

**CSSA B-3 BIOREACTOR OPERATIONS
PERFORMANCE STATUS REPORT
(QUARTER 17, MONTHS 49 – 51, MAY - JULY, 2011)**

OCTOBER 11, 2011

This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from May 1 through July 31, 2011, comprising the seventeenth 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 July 2011 are attached for reference. Parsons personnel working on this project during the reporting period include: Julie Bouch, Ken Rice, Adrien Lindley, Samantha Elliott, Scott Pearson, and William Martin.

Executive Summary

Site conditions were hot and dry through the quarter with 2.49 inches of precipitation reported. Injection of extracted groundwater continued through the quarter with few interruptions. Minor interruptions in injection operations were due to decreased aquifer levels triggering the automatic cut-off in the extraction wells and/or storage tank. Approximately 44,004,104 gallons of groundwater extracted from CS-MW16-LGR, CS-MW16-CC, B3-EXW01, and B3-EXW02 have been injected into bioreactor trenches 1, 2, and 6 since the start of normal operations. During quarter 17, a total of 2,604,815 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, ~1,006,000 gallons, was from CS-MW16-CC, while ~684,000 were extracted from B3-EXW02, ~548,000 gallons were extracted from CS-MW16-LGR, and ~366,500 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 nanoMolar (nM), indicating that there is sufficient electron donor present to stimulate anaerobic dechlorination of CAHs.

Analytical results for samples collected in trench 1 and 6 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 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 trenches 1 and 6. 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 17 analytical results from monitoring bioreactor sumps indicate that the SWMU B-3 trenches contain a range of *cis*-DCE levels (0.52 – 339 µg/L – Quarter 17) as well as concentrations of other dechlorination products (e.g., VC, ethene, ethane). Sump samples were collected from Trenches 1 and 6 during Quarter 17. Over this reporting period, minor amounts of toluene and other fuel related compounds were identified. A summary of the analytical data collected for the reporting period is included in Table 1. A summary of monthly and quarter 17 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, CS-WB06, and CS-WB07 contain less than 100 micrograms per liter (µg/L) of PCE, and wells CS-WB05, CS-WB07, and CS-WB08 contain less than 100 micrograms per liter (µg/L) of TCE, and *cis*-DCE was detected in concentrations less than 100 µg/L in CS-WB07. Well CS-WB08 water contained concentrations greater than 100 µg/L of PCE and *cis*-DCE, well CS-WB06 water contained concentrations greater than 100 µg/L of TCE and *cis*-DCE, and water from CS-WB05 contained concentrations greater than 100 µg/L *cis*-DCE. Groundwater from CS-MW16-LGR and B3-EWX01 contain greater than 100 µg/L of PCE, TCE, and *cis*-DCE while water from extraction wells B3-EXW-02 and CS-MW16-CC contains less than 100 µg/L of PCE, TCE, and *cis*-DCE. Quarterly data from the bioreactor trench sumps indicate a decreasing trend in contaminant mass (total molar concentration) in sumps 1-1, 1-3, 6-1 and 6-2 through the quarter. An increasing trend in contaminant mass is observed in sump 1-2 through the quarter.

Water quality field measurements from the bioreactor trench 1 sumps indicate that DO readings have lowered from the previous quarter with an average of 0.20 mg/L, ORP has also lowered since the previous quarter, averaging -260 mV, pH ~ 6.20, temperatures range from ~ 25°C to 28°C, and specific conductivity ranges from 0.396 to 1.041 millisiemens per centimeter (mS/cm). Other observations regarding the data collected during this reporting period are listed below.

Water quality field measurements from trench 6 include: average DO, pH, and ORP ~0.15mg/L, ~6.51, and ~ -229 mV, respectively; temperature ranges from 23 °C to 27 °C; and specific conductivity ranges from 0.521 to 0.933 mS/cm.

Ground water elevation data from the shallow UGR wells surrounding the bioreactor 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” centered on the bioreactor trenches. Analyses of samples from the UGR wells indicate the presence of vinyl chloride with concentrations ranging from non-detect to 134 ppb, with the highest concentrations found north and west of the bioreactor. MW-28, located southwest of the bioreactor, has been consistently dry, and MW-29 and MW-30 were also dry through the quarter. 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- 34, while MW-26, -27, -31, and -32 showed fair reducing conditions and MW-30 and -33 showed poor reducing conditions. There were significant perturbations in either DO or ORP observed at MW-27, 31, 33, and 34, while MW-34 and MW-30 consistently indicated good and poor reducing conditions, respectively.

Through the 17th quarter of bioreactor operation, 2.49 inches of precipitation were measured at the weather stations closest to the bioreactor site. Average water thickness in Trench 1 during this period was approximately 3.36 feet, down more than 1.5 feet from the previous quarter. Average water thickness in Trench 6 during this period was approximately 1.12 feet, also down approximately 1.5 feet from the previous quarter.

Attached are graphs including a cumulative total volume of recovered groundwater from CS-MW16-LGR, CS-MW16-CC, B3-EXW-01, and B3-EXW-02 applied into trenches 1, 2, and 6, the B-3 Trench 1 average water thickness with rainfall data and average water applied daily to trench 1, the CVOC concentrations in the extraction wells, 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 all trench sumps sampled in May (14 – 22 µg/L), however in the following months, arsenic was detected below the MCL (ND – 2.4 µg/L) in all sumps. Manganese (Mn) was reported in bioreactor trench samples in concentrations ranging from 12 to 561 µg/L (MCL is 50 µg/L). Of the six shallow UGR wells sampled during the quarter, four had elevated levels of Mn with concentrations ranging from 51 to 651 µg/L. Three of the shallow UGR wells did not produce enough water to sample. An elevated level of Mn was reported in CS-B3-MW01 (154 µg/L) during this quarter. Arsenic was not detected above the MCL in any of the monitoring wells surrounding the bioreactor during the quarter. Elevated levels of Mn were reported in CS-WB06- UGR-01 (575 µg/L) and CS-WB08-UGR01 (818 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 favorable for the reduction of CAHs (generally less than 0.50 mg/L and less than -100 mV), and it is likely that geochemical conditions will continue to be favorable as normal bioreactor operations persist.
3. The VOC summary for trench 1 sumps indicate a decrease in the total molar concentrations (TMCs) as well as a general increase in the percentage of dechlorination products (ethene, VC, and DCE isomer) that contribute to the TMC. The trans-DCE isomer in trenches 1 and 6 is theorized to be the result of an abiotic reductive dechlorination pathway.
4. Reductive dechlorination of CAHs by microbial activity appears to be occurring as DHC bacterial counts are within the range of biostimulated populations (1.0E +03 cell/mL) in trench 1.
5. Saturated conditions within the bioreactor are maintained (while groundwater injection activities were sustained) through the quarter with average water thicknesses of

approximately 3.36 feet and 1.12 feet in trenches 1 and 6, respectively. Although the saturated thickness in trench 6 remains relatively low, field parameter data collected from trench 6 sumps indicate appropriate geochemical conditions for effective anaerobic dechlorination of CAHs is being maintained.

6. High levels of vinyl chloride were noted in deeper zones of the Lower Glen Rose. Samples from WB05-LGR04A, WB05-LGR04B and CS-B3-MW01 found 29, 110 and 36 ppb, respectively. Minor amounts of vinyl chloride were also detected in CS-WB05 zones LGR03B, BS-01, and CC-02 (11, 5.9 and 2.0 ppb, respectively). Both of these wells are located north of the bioreactor. These data indicate reduction byproducts are migrating vertically in this area.

Anticipated Schedule for Next Period (August, 2011 – October, 2011):

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Conduct monthly monitoring events in August and September (Months 52 and 53), and quarterly monitoring event in October (Month 54) for bioreactor system.
- Continue UIC monthly monitoring with semi-annual reporting due December 2011.
- Begin efforts associated with the construction of bioreactor operations building including the installation of new storage tanks, repositioning of injection manifold, and relocating SCADA controls.
- Begin efforts to add mulch and pea-gravel to bioreactor trench sumps.

Specific Data Observation Notes for Attachments

- Analytical results from the B-3 Trench Sump (trenches 1 through 6) samples, shown in Table 17.1.2, present data from quarter 17 sampling events.
- Table 17.1.1 indicates a water thickness of approximately 3.36 feet in trench 1 and 1.12 feet in trench 6 was maintained.
- Table 17.1.2 indicates that VC was present at low to high concentrations in trench sumps; ranging from non-detect (ND) to 175 µg/L in trench 1, and ND to 5.1 µg/L in trench 6. Ethene was observed in concentrations ranging from ND to 116 µg/L in trench 1 and from ND to 3.1 µg/L in trench 6.
- Table 17.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 17.1.3 provides evidence of the biotic anaerobic degradation pathway with elevated concentrations of Mn and CO₂. Ethane was detected in samples from sumps T1-1, T1-2, T1-3, and T6-2 in concentrations ranging from 1.4 to 79 µg/L (when detected). Samples from trench sumps T6-1 did not detect the presence of ethane.
- Table 17.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are moderate in trenches 1 and 6.
- Figure 17.2.5 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 17.7.3 indicates the presence of low concentrations of VC in two of the shallow UGR wells ranging from non-detect to 19 µg/L. Additionally, Table 17.7.3 provides evidence of the biotic anaerobic degradation pathway with the elevated concentrations of Mn and CO₂.

Analytical Summary Data

Table 1 Summary of Analysis Presented for Reporting Period

Event	VOCs	TDS	TOC	DOC	MEE & CO ₂	SO ₃ ⁻	Chloride Sulfate	Fe ²⁺	Mn	Metals	H ⁺	DHC
Monthly Sampling ^a (49)	✓	✓			✓			✓	✓	✓		
Monthly Sampling ^a (50)	✓	✓			✓			✓	✓	✓		
Quarterly Sampling ^b (17)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 (full-suite) includes samples from B3-trench sumps, Monitoring Wells, the uppermost saturated intervals of the multi-port wells (Zone 03B) and B3-UIC samples.

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 12 = Quarter 12 13 = Quarter 13 14 = Quarter 14 15 = Quarter 15 16 = Quarter 16 17 = Quarter 17
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 7 = Shallow UGR 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

