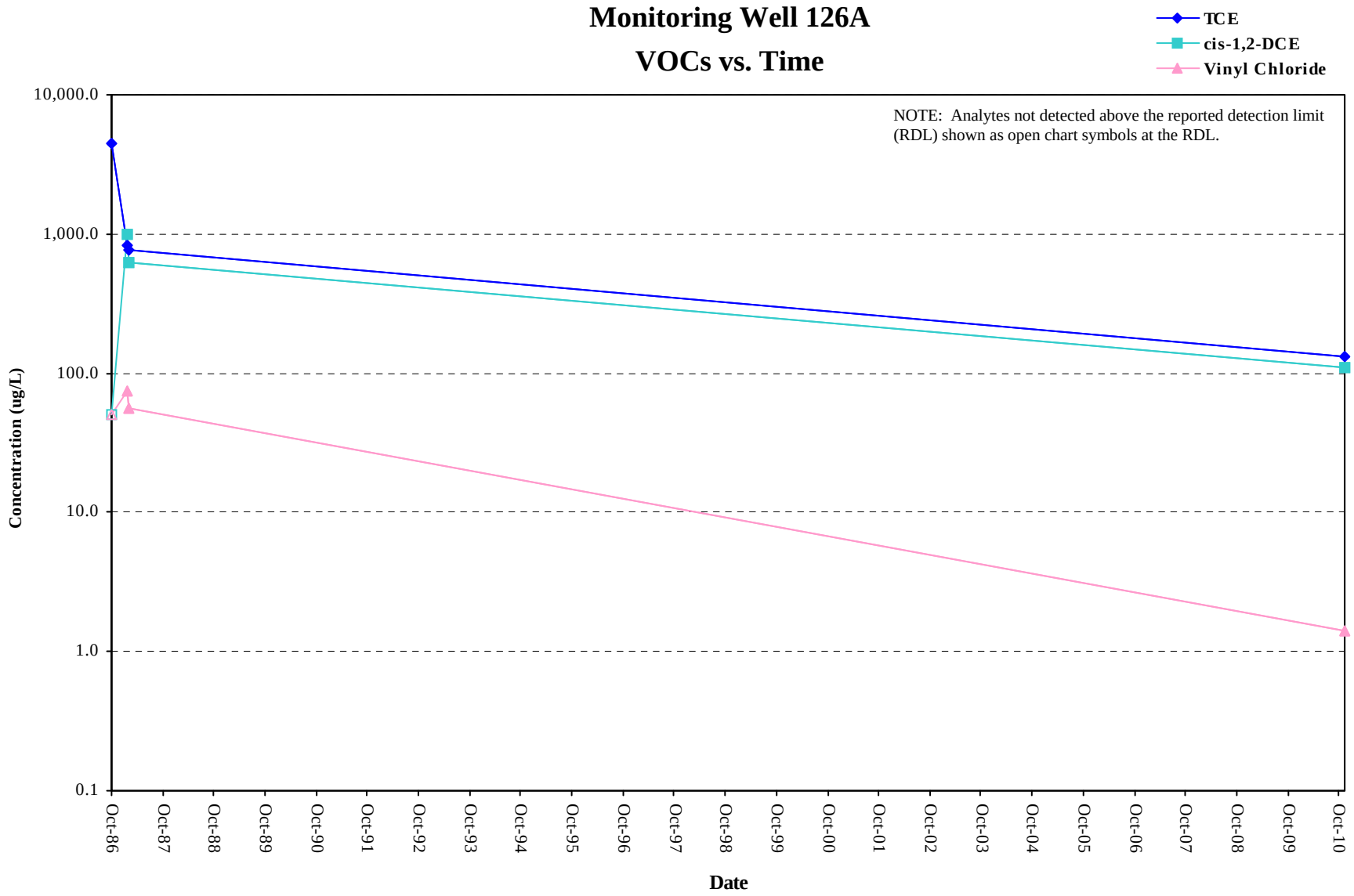


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:02 PM

Weiss Associates

Monitoring Well 126A
VOCs vs. Time

