CSSA B-3 BIOREACTOR OPERATIONS
PERFORMANCE STATUS REPORT
(QUARTER 7, MONTHS 19 – 21, NOVEMBER, 2008 – JANUARY, 2009)

APRIL 13, 2009

This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from November 1, 2008 through January 31, 2009; comprising the seventh 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 2008 are attached for reference. Parsons site personnel working on this project during the reporting period include Ken Rice, Kyle Caskey, Samantha Elliott, Eric Tennyson, Adrien Lindley, Julie Bouch, Michael Zugelder, and Edward Galbavy.

Executive Summary

Site conditions were cool and dry through the quarter with less than 1 inch of precipitation (0.82 inches). Injection of extracted groundwater continued through the quarter. The few interruptions resulted from ground water levels reaching the automatic cut-off water levels in the extraction wells. Approximately 12,619,264 gallons of groundwater extracted from CS-MW16-LGR and CS-MW16-CC have been injected into bioreactor trench 1 since the start of injection. A total of 2,095,566 gallons of extracted groundwater from wells CS-MW16-LGR and CS-MW16-CC were injected into the bioreactor during quarter 7. The majority of extracted groundwater, ~1,300,000 gallons, was from the CS-MW16-CC well, while ~796,000 gallons were extracted from the CS-MW16-LGR well. By letter dated July 31, 2008, the TCEQ authorized CSSA's request for reduced data collection and reporting requirements on the SWMU B-3 Bioreactor Class V Underground Injection Control (UIC) permit. The UIC reporting requirements are now on a semi-annual basis with the next report due June, 2009. The UIC report containing Quarter 5 and 6 data was delivered to the TCEQ on December 3, 2008.

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 conductive to dechlorination of CAHs within the trenches;
- Production of methane indicating that fermentation is occurring; and
- Hydrogen concentrations are greater than 1.0 nanomoles per liter (nmol/L), indicating that there is sufficient electron donor present to stimulate anaerobic dechlorination of CAHs.

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

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

Evidence for the existence of an abiotic reductive dechlorination is the presence of reduced iron [Fe(II)] and trans-DCE in trench 1. 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 7 analytical results from monitoring of the bioreactor sumps indicate that the SWMU B-3 trenches contain significant levels of *cis*-DCE as well as concentrations of other dechlorination products (e.g., VC, ethene). In addition, minor amounts of toluene, and other fuel related compounds were identified during monitoring of bioreactor trench 1 sumps during the quarter. A summary of the analytical data collected for the reporting period is included in Table 1. A summary of monthly and quarter 7 monitoring results from the surrounding wells and 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 analysis from monitoring data indicate that groundwater from the uppermost saturated zones of the Westbay® wells CS-WB05, CS-WB07, and CS-WB08 contain < 100 micrograms per liter (µg/L) of PCE, TCE, and *cis*-DCE and groundwater from CS-MW16-LGR and the uppermost saturated zones of CS-WB06 contain > 100 micrograms per liter (µg/L) of PCE, TCE, and *cis*-DCE. Quarterly data from the bioreactor trench sumps indicate that contaminant mass stable or decreasing slightly, as *cis*-DCE concentrations have remained low and significant VC and ethene concentrations in the trench sumps have been maintained.

Water quality field measurements from the bioreactor sumps generally indicate that DO has risen slightly from the previous quarter (< 0.65 versus < 0.5 mg/L), ORP averages less than -245 mV, pH ~ 6.65, temperatures range from 21.3 ^{o}C to 23.7 ^{o}C, and specific conductivity ranges from 0.574 to 0.925 millisiemens per centimeter (mS/cm). Other observations regarding the data collected during this reporting period are listed below.

Through the 7th quarter, 0.82 inches of precipitation were measured at the B-3 bioreactor site. Average water thickness in Trench 1 during this period is approximately 3.3 feet.

Attached are graphs including a cumulative total volume of recovered groundwater from CS-MW16-LGR and CS-MW16-CC applied into trench 1, the B-3 Trench 1 average water thickness with rainfall data and average water applied daily to trench 1, the CVOC concentrations in CS-MW16-LGR, and the water level elevations in the defined uppermost saturated zone (zone LGR-03B) of the B-3 multi-port monitoring wells with rainfall data.

Analytical Data Observations

1. Arsenic (As) and manganese (Mn) were reported in bioreactor trench water samples at concentrations ranging from Non-Detect (ND) to 14.3 µg/L for As (MCL is 10 µg/L) and from 95.6 to 1100 µg/L for Mn (MCL is 50 µg/L). Elevated levels of Mn and As were reported in only one of the surrounding monitoring wells during this quarter (CS-B3-MW01) with a Mn of 405 µg/L, and an As of 21.6 µg/L. Elevated levels of Mn were reported in CS-WB06-UGR (1310 µg/L), and elevated levels of As were reported in CS-WB05-LGR04B (43.9 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 remain favorable, though slightly elevated DO values were reported, for the reduction of CAHs even with the increased volume of water applied via the continuous operation of the automated injection system, indicating that anaerobic reducing conditions were maintained.
3. The volatile organic compound summary for the trenches indicates a continuation of a predominately a three-component (VC, DCE isomer, and ethene) chemical composition in water collected from the trench sumps. This indicates the further reduction of contaminants along the degradation pathway toward the end product ethene. Total molar concentrations in the trench sumps remain stable or decreased slightly through the quarter. The trans-DCE isomer in trench 1 is theorized to be the result of an abiotic reductive dechlorination pathway.
4. The dissolved hydrogen concentration in trench 1 sump samples was in the range consistent with reductive dechlorination of CAHs by DHC.
5. Saturated conditions are being maintained within bioreactor Trench 1 with an average water thickness for the quarter of approximately 3.3 feet. However, pumping rates to the bioreactor have been steadily decreasing; approximately 250,000 fewer gallons were injected into the bioreactor in quarter 7 compared to quarter 6.
6. Water Supply issues – Due to continuing drought conditions and decreases in water table elevations, it is likely that the volume of injection water from CS-MW16 wells will decrease. The low-level cut-offs have been reached for both CS-MW16-CC and LGR wells, causing the extraction wells to cut out intermittently.

Anticipated Schedule for Next Period (November 2008 – January, 2009):

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Conduct monthly monitoring events in February and March (Months 22 and 23), and quarterly monitoring event in April (Month 24) for bioreactor system.
- Continue UIC monthly monitoring with semi-annual reporting due June, 2009.
- Anticipate start of new extraction well construction for delivery of additional water to the bioreactor during April 2009. Additionally, plans are being prepared to install six shallow monitoring wells near the bioreactor.
- Plans for a water pressure “tracer” test which would inject a large quantity of water into selected trenches and monitoring of water levels in trench sumps, Westbay® wells, and surrounding monitoring wells are on-going.

Specific Data Observation Notes for Attachments

- Analytical results from the B-3 Trench 1 Sump samples, shown in Table 7.1.2, present data from the quarter 7 sampling events.
- Table 7.1.1 indicates a water thickness of approximately 3.3 feet in trench 1 was maintained.
- Table 7.1.2 indicates that VC was present at moderate concentrations in trench 1 sumps (ranging from ND to 34 µg/L) and Ethene was observed in concentrations ranging from ND to 13.1 µg/L.
- Table 7.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways.
- Table 7.3.3 indicates that vinyl chloride was present (2.2 µg/L) in the sample taken from monitoring well CS-B3-MW01, which remains consistent with samples collected through the previous 16 months. Additionally, table 7.1.3 provides evidence of the biotic anerobic degradation pathway with the elevated concentrations of Mn and CO_2.
- Table 7.4.4 indicates that the *Dehalococcoides* (DHC) bacteria populations are very low or are no longer present in the trench sumps.
- The changes in molar fraction and total molar concentrations shown in graphs of quarter 7 trench 1 sumps indicate a continued reduction in contaminant mass to end products VC and ethene.
- Figure 7.2.5 shows that the water levels in Westbay wells are significantly influenced by precipitation, or lack there of, and pumping at CS-MW16-LGR.

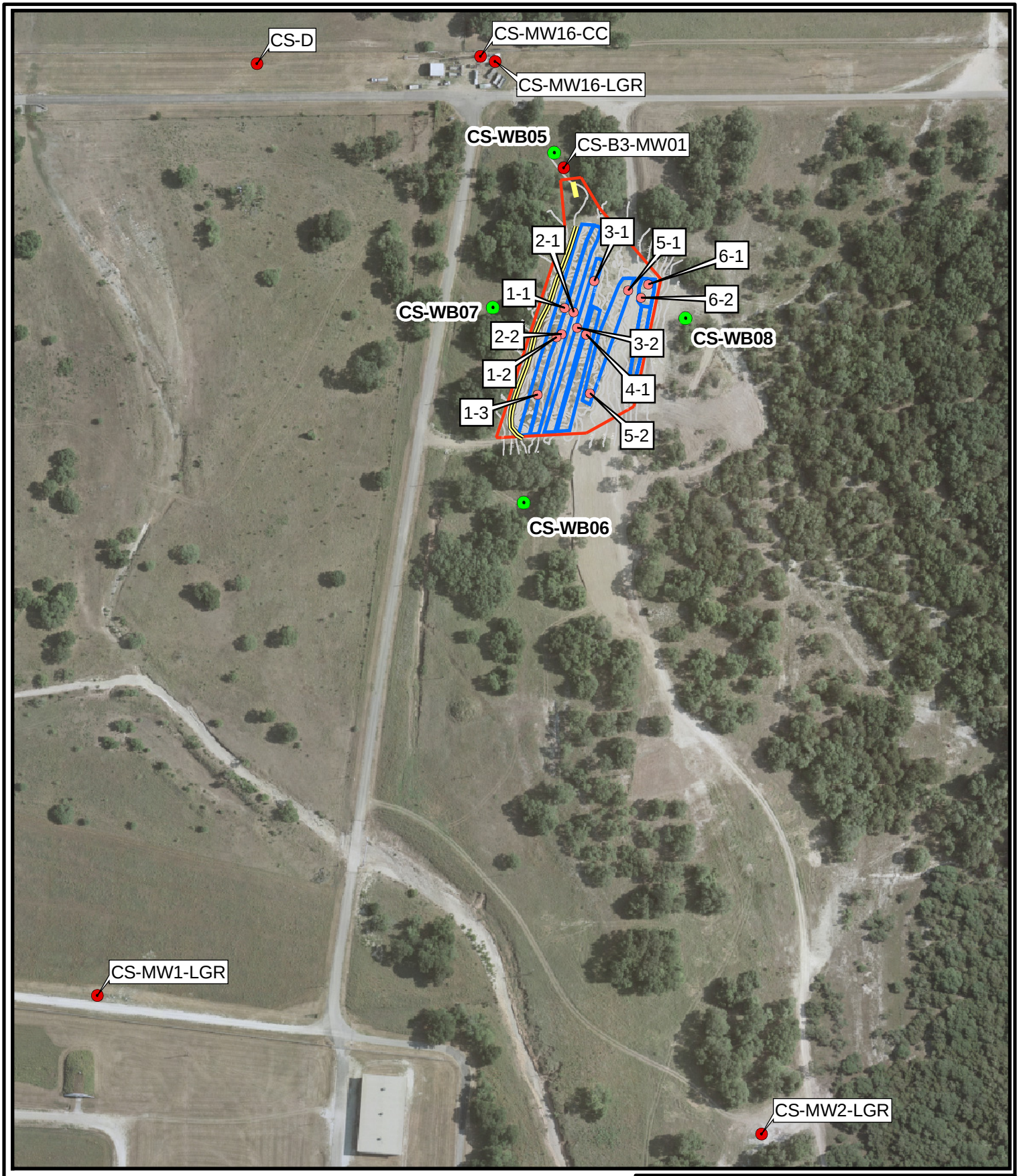

Figure 1

B-3 Bioreactor System
Camp Stanley Storage Activity

P a r s o n s

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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] (19)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monthly Sampling (20)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quarterly Sampling[b] (7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

a - Monthly sampling includes samples from B3-trench sumps, the uppermost saturated intervals of the multi-port wells (Zone 03B) and B3-UIC samples.
b - Quarterly sampling includes samples from B3-trench sumps, Monitoring Wells, and Multi-port (Westbay) wells and monthly samples.

