

**CSSA B-3 BIOREACTOR OPERATIONS  
PERFORMANCE STATUS REPORT  
(QUARTER 11, MONTHS 31 – 33, NOVEMBER, 2009 – JANUARY, 2010)**

**MARCH 11, 2010**

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This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from November 1, 2009 through January 31, 2010, comprising the eleventh quarter 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 January 2010 are attached for reference. Parsons personnel working on this project during the reporting period include Ken Rice, Samantha Elliott, Eric Tennyson, Adrien Lindley, Julie Bouch, Michael Zugelder, Scott Pearson, Edward Galbavy, William Martin, and Justin Kirk.

***Executive Summary***

Site conditions were seasonal and wet through the quarter with 7.54 inches of precipitation reported. Injection of extracted groundwater continued through the quarter with few interruptions. Minor interruptions include: winterizing, reaching automatic cut-off levels in the wells and/or storage tank, and reaching the high water level automatic cut-off level in trench 1. Approximately 22,176,859 gallons of groundwater extracted from CS-MW16-LGR, CS-MW16-CC, and B3-EXW01 have been injected into bioreactor trenches 1 and 2 since the start of normal operations. During quarter 11, a total of 2,804,864 gallons of extracted groundwater from wells CS-MW16-LGR, CS-MW16-CC, and B3-EXW01 were injected into the bioreactor. The majority of extracted groundwater, ~1,473,000 gallons, was from CS-B3-EXW01, while ~861,000 gallons was extracted from CS-MW16-CC, and 471,000 gallons were extracted from CS-MW16-LGR.

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 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 trench 1. 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 detections of high concentrations of Mn(II) in trench 1 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***

Initial baseline and quarter 1 through quarter 11 analytical results from monitoring of the bioreactor sumps indicate that the SWMU B-3 trenches contain a range of *cis*-DCE levels (7.6 – 120 µg/L – Quarter 11) as well as concentrations of other dechlorination products (e.g., VC, ethene). In addition, minor amounts of toluene, and other fuel related compounds were identified during monitoring of bioreactor sumps from trenches 1 through 6 during the quarter. A summary of the analytical data collected for the reporting period is included in Table 1. A summary of monthly and quarter 11 monitoring results from the bioreactor trench sumps are attached, analytical results of the surrounding SWMU B-3 multi-port monitoring wells (MPMW or Westbay®) and monitoring wells are also attached.

Results of VOC analyses indicate that groundwater from the uppermost saturated zone (LGR-03B) of Westbay® wells CS-WB05 and CS-WB07 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. Wells CS-WB06 and CS-WB08 both contain 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. Quarterly data from the bioreactor trench sumps indicate a decrease in contaminant mass (total molar concentration) in all sumps in trenches 1 and 2 through the quarter. Groundwater samples were only collected in November in sumps T3-1, T3-2, T4-1, T5-1, T5-2, T6-1, and T6-2, however, no significant changes from the previous quarter was indicated, as the total molar concentrations for each sump was less than 20 nM/L. Over the bioreactor operational period, contaminant mass appears stable or decreasing.

Water quality field measurements from the bioreactor trench 1 sumps indicate that DO has risen from the previous quarter to an average of 0.76 mg/L, ORP has risen since the previous quarter, averaging -73.3 mV, pH ~ 6.94, temperatures range from 10.48 °C to 20.05 °C, and specific conductivity ranges from 0.348 to 0.668 millisiemens per centimeter (mS/cm). Other observations regarding the data collected during this reporting period are listed below.

Water quality field measurements from trench 2 include: average DO, pH, and ORP ~0.61 mg/L, ~6.70, and ~ -75 mV, respectively; temperature ranges from 16.38 °C to 25.74 °C; and specific conductivity ranges from 0.343 to 1.208 mS/cm.

Through the 11<sup>th</sup> quarter of bioreactor operation, 7.54 inches of precipitation were measured at the weather stations proximal to the bioreactor site. Average water thickness in Trench 1 during this period is approximately 9.28 feet. Average water thickness in Trench 2 during this period is approximately 4.59 feet.

Attached are graphs including a cumulative total volume of recovered groundwater from CS-MW16-LGR and CS-MW16-CC applied into trench 1, the B-3 Trench 1 average water thickness

with rainfall data and average water applied daily to trench 1, the CVOC concentrations in CS-MW16-LGR, and the water level elevations in the defined uppermost saturated zone (zone LGR-03B) of the B-3 multi-port monitoring wells with rainfall data.

### ***Analytical Data Observations***

1. Arsenic (As) was detected in concentrations exceeding the MCL (10 µg/L) in trench samples collected at T2-2 (16.8 µg/L), T3-1 (18.7 µg/L), and T5-2 (20.2 µg/L) during quarter 11. Manganese (Mn) was reported in bioreactor trench water samples at concentrations ranging from non-detect to 1,960 µg/L (MCL is 50 µg/L). An elevated level of Mn was reported in CS-B3-MW01 (125 µg/L) during this quarter. Arsenic was not detected in any of the monitoring wells surrounding the bioreactor during the quarter. Elevated levels of Mn were reported in CS-WB06-UGR01 (201 µg/L), CS-WB08-UGR01 (408 µg/L) and CS-WB05-LGR-04B (51.6 µg/L), and elevated levels of As were reported in CS-WB05-LGR04B (27.1 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. Lead levels in groundwater collected from CS-B3-EXW01 reached 30.6 µg/L, exceeding the drinking water Action Level (15 µg/L). Lead monitoring in groundwater will continue as Bioreactor operations progress.
3. DO and ORP values were less favorable for the reduction of CAHs compared with the previous quarter, however, it is likely that geochemical conditions will improve as flood test operations cease and normal bioreactor operations ensue.
4. The volatile organic compound summary for the trenches indicates a continuation of a predominately a three-component (VC, DCE isomer, and ethene) chemical composition in water collected from the trench sumps. This indicates the further reduction of contaminants along the degradation pathway toward the end product ethene. Total molar concentrations in sumps in trenches 1 and 2 decreased through the quarter. The trans-DCE isomer in trenches 1 and 2 is theorized to be the result of an abiotic reductive dechlorination pathway.
5. Reductive dechlorination of CAHs by microbial activity other than DHC appears to be occurring as DHC bacterial counts have been negligible.
6. Saturated conditions within the bioreactor are maintained through the quarter with average water thicknesses of approximately 9.28 feet and 4.59 feet in trenches 1 and 2, respectively.

### ***Anticipated Schedule for Next Period (November, 2009 – January, 2009):***

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Complete the integration of system controls with SCADA.
- Conduct monthly monitoring events in February and March (Months 34 and 35), and quarterly monitoring event in April (Month 36) for bioreactor system.
- Continue UIC monthly monitoring with semi-annual reporting due June 2010.
- Begin construction of 8 shallow piezometers around the bioreactor.

- Complete the design phase/begin construction of a fourth extraction well to deliver groundwater to the bioreactor.

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

- Analytical results from the B-3 Trench Sump (trenches 1 through 6) samples, shown in Table 11.1.2, present data from the quarter 11 sampling events.
- Table 11.1.1 indicates a water thickness of approximately 9.28 feet in trench 1 and 4.59 feet in trench 2 was maintained.
- Table 11.1.2 indicates that VC was present at moderate concentrations in trench sumps, ranging from 0.54 to 50 µg/L in trench 1 and from non-detect to 80 µg/L in trench 2. Ethene was observed in concentrations ranging from ND to 3.9 µg/L in trench 1 and non-detect to 7.7 µg/L in trench 2.
- Table 11.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 11.1.3 provides evidence of the biotic anaerobic degradation pathway with the elevated concentrations of Mn and CO<sub>2</sub>.
- Table 11.3.3 indicates that VC was present (5.1 µg/L) in the sample taken from monitoring well CS-B3-MW01, which remains consistent with samples collected through the previous 32 months. Additionally, table 11.3.3 indicates that VC concentrations in groundwater samples collected from the new extraction well (B3-EXW01) have decreased from 15 µg/L (July, 2009) to non-detect in January, however lead has increased from non-detect to 30.6 µg/L in the last quarter.
- Table 11.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are very low in the trench sumps.
- The changes in molar fraction and total molar concentrations shown in graphs of quarter 11 trenches 1 and 2sumps indicate a continued reduction in contaminant mass to end products VC and ethene.
- Figure 11.2.5 shows that the water levels in Westbay wells are significantly influenced by precipitation and pumping at CS-MW16-LGR and CS-B3-EXW01.

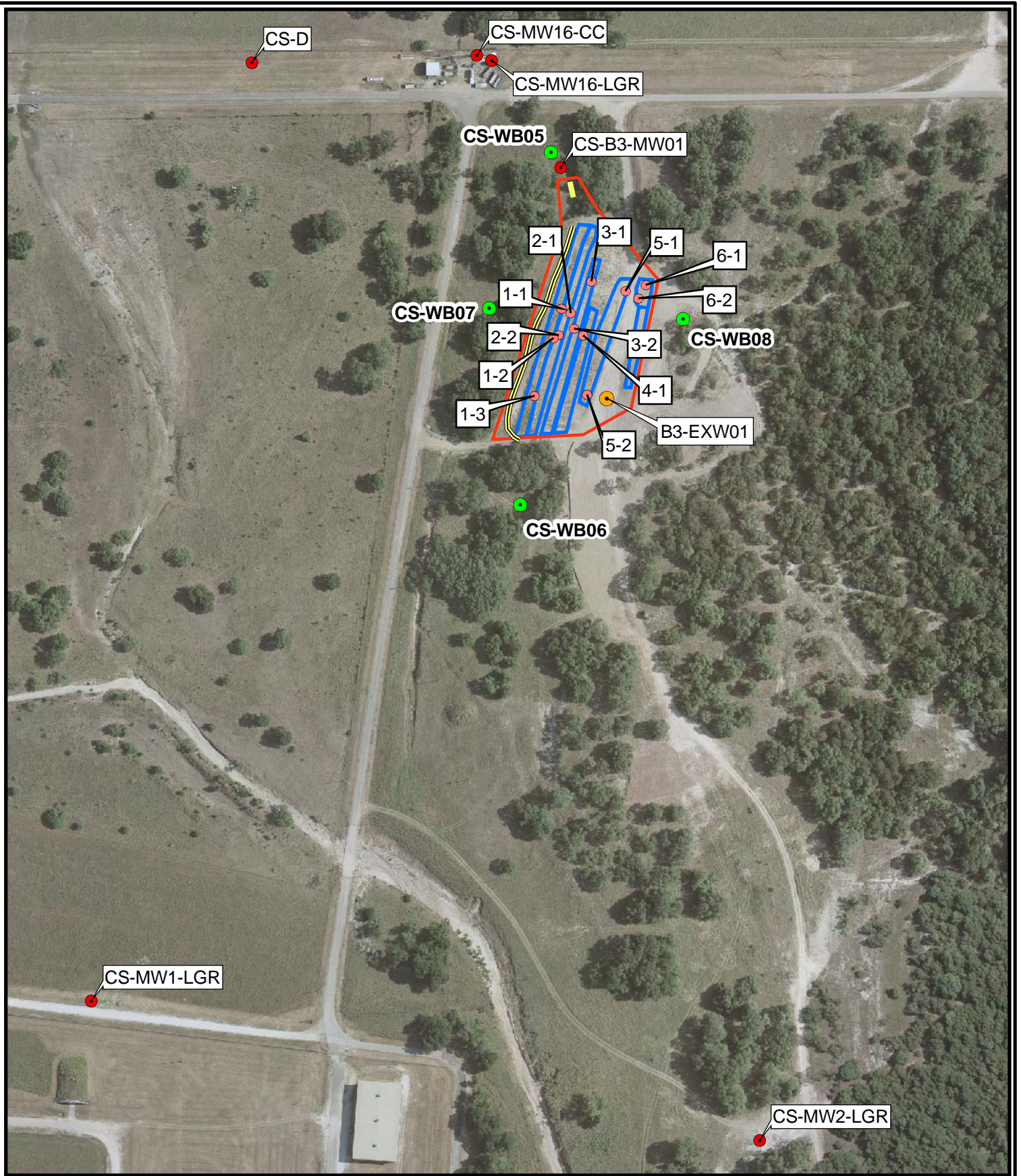
## Analytical Summary Data

**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>Alkalinity</b>	<b>N, NO<sub>3</sub> &amp; NO<sub>2</sub></b>	<b>Fe<sup>2+</sup></b>	<b>Mn</b>	<b>Metals</b>	<b>H<sup>+</sup></b>	<b>DHC</b>
Monthly Sampling <sup>a</sup> (31)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monthly Sampling <sup>a</sup> (32)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quarterly Sampling <sup>b</sup> (11)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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, and Multi-port (Westbay) wells and monthly samples.