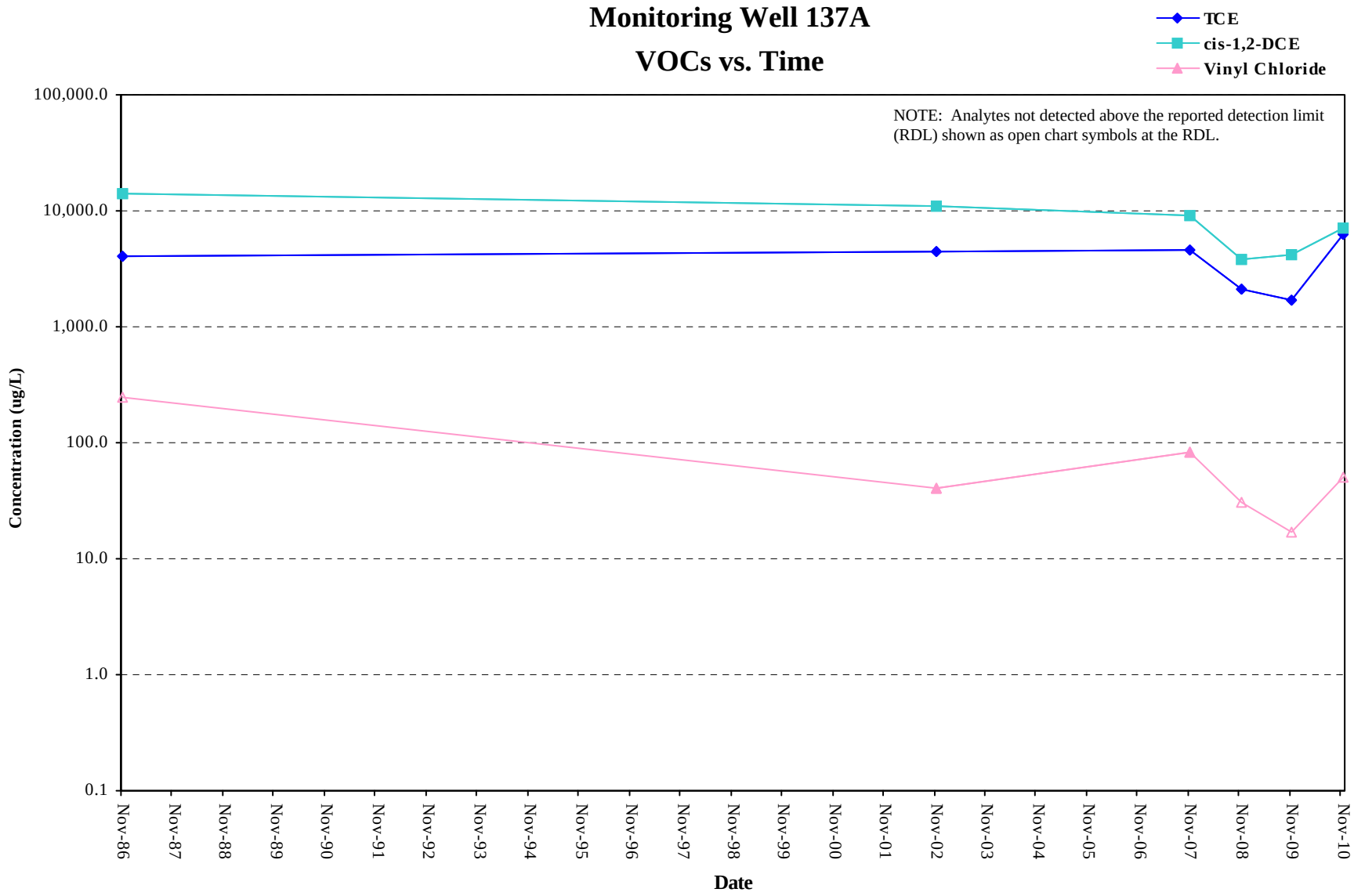


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:06 PM

Weiss Associates

Monitoring Well 137A
VOCs vs. Time

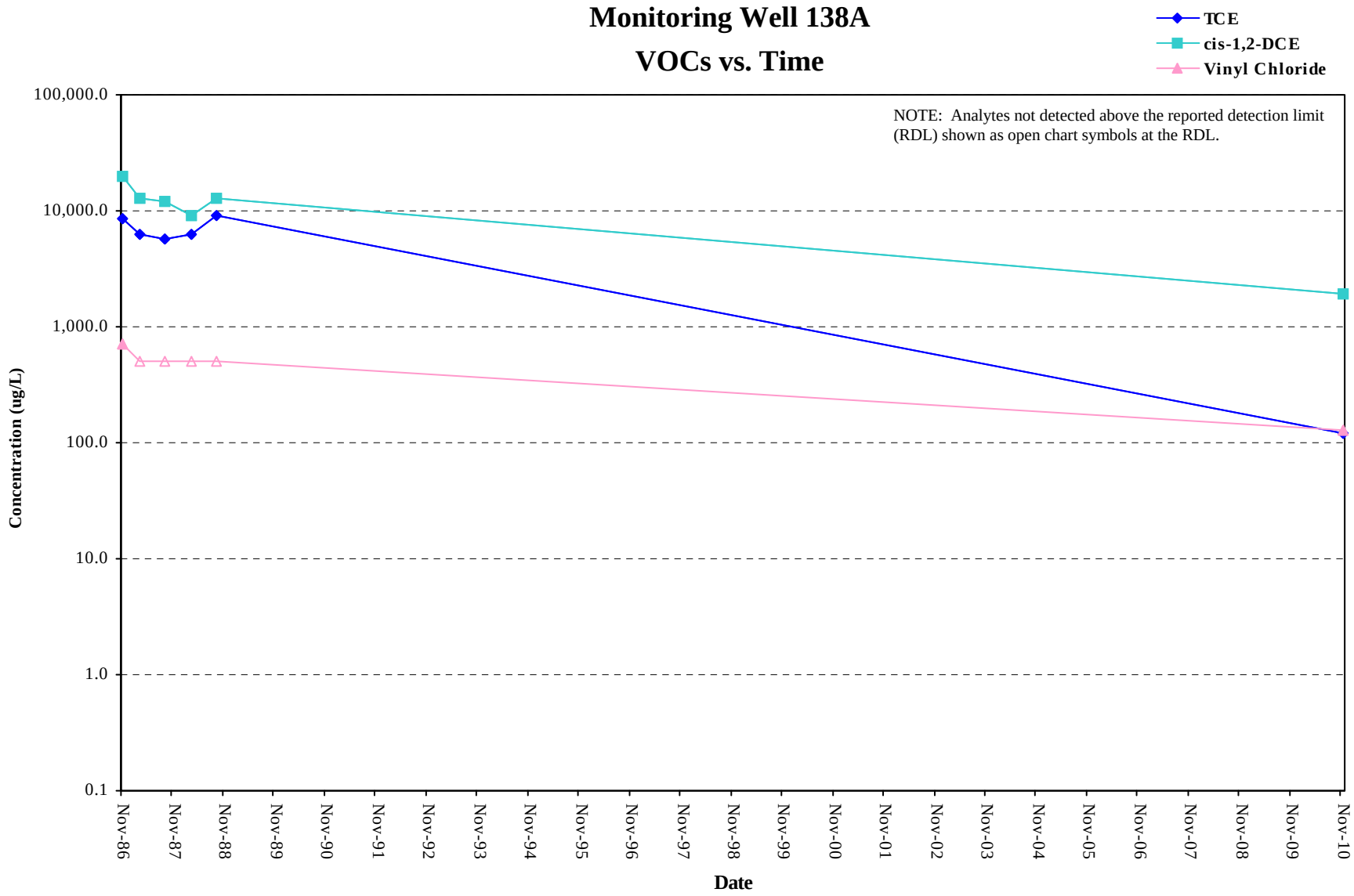


