

**CSSA B-3 BIOREACTOR OPERATIONS
PERFORMANCE STATUS REPORT
(QUARTER 15, MONTHS 43 – 45, NOVEMBER, 2010 – JANUARY, 2011)**

MARCH 15, 2011

This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from November 1, 2010 through January 31, 2011, comprising the fifteenth 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 2011 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, Bill Butler, Scott Pearson, and William Martin.

Executive Summary

Site conditions were seasonal and dry through the quarter with 3.37 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 37,560,672 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 15, a total of 6,402,000 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, ~2,292,300 gallons, was from CS-MW16-CC, while ~1,549,000 were extracted from B3-EXW02, ~1,282,800 gallons were extracted from CS-MW16-LGR, and ~1,277,700 gallons were extracted from CS-B3-EXW01.

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

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

Analytical results for samples collected in trench 1 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 15 analytical results from monitoring bioreactor sumps indicate that the SWMU B-3 trenches contain a range of *cis*-DCE levels (ND – 122.33 µg/L – Quarter 15) as well as concentrations of other dechlorination products (e.g., VC, ethene). Sump samples were collected from Trenches 1 and 6 during Quarter 15. 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 14 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 contained greater than 100 µg/L of PCE, TCE, and *cis*-DCE. Groundwater from CS-MW16-LGR, B3-EWX01, and B3-EXW-02 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 an increase in contaminant mass (total molar concentration) in all sumps in trenches 1 and 6 from the previous quarter. This increase in mass appears to correspond with the start up of B3-EXW-02. Over the bioreactor operational period, contaminant mass appears stable or decreasing.

Water quality field measurements from the bioreactor trench 1 sumps indicate that DO readings have remained stable from the previous quarter with an average of 0.34 mg/L, ORP has risen since the previous quarter, averaging -132.5 mV, pH ~ 6.79, temperatures range from ~ 20°C to 24 °C, and specific conductivity ranges from 0.439 to 1.398 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 ~0.48 mg/L, ~6.72, and ~ -159.6 mV, respectively; temperature ranges from 21 °C to 23 °C; and specific conductivity ranges from 0.426 to 0.865 mS/cm.

Ground water elevation data from the newly installed UGR wells combined with similar data from the Westbay UGR zones in (WB-06, -07, -08) and the bioreactor sumps helped confirm the presence of a groundwater “mound” around the bioreactor trenches. Analyses of samples from these wells indicated the presence of vinyl chloride with concentrations ranging from non-detect to 43 ppb, with the highest levels found north and west of the bioreactor. MW-28, located southwest of the bioreactor, has been consistently dry, and MW-29 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-26, 31 and 34,

while MW-27 and 33 showed fair reducing conditions and MW-32 showed poor reducing conditions. There were, significant perturbations in either DO or ORP observed at MW-27, 31, 33, and 34, while MW-26 and MW-32 consistently indicated good and poor reducing conditions, respectively.

Through the 15th quarter of bioreactor operation, 3.37 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 4.89 feet. Average water thickness in Trench 6 during this period was approximately 2.55 feet.

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 at T1-2 (15 µg/L) in concentrations exceeding the MCL (10 µg/L), however in the subsequent month, arsenic was detected below the MCL. Arsenic was not detected above the MCL in any other trench samples collected during quarter 15. Manganese (Mn) was reported in bioreactor trench samples in concentrations ranging from 4.7 to 697 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 109 to 513 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 (199.4 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-WB05- LGR-04B (52.6 µg/L), CS-WB07-UGR01 (1,199 µg/L), and CS-WB08-UGR01 (389 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. No lead exceedances were reported in groundwater collected from sumps, monitoring wells and MPMW zones during the quarter, the drinking water Action Level is 15 µg/L.
3. 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.
4. The VOC summary for trench 1 sumps indicate an increase in the total molar concentrations (TMCs) as well as an increase in the percentage of parent compounds (PCE and TCE) that contribute to the TMC. This represents a shift in the chemical composition in samples collected from trench 1 sumps in previous quarters where more dechlorination products (ethene, VC, and DCE isomer) accounted for the bulk of contaminant mass. This shift from a more dechlorinated to less dechlorinated VOC profile coincides with the integration of the extraction well B3-EXW02, which began contributing extracted groundwater to the bioreactor at the beginning of the quarter.

The volume contributed by EXW-02 increased nearly four-fold after the first month and TMCs increase as well. This may indicate contaminant recovery from part of the aquifer that was previously unaffected by bioreactor operations. The trans-DCE isomer in trenches 1 and 6 is theorized to be the result of an abiotic reductive dechlorination pathway.

5. 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. Additionally, populations in sumps 6-1 and 1-2 have risen two orders of magnitude, possibly in response to increased contaminant mass injected.
6. Saturated conditions within the bioreactor are maintained (while groundwater injection activities were sustained) through the quarter with average water thicknesses of approximately 4.89 feet and 2.55 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.
7. 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 25.79, 242.3 and 53.3 ppb, respectively. Minor amounts of vinyl chloride were also detected in higher CS-WB05 zones LGR03A and LGR03B (2.2 and 2.3 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 (February – April, 2011):

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Conduct monthly monitoring events in February and March (Months 46 and 47), and quarterly monitoring event in April (Month 48) for bioreactor system.
- Continue UIC monthly monitoring with semi-annual reporting due June 2011.
- Submit scope of work and solicit bids to replace existing 6,000 gallon tank upstream of the injection manifold with a new tank.
- Investigate other potential extraction well installation area(s).

Specific Data Observation Notes for Attachments

- Analytical results from the B-3 Trench Sump (trenches 1 through 6) samples, shown in Table 15.1.2, present data from quarter 15 sampling events.
- Table 15.1.1 indicates a water thickness of approximately 4.89 feet in trench 1 and 2.55 feet in trench 6 was maintained.
- Table 15.1.2 indicates that VC was present at low to moderate concentrations in trench sumps; ranging from non-detect (ND) to 5.8 $\mu\text{g/L}$ in trench 1, and ND to 10.51 $\mu\text{g/L}$ in trench 6. Ethene was observed in concentrations ranging from ND to 2.5 $\mu\text{g/L}$ in trench 1 and from ND to 13.9 $\mu\text{g/L}$ in trench 6.

- Table 15.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 15.1.3 provides evidence of the biotic anaerobic degradation pathway with elevated concentrations of Mn and CO₂. Ethane was detected in samples from sumps T1-2, T1-3, and T6-2 in concentrations ranging from 1.8 to 8.8 µg/L (when detected). Samples from trench sumps T1-1 and T6-1 did not detect the presence of ethane.
- Table 15.3.3 indicates that VC was present (53.3 µg/L) in the sample collected from monitoring well CS-B3-MW01. Table 15.2.3a indicates high VC concentrations in WB05-LGR04B (242.3 µg/L) suggesting a connection between this zone and CS-B3-MW01. Ethene was observed in WB05-LGR04B during the quarter (12.6 µg/L).
- Table 15.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are moderate in trenches 1 and 6. Additionally, an increase in populations may coincide with increased contaminant mass injected with the addition of extracted groundwater from EXW-02 (as shown in increased total molar concentrations in the storage tank [Table 15.5.2] and subsequent increases in total molar concentrations in trench sumps [Table 15.1.2]).
- The changes in molar fraction and total molar concentrations shown in graphs of quarter 15 trench sumps indicate an increase in contaminant mass possibly derived from less-dechlorinated (higher proportion of PCE and TCE) water provided by B3-EXW01. Dechlorination of VOC impacted water to VC and ethene, however, is still occurring in the trenches.
- Figure 15.2.5 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 15.7.3 indicates the presence of VC in several of the shallow UGR wells with concentrations ranging from non-detect to 43 µg/L. Additionally, Table 15.7.3 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	Alkalinity	N, NO ₃ & NO ₂	Fe ²⁺	Mn	Metals	H ⁺	DHC
Monthly Sampling ^a (43)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Monthly Sampling ^a (44)	✓	✓			✓					✓	✓	✓		
Quarterly Sampling ^b (15)	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓
Quarterly Sampling ^c (15)	✓	✓			✓					✓	✓	✓		

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.

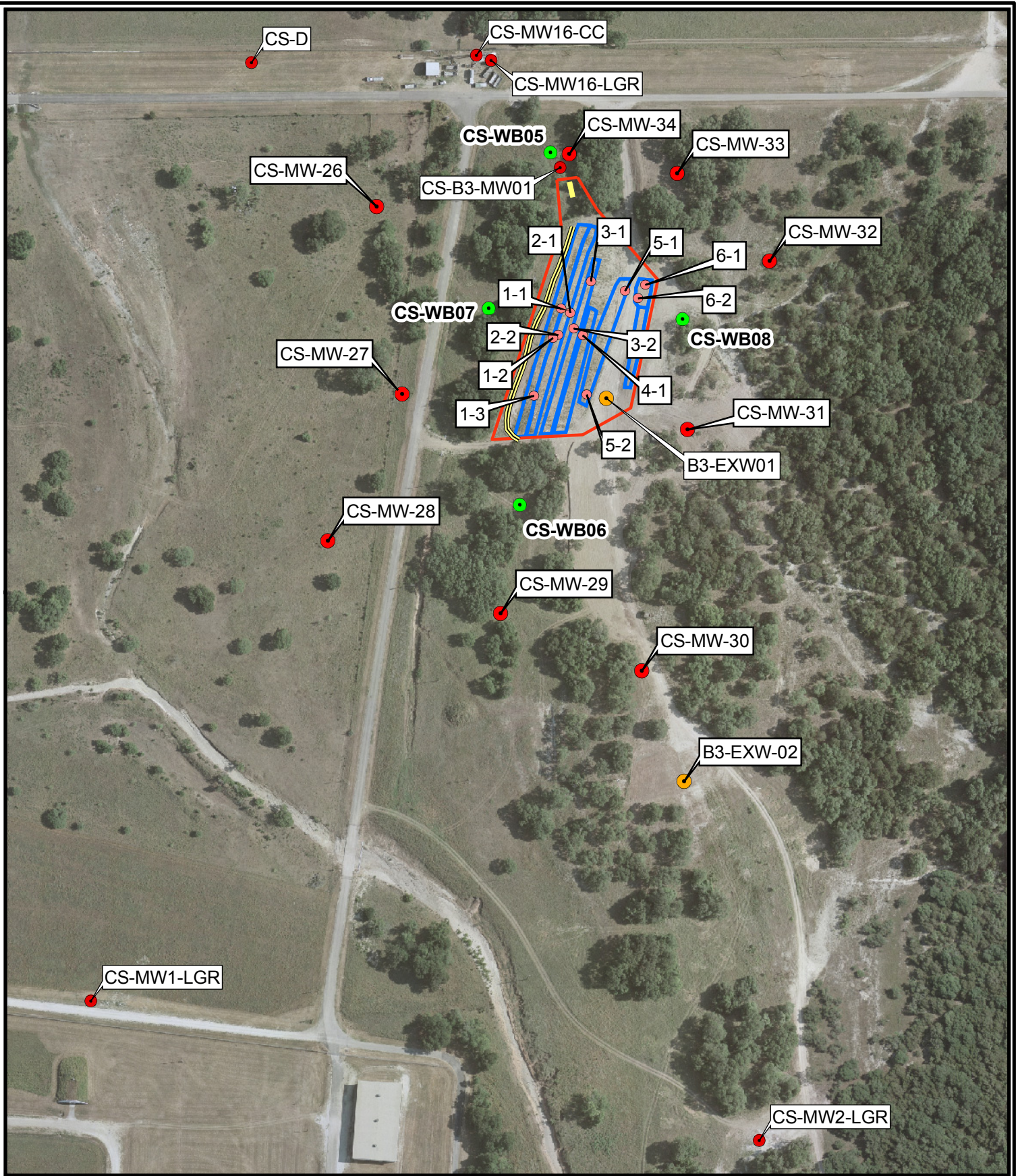
c - Quarterly sampling (reduced-suite) includes samples from UGR wells and 23 intervals of the multi-port monitoring wells other than Zone 03B.

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
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



