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April 13, 2012

Penny Reddy
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Superfund Division SFD-7-3
EPA Region IX
75 Hawthorne Street
San Francisco, CA 94105

Subject: **2011 Annual Progress Report – Former Fairchild Buildings 20 and 20A**
Middlefield-Ellis-Whisman ("MEW") Area
Mountain View, California

Dear Ms. Reddy:

Attached please find the 2011 Annual Progress Report for Former Fairchild Buildings 20 and 20A, prepared by Geosyntec Consultants on behalf of Schlumberger Technology Corporation.

This annual progress report is being submitted in accordance with U.S. Environmental Protection Agency (EPA) Section XV of the Administrative Order for Remedial Design and Remedial Action (106 Order).

If you have any questions regarding this 2011 Annual Progress Report, please feel free to call me.

Very truly yours,

Virgilio Cocianni
Remediation Manager

Attachment

CC: MEW Distribution List

Prepared for

Schlumberger Technology Corporation
225 Schlumberger Drive
Sugar Land, Texas 77478

2011 ANNUAL PROGRESS REPORT FOR FORMER FAIRCHILD BUILDINGS 20 and 20A

MOUNTAIN VIEW, CALIFORNIA

Prepared by

Geosyntec consultants

engineers | scientists | innovators

1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WR1133

13 April 2012

2011 Annual Progress Report for Former Fairchild Buildings 20 and 20A

464 Ellis Street

Middlefield-Ellis-Whisman Study Area

Mountain View, California

Prepared by

Geosyntec Consultants, Inc.
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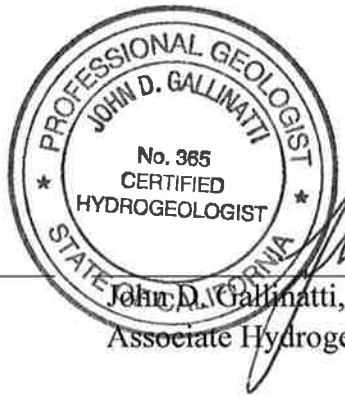

Lea Zimmermann
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Project Number: WR1133
13 April 2012

Geosyntec consultants

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ACRONYMS AND ABBREVIATIONS

106 Order	Administrative Order for Remedial Design and Remedial Action
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
EPA	United States Environmental Protection Agency
Fairchild	Fairchild Semiconductor Corporation
ft	feet
GAC	granulated activated carbon
Geosyntec	Geosyntec Consultants
HLA	Harding Lawson Associates
K	hydraulic conductivity
MEW	Middlefield-Ellis-Whisman
NASA	National Aeronautics and Space Administration
QA/QC	quality assurance and quality control
Raytheon	Raytheon Company
RGRP	Regional Groundwater Remediation Program
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
VOCs	volatile organic compounds
Weiss	Weiss Associates

1. INTRODUCTION

This 2011 Annual Progress Report was prepared by Geosyntec Consultants (Geosyntec) with assistance from Weiss Associates (Weiss) on behalf of Schlumberger Technology Corporation (STC) for the former Fairchild Semiconductor Corporation (Fairchild) facilities previously located at 464 Ellis Street (Buildings 20 and 20A) in Mountain View, California (Site) (Figures 1 and 2).

This progress report contains a summary of Site activities and data from 1 January through 31 December 2011, 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 (EPA), and the EPA's correspondence prescribing annual report contents (EPA, 1990a, 2005, and 2011).

1.1 Site Background

The Site lies within the Middlefield-Ellis-Whisman (MEW) study area, an approximate quarter square-mile area bounded by Middlefield Road on the south, Ellis Street on the east, Whisman Road on the west, and Highway 101 on the north, in Mountain View California (Figure 2).

From 1968 to the mid-1980s, Building 20 functioned as a silicon wafer production facility for Fairchild, and Building 20A served as the parking area (Figure 2). Building 20 was demolished in the 1990s, and new commercial/research offices were constructed and completed over the building and parking area by early 2000. The previous and current addresses of Former Fairchild Buildings 20 and 20A are provided below:

Previous Address	Current Address
Buildings 20 and 20A, 464 Ellis Street	464, 466, and 468 Ellis Street

Remedial actions for the MEW study area, including the Site, are specified in a 1989 Record of Decision (ROD) issued by EPA and two subsequent Explanation of Significant Differences remedy guidance documents (EPA, 1989, 1990b, 1996). The volatile organic compounds (VOCs) addressed in the MEW ROD are assigned to both facility-specific and regional responsibilities.

As specified in the ROD, groundwater cleanup included initial actions (completed) and the current long-term remedial phase (EPA, 1989).[1]

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. In order to prevent migration of VOCs offsite, groundwater extraction wells have been installed at the Site and are maintained by other MEW parties. A description of the remedy is provided in Section 1.3.

1.2 Local Hydrology

The Site is located within the northern portion of the Santa Clara Valley Groundwater Sub-basin, the northern-most of three interconnected groundwater basins within Santa Clara County (SCVWD, 2001). The groundwater flow direction is northerly, toward the San Francisco Bay, and generally sub-parallel to the ground slope. The hydrostratigraphy in this part of the sub-basin is divided into upper and lower water-bearing zones, separated by an extensive regional aquitard (SCVWD, 1989).

The upper water-bearing zone is subdivided into two water-bearing zones: the A Zone (roughly between 20 and 45 feet below ground surface [bgs]) and the B Zone (roughly between 50 and 160 feet bgs), which are separated by the A/B Aquitard. The B Zone is subdivided into three zones (B1, B2, and B3 Zones).

The lower water-bearing zone occurs below a depth of about 200 feet bgs. The lower water bearing zone is subdivided into the C Zone (which extends to about 240 feet bgs) and the Deep Zone. The aquitard separating the upper and lower water-bearing zones is represented as the B/C Aquitard and is the major confining layer beneath the Site.

The water-bearing zones defined at the MEW area are summarized below:

Water Bearing Zones	Approximate Depth Interval Below Ground Surface (bgs)
A[a]	0 to 45 feet
B1[b]	50 to 75 feet
B2	75 to110 feet
B3	120 to 160 feet

[1] The soil cleanup goals have been met at the Site (EPA, 2004). Site soil cleanup actions were conducted from 1996 to 1997 and included in-situ soil vapor extraction (SVE) with treatment by vapor-phase granular activated carbon (GAC), and soil excavation and treatment by aeration.

Water Bearing Zones	Approximate Depth Interval Below Ground Surface (bgs)
C	200 to 240 feet
Deep Aquifer	>240 feet

[a] Navy and the National Aeronautics and Space Administration (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.

The following table summarizes the estimated ranges of hydraulic conductivity (K) hydraulic gradient, and transmissivity for the A and B Zones[2].

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

Groundwater flow beneath the Site is generally towards the north in the A and B Zones during both non-pumping and pumping conditions. Groundwater hydraulic gradients are locally modified by the operation of groundwater recovery wells (both source control and regional recovery wells) and slurry walls, resulting in steeper gradients in the vicinity of pumping wells.

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

[2] Pumping tests were conducted at the MEW study area from 1986 through 1985. References are Canonie, 1986a, 1986b, 1987, and 1988; Geomatrix, 2004; HLA 1986 & 1987; Locus, 1998; PRC, 1991; Navy, 2005 and Weiss Associates 1995 and 2005.

1.3 Description of the Remedy

No Facility Specific Remedy

No potential sources for VOCs were identified on the premises of Fairchild's former Buildings 20/20A at 464 Ellis Street. Therefore, there is no facility-specific remedy for the Site.

Other Facility Remedies on Site

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 (Figure 3). Raytheon Company (Raytheon) installed and currently operates two Source Control Recovery Wells (SCRWs), RAY-1A and RAY-1B1, at the Site. The extracted groundwater from the two wells is conveyed to Raytheon's groundwater treatment system on their 350 Ellis Street property. Additional information regarding Raytheon SCRWs RAY-1A and RAY-1B1 is provided in the Raytheon annual report (Locus, 2012).

Additionally, the MEW Regional Groundwater Remediation Program (RGRP) installed one B1 Zone (REG-4B(1)), one B3 Zone (65B3), and five C Zone/deep aquifer Regional Recovery Wells (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. Fairchild Treatment System 19 is discussed further in the 2011 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23 (Geosyntec, 2012a). Additional information regarding the RRWs is discussed further in the 2011 Annual Progress Report for the Regional Remediation Program (Geosyntec, 2012b).

The effectiveness of the remedy is evaluated using a network of monitoring wells that are currently monitored according to the schedule provided in Table 1. A well construction summary for Site monitoring wells is provided in Table 2.

1.4 Summary of 2011 Site Activities and Deliverables

Table 1 provides the 2011 monitoring and reporting schedule for the Site Groundwater Remediation Program. Ongoing Site activities include:

- Assessment of remedial progress; and

- Planning for future remedial activities.

Specific Site activities and deliverables by month in 2011 are listed below:

March 2011

- 24 March – Collected semiannual groundwater elevation measurements in Site monitoring and extraction wells.

June 2011

- 15 June – Distributed the 2010 Annual Progress Report to the EPA and MEW distribution list parties.

September 2011

- 15 September – Collected semiannual groundwater elevation measurements in Site monitoring and extraction wells.
- 20 September through 21 October – Collected annual groundwater samples from Site wells.

D*ecember 2011*

- 9 December – Annual settlement monitoring.

The 2011 Annual Report Remedy Performance Checklist is provided in Appendix A.

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, 2012). The 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 Annual Report and Fairchild Buildings 13, 19, and 23 Annual Report (Geosyntec, 2012a and 2012b).

2.2 Groundwater Level Monitoring

Groundwater levels are measured at the Site semi-annually. During this reporting period, groundwater levels were measured in wells located at the Site on 24 March and 15 September 2011. Groundwater elevation data from twelve RGRP monitoring wells are used to evaluate groundwater gradients at the Site. Table 2 summarizes the construction details for the RGRP monitoring wells located at the Site. Water levels measured in the RGRP monitoring wells located at the Site during 2011 are included in Table 3. Groundwater elevation contour maps for these wells are included in the MEW RGRP Annual Progress Report (Geosyntec, 2012b).

2.3 VOC Analytical Results

The 2011 Annual Groundwater Quality Sampling Event at the Site was conducted in September and October 2011. A total of 12 MEW RGRP wells located on the Site were sampled in 2011. The analytical results for these wells are reported in the RGRP Annual Report (Geosyntec, 2012b), but are also used to evaluate Site VOC trends. A summary of the chemical analytical results for the 12 RGRP Site wells for the previous five years (2007 through 2011) is provided in Table 4. Appendix B contains the laboratory analytic reports and chain-of-custody documents for samples collected in 2011, and Appendix C contains the quality assurance/quality control (QA/QC) evaluation report, summary tables, and criteria. VOCs versus time graphs for select monitoring wells are included in Appendix D. TCE isoconcentration contour maps for 2011 are included in the MEW RGRP annual progress report (Geosyntec, 2012b).

In addition to the creation of time series graphs a Mann-Kendall statistical analysis was performed in order to evaluate VOC concentration trends in the 12 RGRP monitoring wells located onsite[3] (Table 5). Based on the Mann-Kendall statistical analysis the TCE concentrations are stable, decreasing or have no trend in all of the Site wells. Approximately 58% of wells sampled display decreasing TCE concentration trends and 42% show no trend or are stable.

[3] A Mann-Kendall statistical analysis was performed on all Site wells using the TCE, cis-1,2-dichoroethene (cis-1,2-DCE), and vinyl chloride concentration data from 2002 to 2011 to evaluate the concentration trends. Wells with insufficient data (<4 sampling events) were not included in the trend analysis evaluation.

3. OTHER ACTIVITIES

3.1 Air/Vapor Intrusion

The EPA issued a ROD amendment on 16 August 2010 to address vapor intrusion (EPA, 2010). The MEW parties continued to work with EPA and local entities to implement the ROD amendment during 2011. In accordance with the Statement of Work for the Vapor Intrusion ROD Amendment, an annual report summarizing the status of the vapor intrusion remedy will be submitted under separate cover (Haley and Aldrich, 2012).

3.2 Soil Settlement Survey

An annual settlement survey was performed on 9 December 2011. The purpose of these annual measurements is to evaluate any potential adverse effects on the Site facilities, and whether long-term remedial groundwater extraction could affect soil settlement in the MEW study area. 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 2011 Annual Progress Report (Geosyntec, 2012b).

