

**CSSA B-3 BIOREACTOR OPERATIONS
ANNUAL PERFORMANCE STATUS REPORT
(QUARTER 37 – QUARTER 40, MAY 2016 – APRIL 2017)**

JUNE 19, 2017

This status report summarizes the operation of a bioreactor at Solid Waste Management Unit (SWMU) B-3 from May 2016 through April 2017, comprising the tenth year of bioreactor operations and monitoring since system start-up. This status report includes descriptions of current conditions, field observations, analytical results, and an anticipated schedule of activities for the next reporting period. Analytical results from monthly and quarterly regulatory and performance sampling through April 2017 are attached for reference. Parsons personnel responsible for bioreactor operation during the reporting period include Ken Rice, Bradly Dietert, Samantha Elliott, Adrien Lindley, Elisa Rice, Richard Fincke, Fabian Bocanegra, and Scott Pearson.

Executive Summary

For the year (May, 2016 through April, 2017) a total of 36.45 inches of rain was recorded on site, 3.54 inches above average. Injection of extracted groundwater continued through the year with few interruptions. Minor interruptions include: system maintenance, reaching automatic cut-off levels in the wells and/or storage tank, and B-3 bioreactor system upgrade activities. During the reporting period, pumping at B3-EXW02, B3-EXW03, and B3-EXW05 was temporarily suspended for maintenance and electrical system issues. Well maintenance included a pump replacement at B3-EXW05. Currently, all wells are online and pumping operations at B3-EXW02, B3-EXW03, and B3-EXW05 are continuing as scheduled.

Through the reporting period, approximately 34,794,000 gallons of groundwater was extracted from CS-MW16-LGR, CS-MW16-CC, B3-EXW01, B3-EXW02, B3-EXW03, B3-EXW04, and B3-EXW05 was injected into bioreactor trenches 1 - 6. Additionally, 1,325 gallons of lactate (WilClear Plus Accelerite) were applied to bioreactor trench sumps. Five 265-gallon totes of lactate were connected to the conveyance and distribution system at the bioreactor building via an educator and applied to trenches 1 (2 totes), 6 (2 totes) and trenches 2-5 (1 tote), along with recovered groundwater from the bioreactor extraction well network.

During the reporting period, extracted groundwater was spread more or less evenly across all extraction wells; B3-EXW-01 was the most productive with ~7,537,000 gallons of groundwater extracted. Wells CS-MW16-LGR, B3-EXW-02, and B3-EXW-04 provided similar volumes with ~5,484,000, ~5,208,000, and ~6,285,000 gallons extracted, respectively. Wells CS-MW16-CC, B3-EXW-03, and B3-EXW-05 were the least productive with ~3,290,000, ~3,058,000, and ~3,933,000 gallons extracted, respectively. Since the start of normal operations approximately 192,473,900 gallons of extracted groundwater have been injected into the bioreactor.

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 sumps provide evidence that biotic and abiotic dechlorination of tetrachloroethene (PCE) and trichloroethene (TCE) is occurring. The presence of the end product ethene provides evidence that the biotic reductive dechlorination process appears to be the major degradation pathway for CAHs within trenches 1, 2, and 6. Additionally, two other degradation mechanisms, both biotic and abiotic, appear to be occurring within trenches 1 - 6.

Evidence for the existence of abiotic reductive dechlorination is indicated by the presence of reduced iron [Fe(II)] and trans-DCE in trenches 1 - 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 the reductive dechlorination of CAHs. Although evidence suggests this degradation pathway exists, it may not be a significant contributor to the overall degradation of contaminants.

CSSA is participating in a Strategic Environmental Research and Development Program (SERDP) funded program for the “Abiotic Transformation of Chloroethenes in Low Permeability Formations” (ER-2622) investigated by Dr. David Freedman of Clemson University. The overall objective of this project is to develop a protocol that can be used to estimate the contribution and impact of productive abiotic transformation processes on chlorinated ethene contaminant degradation under intrinsic or enhanced conditions. This project will evaluate naturally-occurring abiotic transformation processes and biologically-mediated abiotic degradation in fractured bedrock sites. The specific objectives are to:

1. determine if geochemical modeling can be used for identification of sites that have a high potential for abiotic transformation of chlorinated ethenes;
2. determine if laboratory studies can accurately predict the likelihood of in situ abiotic transformation of chlorinated ethenes using a protocol involving intact rock core microcosms, under conditions that simulate natural attenuation and in response to amendments;
3. determine if geophysical techniques can assess the potential for abiotic degradation based on sensitivity to magnetite and iron sulfide minerals in the rock matrix, using a protocol involving correlation of geophysical measurements and results of microcosm experiments; and
4. determine if using in situ passive vapor diffusion (PVD) samplers can greatly enhance the detection of acetylene in groundwater, the key abiotic chlorinated ethene degradation product.

As a participant, CSSA is expected to have site specific data evaluated with potential geochemical parameters identified for these abiotic processes geochemical modeling and potential new monitoring techniques identified. Data collection and evaluations are on-going and are expected to continue through next reporting year.

Summary of Bioreactor Operation

Analytical results from biannual sampling at the bioreactor sumps indicate that SWMU B-3 trenches contain a range of *cis*-DCE levels (non-detect (ND) to 102 µg/L) as well as concentrations of other dechlorination products (e.g., VC, ethene). A summary of the analytical data collected for

the reporting period (year 10) is included in Table 1. A summary of biannual 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 volatile organic carbon (VOC) analyses indicate that groundwater from the uppermost saturated zone (LGR-03B) of Westbay® wells CS-WB05, CS-WB07, and CS-WB08 contain less than 100 micrograms per liter ($\mu\text{g/L}$) of PCE, TCE, and *cis*-DCE; well CS-WB06 contains less than 100 $\mu\text{g/L}$ of PCE and TCE and greater than 100 $\mu\text{g/L}$ of *cis*-DCE. Similar analysis of groundwater from extraction wells indicate wells CS-MW16-LGR, CS-MW16-CC, B3-EXW02, B3-EXW03, B3-EXW04, and B3-EXW05 contain less than 100 micrograms per liter ($\mu\text{g/L}$) of PCE, TCE, and *cis*-DCE; well B3-EXW01 contains greater than 100 $\mu\text{g/L}$ of PCE, TCE, and *cis*-DCE.

VOC analytical results from bioreactor trench sumps samples indicate slight decreases in contaminant mass (total molar concentration) in trench sumps T1-1, T1-2, T2-1, T2-2, T4-1, and T6-1 and increases in trench sumps T1-3, T3-1, T3-2, T5-1, T5-2, and T6-2 since the last reporting period in April 2016. Over the bioreactor operational period (10 years), contaminant mass appears stable or decreasing. Currently, extracted groundwater is being applied to all six bioreactor trenches. Applications in trench 1 began in 2006 as the bioreactor became operable and has been ongoing for 10 years. Applications in trench 2 began in 2009 (eight years of application), followed by applications in trench 6 in 2010 (seven years), and trenches 3, 4, and 5 in 2016 (one full year of application).

Water quality field measurements from bioreactor trench 1 sumps indicate during the tenth year of bioreactor operations at trench 1 (established 2007) average annual values for DO, pH, ORP, and specific conductivity were 0.15 mg/L, 6.68, -45.66 mV, and 1.07 mS/cm, respectively, and temperatures ranged from $\sim 17^\circ\text{C}$ to $\sim 25^\circ\text{C}$. Other observations regarding the data collected during this reporting period are listed below.

Field measurements from trench 2 during the year include average DO, pH, ORP, and specific conductivity of 0.18 mg/L, 6.66, -35.02 mV, and 1.08 mS/cm respectively; and temperatures ranged between $\sim 20^\circ\text{C}$ to $\sim 26^\circ\text{C}$.

Field measurements from trench 3 during the year indicated average DO, pH, ORP, and specific conductivity of 0.77 mg/L, 6.71, 81.93 mV, and 0.92 mS/cm respectively; and temperatures ranged between 21°C to 25°C .

Field measurements from trench indicated average DO, pH, ORP, and specific conductivity of 0.15 mg/L, 6.56, -99.70 mV, and 1.05 mS/cm respectively; and temperatures ranged between 22°C to 25°C .

Field measurements from trench 5 during the year include average DO, pH, ORP, and specific conductivity of 0.12 mg/L, 6.57, -78.70 mV, and 0.98 mS/cm respectively; and temperatures ranged between 22°C to 25°C .

Water quality field measurements during the year of injection operations within trench 6 include average DO, pH, ORP, and specific conductivity of 0.73 mg/L, 6.68, 77.55 mV, and 0.98 mS/cm respectively; and temperatures ranged between 22°C to 25°C .

The geochemical parameters measured within each of the six trenches indicate optimal conditions exist for reductive anaerobic bioremediation of CAHs.

Ground water elevation data from the shallow UGR monitoring wells (B3-MW26-UGR – MW34) combined with similar data from the Westbay UGR zones (CS-WB06-UGR-01, CS-WB08-UGR-01) 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 ND to 70 ppb (WB08-UGR-01) with the highest levels typically found north of the bioreactor. B3-MW28, located southwest of the bioreactor, has been consistently dry and therefore was not sampled. 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 B3-MW26 and B3-MW34, while moderate reducing conditions were observed in B3-MW27, and B3-MW33, and poor reducing conditions observed in B3-MW29, B3-MW30, B3-MW31 and B3-MW32.

During the reporting period, 36.45 inches of precipitation were measured on-post. Over the year, average water thicknesses were greatest in trenches 1 and 6 (10.72 and 11.21 feet, respectively). Trenches 2, 3, 4, and 5 indicated saturated thickness of 5.11, 5.88, 5.97, and 7.16 feet within these trenches, respectively. Average water thickness results indicate saturated conditions within the bioreactor is being maintained.

Attached are graphs including: B-3 trench 1 average water thickness with rainfall data, VOC concentration summaries for extraction wells, storage tanks (UIC), trench 1 and 6 sumps, and in the defined uppermost saturated zones (zone LGR-03B) in the surrounding multi-port monitoring wells, cumulative precipitation, as well as water level elevations in the defined uppermost saturated zone (zone LGR-03B) of the B-3 multi-port monitoring wells with rainfall data.

Quarter 40 - Analytical Data Observations

1. Arsenic (As) was detected in concentrations exceeding the MCL (10 µg/L) in five Westbay well zones, CS-WB05-LGR-04B, CS-WB06-UGR-01, CS-WB06-LGR-01, CS-WB06-LGR-04, and CS-WB07-LGR-01 (20, 12, 21, 11, and 12 µg/L) during the year. Elevated levels of As were also reported in CS-B3-MW02 (13 µg/L), CS-B3-MW04 (28 µg/L), CS-B3-MW27-UGR (16 µg/L), and CS-B3-MW34-UGR (14 µg/L). Additionally, As was reported in two bioreactor trench water samples, T4-1 and T6-1, at concentrations of 20 µg/L and 11 µg/L, respectively. Manganese (Mn) was reported in bioreactor trench water samples at concentrations ranging from 15 to 1,420 µg/L (MCL is 50 µg/L). Seven of the UGR wells sampled during the year had elevated levels of Mn with concentrations ranging from 81 to 475 µg/L. Elevated levels of Mn were also reported in CS-B3-MW01 (128 µg/L), CS-B3-MW02 (50 µg/L), and CS-B3-EXW04 (648 µg/L) and elevated levels of Mn were also reported in CS-WB06-UGR-01 (483 µg/L), CS-WB07-LGR-01 (969 µg/L), CS-WB08-UGR-01 (444 µg/L), and WB08-LGR-03A (735 µg/L). All other multi-port monitoring well (MPMW) zones reported Mn and As levels below the MCL. The elevated levels are likely due to changing pH conditions of the groundwater and the reduction of naturally occurring As and Mn within the limestone media to more soluble forms. Additionally, the biotic anaerobic oxidation pathway of CAHs may also be contributing to the elevated levels of Mn within the treatment system.
2. DO and ORP values were favorable for the reduction of CAHs, and it is likely that geochemical conditions will remain favorable for continued enhanced anaerobic continue to improve as normal bioreactor operations continue.
3. The volatile organic compound summary for the trenches indicates an end-product (DCE isomer, VC, and ethene) dominated chemical composition in water. Total molar concentrations in sumps in trenches 1 and 6 have fluctuated through the year.
4. Reductive dechlorination of CAHs by microbial activity appears to be occurring as *Dehalococcoides* (DHC) bacteria counts have been identified at or above the range of biostimulated populations (1.0E +03 cell/mL) within some of the trench sumps, with

Trench 2 as the notable exception. DHC cell counts were reduced three orders of magnitude in Trench 2 from the previous year; however, this could be influenced by the management of IDW (recovered drilling fluids and well development water) associated with drilling activities which began in February of this year (2017).

5. Saturated conditions within the bioreactor were maintained through the year with an average water thicknesses ranging from 0.64 feet to 11.57 feet in trenches 1 - 6.

The reductive dechlorination end products VC, ethene, and ethane are present in samples collected from shallow UGR zone wells around the periphery of SWMU B-3 indicating the lateral influence of the bioreactor in the shallow subsurface. VC is present in samples from shallow UGR wells MW26, -27, -31, -32, -33, -34, (0.82, 3.0, 0.63, 2.8, 12, and 0.46 $\mu\text{g/L}$), and in samples from the WB06-UGR-01 (5.6 $\mu\text{g/L}$) and WB08-UGR-01 (70 $\mu\text{g/L}$) zones.

In addition to reductive dechlorination end products within the UGR, these products are also observed at depth. VC is observed in the LGR-03A, -03B, -04A, -04B, and BS-01 zones within WB05 (8.1, 10, 62, 92, and 3.4 $\mu\text{g/L}$); in the LGR-02 and -04 zones within WB06 (1.1 and 0.72 $\mu\text{g/L}$); in the LGR-01, -02, and -03B zones within WB07 (17, 5.9, and 1.1 $\mu\text{g/L}$); in the LGR-01 and -02 zones within WB08 (1.3 and 1.0 $\mu\text{g/L}$); and within B3-MW01 and B3-MW04 (129 and 4.5 $\mu\text{g/L}$). Ethene is observed within WB05-LGR-04B, WB08-UGR-01, B3-MW01, and MW27-UGR (6.6, 10, 8.2, and 2.1 $\mu\text{g/L}$). Ethane was observed within B3-MW27-UGR and B3-MW04 (3.9 and 0.90 $\mu\text{g/L}$) during this reporting period.

Recommendations

Recommendation for further treatability study actions include:

- Continue monitoring bioreactor and surrounding wells for UIC Permit and Performance parameters.

Anticipated Schedule for Next Period (May, 2017 – April, 2018):

- Continue monitoring and maintenance activities for delivery of groundwater to the bioreactor trenches.
- Conduct semi-annual monitoring events for the bioreactor system.
- Continue UIC monitoring with annual reporting due July 2018.
- Continue SCADA control and automation integration.
- Continue with SERDP investigation.

Specific Data Observation Notes for Attachments

- Table 40.1.1 presents field collected data from bioreactor trench sumps, and indicates saturated conditions were maintained during the year.
- Analytical results from the B-3 trench sump (trenches 1, 2, and 6) samples, shown in Table 40.1.2, present data from the tenth year of bioreactor operations.
- Table 40.1.2 presents the VOC concentrations from biannual samples collected in bioreactor trench sumps. These data indicate that dechlorination products are being generated within the bioreactor. VC was present at variable concentrations in trench sumps, ranging from, ND to 21 $\mu\text{g/L}$ during the year. Ethene was observed in concentrations ranging from ND to 18 $\mu\text{g/L}$.

- Table 40.1.3 indicates that Mn(II) and Fe(II) were present at concentrations consistent with alternative degradation pathways. Additionally, Table 40.1.3 provides evidence of the biotic anaerobic degradation pathway with the elevated concentrations of Mn and CO₂ and presents ethane concentrations ranging from ND to 5.5 µg/L in trenches 1-6 at various times during the year.
- Table 40.3.3 indicates that VC was present (129 µg/L) in the samples collected from monitoring well CS-B3-MW01, thus reductive dechlorination is occurring at depth, within the LGR.
- Table 40.2.3a indicates VC concentrations of 62 µg/L in WB05-LGR04A and 92 µg/L in WB05-LGR04B, suggesting a connection between this zone and CS-B3-MW01. Additionally, ethene was observed in WB05 zone LGR04B during the year at a concentration of 6.6 µg/L.
- Table 40.4.4 indicates moderate populations of *Dehalococcoides* (DHC) bacteria exist in trenches 1 - 6 and smaller populations exist at greater depths in B3-EXW-01 and CS-WB05-LGR-04B.
- Figure 40.1.2 presents the changes in molar fraction and total molar concentrations at sumps in trenches 1, 2, and 6 and indicate slight increases in contaminant mass possibly derived from less-dechlorinated (higher proportion of PCE and TCE) water provided by the extraction wells or by the initiation of injection activities within previously unused trenches. Dechlorination of VOC impacted water to VC and ethene, however, is still occurring in the trenches.
- Table 40.6.2 indicates that significant amounts of contaminant mass are being provided for injection into the bioreactor by the seven extraction wells. Parent products (PCE and TCE) make up the majority of the contaminant mass, though *cis*-DCE is also present.
- Figure 40.2.5 shows that the water levels in Westbay wells are significantly influenced by drought conditions and 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 40.7.3 indicates the presence of VC in several of the shallow UGR wells with concentrations ranging from ND to 14 µg/L. Additionally, Table 40.7.3 provides evidence of the biotic anaerobic degradation pathway as indicated by elevated concentrations of Mn and CO₂.

Analytical Summary Data

Table 1 Summary of Analysis Presented for Reporting Period

Event	VOCs	TDS	TOC	MEE & CO₂	SO₃²⁻	Chloride, Sulfate	Fe²⁺	Mn	Metals*	H⁺	DHC
Semi-Annual Sampling ^a (Quarter 38)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Semi-Annual Sampling ^a (Quarter 40)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

^a - Semi-annual sampling includes samples from B3-trench sumps, Monitoring Wells, Extraction Wells, and Multi-port (Westbay) wells.

* - Metals analyses was reduced to include only arsenic results beginning with the Month 44 sampling event.

