

**CSSA B-3 BIOREACTOR OPERATIONS  
ANNUAL PERFORMANCE STATUS REPORT  
(QUARTER 17 – QUARTER 20, MAY 2011 – APRIL 2012)**

**JUNE 29, 2012**

---

---

This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from May 2011 through April 2012, comprising the fifth 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, William Martin, and Erin Atkinson.

***Executive Summary***

Site conditions were mixed through the year. Drought conditions persisted from May through October (~7.7 inches of precipitation) followed by moderate conditions from November through April (~12.96 inches of precipitation) for a reported total of 20.66 inches of precipitation on Post for the year. Injection of extracted groundwater continued through the year with few interruptions. Minor interruptions include: winterizing, system maintenance, reaching automatic cut-off levels in the wells and/or storage tank, and B-3 bioreactor system upgrade activities. During the year, approximately 17,384,981 gallons of groundwater extracted from CS-MW16-LGR, CS-MW16-CC, B3-EXW01, and B3-EXW02 were injected into bioreactor trenches 1 and 6 for a total of 58,784,270 gallons since the start of normal operations. During quarter 20, a total of 5,310,378 gallons of extracted groundwater from wells CS-MW16-LGR, CS-MW16-CC, B3-EXW01 and B3-EXW02 were injected into the bioreactor. The majority of extracted groundwater, ~1,421,605 gallons, was from CS-MW16-CC, while ~792,840 gallons was extracted from CS-MW16-LGR, ~1,151,176 gallons was extracted from B3-EXW02, and ~831,887 gallons were extracted from CS-B3-EXW01.

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 1 sumps provide evidence that biotic and abiotic dechlorination of tetrachloroethene (PCE) and trichloroethene (TCE) is occurring. The consistent 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***

Monthly and quarterly analytical results throughout the year at the bioreactor sumps indicate that SWMU B-3 trenches contain a range of *cis*-DCE levels (0.40 – 339 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 5) is included in Table 1. A summary of monthly and quarterly 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 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 and TCE, while *cis*-DCE was detected in concentrations less than 100 µg/L in CS-WB07 and greater than 100 µg/L in CS-WB05, CS-WB06 and CS-WB08. Well CS-WB06 contains greater than 100 µg/L of PCE, TCE, and *cis*-DCE. Groundwater from CS-MW16-LGR and B3-EWX01 contain greater than 100 µg/L of PCE, TCE, and *cis*-DCE while CS-MW16-CC contains less than 100 µg/L of PCE, TCE, and *cis*-DCE.

Volatile organic carbon (VOC) analytical results from bioreactor trench sumps samples indicate a decrease in contaminant mass (total molar concentration) in trench sumps T1-2 and T6-1 through the year. Increases in total molar concentrations were observed in samples from T1-1, T1-3 and T6-2 through the year. Over the bioreactor operational period (5 years), contaminant mass appears stable or decreasing.

Water quality field measurements from the bioreactor trench 1 sumps indicate that DO has risen slightly from the previous quarter to an average of 0.12 mg/L, ORP has fallen since the previous quarter, averaging -47.9 mV, pH ~6.86, temperatures range from ~18 °C to ~24 °C, and specific conductivity ranges from ~0.402 to ~1.236 millisiemens per centimeter (mS/cm). Average annual values for DO, pH, ORP, and specific conductivity in trench 1 during the fifth year of bioreactor operations include: 0.29 mg/L, 6.49, -47.90 mV, and 0.819 mS/cm, respectively. Other observations regarding the data collected during this reporting period are listed below.

Water quality field measurements from trench 6 during the twentieth quarter include average DO, pH, and ORP of ~0.31 mg/L, ~6.58, and ~ -84.43 mV, respectively; temperature ranges from 21.82 °C to 27.99 °C; and specific conductivity ranges from 0.441 to 1.851 mS/cm.

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 107 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, MW-30 and MW-33 were also dry at various times through the year. 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, 31 and 34, while MW-27 showed fair reducing conditions and MW-32 and MW-33 showed poor reducing conditions. MW-29 and MW-30 did not have enough water for consistent readings.

Through the 20<sup>th</sup> quarter of bioreactor operation, 5.88 inches of precipitation were measured at the weather station proximal to the bioreactor site for a reported total of 20.66 inches for the year. Average water thickness in trench 1 during the quarter was approximately 5.07 feet. Average water thickness in trench 6 during the quarter was approximately 1.65 feet. Average water thicknesses in trenches 1 and 6 for the year were 4.91 and 0.57 feet, respectively.

Attached are graphs including: cumulative total volume of recovered groundwater from CS-MW16-LGR, CS-MW16-CC, and B3-EXW01 applied into trenches 1, 2 and 6 through the O&M period, B-3 trench 1 average water thickness with rainfall data and water applied daily to trench 1, 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 20 - Analytical Data Observations***

1. Arsenic (As) was detected in concentrations exceeding the MCL (10 µg/L) in one sump, T1-1 (18 µg/L) and one Westbay well zone, CS-WB05-LGR04B (11.0 µg/L) during Period 40. Manganese (Mn) was reported in bioreactor trench water samples at concentrations ranging from 5.3 to 630 µg/L (MCL is 50 µg/L). All of the shallow UGR wells sampled during the year (8 of 9) had, at some point, elevated levels of Mn. During the quarter, samples from 5 of 7 UGR wells indicated elevated levels of Mn, with concentrations ranging from 62 to 771 µg/L. One of the shallow UGR wells did not produce enough water to sample during quarter 20. An elevated level of Mn was reported in CS-B3-MW01 (148 µg/L) during this quarter. Elevated levels of Mn were reported in CS-WB05-LGR-04B (51.0 µg/L), CS-WB08-UGR-01 (542 µg/L) and CS-WB07-LGR-01 (1020 µg/L), all other 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 more favorable for the reduction of CAHs compared with the previous quarter, 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 6.

5. Saturated conditions within the bioreactor were maintained through the quarter with average water thicknesses of approximately 5.07 and 1.65 feet in trenches 1 and 6, respectively, and annually with average water thicknesses of 4.91 and 0.57 feet 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 the shallow UGR wells MW26, -27, -32, -33 and -34, (39, 0.76, 0.46, 1.3 and 35 µg/L). VC is also present in CS-WB05-LGR03A, CS-WB05-LGR03B, CS-WB05-LGR-04A, CS-WB05-LGR-04B, CS-WB05-BS-01, CS-WB05-CC-02, CS-WB06-LGR-02, CS-WB06-LGR-04, CS-WB07-LGR-01, CS-WB07-LGR-02, CS-WB08-UGR-01 and CS-WB08-LGR-04 (23, 25, 49, 220, 7.7, 0.43, 0.45, 0.84, 27, 48, 56, and 0.44 µg/L, respectively). Ethene is present in samples from MW26 and -34, and CS-WB05-LGR-04A, CS-WB-05-LGR-04B, CS-WB07-LGR-01, CS-WB07-LGR-02 and CS-WB08-UGR-01 (6.9, 9.4, and 2.2, 41, 4.8, 5.1, and 7.8 µg/L, respectively). Ethane is present in samples from MW26, -27 and -34, and WB08-UGR-01 (3.5, 3.6, 9.4 and 0.90 µg/L, respectively). Additionally, end products VC and ethene are observed at depth in the WB05-LGR-04A and -04B zones (49 µg/L VC and 2.2 µg/L ethene in -04A; and 220.0 µg/L VC and 41 µg/L ethene in -04B), as well as CS-B3-MW01 (209 µg/L VC and 19 µg/L ethene). These two wells are both located north of the bioreactor indicating reduction byproducts are migrating vertically in this area.

### ***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, 2012 – April, 2013):***

- 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 June 2013.
- Complete re-design and construction of various bioreactor system controls and components including: installation of a new storage tank(s), relocating system controls, and incorporating system instrumentation in SCADA, and trench upgrade and new extraction well hook –up.

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

- Analytical results from the B-3 trench sump (trenches 1 through 6) samples, shown in Table 20.1.2, present data from the fifth year of bioreactor operations as well as quarter 20 sampling events.
- Table 20.1.1 indicates an average water thickness of 5.07 feet was maintained during the quarter and an average water thickness of 4.91 feet was achieved during the year in

trench 1. Average water thicknesses in trench 6 were 1.65 and 0.57 feet for the quarter and the year, respectively.

- Table 20.1.2 indicates that VC was present at variable concentrations in trench sumps, ranging from non-detect to 7.2 µg/L during the year and the quarter. Ethene was observed in concentrations ranging from ND to 6.5 µg/L in trench 1, and non-detect to 2.9 µg/L in trench 6 through the year.
- Table 20.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 20.1.3 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 2.8 µg/L in trench 1, and ND to 1.7 µg/L in trench 6 during the quarter. Ethane was detected in samples from sumps T1-1 and T6-2 in concentrations ranging from 2.8 to 1.7 µg/L (when detected). Samples from trench sumps T1-2, T1-3 and T6-1 did not indicate the presence of ethane.
- Table 20.3.3 indicates that VC was present (209 µg/L) in the sample collected from monitoring well CS-B3-MW01. Table 20.2.3a indicates VC concentrations of 49 µg/L in WB05-LGR04A and 220 µg/L in WB05-LGR04B, suggesting a connection between this zone and CS-B3-MW01. Ethene was observed in WB05-LGR04B during the quarter (41 µg/L).
- Table 20.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are low to moderate in the trench sumps.
- The changes in molar fraction and total molar concentrations shown in graphs of quarter 20 trench sumps indicate an increase in contaminant mass possibly derived from less-dechlorinated (higher proportion of PCE and TCE) water provided by B3-EXW01 and EXW02 (Table 20.6.2). Dechlorination of VOC impacted water to VC and ethene, however, is still occurring in the trenches.
- Table 20.6.3 indicates that significant amounts of contaminant mass are being provided for injection into the bioreactor by the four extraction wells. Parent products (PCE and TCE) make up the majority of the contaminant mass, though *cis*-DCE is also present.
- Figure 20.2.5 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 20.7.3 indicates the presence of VC in several of the shallow UGR wells with concentrations ranging from non-detect to 39 µg/L. Additionally, Table 20.7.3 provides evidence of the biotic anaerobic degradation pathway with the elevated concentrations of Mn and CO<sub>2</sub>.

## Analytical Summary Data

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

Event	VOCs	TDS	TOC	DOC	MEE & CO <sub>2</sub>	SO <sub>3</sub> <sup>-</sup>	Chloride, Sulfate	Fe <sup>2+</sup>	Mn	Metals*	H <sup>+</sup>	DHC
Monthly Sampling <sup>a</sup> (48)	✓	✓			✓			✓	✓	✓		
Monthly Sampling <sup>a</sup> (49)	✓	✓			✓			✓	✓	✓		
Quarterly Sampling <sup>b</sup> (17)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quarterly Sampling <sup>b</sup> (18)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quarterly Sampling <sup>c</sup> (19)	✓	✓										
Semi-Annual Sampling <sup>d</sup> (Quarter 20)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

a - Monthly sampling includes samples from B3-trench sumps, the uppermost saturated intervals of the multi-port wells (Zone 03B) and B3-UIC samples.

b - Quarterly sampling includes samples from B3-trench sumps, Monitoring Wells, Extraction Wells, and Multi-port (Westbay) wells.

c - Quarterly sampling includes samples from B3 trench sumps and Multi-port (Westbay) wells.