- 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

Figure 15.1.2T1-1

B3 Bioreactor Trench 1 Sump 1 VOC Summary Quarter 13 - Quarter 15

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

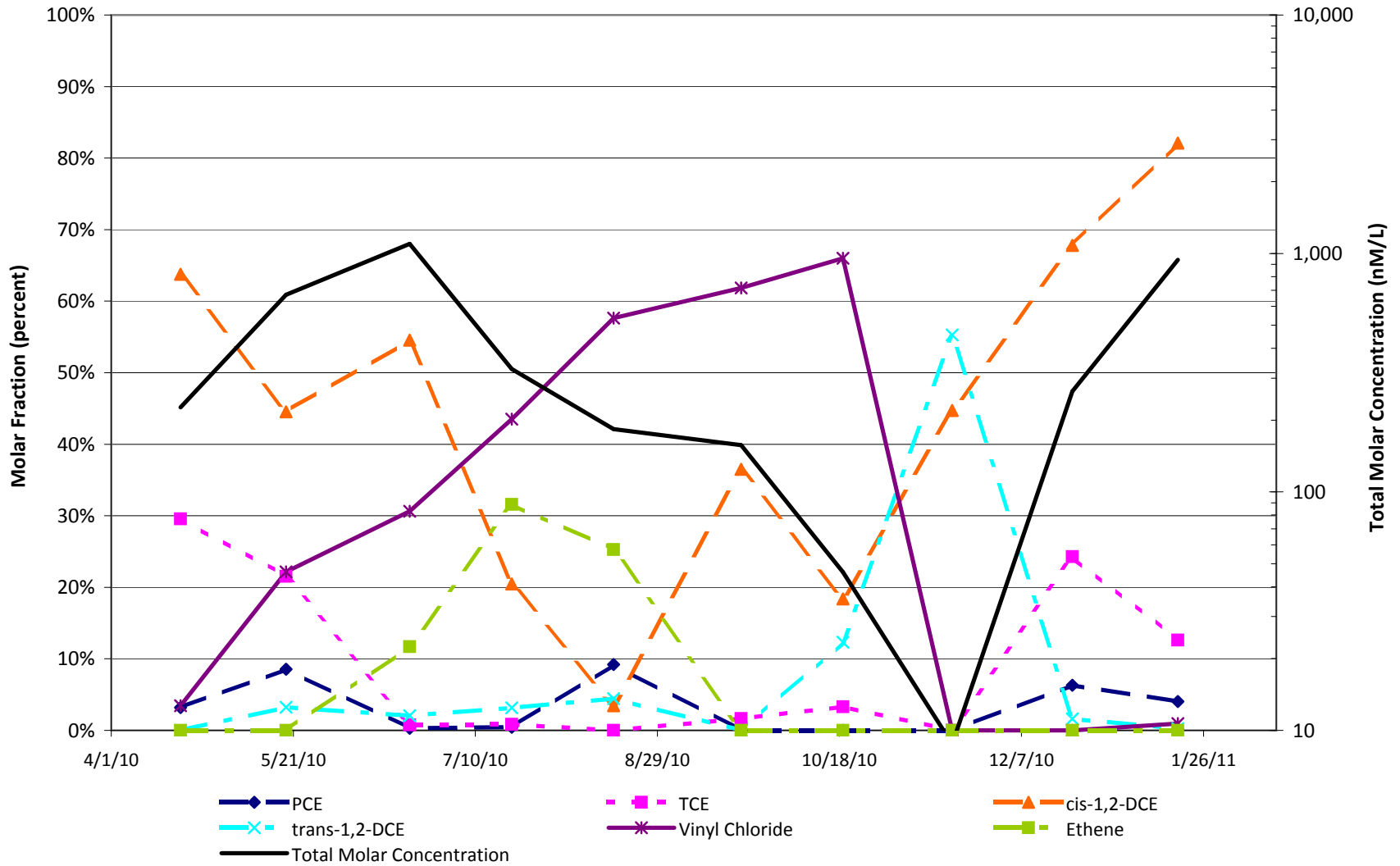


Figure 15.1.2T1-2

B-3 Bioreactor Trench 1 Sump 2 VOC Summary Quarter 13 - Quarter 15

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

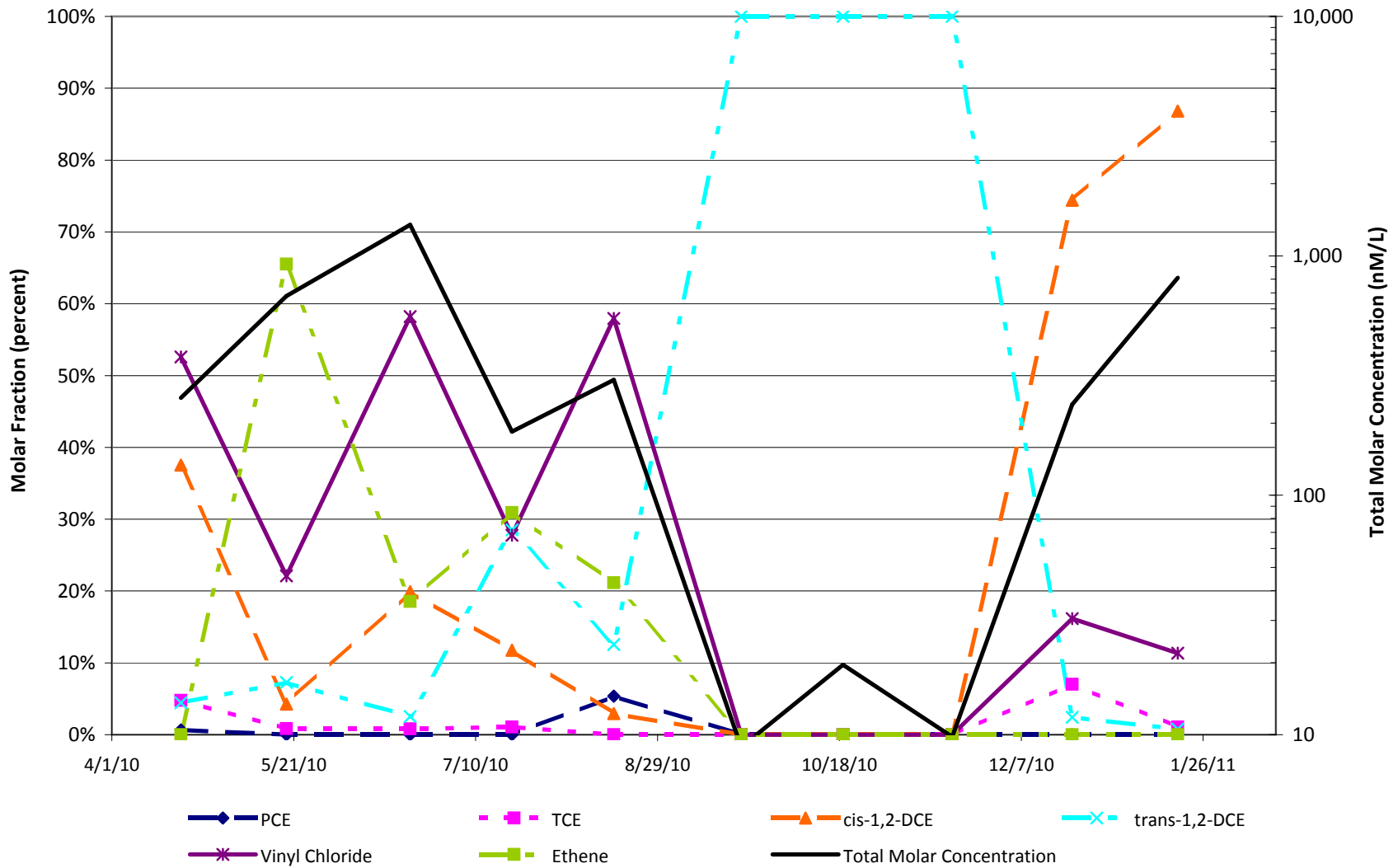


Figure 15.1.2T1-3

B-3 Bioreactor Trench 1 Sump 3 VOC Summary Quarter 13 - Quarter 15

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

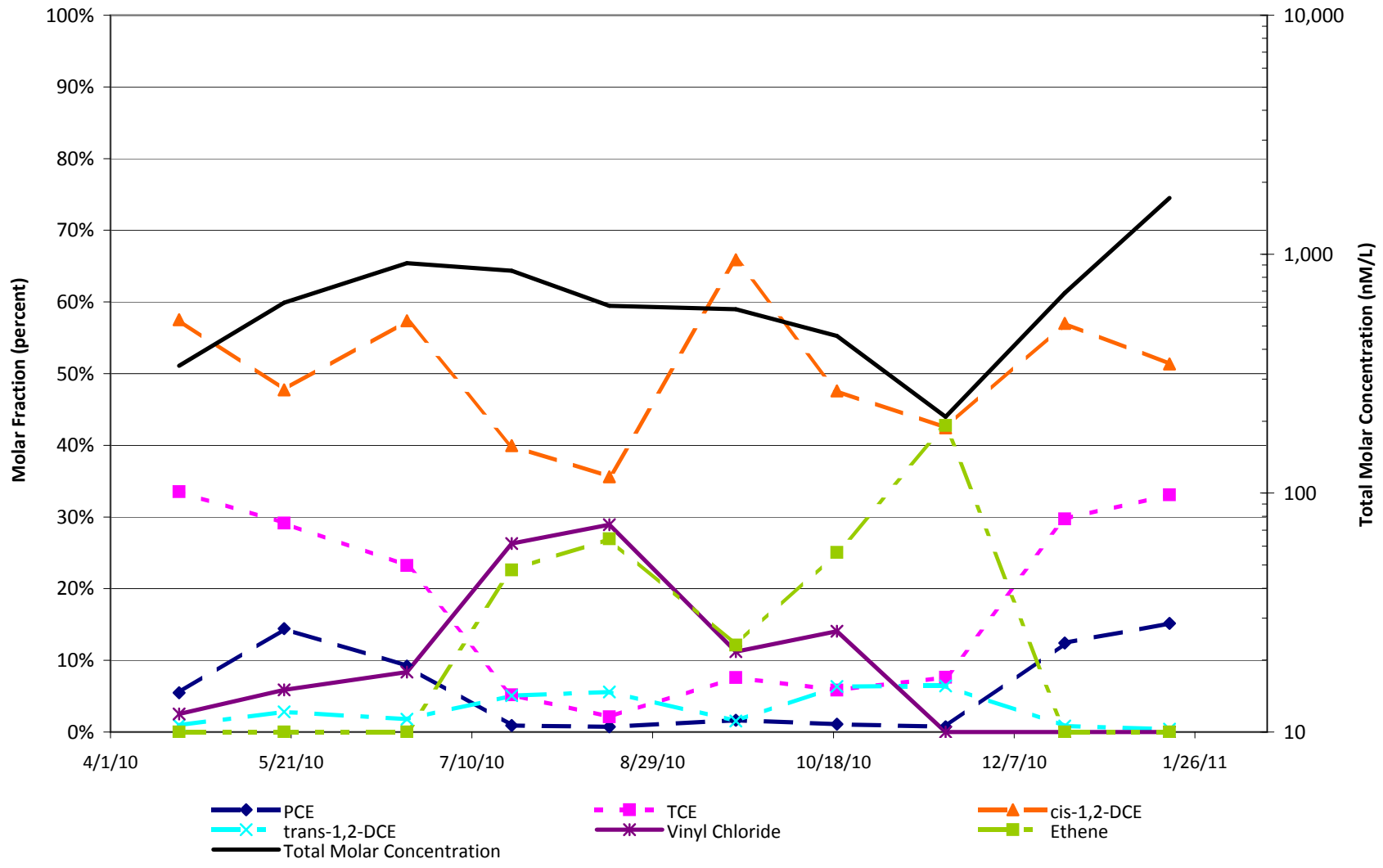


Figure 15.1.2T6-1

B-3 Bioreactor Trench 6 Sump 1 VOC Summary Quarter 13 - Quarter 15