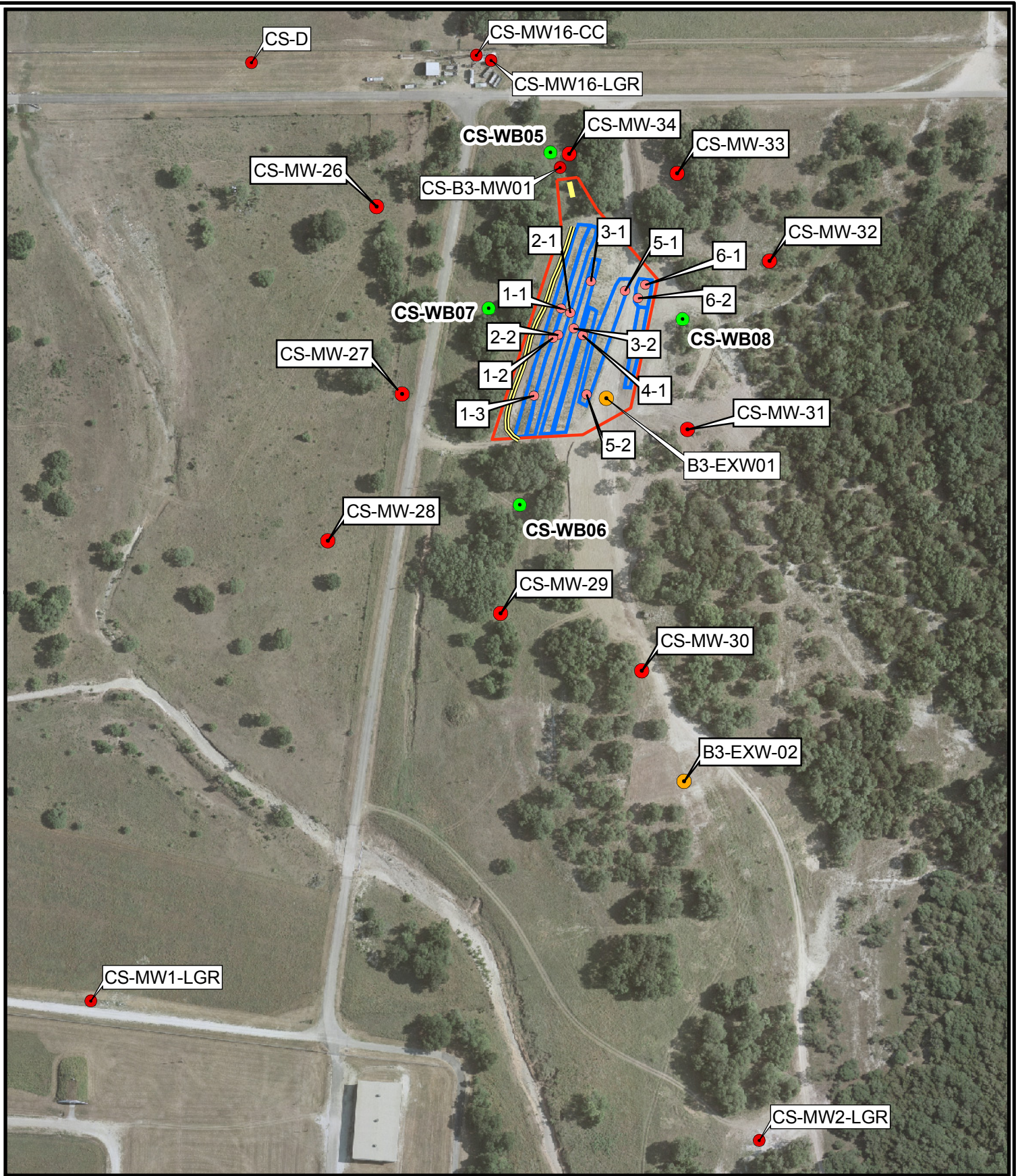


Figure 1

B-3 Bioreactor System
Camp Stanley Storage Activity

PARSONS

Figure 17.1.2T1-1

B3 Bioreactor Trench 1 Sump 1 VOC Summary Quarter 13 - Quarter 17

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

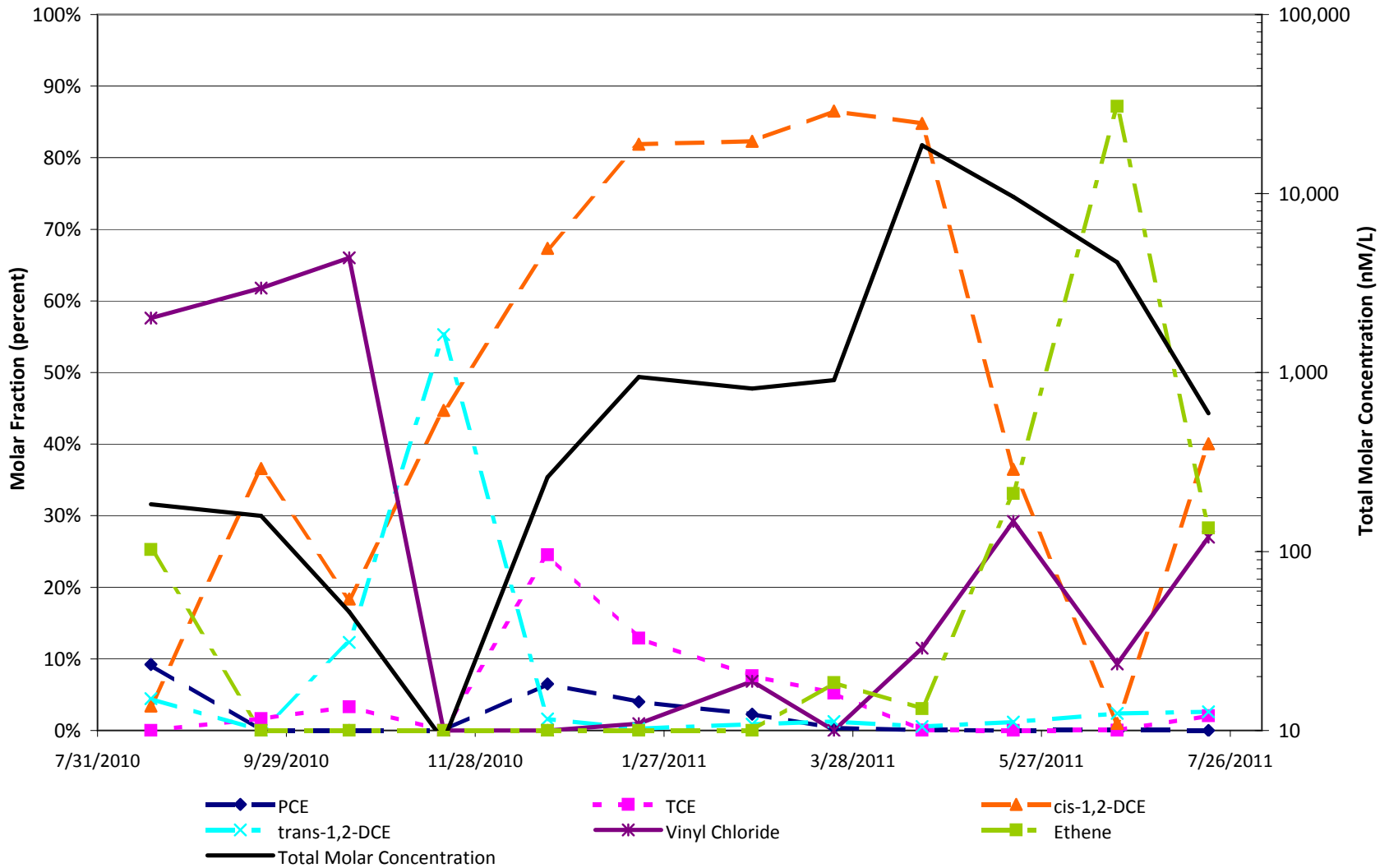


Figure 17.1.2T1-2

B-3 Bioreactor Trench 1 Sump 2 VOC Summary Quarter 13 - Quarter 17

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

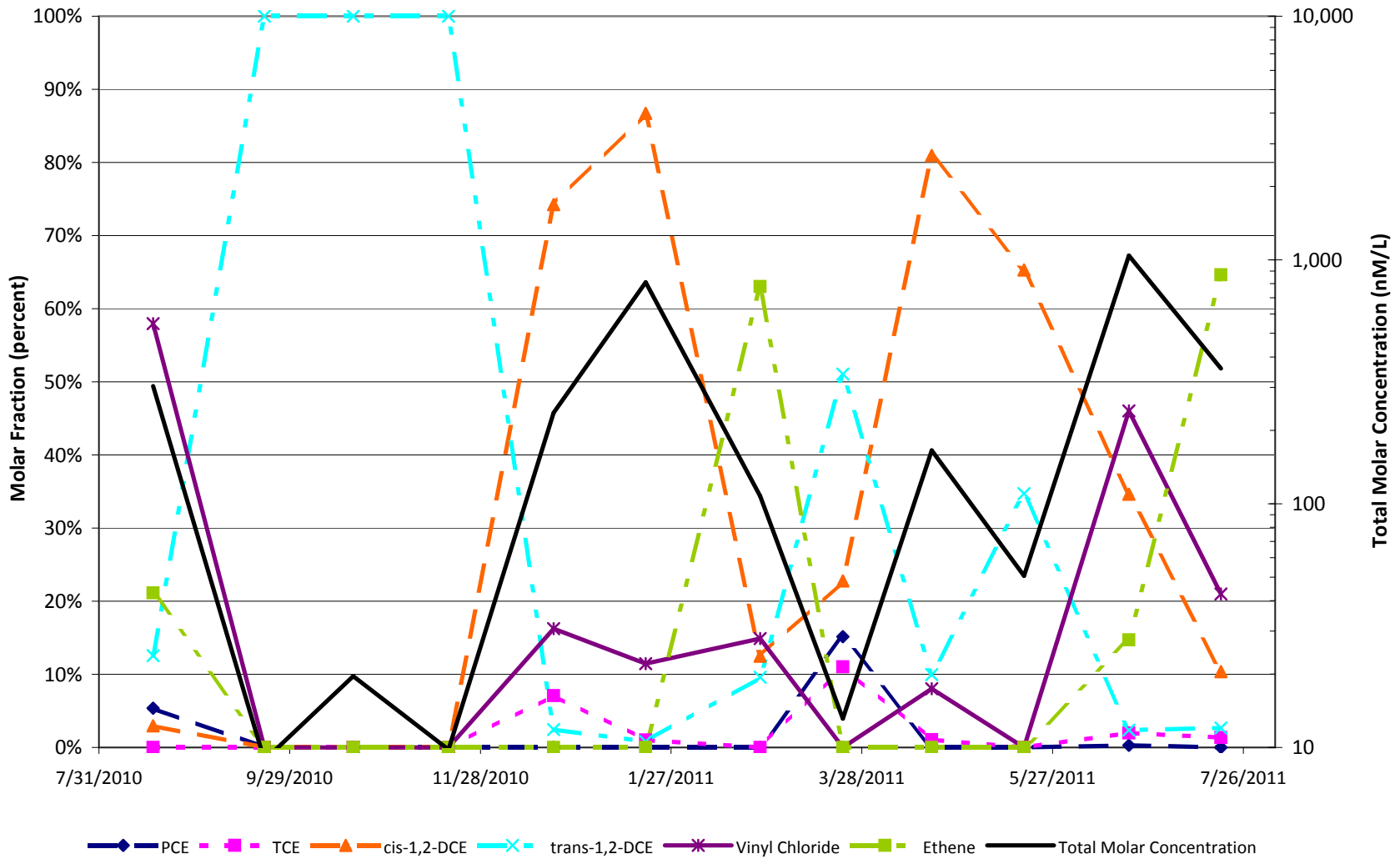


Figure 17.1.2T1-3

B-3 Bioreactor Trench 1 Sump 3 VOC Summary Quarter 13 - Quarter 17

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

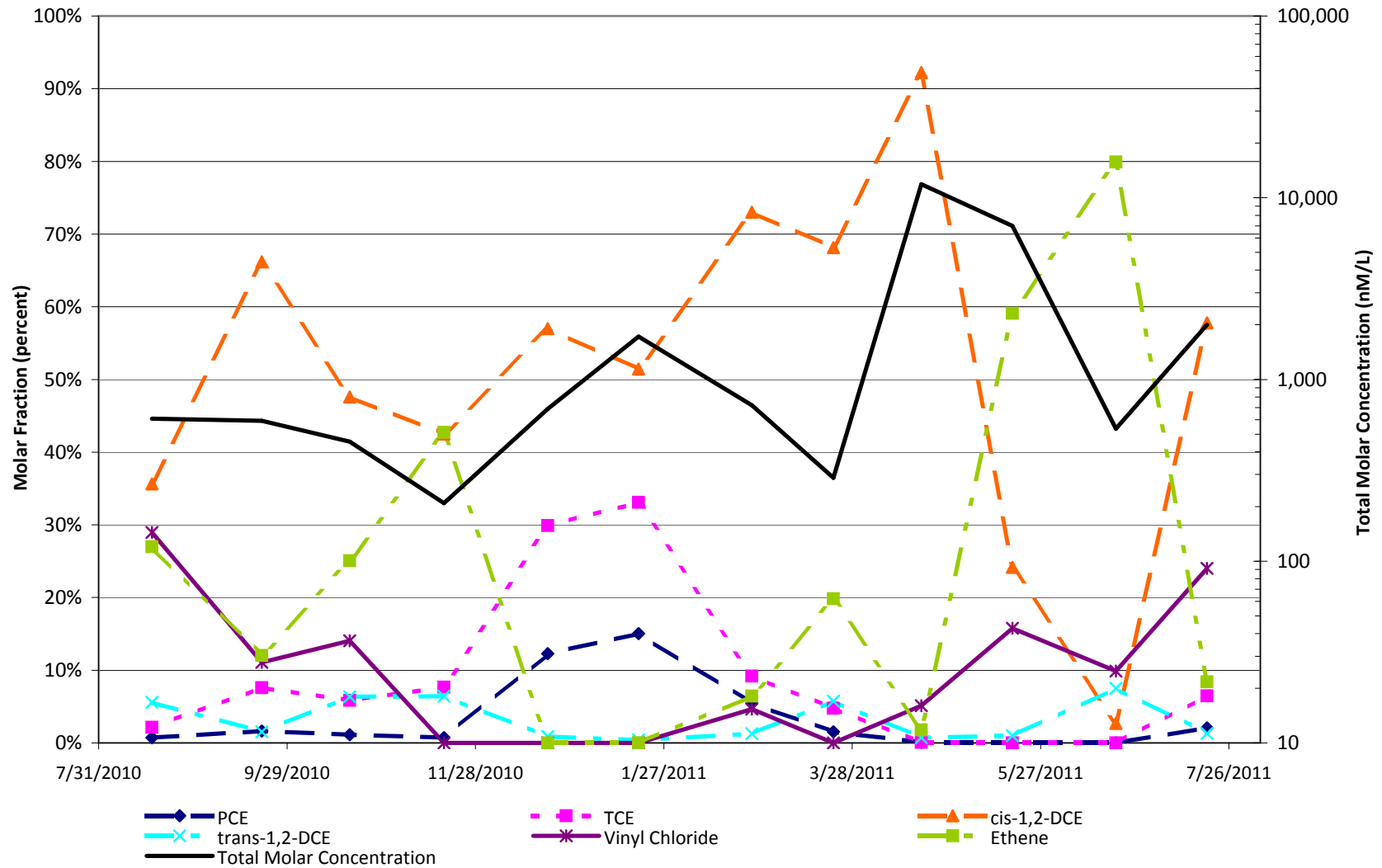


Figure 17.1.2T6-1

B-3 Bioreactor Trench 6 Sump 2 VOC Summary Quarter 13 - Quarter 17

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 Trench 6-1

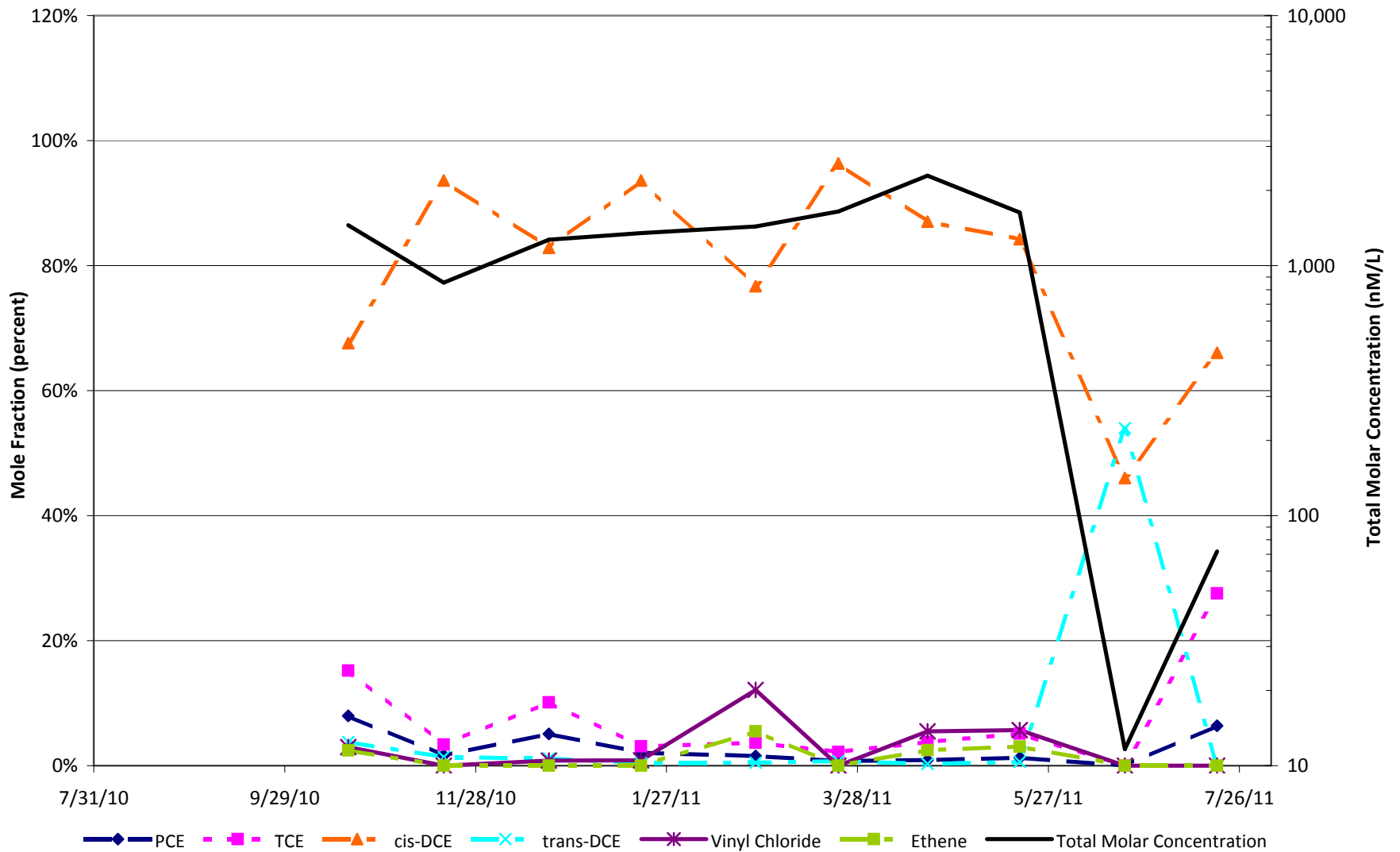


Figure 17.2.2a

Changes in Mole Fraction and Total Molar Concentration at CS-WB05-LGR03B Quarters 13-17