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:07 PM

Weiss Associates

Monitoring Well 138A
VOCs vs. Time

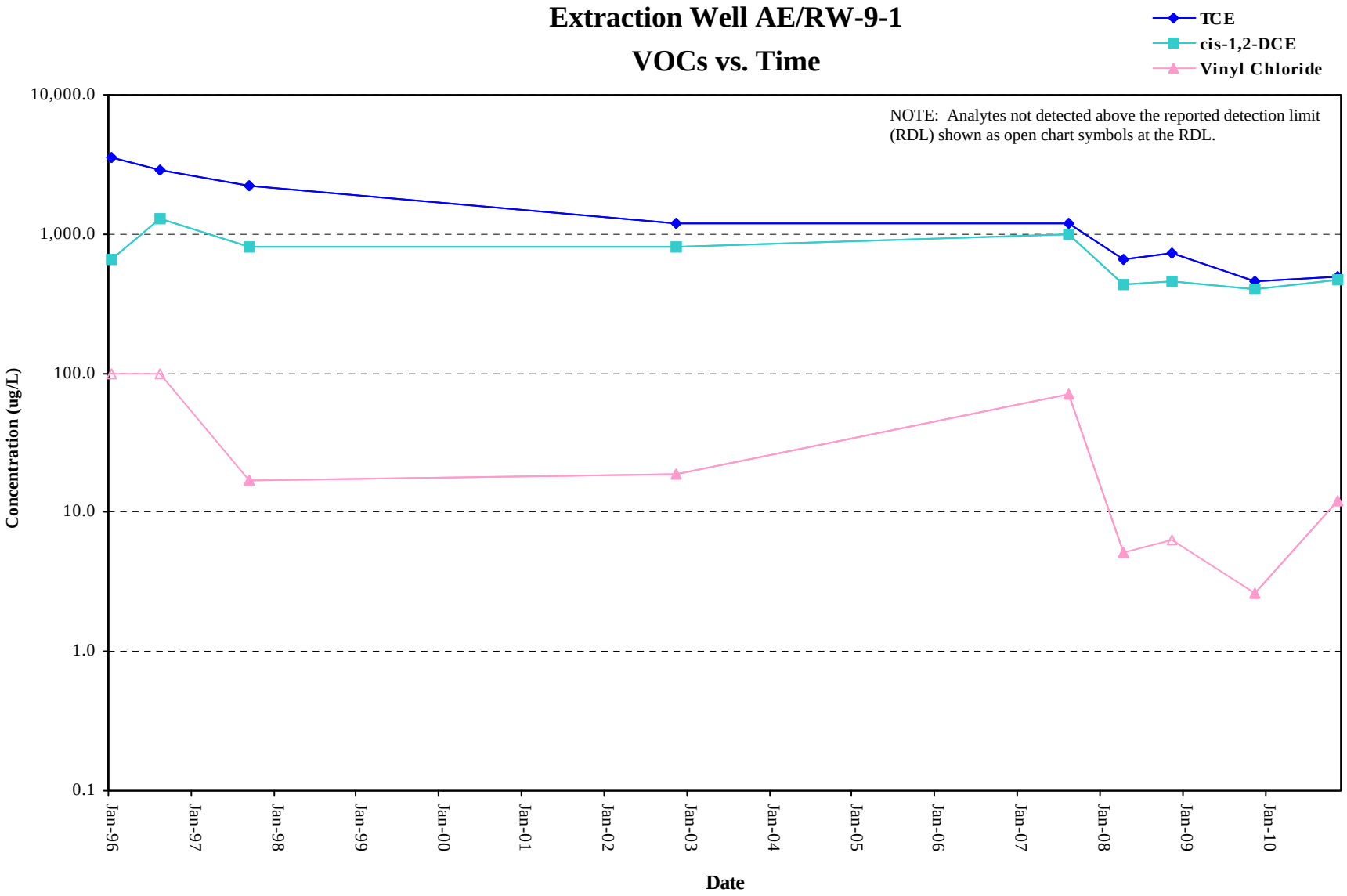


