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 Buildings 20 and 20A
464 Ellis Street
Middlefield-Ellis-Whisman 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 Buildings 20 and 20A
464 Ellis Street
Middlefield-Ellis-Whisman Area
Mountain View, California

submitted to

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

prepared by

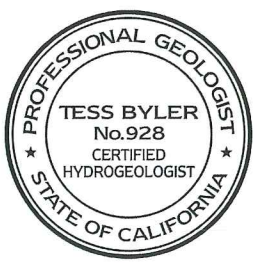
Weiss Associates
350 E. Middlefield Road
Mountain View, California 94043

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 was conducted under my supervision. To the best of my knowledge, the data contained in this report are true and accurate and are 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, C.Hg
Sr. Project Geologist
CA # 928, expiration Nov. 2012

June 10, 2011
Date

CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

106 Order	Administrative Order for Remedial Design and Remedial Action
Fairchild	Fairchild Semiconductor Corporation
ft	feet
ft/ft	feet per foot
ft bgs	feet below ground surface
FSCRD	final source control remedial design
Geosyntec	Geosyntec Consultants
HLA	Harding Lawson Associates
K	hydraulic conductivity
Locus	Locus Technologies
µg/L	micrograms per liter
MEW	Middlefield-Ellis-Whisman
MNA	Monitored Natural Attenuation
NASA	National Aeronautics and Space Administration
PRPs	potentially responsible parties
QA/QC	quality assurance and quality control
Raytheon	Raytheon Company
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
Site	Former Fairchild Buildings 20/20A located at 464 Ellis Street in Mountain View, California
STC	Schlumberger Technology Corporation
SVE	Soil Vapor Extraction
TCE	trichloroethene
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
Weiss	Weiss Associates

SUMMARY

This *2010 Annual Progress Report for Former Fairchild Buildings 20 and 20A 464 Ellis Street in Mountain View, California* (Figures 1, 2, and 3) summarizes activities from January 1 through December 31, 2010, and analytical data for 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 annual report contents (USEPA, 1990a and 2005).

The Buildings 20 and 20A property (Site) has been redeveloped and the current addresses are 464, 466 and 468 Ellis Street. Remedial investigations did not identify any sources; therefore the Site does not have any associated groundwater extraction and treatment system. However, nine groundwater extraction wells associated with other systems are located on the Site, as follows:

- RAY-1A and RAY-1B1: Two source control recovery wells (SCRWs) associated with the upgradient former Raytheon site, with the extracted groundwater treated at the Raytheon treatment plant located at 350 Ellis Street;
- REG-4B(1) and 65B3: Two regional recovery wells (RRWs), with the extracted groundwater treated by Fairchild System 19, located at 369 Whisman Road; and
- DW3-219, DW3-244, DW3-334, DW3-364, and DW3-505R: Five deep groundwater RRWs that have been turned off with USEPA approval.

The operations and monitoring of the above-noted extraction wells are reported in the *2010 Annual Progress Report, Former Raytheon Facilities 350 Ellis Street, Mountain View California* (Locus, 2011), and *2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23, 369/441 North Whisman Road, Mountain View California* (Weiss, 2011).

Twelve groundwater monitoring wells (Table 1) are currently used to evaluate the distribution of volatile organic compounds (VOCs) in groundwater at the Site. These monitoring wells are sampled annually and water levels are collected semiannually.

Site activities conducted in compliance with the 106 Order at the Site during this reporting period included continued semiannual groundwater level monitoring in March and November and annual groundwater sampling in November and December, 2010.

The VOC concentrations in the Site monitoring wells continue to remain well below historical maximums, and indicate stable or long term decreasing concentrations.

1. INTRODUCTION

This 2010 Annual Progress Report was prepared at the direction of Schlumberger Technology Corporation (STC) and describes activities from January 1 through December 31, 2010 at the former Fairchild Semiconductor Corporation (Fairchild) Buildings 20 and 20A (Site) previously located at 464 Ellis Street in Mountain View, California (Figures 1 and 2). It also summarizes analytical data for 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 reports (USEPA, 1990a and 2005).

1.1 Site Background

The Site is located in a light-industrial area in Mountain View, California. Building 20 functioned as a silicon wafer production facility for Fairchild from 1968 to the mid-1980s, and Building 20A served as the parking area (Figure 2). The Site is located within the Middlefield-Ellis-Whisman (MEW) area, 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. Remedial investigation and feasibility studies (RI/FSs) were 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).

Building 20 was demolished in the 1990s, with commercial/research offices constructed over the building and parking area by early 2000. The previous and current addresses and current occupants of Former Fairchild Buildings 20 and 20A are provided below:

Previous Address	Current Address	Current Occupants
Buildings 20 and 20A, 464 Ellis Street	464, 466, and 468 Ellis Street	464 Ellis Street: Unoccupied 466 Ellis Street: Symantec 468 Ellis Street: Unoccupied

The primary constituent of concern at the Site is trichloroethene (TCE) in groundwater from historical offsite underground tank, piping, sump, and/or surface spills that migrated onto the Site property.

Remediation within the MEW area includes facility-specific activities by the individual potentially responsible parties (PRPs) (such as activities at this facility-specific Site) and a Regional Groundwater Remediation Program (RGRP) that addresses commingled volatile organic chemicals (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 at the MEW Area are summarized in the following table:

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] The Navy and National Aeronautics and Space Administration (NASA) refer to this zone as the A1-zone north of Highway 101.

[b] The Navy and NASA refer to this zone as A2 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/B aquitard. The B-zone has been further subdivided into three subzones. From youngest to oldest (shallowest to deepest), these are the B1-, B2-, and B3-zones, separated by aquitards, which are designated the B1/B2 aquitard and the B2/B3 aquitard. The lower groundwater zones occur below the B/C aquitard, below approximately 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).

The ranges of hydraulic conductivity (K), hydraulic gradient, and transmissivity of the upper groundwater zone, i.e., the zones above the B3/C aquitard, were calculated from pumping tests conducted at the MEW Site from 1986 through 2005. The results are summarized below (Canonie, 1986a, 1986b, 1987, and 1988; Geomatrix, 2004; HLA, 1987; Locus, 1998; PRC, 1991; Navy, 2005; and Weiss, 1995 and 2005).

Water-Bearing Zone	Estimated Hydraulic Conductivity (K) (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. 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 (Geosyntec et al 2008).

The vertical component of groundwater flow is generally upward from the B1- to the A-zone but locally downward in some areas of the Site (HLA, 1987). Vertical gradients below the B1-zone are generally upward (Geosyntec, et al., 2008).

1.3 Description of Remedy

No potential sources for VOCs were identified on the premises of Fairchild's former Buildings 20/20A at 464 Ellis Street. Therefore, the Final Source Control Remedial Design (FSCRD) for the Site was included as part of Raytheon's FSCRD for its facility at 350 Ellis Street in Mountain View, California. The remediation of soils at the Site was also incorporated in the *in-situ* aeration system operated by Raytheon at its 350 Ellis Street facility. A soil vapor extraction (SVE) and treatment system started operation on August 7, 1996.

On May 7, 1997, the USEPA approved the *Soil Closure Confirmation Sampling Report* for areas outside Raytheon's slurry wall at 350 Ellis Street and on the adjacent Site. The SVE wells and associated piping in the area have since been removed.

Although no onsite sources were identified for the TCE in groundwater beneath the Site, there are nine onsite extraction wells installed and maintained by other MEW parties. Raytheon installed and currently operates two SCRWs, RAY-1A and RAY-1B1, at the Site. The extracted groundwater from these two wells is conveyed to Raytheon's groundwater treatment system on their 350 Ellis Street property. Additionally, the MEW RGRP installed one B1-zone (REG-4B(1)), one B3-zone (65B3), and five C-zone/deep groundwater RRWs (DW3-219, DW3-244, DW3-334, DW3-364, and DW3-505R) at the Site. When the RRWs are operating, groundwater from them is conveyed to Fairchild System 19, located at 369 Whisman Road.

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] 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 (USEPA, 1989).

[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.

1.4 Summary of 2010 Site Activities and Deliverables

Site activities conducted in compliance with the 106 Order during this reporting period include:

- Measuring semiannual groundwater elevations in Site monitoring wells on March 25 and November 18, 2010;
- Distributing the 2009 Annual Progress Report to the USEPA and MEW Distribution List parties on June 15, 2010;
- Collecting groundwater samples from Site monitoring wells in November, 2010;
- Collecting supplemental samples for groundwater geochemistry from monitoring wells;
- Assessing the progress of remedial actions during 2010; and
- Planning remedial actions for 2011.

No optimization activities were planned or occurred specifically for Buildings 20 and 20A during 2010. However, extraction rates were optimized for onsite RRWs 65B3 and REG-4B(1). These wells are plumbed to Fairchild Treatment System 19, and optimization of these wells is discussed in the *2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23* (Weiss, 2011).

Section 2 of this report summarizes groundwater extraction and remediation at the Site during the reporting period. Sections 3 through 7 document additional activities, problems encountered, technical assessment, conclusions and recommendations, and upcoming work in 2011 and planned future activities. Supporting data are presented in Figures 1 through 3, Tables 1 through 3, and Appendices A through D.

2. GROUNDWATER EXTRACTION AND TREATMENT

2.1 Groundwater Extraction Wells

There are no extraction wells associated with the Site. However, nine extraction wells are located on the Site that are owned and operated by Raytheon and the RGRP.

Raytheon SCRWs RAY-1A and RAY-1B1 are discussed in the Raytheon annual report (Locus, 2011). The MEW RGRP RRWs, REG-4B(1), 65B3, DW3-219, DW3-244, DW3-334, DW3-364, and DW3-505R, which are plumbed to Fairchild Treatment System 19, are discussed in the RGRP and Fairchild Building 13, 19, and 23 annual reports (Geosyntec, 2011b and Weiss, 2011).

2.2 Groundwater Monitoring Wells

There are currently twelve monitoring wells associated with the Site. Four wells are in the A-zone, two in the B1-zone, four in the B2-zone, and one each in the B3- and C-zones. These wells are sampled annually for VOCs, and water levels are measured semiannually. Monitoring well construction details are provided in Table 1.

The RGRP collected supplemental data in 2010 to assess groundwater geochemistry and intrinsic remediation capability in the MEW area. Two Site monitoring wells, 16B2 and 89B2 (see Table 1 and Figure 3), were included in the supplemental sampling. Results of the supplemental sampling were submitted to the USEPA as part of the *Draft Conceptual Site Model* for MEW Geosyntec, 2011a).

