

**CSSA B-3 BIOREACTOR OPERATIONS  
ANNUAL PERFORMANCE STATUS REPORT  
(QUARTER 21 – QUARTER 24, MAY 2012 – APRIL 2013)**

**JULY 9, 2013**

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This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from May 2012 through April 2013, comprising the sixth year of bioreactor operations and monitoring since system start-up. This status report includes descriptions of current conditions, field observations, analytical results, and an anticipated schedule of activities for the next reporting period. Analytical results from monthly and quarterly regulatory and performance sampling through April 2012 are attached for reference. Parsons personnel working on this project during the reporting period include Ken Rice, Samantha Elliott, Julie Bouch, Adrien Lindley, Elisa Rice, Michael Zugelder, Scott Pearson, and William Martin.

***Executive Summary***

Site conditions were mixed through the year. From May through October, 2012 a greater than average amount of precipitation was recorded (21.89 inches) followed by a less than average amount from November, 2012 through April, 2013 (8.66 inches). Although the total precipitation recorded (30.55 inches) is close to the average annual amount for the region, moderate to exceptional drought conditions experienced in prior years have created a net deficit which is reflected in low aquifer water levels. Injection of extracted groundwater continued through the year with few interruptions. Minor interruptions include: system maintenance, reaching automatic cut-off levels in the wells and/or storage tank, and B-3 bioreactor system upgrade activities.

During the reporting period three new extraction wells were brought online (EXWs -03, -04, and -05). Additionally, pumping at EXWs, -01 and -02 has been temporarily suspended for maintenance and electrical system upgrades. Through the reporting period, approximately 15,218,814 gallons of groundwater was extracted from CS-MW16-LGR, CS-MW16-CC, B3-EXW01, B3-EXW02, B3-EXW03, B3-EXW04, and B3-EXW05 and were injected into bioreactor trenches 1 and 6. The majority of extracted groundwater, ~5,332,600 gallons, was extracted from CS-MW16-CC, with lesser contributions of ~2,579,600, ~2,152,000, ~1,575,100, ~1,464,000, ~1,096,000, and ~937,500 gallons from wells B3-EXW02, B3-EXW01, CS-MW16-LGR, B3-EXW03, B3-EXW04, and B3-EXW05, respectively. Since the start of normal operations a total of 73,841,268 gallons have been injected into the bioreactor.

Data from monitoring efforts indicate that the B-3 bioreactor has continued to maintain appropriate geochemical conditions for effective anaerobic dechlorination of chlorinated aliphatic hydrocarbons (CAHs). Geochemical parameters indicating optimal conditions include the following:

- Concentrations of dissolved oxygen (DO) are generally less than 0.5 milligrams per liter (mg/L) and oxidation-reduction potential (ORP) values are less than 100 millivolts (mV), indicating an anaerobic environment conducive to dechlorination of CAHs within the trenches;
- Production of methane indicating that fermentation is occurring; and
- Hydrogen concentrations are greater than 1.0 nanomoles per liter (nmol/L), indicating that there is sufficient electron donor present to stimulate anaerobic dechlorination of CAHs.

Analytical results for samples collected in trench sumps provide evidence that biotic and abiotic dechlorination of tetrachloroethene (PCE) and trichloroethene (TCE) is occurring. The presence of the end product ethene provides evidence that the biotic reductive dechlorination process appears to be the major pathway for degradation of CAHs within trenches 1 and 6. Additionally, two other degradation mechanisms, both biotic and abiotic, appear to be occurring within trench 1.

It appears that biotic anaerobic oxidation of CAHs to carbon dioxide may be occurring with Mn (IV) as the terminal electron acceptor. This degradation pathway reaction results in the production of the reduced form of manganese [Mn (II)]. The periodic detections of high concentrations of Mn(II) in trenches 1 and 6 may be the result of this biotic process.

Evidence for the existence of an abiotic reductive dechlorination is indicated by the presence of reduced iron [Fe(II)] and trans-DCE in trench 1. Field sampling analyses (Noblis) indicated positive results for hydrogen sulfide and sulfate-reducing bacteria. Hydrogen sulfide likely reduces iron [III] in soil minerals to iron [II], which is then available to facilitate reductive dechlorination of CAHs. Although evidence suggests this degradation pathway exists, it may not be a significant contributor to the overall degradation of contaminants.

### **Summary of Bioreactor Operation**

Analytical results from biannual sampling at the bioreactor sumps indicate that SWMU B-3 trenches contain a range of *cis*-DCE levels (0.19 – 106 µg/L) as well as concentrations of other dechlorination products (e.g., VC, ethene). A summary of the analytical data collected for the reporting period (year 6) is included in Table 1. A summary of biannual monitoring results from the bioreactor trench sumps are attached, analytical results of the surrounding SWMU B-3 multi-port monitoring wells (MPMW or Westbay<sup>®</sup>) and monitoring wells are also attached.

Results of volatile organic carbon (VOC) analyses indicate that groundwater from the uppermost saturated zone (LGR-03B) of Westbay<sup>®</sup> wells CS-WB05, CS-WB07 and CS-WB08 (when sampled) contain less than 100 micrograms per liter (µg/L) of PCE, TCE, and *cis*-DCE and groundwater from CS-WB06 contains greater than 100 µg/L of PCE, TCE, and *cis*-DCE. Similar analysis of groundwater from extraction wells indicate wells CS-MW16-CC and B3-EXW05 contain less than 100 micrograms per liter (µg/L) of PCE, TCE, and *cis*-DCE; wells CS-MW16-LGR, B3-EXW01, B3-EXW03, and B3-EXW04 contains greater than 100 µg/L of PCE, TCE, and *cis*-DCE, and B3-EXW02 contains less than 100 µg/L of PCE, and greater than 100 µg/L of TCE and *cis*-DCE.

VOC analytical results from bioreactor trench sump samples indicate an overall decrease in contaminant mass (total molar concentration) in trench 1 sumps (T1-1, T1-2, and T1-3) and an overall increase in trench 6 sumps (T6-1 and T6-2) since April 2012. Over the bioreactor operational period (6 years), contaminant mass appears stable or decreasing.

Water quality field measurements from bioreactor trench 1 sumps indicate during the sixth year of bioreactor operations average annual values for DO, pH, ORP, and specific conductivity were 0.31 mg/L, 6.72, -43.97 mV, and 0.785 mS/cm, respectively, and temperatures ranged from ~21 °C to ~28 °C. Other observations regarding the data collected during this reporting period are listed below.

Water quality field measurements from trench 6 during sixth year of operations include average DO, pH, ORP, and specific conductivity of 0.27 mg/L, 6.50, -54.63 mV, and 0.76 mS/cm respectively; and temperatures ranged between 21 °C to 25.5 °C.

Ground water elevation data from the shallow UGR wells combined with similar data from the Westbay UGR zones in (WB-06, -07, -08) and the bioreactor sumps helped confirm the presence of a groundwater “mound” around the bioreactor trenches. Analyses of samples from these wells

indicated the presence of vinyl chloride with concentrations ranging from non-detect to 63 ppb, with the highest levels found north and west of the bioreactor. MW-28, located southwest of the bioreactor, has been consistently dry, and MW-29 was dry in April 2013, and therefore not sampled. Water quality parameters in the UGR wells fluctuated during the reporting period. In general, good reducing conditions (low DO, ORP, and pH) were reported in MW-26, 27, and 34, while poor reducing conditions were observed in MW-29, 30, 31, 32, and 33. MW-28 did not have enough water for consistent readings.

During the reporting period, 30.55 inches of precipitation were measured on-post. Over the year, average water thicknesses in active trenches 1 and 6 (6.09 feet and 3.39 feet, respectively) indicate saturated conditions within the bioreactor is being maintained.

Attached are graphs including: B-3 trench 1 average water thickness with rainfall data, VOC concentration summaries for extraction wells, storage tank (UIC), trench 1 and 6 sumps, and in the defined uppermost saturated zones (zone LGR-03B) in the surrounding multi-port monitoring wells, cumulative precipitation, as well as water level elevations in the defined uppermost saturated zone (zone LGR-03B) of the B-3 multi-port monitoring wells with rainfall data.

#### ***Quarter 24 - Analytical Data Observations***

1. Arsenic (As) was detected in concentrations exceeding the MCL (10 µg/L) in two Westbay well zones, CS-WB05-LGR04B (14 µg/L) and CS-WB06-UGR01 (64 µg/L) during the year. Manganese (Mn) was reported in bioreactor trench water samples at concentrations ranging from 21 to 376 µg/L (MCL is 50 µg/L). All eight of the UGR wells sampled during the year had elevated levels of Mn with concentrations ranging from 125 to 1,690 µg/L. One shallow UGR well did not produce enough water to sample. An elevated level of Mn was reported in CS-B3-MW01 (158µg/L) and elevated levels of Mn were reported in CS-WB06-UGR-01 (3,020 µg/L), WB07-LGR-01 (601 µg/L), and CS-WB08-UGR-01 (766 µg/L), all other multi-port monitoring well (MPMW) zones reported Mn and As levels below the MCL. The elevated levels are likely due to changing pH conditions of the groundwater and the reduction of naturally occurring As and Mn within the limestone media to more soluble forms. Additionally, the biotic anaerobic oxidation pathway of CAHs may also be contributing to the elevated levels of Mn within the treatment system.
2. DO and ORP values were favorable for the reduction of CAHs, and it is likely that geochemical conditions will continue to improve as normal bioreactor operations continue.
3. The volatile organic compound summary for the trenches indicates an end-product (DCE isomer, VC, and ethene) dominated chemical composition in water. Total molar concentrations in sumps in trenches 1 and 6 have fluctuated through the year.
4. Reductive dechlorination of CAHs by microbial activity appears to be occurring as DHC bacteria counts have been within the range of biostimulated populations (1.0E +03 cell/mL) in trench 1.
5. Saturated conditions within the bioreactor were maintained through the year with average water thicknesses of approximately 6.09 and 3.39 feet in trenches 1 and 6, respectively.

The reductive dechlorination end products VC, ethene, and ethane are present in the shallow UGR zone around the SWMU B-3 in addition to samples collected from sumps indicating the lateral influence of the bioreactor. VC is present in samples from shallow UGR wells MW26, -27, -32, -33 and -34, (18, 19, 0.43, 2.1 and 63 µg/L), and in samples from the WB06-UGR01 (2.2

µg/L) and WB08-UGR01 (68 µg/L) zones. Ethene and ethane is present in MW26, -27, -34, and WB08-UGR01 (13, 2.6, 19, and 36 µg/L ethene, and 5.7, 1.7, 6.7, and 3.0 µg/L ethane, respectively).

In addition to reductive dechlorination end products within the UGR, these products are also observed at depth. VC is observed in the LGR-01, -03B, -04A, -04B, and BS-01 zones within WB05 (0.43, 6.3, 86, 223, and 2.2 µg/L); in the LGR-02 and -04 zones within WB06 (0.58 and 1.4 µg/L); in the LGR-01 and -02 zones within WB07 (24 and 5.1 µg/L); and within WB08-LGR-02, B3-MW01, and MW16-LGR (0.3, 69, and 0.4 µg/L, respectively). Ethene is observed at depth within B3-MW01, WB05-LGR-04A and -04B, and WB07-LGR-01 and -02 zones (5.4, 1.9, 23, 5.2, and 10 µg/L, respectively). Ethane was not observed within samples collected within the LGR during this reporting period.

### ***Recommendations***

Recommendation for further treatability study actions include:

- Continue monitoring bioreactor and surrounding wells for UIC Permit and Performance parameters.
- Apply new deciduous bark mulch and gravel, and install new injection lines to remaining trenches (trenches 3 through 5) and cover the bioreactor with a less permeable layer of clay to reduce influence of precipitation and prevent bioreactor overflow.

### ***Anticipated Schedule for Next Period (May, 2013 – April, 2014):***

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Conduct semi-annual monitoring events for the bioreactor system.
- Continue UIC monitoring with annual reporting due July 2014.
- Incorporate SCADA controls and automation, upgrade remaining trenches with new bark mulch and gravel, and cover the bioreactor trenches with a soil cap to reduce surface runoff influence during periods of heavy precipitation.

## **Specific Data Observation Notes for Attachments**

- Analytical results from the B-3 trench sump (trenches 1 through 6) samples, shown in Table 24.1.2, present data from the sixth year of bioreactor operations as well as quarter 24 sampling events.
- Table 24.1.1 presents field collected data from bioreactor trench sumps, and indicates saturated conditions were maintained during the year.
- Table 24.1.2 presents the VOC concentrations from biannual samples collected in bioreactor trench sumps. These data indicate indicates that dechlorination products are being generated within the bioreactor. VC was present at variable concentrations in trench sumps, ranging from non-detect to 23 µg/L during the year. Ethene was observed in concentrations ranging from ND to 20 µg/L in trench 1, and non-detect to 10 µg/L in trench 6 through the year.

- Table 24.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 24.1.3 provides evidence of the biotic anaerobic degradation pathway with the elevated concentrations of Mn and CO<sub>2</sub> and presents ethane concentrations ranging from ND to 6.3 µg/L in trench 1, and ND to 3.1 µg/L in trench 6 at various times during the year. Ethane was detected in each of the active trench sumps at least once during the last year.
- Table 24.3.3 indicates that VC was present (69 µg/L) in the samples collected from monitoring well CS-B3-MW01. Table 24.2.3a indicates VC concentrations of 86 µg/L in WB05-LGR04A and 223 µg/L in WB05-LGR04B, suggesting a connection between this zone and CS-B3-MW01. Ethene was observed in WB05 zones LGR04A and LGR04B during the year (1.9 and 23 µg/L, respectively).
- Table 24.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are moderate in the trench sumps.
- The changes in molar fraction and total molar concentrations shown in graphs of trench sumps indicate an increase in contaminant mass possibly derived from less-dechlorinated (higher proportion of PCE and TCE) water provided by the extraction wells. Dechlorination of VOC impacted water to VC and ethene, however, is still occurring in the trenches.
- Table 24.6.3 indicates that significant amounts of contaminant mass are being provided for injection into the bioreactor by the seven extraction wells. Parent products (PCE and TCE) make up the majority of the contaminant mass, though *cis*-DCE is also present.
- Figure 24.2.5 shows that the water levels in Westbay wells are significantly influenced by precipitation, while pumping at CS-MW16-LGR and CS-B3-EXW01 shows strong influence in the deeper LGR zones. Pumping at CS-MW16-CC appears to have no influence on UGR or upper LGR zones.
- Table 24.7.3 indicates the presence of VC in several of the shallow UGR wells with concentrations ranging from non-detect to 63 µg/L. Additionally, Table 24.7.3 provides evidence of the biotic anaerobic degradation pathway as indicated by elevated concentrations of Mn and CO<sub>2</sub>.

## Analytical Summary Data

**Table 1 Summary of Analysis Presented for Reporting Period**

<b>Event</b>	<b>VOCs</b>	<b>TDS</b>	<b>TOC</b>	<b>DOC</b>	<b>MEE &amp; CO<sub>2</sub></b>	<b>SO<sub>3</sub><sup>-</sup></b>	<b>Chloride, Sulfate</b>	<b>Fe<sup>2+</sup></b>	<b>Mn</b>	<b>Metals*</b>	<b>H<sup>+</sup></b>	<b>DHC</b>
Semi-Annual Sampling <sup>a</sup> (Quarter 22)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Semi-Annual Sampling <sup>a</sup> (Quarter 24)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

a – Semi-annual sampling includes samples from B3-trench sumps, Monitoring Wells, Extraction Wells, and Multi-port (Westbay) wells.

\* - Metals analyses was reduced to include only arsenic results beginning with the Month 44 sampling event.