Figures

Figure 40.1.2 T6-2

B-3 Bioreactor Trench 6 Sump 2 VOC Summary
April 2016 - April 2017

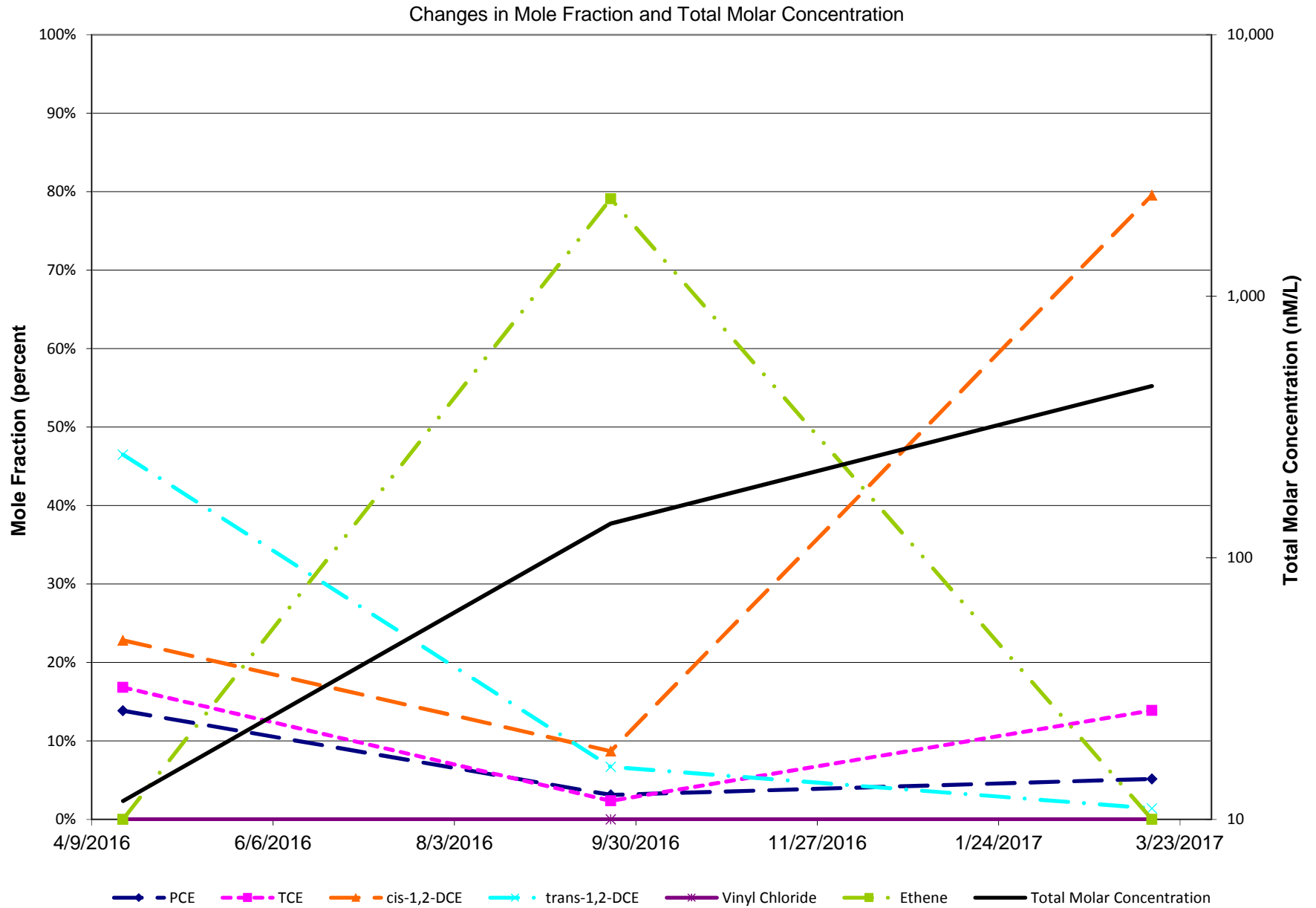


Figure 40.1.2 T6-1

B-3 Bioreactor Trench 6 Sump 1 VOC Summary April 2016 - April 2017

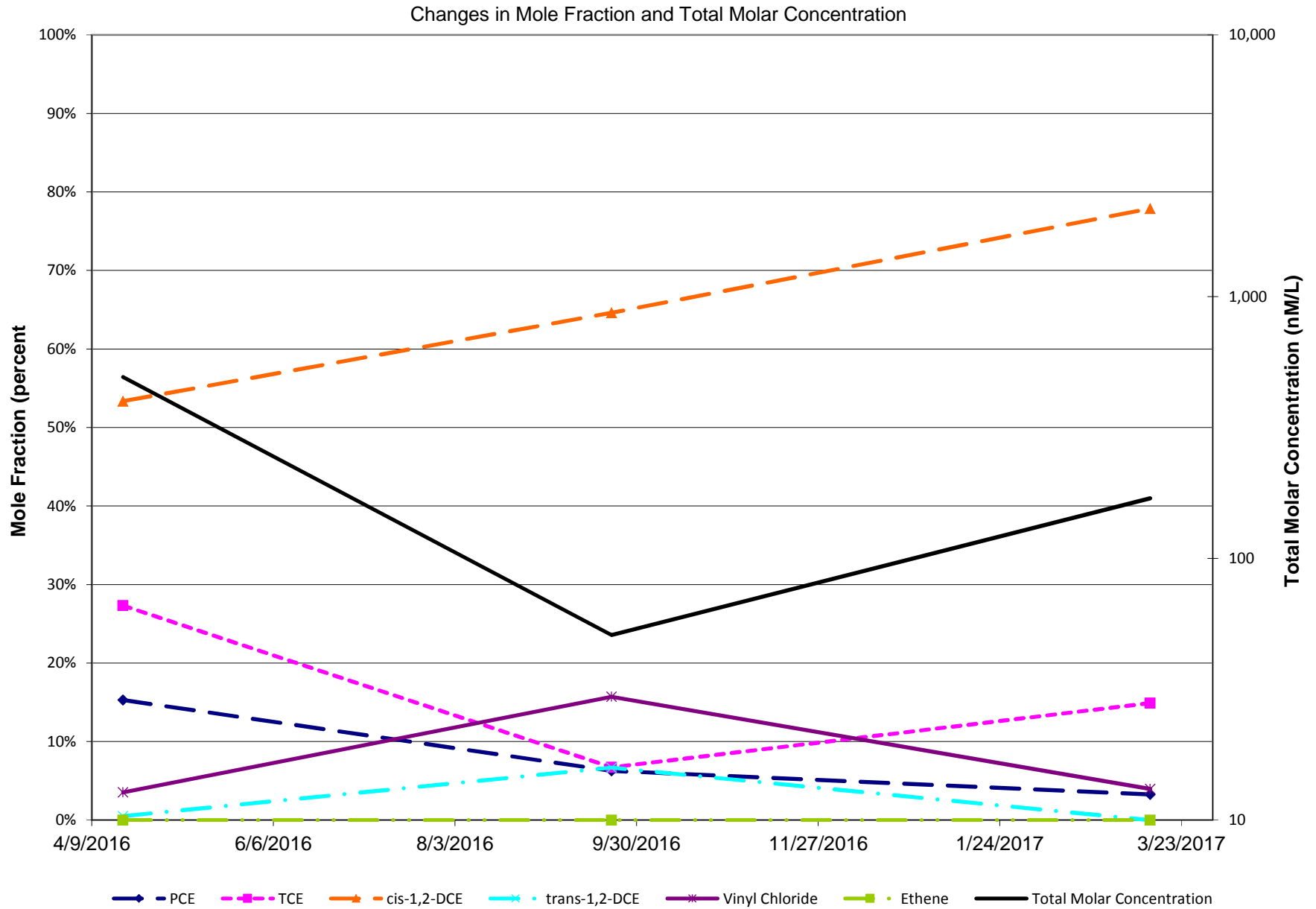


Figure 40.1.2 T5-2

B-3 Bioreactor Trench 1 Sump 3 VOC Summary April 2016 - April 2017

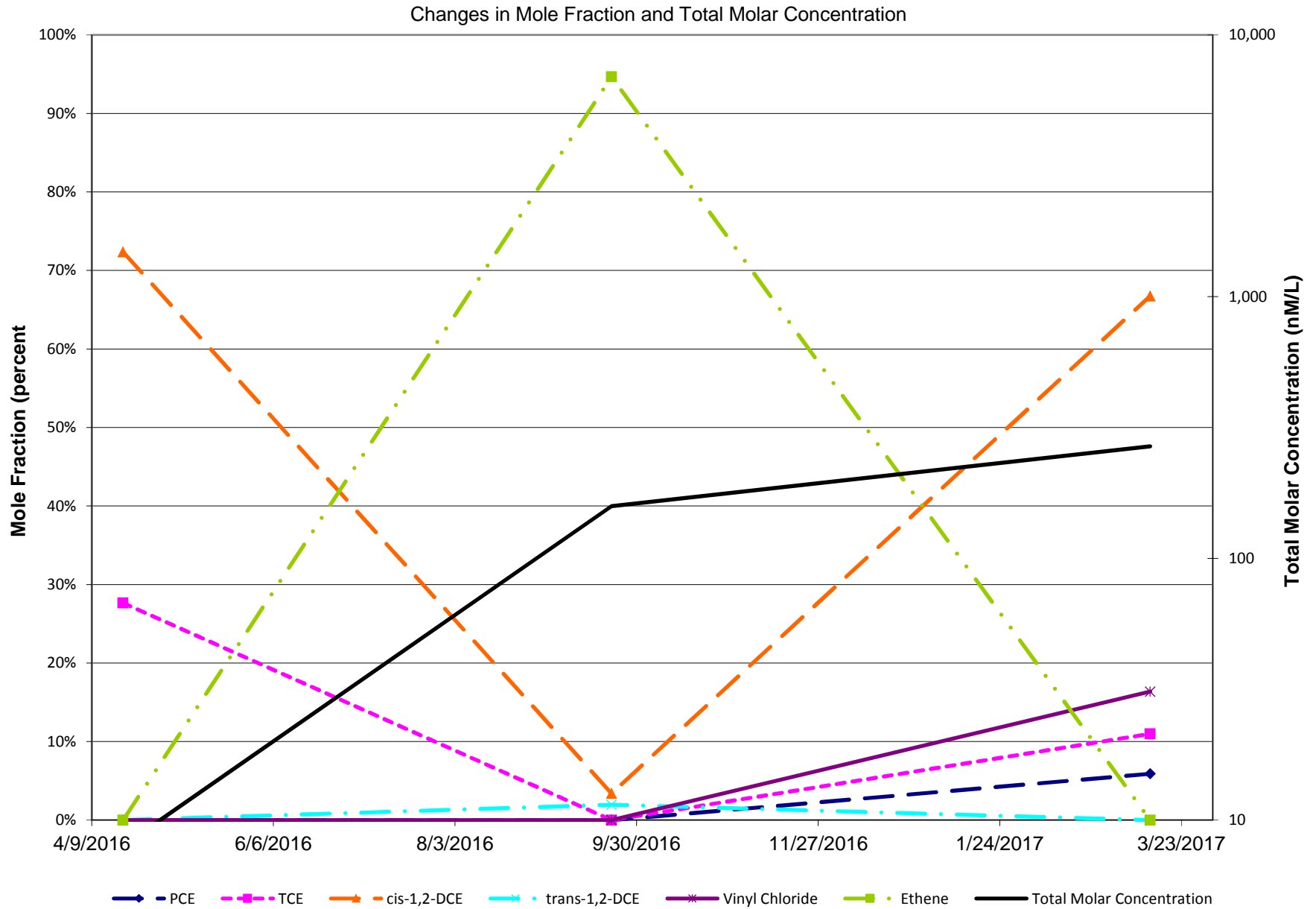


Figure 40.1.2 T5-1

B-3 Bioreactor Trench 1 Sump 3 VOC Summary
April 2016 - April 2017

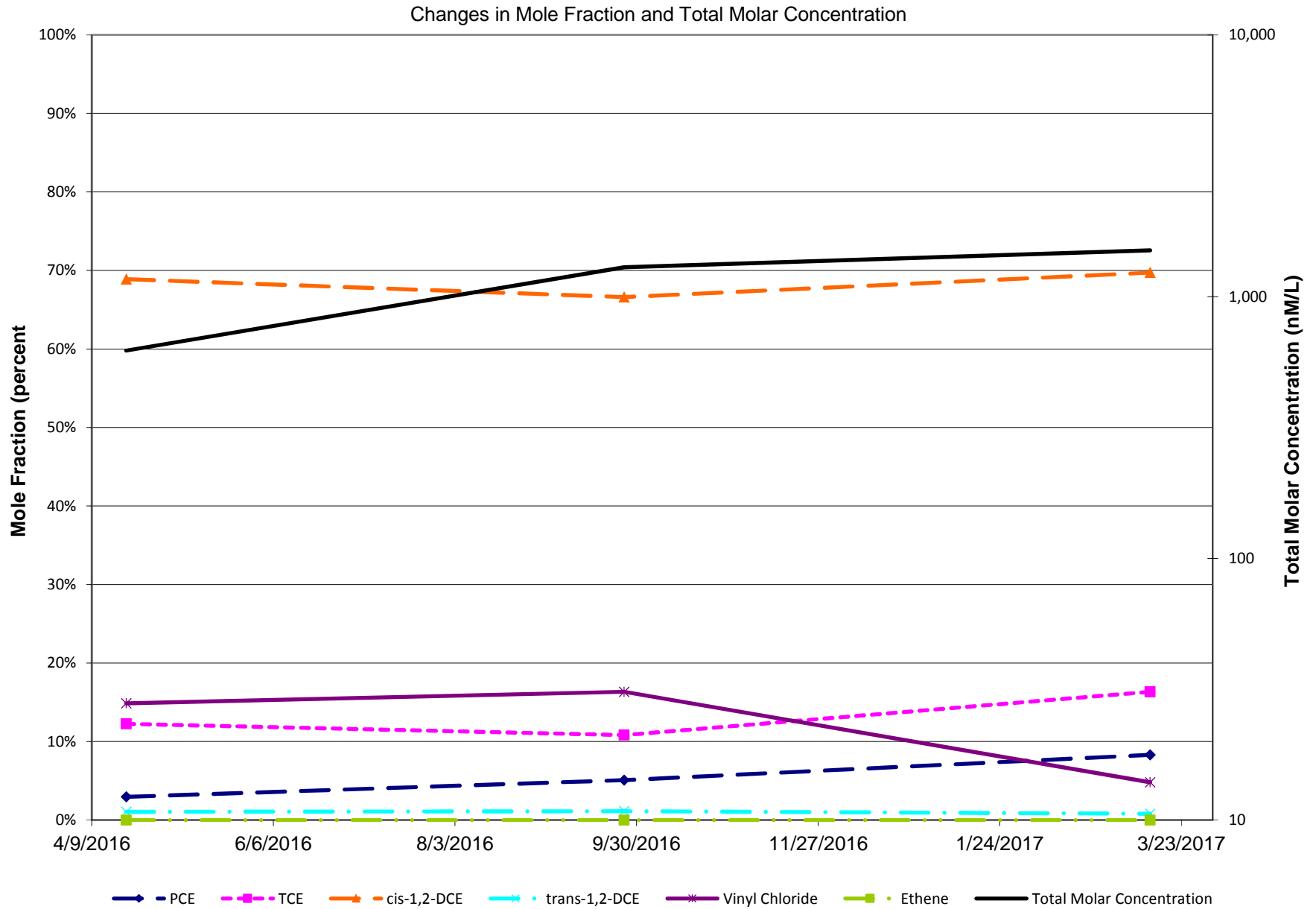


Figure 40.1.2 T4-1

**B-3 Bioreactor Trench 1 Sump 3 VOC Summary
April 2016 - April 2017**

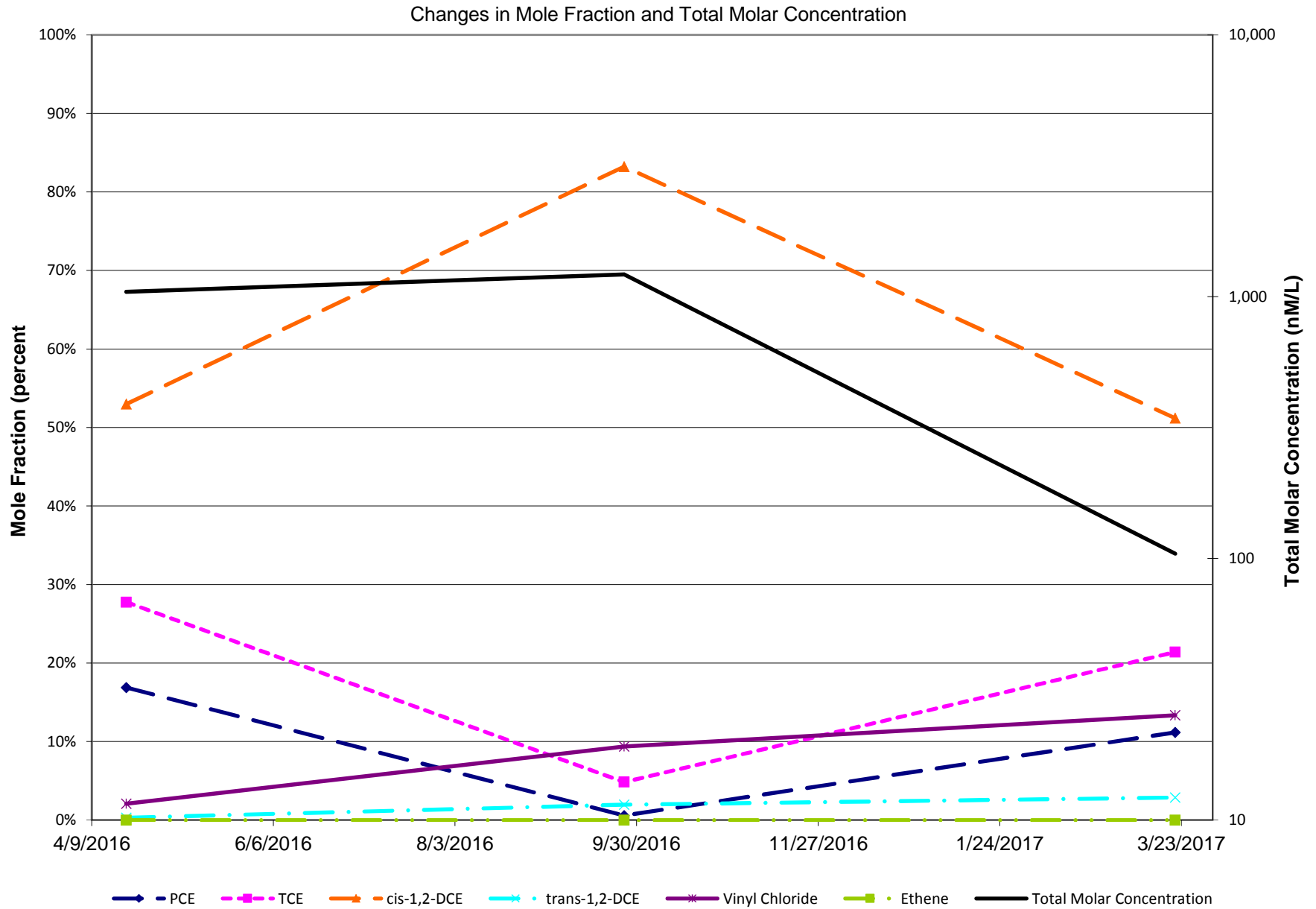


Figure 40.1.2 T3-2

B-3 Bioreactor Trench 1 Sump 3 VOC Summary April 2016 - April 2017