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
Second digit (Well/Sump Sampled)	1 = Trench Sumps
	2 = Westbay Wells
	3 = Monitoring Wells
	4 = Combination of Wells and Sumps
	5 = Injection System
	6 = Extraction Wells
Third digit (Sampled for)	1 = Field Parameters
	2 = VOC Analytical Data
	3 = Other Analytical Data
	4 = Microbial Data
	5 = Applied Water Volume
	6 = System Physical Parameters
Third digit qualifier (Westbay Identifier)	a = CS-WB05
	b = CS-WB06
	c = CS-WB07
	d = CS-WB08

Table 0 **COC MCLs**

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

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 1 Sump 1-1								
Sump Depth:		12.9 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	9.54	6.51	24.28	0.886	0.58	-264.9	3.36
11/14/2008	1030	10.37	6.43	24.44	0.817	0.84	-173.8	2.53
11/18/2008	955	10.53	6.88	24.13	0.804	0.52	-249.3	2.37
11/24/2008	1030	10.75	6.41	24.35	0.99	0.65	-221.3	2.15
12/5/2008	850	10.91	6.43	23.44	0.715	0.83	-233.3	1.99
12/12/2008	1015	10.36	6.34	21.60	0.95	0.98	-245.3	2.54
12/16/2008	900	9.40	6.49	21.89	0.67	0.66	-275.6	3.50
12/23/2008	1500	8.67	6.80	21.85	0.847	1.02	-295.9	4.23
12/30/2008	900	9.15	6.88	22.16	0.591	0.45	-300.8	3.75
1/5/2009		8.85	6.60	21.92	0.862	0.88	-261.3	4.05
1/15/2009	1500	8.75	6.58	21.67	0.838	0.98	-264.6	4.15
1/21/2009	930	8.89	6.72	21.83	0.635	0.42	-218.9	4.01
1/30/2009	1000	8.80	6.51	21.59	0.902	0.40	-217.5	4.10

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 1 Sump 1-2								
Sump Depth:		12.4 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	9.07	6.67	23.40	0.827	0.54	-267.8	3.33
11/14/2008	1030	9.89	6.61	23.44	0.719	0.63	-277.5	2.51
11/18/2008	955	10.02	7.05	23.34	0.723	0.38	-279.3	2.38
11/24/2008	1030	10.10	6.60	22.73	0.939	0.60	-242	2.30
12/5/2008	850	10.48	6.60	22.26	0.703	0.73	-214.3	1.92
12/12/2008	1015	10.25	6.47	22.00	0.963	0.89	-245.1	2.15
12/18/2008	900	9.34	6.55	21.52	0.767	0.51	-272.1	3.06
12/23/2008	1500	8.39	6.83	21.83	0.898	0.95	-223.5	4.01
12/30/2008	900	8.85	6.89	21.88	0.661	0.55	-297.6	3.55
1/5/2009		8.51	6.67	21.62	0.910	0.73	-296.9	3.89
1/15/2009	1500	8.49	6.67	21.34	0.901	0.68	-251.4	3.91
1/21/2009	930	8.62	6.77	21.67	0.671	0.54	-248.4	3.78
1/30/2009	1000	8.52	6.55	21.20	0.960	0.59	-240.5	3.88

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 1 Sump 1-3								
Sump Depth:		12.85 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	8.86	6.71	23.23	0.734	0.58	-277.5	3.99
11/18/2008	1030	9.59	6.57	23.30	0.720	0.66	-219.3	3.26
11/18/2008	955	10.02	6.71	23.13	0.740	0.34	-249.9	2.83
11/24/2008	1030	9.92	6.63	22.47	0.846	0.60	-213.7	2.93
12/5/2008	850	10.51	6.57	21.95	0.652	0.77	-163.3	2.34
12/12/2008	1015	10.10	6.45	21.81	0.973	0.69	-228.3	2.75
12/18/2008	900	9.05	6.53	21.04	0.718	0.47	-242.9	3.80
12/23/2008	1500	8.28	6.84	21.43	0.747	0.85	-180.0	4.57
12/30/2008	900	8.68	6.91	21.61	0.469	0.45	-250.0	4.17
1/5/2009		9.42	6.67	21.30	0.710	0.65	-266.1	3.43
1/15/2009	1500	8.45	6.69	21.06	0.735	0.70	-253.7	4.40
1/21/2009	930	8.59	6.79	20.99	0.554	0.45	-222.5	4.26
1/30/2009	1000	8.40	6.59	21.08	0.757	0.47	-223.2	4.45

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 2 Sump 2-1								
Sump Depth:		9.67 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	9.45						0.22
11/14/2008	1030	9.47						0.20
11/18/2008	955	9.52						0.15
11/24/2008	1030	9.67						0.00
12/5/2008	850	9.63						0.04
12/12/2008	1015	9.65						0.02
12/18/2008	900	8.74	6.83	24.06	0.680	1.28	-48.1	0.93
12/23/2008	1500	8.8	7.04	23.13	0.799	1.42	-126.1	0.87
12/30/2008	900	8.84	7.21	22.62	0.510	1.91	-121.4	0.83
1/5/2009		8.58	6.81	22.41	0.759	1.42	-109.6	1.09
1/15/2009	1500	8.73	6.94	21.83	0.748	2.10	-82.9	0.94
1/21/2009	930	8.54	7.08	21.52	0.571	2.19	-78.5	1.13
1/30/2009	1000	8.66	6.89	21.22	0.796	2.01	-57.0	1.01

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 2 Sump 2-2								
Sump Depth:		10.01 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	9.78						0.23
11/14/2008	1030	10.01						0.00
11/18/2008	955	10.01						0.00
11/24/2008	1030	10.01						0.00
12/5/2008	850	10.01						0.00
12/12/2008	1015	10.01						0.00
12/18/2008	900	10.01						0.00
12/23/2008	1500	10.01						0.00
12/30/2008	900	10.01						0.00
1/5/2009		10.01						0.00
1/15/2009	1500	10.01						0.00
1/21/2009	930	10.01						0.00
1/30/2009	1000	10.01						0.00

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 3 Sump 3-1								
Sump Depth:		9.96 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	9.10	6.79	32.32	1.308	0.35	-261.9	0.86
11/14/2008	1030	9.12	6.80	31.86	1.187	0.42	-236.0	0.84
11/18/2008	955	9.13						0.83
11/24/2008	1030	9.15						0.81
12/5/2008	850	9.12						0.84
12/12/2008	1015	9.15						0.81
12/18/2008	900	9.16						0.80
12/23/2008	1500	9.21						0.75
12/30/2008	900	9.24						0.72
1/5/2009		9.23						0.73
1/15/2009	1500	9.27						0.69
1/21/2009	930	9.28	6.73	27.2	0.684	1.14	-99.3	0.68
1/30/2009	1000	9.28						0.68

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 3 Sump 3-2								
Sump Depth:		7.4 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	7.32						0.08
11/14/2008	1030	7.40						0.00
11/18/2008	955	7.40						0.00
10/24/2008	1030	7.40						0.00
12/5/2008	850	7.40						0.00
12/12/2008	1015	7.40						0.00
12/18/2008	900	7.40						0.00
12/23/2008	1500	7.40						0.00
12/30/2008	900	7.40						0.00
1/5/2009		7.40						0.00
1/15/2009	1500	7.40						0.00
1/21/2009	930	7.40						0.00
1/30/2009	1000	7.40						0.00

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 4 Sump 4-1								
Sump Depth:		6.32 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		*(°C)*	*(m-mho/cm)*	*(mg/L)*	*(eV)*	*(feet)*
11/5/2008	1330	6.32						0.00
11/14/2008	1030	6.32						0.00
11/18/2008	955	6.32						0.00
11/24/2008	1030	6.32						0.00
12/5/2008	850	6.32						0.00
12/12/2008	1015	6.32						0.00
12/18/2008	900	6.32						0.00
12/23/2008	1500	6.32						0.00
12/30/2008	900	6.32						0.00
1/5/2009		6.32						0.00
1/15/2009	1500	6.32						0.00
1/21/2009	930	6.32						0.00
1/30/2009	1000	6.32						0.00

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 5 Sump 5-1								
Sump Depth:		9.33 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		***(°C)***	***(m-mho/cm)***	***(mg/L)***	***(eV)***	***(feet)***
11/5/2008	1330	9.15						0.18
10/14/2008	1030	9.21						0.12
11/18/2008	955	9.23						0.10
11/24/2008	1030	9.33						0.00
12/5/2008	850	9.33						0.00
12/12/2008	1015	9.33						0.00
12/18/2008	900	9.33						0.00
12/23/2008	1500	9.33						0.00
12/30/2008	900	9.33						0.00
1/5/2009		9.33						0.00
1/15/2009	1500	9.33						0.00
1/21/2009	930	9.33						0.00
1/30/2009	1000	9.33						0.00

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 5 Sump 5-2								
Sump Depth:		7.98 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		***(°C)***	***(m-mho/cm)***	***(mg/L)***	***(eV)***	***(feet)***
11/5/2008	1330	7.89						0.09
11/14/2008	1030	7.90						0.08
11/18/2008	955	7.92						0.06
11/24/2008	1030	7.98						0.00
12/5/2008	850	7.98						0.00
12/12/2008	1015	7.98						0.00
12/18/2008	900	7.98						0.00
12/23/2008	1500	7.98						0.00
12/30/2008	900	7.98						0.00
1/5/2009		7.98						0.00
1/15/2009	1500	7.98						0.00
1/21/2009	930	7.98						0.00
1/30/2009	1000	7.98						0.00

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 6 Sump 6-1								
Sump Depth:		11.45 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		***(°C)***	***(m-mho/cm)***	***(mg/L)***	***(eV)***	***(feet)***
11/5/2008	1330	11.08						0.37
11/14/2008	1030	11.05						0.40
11/18/2008	955	11.05						0.40
11/24/2008	1030	11.01						0.44
12/5/2008	850	11.06						0.39
12/12/2008	1015	11.05						0.40
12/18/2008	900	11.06						0.39
12/23/2008	1500	11.03						0.42
12/30/2008	900	11.02						0.43
1/5/2009		11.04						0.41
1/15/2009	1500	11.02						0.43
1/21/2009	930	10.98						0.47
1/30/2009	1000	10.98						0.47
.								

NA = Not Available

Table 7.1.1 SWMU B-3 Bioreactor Trenches - Field Measurement Data - Quarter 7

TRENCH 6 Sump 6-2								
Sump Depth:		12.34 *feet BTOC*						
Sample Date	**Sample Time**	**Sump H_20 Level**	**pH**	**Temperature**	**Specific Conductivity**	**Dissolved Oxygen**	**ORP**	**Sump H_20 Thickness**
		(feet BTOC)		***(°C)***	***(m-mho/cm)***	***(mg/L)***	***(eV)***	***(feet)***
11/5/2008	1330	11.98						0.36
11/14/2008	1030	11.93						0.41
11/18/2008	955	11.94						0.40
11/24/2008	1030	11.94						0.40
12/5/2008	850	11.91						0.43
12/12/2008	1015	11.9						0.44
12/18/2008	900	11.9						0.44
12/23/2008	1500	11.88						0.46
12/30/2008	900	11.84						0.50
1/5/2009		11.58						0.76
1/15/2009	1500	11.84						0.50
1/21/2009	930	11.8						0.54
1/30/2009	1000	11.84						0.50