- New Extraction Well
- Bioreactor Trench Sumps
- B-3 Monitoring Wells
- Westbay Wells
- B-3 Boundary
- Berm Location
- Tank
- Former Trench Locations

Figure 1

B-3 Bioreactor System  
Camp Stanley Storage Activity

**PARSONS**

**Key for table/figure numbering**

First digit (Sample Event)	0 = Baseline 1 = Quarter 1 (or baseline through quarter 1) 2 = Quarter 2 3 = Quarter 3 4 = Quarter 4 5 = Quarter 5 6 = Quarter 6 7 = Quarter 7 8 = Quarter 8 9 = Quarter 9 10 = Quarter 10 11 = Quarter 11
Second digit (Well/Sump Sampled)	1 = Trench Sumps 2 = Westbay Wells 3 = Monitoring Wells 4 = Combination of Wells and Sumps 5 = Injection System 6 = Extraction Wells
Third digit (Sampled for)	1 = Field Parameters 2 = VOC Analytical Data 3 = Other Analytical Data 4 = Microbial Data 5 = Applied Water Volume 6 = System Physical Parameters
Third digit qualifier (Westbay Identifier)	a = CS-WB05 b = CS-WB06 c = CS-WB07 d = CS-WB08

**Table 0 COC MCLs**

COC	MCL (mg/L)	MCL (µg/L)	Type
Arsenic	0.01	10	Metal
Manganese	0.05	50	
<i>cis</i> -Dichloroethene	0.07	70	Organic Compound
<i>trans</i> -Dichloroethene	0.1	100	
Trichloroethene	0.005	5	
Tetrachloroethene	0.005	5	
Vinyl Chloride	0.002	2	

## Figures



Figure 11.1.2T1-1

B-3 Bioreactor Trench 1 Sump 1 VOC Summary  
 Quarter 8 - Quarter 11

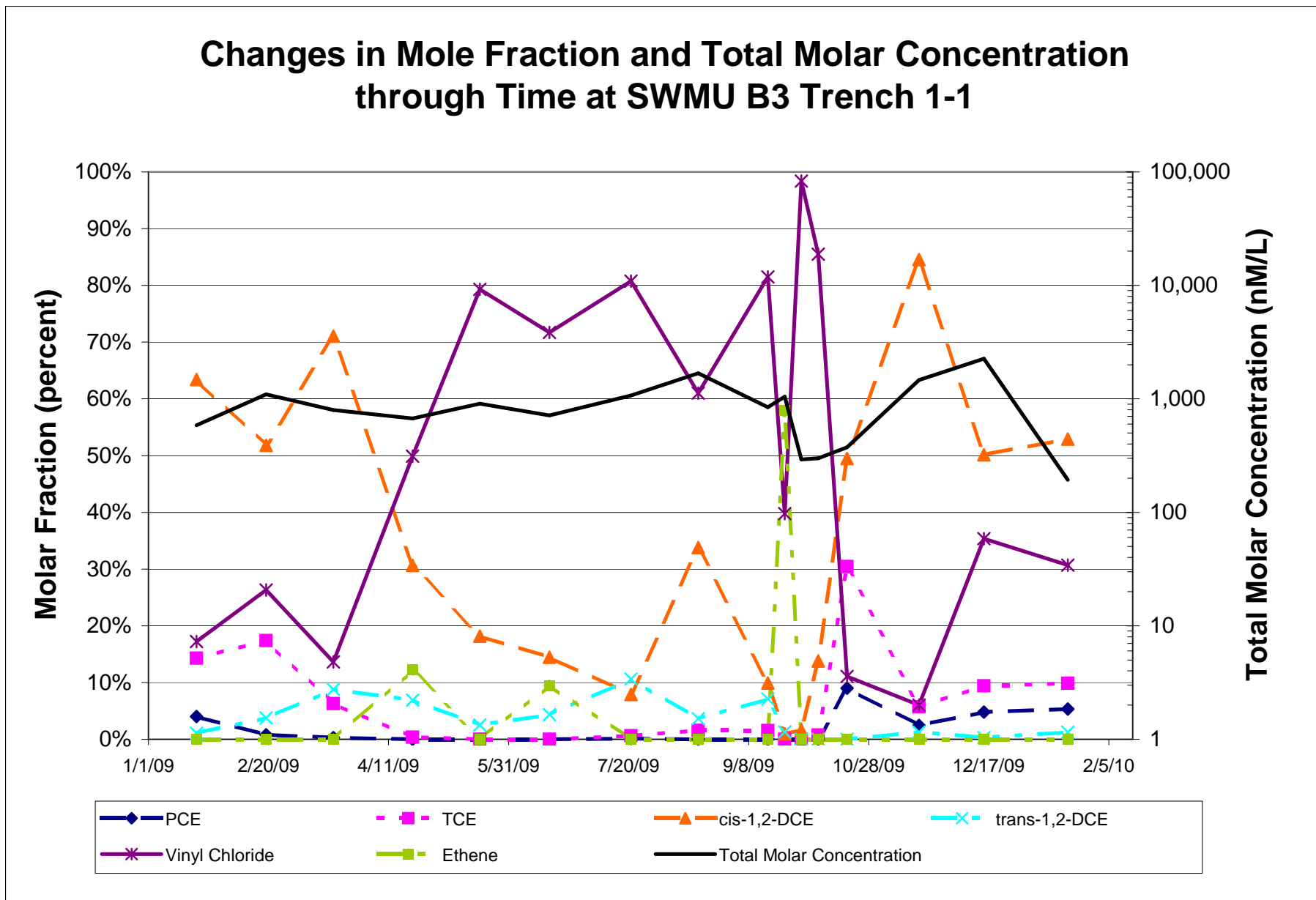
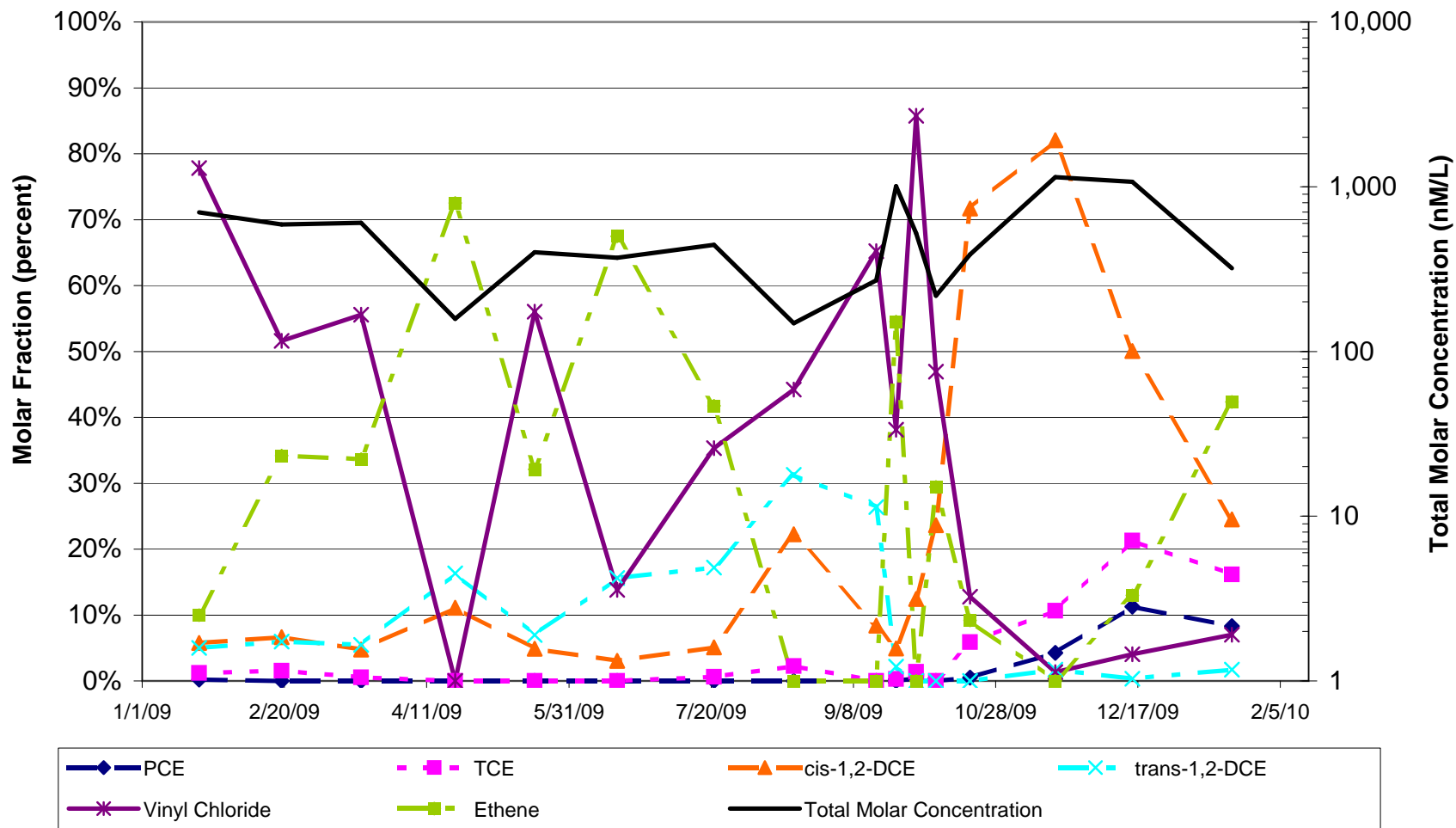