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:08 PM

Weiss Associates

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

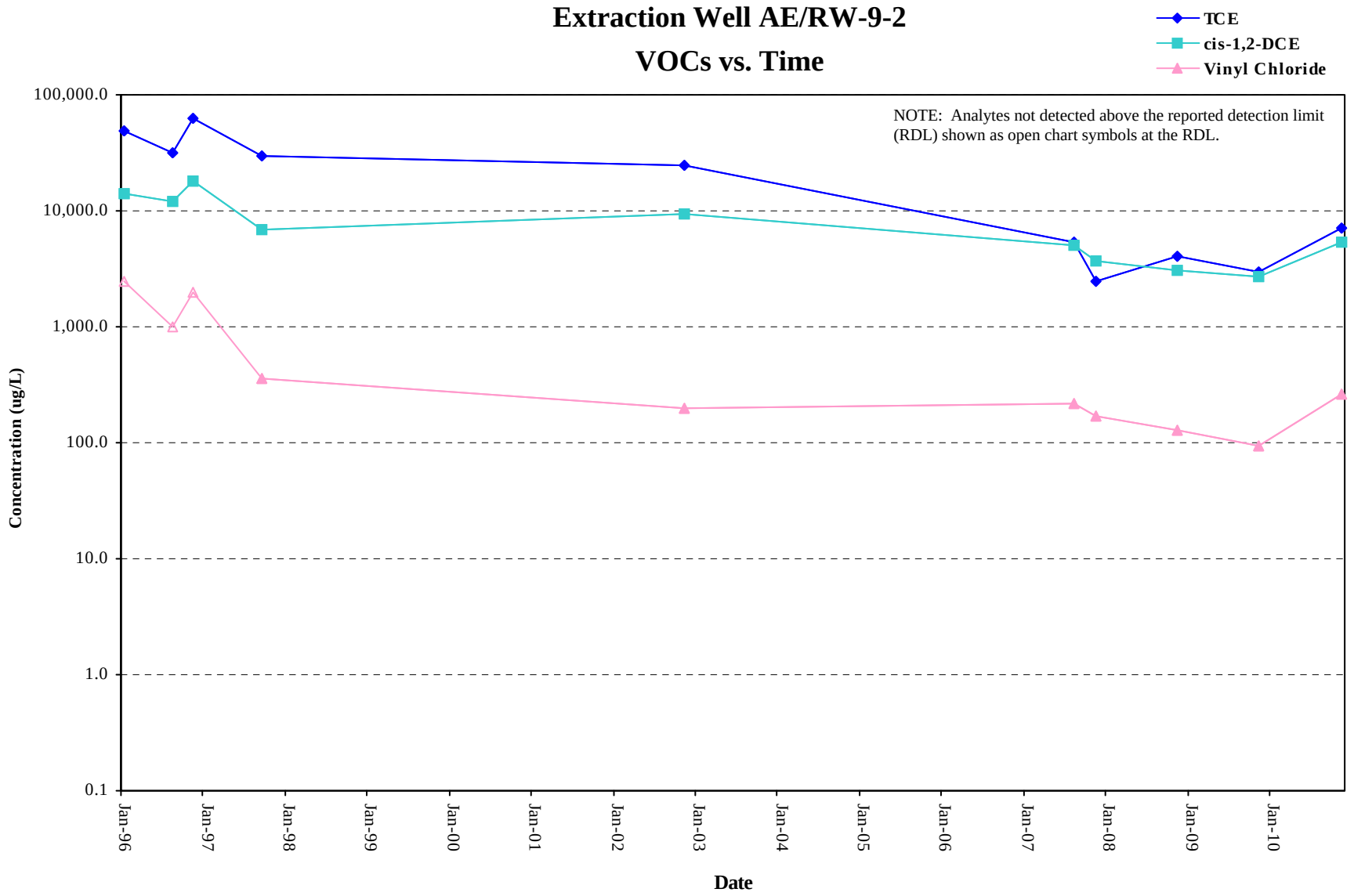