NA = Not Available

Table 7.1.2 SWMU B-3 Trench 1 and 2 Quarter 7 - VOC Analytical Summary Table

Q5	B3 T1-1			B3 T1-2			B3 T1-3			B3 T2-1	
Date	**11/18/08**	**12/17/08**	**1/21/09**	**11/18/08**	**12/17/08**	**1/21/09**	**11/18/08**	**12/17/08**	**1/21/09**	**12/116/08**	**1/21/09**
PCE (µg/L)	0.16	9.8	3.9	0	0.64	0.26	0	0.29	0	0.79	3.5
TCE (µg/L)	0	36	11	0	3.1	1.1	0.17	0.94	0.35	6.8	1.9
cis-1,2-DCE (µg/L)	0	36	36	0	2.7	3.9	0	0.63	0.69	7.2	23
trans-1,2-DCE (µg/L)	5.7	0.24	0.6	6.2	3.9	3.4	13	8.6	11	0	0.48
Vinyl Chloride (µg/L)	15	0	6.3	1.4	22	34	5.7	19	27	0	0.47
Ethene (µg/L)	1.42	0	0	10.4	2.03	1.96	8.35	6.45	13.1	0	0
PCE (nM/L)	0.965	59.097	23.518	0.000	3.859	1.568	0.000	1.749	0.000	4.764	21.106
TCE (nM/L)	0.000	273.993	83.720	0.000	23.594	8.372	1.294	7.154	2.664	51.754	14.461
cis-1,2-DCE (nM/L)	0.000	371.325	371.325	0.000	27.849	40.227	0.000	6.498	7.117	74.265	237.236
trans-1,2-DCE (nM/L)	58.793	2.476	6.189	63.950	40.227	35.070	134.090	88.706	113.461	0.000	4.951
Vinyl Chloride (nM/L)	239.962	0.000	100.784	22.396	351.944	543.913	91.185	303.951	431.931	0.000	7.519
Ethene (nM/L)	50.624	0.000	0.000	370.766	72.371	69.875	297.683	229.947	467.023	0.000	0.000
Total Molar Conc. (nM/L)	350.344	706.891	585.536	457.113	519.844	699.025	524.252	638.005	1,022.196	130.783	285.272
% moles PCE	0.275%	8.360%	4.016%	0.000%	0.742%	0.224%	0.000%	0.274%	0.000%	3.643%	7.399%
% moles TCE	0.000%	38.760%	14.298%	0.000%	4.539%	1.198%	0.247%	1.121%	0.261%	39.573%	5.069%
% moles cis-1,2-DCE	0.000%	52.529%	63.416%	0.000%	5.357%	5.755%	0.000%	1.019%	0.696%	56.785%	83.161%
% moles trans-1,2-DCE	16.782%	0.350%	1.057%	13.990%	7.738%	5.017%	25.577%	13.904%	11.100%	0.000%	1.736%
% moles Vinyl Chloride	68.493%	0.000%	17.212%	4.900%	67.702%	77.810%	17.393%	47.641%	42.255%	0.000%	2.636%
% moles Ethene	14.450%	0.000%	0.000%	81.110%	13.922%	9.996%	56.782%	36.042%	45.688%	0.000%	0.000%
sum % moles	100.0% Month 19	100.0% Month 20	100.0% Month 21	100.0% Month 19	100.0% Month 20	100.0% Month 21	100.0% Month 19	100.0% Month 20	100.0% Month 21	100.0% Month 20	100.0% Month 21

Note: 0 sample indicates a non-detect analyte value

Q7		B3																					
Well ID		**B3 T1-1**						**B3 T1-2**						**B3 T1-3**						**B3 T2-1**			
Sample Date		**11/18/2008**		**12/17/2008**		**1/21/2009**		**11/18/2008**		**12/17/2008**		**1/21/2009**		**11/18/2008**		**12/17/2008**		**1/21/2009**		**12/16/2008**		**1/21/2009**	
Compound	**Units**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**
Dissolved Organic Carbon	mg/L	1.3	B	4.2	B	3.1		1.3	B	4.3	B	4.6		3.4	B	2.5	B	1.1		14.3		2.4	
Total Organic Carbon	mg/L	3.1	B	5.7		2.4		2.9	B	3.6	B	4.4		3.7	B	2.6	B	4.6		10.9		4.7	
Methane	µg/L	3,920		121		54.0		8,790		1,810		229		4,130		3,710		2,610		154		18.9	
Ethene	µg/L	1.42		0		0		10.4		2.03		1.96		8.35		6.45		13.1		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	321,000		136,000		27,700		254,000		221,000		29,800		225,000		191,000		57,500		122,000		10,300	
Alkalinity, Total (as CACO3)	mg/L	591		434		457		560		589		494		571		539		469		484		429	
Nitrate/Nitrite	mg/L	0		0		0		0		0.041	J	0		0		0		0.042	J	0.037	J	0.13	
Sulfate	mg/L	3.5		48.2		79.3		6.1		25.4		78.5		3.2		11.8		10.1		41.5		37.1	
Chloride	mg/L	15		14.7		14.9		14.7		14.9		15.4		14.8		15		15.1		14.1		15.6	
Ferrous Iron	mg/L	5.7		2.7		0.98	J	3.3		4.3		1.7		2.3		1		2.4		2.4		0.95	J
Manganese	µg/L	302		220		95.6		199		281		123		294		388		216		1100		182	
Hydrogen	nM/L	2.6		2.9		1.6		3.3		2.4		14		2.8		2.5		1.6		4		1.6	
Hydrogen Sulfide																							
Total Dissolved Solids	mg/L	532		435		509		482		552		526		489		474		416		538		440	
Benzene	µg/L	0		0		0		0.55		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	0		36		36		0		2.7		3.9		0		0.63	J	0.69	J	7.2		23	
Dichloroethene, trans-1,2-	µg/L	5.7		0.24	J	0.60		6.2		3.9		3.4		13		8.6		11		0		0.48	J
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.16	J	9.8		3.9		0		0.64	J	0.26	J	0		0.29	J	0		0.79	J	3.5	
Toluene	µg/L	2.9		0.18	J	0		0.86	J	1.4		0		0.7	J	1.3		0.43	J	0		0	
Trichloroethene	µg/L	0		36		11		0		3.1		1.1		0.17	J	0.94	BJ	0.35	J	6.8		1.9	
Vinyl chloride	µg/L	15		0		6.3		1.4		22		34		5.7		19		27		0		0.47	J
Arsenic	µg/L	0		3.1	J	2.6	J	0		4.2	J	0		0		5.6		0		14.3		2.5	J
Barium	µg/L	99.4		95.8		81.4		146		137		74.9		119		131		90.8		164		126	
Cadmium	µg/L	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	
Copper	µg/L	1	BJ	0		0		0		0		0		0		0		0		2.8	J	0	
Lead	µg/L	4.2	J	0		3.3	J	4.5	J	0		3.1	J	5.3		0		3.4	J	0		3.1	J
Mercury	µg/L	0		0.075	J	0.14	J	0		0.076	J	0.22		0		0.11	J	0.15	J	0.069	J	0.090	J
Nickel	µg/L	0		0		0		0		0		0		0		0		0		4.2	J	0.43	J
Zinc	µg/L	0		16.8	J	37.3	J	0		0		27.6	J	0		0		22.9	J	6.2	J	20.3	J
		Month 19		Month 20		Month 21		Month 19		Month 20		Month 21		Month 19		Month 20		Month 21		Month 20		Month 21	

Note: 0 sample indicates a non-detect analyte value

Table 7.2.3a

SWMU B-3 Bioreactor Multi-port Well CS-WB05 - Q7 Performance Data

Q7		WB05																	
Well ID		**CS-WB05-LGR01**		**CS-WB05-LGR03B**						**CS-WB05-LGR04A**		**CS-WB05-LGR04B**		**CS-WB05-BS-01**		**CS-WB05-CC-01**		**CS-WB05-CC-02**	
Sample Date		**1/26/2009**		**11/17/2008**		**12/18/2008**		**1/20/2009**		**1/26/2009**		**1/26/2009**		**1/22/2009**		**1/22/2009**		**1/22/2009**	
Compound	**Units**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**
Dissolved Organic Carbon	mg/L	0		0		1.5	B	0		0.15	J	1.0		0		0		0	
Total Organic Carbon	mg/L	0		1.8	B	3.2	B	0		0		0.48	J	0		0		0	
Methane	µg/L	174		2,770		2,110		2,250		2,700		11,900		2.7		2.91		4.69	
Ethene	µg/L	0		0		0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	42,600		42,000		30,800		11,700		30,500		136,000		3,820		9,670		10,400	
Alkalinity, Total (as CACO3)	mg/L	444		375		403		365		394		424		327		320		317	
Nitrate/Nitrite	mg/L	0.028	J	0.067	J	0		0.10		0.028	J	0.069	J	0		0		0.043	J
Sulfate	mg/L	93.5		52.4		49.7		48.7		21.5		4.0		33.6		83.6		93.3	
Chloride	mg/L	14.2		11.2		11.5		11.9		11.9		13.1		12.3		17.6		18.3	
Ferrous Iron	mg/L	0		0.17	J	0		0		0		0		0		0		0.23	J
Manganese	µg/L	0		0				0		7.6		38.6		0		0		0	
Hydrogen	nM																		
Hydrogen Sulfide																			
Total Dissolved Solids	mg/L	545		385		408		397		411		440		343		419		426	
Benzene	µg/L	0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0.34	J	0.33	J	0		0		0	
Dichloroethene, cis-1,2-	µg/L	1.6		60		63		100		410		740		18		7.4		61	
Dichloroethene, trans-1,2-	µg/L	0.30	J	4.2		5.9		13		4.2		2.3		0.50	J	0		0.91	
Methylene chloride	µg/L	0.73	J	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.83	J	0		0		0		5.9		69		0.25	J	12		5.4	
Toluene	µg/L	0		0		0.18	J	0		0.22	J	0		0		0		0	
Trichloroethene	µg/L	2.3		23		2.1		0.54	J	220		97		9.8		17		84	
Vinyl chloride	µg/L	0		0		0		0		0.81	J	1.3		0		0		0	
Arsenic	µg/L	0		0				0		3.2	J	43.9		0		0		2.8	J
Barium	µg/L	28.8		25.3				30.1		34.6		25.9		20		25.4		20.8	
Cadmium	µg/L	0		0				0		0		0		0		0		0	
Chromium	µg/L	1.4	J	9.7				5		4.2	J	1.8	J	0		5.0		0	
Copper	µg/L	0		2.4	BJ			0		0		0		0		0		0	
Lead	µg/L	2.4	J	3.1	J			2.6	J	2.9	J	2.9	J	0		0		1.8	J
Mercury	µg/L	0		0				0.10	J	0		0		0		0		0	
Nickel	µg/L	2.9	J	8.9				2.5	J	2.7	J	62		3.7	J	1.7	J	0	
Zinc	µg/L	17.4	J	0				19.4	J	20.6	J	25.9	J	17.7	J	14.2	J	16.3	J
		Q7-Month 21		Month 19		Month 20		Month 21		Q7 - Month 21		Q7 - Month 21		Q7 - Month 21		Q7 - Month 21		Q7- Month 21	

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

Note: Dry zones including LGR02 and LGR03A were not sampled during the quarterly sampling event.