Figure 11.1.2T1-2

B-3 Bioreactor Trench 1 Sump 2 VOC Summary  
 Quarter 8 - Quarter 11

### Changes in Mole Fraction and Total Molar Concentration through Time at SWMU B3 Trench 1-2



### Changes in Mole Fraction and Total Molar Concentration through Time at SWMU B3 Trench 1-3

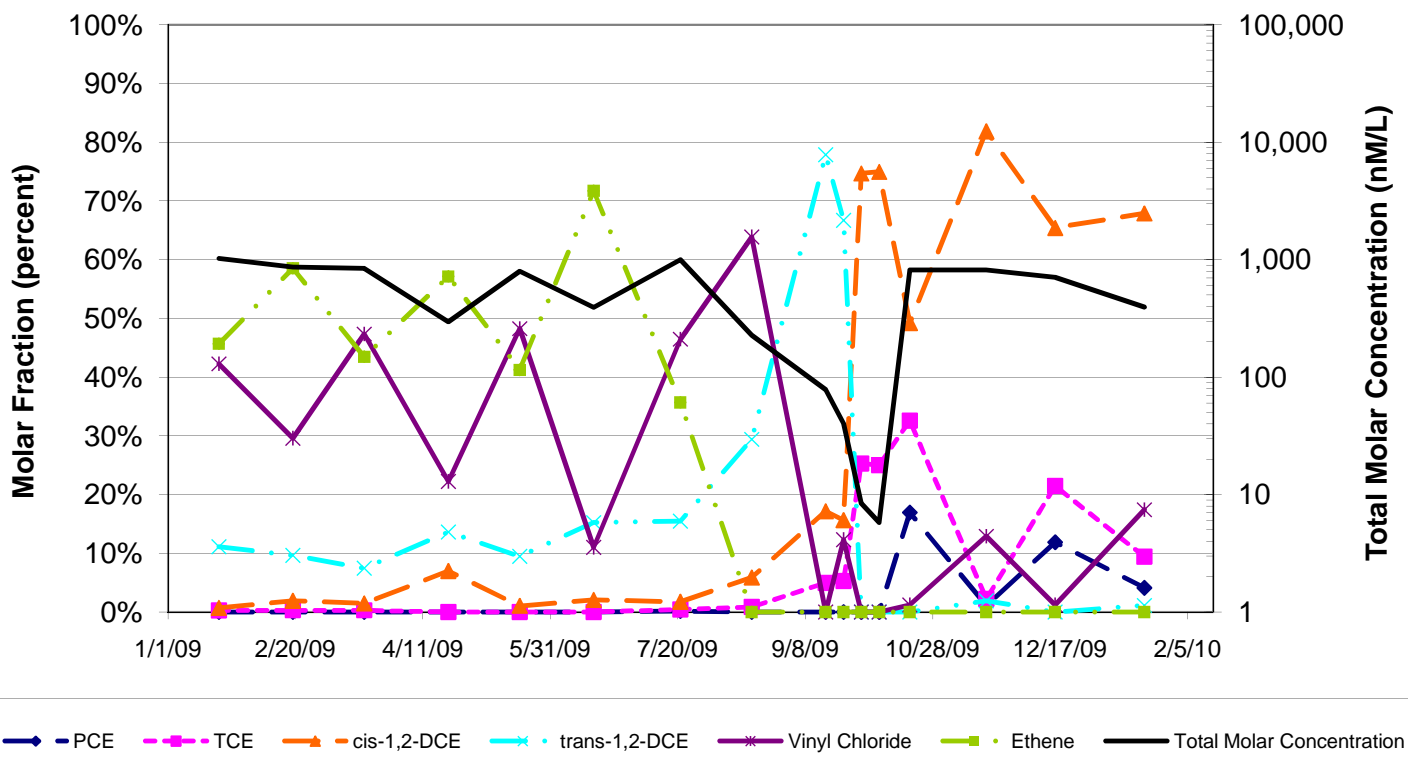


Figure 11.1.2T2-1

B-3 Bioreactor Trench 2 Sump 1 VOC Summary  
 Quarter 8 - Quarter 11

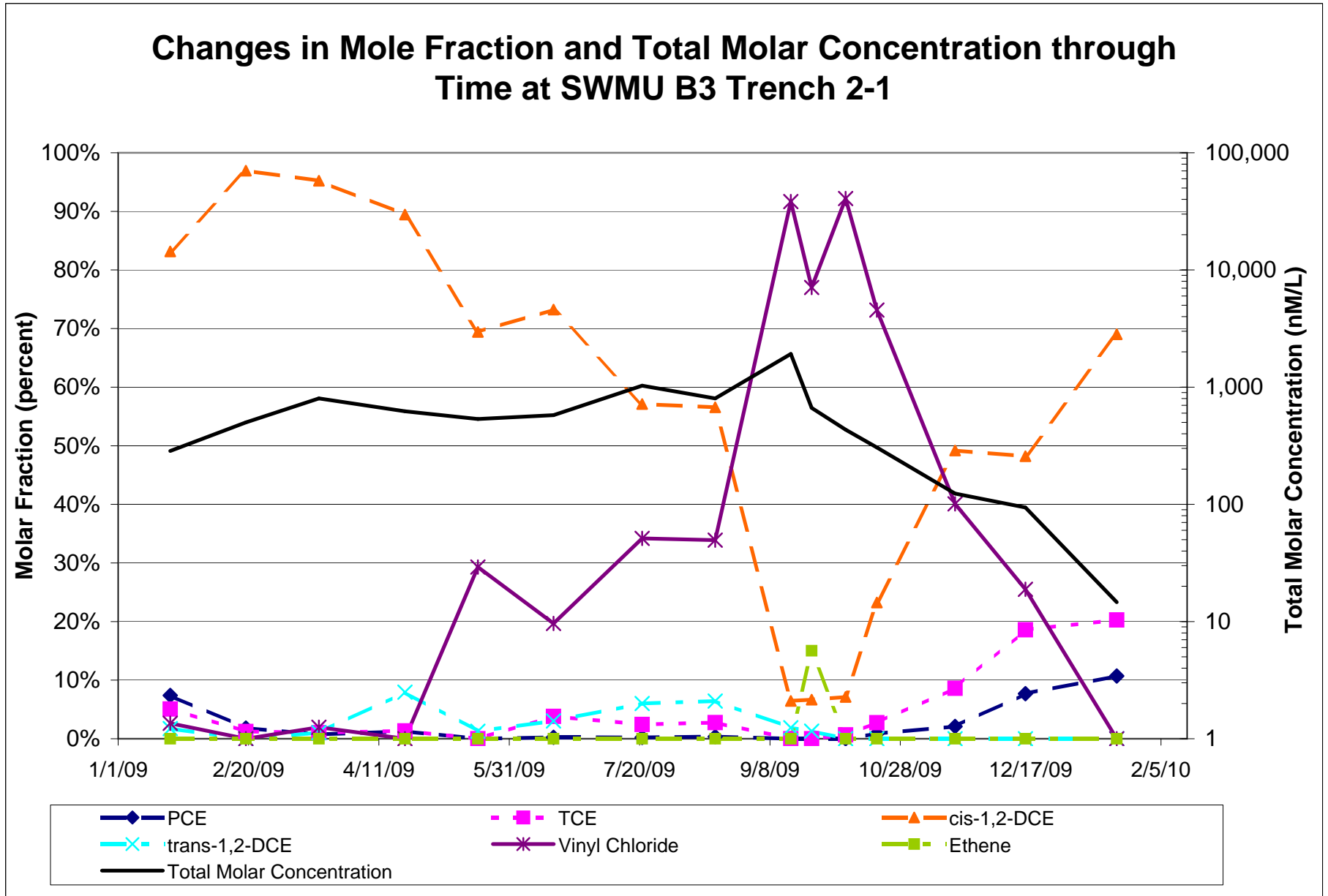


Figure 11.1.2T2-2

B-3 Bioreactor Trench 2 Sump 2 VOC Summary  
 Quarter 10 - Quarter 11

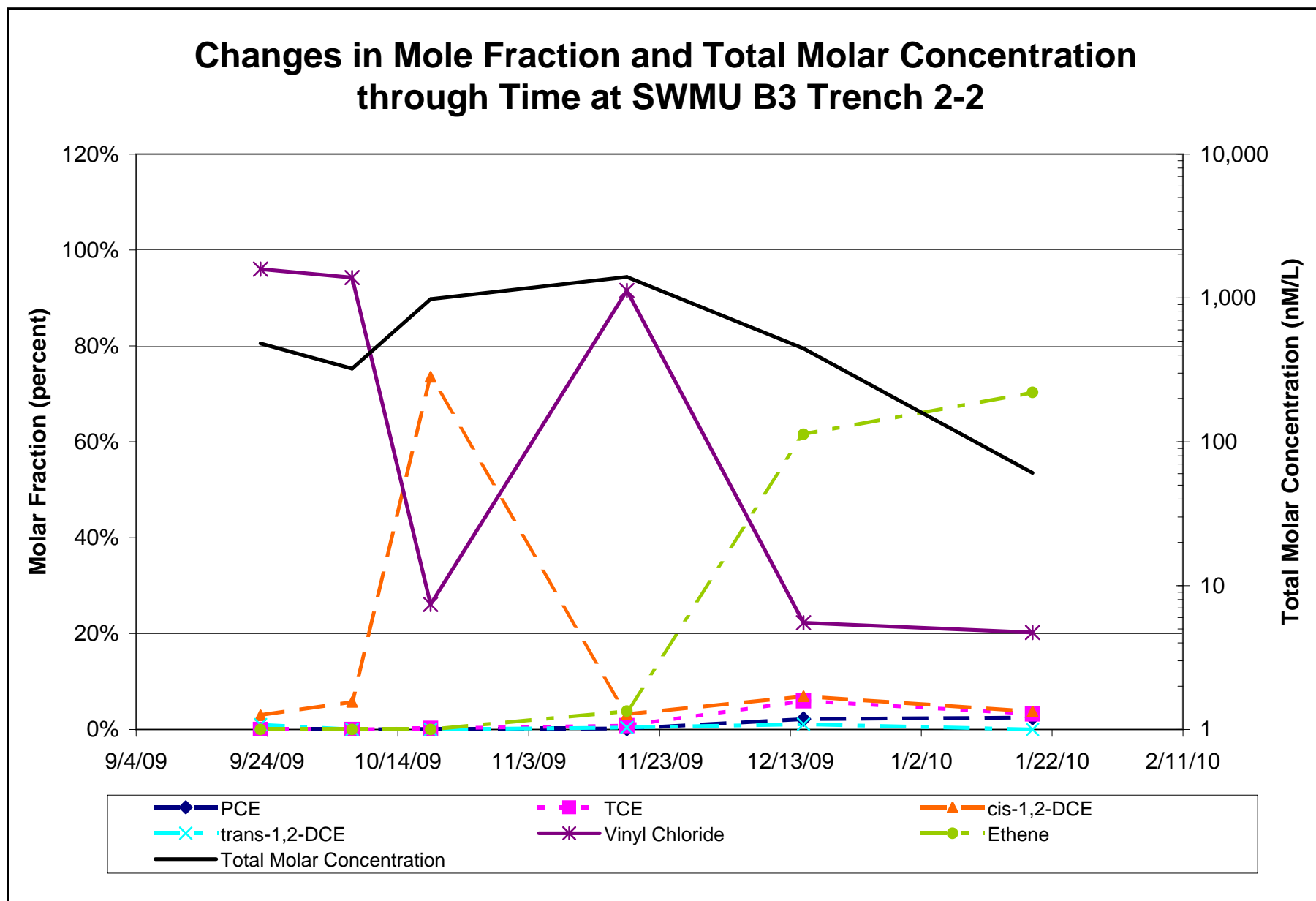


Figure 11.2.2a

Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB05-LGR03B

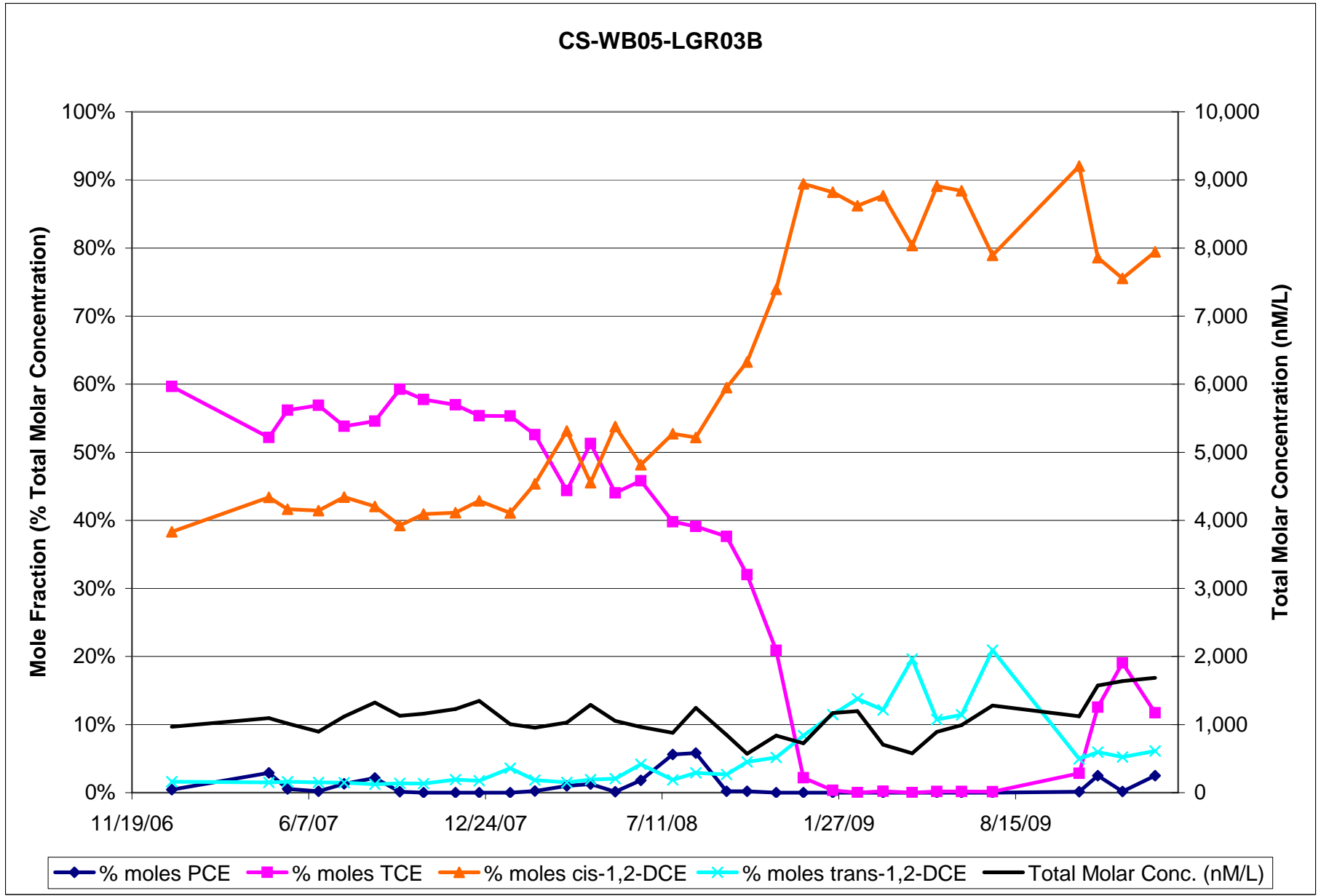


Figure 11.2.2b

Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB06-LGR03B

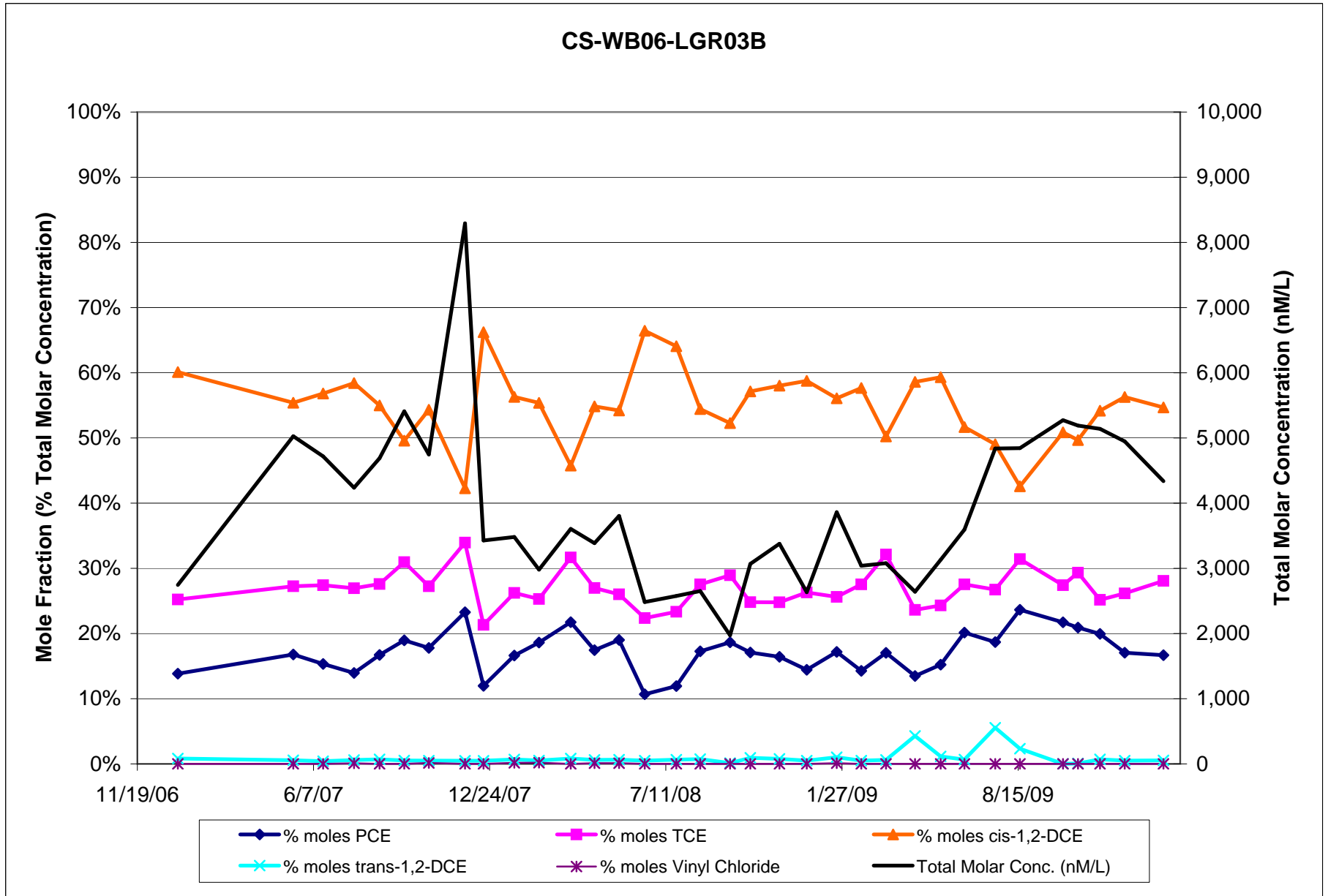


Figure 11.2.2c

Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB07-LGR03B

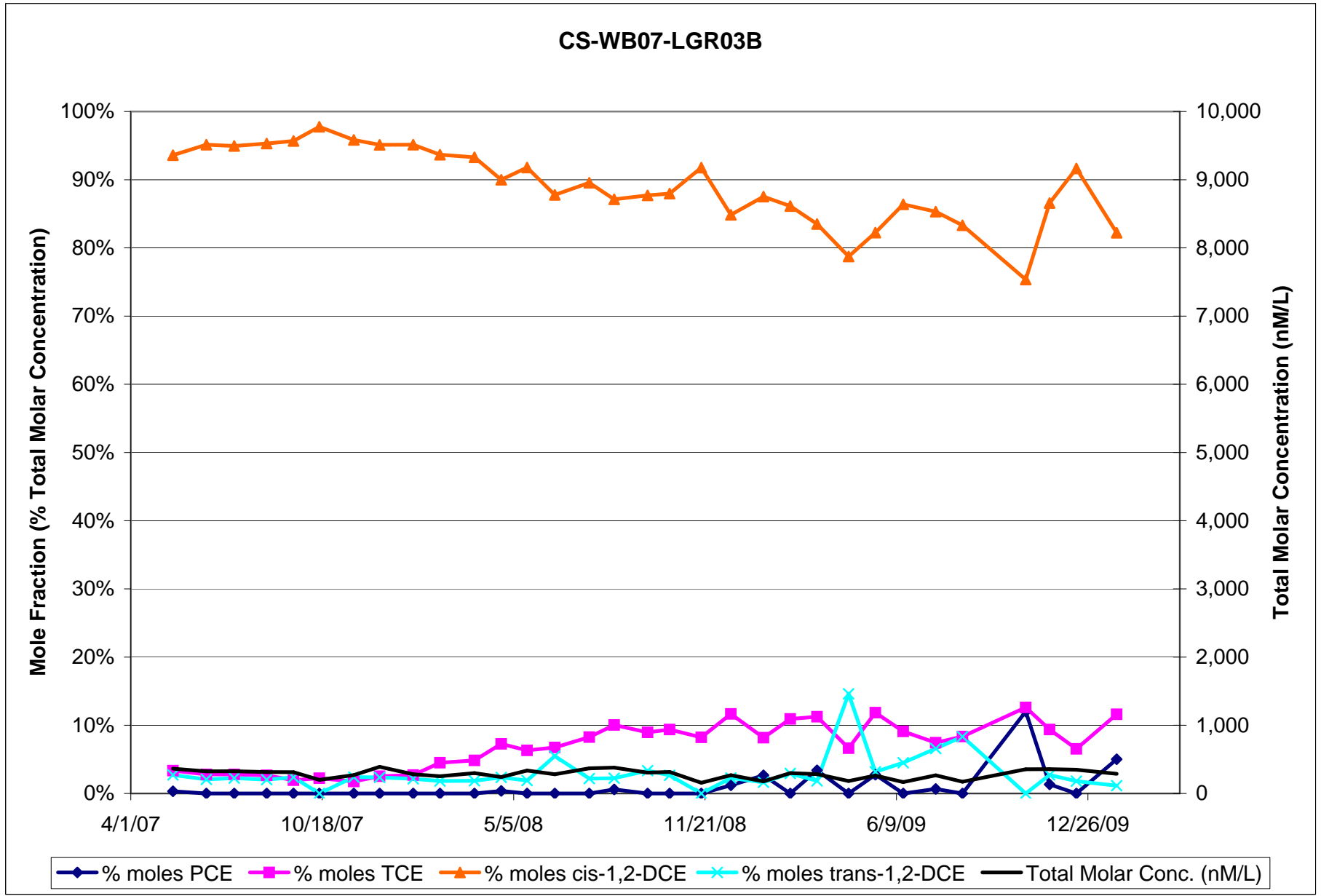




Figure 11.2.2d

Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB08-LGR03B

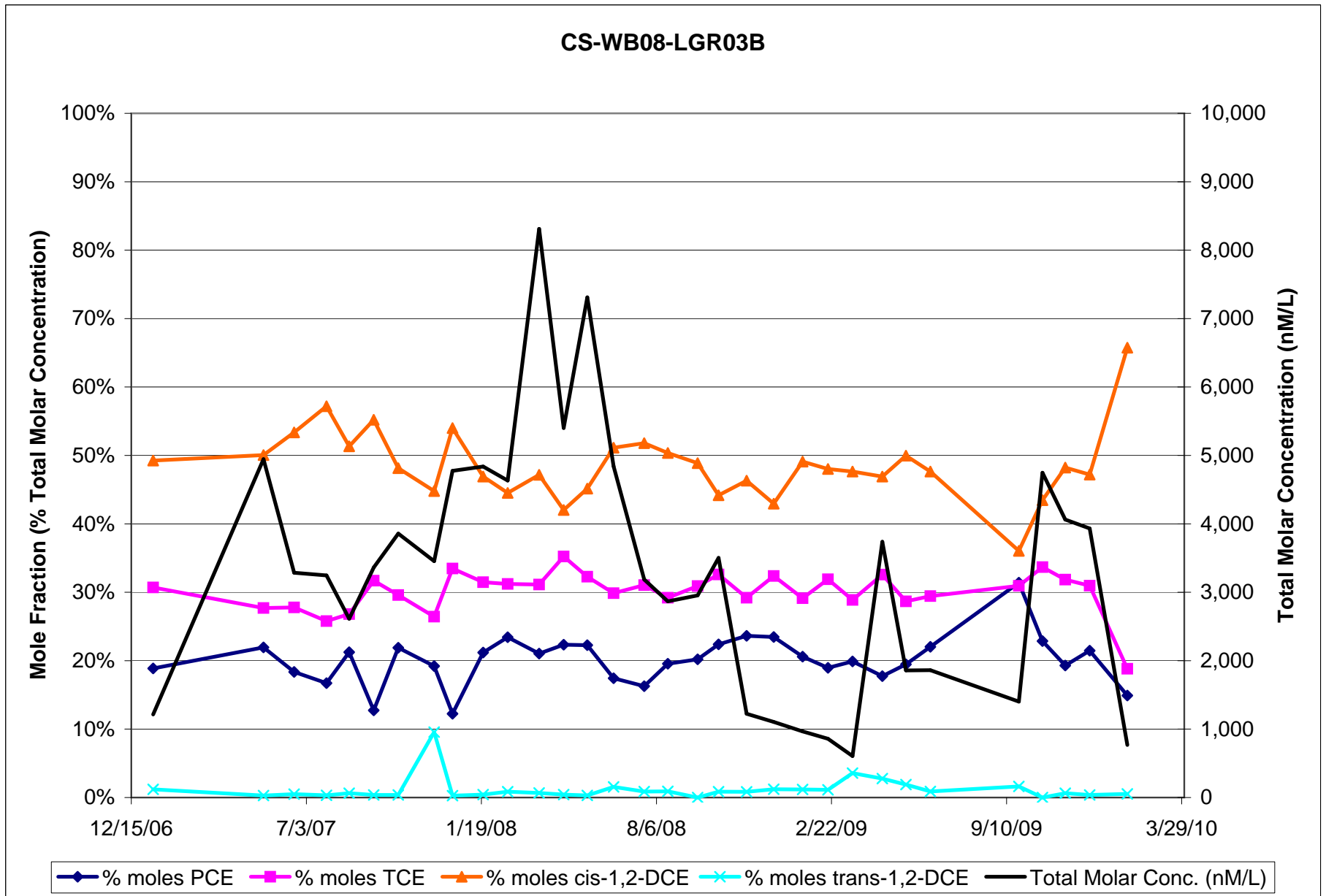


Figure 11.2.5 Lower Glen Rose Groundwater Elevations (feet above MSL) Measured in Westbay Wells through Quarter 11

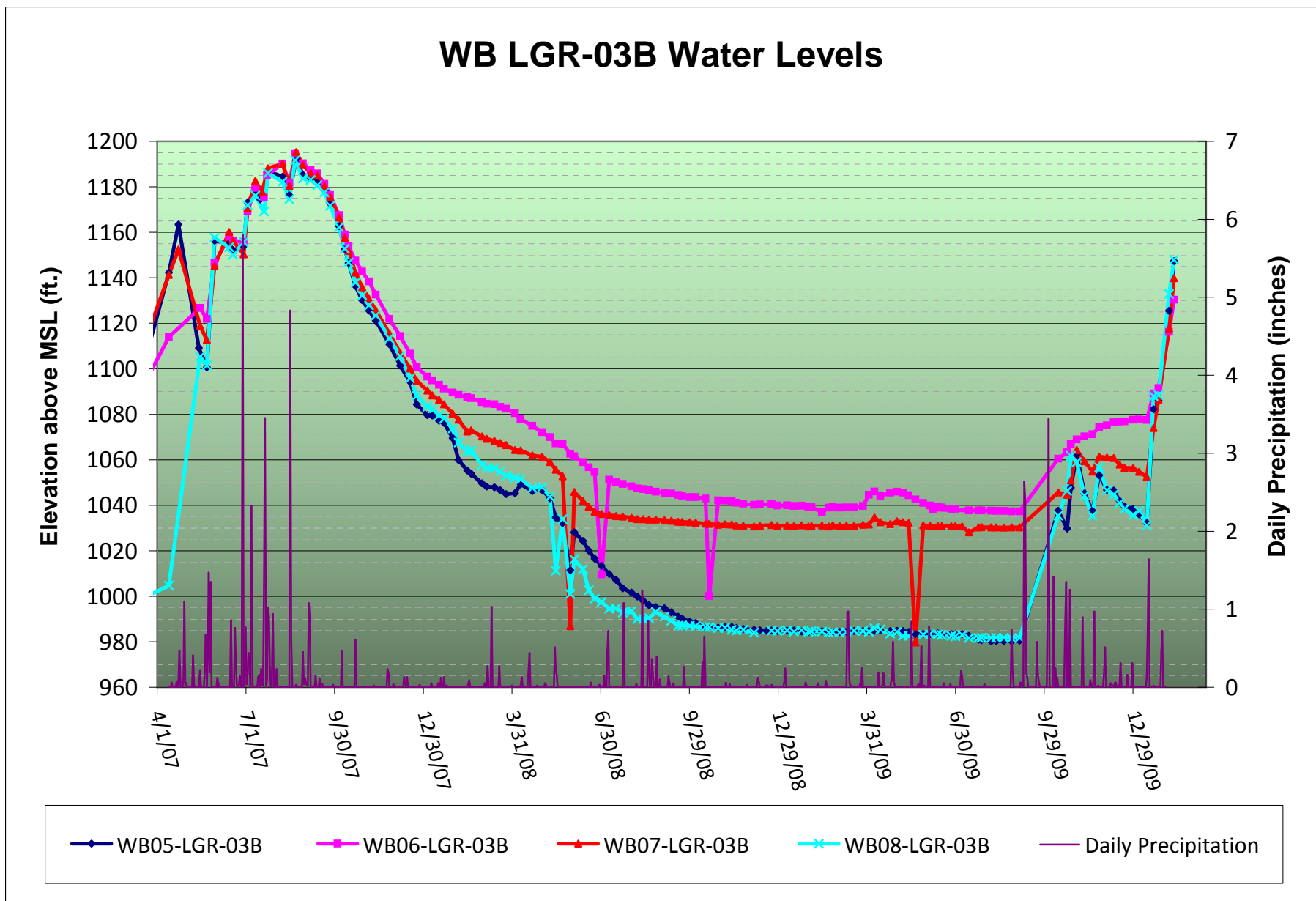


Figure 11.5.2

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

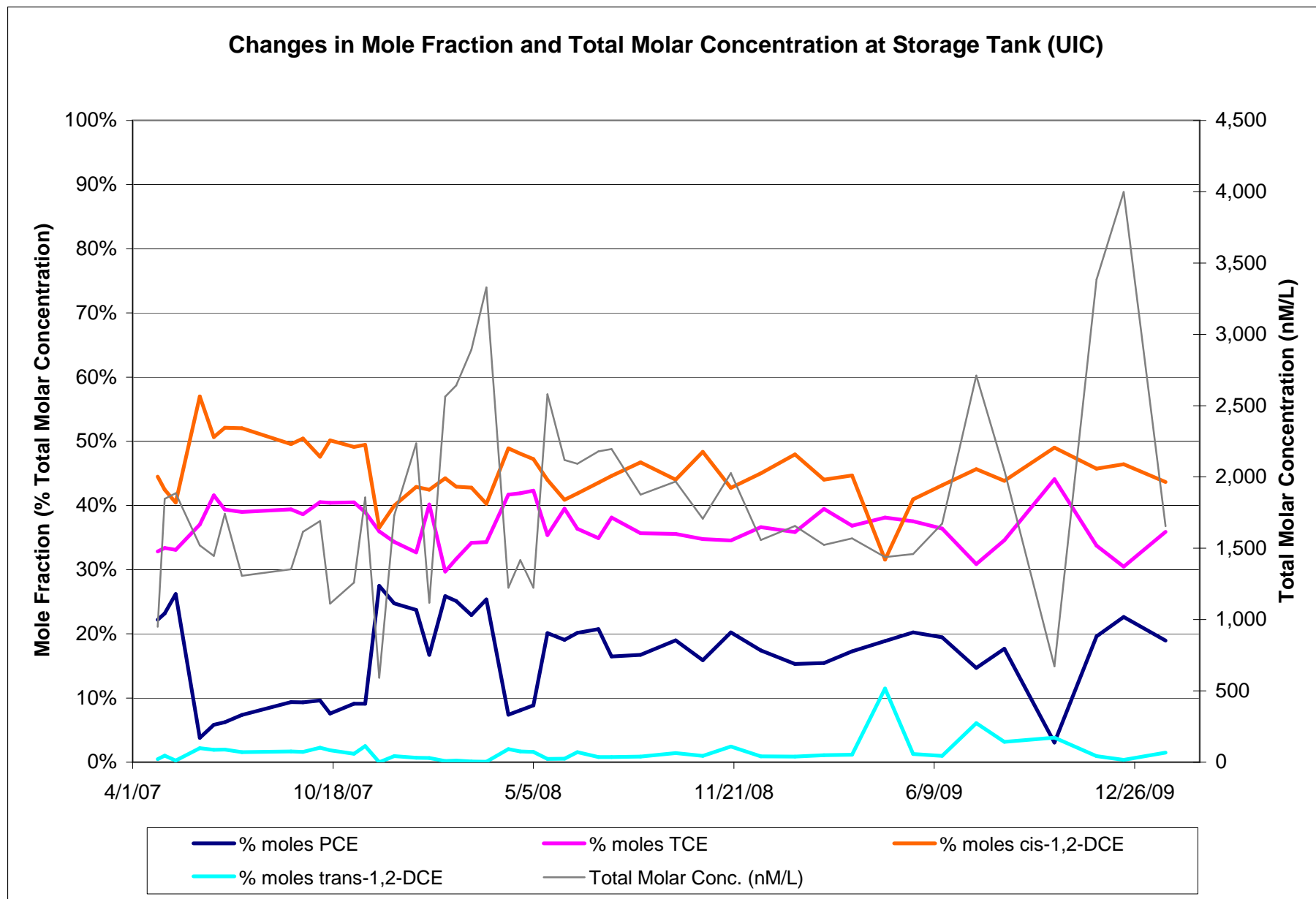


Figure 11.5.5 Cumulative Total Groundwater from CS-MW16 LGR and CC Applied to SWMU B3 Trench 1 and 2 through Quarter 11