## Figures

Figure 24.1.2 T1-1

**B-3 Bioreactor Trench 1 Sump 1 VOC Summary**  
**Apr 2012 - Apr 2013**

Changes in Mole Fraction and Total Molar Concentration

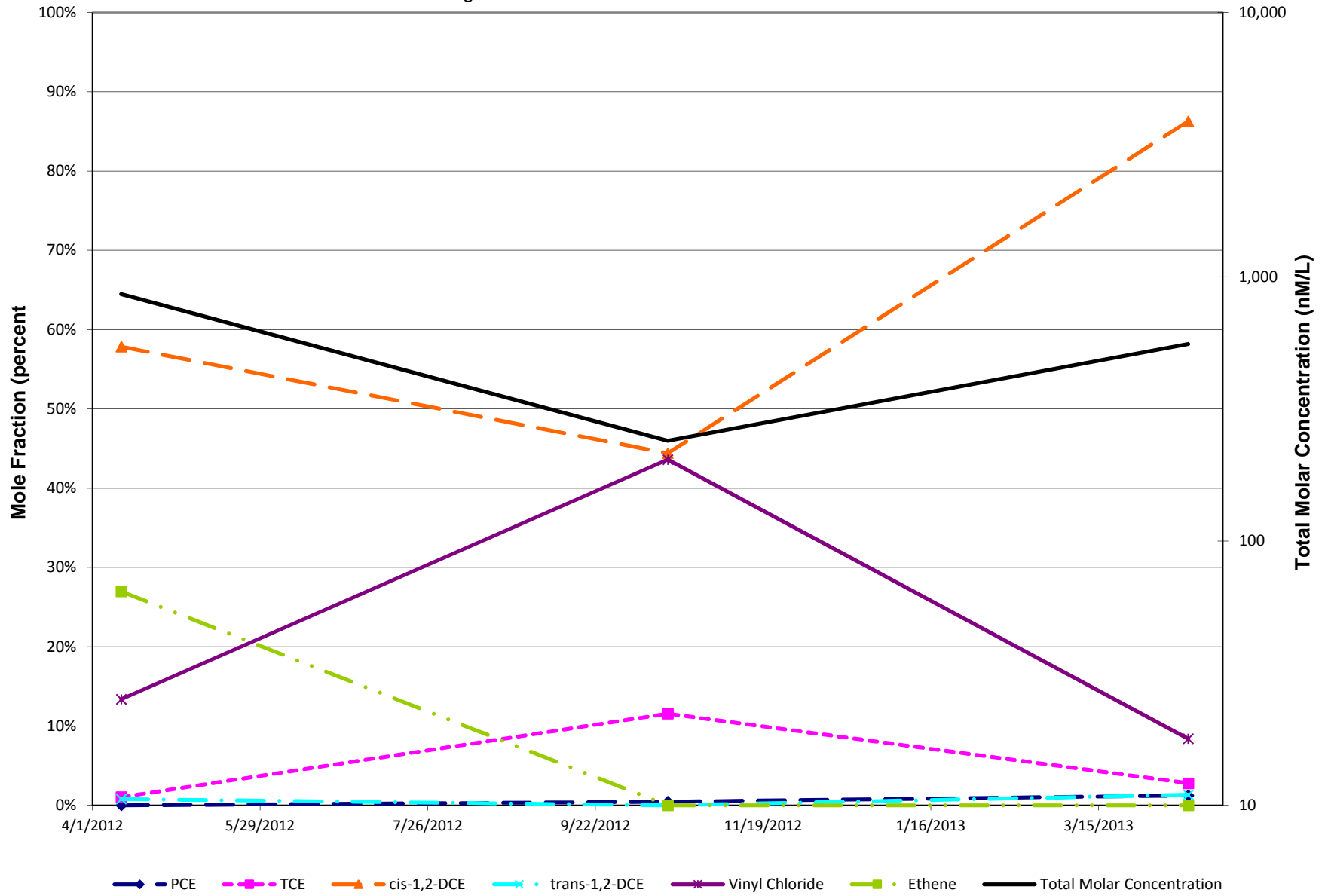




Figure 24.1.2 T1-2

**B-3 Bioreactor Trench 1 Sump 2 VOC Summary  
Apr 2012 - Apr 2013**

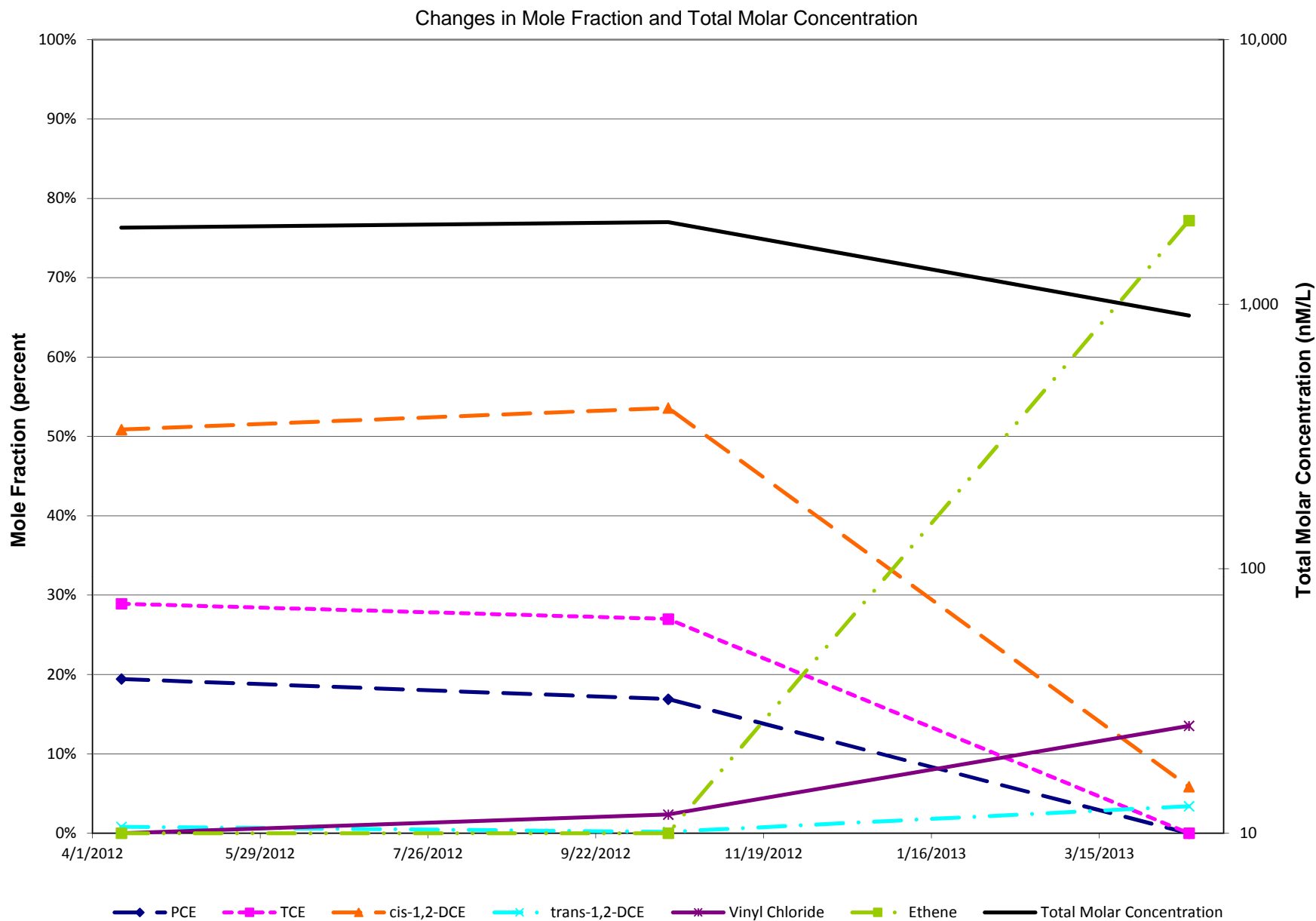


Figure 24.1.2 T1-3

**B-3 Bioreactor Trench 1 Sump 3 VOC Summary**  
**Apr 2012 - Apr 2013**

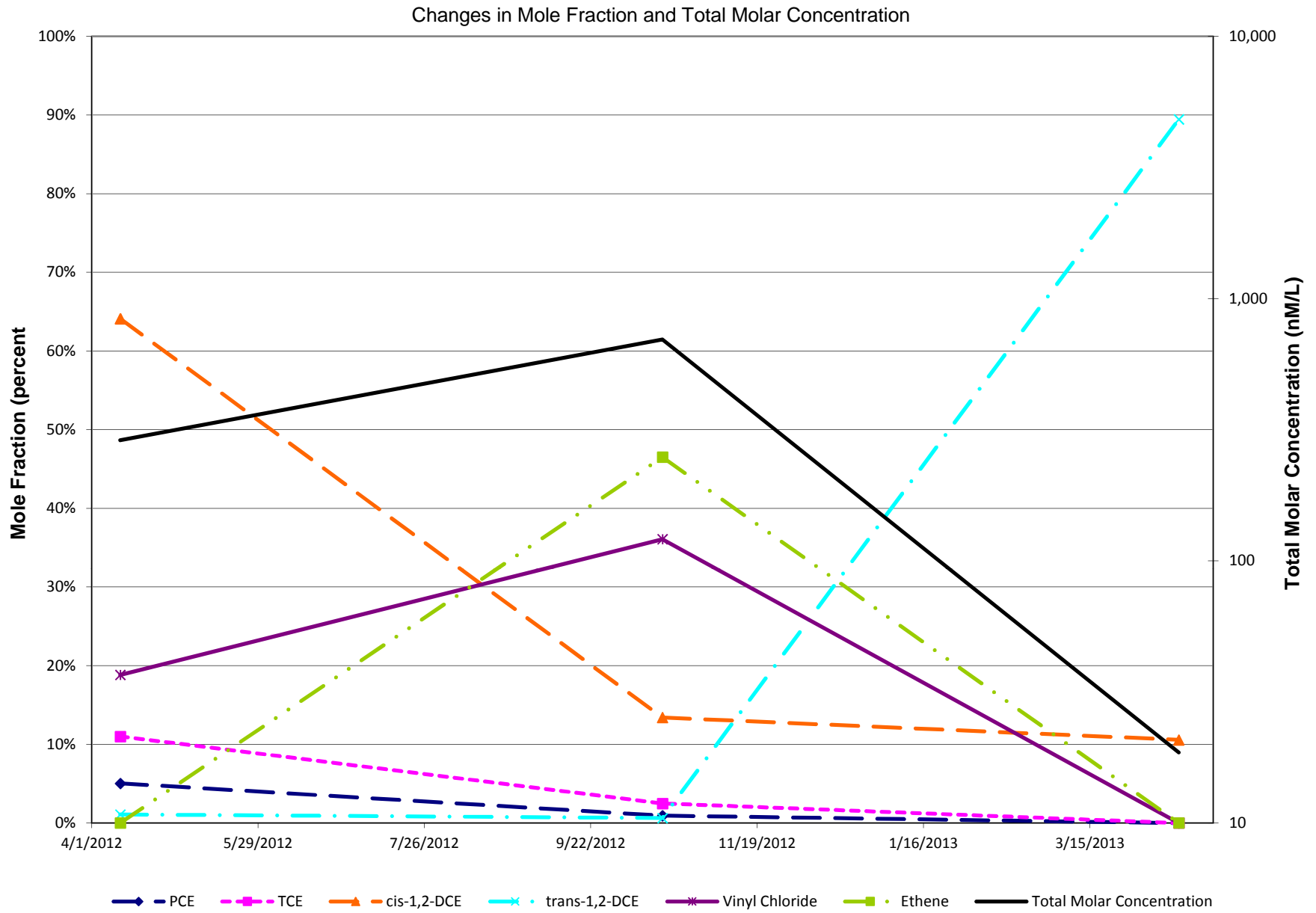


Figure 24.1.2 T6-1

**B-3 Bioreactor Trench 6 Sump 1 VOC Summary**  
**Apr 2012 - Apr 2013**

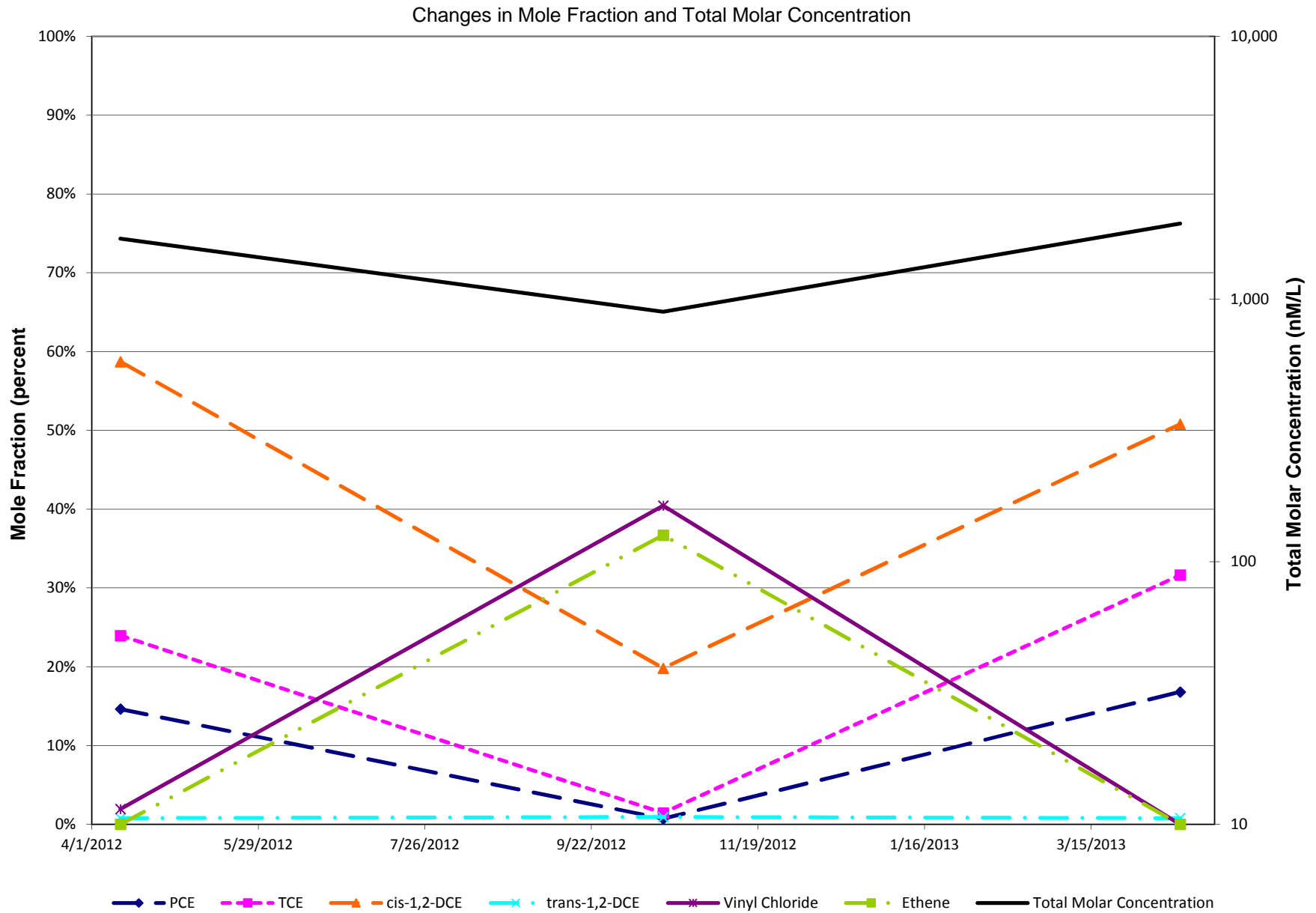