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

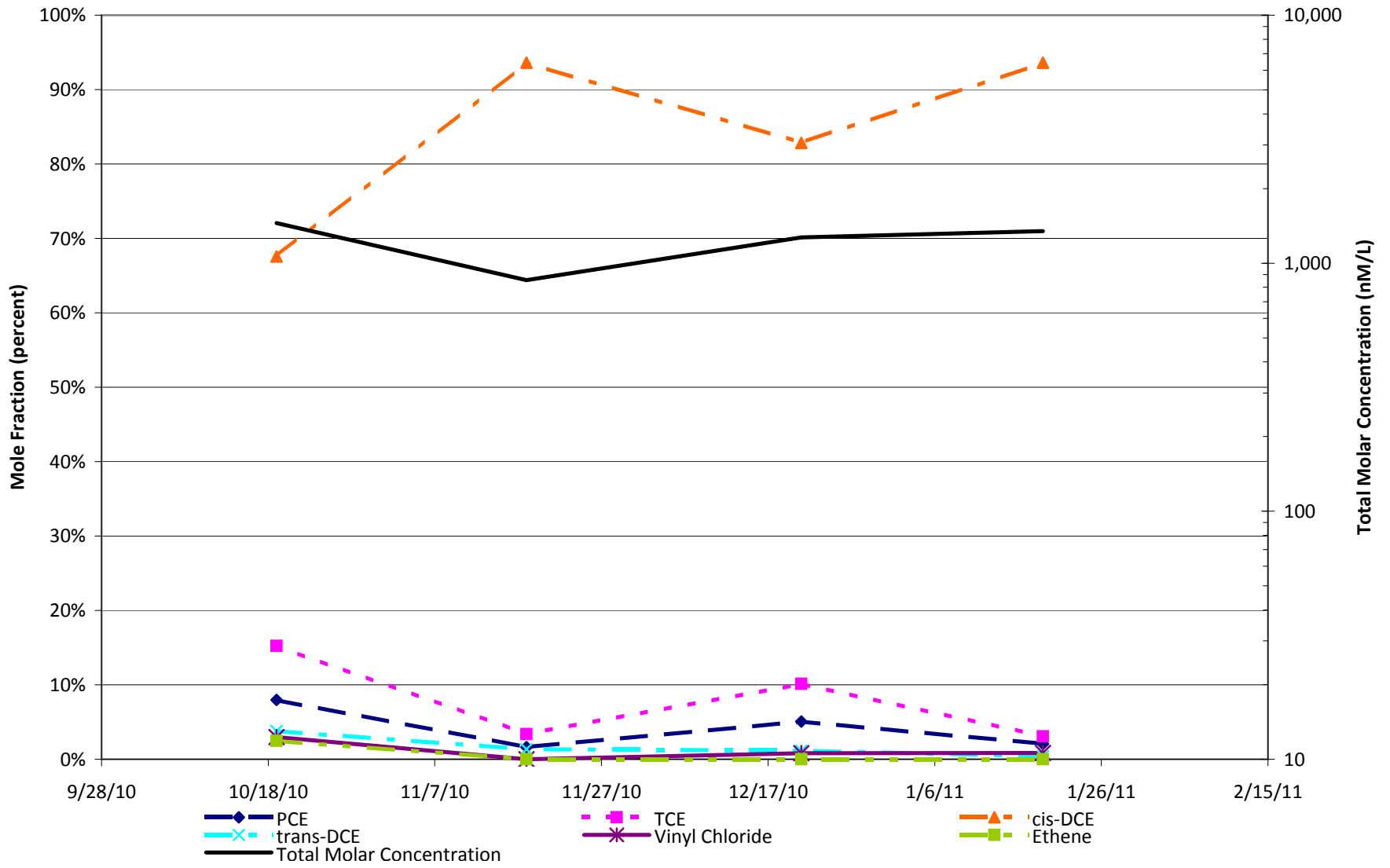


Figure 15.1.2T6-2

B-3 Bioreactor Trench 6 Sump 2 VOC Summary Quarter 13 - Quarter 15

Changes in Mole Fraction and Total Molar Concentration at SWMU B3 Trench 6-2

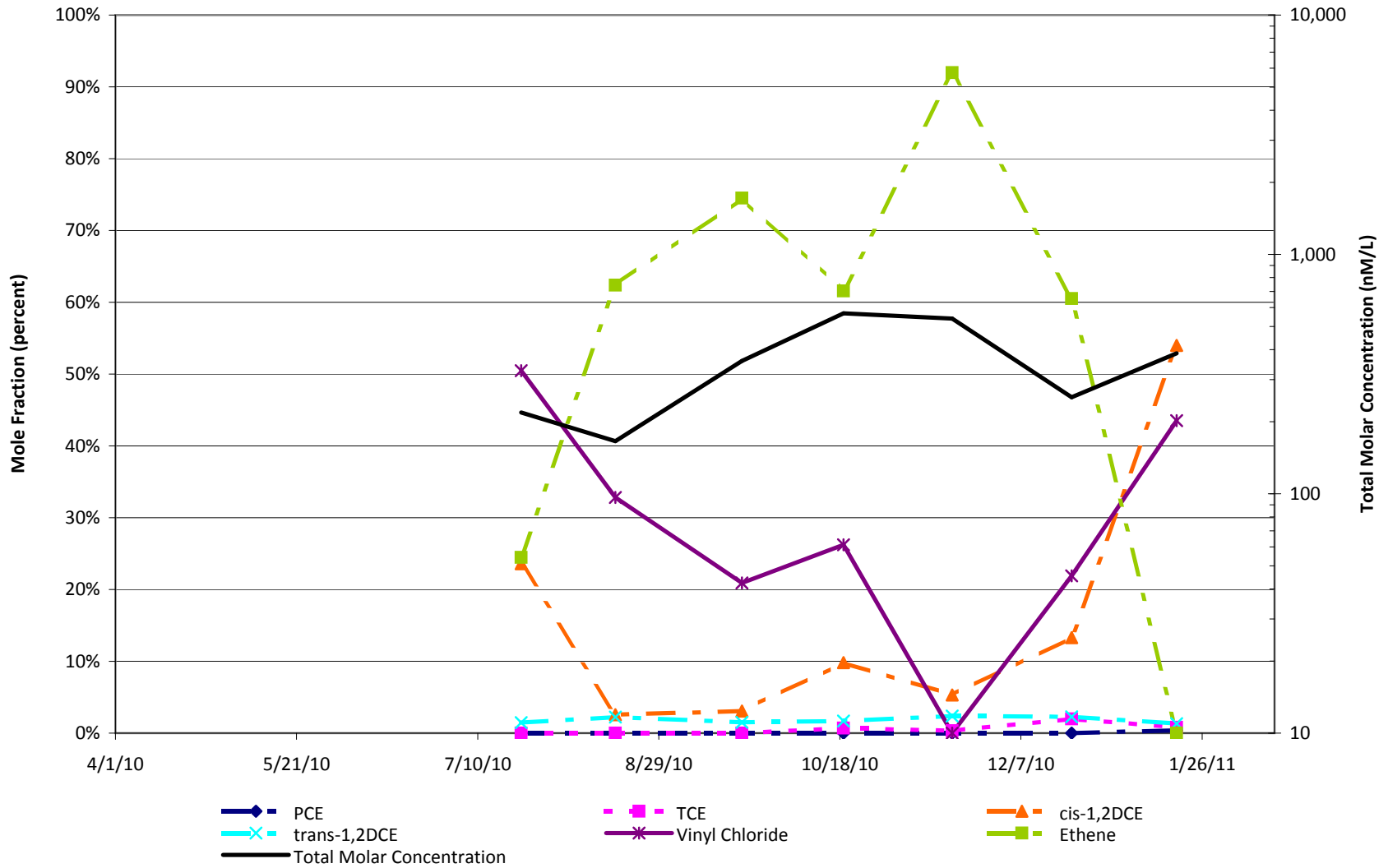


Figure 15.6.2-EXW01

B3-EXW-01 VOC Summary Quarter 12 - Quarter 15

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

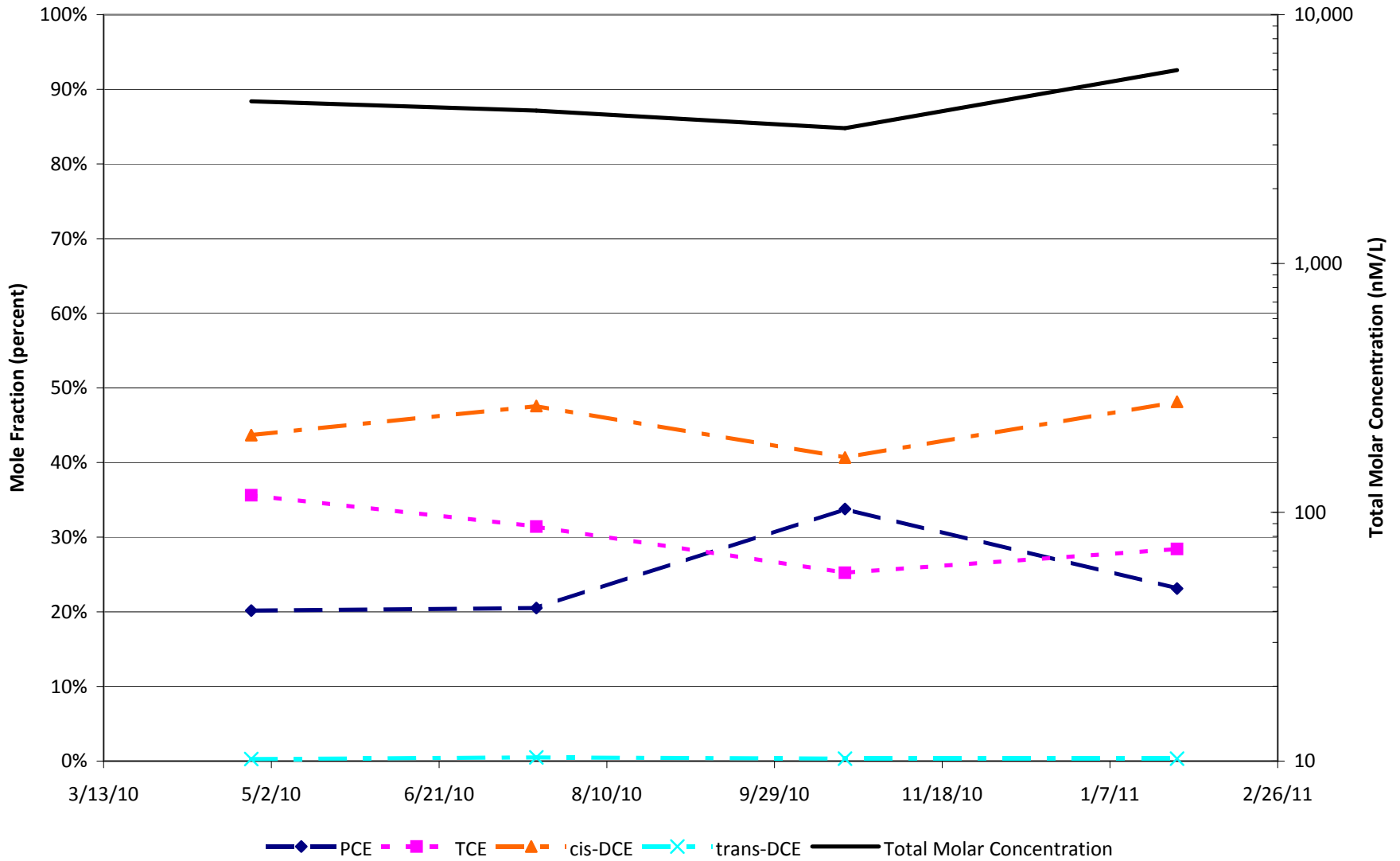


Figure 15.6.2-16LGR

CS-MW16-LGR VOC Summary Quarter 12 - Quarter 15

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

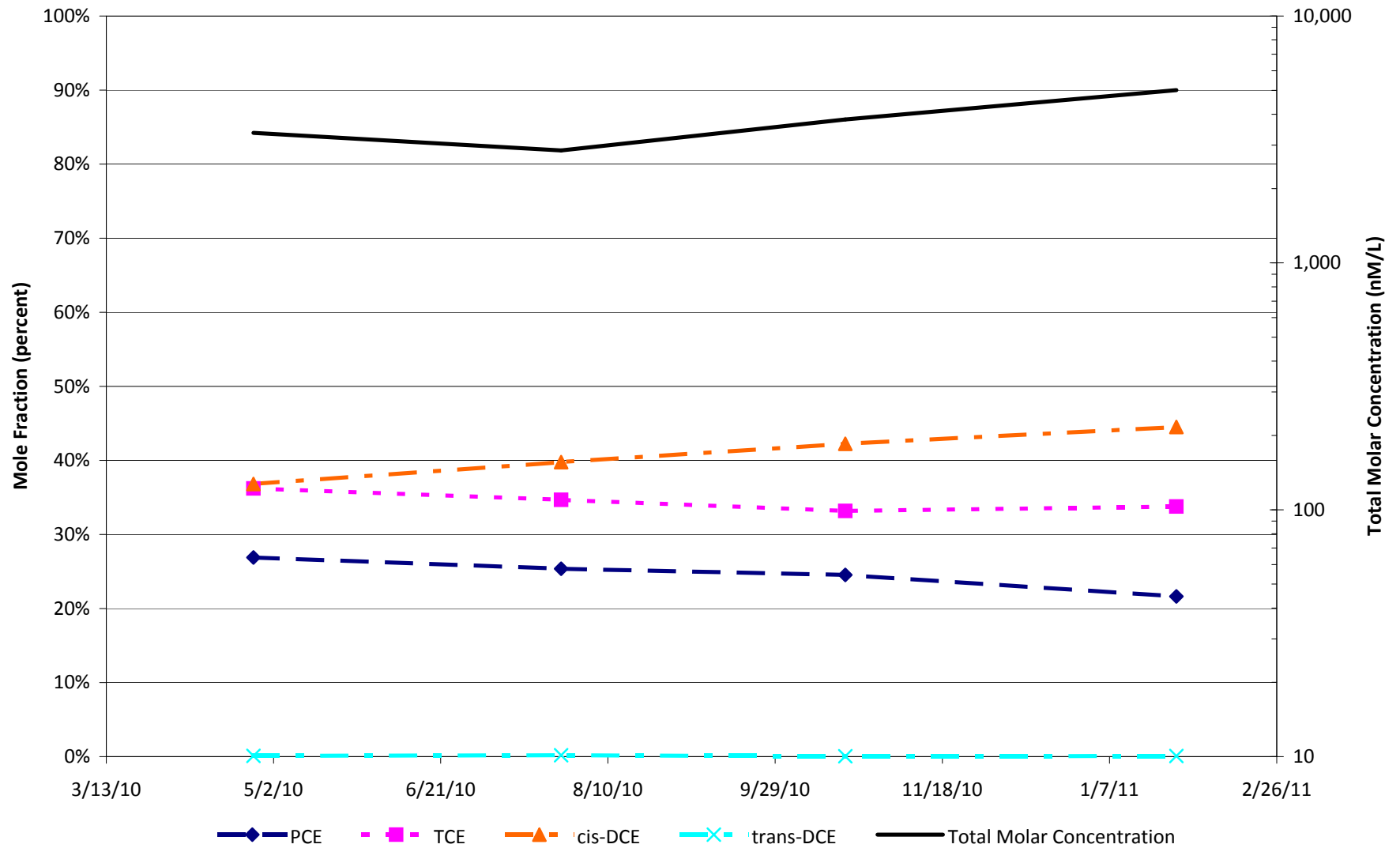


Figure 15.6.2-16CC

CS-MW16-CC VOC Summary Quarter 12 - Quarter 15