4. PROBLEMS ENCOUNTERED

No problems were identified for Former Fairchild Buildings 20 and 20A during 2011.

5. TECHNICAL ASSESSMENT

The following assessment of the groundwater remedy performance was made based on data collected through 2011.

- There is no remedy for this Site. Groundwater is being addressed under the Raytheon and RGRP programs. An "Annual Remedy Performance Checklist" is included in Appendix A.
- VOC concentrations are steady to decreasing over time. Table 5 shows that TCE concentrations in monitoring wells sampled at the Site in 2011 either have no trend or have a stable to decreasing trend over the last ten years.

The 2011 Annual Progress Reports for the Former Raytheon Facilities, the Former Fairchild Buildings 13, 19, and 23, and the Regional Groundwater Remediation Program further discuss VOC mass removal and hydraulic control at the Site (Locus, 2012; Geosyntec, 2012a; and Geosyntec, 2012b).

6. CONCLUSIONS AND RECOMMENDATIONS

Facility-specific reporting for Former Fairchild Buildings 20 and 20A should be discontinued. The rationale for this recommendation is:

- No potential source areas were identified at former Fairchild Building 20 property during Site investigations.
- Building 20/20A does not have an associated groundwater treatment system.
- There is no facility-specific capture to evaluate.
- Measured water levels and analytical results from groundwater monitoring wells at the property are reported in the RGRP Annual report.
- Monitoring results from 2011 continue to indicate that VOC concentrations in groundwater are generally stable to declining.

This report is redundant with other reports at the MEW Site since all information is covered under other MEW facility-specific and MEW regional reporting. There are no planned optimization activities or EPA Second Five Year Remedy Review follow-up activities for Buildings 20 and 20A.

7. UPCOMING WORK IN 2012 AND PLANNED FUTURE ACTIVITIES

March	• Groundwater level measurements
April	• Submit Annual Progress Report to EPA
September	• Annual Groundwater sampling • Groundwater level measurements

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

Environmental Protection Agency, Region 9 (EPA), 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.

EPA, 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.

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

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

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

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

EPA, 2010. Record of Decision Amendment For The Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (Mew) Superfund Study Area, Mountain View And Moffett Field, California. August 16.

EPA, 2011. Required Content for Annual Progress Reports, distributed by Penny Reddy to the MEW distribution list via email on June 20, 2011.

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, 2012a. 2011 Annual Progress Report for Former Fairchild Buildings 13, 19, and 23, 369/441, Whisman Road Middlefield-Ellis-Whisman Study Area, Mountain View, California, April 15, 2012.

Geosyntec, 2012b. 2010 Annual Progress Report for Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Study Area, Mountain View, California, April 15, 2012.

Haley and Aldrich, 2012. Annual Vapor Intrusion Progress Report, Regional Groundwater Remediation Program, Middlefield-Ellis-Whisman Area, Mountain View, April 15.

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).

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

Locus, 2012. 2011 Annual Progress Report, Former Raytheon Facilities, 350 Ellis Street, Mountain View, California, April 15, 2012.

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.

Santa Clara Valley Water District (SCVWD), 1989. Standards for the Construction and Destruction of Wells and other Deep Excavation in Santa Clara County. Appendix A. Geology and Ground Water Quality.

SCVWD, 2001. Santa Clara Valley Water District Groundwater Management Plan, Prepared by Vanessa Reymers and Tracy Hemmeter under the direction of Behzad Ahmadi, Unit Manager, Groundwater Management Unit, July.

Weiss Associates (Weiss), 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

TABLES

Table 1
2011 Monitoring and Reporting Schedule
MEW Former Fairchild Buildings 20 and 20A Groundwater Remediation Program
Mountain View, CA

Monitoring and Sampling		
Well	**Sample Frequency**	**Water Level Gauging Frequency**
26A (RGRP)	Annually (September or October)	Semiannually (March, September)
29A (RGRP)	Annually (September or October)	Semiannually (March, September)
99A (RGRP)	Annually (September or October)	Semiannually (March, September)
153A (RGRP)	Annually (September or October)	Semiannually (March, September)
B1/A2 Zone		
91B1 (RGRP)	Annually (September or October)	Semiannually (March, September)
92B1 (RGRP)	Annually (September or October)	Semiannually (March, September)
B2 Zone		
16B2 (RGRP)	Annually (September or October)	Semiannually (March, September)
89B2 (RGRP)	Annually (September or October)	Semiannually (March, September)
132B2 (RGRP)	Annually (September or October)	Semiannually (March, September)
134B2 (RGRP)	Annually (September or October)	Semiannually (March, September)
B3 Zone		
28B3 (RGRP)	Annually (September or October)	Semiannually (March, September)
C/Deep Zone		
11C (RGRP)	Annually (September or October)	Semiannually (March, September)

Reporting	
Report	**Due Date**
EPA Annual Progress Report	April 15

Notes:

(RGRP) = Wells listed in the table are sampled annually by the Regional Groundwater Remediation Program, but are listed because they are located in the vicinity of the Buildings 20 and 20A and are used to evaluate the distribution of VOCs in the groundwater at the Site.

EPA = United States Environmental Protection Agency

Table 2
Monitoring Well Construction Summary
MEW Former Fairchild Buildings 20 and 20A Groundwater Remediation Program
Mountain View, CA

Well ID	Year Installed	Reference Elevation[1] (ft msl)	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
A/A1 Zone									
26A	1982	47.20	2	30	12	30	10	30	Mon
29A	1982	46.08	2	30	15	30	10	30	Mon
99A	1986	48.33	4	24.5	9.5	24.5	8	29	Mon
153A	1991	45.72	4	23	13	23	12	25	Mon
B1/A2 Zone									
91B1	1986	48.44	4	58	48	58	43	60	Mon
92B1	1986	46.99	4	65	55	65	50	68	Mon
B2 Zone									
16B2	1986	47.18	4	84	79	84	77	87	Mon
89B2	1986	48.43	4	90	80	90	77	92	Mon
132B2	1987	49.21	4	89	79	89	78	91	Mon
134B2	1987	47.24	4	88	83	88	78	90	Mon
B3 Zone									
28B3	1985	46.85	4	132	122	132	120	134	Mon
C/Deep Zone									
11C	1987	49.21	4	216	209	214	204	216	Mon

Notes:
Water levels for extraction wells are taken from a 2" piezometer located next to the well.
1. Reference Elevations are in National Geodetic Vertical Datum from 1929 (NGVD 29).
ft msl = feet mean sea level
ft btoc = feet below top-of-casing
Mon = monitoring well

Table 3

Groundwater Elevations, January Through December 2011

MEW Former Fairchild Buildings 20 and 20A Groundwater Remediation Program

Mountain View, California

Well ID	TOC Elevation (ft msl)	24 March 2011		15 September 2011	
		Depth To Water (feet)	Groundwater Elevation (ft msl)	Depth To Water (feet)	Groundwater Elevation (ft msl)
A/A1 Zone					
26A	47.20	9.00	38.20	9.82	37.38
29A	46.08	10.43	35.65	11.47	34.61
99A	48.33	12.91	35.42	14.40	33.93
153A	45.72	10.14	35.58	11.18	34.54
A2/B1 Zone					
91B1	48.44	12.87	35.57	14.44	34.00
92B1	46.99	12.09	34.90	14.50	32.49
B2 Zone					
16B2	47.18	9.11	38.07	9.97	37.21
89B2	48.43	11.67	36.76	13.29	35.14
132B2	49.21	13.79	35.42	14.35	34.86
134B2	47.85	9.89	37.96	10.69	37.16
B3 Zone					
28B3	46.85	-8.50	55.35	-7.49	54.34
C Zone					
11C	49.21	-17.42	66.63	-15.86	65.07

Notes:
ft msl = Feet Mean Sea Level
TOC = Top of Casing

Table 4
VOC Analytical Results
Five Year Summary, January 2007 through December 2011
MEW Former Fairchild Building 20 and 20A Groundwater Remediation Program
Mountain View, California

Sample Location	Sample Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloroform	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	1,4-Dioxane
A/A1 Zone														
26A	11/9/2007	<1.0	**2.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
26A	11/7/2008	<1.0	**1.1**	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	**0.5**	<0.5	NA
26A	11/6/2009	<1.0	**2.3**	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	NA
26A	11/4/2010	<1.0	**2.6**	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
26A	9/26/2011	<1.0	**2.6**	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
29A	11/9/2007	<1.0	**4.3**	<0.5	**8.4**	<0.5	<0.5	**3.6**	<20	**0.8**	**48**	**1.9**	<0.5	NA
29A	11/11/2008	**1.2**	**6.2**	<0.5	**11**	<0.5	<0.5	**4.0**	<20	<0.5	**57**	**1.3**	<0.5	NA
29A	11/10/2009	<1.0	**3.7**	<0.5	**9.0**	<0.5	<0.5	<2.0	<20	**0.6**	**30**	**1.4**	<0.5	NA
29A	11/9/2010	<1.0	**4.2**	<0.5	**8.1**	<0.5	<0.5	<2.0	<2.0	**0.8**	**31**	**1.6**	<0.5	NA
29A	9/22/2011	<1.0	**5.7**	<0.5	**8.1**	<0.5	<0.5	**2.0**	<2.0	**0.5**	**33**	**1.1**	<0.5	NA
99A	11/8/2007	<4.0	**3.9**	<2.0	**5.2**	**140**	**2.9**	**41**	<80	<2.0	**9.5**	**360**	<2.0	NA
99A	11/11/2008	<3.3	**4.2**	<1.7	**6.6**	**150**	<1.7	**44**	<67	<1.7	**7.7**	**350**	<1.7	NA
99A	11/23/2009	<4.0	**3.2**	<2.0	**5.1**	**140**	**2.8**	**27**	<80	<2.0	**5.3**	**300**	<2.0	NA
99A D	11/23/2010	<1.0	**5.2**	<0.5	**8.2**	**140**	**1.9**	**38**	<2.0	**0.5**	**7.0**	**290**	**0.7**	NA
99A	11/23/2010	<2.5	**4.6**	<1.3	**6.6**	**160**	**2.0**	**31**	<5.0	<1.3	**6.1**	**320**	<1.3	NA
99A	9/21/2011	<3.3	**4.5**	<1.7	**5.8**	**180**	**2.2**	**23**	<6.7	<1.7	**5.6**	**300**	<1.7	NA
153A	11/14/2007	<1.0	<0.5	<0.5	**1.1**	**1.5**	<0.5	**1.4**	<20	<0.5	**1.1**	**20**	<0.5	NA
153A	11/7/2008	<1.0	<0.5	<0.5	**0.7**	**1.2**	<0.5	**0.7**	<20	<0.5	**1**	**15**	<0.5	NA
153A D	11/7/2008	<1.0	<0.5	<0.5	**0.8**	**1.1**	<0.5	**0.7**	<20	<0.5	**1**	**16**	<0.5	NA
153A	11/10/2009	<1.0	<0.5	<0.5	**0.7**	**1.0**	<0.5	<2.0	<20	<0.5	**0.7**	**12**	<0.5	NA
153A D	11/10/2009	<1.0	<0.5	<0.5	**0.8**	**0.9**	<0.5	<2.0	<20	<0.5	**0.7**	**13**	<0.5	NA
153A D	11/9/2010	<1.0	<0.5	<0.5	**0.8**	**1.3**	<0.5	<2.0	<2.0	<0.5	**0.9**	**14**	<0.5	NA
153A	11/9/2010	<1.0	<0.5	<0.5	**0.8**	**1.2**	<0.5	<2.0	<2.0	<0.5	**0.9**	**15**	<0.5	NA
153A	9/22/2011	<1.0	<0.5	<0.5	**0.7**	**1.4**	<0.5	<2.0	<2.0	<0.5	**0.8**	**14**	<0.5	NA
A2/B1 Zone														
91B1	11/8/2007	<1.4	**2.7**	<0.7	**1.3**	**62**	**1.7**	**1.0**	<29	<0.7	<0.7	**120**	<0.7	NA
91B1	11/11/2008	<1.0	**3.5**	<0.5	**2.7**	**74**	**0.9**	**1.7**	<20	<0.5	**0.6**	**120**	<0.5	NA
91B1	11/23/2009	<1.0	**1.1**	<0.5	<0.5	**23**	<0.5	<2.0	<20	<0.5	<0.5	**30**	<0.5	NA
91B1	11/22/2010	<1.0	**2.3**	<0.5	**1.4**	**52**	**0.7**	<2.0	<2.0	<0.5	<0.5	**68**	<0.5	NA