Figure 24.1.2 T6-2

**B-3 Bioreactor Trench 6 Sump 2 VOC Summary**  
**Apr 2012 - Apr 2013**

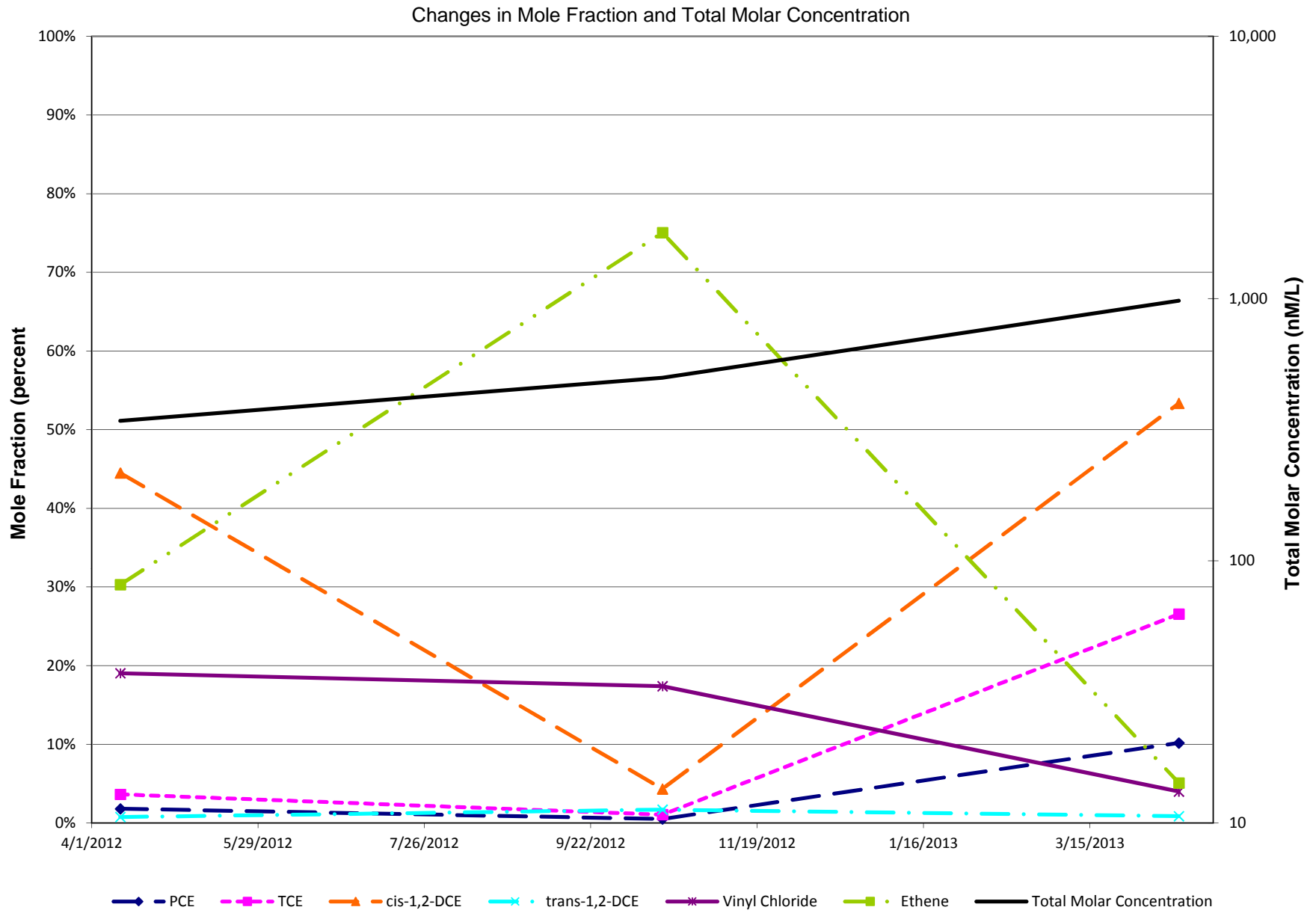


Figure 24.2.2a

### CS-WB05-LGR03B VOC Summary Apr 2012 - Apr 2013

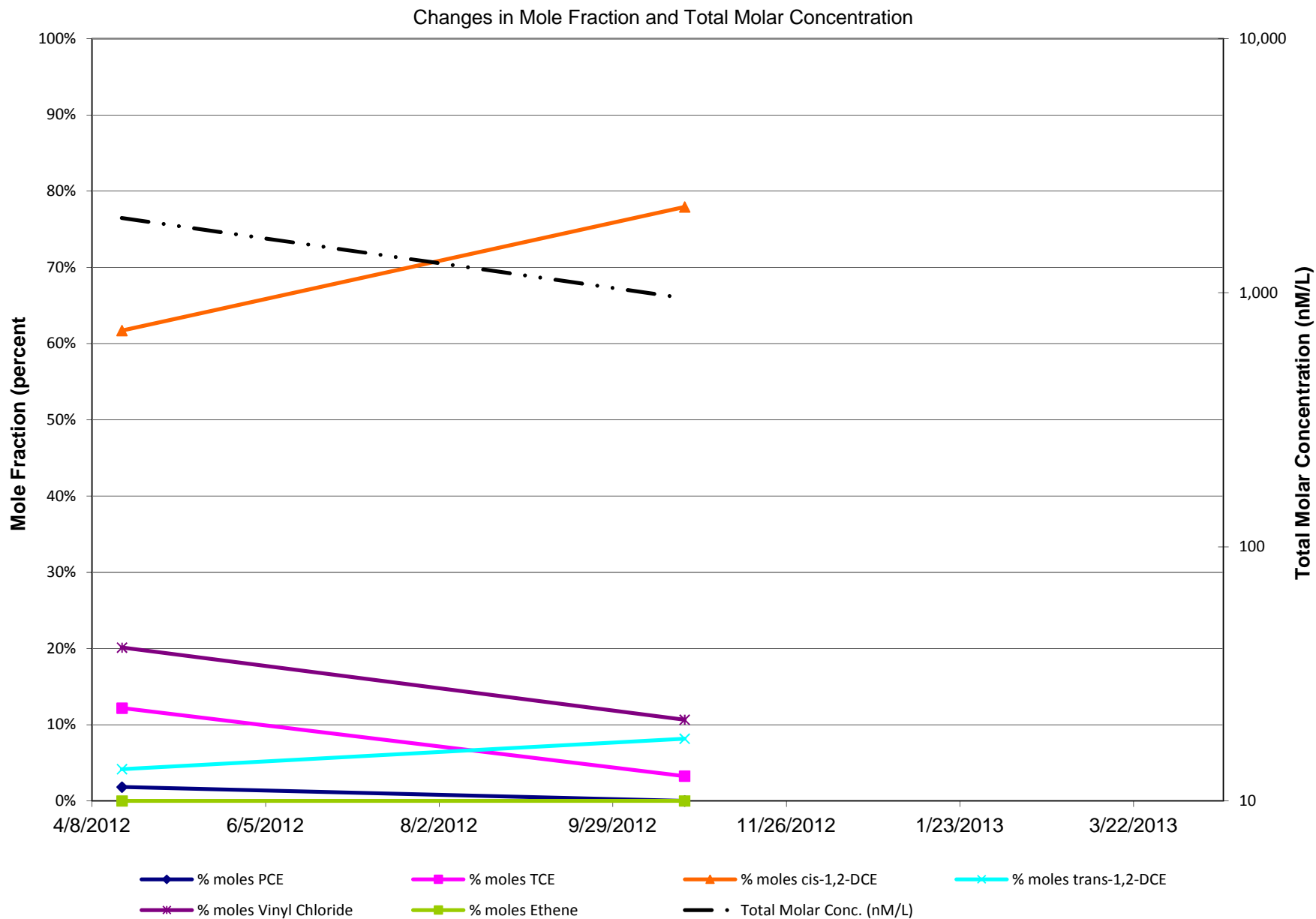


Figure 24.2.2b

### CS-WB06-LGR03B VOC Summary Apr 2012 - Apr 2013

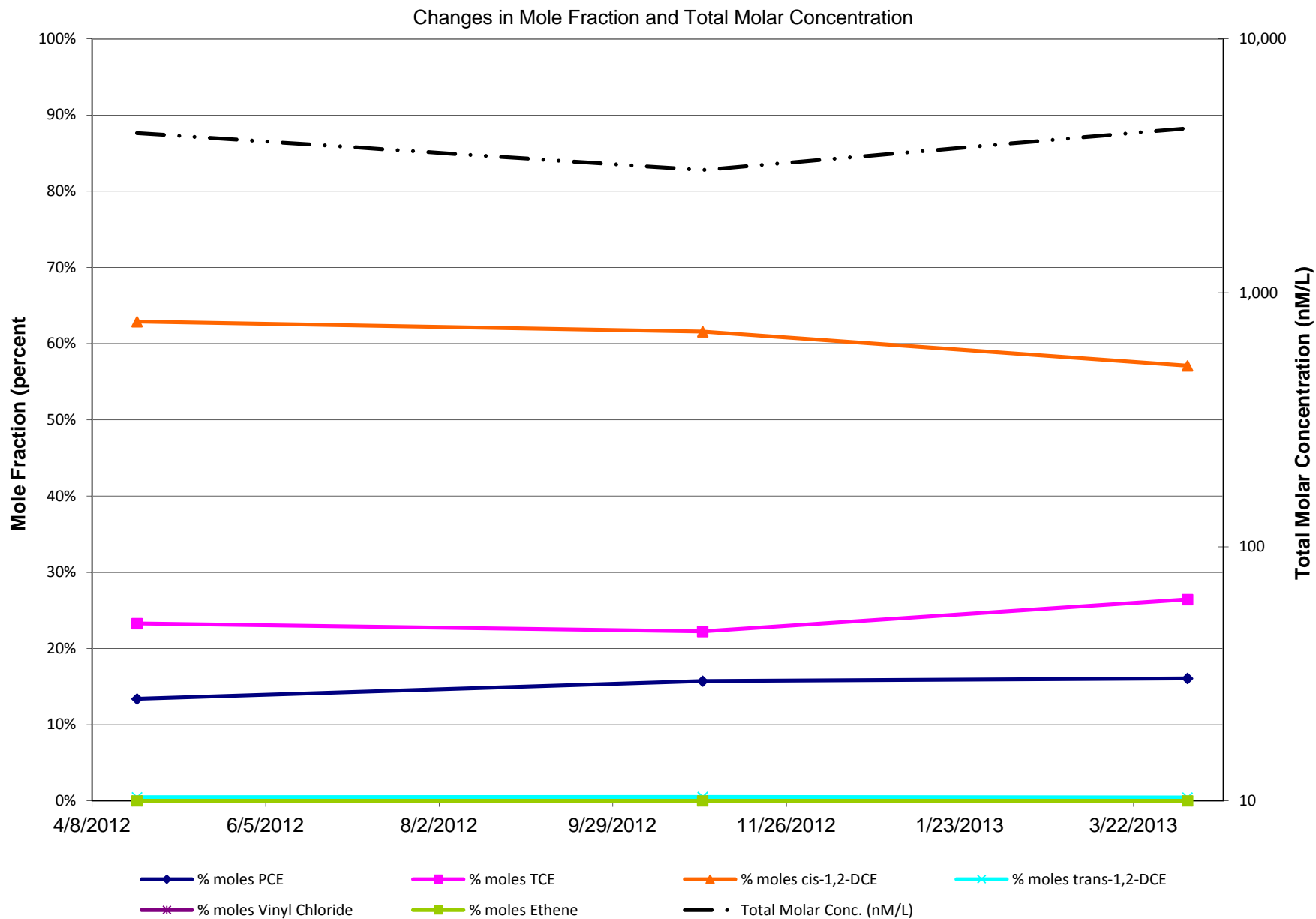


Figure 24.2.2c

### CS-WB07-LGR03B VOC Summary Apr 2012 - Apr 2013

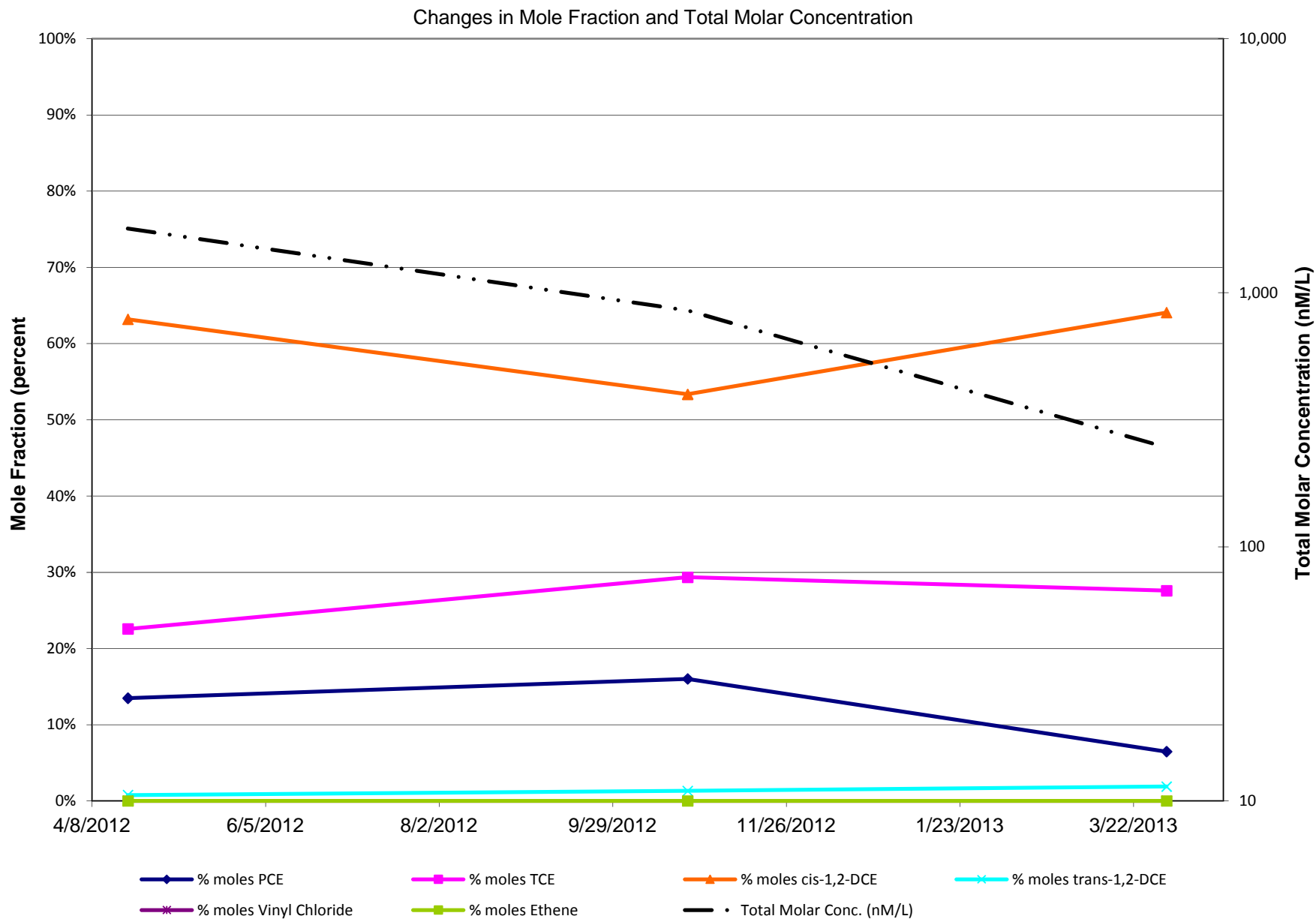


Figure 24.2.2d