Table 7.2.3b SWMU B-3 Bioreactor Multi-port Well CS-WB06 - Q7 Performance Data

Q7		WB06															
Well ID		**CS-WB06-UGR01**		**CS-WB06-LGR01**		**CS-WB06-LGR02**		**CS-WB06-LGR03A**		**CS-WB06-LGR03B**						**CS-WB06-LGR04**	
Sample Date		**1/29/2009**		**1/29/2009**		**1/29/2009**		**1/29/2009**		**11/17/2008**		**12/18/2008**		**1/21/2009**		**1/29/2009**	
Compound	**Units**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**
Dissolved Organic Carbon	mg/L	0.95		0		0		0						1.3		0.45	J
Total Organic Carbon	mg/L	0.45	J	0		0		0						2.1		0	
Methane	µg/L	1730		3.52		0		0.455						4.0		0	
Ethene	µg/L	3.35		0		0		0						0		0	
Ethane	µg/L	0		0		0		0						0		0	
Carbon Dioxide	µg/L	147,000		32,000		10,200		28,100						9,030		28,300	
Alkalinity, Total (as CACO3)	mg/L	609		415		408		412						333		363	
Nitrate/Nitrite	mg/L	0		0.34		0		0.11						0.051	J	0.95	
Sulfate	mg/L	6.0		19.6		24.3		18.4						18.3		10.3	
Chloride	mg/L	15.6		12.8		10.2		11.8						12.6		12.8	
Ferrous Iron	mg/L	0.16	J	0		0		0						0		0	
Manganese	µg/L	1310		0		0		0						0		0	
Hydrogen	nM																
Hydrogen Sulfide																	
Total Dissolved Solids	mg/L	489		391		352		364		302		361		322		356	
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		0.071	J	0		0		0		0.11	J
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	24		33		30		130		190		150		210		310	
Dichloroethene, trans-1,2-	µg/L	8.5		2.2		1.6		0.95		2.5		1.3		3.8		1.6	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.34	J	11		12		55		92		63		110		140	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0.21	J	22		14		68		110		91		130		110	
Vinyl chloride	µg/L	20		5		0		0		0		0		0.24	J	0	
Arsenic	µg/L	0		0		0		3.7	J					0		0	
Barium	µg/L	80.2		49.3		60.5		27.6						28.6		26.9	
Cadmium	µg/L	0		0		0		0						0		0	
Chromium	µg/L	4.3	J	15.9		4.2	J	3.4	J					2.0	J	3	J
Copper	µg/L	0		0		0		0						0		0	
Lead	µg/L	1.8	J	0		0		0						2.3	J	0	
Mercury	µg/L	0.078	J	0.087	J	0.09	J	0.062	J					0.11	J	0	
Nickel	µg/L	24.5		10.5		4.9	J	4.5	J					3.3	J	1.8	J
Zinc	µg/L	18.5	J	19.3	J	15.1	J	21.3	J					27.5	J	16.5	J
		Q7 - Month 21		Q7 - Month 21		Q7 - Month 21		Q7 - Month 21		Month 19		Month 20		Month 21		Q7 - Month 21	

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

Table 7.2.3c SWMU B-3 Bioreactor Multi-port Well CS-WB07 - Q7 Performance Data

Q7		WB07													
Well ID		**CS-WB07-LGR01**		**CS-WB07-LGR-02**		**CS-WB07-LGR-03A**		**CS-WB07-LGR-03B**						**CS-WB07-LGR-04**	
Sample Date		**1/27/2009**		**1/27/2009**		**1/27/2009**		**11/17/2008**		**12/18/2008**		**1/21/2009**		**1/27/2009**	
Compound	**Units**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**
Dissolved Organic Carbon	mg/L	1.5		0		0		0.43	BJ			0		0	
Total Organic Carbon	mg/L	0		0		0		2.4	B			0		0	
Methane	µg/L	0		0		3.99		5.65				10.0		0	
Ethene	µg/L	0		0		0		0				0		0	
Ethane	µg/L	0		0		0		0				0		0	
Carbon Dioxide	µg/L	15,900		8,460		17,400		7,070				12,300		12,300	
Alkalinity, Total (as CACO3)	mg/L	487		358		330		342		345		345		324	
Nitrate/Nitrite	mg/L	0		0		0		0		0		0		0.87	
Sulfate	mg/L	85.7		36.7		19.5		19.7		19.9		19.9		9.9	
Chloride	mg/L	16.4		13.0		10.0		10.7		10.4		10.4		12.0	
Ferrous Iron	mg/L	0		0		0		0		0		0		0	
Manganese	µg/L	0		0		0		0		0		0		0	
Hydrogen	nM														
Hydrogen Sulfide															
Total Dissolved Solids	mg/L	578		379		337		316		299		336		336	
Benzene	µg/L	0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0.22	J
Dibromochloromethane	µg/L	0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0.44	J
Dichloroethene, cis-1,2-	µg/L	2.0		0		22		14		22		15		300	
Dichloroethene, trans-1,2-	µg/L	0.22	J	0		0		0		0.59	J	0.28	J	2.4	
Methylene chloride	µg/L	0.62	J	0.58	J	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	1.2	J	0.82	J	5.8		0		0.53	J	0.78	J	200	
Toluene	µg/L	0		0		0		0		0		0		0	
Trichloroethene	µg/L	1.7		0		6.9		1.7		4.1		1.9		210	
Vinyl chloride	µg/L	0		0		0		0		0		0		0	
Arsenic	µg/L	0		0		0		0				0		0	
Barium	µg/L	109		92.3		33.0		26.9				32.9		28.8	
Cadmium	µg/L	0		0		0		0				0		0	
Chromium	µg/L	6.9		3.5	J	5.8		1.7	J			5.5		10.2	
Copper	µg/L	0		0		0		2.3	BJ			0		0	
Lead	µg/L	0		1.9	J	2.1	J	2.8	J			2.5	J	2.3	J
Mercury	µg/L	0.14	J	0.13	J	0.12	J	0				0.11	J	0.14	J
Nickel	µg/L	8.2		1.8	J	3.5	J	1.5	J			3.4	J	7.1	
Zinc	µg/L	21.7	J	12.4	J	14.4	J	0				22.2	J	16.0	J
		Q7 - Month 19		Q7 - Month 21		Q7 - Month 21		Month 19		Month 20		Month 21		Q7 - Month 21	

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

Q7		WB08											
Well ID		**CS-WB08-LGR01**		**CS-WB08-LGR02**		**CS-WB08-LGR03B**						**CS-WB08-LGR04**	
Sample Date		**1/28/2009**		**1/28/2009**		**11/17/2008**		**12/18/2008**		**1/20/2009**		**1/28/2009**	
Compound	**Units**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**	**Value**	**Flag**
Dissolved Organic Carbon	mg/L	0		0						1.3		0	
Total Organic Carbon	mg/L	0		0						1.1		0.53	
Methane	µg/L	0		2.10						0.404		0	
Ethene	µg/L	0		0						0		0	
Ethane	µg/L	0		0						0		0	
Carbon Dioxide	µg/L	23,200		10,800						7,580		89,000	
Alkalinity, Total (as CACO3)	mg/L	364		409						359		484	
Nitrate/Nitrite	mg/L	0		0.052	J					0.14		0.11	
Sulfate	mg/L	88.6		92						27.5		11.8	
Chloride	mg/L	10.3		11.0						10.8		15.6	
Ferrous Iron	mg/L	0		0						0		0	
Manganese	µg/L	4.1	J	13.2						0		0	
Hydrogen	nM												
Hydrogen Sulfide													
Total Dissolved Solids	mg/L	494		503		307		368		350		473	
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		0		0	
Dichloroethene, cis-1,2-	µg/L	23		25		55		46		46		58	
Dichloroethene, trans-1,2-	µg/L	1.8		0.28	J	1.0		1.3		1.1		1.4	
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	0.53	J	4.8		48		43		33		2.5	
Toluene	µg/L	0		0		0		0		0		0	
Trichloroethene	µg/L	5.4		5.6		47		47		37		2.5	
Vinyl chloride	µg/L	0		0		0		0		0		0	
Arsenic	µg/L	0		3.1	J					0		0	
Barium	µg/L	116		55.0						28.8		55.5	
Cadmium	µg/L	0		0						0		0	
Chromium	µg/L	7.7		8.4						2.9	J	1.5	J
Copper	µg/L	0		0						0		0	
Lead	µg/L	1.6	J	0						2.3	J	2.1	J
Mercury	µg/L	0		0						0.11	J	0	
Nickel	µg/L	4.5	J	3.6	J					10.70		0.49	J
Zinc	µg/L	45.8	J	20.0	J					23.3	J	22.6	J
		Q7 - Month 21		Q7 - Month 21		Month 19		Month 20		Month 21		Q7 - Month 21	

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

Note: Dry zones including UGR01 and LGR03A were not sampled during the quarterly sampling event.

Q7 **Monitoring Wells**

Well ID		CS-MW16-LGR		CS-MW1-LGR		CS-B3-MWO1		CS-MW16-CC	
Sample Date		1/20/2009		1/20/2009		1/20/2009		1/20/2009	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L	2.0		0		17.9		3.6	
Total Organic Carbon	mg/L	3.1		1.2		162		2.2	
Methane	µg/L	1.48		0		3,920		7.61	
Ethene	µg/L	0		0		0		0	
Ethane	µg/L	0		0		0		0	
Carbon Dioxide	µg/L	4,650		10,100		278,000		10.0	
Alkalinity, Total (as CACO3)	mg/L	323		276		1580		317	
Nitrate/Nitrite	mg/L	1.0		0.77		0.059	J	0.031	J
Sulfate	mg/L	17.9		13.3		3.6		58.5	
Chloride	mg/L	10.9		9.2		14.4		16.6	
Ferrous Iron	mg/L	0		0		8.8		0.27	J
Manganese	µg/L	0		1.7	J	405		0	
Hydrogen	nM	7.3		1.3		1.4		2.5	
Hydrogen Sulfide									
Total Dissolved Solids	mg/L	299		277		1480		392	
Benzene	µg/L	0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0	
Bromoform	µg/L	0		0		0		0	
Chloroform	µg/L	0.18	J	0		0		0	
Dibromochloromethane	µg/L	0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0.41	J
Dichloroethene, cis-1,2-	µg/L	150		7.2		160		44	
Dichloroethene, trans-1,2-	µg/L	0.55	J	0		0.37	J	2.4	
Methylene chloride	µg/L	0		0		0		0	
Naphthalene	µg/L	0		0		0		0	
Tetrachloroethene	µg/L	150		2.5		0		10	
Toluene	µg/L	0		0		0		0	
Trichloroethene	µg/L	160		9.4		0		54	
Vinyl chloride	µg/L	0		0		2.2		0	
Arsenic	µg/L	0		0		21.6		0	
Barium	µg/L	36.9		34.4		1230		24.2	
Cadmium	µg/L	0		0		1.2	J	0	
Chromium	µg/L	0		18.8		11		0	
Copper	µg/L	8.2		0		5.5		0	
Lead	µg/L	2.8	J	2.8	J	65.4		8.3	
Mercury	µg/L	0.13	J	0.097	J	0.12	J	0.10	J
Nickel	µg/L	0		8.9		36.9		3.4	J
Zinc	µg/L	111		13.2	J	255		137	
		Quarter 7 - Month 21		Quarter 7 - Month 21		Quarter 7 - Month 21		Quarter 7 - Month 21	

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

Table 7.4.4

SWMU B-3 Sump and Monitoring Well Microbial Data Quarter 7

Trench Sump	Sample date:	11/18/2008	12/16/2008	1/20/2009
B3 T1-1				
Dechlorinating Bacteria	units			
Dehalococcoides spp (1)	(cells/mL)			1.08E+01
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)			6.60E+00
BAV1 VC R-Dase (1)	(cells/mL)			<5.00E-01
VC R-Dase	(cells/mL)			1.21E+01
B3 T1-2				
Dechlorinating Bacteria	units			
Dehalococcoides spp (1)	(cells/mL)	1.12E+04	3.65E+01	6.79E+01
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)	6.37E+03	1.60E+01	4.77E+01
BAV1 VC R-Dase (1)	(cells/mL)	4.00E-01 (J)	<5.00E-01	<5.00E-01
VC R-Dase	(cells/mL)	1.27E+04	5.00E-01 (J)	7.60E+00
B3 T1-3				
Dechlorinating Bacteria	units			
Dehalococcoides spp (1)	(cells/mL)			2.06E+02
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)			8.70E+01
BAV1 VC R-Dase (1)	(cells/mL)			1.21E+01
VC R-Dase	(cells/mL)			2.16E+02
B3 T2-1				
Dechlorinating Bacteria	units			
Dehalococcoides spp (1)	(cells/mL)		5.40E+00	1.08E+01
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)		<5.00E-01	2.00E-01 (J)
BAV1 VC R-Dase (1)	(cells/mL)		<5.00E-01	<5.00E-01
VC R-Dase	(cells/mL)		<5.00E-01	9.00E-01

Monitoring Wells		CS-MW 16-LGR	CS-MW16-CC	CS-MW01-LGR
	Sample date:	1/20/2009	1/20/2009	1/20/2009
Dechlorinating Bacteria	units			
Dehalococcoides spp (1)	(cells/mL)	<5.00E-01	<5.00E-01	<5.00E-01
Functional Genes	units			
TCE R-Dase (1)	(cells/mL)	<5.00E-01	<5.00E-01	<5.00E-01
BAV1 VC R-Dase (1)	(cells/mL)	<5.00E-01	<5.00E-01	<5.00E-01
VC R-Dase	(cells/mL)	<5.00E-01	<5.00E-01	<5.00E-01

