MAUL FOSTER ALONGI
3121 SW Moody Avenue, Suite 200 | Portland, OR 97239 | 971 544 2139 | www.maulfoster.com

December 10, 2009
Project No. 8128.01.08

Mr. Dana Bayuk
Oregon Department of Environmental Quality
2020 SW 4th Avenue
Portland, Oregon

Re: Monthly Progress Report – November 2009
Siltronic Corporation
7200 NW Front Avenue, Portland, OR
ECSI #183

Dear Dana:

Maul Foster & Alongi, Inc. (MFA) has prepared this progress report (Report) in accordance with the requirements of the *Order Requiring Remedial Investigation (RI) and Source Control Measures* (the Order), Oregon Department of Environmental Quality (DEQ) No. VC-NWR-03-16, issued to Siltronic Corporation (Siltronic) on February 9, 2004. The reporting period for this Report is November 1, 2009, through November 30, 2009. The next report is due January 10, 2010.

The report organization follows that of the previous progress reports.

ACTIONS TAKEN UNDER THE ORDER SINCE THE PREVIOUS PROGRESS REPORT

Fieldwork

The eighth round of sampling for the Group 3 PMWs was completed during November.

Monthly water levels were collected on November 16, 2009, as shown on Table 1.[1]

Measurements of DNAPL were collected in selected Group 1 and 2 PMWs on November 16, 2009. DNAPL was not detected in the PMWs with one exception. MGP DNAPL was measured in WS-33-81 (MGP DNAPL thickness: 0.92 ft), and a sample was collected and submitted for analysis consistent with previous MGP DNAPL sampling.

Quarterly groundwater samples were collected during the week of November 16, 2009.

[1] Table includes monthly water levels from January 2009 through November 2009; water levels from preceding years have previously been submitted.

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ACTIONS TO BE TAKEN IN THE NEXT TWO MONTHS

Groundwater elevations and DNAPL thickness measurements will be collected in December.

Performance monitoring in Groups 1, 2 and 3 will continue in December. Performance monitoring in Group 3 will continue in January 2010.

MFA anticipates submitting ongoing performance monitoring data collected consistent with the reporting protocol in December 2009 and January 2010.

TEST RESULTS AND DATA RECEIVED SINCE THE PREVIOUS PROGRESS REPORT

MFA has received the results of the sixth round of samples from Groups 1 and 2, and the seventh and eighth round of samples from Group 3. The attached data submittal memorandum describes the results of these sampling events and includes a MS Excel data file containing all performance monitoring data received to date.

MFA notes that concentrations of TCE in all but one of the 23 Group 1 and Group 2 PMWs are below the injection threshold and therefore meet the Remedial Action Objective (RAO 1) for the source area. MFA also notes that the combined data sets suggest that increased concentrations of TCE degradation products in the Group 1 and 2 wells are not reflected in the downgradient Group 3 data.

PROBLEMS EXPERIENCED SINCE THE PREVIOUS PROGRESS REPORT

No additional problems were experienced since the previous progress report.

Please call either of us at (971) 544-2139 if you have questions or comments.

Sincerely,

Maul Foster & Alongi, Inc.

James G.D. Peale, RG
Senior Hydrogeologist

James J. Maul
Principal Hydrogeologist

Attachment: Table 1
Memorandum – Performance Monitoring Data through November, 2009

cc: Tom McCue, Siltronic Corporation (electronic and hard copy)
Alan Gladstone, Davis Rothwell Earle and Xochihua (electronic and hard copy)
Chris Reive, Jordan Schrader Ramis (electronic and hard copy)
Jim Anderson, DEQ (electronic)
Kristine Koch, EPA (electronic)
Sean Sheldrake, EPA Seattle (electronic)
Rene Fuentes, EPA Seattle (electronic)
Eric Blischke, EPA Portland (electronic)
Chip Humphrey, EPA Portland (electronic)

TABLE 1

Table
Groundwater Elevations and Willamette River Stage
January 2009 - November 2009
Siltronic Corporation
Portland, Oregon

PERIOD: From 01/02/2009 thru 11/16/2009 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WR-STAGE	1/2/2009	0.00	13:30	-12.39	NA	12.39
WR-STAGE	2/27/2009	0.00	12:30	-6.44	-5.95	6.44
WR-STAGE	4/15/2009	0.00	11:00	-9.19	2.75	9.19
WR-STAGE	5/15/2009	0.00	11:00	-8.91	-0.28	8.91
WR-STAGE	6/9/2009	0.00	11:00	-12.27	3.36	12.27
WR-STAGE	7/15/2009	0.00	13:30	-4.77	-7.50	4.77
WR-STAGE	8/11/2009	0.00	13:30	-3.23	-1.54	3.23
WR-STAGE	9/2/2009	0.00	13:00	-2.10	-1.13	2.10
WR-STAGE	10/15/2009	0.00	10:00	-3.08	0.98	3.08
WR-STAGE	11/16/2009	0.00	10:00	-4.52	1.44	4.52
WS-10-27	1/2/2009	33.45	16:29	15.76	NA	17.69
WS-10-27	2/27/2009	33.45	15:27	13.71	2.05	19.74
WS-10-27	4/15/2009	33.45	13:32	12.83	0.88	20.62
WS-10-27	5/15/2009	33.45	15:55	13.14	-0.31	20.31
WS-10-27	6/9/2009	33.45	12:06	13.49	-0.35	19.96
WS-10-27	7/15/2009	33.45	15:36	13.92	-0.43	19.53
WS-10-27	8/11/2009	33.45	15:52	14.37	-0.45	19.08
WS-10-27	9/2/2009	33.45	14:57	14.66	-0.29	18.79
WS-10-27	10/15/2009	33.45	11:52	15.47	-0.81	17.98
WS-10-27	11/16/2009	33.45	12:02	15.22	0.25	18.23
WS-11-125	1/2/2009	31.98	11:16	19.92	NA	12.06
WS-11-125	2/27/2009	31.98	10:11	24.36	-4.44	7.62
WS-11-125	4/15/2009	31.98	8:47	22.67	1.69	9.31
WS-11-125	5/15/2009	31.98	8:59	22.81	-0.14	9.17
WS-11-125	6/9/2009	31.98	9:18	19.42	3.39	12.56
WS-11-125	7/15/2009	31.98	10:52	26.82	-7.40	5.16
WS-11-125	8/11/2009	31.98	10:26	26.80	0.02	5.18
WS-11-125	9/2/2009	31.98	11:55	28.96	-2.16	3.02
WS-11-125	10/15/2009	31.98	09:09	27.43	1.53	4.55
WS-11-125	11/16/2009	31.98	09:12	26.23	1.20	5.75
WS-11-161	1/2/2009	32.00	11:15	19.90	NA	12.10
WS-11-161	2/27/2009	32.00	10:10	24.37	-4.47	7.63
WS-11-161	4/15/2009	32.00	8:46	22.65	1.72	9.35
WS-11-161	5/15/2009	32.00	8:56	22.80	-0.15	9.20
WS-11-161	6/9/2009	32.00	9:16	19.41	3.39	12.59
WS-11-161	7/15/2009	32.00	10:49	27.74	-8.33	4.26
WS-11-161	8/11/2009	32.00	10:24	26.81	0.93	5.19
WS-11-161	9/2/2009	32.00	10:48	28.59	-1.78	3.41
WS-11-161	10/15/2009	32.00	09:07	27.50	1.09	4.50
WS-11-161	11/16/2009	32.00	09:10	26.24	1.26	5.76
WS-12-125	1/2/2009	32.91	11:05	20.89	NA	12.02
WS-12-125	2/27/2009	32.91	10:01	25.24	-4.35	7.67
WS-12-125	4/15/2009	32.91	8:36	23.61	1.63	9.30

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

Table
Groundwater Elevations and Willamette River Stage
January 2009 - November 2009
Siltronic Corporation
Portland, Oregon

PERIOD: From 01/02/2009 thru 11/16/2009 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WS-12-125	5/15/2009	32.91	9:08	23.72	-0.11	9.19
WS-12-125	6/9/2009	32.91	9:13	20.40	3.32	12.51
WS-12-125	7/15/2009	32.91	10:43	27.64	-7.24	5.27
WS-12-125	8/11/2009	32.91	10:17	27.68	-0.04	5.23
WS-12-125	9/2/2009	32.91	10:43	29.41	-1.73	3.50
WS-12-125	10/15/2009	32.91	09:01	28.21	1.20	4.70
WS-12-125	11/16/2009	32.91	09:06	27.13	1.08	5.78
WS-12-161	1/2/2009	32.92	11:03	20.88	NA	12.04
WS-12-161	2/27/2009	32.92	10:00	25.24	-4.36	7.68
WS-12-161	4/15/2009	32.92	8:34	23.60	1.64	9.32
WS-12-161	5/15/2009	32.92	8:50	23.70	-0.10	9.22
WS-12-161	6/9/2009	32.92	9:12	20.31	3.39	12.61
WS-12-161	7/15/2009	32.92	10:42	27.67	-7.36	5.25
WS-12-161	8/11/2009	32.92	10:15	27.64	0.03	5.28
WS-12-161	9/2/2009	32.92	10:40	29.41	-1.77	3.51
WS-12-161	10/15/2009	32.92	09:00	28.25	1.16	4.67
WS-12-161	11/16/2009	32.92	09:04	27.06	1.19	5.86
WS-13-105	2/27/2009	33.30	15:52	24.82	NA	8.48
WS-13-105	4/15/2009	33.30	13:07	23.22	1.60	10.08
WS-13-105	5/15/2009	33.30	15:13	23.07	0.15	10.23
WS-13-105	6/9/2009	33.30	11:53	20.05	3.02	13.25
WS-13-105	7/15/2009	33.30	15:21	26.93	-6.88	6.37
WS-13-105	8/11/2009	33.30	15:37	27.80	-0.87	5.50
WS-13-105	9/2/2009	33.30	14:43	28.72	-0.92	4.58
WS-13-105	10/15/2009	33.30	11:42	27.63	1.09	5.67
WS-13-105	11/16/2009	33.09	11:43	26.55	0.87	6.54
WS-13-69	2/27/2009	33.32	15:53	24.05	NA	9.27
WS-13-69	4/15/2009	33.32	13:09	23.43	0.62	9.89
WS-13-69	5/15/2009	33.32	15:15	22.47	0.96	10.85
WS-13-69	6/9/2009	33.32	11:54	20.08	2.39	13.24
WS-13-69	7/15/2009	33.32	15:23	26.72	-6.64	6.60
WS-13-69	8/11/2009	33.32	15:39	27.60	-0.88	5.72
WS-13-69	9/2/2009	33.32	14:44	28.20	-0.60	5.12
WS-13-69	10/15/2009	33.32	11:43	27.49	0.71	5.83
WS-13-69	11/16/2009	33.17	11:44	26.52	0.82	6.65
WS-14-125	1/2/2009	32.21	14:30	19.98	NA	12.23
WS-14-125	2/27/2009	32.21	11:43	24.92	-4.94	7.29
WS-14-125	4/15/2009	32.21	10:01	22.73	2.19	9.48
WS-14-125	5/15/2009	32.21	11:34	22.94	-0.21	9.27
WS-14-125	6/9/2009	32.21	10:10	19.68	3.26	12.53
WS-14-125	7/15/2009	32.21	12:53	27.01	-7.33	5.20
WS-14-125	8/11/2009	32.21	11:33	27.44	-0.43	4.77
WS-14-125	9/2/2009	32.21	12:37	29.56	-2.12	2.65

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

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WS-14-125	10/15/2009	32.21	10:29	28.20	1.36	4.01
WS-14-125	11/16/2009	32.21	10:06	26.72	1.48	5.49
WS-14-161	1/2/2009	32.27	14:28	20.00	NA	12.27
WS-14-161	2/27/2009	32.27	11:41	24.95	-4.95	7.32
WS-14-161	4/15/2009	32.27	9:59	22.76	2.19	9.51
WS-14-161	5/15/2009	32.27	11:06	22.98	-0.22	9.29
WS-14-161	6/9/2009	32.27	10:08	19.71	3.27	12.56
WS-14-161	7/15/2009	32.27	12:51	27.03	-7.32	5.24
WS-14-161	8/11/2009	32.27	11:30	27.47	-0.44	4.80
WS-14-161	9/2/2009	32.27	12:38	29.66	-2.19	2.61
WS-14-161	10/15/2009	32.27	10:28	28.25	1.41	4.02
WS-14-161	11/16/2009	32.27	10:05	26.75	1.50	5.52
WS-15-140	1/2/2009	33.02	15:07	20.75	NA	12.27
WS-15-140	2/27/2009	33.02	12:54	25.44	-4.69	7.58
WS-15-140	4/15/2009	33.02	10:24	23.25	2.19	9.77
WS-15-140	5/15/2009	33.02	11:53	23.09	0.16	9.93
WS-15-140	6/9/2009	33.02	10:24	20.24	2.85	12.78
WS-15-140	7/15/2009	33.02	13:04	27.15	-6.91	5.87
WS-15-140	8/11/2009	33.02	12:52	27.85	-0.70	5.17
WS-15-140	9/2/2009	33.02	13:27	29.50	-1.65	3.52
WS-15-140	10/15/2009	33.02	10:47	28.05	1.45	4.97
WS-15-140	11/16/2009	33.02	10:27	26.75	1.30	6.27
WS-15-85	1/2/2009	32.98	15:09	21.89	NA	11.09
WS-15-85	2/27/2009	32.98	12:56	23.94	-2.05	9.04
WS-15-85	4/15/2009	32.98	10:26	23.74	0.20	9.24
WS-15-85	5/15/2009	32.98	11:55	21.99	1.75	10.99
WS-15-85	6/9/2009	32.98	10:26	19.61	2.38	13.37
WS-15-85	7/15/2009	32.98	13:05	27.78	-8.17	5.20
WS-15-85	8/11/2009	32.98	12:54	27.72	0.06	5.26
WS-15-85	9/2/2009	32.98	13:32	28.55	-0.83	4.43
WS-15-85	10/15/2009	32.98	10:48	27.57	0.98	5.41
WS-15-85	11/16/2009	32.98	10:28	26.90	0.67	6.08
WS-16-125	1/2/2009	32.93	14:23	20.78	NA	12.15
WS-16-125	2/27/2009	32.93	12:48	25.69	-4.91	7.24
WS-16-125	4/15/2009	32.93	10:18	23.47	2.22	9.46
WS-16-125	5/15/2009	32.93	11:47	23.59	-0.12	9.34
WS-16-125	6/9/2009	32.93	10:20	20.47	3.12	12.46
WS-16-125	7/15/2009	32.93	12:59	27.66	-7.19	5.27
WS-16-125	8/11/2009	32.93	11:48	28.14	-0.48	4.79
WS-16-125	9/2/2009	32.93	13:22	30.31	-2.17	2.62
WS-16-125	10/15/2009	32.93	10:38	28.78	1.53	4.15
WS-16-125	11/16/2009	32.93	10:18	27.32	1.46	5.61