### CS-WB08-LGR03B VOC Summary Apr 2012 - Apr 2013

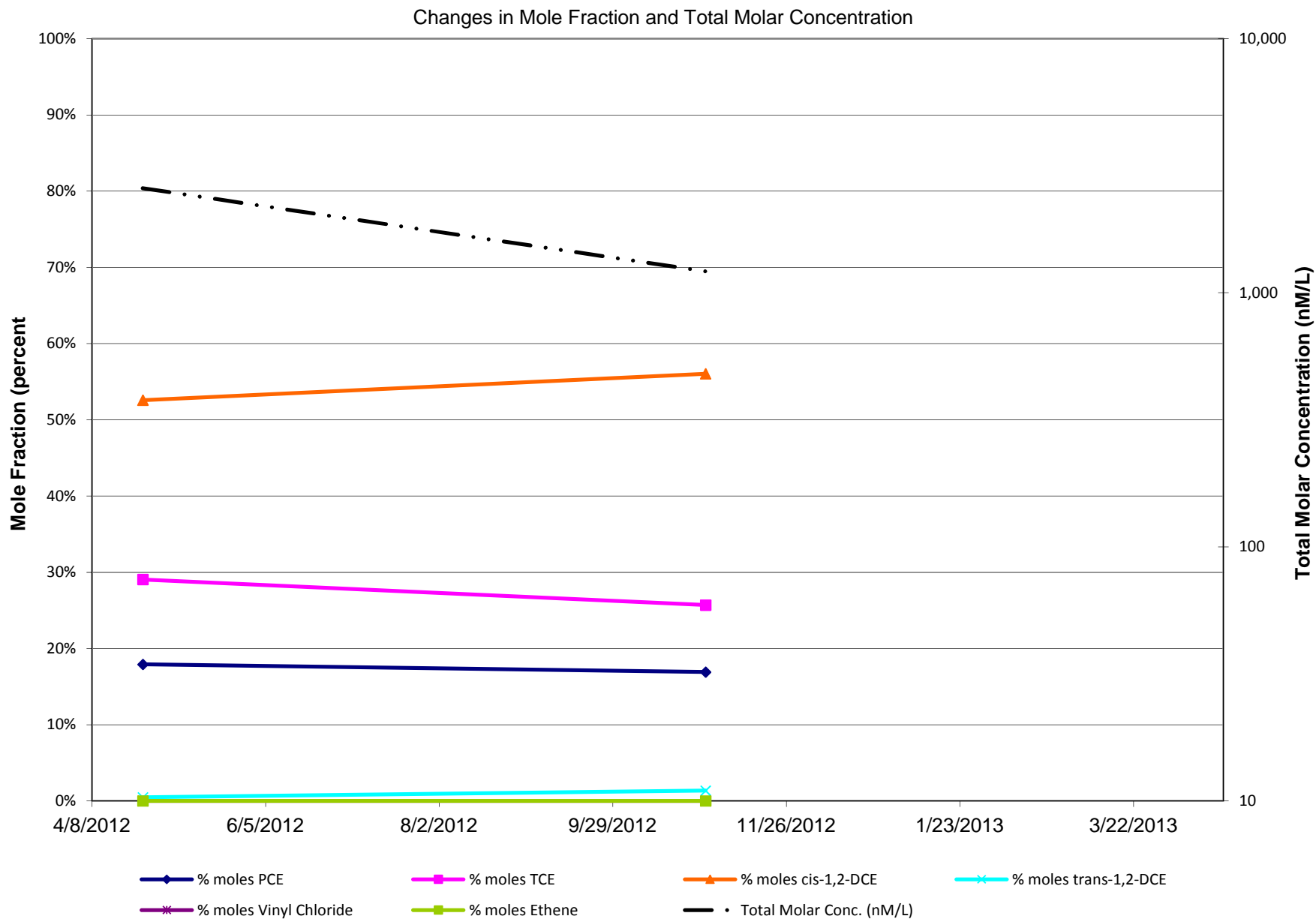




Figure 24.2.5

### Lower Glen Rose Groundwater Elevations (feet above MSL) Measured in Westbay Wells May 2010 - April 2013

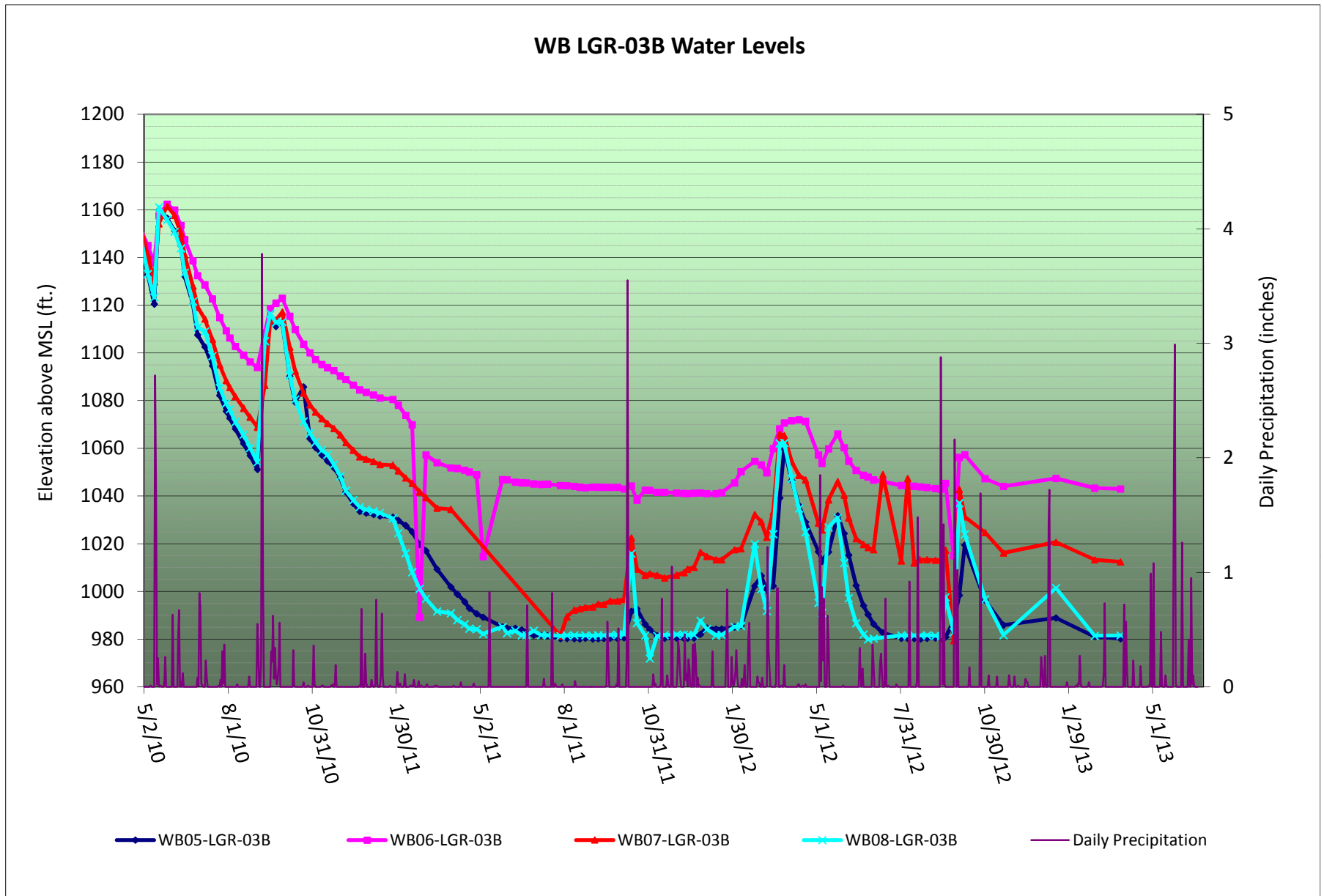


Figure 24.5.6

### SWMU B-3 Bioreactor -Trench 1 Average Water Thickness and Daily Precipitation

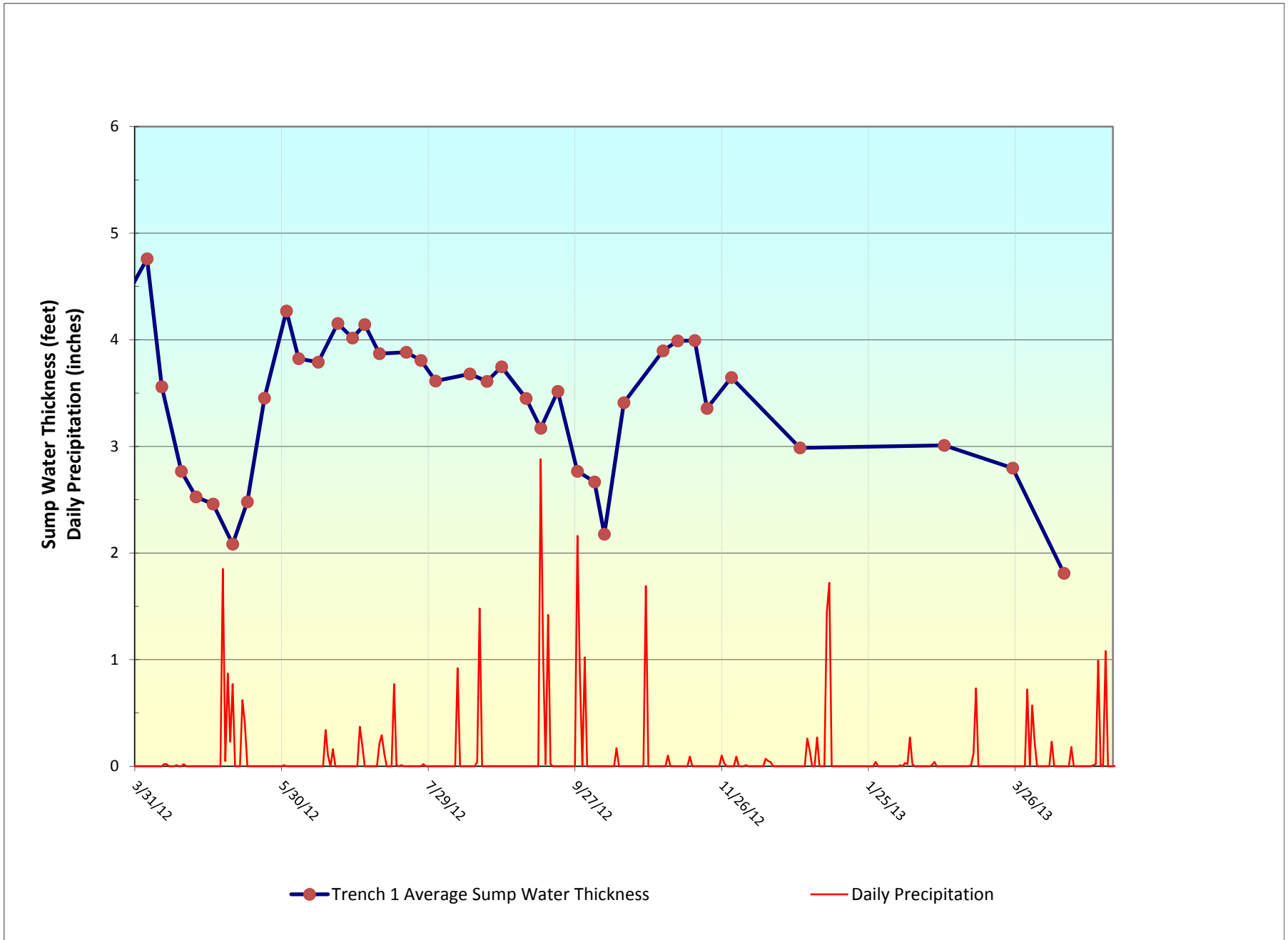


Figure 24.6.2 16-CC

### CS-MW16-CC VOC Summary Oct 2011 - Apr 2013

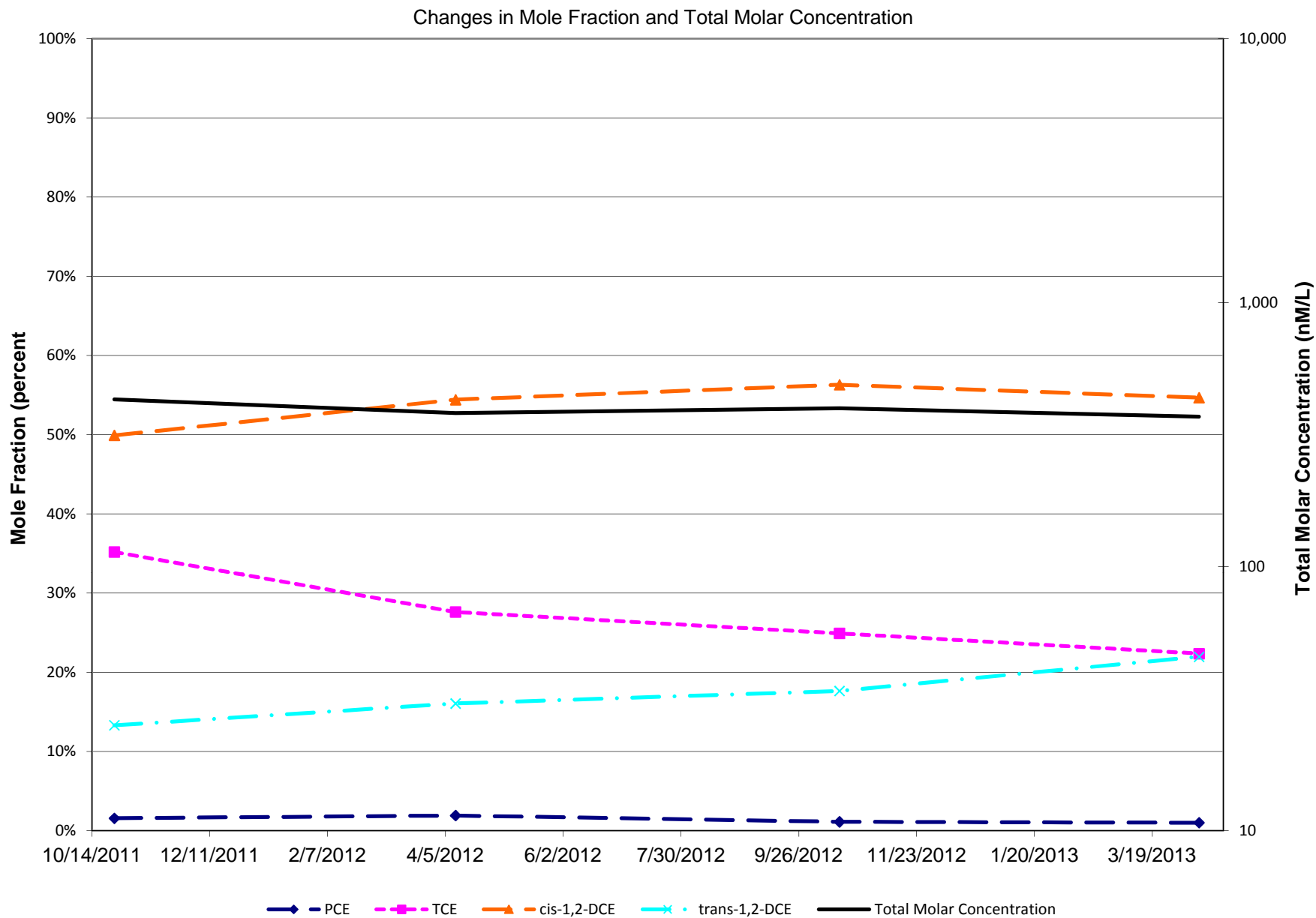


Figure 24.6.2 16-LGR

### CS-MW16-LGR VOC Summary Oct 2011 - Apr 2013

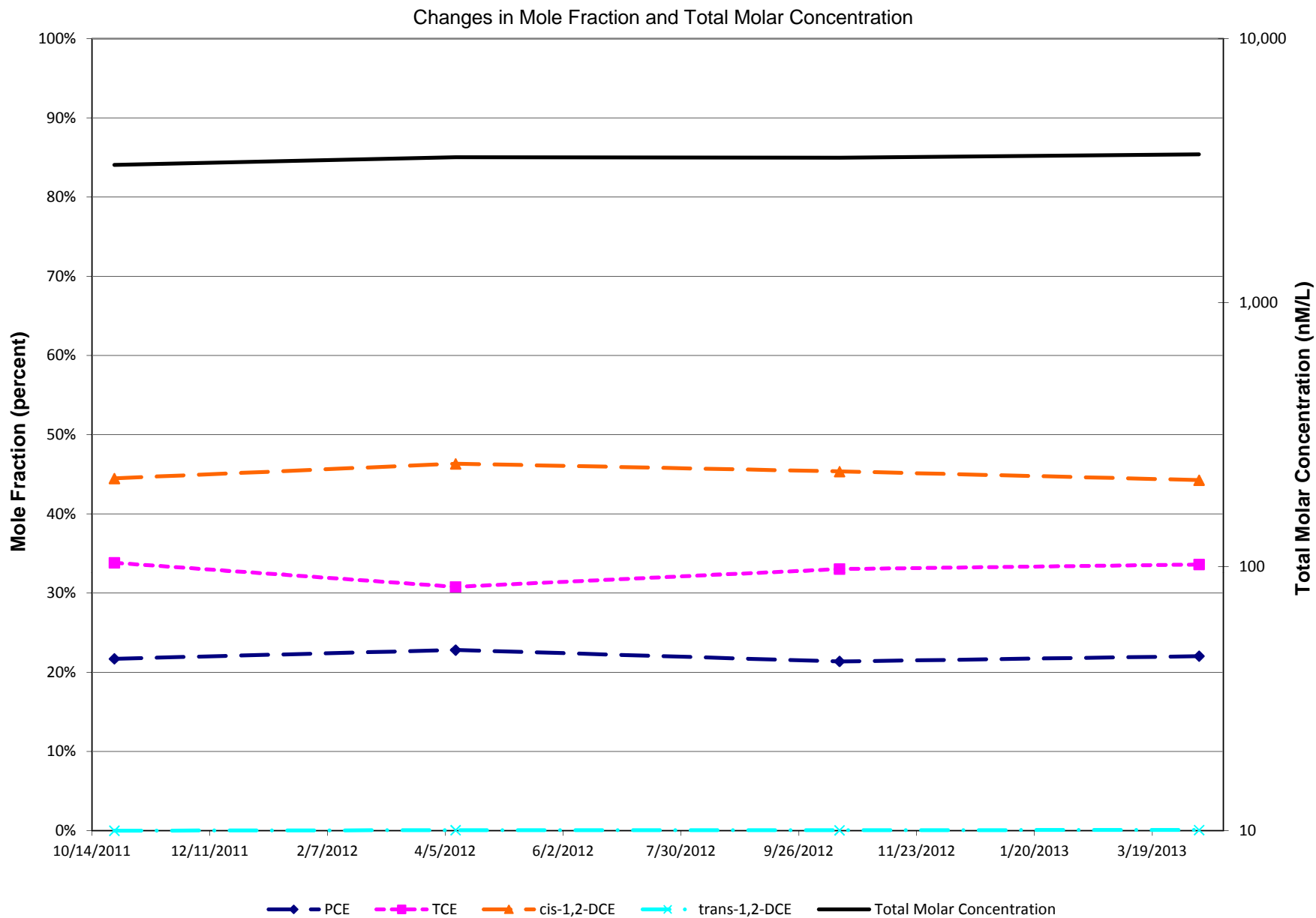