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:10 PM

Weiss Associates

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

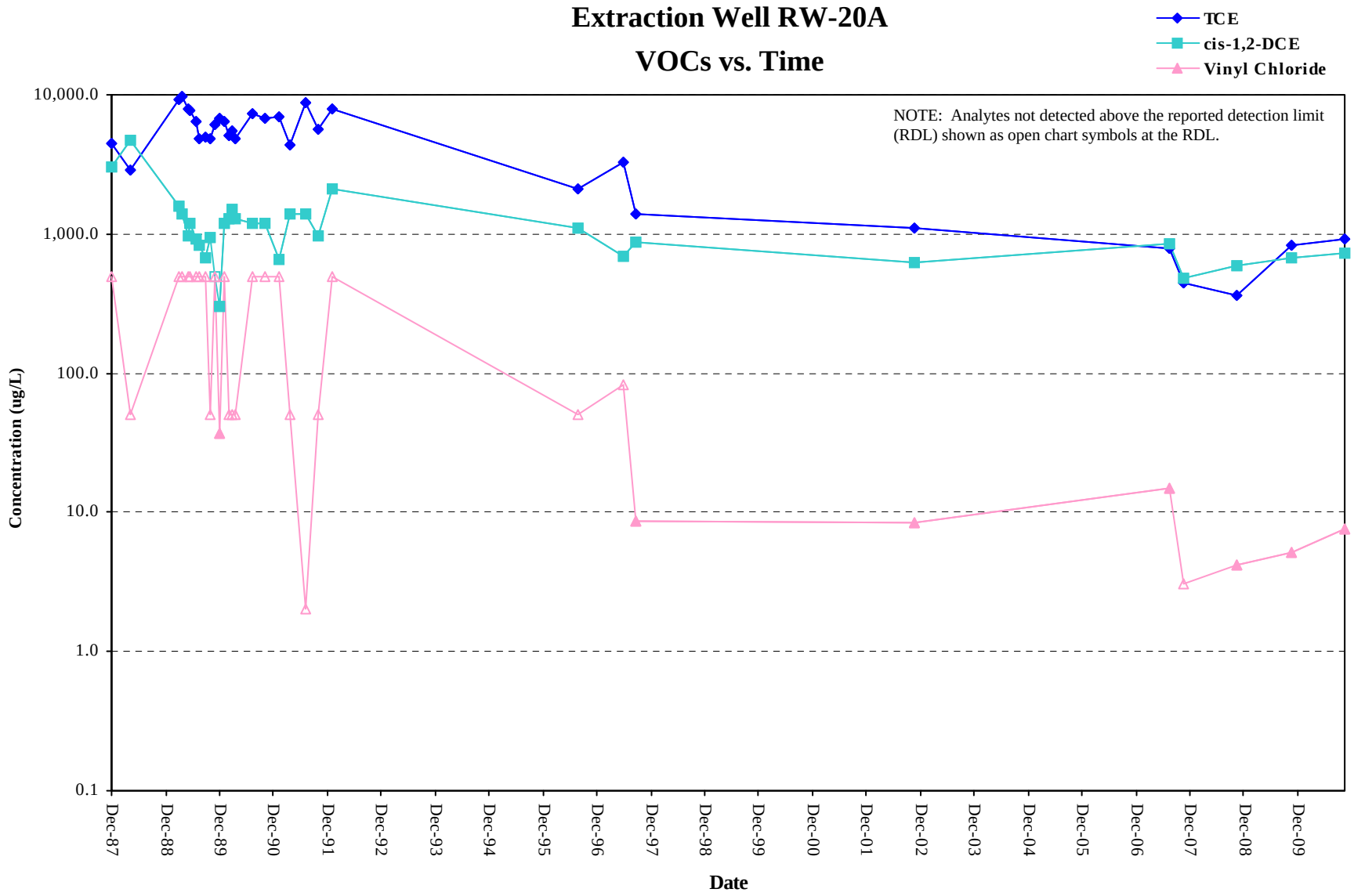