MP - measuring point
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SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WS-16-161	1/2/2009	33.03	14:21	20.73	NA	12.30
WS-16-161	2/27/2009	33.03	12:47	25.60	-4.87	7.43
WS-16-161	4/15/2009	33.03	10:16	23.37	2.23	9.66
WS-16-161	5/15/2009	33.03	11:46	23.57	-0.20	9.46
WS-16-161	6/9/2009	33.03	10:19	20.59	2.98	12.44
WS-16-161	7/15/2009	33.03	12:58	27.45	-6.86	5.58
WS-16-161	8/11/2009	33.03	11:46	28.01	-0.56	5.02
WS-16-161	9/2/2009	33.03	13:24	30.17	-2.16	2.86
WS-16-161	10/15/2009	33.03	10:37	28.66	1.51	4.37
WS-16-161	11/16/2009	33.03	10:16	27.41	1.25	5.62
WS-17-52	1/2/2009	33.68	16:20	20.49	NA	13.19
WS-17-52	2/27/2009	33.68	15:06	20.08	0.41	13.60
WS-17-52	4/15/2009	33.68	13:19	19.72	0.36	13.96
WS-17-52	5/15/2009	33.68	15:45	19.19	0.53	14.49
WS-17-52	6/9/2009	33.68	12:01	18.47	0.72	15.21
WS-17-52	7/15/2009	33.68	15:31	20.36	-1.89	13.32
WS-17-52	8/11/2009	33.68	15:45	21.27	-0.91	12.41
WS-17-52	9/2/2009	33.68	14:52	21.70	-0.43	11.98
WS-17-52	10/15/2009	33.68	11:48	21.42	0.28	12.26
WS-17-52	11/16/2009	33.68	11:54	21.51	-0.09	12.17
WS-17-94	1/2/2009	33.78	16:17	21.94	NA	11.84
WS-17-94	2/27/2009	33.78	15:04	25.42	-3.48	8.36
WS-17-94	4/15/2009	33.78	13:17	23.64	1.78	10.14
WS-17-94	5/15/2009	33.78	15:43	23.39	0.25	10.39
WS-17-94	6/9/2009	33.78	11:59	20.66	2.73	13.12
WS-17-94	7/15/2009	33.78	15:30	27.10	-6.44	6.68
WS-17-94	8/11/2009	33.78	15:44	28.05	-0.95	5.73
WS-17-94	9/2/2009	33.78	14:52	28.86	-0.81	4.92
WS-17-94	10/15/2009	33.78	11:46	27.92	0.94	5.86
WS-17-94	11/16/2009	33.78	11:53	26.95	0.97	6.83
WS-18-101	1/2/2009	33.98	15:58	22.41	NA	11.57
WS-18-101	2/27/2009	33.98	14:16	24.88	-2.47	9.10
WS-18-101	4/15/2009	33.98	11:44	24.23	0.65	9.75
WS-18-101	5/15/2009	33.98	14:15	23.54	0.69	10.44
WS-18-101	6/9/2009	33.98	11:34	19.82	3.72	14.16
WS-18-101	7/15/2009	33.98	15:01	27.84	-8.02	6.14
WS-18-101	8/11/2009	33.98	15:16	28.67	-0.83	5.31
WS-18-101	9/2/2009	33.98	14:28	29.55	-0.88	4.43
WS-18-101	10/15/2009	33.98	11:25	28.91	0.64	5.07
WS-18-101	11/16/2009	33.98	11:24	27.80	1.11	6.18
WS-18-71	1/2/2009	33.93	16:00	22.43	NA	11.50
WS-18-71	2/27/2009	33.93	14:19	24.32	-1.89	9.61
WS-18-71	4/15/2009	33.93	11:46	23.74	0.58	10.19

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

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SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WS-18-71	5/15/2009	33.93	14:17	22.56	1.18	11.37
WS-18-71	6/9/2009	33.93	11:36	20.51	2.05	13.42
WS-18-71	7/15/2009	33.93	15:07	26.97	-6.46	6.96
WS-18-71	8/11/2009	33.93	15:17	27.89	-0.92	6.04
WS-18-71	9/2/2009	33.93	14:29	28.30	-0.41	5.63
WS-18-71	10/15/2009	33.93	11:27	28.04	0.26	5.89
WS-18-71	11/16/2009	33.93	11:26	27.65	0.39	6.28
WS-19-101	1/2/2009	33.79	16:03	22.95	NA	10.84
WS-19-101	2/27/2009	33.79	14:28	25.43	-2.48	8.36
WS-19-101	5/15/2009	33.79	14:22	23.49	1.94	10.30
WS-19-101	6/9/2009	33.79	11:41	20.32	3.17	13.47
WS-19-101	7/15/2009	33.79	15:09	27.36	-7.04	6.43
WS-19-101	8/11/2009	33.79	15:20	28.26	-0.90	5.53
WS-19-101	9/2/2009	33.79	14:30	28.79	-0.53	5.00
WS-19-101	10/15/2009	33.79	11:29	28.84	-0.05	4.95
WS-19-101	11/16/2009	33.79	11:31	28.25	0.59	5.54
WS-19-71	1/2/2009	33.74	16:05	22.61	NA	11.13
WS-19-71	2/27/2009	33.74	14:23	24.21	-1.60	9.53
WS-19-71	5/15/2009	33.74	14:27	22.73	1.48	11.01
WS-19-71	6/9/2009	33.74	11:43	20.35	2.38	13.39
WS-19-71	7/15/2009	33.74	15:11	27.03	-6.68	6.71
WS-19-71	8/11/2009	33.74	15:22	27.93	-0.90	5.81
WS-19-71	9/2/2009	33.74	14:32	28.51	-0.58	5.23
WS-19-71	10/15/2009	33.74	11:30	28.26	0.25	5.48
WS-19-71	11/16/2009	33.74	11:34	27.64	0.62	6.10
WS-20-112	1/2/2009	32.09	11:20	19.81	NA	12.28
WS-20-112	2/27/2009	32.09	10:13	23.82	-4.01	8.27
WS-20-112	4/15/2009	32.09	8:50	22.13	1.69	9.96
WS-20-112	5/15/2009	32.09	14:27	22.21	-0.08	9.88
WS-20-112	6/9/2009	32.09	9:22	19.06	3.15	13.03
WS-20-112	7/15/2009	32.09	10:55	26.35	-7.29	5.74
WS-20-112	8/11/2009	32.09	10:29	26.17	0.18	5.92
WS-20-112	9/2/2009	32.09	12:10	28.15	-1.98	3.94
WS-20-112	10/15/2009	32.09	09:14	26.55	1.60	5.54
WS-20-112	11/16/2009	32.09	09:15	25.44	1.11	6.65
WS-21-112	1/2/2009	34.47	13:38	21.46	NA	13.01
WS-21-112	2/27/2009	34.47	11:02	26.04	-4.58	8.43
WS-21-112	4/15/2009	34.47	9:25	24.16	1.88	10.31
WS-21-112	5/15/2009	34.47	10:05	24.16	0.00	10.31
WS-21-112	6/9/2009	34.47	9:45	21.08	3.08	13.39
WS-21-112	7/15/2009	34.47	11:26	28.28	-7.20	6.19
WS-21-112	8/11/2009	34.47	11:00	28.55	-0.27	5.92
WS-21-112	9/2/2009	34.47	12:28	30.59	-2.04	3.88

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

Table
Groundwater Elevations and Willamette River Stage
January 2009 - November 2009
Siltronic Corporation
Portland, Oregon

PERIOD: From 01/02/2009 thru 11/16/2009 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WS-21-112	10/15/2009	34.47	09:40	29.12	1.47	5.35
WS-21-112	11/16/2009	34.47	09:42	27.91	1.21	6.56
WS-21-131	11/16/2009	33.74	09:39	28.11	NA	5.63
WS-22-112	1/2/2009	33.51	13:00	20.37	NA	13.14
WS-22-112	2/27/2009	33.51	11:06	25.08	-4.71	8.43
WS-22-112	4/15/2009	33.51	9:28	23.09	1.99	10.42
WS-22-112	5/15/2009	33.51	10:36	23.09	0.00	10.42
WS-22-112	6/9/2009	33.51	9:48	20.61	2.48	12.90
WS-22-112	7/15/2009	33.51	11:30	27.40	-6.79	6.11
WS-22-112	8/11/2009	33.51	11:03	27.34	0.06	6.17
WS-22-112	9/2/2009	33.51	12:31	28.59	-1.25	4.92
WS-22-112	10/15/2009	33.51	09:42	27.96	0.63	5.55
WS-22-112	11/16/2009	33.51	09:46	27.52	0.44	5.99
WS-23-116	11/16/2009	32.49	10:01	26.92	NA	5.57
WS-24-111	11/16/2009	33.73	09:57	28.11	NA	5.62
WS-24-126	11/16/2009	33.76	09:55	28.19	NA	5.57
WS-24-155	11/16/2009	33.75	09:50	40.33	NA	- 6.58
WS-25-111	11/16/2009	34.01	09:33	28.28	NA	5.73
WS-25-96	11/16/2009	34.13	09:35	28.29	NA	5.84
WS-26-116	11/16/2009	33.56	09:27	27.73	NA	5.83
WS-26-86	11/16/2009	33.32	09:29	27.50	NA	5.82
WS-27-86	11/16/2009	33.93	09:22	28.01	NA	5.92
WS-30-96	11/16/2009	33.40	10:37	27.25	NA	6.15
WS-31-106	11/16/2009	33.11	10:58	27.47	NA	5.64
WS-32-106	11/16/2009	33.17	10:54	27.08	NA	6.09
WS-32-76	11/16/2009	33.08	10:56	26.84	NA	6.24
WS-33-106	11/16/2009	33.74	10:46	28.21	NA	5.53
WS-33-81	11/16/2009	33.74	10:49	27.47	NA	6.27
WS-34-106	11/16/2009	33.29	11:16	27.84	NA	5.45
WS-34-71	11/16/2009	33.36	11:20	27.51	NA	5.85

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

Table
Groundwater Elevations and Willamette River Stage
January 2009 - November 2009
Siltronic Corporation
Portland, Oregon

PERIOD: From 01/02/2009 thru 11/16/2009 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
WS-35-106	11/16/2009	33.59	11:12	27.39	NA	6.20
WS-35-76	11/16/2009	33.68	11:14	27.90	NA	5.78
WS-36-106	11/16/2009	34.49	11:03	28.27	NA	6.22
WS-36-81	11/16/2009	34.47	11:05	28.57	NA	5.90
WS-37-51	11/16/2009	33.58	11:38	26.89	NA	6.69
WS-38-61	11/16/2009	33.72	11:36	26.97	NA	6.75
WS-39-101	11/16/2009	34.04	10:41	28.00	NA	6.04
WS-8-33	1/2/2009	32.96	10:55	25.36	NA	7.60
WS-8-33	2/27/2009	32.96	9:54	26.61	-1.25	6.35
WS-8-33	4/15/2009	32.96	8:31	24.85	1.76	8.11
WS-8-33	5/15/2009	32.96	8:43	23.39	1.46	9.57
WS-8-33	6/9/2009	32.96	9:06	20.98	2.41	11.98
WS-8-33	7/15/2009	32.96	10:37	26.45	-5.47	6.51
WS-8-33	8/11/2009	32.96	10:11	27.49	-1.04	5.47
WS-8-33	9/2/2009	32.96	10:33	28.02	-0.53	4.94
WS-8-33	10/15/2009	32.96	08:56	28.44	-0.42	4.52
WS-8-33	11/16/2009	32.96	08:58	27.28	1.16	5.68
WS-8-59	1/2/2009	32.84	11:00	21.20	NA	11.64
WS-8-59	2/27/2009	32.84	9:56	25.26	-4.06	7.58
WS-8-59	4/15/2009	32.84	8:32	23.67	1.59	9.17
WS-8-59	5/15/2009	32.84	8:45	23.67	0.00	9.17
WS-8-59	6/9/2009	32.84	9:08	20.36	3.31	12.48
WS-8-59	7/15/2009	32.84	10:39	27.54	-7.18	5.30
WS-8-59	8/11/2009	32.84	10:13	27.65	-0.11	5.19
WS-8-59	9/2/2009	32.84	10:35	29.15	-1.50	3.69
WS-8-59	10/15/2009	32.84	08:58	28.22	0.93	4.62
WS-8-59	11/16/2009	32.84	09:01	27.01	1.21	5.83
WS-9-34	1/2/2009	32.28	10:45	22.62	NA	9.66
WS-9-34	2/27/2009	32.28	9:45	24.30	-1.68	7.98
WS-9-34	4/15/2009	32.28	8:22	22.44	1.86	9.84
WS-9-34	5/15/2009	32.28	8:33	21.61	0.83	10.67
WS-9-34	6/9/2009	32.28	8:58	20.22	1.39	12.06
WS-9-34	7/15/2009	32.28	10:30	24.00	-3.78	8.28
WS-9-34	8/11/2009	32.28	10:02	25.02	-1.02	7.26
WS-9-34	9/2/2009	32.28	10:29	25.50	-0.48	6.78
WS-9-34	10/15/2009	32.28	08:50	26.04	-0.54	6.24
WS-9-34	11/16/2009	32.28	08:53	24.86	1.18	7.42

MP - measuring point
Elevations relative to Mean Sea Level (NGVD 29)

MEMORANDUM

PERFORMANCE MONITORING DATA
THROUGH NOVEMBER, 2009

MAUL FOSTER ALONGI

MEMORANDUM

To:	Mr. Dana Bayuk – Oregon DEQ	Date:	December 10, 2009
From:	James G.D. Peale, RG	Project:	8128.01.20

RE: Enhanced *In Situ* Bioremediation Performance Monitoring Data Submittal
Data Collected through November, 2009
Siltronic Corporation – ECSI #183

The following summarizes data and trends from the EIB performance monitoring wells (PMWs) for the sampling events completed through November, 2009. The data confirm successful full-scale installation of the EIB permeable reactive barrier (PRB), and ongoing natural attenuation in the downgradient portion of the plume. The previous data memorandum included observations based on data through September; these observation are still valid, but are not reiterated here.