Table 4
VOC Analytical Results
Five Year Summary, January 2007 through December 2011
MEW Former Fairchild Building 20 and 20A Groundwater Remediation Program
Mountain View, California

Sample Location	Sample Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloroform	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	1,4-Dioxane
A2/B1 Zone														
91B1	9/21/2011	<2.0	**2.1**	<1.0	**1.4**	**52**	**1.4**	<4.0	<4.0	<1.0	<1.0	**98**	<1.0	NA
92B1	11/8/2007	<2.0	<1.0	<1.0	<1.0	**3.8**	<1.0	<1.0	<40	<1.0	<1.0	**94**	<1.0	NA
92B1	11/18/2008	<2.0	<1.0	<1.0	<1.0	**4.8**	<1.0	**1.2**	<40	<1.0	<1.0	**98**	<1.0	NA
92B1	11/18/2009	<1.0	<0.5	<0.5	<0.5	**3.3**	<0.5	<2.0	<20	<0.5	<0.5	**91**	<0.5	NA
92B1	11/22/2010	<1.0	<0.5	<0.5	<0.5	**3.7**	<0.5	<2.0	<2.0	<0.5	<0.5	**90**	<0.5	NA
92B1 D	9/21/2011	<1.0	<0.5	<0.5	<0.5	**3.8**	<0.5	<2.0	<2.0	<0.5	<0.5	**93**	<0.5	NA
92B1	9/21/2011	<1.0	<0.5	<0.5	<0.5	**3.9**	<0.5	<2.0	<2.0	<0.5	<0.5	**98**	<0.5	NA
B2 Zone														
16B2	11/9/2007	<1.0	<0.5	<0.5	<0.5	**2.5**	<0.5	<0.5	<20	<0.5	<0.5	**78**	<0.5	NA
16B2	11/11/2008	<1.0	<0.5	<0.5	<0.5	**2.9**	<0.5	<0.5	<20	<0.5	<0.5	**78**	<0.5	NA
16B2	11/11/2009	<1.0	<0.5	<0.5	<0.5	**2.3**	<0.5	<2.0	<20	<0.5	<0.5	**62**	<0.5	NA
16B2	11/10/2010	<0.5	<0.5	<0.5	<0.5	**2.1**	<0.5	<2.0	<20	<0.5	<0.5	**82**	<0.5	NA
16B2	9/26/2011	<1.0	<0.5	<0.5	<0.5	**1.9**	<0.5	<2.0	<2.0	<0.5	<0.5	**65**	<0.5	NA
89B2	11/8/2007	<1.0	<0.5	<0.5	<0.5	**11**	<0.5	<0.5	<20	<0.5	<0.5	**19**	<0.5	NA
89B2	11/11/2008	<1.0	<0.5	<0.5	<0.5	**8.9**	<0.5	<0.5	<20	<0.5	<0.5	**18**	<0.5	NA
89B2	11/23/2009	<1.0	<0.5	<0.5	<0.5	**6.4**	<0.5	<2.0	<20	<0.5	<0.5	**9.1**	<0.5	NA
89B2	11/10/2010	<0.5	<0.5	<0.5	<0.5	**4.1**	<0.5	<2.0	<20	<0.5	<0.5	**8.1**	<0.5	NA
89B2	9/20/2011	<1.0	<0.5	<0.5	<0.5	**3.4**	<0.5	<2.0	<2.0	<0.5	<0.5	**6.9**	<0.5	NA
132B2	11/8/2007	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
132B2	11/11/2008	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
132B2	11/4/2009	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	NA
132B2	11/4/2010	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
132B2 D	9/23/2011	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
132B2	9/23/2011	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
134B2	11/9/2007	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
134B2	11/7/2008	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
134B2	11/3/2009	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	NA
134B2	11/4/2010	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA

Table 4
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Mountain View, California

Sample Location	Sample Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloroform	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	1,4-Dioxane
B2 Zone														
134B2	9/26/2011	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
B3 Zone														
28B3	4/24/2008	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
28B3	11/14/2008	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	NA
28B3	11/3/2009	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	<0.5	<0.5	NA
28B3	11/11/2010	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
28B3	10/21/2011	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA
C Zone														
11C	11/19/2007	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	**1.6**	<0.5	NA
11C	11/14/2008	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	**2.0**	<0.5	NA
11C	11/9/2009	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<20	<0.5	<0.5	**1.7**	<0.5	NA
11C	11/11/2010	<1.0	<0.5	<0.5	<0.5	**0.5**	<0.5	<2.0	<2.0	<0.5	<0.5	**1.9**	<0.5	NA
11C	10/21/2011	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	NA

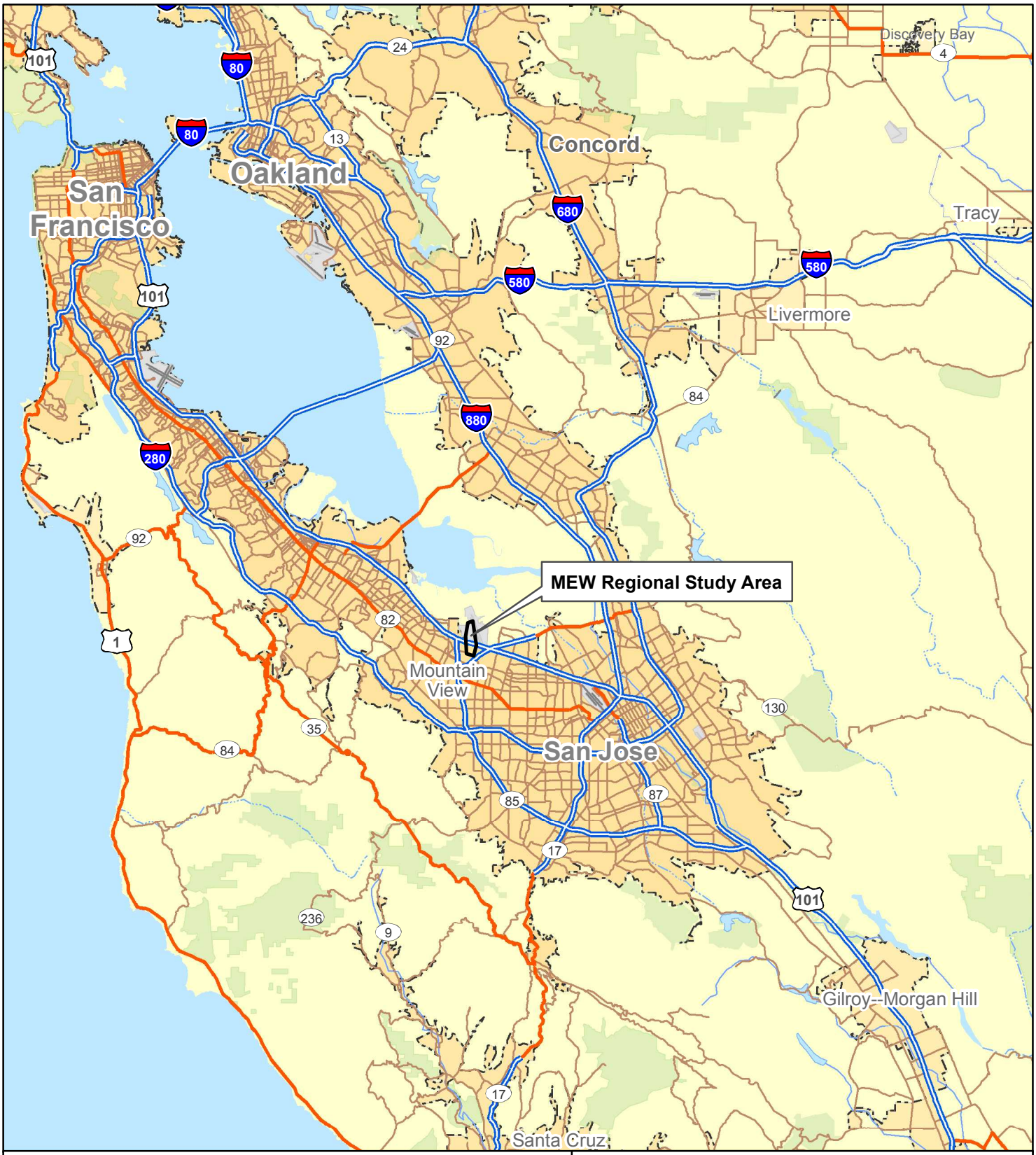
Notes:
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,2-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
< indicates analyte not detected above the reported detection limit
D indicates duplicate sample
NA indicates the sample wasn't analyzed for the given analyte

Table 5
Mann-Kendall Statistics Concentration Trends Summary
MEW Former Fairchild Buildings 20 and 20A Groundwater Remediation Program
Mountain View, California

Well Name	TCE	cis-1,2-DCE	Vinyl Chloride
A/A1 Zone			
26A	PD	PD	NT
29A	PD	S	NT
99A	D	S	NT
153A	PD	NT	NT
B1/A2 Zone			
91B1	D	D	NT
92B1	D	PD	NT
B2 Zone			
16B2	D	D	NT
89B2	NT	D	NT
132B2	NT	S	NT
134B2	S	S	NT
B3 Zone			
28B3	S	S	NT
C/Deep Zone			
11C	NT	S	NT

Notes:
cis-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichloroethene
S = Stable
PD = Probably Decreasing
D = Decreasing
NT = No Trend

FIGURES



N

0 10 Miles

Site Location Map

MEW Area, Mountain View, California

Geosyntec consultants

Oakland	April 2012

Figure 1

P:\GIS\MEW\Project\Fairchild\Building20\2011_AR\Fig01_Loc_Map1.mxd

Legend

Former Fairchild Facility

- Buildings 1 - 4
- Building 18
- Building 9
- Building 20 and 20A
- Buildings 13, 19, and 23
- Slurry Wall
- Building
- Road

FAIRCHILD BUILDINGS 1 - 4
A. 313 Fairchild Drive
B. 323 Fairchild Drive
C. 545 North Whisman Road
D. 515 North Whisman Road

FAIRCHILD BUILDING 18
E. 644 National Avenue

FAIRCHILD BUILDING 9
F. 401 National Avenue

FAIRCHILD BUILDING 20 AND 20A
G. 468 Ellis Street
H. 466 Ellis Street
I. 464 Ellis Street

FAIRCHILD BUILDINGS 13, 19, AND 23
J. 399 North Whisman Road
K. 389 North Whisman Road
L. 369 North Whisman Road
M. 379 North Whisman Road