Figure 24.6.2 EXW01

### B3-EXW01 VOC Summary Oct 2011 - Apr 2013

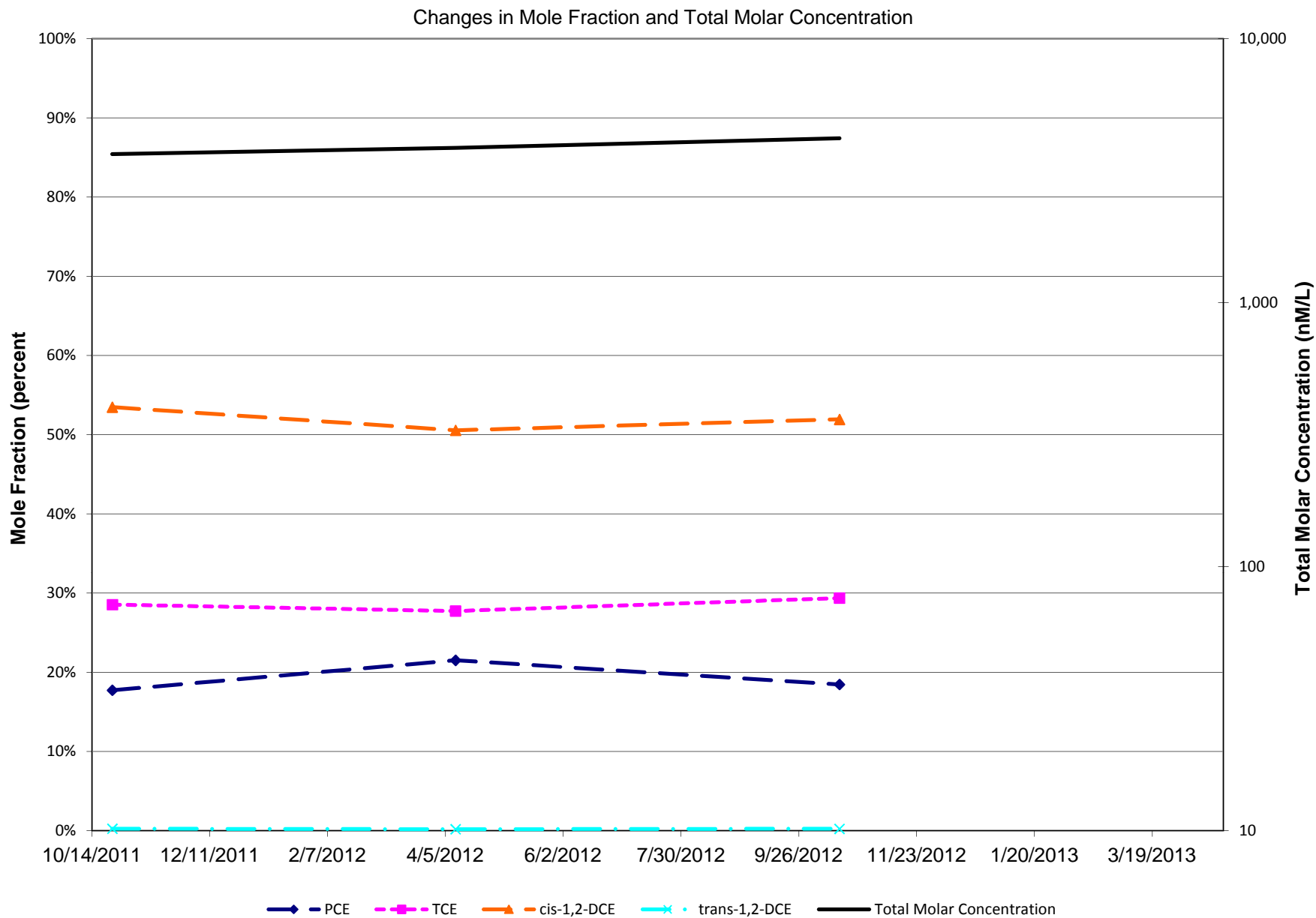
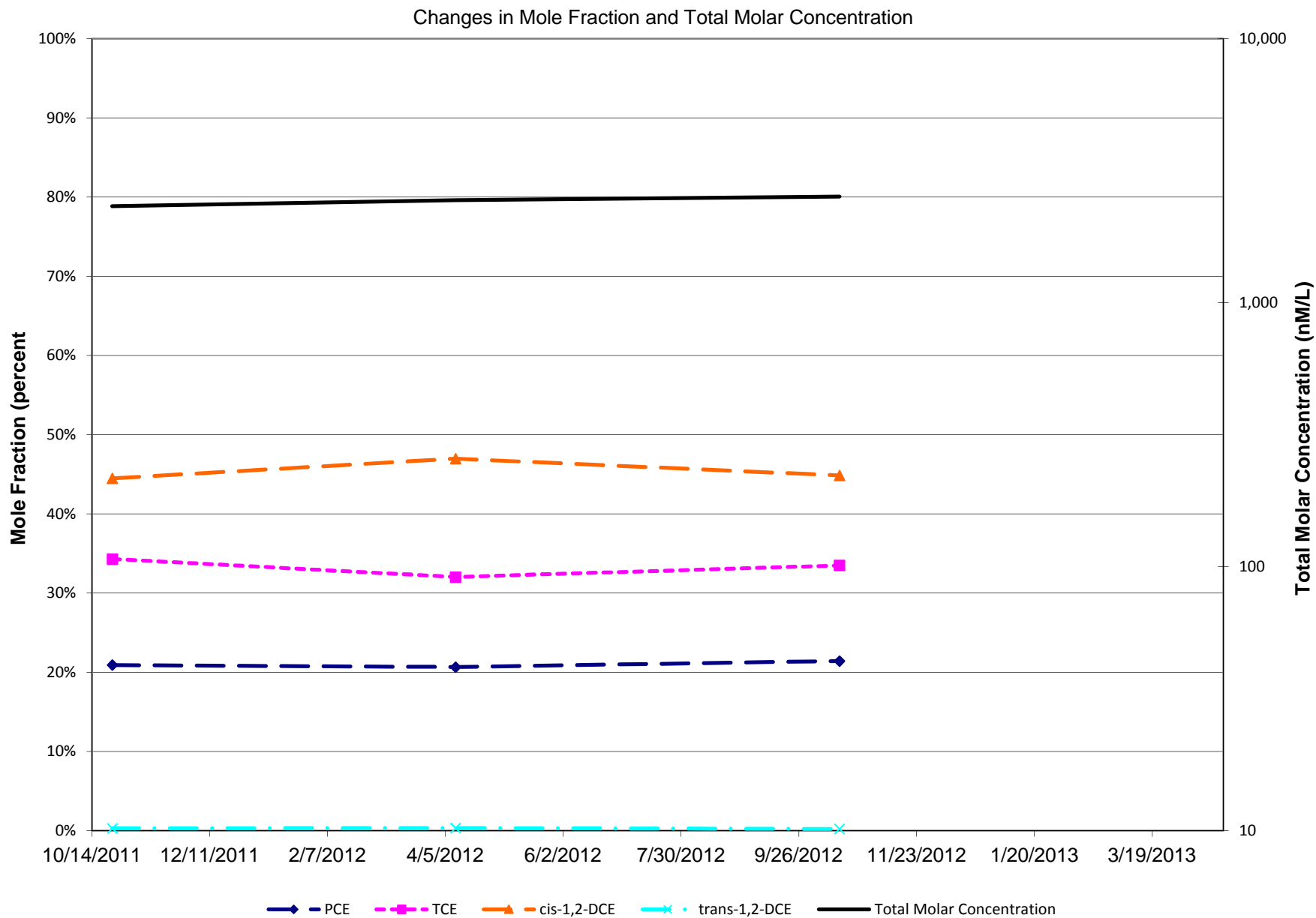


Figure 24.6.2 EXW02

### B3-EXW02 VOC Summary Oct 2011 - Apr 2013



**B3-EXW03 VOC Summary**  
**Apr 2012 - Apr 2013**

Changes in Mole Fraction and Total Molar Concentration

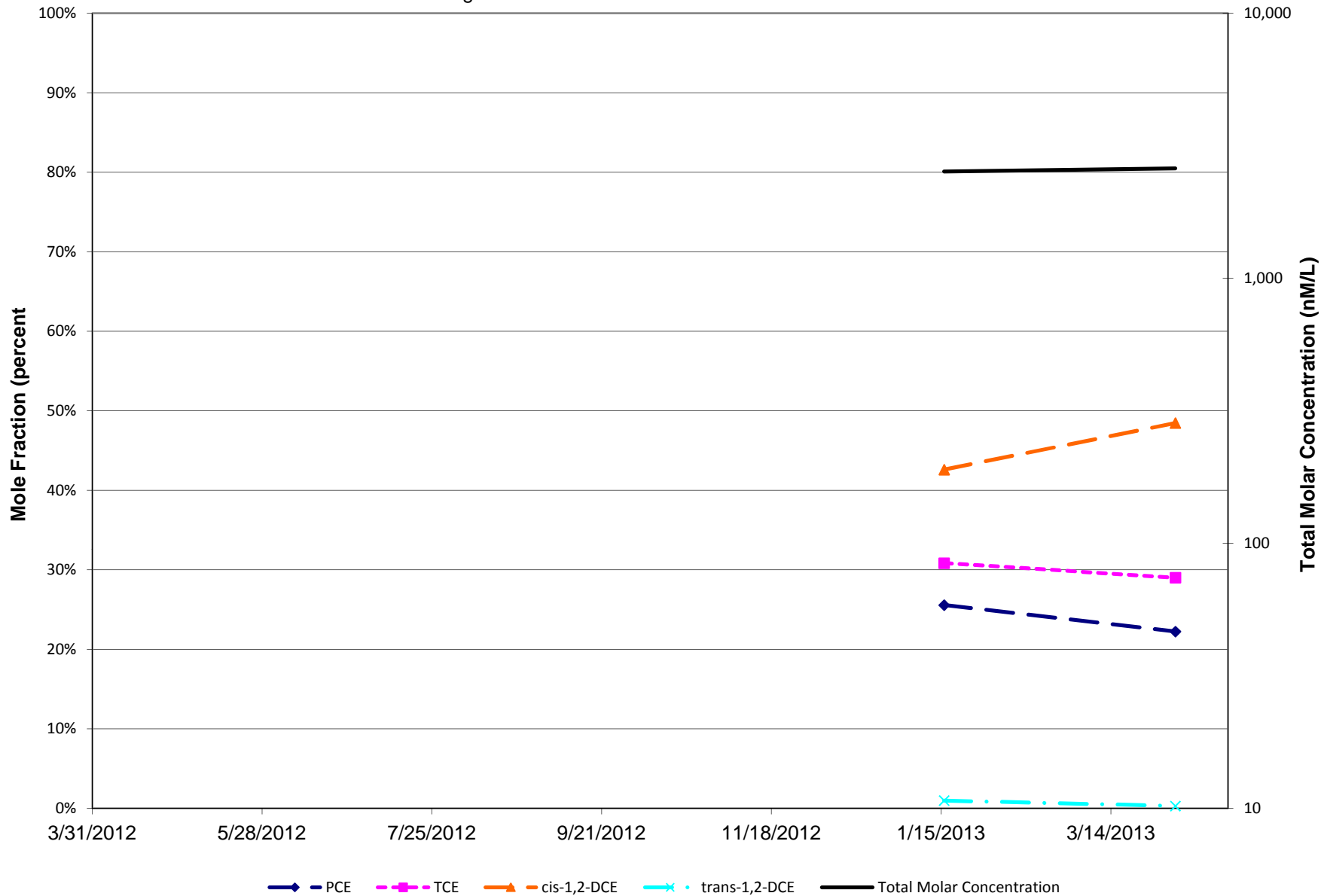


Figure 24.6.2 EXW04

### B3-EXW04 VOC Summary Apr 2012 - Apr 2013

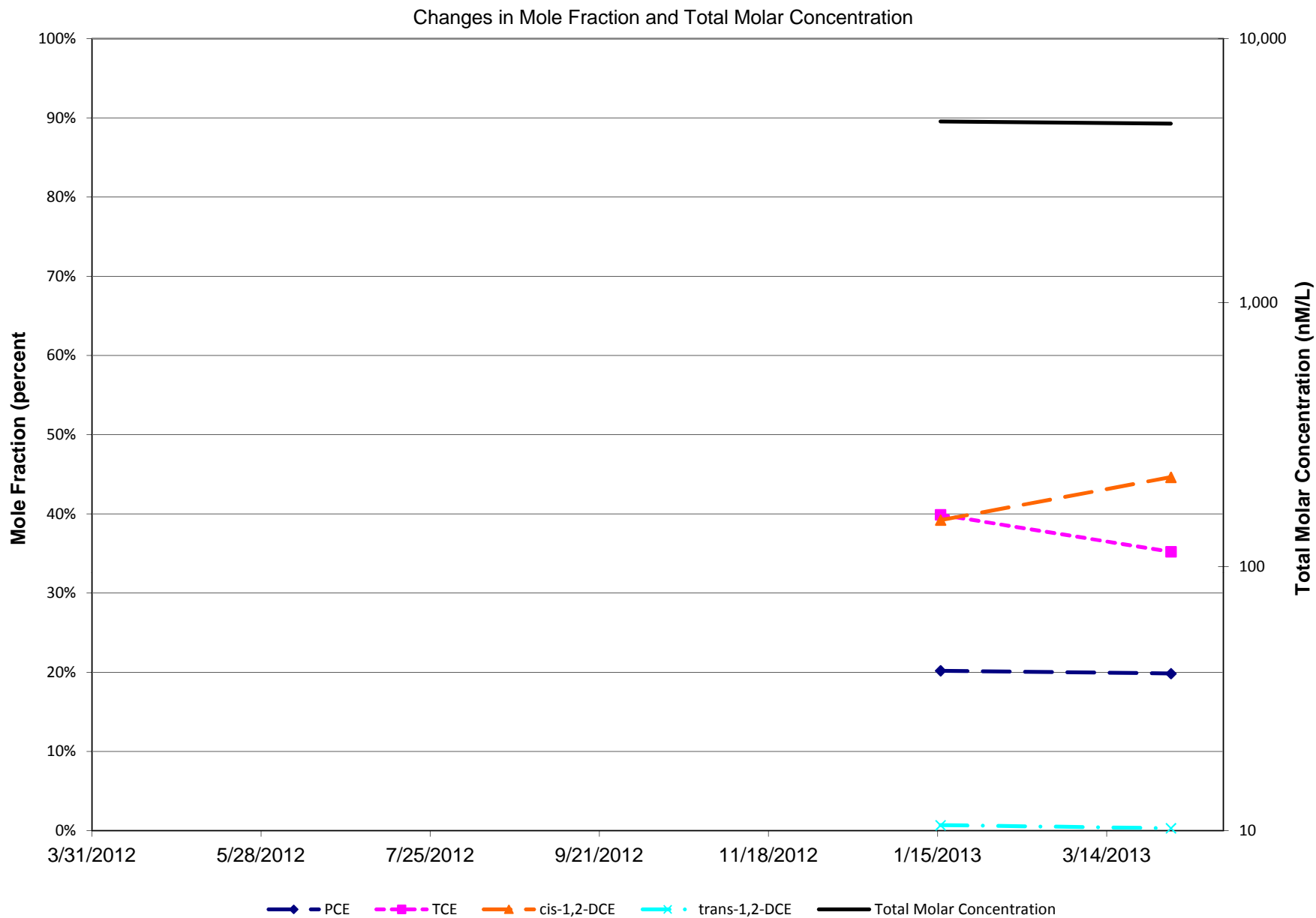
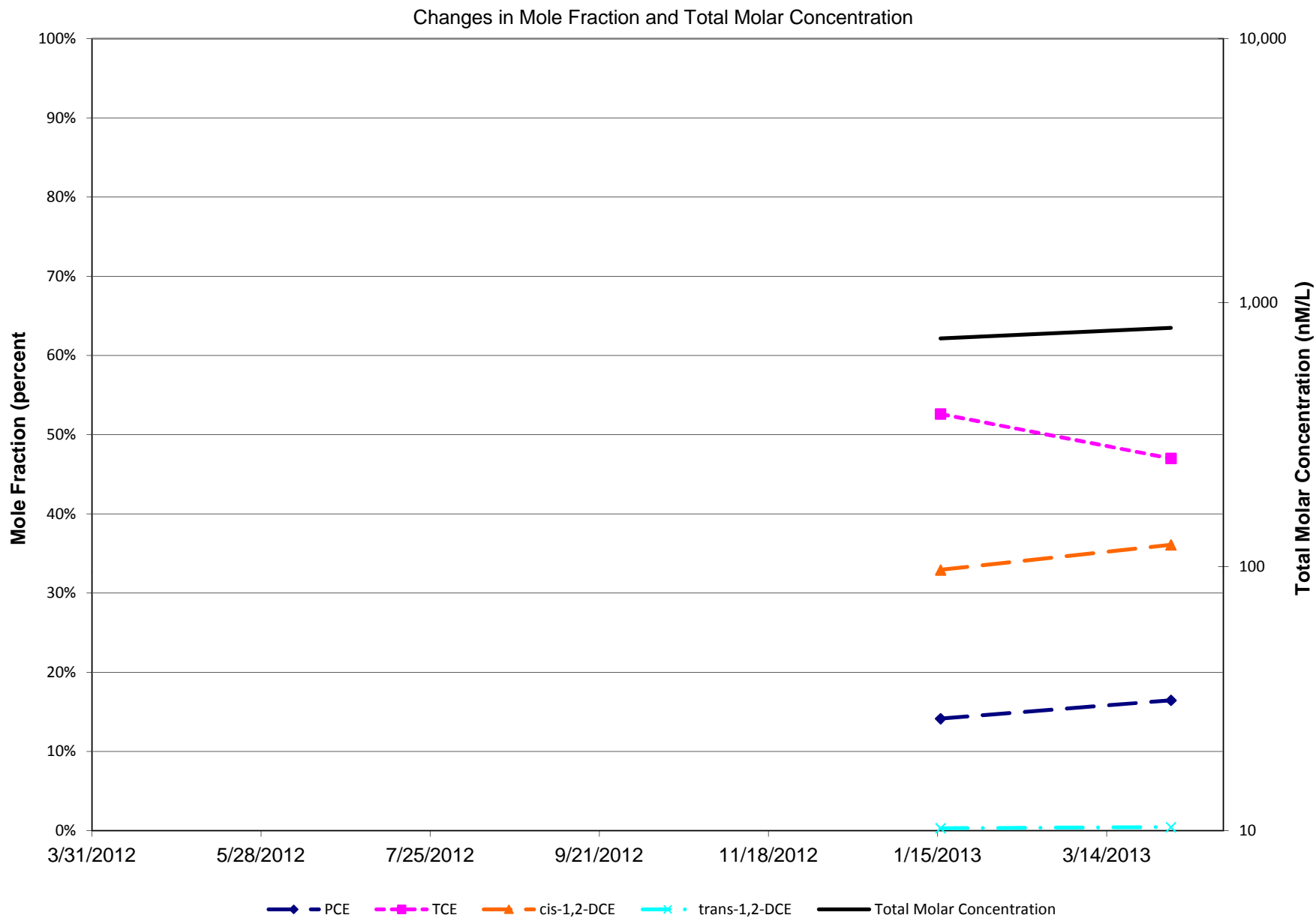