Group 1 and 2 PMWs – Data Collected through October 2009

Table 1 summarizes recent Group 1 and 2 data and trends for TCE, cis-1,2-DCE and vinyl chloride. Table 1 also includes recent data for dehalococcoides (Dhc), Dhc containing the vinyl chloride reductase enzyme (vcrA), chloride, and total iron. The wells are grouped into transects across the EIB injection zone, from upgradient of the PRB (or within a supplemental injections zone) to downgradient (Figure 1). Concentration *vs* time (C *vs* T) plots for each transect are included as Figures 2-9. MFA has developed the following new observations regarding the data.

- RAO 1 (TCE concentrations below the injection threshold) has been achieved in 22 of the 23 Group 1 and 2 PMWs. The concentration in one of the remaining PMWs previously above the injection threshold (WS-39-101) decreased from 12,700 ug/L to 6,520 ug/L between the September and October sampling events. TCE concentrations in WS13-69 remain above the injection threshold, but PMWs located downgradient of this well are below the injection threshold.
- Successful distribution of EHC™ within and downgradient of the EIB PRB has been confirmed by increased concentrations of iron in all of the Group 1 and 2 PMWs located within or downgradient of the PRB.

- Successful dechlorination of TCE and its degradation products within and downgradient of the EIB PRB has been confirmed by increased concentrations of chloride in all of the Group 1 and 2 PMWs located within or downgradient of the PRB.
- Successful distribution of KB-1 bacteria within and downgradient of the EIB PRB has been confirmed by increased counts of Dhc and vcrA in nearly all of the Group 1 PMWs. Increased Dhc and vcrA counts have been observed in all of the Group 2 PMWs.
- Decreasing trends for DCE and vinyl chloride (simultaneous with decreasing TCE trends) were observed in some Group 1 and 2 PMWs, suggesting contribution from abiotic mechanisms.

Group 3 PMWs

The trends are summarized in the attached Table 2. A time-series chart of the geometric means of TCE, cis-1,2-DCE, and VC in the Group 3 PMWs (Figure 10) is attached. A scatter plot of chloride concentrations in the Group 1, 2 and 3 PMWs (Figure 11) follows. C *vs* T plots for 10 of the 11 Group 3 PMWs are included as Figures 12-21. MFA has developed the following conclusions:

- As shown on Figure 10, overall concentrations are declining in the downgradient portion of the plume, consistent with our understanding.
- The RAO has been met for all three compounds in three wells, two compounds (TCE and DCE) in two additional well, and one compound (TCE) in three additional wells.
- Increasing trends for cis-1,2-DCE and/or vinyl chloride in wells WS25-96, WS23-116, WS21-131, and WS24-111 reflect the variability of compound distribution in the subsurface. The chloride comparison scatter plot (Figure 11) demonstrates that elevated chloride concentrations in the source area have not resulted in increased chloride concentrations in the Group 3 PMWs. As shown on Table 1, the geometric mean of the chloride concentration in the Group 1 and 2 PMWs ranged from 10x to 20x the geometric mean of the cis-1,2-DCE concentrations. Chloride is a conservative tracer (i.e., it is not retarded by sorption to organic carbon, unlike TCE and its degradation products). The attenuation of chloride in groundwater between the source area and the Group 3 data set strongly implies that increased concentrations of cis-1,2-DCE and vinyl chloride in some of the Group 3 PMWs are not the result of EIB injections in the source area.
- Increasing trends for all three compounds were observed in one well (WS24-111). Increasing trends for cis-1,2-DCE observed in three wells (WS25-96, WS23-116, and WS21-131) were accompanied by flat, decreasing, or increasing trends for vinyl chloride.

Previous observations regarding EIB performance and downgradient data trends are generally unchanged by these data. Subsequent data will be evaluated in the context of the Performance Monitoring Plan (PMP), pending receipt of DEQ comments.

Attachments: Tables
Figures
PMW Data file (electronic only)

cc: Tom McCue, Siltronic Corporation (electronic and hard copy)
Alan Gladstone, Davis Rothwell Earle and Xochihua (electronic and hard copy)
Chris Reive, Jordan Schrader Ramis (electronic and hard copy)
Jim Anderson, DEQ (electronic)
Kristine Koch, EPA (electronic)
Sean Sheldrake, EPA Seattle (electronic)
Rene Fuentes, EPA Seattle (electronic)
Eric Blischke, EPA Portland (electronic)
Chip Humphrey, EPA Portland (electronic)

TABLES

Table 1
Summary of Group 1 and 2 Performance Monitoring Data
Through October 2009
Siltronic Corporation

		TCE (ug/L)		DCE (ug/L)		VC (ug/L)		Dhc (per L)	vcrA (per L)	Cl (mg/L)	Fe (mg/L)
Transect 1	Location	Trend	Oct-09	Trend	Oct-09	Trend	Oct-09	Oct-09	Oct-09	Oct-09	Oct-09
WS15-85	UPG	DEC	2.18	DEC	234	FLAT	15	**1.E+05**	**2.E+05**	7	62
WS30-96	PRB	DEC	692	INC	200,000	INC	468	1.E+04	2.E+04	INT	**1,420**
WS39-101	DNG	DEC	6,520	INC	156,000	INC	2,750	**4.E+08**	**2.E+08**	**84**	**140**
Transect 2-Shallow											
WS32-76	PRB	DEC	124	DEC	13,900	INC	668	3.E+04	2.E+04	**109**	**2,300**
WS33-81	DNG	DEC	431	FLAT	104,000	INC	4,130	**3.E+08**	**6.E+05**	**248**	**1,860**
Transect 2-Deep											
WS31-106	UPG	DEC	2.28	DEC	32,400	INC	7,080	**8.E+07**	**5.E+07**	**110**	**922**
WS32-106	PRB	DEC	124	INC	53,600	INC	5,990	2.E+04	2.E+04	**87**	**2,570**
WS33-106	DNG	DEC	0.38	DEC	1,190	INC	2,410	**5.E+08**	**2.E+08**	**84**	**492**
Transect 3-Shallow											
WS34-71	UPG	DEC	4.1	DEC	58,800	INC	68,100	**6.E+08**	**1.E+08**	**120**	**267**
WS35-76	PRB	DEC	142	FLAT	116,000	DEC	2,760	**4.E+05**	2.E+04	INT	**2,540**
WS36-81	DNG	DEC	44.7	INC	202,000	INC	45,900	**7.E+08**	**5.E+07**	**170**	**95.7**
Transect 3-Deep											
WS34-106	UPG	DEC	0.5	DEC	2.4	DEC	23	**7.E+07**	**5.E+07**	**48**	**172**
WS35-106	PRB	DEC	20.3	INC	285,000	INC	10,300	**3.E+08**	**1.E+08**	**202**	**1,020**
WS36-106	DNG	DEC	28	FLAT	27,500	INC	13,300	**7.E+06**	**7.E+06**	INT	**3320**
Transect 4-Shallow											
WS13-69	UPG	DEC	107,000	INC	62,800	INC	67	1.E+04	8.E+03	58	117
WS19-71	PRB	DEC	0.78	DEC	18	DEC	30	**5.E+06**	**7.E+05**	**126**	**52.8**
WS18-71	DNG	FLAT	1.51	DEC	73	DEC	806	**4.E+08**	**1.E+08**	**149**	**334**
Transect 4-Deep											
WS13-105	UPG	DEC	0.65	DEC	0.8	DEC	0.89	**1.E+06**	**9.E+05**	18	59.2
WS19-101	PRB	DEC	<0.5	DEC	8.2	DEC	43	**3.E+06**	**1.E+06**	**164**	45.9
WS18-101	DNG	FLAT	684	INC	220,000	FLAT	43,400	**8.E+07**	**6.E+07**	**220**	**583**
Transect 5											
WS37-51	PRB	DEC	0.97	DEC	23,500	INC	5,720	**1.E+08**	**7.E+07**	**51**	**336**
WS38-61	DNG	DEC	0.55	DEC	189	DEC	4,210	**9.E+08**	**2.E+08**	**80**	**292**
RAO 1 Met (out of 23 PMWs)		22									
	Decreasing	20		12		7					
	Flat	2		3		2					
	Increasing	--		7		13					
Geometric Mean of All Wells		22		4,552		1,107		1.E+07	4.E+06	87	385
Geometric Mean of DNG Wells		31		11,598		6,293		2.E+08	4.E+07	134	468

WS15-140 not shown; recent concentrations of TCE and its degradation products <1 ug/L
Bold indicates elevated value relative to arithmetic mean background or lower quantitation limit
Mean background calculated using pre-injection data from WS13 and WS15 well pairs: 31 mg/L for chloride (Cl), 55 mg/L for iron (Fe)
Lower quantitation limit for Dhc/vcrA is approximately 10,000 copies/liter
INT - High concentrations of volatile fatty acids interfered with quantification of chloride values
UPG - located upgradient of PRB or within supplemental injection area (Group 1)
PRB - located in PRB (Group 1)
DNG - located downgradient of PRB (Group 2)

Table 2
Data Trend and RAO 2 Summary
Group 3 PMWs - Data Through November 2009
Siltronic Corporation

Well ID	TCE	DCE	VC
JSCS SLV (ug/L)	30	61	2.4
WS24-155	RAO 2 Met	RAO 2 Met	RAO 2 Met
WS24-126	RAO 2 Met	RAO 2 Met	RAO 2 Met
WS26-86	RAO 2 Met	RAO 2 Met	RAO 2 Met
WS26-116	RAO 2 Met	RAO 2 Met	DEC
WS27-86	RAO 2 Met	RAO 2 Met	FLAT
WS25-96	RAO 2 Met	INC	DEC
WS23-116	RAO 2 Met	INC	FLAT
WS21-131	RAO 2 Met	INC	INC
WS25-111	DEC	DEC	DEC
WS21-112	DEC	DEC	DEC
WS24-111	INC	INC	INC
Totals			
RAO 2 Met	8	5	3
Decreasing	2	2	4
Flat	--	--	2
Increasing	1	4	2

FIGURES

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Figure 1
Group 1 and 2 Transects

Siltronic
Portland, Oregon

DRAFT

Legend

- Monitoring Wells
- Transect 1
- Transect 2 - Shallow
- Transect 2 - Deep
- Transect 3 - Shallow
- Transect 3 - Deep
- Transect 4 - Shallow
- Transect 4 - Deep
- Transect 5

0 8 16

Feet

Source: Aerial photograph obtained from Metro Data Resource Center

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Project: 8128.20 Produced By: W. Coffey Approved By: J. Peale Print Date: 12-10-2009

Figure 2
TCE, cDCE and VC in Groundwater
Transect 1

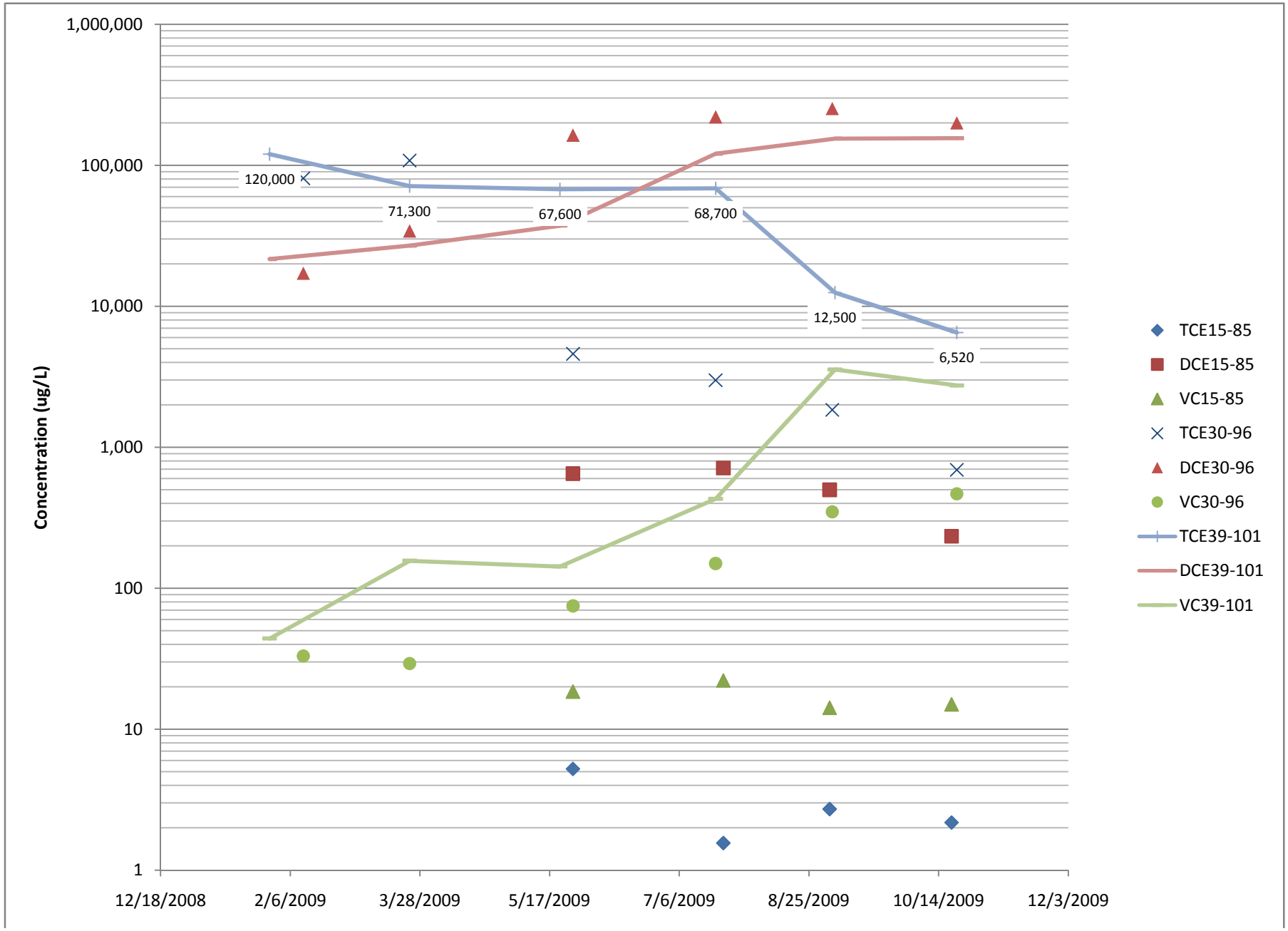

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Figure 3
TCE, cDCE and VC in Groundwater
Transect 2 Shallow