2.3 VOC Analytical Results

The 2010 annual groundwater sampling event at the Site was completed in November and December, 2010. The sampling schedule for the Site is provided in Table 2. Copies of the chain-of-custody forms and analytic reports for the samples collected during the event are located in Appendix B. Chemical analytic results for the previous five years are summarized in Table 3. Appendix C contains the quality assurance and quality control (QA/QC) evaluation and summary tables. Graphs of VOCs versus time for Site monitoring wells are provided in Appendix D. The data in Table 3 and Appendix D show that for the monitoring wells sampled in 2010, VOC concentrations in groundwater are generally stable to declining.

TCE isoconcentration contour maps for 2010 are included in the MEW RGRP annual progress report (Geosyntec, 2011b).

3. OTHER ACTIVITIES

3.1 Optimization

No optimization activities were planned or occurred specifically for Buildings 20 and 20A during 2010. However, extraction rates were optimized for onsite wells 65B3 and REG-4B(1). These wells are plumbed to Fairchild Treatment System 19, and optimization of these wells is discussed in the *2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23* (Weiss, 2011).

3.2 Air/Vapor Intrusion

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

3.3 Soil Settlement Survey

An annual soil settlement survey was performed on December 7 and 8, 2010. The purpose of these annual measurements is to evaluate if long-term remedial groundwater extraction has affected soil 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. Additional information on the settlement survey can be found in the RGRP 2010 annual progress report (Geosyntec, 2011b).

4. PROBLEMS ENCOUNTERED

No problems were identified for Former Fairchild Buildings 20 and 20A during 2010.

5. TECHNICIAL ASSESSMENT

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

- The remedy is functioning as intended. Groundwater impacts are being addressed under the Raytheon and RGRP programs. An "Annual Remedy Performance Checklist" is included in Appendix A.

- VOC concentrations are stable to decreasing. VOC concentrations in monitoring wells at the Site remain stable or are declining. Since 2003, TCE concentrations in well 11C have fluctuated between non-detected and 6.5 µg/L. TCE was detected at 1.9 µg/L in November 2010, indicating stable concentrations since 2007, but still above the 0.8 µg/L cleanup standard.

The *2010 Annual Progress Report, Former Raytheon Facilities, 2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23,* and *2010 Annual Progress Report for Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Study Area* further discuss VOC mass removal and hydraulic control at the Site (Locus, 2011, Weiss, 2011, and Geosyntec, 2011b).

6. CONCLUSIONS AND RECOMMENDATIONS

Twelve monitoring wells were used to assess remedial progress in the area. The VOC concentrations in these wells are stable or decreasing. The reader is referred to the *2010 Annual Progress Report, Former Raytheon Facilities, 2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23,* and *2010 Annual Progress Report for Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Study Area* for further discussion of VOC mass removal and hydraulic control at the Site (Locus, 2011, Weiss, 2011, and Geosyntec, 2011b).

7. UPCOMING WORK IN 2011 AND PLANNED FUTURE ACTIVITIES

In 2011, the twelve groundwater wells at the Site will continue to be monitored 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

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

Canonie, 1986b. *Pumping 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 Environmental (Canonie), 1988. *Feasibility Study, Middlefield-Ellis-Whisman Area, Mountain View, California,* November 1988.

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), 2008. *Optimization Evaluation-Fairchild Sites, Middlefield-Ellis-Whisman Site, Mountain View, California,* September 3.

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 Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Study Area, Mountain View, California,* June 15, 2011.

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

Haley and Aldrich, 2009. *Revised Supplemental Feasibility Study for Vapor Intrusion Middlefield-Ellis-Whisman Vapor Intrusion Study Area, Mountain View, California,* June 29.

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

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

Locus, 2011. *2010 Annual Progress Report, Former Raytheon Facilities, 350 Ellis Street, Mountain View, California,* April 15, 2011.

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 Environmental, Inc., 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.

United States Environmental Protection Agency, Region 9 (USEPA), 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, 2005. *Required Content for Annual Progress Reports,* distributed by Alana Lee to the MEW distribution list via email on May 6, 2005.

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

USEPA, 2010. *Record of Decision Amendment for the Vapor Intrusion Pathway - Fairchild Semiconductor Corp. – Mountain View Superfund Site - Raytheon Company Superfund Site- Intel Corp. – Mountain View Superfund Site - Portions of NAS Moffett Field Superfund Site* U.S. Environmental Protection Agency Region 9 San Francisco, California, August 16, 2010.

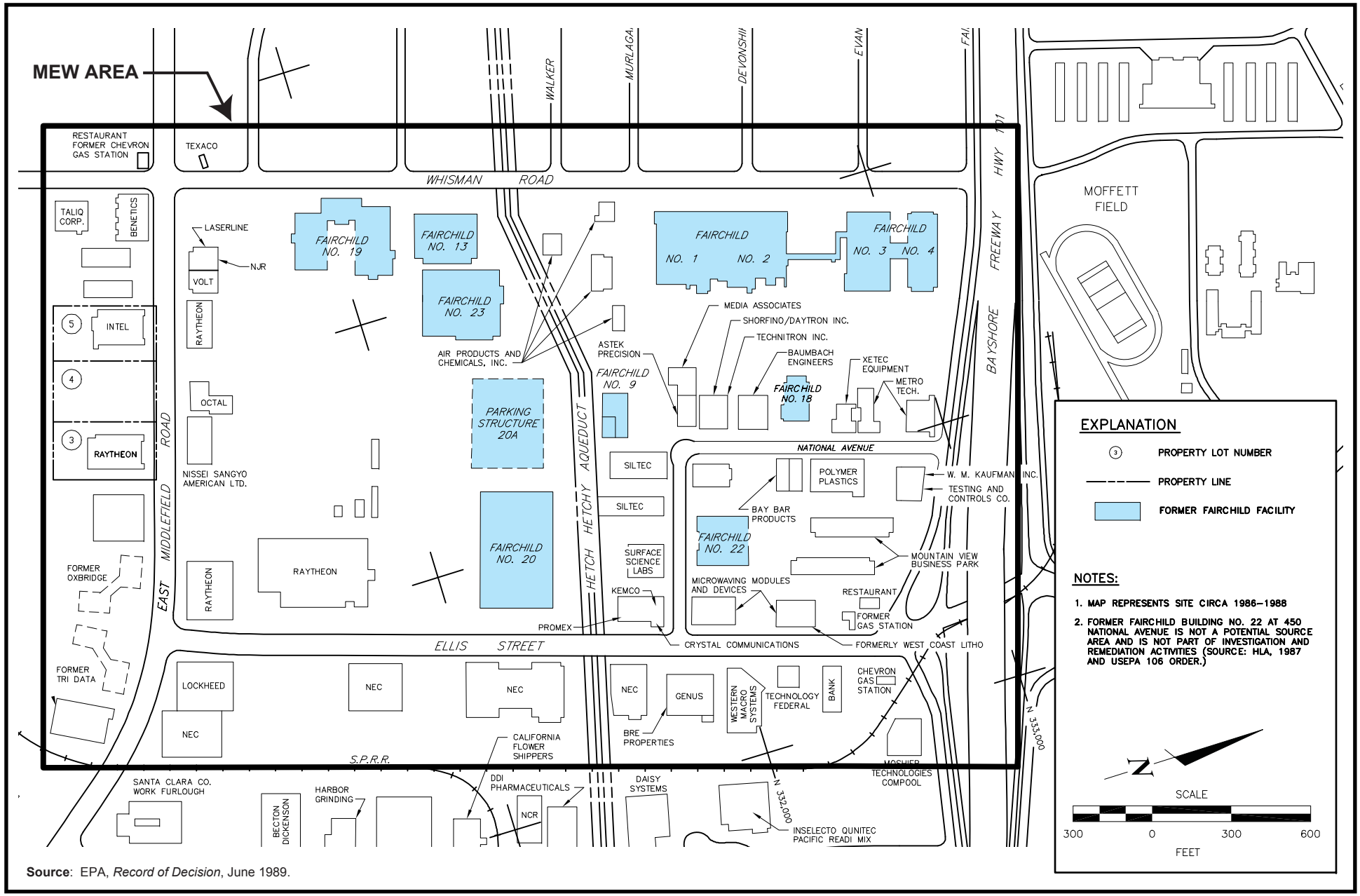
Weiss Associates, 1995. *VOC Transport Report for Intel Mountain View, 365 Middlefield Road, Mountain View, California,* July 6, 1995.

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

Weiss, 2011. *2010 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23, 369/441, Whisman Road 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 Buildings 1 through 4 Site

Former Fairchild Building 9 Site

Former Fairchild Buildings 20 and 20A

Former Fairchild Building 19 Site

Raytheon Site

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

99A 89B2 91B1 DW3-551 DW3-244 DW3-219 83A 25B1 65B3 92B1 28A RAY-1B1 RAY-1A 119A 153A 29A 112B1 REG-4B(1) R10A 24A 7B1 132B2 11C 97B1 R27A R58B2 R5B3 R5B1 134B2 94B1 R62A R3B1 26A 28B3 16B2 158A

0 300 600 900 Feet

N

Explanation

Extraction and Monitoring Wells at Building 20
- Regional Recovery Well, On
- Source Control Recovery Well, On
- Regional Recovery Well, Off
- Source Control Recovery Well, Off
- Monitoring Well

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

- Inlet to storm drain
- Groundwater Treatment System 19
- Groundwater Treatment System
- Treatment-System Pipeline (Arrows show direction of flow)
- Treatment-System Discharge Pipeline (Arrows show direction of flow)
- Slurry Wall
- Building
- Road
- Former Fairchild Buildings 20 and 20A 464 Ellis Street (Current - 464, 466, 468 Ellis Street)

Note: On-Site wells not associated with Buildings 20 and 20A are shown in grey.