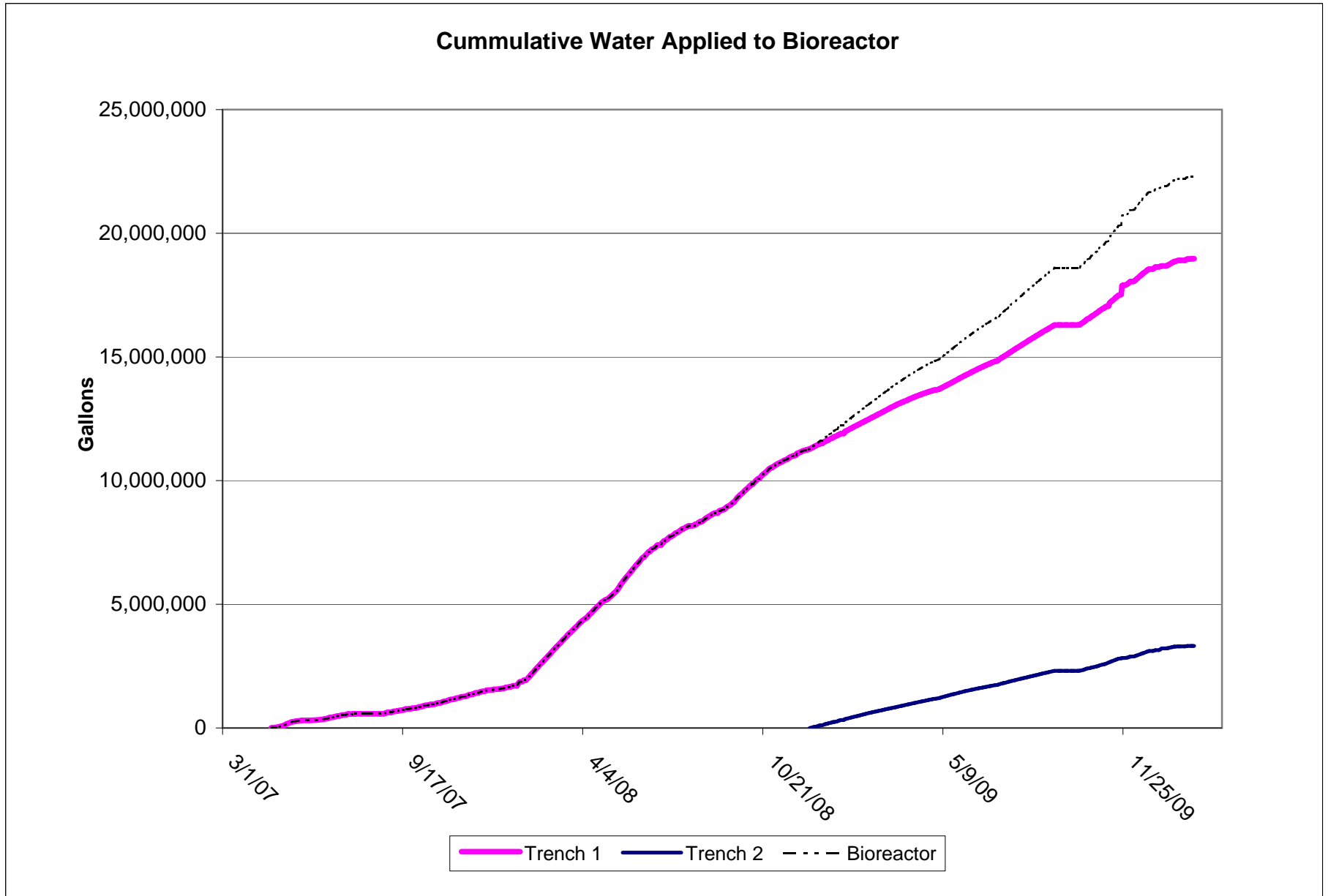
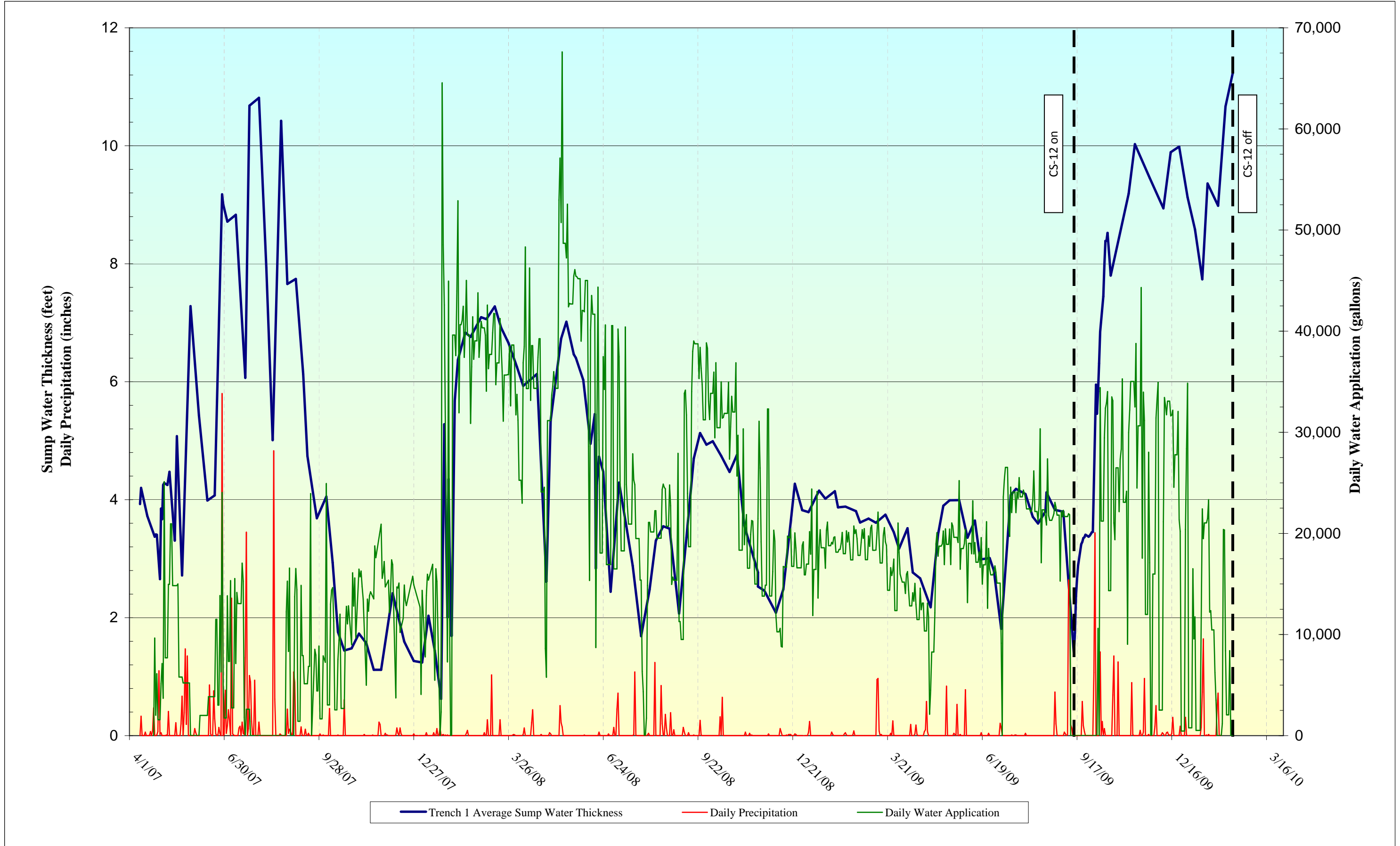


Figure 11.5.6

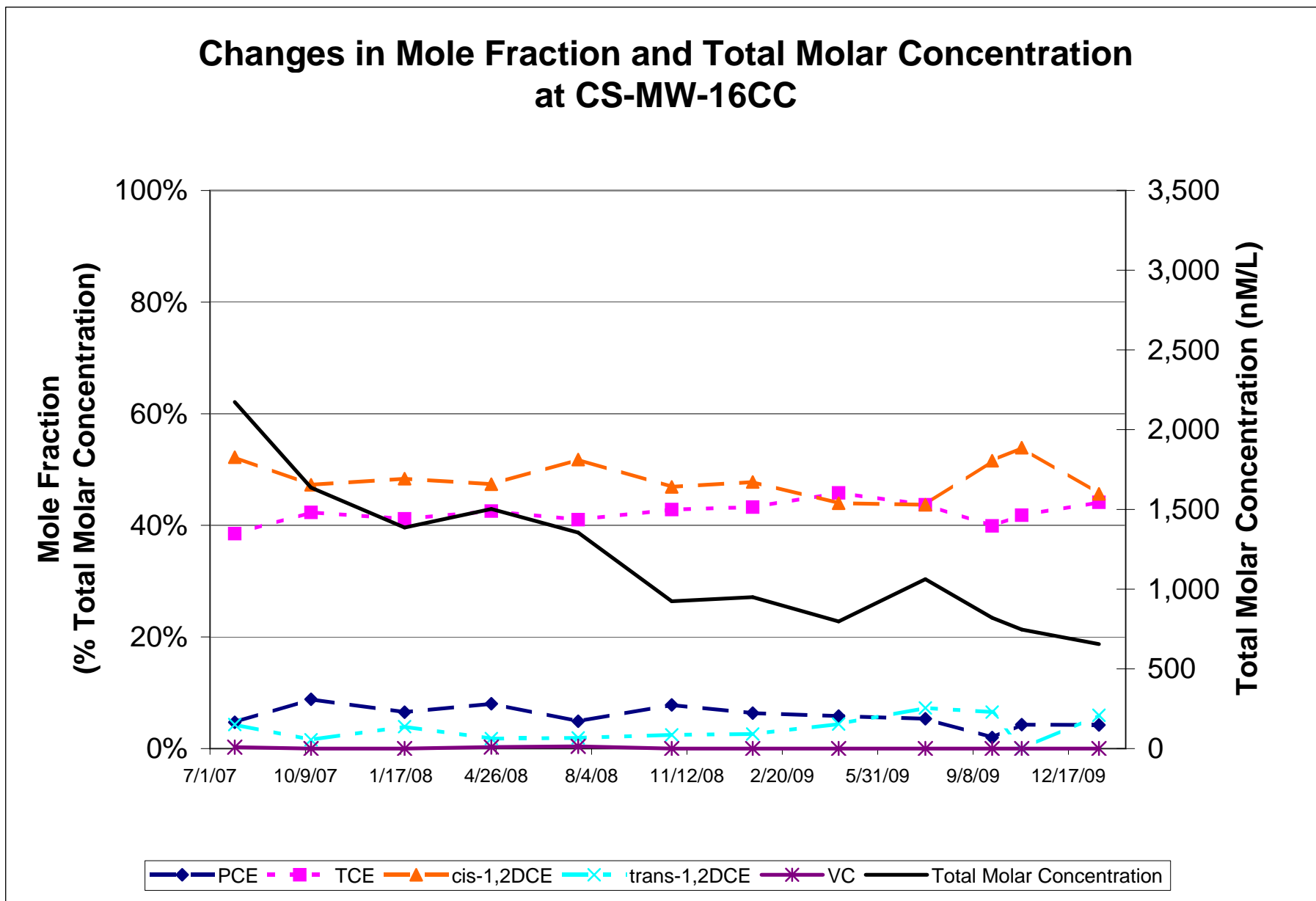
### SWMU B-3 Bioreactor - Trench 1 Average Water Thickness, CS-16 and CS-B3EXW01 Water Application, and Daily Precipitation