Table 7.5.3 SWMU B3-UIC Analytical Summary Table - Quarter 7

Q7

Well ID		B3-UIC		B3-UIC		B3-UIC	
Sample Date		11/18/2008		12/18/2008		1/21/2009	
Compound	Units	Value	Flag	Value	Flag	Value	Flag
Dissolved Organic Carbon	mg/L						
Total Organic Carbon	mg/L						
Methane	µg/L						
Ethene	µg/L						
Ethane	µg/L						
Carbon Dioxide	µg/L						
Alkalinity, Total (as CACO3)	mg/L						
Nitrate/Nitrite	mg/L						
Sulfate	mg/L						
Chloride	mg/L						
Ferrous Iron	mg/L						
Manganese	µg/L						
Hydrogen	nM						
Hydrogen Sulfide							
Total Dissolved Solids	mg/L	343		378		345	
Benzene	µg/L	0		0		0	
Bromodichloromethane	µg/L	0		0		0	
Bromoform	µg/L	0		0		0	
Chloroform	µg/L	0		0		0	
Dibromochloromethane	µg/L	0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0	
Dichloroethene, cis-1,2-	µg/L	84		68		77	
Dichloroethene, trans-1,2-	µg/L	4.8		1.4		1.4	
Methylene chloride	µg/L	0		0		0	
Naphthalene	µg/L	0		0		0	
Tetrachloroethene	µg/L	68		45		42	
Toluene	µg/L	0		0		0	
Trichloroethene	µg/L	92		75		78	
Vinyl chloride	µg/L	0		0		0	

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

Figures

Figure 7.1.2T1-1 B-3 Bioreactor Trench 1 Sump 1 VOC Summary through Quarter 7

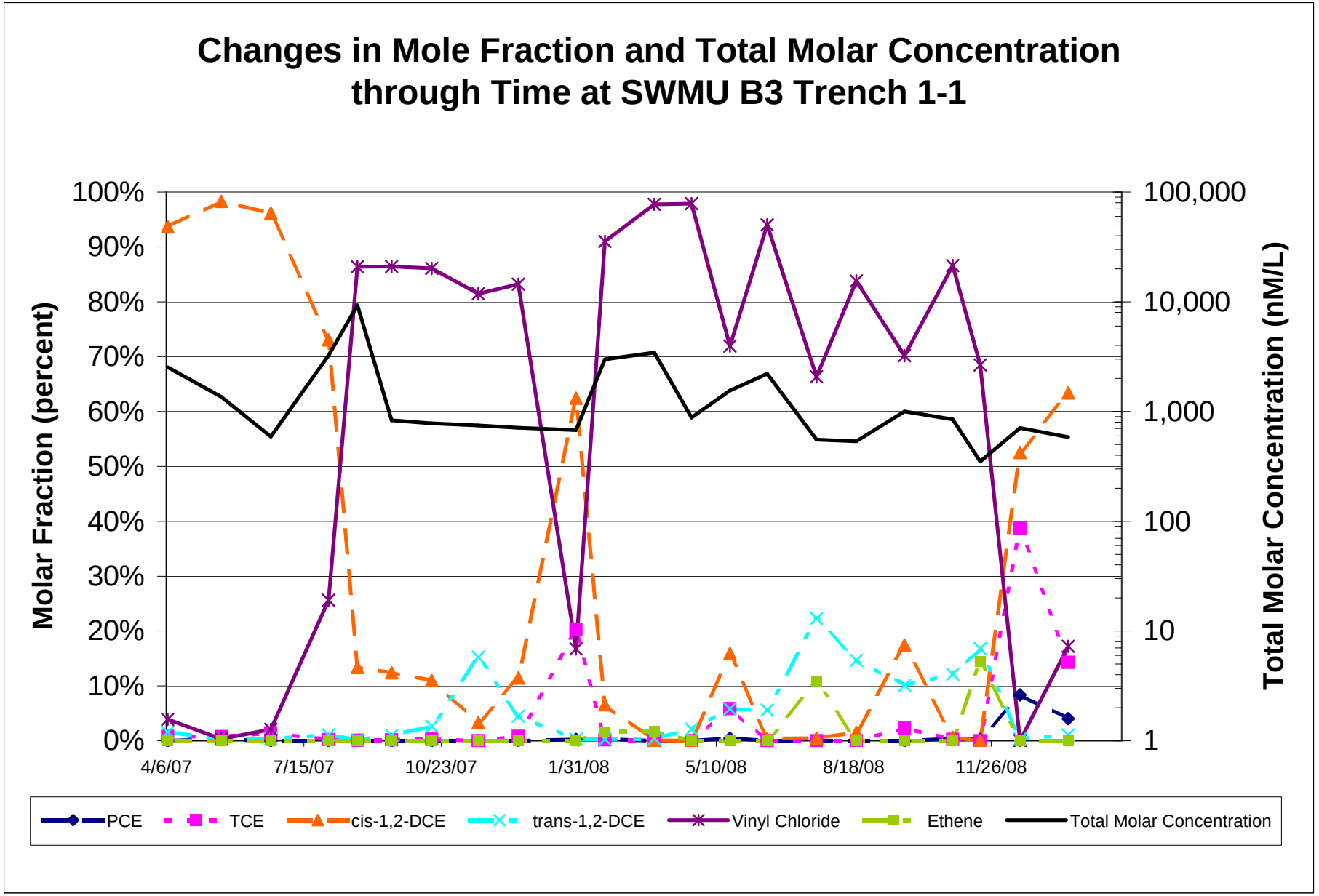

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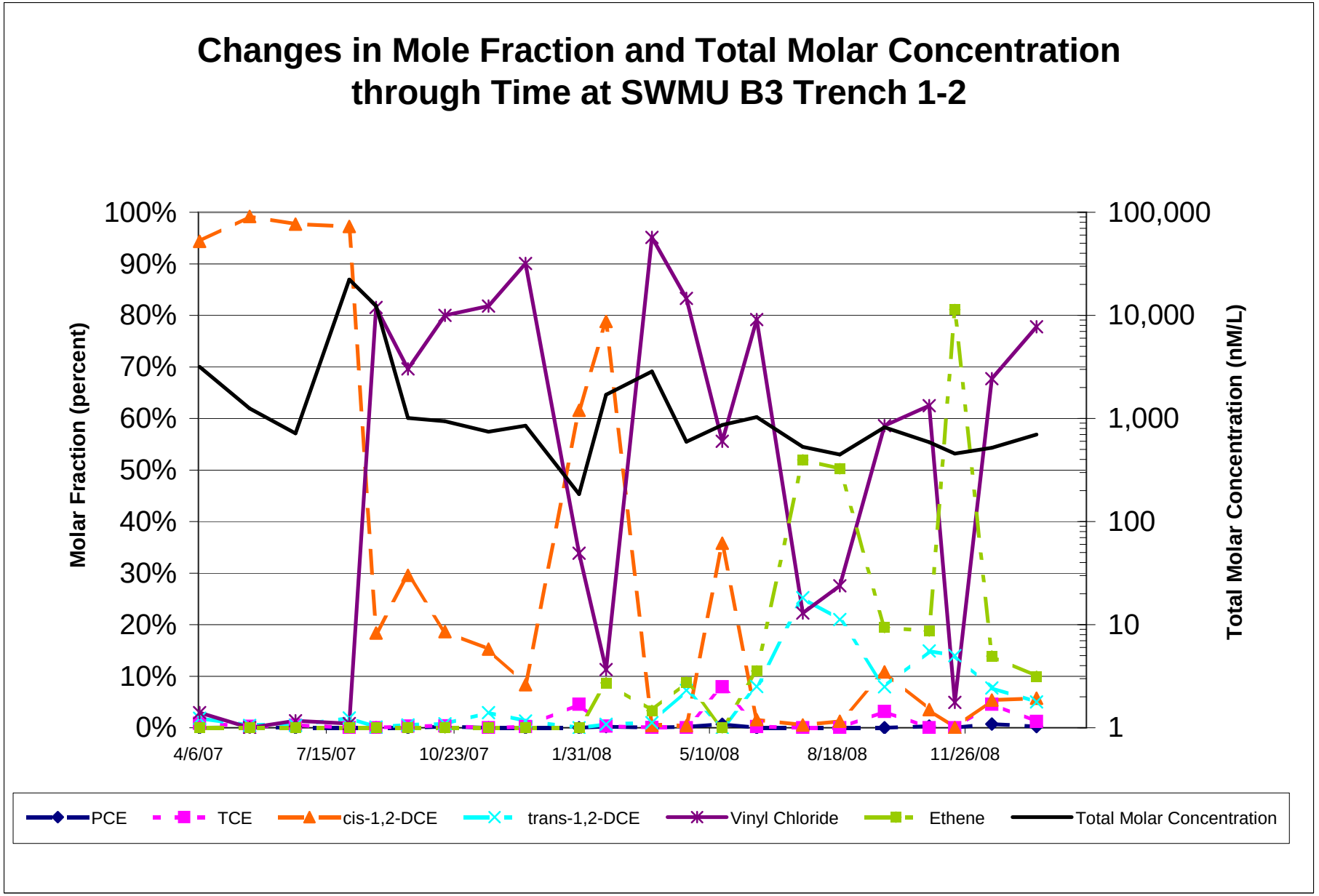
Figure 7.1.2T1-2 B-3 Bioreactor Trench 1 Sump 2 VOC Summary through Quarter 7



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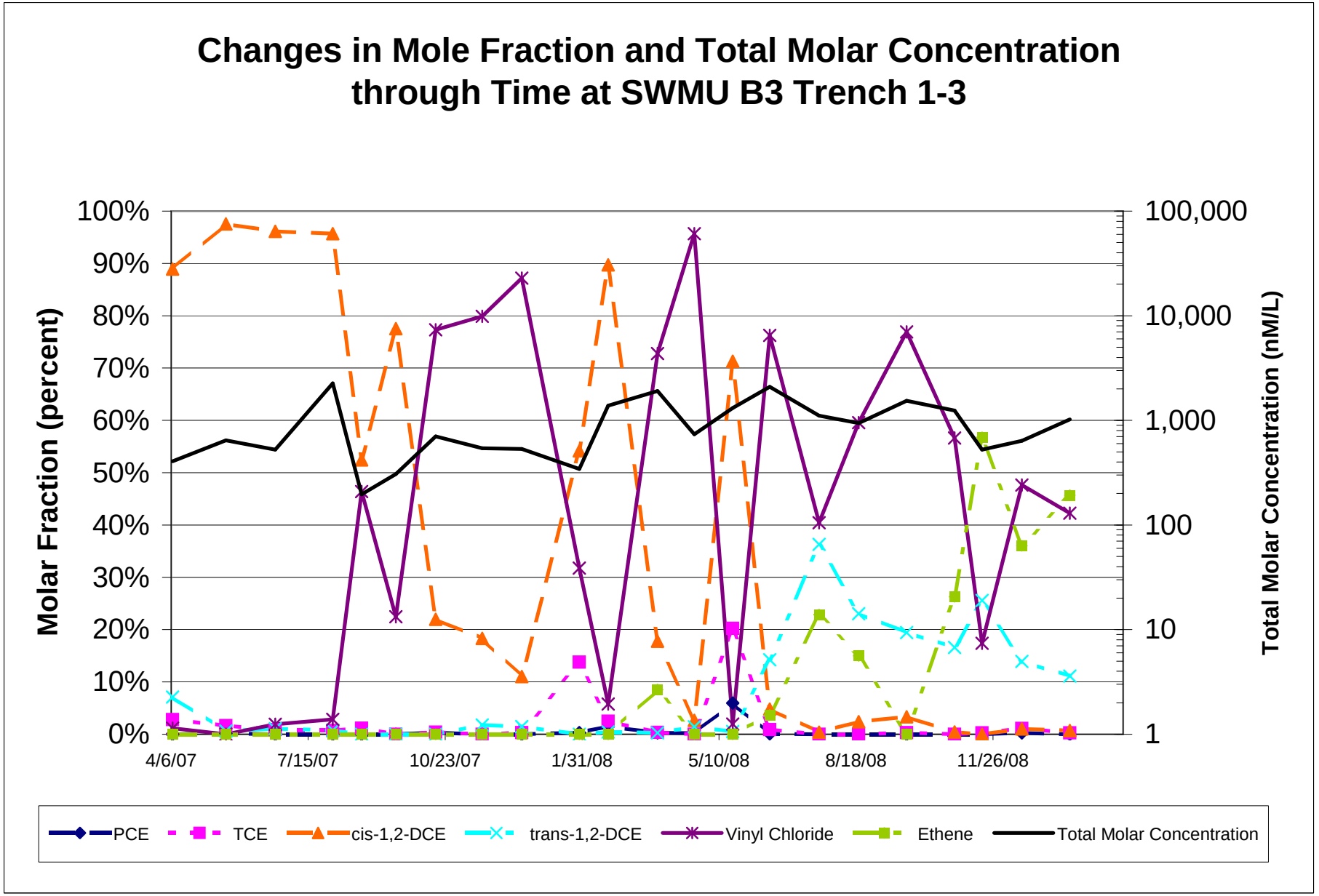
Changes in Mole Fraction and Total Molar Concentration through Time at SWMU B3 Trench 1-3
Molar Fraction (percent)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
100,000
10,000
1,000
100
10
1
Total Molar Concentration (nM/L)
4/6/07
7/15/07
10/23/07
1/31/08
5/10/08
8/18/08
11/26/08
PCE
TCE
cis-1,2-DCE
trans-1,2-DCE
Vinyl Chloride
Ethene
Total Molar Concentration