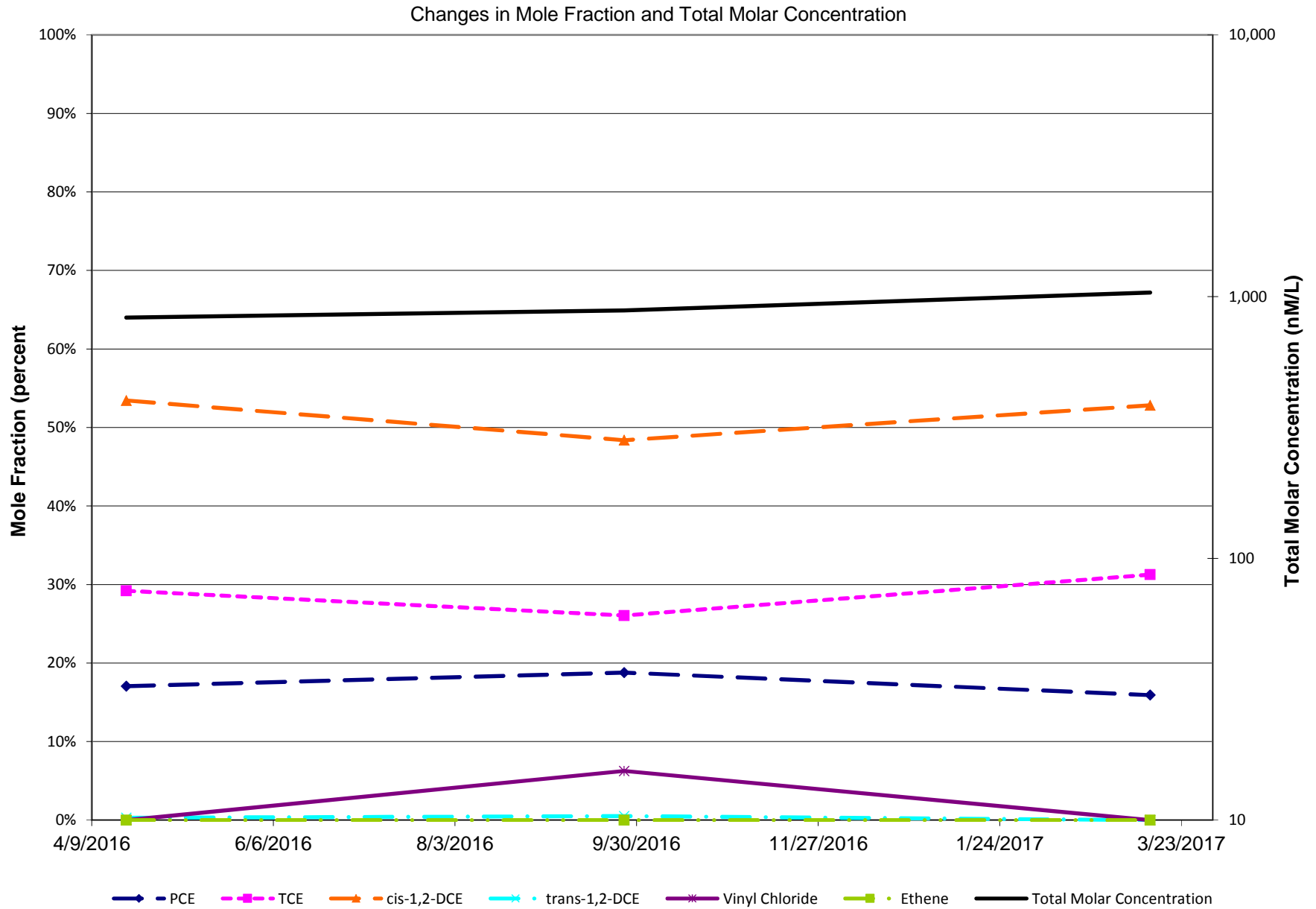


Figure 40.1.2 T3-1

B-3 Bioreactor Trench 1 Sump 3 VOC Summary April 2016 - April 2017

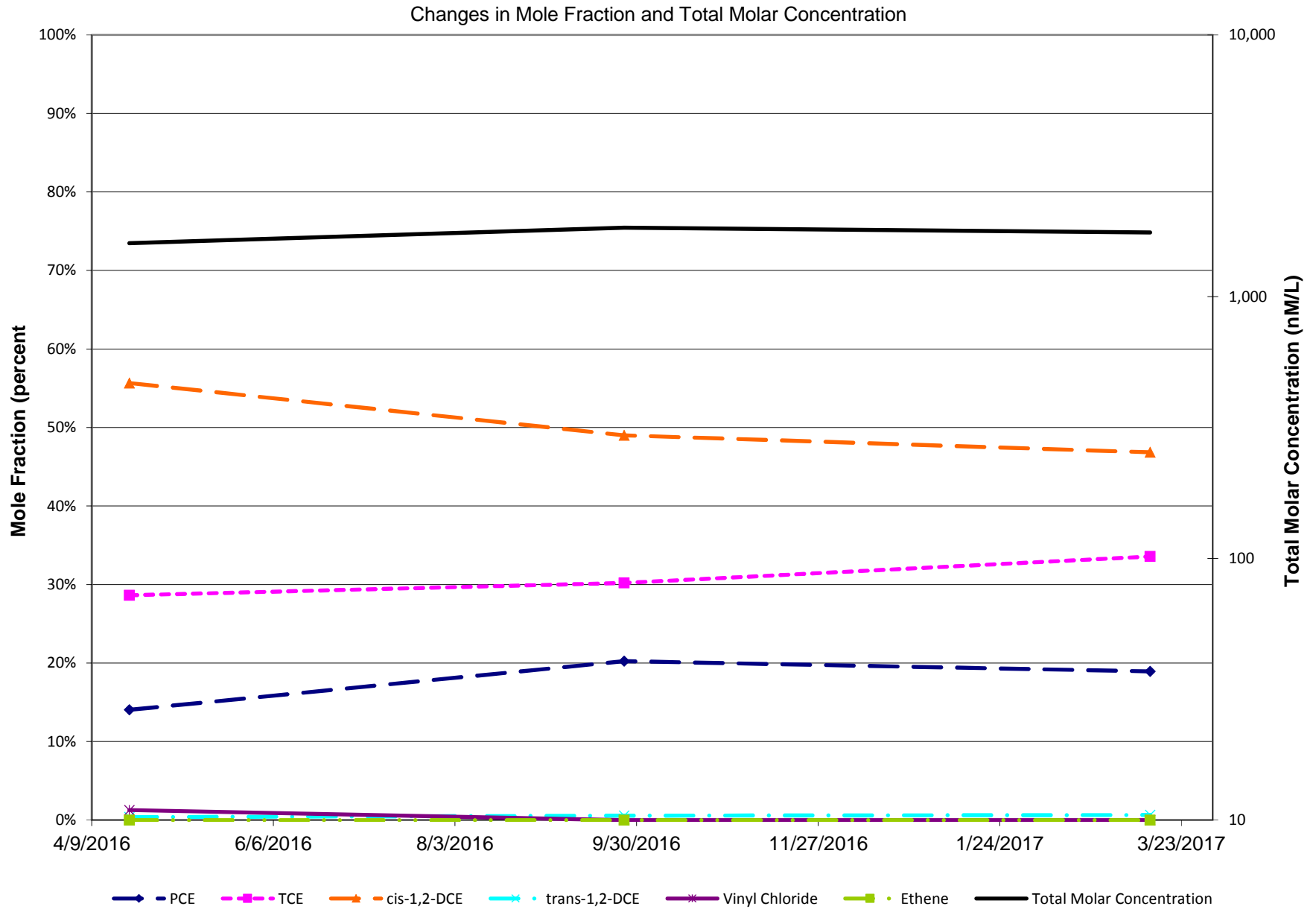


Figure 40.1.2 T2-2

B-3 Bioreactor Trench 1 Sump 3 VOC Summary April 2016 - April 2017

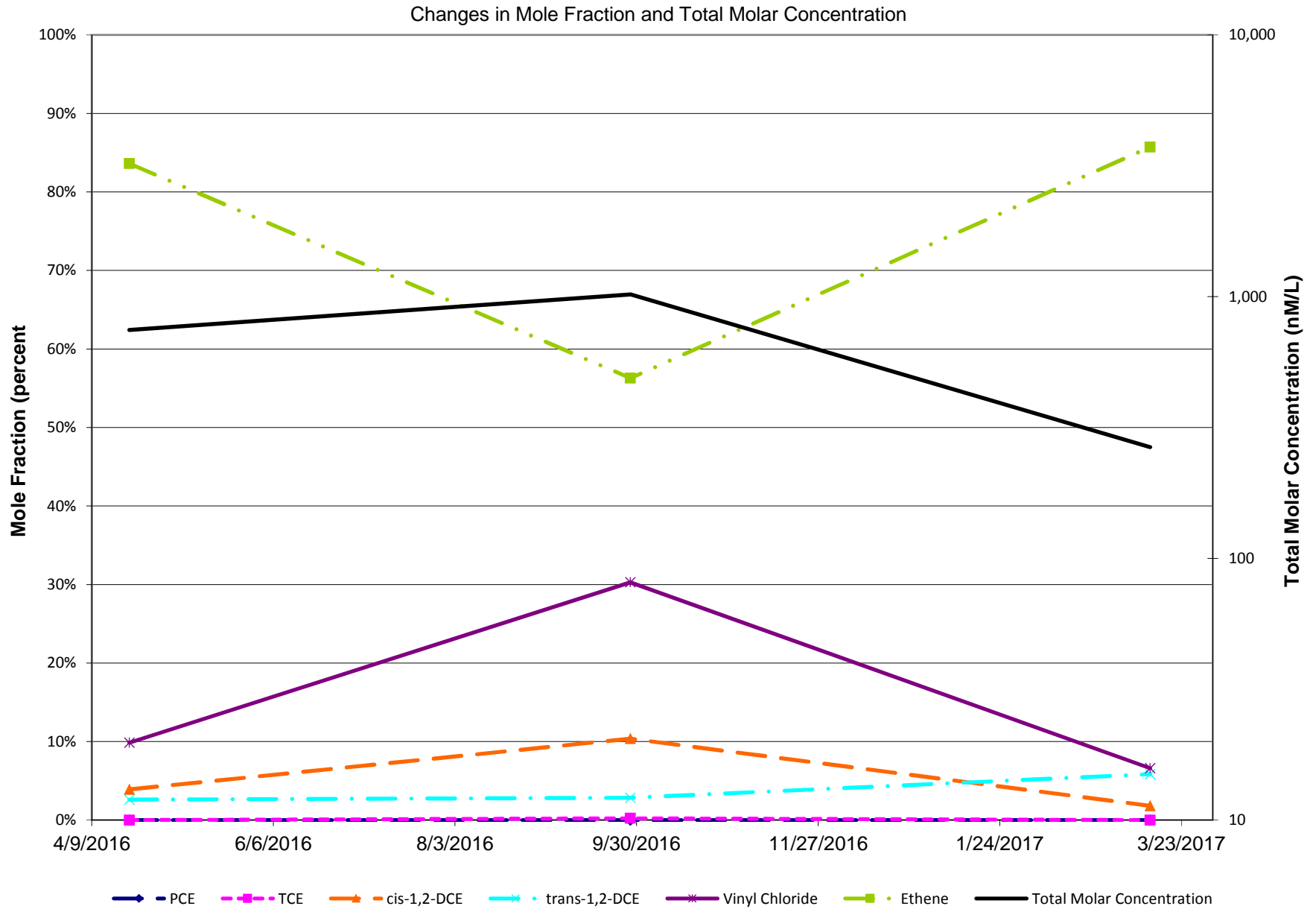


Figure 40.1.2 T2-1

**B-3 Bioreactor Trench 1 Sump 3 VOC Summary
April 2016 - April 2017**

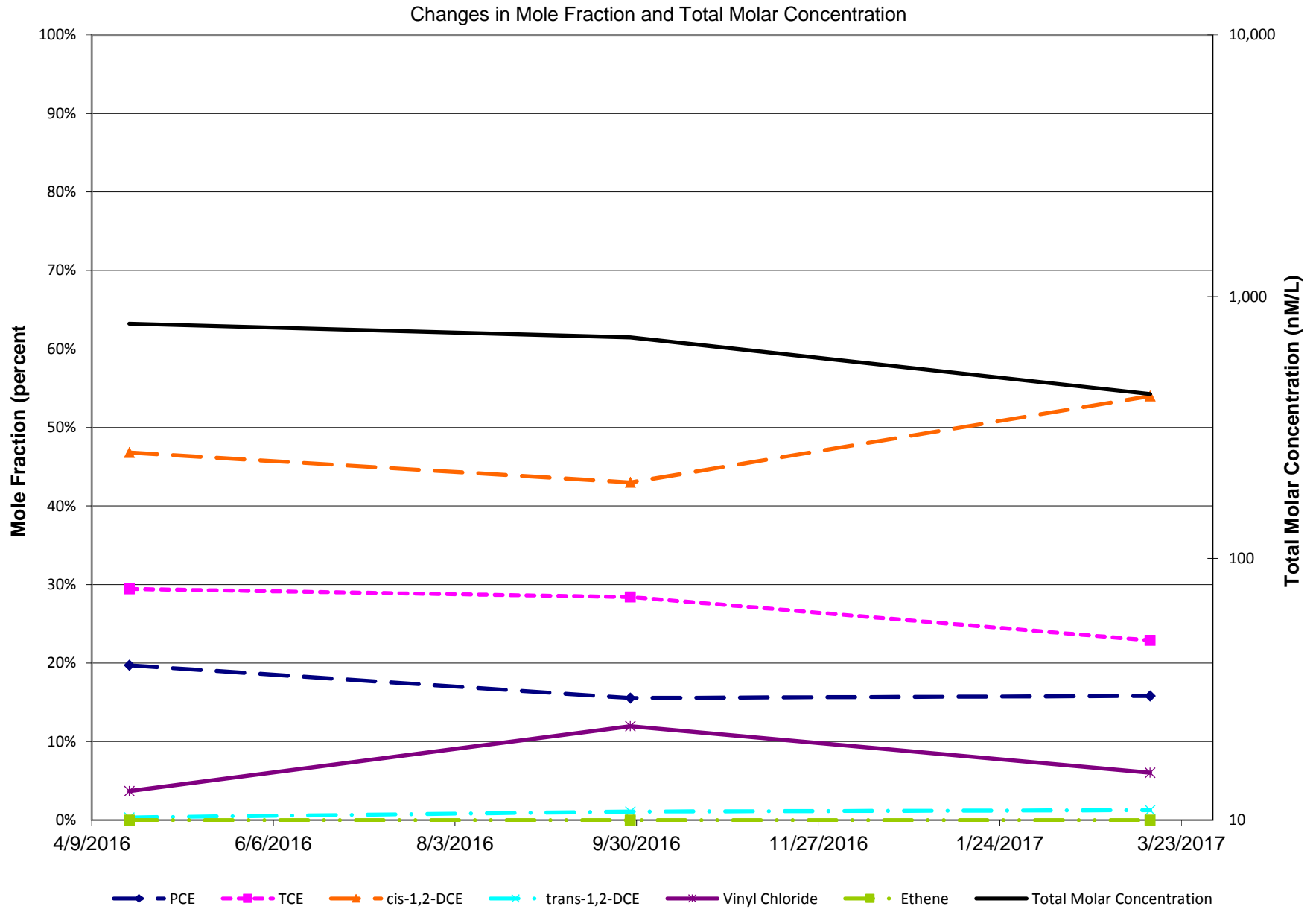


Figure 40.1.2 T1-3

B-3 Bioreactor Trench 1 Sump 3 VOC Summary
April 2016 - April 2017

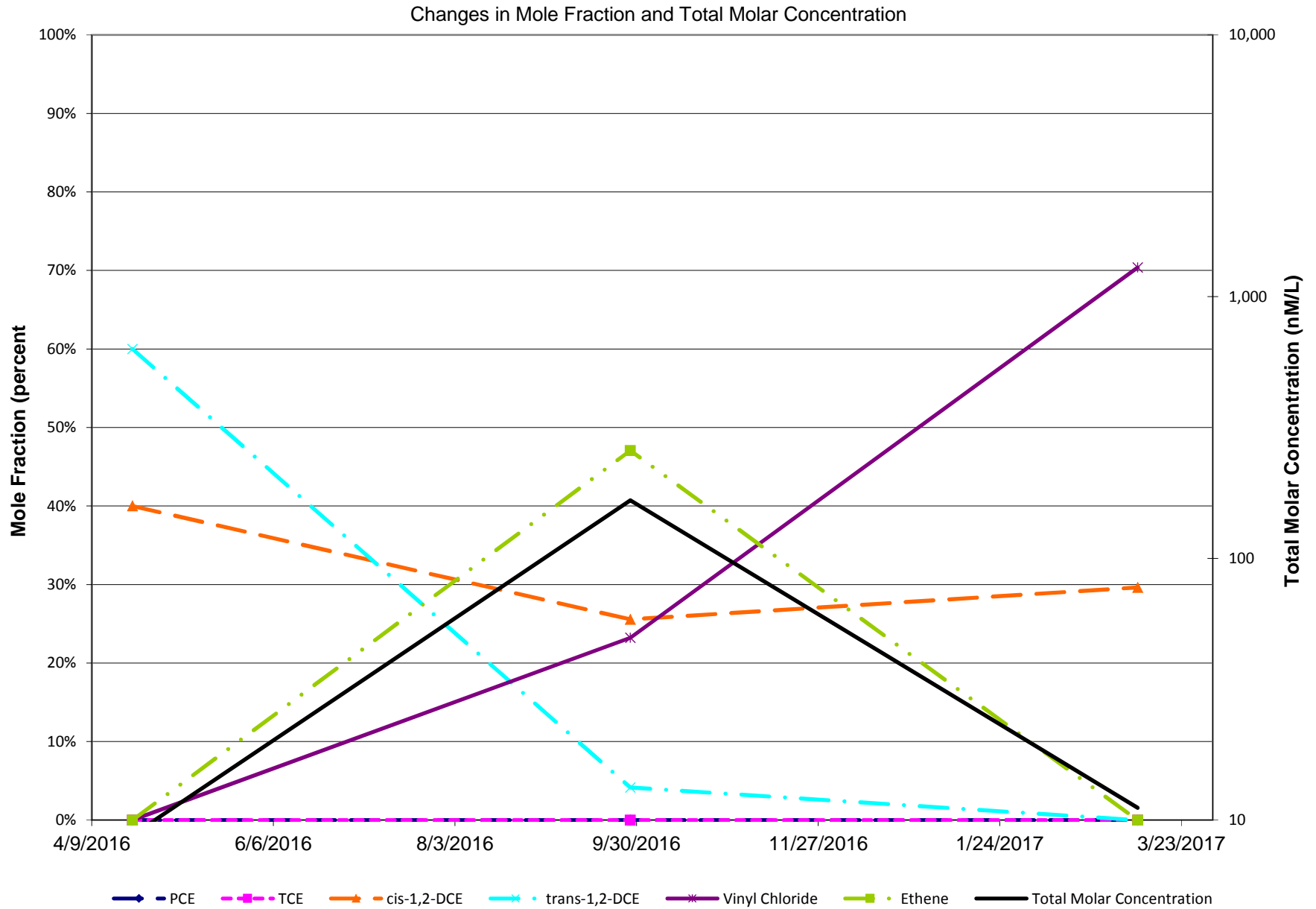


Figure 40.1.2 T1-2

B-3 Bioreactor Trench 1 Sump 2 VOC Summary
April 2016 - April 2017

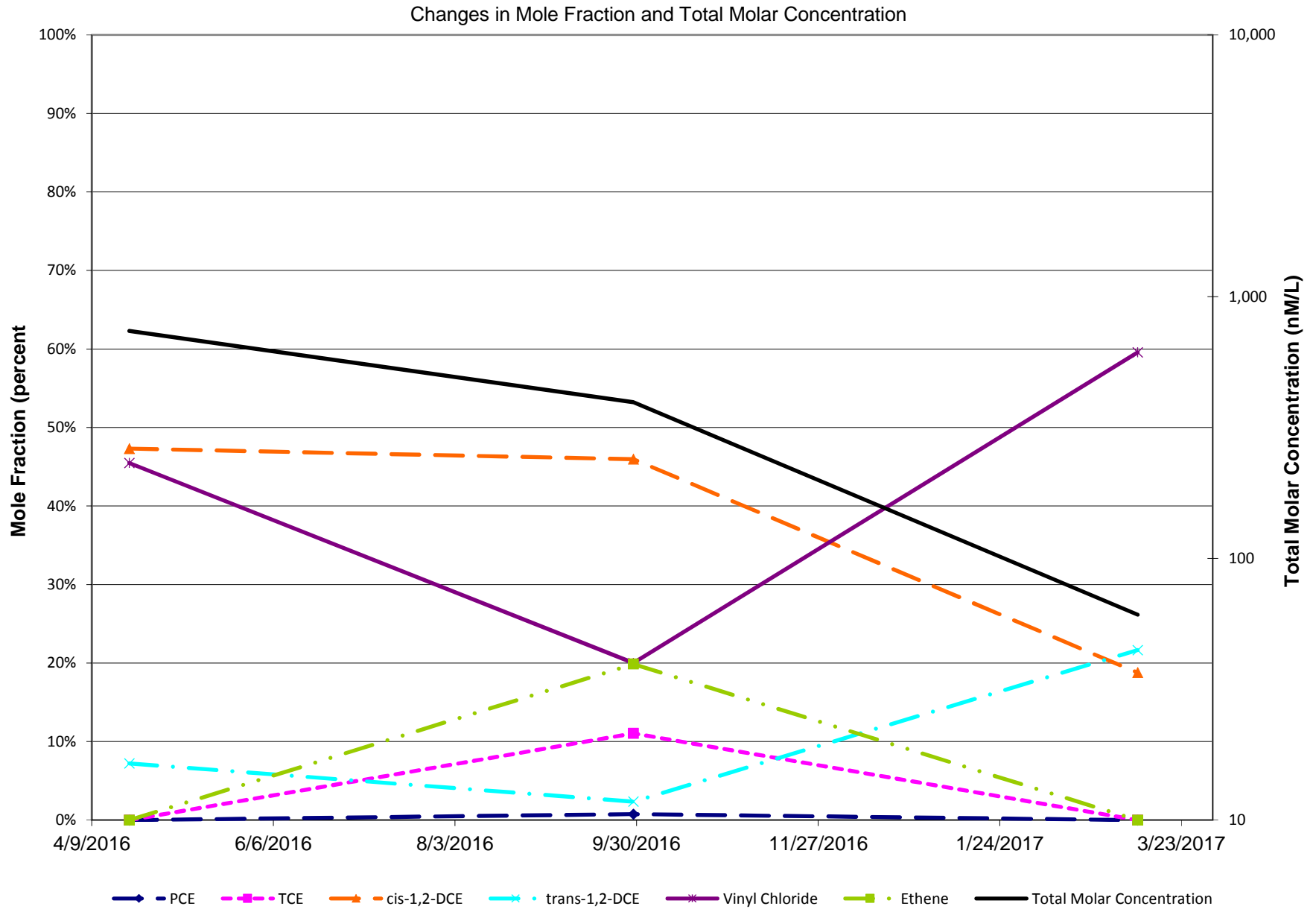


Figure 40.1.2 T1-1

B-3 Bioreactor Trench 1 Sump 1 VOC Summary April 2016 - April 2017