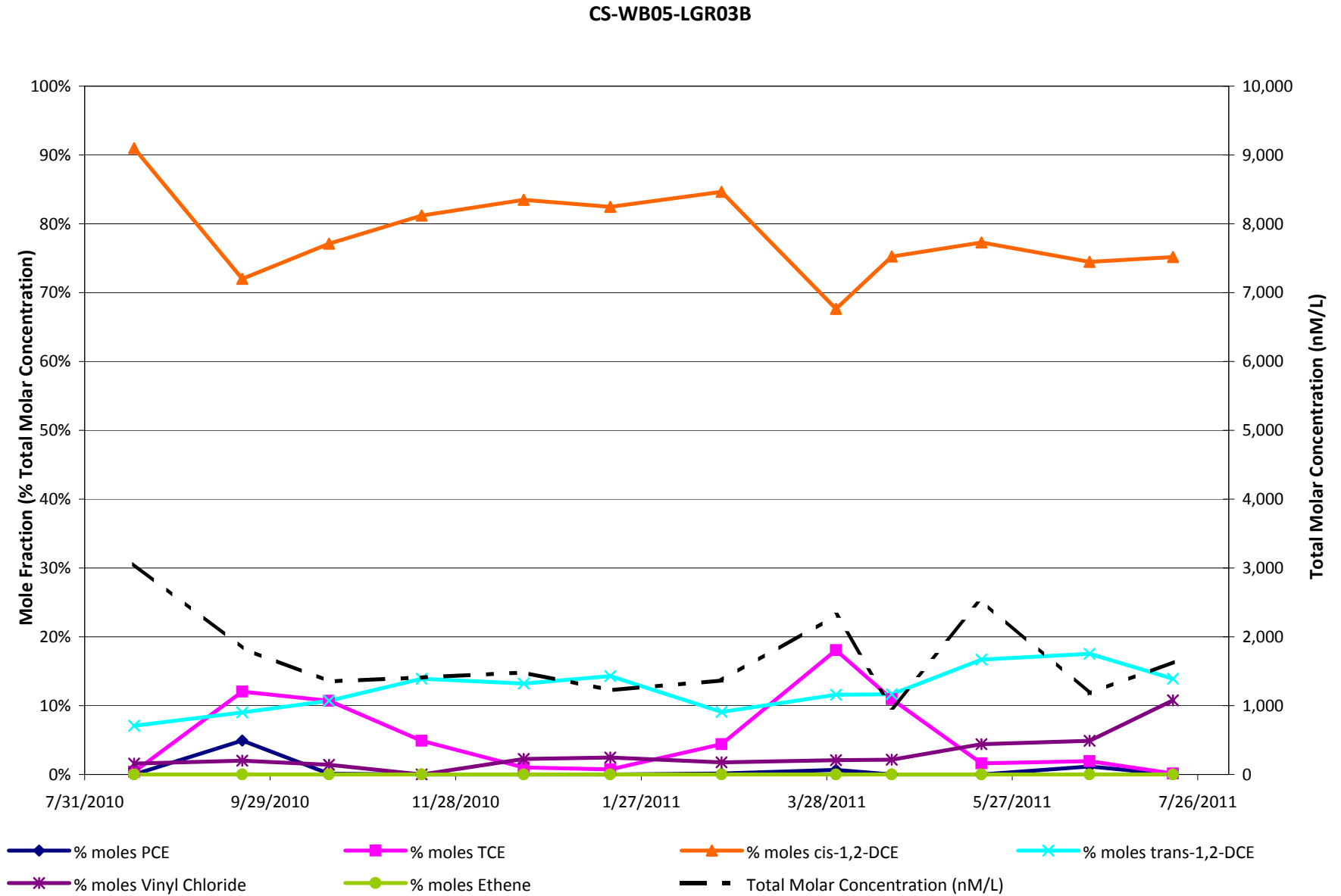


Figure 17.2.2b

Changes in Mole Fraction and Total Molar Concentration at CS-WB06-LGR03B Quarters 13 - 17

CS-WB06-LGR03B

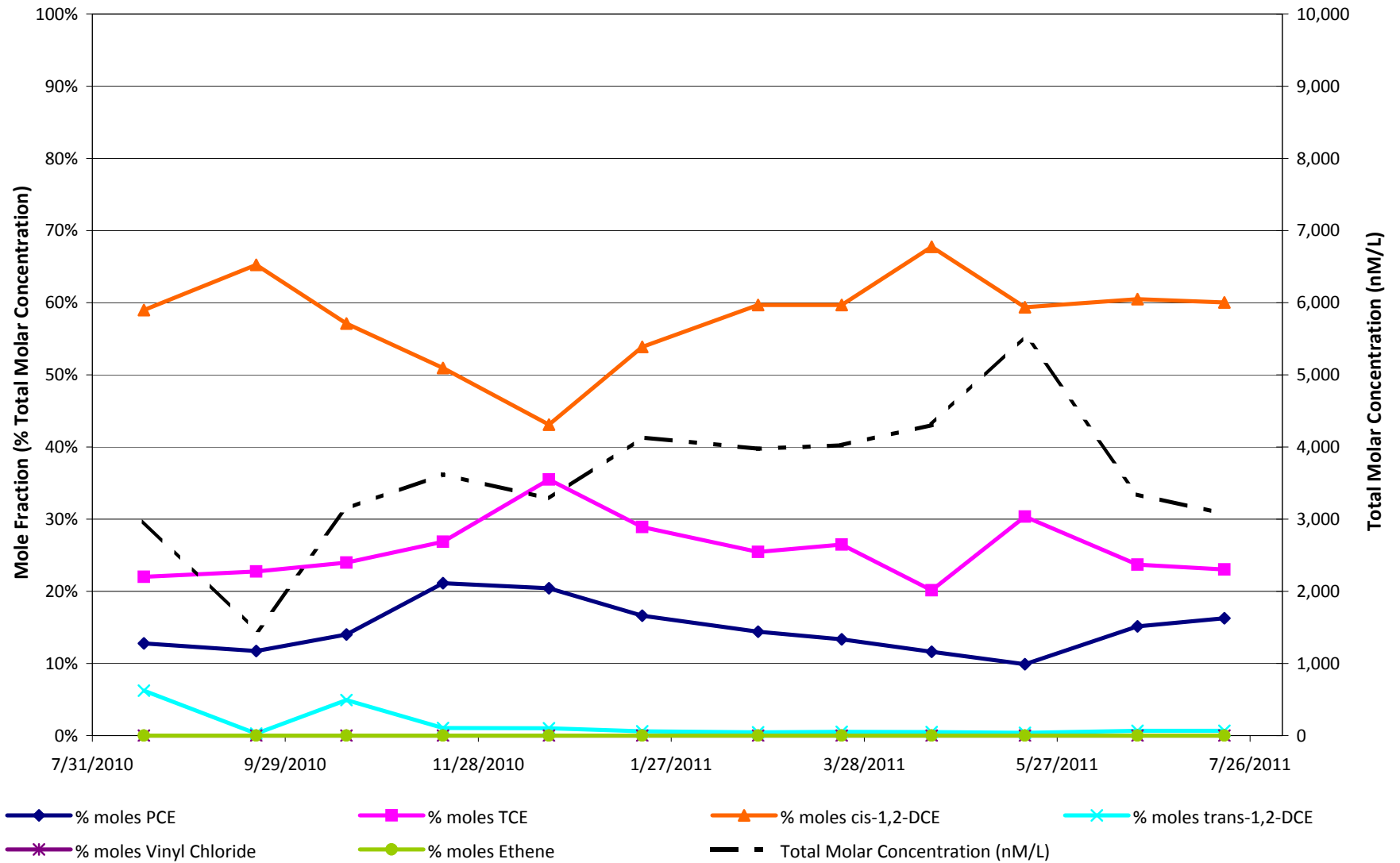


Figure 17.2.2c

Changes in Mole Fraction and Total Molar Concentration at CS-WB07-LGR03B Quarters 13-17

CS-WB07-LGR03B

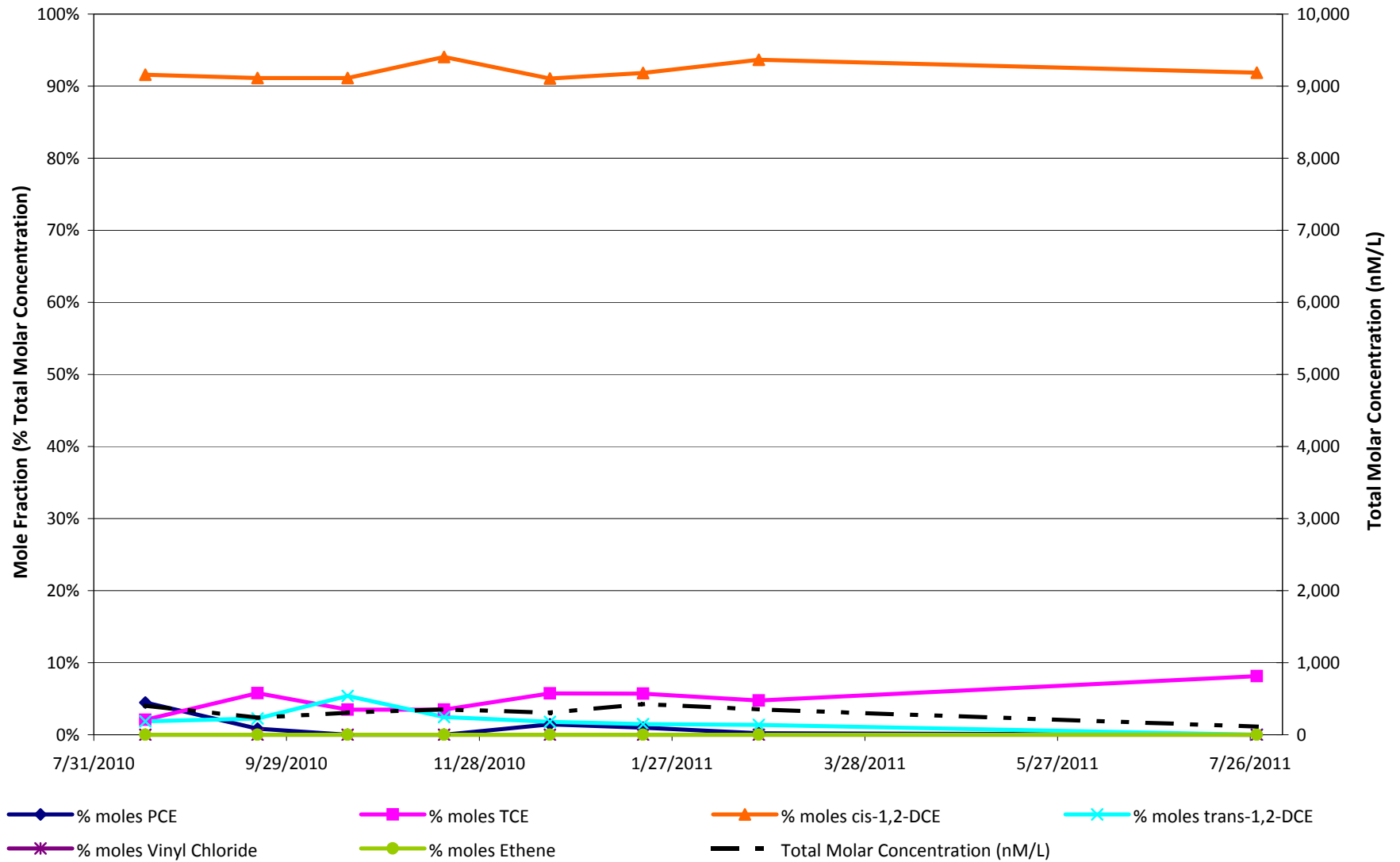


Figure 17.2.2d

Changes in Mole Fraction and Total Molar Concentration at CS-WB08-LGR03B Quarters 13 - 17