d - 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 20.1.2T1-1

**B3 Bioreactor Trench 1 Sump 1 VOC Summary  
Quarter 17 - Quarter 20**

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 T1-1

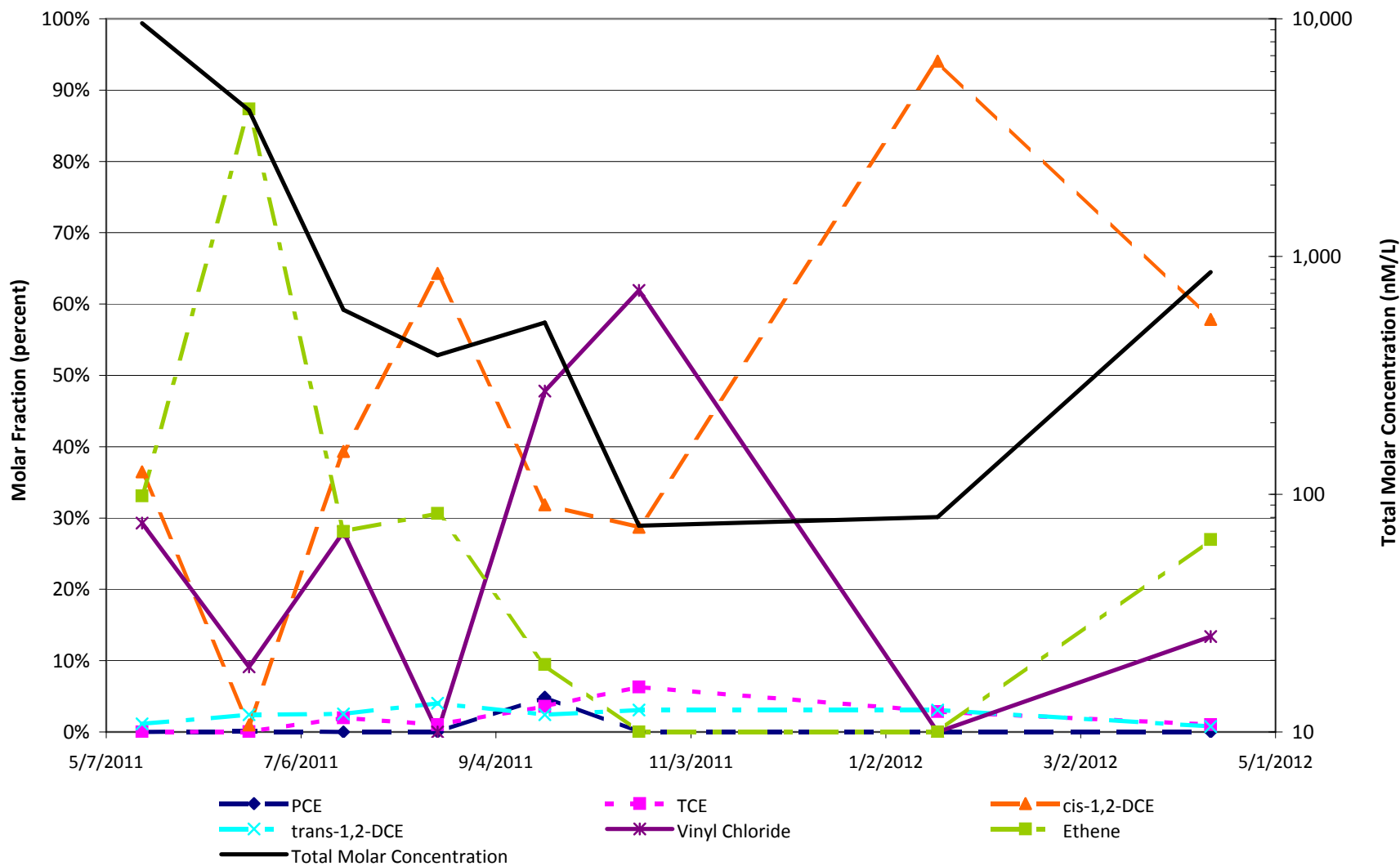




Figure 20.1.2T1-2

**B3 Bioreactor Trench 1 Sump 2 VOC Summary  
Quarter 17 - Quarter 20**

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 T1-2

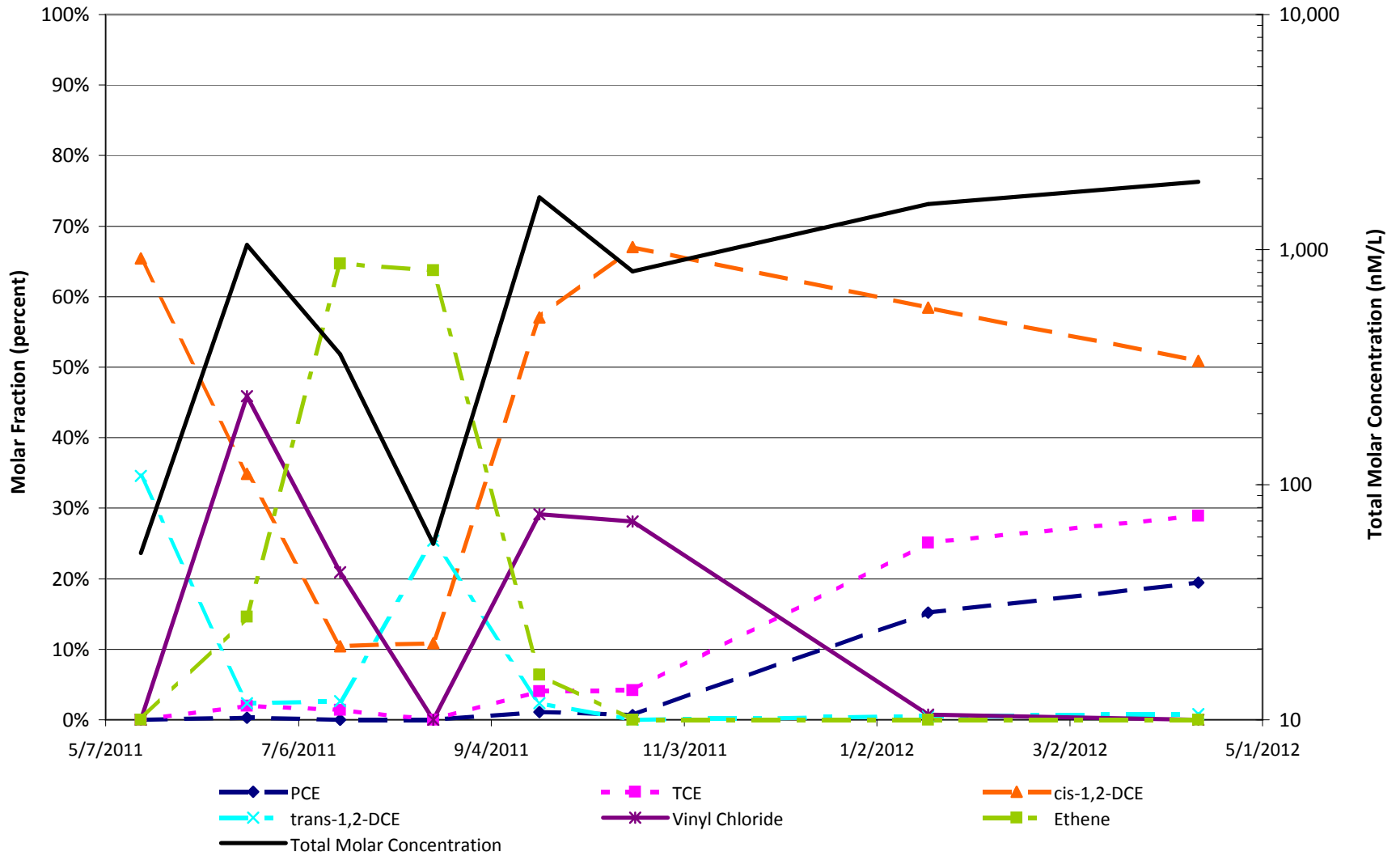


Figure 20.1.2T1-3

**B3 Bioreactor Trench 1 Sump 3 VOC Summary  
Quarter 17 - Quarter 20**

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 T1-3

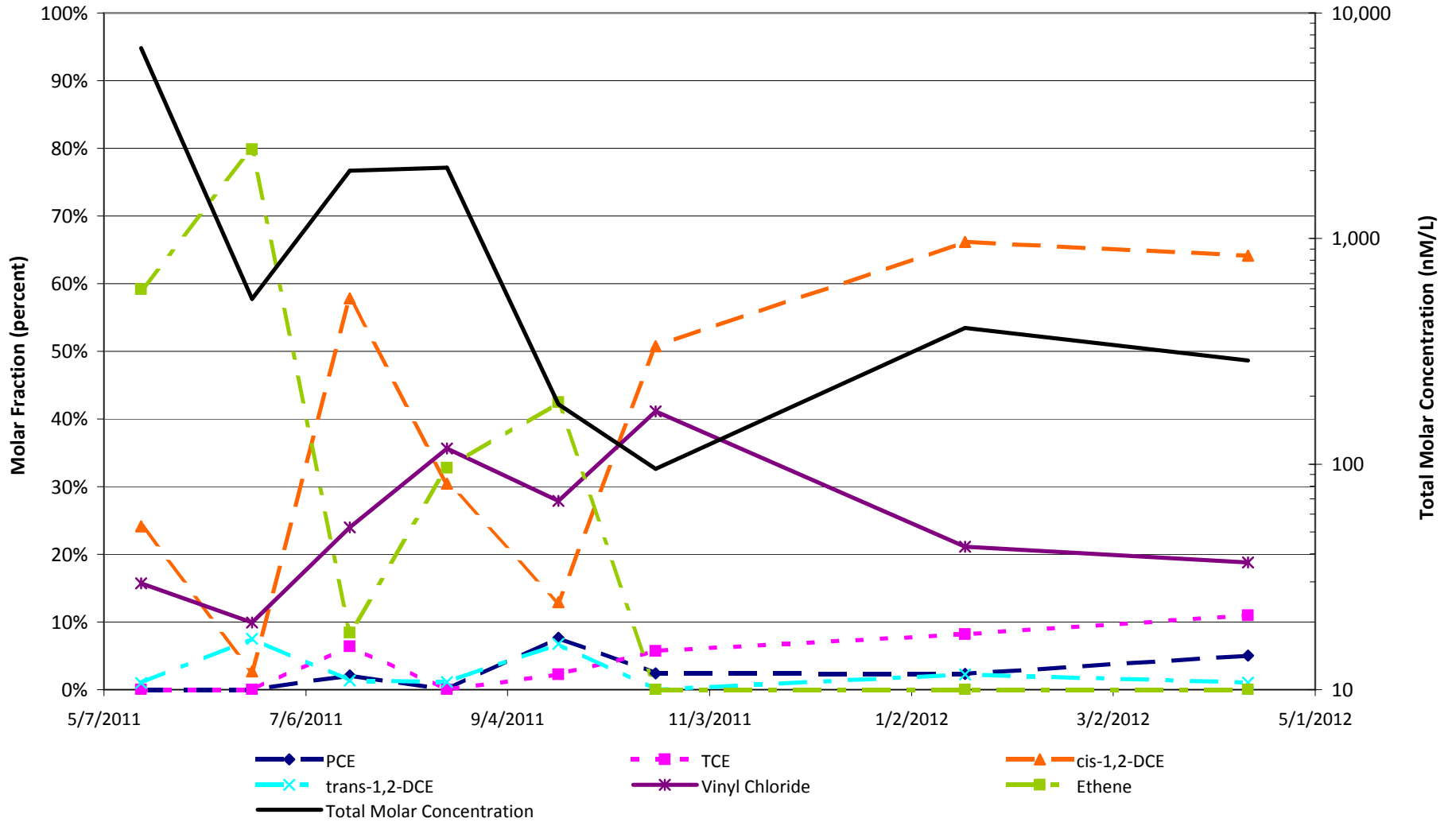


Figure 20.1.2T6-1

**B3 Bioreactor Trench 6 Sump 1 VOC Summary  
Quarter 17 - Quarter 20**

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 T6-1

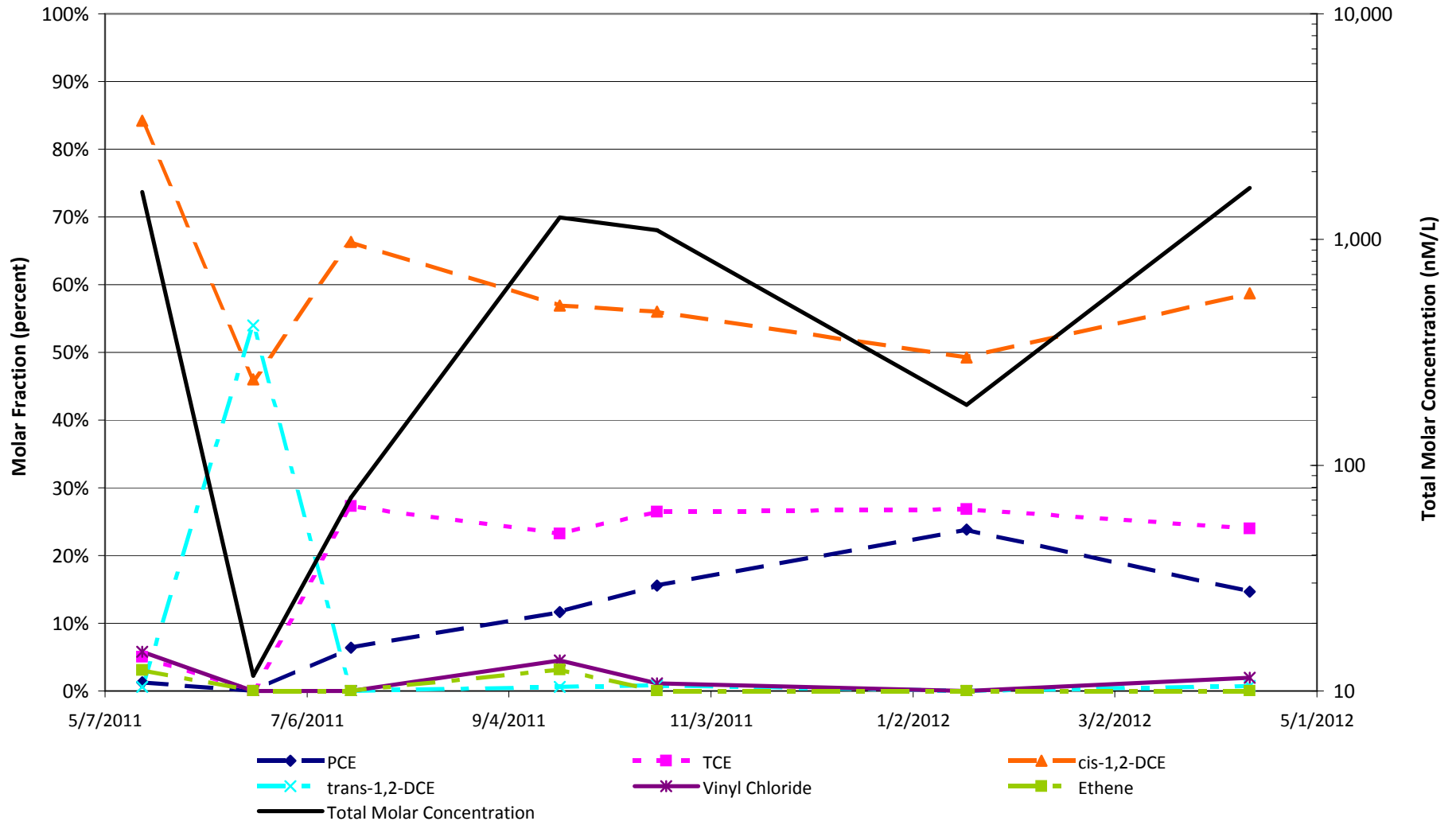


Figure 20.1.2T6-2

### B3 Bioreactor Trench 6 Sump 2 VOC Summary Quarter 17 - Quarter 20

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 T6-2

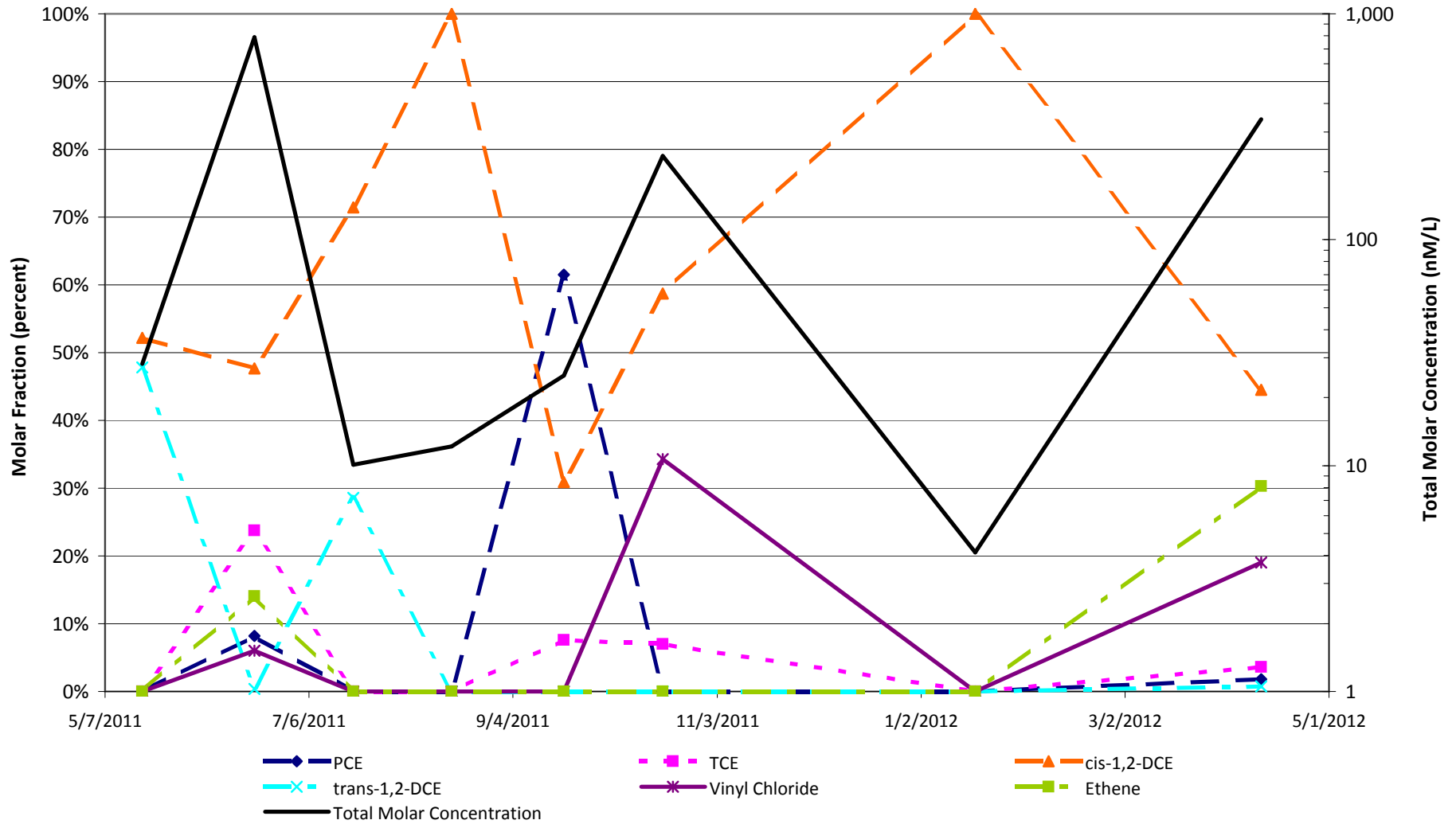


Figure 20.2.2a

### Changes in Mole Fraction and Total Molar Concentration at CS-WB05-LGR03B Quarter 17 - Quarter 20

CS-WB05-LGR03B

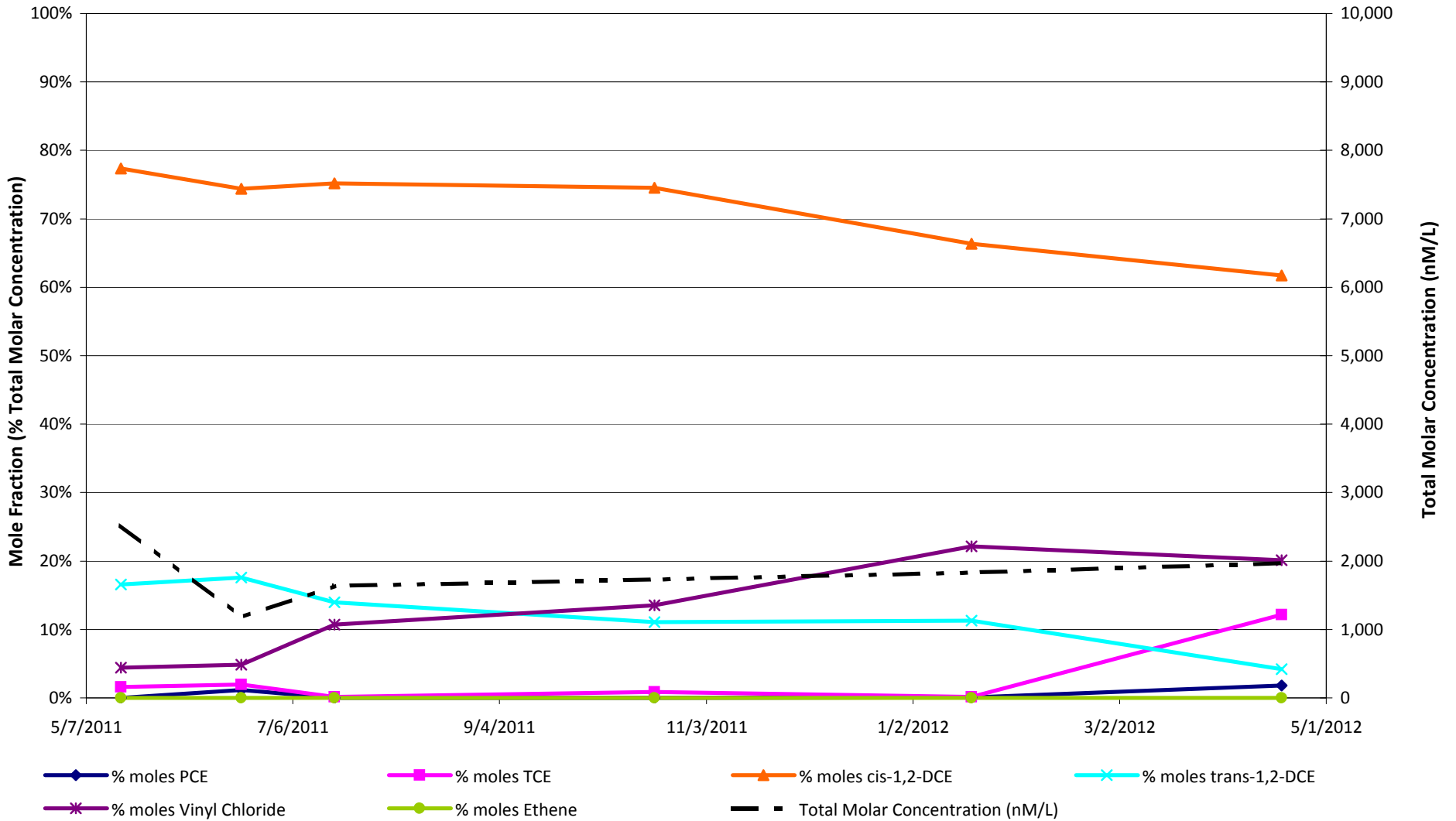


Figure 20.2.2b

Changes in Mole Fraction and Total Molar Concentration at CS-WB06-LGR03B  
Quarter 17 - Quarter 20

CS-WB06-LGR03B

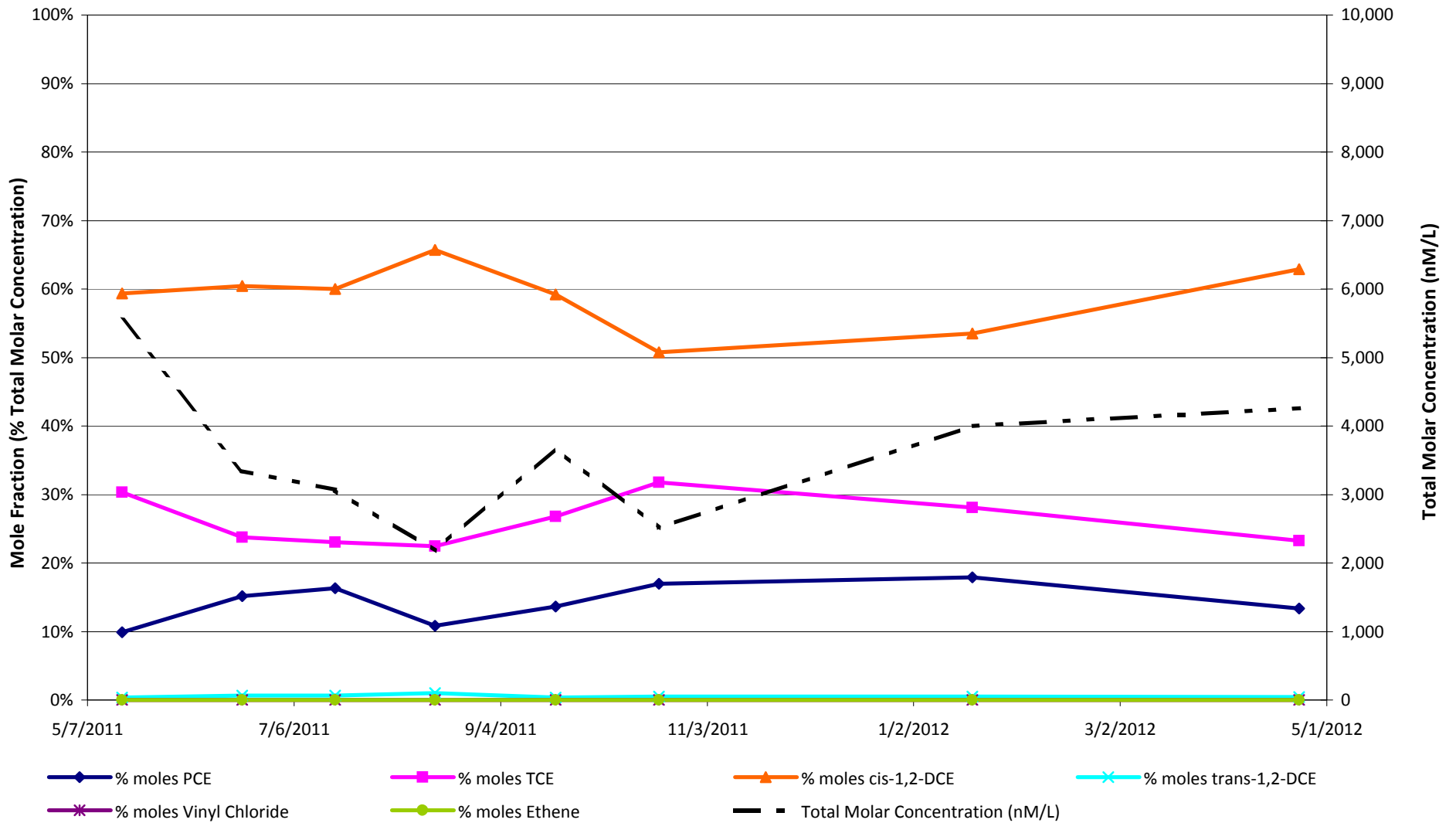


Figure 20.2.2c

Changes in Mole Fraction and Total Molar Concentration at CS-WB07-LBR03B  
Quarter 17 - Quarter 20