Note: CS-12 extracted groundwater used for flood test operations

Figure 11.6.2CC

CS-MW16-CC VOC summary through Quarter 11



### Changes in Mole Fraction and Total Molar Concentration at CS-MW-16LGR

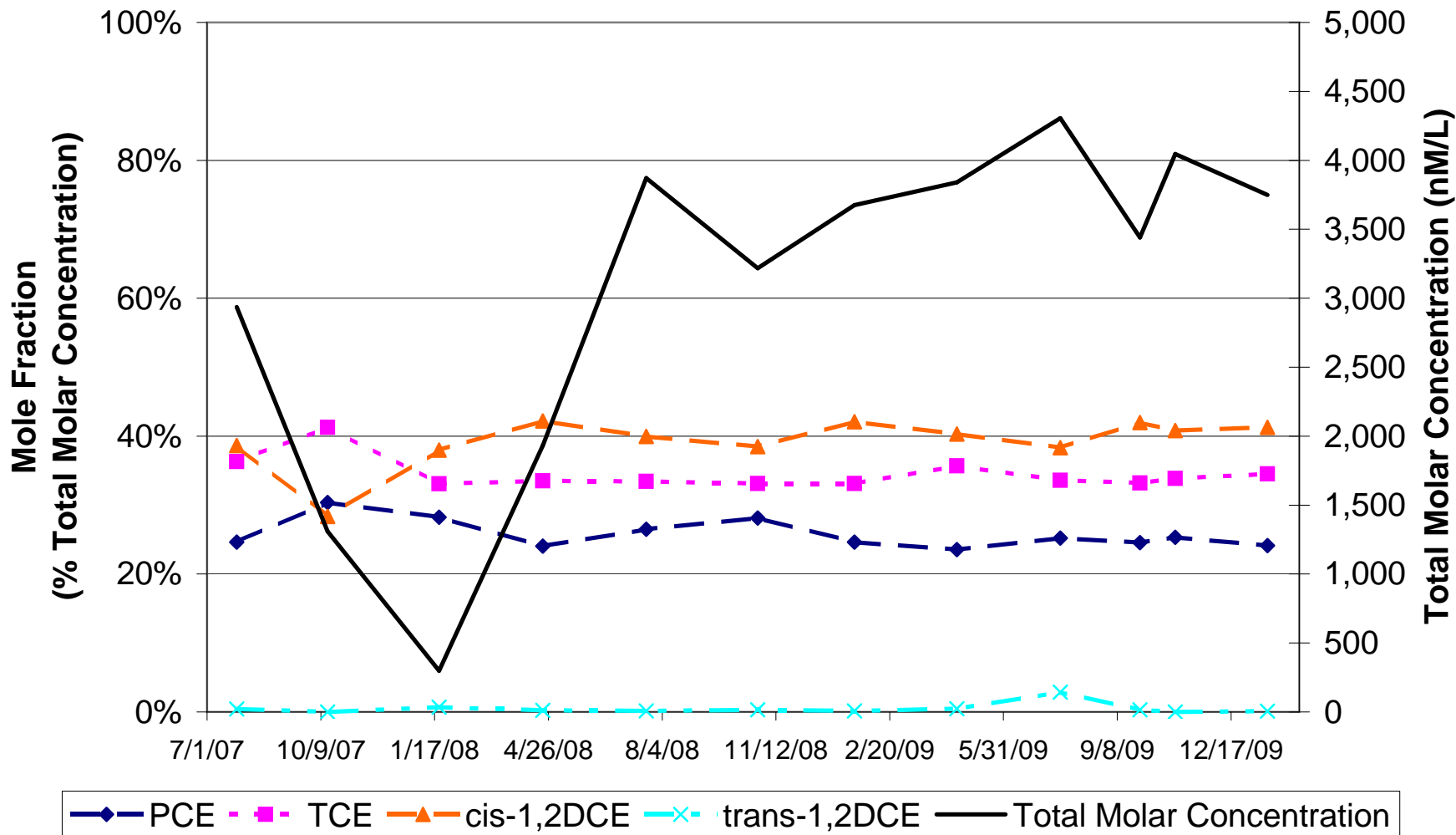
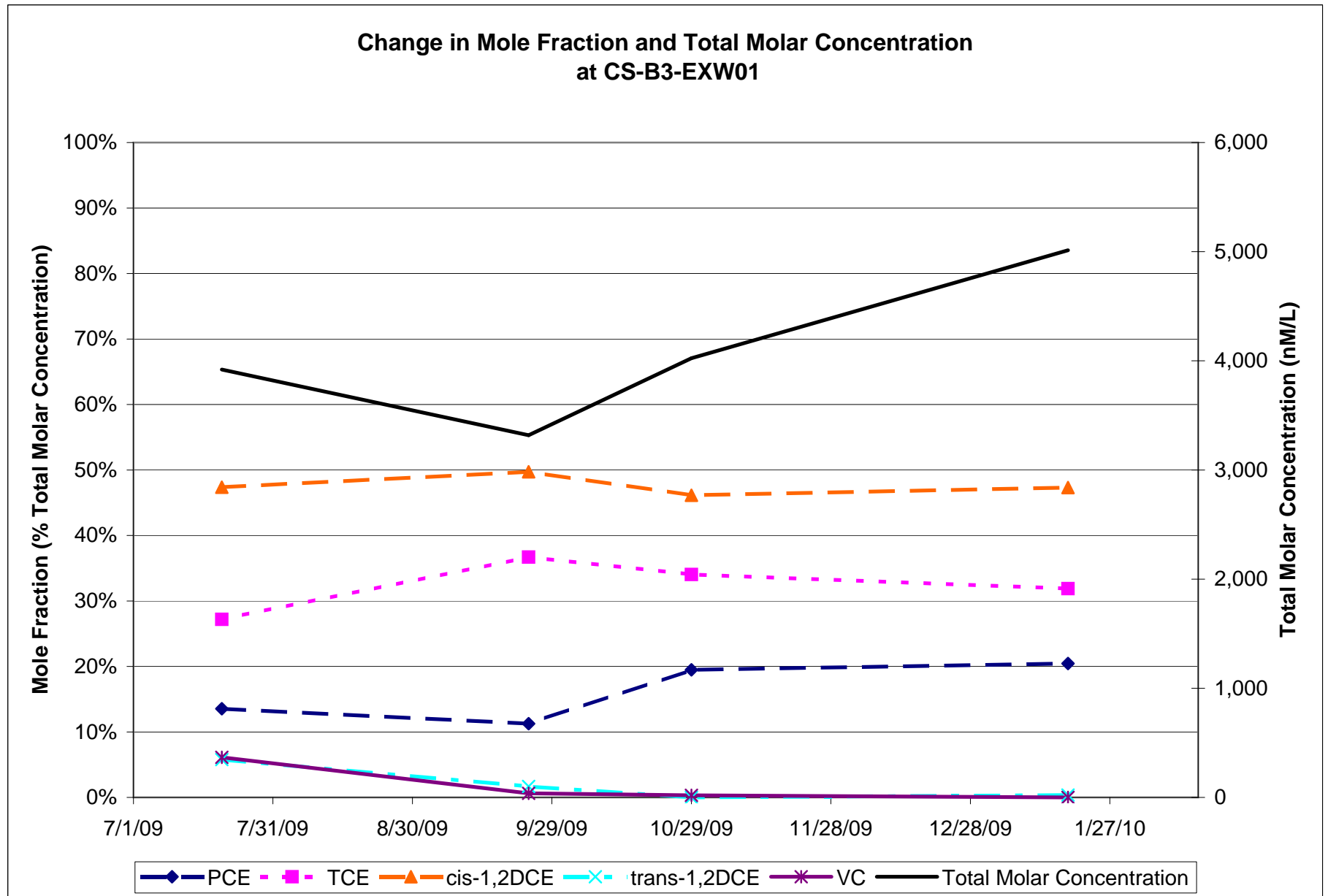


Figure 11.6.2EX1

CS-B3-EXW01 VOC summary through Quarter 11





## Tables



























Table 11.1.2

SWMU B-3 Trench 1 through 6 Quarter 11 - VOC Analytical Summary Table

Q11 Date	B3 T1-1			B3 T1-2			B3 T1-3		
	11/18/09	12/15/09	1/19/10	11/18/09	12/15/09	1/19/10	11/18/09	12/15/09	1/19/10
PCE (µg/L)	5.9	18	1.7	8.1	20	4.4	1.5	14	2.7
TCE (µg/L)	11	28	2.5	16	30	6.8	2.4	20	4.9
cis-1,2-DCE (µg/L)	120	110	9.9	91	52	7.6	65	45	26
trans-1,2-DCE (µg/L)	1.8	0.62	0.23	1.9	0.36	0.53	1.5	0	0.43
Vinyl Chloride (µg/L)	5.5	50	3.7	0.96	2.7	1.4	6.6	0.54	4.3
Ethene (µg/L)	0	0	0	0	3.9	3.8	0	0	0
PCE (nM/L)	35.579	108.545	10.251	48.845	120.605	26.533	9.045	84.424	16.282
TCE (nM/L)	83.720	213.106	19.027	121.775	228.328	51.754	18.266	152.219	37.294
cis-1,2-DCE (nM/L)	1237.751	1134.605	102.114	938.628	536.359	78.391	670.449	464.157	268.179
trans-1,2-DCE (nM/L)	18.566	6.395	2.372	19.598	3.713	5.467	15.472	0.000	4.435
Vinyl Chloride (nM/L)	87.986	799.872	59.191	15.358	43.193	22.396	105.583	8.639	68.789
Ethene (nM/L)	0.000	0.000	0.000	0.000	139.037	135.472	0.000	0.000	0.000
Total Molar Conc. (nM/L)	1,463.602	2,262.523	192.956	1,144.204	1,071.236	320.014	818.815	709.438	394.979
% moles PCE	2.431%	4.798%	5.313%	4.269%	11.259%	8.291%	1.105%	11.900%	4.122%
% moles TCE	5.720%	9.419%	9.861%	10.643%	21.314%	16.173%	2.231%	21.456%	9.442%
% moles cis-1,2-DCE	84.569%	50.148%	52.921%	82.033%	50.069%	24.496%	81.880%	65.426%	67.897%
% moles trans-1,2-DCE	1.269%	0.283%	1.229%	1.713%	0.347%	1.708%	1.890%	0.000%	1.123%
% moles Vinyl Chloride	6.012%	35.353%	30.676%	1.342%	4.032%	6.999%	12.895%	1.218%	17.416%
% moles Ethene	0.000%	0.000%	0.000%	0.000%	12.979%	42.333%	0.000%	0.000%	0.000%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Month 31	Month 32	Month 33	Month 31	Month 32	Month 33	Month 31	Month 32	Month 33

Note: 0 sample indicates a non-detect analyte value

Table 11.1.2 (cont.)

SWMU B-3 Trench 1 through 6 Quarter 11 - VOC Analytical Summary Table

Q11	B3 T2-1			B3 T2-2			B3-T3-1	B3-T3-2	B3-T4-1	B3-T5-1	B3-T5-2	B3-T6-1	B3T6-2
Date	11/18/09	12/15/09	1/19/10	11/18/09	12/15/09	1/19/10	11/17/09	11/17/09	11/17/09	11/17/09	11/17/09	11/17/09	11/17/09
PCE (µg/L)	0.43	1.2	0.26	0.48	1.6	0.25	0	0	0	0	0.21	0	0
TCE (µg/L)	1.4	2.3	0.39	1.5	3.5	0.26	0.20	0.37	0.30	0	0.36	0	0
cis-1,2-DCE (µg/L)	5.9	4.4	0.98	4.3	3	0.22	0.72	1.2	0.20	0	0.45	0	0
trans-1,2-DCE (µg/L)	0	0	0	0.57	0.47	0	0	0	0	0	0	0	0
Vinyl Chloride (µg/L)	3.1	1.5	0	80	6.2	0.77	0.53	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	1.5	7.7	1.2	0	0	0	0	0	0	0
PCE (nM/L)	2.593	7.236	1.568	2.895	9.648	1.508	0.000	0.000	0.000	0.000	1.266	0.000	0.000
TCE (nM/L)	10.655	17.505	2.968	11.416	26.638	1.979	1.522	2.816	2.283	0.000	2.740	0.000	0.000
cis-1,2-DCE (nM/L)	60.856	45.384	10.108	44.353	30.944	2.269	7.427	12.378	2.063	0.000	4.642	0.000	0.000
trans-1,2-DCE (nM/L)	0.000	0.000	0.000	5.879	4.848	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vinyl Chloride (nM/L)	49.592	23.996	0.000	1279.795	99.184	12.318	8.479	0.000	0.000	0.000	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	53.476	274.510	42.781	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Molar Conc. (nM/L)	123.696	94.122	14.644	1,397.814	445.772	60.854	17.427	15.194	4.346	0.000	8.648	0.000	0.000
% moles PCE	2.096%	7.688%	10.706%	0.207%	2.164%	2.477%	0.000%	0.000%	0.000%	0.000%	14.644%	0.000%	0.000%
% moles TCE	8.614%	18.598%	20.269%	0.817%	5.976%	3.252%	8.734%	18.534%	52.535%	0.000%	31.683%	0.000%	0.000%
% moles cis-1,2-DCE	49.198%	48.219%	69.025%	3.173%	6.942%	3.729%	42.614%	81.466%	47.465%	0.000%	53.673%	0.000%	0.000%
% moles trans-1,2-DCE	0.000%	0.000%	0.000%	0.421%	1.088%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
% moles Vinyl Chloride	40.092%	25.495%	0.000%	91.557%	22.250%	20.242%	48.651%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
% moles Ethene	0.000%	0.000%	0.000%	3.826%	61.581%	70.300%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
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%
	Month 31	Month 32	Month 33	Month 31	Month 32	Month 32	Month 31	Month 31	Month 31	Month 31	Month 31	Month 31	Month 31