CS-WB08-LGR03B

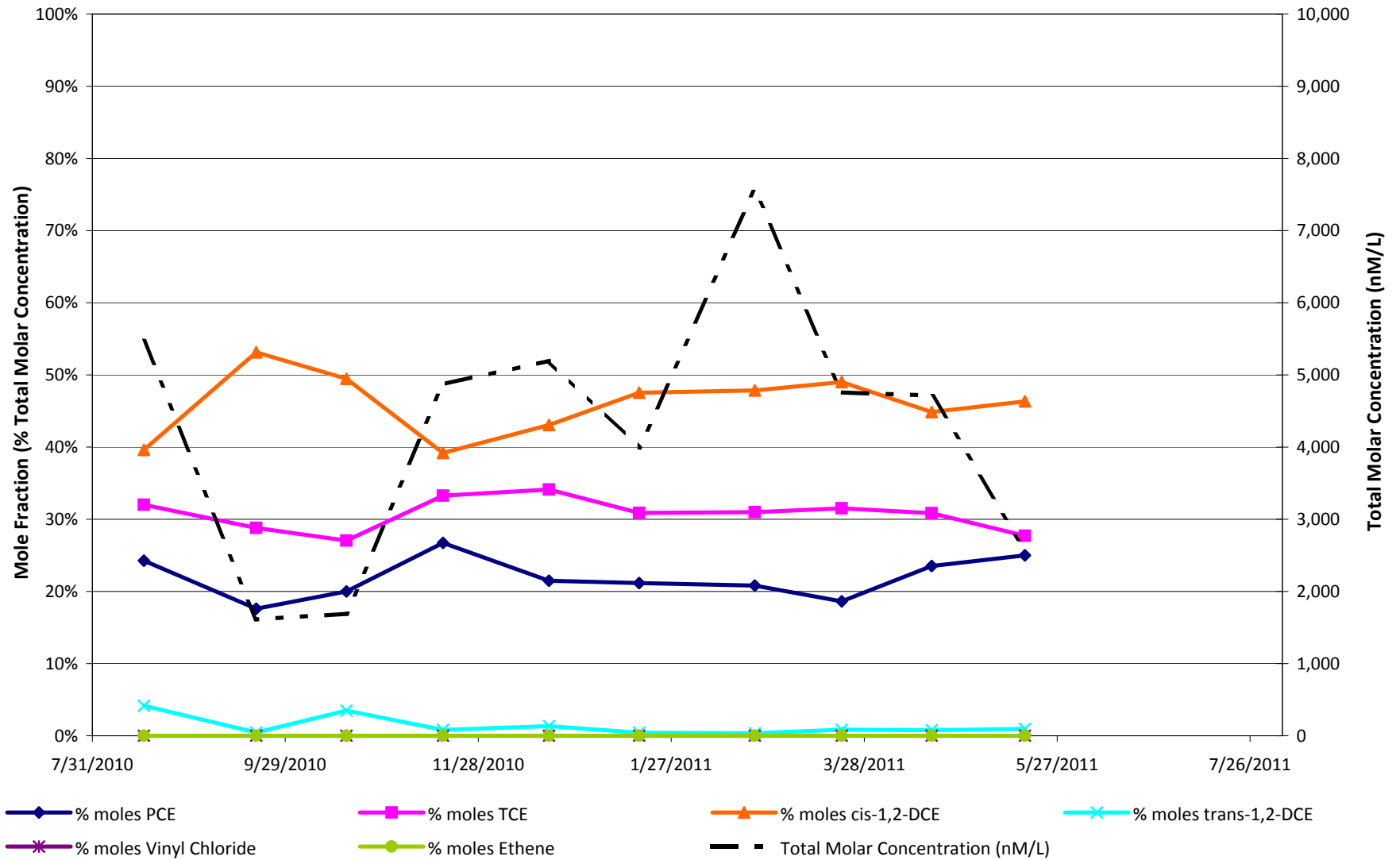


Figure 17.5.2

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

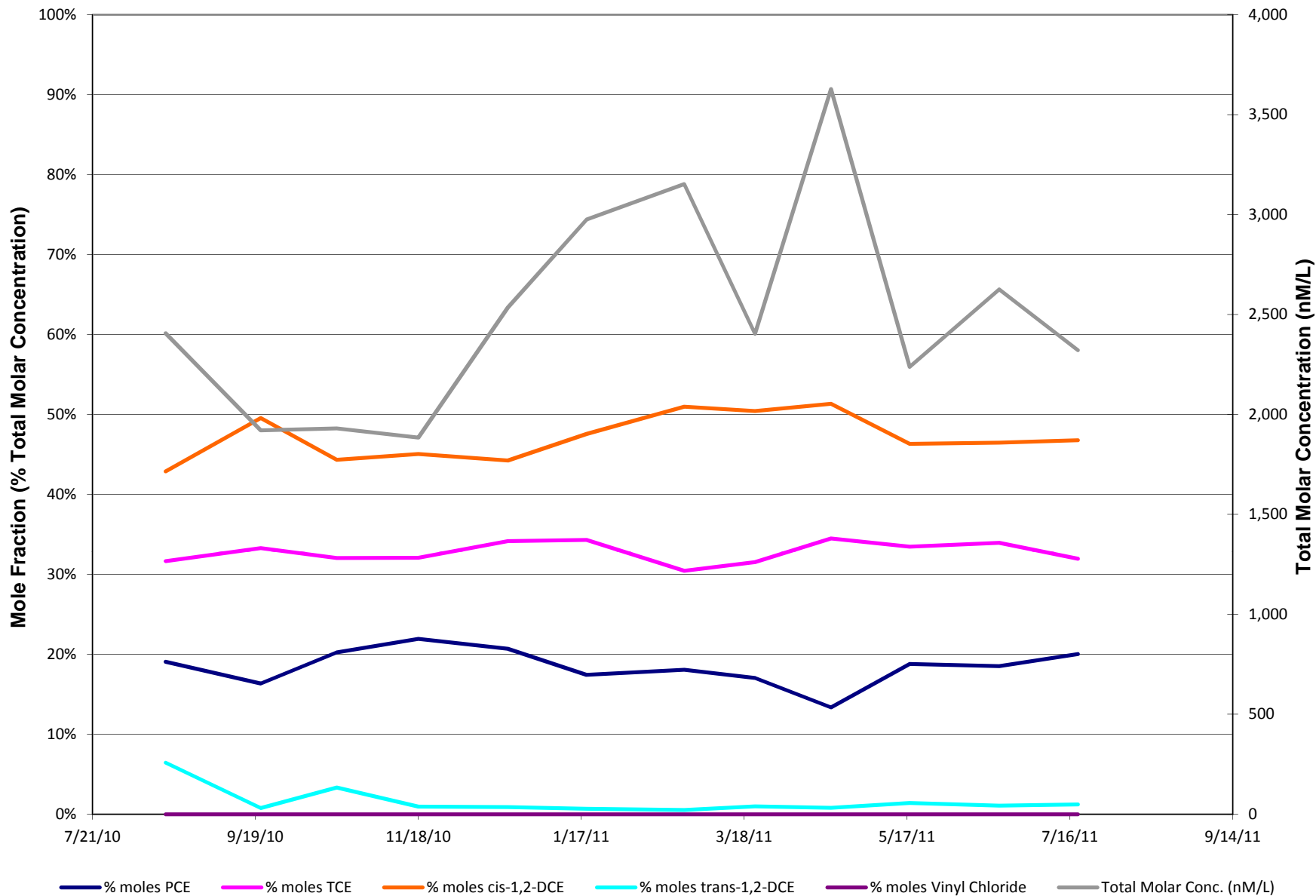


Figure 17.5.5

Cumulative Total Extracted Groundwater Applied to SWMU B3 Trenches Through July 2011