CS-WB07-LGR03B

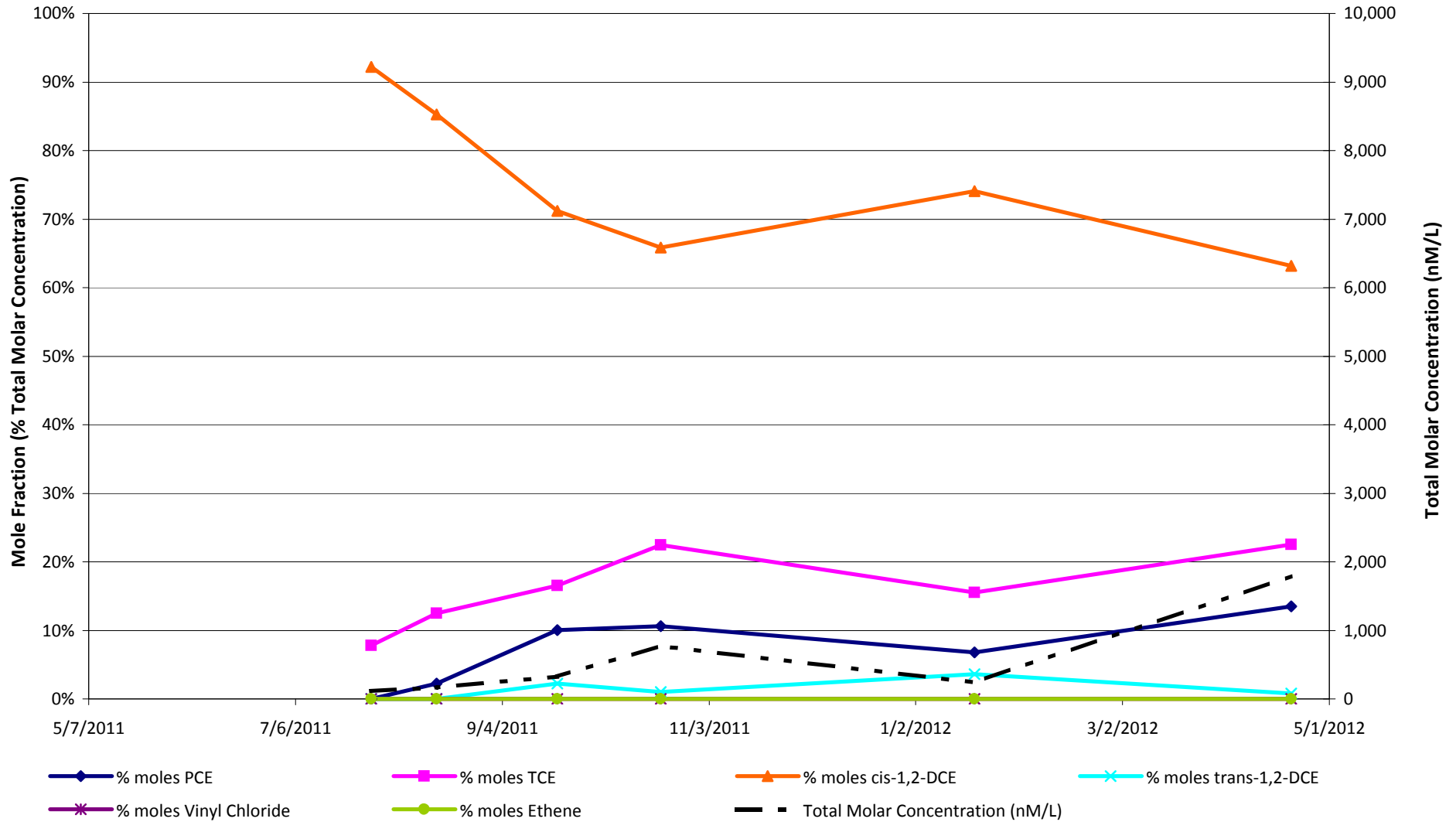


Figure 20.2.2d

### Changes in Mole Fraction and Total Molar Concentration at CS-WB08-LGR03B Quarter 17 - Quarter 20

CS-WB08-LGR03B

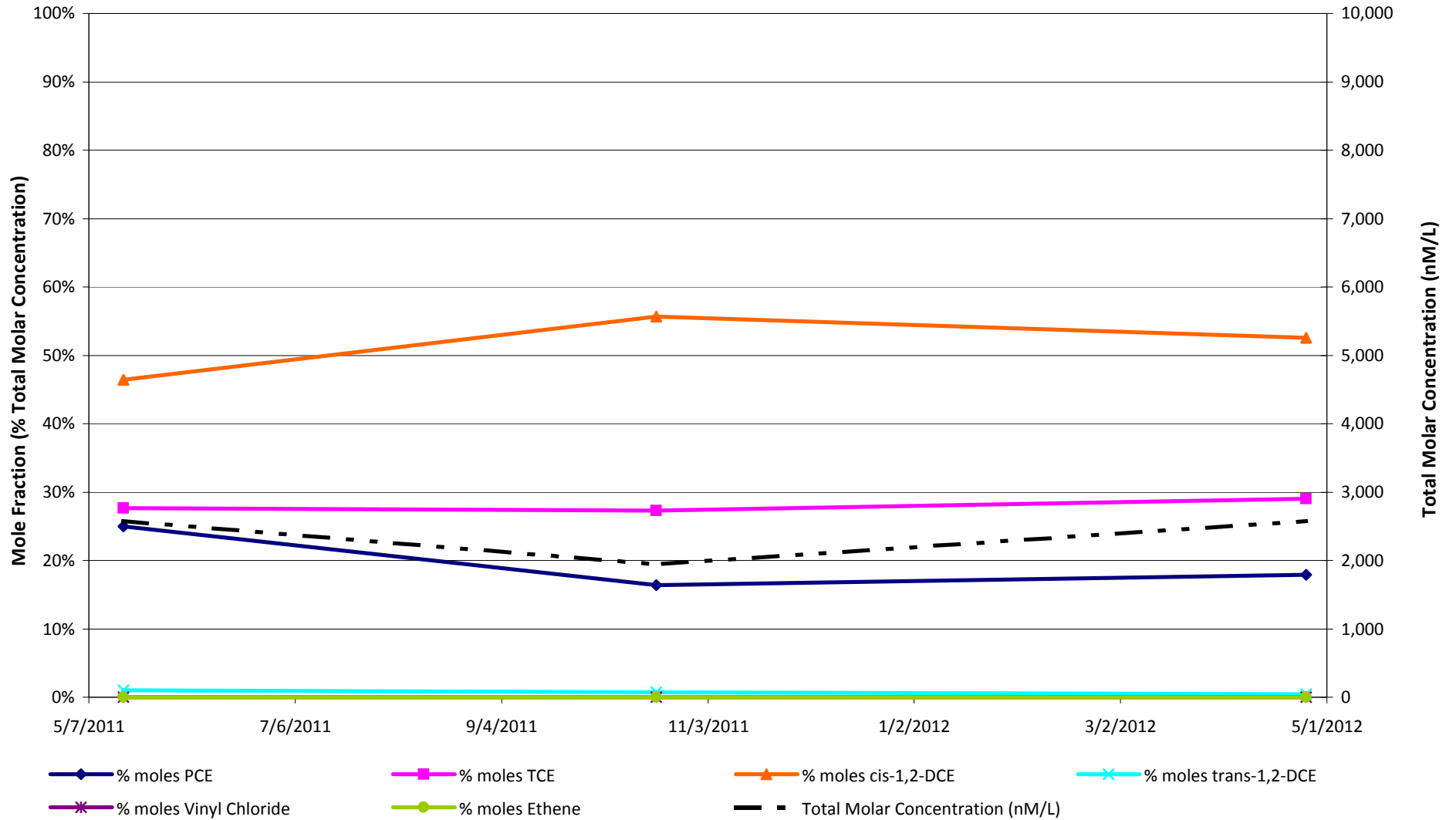




Figure 20.5.2

Changes in Mole Fraction and Total Molar Concentration at Storage Tank (UIC)

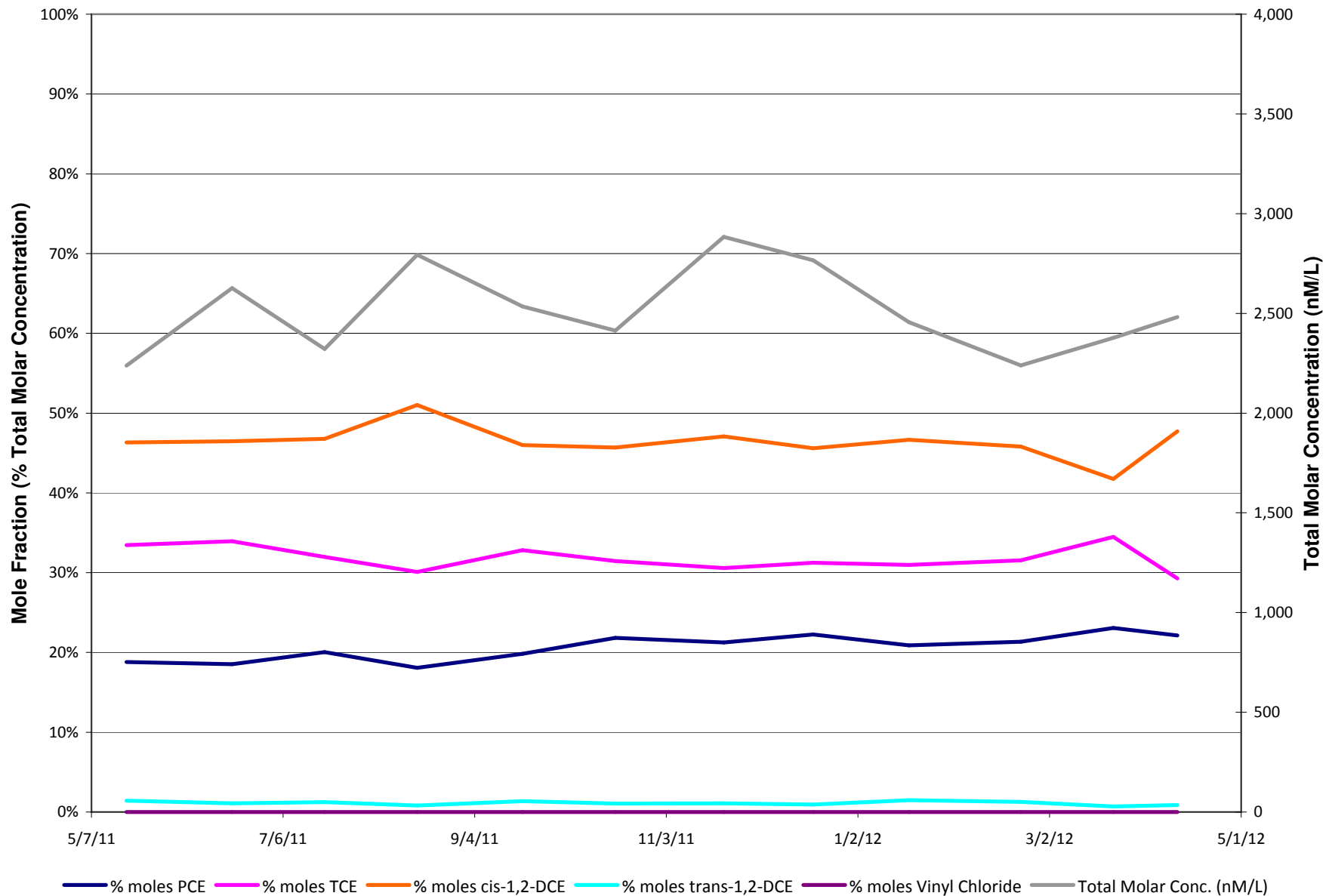


Figure 20.2.5

### Lower Glen Rose Groundwater Elevations (feet above MSL) Measured in Westbay Wells May 2009 - April 2012

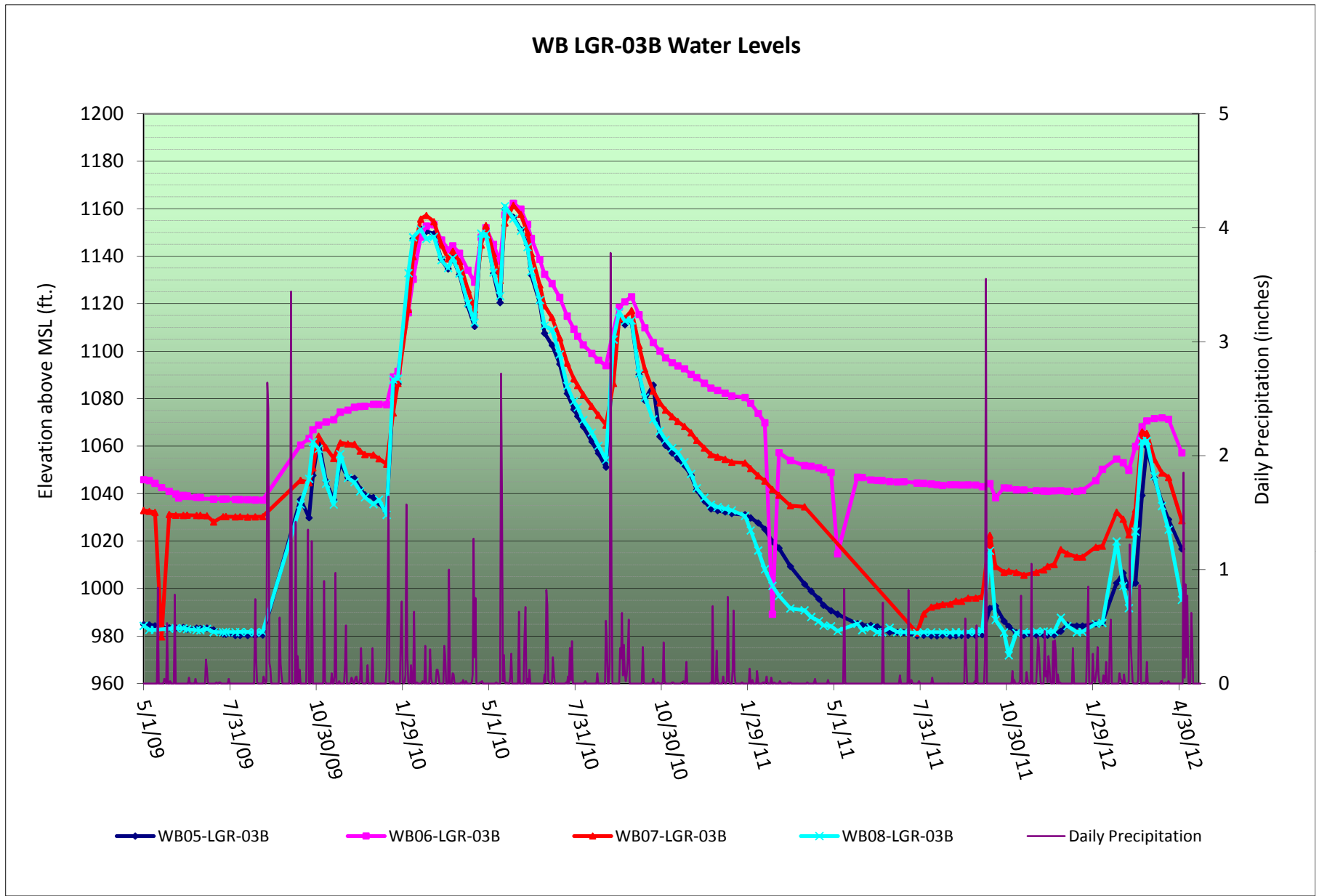


Figure 20.5.6

### SWMU B-3 Bioreactor -Trench 1

Average Water Thickness, Water Applied from Extraction wells, and Precipitation

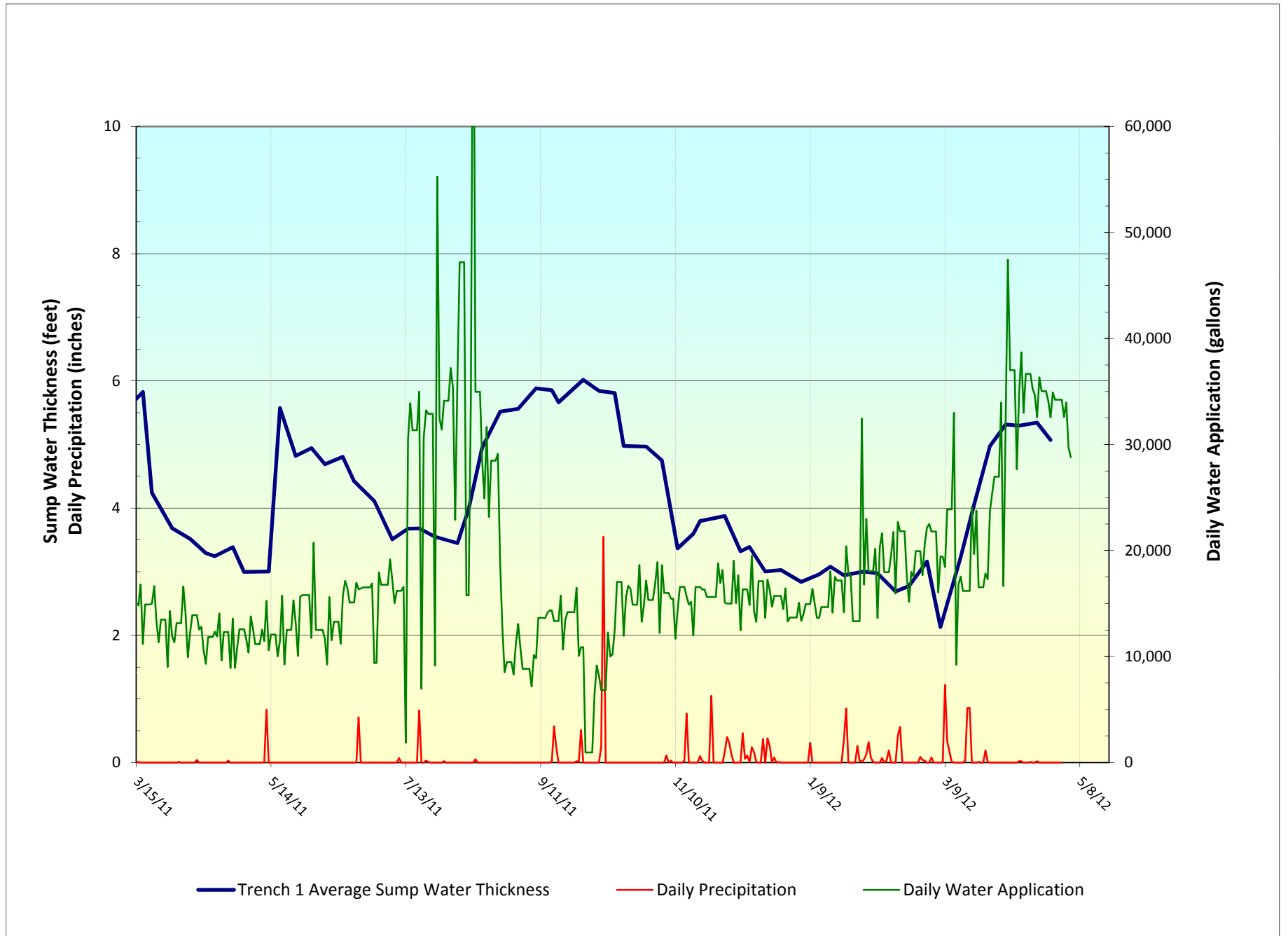
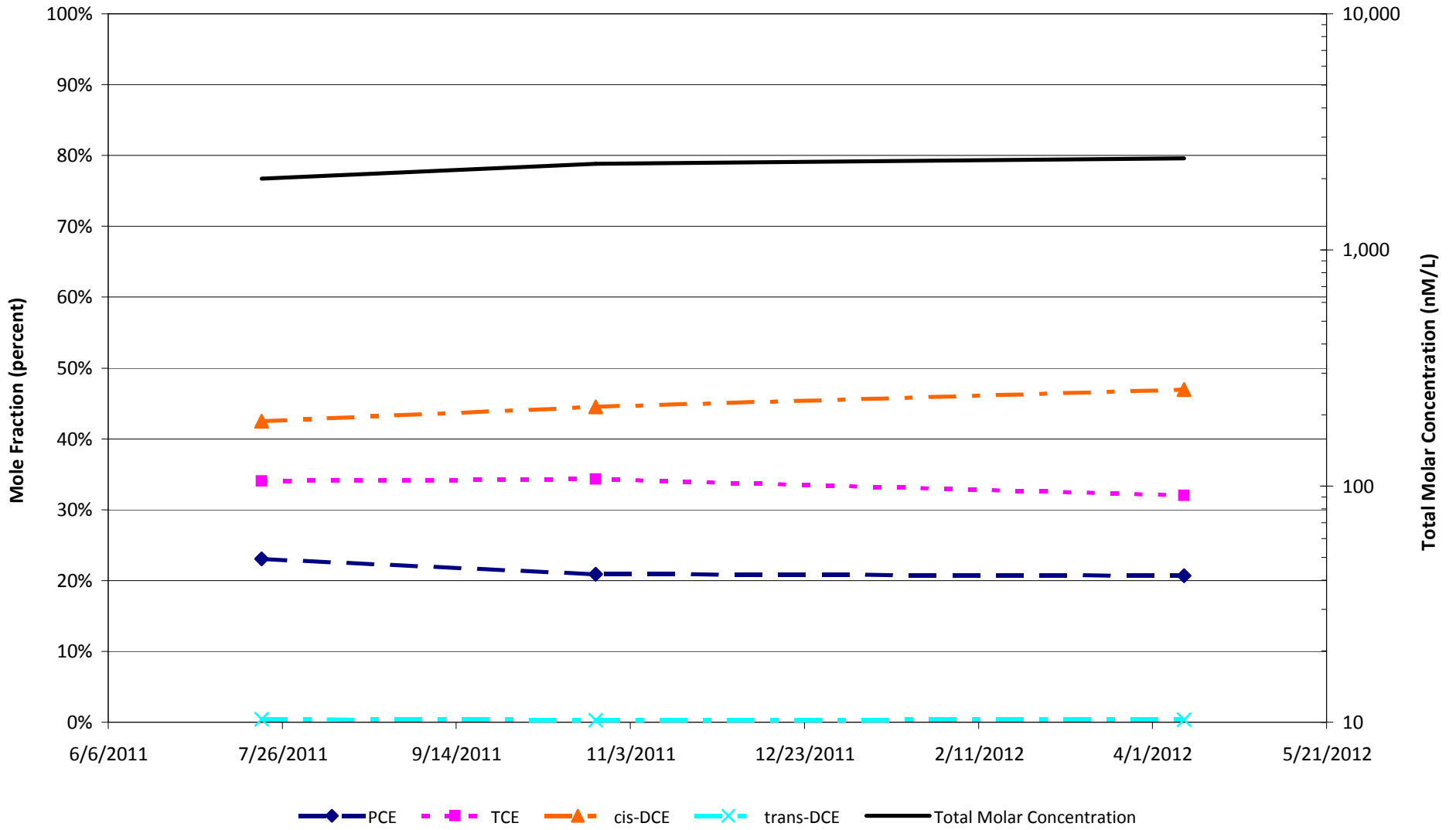