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

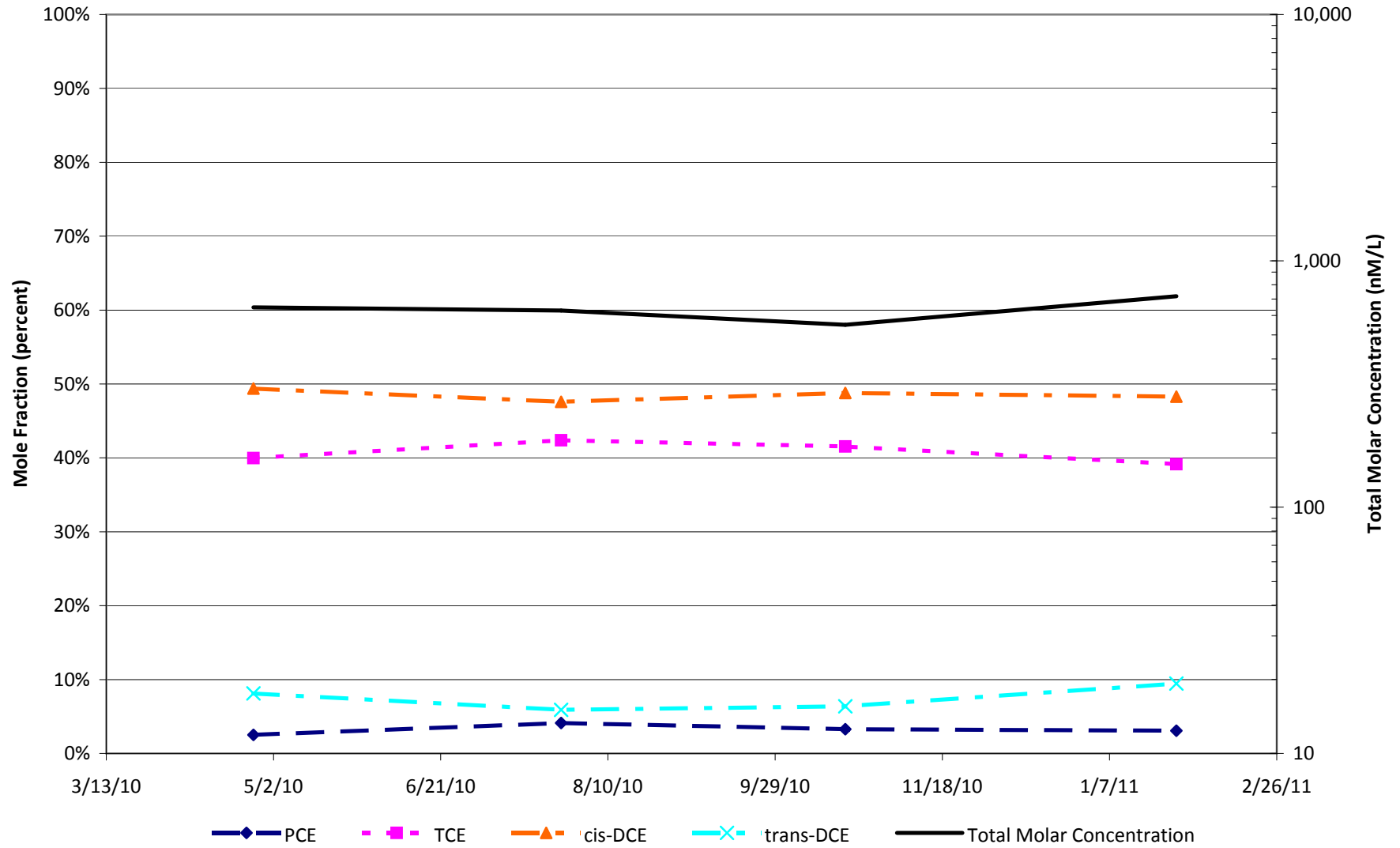


Figure 15.2.2a

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

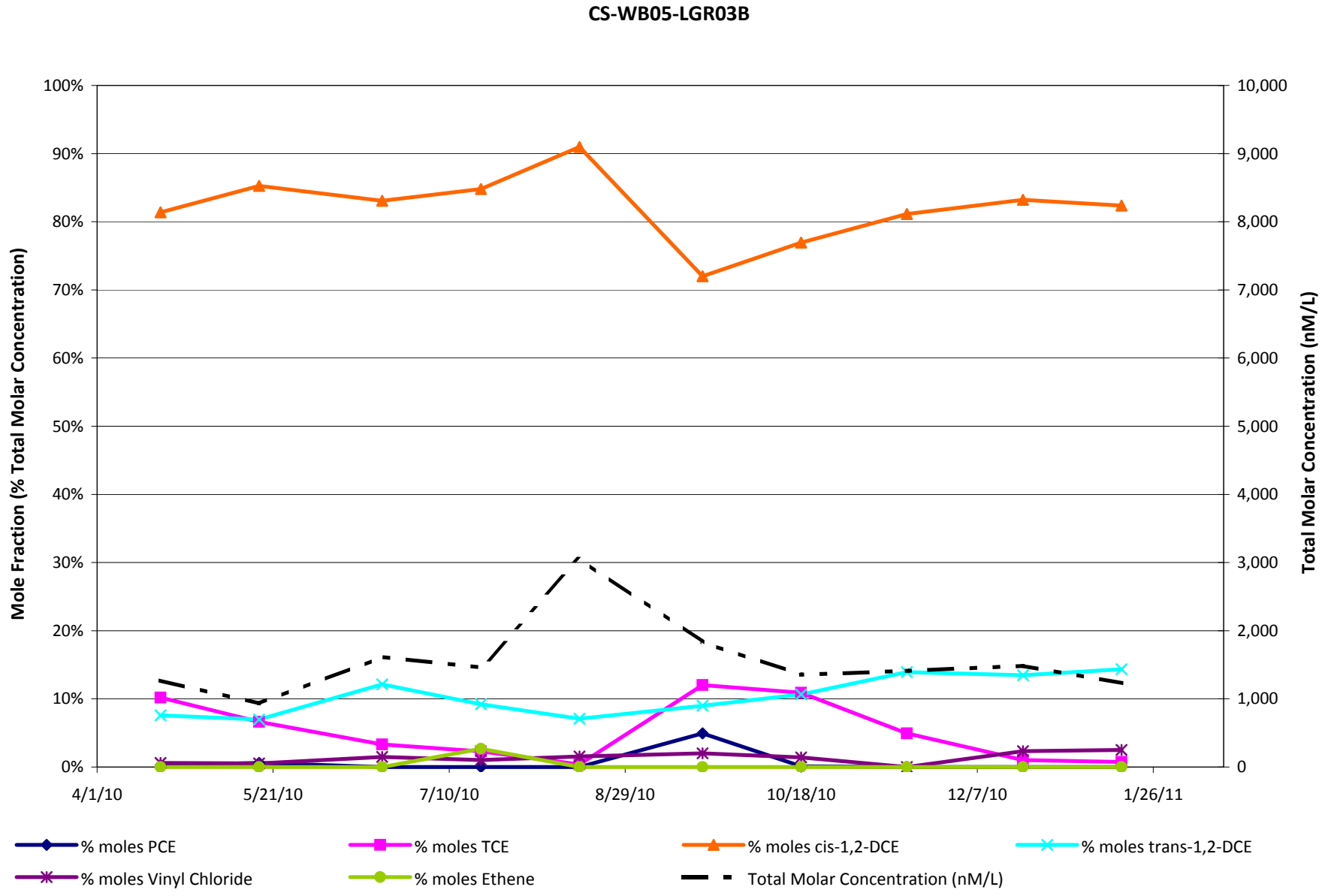


Figure 15.2.2b

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

CS-WB06-LGR03B

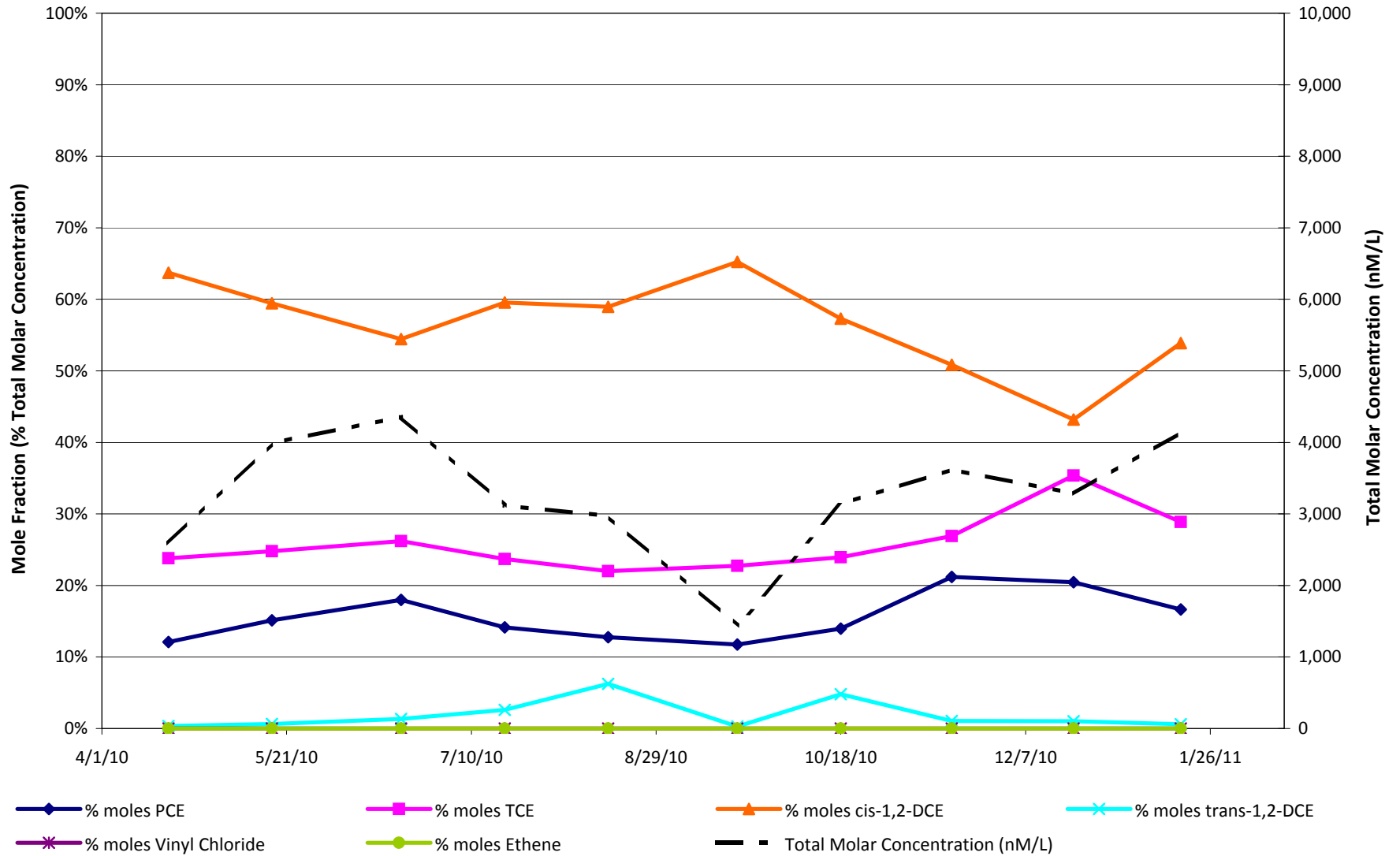


Figure 15.2.2c

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

CS-WB07-LGR03B

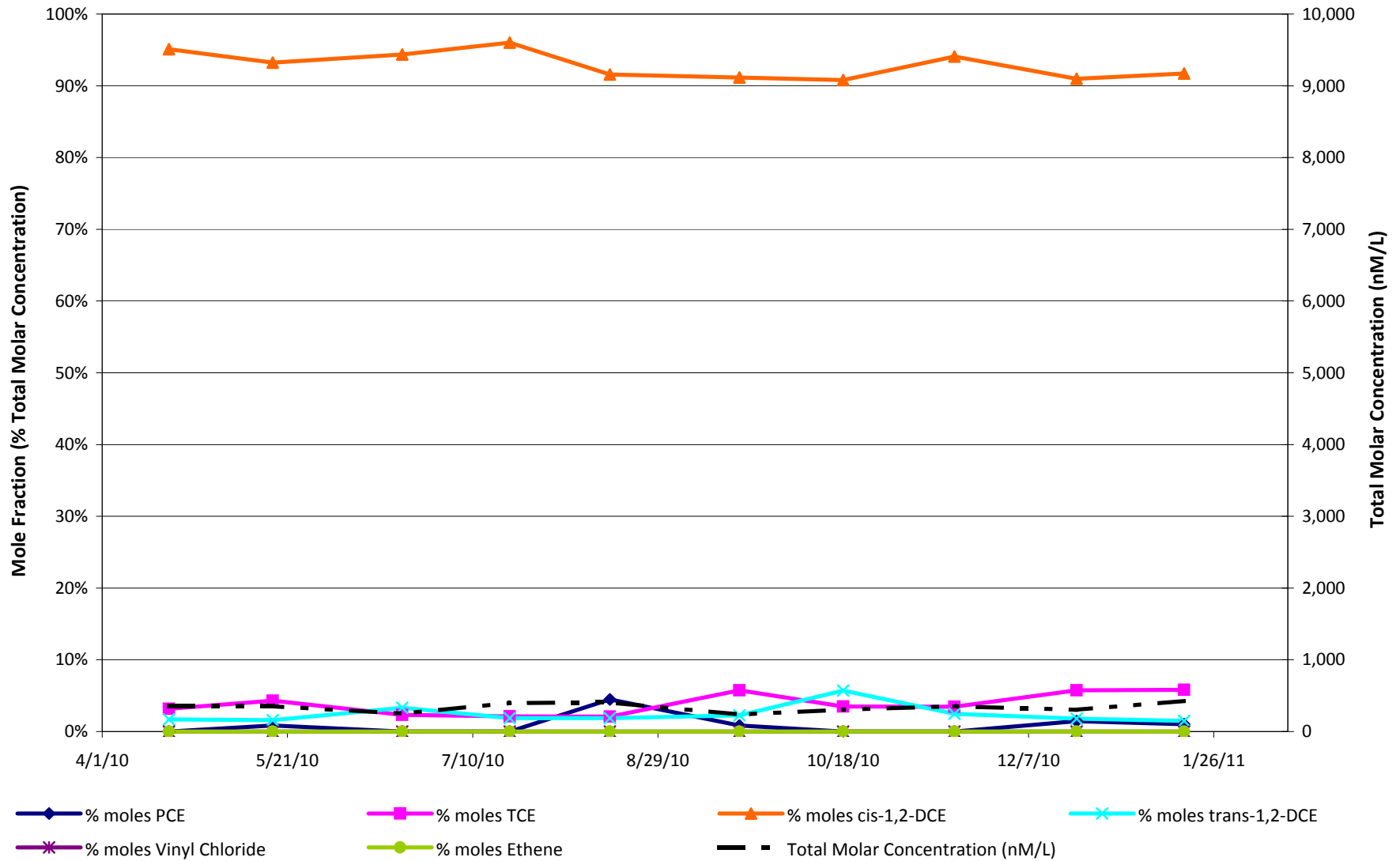


Figure 15.2.2d

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

CS-WB08-LGR03B

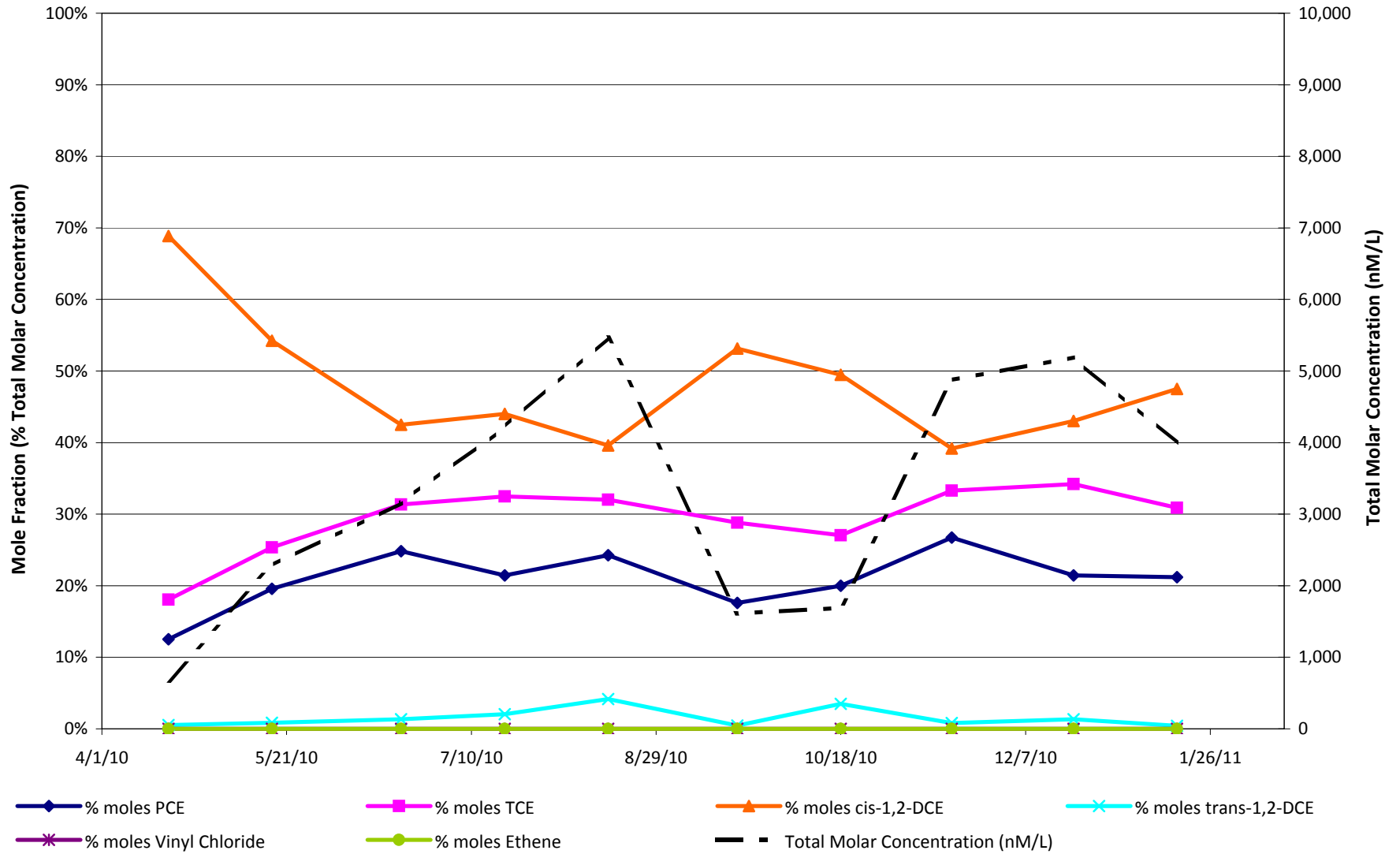


Figure 15.2.5

Lower Glen Rose Groundwater Elevations (feet above MSL) Measured in Westbay Wells May 2009 - February 2011