Figure 7.2.2a Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB05-LGR03B

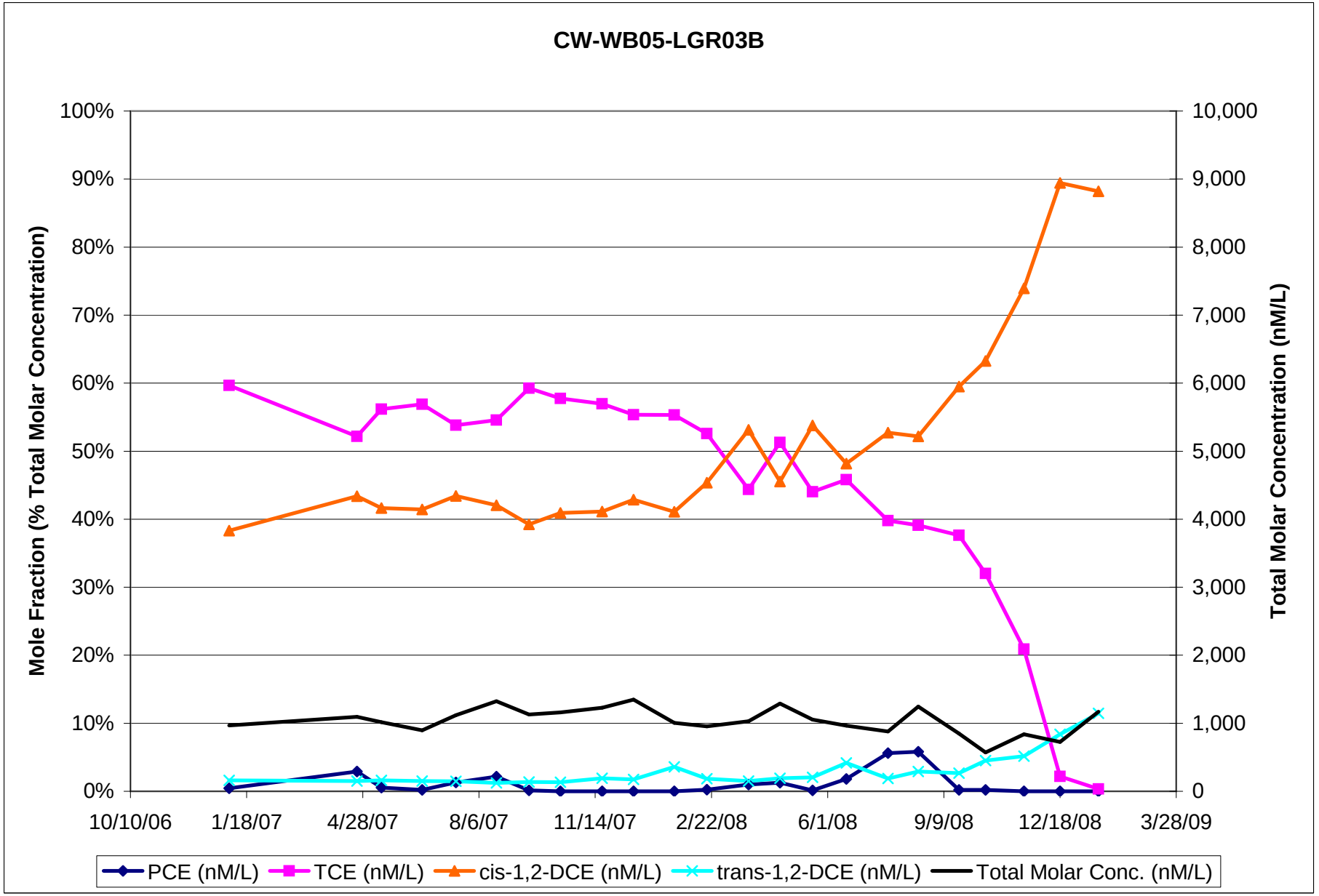

Figure 7.2.2b Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB06-LGR03B

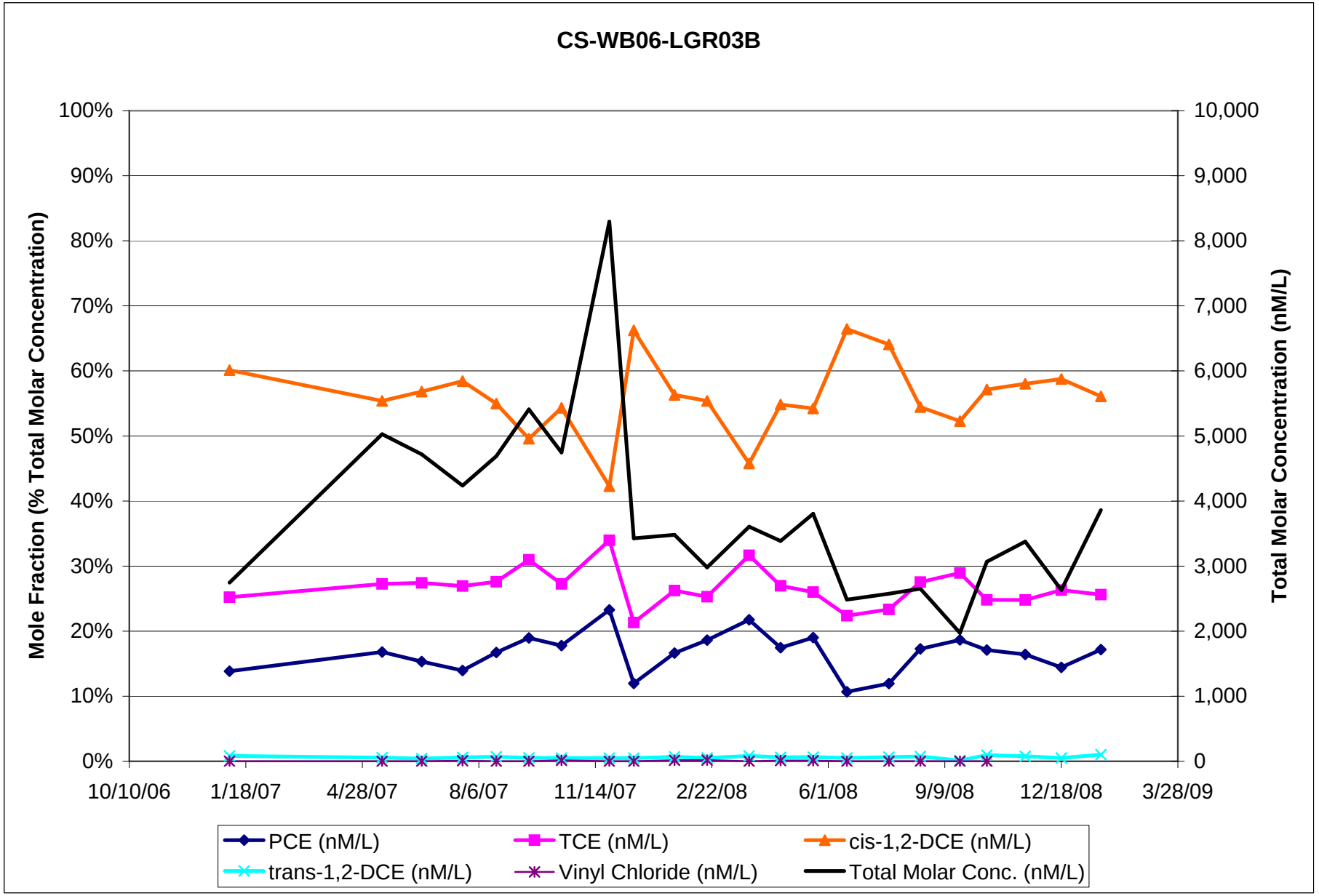

Figure 7.2.2c Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB07-LGR03B

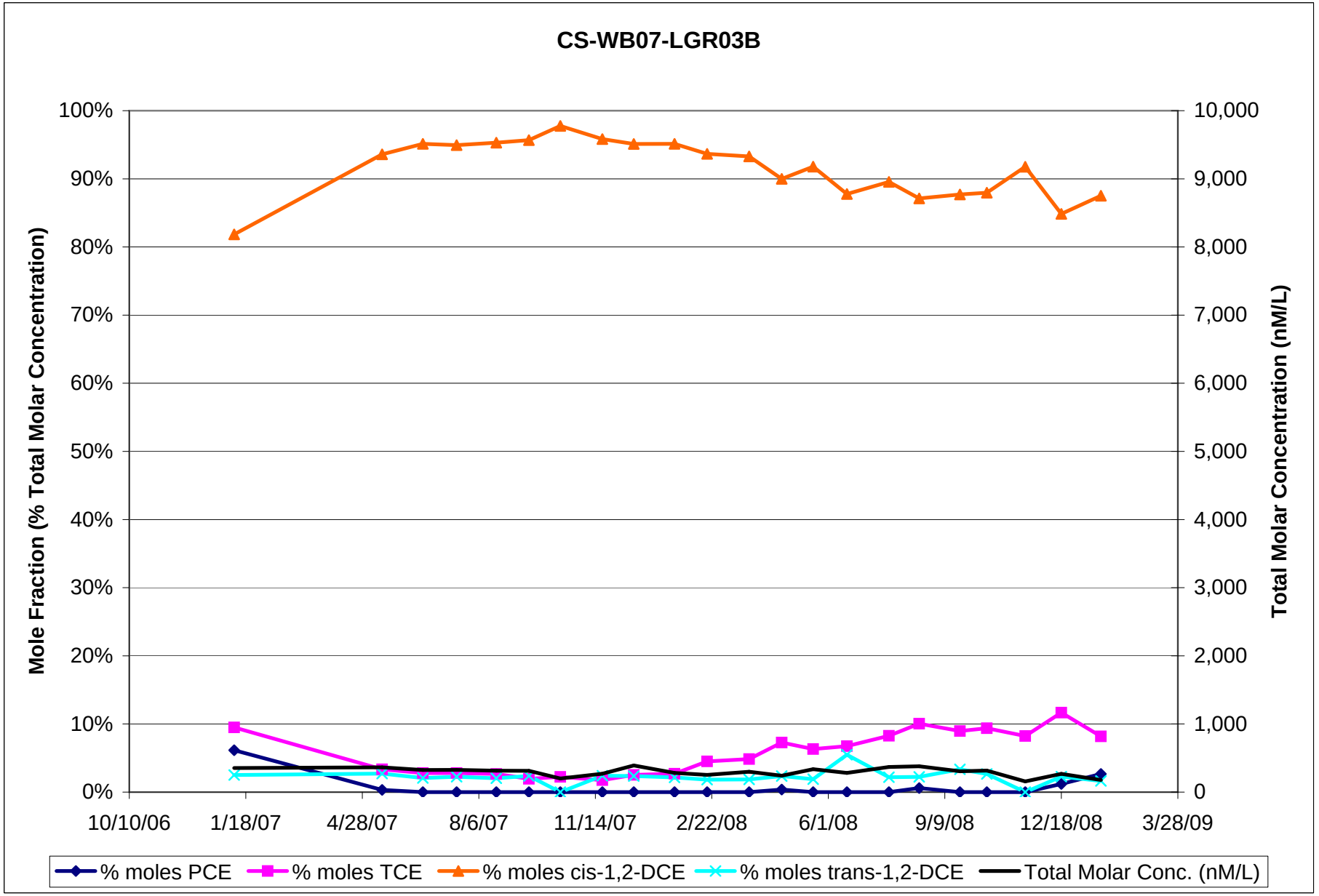

Figure 7.2.2d Changes in Mole Fraction and Total Molar Concentration through Time at CS-WB08-LGR03B