N

300 150 0 300 Feet

Current Building Configurations
Former Fairchild Facilities

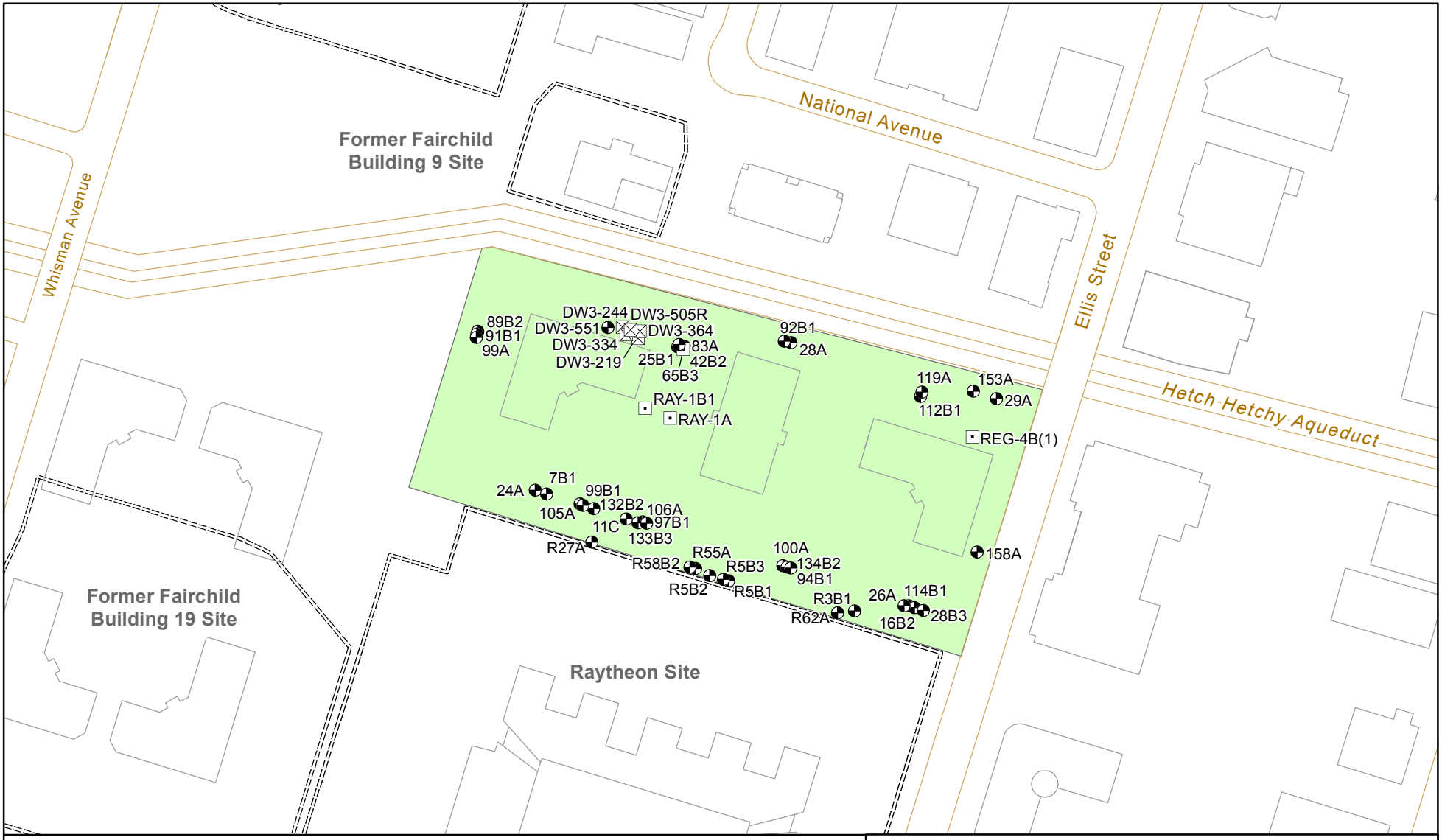
MEW Former Fairchild Building 20 and 20A Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2012

Figure **2**

P:\GIS\MEW\Project\Fairchild\Building20\2011_AR\Fig02_FormerFacilities.mxd



Site Map and Well Network

MEW Former Fairchild Building 20 and 20A Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland	April 2012	Figure 3

P:\GIS\MEW\Project\Fairchild\Building20\2011_AR\Fig03_SiteMap.mxd

APPENDIX A

2011 Annual Report Remedy Performance Checklist

2011 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: 23 march 2012

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 A/B1 aquitard.
2. Extraction Systems as described below:

Buildings 1-4 – 20 recovery wells: three Regional Groundwater Remediation Program (RGRP) wells and 17 Source Control Recovery Wells (SCRWs)

Buildings 13, 19, 23 – 15 recovery wells: one RGRP well and 14 SCRWs

Building 9 – Four SCRWs

Building 18 – One SCRW and one basement dewatering sump

3. Treatment Systems as described below:

System 1 (treats water from Buildings 1-4, Building 9, and Building 18)

- Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.

System 3 (treats water from Buildings 1-4)

- Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.

System 19 (treats water from Buildings 13, 19, and 23)

- Three 5,000-pound GAC vessels in series, treatment pad, controls, double-contained groundwater conveyance piping, vaults, electrical distribution, controls and other appurtenances.

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	Alok Kolekar Weiss Associates	650-968-7000	adk@weiss.com

2011 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 453 Ravendale Drive, Suite C, 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).

- Signs and other security measures are in place at extraction and treatment points.
- Groundwater production wells within plume area are prohibited. Administered by Santa Clara Valley Water District.
- Properties formerly owned by Fairchild have deed restrictions that require notification prior to subsurface construction and provide for access for remedial actions.
- Public notifications regarding remediation activities.

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:

2011 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:

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 Building 18) has been bought by Carr America National Avenue LLC. The building will be removed and replaced by a multi-parcel development. Construction is anticipated to begin May/June 2012.

369 and 441 North Whisman Road (former Bldgs. 13 and 19 and 23), owned by Keenan, Lovewell Ventures, is developing plans 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.

2011 Annual Report Remedy Performance Checklist

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

Groundwater Quality Data

List the types of data that are available:	What is the source report?
Potentiometric surface maps, hydrographs Capture zone maps, isoconcentration maps VOC time series plots and trend analysis Laboratory Analytical Results and Reports	2011 Annual Fairchild Building Reports (Geosyntec, 2012) and the 2011 Annual Regional Report (Geosyntec, 2012)

☑ 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 System Influent & Effluent water samples VOC mass and groundwater removal graphs	NPDES Self-Monitoring Reports 2011 Annual Fairchild Building Reports

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

Discharge Data

List the types of data that are available:	What is the source report?
System performance data such as average flow rates, totalized flow, influent/effluent 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 Analysis of inward and upward hydraulic gradients	2011 Annual Fairchild Reports (Geosyntec, 2012)

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.

The chemical concentration data and potentiometric surface contours from 2011 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

2011 Annual Report Remedy Performance Checklist

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

Walk-throughs/Surveys: The EPA issued a ROD amendment on 16 August 2010 to address vapor intrusion. The MEW parties continued to work with EPA and local entities to implement the ROD amendment during 2011. In accordance with the Statement of Work for the Vapor Intrusion ROD Amendment, an annual report summarizing the status of the vapor intrusion remedy will be submitted under separate cover (Haley and Aldrich, 2012).

Summary of Results: See the Annual Vapor Intrusion Progress Report (Haley and Aldrich, 2012).

Problems Encountered: See the Annual Vapor Intrusion Progress Report (Haley and Aldrich, 2012).

Recommendations/Next Steps: See the Annual Vapor Intrusion Progress Report (Haley and Aldrich, 2012).

Schedule: See the Annual Vapor Intrusion Progress Report (Haley and Aldrich, 2012).

X. REMEDY PERFORMANCE ASSESSMENT

A. Groundwater Remedies

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

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

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

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

Concentrations within TCE plume have been evaluated using Mann-Kendall analysis and reviewing VOC concentrations over time. The analyses show that TCE concentrations continued to decrease, remain stable, or show no trend in all zones, while the lateral extent of TCE exceeding 5 µg/L has been stable. See Annual Reports for trends in monitoring wells (Geosyntec 2012).

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 2011 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.

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)

2011 Annual Report Remedy Performance Checklist

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

The objective is to remediate and control the plume. VOC concentrations in groundwater continue to remain well below historical maximums, and generally show long-term decreasing trends. The groundwater extraction, treatment, and containment systems are functioning as intended and meet the Remedial Action Objectives for the Site.

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: 2011 Annual Fairchild Building Reports (Geosyntec, 2012)
2011 Annual Regional Report (Geosyntec, 2012)
2008 Optimization Evaluation (Geosyntec, 2008)

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 2011 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: September/October 2012

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

Remedy Projections for the upcoming year (2012/2013)
☑ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. Expansion or minimization (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
☐ Other modification(s) anticipated: Groundwater Feasibility Study Elaborate below. Target date: 2012

Elaborate on Remedy Projections: The EPA is developing a Groundwater Feasibility Study for MEW.

2011 Annual Report Remedy Performance Checklist

Remedy Projections for **the long-term** (Check all that apply)
☐ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. ☐ Expansion or ☐ minimization (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
☑ Other modification(s) anticipated: Groundwater Feasibility Study Elaborate below. Target date: 2012

Elaborate on Remedy Projections: The EPA is developing a Groundwater Feasibility Study for MEW.

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: Groundwater Feasibility Study Elaborate below. Target date: 2012

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: The EPA is developing a Groundwater Feasibility Study for MEW.

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.

Extraction rates were modified in 2010 based on an Optimization Evaluation conducted in 2008 (Geosyntec, 2008).

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

XIII. RECOMMENDATIONS

APPENDIX B

Analytic Reports and Chain-of-Custody Documents January through December 2011

(This appendix is being submitted on CD to the EPA only and is available upon request.)

APPENDIX C

QA/QC Report, Summary Tables, and Criteria

Weiss Associates

M E M O R A N D U M

TO: Carolyn Kneiblher, C.HG.
Geosyntec Consultants

FROM: Alok D. Kolekar, P.E.
Weiss Associates

RE: **2011 DATA QUALITY SUMMARY**
FORMER FAIRCHILD BUILDINGS 20 & 20A
MIDDLEFIELD-ELLIS-WHISMAN AREA SUPERFUND SITE
MOUNTAIN VIEW, CALIFORNIA

DATE: April 6, 2012

This memorandum summarizes data quality for groundwater and treatment system water samples collected in 2011 from monitoring wells associated with former Fairchild Buildings 20 and 20A at the Middlefield-Ellis-Whisman (MEW) Area Superfund Site in Mountain View, California. The groundwater samples were collected during the 2011 annual groundwater sampling event in September and October. Detailed results for quality assurance/quality control (QA/QC) samples collected during the MEW annual groundwater sampling are presented in Weiss Associates' (Weiss) memorandum titled, "Data Quality Assurance/Quality Control Report, 2011 Groundwater Sampling, Middlefield-Ellis-Whisman Area Superfund Site" and dated March 9, 2012.

The analytical laboratory data and accompanying quality assurance/quality control (QA/QC) information were reviewed for precision, accuracy, reproducibility, and completeness in accordance with the approved MEW 1991 *Quality Assurance Project Plan* (QAPP).[1] In addition, the data quality review was based on Weiss Associates' Standard Operating Procedures (SOPs) for data verification, data validation, and validation procedures for metals, volatile organic chemicals (VOCs), and semivolatile organic chemicals. The SOPs functionally adhere to the most recent USEPA *Contract Laboratory Program National Functional Guidelines for Organic (October 1999) and Inorganic (February 1994) Data Review*. As specified by the QAPP and the SOPs, Weiss Associates collected field QA/QC samples and performed a laboratory data quality review.

FIELD QC SAMPLE COLLECTION

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

- Field duplicate – Field duplicate samples are blind duplicates that provide data to assess precision of the contract laboratory. Field duplicates are specified to be collected at a frequency of 1 for every 20 field samples collected.
- Matrix spike/Matrix spike duplicate – Matrix spike/matrix spike duplicate (MS/MSD) samples measure the accuracy and precision of the analytical methods MS/MSD samples are specified at a frequency of 1 for every 20 field samples collected.

[1] 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.

- Rinseate blank – These 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 evaluate whether the sampling equipment may be causing cross-contamination of the samples. Rinseate blank sampling is not necessary for locations that have dedicated sample collection, such as at GWETS sample ports. Following equipment decontamination, deionized/organic-free water used for the final rinse is collected in appropriate bottles. Rinseate samples were specified at a frequency of 1 for every 20 field samples that are collected using reusable sample collection equipment.
- Field blank – These samples consist of source water used for decontamination of equipment. The purpose of field blanks is to evaluate whether source water is contributing to contamination of samples. Field blanks were collected at a frequency of 5% of the field samples collected.
- Trip blank – These samples consist of "clean," volatile organic analysis vials (VOAs) filled with deionized/organic-free water and preserved. These pre-filled VOAs are supplied by the laboratory and accompany other samples in the field and on their trip to the laboratory. The purpose of the trip blank is to evaluate whether exposure to sampling site conditions, storage, and shipment of samples may be causing contamination after the samples are collected. Trip blanks are collected only when samples are collected for VOC analysis. One trip blank accompanies each VOC sample shipment.

LABORATORY DATA QUALITY REVIEW PARAMETERS

For the 2011 annual groundwater sampling event, the sample results were verified for completeness using a Level 2 data review summary per the QAPP and SOPs. The following parameters were reviewed in this review:

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

Ten percent of the sample delivery groups underwent a Level 4 data validation as required by the QAPP. The samples intended for the Level 4 data validation were documented on separate chain-of-custody forms than the other samples. Level 4 validation procedures vary by method. In addition to the Level 2 verification parameters listed above, the Level 4 validation parameters for organic (e.g., VOC) analyses include:

- 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 (e.g., metal) data include:

- 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.