Note: 0 sample indicates a non-detect analyte value

Table 11.1.3

B-3 Bioreactor Analytical Summary - Quarter 11

Q11		B3																	
Well ID		B3 T1-1						B3 T1-2						B3 T1-3					
Sample Date		11/18/2009		12/15/2009		1/19/2010		11/18/2009		12/15/2009		1/19/2010		11/18/2009		12/15/2009		1/19/2010	
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	9.2		8.9		6.1		6.7		7.4		8.8		4.0		6.2		9.3	
Total Organic Carbon	mg/L	11.5		7.5		7.2		8.6		9.1		9.1		4.7		7.1		9.3	
Methane	µg/L	25.8		978		35.9		0		6,310		11,000		601		1.1		0.30	J
Ethene	µg/L	0		0		0		0		3.9		3.8		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	22,600		34,900		38,000		19,700		59,600		86,900	J	19,700		16,600		28,900	
Alkalinity, Total (as CaCO3)	mg/L	321		319		292		333		312		341		315		320		313	
Nitrate/Nitrite	mg/L	0		0.064	J	0.29	B	0.16		0.19		0.064	BJ	0		0.087	J	0	
Sulfate	mg/L	15.5		10.7		29.3		17.6		11.2		25.2		15.4		18.6		46.2	
Chloride	mg/L	13.5		12.4		11.5		13.3		12.8		13.3		12.9		12.7		13.6	
Ferrous Iron	mg/L	0.52	J	0.45	J	0.21	J	0.37	J	1.2		2.4		0.54	J	0.23	J	0.86	J
Manganese	µg/L	820		639		284		187		251		303		128		62.5		269	
Hydrogen	nM/L							1.9		2.8		2.6				2.8			
Total Dissolved Solids	mg/L	430		360		422		410		364		448		397		386		419	
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	120		110		9.9		91		52		7.6		65		45		26	
Dichloroethene, trans-1,2-	µg/L	1.8		0.62		0.23	J	1.9		0.36	J	0.53	J	1.5		0		0.43	J
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	5.9		18		1.7		8.1		20		4.4		1.5		14		2.7	
Toluene	µg/L	0		0		0		0		0.21	J	0.34	J	0		0		0	
Trichloroethene	µg/L	11		28		2.5		16		30		6.8		2.4		20		4.9	
Vinyl chloride	µg/L	5.5		50		3.7		0.96	J	2.7		1.4		6.6		0.54	J	4.3	
Arsenic	µg/L	6.9		6.3		0		4.3	J	3.3	J	0		3.4	J	0		0	
Barium	µg/L	111		204		352		81.1		113		113		74.2		68.1		135	
Cadmium	µg/L	0		0		0		0		0		0		0		0		0	
Chromium	µg/L	0		0		0		0		0		0		0		0		0	
Copper	µg/L	48.5		1.7	J	1.1	J	50.6		1.3	J	1.0	J	49.3		0		1.1	J
Lead	µg/L	0		0		0		0		0		0		0		0		2.0	J
Mercury	µg/L	0.18	BJ	0		0.19	BJ	0.16	BJ	0		0.18	BJ	0.17	BJ	0		0.18	BJ
Nickel	µg/L	3.5	J	2.5	J	0.51	J	2.4	J	2.2	J	0		1.1	J	2.8	J	2.6	J
Zinc	µg/L	78.6		54		22.5	J	92		38.6	J	27.3	J	42.7	J	24.9	J	16	J
		Month 31		Month 32		Month 33		Month 31		Month 32		Month 33		Month 31		Month 32		Month 33	

Note: 0 sample indicates a non-detect analyte value



Table 11.1.3 (cont.)

B-3 Bioreactor Analytical Summary - Quarter 11

Q11		B3																														
Well ID		B3 T2-1						B3 T2-2						B3-T3-1		B3-T3-2		B3-T4-1		B3-T5-1		B3-T5-2		B3-T6-1		B3-T6-2						
Sample Date		11/18/2009		12/15/2009		1/19/2010		11/18/2009		12/15/2009		1/19/2010		11/17/2009		11/17/2009		11/17/2009		11/17/2009		11/17/2009		11/17/2009		11/17/2009		11/17/2009		12/15/2009		
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	Value	Flag	Value	Flag	
Dissolved Organic Carbon	mg/L	13.8		8.6		6.2		23.4		32.2		26.6		26.7		21.4		9.1		2.7		12.5		2.4		2.5						
Total Organic Carbon	mg/L	13.9		10.1		9.9		48.8		37.1		19.6		30		30.4		17.9		3.8		16.4		0.93		2.3						
Methane	µg/L	4,920		218		0		22,000		31,800		24,500		9,360		1,420		0		9.2		1,930		0		47						
Ethene	µg/L	0		0		0		1.5	J	7.7		1.2	J	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	83,900		42,000		42,300		636,000		696,000		377,000		193,000		60,300		26,800		19,100		61,600		16,900		22,300						
Alkalinity, Total (as CaCO3)	mg/L	386		317		346		681		556		435		602		409		339		236		406		248		272						
Nitrate/Nitrite	mg/L	0		0.33		0.482	B	0		0		0		0		0		0.030	J	1.0		0		1.1		0.040	J					
Sulfate	mg/L	1.2		6.1		16.9		0.99	J	4.1		15.4		1.7		0.77	J	1.0		19.8		0.76	J	19.2		17						
Chloride	mg/L	14.4		13.4		12.4		15.3		14.8		14		13.5		13.6		13.8		13.6		14		13.6		13.2						
Ferrous Iron	mg/L	3.8		0.24	J	0.21	J	9.0		10.1		7.6		7.1		1.5		0.95	J	0.25	J	3.5		0		0.29	J					
Manganese	µg/L	1,250		193		216		1,100		980		756		1,960		1,370		826		1.5	J	1,530		0		102						
Hydrogen	nM/L	6.3		2.3		1.1								2.6				6.9		1.1				1.3						5.7		
Total Dissolved Solids	mg/L	499		391		400		830		662		543		737		513		401		302		493		313		319						
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		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		0		0		0		0		0		0		0		0						
Dichloroethene, cis-1,2-	µg/L	5.9		4.4		0.98	J	4.3		3		0.22	J	0.72	J	1.2		0.20	J	0		0.45	J	0		0						
Dichloroethene, trans-1,2-	µg/L	0		0		0		0.57	J	0.47	J	0		0		0		0		0		0		0		0						
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	0.43	J	1.2	J	0.26	J	0.48	J	1.6		0.25	J	0		0		0		0		0.21	J	0		0						
Toluene	µg/L	0.27	J	0		0		0.36	J	0.88	J	1.3		0		0		0		0		0.42	J	0		0						
Trichloroethene	µg/L	1.4		2.3		0.39	J	1.5		3.5		0.26	J	0.20	J	0.37	J	0.30	J	0		0.36	J	0		0						
Vinyl chloride	µg/L	3.1		1.5		0		80		6.2		0.77	J	0.53	J	0		0		0		0		0		0						
Arsenic	µg/L	9.2		0		0		16.8		10.9		13.5		18.7		9.7		5.7		0		20.2		0		0						
Barium	µg/L	138		108		86.7		254		184		172		193		120		125		57		247		37.2		85						
Cadmium	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0						
Chromium	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0						
Copper	µg/L	48.9		2.4	J	1.8	J	46.6		0		1.2	J	49.2	B	50	B	51.6	B	48.9	B	49.8	B	48.8	B	48.3	B					
Lead	µg/L	0		0		0		0		0		0		1.7	J	0		0		0		1.6	J	0		0						
Mercury	µg/L	0.18	BJ	0		0.17	BJ	0.17	BJ	0		0.17	BJ	0		0.12	J	0		0		0		0		0						
Nickel	µg/L	1.3	J	1.5	J	0		3.3	J	3.5	J	1	J	5.6		4.9	J	3.6	J	0.70	J	4.8	J	4.8	J	0.94	J					
Zinc	µg/L	35	J	16	J	6.2	J	33.5	J	19.8	J	7.3	J	42.4	J	67.5		42	J	43.5	J	52.7		269		42.5	J					
		Month 31		Month 32		Month 33		Month 31		Month 32		Month 33		Month 31		Month 31		Month 31		Month 31		Month 31		Month 31		Month 31		Month 31		Month 32		

Note: 0 sample indicates a non-detect analyte value

Table 11.2.2

SWMU B-3 Westbay Monitoring Wells  
Upper Saturated Zone (Zone LGR03B) Analytical Results Summary Quarter 11

Q11 Date	CS-WB05-LGR03B			CS-WB06-LGR03B			CS-WB07-LGR03B			CS-WB08-LGR03B		
	11/16/09	12/14/09	1/20/10	11/16/09	12/14/09	1/27/10	11/16/09	12/14/09	1/25/10	11/16/09	12/14/09	1/26/10
PCE (µg/L)	6.5	0.50	7.0	170	140	120	0.79	0	2.4	130	140	19
TCE (µg/L)	26	41	26	170	170	160	4.4	3.0	4.4	170	160	19
cis-1,2-DCE (µg/L)	120	120	130	270	270	230	30	31	23	190	180	49
trans-1,2-DCE (µg/L)	9.1	8.3	10	3.5	2.4	2.3	0.94	0.61	0.32	2.5	1.4	0.40
Vinyl Chloride (µg/L)	0.38	0	0.24	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0
<b>PCE (nM/L)</b>												
PCE (nM/L)	39.197	3.015	42.212	1025.146	844.238	723.633	4.764	0.000	14.473	783.935	844.238	114.575
<b>TCE (nM/L)</b>												
TCE (nM/L)	197.884	312.048	197.884	1293.858	1293.858	1217.749	33.488	22.833	33.488	1293.858	1217.749	144.608
<b>cis-1,2-DCE (nM/L)</b>												
cis-1,2-DCE (nM/L)	1237.751	1237.751	1340.897	2784.941	2784.941	2372.357	309.438	319.752	237.236	1959.773	1856.627	505.415
<b>trans-1,2-DCE (nM/L)</b>												
trans-1,2-DCE (nM/L)	93.863	85.611	103.146	36.101	24.755	23.724	9.696	6.292	3.301	25.786	14.440	4.126
<b>Vinyl Chloride (nM/L)</b>												
Vinyl Chloride (nM/L)	6.079	0.000	3.839	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Ethene (nM/L)</b>												
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Total Molar Conc. (nM/L)</b>												
Total Molar Conc. (nM/L)	1,574.77	1,638.43	1,687.98	5,140.05	4,947.79	4,337.46	357.39	348.88	288.50	4,063.35	3,933.05	768.72
<b>% moles PCE</b>												
% moles PCE	2.489%	0.184%	2.501%	19.944%	17.063%	16.683%	1.333%	0.000%	5.017%	19.293%	21.465%	14.905%
<b>% moles TCE</b>												
% moles TCE	12.566%	19.046%	11.723%	25.172%	26.150%	28.075%	9.370%	6.545%	11.608%	31.842%	30.962%	18.811%
<b>% moles cis-1,2-DCE</b>												
% moles cis-1,2-DCE	78.599%	75.545%	79.438%	54.181%	56.287%	54.695%	86.584%	91.652%	82.232%	48.230%	47.206%	65.747%
<b>% moles trans-1,2-DCE</b>												
% moles trans-1,2-DCE	5.960%	5.225%	6.111%	0.702%	0.500%	0.547%	2.713%	1.803%	1.144%	0.635%	0.367%	0.537%
<b>% moles Vinyl Chloride</b>												
% moles Vinyl Chloride	0.386%	0.000%	0.227%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<b>% moles Ethene</b>												
% moles Ethene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<b>sum % moles</b>												
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%
	Month 31	Month 32	Month 33	Month 31	Month 32	Month 33	Month 31	Month 32	Month 33	Month 31	Month 32	Month 32

Note: 0 sample indicates a non-detect analyte value

Table 11.2.3a

SWMU B-3 Bioreactor Multi-port Well CS-WB05 - Q11 Performance Data

Q11		WB05																							
Well ID		CS-WB05-LGR01		CS-WB05-LGR02				CS-WB05-LGR03A		CS-WB05-LGR03B						CS-WB05-LGR04A		CS-WB05-LGR04B		CS-WB05-BS-01		CS-WB05-CC-01		CS-WB05-CC-02	
Sample Date		1/20/2010		11/2/2009		1/20/2010		1/20/2010		11/16/2009		12/14/2009		1/20/2010		1/20/2010		1/21/2010		1/21/2010		1/21/2010		1/21/2010	
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	0.23	J	0.84		0.30	J	0.18	J	10.6		0.59		0.14	J	0.49	J	0.75		0.24	J	0		0.19	J
Total Organic Carbon	mg/L	0.77		1.9		1		0.91		2.5		1.3		0.86		1.3		2.9		0.56		0.54		0.74	
Methane	µg/L	0.8	J	296		176		644		285		928		288		5,590		3,000		54.9		5.3		5.0	
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	11,800		29,200		12,700		42,900		10,900		40,200		20,400		64,200		45,500		16,300		53,500		9,680	
Alkalinity, Total (as CaCO3)	mg/L	370		325		333		289		324		308		327		321		315		290		283		276	
Nitrate/Nitrite	mg/L	0		0.08	BJ	0		0.039	J	0		0		0		0.21		0		0		0		0	
Sulfate	mg/L	94.4		85.6		80.4		42.5		47.1		43.7		44.1		18.9		6.8		30.5		79.1		89.9	
Chloride	mg/L	13.8		12.8		11.7		10.9		12.2		11.3		11.1		11.9		12.6		11.7		17.2		17.9	
Ferrous Iron	mg/L	0		0.35	J	0		0		0.27	J	0		0		0		4.5		0		0		0	
Manganese	µg/L	1.8	J	0		0		0		0		0		1.3	J	10.4		51.6		0		0		0	
Hydrogen	nM																								
Total Dissolved Solids	mg/L	549		464		480		398		390		366		405		367		360		335		416		444	
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		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		0.32	J	0		0		0.38	J
Dichloroethene, cis-1,2-	µg/L	1.5		26		11		74		120		120		130		400		630		48		3.2		69	
Dichloroethene, trans-1,2-	µg/L	0		0		2.0		4		9.1		8.3		10		4.8		0		0		0		3.1	
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	0		0		0		11		6.5		0.50	J	7.0		90		150		0		0.84	J	0.26	J
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	2.2		0.99	BJ	0.35	J	22		26		41		26		190		270		3.9		11		81	
Vinyl chloride	µg/L	0		0		0		0		0.38	J	0		0.24	J	2.4		0.95	J	0.84	J	0		10	
Arsenic	µg/L	0		25.4		0		0		0		2.5	J	0		0		27.1		0		0		0	
Barium	µg/L	34.5		34.2		45.1		34.5		34		30.1		34.1		36.5		25		30.2		23.6		22.7	
Cadmium	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Chromium	µg/L	3.5	J	0		2.0	J	2.1	J	0		0		1.4	J	0		0		0		0		0	
Copper	µg/L	0		0		0		0		48.6	B	1.6	J	0		0		0		0		0		0	
Lead	µg/L	0		0		0		0		0		0		0		0		0		0		0		0	
Mercury	µg/L	0.09	J	0.065	BJ	0.078	J	0.060	J	0		0		0.083	J	0.081	J	0.069	J	0.073	J	0.076	J	0.065	J
Nickel	µg/L	4.5	J	1.9	J	3.9	J	4.1	J	3.7	J	4.7	J	3.2	J	1.2	J	73.7		0		2.1	J	0	
Zinc	µg/L	29.8	J	3.8	J	47.2	J	24.6	J	55.8		22	J	15.7	J	17.8	J	38.2	J	24	J	13.2	J	12.8	J
		Q11- Month 33		Q10- Month 31		Q11- Month 33		Q11- Month 33		Q11- Month 31		Q11- Month 32		Q11- Month 33		Q11- Month 33		Q11- Month 33		Q11- Month 33		Q11- Month 33		Q11- Month 33	

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

Note: Dry zones including LGR02 were not sampled during the quarterly sampling event.