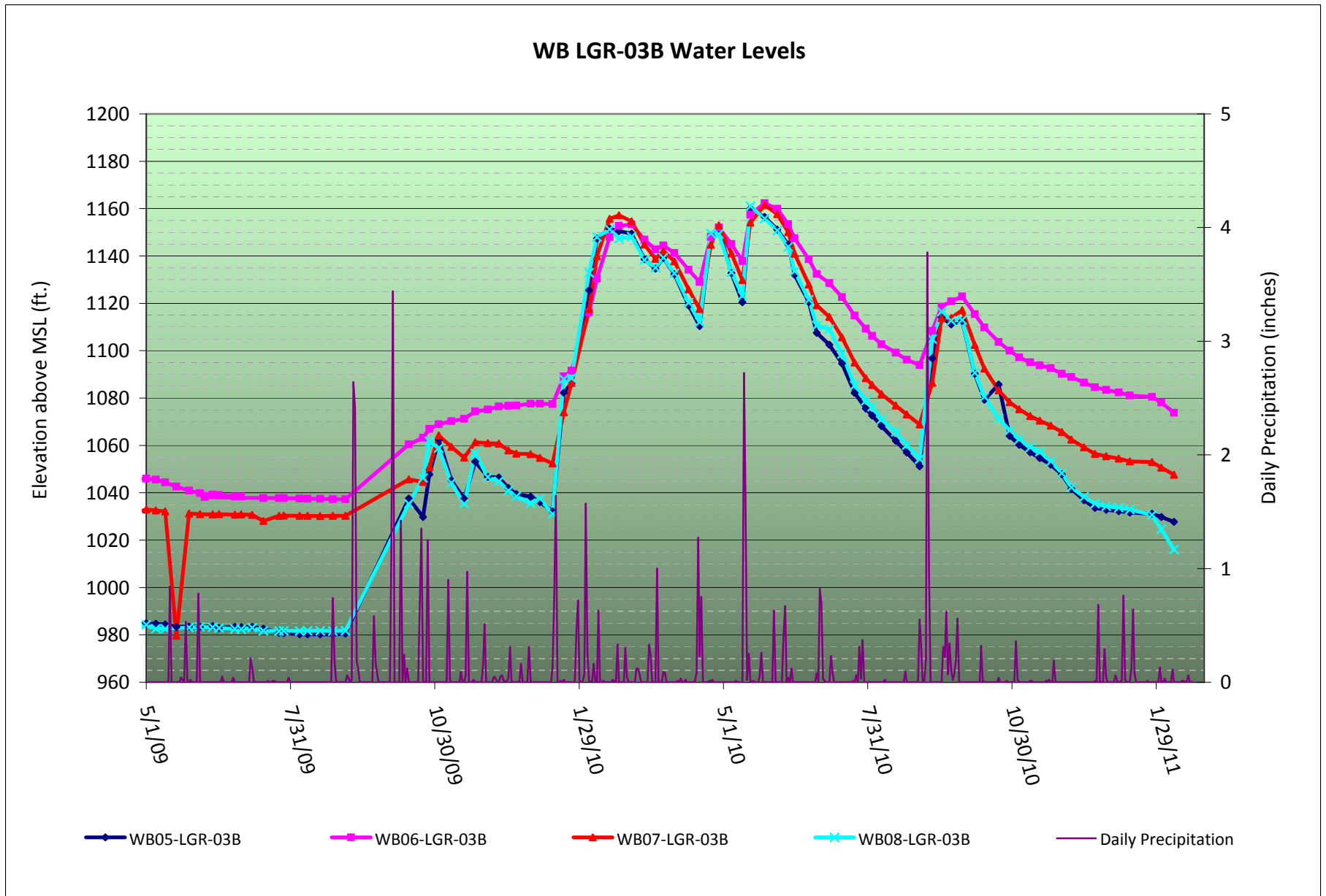
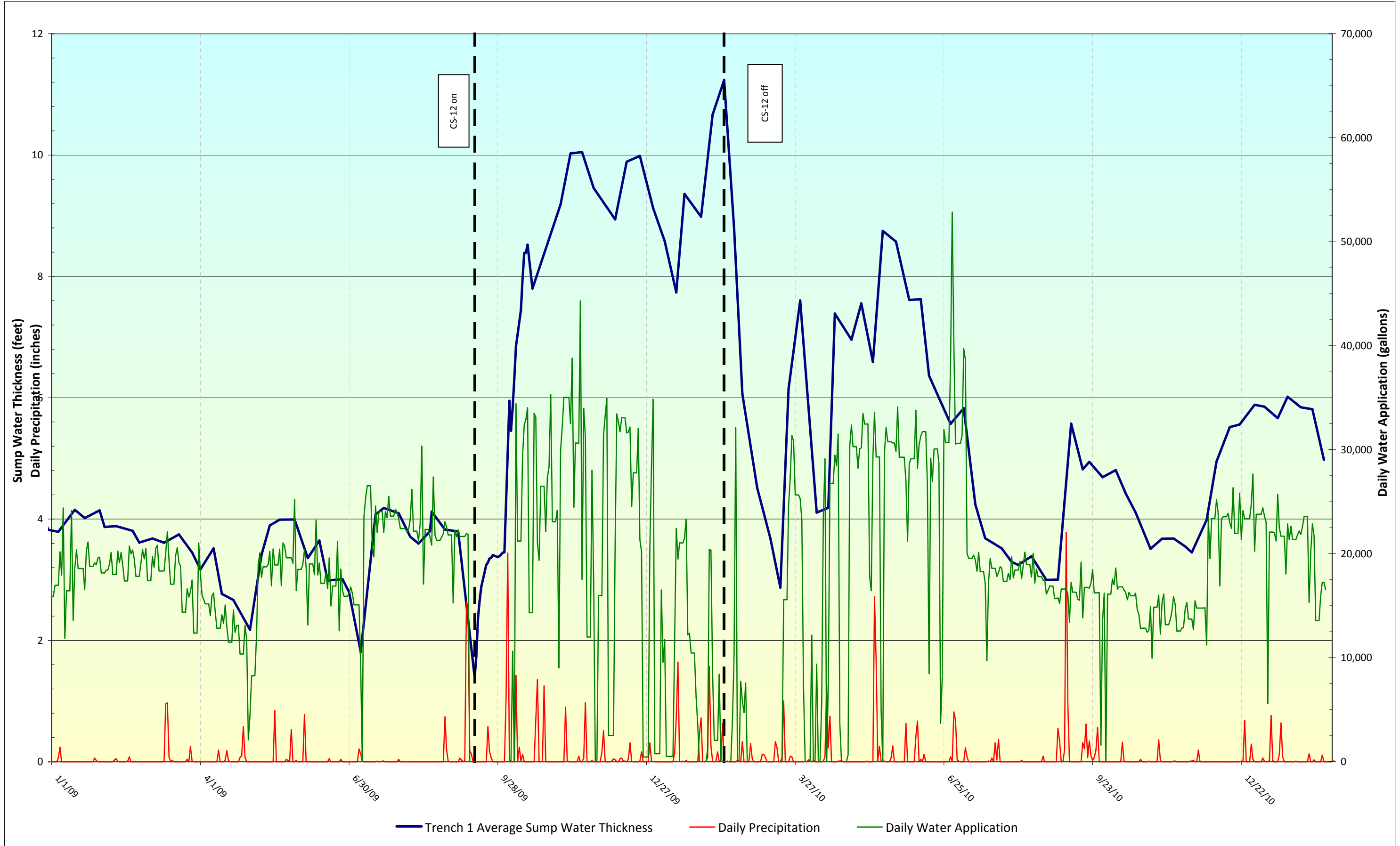


Figure 15.5.6

SWMU B-3 Bioreactor - Trench 1 Average Water Thickness, Extraction well CS-MW16 (LGR and CC), B3-EXW (01 and 02) Water Application, and Daily Precipitation