CONCLUSIONS

Weiss Associates' Project Chemist assigned qualifiers to data that were found outside the control limits specified by the QAPP and data evaluation SOPs. Data qualifiers defined in the USEPA *Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* were used.

A total of 14 groundwater samples were collected from monitoring wells associated with former Fairchild Buildings 20 & 20A during the annual sampling. These samples were analyzed by Curtis and Tompkins, Ltd in Berkeley, California for:

- Halogenated VOCs by U.S. EPA Method 8260B (14 samples)

The samples were collected, stored, transported, and managed according to USEPA protocols based on Weiss' review of field and laboratory documentation. The laboratories reported that sample temperature and holding times were within acceptable ranges. Custody seals were used for each set of samples as specified by the QAPP.

No data non-conformances were identified during the data verification and validation process. Thus, no data qualifiers were necessary, and the data are usable for their intended purposes. Tables 1 and 2 summarize the conformance with sampling and analytical QA/QC methods, respectively.

Table 1. Summary of Conformance with Sampling QA/QC Methods for Water Samples Collected in 2011, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, Mountain View, California.

Who performed sampling (Firm name/address/contact/phone):	Weiss Associates 453 Ravendale Drive, Suite C, Mountain View, CA 94043 Alok D. Kolekar (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.

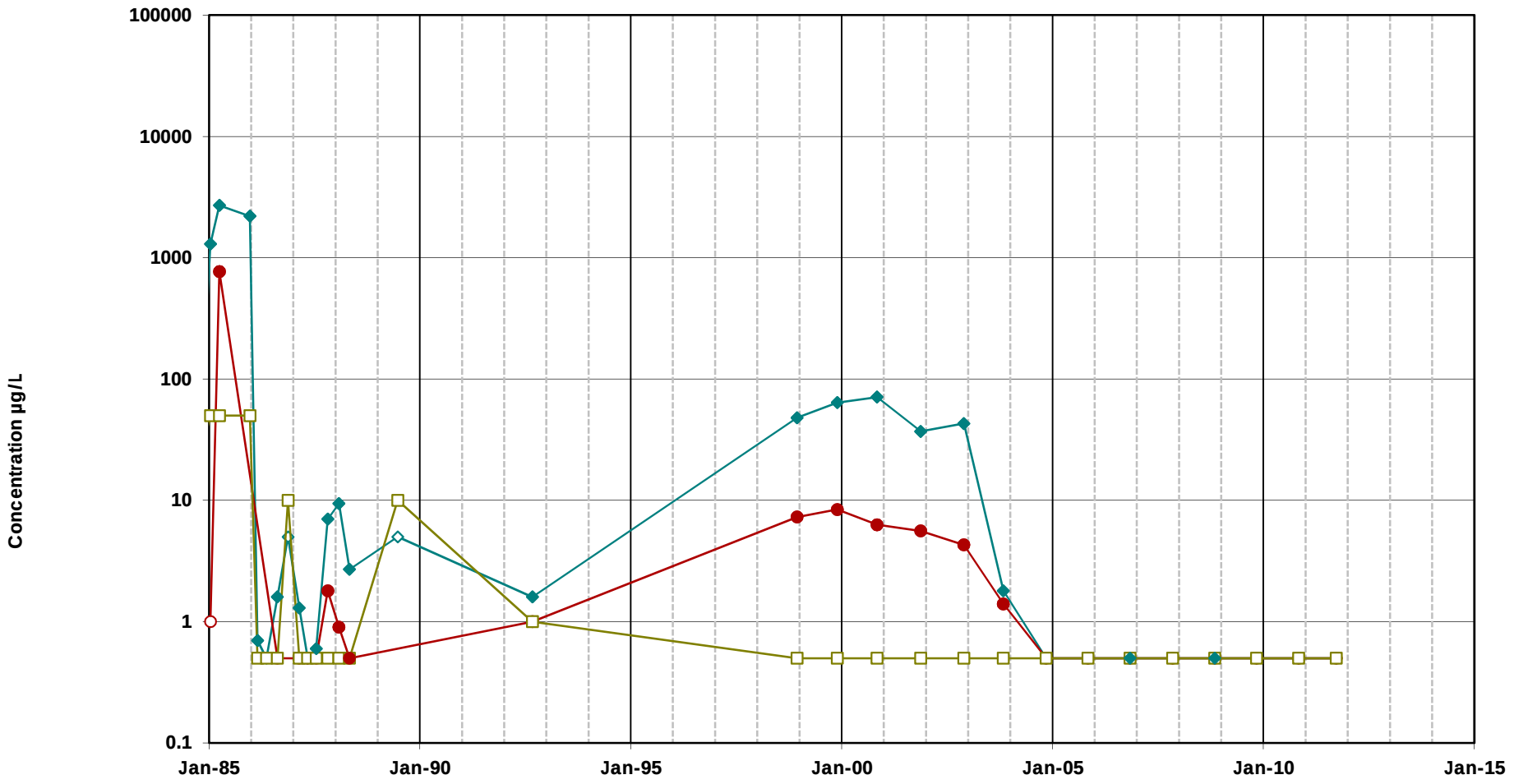
Table 2. Summary of Conformance with Analytical QA/QC Methods for Water Samples Collected in2011, Former Fairchild Buildings 20 and 20A, 464 Ellis Street, Mountain View, California.

Who performed analysis (Lab name/address/contact/phone):	Curtis and Tompkins 2323 Fifth Street Berkeley, CA 94710 Micah Smith (510) 204-2223
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
QA/QC results and acceptance criteria on file?	YES

Explain any "NO" answers.

APPENDIX D

VOCs versus Time Graphs



Note:
Open symbols represent non-detects
(plotted at the method detection limit)

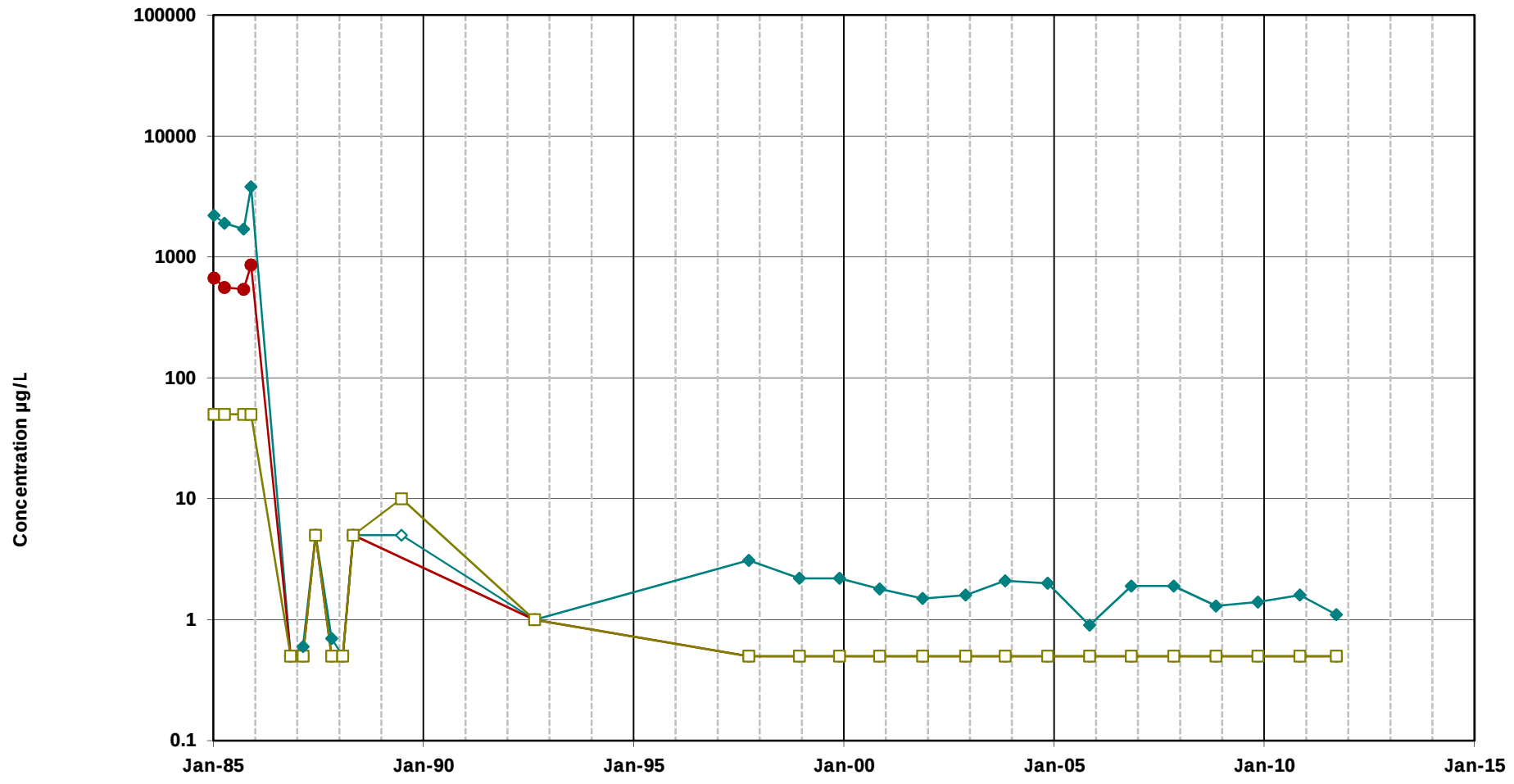
Chlorinated Ethenes in Groundwater
Well 26A
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure **D-01**

\\Oakland-01\data\GIS\MEW\Excel\TimeSeries\2011_AR\Building 20\[26A_VOC.xls]Plot_26A_VOC



Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

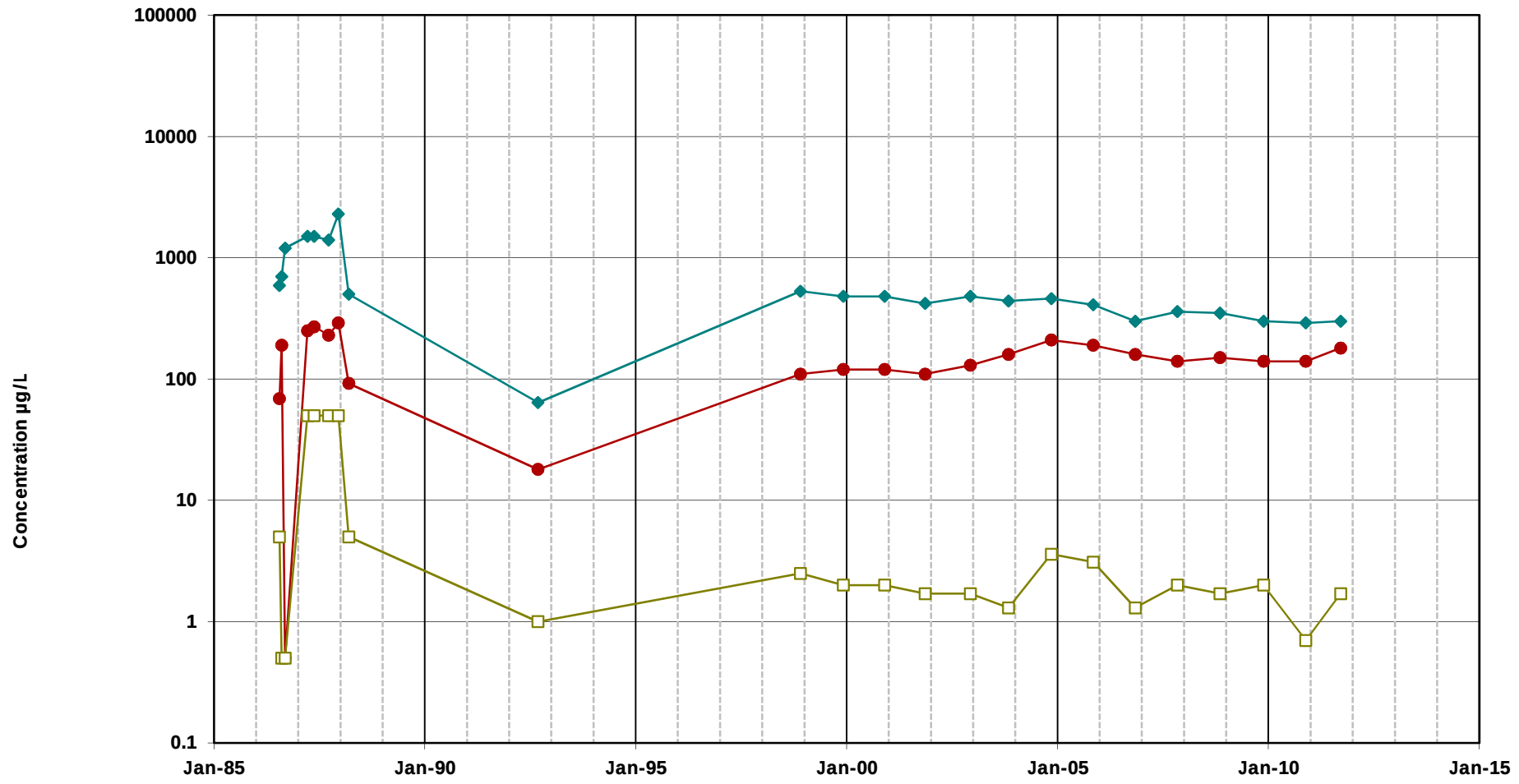
Chlorinated Ethenes in Groundwater
Well 29A
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure **D-02**