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Figure 4
TCE, cDCE and VC in Groundwater
Transect 2 Deep

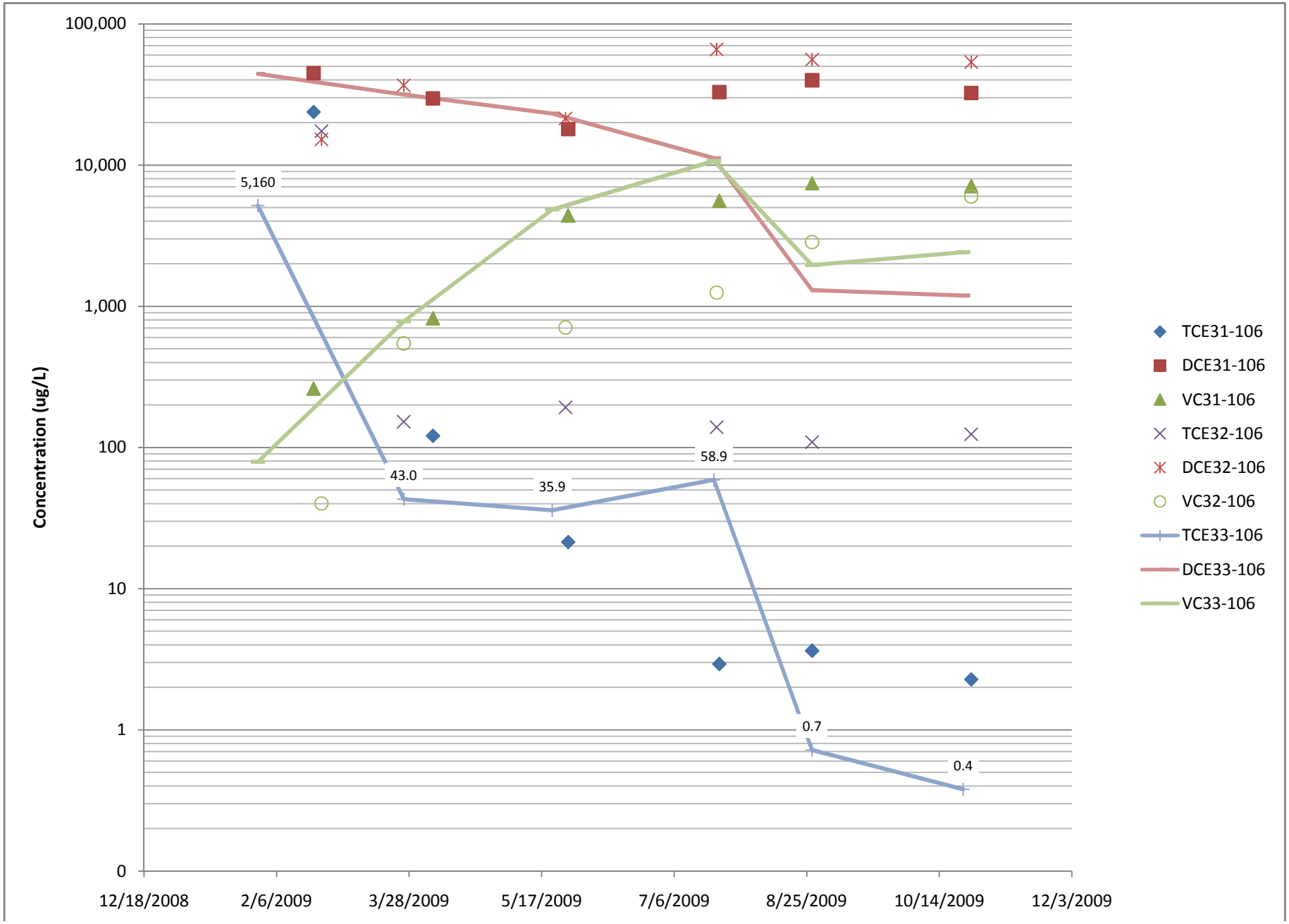

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Figure 5
TCE, cDCE and VC in Groundwater
Transect 3 Shallow

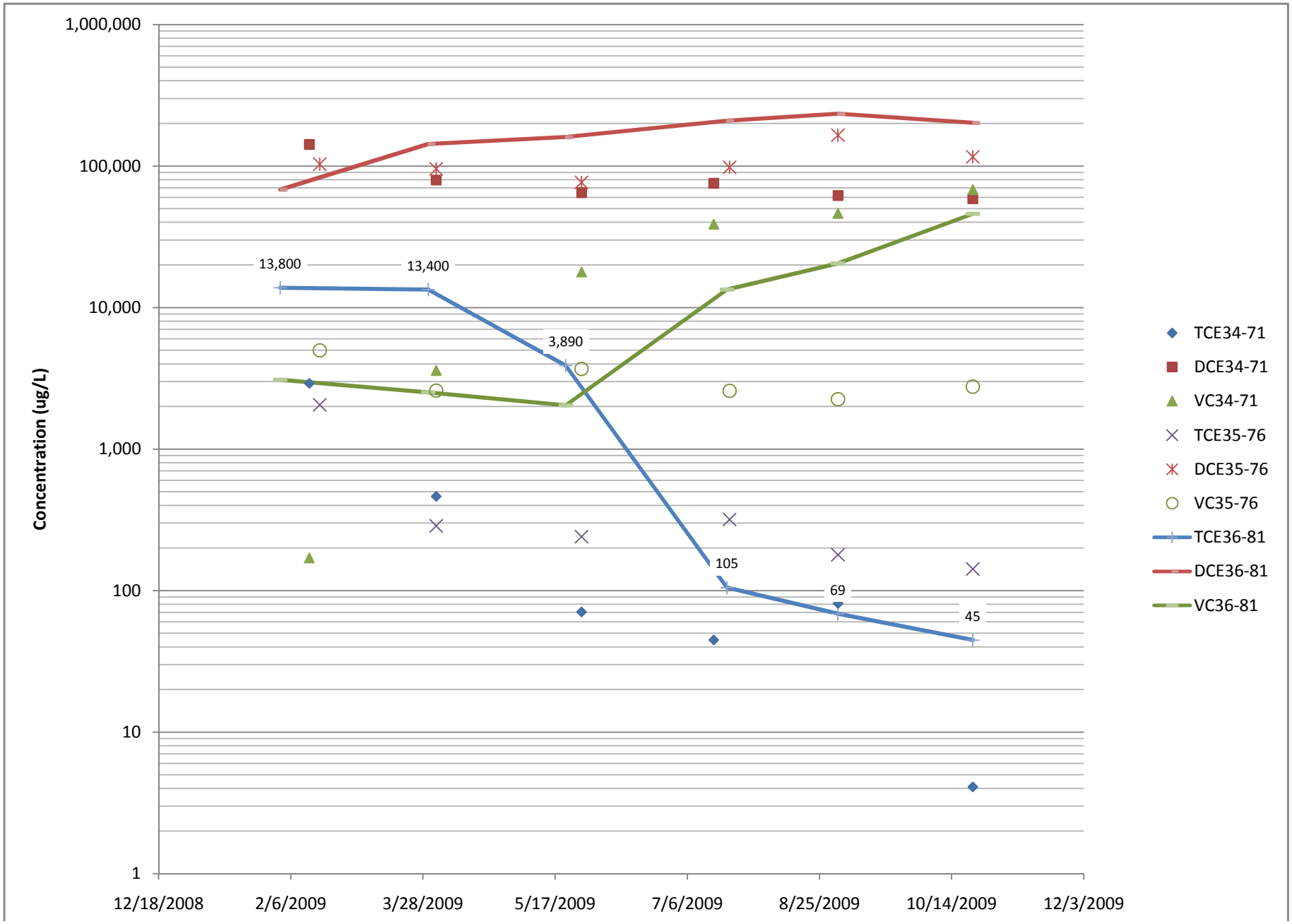

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Figure 6
TCE, cDCE and VC in Groundwater
Transect 3 Deep

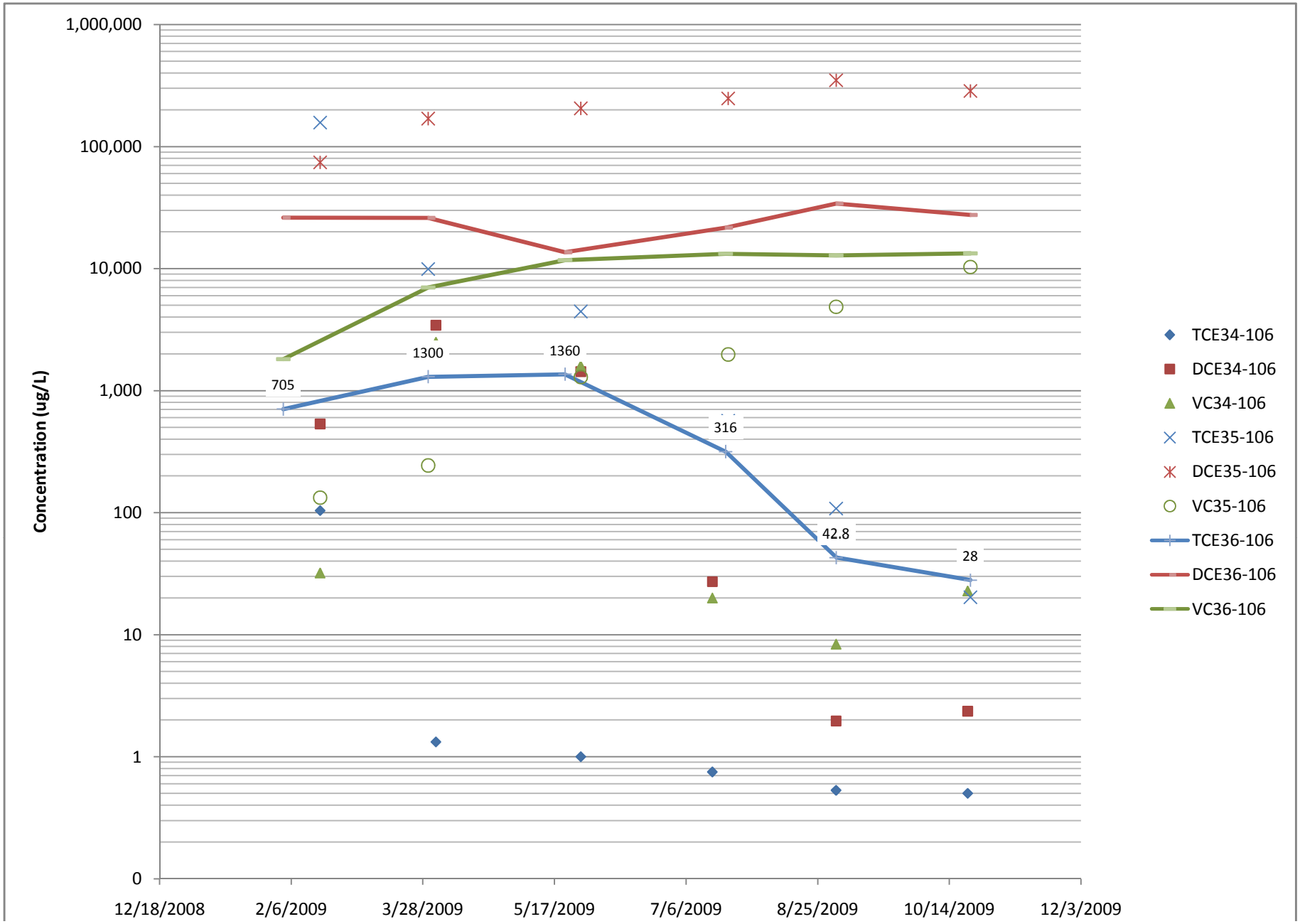

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Figure 7
TCE, cDCE and VC in Groundwater
Transect 4 Shallow