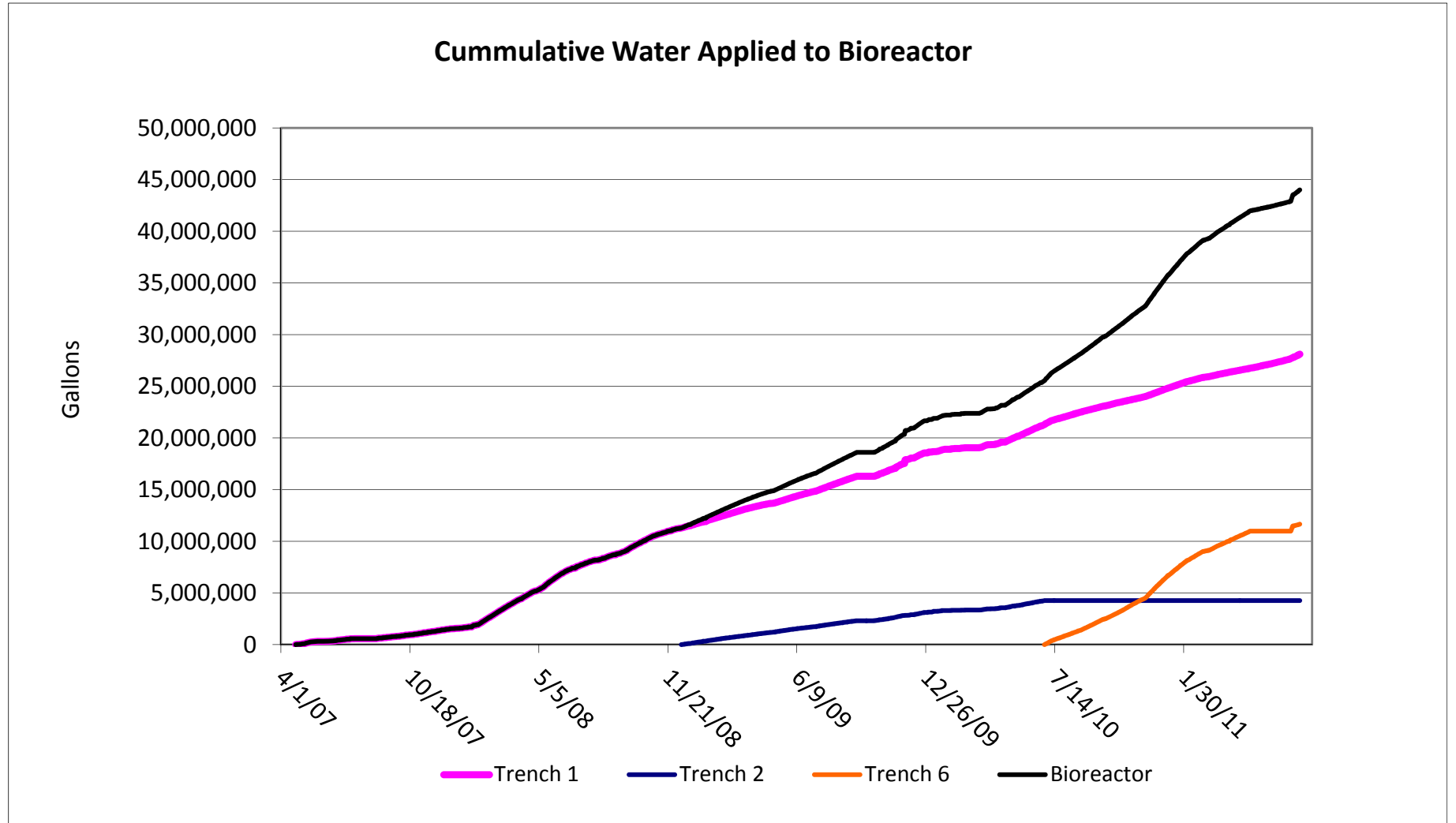


Figure 17.5.6

SWMU B-3 Bioreactor - Trench 1

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

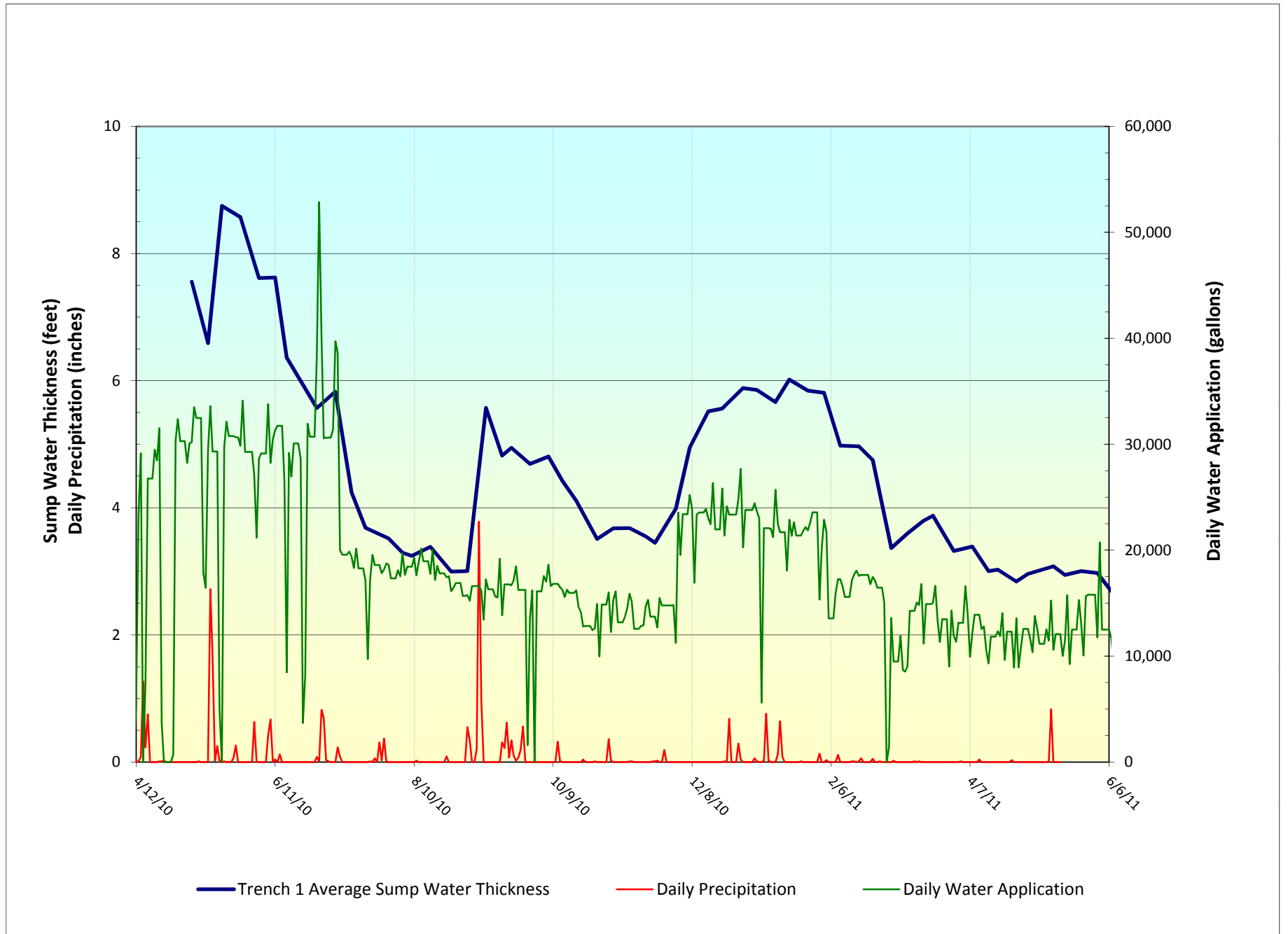


Figure 17.6.2-16CC

CS-MW16-CC VOC Summary Quarter 13 - Quarter 17

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

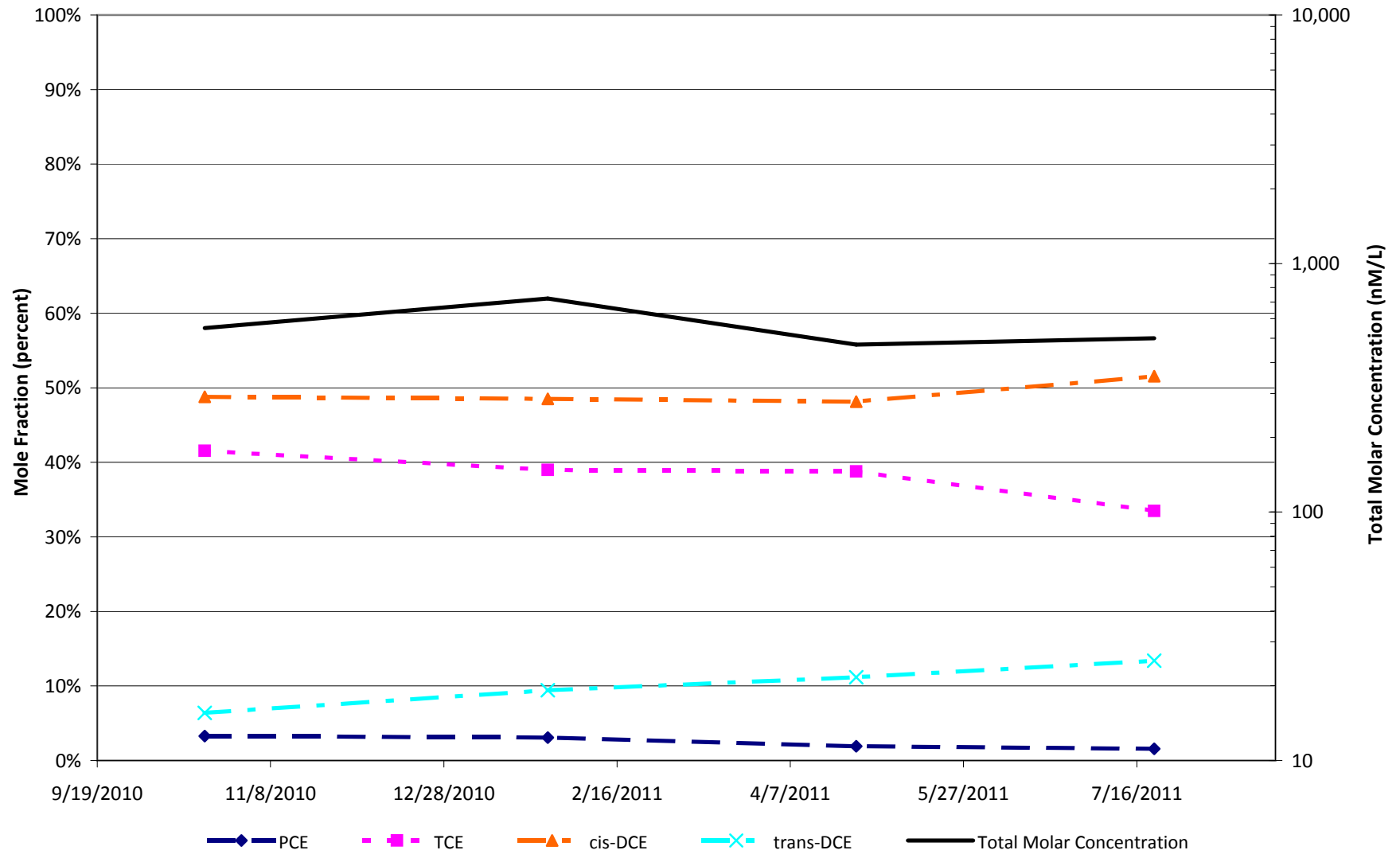


Figure 17.6.2-16LGR

CS-MW16-LGR VOC Summary Quarter 13 - Quarter 17

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

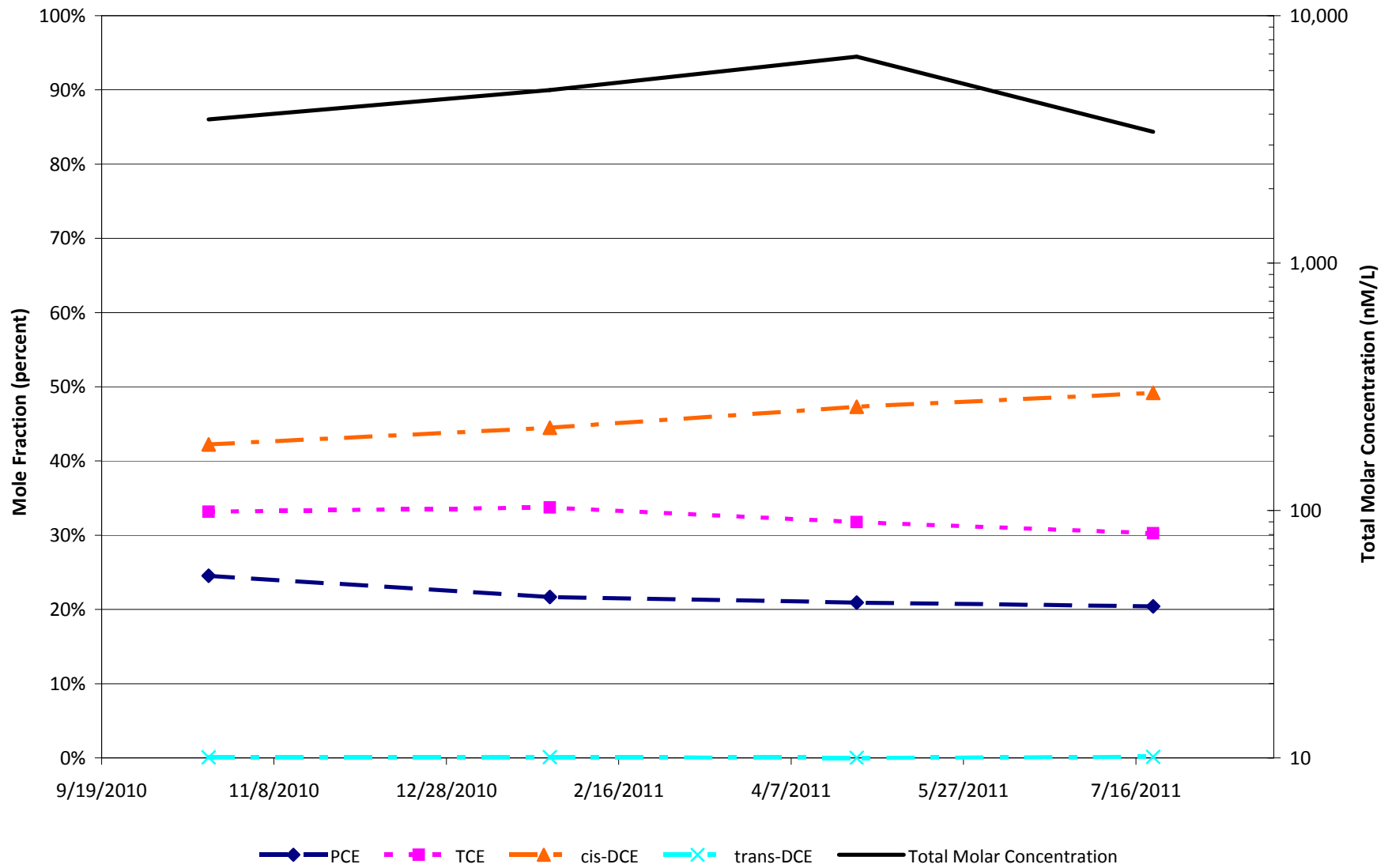
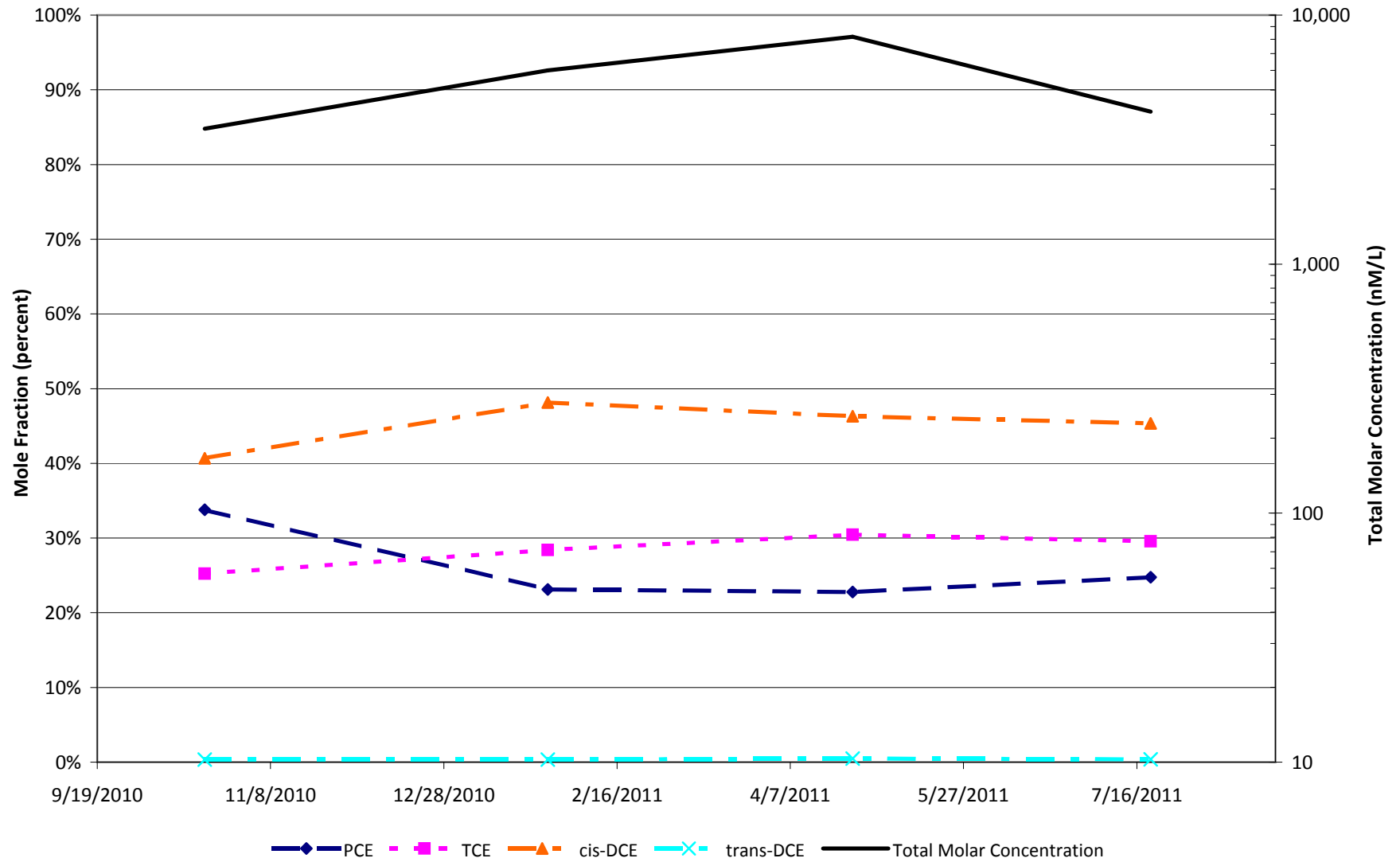
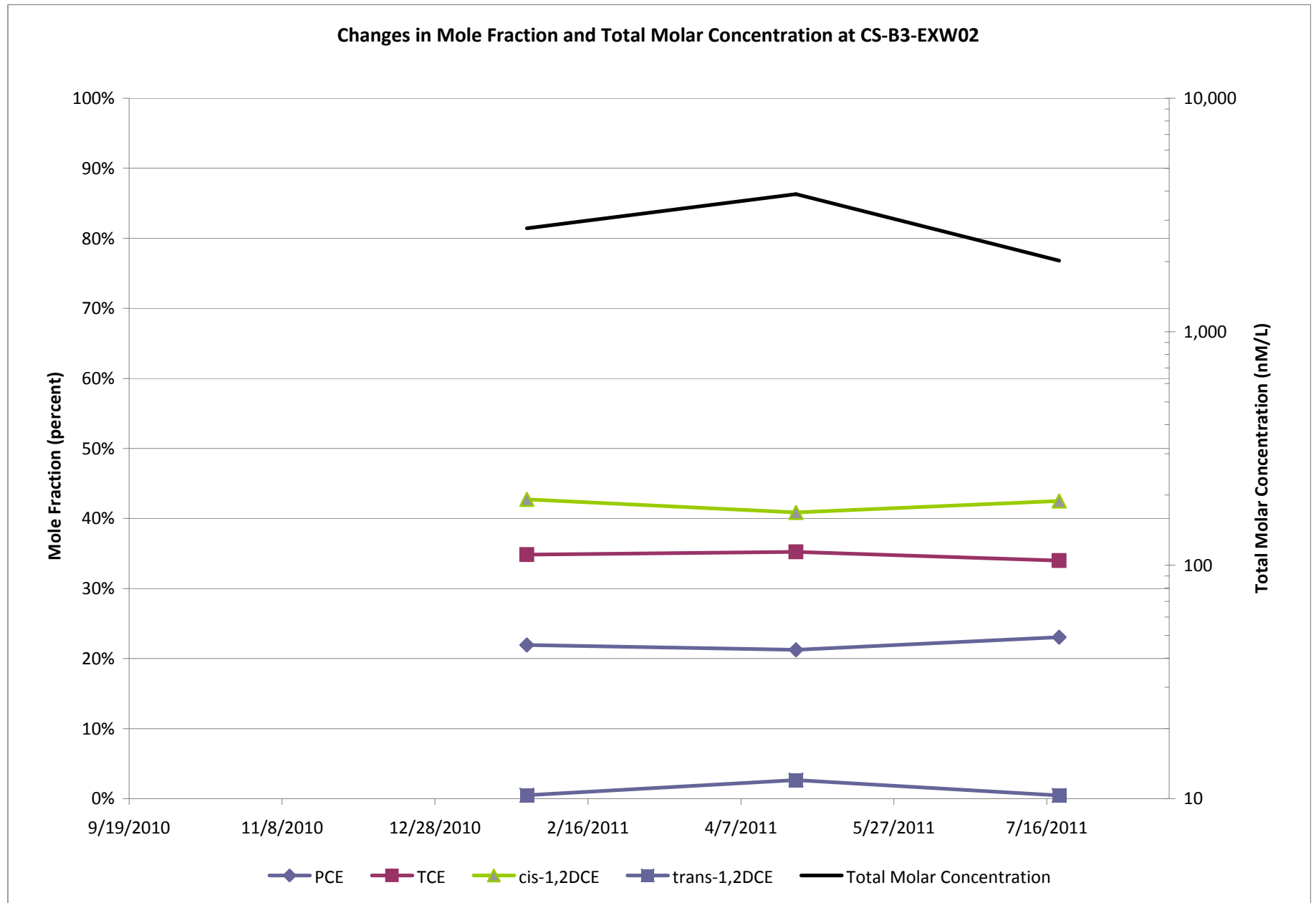