\\Oakland-01\data\GIS\MEW\Excel\TimeSeries\2011_AR\Building 20\[29A_VOC.xls]Plot_29A_VOC



Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 99A
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure **D-03**

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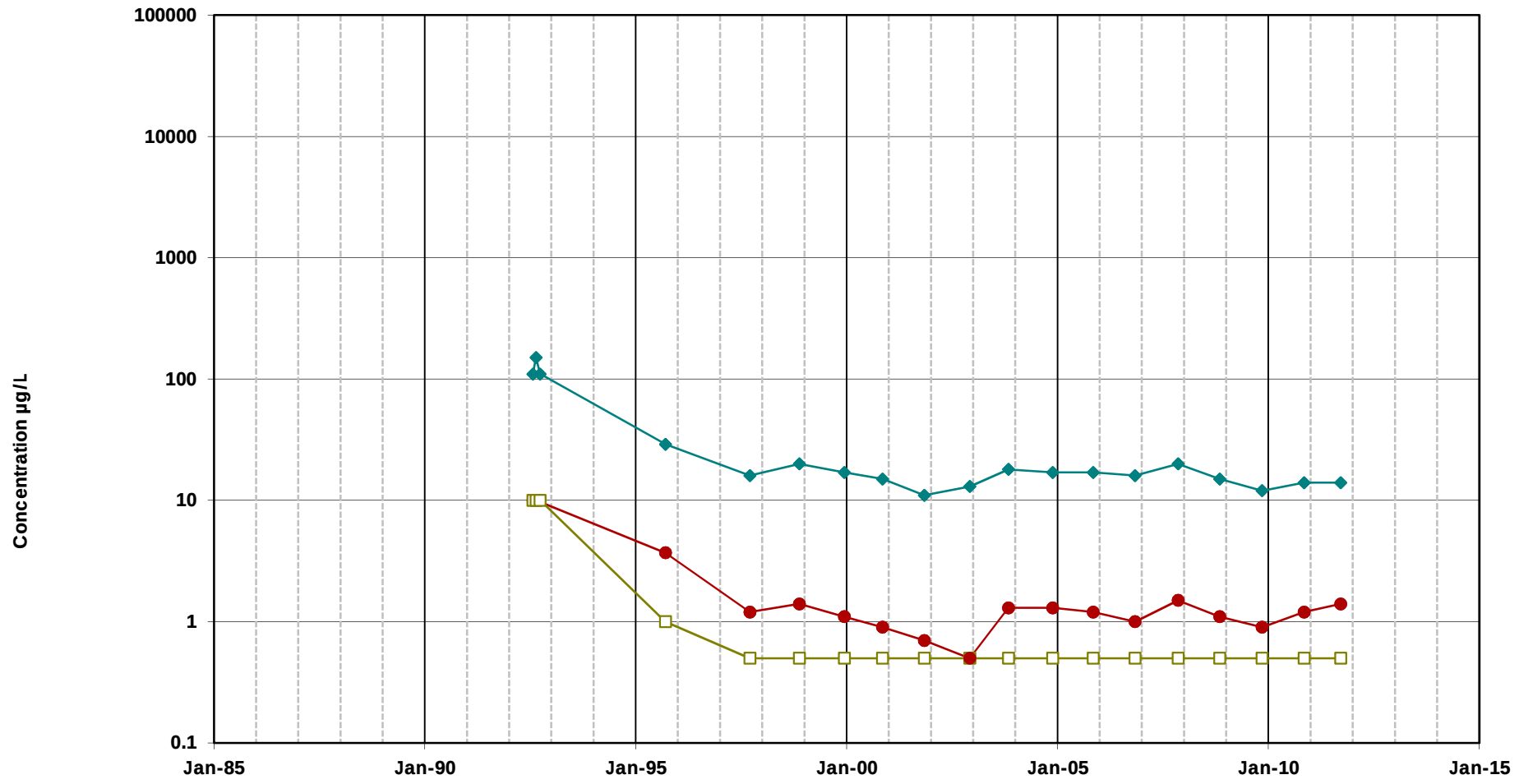

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 153A
MEW Former Fairchild Buildings 20 and 20A

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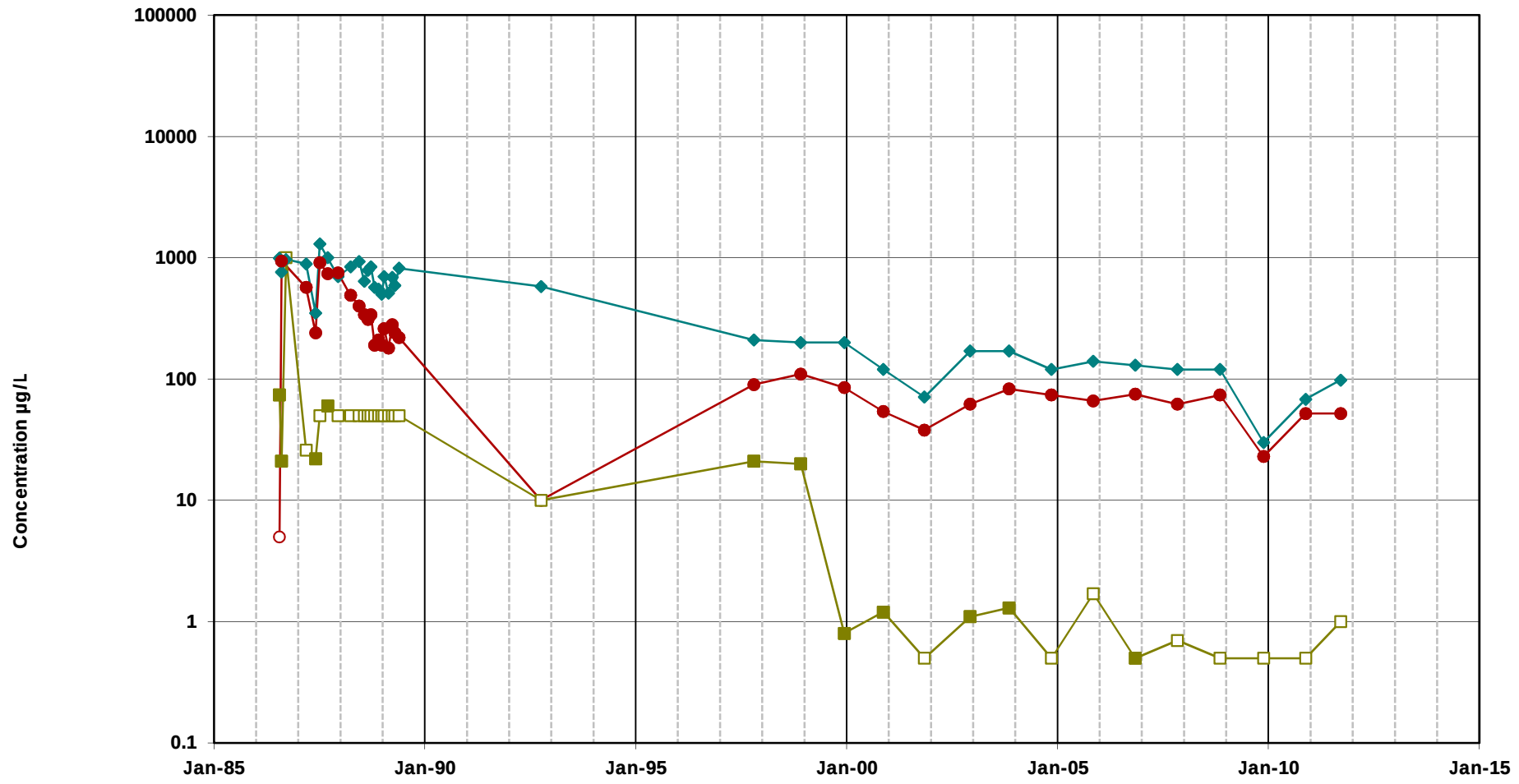
Figure
D-04

\\Oakland-01\data\GIS\MEW\Excel\TimeSeries\2011_AR\Building 20\[153A_VOC.xls]Plot_153A_VOC



Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 91B1
MEW Former Fairchild Buildings 20 and 20A

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Figure **D-05**

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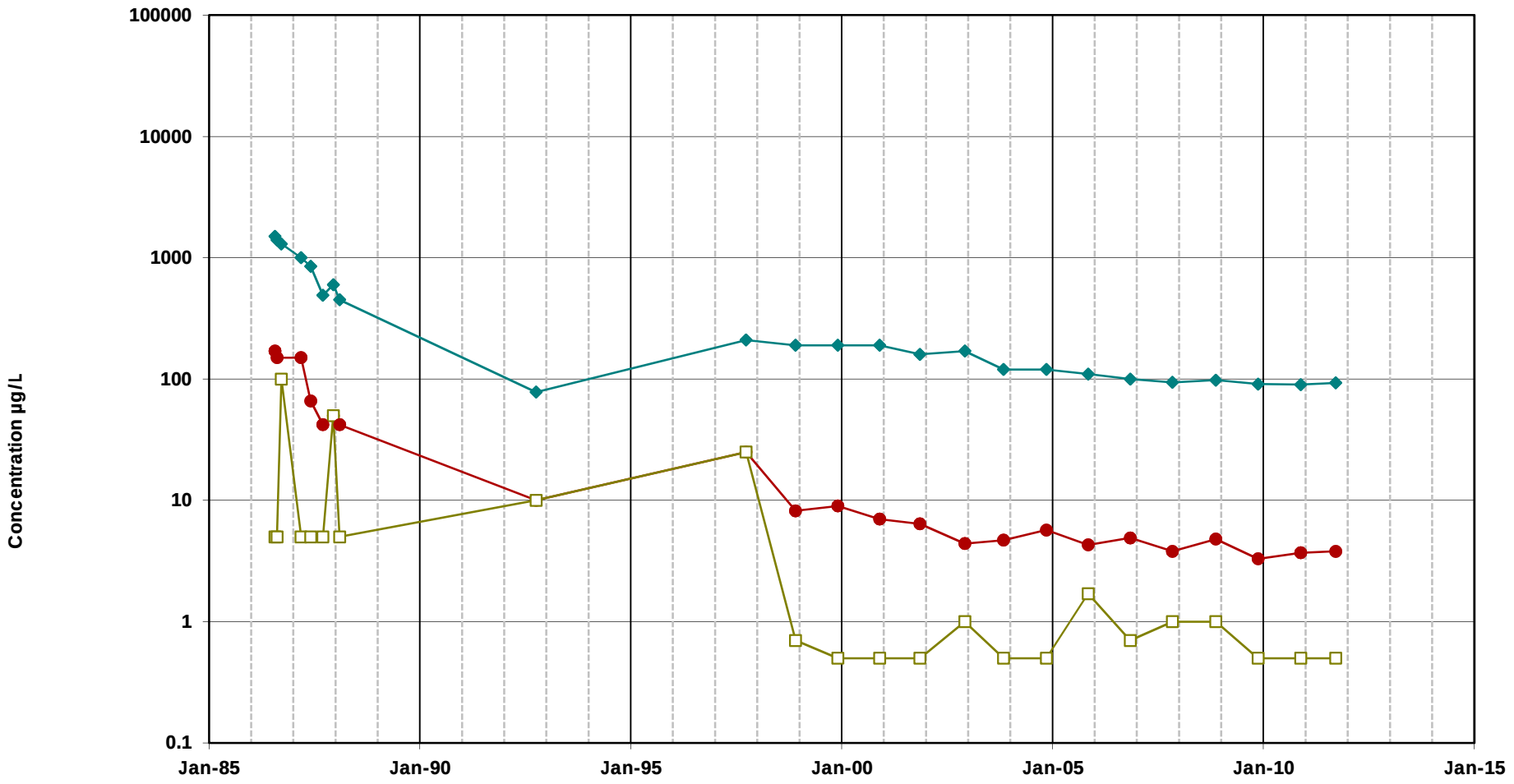