Table 11.2.3b

SWMU B-3 Bioreactor Multi-port Well CS-WB06 - Q11 Performance Data

Q11		WB06															
Well ID		CS-WB06-UGR01		CS-WB06-LGR01		CS-WB06-LGR02		CS-WB06-LGR03A		CS-WB06-LGR03B						CS-WB06-LGR04	
Sample Date		1/27/2010		1/27/2010		1/27/2010		1/27/2010		11/16/2009		12/14/2009		1/27/2010		1/27/2010	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	1.3		0.79		0.23	J	0.57						0		0.51	
Total Organic Carbon	mg/L	1.5		1.1		0.93		0.52						0.28	J	1.7	
Methane	µg/L	14.5		0		2.2		1.4						4.7		0	
Ethene	µg/L	0		0		0		0						0		0	
Ethane	µg/L	0		0		0		0						0		0	
Carbon Dioxide	µg/L	16,200		11,600		36,900		14,400						37,100		29,200	
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	274		336		293		284						293		274	
Nitrate/Nitrite	mg/L	0.066	J	0.13		0		0						0		0.75	
Sulfate	mg/L	22.6		24.5		25.7		19						19.6		11.1	
Chloride	mg/L	13.7		12.6		10		12.1						12		13.2	
Ferrous Iron	mg/L	0		0		0		0						0		0	
Manganese	µg/L	201		2.4	J	0		0						0		2.2	J
Hydrogen	nM																
Total Dissolved Solids	mg/L	364		413		348		351		334		347		365		362	
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		0.12	J	0		0		0.11	J
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		0.36	J	0		0		0.36	J
Dichloroethene, cis-1,2-	µg/L	80		21		16		230		270		270		230		380	
Dichloroethene, trans-1,2-	µg/L	0.19	J	0.74		0.85		2.3		3.5		2.4		2.3		2.6	
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	150		20		8.4		150		170		140		120		210	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	37		19		8		170		170		170		160		140	
Vinyl chloride	µg/L	3.9		0.43	J	0.30	J	0		0		0		0		0	
Arsenic	µg/L	0		0		0		0						0		0	
Barium	µg/L	36.5		69.4		64.8		24.4						23.9		26.2	
Cadmium	µg/L	0		0		0		0						0		0	
Chromium	µg/L	0		0		0		0						0		0	
Copper	µg/L	0		0		0		0						0		0	
Lead	µg/L	4	J	3.2	J	2.4	J	4.4	J					3.9	J	5.2	
Mercury	µg/L	0.14	J	0.14	J	0.13	J	0.19	J					0.19	J	0.17	J
Nickel	µg/L	3.6	J	0.58	J	1.7	J	2.0	J					2.2	J	0.58	J
Zinc	µg/L	5.5	J	6.5	J	15.9	J	9.5	J					8.0	J	41.9	J
		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11 - Month 31		Q11 - Month 32		Q11 - Month 33		Q11 - Month 33	

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

Table 11.2.3c

SWMU B-3 Bioreactor Multi-port Well CS-WB07 - Q11 Performance Data

Q11		WB07															
Well ID		CS-WB07-UGR01		CS-WB07-LGR01		CS-WB07-LGR-02		CS-WB07-LGR-03A		CS-WB07-LGR-03B				CS-WB07-LGR-04			
Sample Date		1/25/2010		1/25/2010		1/25/2010		1/25/2010		11/16/2009		12/14/2009		1/25/2010		1/25/2010	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	4.5		1.1		0.60		0.35	J	3.6		0		0.39	J	0.40	J
Total Organic Carbon	mg/L	5.1		0.70		1.4		0.41	J	2.2		0.62		0.68		0	
Methane	µg/L	985		23.8		3.8		8.3		2.0		3.1		7.2		0	
Ethene	µg/L	5.2		0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	44,400		111,000		31,000		41,900		8,820		9,810		44,200		66,800	
Alkalinity, Total (as CaCO3)	mg/L	396		408		293		282		286		283		288		277	
Nitrate/Nitrite	mg/L	0		0		0		0		0		0		0		1.1	
Sulfate	mg/L	18.2		78.3		37.8		19.8		20.8		19.5		19.9		9.3	
Chloride	mg/L	28.7		16.1		13.2		10.4		10.9		10.4		10.4		11.9	
Ferrous Iron	mg/L	4.5		0		0		0		0.22	J	0		0		0	
Manganese	µg/L	1,190		3.0	J	0		0		0		0		0		0	
Hydrogen	nM																
Total Dissolved Solids	mg/L	534		571		397		333		331		362		343		341	
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		0.17	J
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	
Dichloroethene, cis-1,2-	µg/L	42		2.9		0.18	J	30		30		31		23		250	
Dichloroethene, trans-1,2-	µg/L	3.3		0.43	J	0		0.64		0.94		0.61		0.32	J	0.55	J
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		0.21	J	0.64	J	0.79	J	0		2.4		140	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0.77	J	1.3		0.57	J	4.6		4.4		3.0		4.4		170	
Vinyl chloride	µg/L	56		3		0		0		0		0		0		0	
Arsenic	µg/L	4.0	J	0		0		0		0		0		0		0	
Barium	µg/L	87		105		80.8		33.2		36.6		32.8		29.1		26	
Cadmium	µg/L	0		0		0		0		0		0		0		0	
Chromium	µg/L	1.4	J	0		0		0		0		0		0		0	
Copper	µg/L	0		0		1.5	BJ	0		44.5	B	1.6	J	1.0	BJ	2.0	BJ
Lead	µg/L	1.7	J	0		2.4	J	2.7	J	0		0		3.8	J	3.0	J
Mercury	µg/L	0		0		0		0		0		0		0		0	
Nickel	µg/L	1.9	J	3.3	J	0		0		1.5	J	1.6	J	0		0	
Zinc	µg/L	3.9	J	4.7	J	6.6	J	10.6	J	42.3	J	15.5	J	9.7	J	5.7	J
		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11- Month 31		Q11- Month 32		Q11 - Month 33		Q11 - Month 33	

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

Note: Dry zones including UGR-01 were not sampled during the quarterly sampling event.

Table 11.2.3d

SWMU B-3 Bioreactor Multi-port Well CS-WB08 - Q11 Performance Data

Q11		WB08													
Well ID		CS-WB08-UGR01		CS-WB08-LGR01		CS-WB08-LGR02		CS-WB08-LGR03A		CS-WB08-LGR03B				CS-WB08-LGR04	
Sample Date		1/26/2010		1/26/2010		1/26/2010		1/26/2010		11/16/2009		12/14/2009		1/26/2010	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	0.55		0.40	J	1.1		0.68						1.4	
Total Organic Carbon	mg/L	1.3		1.1		1.2		0.84						1	
Methane	µg/L	110		0		2.3		0						0	J
Ethene	µg/L	0		0		0		0						0	
Ethane	µg/L	0		0		0		0						0	
Carbon Dioxide	µg/L	33,100		10,400		29,600		42,300						78,900	
Alkalinity, Total (as CaCO3)	mg/L	277		357		343		329						330	
Nitrate/Nitrite	mg/L	0.089	J	0		0		0.44						0.44	
Sulfate	mg/L	19.4		90		109		16.2						16.5	
Chloride	mg/L	12.2		12.9		11.8		14.6						15	
Ferrous Iron	mg/L	0		0		0		0						0	
Manganese	µg/L	408		0		0		0						0	
Hydrogen	nM														
Total Dissolved Solids	mg/L	366		521		573		400		360		338		398	
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		0.17	J	0.16	J	0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		16	
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	83		110		2.4		96		190		180		49	
Dichloroethene, trans-1,2-	µg/L	0.39	J	9.8		0		1.4		2.5		1.4		0.40	J
Methylene chloride	µg/L	0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	3.7		0.42	J	0.22	J	56		130		140		19	
Toluene	µg/L	0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.5		4.3		0.49	J	55		170		160		19	
Vinyl chloride	µg/L	7.3		1.3		0		0		0		0		0	
Arsenic	µg/L	0		0		0		0						0	
Barium	µg/L	28.1		104		64.2		35.5						33.9	
Cadmium	µg/L	0		0		0		0						0	
Chromium	µg/L	1.6	J	2.4	J	1.4	J	0						0	
Copper	µg/L	0		0		0		0						0	
Lead	µg/L	3.3	J	2.0	J	0		3.2	J					3.3	J
Mercury	µg/L	0		0		0		0						0	
Nickel	µg/L	7.7		2.0	J	0		1.4	J					1.3	J
Zinc	µg/L	7.9	J	6.4	J	3.0	J	8.3	J					4.1	J
		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11 - Month 33		Q11 - Month 31		Q11 - Month 32		Q11 - Month 33	

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

Table 11.3.3

B-3 Bioreactor Monitoring Well Analytical Summary - Quarter 11

Q11		Monitoring Wells											
Well ID		CS-MW16-LGR		CS-MW1-LGR		CS-D		CS-B3-MW01		CS-MW16-CC		B3-EXW01	
Sample Date		1/18/2010		1/18/2010		1/18/2010		1/18/2010		1/18/2010		1/18/2010	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	0		0		0		10.7		0		0.17	J
Total Organic Carbon	mg/L	0.81		0.85		0.18	J	10.8		0.23	J	0.71	
Methane	µg/L	32.3		0		0		85,000		6.9		0.50	J
Ethene	µg/L	0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0	
Carbon Dioxide	µg/L	36,100		26,100		27,800		573,000		24,800		29,300	
Alkalinity, Total (as CaCO3)	mg/L	279		284		269		503		302		271	
Nitrate/Nitrite	mg/L	1.1		1.4		1.2		0.019	J	0		0.455	
Sulfate	mg/L	17.5		13.8		15.1		2.4		61.9		12.7	
Chloride	mg/L	10.6		10.2		10.8		12.8		17.1		11.4	
Ferrous Iron	mg/L	0.19	J	0.21	J	0.18	J	4.1		0.33	J	0.29	J
Manganese	µg/L	0		0		0		125		0		19.5	
Hydrogen	nM	5.6		2.1		5.1		5.1		3.9		12	
Total Dissolved Solids	mg/L	341		317		325		611		420		345	
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	0.16	J	0		0.17	J	0		0		0.19	J
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		0.37	J	0	
Dichloroethene, cis-1,2-	µg/L	150		51		120		470		29		230	
Dichloroethene, trans-1,2-	µg/L	0.39	J	0.76		0.55	J	3.4		3.8		1.7	
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	150		43		120		0		4.6		170	
Toluene	µg/L	0		0		0		0		0		0.54	J
Trichloroethene	µg/L	170		54		150		3.2		38		210	
Vinyl chloride	µg/L	0		0		0		5.1		0		0	
Arsenic	µg/L	0		0		0		0		0		0	
Barium	µg/L	34		30.9		28.9		88.5		21.8		28	
Cadmium	µg/L	0		0		0		0		0		0	
Chromium	µg/L	0		0		0		0		0		0	
Copper	µg/L	1.7	J	0		0		0		4.5	J	23	
Lead	µg/L	0		0		0		0		0		30.6	
Mercury	µg/L	0		0		0		0.18	BJ	0		0	
Nickel	µg/L	0		4	J	0.49	J	0.76	J	2.8	J	1.5	J
Zinc	µg/L	63.6		2.9	J	13.1	J	31.4	J	17.6	J	3,250	
		Quarter 11 - Month 33		Quarter 11 - Month 33		Quarter 11 - Month 33		Quarter 11 - Month 33		Quarter 11 - Month 33		Quarter 11 - Month 33	

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

Table 11.4.4

SWMU B-3 Sump and Monitoring Well Microbial Data Quarter 11

<b>Trench Sump</b>	<b>Sample date:</b>	1/19/2010
<b>B3 T1-2</b>		
<b>Dechlorinating Bacteria</b>	units	
<i>Dehalococcoides spp (1)</i>	(cells/mL)	1.53E+03
<b>Functional Genes</b>	units	
TCE R-Dase (1)	(cells/mL)	2.75E+02
BAV1 VC R-Dase (1)	(cells/mL)	1.40E+00
VC R-Dase	(cells/mL)	6.68E+01



Table 11.5.3

SWMU B3-UIC Analytical Summary Table  
Quarter 10 - Quarter 11

Q11		B3									
Well ID		B3-UIC		B3-UIC		B3-UIC		B3-UIC		B3-UIC	
Sample Date		8/18/2009		10/7/2009		11/18/2009		12/15/2009		1/26/2010	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Dissolved Solids	mg/L	365		359		353		315		364	
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		0.15	J	0.19	J	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	87		32		150		180		70	
Dichloroethene, trans-1,2-	µg/L	6.3		2.5		3.1		1.4		2.4	
Methylene chloride	µg/L	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0	
Tetrachloroethene	µg/L	60		3.4		110		150		52	
Toluene	µg/L	0		0		0		0		0	
Trichloroethene	µg/L	93		39		150		160		78	
Vinyl chloride	µg/L	0.89	J	0		0		0.31	J	0	

Note: 0 sample value indicates a non-detect analyte value.  
No sample collected in September 2009 as injection was suspended for flood test.