Figure 20.6.2-EXW02

B3-EXW-02 VOC Summary  
Quarter 17 - Quarter 20

Changes in Mole Fraction and Total Molar Concentration at CS-EXW-02



B3-EXW-01 VOC Summary  
Quarter 17 - Quarter 20

Changes in Mole Fraction and Total Molar Concentration at CS-EXW-01

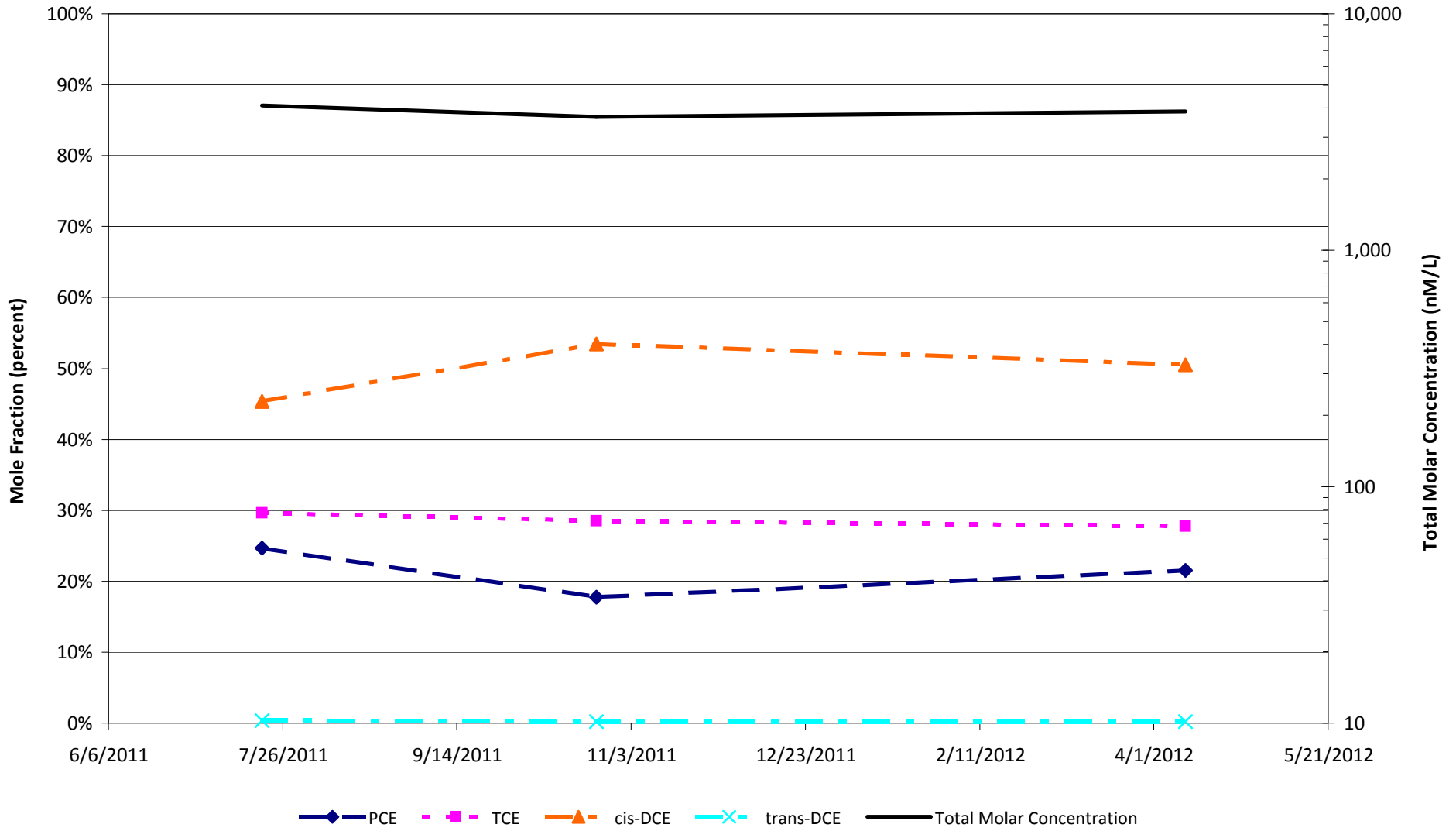
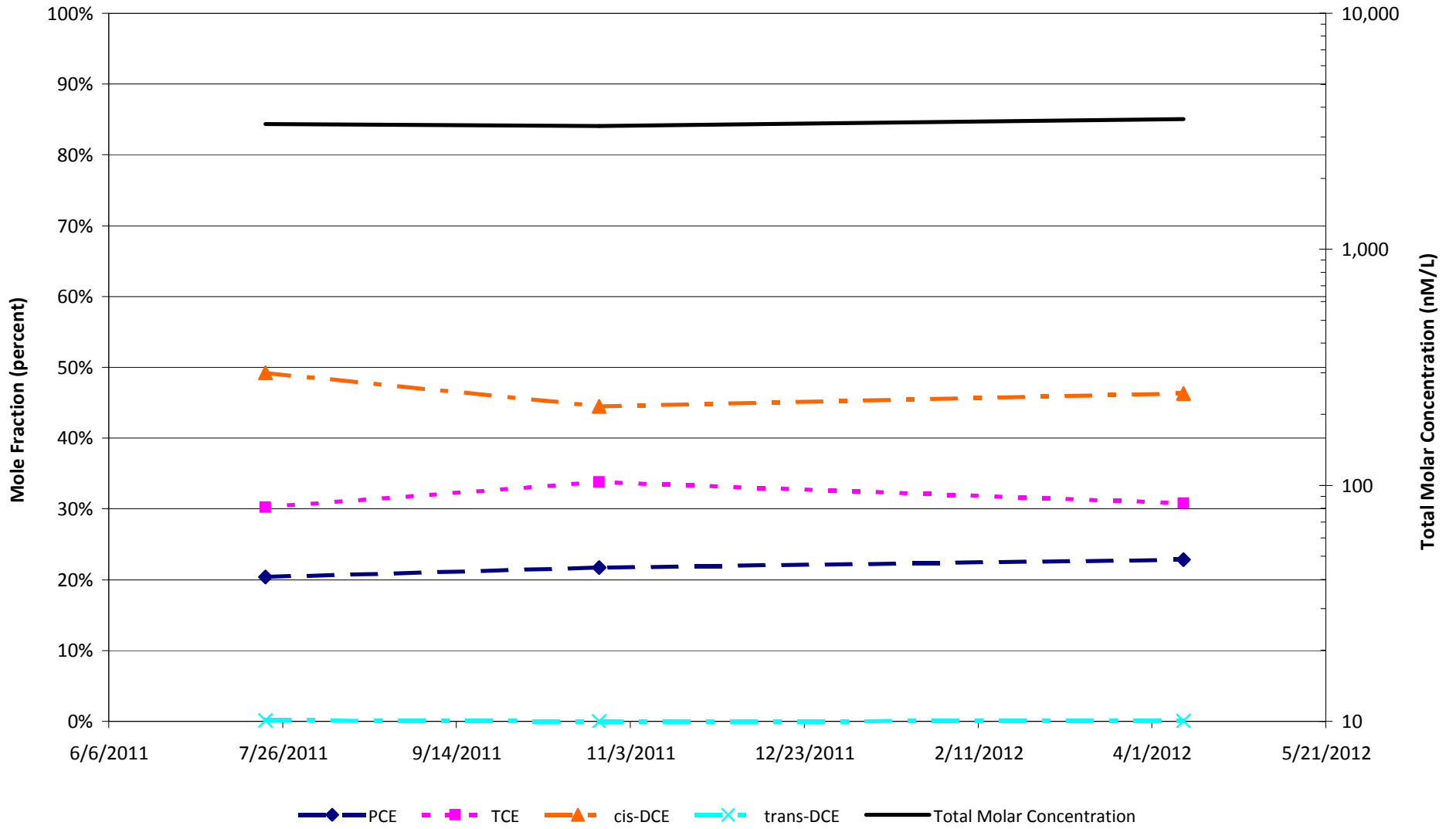


Figure 20.6.2-16LGR

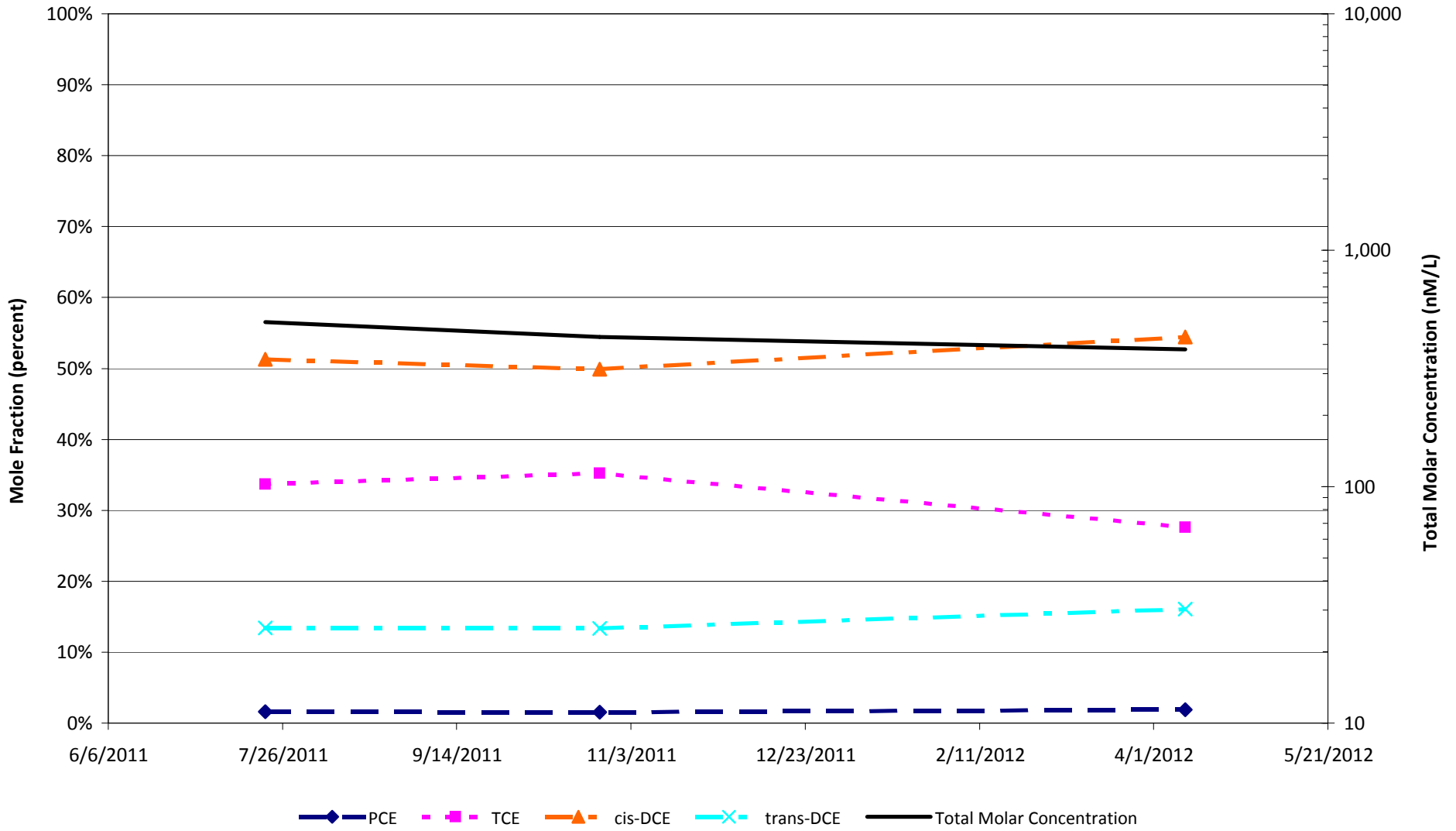
CS-MW16-LGR VOC Summary  
Quarter 17 - Quarter 20

Changes in Mole Fraction and Total Molar Concentration at CS-MW16-LGR



CS-MW16-CC VOC Summary  
Quarter 17 - Quarter 20

Changes in Mole Fraction and Total Molar Concentration at CS-MW16-CC



## Tables



Table 20.1.1

## SWMU B-3 Bioreactor Trenches - Field Measurement Data

May 2011 - April 2012

TRENCH 1								
Sump 1-1								
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)
5/2/2011	No data collected							
5/13/2011	1345	10.05	6.72	26.01	0.974	0.05	-265.1	2.85
5/18/2011	920	10.14	6.45	26.19	0.977	0.04	-216.2	2.76
5/25/2011	1000	10.08	6.44	27.28	0.835	0.20	-206.9	2.82
6/1/2011	900	10.08	6.50	27.24	0.841	0.23	-217.8	2.82
6/7/2011	1400	10.37	6.49	26.99	0.668	0.41	-300.1	2.53
6/15/2011	945	10.13	6.30	27.27	0.862	0.51	-301.3	2.77
6/20/2011	900	9.95	6.50	28.36	0.883	0.40	-213.3	2.95
6/29/2011	1000	10.92	6.63	26.07	1.041	0.52	-189.2	1.98
7/7/2011	930	9.85	6.53	27.45	0.832	0.30	-191.3	3.05
7/14/2011	1000	9.67	6.52	26.13	0.939	0.14	-204.5	3.23
7/19/2011	1100	8.77	6.54	25.97	0.586	0.07	-274.2	4.13
7/26/2011	1000	8.55	6.52	26.34	0.896	0.18	-193.2	4.35
8/5/2011	935	8.59	6.52	26.40	0.879	0.35	-350.3	4.31
8/10/2011	1330	8.51	6.47	26.34	0.706	0.28	-310.3	4.39
8/16/2011	900	8.80	6.56	26.08	0.886	0.32	-335.3	4.10
8/24/2011	1030	9.29	6.51	26.59	0.841	0.19	-238.3	3.61
9/1/2011	1045	10.04	6.49	26.63	0.837	0.35	-152.0	2.86
9/9/2011	815	10.32	6.51	26.56	0.811	0.32	-128.4	2.58
9/16/2011	1010	9.65	6.45	25.71	0.598	0.12	-156.9	3.25
9/19/2011	1025	9.58	6.48	25.44	0.881	0.34	-146.1	3.32
9/30/2011	1015	10.15	6.57	25.51	0.521	0.09	-97.0	2.75
10/7/2011	1420	10.90	6.63	25.79	0.528	0.36	-62.8	2.00
10/14/2011	930	8.55	6.71	28.97	1.651	0.13	33.1	4.35
10/18/2011	950	8.18	6.71	24.85	1.654	0.21	157.3	4.72
10/28/2011	1100	8.35	6.84	24.24	1.551	0.15	144.7	4.55
11/4/2011	1330	8.48	6.80	23.85	0.908	0.23	150.6	4.42
11/11/2011	1000	8.70	6.79	23.55	1.070	0.16	136.2	4.20
11/18/2011	930	8.49	6.84	23.23	1.364	0.33	145.1	4.41
11/21/2011	1400	No data collected						
12/2/2011	1410	8.38	6.76	22.51	1.321	0.29	145.0	4.52
12/9/2011	930	8.16	6.70	21.73	1.128	0.16	149.1	4.74
12/12/2011	939	8.00	6.88	21.43	1.2205	0.37	149.7	4.90
12/20/2011	1015	7.61	6.85	21.40	0.678	0.24	140.3	5.29
12/27/2011	1110	7.21	6.95	20.91	1.015	0.30	57.2	5.69
1/5/2012	845	7.88	6.99	20.72	1.047	0.33	129.7	5.02
1/13/2012	1233	8.35	7.00	21.19	0.914	0.39	114.8	4.55
1/18/2012	1310	8.44	6.94	21.12	0.956	0.34	121.8	4.46
1/24/2012	1000	8.62	6.84	21.59	0.613	0.22	43.2	4.28
2/2/2012	830	7.97	6.88	21.60	0.927	0.20	206.3	4.93
2/8/2012	830	7.91	6.90	21.85	0.918	0.23	102.9	4.99
2/16/2012	830	7.99	6.89	21.16	0.865	0.49	135.6	4.91
2/22/2012	1205	6.98	6.79	21.39	0.534	0.38	103.9	5.92
3/1/2012	915	6.33	6.98	21.79	0.771	0.32	25.9	6.57
3/7/2012	1630	6.39	6.95	22.13	0.811	0.43	15.0	6.51
3/16/2012	1420	5.79	6.91	21.51	0.74	0.22	23.1	7.11
3/22/2012	1103	4.95	7.12	21.62	0.785	0.60	127.9	7.95
3/29/2012	800	5.20	7.13	22.23	0.759	0.32	102.3	7.70
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