Figure 3

Site Map and Well Network
Former Fairchild Buildings 20 and 20A,
464 Ellis Street, Mountain View, California

Weiss Associates
Environmental Science, Engineering, and Management Services

T:\MEW\Maps\AnnRpt\draft2010\BdIg20SiteMapWellNetWrk.mxd

21-April-2011

TABLES

Table 1. Monitoring Well Details, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, Mountain View, California

Well ID	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
153A	10/03/91	A	45.72	4	23	13	23	12	25	Mon
26A	02/20/82	A	47.20	2	30	12	30	10	30	Mon
29A	02/20/82	A	46.08	2	30	15	30	10	30	Mon
99A	07/07/86	A	48.26	4	24.5	9.5	24.5	8	29	Mon
91B1	07/03/86	B1	48.44	4	58	48	58	43	60	Mon
92B1	06/30/86	B1	46.99	4	65	55	65	50	68	Mon
132B2	02/11/87	B2	49.21	4	89	79	89	78	91	Mon
134B2	06/17/87	B2	47.85	4	88	83	88	78	90	Mon
16B2	06/06/85	B2	47.18	4	84	79	84	77	87	Mon
89B2	06/26/86	B2	48.43	4	90	80	90	77	92	Mon
28B3	06/25/85	B3	46.85	4	132	122	132	120	134	Mon
11C	06/15/87	C	49.21	4	216	209	214	204	216	Mon

Notes:

General Notes:

Wells listed in the table are sampled annually by the RGRP, but are listed in the table because they are located in the vicinity of the Buildings 20 and 20A site and are used to evaluate the distribution of VOCs in the groundwater at the Site. Other wells in the vicinity are shown on Figure 3.

Reference 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 aquifer (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

ft = feet

Mon = monitoring well

Table 2. 2010 Monitoring and Reporting Schedule, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, Mountain View, California

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
153A			WL								1, WL	
26A			WL								1, WL	
29A			WL								1, WL	
99A			WL								1, WL	
91B1			WL								1, WL	
92B1			WL								1, WL	
132B2			WL								1, WL	
134B2			WL								1, WL	
16B2			WL								1, 2, WL	
89B2			WL								1, 2, WL	
28B3			WL								1, WL	
11C			WL								1, WL	
Reporting												
USEPA Annual Progress Report						6/15/2010						

Notes:

Wells listed in the table are sampled annually by the RGRP, but are listed in the table because they are located in the vicinity of the Buildings 20 and 20A Site and are used to evaluate the distribution of VOCs in the groundwater at the Site. Other wells in the vicinity are shown on Figure 3.

All samples collected include standard observations, including field analysis for pH, temperature, conductivity, DO, and ORP.

Abbreviations:

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

2 = These wells were selected for Regional-Scale MNA Sampling. In addition to VOCs, samples from these wells were also analyzed for nitrate, sulfate, and ferrous iron (Fe^{II}).

DO = Dissolved Oxygen

MNA = Monitored Natural Attenuation

ORP = Oxidation Reduction Potential

RGRP = Regional Groundwater Remediation Program

USEPA = United States Environmental Protection Agency

VOCs = volatile organic compounds

WL = Semiannual water level

Table 3. Groundwater Sampling Results Summary, January 2006 through December 2010, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, 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
			<						µg/L						>
26A	11/06/06	CT/8260	<1.0	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	0.5	<0.5	2.7
26A	11/09/07	CT/8260	<1.0	2.7	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	2.7
26A	11/07/08	CT/8260	<1.0	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	0.5	<0.5	1.6
26A	11/06/09	CT/8260	<1.0	2.3	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	2.3
26A	11/04/10	CT/8260	<1.0	2.6	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	2.6
29A	11/06/06	CT/8260	<1.0	3.3	<0.5	9.2	<0.5	<0.5	3.1	<20	0.9	47	1.9	<0.5	65.4
29A	11/09/07	CT/8260	<1.0	4.3	<0.5	8.4	<0.5	<0.5	3.6	<20	0.8	48	1.9	<0.5	67
29A	11/11/08	CT/8260	1.2	6.2	<0.5	11	<0.5	<0.5	4	<20	<0.5	57	1.3	<0.5	80.7
29A	11/10/09	CT/8260	<1.0	3.7	<0.5	9	<0.5	<0.5	<2.0	<20	0.6	30	1.4	<0.5	44.7
29A	11/09/10	CT/8260	<1.0	4.2	<0.5	8.1	<0.5	<0.5	<2.0	<2.0	0.8	31	1.6	<0.5	46.3
99A	11/07/06	CT/8260	<2.5	3.9	<1.3	6.5	160	1.4	34	<50	<1.3	8.3	300	<1.3	514.1
99A	11/08/07	CT/8260	<4.0	3.9	<2.0	5.2	140	2.9	41	<80	<2.0	9.5	360	<2.0	562.5
99A	11/11/08	CT/8260	<3.3	4.2	<1.7	6.6	150	<1.7	44	<67	<1.7	7.7	350	<1.7	562.5
99A	11/23/09	CT/8260	<4.0	3.2	<2.0	5.1	140	2.8	27	<80	<2.0	5.3	300	<2.0	483.4
99A	11/23/10	CT/8260	<2.5	4.6	<1.3	6.6	160	2	31	<5.0	<1.3	6.1	320	<1.3	530.3
99A (DUP)	11/23/10	CT/8260	<1.0	5.2	<0.5	8.2	140	1.9	38	<2.0	0.5	7	290	0.7	491.5
153A	11/06/06	CT/8260	<1.0	<0.5	<0.5	1.2	1	<0.5	0.9	<20	<0.5	1.2	16	<0.5	20.3
153A	11/14/07	CT/8260	<1.0	<0.5	<0.5	1.1	1.5	<0.5	1.4	<20	<0.5	1.1	20	<0.5	25.1
153A	11/07/08	CT/8260	<1.0	<0.5	<0.5	0.7	1.2	<0.5	0.7	<20	<0.5	1	15	<0.5	18.6
153A (DUP)	11/07/08	CT/8260	<1.0	<0.5	<0.5	0.8	1.1	<0.5	0.7	<20	<0.5	1	16	<0.5	19.6
153A	11/10/09	CT/8260	<1.0	<0.5	<0.5	0.7	1	<0.5	<2.0	<20	<0.5	0.7	12	<0.5	14.4
153A (DUP)	11/10/09	CT/8260	<1.0	<0.5	<0.5	0.8	0.9	<0.5	<2.0	<20	<0.5	0.7	13	<0.5	15.4
153A	11/09/10	CT/8260	<1.0	<0.5	<0.5	0.8	1.2	<0.5	<2.0	<2.0	<0.5	0.9	15	<0.5	17.9
153A (DUP)	11/09/10	CT/8260	<1.0	<0.5	<0.5	0.8	1.3	<0.5	<2.0	<2.0	<0.5	0.9	14	<0.5	17
91B1	11/07/06	CT/8260	<1.0	2.9	<0.5	2.5	75	0.8	1.3	<20	<0.5	0.6	130	0.5	213.6
91B1	11/08/07	CT/8260	<1.4	2.7	<0.7	1.3	62	1.7	1	<29	<0.7	<0.7	120	<0.7	188.7
91B1	11/11/08	CT/8260	<1.0	3.5	<0.5	2.7	74	0.9	1.7	<20	<0.5	0.6	120	<0.5	203.4
91B1	11/23/09	CT/8260	<1.0	1.1	<0.5	<0.5	23	<0.5	<2.0	<20	<0.5	<0.5	30	<0.5	54.1

Table 3. Groundwater Sampling Results Summary, January 2006 through December 2010, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, 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
			<						µg/L						>
91B1	11/22/10	CT/8260	<1.0	2.3	<0.5	1.4	52	0.7	<2.0	<2.0	<0.5	<0.5	68	<0.5	124.4
92B1	11/07/06	CT/8260	<1.4	<0.7	<0.7	<0.7	4.9	<0.7	<0.7	<29	<0.7	<0.7	100	<0.7	104.9
92B1	11/08/07	CT/8260	<2.0	<1.0	<1.0	<1.0	3.8	<1.0	<1.0	<40	<1.0	<1.0	94	<1.0	97.8
92B1	11/18/08	CT/8260	<2.0	<1.0	<1.0	<1.0	4.8	<1.0	1.2	<40	<1.0	<1.0	98	<1.0	104
92B1	11/18/09	CT/8260	<1.0	<0.5	<0.5	<0.5	3.3	<0.5	<2.0	<20	<0.5	<0.5	91	<0.5	94.3
92B1	11/22/10	CT/8260	<1.0	<0.5	<0.5	<0.5	3.7	<0.5	<2.0	<2.0	<0.5	<0.5	90	<0.5	93.7
16B2	11/06/06	CT/8260	<1.0	<0.5	<0.5	<0.5	2.6	<0.5	<0.5	<20	<0.5	<0.5	95	<0.5	97.6
16B2	11/09/07	CT/8260	<1.0	<0.5	<0.5	<0.5	2.5	<0.5	<0.5	<20	<0.5	<0.5	78	<0.5	80.5
16B2	11/11/08	CT/8260	<1.0	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<20	<0.5	<0.5	78	<0.5	80.9
16B2	11/11/09	CT/8260	<1.0	<0.5	<0.5	<0.5	2.3	<0.5	<2.0	<20	<0.5	<0.5	62	<0.5	64.3
16B2	11/10/10	CT/8260	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<2.0	<20	<0.5	<0.5	82	<0.5	84.1
89B2	11/07/06	CT/8260	<1.0	<0.5	<0.5	<0.5	19	<0.5	<0.5	<20	<0.5	<0.5	25	<0.5	44
89B2	11/08/07	CT/8260	<1.0	<0.5	<0.5	<0.5	11	<0.5	<0.5	<20	<0.5	<0.5	19	<0.5	30
89B2	11/11/08	CT/8260	<1.0	<0.5	<0.5	<0.5	8.9	<0.5	<0.5	<20	<0.5	<0.5	18	<0.5	26.9
89B2	11/23/09	CT/8260	<1.0	<0.5	<0.5	<0.5	6.4	<0.5	<2.0	<20	<0.5	<0.5	9.1	<0.5	15.5
89B2	11/10/10	CT/8260	<0.5	<0.5	<0.5	<0.5	4.1	<0.5	<2.0	<20	<0.5	<0.5	8.1	<0.5	12.2
132B2	11/07/06	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
132B2	11/08/07	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
132B2	11/11/08	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
132B2	11/04/09	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	ND
132B2	11/04/10	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	ND
134B2	11/07/06	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
134B2	11/09/07	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
134B2	11/07/08	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
134B2	11/03/09	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	ND
134B2	11/04/10	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	ND

Table 3. Groundwater Sampling Results Summary, January 2006 through December 2010, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, 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
			<						µg/L						>
28B3	11/06/06	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
28B3	04/24/08	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
28B3	11/14/08	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
28B3	11/03/09	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	ND
28B3	11/11/10	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	ND
11C	11/07/06	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	ND
11C	11/19/07	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	1.6	<0.5	1.6
11C	11/14/08	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	2	<0.5	2
11C	11/09/09	CT/8260	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	1.7	<0.5	1.7
11C	11/11/10	CT/8260	<1.0	<0.5	<0.5	<0.5	0.5	<0.5	<2.0	<2.0	<0.5	<0.5	1.9	<0.5	2.4

Note:

The letter in the sample location name identifies the respective water-bearing zone. There are six designated water-bearing zones in the MEW area: A, B1, B2, B3, C and deep aquifer (DW)

Abbreviations:

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

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

ANALYTIC REPORTS AND CHAIN-OF-CUSTODY DOCUMENTS,
JANUARY THROUGH DECEMBER 2010

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

Weiss Associates

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 at the Middlefield-Ellis Whisman (MEW) Area were reviewed for precision, accuracy, reproducibility, and completeness in accordance with the approved MEW 1991 *Quality Assurance Project Pla*n (QAPP).[3] In addition, the data quality review was based on Weiss November 2009 *Standard Operating Procedures* (SOPs) for data verification, data validation, and validation procedures for metals, volatile organic chemicals (VOCs), and semivolatile organic chemicals. The SOPs are based on the 1991 MEW QAPP, but they functionally adhere to the most recent USEPA data validation guidelines.