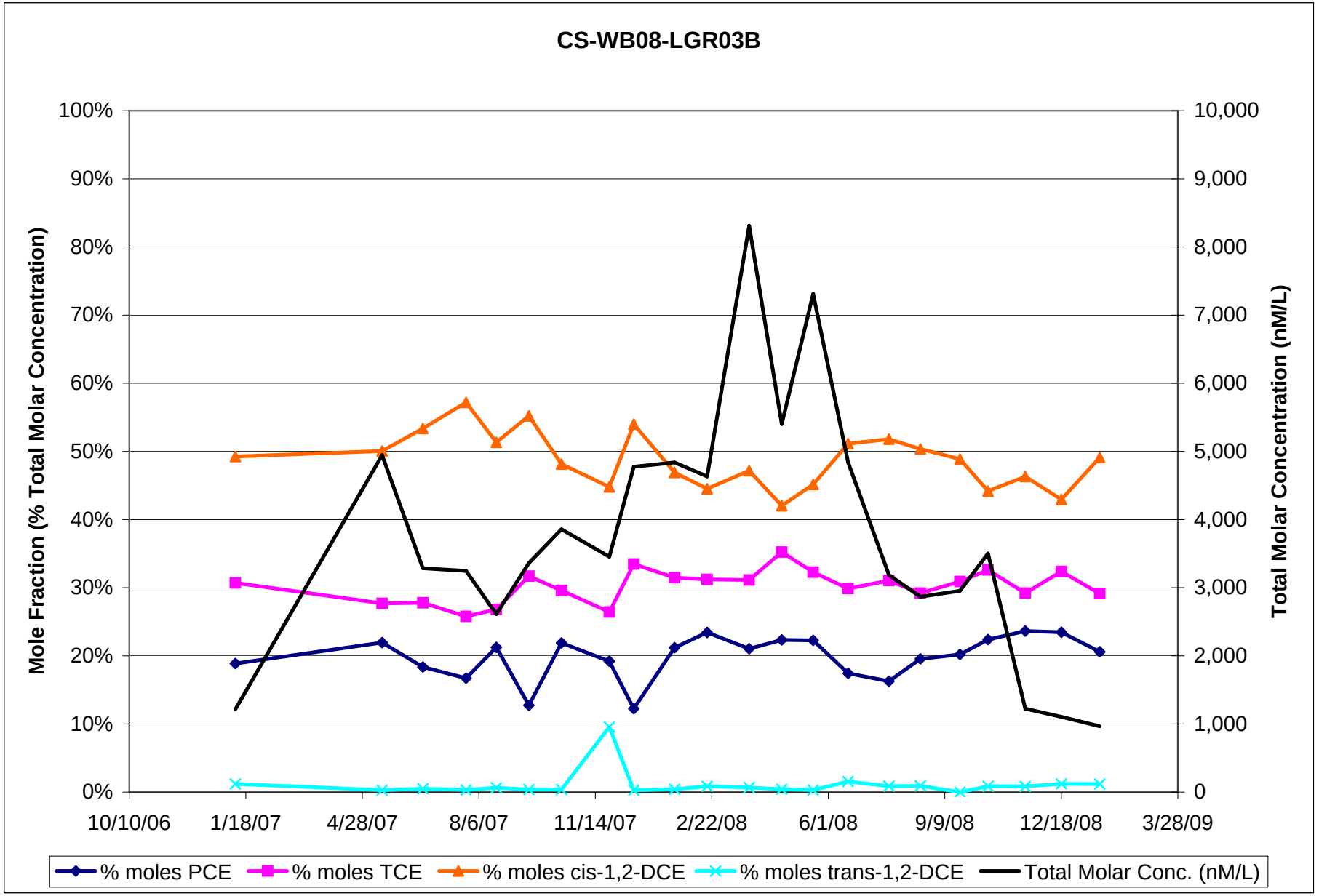

Figure 7.2.5

SWMU B-3 Multiport Monitoring Wells - Zone LGR 03B
(uppermost saturated zone) through Quarter 7

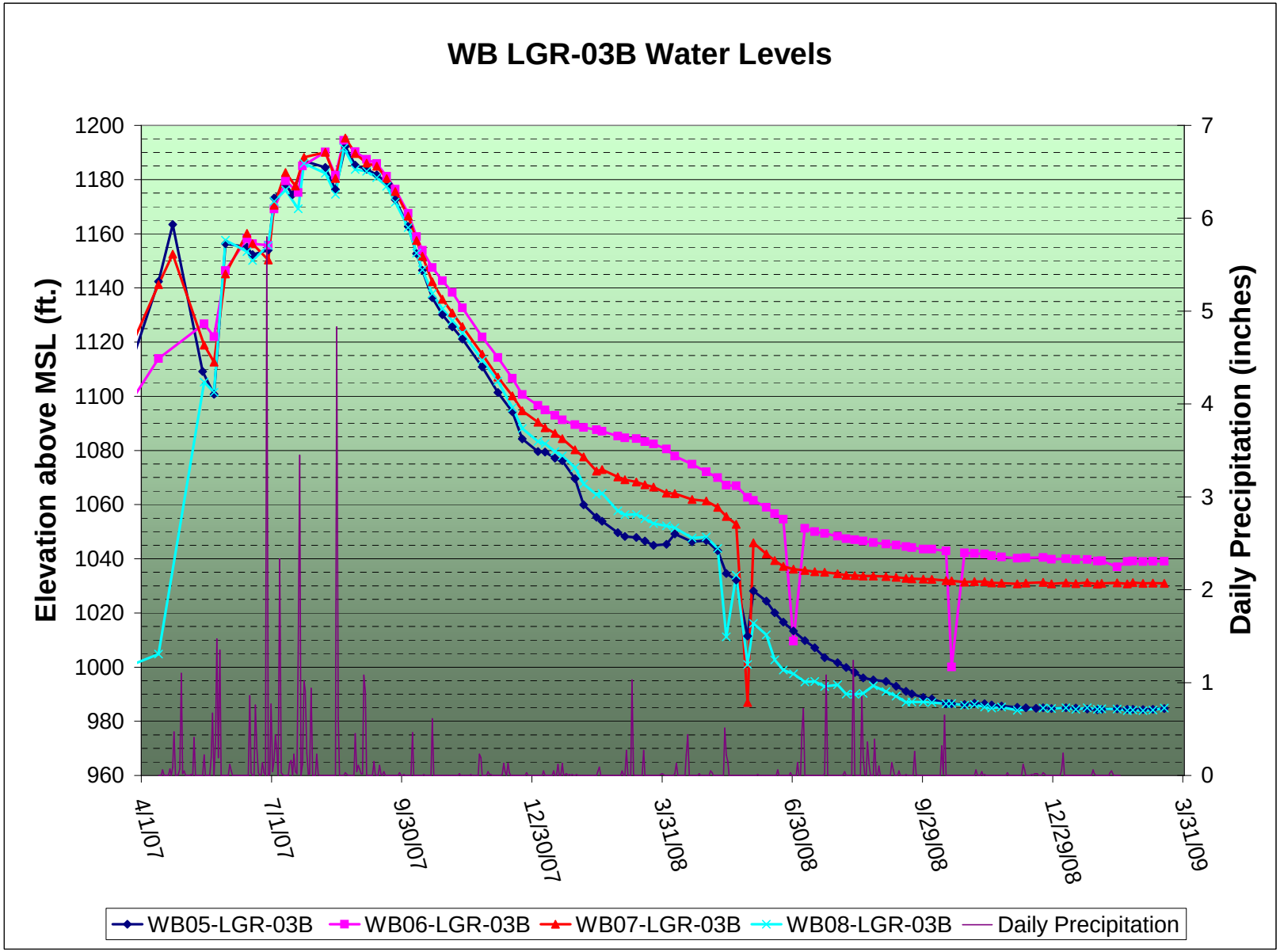

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Figure 7.5.5 Cumulative Total Groundwater from CS-MW16 LGR and CC Applied to SWMU B3 Trench 1and 2 through Quarter 7

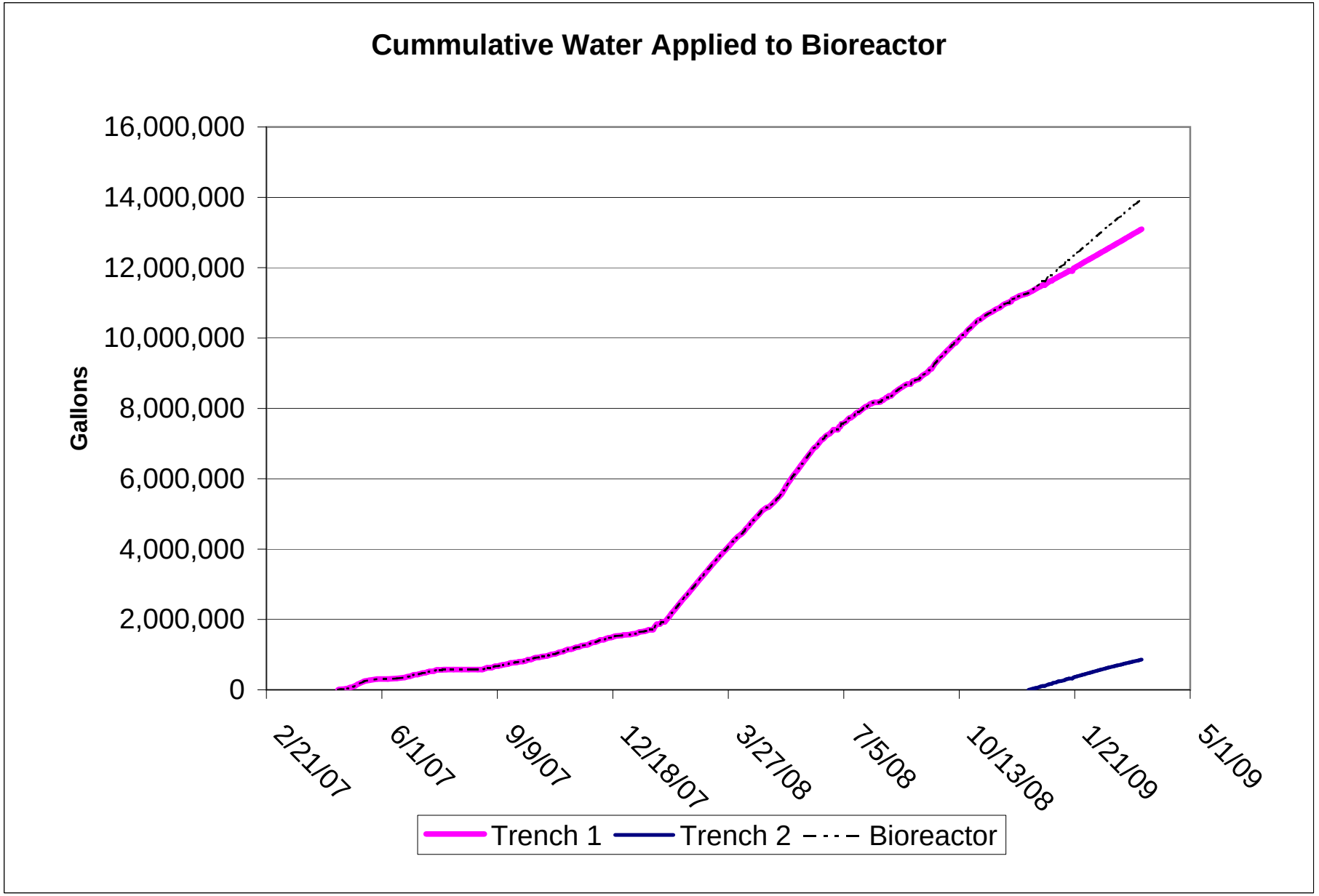
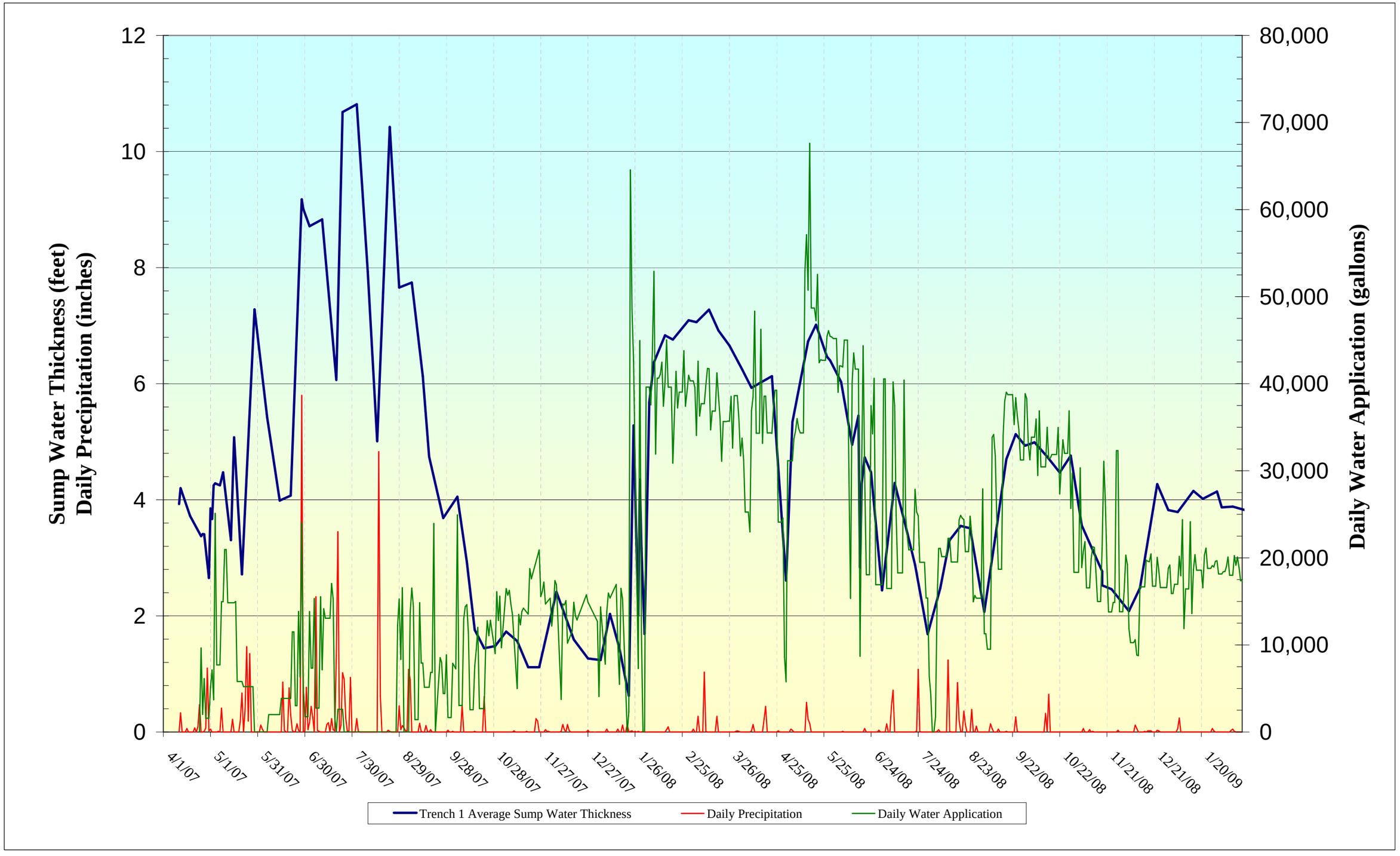