Figure 17.6.2-EXW01

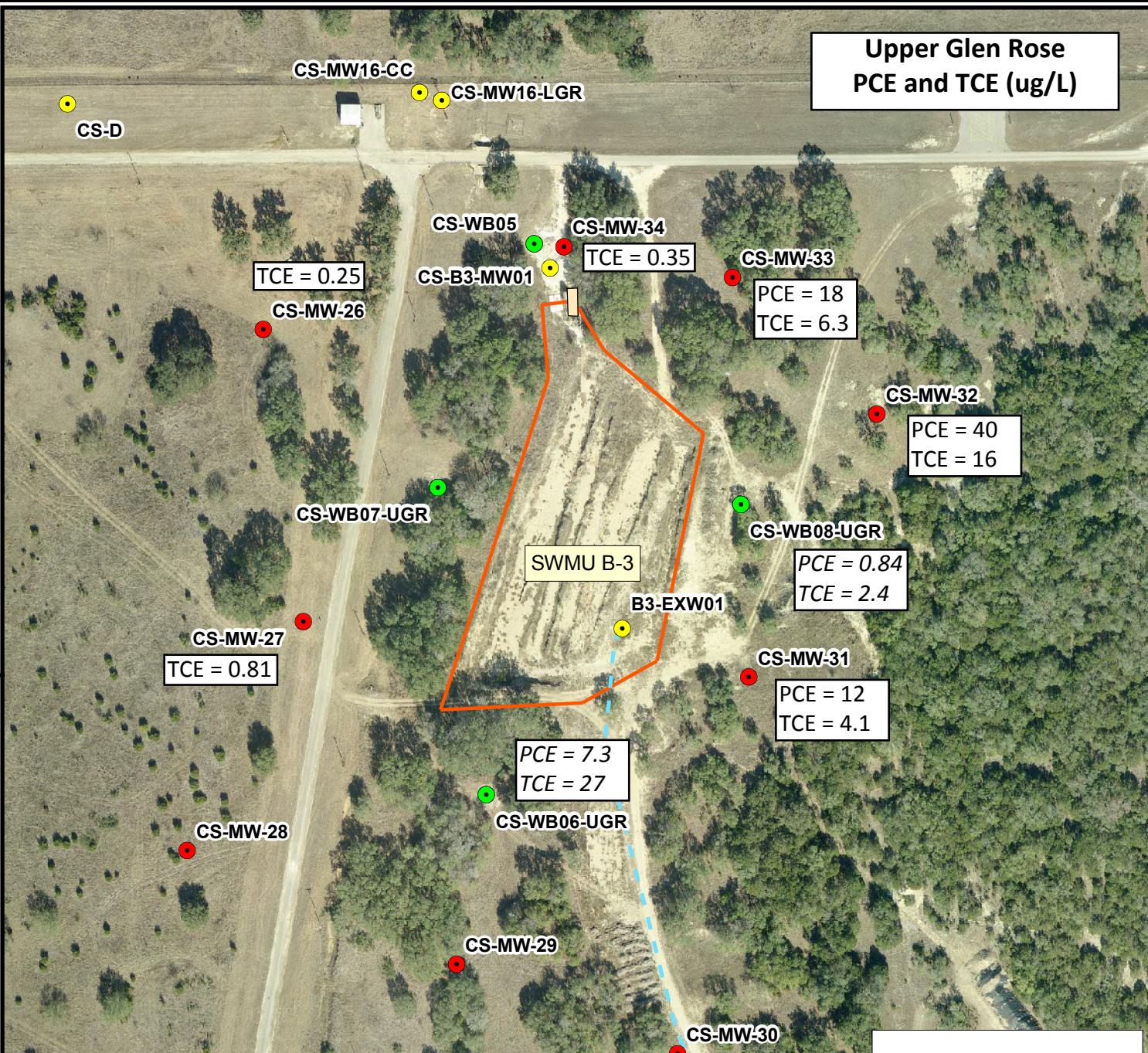
B3-EXW-01 VOC Summary Quarter 13 - Quarter 17

Changes in Mole Fraction and Total Molar Concentration at CS-B3-EXW01





Upper Glen Rose PCE and TCE (ug/L)

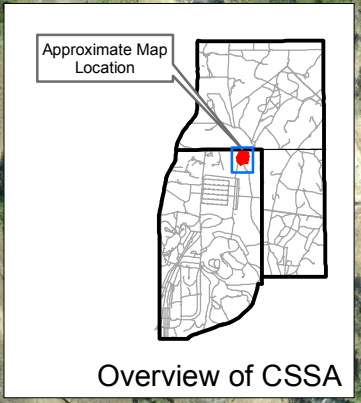


Note: MW-UGR wells sampled 7/20/11 - 7/21/11;
WB UGR zones sampled 7/27/11 - 7/28/11

Aerial Photo Date: 2009

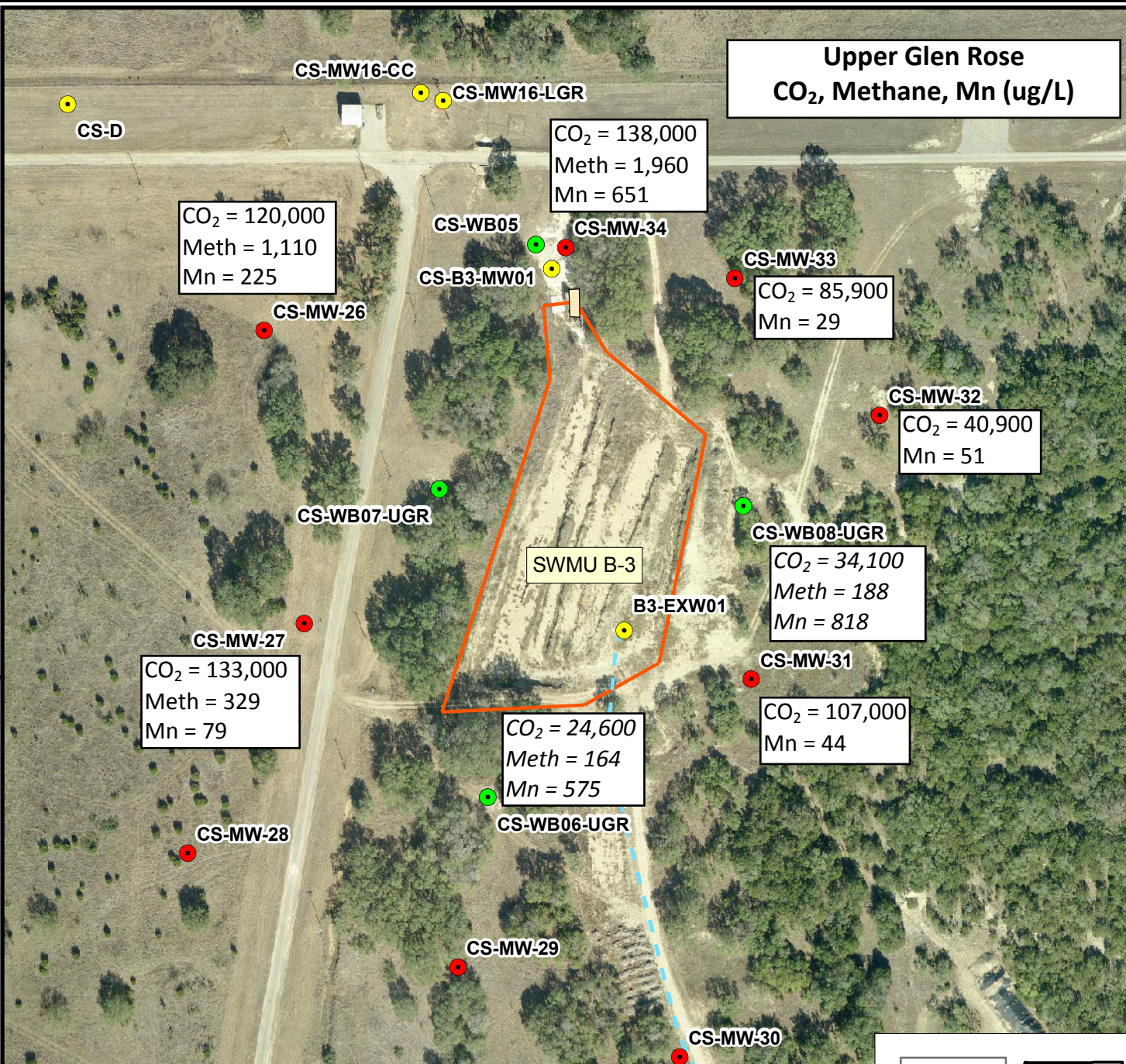
180 90 0 180 Feet

- New UGR Monitoring Well Location
- New Extraction Well Location
- Existing Westbay Multi-port Well
- Existing Supply/Monitoring Well
- ▭ SWMU Boundary
- Proposed HDPE Water Delivery
- Proposed Power Extension



Overview of CSSA

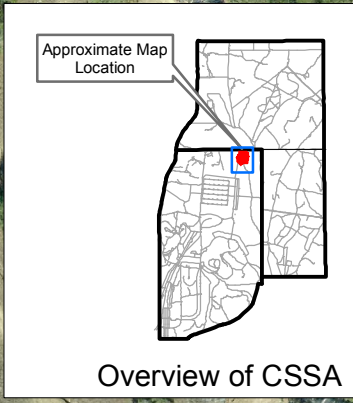
**Upper Glen Rose
CO₂, Methane, Mn (ug/L)**



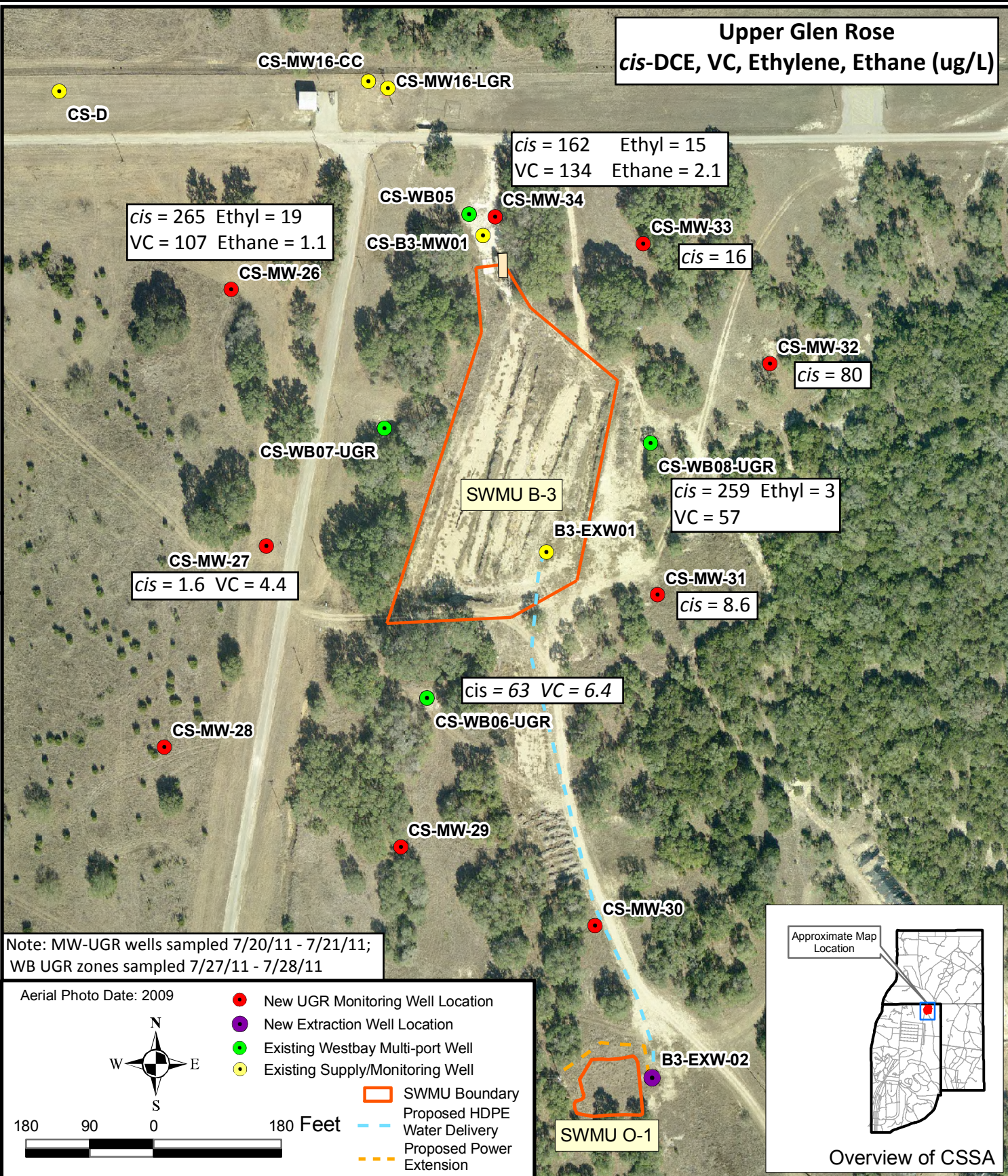
Note: MW-UGR wells sampled 7/2011 - 7/21/11;
WB UGR zones sampled 7/27/11 - 7/28/11

Aerial Photo Date: 2009

- New UGR Monitoring Well Location
- New Extraction Well Location
- Existing Westbay Multi-port Well
- Existing Supply/Monitoring Well
- SWMU Boundary
- Proposed HDPE Water Delivery
- Proposed Power Extension

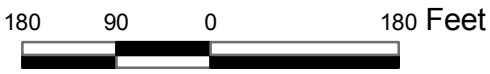


Upper Glen Rose cis-DCE, VC, Ethylene, Ethane (ug/L)

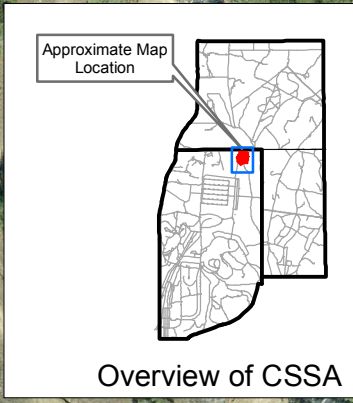


Note: MW-UGR wells sampled 7/20/11 - 7/21/11;
WB UGR zones sampled 7/27/11 - 7/28/11

Aerial Photo Date: 2009



- New UGR Monitoring Well Location
- New Extraction Well Location
- Existing Westbay Multi-port Well
- Existing Supply/Monitoring Well
- SWMU Boundary
- Proposed HDPE Water Delivery
- Proposed Power Extension