Figure 24.6.2 EXW05

### B3-EXW05 VOC Summary Apr 2012 - Apr 2013



## Tables

Table 24.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
April 2012 - April 2013

<b>TRENCH 1</b>									
<b>Sump 1-1</b>									
Sump Depth: 12.9 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H <sub>2</sub> O Thickness	
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)	
4/5/2012	845	5.07	7.07	22.81	0.752	0.67	117.3	7.83	
4/11/2012	916	5.03	6.94	22.84	0.758	0.30	81.9	7.87	
4/19/2012	800	5.39	7.09	22.96	1.236	0.21	96.5	7.51	
4/25/2012	815	5.72	6.98	23.05	0.726	0.21	-83.1	7.18	
5/2/2012	915	6.34	6.87	23.80	0.47	0.65	-74.0	6.56	
5/10/2012	1430	6.13	6.74	23.84	0.55	0.34	-21.8	6.77	
5/16/2012	1050	5.55	6.53	23.60	0.885	0.34	-7.2	7.35	
5/23/2012	1837	5.11	6.56	23.60	0.96	0.07	-22.6	7.79	
6/1/2012	1542	6.50	6.25	23.87	0.668	0.52	-72.7	6.40	
6/6/2012	1145	6.75	6.48	24.12	0.984	0.08	-122.0	6.15	
6/14/2012	1017	7.25	6.56	24.33	0.685	0.22	-83.9	5.65	
6/22/2012	1000	7.48	6.68	25.88	0.558	0.04	-71.2	5.42	
6/28/2012	1215	7.72	6.31	24.92	0.935	0.05	-158.1	5.18	
7/3/2012	800	7.83	6.52	25.52	1.405	0.18	-146.1	5.07	
7/9/2012	900	7.97	6.51	25.01	0.893	0.23	-154.7	4.93	
7/20/2012	1600	8.07	6.38	25.14	0.877	3.91	-277.4	4.83	
7/26/2012	1400	No data collected							
8/1/2012	1400	No data collected							
8/15/2012	1312	8.65	6.33	25.71	0.93	0.11	-145.8	4.25	
8/22/2012	1430	8.30	6.39	26.72	0.889	0.18	-196.7	4.60	
8/28/2012	1143	8.83	6.40	25.57	0.935	0.34	-221.8	4.07	
9/7/2012	1050	8.53	6.63	25.81	0.803	0.33	-159.3	4.37	
9/13/2012	1130	8.29	6.52	25.30	0.851	0.04	-112.0	4.61	
9/20/2012	830	6.92	7.19	28.48	1.199	0.26	-98.6	5.98	
9/28/2012	1600	7.34	6.60	27.68	1.24	0.18	-257.0	5.56	
10/5/2012	1000	4.60	6.47	24.24	1.284	0.16	-19.2	8.30	
10/9/2012	1415	4.68	6.71	24.59	0.988	0.07	-25.0	8.22	
10/17/2012	900	4.68	6.86	23.71	1.165	0.19	-31.6	8.22	
11/2/2012	1045	7.18	7.02	23.82	0.692	0.17	-35.4	5.72	
11/8/2012	1400	6.50	6.94	23.34	0.79	0.12	52.3	6.40	
11/15/2012	855	7.09	7.36	22.90	0.758	0.40	70.8	5.81	
11/20/2012	930	7.15	6.53	21.79	0.913	0.25	-181.5	5.75	
11/30/2012	1340	7.95	6.58	21.94	0.671	0.44	-184.4	4.95	
12/28/2012	1100	6.57	6.64	21.03	0.627	0.84	178.7	6.33	
2/25/2013	1315	5.82	6.76	21.31	0.574	0.23	42.5	7.08	
3/25/2013	1305	6.43	6.37	22.31	0.791	0.80	202.3	6.47	
4/15/2013	920	6.02	6.82	21.88	1.016	0.33	8.1	6.88	



Table 24.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
April 2012 - April 2013

<b>TRENCH 1</b>									
<b>Sump 1-3</b>									
Sump Depth: 12.85 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H <sub>2</sub> O Thickness	
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)	
4/5/2012	845	4.54	7.02	21.90	0.722	0.06	-56.40	8.31	
4/11/2012	916	4.38	7.20	22.35	0.641	0.06	77.40	8.47	
4/19/2012	800	5.13	7.19	22.30	1.086	0.17	12.60	7.72	
4/25/2012	815	5.68	6.86	22.69	0.703	0.12	-94.50	7.17	
5/2/2012	915	6.20	6.74	23.60	0.493	0.06	-142.90	6.65	
5/10/2012	1430	6.14	6.77	25.25	0.585	0.06	-25.80	6.71	
5/16/2012	1050	5.43	6.59	24.44	1.032	0.04	-28.10	7.42	
5/23/2012	1837	5.65	6.53	24.30	1.099	0.14	-14.80	7.20	
6/1/2012	1542	6.32	6.45	24.90	0.749	0.07	-20.10	6.53	
6/6/2012	1145	6.68	6.53	25.16	1.063	0.10	-45.10	6.17	
6/14/2012	1017	7.10	6.52	25.50	0.699	0.02	9.60	5.75	
6/22/2012	1000	7.44	6.63	25.42	0.567	0.12	-13.40	5.41	
6/28/2012	1215	7.68	6.58	25.56	0.846	0.09	-85.10	5.17	
7/3/2012	800	7.76	6.44	25.86	1.184	0.06	-107.90	5.09	
7/9/2012	900	7.89	6.54	25.79	0.673	0.09	-130.80	4.96	
7/20/2012	1600	7.94	6.53	25.79	0.742	2.70	-290.00	4.91	
7/26/2012	1400	No data collected							
8/1/2012	1400	No data collected							
8/15/2012	1312	8.49	6.49	26.65	0.783	0.07	-164.50	4.36	
8/22/2012	1430	8.19	6.52	27.48	0.790	0.11	-200.50	4.66	
8/28/2012	1143	8.64	6.54	26.79	0.801	0.12	-217.90	4.21	
9/7/2012	1050	8.43	6.81	26.29	0.747	0.22	-166.80	4.42	
9/13/2012	1130	8.2	6.71	26.25	0.775	0.15	-122.30	4.65	
9/20/2012	830	6.82	6.80	26.70	0.941	0.22	-71.00	6.03	
9/28/2012	1600	7.49	6.48	25.11	0.786	0.15	-249.40	5.36	
10/5/2012	1000	4.53	6.62	25.24	1.037	0.08	19.30	8.32	
10/9/2012	1415	4.52	6.64	24.58	0.782	0.09	17.60	8.33	
10/17/2012	900	4.36	6.73	24.29	0.857	0.01	23.10	8.49	
10/2/2012	1045	6.86	6.92	23.48	0.581	0.06	34.00	5.99	
11/8/2012	1400	6.54	6.67	22.79	0.694	0.07	58.80	6.31	
11/15/2012	855	7.17	6.84	22.69	0.684	0.09	85.10	5.68	
11/20/2012	930	7.25	6.56	22.04	0.852	0.28	-165.10	5.60	
11/30/2012	1340	8.03	6.51	22.39	0.693	0.38	-133.00	4.82	
12/28/2012	1100	6.62	6.50	20.84	0.772	0.37	-21.00	6.23	
2/25/2013	1315	6.18	6.53	20.13	0.695	0.12	-190.70	6.67	
3/25/2013	1305	6.53	6.20	21.26	0.935	0.24	-173.40	6.32	
4/15/2013	920	6.26	6.65	21.72	1.200	0.07	-80.50	6.59	





Table 24.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
April 2012 - April 2013

<b>TRENCH 3</b>									
<b>Sump 3-1</b>									
Sump Depth: 9.96 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H <sub>2</sub> O Thickness	
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)	
4/5/2012	845	9.2						0.76	
4/11/2012	916	9.25						0.71	
4/19/2012	800	9.24						0.72	
4/25/2012	815	9.25						0.71	
5/2/2012	915	9.28						0.68	
5/10/2012	1430	9.13						0.83	
5/16/2012	1050	9.18						0.78	
5/23/2012	1837	9.15						0.81	
6/1/2012	1542	9.15						0.81	
6/6/2012	1145	9.13						0.83	
6/14/2012	1017	9.13						0.83	
6/22/2012	1000	9.16	6.46	27.99	0.577	0.18	-21.5	0.80	
6/28/2012	1215	9.14						0.82	
7/3/2012	800	9.1	6.46	28.733	1.413	0.2	-123	0.86	
7/9/2012	900	9.1						0.86	
7/20/2012	1600	9.29						0.67	
7/26/2012	1400	No data collected							
8/1/2012	1400	No data collected							
8/15/2012	1312	7.4	No data collected					2.56	
8/22/2012	1430	8.92	6.6	31.94	1.18	0.26	-71.6	1.04	
8/28/2012	1143	9.13	6.66	31.71	1.233	0.18	-163.5	0.83	
9/7/2012	1050	9.12	No data collected					0.84	
9/13/2012	1130	9.14	No data collected					0.82	
9/20/2012	830	8.56	No data collected					1.40	
9/28/2012	1600	9.06	6.71	30.92	1.169	0.13	-37.1	0.90	
10/5/2012	1000	8.13						1.83	
10/9/2012	1415	8.49	7.07	29.75	1.062	0.19	116.7	1.47	
10/17/2012	900	8.74	7.36	29.82	1.219	0.37	144.4	1.22	
11/2/2012	1045	8.95						1.01	
11/8/2012	1400	9.15						0.81	
11/15/2012	855	9.2						0.76	
11/20/2012	930	9.22						0.74	
11/30/2012	1340	9.28						0.68	
12/28/2012	1100	9.38						0.58	
2/25/2013	1315	9.28	6.85	21.91	1.078	2.34	77.3	0.68	
3/25/2013	1305	9.27	6.43	21.87	1.402	1.39	52	0.69	
4/15/2013	920	8.85	6.78	22.36	1.843	0.73	85.3	1.11	







Table 24.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
April 2012 - April 2013

<b>TRENCH 5</b>								
<b>Sump 5-1</b>								
Sump Depth: 9.33 feet BTOC								
Sample Date	Sample Time	Sump H <sub>2</sub> O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H <sub>2</sub> O Thickness
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)
4/5/2012	845	9.24						0.09
4/11/2012	916	9.2						0.13
4/19/2012	800	9.2						0.13
4/25/2012	815	9.2						0.13
5/2/2012	915	9.33						0.00
5/10/2012	1430	9.14						0.19
5/16/2012	1050	9.3						0.03
5/23/2012	1837	9.12						0.21
6/1/2012	1542	9.18						0.15
6/6/2012	1145	9.16						0.17
6/14/2012	1017	9.19						0.14
6/22/2012	1000	9.19						0.14
6/28/2012	1215	9.2						0.13
7/3/2012	800	9.19						0.14
7/9/2012	900	9.16						0.17
7/20/2012	1600	9.16						0.17
7/26/2012	1400	No data collected						
8/1/2012	1400	No data collected						
8/15/2012	1312	9.18						0.15
8/22/2012	1430	9.16						0.17
8/28/2012	1143	9.2						0.13
9/3/2012	1050	9.23						0.10
9/13/2012	1130	9.2						0.13
9/20/2012	830	9.14						0.19
9/28/2012	1600	9.01						0.32
10/5/2012	1000	8.79						0.54
10/9/2012	1415	8.82						0.51
10/17/2012	900	8.96						0.37
11/8/2012	1400	9.1						0.23
11/15/2012	855	9.02						0.31
11/20/2012	930	8.88						0.45
11/30/2012	1340	8.94						0.39
12/28/2012	1100	8.57						0.76
2/25/2013	1315	9.22						0.11
3/25/2013	1305	8.98	6.48	21.55	0.78	1.01	105.4	0.35
4/15/2013	920	8.09	6.84	22.17	1.044	1.17	140.2	1.24

Table 24.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
April 2012 - April 2013

<b>TRENCH 5</b>									
<b>Sump 5-2</b>									
Sump Depth: 7.98 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H <sub>2</sub> O Thickness	
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>	
4/5/2012	845	7.98						0.00	
4/11/2012	916	7.98						0.00	
4/19/2012	800	7.98						0.00	
4/25/2012	815	7.98						0.00	
5/2/2012	915	No data collected							
5/10/2012	1430	6.32	6.76	22.88	0.51	0.25	40.6	1.66	
5/16/2012	1050	7.96						0.02	
5/23/2012	1837	7.88						0.10	
6/1/2012	1542	7.96						0.02	
6/6/2012	1145	7.91						0.07	
6/14/2012	1017	7.92						0.06	
6/22/2012	1000	7.97						0.01	
6/28/2012	1215	7.87						0.11	
7/3/2012	800	7.88						0.10	
7/9/2012	900	7.89						0.09	
7/20/2012	1600	7.98						0.00	
7/26/2012	1400	No data collected							
8/1/2012	1400	No data collected							
8/15/2012	1312	7.85						0.13	
8/22/2012	1430	7.86						0.12	
8/28/2012	1143	7.87						0.11	
9/3/2012	1050	7.88						0.10	
9/13/2012	1130	7.94						0.04	
9/20/2012	830	7.85						0.13	
9/28/2012	1600	7.89						0.09	
10/5/2012	1000	7.85						0.13	
10/9/2012	1415	7.87						0.11	
10/17/2012	900	7.89						0.09	
11/8/2012	1400	7.88						0.10	
11/15/2012	855	7.91						0.07	
11/20/2012	930	7.89						0.09	
11/30/2012	1340	7.94						0.04	
11/28/2012	1100	7.94						0.04	
2/25/2013	1315	7.98						0.00	
3/25/2013	1305	7.98						0.00	
4/15/2013	920	7.92						0.06	