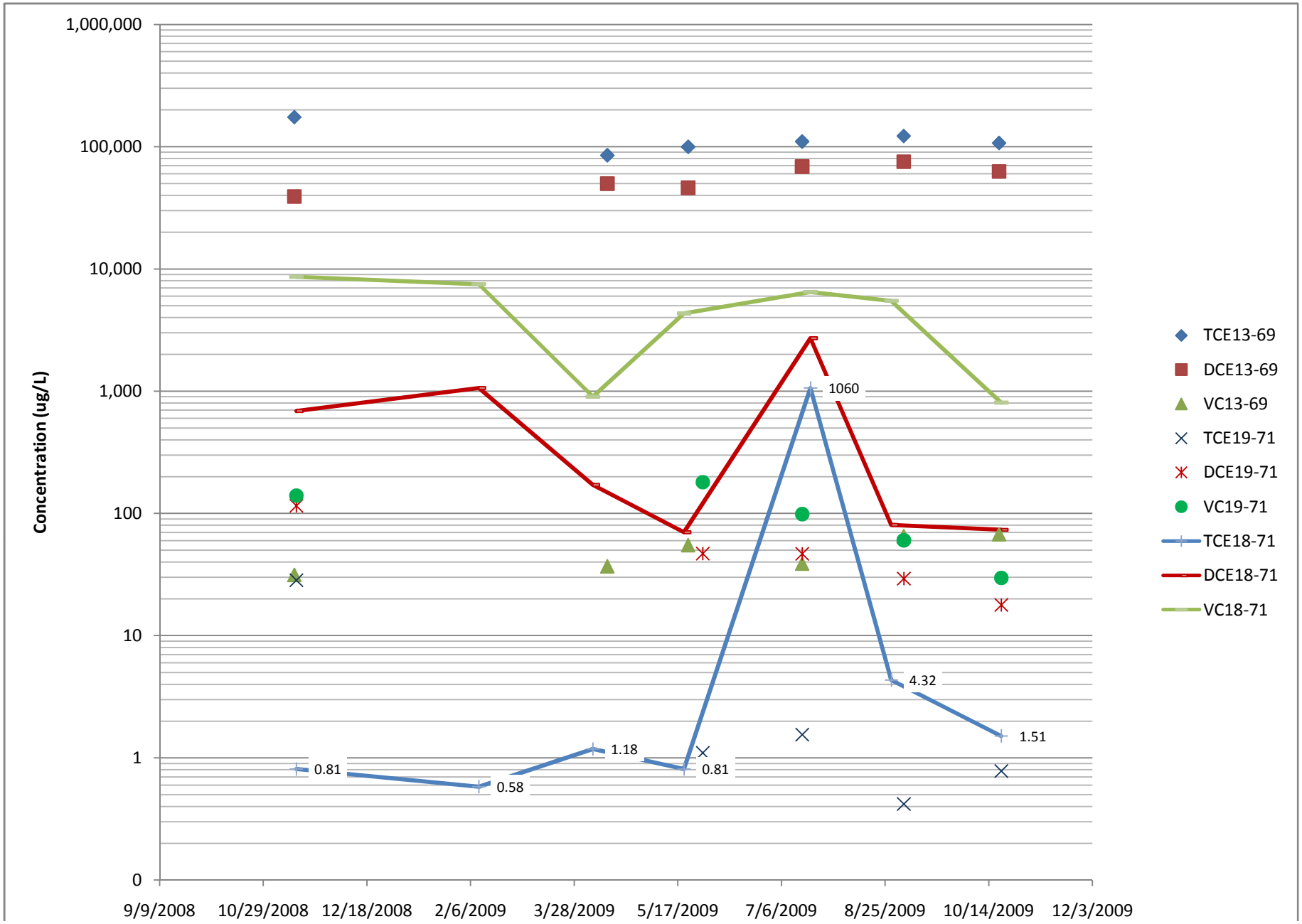

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Figure 8
TCE, cDCE and VC in Groundwater
Transect 4 Deep

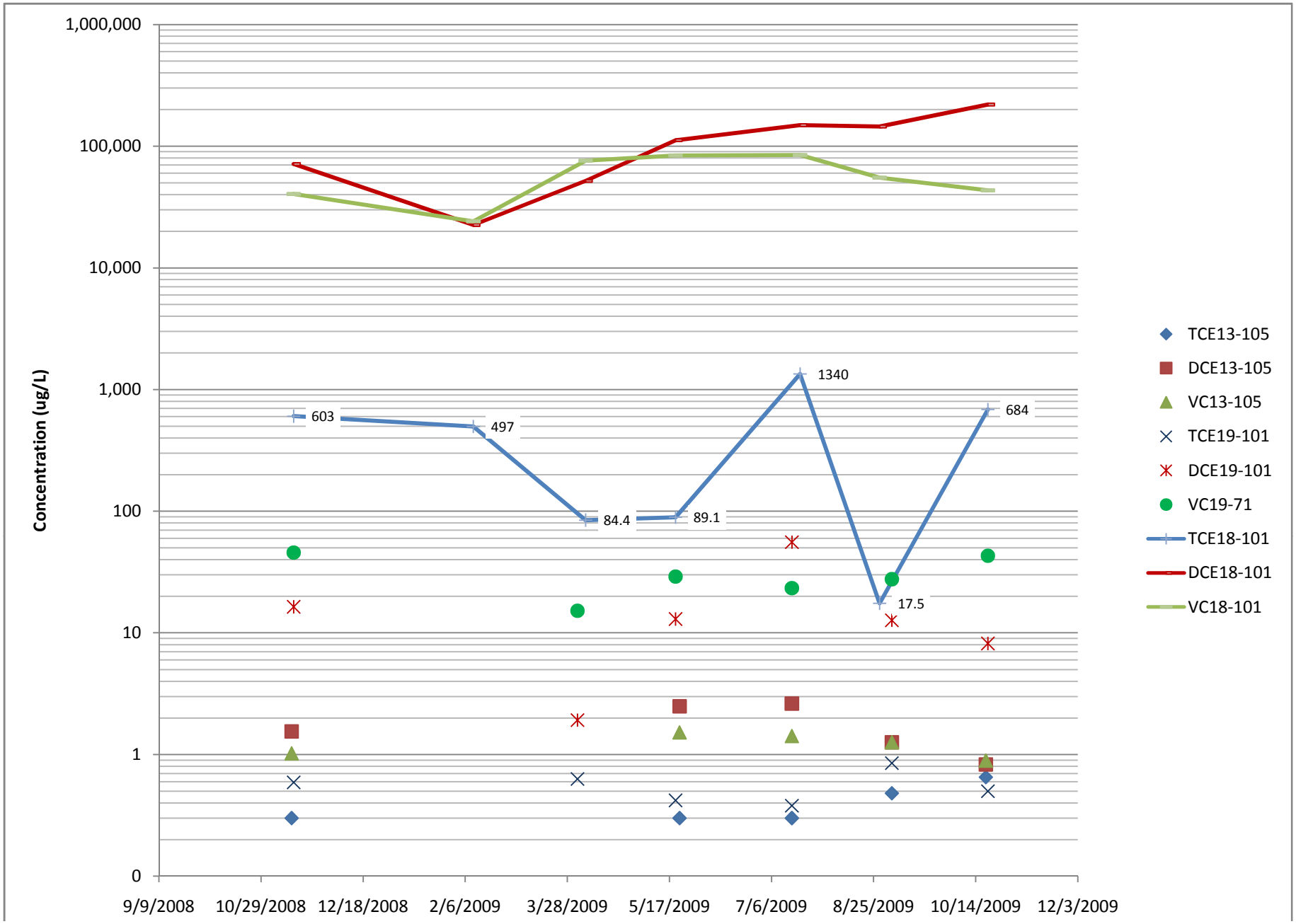

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Figure 9
TCE, cDCE and VC in Groundwater
Transect 5

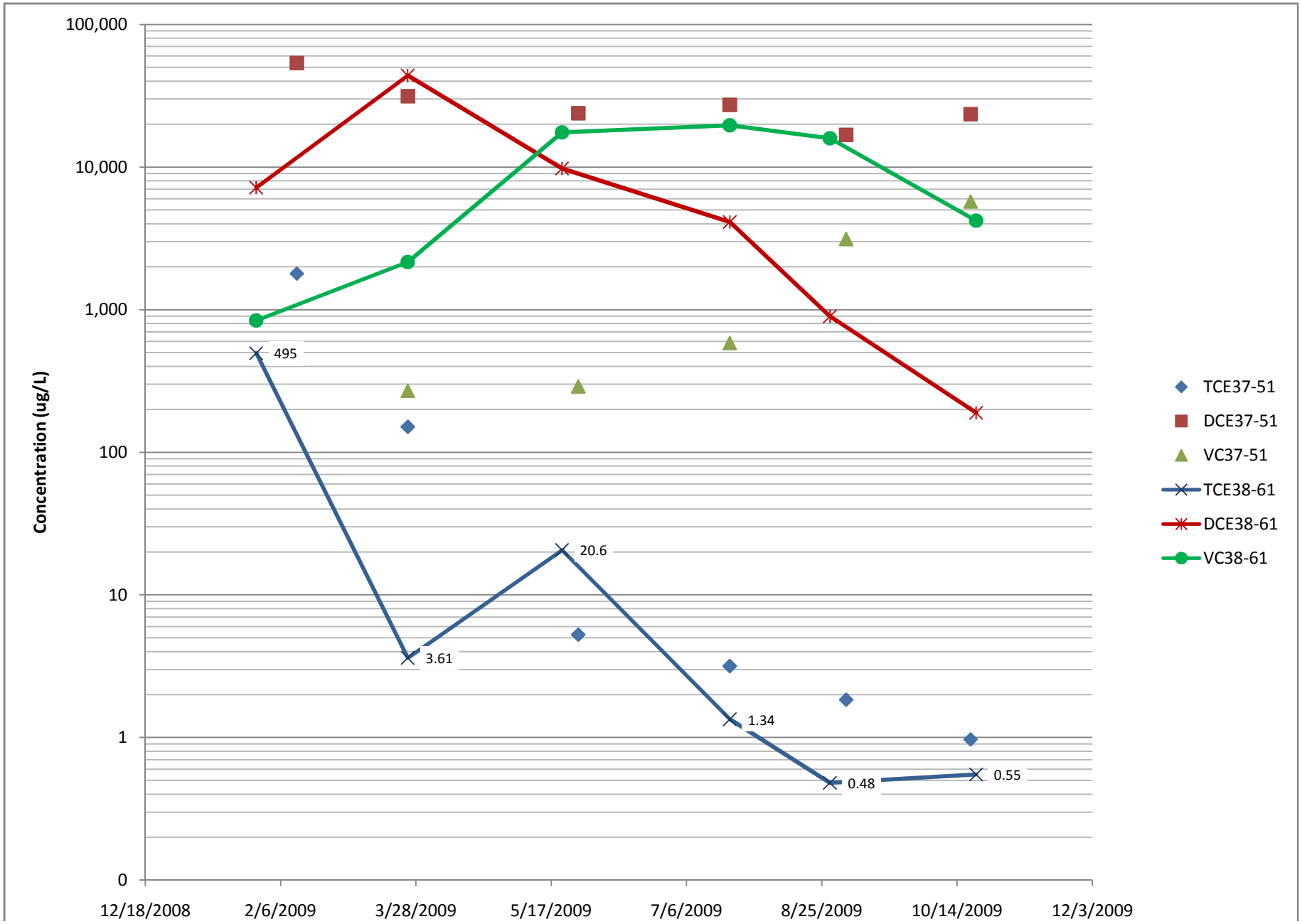

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Figure 10
TCE, cDCE and VC in Groundwater
Geometric Mean of All Group 3 PMW Data

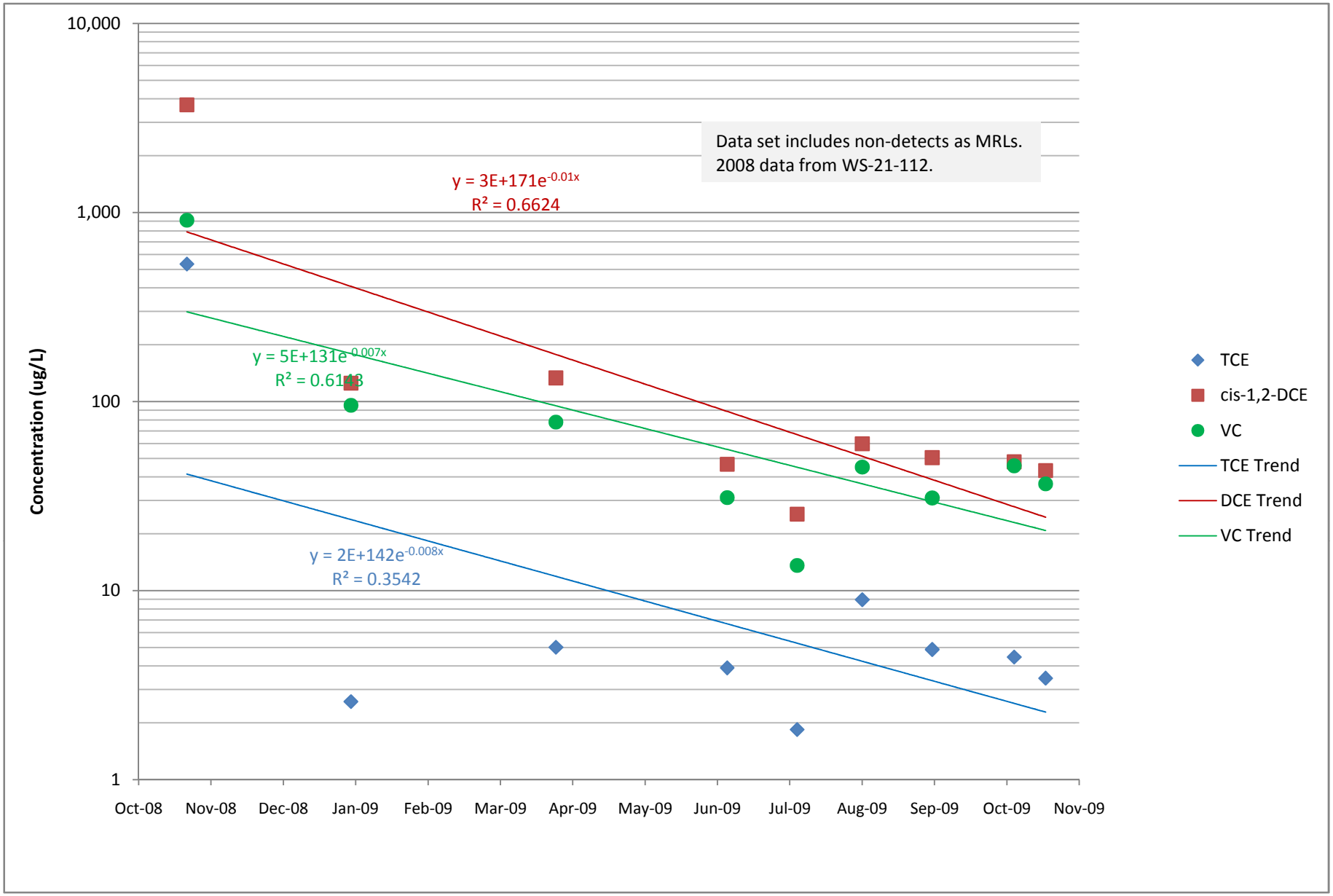

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Figure 11
Comparison of Chloride Concentrations
Group 1 and 2 vs. Group 3