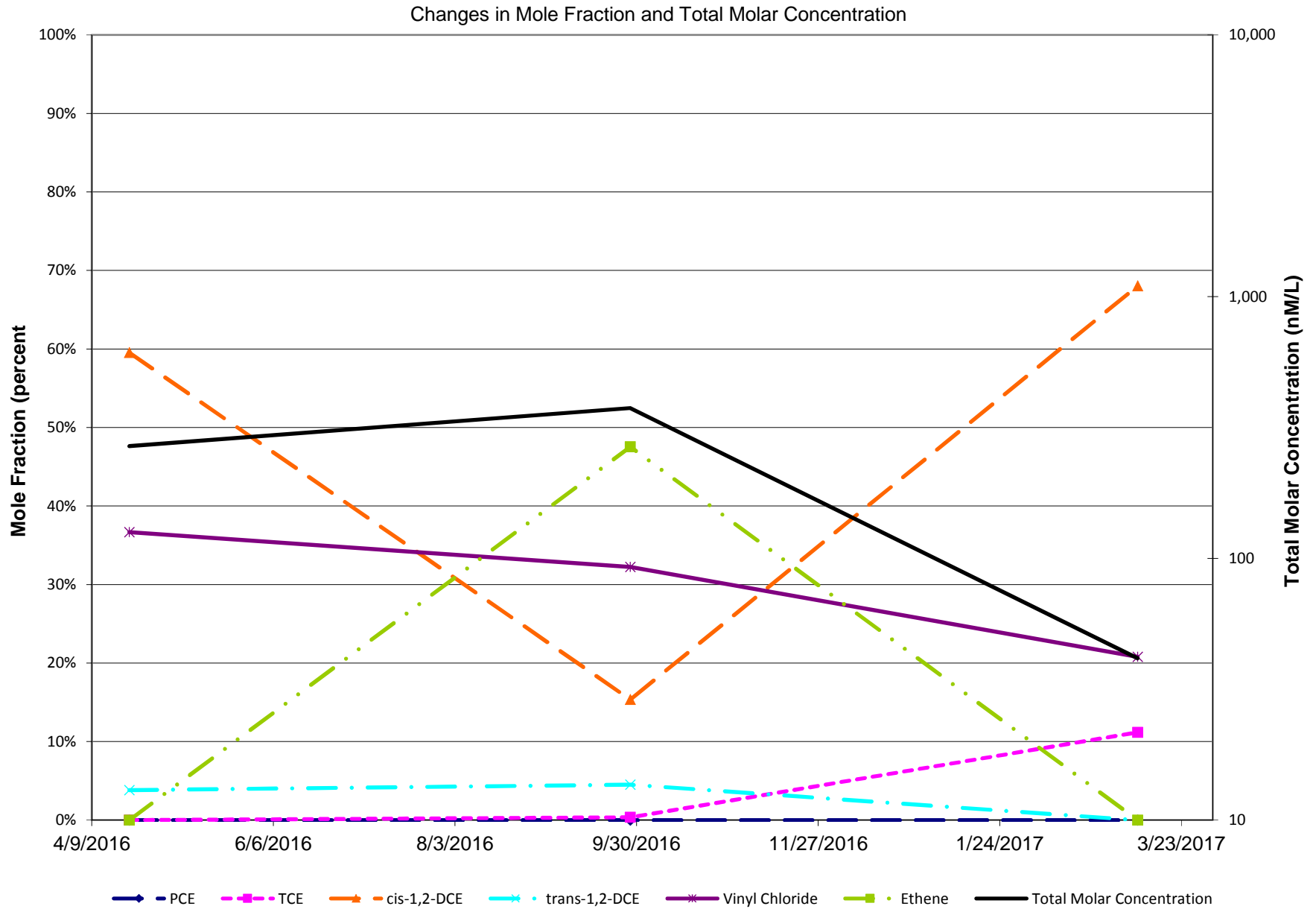


Figure 40.2.2d

CS-WB08-LGR03B VOC Summary
April 2016 - April 2017

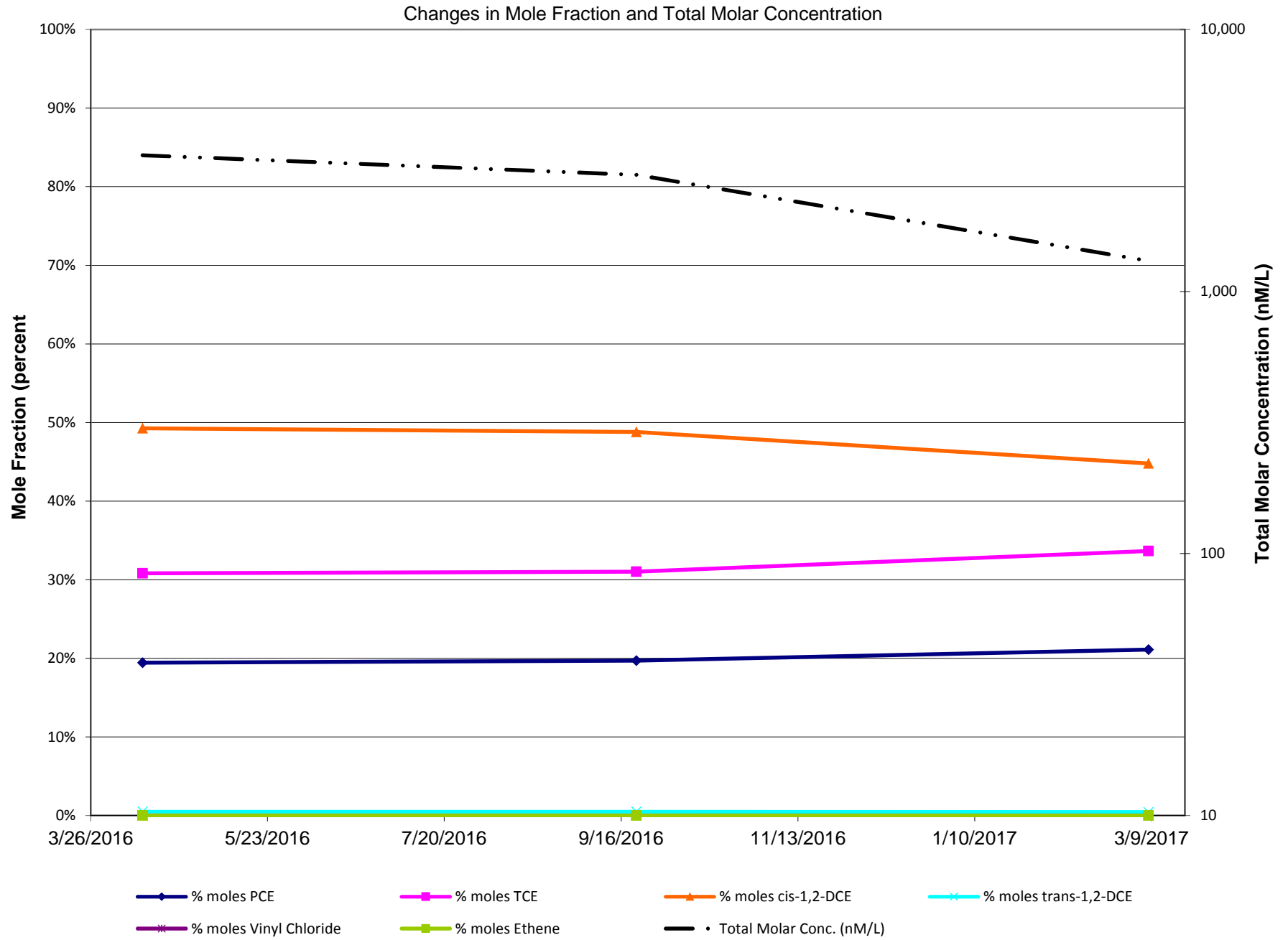


Figure 40.2.2c

CS-WB07-LGR03B VOC Summary April 2016 - April 2017

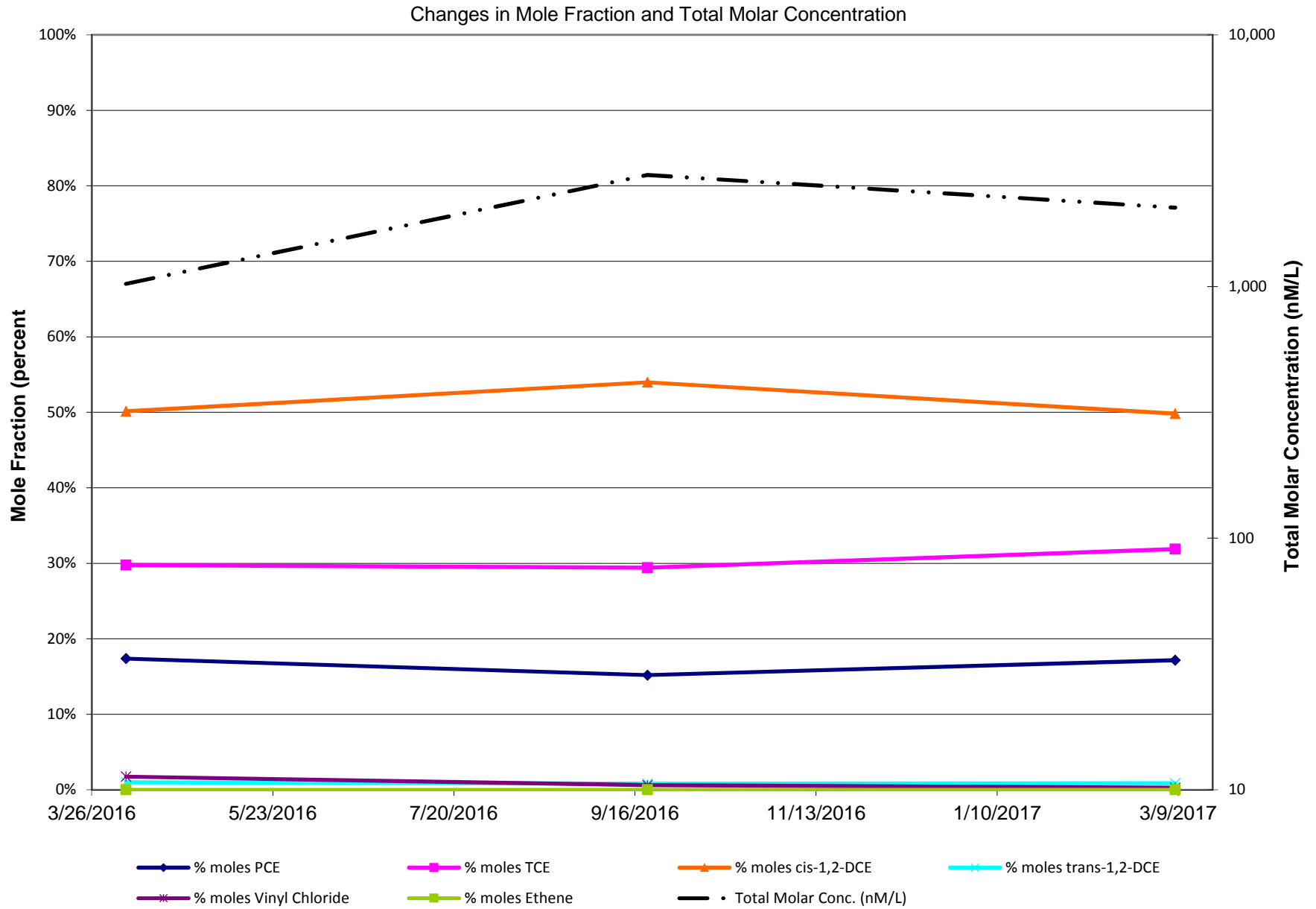


Figure 40.2.2b

CS-WB06-LGR03B VOC Summary
April 2016 - April 2017

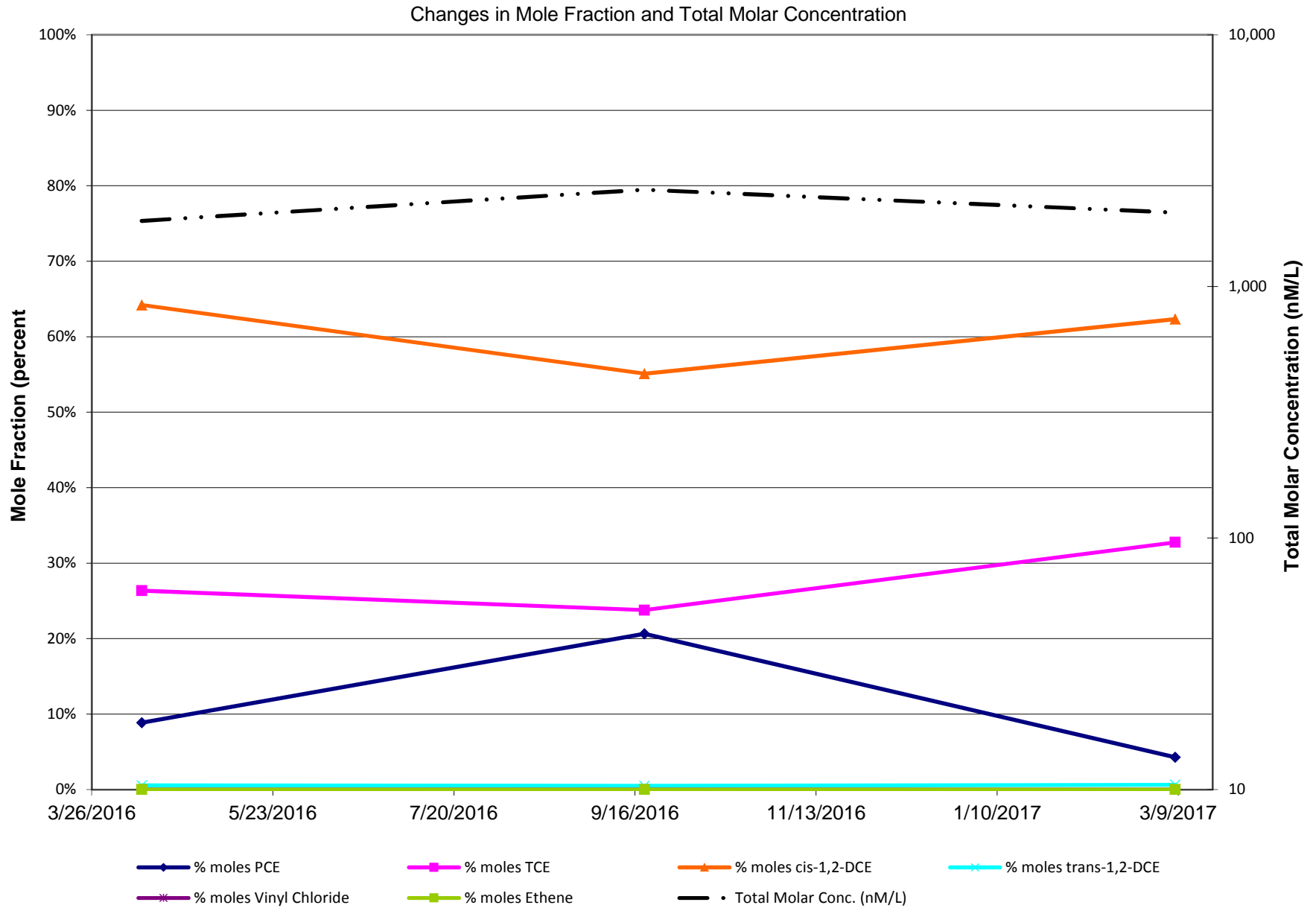


Figure 40.2.2a

CS-WB05-LGR03B VOC Summary
April 2016 - April 2017

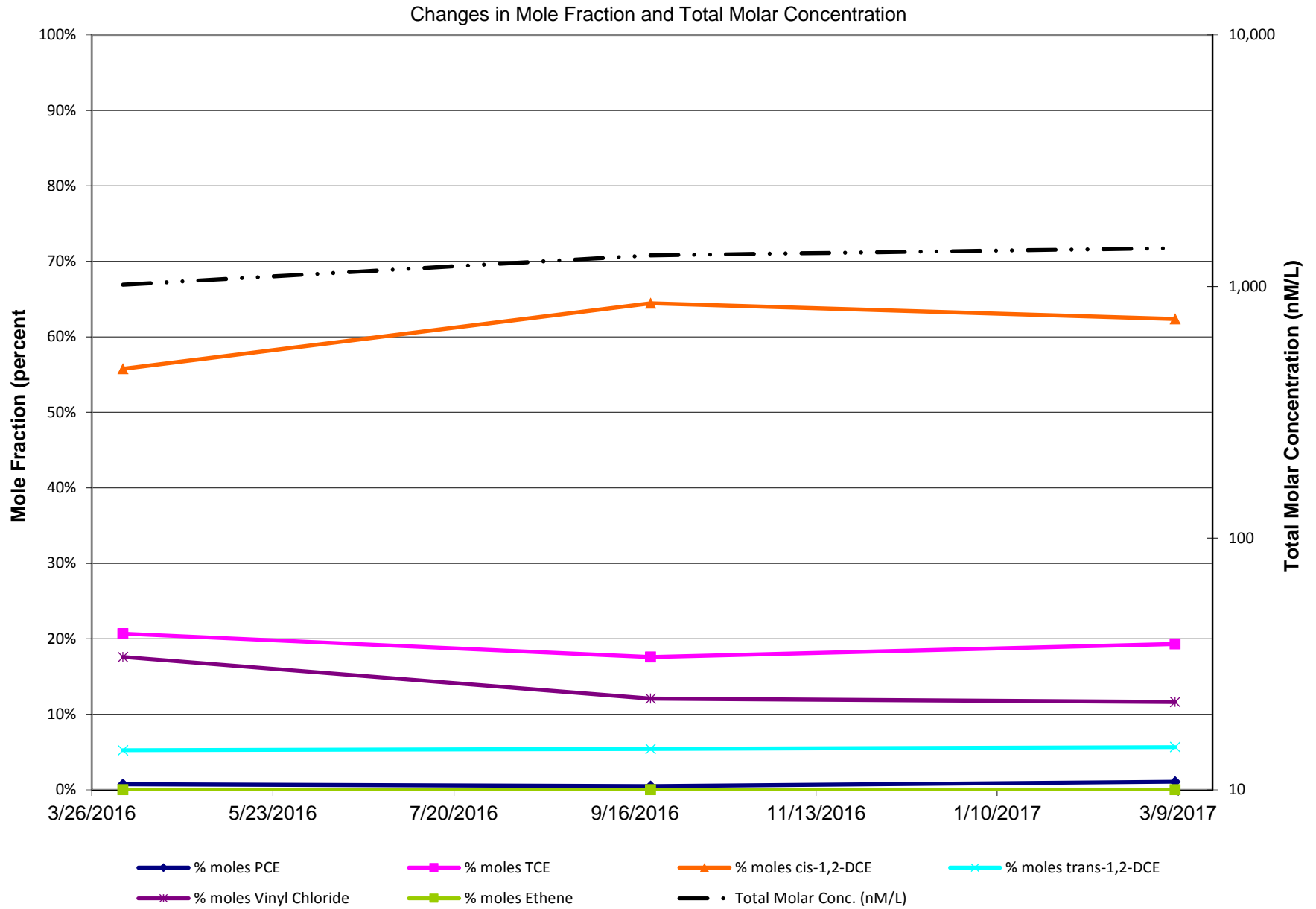


Figure 40.2.5

Lower Glen Rose Groundwater Elevations (feet above MSL) Measured in Westbay Wells May 2012 - April 2017

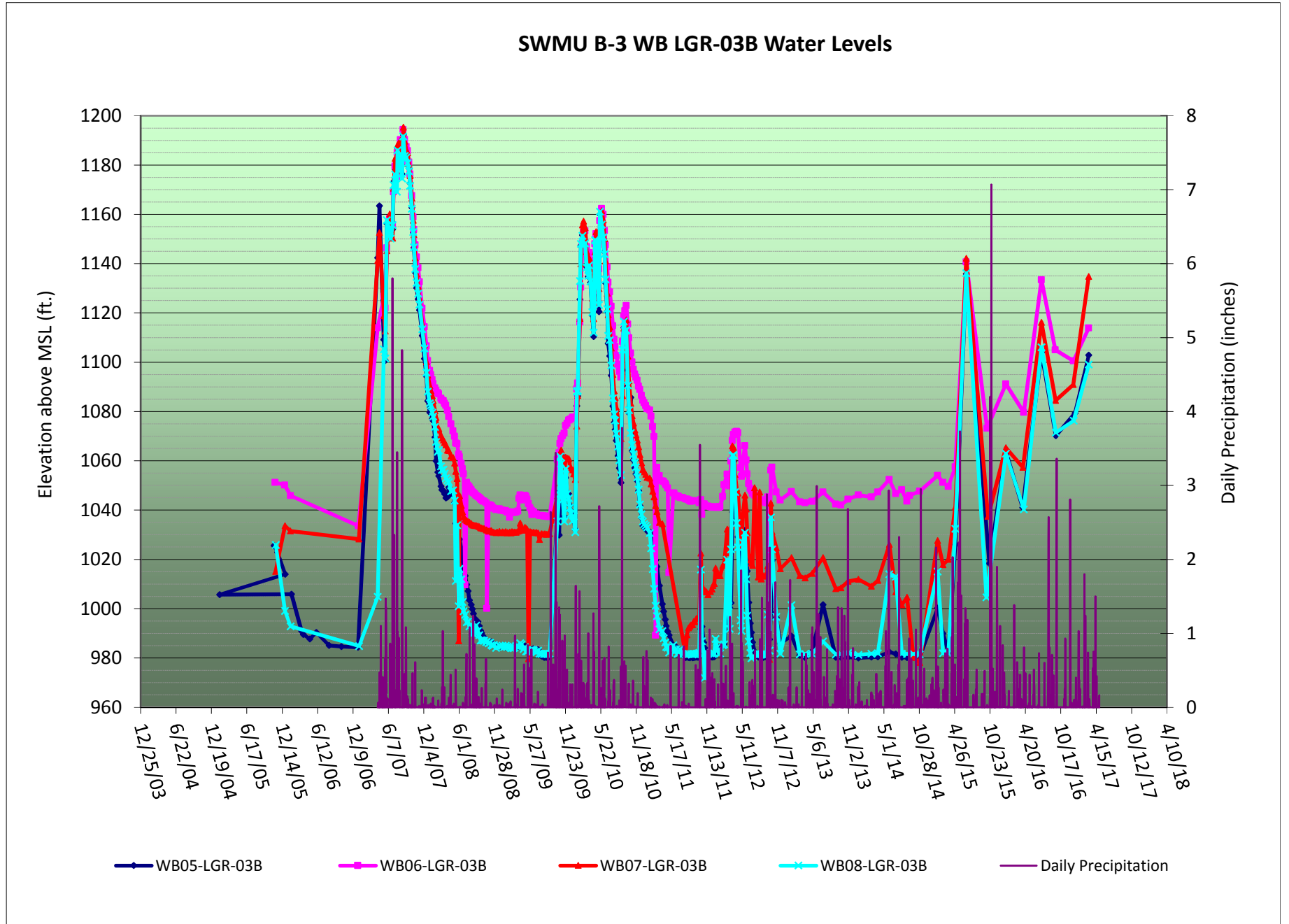


Figure 40.5.2

Changes in Mole Fraction and Total Molar Concentration at Storage Tank (UIC)
April 2016 - April 2017