The complete data quality review report is presented in Appendix G of the RGRP annual report (Geosyntec, 2011b).

The MEW QAPP specifies Level 2 and 10% Level 4 Data Quality Review, and this was performed for samples collected by Weiss Associates during the 2010 annual sampling event in accordance with the MEW QAPP and SOPs.

To assess the reliability of field sampling procedures and materials, the following field QA/QC samples were collected or prepared for each sampling event:

- Field duplicates were collected for 2 wells associated with the Site: 153A and 99A. The relative percent differences between the duplicates and the original samples were less than 10% and are well within the acceptance criteria of 35%. For more details, see Table G-3 of the RGRP Annual Report (Geosyntec 2011b).
- Rinseate Sample/Equipment Blank – These samples consist of water collected from a final deionized water rinse of sampling equipment after decontamination. These samples were collected at a frequency of 5% of the field samples collected.. The purpose of rinseate samples is to determine whether the sampling equipment is causing cross contamination of samples. 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. This document is sometimes referred to as the Unified QAPP because it is used by MEW, NASA and Navy.

- 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 VOC analyses. Trip blanks were analyzed for all VOC analyses specified for samples in the corresponding cooler. The 2010 trip blank results demonstrate that the samples were not exposed to contamination during storage and transport to the laboratory.

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.

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.

Ten percent of all sample delivery groups underwent a stringent Level 4 data validation as required by the MEW QAPP. 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 of relative standard deviations in initial calibrations;
- Percent of 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 within established limits;
- Initial calibration correlation coefficients within established limits;
- Continuing calibration verification recoveries within established limits;
- Analytical sequence carryover;
- Dilutions performed appropriately;
- Laboratory duplicate results 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.

The MEW Project Chemist assigned qualifiers to data that were found outside control limits in the MEW QAPP and data evaluation SOPs. 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*.

A total of 233 treatment system samples were submitted to Curtis and Tompkins in Berkeley, California, a state-certified analytical laboratory for specified analyses, including VOCs, semi-VOCs, metals, and 1,4-dioxane analysis. Three samples were analyzed for acute toxicity using USEPA-821-R-02-012 and turbidity using USEPA method 180.1 by Block Environmental Services, Inc., another state-certified laboratory. In addition to the monthly treatment system samples, 96 total groundwater samples were collected from the former Fairchild buildings area, including Treatment Systems 1, 3, and 19 monitoring and extraction wells as a part of MEW annual groundwater sampling event. The groundwater samples were analyzed for halogenated VOCs using EPA Method USEPA 8260B for the 8010 MS Parameters by Curtis and Tompkins.

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.

Table C-1 summarizes the sampling QA/QC, and Table C-2 summarizes samples for the 2010 annual groundwater sampling event at former Fairchild Buildings 20 and 20A.

Table C-1. Summary of Sampling QA/QC for January through December 2010, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, 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 < 6mm (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 20 and 20A, 464 Ellis Street, Mountain View, California.

Who performed analysis (Lab name/address/contact/phone):	Curtis and Tompkins 2323 Fifth Street Berkeley, CA 94710 Micah Smith (510) 204-2223
Analytical methods (by method number and chemical category): Groundwater samples[1]:	16 samples (including 2 travel blanks and 2 duplicates) analyzed by USEPA 8260B – halogenated volatile organic compounds (8010 MS parameters) 2 samples analyzed by USEPA 300.0 – Nitrate and Sulfate 2 samples analyzed by USEPA 200.7 – Ferrous Iron (Fe^{II})
Are the labs state-certified for the above-noted 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]
QA/QC results and acceptance criteria on file?	YES

Explain any "NO" answers.

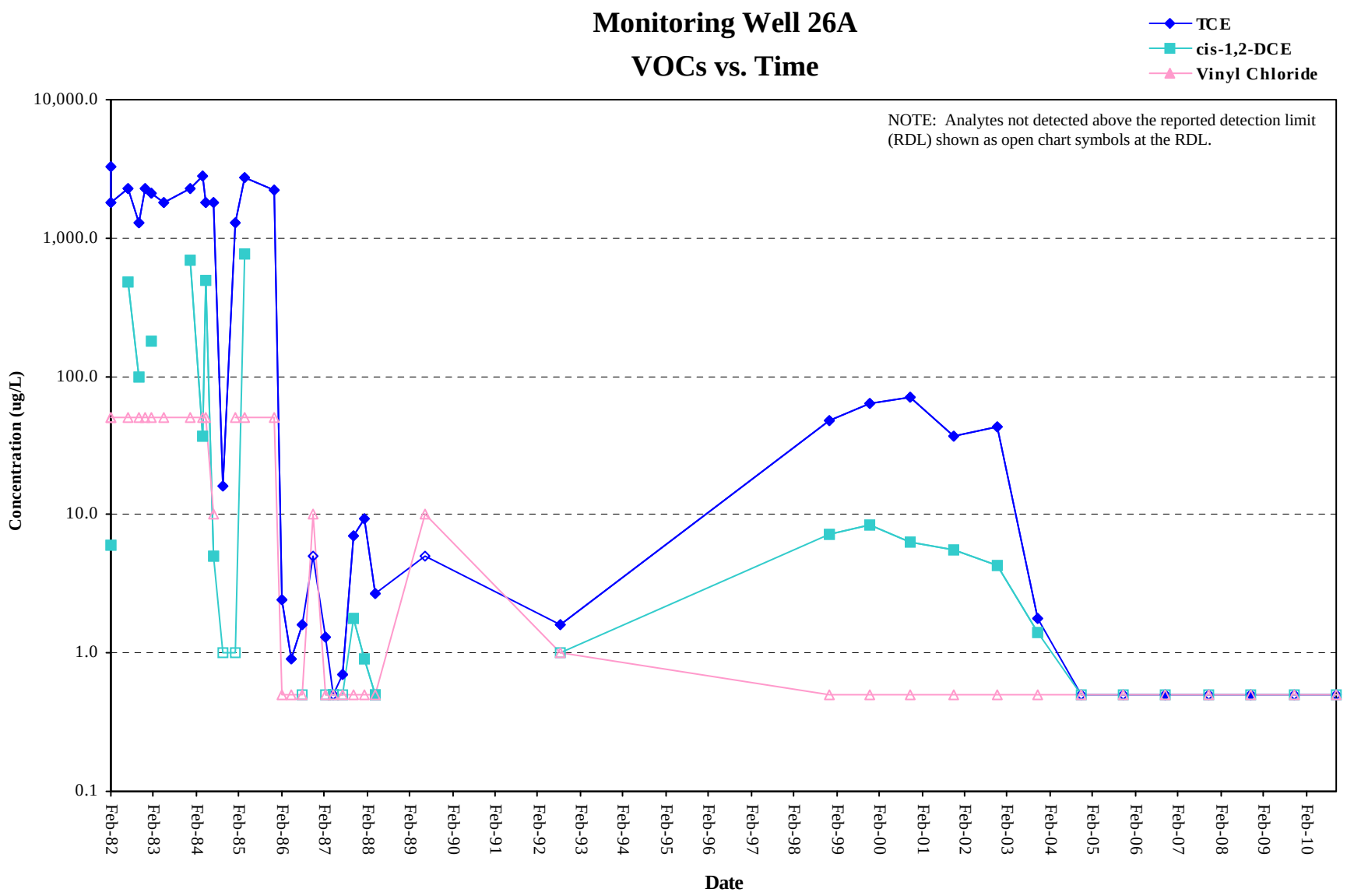
1. The analytical reports and chain-of-custody forms are located in Appendix B.