Table 24.1.2

**B-3 Bioreactor Trench VOC Summary**  
**Apr 2012 - Apr 2013**

Q24 Date	T1-1			T1-2			T1-3			T6-1			T6-2		
	4/11/2012	10/17/2012	4/15/2013	4/11/2012	10/17/2012	4/15/2013	4/11/2012	10/17/2012	4/15/2013	4/11/2012	10/17/2012	4/15/2013	4/11/2012	10/17/2012	4/15/2013
PCE (µg/L)	0	0.18	1.1	63	57	0	2.4	1.1	0	41	1.0	54	1.0	0.42	17
TCE (µg/L)	1.2	3.6	2.0	74	72	0	4.2	2.3	0	53	1.7	80	1.6	0.69	34
cis-1,2-DCE (µg/L)	48	10	47	96	106	5.2	18	9.1	0.19	97	17	95	15	2.1	51
trans-1,2-DCE (µg/L)	0.65	0	0.71	1.5	0.35	3.0	0.30	0.42	1.6	1.3	0.80	1.5	0.25	0.82	0.82
Vinyl chloride (µg/L)	7.2	6.5	2.9	0	3.0	7.6	3.4	16	0	2.0	23	0	4.1	5.4	2.4
Ethene (µg/L)	6.5	0	0	0	0	20	0	9.1	0	0	9.2	0	2.9	10	1.4
PCE (nM/L)	0.000	1.085	6.875	378.460	344.992	0.000	14.473	6.452	0.000	248.206	6.332	325.273	6.151	2.533	99.801
TCE (nM/L)	8.829	27.628	15.450	563.209	551.183	0.000	31.661	17.201	0.000	406.424	12.786	612.299	12.406	5.252	260.522
cis-1,2-DCE (nM/L)	497.060	106.240	480.041	990.820	1094.172	53.120	184.734	93.553	1.960	996.287	177.102	983.600	151.831	21.558	523.569
trans-1,2-DCE (nM/L)	6.704	0.000	7.323	15.472	3.610	30.737	3.094	4.332	16.606	13.203	8.252	15.266	2.579	8.458	8.458
Vinyl chloride (nM/L)	114.862	104.303	46.713	0.000	47.992	122.380	54.231	251.640	0.000	32.795	361.542	0.000	64.950	86.706	39.194
Ethene (nM/L)	231.729	0.000	0.000	0.000	0.000	698.752	0.000	324.421	0.000	0.000	327.986	0.000	103.387	374.332	49.911
Total Molar Conc. (nM/L)	859.18	239.26	556.40	1947.96	2041.95	904.99	288.19	697.60	18.57	1696.91	894.00	1936.44	341.30	498.84	981.5
% moles PCE	0.0%	0.5%	1.2%	19.4%	16.9%	0.0%	5.0%	0.9%	0.0%	14.6%	0.7%	16.8%	1.8%	0.5%	10.2%
% moles TCE	1.0%	11.5%	2.8%	28.9%	27.0%	0.0%	11.0%	2.5%	0.0%	24.0%	1.4%	31.6%	3.6%	1.1%	26.5%
% moles cis-1,2-DCE	57.9%	44.4%	86.3%	50.9%	53.6%	5.9%	64.1%	13.4%	10.6%	58.7%	19.8%	50.8%	44.5%	4.3%	53.3%
% moles trans-1,2-DCE	0.8%	0.0%	1.3%	0.8%	0.2%	3.4%	1.1%	0.6%	89.4%	0.8%	0.9%	0.8%	0.8%	1.7%	0.9%
% moles Vinyl Chloride	13.4%	43.6%	8.4%	0.0%	2.4%	13.5%	18.8%	36.1%	0.0%	1.9%	40.4%	0.0%	19.0%	17.4%	4.0%
% moles Ethene	27.0%	0.0%	0.0%	0.0%	0.0%	77.2%	0.0%	46.5%	0.0%	0.0%	36.7%	0.0%	30.3%	75.0%	5.1%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 24.1.3

SWMU B-3 Active Trench Sumps  
May 2012 - April 2013

Q24		Bioreactor Active Trench Sumps																			
Well ID		T1-1				T1-2				T1-3				T6-1				T6-2			
Sample Date		10/17/2012		4/15/2013		10/17/2012		4/15/2013		10/17/2012		4/15/2013		10/17/2012		4/15/2013		10/17/2012		4/15/2013	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	50		8.0		0.58		5.7		21		9.8		13		1.9		22		3.5	
Total Organic Carbon	mg/L	87		15		1.8		6.1		29		10		13		2.0		24		3.4	
Methane	µg/L	7,610		1,630		51		3,140		7,750		2,920		653		11		1,620		66	
Ethene	µg/L	0		0		0		20		9.1		0		9.2		0		10		1.4	F
Ethane	µg/L	1.3	F	1.7	F	0		6.3		2.2		5.5		3.0		0		3.1		0	
Carbon Dioxide	µg/L	276,000		127,000		43,900		133,000		135,000		107,000		135,000		61,500		187,000		94,200	
Sulfate	mg/L	3.1		17		15		8.8		1.6		4.0		18		27		18		25	
Chloride	mg/L	26		15		13		15		13		15		14		15		16		15	
Ferrous Iron	mg/L	15		7.0		0.33	F	4.3		11		3.3		14		0.31	F	0.84	F	0.63	F
Manganese	µg/L	597		150		5.4		166		898		376		379		21		95		32	
Hydrogen	nM					7.0		15										17		9.4	
Sulfide	mg/L	0		0		0		3.5	F	0		0		7.7		0		6.3		0	
Total Dissolved Solids	mg/L	783		457		331		439		542		526		440		374		487		406	
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0.090	F	0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	10		47		106		5.2		9.1		0.19	F	17		95		2.1		51	
Dichloroethene, trans-1,2-	µg/L	0		0.71		0.35	F	3.0		0.42	F	1.6		0.80		1.5		0.82		0.82	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.18	F	1.1	F	57		0		1.1	F	0		1.0	F	54		0.42	F	17	
Toluene	µg/L	0		0		0		0.21	F	4.3		0		0		0		0		0	
Trichloroethene	µg/L	3.6		2.0		72		0		2.3		0		1.7		80		0.69	F	34	
Vinyl chloride	µg/L	6.5		2.9		3.0		7.6		16		0		23		0		5.4		2.4	
Arsenic	µg/L	5.7		8.7		0.30	F	0		7.3		0.50	F	1.9	F	1.4	F	1.5	F	0.70	F
		Month 66		Month 72		Month 66		Month 72		Month 66		Month 72		Month 66		Month 72		Month 66		Month 72	

Note: 0 sample indicates a non-detect analyte value



Table 24.2.2

## Multi-Port Monitoring Well Upper Saturated Zone (LGR03B) VOC Results Summary

May 2012 - April 2013

Q24	CS-WB05-LGR03B	CS-WB06-LGR03B		CS-WB07-LGR03B		CS-WB08-LGR03B
Date	10/23/2012	10/29/2012	4/9/2013	10/24/2012	4/2/2013	10/30/2012
PCE (µg/L)	0	79	118	23	2.6	34
TCE (µg/L)	4.1	89	154	33	8.9	41
cis-1,2-DCE (µg/L)	72	182	246	44	15	66
trans-1,2-DCE (µg/L)	7.5	1.5	1.8	1.1	0.45	1.6
Vinyl chloride (µg/L)	6.3	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0
PCE (nM/L)	0.000	477.477	713.562	136.284	15.920	205.331
TCE (nM/L)	30.976	675.851	1173.301	249.867	67.889	312.124
cis-1,2-DCE (nM/L)	741.929	1872.408	2535.946	454.255	157.710	680.660
trans-1,2-DCE (nM/L)	77.772	15.369	19.082	11.140	4.642	16.400
Vinyl chloride (nM/L)	101.424	0.000	0.000	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000
Total Molar Conc. (nM/L)	952.10	3041.10	4441.89	851.55	246.16	1214.5
% moles PCE	0.0%	15.7%	16.1%	16.0%	6.5%	16.9%
% moles TCE	3.3%	22.2%	26.4%	29.3%	27.6%	25.7%
% moles cis-1,2-DCE	77.9%	61.6%	57.1%	53.3%	64.1%	56.0%
% moles trans-1,2-DCE	8.2%	0.5%	0.4%	1.3%	1.9%	1.4%
% moles Vinyl Chloride	10.7%	0.0%	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Q24		CS-WB05																											
Well ID	Sample Date	CS-WB05-LGR-01				CS-WB05-LGR03B				CS-WB05-LGR-04A				CS-WB05-LGR-04B				CS-WB05-BS-01				CS-WB05-CC-01				CS-WB05-CC-02			
		10/23/2012		4/8/2013		10/23/2012		10/23/2012		4/8/2013		10/22/2012		4/4/2013		10/22/2012		4/4/2013		10/22/2012		4/4/2013		10/22/2012		4/4/2013			
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag		
Dissolved Organic Carbon	mg/L	0.93		0.50		0.61		0.76		1.6		1.4		1.1		4.1		0.20	F	1.0		0.43	F	1.0		0.32	F		
Total Organic Carbon	mg/L	0.18	F	0.50		0		1.3		0.78		2.3		1.1		0.24	F	0.18	F	0		1.0		0.58		0.39	F		
Methane	µg/L	9.8		4.7		165		303		412		2,880		2,800		25		46		1.7		1.8		2.6		9.8			
Ethane	µg/L	0		0		0		1.0	F	1.9	F	17		23		0		0		0		0		0		0			
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Carbon Dioxide	µg/L	45,900		30,400		34,400		13,300		17,100		42,400		49,600		12,500		12,700		10,800		9,970		11,900		23,500			
Sulfate	mg/L	96		100		40		28		26		6.5		7.5		31		32		81		84		95		99			
Chloride	mg/L	13		14		11		12		12		13		13		12		12		17		18		18		19			
Ferrous Iron	mg/L	0.26	F	0		0.17	F	0.26	F	0.52	F	2.1		0		0.32	F	0		0.42	F	0.65	F	0.38	F	0			
Manganese	µg/L	0		1.7	F	0		6.4		7.0		54		42		0		0		0		0		0		0			
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0		4.8	F		
Total Dissolved Solids	mg/L	545		513		383		368		340		358		359		338		335		420		411		450		443			
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Chloroform	µg/L	0		0		0		0		0		0		0.070	F	0		0		0		0		0		0			
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Dichloroethene, 1,1-	µg/L	0		0		0		0		0.21	F	0		0		0		0		0		0		0		0			
Dichloroethene, cis-1,2-	µg/L	2.7		2.1		72		410		405		16		191		24		15		2.0		1.1	F	22		17			
Dichloroethene, trans-1,2-	µg/L	0.68		0.83		7.5		11		9.9		5.3		2.5		0		0		0.80		0.64		9.8		9.9			
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Tetrachloroethene	µg/L	0.78	F	0.20	F	0		2.5		0		0.35	F	59		0		0		0.35	F	0		0.27	F	0			
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0			
Trichloroethene	µg/L	1.6		0.74	F	4.1		73		4.8		3.0		100		0.18	F	0		2.6		1.6		8.2		4.6			
Vinyl chloride	µg/L	0.43	F	0		6.3		40		86		223		72		2.2		2.2		0		0		0		0			
Arsenic	µg/L	0.70	F	0		1.1	F	0		0		15		14		1.7	F	0		0		0		0.50	F	0.30	F		
		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72			

Note: 0 sample indicates a non-detect analyte value

Q24		CS-WB06																								
Well ID		CS-WB06-UGR-01				CS-WB06-LGR-01				CS-WB06-LGR-02				CS-WB06-LGR03A				CS-WB06-LGR03B				CS-WB06-LGR-04				
Sample Date		10/29/2012		4/9/2013		10/29/2012		4/9/2013		10/29/2012		4/9/2013		10/29/2012		4/9/2013		10/29/2012		4/9/2013		10/25/2012		4/8/2013		
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	
Dissolved Organic Carbon	mg/L	6.8		1.4		2.1		0		1.7		0.70		0.55		0.64		0.37		F	0.68		0.28		F	0.97
Total Organic Carbon	mg/L	7.2		1.6		0.91		1.8		0		0.62		0		0.42		F	0		1.1		0		F	0.75
Methane	µg/L	1,150		10		0		0		2.3		1.8		0		0		0		0		0		110		0
Ethene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Carbon Dioxide	µg/L	109,000		13,000		72,700		42,000		24,900		19,200		13,400		11,500		36,000		16,900		36,900		52,100		
Sulfate	mg/L	10		19		21		22		25		26		20		19		20		20		12		12		12
Chloride	mg/L	16		15		14		15		10.0		11		12		12		12		12		14		14		14
Ferrous Iron	mg/L	0.85	F	0.53	F	0.27	F	0		0		0		2.9		0.40	F	0.19	F	0		0.26	F	0.38	F	
Manganese	µg/L	1,260		3,020		6.9		20		0		0		0		0		0		0		0		0		0
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Total Dissolved Solids	mg/L	502		385		429		422		340		319		340		327		340		324		350		357		
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Chloroform	µg/L	0		0		0		0		0		0		0		0		0		0.11	F	0		0		0
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Dichloroethene, 1,1-	µg/L	0		0.28	F	0		0		0		0		0		0		0		0		0		0.16	F	
Dichloroethene, cis-1,2	µg/L	28		169		28		30		21		24		166		186		182		246		174		143		
Dichloroethene, trans-1,2	µg/L	0.37	F	0.36	F	0.48	F	0		0.30	F	0.51	F	1.7		1.7		1.5		1.8		1.4		1.2		
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Tetrachloroethene	µg/L	2.0		20		21		20		4.9		4.3		71		97		79		118		66		83		
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0
Trichloroethene	µg/L	2.1		26		18		17		10		11		94		133		89		154		54		50		
Vinyl chloride	µg/L	2.2		1.0	F	0		0		0		0.58	F	0		0		0		0		1.4		0		
Arsenic	µg/L	1.1	F	64		0		0		0		0		0		0.50	F	0		0		0		0		0
		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		

Note: 0 sample indicates a non-detect analyte value

Q24

Well ID		CS-WB07															
		CS-WB07-LGR-01				CS-WB07-LGR-02				CS-WB07-LGR03B				CS-WB07-LGR-04			
Sample Date		10/25/2012		4/3/2013		10/24/2012		4/3/2013		10/24/2012		4/2/2013		10/24/2012		4/2/2013	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.7		1.7		1.1		1.3		0		0.30	F	0.41	F	0.26	F
Total Organic Carbon	mg/L	2.0		2.1		0.26	F	0.62		0		0.26	F	0		2.7	
Methane	µg/L	167		637		57		81		0.60	F	2.3		0		0	
Ethene	µg/L	2.2	F	5.2		1.3	F	10		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	23,200		60,100		11,800		13,300		9,890		16,700		69,300		22,400	
Sulfate	mg/L	11		15		38		41		20		23		10		10	
Chloride	mg/L	16		17		13		14		10		10		12		13	
Ferrous Iron	mg/L	1.9		2.1		0.72	F	0.56	F	0.36	F	0.25	F	0.38	F	0.41	F
Manganese	µg/L	693		601		77		43		1.6	F	2.4	F	0		1.8	F
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	381		394		390		376		334		320		331		322	
Benzene	µg/L	0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0.22	F	0.27	F
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0.40	F
Dichloroethene, cis-1,2-	µg/L	69		86		5.1		1.1	F	44		15		248		496	
Dichloroethene, trans-1,2-	µg/L	4.7		2.8		0.64		0		1.1		0.45	F	0.75		3.0	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		1.6		0		0	
Tetrachloroethene	µg/L	0		0		0		0		23		2.6		142		350	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	13		5.3		0		0		33		8.9		173		401	
Vinyl chloride	µg/L	24		11		5.1		0.68	F	0		0		0		0	
Arsenic	µg/L	2.7	F	1.6	F	1.5	F	0		1.9	F	1.5	F	0		0	
		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72	

Note: 0 sample indicates a non-detect analyte value

Table 24.2.3d

SWMU B-3 MPMW CS-WB08 Analytical Summary  
May 2012 - April 2013

Q24		CS-WB08																	
Well ID		CS-WB08-UGR-01				CS-WB08-LGR-01				CS-WB08-LGR-02				CS-WB08-LGR03B		CS-WB08-LGR-04			
Sample Date		10/30/2012		4/1/2013		10/30/2012		4/1/2013		10/30/2012		4/1/2013		10/30/2012		10/30/2012		4/1/2013	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	1.9		1.6		0		0.80		0.22	F	1.4		0.85		2.9		1.8	
Total Organic Carbon	mg/L	2.0		1.7		2.4		0.45	F	1.2		0.34	F	0.53		1.6		1.7	
Methane	µg/L	1,470		324		0		0		3.2		6.0		0		0		0	
Ethene	µg/L	36		7.3		0		0		0		0		0		0		0	
Ethane	µg/L	3.0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	130,000		25,000		33,800		21,300		24,300		42,200		47,400		93,900		17,200	
Sulfate	mg/L	22		17		99		103		104		107		21		17		19	
Chloride	mg/L	15		15		12		12		11		12		14		15		17	
Ferrous Iron	mg/L	3.2		0.70	F	0.26	F	0.43	F	0.32	F	0.18	F	0.28	F	0.45	F	0.52	F
Manganese	µg/L	1,420		766		0		0		0		0		0		82		25	
Sulfide	mg/L	0		0		0		3.2	F	0		0		0		0		0	
Total Dissolved Solids	mg/L	430		376		526		522		548		527		389		432		422	
Benzene	µg/L	0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	102		97		26		25		6.1		14		66		31		66	
Dichloroethene, trans-1,2-	µg/L	2.1		1.8		3.0		1.9		0		0.27	F	1.6		0.77		0.28	F
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0		0		0		6.2		3.5		34		2.4		3.0	
Toluene	µg/L	0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0.45	F	1.2		0.22	F	0		5.6		2.0		41		3.9		7.3	
Vinyl chloride	µg/L	41		68		0		0		0		0.30	F	0		0		0	
Arsenic	µg/L	4.4	F	3.0	F	0		0		0.30	F	0		0		0		0	
		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q24-Month 72		Q22-Month 66		Q22-Month 66		Q24-Month 72	