Table 20.1.1

## SWMU B-3 Bioreactor Trenches - Field Measurement Data

May 2011 - April 2012

TRENCH 1									
Sump 1-2									
Sump Depth: 12.4 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)	
5/2/2011		No data collected							
5/13/2011	1345	9.63	6.55	25.15	0.923	0.04	-217.8	2.77	
5/18/2011	920	9.7	6.53	25.27	0.908	0.31	-156.4	2.70	
5/25/2011	1000	9.61	6.43	26.69	0.689	0.36	-191.7	2.79	
6/1/2011	900	9.58	6.54	25.43	0.777	0.03	-201.6	2.82	
6/7/2011	1400	9.82	6.61	25.02	0.579	0.34	-318.7	2.58	
6/15/2011	945	9.62	6.41	26.08	0.746	0.22	-329.4	2.78	
6/20/2011	900	9.38	6.54	26.03	0.753	0.06	-299.3	3.02	
6/29/2011	1000	10.51	6.63	25.62	0.688	0.35	-270.5	1.89	
7/7/2011	930	9.38	6.62	26.2	0.638	0.15	-248.4	3.02	
7/14/2011	1000	8.99	6.58	26	0.842	0.11	-243	3.41	
7/19/2011	1100	8.16	6.59	28.35	0.603	0.09	-292.9	4.24	
7/26/2011	1000	7.9	6.65	23.24	0.604	0.17	-226.1	4.50	
8/5/2011	935	7.91	6.62	26.41	0.767	0.15	-328.2	4.49	
8/10/2011	1330	7.93	6.59	26.37	0.619	0.15	-315.6	4.47	
8/16/2011	900	8.12	6.72	26.27	0.791	0.12	-317	4.28	
8/24/2011	1030	8.58	6.65	26.54	0.725	0.12	-193.3	5.75	
9/1/2011	1045	9.55	6.54	25.64	0.655	0.18	-153.4	5.86	
9/9/2011	815	9.81	6.49	25.17	0.658	0.24	-125.5	5.91	
9/16/2011	1010	9.17	6.65	24.6	0.449	0.03	-156	5.75	
9/19/2011	1025	9.1	6.7	24.13	0.643	0.03	-139.7	5.70	
9/30/2011	1015	9.79	6.63	24.3	0.391	0.02	-79.7	5.77	
10/7/2011	1420	10.42	6.66	24.52	0.473	0.08	-87.7	5.74	
10/14/2011	930	8.15	6.63	23.69	0.958	0.08	19.2	5.77	
10/18/2011	950	7.79	6.68	23.49	9.31	0.19	-51.2	5.72	
10/28/2011	1100	7.96	6.89	22.89	0.755	0.16	-38.7	5.51	
11/4/2011	1330	8.05	6.91	27.14	0.426	0.08	71.3	5.49	
11/11/2011	1000	8.26	6.88	22.16	0.487	0.15	127	5.52	
11/18/2011	930	8.06	6.91	22.04	0.654	0.55	146.6	5.49	
11/21/2011	1400	No data collected							
12/2/2011	1410	7.96	6.85	22.51	0.687	0.36	107.1	5.55	
12/9/2011	930	7.75	6.81	20.75	0.582	0.61	92.8	5.59	
12/13/2011	939	7.59	6.93	21.21	0.653	1.11	145.4	5.47	
12/20/2011	1015	7.2	6.92	21.42	0.404	0.6	142.9	5.48	
12/27/2011	1110	6.84	6.96	20.6	0.615	0.48	79.2	5.44	
1/5/2012	845	7.5	6.9	21.38	0.651	0.89	134.9	5.50	
1/13/2012	1233	7.95	6.91	20.39	0.607	0.8	100.8	5.49	
1/18/2012	1310	8.05	6.94	20.95	0.667	0.87	119.2	5.46	
1/24/2012	1000	8.22	6.88	21.65	0.448	0.77	23	5.52	
2/2/2012	830	7.6	6.97	22.15	0.616	0.4	195.1	5.43	
2/8/2012	830	7.54	6.97	21.33	0.638	0.57	119.4	5.43	
2/16/2012	830	7.62	6.98	21.74	0.639	0.67	135.8	5.42	
2/22/2012	1205	6.62	7.03	21.76	0.402	0.52	134.1	5.37	
3/1/2012	915	5.9	7.14	22.26	0.588	0.3	77.3	5.26	
3/7/2012	1630	5.98	6.98	22.27	0.627	0.42	76.9	5.42	
3/16/2012	1420	5.2	6.96	22.33	0.596	0.37	90.2	5.44	
3/22/2012	1103	4.59	7.22	21.72	0.597	0.9	80.2	5.18	
3/29/2012	800	4.79	7.14	22.42	0.623	1.33	96.6	5.26	
4/5/2012	845	4.66	7.13	22.35	0.614	1.55	100.9	5.27	
4/11/2012	916	4.57	6.96	22.26	0.605	0.99	110.4	5.44	
4/19/2012	800	4.96	7.12	22.54	1.044	1.05	90.6	5.28	
4/25/2012	815	5.3	7.03	23.28	0.643	0.26	-43.6	5.37	

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<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)
5/2/2011	No data collected							
5/13/2011	1345	9.23	6.54	25.51	0.857	0.03	-127.5	3.62
5/18/2011	920	9.48	6.49	25.66	0.856	0.05	-166.5	3.37
5/25/2011	1000	9.45	6.44	25.82	0.717	0.23	-95.1	3.40
6/1/2011	900	9.57	6.51	26.41	0.743	0.14	-179.2	3.28
6/7/2011	1400	9.89	6.49	26.91	0.626	0.24	-281.4	2.96
6/15/2011	945	12.85*						
6/20/2011	900	9.34	6.45	28.55	0.859	0.29	-232.3	3.51
6/29/2011	1000	10.33	6.54	26.77	0.846	0.49	-248.2	2.52
7/7/2011	930	9.22	6.53	29.42	0.858	0.17	-206.8	3.63
7/14/2011	1000	7.32	6.68	25.90	0.643	0.10	-244.5	5.53
7/19/2011	1100	6.30	6.88	25.02	0.396	0.02	-298.4	6.55
7/26/2011	1000	5.76	6.93	24.51	0.880	0.21	-193.7	7.09
8/5/2011	935	5.76	6.93	24.51	0.604	0.04	-226.1	7.09
8/10/2011	1330	5.68	6.9	25.13	0.508	0.06	-322.8	7.17
8/16/2011	900	6.02	6.96	25.38	0.636	0.08	-333.9	6.83
8/24/2011	1030	6.63	6.97	25.69	0.615	0.08	-274.9	6.22
9/1/2011	1045	9.67	6.60	26.43	0.852	0.19	-186.0	3.18
9/9/2011	815	10.00	6.61	27.32	0.919	0.24	-146.9	2.85
9/16/2011	1010	9.12	6.49	26.01	0.645	0.07	-173.3	3.73
9/19/2011	1025	9.04	6.51	25.93	0.990	0.08	-156.4	3.81
9/30/2011	1015	9.57	6.59	25.24	0.603	0.18	-97.6	3.28
10/7/2011	1420	10.28	6.66	26.15	0.604	0.15	-90.0	2.57
10/14/2011	930	7.90	6.80	26.10	0.937	0.08	-106.8	4.95
10/18/2011	950	7.56	6.80	25.00	0.995	0.10	-79.9	5.29
10/28/2011	1100	7.78	6.84	23.81	0.861	0.19	-67.60	5.07
11/4/2011	1330	7.88	6.77	23.42	0.465	0.07	83.70	4.97
11/11/2011	1000	8.04	6.73	23.12	0.573	0.14	76.00	4.81
11/18/2011	930	7.89	6.76	22.88	0.802	0.24	142.30	4.96
11/21/2011	1400	No data collected						
12/2/2011	1410	7.72	6.68	22.19	0.854	0.07	86.40	5.13
12/9/2011	930	7.53	6.63	20.07	0.744	0.11	128.00	5.32
12/13/2011	939	7.38	6.67	20.42	0.828	0.16	141.20	5.47
12/20/2011	1015	7.06	6.79	20.07	0.477	0.26	137.30	5.79
12/27/2011	1110	6.75	6.91	18.39	0.675	0.07	112.40	6.10
1/5/2012	845	7.39	6.86	18.21	0.675	0.17	139.20	5.46
1/13/2012	1233	7.82	6.92	18.61	0.631	0.28	113.40	5.03
1/18/2012	1310	7.90	6.84	18.62	0.718	0.08	51.80	4.95
1/24/2012	1000	8.10	6.73	19.36	0.497	0.06	-40.90	4.75
2/2/2012	830	7.54	6.74	19.29	0.756	0.17	-30.70	5.31
2/8/2012	830	7.48	6.75	19.43	0.795	0.35	51.10	5.37
2/16/2012	830	7.57	6.68	19.63	0.862	0.35	139.40	5.28
2/22/2012	1205	6.66	6.64	19.67	0.543	0.44	95.30	6.19
3/1/2012	915	5.97	6.82	20.20	0.759	0.26	114.90	6.88
3/7/2012	1630	6.02	7.00	20.08	0.734	0.06	88.90	6.83
3/16/2012	1420	5.33	6.98	20.34	0.682	0.15	70.50	7.52
3/22/2012	1103	4.30	7.21	18.68	0.605	0.40	108.90	8.55
3/29/2012	800	4.73	7.10	19.90	0.711	0.08	-64.90	8.12
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

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

TRENCH 2 Sump 2-1									
Sump Depth: 9.67 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>	
5/2/2011	No data collected								
5/13/2011	1345	9.24						0.43	
5/18/2011	920	9.49						0.18	
5/25/2011	1000	9.67						0.00	
6/1/2011	900	9.67						0.00	
6/7/2011	1400	9.67						0.00	
6/15/2011	945	9.67						0.00	
6/20/2011	900	9.67						0.00	
6/29/2011	1000	9.67						0.00	
7/7/2011	930	9.67						0.00	
7/14/2011	1000	9.67						0.00	
7/19/2011	1100	9.67						0.00	
7/26/2011	1000	9.49						0.18	
8/5/2011	935	9.49						0.18	
8/10/2011	1330	9.67						0.00	
8/16/2011	900	9.67						0.00	
8/24/2011	1030	9.67						0.00	
9/1/2011	1045	9.67						0.00	
9/9/2011	815	9.67						0.00	
9/16/2011	1010	9.67						0.00	
9/19/2011	1025	9.61	6.32	30.81	0.003	2.73	29.5	0.06	
9/30/2011	1015	9.58						0.09	
10/7/2011	1420	9.67						0.00	
10/14/2011	930	9.16						0.51	
10/18/2011	950	9.15						0.52	
10/28/2011	1100	9.23						0.44	
11/4/2011	1330	9.28						0.39	
11/11/2011	1000	9.32						0.35	
11/18/2011	930	9.04						0.63	
11/21/2011	1400	No data collected							
12/2/2011	1410	9.09						0.58	
12/9/2011	930	9.08						0.59	
12/13/2011	939	8.95						0.72	
12/20/2011	1015	8.97	6.9	21.78	1.385	2.98	145.3	0.70	
12/27/2011	1110	8.68	7.31	20.46	2.08	4.2	112.5	0.99	
1/5/2012	845	9.08						0.59	
1/13/2012	1233	9.17						0.50	
1/18/2012	1310	9.2						0.47	
1/24/2012	1000	9.31						0.36	
2/2/2012	830	9.1						0.57	
2/8/2012	830	9.08						0.59	
2/16/2012	830	9.13						0.54	
2/22/2012	1205	8.46	6.9	19.39	1.25	4.24	145.7	1.21	
3/1/2012	915	7.79	6.95	19.69	1.728	0.46	110	1.88	
3/7/2012	1630	7.84	No data collected						1.83
3/16/2012	1420	7.24	6.69	19.92	1.344	0.38	119.5	2.43	
3/22/2012	1103	6.42	6.87	20.22	1.385	0.74	132.8	3.25	
3/29/2012	800	6.67	6.97	20.24	1.318	0.26	121.9	3.00	
4/5/2012	845	6.53	6.9	21.08	1.489	0.13	51.2	3.14	
4/11/2012	916	6.48	6.88	21.6	1.597	0.24	-43.1	3.19	
4/19/2012	800	6.87	7.02	22.16	2.79	0.18	-62.8	2.80	
4/25/2012	815	7.2	6.98	22.51	1.575	0.23	-154.4	2.47	

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

TRENCH 2 Sump 2-2									
Sump Depth: 10.01 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>	
5/2/2011	No data collected								
5/13/2011	1345	10.01						0.00	
5/18/2011	920	10.01						0.00	
5/25/2011	1000	10.01						0.00	
6/1/2011	900	10.01						0.00	
6/7/2011	1400	10.01						0.00	
6/15/2011	945	10.01						0.00	
6/20/2011	900	10.01						0.00	
6/29/2011	1000	10.01						0.00	
7/7/2011	930	10.01						0.00	
7/14/2011	1000	10.01						0.00	
7/19/2011	1100	10.01						0.00	
7/26/2011	1000	10.01						0.00	
8/5/2011	935	10.01						0.00	
8/10/2011	1330	10.01						0.00	
8/16/2011	900	10.01						0.00	
8/24/2011	1030	10.01						0.00	
9/1/2011	1045	10.01						0.00	
9/9/2011	815	10.01						0.00	
9/16/2011	1010	10.01						0.00	
9/19/2011	1025	10.01						0.00	
9/30/2011	1015	10.01						0.00	
10/7/2011	1420	10.01						0.00	
10/14/2011	930	9.04	7.14	30.45	1.277	0.25	30.4	0.97	
10/18/2011	950	9.14	7.05	30.38	1.458	13.2	0.05	0.87	
10/28/2011	1100	9.45						0.56	
11/4/2011	1330	9.6						0.41	
11/11/2011	1000	9.72						0.29	
11/18/2011	930	9.47						0.54	
11/21/2011	1400	No data collected							
12/2/2011	1410	9.35	7.1	24.69	1.315	1.41	136.8	0.66	
12/9/2011	930	9.12	7.08	22.8	1.297	1.14	134.2	0.89	
12/13/2011	939	9.07	7.13	22.52	1.608	0.2	141.6	0.94	
12/20/2011	1015	8.94	7.05	21.74	1.078	0.29	145.1	1.07	
12/27/2011	1110	8.9	7.15	20.71	1.709	1.24	123.4	1.11	
1/5/2012	845	9.22	7.08	20.32	1.846	1.08	146	0.79	
1/13/2012	1233	9.45	7.15	19.82	1.681	3.34	125.6	0.56	
1/18/2012	1310	9.55						0.46	
1/24/2012	1000	9.74						0.27	
2/2/2012	830	9.25	7.04	20.43	1.411	2.31	204.9	0.76	
2/8/2012	830	9.17	7.01	20.14	1.479	1.74	141.7	0.84	
2/16/2012	830	9.36	7.1	20.04	1.509	2.64	145.2	0.65	
2/22/2012	1205	8.79	6.85	20.13	1.026	0.42	144.7	1.22	
3/1/2012	915	8.12	6.9	20.46	1.24	0.4	114	1.89	
3/7/2012	1630	8.14	No data collected						1.87
3/16/2012	1420	7.55	6.7	20.84	1.033	0.22	113.9	2.46	
3/22/2012	1103	6.71	6.98	21.12	1.173	0.35	-39	3.30	
3/29/2012	800	6.98	6.84	21.46	1.27	0.25	-60.2	3.03	
4/5/2012	845	6.84	6.85	22.15	1.302	0.16	-65.2	3.17	
4/11/2012	916	6.74	6.74	22.86	1.252	0.05	5.4	3.27	
4/19/2012	800	7.15	6.94	23.24	2.086	0.18	-62.8	2.86	
4/25/2012	815	7.56	6.77	23.37	1.195	0.36	-134.4	2.45	

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<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 <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>
5/2/2011	No data collected							
5/13/2011	1345	9.64						0.32
5/18/2011	920	9.63						0.33
5/25/2011	1000	9.63						0.33
6/1/2011	900	9.62						0.34
6/7/2011	1400	9.62						0.34
6/15/2011	945	9.67						0.29
6/20/2011	900	9.61						0.35
6/29/2011	1000	9.62						0.34
7/7/2011	930	9.58						0.38
7/14/2011	1000	9.57						0.39
7/19/2011	1100	9.54						0.42
7/26/2011	1000	9.53						0.43
8/5/2011	935	9.46						0.50
8/10/2011	1330	9.48						0.48
8/16/2011	900	9.5						0.46
8/24/2011	1030	9.47						0.49
9/1/2011	1045	9.48						0.48
9/9/2011	815	9.48						0.48
9/16/2011	1010	9.44						0.52
9/19/2011	1025	9.41						0.55
9/30/2011	1015	9.48						0.48
10/7/2011	1420	9.54						0.42
10/14/2011	930	8.4						1.56
10/18/2011	950	8.63	6.98	29.15	0.905	45.6	0.21	1.33
10/28/2011	1100	9.1						0.86
11/4/2011	1330	9.19						0.77
11/11/2011	1000	9.24						0.72
11/18/2011	930	9.07						0.89
11/21/2011	1400	No data collected						
12/2/2011	1410	9.19						0.77
12/9/2011	930	9.24						0.72
12/13/2011	939	9.25						0.71
12/20/2011	1015	9.29						0.67
12/27/2011	1110	9.19						0.77
1/5/2012	845	9.26						0.70
1/13/2012	1233	9.32						0.64
1/18/2012	1310	9.35	7.11	23.06	1.219	4.76	111.5	0.61
1/24/2012	1000	9.31						0.65
2/2/2012	830	9.2						0.76
2/8/2012	830	9.19						0.77
2/16/2012	830	9.24						0.72
2/22/2012	1205	9.28						0.68
3/1/2012	915	9.22						0.74
3/7/2012	1630	9.24						0.72
3/16/2012	1420	9.15						0.81
3/22/2012	1103	8.12						1.84
3/29/2012	800	9.26						0.70
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

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<b>TRENCH 3</b>									
<b>Sump 3-2</b>									
Sump Depth: 7.4 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>	
5/2/2011	No data collected								
5/13/2011	1345	7.4						0.00	
5/18/2011	920	7.4						0.00	
5/25/2011	1000	7.4						0.00	
6/1/2011	900	7.4						0.00	
6/7/2011	1400	7.4						0.00	
6/15/2011	945	7.4						0.00	
6/20/2011	900	7.4						0.00	
6/29/2011	1000	7.4						0.00	
7/7/2011	930	7.4						0.00	
7/14/2011	1000	7.4						0.00	
7/19/2011	1100	7.4						0.00	
7/26/2011	1000	7.4						0.00	
8/5/2011	935	7.4						0.00	
8/10/2011	1330	7.4						0.00	
8/16/2011	900	7.4						0.00	
8/24/2011	1030	7.4						0.00	
9/1/2011	1045	7.4						0.00	
9/9/2011	815	7.4						0.00	
9/16/2011	1010	7.4						0.00	
9/19/2011	1025	7.4						0.00	
9/30/2011	1015	7.4						0.00	
10/7/2011	1420	7.4						0.00	
10/14/2011	930	7.21						0.19	
10/18/2011	950	7.4						0.00	
10/28/2011	1100	7.4						0.00	
11/4/2011	1330	7.4						0.00	
11/11/2011	1000	7.4						0.00	
11/18/2011	930	7.4						0.00	
11/21/2011	1400	No data collected							
12/2/2011	1410	7.4						0.00	
12/9/2011	930	7.4						0.00	
12/13/2011	939	7.4						0.00	
12/20/2011	1015	7.4						0.00	
12/27/2011	1110	7.4						0.00	
1/5/2012	845	7.4						0.00	
1/13/2012	1233	7.4						0.00	
1/18/2012	1310	7.4						0.00	
1/24/2012	1000	7.4						0.00	
2/2/2012	830	7.4						0.00	
2/8/2012	830	7.4						0.00	
2/16/2012	830	7.4						0.00	
2/22/2012	1205	7.4						0.00	
3/1/2012	915	7.4						0.00	
3/7/2012	1630	7.4						0.00	
3/16/2012	1420	7.4						0.00	
3/22/2012	1103	7.4						0.00	
3/29/2012	800	7.4						0.00	
4/5/2012	845	7.4						0.00	
4/11/2012	916	7.4						0.00	
4/19/2012	800	7.4						0.00	
4/25/2012	815	7.4						0.00	

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<b>TRENCH 4</b>									
<b>Sump 4-1</b>									
Sump Depth: 6.32 feet BTOC									
Sample Date	Sample Time	Sump H <sub>2</sub> O Level <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>	
5/2/2011	No data collected								
5/13/2011	1345	6.32						0.00	
5/18/2011	920	6.32						0.00	
5/25/2011	1000	6.32						0.00	
6/1/2011	900	6.32						0.00	
6/7/2011	1400	6.32						0.00	
6/15/2011	945	6.32						0.00	
6/20/2011	900	6.32						0.00	
6/29/2011	1000	6.32						0.00	
7/7/2011	930	6.32						0.00	
7/14/2011	1000	6.32						0.00	
7/19/2011	1100	6.32						0.00	
7/26/2011	1000	6.32						0.00	
8/5/2011	935	6.32						0.00	
8/10/2011	1330	6.32						0.00	
8/16/2011	900	6.32						0.00	
8/24/2011	1030	6.32						0.00	
9/1/2011	1045	6.32						0.00	
9/9/2011	815	6.32						0.00	
9/16/2011	1010	6.32						0.00	
9/19/2011	1025	6.32						0.00	
9/30/2011	1015	6.32						0.00	
10/7/2011	1420	6.32						0.00	
10/14/2011	930	6.17						0.15	
10/18/2011	950	6.32						0.00	
10/28/2011	1100	6.32						0.00	
11/4/2011	1330	6.32						0.00	
11/11/2011	1000	6.32						0.00	
11/18/2011	930	6.32						0.00	
11/21/2011	1400	No data collected							
12/2/2011	1410	6.32						0.00	
12/9/2011	930	6.32						0.00	
12/13/2011	939	6.32						0.00	
12/20/2011	1015	6.32						0.00	
12/27/2011	1110	6.32						0.00	
1/5/2012	845	6.32						0.00	
1/13/2012	1233	6.32						0.00	
1/18/2012	1310	6.32						0.00	
1/24/2012	1000	6.32						0.00	
2/2/2012	830	6.32						0.00	
2/8/2012	830	6.32						0.00	
2/16/2012	830	6.32						0.00	
2/22/2012	1205	6.32						0.00	
3/1/2012	915	6.32						0.00	
3/7/2012	1630	6.32						0.00	
3/16/2012	1420	6.32						0.00	
3/22/2012	1103	6.32						0.00	
3/29/2012	800	6.32						0.00	
4/5/2012	845	6.32						0.00	
4/11/2012	916	6.32						0.00	
4/19/2012	800	6.32						0.00	
4/25/2012	815	6.32						0.00	



Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<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)	
5/2/2011	No data collected								
5/13/2011	1345	9.33						0.00	
5/18/2011	920	9.33						0.00	
5/25/2011	1000	9.33						0.00	
6/1/2011	900	9.33						0.00	
6/7/2011	1400	9.33						0.00	
6/15/2011	945	9.33						0.00	
6/20/2011	900	9.33						0.00	
6/29/2011	1000	9.33						0.00	
7/7/2011	930	9.33						0.00	
7/14/2011	1000	9.33						0.00	
7/19/2011	1100	9.33						0.00	
7/26/2011	1000	9.33						0.00	
8/5/2011	935	9.33						0.00	
8/10/2011	1330	9.33						0.00	
8/16/2011	900	9.33						0.00	
8/24/2011	1030	9.33						0.00	
9/1/2011	1045	9.33						0.00	
9/9/2011	815	9.33						0.00	
9/16/2011	1010	9.33						0.00	
9/19/2011	1025	9.33						0.00	
9/30/2011	1015	9.33						0.00	
10/7/2011	1420	9.33						0.00	
10/14/2011	930	9.2						0.13	
10/18/2011	950	9.24						0.09	
10/28/2011	1100	9.31						0.02	
11/4/2011	1330	9.33						0.00	
11/11/2011	1000	9.33						0.00	
11/18/2011	930	9.33						0.00	
11/21/2011	1400	No data collected							
12/2/2011	1410	9.33						0.00	
12/9/2011	930	9.33						0.00	
12/13/2011	939	9.33						0.00	
12/20/2011	1015	9.33						0.00	
12/27/2011	1110	9.33						0.00	
1/5/2012	845	9.33						0.00	
1/13/2012	1233	9.33						0.00	
1/18/2012	1310	9.33						0.00	
1/24/2012	1000	9.33						0.00	
2/2/2012	830	9.33						0.00	
2/8/2012	830	9.33						0.00	
2/16/2012	830	9.33						0.00	
2/22/2012	1205	9.33						0.00	
3/1/2012	915	9.33						0.00	
3/7/2012	1630	9.33						0.00	
3/16/2012	1420	9.33						0.00	
3/22/2012	1103	9.19						0.14	
3/29/2012	800	9.24						0.09	
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	

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<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 <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H <sub>2</sub> O Thickness <i>(feet)</i>
5/2/2011	No data collected							
5/13/2011	1345	7.82						0.16
5/18/2011	920	7.98						0.00
5/25/2011	1000	7.86						0.12
6/1/2011	900	7.85						0.13
6/7/2011	1400	7.88						0.10
6/15/2011	945	7.87						0.11
6/20/2011	900	7.84						0.14
6/29/2011	1000	7.83						0.15
7/7/2011	930	7.85						0.13
7/14/2011	1000	7.86						0.12
7/19/2011	1100	7.85						0.13
7/26/2011	1000	7.82						0.16
8/5/2011	935	7.81						0.17
8/10/2011	1330	7.98						0.00
8/16/2011	900	7.85						0.13
8/24/2011	1030	7.86						0.12
9/1/2011	1045	7.85						0.13
9/9/2011	815	7.89						0.09
9/16/2011	1010	7.98						0.00
9/19/2011	1025	7.78						0.20
9/30/2011	1015	7.98						0.00
10/7/2011	1420	7.98						0.00
10/14/2011	930	7.31	6.92	28.16	1.159	0.23	-65.4	0.67
10/18/2011	950	7.8						0.18
10/28/2011	1100	7.86						0.12
11/4/2011	1330	7.98						0.00
11/11/2011	1000	7.98						0.00
11/18/2011	930	7.82						0.16
11/21/2011	1400	No data collected						
12/2/2011	1410	7.82						0.16
12/9/2011	930	7.98						0.00
12/13/2011	939	7.98						0.00
12/20/2011	1015	7.98						0.00
12/27/2011	1110	7.98						0.00
1/5/2012	845	7.98						0.00
1/13/2012	1233	7.98						0.00
1/18/2012	1310	7.98						0.00
1/24/2012	1000	7.98						0.00
2/2/2012	830	7.98						0.00
2/8/2012	830	7.86						0.12
2/16/2012	830	7.94						0.04
2/22/2012	1205	7.98						0.00
3/1/2012	915	7.74						0.24
3/7/2012	1630	7.84						0.14
3/16/2012	1420	7.98						0.00
3/22/2012	1103	7.84						0.14
3/29/2012	800	7.98						0.00
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

Table 20.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data  
May 2011 - April 2012

<b>TRENCH 6</b>									
<b>Sump 6-1</b>									
Sump Depth: 11.45 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)	
5/2/2011		No data collected							
5/13/2011	1345	10.29	6.68	23.41	0.738	0.01	-223.7	1.16	
5/18/2011	920	10.00	6.53	25.4	0.837	0.07	-213.1	1.45	
5/25/2011	1000	10.04	6.67	25.17	0.591	0.25	-254.7	1.41	
6/1/2011	900	11.01	6.67	25.42	0.615	0.05	-134.8	0.44	
6/7/2011	1400	11.15						0.30	
6/15/2011	945	11.08						0.37	
6/20/2011	900	10.74	6.53	26.41	0.773	0.06	-285	0.71	
6/29/2011	1000	11.18						0.27	
7/7/2011	930	11.01						0.44	
7/14/2011	1000	11.08						0.37	
7/19/2011	1100	11.12	6.42	24.91	0.521	0.08	-188.6	0.33	
7/26/2011	1000	11.43						0.02	
8/5/2011	935	11.39						0.06	
8/10/2011	1330	11.34						0.11	
8/16/2011	900	11.30						0.15	
8/24/2011	1030	11.34						0.11	
9/1/2011	1045	10.99	6.53	28.93	0.883	0.24	-181.7	0.46	
9/9/2011	815	11.20						0.25	
9/16/2011	1010	10.86	6.57	24.48	0.483	0.1	-97.9	0.59	
9/19/2011	1025	10.87	6.59	23.75	0.688	0.03	-48.5	0.58	
9/30/2011	1015	11.14						0.31	
10/7/2011	1420	11.25						0.20	
10/14/2011	930	11.04						0.41	
10/18/2011	950	10.93	6.56	23.15	0.858	0.29	137.9	0.52	
10/28/2011	1100	11.05						0.40	
11/4/2011	1330	11.12						0.33	
11/11/2011	1000	11.28						0.17	
11/18/2011	930	11.18	6.53	22.34	0.766	0.24	108.2	0.27	
11/21/2011	1400	No data collected							
12/2/2011	1410	11.18						0.27	
12/9/2011	930	11.17						0.28	
12/13/2011	939	11.15	6.54	21.82	0.75	1.11	146.60	0.30	
12/20/2011	1015	11.17						0.28	
12/27/2011	1110	11.20						0.25	
1/5/2012	845	11.20						0.25	
1/13/2012	1233	11.18						0.27	
1/18/2012	1310	11.18						0.27	
1/24/2012	1000	11.33						0.12	
2/2/2012	830	11.29						0.16	
2/8/2012	830	11.28						0.17	
2/16/2012	830	11.28						0.17	
2/22/2012	1205	11.38						0.07	
3/1/2012	915	11.10						0.35	
3/7/2012	1630	10.99						0.46	
3/16/2012	1420	11.17						0.28	
3/22/2012	1103	10.65	6.52	22.16	0.711	0.43	81.4	0.80	
3/29/2012	800	10.92	6.48	22.42	0.728	0.4	73.3	0.53	
4/5/2012	845	8.93	6.67	22.88	0.851	0.38	106.6	2.52	
4/11/2012	916	8.83	6.6	23	0.694	0.18	29.8	2.62	
4/19/2012	800	8.72	6.85	23.28	1.113	0.48	3.8	2.73	
4/25/2012	815	8.45	6.63	23.01	1.055	0.31	-164.2	3.00	

Table 20.1.1

## SWMU B-3 Bioreactor Trenches - Field Measurement Data

May 2011 - April 2012

TRENCH 6									
Sump 6-2									
Sump Depth: 12.34 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)	
5/2/2011		No data collected							
5/13/2011	1345	9.92	6.56	25.39	0.880	0.02	-240.8	2.42	
5/18/2011	920	10	6.53	25.4	0.837	0.07	-213.1	2.34	
5/25/2011	1000	10.34	6.50	26.32	0.742	0.18	-266.3	2.00	
6/1/2011	900	10.77	6.52	26.17	0.784	0.14	-182	1.57	
6/7/2011	1400	11	6.53	27.3	0.698	0.6	-252	1.34	
6/15/2011	945	10.68	6.31	27.16	0.933	0.17	-274.2	1.66	
6/20/2011	900	10.48	6.44	27.62	0.922	0.26	-256.5	1.86	
6/29/2011	1000	12.34						0.00	
7/7/2011	930	10.55	6.52	26.11	0.825	0.19	-228.9	1.79	
7/14/2011	1000	10.7	6.49	26.92	0.829	0.17	-233.2	1.64	
7/19/2011	1100	10.96	6.41	27.15	0.554	0.09	-255.3	1.38	
7/26/2011	1000	11	6.51	27.21	0.88	0.21	-193.7	1.34	
8/5/2011	935	11.16	6.49	26.8	0.87	0.17	-289.2	1.18	
8/10/2011	1330	11.1	6.35	26.8	0.731	0.41	-288.6	1.24	
8/16/2011	900	11.25	6.48	26.77	0.943	0.1	-265	1.09	
8/24/2011	1030	11.72	6.49	27.99	0.9	0.13	-233.3	0.62	
9/1/2011	1045	10.77						1.57	
9/9/2011	815	10.95	6.57	27.84	0.866	0.23	-149.7	1.39	
9/16/2011	1010	10.6	6.51	27.44	0.62	0.09	-163.7	1.74	
9/19/2011	1025	10.6	6.53	26.57	0.895	0.1	-141	1.74	
9/30/2011	1015	11.4	6.58	25.82	0.532	0.532	-70.9	0.94	
10/7/2011	1420	11.4	6.64	26.8	0.565	0.24	-80.9	0.94	
10/14/2011	930	10.84	6.61	25.12	0.959	0.27	34.2	1.50	
10/18/2011	950	10.67	6.67	23.65	0.961	0.29	138.9	1.67	
10/28/2011	1100	10.84	6.63	24.93	0.823	0.25	49.9	1.50	
11/4/2011	1330	11.12	6.56	25.08	0.570	0.1	-33.8	1.22	
11/11/2011	1000	11.33	6.51	24.53	0.632	0.06	-49	1.01	
11/18/2011	930	11.24	6.55	24.61	0.862	0.11	-48.8	1.10	
11/21/2011	1400	No data collected							
12/2/2011	1410	11.33	6.52	23.78	0.965	0.3	-70.4	1.01	
12/9/2011	930	11.32	6.53	23.53	0.878	0.23	-45.90	1.02	
12/13/2011	939	11.37	6.68	23.15	0.992	0.14	-17.90	0.97	
12/20/2011	1015	11.39	6.60	23.36	0.630	0.29	-4.10	0.95	
12/27/2011	1110	11.28	6.63	22.75	1.038	0.52	4.1	1.06	
1/5/2012	845	11.56	6.61	22.66	1.08	0.76	125.5	0.78	
1/13/2012	1233	11.6	6.60	22.83	0.974	1.28	120.6	0.74	
1/18/2012	1310	11.64	6.49	22.97	1.042	0.27	109.7	0.70	
1/24/2012	1000	11.65	6.46	22.86	0.689	0.27	56.3	0.69	
2/2/2012	830	11.58	6.49	22.69	1.141	0.45	-67	0.76	
2/8/2012	830	11.11	6.50	21.95	1.277	0.48	-69.3	1.23	
2/16/2012	830	11.18	6.57	22.11	1.254	0.54	-59.8	1.16	
2/22/2012	1205	11.09	6.53	22.65	0.779	0.58	-41.2	1.25	
3/1/2012	915	10.85	6.65	22.64	1.133	0.56	-26	1.49	
3/7/2012	1630	10.75	6.48	22.65	1.145	0.39	-51.9	1.59	
3/16/2012	1420	11.18	6.41	22.81	1.073	0.67	-28.8	1.16	
3/22/2012	1103	10.35	6.62	23.19	1.141	0.37	88.7	1.99	
3/29/2012	800	10.67	6.61	23.37	1.156	0.28	-1.2	1.67	
4/5/2012	845	8.67	6.59	23.3	1.201	0.38	106.6	3.67	
4/11/2012	916	8.57	6.49	23.07	1.152	0.17	3.5	3.77	
4/19/2012	800	8.46	6.73	22.79	1.851	0.28	-116.5	3.88	
4/25/2012	815	8.45	6.63	23.01	1.055	0.31	-164.2	3.89	

Table 20.1.2

**B-3 Bioreactor VOC Summary**  
**May 2011 - April 2012**

Q20 Date	T1-1								T1-2							
	5/18/2011	6/20/2011	7/19/2011	8/17/2011	9/19/2011	10/18/2011	1/18/2012	4/11/2012	5/18/2011	6/20/2011	7/19/2011	8/17/2011	9/19/2011	10/18/2011	1/18/2012	4/11/2012
PCE (µg/L)	0	0.39	0	0	4.3	0	0	0	0	0.53	0	0	3.1	0.84	39	63
TCE (µg/L)	0	0.28	1.6	0.52	2.5	0.61	0.30	1.2	0	2.7	0.64	0	8.8	4.5	51	74
cis-1,2-DCE (µg/L)	339	4.0	23	24	16	2.0	7.3	48	3.2	35	3.6	0.59	93	53	88	96
trans-1,2-DCE (µg/L)	11	9.6	1.5	1.5	1.2	0.22	0.24	0.65	1.7	2.4	0.93	1.4	3.8	0	0.80	1.5
Vinyl chloride (µg/L)	175	24	10	0	16	2.8	0	7.2	0	30	4.7	0	30	14	0.71	0
Ethene (µg/L)	89	101	4.7	3.3	1.4	0		6.5	0	4.3	6.5	1.0	3.0	0		0
PCE (nM/L)	0.00	2.35	0.00	0.00	25.69	0.00	0.00	0.00	0.00	3.20	0.00	0.00	18.88	5.07	236.69	378.46
TCE (nM/L)	0.00	2.13	11.87	3.96	18.88	4.64	2.28	8.83	0.00	20.40	4.87	0.00	66.98	34.02	391.43	563.21
cis-1,2-DCE (nM/L)	3496.34	40.85	234.55	246.93	168.03	21.15	75.40	497.06	33.52	365.55	37.34	6.09	954.31	542.55	910.88	990.82
trans-1,2-DCE (nM/L)	109.03	99.43	15.16	15.47	12.79	2.27	2.48	6.70	17.74	24.55	9.59	14.23	38.89	0.00	8.25	15.47
Vinyl chloride (nM/L)	2807.07	376.58	167.17	0.00	252.12	45.59	0.00	114.86	0.00	480.24	74.87	0.00	487.12	227.32	11.36	0.00
Ethene (nM/L)	3172.91	3600.71	167.56	117.65	49.91	0.00		231.73	0.00	153.30	231.73	35.65	106.95	0.00		0.00
Total Molar Conc. (nM/L)	9585.34	4122.05	596.32	384.01	527.41	73.65	80.16	859.18	51.26	1047.23	358.40	55.97	1673.12	808.96	1558.61	1947.96
% moles PCE	0.0%	0.1%	0.0%	0.0%	4.9%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	1.1%	0.6%	15.2%	19.4%
% moles TCE	0.0%	0.1%	2.0%	1.0%	3.6%	6.3%	2.8%	1.0%	0.0%	1.9%	1.4%	0.0%	4.0%	4.2%	25.1%	28.9%
% moles cis-1,2-DCE	36.5%	1.0%	39.3%	64.3%	31.9%	28.7%	94.1%	57.9%	65.4%	34.9%	10.4%	10.9%	57.0%	67.1%	58.4%	50.9%
% moles trans-1,2-DCE	1.1%	2.4%	2.5%	4.0%	2.4%	3.1%	3.1%	0.8%	34.6%	2.3%	2.7%	25.4%	2.3%	0.0%	0.5%	0.8%
% moles Vinyl Chloride	29.3%	9.1%	28.0%	0.0%	47.8%	61.9%	0.0%	13.4%	0.0%	45.9%	20.9%	0.0%	29.1%	28.1%	0.7%	0.0%
% moles Ethene	33.1%	87.4%	28.1%	30.6%	9.5%	0.0%	0.0%	27.0%	0.0%	14.6%	64.7%	63.7%	6.4%	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%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Q20 Date	T1-3								T6-1							
	5/18/2011	6/20/2011	7/19/2011	8/17/2011	9/19/2011	10/18/2011	1/18/2012	4/11/2012	5/18/2011	6/20/2011	7/19/2011	9/19/2011	10/18/2011	1/18/2012	4/11/2012	
PCE (µg/L)	0	0	6.9	0	2.3	0.38	1.5	2.4	3.4	0	0.76	24	28	7.3	41	
TCE (µg/L)	0	0	17	0	0.54	0.72	4.3	4.2	11	0	2.6	38	38	6.6	53	
cis-1,2-DCE (µg/L)	164	1.4	112	61	2.3	4.7	26	18	133	0.52	4.6	69	60	8.9	97	
trans-1,2-DCE (µg/L)	6.6	3.9	2.5	2.3	1.2	0	0.88	0.30	0.99	0.61	0	0.74	0.84	0	1.3	
Vinyl chloride (µg/L)	69	3.3	30	46	3.2	2.4	5.3	3.4	5.8	0	0	3.5	0.77	0	2.0	
Ethene (µg/L)	116	12	4.7	19	2.2	0		0	1.4	0	0	1.1	0		0	
PCE (nM/L)	0.00	0.00	41.49	0.00	14.11	2.29	9.23	14.47	20.68	0.00	4.58	145.81	170.54	44.26	248.21	
TCE (nM/L)	0.00	0.00	127.41	0.00	4.11	5.48	32.73	31.66	81.29	0.00	19.64	290.36	290.74	49.85	406.42	
cis-1,2-DCE (nM/L)	1687.98	14.65	1152.76	629.60	23.93	48.38	265.09	184.73	1366.99	5.36	47.76	712.02	615.06	91.39	996.29	
trans-1,2-DCE (nM/L)	68.08	40.54	26.30	23.72	12.48	0.00	9.08	3.09	10.21	6.29	0.00	7.63	8.66	0.00	13.20	
Vinyl chloride (nM/L)	1098.38	53.43	478.16	736.20	51.51	39.19	84.63	54.23	93.59	0.00	0.00	56.31	12.32	0.00	32.80	
Ethene (nM/L)	4135.47	431.37	167.56	677.36	78.43	0.00		0.00	49.91	0.00	0.00	39.22	0.00		0.00	
Total Molar Conc. (nM/L)	6989.92	539.99	1993.68	2066.89	184.57	95.34	400.74	288.19	1622.67	11.66	71.98	1251.34	1097.32	185.50	1696.91	
% moles PCE	0.0%	0.0%	2.1%	0.0%	7.6%	2.4%	2.3%	5.0%	1.3%	0.0%	6.4%	11.7%	15.5%	23.9%	14.6%	
% moles TCE	0.0%	0.0%	6.4%	0.0%	2.2%	5.7%	8.2%	11.0%	5.0%	0.0%	27.3%	23.2%	26.5%	26.9%	24.0%	
% moles cis-1,2-DCE	24.1%	2.7%	57.8%	30.5%	13.0%	50.7%	66.1%	64.1%	84.2%	46.0%	66.4%	56.9%	56.1%	49.3%	58.7%	
% moles trans-1,2-DCE	1.0%	7.5%	1.3%	1.1%	6.8%	0.0%	2.3%	1.1%	0.6%	54.0%	0.0%	0.6%	0.8%	0.0%	0.8%	
% moles Vinyl Chloride	15.7%	9.9%	24.0%	35.6%	27.9%	41.1%	21.1%	18.8%	5.8%	0.0%	0.0%	4.5%	1.1%	0.0%	1.9%	
% moles Ethene	59.2%	79.9%	8.4%	32.8%	42.5%	0.0%	0.0%	0.0%	3.1%	0.0%	0.0%	3.1%	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%	100.0%	100.0%	100.0%	