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

Figure 15.5.5

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

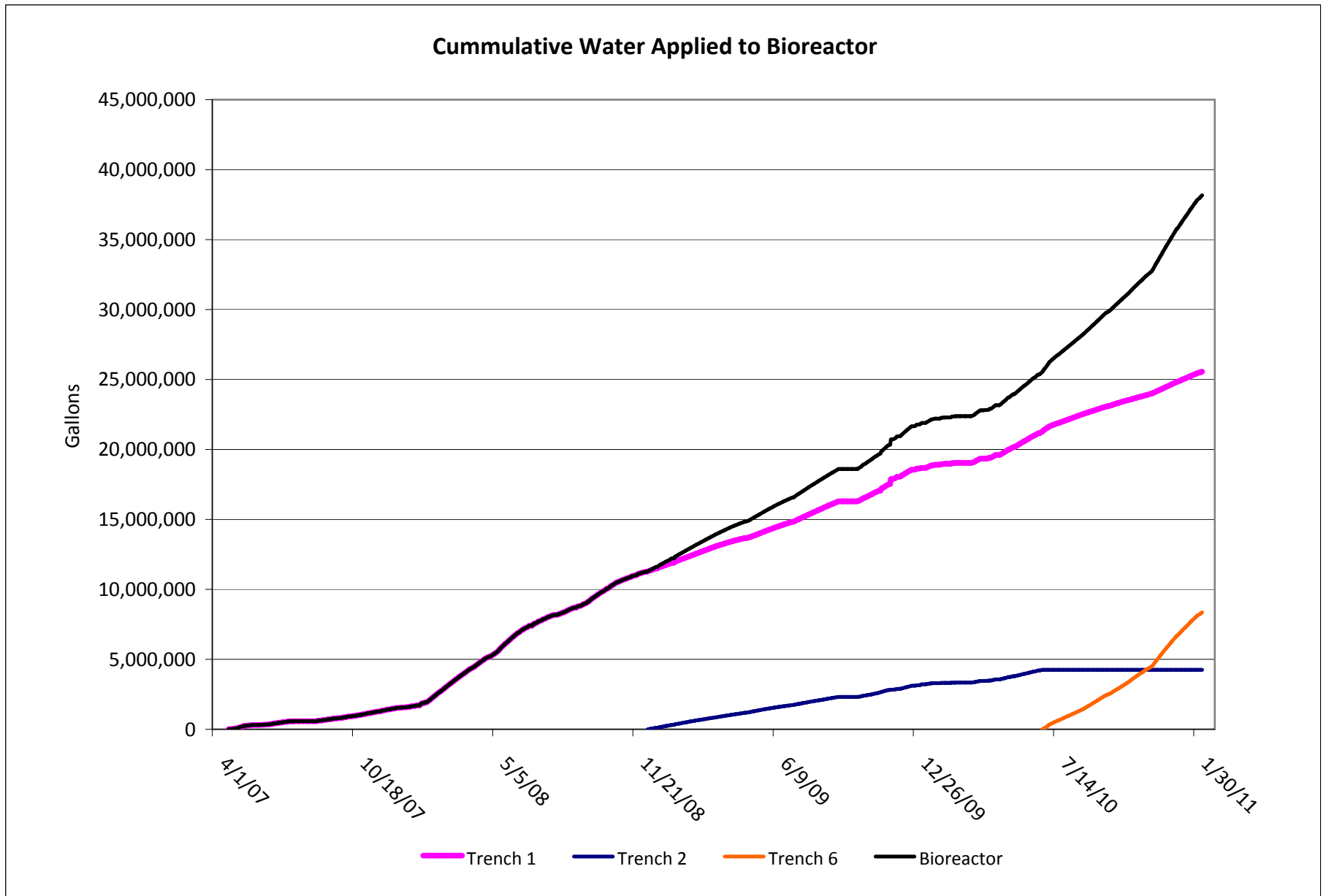
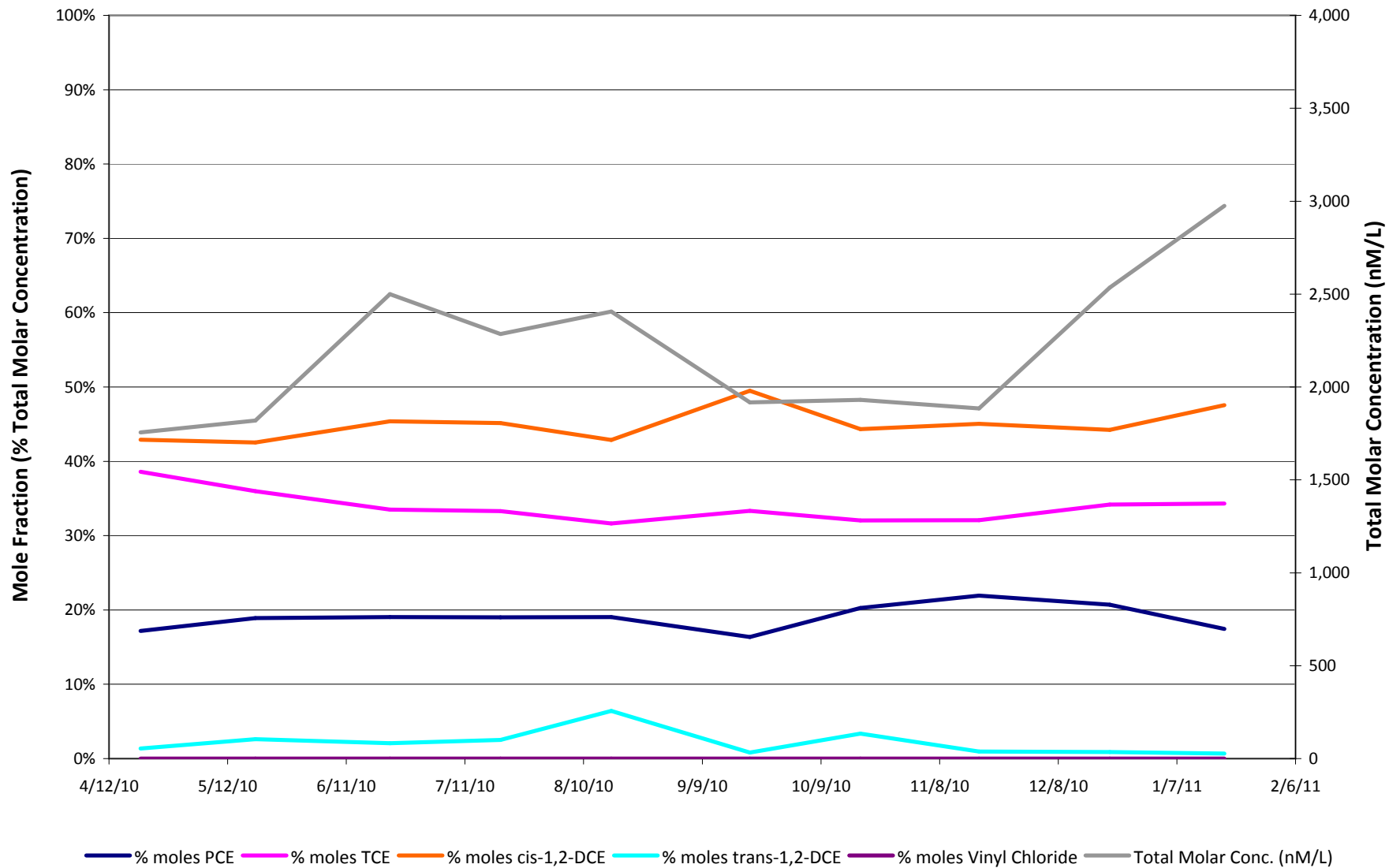
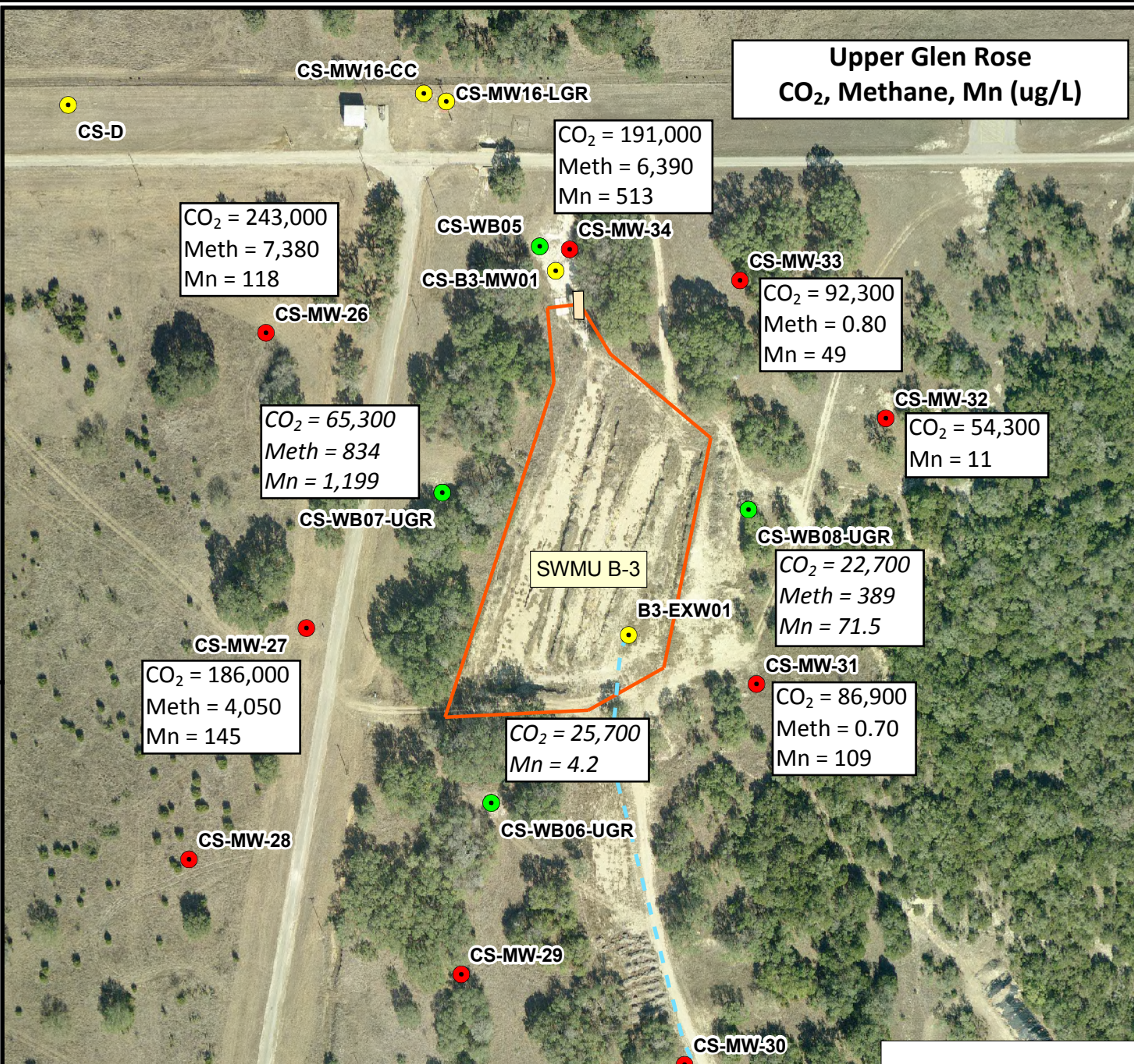


Figure 15.5.2

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

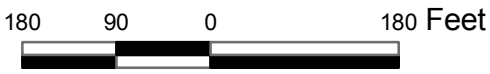


Upper Glen Rose CO₂, Methane, Mn (ug/L)

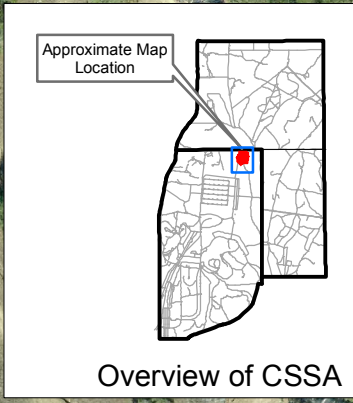


Note: MW-UGR wells sampled 1/20/11;
WB UGR zones sampled 1/25/11 - 2/1/11

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



CO₂ = 243,000
Meth = 7,380
Mn = 118

CO₂ = 191,000
Meth = 6,390
Mn = 513

CO₂ = 92,300
Meth = 0.80
Mn = 49

CO₂ = 65,300
Meth = 834
Mn = 1,199

CO₂ = 54,300
Mn = 11

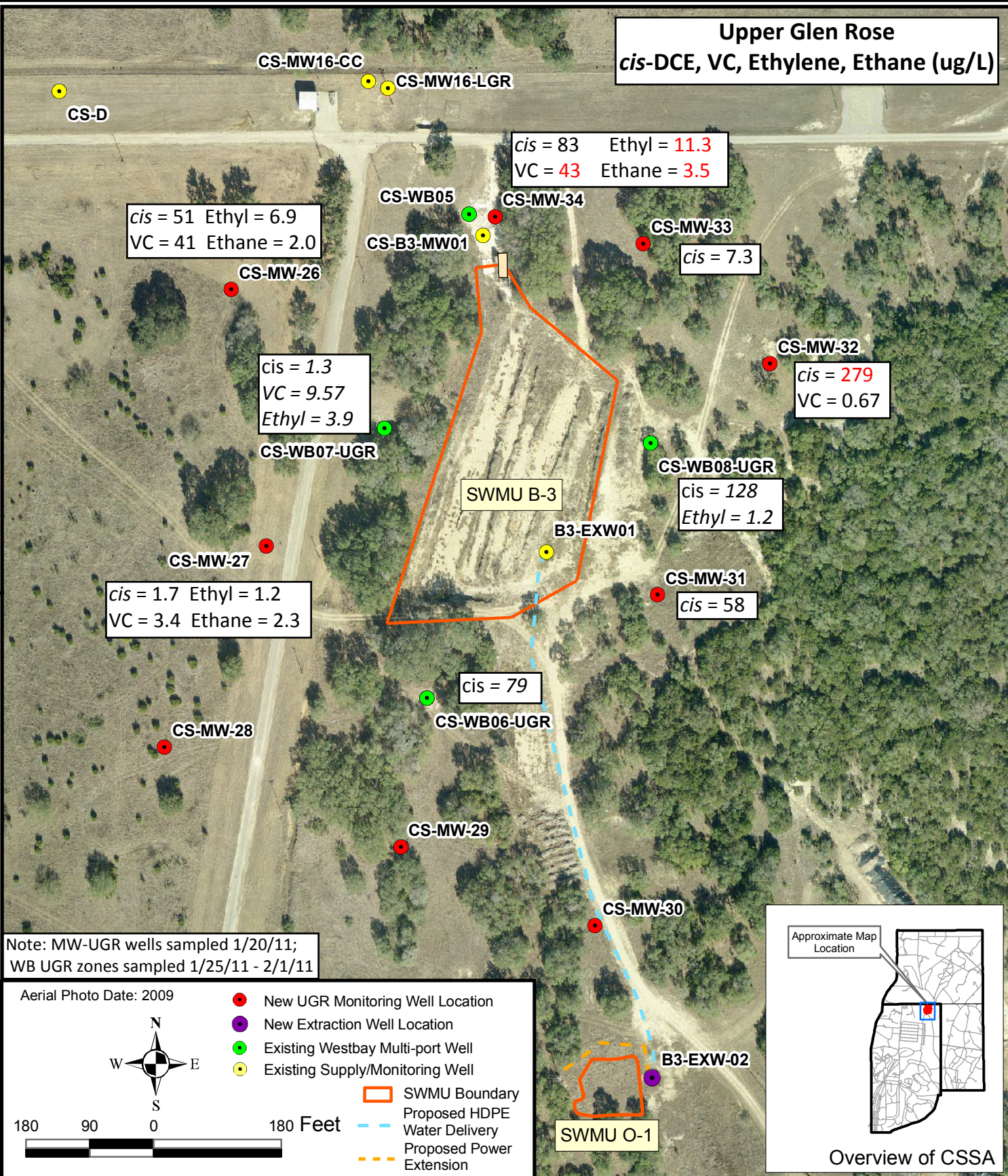
CO₂ = 22,700
Meth = 389
Mn = 71.5

CO₂ = 186,000
Meth = 4,050
Mn = 145

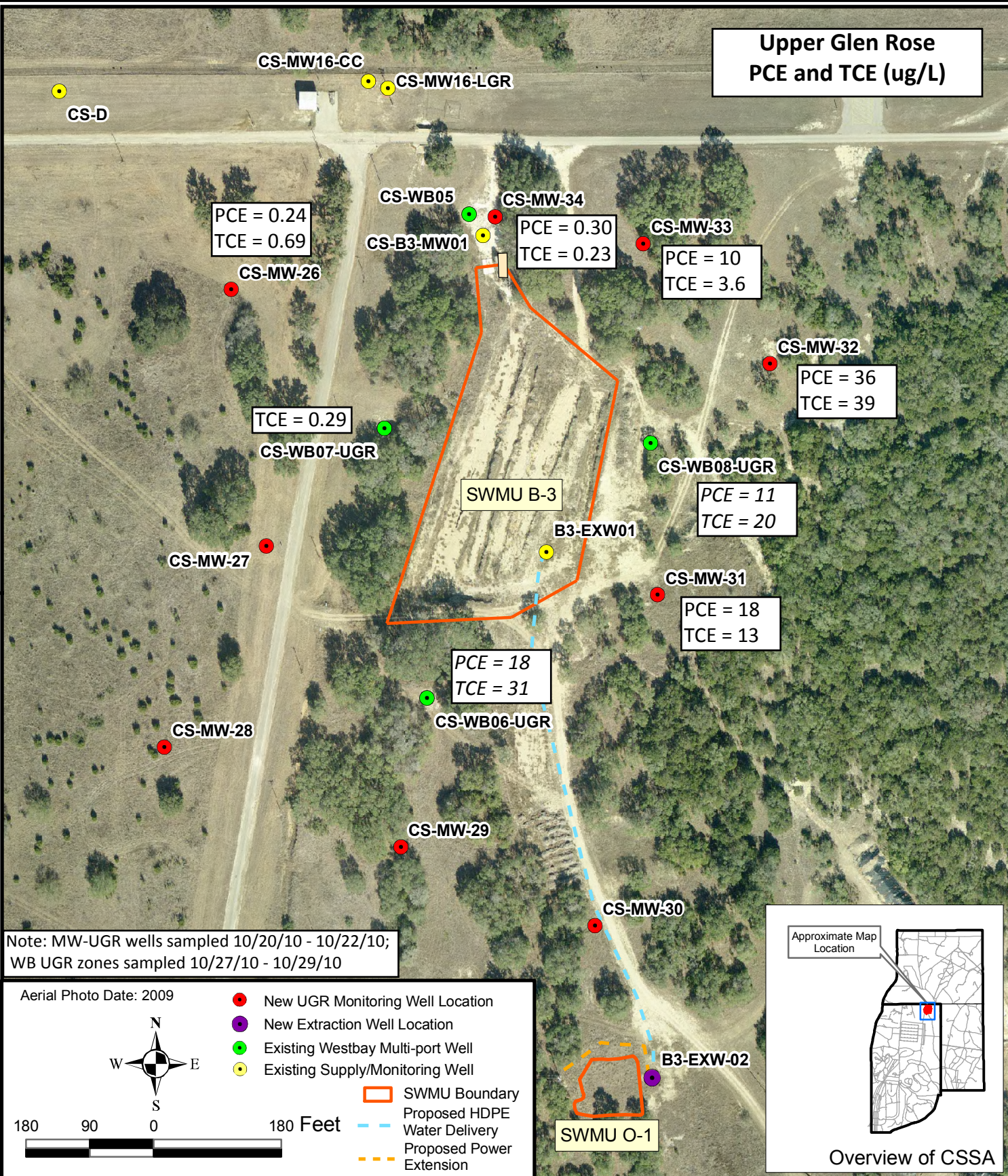
CO₂ = 25,700
Mn = 4.2

CO₂ = 86,900
Meth = 0.70
Mn = 109

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



Upper Glen Rose PCE and TCE (ug/L)