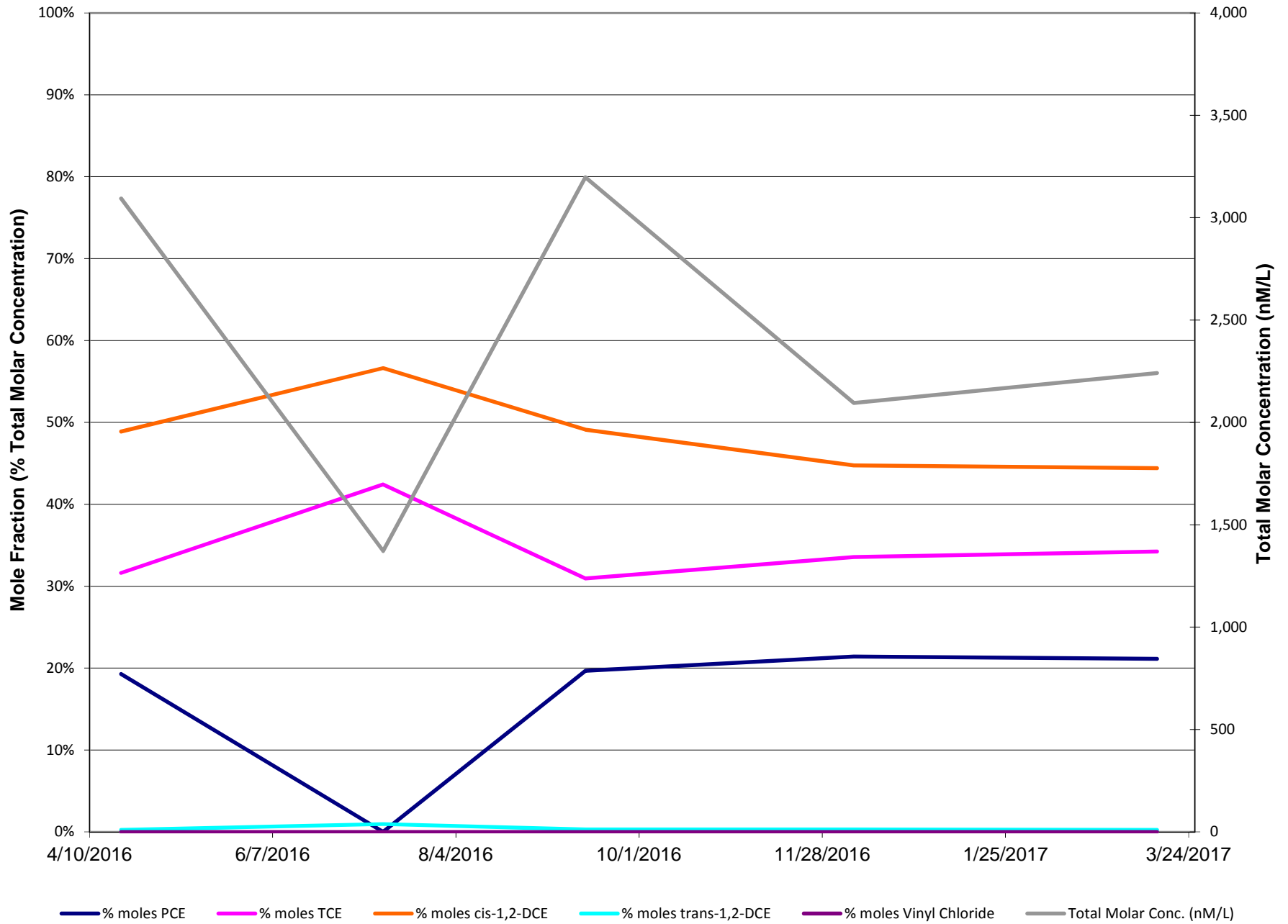


Figure 40.6.2 EXW04

B3-EXW04 VOC Summary
April 2016 - April 2017

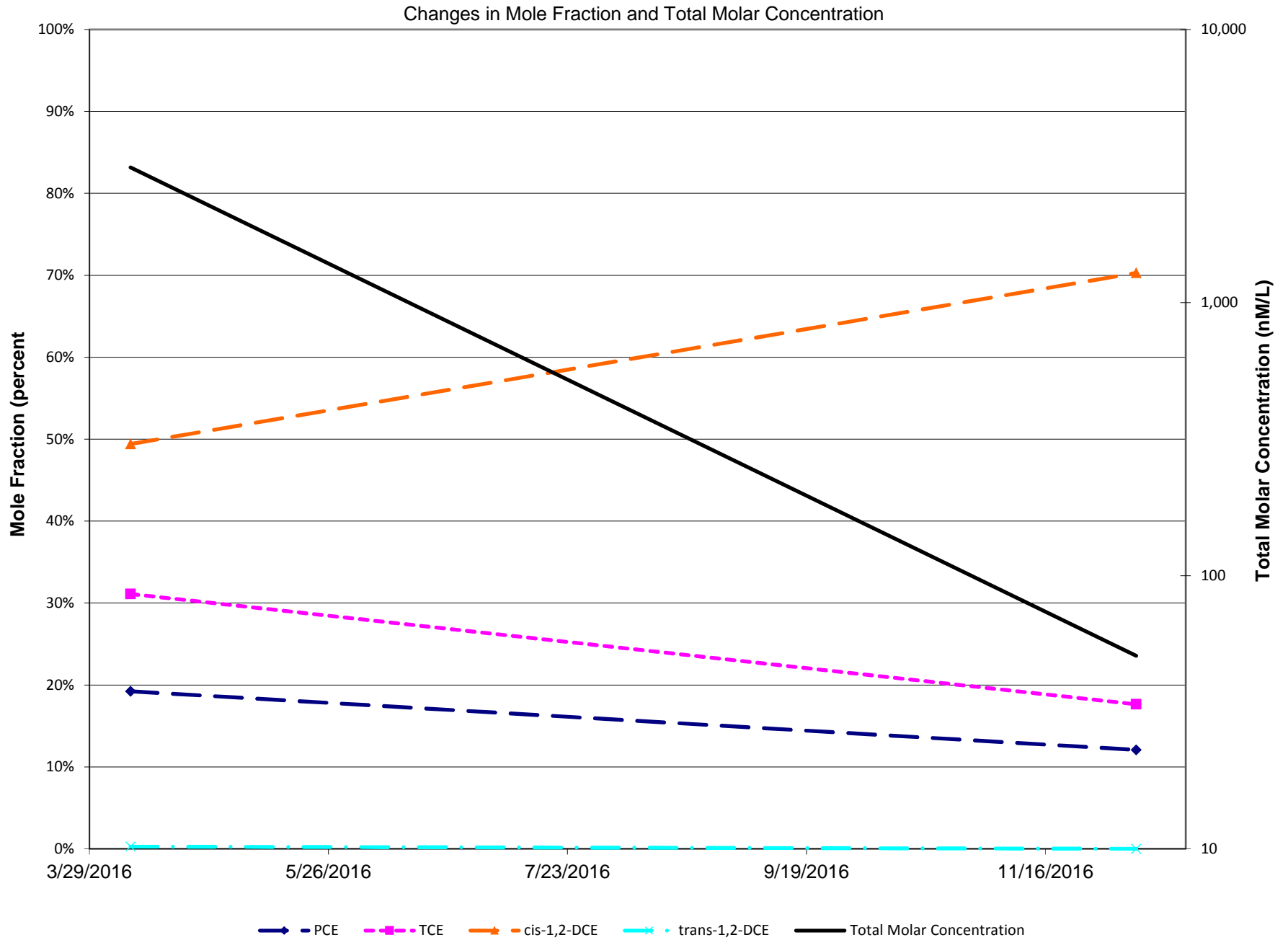


Figure 40.6.2 EXW03

B3-EXW03 VOC Summary
April 2016 - April 2017

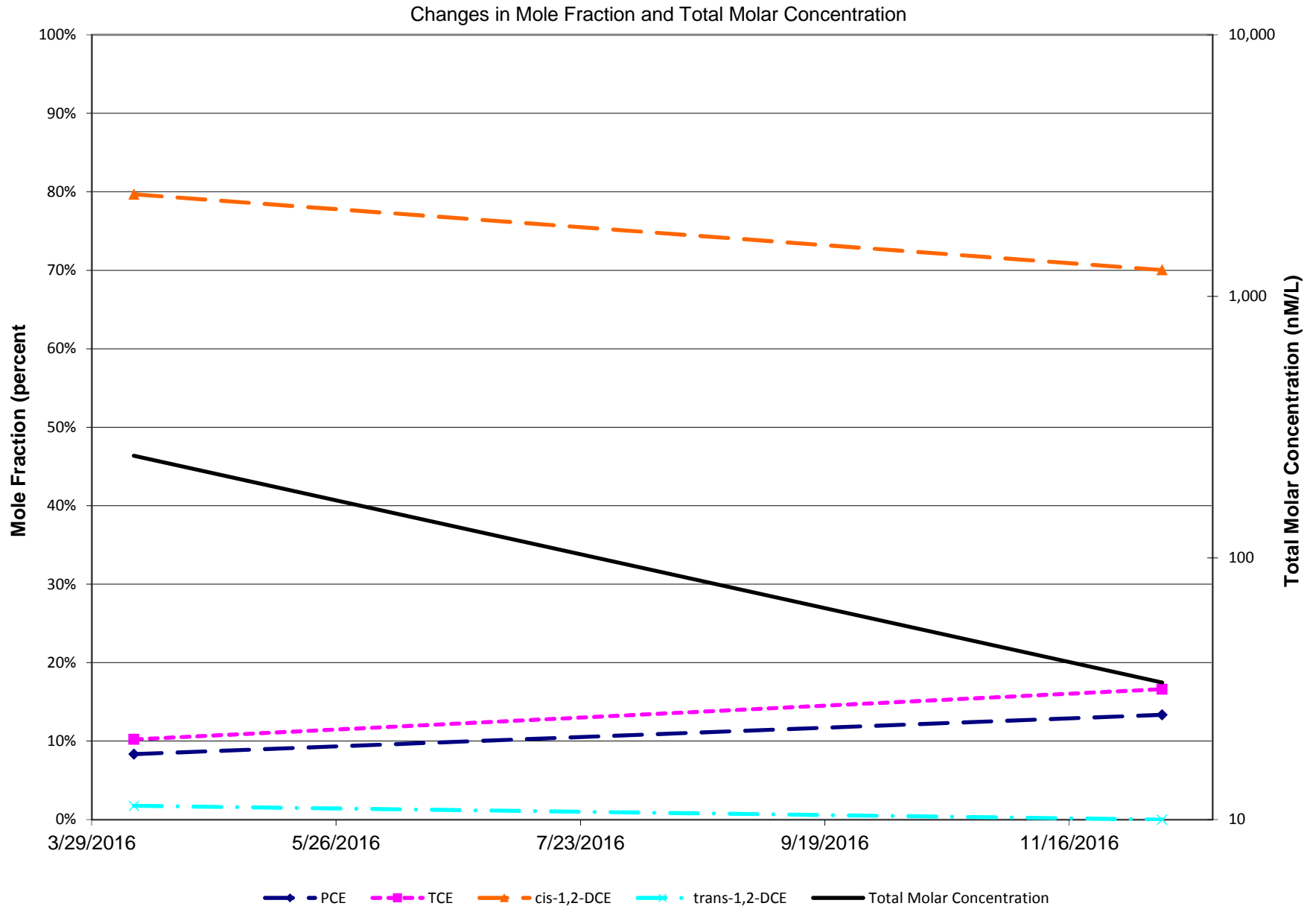


Figure 40.6.2 EXW02

B3-EXW02 VOC Summary
April 2016 - April 2017

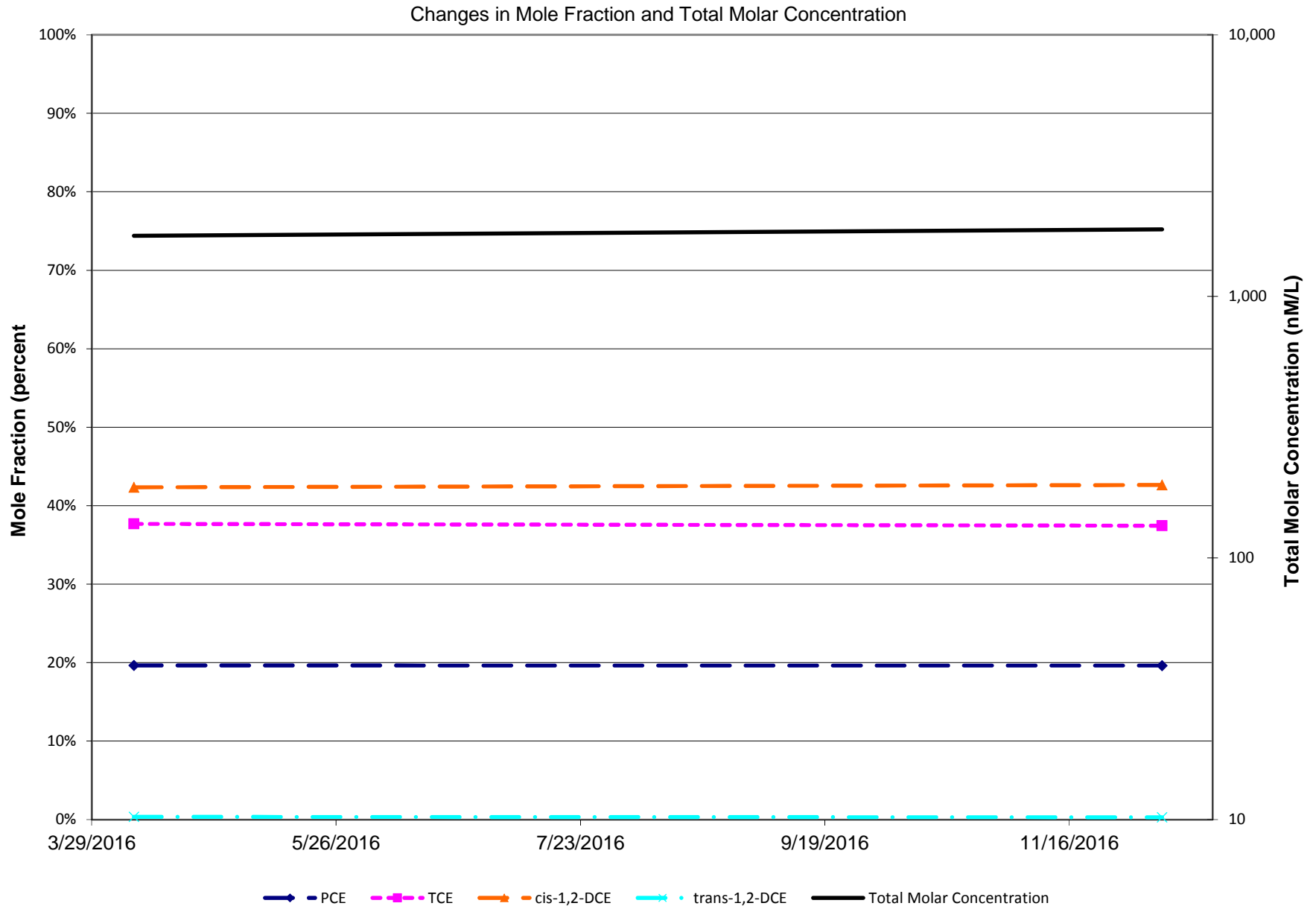


Figure 40.6.2 EXW01

B3-EXW01 VOC Summary
April 2016 - April 2017

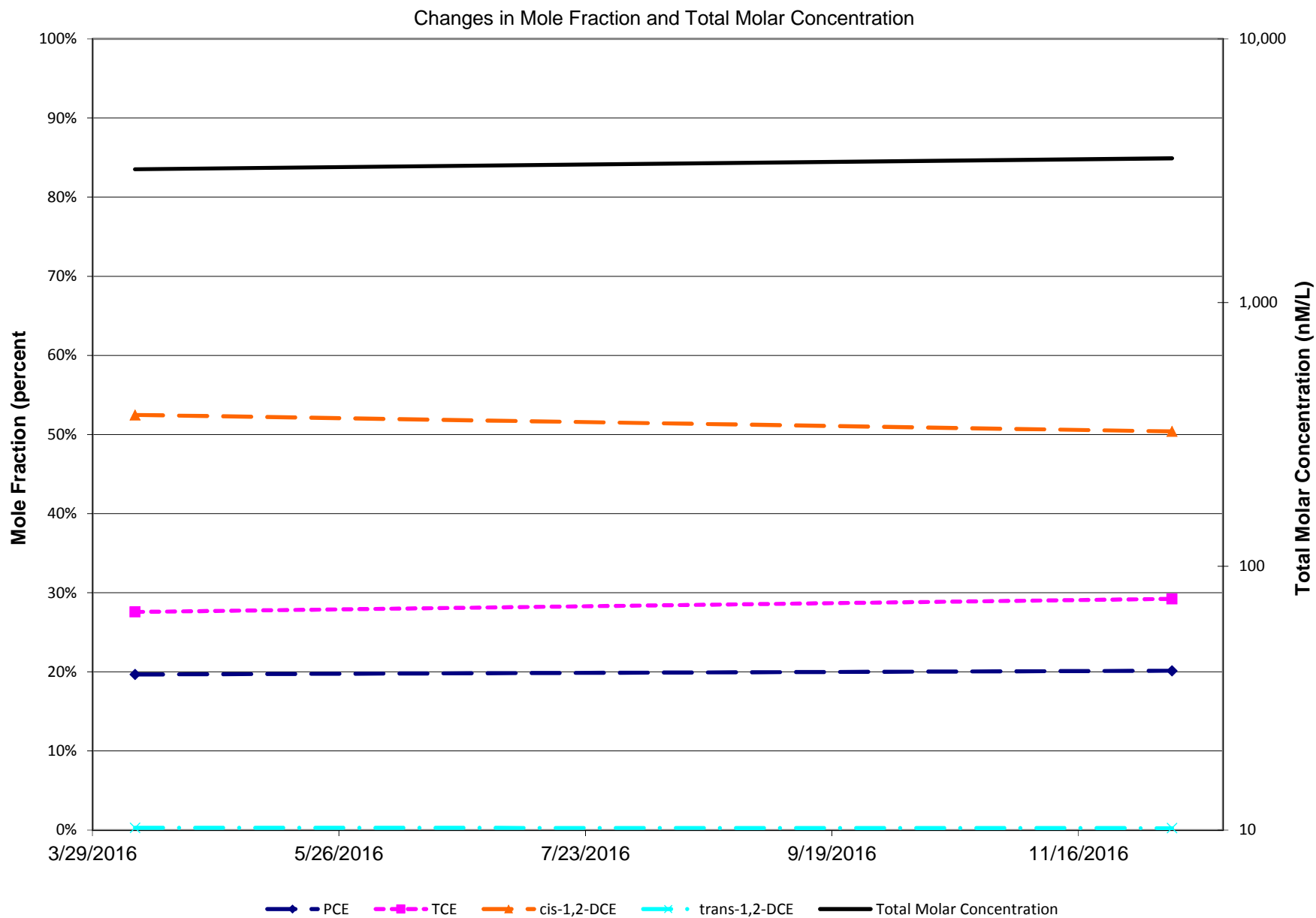


Figure 40.6.2 16-CC

CS-MW16-CC VOC Summary
April 2016 - April 2017

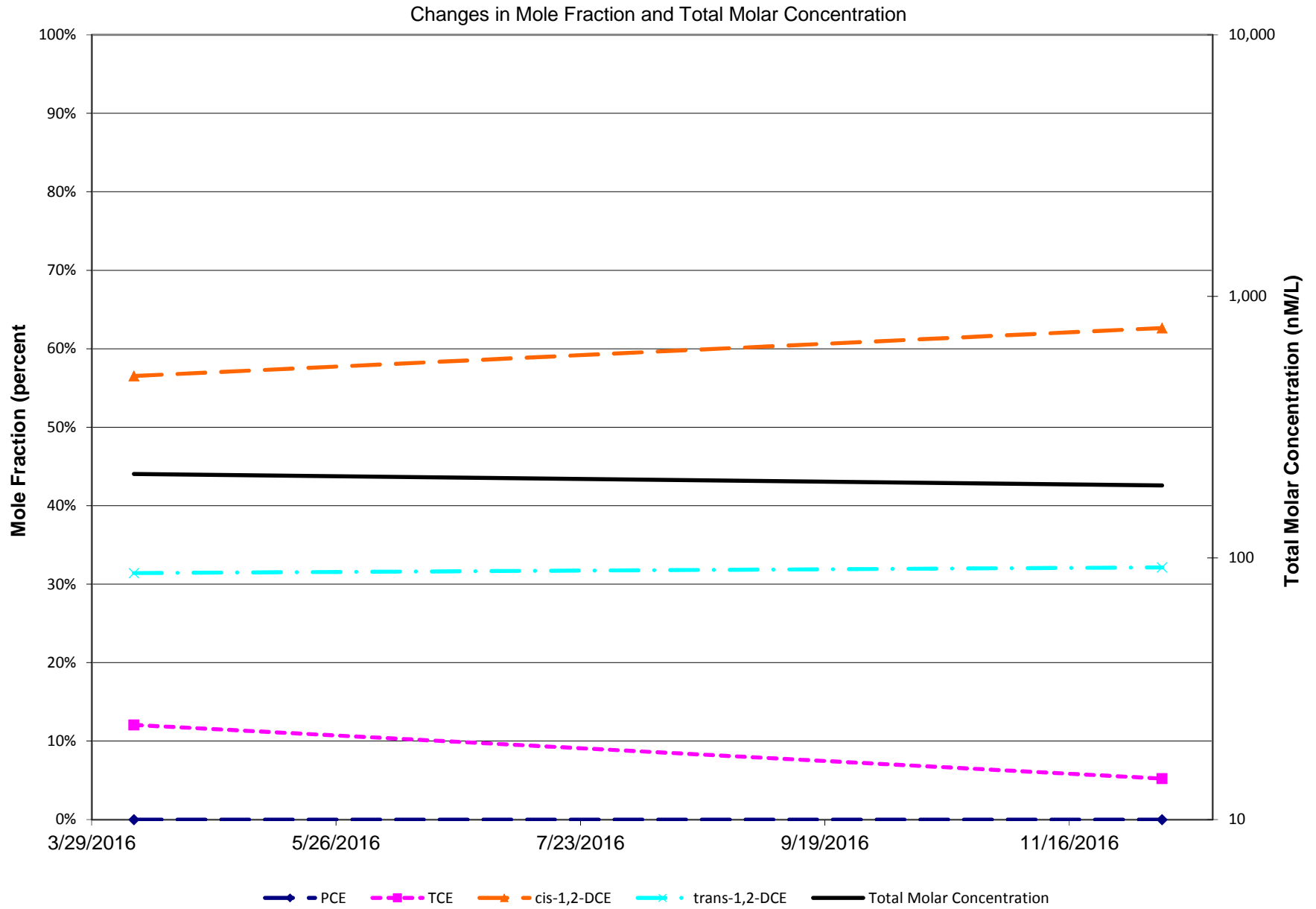
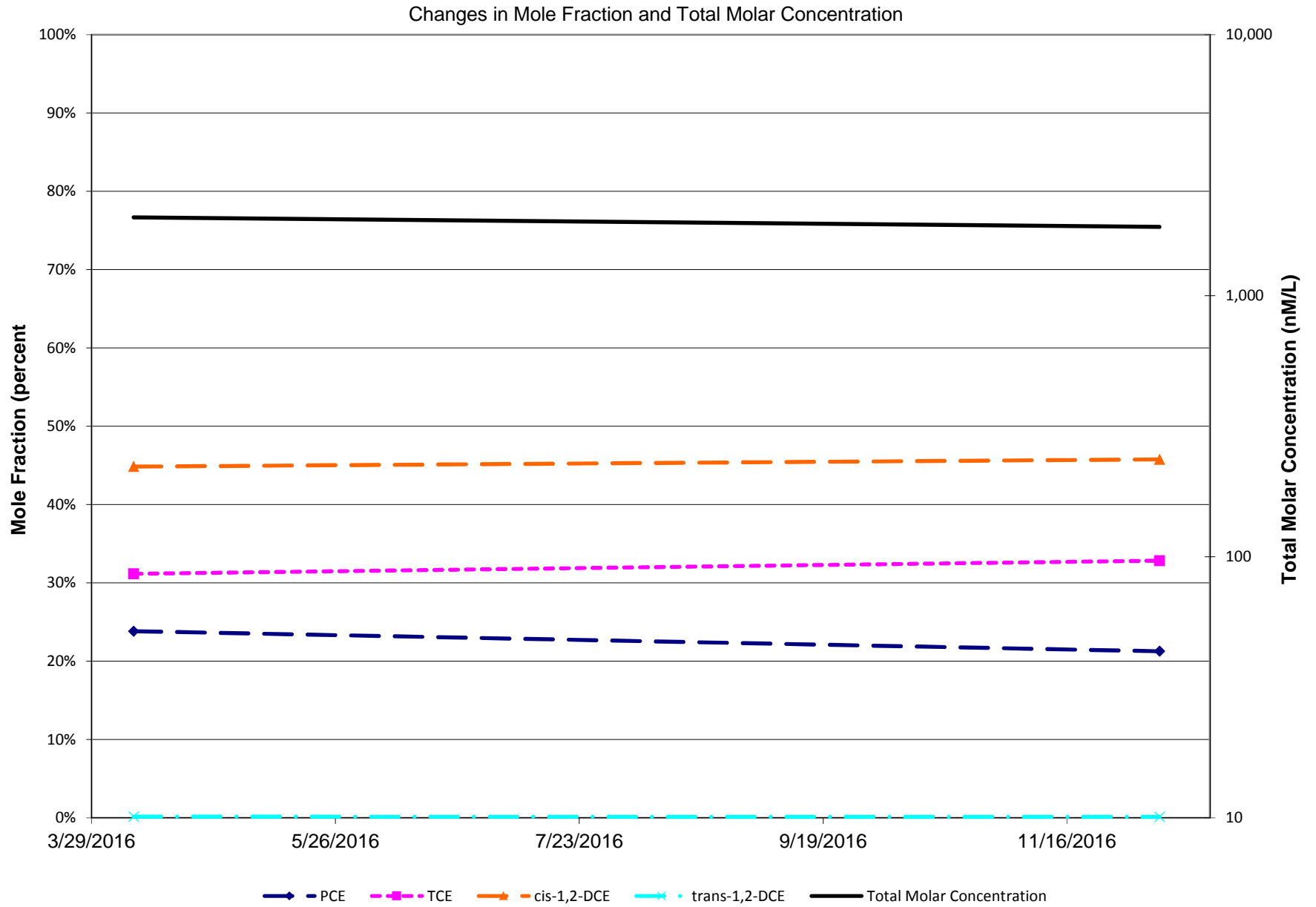


Figure 40.6.2 16-LGR

CS-MW16-LGR VOC Summary
April 2016 - April 2017



Tables

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 1								
Sump 1-1								
Sump Depth: 15.95 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1155	4.40	6.85	21.75	0.721	0.28	19.4	11.55
7/12/2016	945	6.05	6.69	23.70	0.838	0.14	-182.8	9.90
9/26/2016	1350	4.47	6.15	23.96	1.662	0.20	30.9	11.48
1/13/2017	1357	5.15	6.84	20.36	0.699	0.07	29.9	10.80

TRENCH 1								
Sump 1-2								
Sump Depth: 15.52 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1405	4.06	6.86	21.92	0.711	0.14	-21.9	11.46
7/12/2016	945	6.12	6.68	25.31	0.787	0.06	-180.4	9.40
9/26/2016	1350	4.40	6.69	24.62	1.613	0.21	-35.8	11.12
1/13/2017	1415	4.80	6.78	19.25	0.733	0.00	117.2	10.72

TRENCH 1								
Sump 1-3								
Sump Depth: 14.97 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	830	2.85	6.89	21.58	0.762	0.13	-64.1	12.12
7/12/2016	945	5.47	6.97	26.88	0.913	0.55	-164.3	9.50
9/26/2016	1420	2.85	6.38	24.34	1.619	0.12	-8.5	12.12
1/13/2017	1421	3.50	6.96	12.62	0.733	0.00	-17.1	11.47

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 2								
Sump 2-1								
Sump Depth: 11.78 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1105	4.80	6.75	22.10	0.898	0.16	72.6	6.98
7/12/2016	945	6.26	6.66	24.98	0.865	0.08	-132.4	5.52
9/28/2016	1100	4.83	6.67	26.67	1.862	0.32	99.1	6.95
1/13/2017	1351	4.45	6.57	20.77	0.822	0.03	97.4	7.33

TRENCH 2								
Sump 2-1								
Sump Depth: 11.78 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1345	4.06	6.88	21.93	0.846	0.29	-135.1	7.72
7/12/2016	945	6.08	6.64	25.11	0.879	0.49	-152.3	5.70
9/28/2016	1035	4.22	6.7	24.58	1.298	0.17	-66.4	7.56
1/13/2017	1412	4.82	6.72	20.11	0.768	0.01	-55.5	6.96

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 3								
Sump 3-1								
Sump Depth: 11.05 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1010	6.42	6.85	21.72	0.632	2.02	247.4	4.63
7/12/2016	945	5.75	6.91	23.21	0.605	1.90	97.9	5.30
9/22/2016	1152	5.20	6.55	22.78	0.978	1.61	255.5	5.85
1/13/2017	1346	6.66	6.76	19.93	0.696	0.64	127.8	4.39

TRENCH 3								
Sump 3-2								
Sump Depth: 7.4 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/21/2016	1340	4.92	6.52	22.35	0.762	0.17	158.1	2.48
7/12/2016	945	5.58	6.67	26.32	1.035	0.04	-209.6	1.82
9/28/2016	1505	4.50	6.65	24.01	1.471	0.34	136.9	2.90
1/13/2017	1401	5.09	6.74	21.15	0.733	0.06	83.1	2.31

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 4								
Sump 4-1								
Sump Depth:			8.42 feet BTOC					
Sample Date	Sample Time	Sump H ₂ O Level <i>(feet BTOC)</i>	pH	Temperature <i>(°C)</i>	Specific Conductivity <i>(m-mho/cm)</i>	Dissolved Oxygen <i>(mg/L)</i>	ORP <i>(eV)</i>	Sump H ₂ O Thickness <i>(feet)</i>
4/20/2016	1015	5.81	6.58	22.3	0.938	0.24	-90.2	2.61
7/12/2016	945	6.38	6.64	25.24	0.904	0.02	-213.2	2.04
9/28/2016	1545	5.55	6.44	23.87	1.44	0.42	-36.6	2.87
1/13/2017	1408	5.98	6.6	21.53	0.793	0	-49.3	2.44

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 5								
Sump 5-1								
Sump Depth: 11.55 feet BTOC								
Sample Date	Sample Time	Sump H2O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H2O Thickness
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)
4/20/2016	915	8.04	6.7	21.58	0.64	0.21	-10.2	3.51
7/12/2016	945	7.29	6.85	23.10	0.601	0.03	-245.3	4.26
9/22/2016	1015	6.51	6.44	22.80	1.2	0.23	100.6	5.04
1/13/2017	1332	6.82	6.67	21.73	0.731	0.04	3.7	4.73

TRENCH 5								
Sump 5-2								
Sump Depth: 11.04 feet BTOC								
Sample Date	Sample Time	Sump H2O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H2O Thickness
		(feet BTOC)		(°C)	(m-mho/cm)	(mg/L)	(eV)	(feet)
4/19/2016	1530	6.52	6.54	24.05	1.107	0.07	-66.7	4.52
7/12/2016	945	7.76	6.42	27.38	1.218	0.11	-220.2	3.28
9/22/2016	1430	9.21	6.22	28.71	1.748	0.29	-44.6	1.83
1/13/2017	1432	5.34	6.79	21.40	0.902	0.04	-66.4	5.70

Table 40.1.1

SWMU B-3 Bioreactor Trenches - Field Measurement Data
April 2016 - April 2017

TRENCH 6								
Sump 6-1								
Sump Depth: 14.63 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/19/2016	1505	10.82	6.67	21.89	0.651	1.29	22.6	3.81
7/12/2016	945	10.15	6.86	23.05	0.605	1.42	314.8	4.48
9/22/2016	1345	14.22	6.65	24.85	1.572	0.79	-63.3	0.41
1/13/2017	1320	9.31	6.89	21.60	0.659	1.59	87.8	5.32

TRENCH 6								
Sump 6-2								
Sump Depth: 15.56 feet BTOC								
Sample Date	Sample Time	Sump H ₂ O Level	pH	Temperature	Specific Conductivity	Dissolved Oxygen	ORP	Sump H ₂ O Thickness
		<i>(feet BTOC)</i>		<i>(°C)</i>	<i>(m-mho/cm)</i>	<i>(mg/L)</i>	<i>(eV)</i>	<i>(feet)</i>
4/19/2016	1320	10.53	6.41	21.90	0.797	0.10	-127.3	5.03
7/12/2016	945	9.83	6.79	22.98	0.655	0.18	270.4	5.73
9/22/2016	1110	14.69	6.37	24.29	1.503	0.29	-15.0	0.87
1/13/2017	1325	9.05	6.53	21.51	0.864	0.08	-129.4	6.51

Table 40.1.2

B-3 Bioreactor Trench VOC Summary
April 2016 - April 2017

Q40 Date	T1-1			T1-2			T1-3			T2-1			T2-2			T3-1		
	4/21/2016	9/28/2016	3/9/2017	4/21/2016	9/29/2016	3/9/2017	4/22/2016	9/28/2016	3/9/2017	4/21/2016	9/28/2016	3/13/2017	4/21/2016	9/28/2016	3/13/2017	4/21/2016	9/26/2016	3/13/2017
PCE (µg/L)	0	0	0	0	0.50	0	0	0	0	26	18	11	0	0	0	37	62	55
TCE (µg/L)	0	0.18	0.61	0	5.7	0	0	0	0	30	26	13	0	0.30	0	60	73	77
cis-1,2-DCE (µg/L)	15	5.6	2.7	34	18	1.1	0.34	4.1	0.32	36	29	22	2.8	10	0.47	86	87	80
trans-1,2-DCE (µg/L)	0.99	1.6	0	5.2	0.90	1.3	0.51	0.67	0	0.26	0.73	0.52	1.9	2.8	1.5	0.59	0.99	1.1