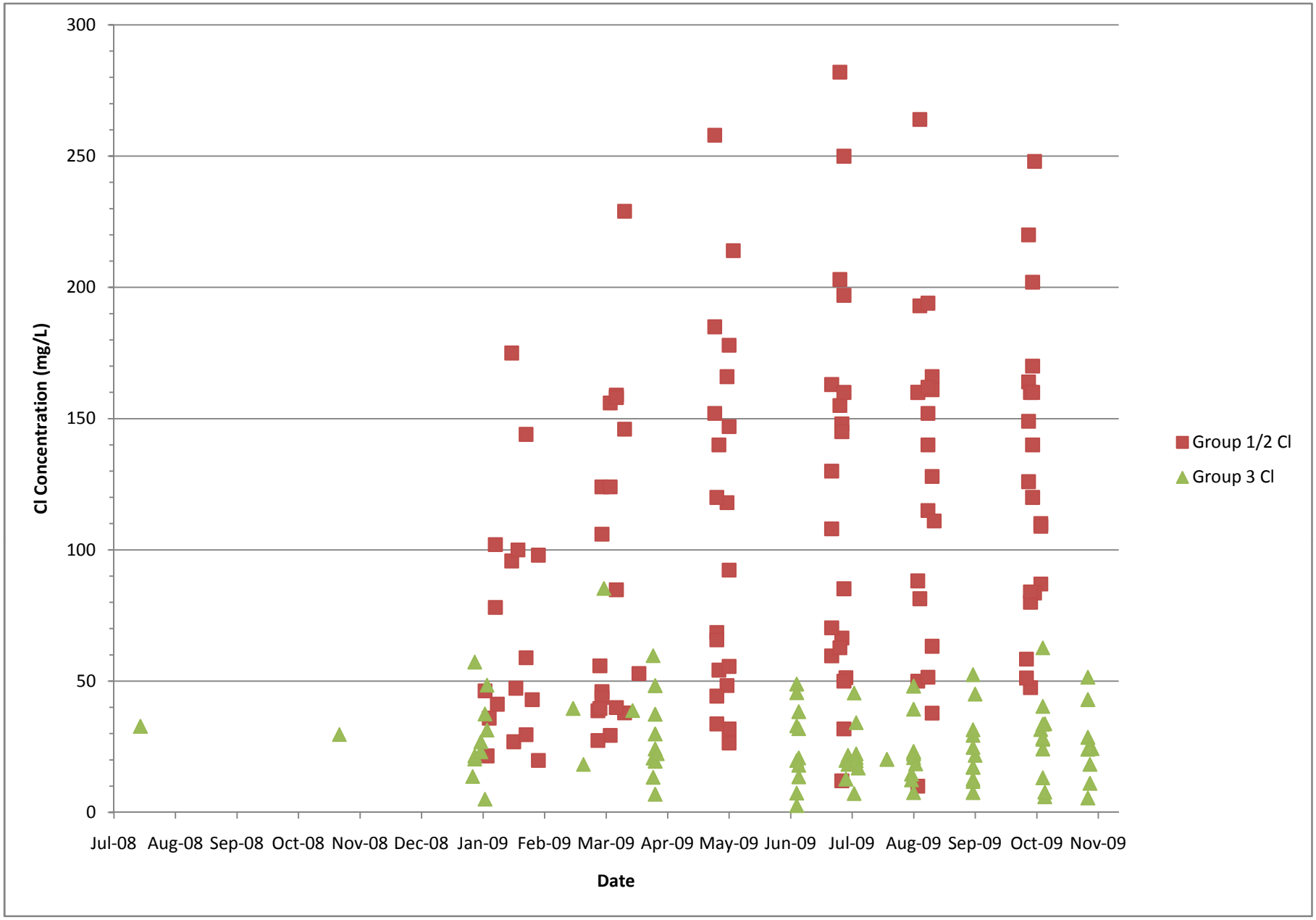

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Figure 12
TCE, cDCE and VC in Groundwater
WS21-112

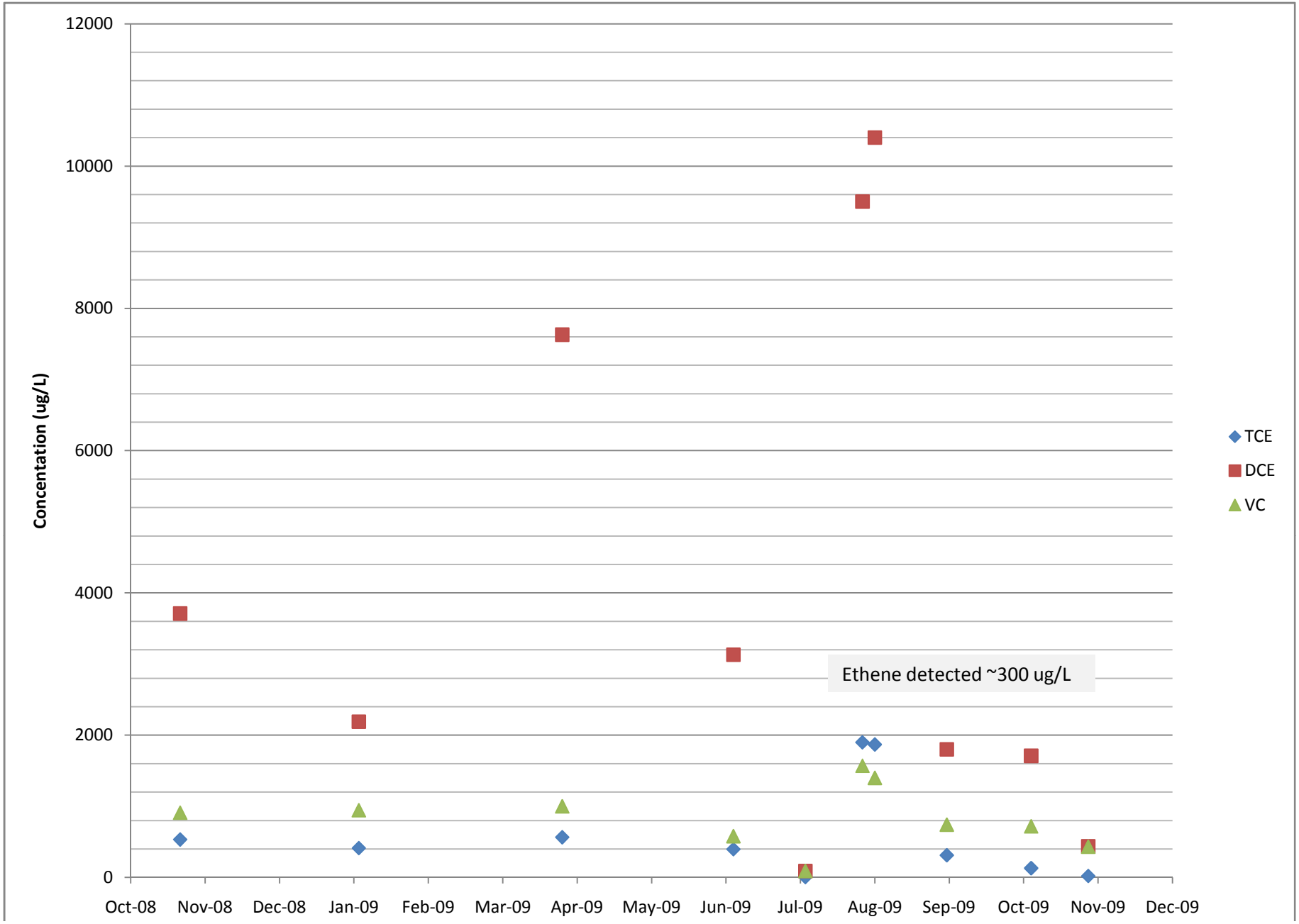

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Figure 13
TCE, cDCE and VC in Groundwater
WS24-111

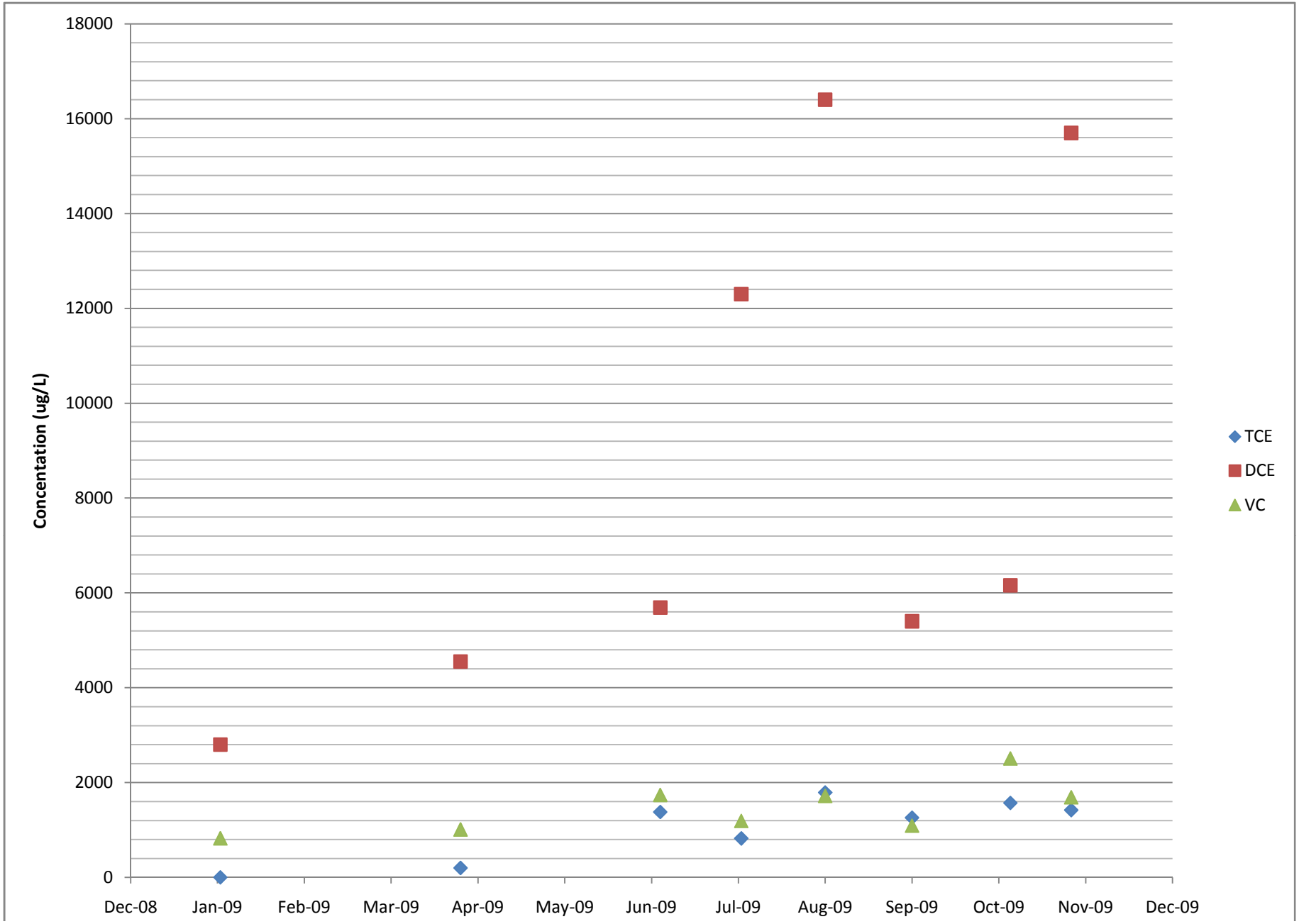

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Figure 14
TCE, cDCE and VC in Groundwater
WS25-96

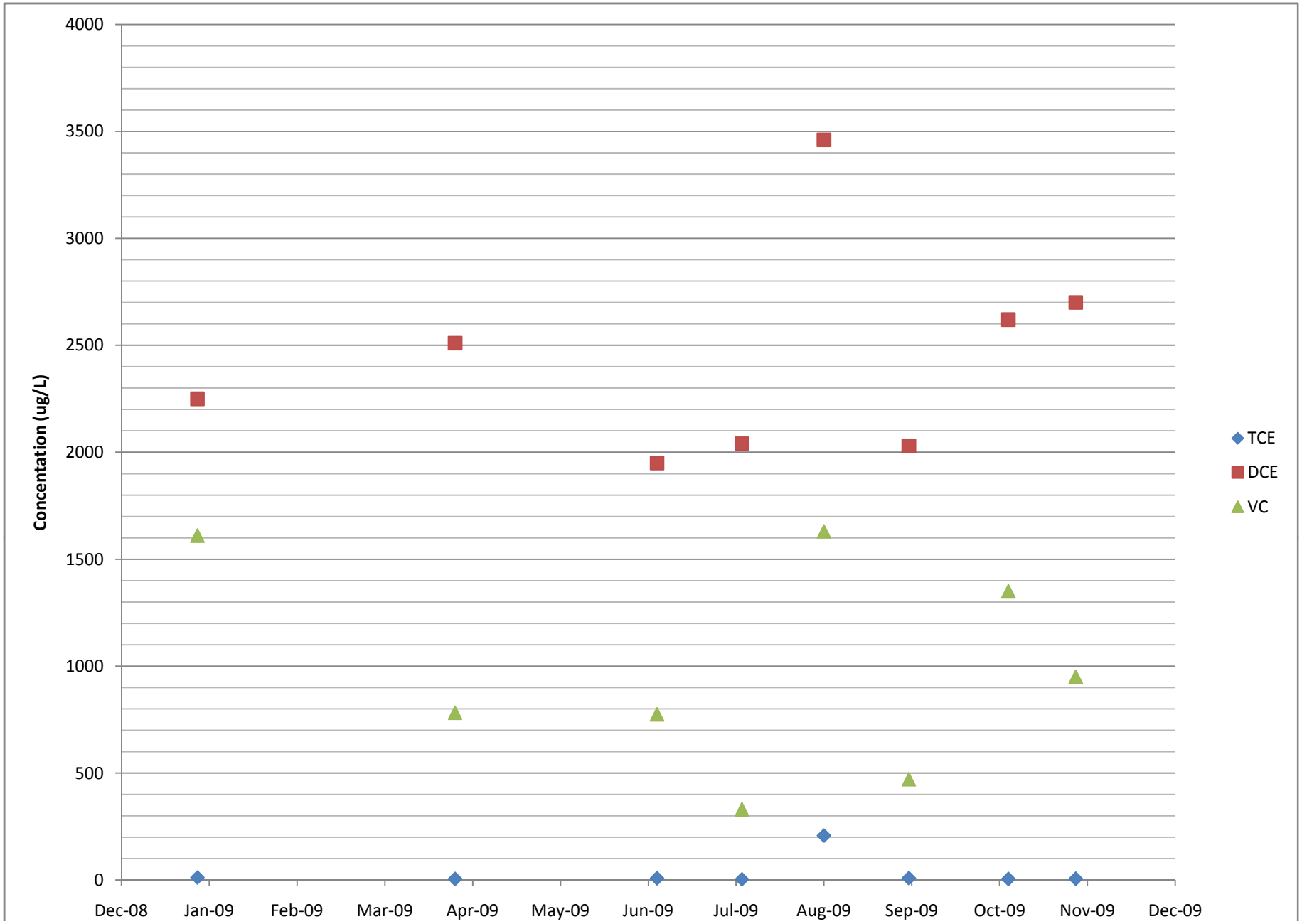

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Figure 15
TCE, cDCE and VC in Groundwater
WS21-131