Tables

Table 17.1.2

SWMU B3 Trenches 1 and 6 Quarter 17 - VOC Analytical Summary Table

Q17	T1-1			T1-2			T1-3			T6-1			T6-2		
	Date	5/18/11	6/20/11	7/19/11	5/18/11	6/20/11	7/19/11	5/18/11	6/20/11	7/19/11	5/18/11	6/20/11	7/19/11	5/18/11	6/20/11
PCE (µg/L)	0.00	0.39	0.00	0.00	0.53	0.00	0.00	0.00	6.90	3.40	0.00	0.76	0.00	11.00	0.00
TCE (µg/L)	0.00	0.28	1.60	0.00	2.70	0.64	0.00	0.00	17.00	11.00	0.00	2.60	0.00	25.00	0.00
cis-1,2-DCE (µg/L)	339.00	4.00	23.00	3.20	35.00	3.60	164.00	1.40	112.00	133.00	0.52	4.60	1.40	36.00	0.70
trans-1,2-DCE (µg/L)	11.00	9.60	1.50	1.70	2.40	0.93	6.60	3.90	2.50	0.99	0.61	0.00	1.30	0.29	0.28
Vinyl chloride (µg/L)	175.00	24.00	10.00	0.00	30.00	4.70	69.00	3.30	30.00	5.80	0.00	0.00	0.00	2.90	0.00
Ethene (µg/L)	89.00	101.00	4.70	0.00	4.30	6.50	116.00	12.00	4.70	1.40	0.00	0.00	0.00	3.10	0.00
PCE (nM/L)	0.00	2.35	0.00	0.00	3.20	0.00	0.00	0.00	41.61	20.50	0.00	4.58	0.00	66.33	0.00
TCE (nM/L)	0.00	2.13	12.18	0.00	20.55	4.87	0.00	0.00	129.39	83.72	0.00	19.79	0.00	190.27	0.00
cis-1,2-DCE (nM/L)	3,496.65	41.26	237.24	33.01	361.01	37.13	1,691.59	14.44	1,155.24	1,371.84	5.36	47.45	14.44	371.33	7.22
trans-1,2-DCE (nM/L)	113.46	99.02	15.47	17.54	24.76	9.59	68.08	40.23	25.79	10.21	6.29	0.00	13.41	2.99	2.89
Vinyl chloride (nM/L)	2,799.55	383.94	159.97	0.00	479.92	75.19	1,103.82	52.79	479.92	92.79	0.00	0.00	0.00	46.39	0.00
Ethene (nM/L)	3,172.91	3,600.71	167.56	0.00	153.30	231.73	4,135.47	427.81	167.56	49.91	0.00	0.00	0.00	110.52	0.00
Total Molar Conc. (nM/L)	9,582.57	4,129.41	592.42	50.54	1,042.73	358.51	6,998.97	535.27	1,999.50	1,628.97	11.66	71.82	27.85	787.83	10.11
% moles PCE	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	2.1%	1.3%	0.0%	6.4%	0.0%	8.4%	0.0%
% moles TCE	0.0%	0.1%	2.1%	0.0%	2.0%	1.4%	0.0%	0.0%	6.5%	5.1%	0.0%	27.6%	0.0%	24.2%	0.0%
% moles cis-1,2-DCE	36.5%	1.0%	40.0%	65.3%	34.6%	10.4%	24.2%	2.7%	57.8%	84.2%	46.0%	66.1%	51.9%	47.1%	71.4%
% moles trans-1,2-DCE	1.2%	2.4%	2.6%	34.7%	2.4%	2.7%	1.0%	7.5%	1.3%	0.6%	54.0%	0.0%	48.1%	0.4%	28.6%
% moles Vinyl Chloride	29.2%	9.3%	27.0%	0.0%	46.0%	21.0%	15.8%	9.9%	24.0%	5.7%	0.0%	0.0%	0.0%	5.9%	0.0%
% moles Ethene	33.1%	87.2%	28.3%	0.0%	14.7%	64.6%	59.1%	79.9%	8.4%	3.1%	0.0%	0.0%	0.0%	14.0%	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 17.1.3

B-3 Bioreactor Analytical Summary - Quarter 17

Q17		Active Bioreactor Trench Sumps																													
Well ID	Sample Date	T1-1						T1-2						T1-3						T6-1						T6-2					
		5/18/2011		6/20/2011		7/19/2011		5/18/2011		6/20/2011		7/19/2011		5/18/2011		6/20/2011		7/19/2011		5/18/2011		6/20/2011		7/19/2011		5/18/2011		6/20/2011		7/19/2011	
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					4.7						10						1.8						6.6						4.1	
Total Organic Carbon	mg/L					10						12						6.2						13						5.9	
Methane	µg/L	6,800		11,700		4,020		8,200		1,720		4,230		6,480		6,790		619		130		36		20		10,900		3,670		2,240	
Ethene	µg/L	89		101		4.7		0		4.3		6.5		116		12		4.7		1.4	F	0		0		0		3.1		0	
Ethane	µg/L	2.6		79		7.7		6.4		1.4	F	3.2		8.3		35		0		0		0		0		7.7		2.5		1.6	F
Carbon Dioxide	µg/L	396,000		228,000		216,000		234,000		140,000		223,000		232,000		218,000		47,100		132,000		116,000		193,000		303,000		283,000		248,000	
Sulfate	mg/L					16						30						26						32						14	
Chloride	mg/L					14						14						14						15						14	
Ferrous Iron	mg/L	4.3		37		5.2		6.0		3.2		5.4		4.6		13		3.9		1.5		0.74	F			3.0		3.4		2.0	
Manganese	µg/L	110		561		294		300		104		212		340		334		134		35		162		31		170		12		140	
Hydrogen	nM											4.6																		4.8	
Sulfide	mg/L					0						5.2						2.8	F											0	
Total Dissolved Solids	mg/L	718		570		489		517		396		544		502		470		353		426		511		469		505		418		485	
Benzene	µg/L	0		0.14	F	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		0		0	
Bromoform	µg/L	0		0		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		0		0	
Dibromochloromethane	µg/L	0		0		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		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	339		4.0		23		3.2		35		3.6		164		1.4		112		133		0.52	F	4.6		1.4		36		0.70	F
Dichloroethene, trans-1,2-	µg/L	11		9.6		1.5		1.7		2.4		0.93		6.6		3.9		2.5		0.99		0.61		0		1.3		0.29	F	0.28	F
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0.81		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0.39	F	0		0		0.53	F	0		0		0		6.9		3.4		0		0.76	F	0		11		0	
Toluene	µg/L	0.71	F	0.90	F	0.80	F	0.65	F	0.18	F	0.31	F	16		19		0.18	F	0.21	F	0.73	F	0.19	F	1.0	F	0.28	F	0.17	F
Trichloroethene	µg/L	0		0.28	F	1.6		0		2.7		0.64	F	0		0		17		11		0		2.6		0		25		0	
Vinyl chloride	µg/L	175		24		10		0		30		4.7		69		3.3		30		5.8		0		0		0		2.9		0	
Arsenic	µg/L	22		0.70	F	1.6	F	19		0		2.4	F	21		0		0.80	F	14		0		1.7	F	21		0		1.8	F
		Month 49		Month 50		Month 51		Month 49		Month 50		Month 51		Month 49		Month 50		Month 51		Month 49		Month 50		Month 51		Month 49		Month 50		Month 51	

Note: 0 sample indicates a non-detect analyte value

Table 17.2.2

SWMU B-3 Westbay Monitoring Wells
Upper Saturated Zone (Zone LGR03B) Analytical Results Summary Quarter 17

Q17 Date	CS-WB05-LGR03B			CS-WB06-LGR03B			CS-WB07-LGR03B	CS-WB08-LGR03B
	5/17/11	6/21/11	7/18/11	5/17/11	6/21/11	7/18/11	7/28/11	5/17/11
PCE (µg/L)	0.00	2.30	0.00	91.00	84.00	83.00	0.00	107.00
TCE (µg/L)	5.40	3.00	0.33	221.00	104.00	93.00	1.20	94.00
cis-1,2-DCE (µg/L)	190.00	85.00	119.00	319.00	196.00	179.00	10.00	116.00
trans-1,2-DCE (µg/L)	41.00	20.00	22.00	2.10	2.20	2.00	0.00	2.40
Vinyl chloride (µg/L)	7.00	3.60	11.00	0.00	0.00	0.00	0.00	0.00
Ethene (µg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PCE (nM/L)	0.00	13.87	0.00	548.76	506.54	500.51	0.00	645.24
TCE (nM/L)	41.10	22.83	2.51	1,682.02	791.54	707.82	9.13	715.43
cis-1,2-DCE (nM/L)	1,959.77	876.74	1,227.44	3,290.36	2,021.66	1,846.31	103.15	1,196.49
trans-1,2-DCE (nM/L)	422.90	206.29	226.92	21.66	22.69	20.63	0.00	24.76
Vinyl chloride (nM/L)	111.98	57.59	175.97	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
Total Molar Conc. (nM/L)	2,535.75	1,177.33	1,632.84	5,542.79	3,342.43	3,075.27	112.28	2,581.91
% moles PCE	0.0%	1.2%	0.0%	9.9%	15.2%	16.3%	0.0%	25.0%
% moles TCE	1.6%	1.9%	0.2%	30.3%	23.7%	23.0%	8.1%	27.7%
% moles cis-1,2-DCE	77.3%	74.5%	75.2%	59.4%	60.5%	60.0%	91.9%	46.3%
% moles trans-1,2-DCE	16.7%	17.5%	13.9%	0.4%	0.7%	0.7%	0.0%	1.0%
% moles Vinyl Chloride	4.4%	4.9%	10.8%	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%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Month 49	Month 50	Month 51	Month 49	Month 50	Month 51	Month 51	Month 49

Note: 0 sample indicates a non-detect analyte value

Table 17.2.3a

SWMU B-3 Bioreactor Multi-port Well CS-WB05 Quarter 17 Performance Data

Q17		CS-WB05																	
Well ID		CS-WB05-LGR-01		CS-WB05-LGR03B				CS-WB05-LGR-04A		CS-WB05-LGR-04B		CS-WB05-BS-01		CS-WB05-CC-01		CS-WB05-CC-02			
Sample Date		7/26/2011		5/17/2011		6/21/2011		7/18/2011		7/25/2011		7/25/2011		7/25/2011		7/25/2011			
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag		
Dissolved Organic Carbon	mg/L	1.4						1.5		0.88		1.4		0.40	F	0.36	F	6.3	
Total Organic Carbon	mg/L	1.5						5.6		14	J	1.6	J	0.53	J	0.94		4.5	
Methane	µg/L	16		43		72		94		719		3,990		30		3.6		52	
Ethene	µg/L	0		0		0		0		0		16		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	46,000		8,070		19,900		27,800		25,300		53,700		15,000		18,300		11,800	
Sulfate	mg/L	94						43		21		6.4		32		84		96	
Chloride	mg/L	13						11		12		12		12		17		19	
Ferrous Iron	mg/L	0		0		0		0		0.26	F	0.51	F	0		0.36	F	0.38	
Manganese	µg/L	0		0		0		0		6.7		48		0		0		4.9	
Sulfide	mg/L	0						0		0		0		0		0		0	
Total Dissolved Solids	mg/L	514		393		380		377		355		366		334		420		430	
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		0.070	F	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	2.8		190		85		119		486		108		31		1.6		25	
Dichloroethene, trans-1,2-	µg/L	0.68		41		20		22		4.9		3.6		0.37	F	0.38	F	4.5	
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		2.3		0		0.62	F	31		0		0.25	F	0	
Toluene	µg/L	0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.9		5.4		3.0		0.33	F	136		91		0.18	F	2.4		25	
Vinyl chloride	µg/L	0		7.0		3.6		11		29		110		5.9		0		2.0	
Arsenic	µg/L	1.5	F	12		0		0.90	F	3.0	F	9.8		0.80	F	0.80	F	1.8	F
		Q17-Month 51		Quarter 17				Q17-Month 51		Q17-Month 51		Q17-Month 51		Q17-Month 51		Q17-Month 51			

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

Zones CS-WB05-LGR02 and CS-WB05-LGR03A were dry; not sampled

Table 17.2.3b

SWMU B-3 Bioreactor Multi-port Well CS-WB06 Quarter 17 Performance Data

Q17		CS-WB06															
Well ID		CS-WB06-UGR-01		CS-WB06-LGR-01		CS-WB06-LGR-02		CS-WB06-LGR03A		CS-WB06-LGR03B						CS-WB06-LGR-04	
Sample Date		7/27/2011		7/27/2011		7/27/2011		7/26/2011		5/17/2011		6/21/2011		7/18/2011		7/26/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.4		1.3		1.2		0.48	F					0.65		1.1	
Total Organic Carbon	mg/L	2.7		0.70		0		0.42	F					2.7		0.30	F
Methane	µg/L	164		0		0		0		1.6		0		13		0	
Ethene	µg/L	0		0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	24,600		36,400		11,200		38,200		27,300		29,800		31,800		44,100	
Sulfate	mg/L	18		29		25		20						21		11	
Chloride	mg/L	15		14		10		12						12		13	
Ferrous Iron	mg/L	0		0		0		0		0		0		0		0	
Manganese	µg/L	575		1.6	F	0		0		0		0		0		0	
Sulfide	mg/L	0		0		0		0						0		0	
Total Dissolved Solids	mg/L	432		415		327		318		342		339		344		357	
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		0.12	F
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0.23	F	0		0		0		0.34	F
Dichloroethene, cis-1,2-	µg/L	63		37		29		178		319		196		179		330	
Dichloroethene, trans-1,2-	µg/L	1.6		0.58	F	0.72		2.5		2.1		2.2		2.0		4.8	
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	7.3		13		4.0		101		91		84		83		173	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	27		18		10		86		221		104		93		117	
Vinyl chloride	µg/L	6.4		0		0		0		0		0		0		0	
Arsenic	µg/L	1.0	F	0.60	F	0.50	F	1.4	F	16		0		1.3	F	0.40	F
		Q17-Month 51		Q17-Month 51		Q17-Month 51		Q17-Month 51		Quarter 17						Q17-Month 51	