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 92B1
MEW Former Fairchild Buildings 20 and 20A

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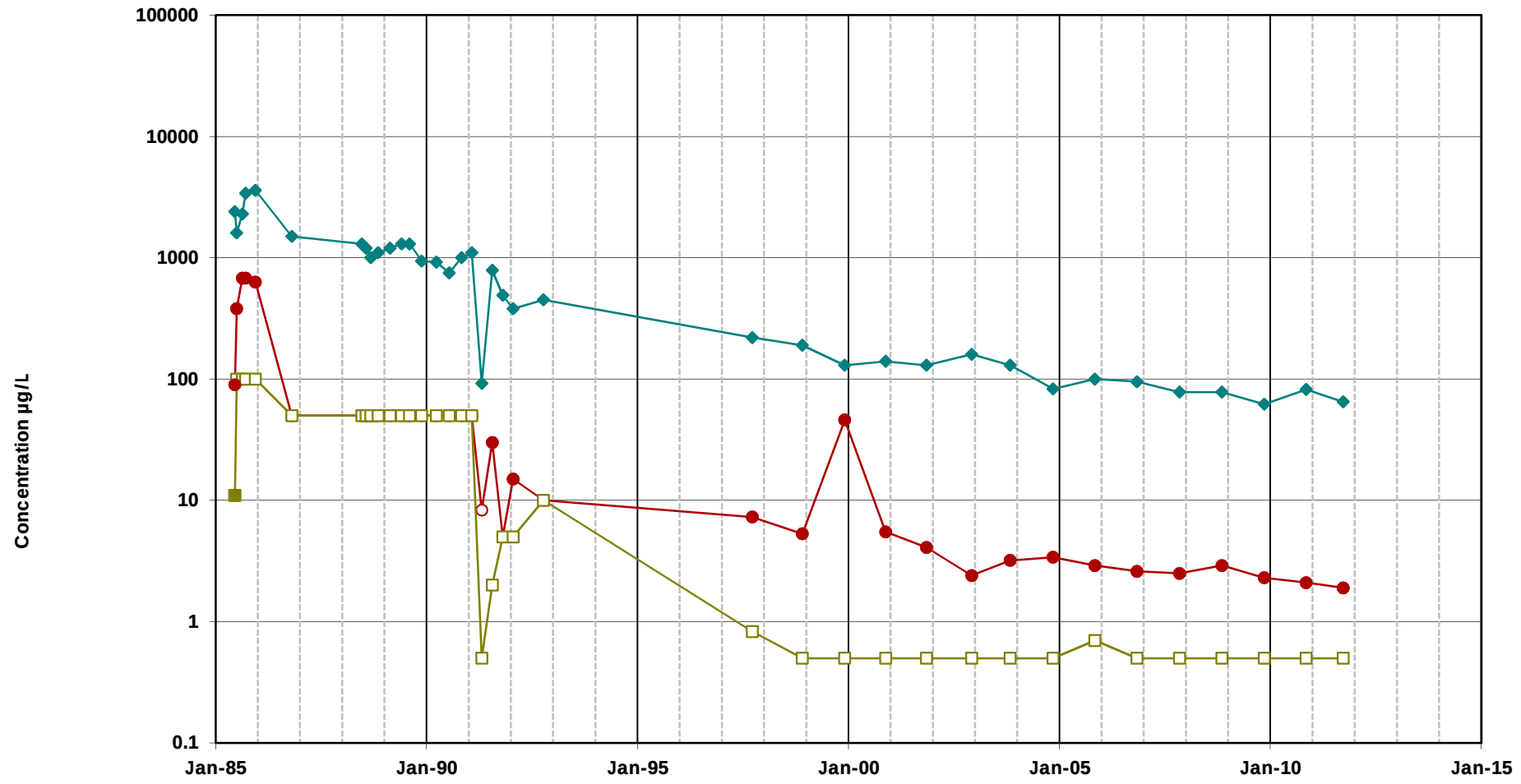
Figure
D-06

U:\MEW\Excel\TimeSeries\2011_AR\Building 20\ExcelFiles\[92B1_VOC.xls]Plot_92B1_VOC



Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 16B2
MEW Former Fairchild Buildings 20 and 20A

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Figure **D-07**

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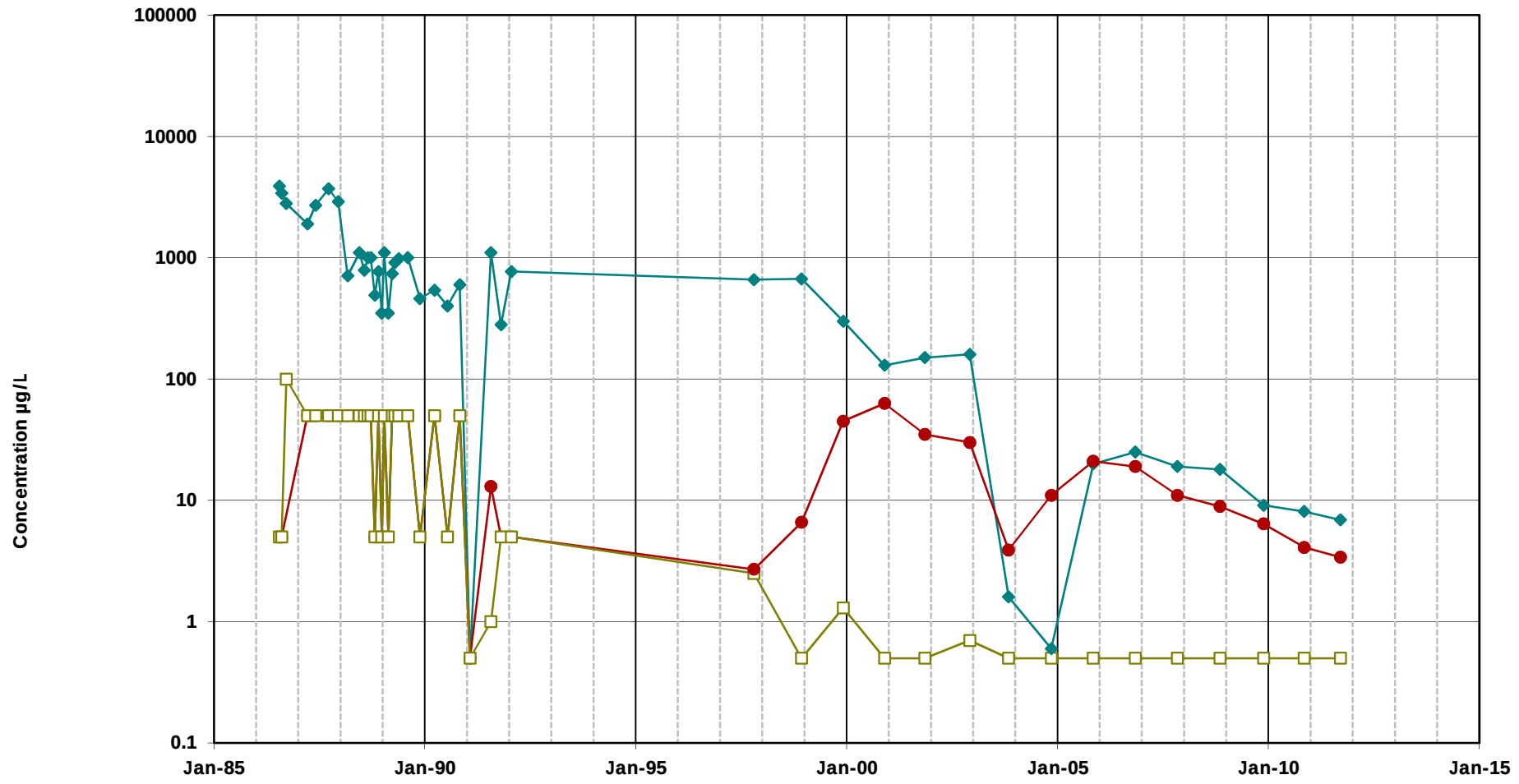

Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 89B2
MEW Former Fairchild Buildings 20 and 20A

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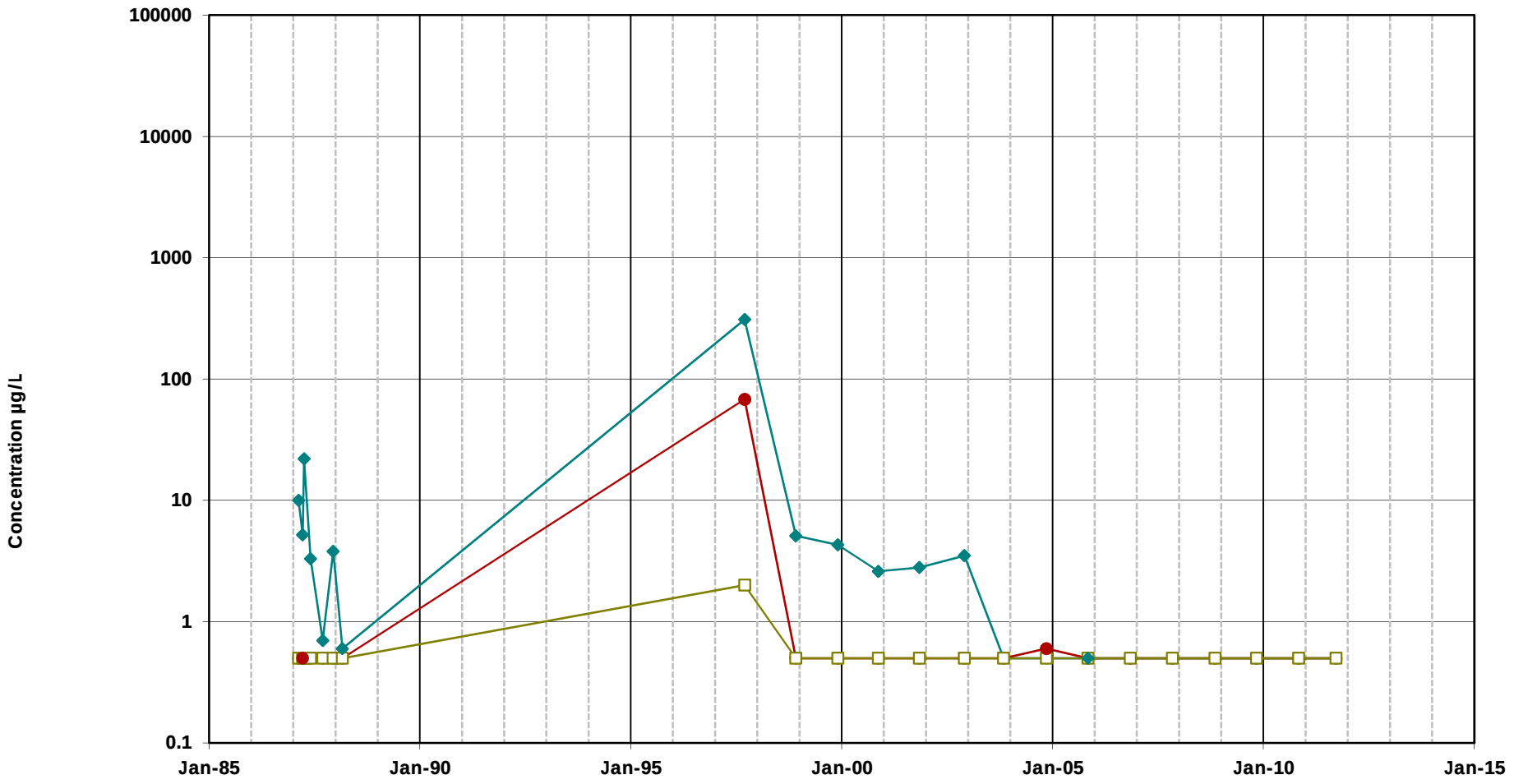
Figure