Vinyl chloride (µg/L)	6.2	7.6	0.54	21	4.9	2.3	0	2.4	0.49	1.8	5.2	1.6	4.6	19	1.1	1.3	0	0
Ethene (µg/L)	0	5.0	0	0	2.2	0	0	2.2	0	0	0	0	18	16	6.4	0	0	0
PCE (nM/L)	0.000	0.000	0.000	0.000	3.015	0.000	0.000	0.000	0.000	155.400	108.605	67.177	0.000	0.000	0.000	224.628	371.284	332.690
TCE (nM/L)	0.000	1.370	4.643	0.000	43.611	0.000	0.000	0.000	0.000	232.057	198.417	97.192	0.000	2.283	0.000	457.950	553.771	589.771
cis-1,2-DCE (nM/L)	159.670	57.555	28.262	349.871	181.434	11.449	3.507	42.599	3.301	368.953	300.361	229.397	29.293	105.725	4.848	890.253	899.020	822.795
trans-1,2-DCE (nM/L)	10.211	16.916	0.000	53.430	9.283	13.203	5.260	6.911	0.000	2.682	7.530	5.364	19.495	28.881	15.575	6.086	10.211	11.449
Vinyl chloride (nM/L)	98.384	120.941	8.639	336.266	79.027	36.314	0.000	38.714	7.839	29.115	83.507	25.596	73.588	308.751	17.597	20.477	0.000	0.000
Ethene (nM/L)	0.000	178.253	0.000	0.000	78.431	0.000	0.000	78.431	0.000	0.000	0.000	0.000	623.886	573.975	228.164	0.000	0.000	0.000
Total Molar Conc. (nM/L)	268.27	375.04	41.54	739.57	394.80	60.97	8.77	166.66	11.14	788.21	698.42	424.72	746.26	1019.61	266.18	1599.39	1834.29	1756.71
% moles PCE	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	19.7%	15.6%	15.8%	0.0%	0.0%	0.0%	14.0%	20.2%	18.9%
% moles TCE	0.0%	0.4%	11.2%	0.0%	11.0%	0.0%	0.0%	0.0%	0.0%	29.4%	28.4%	22.9%	0.0%	0.2%	0.0%	28.6%	30.2%	33.6%
% moles cis-1,2-DCE	59.5%	15.3%	68.0%	47.3%	46.0%	18.8%	40.0%	25.6%	29.6%	46.8%	43.0%	54.0%	3.9%	10.4%	1.8%	55.7%	49.0%	46.8%
% moles trans-1,2-DCE	3.8%	4.5%	0.0%	7.2%	2.4%	21.7%	60.0%	4.1%	0.0%	0.3%	1.1%	1.3%	2.6%	2.8%	5.9%	0.4%	0.6%	0.7%
% moles Vinyl Chloride	36.7%	32.2%	20.8%	45.5%	20.0%	59.6%	0.0%	23.2%	70.4%	3.7%	12.0%	6.0%	9.9%	30.3%	6.6%	1.3%	0.0%	0.0%
% moles Ethene	0.0%	47.5%	0.0%	0.0%	19.9%	0.0%	0.0%	47.1%	0.0%	0.0%	0.0%	0.0%	83.6%	56.3%	85.7%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Q40 Date	T3-2			T4-1			T5-1			T5-2			T6-1			T6-2		
	4/20/2016	9/26/2016	3/13/2017	4/20/2016	9/26/2016	3/21/2017	4/20/2016	9/26/2016	3/13/2017	4/19/2016	9/22/2016	3/13/2017	4/19/2016	9/22/2016	3/13/2017	4/19/2016	9/22/2016	3/14/2017
PCE (µg/L)	24	28	27	29	1.2	1.9	3.0	11	21	0	0	2.6	12	0.53	0.92	0.27	0.70	3.9
TCE (µg/L)	32	30	43	38	7.7	2.9	10	18	32	0.29	0	3.9	18	0.45	3.3	0.26	0.42	8.3
cis-1,2-DCE (µg/L)	43	42	53	54	98	5.2	42	84	102	0.56	0.52	17	25	3.2	13	0.26	1.1	35
trans-1,2-DCE (µg/L)	0.24	0.44	0	0.31	2.3	0.29	0.63	1.4	1.2	0	0.30	0	0.24	0.33	0	0.53	0.88	0.62
Vinyl chloride (µg/L)	0	3.5	0	1.4	7.1	0.87	5.8	13	4.5	0	0	2.7	1.1	0.50	0.42	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	4.2	0	0	0	0	0	3.0	0
PCE (nM/L)	141.772	166.556	164.928	175.963	7.116	11.638	18.392	65.851	124.766	0.000	0.000	15.799	75.378	3.196	5.548	1.628	4.221	23.397
TCE (nM/L)	242.789	230.992	323.845	289.291	58.832	22.300	76.185	140.269	245.529	2.207	0.000	29.454	134.637	3.425	25.268	1.979	3.197	62.942
cis-1,2-DCE (nM/L)	444.250	428.881	547.292	551.934	1011.552	53.326	428.262	862.610	1047.550	5.776	5.364	178.752	262.919	32.904	132.130	2.682	11.759	361.011
trans-1,2-DCE (nM/L)	2.476	4.538	0.000	3.198	23.930	2.991	6.498	14.750	12.171	0.000	3.094	0.000	2.476	3.404	0.000	5.467	9.077	6.395
Vinyl chloride (nM/L)	0.000	55.511	0.000	21.757	114.062	13.918	92.465	211.646	72.468	0.000	0.000	43.833	17.437	7.999	6.719	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	149.733	0.000	0.000	0.000	0.000	0.000	106.952	0.000
Total Molar Conc. (nM/L)	831.29	886.48	1036.07	1042.14	1215.49	104.17	621.80	1295.13	1502.48	7.98	158.19	267.84	492.85	50.93	169.67	11.76	135.21	453.7
% moles PCE	17.1%	18.8%	15.9%	16.9%	0.6%	11.2%	3.0%	5.1%	8.3%	0.0%	0.0%	5.9%	15.3%	6.3%	3.3%	13.9%	3.1%	5.2%
% moles TCE	29.2%	26.1%	31.3%	27.8%	4.8%	21.4%	12.3%	10.8%	16.3%	27.6%	0.0%	11.0%	27.3%	6.7%	14.9%	16.8%	2.4%	13.9%
% moles cis-1,2-DCE	53.4%	48.4%	52.8%	53.0%	83.2%	51.2%	68.9%	66.6%	69.7%	72.4%	3.4%	66.7%	53.3%	64.6%	77.9%	22.8%	8.7%	79.6%
% moles trans-1,2-DCE	0.3%	0.5%	0.0%	0.3%	2.0%	2.9%	1.0%	1.1%	0.8%	0.0%	2.0%	0.0%	0.5%	6.7%	0.0%	46.5%	6.7%	1.4%
% moles Vinyl Chloride	0.0%	6.3%	0.0%	2.1%	9.4%	13.4%	14.9%	16.3%	4.8%	0.0%	0.0%	16.4%	3.5%	15.7%	4.0%	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%	94.7%	0.0%	0.0%	0.0%	0.0%	0.0%	79.1%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Well ID	Bioreactor Active Trench Sumps																		
	T1-1			T1-2			T1-3			T2-1			T2-2			T3-1			
	4/21/2016	9/28/2016	3/9/2017	4/21/2016	9/28/2016	3/9/2017	4/22/2016	9/28/2016	3/9/2017	4/21/2016	9/28/2016	3/13/2017	4/21/2016	9/28/2016	3/13/2017	4/21/2016	9/28/2016	3/13/2017	
Sample Date	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	6.8		6.9		4.0		5.3		26		7.3		11		15		17	
Methane	µg/L	0		333		44		1.2		764		3,600		793		2,540		7,590	
Ethane	µg/L	0		5.0		0		2.2	F	0		0		0		2.2	F	0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	47,000		112,000		133,000		43,400		78,800		453,000		40,100		96,700		28,600	
Sulfate	mg/L	23		22		12		13		2.2		5.8		12		5.6		0.75	F
Chloride	mg/L	11		14		14		11		11		13		12		13		10	
Ferrous Iron	mg/L	2.3		3.9		1.2		2.1		7.3		3.9		5.6		8.1		4.1	
Manganese	µg/L	643		338		287		436		688		357		404		708		593	
Hydrogen	nM					16		6.0	n	1.4	n			16		8.1	n	1.2	n
Sulfide	mg/L	0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	419		497		380		401		525		439		428		493		466	
Benzene	µg/L	0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	15		5.6		2.7		34		18		1.1	F	0.34	F	4.1		0.32	F
Dichloroethene, trans-1,2-	µg/L	0.99		1.6		0		5.2		0.90		1.3		0.51	F	0.67		0.26	F
Methylene chloride	µg/L	0		0		0		0		0		0		0		0.41	F	0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0		0		0.50	F	0		0		0		0		26	
Toluene	µg/L	0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0		0.18	F	0.61	F	0		5.7		0		0		30		26	
Vinyl chloride	µg/L	6.2		7.6		0.54	F	21		4.9		2.3		0		2.4		0.49	F
Arsenic	µg/L	3.8	F	5.2	F	4.1	F	0		6.5	F	2.1	F	4.4	F	6.1	F	2.7	F
		Month 108		Month 113		Month 119		Month 108		Month 113		Month 119		Month 108		Month 113		Month 119	