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:12 PM

Weiss Associates

Extraction Well RW-20A
VOCs vs. Time

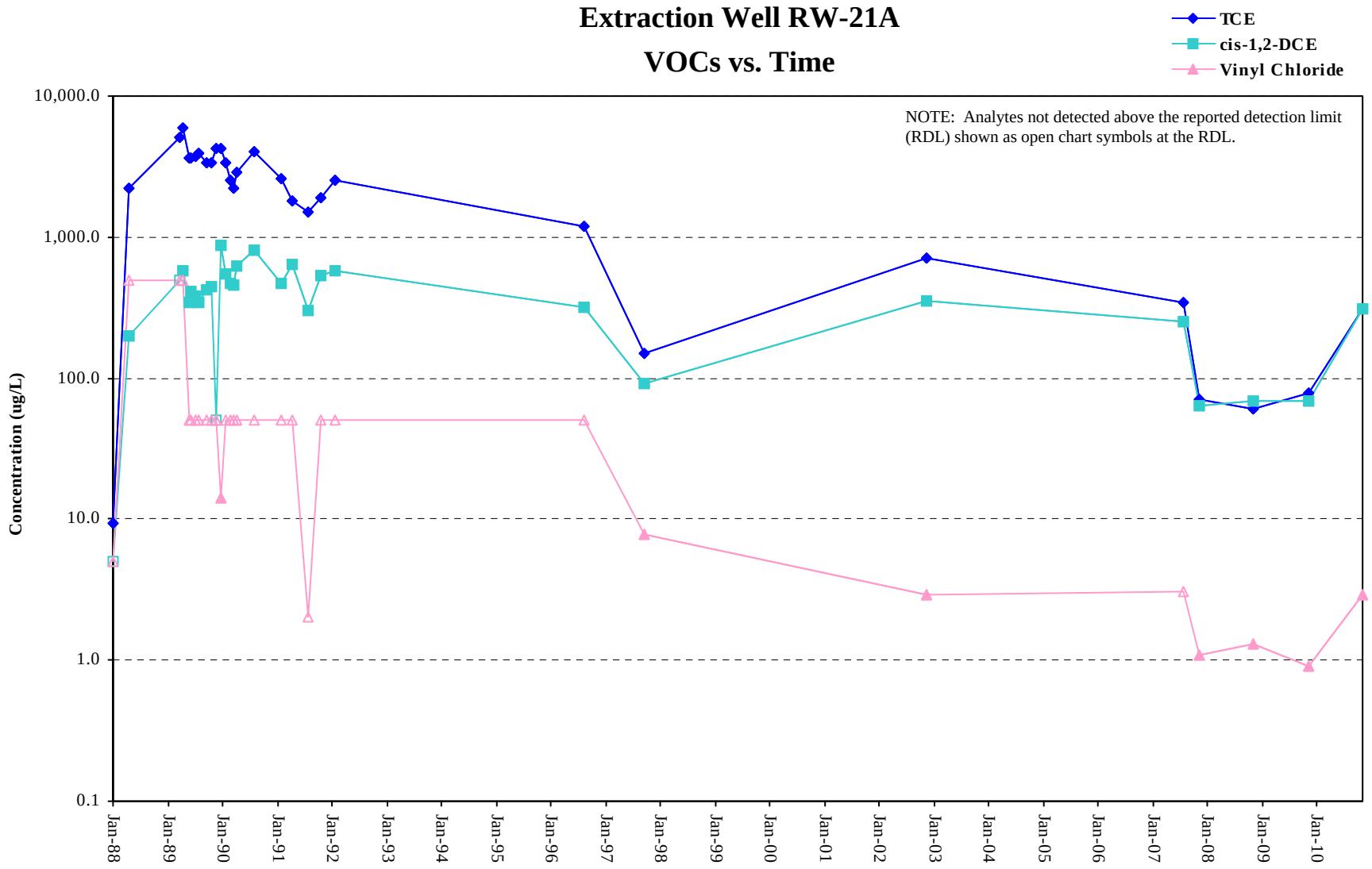


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:13 PM

Weiss Associates

Extraction Well RW-21A
VOCs vs. Time



Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg9

Printed: 5/31/2011 4:08:14 PM