Note: 0 sample indicates a non-detect analyte value

Q24		Monitoring Wells									
Well ID		CS-MW1-LGR				CS-B3-MW01				CS-4	
Sample Date		10/18/2012		4/11/2013		10/18/2012		4/11/2013		10/18/2012	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	1.2		0.69		5.0		5.4			
Total Organic Carbon	mg/L	0		0		4.8		5.4			
Methane	µg/L	0		0		2,580		892			
Ethene	µg/L	0		0		5.4		0			
Ethane	µg/L	0		0		0		0			
Carbon Dioxide	µg/L	40,500		40,600		122,000		123,000			
Sulfate	mg/L	14		15		1.1		2.9			
Chloride	mg/L	9.2		8.8		12		12			
Ferrous Iron	mg/L	0		0		4.9		0.80	F		
Manganese	µg/L	0		0		164		158			
Hydrogen	nM	14		16							
Sulfide	mg/L	0		0		2.9	F	0			
Total Dissolved Solids	mg/L	290		308		510		598			
Benzene	µg/L	0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0	
Chloroform	µg/L	0		0.15	F	0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	20		20		0.49	F	0.21	F	0.32	F
Dichloroethene, trans-1,2-	µg/L	0.18	F	0.20	F	1.4		0.30	F	0	
Methylene chloride	µg/L	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0	
Tetrachloroethene	µg/L	13		15		0		0		1.3	F
Toluene	µg/L	0		0		0		0		0	
Trichloroethene	µg/L	31		33		0		0		1.1	
Vinyl chloride	µg/L	0		0		69		16		0	
Arsenic	µg/L	0		0		0.30	F	0			

Note: 0 sample indicates a non-detect analyte value

Table 24.4.4

SWMU B-3 Microbial Data Summary  
May 2012 - April 2013

<b>Trench Sump</b>			
<b>B3-T1-2</b>	<b>Sample Date:</b>	<b>10/17/2012</b>	<b>4/15/2013</b>
<b>Dechlorinating Bacteria</b>	<b>Units</b>		
Dehalococcoides spp (1)	cells/mL	1.28E+02	7.61E+03
<b>Functional Genes</b>	<b>Units</b>		
TCE R-Dase (1)	cells/mL	3.76E+01	6.89E+03
BAV1 VC R-Dase (1)	cells/mL	< 5.00E-01	1.55E+03
VC R-Dase	cells/mL	5.00E-01 F	2.19E+01
<b>B3-T6-2</b>	<b>Sample Date:</b>	<b>10/17/2012</b>	<b>4/15/2013</b>
<b>Dechlorinating Bacteria</b>	<b>Units</b>		
Dehalococcoides spp (1)	cells/mL	5.94E+03	8.71E+02
<b>Functional Genes</b>	<b>Units</b>		
TCE R-Dase (1)	cells/mL	9.34E+02	8.89E+02
BAV1 VC R-Dase (1)	cells/mL	1.51E+02	3.63E+02
VC R-Dase	cells/mL	4.00E+00	3.00E-01 F

<b>Extraction Wells</b>			
<b>CS-MW16-LGR</b>	<b>Sample Date:</b>	<b>10/16/2012</b>	<b>4/11/2013</b>
<b>Dechlorinating Bacteria</b>	<b>Units</b>		
Dehalococcoides spp (1)	cells/mL	< 5.00E-01	< 5.00E-01
<b>Functional Genes</b>	<b>Units</b>		
TCE R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01
BAV1 VC R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01
VC R-Dase	cells/mL	< 5.00E-01	< 5.00E-01

<b>Monitoring Wells</b>			
<b>CS-MW1-LGR</b>	<b>Sample Date:</b>	<b>10/18/2012</b>	<b>4/11/2013</b>
<b>Dechlorinating Bacteria</b>	<b>Units</b>		
Dehalococcoides spp (1)	cells/mL	4.00E-01 F	< 5.00E-01
<b>Functional Genes</b>	<b>Units</b>		
TCE R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01
BAV1 VC R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01
VC R-Dase	cells/mL	< 5.00E-01	< 5.00E-01





Table 24.6.2

B-3 Bioreactor Extraction Well VOC Summary  
May 2012 - April 2013

Q24 Date	16-LGR		16-CC		EXW01	EXW02	EXW03		EXW04		EXW05	
	10/16/2012	4/11/2013	10/16/2012	4/11/2013	10/16/2012	10/16/2012	1/16/2013	4/5/2013	1/16/2013	4/5/2013	1/16/2013	4/5/2013
PCE (µg/L)	125	133	0.74	0.62	128	90	107	96	163	157	17	22
TCE (µg/L)	154	161	13	11	162	111	102	99	255	220	51	50
cis-1,2-DCE (µg/L)	156	157	22	20	211	110	104	122	185	206	23	28
trans-1,2-DCE (µg/L)	0.19	0.30	6.8	7.9	0.94	0.55	2.4	0.74	3.2	1.4	0.22	0.35
Vinyl chloride (µg/L)	0.40	0	0	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0		0		0		0
PCE (nM/L)	756.558	804.076	4.462	3.739	774.046	540.493	646.023	577.821	981.366	944.642	103.600	132.063
TCE (nM/L)	1169.495	1226.349	99.247	82.655	1231.829	845.041	779.359	753.863	1938.656	1677.677	385.341	377.198
cis-1,2-DCE (nM/L)	1605.467	1615.059	224.239	202.166	2177.927	1131.924	1076.431	1259.103	1906.447	2125.632	241.155	289.634
trans-1,2-DCE (nM/L)	1.960	3.094	70.242	81.176	9.696	5.673	24.858	7.633	33.522	14.853	2.269	3.610
Vinyl chloride (nM/L)	6.399	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000		0.000		0.000		0.000
Total Molar Conc. (nM/L)	3539.88	3648.6	398.19	369.74	4193.50	2523.13	2526.67	2598.42	4859.99	4762.80	732.37	802.50
% moles PCE	21.4%	22.0%	1.1%	1.0%	18.5%	21.4%	25.6%	22.2%	20.2%	19.8%	14.1%	16.5%
% moles TCE	33.0%	33.6%	24.9%	22.4%	29.4%	33.5%	30.8%	29.0%	39.9%	35.2%	52.6%	47.0%
% moles cis-1,2-DCE	45.4%	44.3%	56.3%	54.7%	51.9%	44.9%	42.6%	48.5%	39.2%	44.6%	32.9%	36.1%
% moles trans-1,2-DCE	0.1%	0.1%	17.6%	22.0%	0.2%	0.2%	1.0%	0.3%	0.7%	0.3%	0.3%	0.5%
% moles Vinyl Chloride	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 24.6.3

B-3 Bioreactor Extraction Well Analytical Summary  
May 2012 - April 2013

Q24		Extraction Wells																								
Well ID	Compound	Units	CS-MW16-LGR				CS-MW16-CC				B3-EXW01		B3-EXW02		B3-EXW03			B3-EXW04			B3-EXW05					
			10/16/2012	4/11/2013	10/16/2012	4/11/2013	10/16/2012	4/11/2013	10/16/2012	4/11/2013	10/16/2012	4/11/2013	1/16/2013	4/5/2013	1/16/2013	4/5/2013	1/16/2013	4/5/2013	1/16/2013	4/5/2013						
Sample Date			Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag				
	Dissolved Organic Carbon	mg/L	0.31	F	1.8		0		0.17	F	0.25	F	0.31	F			1.4				1.2		0.14	F		
	Total Organic Carbon	mg/L	0		0.24	F	0		0.56		0.33	F	0				1.3				0.56		0.38	F		
	Methane	µg/L	6.8		1.9		7.5		6.9		0		0				0				0		0			
	Ethene	µg/L	0		0		0		0		0		0				0				0		0			
	Ethane	µg/L	0		0		0		0		0		0				0				0		0			
	Carbon Dioxide	µg/L	43,200		33,500		35,000		26,700		52,300		44,900				60,800				30,800		22,500			
	Sulfate	mg/L	17		17		74		71		11		13				19				8.9		14			
	Chloride	mg/L	10		10.0		18		18		12		12				21				13		9.5			
	Ferrous Iron	mg/L	0		0		0.33	F	0.22	F	0		0				0.38	F			0.37	F	0.34	F		
	Manganese	µg/L	0		0		0		0		0		0				44				0		0			
	Hydrogen	nM	8.6		16																					
	Sulfide	mg/L	0		0		0		0		0		0				0				0		0			
	Total Dissolved Solids	mg/L	313		330		398		418		334		335		408		386		330		327		315		302	
	Benzene	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Chloroform	µg/L	0.12	F	0.18	F	0		0		0.15	F	0.17	F	0.25	F	0.13	F	0.28	F	0.25	F	0.16	F	0.16	F
	Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0.19	F	0			
	Dichloroethene, cis-1,2-	µg/L	156		157		22		20		211		110		104		122		185		206		23		28	
	Dichloroethene, trans-1,2-	µg/L	0.19	F	0.30	F	6.8		7.9		0.94		0.55	F	2.4		0.74		3.2		1.4		0.22	F	0.35	F
	Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Tetrachloroethene	µg/L	125		133		0.74	F	0.62	F	128		90		107		96		163		157		17		22	
	Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0			
	Trichloroethene	µg/L	154		161		13		11		162		111		102		99		255		220		51		50	
	Vinyl chloride	µg/L	0.40	F	0		0		0		0		0		0		0		0		0		0			
	Arsenic	µg/L	0		0		0.90	F	1.1	F	0		0				0				0		0			

Note: 0 sample indicates a non-detect analyte value

B3-MW-26								
Elev (ft. MSL)		Total Depth: 20.32 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1300	12.06	6.56	19.53	0.623	0.82	-5.90	1226.43
10/15/2012	1020	12.03	6.46	21.79	0.815	0.38	-170.00	1226.46
4/12/2013	915	12.87	6.77	17.45	0.709	0.61	172.90	1225.62

B3-MW-28								
Elev (ft. MSL)		Total Depth: 18.32 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012		Dry						Dry
10/15/2012	1046	18.30						-18.30
4/12/2013		Dry						Dry

B3-MW-30								
Elev (ft. MSL)		Total Depth: 23.90 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1010	21.56	6.68	20.72	0.619	4.16	143.3	-21.56
10/15/2012	1120	22.33	6.65	21.88	0.786	3.34	118.2	-22.33
4/12/2013	1015	23.10	6.93	19.7	0.797	5.58	173.8	-23.10

B3-MW-32								
Elev (ft. MSL)		Total Depth: 58.45 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1340	39.17	6.78	21.01	0.485	5.77	81.4	-39.17
10/15/2012	1320	38.62	6.76	20.99	0.594	3.49	132.7	-38.62
4/12/2013	1100	40.24	7.12	21.83	0.626	6.09	122.2	-40.24

B3-MW-34								
Elev (ft. MSL)		Total Depth: 25.40 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1315	17.31	6.64	21.35	0.569	0.50	5.7	-17.31
10/15/2012	950	17.02	6.55	21.90	0.720	0.35	-170.4	-17.02
4/12/2013	1150	18.10	6.93	21.24	0.712	2.64	30.5	-18.10

B3-MW-27								
Elev (ft. MSL)		Total Depth: 17.00 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1115	7.70	6.77	19.69	0.522	2.36	118.7	-7.70
10/15/2012	1040	7.94	6.59	24.88	0.713	0.35	-86.9	-7.94
4/12/2013	940	8.41	6.82	19.20	0.707	0.25	25.0	-8.41

B3-MW-29								
Elev (ft. MSL)		Total Depth: 20.40 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1050	19.16	6.67	19.80	0.58	4.31	105.50	-19.16
10/15/2012	1052	19.48	6.62	21.43	0.77	1.82	67.50	-19.48
4/12/2013	1000	20.02						-20.02

B3-MW-31								
Elev (ft. MSL)		Total Depth: 39.06 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1025	33.15	6.61	21.47	0.681	0.63	51.8	-33.15
10/15/2012	1140	32.89	6.55	21.51	0.759	2.66	128.7	-32.89
4/12/2013	1040	34.89	6.90	20.95	0.815	2.83	58.2	-34.89

B3-MW-33								
Elev (ft. MSL)		Total Depth: 29.55 feet BTOC						
Sample Date	Sample Time	Depth to H <sub>2</sub> O (ft. BTOC)	pH	Temperature (°C)	Specific Conductivity (m-mho/cm)	Dissolved Oxygen (mg/L)	ORP (eV)	H <sub>2</sub> O Elevation (feet)
4/16/2012	1355	21.46	6.58	20.42	0.603	2.50	95.5	-21.46
10/15/2012	1345	20.90	6.70	20.95	0.876	0.28	-234.2	-20.90
4/12/2013	1130	23.03	6.90	21.06	0.732	3.44	159.1	-23.03

Q24		Shallow UGR Wells													
Well ID		B3-MW26-UGR				B3-MW27-UGR				B3-MW29-UGR		B3-MW30-UGR			
Sample Date		10/15/2012		4/12/2013		10/15/2012		4/12/2013		10/15/2012		10/15/2012		4/12/2013	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	3.5		2.4		1.9		3.3		4.0		2.5		3.6	
Total Organic Carbon	mg/L	3.1		2.5		2.6		2.5		5.0		2.0		4.9	
Methane	µg/L	5,040		198		438		1,250		0		0		0	
Ethene	µg/L	13		0		2.0	F	2.6	F	0		0		0	
Ethane	µg/L	5.7		0		0.80	F	1.7	F	0		0		0	
Carbon Dioxide	µg/L	231,000		58,700		139,000		102,000		102,000		80,700		72,300	
Sulfate	mg/L	22		25		14		16				37		46	
Chloride	mg/L	15		15		23		15				12		13	
Ferrous Iron	mg/L	1.7		0		0.68	F	0.36	F			3.2			
Manganese	mg/L	214		587		75		148		125		335		138	
Sulfide	mg/L	0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	478		425		419		446				463		486	
Benzene	µg/L	0.19	F	0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	67		87		10		31		0		6.0		0.22	F
Dichloroethene, trans-1,2-	µg/L	4.9		2.5		1.6		1.3		0		0		0	
Methylene chloride	µg/L	0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	4.4		0.32	F	0		0		1.4	F	17		5.8	
Toluene	µg/L	0		0		0		0		0		0.35	F	0.37	F
Trichloroethene	µg/L	5.7		2.4		0		0		1.1		6.3		0.77	F
Vinyl chloride	µg/L	18		15		8.1		19		0		0		0	
Arsenic	µg/L	0.50	F	0.70	F	0		0		1.4	F	3.0	F	0.50	F

Note: 0 sample indicates a non-detect analyte value

Q24		Shallow UGR Wells															
Well ID		B3-MW31-UGR				B3-MW32-UGR				B3-MW33-UGR				B3-MW34-UGR			
Sample Date		10/15/2012		4/12/2013		10/15/2012		4/12/2013		10/15/2012		4/12/2013		10/15/2012		4/12/2013	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	1.4		3.1		1.7		1.4		1.4		2.9		5.3		2.8	
Total Organic Carbon	mg/L	1.2		3.2		1.5		1.2		1.4		3.0		5.1		3.9	
Methane	µg/L	1.0		0		0		0		12		0		5,550		1,230	
Ethene	µg/L	0		0		0		0		0		0		19		6.3	
Ethane	µg/L	0		0		0		0		0		0		6.7		2.3	
Carbon Dioxide	µg/L	117,000		105,000		62,800		56,500		93,700		89,100		186,000		80,400	
Sulfate	mg/L	100		83		14		18		87		25		13		12	
Chloride	mg/L	9.5		10		10		12		11		12		16		17	
Ferrous Iron	mg/L	1.8		0.89	F	0.19	F	1.4		3.6		0		1.0		0.59	F
Manganese	mg/L	162		132		21		267		188		1,690		956		959	
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	566		518		346		378		530		444		418		430	
Benzene	µg/L	0		0		0		0		0		0		0		0.22	F
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		1.4		0	
Dichloroethene, cis-1,2-	µg/L	9.6		10		32		178		16		7.0		639		87	
Dichloroethene, trans-1,2-	µg/L	2.2		1.2		0		0.81		1.9		0.21	F	8.5		2.9	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	11		8.0		13		28		15		12		79		0.35	F
Toluene	µg/L	0		0		0		0		0.19	F	0		0		0	
Trichloroethene	µg/L	4.9		3.2		6.0		21		8.0		4.2		96		0.16	F
Vinyl chloride	µg/L	0		0		0		0.43	F	2.1		0		63		54	
Arsenic	µg/L	1.2	F	0		0		4.5	F	0.80	F	0		1.8	F	3.2	F

Note: 0 sample indicates a non-detect analyte value