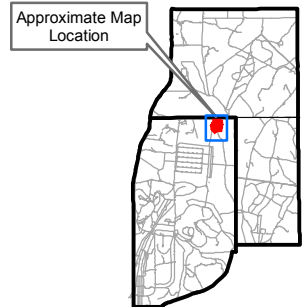
Note: MW-UGR wells sampled 10/20/10 - 10/22/10;
WB UGR zones sampled 10/27/10 - 10/29/10

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

Tables

Table 15.1.2

SWMU B3 Trench 1 and 6 Quarter 15 - VOC Analytical Summary Table

Q15 Date	T1-1			T1-2			T1-3			T6-1		
	11/18/10	12/21/10	1/19/11	11/18/10	12/21/10	1/19/11	11/18/10	12/21/10	1/19/11	11/18/10	12/21/10	1/19/11
PCE (µg/L)	0	2.8	6.3	0	0	0	0.25	14	43	2.3	11	4.6
TCE (µg/L)	0	8.4	16	0	2.2	1.1	2.1	27	75	3.8	17	5.4
cis-1,2-DCE (µg/L)	0.38	17	75	0	17	68	8.6	38	86	78	102	122
trans-1,2-DCE (µg/L)	0.47	0.41	0.25	0.95	0.56	0.62	1.3	0.57	0.67	1.1	1.4	0.52
Vinyl Chloride (µg/L)	0	0	0.56	0	2.4	5.8	0	0	0	0	0.64	0.71
Ethene (µg/L)	0	0	0	0	0	0	2.5	0	0	0	0	0
PCE (nM/L)	0.00	16.64	37.93	0.00	0.00	0.00	1.51	85.27	261.05	13.99	64.52	27.98
TCE (nM/L)	0.00	64.16	118.65	0.00	16.82	8.52	15.91	204.28	569.22	28.85	128.62	41.40
cis-1,2-DCE (nM/L)	3.92	179.06	771.94	0.00	178.34	703.15	88.40	391.65	883.45	799.59	1053.02	1261.78
trans-1,2-DCE (nM/L)	4.85	4.23	2.58	9.80	5.78	6.40	13.41	5.88	6.91	11.66	14.54	5.36
Vinyl Chloride (nM/L)	0.00	0.00	8.96	0.00	38.71	91.99	0.00	0.00	0.00	0.00	10.24	11.36
Ethene (nM/L)	0.00	0.00	0.00	0.00	0.00	0.00	89.13	0.00	0.00	0.00	0.00	0.00
Total Molar Conc. (nM/L)	8.8	264.1	940.1	9.8	239.6	810.1	208.3	687.1	1,720.6	854.1	1,270.9	1,347.9
% moles PCE	0.0%	6.3%	4.0%	0.0%	0.0%	0.0%	0.7%	12.4%	15.2%	1.6%	5.1%	2.1%
% moles TCE	0.0%	24.3%	12.6%	0.0%	7.0%	1.1%	7.6%	29.7%	33.1%	3.4%	10.1%	3.1%
% moles cis-1,2-DCE	44.7%	67.8%	82.1%	0.0%	74.4%	86.8%	42.4%	57.0%	51.3%	93.6%	82.9%	93.6%
% moles trans-1,2-DCE	55.3%	1.6%	0.3%	100.0%	2.4%	0.8%	6.4%	0.9%	0.4%	1.4%	1.1%	0.4%
% moles Vinyl Chloride	0.0%	0.0%	1.0%	0.0%	16.2%	11.4%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	42.8%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 15.1.3

B-3 Bioreactor Analytical Summary - Quarter 15

Well ID Sample Date		Active Bioreactor Trench Sumps																													
		T1-1						T1-2						T1-3						T6-1						T6-2					
		11/18/10		12/21/10		1/19/11		11/18/10		12/21/10		1/19/11		11/18/10		12/21/10		1/19/11		11/18/10		12/21/10		1/19/11		11/18/10		12/21/10		1/19/11	
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		
Dissolved Organic Carbon	mg/L	3.5				1.9		4.3		6.1		2.2		1.5		1.7		2.0		3.3						3.2					
Total Organic Carbon	mg/L	4.4				1.1		3.9		5.0		1.2		0.42	F	0.72		0.86		3.1					2.1						
Methane	µg/L	10,400		3.7		2.4		12,200		104		1,880		0		74		24		8.1		2,930		2,090		0					
Ethane	µg/L	0		0		0		0		0		2.5	F	0		0		0		14		4.3		0							
Ethane	µg/L	0		0		0		3.6		0		1.8	F	0		0		0		5.4		8.8		0							
Carbon Dioxide	µg/L	658,000		65,700		67,600		490,000		72,500		64,100		325,000		36,800		26,000		90,600		41,100		136,000		154,000		126,000		111,000	
Alkalinity, Total (as CaCO3)	mg/L	523				460				391						331				337											
Nitrate/Nitrite	mg/L	0				0				0						0.040	F			0											
Sulfate	mg/L	5.6				53.4		13.8		39.2		66.9		31		15		26.5		24					17						
Chloride	mg/L	15				13.9		15.0		14		14.9		13.5		15		13.8		15					14						
Ferrous Iron	mg/L	1.8		0.26	F	0.16	F	3.0		1.4		0.80	F	1.6		0.22	F	0.18	F	0.91	F	0		0.23	F	2.4		2.7		0.97	F
Manganese	µg/L	205		141		40		253		697		447		63		23		4.7	F	69		24		38.5		118		125		140	
Hydrogen	nM/L							10				0.84								1.3				1.8							
Hydrogen Sulfide																															
Total Dissolved Solids	mg/L	503		682		472		454		837		473		491		4,532		372		349		391		423		339		509		473	
Benzene	µg/L	0		0		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		0.24	F	0.16	F	0.25	F	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	0.38	F	17		75		17		68		8.6		38		86		78		102		122		2.8		3.3		20			
Dichloroethene, trans-1,2-	µg/L	0.47	F	0.41	F	0.25	F	0.95		0.56	F	0.62		1.3		0.57	F	0.67		1.1		1.4		0.52	F	1.3		0.56	F	0.50	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		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		2.8		6.3		0		0		0.25	F	14		43		2.3		11		4.6		0		0		0.25	F		
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0.23	F	0		0		0	
Trichloroethene	µg/L	0		8.4		16		0		2.2		1.1		2.1		27		75		3.8		17		5.4		0.24	F	0.66	F	0.40	F
Vinyl chloride	µg/L	0		0		0.56	F	0		2.4		5.8		0		0		0		0.64	F	0.71	F	0		3.5		11			
Arsenic	µg/L	0		7.1		0		0.60	F	15		2.5	F	0		6.4		0		4.3	F	0		0		6.8		0			
Barium	µg/L	89				137				72						56								64							
Cadmium	µg/L	0				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		0	
Copper	µg/L	14				15		15		15		14		14		14		14		14		14		14		14		14		14	
Lead	µg/L	6.3				5.9		6.3		6.3		7.3		7.3		7.3		6.8		6.8		6.8		6.8		6.8		6.8		6.8	
Mercury	µg/L	0				0		0		0.070	F			0.060	F			0.060	F			0.060	F			0.060	F				
Nickel	µg/L	1.1	F			0		0		0		0		2.4	F			1.4	F			1.4	F			1.4	F				
Zinc	µg/L	34	F			48	F			55				67				33	F			33	F			33	F				
		Month 43		Month 44		Month 45		Month 43		Month 44		Month 45		Month 43		Month 44		Month 45		Month 43		Month 44		Month 45		Month 43		Month 44		Month 45	

Note: 0 sample indicates a non-detect analyte value

Table 15.2.2

**SWMU B-3 Westbay Monitoring Wells
Upper Saturated Zone (Zone LGR03B) Analytical Results Summary Quarter 15**

Q15 Date	CS-WB05-LGR03B			CS-WB06-LGR03B			CS-WB07-LGR03B			CS-WB08-LGR03B		
	11/17/10	12/20/10	1/17/11	11/17/10	12/20/10	1/18/11	11/17/10	12/20/10	1/18/11	11/17/10	12/20/10	1/17/11
PCE (µg/L)	0	0	0	127	111	114	0	0.73	0.71	216	185	140
TCE (µg/L)	9.1	2.0	1.2	128	153	157	1.6	2.3	3.2	213	233	162
cis-1,2-DCE (µg/L)	111	120	98	179	137	216	32	27	38	185	217	184
trans-1,2-DCE (µg/L)	19	19	17	3.7	3.2	2.5	0.84	0.53	0.61	3.9	6.7	1.7
Vinyl Chloride (µg/L)	0	2.2	1.9	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0
PCE (nM/L)	0.00	0.00	0.00	768.02	671.59	688.78	0.00	4.40	4.28	1302.54	1112.95	845.50
TCE (nM/L)	69.49	15.07	9.29	973.89	1160.82	1196.51	12.18	17.35	24.66	1621.13	1776.09	1233.50
cis-1,2-DCE (nM/L)	1143.37	1236.41	1014.23	1841.88	1417.84	2231.98	330.69	274.27	389.79	1908.20	2233.52	1895.10
trans-1,2-DCE (nM/L)	196.49	200.00	176.79	37.85	33.11	25.27	8.66	5.47	6.29	40.23	68.90	17.23
Vinyl Chloride (nM/L)	0.00	34.39	30.88	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
Total Molar Conc. (nM/L)	1,409.4	1,485.9	1,231.2	3,621.6	3,283.4	4,142.5	351.5	301.5	425.0	4,872.1	5,191.5	3,991.3
% moles PCE	0.0%	0.0%	0.0%	21.2%	20.5%	16.6%	0.0%	1.5%	1.0%	26.7%	21.4%	21.2%
% moles TCE	4.9%	1.0%	0.8%	26.9%	35.4%	28.9%	3.5%	5.8%	5.8%	33.3%	34.2%	30.9%
% moles cis-1,2-DCE	81.1%	83.2%	82.4%	50.9%	43.2%	53.9%	94.1%	91.0%	91.7%	39.2%	43.0%	47.5%
% moles trans-1,2-DCE	13.9%	13.5%	14.4%	1.0%	1.0%	0.6%	2.5%	1.8%	1.5%	0.8%	1.3%	0.4%
% moles Vinyl Chloride	0.0%	2.3%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Month 43	Month 44	Month 45	Month 43	Month 44	Month 45	Month 43	Month 44	Month 45	Month 43	Month 44	Month 45

Note: 0 sample indicates a non-detect analyte value

Table 15.2.3a

SWMU B-3 Bioreactor Multi-port Well CS-WB05 - Q15 Performance Data

Q15		CS-WB05																			
Well ID		CS-WB05-LGR01		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		1/25/2011		1/25/2011		11/17/2010		12/20/2010		1/17/2011		1/24/2011		1/24/2011		1/24/2011		1/24/2011		1/24/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L					0.28	F			0.51											
Total Organic Carbon	mg/L					0				0											
Methane	µg/L	17.5		78.5		247		147		147		463		10,100		27.1		0.90	F	1.4	
Ethene	µg/L	0		0		0		0		0		0		12.6		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	12,600		9,040		26,500		30,500		33,000		9,200		148,000		36,400		9,340		9,760	
Alkalinity, Total (as CaCO3)	mg/L					291															
Nitrate/Nitrite	mg/L					0															
Sulfate	mg/L					45				48.5											
Chloride	mg/L					11				11.2											
Ferrous Iron	mg/L	0		0		0		0		0		0		0.36	F	0		0.17	F	0	
Manganese	µg/L	0		0		1.9	F	0		0		7.6		52.6		0		0		0	
Hydrogen	nM																				
Hydrogen Sulfide																					
Total Dissolved Solids	mg/L	500		376		261		416		419		333		357		300		411		417	
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0.27	F	0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	2.0		97.0		111		120		98		511		80.8		34.0		2.5		15.4	
Dichloroethene, trans-1,2-	µg/L	0.65		15.9		19		19		17		5.2		5.6		0		0		0.89	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0.30	F	0		0		0		44.5		49		0		1.8		0.38	F
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.3		1.6		9.1		2.0		1.2		188		63		0.31	F	6.0		23	
Vinyl chloride	µg/L	0		2.3		0		2.2		1.9		26		242		1.9		0		0	
Arsenic	µg/L	0		0		0.70	F	7.0		2.5	F	0		5.8		0		0		0	
Barium	µg/L					32															
Cadmium	µg/L					0															
Chromium	µg/L					0															
Copper	µg/L					14															
Lead	µg/L					6.9															
Mercury	µg/L					0.050	F														
Nickel	µg/L					4.0	F														
Zinc	µg/L					32	F														
		Q15- Month 45		Q15- Month 45		Quarter 15						Q15- Month 45		Q15- Month 45		Q15- Month 45		Q15- Month 45		Q15- Month 45	

Note: 0 sample value indicates a non-detect analyte value
 Zone CS-WB05-LGR02 was dry; not sampled

Table 15.2.3b

SWMU B-3 Bioreactor Multi-port Well CS-WB06 - Q15 Performance Data

Q15		WB06															
Well ID		CS-WB06-UGR01		CS-WB06-LGR01		CS-WB06-LGR02		CS-WB06-LGR03A		CS-WB06-LGR03B		CS-WB06-LGR04					
Sample Date		1/26/2011		1/26/2011		1/26/2011		1/26/2011		11/17/2010		12/20/2010		1/18/2011		1/26/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L									0.21	F			0.26	F		
Total Organic Carbon	mg/L									0				0			
Methane	µg/L	0		0		0		0		3.2		1.2		3.5		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	25,700		9,340		7,140		7,690		26,100		14,500		36,500		77,000	
Alkalinity, Total (as CaCO ₃)	mg/L									280							
Nitrate/Nitrite	mg/L									0							
Sulfate	mg/L									20				21.4			
Chloride	mg/L									12				12.1			
Ferrous Iron	mg/L	0		0		0		0		0		0		0		0	
Manganese	µg/L	4.2	F	2.3	F	1.5	F	0		1.3	F	0		0		0	
Hydrogen	nM																
Hydrogen Sulfide																	
Total Dissolved Solids	mg/L	339		377		289		317		191		373		369		306	
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		0.11	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		0.55	F	0		0		0.37	F	0.31	F
Dichloroethene, cis-1,2-	µg/L	79		51		13.6		272		179		137		216		339	
Dichloroethene, trans-1,2-	µg/L	0.86		1.0		0.95		3.1		3.7		3.2		2.5		3.2	
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	18		24		6.4		107		127		111		114		128	
Toluene	µg/L	0		0		0		0		0		0		0.11	F	0	
Trichloroethene	µg/L	31		26		8.3		144		128		153		157		121	
Vinyl chloride	µg/L	0		0		0.27	F	0		0		0		0		0	
Arsenic	µg/L	0		0		0		0		0		5.7		0.60	F	0	
Barium	µg/L									43							
Cadmium	µg/L									0							
Chromium	µg/L									0							
Copper	µg/L									12							
Lead	µg/L									6.3							
Mercury	µg/L									0.060	F						
Nickel	µg/L									3.2	F						
Zinc	µg/L									39	F						
		Q15- Month 45		Q15- Month 45		Q15- Month 45		Q15- Month 45		Quarter 15						Q15- Month 45	