Note: 0 sample indicates a non-detect analyte value

Table 20.1.2

B-3 Bioreactor VOC Summary  
May 2011 - April 2012

Q20 Date	B3-T6-2							
	5/18/2011	6/20/2011	7/19/2011	8/17/2011	9/19/2011	10/18/2011	1/18/2012	4/11/2012
PCE (µg/L)	0	11	0	0	2.5	0	0	1.0
TCE (µg/L)	0	25	0	0	0.25	2.1	0	1.6
cis-1,2-DCE (µg/L)	1.4	36	0.70	1.2	0.75	13	0.40	15
trans-1,2-DCE (µg/L)	1.3	0.29	0.28	0	0	0	0	0.25
Vinyl chloride (µg/L)	0	2.9	0	0	0	5.0	0	4.1
Ethene (µg/L)	0	3.1	0	0	0	0		2.9
PCE (nM/L)	0.00	64.22	0.00	0.00	15.38	0.00	0.00	6.15
TCE (nM/L)	0.00	186.62	0.00	0.00	1.90	16.36	0.00	12.41
cis-1,2-DCE (nM/L)	14.75	374.21	7.22	12.17	7.74	137.70	4.13	151.83
trans-1,2-DCE (nM/L)	13.51	2.99	2.89	0.00	0.00	0.00	0.00	2.58
Vinyl chloride (nM/L)	0.00	47.03	0.00	0.00	0.00	80.47	0.00	64.95
Ethene (nM/L)	0.00	110.52	0.00	0.00	0.00	0.00		103.39
Total Molar Conc. (nM/L)	28.26	785.60	10.11	12.17	25.02	234.53	4.13	341.30
% moles PCE	0.0%	8.2%	0.0%	0.0%	61.5%	0.0%	0.0%	1.8%
% moles TCE	0.0%	23.8%	0.0%	0.0%	7.6%	7.0%	0.0%	3.6%
% moles cis-1,2-DCE	52.2%	47.6%	71.4%	100.0%	30.9%	58.7%	100.0%	44.5%
% moles trans-1,2-DCE	47.8%	0.4%	28.6%	0.0%	0.0%	0.0%	0.0%	0.8%
% moles Vinyl Chloride	0.0%	6.0%	0.0%	0.0%	0.0%	34.3%	0.0%	19.0%
% moles Ethene	0.0%	14.1%	0.0%	0.0%	0.0%	0.0%	0.0%	30.3%
sum % moles	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 20.2.2

**Upper Saturated Zone (Zone LGR03B) VOC Results Summary  
May 2011 - April 2012**

Date	CS-WB05-LGR03B						CS-WB06-LGR03B							
	5/17/2011	6/21/2011	7/18/2011	10/19/2011	1/19/2012	4/18/2012	5/17/2011	6/21/2011	7/18/2011	8/16/2011	9/20/2011	10/20/2011	1/19/2012	4/23/2012
PCE (µg/L)	0	2.3	0	0	0.27	6.0	91	84	83	39	83	70	119	94
TCE (µg/L)	5.4	3.0	0.33	2.0	0.39	32	221	104	93	64	129	105	147	130
cis-1,2-DCE (µg/L)	190	85	119	125	118	118	319	196	179	139	211	124	208	260
trans-1,2-DCE (µg/L)	41	20	22	19	20	8.0	2.1	2.2	2.0	2.2	1.4	1.2	2.0	1.9
Vinyl chloride (µg/L)	7.0	3.6	11	15	25	25	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCE (nM/L)	0.00	13.69	0.00	0.00	1.63	35.94	547.97	507.69	501.72	235.60	500.15	425.01	716.34	569.62
TCE (nM/L)	41.10	22.91	2.51	14.84	2.97	239.82	1684.22	793.67	707.28	489.54	983.41	797.40	1121.78	990.41
cis-1,2-DCE (nM/L)	1956.06	876.43	1231.56	1288.60	1213.10	1214.96	3294.59	2019.50	1842.08	1433.42	2175.35	1274.27	2140.28	2676.64
trans-1,2-DCE (nM/L)	418.77	207.32	228.47	191.03	205.78	82.10	21.35	22.38	20.73	22.38	14.03	12.89	20.32	19.70
Vinyl chloride (nM/L)	112.14	57.43	174.85	233.72	404.74	396.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethene (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Molar Conc. (nM/L)	2528.07	1177.78	1637.39	1728.19	1828.21	1968.92	5548.13	3343.23	3071.82	2180.94	3672.93	2509.57	3998.71	4256.37
% moles PCE	0.0%	1.2%	0.0%	0.0%	0.1%	1.8%	9.9%	15.2%	16.3%	10.8%	13.6%	16.9%	17.9%	13.4%
% moles TCE	1.6%	1.9%	0.2%	0.9%	0.2%	12.2%	30.4%	23.7%	23.0%	22.4%	26.8%	31.8%	28.1%	23.3%
% moles cis-1,2-DCE	77.4%	74.4%	75.2%	74.6%	66.4%	61.7%	59.4%	60.4%	60.0%	65.7%	59.2%	50.8%	53.5%	62.9%
% moles trans-1,2-DCE	16.6%	17.6%	14.0%	11.1%	11.3%	4.2%	0.4%	0.7%	0.7%	1.0%	0.4%	0.5%	0.5%	0.5%
% moles Vinyl Chloride	4.4%	4.9%	10.7%	13.5%	22.1%	20.1%	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%	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%	100.0%	100.0%
	Month 49	Month 50	Month 51	Month 54	Month 57	Month 60	Month 49	Month 50	Month 51	Month 52	Month 53	Month 54	Month 57	Month 60

Note: 0 sample indicates a non-detect analyte value

Date	CS-WB07-LGR03B						CS-WB08-LGR03B		
	7/28/2011	8/16/2011	9/20/2011	10/20/2011	1/19/2012	4/20/2012	5/17/2011	10/19/2011	4/25/2012
PCE (µg/L)	0	0.62	5.4	14	2.7	40	107	53	76
TCE (µg/L)	1.2	2.7	7.0	23	4.9	53	94	70	98
cis-1,2-DCE (µg/L)	10	14	22	50	17	110	116	105	131
trans-1,2-DCE (µg/L)	0	0	0.69	0.78	0.83	1.3	2.4	1.3	1.2
Vinyl chloride (µg/L)	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0
PCE (nM/L)	0.00	3.74	32.44	82.37	16.16	241.21	643.31	318.22	461.26
TCE (nM/L)	8.83	20.63	53.20	174.14	36.99	403.68	712.31	530.03	748.38
cis-1,2-DCE (nM/L)	104.18	141.10	229.60	510.88	176.59	1130.79	1196.39	1082.00	1354.31
trans-1,2-DCE (nM/L)	0.00	0.00	7.12	8.05	8.56	13.72	25.27	13.82	12.07
Vinyl chloride (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethene (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Molar Conc. (nM/L)	113.01	165.47	322.36	775.44	238.30	1789.40	2577.28	1944.07	2576.01
% moles PCE	0.0%	2.3%	10.1%	10.6%	6.8%	13.5%	25.0%	16.4%	17.9%
% moles TCE	7.8%	12.5%	16.5%	22.5%	15.5%	22.6%	27.6%	27.3%	29.1%
% moles cis-1,2-DCE	92.2%	85.3%	71.2%	65.9%	74.1%	63.2%	46.4%	55.7%	52.6%
% moles trans-1,2-DCE	0.0%	0.0%	2.2%	1.0%	3.6%	0.8%	1.0%	0.7%	0.5%
% moles Vinyl Chloride	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%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Month 51	Month 52	Month 53	Month 54	Month 57	Month 60	Month 49	Month 54	Month 60

Note: 0 sample indicates a non-detect analyte value

Table 20.2.3a

SWMU B-3 Bioreactor Multi-port Well CS-WB05  
May 2011 - April 2012

Q20		CS-WB05																								
Well ID		CS-WB05-LGR-01						CS-WB05-LGR03A		CS-WB05-LGR03B								CS-WB05-LGR-04A								
Sample Date		7/26/2011		10/27/2011		4/19/2012		4/18/2012		5/17/2011		6/21/2011		7/18/2011		10/19/2011		1/19/2012		4/18/2012		7/25/2011		4/18/2012		
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	1.4		1.6		0.79		0.55						1.5		2.5				0.83		0.88		1.3		
Total Organic Carbon	mg/L	1.5		1.2		0		2.5						5.6		2.3				0.68		14	J	1.1		
Methane	µg/L	16		24		1.7		45		43		72		94		67				76		719		1,940		
Ethene	µg/L	0		0		0		0		0		0		0		0				0		0		2.2	F	
Ethane	µg/L	0		0		0		0		0		0		0		0				0		0		0		
Carbon Dioxide	µg/L	46,000		64,400		69,800		9,590		8,070		19,900		27,800		12,700				12,200		25,300		45,400		
Sulfate	mg/L	94		100		99		41						43		42				41		21		21		
Chloride	mg/L	13		13		14		12						11		11				12		12		12		
Ferrous Iron	mg/L	0		0		0.26	F	0		0		0		0		0.17	F			0		0.26	F	0		
Manganese	µg/L	0		0		0		0		0		0		0		0				0		6.7		7.9		
Sulfide	mg/L	0		0		0		0						0		0				0		0		0		
Total Dissolved Solids	mg/L	514		507		534		375		393		380		377		384				376		384		355		349
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		0		0		0		0		0		0		0				0.11	F	0		0		
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		0		
Dichloroethene, cis-1,2-	µg/L	2.8		3.4		2.3		110		190		85		119		125		118		118		486		407		
Dichloroethene, trans-1,2-	µg/L	0.68		0.96	F	0.84		12		41		20		22		19		20		8.0		4.9		5.3		
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	0		0		0.15	F	7.2		0		2.3		0		0		0.27	F	6.0		0.62	F	26		
Toluene	µg/L	0		0		0		0		0		0		0		0				0		0		0		
Trichloroethene	µg/L	1.9		1.9		0.73	F	31		5.4		3.0		0.33	F	2.0		0.39	F	32		136		75		
Vinyl chloride	µg/L	0		0		0		23		7.0		3.6		11		15				25		29		49		
Arsenic	µg/L	1.5	F	2.6	F	3.1	F	2.8	F	12		0		0.90	F	0.90	F			3.1	F	3.0	F	3.0	F	
		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q20 - Month 60		Quarter 17						Q18 - Month 54		Q19 - Month 57		Q20 - Month 60		Q17 - Month 51		Q20 - Month 60		

Well ID		CS-WB05-LGR-04B						CS-WB05-B5-01						CS-WB05-CC-01						CS-WB05-CC-02					
Sample Date		7/25/2011		10/27/2011		4/18/2012		7/25/2011		10/26/2011		4/17/2012		7/25/2011		10/26/2011		4/17/2012		7/25/2011		10/26/2011		4/17/2012	
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	1.4		2.6		1.6		0.40	F	1.0		0		0.36	F	0.92		0		6.3		1.5		1.3	
Total Organic Carbon	mg/L	1.6	J	2.5		1.5		0.53	J	1.4		0		0.94		1.5		0.16	F	4.5		0.91		0.24	F
Methane	µg/L	3,990		8,750		9,050		30		30		37		3.6		2.2		6.5		52		3.4		42	
Ethene	µg/L	16		19		41		0		0		0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	53,700		96,600		75,700		15,000		14,200		12,100		18,300		11,600		26,500		11,800		12,300		7,780	
Sulfate	mg/L	6.4		6.2		5.1		32		31		31		84		83		85		96		99		96	
Chloride	mg/L	12		12		13		12		12		12		17		17		18		19		18		19	
Ferrous Iron	mg/L	0.51	F	1.5		1.4		0		0.27	F	0		0.36	F	0.32	F	0.28	F	0.38	F	0.23	F	0.22	F
Manganese	µg/L	48		52		51		0		0		0		0		0		0		4.9	F	0		0	
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	366		347		393		334		331		369		420		406		423		430		435		443	
Benzene	µg/L	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	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0.070	F	0		0		0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	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	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	108		133		45		31		33		31		1.6		1.6		1.5		25		31		25	
Dichloroethene, trans-1,2-	µg/L	3.6		5.1		4.0		0.37	F	0.24	F	0.25	F	0.38	F	0.56	F	0.76		4.5		4.4		8.5	
Methylene chloride	µg/L	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	
Tetrachloroethene	µg/L	31		6.0		20		0		0		0		0.25	F	0		0.32	F	0		0		0.26	F
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	91		82		27		0.18	F	0		0.33	F	2.4		3.2		2.4		25		19		13	
Vinyl chloride	µg/L	110		233		220		5.9		12		7.7		0		0		0		2.0		0		0.43	F
Arsenic	µg/L	9.8		21		11		0.80	F	0.70	F	2.1	F	0.80	F	1.3	F	2.1	F	1.8	F	2.6	F	2.5	F
		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60	

Note: 0 sample value indicates a non-detect analyte value



Table 20.2.3b

**SWMU B-3 Bioreactor Multi-port Well CS-WB06**  
**May 2011 - April 2012**

Q20		CS-WB06																							
Well ID		CS-WB06-UGR-01						CS-WB06-LGR-01						CS-WB06-LGR-02						CS-WB06-LGR03A					
Sample Date		7/27/2011		11/1/2011		4/25/2012		7/27/2011		11/1/2011		4/24/2012		7/27/2011		11/1/2011		4/24/2012		7/26/2011		11/1/2011		4/24/2012	
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	2.4		4.7		2.6		1.3		2.3		1.6		1.2		1.4		0.78		0.48	F	1.1		0.85	
Total Organic Carbon	mg/L	2.7		2.0		1.3		0.70		2.0		1.2		0		1.1		0.44	F	0.42	F	0.98		0.31	F
Methane	µg/L	164		0		1.3		0		0		0		0		2.0		0		0		0		1.1	
Ethene	µg/L	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	
Carbon Dioxide	µg/L	24,600		23,800		46,500		36,400		74,500		20,500		11,200		38,400		16,900		38,200		25,400		45,100	
Sulfate	mg/L	18		30		20		29		26		25		25		25		26		20		19		19	
Chloride	mg/L	15		13		14		14		13		14		10		9.8		10		12		11		12	
Ferrous Iron	mg/L	0		0.16	F	0		0		0		0		0		0.18	F	0		0		0		0	
Manganese	µg/L	575		2.2	F	5.8		1.6	F	7.3		9.9		0		0		0		0		0		0	
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	432		337		366		415		384		396		327		313		340		318		317		328	
Benzene	µg/L	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	
Bromoform	µg/L	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		0		0	
Dibromochloromethane	µg/L	0		4.7		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	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0.23	F	0		0	
Dichloroethene, cis-1,2-	µg/L	63		96		117		37		41		32		29		28		20		178		237		171	
Dichloroethene, trans-1,2-	µg/L	1.6		0.85	F	0.27	F	0.58	F	0.63	F	0.22	F	0.72		0.77	F	0.61		2.5		1.4		0.93	
Methylene chloride	µg/L	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	
Tetrachloroethene	µg/L	7.3		50		13		13		16		4.6		4.0		4.5		3.0		101		88		50	
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	27		68		17		18		18		7.5		10		11		9.8		86		119		73	
Vinyl chloride	µg/L	6.4		0		0		0		0		0		0		0		0.45	F	0		0		0	
Arsenic	µg/L	1.0	F	0.50	F	0		0.60	F	0		0		0.50	F	0		0		1.4	F	1.0	F	0	
		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60	

Well ID		CS-WB06-LGR03B												CS-WB06-LGR-04									
Sample Date		5/17/2011		6/21/2011		7/18/2011		8/16/2011		9/20/2011		10/20/2011		1/19/2012		4/23/2012		7/26/2011		11/1/2011		4/23/2012	
Compound	Units	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					0.65						1.6				0.77		1.1		1.4		0.59	
Total Organic Carbon	mg/L					2.7						1.5				0.17	F	0.30	F	1.2		1.1	
Methane	µg/L	1.6		0		13		0		0		0		0		0		0		0		27	
Ethene	µg/L	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	
Carbon Dioxide	µg/L	27,300		29,800		31,800		13,000		44,000		49,500		10,300		44,100		70,800		69,300			
Sulfate	mg/L					21						20				19		11		12		12	
Chloride	mg/L					12						11				12		13		13		14	
Ferrous Iron	mg/L	0		0		0		0.23	F	0		0		0		0		0		0		0	
Manganese	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Sulfide	mg/L					0						0				0		0		0		0	
Total Dissolved Solids	mg/L	342		339		344		357		328		332		325		335		357		346		352	
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		0		0		0		0		0		0.15	F	0		0.12	F	0		0	
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		0.34	F	0		0	
Dichloroethene, cis-1,2-	µg/L	319		196		179		139		211		124		208		260		330		305		209	
Dichloroethene, trans-1,2-	µg/L	2.1		2.2		2.0		2.2		1.4		1.2		2.0		1.9		4.8		2.6		1.9	
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	91		84		83		39		83		70		119		94		173		103		105	
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0.27	F
Trichloroethene	µg/L	221		104		93		64		129		105		147		130		117		93		70	
Vinyl chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0.84	F
Arsenic	µg/L	16		0		1.3	F	2.0	F	1.5	F	1.7	F			0		0.40	F	0		0	
		Quarter 17				Quarter 18				Q19 - Month 57				Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60			

Note: 0 sample value indicates a non-detect analyte value

Table 20.2.3c

SWMU B-3 Bioreactor Multi-port Well CS-WB07  
May 2011 - April 2012

Q20		WB07													
Well ID		CS-WB07-LGR-01						CS-WB07-LGR-02						CS-WB07-LGR03A	
Sample Date		7/29/2011		11/2/2011		4/23/2012		7/29/2011		11/2/2011		4/23/2012		4/20/2012	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.9		1.7		1.6		1.2		1.7		1.7		0.61	
Total Organic Carbon	mg/L	4.6		5.4		1.7		3.3		1.3		1.7		0.24	F
Methane	µg/L	0		510		361		1.1		0		165		0	
Ethene	µg/L	0		4.5		4.8		0		0		5.1		0	
Ethane	µg/L	0		0.70	F	0		0		0		0		0	
Carbon Dioxide	µg/L	48,700		63,400		40,300		16,000		56,600		57,400		25,100	
Sulfate	mg/L	44		17		24		54		51		26		29	
Chloride	mg/L	16		14		21		13		13		20		11	
Ferrous Iron	mg/L	0		3.4		2.5		0		0		1.3		0	
Manganese	µg/L	14		621		1020		6.3		0		234		2.0	F
Sulfide	mg/L	0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	466		446		400		399		406		404		336	
Benzene	µg/L	0		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	2.4		52		123		2.6		2.0		159		129	
Dichloroethene, trans-1,2-	µg/L	0		1.5		1.7		0		0		5.0		2.1	
Methylene chloride	µg/L	0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0		0.47	F	2.3		0.89	F	0		55	
Toluene	µg/L	0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.4		1.6		27		2.4		1.4		16		75	
Vinyl chloride	µg/L	0		15		27		0		0		48		0	
Arsenic	µg/L	0		4.2	F	1.2	F	0		0.40	F	1.9	F	0	
		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q20 - Month 60	