APPENDIX D

SELECT VOCS-VERSUS-TIME GRAPHS

Weiss Associates

Monitoring Well 26A
VOCs vs. Time

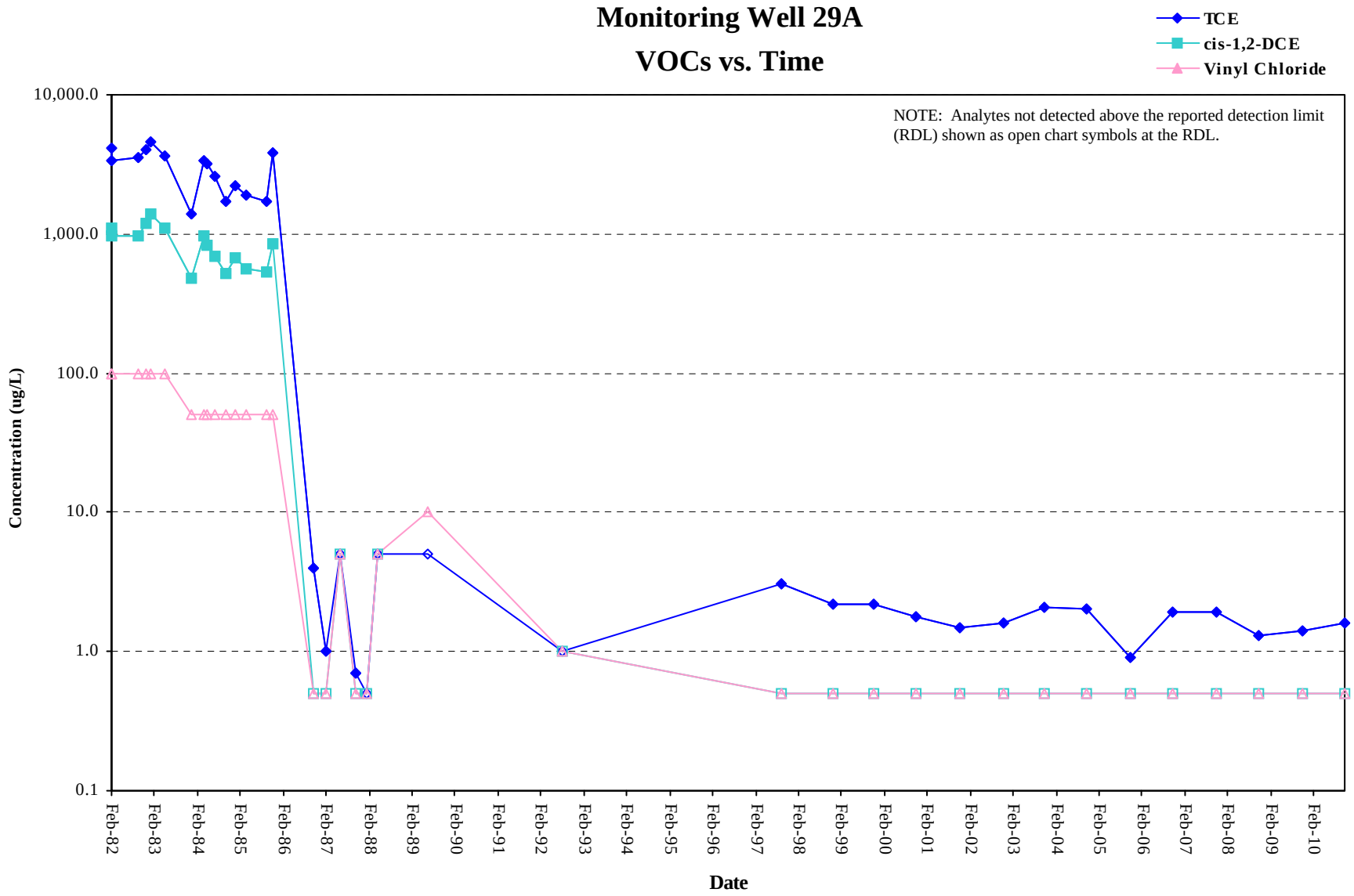


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:32 PM

Weiss Associates

Monitoring Well 29A
VOCs vs. Time

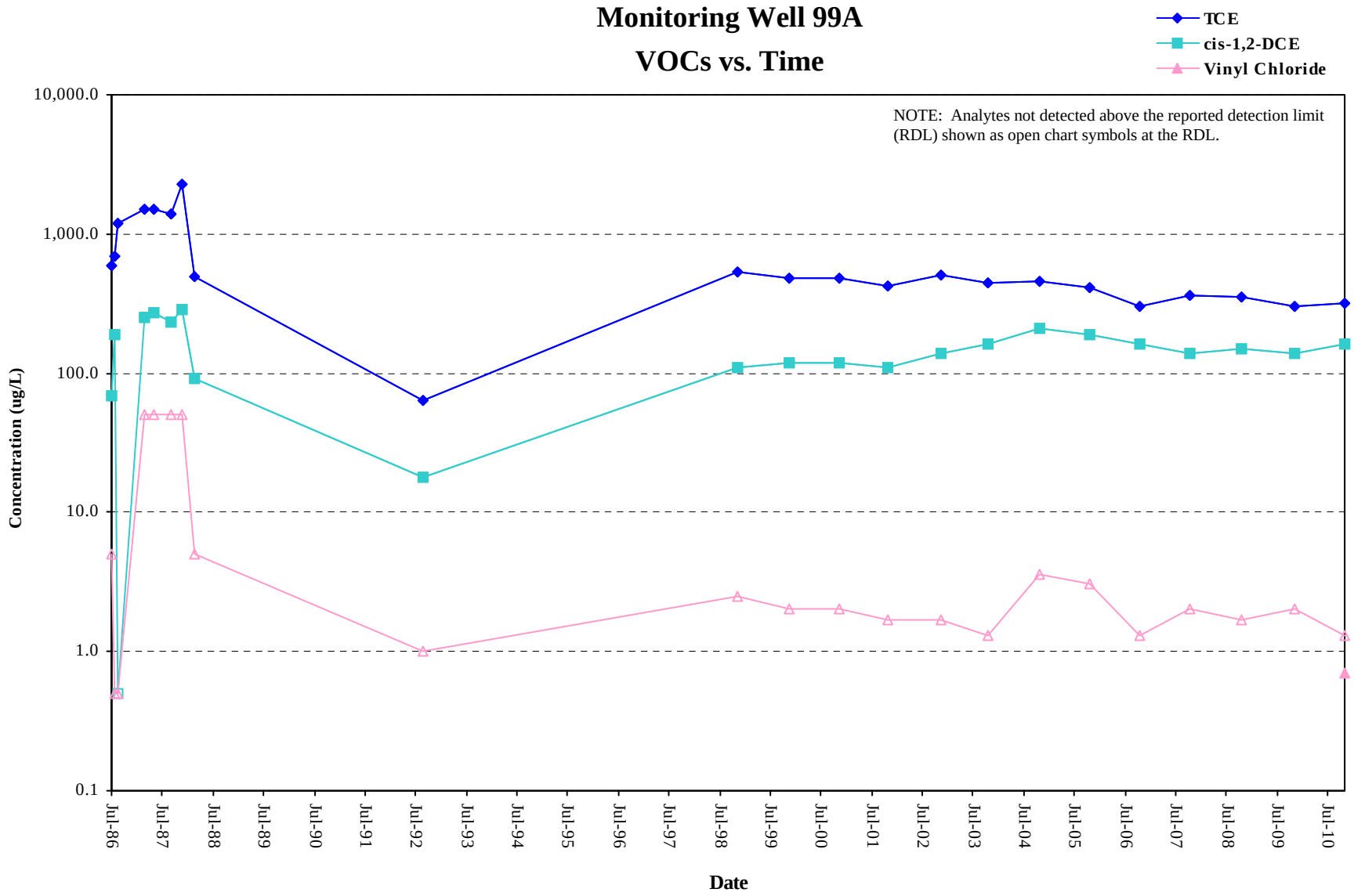


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:34 PM

Weiss Associates

Monitoring Well 99A
VOCs vs. Time

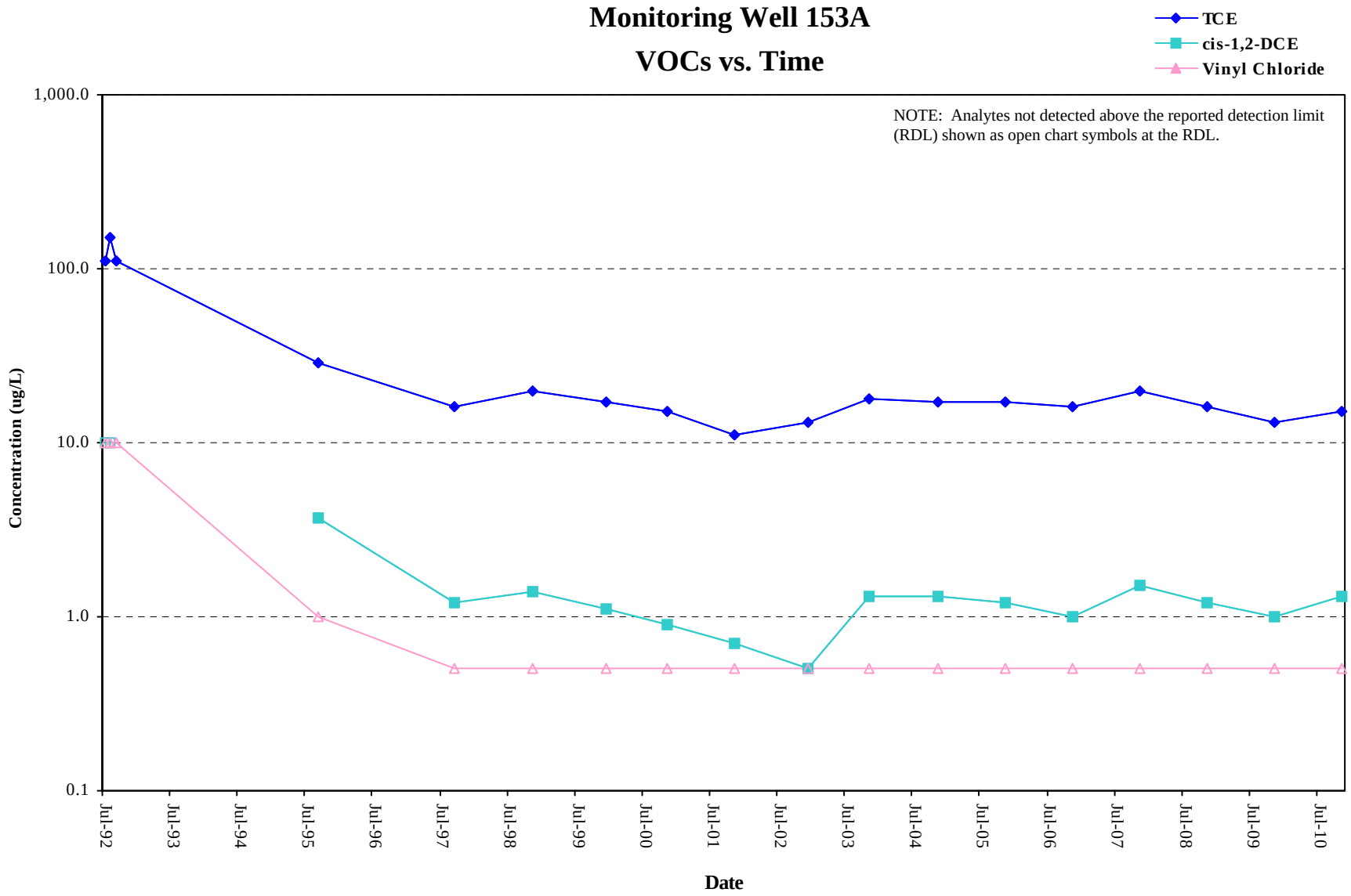