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

Table 15.2.3c

SWMU B-3 Bioreactor Multi-port Well CS-WB07 - Q15 Performance Data

Q15		WB07															
Well ID		CS-WB07-UGR01		CS-WB07-LGR01		CS-WB07-LGR02		CS-WB07-LGR03A		CS-WB07-LGR03B				CS-WB07-LGR04			
Sample Date		2/1/2011		2/1/2011		2/1/2011		2/1/2011		11/17/2010		12/20/2010		1/18/2011		2/1/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L									0.29	F			0.24	F		
Total Organic Carbon	mg/L									0				0			
Methane	µg/L	834		0		0		6.0		6.6		5.3		4.8		2.1	
Ethene	µg/L	3.9		0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	65,300		68,500		9,300		26,100		20,100		30,600		20,400		10,500	
Alkalinity, Total (as CaCO3)	mg/L									277							
Nitrate/Nitrite	mg/L									0							
Sulfate	mg/L									20				20			
Chloride	mg/L									10				10			
Ferrous Iron	mg/L	5.0		0		0.18	F	0		0		0		0		0	
Manganese	µg/L	1,199		0		0		0		0		0		0		0	
Hydrogen	nM																
Hydrogen Sulfide																	
Total Dissolved Solids	mg/L	493		575		373		335		330		359		338		341	
Benzene	µg/L	0		0		0		0		0		0		0		0.12	F
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0.30	
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		0.42	F
Dichloroethene, cis-1,2-	µg/L	1.3		0		0.30	F	28		32		27		38		572	
Dichloroethene, trans-1,2-	µg/L	4.0		0		0		0.40	F	0.84		0.53	F	0.61		1.7	
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		0.37	F	0		3.0		0		0.73	F	0.71	F	445	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0.29	F	0.56	F	0		4.3		1.6		2.3		3.2		452	
Vinyl chloride	µg/L	9.57		0		0		0		0		0		0		0	
Arsenic	µg/L	2.1	F	0		0		0		0		6.0		0.70	F	0	
Barium	µg/L									40							
Cadmium	µg/L									0							
Chromium	µg/L									0							
Copper	µg/L									14							
Lead	µg/L									6.2							
Mercury	µg/L									0.080	F						
Nickel	µg/L									1.5	F						
Zinc	µg/L									32	F						
		Q15- Month 45		Q15- Month 45		Q15- Month 45		Q15- Month 45		Quarter 15				Q15- Month 45			

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

Table 15.2.3d

SWMU B-3 Bioreactor Multi-port Well CS-WB08 - Q15 Performance Data

Q15		WB08															
Well ID		CS-WB08-UGR01		CS-WB08-LGR01		CS-WB08-LGR02		CS-WB08-LGR03A		CS-WB08-LGR03B				CS-WB08-LGR04			
Sample Date		1/25/2011		1/25/2011		1/25/2011		1/25/2011		11/17/2010		12/20/2010		1/17/2011		1/25/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L									1.1				0.41	F		
Total Organic Carbon	mg/L									0				0			
Methane	µg/L	71.5		0		0		0		0		0		0		0	
Ethene	µg/L	1.2	F	0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	22,700		43,600		8,600		7,810		61,500		39,100		42,800		27,100	
Alkalinity, Total (as CaCO3)	mg/L									291							
Nitrate/Nitrite	mg/L									0.69							
Sulfate	mg/L									15				15			
Chloride	mg/L									12				12			
Ferrous Iron	mg/L	0		0		0		0		0		0		0		0	
Manganese	µg/L	389		0		0		0		1.4	F	0		0		3.9	F
Hydrogen	nM																
Hydrogen Sulfide																	
Total Dissolved Solids	mg/L	339		481		513		335		279		371		364		374	
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		0.23	F	0.17	F	0.20	F	0.16	F	0.080	F
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	128		67		3.3		206		185		217		184		81	
Dichloroethene, trans-1,2-	µg/L	1.2		4.6		0		3.9		3.9		6.7		1.7		1.2	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	11		0.51	F	3.7		107		216		185		140		31	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	20		0.61	F	3.3		134		213		233		162		51	
Vinyl chloride	µg/L	0		0		0		0		0		0		0		0	
Arsenic	µg/L	0		0		0.30	F	0		0		5.2		0.40	F	0	
Barium	µg/L									40							
Cadmium	µg/L									0							
Chromium	µg/L									1.1	F						
Copper	µg/L									13							
Lead	µg/L									5.9							
Mercury	µg/L									0.070	F						
Nickel	µg/L									3.5	F						
Zinc	µg/L									31	F						
		Q15- Month 45		Q15- Month 45		Q15- Month 45		Q15- Month 45		Quarter 15				Q15- Month 45			

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

Table 15.3.3

B-3 Bioreactor Monitoring Well Analytical Summary - Quarter 15

Q15		Monitoring Wells							
Well ID		CS-MW1-LGR		CS-D		CS-B3-MW01		CS-4	
Sample Date		1/31/2011		1/31/2011		1/31/2011		1/31/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	0		0.34	F	3.1		0.44	F
Total Organic Carbon	mg/L	0		0		2.0		0	
Methane	µg/L	0		0		4,450		0	
Ethene	µg/L	0		0		1.3	F	0	
Ethane	µg/L	0		0		0		0	
Carbon Dioxide	µg/L	30,300		36,900		168,000		29,400	
Sulfate	mg/L	14.0		15.7		1.8		25.8	
Chloride	mg/L	9.0		11.1		13.3		16.6	
Ferrous Iron	mg/L	0		0		6.5		0	
Manganese	µg/L	0		0		199		0	
Total Dissolved Solids	mg/L	314		355		641		333	
Benzene	µg/L	0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0	
Bromoform	µg/L	0		0		0		0	
Chloroform	µg/L	0.16	F	0.20	F	0		0	
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	22.4		138		0.21	F	1.4	
Dichloroethene, trans-1,2-	µg/L	0.38	F	1.6		0.66		0	
Methylene chloride	µg/L	0		0		0		0	
Naphthalene	µg/L	0		0		0		0	
Tetrachloroethene	µg/L	15.8		144		0		3.3	
Toluene	µg/L	0		0		0		0	
Trichloroethene	µg/L	39.2		179		0		4.4	
Vinyl chloride	µg/L	0		0		53.3		0	
Arsenic	µg/L	0		1.0	F	1.2	F	0.40	F

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

Table 15.4.4

SWMU B-3 Supm Microbial Data
Quarter 15

Q15	Sample Location	B3 T1-2	B3 T6-1	CS-MW16-LGR
Analysis	Sample date:	1/19/2011	1/19/2011	1/27/2011
Dechlorinating Bacteria	units			
<i>Dehalococcoides spp (1)</i>	(cells/mL)	1.50E+03	5.47E+02	2.00E-01 J
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)	6.56E+01	2.97E+01	<5.00E-01
BAV1 VC R-Dase (1)	(cells/mL)	1.00E-01 J	2.09E+02	<5.00E-01
VC R-Dase	(cells/mL)	1.77E+02	1.39E+02	<5.00E-01

Table 15.5.2

B3 - UIC Analytical Results
August 2010 - January 2011

Sample ID Sample Date Sample Type Sampling Method Lab ID	B3-UIC			B3-UIC			B3-UIC			B3-UIC			B3-UIC								
	08/17/10			09/21/10			10/29/10			11/18/10			12/21/10			01/19/11					
	N1			N1			N1			N1			N1			N1					
Grab			Grab			Grab			Grab			Grab			Grab						
AY19940			AY22083			AY24744			AY27043			AY29487			AY30319						
B-3 UIC			B-3 UIC			B-3 UIC			B-3 UIC			B-3 UIC			B-3 UIC						
Lab	Lab	Criteria	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution				
MDL	PQL	(RCRA Haz.)																			
SW8260B (µg/L)																					
Cis-DCE	0.16	1.2	--	100		1	92		1	83		1	82		1	109		1	137		1
Trans-DCE	0.19	0.6	--	15		1	1.5		1	6.3		1	1.7		1	2.2		1	2.0		1
TCE	0.16	1.0	500.	100		1	84		1	81.3		1	79		1	114		1	134		1
PCE	0.15	1.4	700.	76		1	52		1	64.9		1	68		1	87		1	86		1
Toluene	0.17	1.1	--	0.17	U	1	0.06	U	1	0.06	U	1	0.06	U	1	0.06	U	1	0.06	U	1
Vinyl Chloride	0.23	1.1	200.	0.23	U	1	0.08	U	1	0.08	U	1	0.08	U	1	0.08	U	1	0.08	U	1
EPA 160.1 (mg/L)																					
TDS	4.4	10.	--	392		1	377		1	364		1	221		1	376		1	368		1
Field measured																					
pH				7.44			7.26			6.89			7.40			7.23			7.34		

Tables present all laboratory results for analytes.
Data packages for laboratory results are presented in Attachment 1.
All samples were analyzed by APPL Laboratory Services.
pH results reported were field measured.
UIC criteria specified in 40 CFR 261.24 Table 1

Data Quantifiers:

J - The analyte was positively identified, the quantitation is an estimate
U - The analyte was analyzed for, but not detected. The associated numerical value is the MDL.

Abbreviations:

PQL Practical Quantitation Limit
MDL Method Detection Limit
N1 Environmental Sample
SQL Sample Quantitation Limit
UIC Underground Injection Control

Table 15.6.2

B-3 Bioreactor Extraction Well VOC Summary - Quarter 15

Q15	16 LGR	16 CC	EXW 01	EXW 02
Date	1/27/11	1/27/11	1/27/11	1/27/11
PCE (µg/L)	180	3.7	230	101
TCE (µg/L)	222	37	224	127
cis-1,2-DCE (µg/L)	216	34	280	115
trans-1,2-DCE (µg/L)	0.42	6.6	1.9	1.3
Vinyl Chloride (µg/L)	0	0	0	0
Ethene (µg/L)	0	0	0	0
PCE (nM/L)	1084.06	22.13	1384.79	609.06
TCE (nM/L)	1691.99	281.15	1703.33	966.59
cis-1,2-DCE (nM/L)	2229.81	346.78	2884.27	1186.18
trans-1,2-DCE (nM/L)	4.33	67.97	19.39	13.41
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)	5,010.2	718.0	5,991.8	2,775.2
% moles PCE	21.6%	3.1%	23.1%	21.9%
% moles TCE	33.8%	39.2%	28.4%	34.8%
% moles cis-1,2-DCE	44.5%	48.3%	48.1%	42.7%
% moles trans-1,2-DCE	0.1%	9.5%	0.3%	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 15.6.3

B-3 Bioreactor Extraction Well Analytical Summary - Quarter 15

Q15		Extraction Wells							
Well ID		CS-MW16-LGR		CS-MW16-CC		B3-EXW01		B3-EXW02	
Sample Date		1/27/2011		1/27/2011		1/27/2011		1/27/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	0		0		0.14	F	0.21	F
Total Organic Carbon	mg/L	0		0		0		0	
Methane	µg/L	9		5.7		0		0	
Ethene	µg/L	0		0		0		0	
Ethane	µg/L	0		0		0		0	
Carbon Dioxide	µg/L	46,300		36,200		38,300		45,600	
Sulfate	mg/L	17.1		65.6		10.0		13.1	
Chloride	mg/L	10.6		18.1		11.5		12.5	
Ferrous Iron	mg/L	0		0.22	F	0		0.45	F
Manganese	µg/L	0		0		0		0	
Hydrogen	nM	2.5							
Total Dissolved Solids	mg/L	328		397		330		329	
Benzene	µg/L	0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0	
Bromoform	µg/L	0		0		0		0	
Chloroform	µg/L	0.16	F	0		0.24	F	0.17	F
Dibromochloromethane	µg/L	0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0.39	F	0.36	F	0	
Dichloroethene, cis-1,2-	µg/L	216		34		280		115	
Dichloroethene, trans-1,2-	µg/L	0.42	F	6.6		1.9		1.3	
Methylene chloride	µg/L	0		0		0		0	
Naphthalene	µg/L	0		0		0		0	
Tetrachloroethene	µg/L	180		3.7		230		101	
Toluene	µg/L	0		0		0		0	
Trichloroethene	µg/L	222		37		224		127	
Vinyl chloride	µg/L	0		0		0		0	
Arsenic	µg/L	0		0		0		0	

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

Table 15.7.3

B-3 Bioreactor UGR Well Analytical Summary - Quarter 15

Q15		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		1/20/2011		1/20/2011		1/20/2011		1/20/2011		1/20/2011		1/20/2011	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Methane	µg/L	7,380		4,050		0.70	F	0		0.80	F	6,390	
Ethene	µg/L	6.9		1.2	F	0		0		0		11.3	
Ethane	µg/L	2.0		2.3		0		0		0		3.5	
Carbon Dioxide	µg/L	243,000		186,000		86,900		54,300		92,300		191,000	
Ferrous Iron	mg/L	0		0.64	F	0.27	F	0.52	F	0.53	F	1.3	
Manganese	µg/L	118		145		109		11		49		513	
Total Dissolved Solids	mg/L	469		481		442		354		410		483	
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		0		0		0.42	F	0		0	
Dichloroethene, cis-1,2-	µg/L	51		1.7		58		279		7.3		83	
Dichloroethene, trans-1,2-	µg/L	2.2		2.2		2.0		1.1		0		3.1	
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.24	F	0		18		36		10		0.30	F
Toluene	µg/L	0.26	F	0.26	F	0.81	F	0		0.41	F	0.55	F
Trichloroethene	µg/L	0.69	F	0		13		39		3.6		0.23	F
Vinyl chloride	µg/L	41		3.4		0		0.67	F	0		43	
Arsenic	µg/L	0		0		0		0		0		0	

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