Well ID		CS-WB07-LGR03B										CS-WB07-LGR-04							
Sample Date		7/28/2011		8/16/2011		9/20/2011		10/20/2011		1/19/2012		4/20/2012		7/29/2011		11/2/2011		4/20/2012	
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	0.97						1.6				0.62		1.5		1.3		1.0	
Total Organic Carbon	mg/L	0.66						1.4				0.50	F	1.6		1.6		0.53	
Methane	µg/L	0.90	F	0		0		0		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	10,500		34,800		30,700		40,400				8,260		32,800		39,500		25,300	
Sulfate	mg/L	35						26				28		12		11		9.7	
Chloride	mg/L	10						10				11		12		12		13	
Ferrous Iron	mg/L	0		0		0.30	F	0.17	F			0		0.16	F	0		0	
Manganese	µg/L	2.3	F	0		0		0				2.1	F	5.9		0		0	
Sulfide	mg/L	0						0				0		0		0		0	
Total Dissolved Solids	mg/L	348		368		342		334		326		344		328		313		325	
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		0.22	F	0		0.21	F
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		0.32	F	0		0	
Dichloroethene, cis-1,2-	µg/L	10		14		22		50		17		110		325		418		443	
Dichloroethene, trans-1,2-	µg/L	0		0		0.69		0.78		0.83		1.3		3.5		0.43	F	0.87	
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		0.62	F	5.4		14		2.7		40		155		226		259	
Toluene	µg/L	0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.2		2.7		7.0		23		4.9		53		209		314		294	
Vinyl chloride	µg/L	0		0		0		0		0		0		0		0		0	
Arsenic	µg/L	2.0	F	1.0	F	2.2	F	2.2	F			0		0		0		0.70	F
		Q17 - Month 51		Quarter 18						Q19 - Month 57		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60	

Note: 0 sample value indicates a non-detect analyte value

Table 20.2.3d

SWMU B-3 Multi-port Well CS WB08  
May 2011 - April 2012

Q20		CS-WB08																	
Well ID		CS-WB08-UGR-01						CS-WB08-LGR-01						CS-WB08-LGR-02					
Sample Date		7/28/2011		11/3/2011		4/26/2012		7/28/2011		11/3/2011		4/26/2012		7/27/2011		11/3/2011		4/26/2012	
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	2.0		2.9		2.7		0.64		1.6		0.79		0.47	F	1.4		0.80	
Total Organic Carbon	mg/L	2.2		3.0		1.8		0.22	F	1.1		0.34	F	0.13	F	1.1		1.4	
Methane	µg/L	188		944		446		0		1.1		0		2.0		3.0		7.8	
Ethene	µg/L	3.0		12		7.8		0		0		0		0		0		0	
Ethane	µg/L	0		0.90	F	0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	34,100		97,600		51,300		28,700		50,200		44,300		27,400		32,400		77,200	
Sulfate	mg/L	11		21		14		98		100		100		106		105		106	
Chloride	mg/L	15		15		16		11		11		11		11		11		12	
Ferrous Iron	mg/L	0.24	F	0		0.50	F	0		0.18	F	0.32	F	0.22	F	0		0.21	F
Manganese	µg/L	818		624		542		0		2.1	F	1.9	F	0		0		0	
Sulfide	mg/L	0		0		0		0		5.0		0		0		0		0	
Total Dissolved Solids	mg/L	475		426		380		522		528		531		537		544		552	
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		0.36	F	0.30	F	0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	259		375		565		54		51		32		6.6		7.4		2.6	
Dichloroethene, trans-1,2-	µg/L	1.7		2.0		2.4		4.5		4.9		2.7		0		0		0	
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	0.84	F	7.3		0.35	F	0		0.56	F	0		0		0		0	
Toluene	µg/L	0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	2.4		26		2.2		1.2		2.6		1.2		0		0		0.14	F
Vinyl chloride	µg/L	57		86		56		0		0		0		0		0		0	
Arsenic	µg/L	3.0	F	0.50	F	6.2		1.7	F	0.80	F	7.1		2.1	F	1.2	F	5.2	
		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60	

Well ID		CS-WB08-LGR03B						CS-WB08-LGR-04					
Sample Date		5/17/2011		10/19/2011		4/25/2012		7/27/2011		11/3/2011		4/25/2012	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L			1.5		0.53		1.2		3.8		1.2	
Total Organic Carbon	mg/L			1.2		0.26	F	4.7		1.5		1.2	
Methane	µg/L	0		0		0		0		0		0	
Ethene	µg/L	0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0	
Carbon Dioxide	µg/L	7,740		38,000		34,000		77,300		91,300		45,800	
Sulfate	mg/L	19		17		17		23		26		21	
Chloride	mg/L			11		12		15		14		16	
Ferrous Iron	mg/L	0		0.17	F	0.18	F	0.29	F	0.37	F	0.18	F
Manganese	µg/L	0		0		38		20		80		80	
Sulfide	mg/L	0		0		0		0		3.0	F	0	
Total Dissolved Solids	mg/L	353		337		337		402		394		391	
Benzene	µg/L	0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0	
Chloroform	µg/L	0.11	F	0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	116		105		131		31		33		75	
Dichloroethene, trans-1,2-	µg/L	2.4		1.3		1.2		0		0		0.26	F
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	107		53		76		2.7		13		15	
Toluene	µg/L	0		0		0		0		0		0	
Trichloroethene	µg/L	94		70		98		5.9		21		21	
Vinyl chloride	µg/L	0		0		0		0		0		0.44	F
Arsenic	µg/L	16		1.5	F	2.7	F	0.30	F	0		0	
		Q17 - Month 49		Q18 - Month 54		Q20 - Month 60		Q17 - Month 51		Q18 - Month 54		Q20 - Month 60	

Note: 0 sample value indicates a non-detect analyte value

Table 20.3.3

**B-3 Bioreactor Monitoring Well Analytical Summary**  
**May 2011 - April 2012**

Q20		Monitoring Wells													
Well ID		CS-B3-MW01						CS-D		CS-MW1-LGR					
Sample Date		7/20/2011		10/25/2011		4/12/2012		4/10/2012		7/20/2011		10/25/2011		4/10/2012	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	4.2		7.3		7.0		0.54		0		2.2		0.60	
Total Organic Carbon	mg/L	8.5		6.6		7.6		0.37	F	0.58		2.4		0	
Methane	µg/L	517		2.6		81,300		0		0		0		0	
Ethene	µg/L	0		0		19		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	108,000		53,100		428,000		27,000		34,200		41,800		37,600	
Sulfate	mg/L	1.6		1.2		1.7		16		14		14		14	
Chloride	mg/L	12		12		13		11		9.0		9.0		9.4	
Ferrous Iron	mg/L	3.2		15		8.6		0		0		0		0	
Manganese	µg/L	154		249		148		0		0		3.7	F	0	
Hydrogen	nM									3.3		8.0		5.9	
Sulfide	mg/L	0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	722		542		550		309		298		305		302	
Benzene	µg/L	0		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		0.11	F	0.13	F	0		0.13	F
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	0.48	F	0		60		61		15		17		18	
Dichloroethene, trans-1,2-	µg/L	0.31	F	0		2.5		0.40	F	0.21	F	0		0.23	F
Methylene chloride	µg/L	0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.77	F	0		0		47		14		14		14	
Toluene	µg/L	0.12	F	0		0.29	F	0		0		0		0	
Trichloroethene	µg/L	0.59	F	0		1.5		49		30		32		25	
Vinyl chloride	µg/L	36		5.4		209		0		0		0		0	
Arsenic	µg/L	1.0	F	8.3		0		0		0		1.8	F	0	

Note: 0 sample value indicates a non-detect value

Table 20.4.4

**SWMU B-3 Microbial Data Summary**  
**May 2011 - April 2012**

Trench Sump	Sample date:	7/19/2011	10/25/2011	4/11/2012
<b>B3 T1-2</b>				
<b>Dechlorinating Bacteria</b>	units			
<i>Dehalococcoides spp (1)</i>	(cells/mL)	1.57E+02	5.70E+01	1.91E+02
<b>Functional Genes</b>	units			
TCE R-Dase (1)	(cells/mL)	4.72E+02	6.78E+02	1.79E+02
BAV1 VC R-Dase (1)	(cells/mL)	1.37E+01	<5.00E-01	5.00E-01 F
VC R-Dase	(cells/mL)	2.38E+02	2.06E+02	1.25E+01
<b>B3 T6-2</b>				
<b>Dechlorinating Bacteria</b>	units			
<i>Dehalococcoides spp (1)</i>	(cells/mL)	1.90E+03	1.56E+02	5.35E+03
<b>Functional Genes</b>	units			
TCE R-Dase (1)	(cells/mL)	4.07E+02	4.26E+01	6.49E+02
BAV1 VC R-Dase (1)	(cells/mL)	1.08E+02	2.62E+01	4.52E+01
VC R-Dase	(cells/mL)	8.76E+01	8.25E+01	3.47E+01

Monitoring wells	Sample date:	7/21/2011	10/25/2011	4/10/2012
<b>CS-MW1-LGR</b>				
<b>Dechlorinating Bacteria</b>	units			
<i>Dehalococcoides spp (1)</i>	(cells/mL)	1.00E+00	2.00E-01 F	3.80E+00
<b>Functional Genes</b>	units			
TCE R-Dase (1)	(cells/mL)	5.00E-01 F	< 5.00E-01	< 5.00E-01
BAV1 VC R-Dase (1)	(cells/mL)	< 5.00E-01	< 5.00E-01	< 5.00E-01
VC R-Dase	(cells/mL)	2.00E+00	1.80E+00	< 5.00E-01
<b>CS-MW16-LGR</b>				
<b>Dechlorinating Bacteria</b>	units			
<i>Dehalococcoides spp (1)</i>	(cells/mL)	< 5.00E-01	< 5.00E-01	6.00E-01
<b>Functional Genes</b>	units			
TCE R-Dase (1)	(cells/mL)	< 5.00E-01	< 5.00E-01	< 5.00E-01
BAV1 VC R-Dase (1)	(cells/mL)	< 5.00E-01	< 5.00E-01	< 5.00E-01
VC R-Dase	(cells/mL)	< 5.00E-01	< 5.00E-01	< 5.00E-01



Table 20.6.2

**B-3 Bioreactor Extraction Well VOC Summary**  
**May 2011 - April 2012**

Q20	16 LGR			16 CC			EXW01			EXW 02		
	Date	7/21/2011	10/25/2011	4/10/2012	7/21/2011	10/25/2011	4/10/2012	7/20/2011	10/24/2011	4/10/2012	7/20/2011	10/24/2011
PCE (µg/L)	115	120	134	1.3	1.1	1.2	168	107	138	77	80	84
TCE (µg/L)	135	148	144	22	20	14	159	137	141	90	105	103
cis-1,2-DCE (µg/L)	162	143	160	25	21	20	180	190	189	83	100	111
trans-1,2-DCE (µg/L)	0.44	0	0.23	6.5	5.5	5.9	1.5	0.86	0.70	0.88	0.66	0.81
Vinyl chloride (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0
PCE (nM/L)	690.59	721.04	811.07	7.96	6.75	7.30	1011.04	648.19	830.73	461.92	485.20	505.28
TCE (nM/L)	1024.43	1123.98	1094.45	167.52	151.31	105.34	1212.35	1043.54	1071.01	682.40	795.42	783.09
cis-1,2-DCE (nM/L)	1669.31	1477.57	1647.04	255.49	214.65	207.63	1857.56	1955.13	1952.14	851.88	1031.67	1148.94
trans-1,2-DCE (nM/L)	4.54	0.00	2.37	66.84	57.25	61.27	15.58	8.87	7.22	9.08	6.81	8.36
Vinyl chloride (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethene (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Molar Conc. (nM/L)</b>	<b>3388.87</b>	<b>3322.59</b>	<b>3554.93</b>	<b>497.81</b>	<b>429.95</b>	<b>381.53</b>	<b>4096.51</b>	<b>3655.73</b>	<b>3861.10</b>	<b>2005.27</b>	<b>2319.09</b>	<b>2445.66</b>
% moles PCE	20.4%	21.7%	22.8%	1.6%	1.6%	1.9%	24.7%	17.7%	21.5%	23.0%	20.9%	20.7%
% moles TCE	30.2%	33.8%	30.8%	33.7%	35.2%	27.6%	29.6%	28.5%	27.7%	34.0%	34.3%	32.0%
% moles cis-1,2-DCE	49.3%	44.5%	46.3%	51.3%	49.9%	54.4%	45.3%	53.5%	50.6%	42.5%	44.5%	47.0%
% moles trans-1,2-DCE	0.1%	0.0%	0.1%	13.4%	13.3%	16.1%	0.4%	0.2%	0.2%	0.5%	0.3%	0.3%
% moles Vinyl Chloride	0.0%	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 20.6.3

**B-3 Bioreactor Extraction Well Analytical Summary**  
 May 2011 - April 2012

Q20		Extraction Wells																							
Well ID		CS-MW16-LGR						CS-MW16-CC						B3-EXW01				B3-EXW02							
Sample Date		7/21/2011		10/25/2011		4/10/2012		7/21/2011		10/25/2011		4/10/2012		7/20/2011		10/24/2011		4/10/2012		7/20/2011		10/24/2011		4/10/2012	
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	1.8		1.6		0.25	F	0		1.3		1.3		1.8		1.4		0.53		0.15	F	1.2		0.52	
Total Organic Carbon	mg/L	0.34	F	0.57		0.47	F	2.7		1.2		0.68		3.2		1.2		0.50		0.36	F	1.1		1.2	
Methane	µg/L	0		1.8		8.5		6.2		5.6		7.0		0		0		0		0		0		0	
Ethene	µg/L	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	
Carbon Dioxide	µg/L	33,000		41,200		39,600		24,500		28,300		29,200		47,700		38,600		40,800		32,300		34,200		37,300	
Sulfate	mg/L	18		17		18		69		69		70		11		11		14		13		13		13	
Chloride	mg/L	10		10		11		18		17		18		12		12		12		13		12		13	
Ferrous Iron	mg/L	0		0.18	F	0		0.38	F	0.42	F	0.43	F	0		0.16	F	0		0		0		0	
Manganese	µg/L	0		0		0		0		0		0		3.3	F	0		0		0		0		0	
Hydrogen	nM			6.8		9.8		7.0																	
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	327		315		315		383		394		402		346		331		338		339		335		329	
Benzene	µg/L	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	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0.17	F	0		0.12	F	0.12	F	0		0.13	F
Dibromochloromethane	µg/L	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	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	162	J	143		160		25		21		20		180		190		189		83		100		111	
Dichloroethene, trans-1,2-	µg/L	0.44	F	0		0.23	F	6.5		5.5		5.9		1.5		0.86		0.70		0.88		0.66		0.81	
Methylene chloride	µg/L	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	
Tetrachloroethene	µg/L	115	J	120		134		1.3	F	1.1	F	1.2	F	168		107		138		77		80		84	
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	135	J	148		144		22		20		14		159		137		141		90		105		103	
Vinyl chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Arsenic	µg/L	0.50	F	1.8	F	0		0.30	F	2.4	F	0		0		0.40	F	0		1.0	F	1.0	F	0	

Note: 0 sample value indicates a non-detect analyte value



**B-3 Bioreactor UGR Well Analytical Summary**  
**May 2011 - April 2012**

Q20		Shallow UGR Wells															
Well ID		B3-MW26-UGR						B3-MW27-UGR						B3-MW29-UGR		B3-MW30-UGR	
Sample Date		7/21/2011		10/24/2011		4/16/2012		7/21/2011		10/24/2011		4/16/2012		4/16/2012		4/16/2012	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.0		3.5		3.0		2.1		3.5		1.6		2.6		3.2	
Total Organic Carbon	mg/L	2.3		3.4		3.3		5.0		3.2		1.8		2.1		3.8	
Methane	µg/L	1,110		472		2,630		329		1,200		871		0		0	
Ethene	µg/L	19		4.8		6.9		0		4.0		0		0		0	
Ethane	µg/L	1.1	F	0		3.5		0		1.5	F	3.6		0		0	
Carbon Dioxide	µg/L	120,000		124,000		110,000		133,000		207,000		109,000		58,100		67,200	
Sulfate	mg/L	24		16		19		10		9.8		13		42		33	
Chloride	mg/L	15		14		16		15		15		24		15		13	
Ferrous Iron	mg/L	1.2		0.28	F	0.45	F	1.4		1.3		0.56	F	0.37	F	0.35	F
Manganese	µg/L	225		204		316		79		62		48		67		33	
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	475		489		432		505		493		462		448		436	
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		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	0.36	F	0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	265		100		66		1.6		6.1		0.48	F	0		5.9	
Dichloroethene, trans-1,2-	µg/L	2.5		0.66		1.6		0.61		0.98		0.22	F	0		0	
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	0		0		0		0		0		0		0.52	F	11	
Toluene	µg/L	0.22	F	0.39	F	0.30	F	0		0		0		0		0.35	F
Trichloroethene	µg/L	0.25	F	0.76	F	1.6		0.81	F	2.4		0		0.27	F	4.1	
Vinyl chloride	µg/L	107		19		39		4.4		10		0.76	F	0		0	
Arsenic	µg/L	0.80	F	1.0	F	0		7.4		5.6		0		0		0	

Well ID		B3-MW31-UGR						B3-MW32-UGR						B3-MW33-UGR				B3-MW34-UGR					
Sample Date		7/20/2011		10/24/2011		4/16/2012		7/21/2011		10/24/2011		4/16/2012		7/21/2011		4/16/2012		7/21/2011		10/24/2011		4/16/2012	
Compound	Units	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	2.3		3.4		2.3		0.87		4.0		0.70		1.7		1.9		2.2		3.4		2.9	
Total Organic Carbon	mg/L	4.6		3.4		2.0		2.3		5.6		1.7		3.2		2.2		3.5		4.1		3.0	
Methane	µg/L	0		0		0		0		0		0		13		1,960		1,260		4,410			
Ethene	µg/L	0		0		0		0		0		0		0		15		7.9		9.4			
Ethane	µg/L	0		0		0		0		0		0		0		2.1		1.7	F	6.0			
Carbon Dioxide	µg/L	107,000		117,000		79,600		40,900		54,800		48,600		85,900		82,100		138,000		170,000		59,300	
Sulfate	mg/L	73		214		119		30		37		19		97		102		20		18		7.1	
Chloride	mg/L	11		11		12		10		9.9		12		10		13		16		14		15	
Ferrous Iron	mg/L	0		1.0		0.61	F	0.56	F	2.3		1.5		0.80	F	0.18	F	0.59	F	0.57	F	0.21	F
Manganese	µg/L	44		270		324		51		307		478		29		197		651		464		771	
Sulfide	mg/L	0		0		0		0		0		0		5.3		0		0		0		0	
Total Dissolved Solids	mg/L	500		714		575		374		420		372		550		548		453		467		398	
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		0		0		0		0		0		0		0		0		0		0	
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		0.52	F	0		0		0	
Dichloroethene, cis-1,2-	µg/L	8.6		13		15		80		78		16		16		24		162		185		64	
Dichloroethene, trans-1,2-	µg/L	0.47	F	0		1.6		2.3		1.4		0		0.54	F	2.7		1.5		2.0			
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	12		8.6		6.7		40		35		6.0		18		18		0		0.72	F	1.6	
Toluene	µg/L	0.54	F	0.56	F	0		0		0		0.26	F	0		0.26	F	0.35	F	0		0.28	F
Trichloroethene	µg/L	4.1		3.3		4.1		16		16		2.5		6.3		9.4		0.35	F	0.79	F	4.4	
Vinyl chloride	µg/L	0		0		0		0		0		0.46	F	0		1.3		134		76		35	
Arsenic	µg/L	1.6	F	3.6	F	0		1.8	F	7.7		13		0.60	F	0		0.60	F	1.1	F	0	

Note: 0 sample value indicates a non-detect analyte value