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:35 PM

Weiss Associates

Monitoring Well 153A
VOCs vs. Time

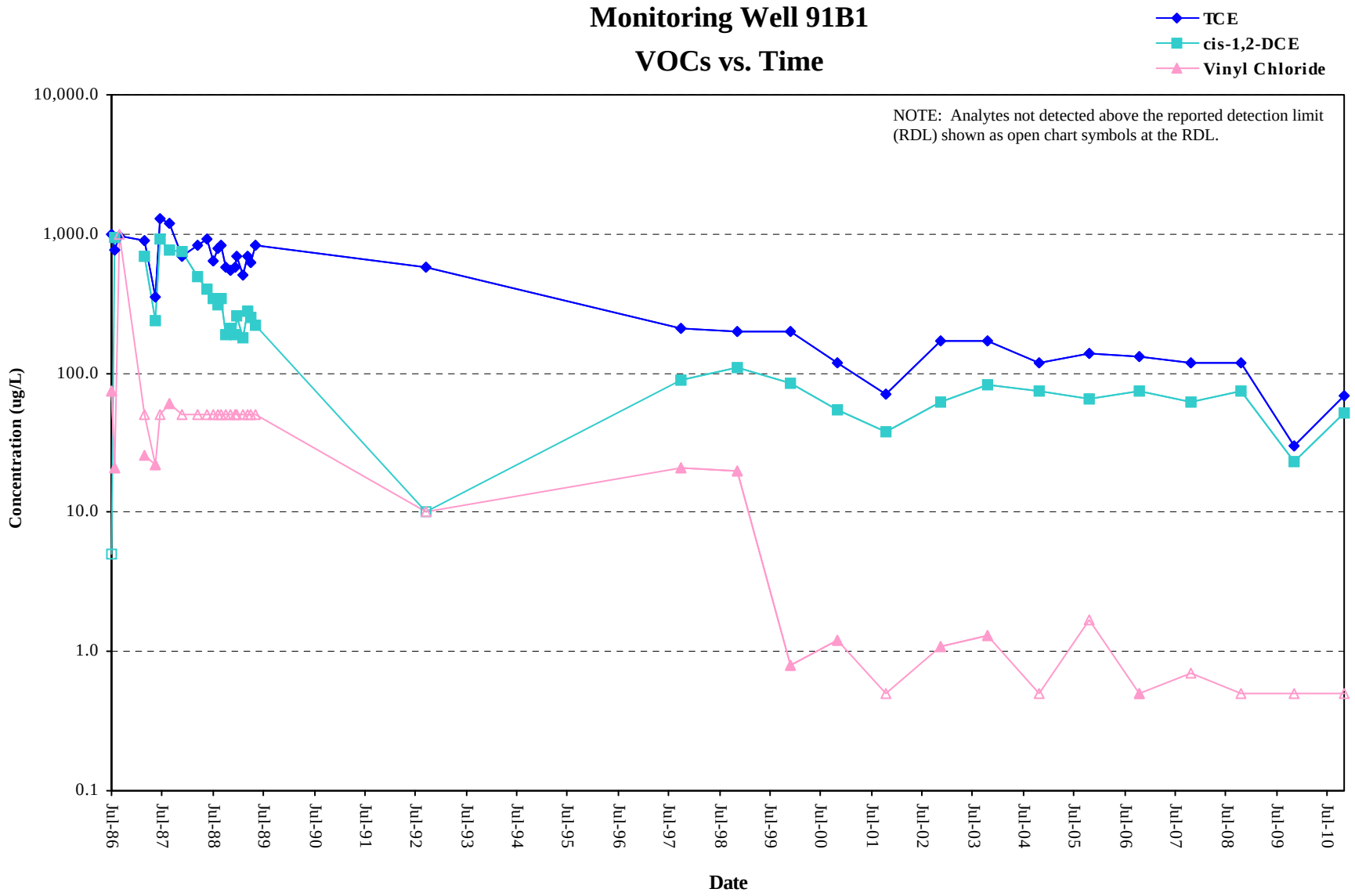


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:36 PM

Weiss Associates

Monitoring Well 91B1
VOCs vs. Time

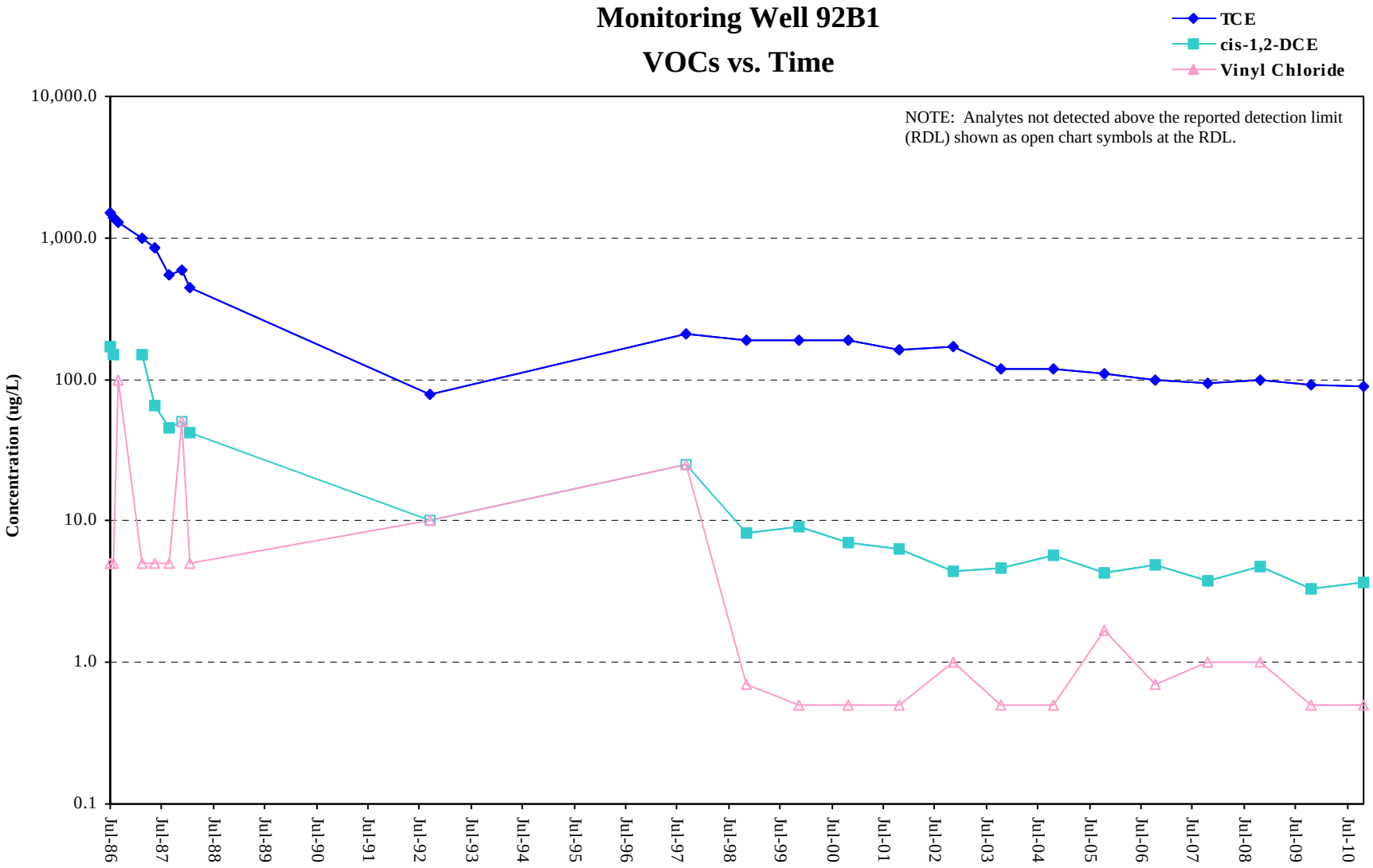


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:38 PM

Weiss Associates

Monitoring Well 92B1
VOCs vs. Time

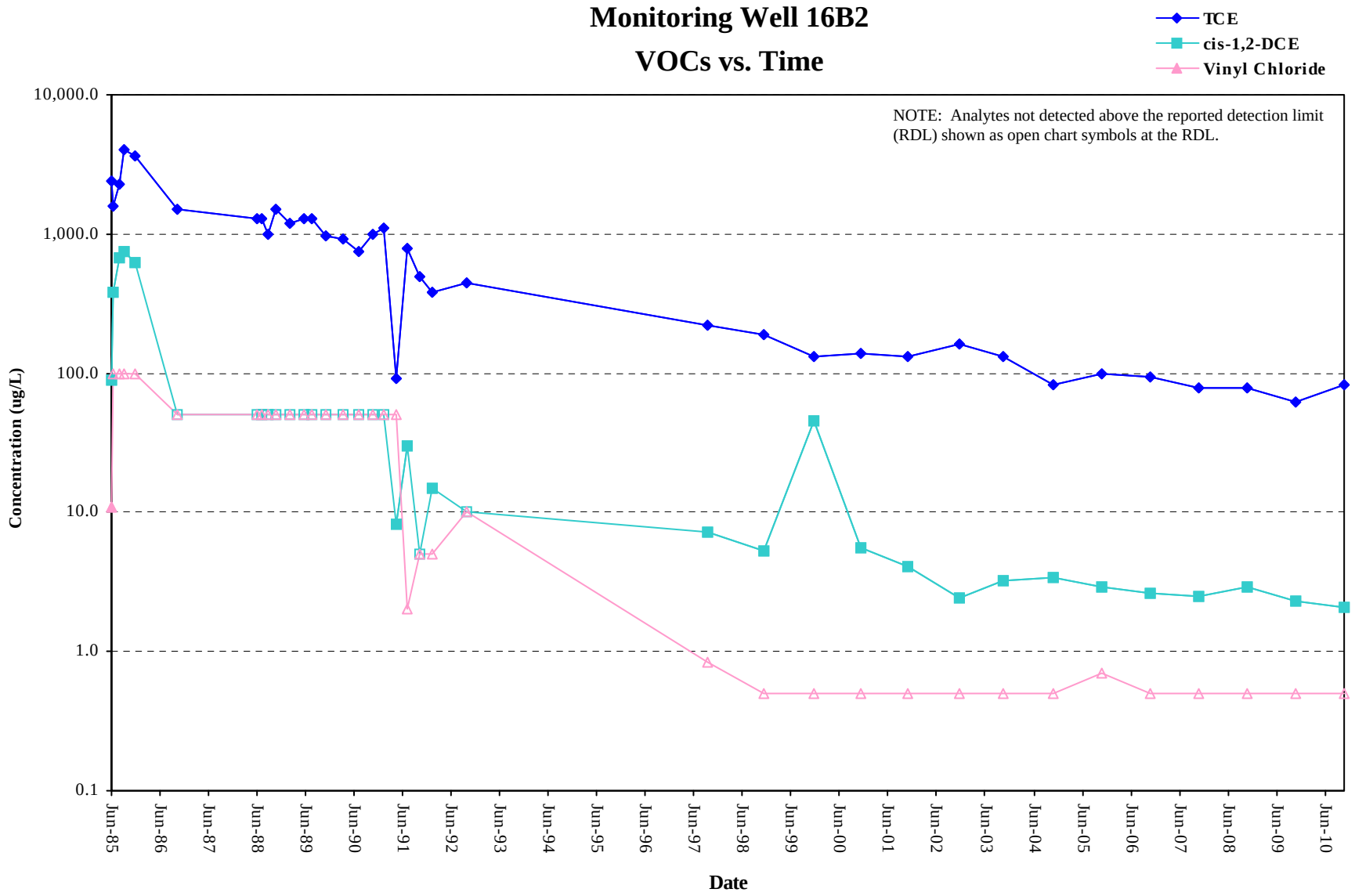