D-08



Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 132B2
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure

D-09

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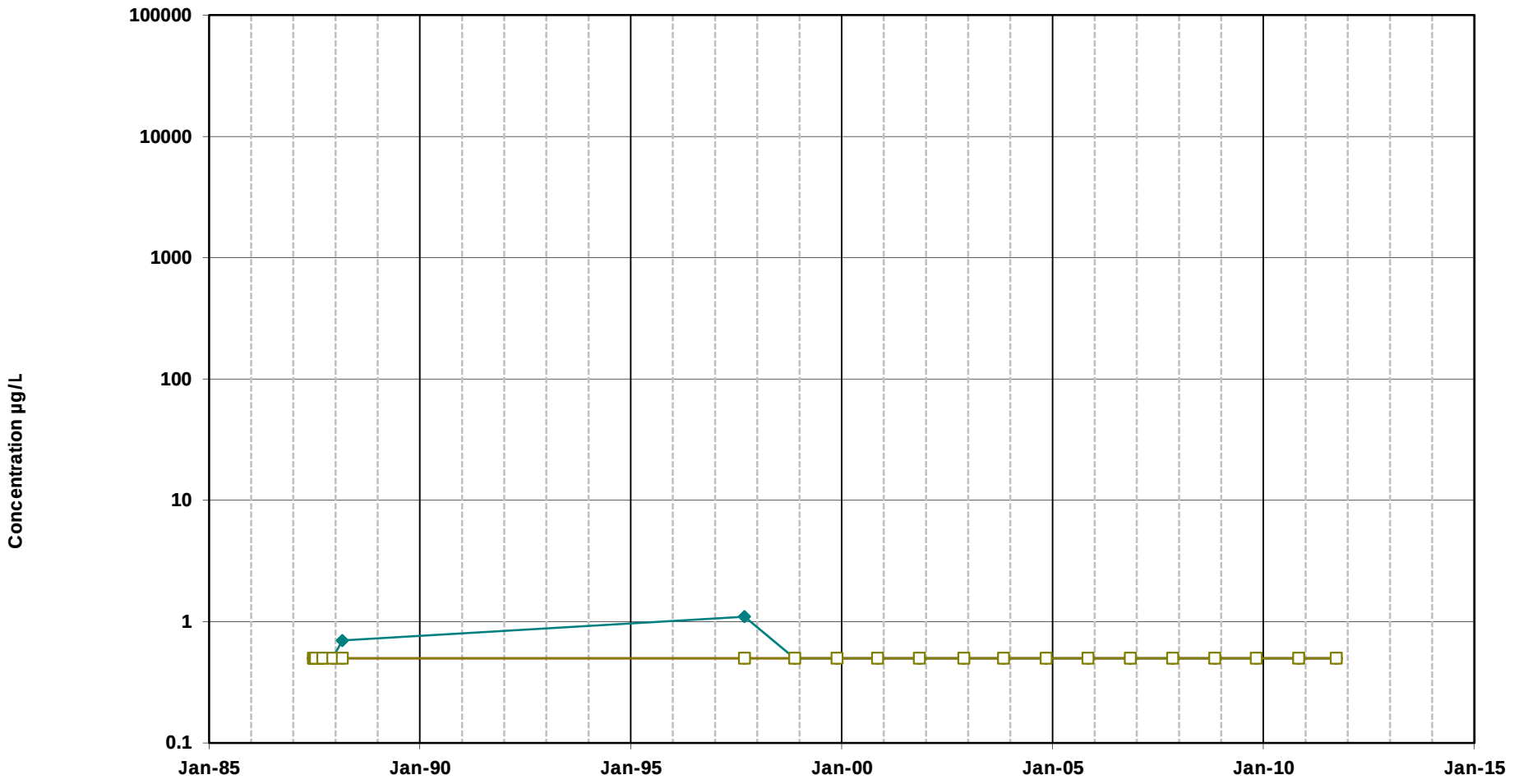


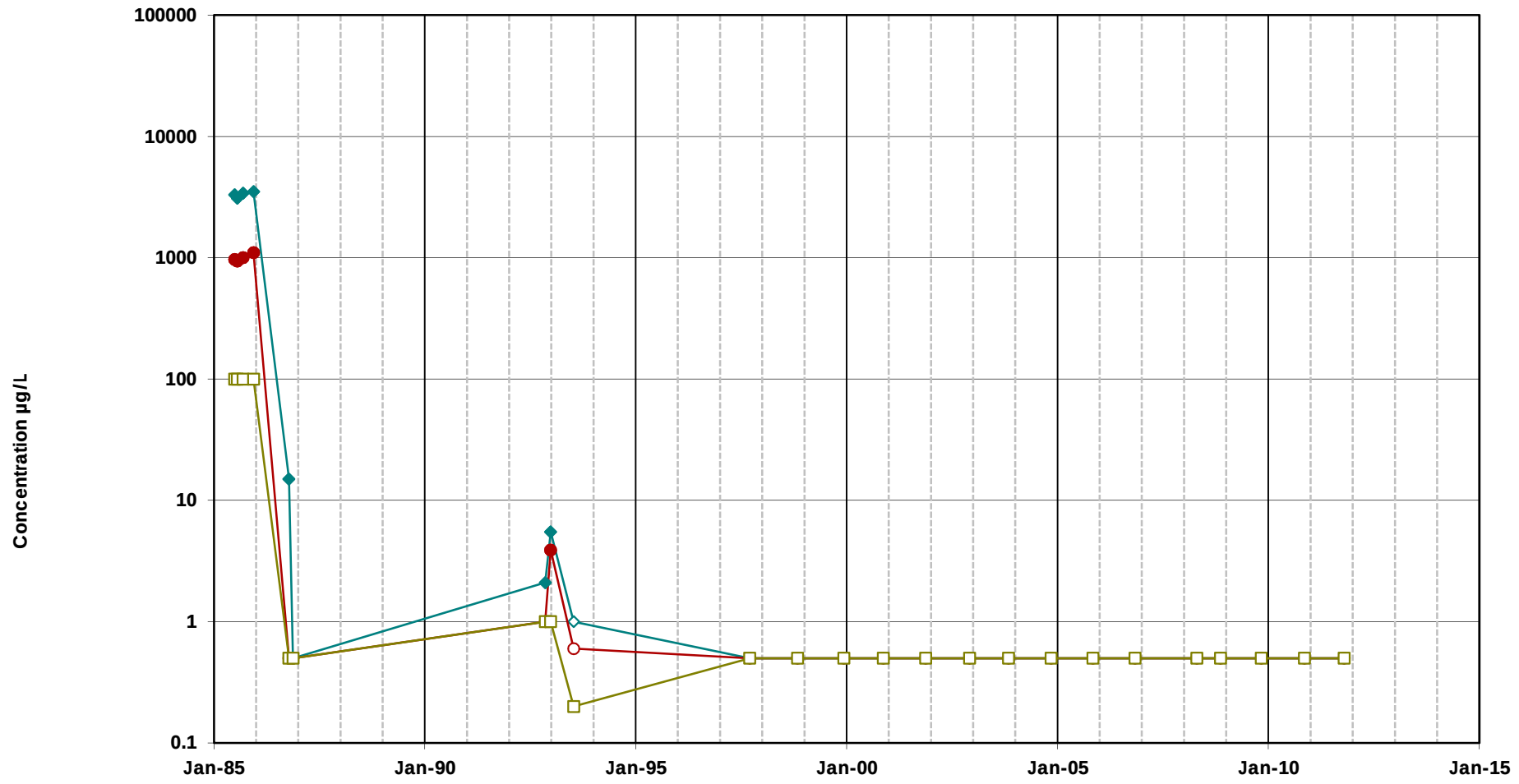
Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 134B2
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure **D-10**



Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 28B3
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure

D-11

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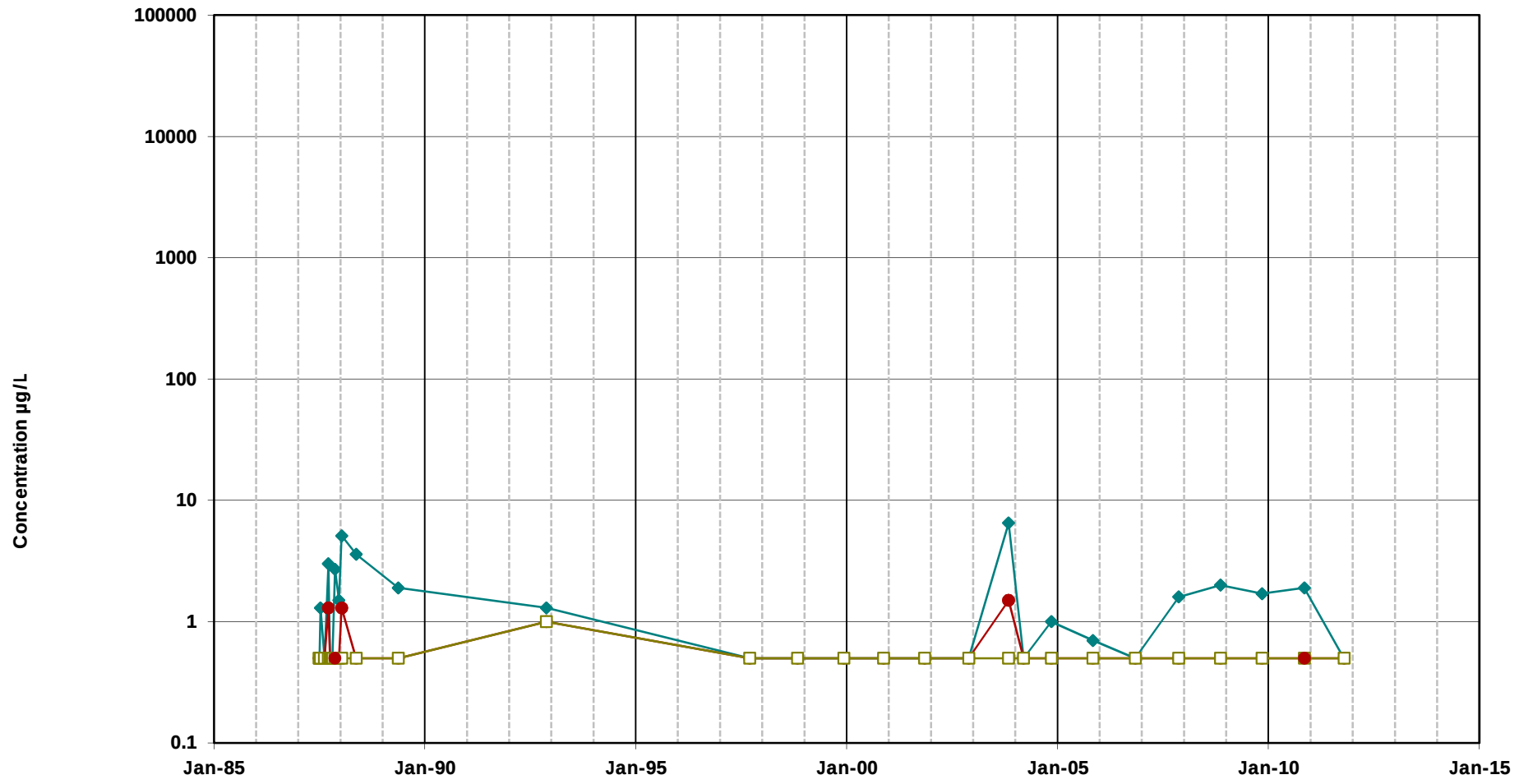

Trichloroethene

cis-1,2-Dichloroethene

Vinyl Chloride

Note:
Open symbols represent non-detects
(plotted at the method detection limit)

Chlorinated Ethenes in Groundwater
Well 11C
MEW Former Fairchild Buildings 20 and 20A

Geosyntec consultants

Oakland | April 2012

Figure

D-12

\\Oakland-01\data\GIS\MEW\Excel\TimeSeries\2011_AR\Building 20\[11C_VOC.xls]Plot_11C_VOC