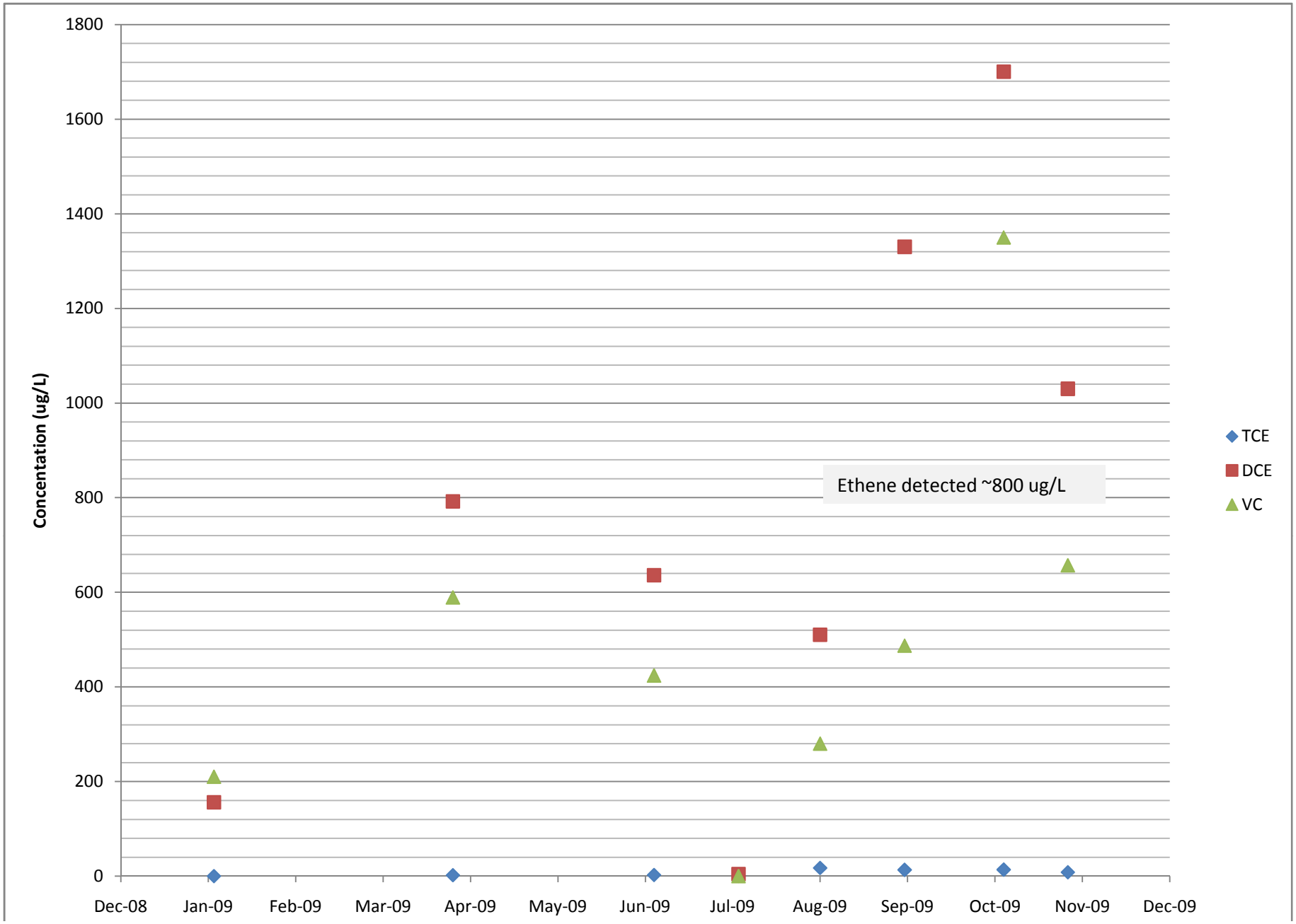

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Figure 16
TCE, cDCE and VC in Groundwater
WS23-116

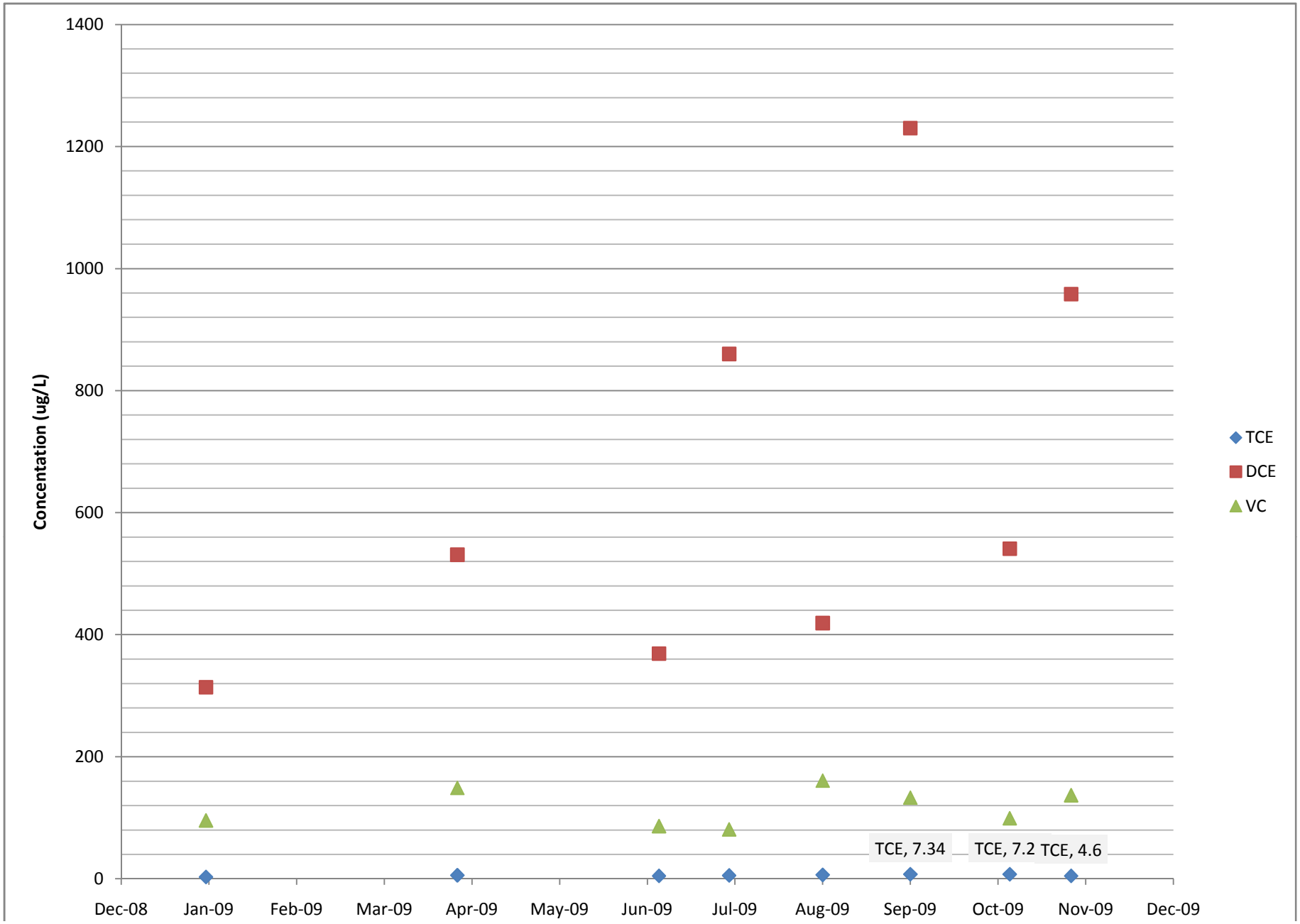

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Figure 17
TCE, cDCE and VC in Groundwater
WS25-111

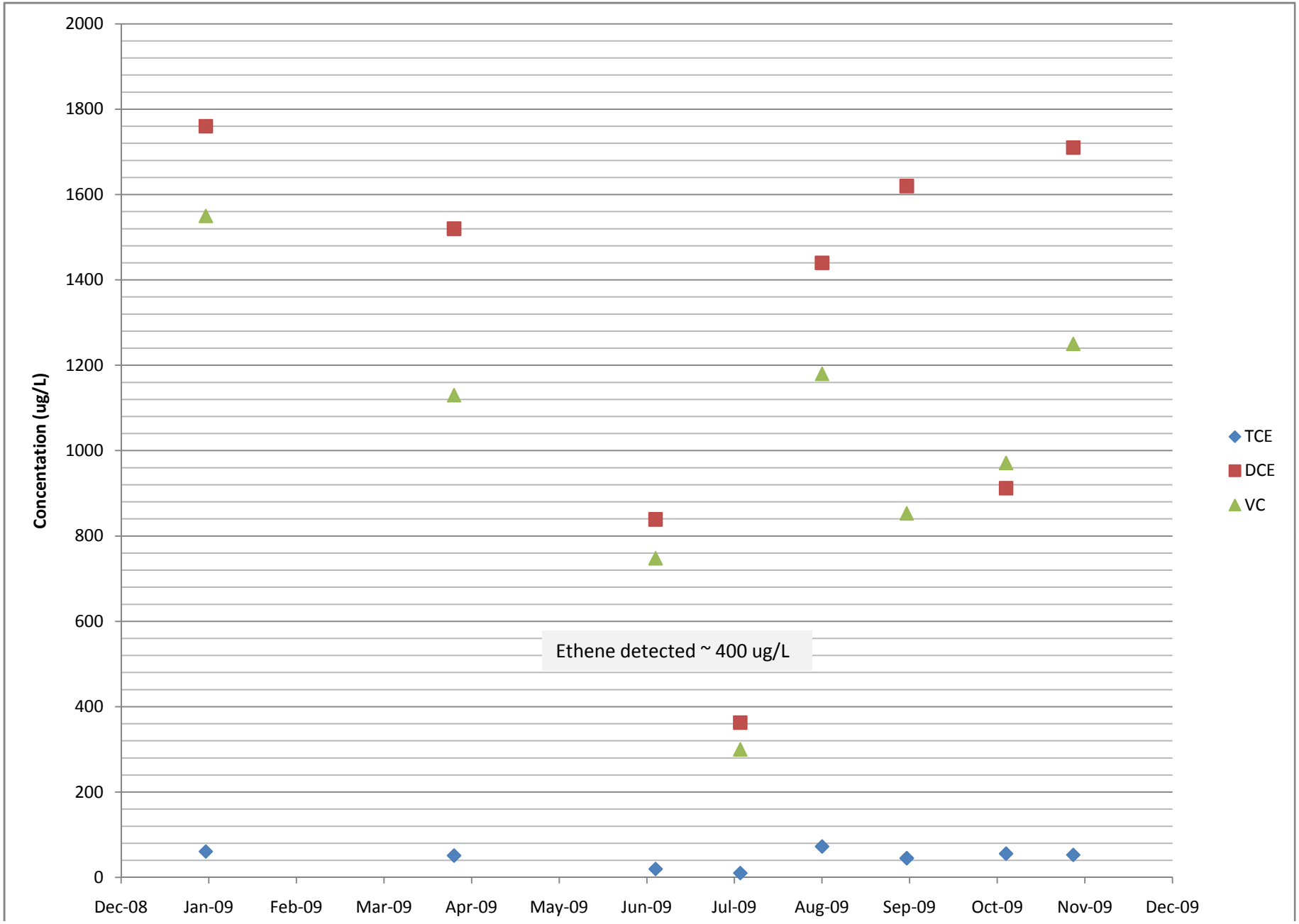

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Figure 18
TCE, cDCE and VC in Groundwater
WS26-116