Figure 7.5.6

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



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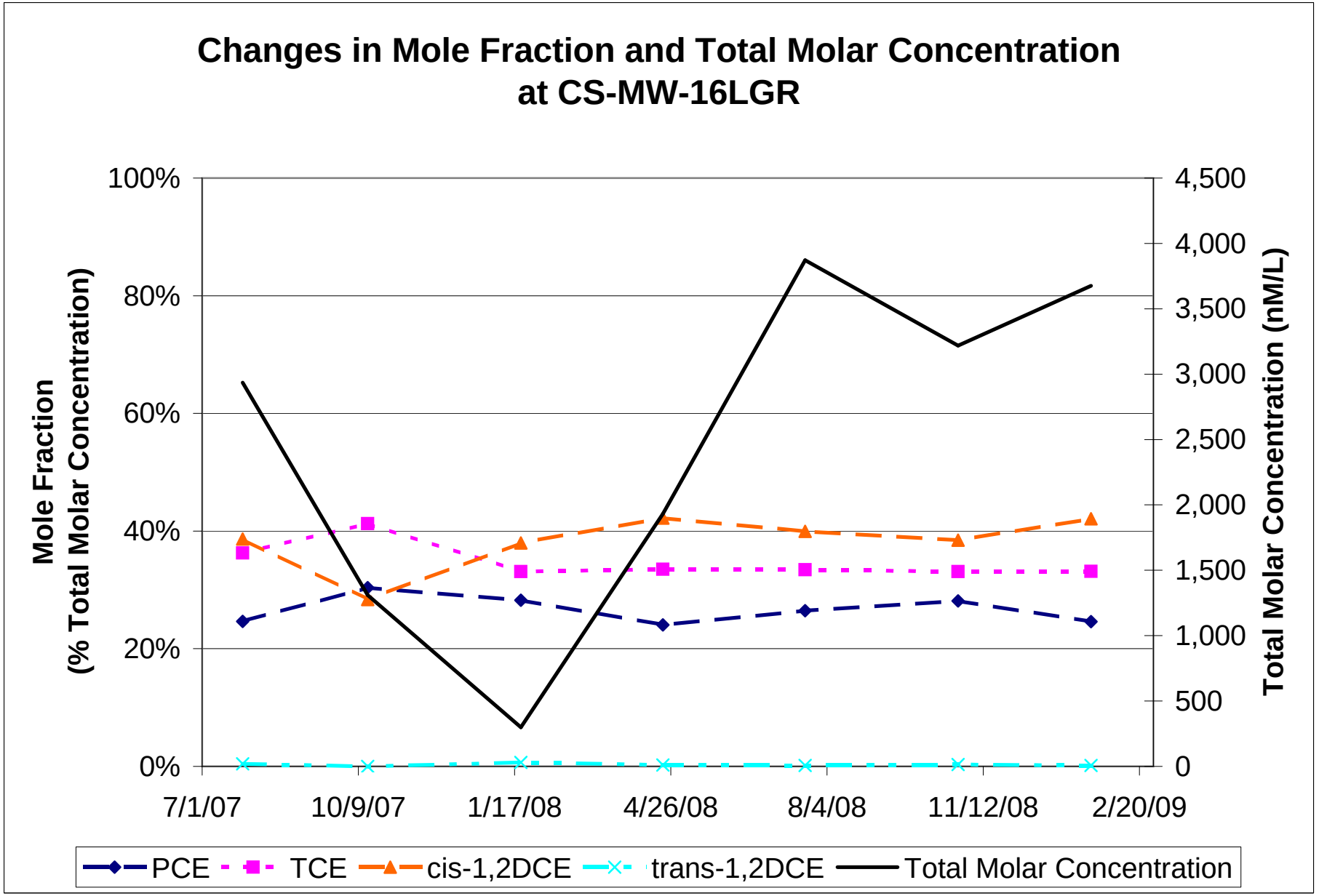
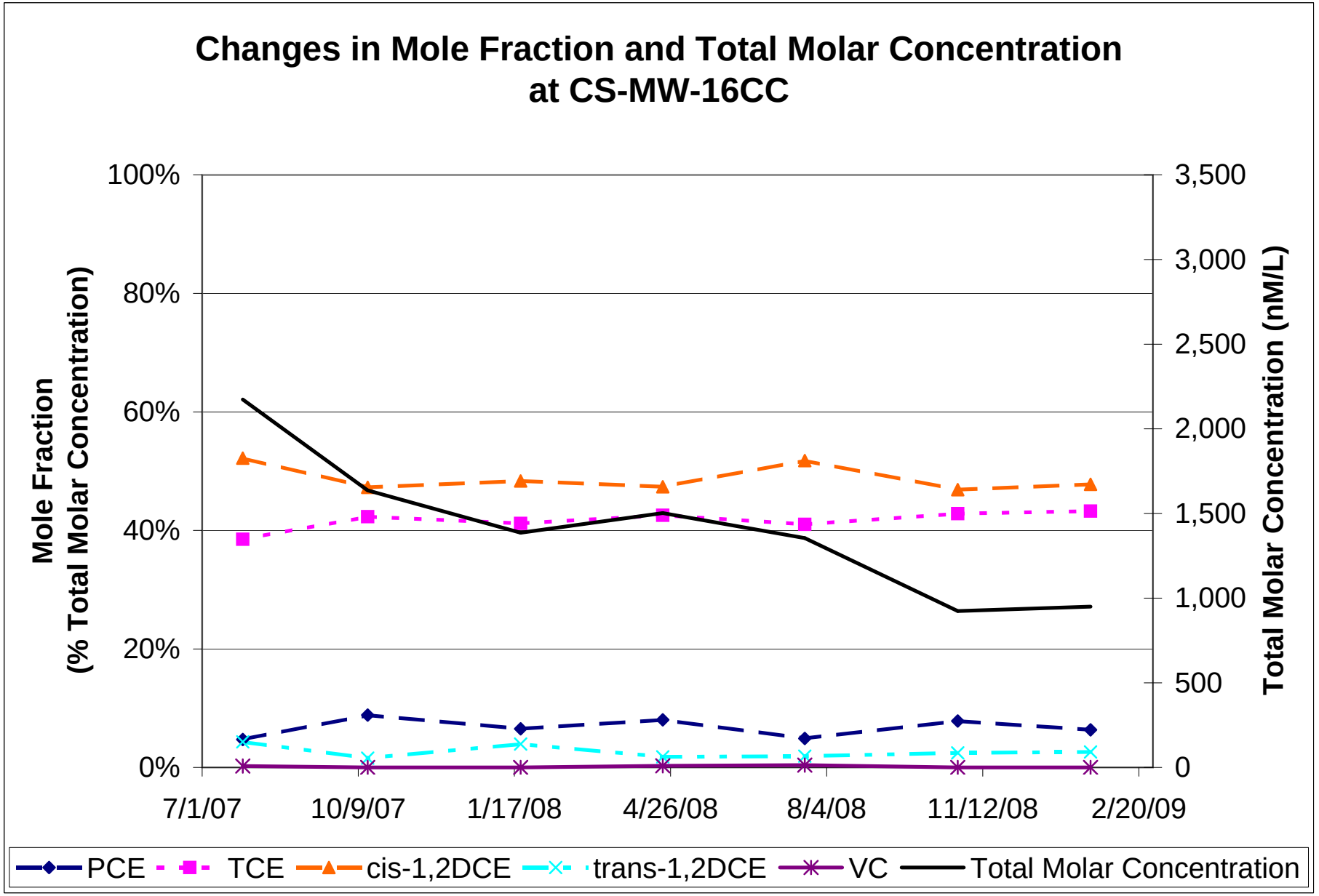

Changes in Mole Fraction and Total Molar Concentration at CS-MW-16LGR
Mole Fraction (% Total Molar Concentration)
Total Molar Concentration (nM/L)
100%
80%
60%
40%
20%
0%
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
7/1/07
10/9/07
1/17/08
4/26/08
8/4/08
11/12/08
2/20/09
PCE
TCE
cis-1,2DCE
trans-1,2DCE
Total Molar Concentration


Changes in Mole Fraction and Total Molar Concentration at CS-MW-16CC
Mole Fraction (% Total Molar Concentration)
100%
80%
60%
40%
20%
0%
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Total Molar Concentration (nM/L)
7/1/07
10/9/07
1/17/08
4/26/08
8/4/08
11/12/08
2/20/09
PCE
TCE
cis-1,2DCE
trans-1,2DCE
VC
Total Molar Concentration