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:39 PM

Weiss Associates

Monitoring Well 16B2
VOCs vs. Time

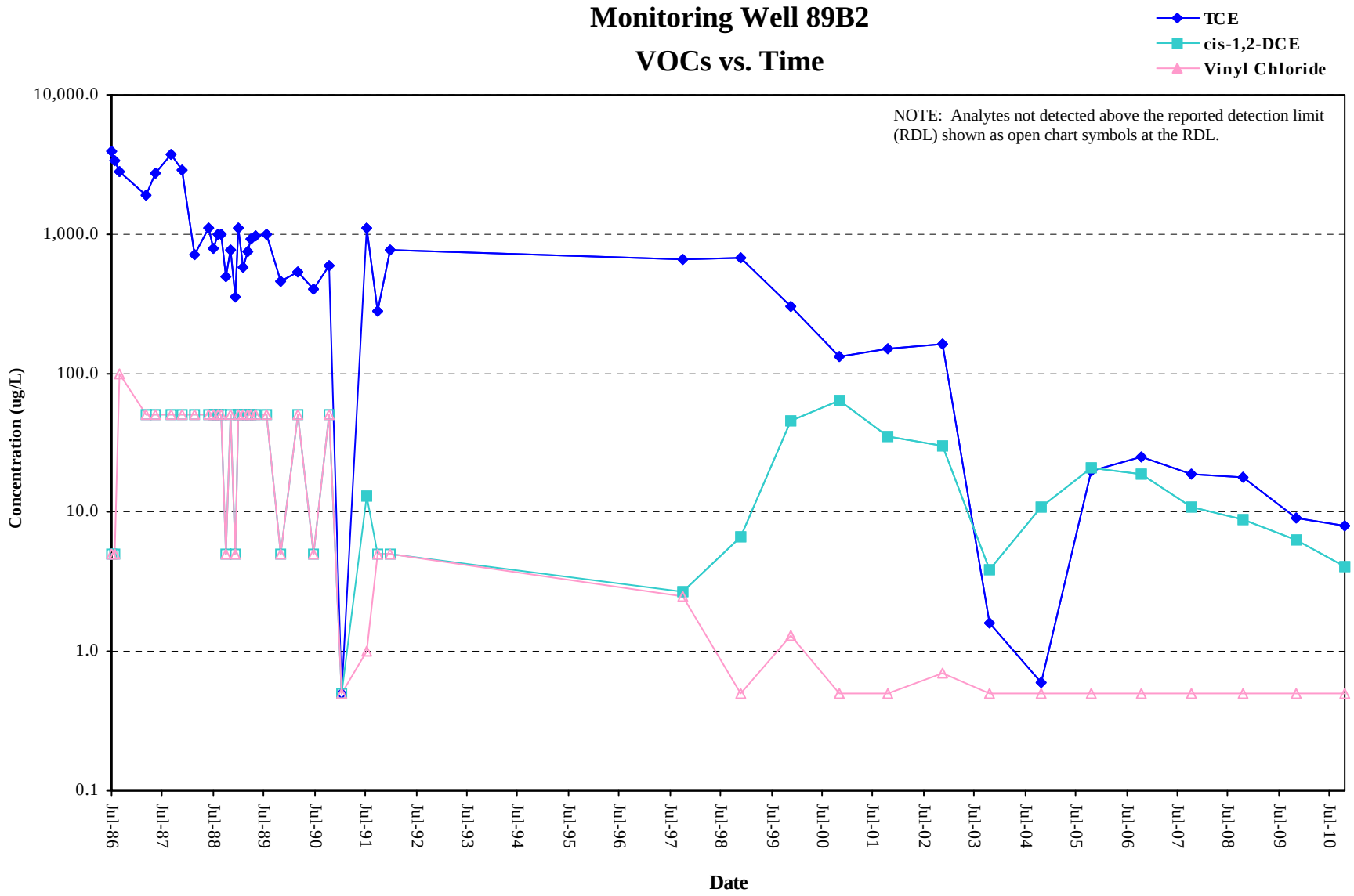


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:40 PM

Weiss Associates

Monitoring Well 89B2
VOCs vs. Time

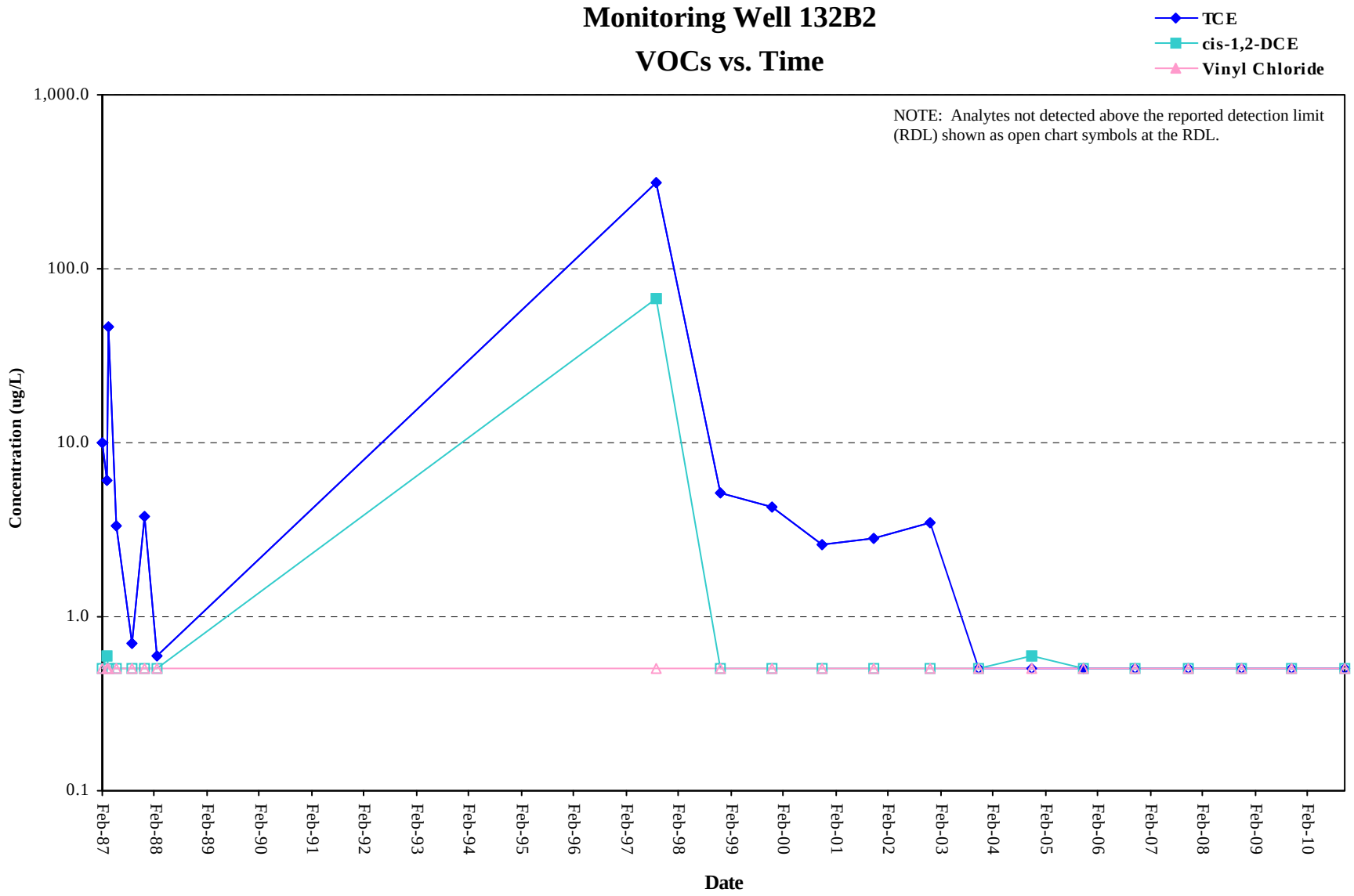


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:42 PM

Weiss Associates

Monitoring Well 132B2
VOCs vs. Time

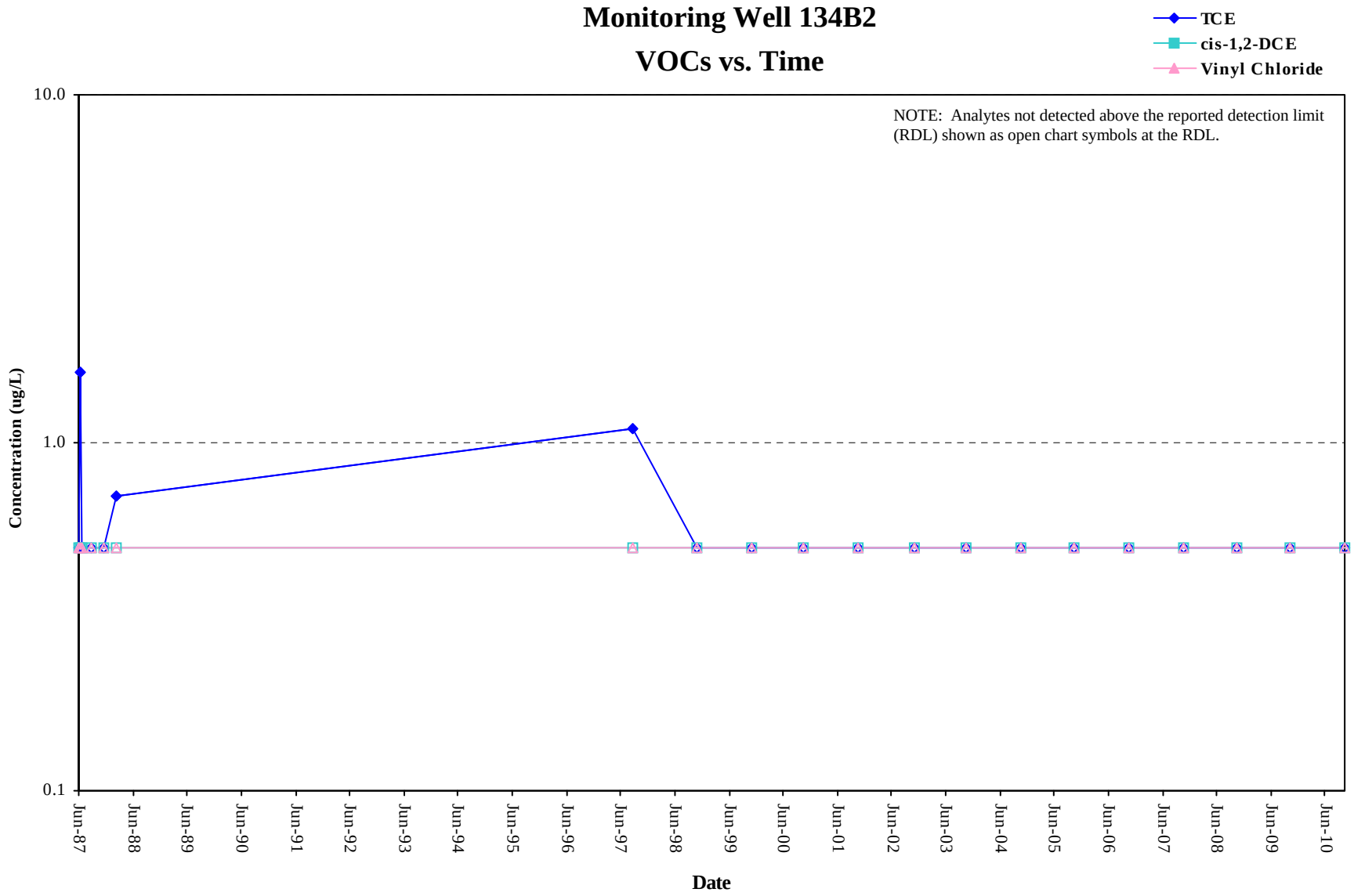


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:43 PM