Note 0 sample value indicates a non-detect analyte value

Table 17.2.3d

SWMU B-3 Bioreactor Multi-port Well CS-WB08 Quarter 17 Performance Data

Q17		CS-WB08									
Well ID		CS-WB08-UGR-01		CS-WB08-LGR-01		CS-WB08-LGR-02		CS-WB08-LGR03B		CS-WB08-LGR-04	
Sample Date		7/28/2011		7/28/2011		7/27/2011		5/17/2011		7/27/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.0		0.64		0.47	F			1.2	
Total Organic Carbon	mg/L	2.2		0.22	F	0.13	F			4.7	
Methane	µg/L	188		0		2.0		0		0	
Ethene	µg/L	3.0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0	
Carbon Dioxide	µg/L	34,100		28,700		27,400		7,740		77,300	
Sulfate	mg/L	11		98		106				23	
Chloride	mg/L	15		11		11				15	
Ferrous Iron	mg/L	0.24	F	0		0.22	F	0		0.29	F
Manganese	µg/L	818		0		0		0		20	
Sulfide	mg/L	0		0		0				0	
Total Dissolved Solids	mg/L	475		522		537		353		402	
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		0.11	F	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	259		54		6.6		116		31	
Dichloroethene, trans-1,2-	µg/L	1.7		4.5		0		2.4		0	
Methylene chloride	µg/L	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0	
Tetrachloroethene	µg/L	0.84	F	0		0		107		2.7	
Toluene	µg/L	0		0		0		0		0	
Trichloroethene	µg/L	2.4		1.2		0		94		5.9	
Vinyl chloride	µg/L	57		0		0		0		0	
Arsenic	µg/L	3.0	F	1.7	F	2.1	F	16		0.30	F
		Q17-Month 51		Q17-Month 51		Q17-Month 51		Q17-Month 49		Q17-Month 51	

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

Table 17.3.3

B-3 Bioreactor Monitoring Well Analytical Summary - Quarter 17

Q17		Monitoring Wells			
Well ID		CS-MW1-LGR		CS-B3-MW01	
Sample Date		7/20/2011		7/20/2011	
Compound	Units	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	0		4.2	
Total Organic Carbon	mg/L	0.58		8.5	
Methane	µg/L	0		517	
Ethene	µg/L	0		0	
Ethane	µg/L	0		0	
Carbon Dioxide	µg/L	34,200		108,000	
Sulfate	mg/L	14		1.6	
Chloride	mg/L	9.0		12	
Ferrous Iron	mg/L	0		3.2	
Manganese	µg/L	0		154	
Hydrogen	nM	3.3			
Sulfide	mg/L	0		0	
Total Dissolved Solids	mg/L	298		722	
Benzene	µg/L	0		0	
Bromodichloromethane	µg/L	0		0	
Bromoform	µg/L	0		0	
Chloroform	µg/L	0.13	F	0	
Dibromochloromethane	µg/L	0		0	
Dichlorodifluoromethane	µg/L	0		0	
Dichloroethene, 1,1-	µg/L	0		0	
Dichloroethene, cis-1,2-	µg/L	15		0.48	F
Dichloroethene, trans-1,2-	µg/L	0.21	F	0.31	F
Methylene chloride	µg/L	0		0	
Naphthalene	µg/L	0		0	
Tetrachloroethene	µg/L	14		0.77	F
Toluene	µg/L	0		0.12	F
Trichloroethene	µg/L	30		0.59	F
Vinyl chloride	µg/L	0		36	
Arsenic	µg/L	0		1.0	F

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

Table 17.4.4

SWMU B-3 Sump Microbial Data
Quarter 17

Q17	Sample Location:	B3-T1-2	B3-T6-2	CS-MW1-LGR	CS-MW16-CC
Analysis	Sample Date:	7/19/11	7/19/11	7/20/11	7/21/11
Dechlorinating Bacteria	Units				
Dehalococcoides spp (1)	cells/mL	1.57E+02	1.90E+03	1.00E+00	< 5.00E-01
Functional Genes	Units				
TCE R-Dase (1)	cells/mL	4.72E+02	4.07E+02	5.00E-01 F	< 5.00E-01
BAV1 VC R-Dase (1)	cells/mL	1.40E+01	1.08E+02	< 5.00E-01	< 1.00E-01
VC R-Dase	cells/mL	2.38E+02	8.80E+01	2.00E+00	< 5.00E-01

Table 17.6.2

B-3 Bioreactor Extraction Well VOC Summary
October 2010 - July 2011

Q17	16 LGR				16 CC				EXW 01				EXW 02		
	Date	10/20/2010	1/27/2011	4/26/2011	7/21/2011	10/20/2010	1/27/2011	4/26/2011	7/21/2011	10/20/2010	1/27/2011	4/25/2011	7/20/2011	1/27/2011	4/25/2011
PCE (µg/L)	155	180	237	115	3.00	3.70	1.50	1.30	196	230	309	168	101	137	77
TCE (µg/L)	166	222	285	135	30	37	24	22	116	224	327	159	127	180	90
cis-1,2-DCE (µg/L)	156	216	313	162	26	34	22	25	138	280	367	180	115	154	83
trans-1,2-DCE (µg/L)	0.20	0.42	0	0.44	3.4	6.6	5.1	6.5	1.1	1.9	3.8	1.5	1.3	10.0	0.88
Vinyl Chloride (µg/L)	0	0	0	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	0	0	0
PCE (nM/L)	934.69	1085.45	1429.17	693.48	18.09	22.31	9.05	7.84	1181.93	1386.96	1863.35	1013.09	609.06	826.15	464.33
TCE (nM/L)	1263.41	1689.63	2169.11	1027.48	228.33	281.60	182.66	167.44	882.87	1704.85	2488.77	1210.14	966.59	1369.97	684.98
cis-1,2-DCE (nM/L)	1609.08	2227.95	3228.47	1670.96	268.18	350.70	226.92	257.86	1423.41	2888.09	3785.46	1856.63	1186.18	1588.45	856.11
trans-1,2-DCE (nM/L)	2.06	4.33	0.00	4.54	35.07	68.08	52.60	67.04	11.35	19.60	39.20	15.47	13.41	103.15	9.08
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	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	0.00
Total Molar Conc. (nM/L)	3,809.2	5,007.4	6,826.8	3,396.5	549.7	722.7	471.2	500.2	3,499.6	5,999.5	8,176.8	4,095.3	2,775.2	3,887.7	2,014.5
% moles PCE	24.5%	21.7%	20.9%	20.4%	3.3%	3.1%	1.9%	1.6%	33.8%	23.1%	22.8%	24.7%	21.9%	21.3%	23.0%
% moles TCE	33.2%	33.7%	31.8%	30.3%	41.5%	39.0%	38.8%	33.5%	25.2%	28.4%	30.4%	29.5%	34.8%	35.2%	34.0%
% moles cis-1,2-DCE	42.2%	44.5%	47.3%	49.2%	48.8%	48.5%	48.2%	51.6%	40.7%	48.1%	46.3%	45.3%	42.7%	40.9%	42.5%
% moles trans-1,2-DCE	0.1%	0.1%	0.0%	0.1%	6.4%	9.4%	11.2%	13.4%	0.3%	0.3%	0.5%	0.4%	0.5%	2.7%	0.5%
% 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%	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%	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 17.6.2

B-3 Bioreactor Extraction Well VOC Summary - Quarter 17

Q17	Extraction Wells			
	16-LGR	16-CC	EXW 01	EXW 02
Date	7/21/11	7/21/11	7/20/11	7/20/11
PCE (µg/L)	115.00	1.30	168.00	77.00
TCE (µg/L)	135.00	22.00	159.00	90.00
cis-1,2-DCE (µg/L)	162.00	25.00	180.00	83.00
trans-1,2-DCE (µg/L)	0.44	6.50	1.50	0.88
Vinyl chloride (µg/L)	0.00	0.00	0.00	0.00
Ethene (µg/L)	0.00	0.00	0.00	0.00
PCE (nM/L)	693.48	7.84	1,013.09	464.33
TCE (nM/L)	1,027.48	167.44	1,210.14	684.98
cis-1,2-DCE (nM/L)	1,670.96	257.87	1,856.63	856.11
trans-1,2-DCE (nM/L)	4.54	67.05	15.47	9.08
Vinyl chloride (nM/L)	0.00	0.00	0.00	0.00
Ethene (nM/L)	0.00	0.00	0.00	0.00
Total Molar Conc. (nM/L)	3,396.46	500.19	4,095.32	2,014.50
% moles PCE	20.4%	1.6%	24.7%	23.0%
% moles TCE	30.3%	33.5%	29.5%	34.0%
% moles cis-1,2-DCE	49.2%	51.6%	45.3%	42.5%
% moles trans-1,2-DCE	0.1%	13.4%	0.4%	0.5%
% moles Vinyl Chloride	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 17.6.3

B-3 Bioreactor Extraction Well Analytical Summary - Quarter 17

Q17		Extraction Wells							
Well ID		CS-MW16-LGR		CS-MW16-CC		B3-EXW01		B3-EXW02	
Sample Date		7/21/2011		7/21/2011		7/20/2011		7/20/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	1.8		0		1.8		0.15	F
Total Organic Carbon	mg/L	0.34	F	2.7		3.2		0.36	F
Methane	µg/L	0		6.2		0		0	
Ethene	µg/L	0		0		0		0	
Ethane	µg/L	0		0		0		0	
Carbon Dioxide	µg/L	33,000		24,500		47,700		32,300	
Sulfate	mg/L	18		69		11		14	
Chloride	mg/L	10		18		12		13	
Ferrous Iron	mg/L	0		0.38	F	0		0	
Manganese	µg/L	0		0		3.3	F	0	
Hydrogen	nM			7.0					
Sulfide	mg/L	0		0		0		0	
Total Dissolved Solids	mg/L	327		383		346		339	
Benzene	µg/L	0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0	
Bromoform	µg/L	0		0		0		0	
Chloroform	µg/L	0		0		0.17	F	0.12	F
Dibromochloromethane	µg/L	0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	162	J	25		180		83	
Dichloroethene, trans-1,2-	µg/L	0.44	F	6.5		1.5		0.88	
Methylene chloride	µg/L	0		0		0		0	
Naphthalene	µg/L	0		0		0		0	
Tetrachloroethene	µg/L	115	J	1.3	F	168		77	
Toluene	µg/L	0		0		0		0	
Trichloroethene	µg/L	135	J	22		159		90	
Vinyl chloride	µg/L	0		0		0		0	
Arsenic	µg/L	0.50	F	0.30	F	0		1.0	F

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

Table 17.7.1

SWMU B-3 Shallow UGR Well - Field Measurement Data
Quarter 17

B3-MW-26								
Elev. (ft. MSL)		<i>1238.49</i>		Total Depth:		<i>20.32 feet BTOC</i>		
Sample Date	Sample Time	Depth to H ₂ O	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	H ₂ O Elevation
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
5/20/2011	1055	14.32	6.41	19.79	0.657	0.33	-20.90	1224.17
6/23/2011	915	14.38	6.52	20.18	0.791	2.41	-131.70	1224.11
7/21/2011	1055	14.26	6.65	21.34	0.769	0.87	-216.40	1224.23
*reading from MW-29 and MW-26 may have been switched								

Table 17.7.1

SWMU B-3 Shallow UGR Well - Field Measurement Data
Quarter 17

B3-MW-31								
Elev. (ft. MSL)		<i>1257.20</i>		Total Depth:		<i>39.06 feet BTOC</i>		
Sample Date	Sample Time	Depth to H ₂ O	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	H ₂ O Elevation
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
5/20/2011	1211	35.64	6.70	21.24	0.662	0.50	-65.8	1221.56
6/23/2011	1002	36.15	6.72	21.07	0.801	9.66*	110.5	1221.05
7/20/2011	1400	36.50	6.75	26.26	0.538	2.58	44.3	1220.70
* DO readings are not correct. DO membrane was changed after readings were taken.								

Table 17.7.1

SWMU B-3 Shallow UGR Well - Field Measurement Data
Quarter 17

B3-MW-33								
Elev. (ft. MSL)		<i>1249.55</i>		Total Depth:		<i>29.55 feet BTOC</i>		
Sample Date	Sample Time	Depth to H ₂ O	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	H ₂ O Elevation
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
5/20/2011	1140	26.84	6.68	20.57	0.676	0.97	21.9	1222.71
6/23/2011	1024	27.09	6.74	20.48	0.831	19*	102.0	1222.46
7/21/2011	915	27.28	6.77	20.65	0.845	2.12	250.3	1222.27
* DO readings are not correct. DO membrane was changed after readings were taken.								

Table 17.7.1

SWMU B-3 Shallow UGR Well - Field Measurement Data
Quarter 17

B3-MW-34								
Elev. (ft. MSL)		<i>1244.51</i>		Total Depth:		<i>25.40 feet BTOC</i>		
Sample Date	Sample Time	Depth to H ₂ O	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	H ₂ O Elevation
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
5/20/2011	1110	19.56	6.62	20.97	0.635	0.27	-100.2	1224.95
6/23/2011	1043	19.61	6.66	20.89	0.755	13.25*	-43.7	1224.90
7/21/2011	940	19.55	6.68	21.03	0.744	0.51	-114.9	1224.96
* DO readings are not correct. DO membrane was changed after readings were taken.								

Table 17.7.3

B-3 Bioreactor UGR Well Analytical Summary - Quarter 17

Q17		Shallow UGR Wells											
Well ID		B3-MW26-UGR		B3-MW27-UGR		B3-MW31-UGR		B3-MW32-UGR		B3-MW33-UGR		B3-MW34-UGR	
Sample Date		7/21/2011		7/21/2011		7/20/2011		7/21/2011		7/21/2011		7/21/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.0		2.1		2.3		0.87		1.7		2.2	
Total Organic Carbon	mg/L	2.3		5.0		4.6		2.3		3.2		3.5	
Methane	µg/L	1,110		329		0		0		0		1,960	
Ethene	µg/L	19		0		0		0		0		15	
Ethane	µg/L	1.1	F	0		0		0		0		2.1	
Carbon Dioxide	µg/L	120,000		133,000		107,000		40,900		85,900		138,000	
Sulfate	mg/L	24		10		73		30		97		20	
Chloride	mg/L	15		15		11		10		10		16	
Ferrous Iron	mg/L	1.2		1.4		0		0.56	F	0.80	F	0.59	F
Manganese	µg/L	225		79		44		51		29		651	
Sulfide	mg/L	0		0		0		0		0		0	
Total Dissolved Solids	mg/L	475		505		500		374		550		453	
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		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	0.36	F	0		0		0		0		0.52	F
Dichloroethene, cis-1,2-	µg/L	265		1.6		8.6		80		16		162	
Dichloroethene, trans-1,2-	µg/L	2.5		0.61		0.47	F	2.3		0		2.7	
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0		12		40		18		0	
Toluene	µg/L	0.22	F	0		0.54	F	0		0		0.35	F
Trichloroethene	µg/L	0.25	F	0.81	F	4.1		16		6.3		0.35	F
Vinyl chloride	µg/L	107		4.4		0		0		0		134	
Arsenic	µg/L	0.80	F	7.4		1.6	F	1.8	F	0.60	F	0.60	F

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

- No sample was collected from dry wells B3-MW28-UGR, B3-MW29-UGR, and B3-MW30-UGR.