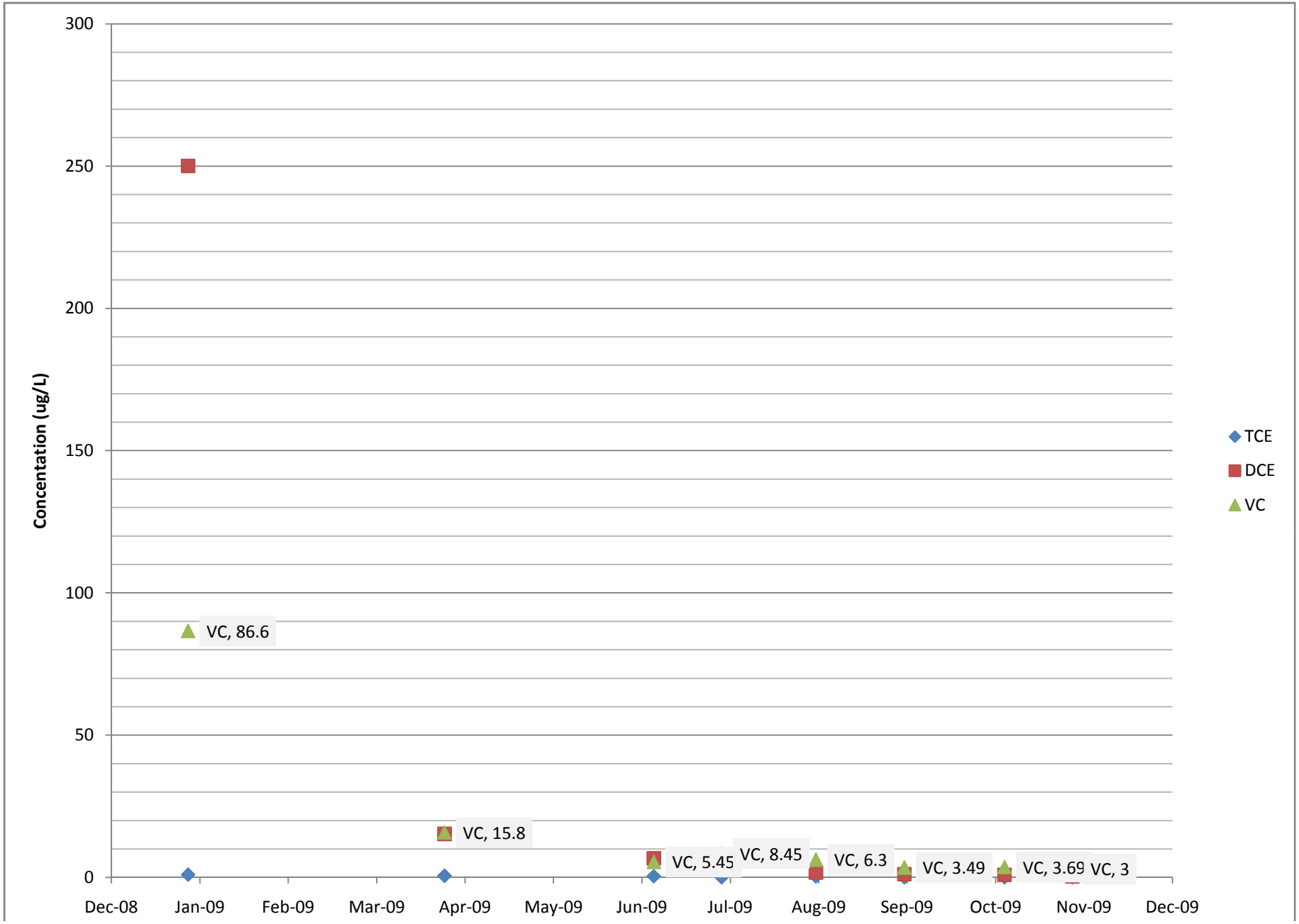

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Figure 19
TCE, cDCE and VC in Groundwater
WS24-126

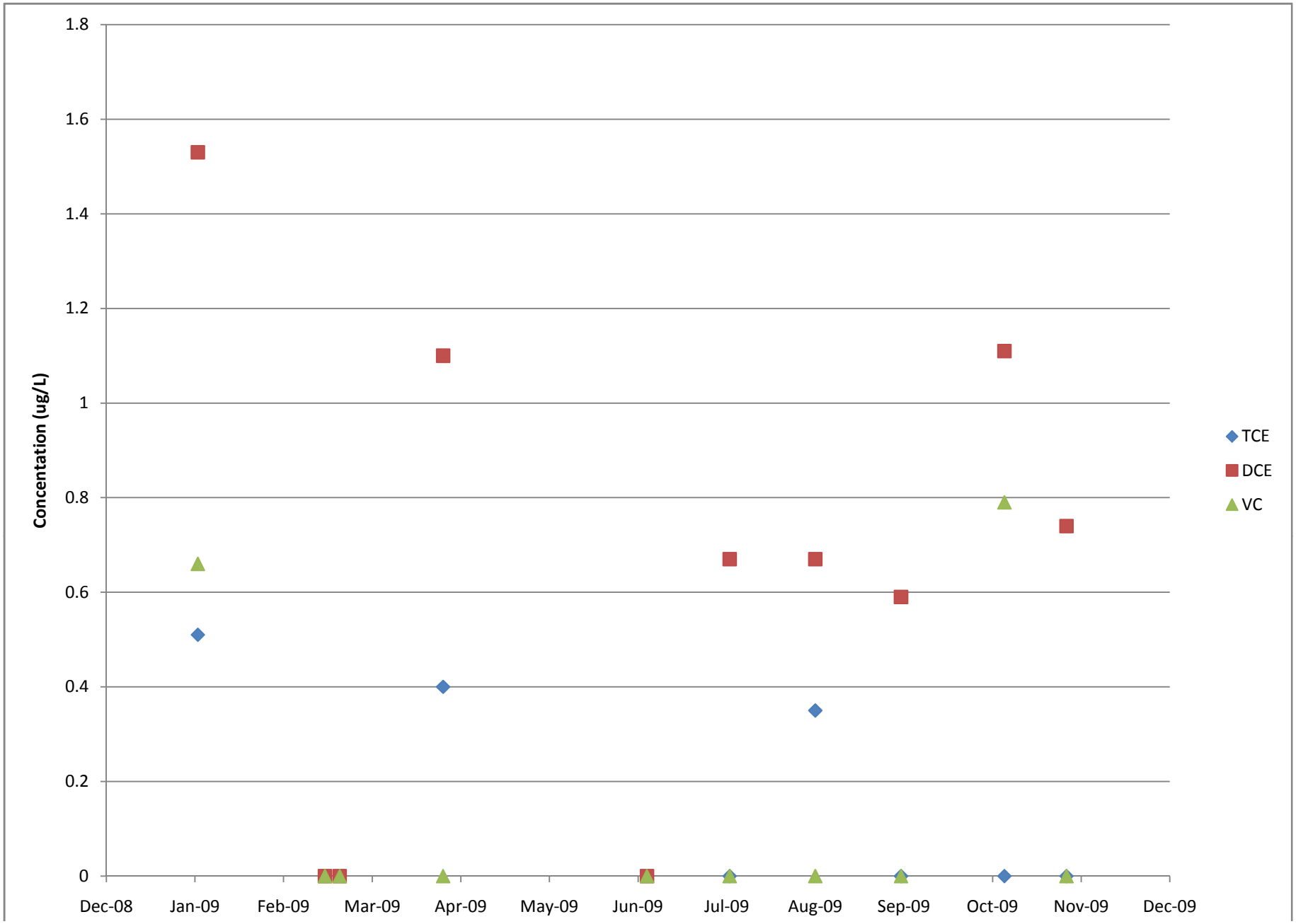

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Figure 20
TCE, cDCE and VC in Groundwater
WS26-86

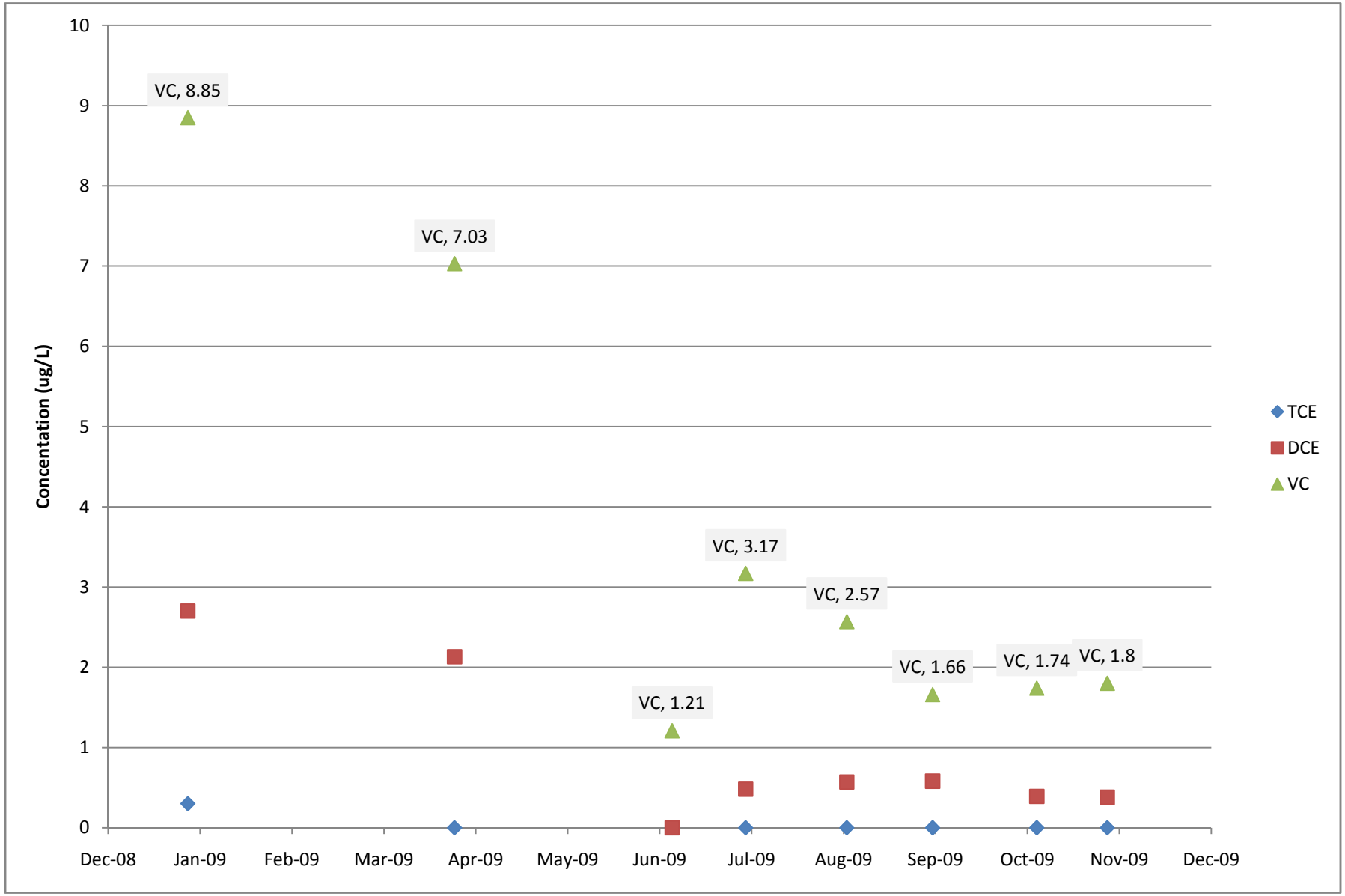

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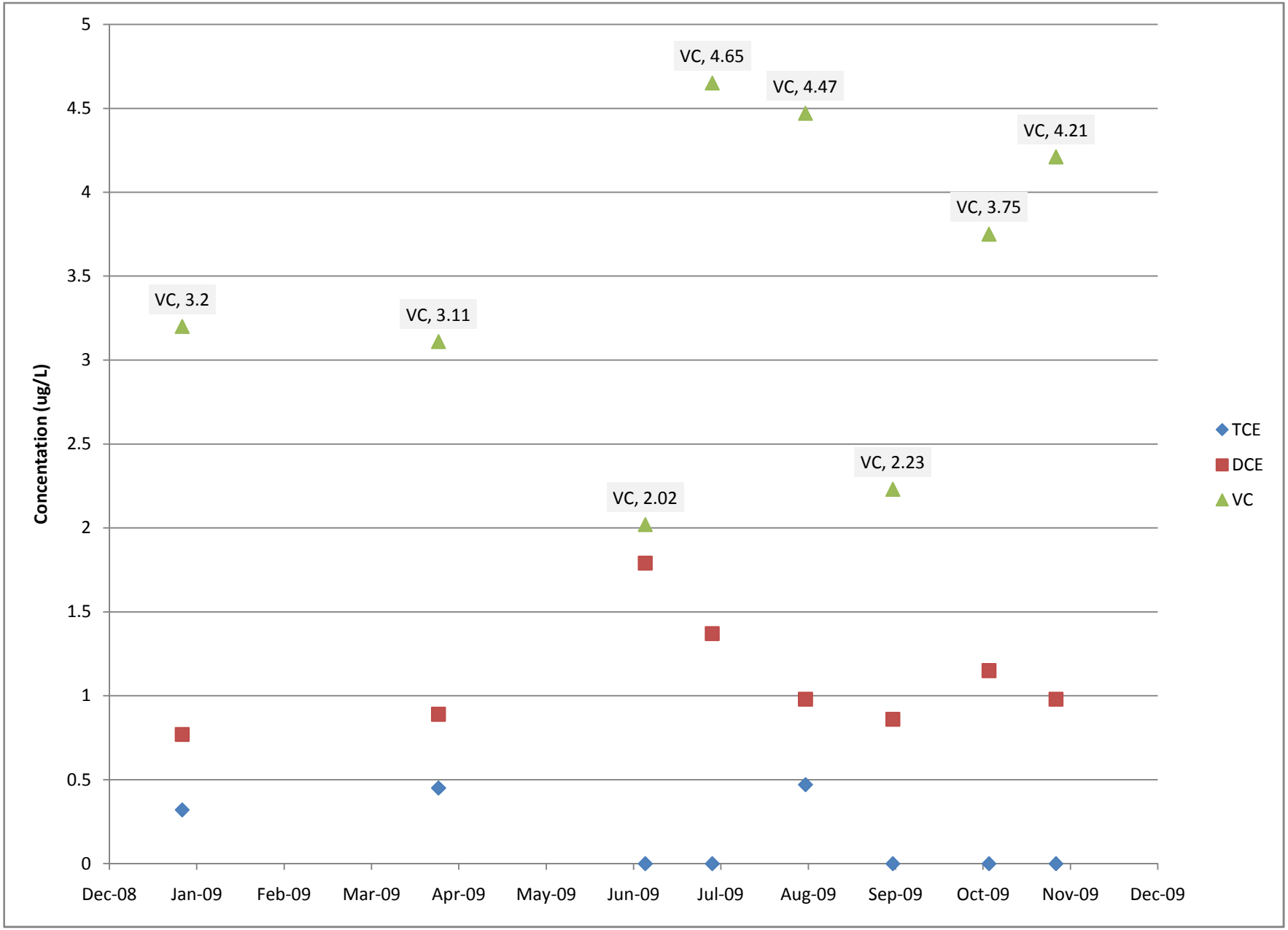
Figure 21
TCE, cDCE and VC in Groundwater
WS27-86



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