Weiss Associates

Monitoring Well 134B2
VOCs vs. Time

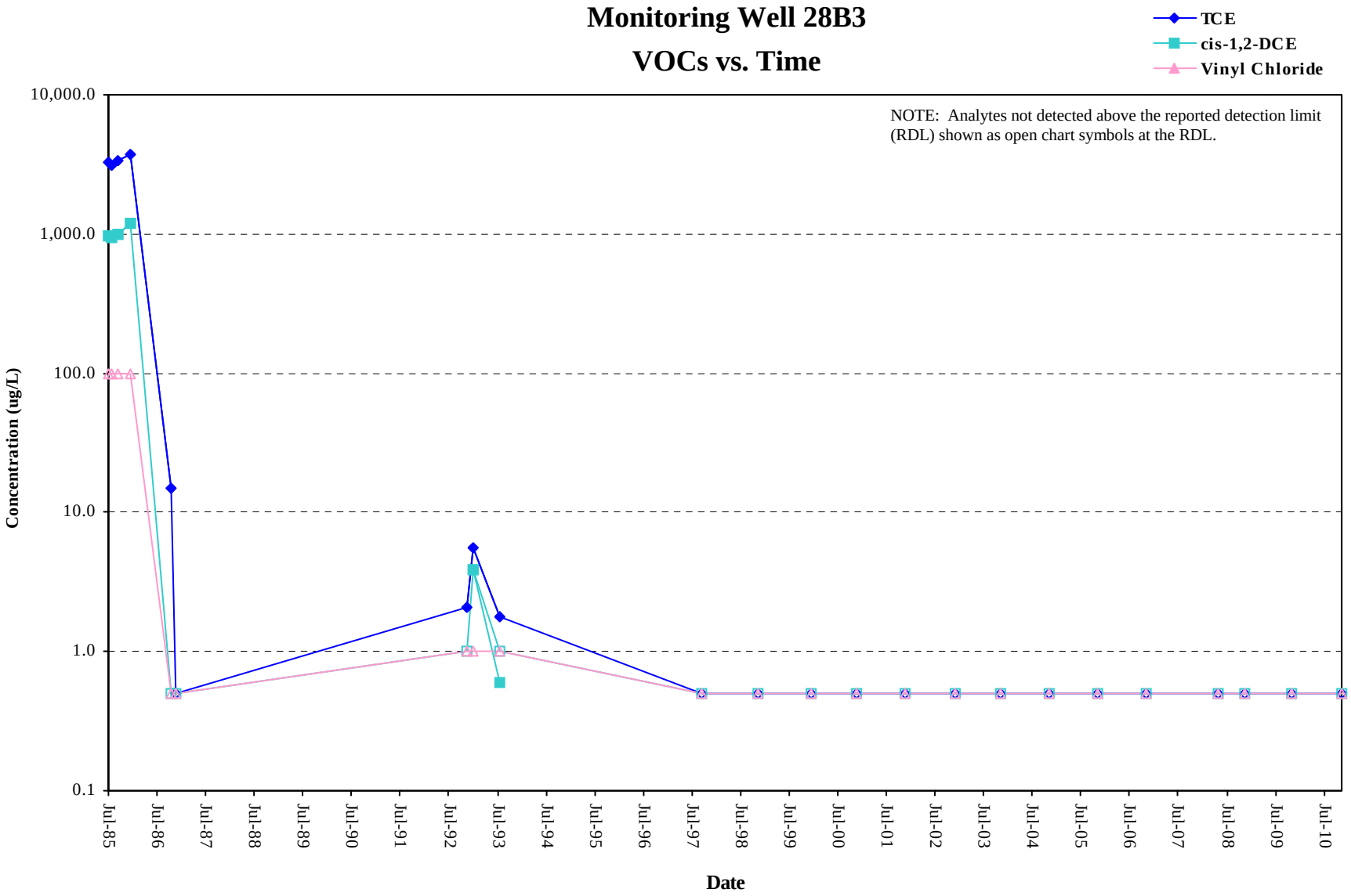


Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:44 PM

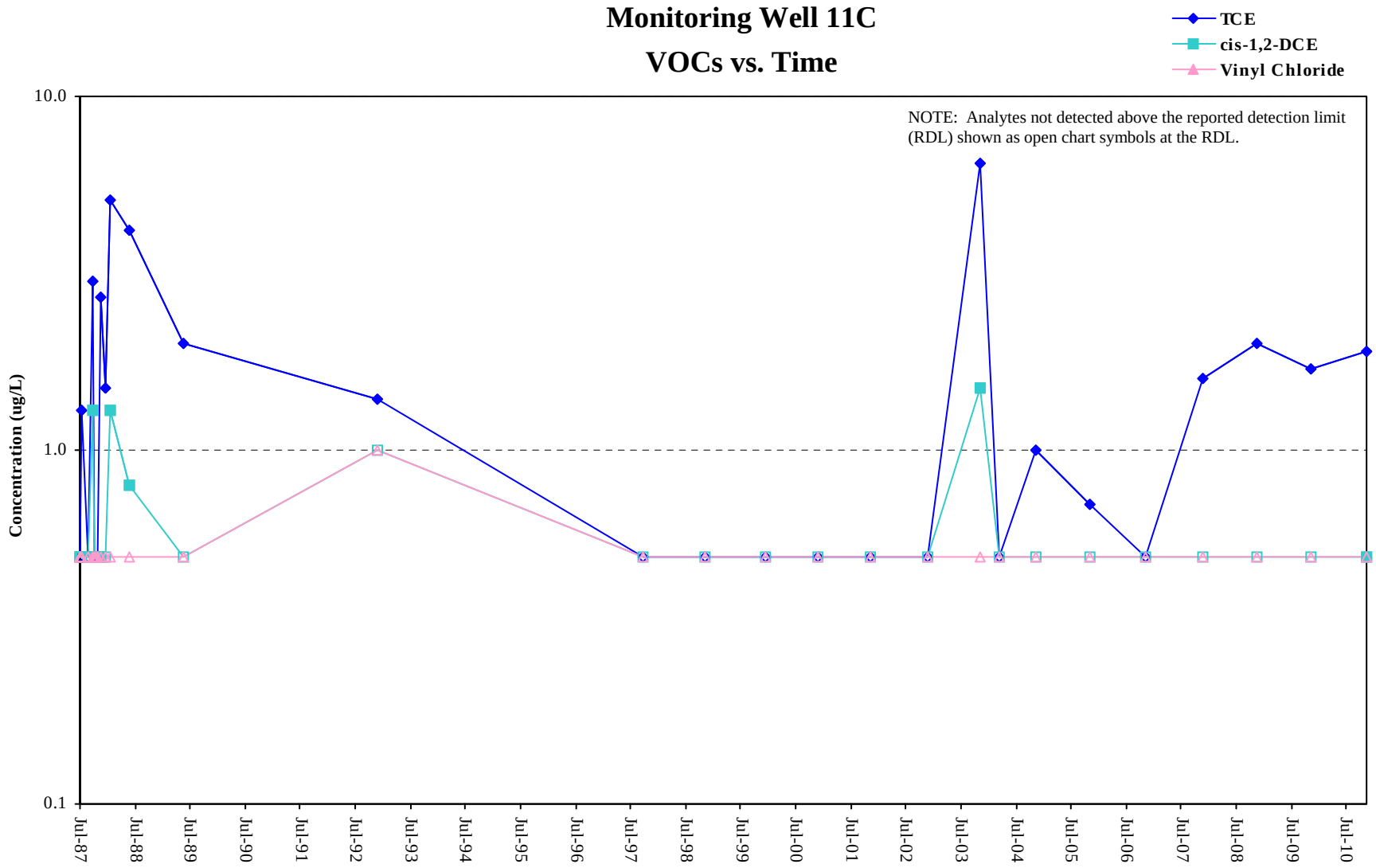
Weiss Associates

Monitoring Well 28B3
VOCs vs. Time



Weiss Associates

Monitoring Well 11C
VOCs vs. Time



Database: S:\WELLDATA\Schlumberger\Mt View - MEW\SlmbMv.mdb
Report: rptMvChrts2010LogV2 Loc. Group: Bldg20

Printed: 5/31/2011 5:12:46 PM