Note: 0 sample indicates a non-detect analyte value

Well ID	Bioreactor Active Trench Sumps																		
	T3-2			T4-1			T5-1			T5-2			T6-1			T6-2			
	4/20/2016	9/26/2016	3/13/2017	4/20/2016	9/26/2016	3/21/2017	4/20/2016	9/26/2016	3/13/2017	4/19/2016	9/22/2016	3/13/2017	4/19/2016	9/22/2016	3/13/2017	4/19/2016	9/22/2016	3/14/2017	
Sample Date	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	11		30		2.7	F	12		14		9.5		3.2		3.0		1.7	
Methane	µg/L	19		0		7.7		39		56		1,850		65		5.5		69	
Ethane	µg/L	0		0		0		0		0		0		0		4.2		0	
Ethane	µg/L	0		0		0		0		0		0		0		2.2		0	
Carbon Dioxide	µg/L	59,000		60,600		11,900		73,300		25,700		124,000		53,200		73,800		37,200	
Sulfate	mg/L	11		13		21		14		12		2.8		12		61		32	
Chloride	mg/L	10		10		12		10		12		13		10		13		5.4	
Ferrous Iron	mg/L	0.57	F	2.6		0.33	F	3.3		7.6		9.1		0.92	F	2.1		0.59	F
Manganese	µg/L	1,220		161		187		296		226		463		92		36		15	
Hydrogen	nM					12		1.9	n	8.4	n	25		2.0	n	7.9	n		
Sulfide	mg/L	0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	432		559		351		414		499		500		348		439		372	
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	0.33		0		0		0.33		0.080	F	0		0.17	F	0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	43		42		53		54		98		5.2		42		84		102	
Dichloroethene, trans-1,2-	µg/L	0.24	F	0.44	F	0		0.31	F	2.3		0.29	F	0.63		1.4		1.2	
Methylene chloride	µg/L	0.42	F	0		0		0.40	F	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	24		28		27		29		1.2	F	1.9		3.0		11		21	
Toluene	µg/L	0		0		0		0		0.21	F	0		0		0		0	
Trichloroethene	µg/L	32		30		43		38		7.7		2.9		10		18		32	
Vinyl chloride	µg/L	0		3.5		0		1.4		7.1		0.87	F	5.8		13		4.5	
Arsenic	µg/L	10	F	3.2	F	0.30	F	7.6	F	7.2	F	20	F	2.2	F	1.5	F	0	
		Month 108		Month 113		Month 119		Month 108		Month 113		Month 119		Month 108		Month 113		Month 119	

Table 40.2.2

Upper Saturated Zone (Zone 03B) VOC Summary
April 2016 - April 2017

Q40	CS-WB05-LGR03B			CS-WB06-LGR03B			CS-WB07-LGR03B			CS-WB08-LGR03B		
Date	4/5/2016	9/21/2016	3/8/2017	4/11/2016	9/19/2016	3/8/2017	4/6/2016	9/20/2016	3/8/2017	4/12/2016	9/21/2016	3/8/2017
PCE (µg/L)	1.2	1.1	2.5	27	83	14	30	70	59	107	91	46
TCE (µg/L)	28	31	36	63	76	85	40	107	86	134	113	58
cis-1,2-DCE (µg/L)	55	83	86	113	129	119	50	145	99	158	132	57
trans-1,2-DCE (µg/L)	5.2	7.0	7.8	0.99	1.1	1.2	0.99	2.2	1.7	1.6	1.3	0.57
Vinyl chloride (µg/L)	11	10	10	0	0	0	1.1	1.1	0.35	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0
PCE (nM/L)	7.478	6.513	15.136	161.551	499.729	84.062	177.893	421.214	353.133	643.430	548.514	276.247
TCE (nM/L)	210.138	233.275	274.070	480.250	575.843	643.809	304.742	816.120	655.377	1019.941	863.308	440.292
cis-1,2-DCE (nM/L)	566.581	856.111	885.508	1169.366	1334.502	1225.374	513.667	1497.267	1024.239	1630.634	1358.845	586.178
trans-1,2-DCE (nM/L)	53.223	71.996	80.248	10.211	11.862	12.378	10.211	22.383	17.844	16.194	13.615	5.879
Vinyl chloride (nM/L)	178.691	160.454	165.254	0.000	0.000	0.000	17.757	16.957	5.599	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Molar Conc. (nM/L)	1016.11	1328.35	1420.21	1821.38	2421.94	1965.62	1024.27	2773.94	2056.19	3310.20	2784.28	1308.6
% moles PCE	0.7%	0.5%	1.1%	8.9%	20.6%	4.3%	17.4%	15.2%	17.2%	19.4%	19.7%	21.1%
% moles TCE	20.7%	17.6%	19.3%	26.4%	23.8%	32.8%	29.8%	29.4%	31.9%	30.8%	31.0%	33.6%
% moles cis-1,2-DCE	55.8%	64.4%	62.4%	64.2%	55.1%	62.3%	50.2%	54.0%	49.8%	49.3%	48.8%	44.8%
% moles trans-1,2-DCE	5.2%	5.4%	5.7%	0.6%	0.5%	0.6%	1.0%	0.8%	0.9%	0.5%	0.5%	0.4%
% moles Vinyl Chloride	17.6%	12.1%	11.6%	0.0%	0.0%	0.0%	1.7%	0.6%	0.3%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 40.2.3a

B-3 Bioreactor Multi-Port Well CS-WB05 Analytical Summary
April 2016 - April 2017

Q40		CS-WB05																			
Well ID		CS-WB05-LGR-01				CS-WB05-LGR-02				CS-WB05-LGR03A				CS-WB05-LGR03B				CS-WB05-LGR-04A			
Sample Date		4/6/2016		12/28/2016		12/28/2016		4/5/2016		12/27/2016		4/5/2016		9/21/2016		3/8/2017		4/5/2016		12/27/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	1.2		1.4		1.2		0.90	F	1.1		0.92	F	0.91	F	1.4		1.0		1.3	
Methane	µg/L	0		0		0		56		19		70		23		0		528		464	
Ethene	µg/L	0		0		0		0		0		0		0		0		1.2	F	0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	29,900		20,700		23,400		19,700		15,400		24,000		14,300		1,350		16,600		17,500	
Sulfate	mg/L	113		94		89		47		41		47		45		44		23		19	
Chloride	mg/L	13		13		11		11		10		11		11		11		12		11	
Ferrous Iron	mg/L	0.16	F	0.19	F	0		0		0.16	F	0		0.38	F	0.16	F	0.35	F	1.4	
Manganese	µg/L	0		2.0	F	4.0	F	0		0		0		0		0		7.0		7.0	
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	516		541		488		362		381		353		372		374		335		357	
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		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	3.1		3.7		22		51		90		55		83		86		409		485	
Dichloroethene, trans-1,2-	µg/L	0.76		0.87		2.7		4.5		6.9		5.2		7.0		7.8		11		13	
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	0.34	F	0		5.5		1.2	F	4.6		1.2	F	1.1	F	2.5		0.32	F	1.2	F
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0.43	F	0.47	F	10		25		31		28		31		36		3.6		31	
Vinyl chloride	µg/L	0		0		0		9.1		8.1		11		10		10		64		62	
Arsenic	µg/L	3.5	F	0.40	F	0.40	F	3.7	F	0.80	F	5.5	F	0		0.60	F	3.1	F	1.1	F
		Q36-Month 108		Q39-Month 116		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q38-Month 113		Q40-Month 119		Q36-Month 108		Q39-Month 116	

Note: 0 sample indicates a non-detect analyte value

Q40		CS-WB05															
Well ID		CS-WB05-LGR-04B				CS-WB05-BS-01				CS-WB05-CC-01				CS-WB05-CC-02			
Sample Date		4/5/2016		12/27/2016		4/5/2016		12/22/2016		4/4/2016		12/22/2016		4/4/2016		12/22/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	1.4		1.4		0.88	F	0.86	F	0.77	F	1.0		0.92	F	1.0	
Methane	µg/L	1,890		1,090		27		25		1.9		3.2		3.9		4.1	
Ethene	µg/L	14		6.6		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	31,900		27,000		12,500		11,800		11,500		11,100		11,600		16,000	
Sulfate	mg/L	9.6		8.6		34		28		88		84		102		99	
Chloride	mg/L	13		12		12		10		17		16		18		17	
Ferrous Iron	mg/L	1.8		0.31	F	0.20	F	0.17	F	0.32	F	0.24	F	0.26	F	0.32	F
Manganese	µg/L	38		34		0		0		0		2.0	F	0		2.0	F
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	333		364		314		353		407		428		428		454	
Benzene	µg/L	0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	97		316		23		34		0		0.95	F	9.2		12	
Dichloroethene, trans-1,2-	µg/L	8.3		10		0		0.46	F	0		1.2		6.3		8.7	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		1.3		0	
Tetrachloroethene	µg/L	32		95		0		0		0		0		0		0	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	55		240		0		0.29	F	0		0		0.35	F	0	
Vinyl chloride	µg/L	206		92		2.8		3.4		0		0		0		0	
Arsenic	µg/L	25	F	20	F	3.4	F	0.30	F	0		0		0.50	F	0.40	F
		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116	

Note: 0 sample indicates a non-detect analyte value

Table 40.2.3b

B-3 Bioreactor Multi-Port Well CS-WB06 Analytical Summary
April 2016 - April 2017

Q40		CS-WB06											
Well ID		CS-WB06-UGR-01				CS-WB06-LGR-01				CS-WB06-LGR-02			
Sample Date		4/12/2016		12/20/2016		4/11/2016		12/20/2016		4/11/2016		12/20/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	1.9		2.4		2.3		2.4		0.91	F	1.1	
Methane	µg/L	187		60		0		0		5.3		7.5	
Ethene	µg/L	0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0	
Carbon Dioxide	µg/L	39,100		38,600		30,700		33,600		10,100		11,700	
Sulfate	mg/L	14		13		16		17		25		24	
Chloride	mg/L	13		11		13		11		8.8		8.8	
Ferrous Iron	mg/L	0.16	F	0.47	F	0		0		0.18	F	0	
Manganese	µg/L	550		483		33		27		2.0	F	4.0	F
Sulfide	mg/L	0		0		0		0		0		0	
Total Dissolved Solids	mg/L	404		439		425		440		322		338	
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	75		58		18		10		12		17	
Dichloroethene, trans-1,2-	µg/L	2.3		0.65		0		0		0		0	
Methylene chloride	µg/L	0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		1.6		5.7		7.2		0.28	F	0.53	F
Toluene	µg/L	0		0		0		0		0		0	
Trichloroethene	µg/L	5.7		5.1		5.0		6.5		0.97	F	1.8	
Vinyl chloride	µg/L	14		5.6		0		0		0.52	F	1.1	
Arsenic	µg/L	1.2	F	12	F	1.7	F	21	F	0.50	F	5.1	F
		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116	

Note: 0 sample indicates a non-detect analyte value

Q40		CS-WB06													
Well ID		CS-WB06-LGR03A				CS-WB06-LGR03B				CS-WB06-LGR-04					
Sample Date		4/11/2016		12/20/2016		4/11/2016		9/19/2016		3/8/2017		4/11/2016		12/19/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	0.92	F	1.1		0		0.98	F	1.1		0.69	F	1.2	
Methane	µg/L	0.60	F	0		0.90	F	0		1.2		1.6		131	
Ethene	µg/L	0		0		0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	11,100		16,200		17,200		13,800		17,100		39,500		32,100	
Sulfate	mg/L	23		23		23		25		25		13		12	
Chloride	mg/L	11		11		11		12		12		14		13	
Ferrous Iron	mg/L	0.19	F	0		0		0		0		0		0	
Manganese	µg/L	0		3.0	F	0		0		0		0		0	
Sulfide	mg/L	0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	328		344		330		348		342		394		384	
Benzene	µg/L	0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0.18	F	0		0		0	
Dichloroethene, cis-1,2-	µg/L	108		137		113		129		119		92		129	
Dichloroethene, trans-1,2-	µg/L	0		1.3		0.99		1.1		1.2		0		1.7	
Methylene chloride	µg/L	0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	25		24		27		83		14		35		74	
Toluene	µg/L	0		0		0		0		0		0		0	
Trichloroethene	µg/L	56		91		63		76		85		31		61	
Vinyl chloride	µg/L	0		0		0		0		0		0		0.72	F
Arsenic	µg/L	0		5.3	F	1.1	F	1.6	F	0		0.30	F	11	F
		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q38-Month 113		Q40-Month 119		Q36-Month 108		Q39-Month 116	

Note: 0 sample indicates a non-detect analyte value

Table 40.2.3c

B-3 Bioreactor Multi-Port Well CS-WB07 Analytical Summary
April 2016 - April 2017

Q40		CS-WB07																					
Well ID		CS-WB07-LGR-01				CS-WB07-LGR-02				CS-WB07-LGR03A				CS-WB07-LGR03B				CS-WB07-LGR-04					
Sample Date		4/7/2016		12/19/2016		4/7/2016		12/19/2016		4/7/2016		12/19/2016		4/6/2016		9/20/2016		3/8/2017		4/6/2016		12/19/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	2.5		3.2		1.4		1.9		0.91	F	1.0		0.91	F	0.92	F	1.1		0.96	F	1.0	
Methane	µg/L	1,250		732		85		86		0		0		0		0		0		0		0	
Ethene	µg/L	1.8	F	0		0		0		0		0		0		0		0		0		0	
Ethane	µg/L	1.9	F	0		0		0		0		0		0		0		0		0		0	
Carbon Dioxide	µg/L	46,200		54,500		20,400		22,300		12,300		12,400		12,100		16,400		16,900		30,000		25,000	
Sulfate	mg/L	12		6.9		31		24		21		14		23		19		19		11		9.3	
Chloride	mg/L	19		16		15		14		10		11		11		12		11		13		12	
Ferrous Iron	mg/L	1.5		1.8		0.29	F	0.56	F	0.32	F	0		0		0.37	F	0		0		0	
Manganese	µg/L	814		969		17		23		0		2.0	F	0		0		2.0	F	0		2.0	F
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	401		483		394		430		376		357		317		342		328		314		347	
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0.16	F	0		0		0		0.20	F	0.35	
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		0.42	F
Dichloroethene, cis-1,2-	µg/L	97		96		21		30		51		199		50		145		99		283		456	
Dichloroethene, trans-1,2-	µg/L	1.6		1.6		0.47	F	0.60		1.0		1.6		0.99		2.2		1.7		0		2.5	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0.50	F	0.50	F	2.4		23		101		30		70		59		168		282	
Toluene	µg/L	0		0		0		0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	7.0		3.8		0.65	F	2.3		36		151		40		107		86		205		338	
Vinyl chloride	µg/L	17		17		4.1		5.9		1.1	F	0		1.1		1.1	F	0.35	F	0		0	
Arsenic	µg/L	7.6	F	12	F	3.6	F	9.7	F	8.5	F	3.7	F	1.0	F	0		0.70	F	2.8	F	7.7	F
		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q38-Month 113		Q40-Month 119		Q36-Month 108		Q39-Month 116	

Note: 0 sample indicates a non-detect analyte value

Table 40.2.3d

B-3 Bioreactor Multi-Port Well CS-WB08 Analytical Summary
 April 2016 - April 2017

Well ID		CS-WB08																										
Sample Date		CS-WB08-UGR-01				CS-WB08-LGR-01				CS-WB08-LGR-02				CS-WB08-LGR03A				CS-WB08-LGR03B				CS-WB08-LGR-04						
Compound		4/13/2016		12/21/2016		4/12/2016		12/21/2016		4/12/2016		12/21/2016		4/12/2016		12/21/2016		4/12/2016		9/21/2016		3/8/2017		4/12/2016		12/21/2016		
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
Total Organic Carbon	mg/L	2.2		2.4		1.1		1.3		1.1		1.1		0.89	F	1.1		0.93	F	1.0		1.2		2.3		2.1		
Methane	µg/L	655		341		0		0		6.8		13		0		0		0		0		0		0.90	F	0		
Ethene	µg/L	11		10		0		0		0		0		0		0		0		0		0		0		0		
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Carbon Dioxide	µg/L	60,100		29,200		20,100		23,100		18,000		19,800		20,300		34,200		21,900		19,500		8,020		22,400		36,900		
Sulfate	mg/L	6.9		8.3		100		107		99		104		15		17		15		18		20		12		12		
Chloride	mg/L	13		13		11		10		10		10		11		11		13		11		11		16		11		
Ferrous Iron	mg/L	0.84	F	1.1		0		0.17	F	0		0.24	F	0.16	F	0.17	F	0		0.52	F	0.26	F	0.16	F	0		
Manganese	µg/L	568		444		0		4.0	F	0		2.0	F	0		735		0		0		0		21		21		
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Total Dissolved Solids	mg/L	462		426		554		554		523		542		347		398		351		361		350		422		417		
Benzene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Bromoform	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Chloroform	µg/L	0		0		0		0		0		0		0.15	F	0		0.15	F	0.14	F	0		0		0		
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Dichloroethene, cis-1,2-	µg/L	193		262		24		22		6.6		6.5		159		127		158		132		57		25		8.3		
Dichloroethene, trans-1,2-	µg/L	2.7		2.7		1.7		1.5		0		0		1.4		1.3		1.6		1.3		0.57	F	0.36	F	0		
Methylene chloride	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Naphthalene	µg/L	0		0		0		0		0		0		0		0		0		0		0		0		0		
Tetrachloroethene	µg/L	0.45	F	1.8		0		0.34	F	1.6		0.96	F	106		149		107		91		46		1.1	F	4.1		
Toluene	µg/L	0.10	F	0		0		0		0		0		0		0		0		0		0		0		0		
Trichloroethene	µg/L	1.4		1.0		0		0.32	F	1.6		0.73	F	131		138		134		113		58		1.9		3.1		
Vinyl chloride	µg/L	73		70		1.1		1.3		0.46	F	1.0	F	0		0		0		0		0		0.67	F	0		
Arsenic	µg/L	2.4	F	1.7	F	2.5	F	0		0		0		3.0	F	0.30	F	1.4	F	3.9	F	0		4.2	F	0.70	F	
		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q39-Month 116		Q36-Month 108		Q38-Month 113		Q40-Month 119		Q36-Month 108		Q39-Month 116		

Note: 0 sample indicates a non-detect analyte value

Table 40.3.3

B-3 Bioreactor Monitoring Well Analytical Summary
April 2016 - April 2017

Q40		Monitoring Wells																							
Well ID	Sample Date	CS-MW1-LGR						CS-D						CS-B3-MW01				CS-B3-MW02		CS-B3-MW04		CS-4		CS-MW5-LGR	
		4/14/2016		9/21/2016		3/7/2017		4/14/2016		9/22/2016		3/6/2017		4/14/2016		12/28/2016		3/21/2017		3/28/2017		9/9/2016		3/6/2017	
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
Total Organic Carbon	mg/L	0.74	F	0.86	F	0.88	F	0.78	F	0.81	F	0.80	F	5.1		6.2		1.7		3.8				0.84	F
Methane	µg/L	0		0		0		0		0		0		16,800		22,100		2.6		815				0	
Ethene	µg/L	0		0		0		0		0		0		6.1		8.2		0		0				0	
Ethane	µg/L	0		0		0		0		0		0		0		0		0		0.90	F			0	
Carbon Dioxide	µg/L	30,900		25,500		24,500		20,600		21,900		19,800		146,000		139,000		16,300		313	F			23,700	
Sulfate	mg/L	17		18		24		17		18		18		3.0		0.81	F	20		21				15	
Chloride	mg/L	9.9		10		10		9.1		12		10		12		11		12		15				8.7	
Ferrous Iron	mg/L	0.19	F	0		0		0.32	F	0		0.21	F	3.4		3.3		0		0.44	F			0	
Manganese	µg/L	0		0		0		0		6.0		0		129		128		50		7.0				0	
Hydrogen	nM	10		1.9	n	1.5	n																		
Sulfide	mg/L	0		0		0		0		0		0		0		0		0		0				0	
Total Dissolved Solids	mg/L	319		311		333		308		308		310		490		471		366		592				307	
Benzene	µg/L	0				0		0				0		0		0		0		0.21	F			0	
Bromodichloromethane	µg/L	0				0		0				0		0		0		0		0				0	
Bromoform	µg/L	0				0		0				0		0		0		0		0				0	
Chloroform	µg/L	0				0		0				0		0		0		0		0				0	
Dibromochloromethane	µg/L	0				0		0				0		0		0		0		0				0	
Dichlorodifluoromethane	µg/L	0				0		0				0		0		0		0		0				0	
Dichloroethene, 1,1-	µg/L	0				0		0				0		0		0		0		0				0	
Dichloroethene, cis-1,2-	µg/L	21		24		26		10		13		6.6		0		4.9		39		16		0		11	
Dichloroethene, trans-1,2-	µg/L	0				0.61		0				0		2.8		3.9		0.25	F	0.81				0.46	F
Methylene chloride	µg/L	0				0		0				0		0		0		0		0				0	
Naphthalene	µg/L	0				0		0				0		0		0		0		0				0	
Tetrachloroethene	µg/L	16		15		17		13		13		8.1		0		0		17		2.0		0.68	F	5.6	
Toluene	µg/L	0				0		0		0		0		0		0		14		771				0	
Trichloroethene	µg/L	28		24		17		14		19		10		0		0.45	F	22		3.5		0.64	F	12	
Vinyl chloride	µg/L	0		0		0		0		0		0		87		129		0		4.5		0		0	
Arsenic	µg/L	1.8	F	0		0.30	F	1.5	F	0		4.7	F	0		0.30	F	13	F	28	F			2.4	F

Note: 0 sample indicates a non-detect analyte value

Table 40.4.4

SWMU B-3 Microbial Data Summary
April 2016 - April 2017

Trench Sump				
B3-T1-2	Sample Date:	4/21/2016	9/29/2016	3/9/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	8.66E+03	2.36E+03	1.13E+03
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	2.35E+02	3.94E+01	1.86E+02
BAV1 VC R-Dase (1)	cells/mL	1.98E+03	4.61E+02	6.87E+02
VC R-Dase	cells/mL	1.06E+02	2.30E+02	2.96E+02
B3-T2-1	Sample Date:	4/21/2016	9/28/2016	3/13/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	8.04E+04	1.64E+04	1.82E+01
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	1.57E+02	1.95E+01	3.40E+00
BAV1 VC R-Dase (1)	cells/mL	1.30E+00	8.21E+01	2.80E+00
VC R-Dase	cells/mL	4.76E+03	3.80E+03	1.60E+01
B3-T3-1	Sample Date:	4/21/2016	9/26/2016	3/13/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	6.58E+03	3.40E+00	< 5.00E-01
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	1.08E+02	< 5.00E-01	< 5.00E-01
BAV1 VC R-Dase (1)	cells/mL	2.01E+02	< 5.00E-01	< 5.00E-01
VC R-Dase	cells/mL	6.45E+01	< 5.00E-01	< 5.00E-01
B3-T4-1	Sample Date:	4/20/2016	9/26/2016	3/14/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	4.50E+03	3.50E+03	3.70E+01
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	5.21E+01	3.75E+01	2.01E+01
BAV1 VC R-Dase (1)	cells/mL	4.22E+01	6.92E+01	4.40E+00
VC R-Dase	cells/mL	4.52E+01	4.40E+02	8.00E+00
B3-T5-1	Sample Date:	4/20/2016	9/26/2016	3/13/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	2.52E+03	7.68E+03	1.04E+02
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	5.87E+01	1.40E+02	2.89E+01
BAV1 VC R-Dase (1)	cells/mL	5.00E+01	1.08E+02	2.16E+01
VC R-Dase	cells/mL	3.19E+01	1.07E+03	9.56E+01
B3-T6-2	Sample Date:	4/19/2016	9/22/2016	3/14/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	4.93E+04	4.52E+04	2.33E+02
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	3.81E+02	4.87E+02	6.63E+01
BAV1 VC R-Dase (1)	cells/mL	4.79E+03	4.71E+03	2.28E+02
VC R-Dase	cells/mL	1.28E+03	2.47E+03	8.43E+01

Extraction Wells				
CS-MW16-LGR	Sample Date:	4/8/2016	12/29/2016	Not Sampled
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	< 5.00E-01	9.00E-01	--
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01	--
BAV1 VC R-Dase (1)	cells/mL	< 5.00E-01	3.00E-01 F	--
VC R-Dase	cells/mL	< 5.00E-01	< 5.00E-01	--

Monitoring Wells				
CS-MW1-LGR	Sample Date:	4/14/2016	9/21/2016	3/7/2017
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	8.00E-01	3.00E-01 F	< 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

Extraction Wells				
B3-EXW01	Sample Date:	4/8/2016	12/29/2016	Not Sampled
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	< 5.00E-01	3.70E+00	--
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	< 5.00E-01	< 5.00E-01	--
BAV1 VC R-Dase (1)	cells/mL	< 5.00E-01	3.00E-01 F	--
VC R-Dase	cells/mL	< 5.00E-01	2.00E-01 F	--

Westbay Multi-Port Wells				
CS-WB05-LGR-04B	Sample Date:	4/5/2016	12/29/2016	Not Sampled
Dechlorinating Bacteria	Units			
Dehalococcoides spp (1)	cells/mL	2.12E+02	4.07E+01	--
Functional Genes	Units			
TCE R-Dase (1)	cells/mL	3.80E+00	1.20E+00	--
BAV1 VC R-Dase (1)	cells/mL	5.00E-01 F	8.00E-01	--
VC R-Dase	cells/mL	< 5.00E-01	< 5.00E-01	--

Table 40.5.2

Storage Tank (UIC) VOC Summary
April 2016 - April 2017

Q40	B3-UIC				
Date	4/20/2016	7/12/2016	9/14/2016	12/8/2016	3/14/2017
PCE (µg/L)	99	0	104	74	79
TCE (µg/L)	129	76	130	92	101
cis-1,2-DCE (µg/L)	147	75	152	91	96
trans-1,2-DCE (µg/L)	0.69	1.3	0.91	0.57	0.53
Vinyl chloride (µg/L)	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0
PCE (nM/L)	595.791	0.000	629.018	448.532	473.437
TCE (nM/L)	978.157	581.932	989.116	702.717	767.334
cis-1,2-DCE (nM/L)	1512.120	776.689	1569.985	937.390	995.358
trans-1,2-DCE (nM/L)	7.117	12.996	9.386	5.879	5.467
Vinyl chloride (nM/L)	0.000	0.000	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000
Total Molar Conc. (nM/L)	3093.2	1371.6	3197.5	2094.5	2241.6
% moles PCE	19.3%	0.0%	19.7%	21.4%	21.1%
% moles TCE	31.6%	42.4%	30.9%	33.6%	34.2%
% moles cis-1,2-DCE	48.9%	56.6%	49.1%	44.8%	44.4%
% moles trans-1,2-DCE	0.2%	0.9%	0.3%	0.3%	0.2%
% moles Vinyl Chloride	0.0%	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 40.5.3

SWMU B3-UIC Analytical Summary Table
April 2016 - April 2017

Well ID		B3-UIC									
Sample Date		4/20/2016		7/12/2016		9/14/2016		12/8/2016		3/14/2017	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Dissolved Solids	mg/L	357		349		336		341		350	
Benzene	µg/L	0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0	
Chloroform	µg/L	0		0.090	F	0.17	F	0.12	F	0	
Dibromochloromethane	µg/L	0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	147		75		152		91		96	
Dichloroethene, trans-1,2-	µg/L	0.69		1.3		0.91		0.57	F	0.53	F
Methylene chloride	µg/L	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0	
Tetrachloroethene	µg/L	99		0		104		74		79	
Toluene	µg/L	0		0		0		0		0	
Trichloroethene	µg/L	129		76		130		92		101	
Vinyl chloride	µg/L	0		0		0		0		0	

Table 40.6.2

B-3 Bioreactor Extraction Well VOC Summary
April 2016 - April 2017

Q39/Q40 Date	16-LGR		16-CC		EXW01		EXW02		EXW03		EXW04		EXW05
	4/8/2016	12/8/2016	4/8/2016	12/8/2016	4/8/2016	12/8/2016	4/8/2016	12/8/2016	4/8/2016	12/8/2016	4/8/2016	12/8/2016	4/8/2016
PCE (µg/L)	79	65	0	0	104	118	56	59	3.4	0.74	100	1.0	44
TCE (µg/L)	82	79	3.3	1.3	116	135	84	89	3.3	0.73	128	1.2	60
cis-1,2-DCE (µg/L)	87	82	11	12	163	172	70	75	19	2.3	150	3.5	49
trans-1,2-DCE (µg/L)	0.30	0.21	6.4	5.9	0.92	0.84	0.57	0.51	0.42	0	0.81	0	0.30
Vinyl chloride (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0	0
Ethene (µg/L)	0	0	0	0	0	0	0	0	0	0	0	0	0
PCE (nM/L)	476.030	390.701	0.000	0.000	629.802	710.366	334.982	353.917	20.503	4.462	600.917	6.151	263.885
TCE (nM/L)	622.346	603.242	25.268	9.894	883.096	1030.672	642.819	675.394	25.116	5.556	972.372	8.981	456.732
cis-1,2-DCE (nM/L)	895.719	840.743	118.412	118.618	1680.660	1777.102	722.331	769.056	195.874	23.414	1544.817	35.792	504.074
trans-1,2-DCE (nM/L)	3.094	2.166	65.807	60.856	9.489	8.664	5.879	5.260	4.332	0.000	8.355	0.000	3.094
Vinyl chloride (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ethene (nM/L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Molar Conc. (nM/L)	1997.19	1836.9	209.49	189.37	3203.05	3526.80	1706.01	1803.63	245.83	33.43	3126.46	50.92	1227.79
% moles PCE	23.8%	21.3%	0.0%	0.0%	19.7%	20.1%	19.6%	19.6%	8.3%	13.3%	19.2%	12.1%	21.5%
% moles TCE	31.2%	32.8%	12.1%	5.2%	27.6%	29.2%	37.7%	37.4%	10.2%	16.6%	31.1%	17.6%	37.2%
% moles cis-1,2-DCE	44.8%	45.8%	56.5%	62.6%	52.5%	50.4%	42.3%	42.6%	79.7%	70.0%	49.4%	70.3%	41.1%
% moles trans-1,2-DCE	0.2%	0.1%	31.4%	32.1%	0.3%	0.2%	0.3%	0.3%	1.8%	0.0%	0.3%	0.0%	0.3%
% moles Vinyl Chloride	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% moles Ethene	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
sum % moles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: 0 sample indicates a non-detect analyte value

Table 40.6.3

B-3 Bioreactor Extraction Well Analytical Summary
April 2016 - April 2017

Q40		Extraction Wells															
Well ID		CS-MW16-LGR				CS-MW16-CC				B3-EXW01				B3-EXW02			
Sample Date	Units	4/8/2016		12/8/2016		4/8/2016		12/8/2016		4/8/2016		12/8/2016		4/8/2016		12/8/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	0.82	F	0.89	F	0.84	F	0.87	F	0.96	F	1.1		0.92	F	0.98	F
Methane	µg/L	0		0		7.4		3.8		0		0		0		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	28,400		8,750		22,700		16,400		37,600		25,400		34,100		24,100	
Sulfate	mg/L	18		17		75		73		12		11		13		12	
Chloride	mg/L	10		9.5		19		17		12		12		12		12	
Ferrous Iron	mg/L	0		0		0.16	F	0.57	F	0		0		0		0	
Manganese	µg/L	0		0		0		2.0	F	0		4.0	F	0		0	
Hydrogen	nM	16		5.0	n					2.2		6.2	n				
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	318		332		398		414		351		361		344		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	0.10	F	0		0		0		0.16	F	0.14	F	0.14	F	0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	87		82		11		12		163		172		70		75	
Dichloroethene, trans-1,2-	µg/L	0.30	F	0.21	F	6.4		5.9		0.92		0.84		0.57	F	0.51	F
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	1.5		0		1.6		0		0		0		0		0	
Tetrachloroethene	µg/L	79		65		0		0		104		118		56		59	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	82		79		3.3		1.3		116		135		84		89	
Vinyl chloride	µg/L	0		0		0		0		0		0		0		0	
Arsenic	µg/L	4.2	F	4.1	F	3.1	F	0		4.1	F	3.1	F	4.2	F	1.7	F

Note: 0 sample indicates a non-detect analyte value

Q40		Extraction Wells									
Well ID		B3-EXW03				B3-EXW04				B3-EXW05	
Sample Date	Units	4/8/2016		12/8/2016		4/8/2016		12/8/2016		4/8/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	2.7		7.1		0.99	F	2.3		0.76	F
Methane	µg/L	0		0		0		0		0	
Ethene	µg/L	0		0		0		0		0	
Ethane	µg/L	0		0		0		0		0	
Carbon Dioxide	µg/L	43,900		33,500		28,100		43,400		19,100	
Sulfate	mg/L	13		11		9.4		10		20	
Chloride	mg/L	16		9.1		12		9.1		9.2	
Ferrous Iron	mg/L	0.27	F	0		0		0.65	F	0.17	F
Manganese	µg/L	1,980		36		2.0	F	648		2.0	F
Hydrogen	nM										
Sulfide	mg/L	0		0		0		0		0	
Total Dissolved Solids	mg/L	425		371		352		400		329	
Benzene	µg/L	0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0	
Chloroform	µg/L	0		0		0.17	F	0		0.15	F
Dibromochloromethane	µg/L	0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	19		2.3		150		3.5		49	
Dichloroethene, trans-1,2-	µg/L	0.42	F	0		0.81		0		0.30	F
Methylene chloride	µg/L	0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0	
Tetrachloroethene	µg/L	3.4		0.74	F	100		1.0	F	44	
Toluene	µg/L	0		0		0		0		0	
Trichloroethene	µg/L	3.3		0.73	F	128		1.2		60	
Vinyl chloride	µg/L	0		0		0		0		0	
Arsenic	µg/L	13	F	7.1	F	6.1	F	5.5	F	3.8	F

Note: 0 sample indicates a non-detect analyte value

Table 40.7.3

B-3 Bioreactor UGR Well Analytical Summary
April 2016 - April 2017

Q40		Shallow UGR Wells															
Well ID		B3-MW26-UGR				B3-MW27-UGR				B3-MW29-UGR				B3-MW30-UGR			
Sample Date		4/18/2016		12/7/2016		4/18/2016		12/7/2016		4/18/2016		12/7/2016		4/18/2016		12/7/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	2.5		2.5		3.3		2.8		3.0		2.4		12		14	
Methane	µg/L	2,910		581		3,250		2,420		0		0		0		0	
Ethene	µg/L	4.1		0		3.6		2.1	F	0		0		0		0	
Ethane	µg/L	11		0		7.1		3.9		0		0		0		0	
Carbon Dioxide	µg/L	105,000		78,000		117,000		87,200		47,400		82,300		73,700		49,200	
Sulfate	mg/L	12		23		6.2		4.9		26		24		24		22	
Chloride	mg/L	22		15		14		13		22		13		9.0		11	
Ferrous Iron	mg/L	0.62	F	0.20	F	0.68	F	0.66	F	1.8		0		0.21	F	0	
Manganese	µg/L	1,180		475		233		319		53		151		21		12	
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	452		464		422		440		383		440		450		468	
Benzene	µg/L	0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	8.0		1.4		4.7		2.0		0		0		3.7		0.39	F
Dichloroethene, trans-1,2-	µg/L	1.8		0.43	F	1.7		0.78		0		0		0		0	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	0		0.27	F	0		0.26	F	0		0.27	F	4.2		4.3	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	0		0.23	F	0		0.26	F	0		0		2.2		0.86	F
Vinyl chloride	µg/L	7.2		0.82	F	4.6		3.0		0		0		0		0	
Arsenic	µg/L	0.60	F	6.5	F	4.3	F	16	F	0.40	F	6.0	F	0		1.2	F

Note: 0 sample indicates a non-detect analyte value

Q40		Shallow UGR Wells															
Well ID		B3-MW31-UGR				B3-MW32-UGR				B3-MW33-UGR				B3-MW34-UGR			
Sample Date		4/18/2016		12/7/2016		4/18/2016		12/7/2016		4/18/2016		12/7/2016		4/18/2016		12/7/2016	
Compound	Units	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag	Value	Flag
Total Organic Carbon	mg/L	2.0		1.8		5.8		16		1.9		5.9	F	4.2		4.2	
Methane	µg/L	24		4.2		3.6		9.2		2.9		285		0		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	67,200		67,000		60,200		39,300		58,200		53,600		86,500		116,000	
Sulfate	mg/L	27		19		15		14		18		16		14		19	
Chloride	mg/L	12		11		12		11		12		13		20		17	
Ferrous Iron	mg/L	1.6		0.81	F	0.24	F	0.43	F	0.68	F	0		0.63	F	2.4	
Manganese	µg/L	59		86		17		81		557		409		424		182	
Sulfide	mg/L	0		0		0		0		0		0		0		0	
Total Dissolved Solids	mg/L	431		430		401		405		390		421		440		607	
Benzene	µg/L	0		0		0		0		0		0		0		0	
Bromodichloromethane	µg/L	0		0		0		0		0		0		0		0	
Bromoform	µg/L	0		0		0		0		0		0		0		0	
Chloroform	µg/L	0		0		0		0		0		0		0		0	
Dibromochloromethane	µg/L	0		0		0		0		0		0		0		0	
Dichlorodifluoromethane	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, 1,1-	µg/L	0		0		0		0		0		0		0		0	
Dichloroethene, cis-1,2-	µg/L	32		32		36		30		86		105		41		11	
Dichloroethene, trans-1,2-	µg/L	1.7		1.1		0.61		0.39	F	1.7		1.3		1.7		0	
Methylene chloride	µg/L	0		0		0		0		0		0		0		0	
Naphthalene	µg/L	0		0		0		0		0		0		0		0	
Tetrachloroethene	µg/L	1.4	F	3.5		5.1		3.5		5.9		7.9		0		0	
Toluene	µg/L	0		0		0		0		0		0		0		0	
Trichloroethene	µg/L	2.8		7.7		7.2		2.6		15		10		0.74	F	1.4	
Vinyl chloride	µg/L	2.4		0.63	F	2.1		2.8		11		12		14		0.46	F
Arsenic	µg/L	0		0		3.5	F	5.3	F	1.1	F	4.3	F	1.8	F	14	F

Note: 0 sample indicates a non-detect analyte value